

13th February 2009

To: Joint Chairs of the Electricity Networks Strategy Group;

**Chris Barton, Head of Renewable Energy and Innovation Directorate
&
Steve Smith, Director of Networks, Office of Gas and Electricity
Markets**

**REPORT TO THE ENSG BY THE CHAIRMAN OF THE TRANSMISSION
STUDIES WORKING GROUP**

At the first meeting of the reconstituted Electricity Networks Strategy Group (ENSG) on 1st July 2008, it agreed to set up a Transmission Studies Working Group to support National Grid and the Scottish Transmission Licensees to identify and evaluate the GB transmission network investment options to accommodate the electricity generation needed to meet the UK's 15% renewable energy target by 2020.

The purpose of establishing the project Working Group was to assist and have oversight of these industry led transmission studies to ensure that they provided – as far as possible – a robust, transparent and authoritative approach to identifying the likely GB transmission network investments needed to connect new renewable and other forms of generation needed to deliver the 2020 target and ensure security of supply.

In addition to the three transmission network owners, DECC and Ofgem invited onto the Working Group representatives with generation and distribution network interests to help develop and challenge the background assumptions and generation scenarios on which the network development options set out in the Working Group's Study Report are based. I acted as Chair of the group and this is my report to the ENSG setting out for consideration the main findings and recommendations of the Working Group. The purpose of preparing the Study Report was to identify and evaluate specific economic transmission network investments needed to achieve the 2020 target. The delivery of specific proposals for the reinforcement and/or expansion of the transmission network are the responsibility of the Transmission Licensees and will be subject to the appropriate regulatory and planning processes.

The Study Report concludes that, provided the identified reinforcements are taken forward in a timely manner and can obtain development consent, the reinforcements identified can be delivered to the required timescales.

The terms of reference for both Working Group and its Study Report together with a list of the Group's membership and others that attended meetings over the course of the project are annexed.

The Working Group's first meeting was on 19th August 2008 and it has met six times. Over this period there has been intense activity and a high level of commitment by the group members which has enabled the successful completion of the Study Report in an extremely challenging timeframe. I would like to thank all members of the group for their assistance, but particular thanks should go to the core 'Study Team' made up of National Grid, Scottish Power Transmission Limited (SPTL) and Scottish Hydro Electric Transmission Limited (SHETL).

The minutes of all meetings are available from the ENSG secretariat and will be put onto ENSG website shortly.

The Transmission Studies Project

The study was split into two phases. The first phase, which considered future investment plans to 2020, is now complete and the Study Report is attached to this report for presentation to and discussion at the ENSG meeting on 18th February.

The second phase that is now underway will evaluate the ongoing need for those investment plans using 2025 & 2030 scenarios and this phase is expected to complete by early April.

The Working Group has considered the outputs from the Study as it has progressed, and has discussed and questioned the Study Team on the technical, spatial, cost assumptions and scenarios used. The group has received and taken into account other relevant information and developments, including network studies carried out in support of the DECC Offshore Energy Strategic Environmental Assessment for Round 3 Offshore Wind, Crown Estate Leasing of Round 3 Offshore Wind projects and the first report by the Committee on Climate Change.

The Working Group's Conclusions and Recommendations

In this Chairman's report, I draw out the Working Group's general observations on the main findings of the Study Report for the attention of the ENSG. I also draw the ENSG's attention to a number of technical, commercial and regulatory issues that the Working Group identified in the course of the project as being potential barriers to the timely delivery of these essential transmission investments.

It is the consensus view of the Working Group's members that the approach taken and the methodology applied to the Study Report, and the underpinning electricity generation and demand scenarios and assumptions used, has identified a robust set of network options.

Reinforcements Identified

The study group in developing its scenarios have given consideration to the interaction of wind and nuclear. The scenarios in the Study Report vary the renewable penetration in Scotland from a minimum of 6.6GW, a second scenario with 8GW, and a final scenario with a maximum of 11.4GW by 2020. These figures are for new renewable generation (potentially both on and offshore) and are in addition to existing hydro. However, all scenarios considered achieve a total UK renewable contribution of 147TWh by 2020. To achieve this UK target, the volume of offshore windfarm generation in England and Wales was increased to compensate for any volumes less than 11.4GW in Scotland. The assumptions used in the scenarios are entirely independent from and in no way pre-suppose the outcome of individual planning decisions about projects on particular sites and, in the case of nuclear, the Strategic Siting Assessment (SSA) process.

The successful completion of existing and planned transmission works including Beaulieu-Denny is assumed in the Study Report as a pre-requisite for all the analyses undertaken.

In identifying the potential transmission reinforcements, the primary approach of the Study Team has been to maximise the utilisation of the existing assets where possible. Where the need for significant reinforcements requires new assets, consideration has been given to employing the 'latest' technology, especially where additional economic and/or additional environmental benefits can be expected.

In such cases, the Study Report has taken account of the lead time required to develop robust engineering solutions and the need to obtain the necessary land, rights and development consents for each of the reinforcements in a timely manner. The opportunity has also been taken to optimise the integration of onshore and offshore developments to ensure the lowest cost solution. The report identified a range of reinforcements which could accommodate up to 45GW of new generation (potentially up to 34GW of both onshore/offshore renewables).

Details of all the reinforcements are set out in the Study Report.

Costs

The scale of the transmission investment in the Study Report needed to facilitate delivery of the UK's 2020 targets is estimated to be in the order of £4.7bn. The Working Group has highlighted that it is worth noting that this investment is over a ten-year period and is a relatively small fraction of the £100bn investment estimated needed to meet our 2020 targets.

The pre-construction costs have been estimated in the range 2-4% of the total investment costs or £150m, with typically 0.25-0.5% or £7.5-15m of this cost being in the first year. The Working Group has highlighted that the immediate commencement of pre-construction works would ensure the necessary development of our networks is 'on course' to fully facilitate the UK to meet its targets.

Potential Barriers

The Working Group has also identified a number of issues that individual and/or collectively could present barriers to the timely delivery of these essential investments. These have been brought together under broad themes:

Planning: Historically the timeline for constructing new transmission network has proved longer [by several years] than the timeline for consenting and constructing new generation. To meet the 2020 target, the Working Group considers that certain elements of the new transmission infrastructure identified in the Study Report should, in many cases, commence before the generation projects that it would connect are themselves consented.

The Working Group considers that the National Policy Statements that will inform planning decisions by the Infrastructure Planning Commission and the approach applied to the planning and decision making processes need to recognize this and take into account the characteristics of network and other energy infrastructure development if it is to fully and fairly facilitate the delivery of this important strategic infrastructure. Similarly the Working Group make the same observations in respect of the Scottish National Planning Framework. The Working Group **recommends** that ENSG draw this to the attention of the DECC Energy Development Unit and the Department for Communities and Local Government.

Investment: Securing the necessary investment for new network infrastructure will be critical. Timely decisions will need to be taken by the regulator on approval of the necessary new investments. The group notes that in this respect Ofgem has recently published proposals for enhanced investment incentives. The Working Group **supports** Ofgem's proposal that the immediate priority for regulatory funding is placed on the early pre-construction works as delay to these decisions will in its view immediately compromise the UK's ability to meet its renewable energy targets.

Technical Challenges: The network solutions set out in the final report incorporate the use of technologies that have not to date been employed in the UK energy system i.e. HVDC and Series Compensation, which coupled with a significant volume of renewables, may present a number of technical challenges for the operation of the network. While the Working Group

considered that there were no technical barriers to the incorporation onto the system of the level of wind envisaged in the scenarios in the Study Report, further research could assist in the successful deployment of these solutions. The Working Group **recommends** that the ENSG considers whether further research is needed, for example the Energy Technologies Institute or other research bodies could play an active role.

Supply Chain: There is risk that supply chain issues could impose constraints, resulting in delays or narrow windows for procurement and will therefore need to be included in the planning and scheduling of developments. The Working Group **recommends** that ENSG should draw this to the attention of the Office of Renewable Energy Deployment for further consideration.

Skills: The availability of the suitably skilled people needed deliver these network projects represents a major risk, as many of the people with the necessary skills are approaching retirement. Moreover, the lead time through training to full competence is long - 5 years or more. On top of this, there is a limited capacity to train people. The sector will need to attract new people that have the necessary skills, education and training. The Working Group **recommends** that the ENSG draw this to the attention of the EU Skills and the National Skills Academy for Power that is currently under development.

In the course of its discussions the group has recognised that there are other issues coming to the fore, such as proposals for a North Sea "supergrid". While it may be useful to debate these longer-term proposals the Working Group considers that the focus of the Government and the Regulator should remain on the challenges that need to be addressed to ensure the delivery of the UK's 2020 renewable energy target.

Conclusions

An executive summary of the full report has been prepared for the ENSG's consideration. In addition, Annex 1 of this report sets out a number of points and suggestions by the Working Group which it wishes to draw to the ENSG's attention.

The full report has also been made available to ENSG members and the Working Group recommends that the ENSG considers the publication of a précis and the Study Report itself to further inform debate on the shape of the GB transmission network needed to achieve the UK's 2020 renewable energy target.

It is proposed that the working group meet once more to complete Phase 2 of the study [2025 & 2030 scenarios] this work is expected to complete by the spring, after which the group will be dissolved.

While the group believes that all of the challenges outlined above can be addressed, it will require coordination of effort and co-operation between the various key stakeholders. It is in this respect that the Working Group believes ENSG can be most effective having an essential role in providing a strategic overview and raising awareness of the issues.

**John Overton, Chairman of the ENSG Transmission Studies Working Group and Deputy Director, Future Electricity Networks Team
Department of Energy and Climate Change**

Annex 1

The ENSG is invited to:-

Note:-

- The Study Report concludes that, provided the identified reinforcements are taken forward in a timely manner and the planning consent process facilitates network development, the reinforcements identified can be delivered to the required timescales;
- The work done by the PWG in assessing the required transmission investment to meet 2020 targets;
- the total capex costs quoted, of around £4.7b, are only estimates at this stage and will be fully reviewed during the pre-construction engineering;
- the pre-construction engineering expenditure is estimated to be in the order of £150M, with between £7.5-15M occurring in year 1. Such works should commence without delay;
- regulatory reform of the current user commitment arrangements is required to facilitate GB Transmission Licence holders to fully resource to take projects forward in timely manner;
- Conditionality of Beaulieu-Denny;
- Timely investment of the onshore network can provide significant benefits in facilitating the connection of offshore networks ;
- application of new technology [to GB] and risk mitigation strategy being applied and
- the obtaining of planning consents in a timely manner is critical if reinforcements are to be delivered to required timescales and it is anticipated that the need for such reinforcements will be discussed in the proposed National Policy Statement for Electricity Networks.

Endorse:-

- the findings of the PWG with regard to the required transmission reinforcements identified by the Transmission Investment Option Study; specifically –
 - that the PWG has defined a network to deliver against a robust and credible set of assumptions, and
 - based on the assumptions, that the recommendations in the report are a rational set of options for moving forward.

Publish, Monitor and Review:-

- publish a précis and the Study Report itself to further inform debate on the shape of the GB transmission network needed to achieve the UK's 2020 renewable energy target;
- progress of implementation as work proceeds in order to help ensure additional information/issues are identified; in this respect the GB Transmission Licence holders will keep the assumptions underpinning the studies under review and report [by exception] when material issues arise, as the project moves forward.

Annex 2

ENSG Transmission Project Working Group Terms of Reference

- Support National Grid and the transmission licensees in developing the likely capacity (renewable and conventional) deployment scenarios in GB needed to support delivery of the 2020 targets.
- Review the high-level transmission investment plans as they are developed and consider and comment on the scale, costs and associated timescales of investment that might be necessary throughout the GB transmission network to accommodate these scenarios in particular identifying those investments that are likely to be essential in any plausible scenario.
- Identify potential regulatory issues and obstacles that might arise in relation to the timely and efficient delivery of this investment.

In addition, the ENSG asked that:

The Project Working Group should take into account and build upon related work commissioned in support of the DECC Renewable Energy Strategy Consultation.

The Project Working Group should maintain awareness of, take into account and contribute to, other related ongoing activities that have the potential to affect the conclusions and outputs of the Group.

Annex 3

ENSG 2020 Transmission Study Terms of Reference

To identify and evaluate specific economic transmission investment options to accommodate electricity generation to meet the UK's 15% renewable energy target by 2020.

- Quantify level of renewables that can be accommodated on the existing networks (inc. approved reinforcements) by 2015 based on transmission upgrades with low consent and technology risks.
- Identify network to accommodate UK renewable targets for 2020 whilst maintaining sufficient transmission capacity ensure continued security of supply (appropriate generation can get access to demand).
- High level overview of Environmental considerations (final report).
- Final report by end January 2009 which identifies the optimum reinforcement strategy

Annex 4

Membership of the ENSG Transmission Studies Project Working Group

John Overton (Chair)	BERR/DECC
John Spurgeon	BERR/DECC
Stuart Cook	Ofgem
Chris Bennett	National Grid
Mike Barlow	Scottish Hydro Transmission Ltd [Study Team]
Colin Bayfield	Scottish Power Transmission Ltd [Study Team]
Guy Phillips	E.ON
Dave Openshaw	EdF
Nic Rigby	RWE
Keith Maclean	SSE
Robert Longden	Trade Organisations
Richard Ford	RES
Rob Rome	BE
Floren Castro	SKM (Independent Expert)
Chris Naish	Secretariat, AEA Technology

List of attendees to the Working Group meetings over the course of the project

Andrew Hiorns	National Grid [Study Team]
David Paradine	National Grid [Study Team]
Min Zhu	Ofgem
David Hunt	Ofgem
Cheryl Mundie	Ofgem
Graham Knowles	Ofgem
Danielle Lane	Crown Estate
Aileen McLeod	Scottish & Southern Energy
Alan Michie	Scottish Power
Charles Ruffell	RWE
Tim Russell	Independent [Trade Associations]