

Energy Security Team  
Department for Business, Energy and Industrial Strategy  
3rd Floor, 1 Victoria Street,  
London, SW1H 0ET



Submitted by email to: [energy.security@beis.gov.uk](mailto:energy.security@beis.gov.uk)

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Dear Sir/Madam,

### **Capacity Market and Emissions Performance Standard Review – call for evidence**

Scottish Renewables is the voice of Scotland's renewable energy industry, working to grow the sector and sustain its position at the forefront of the global clean energy industry. We represent around 250 organisations working across the full range of renewable energy technologies in Scotland and around the world, from large suppliers, operators and manufacturers to small developers, installers and community groups, and companies right across the supply chain.

We strongly welcome that one of the objectives of the Capacity Market (CM) review is to explore the participation of wind and solar generators. These technologies already contribute to UK security of supply and we consider that allowing these generators to access the Capacity Market is consistent with the Government's aims of making it a market wide and technology neutral scheme. It will help ensure that all forms of generation are competing on a level playing field - supporting life extensions for operational renewable projects to make the most efficient use of existing assets, and in the long-term potentially supporting the investment case for new-build projects. We would stress however that in the near-term the volume of unsubsidised renewable new-build projects eligible to bid into the Capacity Market will be relatively small, reflecting wider barriers to deployment at volume which we believe would be best solved by allowing further CfD auctions for established technologies.

We also believe that the Government should reform CM design to enable new-build hydroelectric pumped storage projects to compete. There is a pipeline of c.4 GW of projects in development across the UK that cannot currently compete in the CM, due to their long construction lead times (longer than the four years required for the T4 auction). These projects have a large potential to provide a valuable alternative source of large scale flexibility, enhancing competition for long-term contracts in the CM auction and diversifying investment across different technologies. They would also bring wider benefits, providing a number of ancillary system services at scale and could help reduce consumer bills both through arbitrage and by reducing network transmission and balancing costs. Most of the new build projects are located in Scotland where there is a particular need to alleviate transmission congestion.

It should be noted that new build pumped hydro projects face a number of barriers that currently deter investment and further investigation would be required to establish whether participation in CM auctions alone would enable new investment. Given the long-lived nature of these assets and the number of wider system

6th Floor, Tara House, 46 Bath Street,  
Glasgow, G2 1HG  
☎ 0141 353 4980 📧 @ScotRenew  
[www.scottishrenewables.com](http://www.scottishrenewables.com)

Scottish Renewables Forum Limited.  
A company limited by guarantee in Scotland No.200074  
Registered office: c/o Harper Macleod,  
The Ca'd'oro, 45 Gordon Street, Glasgow G1 3PE



benefits that they can provide, we think it appropriate for Government to review their role within the CM and EMR. This review could include the economic costs and benefits of pumped hydro projects to the GB system.

We provide further evidence on the benefits and investment barriers facing these projects below.

### **The investment case for new-build pumped hydro projects**

Pumped storage schemes have significant capital costs associated with them due to the large proportion of specialist underground construction and dam works, long construction period and site specific electrical and mechanical components. However, once built, pumped storage projects can have operational lives of at least 50 years. New projects will look to secure revenues from three sources:

- arbitrage between prices at peak and off-peak demand;
- provision of balancing services;
- capacity payments available under EMR arrangements.

Since pumped storage generally provides ancillary services to the System Operator that cannot be planned for in advance, such stations do not receive long-term contracts. It is also not currently possible to enter into forward agreements to capture peak/off-peak spreads or to provide balancing services for the period relevant to investment in pumped storage plants. Both issues make long term investment decisions more difficult as revenue is less certain.

We would welcome the opportunity to discuss our response in further detail,

Yours sincerely,



**Fabrice Leveque**

Senior Policy Manager - Large Scale Renewables

[fleveque@scottishrenewables.com](mailto:fleveque@scottishrenewables.com)

## Assessing the need for the Capacity Market and its objectives

### 2. Do you believe the current objectives of the Capacity Market remain appropriate?

Yes, we believe that the current objectives are the right ones, but we believe that the market needs to be adjusted to allow a more diverse range of technologies to compete. We believe that allowing renewables as well as pumped storage to compete effectively in the market could improve the cost effectiveness of the scheme and enhance security of supply by diversifying the mix of technologies called upon.

We welcome the Government's intention to be "mindful of the shifting energy system landscape". Although the Capacity Market's objective should remain to procure capacity, decisions must be mindful of the wider system security and flexibility context. We would like to highlight that at present there are no proposals to provide a clear and appropriate future value for providers of inertia and we urge the Government and SO to work together to ensure that this issue is investigated properly.

## Assessing performance against the Capacity Market's objectives

### 5. Has the Capacity Market been successful in supporting investment in capacity (new and existing), both directly and indirectly? If not, please identify any changes that need to be made.

Whilst we recognise that the Capacity Market has successfully supported investment in some new capacity, we disagree with the assertion that "Holding the main auctions four years ahead of the delivery year provides the lead-time to build new capacity before the delivery year". Holding the main auction four years ahead does not allow new pumped hydro storage technologies to compete for contracts, given their longer lead times. These can range from five to eight years, reflecting the significant civil engineering works arising from specialist underground construction and dam works. As a consequence, the 4 GW of proposed new pumped hydro storage stations across the UK (see Figure 1) are not able to compete in the market, reducing both the potential volume and diversity of investment in new capacity. This potentially reduces competition for long-term contracts and prevents the wider system benefits that these projects could bring.

**Figure 1. UK pumped hydro storage projects in development**

Name	Location	Maximum output (MW)	Storage capacity (MWh)
Coire Glas	Scotland	1500	30,000
Cruachan 2	Scotland	600	7200
Balliemeanoch	Scotland	520	4200
Red John	Scotland	450	2800
Fin Glen	Scotland	600	5300
Glenmuckloch	Scotland	210/400	1600
Glyn Rhonwy	Wales	100	700
TOTAL		4,170	51,800

Holding some auctions further ahead (e.g. 6 to 8 years to account for longer construction times) alongside the existing T4 auctions could enable new build pumped storage projects to bid in, opening up long term contracts to a wider pool of projects and technologies. Such auctions could be held less frequently to reflect the risks of anticipating electricity demand many years ahead. It should be noted that new build pumped hydro projects face a number of barriers that currently deter investment (outlined in the introduction to this response) and further investigation would be required to establish whether auctions held further ahead would be able to

support new investment. However, given the long-lived nature of these assets and the number of wider system benefits that they can provide, we think it appropriate for Government to review their role within the CM and EMR.

### **The benefits of enabling new-build pumped hydro to compete in the Capacity Market**

Adjusting the design of the Capacity Market allow new build pumped hydro projects to compete could enhance security of supply by diversifying investment in new capacity and help to reduce consumer energy bills both through arbitrage and lower transmission and system balancing costs.

Pumped hydro projects provide a highly flexible, dispatchable source of capacity. Unlike other forms of storage, they can store and dispatch energy over periods of tens of hours at significant volumes (in the tens of GWhs) and could fulfil a similar role to interconnectors and DSR. The Capacity Market has so far directly supported the deployment of three types of new build capacity – interconnectors, DSR and small peaking generators. It has also indirectly influenced decisions to construct two CCGTs. Enabling new build pumped storage projects as well as renewables to compete in the Capacity Market could enhance security of supply by ensuring that investment is not concentrated in only a few technology types. Given the increasing need for flexible generation during the 2020s, a diversified approach to investment in new capacity would help manage the greater fluctuations in both electricity demand and supply expected to result from increasing renewables deployment and the electrification of transport and heat.

Increasing the volume of energy storage on the system would likely lead to further reductions in energy bills. Analysis by Carbon Trust and Imperial College has suggested that savings of up to £2.4 billion per annum could be realised by installing around 6GW of additional storage capacity by 2030<sup>1</sup>. This saving would be due to the reduction of investment in gas plant and the use of gas, and does not include savings from reduced investment in networks and the wider ancillary services that storage can provide. Pumped hydro has the highest efficiency of all currently available storage technologies at up to 80% and can provide a broad range of system services beyond balancing the daily and multi-day grid demand cycle, including frequency response, fast reserve, reactive power and black start.

Moreover, the size and flexibility of pumped storage plants can be used in the scheduling and dispatch of the system so as to modify the power flows in the transmission network, helping to alleviate transmission congestion, reduce transmission congestion prices, and improve the transmission assets' utilisation. Most new build projects are located in Scotland where there is a particular need to alleviate transmission network congestion.

#### **14. Do you believe that the auctions have been sufficiently liquid to date and to ensure strong competition? If not, how could we improve liquidity and competition?**

We believe that there is scope to increase the volume and diversity of new capacity competing for contracts. The Capacity Market has so far directly supported three types of new build capacity – interconnectors, DSR small peaking plant and indirectly influenced decisions to construct two CCGTs. Holding some auctions further ahead than four years could enable the c. 4 GW of new-build pumped storage projects (which have lead times longer than four years) to compete, enhancing market liquidity and competition for long term contracts. Holding an auction 6 to 8 years ahead of delivery would allow pumped storage projects to bid in, opening up long term contracts to a wider pool of projects and technologies. Such auctions could be held less frequently to reflect the risks of anticipating demand many years ahead.

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<sup>1</sup> Carbon Trust & Imperial College (2016) Can storage help reduce the cost of a future energy system?

## **Avoiding unintended consequences**

### **18. What are the main distortions in competition that need to be addressed to ensure a level playing field in the CM auctions?**

Current design makes the Capacity Market unsuitable for renewables and new-build pumped storage projects, which has resulted in an un-level playing field for these technologies. As well as progressing reforms to enable renewables to compete, we urge the Government to explore the mechanisms to allow new build pumped storage projects to bid, opening up long term contracts to a wider pool of projects and technologies.

## **Priority issues - Renewables**

### **21. Should wind and solar be allowed to participate in the Capacity Market? Why?**

Yes. We strongly welcome the focus on this issue in recognition of the contribution to security of supply that renewable technologies like wind and solar provide. These technologies already contribute to UK security of supply and we consider that allowing these generators to access the Capacity Market is consistent with the Government's aims of making it a market wide and technology neutral scheme. It will also enhance both the competitiveness of the auction and minimise the costs to consumers. It will help ensure that all forms of generation are competing on a level playing field - supporting life extensions for operational renewable projects that will ensure the most efficient use of existing assets, and in the long-term potentially supporting the investment case for new-build projects. We would stress however that in the near-term, the volume of unsubsidised renewable new-build projects eligible to bid into the Capacity Market will be relatively small, reflecting wider barriers to deployment at volume which we believe would be best solved by allowing further CfD auctions for established renewable technologies.

### **22. What factors need to be considered to enable renewables to participate in the Capacity Market whilst ensuring security of supply?**

Wind and solar are not currently listed on Schedule 3 of the CM Rules, which prevents participation. It is critical that the penalty and testing regimes work on a fair and transparent basis. Changes to the penalty regime need to be technology neutral and they should not disproportionately disadvantage the participation of renewable technologies in the market. Similarly, wind and solar technologies require a de-rating factor to participate in the Capacity Market.

Increasing the liquidity of a secondary trading market should be considered. This would allow generators to re-allocate contracts if they consider that they are unable to deliver the required volumes of capacity nearer the delivery window. However, the participation of some renewable technologies is likely to increase liquidity in the secondary trading market if these projects look to hedge delivery.

### **23. What factors need to be considered to enable the participation of hybrid projects in the Capacity Market?**

We welcome investigation of this issue, although we see participation of renewables and pumped storage as a priority.

### **24. What factors need to be considered when developing the de-rating methodology for wind and solar? What approach could be taken to de-rating hybrid CMUs?**

We support the process underway by the EMR Delivery Body, which aims to find an appropriate derating solution.