

## **Response to the National Infrastructure Commission Call for Evidence: Electricity interconnection and storage.**

**January 2016**

The following response provides the thoughts of the Association of Directors of Economy, Environment, Planning and Transport (ADEPT) in the area of energy as requested by the Call for Evidence.

### **About ADEPT**

ADEPT represents local authority county, unitary and metropolitan Directors who manage some of the most pressing issues facing the UK today. Operating at the strategic tier of local government, we are responsible for delivering public services that primarily relate to the physical environment and the economy, but which have a significant impact on all aspects of the nation's well-being.

ADEPT is submitting a response to this call for evidence within this context. At the local level, our members, with our wide-ranging responsibilities and cross-cutting professional knowledge, have a unique understanding of the opportunities and barriers facing their respective places. Because we start from a place-based approach, we automatically join up policy areas that in Whitehall are spread across a number of different Departments. We therefore see ourselves as having a key role in supporting and helping to deliver sustainable economic growth and quality of life and are keen to work with Government, business and the community and voluntary sector to make the most of the opportunities available.

As one of the key organisations representing officers in local government whose areas of responsibility cover energy and climate change we would welcome the opportunity to work closely with the Commission in its deliberations.

### **1. What changes may need to be made to the electricity market to ensure that supply and demand is 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?

ADEPT believe that the system operator function should remain with National Grid (NGET and NGG), and that any dilution of this would be counterproductive. The incentives currently, related to cost factors, should remain however there should be a greater range of incentives covering storage capacity and the stimulation and delivery of demand reduction within the system.

The balancing market should be shifted to ensure that the most is made of renewable energy generation, on a local level<sup>1</sup>, so that transmission losses are reduced to a minimum. The inefficiency in the electricity distribution network, due to transmission losses, needs to be addressed, and significant inroads into this will greatly increase energy security, and reduce the costs for consumers. This is particularly for consumers in rural and remote locations where renewable and storage can provide an important part of the future energy infrastructure. The approaches of some islands in Scotland are beginning to demonstrate what can be achieved through community generation and storage. A greater level of investment in innovation in business and universities through, for example, Innovate UK, can help drive this area of the economy and provide potentially increased productivity in local economies through the commercialisation of solutions for the UK and export markets.

The new energy infrastructure thought needs to ensure that it enables the transition to a low carbon economy. While this needs to be mindful of the costs to the consumer the cost of not transitioning will be greater to the consumer and other parts of the economy. The transition, for which the energy sector is pivotal, needs to be based on the needs of the UK as a country and not through the pure lens of a market derived solution. The transition while offering many opportunities for business and the country will also require challenging existing vested interests. The Commission will need to make some difficult choices and there will be a need for further research, to understand when we need to make significant step changes, to position the UK ahead of its competitors. If we are not to miss out on export possibilities and maintain and grow any productive advantage for UK innovation and development.

In this light our future infrastructure needs to be flexible so that it that does not penalise renewable technologies, for periods when the wind does not blow or there are low light levels. We would argue that the growth of renewable energy is only part of the renewable solution. Energy storage, as power or heat, or its use in power to gas solutions provides the whole of the renewable technology offer, to date renewable have been seen in isolation from their complementary technologies.

Therefore it is the development of storage that is key to smoothing out fluctuations in generation, and this is where investment and market balancing

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<sup>1</sup> <http://www.ukcec.org/our-vision-community-energy-2020>

should be targeted. There needs to be greater research into the potential for domestic, community and city level energy storage to support local renewable generation but also provide storage for energy produced in excess of what is needed from nuclear and gas so it can be used in periods of high use. It should also be considered how this can be built into new developments funded through Government and European programmes to provide a more joined up solution. We need to future proof economic development and housing infrastructure for the future so that we can deploy “plug and play” energy solutions be they district heating or sub-national energy storage.

The Commission, we would suggest, needs to consider undertaking research in how the new infrastructure should be financed and, how and, if there should be separate funding and incentives regimes for different levels of investment and technology at national, city, community and domestic levels. There also needs to be a better understanding of how the internet of things can support this transition and the potential costs<sup>2</sup>.

We would agree with the publication by Green Alliance<sup>3</sup>, and comments made by the Energy and Climate Change Select Committee, that the Government should create a FIT mechanism for demand side reduction as part of a comprehensive transition finance package for domestic properties and businesses.

The current demand reduction pilot needs to be expanded, and represent better value for money for businesses and have greater flexibility.

The Government also needs to ensure that the emergency capacity market does not create strange anomalies where diesel generators can out-compete more low carbon options on price without regard to the carbon impact.

## **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 lack of investment in energy storage capacity at sub-grid level and research, which has the potential to be a significant area for growth and export, lags a long way behind where it needs to be. If we are to achieve the ambitions in the Low

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<sup>2</sup> <http://www.techthefuture.com/technology/the-hidden-energy-cost-of-networked-devices/>

<sup>3</sup> The Power of Negawatts Green Alliance October 2012 <http://www.green-alliance.org.uk/resources/The%20power%20of%20negawatts.pdf>

Carbon Transition Plan then we need to increase the development and deployment of the current small scale storage industry including investment in non vehicle based hydrogen fuel cell storage, thermal and electricity storage. The Government and system operators need to see renewable technology as an integral part of the mix with storage enabling the smoothing out of fluctuations in generation and increasing resilience.

However at present the cost of domestic, community and city scale storage is unaffordable and does not represent value for money at anything but large scale deployment by DNO's. The Government needs to provide market mechanisms to reduce the initial cost of storage options, and grow the market place and reduce cost in the long term. The FIT for renewable generation, as mentioned above, should be deployed as has been done in Germany<sup>4</sup>. Homes and offices that generate energy, but have a surplus, would be better storing it for use at peak times, thus supporting peak demand reduction as well.

The transition to an electric/ hydrogen economy in domestic and transport use requires a significant increase in domestic, community and city storage.

The UK should consider the generation and distribution of energy on a more district heating ethos. In other words, local generation used locally. While we will still need a national generation and distribution network, we need to maximise the benefits of local network storage, to reduce costs for the consumer and increase resilience.

As the energy network of the future needs to be more distributive, then investment must come from Government, National Grid and the DNO's to stimulate the market. The current regulation framework does not appear to incentivise this.

There is the potential for energy companies to develop Power Purchase Agreement solutions for its customers, to increase the spread of single property and community level storage. The current energy system incentivises large scale single point storage, we need to diversify this to increase energy security, and make the most of UK local generation and reduce interconnector dependencies.

The Government needs to set out a national energy storage policy, and target to stimulate the market and put appropriate incentives in place. The storage should be for both power and heat. There also needs to be a clear policy steer on the role of the hydrogen economy, and how power storage and surplus energy, is used for this emerging part of the economy.

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<sup>4</sup> The Energy Storage Market in Germany Factsheet: Germany Trade and Invest Issue 2015/16  
[https://www.gtai.de/GTAI/Content/EN/Invest/\\_SharedDocs/Downloads/GTAI/Fact-sheets/Energy-environmental/fact-sheet-energy-storage-market-germany-en.pdf](https://www.gtai.de/GTAI/Content/EN/Invest/_SharedDocs/Downloads/GTAI/Fact-sheets/Energy-environmental/fact-sheet-energy-storage-market-germany-en.pdf)

The reduction in FIT has had a negative impact in particular, on the potential for community generation in off grid rural and urban locations, we feel this is unfortunate of the Government and runs contrary to localism, devolution and the Community Energy Strategy. For those communities that are off grid in particular, renewables provide potentially the only option to reduce the significant costs of energy, and when these are linked to storage options can create greater energy security and cost reduction for these communities.

This needs to be detailed consideration of the climate change vulnerability of current and future energy generation and storage facilities and locations. The floods over the last ten years have shown how vulnerable energy infrastructure is and the events in Cumbria in 2015 show that even protected assets are still vulnerable. The climate adaptability of our infrastructure is just as important as what infrastructure we should have. It must not be seen as an optional extra but built into the design, location and costing of our future network. There is the opportunity with the current reviewing of the Climate Change Risk Assessment<sup>5</sup> and National Adaptation Programme<sup>6</sup> to address these concerns.

### **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?

There is a concern that a reliance on greater interconnectivity will leave the UK subject to uncertain energy cost increases from other national governments. There is also a concern about the distance electricity can be transported before the energy losses through transportation defeat the objective.

While there is certainly a need for a European interconnector energy system based around the North Sea, because of the potential from offshore wind energy, we need to consider how we can store energy from UK generation to reduce the need for taking supply from interconnectors. There also needs to be an assessment of the vulnerability of energy generated from countries we are connected to in terms of how climate change will affect their ability to generate and supply surplus or dedicated energy to the UK.

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<sup>5</sup> <https://www.theccc.org.uk/tackling-climate-change/preparing-for-climate-change/climate-change-risk-assessment-2017/>

<sup>6</sup> <https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme>

The cost of energy from interconnectors should be cost competitive with that from renewable and other low carbon technologies. Further any energy delivered through interconnectors should only come from low carbon sources. We would not wish to see the UK low carbon transition undermined through carbon intensive interconnection sources.

#### **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?**

It is important that the new energy infrastructure acknowledges the important part that will be played by non-traditional infrastructure at local and city level. While we need a national generation and distribution network we need to invest in and develop more distributive energy networks such as those in Scandinavia and Germany to deliver zero and near zero carbon production. The continued investment in HNDU is welcomed but there is still a significant knowledge gap in local authorities who are the prime instigators of this approach nationally. Funded training for knowledge transfer to local authority officers involved in district heating would be welcomed so that we can ensure that the public sector obtains the best value for money.

We would suggest that the Commission speak to the author and futurologist Jeremy Rifkin who has a significant insight into the energy infrastructure transition that needs to take place. He has advised the European Union, Angela Merkel and Francois Hollande as well as the Chinese Government and numerous cities globally<sup>7</sup>.

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#### **Contact details**

If you would like to get in touch with ADEPT, please contact the Association's Secretariat who will direct your enquiry to the appropriate person.

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<sup>7</sup> Jeremy Rifkin The Third Industrial Age <http://www.thethirdindustrialrevolution.com/>