

Dear Guests, Ladies and Gentlemen,

- I am very pleased to join this conference, which is very timely - coming just a couple of days after the UN adoption of the Sustainable Development Goals. These Global Goals, together with the Sendai Framework of March this year, will give a new impetus to policies and action for resilience across the world. The SDGs give a prominent role to science, technology and innovation (STI). European R&I policy will be called upon to significantly contribute to realising these global goals, which seek a transformation of our global economy. The EU has committed to make at least 60% of Horizon 2020's budget contribute to sustainable development. This also includes the JRC's activities. With Horizon 2020 being entirely open to international cooperation, it is set to become an important lever for global STI cooperation in support of sustainability and resilience.
- It is thus very timely for us to address the concept of resilience, especially the ways through which we can

operationalise it in order to build a more resilient Europe and world in social, economic and environmental terms.

- Today we live in a very complex and interconnected world. We are therefore confronted with new challenges, unexpected threats and shocks that might happen in one place but can affect a larger territory, the European economy, the entire world. This complexity and interconnectedness oblige us to be creative in finding new and dynamic solutions to evolving challenges and to transforming problems into new opportunities. In this framework, solid scientific knowledge, research and innovation are pivotal.
- The concept of resilience already has a long history behind it. It has been investigated in different scientific disciplines, from biology and ecosystems to engineering (e.g. elasticity of materials) and health (e.g. psychological trauma), and for different contexts and entities (communities, organisations and nations). This explains why there are so many different definitions of the term,

sometimes complementary or opposed to vulnerability or poverty analysis.

- Our understanding of resilience is that it is not a state to achieve, but a dynamic process to drive and steer. It is about responding to challenges and threats in a way that transforms and progresses our society and economy towards sustainability.
- Resilience is about making use of systems' thinking and systems' acting, e.g. for ecology or in urban areas, since all systems are interconnected and interdependent. It is about combining synoptic views and analytical thinking to identify connections, vulnerabilities and linkages, and come up with solutions. Thinking and acting in terms of systems can help us reduce our vulnerabilities, prevent risks, and when faced with challenges, develop innovative solutions that transform and effectively protect our societies against future threats, make them future-proofed.

- It is fair to say that Europe has made great strides in building sustainable and resilient cities and territories, in addressing key environmental problems which make our society vulnerable through resource scarcity (may it be water, minerals, or food) and in supporting alike international effort in several fields. We have to capitalise on this knowledge and innovation, which has stemmed from the thirty years of transnational EU Research and Innovation. Let me provide here some examples.
- In support of the International Agenda on Disaster Risk Reduction, as set through the previous Hyogo Framework for Action (2005-2015) and now through the Sendai Framework, and in order to increase our understanding of hazardous phenomena and risks, European Science has contributed to enhancing the adaptive and coping capacities of societies to events such as earthquakes, floods, droughts, volcanic eruptions, forest fires.  
For example, in the field of building resilient infrastructure, the project **SHARE** (Seismic Hazard Assessment in Europe) has produced several unique European Seismic hazard maps and datasets that serve as

"harmonized references" for the implementation of European standards for the design of earthquake-resistant structures. They are of direct use for engineers and architects in the construction sector and complement the important work done by the European Committee for Standardization that develops coherent sets of standards and specifications, the EUROCODES.

- As a follow-up, the **STRESSED** (Harmonized approach to stress tests for critical infrastructures against natural hazards) project will develop new assessment methodologies that should contribute to the elaboration of new stress-tests for critical infrastructures such as dams, pipelines or ports exposed to low probability but high impact/ or cascading events. Research here has been inspired by the work done on stress-tests in the nuclear sector and the cascade disasters in Fukushima. This type of work, done at European level is essential to increase our security, in Europe, but also internationally.
- **TURAS** "Transition to Urban Resilience and Sustainability" is providing 12 municipalities in Europe

with specific nature-based solutions (from green roofs and walls, to urban brownfield and urban gardens) and user friendly tools needed to build a transition path towards a more sustainable and resilient future.

**RAMSES** focuses on cities in order to deliver quantified evidence of the impacts of climate change and the costs and benefits of a wide range of measures for adapting to climate change. In operational terms, the project is developing indicators and is designing guidelines for resilient architecture, infrastructure and urban environments that can be implemented by public authorities at the building, neighbourhood and catchment scales of the city. In the context of building resilience, the project analyses further the interplay of blue, green and grey infrastructures and soft adaptation measures, and highlights the necessity of a multi-scale approach to resilient infrastructure within and between sectors.

- While capitalising and building on the successes and knowledge created through the seven EU Research Framework Programmes - for which the Knowledge

Centre for disaster Risk Management can play an important role to stimulate the use and uptake of research results and innovation - we are now developing and implementing the new orientations and philosophy of the Horizon 2020 Framework Programme for Research and Innovation, which aims at excellent science, industrial leadership, and at delivering solutions to societal challenges.

- New ideas are emerging from different fora requiring more challenge- or demand-driven and solution-oriented approaches in research and innovation. The response to challenges or demands needs to be effective and sustainable. Novel ways of including users and relevant stakeholders in the problem identification and possible responses need to be explored. New public-private partnerships and new governance schemes need to be elaborated.
- Within the climate and environmental societal challenge of Horizon 2020, we position our research and innovation agenda as resolutely trans-disciplinary, adopting a

systemic approach. We pilot such approach in areas like climate services and earth observation, circular economy and nature-based solutions.

- Take nature-based solutions. We will, through Horizon 2020, invest in large demonstration projects, in both cities and natural areas to act as 'living labs'. One of the aims will be to harness the power of nature, and enhance ecosystem services to help build resilience against climate change and disasters, but also address resource-based challenges, such as water and waste management, and at the same time contribute to health, well-being and diversification of economic activity.
- For the urban environment, these large Horizon 2020 demonstration projects will throw the spotlight on leading European cities which have an important role as stewards of multiple value creation by encouraging the upscale and deployment of nature-based solutions also in other 'follower' cities of different size and background across Europe.

- Our approach for developing innovative solutions towards resilience, in the urban environment (and beyond), can be understood as part of the City Resilience Framework, developed by ARUP with support from the Rockefeller Foundation. This City Resilience Framework (CRF) is built on four essential dimensions of urban resilience: **Health & Wellbeing** (Everyone living and working in the city has access to what they need to survive and thrive); **Economy & Society** (The social & financial systems that enable urban populations to live peacefully, and act collectively); **Infrastructure & Environment** (The man-made and natural systems that provide critical services, protect and connect urban assets enabling the flow of goods, services, and knowledge); and **Leadership & Strategy** (The processes that promote effective leadership, inclusive decision-making, empowered stakeholders, and integrated planning).
- Building on these four pillars, we wish to contribute to the transformation towards sustainable urbanisation through a Renewed R&I Framework for 'Cities of the future' a subject which is currently in discussion in the

Commission. We are in a situation where we can build on the very many and successful but fragmented examples of sustainable urbanisation. It is now our intention to seek to integrate the various aspects and thus make 'Cities of the Future' a prime example of an integrated 'city ecosystem' approach. Such an 'ecosystem' approach would complement the current largely technology-driven 'Smart Cities' model with the socio-economic and environmental needs of citizens. It would also make converging technologies, markets, infrastructure and systemic innovation, including social innovation, interact in an optimal manner.

- In the framework of the research and innovation initiative on Nature-based Solutions to societal challenges, a broader and integrated approach towards land and risk management will be developed. Sustainable options are needed that can help prevent or mitigate several challenges, - including climate change impacts or natural hazards and disaster risks - in a cost-efficient way. The building of a strong evidence base is key and will be achieved for example through living labs – large scale

demonstrations projects. Decision makers, planners, designers or engineers conceiving future management plans, need to be able to compare these new 'green' solutions with traditional 'grey' engineering ones, or possible hybrid ones and be convinced that such infrastructure investments can provide multiple benefits with a long term perspective.

- However, through EU Research and Innovation, we will also be investing in bringing more knowledge on future climate, its impacts and solutions to the hands of decision makers. The research and innovation policy initiative on climate services will be set up with the concept of 'co-design actions with the end users of climate services' – that can be cities, local governments, business associations or investors. These actions should demonstrate the added value and positive impacts of climate services. Climate services can also show new business opportunities. This is why we need to consider all angles from which we are tackling the climate challenge.

- Actions under Horizon 2020 are also instrumental to promote new resilient socio-economic systems embedded in the sustainable management of resources. This is the idea behind **circular economy**. Horizon 2020 will in 2016-17 invest around 160 M EUR in the Focus Area 'Industry 2020 in the Circular Economy' calling for large scale demonstration projects to widen the solution portfolio and include new governance, finance and business models that can help develop new and sustainable markets. This Focus Area will also support Innovation Deals which encourage the participation of innovators, municipalities, in cooperation with the European Commission, to overcome regulatory bottlenecks and help innovations reach the market. We strongly believe that through new solutions and new business models for a circular economy, we will be able to make Europe more resilient to shortages and shocks in resource markets.
- My last points are related to the link between resilience and sustainable urbanisation at the international level. Urban challenges are largely shared and in many cases

further exacerbated in cities around the world. EU R&I will be a vehicle to promote the new EU Urban Agenda for the 'Cities of the Future' at the international level, bringing together science and international diplomacy. Science diplomacy will be instrumental in the context of the post-2015 Sustainable Development Goals with the specific SDG Goal 11 on 'Making Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable. It will equally be so in the UN Habitat III 2016 conference on 'Housing and Sustainable Urban Development' and in the Belmont Forum which gathers the world's major and emerging funders of global environmental change research.

- Ladies and gentlemen, as humans, belonging to different communities, organisations, cities and societies around the world, we have to accept to live with threats, with new emerging risks or challenges. The International agenda like the COP 21 in Paris, the recent Sendai Framework on disaster risk reduction in Japan, the sustainable development goals and the European policies and strategies are all converging in calling for and

promoting new solutions to help the planet be a better place for people to live on.

- Research and Innovation needs to be inventive and creative. It has the duty to invest in a better future. And it can do this by delivering on the paradigm that our Commissioner Moedas has proposed, promoting open science and open innovation in full openness to the world.
- European research and innovation policy, notably through Horizon 2020, will take its share in this endeavour to build a resilient Europe and make people more resilient and therefore 'actors' of their future.

I thank you.