

Energy Technologies Institute (ETI)

Response to the Energy and Climate Change Committee Inquiry into the “Impact of potential Scottish independence on energy and climate change” March 2012

Summary

1. Delivering and operating an affordable, secure and sustainable energy system for the UK in line with 2020, 2030 and 2050 targets will require a considerable degree of integrated design, development, planning and delivery at a very deep level of system and policy integration. Across all regions of the UK it will be important to consider power, heat and transport as integrated aspects of a single system. Effective integration is the critical aspect of this and will be essential in delivering a system which can meet consumers needs for energy and which is cost effective and supports (rather than constrains) economic growth.
2. Making this happen will require a coherent approach to policy development at a number of levels – UK wide in terms of acceptance and apportioning of international climate change targets, nationally / devolved administration level in terms of regional population demands and energy services delivery and locally in terms of planning etc.
3. Scotland has a distinctive demand for energy services compared to most of the rest of the UK driven by its population and industrial distribution, its climate and by the proximity and accessibility of specific energy resources – principally fossil fuels and renewables.
4. ETI’s ‘ESME’ system and associated expertise for modelling and design of the overall UK energy system out to 2050 allows assessment of regional needs and impacts. ESME highlights the importance in Scotland of power supply using onshore and offshore wind, hydro, biomass, and gas turbine plants with CCS (fuelled using natural gas or biomass). ESME searches for the lowest cost national (UK) solution for 2050 and in this context also highlights the use of nuclear plant in Scotland (on existing nuclear sites) and gas turbines fuelled with hydrogen (syngas from natural gas, coal or biomass). This power capacity is heavily reliant for effective and secure operation on strong electricity transmission links to England (and Ireland to an extent). In a UK cost-optimised design, over 75% of the capacity in Scotland would be based on renewables and power generation from this would require some intermittency management including some ‘balancing capacity’ from south of the border.
5. The potential independence of Scotland clearly brings additional complexity around development of the optimum energy system for the UK and the ESME summary above (para 4) serves to highlight two critical risks :
 - The most efficient and optimised UK energy system requires a single UK energy strategy and supporting policies. Implementation of distinct policy in Scotland (eg; “no nuclear”) may lead to a sub-optimal UK energy system with cost impacts on all consumers across the UK.

(NB : The impact of not implementing nuclear to its full potential across the UK brings an additional cost of around £4bn p.a. in 2050 (£2010) in a UK wide energy system cost of around £294bn. We have not yet identified the cost impact of not implementing nuclear in Scotland alone).
 - Irrespective of potential independence, interconnection of energy systems north and south of the border will require that policy development and implementation across UK and Scottish agencies must remain very closely coordinated. In critical interface areas this must be integrated as ‘single policy’ – particularly for major system integration infrastructure based developments (such as transmission systems). Without this it is inevitable that investment

decisions will be delayed and the UK system on both sides of the border will be compromised in terms of affordability and security.

6. It is critical that these risks are addressed effectively to ensure that investor confidence is sustained across the whole UK energy system. Uncertainty, and in particular any perceived 'policy competition' (which is likely to be short term and highly variable) will deter investors and operators who will be looking for an environment of stable regulation which allows them to plan their business. An additional impact is likely to be that manufacturing supply capacity may become prioritised towards other international markets with what are perceived as more stable long-term positions.
7. In the time available for this submission it has not been possible to implement a programme of ETI modelling work to address the specific issues associated with design of a UK system optimised to allow for a 'policy-independent' Scotland. This is work which the ETI could undertake and feed into the Energy and Climate Change Committee at their request.
8. ETI delivers capability for the UK on behalf of the devolved administrations as well as HMG central departments. We would expect to continue to provide support to all the UK administrations irrespective of potential Scottish independence.

Comments relevant to the more specific questions in the inquiry

9. Security - Energy security is delivered primarily through diversity in both fuel supply and conversion / generation / distribution technologies. The UK currently operates a diverse portfolio and our modelling to date suggests that Scottish independence would not significantly affect the technology aspects of this provided adequate two-way electricity and primary fuel transmission capacity existed between Scotland and England. This would be needed to address both primary fuel supply security (gas in particular) and renewable intermittency management in Scotland. This would require integration of both technology upgrade investments (line capacity for instance) and pricing policy.
10. Delivering climate change objectives – This is probably the most challenging factor in this inquiry. It is realistic to assume that most policy and 'north-south energy trading' issues between an independent Scotland and the rest of the UK can be addressed through appropriate pricing structures and agreements. The climate change and renewable energy targets are difficult to apportion to individual countries other than through agreement around an underpinning analytical model and design system (such as the ETI ESME approach or similar) and negotiation. The challenge is then sustaining necessarily long-term national *integrated* strategies which are intended to deliver an overall system output. Financial recompense for failure to meet a national carbon target would then be implied, however, this is likely to be challenging to implement. In practise, the overall system cost penalty could result as much from the failure to deliver adequate security of supply as failure to meet a carbon target. The financial impact of addressing security issues could be much greater in the short term in terms of additional capital investment in plant and infrastructure.
11. Investor confidence – In addition to an environment of stable regulation (para 6 above) investors will be seeking to have known liabilities around any specific investments and to also have proven value chains which, together, allow them to build an investment case at acceptable risk. Uncertainty in timing of policy delivery can be expected to be seen as negatively as uncertainty in financial commitments of the public sector in terms of support for capital investments. In this respect it will be critical that there is clear, tangible action which provides integration across key policies between Scotland and England and provides for effective and timely dispute resolution.

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Context and background on ETI

1. The ETI has two modes of operation – (1) modelling and analysis of the UK energy system to allow identification of key challenges and potential solutions to meeting the UK 2020 and 2050 targets at the lowest cost to the UK, and (2) investing in major engineering and technology demonstration projects which address these challenges with the aim of de-risking solutions – both in technology and in supply-chain development – for subsequent commercial investors.
2. ETI has 6 industry members (BP, Caterpillar, E.ON, EDF, Rolls-Royce and Shell) who offer complementary capabilities in the energy area. Their financial support (£5m p.a. each), skills, business capabilities and market access routes are made available to the Government through the ETI partnership structure. HMG (through BIS) provides matching support to industry member financial contributions. ETI invests in projects as a commercial entity, it is not a grant awarding body.
3. ETI’s in-house strategic modelling capability has been developed with the strong involvement of the UK industrial base (not just ETI Members). The ETI capability addresses the full UK energy system and centres on first developing robust, shared understanding of critical issues for the UK in reaching 2020 and 2050 energy targets.
4. By carrying out rigorous strategic analysis of future UK energy system designs options, and by then investing in targeted and controlled development and demonstration of technology, engineering and manufacturing capability which supports these system designs, the ETI partnership provides an accelerated route to market for low carbon energy technologies. The ETI manages risk through targeting of project requirements, by selection and development of the delivery team and by active decision making around quality assurance of project outputs - throughout delivery of the project
5. This approach forms a key part of demonstrating the industrial capabilities needed to meet the UK’s future needs, incentivising industry by informing them of the potential business opportunities and developing the supply-chain and skills to deliver solutions for the UK.
6. To date the ETI has invested in 41 projects to benefit the UK. Projects range from £20,000 to £25 million and total over £133m. The majority of ETI projects involve a mix of SMEs, academia and large industrial groups.
7. Uniquely, the ETI’s energy system modelling focuses on identifying the lowest cost solutions to the UK and provides an assessment of the option value of key technologies in the 2050 energy system (ie; answering the question “what is the cost to the UK of NOT implementing a specific technology ?”). The primary modelling tool is a bespoke toolset developed by the ETI and termed ‘ESME’.
8. ETI modelling and ESME was used by DECC in support of its 2050 pathway work and also supported the Committee on Climate Change (CCC) development of the fourth Carbon budget proposals and the 2011 CCC Renewables Review. In addition it is currently being used by a range of academic and industrial groups to aid investment targeting.