‘The justification of mega-projects in the EU energy mix’

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Until recently, the UK was largely self-reliant for energy, producing significant quantities of oil, gas and coal. The gradual depletion of oil and gas reserves and a decrease in domestic coal production has led to a growing dependence on imports. In the electricity sector, gas has replaced coal as the principal fuel. Since 2005, rapidly increasing energy prices, growing concerns on security of supply and awareness of climate change have raised the profile of energy in the UK. By then the Government has come out strongly in favor of new nuclear build, while some regions are putting particular focus on renewable energies (particularly wind and tidal). Although, the work in this direction was started long before in 1997, when the European Union has had a successful renewable energy policy which has enabled significant progress to be made towards the EU’s objectives of reducing greenhouse gas emissions, ensuring security of supply and improving EU competitiveness. Ambitious targets are at the core of the EU’s policies to promote energy from renewable sources. Due to the early adoption of ambitious national and EU targets, European companies are world leaders in wind power technology and have a leading share of the world market. Europe’s power mix changed dramatically over the past 40 years. Four decades ago, almost half of Europe’s power came from coal, and a quarter from fuel oil. In current scenario EU imports 82% of its oil and 57% of its gas, making it the world's leading importer of these fuels. Only 3% of the uranium used in European nuclear reactors was mined in Europe. And due to adopting the progressive energy policy, Europe today gets approximately 20% of its electricity from renewable energy sources, including 5.3% from wind energy alone, while still fossil fuels represent up to 80% of the energy mix today in Europe. In order to continue the development and deployment of renewable energy technologies, the EU adopted the 2009 Renewable Energy Directive, which included a 20% renewable energy target by 2020 for the EU. According to the Renewable Energy Directive’s 27 National Renewable Energy Action Plans, 34% of the EU’s total electricity consumption will be drived from renewable energy sources, including 495 TWh from wind energy meeting 14% of consumption. Whereas, solar and wind develop for electricity generation while biomass remains dominant for the heating sector.

The Energy Community extends the EU internal energy market to South East Europe and beyond on the ground of legally binding framework. It thereby provides a stable investment environment based on the rule of law, and ties the Contracting Parties together with the European Union. Through its actions, the Energy Community contributes to security of supply in wider Europe. The general objective of the Energy Community is to create a stable regulatory and market framework in order achieve following

1. Attract investment in power generation and energy net-works in order to ensure stable and continuous energy supply that is essential for economic development and social stability

2. Create a regional energy market allowing for cross-border energy trade and interconnection to the EU market
3. Enhance security of energy supply and
4. Improve the environmental situation in relation with energy production and supply in the region.

For this several megaprojects are step ahead toward the EU energy mix: State of the art of the strategic energy technologies, which includes extremely large-scale investment projects typically costing more than € 0.5 billion. Megaprojects include power plant (conventional, nuclear or renewable), oil and gas extraction and processing projects and infrastructural projects such as highways and tunnels, bridges, railways, seaports and even cultural events such as the Olympics. Megaprojects are united by their extreme complexity (both in technical and human terms) and by a long record of poor delivery. These include European (i) Wind initiative, which focuses on large turbines and large systems validation and demonstration (relevant to on and off-shore applications), (ii) Solar Europe Initiative which focuses on large-scale demonstration for photovoltaics and concentrated solar power, (iii) Bioenergy Europe Initiative, which focuses on 'next generation' biofuels within the context of an overall bio-energy use strategy, (iv) European CO_2 capture, transport and storage initiative, which focuses on the whole system requirements, including efficiency, safety and public acceptance, to prove the viability of zero emission fossil fuel power plants at industrial scale. (v) European electricity grid initiative, which focuses on the development of the smart electricity system, including storage, and on the creation of a European center to implement a research programme for the European transmission network, last but not the lease in the list is the (vi) Sustainable nuclear fission initiative, which focuses on the development of Generation IV reactors technologies. The "2011 Technology Map", produced by the European Commission's in-house science service, the Joint Research Centre (JRC), provides a European and worldwide analysis of 15 low-carbon energy technologies, energy efficiency in industry, energy performance of buildings and electricity storage in the power sector. Compared with the 2009 Technology Map, the steep increase of wind and solar (photovoltaics) generation capacity in the EU and worldwide is to be highlighted. On a global scale, hydropower continues to be the technology most widely used, providing 88% of electricity generated from renewable sources.

If we talk of several renewables applications and planning in EU member states, we found that the National Renewable Energy Action Plans (NREAPs) predict that advanced biofuels will contribute 2.7 Mtoe to the transport sector by 2020, approximately 11% of the total biofuel contribution. Since the adoption of the EU Renewables Directive in 2009, the development of advanced biofuel production processes has rapidly gathered pace. Moreover major oil companies are scale demonstration projects in Europe using non-food, waste and lignocellulosic feedstocks, mainly to produce bioethanol. Likewise, the EU also have photovoltaics (PV) electricity generation capacity with a total installed capacity of almost 30 GW, the member states have already made a significant step towards the target of 84 GW they committed in the National Renewable Energy Plans for 2020. While at the beginning of 2011,

concentrated solar power plants with a cumulated capacity of about 730 MW, were in commercial operation in Spain, about 58% of the worldwide capacity of 1.26 GW. Spain is also currently constructing an additional 898 MW and another 842 MW have already registered for the feed-in tariff, which would bring the total capacity to about 2.5 GW by 2013. On the other hand with the requirement of nearly-zero energy buildings from 2018-2020 as mentioned in the directive on energy performance of buildings (2010/31/EU) requires the development of new design approaches, supported by short and long term research activities, focusing more on the energy flows in, to and from the buildings. The JRC is supporting European legislation by assessing technical requirements for standardization in relation to energy performance of buildings. Last but not least, a new chapter in the 2011 Technology Map looks at the energy efficiency and CO_2 emission reduction measures being undertaken in the cement, iron and steel and pulp and paper industries.

Beyond the bounds of the European Union, EU energy policy has included negotiating and developing wider international agreements, such as the Energy Charter Treaty, the Kyoto Protocol, the post-Kyoto regime and a framework agreement on energy efficiency, extension of the EC energy regulatory framework or principles to neighbours (Energy Community, Baku Initiative, Euro-Med energy cooperation) and the emission trading scheme to global partners, the promotion of research and the use of renewable energy. Likewise, another initiative like EU-Russia energy cooperation have based on a new comprehensive framework agreement within the post-Partnership and Cooperation Agreement (PCA), which was negotiated in 2007. The energy cooperation with other third energy producer and transit countries is facilitated with different tools, such as the PCAs, the existing and foreseen Memorandums of Understanding on Energy Cooperation (with Ukraine, Azerbaijan, Kazakhstan and Algeria), the Association Agreements with Mediterranean countries, the European Neighbourhood Policy Action Plans; Euromed energy cooperation; the Baku initiative; and the EU-Norway energy dialogue. For the cooperation with African countries, a comprehensive Africa-Europe Energy partnership has been launched at the highest level, with the integration of Europe's Energy and Development Policies. Thus for ensuring efficient follow-up and coherence in pursuing the initiatives and processes, for sharing information in case of an external energy crisis was made. For assisting the EU's early response and reactions in case of energy security threats, the network of energy correspondents in the Member States was established in early 2007. After the Russian-Ukrainian Gas Crisis of 2009 the EU decided that the existing external measures regarding gas supply security should be supplemented by internal provisions for emergency prevention and response, such as enhancing gas storage and network capacity or the development of the technical prerequisites for reverse flow in transit pipelines. Thus we can conclude with the justification that the EU energy mix is the perfect example of what world need to follow, for save its resources, make a check on environment pollution and global warming.