

Smart Grid Forum WS3

(Developing Networks for Low Carbon)

Terms of reference

Objective

Networks will be a key enabler of future energy delivery and the achievement of the UK's low carbon objectives. The future needs of customers will be very different from today's requirements, and power generation will also change to include more intermittent and local generation sources. An efficient energy system in 2030 is therefore likely to have very different characteristics to the current model.

This work will translate the UK's energy scenarios into key strategic direction for network development, identifying incremental network growth and smart grid techniques as well as considering plausible unconstrained or ideal network services, infrastructure and operation.

It is also important to recognise the degree of uncertainty within the energy scenarios, and therefore identify elements of the networks response that could provide a degree of mitigation.

This workstream has three main objectives.

1. Assimilate the UK's energy scenarios, from WS1, and confirm a central case and sensitivities
2. Identify the network implications of the central scenario
 - a. Demand / DG integration growth at each voltage level;
 - b. The 'peak heat' challenge;
 - c. The combined heat and EV challenge;
 - d. Dealing with intermittency in energy supplies;
 - e. Potential misalignment of local and national energy demands and signals;
 - f. New and existing actors, responsibilities and interfaces with differing objectives along the energy chain.
3. Develop the network response to the implications of the central scenario

This includes operation, services, network investment and standards (eg security, voltage, power quality) and considers three key elements;

- a. Traditional network response;
- b. Traditional network response enhanced by smart grid techniques (eg demand side response);
- c. Network response with ambitious evolution to ideal network characteristics of 2030. This will include consideration of the ideal technologies assumed to be part of an ideal network in 2050, then identify those credible technologies that either currently exist or have a defined development plan for the 2030 proposal.

In order to support the timely development of ED1 plans for Ofgem and network companies, the work will be undertaken in two distinct phases.

Phase One Uses predominantly qualitative inputs to develop key network responses and quickly identify overall network implications and responses along with shorter term regulatory framework implications. (September 2011)

Phase Two Builds on the ambitious evolution to 2030 and uses generic network models to develop a more informed view of ideal network characteristics. This will apply the central energy scenario to model rural, urban and suburban urban networks at each voltage level. (February 2012)

Phase Two also delivers a suite of detailed smart grid use case templates that can be used as a foundation for further technology, system and process development.

Scope

The work is network focused, predominantly up to 132kV, but it will consider the whole energy delivery system, from sources of generation to points of end use. It therefore includes issues such as energy trading and balancing and system management, and also highlights physical, technical, legal, regulatory and commercial requirements as appropriate, along with the actors or participants, and their roles in future energy delivery.

Lead

Network companies

Funding

Network companies

Outputs

The primary output from the workstream will be Phase 1 and Phase 2 reports containing the following:

- Energy scenarios – central scenario and sensitivities (linkage with WS1) (and assumptions)
- Implications for networks within the energy supply chain
- Network Response, including distinction between ‘historic’, smartgrid, and ‘ideal’ ambitious evolution
- Use cases for the key operational features of future networks in summary table form and as detailed individual cases.
- Identification of “no regrets” actions towards 2030 future network
- ENA actions and work plan
- Identification of steps that government or others could take towards efficient future networks.

Support

Consultants, manufacturers, suppliers, Ofgem, DECC,

Governance

A WS Steering Group of Smart Grid Forum members will oversee the development and management of the project.

The project will be undertaken principally by ENA member companies, with appropriate contributions and input under the guidance of the Steering Group

Timescale

There is a potential critical dependency on the development of the energy scenarios within WS1. ENA has already undertaken some scenario comparison and assimilation work, and is already working with Redpoint to consolidate the work. This will be available early within the timeframe of Phase One and can therefore inform the project in advance of WS1 delivery.

- Agree the scope of the work and deliverables - June
- Form a WG – July
- Liaison with WS1 - August
- Deliver Phase One output - September
- Agree detailed scope for Phase Two – September
- Draft report – end January
- Final report – end February

Project Structure

