CONSULTATION OF STAKEHOLDERS ON POTENTIAL PRIORITIES FOR RESEARCH AND INNOVATION IN THE 2018-2020 WORK PROGRAMME OF HORIZON 2020 SOCIETAL CHALLENGE 5 'CLIMATE ACTION, ENVIRONMENT, RESOURCE EFFICIENCY AND RAW MATERIALS'

The European Commission is starting to prepare the next Horizon 2020 Work Programme and calls for proposals, to cover the period 2018-2019-2020. Within Societal Challenge 5, research and innovation aims to "achieve a resource – and water – efficient and climate change resilient economy and society, the protection and sustainable management of natural resources and ecosystems, and a sustainable supply and use of raw materials, in order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources and eco-system" and hence to address societal needs and socio-economic priorities. Since the adoption of Horizon 2020 the socio-economic and policy context has been changing (see the background document below). For Societal Challenge 5, the budget to be allocated will be in the order of magnitude of €1 billion. The responsibility is great, hence the decision to launch a new consultation of stakeholders to gather valuable input for this final programming period.

Please consider the following questions, citing in support of your response any available evidence such as foresight and other assessments of research and innovation trends and market opportunities, across the six sub-challenges of Societal Challenge 5 (i.e. Fighting and adapting to climate change; Protecting the environment, sustainably managing natural resources, water, biodiversity and ecosystems; Ensuring the sustainable supply of non-energy and non-agricultural raw materials; Enabling the transition towards a green economy and society through eco-innovation; Developing comprehensive and sustained global environmental observation and information systems; Cultural heritage).:

1) **What are the challenges in the areas of Societal Challenge 5 'Climate action, environment, resource efficiency and raw materials' that require action under the Work Programme 2018-2020? Would they require an integrated approach across the Horizon 2020 Societal Challenges and Leadership in Enabling and Industrial Technologies?**
2) **What is the output/impact that could be foreseen? Which innovation aspects could reach (market) deployment within 5-7 years?**
3) **Which gaps (in science and technology, innovation, markets, policy, financing and governance, regulation etc.) and potential game changers, including the role of the public sector in accelerating changes, need to be taken into account?**
4) **Which areas could benefit from integration of horizontal aspects such as social sciences and humanities, responsible research and innovation, gender aspects, international cooperation?**
5) **In view of the recent evolution of the socio-economic and policy context (see point 3 of this document), what are the emerging priorities for Societal Challenge 5?**

Please send your responses by e-mail to:

RTD-ENV-H2020STAKEHOLDERS@ec.europa.eu

This consultation closes on Friday, 8 April 2016.

BACKGROUND

1. Introduction

This paper provides the basis for the consultation of stakeholders with respect to the preparation of the Horizon 2020 work programme covering 2018-20 for Societal Challenge 5 'Climate action, environment, resource efficiency and raw materials'.

The Horizon 2020 Specific Programme sets the scope and content for the implementation of the Framework Programme for research and innovation (2014-2020). Providing the legal base as politically agreed with the Member States and the European Parliament, it determines the specific objectives for Union support to the research and innovation activities for each Horizon 2020 challenge/part. On this basis, the Commission services prepare multiannual work programmes of which the first Horizon 2020 work programme covering 2014-2015 was adopted on 10 December 2013 and the second covering 2016-2017 was adopted on 13 October 2015.

This consultation is the first step in the work programme preparation process. The work programme 2018-20 will be the final Horizon 2020 work programme.

This consultation of stakeholders is carried out on the basis of a series of questions (provided in the box above). Main stakeholders such as European Technology Platforms, European Innovation Partnerships, Joint Programming Initiatives, contractual Public-Private Partnerships and other relevant representatives from professional organisations and civil society will be included in this consultation. The Commission will have discussions with the Member States on overall priorities for the 2018-2020 work programme in the third quarter of the year. The interim evaluation of Horizon 2020 is due to be published in the summer 2017. The Commission expects, on the basis of the priorities identified through these consultations and on the basis of the recommendations in the interim evaluation of Horizon 2020, to develop the content of the 2018-2020 work programme in the last quarter of 2016 and the first three quarters of 2017 with the adoption and publication of the calls for proposals not earlier than autumn 2017.

The Horizon 2020 work programme comprises 19 sections, which set out the funding opportunities under the different parts of the programme. Each part is self-contained, and describes the overall objectives, the respective calls, and the topics within each call. The Horizon 2020 work programme is complemented by the separate work programmes for the European Research Council, Euratom, the Joint Research Centre, the strategic Innovation Agenda for the European Institute of Innovation and Technology (EIT), as well as the Article 187 Joint Technology Initiatives with industry and Article 185 Public-Public Partnerships with Member States.

2. Policy priorities in the Horizon 2020 work programmes for 2014-2015 and 2016-2017

The first Horizon 2020 work programme which covered the years 2014-2015, had as overriding priorities the need to boost competitiveness and support the creation of jobs and new sources of growth. Strong emphasis was placed on addressing societal challenges with high potential for sustainable competiveness, innovation and growth; thus reflecting the strong challenge-based approach of Horizon 2020, inviting applicants to come up with innovative solutions and attracting more multi-disciplinary and multi-sectoral proposals.

The Societal Challenge 5 work programme for 2014-2015 focused on investing in innovation for a green economy. Specific calls addressed 'Waste: a resource to recycle, reuse and recover raw materials', 'Water innovation: boosting its value for Europe' and 'Growing a low carbon, resource efficient economy with a sustainable supply of raw materials', and further topics were funded in the calls 'Blue growth: unlocking the potential of seas and oceans', 'Energy efficiency' and 'Disaster resilience: safeguarding and securing society, including adaptation to climate change'.

In the second Horizon 2020 work programme which covers 2016-2017, the overriding priority continues to be the boosting of competitiveness and supporting the creation of jobs and new sources of growth in the context of the Commission's 10 priorities[1]. The chosen focus calls includes Industry 2020 in the Circular Economy; Sustainable Food Security – Resilient and resource-efficient value chains; Energy Efficiency; Digital Security; Blue Growth - Demonstrating an ocean of opportunities; Internet of Things; Competitive Low-carbon Energy; Smart and Sustainable Cities; Automated Road Transport – The New Frontier.

In the 2016-17 work programme, further efforts have also been made to ensure that cross-cutting issues (e.g. social sciences and humanities, gender, international cooperation, climate change and sustainable development) are integrated in each of the different parts of the Work Programme, ensuring an integrated approach.

The Societal Challenge 5 work programme for 2016-2017 prioritised actions which take a systemic approach to promoting a more resource efficient, greener and more competitive economy as a key part of smart, inclusive and sustainable growth. In calls 'Greening the economy', 'Industry 2020 in the Circular Economy', 'Smart and sustainable cities', 'Blue growth: demonstrating an ocean of opportunities' and 'Sustainable food security', Societal Challenge 5 actions addressed systemic eco-innovation for the circular economy, climate services, the transition towards a low-carbon Europe, the Arctic dimension of climate change, nature-based solutions for territorial resilience and sustainable cities, water, raw materials, Earth observation and cultural heritage for sustainable growth.

3. Policy priorities for the work programme 2018-2020

Although there are positive signs, the EU still has a long way to go before it overcomes the effects of the economic crisis, and the high unemployment rate especially amongst young

[1] The 10 Juncker priorities can be found here: http://ec.europa.eu/priorities/index_en.htm.

people, remains one of the biggest concern and challenge in many Member States. The five point strategic agenda for the Union in times of change[2] set by the European Council and followed up by the Commission's agenda for jobs, growth, fairness and democratic change is a strong response to the challenges we face, namely by strengthening our global competitiveness, stimulating investments from both public and private sources, promoting growth and creating new and sustainable jobs for the benefit of the economy and citizens.

The Juncker Commission sets out ten policy areas on which the EU needs to focus its efforts over the five year period[3]. This includes maximising the opportunities and assets of the EU by fully exploiting the potential of the single market as well as of international markets and reinforcing its global attractiveness as a place of production, investment, education and living, thus delivering benefits for all by promoting a climate of entrepreneurship, job creation and social fairness. Migration is also a policy priority. Societal Challenge 5 actions intend to demonstrably contribute to the priorities 'Growth, jobs and investment', 'Energy Union and Climate', 'Digital Single Market' and 'A Stronger Global Actor'.

Research and innovation represent major drivers to both stimulate and leverage investment, providing new solutions and the knowledge which will help to deliver the new Commission's agenda.

Commissioner for Research, Science and Innovation Carlos Moedas has emphasised the importance of 'Open innovation', 'Open science' and of being 'Open to the world'. In general, Horizon 2020 is fully open to participation of entities from across the globe. Challenges in areas like energy, health, food and water are global challenges, and Europe should be leading the way in developing global research and innovation partnerships to address these sustainably. To remain competitive Europe needs to engage more with partners in global value chains and in new and emerging markets.

Open innovation is characterised by the combined power of ideas and knowledge from different actors (whether private, public, third sector) to co-create new products and services, and find solutions to societal needs. Creating and supporting an Open Innovation ecosystem encourages dynamic knowledge circulation and facilitates the translation of that knowledge into socio-economic value.

Open Science describes the on-going transitions in the way research is performed, researchers collaborate, knowledge is shared, and science is organised. It is enabled by digital technologies, and driven by the enormous growth of data, the globalisation and enlargement of the scientific community including new actors (e.g. citizen science), and the need to address societal challenges. In the short term, Open Science may offer more transparency, openness, inclusiveness and networked collaboration. In the long term, it may make science more efficient, reliable and responsive to the grand challenges of our times as well as foster co-creation and Open Innovation.

[2] http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/143477.pdf
[3] The 10 Juncker priorities can be found here: http://ec.europa.eu/priorities/index_en.htm.

The speed and scale of digitalisation are accelerating and transforming the way we design, develop and manufacture products, the way we deliver services, and the products/services themselves. It is enabling new innovation processes and new ways of doing business, introducing new cross-sector value chains and infrastructures. Horizon 2020 actions can play an important part in merging the physical and digital worlds, notably by maximising the synergies between digital technologies and innovative solutions to societal challenges. Many synergies are already in place, but there are growing opportunities and challenges.

Climate change and sustainable development are important cross-cutting priorities for the whole of Horizon 2020, as evidenced by the expenditure targets linked to these objectives[4]. In an evolving political context – the Juncker Commission's priorities of growth and jobs, the agreement at the climate change conference in Paris in December 2015, the adoption in September 2015 of the UN's 2030 Sustainable Development Agenda with its related Sustainable Development Goals (SDGs), the adoption in March 2015 of the Sendai framework for Disaster Risk Reduction, and the adoption foreseen in October 2016 of a New Urban Agenda, EU policies such as the Commission's new Circular Economy Package or the 2030 Climate and Energy Framework, and the current context of migration – there is a clear and timely political imperative for research and innovation to support and drive forward on these key issues.

Annex I:
The Horizon 2020 Specific Programme, where the broad lines of the activities for Societal Challenge 5 'Climate action, environment, resource efficiency and raw materials' are defined: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D0743&qid=1455193076073&from=EN

Annex II:
The report and its annexes of a foresight study that reviewed relevant drivers of future change and explored the implications of different future scenarios for the final work programme for 2018-2020 of Horizon 2020:

http://bookshop.europa.eu/en/strategic-foresight-pbKI0215938/

http://bookshop.europa.eu/en/foresight-in-support-of-the-3rd-strategic-programme-of-horizon-2020-pbKI0215948/

[4] The Horizon 2020 Regulation states: *"Climate action and resource efficiency are mutually reinforcing objectives for achieving sustainable development. The specific objectives relating to both should be complemented through the other specific objectives of Horizon 2020. As a result it is expected that at least 60% of the overall Horizon 2020 budget should be related to sustainable development. It is also expected that climate-related expenditure should exceed 35% of the budget, including mutually compatible measures improving resource efficiency."*