National Infrastructure Commission
Call for evidence on Electricity Interconnection and Storage

Written evidence submitted by Statkraft UK Ltd

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About Statkraft

1. Statkraft is Europe's largest renewable energy company, with operations in over 20 countries. We have invested over £1.4 billion in the UK's renewable energy infrastructure since 2009 and we are among the biggest provider of power purchase contracts (PPAs) for independent renewable electricity generators in the UK.

2. We have over 500 MW of UK generation plant. We are majority owner and operator of three onshore wind farms (with a further one under development), a large hydropower plant and we are major shareholder in two offshore wind farms. Statkraft is a partner in developing the Triton Knoll offshore wind farm, and part of a consortium of four companies developing Dogger Bank, the world's largest offshore wind farm.

3. Statkraft is playing an important role facilitating the strategic energy partnership between Norway and the UK. A key element in this is the NSN interconnector that is being progressed by National Grid and the Norwegian transmission system operator Statnett. NSN will be able to provide low carbon energy for almost 750,000 British homes and, according to Ofgem, will save UK households up to £3.5 billion over 25 years by importing low carbon electricity from Norway.

Summary

4. Statkraft welcomes the opportunity to respond to this consultation. The overarching aim for any reform to energy infrastructure policy should be to establish energy security and ensure affordable carbon reductions to keep the world on track to keep future temperature rise below 2C. The National Infrastructure Commission's recommendations relating to this consultation, and its next areas of inquiry, should focus on how we meet these objectives.

5. Investment in low carbon technology is essential to meeting these aims. Interconnection and energy storage technology have an important role to play in the UK's long term energy mix. The UK particularly needs to do more to improve grid connections with Europe, which will enhance security, accelerate decarbonisation and can contribute to lower consumer bills. However, such developments are only one part of the solution, and should not be seen as alternatives to renewables investments, such as offshore wind.

6. Investors in low carbon energy infrastructure require certainty of policy direction. The National Infrastructure Commission has a vital role in ensuring long term policy stability is achieved.

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?*

7. It is very important that the operation of the transmission grid is neutral, fair and efficient and that the operation and development of the grid is sufficiently independent of other business interests. There is a potential conflict between the TSO role as owner of transmission grid and the role as SO. National Grid also has other business interests where conflicts in principle may arise. Current business separation within National Grid seems to be working well, so we are not very concerned with the situation at the moment. We hence see no urgent need for a SO- reform. It is however important that the regulator closely monitors how well National Grid fulfils its critical role as TSO.

8. The balancing market has been through a number of reforms, like making balancing charges more marginal and the introduction of a single imbalance price. There is a need to consider the impact of these changes over some time before new significant reform should be considered. The recent changes have led to increased balancing cost exposure for generators, and increased interest in trading this risk. We are positive to introducing measures that could enable parties to better manage this risk, like trading closer to or post market gate closure.

To what extent can demand-side management measures and embedded generation be used to increase the flexibility of the electricity system?

9. Demand side management and embedded generation are critical in an effective electricity market. To increase market flexibility, further market integration of such technologies should be encouraged.

10. Demand side management is less developed in the United Kingdom than in many other markets. We are however not aware of any major barriers to this with the exception that real-time metering has not been rolled out yet. Aggregation of demand side response should be possible, but in this case the aggregator should take over the balancing responsibility of such demand. We see no need to develop a mandatory framework regulating the relations between supplier-aggregator-consumer. The Government should not implement financial support mechanisms for demand side response that undermines the business case for developing flexibility through generation and interconnection.

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.)

11. Statkraft is at the forefront of developing energy storage technology in Europe, and is actively developing battery storage solutions in the UK. It is clear that the market design rules –like for trading, ROCs, ancillary services - are not designed with batteries in mind.

12. Batteries store energy when prices are relatively low and release energy when prices are higher. Treatment of storage as both generator and consumer in terms of charges like Renewables Obligation charges or transmission pricing might be a barrier to storage and might unduly worsen the business case.

13. The capacity market is designed for fuelled generators and not for storage as batteries. Participants are expected to keep generating for a long time, but storage like batteries run flat eventually. Still batteries will be very helpful in dealing with a temporary capacity crunch. Possible ways to address this is an 'x hour' capacity auction or a scheme where capacity payment would be stepped according to the time the storage can deliver capacity.

14. In this respect we will also point to that investments in small scale storage behind the meter tend to be incentivised by avoiding paying retail tariffs rather than being market driven. Such investments will hence tend to be artificially competitive and tend to increase system costs compared to market based solutions.

15. Research and development of energy storage technology needs to be supported through policy mechanisms. From a UK perspective, this could include investment in R&D funding through the budget of the Department for Business, Innovation and Skills.

16. Energy storage technology is fast advancing. However, once such technologies are commercially viable it should be left to the market to decide which technologies are most appropriate for commercial scale contribution the UK's electricity framework, rather than the Government "picking winners".

17. Storage (like generators) can provide grid support services to National Grid as well as to DSOs. However, TSOs/DSOs should not be allowed to own and operate storage facilities. TSOs/DSOs can contract such services from market parties. The regulatory framework should be such that TSOs/DSOs have the proper incentives to take efficient decisions choosing between network investments and contracting services.

18. Further clarification is required from National Grid and the Department for Energy and Climate Change on the relationship between the capacity market and energy storage technologies

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?

19. Statkraft is very supportive of increased interconnection between Great Britain and mainland Europe. Interconnectors will play an important role in helping the UK to achieve

security of energy supply. There is currently just over 4GW of interconnector capacity in operation but a substantial level of interconnector capacity in the pipeline, including 7.5GWs deemed eligible to partake in the cap and floor regime.

20. We welcome the European Commission's proposals to increase electricity interconnections between member states (to 10% of installed electricity generation by 2020 and 15% by 2030) and would like to see the UK Government drive this initiative forward. In particular, Statkraft strongly supports the development of further interconnection, particularly the NSN- link with Norway, which could enable both flexible and renewable capacity to enter the UK market.

21. There are a great number of advantages of linking hydropower with seasonal storage via interconnection with intermittent renewable sources in the UK market. Particularly, there is real potential for interconnections to be built in tandem with offshore wind developments, ensuring that intermittency is balanced as and when required. The combination of hydro storage and interconnection can provide both short term (fast response) flexibility as well as firm longer term back up e.g. in longer periods with scarcity due to high demand and low wind generation. It is for this reason that Statkraft is very supportive of the proposed North Sea Grid which has the potential to revolutionise the UK's energy market and security.

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?

22. After introduction of the single imbalance price which was an important step in the right direction, further progress could be made by allow trading closer to time of delivery.

23. Statkraft believes that a well-functioning balancing market should be open to both generators and demand side measures. All generators should in principle be responsible for balancing supply and demand, including smaller and intermittent generators. The UK balancing scheme is well progressed in following these principles, also compared with other markets.

24. In the UK the grid cost through the TNUoS charges are cost-reflective. Also imbalance charges are cost-reflective. This indicates that intermittent generators and generators far from centre of demand are charged for the cost they are imposing on the system. When it is appropriate that intermittent generators should pay their balancing cost and grid costs, we see no case for additional 'punishment' of intermittent generators. Given improvements in market design, increased flexibility through interconnectors and through the demand side, the electricity system will be capable of handling an increasing share of intermittent generation with less cost.

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