

Policy Brief

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Exploring the meaning of 'energy security' in the United Kingdom

EXECUTIVE SUMMARY

Securing energy is vital for our economy and society to function, and policy decisions are often made on the basis of 'improving energy security'. However what is meant by 'energy security' remains vague, and without a commonly-accepted definition. Meeting carbon emissions reduction targets adds an additional complication to the challenge of creating secure energy systems. This could lead to unavoidable trade-offs between security, cost and carbon objectives in a transition to a low-carbon energy system. This research set out to explore the meaning of energy security drawing on discussions with key experts in the UK energy sector. The focus was on energy security in a low-carbon energy system transition. Researcher Emily Cox first identified a set of key issues relating to energy security from a thorough review of the existing literature. Interviews were then conducted with 25 experts from across the energy sector in the UK, to determine their opinions on the following:

- What factors are considered important for energy security
- Which of these factors should be prioritised
- What is the justification for these priorities

Analysis revealed a real need to take multiple competing views on energy security into account. Energy security assessments sometimes focus on a small number of quantifiable metrics e.g. the level of dependence on imports and the diversity of fuels. This research suggests that it is necessary instead to capture a broader range of issues and perspectives, for example issues such as flexibility and affordability.

Key findings

- Securing energy is vital for the well being of the economy and society, but there is very little agreement on what 'energy security' means.
- Experts disagree on whether affordability and environmental sustainability are a component of 'energy security', or separate and should be thought of as trade-offs.
- Reducing reliance on imports is seen to be less of an issue because of the globalisation of energy markets and potential advantages of global trade and diversity.
- Experts prioritise measures focusing on flexible supply and demand, electricity storage and interconnection.
- Sufficient infrastructure investment is crucial for energy security. This requires policy stability and a consistent guiding 'vision' for the future, especially over the level of low-carbon ambition.
- Current energy policies risk failing to address the above important factors for energy security i.e. flexibility and policy stability.



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OVERVIEW

Secure energy provision plays a fundamental role in the economy and in people's everyday lives. In many countries such as the UK it is seen as imperative that energy provision is affordable and meets demand levels at any given moment. Energy shortages or severe spikes in consumer fuel price are politically very damaging. Stability concerns in some key fuel export regions have increased recently, as well as the investment requirements to replace ageing generation and network infrastructure. At the same time, energy systems are under increasing pressure to reduce carbon emissions to mitigate dangerous climate change. Energy security has become a key factor in responding to these pressures and has been the justification of much energy policy in recent years.

However energy security is a complex topic and is without a commonly accepted definition. In this research the meaning of energy security in the UK is explored. A set of 22 energy security issues (see Figure 1) was discussed with 25 experts from across the energy sector in the UK. Experts were asked to justify the priorities of these issues and also to explore their implications. All participants were chosen because they are actively engaged in UK energy policy processes. Participants were selected from a wide range of organisations including utilities, NGOs, policy and regulatory bodies, think tanks and consultancies, energy network companies, and academia.



RESULTS

The interviews showed a lack of consensus on what issues are the most critical for energy security. Roughly half said that a broad view of security should be taken including aspects such as affordability and environmental sustainability. The remainder said that affordability and sustainability should be treated as separate objectives.

There was a stronger consensus in the need to focus on flexibility and resilience measures when assessing energy security. These attributes will become especially important in the future in a low carbon energy system and also to address the shifting and unpredictable nature of different threats to energy security. For example, most of the experts placed strong emphasis on measures of flexibility such as quick responsive supply, storage, interconnection, and demand-side response. Resilience in the form of capacity margins is important, although many experts emphasised that conventional measures of a de-rated capacity margin may be less relevant for a highly flexible system. Experts also emphasised options that can create co-benefits in multiple areas (such as affordability and sustainability as well as security). An example of this would be demand reduction incentives.

De-Rated Capacity Margins

The de-rated capacity margin measures the amount of electricity generating capacity that can reasonably be expected to be available at times of peak demand, taking into account planned and unplanned outages and intermittency. For example, the 'reasonable availability' of solar to meet peak demand would be 0%, because peak demand often occurs in the evening when it's dark.

Flexibility was viewed as far more important than some of the more traditional issues associated with energy security, such as reducing dependence on imports or increasing diversity of supply. Previous attempts to assess the security of electricity systems have tended to give higher preference to systems that perform badly for flexibility but well for import dependence.

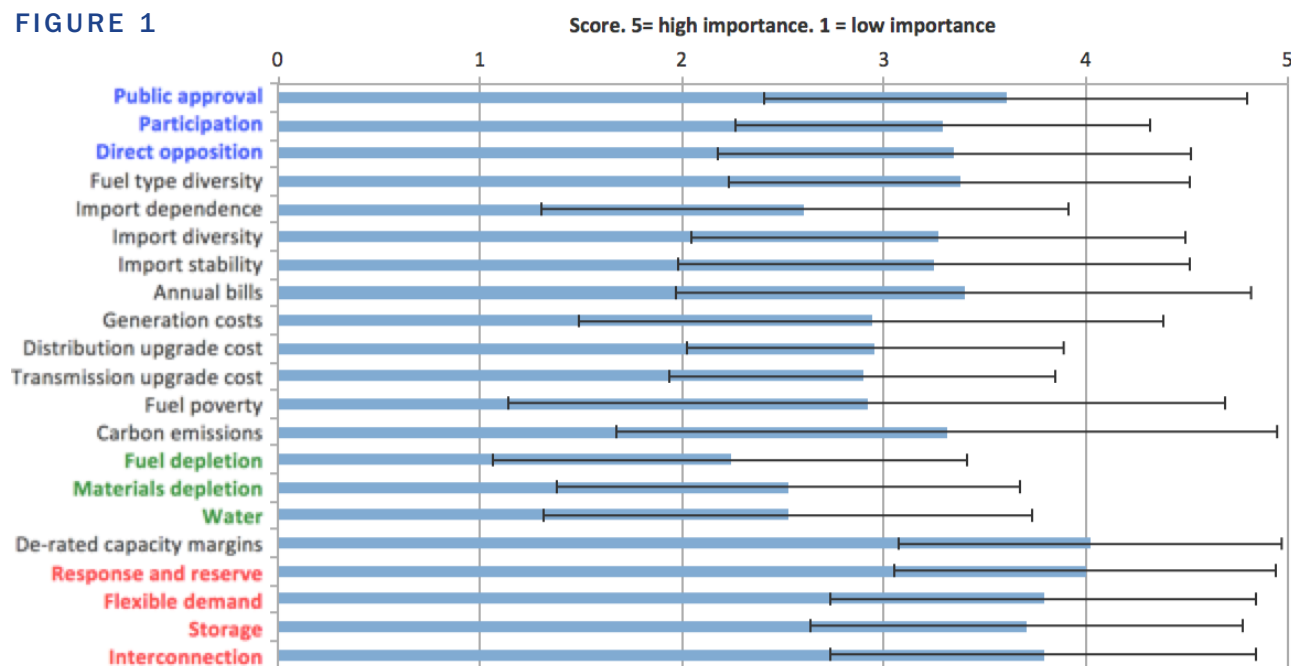
Securing adequate investment in generation and network infrastructure was also emphasised as important. Many experts adding that policy stability was desirable to improve investor confidence and expressed concern at the current lack of sufficient investment in UK energy infrastructure. Suggestions to improve policy stability include; long-term planning and a guiding 'vision' for the future, and improved clarity on commitment levels to medium- and long-term decarbonisation targets. The diversion of political focus following the EU referendum could have a negative impact on energy security. This is especially important for the UK's future involvement in the EU energy market: Many of those interviewed highlighted the significant role that interconnectors with neighbouring EU countries would play in maximising UK energy security.

Figure 1 shows the responses to the question: "How important is this issue for security in a low-carbon context?" The error bars in the graph show the extent of disagreement among those interviewed. It is clear that 'flexibility' (in red) related issues are rated as very important with a relatively high level of agreement. Issues relating to public acceptability (in blue) of the energy mix are fairly important, although there are higher levels of disagreement among experts.

Resource constraint issues (in green) are rated as much lower importance. Some of the highest levels of disagreement related to 'affordability' issues such as consumer bills and generation costs. This can be explained by a high level of disagreement as to whether 'affordability' should be considered an energy security issue. Some experts consider that affordability should be treated separately or as a trade-off.

Experts were chosen from 6 different types of organisation within the UK energy sector; energy utilities, network companies, civil society, policy, think tanks and academia. The results found no clear link between their responses and the type of organisation for which they work. Experts were chosen for this study due to their in-depth knowledge of energy issues often from a long career in a variety of roles and not because of their representation of their current employer.

FIGURE 1



Policy implications

- Energy security policy should allow for measures of flexibility and resilience of the energy system. Examples; flexible supply and demand, electricity storage and interconnection.
- There should be increased focus on measures that bring about co-benefits in multiple areas, such as reducing overall energy demand.
- Adequate infrastructure investment is critical and requires policy stability and long-term planning. Energy security assessments tend to exclude these aspects because they are difficult to measure.
- The particular perspective being applied in making an energy security assessment should be clearly stated since there a wide variety can be taken. In addition, consideration of any impact that opposing perspectives could have on the results or conclusions should be undertaken.
- Investment, policy stability and interconnection were all high on the list of priorities for energy security for the majority of experts interviewed. In the negotiations that now follow with the EU following the referendum, these factors need to figure strongly in maintaining a secure energy system for the UK.

FURTHER INFORMATION

This research report reports the findings of the paper referenced below; please refer to that paper for further background information and references. This research was sponsored by a CASE PhD studentship, jointly funded by the Engineering and Physical Sciences Research Council and by E.ON Technologies (Ratcliffe). Emily Cox stands by the integrity of her findings and the validity of the methodology employed in this research study. The report reflects the views of Emily Cox alone. The study was conducted in 2015.

REFERENCES

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