RESPONSE TO THE PUBLIC CONSULTATION ON THE DEVELOPMENT OF A COMPREHENSIVE, INTEGRATED RESEARCH, INNOVATION, AND COMPETITIVENESS STRATEGY FOR THE ENERGY UNION

Brussels, 31 May 2016

The European Platform of Universities in Energy Research & Education (EUA-EPUE) and the UNI-SET Steering Committee and Project Consortium welcome the initiative of the European Union to create a comprehensive strategy on research, innovation and competitiveness for the Energy Union. This response is submitted as a common statement from the experience of the UNI-SET project to date in mobilising universities' capacities in the field of energy. It is presented in the form of this statement, rather than a direct response to the online questionnaire as the latter includes many issues that are not of direct relevance to universities.

'Energy' is a multi-faceted and multi-disciplinary domain, encompassing many different actors on a multitude on levels and presenting many technological and societal challenges to be overcome. This inter-connected nature of the energy system and the energy system transformation, the objective of the Energy Union, demand a comprehensive approach to the challenges ahead.

Universities are central players in research, innovation and competitiveness, most notably through their research, innovation, education and training activities which have regional and national impact including global outreach. Higher education institutions are actively developing new education and research structures that are flexible and responsive to the changing demands of the energy landscape. These new approaches provide effective opportunities for interdisciplinary training and research working to help prepare the next generation of researchers.

Universities in Europe moreover have strong and well-established capacities in research and education in the field of energy, highlighted by a recent survey conducted by EUA-EPUE in the framework of the FP7 UNI-SET project.[1] The responses so far indicate that at least 120 universities from 31 European countries have the field of 'energy' as a focal area of their institutional strategic orientation and anticipate that their energy-related research budget and student numbers will increase in the coming years.

EUA-EPUE emphasises the need for an integrated strategy to address research, innovation and education and advice to decision-makers in a comprehensive way, including dissemination of knowledge to society to enable the required changes, in order to ensure Europe's long-term competitiveness in the field of technological and non-technological energy innovation. A "sustainable, low-carbon and climate friendly economy that is designed to last"[2] will require long-term, sustained support for the foundations of innovation – excellent research and education – which require investment in young talent as new entrants, and training of experienced professionals through Life Long Learning in the energy sector.

A comprehensive strategy for research, innovation and competitiveness for the Energy Union should thus consider higher education institutions as core stakeholders in all dimensions, and support collaborative activities of universities and activities of universities with other organisations. The consultative and implementation mechanisms of the strategy should address the university sector.

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[1] www.uni-set.eu

[2] COM(2015)80 - A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy.

RESEARCH & INNOVATION

To take and hold the "lead on the next generation of renewable technologies",[3] Europe should commit to sustained support for fundamental and applied research, innovation, as well as demonstration and deployment projects. EUA-EPUE recommends to include the following points in a comprehensive Energy Union R&I agenda:

- Excellent basic research is critical to lay down the foundations to create the technological solutions for the realisation of the Energy Union. Long-term support for fundamental research, including research based on societal needs, also known as "use-inspired basic research",[4] is needed for next-generation and breakthrough technologies and non-technological solutions that are necessary to achieve the EU's greenhouse gas emission reduction targets. "Investment in long-term R&D to develop frontier technologies", so the OECD, has the potential "[to] provide urgently needed solutions to global challenges like climate change".[5]
- Cooperation between higher education institutions, research and technology organisations, industry and enterprises, and public actors needs strong support to bring higher-TRL, innovative technologies and non-technological innovation to the market and to society. This will strengthen the creation of new industries and jobs in Europe.
- International research collaboration, e.g. in the framework of the Paris Agreements following COP21 and "Mission Innovation" provides an opportunity to globalise the impact of Europe's clean-tech research.
- Governments, industry/businesses and public authorities need to work more closely with higher education institutions to create a "new environment" that facilitates the take-up of new technologies and new business models for a low carbon energy sector; also for the benefit of society at large through developing regulatory frameworks, financial environments and market incentives conducive to faster deployment of clean energy technology.
- EU should be strongly pro-active in seeking to achieve this "new environment" – an Energy Union that in terms of results is greater than the sum of the parts of individual member States' priorities and efforts.

In order to achieve these points, the contribution of universities is necessary. Policies that support the development of energy solutions should take into account the existing knowledge in universities and the constant new knowledge being generated through their research activities.

EDUCATION & TRAINING

Education is crucial to develop the "European labour force with the skills to build and manage the energy system of tomorrow".[6] Education and skills are not just a necessity for advanced energy-related R&I or RD&D, they are a key investment of public resources and affect all aspects of the energy transition. To become a low-carbon society, Europe will need informed citizens, more researchers and entrepreneurs, a skilled and re-skilled workforce and, importantly, decision-makers and opinion leaders with a sound understanding of the complexities of the energy system and its inherent challenges.

[3] COM(2015)80 - A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy.
[4] Donald Stokes (1997) "Pasteur's Quadrant: Basic Science and Technological Innovation", Brookings Institution Press.
[5] OECD (2015) "Governments must step up R&D in frontier technology" (press release). Full report "OECD Science, Technology and Industry Scoreboard 2015". (Accessed 16/11/2015).
[6] COM(2015)80 - A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy.

Education and training are critical obstacles to the near-term development and deployment of renewable energy on a larger scale. The International Energy Agency,[7] the International Labour Organization,[8] and the International Renewable Energy Agency[9] all recognise that cooperating with the private sector to develop curricula and educational contents is vital to foster such skills.

Developing these skills, nurturing a holistic view of the energy system and training professionals and researchers will be essential to sustain Europe's edge and future competitiveness, and will be a foundation for the talent that creates new and disruptive businesses in the energy sector. A comprehensive strategy for the Energy Union should therefore consider the following points:

- The "Energy Union" needs an informed, educated and critical citizenry, the creation of which is a core mission of higher education. Education is a key ingredient for informed citizens as actors and consumers in a low carbon sustainable energy eco-system.
- Sustained support for training of researchers and professionals who understand the systemic challenges of energy generation, transmission, distribution, conversion and consumption. This 'holistic' understanding is a transversal skill and will be vital to drive energy system integration efforts, without prejudice to fostering advanced skills for R&I and deployment of renewable energy, energy efficiency, energy storage, new inter-convertible energy vectors or other low-carbon solutions.
- Support for up-to-date, high-quality higher education programmes, skills upgrading and Life Long Learning activities fit for an evolving energy sector. This will be particularly important when business models, patterns of energy generation and consumption, and job profiles adapt and change.

To bolster the impact of research and innovation, education and training in the field of energy, an integrated strategy also needs to support enabling conditions: cooperation between stakeholders and openness for input.

COOPERATION

To accelerate the energy transition and to speed up the translation of research results into services and products, an integrated strategy should foster collaboration between the public and private sectors in order to increase the impact of research and the deployment of innovative low-carbon technologies. This is especially important for larger-scale demonstration facilities, the development of living labs or other actions which require substantial public and private investment.

OPENNESS FOR EXPERT ADVICE AND CITIZEN INPUT

In the rapidly changing environment of the European energy system, European, national and regional actors need to be open for impartial advice for robust decision-making, and take account of the voices of informed citizens. The university sector can contribute with input from excellent research and newest scientific knowledge. Regulatory and financial frameworks need robust evidence to ensure they achieve their objectives - universities can provide this evidence very effectively.

Hence, a comprehensive research and innovation strategy of the Energy Union should draw upon and strengthen the public utility of university research and education activities, including through new Open Science and Open Education measures that offer the necessary training and re-skilling and provide access to knowledge for European citizens.

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[7] IEA (2010) "Energy Technology Perspectives 2010: Scenarios & Strategies to 2050". (Accessed 23/05/16).
[8] ILO (2011) "Skills and Occupational Needs in Renewable Energy 2011". (Accessed 23/05/16).
[9] IRENA (2012) "Capacity Building Strategic Framework for IRENA (2012-2015)". (Accessed 23/05/16).