

# Energy Futures Lab White Paper Series

## Paper 1: Is the UK facing an electricity security of supply crisis in the coming years?

### Scoping Note

Over the past few years, there has been a series of reports from think-tanks and professional bodies (Institution of Mechanical Engineers 2016; British Infrastructure Group 2016; Centre for Policy Studies 2016), newspaper articles (Daily Telegraph 2016; Daily Mirror 2015b; Daily Mirror 2015a), and TV programmes (Channel 4 2013) speculating to various degrees of certainty that the UK electricity system is facing a looming security of supply crisis, often termed an ‘energy gap’. These claims are vigorously disputed by National Grid and Ofgem (Ofgem 2015), which maintain that the UK has sufficient capacity to satisfy demand for the foreseeable future. This White Paper will review the evidence surrounding electricity security of supply in the UK to determine whether there is a serious risk of electricity supply issues in the next five years, what the issues and concerns are and why the topic is so controversial.

### Background

Over the past several years, Britain’s media outlets have carried many stories relating to an impending ‘energy supply gap’, whereupon the UK’s power generation will not be able to provide enough electricity to fulfil demand. These stories are often based around the outcomes of reports produced by lobby groups, think tanks, professional bodies and academics. The scale of the problem may be exaggerated in some of the press, but this is clearly an important subject for public debate.

Though these stories often highlight different aspects of the security of supply debate, they tend to be grounded in a specific set of common contentions. These state that the UK government, following the passing of the Climate Change Act in 2008, has placed particular emphasis on pursuing dramatic reductions in domestic carbon emissions. As the power sector is considered the easiest to decarbonise, this has led to policy favouring the deployment of renewable energy sources such as wind and solar generation, which are intermittent and variable in nature. (Centre for Policy Studies 2016) It is also contended that governments have neglected the conventional generation sector and that a number of policies have distorted the market and discouraged investment in conventional sources of power, particularly gas. (British Infrastructure Group 2016) Policies have also led to the closure of older coal fired power stations. Whilst nuclear power is both low carbon and not intermittent, the first new nuclear station will not be complete until the mid-2020s.

This rests on several interpretations and projections, laid out below:

1. The focus on deploying renewable generation has meant fewer conventional generation plants have been built in the last decade;
2. EU regulations on emissions (the LCPD), UK's legally-binding carbon budgets and the carbon price floor are forcing coal baseload plants to shut. In addition, the UK's nuclear fleet is aging, with almost half to be decommissioned by 2025.
3. As renewable generation is intermittent, there will be times at which output from these will be low or non-existent due to weather conditions;
4. Backup conventional plant will need to be constructed to provide electricity in these cases;
5. The government, due to a focus on emissions reduction, has either not been incentivizing or has been actively discouraging the construction of new conventional plant. This could mean, in the near future, a lack of backup capacity for intermittent renewable generation.
6. This could lead to a situation whereupon, due to weather conditions, renewable generation cannot meet current demand and there is insufficient backup generation to cover the gap, with the possibility of rolling brown- or –blackouts.

Many of these claims are disputed by the major actors operating and governing the UK electricity system. Though capacity margins have tightened in recent years, no official report forecasts a high probability of a security of supply crisis in the next few years. The BEIS/Ofgem Statutory Security of Supply Report 2016 (BEIS & Ofgem 2016) states that the introduction of the Capacity Market auctioning process has provided sufficient capacity to meet demand up to 2020, and forecasts an adequate level of security (6.6% margin) for the 2106/17 winter. In 2015, Ofgem published an Electricity Capacity Assessment for the next three winters, (Ofgem 2015) finding that there is a wider range of uncertainty around security of supply risks at certain times (chiefly the 2016/17 winter, which has now passed without incident) but that National Grid had sufficient tools to manage the system to mitigate these risks and that uncertainties on the system reduce into 2017/18.

The literature surrounding electricity security of supply is plentiful, but often complex, with complicated models, analysis and terminology, much of which may be rather inaccessible to a non-specialist audience. This White Paper will attempt to clarify and present the arguments surrounding security of supply issues in an accessible and transparent manner.

### *Methodology*

This report will review the evidence available to determine whether the UK will face a security-of-supply crisis in the coming years. The report will use a Rapid Evidence Assessment (REA) methodology, defined as 'a short but systematic assessment on a constrained topic' (GSR 2014) to systematically and critically appraise the available literature on this subject. This methodology, developed by researchers at Imperial College for the UK Energy Research Centre's Technology and Policy Assessment (TPA) function (Speirs et al. 2015), is designed to produce academically rigorous systematic reviews of a policy area in a relatively short space of time (typically 3-6 months). The proposed approach follows the procedures established in previous TPA assessments, which are directly comparable to established protocols for conducting REAs (Collins et al. 2014).

As such the REA will involve the following steps:

- Publication of this scoping note on the Energy Futures Lab website;
- Establishing a small group of experts to advise the project team;
- A systematic search of a clearly defined evidence base using keywords;
- Categorisation, prioritisation and analysis of the evidence, including an appraisal of methodological quality;
- Drafting of the White Paper;
- Expert feedback and peer review of the draft White Paper;
- Publication and dissemination through appropriate mechanisms.

### *Imperial Resources*

The White Paper will leverage the expertise of Imperial College's highly respected energy research community. An Advisory Group of senior Imperial researchers will be convened to oversee the project and provide guidance. The project will include a half-day workshop towards the end of the timeframe for Imperial researchers and outside stakeholders to critique the draft White Paper and to suggest improvements and additions.

### *Timescale*

The White Paper is projected to be complete by the end of July.

- March: Initial scoping and research, writing of scoping note.
- April: Publishing of scoping note. Formation of Advisory Group. Beginning of systematic search.
- May – Completion of systematic search. Categorization and analysis of evidence. Beginning of drafting.
- June – Completion of draft White Paper. Expert workshop held at Imperial College
- July – Completion of final report.

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