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Smart Grid Forum - Annual Report

The Smart Grid Forum – Annual Report 2014

We are celebrating another productive year for the Smart Grid Forum (SGF) by looking back at what it has delivered to support the UK's transition to a secure, safe, low carbon energy system. Thanks to the continued collaboration and support from across the industry, progress and delivery has been significant. This report highlights the progress made by the SGF in the last year and sets out its direction of travel for the year ahead.

Progress summary

- The Transform model, produced by Work Stream 3, has been used in the development of RIIO ED1 business plans
- In February the SGF's 'Vision and Routemap' was published setting out a strategic direction for the SGF and identifying new challenges to be addressed
- In April the SGF's Work Stream 6 published its interim report, marking a significant milestone for this project
- The Work Stream 7 study focussing on the technical challenges of a 2030 distribution network is underway
- A partnership agreement is being put in place to deliver a UK smart grids web portal.

Background to the Smart Grid Forum

There is a broad consensus that the transition to a low carbon energy system will have significant impacts on our electricity networks but also bring opportunities. The electrification of heat and transport and the integration of intermittent generation will bring many new challenges, particularly for the distribution network operators (DNOs) as they work to increase capacity and accommodate new technologies. But with these challenges come opportunities to improve our electricity networks and to support the economy. For example, by adopting more intelligent monitoring and control into distribution networks and engaging the demand side (ie elements of a smart grid), DNOs can meet these challenges at lower cost than more conventional solutions. This will support new jobs in the 'smart grid' sector and, noting the international agenda for smart grids, create potential export opportunities. It will also reduce upward pressure on bills for customers.

The government and Ofgem support innovation across the network companies so they are able to play a full role in achieving our low carbon targets while ensuring value for money for customers. In particular, innovation is a central element of Ofgem's RIIO¹ philosophy. In addition to incentives in the price control settlements, Ofgem encourages all network companies to generate new ideas through the Innovation Funding Incentive and the Low Carbon Networks Fund (LCN Fund). The Department of Energy & Climate Change's (DECC's) Low Carbon Investment Fund provided early backing for innovative projects. Its rollout of smart meters across GB by 2020 will provide a critical platform for the development of a smart grid by providing more accurate information and improving communication between consumers, electricity suppliers and network companies.

The SGF is another important way that Ofgem and DECC support industry on smart grid issues. Established in April 2011, the SGF brings together expertise from across the network, supplier, generator, customer and manufacturer communities to provide strategic input to help shape Ofgem's and DECC's policy making and leadership in this area. The SGF also helps network companies address future network challenges, to ensure that whole system benefits are considered in this work, that commercial and regulatory aspects are addressed in a timely way, and to provide drive and direction for the development of smart grids.

You can find more details about the [Smart Grid Forum](#), including a full list of [Smart Grid Forum members](#) on Ofgem's website.

¹ <http://www.ofgem.gov.uk/Networks/rpix20/ConsultDocs/Documents1/RIIO%20handbook.pdf>

The Smart Grid Forum

The SGF's key theme over the last year continued to be preparation for RIIO ED1 – the next electricity distribution price control. The SGF has established a basis for meaningful analysis and discussion between companies, regulators and policy makers about critical decisions for companies, regulators and, above all, customers on investment in smart grid technology that has the potential to make material long term savings for customers. In particular, the development of the Transform model by Work Stream 3 has enabled the companies to make these projections using a nationally recognised model that had significant stakeholder input. This is a very significant achievement. The Transform model was used by the DNOs to help preparation of their RIIO ED1 business plans, which were submitted to Ofgem in July 2013.

Ofgem made its "Fast Track" decision² in February this year. The RIIO ED1 process is now continuing with the remaining companies. Their approach to smart grid opportunities will form an important part of Ofgem's business plan evaluation. Real progress has been made by all the work streams as reported here.

Work Stream 1 – Assumptions and scenarios

The purpose of this work stream is to develop shared assumptions and scenarios about the need for additional distribution network capacity. It involves setting out government analysis of the implications of its low carbon policies, consistent with meeting the government's [Carbon Plan](#). During the last year, the assumptions and scenarios produced by this work stream have been stable, consistent with the government's position. No new work can be reported here but the vital role that the work stream plays continues.

Work Stream 2 – Smart grid evaluation framework

At the end of the SGF's first year, this work stream successfully completed the development of an evaluation framework for high-level assessment of alternative network development options. Having achieved its purpose it was closed. The framework was adopted by Work Stream 3 and provided the foundation for the Transform model.

Work Stream 3 – Developing networks for low carbon

The purpose of this work stream has been to create a ground-breaking model (Transform) of the costs and benefits of smart developments of the GB distribution system. This model incorporates the fundamental economic assessment approaches developed in Work Stream 2 and uses the low carbon projections for GB from Work Stream 1. Phase 1 of this work was completed in year one.³ Phase 2 focused on developing the model.⁴ It found that the impact of decarbonisation on GB electricity distribution networks is likely to be very significant, especially beyond 2020. Analysis confirmed that smart solutions are more cost effective than traditional solutions, with the optimum response being a blend of smart and traditional network solutions. Furthermore, customers should benefit from new services delivered on the back of smarter networks. The methodology and findings were published in August 2012 in the report, ["Assessing the impact of low carbon technologies on Great Britain's power distribution networks"](#).

Phase 3 of the work was essentially complete at the end of year two. This focused on refining Transform and splitting the model into 14 licence areas. The outputs of this work are now published on the SGF website. DNOs and Ofgem used Transform in the development and evaluation of the 'Well Justified Business Plans' that DNOs submitted to Ofgem in July 2013. They have been used again for the resubmissions of March 2014. During this time Work Stream 3 has met to oversee minor changes and improvements to Transform based on feedback from its user base. A public dissemination event on their work was held in London on 14 October 2013.

² <https://www.ofgem.gov.uk/publications-and-updates/decision-fast-track-western-power-distribution>.

³ This undertook an initial evaluation of the networks' response to the challenges of a decarbonized energy system. It was published in November 2011, available [here](#).

⁴ EA Technology Ltd was the main contractor for this work but included sophisticated contributions from Element Energy and GN Noble Denton.

Work Stream 4 – Closing doors

This work stream highlights the potential impact that near-term policy development and decisions could have on our longer-term goals. The work stream continues to work with other SGF work streams (eg development of the Work Stream 7 requirements and objectives) to ensure that policy development is challenged and validated against wider supply chain concerns. A further example of this was the contribution to the SGF's Vision and Routemap in the area of technology innovation. In particular this year, Work Stream 4 has focused on the models and tools available for building our understanding of the increasingly complex interrelationships between the various governance, market structures, technical deployments and end user engagement. These relationships are further complicated by European, national and local policy development, and the way commercial and technical deployments are viewed by the wider supply chain. This has led the Work Stream 4 members to propose the use of the CEN/CENELEC/ETSI Smart Grid Architecture Model as a tool to build a common lexicon and understanding across the industry. Work is underway with DNO members to consider the implementations that have already been used and to see if this work can be leveraged to assist the wider aspects that the supply chain needs.

Work Stream 5 – Ways of working

This work stream is primarily responsible for leading effective knowledge dissemination in relation to the SGF's key activities.

A major milestone was reached in year three when the ENA launched its Smart Grid Portal. The portal is a valuable information resource relating to innovation, ideas and projects to help deliver a Smart Grid. It gives easy access to the latest learning from the Low Carbon Networks Fund projects and holds over 500 innovation projects covering the Innovation Funding Incentive and the Registered Power Zone work. Going forward, it will include information on the Network Innovation Allowance and Network Innovation Competition projects from all four gas and electricity network sectors.

During year four, the number of parties engaged in the Work Stream 5 'project' has increased. The ENA, Smart Grids GB, HubNet and BEAMA have been joined by the Technology Strategy Board, the Energy Technologies Institute and the Institution of Engineering and Technology.

These parties are now close to signing an agreement with Ofgem and DECC to develop a UK smart grids portal to give easy access to their combined smart grid initiatives. This is planned to go live later this year.

The work stream is also strengthening its links with academia. Discussions are taking place to explore ways in which the learning and dissemination from the wide-ranging UK smart grid activities can be enhanced.

Work Stream 6 – Overcoming commercial and regulatory barriers

Work Stream 6 is halfway through its ambitious two-year programme to explore how customers will engage with a smart grid, in particular to provide responsive demand or generation. The work stream has recently produced a report capturing its work to date. This report outlines a number of options (tariffs or commercial arrangements) through which customers (domestic, industrial and commercial or distributed generators) might be able to engage with a smart grid and realise the associated benefits. For each option the work stream has identified potential roles and relationships required between industry parties, including which party could engage with customers. It has made some early observations on the challenges associated with implementing the options. These include DNO access to smart metering data and lack of commercial arrangements to ensure the system operator has visibility of actions taken by the DNO.

From April onwards, the work stream will focus on developing commercial relationships to have a fully defined list of options. These commercial arrangements will look to balance the benefits of smart grids amongst active smart grid parties and the customer base as a whole. The work stream will also look to recommend options to overcome the challenges already identified in its report. The fully defined options will act as practical examples to test against the current regulatory and commercial framework, taking account of recent policy developments such as the retail market review and electricity market reform. This process will be used to highlight where changes need to be made to current frameworks in order to maximise the value of smart grids for customers. The work stream will conclude its work in April 2015.

Work Stream 7 – 2030 Distribution Network

The Work Stream 7 project is a natural progression from Work Stream 3. Work Stream 3 used an engineering and economic model (Transform) to examine the likely mix of traditional and smart solutions necessary to meet the growth in use of distribution networks that will result from decarbonisation. This model shows that using smart solutions reduces the cost of electricity distribution. However, Transform does not make in-depth analysis of the operation of such networks. Work Stream 7 focuses on how such networks will operate in practice, modelling in detail how system components will interact. It takes into account the interactions with both the transmission system and also smart electrical appliances in the home. In particular, it will assess how the various control systems, and their communication media, interact between transmission, distribution and customers. There is a clear parallel with the work of the Institution of Engineering and Technology (IET) Power Networks Joint Vision⁵, but whereas the IET work is concerned with the operability of the whole system, Work Stream 7 is focussed on distribution networks. As such, the two areas of work are complementary and aligned.

The work stream has articulated the main challenges and questions to be answered in a report that was accepted by the SGF at its October 2013 meeting. This report forms the foundation of the modelling work to be undertaken. Work Stream 7 seeks to undertake its work through a consortium of consultants and experts. A workshop was held for those organisations interested in tendering for the work on 9 January in central London with more than 50 representatives from 24 organisations. A contract is soon to be placed with a consortium to carry out this work, guided by the work stream. Dissemination events will be organised and a final report is scheduled to be completed by May next year.

Work Stream 8 – Vision and Routemap

A key deliverable for year three was a refreshed vision and routemap for the SGF. A new work stream was established at the beginning of the year, led by DECC, and the work was completed in February. The Vision and Routemap is now available.⁶

The Vision and Routemap reflects on the implications of the development of smart grids for the energy system as a whole, but is primarily focused on the distribution network where the SGF believes most action is needed at this stage. The document does not attempt to outline a precise path to reaching our vision as this will evolve over time as innovations emerge and as the needs of network users evolve. However, the SGF does have a sense of the direction of travel and this is what the routemap is seeking to convey.

The routemap proposes a series of actions which are now being incorporated into the work programme for the SGF.

⁵ <http://www.theiet.org/factfiles/energy/elec-shock-page.cfm>

⁶ <https://www.gov.uk/government/publications/smart-grid-forums-smart-grid-vision-and-routemap>

Smart Grid Forum – year four programme

A significant programme of ongoing and new work is planned for the SGF's fourth year:

- **Work Stream 4** – plans to engage with a wide range of stakeholders to explore the application the Smart Grid Architecture Model that has been developed by Expert Group 1 of the European Commission's Smart Grid Task Force.
 - **Work Stream 6** – as reported above, this work stream has reached the mid-point of its project to explore the smart grid opportunities at the customer interface, as well as for storage. The work is planned to be complete by April 2015.
 - **Work Stream 7** – the 2030 distribution network study is proceeding to the schedule set out a year ago. The detailed programme of work is now underway and a final report is planned for May 2015
 - **Work Stream 5** – the work of this group will continue with the key aim to deliver a UK smart grids web portal later this year. It will then consider what other knowledge dissemination initiatives might be pursued. It will also give further consideration to establishing better linkages across the smart grid community.
 - **Work Stream 8** – having completed the vision and routemap, this work stream will consider, with the SGF members, how best the proposed new work can be taken forward.
- consider further the work programme proposed by [Work Stream 4](#)
 - work in co-operation with other industry groups such as ENSG, SGGB, and the Institution of Engineering and Technology.

We welcome your feedback and look forward to working with you over the coming year.

Yours faithfully,

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In addition, the SGF will continue to:

- update and maintain shared assumptions and scenarios (Work Stream 1) of the rollout of low carbon technologies in support of the Government's energy goals
- provide governance for the Transform model (Work Stream 3), including any necessary ongoing maintenance and incorporation of any new data from [Work Stream 1](#)

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⁷ http://ec.europa.eu/energy/gas_electricity/smartgrids/taskforce_en.htm

⁸ Electricity Networks Strategy Group; Smart Grids GB.