Jo Kaye
The Quadrant
Elder Gate
Milton Keynes
Buckinghamshire
MK9 1EN

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National Infrastructure Commission call for evidence; Improving how electricity supply and demand are balanced

Network Rail welcomes the opportunity to contribute to the call for evidence by the National Infrastructure Commission concerning improving how electricity supply and demand are balanced.

1. **What changes may need to be made to the electricity market to ensure that supply and demand are balanced, whilst minimising cost to consumers, over the long-term?**

- **What role can changes to the market framework play to incentivise this outcome:**
- **Is there a need for an independent system operator (SO)? How could the incentives faced by the SO be set to minimise long-run balancing costs?**
- **Is there a need to further reform the "balancing market" and which market participants are responsible for imbalances?**
- **To what extent can demand-side management measures and embedded generation be used to increase the flexibility of the electricity system?**

Network Rail is one of the UK's biggest purchasers of electricity and operates a large electrical power system in its own right. It is investing heavily in electrifying more of the network and our demand for and reliance on electricity will increase in the years ahead. We welcome market reforms that will deliver long-term price stability, security of supply and reduced emissions, and minimises the on cost of network provision.

Although we have not seen evidence that suggests the electrical system operator needs to be "independent" we welcome this debate. We wish to see a transparent relationship between participants, marked by clear incentives that are an efficient and sustainable balance between short-run and long-run costs and a coordinated forward view of investment.

We wish to see a more symmetrical operation of the balancing market that fosters greater participation from the demand-side and more opportunities for industrial, commercial and domestic users to participate. We would also welcome reforms that create a longer term market to aid price stability and risk management.

Further incentives are required to improve demand side management and to bring the heat and power markets together. The development of the Energy Systems Catapult in early 2015 is a welcome development. We believe increased deployment of distributed generation and combining heat and power schemes, active control schemes and integration with demand side schemes will inevitably improve flexibility and gain greater utilisation of assets across shared functions.

Coordinating or joint investment plans by aligning incentives between sectors and regulatory periods would provide an opportunity to reduce costs and improve performance and could also encourage scaling up of small participants and novel technologies.

2. What are the barriers to the deployment of energy storage capacity?

- **Are there specific market failures/barriers that prevent investment in energy storage that are not faced by other 'balancing' technologies? How might these be overcome?**
- **What is the most appropriate scale for future energy storage technologies in the UK? (i.e. transmission network scale, the distributed network or the domestic scale.)**

The current market reflects its historic roots and is built around large producers, bulk transport and a one way flow of energy. Industrial and commercial companies that can actively manage their own demand and energy systems should be encouraged to participate in the market to foster competition and choice. We recognise that National Grid has introduced new balancing and reserve products and industrial users are responding but in our view there needs to be more thought on more integrated solutions.

Infrastructure investments could also be more coordinated and integrated across sector or corporate boundaries in order to develop a more coherent infrastructure which would reduce investment costs. And these infrastructure investments may enable or assist in the business case for other sectors e.g. the scavenging of utilisation of multiple small storage, demand management or generation; or leveraging of aggregated battery storage from electric vehicles using non-utility power infrastructure and property rights.

Our view is that there is no one answer to the scale of energy storage and deployment across industrial, commercial, domestic as well as distribution and transmission will be required. Successfully deploying energy storage will enable other technologies such as distributed generation and more optimal asset investment to be facilitated, avoiding building network infrastructure for very peaky demand curves, increasing resilience.

3. What level of electricity interconnection is likely to be in the best interests of consumers?

- **Is there a case for building interconnection out to a greater capacity or more rapidly than the current 'cap and floor' regime would allow beyond 2020? If so, why do you think the current arrangements are not sufficient to incentivise this investment?**
- **Are there specific market failures/barriers that prevent investment in electricity interconnection that are not faced by other 'balancing' technologies? How might these be overcome?**

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Network Rail supports measures to improve the security of supply and long-term investment in the UK's generation capacity and interconnection. We support measures that increase security of supply and that facilitate completion to reduce costs, increase innovation and effective response to climate change. Interconnection can enable this but electricity (and gas) interconnections increase the interaction between markets and territories as well as facilitating competition. We note historic interactions between European gas markets and territories that has had an impact on gas security of supply in the UK; and with low storage capacity for gas in the UK - and a potential move to increases in gas in the electricity supply mix - the market incentives and protections on interconnections should be considered carefully and the interactions between these principle energy supply markets in the UK.

4. What can the UK learn from international best practice in terms of dealing with changes in energy technology when planning to balance supply and demand?

We understand that in Europe unbundling of private power networks is being investigated and synergies with transmission and distribution systems explored. The Polish and Italian railway operators already use their private power systems to serve external customers and in Germany this extends to power generation. Switzerland also has an extensive power system that operates alongside electricity utilities. This potential for integration between power and rail sectors and increased utilisation of cross sector power assets may provide insights in the integration of infrastructure.
We believe that future infrastructure investments should consider the economic and other benefits from integrated planning and investment across sectors such as transport and energy and also facilitate innovative or alternative ways of delivering energy.

Network Rail would welcome the opportunity to discuss the issues raised in this evidence submission further with the commission.

Yours sincerely,

Jo Kaye
Director, Network Strategy & Capacity Planning