

REA response to National Infrastructure Commission Call for Evidence

The Renewable Energy Association (REA) is pleased to submit this response to the above consultation. The REA represents a wide variety of organisations, including generators, project developers, fuel and power suppliers, investors, equipment producers and service providers. Members range in size from major multinationals to sole traders. There are over 750 corporate members of the REA, making it the largest renewable energy trade association in the UK and the only trade body covering power heat and transport.

We are particularly keen to work with the Commission and its Commissioners on energy storage and the value it can bring to the UK. The REA is working on a report with KPMG on the costs of storage and recommendations for supporting the market in the UK which we hope will assist the Commission and Government. Further detail will be provided in the report therefore we have not gone into details of prices and some other aspects in this response.

The REA believes the National Infrastructure Commission (NIC) should consider the following priorities:

- **Supporting new build energy storage projects.** Under the UK's legally binding climate change targets, there is a limit on the energy we can generate from fossil fuels, and this reduces steadily over time. Therefore the UK must design an energy system that incentivises large amounts of low carbon capacity and increased flexibility. Under the Committee on Climate Change's scenarios, we will also need to significantly increase electricity supplies as transport and heating are electrified. In this context, the Capacity Market (the only public contracts available for energy storage in the UK) should be reformed in order to support energy storage. This would enable storage companies to secure finance on the back of the mechanism, which they presently cannot due to the short term nature of support. Increasing flexibility in the system is a win-win situation and one which should not result in 'stranded assets' as the need for flexibility will always exist and increasing low carbon energy sources and new infrastructure, such as Electric Vehicle charging points, will significantly increase this requirement.
- Energy storage helps provide not only security of supply and other important technical support to the grid network, but also a level of stability to the power market and wholesale prices
- **Consider a carbon emissions test in new infrastructure considerations.** In line with the CCC's advice on meeting legally binding carbon budgets, the Commission should consider or require Government to consider, the carbon and environmental impact of new infrastructure projects, for example road projects.

New-build energy storage: balancing supply and demand on the system

New-build energy storage projects help balance the energy system and incentivise and enable low-carbon technologies. They help stabilise energy prices by enabling peak shifting. Many storage projects also strengthen the grid network, at a lower cost than building new overhead lines or underground cables. See Low Carbon Network Fund projects for more details¹. Further benefits to the System Operator are illustrated by the fact that National Grid are currently running an auction process for support for 'frequency response' services, which is specifically targeted at battery storage providers due to the speed and scale at which they can respond.

These projects, due to the current regulatory and legal framework, and only short term nature of support currently available, often struggle to secure finance in the market. Our energy storage member companies tell us that if longer term support was available then securing finance would be eased.

Therefore we strongly agree that energy storage projects should be a key priority for the Commission.

Storage services

Energy storage technologies provide a range of services to the grid and the System Operator. These include:

- **Balancing electricity supply and demand:** storage technologies can respond within milliseconds (batteries) to signals to discharge to the grid. Other bulk technologies (pumped hydro) can still respond within 1-4 hours, and provide very large amounts of capacity.
- **Frequency response:** National Grid has recently launched a tender programme for capacity specifically to assist with regulating the frequency of electricity on the network, targeting rapid (seconds) response, for which battery storage is ideally suited. The system frequency must be kept within statutory limits to prevent damage to consumers and businesses, but frequency stability has reduced in recent years partly due to an increase in non-synchronous generation.
- **Voltage stabilisation:** Alongside the range of other services, energy storage devices can assist in regulating network voltage, another critical aspect of the grid system. Storage is typically more versatile than generators at providing this service.
- **Avoiding grid infrastructure reinforcement:** UK DNOs have used batteries as a substitute for upgrading overhead lines and in the right environment this could be commonplace. The Capital costs of the first demonstrator projects are already believed to have reduced in the roughly two years since they were commissioned, and have the potential to offer a significant cost saving to traditional circuit reinforcement upgrades.

By integrating energy storage into the UK's system we can reap the benefits of low carbon energy and reduce the costs associated with this transition. An Imperial College/Carbon Trust report into the benefits of storage discusses the net saving to

¹ Low Carbon Network Fund, UKPN, Leighton Buzzard Battery, [http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-2-projects/Smarter-Network-Storage-\(SNS\)/](http://innovation.ukpowernetworks.co.uk/innovation/en/Projects/tier-2-projects/Smarter-Network-Storage-(SNS)/)

UK consumers of large amounts of storage on the system, for example a £2billion net saving from 5GW of storage capacity, which rises to £10billion by 2050 in a high renewables system².

Many other countries around the world have realised the benefits of energy storage, such as the US and Germany, and installations globally this year topped 1GWh or large-scale storage devices. See the REA's high-level Overview report for full list of other countries' energy storage projects, which can be [read here](#)³. The UK must develop its market now in order to avoid missing out on the supply chain and investment opportunities this global market offers. For example, some early stage companies are manufacturing in the UK, sometimes through contractors who are active already in other markets (for example Cumulus storage).

Costs of energy storage

The costs of storage are rapidly declining for most technologies. The REA is working with KPMG on a report into energy storage and decentralised energy that includes costs and cost reduction projections, and will send this to the Commission.

It is often stated that there are parallels to be drawn between solar PV and lithium-ion batteries, as costs are reducing at a similar rate. Lithium-ion batteries have come down roughly 16-18% in costs each year for the past five years, with the trend expected to continue. Solar PV costs have fallen by over 75% in the past five years.

The market expects grid scale battery costs to be roughly 50% lower in summer/autumn 2016 compared to the same time in 2015, as supply chains grow and learning rates increase. The REA-KPMG Report will clarify the cost reductions expected in the market.

Barriers to the deployment of energy storage

The Commission will be aware that DECC and Ofgem are examining barriers to energy storage in the UK and we understand the two organisations' work will be linked.

The REA and our members have identified a number of barriers and suggestions for improving the market for storage in the UK, which are summarised below:

Barriers to the development of energy storage in the UK:

- Lack of clear route to market for UK energy storage providers. There is only one public mechanism supporting storage in the UK, the Capacity Market (CM), yet this policy is failing to deliver new energy storage as the past two auctions have proven. We are calling for several changes to be made to the mechanism, which are detailed below.

² Strbac et al, 2012, 'Imperial College/Carbon Trust: Strategic Assessment of the Role and Value of Energy Storage Systems in the UK Low Carbon Energy Future', <https://www.carbontrust.com/media/129310/energy-storage-systems-role-value-strategic-assessment.pdf>

³ REA, 2015, 'Energy Storage in the UK: An Overview', http://www.r-e-a.net/upload/rea_uk_energy_storage_report_november_2015_-_final.pdf

- Application of final consumption levies to energy storage despite this being in clear conflict with the spirit of final consumption levies
- Lack of longer term contractual mechanisms(via either the CM or National Grid mechanisms) creates problems accessing finance, either being completely unavailable, or unavailable at economic rates.
- At the grid-scale level, DNOs are unsure whether they are currently prevented from installing and running energy storage due to the EU market un-coupling legislation preventing them 'putting power back down the wires' (effectively acting as a generator). This uncertainty may deter the development of the distribution network storage market. Consumers could be paying for unnecessarily expensive grid reinforcements when cheaper, more effective storage options exist.
- The position of storage within the UK legal and regulatory framework is unclear. This creates a perception of regulatory risk for investors. It also results in the absence of common terminology, which is a key tool in the development of appropriate market and network rules.
- There is a lack of a common terminology and knowledge in the wider market.
- There is no standard technical guidance or best practice, to prevent 'cowboys' entering the market and dangerous installations.
- No central tracking of installations (especially behind the meter) – this could develop into a problem for the DNOs as there is no central database of installations.
- CfD uncertainty and eligibility and design issues for hybrid systems

Opportunities for overcoming these barriers and developing storage in the UK:

- Provide signals of high-profile Government support to provide investor confidence, potentially in the form of a 2020 capacity target for storage.
- Reform the Capacity Market:
 - Energy storage projects should be eligible for longer term contracts – this should be the 15 years available to new build conventional plants, or at least of seven years in order to offer adequate options for finance. This will enable financeable contracts with lower equity costs leading to greater savings for consumers – enabling more capacity for the same amount of money.
 - Remove the restriction on 'stacking' revenues for energy storage projects – ie allowing these projects to receive income streams from multiple sources and therefore enable more to go ahead.
 - Clarify the time restrictions for energy storage and DSR providers, so they know how long they would need to supply power for. Associated fines for non-delivery should be capped at the minimum required period of supply. Storage projects vary in length in terms of how long they can store and discharge power for but they may not always be fully charged when a request from the SO comes to provide power back to the grid.

- Storage projects could be further incentivised by allowing higher payments to projects able to provide quicker response times and additional services to the grid such as frequency response.
- Improve access to finance – eg through providing Green Investment Bank finance
- Government should shift their mindset from seeing storage as an collective industry at the R&D stage, to one capable of delivering at scale now via numerous technologies (although some are at other stages)
- Develop support for joint renewable energy / storage deployment. We would be happy to work with Government on policy proposals in this area.
- Set an agreed 'definition' for energy storage in legislation and clarify its regulatory position.
- Amend licence conditions to enable DNOs to install and operate storage
- Develop technical standards and consumer guidance for installing and using energy storage technologies – the REA is working on this at present with a number of partners
- Consider reforms to the CfD mechanism to enable storage and renewable hybrid projects

Conclusion

We look forward to working with the NIC on developing storage in the UK and can provide cost information and market knowledge we hope will be of use.

Energy storage can transition us to a low carbon energy system in line with Government targets and legally binding commitments as well as reducing net costs to consumers. As the price of the technologies reduce rapidly the costs of not taking advantage of the technologies becomes ever greater. If the UK acts quickly it can reap numerous benefits, which extend beyond the energy system, into the creation of new jobs, supply chains and Intellectual Property.