

Seminar on 'Electrifying Europe: The Future Generation of Electricity and the Supergrid'

Sussex University, 28 June 2012

Driven by three imperatives of combating climate change, providing affordable energy to consumers and ensuring security and independence of energy supplies Europe is moving towards the creation of a single market in electricity. This market will bring low-carbon electricity from wind power from the North Sea and solar power from Southern Europe and North Africa to the densely populated regions and countries of Northern Europe. To generate solar power large concentrated solar power (CSP) will be widely deployed and where appropriate photovoltaic technologies (of which there are currently several) will be utilised. This transition will not happen without a new approach to the transmission. The new approach is the Supergrid. The basic concept is the construction of a pan-European transmission network facilitating the integration of large-scale renewable energy and the balancing and transportation with the aim of improving the European market. For the northern section of the Supergrid (Offshore North-Sea Grid) the countries involved are Germany, France, Denmark, Sweden, the Netherlands, Belgium, the UK, Ireland and Luxembourg. In the southern section of the Supergrid, the countries involved includes; Spain, Egypt, Italy, Morocco, Algeria, Germany, France. Some of the organisations involved are; ABB, ABENGOA Solar, Deutsche Bank, E.ON, Munich Re, M+W Zander, RWE, SIEMENS, GE, Intel and Alstom.

The creation of a new integrated network will radically change relationships between countries in terms of energy and lead to the creation of new inequalities. The huge number of wind and solar farms that need to be constructed will have a significant impact on the environment and landscapes and these will need to be analysed in historical perspective. The tentative total cost of building the Supergrid has been estimated at approximately €400bn.

The European Union (EU) is committed to reducing greenhouse gas emissions by at least 20% below 1990 levels by 2020 and by 80-95% by 2050. In addition, the EU has agreed that by 2020, 20% of all energy produced by Member States will come from renewable sources. This will require at least 30% of the EU's electricity to come from renewable sources from that date. The fuel sources for this transition will be renewable. By their nature these assets are not strictly national, they are more continental. The old approach when electricity grids were planned around fossil fuels and nuclear will not deliver the transformed energy systems Europe requires. This is where DESERTEC comes in. It is a German-led initiative that aims to provide 15% of Europe's electricity by 2050 through a vast network of solar and wind farms stretching right across the Middle East and North Africa (Mena) region and connecting to continental Europe via special high voltage, direct current (HVDC) transmission cables, which lose only around 3% of the electricity they carry per 1,000km. DESERTEC was first proposed about a decade ago and aims to provide a comprehensive solution that not only aims to cover increasing energy needs, but also to reduce carbon emissions to tackle global warming. It has been given an additional boost with the development of Medgrid, a French-backed initiative that has virtually the same aims and objectives as the former. The two initiatives have agreed to work in concert with one another.

We expect this interdisciplinary meeting to focus on the implications the Supergrid will have not only on the UK and Europe more widely, but also on those regions such as North Africa that will be tightly linked into the Supergrid. Papers are also welcome on India and elsewhere where solar technology is now being rapidly adopted and the lessons that other countries can learn from.

We are hoping to invite an interdisciplinary group of speakers to discuss some of the many different science, environmental, innovation and engineering implications of the Supergrid, and the adoption and diffusion of sustainable energy in the cities of Europe.

Sessions:

Sustainable Energy

Adoption and Diffusion of Sustainable Energy

Environmental Implications of Energy: Past, Present and Future

Understanding Large Scale Electrification

The Role of Emerging Technologies and the Supergrid