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REPORT

on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014 - 2020)
(COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Committee on Industry, Research and Energy

Rapporteur: Maria Da Graça Carvalho

Symbols for procedures

*	Consultation procedure
***	Consent procedure
***I	Ordinary legislative procedure (first reading)
***II	Ordinary legislative procedure (second reading)
***III	Ordinary legislative procedure (third reading)

(The type of procedure depends on the legal basis proposed by the draft act.)

Amendments to a draft act

In amendments by Parliament, amendments to draft acts are highlighted in ***bold italics***. Highlighting in *normal italics* is an indication for the relevant departments showing parts of the draft act which may require correction when the final text is prepared – for instance, obvious errors or omissions in a language version. Suggested corrections of this kind are subject to the agreement of the departments concerned.

The heading for any amendment to an existing act that the draft act seeks to amend includes a third line identifying the existing act and a fourth line identifying the provision in that act that Parliament wishes to amend. Passages in an existing act that Parliament wishes to amend, but that the draft act has left unchanged, are highlighted in **bold**. Any deletions that Parliament wishes to make in such passages are indicated thus: **[...]**.

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DRAFT EUROPEAN PARLIAMENT LEGISLATIVE RESOLUTION

on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
(COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

(Special legislative procedure – consultation)

The European Parliament,

– having regard to the Commission proposal to the Council (COM(2011)0811),

– having regard to Article 182(4) of the Treaty on the Functioning of the European Union , pursuant to which the Council consulted Parliament (C7-0509/2011),

– having regard to Rule 55 of its Rules of Procedure,

– having regard to the report of the Committee on Industry, Research and Energy and the opinions of the Committee on Foreign Affairs, the Committee on the Environment, Public Health and Food Safety, the Committee on Agriculture, the Committee on Culture and Education and the Committee on Legal Affairs (A7-0002/2013),

1. Approves the Commission proposal as amended;

2. Calls on the Commission to alter its proposal accordingly, in accordance with Article 293(2) of the Treaty on the Functioning of the European Union;

3. Calls on the Council to notify Parliament if it intends to depart from the text approved by Parliament;

4. Asks the Council to consult Parliament again if it intends to substantially amend the Commission proposal;

5. Instructs its President to forward its position to the Council, the Commission and the national parliaments.

Amendment 1
Proposal for a decision
Recital 1 a (new)

Text proposed by the Commission	*Amendment*
	(1a) The Union has the objective of strengthening its scientific and technological bases by achieving a European Research Area ("ERA") in which researchers, scientific knowledge and technology circulate freely, and encouraging the Union to become more competitive, including in its industry. To pursue those objectives the Union should carry out activities to implement research, technological development and demonstration, promote international cooperation, disseminate and optimise results and stimulate training and mobility.

Amendment 2
Proposal for a decision
Recital 1 b (new)

Text proposed by the Commission	*Amendment*
	(1b) Widening participation should be encouraged in order to exploit the potential of Europe's talent pool and to optimise the economic and social impact of research, something that should contribute to closing the research and innovation gap in Europe.

Amendment 3

Proposal for a decision
Recital 2

Text proposed by the Commission	*Amendment*
(2) Horizon 2020 pursues three priorities,	(2) Horizon 2020 ***will be based on***

namely generating excellent science ('Excellent science'), creating industrial leadership ('Industrial leadership') and tackling societal challenges ('Societal challenges'). Those priorities should be implemented by a specific programme consisting of three Parts on indirect actions and one Part on the direct actions of the Joint Research Centre (JRC).

excellence while it pursues three priorities, namely generating excellent science ('Excellent science'), creating industrial leadership ('Industrial leadership') and tackling societal challenges ('Societal challenges'). Those priorities should be implemented by a specific programme consisting of three Parts on indirect actions and one Part on the direct actions of the Joint Research Centre (JRC).

Amendment 4

Proposal for a decision
Recital 3

Text proposed by the Commission	*Amendment*
(3) While Horizon 2020 sets out the general objective of that framework programme, the priorities and the broad lines of the specific objectives and activities to be carried out, the specific programme should define the specific objectives and the broad lines of the activities which are specific to each of the Parts. The provisions set out in Horizon 2020 on implementation apply fully to this specific programme, including those relating to ethical principles.	(3) While Horizon 2020 sets out the general objective of that framework programme, the priorities and the broad lines of the specific objectives and activities to be carried out, the specific programme should define the specific objectives and the broad lines of the activities which are specific to each of the Parts. The provisions set out in Horizon 2020 on implementation apply fully to this specific programme, including those relating to ethical principles. ***Any documents issued by the Commission concerning Horizon 2020 shall be provided upon request in accessible formats for all, including large print, Braille, easy-to-read text, audio, video, and electronic format.***

Amendment 5
Proposal for a decision
Recital 4

Text proposed by the Commission	*Amendment*
(4) Each Part should be complementary to and implemented in a coherent way with the other Parts of the specific programme.	(4) Each Part should be complementary to and implemented in a coherent way with the other Parts of the specific programme. ***Strategic coordination of research and***

	innovation across the three main priorities for each thematic area (e.g. health) should address fragmentation, improve the use of technological and infrastructural resources, involving the sharing of data in order to accelerate the achievement of results.

Amendment 6

Proposal for a decision
Recital 4 a (new)

Text proposed by the Commission	*Amendment*
	(4a) The gender dimension should be mainstreamed in all three Horizon 2020 priorities, Excellent Science, Industrial Leadership and Societal Changes; it should also be reflected in all fundamental research and actions, as well as in the fair allocation of Union funding to both male and female researchers by means of appropriate gender indicators.

Amendment 7
Proposal for a decision
Recital 5

Text proposed by the Commission	*Amendment*
(5) There is a critical need to reinforce and extend the excellence of the Union's science base and ensure a supply of world class research and talent to secure Europe's long term competitiveness and well-being. part I 'Excellent science' should support the activities of the European Research Council on frontier research, future and emerging technologies, Marie ***Curie*** Actions and European research infrastructures. These activites should aim at building competence in the long term, focusing strongly on the next-generation of science, systems and researchers, and providing support for emerging talent from across the Union and from associated	(5) There is a critical need to reinforce and extend the excellence of the Union's science base and ensure a supply of world class research and talent to secure Europe's long term competitiveness and well-being. part I 'Excellent science' should support the activities of the European Research Council on frontier research, future and emerging technologies, Marie ***Skłodowska-Curie*** Actions and European research infrastructures. These activites should aim at building competence in the long term, focusing strongly on the next-generation of science, systems and researchers, and providing support for emerging talent from across the Union and from associated

countries. Union activities to support excellent science should help consolidate the European Research Area and make the Union's science system more competitive and attractive on a global scale.	countries. Union activities to support excellent science should help consolidate the European Research Area and make the Union's science system more competitive and attractive on a global scale.

Justification

Horizontal Amendment: each time that the text reads "Marie Curie" should be replaced by "Marie Skłodowska-Curie" throughout all the text.

Amendment 8

Proposal for a decision
Recital 5 a (new)

Text proposed by the Commission	*Amendment*
	(5a) Horizon 2020 should develop synergies with other Union and Member States policies, especially in education, in order to render the professions of researcher and innovator as attractive, high-status career options for talented young Europeans and for attracting the best talent from third countries. In order to prepare the next generation of researchers science, technology, engineering, and mathematics (STEM) education should be promoted, and the gender gap in science and innovation should be tackled, as a necessary means for assuring that the Union will be able to have access to the human capital needed for achieving its research and innovation goals.

Amendment 9

Proposal for a decision
Recital 7 a (new)

Text proposed by the Commission	*Amendment*
	(7a) In order to maintain and increase the Union's industrial leadership there is an urgent need to stimulate private sector research and development and innovation

investment, to promote research and innovation with a business driven agenda and accelerate the development of new technologies which will underpin future businesses and economic growth. Therefore it is necessary to strongly stimulate the participation of industry in Horizon 2020, especially in Part II "Industrial leadership" and Part III "Societal challenges".

Amendment 10
Proposal for a decision
Recital 8

Text proposed by the Commission	*Amendment*
(8) In order to maintain and increase the Union's industrial leadership there is an urgent need to stimulate private sector research and development and innovation investment, promote research and innovation with a business driven agenda and accelerate the development of new technologies which will underpin future businesses and economic growth. part II 'Industrial leadership' should support investments in excellent research and innovation in key enabling technologies and other industrial technologies, facilitate access to risk finance for innovative companies and projects, and provide Union wide support for innovation in small and medium-sized enterprises.	(8) In order to maintain and increase the Union's industrial leadership there is an urgent need to stimulate private sector research and development and innovation investment, promote research and innovation with a business driven agenda and accelerate the development of new technologies which will underpin future businesses and economic growth. part II 'Industrial leadership' should support investments in excellent research and innovation in key enabling technologies and other industrial technologies, facilitate access to risk finance for innovative companies and projects, and provide Union wide support for innovation in small and medium-sized enterprises***, primarily by lowering the entry threshold for small and medium-sized enterprises.***

Amendment 11
Proposal for a decision
Recital 9

Text proposed by the Commission	*Amendment*
(9) Space research and innovation, which is a shared competence of the Union, should	(9) Space research and innovation, which is a shared competence of the Union,

be included as a coherent element in Part II **'**Industrial leadership**'** in order to maximize the scientific, economic and societal impact and**,** to ensure an efficient and cost effective implementation.	should be included as a coherent element in Part II 'Industrial leadership' in order to maximize the scientific, economic and societal impact and to ensure an efficient and cost effective implementation ***carried out in coordination with Member States and the European Space Agency (ESA)***.

Amendment 12

Proposal for a decision
Recital 10

Text proposed by the Commission	*Amendment*
(10) Addressing the major societal challenges identified in the Europe 20207 strategy requires major investments in research and innovation to develop and deploy novel and breakthrough solutions that have the necessary scale and scope. These challenges also represent major economic opportunities for innovative companies and therefore contribute to the Union's competitiveness and employment.	(10) Addressing the major societal challenges identified in the Europe 20207 strategy requires major investments in research and innovation to develop and deploy novel and breakthrough solutions that have the necessary scale and scope***, including, for example, the implementation of new research funding tools, such as innovation awards, especially when the markets fail to function***. These challenges also represent major economic opportunities for innovative companies and therefore contribute to the Union's competitiveness and employment.

Amendment 13
Proposal for a decision
Recital 11

Text proposed by the Commission	*Amendment*
(11) Part III 'Societal challenges' should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different	(11) Part III 'Societal challenges' should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different

fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation ***with an emphasis on innovation-related*** activities such as piloting, demonstration***, test-beds***, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. The activities should support ***directly*** the corresponding sectoral policy competences at Union level. All challenges should contribute to the overarching objective of sustainable development.	fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation activities such as ***basic and applied research, development,*** piloting, demonstration, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. The activities should ***directly*** support the corresponding sectoral policy competences at Union level ***and Union industrial sector competitiveness at a global level***. All challenges should contribute to the overarching objective of sustainable development ***and to the development of safe and innovative societies and to full participation of researchers and engineers everywhere in the Union***.

Amendment 14

Proposal for a decision
Recital 11 a (new)

Text proposed by the Commission	*Amendment*
	(11a) International cooperation is essential to achieve the stated aims of all parts of the specific programme, and international cooperation projects targeted at countries or groups of countries on horizontal or priority issues should be implemented under each part.

Justification

International cooperation projects, of whatever type affect all parts of the specific programme, notwithstanding security aspects. They cannot be limited to horizontal action to address the 'societal challenge': health, demographic change and wellbeing.

Amendment 15

Proposal for a decision
Recital 11 b (new)

Text proposed by the Commission	*Amendment*
	(11b) Horizon 2020 should also promote multi-disciplinary approaches to innovation including development of non-technological solutions, organisational approaches, new business models, systems innovation and public sector innovations, as a necessary complement to technologically focused innovation activities.

Amendment 16
Proposal for a decision
Recital 12

Text proposed by the Commission	*Amendment*
(12) As an integral part of Horizon 2020, the Joint Research Centre (JRC) should continue to provide independent customer-driven scientific and technical support for the formulation, development, implementation and monitoring of Union policies. In order to achieve its mission the Joint Research Centre should carry out research of the highest quality. In carrying out the direct actions in accordance with its mission, the Joint Research Centre should place particular emphasis on areas of key concern for the Union, namely smart, inclusive and sustainable growth, security and citizenship and Global Europe.	(12) As an integral part of Horizon 2020, the Joint Research Centre (JRC) should continue to provide independent customer-driven scientific and technical support for the formulation, development, implementation and monitoring of Union policies. ***JRC should also assist national, regional and local decision making with the latest research and innovation outcomes.*** In order to achieve its mission the Joint Research Centre should carry out research of the highest quality. In carrying out the direct actions in accordance with its mission, the Joint Research Centre should place particular emphasis on areas of key concern for the Union, namely smart, inclusive and sustainable growth, security and citizenship and Global Europe.

Amendment 17

Proposal for a decision
Recital 13

Text proposed by the Commission	*Amendment*
(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the Joint Research Centre ***and Union*** policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments ***and*** aim to achieve scientific excellence.	(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the ***Union and*** Joint Research Centre policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments, aim to achieve scientific excellence ***and ensure dissemination in the cultural, communication and education sectors***.

Justification

Wrong order. In the proposed text the policies of the JRC come before the political responsibilities of the Union.

Amendment 18

Proposal for a decision
Recital 15

Text proposed by the Commission	*Amendment*
(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the ***implementation*** of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, industry, public health, consumer protection, employment and social ***policy***, energy, transport, environment, climate action, security, marine and fisheries, development cooperation and enlargement and neighbourhood policy.	(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the ***realisation*** of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, ***culture and the arts,*** industry, public health, consumer protection, employment and social ***policies***, ***gender issues, sport***, energy, transport, environment, climate action, security, marine and fisheries, ***cultural heritage,*** development cooperation and enlargement and neighbourhood policy.

Amendment 19
Proposal for a decision
Recital 15 a (new)

Text proposed by the Commission	*Amendment*
	(15a) Horizon 2020, in which excellence is the main driver, should create, by means of the stairway to excellence, greater synergy, complementarity and interoperability with the structural funds, whose main driver is capacity building and smart specialisation. In this respect bridges should be built in both directions linking the two policies. This articulation should take into account of the specific characteristics of the regions referred to in Articles 174, 349 and 355(1) TFEU.

Amendment 20
Proposal for a decision
Article 3 – paragraph 1 – subparagraph 1 – points c and d

Text proposed by the Commission	*Amendment*
(c) strengthening skills, training and career development, through the Marie Skłodowska-Curie actions ***('Marie Curie actions')***;	(c) strengthening skills, training and career development, through the Marie Skłodowska-Curie actions;
(d) strengthening European research infrastructures, including e-infrastructures	(d) strengthening European research infrastructures, including e-infrastructures;
	(da) spreading excellence and widening participation;

Amendment 21
Proposal for a decision
Article 3 – paragraph 3

Text proposed by the Commission	*Amendment*
3. Part III ‘Societal challenges’ shall contribute to the priority ‘Societal challenges’ set out in Article 5(2)(c) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing research, technological development, demonstration and innovation actions which contribute to the following specific objectives:	3. Part III 'Societal challenges' shall contribute to the priority 'Societal challenges' set out in Article 5(2)(c) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing ***participatory and transdisciplinary*** research, technological development, demonstration and innovation actions***, including socio-economic issues, social innovation and promoting research with and for society. Those actions shall*** contribute to the following specific objectives:
(a) improving the lifelong health and wellbeing;	(a) improving the lifelong health and wellbeing ***and improving solutions for maintaining the autonomy of ageing persons***;
(b) securing sufficient supplies of safe and high quality food and other bio-based products, by developing productive and resource-efficient primary production systems, fostering related ecosystem services, along side competitive and low carbon supply chains;	(b) securing sufficient supplies of safe and high quality food***, safeguarding quality agriculture*** and ***securing sufficient supplies of*** other bio-based products, by developing ***long-term*** productive and resource-efficient primary production systems, fostering related ecosystem services, ***reinforcing and nourishing the resource base,*** along side competitive and ***sustainable*** supply chains;
(c) making the transition to ***a reliable***, sustainable and competitive energy system, in the face of increasing resource scarcity, increasing energy needs and climate change;	(c) making the transition to ***an efficient***, sustainable***, safe*** and competitive energy system, in the face of increasing resource scarcity, increasing energy needs and climate change;
(d) achieving a European transport system that is resource-efficient, environmentally-friendly, safe and seamless for the benefit of citizens, the economy and society;	(d) achieving a European transport system that is resource-efficient, environmentally-friendly, safe***, reliable*** and seamless for the benefit of ***European*** citizens, the economy and society;
(e) achieving a resource-efficient and climate change ***resilient economy*** and a sustainable supply of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;	(e) achieving a resource-efficient***, resource-conserving economy*** and ***accelerating*** climate change ***mitigation, considering its impacts on ecosystems, on the structure and reduction of biodiversity and on natural resource management*** and a sustainable supply of raw materials, in

	order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;
(f) fostering inclusive, innovative and ***secure*** European societies in a context of unprecedented transformations and growing global interdependencies***.***	(f) fostering inclusive, innovative and ***reflective*** European societies in a context of unprecedented transformations and growing global interdependencies***;***
	(fa) protecting the freedom and security ofEurope and its citizens.

Amendment 22
Proposal for a decision
Article 3 – paragraph 5 – subparagraph 1

Text proposed by the Commission	*Amendment*
5. The specific programme shall be assessed in relation to results and impact as measured against performance indicators, including, where appropriate, publications in high impact journals, the circulation of researchers, the accessibility of research infrastructures, investments mobilised via debt financing and venture capital, SMEs introducing innovations new to the company or the market, references to relevant research activities in policy documents as well as occurences of specific impacts on policies.	5. The specific programme shall be assessed in relation to results and impact as measured against ***general and specific*** performance indicators, including, where appropriate, publications in high impact journals, ***creation of patents and intellectual property rights (IPR),*** the circulation of researchers, the accessibility of research infrastructures, investments mobilised via debt financing and venture capital, ***creation of start-ups and spin-offs,*** SMEs introducing innovations new to the company or the market, references to relevant research activities in policy documents as well as occurences of specific impacts on policies ***and the implementation of research results in practice***.
	Those performance indicators, across all programmes of Horizon 2020, shall be published at least once a year and shall be constantly available to Union citizens through a public website. Detailed comparisons in the research and innovation output of Horizon 2020 with the major global competitors of the Union will be periodically published.

Amendment 23
Proposal for a decision
Article 3 – paragraph 5 – subparagraph 2

Text proposed by the Commission	*Amendment*
Further detail on the key performance indicators which correspond to the specific objectives set out in paragraphs 1 to 4 of this Article are set out in Annex II.	Further detail on the key performance indicators which correspond to the specific objectives set out in paragraphs 1 to 4 of this Article are set out in Annex II. ***The performance indicators for assessing progress against Horizon 2020 general objectives are set out in Annex I of Regulation (EU) No XX/XX [Horizon 2020].***

Amendment 24
Proposal for a decision
Article 4 – paragraphs 2and 3

Text proposed by the Commission	*Amendment*
2. The amount referred to in paragraph 1 shall be distributed among the four Parts set out in Article 2(2) of this Decision in accordance with ***Article*** 6(2) of Regulation (EU) No XX/2012 [Horizon 2020]. The indicative budgetary breakdown for the specific objectives set out in Article 3 of this Decision and the maximum overall amount of the contribution to the actions of the Joint Research Centre are set out in Annex II to Regulation (EU) No XX/2012 [Horizon 2020].	2. The amount referred to in paragraph 1 shall be distributed among the four Parts set out in Article 2(2) of this Decision in accordance with ***Articles*** 6(2) ***and 6(4)*** of Regulation (EU) No XX/2012 [Horizon 2020]. The indicative budgetary breakdown for the specific objectives set out in Article 3 of this Decision and the maximum overall amount of the contribution to the actions of the Joint Research Centre are set out in Annex II to Regulation (EU) No XX/2012 [Horizon 2020].
3. ***No more than 6 % of the amounts referred to in Article 6(2) of Regulation (EU) No XX/2012 [Horizon 2020] for the Parts I, II and III of the specific programme shall be for the Commission's administrative expenditure***.	3. ***The amounts for the Commission's administrative expenditure shall come from heading 5 of the Multiannual Financial Framework.***

Amendment 25
Proposal for a decision
Article 5 – paragraph 2

Text proposed by the Commission	*Amendment*
2. The Commission shall adopt common or separate work programmes for the implementation of the Parts I, II and III of this specific programme referred to in points (a), (b) and (c) of Article 2(2), except for the implementation of the actions under the specific objective 'Strengthening Europe's science base in frontier research'. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 9(2).	2. The Commission shall adopt common or separate work programmes for the implementation of the Parts I, II and III of this specific programme referred to in points (a), (b) and (c) of Article 2(2), except for the implementation of the actions under the specific objective 'Strengthening Europe's science base in frontier research'. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 9(2). ***The Commission shall ensure effective coordination between the three main priorities of Horizon 2020.***

Amendment 26

Proposal for a decision
Article 5 – paragraph 5

Text proposed by the Commission	*Amendment*
5. The work programmes shall take account of the state of science, technology and, innovation at national, Union and international level and of relevant policy, market and societal developments. They shall contain information on coordination with research and innovation activities carried out by Member States, including in areas where there are joint programming initiatives. They shall be updated where appropriate.	5. The work programmes shall take account of the state of science, technology and, innovation at national, Union and international level and of relevant policy, market and societal developments. They shall contain information on coordination with research and innovation activities carried out by Member States ***(including their regions)***, including in areas where there are joint programming initiatives. They shall be updated where appropriate.

Amendment 27
Proposal for a decision
Article 5 – paragraphs 5 a (new)

Text proposed by the Commission	*Amendment*
	5a. Coordination shall address fragmentation and improve the use of technological and infrastructural resources by the entire research community related to each thematic area. Strategic actions and scientific coordination shall ensure expert input on policy from the outset, advance innovation and competitiveness by understanding the complexity of the innovation cycle, and encouraging participation from more researchers across borders. Strategic research and innovation coordination based on strategic scientific panels shall be established based on need and demand.
	When drafting the work programmes, the Commission shall consult those strategic scientific panels as well as other stakeholders using existing instruments whenever relevant, such as European Innovation Partnerships, European Technology Platforms and Joint Technology Initiatives.

Amendment 28
Proposal for a decision
Article 5 – paragraph 6 – subparagraph 1

Text proposed by the Commission	*Amendment*
6. The work programmes for the implementation of the Parts I, II and III referred to in points (a), (b) and (c) of Article 2(2) shall set out the objectives pursued, the expected results, the method of implementation and their total amount, including indicative information on the amount of climate related expenditure, where appropriate. They shall also contain a description of the actions to be financed, an indication of the amount allocated to each action, an indicative implementation	6. The work programmes for the implementation of the Parts I, II and III referred to in points (a), (b) and (c) of Article 2(2) shall set out the objectives pursued, the expected results, the method of implementation and their total amount, including indicative information on the amount of climate related expenditure, where appropriate. They shall also contain a description of the actions to be financed, an indication of the amount allocated to each action, an indicator of the Technology

timetable, as well as a multi-annual approach and strategic orientations for the following years of implementation. They shall include for grants the priorities, the ***essential*** evaluation criteria and the maximum rate of co-financing. They shall allow for bottom-up approaches that address the objectives in innovative ways.	Readiness Level (***TRL) of the action,*** an indicative implementation timetable, as well as a multi-annual approach and strategic orientations for the following years of implementation. They shall include for grants the priorities, the evaluation criteria and the maximum rate of co-financing. They shall allow for ***strategic top-down as well as*** bottom-up approaches, ***as appropriate, in all the three priorities,*** that address the objectives in innovative ways.

Justification

The Commission should include an indicator of the Technology Readiness Level ("TRL") scale, established by NASA but in wide use in R&D policy departments in governments around the world, in actions it calls for in its work programmes.

While a loosely coordinated 'bottom-up' approach is quite appropriate for some areas of research, others require big-picture, strategic thinking and tight, 'top-down' coordination. The increased emphasis in Horizon 2020 on systems biology and similar research approaches requires that provision be made for top-down frameworks.

Amendment 29

Proposal for a decision
Article 5 – paragraph 6 – subparagraph 1 a (new)

Text proposed by the Commission	*Amendment*
	Instruments for the connection between Research, Innovation and the Smart Specialisation Strategies shall be implemented both in Horizon 2020 and the Structural Funds in order to create objective indicators for the stairway of excellence and building the ERA.

Amendment 30

Proposal for a decision
Article 5 – paragraph 6 – subparagraph 1 b (new)

Text proposed by the Commission	*Amendment*
	The work programmes shall include a balanced number of small (focused), medium and large (integrative) projects. Small scale projects can be an effective way to promote the participation of SMEs, but should not be exclusive to SMEs.

Amendment 31
Proposal for a decision
Article 5 – paragraph 6 – paragraph 1 c (new)

Text proposed by the Commission	*Amendment*
	Good management of the project shall be rewarded in the analysis of Commission and Agencies staff performances.

Amendment 32

Proposal for a decision
Article 6 – paragraph 3 – subparagraph 2

Text proposed by the Commission	*Amendment*
The President shall be appointed by the Commission following a recruitment process involving ***a*** dedicated search committee, for a term of office limited to four years, renewable once. The recruitment process and the candidate selected shall have the approval of the Scientific Council.	The President shall be appointed by the Commission following a ***transparent*** recruitment process involving ***an independent*** dedicated search committee, for a term of office limited to four years, renewable once. The recruitment process and the candidate selected shall have the approval of the Scientific Council.

Amendment 33

Proposal for a decision
Article 6 – paragraph 3 – subparagraph 3

Text proposed by the Commission	*Amendment*
The President shall chair the Scientific Council ***and*** shall ensure its leadership and liaison with the dedicated implementation	The President shall chair the Scientific Council***,*** shall ensure its leadership and liaison with the dedicated implementation

structure, and represent it in the world of science.	structure, ***shall be accountable to the Commission for its activities*** and ***shall*** represent it in the world of science.

Amendment 34

Proposal for a decision
Article 6 – paragraph 4

Text proposed by the Commission	*Amendment*
4. The European Research Council shall operate according to the principles of scientific excellence, autonomy, efficiency, effectiveness, transparency and accountability. It shall ensure continuity with European Research Council actions conducted under Council Decision 2006/972/EC.	4. The European Research Council shall operate according to the principles of scientific excellence, autonomy, efficiency, effectiveness, transparency and accountability. It ***shall ensure unconscious gender bias is properly tackled in evaluation procedures. It*** shall ensure continuity with European Research Council actions conducted under Council Decision 2006/972/EC.

Amendment 35
Proposal for a decision
Article 7 – paragraph 1

Text proposed by the Commission	*Amendment*
1. The Scientific Council shall be composed of scientists, engineers and scholars of the highest repute and appropriate expertise, ensuring a diversity of research areas and acting in their personal capacity, independent of extraneous interests.	1. The Scientific Council shall be composed of scientists, engineers and scholars of the highest repute and appropriate expertise, ensuring diversity of research areas ***and of researchers***, and acting in their personal capacity, independent of extraneous interests. ***In the composition of the Scientific Council, gender balance shall be sought.***
The members of the Scientific Council shall be appointed by the Commission, following an independent and transparent procedure for their identification agreed with the Scientific Council, including a consultation of the scientific community and a report to the European Parliament and Council.	The members of the Scientific Council shall be appointed by the Commission, following an independent and transparent procedure for their identification agreed with the Scientific Council, including a consultation of the scientific community and a report to the European Parliament and Council.

Amendment 36

Proposal for a decision
Article 7 – paragraph 2 – subparagraph 1 – point e

Text proposed by the Commission	*Amendment*
(e) a code of conduct addressing, inter alia, the avoidance of conflict of interests.	(e) a code of conduct addressing, inter alia, the avoidance of conflict of interests***, and rules governing professional secrecy and communication issues***;

Amendment 37

Proposal for a decision
Article 10 – paragraph 2

Text proposed by the Commission	*Amendment*
2. The power to adopt delegated acts shall be conferred on the Commission for ***an indeterminate*** period of ***time*** from the entry into force of this Decision.	2. The power to adopt delegated acts shall be conferred on the Commission for ***a*** period of ***seven years*** from the entry into force of this Decision. ***The Commission shall draw up a report in respect of the delegation of power not later than nine months before the end of the seven-year period. The delegation of power shall be tacitly extended for periods of an identical duration, unless the European Parliament or the Council opposes such extension not later than three months before the end of each period.***

Amendment 38

Proposal for a decision
Article 10 – paragraph 3

Text proposed by the Commission	*Amendment*
3. The delegation of power may be revoked at any time by the Council. A decision of revocation shall put an end to the	3. The delegation of powers may be revoked at any time by the ***European Parliament or by the*** Council. A decision

delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the Official Journal of the European Union or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.	of revocation shall put an end to the delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the Official Journal of the European Union or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.

Amendment 39

Proposal for a decision
Article 10 – paragraph 4

Text proposed by the Commission	*Amendment*
4. As soon as it adopts a delegated act, the Commission shall notify it to the Council.	4. As soon as it adopts a delegated act, the Commission shall notify it ***simultaneously to the European Parliament and*** to the Council.

Amendment 40

Proposal for a decision
Article 10 – paragraph 5

Text proposed by the Commission	*Amendment*
5. A delegated act shall enter into force only if no objection has been expressed by the Council within a period of two months of notification of that act to the Council or if, before the expiry of that period, the Council has informed the Commission that it will not object. That period shall be extended by one month at the initiative of the Council.	5. A delegated act shall enter into force only if no objection has been expressed by ***the European Parliament or*** the Council within a period of two months of notification of that act to ***the European Parliament and*** the Council or if, before the expiry of that period, ***the European Parliament or*** the Council has informed the Commission that it will not object. That period shall be extended by one month at the initiative of ***the European Parliament or*** the Council.

Amendment 41

Proposal for a decision
Article 10 – paragraph 6

Text proposed by the Commission	*Amendment*
6. The European Parliament shall be informed of the ***adoption of*** delegated acts by the Commission***, or any objection formulated to them,*** or of the revocation of the delegation of powers by the Council.	6. The European Parliament shall be informed of ***any objection formulated by*** the ***Council to the*** delegated acts ***adopted*** by the Commission or of the revocation of the delegation of powers by the Council.

Amendment 42
Proposal for a decision
Annex 1 – point 1 – point 1.1

Text proposed by the Commission	*Amendment*
1.1. General	1.1. General
Regulation (EU) No XX/2012 (Horizon 2020) provides a set of principles in order to foster a programmatic approach whereby activities contribute in a strategic and integrated way to its objectives and in order to ensure strong complementarities with other related policies and programmes across the Union.	Regulation (EU) No XX/2012 (Horizon 2020) provides a set of principles in order to foster a programmatic approach whereby activities contribute in a strategic and integrated way to its objectives and in order to ensure strong complementarities with other related policies and programmes across the Union.
The indirect actions of Horizon 2020 will be implemented through the forms of funding provided for in the Financial Regulation, in particular grants, prizes, procurement and financial instruments. All forms of funding will be used in a flexible manner across all of Horizon 2020‘s general and specific objectives, with their use being determined on the basis of the needs and the specificities of the particular specific objective.	The indirect actions of Horizon 2020 will be implemented through the forms of funding provided for in the Financial Regulation, in particular grants, prizes, procurement and financial instruments. All forms of funding will be used in a flexible manner across all of Horizon 2020′s general and specific objectives, with their use being determined on the basis of the needs and the specificities of the particular specific objective. ***Particular attention will be paid, when financing SMEs, to simplification of procedures for accessing the funds and reporting obligations.***
Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel	Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel

applications, continuous improvement, non-technological ***and social*** innovation. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries.

applications, continuous improvement, non-technological***, social, cultural and institutional*** innovation ***and maximising the dissemination, accessibility, and use of knowledge produced. Innovation in services will also be encouraged by investing in multi-disciplinary competences, creation of capabilities, knowledge and value based on service solutions and intangible contents***. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries. ***The Horizon 2020 structure should be flexible in order to allow joint calls and activities organised by and funded from different challenges and parts of Horizon 2020.***

For the societal challenges and the enabling and industrial technologies in particular, there will be a particular emphasis on supporting activities which operate close to the end-users and the market, such as demonstration, piloting or proof-of-concept. This will also include***, where appropriate,*** activities in support of social innovation, and support to demand side approaches such as pre-standardisation or pre-commercial procurement, procurement of innovative solutions, standardisation and other user-centered measures to help accelerate the deployment and diffusion of innovative products and services into the market. In addition, there will be sufficient room for bottom-up approaches and open, light and fast schemes under each of the challenges and technologies to provide Europe's best researchers, entrepreneurs and enterprises with the opportunity to put forward breakthrough solutions of their choice.

For the societal challenges and the enabling and industrial technologies in particular, there will be a particular emphasis on supporting activities which operate close to the end-users and the market, such as demonstration, piloting or proof-of-concept. This will also include activities in support of social innovation, ***innovation in services*** and support to demand side approaches such as pre-standardisation or pre-commercial procurement, procurement of innovative solutions, standardisation and other user-centered measures to help accelerate the deployment and diffusion of innovative products and services into the market. In addition, there will be sufficient room for bottom-up approaches and open, light and fast schemes under each of the challenges and technologies to provide Europe's best researchers, entrepreneurs and enterprises***, in particular SMEs,*** with the opportunity to put forward breakthrough solutions of their choice.

Within the societal challenges a challenge-based approach should be followed, in which basic science, applied research, knowledge transfer and innovation are equally important and

interlinked components. Furthermore, the right balance should be struck within the societal challenges and the enabling and industrial technologies between smaller and bigger projects, taking into account the specific sector structure, type of activity, technology and research landscape. The specific characteristics of the regions referred to in Articles 174, 349 and 355(1) TFEU will be taken into account in the research priorities.

Detailed priority setting during implementation of Horizon 2020 will entail a strategic approach to programming of research, using modes of governance aligning closely with policy development yet cutting across the boundaries of traditional sectoral policies. This will be based on sound evidence, analysis and foresight, with progress measured against a robust set of performance indicators. This cross-cutting approach to programming and governance will allow effective coordination between all of Horizon 2020‘s specific objectives and will allow to address challenges which cut across them, such as for instance sustainability, climate change or marine sciences and technologies.

Detailed priority setting during implementation of Horizon 2020 will entail a strategic approach to programming of research, using ***transparent and participatory*** modes of governance aligning closely with policy development yet cutting across the boundaries of traditional sectoral policies. ***In order to improve the governance structure, it is necessary to demonstrate to what extent stakeholders and civil society representatives are involved in bottom-up processes, work programmes and decision-making.*** This will be based on sound evidence, analysis and foresight, with progress measured against a robust set of performance indicators. This cross-cutting approach to programming and governance will allow effective coordination between all of Horizon 2020's specific objectives and will allow to address challenges which cut across them, such as for instance sustainability, climate change or marine sciences and technologies.

Horizon 2020 will be targeted towards activities where intervention at Union level brings added value compared to intervention at national or regional level by creating economies of scale and critical mass, reducing fragmentation and ensuring a Union-wide dissemination of results. These activities are mainly transnational, pre-competitive, collaborative projects and they shall comprise the majority of the total

combined budget for the priority "Societal challenges" and the specific objective on "Leadership in enabling and industrial technologies".

Priority setting will equally be based on a wide range of inputs and advice. It will include, where appropriate, groups of independent experts set up specifically to advise on the implementation of Horizon 2020 or any of its specific objectives. These experts group shall show the appropriate level of expertise and knowledge in the covered areas and a variety of professional backgrounds, including industry and civil society involvement.

Priority setting will equally be based on a wide range of inputs and advice. It will include, where appropriate, groups of independent experts set up specifically to advise on the implementation of Horizon 2020 or any of its specific objectives. These experts group shall show the appropriate level of expertise and knowledge in the covered areas and a variety of professional backgrounds, including industry and civil society involvement***, characterised and subject to geographical and gender balance***.

The cross- and transdisciplinary nature of the societal challenges requires the setting up of dedicated strategic scientific panels. Their input, as well as other relevant stakeholders from academia, industry, end-users and civil society of the highest repute and appropriate expertise will be taken into account by the Commission. This will ensure a diversity of all sectors and research areas concerned, in order to monitor the appropriateness and sufficiency of present and planned actions and to be aware of neglected subjects and duplicated efforts. The Commission should seek to use existing instruments for this purpose wherever possible in implementing Horizon 2020, such as, inter-alia, European Innovative Partnerships, European Technology Platforms and Joint Programming Initiatives.

Priority setting may also take into account the strategic research agendas of European Technology Platforms or inputs from the European Innovation Partnerships. Where appropriate, public-public partnerships and public-private partnerships supported through Horizon 2020 will also contribute to the priority setting process and to the implementation, in line with the provisions

Priority setting may also take into account the strategic research agendas of European Technology Platforms or inputs from the European Innovation Partnerships ***and FEST flagships provided these have been drafted in consultation with a wide range of experts and stakeholders***. Where appropriate, public-public partnerships and public-private partnerships supported

laid down in Horizon 2020. Regular interactions with end-users, citizens and civil society organisations, through appropriate methodologies such as consensus conferences, participatory technology assessments or direct engagement in research and innovation processes, will also be a cornerstone of the priority setting process.	through Horizon 2020 will also contribute to the priority setting process and to the implementation, in line with the provisions laid down in Horizon 2020. Regular interactions with end-users, citizens and civil society organisations***, as well as national and regional authorities***, through appropriate methodologies such as consensus conferences, participatory technology assessments or direct engagement in research and innovation processes, will also be a cornerstone of the priority setting process.
As Horizon 2020 is a programme for seven years, the economic, societal and policy context in which it will operate may change significantly during its life-time. Horizon 2020 needs to be able to adapt to these changes. Under each of the specific objectives, there will therefore be the possibility to include support for activities beyond the descriptions set out below, where this is duly justified to address major developments, policy needs or unforeseen events.	As Horizon 2020 is a programme for seven years, the economic, societal and policy context in which it will operate may change significantly during its life-time. Horizon 2020 needs to be able to adapt to these changes. Under each of the specific objectives, there will therefore be the possibility to include support for activities beyond the descriptions set out below, where this is duly justified to address major developments, policy needs or unforeseen events.

Amendment 43
Proposal for a decision
Annex 1 – point 1 – point 1.2

Text proposed by the Commission	*Amendment*
1.2. Social sciences and humanities	1.2. Social sciences and humanities
Social sciences and humanities research will be fully integrated into each of the general objectives of Horizon 2020. This will include ample opportunities for supporting such research through the European Research Council, the Marie Curie actions ***or*** the Research Infrastructures specific objective.	Social sciences and humanities research will be fully integrated***, as a horizontal axis,*** into each of the general objectives of Horizon 2020. ***They shall be fully integrated through their representatives in programme committees and experts' groups in charge of drafting work-programmes and project evaluation, as well as through development of social sciences oriented calls.*** This will include ample opportunities ***and funding*** for supporting such research through the

	European Research Council, the Marie ***Skłodowska-Curie*** actions ***and*** the Research Infrastructures specific objective.
Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas ***and*** promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy.	Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact ***as well as to contribute to solutions through more participative research and to provide the expertise to systematically tackle the gender balance issue***. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural***, mountainous, insular and remote*** areas***, researching*** *and* ***preserving Europe's cultural heritage and richness,*** promoting informed consumer choices, ***creating an inclusive digital ecosystem based on knowledge and information,*** robust decision making on energy policy and in ensuring a consumer friendly European electricity ***and gas*** grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green***, fair*** and sustainable economy.
In addition, the specific objective ***'***Inclusive, innovative and ***secure*** societies***'*** will support social sciences and humanities research into issues of a horizontal nature such as the creation of smart and sustainable growth, social transformations in European societies, social innovation, innovation in the public sector or the position of Europe as a global actor.	In addition, the specific objective ***'Understanding Europe in a changing world:*** inclusive, innovative and ***reflective*** societies*'* will support social sciences and humanities research into issues of a horizontal nature such as the creation of smart and sustainable growth, social ***and cultural*** transformations in European societies***, political inclusion and democratic participation, the role of media and the formation of the public sphere***, social innovation, innovation in the public sector or the position of Europe as a global actor.

Amendment 44
Proposal for a decision
Annex 1 – point 1 – point 1.3

Text proposed by the Commission	*Amendment*
1.3. Small and medium-sized enterprises (SMEs)	1.3. ***Industry and small*** and medium-sized enterprises (SMEs)
	With its potential to make Europe truly competitive, Horizon 2020 will foster a broader participation of private companies in all parts of the programme, particularly within part II ("Industrial Leadership") and part III ("Societal Challenges"). Collaboration between academia and industry a driving force for innovation will be strengthened in order to unlock full dynamic interaction between basic research, applied research and development and demonstration activities.
	In accordance with Article 18a of Horizon 2020, a Fast Track to Innovation within the specific objective 'Leadership in enabling and industrial technologies' and Part III 'Societal challenges' will provide a fast lane for projects that focus on bringing innovative ideas to the market. While being open to all types of participants, the Fast Track to Innovation is expected to attract a high number of industry participants to whom time is a crucial factor when turning an innovative idea into business success.
Horizon 2020 will encourage and support the participation of SMEs in an integrated way across all specific objectives.	Horizon 2020 will encourage and support the participation of ***all kind of*** SMEs in an integrated way across all specific objectives.
In accordance with Article 18 of Horizon 2020, dedicated measures as set out in the specific objective **'**Innovation in SMEs**'** (dedicated SME instrument) shall be applied in the specific objective **'**Leadership in enabling and industrial technologies**'** and Part III **'**Societal challenges**'. *This integrated approach is***	In accordance with Article 18 of Horizon 2020, dedicated measures as set out in the specific objective 'Innovation in SMEs' (dedicated SME instrument) shall be applied in the specific objective 'Leadership in enabling and industrial technologies' and Part III 'Societal challenges'***. The dedicated SME***

expected to lead to around 15 % of their total combined ***budgets going*** to SMEs.

instrument will target highly innovative SMEs showing a strong ambition to develop, grow and internationalise, regardless of whether they are high-tech and research-driven or non-research conducting companies, and shall be implemented in a consistent manner and through a single management body. At least 4 % of the Horizon 2020 budget shall be used for the dedicated SME instrument. Furthermore, at least 20 % of the total combined ***budget for the specific objective 'Leadership in enabling and industrial technologies' and the priority "societal challenges" shall go*** to SMEs.

Particular attention shall also be paid to ensure the adequate participation and representation of SMEs in the governing structures of the European Research Areas and in particular of public-private partnerships.

Amendment 45
Proposal for a decision
Annex 1 – point 1 – point 1.4

Text proposed by the Commission	*Amendment*
1.4. Access to risk finance	1.4. Access to risk finance
Horizon 2020 will help companies and other types of organisation gain access to loans, guarantees and equity finance via two facilities.	Horizon 2020 will help companies and other types of organisation gain access to loans, guarantees and equity finance via two facilities.
The debt facility will provide loans to single beneficiaries for investment in research and innovation; guarantees to financial beneficiaries making loans to beneficiaries; combinations of loans and guarantees, and guarantees or counter-guarantees for national ***and regional*** debt-financing schemes. It will include an SME window targeting R&I-driven SMEs with loan amounts that complement finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs.	The debt facility will provide loans to single beneficiaries for investment in research and innovation; guarantees to financial beneficiaries making loans to beneficiaries; combinations of loans and guarantees, and guarantees or counter-guarantees for national***, regional and local*** debt-financing schemes. It will include an SME window targeting R&I-driven SMEs with loan amounts that complement finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs.

The equity facility will provide venture and/or mezzanine capital to individual enterprises in the early stage (start-up window). The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth under the Programme for the Competitiveness of Enterprises and SMEs, including in funds-of-funds.	The equity facility will provide venture and/or mezzanine capital to individual enterprises in the early stage (start-up window) ***as well as knowledge and technology transfer processes at the stages prior to the industry uptake phase (proof-of-concept window)***. The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth under the Programme for the Competitiveness of Enterprises and SMEs, including in funds-of-funds.
These facilities will be central to the specific objective ‘Access to risk finance’ but may, where relevant, also be used across all other specific objectives of Horizon 2020.	These facilities will be central to the specific objective 'Access to risk finance' but may, where relevant, also be used across all other specific objectives of Horizon 2020.
	Every effort will be made to ensure the widest possible participation in the programme, of companies and/or organisations from all Member States and significantly facilitate access to funding. Special attention to regions performing less well on innovation will be paid in accordance with the principle of excellence.
The equity facility and the SME window of the debt facility will be implemented as part of two EU Financial Instruments that provide equity and debt to support SMEs' R&I and growth, in conjunction with the equity and debt facilities under the Programme for the Competitiveness of Enterprises and SMEs.	

Amendment 46
Proposal for a decision
Annex 1 – point 1 – point 1.5

Text proposed by the Commission	*Amendment*
1.5. Communication and dissemination	1.5. Communication and dissemination
A key added value of research and innovation funded at the Union level is the	A key added value of research and innovation funded at the Union level is the

possibility to disseminate and communicate results on a continent wide scale to enhance their impact. Horizon 2020 will therefore include, under all of its specific objectives, dedicated support to dissemination (including through open access to research results), communication and dialogue actions, with a strong emphasis on communicating results to end-users, citizens, civil society organisations, industry and policy makers. To this extent, Horizon 2020 may make use of networks for information transfer***. Communication activities undertaken in the context of Horizon 2020 will also seek to raise public awareness on the importance of research and innovation by means of publications, events, knowledge*** repositories***, databases, websites or a targeted use of social media***.

possibility to disseminate and communicate results on a continent wide scale to enhance their impact ***and to spur social and economic growth***. Horizon 2020 will therefore include, under all of its specific objectives, dedicated support to dissemination (including through open access to research results), communication and dialogue actions, with a strong emphasis on communicating results to end-users, citizens, civil society organisations, industry and policy makers. ***A gender-sensitive communication shall be expected.*** To this extent, Horizon 2020 may make use of networks for information transfer ***and digital*** repositories ***and libraries***.

Additional conditions will be laid down to facilitate the exploitation and dissemination of results concerning technologies with potential for tackling major societal challenges, for example the development into a novel medical technology (e.g. drug, diagnostic or vaccine) or technologies for fighting climate change.

Communication activities undertaken in the context of Horizon 2020 will also seek to raise public awareness on the importance of research and innovation by means of publications, events, knowledge repositories, databases, websites or a targeted use of social media

Communication activities undertaken in the context of Horizon 2020 will also seek to raise public awareness on the importance of research and innovation by means of publications, events, knowledge repositories, databases, websites or a targeted use of social media. ***When a decision to publish is taken, open access to scientific publications resulting from research receiving public funding from Horizon 2020 shall be mandatory and where appropriate fees associated with publishing in open access journals shall be eligible for reimbursement.***

Furthermore, open access to scientific data resulting from publicly funded research under Horizon 2020 shall be promoted, taking into account constraints pertaining to privacy, national security or

intellectual property rights.

Communication will be in the European Union's name. In order to simplify the access to information and to develop an instrument with all the information demanded by the research community and, having regard the need for a transparency, Cordis, as a digital instrument should be revised and reformed in a clearer and flexible way.

Amendment 47
Proposal for a decision
Annex 1 – point 2

Text proposed by the Commission	*Amendment*
2. International Cooperation	2. International Cooperation
International cooperation with partners in third countries is necessary to address effectively many specific objectives defined in Horizon 2020, in particular those relating to Union external policies and international commitments. ***This is the case for all the societal challenges addressed by Horizon 2020, which are global in nature.*** International cooperation is also essential for frontier and basic research in order to capture the benefits from emerging science and technology opportunities. Promoting researchers and innovation staff mobility at an international scale is therefore crucial to enhance this global cooperation. Activities at the international level are equally important to enhance the competitiveness of European industry by promoting the take-up and trade of novel technologies, for instance through the development of worldwide standards and interoperability guidelines, and by promoting the acceptance and deployment of European solutions outside Europe.	International cooperation with partners in third countries is necessary to address effectively many specific objectives defined in Horizon 2020, in particular those relating to Union external policies and international commitments. International cooperation is also essential for frontier and basic research in order to capture the benefits from emerging science and technology opportunities. Promoting researchers and innovation staff mobility at an international scale is therefore crucial to enhance this global cooperation. Activities at the international level are equally important to enhance the competitiveness of European industry by promoting the take-up and trade of novel technologies, for instance through the development of worldwide standards and interoperability guidelines, and by promoting the acceptance and deployment of European solutions outside Europe.
	The three priorities of Horizon 2020 shall

	include an international dimension as international scientific and technological cooperation is a crucial issue for the Union and its partners. The share for the international cooperation activities described shall be at least maintained at the level of the previous Framework Programmes.
The focus of international cooperation in Horizon 2020 will be on cooperation with three major country groupings:	The focus of international cooperation in Horizon 2020 will be on cooperation with three major country groupings: ***industrialised and emerging economies, enlargement and neighbourhood countries and developing countries.***
Where appropriate, Horizon 2020 will promote cooperation at regional or multilateral level. International cooperation in research and innovation is a key aspect of the Union's global commitments and has an important role to play in the Union's partnership with developing countries, such as progressing towards the achievement of the Millennium Development Goals.	Horizon 2020 will promote cooperation at regional or multilateral level. International cooperation in research and innovation is a key aspect of the Union's global commitments and has an important role to play in the Union's partnership with developing countries, such as progressing towards the achievement of the Millennium Development Goals. ***In accordance with Union development policy, targeted programmes should be implemented in conjunction with these countries in sectors which build the foundations for growth and help ensure that it is inclusive, notably social protection, health and education, as well as environmental protection, climate change prevention and adaptation measures.***
Article 21 of Horizon 2020 sets out the general principles for participation of organisations from third countries and international organisations. As research and innovation in general benefit largely from an openness towards third countries, Horizon 2020 will continue with the principle of general openness, while encouraging reciprocal access to third country programmes. ***For a number of areas, however, a more cautious approach may be advisable to safeguard European interest.***	Article 21 of Horizon 2020 sets out the general principles for participation of organisations from third countries and international organisations. As research and innovation in general benefit largely from an openness towards third countries, Horizon 2020 will continue with the principle of general openness, while encouraging reciprocal access to third country programmes.
In addition, a range of targeted actions	Targeted actions will be implemented

will be implemented taking a strategic approach ***to international cooperation*** on the basis of common interest and mutual benefit ***and promoting*** coordination and synergies with Member States activities. This will include a mechanism for supporting joint calls and the possibility of co-funding programmes together with third countries or international organisations.

Examples of areas where such strategic international cooperation may be developed are:

(a) The continuation of the European and Developing Countries Clinical Trials Partnership (EDCTP2) on clinical trials for medical interventions against HIV, malaria and tuberculosis;

(b) Support by way of an annual subscription to the Human Science Frontier Programme (HSFP) to allow non-G7 Member States of the Union to fully benefit from the funding provided by the HSFP;

(c) International consortium on rare diseases, with a number of Union Member States and third countries. The aim of this initiative is to develop by 2020, diagnostic tests for most rare diseases and 200 new therapies for rare diseases;

(d) Support to the activities of the International Knowledge-Based Bio-Economy Forum and the EU-US Task Force on Biotechnology Research as well as collaborative links with relevant international organisations and initiatives (such as global research alliances on agricultural greenhouse gases and on animal health) ;

(e) Contribution to multilateral processes and initiatives, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Platform on Biodiversity and Ecosystem

taking a strategic approach on the basis of common interest and mutual benefit**.** Coordination and synergies with Member States' activities ***will be sought***. This will include a mechanism for supporting joint calls and the possibility of co-funding programmes together with third countries or international organisations.

Examples of areas where such strategic international cooperation may be developed are:

(a) The continuation ***and geographical expansion to other developing regions*** of the European and Developing Countries Clinical Trials Partnership (EDCTP2) on clinical trials ***from Phase I-IV*** for medical interventions against HIV, malaria and tuberculosis ***and neglected diseases***;

(b) Support by way of an annual subscription to the Human Science Frontier Programme (HSFP) to allow non-G7 Member States of the Union to fully benefit from the funding provided by the HSFP;

(c) International consortium on rare diseases, with a number of Union Member States and third countries. The aim of this initiative is to develop by 2020, diagnostic tests for most rare diseases and 200 new therapies for rare diseases;

(d) Support to the activities of the International Knowledge-Based Bio-Economy Forum and the EU-US Task Force on Biotechnology Research as well as collaborative links with relevant international organisations and initiatives (such as global research alliances on agricultural greenhouse gases and on animal health);

(e) Contribution to multilateral processes and initiatives, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Platform on Biodiversity and Ecosystem

Services (IPBES), and the Group on Earth Observations (GEO);	Services (IPBES), and the Group on Earth Observations (GEO);
(f) The Space Dialogues between the Union and the United States of America and Russia, the two major space faring nations, is an extremely valuable one and forms the basis for the establishment of strategic cooperation in space partnerships such as the International Space Station or launchers, and collaboration in cutting edge space RTD projects**.**	(f) The Space Dialogues between the Union and the United States of America and Russia, the two major space faring nations, is an extremely valuable one and forms the basis for the establishment of strategic cooperation in space partnerships such as the International Space Station or launchers, and collaboration in cutting edge space RTD projects
	(fa) The implementing arrangement for cooperative activities between the European Union and the United States of America in the field of Homeland Security/Civil Security/ Research, signed on 18 November 2010;
	(fb) Support research activities in fair, sustainable and secure supply of raw materials ;
	(fc) Cooperation with developing countries, namely from Sub-Saharan Africa, in the field of decentralised energy production for poverty alleviation;
	(fd) Continuation of research collaboration with Brazil on new-generation biofuels.
	Synergies between Horizon 2020 and the European Development Fund should be established in order to maximise the benefits from international cooperation with developing countries, especially in the areas of agriculture, health and energy. European Development Fund could finance the implementation of Horizon 2020 activities and market uptake of research results.

Amendment 48
Proposal for a decision
Annex 1 – point 3

Text proposed by the Commission	*Amendment*
3. Complementarities and cross-cutting actions	3. Complementarities and cross-cutting actions
Horizon 2020 is structured around the objectives defined for its three major parts: generating excellent science, creating industrial leadership and tackling societal challenges. Particular attention will be paid to ensuring adequate coordination between these parts and fully exploiting the synergies generated between all specific objectives to maximise their combined impact on the higher level policy objectives of the Union. The objectives of Horizon 2020 will therefore be addressed through a strong emphasis on finding efficient solutions, going well beyond an approach based simply on traditional scientific and technological disciplines and economic sectors.	Horizon 2020 is structured around the objectives defined for its three major parts: generating excellent science, creating industrial leadership and tackling societal challenges. Particular attention will be paid to ensuring adequate coordination between these parts and fully exploiting the synergies generated between all specific objectives to maximise their combined impact on the higher level policy objectives of the Union. The objectives of Horizon 2020 will therefore be addressed through a strong emphasis on finding efficient solutions, going well beyond an approach based simply on traditional scientific and technological disciplines and economic sectors. ***Special attention should be given to research efforts which one Member State alone cannot undertake or cannot undertake as efficiently as Member States working together and which will directly benefit citizens in the foreseeable future.***
Cross-cutting actions will be promoted between Part I 'Excellent science' and the societal challenges and the enabling and industrial technologies to develop jointly new knowledge, future and emerging technologies, research infrastructures and key competences. Research infrastructures will also be leveraged for broader usage in society, for example in public services, promotion of science, civil security and culture. Furthermore, priority setting during implementation for the direct actions of the Joint Research Centre and the activities of the European Institute of Innovation and Technology (EIT) will be adequately coordinated with the other parts of Horizon 2020.	
Furthermore, in many cases, contributing effectively to the objectives of Europe	Furthermore, in many cases, contributing effectively to the objectives of Europe

2020 and the Innovation Union will require solutions to be developed which are interdisciplinary in nature and therefore cut across multiple specific objectives of Horizon 2020. Particular attention will be given to responsible research and innovation. Gender will be addressed as a cross-cutting issue in order to rectify imbalances between women and men, and to integrate a gender dimension in research and innovation programming and content. Horizon 2020 includes specific provisions to incentivise such cross-cutting actions, including by an efficient bundling of budgets. This includes also for instance the possibility for the societal challenges and enabling and industrial technologies to make use of the provisions for financial instruments and the dedicated SME instrument.

2020 and the Innovation Union will require solutions to be developed which are interdisciplinary in nature and therefore cut across multiple specific objectives of Horizon 2020. Particular attention will be given to responsible research and innovation. Gender will be addressed as a cross-cutting issue in order to rectify imbalances between women and men, and to integrate a gender dimension in ***the*** research and innovation programming and content. Horizon 2020 includes specific provisions to incentivise such cross-cutting actions, including by an efficient bundling of budgets. This includes also for instance the possibility for the societal challenges and enabling and industrial technologies to make use of the provisions for financial instruments and the dedicated SME instrument.

In order to reward the best Horizon 2020 beneficiaries and best performing Horizon 2020 projects, symbolic prizes will be given for each thematic area across all pillars.

Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems, mainstreaming of climate actions, nanomedicine, advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in

Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs ***and a fair economy***. Examples of where such interactions may be developed are: the domain of eHealth, ***cyber security,*** smart grids, ***energy storage,*** intelligent transport systems, mainstreaming of climate actions***,*** ***gender***, nanomedicine, ***genetic technology, testing methods that are more predictive and more relevant to human beings, risk assessment, medical research,*** advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies ***and social innovation***. This will be explicitly taken into account in

many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.

developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned. ***The success of the implementation of necessary changes really depends of the public engagement with Science and Innovation and its benefits.***

The cross-cutting objective of the Societal Challenges is to align the Union's research and innovation instruments to the EU 2020 strategy by ensuring smart, inclusive and sustainable growth. Priorities should be set against the background of addressing the most pressing societal challenges and in the most efficient way. Preference should be given to measures which deliver solutions fast and effectively and which are able to convert research into concrete, measurable results.

Smart specialisation platforms have a key role to play to this end, particularly in terms of creation and networking, the exchange of information, twinning schemes and support for research and innovation policies, whereby the specific circumstances of the outermost regions must be taken into account.

Particular attention will also be paid to the coordination of activities funded through Horizon 2020 with those supported under other Union funding programmes, such as the Common Agricultural Policy, the Common Fisheries Policy or the Erasmus For All: the Union's programme for Education, Training, Youth and Sport or the Health for Growth Programme. This includes an appropriate articulation with the Cohesion policy funds, where support to capacity building for research and

Particular attention will also be paid to the coordination of activities funded through Horizon 2020 with those supported under other Union funding programmes, such as the Common Agricultural Policy, the Common Fisheries Policy or the Erasmus For All: the Union's programme for Education, Training, Youth and Sport or the Health for Growth Programme***, LIFE programme and New Entrants' Reserve (NER300)***. This includes an appropriate articulation with the Cohesion policy

innovation at regional level may act as a ‘stairway to excellence’, the establishment of regional centres of excellence may help close the innovation divide in Europe or support to large-scale demonstration and pilot line projects may aid in achieving the objective of generating industrial leadership in Europe.

funds, where support to capacity building for research and innovation at regional level may act as a 'stairway to excellence', the establishment of regional centres of excellence may help close the innovation divide in Europe or support to large-scale demonstration and pilot line projects may aid in achieving the objective of generating industrial leadership in Europe.

Structural Funds should be used to their full extent to support capacity building in the regions through dedicated activities aimed at enabling centres of excellence to develop, modernising universities, purchasing of scientific equipment, local technology transfer, supporting start-ups and spin-offs, local interaction between industry and academia, enabling clusters in the priority areas of Horizon 2020 and as a source of small grants given for the preparation of proposals to be submitted to Horizon 2020. This will allow a stairway of excellence to be developed, leading these regions to fully participate in the Horizon 2020, based on quality and excellence.

Downstream from Horizon 2020, the structural funds could be used to finance or co-finance the follow up to Horizon 2020 research projects and to valorise research results in such a way as to encourage easy access to knowledge or to facilitate the deployment of the resulting knowledge in terms of its direct economic or societal use. Building greater synergy, complementarity and interoperability between the instruments of Horizon 2020, in which excellence is the main driver, and the structural funds, by means of the stairway to excellence and whose main driver is capacity building and smart specialisation, providing that bridges are built in both directions linking the two programmes. Horizon 2020 projects should attract additional financing from the Structural Funds, the EIB and from the private sector, something that

	supposes adopting a multi-fund approach. An all-European common fund financed by the structural funds should be set up to promote collaborative European research.

Amendment 49
Proposal for a decision
Annex 1 – point 4

Text proposed by the Commission	*Amendment*
For achieving sustainable growth in Europe, the contribution of public and private players must be optimised. This is essential for consolidating the European Research Area and for delivering on the Innovation Union, the Digital Agenda and other Europe 2020 flagship initiatives. Furthermore, responsible research and innovation requires that best solutions be derived from interactions between partners having various perspectives but common interests.	For achieving sustainable growth in Europe, the contribution of public and private players must be optimised. ***In particular, to meet the Union's 3% target of investments in R&D, private investments in research and innovation need to be substantially increased.*** This is essential for consolidating the European Research Area and for delivering on the Innovation Union, ***a Resource Efficient Europe,*** the Digital Agenda and other Europe 2020 flagship initiatives***. To that end, Union funds should act as much as possible as leverage to further private and public investments***. Furthermore, responsible research and innovation requires that best solutions be derived from interactions between partners having various perspectives but common interests.
Horizon 2020 includes scope and a clear set of criteria for setting up public-public and public-private partnerships. Public-private partnerships can be based on a contractual arrangement between public and private actors and can in limited cases be institutionalised public-private partnerships (such as Joint Technology Initiatives and other Joint Undertakings).	Horizon 2020 includes scope and a clear set of criteria for setting up public-public and public-private partnerships. Public-private partnerships can be based on a contractual arrangement between public and private actors and can in limited cases be institutionalised public-private partnerships (such as Joint Technology Initiatives and other Joint Undertakings).
Existing public-public and public-private partnerships may receive support from Horizon 2020, provided they address Horizon 2020 objectives, they meet the criteria laid down in Horizon 2020 and they have shown to make significant progress under the Seventh Framework	Existing public-public and public-private partnerships may receive support from Horizon 2020, provided they address Horizon 2020 objectives, they meet the criteria laid down in Horizon 2020 and they have shown to make significant progress under the Seventh Framework

Programme for Research, Technological Development and Demonstration (FP7).	Programme for Research, Technological Development and Demonstration (FP7)***, according to the criteria laid down in Article 19(2) of Regulation (EU) No XX/XX [Horizon 2020] and in Article X of Rules of Participation of Horizon 2020. New innovative partnerships, including product development partnerships may also receive support, provided they address Horizon 2020 objectives and meet the criteria***. ***Cooperation with the Eureka initiative network, a natural partner for the design and implementation of innovation components of cohesion policy, notably when setting up regional innovation smart specialisation strategies will contribute to achieve the objectives of Horizon 2020 and thus further consolidate the Innovation Union.***
Initiatives under Article 185 of the Treaty supported under FP6 and/or FP7 for which further support may be provided under the above conditions include: the European and Developing Countries Clinical Trials Partnership (EDCTP), Ambient Assisted Living (AAL), Baltic Sea Research and Development Programme (BONUS), Eurostars and the European Metrology Research Programme. Further support may also be provided to the European Energy Research Alliance (EERA) established under the Strategic Energy Technology Plan (SET Plan).	Initiatives under Article 185 of the Treaty supported under FP6 and/or FP7 for which further support may be provided under the above conditions include: the European and Developing Countries Clinical Trials Partnership (EDCTP), Ambient Assisted Living (AAL), Baltic Sea Research and Development Programme (BONUS), Eurostars and the European Metrology Research Programme. ***Stronger private sector involvement may be provided through European and National Technology Platforms.*** Further support may also be provided to the European Energy Research Alliance (EERA) established under the Strategic Energy Technology Plan (SET Plan).
Joint Undertakings established in FP7 under Article 187 of the Treaty, for which further support may be provided under the above conditions are: the Innovative Medicines Initiative (IMI), Clean Sky, Single European Sky ATM Research (SESAR), Fuel Cells and Hydrogen (FCH), and Embedded computing systems (ARTEMIS) and Nanoelectronics (ENIAC). The latter two may be combined	Joint Undertakings established in FP7 under Article 187 of the Treaty, for which further support may be provided under the above conditions are: the Innovative Medicines Initiative (IMI), Clean Sky, Single European Sky ATM Research (SESAR), Fuel Cells and Hydrogen (FCH), and Embedded computing systems (ARTEMIS) and Nanoelectronics (ENIAC). The latter two may be combined

into a single initiative.

Other public-private partnerships supported under FP7 for which further support may be provided under the above conditions are: Factories of the Future, Energy-efficient Buildings, European Green Cars Initiative, Future Internet. Further support may also be provided to the European Industrial Initiatives (EIIs) established under the SET Plan.

Further public-public partnerships and public-private partnerships may be launched under Horizon 2020 where they meet the defined criteria. This may include partnerships on Information and Communication Technologies in the areas of Photonics and Robotics, on sustainable process industries, on bio-based industries and on security technologies for maritime border surveillance.

into a single initiative.

Other public-private partnerships supported under FP7 for which further support may be provided under the above conditions are: Factories of the Future, Energy-efficient Buildings, European Green Cars Initiative, Future Internet. Further support may also be provided to the European Industrial Initiatives (EIIs) established under the SET Plan.

Further public-public partnerships and public-private partnerships may be launched under Horizon 2020 where they meet the defined criteria ***where the scope of the objectives required justifies such a set-up and where it can be demonstrated that no other forms of partnerships or funding instrument can fulfil the desired objective or generate the necessary leverage and involvement of players***. This may include partnerships on Information and Communication Technologies in the areas of Photonics and Robotics, on sustainable process industries, on bio-based industries***, on telemedecine, home treatment appliances*** and on security technologies for maritime border surveillance ***or critical infrastructure protection***.

Support to all the above-mentioned partnerships will be conditional to a cost-benefit analysis and a thorough assessment of their governance and functioning with regards to criteria of openness, transparency, effectiveness and efficiency. Moreover, the research priorities covered by these partnerships should also be funded through the work programmes in regular calls.

All the above-mentioned partnerships are strongly encouraged to collaborate and explore synergies with the European Institute of Innovation and Technology and its Knowledge Innovation Communities. Collaborations should be explored particularly in the field of

education, in order to expand Europe's talent pool and guarantee the future availability of highly-skilled scientists and knowledge-workers.

Amendment 50
Proposal for a decision
Annex 1 – section 1

Text proposed by the Commission	*Amendment*
Excellent Science	Excellent Science
1. European Research Council	1. European Research Council
The European Research Council (ERC) will promote world class frontier research. Research at and beyond the frontiers of current understanding is both of critical importance to economic and social welfare, and an intrinsically risky venture, progressing on new and most challenging research areas and characterised by an absence of disciplinary boundaries.	The European Research Council (ERC) will promote world class frontier research. Research at and beyond the frontiers of current understanding is both of critical importance to economic and social welfare, and an intrinsically risky venture, progressing on new and most challenging research areas and characterised by an absence of disciplinary boundaries.
In order to stimulate substantial advances at the frontiers of knowledge, the ERC will support individual teams to carry out research in any field of basic scientific and technological research which falls within the scope of Horizon 2020, including engineering, social sciences and the humanities. As appropriate, specific research topics or target groups (e.g. new generation researchers/emerging teams) may be taken into account, following the objectives of the ERC and needs for efficient implementation. Particular attention will be paid to emerging and fast-growing areas at the frontier of knowledge, and at the interface between disciplines.	In order to stimulate substantial advances at the frontiers of knowledge, the ERC will support individual teams to carry out research in any field of basic scientific and technological research which falls within the scope of Horizon 2020, including engineering, social sciences and the humanities. As appropriate, specific research topics or target groups (e.g. new generation researchers/emerging teams***/women***) may be taken into account, following the objectives of the ERC and needs for efficient implementation. Particular attention will be paid to emerging and fast-growing areas at the frontier of knowledge, and at the interface between disciplines.
Independent researchers of any age, including starting researchers making the transition to being independent research leaders in their own right, from any country in the world will be supported to	Independent researchers of any age ***and gender***, including starting researchers making the transition to being independent research leaders in their own right ***and researchers at the stage of consolidation of their own research career***

carry out their research in Europe.

(consolidators), from any country in the world will be supported to carry out their research in Europe. ***Return and reintegration of researchers after the end of an ERC funding period may also be supported, particularly in combination with the 'ERA chair' scheme.***

Research between excellent researchers from different Member-States may also be supported through the ERC Synergy Grant, which has proven to be very attractive for researchers in the previous framework programme.

An ‘investigator-driven’ approach will be followed. This means that the ERC will support projects carried out by researchers on subjects of their choice within the scope of calls for proposals. Proposals will be evaluated on the sole criterion of excellence as judged by peer review, taking account of excellence in new groups, new generation researchers, as well as established teams, and paying particular attention to proposals which are highly pioneering and involve correspondingly high scientific risks.

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The ERC will operate as a science-led funding body consisting of an independent Scientific Council, supported by a lean and cost-effective dedicated implementation structure.

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The ERC Scientific Council will establish the overall scientific strategy and will have full authority over decisions on the type of research to be funded.

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The Scientific Council will establish the work programme to meet the ERC's objectives based on its scientific strategy as below. It will establish the necessary international cooperation initiatives in line with its scientific strategy, including outreach activities to increase the visibility of the ERC for the best researchers from the rest of the world.

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The Scientific Council will continuously

The Scientific Council will continuously

monitor the operation of the ERC and consider how best to achieve its broader objectives. It will develop the ERC's mix of support measures as necessary to respond to emerging needs.

The ERC will aim for excellence in its own operations. The administrative and staffing costs for the ERC relating to the Scientific Council and dedicated implementation structure will be consistent with lean and cost-effective management. Administrative expenditure will be kept to a minimum, consistent with ensuring the resources necessary for world class implementation, in order to maximise funding for frontier research.

ERC awards will be made and grants operated according to simple procedures that maintain the focus on excellence, encourage initiative and combine flexibility with accountability. The ERC will continuously look for further ways to simplify and improve its procedures in order to ensure that these principles are met.

Given the unique structure and role of the ERC as a science-led funding body the implementation and management of the activities of the ERC will be reviewed and evaluated on an ongoing basis with the full involvement of the Scientific Council to assess its achievements and to adjust and improve procedures and structures on the basis of experience.

1.1. The Scientific Council

In order to carry out its tasks, as set out in Article 7, the Scientific Council will:

(1) Scientific strategy:

– establish the overall scientific strategy for the ERC, in the light of scientific opportunities and European scientific needs;

– on a permanent basis, in accordance with the scientific strategy, ensure the

monitor the operation of the ERC and consider how best to achieve its broader objectives. It will develop the ERC's mix of support measures as necessary to respond to emerging needs.

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1.1. The Scientific Council

In order to carry out its tasks, as set out in Article 7, the Scientific Council will:

(1) ***Develop*** scientific strategy:

– establish the overall scientific strategy for the ERC, in the light of scientific opportunities and European scientific needs;

– on a permanent basis, in accordance with the scientific strategy, ensure the

establishment of the work programme and necessary modifications, including calls for proposals and criteria and, as may be required, the definition of specific topics or target groups (e.g. starting /emerging teams);	establishment of the work programme and necessary modifications, including calls for proposals and criteria and, as may be required, the definition of specific topics or target groups (e.g. starting /emerging teams);
(2) Scientific management, monitoring and quality control:	(2) ***carry out*** scientific management, monitoring and quality control:
– as appropriate, from a scientific perspective, establish positions on implementation and management of calls for proposals, evaluation criteria, peer review processes including the selection of experts, the methods for peer review and proposal evaluation and the necessary implementing rules and guidelines, on the basis of which the proposal to be funded will be determined under the supervision of the Scientific Council; as well as any other matter affecting the achievements and impact of the ERC's activities, and the quality of the research carried out, including the principal provisions of the ERC Model Grant Agreement;	– as appropriate, from a scientific perspective, establish positions on implementation and management of calls for proposals, ***develop*** evaluation criteria, peer review processes including the selection of experts, the methods for peer review and proposal evaluation and the necessary implementing rules and guidelines, on the basis of which the proposal to be funded will be determined under the supervision of the Scientific Council; as well as any other matter affecting the achievements and impact of the ERC's activities, and the quality of the research carried out, including the principal provisions of the ERC Model Grant Agreement;
– monitor quality of operations and evaluate implementation and achievements and make recommendations for corrective or future actions.	– monitor quality of operations and evaluate implementation and achievements and make recommendations for corrective or future actions.
(3) Communication and dissemination:	(3) ***organise*** communication and dissemination:
– assure communication with the scientific community and key stakeholders on the ERC's activities and achievements;	– assure communication with the scientific community and key stakeholders***,*** ***including national, regional and local funding agencies*** on the ERC's activities and achievements;
– regularly report to the Commission on its own activities***.***	– regularly report to the Commission ***and the European Parliament*** on its own activities***;***
	- promote the active involvement by researchers from under-represented European regions.
The Scientific Council has full authority over decisions on the type of research to be	The Scientific Council has full authority over decisions on the type of research to be

funded and is the guarantor of the quality of the activity from the scientific perspective.

Where appropriate, the Scientific Council shall consult with the scientific, engineering and scholarly Community.

The members of the Scientific Council shall be compensated for the tasks they perform by means of an honorarium and, where appropriate, reimbursement of travel and subsistence expenses.

The ERC President will reside in Brussels for the duration of the appointment and devote most of his/her time to ERC business. He/she will be remunerated at a level commensurate with the Commission's top management.

The Scientific Council shall elect from amongst its members three Vice-Chairs who shall assist the President in its representation and the organisation of its work. They may also hold the title of Vice-President of the European Research Council.

Support will be provided to the three Vice Chairs to ensure adequate local administrative assistance at their home institutes.

1.2. Dedicated implementation structure

The dedicated implementation structure will be responsible for all aspects of administrative implementation and programme execution, as provided for in the work programme. It will, in particular, implement the evaluation procedures, peer review and selection process in accordance with the strategy established by the Scientific Council and will ensure the financial and scientific management of the grants.

The dedicated implementation structure will support the Scientific Council in the conduct of all of its tasks as set out above, provide access to the necessary documents

funded and is the guarantor of the quality of the activity from the scientific perspective.

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1.2. Dedicated implementation structure

The dedicated implementation structure will be responsible for all aspects of administrative implementation and programme execution, as provided for in the work programme. It will, in particular, implement the evaluation procedures, peer review and selection process in accordance with the strategy established by the Scientific Council and will ensure the financial and scientific management of the grants.

The dedicated implementation structure will support the Scientific Council in the conduct of all of its tasks as set out above, provide access to the necessary documents

and data in its possession, and keep the Scientific Council informed of its activities.

In order to ensure an effective liaison with the dedicated implementation structure on strategy and operational matters, the leadership of the Scientific Council and the Director of the dedicated implementation structure will hold regular coordination meetings.

The management of the ERC will be carried out by staff recruited for that purpose, including where necessary, officials from Union institutions, and will cover only the real administrative needs in order to assure the stability and continuity necessary for an effective administration.

1.3. Role of the Commission

In order to fulfil its responsibilities as set out in Articles 6, 7 and 8 the Commission will:

– ensure the continuity of the dedicated implementation structure and the delegation of tasks and responsibilities to it taking into account the views of the Scientific Council;

– appoint the Director and the Senior Staff of the dedicated implementation structure taking into account the views of the Scientific Council;

– ensure the timely adoption of the work programme, the positions regarding implementing methodology and the necessary implementing rules as provided by the ERC Rules of Submission and the ERC Model Grant Agreement, taking into account the positions of the Scientific Council;

– regularly inform the programme committee on the implementation of the ERC activities.

and data in its possession, and keep the Scientific Council informed of its activities.

In order to ensure an effective liaison with the dedicated implementation structure on strategy and operational matters, the leadership of the Scientific Council and the Director of the dedicated implementation structure will hold regular coordination meetings.

The management of the ERC will be carried out by staff recruited for that purpose, including where necessary, officials from Union institutions, and will cover only the real administrative needs in order to assure the stability and continuity necessary for an effective administration.

1.3. Role of the Commission

In order to fulfil its responsibilities as set out in Articles 6, 7 and 8 the Commission will:

– ensure the continuity of the dedicated implementation structure and the delegation of tasks and responsibilities to it taking into account the views of the Scientific Council;

– appoint ***and dismiss*** the Director and the Senior Staff of the dedicated implementation structure taking into account the views of the Scientific Council;

– ensure the timely adoption of the work programme, the positions regarding implementing methodology and the necessary implementing rules as provided by the ERC Rules of Submission and the ERC Model Grant Agreement, taking into account the positions of the Scientific Council;

– regularly inform the programme committee on the implementation of the ERC activities ***and results, ensuring they are continuously updated according to the latest information***.

Amendment 51
Proposal for a decision
Annex 1 – section 1 – point 2

Text proposed by the Commission	*Amendment*
2. Future and Emerging Technologies	2. Future and Emerging Sciences and Technologies
Future and Emerging Technologies (***FET***) activities will concretise different logics of intervention, from completely open to varying degrees of structuring of topics, communities and funding, structured around three pillars:	Future and Emerging ***Sciences and*** Technologies (***FEST***) activities will concretise different logics of intervention, from completely open to varying degrees of structuring of topics, communities and funding, structured around three pillars:
2.1. ***FET*** Open: fostering novel ideas	2.1. ***FEST*** Open: fostering novel ideas
Supporting a large set of ***embryonic***, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new future technologies. By being explicitly non–topical and non-prescriptive, this activity allows for new ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young researchers and high-tech SMEs is also important for nurturing the scientific and industrial leaders of the future.	Supporting a large set of ***early stage***, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new ***scientific knowledge and*** future technologies. By being explicitly non–topical and non-prescriptive, this activity allows for new ***and transformational*** ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young ***and female*** researchers and high-tech SMEs is also important for nurturing the scientific and industrial leaders of the future.
2.2. ***FET*** Proactive: nurturing emerging themes and communities	2.2. ***FEST*** Proactive: nurturing emerging themes and communities
Novel areas and themes need to be matured, by working towards structuring emerging communities and supporting the design and development of transformative research themes. The main benefits of this	Novel areas and themes need to be matured, by working towards structuring emerging communities and supporting the design and development of transformative research themes. The main benefits of this

structuring yet explorative approach are emerging novel areas that are not yet ready for inclusion in industry research roadmaps, and building up and structuring of research communities around them. It makes the step from collaborations between a small number of researchers, to a cluster of projects that each address aspects of a research theme and exchange results.

2.3. ***FET*** Flagships: tackling grand interdisciplinary science and technology challenges

Research initiatives within this challenge are science-driven, large-scale, multidisciplinary and built around a visionary unifying goal. They tackle grand science and technology challenges requiring cooperation among a range of disciplines, communities and programmes. The scientific advance should provide a strong and broad basis for future technological innovation and economic exploitation, as well as novel benefits for society. The overarching nature and magnitude implies that they can only be realised through a federated and sustained effort (in the order of 10 years duration).

Activities in the three ***FET*** pillars are complemented, by a wide range of networking and community-based activities for creating a fertile and vibrant European base for science-driven research towards future technologies. They will support the future developments of the ***FET*** activities, foster the debate on implications of new technologies, and accelerate impact.

2.4. Specific implementation aspects

A FET Advisory Board will provide stakeholder input on the overall scientific

structuring yet explorative approach are emerging novel areas that are not yet ready for inclusion in industry research roadmaps, and building up and structuring of research communities around them. It makes the step from collaborations between a small number of researchers, to a cluster of projects that each address aspects of a research theme and exchange results.

2.3. ***FEST*** Flagships: tackling grand interdisciplinary science and technology challenges

Research initiatives within this challenge are science-driven, large-scale, multidisciplinary and built around a visionary unifying goal. They tackle grand science and technology challenges requiring cooperation among a range of disciplines, communities and programmes. The scientific advance should provide a strong and broad basis for future technological innovation and economic exploitation, as well as novel benefits for society. ***Activities with a high social impact should be taken into consideration.*** The overarching nature and magnitude implies that they can only be realised through a federated and sustained effort (in the order of 10 years duration).

Activities in the three ***FEST*** pillars are complemented, by a wide range of networking and community-based activities for creating a fertile and vibrant European base for science-driven research towards future technologies. They will support the future developments of the ***FEST*** activities, foster the debate on implications of new technologies, and accelerate impact. ***FEST activities should be open to collaboration with third countries, based on common interest and mutual benefit.***

2.4. Specific implementation aspects

strategy, including the definition of the work programme.

The Commission will be required to consult relevant stakeholders on the FEST programme, including scientists, researchers and engineers of the highest repute and appropriate expertise, ensuring a diversity of research areas and acting in their personal capacity.

This consultation will provide for input, in particular, on:

- the overall scientific strategy for the FEST activities, in the light of scientific and application opportunities and needs at European level

- the establishment of the work programme priorities and necessary modifications, including calls for proposals and criteria preventing overlaps.

- the definition of specific topics for the top-down FEST activities (Proactive and Flagships), including in particular those emerging from the FEST bottom-up activities (Open) as well as from ERC grants funded in the relevant areas.

To minimise duplication of effort, the Commission should seek to use existing instruments for consultation wherever possible in implementing Horizon 2020, such as, inter-alia, European Innovative Partnerships, European Technology Platforms and Joint Programming Initiatives.

Evaluation of all FEST projects will follow exclusively strict criteria of scientific and technological excellence.

The majority of FEST resources will be devoted to bottom-up collaborative frontier research in all fields.

FET will continue to be science-led supported by a light and efficient implementation structure. Simple administrative procedures will be adopted

FEST will continue to be science-led supported by a light and efficient implementation structure. Simple administrative procedures will be adopted

to maintain the focus on excellence in science-driven technological innovation, encourage initiative and combine flexibility with accountability. The most appropriate approaches will be used for probing the ***FET*** research landscape (e.g., for portfolio analysis) and for involving communities of stakeholders (e.g., for consultations). The aim will be for continuous improvement, and the search for further ways to simplify and improve procedures in order to ensure that these principles are met. Assessments of the effectiveness and impact of the ***FET*** activities will be carried out, complementing those at programme level.

Given its mission of fostering science-driven research towards future technologies, ***FET*** strives to bring together actors from science, technology and innovation. ***FET*** should therefore play an active and catalytic role in stimulating new thinking, new practices and new collaborations.

FET-Open groups activities for an entirely bottom up search for promising new ideas. The high-risk implied by each such idea is countered by exploring many of them. Efficiency in terms of time and resources, low opportunity cost for the proposers, and undisputable openness to non-conventional and interdisciplinary ideas are the key characteristics for these activities. Light-and-fast continuously open submission schemes will seek for high-risk promising new research ideas and will include tracks for new and high potential innovation actors such as young researchers and high tech SMEs. It will be complemented with activities to actively stimulate creative out-of-the-box thinking.

FET proactive: this activity regularly opens calls on several high-risk, high-potential innovative themes, funded at such a level that several projects can be selected. These projects will be supported by community building actions that foster

to maintain the focus on excellence in science-driven technological innovation, encourage initiative and combine flexibility with accountability. The most appropriate approaches will be used for probing the ***FEST*** research landscape (e.g., for portfolio analysis) and for involving communities of stakeholders (e.g., for consultations). The aim will be for continuous improvement, and the search for further ways to simplify and improve procedures in order to ensure that these principles are met. Assessments of the effectiveness and impact of the ***FEST*** activities will be carried out, complementing those at programme level.

Given its mission of fostering science-driven research towards future technologies, ***FEST*** strives to bring together actors from science, technology and innovation. ***FEST*** should therefore play an active and catalytic role in stimulating new thinking, new practices and new collaborations.

FEST-Open groups activities for an entirely bottom up search for promising new ideas. The high-risk implied by each such idea is countered by exploring many of them. Efficiency in terms of time and resources, low opportunity cost for the proposers, and undisputable openness to non-conventional and interdisciplinary ideas are the key characteristics for these activities. Light-and-fast continuously open submission schemes will seek for high-risk promising new research ideas and will include tracks for new and high potential innovation actors such as young researchers and high tech SMEs. It will be complemented with activities to actively stimulate creative out-of-the-box thinking.

FEST proactive: this activity regularly opens calls on several high-risk, high-potential innovative themes, funded at such a level that several projects can be selected. These projects will be supported by community building actions that foster

activities such as joint events, development of new curricula and research roadmaps. The selection of themes will take into account excellence in science-driven research towards future technologies, potential for creating a critical mass and impact on science and technology.

A number of large scale focused initiatives (***FET*** Flagships) will be implemented. They will be based on partnerships that enable combining Union, national and private contributions, with a balanced governance that allows programme owners to have appropriate influence, as well as a large degree of autonomy and flexibility in the implementation, enabling the flagship to follow closely a broadly supported research roadmap. The selection will take into account the unifying goal, the impact, integration of stakeholders and resources under a cohesive research roadmap and support from stakeholders and national/regional research programmes

activities such as joint events, development of new curricula and research roadmaps. The selection of themes will take into account excellence in science-driven research towards future technologies, potential for creating a critical mass and impact on science and technology.

A number of large scale focused initiatives (***FEST*** Flagships) will be implemented. They will be based on partnerships that enable combining Union, national and private contributions, with a balanced governance that allows programme owners to have appropriate influence, as well as a large degree of autonomy and flexibility in the implementation, enabling the flagship to follow closely a broadly supported research roadmap. The selection will take into account the unifying goal, the impact, integration of stakeholders and resources under a cohesive research roadmap and support from stakeholders and national/regional research programmes

Amendment 52
Proposal for a decision
Annex 1 – section 1 – point 3

Text proposed by the Commission	*Amendment*
3. Marie Curie Actions	3. Marie ***Skłodowska-Curie*** Actions
3.1. Fostering new skills by means of excellent initial training of researchers	3.1. Fostering new skills by means of excellent initial training of researchers
Europe needs a strong and creative human resource base, mobile across countries and sectors, with the right combination of skills to innovate and to convert knowledge and ideas into products and services for economic and social benefit.	Europe needs a strong and creative human resource base, mobile across countries and sectors, with the right combination of skills to innovate and to convert knowledge and ideas into products and services for economic and social benefit.
This will be achieved in particular by structuring and raising excellence in a substantial share of the high-quality initial training of early stage researchers and	This will be achieved in particular by structuring and raising excellence in a substantial share of the high-quality initial training of early stage researchers and

doctoral candidates throughout Member states and associated countries. By equipping early stage researchers with a diversity of skills that will allow them to face current and future challenges, the next generation of researchers will benefit from enhanced career perspectives in both public and private sectors, thereby enhancing also the attraction of young people to research careers.

doctoral candidates throughout Member states and associated countries. By equipping early stage researchers with a diversity of skills that will allow them to face current and future challenges, the next generation of researchers will benefit from enhanced career perspectives in both public and private sectors, ***including the not-for-profit civil society sector,*** thereby enhancing also the attraction of young people to research careers. ***It is for that reason as well that doctoral candidates must be clearly identified as one of the key target groups of the new programme for education, training, youth, and sport, whose resources must be used in a manner which complements Horizon 2020.***

The action will be implemented through support to Union-wide competitively selected research training programmes implemented by partnerships of universities, research institutions, businesses, SMEs and other socio-economic actors from different countries across Europe and beyond. Single institutions able to provide the same enriching environment will also be supported. ***Flexibility in the implementation of the objectives will have to be ensured in order to address the different needs.*** Typically, successful partnerships will take the form of research training networks or industrial doctorates, while single institutions will usually be involved in innovative doctoral programmes. In this frame, support is foreseen for the best early stage researchers from any country to join these excellent programmes.

The action will be implemented through support to Union-wide competitively selected research training programmes ***allowing researchers to develop their research curriculum,*** implemented by partnerships of universities, research institutions, businesses, SMEs and other socio-economic actors from different countries across Europe and beyond. Single institutions able to provide the same enriching environment will also be supported. Typically, successful partnerships will***, inter alia,*** take the form of research training networks or industrial***, joint and multiple*** doctorates, while single institutions will usually***, but not necessarily,*** be involved in innovative doctoral programmes. In this frame, support is foreseen for the best early stage researchers from any country***, regardless of the gender*** to join these excellent programmes.

These training programmes will address the development and broadening of core research competences, while equipping researchers with a creative mind, an entrepreneurial outlook and innovation skills that will match the future needs of the labour market. The programmes will

These training programmes will address the development and broadening of core research competences, ***allowing researchers to develop their research curriculum,*** while equipping researchers with a creative mind, an entrepreneurial outlook and innovation skills that will

also provide training in transferable competences such as team-work, risk-taking, project management, standardisation, entrepreneurship, ethics, IPR, communication and societal outreach which are essential for the generation, development, commercialisation and diffusion of innovation.	match the future needs of the labour market. The programmes will also provide training in transferable competences such as team-work, risk-taking, project management, standardisation, entrepreneurship, ethics, IPR, communication and societal outreach which are essential for the generation, development, commercialisation and diffusion of innovation.
3.2. Nurturing excellence by means of cross-border and cross-sector mobility	3.2. Nurturing excellence by means of cross-border and cross-sector mobility
Europe has to be attractive for the best researchers, European and non-European. This will be achieved in particular by supporting attractive career opportunities for experienced researchers in both public and private sectors, and encouraging them to move between countries, sectors and disciplines to enhance their creative and innovative potential.	Europe has to be attractive for the best researchers, European and non-European. This will be achieved in particular by supporting attractive career opportunities for ***early stage and*** experienced researchers in both public and private sectors, ***including the non-for-profit civil society sector,*** and encouraging them to move between countries, sectors and disciplines to enhance their creative and innovative potential.
Funding will be given to the best or most promising experienced researchers, regardless of their nationality, who want to develop their skills through a trans-national or international mobility experience. They can be supported along all the different stages of their career, including the most junior ones just after their doctoral degree or equivalent experience. These researchers will receive funding on the condition that they move from one country to another to broaden or deepen their competences in universities, research institutions, businesses, SMEs or other socio-economic actors of their choice, working on research and innovation projects fitting their personal needs and interests. They will also be encouraged to move from public to private sector or vice-versa through the support of temporary postings. Part-time opportunities allowing combined positions in both public and private sectors will also be supported to enhance the transfer of knowledge between sectors and also	Funding will be given to the best or most promising experienced ***and early stage*** researchers, regardless of their nationality ***or gender***, who want to develop their skills through a trans-national or international mobility experience. They can be supported along all the different stages of their career, including the most junior ones just after their doctoral degree or equivalent experience ***and subsequently return to Europe, should they so wish***. These researchers will receive funding on the condition that they move from one country to another to broaden or deepen their competences in universities, research institutions, businesses, SMEs***, civil society organisations, research infrastructures, Knowledge and Innovation Communities of the EIT*** or other socio-economic actors of their choice, working on research and innovation projects fitting their personal needs and interests. ***Funding should also be available to promote researchers' mobility towards institutions in the***

encourage the creation of start-ups. Such tailor-made research opportunities will help promising researchers to become fully independent and to facilitate career moves between public and private sectors.

regions performing less well on innovation. They will also be encouraged to move from public to private sector or vice-versa through the support of temporary postings. Part-time opportunities allowing combined positions in both public and private sectors will also be supported to enhance the transfer of knowledge between sectors and also encourage the creation of start-ups ***and spin-offs***. Such tailor-made research opportunities will help promising researchers to become fully independent and to facilitate career moves between public and private sectors.

In order to fully exploit the existing potential of researchers, possibilities to restart a research career after a break will also be supported.

In order to fully exploit the existing potential of researchers, possibilities to restart a research career after a break will ***be supported. Re-integration of researchers into a longer term research position in Europe, including in the country of origin, after a trans-national/international mobility experiences, will*** also be supported. ***Mobility and opportunities for researchers' career development should be promoted.***

3.3. Stimulating innovation by means of cross-fertilisation of knowledge

3.3. Stimulating innovation by means of cross-fertilisation of knowledge

Societal challenges are becoming more and more global and cross-border and cross-sector collaborations are crucial to successfully face them. Sharing of knowledge and ideas from research to market is therefore vital and can only be achieved through the connection of people. This will be promoted through the support of flexible exchanges of highly skilled research and innovation staff between sectors, countries and disciplines.

Societal challenges are becoming more and more global and cross-border and cross-sector collaborations are crucial to successfully face them. Sharing of knowledge and ideas from research to ***society and to*** market is therefore vital and can only be achieved through the connection of people. This will be promoted through the support of flexible exchanges of highly skilled research and innovation staff between sectors, countries and disciplines.

European funding will support short term exchanges of research and innovation staff within partnerships of universities, research institutions, businesses, SMEs and other socio-economic actors among Europe, as well as between Europe and third countries

European funding will support short term exchanges of research and innovation staff within partnerships of universities, research institutions, businesses, SMEs ***research infrastructures, Knowledge and Innovation Communities of the EIT*** and

to reinforce international cooperation. It will be open to research and innovation staff at all career levels, from the most junior (post-graduate) to the most senior (management), including also administrative and technical staff.

other socio-economic actors among Europe, as well as between Europe and third countries to reinforce international cooperation. ***Specific measures will be taken with a view to strengthening the research capacities of developing countries.*** It will be open to research and innovation staff at all career levels, from the most junior (post-graduate) to the most senior (management), including also administrative and technical staff. ***In this sense, industrial doctoral programmes should be strengthened as an important element to foster an innovative spirit among researchers and create closer links between industry and academia.***

3.4. Increasing structural impact by co-funding the activities

3.4. Increasing structural impact by co-funding the activities

Stimulating regional, national or international programmes to foster excellence and spread best practices of Marie ***Curie*** Actions in terms of European-wide mobility possibilities for researchers training, career development and staff exchange will increase the numerical and structural impact of ***Marie Curie*** Actions. This will also enhance the attractiveness of centres of excellence across Europe.

Stimulating regional, national or international programmes to foster excellence and spread best practices of Marie ***Skłodowska-Curie*** Actions in terms of European-wide mobility possibilities for researchers training, career development and staff exchange will increase the numerical and structural impact of ***Skłodowska-Curie*** Actions. This will also enhance the attractiveness of centres of excellence across Europe.

This will be achieved by co-funding new or existing regional, national, private and international programmes to open-up to and provide for international, intersectoral and interdicisplinary research training, as well as cross-border and cross-sector mobility of researchers and innovation staff at all stages of their career.

This will be achieved by co-funding new or existing regional, national, private and international programmes to open-up to and provide for international, intersectoral and interdicisplinary research training, as well as cross-border and cross-sector mobility of researchers and innovation staff at all stages of their career.

This will allow the exploitation of synergies between Union actions and those at regional and national level, combating fragmentation in terms of objectives, evaluation methods and working conditions of researchers.

This will allow the exploitation of synergies between Union actions and those at regional and national level, combating fragmentation in terms of objectives, evaluation methods and working conditions of researchers.

3.5. Specific support and policy actions

3.5. Specific support and policy actions

To efficiently meet the challenge it will be

To efficiently meet the challenge it will be

essential to monitor progress. The programme will support the development of indicators and the analysis of data related to researchers' mobility, skills and careers with a view to identifying gaps in the Marie ***Curie*** actions and to increasing the impact of these actions. These activities will be implemented seeking synergies and close coordination with the policy support actions on researchers, their employers and funders carried out under ***'Inclusive, innovative and secure societies'***. Specific actions will be funded to support initiatives to raise awareness on the importance of the research career**,** and to disseminate research and innovation results emanating from work supported by Marie ***Curie*** actions.

essential to monitor progress. The programme will support the development of indicators and the analysis of data related to researchers' mobility, skills and careers with a view to identifying gaps ***and barriers*** in the ***Skłodowska-Curie*** actions and to increasing the impact of these actions. These activities will be implemented seeking synergies and close coordination with the policy support actions on researchers, their employers and funders carried out under ***'Science with and for Society'***. Specific actions will be funded to support initiatives to raise awareness on the importance of the research career and to disseminate research and innovation results emanating from work supported by Marie ***Skłodowska-Curie*** actions.

To further increase the impact of the Marie Curie actions, the networking between Marie ***Curie*** researchers (current and past) will be enhanced through a strategy of alumni services. These will range from supporting a forum for contact and exchange between the researchers, providing possibilities for exploring collaborations and job opportunities, to the organisation of joint events and the involvement of the fellows in outreach activities as ambassadors for Marie ***Curie*** actions and for the European Research Area.

To further increase the impact of the Marie Curie actions, the networking between Marie ***Skłodowska-Curie*** researchers (current and past) will be enhanced through a strategy of alumni services. These will range from supporting a forum for contact and exchange between the researchers, providing possibilities for exploring collaborations and job opportunities, to the organisation of joint events and the involvement of the fellows in outreach activities as ambassadors for Marie ***Skłodowska-Curie*** actions and for the European Research Area.

3.6. Specific implementation aspects

3.6. Specific implementation aspects

The Marie ***Curie*** actions will be open to training and career development activities within all domains of research and innovation addressed under the Treaty, from basic research up to market take-up and innovation services. Research and innovation fields as well as sectors will be chosen freely by the applicants.

The Marie ***Skłodowska-Curie*** actions will be open to training and career development activities within all domains of research and innovation addressed under the Treaty, from basic research ***- including in the social sciences and humanities -*** up to market take-up and innovation services. Research and innovation fields as well as sectors will be chosen freely by the applicants.

To benefit from the worldwide knowledge base, the Marie ***Curie*** Actions will be open

To benefit from the worldwide knowledge base, the Marie ***Skłodowska-Curie*** Actions

to researchers and innovation staff, as well as to universities, research institutions, businesses and other socio-economic actors from all countries, including third countries under the conditions defined in Regulation (EU) XX/2012 (Rules for Participation).

Throughout all the activities described above, attention will be paid to encourage a strong participation of enterprises, in particular SMEs, as well as other socio-economic actors for the successful implementation and impact of the Marcie Curie actions. A long-term collaboration between higher education, research organisations and the private sector, taking into account the protection of intellectual property rights, is promoted throughout all the Marie ***Curie*** actions.

The possibility is retained, if specific needs arise, to target certain activities under the programme regarding specific societal challenges, types of research and innovation institutions, or geographical locations in order to respond to the evolution of Europe's requirements in terms of skills, research training, career development and knowledge sharing.

In order to be open to all sources of talent, general measures to overcome any distortions in the access to the grants will be ensured, for example by encouraging equal opportunities in all Marie ***Curie*** actions and by benchmarking gender participation. In addition, the Marie ***Curie*** actions will support researchers to get established on a more stable career path and to ensure that they can achieve an appropriate work/life balance, taking into account their family situation, and to contribute to facilitate resuming a research career after a break. The principles of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers promoting open recruitment

will be open to researchers and innovation staff, as well as to universities, research institutions, businesses and other socio-economic actors from all countries, including third countries under the conditions defined in Regulation (EU) XX/2012 (Rules for Participation).

Throughout all the activities described above, attention will be paid to encourage a strong participation of enterprises, in particular SMEs, ***civil society organisations*** as well as other socio-economic actors for the successful implementation and impact of the Marie ***Skłodowska-Curie*** actions. A long-term collaboration between higher education, research organisations and the private sector, taking into account the protection of intellectual property rights, is promoted throughout all the Marie ***Skłodowska-Curie*** actions.

The possibility is retained, if specific needs arise, to target certain activities under the programme regarding specific societal challenges, types of research and innovation institutions, or geographical locations in order to respond to the evolution of Europe's requirements in terms of skills, research training, career development and knowledge sharing.

In order to be open to all sources of talent, general measures to overcome any distortions in the access to the grants will be ensured, for example by encouraging equal opportunities in all Marie ***Skłodowska-Curie*** actions and by benchmarking gender participation***, the mobility of female researchers and by ensuring there is no discrimination, in particular against gender or against researchers returning to work after a career break***. In addition, the Marie ***Skłodowska-Curie*** actions will support researchers to get established on a more stable career path and to ensure that they can achieve an appropriate work/life balance, taking into account their family

and attractive working conditions will ***have to be endorsed and applied by all the funded participants***.	situation, and to contribute to facilitate resuming a research career after a break. The ***general*** principles of the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers promoting open recruitment and attractive working conditions will ***apply.***
	A participant awarded funding under Marie Skłodowska-Curie Actions should be allowed the option to phase their funding over an additional 12 month period if this is necessary in order to complete their research project.

Amendment 53
Proposal for a decision
Annex 1 – section 1 – point 4

Text proposed by the Commission	*Amendment*
4. Research Infrastructures	4. Research Infrastructures
The activities will aim at developing the European research infrastructures for 2020 and beyond, fostering their innovation potential and human capital and reinforcing European policy. Coordination with the cohesion funding sources will be pursued to ensure synergies and a coherent approach for the development of the research infrastructures.	The activities will aim at developing the European research infrastructures for 2020 and beyond, fostering their innovation potential and human capital and reinforcing European policy. Coordination with the cohesion funding sources will be pursued to ensure synergies and a coherent approach for the development of the research infrastructures.
4.1. Developing the European research infrastructures for 2020 and beyond	4.1. Developing the European research infrastructures for 2020 and beyond
4.1.1. Developing ***new*** world-class ***research*** infrastructures	4.1.1. Developing world-class research infrastructures
The aim is to ensure the implementation, long-term sustainability and efficient operation of the research infrastructures identified by the European Strategy Forum on Research Infrastructures (ESFRI) and other world-class research infrastructures**,** which will help Europe to respond to grand challenges in science, industry and society. This objective will address ***specifically***	The aim is to ensure the implementation, long-term sustainability and efficient operation of the research infrastructures**,** ***namely the infrastructures*** identified by the European Strategy Forum on Research Infrastructures (ESFRI) and other ***existing*** world-class research infrastructures ***based in Europe, including outstanding regional infrastructures of European value*** which

those infrastructures that are setting up or that have set up their governance, e.g. on the basis of the European Research Infrastructure Consortium (ERIC) or any equivalent structure at European or international level.	will help Europe to respond to grand challenges in science, industry and society. ***A balanced distribution of new infrastructures will be taken into account.*** This objective will address those infrastructures that are setting up or that have set up their governance, e.g. on the basis of the European Research Infrastructure Consortium (ERIC) or any equivalent structure at European or international level.
The Union funding will contribute to, as appropriate:	The Union funding will contribute to, as appropriate:
(a) the preparatory phase of future infrastructures (e.g. detailed construction plans, legal arrangements, multiannual planning);	(a) the preparatory phase of future infrastructures (e.g. detailed construction plans, legal arrangements, multiannual planning);
(b) the implementation phase (e.g. R&D and engineering work jointly with industry and users, development of regional partner facilities aiming at a more balanced development of the European Research Area); and/or	(b) the implementation phase (e.g. R&D and engineering work jointly with industry and users, development of regional partner facilities aiming at a more balanced development of the European Research Area); and/or
(c) the operation phase (e.g. access, data handling, outreach, training and international cooperation activities).	(c) the operation phase (e.g. ***European-level coordination activities, transnational*** access, data handling, outreach, training and international cooperation activities).
	(ca) the revamping phase (for example adaptation measures to ensure that existing infrastructures meet strategic needs more effectively).
This activity will also support design studies for new research infrastructures through a bottom-up approach.	This activity will also support design studies for new research infrastructures through a bottom-up approach.
4.1.2. Integrating and opening existing national research infrastructures of pan-European interest	4.1.2. Integrating and opening existing national research infrastructures of pan-European interest
The aim is to open up key national research infrastructures to all European researchers, from both academia and industry, and to ensure their optimal use and joint development.	The aim is to open up key national research infrastructures to all European researchers, from both academia and industry, and to ensure their optimal use and joint development.
The Union will support networks that bring together and integrate, on European scale,	The Union will support networks that bring together and integrate, on European scale,

key national research infrastructures**.**

key national ***fundamental and applied*** research infrastructures***, with particular focus on promoting networking and integration of scientific communities of*** the ***regions performing less well on innovation, through, for instance, a more integrated Research Infrastructure landscape***.

Funding will be provided to support, in particular, the trans-national and virtual access of researchers and the harmonisation and improvement of the services the infrastructures provide. Around one hundred networks of infrastructures in all fields of science and technology would require such support, with up to twenty thousands researchers per year benefitting from access to these facilities.

Funding will be provided to support, in particular, the trans-national and virtual access of researchers and the harmonisation and improvement of the services the infrastructures provide. Around one hundred networks of infrastructures in all fields of science and technology would require such support, with up to twenty thousands researchers per year benefitting from access to these facilities.

4.1.3. Development, deployment and operation of ICT-based e-infrastructures

4.1.3. Development, deployment and operation of ICT-based e-infrastructures

The aim is to achieve by 2020 a single and open European space for online research where researchers enjoy leading-edge, ubiquitous and reliable services for networking and computing, and seamless and open access to e-Science environments and global data resources.

The aim is to achieve by 2020 a single and open European space for online research where researchers enjoy leading-edge, ubiquitous and reliable services for networking and computing, and seamless and open access to e-Science environments and global data resources. ***It is therefore appropriate budget under this specific objective to go towards research and innovation in e-infrastructures.***

To achieve this goal, support will be given to: global research and education networks providing advanced, standardised and scalable inter-domain services on-demand; grid and cloud infrastructures providing virtually unlimited computational and data processing capacity; an ecosystem of supercomputing facilities, advancing towards exa-scale; a software and service infrastructure, e.g. for simulation and visualisation; real-time collaborative tools; and an interoperable, open and trusted scientific data infrastructure.

To achieve this goal, support will be given to: global research and education networks providing advanced, standardised and scalable inter-domain services on-demand; grid and cloud infrastructures providing virtually unlimited computational and data processing capacity; an ecosystem of supercomputing facilities, advancing towards exa-scale; a software and service infrastructure, e.g. for simulation and visualisation; real-time collaborative tools; and an interoperable, open and trusted scientific data infrastructure.

Universal online access by European universities and research institutions to

	the bulk of the world scientific publications will be supported by consolidating a EU e-infrastructure for an Online Open Science Library.
4.2. Fostering the innovation potential of research infrastructures and their human capital	4.2. Fostering the innovation potential of research infrastructures and their human capital
4.2.1. Exploiting the innovation potential of research infrastructures	4.2.1. Exploiting the innovation potential of research infrastructures
The goal is to stimulate innovation both in the infrastructures themselves and in their supplier and user industry.	The goal is to stimulate innovation both in the infrastructures themselves and in their supplier and user industry.
To this end, support will be provided to	To this end, support will be provided to
(a) R&D partnerships with industry to develop Union capacities and industrial supply in high-tech areas such as scientific instrumentation or ICT;	(a) R&D partnerships with industry to develop Union capacities and industrial supply in high-tech areas such as scientific instrumentation or ICT;
(b) pre-commercial procurement by research infrastructure actors to drive forward innovation and act as early adopters of technologies;	(b) pre-commercial procurement by research infrastructure actors to drive forward innovation and act as early adopters of technologies;
(c) stimulate the use of research infrastructures by industry, e.g. as experimental test facilities or knowledge-based centres; and	(c) stimulate the use of research infrastructures by industry, e.g. as experimental test facilities or knowledge-based centres; and
(d) encourage the integration of research infrastructures into local, regional and global innovation ecosystems	(d) encourage the integration of research infrastructures into local, regional and global innovation ecosystems
	(da) foster access to private research infrastructures suitable for public research purposes.
	(db) Support activities enhancing interoperability of research infrastructures including e-infrastructure
The Union actions will also leverage the use of research infrastructures, in particular e-infrastructures, for public services, social innovation, culture and education.	The Union actions will also leverage the use of research infrastructures, in particular e-infrastructures, for public services, social innovation, culture and education.
4.2.2. Strengthening the human capital of research infrastructures	4.2.2. Strengthening the human capital of research infrastructures
The complexity of research infrastructures and the exploitation of their full potential	The complexity of research infrastructures and the exploitation of their full potential

require adequate skills for their managers, engineers and technicians, as well as users.

The Union funding will support the training of staff managing and operating research infrastructures of pan-European interest, the exchange of staff and best practices between facilities, and the adequate supply of human resources in key disciplines, including the emergence of specific education curricula.

4.3. Reinforcing European research infrastructure policy and international cooperation

4.3.1. Reinforcing European policy for research infrastructures

The aims are to exploit synergies between national and Union initiatives by setting up partnerships between relevant policy makers and funding bodies (e.g. ESFRI, e-Infrastructure Reflection Group (e-IRG), EIROforum organisations, national public authorities), to develop complementarities and cooperation between research infrastructures and activities implementing other Union policies (such as regional, cohesion, industrial, health, employment, or development policy), and to ensure coordination between different Union funding sources. Union actions will also support survey, monitoring and assessment of research infrastructures at Union level, as well as relevant policy studies and communication tasks.

4.3.2. Facilitate strategic international cooperation

The aim is to facilitate the development of

require adequate skills for their managers, engineers and technicians, as well as users.

The Union funding will support the ***education and*** training of staff ***using,*** managing and operating research infrastructures of pan-European interest, the exchange of staff and best practices between facilities, ***including a secondment scheme for senior staff and project managers,*** and the adequate supply of human resources in key disciplines, including the emergence of specific education curricula. ***Synergy and coherence with the Marie Sklodowska Curie actions and the Knowledge and Innovation Communities of the EIT shall be encouraged.***

4.3. Reinforcing European research infrastructure policy and international cooperation

4.3.1. Reinforcing European policy for research infrastructures

The aims are to exploit synergies between national and Union initiatives by setting up partnerships between relevant policy makers and funding bodies (e.g. ESFRI, e-Infrastructure Reflection Group (e-IRG), EIROforum organisations, national public authorities), to develop complementarities and cooperation between research infrastructures and activities implementing other Union policies (such as regional, cohesion, industrial, health, employment, ***security*** or development policy), and to ensure coordination between different Union funding sources***. Activities with a high social impact should be taken into consideration***. Union actions will also support survey, monitoring and assessment of research infrastructures at Union level, as well as relevant policy studies and communication tasks.

4.3.2. Facilitate strategic international cooperation

The aim is to facilitate the development of

global research infrastructures i.e. research infrastructures that require funding and agreements on a global scale. The aim is also to facilitate the cooperation of European research infrastructures with their non-European counterparts, ensuring their global interoperability and reach, and to pursue international agreements on the reciprocal use, openness or co-financing of infrastructures. In this respect due account will be taken of the recommendations of the Carnegie Group of Senior Officials on Global Research Infrastructures. Attention will also be given to ensure adequate Union participation in coordination with international bodies such as the UN or the OECD.	global research infrastructures i.e. research infrastructures that require funding and agreements on a global scale. The aim is also to facilitate the cooperation of European research infrastructures with their non-European counterparts, ensuring their global interoperability and reach, and to pursue international agreements on the reciprocal use, openness or co-financing of infrastructures. In this respect due account will be taken of the recommendations of the Carnegie Group of Senior Officials on Global Research Infrastructures. Attention will also be given to ensure adequate Union participation in coordination with international bodies such as the UN or the OECD. ***Research Infrastructure partnerships with developing countries shall also be addressed.***
4.4. Specific implementation aspects	4.4. Specific implementation aspects
During implementation independent expert groups will be consulted, as well as stakeholders and advisory bodies, such as ESFRI and the e-IRG.	During implementation independent expert groups will be consulted, as well as stakeholders and advisory bodies, such as ESFRI and the e-IRG.
The implementation will follow a three-pronged approach: bottom-up where the exact content and partnership of projects are not known; targeted where the specific research infrastructures and/or communities addressed are well-defined; and named beneficiaries, for example where a contribution to operational costs is provided to (a consortium of) infrastructure operator(s).	The implementation will follow a three-pronged approach: bottom-up where the exact content and partnership of projects are not known; targeted where the specific research infrastructures and/or communities addressed are well-defined; and named beneficiaries, for example where a contribution to operational costs is provided to (a consortium of) infrastructure operator(s).
The objectives under the last two activities will be pursued through their own specific actions and, whenever appropriate, through the actions under the first activity.	The objectives under the last two activities will be pursued through their own specific actions and, whenever appropriate, through the actions under the first activity.

Amendment 54

Proposal for a decision

Annex 1 – section 1 – point 4 a (new)

Text proposed by the Commission	*Amendment*
	4a. Spreading Excellence and Widening Participation
	There are significant disparities across Europe in research and innovation performance which need to be addressed in accordance with the principle of excellence.
	In this context, measures will aim at fully exploiting the potential of Europe's talent pool and thereby optimising the economic and social impact of research and innovation and fostering the growth of the first sprouts of excellence such as small research groups and highly innovative start ups.
	These measures include:
	4a.1. Twinning and networking measures:
	(a) Linking in a competition emerging institutions and centres of excellence in the regions performing less well on innovation to leading international counterparts elsewhere in Europe. This will involve twinning of staff exchanges, expert advice and assistance and the development of joint strategies for the development of centres of excellence. This may be supported by the Cohesion policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.
	(b) Launching a competition for the foundation of internationally competitive research centres in cohesion regions: the candidates for the competition should be teams each comprising an innovative but still less developed region and an internationally recognised centre of excellence elsewhere in Europe. The

scientific concepts underlying the newly founded research institutes should be assessed on the principle of excellence and based on the priorities identified in the regional Smart Specialization Strategy; the regions should be required to come up with a viable overall approach for an infrastructure and overall environment amenable to research and innovation, something to be built up with the help of their structural funds; this competition should provide a powerful complement to the efforts of the economically weaker regions to develop a long term Smart Specialisation Strategy.

(c) Establishing 'ERA Chairs' to attract outstanding academics to institutions with a clear potential for research excellence, in order to help these institutions fully unlock this potential and thereby create a level playing field for research and innovation in the European Research Area. This will include institutional and regional support for creating a competitive research environment and the framework conditions necessary for attracting, retaining and developing top research talent within these institutions.

(d) Attribution of "Return Grants" to excellent researchers currently working outside of Europe and who wish to work in Europe or to researchers already working in Europe who wish to move to a region performing less well on innovation.

(e) Support complementary agreements signed among organisations beneficiaries of the collaborative research projects with other entities and organisations established mainly in countries others than those directly involved in the project with the specific objective of facilitating training opportunities (namely doctoral and post-doctoral positions)

(f) Strengthening successful networks aiming at establishing high quality

institutional networking in research and innovation. Particular attention will be paid to COST in order to promote activities to identify and connect "pockets of excellence" (high-quality scientific communities and early career investigators) throughout Europe.

(g) Developing specific training mechanisms on how to participate in Horizon 2020, taking full advantage of existing networks such as the National Contact Points.

(h) Setting up an online marketplace where intellectual property can be advertised in order to bring together the owners and users of IPR.

4a.2. Building synergies with Structural Funds:

(i) Conferring a "seal of excellence" on positively evaluated ERC, Marie Sklodowska-Curie or collaborative project proposals that have not been able to achieve funding because of budgetary limitations; as well as to completed projects in order to facilitate funding of the follow up (e.g. pilot scale, demonstration projects or valorisation of research results) by national, regional or private sources. National, regional and private funds might thus be used to contribute to the funding of those projects that meet the criteria of excellence but cannot be funded due to lack of European funds.

(j) Supporting the development and monitoring of smart specialisation strategies. A policy support facility will be developed and policy learning at regional level will be facilitated through international evaluation by peers and sharing of best practice.

Amendment 55
Proposal for a decision
Annex 1 – section 2 – point 1

Text proposed by the Commission	*Amendment*
Industrial Leadership	Industrial Leadership
1. Leadership in enabling and industrial technologies	1. Leadership in enabling and industrial technologies
General	General
The successful mastering and deployment of enabling technologies by European industry is a key factor in strengthening Europe's productivity and innovation capacity and ensuring Europe has an advanced, sustainable and competitive economy, global leadership in high-tech application sectors and the ability to develop unique solutions for societal ***challenges.Innovation*** activities will be combined with R&D, as an integral part of the funding.	The successful mastering and deployment of enabling technologies by European industry is a key factor in strengthening Europe's productivity and innovation capacity and ensuring Europe has an advanced, sustainable and competitive economy, global leadership in high-tech application sectors and the ability to develop unique solutions for societal ***challenges and user needs. Industrial sectors that have higher impact in value added, employment, importance for the rest of the economy and potential for reducing the cost of non-Europe should be targeted. Innovation*** activities will be combined with R&D, as an integral part of the funding. ***Substantial focus shall be given to small- and medium-scale projects.***
An integrated approach to Key Enabling Technologies	An integrated approach to Key Enabling Technologies
A major component of **'**Leadership in Enabling and Industrial Technologies**'** are Key Enabling Technologies (KETs), defined as micro- and nanoelectronics, photonics, nanotechnology, biotechnology, advanced materials and advanced manufacturing systems . Many innovative products incorporate several of these technologies simultaneously, as single or integrated parts. While each technology offers technological innovation, the accumulated benefit from combining a number of enabling technologies can also	A major component of 'Leadership in Enabling and Industrial Technologies' are Key Enabling Technologies (KETs), defined as micro- and nanoelectronics, photonics, nanotechnology, biotechnology, advanced materials and advanced manufacturing systems. Many innovative products incorporate several of these technologies simultaneously, as single or integrated parts ***as well as a huge amount of outcomes from basic scientific research, in particular from mathematics***. While each technology offers technological

lead to technological leaps. Tapping into cross-cutting key enabling technologies will enhance product competitiveness and impact. The numerous interactions of these technologies ***will therefore be exploited. Dedicated support will be provided for larger-scale pilot line and demonstrator projects***.	innovation, the accumulated benefit from combining a number of enabling technologies ***and mathematical tools*** can also lead to technological leaps. Tapping into cross-cutting key enabling technologies will enhance product competitiveness and impact. The numerous interactions of these technologies ***and basic scientific results will therefore be exploited***.
This will include cross-cutting activities that bring together and integrate various individual technologies, resulting in technology validation in an industrial environment to a complete and qualified system, ready for the market. Strong private sector involvement in such activities will be a prerequisite and implementation will therefore notably be through public private partnerships. To this extent and through a dedicated governance structure, a joint work programme for cross-cutting KETs activities will be developed. Taking into account market needs and the requirements of the societal challenges, it will aim at providing generic KETs building blocks for different application areas, including societal challenges.	This will include cross-cutting activities that bring together and integrate various individual technologies, resulting in technology validation in an industrial environment to a complete and qualified system, ready for the market. Strong private sector involvement in such activities will be a prerequisite and implementation will therefore notably be through public private partnerships. To this extent and through a dedicated governance structure, a joint work programme for cross-cutting KETs activities will be developed. Taking into account market needs and the requirements of the societal challenges, it will aim at providing generic KETs building blocks for different application areas, including societal challenges. ***In particular support will focus on the pre-commercial and pre-competitive stages. Funding shall aim at tackling common technological barriers rather than picking winners or the financing of particular production lines and single company activities. Activities shall be designed to support industrial competitiveness by stimulating industry, to increase its research and innovation investments and to improve in particular its resource and energy efficiency.***
Specific implementation aspects	Specific implementation aspects
Innovation activities will include the integration of individual technologies; demonstrations of capacities to make and deliver innovative products and services;	Innovation activities will ***be fostered from the earliest stages of the passage from concept to market. They will also*** include the integration of individual technologies;

user and customer pilots to prove feasibility and added value; and large-scale demonstrators to facilitate market take-up of the research results.

demonstrations of capacities to make and deliver innovative products and services; user and customer pilots to prove feasibility and added value; and large-scale demonstrators to facilitate market take-up of the research results ***and implementation of small- and medium-scale projects to pave the way towards large-scale projects. It is also important to promote at the European level bottom-up collaborative, disruptive and incremental innovation approaches, both digital and physical, mobility of young innovators and incubators/accelerators***.

Various individual technologies will be integrated, resulting in technology validation in an industrial environment to a complete and qualified system, ready for the market. Strong private sector involvement in such activities will be a prerequisite, notably through public-private partnerships.

Various individual technologies will be integrated, resulting in technology validation in an industrial environment to a complete and qualified system, ready for the market. Strong private sector involvement in such activities will be a prerequisite, notably through public-private partnerships.

Demand-side actions will complement the technology push of the research and innovation initiatives. These include making the best use of public procurement of innovation; developing appropriate technical standards; private demand and engaging users to create more innovation-friendly markets.

Demand-side actions will complement the technology push of the research and innovation initiatives. These include making the best use of public procurement of innovation; developing appropriate technical standards; private demand and engaging users to create more innovation-friendly markets.

For nanotechnology and biotechnology in particular, engagement with stakeholders and the general public will aim to raise the awareness of benefits and risks. Safety assessment and the management of overall risks in the deployment of these technologies will be systematically addressed.

For nanotechnology and biotechnology in particular, engagement with stakeholders and the general public will aim to raise the awareness of benefits and risks. Safety assessment and the management of overall risks in the deployment of these technologies will be systematically addressed. ***Criteria and transparent procedures will be developed to assess, at an early stage of development, the social desirability and social acceptability of new technologies.***

Union RDI activities on the Technology Readiness Level scale will be in line with the OECD definition. The Commission will consider this definition in order to

	include technological research, product development and demonstration activities within its RDI portfolio.
These activities will complement support for research and innovation in enabling technologies, which may be provided by national or regional authorities under the Cohesion Policy funds, within the framework of smart specialisation strategies.	These activities will complement support for research and innovation in enabling technologies, which may be provided by national or regional authorities under the Cohesion Policy funds, within the framework of smart specialisation strategies.
Strategic international cooperation initiatives will be pursued in areas of mutual interest and benefit with leading partner countries. Of particular, but not exclusive, interest for enabling and industrial technologies are	Strategic international cooperation initiatives will be pursued in areas of mutual interest and benefit with leading partner countries. Of particular, but not exclusive, interest for enabling and industrial technologies are
– the development of global standards;	– the development of global standards;
– removing bottlenecks in industrial exploitation and conditions for trade;	– removing bottlenecks in industrial exploitation and conditions for trade;
– the safety of nanotechnology-based and biotechnology-based products;	– the safety of nanotechnology-based and biotechnology-based products;
– the development of materials and methods to reduce energy and resource consumption;	– the development of materials and methods to reduce energy and resource consumption;
– industry-led, collaborative international initiatives within the manufacturing community; and	– industry-led, collaborative international initiatives within the manufacturing community; and
– the interoperability of systems.	– the interoperability of systems.
	- the development and application of predictive and human-relevant tools for safety testing, risk assessment and health research
1.1. Information and Communication Technologies (ICT)	1.1. Information and Communication Technologies (ICT)
A number of activity lines will target ICT industrial and technological leadership challenges and cover generic ICT research and innovation agendas, including notably:	A number of activity lines will target ICT industrial and technological leadership challenges and cover ***ICT standards and protocols, as well as*** generic ICT research and innovation agendas, including notably:
1.1.1. A new generation of components and systems: engineering of advanced and smart embedded components and systems	1.1.1. A new generation of components and systems: engineering of advanced***, secure*** and smart embedded components and

	systems ***components***
The objective is to maintain and reinforce European leadership in technologies related to smart embedded components and systems. It also includes micro-nano-bio systems, organic electronics, large area integration, underlying technologies for the Internet of Things (IoT) including platforms to support the delivery of advanced services, smart integrated systems, systems of systems and complex systems engineering.	The objective is to maintain and reinforce European leadership in technologies related to ***major information systems and to*** smart embedded components and systems ***and components***. It also includes micro-nano-bio systems, organic electronics, ***computational systems biology,*** large area integration, underlying technologies for the Internet of Things (IoT) including platforms to support the delivery of advanced services, ***sensors,*** smart integrated systems, ***distributed systems,*** systems of systems and complex systems engineering.
1.1.2. Next generation computing: advanced computing systems and technologies	1.1.2. Next generation computing: advanced ***and secure*** computing systems and technologies
The objective is to leverage European assets in processor and system architecture, interconnect and data localisation technologies, cloud computing, parallel computing ***and*** simulation software for all market segments of computing.	The objective is to leverage European assets in processor and system architecture, interconnect and data localisation technologies, cloud computing, ***large-scale and supercomputing, "big data",*** parallel computing***,*** simulation software for all market segments of computing***, uncertainty quantification, risk analysis and decision in engineering***.
1.1.3. Future Internet: infrastructures, technologies and services	1.1.3. Future Internet: ***software, hardware,*** infrastructures, technologies and services
The objective is to reinforce the competitiveness of European industry in developing, mastering and shaping the next generation Internet that will gradually replace the current Web, fixed and mobile networks and service infrastructures, and enable the interconnection of trillions of devices (IoT) across multiple operators and domains that will change the way we communicate, access and use knowledge. This includes R&I on networks, software and services, cyber security, privacy ***and trust, wireless*** communication and all optical networks, immersive interactive multimedia and on the connected enterprise of the future.	The objective is to reinforce the competitiveness of European industry in developing, mastering and shaping the next generation Internet that will gradually replace the current Web, fixed***, satellite*** and mobile networks and service infrastructures, and enable the interconnection of trillions of devices (IoT) across multiple operators and domains that will change the way we communicate, access and use knowledge. This includes R&I on networks, software and services, cyber security, privacy***,*** trust ***and social implications,*** wireless communication and all optical networks, immersive interactive multimedia and on the connected enterprise of the future. ***In particular support will be***

	provided for research and development of open-systems and distributive systems.
1.1.4. Content technologies and information management: ICT for digital content and creativity	1.1.4. Content technologies and information management: ICT for digital content***, cultural industries*** and creativity
The objective is to provide professionals and citizens with new tools to create, exploit and preserve all forms of digital content in any language and to model, analyse, and visualise vast amounts of data, including linked data. This includes new technologies for language, learning, interaction, digital preservation, content access and analytics; intelligent information management systems based on advanced data mining, machine learning, statistical analysis and visual computing technologies.	The objective is to provide professionals and citizens with new tools to create, exploit and preserve all forms of digital content in any language and to model, analyse, and visualise vast amounts of data, including linked data. This includes new technologies for language, learning, interaction, digital preservation, ***arts, cultural resource access,*** content access and analytics; intelligent information management systems based on advanced data mining, machine learning ***and machine knowledge,*** statistical analysis and visual computing technologies.
1.1.5. Advanced interfaces and robots: robotics and smart spaces	1.1.5. Advanced interfaces and robots: robotics and smart spaces
The objective is to reinforce European scientific and industrial leadership in industrial and service robotics, cognitive systems, advanced interfaces and smart spaces, and sentient machines, building on increases in computing and networking performance and progress in the ability to build systems that can learn, adapt and react.	The objective is to reinforce European scientific and industrial leadership in industrial and service robotics, cognitive systems, ***artificial intelligence and neuroscience,*** advanced interfaces and smart spaces, and sentient machines, building on ***miniaturisation and*** increases in computing***,*** and networking performance and progress in the ability to build systems that can learn, adapt and react.
1.1.6. Micro- and nanoelectronics and photonics	1.1.6. Micro- and nanoelectronics and photonics
The objective is to take advantage of the excellence of Europe in this key enabling technology and support the competitiveness and market leadership of its industry. Activities will also include research and innovation on design, advanced processes, pilot lines for fabrication, related production technologies and demonstration actions to validate technology developments and innovative business models.	The objective is to take advantage of the excellence of Europe in this key enabling technology and support the competitiveness and market leadership of its industry. Activities will also include research and innovation on design, advanced processes, pilot lines for fabrication, related production technologies and demonstration actions to validate technology developments and innovative business models.

	1.1.6a. Quantum technologies: next generation of ICT devices through the combination of quantum physics and information science
	The objective is to develop the next generation of ICT devices through the combination of quantum physics and information science, thereby securing a key role for the Union in a future global market where the quantum limits will define the performance of industrial applications.
These ***six*** major activity lines are expected to cover the full range of needs. These would include industrial leadership in generic ICT-based solutions, products and services needed to tackle major societal challenges as well as application-driven ICT research and innovation agendas which will be supported together with the relevant societal challenge.	These ***seven*** major activity lines are expected to cover the full range of needs. These would include industrial leadership in generic ICT-based solutions, products and services needed to tackle major societal challenges as well as application-driven ICT research and innovation agendas which will be supported together with the relevant societal challenge.
Included under each of the ***six*** big activity lines are also ICT-specific research infrastructures such as living labs for large-scale experimentation and infrastructures for underlying key enabling technologies and their integration in advanced products and innovative smart systems, including equipment, tools, support services, clean rooms and access to foundries for prototyping.	Included under each of the ***seven*** big activity lines are also ICT-specific research infrastructures such as living labs for large-scale experimentation and infrastructures for underlying key enabling technologies and their integration in advanced products and innovative smart systems, including equipment, tools, support services, clean rooms and access to foundries for prototyping. ***Union funding will be targeted at shared facilities and infrastructure open to multiple actors including in particular small and medium-sized firms.***
	The fundamental rights and freedoms of natural persons and in particular their right to privacy are key in the Union. Horizon 2020 shall support research and development of systems that can give the Union's citizens full control over their communications.
1.2. Nanotechnologies	1.2. Nanotechnologies
1.2.1. Developing next generation nanomaterials, nanodevices and	1.2.1. Developing next generation nanomaterials, nanodevices and

nanosystems	nanosystems
Development and integration of knowledge at the cross-roads of different scientific disciplines, aiming at fundamentally new products enabling sustainable solutions in a wide range of sectors.	Development and integration of knowledge at the cross-roads of different scientific disciplines, aiming at fundamentally new products enabling sustainable solutions in a wide range of sectors.
1.2.2. Ensuring the safe development and application of nanotechnologies	1.2.2. Ensuring the safe development and application of nanotechnologies
Advancing scientific knowledge of their potential impact on health or on the environment for pro-active, science-based governance of nanotechnologies, and providing validated scientific tools and platforms for hazard, exposure and risk assessment and management along the entire life cycle of nanomaterials and nanosystems.	Advancing scientific knowledge of their potential impact on health or on the environment for pro-active, science-based governance of nanotechnologies, and providing validated scientific tools and platforms for hazard, exposure and risk assessment and management along the entire life cycle of nanomaterials and nanosystems.
	1.2.2a. Developing new tools for designing, simulation, characterisation and manipulations of nanomaterials, components and systems
	Studying, imaging and controlling the new nanomaterials and systems at the nanoscale.
1.2.3. Developing the societal dimension of nanotechnology	1.2.3. Developing the societal dimension of nanotechnology
Addressing the human and physical infrastructure needs of nanotechnology deployment and focussing on governance of nanotechnology for societal benefit.	Addressing the human and physical infrastructure needs of nanotechnology deployment and focussing on governance of nanotechnology for societal benefit ***and on the attitudes of the public towards nanotechnology and related products taking into account the precautionary principle***.
1.2.4. Efficient synthesis and manufacturing of nanomaterials, components and systems	1.2.4. Efficient synthesis and manufacturing of nanomaterials, components and systems
Focusing on new flexible, scalable and repeatable unit operations, smart integration of new and existing processes, as well as up-scaling to achieve mass production of products and multi-purpose plants that ensures the efficient transfer of	Focusing on new flexible, scalable and repeatable unit operations, smart integration of new and existing processes, as well as up-scaling to achieve mass production of products and multi-purpose plants that ensures the efficient transfer of

knowledge into industrial innovation.	knowledge into industrial innovation.
1.2.5. Developing capacity-enhancing techniques, measuring methods and equipment	1.2.5. Developing capacity-enhancing techniques, measuring methods and equipment
Focusing on the underpinning technologies, supporting the development and market introduction of complex nanomaterials and nanosystems, including characterising and manipulating matter at the nano-scale, modelling, computational design and advanced engineering at the atomic level.	Focusing on the underpinning technologies, supporting the development and market introduction of complex nanomaterials and nanosystems, including characterising and manipulating matter at the nano-scale, modelling, computational design and advanced engineering at the atomic level.
1.3. Advanced materials	1.3. Advanced materials
1.3.1 Cross-cutting and enabling materials technologies	1.3.1 Cross-cutting and enabling materials technologies
Research on functional materials, multifunctional materials such as self-repairing or biocompatible materials and structural materials, for innovation in all industrial sectors particularly for high value markets.	Research on functional materials, ***technological materials, scarce materials and rare earth elements,*** multifunctional materials such as self-repairing or biocompatible materials and structural materials, for innovation in all industrial sectors particularly for high value markets.
1.3.2. Materials development and transformation	1.3.2. Materials development and transformation
Research and development to ensure efficient ***and sustainable*** scale up to enable industrial manufacturing of future products e.g. in the metal ***or chemical*** industries.	Research and development to ensure ***resource*** efficient***, sustainable and safe and secure*** scale up to enable industrial manufacturing of future products e.g. in the metal ***chemical and renewable energy*** industries.
1.3.3. Management of materials components	1.3.3. Management of materials components
Research and development for new and innovative techniques and systems, joining, adhesion, separation, assembly, self-assembly and disassembling, decomposition and deconstruction.	Research and development for new and innovative ***production*** techniques ***for materials, components*** and systems, joining, adhesion, separation, assembly, self-assembly and disassembling, decomposition and deconstruction.
1.3.4. Materials for a sustainable industry	1.3.4. Materials for a sustainable ***and low carbon*** industry
Developing new products and applications and consumer behaviour that reduce energy demand and facilitate ***low-carbon***	Developing new ***materials, components,*** products and applications and consumer behaviour that reduce energy demand and

production, as well as process intensification, recycling, depollution and high added-value materials from waste and remanufacture.

1.3.5. Materials for creative industries

Applying design and the development of converging technologies to create new business opportunities, including the preservation of Europe's materials with historical or cultural value.

1.3.6. Metrology, characterisation, standardisation and quality control

Promoting technologies such as characterisation, non-destructive evaluation and predictive modelling of performance for progress in materials science and engineering.

facilitate ***low-emission*** production, as well as process intensification, recycling, depollution and high added-value materials from waste and remanufacture.

1.3.5. Materials for creative industries

Applying design and the development of converging technologies to create new business opportunities, including the preservation of Europe's ***heritage and*** materials with historical or cultural value. ***Protecting the cultural heritage: assessment, monitoring and choice of conservation materials and techniques, with reference to the environment and energy management, use and maintenance, and integration into contemporary and historical urban surroundings and archaeological and cultural contexts.***

1.3.5a. New raw materials for the chemical industry and carbon usage

Development of an alternative feedstock basis for the chemical industry, ranging from coal, biomass, and waste materials, to environmentally friendly substitute petroleum as carbon source in the medium and long term.

CCU systems and technologies to convert CO2 into products such as chemicals, fertilizers, fuels and bio-oils shall be explored, together with new storage technologies, including storage in chemical products, syngas-based production of fuels for storage as well as the development of low-cost and fuel-tolerant gasification technologies which are essential for these systems.

1.3.6. Metrology, characterisation, standardisation and quality control

Promoting technologies such as characterisation, non-destructive evaluation and predictive modelling of performance for progress in materials science and engineering.

1.3.7. Optimisation of the use of materials	1.3.7. Optimisation of the use of materials
Research and development to investigate alternatives to the use of materials and innovative business model approaches.	Research and development to investigate alternatives to the use of materials***,*** ***including scarce and/or raw materials,*** and innovative business model approaches.
1.4. Biotechnology	1.4. Biotechnology
1.4.1. Boosting cutting-edge biotechnologies as future innovation drivers	1.4.1. Boosting ***sustainable*** cutting-edge biotechnologies as future innovation drivers
The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) and ICT (e.g. bioelectronics). These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, etc).	The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) and ICT (e.g. bioelectronics) ***and plant and agricultural biotechnology***. These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, etc)***, products and technologies, avoiding interference with natural environment and taking into account ethical principles***.
1.4.2. Biotechnology-based industrial processes	1.4.2. Biotechnology-based industrial ***products and*** processes
The objective is twofold: on the one hand, enabling the European industry (e.g. chemical, health, mining, energy, pulp and paper, textile, starch, food processing) to develop new products ***and*** processes meeting industrial and societal demands; and competitive and enhanced biotechnology-based alternatives to replace established ones; on the other hand, harnessing the potential of biotechnology for detecting, monitoring, preventing and removing pollution. It includes R&I on enzymatic and metabolic pathways, bio-processes design, advanced fermentation,	The objective is twofold: on the one hand, enabling the European industry (e.g. chemical, health, mining, energy, pulp and paper, textile, starch, ***crop production and*** food processing) to develop new products***, materials and sustainable*** processes meeting ***agricultural and aquacultural,*** industrial and societal demands; and competitive and enhanced biotechnology-based alternatives to replace established ones;on the other hand, harnessing the potential of biotechnology for detecting, monitoring, preventing and removing pollution. It includes R&I on enzymatic

up- and down-stream processing, gaining insight on the dynamics of microbial communities. It will also encompass the development of prototypes for assessing the techno-economic feasibility of the developed products and processes.

and metabolic pathways, bio-processes design, advanced fermentation, up- and down-stream processing, gaining insight on the dynamics of microbial communities. It will also encompass the development of prototypes for assessing the techno-economic feasibility of the developed products and processes.

1.4.3. Innovative and competitive platform technologies

1.4.3. Innovative and competitive platform technologies

The objective is to develop platform technologies (e.g. genomics, meta-genomics, proteomics, molecular tools) triggering leadership and competitive advantage on a wide number of economic ***sectors***. It includes aspects, such as underpinning the development of bio-resources with optimised properties and applications beyond conventional alternatives; enabling exploration, understanding and exploitation in a sustainable manner of terrestrial and marine biodiversity for novel applications; and sustaining the development of biotechnology-based healthcare solutions (e.g. diagnostics, biologicals, bio-medical devices).

The objective is to develop platform technologies (e.g. ***systems biology,*** genomics, meta-genomics, proteomics, ***phenomics,*** molecular tools ***and cell-based platforms***) triggering leadership and competitive advantage on a wide number of ***sectors having*** economic ***impact. This approach can further advance the potential of novel SMEs. It includes development of activities for enhancing populations' health and well-being***. It includes ***also*** aspects, such as underpinning the development of bio-resources with optimised properties and applications beyond conventional alternatives; enabling exploration, understanding and exploitation in a sustainable manner of terrestrial and marine biodiversity for novel applications; and sustaining the development of biotechnology-based healthcare solutions (e.g. ***pharmaceuticals,*** diagnostics, biologicals, bio-medical devices***, healthier plants and animals for healthy nutrition***).

1.4.3a. Addressing environmental, societal and ethical concerns

The objective is to take account of environmental, societal and ethical concerns with regard to certain types of technologies by developing assessment processes including broad consultation of stakeholders;

1.5. Advanced Manufacturing and Processing

1.5. Advanced Manufacturing and Processing

1.5.1. Technologies for Factories of the Future

1.5.1. Technologies for Factories of the Future

Promoting sustainable, industrial growth by facilitating a strategic shift in Europe from cost-based manufacturing to an approach based on the creation of high added value. This requires addressing the challenge of producing more, while consuming less material, using less energy and creating less waste and pollution. The focus will be on the development and integration of the adaptive production systems of the future, with particular emphasis on the needs of European SMEs, in order to achieve advanced and sustainable manufacturing systems and processes.

1.5.2. Technologies enabling Energy-efficient buildings

Reducing energy consumption and CO2 emissions by the development and deployment of sustainable construction technologies, implementation and replication of measures for an increased uptake of energy-efficient systems and materials in new, renovated and retrofitted buildings. Life-cycle considerations and the growing importance of design-build-operate concepts will be key in addressing the challenge of a transition to nearly zero energy buildings in Europe by 2020 and the realisation of energy-efficient districts through the engagement with the wide stakeholder community.

1.5.3. Sustainable and low-carbon technologies in energy-intensive process industries

Increasing the competitiveness of process industries, such as chemical, pulp and paper, glass, or non-ferrous metals and steel by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities. Focus will be on the development, and validation of enabling technologies for innovative substances, materials and technological solutions for

Promoting sustainable, industrial growth by facilitating a strategic shift in Europe from cost-based manufacturing to an approach based on the creation of high added value. This requires addressing the challenge of producing more ***quality products***, while consuming less material, using less energy and creating less waste and pollution. The focus will be on the development and integration of the adaptive production systems of the future, with particular emphasis on the needs of European SMEs, in order to achieve advanced and sustainable manufacturing systems and processes.

1.5.2. Technologies enabling Energy-efficient ***and low environmental impact*** buildings

Reducing energy consumption and CO2 emissions by the development and deployment of sustainable construction technologies, implementation and replication of measures for an increased uptake of energy-efficient systems and materials in new, renovated and retrofitted buildings. Life-cycle considerations and the growing importance of design-build-operate concepts will be key in addressing the challenge of a transition to nearly zero energy buildings in Europe by 2020 and the realisation of energy-efficient districts through the engagement with the wide stakeholder community.

1.5.3. Sustainable and low-carbon technologies in energy-intensive ***and resource intensive*** process industries

Increasing the competitiveness of process industries, such as chemical, pulp and paper, glass, ***construction*** or non-ferrous metals and steel by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities***, such as clean combustion for lowering micro-particles and heavy metals emissions***. Focus will be on the development, and validation of

low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.	enabling technologies for innovative substances, materials and technological solutions for low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.
1.5.4. New, sustainable business models	1.5.4. New, sustainable business models
Cross-sectoral cooperation in concepts and methodologies for ‘knowledge-based’, specialised production can boost creativity and innovation with a focus on business models in customised approaches that can adapt to the requirements of globalised value chains and networks, changing markets, and emerging and future industries.	Cross-sectoral cooperation in concepts and methodologies for ‘knowledge-based’, specialised production can boost creativity and innovation with a focus on business models in customised approaches that can adapt to the requirements of globalised value chains and networks, changing markets, and emerging and future industries. ***Support in particular will be provided to development of novel eco-innovation business models and alternative resource-productive approaches.***
1.6. Space	1.6. Space
1.6.1. Enable European competitiveness, non-dependence and innovation in space activities	1.6.1. Enable European competitiveness, non-dependence and innovation in space activities ***Space includes, when it is referred to as a generic term, satellite observation, satellite navigation and satellite telecommunications industry, infrastructure (ground and space), services and applications.***
The objective is to maintain a ***globally*** leading role in space by safeguarding and developing a competitive space industry and research community and by fostering space-based innovation.	The objective is to maintain a leading role ***on the global level*** in space by safeguarding and developing a competitive space industry and research community and by fostering space-based innovation.
1.6.1.1. Safeguard a competitive space industry and research community	1.6.1.1. Safeguard a competitive space industry and research community
Europe is playing a leading role in space research and in the development of space technologies, and has developed its own space infrastructures (e.g. Galileo). In fact,	Europe is playing a leading role in space research and in the development of space technologies, and has developed its own space infrastructures (e.g. Galileo). In fact,

European industry has established itself as an exporter of first class satellites. Nevertheless, important challenges to this position are the fragmented character of the European markets and research institutions, competition from major space powers benefitting from large domestic markets, and limited systematic investments in space research and technology development and capacity building in Europe. The development of a research-base by providing continuity in space research programmes, for example by a sequence of smaller and more frequent in-space demonstration projects. This will allow Europe to develop its industrial base and space RTD community, thereby contributing to its non-dependence from imports of critical technologies.

1.6.1.2. Boost innovation between space and non-space sectors

A number of challenges in space technologies have parallels to terrestrial challenges, for example in the fields of energy, telecommunications, natural resource exploration, robotics, security, and health. These commonalities offer opportunities for early co-development, in particular by SMEs, of technologies across space and non-space communities, potentially resulting in breakthrough innovations more rapidly than achieved in spin-offs at a later stage. Exploitation of existing European space infrastructure should be stimulated by promoting development of innovative products and services based on remote sensing and geo-positioning. Europe should furthermore reinforce the incipient development of an entrepreneurial space sector by well targeted measures.

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1.6.2. Enabling advances in space technologies	1.6.2. Enabling advances in space technologies
The objective is to ensure the capability to access space and to operate space systems to the benefit of European society in the next decades.	The objective is to ensure the capability to access space and to operate space systems to the benefit of European society in the next decades.
The ability to access space and to maintain and operate European or international space systems in Earth orbit and beyond, are vital to the future of European society. The necessary capabilities require constant investments in a multitude of space technologies (e.g. launchers, satellites, robotics, instruments and sensors), and in operational concepts from idea to demonstration in space. Europe is currently one of the three leading space powers, but compared to the level of investment in space R&D in the United States of America (e.g. about 20 % of the total NASA budget), the European level of investment in future space technologies is insufficient (less than 10 % of total expenditure in space) and needs to be strengthened along the entire chain:	The ability to access space and to maintain and operate European or international space systems in Earth orbit and beyond, are vital to the future of European society. The necessary capabilities require constant investments in a multitude of space technologies (e.g. launchers, satellites, robotics, instruments and sensors), and in operational concepts from idea to demonstration in space. Europe is currently one of the three leading space powers, but compared to the level of investment in space R&D in the United States of America (e.g. about 20 % of the total NASA budget), the European level of investment in future space technologies is insufficient (less than 10 % of total expenditure in space) and needs to be strengthened along the entire chain:
(a) fundamental technological research, often relying heavily on key enabling technologies, with the potential of generating breakthrough technologies with terrestrial applications;	(a) fundamental technological research, often relying heavily on key enabling technologies, with the potential of generating breakthrough technologies with terrestrial applications;
(b) improvement of existing technologies, e.g. through miniaturisation, higher energy efficiency, and higher sensor sensitivity;	(b) improvement of existing technologies, e.g. through miniaturisation, higher energy efficiency, and higher sensor sensitivity;
(c) demonstration and validation of new technologies and concepts in the space and terrestrial analogue environments;	(c) demonstration and validation of new technologies and concepts in the space and terrestrial analogue environments;
(d) mission context, e.g. analysis of the space environment, ground stations, protecting space systems from collision with debris and effects of solar flares (Space Situational Awareness, SSA), fostering innovative data and sample archiving infrastructure;	(d) mission context, e.g. analysis of the space environment, ***data transmission,*** ground stations, protecting space systems from collision with debris and effects of solar flares (Space Situational Awareness, SSA), fostering innovative data ***gathering and transmission*** and sample archiving infrastructure;
(e) Advanced navigation and remote	(e) Advanced navigation and remote

sensing technologies, covering the research essential for future generations of Union space systems (e.g. Galileo).

1.6.3. Enabling exploitation of space data

The objective is to ensure more extensive utilisation of space data from existing and future European missions in the scientific, public and commercial domain.

Space systems produce information which often cannot be acquired in any other way. Despite world class European missions, publication figures show that data from European missions are not as likely to be used as data from US missions. A considerably increased exploitation of data could be achieved if a concerted effort were made to coordinate and organise the processing, validation and standardisation of space data from European missions. Innovations in data acquisition and processing, data fusion, and data dissemination, utilising also innovative ICT enabled forms of collaboration, can ensure a higher return on investment of space infrastructure. Calibration and validation of space data (for individual instruments, between instruments and missions, and with respect to in-situ objects) are key to efficient use of space data in all domains, but have been hampered by the lack of Union-level bodies or institutes mandated to ensure the standardisation of space-derived data and reference frames. Data access and exploitation of space missions is a matter that requires global coordination. For Earth observation data, harmonised approaches and best practices are partly achieved in coordination with the intergovernmental organization Group on Earth Observation, aiming to sustain a Global Earth Observation System of Systems, in which the Union participates.

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Support will be provided for the development of a comprehensive and sustained global environmental

	observation and information system, including through fostering cooperation between climate modelling communities and environmental observation and data management communities. The inclusion of the Member States in such cooperation is essential since national authorities are often the owners of data records.
	Support dedicated to research and development of space-related applications will in particular be devoted to supporting the meeting of the societal challenges such as climate change, environment, sustainable transport systems, agriculture. The objectives of knowledge sharing and interoperable development shall underpin support provided in these areas.
1.6.4. Enabling European research in support of international space partnerships	1.6.4. Enabling European research in support of international space partnerships
The objective is to support the European research and innovation contribution to long term international space partnerships.	The objective is to support the European research and innovation contribution to long term international space partnerships.
Although space information provides great local benefits, space undertakings have a fundamentally global character. This is particularly clear for the cosmic threat to Earth and space systems. The loss of satellites due to space weather and space debris is estimated to be in the order of EUR 100 million per annum. Equally global are activities such as the International Space Station (ISS), which is built and operated by Europe, the United States, Canada, Japan and Russia, and robotic space science and exploration activities. The development of cutting edge space technology is increasingly taking place within such international frameworks, making access to such international projects an important success factor for European researchers and industry. The Union contribution to such global space endeavours needs to be defined in long-term strategic roadmaps (10 years and more), aligning with the Union's space policy priorities, and in	Although space information provides great local benefits, space undertakings have a fundamentally global character. This is particularly clear for the cosmic threat to Earth and space systems. The loss of satellites due to space weather and space debris is estimated to be in the order of EUR 100 million per annum. Equally global are activities such as the International Space Station (ISS), which is built and operated by Europe, the United States, Canada, Japan and Russia, and robotic space science and exploration activities. The development of cutting edge space technology is increasingly taking place within such international frameworks, making access to such international projects an important success factor for European researchers and industry. The Union contribution to such global space endeavours needs to be defined in long-term strategic roadmaps (10 years and more), aligning with the Union's space policy priorities, and in

coordination with internal European partners, such ESA; with international partners, such as COSPAR, UNOOSA; and with the space agencies of space-faring nations such as NASA and ROSCOSMOS.

coordination with internal European partners, such ESA; with international partners, such as COSPAR, UNOOSA; and with the space agencies of space-faring nations such as NASA and ROSCOSMOS.

1.6.4a. Developing applications in the area of GNSS to ensure positive return on investment in European satellite navigation systems

At the time when EGNOS is fully operational and Galileo successfully closed the In Orit Validation, it is crucial for the European industries to adopt the new technology available and be prepared for full capability of Galileo in order to capture the socio-economic benefits, estimated at around EUR 90 billion. Research funding shall drive the development of EGNOS and Galileo in critical sectors like aviation and road transport and many professional applications, including precision agriculture, timing and geodesy, ensuring the use of new signals in current and future applications.

1.6.5. Specific implementation aspects

The implementation priorities of space research and innovation under Horizon 2020 are in line with the Union's space policy priorities as defined by the Space Council and the Communication Towards a space strategy for the European Union that benefits its citizens . The implementation will be developed in consultation with stakeholders from European space industry, SMEs, academia, and technology institutes, represented by the Space Advisory Group and important partners such as the European Space Agency and national space agencies. As regards the participation in international undertakings, the research and innovation agenda will be defined in collaboration with international partners (e.g. NASA, ROSCOSMOS, JAXA).

1.6.5. Specific implementation aspects

The implementation priorities of space research and innovation under Horizon 2020 are in line with the Union's space policy priorities as defined by the Space Council and the Communication Towards a space strategy for the European Union that benefits its citizens. The implementation will be developed in consultation with stakeholders from European space industry, SMEs, academia, and technology institutes, represented by the Space Advisory Group and important partners such as the European Space Agency and national space agencies. ***Activities shall be developed and implemented in a complementary way between the EU, ESA and the Member States.*** As regards the participation in international undertakings, the research and innovation agenda will be defined in collaboration with international

partners (e.g. NASA, ROSCOSMOS, JAXA).

Amendment 56
Proposal for a decision
Annex 1 – section 2 – point 2

Text proposed by the Commission	*Amendment*
2. Access to risk finance	2. Access to risk finance
Horizon 2020 will set up two facilities (the ‘Equity facility’ and the ‘Debt facility’), composed of various windows. The Equity facility and the SME window of the Debt facility will be implemented as part of two EU Financial Instruments that provide equity and debt to support SMEs' R&I and growth.	Horizon 2020 will set up two facilities (the ‘Equity facility’ and the ‘Debt facility’), composed of various windows. The Equity facility and the SME window of the Debt facility will be implemented as part of two EU Financial Instruments that provide equity and debt to support SMEs' R&I and growth.
The Equity facility and the Debt facility may, where appropriate, allow pooling of financial resources with Member States willing to contribute part of the Structural Funds allocated to them, in accordance with Article 31(1)(a) of the Structural Funds Council Regulation.	The Equity facility and the Debt facility may, where appropriate, allow pooling of financial resources with Member States willing to contribute part of the Structural Funds allocated to them, in accordance with Article 31(1)(a) of the Structural Funds Council Regulation.
Instead of providing loans, guarantees or equity, etc, directly to final beneficiaries, the Commission will delegate financial institutions to provide support via, in particular, risk-sharing, guarantee schemes and equity and quasi-equity investments.	Instead of providing loans, guarantees or equity, etc, directly to final beneficiaries, the Commission will delegate financial ***or other appropriate*** institutions to provide support via, in particular, risk-sharing, guarantee schemes and equity and quasi-equity investments.
	The risk sharing financing schemes shall also target unsolved needs within policies and sectors, notably regarding the societal challenges, which are pressing but chronically underfinanced by the private sector due to high risk thresholds.
2.1. Debt facility	2.1. Debt facility
The Debt facility will provide loans to single beneficiaries for investment in R&I; guarantees to financial intermediaries making loans to beneficiaries; combinations of loans and guarantees; and	The Debt facility will provide loans to single beneficiaries for investment in R&I; guarantees to financial intermediaries making loans to beneficiaries; combinations of loans and guarantees; and

guarantees and/or counter-guarantees for national or regional debt-financing schemes. The Debt facility will undertake maturity enhancement activities, and it will support the dedicated SME Instrument (see Part II, section ‘3. Innovation in SMEs’ of this Annex). Provisions from the debt facility may be combined, with the possible addition of grants (including lump sums), with provisions from the equity financial instrument in one or more integrated schemes. Soft loans and convertible loans may also be possible.

As well as providing loans and guarantees on a market-driven, first-come, first-served basis, the debt facility will target, under a series of compartments, particular policies and sectors. Ring-fenced budgetary contributions for this purpose may come from:

(a) Other parts of Horizon 2020, notably Part III ‘Societal challenges’;

(b) other frameworks, programmes and budget lines in the Union budget;

(c) particular regions and Member States that wish to contribute with resources available from the Cohesion Policy funds;

(d) specific entities (such as Eureka or Joint Technology Initiatives) or initiatives.

Such budgetary contributions may be made or topped up at any time during the course of Horizon 2020.

Risk-sharing and other parameters may vary within policy or sector compartments, provided their values or states comply with the common rules for debt instruments. Furthermore, compartments may have specific communications strategies within the overall promotional campaign for the Debt facility. In addition, specialist intermediaries at national level may be used if specific expertise is needed to assess prospective loans in the domain of a particular compartment**.**

guarantees and/or counter-guarantees for national or regional debt-financing schemes. The Debt facility will undertake maturity enhancement activities, and it will support the dedicated SME Instrument (see Part II, section ‘3. Innovation in SMEs’ of this Annex). Provisions from the debt facility may be combined, with the possible addition of grants (including lump sums), with provisions from the equity financial instrument in one or more integrated schemes. Soft loans and convertible loans may also be possible.

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The European Investment Fund, managing the Debt facility on behalf of the Commission, may have a limited mandate to lend to projects carrying a high technological risk and not merely to offer below-market-rate loans to projects with a low technological risk. This mandate, however, will be subject to strict portfolio and project risk management criteria and appropriate risk return criteria and oversight.

The SME window under the Debt facility shall target R&I-driven SMEs ***and small mid-caps*** with loan amounts exceeding EUR 150 000, thus complementing finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs.

The SME window under the Debt facility shall target R&I-driven SMEs with loan amounts exceeding EUR 150.000, thus complementing finance to SMEs by the Loan Guarantee Facility under the Programme for the Competitiveness of Enterprises and SMEs.

The leverage of the Debt facility - defined as the total funding (i.e. Union funding plus contribution from other financial institutions) divided by the Union financial contribution - is expected to range from an average 1.5 to 6.5, depending on the type of operations involved (level of risk, target beneficiaries, and the particular debt financial instrument facility concerned). The multiplier effect - defined as the total of investments made by supported beneficiaries divided by the Union financial contribution - is expected to be 5 to 20, again depending on the type of operations involved.

The leverage of the Debt facility – defined as the total funding (i.e. Union funding plus contribution from other financial institutions) divided by the Union financial contribution – is expected to range from an average 1.5 to 6.5, depending on the type of operations involved (level of risk, target beneficiaries, and the particular debt financial instrument facility concerned). The multiplier effect –defined as the total of investments made by supported beneficiaries divided by the Union financial contribution –is expected to be 5 to 20, again depending on the type of operations involved.

2.2. Equity facility

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The Equity facility will focus on early-stage venture capital funds providing venture capital and/or mezzanine capital to individual portfolio enterprises. These enterprises may, in addition, seek debt financing from financial intermediaries implementing the Debt facility**.**

The Equity facility will focus on early-stage venture capital funds providing venture capital and/or mezzanine capital to ***early-stage*** individual portfolio enterprises. These enterprises may, in addition, seek debt financing from financial intermediaries implementing the Debt facility.

The equity facility will also support knowledge and technology transfer processes at the stages prior to the industry uptake phase with the aim of

verifying and, where appropriate, increasing the innovatory market impact of the transfer.

The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth (EFG) under the Programme for the Competitiveness of Enterprises and SMEs(this includes investments in funds-of-funds with a broad investor base and includes private institutional and strategic investors as well as national public and semi-public financial institutions).In the latter case, the investment from the Equity Facility of Horizon 2020 shall not exceed 20 % of the total EU investment except in cases of multi-stage funds, where funding from EFG and the equity facility for RDI will be provided on a pro rata basis, based on the funds' investment policy. Like the EFG, the Equity Facility shall avoid buy-out or replacement capital intended for the dismantling of an acquired enterprise. The Commission may decide to amend the 20% threshold in light of changing market conditions.

The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth (EFG) under the Programme for the Competitiveness of Enterprises and SMEs(this includes investments in ***public and private*** funds-of-funds with a broad investor base and includes private institutional and strategic investors as well as national public and semi-public financial institutions). In the latter case, the investment from the Equity Facility of Horizon 2020 shall not exceed 20 % of the total EU investment except in cases of multi-stage funds, where funding from EFG and the equity facility for RDI will be provided on a pro rata basis, based on the funds' investment policy. Like the EFG, the Equity Facility shall avoid buy-out or replacement capital intended for the dismantling of an acquired enterprise. The Commission may decide to amend the 20% threshold in light of changing market conditions.

Investment parameters will be set in such a way that specific policy objectives, including the targeting of particular groups of potential beneficiaries, can be achieved while still preserving the market-oriented, demand-driven approach of this instrument.

Investment parameters will be set in such a way that specific policy objectives, including the targeting of particular groups of potential beneficiaries, can be achieved while still preserving the market-oriented, demand-driven approach of this instrument.

The Equity facility may be supported by budgetary contributions from other parts of Horizon 2020; other frameworks, programmes and budget lines in the Union budget; particular regions and Member States; and specific entities or initiatives.

The Equity facility may be supported by budgetary contributions from other parts of Horizon 2020; other frameworks, programmes and budget lines in the Union budget; particular regions and Member States; and specific entities or initiatives.

The leverage of the Equity facility - defined as the total funding (i.e., Union funding plus contribution from other financial institutions) divided by the Union financial contribution - is expected to be around 6, depending on market

The leverage of the Equity facility – defined as the total funding (i.e., Union funding plus contribution from other financial institutions) divided by the Union financial contribution – is expected to be around 6, depending on market

specificities, with an expected multiplier effect - defined as the total of investments made by supported beneficiaries divided by the Union financial contribution - of, on average, 18**.**

2.3. Specific implementation aspects

The implementation of the two facilities will be delegated to the European Investment Bank Group (EIB, EIF) and/or to other financial institutions that may be entrusted with the implementation of financial instruments in compliance with the Financial Regulation. Their design and implementation will be aligned with the general provisions for financial instruments set out in the Financial Regulation and with more specific operational requirements to be set out in Commission guidance.

specificities, with an expected multiplier effect – defined as the total of investments made by supported beneficiaries divided by the Union financial contribution – of, on average, 18

2.3. Specific implementation aspects

The Equity Facility of Horizon 2020 shall be implemented as a window of a single Union equity financial instrument supporting Union enterprises' growth and R&I from the early stage (including seed) to the growth stage and financially supported by Horizon 2020 and the Programme for the Competitiveness of Enterprises and Small and Medium-sized enterprises (COSME).

The Equity Facility of Horizon 2020 shall use the same delivery mechanism as the Equity Facility for Growth (EFG) to be established under COSME.

Support from the Equity Facility of Horizon 2020 shall be in the form of one of the following investments:

(a) directly by the European Investment Fund (EIF) or other entities entrusted with the implementation on behalf of the Commission; or

(b) by public and private funds-of-funds or investment vehicles investing across borders established by the EIF or other entities entrusted with the implementation on behalf of the Commission together

with private investors and/or public financial institutions.

The Guarantee Facility of Horizon 2020 shall be operated by the EIF or other entities entrusted with the implementation on behalf of the Commission. The facility shall provide:

(a) counter-guarantees and other risk sharing arrangements for guarantee schemes;

(b) direct guarantees and other risk sharing arrangements for any other financial intermediaries meeting the eligibility criteria;

The Guarantee Facility of Horizon 2020 shall be implemented as part of a single EU debt financial instrument for EU enterprises' growth and R&I, using the same delivery mechanism as the Loan Guarantee Facility (LGF) of COSME. The Guarantee Facility shall be open to national intermediaries that provide loans directly or indirectly.

The Guarantee Facility shall consist of:

(a) debt financing via loan guarantees, including subordinated and participating loans, or leasing;

(b) securitisation of debt finance portfolios under appropriate risk-sharing arrangements with the targeted institutions.

Their elements may be combined, with the possible addition of grants (including lump sums), in one or more integrated schemes supporting particular categories of beneficiary or special-purpose project, such as SMEs and mid-caps with growth potential, or the large-scale demonstration of innovative technologies.

Their elements may be combined, with the possible addition of grants (including lump sums), in one or more integrated schemes supporting particular categories of beneficiary or special-purpose project, such as SMEs and mid-caps with growth potential, or the large-scale demonstration of innovative technologies.

Their implementation will be supported by a set of accompanying measures. These may include, amongst other measures, technical assistance for financial intermediaries involved in assessing the

Their implementation will be supported by a set of accompanying measures. These may include, amongst other measures, technical assistance for financial intermediaries involved in assessing the

eligibility of loan applications or the value of knowledge assets; investment-readiness schemes covering incubating, coaching and mentoring SMEs and fostering their interaction with potential investors; measures to raise the awareness of venture capital firms and business angels about the growth potential of innovative SMEs involved in Union funding programmes; schemes to attract private investors to support the growth of innovative SMEs and mid-caps; schemes for encouraging philanthropic foundations and individuals to support R&I; and schemes to foster corporate venturing and encourage the activities of family offices and business angels.	eligibility of loan applications or the value of knowledge assets; investment-readiness schemes covering incubating, coaching and mentoring SMEs and fostering their interaction with potential investors; measures to raise the awareness of venture capital firms and business angels about the growth potential of innovative SMEs involved in Union funding programmes; schemes to attract private investors to support the growth of innovative SMEs and mid-caps; schemes for encouraging philanthropic foundations and individuals to support R&I; and schemes to foster corporate venturing and encourage the activities of family offices and business angels.
Complementarity will be ensured with the facilities of the Programme for the Competitiveness of Enterprises and SMEs.	Complementarity will be ensured with the facilities of the Programme for the Competitiveness of Enterprises and SMEs.

Justification

The detailed provisions for the implementation of the financial instruments as a window of a single instrument in conjunction with COSME should be specified and aligned with the wording in COSME (Annex II as amended)

Amendment 57
Proposal for a decision
Annex 1 – section 2 – point 3

Text proposed by the Commission	*Amendment*
3. Innovation in SMEs	3. Innovation in SMEs
3.1. ***Mainstreaming SME support***	3.1. ***Support to SMEs through a dedicated SME instrument***
SMEs will be supported across Horizon 2020. For this purpose a dedicated SME instrument is targeted at all types of ***innovative*** SMEs showing a strong ambition to develop, grow and internationalise. It will be provided for all types of innovation, including non-technological and service innovations. The objective is to help filling the gap in funding for early stage high risk research	SMEs will be supported across Horizon 2020. For this purpose a dedicated SME instrument is targeted at all types of ***innovation in*** SMEs showing a strong ambition to develop, grow and internationalise. It will be provided for all types of innovation, including non-technological and service innovations. The objective is to help filling the gap in funding for early stage high risk research

and innovation, stimulate break-through innovations and increase private-sector commercialisation of research results.

and innovation, stimulate break-through innovations and increase private-sector commercialisation of research results.

Successful participation in the SME instrument should constitute a quality label for the SME participants facilitating access to public procurement.

All of the societal challenges and the enabling and industrial technologies shall apply the dedicated SME instrument and allocate an amount to it.

The dedicated SME instrument will be used in all the societal challenges and the enabling and industrial technologies

Only SMEs will be allowed to apply for funding and support. They can form collaborations according to their needs, including for subcontracting research and development work. Projects must be of clear interest and potential benefit to SMEs and have a distinct European dimension.

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The SME instrument will cover all fields of science, technology and innovation in a bottom-up approach within a given societal challenge or enabling technology so as to leave sufficient room for all kinds of promising ideas, notably cross-sector and inter-disciplinary projects, to be funded.

The SME instrument will cover all fields of science, technology and innovation in a bottom-up approach ***with open calls*** within a given societal challenge or enabling technology so as to leave sufficient room for all kinds of promising ideas, notably cross-sector and inter-disciplinary projects, to be funded.

The SME instrument will provide simplified and staged support. Its three phases will cover the whole innovation cycle. Transition from one phase to the next will be seamless provided the SME project has proven to be worth further funding during a previous phase. At the same time each phase will be open to all SMEs:

The SME instrument will provide simplified and staged support. Its three phases will cover the whole innovation cycle. Transition from one phase to the next will be seamless provided the SME project has proven to be worth further funding during a previous phase. ***SMEs can apply directly to Phase 2, independently from Phase 1.*** At the same time each phase will be open to all SMEs:

– Phase 1: Concept and feasibility assessment:

– Phase 1: Concept and feasibility assessment:

SMEs will receive funding to explore the scientific or technical feasibility and the commercial potential of a new idea (proof of concept) in order to develop an innovation project. A positive outcome of this assessment will allow for funding

SMEs will receive funding to explore the scientific or technical feasibility and the commercial potential of a new idea (proof of concept) in order to develop an innovation project. A positive outcome of this assessment will allow for funding

under the following phase(s).

– Phase 2: R&D, demonstration, market replication:

Research and development will be supported ***with*** a particular focus ***on*** demonstration activities (testing, prototype, scale-up studies, design, piloting innovative processes, products and services, performance verification etc.) and market replication.

– Phase 3: Commercialisation:

This phase will not provide direct funding other than support activities, but aims to facilitate access to private capital and innovation enabling environments. Links to the financial instruments (see Part II, section 2 'Access to Risk Finance of this Annex) are foreseen, for example by giving SMEs that have successfully completed phases 1 and/or 2 priority within a ring-fenced volume of financial resources. SMEs will also benefit from support measures like networking, training, coaching and advice. In addition this part may connect to measures promoting pre-commercial procurement and procurement of innovative solutions.

Uniform promotion, implementation and monitoring of the SME instrument across Horizon 2020 will ensure easy access for SMEs. Relying on existing SME support

under the following phase(s).

– Phase 2: R&D, demonstration, market replication:

The full range of research and development ***and innovation activities*** will be supported ***through an Innovation Voucher which SMEs can use to work individually or with one or more research performers (universities, research centres or other companies in another Member State or Associated Country). Although*** a particular focus ***will be given to*** demonstration activities (testing, prototype, scale-up studies, design, piloting innovative processes, products and services, performance verification etc.) and market replication***, R&D activities are also possible***.

– Phase 3: Commercialisation:

This phase will not provide direct funding other than support activities, but aims to facilitate access to private capital and innovation enabling environments. Links to the financial instruments (see Part II, section 2 'Access to Risk Finance of this Annex) are foreseen, for example by giving SMEs that have successfully completed phases 1 and/or 2 priority within a ring-fenced volume of financial resources. SMEs will also benefit from support measures like networking, training, coaching and advice. In addition this part may connect to measures promoting pre-commercial procurement and procurement of innovative solutions.

The SME instrument may also serve as an instrument for pre-commercial procurement or procurement of innovative solutions for specific top-down identified common need of EU public procurers in Europe.

Uniform promotion, implementation and monitoring of the SME instrument across Horizon 2020 will ensure easy access for SMEs. ***To provide a single entry point for***

networks a mentoring scheme for the beneficiary SMEs shall be established to accelerate impact from the support provided.

SMEs, the SME instrument shall be implemented by a single body such as a specialised executive agency. Relying on existing SME support networks ***and other innovation service providers and*** a mentoring scheme for the beneficiary SMEs shall be established to accelerate impact from the support provided.

A dedicated body of stakeholders and experts in SME research and innovation will be set up with view to promoting and accompanying the specific SME measures of Horizon 2020.

A dedicated body of stakeholders and experts in SME research and innovation will be set up with view to promoting and accompanying the specific SME measures of Horizon 2020.

3.2. Specific support

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3.2.1. Support for research intensive SMEs

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A specific action will promote market-oriented innovation of R&D performing SMEs. It targets research intensive SMEs in high-technology sectors that also need to demonstrate their capability to commercially exploit the project results.

A specific action will promote market-oriented innovation of R&D performing SMEs. It targets research intensive SMEs in high-technology sectors that also need to demonstrate their capability to commercially exploit the project results.

The action will cover the entire field of science and technology with a bottom-up approach to fit the needs of R&D performing SMEs.

The action will cover the entire field of science and technology with a bottom-up approach to fit the needs of R&D performing SMEs.

The action will be implemented by an Article 185 TFEU initiative building on the Eurostars Joint Programme and reorienting it along the lines stated in its interim evaluation.

The action will be implemented by an Article 185 TFEU initiative building on the Eurostars Joint Programme and reorienting it along the lines stated in its interim evaluation.

3.2.2. Enhancing the innovation capacity of SMEs

3.2.2. ***Mainstreaming SME support and*** enhancing the innovation capacity of SMEs

Activities assisting the implementation and complementing the SME specific measures across Horizon 2020 will be supported, notably to enhance the innovation capacity of SMEs. Activities may include awareness raising, information and dissemination, training and mobility activities, networking and exchange of best practices, developing high quality innovation support mechanisms and services with strong Union added value for SMEs (e.g. intellectual property and innovation

Activities assisting the implementation and complementing the SME specific measures across Horizon 2020 will be supported, notably to enhance the innovation capacity of SMEs. Activities may include awareness raising, information and dissemination, training and mobility activities, networking and exchange of best practices, developing high quality innovation support mechanisms and services with strong Union added value for SMEs (e.g. intellectual property and innovation

management, knowledge transfer, innovative use of ICT and e-skills in SMEs), as well as assisting SMEs to connect to research and innovation partners across the Union, allowing them to spin in technology and develop their innovation capacity***. Intermediary organisations representing groups of innovative SMEs shall be invited to conduct cross-sectoral and cross-regional innovation activities with SMEs having mutually reinforcing competences, in order to develop new industrial value chains***.	management, knowledge transfer, innovative use of ICT and e-skills in SMEs), as well as assisting SMEs to connect to research and innovation partners across the Union, allowing them to spin in technology and develop their innovation capacity ***and their capacity to incorporate innovations and transform research results into innovative products, processes and services***.
	Intermediary organisations representing groups of innovative SMEs shall be invited to conduct cross-sectoral and cross-regional innovation activities with SMEs having mutually reinforcing competences, in order to develop new industrial value chains.
	In addition, enhanced participation of SMEs in the governance of the programme in particular the participation in the setting of research agendas and implementation of the public-private partnerships shall be promoted throughout Horizon 2020.
Synergies with Union cohesion policy will be sought in the context of national and regional innovation strategies for smart specialisation.	Synergies with Union cohesion policy will be sought in the context of national and regional innovation strategies for smart specialisation. ***These synergies may also build on the bottom-up national and regional experience of Eureka and Eurostars in supporting SME innovation and research activities.***
A reinforced link with the Enterprise Europe Network (under the Programme for the Competitiveness of Enterprises and SMEs) is envisaged. The support could range from improved information and advisory services through mentoring, coaching and partner search activities for SMEs wishing to develop cross-border innovation projects, to providing innovation support services. This will consolidate the ‘one stop shop’ approach of	A reinforced link with the Enterprise Europe Network (under the Programme for the Competitiveness of Enterprises and SMEs) is envisaged. The support could range from improved information and advisory services through mentoring, coaching and partner search activities for SMEs wishing to develop cross-border innovation projects, to providing innovation support services. This will consolidate the 'one stop shop' approach of

the Enterprise Europe Network to supporting SMEs, together with a strong regional and local presence of the network.	the Enterprise Europe Network to supporting SMEs, together with a strong regional and local presence of the network.
3.2.3. Supporting market-driven innovation	3.2.3. Supporting market-driven innovation
This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, in particular SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design) and reviews of public policies in relation to innovation will be supported.	This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, in particular SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support (on e.g. ***support in registering IP and*** IP exploitation, networks of procurers, support to technology transfer offices, strategic design***, cluster development***) and reviews of public policies in relation to innovation will be supported.
	3.2.3a. Supporting the transfer of knowledge and technology between public research and the market
	The objective is to support the transfer processes between the sphere of public research and innovative SME, as an effective mechanism for the market transfer of research results and inventions generated by universities and research centres.

Amendment 58
Proposal for a decision
Annex 1 – section 3 – point -1 (new)

Text proposed by the Commission	*Amendment*
	-1. Science with and for Society: a cross-cutting challenge
	In order to build an effective dialogue between science and society, to recruit new talent for science and to pair scientific excellence with social awareness and responsibility the following activities will be supported. These actions should

complement existing actions at Members States level and are horizontal to the whole Horizon 2020.

- Attractive scientific and technological careers for young students: Promoting scientific careers in the fields of science, technology and engineering in schools; opening up universities for young students; fostering sustainable interaction between schools and research institutions, and between students and their families, science teachers and researchers.

- Gender equality in its both dimensions: ensuring gender equality in research careers and decision-making and including gender considerations in the research development. Promotion of gender equality in particular by supporting changes in the organisation of research institutions and in the content and design of research activities.

- Integration of society in science and innovation issues: Enable all societal actors to engage in the research and innovation cycle and promote trans-disciplinary research and innovation in order to increase the quality, relevance, acceptability and sustainability of innovation outcomes by integrating society's interests and values; in particular support the participation of citizens and civil society organisations in research and innovation activities; promoting the interest of society in science and innovation issues; monitoring the perception of science by the citizens and supporting their participation in issues related to the development of science and technology.

- Encourage citizens to engage in science: A scientifically literate, responsible and creative society will be nurtured through the promotion of and research on appropriate science education methods, contributing to better formal and informal science and technology education, to

project-based science activities and to the networking of scientists and non-scientists at national, European and international level.;

- Open access to scientific results and data in order to augment scientific excellence and economic competitiveness: Promotion of a single data base with all European funded research projects. National and regional funding authorities will be encouraged to share the same information on national/regional projects. The inclusion of scientific data in this database will be promoted.

- Governance for the development of responsible research and innovation: Shaping governance for the development of responsible research and innovation by engaging all stakeholders (researchers, public authorities, industry), fostering the role of scientific expertise in decision-making processes, namely the participation of scientists and independent research organisations in societal controversies and in risk-governance related issues. An Ethics Framework for research and innovation, based on the fundamental ethical principles - including those enshrined in the Charter of Fundamental Rights and all the relevant Union laws and Conventions - will be promoted in coordination with relevant international organisations. The opinion of the European Group of Ethics in Science and New Technologies should be considered.

- Knowledge on science communication: In order to improve knowledge circulation within the scientific community and the wider public, the accessibility and use of the results of publicly funded research will be further developed. This will increase knowledge on science communication in order to improve the quality and effectiveness of interactions between scientists, the media and the public and promote wider participation of

citizens as active stakeholders and, whenever possible and appropriate, as participants of research.

Amendment 59
Proposal for a decision
Annex 1 – section 3

Text proposed by the Commission	*Amendment*
Societal Challenges	Societal Challenges
1. Health, demographic change and wellbeing	1. Health, demographic change and wellbeing
Effective health promotion, supported by a robust evidence base, prevents disease, improves wellbeing and is cost effective. Health promotion and disease prevention also depend on an understanding of the determinants of health, on effective preventive tools, such as vaccines, on effective health and disease surveillance and preparedness, and on effective screening programmes.	Effective health promotion, supported by a robust evidence base, prevents disease, improves wellbeing***, reduces disability, dependency and social exclusion*** and is cost effective. Health promotion and disease prevention also depend on an understanding of the determinants of health, on effective preventive tools, such as vaccines, on effective health and disease surveillance and preparedness, and on effective screening programmes***, and on better and integrated patient-centred health care delivery. The cultural, social, behavioural and psychological dimensions of health shall also be taken into account. Social sciences and humanities thus have an important role to play in understanding health and wellbeing.***
Successful efforts to prevent, manage, treat and cure disease, disability and reduced functionality are underpinned by the fundamental understanding of their causes, processes and impacts, as well as factors underlying good health and wellbeing. Effective sharing of data and the linkage of these data with real-world large scale cohort studies is also essential, as is the translation of research findings into the clinic, in particular through the conduct of clinical trials.	Successful efforts to prevent, manage, treat and cure disease, disability and reduced functionality ***as well as the study of living standard of elderly citizens*** are underpinned by the fundamental understanding of their causes, processes and impacts, as well as factors underlying good health and wellbeing. Effective sharing of data and the linkage of these data with real-world large scale cohort studies is also essential, as is the translation of research findings into the clinic, in particular through the conduct of clinical

trials.

An increasing disease and disability burden in the context of an aging population places further demands on health and care sectors. If effective health and care is to be maintained for all ages, efforts are required to improve decision making ***in*** prevention and treatment provision, to identify and support the dissemination of best practice in the healthcare sector, and to support integrated care and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent. Doing so will contribute to increasing, and lengthening the duration of their physical, social, and mental well-being.

An increasing disease***, particularly chronic disease,*** and disability burden in the context of an aging population places further demands on health and care sectors***, but also in social innovation research and development***. If effective health and care is to be maintained for all ages, efforts are required to improve ***and speed-up*** decision making ***and awareness-raising in disease*** prevention and treatment provision, ***rehabilitation and retraining*** to identify and support the dissemination of best practice in the healthcare sector, and to support integrated care***, including interventions of complementary and alternative medicine*** and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent***, in full respect for their health care choices***. Doing so will contribute to increasing, and lengthening the duration of their physical, social, ***economic*** and mental well-being. ***Special attention should be devoted to chronic diseases, such as cancer, cardiovascular, rheumatic and musculoskeletal, diabetes, respiratory and mental diseases.***

All of these activities will be undertaken in such a way as to provide support throughout the research and innovation cycle, strengthening the competitiveness of the European based industries and development of new market opportunities.

All of these activities will be undertaken in such a way as to provide support throughout the research and innovation cycle, ***including support for excellent basic research in health,*** strengthening the competitiveness of the European based industries and ***SMEs and*** development of new market opportunities***, based on an integrated and patient-centred approach***.

Programmes and projects under this topic should coordinate their research programmes with and take advantage of ESFRI research infrastructures. In order to foster strategic coordination of health research and innovation across Horizon 2020 and promote transnational medical research, the corresponding Strategic Scientific Panel for Health will be

	established. This co-ordinated, European effort will increase the scientific and human capabilities in health research.
Specific activities are described below.	Specific activities are described below.
1.1. Understanding the determinants of health, improving health promotion and disease prevention	1.1. Understanding the determinants of health, improving health promotion and disease prevention
A better understanding of the determinants of health is required in order to provide evidence for effective health promotion and disease prevention, and will also allow the development of comprehensive health and wellbeing indicators in the Union. Environmental, behavioural (including life-style), socio-economic and genetic factors, in their broadest senses will be studied. Approaches will include the long term study of cohorts and their linkage with data derived from **'**-omics**'** research, and other methods.	A better understanding of the determinants of health is required in order to provide evidence for effective health promotion***, wellbeing*** and disease prevention, and will also allow the development of comprehensive health and wellbeing indicators in the Union ***and worldwide***. Environmental, ***occupational,*** behavioural (including life-style), ***biological, genetic,*** socio-economic***, pathogen*** and genetic factors, in their broadest senses will be studied. Approaches will include the long term study of cohorts and their linkage with data derived from ′-omics′ research, and other methods.
In particular, a better understanding of the environment as a determinant of health will require integrated molecular biological, epidemiological and toxicological approaches to investigate health-environment relationships, including studies of modes of action of chemicals, combined exposures to pollution and other environmental and climate related stressors, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation biomarkers based on **'**omics**'** and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors. Improved links with environmental data using advanced information systems will be supported.	In particular, a better understanding of the environment as a determinant of health will require integrated ***and human-relevant*** molecular biological, epidemiological and toxicological approaches to investigate health-environment relationships ***and to elucidate the underlying mechanisms of illness and human toxicity***, including studies of modes of action of chemicals, combined exposures to pollution and other environmental and climate related stressors, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation ***and human- relevant*** biomarkers based on ′omics′ and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors. Improved links with environmental data using advanced

	information systems will be supported.
In this way, existing and planned policies and programmes can be assessed and policy support provided. Similarly, improved behavioural interventions, prevention and education programmes can be developed including those pertaining to health literacy in nutrition, vaccination and other primary care interventions.	In this way, existing and planned policies and programmes can be assessed and policy support provided. Similarly, improved behavioural interventions, prevention and education programmes can be developed including those pertaining to health literacy in nutrition, vaccination and other primary care interventions. ***'Health-in-all' approaches (such as those addressing the environment and the work place) can likewise be developed in order to minimise risk factors.***
1.2. Developing effective screening programmes and improving the assessment of disease susceptibility	1.2. Developing effective screening programmes and improving the assessment of disease susceptibility
The development of screening programmes depends on the identification of early biomarkers of risk and of disease onset, and their deployment depends on the testing and validation of screening methods and programmes. Identifying individuals and populations at high-risk of disease will allow personalised, stratified and collective strategies for efficacious and cost effective disease prevention to be developed.	The development of screening programmes depends on the identification of early biomarkers of risk and of disease onset, and their deployment depends on the testing and validation of screening methods and programmes. Identifying individuals and populations at high-risk of disease will allow personalised, stratified and collective strategies for efficacious and cost effective disease prevention to be developed.
1.3. Improving surveillance and preparedness	1.3. Improving surveillance and preparedness
Human populations are under threat from new and emerging infections (including those resulting from climate change), from drug resistance to existing pathogens and from other direct and indirect consequences of climate change. Improved methods for surveillance, early warning networks, health service organisation and preparedness campaigns are needed for the modelling of epidemics, for effective pandemic response, for responses to non infectious disease consequences of climate change, as are efforts to maintain and enhance capabilities to combat drug resistant infectious disease.	Human populations are under threat from new and emerging infections (including those resulting from climate change), from drug resistance to existing pathogens and from other direct and indirect consequences of climate change. ***Predictive mathematical theories and*** improved methods for surveillance, early warning networks, health service organisation and preparedness campaigns are needed for the modelling of epidemics, for effective pandemic response, for responses to non infectious disease consequences of climate change, as are efforts to maintain and enhance capabilities to combat drug resistant infectious disease. ***In order to face up to these global challenges, the EU will, in partnership with the countries***

	concerned, implement measures aimed at achieving concrete results in health policy, improving health care services and supporting their own research capacity.
1.4. Understanding disease	1.4. Understanding disease
There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. Interdisciplinary, translational research on the patho-physiology of disease is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and disease based on molecular data, and to validate and use research results in clinical applications.	There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. ***Fundamental excellent research and*** interdisciplinary, translational research on the patho-physiology of disease is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and disease based on molecular data, and to validate and use research results in clinical applications.
Underpinning research will encompass and encourage development and use of new tools and approaches for the generation of biomedical data and include ‘-omics’, high throughput and systems medicine approaches. These activities will demand close linkage between fundamental and clinical research and with long term cohort studies (and the corresponding research domains) as described above. Close links with research and medical infrastructures (databases, bio-banks etc.) will also be required, for standardisation, storage, sharing and access to data, which are all essential for maximising data utility and for stimulating more innovative and effective ways of analysing and combining datasets.	Underpinning research will encompass and encourage development and use of new tools and approaches for the generation of biomedical data and include "-omics", high throughput and systems medicine approaches. These activities will demand close linkage between fundamental and clinical research and with long term cohort studies (and the corresponding research domains) as described above. Close links with research and medical infrastructures (databases, bio-banks etc.) will also be required, for standardisation, storage, sharing and access to data, which are all essential for maximising data utility and for stimulating more innovative and effective ways of analysing and combining datasets.
1.5. Developing better preventive vaccines	1.5. Developing ***new and*** better preventive vaccines ***and drugs***
There is a need for more effective preventive vaccines (or alternative preventive interventions) and evidence-based vaccination schemes for an expanded range of diseases. This relies on a better understanding of disease and disease processes and their consequent epidemics,	There is a need for more effective ***drugs and*** preventive vaccines (or alternative preventive interventions) and evidence-based vaccination schemes for an expanded range of ***diseases, including poverty-related diseases such as HIV/AIDS, tuberculosis, malaria and neglected***

and that clinical trials and associated studies are undertaken.	diseases. This relies on a better understanding of disease and disease processes and their consequent epidemics, and that clinical trials and associated studies are undertaken.
1.6. Improving diagnosis	1.6. Improving diagnosis
An improved understanding of health, disease and disease processes at all ages is needed to develop new and more effective diagnostics. Innovative and existing technologies will be developed with the goal of ***significantly improving disease outcomes through*** earlier, more accurate diagnosis and by allowing for ***more*** patient-adapted treatment.	An improved understanding of health, disease and disease processes at all ages is needed to develop new and more effective diagnostics***, including in vitro and image diagnostics***. Innovative and existing technologies will be developed ***so that they can be adapted to different environmental and socio-economic conditions,*** with the goal of ***ensuring (deletion)*** earlier, more accurate diagnosis and by allowing for ***better and more accessible*** patient-adapted treatment ***in the pre-hospital as well as in hospital phase. Mutations causing genetic diseases will be identified and the availability of diagnostic tests will be significantly increased***.
1.7. Using in-silico medicine for improving disease management and prediction	1.7. Using in-silico medicine for improving disease management and prediction
Computer simulation using patient specific data and building on systems medicine approaches and physiological modelling can be used to predict susceptibility to disease, disease evolution and the likely success of medical treatments. Model based simulation can be used to support clinical trials, predictability of treatment response, and the personalisation and optimisation of treatment.	Computer simulation using patient specific data and building on systems medicine approaches and physiological modelling can be used to predict susceptibility to disease, disease evolution and the likely success of medical treatments. Model based simulation can be used to support clinical trials, predictability of treatment response, and the personalisation and optimisation of treatment.
1.8. Treating disease	1.8. ***Developing adapted treatments and*** treating disease
There is a need to support the improvement of cross-cutting support technologies for drugs, vaccines and other therapeutic approaches, including transplantation, gene and cell therapy; to increase success in the drug and vaccine development process (including alternative methods to replace classical safety and effectiveness testing e.g. the development of new methods); to	There is a need to support the improvement of cross-cutting support technologies for drugs, ***biotherapies,*** vaccines and other therapeutic approaches, including transplantation, gene and cell therapy ; to increase success in the drug and vaccine development process (including alternative methods to replace classical safety and effectiveness testing e.g. the development

develop regenerative medicine approaches, including approaches based on stem cells; to develop improved medical and assistive devices and systems; to maintain and enhance our ability to combat communicable, rare, major and chronic diseases and undertake medical interventions that depend on the availability of effective antimicrobial drugs; and to develop comprehensive approaches to treat co-morbidities at all ages and avoid poly-pharmacy. These improvements will facilitate the development of new, more efficient, effective and sustainable treatments for disease and for the management of disability.

of new methods); to develop regenerative medicine approaches, including approaches based on stem cells; to develop improved medical and assistive devices and systems; to ***improve palliative therapies; to*** maintain and enhance our ability to combat communicable***, poverty-related, neglected,*** rare, major and chronic diseases and undertake medical interventions that depend on the availability of effective antimicrobial drugs; and to develop comprehensive approaches to treat co-morbidities at all ages and avoid poly-pharmacy. These improvements will facilitate the development of new, more efficient ***and adapted***, effective and sustainable treatments for disease and for the management of disability***, both outside and inside hospital***. ***Research shall make it possible to improve advanced therapies and cellular therapies. This shall be focused on the treatment of chronic diseases.***

1.9. Transferring knowledge to clinical practice and scalable innovation actions

Clinical trials are the means to transfer biomedical knowledge to application in patients and support for these will be provided, as well as for the improvement of their practice. Examples include the development of better methodologies to allow trials to focus on relevant population groups, including those suffering from other concomitant diseases and/or already undergoing treatment, the determination of comparative effectiveness of interventions and solutions, as well as enhancing the use of databases and electronic health records as data sources for trials and knowledge transfer. Similarly, support for the transfer of other types of interventions such as those related to independent living into real world environments will be provided.

1.9. Transferring knowledge to clinical practice and scalable innovation actions

Clinical trials are the means to transfer biomedical knowledge to application in patients and support for these will be provided, as well as for the improvement of their practice. Examples include the development of better methodologies to allow trials to focus on relevant population groups, including those suffering from ***rare diseases*** other concomitant diseases and/or already undergoing treatment, the determination of comparative effectiveness of interventions and solutions, as well as enhancing the use of databases and electronic health records as data sources for trials and knowledge transfer. ***Specific support should be ensured for the preclinical and/or clinical development of substances with a clear potential to address largely unmet medical needs, such as designated orphan drugs.*** Similarly, support for the transfer of other types of interventions such as those related

	to independent living into real world environments will be provided. ***Ethical principles, and in particular the Helsinki Declaration, require that data from all research activity carried out on humans be made public.***
1.10. Better use of health data	1.10. Better ***collection and*** use of health data ***and standardised data analysis techniques***
The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and access to data, will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation.	The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and access to data, will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation ***as well as to mechanisms ensuring the long-term sustainability of such infrastructures in order to make the best use of resources***.
1.11. Improving scientific tools and methods to support policy making and regulatory needs	1.11. Improving scientific tools and methods to support policy making and regulatory needs
There is a need to support the development of scientific tools, methods and statistics for rapid, accurate and predictive assessment of the safety, efficacy and quality of health technologies including new drugs, biologics, advanced therapies and medical devices. This is particularly relevant for new developments in domains including those concerning vaccines, cell/tissue and gene therapies, organs and transplantation, specialist manufacturing, bio banks, new medical devices, diagnostic/treatment procedures, genetic testing, interoperability and e-health, including privacy aspects. Similarly, support for improved risk assessment methodologies, testing approaches and strategies relating to environment and health are required. There is also a need to	There is a need to support the development***, the integration and use*** of scientific tools, methods and statistics for rapid, accurate and predictive assessment of the safety, efficacy and quality of health technologies including new drugs, biologics, advanced therapies and medical devices. This is particularly relevant for new developments in domains including those concerning vaccines, cell/tissue and gene therapies, organs and transplantation, specialist manufacturing, bio banks, new medical devices, diagnostic/treatment procedures, genetic testing, interoperability***, telemedecine*** and e-health, including privacy aspects. Similarly, support for improved risk assessment methodologies, testing approaches and strategies relating to environment and

support the development of relevant methods for assisting the assessment of ethical aspects of the above domains.	health are required***, including more predictive and efficient pre-clinical safety assessments (e.g. consistency approach together with other non-animal or reduction approaches)***. There is also a need to support the development of relevant methods for assisting the assessment of ethical aspects of the above domains.
1.12. Active ageing, independent and assisted living	1.12. ***Healthy and*** active ageing, independent and assisted living
Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies, service and social robotics, and ambient assistive environments. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported.	Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies, service and social robotics, and ambient assistive environments. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported.
1.13. Individual empowerment for self-management of health	1.13. Individual empowerment for self-management of health
Empowering individuals to improve and manage their health throughout life will result in cost savings to healthcare systems by enabling the management of chronic disease outside institutions and improve health outcomes. This requires research into behavioural and social models, social attitudes and aspirations in relation to personalised health technologies, mobile and/or portable tools, new diagnostics and personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional interaction, personalised programmes for disease and disability management, as well as support for knowledge infrastructures.	Empowering individuals to improve and manage their health throughout life will result in cost savings to healthcare systems by enabling the management of chronic disease outside institutions and improve health outcomes. This requires research into behavioural and social models, social attitudes and aspirations in relation to personalised health technologies, mobile and/or portable tools, new diagnostics and personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional interaction, personalised programmes for disease and disability management, ***to enhance patients' personal and social***

autonomy, as well as support for knowledge infrastructures.

1.14. Promoting integrated care

1.14. Promoting integrated care ***including psychosocial aspects***

Supporting the management of chronic disease outside institutions also depends on improved cooperation between the providers of health ***and*** social or informal care**.** Research and innovative applications will be supported for decision making based on distributed information, and for providing evidence for large scale deployments and market exploitation of novel solutions, including interoperable tele-health and tele-care services. Research and innovation to improve the organisation of long-term care delivery will also be supported.

Supporting the management of chronic disease ***and conditions*** outside institutions also depends on improved cooperation between the ***patients and the*** providers of health**,** social or informal care**,** Research and innovative applications will be supported for decision making based on distributed information, and for providing evidence for large scale deployments and market exploitation of novel solutions, including interoperable tele-health and tele-care services. Research and innovation to improve the organisation of long-term care delivery ***and public health system*** will also be supported. ***Interdisciplinary research in social sciences is also needed to provide the most suitable solutions for addressing the needs of the patients in their everyday life and to contribute to their empowerment, especially for patients living with chronic conditions, such as rare disease patients.***

1.15. Optimising the efficiency and effectiveness of healthcare systems and reducing inequalities through evidence based decision making and dissemination of best practice, and innovative technologies and approaches**.**

1.15. Optimising the efficiency and effectiveness of healthcare systems and reducing inequalities through evidence based decision making and dissemination of best practice, and innovative technologies and approaches

There is a need to support the development of health technology assessment and health economics, as well as the gathering evidence and dissemination of best practice and innovative technologies and approaches in the healthcare sector, including ICT and e-health applications. Comparative analyses of the reform of public health systems in Europe and in third countries and assessments of their mid to long-term economic and social impacts will be supported. Analyses of future health workforce needs both in terms of numbers and required skills in

There is a need to support the development of health technology assessment and health economics, as well as the gathering evidence and dissemination of best practice and innovative technologies and approaches in the healthcare sector, including ICT and e-health applications. Comparative analyses of the reform of public health systems in Europe and in third countries and assessments of their mid to long-term economic and social impacts will be supported. Analyses of future health workforce needs both in terms of numbers and required skills in

relation to new patterns of care will be supported. Research on the evolution of health inequalities, of their interplay with other economic and social inequalities and on the effectiveness of policies aiming to reduce them in Europe and beyond will be supported. Finally, there is a need to support the assessment of patient safety solutions and quality assurance systems, including the role of patients on safety and quality of care.

relation to new patterns of care will be supported. Research on the evolution of health inequalities, of their interplay with other economic and social inequalities and on the effectiveness of policies aiming to reduce them in Europe and beyond will be supported. Finally, there is a need to support the assessment of patient safety solutions and quality assurance systems, including the role of patients on safety and quality of care.

1.15a. Developing simulation-based medical devices

The drop in costs of sequencing and other –omics technologies as well as the availability of high power computing allows in the near future for the first time the development of mechanistic, computer-based simulation models and its implementing medical devices, which will support treatment decision of physician based on evidence and prior simulation before use as well as new and cheaper drug development technologies. Precision medicines become possible with the ultimate goal of curing diseases not only treating and reducing the growth rate of health care spending.

1.15b. Promoting personalised medicine for severe disease

Personalised medicine must be developed in order to generate new preventive and therapeutic strategies which can be adjusted to patient requirements, so as to increase the prevention and early detection of diseases. The factors which influence therapeutic decision-making must be identified, further elucidated and developed through research.

1.16. Specific implementation aspects

Support provided will cover the full spectrum of activities from knowledge and technology transfer ***to*** large scale demonstration actions, leading to scalable solutions for Europe and beyond.

1.16. Specific implementation aspects

Support provided will cover the full spectrum of activities from ***capacity building,*** knowledge and technology transfer ***(including health policy), implementation, monitoring and***

assessment of large scale demonstration actions, leading to scalable solutions for Europe and beyond.

It is widely recognised that coordinated and strategic planning of health research is urgently needed in order to tackle the major health challenges facing Europe. Coordination can address fragmentation and improve the use of technological and infrastructural resources by the entire biomedical research community. Success and innovation in health research moreover requires a long-term commitment to sustain excellent research.

Strategic action and high-level scientific assistance can ensure expert input on policy from the outset, advance innovation and competitiveness by understanding the complexity of the innovation cycle, encourage participation from more researchers across borders and science-based savings for national health systems.

As a first step, the Strategic Scientific Panel for Health research will be established in order to respond to the urgent need of fostering strategic scientific coordination of health research across Horizon 2020 and of promoting translational medical research. Such strategic coordination will aim at contributing to defining biomedical research and translation programmes based upon the best scientific leadership and that should ensure expert scientific input on policy from the outset and warrant cost-effectiveness for national health systems. Strategic scientific coordination will also aim at attracting other areas of scientific and technological research to the opportunities provided by modern biomedical research.

By establishing Horizon 2020 internal strategic coordination across health research issues, based upon top-level scientific advisory, the Strategic Scientific

Panel will also provide the impetus and instruments needed to promote interaction and synergies at a larger scale. Voluntary convergence among national funding agencies, and with the Commission, on specific objectives, whenever appropriate, as well as strategic specific partnership, at Union level, between industry, national agencies and the Commission and strategic convergence at programme level involving regulatory bodies and national health authorities will be pursued.

Amendment 60
Proposal for a decision
Annex 1 – section 3 – point 2

Text proposed by the Commission	*Amendment*
2. ***Food*** security, sustainable agriculture, marine and maritime research and ***the bio-economy***	2. Food ***quality,*** security ***and safety***, sustainable agriculture ***and forestry***, marine and maritime research and ***bio-based industries***
2.1. Sustainable agriculture and forestry	2.1. Sustainable ***and competitive*** agriculture***, livestock farming*** and forestry
Appropriate knowledge, tools, services and innovations are necessary to support more productive, resource-efficient and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials ***and deliver*** ecosystems services while at the same time ***supporting the development*** of thriving rural livelihoods. Research and innovation will provide options for integrating agronomic and environmental goals into sustainable production, ***thus***: increasing productivity and resource efficiency of agriculture; reducing agricultural greenhouse gases (GHGs) emissions; reducing leaching of nutrients from cultivated lands into terrestrial and aquatic environments; decreasing dependence from international plant derived protein imports to Europe;	Appropriate knowledge, ***knowledge transfers,*** tools, services and innovations are necessary to support more productive, resource-efficient***, resource-protecting*** and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials***, deliver and maintain*** ecosystems services while at the same time ***preserving the natural resource base, biodiversity and support (deletion)***of thriving rural livelihoods***, safeguarding consumer health and reducing the environmental impact. The aim is that of establishing food production systems that strengthen, reinforce and nourish the resource base, which would allow sustainable wealth generation***. Research and innovation will provide options for integrating agronomic and environmental

increasing the level of biodiversity in primary production systems.

goals into ***more*** sustainable production, ***such as***: increasing productivity and resource efficiency of agriculture; reducing agricultural greenhouse gases (GHGs) emissions; reducing leaching of nutrients from cultivated lands into terrestrial and aquatic environments; decreasing dependence from international plant derived protein imports to Europe; ***understanding the complex relationship of agriculture and forestry with the hydrologic cycle; improving (deletion) agricultural*** systems ***and landscapes, recycling of nutrients and organic matter and preserving water and soil resources, thereby improving adaptive capacities of farmers with regard to climate change and uncertainties***.

2.1.1. Increasing production efficiency and coping with climate change, while ensuring sustainability and resilience

2.1.1. Increasing production efficiency and coping with climate change, while ensuring sustainability and resilience

Activities will enhance productivity as well as the adaptive capacity of plants, animals and production systems to cope with rapidly changing environmental/climatic conditions and increasingly scarce natural resources. The resulting innovations will help to move towards a low energy, low emission and low waste economy, along the entire food and feed supply chain. In addition to contributing to food security, new opportunities will be created for the use of biomass and by-products from agriculture and forestry for a wide range of non-food applications.

Activities will enhance productivity as well as the adaptive capacity of plants, animals and production systems to cope with rapidly changing environmental/climatic conditions and increasingly scarce natural resources***, especially water***. The resulting innovations ***and their transfer to all economic actors involved*** will help to move towards a low energy, low emission***, low external input*** and low waste economy, along the entire food and feed supply chain. In addition to contributing to food security ***and consumer health***, new opportunities will be created for the use of biomass and by-products from agriculture and forestry for a wide range of non-food applications.

Multi-disciplinary approaches will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, nutrients, energy) and the ecological integrity of rural areas. Emphasis will be placed on integrated and diverse production systems and agronomic practices, including the use of precision

Multi and trans-disciplinary approaches ***along the whole supply chain*** will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, ***soil,*** nutrients, energy)***, the quality of production*** and the ecological integrity ***and vitality*** of rural areas. Emphasis will be placed on integrated and diverse

technologies and ecological intensification approaches to benefit ***both conventional and organic*** agriculture. ***Genetic improvement of plants and animals for adaptation and productivity traits will call for all appropriated conventional and modern breeding approaches and for a better*** use of ***genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed. Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet societal concerns. The above listed areas will be underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies***.

production systems and agronomic practices, including the use of precision technologies and ecological intensification approaches to benefit ***all types of*** agriculture. ***The appropriate*** use of ***treated wastewater as a means of increasing production efficiency must be considered. Reducing leaching of nutrients from cultivated lands into terrestrial and aquatic environments, avoiding diffuse pollution through groundwater returning to surface water bodies, is particularly important***.

Genetic improvement of plants and animals for adaptation and productivity traits will call for all appropriated conventional and modern breeding approaches and for a better use of genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed.

Genetic improvement of plants and animals for adaptation and productivity traits will call for all appropriated conventional and modern breeding approaches and for a better use ***and conservation*** of genetic resources***, opening avenues for the production of new and diversified products (food, feed, materials, energy), which meet the increasing demand for low-carbon short-chain delivery systems***. Due attention will be given to on-farm soil management for increasing soil fertility as a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed.

Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet societal concerns. The above listed areas will be

Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet societal concerns. The above listed areas will be

underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies.

2.1.2. Providing ecosystem services and public goods

Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value) and important ecological services such as functional and in-situ biodiversity, pollination, water regulation, landscape, erosion reduction and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, decision-support tools and the assessment of their non-market value. Specific issues to be dealt with include the identification of farming/forest systems and landscape patterns likely to achieve these goals. Shifts in ***theactive*** management of agricultural systems - including the use of technologies and change of practices - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change.

2.1.3. Empowerment of rural areas, support to policies and rural innovation

Development opportunities for rural

underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies ***and Europe's leading role in global initiatives.***

2.1.2. ***Strengthening multi-functionality of agriculture, including*** ecosystem services and public goods

Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value) and important ecological services such as functional and in-situ biodiversity, pollination, water ***storage and*** regulation, landscape, ***soil functionality,*** erosion reduction***, resilience to floods and drought*** and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, decision-support tools and the assessment of their non-market value. Specific issues to be dealt with include the identification of farming/forest systems and landscape patterns likely to achieve these goals. ***Socio-economic and comparative assessment of farming/forestry systems and their sustainability performance will be addressed.*** Shifts in ***the active*** management of agricultural systems - including the use of technologies and change of practices - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change. ***This also calls for integrated water management and alternative sources (e.g. treated wastewater) for irrigation (agriculture, landscape and forestry), environmental restoration/enhancement, forest-fire fighting and public water supply.***

2.1.3. Empowerment of rural areas, support to policies and rural innovation

Development opportunities for rural

communities will be mobilised by strengthening their capacity for primary production and delivery of eco-systems services as well as by opening avenues for the production of new and diversified products (food, feed, materials, energy), which meet the increasing demand for low-carbon short-chain delivery systems. Socio-economic research along with the development of new concepts and institutional innovations is needed to ensure cohesion of rural areas and prevent economic and social marginalisation, foster diversification of economic activities (including service sector), ensure appropriate relations between rural and urban areas, as well as facilitate knowledge exchange, demonstration, innovation and dissemination and foster participatory resource management. Also, there is a need to look at ways in which public goods in rural areas can be converted into local/regional socio-economic benefits. Innovation needs defined at regional and local levels will be complemented by cross-sectoral research actions at inter-regional and European levels. By providing the necessary analytical tools, indicators, models and forward looking activities, research projects will support policy makers and other actors in the implementation, monitoring and assessment of relevant strategies, policies and legislation, not only for rural areas but for the whole bio-economy. Tools and data are also required to allow for proper assessment of potential trade-offs between various types of resource use (land, water and other inputs) and bio-economy products. Socio-economic and comparative assessment of farming/forestry systems and their sustainability performance will be ***addressed***.

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2.2. Sustainable and competitive agri-food sector for a safe and healthy diet

2.2. Sustainable and competitive agri-food sector for a safe***, affordable*** and healthy diet

Consumer needs for safe, healthy and affordable food have to be addressed, while considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, covering the whole food chain and related services, whether conventional or organic, from primary production to consumption. ***This approach will contribute to (a) achieving food safety and security for all Europeans and eradication of hunger in the world (b) decreasing the burden of food- and diet-related diseases by promoting the shift towards healthy and sustainable diets, via consumer education and innovations in the food industry (c) reducing water and energy consumption in food processing, transport and distribution and (d) reducing food waste by 50 % by 2030***.

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2.2.1. Informed consumer choices

Consumer preferences, attitudes, needs, behaviour, lifestyle and education will be addressed, and communication between consumers and the food chain research community and its operators will be enhanced in order to improve informed choice, sustainable consumption and their

Consumer needs for safe, healthy and affordable food have to be addressed, while considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, covering the whole food chain and related services, whether conventional or organic, ***for all types of farming and products,*** from primary production to consumption. ***Competitiveness can be defined on various levels, and the aim is to achieve systems which also enable farmers to be competitive on a local and regional level. There should be coherence in the Union's approach so that striving for competitiveness on a global market should not run contrary to Union efforts and funding to create vibrant local economies and short food production and supply chains***.

This approach will contribute to (a) achieving food safety and security for all Europeans and eradication of hunger in the world (b) decreasing the burden of food- and diet-related diseases ***and obesity*** by promoting the shift towards healthy and sustainable diets, via consumer education and innovations in the ***agriculture and*** food industry (c) reducing water and energy consumption in food processing, transport and distribution, (d) reducing food waste by 50 % by 2030 ***and (e) achieving a broad diversity of healthy, authentic, high quality and safe food for all***.

2.2.1. Informed consumer choices

Consumer preferences, attitudes, needs, behaviour, lifestyle and education will be addressed, and communication between consumers and the food chain research community and its operators will be enhanced in order to improve informed choice, sustainable consumption and their

impacts on production, inclusive growth and quality of life, especially of vulnerable groups. Social innovation will respond to societal challenges, and innovative models and methodologies in consumer science will deliver comparable data and lay the ground for responses to Union policy needs.

impacts on production, inclusive growth and quality of life, especially of vulnerable groups. Social innovation will respond to societal challenges, and innovative models and methodologies in consumer science will deliver comparable data and lay the ground for responses to Union policy needs.

The research activities should also focus on a broad diversity of healthy, authentic, high quality and safe foods for all. Furthermore, they should concentrate on consumer wishes and competitive food processing methods that use less resources and additives and produce fewer by-products and less greenhouse gases.

2.2.2. Healthy and safe foods and diets for all

2.2.2. Healthy and safe foods and diets for all

Nutritional needs and the impact of food on physiological functions, physical and mental performance will be addressed as well as the links between diet, ageing, chronic diseases and disorders and dietary patterns. Dietary solutions and innovations leading to improvements in health and well-being will be identified. Chemical and microbial food and feed contamination, risks and exposures will be assessed, monitored, controlled and traced throughout the food and drinking water supply chains from production and storage to processing, packaging, distribution, catering, and preparation at home. Food safety innovations, improved risk communication tools and improved food safety standards will lead to enhanced consumer trust and protection in Europe. Globally improved food safety standards will also help to strengthen the competitiveness of the European food industry.

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2.2.3. A sustainable and competitive agri-food industry

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The needs for the food and feed industry to cope with social, environmental, climate

The needs for the food and feed industry to cope with social, environmental, climate

and economic change from local to global will be addressed at all stages of the food and feed production chain, including food design, processing, packaging, process control, waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, affordable and high quality products will be generated. This will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-economic factors, the resilience of the food chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.

2.3 Unlocking the potential of aquatic living resources

One of the main features of living aquatic resources is that they are renewable and their sustainable exploitation relies on in depth understanding and a high degree of quality and productivity of the aquatic ecosystems. The overall objective is to sustainably exploit aquatic living resources to maximise social and economic benefits/returns from Europe's oceans and seas. This includes the need to optimise the sustainable contribution of fisheries and aquaculture to food security in the context of the global economy and reduce the heavy Union's dependence on seafood imports (approximately 60 % of total European sea food consumption depends on import and the Union is the world's largest importer of fisheries products), and to boost marine biotechnologies to fuel "blue" growth. In line with current policy frameworks, research activities will

and economic change from local to global will be addressed at all stages of the food and feed production chain, including ***agricultural production,*** food design, processing, packaging, process control, ***water reuse,*** waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, ***healthy,*** affordable and high quality products will be generated. This will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-economic factors, the resilience of the food chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.

2.3. Unlocking the potential of *fisheries, aquaculture and marine biotechnologies*

One of the main features of living aquatic resources is that they are renewable and their sustainable exploitation relies on in depth understanding and a high degree of quality and productivity of the aquatic ecosystems. The overall objective is to sustainably exploit aquatic living resources to ***fulfil*** social ***needs, deliver*** economic benefits/returns from Europe's oceans***, seas, rivers*** and ***other water bodies, while protecting biodiversity, ecosystem services and preserving the resource base***. This includes the need to optimise the sustainable contribution of fisheries and aquaculture to food security in the context of the global economy***, specially reducing*** the heavy Union's dependence on seafood imports (approximately 60 % of total European sea food consumption depends on import and the Union is the world's largest importer of fisheries products), and

underpin the ecosystem approach to the management and exploitation of natural resources, and the 'greening' of the sectors involved.

to boost marine biotechnologies to fuel 'blue' growth. ***Cross-cutting marine and maritime scientific and technological knowledge will be addressed with a view to unlock the potential of the seas and inland waters across the range of marine and maritime industries, while protecting the environment and adapting to climate change.*** In line with current policy frameworks, research activities will underpin the ecosystem approach to the management and exploitation of natural resources, and the 'greening' of the sectors involved.

2.3.1. Developing sustainable and environmentally-friendly fisheries

2.3.1. Developing sustainable and environmentally-friendly fisheries

The new Common Fisheries Policy, the Marine Strategy Framework Directive and the Union's Biodiversity Strategy call for European fisheries to be more sustainable, competitive, and environmentally-friendly. The move towards an ecosystem approach to fisheries management will require an in depth understanding of marine ecosystems. New insights, tools and models will be developed to improve understanding of what makes marine ecosystems healthy and productive and to assess, evaluate and mitigate the impact of fisheries on marine ecosystems (including deep sea). New harvest strategies will be developed which provide services to society while maintaining healthy marine ecosystems. The socio-economic effects of management options will be measured. The effects and adaptation to environmental changes, including climate change, will also be investigated along with new management tools to deal with risk and uncertainty. Activities will support research on the biology, genetic and dynamics of fish populations, on the role of key species in the ecosystems, on fishing activities and their monitoring, on fishing sector behaviours and adaptation to new markets e.g. eco-labelling on fishing industry involvement in decision making.

The new Common Fisheries Policy, the Marine Strategy Framework Directive and the Union's Biodiversity Strategy call for European fisheries to be more sustainable, competitive, and environmentally-friendly. The move towards an ecosystem approach to fisheries management will require an in depth understanding of marine ecosystems ***and rebuilding fish stocks by keeping them above the levels which can produce the maximum sustainable yield***. New insights, tools and models will be developed to improve understanding of what makes marine ecosystems healthy and productive and to assess, evaluate and mitigate the impact of fisheries on marine ecosystems (including deep sea). New harvest strategies will be developed which provide services to society while maintaining healthy marine ecosystems. The socio-economic effects of management options will be measured. The effects and adaptation to environmental changes, including climate change, will also be investigated along with new management tools to deal with risk and uncertainty. Activities will support research on the biology, genetic and dynamics of fish populations, on the role of key species in the ecosystems, on fishing activities and their monitoring, on fishing

The shared use of maritime space with other activities, in particular in the coastal zone, and its socio-economic impact will also be addressed.	sector behaviours and adaptation to new markets e.g. eco-labelling on fishing industry involvement in decision making. The shared use of maritime space with other activities, in particular in the coastal zone, and its socio-economic impact will also be addressed.
2.3.2. Developing competitive European aquaculture	2.3.2. Developing ***sustainable and*** environmentally-friendly fisheries
Aquaculture has a large potential for the development of healthy safe and competitive products tailored to consumer needs and preferences as well as for environmental services (bioremediation, land and water management, etc) and energy production but it needs to be fully realised in Europe. Knowledge and technologies will be strengthened in all aspects of domestication of established species and diversification for new species while taking into account the interactions between aquaculture and the aquatic ecosystems, and the effects of climate change and how the sector can adapt to them. Innovation will also be promoted for sustainable production systems in inland, on the coastal zone and offshore. Emphasis will also be given to understanding the social and economic dimensions of the sector to underpin cost and energy efficient production matching with the market and consumer demands, while ensuring competitiveness and attractive prospects for investors and producers.	***Sustainable*** aquaculture has a large potential for the development of healthy safe and competitive products tailored to consumer needs and preferences as well as for environmental services (bioremediation, land and water management, etc) and energy production but it needs to be fully realised in Europe. Knowledge and technologies will be strengthened in all aspects of domestication of established species and diversification for new species while taking into account the interactions between aquaculture and the aquatic ecosystems, and the effects of climate change and how the sector can adapt to them. Innovation will also be promoted for sustainable production systems in inland, on the coastal zone and offshore. Emphasis will also be given to understanding the social, economic ***and environmental*** dimensions of the sector to underpin cost and energy efficient production matching with the market and consumer demands, while ensuring competitiveness and attractive prospects for investors and producers.
2.3.3. Boosting marine innovation through biotechnology	2.3.3. Boosting marine innovation through biotechnology **and protecting biodiversity**
More than 90 % of the marine biodiversity remains unexplored, offering a huge potential for discovery of new species and applications in the field of marine biotechnologies, which is foreseen to generate a 10 % annual growth for this sector. Support will be given to further explore and exploit the large potential	More than 90 % of the marine biodiversity remains unexplored, offering a huge potential for discovery of new species and applications in the field of marine biotechnologies, which is foreseen to generate a 10 % annual growth for this sector. Support will be given to further explore the large potential offered by

offered by marine biodiversity and aquatic biomass to bring new innovative processes, products and services on the markets with potential applications in sectors including chemical and material industries, pharmaceutical, fisheries and aquaculture, energy supply and cosmetic.

marine biodiversity and aquatic biomass to bring innovative ***and sustainable*** processes, products and services on the markets with potential applications in sectors including chemical and material industries, pharmaceutical, fisheries and aquaculture, energy supply and cosmetic. ***Environmental concerns regarding the use of biotechnology in open marine ecosystems have to be carefully taken into account.***

2.4. Sustainable and competitive bio-based industries

2.4. Sustainable and competitive bio-based industries

The overall objective is to accelerate the conversion of fossil-based European industries to low carbon, resource efficient and sustainable ones. Research and innovation will provide the means to reduce the Union's dependency on fossil fuels and contribute to meeting its energy and climate change policy targets for 2020 (10 % of transport fuels from renewables and a 20 % reduction of greenhouse gases emissions). Estimates conclude that a shift to biological raw materials and biological processing methods could save up to 2.5 billion tons of CO_2 equivalent per year by 2030, increasing markets for bio-based raw materials and new consumer products several-fold. Reaping these potentials requires building a broad knowledge base and developing relevant (bio)technologies, focussing mainly on three essential elements: a) transforming current fossil-based processes by resource and energy efficient biotechnology based ones; b) establishing reliable and appropriate supply chains of biomass and waste streams and a wide network of bio-refineries throughout Europe; and c) supporting market development for bio-based products and processes. Synergies will be sought with the '*Leadership in Enabling and Industrial Technologies*' specific objective.

The overall objective is to accelerate the conversion of fossil-based European industries to low carbon, resource efficient and sustainable ones. Research and innovation will provide the means to reduce the Union's dependency on fossil fuels and contribute to meeting its energy and climate change policy targets for 2020 (10 % of transport fuels from renewables and a 20 % reduction of greenhouse gases emissions). Estimates conclude that a shift to biological raw materials and biological processing methods could save up to 2.5 billion tons of CO_2 equivalent per year by 2030, increasing markets for bio-based raw materials and new consumer products several-fold. Reaping these potentials requires building a broad knowledge base and developing relevant (bio)technologies, focussing mainly on three essential elements: a) transforming current fossil-based processes by resource and energy efficient biotechnology based ones; b) establishing reliable and appropriate supply chains of biomass and waste streams and a wide network of bio-refineries throughout Europe; and c) supporting market development for bio-based products and processes. Synergies will be sought with the '*Leadership in Enabling and Industrial Technologies*' specific objective.

2.4.1. Fostering the bio-economy for bio-based industries

2.4.1. Fostering the bio-economy for bio-based industries

Major progress towards low carbon, resource efficient and sustainable industries will be supported through discovery and exploitation of terrestrial and aquatic biological resources, while minimising adverse environmental impacts. Potential trade-offs between the various uses of biomass should be examined. The development of bio-based products and biologically active compounds for industries and consumers with novel qualities, functionalities and improved sustainability will be targeted. The economic value of renewable resources, bio-waste and by-products will be maximised through new and resource efficient processes.	Major progress towards low carbon, resource efficient and sustainable industries will be supported through discovery and exploitation of terrestrial and aquatic biological resources, while minimising adverse environmental impacts. Potential trade-offs between the various uses of biomass should be ***carefully assessed, in particular ensuring that new uses of biomass does not jeopardise food production and security, does not lead to unsustainable land-use conversion or land-grabbing practices***. The development of bio-based products and biologically active compounds for industries and consumers with novel qualities, functionalities and improved sustainability will be targeted. The economic value of renewable resources, bio-waste and by-products will be maximised through new and resource efficient processes.
2.4.2. Developing integrated biorefineries	2.4.2. Developing integrated biorefineries
Activities will be supported to boost sustainable bioproducts, intermediates and bioenergy/biofuels, predominantly focussing on a cascade approach, prioritising the generation of high added-value products. Technologies and strategies will be developed to assure the raw material supply. Enhancing the range of types of biomass for use in second and third generation biorefineries, including forestry, biowaste and industrial by-products, will help avoid food/fuel conflicts and support economic development of rural and coastal areas in the Union.	Activities will be supported to boost sustainable bioproducts, intermediates and bioenergy/biofuels, predominantly focussing on a cascade approach, prioritising the generation of high added-value products. Technologies and strategies will be developed to assure the raw material supply. Enhancing the ***availability,*** range ***and characteristics*** of types of biomass for use in second and third generation biorefineries, including ***agriculture, horticulture,*** forestry, biowaste and industrial by-products, will help avoid food/fuel conflicts and support economic development of rural and coastal areas in the Union
2.4.3. Supporting market development for bio-based products and processes	2.4.3. Supporting market development for bio-based products and processes
Demand-side measures will open new markets for biotechnology innovation. Standardisation at Union and international levels is needed for, amongst others, determination of bio-based content,	Demand-side measures will open new markets for biotechnology innovation. Standardisation at Union and international levels is needed for, amongst others, determination of bio-based content,

product functionalities and biodegradability. Methodologies and approaches to life-cycle analysis need to be further developed and continuously adapted to scientific and industrial advances. Research activities supporting product and process standardisation and regulatory activities in the field of biotechnology are considered essential for supporting the creation of new markets and for realising trade opportunities.

resource use efficiency (land, water, nutrients), product functionalities and biodegradability. Methodologies and approaches to ***lifecycle*** analysis need to be further developed and continuously adapted to scientific and industrial advances. Research activities supporting product and process standardisation***, public procurement*** and regulatory activities in the field of biotechnology are considered essential for supporting the creation of new markets and for realising trade opportunities.

2.4a. Cross-cutting marine and maritime research

2.4a.1. Climate change impact on marine ecosystems and maritime economy

Activities will be supported to increase the current understanding of the functioning of marine ecosystems, the interactions between oceans-atmosphere. This will increase the ability to assess the role of the oceans on climate and the impact of climate change and ocean acidification on marine ecosystems and coastal areas.

2.4a.2. Develop the potential of marine resources through an integrated approach

Boosting long-term, sustainable maritime growth and create synergies across all the maritime sectors requires an integrated approach. Research activities will focus on preserving the marine environment as well as the impact of maritime activities and products on non-maritime sectors. This will allow advances in the field of eco-innovation such as new products, processes and the application of management concepts, tools and measures to assess and mitigate the impact of human pressures on the marine environment in order to advance towards a sustainable management of maritime activities.

2.4a.3. Cross-cutting concepts and technologies enabling maritime growth

	Advances in cross-cutting enabling technologies (e.g. ICT, electronics, nanomaterials, alloys, biotechnologies, etc) and new developments and concepts in engineering will continue to enable growth. Activities will allow major breakthroughs in the field of marine and maritime research and ocean observation (e.g. deep-sea research, observing systems, sensors, automated systems for monitoring of activities and surveillance, screening marine biodiversity, marine geohazards, Remotely Operated Vehicles, etc). The aim is to reduce the impact on the marine environment (e.g. underwater noise, introduction of invasive species and pollutants from sea and land, etc) and minimise the carbon foot-print of human activities. Cross-cutting enabling technologies will underpin the implementation of marine and maritime Union policies.
2.5. Specific implementation actions	2.5. Specific implementation actions
Beyond the general sources of external advice, specific consultations will be sought from the Standing Committee on Agricultural Research (SCAR) on a range of issues, including on strategic aspects through its foresight activity and on the coordination of agricultural research between national and Union levels. Appropriate links will be established with the actions of the European Innovation Partnership 'Agricultural Productivity and Sustainability'.	Beyond the general sources of external advice, specific consultations will be sought from the Standing Committee on Agricultural Research (SCAR) on a range of issues, including on strategic aspects through its foresight activity and on the coordination of agricultural research between national and Union levels. Appropriate links will be established with the actions of the European Innovation Partnership 'Agricultural Productivity and Sustainability'. ***The roadmap of the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), developed in open partnership with multi-stakeholder organisations, including FAO, GEF, UNDP, UNEP, UNESCO, the World Bank, and the WHO, will be also guiding the development of specific work programmes under this challenge.***
The impact and dissemination of research results will be actively supported through specific actions on communication,	The impact and dissemination of research results will be actively supported through specific actions on communication,

knowledge exchange and the involvement of various actors all along the projects. Implementation will combine a wide range of activities, including substantial demonstration and pilot activities. Easy and open access to research results and best practices will be fostered, where appropriate via databases.

knowledge ***and technology*** exchange and the involvement of various actors all along the projects. Implementation will combine a wide range of activities, including substantial demonstration and pilot activities. Easy open access to research results and best practices will be fostered, where appropriate via databases.

The specific support to SMEs will allow for an increased participation of farms, fishermen and other types of micro-enterprises in research and demonstration activities. The specific needs of the primary production sector for innovation support services and outreach structures will be taken into account. Implementation will combine a wide range of activities, including knowledge exchange actions where the involvement of farmers and intermediaries will be actively ensured in view of summarising the research needs of end-users. Easy and open access to research results and best practices will be fostered.

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Support to standard setting will be used to help accelerate market deployment for novel bio-based goods and services.

Support to standard setting will be used to help accelerate market deployment for novel bio-based goods and services ***ranging from terrestrial and aquatic production systems through to the end-consumer***.

Consideration may be given to support to the Joint Programming Initiatives (JPIs) including 'Agriculture, Food Security and Climate Change'; 'A Healthy Diet for a Healthy Life'; and 'Healthy and Productive Seas and Oceans' and to implementing possible public-private partnerships in the field of bio-based industries.

Consideration may be given to support to the Joint Programming Initiatives (JPIs) including 'Agriculture, Food Security and Climate Change'; 'A Healthy Diet for a Healthy Life'; and 'Healthy and Productive Seas and Oceans' and to implementing possible public-private partnerships in the field of bio-based industries.

Synergies with and further deployment by other Union funds related to this societal challenge, such as the Rural Development Funds and Fisheries Funds will be sought.

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Forward looking activities will be undertaken across the sectors of the bio-economy, including the development of data bases, indicators and models

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addressing global, European, national and regional dimensions. A European bio-economy observatory shall be developed for mapping and monitoring Union and global research and innovation activities, developing key performance indicators, and monitoring innovation policies in the bio-economy.

addressing global, European, national and regional dimensions. A European bio-economy observatory***, bringing together all stakeholders from science, industry and civil society*** shall be developed for mapping and monitoring Union and global research and innovation activities, developing key performance indicators, and monitoring innovation policies in the bio-economy.

Amendment 61
Proposal for a decision
Annex 1 – section 3 – point 3

Text proposed by the Commission	*Amendment*
3. Secure, clean and efficient energy	3. Secure, clean and efficient energy
3.1. Reducing energy consumption and carbon footprint through smart and sustainable ***usage***	3.1. ***Increasing energy efficiency and*** reducing energy consumption and carbon footprint through smart and sustainable ***and secure use***
The energy sources and consumption patterns of Europe's industries, transport, buildings, towns and cities are largely unsustainable, leading to significant environmental and climate change impacts. The development of ***near-zero-emission*** buildings, highly efficient industries and mass take-up of energy-efficient approaches by companies, individuals, communities and cities will require not only technological advances, but also non-technological solutions such as new advisory, financing and demand management services. In this way energy efficiency ***may*** provide one of the most cost effective ways to reduce energy demand, thereby enhancing security of energy supply, reducing environmental and climate impacts and boosting competitiveness.	The energy sources and consumption patterns of Europe's industries, transport, buildings, towns and cities are ***often inefficient and*** largely unsustainable, leading to significant environmental and climate change impacts. The development of ***new and existing near-zero-energy and positive energy*** buildings, ***renewable energy technologies,*** highly efficient industries and mass take-up of energy-efficient approaches by companies, individuals, communities and cities will require not only technological advances, but also non-technological solutions such as new advisory, financing and demand management services. In this way energy efficiency ***and savings will*** provide one of the most cost effective ways to reduce energy demand, thereby enhancing security of energy supply, reducing environmental and climate impacts and boosting competitiveness ***and Union leadership in***

	this field.
3.1.1. Bring to mass market technologies and services for a smart and efficient energy use	3.1.1. Bring to mass market technologies and services for a smart and efficient energy use
Reducing energy consumption and eliminating energy waste, while providing the services that society and economy need, requires not only that more, efficient, cost-competitive, environmentally-friendly, and smarter products and services are brought to mass market but also the integration of components and devices in such a way that they cooperate to optimise the overall energy use of buildings, services and industry.	Reducing energy consumption and eliminating energy waste, while providing the services that society and economy need, requires not only that more, efficient, cost-competitive, ***safe,*** environmentally-friendly, and smarter products and services are brought to mass market but also the integration of components and devices in such a way that they cooperate to optimise the overall energy use of buildings, services and industry.
To ensure full adoption and full benefits for consumers (including the possibility for them to monitor their own consumption), energy performance of these technologies and services needs to be customised and optimised for and in their application environments. This requires not only researching, developing and testing innovative Information and Communication Technologies (ICT) and monitoring and control techniques but also large-scale demonstration projects and pre-commercial deployment activities to ensure interoperability and scalability. Such projects should aim to develop common procedures to collect, collate and analyse energy consumption and emissions data to improve the measurability, transparency, social acceptability, planning and visibility of energy use and its environmental impacts.	To ensure full adoption and full benefits for consumers (including the possibility for them to monitor their own consumption), energy performance of these technologies and services needs to be ***improved,*** customised and optimised for and in their application environments. This requires not only researching, developing and testing innovative Information and Communication Technologies (ICT) and monitoring and control techniques but also large-scale demonstration projects and pre-commercial deployment activities to ensure interoperability and scalability. Such projects should aim to develop common procedures to collect, collate and analyse energy consumption and emissions data to improve the measurability, transparency***,*** ***accuracy***, social acceptability, planning and visibility of energy use and its environmental impacts.
3.1.2. Unlock the potential of efficient and renewable heating-cooling systems	3.1.2. Unlock the potential of efficient and renewable heating-cooling systems
A substantial share of energy is consumed for heating or cooling purposes across the Union and the development of cost-effective and efficient technologies, system integration techniques e.g. network connectivity with standardised languages and services in this area would have a major impact in reducing energy demand.	A substantial share of energy is consumed for heating or cooling purposes across the Union and the development of cost-effective***, sustainable*** and efficient technologies, system integration techniques e.g. network connectivity with standardised languages and services in this area would have a major impact in reducing energy

This requires research and demonstration of new systems and components for industrial as well as residential applications, for example in decentralised and district supply of hot water, space heating and cooling. This should encompass different technologies: solar thermal, geothermal, biomass, heat pumps, combined heat and power etc, and meet the requirements of near-zero energy buildings and districts. Further breakthroughs are needed, in particular, in thermal storage from renewable energy sources and to foster the development and deployment of efficient combinations of hybrid heating and cooling systems, for centralised and de-centralised applications.

3.1.3. Foster European Smart cities and Communities

Urban areas are one of the largest consumers of energy in the Union and emit a correspondingly large share of greenhouse gases, while generating a substantial amount of air pollutants. At the same time, urban areas are affected by decreasing air quality and climate change and have to develop their own mitigation and adaptation strategies. Finding innovative energy solutions (energy efficiency, electricity and heating and cooling supply systems), integrated with transport, waste and water treatment as well as ICT solutions for the urban environment are therefore crucial in the transformation towards a low carbon society. Targeted initiatives in support to the convergence of industrial value chains of the energy, transport and ICT sector for smart urban applications need to be envisaged. At the same time, new technological, organisational, planning and business models need to be developed and tested at full scale according to the needs and means of cities and communities. Research is also needed to understand the social, economic and cultural issues that are involved in this transformation.

demand. This requires research and demonstration of new systems and components for industrial as well as residential applications, for example in decentralised and district supply of hot water, space heating and cooling. This should encompass different technologies: solar thermal, geothermal, biomass, heat pumps, combined heat and power etc, and meet the requirements of near-zero energy buildings and districts. Further breakthroughs are needed, in particular, in thermal storage from renewable energy sources and to foster the development and deployment of efficient combinations of hybrid heating and cooling systems, for centralised and de-centralised applications.

3.1.3. Foster European Smart cities and Communities

Urban areas are one of the largest consumers of energy in the Union and emit a correspondingly large share of greenhouse gases, while generating a substantial amount of air pollutants. ***In that context, there is a need of promoting integrated systemic urban development strategies that take into account: energy efficiency, accessibility, green spaces, adaptation of habitats and social integration.*** At the same time, urban areas are affected by decreasing air quality and climate change and have to develop their own mitigation and adaptation strategies. Finding innovative energy solutions (energy efficiency, ***integration of renewables within the built environment,*** electricity and heating and cooling supply systems), integrated with transport, waste and water treatment as well as ICT solutions for the urban environment are therefore crucial in the transformation towards a low carbon society. Targeted initiatives in support to the convergence of industrial value chains of the energy, transport and ICT sector for smart urban applications need to be envisaged. At the same time, new technological,

	organisational, planning and business models need to be developed and tested at full scale according to the needs and means of cities and communities. Research is also needed to understand the social, economic***,*** ***environmental*** and cultural issues that are involved in this transformation.
3.2. ***Low-cost***, low-carbon electricity supply	3.2. ***Sustainable***, low-carbon***, low-cost*** electricity supply
Electricity will play a central role in the establishment of an environmentally sustainable low-carbon economy. The uptake of low-carbon electricity generation is too slow due to the high costs involved. There is a pressing need to find solutions that reduce ***costs significantly***, with enhanced performance and sustainability, to accelerate the market deployment of low carbon electricity generation. In particular to:	Electricity will play a central role in the establishment of an environmentally sustainable low-carbon economy. The uptake of low-carbon electricity generation is too slow due to the high costs involved. There is a pressing need to find solutions that reduce ***entry barriers (deletion)***, with enhanced performance and sustainability, to accelerate the market deployment of low carbon electricity generation. ***Activities should cover research and innovation in renewable energy technologies in order to improve their efficiency and reduce the costs of those technologies, making them more competitive on the market. It is necessary*** in particular to:
3.2.1. Develop the full potential of wind energy	3.2.1. Develop the full potential of wind energy
The objective for wind energy is to reduce the cost of electricity production of onshore and offshore wind by up to about 20 % by 2020 compared to 2010, to increasingly move offshore, and to enable proper integration in the electricity grid. The focus will be on the development, testing and demonstration of next generation wind energy conversion systems of larger scale, higher conversion efficiencies and higher availabilities for both on- and off-shore (including remote locations and hostile weather environments) as well as new serial manufacturing processes.	The objective for wind energy is to reduce the cost of electricity production of onshore and offshore wind by up to about 20 % by 2020 compared to 2010, to increasingly move offshore, and to enable proper integration in the electricity grid. The focus will be on the ***design,*** development, testing and demonstration of next generation wind energy conversion systems of larger scale, higher conversion efficiencies and higher availabilities for both on- and off-shore (including remote locations and hostile weather environments) as well as new serial manufacturing processes. ***To this end, collaboration with other parts of the Horizon 2020 programme regarding research on the availability, production and substitution of novel and technological materials, including rare-***

	earth products, and other critical resources which are necessary for wind turbines, should be promoted. The feasibility of remote and hostile weather locations should be investigated using appropriate atmosphere and ocean modelling tools.
3.2.2. Develop efficient, reliable and cost-competitive solar energy systems	3.2.2. Develop efficient, reliable and cost-competitive solar energy systems
The cost of solar energy, covering photovoltaics (PV) and concentrating solar power (CSP), should be halved by 2020 compared to 2010, if it is to gain share of the electricity market.	The cost of solar energy, covering photovoltaics (PV) and concentrating solar power (CSP), should be halved by 2020 compared to 2010, if it is to gain share of the electricity market.
For PV, this will need ***long term*** research on ***novel concepts and systems***, demonstration and testing of mass production with a view to large-scale deployment.	For PV, this will need research on ***higher performance manufacturing processes and products***, demonstration and testing of mass production with a view to large-scale deployment ***of both centralised and small scale decentralised PV-systems and an increased focus on European strength positions such as industrial design and building integration***.
For CSP, the focus will be on developing ways to increase efficiency while reducing costs and environmental impact***, enabling*** industrial up-scaling of demonstrated technologies by building first-of-a-kind power plants. Solutions to efficiently combine the production of solar electricity with water desalination will be tested.	For CSP, the focus will be on developing ways to increase efficiency ***and dispatchability,*** while reducing costs and environmental impact***. In addition to research topics, the objective is to foster*** industrial up-scaling of demonstrated technologies by building first-of-a-kind power plants. Solutions to efficiently combine the production of solar electricity with ***other renewables as biomass in hybrid plants which will allow for firm electricity generation or other purposes as*** water desalination will be tested ***as well as solutions to store solar power efficiently***.
3.2.3. Develop competitive and environmentally safe technologies for CO2 capture, transport and storage	
Carbon capture and storage (CCS) is a key option that has to be widely deployed on a commercial scale at global level to meet the challenge of a decarbonised power generation and low carbon industry	

by 2050. The objective is to minimise the extra-cost of CCS in the power sector for coal-fired and gas-fired power plants compared to equivalent plants without CCS and energy intensive industrial installations.

Support will be given, in particular, to demonstrate the full CCS chain for a representative portfolio of different capture, transport and storage technology options. This will be accompanied by research to further develop these technologies and to deliver more competitive capture technologies, improved components, integrated systems and processes, safe geological storage and rational solutions for the large-scale re-use of captured CO2 to enable the commercial deployment of CCS technologies for fossil fuel power plants and other carbon-intensive industries going into operation after 2020.

3.2.4. Develop geothermal, hydro, marine and other renewable energy options

Geothermal, hydro, and marine energy as well as other renewable energies can contribute to the decarbonisation of the European energy supply while enhancing its flexibility to variable production and use of energy. The objective is to bring to commercial maturity cost-effective and sustainable technologies, enabling large-scale deployment at an industrial scale including grid integration. Ocean energies such as tidal, current or wave energy offer truly zero-emission, predictable energy. Research activities should include laboratory scale innovative research into low-cost reliable components and materials in a high corrosion, biofouling environment as well as demonstrations under the varied conditions found in European waters.

3.2.4. Develop geothermal, hydro, marine and other renewable energy options

Geothermal, hydro, and marine energy as well as other renewable energies can contribute to the decarbonisation of the European energy supply while enhancing its flexibility to variable production and use of energy. The objective is to bring to commercial maturity cost-effective and sustainable technologies, enabling large-scale deployment at an industrial scale including grid integration. Ocean energies such as tidal, current or wave energy offer truly zero-emission, predictable energy. Research activities should include laboratory scale innovative research into low-cost reliable components and materials in a high corrosion, biofouling environment as well as demonstrations under the varied conditions found in European waters. ***Besides pilot installations, demonstration projects should include adequate management systems based on information provided by monitoring and forecasting tools, aiming at the protection***

of assets.

3.2.4a. Decentralised energy production

Distributed energy production, such as electricity micro-generation, plays an important role in inland isolated regions and islands. Adequate solutions for energy production and energy systems management will be further investigated. International cooperation activities with developing countries with regard to poverty alleviation will be promoted.

3.2.4 b. Lowering the environmental impact of transitional energy sources

The roadmap to a low-carbon economy shows that gas, in the short to medium term, can contribute to the transformation of the energy system. During this transitional period, to achieve the required emission reductions, significant investments are needed in research, development, demonstration and market roll-out of efficient, safe and reliable low-emission energy technologies for transitional energy sources. Technological research and demonstration projects should improve the environmental performance, risk management and safety of indigenous conventional and unconventional hydrocarbon as a major fuel source for electrical production and combined heating and cooling. The objective is to lower their emissions and their environmental impact until they can be replaced and phrased out by low-carbon alternatives.

3.2.4c.Develop competitive and environmentally safe technologies for CO2 capture, transport and storage

Carbon capture and storage (CCS) is a key option that has to be widely deployed on a commercial scale at global level to meet the challenge of a decarbonised power generation and low carbon industry by 2050. The objective is to minimise the extra-cost of CCS in the power sector for

	coal-fired and gas-fired power plants compared to equivalent plants without CCS and energy intensive industrial installations.
	Support will be given, in particular, to demonstrate the full CCS chain for a representative portfolio of different capture, transport and storage technology options as well as to raise public awareness. This will be accompanied by research to deliver more efficient power and capture technologies, improved components, integrated systems and processes, for fossil fuelled power plants and other carbon-intensive industries going into operation after 2020. Furthermore, research on safe geological storage and rational solutions for the utilisation of captured CO2 will be conducted to enable the commercial deployment of CCS.
3.3. Alternative fuels and mobile energy sources	3.3. Alternative fuels and mobile energy sources
Meeting Europe's energy and CO2 reduction goals also requires the development of new fuels and mobile energy sources. This is particularly important to meet the challenge of smart, green and integrated transport. Value chains for these technologies and alternative fuels are not sufficiently developed and must be accelerated to demonstration scale.	Meeting Europe's energy and CO2 reduction goals also requires the development of new fuels and mobile energy sources. This is particularly important to meet the challenge of smart, green and integrated transport. Value chains for these technologies and alternative fuels are not sufficiently developed and must be accelerated to demonstration scale.
3.3.1. Make bio-energy competitive and sustainable	3.3.1. Make bio-energy competitive and sustainable
The objective for bio-energy is to bring to commercial maturity the most promising technologies, to permit large-scale, sustainable production of advanced second generation biofuels of different value chains for transport, and highly efficient combined heat and power from biomass, ***including CCS***. The aim is to develop and demonstrate the technology for different bio-energy pathways at different scales, taking account of differing geographical	The objective for bio-energy is to bring to commercial maturity the most promising technologies, to permit large-scale, sustainable production of advanced second ***and third*** generation biofuels of different value chains for transport, and highly ***energy*** efficient combined heat and power from biomass. The aim is to develop and demonstrate the technology for different bio-energy pathways at different scales, taking account of differing geographical

and climate conditions and logistical constraints. Longer term research will support the development of a sustainable bio-energy industry beyond 2020. These activities will complement upstream (feedstock, bio-resources) and downstream (integration into vehicle fleets) research activities carried out in other relevant Societal Challenges.

3.3.2. Reducing time to market for hydrogen and fuel cells technologies

Fuel cells and hydrogen have a great potential to contribute to addressing energy challenges facing Europe. Bringing these technologies to market competitiveness will require significant cost decrease. As an illustration the cost of fuel cell systems for transportation will have to be reduced by a factor 10 over the next 10 years. To do so, support will be given to large scale demonstrations and pre-commercial deployment activities for portable, stationary, transport applications and the related services, as well as long-term research and technology development to build up a competitive fuel cell chain and a sustainable hydrogen production and infrastructure across the Union. Strong national and international cooperation is needed to enable market breakthroughs of a sufficient scale, including the development of appropriate standards.

3.3.3. New alternative fuels

There is a range of new options with long term potential, such as powdered metal fuel, fuel from photosynthetic microorganisms (in water and land environments) and from artificial photosynthesis mimics. These new paths may offer potential for more efficient energy conversion, more cost-competitive and sustainable technologies, and almost neutral ‘greenhouse gases’ emitting processes that do not compete for agricultural lands. Support will be given notably to bring these new and other

and climate conditions and logistical constraints. Longer term research will support the development of a sustainable bio-energy industry beyond 2020. These activities will complement upstream (feedstock, bio-resources) and downstream (integration into vehicle fleets) research activities carried out in other relevant Societal Challenges.

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3.3.3. New alternative fuels

There is a range of new options with long term potential, such as powdered metal fuel, fuel from photosynthetic microorganisms (in water and land environments) and from artificial photosynthesis mimics ***or from low temperature pyroelectrical water decomposition***. These new paths may offer potential for more efficient energy conversion, more cost-competitive and sustainable technologies, and almost neutral 'greenhouse gases' emitting processes that do not compete for

potential technologies from laboratory to demonstration scale size in view of pre-commercial demonstration by 2020.

3.4. A single, smart European ***electricity*** grid

Electricity networks have to respond to three interrelated challenges to enable a consumer friendly and increasingly decarbonised electricity system: creating a pan-European market; integrating a massive increase of renewable energy sources; and managing interactions between millions of suppliers and customers (where increasingly households will be both), including owners of electrical vehicles. Future electricity networks will play a key role for the transition to a fully decarbonised electricity system, while providing additional flexibility and cost benefits to the consumers. The overriding goal by 2020 is to transmit and distribute about 35 % of electricity from dispersed and concentrated renewable energy sources.

A strongly integrated research and demonstration effort will support the development of new components and technologies which will respond to the particularities of both the transmission and distribution side of the grid, as well as storage.

All options to successfully balance energy supply and demand must be considered to minimise emissions and costs. New power systems technologies and a bi-directional digital communication infrastructure must be researched and integrated into the electricity grid. This will contribute to better plan, monitor, control and securely operate networks in normal and emergency conditions as well as to manage the interactions between suppliers and customers and to transport, manage and trade energy flow. For the deployment of

agricultural lands. Support will be given notably to bring these new and other potential technologies from laboratory to demonstration scale size in view of pre-commercial demonstration by 2020.

3.4. A single, smart ***flexible*** European ***energy*** grid

Energy networks have to respond to three interrelated challenges to enable a consumer friendly and increasingly decarbonised electricity system: creating a pan-European market; integrating a massive increase of renewable energy sources; and managing interactions between millions of suppliers and customers (where increasingly households will be both), including owners of electrical vehicles. Future electricity networks will play a key role for the transition to a fully decarbonised electricity system, while providing additional flexibility and cost benefits to the consumers. The overriding goal by 2020 is to transmit and distribute about 35 % of electricity from dispersed and concentrated renewable energy sources.

A strongly integrated research and demonstration effort will support the development of new components and technologies which will respond to the particularities of both the transmission and distribution side of the grid, as well as storage.

All options to successfully balance energy supply and demand must be considered to minimise emissions and costs. New power systems technologies***, demand management*** and a bi-directional digital communication infrastructure must be researched and integrated into the electricity grid. This will contribute to better plan, monitor, control and securely operate networks in normal and emergency conditions as well as to manage the interactions between suppliers and customers and to transport, manage and

future infrastructure, indicators and cost benefit analysis should take into account energy system-wide considerations. In addition, synergies between smart grids and telecommunication networks will be maximised in order to avoid duplication of investments and to accelerate the take up of smart energy services

Novel energy storage means (including both large scale and batteries) and vehicle systems will provide the required flexibility between production and demand. Improved ICT technologies will further increase the flexibility of electricity demand by providing customers (industrial, commercial and residential) with the necessary automation tools.

New planning, market and regulatory designs need to drive the overall efficiency and cost-effectiveness of the electricity supply chain and interoperability of infrastructures as well as the emergence of an open and competitive market for smart grid technologies, products and services. Large-scale demonstration projects are needed to test and validate solutions and assess the benefits for the system and for individual stakeholders, before deploying them across Europe. This should be accompanied by research to understand how consumers and businesses react to economic incentives, behavioural changes, information services and other innovative opportunities provided by smart grids.

trade energy flow. For the deployment of future infrastructure, indicators and cost benefit analysis should take into account energy system-wide considerations. In addition, synergies between smart grids and telecommunication networks will be maximised in order to avoid duplication of investments and to accelerate the take up of smart energy services**.**

Novel energy storage means (including both large scale and batteries) and vehicle systems will provide the required flexibility between production and demand. Improved ICT technologies will further increase the flexibility of electricity demand by providing customers (industrial, commercial and residential) with the necessary automation ***and control*** tools.

New planning, market and regulatory designs need to drive the overall efficiency and cost-effectiveness of the electricity supply chain and interoperability of infrastructures as well as the emergence of an open and competitive market for smart grid technologies, products and services. Large-scale demonstration projects are needed to test and validate solutions and assess the benefits for the system and for individual stakeholders, before deploying them across Europe. This should be accompanied by research to understand how consumers and businesses react to economic incentives, behavioural changes, information services and other innovative opportunities provided by smart grids.

3.4.1. Energy storage

With increasing implementation of renewable energies the demand for storage of variable renewables becomes more and more important. A development of storage technologies will become mandatory, for short-term storage (minute reserve in tertiary grid control) as well as for long-term applications from hours up to seasonal storage. The large temporal range requires a broad range of

	technologies. The objective is to develop different routes using electrical, mechanical, chemical and thermal storage
	3.4.2. Back-up and balancing technologies
	Flexible and efficient fossil fuel power plants are still essential for ensuring grid stability and security of electricity supply. In a transition period, moving on towards a low-carbon economy, we are facing the challenge to balance electricity from variable renewables with electricity from flexible conventional power plants. Conventional power plants are currently designed to operate at base-load, whereas, when backing up renewable energy, they will frequently run at part-load. In this mode, they are less efficient with an impact on emissions.
	Research is needed to optimise the flexibility and efficiency of conventional power plants when operated part-load, thus ensuring that flexible and efficient backup will be available to accompany and support the growth of renewable energy and gradually enabling a higher integration of electricity from variable renewables into the grid.
	According to Commission analysis in Energy Roadmap 2050, the Unions' power sector will have to decarbonise by 93-99% by 2030. In view of this, further research is urgently needed to accelerate the development and deployment of non-fossil fuel back-up and balancing technologies that are flexible and fully sustainable, in order to successfully integrate the rapidly growing supply of variable renewable energy sources.
3.5. New knowledge and technologies	3.5. New knowledge and technologies
Novel, more efficient and cost-competitive technologies will be required for the long term. Progress should be accelerated through multi-disciplinarily research to achieve scientific breakthroughs in energy related concepts and enabling technologies	Novel, more efficient and cost-competitive technologies will be required for the long term. Progress should be accelerated through multi-disciplinarily research to achieve scientific breakthroughs in energy related concepts and enabling technologies

(e.g. nano-science, material science, solid state physics, ICT, bio-science, computation, space); as well as the development of innovations in future and emerging technologies.

Advanced research will also be needed to provide solutions to adapt energy systems to changing climatic conditions. Priorities may be adjusted to new scientific and technological needs and opportunities or newly-observed phenomena which could indicate promising developments or risks to society and that may emerge during the course of implementation of Horizon 2020.

3.6. Robust decision making and public engagement

Energy research should support and be strongly aligned with the energy policy. Extensive knowledge of energy technologies and services, infrastructure, markets (including regulatory frameworks) and consumer behaviour is required to provide policy makers with robust analyses. Support will be given, in particular in the frame of the European Commission's Information System of the SET-Plan, to develop robust and transparent tools, methods and models to assess the main economic and social issues related to energy; to build databases and scenarios for an enlarged Union and the assessment of the impact of energy and energy-related policies on security of supply, the environment and climate change, society and competitiveness of the energy industry; to carry out socio-economic research activities.

Taking advantage of the possibilities offered by web and social technologies, consumer behaviour including that of vulnerable consumers like persons with disabilities and behavioural changes will be

(e.g. nano-science, material science, solid state physics, ICT, bio-science, computation, space***, critical metals from waste, residuals and by-products***); as well as the development of innovations in future and emerging technologies.

Advanced research will also be needed to provide solutions to adapt energy systems to changing climatic conditions. ***The challenges created by the variable character of solar and wind energy must be addressed.*** Priorities may be adjusted to new scientific and technological needs and opportunities or newly-observed phenomena which could indicate promising developments or risks to society and that may emerge during the course of implementation of Horizon 2020.

3.6. Robust decision making and public engagement

Energy research should support and be strongly aligned with the energy policy. Extensive knowledge of energy technologies and services, infrastructure, markets (including regulatory frameworks) and consumer behaviour is required to provide policy makers with robust analyses. Support will be given, in particular in the frame of the European Commission's Information System of the SET-Plan, to develop robust and transparent tools, methods and models to assess the main economic and social issues related to energy; to build databases and scenarios for an enlarged Union and the assessment of the impact of energy and energy-related policies on security of supply, the environment and climate change, society and competitiveness of the energy industry; to carry out socio-economic research activities.

Taking advantage of the possibilities offered by web and social technologies, consumer behaviour including that of vulnerable consumers like persons with disabilities and behavioural changes will be

studied in open innovation platforms such as the Living Labs and large scale demonstrators for service innovation.

3.7. Market uptake of energy innovation, empowering markets and consumers

Innovative market uptake and replication solutions are essential to rollout new energy technologies in time and through a cost effective implementation. In addition to technology-driven research and demonstration, this requires actions with clear Union added value aiming to develop, apply, share and replicate non-technological innovations with a high leverage factor in Union's sustainable energy markets across disciplines and levels of governance.

Such innovations will focus on creating favourable market conditions at the regulatory, administrative and financing level for ***low-carbon,*** renewable and energy ***efficiencies*** technologies and solutions. Support will be given to measures facilitating the energy policy implementation, preparing the ground for rollout of the investments, supporting the capacity building and acting on public acceptance.

Research and analysis repeatedly confirms the crucial role of the human factor in the success and failure of sustainable energy policies. Innovative organisational structures, the dissemination and exchange of good practices and specific training and capacity building actions will be encouraged.

3.8. Specific implementation aspects

The priority setting for the implementation of the activities in this challenge is led by the need to strengthen the European dimension of energy research and innovation. A main aim will be to support the implementation of the research and innovation agenda of the Strategic Energy

studied in open innovation platforms such as the Living Labs and large scale demonstrators for service innovation.

3.7. Market uptake of energy innovation, empowering markets and consumers ***through Intelligent Energy Europe III***

Innovative market uptake and replication solutions are essential to rollout new energy technologies in time and through a cost effective implementation. In addition to technology-driven research and demonstration, this requires actions with clear Union added value aiming to develop, apply, share and replicate non-technological innovations with a high leverage factor in Union's sustainable energy markets across disciplines and levels of governance.

Such innovations will focus on creating favourable market conditions at the regulatory, administrative and financing level for renewable and ***end-user*** energy ***efficient*** technologies and solutions. Support will be given to measures facilitating the energy policy implementation, preparing the ground for rollout of the investments, supporting the capacity building and acting on public acceptance ***and participation***.

Research and analysis repeatedly confirms the crucial role of the human factor in the success and failure of sustainable energy policies. Innovative organisational structures, the dissemination and exchange of good practices and specific training and capacity building actions will be encouraged.

3.8. Specific implementation aspects

The priority setting for the implementation of the activities in this challenge is led by the need to strengthen the European dimension of energy research and innovation. A main aim will be to support the implementation of the research and innovation agenda of the Strategic Energy

Technology Plan (SET Plan) to achieve the objectives of the Union's energy and climate change policy. The SET-Plan roadmaps and implementation plans will therefore provide a valuable input for the formulation of the work programmes. The SET Plan governance structure will be used as a principle basis for strategic priority setting and the coordination of Energy Research and innovation across the Union.

Technology Plan (SET Plan) to achieve the ***2020 and 2050's*** objectives of the Union's energy and climate change policy. The SET-Plan roadmaps and implementation plans will therefore provide a valuable input for the formulation of the work programmes. The SET Plan governance structure will be used as a principle basis for strategic priority setting and the coordination of Energy Research and innovation across the Union. ***The input of the industry within the governance of the European Industry Initiatives will be taken formally and transparently into account with respect to tools financing priorities identified in the EIIs Implementation Plans. The Initiatives will be financed through dedicated budget lines per technologies created under the SET-Plan budget line.***

The non-technological agenda will be guided by the Union's energy policy and legislation. The enabling environment for mass deployment of demonstrated technological and service solutions, processes and policy initiatives for low-carbon technologies and energy efficiency across the Union shall be supported. This may involve support to technical assistance for development and roll-out of energy efficiency and renewable energy investments.

The non-technological agenda will be guided by the Union's energy policy and legislation. The enabling environment for mass deployment of demonstrated technological and service solutions, processes and policy initiatives for low-carbon technologies and energy efficiency across the Union shall be supported. This may involve support to technical assistance for development and roll-out of energy efficiency and renewable energy investments.

Partnering with European stakeholders will be important to share resources and implement jointly. It may be envisaged, on a case by case basis, that existing European Industrial Initiatives of the SET Plan are turned into formalised public-private partnerships, if considered appropriate, to increase the level and coherence of national funding and to stimulate joint research and innovation actions among Member States. Consideration will be given to provide support, including with Member States, to alliances of public research performers, in particular, the European Energy Research Alliance

Partnering with European stakeholders will be important to share resources and implement jointly. It may be envisaged, on a case by case basis, that existing European Industrial Initiatives of the SET Plan are turned into formalised public-private partnerships, if considered appropriate, to increase the level and coherence of national funding and to stimulate joint research and innovation actions among Member States. Consideration will be given to provide support, including with Member States, to alliances of public research performers, in particular, the European Energy Research Alliance established under the SET Plan to

established under the SET Plan to pool public research resources and infrastructures to address critical research areas of European interest. International coordination actions shall support the SET Plan priorities according to the variable geometry principle, taking account of countries capabilities and specificities.

pool public research resources and infrastructures to address critical research areas of European interest. International coordination actions shall support the SET Plan priorities according to the variable geometry principle, taking account of countries capabilities and specificities.

In the field of energy, full use should be made of the SET Plan Steering Group to coordinate the use of the Common Provisions Regulation with the use of auctioning revenues from phase 3 of the Emissions Trading scheme, NER300, projects funded with Horizon 2020 and national funds, with a view to using them to fund large-scale demonstration projects.

Despite the fact that Horizon 2020 funding is not provided through mechanisms that require the pooling of national co-funding, positive measures are needed to allow the full participation of project partners from Member States currently unable to provide co-funding.

The European Commission's Information System of the SET-Plan will be mobilised to develop, together with stakeholders, key performance indicators (KPIs) to monitor the progress of implementation and which will be revised on a regular basis to account of the latest developments. More broadly, implementation under this Challenge will seek to improve the coordination of relevant Union Programmes, initiatives and policies, such as Cohesion policy, in particular through the national and regional strategies for smart specialisation, and the Emission Trading Scheme mechanisms, for example concerning support to demonstration projects.

The European Commission's Information System of the SET-Plan will be mobilised to develop, together with stakeholders, key performance indicators (KPIs) to monitor the progress of implementation and which will be revised on a regular basis to account of the latest developments. More broadly, implementation under this Challenge will seek to improve the coordination of relevant Union Programmes, initiatives and policies, such as Cohesion policy, in particular through the national and regional strategies for smart specialisation, and the Emission Trading Scheme mechanisms, for example concerning support to demonstration projects.

The priorities on decision making and market uptake should be built on the success of the Intelligent Energy Europe (IEE)Programme, which since its creation

	in 2003 has provided funding for more than 500 European projects involving 3,500 European organisations. IEE Programme should continue with similar objectives and managed along the same lines as done so far.
	It is appropriate for three quarters of the budget under this challenge to go towards research and innovation in renewable energy, end-use energy efficiency, smart grids and energy storage. An additional 15% of the budget of the current societal challenge should be allocated to the IEE Programme.

Amendment 62
Proposal for a decision
Annex 1 – section 3 – point 4

Text proposed by the Commission	*Amendment*
4. Smart, green and integrated transport	4. Smart, green***, secure*** and integrated transport ***and mobility***
4.1. Resource efficient transport that respects the environment	4.1. Resource efficient transport that respects the environment ***and public health***
Europe has set a policy target of achieving a 60 % reduction of CO2 by 2050. It aims at halving the use of ‘conventionally-fuelled’ cars in cities and achieving virtually CO2-free city logistics in major urban centres by 2030. Low-carbon fuels in aviation should reach 40 % by 2050, and CO2 emissions from maritime bunker fuels should be reduced by 40 % by 2050.	Europe has set a policy target of achieving a 60 % reduction of CO2 by 2050 ***compared to 1990 levels***. It aims at halving the use of 'conventionally-fuelled' cars in cities and achieving virtually CO2-free city logistics in major urban centres by 2030. Low-carbon fuels in aviation should reach 40 % by 2050, and CO2 emissions from maritime bunker fuels should be reduced by 40 % by 2050 ***compared to 2005 levels***.
Research and innovation will substantially contribute to the development and take up of the necessary solutions for all transport modes, which will drastically reduce transport's emissions that are harmful to the environment (such as CO_2, NO_x, and SO_x), lower its dependence on fossil fuels, and hence reduce transport impact on biodiversity and preserve natural resources	Research and innovation will substantially contribute to the development and take up of the necessary solutions for all transport modes, which will drastically reduce transport's emissions that are harmful to the environment (such as CO_2, NO_x, and SO_x), lower its dependence on fossil fuels, and hence reduce transport impact on biodiversity and preserve natural resources.

This will be done through work on the following specific activities:

4.1.1. Making aircraft, vehicles and vessels cleaner and quieter will improve environmental performance and reduce perceived noise and vibration

The activities in this domain will focus on the end products, but will also address lean and ecological design and manufacturing processes, with recyclability integrated in the design phase.

(a) Developing and accelerating the take-up of cleaner propulsion technologies is important for reducing or eliminating CO2 and pollution from transport. New and innovative solutions are necessary, based on electric engines and batteries, fuel cells, or hybrid propulsion. Technological breakthroughs will also help improve the environmental performance of traditional propulsion systems.

(b) Exploring options for the use of low emission alternative energies will help reduce the consumption of fossil fuels. This includes using sustainable fuels and electricity from renewable energy sources in all modes of transport including aviation, reducing fuel consumption through energy harvesting or diversified energy supply and other innovative solutions. New holistic approaches will be pursued encompassing vehicles, energy storage and energy supply infrastructure, including vehicle-to-grid interfaces and innovative solutions for the use of alternative fuels.

(c) Reducing the weight of aircraft, vessels and vehicles and lowering their aerodynamic, hydrodynamic or rolling resistance by using lighter materials, leaner structures and innovative design, will contribute to lower fuel consumption.

4.1.2. Developing smart equipment,

This will be done through work on the following specific activities:

4.1.1. Making aircraft, vehicles and vessels cleaner and quieter will improve environmental performance and reduce perceived noise and vibration

The activities in this domain will focus on the end products, but will also address lean and ecological design and manufacturing processes, ***considering the entire life-cycle process*** with recyclability integrated in the design phase.

(a) Developing and accelerating the take-up of cleaner propulsion technologies is important for reducing or eliminating CO2 and pollution from ***all kind of*** transport ***(e.g. particulate matter)***. New and innovative solutions are necessary, based on electric engines and batteries, fuel cells, or hybrid propulsion. Technological breakthroughs will also help improve the environmental performance of traditional propulsion systems.

(b) Exploring options for the use of low emission alternative energies will help reduce the consumption of fossil fuels. This includes using sustainable fuels and electricity from renewable energy sources in all modes of transport including aviation, reducing fuel consumption through energy harvesting or diversified energy supply and other innovative solutions. New holistic approaches will be pursued encompassing vehicles, energy storage and energy supply infrastructure, including vehicle-to-grid interfaces and innovative solutions for the use of alternative fuels.

(c) Reducing the weight of aircraft, vessels and vehicles and lowering their aerodynamic, hydrodynamic or rolling resistance by using lighter materials, leaner structures and innovative design, will contribute to lower fuel consumption.

4.1.2. Developing smart equipment,

infrastructures and services

This will help optimise transport operations and reduce resource consumption. The focus will be on the efficient use and management of airports, ports, logistic platforms and surface transport infrastructures, as well as on autonomous and efficient maintenance and inspection systems. Particular attention will be given to the climate resilience of infrastructures, cost-efficient solutions based on a life-cycle approach, and the wider take-up of new materials allowing for more efficient and lower cost maintenance. Attention will also be paid to accessibility and social inclusiveness.

4.1.3. Improving transport and mobility in urban areas

This will benefit a large and increasing share of the population which lives and works in cities or uses them for services and leisure. New mobility concepts, transport organisation, logistics and planning solutions need to be developed and tested, which will contribute to reduce air pollution and noise, and improve efficiency. Public and non-motorised transport as well as other resource-efficient transport options should be developed as a real alternative to the use of private motor vehicles, supported by greater use of intelligent transport systems as well as by innovative demand management.

4.2. Better mobility, less congestion, more safety and security

Relevant European transport policy goals aim to optimise performance and efficiency in the face of growing demands for mobility, to make Europe the safest region for aviation and to move towards the target of zero fatalities in road transport by 2050. By 2030, 30 % of road freight transport over 300 kilometres should shift to rail and waterborne transport. A continuous and efficient pan-European transport of people

infrastructures and services

This will help optimise transport operations and reduce resource consumption. The focus will be on the efficient use and management of airports, ***heliports,*** ports, logistic platforms and surface transport infrastructures, as well as on autonomous and efficient maintenance and inspection systems. Particular attention will be given to the climate resilience of infrastructures, cost-efficient solutions based on a life-cycle approach, and the wider take-up of new materials allowing for more efficient and lower cost maintenance. Attention will also be paid to accessibility***, in particular to islands and remote areas*** and social inclusiveness.

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and goods, also internalising external costs, requires a new European multimodal transport management, information and payment system.

Research and innovation will make important contributions to these ambitious policy goals through activities in the following specific activities:

4.2.1. A substantial reduction of traffic congestion

This can be achieved by implementing a fully intermodal ‘door-to-door’ transport system and by avoiding unnecessary use of transport. This means promoting greater integration between transport modes, the optimisation of transportation chains and better integrated transport services. Such innovative solutions will also facilitate accessibility, including for the ageing population and vulnerable users.

4.2.2. Substantial improvements in the mobility of people and freight

This can be achieved through the development and widespread use of intelligent transport applications and management systems. This entails: planning, demand management, information and payment systems that are interoperable Europe-wide; and the full integration of information flows, management systems, infrastructure networks and mobility services into a new common multi-modal framework based on open platforms. This will also ensure flexibility and rapid responses to crisis events and extreme weather conditions by reconfiguring travel across modes. New positioning, navigation and timing applications, made possible through the Galileo and EGNOS satellite navigation systems, ***will be instrumental*** in achieving

and goods, also internalising external costs, requires a new European multimodal transport management, information and payment system.

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4.2.1. A substantial reduction of traffic congestion

This can be achieved by implementing a fully intermodal ‘door-to-door’ transport ***and mobility*** system and by avoiding unnecessary use of transport. This means promoting greater integration between transport modes, the optimisation of transportation chains and better integrated transport ***and logistics*** services ***leveraging new and more performing navigation systems, such as EGNOS and Galileo***. Such innovative solutions will also facilitate accessibility, including for the ageing population***, persons with reduced mobility (PRMs) and dsiable*** and vulnerable users.

4.2.2. Substantial improvements in the mobility of people and freight

This can be achieved through the development and widespread use of intelligent transport applications and management systems. This entails: planning, demand management, information***, ticketing*** and payment systems that are interoperable Europe-wide; and the full integration of information flows, management systems, infrastructure networks and mobility services into a new common multi-modal framework based on open platforms. This will also ensure flexibility and rapid responses to crisis events and extreme weather conditions by reconfiguring travel across modes. New positioning, navigation and timing applications, made possible through the Galileo and EGNOS satellite navigation systems, ***are key enablers*** in

this objective.

(a) Innovative air traffic management technologies will contribute to a step-change in safety and efficiency with rapidly increasing demand, to achieve improved punctuality, to reduce time spent in travel-related procedures at airports and to achieve resilience in the air transport system. The implementation and further development of the ‘Single European Sky’ will be supported with solutions for increased automation and autonomy in air traffic management and aircraft control, better integration of air and ground components, and novel solutions for the efficient and seamless handling of passengers and freight throughout the transport system.

(b) For waterborne transport, improved and integrated planning and management technologies will contribute to the emergence of a ‘Blue Belt’ in the seas around Europe, improving port operations, and to a suitable framework for inland waterways.

(c) For rail and road, the optimisation of network management will improve efficient use of infrastructure and make cross-border operations easier. Comprehensive cooperative road traffic management and information systems will be developed, relying on vehicle to vehicle and vehicle to infrastructure communication.

4.2.3. Developing and applying new concepts of freight transport and logistics

This can reduce pressure on the transport system and improve safety and freight capacity. They can, for example, combine

achieving this objective.

(a) Innovative air traffic management technologies will contribute to a step-change in safety and efficiency with rapidly increasing demand, to achieve improved punctuality, to reduce time spent in travel-related procedures at airports and to achieve resilience in the air transport system. ***Innovative navigation systems, leveraging the European GNSS, such as EGNOS, will optimise landing approaches, increase flight safety and reduce fuel consumption, with better use of major airports and allowing full exploitation of minor ones.*** The implementation and further development of the 'Single European Sky' will be supported with solutions for increased automation and autonomy in air traffic management and aircraft control, better integration of air and ground components, and novel solutions for the efficient and seamless handling of passengers and freight throughout the transport system.

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4.2.3. Developing and applying new concepts of freight transport and logistics

This can reduce pressure on the transport system and improve safety and freight capacity. They can, for example, combine

high performance and low environmental impact vehicles with smart, secure on-board and infrastructure-based systems (e.g. road trains). Activities will also support the development of the e-Freight vision of a paperless freight transport process, where electronic information flows, services and payments are linked to physical freight flows across transport modes.

4.2.4. Reducing accident rates and fatal casualties and improving security

This will be achieved by addressing aspects inherent to the organisation, management and monitoring of performance and risk of transport systems; and by focusing on the design and operations of aircraft, vehicles and vessels, infrastructures and terminals.. The focus will be on passive and active safety, preventive safety, and enhanced automation and training processes to reduce the impact of human errors. To better anticipate, assess and mitigate the impact of weather and other natural hazards, special tools and techniques will be devised. Activities will also focus on the integration of security aspects in the planning and management of passenger and freight flows, on the conception of aircraft, vehicles and vessels, on traffic and system management and on the design of terminals.

4.3. Global leadership for the European transport industry

By staying ahead in new technologies and reducing the costs of existing manufacturing processes, research and innovation will contribute to growth and highly skilled jobs in the European transport industry, in the face of growing competition. At stake is the preservation of the competitiveness of a major economic sector that directly represents 6.3 % of the Union GDP and employs nearly 13 million people in Europe. Specific objectives

high performance and low environmental impact vehicles with smart, secure on-board and infrastructure-based systems (e.g. road trains). Activities will also support the development of the e-Freight vision of a paperless freight transport process, where electronic information flows, services and payments are linked to physical freight flows across transport modes.

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4.3. Global leadership for the European transport industry

By staying ahead in new technologies and reducing the costs***, improving resource and energy efficiency*** of existing manufacturing processes, research and innovation will contribute to growth and highly skilled jobs in the European transport industry, in the face of growing competition. At stake is the preservation of the competitiveness of a major economic sector that directly represents 6.3 % of the Union GDP and employs nearly 13 million

include the development of the next generation of innovative transport means and to prepare the ground for the following one, by working on novel concepts and designs, smart control systems and efficient production processes. Europe aims at becoming the world-leader in efficiency and safety in all modes of transport.

Research and innovation will focus on the following specific activities:

4.3.1. Developing the next generation of transport means as the way to secure market share in the future

It will help enhance European leadership in aircraft, high speed trains, (sub)urban rail transport, road vehicles, electromobility, passenger cruise ships, ferries and specialised high technology ships and marine platforms. It will also spur the competitiveness of European industries in upcoming technologies and systems and support their diversification towards new markets, including in sectors other than transport. This includes the development of innovative safe aircraft, vehicles and vessels that incorporate efficient propulsion units, high performance and intelligent control systems.

4.3.2. On board, smart control systems

These are needed to realise higher levels of performance and system integration in transport. Appropriate interfaces for communications between aircraft, vehicles, vessels and infrastructures in all relevant combinations will be developed, with a view to defining common operational standards.

4.3.3. Advanced production processes

These will allow customization, lower lifecycle cost and development time and facilitate the standardisation and certification of aircraft, vehicles and

people in Europe. Specific objectives include the development of the next generation of innovative transport means and to prepare the ground for the following one, by working on novel concepts and designs, smart control systems and efficient production processes. Europe aims at becoming the world-leader in efficiency and safety in all modes of transport.

Research and innovation will focus on the following specific activities:

4.3.1. Developing the next generation of transport means as the way to secure market share in the future

It will help enhance European leadership in aircraft, ***rotorcraft, regional and small aircrafts,*** high speed trains, (sub) urban rail transport, road vehicles, electromobility, passenger cruise ships, ferries and specialised high technology ships and marine platforms. It will also spur the competitiveness of European industries in upcoming technologies and systems and support their diversification towards new markets, including in sectors other than transport. This includes the development of innovative safe aircraft, vehicles and vessels that incorporate efficient propulsion units, high performance and intelligent control systems.

4.3.2. On board, smart control systems

These are needed to realise higher levels of performance and system integration in transport. Appropriate interfaces for communications between aircraft, vehicles, vessels and infrastructures in all relevant combinations will be developed, with a view to defining common operational standards.

4.3.3. Advanced production processes

These will allow customization, lower lifecycle cost and development time and facilitate the standardisation and certification of aircraft, vehicles and

vessels, and related infrastructure. Activities in this area will develop fast and cost efficient design and manufacturing techniques, including assembly, construction, maintenance and recycling, through digital tools and automation, and capacity to integrate complex systems. This will foster competitive supply chains able to deliver with short time-to-market and reduced costs.

4.3.4. Exploring entirely new transport concepts

This will help enhance Europe's competitive edge in the longer term perspective. Strategic research and proof of concept activities shall address innovative transport systems and services, including fully automated and other new types of aircraft, vehicles and vessels with long term potential.

4.4. Socio-economic research and forward looking activities for policy making

Actions to support policy analysis and development including on socio-economic

vessels, and related infrastructure. Activities in this area will develop fast and cost efficient design and manufacturing techniques, including assembly, construction, maintenance and recycling, through digital tools and automation, and capacity to integrate complex systems. This will foster competitive supply chains able to deliver with short time-to-market and reduced costs.

4.3.4. Exploring entirely new transport concepts

This will help enhance Europe's competitive edge in the longer term perspective. Strategic research and proof of concept activities shall address innovative transport systems and services, including fully automated and other new types of aircraft, vehicles and vessels with long term potential.

4.3 a. Smart logistics

This will help to design and develop more efficient and greener logistics transport systems through facilitation and cost/time optimisation.

This includes a better understanding of consumer patterns and the impact on urban freight logistics, traffic and congestion is needed in order to develop smart logistics; to develop new IT and management tools for logistics, by improving real time information systems to manage, track and trace freight flows, integration and communication on vehicle and with infrastructure; to develop unconventional systems for goods distribution; to develop competitive intermodal solutions for the supply chain and logistics platforms that improve freight flows.

4.4. Socio-economic ***and behavioural*** research and forward looking activities for policy making

Actions to support policy analysis and development including on socio-economic***,***

aspects of transport are necessary to promote innovation and meet the challenges raised by transport. Activities will target the development and implementation of European research and innovation policies for transport, prospective studies and technology foresight, and strengthening of the European Research Area.

psychological/behavioural and geographic aspects of transport ***and mobility*** are necessary to promote innovation and meet the challenges raised by transport ***and mobility***. Activities will target the development and implementation of European research and innovation policies for transport ***and mobility***, prospective studies and technology foresight, and strengthening of the European Research Area.

Understanding user behaviour, social acceptance, impact of policy measures, mobility patterns and business models and their implications are of paramount importance for the evolution of the European transport system. Scenario development taking into account societal trends, policy objectives and technology foresight in a 2050 perspective will be carried out. In view of better understanding the links between territorial development and the European transport system, robust models are needed on which sound policy decisions can be taken.

Understanding user behaviour, social acceptance ***of behavioural change towards more sustainable transport modes***, impact of policy measures, mobility patterns***, awareness-raising by carbon-footprint tools*** and business models and their implications are of paramount importance for the evolution of the European transport ***and mobility*** system. Scenario development taking into account societal trends, ***demographic change,*** policy objectives and technology foresight in a 2050 perspective will be carried out. In view of better understanding the links between territorial development and the European transport system***, between green logistics, mobility management and transport avoidance***, robust models are needed on which sound policy decisions can be taken.

Research will focus on how to prevent social inequalities in access to mobility, and how to improve the position of vulnerable road users. Economic issues must also be addressed, focusing on ways to internalise the externalities from transport across modes, as well as taxation and pricing models. Prospective research is needed to assess future requirements for skills and jobs.

Research will focus on how to prevent social inequalities in access to mobility, and how to improve the position of vulnerable road users. Economic issues must also be addressed, focusing on ways to internalise the externalities from transport ***and mobility*** across modes, as well as taxation and pricing models. Prospective research is needed to assess future requirements for skills and jobs.

4.5. Specific implementation aspects

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In establishing the priorities in the work programme, in addition to the input of the external independent advice and of the various European Technology Platforms,

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account will be taken of the work carried out in the framework of the Strategic Transport Technology Plan.

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Amendment 63
Proposal for a decision
Annex 1 – section 3 – point 5

Text proposed by the Commission	*Amendment*
5. Climate action, resource efficiency and raw materials	5. Climate action, ***environment,*** resource efficiency and ***sustainable use of*** raw materials
5.1. Fighting and adapting to climate change	5.1. Fighting and adapting to climate change
Current CO2 concentrations in the atmosphere are close to 40 % higher than those at the start of the industrial revolution and at the highest levels experienced in the last 2 million years. Non-CO2 greenhouse gases also contribute to climate change and are playing an increasingly significant role. Without decisive action, climate change could cost the world at least 5 % of GDP each year; and up to 20 % under some scenarios.	Current CO2 concentrations in the atmosphere are close to 40 % higher than those at the start of the industrial revolution and at the highest levels experienced in the last 2 million years. Non-CO2 greenhouse gases ***and particles*** also contribute to climate change and are playing an increasingly significant role. Without decisive action, climate change could cost the world at least 5 % of GDP each year; and up to 20 % under some scenarios.
In contrast, with early and effective action the net costs could be limited to around 1 % of GDP per year. Meeting the 2°C target and avoiding the worst impacts of climate change will require developed countries to cut greenhouse gas emissions by 80-95 % by 2050 compared to 1990 levels.	In contrast, with early and effective action the net costs could be limited to around 1 % of GDP per year. Meeting the 2°C target and avoiding the worst impacts of climate change will require developed countries to cut greenhouse gas emissions by 80-95 % by 2050 compared to 1990 levels.
The aim of this activity is therefore to develop and assess innovative, cost-effective and sustainable adaptation and mitigation measures, targeting both CO2 and non-CO2 greenhouse gases, and underlining both technological and non-technological green solutions, through the generation of evidence for informed, early and effective action and the networking of the required competences.	The aim of this activity is therefore to develop and assess innovative, cost-effective and sustainable adaptation and mitigation measures, targeting both CO2 and non-CO2 greenhouse gases ***and aerosols***, and underlining both technological and non-technological green solutions, through the generation of evidence for informed, early and effective action and the networking of the required

competences.

To achieve this, research and innovation will focus on the following:

5.1.1. Improve the understanding of climate change and the provision of reliable climate projections

Better understanding of the causes and evolution of climate change and more accurate climate projections are crucial for society to protect lives, goods and infrastructures and ensure effective decision making. It is essential to further improve the scientific knowledge-base of climate drivers, processes, mechanisms and feedbacks associated with the functioning of oceans, terrestrial ecosystems and the atmosphere. Improved climate predictions at pertinent temporal and spatial scales will be supported via the development of more accurate scenarios and models, including fully coupled Earth-system models.

5.1.2. Assess impacts, vulnerabilities and develop innovative cost-effective adaptation and risk prevention measures:

There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society require the integrated analysis of current and future impacts, vulnerabilities, population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems and ecosystem services, infrastructures and economic and natural assets. Emphasis will be placed on the most valuable natural ecosystems and built environments, as well as key societal, cultural and economic sectors across

To achieve this, research and innovation will focus on the following:

5.1.1. Improve the understanding of climate change and the provision of reliable climate projections

Better understanding of the causes and evolution of climate change and more accurate climate projections are crucial for society to protect lives, ***economic activities,*** goods and infrastructures and ensure effective decision making. It is essential to further improve the scientific knowledge-base of climate drivers, processes, mechanisms and feedbacks associated with the functioning of oceans, terrestrial ecosystems and the atmosphere ***as well as polar regions***. Improved climate predictions at pertinent temporal and spatial scales will be supported via the development of more accurate scenarios and models, including fully coupled Earth-system models.

5.1.2. Assess impacts, vulnerabilities and develop innovative cost-effective adaptation and risk prevention measures:

There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society require the integrated analysis of current and future impacts, vulnerabilities, population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems and ecosystem services, infrastructures and economic and natural assets. ***For instance, climate changes are likely to enhance the occurrence of extreme hydrological phenomena (floods and droughts) with major impacts in***

Europe. Actions will investigate the impacts and growing risks for human health stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.

water resources, ecosystems and the sustainability of economic activities as known today. Impact on water availability is especially relevant. In many regions of the Union scarcity will be intensified and a more uneven distribution in space and time will occur, requiring new forms of management. Emphasis will be placed on the most valuable natural ecosystems and built environments, as well as key societal, cultural and economic sectors across Europe. Actions will investigate the impacts and growing risks for human health stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including ***the specificities of islands and outermost regions and*** the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.

5.1.3. Support mitigation policies

The Union's transition to a competitive, resource efficient and climate change resilient economy by 2050 requires the design of effective, long-term, low-emission strategies and major advancements in our capacity to innovate. Research will assess the environmental and socio-economic risks, opportunities and impacts of climate change mitigation options. Research will support the development and validation of new climate-energy-economy models, taking into account economic instruments and

5.1.3. Support mitigation policies

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relevant externalities, with the aim of testing mitigation policy options and low carbon technology pathways at different scales and for the key economic and societal sectors at Union and global level. Actions will facilitate technological, institutional and socio-economic innovation by improving the links between research and application and between entrepreneurs, end users, researchers and knowledge institutions.

relevant externalities, with the aim of testing mitigation policy options and low carbon technology pathways at different scales and for the key economic and societal sectors at Union and global level. Actions will facilitate technological, institutional and socio-economic innovation by improving the links between research and application and between entrepreneurs, end users, researchers and knowledge institutions.

5.1.3a. Cultural heritage

Research strategies, methodologies and tools needed to enable a dynamic and sustainable cultural heritage in Europe in response to climate change. Cultural heritage in its diverse physical forms provides the living context for resilient communities responding to multivariate changes. Research in cultural heritage requires a multidisciplinary approach to improve the understanding of historical material. Activities shall focus on identifying resilience levels via observations, monitoring and modelling as well as provide for a better understanding on how communities perceive and respond to climate change and seismic and volcanic hazards.

5.2. Sustainably ***managing*** natural resources and ecosystems

5.2. ***Protecting the environment,*** sustainably ***management of*** natural resources***, water, biodiversity*** and ecosystems

Societies face a major challenge to establish a sustainable balance between human needs and the environment. Environmental resources, including water, air, biomass, fertile soils, biodiversity, ecosystems and the services they provide, underpin the functioning of the European and global economy and quality of life. Global business opportunities related to natural resources are expected to amount to over EUR 2 trillion by 2050. Despite this, ecosystems in Europe and globally are being degraded beyond nature's ability to

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regenerate them and environmental resources are being over-exploited. For example, 1000 km² of some of the most fertile soils and valuable ecosystems are lost every year in the Union, while a quarter of fresh water is wasted. Continuing these patterns is not an option. Research must contribute to reversing the trends that damage the environment and to ensuring that ecosystems continue to provide the resources, goods and services that are essential for well-being and economic prosperity.

beyond nature's ability to regenerate them and environmental resources are being over-exploited ***and even destroyed***. For example, 1000 km² of some of the most fertile soils and valuable ecosystems are lost every year in the Union, while a quarter of fresh water is wasted. Continuing these patterns is not an option. Research must contribute to reversing the trends that damage the environment and to ensuring that ecosystems continue to provide the resources, goods and services that are essential for well-being and economic prosperity.

The aim of this activity is therefore to provide knowledge for the management of natural resources that achieves a sustainable balance between limited resources and the needs of society and the economy.

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To achieve this, research and innovation will focus on the following:

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5.2.1. Further our understanding of the functioning of ecosystems, their interactions with social systems and their role in sustaining the economy and human well-being.

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Society's actions risk triggering changes in the environment that are irreversible and which alter the character of ecosystems. It is vital to anticipate these risks by assessing, monitoring and forecasting the impact of human activities on the environment, and environmental changes on human well-being.

Society's actions risk triggering changes in the environment that are irreversible and which alter the character of ecosystems. It is vital to anticipate these risks by assessing, monitoring and forecasting the impact of human activities on the environment, and environmental changes on human well-being. ***A better understanding of the environmental determinants of health and wellbeing and the mediating mechanisms is required in order to provide evidence for effective health protection strategies and inform the Union programmes and policies.***

Research on marine, (from coastal zones to the deep sea), fresh-water, terrestrial and urban ecosystems, including groundwater dependent ecosystems, will improve our understanding of the complex interactions

Research on marine, (from coastal zones to the deep sea), ***polar,*** fresh-water, terrestrial and urban ecosystems, including groundwater dependent ecosystems ***and their biological diversity***, will improve our

between natural resources and social, economic, and ecological systems, including natural tipping points, and the resilience, or fragility, of human and biological systems. It will examine how ecosystems function and react to anthropogenic impacts, how ***they*** can be restored, and how this will affect economies and human well-being. It will also investigate solutions for addressing resource challenges. It will contribute to policies and practices that ensure that social and economic activities operate within the limits of the sustainability and adaptability of ecosystems and biodiversity.

understanding of the complex interactions between natural resources and social, economic, and ecological systems, including natural tipping points, and the resilience, or fragility, of human and biological systems. It will examine how ecosystems function and react to anthropogenic impacts, how ***these impacts can be minimised, how ecosystems*** can be restored, and how this will affect economies and human well-being. It will also investigate solutions for addressing resource challenges. It will contribute to policies and practices that ensure that social and economic activities operate within the limits of the sustainability and adaptability of ecosystems and biodiversity.

A better understanding of the physical and social phenomena that lead forest fires is of paramount need. Simulation, data collection and analysis is fundamental to feed research based decision support systems as a primordial way to prevent forest fires and increase efficiency in their combat and decrease damages in human, environmental, social and economic assets.

5.2.1a. Ensuring action to safeguard the sustainable transition, management and use of water resources and water services.

In the future the great challenges for water research will primarily result from the necessity of viewing the topic increasingly in connection with questions of global change, climate change, the growing geopolitical significance as well as energy and health aspects. Water resources should be viewed and managed holistically. This includes natural regions and ecological questions, an understanding of ecosystem services as a process, protection of drinking water quality and different political systems and institutional structures. The knowledge base should integrate the concept of 'environmental flows' and take into

account the ecosystem services supported by water; stresses the need to take into account that water cycle changes depend on habitat and this has influence on the percentage of water that is recycled.

With respect to water, management strategies integrating natural bodies and alternative sources (e.g. treated wastewater) for the often-conflicting uses (agriculture, landscape maintenance, environmental restoration/enhancement, forest fire fighting, recreational activities and public supply) are envisaged. Attention shall be given to the water quantity and quality of natural bodies, particularly those used for drinking water abstraction.

The aim is to improve an innovative knowledge base on (transitions in) water supply, water purification, closing the water cycle, energy /raw material recovery and improving end-user engagement/behaviour to meet future needs.

5.2.1b. Reaching the Good Environmental Status of Europe's seas and Oceans

Climate change and resources exploitation are main threats to ecosystems. The protection and sustainable management of natural resources and biodiversity assessment and conservation in coastal and marine (including deep sea) ecosystems through innovative observation and monitoring tools is of paramount importance. Also, the mitigation of coastal and marine biodiversity threats (including habitat change and fragmentation, invasive species, overexploitation and pollution) must be guaranteed.

The aim is to Enhancing the knowledge and impacts of marine contaminants to reach and maintain the good environmental status of European seas and oceans as required in the marine strategy directive (MSFD) and to promote

	and improved the marine spatial planning tools including coastal protection and marine protected areas.
5.2.2. Provide knowledge and tools for effective decision making and public engagement	5.2.2. Provide knowledge and tools for effective decision making and public engagement
Social, economic and governance systems still need to address both resource depletion and the damage to ecosystems. Research and innovation will underpin policy decisions needed to manage natural resources and ecosystems so as to avoid, or adapt to, disruptive climate and environmental change and to promote institutional, economic, behavioural and technological change that ensure sustainability. Emphasis will be put on critical policy relevant ecosystems and ecosystem services, such as fresh water, seas and oceans, air quality, biodiversity, land use and soil. The resilience of societies and ecosystems to catastrophic events, including natural hazards, will be supported through improving capacities for forecasting, early warning, and assessing vulnerabilities and impacts, including the multi-risk dimension. Research and innovation will thus provide support for environmental and resource efficiency policies, and options for effective evidence-based governance within safe operating limits. Innovative ways will be developed to increase policy coherence, resolve trade-offs and manage conflicting interests***, and*** improve public awareness of research results ***and*** the participation of citizens in decision-making.	Social, economic and governance systems still need to address both resource depletion and the damage to ecosystems. Research and innovation will underpin policy decisions needed to manage natural resources and ecosystems so as to avoid, or adapt to, disruptive climate and environmental change and ***its impacts and*** to promote institutional, economic, behavioural and technological change that ensure sustainability. Emphasis will be put on critical policy relevant ecosystems and ecosystem services, such as fresh water, seas and oceans, ***polar regions,*** air quality, biodiversity, land use***, forest fires*** and soil. The resilience of societies and ecosystems to catastrophic events, including natural hazards, will be supported through improving capacities for forecasting, early warning, and assessing vulnerabilities and impacts, including the multi-risk dimension. Research and innovation will thus provide support for environmental and resource efficiency policies, and options for effective evidence-based governance within safe operating limits. Innovative ways will be developed to increase policy coherence, resolve trade-offs and manage conflicting interests***. Special attention will also be given to*** improve public awareness of research results***,*** the participation of citizens in decision-making ***and the public acceptance of innovations and innovative technologies. Availability and productivity of all the substantial resources must be analysed at the various relevant territorial scales: global, regional and local and the related socioeconomic consequences should be analysed in order to elaborate options for political actions***.

	5.2.2a. Addressing resource consumption patterns and lifestyles changes.
	Research into sustainability lifestyle changes and fostering emergence of sustainable lifestyles. Support implementation of demand-side innovations and solutions to reduce resource use and unsustainable use of resources
5.3. Ensuring the sustainable supply of non-energy and non-agricultural raw materials	5.3. Ensuring the sustainable ***use, management and*** supply of non-energy and non-agricultural raw materials
Sectors such as construction, chemicals, automotive, aerospace, machinery and equipment, which have a combined added value in excess of EUR 1,000 billion and provide employment for some 30 million people, all depend on access to raw materials. ***The Union is self-sufficient in construction minerals.*** Nonetheless, whilst the Union is one of the world's largest producers of certain industrial minerals, it remains a net importer of most of them. Furthermore, the Union is highly dependent on imports of metallic minerals and is totally import dependent for some critical raw materials.	Sectors such as construction, chemicals, automotive, aerospace, machinery and equipment, which have a combined added value in excess of EUR 1,000 billion and provide employment for some 30 million people, all depend on access to raw materials. Nonetheless, whilst the Union is one of the world's largest producers of certain industrial minerals, it remains a net importer of most of them. Furthermore, the Union is highly dependent on imports of metallic minerals and is totally import dependent for some critical raw materials.
Recent trends indicate that demand for raw materials will be driven by the development of emerging economies and by the rapid diffusion of key enabling technologies. Europe has to ensure a sustainable management and secure a sustainable supply of raw materials from inside and outside its borders for all sectors that depend on access to raw materials. Policy targets for critical raw materials are outlined in the Commission's Raw Materials Initiative .	Recent trends indicate that demand for raw materials will be driven by ***continued demand from developed economies*** the development of emerging economies and by the rapid diffusion of key enabling technologies. Europe has to ensure a sustainable management and secure a sustainable supply of raw materials from inside and outside its borders for all sectors that depend on access to raw materials. Policy targets for critical raw materials are outlined in the Commission's Raw Materials Initiative.
The aim of this activity is therefore to improve the knowledge base on raw materials and develop innovative solutions for the cost-effective and environmentally friendly exploration, extraction, processing, recycling and recovery of raw	The aim of this activity is therefore to improve the knowledge base on raw materials***, both on land and sea-bed*** and develop innovative solutions for the cost-effective and environmentally friendly exploration, extraction, processing,

materials and for their substitution by economically attractive alternatives with a lower environmental impact.

resource efficiency, re-use, recycling and recovery of raw materials and for their substitution by economically attractive alternatives with a lower environmental impact. ***International co-operation including co-operation on developing better international resource governance and co-operation between national geological surveys will be relevant in this context and will be pursued.***

To achieve this, research and innovation will focus on the following:

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5.3.1. Improve the knowledge base on the availability of raw materials

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The assessment of the long-term availability of global and Union resources, including access to urban mines (landfills and mining waste), deep-sea resources (e.g., the sea-bed mining of rare earth minerals) and the associated uncertainties will be improved. This knowledge will help society reach a more efficient use, recycling and reuse of scarce or environmentally harmful raw materials. It will also develop global rules, practices and standards governing economically viable, environmentally sound and socially acceptable resource exploration, extraction and processing, including practices in land use and marine spatial planning.

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5.3.2. Promote the sustainable supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery

5.3.2. Promote the sustainable ***and efficient*** supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery

Research and innovation is needed over the entire life cycle of materials, in order to secure an affordable, reliable, and sustainable supply and management of raw materials essential for European industries. Developing and deploying economically viable, socially acceptable and environmentally friendly exploration, extraction ***and processing*** technologies will boost the efficient use of resources. This will also exploit the potential of urban mines. New and economically viable

Research and innovation is needed over the entire life cycle of materials, in order to secure an affordable, reliable, and sustainable supply and management of raw materials essential for European industries. Developing and deploying economically viable, socially acceptable and environmentally friendly exploration, extraction***, processing and recycling*** technologies will boost the efficient use of resources. This will also exploit the potential of urban mines. New and

recycling and materials recovery technologies, business models and processes will also contribute to reducing the Union's dependence on the supply of primary raw materials. This will include the need for longer use, high-quality recycling and recovery, and the need to drastically reduce ***resource*** wastage. A full life-cycle approach will be taken, from the supply of available raw materials to end of life, with minimum energy and resources requirements.

5.3.3. Find alternatives for critical raw materials

In anticipation of the possible reduced global availability of certain materials, due for example to trade restrictions, sustainable substitutes and alternatives for critical raw materials, with similar functional performance, will be investigated and developed. This will reduce the Union's dependence on primary raw materials and improve the impact on the environment.

5.3.4. Improve societal awareness and skills on raw materials

The necessary move to a more self-reliant and resource efficient economy will require cultural, behavioural, socio-economic and institutional change. In order to address the growing problem of skills shortage in the Union's raw materials sector, (including the European mining industry), more effective partnerships between universities and geological surveys and industry will be encouraged. It will also be essential to support the development of innovative green skills. In addition there is still limited public awareness of the importance of domestic raw materials for the European economy. To facilitate the necessary structural changes, research and innovation will aim to empower citizens, policy-makers, practitioners and institutions.

5.4. Enabling the transition towards a

economically viable recycling and materials recovery technologies, business models and processes will also contribute to reducing the Union's dependence on the supply of primary raw materials. This will include the need for longer use, high-quality recycling and recovery, and the need to drastically reduce ***both the normal consumption as well as the*** wastage ***of these resources***. A full life-cycle approach will be taken, from the supply of available raw materials to end of life, with minimum energy and resources requirements.

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5.4. Enabling the transition towards a

green economy through eco-innovation	***sustainable society and*** economy through eco-innovation
The Union cannot prosper in a world of ever increasing resource consumption, environmental degradation and biodiversity loss. Decoupling growth from the use of natural resources requires structural changes in how such resources are used, re-used and managed, while safeguarding our environment. Eco-innovations will enable us to reduce pressure on the environment, increase resource efficiency, and put the Union on the path to a resource and energy efficient economy. Eco-innovation also creates major opportunities for growth and jobs, and increases European competitiveness within the global market, which is estimated to grow to a trillion Euro market after 2015. Already 45 % of companies have introduced some type of eco-innovation. It has been estimated that around 4 % of eco-innovations led to more than a 40 % reduction of material use per unit of output, highlighting the great future potential.	The Union cannot prosper in a world of ever increasing resource consumption, environmental degradation and biodiversity loss. Decoupling growth from the use of natural resources requires structural changes in how such resources are used, re-used and managed, while safeguarding our environment. Eco-innovations will enable us to reduce pressure on the environment, increase resource efficiency, and put the Union on the path to a resource and energy efficient economy. Eco-innovation also creates major opportunities for growth and jobs, and increases European competitiveness within the global market, which is estimated to grow to a trillion Euro market after 2015. Already 45 % of companies have introduced some type of eco-innovation. It has been estimated that around 4 % of eco-innovations led to more than a 40 % reduction of material use per unit of output, highlighting the great future potential.
The aim of this activity is therefore to foster all forms of eco-innovation that enable the transition to a green economy.	The aim of this activity is therefore to foster all forms of eco-innovation that enable the transition to a green economy.
To achieve this, research and innovation will focus on the following:	To achieve this, research and innovation will focus on the following:
5.4.1. Strengthen eco-innovative technologies, processes, services and products ***and boost their market uptake.***	5.4.1. Strengthen eco-innovative technologies, processes, services and products
All forms of innovation, both incremental and radical, combining technological, organisational, societal, behavioural, business and policy innovation, and strengthening the participation of civil society, will be supported. This will underpin a more circular economy, while reducing environmental impacts and taking account of rebound effects on the environment. This will include business models, industrial symbiosis, product service systems, product design, full life cycle and cradle-to-cradle approaches. The	All forms of innovation, both incremental and radical, combining technological, organisational, societal, behavioural, business and policy innovation, and strengthening the participation of civil society, will be supported. This will underpin a more circular economy, while reducing environmental impacts and taking account of rebound effects on the environment. This will include business models, industrial symbiosis, product service systems, product design, full life cycle and cradle-to-cradle approaches. The

aim will be to improve resource efficiency by reducing, in absolute terms, inputs, waste and the release of harmful substances along the value chain and foster re-use, recycling and resource substitution. Emphasis will be given to facilitate the transition from research to market, involving industry and notably SMEs, from the development of prototypes to ***their introduction in the market and replication***. Networking among eco-innovators will also seek to enhance the dissemination of knowledge and better link supply with demand.

aim will be to improve resource efficiency by reducing, in absolute terms, inputs, waste and the release of harmful substances along the value chain and foster re-use, recycling and resource substitution. ***With current economic context, priority needs to be given to support private companies with an emphasis on SMEs in introducing environmental innovative ideas into the market, as successfully done by the previous Eco-innovation market replication.*** Emphasis will be given to facilitate the transition from research to market, involving industry and notably SMEs, from the development of prototypes to ***pre-commercial demonstration***. Networking among eco-innovators will also seek to enhance the dissemination of knowledge and better link supply with demand.

5.4.1a. Promote the first application and market replication of near commercial eco-innovative solutions

It is not uncommon that highly promising and technically advanced eco-innovative technologies, processes, services and products do not reach the market due to pre-commercialisation challenges and the residual risk linked to scaling-up. Eco-innovative solutions that have been technically demonstrated do not realise their full environmental and economic potential as their market introduction is perceived as too risky by private investors. This is in particular true for solutions originating from start-ups and innovative SMEs. The aim will be to support projects concerned with the first application and market replication of eco-innovative techniques, products, services or practices of Union relevance, that have already been technically demonstrated but that, owing to residual risk, have not yet penetrated the market. Actions should contribute to removing barriers to the development and wide application of eco-innovation, create or enlarge markets for

	the solutions concerned and improve the competitiveness of Union enterprises, especially SMEs, on world markets.
5.4.2. Support innovative policies and societal changes	5.4.2. Support innovative policies and societal changes
Structural and institutional changes are needed to enable the transition towards a green economy. Research and innovation will address the main barriers to societal and market change and will aim to empower consumers, business leaders and policy makers to adopt innovative and sustainable behaviour. Robust and transparent tools, methods and models to assess and enable the main economic, societal and institutional changes needed to achieve a paradigm shift towards a green economy will be developed. Research will explore how to promote sustainable consumption patterns, encompassing socio-economic research, behavioural science, user engagement and public acceptance of innovation, as well as activities to improve communication and public awareness. Full use will be made of demonstration actions.	Structural and institutional changes are needed to enable the transition towards a green economy. Research and innovation will address the main barriers to societal and market change and will aim to empower consumers, business leaders and policy makers to adopt innovative and sustainable behaviour. Robust and transparent tools, methods and models to assess and enable the main economic, societal and institutional changes needed to achieve a paradigm shift towards a green economy will be developed. Research will explore how to promote sustainable consumption patterns, encompassing socio-economic research, behavioural science, user engagement and public acceptance of innovation, as well as activities to improve communication and public awareness. Full use will be made of demonstration actions.
5.4.3. Measure and assess progress towards a green economy	5.4.3. Measure and assess progress towards a green economy
It is necessary to develop robust indicators at all appropriate spatial scales that are complementary to GDP, methods and systems to support and assess the transition towards a green economy and the effectiveness of relevant policy options. Driven by a life-cycle approach, research and innovation will improve the quality and availability of data, measurement methods and systems relevant to resource efficiency and eco-innovation and facilitate the development of innovative offset schemes. Socio economic research will provide a better understanding of the root causes of producer and consumer behaviour and thus contribute to the design of more effective policy instruments to facilitate the transition to a resource efficient and climate change resilient	It is necessary to develop robust indicators at all appropriate spatial scales that are complementary to GDP, methods and systems to support and assess the transition towards a green economy and the effectiveness of relevant policy options. Driven by a life-cycle approach, research and innovation will improve the quality and availability of data, measurement methods and systems relevant to resource efficiency and eco-innovation and facilitate the development of innovative offset schemes. Socio economic research will provide a better understanding of the root causes of producer and consumer behaviour and thus contribute to the design of more effective policy instruments to facilitate the transition to a resource efficient and climate change resilient

economy. Moreover, technology assessment methodologies and integrated modelling will be developed to support resource efficiency and eco-innovation policies at all levels, while increasing policy coherence and resolving trade-offs. The results will enable the monitoring, assessment and reduction in material and energy flows involved in production and consumption, and will enable policy-makers and businesses to integrate environmental costs and externalities into their actions and decisions.

5.4.4. Foster resource efficiency through digital systems

Innovations in information and communication technologies can constitute a key tool to support resource efficiency. To achieve this objective, modern and innovative ICT will contribute to significant efficiency gains in productivity, notably through automated processes, real time monitoring and decision support systems. The use of ICT will look to accelerate a progressive dematerialisation of the economy, by increasing the shift towards digital services, and to facilitate changes of consumption behaviours and business models through the use of the ICT of the future.

5.5. Developing comprehensive and sustained global environmental observation and information systems

Comprehensive environmental observation and information systems are essential to ensure the delivery of the long-term data and information required to address this challenge. These systems will be used to assess and predict the condition, status and trends of the climate, natural resources including raw materials, ecosystems and ecosystem services, as well as to evaluate low-carbon and climate mitigation and adaptation policies and options across all sectors of the economy. Information and knowledge from these systems will be used

economy. Moreover, technology assessment methodologies and integrated modelling will be developed to support resource efficiency and eco-innovation policies at all levels, while increasing policy coherence and resolving trade-offs. The results will enable the monitoring, assessment and reduction in material and energy flows involved in production and consumption, and will enable policy-makers and businesses to integrate environmental costs and externalities into their actions and decisions.

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to stimulate the smart use of strategic resources; to support the development of evidence-based policies; to foster new environmental and climate services; and to develop new opportunities in global markets.

to stimulate the smart use of strategic resources; to support the development of evidence-based policies; to foster new environmental and climate services; ***to support digital technologies for the monitoring, follow-up and management of water resources via satellite;*** and to develop new opportunities in global markets.

Capabilities, technologies and data infrastructures for earth observation and monitoring must build on advances in ICT, space technologies and enabled networks, remotely sensed observations, novel in situ sensors, mobile services, communication networks, participatory web-service tools and improved computing and modelling infrastructure, with the aim of continuously providing timely and accurate information, forecasts and projections. Free, open and unrestricted access to interoperable data and information will be encouraged, as well as the effective storage, management and dissemination of research results.

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5.6. Specific implementation aspects

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Activities will enhance the Union's participation in and financial contribution to multilateral processes and initiatives, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and the Group on Earth Observations (GEO). Cooperation with other major public and private research funders will improve global and European research efficiency and contribute to global research governance.

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S&T cooperation will contribute to the UNFCCC global technology mechanism and facilitate technology development, innovation and transfer in support of climate adaptation and the mitigation of greenhouse gases.

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explored to systematically collect, collate and analyse scientific and technological knowledge on key sustainable development and green economy issues, which will include a framework for measuring progress. This will complement existing scientific panels and bodies and seek synergies with them.

Research actions under this challenge will contribute to Global Monitoring for Environment and Security (GMES) operational services by providing a developmental knowledge base for GMES.

Specific measures will ensure that results from Union research and innovation in the fields of climate, resource efficiency and raw materials are used downstream by other Union programmes, such as the LIFE + programme, regional and structural funds, and external cooperation programmes.

An Advisory Network of Institutes may be established to provide: the continuous analysis of scientific and technological progress in the Union and its major partner countries and regions; an early investigation of market opportunities for new environmental technologies and practices; foresight for research & innovation and policy.

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Amendment 64
Proposal for a decision
Annex 1 – section 3 – point 6

Text proposed by the Commission	*Amendment*
6. Inclusive, innovative and ***secure*** societies	6. ***Understanding Europe in a changing world –*** inclusive, innovative and ***reflective*** societies
6.1. Inclusive societies	6.1. Inclusive societies
Current trends at play in European societies bring with them opportunities for a more united Europe but also risks. These	Current trends at play in European societies bring with them opportunities for a more united Europe but also risks. These

opportunities and risks need to be understood and anticipated in order for Europe to evolve with adequate solidarity and cooperation at social, economic, political and cultural levels, taking into account an increasingly interconnected world.

In this context, the objective is to enhance social, economic and political inclusion, combat poverty, enhance human rights, digital inclusiveness, equality, solidarity and inter-cultural ***dynamics*** by supporting interdisciplinary research, indicators, technological advances, organisational solutions and new forms of collaboration and co-creation. Research and other activities shall support the implementation of the Europe 2020 strategy as well as other relevant Union foreign policies. Humanities research ***may*** have an important role to play in this context. Specifying, monitoring and assessing the objectives of European strategies and policies will require focused research on high-quality statistical information systems, and the development of adapted instruments that allow policy makers to assess the impact and effectiveness of envisaged measures, in particular in favour of social inclusion.

The following specific objectives will be pursued

6.1.1. Promoting smart, sustainable and inclusive growth

The constant quest for economic growth carries a number of important human, social, environmental and economic costs. A smart, sustainable and inclusive growth in Europe implies substantial changes in the way growth and wellbeing are defined, measured (including through the measurement of progress beyond the commonly used GDP indicator), generated and sustained over time. Research will analyse the development of sustainable

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In this context, the objective is to enhance social, economic and political inclusion, combat poverty, enhance human rights, digital ***and educational*** inclusiveness, equality, solidarity***, cultural diversity*** and inter-cultural ***dialogue*** by supporting interdisciplinary research, indicators ***development***, technological advances, organisational solutions and new forms of collaboration and co-creation. Research and other activities shall support the implementation of the Europe 2020 strategy as well as other relevant Union foreign policies. ***Social sciences and*** humanities research ***will*** have an important role to play in this context. Specifying, monitoring and assessing the objectives of European strategies and policies will require focused research on high-quality statistical information systems, and the development of adapted instruments that allow policy makers to assess the impact and effectiveness of envisaged measures, in particular in favour of social inclusion.

The following specific objectives will be pursued

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lifestyles and socio-economic behaviours and values and how they relate to paradigms, policies and to the functioning of institutions, markets, firms, governance and belief systems in Europe. It will develop tools for a better assessment of the contextual and mutual impacts of such evolutions and policy options in areas such as employment, taxation, inequalities, poverty, social inclusion, education and skills, community development, competitiveness and the Internal Market. It will also analyse how national economies evolve and which forms of governance at European and international level could help prevent macro-economic imbalances, monetary difficulties, fiscal competition, unemployment and employment problems and other forms of economic and financial disorders. It will take into account the growing interdependencies between Union and global economies, markets and financial systems.

lifestyles and socio-economic behaviours and values and how they relate to paradigms, policies and to the functioning of institutions, markets, firms, governance and belief systems in Europe. It will develop***, taking into account the economic and social diversity,*** tools for a better assessment of the contextual and mutual impacts of such evolutions and policy options in areas such as employment, taxation, inequalities, poverty, social inclusion, education and skills, community development, competitiveness and the Internal Market. It will also analyse how national economies evolve and which forms of governance at European and international level could help prevent macro-economic imbalances, monetary difficulties, fiscal competition, unemployment and employment problems and other forms of economic and financial disorders. It will take into account the growing interdependencies between Union and global economies, markets and financial systems. ***The European cities have to be at the heart policies aiming to create growth, jobs and a sustainable future. The scrutiny of their performance – how well they function, their liveability, their attractiveness to investment and skills – is therefore critical to Europe's success. A European research agenda knowledgeable of inclusive urban development is more able to mitigate the social and the economic cost of inter-regional contrasts.***

6.1.2. Building resilient and inclusive societies in Europe

Understanding social transformations in Europe requires the analysis of changing democratic practices and expectations as well as of the historical evolution of identities, diversity, territories, religions, cultures and values. This includes a good understanding of the history of European integration. Besides, understanding the strains and opportunities arising from the

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uptake of ICT, both at individual and collective levels, is important in order to open new paths of inclusive innovation. It is essential to identify ways to adapt and improve the European welfare systems, public services and the broader social security dimension of policies in order to achieve cohesion and promote more social and economic equality and intergenerational solidarity. Research will analyse how societies and politics become more European in a broad sense through evolutions of identities, cultures and values, the circulation of ideas and beliefs and combinations of principles and practices of reciprocity, commonality and equality. It will analyse how vulnerable populations can participate fully in society and democracy, notably through the acquisition of various skills and the protection of human rights. The analysis of how political systems respond or not to such social evolutions and themselves evolve will thus be central. Research will also address the evolution of key systems that provide underlying forms of social bonds, such as family, work, education and employment and help combat poverty. It will take into account the importance of migration and demography in the future development of European policies.

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Given the increasing socio-economic importance of digital inclusion, research and large-scale innovation actions will promote inclusive ICT solutions and the effective acquisition of digital skills leading to the empowerment of citizens and a competitive workforce. Emphasis will be given to new technological advances that will enable a radical improvement in personalisation, user-friendliness and accessibility through a better understanding of citizen, consumer and user behaviours and values, including persons with disabilities. This will require

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6.1.2a. Addressing European models for social cohesion and well-being

Europe and the Union have developed a specific and rather unique combination of economic progress, social policies aimed at a high level of social cohesion, humanistic shared cultural values embracing democracy and the rule of common law, human rights, the respect and preservation of the diversity of cultural heritage, as well as the promotion of education and science, arts and humanities as fundamental drivers of social and economic progress and wellbeing. This "European Social Model" has somehow contributed to shaping the unity of Europe and its international role.

Globalisation and demography, as well as European integration itself, and the shifting international economical and financial environment, can now be perceived both as major challenges and as factors shaping the diversity and the future of European social models of economic development.

Research able to contribute new knowledge to our understanding of those factors and challenges across Europe, and how public policies may interact and contribute to the sustainability of our major social and economic objectives, is therefore a priority to be addressed.

Benchmarking the dynamics of European societies and economies in view of strengthening Europe's unity and inclusiveness as fundamental drivers of economic and social progress, assessing and comparing public policies against the variety of challenges across Europe, understanding the new conditions and opportunities for greater European integration, assessing the role of the European model and of its social, cultural, scientific and economic

	components and synergies as sources of comparative Union advantages at world level, shall be considered.
6.1.3. Strengthening Europe's role as a global actor	6.1.3. Strengthening Europe's role as a global actor
Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global governance in key domains like trade, development, work, economic cooperation, human rights, defence and security. This implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international arena with governmental and non governmental actors.	Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global governance in key domains like trade, development, work, economic cooperation, human rights, defence and security. This implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international arena with governmental and non governmental actors.
6.1.4. Closing the research and innovation divide in Europe	
There are significant regional disparities across Europe in research and innovation performance which need to be addressed. Measures will aim at unlocking excellence and innovation and will be distinct, complementary and synergistic with policies and actions of the Cohesion policy Funds. They include:	
- Linking in a competition emerging institutions, centres of excellence and	

innovative regions in less developed Member States to international leading counterparts elsewhere in Europe. This will involve teaming of excellent research institutions and less developed regions, twinningof staff exchanges, expert advice and assistance and the development of joint strategies for the establishment of centres of excellence that may be supported by the Cohesion policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.

- Establishing 'ERA Chairs' to attract outstanding academics to institutions with a clear potential for research excellence, in order to help these institutions fully unlock this potential and hereby create a level playing field for research and innovation in the European Research Area. This will include institutional support for creating a competitive research environment and the framework conditions necessary for attracting, retaining and developing top research talent within these institutions.

- Supporting access to international networks for excellent researchers and innovators who lack sufficient involvement in European and international networks. This will include support provided through COST and National Contact Points

- Supporting the development and monitoring of smart specialisation strategies. A policy support facility will be developed and policy learning at regional level will be facilitated through international evaluation by peers and best practice sharing.

6.2. Innovative societies	6.2. Innovative societies
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knowledge production emphasizes the need to maximise the socio-economic impacts and efficiency of research and innovation policies and to increase substantially transnational policy synergies and coherence. Innovation will be addressed in a wide sense, including large scale policy, user- and market-driven innovation. These activities will support the achievement and functioning of the European Research Area and in particular the Flagship initiatives of the Europe 2020 strategy in favour of the 'Innovation Union' and the 'Digital Agenda for Europe'.

The following specific objectives will be pursued:

6.2.1. Strengthening the evidence base and support for the Innovation Union and European Research Area

In order to assess and prioritise investments and strengthen the Innovation Union and the European Research Area, the analysis of research and innovation policies, systems and actors in Europe and third countries as well as the development of indicators, data and information infrastructures will be supported. Forward-looking activities and pilot initiatives, economic analysis, policy monitoring, mutual learning, coordination tools and activities and the development of methodologies for impact assessment and evaluations will also be needed, exploiting direct feedback from research stakeholders, enterprises, public authorities and citizens.

To ensure a single market for research and innovation, measures to incentivise ERA compatible behaviour will be implemented. Activities underpinning policies related to the quality of research training, mobility and career development of researchers will

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The following specific objectives will be pursued:

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In order to assess and prioritise investments and strengthen the Innovation Union and the European Research Area, the analysis of research and innovation policies, systems and actors in Europe and third countries as well as the development of indicators, data and information infrastructures will be supported. ***Coordination with other European policies, such as education, innovation and cohesion policies will also be envisaged, as stated in The Ljubljana Process.*** Forward-looking activities and pilot initiatives, economic analysis, policy monitoring, mutual learning, coordination tools and activities and the development of methodologies for impact assessment and evaluations will also be needed, exploiting direct feedback from research stakeholders, enterprises, public authorities***, civil society organizations*** and citizens.

To ensure a single market for research and innovation, measures to incentivise ERA compatible behaviour will be implemented. Activities underpinning policies related to the quality of research training, mobility and career development of researchers will

be supported, including initiatives to provide for mobility services, open recruitment, researchers' rights and links with global researcher communities. These activities will be implemented seeking synergies and close coordination with the Marie ***Curie*** Actions under **'**Excellent science**'**. Institutions presenting innovative concepts for the rapid implementation of ERA principles, including the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, will be supported.

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As regard coordination of policies, a facility for policy advice will be set up to make expert policy advice available to national authorities when defining their National Reform Programmes and research and innovation strategies.

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To implement the Innovation Union initiative, there is also a need to support (private and public) market-driven innovation in view of enhancing the innovation capacity of firms and fostering European competitiveness. This will require improving the overall framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms. Powerful innovation support mechanisms (for e.g. improved cluster management, public-private partnerships and network cooperation), highly specialised innovation support services (on e.g. IPR management/exploitation, innovation management, networks of procurers) and reviews of public policies in relation to innovation will be supported. Issues specific to SMEs will be supported under the specific objective **'**Innovation in SMEs**'**.

To implement the Innovation Union initiative, there is also a need to support (private and public) market-driven ***and non-market driven*** innovation in view of enhancing the innovation capacity of firms and fostering European competitiveness ***as well as social, economic and ecological resilience***. This will require improving the overall framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms. Powerful innovation support mechanisms (for e.g. improved cluster management, public-private partnerships and network cooperation), highly specialised innovation support services (on e.g. IPR management/exploitation, innovation management, networks of procurers) and reviews of public policies in relation to innovation will be supported. Issues specific to SMEs will be supported under the specific objective 'Innovation in SMEs'.

6.2.2. Exploring new forms of innovation, including social innovation and creativity

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innovation and creativity

Social innovation generates new goods, services, processes and models that meet societal needs and create new social relationships. It is important to understand how social innovation and creativity may lead to change in existing structures and policies and how they can be encouraged and scaled-up. Grassroots on-line and distributed platforms networking citizens and allowing them to collaborate and co-create solutions based on an extended awareness of the social, political and environmental context can be a powerful tool to support the objectives of Europe 2020. Support will also be given to networking and experimentation of the use of ICT for improving learning processes, as well as to networks of social innovators and social entrepreneurs.

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It will be essential to promote innovation in order to foster efficient, open and citizen-centric public services (eGovernment). This will require multidisciplinary research on new technologies and large-scale innovation related in particular to digital privacy, interoperability, personalised electronic identification, open data, dynamic user interfaces, citizen-centric public service configuration and integration and innovation driven by users, including in social sciences and the humanities. Such actions will also address social-network dynamics and crowd-sourcing and smart-sourcing for co-production of solutions addressing social problems, based on open data sets. They will help to manage complex decision-making, in particular the handling and analysis of huge quantities of data for collaborative policy modelling, simulation of decision-making, visualisation techniques, process modelling and participatory systems as well as to analyse changing relationships between citizens and the public sector.

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posed by technology, advanced computation, life sciences and bio-engineering impinge upon areas of knowledge traditionally related with human studies, such as philosophy, theology, and legal, political and economic thought should be addressed. It is important to combine art, science and entrepreneurship; new forms of urban expression; knowledge, art and entrepreneurism related to the integration of multiculturalism and integration of migratory flows; multilingualism.

6.2.2a. Exploring processes which provide a favourable background to creativity and innovation

Providing a better understanding of the social, cultural, economic and political context for innovation shall be a priority. New knowledge on how "innovative societies" emerge and prosper is needed. In the current international economic context, this requires a fresh view of the conditions for sustainability of innovative socio-economic environments based on detailed and systematic field work and comparative analysis.

Social cohesion and predictable justice, education, democracy, tolerance and diversity are factors that need to be carefully considered with a view to identifying and better exploiting European comparative advantages at world level and of providing improved evidence-based support to innovation policies.

In particular, the role of youth perception of the opportunities for innovation in the current economic environment of high unemployment in many EU regions shall be carefully understood in relation to education and to the risk of brain-drain.

The role of risk governance policies need to be better understood in its relations with innovation policies and the shaping factors and actors of innovation.

Clarifying, in the context of innovation, some of the current controversies, namely the debate risk versus precaution, or the role of distinct regulatory environments, is of major importance and requires new unbiased scientific approaches.

6.2.3. Ensuring societal engagement in research and innovation.

Enabling all societal actors to interact in the innovation cycle increases the quality, relevance, acceptability and sustainability of innovation outcomes by integrating society's interests and values. This requires developing specific skills, knowledge and capacities at individual and organisational as well as at national and transnational levels. A scientifically literate, responsible and creative society will be nurtured through the promotion of and research on appropriate science education methods. Gender equality will be promoted in particular by supporting changes in the organisation of research institutions and in the content and design of research activities. In order to improve knowledge circulation within the scientific community and the wider public, the accessibility and use of the results of publicly funded research will be further developed. An Ethics Framework for research and innovation, based on the fundamental ethical principles including those reflected in the Charter of Fundamental Rights and all the relevant Union laws and Conventions, will be promoted in coordination with relevant international organisations.

6.2.4. ***Promoting*** coherent and effective cooperation with third countries.

Horizontal activities will ensure the strategic development of international cooperation across Horizon 2020 and address cross-cutting policy objectives. Activities to support bilateral, multilateral and bi-regional policy dialogues in research and innovation with third

6.2.4. ***Understanding*** coherent and effective cooperation with third countries.

International cooperation is an horizontal priority through the whole Horizon 2020. Horizontal activities will ensure the strategic development of international cooperation across Horizon 2020 and address cross-cutting policy objectives. ***Exploring how*** activities to support

countries, regions, international fora and organisations ***will*** facilitate policy exchange, mutual learning and priority setting, promote reciprocal access to programmes and monitor the impact of cooperation**.** Networking and twinning activities will facilitate optimal partnering between research and innovation actors on both sides and improve competencies and cooperation capacity in less advanced third countries. Activities will ***promote*** coordination of Union and national cooperation policies and programmes as well as joint actions of Member States and Associated Countries with third countries in order to enhance their overall impact. Finally, the European research and innovation **'**presence**'** in third countries will be ***consolidated and strengthened***, notably by promoting the creation of European **'**science and innovation houses**'**, services to European organisations extending their activities into third countries and the opening of research centres established jointly with third countries to organisations or researchers from other Member States and Associated Countries.

bilateral, multilateral and bi-regional policy dialogues in research and innovation with third countries, regions, international fora and organisations ***can*** facilitate policy exchange, mutual learning and priority setting, promote reciprocal access to programmes and monitor the impact of cooperation ***is extremely important in order to enhance the potential benefits of international cooperation. Exploring innovative ways of*** networking and twinning activities will facilitate optimal partnering between research and innovation actors on both sides and improve competencies and cooperation capacity in less advanced third countries. Activities will ***also examine how*** coordination of Union and national cooperation policies and programmes as well as joint actions of Member States and Associated Countries with third countries ***can be improved*** in order to enhance their overall impact. Finally, the ***effectiveness and appropriateness of*** European research and innovation 'presence' in third countries will be ***explored with the aim to consolidate and strengthen***, notably by promoting the creation of European 'science and innovation houses', services to European organisations extending their activities into third countries and the opening of research centres established jointly with third countries to organisations or researchers from other Member States and Associated Countries.

6.2.4a. Regulatory and economical challenges for the future

The objective is to research how and where there may be need for new regulatory frameworks to accommodate for the new relationships between citizens and their societies, as well as markets and their consumers. This includes cross-scientific research combining legal analysis with the economic, cultural and social impacts of the technological changes.

	6.2.4 b. Cultural heritage and European identity
	The aim is to contribute to an understanding of Europe's intellectual basis: its history and the many European and non-European influences European diversity and its opportunities should be recognized and considered.
	European collections, including digital ones, in libraries, archives, museums, galleries and other public institutions have a wealth of rich, untapped documentation and objects for study. These cultural heritage resources represent the history of individual Member States but also the collective heritage of a European Union that has emerged through time. Such materials should be made accessible through new and innovative technologies and integrated information services to researchers and citizens to enable a look to the future through the archive of the past and to contribute to the European participative intelligence. Accessibility and preservation of cultural heritage in these forms is needed for the vitality of the living engagements within and across European cultures by also considering the importance of cultural heritage as strong economic driver in a post-industrial economy and its contribution to sustainable economic growth.

Amendment 65
Proposal for a decision
Annex 1 – section 3 – point 6 a (new)

Text proposed by the Commission	*Amendment*
6.3. Secure societies	6a. Secure societies ***- Protecting freedom and security of Europe and its citizens***
The European Union, its citizens and its international partners are confronted with a range of security threats ***like*** crime,	The European Union, its citizens and its international partners are confronted with a range of security threats ***and challenges***

terrorism and mass emergencies due to man-made or natural disasters. These threats can span across borders and ***aim at*** physical targets or the cyberspace. Attacks against Internet sites of public authorities and private entities for instance not only undermine the citizen's trust but may seriously affect such essential sectors as energy, transport, health, finance or telecommunications.

In order to anticipate, prevent and manage these threats, it is necessary to develop and apply innovative technologies, solutions, foresight tools and knowledge, stimulate cooperation between providers and users, find civil security solutions, improve the competitiveness of the European security, ***ICT*** and services industries and prevent and combat the abuse of privacy and breaches of human ***rights in Internet***.

The coordination and improvement of the security research area will thus be an essential element and will help to map present research efforts, including foresight, and improve relevant legal conditions and procedures for coordination, including ***pre-normative activities.***

Activities will follow a mission-oriented approach and integrate the relevant societal dimensions. They will support the Union's policies for ***internal and external*** security, defence policies, and the relevant new provision of the Lisbon Treaty, and ensure cyber security, trust and privacy ***in the Digital single Market***.

The following specific objectives will be pursued:

6.3.1. Fighting crime and terrorism

The ambition is both to avoid an incident and to mitigate its potential consequences. This requires new technologies and capabilities (including against cyber crime and cyber terrorism) for the support to health, food, water and environmental security which are essential for the good

such as crime, terrorism and mass emergencies due to man-made or natural disasters. These threats can span across borders and ***affect*** physical targets or the cyberspace. Attacks against Internet sites of public authorities and private entities***,*** for instance***,*** not only undermine the citizen's trust but may seriously affect such essential sectors as energy, transport, health, finance or telecommunications.

In order to anticipate, prevent and manage these threats, it is necessary to develop and apply innovative technologies, solutions, foresight tools and knowledge, stimulate cooperation between providers and users, find civil security solutions, improve the competitiveness of the European security, and services industries and prevent and combat the abuse of privacy and breaches of human ***and fundamental rights***.

The coordination and improvement of the security research area will thus be an essential element and will help to map present research efforts, including foresight, and improve relevant legal conditions and procedures for coordination, including ***standardisation activities***.

Activities will follow a mission-oriented approach and integrate the relevant societal dimensions. They will support the Union's policies for security, defence policies, and the relevant new provision of the Lisbon Treaty, and ensure cyber security, trust and privacy ***by design and fundamental rights compliance.***

The following specific objectives will be pursued:

6a.1. Fighting crime and terrorism

The ambition is both to avoid an incident and to mitigate its potential consequences. This requires ***an understanding of underlying causes and impacts, as well as the development of*** new technologies and capabilities (including against cyber crime and cyber terrorism) for the support to

functioning of society and economy. ***New technologies and dedicated capabilities will help to protect critical*** infrastructures***, systems*** and services ***(including communications, transport, health, food, water, energy, logistic and supply chain, and environment). This will include analysing and securing public and private critical networked infrastructures and services against any type of threats***.

health, food, water and environmental security which are essential for the good functioning of society and economy. ***This will include analysing and securing public and private critical networked*** infrastructures and services ***against any type of threats. Attention shall also be paid to the social and behavioural dimensions of crime and terrorism, in order to fully understand their causes and impacts, and to identify effective social policy measures to address these. Additional topics aimed at improving the protection of citizens will foster the development of secure civil societies***.

6a.2. Protecting and improving the resilience of critical infrastructures

New technologies and dedicated capabilities will help to protect critical infrastructures, systems and services (including communications, transport, health, food, water, energy, logistic and supply chain, and environment). This will include analysing and securing public and private critical networked infrastructures and services against any type of threat.

6.3.2. Strengthening security through border management

Technologies and capabilities are also required to enhance systems, equipments, tools, processes, and methods for rapid identification to improve border security, including both control and surveillance issues, while exploiting the full potential of EUROSUR. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of fundamental rights. Research will also support the improvement of the integrated European border management, including through increased cooperation with candidate, potential candidate and European Neighbourhood Policy countries.

6a.3. Strengthening security through border management ***and maritime security***

Technologies and capabilities are also required to enhance systems, equipments, tools, processes, and methods for rapid identification to improve border security ***and management***, including both control and surveillance issues, while exploiting the full potential of EUROSUR***, the European external border Surveillance System***. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of fundamental rights. Research will also support the improvement of the integrated European border management, including through increased cooperation with candidate, potential candidate and

European Neighbourhood Policy countries. ***The full range of maritime security aspects will be addressed. This includes blue border management aspects as well as protection and control of water transport.***

6.3.3. Providing cyber security

Cyber security is a prerequisite for people, business and public services in order to benefit from the opportunities offered by the Internet. It requires providing security for systems, networks, access devices, and software and services, including cloud computing, while taking into account the interoperability of multiple technologies. Research will prevent, detect and manage in real-time cyber-attacks across multiple domains and jurisdictions, and to protect critical ICT infrastructures. The digital society is in full development with constantly changing uses and abuses of the Internet, new ways of social interaction, new mobile and location-based services and the emergence of the Internet of Things. This requires a new type of research which should be triggered by the emerging applications, usage and societal trends. ***Nimble research initiatives will be undertaken including pro-active R&D to react quickly to new contemporary developments in trust and security.***

6a.4. Providing cyber security

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6.3.4. Increasing Europe's resilience to crises and disasters

This requires the development of dedicated technologies and capabilities to support different types of emergency management operations (such as civil protection, fire fighting and marine pollution, humanitarian aid, ***civil defence, conflict prevention***, development of medical information infrastructures rescue tasks ***and post-crisis-stabilisation***) as well as law enforcement. Research will cover the whole crisis management chain and

6a.5. Increasing Europe's resilience to crises and disasters ***and supporting the Union's internal and external security policies***

Europe's preparedness and resilience to crisis and disasters needs to be increased. This requires the development of dedicated technologies and capabilities to support different types of emergency management operations (such as civil protection, fire fighting and marine pollution, humanitarian aid, development of medical information infrastructures rescue tasks) as well as law enforcement. Research will cover the whole crisis management chain

societal resilience, and support the establishment of a European emergency response capacity.	and societal resilience, and support the establishment of a European emergency response capacity. ***The dividing line between external and internal security is increasingly blurred, conflicts outside of Europe and their consequences can rapidly have a direct impact on Europe's security. Furthermore the interface between civil and defence oriented activities and policies requires particular attention as there is a large opportunity to exploit synergies between civil protection, situation assessment, conflict management and conflict prevention, peace-keeping and post-crisis stabilisation operations. The development of crisis management capabilities shall be encouraged where complementarities have been identified, so as to quickly close capability gaps whilst avoiding unnecessary duplication, creating synergies and supporting standardisation.***
6.3.5. ***Ensuring privacy and freedom in the internet and enhancing the societal dimension of security***	6a.6. ***Enhancing the societal dimension of security and ensuring privacy and freedom in the Internet*** ***Any new security solution and technology needs to be acceptable to the society, comply with Union and international law, be effective and proportionate in identifying and addressing the security threat. Better understanding the socioeconomic, cultural, and anthropological dimensions of security, the causes of insecurity, the role of media and communication and the citizen's perceptions, are therefore essential. Ethical issues and protection of human values and fundamental rights compliance will be ensured.***
Safeguarding the human right of privacy in the digital society will require the development of privacy-by-design frameworks and technologies since the conception of products and services. Technologies will be developed ***allowing*** users to control their personal data and its	Safeguarding the human right of privacy in the digital society will require the development of privacy-by-design frameworks and technologies since the conception of products and services. Technologies will be developed ***empowering*** users to control their personal

use by third parties; as well as tools to detect and block illegal content and data breaches and to protect human rights on-line preventing that people's behaviours individually or in groups is limited by unlawful searching and profiling.

Any new security solution and technology needs to be acceptable to the society, comply with Union and international law, be effective and proportionate in identifying and addressing the security threat. Better understanding the socioeconomic, cultural, and anthropological dimensions of security, the causes of insecurity, the role of media and communication and the citizen's perceptions, are therefore essential. Ethical issues and protection of human values and fundamental rights will be addressed.

Activities across all mission areas will also address the integration and interoperability of systems and services including aspects such as communication***, distributed architectures and human factors***. This also requires integrating civilian and military capabilities in tasks ranging from civil protection to humanitarian relief, border management or peace-keeping. This will include technological development in the ***sensitive*** area of dual-use technologies to guarantee interoperability between civil protection and military forces and amongst civil protection forces worldwide, as well as reliability, organisational, legal and ethical aspects, trade issues, protection of confidentiality and integrity of information and traceability of all transactions and processing.

data and its use by third parties; as well as tools to detect and block illegal content and data breaches and to protect human rights on-line preventing that people's behaviours individually or in groups is limited by unlawful searching and profiling.

6a.7.Enhancing standardisation and interoperability

Pre-normative and standardisation activities will be supported across all mission areas. Focus will be on identified standardisation gaps and the next generation of tools and technologies.
Activities across all mission areas will also address the integration and interoperability of systems and services***,*** including aspects such as communication. This also requires integrating civilian and military capabilities in tasks ranging from civil protection to humanitarian relief, border management or peace-keeping. This will include technological development in the area of ***bridging*** dual-use technologies to guarantee interoperability between civil protection and military forces and amongst civil protection forces worldwide, as well as reliability, organisational, legal and ethical aspects, trade issues, protection of confidentiality and integrity of information and traceability of all transactions and processing ***without infringing the fundamental rights to privacy and***

	protection of personal data.
6.3.6. Specific implementation aspects	6a.9. Specific implementation aspects
Whereas research will have a civil security orientation, coordination with the activities of the European Defence Agency (EDA) will be actively pursued in order to strengthen cooperation with EDA, notably through the already established European Framework Cooperation, recognising that there are areas of dual use technology relevant for both civil and military applications. Coordination mechanisms with relevant Union Agencies, such as e.g. FRONTEX, EMSA and Europol, will also be further strengthened in order to improve the coordination of Union Programmes and policies in the field of both internal and external security, and of other Union initiatives.	Whereas research will have a civil security orientation, coordination with the activities of the European Defence Agency (EDA) will be actively pursued in order to strengthen cooperation with EDA, notably through the already established European Framework Cooperation, recognising that there are areas of dual use technology relevant for both civil and military applications. Coordination mechanisms with relevant Union Agencies, such as e.g. FRONTEX, EMSA and Europol, will also be further strengthened in order to improve the coordination of Union Programmes and policies in the field of both internal and external security, and of other Union initiatives.
Taking into account the particular nature of security, specific arrangements will be put in place with regards to programming and governance, including arrangements with the Committee refered to in Article 9 of this Decision. Classified or otherwise sensitive information related to security will be protected and particular requirements and criteria for international cooperation may be specified in work programmes. This will also be reflected in the programming and governance arrangements for Secure Societies (including the comitology aspects).	Taking into account the particular nature of security, specific arrangements will be put in place with regards to programming and governance, including arrangements with the Committee refered to in Article 9 of this Decision. Classified or otherwise sensitive information related to security will be protected and particular requirements and criteria for international cooperation may be specified in work programmes. This will also be reflected in the programming and governance arrangements for Secure Societies (including the comitology aspects).

Amendment 66
Proposal for a decision
Annex I – part IV – point 1

Text proposed by the Commission	*Amendment*
The JRC will carry out research to enhance the scientific evidence base for policy making, to promote understanding of natural processes underlying societal challenges, and to examine emerging fields	The JRC will carry out research to enhance the scientific evidence base for policy making ***at European, national, regional and local level,*** to promote understanding of natural processes underlying societal

of science and technology, including through an exploratory research programme.	challenges, and to examine emerging fields of science and technology, including through an exploratory research programme.

Amendment 67

Proposal for a decision
Annex I – part IV – point 3 – point 3.2 – title

Text proposed by the Commission	*Amendment*
3.2. Food security, sustainable agriculture, marine and maritime research and the bio-economy	3.2. Food security, sustainable agriculture ***and forestry***, marine and maritime research and the bio-economy

Amendment 68

Proposal for a decision
Annex 1 – part IV – point 3 – point 3.3 – paragraph 1 – point a

Text proposed by the Commission	*Amendment*
(a) Security of energy supply, in particular as regards links and interdependencies with the extra-European energy supply and transmission systems; mapping indigenous primary and external energy sources and infrastructures on which Europe depends.	(a) Security ***and diversity*** of energy supply, in particular as regards links and interdependencies with the extra-European energy supply and transmission systems; mapping indigenous primary and external energy sources and infrastructures on which Europe depends.

Justification

While the JRC focuses broadly on "security of supply" measures for the EU, research attention must also be drawn to the element of "diversity" of supply routes and transits.

Amendment 69

Proposal for a decision
Annex 1 – part IV – point 3 – point 3.6 – paragraph 1 – point h

Text proposed by the Commission	*Amendment*
(h) Enhance the Union's capacity for disaster risk reduction and management of	(h) Enhance the Union's capacity for disaster risk reduction and management of

natural and man-made disasters notably through the development of global multi-hazard early warning and risk management information systems, making use of Earth Observation technologies.	natural and man-made disasters notably through the development of ***test facilities,*** global multi-hazard early warning and risk management information systems, making use of Earth Observation technologies.

Justification

Dealing with natural or man-made disasters requires not only observation and warning but also practical assistance when a disaster takes place – specific test facilities enabling practical preparation for disasters, e.g. serious flooding, are therefore just as important in terms of protecting society.

Amendment 70
Proposal for a decision
Annex 2 – part 1 – paragraph 1 – point 4

Text proposed by the Commission	*Amendment*
Performance indicators	Performance indicators
The following table specifies for the specific objectives of Horizon 2020 a limited number of key indicators for assessing results and impacts.	***Additionally to the performance indicators for assessing progress against the general objectives of Horizon 2020, set out in Annex I of Regulation (EU) No XX/2012 [Horizon 2020], the*** following table specifies for the specific objectives of Horizon 2020 a limited number of key indicators for assessing results and impacts.
1. Part I. Priority 'Excellent Science'	1. Part I. Priority 'Excellent Science'
Specific objectives:	Specific objectives:
– European Research Council	– European Research Council
– Share of publications from ERC funded projects which are among the top 1 % highly cited	– Share of publications from ERC funded projects which are among the top 1 % highly cited
– Number of institutional policy and national/regional policy measures inspired by ERC funding	– Number of institutional policy and national/regional policy measures inspired by ERC funding
– Future and Emerging Technologies	– Future and Emerging Technologies
– Publications in peer-reviewed high impact journals	– Publications in peer-reviewed high impact journals
– Patent applications obtained in the different enabling and industrial	– Patent ***and utility model*** applications obtained in the different enabling and

technologies	industrial technologies
– Marie ***Curie*** actions on skills, training and career development	– Marie ***Skłodowska-Curie*** actions on skills, training and career development
– Cross-sector and cross-country circulation of researchers, including PhD candidates	– Cross-sector and cross-country circulation of researchers, including PhD candidates ***as well as number of publications in peer-reviewed journals and participation in research and innovation projects inspired by that circulation.***
– European research infrastructures (including eInfrastructures)	– European research infrastructures (including eInfrastructures)
– Research infrastructures which are made accessible to all researchers in Europe and beyond through Union support	– Research infrastructures ***developed across the whole Europe*** which are made accessible to all researchers in Europe and beyond through Union support
2. Part II. Priority 'Industrial leadership'	2. Part II. Priority 'Industrial leadership'
Specific objectives:	Specific objectives:
– Leadership in enabling and industrial technologies (ICT, Nanotechnologies, Advanced Materials, Biotechnologies, Advanced manufacturing and Space)	– Leadership in enabling and industrial technologies (ICT, Nanotechnologies, Advanced Materials, Biotechnologies, Advanced manufacturing and Space)
– Patent applications obtained in the different enabling and industrial technologies	– Patent ***and utility model*** applications obtained in the different enabling and industrial technologies
	– ***Number of inventions commercialised***
	– ***Number of SMEs participating***
– Access to risk finance	– Access to risk finance
– Total investments mobilised via debt financing and Venture Capital investments	– Total investments mobilised via debt financing and Venture Capital investments
	– ***Number of SMEs participating***
– Innovation in SMEs	– Innovation in SMEs
– Share of participating SMEs introducing innovations new to the company or the market (covering the period of the project plus three years)	– Share of participating SMEs introducing innovations new to the company or the market (covering the period of the project plus three years)
	– ***Number of start-ups created***
3. Part III. Priority 'Societal challenges'	3. Part III. Priority 'Societal challenges'
Specific objectives:	Specific objectives:
For each of the challenges, progress shall	For each of the challenges, progress shall

be assessed against the contribution to the following specific objectives which are detailed in Annex I of Horizon 2020 together with descriptions of the substantive advancement needed for the achievement of the challenges and policy relevant indicators:

– Improve the lifelong health and wellbeing of all

– Secure sufficient supplies of safe and high quality food and other bio-based products, by developing productive and resource-efficient primary production systems, fostering ecosystem services, along side competitive and low carbon supply chains;

– Make the transition to a reliable, sustainable and competitive energy system, in the face of increasingly scarce resources, increasing energy needs and climate change;

– Achieve a European transport system that is resource-efficient, environmentally-friendly, safe and seamless for the benefit of citizens, the economy and society;

– Achieve a resource efficient and climate change resilient economy and a sustainable supply of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;

– Foster inclusive, innovative and secure European societies in a context of unprecedented transformations and growing global interdependencies;

Additional performance indicators are:

– Publications in peer-reviewed high impact journals in the area of the different Societal Challenges

– Patent applications in the area of the different Societal Challenges

be assessed against the contribution to the following specific objectives which are detailed in Annex I of Horizon 2020 together with descriptions of the substantive advancement needed for the achievement of the challenges and policy relevant indicators:

– Improve the lifelong health and wellbeing of all

– Secure sufficient supplies of safe and high quality food and other bio-based products, by developing productive and resource-efficient primary production systems, fostering ecosystem services, along side competitive and low carbon supply chains;

– Make the transition to a reliable, sustainable and competitive energy system, in the face of increasingly scarce resources, increasing energy needs and climate change;

– Achieve a European transport system that is resource-efficient, environmentally-friendly, safe and seamless for the benefit of citizens, the economy and society;

– Achieve a resource efficient and climate change resilient economy and a sustainable supply of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;

– Foster inclusive, innovative and secure European societies in a context of unprecedented transformations and growing global interdependencies;

Additional performance indicators are:

– Publications in peer-reviewed high impact journals in the area of the different Societal Challenges

– Patent ***and utility model*** applications in the area of the different Societal Challenges

– ***Number of SMEs participating***

– Number of Union pieces of legislation referring to activities supported in the area of the different Societal Challenges	– Number of Union pieces of legislation referring to activities supported in the area of the different Societal Challenges
	– ***Number of Innovation Union objectives achieved***
4. Part IV. Non-nuclear direct actions of the Joint Research Centre	4. Part IV. Non-nuclear direct actions of the Joint Research Centre
Specific objectives:	Specific objectives:
– Provide customer-driven scientific and technical support to Union policies	– Provide customer-driven scientific and technical support to Union policies
– Number of occurrences of tangible specific impacts on European policies resulting from technical and scientific support provided by the Joint Research Centre	– Number of occurrences of tangible specific impacts on European policies resulting from technical and scientific support provided by the Joint Research Centre
– Number of peer reviewed publications	– Number of peer reviewed publications

EXPLANATORY STATEMENT

Context

The forthcoming Horizon 2020 programme will reinforce Europe's leading position in an environment in which Europe has lost ground in many areas. Achieving this, supposes accurately identifying the strengths that Europe possesses but also entails recognising and correcting Europe's weaknesses.

As for its strengths, Europe has world leading researchers, entrepreneurs and companies; a set of deeply embedded values and traditions, a dynamic culture of creativity and diversity and the largest internal market in the world. Finally, European civil society is actively engaged in emerging and developing economies across the globe.

However, at the same time, Europe has a number of weaknesses: under-investment in our knowledge base; unsatisfactory framework conditions (ranging from poor access to finance and the high costs of IPR to slow standardisation and ineffective use of public procurement); and finally, too much fragmentation alongside excessive bureaucracy and red tape.

The Commission proposal for Horizon 2020 draws on and builds upon work that has already been developed in Parliament in such contributions as the reports Simplifying the Implementation of the Research Framework Programmes ("the Carvalho Report"), the Mid-term Review of the Seventh Framework Programme of the European Union for Research, Technological Development and Demonstration Activities ("the Audy Report") and the Green Paper: From Challenges to Opportunities towards a Common Strategic Framework for EU research and Innovation Funding ("the Matias Report").

As such, the proposal represents a real step forward: it strikes an appropriate balance between the three pillars – “Excellent Science”, “Industrial Leadership” and “Societal Challenges” – and in addition to the contribution from Parliament, it effectively integrates input from a whole range of stakeholders. However, some work remains to be done. As the *rapporteur* sees it, the main contributions of this report break down four main elements:

a) excellence as a major driver for Horizon 2020

b) building synergies between Horizon 2020 and the structural funds

c) competitiveness of European industry

d) horizontal issues such as scientific coordination and leadership across Horizon 2020 for each thematic area

1. Excellence as a Major Driver for Horizon 2020

Excellence should be the main driver for Horizon 2020 as a whole. This supposes that excellence is defined independently of any geographical or other precondition. The report promotes the widening of participation in order to stimulate excellence across Europe on the

one hand, and the widening of bottom up scientific excellence across the three pillars of Horizon 2020, on the other hand.

With regard to the widening of participation, Horizon 2020 should include the concept of "stairway to excellence" something that will further encourage the participation of strong units of embryonic excellence such as small research groups and highly innovative start-ups. The Commission has already taken a series of significant steps in this direction such as the "twinning schemes" and the "ERA chairs" scheme. However, we must go even further and a number of additional instruments have been foreseen in the present report: for example, the creation of ERC *return grants*. ERC return grants could be attributed to researchers currently working outside of Europe and who wish to work in Europe or to researchers already working in Europe who wish to move to a less developed region.

As for the widening of excellence across Horizon 2020, usually, excellence in science is fostered by a bottom-up, scientist driven research agenda, one that allows novel ideas and technologies to flourish. In the COM proposal, the first pillar is the main instrument for the promotion of excellence in bottom up research at a European level. Moreover, for the Commission, the Future Emerging Technologies (FET), which is also a bottom up research instrument, is confined to the first pillar. In the report, by contrast, the Future Emerging Technologies instrument has been widened to include science (giving the acronym FEST) and has also been spread across all three pillars.

2. Building Synergies between Horizon 2020 and the Structural Funds

Building greater synergy and as much complementarity as possible between Horizon 2020 and the structural funds is urgently required. There are two wholly distinct programmes. On the one hand, there is Horizon 2020, in which excellence and the stairway to excellence is the main driver. On the other hand, there are the structural funds, whose main driver is capacity building and smart specialisation.

It is essential that these programmes are complementary and that bridges are built in both directions, linking the two programmes. As such, the structural funds have a role to play – both upstream and downstream – with regard to the Horizon 2020 objectives.

Upstream from Horizon 2020, the structural funds can be used for capacity building and a number of amendments have been tabled covering the following:

- The structural funds could be used to finance equipment, human resource development, the creation of clusters in the priority areas of Horizon 2020 and as a source of small grants given for the preparation of proposals to be submitted to Horizon 2020;

- National and regional funds might be used to contribute to the funding of ERC, Marie Skłodowska-Curie or collaborative projects that meet the criteria of excellence but cannot be funded due to lack of European funds. Horizon 2020 could confer a "seal of excellence" on positively evaluated projects that have not otherwise been able to achieve funding because of budgetary limitations.

Downstream from Horizon 2020, the structural funds could be used to help smooth the

passage from conception to market. One again, two areas have been singled out:

- The structural funds could be used to finance or co-finance the follow up to Horizon 2020 research projects (e.g. pilot scale and demonstration projects);

- Structural funds could be used to valorise research results in such a way as to encourage easy access to knowledge or to facilitate the deployment of the resulting knowledge in terms of its direct economic or societal use.

Finally, two modifications have been made at a more general level:

- EU funding for Research and Innovation is of key significance and should be exploited for leverage. Horizon 2020 should attract additional financing from the Structural Funds, the EIB and from the private sector, something that supposes adopting a multi-fund approach;

- The interoperability between the instruments of Horizon 2020 and the structural funds should be enhanced. This supposes designing compatible rules and procedures; coherent application formats and evaluation criteria; common entry points; synchronising priority setting through smart specialisation and using common cost definitions and other administrative and financial criteria. It would also involve synchronised roadmaps and administrative cycles including, for example, the need to respect the academic calendar, especially for universities.

3. Competitiveness of European Industry

In the current economic climate, it is essential that Europe's industrial base is strengthened. Industrial participation in Framework Programmes for Research has dropped significantly over the last few years: it was 43% in FP4, 37% in FP5, 29% in FP6 and has risen, but only slightly, to 31% in FP7.

In addition, Europe has difficulty in ensuring that research results are effectively converted into innovative products and services that reach the market. The ability to innovate but also to see innovation through to viable market solutions is central to competitiveness.

To counter this difficulty, four areas have been amended:

- Firstly, Horizon 2020 must be designed in such a way as to provide industry with an incentive to participate in European projects. However, industry participation should not be narrowly restricted to consideration under the Industrial Leadership pillar. Innovation flourishes best when it strives to attain excellence but also when it offers real solutions to existing societal challenges;

- Secondly, Horizon 2020 has been designed to cover the whole innovation cycle. In particular, innovation should be fostered from the earliest stages of the passage from concept to market. At the same time, the Commission proposal concerning the later stages of the innovation cycle might include different forms of innovation beyond technological innovation;

- Thirdly, SMEs are central to reinforcing the competitiveness of European industry as a whole and their participation in European projects should be fostered across the three pillars. The Commission proposal with regard to the SME instrument is a very welcome initiative. It is also necessary to develop a mechanism that is at once simpler, faster and more efficient. In this respect, an innovation voucher system has been proposed;

- Fourthly, standardisation should be built into technological development projects and should be present throughout the different stages of these projects.

4. Horizontal Issues

Horizon 2020 should be designed in such a way that it will contribute actively to building the European Research Area (ERA). Horizon 2020 should be more than a funding programme: it should have a beneficial structural effect on the organisation of research at European level. In this respect, there are eight specific measures that might contribute to building a strengthened and more efficient ERA:

- Governance: inside Horizon 2020, each research area should be equipped with robust governance mechanisms. The objective of these mechanisms is to implement Horizon 2020 but also to enhance communication, the exchange of data and good practice. These objectives are fundamental to the acceleration of the research and innovation process in various research areas such as health research;

- Project size and type: collaborative research should be a central element across Horizon 2020, mainly in the Industrial Leadership and Societal Challenges pillars. Within these pillars, a balance should be struck between small focused projects and large integrative projects;

- Barriers to entry: smaller research units have difficulty in participating in the existent European networks. In particular, outsiders from these networks encounter barriers in participating in large consortia and measures should be taken to remedy this.

- Gender balance: the promotion of the general participation of women in the different projects – including as team coordinators – should be encouraged. For example, the dissemination actions of Horizon 2020 should target women scientists. Gender balance should be ensured for the Programme, Expert and Advisory Committees.

- Youth employment: the participation of young scientists in project teams in the context of collaborative research activities by industry and science organisations should be furthered. The rules deployed should facilitate the recruitment of staff to universities in order to work on Horizon 2020 projects with the aim of keeping young researchers in gainful employment.

- Dissemination and exploitation; the results of research and demonstration projects should be disseminated more effectively, whilst still respecting issues relating to innovation and protecting commercial sensitivities.

- Enhanced dialogue between science and society: Horizon 2020 should promote

effective dialogue between the different stakeholders involved and seek to stimulate interest and enthusiasm for science amongst the general public.

- International cooperation: in order to strengthen collaboration in strategically defined priorities with key international partners, international cooperation should be present throughout Horizon 2020.

19.9.2012

OPINION OF THE COMMITTEE ON FOREIGN AFFAIRS

for the Committee on Industry, Research and Energy

on the proposal for a Council Decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Rapporteur: Sophocles Sophocleous

AMENDMENTS

The Committee on Foreign Affairs calls on the Committee on Industry, Research and Energy, as the committee responsible, to incorporate the following amendments in its report:

Amendment 1

Proposal for a decision
Recital 11 a (new)

Text proposed by the Commission	*Amendment*
	(11a) International cooperation is essential to achieve the stated aims of all parts of the specific programme, and international cooperation projects targeted at countries or groups of countries on horizontal or priority issues should be implemented under each part.

Amendment 2

Proposal for a decision
Article 3 - paragraph 3 - point f

Text proposed by the Commission	*Amendment*
(f) fostering inclusive, innovative and ***secure European*** societies in a context of unprecedented transformations and growing global interdependencies***.***	(f) fostering inclusive ***and*** innovative societies in a context of unprecedented transformations and growing global interdependencies***;***

Amendment 3

Proposal for a decision
Article 3 - paragraph 3 - point f a (new)

Text proposed by the Commission	*Amendment*
	(fa) fostering secure European societies in a context of unprecedented transformations and growing global interdependencies and threats, while strengthening the European culture of freedom and justice.

Amendment 4

Proposal for a decision
Article 7 – paragraph 1 – subparagraph 1

Text proposed by the Commission	*Amendment*
The Scientific Council shall be composed of scientists, engineers and scholars of the highest repute and appropriate expertise, ensuring a diversity of research areas and acting in their personal capacity, independent of extraneous interests.	The Scientific Council shall be composed of scientists, engineers and scholars of the highest repute and appropriate expertise, ***subject to gender and geographical balance,*** ensuring a diversity of research areas and acting in their personal capacity, independent of extraneous interests.

Amendment 5

Proposal for a decision
Annex 1 – point 1 – point 1.1 – paragraph 6

Text proposed by the Commission	*Amendment*
Priority setting will equally be based on a wide range of inputs and advice. It will include, where appropriate, groups of independent experts set up specifically to advise on the implementation of Horizon 2020 or any of its specific objectives. These experts group shall show the appropriate level of expertise and knowledge in the covered areas and a variety of professional backgrounds, including industry and civil society involvement.	Priority setting will equally be based on a wide range of inputs and advice. It will include, where appropriate, groups of independent experts set up specifically to advise on the implementation of Horizon 2020 or any of its specific objectives. These experts group shall show the appropriate level of expertise and knowledge in the covered areas and a variety of professional backgrounds, including industry and civil society involvement ***and should also be subject to geographical and gender balance***.

Amendment 6

Proposal for a decision
Annex 1 – section 1 – point 1 – paragraph 3

Text proposed by the Commission	*Amendment*
Independent researchers of any age, including starting researchers making the transition to being independent research leaders in their own right, from any country in the world will be supported to carry out their research in Europe.	Independent researchers of any age, including starting researchers making the transition to being independent research leaders in their own right ***and researchers at the stage of consolidation of their own research career (consolidators)***, from any country in the world will be supported to carry out their research in Europe.

Amendment 7

Proposal for a decision
Annex 1 – section 1 – point 3 – point 3.4 – paragraph 2

Text proposed by the Commission	*Amendment*
This will be achieved by co-funding new or existing regional, national, private and international programmes to open-up to and provide for international, intersectoral and interdicisplinary research training, as well as cross-border and cross-sector	This will be achieved by co-funding new or existing regional, national, private and international programmes to open-up to and provide for international, intersectoral and interdicisplinary research training, as well as cross-border and cross-sector

mobility of researchers and innovation staff at all stages of their career.	mobility of researchers and innovation staff ***of any nationality*** at all stages of their career.

Amendment 8

Proposal for a decision
Annex 1 – section 1 – point 3 – point 3.5 – paragraph 1

Text proposed by the Commission	*Amendment*
To efficiently meet the challenge it will be essential to monitor progress. The programme will support the development of indicators and the analysis of data related to researchers' mobility, skills and careers with a view to identifying gaps in the Marie Curie actions and to increasing the impact of these actions. These activities will be implemented seeking synergies and close coordination with the policy support actions on researchers, their employers and funders carried out under 'Inclusive, innovative and secure societies'. Specific actions will be funded to support initiatives to raise awareness on the importance of the research career, and to disseminate research and innovation results emanating from work supported by Marie Curie actions.	To efficiently meet the challenge it will be essential to ***further develop EURAXESS network as well as to*** monitor progress. The programme will support the development of indicators and the analysis of data related to researchers' mobility, skills and careers with a view to identifying gaps in the Marie Curie actions and to increasing the impact of these actions. These activities will be implemented seeking synergies and close coordination with the policy support actions on researchers, their employers and funders carried out under 'Inclusive, innovative and secure societies'. Specific actions will be funded to support initiatives to raise awareness on the importance of the research career, and to disseminate research and innovation results emanating from work supported by Marie Curie actions.

Amendment 9

Proposal for a decision
Annex 1 – section 3 – point 4 – point 4.4 – paragraph 1

Text proposed by the Commission	*Amendment*
Actions to support policy analysis and development including on socio-economic aspects of transport are necessary to promote innovation and meet the challenges raised by transport. Activities will target the development and	Actions to support policy analysis and development including on socio-economic ***and geographic*** aspects of transport are necessary to promote innovation and meet the challenges raised by transport. Activities will target the development and

implementation of European research and innovation policies for transport, prospective studies and technology foresight, and strengthening of the European Research Area.	implementation of European research and innovation policies for transport, prospective studies and technology foresight, and strengthening of the European Research Area.

Amendment 10

Proposal for a decision
Annex I - Part III – point 6 – title

Text proposed by the Commission	*Amendment*
6. Inclusive, innovative and ***secure*** societies	6. ***Europe in a changing world -*** inclusive ***and*** innovative societies

Amendment 11

Proposal for a decision
Annex 1 – section 3 – point 6 – point 6.1 – point 6.1.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global governance in key domains like trade, development, work, economic cooperation, human rights, ***defence*** and security. This	Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities ***and knowledge base*** for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its ***knowledge base regarding conflicts, the transformation of conflict and cooperation and the*** capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global

implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international arena with governmental and non governmental actors.	governance in key domains like trade, development, work, economic cooperation, human rights, ***conflict prevention, peace-building*** and security. This implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international arena with governmental and non governmental actors.

Amendment 12

Proposal for a decision
Annex 1 – section 3 – point 6 – point 6.1 – point 6.1.4 – indent 1

Text proposed by the Commission	*Amendment*
– Linking in a competition emerging institutions, centres of excellence and innovative regions in less developed Member States to international leading counterparts elsewhere in Europe. This will involve teaming of excellent research institutions and less developed regions, twinning of staff exchanges, expert advice and assistance and the development of joint strategies for the establishment of centres of excellence that may be supported by the Cohesion policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.	– Linking in a competition emerging institutions, centres of excellence and innovative regions in less developed ***and less experienced*** Member States to international leading counterparts elsewhere in Europe. This will involve teaming of excellent research institutions and less developed regions, twinning of staff exchanges, expert advice and assistance and the development of joint strategies for the establishment of centres of excellence that may be supported by the Cohesion policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.

Amendment 13

Proposal for a decision
Annex 1 – section 3 – point 6 – point 6.1 – point 6.1.4 – indent 4 a (new)

Text proposed by the Commission	*Amendment*
	- Supporting the participation of additional partners located in countries not already present in the existing consortium, in on-going projects with the aim to increase the level of expertise, broaden the scope and speed up developments.

Amendment 14

Proposal for a decision
Annex I – part III – point 6 – subpoint 6.3

Text proposed by the Commission	*Amendment*
6.3. Secure societies	***deleted***
The European Union, its citizens and its international partners are confronted with a range of security threats like crime, terrorism and mass emergencies due to man-made or natural disasters. These threats can span across borders and aim at physical targets or the cyberspace. Attacks against Internet sites of public authorities and private entities for instance not only undermine the citizen's trust but may seriously affect such essential sectors as energy, transport, health, finance or telecommunications. In order to anticipate, prevent and manage these threats, it is necessary to develop and apply innovative technologies, solutions, foresight tools and knowledge, stimulate cooperation between providers and users, find civil security solutions, improve the competitiveness of the European security, ICT and services industries and prevent and combat the abuse of privacy and breaches of human rights in Internet.	
The coordination and improvement of the security research area will thus be an	

essential element and will help to map present research efforts, including foresight, and improve relevant legal conditions and procedures for coordination, including pre-normative activities.

Activities will follow a mission-oriented approach and integrate the relevant societal dimensions. They will support the Union's policies for internal and external security, defence policies, and the relevant new provision of the Lisbon Treaty, and ensure cyber security, trust and privacy in the Digital single Market. The following specific objectives will be pursued:

6.3.1. Fighting crime and terrorism.

The ambition is both to avoid an incident and to mitigate its potential consequences. This requires new technologies and capabilities (including against cyber crime and cyber terrorism) for the support to health, food, water and environmental security which are essential for the good functioning of society and economy. New technologies and dedicated capabilities will help to protect critical infrastructures, systems and services (including communications, transport, health, food, water, energy, logistic and supply chain, and environment). This will include analysing and securing public and private critical networked infrastructures and services against any type of threats.

6.3.2. Strengthening security through border management

Technologies and capabilities are also required to enhance systems, equipments, tools, processes, and methods for rapid identification to improve border security, including both control and surveillance issues, while exploiting the full potential of EUROSUR. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of

fundamental rights. Research will also support the improvement of the integrated European border management, including through increased cooperation with candidate, potential candidate and European Neighbourhood Policy countries.

6.3.3. Providing cyber security

Cyber security is a prerequisite for people, business and public services in order to benefit from the opportunities offered by the Internet. It requires providing security for systems, networks, access devices, and software and services, including cloud computing, while taking into account the interoperability of multiple technologies. Research will prevent, detect and manage in real-time cyber-attacks across multiple domains and jurisdictions, and to protect critical ICT infrastructures. The digital society is in full development with constantly changing uses and abuses of the Internet, new ways of social interaction, new mobile and location-based services and the emergence of the Internet of Things. This requires a new type of research which should be triggered by the emerging applications, usage and societal trends. Nimble research initiatives will be undertaken including pro-active R&D to react quickly to new contemporary developments in trust and security.

6.3.4. Increasing Europe's resilience to crises and disasters

This requires the development of dedicated technologies and capabilities to support different types of emergency management operations (such as civil protection, fire fighting and marine pollution, humanitarian aid, civil defence, conflict prevention, development of medical information infrastructures rescue tasks and post-crisis-stabilisation) as well as law enforcement. Research will cover the whole crisis management chain

and societal resilience, and support the establishment of a European emergency response capacity.

Activities across all mission areas will also address the integration and interoperability of systems and services including aspects such as communication, distributed architectures and human factors. This also requires integrating civilian and military capabilities in tasks ranging from civil protection to humanitarian relief, border management or peace-keeping. This will include technological development in the sensitive area of dual-use technologies to guarantee interoperability between civil protection and military forces and amongst civil protection forces worldwide, as well as reliability, organisational, legal and ethical aspects, trade issues, protection of confidentiality and integrity of information and traceability of all transactions and processing.

6.3.5. Ensuring privacy and freedom in the internet and enhancing the societal dimension of security

Safeguarding the human right of privacy in the digital society will require the development of privacy-by-design frameworks and technologies since the conception of products and services. Technologies will be developed allowing users to control their personal data and its use by third parties; as well as tools to detect and block illegal content and data breaches and to protect human rights on-line preventing that people's behaviours individually or in groups is limited by unlawful searching and profiling.

Any new security solution and technology needs to be acceptable to the society, comply with Union and international law, be effective and proportionate in identifying and addressing the security threat. Better understanding the socioeconomic, cultural, and

anthropological dimensions of security, the causes of insecurity, the role of media and communication and the citizen's perceptions, are therefore essential. Ethical issues and protection of human values and fundamental rights will be addressed.

6.3.6. Specific implementation aspects

Whereas research will have a civil security orientation, coordination with the activities of the European Defence Agency (EDA) will be actively pursued in order to strengthen cooperation with EDA, notably through the already established European Framework Cooperation, recognising that there are areas of dual use technology relevant for both civil and military applications. Coordination mechanisms with relevant Union Agencies, such as e.g. FRONTEX, EMSA and Europol, will also be further strengthened in order to improve the coordination of Union Programmes and policies in the field of both internal and external security, and of other Union initiatives.

Taking into account the particular nature of security, specific arrangements will be put in place with regards to programming and governance, including arrangements with the Committee refered to in Article 9 of this Decision. Classified or otherwise sensitive information related to security will be protected and particular requirements and criteria for international cooperation may be specified in work programmes. This will also be reflected in the programming and governance arrangements for Secure Societies (including the comitology aspects).

Amendment 15

Proposal for a decision
Annex I - Part III - point 6 a (new)

Text proposed by the Commission	*Amendment*
	6a. Secure societies - Protecting freedom and security of Europe and its citizens
	The European Union, its citizens and its international partners are confronted with a range of security threats such as crime, terrorism and mass emergencies caused by man-made or natural disasters. These threats can span across borders and aim at physical targets or the cyberspace. Attacks against internet sites of public authorities and private entities, for instance, not only undermine the citizen's trust but may seriously affect such essential sectors as energy, transport, health, finance or telecommunications.
	In order to anticipate, prevent and manage these threats, it is necessary to develop and apply innovative technologies, solutions, foresight tools and knowledge, stimulate cooperation between providers and users, find civil security solutions, improve the competitiveness of the European security and services industries and prevent and combat the abuse of privacy and breaches of human rights.
	The coordination and improvement of the security research area will thus be an essential element and will help to map present research efforts, including foresight, and improve relevant legal conditions and procedures for coordination, including standardisation activities.
	Activities will follow a mission-oriented approach and integrate the relevant societal dimensions. They will support the Union's policies for internal and external security, defence policies, and the relevant

new provision of the Lisbon Treaty, and ensure cyber security, trust and privacy. The following specific objectives will be pursued:

6a.1. Increasing security and protection of citizens - Fighting crime and terrorism.

The ambition is both to avoid an incident and to mitigate its potential consequences. This requires new technologies and capabilities (including against cyber crime and cyber terrorism) for supporting health, food, water and environmental security which are essential for the good functioning of society and the economy. Additional topics aimed at improving the protection of citizens will foster the development of secure civil societies.

6a.2. Protecting and improving the resilience of critical infrastructures

New technologies and dedicated capabilities will help to protect critical infrastructures, systems and services (including communications, transport, health, food, water, energy, logistic and supply chain, and environment). This will include analysing and securing public and private critical network infrastructures and services against any type of threats.

6a.3. Strengthening security through border management - maritime security

Technologies and capabilities are also required to enhance systems, equipment, tools, processes, and methods for rapid identification with the aim of improving border security, including both control and surveillance aspects, while exploiting the full potential of EUROSUR. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of fundamental rights. Research will also support the improvement of the integrated European border management, including

through increased cooperation with candidate, potential candidate and European Neighbourhood Policy countries.

The full range of maritime security aspects will be addressed. This includes blue border management aspects as well as protection and control of water transport.

6a.4. Providing and improving cyber security

Cyber security is a prerequisite for people, business and public services in order to benefit from the opportunities offered by the internet. It requires providing security for systems, networks, access devices, and software and services, including cloud computing, while taking into account the interoperability of multiple technologies. Research will prevent, detect and manage, in real-time, cyber-attacks across multiple domains and jurisdictions, counteract misuse of cyber technologies, prevent privacy violations and protect critical ICT infrastructures.

6a.5. Increasing Europe's resilience to crises and disasters

This requires the development of dedicated technologies and capabilities to support different types of emergency management operations (such as civil protection, fire fighting and marine pollution, humanitarian aid, civil defence, conflict prevention, development of medical information infrastructures, rescue tasks and post-crisis-stabilisation) as well as law enforcement. Research will cover the whole crisis management chain and societal resilience, and support the establishment of a European emergency response capacity.

Activities across all mission areas will also address the integration and interoperability of systems and services, including aspects such as communication,

distributed architectures and human factors. This also requires integrating civilian and military capabilities in tasks ranging from civil protection to humanitarian relief, border management or peace-keeping. This will include technological development in the sensitive area of dual-use technologies to guarantee interoperability between civil protection and military forces and amongst civil protection forces worldwide, as well as reliability, organisational, legal and ethical aspects, trade issues, protection of confidentiality and integrity of information and traceability of all transactions and processing.

6a.6. Enhancing the societal dimension of security and ensuring privacy and freedom in the internet

Any new security solution and technology needs to be acceptable to society, comply with Union and international law and be effective and proportionate in identifying and addressing the security threat. A better understanding of the socioeconomic, cultural and anthropological dimensions of security, the causes of insecurity, the role of the media, communication and citizens' perceptions are therefore essential. Ethical issues and protection of human values and fundamental rights will be addressed.

Safeguarding the human right to privacy in the digital society will require the development of privacy-by-design frameworks and technologies as of the conception of products and services. Technologies will be developed allowing users to control their personal data and their use by third parties as well as tools to detect and block illegal content and data breaches and to protect human rights on-line, preventing that people's behaviour, individually or in groups, is limited by unlawful searching and profiling.

6a.7. Strengthening the capability to conduct missions and operations under the Common Security and Defence Policy

Since the dividing line between external and internal security is increasingly blurred, conflicts outside Europe and their consequences can rapidly have a direct impact on Europe's security. Furthermore, the interface between civil and defence-oriented activities and policies requires particular attention as there is ample opportunity to exploit synergies between civil protection, situation assessment, conflict management and conflict prevention, peace-keeping and post-crisis stabilisation operations. Investment in the development of crisis management capabilities shall be encouraged where complementarities have been identified, so as to quickly close capability gaps whilst avoiding unnecessary duplication, creating synergies and supporting standardisation.

6a.8. Specific implementation aspects

Whereas research will have a civil security orientation, coordination with the activities of the European Defence Agency (EDA) will be actively pursued in order to strengthen cooperation with the EDA, notably through the already established European Framework Cooperation, recognising that there are areas of dual use technology relevant for both civil and military applications. Coordination mechanisms involving relevant Union Agencies such as FRONTEX, EMSA and Europol will also be further strengthened in order to improve the coordination of Union programmes and policies in the field of both internal and external security and of other Union initiatives.

Taking into account the particular nature of security, specific arrangements will be put in place with regard to programming and governance, including arrangements

with the Committee referred to in Article 9 of this Decision. Classified or otherwise sensitive information related to security will be protected and particular requirements and criteria for international cooperation may be specified in work programmes. This will also be reflected in the programming and governance arrangements for Secure Societies (including the comitology aspects).

Amendment 16

Proposal for a decision
Annex 2 – part 3 – paragraph 1 – subparagraph 1 – indent 1 d (new)

Text proposed by the Commission	*Amendment*
	- share of addicted alcoholics in Europe / per participating State,

Amendment 17

Proposal for a decision
Annex 2 – part 3 – paragraph 1 – subparagraph 1 – indent 1 e (new)

Text proposed by the Commission	*Amendment*
	- share of poverty in Europe / per participating State,

Amendment 18

Proposal for a decision
Annex 2 – part 3 – paragraph 1 – subparagraph 1 – indent 1 f (new)

Text proposed by the Commission	*Amendment*
	- share of unemployment in Europe / per participating State.

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)
Committee responsible Date announced in plenary	ITRE 17.1.2012
Opinion by Date announced in plenary	AFET 15.3.2012
Rapporteur Date appointed	Sophocles Sophocleous 4.9.2012
Previous rapporteur	Kyriakos Mavronikolas
Discussed in committee	21.6.2012 11.7.2012 17.9.2012
Date adopted	18.9.2012
Result of final vote	+: 36 –: 7 0: 0
Members present for the final vote	Jerzy Buzek, Tarja Cronberg, Arnaud Danjean, Michael Gahler, Marietta Giannakou, Anna Ibrisagic, Liisa Jaakonsaari, Anneli Jäätteenmäki, Jelko Kacin, Ioannis Kasoulides, Tunne Kelam, Maria Eleni Koppa, Eduard Kukan, Vytautas Landsbergis, Krzysztof Lisek, Sabine Lösing, Mario Mauro, Francisco José Millán Mon, Annemie Neyts-Uyttebroeck, Norica Nicolai, Raimon Obiols, Kristiina Ojuland, Justas Vincas Paleckis, Ioan Mircea Paşcu, Alojz Peterle, Cristian Dan Preda, Fiorello Provera, Jacek Saryusz-Wolski, György Schöpflin, Werner Schulz, Sophocles Sophocleous, Charles Tannock, Inese Vaidere, Geoffrey Van Orden, Sir Graham Watson
Substitute(s) present for the final vote	Christian Ehler, Diogo Feio, Kinga Gál, Norbert Neuser, Alf Svensson, Indrek Tarand
Substitute(s) under Rule 187(2) present for the final vote	Martin Ehrenhauser, Judith Sargentini

20.9.2012

OPINION OF THE COMMITTEE ON THE ENVIRONMENT, PUBLIC HEALTH AND FOOD SAFETY

for the Committee on Industry, Research and Energy

on the proposal for a Council decision on establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Rapporteur: Cristian Silviu Buşoi

SHORT JUSTIFICATION

Horizon 2020, as mentioned in the Commission Communication accompanying the programme, aims at implementing the Innovation Union flagship objectives, focusing on current societal challenges and strengthening the link between bottom-up, top-down research and commercialisation. Further simplification and increasing SMEs' participation are also targeted. Many societal challenges are ENVI committee related such as climate, resource efficiency, clean energy and transport, health and food safety. The rapporteur warmly welcomes the proposals of the Commission, but wishes to put more emphasis on some of the aspects addressed.

In the current opinion, the Rapporteur considered a holistic approach as the best way to further strengthen ENVI committee priorities. This first report should also be seen as opening the debate on this complex programme which is of key importance for increasing sustainable and green economic growth in the European Union while promoting a healthy society.

The opinion mainly focuses on societal challenges and proposes to strengthen some aspects related to health, food safety, climate and environment.

Health

Given its high added value for innovative treatments, for instance in regenerative medicine, stem cell research, through exploring existing alternatives to embryonic stem cells, should continue to be supported while acknowledging ethical concerns. A special focus should also be paid to research and innovation on disease treatment. Public support for R&D on infections and rare diseases should be increased and knowledge sharing should be promoted. Patients' needs should be a driver for health innovation and R&D funding. Moreover, environmental health R&D and innovation should be properly financed.

Food safety

The Societal Challenges related to food security is proposed to be broadened by opening it to all aspects of food safety.

Climate and Environment

The balance between economic, social and environmental aspects of research and innovation should be regularly and effectively monitored. Support for renewable energy should be strengthened. Increasing the efficiency of renewable energy can make it more economically attractive, while fighting climate change, decreasing our dependency on fossil fuels and promoting a low carbon economy.

Horizon 2020 is a key programme which could help the EU in further decreasing harmful gas and particles emissions for the environment and health, without any burden on industries or Members States.

Horizontal Aspects

Further linking the objectives of Innovation Union and Research Efficiency flagship initiatives to Horizon 2020 is needed and therefore is incorporated in the opinion. In order to have a maximum benefit of R&D and Innovation projects across EU, complementarity of Horizon 2020 with other EU and National Funds should be strictly monitored. Moreover, it is also proposed to further increase the SMEs participation, which can be the driver for a green and sustainable economic growth. One important aspect of performance indications, which monitor the implementation of Horizon 2020 objectives, is also touched on in the report.

Further amendments between the split of research budgets and objectives in the innovation chain as well as simplification are left until after the future ENVI committee debate on Horizon 2020.

AMENDMENTS

The Committee on the Environment, Public Health and Food Safety calls on the Committee on Industry, Research and Energy, as the committee responsible, to incorporate the following amendments in its report:

Amendment 1

Proposal for a decision
Recital 3

Text proposed by the Commission	*Amendment*
(3) While Horizon 2020 sets out the general objective of that framework programme, the priorities and the broad lines of the specific objectives and activities to be carried out, the specific programme should define the specific objectives and the broad lines of the activities which are specific to each of the Parts. The provisions set out in Horizon 2020 on implementation apply fully to this specific programme, including those relating to ethical principles.	(3) While Horizon 2020 sets out the general objective of that framework programme, the priorities and the broad lines of the specific objectives and activities to be carried out, the specific programme should define the specific objectives and the broad lines of the activities which are specific to each of the Parts. The provisions set out in Horizon 2020 on implementation apply fully to this specific programme, including those relating to ethical principles. ***Accessibility of information and communication actions concerning Horizon 2020, including communication concerning supported projects and results, requires the provision of accessible formats for all. Accessible formats include, but are not limited to, large print, Braille, easy-to-read text, audio, video, and electronic format.***

Amendment 2

Proposal for a decision
Recital 8

Text proposed by the Commission	*Amendment*
(8) In order to maintain and increase the Union's industrial leadership there is an urgent need to stimulate private sector research and development and innovation investment, promote research and innovation with a business driven agenda and accelerate the development of new technologies which will underpin future businesses and economic growth. Part II ‘Industrial leadership’ should support investments in ***excellent*** research and innovation in key enabling technologies and other industrial technologies, facilitate access to risk finance for innovative companies and projects, and provide Union wide support for innovation in small and medium-sized enterprises.	(8) In order to maintain and increase the Union's industrial leadership, ***particularly as regards environmentally friendly industry,*** there is an urgent need to stimulate private sector research and development and innovation investment, promote research and innovation with a business driven agenda and accelerate the development of new technologies which will underpin future businesses and economic growth. Part II 'Industrial leadership' should support investments in ***high quality*** research and innovation in key enabling technologies and other industrial technologies, ***particularly those that are environmentally friendly,*** facilitate access to risk finance for innovative companies and projects, and provide Union wide support for innovation in small and medium-sized enterprises.

Amendment 3

Proposal for a decision
Recital 11

Text proposed by the Commission	*Amendment*
(11) Part III “Societal challenges” should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation with an emphasis on innovation-related	(11) Part III “Societal challenges” should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation with an emphasis on innovation-related

activities such as piloting, demonstration, test-beds, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. The activities should support directly the corresponding sectoral policy competences at Union level. All challenges should contribute to the overarching objective of sustainable development.

activities such as piloting, demonstration, test-beds, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. The activities should support directly the corresponding sectoral policy competences at Union level. All challenges should contribute to the overarching objective of sustainable development ***and to the development of safe and innovative societies***.

Amendment 4

Proposal for a decision
Recital 15

Text proposed by the Commission	*Amendment*
(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the implementation of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, industry, public health, consumer protection, employment and social policy, energy, transport, environment, climate action, security, marine and fisheries, development cooperation and enlargement and neighbourhood policy.	(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the implementation of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, industry, public health, consumer protection, employment and social policy, energy, transport, environment, climate action, security, marine and fisheries, development cooperation and enlargement and neighbourhood policy. ***The Commission should endeavour to avoid any overlap between the actions financed under Union programmes and Horizon 2020 and, as far as possible, between actions carried out at national level and those supported by Horizon 2020. In encouraging innovation and research, encouragement should be given to synergies between these policy areas, because experience shows that in some cases societal problems can only be***

resolved by means of complex and integrated solutions.

Amendment 5

Proposal for a decision
Article 2 – paragraph 2 – point c – point i a (new)

Text proposed by the Commission	*Amendment*
	i) Knowledge science and technology. Life sciences, Health, earth, environment, natural resources and food security;

Amendment 6

Proposal for a decision
Article 2 – paragraph 2 – point c – point ii a (new)

Text proposed by the Commission	*Amendment*
	ii) Social, Economic and Humanities. Demographic challenges, education, territorial issues, governance, culture, digital contents, humanities, cultural heritage and intangible knowledge areas;

Amendment 7

Proposal for a decision
Article 3 – paragraph 1 – subparagraph 1 – point d a (new)

Text proposed by the Commission	*Amendment*
	(da) strengthening the knowledge transfer from research and innovation to all levels of education;

Amendment 8

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – introductory part

Text proposed by the Commission	*Amendment*
Part III 'Societal challenges' shall contribute to the priority 'Societal challenges' set out in Article 5(2)(c) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing research, technological development, demonstration and innovation actions which contribute to the following specific objectives:	Part III 'Societal challenges' shall contribute to the priority 'Societal challenges' set out in Article 5(2)(c) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing research, technological development, demonstration and innovation actions ***and the related socio-economic issues,*** which contribute to the following specific objectives:

Amendment 9

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point a

Text proposed by the Commission	*Amendment*
(a) improving the lifelong health and wellbeing;	(a) improving the lifelong health and wellbeing ***and improving solutions for keeping the autonomy of the ageing persons***;

Amendment 10

Proposal for a decision
Article 3 – Paragraph 3 – point c

Text proposed by the Commission	*Amendment*
(c) making the transition to a reliable, sustainable and competitive energy system, in the face of increasing resource scarcity, increasing energy needs and climate change;	(c) making the transition to a reliable, sustainable and competitive energy system, in the face of increasing resource scarcity, increasing energy needs and climate change***, in particular through innovation in renewable energies;***

Amendment 11

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point e

Text proposed by the Commission	*Amendment*
(e) achieving a resource-efficient and climate change resilient economy and a sustainable supply of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;	(e) achieving a resource-efficient and climate change resilient economy***, the impacts of climate change in the shift of the ecosystem structure*** and a sustainable supply of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources;

Amendment 12

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point e a (new)

Text proposed by the Commission	*Amendment*
	(ea) Adapting to the challenges of climate change negative impacts relating to the hydrological cycle, the reduction of biodiversity and natural resource management

Amendment 13

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point f a (new)

Text proposed by the Commission	*Amendment*
	(fa) promoting a coherent inter-relationship between urban and rural areas to improve environmental sustainability;

Amendment 14

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point f b (new)

Text proposed by the Commission	*Amendment*
	(fb) identifying research needs and priorities which are socially relevant, through the set up of platforms for dialogue between civil society and researchers, and ensuring civil society participation in the definition, implementation and evaluation of research programmes under societal challenges;

Amendment 15

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point f c (new)

Text proposed by the Commission	*Amendment*
	(fc) tapping into the diversity of knowledge within society and contributing to social innovation through participatory research approaches;

Amendment 16

Proposal for a decision
Article 5 – paragraph 6 – subparagraph 1

Text proposed by the Commission	*Amendment*
The work programmes for the implementation of the Parts I, II and III referred to in points (a), (b) and (c) of Article 2(2) shall set out the objectives pursued, the expected results, the method of implementation and their total amount, including indicative information on the amount of climate related expenditure, where appropriate. They shall also contain a description of the actions to be financed, an indication of the amount allocated to	The work programmes for the implementation of the Parts I, II and III referred to in points (a), (b) and (c) of Article 2(2) shall set out the objectives pursued, the expected results, the method of implementation and their total amount, including indicative information on the amount of climate related expenditure, where appropriate. They shall also contain a description of the actions to be financed, an indication of the amount allocated to

each action, an indicative implementation timetable, as well as a multi-annual approach and strategic orientations for the following years of implementation. They shall include for grants the priorities, the essential evaluation criteria and the maximum rate of co-financing. They shall allow for bottom-up approaches that address the objectives in innovative ways.	each action, an indicative implementation timetable, as well as a multi-annual approach and strategic orientations for the following years of implementation. They shall include for grants the priorities, the essential evaluation criteria and the maximum rate of co-financing. They shall allow for ***strategic top-down as well as*** bottom-up approaches***, as appropriate,*** that address the objectives in innovative ways.

Justification

While a loosely coordinated 'bottom-up' approach is quite appropriate for some areas of research, others require big-picture, strategic thinking and tight, 'top-down' coordination. The increased emphasis in Horizon 2020 on systems biology and similar research approaches requires that provision be made for top-down frameworks.

Amendment 17

Proposal for a decision
Article 5 – paragraph 6 a (new)

Text proposed by the Commission	*Amendment*
	6 a. The instruments for the connexion between Research, Innovation the Structural Funds should be implemented through programs, "Regions of Knowledge" and "Smart specialisations, both instruments should be located inside ERA, in order to create objective indicators for the stairs of excellence.

Amendment 18

Proposal for a decision
Article 6 – paragraph 3 – subparagraph 2

Text proposed by the Commission	*Amendment*
The President shall be appointed by the Commission following a recruitment process involving a dedicated search	The President shall be appointed by the Commission following a recruitment process involving a dedicated search

committee, for a term of office limited to four years, renewable once. The recruitment ***process*** and the candidate selected shall have the approval of the Scientific Council.	committee, for a term of office limited to four years, renewable once. The recruitment ***procedure*** and the candidate selected shall have the approval of the Scientific Council. ***Before that procedure is completed, the Commission shall forward a report to the European Parliament and the Council, which may give their opinion on the candidate selected.***

Justification

The procedure for appointing the President of the ERC needs to be more transparent.

Amendment 19

Proposal for a decision
Article 6 – paragraph 3 – subparagraph 3

Text proposed by the Commission	*Amendment*
The President shall chair the Scientific Council ***and*** shall ensure its leadership and liaison with the dedicated implementation structure, and represent it in the world of science.	The President shall chair the Scientific Council***,*** shall ensure its leadership and liaison with the dedicated implementation structure, ***shall be accountable to the Commission for its activities*** and ***shall*** represent it in the world of science.

Amendment 20

Proposal for a decision
Annex I – Point 1.1 – paragraph 2

Text proposed by the Commission	*Amendment*
The indirect actions of Horizon 2020 will be implemented through the forms of funding provided for in the Financial Regulation, in particular grants, prizes, procurement and financial instruments. All forms of funding will be used in a flexible manner across all of Horizon 2020's	The indirect actions of Horizon 2020 will be implemented through the forms of funding provided for in the Financial Regulation, in particular grants, prizes, procurement and financial instruments. All forms of funding will be used in a flexible manner across all of Horizon 2020's

general and specific objectives, with their use being determined on the basis of the needs and the specificities of the particular specific objective.	general and specific objectives, with their use being determined on the basis of the needs and the specificities of the particular specific objective. ***Particular attention will be paid, when financing SMEs, to simplification of procedures for accessing the funds and reporting obligations.***

Amendment 21

Proposal for a decision
Annex I – Point 1.1 – paragraph 3

Text proposed by the Commission	*Amendment*
Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries.	Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries. ***The Horizon 2020 structure should be flexible in order to allow joint calls and activities organised by and funded from different challenges and parts of Horizon 2020.***

Amendment 22

Proposal for a decision
Annex I – Point 1.1 – paragraph 4

Text proposed by the Commission	*Amendment*
For the societal challenges and the enabling and industrial technologies in particular, there will be a particular emphasis on supporting activities which operate close to the end-users and the market, such as demonstration, piloting or	For the societal challenges and the enabling and industrial technologies in particular, there will be a particular emphasis on supporting activities which operate close to the end-users and the market, such as demonstration, piloting or

proof-of-concept. This will also include, where appropriate, activities in support of social innovation, and support to demand side approaches such as pre-standardisation or pre-commercial procurement, procurement of innovative solutions, standardisation and other user-centred measures to help accelerate the deployment and diffusion of innovative products and services into the market. In addition, there will be sufficient room for bottom-up approaches and open, light and fast schemes under each of the challenges and technologies to provide Europe's best researchers, entrepreneurs and enterprises with the opportunity to put forward breakthrough solutions of their choice.	proof-of-concept. This will also include, where appropriate, activities in support of social innovation, and support to demand side approaches such as pre-standardisation or pre-commercial procurement, procurement of innovative solutions, standardisation and other user-centred measures to help accelerate the deployment and diffusion of innovative products and services into the market. In addition, there will be sufficient room for bottom-up approaches and open, light and fast schemes under each of the challenges and technologies to provide Europe's best researchers, entrepreneurs and enterprises***, in particular SMEs,*** with the opportunity to put forward breakthrough solutions of their choice.

Amendment 23

Proposal for a decision
Annex I – Point 1.1 – paragraph 5

Text proposed by the Commission	*Amendment*
Detailed priority setting during implementation of Horizon 2020 will entail a strategic approach to programming of research, using modes of governance aligning closely with policy development yet cutting across the boundaries of traditional sectoral policies. This will be based on sound evidence, analysis and foresight, with progress measured against a robust set of performance indicators. This cross-cutting approach to programming and governance will allow effective coordination between all of Horizon 2020's specific objectives and will allow to address challenges which cut across them, such as for instance sustainability, climate change or marine sciences and technologies.	Detailed priority setting during implementation of Horizon 2020 will entail a strategic approach to programming of research, using modes of governance aligning closely with policy development yet cutting across the boundaries of traditional sectoral policies. This will be based on sound evidence, analysis and foresight, with progress measured against a robust set of performance indicators. This cross-cutting approach to programming and governance will allow effective coordination between all of Horizon 2020's specific objectives and will allow to address challenges which cut across them, such as for instance ***resource efficiency,*** sustainability, climate change or marine sciences and technologies.

Amendment 24

Proposal for a decision
Annex I – Point 1.2 – paragraph 2

Text proposed by the Commission	*Amendment*
Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy.	Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, ***promoting renewable energy,*** supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy.

Amendment 25

Proposal for a decision
Annex 1 – point 1 – point 1.2 – paragraph 3 a (new)

Text proposed by the Commission	*Amendment*
	The major societal challenges are not abstract they have a territorial dimension. Moreover, according to the importance of the urban problematic in terms of creativity, innovation and social and economic impacts, there is a need for specific consideration of the urban and territorial dimension.

Amendment 26

Proposal for a decision
Annex I – Point 1.3 – paragraph 2

Text proposed by the Commission	*Amendment*
In accordance with Article 18 of Horizon 2020, dedicated measures as set out in the specific objective 'Innovation in SMEs' (dedicated SME instrument) shall be applied in the specific objective 'Leadership in enabling and industrial technologies' and Part III 'Societal challenges'. This integrated approach is expected to lead to around ***15%*** of their total combined budgets going to SMEs.	In accordance with Article 18 of Horizon 2020, dedicated measures as set out in the specific objective 'Innovation in SMEs' (dedicated SME instrument) shall be applied in the specific objective 'Leadership in enabling and industrial technologies' and Part III 'Societal challenges'. This integrated approach is expected to lead to around ***20%*** of their total combined budgets going to SMEs.

Amendment 27

Proposal for a decision
Annex 1 – point 1 – point 1.5 – paragraph 1

Text proposed by the Commission	*Amendment*
A key added value of research and innovation funded at the Union level is the possibility to disseminate and communicate results on a continent wide scale to enhance their impact. Horizon 2020 will therefore include, under all of its specific objectives, dedicated support to dissemination (including through open access to research results), communication and dialogue actions, with a strong emphasis on communicating results to end-users, citizens, civil society organisations, industry and policy makers. To this extent, Horizon 2020 may make use of networks for information transfer. Communication activities undertaken in the context of Horizon 2020 will also seek to raise public awareness on the importance of research and innovation by means of publications, events, knowledge repositories, databases, websites or a targeted use of social media.	A key added value of research and innovation funded at the Union level is the possibility to disseminate and communicate results on a continent wide scale to enhance their impact. Horizon 2020 will therefore include, under all of its specific objectives, dedicated support to dissemination (including through open access to research results), communication and dialogue actions, with a strong emphasis on communicating results to end-users, citizens, civil society organisations, industry and policy makers. To this extent, Horizon 2020 may make use of networks for information transfer. Communication activities undertaken in the context of Horizon 2020 will also seek to raise public awareness on the importance of research and innovation by means of publications, events, knowledge repositories, databases, websites or a targeted use of social media. ***In order to simplify the access to information and to develop an instrument with all the information demanded by the research community and, having regard***

	the need for a transparency, Cordis, as a digital instrument should be revised and reformed in a more clear and flexible way.

Amendment 28

Proposal for a decision
Annex 1 – point 2 – paragraph 5

Text proposed by the Commission	*Amendment*
In addition, a range of targeted actions will be implemented taking a strategic approach to international cooperation on the basis of common interest and mutual benefit and promoting coordination and synergies with Member States activities. This will include a mechanism for supporting joint calls and the possibility of co-funding programmes together with third countries or international organisations.	In addition, a range of targeted actions will be implemented taking a strategic***, top-down*** approach to international cooperation on the basis of common interest and mutual benefit and promoting coordination and synergies with Member States activities. This will include a mechanism for supporting joint calls and the possibility of co-funding programmes together with third countries or international organisations.

Justification

While a loosely coordinated 'bottom-up' approach is appropriate for some areas of research, others require big-picture, strategic thinking and tight, top-down coordination. The increased emphasis in Horizon 2020 on systems biology and similar research approaches requires that provision be made for top-down frameworks.

Amendment 29

Proposal for a decision
Annex I – point 2 – paragraph 6 – point a

Text proposed by the Commission	*Amendment*
(a) The continuation of the European and Developing Countries Clinical Trials Partnership (EDCTP2) on clinical trials for medical interventions against HIV, malaria and tuberculosis;	(a) The continuation, ***appropriate funding and geographical expansion to other developing regions*** of the European and Developing Countries Clinical Trials Partnership (EDCTP2) on clinical trials ***from Phase I-IV*** for medical interventions against HIV, malaria and tuberculosis ***and***

neglected diseases*;*

Justification

Poverty-related and neglected diseases and co-infections occur also in developing countries outside of Africa (i.e. Chagas in Latin America or leishmaniasis in Asia), an expansion of the geographical scope would be desirable. This would also ensure that synergies in research, which is done in other regions, can be used to make health products more quickly available. The EDCTP should also be financed accordingly in order to safeguard its efficiency.

Amendment 30

Proposal for a decision
Annex I – Point 3 – paragraph 3

Text proposed by the Commission	*Amendment*
Furthermore, in many cases, contributing effectively to the objectives of Europe 2020 and the Innovation Union will require solutions to be developed which are interdisciplinary in nature and therefore cut across multiple specific objectives of Horizon 2020. Particular attention will be given to responsible research and innovation. Gender will be addressed as a cross-cutting issue in order to rectify imbalances between women and men, and to integrate a gender dimension in research and innovation programming and content. Horizon 2020 includes specific provisions to incentivise such cross-cutting actions, including by an efficient bundling of budgets. This includes also for instance the possibility for the societal challenges and enabling and industrial technologies to make use of the provisions for financial instruments and the dedicated SME instrument.	Furthermore, in many cases, contributing effectively to the objectives of Europe 2020 the Innovation Union ***and Resource Efficiency*** will require solutions to be developed which are interdisciplinary in nature and therefore cut across multiple specific objectives of Horizon 2020. Particular attention will be given to responsible research and innovation. Gender will be addressed as a cross-cutting issue in order to rectify imbalances between women and men, and to integrate a gender dimension in research and innovation programming and content. Horizon 2020 includes specific provisions to incentivise such cross-cutting actions, including by an efficient bundling of budgets. This includes also for instance the possibility for the societal challenges and enabling and industrial technologies to make use of the provisions for financial instruments and the dedicated SME instrument.

Amendment 31

Proposal for a decision
Annex 1 – point 3 – paragraph 4

Text proposed by the Commission	*Amendment*
Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems, mainstreaming of climate actions, nanomedicine, advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.	Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems, mainstreaming of climate actions, nanomedicine, ***more predictive and human-relevant tools for safety testing, risk assessment and health research,*** advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.

Amendment 32

Proposal for a decision
Annex 1 – point 3 – paragraph 4

Text proposed by the Commission	*Amendment*
Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems,	Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems,

mainstreaming of climate actions, nanomedicine, advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.	mainstreaming of climate actions, nanomedicine, ***plant-based genetic technology,*** advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.

Amendment 33

Proposal for a decision
Annex 1 – point 3 – paragraph 4

Text proposed by the Commission	*Amendment*
Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, intelligent transport systems, mainstreaming of climate actions, nanomedicine, advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require that stakeholders	Cross-cutting action will also be vital in stimulating the interactions between the societal challenges and the enabling and industrial technologies needed to generate major technological breakthroughs. Examples of where such interactions may be developed are: the domain of eHealth, smart grids, ***energy storage,*** intelligent transport systems, mainstreaming of climate actions, nanomedicine, advanced materials for lightweight vehicles or the development of bio-based industrial processes and products. Strong synergies will therefore be fostered between the societal challenges and the development of generic enabling and industrial technologies. This will be explicitly taken into account in developing the multi-annual strategies and the priority setting for each of these specific objectives. It will require

representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.

that stakeholders representing the different perspectives are fully involved in the implementation and in many cases, it will also require actions which bring together funding from the enabling and industrial technologies and the societal challenges concerned.

Amendment 34

Proposal for a decision
Annex I – point 4 – paragraph 1

Text proposed by the Commission	*Amendment*
For achieving sustainable growth in Europe, the contribution of public and private players must be optimised. This is essential for consolidating the European Research Area and for delivering on the Innovation Union, the Digital Agenda and other Europe 2020 flagship initiatives. Furthermore, responsible research and innovation requires that best solutions be derived from interactions between partners having various perspectives but common interests.	For achieving sustainable growth in Europe, the contribution of public and private players must be optimised. This is essential for consolidating the European Research Area and for delivering on the Innovation Union, ***A Resource Efficient Europe***, the Digital Agenda and other Europe 2020 flagship initiatives. Furthermore, responsible research and innovation requires that best solutions be derived from interactions between partners having various perspectives but common interests.

Amendment 35

Proposal for a decision
Annex I – point 4 – paragraph 7

Text proposed by the Commission	*Amendment*
Further public-public partnerships and public-private partnerships may be launched under Horizon 2020 where they meet the defined criteria. This may include partnerships on Information and Communication Technologies in the areas of Photonics and Robotics, on sustainable process industries, on bio-based industries and on security technologies for maritime	Further public-public partnerships and public-private partnerships, ***including product development partnerships,*** may be launched under Horizon 2020 where they meet the defined criteria. This may include partnerships on Information and Communication Technologies in the areas of Photonics and Robotics, on sustainable process industries, on bio-based industries, ***on pharmaceuticals***, ***on telemedicine and***

border surveillance.	***home treatment appliances,*** and on security technologies for maritime border surveillance.

Justification

Product development partnerships can be of great help especially in the area of poverty related and neglected diseases, which affect primarily the population of poorer countries, thus limiting the incentives for innovative pharmaceutical companies to develop innovative products for patients with such diseases. Horizon 2020 can make a useful contribution to address this market failure.

Amendment 36

Proposal for a decision
Annex 1 – part I – point 1.1 – paragraph 7 a (new)

Text proposed by the Commission	*Amendment*
	The President of the ERC and the members of the Scientific Council shall carry out their duties on an exclusive, full-time basis.

Justification

In order to ensure the transparency and independence of the ERC, the basis on which it is to carry out its professional duties needs to be clearly established.

Amendment 37

Proposal for a decision
Annex 1 – part I – point 1.3 – paragraph 1 – indent 5

Text proposed by the Commission	*Amendment*
– regularly inform the programme committee on the implementation of the ERC activities.	– regularly inform the programme committee***, the European Parliament and the Council*** on the implementation of the ERC activities.

Justification

To make the ERC's activities more transparent and ensure that they are more closely monitored.

Amendment 38

Proposal for a decision
Annex 1 – part I – point 2.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Research initiatives within this challenge are science-driven, large-scale, multidisciplinary and built around a visionary unifying goal. They tackle grand science and technology challenges requiring cooperation among a range of disciplines, communities and programmes. The scientific advance should provide a strong and broad basis for future technological innovation and economic exploitation, as well as novel benefits for society. The overarching nature and magnitude implies that they can only be realised through a federated and sustained effort (in the order of 10 years duration).	Research initiatives within this challenge are science-driven, large-scale, multidisciplinary and built around a visionary unifying goal. They tackle grand science and technology challenges requiring cooperation among a range of disciplines, communities and programmes***, and often a paradigm shift in research approaches***. The scientific advance should provide a strong and broad basis for future technological innovation and economic exploitation, as well as novel benefits for society. The overarching nature and magnitude implies that they can only be realised through a federated and sustained effort (in the order of 10 years duration).

Amendment 39

Proposal for a decision
Annex 1 – part II – point 1 – paragraph 2

Text proposed by the Commission	*Amendment*
A major component of 'Leadership in Enabling and Industrial Technologies' are Key Enabling Technologies (KETs), defined as micro- and nanoelectronics, photonics, nanotechnology, biotechnology, advanced materials ***and*** advanced manufacturing systems. Many innovative products incorporate several of these technologies simultaneously, as single or integrated parts. While each technology offers technological innovation, the accumulated benefit from combining a number of enabling technologies can also lead to technological leaps. Tapping into cross-cutting key enabling technologies will enhance product competitiveness and	A major component of 'Leadership in Enabling and Industrial Technologies' are Key Enabling Technologies (KETs), defined as micro- and nanoelectronics, photonics, nanotechnology, biotechnology, advanced materials***,*** advanced manufacturing systems ***and eco-innovation***. Many innovative products incorporate several of these technologies simultaneously, as single or integrated parts. While each technology offers technological innovation, the accumulated benefit from combining a number of enabling technologies can also lead to technological leaps. Tapping into cross-cutting key enabling technologies will

impact. The numerous interactions of these technologies will therefore be exploited. Dedicated support will be provided for larger-scale pilot line and demonstrator projects.	enhance product competitiveness and impact. The numerous interactions of these technologies will therefore be exploited. Dedicated support will be provided for larger-scale pilot line and demonstrator projects.

Amendment 40

Proposal for a decision
Annex 1 – part II – point 1 – paragraph 9 – indent 3 a (new)

Text proposed by the Commission	*Amendment*
	- further development and application of more predictive and human-relevant tools for safety testing, risk assessment and health research;

Amendment 41

Proposal for a decision
Annex 1 – part II – point 1.1 – point 1.1.1 – paragraph 1

Text proposed by the Commission	*Amendment*
The objective is to maintain and reinforce European leadership in technologies related to smart embedded components and systems. It also includes micro-nano-bio systems, organic electronics, large area integration, underlying technologies for the Internet of Things (IoT) including platforms to support the delivery of advanced services, smart integrated systems, systems of systems and complex systems engineering.	The objective is to maintain and reinforce European leadership in technologies related to smart embedded components and systems. It also includes micro-nano-bio systems, ***high-throughput in-vitro tools, human-on-a-chip, virtual organs and other applications of computational systems biology,*** organic electronics, large area integration, underlying technologies for the Internet of Things (IoT) including platforms to support the delivery of advanced services, smart integrated systems, systems of systems and complex systems engineering.

Amendment 42

Proposal for a decision
Annex I – Part II – point 1.3 – subpoint 1.3.5. – paragraph 1 a (new)

Text proposed by the Commission	*Amendment*
	Materials for increasing the efficiency of renewable energies. Developing new products and applications that increase the efficiency of renewable energies such as photovoltaic, solar thermal and wind turbines.

Amendment 43

Proposal for a decision
Annex 1 – part II – point 1.4 – point 1.4.1 – paragraph 1

Text proposed by the Commission	*Amendment*
The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) ***and*** ICT (e.g. bioelectronics). These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, etc).	The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) and ICT (e.g. bioelectronics) ***and plant and agricultural biotechnology***. These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, ***plant-based genetic technology,*** etc) ***and tools such as human-biology based experimental and computational methods to ensure safer consumer products***.

Amendment 44

Proposal for a decision
Annex 1 – part II – point 1.4 – point 1.4.2 – paragraph 1

Text proposed by the Commission	*Amendment*
The objective is twofold: ***on the one hand,*** enabling the European industry (e.g. chemical, health, mining, energy, pulp and paper, textile, starch, food processing) to develop new products and processes meeting industrial and societal demands; and competitive and enhanced biotechnology-based alternatives to replace established ones; ***on the other hand,*** harnessing the potential of biotechnology for detecting, monitoring, preventing and removing pollution. It includes R&I on enzymatic and metabolic pathways, bio-processes design, advanced fermentation, up- and down-stream processing, gaining insight on the dynamics of microbial communities. It will also encompass the development of prototypes for assessing the techno-economic feasibility of the developed products and processes.	The objective is twofold: enabling the European industry (e.g. chemical, health, mining, energy, pulp and paper, textile, starch, ***crop production and*** food processing) to develop new products and processes meeting ***agriculture, fisheries,*** industrial and societal demands; and competitive and enhanced biotechnology-based alternatives to replace established ones; ***in addition*** harnessing the potential of biotechnology for detecting, monitoring, preventing and removing pollution. It includes R&I on enzymatic and metabolic pathways, bio-processes design, advanced fermentation, up- and down-stream processing, gaining insight on the dynamics of microbial communities. It will also encompass the development of prototypes for assessing the techno-economic feasibility of the developed products and processes.

Justification

it is important to add biotechnology for crop production, as well for agriculture and aquaculture

Amendment 45

Proposal for a decision
Annex 1 – part II – point 1.4 – point 1.4.3 – paragraph 1

Text proposed by the Commission	*Amendment*
The objective is to develop platform technologies (e.g. genomics, meta-genomics, proteomics, molecular tools) triggering leadership and competitive advantage on a wide number of economic sectors. It includes aspects, such as underpinning the development of bio-resources with optimised properties and	The objective is to develop platform technologies (e.g. ***system biology,*** genomics, meta-genomics, proteomics, ***phenomics,*** molecular tools) triggering leadership and competitive advantage on a wide number of economic sectors. It includes aspects, such as underpinning the development of bio-resources with

applications beyond conventional alternatives; enabling exploration, understanding and exploitation in a sustainable manner of terrestrial and marine biodiversity for novel applications; and sustaining the development of biotechnology-based healthcare solutions (e.g. ***diagnostics***, biologicals, bio-medical devices).	optimised properties and applications beyond conventional alternatives; enabling exploration, understanding and exploitation in a sustainable manner of terrestrial and marine biodiversity for novel applications; and sustaining the development of biotechnology-based healthcare solutions (e.g. ***pharmaceuticals diagnostics***, biologicals, bio-medical devices***, healthier plants and animals for healthy nutrition***). ***Priority support will be given to new diagnostic methods where a prevention or diagnosis for the patient in question either already exists or is likely to be developed.***

Amendment 46

Proposal for a decision
Annex 1 – part II – point 1.5 – point 1.5.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Increasing the competitiveness of process industries, such as chemical, pulp and paper, glass, or non-ferrous metals and steel by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities. Focus will be on the development, and validation of enabling technologies for innovative substances, materials and technological solutions for low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.	Increasing the competitiveness of process industries, such as chemical, pulp and paper, ***construction,*** glass, or non-ferrous metals and steel by drastically improving***, at an affordable cost,*** resource and energy efficiencies and reducing the environmental impact of such industrial activities. Focus will be on the development, and validation of enabling technologies for innovative substances, materials and technological solutions for low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.

Amendment 47

Proposal for a decision
Annex 1 – part II – point 1.5 a (new)

Text proposed by the Commission	*Amendment*
	1.5 a. Eco-innovation
	1.5.1 Specific objective for eco-innovation
	The specific objective of eco-innovation is to foster an innovative European industry and innovation community which targetly creates new products, processes and services that deliver green growth and environmental benefits and which is recognized to be a world-leader. The aim is to increase resource-efficiency, reduction of environmental impacts, preventing (water) pollution and / or achieving a more efficient, effective and responsible use of natural resources.
	1.5.2 Rationale and Union added value
	Industrial leadership in eco-innovation will lead to improved environmental performance and resilience across the economy being at the same time cost-effective and good for business and society, from rural to urban citizens, as a whole. The global market (2020) for eco-industries is rapidly expanding and this EU business sector is already growing rapidly: EU eco-industries are often world leaders. Horizon 2020 needs to build on this. Eco-innovation needs to permeate all sectors of the economy and society, providing the basis for a significant competitive advantage for Europe to face up to the challenge of sustainability. Therefore eco-innovation is a key enabling technology.
	Eco-industries are marked by the presence of large numbers of small and medium-sized enterprises (SMEs). These firms account for approximately half of the total employment. Hence, SMEs in partnership with larger industry-partners must play an increasing role in innovating new technologies and solutions and in implementing them.

Key sources of innovations are at the interface between eco-innovation and other enabling technologies, to start with ICT (monitoring and sensoring) and nanotechnologies.

1.5.3 Broad lines of the activities

Eco-innovation is any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources.

Eco-innovation activities focus on sustainable innovations in and across the following fields:

a) Green energy supply

b) Energy Efficiency

c) Material Efficiency

d) Green mobility

e) Water

f) Waste

Amendment 48

Proposal for a decision
Annex 1 – part III – point 1 – paragraph 1

Text proposed by the Commission	*Amendment*
Effective health promotion, supported by a robust evidence base, prevents disease, improves wellbeing and is cost effective. Health promotion and disease prevention also depend on an understanding of the determinants of health, on effective preventive tools, such as vaccines, on effective health and disease surveillance and preparedness, and on effective screening programmes.	Effective health promotion, supported by a robust evidence base, prevents disease, improves wellbeing***, reduces social exclusion*** and is cost effective. Health promotion and disease prevention also depend on an understanding of the determinants of health ***at a molecular level***, ***on*** effective preventive tools ***based*** on ***research on primary and secondary prevention,*** such as vaccines ***and behavioural interventions addressing the***

	risk factors, ***including obesity,*** on effective health and disease surveillance and preparedness, and on effective screening programmes.

Amendment 49

Proposal for a decision
Annex 1 – part III – point 1 – paragraph 2

Text proposed by the Commission	*Amendment*
Successful efforts to prevent, manage, treat and cure disease, disability and reduced functionality are underpinned by the fundamental understanding of their causes, processes and impacts, as well as factors underlying good health and wellbeing. Effective sharing of data and the linkage of these data with real-world large scale cohort studies is also essential, as is the translation of research findings into the clinic, in particular through the conduct of clinical trials.	Successful efforts to prevent, ***diagnose,*** manage, treat and cure disease, disability and reduced functionality are underpinned by the fundamental understanding of their causes, processes ***(e.g. molecular pathways)*** and impacts, as well as factors underlying good health and wellbeing. Effective ***collection and*** sharing of data***, standardised data processing*** and the linkage of these data with real-world large scale cohort studies is also essential, as is the ***timely*** translation of research findings into the clinic, in particular through the conduct of clinical trials ***and through support for medical research focusing on the post-diagnostic phase of disease and for translational research***.

Amendment 50

Proposal for a decision
Annex 1 – part III – point 1 – paragraph 2 a (new)

Text proposed by the Commission	*Amendment*
	Research gaps in the area of infectious, poverty-related, and neglected diseases must be addressed through research and innovation activities driven by patients' needs. By supporting innovative global partnerships to develop prevention, diagnostic, treatment, and telemedicine tools, excellent science can be accelerated,

and the Union can respect its global commitments.

Amendment 51

Proposal for a decision
Annex 1 – part III – point 1 – paragraph 3

Text proposed by the Commission	*Amendment*
An increasing disease and disability burden in the context of an *aging* population places further demands on health and care sectors. If effective health and care is to be maintained for all ages, efforts are required to ***improve*** *decision making* in prevention and treatment provision, to identify and support the dissemination of best practice in the healthcare sector, and to support integrated care and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent. Doing so will contribute to increasing, and lengthening the duration of their physical, social, and mental well-being.	An increasing disease and disability burden in the context of an *ageing* population places further demands on health and care sectors. If effective health and care is to be maintained for all ages, efforts are required to ***speed up*** *decision-making* ***and awareness-raising*** in ***disease*** prevention and treatment provision, to identify and support the dissemination of best practice in the healthcare sector, and to support integrated care and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent. Doing so will contribute to increasing, and lengthening the duration of, their physical, social, and mental well-being.

Amendment 52

Proposal for a decision
Annex 1 – part III – point 1 – paragraph 3

Text proposed by the Commission	*Amendment*
An increasing disease and disability burden in the context of an aging population places further demands on health and care sectors. If effective health and care is to be maintained for all ages, efforts are required to improve decision making in prevention and treatment provision, to identify and support the dissemination of best practice in the healthcare sector, and to support	An increasing disease and disability burden in the context of an aging population places further demands on health and care sectors. If effective health and care is to be maintained for all ages, efforts are required to improve decision making in prevention and treatment provision, to identify and support the dissemination of best practice in the healthcare sector, and to support

integrated care and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent. Doing so will contribute to increasing, and lengthening the duration of their physical, social, and mental well-being.	integrated care and the uptake of technological, organisational and social innovations empowering older persons in particular to remain active and independent. Doing so will contribute to increasing, and lengthening the duration of their physical, social, ***economic*** and mental well-being.

Amendment 53

Proposal for a decision
Annex 1 – part III – point 1 – point 1.1 – paragraphs 1

Text proposed by the Commission	*Amendment*
A better understanding of the determinants of health is required in order to provide evidence for effective health promotion and disease prevention, and will also allow the development of comprehensive health and wellbeing indicators in the Union. Environmental, behavioural (including life-style), socio-economic and genetic factors, in their broadest senses will be studied. Approaches will include the long term study of cohorts and their linkage with data derived from '-omics' research, and other methods.	A better understanding of the determinants of health is required in order to provide evidence for effective health promotion and disease prevention, and will also allow the development of comprehensive health and wellbeing indicators in the Union ***and worldwide***. Environmental, ***climate change-related,*** behavioural (including life-style), socio-economic ***(including occupational)*** and genetic ***risk*** factors, in their broadest senses will be studied***, together with the short and long-term impact of related public health interventions***. Approaches will include the long term study of cohorts and their linkage with data derived from '-omics' research, and other methods.

Amendment 54

Proposal for a decision
Annex 1 – part III – point 1 – point 1.1 – paragraphs 2

Text proposed by the Commission	*Amendment*
In particular, a better understanding of the environment as a determinant of health will require integrated molecular biological,	In particular, a better understanding of the environment as a determinant of health ***during the life course from pregnancy***

epidemiological and toxicological approaches to investigate health-environment relationships***, including*** studies of modes of action of chemicals, combined exposures to pollution and other environmental and climate related stressors, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation biomarkers based on 'omics' and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors. Improved links with environmental data using advanced information systems will be supported.

and childhood to old age will require integrated molecular biological, ***risk exposure assessment,*** epidemiological and toxicological approaches to investigate health-environment relationships ***and elucidate pathways of human disease and toxicity***. ***This includes*** studies of modes of action of chemicals ***with a particular emphasis on endocrine disruptors used in foodstuffs and other consumer products***, combined exposures to pollution and other environmental and climate related stressors ***(such as air pollution, water and soil contamination, noise, temperature, light pollution)***, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation biomarkers based on '-omics' and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors. Improved links with environmental data using advanced information systems will be supported. ***Environmental health indicators should be developed that complement other health indicators.***

Amendment 55

Proposal for a decision
Annex 1 – part III – point 1 – point 1.1 – paragraph 3

Text proposed by the Commission	*Amendment*
In this way, existing and planned policies and programmes can be assessed and policy support provided. Similarly, improved behavioural interventions, prevention and education programmes can be developed including those pertaining to health literacy in nutrition, vaccination and	In this way, existing and planned policies and programmes can be assessed and policy support provided. Similarly, improved behavioural interventions, prevention and education programmes can be developed including those pertaining to health literacy***, notably*** in nutrition, vaccination and other primary care

other primary care interventions.	interventions. ***Likewise, health in all policies approach (such as those addressing the environment and the work place) can be developed in order to minimise risk factors.***

Amendment 56

Proposal for a decision
Annex 1 – part III – point 1 – point 1.2 – paragraph 1

Text proposed by the Commission	*Amendment*
The development of screening programmes depends on the identification of early biomarkers of risk and of disease onset, and their deployment depends on the testing and validation of screening methods and programmes. Identifying individuals and populations at high-risk of disease will allow personalised, stratified and collective strategies for efficacious and cost effective disease prevention to be developed.	The development of screening programmes depends ***not only*** on the identification of early biomarkers of risk ***but also on key pathways*** and of disease onset, and their deployment depends on the testing and validation of screening methods and programmes. Identifying individuals and populations at high-risk of disease will allow personalised, stratified and collective strategies for efficacious and cost effective disease prevention to be developed. ***In this connection, priority will be given to screening programmes where prevention or therapy for the patient concerned are available or are likely to be developed.***

Justification

Screening programmes that do not result in any therapeutic or preventive benefits are no solution and create additional problems, e.g. in the area of data protection.

Amendment 57

Proposal for a decision
Annex 1 – part III – point 1 – point 1.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Human populations are under threat from new and emerging infections (including those resulting from climate change), from drug resistance to existing pathogens and from other direct and indirect	Human populations are under threat from new and emerging infections (including those resulting from climate change), from drug resistance to existing pathogens and from other direct and indirect

consequences of climate change. Improved methods for surveillance, early warning networks, health service organisation and preparedness campaigns are needed for the modelling of epidemics, for effective pandemic response, for responses to non infectious disease consequences of climate change, as are efforts to maintain and enhance capabilities to combat drug resistant infectious disease.	consequences of climate change. Improved methods for surveillance, ***including surveillance of drug resistance in both human and veterinary medicine,*** early warning networks, health service organisation and preparedness campaigns are needed for the modelling of epidemics, for effective pandemic response, for responses to non infectious disease consequences of climate change, as are efforts to maintain and enhance capabilities to combat drug resistant infectious disease.

Amendment 58

Proposal for a decision
Annex 1 – part III – point 1 – point 1.4 – paragraph 1

Text proposed by the Commission	*Amendment*
There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. Interdisciplinary, translational research on the patho-physiology of disease is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and disease based on molecular data, and to validate and use research results in clinical applications.	There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. Interdisciplinary, translational research on the patho-physiology of disease ***using human biology-based tools and approaches*** is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and disease based on molecular data, and to validate and use research results in clinical applications. ***Translational research projects aimed at applying laboratory findings more quickly and efficiently into medical practice should be particularly supported, especially in those areas of high unmet need, such as haematology/oncology, rare diseases and antimicrobial resistance.***

Amendment 59

Proposal for a decision
Annex 1 – part III – point 1 – point 1.4 – paragraph 2

Text proposed by the Commission	*Amendment*
Underpinning research will encompass and encourage development and use of new tools and approaches for the generation of biomedical data and include '-omics', high throughput and systems medicine approaches. These activities will demand close linkage between fundamental and clinical research and with long term cohort studies (and the corresponding research domains) as described above. Close links with research and medical infrastructures (databases, bio-banks etc.) will also be required, for standardisation, storage, sharing and access to data, which are all essential for maximising data utility and for stimulating more innovative and effective ways of analysing and combining datasets.	Underpinning research will encompass and encourage development and use of new tools and approaches for the generation of biomedical data and include ***human biology-based*** '-omics', high throughput and systems medicine approaches. These activities will demand close linkage between fundamental and clinical research and with long term cohort studies (and the corresponding research domains) as described above. Close links with research and medical infrastructures (databases, bio-banks etc.) will also be required, for standardisation, storage, sharing and ***free*** access to ***raw*** data, which are all essential for maximising data utility and for stimulating more innovative and effective ways of analysing and combining datasets.

Amendment 60

Proposal for a decision
Annex I – Part III – Point 1.5

Text proposed by the Commission	*Amendment*
1.5. Developing better preventive ***vaccines***	1.5. Developing better preventive ***tools***
There is a need ***for*** more effective preventive vaccines ***(or alternative preventive interventions)*** and evidence-based vaccination schemes for an expanded range of diseases. This relies on a better understanding of disease and disease processes and their consequent epidemics, and ***that*** clinical trials and associated studies ***are undertaken***.	There is a need ***to support the development of*** more effective preventive vaccines and evidence-based vaccination schemes for an expanded range of diseases, ***including poverty-related diseases such as HIV/AIDS, tuberculosis, malaria and neglected diseases***. ***Similarly, knowledge about the main risk factors of disease, as well as behavioural science can be used in order to devise effective prevention strategies addressing these risk factors and aiming at promoting healthy lifestyles. This has a tremendous potential to reduce the burden of chronic diseases.*** This relies on a better understanding of disease and disease processes and their

	consequent epidemics, and ***on*** clinical trials and associated studies.

Justification

Developing effective preventive vaccines for poverty related diseases, including HIV/AIDS, are the most cost-effective solution for combating such diseases, as vaccines will cost healthcare systems less than continuous treatment. Research in this area will have enormous benefits both for the EU and for the entire world population affected by such diseases and should be encouraged.

Amendment 61

Proposal for a decision
Annex I – Part III – Point 1.6

Text proposed by the Commission	*Amendment*
An improved understanding of health, disease and disease processes at all ages is needed to develop new and more effective diagnostics. Innovative and existing technologies will be developed with the goal of significantly improving disease outcomes through earlier, more accurate diagnosis and by allowing for more patient-adapted treatment.	An improved understanding of health, disease and disease processes at all ages is needed to develop new and more effective diagnostics. Innovative and existing technologies will be developed with the goal of significantly improving disease outcomes through earlier, more accurate diagnosis and by allowing for more patient-adapted treatment. ***To this end, support will be given, inter alia, to the further development of in vitro and image diagnostics. Radioprotection of patients will also be addressed.***

Amendment 62

Proposal for a decision
Annex I – Part III – Point 1.8

Text proposed by the Commission	*Amendment*
1.8. ***Treating*** disease	1.8. ***Improving*** disease ***treatment***
There is a need to support the improvement of cross-cutting support technologies for drugs, vaccines and other therapeutic approaches, including transplantation, gene and cell therapy; to increase success in the	There is a need to support the improvement of cross-cutting support technologies for drugs, vaccines and other therapeutic approaches, including transplantation, gene and cell therapy; to increase success in the

drug and vaccine development process (including alternative methods to replace classical safety and effectiveness testing *e.g.* the development of new methods); to develop regenerative medicine approaches, including approaches based on stem cells; to develop improved medical and assistive devices and systems; to maintain and enhance our ability to combat communicable, rare, major and chronic diseases and undertake medical interventions that depend on the availability of effective antimicrobial drugs; and to develop comprehensive approaches to treat co-morbidities at all ages and avoid poly-pharmacy. These improvements will facilitate the development of new, more efficient, effective and sustainable treatments for disease and for the management of disability.

drug and vaccine development process (including alternative methods to replace classical safety and effectiveness testing *e.g.* the development of new methods); to develop regenerative medicine approaches, including approaches based on stem cells; ***to develop stratified and personalised medicine in order to make treatments more effective and more economical, as well as to ensure the availability of drugs and therapies for as many diseases as possible; to improve reproductive health by addressing the causes of infertility and by developing male contraception tools,*** to develop improved medical and assistive devices and systems; ***to improve palliative therapies;*** to maintain and enhance our ability to combat communicable, rare, ***poverty-related, neglected,*** major and chronic diseases and undertake medical interventions that depend on the availability of effective antimicrobial drugs; and to develop comprehensive approaches to treat co-morbidities at all ages and avoid poly-pharmacy. These improvements will facilitate the development of new, more efficient, effective and sustainable treatments for disease and for the management of disability. ***Additionally, the factors which influence therapeutic decision-making must be identified and further elucidated and developed through research.***

Amendment 63

Proposal for a decision
Annex 1 – part III – point 1 – point 1.9 – paragraph 1

Text proposed by the Commission	*Amendment*
Clinical trials are the means to transfer biomedical knowledge to application in patients and support for these will be provided, as well as for the improvement	Clinical trials are the means to transfer biomedical knowledge to application in patients and support for these will be provided, as well as for the improvement

of their practice. Examples include the development of better methodologies to allow trials to focus on relevant population groups, including those suffering from other concomitant diseases and/or already undergoing treatment, the determination of comparative effectiveness of interventions and solutions, as well as enhancing the use of databases and electronic health records as data sources for trials and knowledge transfer. Similarly, support for the transfer of other types of interventions such as those related to independent living into real world environments will be provided.	of their practice. Examples include the development of better methodologies to allow trials to focus on relevant population groups, including those suffering from other concomitant diseases and/or already undergoing treatment, the determination of comparative effectiveness of interventions and solutions, as well as enhancing the use of databases and electronic health records as data sources for trials and knowledge transfer. Similarly, support for the transfer of other types of interventions such as those related to independent living into real world environments will be provided. ***Particular importance will be given to clinical tests in the field of rare diseases and child illnesses including those associated with premature birth.***

Justification

European cooperation is particularly important in the field of rare diseases and child illnesses, since individual Member States do not see the necessary number of cases and thus do not have adequate scope to act alone in this area.

Amendment 64

Proposal for a decision
Annex 1 – part III – point 1 – point 1.10 – paragraph 1

Text proposed by the Commission	*Amendment*
The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and access to data, will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation.	The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and ***free*** access to ***raw*** data, will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation.

Amendment 65

Proposal for a decision
Annex 1 – part III – point 1 – point 1.11 – paragraph 1

Text proposed by the Commission	*Amendment*
There is a need to support the development of scientific tools, methods and statistics for rapid, accurate and predictive assessment of the safety, efficacy and quality of health technologies including new drugs, biologics, advanced therapies and medical devices. This is particularly relevant for new developments in domains including those concerning vaccines, cell/tissue and gene therapies, organs and transplantation, specialist manufacturing, bio banks, new medical devices, diagnostic/treatment procedures, genetic testing, interoperability and e-health, including privacy aspects. Similarly, support for ***improved*** risk assessment methodologies, testing approaches and strategies relating to environment and health are required. There is also a need to support the development of relevant methods for assisting the assessment of ethical aspects of the above domains.	There is a need to support the development of scientific tools, methods and statistics for rapid, accurate and predictive assessment of the safety, efficacy and quality of health technologies including new drugs, biologics, advanced therapies and medical devices. This is particularly relevant for new developments in domains including those concerning vaccines, cell/tissue and gene therapies, organs and transplantation, specialist manufacturing, bio banks, new medical devices, diagnostic/treatment procedures, genetic testing, interoperability***, telemedicine*** and e-health, including privacy aspects. Similarly, support for ***modern hazard and*** risk assessment methodologies, testing approaches and strategies relating to ***assess chemicals with regard to their effects on the*** environment and health are required. There is also a need to support the development of relevant methods for assisting the assessment of ethical aspects of the above domains.

Justification

EU research should support the paradigm shift in biomedical research and toxicity testing away from animal tests to modern toxicity testing of the 21st century. Advances in molecular biology, biotechnology, and other fields are paving the way for major improvements in how scientists can evaluate the health risks posed by potentially toxic chemicals. These advances can make toxicity testing quicker, less expensive, and more directly relevant to human exposures.

Amendment 66

Proposal for a decision
Annex 1 – part III – point 1 – point 1.12 – paragraph 1

Text proposed by the Commission	*Amendment*
Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies, service and social robotics, and ambient assistive environments. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported.	Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies, service and social robotics, and ambient assistive environments ***without compromising relational capacities and quality of social interactions of patients and people receiving assistance***. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported***, giving preference to projects involving citizens affected by these conditions***.

Amendment 67

Proposal for a decision
Annex 1 – part III – point 1 – point 1.13 – paragraph 1

Text proposed by the Commission	*Amendment*
Empowering individuals to improve and manage their health throughout life will result in cost savings to healthcare systems by enabling ***the management of*** chronic disease outside institutions and improve health outcomes. This requires research into behavioural and social models, social attitudes and aspirations in relation to personalised health technologies, mobile and/or portable tools, new diagnostics and personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional	Empowering individuals to ***understand,*** improve and manage their health throughout life will result in cost savings to healthcare systems by enabling ***them to stay in good health and to prevent diseases but also to manage*** chronic disease outside institutions and improve health outcomes. This requires research into ***health literacy, public health interventions,*** behavioural and social models, social attitudes and aspirations in relation to personalised health technologies, mobile and/or portable tools,

interaction, personalised programmes for disease and disability management, as well as support for knowledge infrastructures.	new diagnostics***, care solutions*** and ***rehabilitation and*** personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional interaction, personalised programmes for disease and disability management, as well as support for knowledge infrastructures.

Amendment 68

Proposal for a decision
Annex 1 – part III – point 1 – point 1.14 – paragraph 1

Text proposed by the Commission	*Amendment*
Supporting the management of chronic disease outside institutions also depends on improved cooperation between the providers of health and social or informal care. Research and innovative applications will be supported for decision making based on distributed information, and for providing evidence for large scale deployments and market exploitation of novel solutions, including interoperable tele-health and tele-care services. Research and innovation to improve the organisation of long-term care delivery will also be supported.	Supporting the management of chronic disease ***inside and*** outside institutions also depends on improved cooperation between the providers of health and social or informal care. Research and innovative applications will be supported for decision making based on distributed information, and for providing evidence for large scale deployments and market exploitation of novel solutions, including interoperable tele-health and tele-care services. Research ***on the organisation*** and ***delivery of healthcare services will be supported in order to promote better integration and coordination between health professionals and services, which -among others- will facilitate the early referral of patients from General Practitioners to specialists for the better management of diseases. Research and*** innovation to improve the organisation of long-term care delivery will also be supported.

Amendment 69

Proposal for a decision
Annex 1 – part III – point 1 – point 1.15 – paragraph 1

Text proposed by the Commission	*Amendment*
There is a need to support the development of health technology assessment and health economics, as well as the ***of gathering*** evidence and ***dissemination of*** best practice and innovative technologies and approaches in the healthcare sector, including ICT and e-health applications. Comparative analyses of the reform of public health systems in Europe and in third countries and assessments of their mid to long-term economic and social impacts will be supported. Analyses of future health workforce needs both in terms of numbers and required skills in relation to new patterns of care will be supported. Research on the evolution of health inequalities, of their interplay with other economic and social inequalities and on the effectiveness of policies aiming to reduce them in Europe and beyond will be supported. Finally, there is a need to support the assessment of patient safety solutions and quality assurance systems, including the role of patients on safety and quality of care.	There is a need to support the development of health technology assessment and health economics***. There is also a need to support research into new ways of providing healthcare which would be more efficient and effective and could be the basis for reforms of the national public health systems***, as well as the ***to gather*** evidence and ***disseminate*** best practice and innovative technologies and approaches in the healthcare sector, including ICT and e-health applications. Comparative analyses of the reform of public health systems in Europe and in third countries and assessments of their mid to long-term economic and social impacts***, as well as of their results in terms of efficiency and effectiveness of the public health system*** will be supported. Analyses of future health workforce needs both in terms of numbers and required skills in relation to new patterns of care will be supported. Research on the evolution of health inequalities, of their interplay with other economic and social inequalities and on the effectiveness of policies aiming to reduce them in Europe and beyond will be supported. Finally, there is a need to support the assessment of patient safety solutions and quality assurance systems, including the role of patients on safety and quality of care.

Amendment 70

Proposal for a decision
Annex 1 – part III – point 1 – point 1.16 – paragraph 1 a (new)

Text proposed by the Commission	*Amendment*
	Adequate funding should be allocated to research fields directly linked to the post-diagnostic phase, particularly in cases of cancer and cardiovascular and

respiratory illnesses, and to improving quality of life.

Amendment 71

Proposal for a decision
Annex 1 – part III – point 2 – title

Text proposed by the Commission	*Amendment*
2. Food security, sustainable agriculture, marine and maritime research and the bio-economy.	2. Food security, ***quality and safety***, sustainable agriculture, marine and maritime research and the bio-economy.

Amendment 72

Proposal for a decision
Annex 1 – part III – point 2.1 – paragraph 1

Text proposed by the Commission	*Amendment*
Appropriate knowledge, tools, services and innovations are necessary to support more productive, resource-efficient and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials and deliver ecosystems services while at the same time supporting the development of thriving rural livelihoods. Research and innovation will provide options for integrating agronomic and environmental goals into sustainable production, ***thus***: increasing productivity and resource efficiency of agriculture; reducing agricultural greenhouse gases (GHGs) emissions; ***reducing leaching of nutrients from cultivated lands into terrestrial*** and ***aquatic environments***; decreasing dependence from international plant derived protein imports to Europe; increasing the level of biodiversity in primary production systems.	Appropriate knowledge, tools, services and innovations are necessary to support more productive, resource-efficient and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials and deliver ecosystems services while at the same time supporting the development of thriving rural livelihoods. Research and innovation will provide options for integrating agronomic and environmental goals into ***more*** sustainable production, ***such as***: ***enhancing the genetic potential of plants to better adapt to biotic and abiotic stresses;*** increasing productivity and resource efficiency of agriculture; reducing agricultural greenhouse gases (GHGs) emissions; ***enhancing nutrient*** and ***water use efficiency***; decreasing dependence from international plant derived protein imports to Europe; increasing the level of biodiversity in primary production systems.

Justification

"thus" replaced by "such as", to be less restrictive, more positive and broader.

Amendment 73

Proposal for a decision
Annex 1 – part III– point 2.1 – point 2.1.1 – title

Text proposed by the Commission	*Amendment*
2.1.1. Increasing production efficiency and coping with climate change, while ensuring sustainability and resilience	2.1.1. Increasing production efficiency**,** ***food quality*** and ***safety and*** coping with climate change, while ensuring sustainability and resilience

Justification

Food quality and safety such as health of plants, sensorial and nutrition characteristics (vitamins, micronutrients)

Amendment 74

Proposal for a decision
Annex 1 – part III – point 2.1 – point 2.1.1 – paragraph 2

Text proposed by the Commission	*Amendment*
Multi-disciplinary approaches will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, nutrients, energy) and the ecological integrity of rural areas. Emphasis will be placed on integrated and diverse production systems and agronomic practices, including the use of precision technologies and ecological intensification approaches to benefit both conventional and organic agriculture. Genetic improvement of plants and animals for adaptation and productivity traits will call for all appropriated conventional and modern breeding approaches and for a better use of genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as	Multi-disciplinary approaches will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, nutrients, energy) and the ecological integrity of rural areas. Emphasis will be placed on integrated and diverse production systems and agronomic practices, including the use of precision technologies and ecological intensification approaches to benefit both conventional and organic agriculture. Genetic improvement of plants and animals for adaptation and productivity traits will call for all appropriated conventional and modern breeding approaches and for a better use of genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as

a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed. Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet societal concerns. The above listed areas will be underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies.	a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed. Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet ***both the logistical and practical concerns of commercial users and the*** societal concerns ***of EU citizens***. The above listed areas will be underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies.

Amendment 75

Proposal for a decision
Annex 1 – part III – point 2.1 – point 2.1.2 – title

Text proposed by the Commission	*Amendment*
2.1.2. ***Providing*** ecosystem services and public goods	2.1.2. ***Strengthening multi-functionality of agriculture, including*** ecosystem services and public goods

Justification

Multi-functionality as a comprehensive approach to combine the use of agriculture and combine it with ecosystems services; to be consistent with CAP policy and research programmes.

Amendment 76

Proposal for a decision
Annex 1 – part III – point 2.1 – point 2.1.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value) and important ecological services such as	Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value) and important ecological services such as

functional and in-situ biodiversity, pollination, water regulation, landscape, erosion reduction and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, decision-support tools and the assessment of their non-market value. Specific issues to be dealt with include the identification of farming/forest systems and landscape patterns likely to achieve these goals. Shifts in the active management of agricultural systems - including the use of technologies and change of practices - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change.

functional and in-situ biodiversity, pollination, water regulation, landscape, erosion reduction and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, decision-support tools and the assessment of their non-market value. Specific issues to be dealt with include the identification of farming/forest systems and landscape patterns likely to achieve these goals. ***Socio-economic and comparative assessment of farming/forestry systems and their sustainability performance will be addressed. [ST1] [ST1]This sentence is coming from Amendment 12*** Shifts in the active management of agricultural systems - including the use of technologies and change of practices - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change. ***For instance, biotechnology can improve the efficient use of existing European agricultural and forestry resources by improving the understanding of biological systems and offering a wide range of tools to enhance the sustainability and productivity of agriculture and forestry. It also secures sufficient supply of food and feed, which is crucial in light of past and future turbulences on the global markets. The combination of the advantages of the various agricultural technologies should be encouraged to achieve a real benefit for human health and the environment.***

Amendment 77

Proposal for a decision
Annex I – Part III – Point 2.2

Text proposed by the Commission	*Amendment*
Consumer needs for safe, healthy and affordable food have to be addressed, while	Consumer needs for safe, healthy and affordable food have to be addressed, while

considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, covering the whole food chain and related services, whether conventional or organic, from primary production to consumption. This approach will contribute to (a) achieving food safety and security for all Europeans and eradication of hunger in the world (b) decreasing the burden of food- and diet-related diseases by promoting the shift towards healthy and sustainable diets, via consumer education and innovations in the food industry (c) reducing water and energy consumption in food ***processing,*** transport and distribution and (d) reducing food waste by 50 % by 2030.	considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, ***in an interdisciplinary approach involving various actors, in particular farmers and SMEs in the agri-food sector, technology developers, and environmentalists, and*** covering the whole food ***supply*** chain and related services, whether conventional ***sustainably intensive*** or organic, from primary production to consumption. This approach will contribute to (a) achieving food safety and security for all Europeans and eradication of hunger in the world (b) decreasing the burden of food- and diet-related diseases by promoting the shift towards healthy and sustainable diets, via consumer education***, increasing access to nutritious foods*** and innovations in the ***agriculture*** food industry (c) reducing water and energy consumption in food ***production***, transport and distribution and (d) reducing food waste by 50 % by 2030.

Amendment 78

Proposal for a decision
Annex I – Part III – Point 2.2.2

Text proposed by the Commission	*Amendment*
Nutritional needs and the impact of food on physiological functions, physical and mental performance will be addressed as well as the links between diet, ageing, chronic diseases and disorders and dietary patterns. Dietary solutions and innovations leading to improvements in health and well-being will be identified. Chemical and microbial food and feed contamination, risks and exposures will be assessed, monitored, controlled and traced	Nutritional needs and the impact of food on physiological functions, physical and mental performance will be addressed as well as the links between diet, ageing, chronic diseases and disorders and dietary patterns. ***Quality and healthy nutrition shall be increased by the investigation and study of healthy compounds in plants (e.g. secondary metabolites) and the health status of cultivated plants. Activities providing the necessary knowledge to***

throughout the food and drinking water supply chains from production and storage to processing, packaging, distribution, catering, and preparation at home. Food safety innovations, improved risk communication tools and improved food safety standards will lead to enhanced consumer trust and protection in Europe. Globally improved food safety standards will also help to strengthen the competitiveness of the European food industry.

facilitate the reformulation of food products, in particular those rich in fat, sugar or salt, will be supported in order to promote healthy diets. Dietary solutions and innovations leading to improvements in health and well-being will be identified. ***This includes developing diets which are tailored to individual health and nutrition needs. Pre-natal and post-natal nutrition, as well as nutrition during infancy will be studied in order to understand the impact of nutrition of the development of infants and their health.*** Chemical and microbial food and feed contamination, risks and exposures will be assessed, monitored, controlled and traced throughout the food and drinking water supply chains from production and storage to processing, packaging, distribution, catering, and preparation at home. Food safety innovations, improved risk communication tools and improved food safety standards will lead to enhanced consumer trust and protection in Europe. Globally improved food safety ***and nutrition*** standards will also help to strengthen the competitiveness of the European food industry.

Amendment 79

Proposal for a decision
Annex 1 – part III – point 2.2 – point 2.2.3 – paragraph 1

Text proposed by the Commission	*Amendment*
The needs for the food and feed industry to cope with social, environmental, climate and economic change from local to global will be addressed at all stages of the food and feed production chain, including food design, processing, packaging, process control, waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, affordable and high quality products will be generated. This	The needs for the food and feed industry to cope with social, environmental, climate and economic change from local to global will be addressed at all stages of the food and feed production chain, including ***agricultural production,*** food design, processing, packaging, process control, waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, affordable and high

will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-economic factors, the resilience of the food chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.	quality products will be generated. This will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-economic factors, the resilience of the food chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.

Amendment 80

Proposal for a decision
Annex 1 – part III – point 2.3 – point 2.3.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Aquaculture has a large potential for the development of healthy safe and competitive products tailored to consumer needs and preferences as well as for environmental services (bioremediation, land and water management, etc) and energy production but it needs to be fully realised in Europe. Knowledge and technologies will be strengthened in all aspects of domestication of established species and diversification for new species while taking into account the interactions between aquaculture and the aquatic ecosystems, and the effects of climate change and how the sector can adapt to them. Innovation will also be promoted for sustainable production systems in inland, on the coastal zone and offshore. Emphasis will also be given to understanding the social and economic dimensions of the sector to underpin cost and energy efficient production matching with the market and consumer demands, while ensuring competitiveness and attractive prospects	Aquaculture has a large potential for the development of healthy safe and competitive products tailored to consumer needs and preferences as well as for environmental services (bioremediation, land and water management, etc) and energy production but it needs to be fully realised in Europe. Knowledge and technologies will be strengthened in all aspects of domestication of established species and diversification for new species while taking into account the interactions between aquaculture and the aquatic ecosystems, and the effects of climate change and how the sector can ***best*** adapt to them. Innovation will also be promoted for sustainable production systems in inland, on the coastal zone and offshore. Emphasis will also be given to understanding the social and economic dimensions of the sector to underpin cost and energy efficient production matching with the market and consumer demands, while ensuring competitiveness and attractive prospects for investors and

for investors and producers.	producers.

Amendment 81

Proposal for a decision
Annex 1 – part III – point 2.3 – point 2.3.3 – paragraph 1

Text proposed by the Commission	*Amendment*
More than 90 % of the marine biodiversity remains unexplored, offering a huge potential for discovery of new species and applications in the field of marine biotechnologies, which is foreseen to generate a 10 % annual growth for this sector. Support will be given to further explore and exploit the large potential offered by marine biodiversity and aquatic biomass to bring new innovative processes, products and services on the markets with potential applications in sectors including chemical and material industries, pharmaceutical, fisheries and aquaculture, energy supply and ***cosmetic***.	More than 90 % of the marine biodiversity remains unexplored, offering a huge potential for discovery of new species and applications in the field of marine biotechnologies, which is foreseen to generate a 10 % annual growth for this sector. Support will be given to further explore and exploit the large potential offered by marine biodiversity and aquatic biomass to bring new innovative processes, products and services on the markets with potential applications in sectors including chemical and material industries, pharmaceutical, fisheries and aquaculture, energy supply and ***cosmetics***.

Amendment 82

Proposal for a decision
Annex 1 – part III – point 2.4 – point 2.4.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Activities will be supported to boost sustainable bioproducts, intermediates and bioenergy/biofuels, predominantly focussing on a cascade approach, prioritising the generation of high added-value products. Technologies and strategies will be developed to assure the raw material supply. Enhancing the range of ***types of*** biomass for use in second and third generation biorefineries, including forestry, biowaste and industrial by-products, will help avoid food/fuel conflicts and support economic development of rural and coastal areas in	Activities will be supported to boost sustainable bioproducts, intermediates and bioenergy/biofuels, predominantly focussing on a cascade approach, prioritising the generation of high added-value products. Technologies and strategies will be developed to assure the raw material supply. Enhancing the ***availability,*** range ***and characteristics*** of biomass for use in second and third generation biorefineries, including ***agriculture, horticulture,*** forestry, biowaste and industrial by-products, will help avoid food/fuel conflicts and support

the Union.	economic development of rural and coastal areas in the Union.

Amendment 83

Proposal for a decision
Annex I – Part III – Point 3.1

Text proposed by the Commission	*Amendment*
The energy sources and consumption patterns of Europe's industries, transport, buildings, towns and cities are largely unsustainable, leading to significant environmental and climate change impacts. The development of near-zero-emission buildings, highly efficient industries and mass take-up of energy-efficient approaches by companies, individuals, communities and cities will require not only technological advances, but also non-technological solutions such as new advisory, financing and demand management services. In this way energy efficiency ***may*** provide one of the most cost effective ways to reduce energy demand, thereby enhancing security of energy supply, reducing environmental and climate impacts and boosting competitiveness.	The energy sources and consumption patterns of Europe's industries, transport, buildings, towns and cities are largely unsustainable, leading to significant environmental and climate change impacts. The development of near-zero-emission buildings, highly efficient industries and mass take-up of energy-efficient approaches by companies, individuals, communities and cities will require not only technological advances, but also non-technological solutions such as new advisory, financing and demand management services. In this way energy efficiency ***and renewable energy*** provide one of the most cost effective ways to reduce energy demand, thereby enhancing security of energy supply, reducing environmental and climate impacts and boosting competitiveness ***while ensuring economic growth.***

Amendment 84

Proposal for a decision
Annex I – Part III – Point 3.1.2.

Text proposed by the Commission	*Amendment*
3.1.2. Unlock the potential of efficient and renewable heating-cooling systems	3.1.2. Unlock the potential of efficient and renewable heating-cooling systems
A substantial share of energy is consumed for heating or cooling purposes across the Union and the development of cost-effective and efficient technologies, system	A substantial share of energy is consumed for heating or cooling purposes across the Union and the development of cost-effective and efficient technologies, system

integration techniques e.g. network connectivity with standardised languages and services in this area would have a major impact in reducing energy demand. This requires research and demonstration of new systems and components for industrial as well as residential applications, for example in decentralised and district supply of hot water, space heating and cooling. This should encompass different technologies: solar thermal, geothermal, biomass, heat pumps, combined heat and power etc, and meet the requirements of near-zero energy buildings and districts. Further breakthroughs are needed, in particular, in thermal storage from renewable energy sources and to foster the development and deployment of efficient combinations of hybrid heating and cooling systems, for centralised and de-centralised applications.

integration techniques e.g. network connectivity with standardised languages and services in this area would have a major impact in reducing energy demand. This requires research and demonstration of new systems and components for industrial, ***public sector*** as well as residential applications, for example in decentralised and district supply of hot water, space heating and cooling. This should encompass different technologies: solar thermal, ***photovoltaic***, geothermal, biomass, heat pumps, combined heat and power etc, and meet the requirements of near-zero energy buildings and districts. Further breakthroughs are needed, in particular, in thermal ***and electricity*** storage from renewable energy sources and to foster the development and deployment of efficient combinations of hybrid heating and cooling systems, for centralised and de-centralised applications. ***Further research in improving efficiency of solar thermal and photovoltaic is needed.***

Amendment 85

Proposal for a decision
Annex 1 – part III – point 3.1 – point 3.1.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Urban areas are one of the largest consumers of energy in the Union and emit a correspondingly large share of greenhouse gases, while generating a substantial amount of air pollutants. At the same time, urban areas are affected by decreasing air quality and climate change and have to develop their own mitigation and adaptation strategies. Finding innovative energy solutions (energy efficiency, electricity and heating and cooling supply systems), integrated with transport, waste and water treatment as well as ICT solutions for the urban environment are therefore crucial in the	Urban areas are one of the largest consumers of energy in the Union and emit a correspondingly large share of greenhouse gases, while generating a substantial amount of air pollutants. ***In that context, there is a need of promoting integrated systemic urban development strategies that take into account: energy efficiency, accessibility, green spaces, adaptation of habitats and social integration.*** At the same time, urban areas are affected by decreasing air quality and climate change and have to develop their own mitigation and adaptation strategies. Finding innovative energy solutions

transformation towards a low carbon society. Targeted initiatives in support to the convergence of industrial value chains of the energy, transport and ICT sector for smart urban applications need to be envisaged. At the same time, new technological, organisational, planning and business models need to be developed and tested at full scale according to the needs and means of cities and communities. Research is also needed to understand the social, economic and cultural issues that are involved in this transformation.

(energy efficiency, electricity and heating and cooling supply systems), integrated with transport, waste and water treatment as well as ICT solutions for the urban environment are therefore crucial in the transformation towards a low carbon society. Targeted initiatives in support to the convergence of industrial value chains of the energy, transport and ICT sector for smart urban applications need to be envisaged. At the same time, new technological, organisational, planning and business models need to be developed and tested at full scale according to the needs and means of cities and communities. Research is also needed to understand the social, economic and cultural issues that are involved in this transformation.

Amendment 86

Proposal for a decision
Annex 1 – part III – point 3.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Electricity will play a central role in the establishment of an environmentally sustainable low-carbon economy. The uptake of low-carbon electricity generation is too slow due to the high costs involved. There is a pressing need to find solutions that reduce costs ***significantly***, with enhanced performance and sustainability, to accelerate the market deployment of low carbon electricity generation. In particular to:	Electricity will play a central role in the establishment of an environmentally sustainable low-carbon economy. The uptake of low-carbon electricity generation is too slow due to the high costs involved. There is a pressing need to find solutions that reduce costs ***so as to make them affordable and competitive***, with enhanced performance and sustainability, to accelerate the market deployment of low carbon electricity generation ***as well as to develop cost-efficient energy storage methods***. In particular to:

Amendment 87

Proposal for a decision
Annex 1 – part III – point 3.2 – point 3.2.2 – paragraph 2

Text proposed by the Commission	*Amendment*
For PV, this will need ***long term*** research on novel concepts and systems, demonstration and testing of mass production with a view to large-scale deployment.	For PV, this will need research on novel concepts and systems, demonstration and testing of mass production with a view to large-scale deployment.

Justification

If the above-mentioned aim is supposed to be achieved by 2020 then we can't talk about "long-term" research.

Amendment 88

Proposal for a decision
Annex 1 – part III – point 3.2 – point 3.2.2 – paragraph 3

Text proposed by the Commission	*Amendment*
For CSP, the focus will be on developing ways to increase efficiency while reducing costs and environmental impact, enabling industrial up-scaling of demonstrated technologies by building first-of-a-kind power plants. Solutions to efficiently combine the production of solar electricity with water desalination will be tested.	For CSP, the focus will be on developing ways to increase efficiency while reducing costs and environmental impact, enabling industrial up-scaling of demonstrated technologies by building first-of-a-kind power plants. Solutions to efficiently combine the production of solar electricity with water desalination will be tested. ***Solutions to store solar power efficiently will also be tested.***

Amendment 89

Proposal for a decision
Annex I – Part III – Point 5.1 – paragraph 1

Text proposed by the Commission	*Amendment*
Current CO_2 concentrations in the atmosphere are close to 40 % higher than those at the start of the industrial revolution and at the highest levels experienced in the last 2 million years. Non-CO_2 greenhouse gases also contribute to climate change and are playing an increasingly significant role.	Current CO_2 concentrations in the atmosphere are close to 40 % higher than those at the start of the industrial revolution and at the highest levels experienced in the last 2 million years. Non-CO_2 greenhouse gases ***and particles*** also contribute to climate change and are playing an

Without decisive action, climate change could cost the world at least 5 % of GDP each year; and up to 20 % under some scenarios. In contrast, with early and effective action the net costs could be limited to around 1 % of GDP per year. Meeting the 2°C target and avoiding the worst impacts of climate change will require developed countries to cut greenhouse gas emissions by 80-95 % by 2050 compared to 1990 levels.	increasingly significant role. Without decisive action, climate change could cost the world at least 5 % of GDP each year; and up to 20 % under some scenarios. In contrast, with early and effective action the net costs could be limited to around 1 % of GDP per year. Meeting the 2°C target and avoiding the worst impacts of climate change will require developed countries to cut greenhouse gas emissions by 80-95 % by 2050 compared to 1990 levels. ***Horizon 2020 could help the Union going beyond the 20% targets.***

Amendment 90

Proposal for a decision
Annex I – Part III – Point 5.1 – paragraph 2

Text proposed by the Commission	*Amendment*
The aim of this activity is therefore to develop and assess innovative, cost-effective and sustainable adaptation and mitigation measures, targeting both CO_2 and non-CO_2 greenhouse gases, and underlining both technological and non-technological green solutions, through the generation of evidence for informed, early and effective action and the networking of the required competences.	The aim of this activity is therefore to develop and assess innovative, cost-effective and sustainable adaptation and mitigation measures, targeting both CO_2 and non-CO_2 greenhouse gases ***and particles***, and underlining both technological and non-technological green solutions, through the generation of evidence for informed, early and effective action and the networking of the required competences.

Amendment 91

Proposal for a decision
Annex I – Part III – Point 5.1.1.

Text proposed by the Commission	*Amendment*
Better understanding of the causes and evolution of climate change and more accurate climate projections are crucial for society to protect lives, goods and infrastructures and ensure effective decision making. It is essential to further	Better understanding of the causes and evolution of climate change and more accurate climate projections are crucial for society to protect lives, goods and infrastructures and ensure effective decision making. It is essential to further

improve the scientific knowledge-base of climate drivers, processes, mechanisms and feedbacks associated with the functioning of oceans, terrestrial ecosystems and the atmosphere. Improved climate predictions at pertinent temporal and spatial scales will be supported via the development of more accurate scenarios and models, including fully coupled Earth-system models.	improve the scientific knowledge-base of climate drivers, processes, mechanisms and feedbacks associated with the functioning of oceans, terrestrial ecosystems and the atmosphere. Improved climate predictions at pertinent temporal and spatial scales will be supported via the development of more accurate scenarios and models, including fully coupled Earth-system models. ***Climate predictions need to properly address persisting uncertainties in regional modelling, the climate-ozone interactions, the coupling of climate change with extreme events and the risks associated with abrupt changes. To obtain more reliable climate scenarios and predictions at smaller spatial scales, greater effort should be made regarding the development of pan-European supercomputing facilities for climate change research.***

Amendment 92

Proposal for a decision
Annex I – part III – point 5 – title

Text proposed by the Commission	*Amendment*
5. Climate action, resource efficiency and raw materials	5. Climate ***and water*** action, resource efficiency and ***sustainable use of*** raw materials

Amendment 93

Proposal for a decision
Annex 1 – part III – point 5.1 – point 5.1.2 – paragraph 1

Text proposed by the Commission	*Amendment*
There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society	There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society

require the integrated analysis of current and future impacts, vulnerabilities, population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems and ecosystem services, infrastructures and economic and natural assets. Emphasis will be placed on the most valuable natural ecosystems ***and*** built environments, as well as key societal***,*** ***cultural*** and economic sectors across Europe. Actions will investigate the impacts and growing risks for human health stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.	require the integrated analysis of current and future impacts, vulnerabilities, population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems ***(including on their dynamics and capacity)*** and ecosystem services, infrastructures and economic and natural assets. ***Research will also address water management issues in connection to climate change.*** Emphasis will be placed on the most valuable natural ecosystems***,*** ***archaeological sites,*** built environments ***and urban landscapes and heritage***, as well as ***cultural resources,*** key societal and economic sectors across Europe. Actions will investigate the impacts ***on water resources, agriculture and forestry, as well as*** the growing risks for human health ***and other socio-economic aspects*** stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.

Amendment 94

Proposal for a decision
Annex 1 – part III – point 5.1 – point 5.1.2 – paragraph 1 a (new)

Text proposed by the Commission	*Amendment*
	There is an urgent need for integrated water system innovations in Europe. Europe faces an ageing water infrastructure (both waste water and drinking water supply), increased water shortages, higher risks of urban flooding, water pollution and a growing and more specific water demand from agriculture, industries and urban population. To meet the societal challenges (guarantee affordable good quality water for all, to provide the right water at the right quality at the right price for industry/ agriculture) and to minimize pollution Europe is required to invest in innovative water system transitions.

Amendment 95

Proposal for a decision
Annex 1 – point 5 – point 5.2 – point 5.2.1 – paragraph 1

Text proposed by the Commission	*Amendment*
Society's actions risk triggering changes in the environment that are irreversible and which alter the character of ecosystems. It is vital to anticipate these risks by assessing, monitoring and forecasting the impact of human activities on the environment, and environmental changes on human well-being. Research on marine, (from coastal zones to the deep sea), fresh-water, terrestrial and urban ecosystems, including groundwater dependent ecosystems, will improve our understanding of the complex interactions between natural resources and social, economic, and ecological systems, including natural tipping points, and the resilience, or fragility, of human and biological systems. It will examine how ecosystems function and react to anthropogenic impacts, how they can be restored, and how this will affect	Society's actions risk triggering changes in the environment that are irreversible and which alter the character of ecosystems. It is vital to anticipate these risks by assessing, monitoring and forecasting the impact of human activities on the environment, and environmental changes on human well-being. Research on marine, (from coastal zones to the deep sea), fresh-water, terrestrial and urban ecosystems, including groundwater dependent ecosystems, will improve our understanding of the complex interactions between natural resources and social, economic, and ecological systems, including natural tipping points, and the resilience, or fragility, of human and biological systems. It will examine how ecosystems function and react to anthropogenic impacts, how they can be restored, and how this will affect

economies and human well-being. It will also investigate solutions for addressing resource challenges. It will contribute to policies and practices that ensure that social and economic activities operate within the limits of the sustainability and adaptability of ecosystems and biodiversity.	economies and human well-being. It will also investigate solutions for addressing resource challenges. ***Research and innovation are necessary to tackle water challenges, namely by creating new models of water management that respond to the pressure on water resources in rural and urban areas based on an integrated approach with the water cycle at the core and involving end-users as well as stakeholders, and which guarantee transparency. This should include: information on the origin of water, equal distribution and the procedure for its sell and use.*** It will contribute to policies and practices that ensure that social and economic activities operate within the limits of the sustainability and adaptability of ecosystems and biodiversity.

Amendment 96

Proposal for a decision
Annex 1 – point 5 – point 5.2 – point 5.2.1 – paragraph 1 a (new)

Text proposed by the Commission	*Amendment*
	Ensuring action to safeguard the sustainable transition, management and use of water resources and water services. The aim is to improve an innovative knowledge base on (transitions in) water supply, water purification, closing the water cycle, energy /raw material recovery and improving end-user engagement/behaviour to meet future needs. Overall, water resources should be viewed and managed holistically. This includes natural regions, ecological questions, the understanding of ecosystem services and the protection of drinking water quality. Different institutional structures should also be taken into account.

Amendment 97

Proposal for a decision
Annex I – Part III – Point 5.1.3.

Text proposed by the Commission	*Amendment*
The Union's transition to a competitive, resource efficient and climate change resilient economy by 2050 requires the design of effective, long-term, low-emission strategies and major advancements in our capacity to innovate. Research will assess the environmental and socio-economic risks, opportunities and impacts of climate change mitigation options. Research will support the development and validation of new climate-energy-economy models, taking into account economic instruments and relevant externalities, with the aim of testing mitigation policy options and low carbon technology pathways at different scales and for the key economic and societal sectors at Union and global level. Actions will facilitate technological, institutional and socio-economic innovation by improving the links between research and application and between entrepreneurs, end users, researchers and knowledge institutions.	The Union's transition to a competitive, resource efficient and climate change resilient economy by 2050 requires the design of effective, long-term, low-emission strategies and major advancements in our capacity to innovate. Research will assess the environmental and socio-economic risks, opportunities and impacts of climate change mitigation options. ***Besides considering CO2 emission reductions, it could emphasize strategies that can produce the fastest climate response. (e.g. cuts in hydrofluorocarbons, black carbon, tropospheric ozone; biosequestration) These fast-action strategies could be implemented soon and lead to climate responses within few decades.*** Research ***focussing on the reduction of CO2 emissions should always consider the urgent nature of the problem and take into account both excellence of standards and speed of response. Research*** will support the development and validation of new climate-energy-economy models, taking into account economic instruments and relevant externalities, with the aim of testing mitigation policy options and low carbon technology pathways at different scales and for the key economic and societal sectors at Union and global level. Actions will facilitate technological, institutional and socio-economic innovation by improving the links between research and application and between entrepreneurs, end users, researchers and knowledge institutions.

Amendment 98

Proposal for a decision
Annex 1 – point 5 – point 5.2 – point 5.2.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Social, economic and governance systems still need to address both resource depletion and the damage to ecosystems. Research and innovation will underpin policy decisions needed to manage natural resources and ecosystems so as to avoid, or adapt to, disruptive climate and environmental change and to promote institutional, economic, behavioural and technological change that ensure sustainability. Emphasis will be put on critical policy relevant ecosystems and ecosystem services, such as fresh water, seas and oceans, air quality, biodiversity, land use and soil. The resilience of societies and ecosystems to catastrophic events, including natural hazards, will be supported through improving capacities for forecasting, early warning, and assessing vulnerabilities and impacts, including the multi-risk dimension. Research and innovation will thus provide support for environmental and resource efficiency policies, and options for effective evidence-based governance within safe operating limits. Innovative ways will be developed to increase policy coherence, resolve trade-offs and manage conflicting interests, and improve public awareness of research results and the participation of citizens in decision-making.	Social, economic and governance systems still need to address both resource depletion and the damage to ecosystems. Research and innovation will underpin policy decisions needed to manage natural resources and ecosystems so as to avoid, or adapt to, disruptive climate and environmental change and to promote institutional, economic, behavioural and technological change that ensure sustainability. Emphasis will be put on critical policy relevant ecosystems and ecosystem services, such as fresh water, seas and oceans, air quality, biodiversity, land use and soil. The resilience of societies and ecosystems to catastrophic events, including natural hazards, will be supported through improving capacities for forecasting, early warning, and assessing vulnerabilities and impacts, including the multi-risk dimension. Research and innovation will thus provide support for environmental and resource efficiency policies, and options for effective evidence-based governance within safe operating limits. Innovative ways will be developed to increase policy coherence, resolve trade-offs and manage conflicting interests, and improve public awareness of research results and the participation of citizens in decision-making. ***Availability and productivity of all the substantial resources must be analysed at the various relevant territorial scales: global, regional and local and the related socioeconomic consequences should be analysed in order to elaborate options for political actions.***

Amendment 99

Proposal for a decision
Annex 1 – point 5 – point 5.3 – paragraph 3

Text proposed by the Commission	*Amendment*
The aim of this activity is therefore to improve the knowledge base on raw materials and develop innovative solutions for the cost-effective and environmentally friendly exploration, extraction, processing, recycling and recovery of raw materials and for their substitution by economically attractive alternatives with a lower environmental impact.	The aim of this activity is therefore to improve the knowledge base on raw materials and develop innovative solutions for the cost-effective***, transparent*** and environmentally friendly exploration, extraction, processing, recycling and recovery of raw materials and for their substitution by economically attractive alternatives with a lower environmental impact.

Amendment 100

Proposal for a decision
Annex 1 – point 5 – point 5.3 – point 5.3.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Research and innovation is needed over the entire life cycle of materials, in order to secure an affordable, reliable, and sustainable supply and management of raw materials essential for European industries. Developing and deploying economically viable, socially acceptable and environmentally friendly exploration, extraction and processing technologies will boost the efficient use of resources. This will also exploit the potential of urban mines. New and economically viable recycling and materials recovery technologies, business models and processes will also contribute to reducing the Union's dependence on the supply of primary raw materials. This will include the need for longer use, high-quality recycling and recovery, and the need to drastically reduce resource wastage. A full life-cycle approach will be taken, from the supply of available raw materials to end of life, with minimum energy and resources requirements.	Research and innovation is needed over the entire life cycle of materials, in order to secure an affordable, reliable, and sustainable supply and management of raw materials essential for European industries. Developing and deploying economically viable, socially acceptable and environmentally friendly exploration, extraction and processing technologies will boost the efficient use of resources. This will also exploit the potential of urban mines. New and economically viable recycling and materials recovery technologies, business models and processes will also contribute to reducing the Union's dependence on the supply of primary raw materials. This will include the need for longer use, high-quality recycling and recovery, and the need to drastically reduce resource wastage. A full life-cycle approach will be taken, from the supply of available raw materials to end of life, with minimum energy and resources requirements ***and full transparency and traceability***.

Amendment 101

Proposal for a decision
Annex 1 – point 5 – point 5.3 – point 5.3.3 – paragraph 1

Text proposed by the Commission	*Amendment*
In anticipation of the possible reduced global availability of certain materials, due for example to trade restrictions, sustainable substitutes and alternatives for critical raw materials, with similar functional performance, will be investigated and developed. This will reduce the Union's dependence on primary raw materials and ***improve the*** impact on the environment.	In anticipation of the possible reduced global availability of certain materials, due for example to trade restrictions, sustainable substitutes and alternatives for critical raw materials, with similar functional performance, will be investigated and developed. This will reduce the Union's dependence on primary raw materials and ***reduce any adverse*** impact on the environment.

Amendment 102

Proposal for a decision
Annex 1 – point 5 – point 5.5 – paragraph 1

Text proposed by the Commission	*Amendment*
Comprehensive environmental observation and information systems are essential to ensure the delivery of the long-term data and information required to address this challenge. These systems will be used to assess and predict the condition, status and trends of the climate, natural resources including raw materials, ecosystems and ecosystem services, as well as to evaluate low-carbon and climate mitigation and adaptation policies and options across all sectors of the economy. Information and knowledge from these systems will be used to stimulate the smart use of strategic resources; to support the development of evidence-based policies; to foster new environmental and climate services; and to develop new opportunities in global markets.	Comprehensive environmental observation and information systems are essential to ensure the delivery of the long-term data and information required to address this challenge. These systems will be used to assess and predict the condition, status and trends of the climate, natural resources including raw materials, ecosystems and ecosystem services, as well as to evaluate low-carbon and climate mitigation and adaptation policies and options across all sectors of the economy. Information and knowledge from these systems will be used to stimulate the smart use of strategic resources; to support the development of evidence-based policies; to foster new environmental and climate services; ***to support digital technologies for the monitoring, follow up*** and ***the management of water resources via***

satellite; and to develop new opportunities in global markets.

Amendment 103

Proposal for a decision
Annex I – Part III – Point 5.5 – paragraph 2

Text proposed by the Commission	*Amendment*
Capabilities, technologies and data infrastructures for earth observation and monitoring must build on advances in ICT, space technologies and enabled networks, remotely sensed ***observations,*** novel in situ sensors, mobile services, communication networks, participatory web-service tools and improved computing and modelling infrastructure, with the aim of continuously providing timely and accurate information, forecasts and projections. Free, open and unrestricted access to interoperable data and information will be encouraged, as well as the effective storage, management and dissemination of research results.	Capabilities, technologies and data infrastructures for earth observation and monitoring must build on advances in ICT, space technologies and enabled ***measurement*** networks ***(combining ground-based, aircraft and balloon measurements from*** remotely sensed ***instruments and*** novel in situ sensors***)***, mobile services, communication networks, participatory web-service tools and improved computing and modelling infrastructure, with the aim of continuously providing timely and accurate information, forecasts and projections. Free, open and unrestricted access to interoperable data and information will be encouraged, as well as the effective storage, management and dissemination of research results.

Amendment 104

Proposal for a decision
Annex I – Part III – Point 5.6 – paragraph 1

Text proposed by the Commission	*Amendment*
Activities will enhance the Union's participation in ***and financial contribution to*** multilateral processes and initiatives, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and the Group on Earth Observations (GEO). Cooperation with other major public and private research	***Research*** activities will enhance the Union's participation in multilateral processes and initiatives, such as the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and the Group on Earth Observations (GEO). Cooperation with other major public and private research funders will improve global and European

funders will improve global and European research efficiency and contribute to global research governance.	research efficiency and contribute to global research governance.

Amendment 105

Proposal for a decision
Annex I – Part III – Point 5.6 – paragraph 2

Text proposed by the Commission	*Amendment*
S&T cooperation will contribute to the UNFCCC global technology mechanism and facilitate technology development, innovation and transfer in support of climate adaptation and the mitigation of greenhouse gases.	S&T cooperation will contribute to the UNFCCC global technology mechanism and facilitate technology development, innovation and transfer in support of climate adaptation and the mitigation of greenhouse gases. ***Equally, S&T cooperation needs to enlighten synergies between the Kyoto and the Montreal Protocols in order to optimise policy options, for example on hydrofluorocarbons.***

Amendment 106

Proposal for a decision
Annex 1 – part III – point 6.1 – point 6.1.1 – paragraph 1 a (new)

Text proposed by the Commission	*Amendment*
	The major societal challenges are not abstract, they have a territorial dimension. Moreover according to the importance of the urban problematic in terms of creativity, innovation, social, economic, cultural and environmental issues, there is a need for a specific consideration.

Amendment 107

Proposal for a decision
Annex 1 – part III – point 6.3.1 – title

Text proposed by the Commission	*Amendment*
6.3.1. Fighting crime and terrorism.	6.3.1. Fighting ***organised*** crime and terrorism.

Amendment 108

Proposal for a decision
Annex 1 – part IV – point 3.1 – paragraph 1 – point a

Text proposed by the Commission	*Amendment*
(a) Assessment of risks and opportunities of new technologies and chemicals, including nanomaterials, in food, feed and consumer products; development and validation of harmonised measurement, identification and quantification methods, integrated testing strategies and state-of-the-art tools for toxicological hazard assessment, including alternative methods to animal testing; assessment of health effects of environmental pollution.	(a) Assessment of risks and opportunities of new technologies and chemicals, including nanomaterials, in food, feed and consumer products; development***,*** ***evaluation*** and validation of harmonised measurement, identification and quantification methods, integrated testing strategies and state-of-the-art ***non-animal experimental and computational*** tools for toxicological hazard ***and risk*** assessment, including alternative methods to animal testing ***for health and environmental effects***; assessment of health effects of environmental pollution.

Amendment 109

Proposal for a decision
Annex 1 – part IV – point 3.3 – paragraph 1 – point b

Text proposed by the Commission	*Amendment*
(b) Energy/electricity transmission networks, in particular modelling and simulation of trans-European energy networks, analysis of smart/super grid technologies***,*** and real-time simulation of power systems.	(b) Energy/electricity transmission networks, in particular modelling and simulation of trans-European energy networks, analysis of smart/super grid technologies and ***energy storage potential and*** real-time simulation of power systems.

Amendment 110

Proposal for a decision
Annex II – Part I – point 1 – indent 2 a (new)

Text proposed by the Commission	*Amendment*
	- Number of researchers from different Member States receiving financing.

Amendment 111

Proposal for a decision
Annex II – Part II – point 1 – indent 1 a (new)

Text proposed by the Commission	*Amendment*
	- Number of inventions commercialised

Amendment 112

Proposal for a decision
Annex II – Part II – point 1 – indent 1 b (new)

Text proposed by the Commission	*Amendment*
	- Number of participating SMEs

Amendment 113

Proposal for a decision
Annex II – Part II – point 1 – indent 1 c (new)

Text proposed by the Commission	*Amendment*
	- Contribution to the Union GDP growth

Amendment 114

Proposal for a decision
Annex II – Part II – point 1 – indent 1 d (new)

Text proposed by the Commission	*Amendment*
	- Number of jobs created

Amendment 115

Proposal for a decision
Annex II – Part II – point 2 – indent 1 a (new)

Text proposed by the Commission	*Amendment*
	- Number of SMEs among the beneficiaries

Amendment 116

Proposal for a decision
Annex II – Part II – point 3 – indent 1 a (new)

Text proposed by the Commission	*Amendment*
	- Contribution to the Union GDP growth

Amendment 117

Proposal for a decision
Annex II – Part II – point 3 – indent 1 b (new)

Text proposed by the Commission	*Amendment*
	- Number of jobs created

Amendment 118

Proposal for a decision
Annex II – Part III – paragraph 2 – indent 2 a (new)

Text proposed by the Commission	*Amendment*
	- Number of inventions commercialised

Amendment 119

Proposal for a decision
Annex II – Part III – paragraph 2 – indent 2 b (new)

Text proposed by the Commission	*Amendment*
	- Number of participating SMEs

Amendment 120

Proposal for a decision
Annex II – Part III – paragraph 2 – indent 2 c (new)

Text proposed by the Commission	*Amendment*
	- Number of innovation union and resource efficiency objectives achieved

Amendment 121

Proposal for a decision
Annex II – Part III – paragraph 2 – indent 2 d (new)

Text proposed by the Commission	*Amendment*
	- Contribution to the Union GDP growth

Amendment 122

Proposal for a decision
Annex II – Part III – paragraph 2 – indent 2 e (new)

Text proposed by the Commission	*Amendment*
	- Number of jobs created

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)
Committee responsible Date announced in plenary	ITRE 17.1.2012
Opinion by Date announced in plenary	ENVI 17.1.2012
Rapporteur Date appointed	Cristian Silviu Buşoi 20.1.2012
Discussed in committee	20.6.2012 10.7.2012
Date adopted	19.9.2012
Result of final vote	+: 62 –: 0 0: 1
Members present for the final vote	Martina Anderson, Kriton Arsenis, Sophie Auconie, Paolo Bartolozzi, Sergio Berlato, Lajos Bokros, Milan Cabrnoch, Martin Callanan, Nessa Childers, Bas Eickhout, Edite Estrela, Karl-Heinz Florenz, Elisabetta Gardini, Gerben-Jan Gerbrandy, Matthias Groote, Françoise Grossetête, Cristina Gutiérrez-Cortines, Satu Hassi, Jolanta Emilia Hibner, Christa Klaß, Eija-Riitta Korhola, Jo Leinen, Peter Liese, Zofija Mazej Kukovič, Linda McAvan, Miroslav Ouzký, Vladko Todorov Panayotov, Andres Perello Rodriguez, Mario Pirillo, Pavel Poc, Frédérique Ries, Anna Rosbach, Oreste Rossi, Dagmar Roth-Behrendt, Kārlis Šadurskis, Carl Schlyter, Horst Schnellhardt, Richard Seeber, Theodoros Skylakakis, Bogusław Sonik, Claudiu Ciprian Tănăsescu, Salvatore Tatarella, Anja Weisgerber, Åsa Westlund, Glenis Willmott
Substitute(s) present for the final vote	Frieda Brepoels, Cristian Silviu Buşoi, Nikos Chrysogelos, João Ferreira, Christofer Fjellner, Gaston Franco, Jutta Haug, Romana Jordan, James Nicholson, Justas Vincas Paleckis, Vittorio Prodi, Britta Reimers, Christel Schaldemose, Alda Sousa, Rebecca Taylor, Anna Záborská, Andrea Zanoni
Substitute(s) under Rule 187(2) present for the final vote	Agustín Díaz de Mera García Consuegra

12.7.2012

OPINION OF THE COMMITTEE ON AGRICULTURE AND RURAL DEVELOPMENT

for the Committee on Industry, Research and Energy

on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Rapporteur: Sandra Kalniete

SHORT JUSTIFICATION

The draftsperson welcomes the creation of the Horizon 2020 Programme by the Commission, since she believes that it will help the European Union (EU) to overcome the debt crisis and restore growth, by strengthening its competitiveness.

The Horizon 2020 Programme will for the first time bring together EU research and innovation funding in one programme. Horizon 2020 is directed towards using scientific breakthroughs in innovative products and services, which will create business opportunities and improve people's lives. It aims to reduce bureaucracy by simplifying the rules and application procedures, in order to attract more scientists and innovative businesses.

Horizon 2020 will enter into force in January 2014, with a budget for the period up to 2020 of 87.74 billion Euros. It is divided up into three broad parts: 1. excellent science, 2. industrial leadership, 3. societal challenges. The draftsperson thinks that the AGRI Committee should focus most of its efforts on the third part, which specifically addresses agriculture-related issues. The third part is divided into six areas:

(a) Health, demographic change and well-being (9.07 billion EUR);

(b) Food security, sustainable agriculture, marine and maritime research, and the bioeconomy (4.69 billion EUR);

(c) Secure, clean and efficient energy (6.53 billion EUR);

(d) Smart, green and integrated transport (7.69 billion EUR);

(e) Climate action, resource efficiency and raw materials (4.31 billion EUR);

(f) Inclusive, innovative and secure societies (4.31 billion EUR).

In the field of food security and sustainable agriculture, the draftsperson stresses the need for scientists to actively cooperate with farmers, notably in discussing research priorities, so that newly generated discoveries are used in real life. Including non-governmental organizations in such discussions is also important.

The draftsperson welcomes the fact that, compared to Seventh Framework Programme (FP7), the budget allocated to agriculture-related research has been substantially increased.

The draftsperson would like to draw particular attention to the need to stimulate research on reducing food waste, in a context of growing demand for food in Europe and globally. It is important to use natural resources with much greater efficiency.

During the AGRI Committee's exchange views on Horizon 2020, it was stated that there was a need to reduce the bureaucracy of its procedures. The draftsperson considers that, in this proposal, the Commission has considerably reduced 'red tape' and has made the application process easier.

Overall, the draftsperson considers the proposal to be balanced and very well designed. The draftsperson invites colleagues to approach the review of this proposal in an astute manner and hopes that the programme will enter into force on 1 January 2014, so that, come the New Year, it will help scientists make new discoveries which will increase Europe's overall competitiveness.

AMENDMENTS

The Committee on Agriculture and Rural Development calls on the Committee on Industry, Research and Energy, as the committee responsible, to incorporate the following amendments in its report:

Amendment 1

Proposal for a decision
Recital 2

Text proposed by the Commission	*Amendment*
(2) Horizon 2020 pursues three priorities, namely generating excellent science (“Excellent science”), creating industrial leadership (“Industrial leadership”) and tackling societal challenges (“Societal challenges”). Those priorities should be implemented by a specific programme consisting of three Parts on indirect actions	(2) Horizon 2020 pursues three priorities, namely generating excellent science (“Excellent science”), creating industrial ***and agricultural*** leadership (“Industrial ***and agricultural*** leadership”) and tackling societal challenges (“Societal challenges”). Those priorities should be implemented by a specific programme consisting of three

and one Part on the direct actions of the Joint Research Centre (JRC).	Parts on indirect actions and one Part on the direct actions of the Joint Research Centre (JRC).

Justification

The goal of achieving industrial leadership is defined without mentioning agriculture, even though over EUR 4.5 billion is earmarked in the programme's budget for agricultural research and innovation.

Amendment 2

Proposal for a decision
Recital 5

Text proposed by the Commission	*Amendment*
(5) There is a critical need to reinforce and extend the excellence of the Union's science base and ensure a supply of world class research and talent to secure Europe's long term competitiveness and well-being. Part I "Excellent science" should support the activities of the European Research Council on frontier research, future and emerging technologies, Marie Curie Actions and ***European*** research infrastructures. These *activites* should aim at building competence in the long term, focusing strongly on the next-generation of science, systems and researchers, and providing support for emerging talent from across the Union and from associated countries. Union activities to support excellent science should help consolidate the European Research Area and make the Union's science system more competitive and attractive on a global scale.	(5) There is a critical need to reinforce and extend the excellence of the Union's science base and ensure a supply of world class research and talent to secure Europe's long term competitiveness and well-being. Part I "Excellent science" should support the activities of the European Research Council on frontier research, future and emerging technologies, Marie Curie Actions and ***the*** research infrastructures ***of Member States jointly forming a European network of science infrastructure***. These *activities* should aim at building competence in the long term, focusing strongly on the next-generation of science, systems and researchers, and providing support for emerging talent from across the Union and from associated countries. Union activities to support excellent science should help consolidate the European Research Area and make the Union's science system more competitive and attractive on a global scale.

Amendment 3

Proposal for a decision
Recital 13

Text proposed by the Commission	*Amendment*
(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the Joint Research Centre ***and Union*** policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments and aim to achieve scientific excellence.	(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the ***Union and*** Joint Research Centre policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments and aim to achieve scientific excellence.

Justification

Wrong order. In the proposed text the policies of the JRC come before the political responsibilities of the Union.

Amendment 4

Proposal for a decision
Recital 14

Text proposed by the Commission	*Amendment*
(14) The Joint Research Centre should continue to generate additional resources through competitive activities, including ***participation to the indirect actions of Horizon 2020,*** third party work and, to a lesser extent, the exploitation of intellectual property.	(14) The Joint Research Centre should continue to generate additional resources through competitive activities, including third-party work and, to a lesser extent, the exploitation of intellectual property.

Justification

The proposal creates a privileged position for the JRC in relation to other EU science centres. The JRC should receive its own budget without the possibility of applying for research funding from other lines under the Horizon 2020 programme.

Amendment 5

Proposal for a decision
Article 3 – paragraph 1 – subparagraph 1 – point d

Text proposed by the Commission	*Amendment*
d) strengthening ***European*** research infrastructures, including ***e-infrastructures***.	d) strengthening ***the*** research infrastructures ***of the Member States forming a European network of science infrastructure***, including ***e-infrastructure***.

Amendment 6

Proposal for a decision
Article 3 – paragraph 2 – subparagraph 1 – introductory part

Text proposed by the Commission	*Amendment*
Part II "Industrial leadership" shall strengthen industrial leadership and competitiveness in accordance with the priority "Industrial leadership" set out in Article 5(2)(b) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing the following specific objectives:	Part II "Industrial ***and agricultural*** leadership" shall strengthen industrial ***and agricultural*** leadership and competitiveness in accordance with the priority "Industrial ***and agricultural*** leadership" set out in Article 5(2)(b) of Regulation (EU) No XX/2012 [Horizon 2020] by pursuing the following specific objectives:

Justification

In line with the amendment to Article 1.

Amendment 7

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point b

Text proposed by the Commission	*Amendment*
(b) securing sufficient supplies of safe and high quality food and other bio-based products, by developing productive and resource-efficient primary production systems, fostering related ecosystem services, along side competitive and low carbon supply chains;	(b) securing sufficient supplies of safe and high quality food and other bio-based products, by developing productive and resource-efficient primary production systems ***(including nutrient, energy, carbon, water and soil use efficiency) and by making agricultural bio-waste an asset used at its full potential, reducing food waste along the whole food supply-chain from primary production to final***

	consumption point, fostering related ecosystem services, along side competitive and low carbon supply chains;

Amendment 8

Proposal for a decision
Article 3 – paragraph 5 – subparagraph 1

Text proposed by the Commission	*Amendment*
The specific programme shall be assessed in relation to results and impact as measured against performance indicators, including, where appropriate, publications in high impact journals, the circulation of researchers, the accessibility of research infrastructures, investments mobilised via debt financing and venture capital, SMEs introducing innovations new to the company or the market, references to relevant research activities in policy documents as well as *occurences* of specific impacts on policies.	The specific programme shall be assessed in relation to results and impact as measured against performance indicators, including, where appropriate, publications in high impact journals, the circulation of researchers, the accessibility of research infrastructures, investments mobilised via debt financing and venture capital, SMEs introducing innovations new to the company or the market, references to relevant research activities in policy documents as well as *occurrences* of specific impacts on policies ***and the implementation of research results in practice***.

Amendment 9

Proposal for a decision
Annex I – point 1 – point 1.1. – paragraph 3

Text proposed by the Commission	*Amendment*
Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation. Only a holistic approach to innovation can	Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation ***and implementation in practice***. Only a

at the same time tackle societal challenges and give rise to new competitive businesses and industries.	holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries.

Amendment 10

Proposal for a decision
Annex I – point 1 – point 1.2. – paragraph 2

Text proposed by the Commission	*Amendment*
Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy.	Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact ***as well as to contribute to solutions through more participative research***. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency ***and sufficiency*** initiatives and measures towards a green and sustainable economy.

Amendment 11

Proposal for a decision
Annex I – Part I – point 2 – point 2.1

Text proposed by the Commission	*Amendment*
Supporting a large set of embryonic, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new future technologies. By being explicitly non–	Supporting a large set of embryonic, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new future technologies. By being explicitly non–

topical and non-prescriptive, this activity allows for new ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young researchers ***and*** high-tech SMEs is also important for nurturing the scientific and industrial leaders of the future.	topical and non-prescriptive, this activity allows for new ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young researchers***,*** high-tech SMEs ***and women researchers*** is also important for nurturing the scientific and industrial leaders of the future.

Amendment 12

Proposal for a decision
Annex I – Part II – point 1 – point 1.4 – point 1.4.1

Text proposed by the Commission	*Amendment*
The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology) ***and*** ICT (e.g. bioelectronics). These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, etc).	The objective is to lay the foundations for the European industry to stay at the front line of innovation, also in the medium and long term. It encompasses the development of emerging tools such as synthetic biology, bioinformatics, systems biology and exploiting the convergence with other enabling technologies such as nanotechnology (e.g. bionanotechnology)***,*** ICT (e.g. bioelectronics) ***and plant and agricultural biotechnology***. These and other cutting-edge fields deserve appropriate measures in terms of research and development to facilitate effective transfer and implementation into new applications (drug delivery systems, biosensors, biochips, ***plant-based genetic technology,*** etc).

Amendment 13

Proposal for a decision
Annex I – Part II – point 1 – point 1.4 – point 1.4.2 – title

Text proposed by the Commission	*Amendment*
1.4.2. Biotechnology-based ***industrial*** processes	1.4.2. Biotechnology-based ***products and*** processes

Amendment 14

Proposal for a decision
Annex I – Part II – point 1 – point 1.5 – point 1.5.3

Text proposed by the Commission	*Amendment*
Increasing the competitiveness of process industries, such as chemical, pulp and paper, glass, or non-ferrous metals and steel by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities. Focus will be on the development, and validation of enabling technologies for innovative substances, materials and technological solutions for low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.	Increasing the competitiveness of process industries, such as chemical, pulp and paper, glass, ***construction,*** or non-ferrous metals and steel by drastically improving resource and energy efficiencies and reducing the environmental impact of such industrial activities. Focus will be on the development, and validation of enabling technologies for innovative substances, materials and technological solutions for low-carbon products and less energy-intensive processes and services along the value chain, as well as the adoption of ultra-low carbon production technologies and techniques to achieve specific GHG emission intensity reductions.

Amendment 15

Proposal for a decision
Annex I – Part II – point 3 – point 3.1 – paragraph 4

Text proposed by the Commission	*Amendment*
The SME instrument will cover all fields of science, technology and innovation in a bottom-up approach within a given societal challenge or enabling technology so as to leave sufficient room for all kinds of promising ideas, notably cross-sector and	The SME instrument will cover all fields of science, technology and innovation***, including agriculture*** in a bottom-up approach within a given societal challenge or enabling technology so as to leave sufficient room for all kinds of promising ideas, notably cross-sector and inter-

inter-disciplinary projects, to be funded.	disciplinary projects, to be funded.

Amendment 16

Proposal for a decision
Annex I –Part II – point 3 – point 3.2 – point 3.2.3

Text proposed by the Commission	*Amendment*
This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, ***in particular*** SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design) and reviews of public policies in relation to innovation will be supported.	This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, ***including the lack of coherence between technological innovation and EU legislation, particularly*** in ***the field of agriculture and*** SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design) and reviews of public policies in relation to innovation will be supported.

Amendment 17

Proposal for a decision
Annex I – Part III – point 1 – point 1.4 – paragraph 1

Text proposed by the Commission	*Amendment*
There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. ***Interdisciplinary***, translational research on the patho-physiology of disease is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and disease based on molecular data, and to	There is a need for an improved understanding of health and disease, in people of all ages, so that new and better prevention measures, diagnosis and treatments can be developed. ***Given the link between human and animal health***, ***interdisciplinary,*** translational research on the patho-physiology of disease is essential to improve the understanding of all aspects of disease processes, including a re-classification of normal variation and

validate and use research results in clinical applications.

disease based on molecular data, and to validate and use research results in clinical applications.

Amendment 18

Proposal for a decision
Annex I – Part III – point 1 – point 1.10

Text proposed by the Commission	*Amendment*
The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and access to data, will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation.	The integration of infrastructures and information structures and sources (including those derived from cohort studies, protocols, data collections, indicators, etc.) as well as the standardisation, interoperability, storage, sharing of and access to data, ***both concerning humans and animals,*** will be supported to enable such data to be properly exploited. Attention should be given to data processing, knowledge management, modelling and visualisation.

Amendment 19

Proposal for a decision
Annex I – Part III – point 2 – title

Text proposed by the Commission	*Amendment*
2. Food security, sustainable agriculture, marine and maritime research and the bio-economy	2. Food security, sustainable agriculture ***and forestry***, marine and maritime research and the bio-economy

Amendment 20

Proposal for a decision
Annex I – Part III – point 2 – point 2.1 – title

Text proposed by the Commission	*Amendment*
2.1. Sustainable agriculture and forestry	2.1. Sustainable ***and competitive*** agriculture and forestry

Amendment 21

Proposal for a decision
Annex I – Part III – point 2 – point 2.1

Text proposed by the Commission	*Amendment*
Appropriate knowledge, tools, services and innovations are necessary to support more productive, resource-efficient and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials and deliver ecosystems services while at the same time supporting the development of thriving rural livelihoods. Research and innovation will provide options for integrating agronomic and environmental goals into sustainable production, ***thus***: increasing productivity and resource efficiency of agriculture; reducing agricultural greenhouse gases (GHGs) emissions; ***reducing leaching of nutrients from cultivated lands into terrestrial*** and ***aquatic environments***; decreasing dependence from international plant derived protein imports to Europe; increasing the level of biodiversity in primary production systems.	Appropriate knowledge, ***knowledge transfers,*** tools, services and innovations are necessary to support more productive, resource-efficient and resilient agriculture and forestry systems that supply sufficient food, feed, biomass and other raw-materials and deliver ecosystems services while at the same time supporting the development of thriving rural livelihoods ***and rural innovative SMEs***. Research and innovation will provide options for integrating agronomic***, climatic*** and environmental goals into ***more*** sustainable production, ***such as***: ***enhancing the genetical potential of plants to better adapt to biotic and abiotic stresses;*** increasing productivity and resource efficiency of agriculture; reducing ***soil erosion and*** agricultural greenhouse gases (GHGs) emissions; ***enhancing nutrient*** and ***water use efficiency***; decreasing dependence from international plant derived protein imports to Europe; increasing the level of biodiversity in primary production systems.

Justification

Agricultural research is also part of the solution. Plants especially, through their genetic potential and their capacity to enhance nutrient and water use efficiency, will make a positive contribution to sustainable agriculture. This should be more clearly addressed and expressed.

Amendment 22

Proposal for a decision
Annex I – Part III – point 2 – point 2.1 – point 2.1.1 – title

Text proposed by the Commission	*Amendment*
2.1.1. Increasing production efficiency and ***coping with climate change***, ***while ensuring*** sustainability and resilience	2.1.1. Increasing production efficiency***, food quality*** and ***safety***, sustainability and resilience***, coping and mitigating with climate change***

Justification

Food quality and safety such as health of plants, sensorial and nutrition characteristics (vitamins, micronutrients)

Amendment 23

Proposal for a decision
Annex I – Part III – point 2 – point 2.1 – point 2.1.1 – paragraph 1

Text proposed by the Commission	*Amendment*
Activities will enhance productivity as well as the adaptive capacity of plants, animals and production systems to cope with rapidly changing environmental/climatic conditions and increasingly scarce natural resources. The resulting innovations will help to move towards a low energy, low emission and low waste economy, along the entire food and feed supply chain. In addition to contributing to food security, new opportunities will be created for the use of biomass and by-products from agriculture and forestry for a wide range of non-food applications.	Activities will enhance productivity as well as the adaptive capacity of plants, animals and production systems to cope with rapidly changing environmental/climatic conditions and increasingly scarce natural resources. The resulting innovations ***and their transfer to all economic actors involved*** will help to move towards a low energy, low emission and low waste economy, along the entire food and feed supply chain. In addition to contributing to food security, new opportunities will be created for the use of biomass***, bio-waste*** and ***agricultural and forestry residues and*** by-products from agriculture and forestry for a wide range of non-food applications ***(in particular energy and chemistry)***.

Amendment 24

Proposal for a decision
Annex I– Part III – point 2 – point 2.1 – point 2.1.1 – paragraph 2

Text proposed by the Commission	*Amendment*
Multi-disciplinary approaches will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, nutrients, energy) and the ecological integrity of rural areas. Emphasis will be placed on integrated and diverse production systems and agronomic practices, including the use of precision technologies and ecological intensification approaches to benefit ***both conventional and organic*** agriculture. Genetic improvement of plants and animals for adaptation and productivity traits will ***call for all appropriated*** conventional and modern breeding ***approaches*** and for a better use of genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as a basis for crop productivity. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed. Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet societal concerns. The above listed areas will be underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies.	Multi-disciplinary approaches ***and inter-sector synergies*** will be sought to improve the performance of plants, animals, micro-organisms, while ensuring efficient resource use (water, ***soil,*** nutrients, energy) and the ecological integrity of rural areas. Emphasis will be placed on integrated and diverse production systems and ***innovative*** agronomic practices, including the use of precision technologies and ecological intensification approaches to benefit ***all types of*** agriculture. Genetic improvement of plants and animals for adaptation***,*** ***resistance*** and productivity traits will ***be reviewed and developed in light of both*** conventional and modern breeding ***techniques*** and ***will call*** for a better use of genetic resources. Due attention will be given to on-farm soil management for increasing soil fertility as a basis for crop ***and animal*** productivity ***and sustainable yields increase***. Animal and plant health will be promoted and integrated disease/pest control measures will be further developed. Strategies for the eradication of animal diseases including zoonoses will be tackled along with research on antimicrobial resistance. Studying the effects of practices on animal welfare will help meet ***both the logistical and practical concerns of commercial users and the*** societal concerns ***of EU citizens***. The above listed areas will be underpinned by more fundamental research to address relevant biological questions as well as to support the development and implementation of Union policies.

Amendment 25

Proposal for a decision
Annex I – Part III – point 2 – point 2.1 – point 2.1.2 – title

Text proposed by the Commission	*Amendment*
2.1.2. ***Providing*** ecosystem services and public goods	2.1.2. ***Strengthening multi-functionality of agriculture, including*** ecosystem services and public goods

Justification

Multi-functionality as a comprehensive approach to combine the use of agriculture and combine it with ecosystems services; to be consistent with CAP policy and research programmes. The multifunctional role of agriculture must be strengthened, such as providing ecosystem services and public goods, but also by paving the way for better understanding of farming/ forestry systems.

Amendment 26

Proposal for a decision
Annex I – Part III – point 2 – point 2.1 – point 2.1.2

Text proposed by the Commission	*Amendment*
Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value) and important ecological services such as functional and in-situ biodiversity, pollination, water regulation, landscape, erosion reduction and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, ***decision-support*** tools and the ***assessment*** of their non-market value. ***Specific issues*** to be dealt with include the identification of farming/forest systems and landscape patterns likely to ***achieve these goals***. ***Shifts*** in the active management of agricultural systems - including the use of technologies and change of practices - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change.	Agriculture and forestry are unique systems delivering commercial products but also wider societal public goods (including cultural and recreational value ***and landscape aesthetics***) and important ecological services such as functional and in-situ biodiversity, pollination, water regulation, landscape ***preservation***, erosion reduction and carbon sequestration / GHG mitigation. Research activities will support the provisions of these public goods and services, through the delivery of management solutions, ***decision and policy*** support tools***, the development of indicators to assist the appropriate measurement of the results achieved through climate change mitigation activities undertaken by farmers,*** and the ***impact measurement*** of their non-market value. ***A system for calculating the financial value of specific public goods and services provided by farmers must also be developed, since increasingly targeted 'greening' measures will play a more prominent role in agricultural policy***

in coming years. Issues to be dealt with include the identification ***and development*** of ***diverse*** of farming/forest***/cultivation*** systems and landscape patterns likely to ***optimise the provision of public goods and services***. ***Socio-economic and comparative assessment of farming/forestry systems and their sustainability performance will be addressed. Developing the countryside through*** shifts in the active management of agricultural systems - including the use of technologies and change of practices***, in particular soil nutrients management*** - will increase GHG mitigation and the adaptive capacity of the agriculture sector to the adverse effects of climate change.

Justification

Socioeconomic research on farming/forestry systems and their environmental effects must be an integral part of research into the multifunctional aspects of agriculture and should be addressed in order to support shifts in the active management of agricultural systems.

Amendment 27

Proposal for a decision
Annex I – Part III – point 2 – point 2.2

Text proposed by the Commission	*Amendment*
Consumer needs for safe, healthy and affordable food have to be addressed, while considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, covering the whole food chain and related services, ***whether conventional or organic***, from primary production to consumption. This approach will contribute to (a) achieving food safety and security for all Europeans and eradication of hunger	Consumer needs for safe, healthy and affordable food have to be addressed, while considering the impacts of food consumption behaviour and food and feed production on human health and the total ecosystem. Food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production and supply will be addressed, covering the whole food chain and related services, ***for all types of farming and products***, from primary production to consumption. This approach will contribute to (a) achieving food safety and security for all Europeans and

in the world (b) decreasing the burden of food- and diet-related diseases by promoting the shift towards healthy and sustainable diets, via consumer education and innovations in the food industry (c) reducing water and energy consumption in food processing, transport and distribution and (d) reducing food ***waste*** by 50 % by 2030.	eradication of hunger in the world (b) decreasing the burden of food- and diet-related diseases by promoting the shift towards healthy and sustainable diets, via consumer education and innovations in the ***agricultural and*** food industry (c) reducing water and energy consumption in food processing, transport and distribution and (d) reducing food ***wastage*** by 50 % by 2030.

Justification

There are different types of agriculture and agricultural products, from conventional, to organic, to sustainably intensive. All types of agriculture and agricultural products must be included as they all aim for safe and healthy products. Agriculture and primary production are key components of the agri-food sector and innovations in the agricultural input industries can provide major contributions to healthy and sustainable diets, for instance by improving healthy compounds in plants.

Amendment 28

Proposal for a decision
Annex I – Part III – point 2 – point 2.2 – point 2.2.3

Text proposed by the Commission	*Amendment*
The needs for the food and feed industry to cope with social, environmental, climate and economic change from local to global will be addressed at all stages of the food and feed production chain, including food design, processing, packaging, process control, waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, affordable and high quality products will be generated. This will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-economic factors, the resilience of the food	The needs for the food and feed industry to cope with social, environmental, climate and economic change from local to global will be addressed at all stages of the food and feed production chain, including ***agricultural production,*** food design, processing, packaging, process control, waste reduction, by-product valorisation and the safe use or disposal of animal by-products. Innovative and sustainable resource-efficient processes and diversified, safe, affordable and high quality products will be generated. This will strengthen the innovation potential of the European food supply chain, enhance its competitiveness, create economic growth and employment and allow the European food industry to adapt to changes. Other aspects to address are traceability, logistics and services, socio-

chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.	economic factors, the resilience of the food chain against environmental and climate risks, and the limitation of negative impacts of food chain activities and of changing diets and production systems on the environment.

Justification

Agricultural production is at the very start of the food and feed production chain and must therefore be clearly addressed.

Amendment 29

Proposal for a decision
Annex I – Part III – point 2 – point 2.5 – paragraph 4

Text proposed by the Commission	*Amendment*
Support to standard setting will be used to help accelerate market deployment for novel bio-based goods and services.	Support to standard setting will be used to help accelerate market deployment for novel bio-based goods and services ***ranging from terrestrial and aquatic production systems through to the end-consumer***.

Justification

It must be made clear that standard setting will be used across the whole value chain, from primary production (terrestrial or aquatic) through to the end-consumer. That is the only way to ensure that the whole value chain is meeting common targets.

Amendment 30

Proposal for a decision
Annex I – Part III – point 2 – point 2.5 – paragraph 7

Text proposed by the Commission	*Amendment*
Forward looking activities will be undertaken across the sectors of the bio-economy, including the development of data bases, indicators and models addressing global, European, national and regional dimensions. A European bio-economy observatory shall be developed	Forward looking activities will be undertaken across the sectors of the bio-economy, including the development of data bases, indicators and models addressing global, European, national and regional dimensions. A European bio-economy observatory***, bringing together***

for mapping and monitoring Union and global research and innovation activities, developing key performance indicators, and monitoring innovation policies in the bio-economy.	***all stakeholders from science, industry and civil society*** shall be developed for mapping and monitoring Union and global research and innovation activities, developing key performance indicators, and monitoring innovation policies in the bio-economy.

Amendment 31

Proposal for a decision
Annex I – Part IV – point 3 – point 3.2 – title

Text proposed by the Commission	*Amendment*
3.2. Food security, sustainable agriculture, marine and maritime research and the bio-economy	3.2. Food security, sustainable agriculture ***and forestry***, marine and maritime research and the bio-economy

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)
Committee responsible Date announced in plenary	ITRE 17.1.2012
Opinion by Date announced in plenary	AGRI 17.1.2012
Rapporteur Date appointed	Sandra Kalniete 20.12.2011
Discussed in committee	31.5.2012
Date adopted	10.7.2012
Result of final vote	+: 30 –: 4 0: 0
Members present for the final vote	John Stuart Agnew, Eric Andrieu, Liam Aylward, Luis Manuel Capoulas Santos, Vasilica Viorica Dăncilă, Michel Dantin, Paolo De Castro, Albert Deß, Diane Dodds, Herbert Dorfmann, Mariya Gabriel, Iratxe García Pérez, Béla Glattfelder, Martin Häusling, Esther Herranz García, Peter Jahr, Elisabeth Jeggle, Jarosław Kalinowski, Elisabeth Köstinger, Gabriel Mato Adrover, Mairead McGuinness, James Nicholson, Georgios Papastamkos, Marit Paulsen, Britta Reimers, Ulrike Rodust, Alfreds Rubiks, Giancarlo Scottà, Czesław Adam Siekierski, Sergio Paolo Francesco Silvestris, Alyn Smith, Marc Tarabella
Substitute(s) present for the final vote	Salvatore Caronna, Marian Harkin, Sandra Kalniete, Giovanni La Via, Astrid Lulling, Maria do Céu Patrão Neves

16.7.2012

OPINION OF THE COMMITTEE ON CULTURE AND EDUCATION

for the Committee on Industry, Research and Energy

on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020) (COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Rapporteur: Emma McClarkin

SHORT JUSTIFICATION

The specific proposal for a Regulation of the European Parliament and of the Council on Horizon 2020 aims to bring together all EU research and innovation funding under a single programme and complements the Framework regulation on Horizon 2020.

The Rapporteur welcomes the proposal and very strongly supports the commitment to excellence in science as the key funding criteria. However, the Rapporteur believes that funds must be more accessible and easier to apply for. The Rapporteur therefore welcomes the focus on simplifying the application processes but believes that this simplification should go further than that proposed by the Commission.

In addition, the Rapporteur believes that Horizon 2020 should complement other European programmes, in particular the Erasmus the All programme and that further emphasis should be placed on the role of academic research in the development of dynamic SME's. Furthermore, research into the Cultural Heritage of Europe, which was included in previous research funding programmes, does not specifically appear in Horizon 2020. The Rapporteur therefore wants to include specific mention of cultural heritage within this regulation.

In addition, as the Lisbon treaty gave the European union new competences in the field of sport, the Rapporteur wants to make use of the funding opportunities available within Horizon 2020 to specifically highlight the potential of research into sport as a means to improve the overall health of people in Europe and as a means to foster social cohesion and inclusiveness.

AMENDMENTS

The Committee on Culture and Education calls on the Committee on Industry, Research and

Energy, as the committee responsible, to incorporate the following amendments in its report:

Amendment 1
Proposal for a decision
Recital 11

Text proposed by the Commission	*Amendment*
(11) Part III 'Societal challenges' should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation with an emphasis on innovation-related activities such as piloting, demonstration, test-beds, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. The activities should support directly the corresponding sectoral policy competences at Union level. All challenges should contribute to the overarching objective of sustainable development.	(11) Part III 'Societal challenges' should increase the effectiveness of research and innovation in responding to key societal challenges by supporting excellent research and innovation activities. Those activities should be implemented using a challenge-based approach which brings together resources and knowledge across different fields, technologies and disciplines. Social sciences and humanities research is an important element for addressing all of the challenges. The activities should cover the full range of research and innovation with an emphasis on innovation-related activities such as piloting, demonstration, test-beds, and support for public procurement, pre-normative research and standard setting, and market uptake of innovations. ***Research into the health and societal cohesion aspects of physical activity should be supported. Cultural and linguistic diversity research and the protection of traditional knowledge should also be supported, not least when pursuing cooperation with third countries.*** The activities should support directly the corresponding sectoral policy competences at Union level. All challenges should contribute to the overarching objective of sustainable development.

Amendment 2

Proposal for a decision
Recital 13

Text proposed by the Commission	*Amendment*
(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the Joint Research Centre and Union policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments and aim to achieve scientific excellence.	(13) The direct actions of the Joint Research Centre should be implemented in a flexible, efficient and transparent manner, taking into account the relevant needs of the users of the Joint Research Centre and Union policies, as well as respecting the objective of protecting the Union's financial interests. Those research actions should be adapted where appropriate to these needs and to scientific and technological developments and aim to achieve scientific excellence ***and ensure dissemination in the cultural, communication and education sectors***.

Amendment 3

Proposal for a decision
Recital 15

Text proposed by the Commission	*Amendment*
(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the ***implementation*** of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, industry, public health, consumer protection, employment and social ***policy***, energy, transport, environment, climate action, security, marine and fisheries, development cooperation and enlargement and neighbourhood policy.	(15) The specific programme should complement the actions carried out in the Member States as well as other Union actions which are necessary for the overall strategic effort for the ***realisation*** of the Europe 2020 Strategy, in particular with actions in the policy areas of cohesion, agriculture and rural development, education and vocational training, ***culture and the arts,*** industry, public health, consumer protection, employment and social ***policies***, ***gender issues, sport***, energy, transport, environment, climate action, security, marine and fisheries, ***cultural heritage,*** development cooperation and enlargement and neighbourhood policy.

Amendment 4
Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point a

Text proposed by the Commission	*Amendment*
(a) improving the lifelong health and wellbeing;	(a) improving the lifelong health and wellbeing ***including through participation in sporting activities***;

Amendment 5

Proposal for a decision
Article 3 – paragraph 3 – subparagraph 1 – point f a (new)

Text proposed by the Commission	*Amendment*
	(fa) promoting and safeguarding cultural and linguistic diversity and protecting the historical, artistic and cultural heritage in the Union.

Amendment 6

Proposal for a decision
Annex I – point 1 – point 1.1 – paragraph 3

Text proposed by the Commission	*Amendment*
Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries.	Particular attention will be paid to ensuring a broad approach to innovation, which is not only limited to the development of new products and services on the basis of scientific and technological breakthroughs, but which also incorporates aspects such as the use of existing technologies in novel applications, continuous improvement, non-technological and social innovation, ***and maximising the dissemination, accessibility, and use of the knowledge produced***. Only a holistic approach to innovation can at the same time tackle societal challenges and give rise to new competitive businesses and industries.

Amendment 7

Proposal for a decision
Annex I – point 1 – point 1.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Social sciences and humanities research will be fully integrated into each of the general objectives of Horizon 2020. This will include ample opportunities for supporting such research through the European Research Council, the Marie Curie actions or the Research Infrastructures specific objective.	Social sciences and humanities research will be fully integrated into each of the general objectives of Horizon 2020. ***These fields constitute the foundation of the activities undertaken to tackle the whole range of challenges posed to the Union from the point of view both of integration of citizens of all origins and of the access that citizens should have to education and social and cultural rights.*** This will include ample opportunities for supporting such research through the European Research Council, the Marie Curie actions or the Research Infrastructures specific objective.

Amendment 8
Proposal for a decision
Annex I – point 1 – point 1.2 – paragraph 2

Text proposed by the Commission	*Amendment*
Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy.	Social sciences and humanities are also mainstreamed as an essential element of the activities needed to tackle each of the societal challenges to enhance their impact. This includes: understanding the determinants of health***, including physical education*** and optimising the effectiveness of healthcare systems, support to policies empowering rural areas and promoting informed consumer choices, robust decision making on energy policy and in ensuring a consumer friendly European electricity grid, supporting evidence based transport policy and foresight, support to climate change mitigation and adaptation strategies, resource efficiency initiatives and measures towards a green and sustainable economy, ***and support for the protection and promotion of cultural diversity and tangible and intangible***

cultural heritage.

Amendment 9

Proposal for a decision
Annex I – point 1 – point 1.2 – paragraph 3

Text proposed by the Commission	*Amendment*
In addition, the specific objective 'Inclusive, innovative and secure societies' will support social sciences and humanities research into issues of a horizontal nature such as the creation of smart and sustainable growth, social transformations in European societies, social innovation, innovation in the public sector or the position of Europe as a global actor.	In addition, the specific objective 'Inclusive, innovative and secure societies' will support social sciences and humanities research into issues of a horizontal nature such as the creation of smart and sustainable growth, social transformations in European societies, social innovation, innovation in the public sector or the position of Europe as a global actor***, in order to help maintain a high level of cultural interaction and communication with third countries***.

Amendment 10

Proposal for a decision
Annex I – point 3 – paragraph 2

Text proposed by the Commission	*Amendment*
Cross-cutting actions will be promoted between Part I 'Excellent science' and the societal challenges and the enabling and industrial technologies to develop jointly new knowledge, future and emerging technologies, research infrastructures and key competences. Research infrastructures will also be leveraged for broader usage in society, for example in public services, promotion of science, civil security and culture. Furthermore, priority setting during implementation for the direct actions of the Joint Research Centre and the activities of the European Institute of Innovation and Technology (EIT) will be adequately coordinated with the other parts	Cross-cutting actions will be promoted between Part I 'Excellent science' and the societal challenges and the enabling and industrial technologies to develop jointly new knowledge, future and emerging technologies, research infrastructures and key competences. Research infrastructures will also be leveraged for broader usage in society, for example in public services, promotion of science, civil security and culture. ***Academic and scientific literature is, from that point of view, a key element of research infrastructures. It is therefore vital that research findings obtained and validated through the work of Union-funded researchers be made accessible to the scientific community as a whole.***

of Horizon 2020.	Furthermore, priority setting during implementation for the direct actions of the Joint Research Centre and the activities of the European Institute of Innovation and Technology (EIT) will be adequately coordinated with the other parts of Horizon 2020.

Amendment 11
Proposal for a decision
Annex I – point 3 – paragraph 5

Text proposed by the Commission	*Amendment*
Particular attention will also be paid to the coordination of activities funded through Horizon 2020 with those supported under other Union funding programmes, such as the Common Agricultural Policy, the Common Fisheries Policy or the Erasmus For All: the Union's programme for Education, Training, Youth and Sport or the Health for Growth Programme. This includes an appropriate articulation with the Cohesion policy funds, where support to capacity building for research and innovation at regional level may act as a 'stairway to excellence', the establishment of regional centres of excellence may help close the innovation divide in Europe or support to large-scale demonstration and pilot line projects may aid in achieving the objective of generating industrial leadership in Europe.	Particular attention will also be paid to the coordination of activities funded through Horizon 2020 with those supported under other Union funding programmes, such as the Common Agricultural Policy, ***cultural policy (including conservation and development of the tangible and intangible cultural heritage),*** the Common Fisheries Policy or the Erasmus For All: the Union's programme for Education, Training, Youth and Sport or the Health for Growth Programme. ***Compatibility, interconnectivity and integration with these programmes are fundamental to ensure the success of Horizon 2020.*** This includes an appropriate articulation with the Cohesion policy funds, where support to capacity building for research and innovation at regional level may act as a 'stairway to excellence', the establishment of regional centres of excellence may help close the innovation divide in Europe or support to large-scale demonstration and pilot line projects may aid in achieving the objective of generating industrial leadership in Europe.

Amendment 12
Proposal for a decision
Annex I – part I – point 2 – point 2.1

Text proposed by the Commission	*Amendment*
Supporting a large set of embryonic, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new future technologies. By being explicitly non–topical and non-prescriptive, this activity allows for new ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young researchers and high-tech SMEs is also important for nurturing the scientific and industrial leaders of the future.	Supporting a large set of embryonic, high risk visionary science and technology collaborative research projects is necessary for the successful exploration of new foundations for radically new future technologies. By being explicitly non–topical and non-prescriptive, this activity allows for new ideas, whenever they arise and wherever they come from, within the broadest spectrum of themes and disciplines. Nurturing such fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, going well beyond the strictly technological realms. Attracting and stimulating the participation of new high-potential actors in research and innovation, such as young researchers and high-tech SMEs ***can also play a role in providing innovative and dynamic staff for Europe's SMEs and*** is also important for nurturing the scientific and industrial leaders of the future.

Amendment 13

Proposal for a decision
Annex I – part I – point 3 – point 3.1 – paragraph 2

Text proposed by the Commission	*Amendment*
This will be achieved in particular by structuring and raising excellence in a substantial share of the high-quality initial training of early stage researchers and doctoral candidates throughout Member states and associated countries. By equipping early stage researchers with a diversity of skills that will allow them to face current and future challenges, the next generation of researchers will benefit from enhanced career perspectives in both public and private sectors, thereby enhancing also the attraction of young people to research	This will be achieved in particular by structuring and raising excellence in a substantial share of the high-quality initial training of early stage researchers and doctoral candidates throughout Member states and associated countries. By equipping early stage researchers with a diversity of skills that will allow them to face current and future challenges, the next generation of researchers will benefit from enhanced career perspectives in both public and private sectors, thereby enhancing also the attraction of young people to research careers. ***Doctoral candidates must, in***

careers.	***addition, be clearly identified as one of the key target groups of the new programme for education, training, youth, and sport, whose resources must be brought into a complementary relationship with Horizon 2020.***

Amendment 14
Proposal for a decision
Annex I – part II – point 1 – point 1.3 – point 1.3.5

Text proposed by the Commission	*Amendment*
Applying design and the development of converging technologies to create new business opportunities, including the preservation of Europe's materials with historical or cultural value.	Applying design and the development of converging technologies to create new business opportunities ***for SMEs within the creative industries***, including the preservation of Europe's materials with historical or cultural value.

Amendment 15
Proposal for a decision
Annex I – part II – point 3 – point 3.1 – paragraph 1

Text proposed by the Commission	*Amendment*
SMEs will be supported across Horizon 2020. For this purpose a dedicated SME instrument is targeted at all types of innovative SMEs showing a strong ambition to develop, grow and internationalise. It will be provided for all types of innovation, including non-technological and service innovations. The objective is to help filling the gap in funding for early stage high risk research and innovation, stimulate break-through innovations and increase private-sector commercialisation of research results.	SMEs will be supported across Horizon 2020. For this purpose a dedicated SME instrument is targeted at all types of innovative SMEs showing a strong ambition to develop, grow and internationalise. It will be provided for all types of innovation, including non-technological and service innovations ***and innovations in the creative industries***. The objective is to help filling the gap in funding for early stage high risk research and innovation, stimulate break-through innovations and increase private-sector commercialisation of research results.

Amendment 16

Proposal for a decision
Annex I – part II – point 3 – point 3.2 – point 3.2.3

Text proposed by the Commission	*Amendment*
This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, in particular SMEs and enterprises of intermediate size with potential for fast growth. Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design) and reviews of public policies in relation to innovation will be supported.	This will support market-driven innovation in view of enhancing the innovation capacity of firms by improving the framework conditions for innovation as well as tackling the specific barriers preventing the growth of innovative firms, in particular SMEs and enterprises of intermediate size with potential for fast growth***, including those in the creative industries***. Specialised innovation support (on e.g. IP exploitation, networks of procurers, support to technology transfer offices, strategic design) and reviews of public policies in relation to innovation will be supported. ***Innovation also has a cultural dimension as content drives technology. The cultural development for innovation, beyond the pure technological understanding of innovation, has been an important step forward and the current programme shall enforce this pace.***

Amendment 17

Proposal for a decision
Annex I – part III – point 1 – paragraph -1 (new)

Text proposed by the Commission	*Amendment*
	In connection with the provision of support under Horizon 2020 for the social sciences and humanities sector, a separate priority defining the specific scope of that support needs to be established.

Amendment 18
Proposal for a decision
Annex I – part III – point 1 – point 1.1 – paragraph 2

Text proposed by the Commission	*Amendment*
In particular, a better understanding of the environment as a determinant of health will require integrated molecular biological, epidemiological and toxicological approaches to investigate health-environment relationships, including studies of modes of action of chemicals, combined exposures to pollution and other environmental and climate related stressors, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation biomarkers based on 'omics' and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors. Improved links with environmental data using advanced information systems will be supported.	In particular, a better understanding of the environment as a determinant of health will require integrated molecular biological, epidemiological and toxicological approaches to investigate health-environment relationships, including studies of modes of action of chemicals, combined exposures to pollution and other environmental and climate related stressors, integrated toxicological testing as well as alternatives to animal testing. Innovative approaches to exposure assessment are needed using new-generation biomarkers based on 'omics' and epigenetics, human biomonitoring, personal exposure assessments and modelling to understand combined, cumulative and emerging exposures, integrating socio-economic and behavioural factors ***such as physical education***. Improved links with environmental data using advanced information systems will be supported.

Amendment 19

Proposal for a decision
Annex I – part III – point 1 – point 1.12

Text proposed by the Commission	*Amendment*
Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies, service and social robotics,	Multidisciplinary advanced and applied research and innovation with behavioural, gerontological, digital***, social, human*** and other sciences is needed for cost effective user-friendly solutions for active, independent and assisted daily living (in the home, the workplace, etc.) for the ageing population and people with disabilities. This applies in a variety of settings and for technologies and systems and services enhancing quality of life and human functionality including mobility, smart personalised assistive technologies,

and ambient assistive environments. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported.	service and social robotics, and ambient assistive environments. Research and innovation pilots to assess implementation and wide uptake of solutions will be supported.

Amendment 20
Proposal for a decision
Annex I – part III – point 1 – point 1.13

Text proposed by the Commission	*Amendment*
Empowering individuals to improve and manage their health throughout life will result in cost savings to healthcare systems by enabling the management of chronic disease outside institutions and improve health outcomes. This requires research into behavioural and social models, social attitudes and aspirations in relation to personalised health technologies, mobile and/or portable tools, new diagnostics and personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional interaction, personalised programmes for disease and disability management, as well as support for knowledge infrastructures.	Empowering individuals to improve and manage their health throughout life will result in cost savings to healthcare systems by enabling the management of chronic disease outside institutions and improve health outcomes. This requires research into behavioural and social models, social attitudes***, the impact of physical exercise,*** and aspirations in relation to personalised health technologies, ***geared in particular to disease prevention,*** mobile and/or portable tools, new diagnostics and personalised services which promote a healthy lifestyle, wellbeing, self-care, improved citizen/healthcare professional interaction, personalised programmes for disease and disability management, as well as support for knowledge infrastructures.

Amendment 21
Proposal for a decision
Annex I – part III – point 5 – point 5.1 – point 5.1.2

Text proposed by the Commission	*Amendment*
There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society require the integrated analysis of current and future impacts, vulnerabilities,	There is incomplete knowledge on the ability of society and the economy to adapt to climate change. Effective, equitable and socially acceptable measures towards a climate resilient environment and society require the integrated analysis of current and future impacts, vulnerabilities,

population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems and ecosystem services, infrastructures and economic and natural assets. Emphasis will be placed on the most valuable natural ecosystems and built environments, as well as key societal, cultural and economic sectors across Europe. Actions will investigate the impacts and growing risks for human health stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.	population exposure, risks, costs and opportunities associated with climate change and variability, taking into account extreme events and related climate-induced hazards and their recurrence. This analysis will also be developed on the adverse impacts of climate change on biodiversity, ecosystems and ecosystem services, infrastructures and economic and natural assets***, including a specific focus on Europe's cultural heritage and an approach which identifies activities which can bring people together across communities***. Emphasis will be placed on the most valuable natural ecosystems and built environments, as well as key societal, cultural and economic sectors across Europe. Actions will investigate the impacts and growing risks for human health stemming from climate change and increased greenhouse gases concentrations in the atmosphere. Research will evaluate innovative, equitably distributed and cost-effective adaptation responses to climate change, including the protection and adaptation of natural resources and ecosystems, and related effects, to inform and support their development and implementation at all levels and scales. This will also include the potential impacts, costs and risks, of geo-engineering options. The complex inter-linkages, conflicts and synergies of adaptation and risk-prevention policy choices with other climate and sectoral policies will be investigated, including impacts on employment and the living standards of vulnerable groups.

Amendment 22

Proposal for a decision
Annex I – part III – point 6 – point 6.1 – paragraph 2

Text proposed by the Commission	*Amendment*
In this context, the objective is to enhance social, economic and political inclusion,	In this context, the objective is to enhance social, economic and political inclusion,

combat poverty, enhance human rights, digital inclusiveness, equality, solidarity and inter-cultural ***dynamics*** by supporting interdisciplinary research, indicators, technological advances, organisational solutions and new forms of collaboration and co-creation. Research and other activities shall support the implementation of the Europe 2020 strategy as well as other relevant Union foreign policies. ***Humanities research may have an important role to play in this context.*** Specifying, monitoring and assessing the objectives of European strategies and policies will require focused research on high-quality statistical information systems, and the development of adapted instruments that allow *policy makers* to assess the ***impact and effectiveness*** of envisaged measures, in particular in favour of social inclusion.	combat poverty, *and* enhance human rights, digital inclusiveness, equality, solidarity, ***cultural diversity,*** and inter-cultural ***dialogue*** by supporting interdisciplinary research, indicators, technological advances, organisational solutions***, drawing, for example, on the action of the social economy sector in the field of social innovation,*** and new forms of collaboration and co-creation***, taking into account the important role and the specific features of social sciences and the humanities, not least where research is concerned***. Research and other activities shall support the implementation of the Europe 2020 strategy as well as other relevant Union foreign policies. Specifying, monitoring and assessing the objectives of European strategies and policies will require focused research on high-quality statistical information systems, and the development of adapted instruments that allow *policy-makers* to assess the ***contribution*** of envisaged measures, in particular in favour of social inclusion.

Amendment 23
Proposal for a decision
Annex I – part III – point 6 – point 6.1 – point 6.1.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Understanding social transformations in Europe requires the analysis of changing democratic practices and expectations as well as of the historical evolution of identities, diversity, territories, religions, cultures and values. This ***includes a good understanding*** of ***the*** history of ***European integration***. ***Besides, understanding*** the strains and opportunities arising from the uptake of ICT, both at individual and collective levels, is important in order to open new paths of inclusive innovation. It is essential to identify ways to adapt and	Understanding social transformations ***and creating culturally sustainable development*** in Europe requires the analysis of changing democratic practices and expectations as well as of the historical evolution of identities, diversity, territories, religions, cultures and values. This ***should be seen as an opportunity to raise awareness*** of ***Europe's*** history***,*** of ***its diversity, the value of cultural heritage and to help Europe's citizens to interact with the range of cultural and communication tools and opportunities***

improve the European welfare systems, public services and the broader social security dimension of policies in order to achieve cohesion and promote more social and economic equality and intergenerational solidarity. Research will analyse how societies and politics become more European in a broad sense through evolutions of identities, cultures and values, the circulation of ideas and beliefs and combinations of principles and practices of reciprocity, commonality and equality. It will analyse how vulnerable populations can participate fully in society and democracy, notably through the acquisition of various skills and the protection of human rights. The analysis of how political systems respond or not to such social evolutions and themselves evolve will thus be central. Research will also address the evolution of key systems that provide underlying forms of social bonds, such as family, work, education ***and employment*** and help combat poverty. It will take into account the importance of migration and demography in the future development of European policies.

that are available to them today. ***Understanding*** the strains and opportunities arising from the uptake of ICT, both at individual and collective levels, is important in order to open new paths of inclusive innovation. It is essential to identify ways to adapt and improve the European welfare systems, public services and the broader social security dimension of policies in order to achieve cohesion and promote more social and economic equality***, cultural heritage*** and intergenerational solidarity. Research will analyse how societies and politics become more European in a broad sense through evolutions of identities, cultures and values, the circulation of ideas and beliefs and combinations of principles and practices of reciprocity, commonality and equality. It will analyse how vulnerable populations can participate fully in society and democracy, notably through the acquisition of various skills and the protection of human rights. The analysis of how political systems respond or not to such social evolutions and themselves evolve will thus be central. Research will also address the evolution of ***cultural*** key systems that provide underlying forms of social bonds, such as family, ***employment and access to leisure, culture and inter-cultural dialogue, and (formal, informal, and non-formal education), sport,*** work, education and help combat poverty. It will take into account the importance of migration and demography ***and the cultural challenge they create*** in the future development of European policies. ***Research will also take into account the role of cultural heritage in the Union.***

Amendment 24

Proposal for a decision
Annex I – part III – point 6 – point 6.1 – point 6.1.3 – paragraph 1

Text proposed by the Commission	*Amendment*
Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global governance in key domains like trade, development, work, economic cooperation, human rights, defence and security. This implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international *arena* with governmental and *non governmental* actors.	Europe's distinct historical, political, social and cultural system is increasingly confronted with the impact of global changes. In order to further develop its external action in its neighbourhood and beyond and its role as a global actor, Europe has to improve its capacities for defining, prioritising, explaining, assessing and promoting its policy objectives with other world regions and societies to further cooperation or prevent or solve conflicts. In this regard, it also has to improve its capacities for anticipating and responding to the evolution and impacts of globalisation. This requires a greater understanding of the history, cultures and political-economic systems of other world regions, as well as of the role and influence of transnational actors. Finally, Europe also has to contribute effectively to global governance in key domains like trade, development, work, economic cooperation, ***cultural cooperation and inter-cultural dialogue,*** human rights, defence and security. This implies the potential to build new capacities whether in terms of tools, systems and instruments of analysis or in terms of diplomacy in formal and informal international *arenas* with governmental and *non-governmental* actors.

Amendment 25

Proposal for a decision
Annex I – part III – point 6 – point 6.1 – point 6.1.4 – indent 1

Text proposed by the Commission	*Amendment*
- Linking ***in a competition*** emerging institutions, centres of excellence and innovative regions in less developed Member States to international leading counterparts elsewhere in Europe. This will involve teaming of excellent research	- Linking emerging institutions, centres of excellence and innovative regions in less developed Member States to international leading counterparts elsewhere in Europe. This will involve teaming of excellent research institutions and less developed

institutions and less developed regions, twinning of staff exchanges, expert advice and assistance and the development of joint strategies for the establishment of centres of excellence that may be supported by the *Cohesion* policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.	regions, twinning of staff exchanges, expert advice and assistance and the development of joint strategies for the establishment of centres of excellence that may be supported by the *cohesion* policy funds in less developed regions. Building links with innovative clusters and recognising excellence in less developed regions, including through peer reviews and awarding labels of excellence to those institutions that meet international standards, will be considered.

Amendment 26

Proposal for a decision
Annex I – part III – point 6 – point 6.1 – point 6.1.4 – indent 3 a (new)

Text proposed by the Commission	*Amendment*
	– Facilitating the widest possible access to scientific and academic literature and to research data in the above-mentioned regions.

Amendment 27

Proposal for a decision
Annex I – part III – point 6 – point 6.2 – point 6.2.2 – paragraph 1

Text proposed by the Commission	*Amendment*
Social innovation generates new goods, services, processes and models that meet societal needs and create new social relationships. It is important to understand how social innovation and creativity may lead to change in existing structures and policies and how they can be encouraged and scaled-up. Grassroots on-line and distributed platforms networking citizens and allowing them to collaborate and co-create solutions based on an extended awareness of the social, political and environmental context can be a powerful tool to support the objectives of Europe	Social innovation generates new goods, services, processes and models that meet societal needs and create new social relationships. It is important to understand how social innovation and creativity may lead to change in existing structures and policies and how they can be encouraged and scaled-up. Grassroots on-line and distributed platforms networking citizens and allowing them to collaborate and co-create solutions based on an extended awareness of the social, ***cultural,*** political and environmental context can be a powerful tool to support the objectives of

2020. Support will also be given to networking and experimentation of the use of ICT for improving learning processes, as well as to networks of social innovators and social entrepreneurs.	Europe 2020. Support will also be given to networking and experimentation of the use of ICT for improving learning processes, as well as to networks of social innovators and social ***and cultural*** entrepreneurs.

Amendment 28

Proposal for a decision
Annex I – part III – point 6 – point 6.2 – point 6.2.3

Text proposed by the Commission	*Amendment*
Enabling all societal actors to interact in the innovation cycle increases the quality, relevance, acceptability and sustainability of innovation outcomes by integrating society's interests and values. This requires developing specific skills, knowledge and capacities at individual and organisational as well as at national and transnational levels. A scientifically literate, responsible and creative society will be nurtured through the promotion of and research on appropriate science education methods. Gender equality will be promoted in particular by supporting changes in the organisation of research institutions and in the content and design of research activities. In order to improve knowledge circulation within the scientific community and the wider public, the accessibility and use of the results of publicly funded research will be further developed. An Ethics Framework for research and innovation, based on the fundamental ethical principles including those reflected in the Charter of Fundamental Rights and all the relevant Union laws and Conventions, will be promoted in coordination with relevant international organisations.	Enabling all societal actors to interact in the innovation cycle increases the quality, relevance, acceptability and sustainability of innovation outcomes by integrating society's interests and values. This requires developing specific skills, knowledge and capacities at individual and organisational as well as at national and transnational levels. A scientifically literate, responsible and creative society will be nurtured through the promotion of and research on appropriate science education methods. ***The principle of non-discrimination and*** gender equality will be promoted in particular by supporting changes in the organisation of research institutions and in the content and design of research activities. In order to improve knowledge circulation within the scientific community and the wider public, the accessibility and use of the results of publicly funded research will be further developed. An Ethics Framework for research and innovation, based on the fundamental ethical principles including those reflected in the Charter of Fundamental Rights and all the relevant Union laws and Conventions, will be promoted in coordination with relevant international organisations.

Amendment 29

Proposal for a decision
Annex I – part III – point 6 – point 6.3 – point 6.3.2

Text proposed by the Commission	*Amendment*
Technologies and capabilities are also required to enhance systems, equipments, tools, processes, and methods for rapid identification to improve border security, including both control and surveillance issues, while exploiting the full potential of EUROSUR. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of fundamental rights. Research will also support the improvement of the integrated European border management, including through increased cooperation with candidate, potential candidate and European Neighbourhood Policy countries.	Technologies and capabilities are also required to enhance systems, equipments, tools, processes, and methods for rapid identification to improve border security, including both control and surveillance issues, while exploiting the full potential of EUROSUR. These will be developed and tested considering their effectiveness, compliance with legal and ethical principles, proportionality, social acceptability and the respect of fundamental rights. Research will also support the improvement of the integrated European border management, including through increased cooperation ***and the development of an appropriate intercultural dialogue policy*** with candidate, potential candidate and European Neighbourhood Policy countries.

Amendment 30

Proposal for a decision
Annex I – part III – point 6 – point 6.3 – point 6.3.3

Text proposed by the Commission	*Amendment*
Cyber security is a prerequisite for people, business and public services in order to benefit from the opportunities offered by the Internet. It requires providing security for systems, networks, access devices, and software and services, including cloud computing, while taking into account the interoperability of multiple technologies. Research will prevent, detect and manage in real-time cyber-attacks across multiple domains and jurisdictions, and to protect critical ICT infrastructures. The digital society is in full development with constantly changing uses and abuses of the Internet, new ways of social interaction,	Cyber security is a prerequisite for people, business and public services in order to benefit from the opportunities offered by the Internet. It requires providing security for systems, networks, access devices, and software and services, including cloud computing, while taking into account the interoperability of multiple technologies. Research will prevent, detect and manage in real-time cyber-attacks across multiple domains and jurisdictions, and to protect critical ICT infrastructures. The digital society is in full development with constantly changing uses and abuses of the Internet ***(requiring, among other things,***

new mobile and location-based services and the emergence of the Internet of Things. This requires a new type of research which should be triggered by the emerging applications, usage and societal trends. Nimble research initiatives will be undertaken including pro-active R&D to react quickly to new contemporary developments in trust and security.

specific technological research into means of putting an end to child pornography on the Internet), new ways of social interaction, new mobile and location-based services and the emergence of the Internet of Things. This requires a new type of research which should be triggered by the emerging applications, usage and societal trends. Nimble research initiatives will be undertaken including pro-active R&D to react quickly to new contemporary developments in trust and security.

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)
Committee responsible Date announced in plenary	ITRE 17.1.2012
Opinion by Date announced in plenary	CULT 17.1.2012
Rapporteur Date appointed	Emma McClarkin 31.1.2012
Discussed in committee	27.3.2012 29.5.2012
Date adopted	10.7.2012
Result of final vote	+: 25 –: 2 0: 0
Members present for the final vote	Zoltán Bagó, Malika Benarab-Attou, Lothar Bisky, Piotr Borys, Jean-Marie Cavada, Silvia Costa, Santiago Fisas Ayxela, Lorenzo Fontana, Mary Honeyball, Petra Kammerevert, Morten Løkkegaard, Emma McClarkin, Emilio Menéndez del Valle, Doris Pack, Chrysoula Paliadeli, Marie-Thérèse Sanchez-Schmid, Marietje Schaake, Marco Scurria, Emil Stoyanov, Hannu Takkula, László Tőkés, Helga Trüpel, Marie-Christine Vergiat
Substitute(s) present for the final vote	Ivo Belet, Nessa Childers, Seán Kelly, Iosif Matula, Mitro Repo
Substitute(s) under Rule 187(2) present for the final vote	Evžen Tošenovský

18.9.2012

OPINION OF THE COMMITTEE ON LEGAL AFFAIRS

for the Committee on Industry, Research and Energy

on the proposal for a Council decision establishing the Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
(COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS))

Rapporteur: Piotr Borys

SHORT JUSTIFICATION

This decision is part of the Horizon 2020 package presented by the Commission in November 2011. The aim of the package is to establish the Framework Programme for Research and Innovation for the 2014-2020 period.

The European Union's research and innovation policy is of particular importance for the Union's competitiveness. The aim is for the EU to adapt to the changing world by pursuing a research policy which puts it at the forefront of technology, thus creating jobs and boosting the economy.

This Council decision establishes the single specific programme implementing the Horizon 2020 package. The legal basis for this decision is Article 182(4) TFEU. That article provides that the specific programme implementing the framework programme shall be adopted by the Council after consulting Parliament.

The Committee on Legal Affairs' interest in this decision is largely restricted to ethical issues, as its responsibility includes ethical questions related to new technologies.

Recital 3 of the draft decision makes it clear that the provisions on ethical principles contained in the Horizon 2020 Regulation, which this Committee has also considered, fully apply to the implementation of the decision establishing the specific programme.

The specific programme is divided into four parts, entitled 'excellent science', 'industrial leadership', 'societal challenges' and 'non-nuclear direct actions of the Joint Research Centre'. Whilst all parts are of great importance in ensuring the EU's leadership in the research field and thus increasing its competitiveness and creating jobs, the third part of the programme, 'societal challenges', is of particular importance to the Committee on Legal Affairs owing to the ethical dimension of this aspect of research.

Thus, for example, this part of the draft decision refers to a series of specific research activities where ethical considerations are of particular importance, including the improvement of scientific tools, societal engagement in research, security and privacy, and crisis resilience.

The Committee therefore calls on Parliament to approve the draft decision, particularly as the proposal makes it clear that the ethical principles which will be laid down in the Horizon 2020 Regulation will apply to the implementation of the specific programme.

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The Committee on Legal Affairs calls on the Committee on Industry, Research and Energy, as the committee responsible, to propose approval of the Commission proposal.

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)
Committee responsible Date announced in plenary	ITRE 17.1.2012
Opinion by Date announced in plenary	JURI 17.1.2012
Rapporteur Date appointed	Piotr Borys 19.12.2011
Discussed in committee	26.4.2012 19.6.2012
Date adopted	18.9.2012
Result of final vote	+: 25 –: 0 0: 0
Members present for the final vote	Raffaele Baldassarre, Luigi Berlinguer, Sebastian Valentin Bodu, Françoise Castex, Christian Engström, Marielle Gallo, Giuseppe Gargani, Lidia Joanna Geringer de Oedenberg, Sajjad Karim, Klaus-Heiner Lehne, Antonio Masip Hidalgo, Jiří Maštálka, Alajos Mészáros, Bernhard Rapkay, Evelyn Regner, Francesco Enrico Speroni, Dimitar Stoyanov, Rebecca Taylor, Alexandra Thein, Rainer Wieland, Cecilia Wikström, Tadeusz Zwiefka
Substitute(s) present for the final vote	Piotr Borys, Eva Lichtenberger, Angelika Niebler, Dagmar Roth-Behrendt, József Szájer
Substitute(s) under Rule 187(2) present for the final vote	Jacek Włosowicz

PROCEDURE

Title	Specific Programme Implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)			
References	COM(2011)0811 – C7-0509/2011 – 2011/0402(CNS)			
Date of consulting Parliament	15.12.2011			
Committee responsible Date announced in plenary	ITRE 17.1.2012			
Committee(s) asked for opinion(s) Date announced in plenary	AFET 15.3.2012	BUDG 17.1.2012	EMPL 17.1.2012	ENVI 17.1.2012
	TRAN 17.1.2012	AGRI 17.1.2012	CULT 17.1.2012	JURI 17.1.2012
Not delivering opinions Date of decision	BUDG 28.8.2012	EMPL 15.12.2011	TRAN 19.12.2011	
Rapporteur(s) Date appointed	Maria Da Graça Carvalho 15.2.2012			
Discussed in committee	23.1.2012	18.6.2012	17.9.2012	8.10.2012
Date adopted	28.11.2012			
Result of final vote	+: –: 0:	54 1 0		
Members present for the final vote	Amelia Andersdotter, Josefa Andrés Barea, Jean-Pierre Audy, Zigmantas Balčytis, Ivo Belet, Jan Březina, Maria Da Graça Carvalho, Giles Chichester, Pilar del Castillo Vera, Dimitrios Droutsas, Christian Ehler, Vicky Ford, Gaston Franco, Adam Gierek, Norbert Glante, András Gyürk, Fiona Hall, Edit Herczog, Kent Johansson, Romana Jordan, Krišjānis Kariņš, Lena Kolarska-Bobińska, Philippe Lamberts, Bogdan Kazimierz Marcinkiewicz, Marisa Matias, Judith A. Merkies, Angelika Niebler, Jaroslav Paška, Aldo Patriciello, Herbert Reul, Teresa Riera Madurell, Jens Rohde, Paul Rübig, Salvador Sedó i Alabart, Konrad Szymański, Britta Thomsen, Patrizia Toia, Evžen Tošenovský, Catherine Trautmann, Ioannis A. Tsoukalas, Claude Turmes, Marita Ulvskog, Vladimir Urutchev, Kathleen Van Brempt, Alejo Vidal-Quadras			
Substitute(s) present for the final vote	Yves Cochet, Satu Hassi, Jolanta Emilia Hibner, Seán Kelly, Zofija Mazej Kukovič, Vladimír Remek, Frédérique Ries, Peter Skinner, Silvia-Adriana Ţicău			
Substitute(s) under Rule 187(2) present for the final vote	Alexandra Thein			
Date tabled	8.1.2013			