

**Terms of Reference for the Electricity Networks Strategy Group (ENSG)
Smart Grid Work stream**

Tasks and outputs of the Working Group

- To produce a **high level vision** of what a UK smart grid might look like and the challenges it would help address by 30 October 2009, and a **route map** for delivery of this vision by 21 December 2009.

The vision will need to say what a smart grid could look like, why we would want to develop it and how big a step this could be compared to how we currently use networks.

- Establish a consensus, industry view of the network challenges that SmartGrids could help address and therefore the likely features and functionality that would characterise a Smart Grid within a UK context – the application of technologies and systems that would constitute a smart grid and their status i.e. maturity, availability and cost as well as the uncertainties and overall timelines.
- Ascertain the level of international experience of SmartGrids to date and future plans, in particular taking account of developments in Europe.
- Determine the high level costs and benefits of developing smart grids in terms of Government policy objectives (carbon budgets and renewables targets, prices, security of supply and business benefits of developing UK expertise on smart grid technology).
- Establish a baseline position - assess current UK networks capability for smarter grid applications.
- Establish, at a high level, whether any unintended barriers exist to the development of smarter networks and if they do, propose ways to address them.

The route map will need to set out how we will deliver on the vision in the coming 5 years, including initial deployment where beneficial, what policy and regulatory issues need to be tackled and by when, who is responsible for what actions.

- Identify key measures for government, industry and other bodies within the next 5 year period to ensure UK is well placed to exploit smart grid technologies if they prove attractive options.
- More specifically propose research, development and deployment opportunities that should be pursued in the immediate future to ensure that our network companies are fully prepared to deploy smarter solutions as they become necessary and/or beneficial.

Background

1. Government is committing to improving the network infrastructure we have in the UK to ensure it is fit for facilitating the transformation in the energy system we expect in the coming decades. Networks are at the heart of defining what our future energy system can do to deliver low carbon energy which is secure and at a fair price for consumers. Part of the improvements to be considered for networks are new ways of managing energy flows with more intelligence, otherwise known as 'smart grid'. To take policy forward, we need to define what smarter network capability we need in the UK to contribute to energy and climate policy goals.
2. 'Smart grid' is not a precisely defined concept- it is unclear what it practically means to have 'smart grid' capability in the UK. The European Technology Platform for SmartGrids¹ has published a definition that is focused on the benefits that a SmartGrid is expected to deliver. This is as follows:

A SmartGrid is an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both - in order to efficiently deliver sustainable, economic and secure electricity supplies.

A SmartGrid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- *better facilitate the connection and operation of generators of all sizes and technologies;*
- *allow electricity consumers to play a part in optimising the operation of the system;*
provide consumers with greater information and choice of supply;
- *significantly reduce the environmental impact of the total electricity supply system; and*
- *deliver enhanced levels of reliability and security of supply.*

3. A SmartGrid should make networks more flexible and able to respond more quickly to changing demands from users. It is expected that a SmartGrid will embrace a range of technologies including advanced communications and metering, demand side management, storage, micro generation and electric vehicles. Smarter networks have the potential to help reduce demand and bring greater efficiency of the overall electricity supply chain, thus reducing carbon. The single most important driver for a SmartGrid is the facilitation of a low-carbon energy system.
4. At a high level therefore smart grids mean an integrated energy network with capability for intelligent management of power flows across the system from generation to consumers. In principle, this smarter capability could help meet Government policy aims. Smarter network management could help customers participate in the market and could smooth peaks in demand (through demand

¹ <http://www.smartgrids.eu/>

side measures). It could also enable more active management of two way power flows at all levels by network operators which helps manage and use efficiently higher volumes of intermittent generation and new sources of demand and storage such as electric vehicles. This active, real time management of power flows could reduce the costs to consumers of providing the secure, clean energy we need to meet our long term energy and climate targets. Smarter management of power on the network could reduce the need for on-going expansion of the physical network as the energy system makes its transition to 2050.

5. However, we currently have little evidence of what the costs and benefits could be for a 'smart' network in terms of UK Government energy-climate policy objectives. We also do not have a clear definition of practically what a smart grid means in terms of the UK network assets. We have some companies using networks in innovative ways to deal with emerging challenges such as intermittent wind, so we need to understand what even more 'smart' capability could deliver. We therefore need to look at a range of issues for a 'UK smart grid strategy': what elements of a smart grid we already have in the UK, what we might need to help deliver our goals and by when, what that will cost and how we will get there.

Membership of Group

The Group will be chaired by DECC/Ofgem

The members of the working group will be selected from nominations put forward by ENSG members. It is suggested the Group comprises;

DECC
Ofgem
DfT
CLG

National Grid, SSE, SP

DNOs – Edf, CE, Eon

ENA
ERP
ETI
SEDG

The Group will be supported by a Secretariat (AEA) and an Independent Consultant appointed by DECC/Ofgem that can provide smart grid and network expertise including capture and development of the Group's thinking, gathering information and inputs and tasks by from Group members and taking forward supporting research and analysis and the preparation of the vision and route map.

Meeting frequency/timetable

To meet monthly for the next six months and as required to finalise outputs.