

ETI comments to EC State aid SA.34947 (2013/C) (ex 2013/N) - Investment Contract for the Hinkley Point C New Nuclear Power Station

Summary

ETI's comments focus on the impact on delivering decarbonisation, increased security of supply and increased energy affordability to consumers, of the proposed development of Hinkley Point C (HPC) as part of a long-term UK nuclear new-build programme.

Decarbonisation

The measure¹ contributes to decarbonisation by creating a supportive environment for early (2023) implementation of a first plant in a new nuclear build programme. Without a sustained long-term UK nuclear build programme ETI ESME analysis highlights that the cost of meeting the UK's 2050 greenhouse gas (CO₂) reduction targets can be expected to increase by ~£50bn (16%). Delay of 5 years in starting the roll-out of a nuclear build programme increases the national cost of meeting the 2050 targets by ~£5bn but the market reaction to a perceived political risk may create a more prolonged and costly slow-down in nuclear new build in the UK and potentially on a wider basis.

Security of supply

The measure contributes to security of supply by establishing a more diverse power generation portfolio with a more diverse fuel supply base. Without a sustained nuclear new build programme ETI analysis shows the need to implement alternative, higher cost, solutions - principally a higher level of renewables (particularly onshore and offshore wind) together with an associated increase in backup capacity from fossil fuelled plants (the majority with Carbon Capture and Storage capability – 'CCS') to manage intermittency and sustain security of supply. Many of these technologies are uncertain and unproven and come with associated cost and delivery risks.

Affordability

The measure helps affordability by enabling construction and operation of a cost optimal low carbon energy system for the UK as noted above. Compared to a 'business as usual' scenario, ETI analysis suggests the minimum additional energy system cost for the UK to meet 2050 targets is ~£300bn to 2050. Without a nuclear new-build programme this rises to £350bn (+16%). It can be expected that the costs of the UK energy system will be passed to consumers via price and tax mechanisms. It is more effective to use national system cost as a measure of the cost impact of implementing alternative technologies than to simply compare electricity delivery prices from alternative technologies recognising (for instance) the need to include system backup capacity for intermittent sources such as renewables).

¹ 'The measure' is taken to mean the proposed investment contract associated with financing build and operation of a new UK nuclear plant - Hinkley Point C (HPC).

New nuclear - key role in UK decarbonisation and security of supply

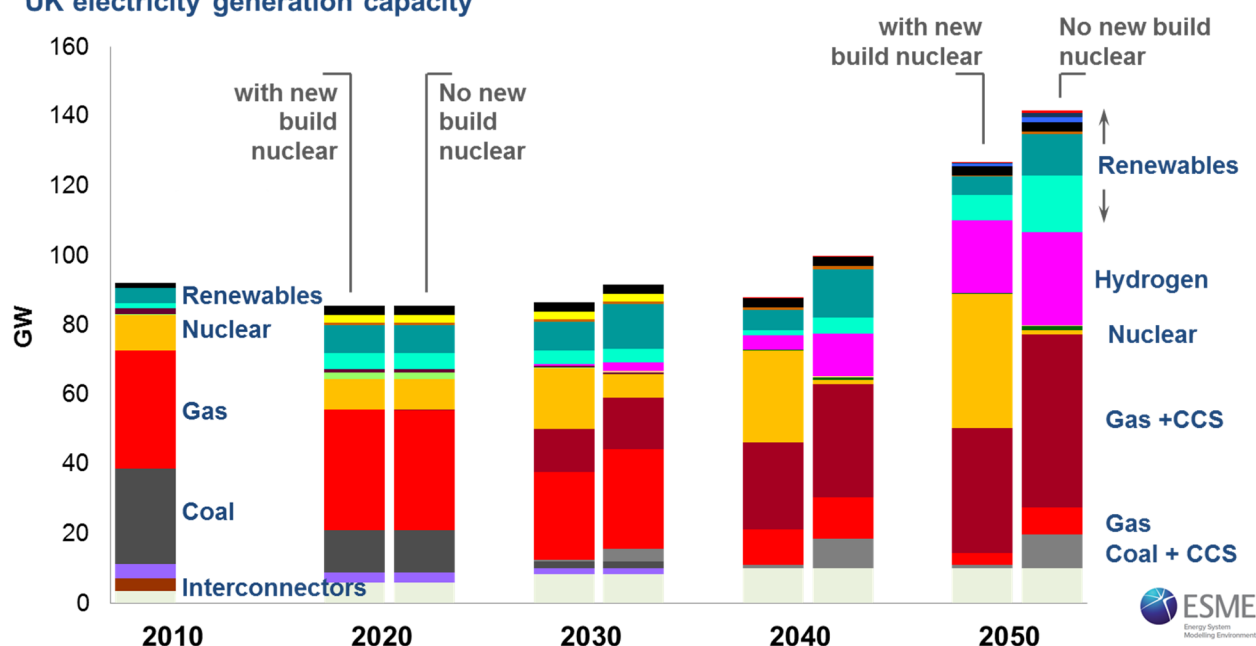
1. ETI's ESME modelling highlights new nuclear as a key component of a future low carbon energy system, providing a core low carbon power generation capability and increasing security of supply by increasing diversity of supply and establishing a baseload generation capability alongside fossil fuel plants with CCS. Without investment in a major new nuclear build programme, the cost and difficulty of meeting the UK climate change targets will rise very significantly.
2. ETI estimates that the cost to the UK of meeting national carbon targets in the period up to 2050 would rise by a minimum of £50bn (£60bn) without investment in new nuclear generation capacity. This increase is driven by the need to implement alternative, higher cost, solutions principally a higher level of renewables (particularly onshore and offshore wind) together with an associated increase in backup capacity from fossil fuelled plants (the majority with Carbon Capture and Storage capability – 'CCS') to manage intermittency and sustain security of supply.

Achieving 2050 UK energy targets without nuclear new build will require UK electricity generation capacity to increase by >10% with a national system cost increase of >£50bn

breakdown becomes 50% fossil + CCS, 25% renewables, 20% hydrogen

Renewables = wind, marine, solar, geothermal

UK electricity generation capacity



ETI ESME analysis of optimised pathways to meeting UK 2050 energy and climate change targets with and without new build nuclear. Hinkley Point C assumed to be first new plant and on-line from 2023.

Interconnection is a key element of both scenarios

3. A delay of 5 years in starting the roll-out of a nuclear build programme increases the national cost of meeting the 2050 targets by ~£5bn. In practice however a delay which is perceived to be caused by political risk is likely to be taken as a significant negative signal by the market and hence cause a much longer term 'stall' in new nuclear plant build – in the UK and potentially on a wider basis.

4. ETI analysis highlights that UK energy system transition pathways to decarbonisation which exclude new nuclear continue to rely heavily on fossil fuels as the main primary source of energy, even in 2050. These would also require substantial investments in carbon capture and storage (CCS) and gasification technologies on an extremely large scale (for example up to 60 GW of power generation with CCS). The practical, economic and societal deployment risks and challenges around such a strategy would be substantial. Without investment in new nuclear, costs could rise even higher if key substitute baseload technologies (principally CCS) prove difficult to deploy.

Delivering a nuclear new-build programme requires early investor confidence

5. ETI modelling consistently shows optimal approaches to meeting UK low carbon energy needs (at least cost and with sustained security of supply) requiring maximising long-term investment in nuclear capacity, within the plausible constraints on build rates and site availability.
6. These results are robust against wide changes in the capital cost assumption of new nuclear (up to +40%) and support decarbonisation of much of UK power delivery by 2030. This early decarbonisation of the power sector (in context of a 2050 -80% greenhouse gas target) is necessary to support subsequent investment in low carbon heat and transport systems – both of which are anticipated to utilise increasing amounts of low carbon electricity.
7. Both the rate at which the UK can build new nuclear and the maximum capacity that can be deployed practically in the UK are therefore key drivers of the design and cost to consumers of the future UK low carbon energy system.
8. Securing ongoing capital investment capacity (at a socially and politically acceptable cost of capital) both for the plants themselves and for development of the associated supply-chain capacity is a key part of delivering a national sequence of new-build nuclear plants rather than delivery of just a single unit. The first new plant (Hinkley Point C) is nevertheless a critical element in securing initial investor confidence both through the delivery of the first unit to cost and time and in establishing a clear route to investment return.
9. Failure to progress early development of new plant technology, including the EPR (European Pressurised Reactor) can be expected to lead to diminished investor appetite for the technology for other projects, both inside and outside the UK.
10. Delivering this investment capacity thus requires a supportive policy environment with clear solutions to long term policy risks (e.g. via long term contracts) and an overall risk mitigation profile which is acceptable to investors and developers. The proposed investment contract (early form of CfD) mechanism is designed to address this issue.

Affordability needs to be assessed against other low carbon alternatives and not against today's energy prices

11. The Commission have questioned the contribution of the investment contract for Hinkley Point C to affordability recognising that the proposed strike price is in excess of current prices. ETI's findings highlight however that the alternative technologies which could be implemented in the context of a future low carbon power system all imply cost increases compared to today's prices and place them in a similar price region to the proposed strike price.
 - Fossil fuel plants with CCS will see capital costs and operating costs increase compared to today's unmitigated plants.
 - Most renewables all incur some form of intermittency in generation associated with resource (wind, solar, tidal etc) requiring alternative capacity to be in place to cover peak demand or low generation points (whether capacity is as generation or as storage).
12. ETI approach the assessment of this problem by evaluating the necessary whole system design and associated cost as a national system from fuel input to power, heat and transport capability provision (figures in earlier paragraphs reflect this). On this basis nuclear can be seen to be a key part of an overall, cost optimised low carbon system. Compared to a 'business as usual' scenario with no carbon reduction targets, ETI analysis suggests the minimum additional energy system cost for the UK to meet 2050 targets is ~£300bn to 2050 and without a nuclear new-build programme this rises to £350bn (+16%).

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Background on ETI

The Energy Technologies Institute (ETI) is a public-private partnership between global energy and engineering firms and the UK Government. ETI carries out three primary activities:

- modelling and strategic analysis of the UK energy system (power, heat, transport, infrastructure) to identify the key challenges and potential solutions to meeting the UK's 2020 and 2050 energy and climate change targets at the lowest cost,
- investing in major engineering and technology demonstration projects through targeted procurement to address these challenges with the aim of de-risking solutions – both in technology and in supply-chain development – for subsequent commercial investors
- providing support to enable the effective third party commercialisation of project outcomes.

Recognising the need to focus and target investments to ensure value for money and leverage from public sector support, the ETI's techno-economic modelling and strategic analysis of the UK energy system is a critical tool for supporting effective system planning and innovation delivery. The ETI approach is termed 'ESME' and is now used by DECC and the Committee on Climate Change to aid with policy development, planning and effective investment targeting.

Insights from ESME analysis have been reviewed with the Commission and the JRC. With their support ETI have now developed a prototype tool for use in assessing energy system design for the European Union area using the same approach used for the UK.

The UK energy system development and decarbonisation priorities identified by ETI are:

- **Efficiency** – introducing systems and technologies to reduce cost and improve buildings and transport efficiency.
- **Nuclear** – establishing a new build programme based on new supply chain capacity and increased investor confidence.
- **Bioenergy** – informing the science, technology and business cases for decisions on how to optimise the use of sustainable bioenergy resources as solid, liquid and gaseous fuels.
- **Carbon Capture and Storage** – providing system demonstration and strategic insights for capture, transport and storage building investor confidence.
- **Gas** – enabling long-term use of a critical fuel for power, heat, storage and potentially transport ('gas' = natural gas, synthetic combustion gases, biogas and hydrogen).
- **Offshore renewables** – reducing cost and building investor confidence.