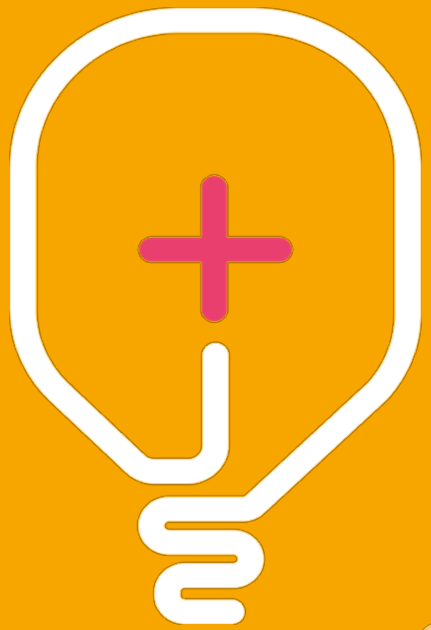
How and where is the value for flexibility shifting, and what does this mean for providers?



Who we are

- Financial services consultancy, based in London
- 700 staff and partners
- LCP Energy Analytics focusses on the GB and Irish electricity markets
- Combination of energy market expertise, mathematical modelling and new technological approaches
- Work closely with industry and decision makers
- Provide a range of services, from modelling support to market insight

We advise half of the FTSE100 firms

LCP Energy Analytics

We have provided the modelling framework for a number of decision makers.

We designed, developed and maintain BEIS' primary forecasting tool, the Dynamic Dispatch Model, used in all long term forecasting and policy impact analysis

- Ofgem uses our modelling to assess network charging reforms, including embedded benefits/TCR
- National Grid uses our modelling to support the annual capacity requirement recommendation, calculate EFCs and derating factors
- The LCCC uses our modelling to calculate the costs of the CfD framework, and to set the interim levy rate and total reserve amount.

ofgem

LOW CARBON CONTRACTS COMPANY

nationalgrid

Department for Business, Energy & Industrial Strategy

Flexibility

What is flexibility?

‘Modifying generation and/or consumption patterns in reaction to an external signal to provide a service within the energy system’

Opportunities for flexible assets

Benefits of flexible assets

Benefits of **flexible assets** include:

- Fast Ramping
- Peaking
- Reducing Curtailment
- Providing Ancillary services
- Resolving Imbalances

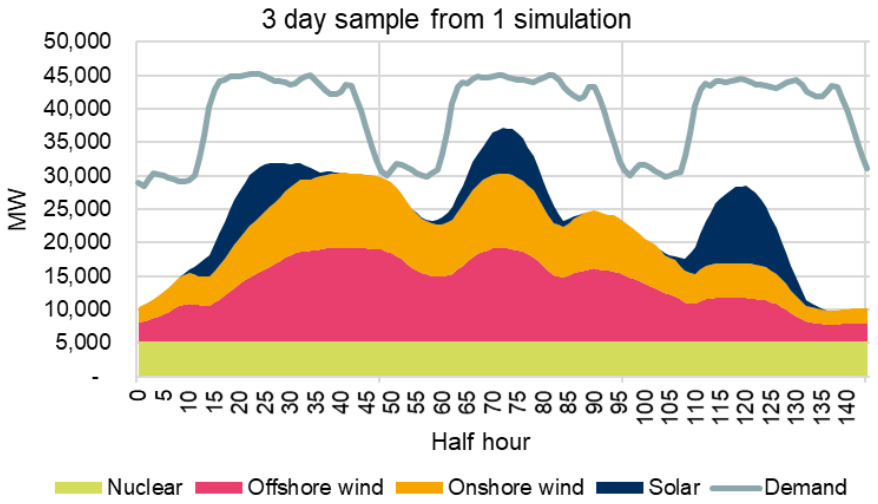
When evaluating the potential future opportunities for flexible assets in the medium to long term it is important to take a **fundamentals** based approach.

Opportunities for flexible assets

LCP flexibility simulation

When evaluating **flexible assets** we model the market stochastically to capture the wide range of intermittency & demand profiles seen historically.

The following slides look at a simulation of 2030 under National Grid's Two Degrees scenario, to explore the opportunities for flexible assets.

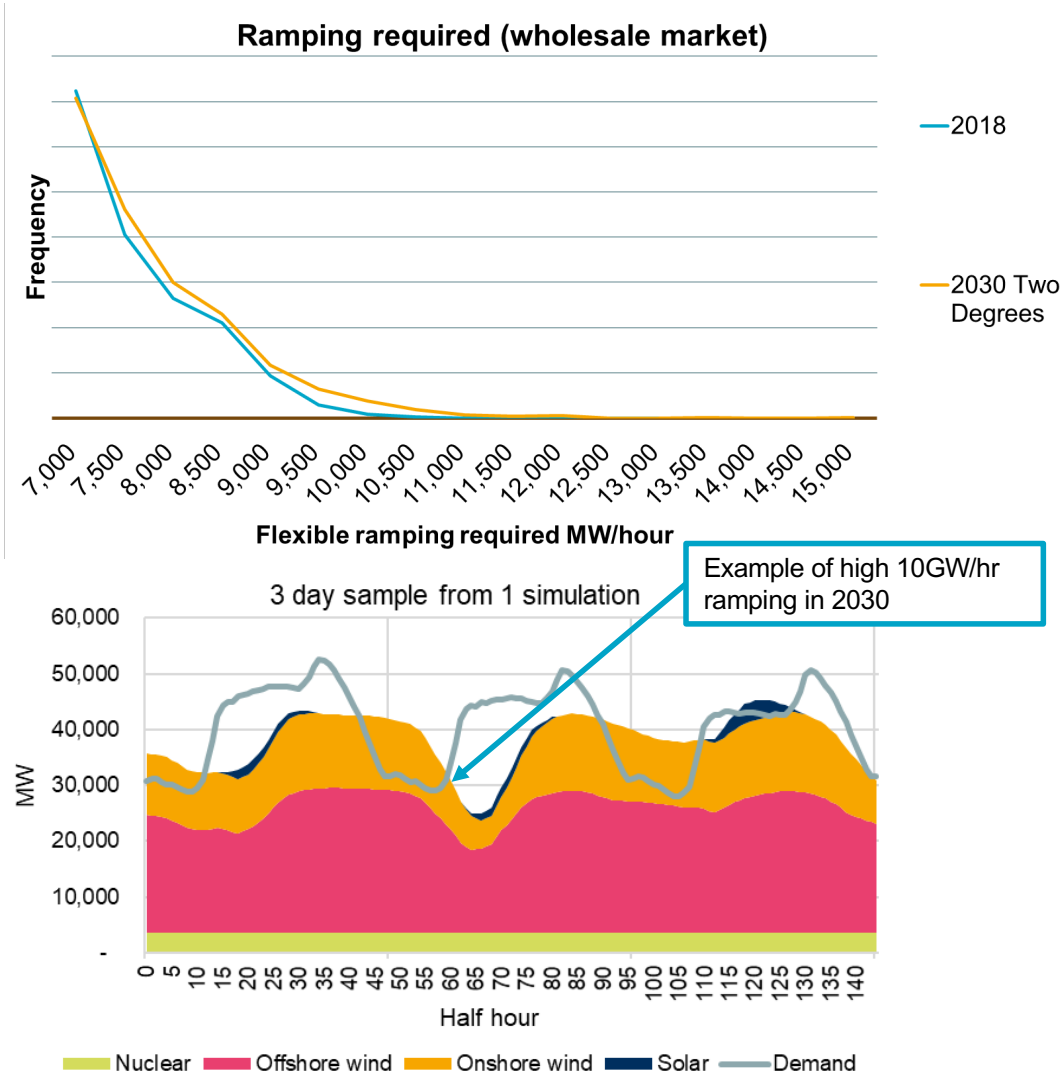


Opportunities for flexible assets

LCP flexibility simulation

Ramping requirements in the wholesale market increase through to 2030, but not dramatically:

- most extreme ramp periods driven by demand-up & wind-down periods
- solar-down periods do not drive largest ramps as do not tend coincide with high demand or wind periods
- large diverse wind fleet means changes occur over several hours

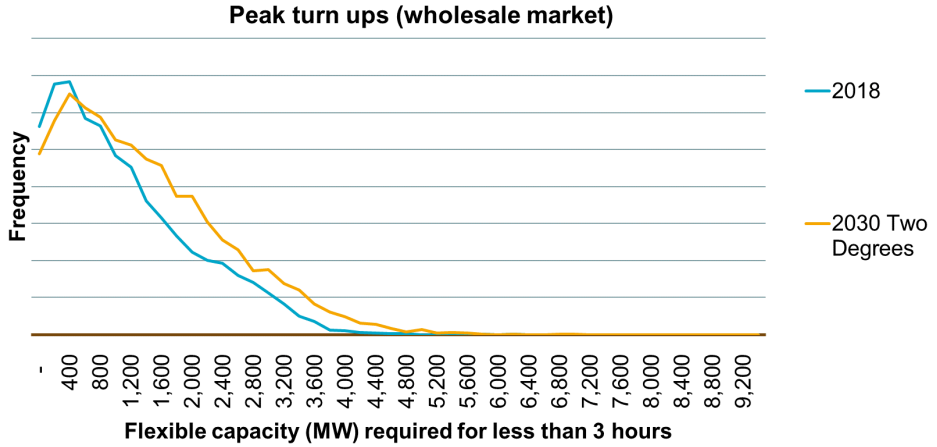


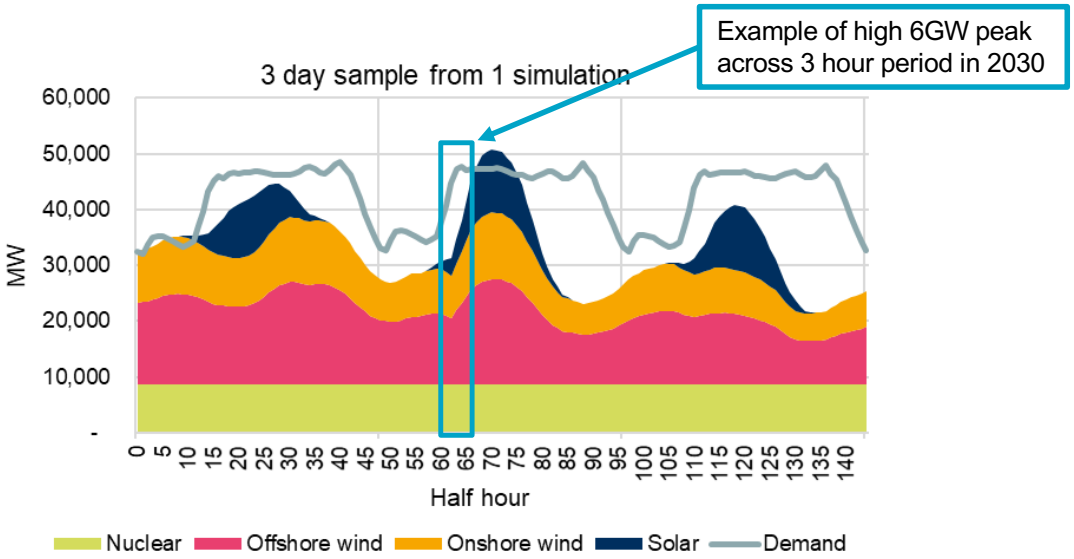
Opportunities for flexible assets

LCP flexibility simulation

Similarly, short peaks (defined here as periods where net demand peaks for 3 hours or less) increase through to 2030, but again not drastically:

- Extreme periods often occur in mornings where demand ramps up before solar and wind, or in evenings where demand ramps down after they fall
- Rarely more than 5GW of turn-up capacity required for such as short period in 2030, even under high renewable scenarios
- Interconnectors, storage and flexible CCGT may provide some of this





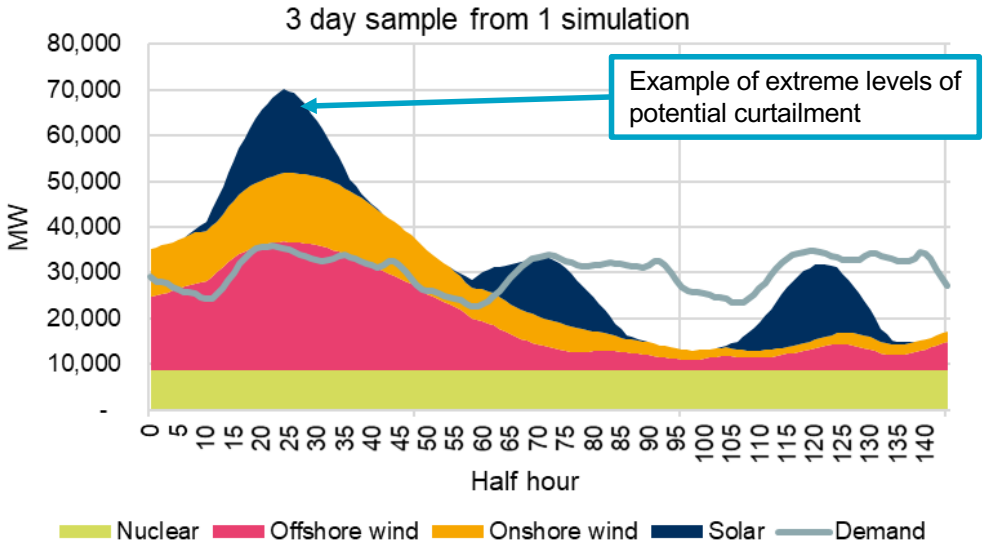
Opportunities for flexible assets

LCP flexibility simulation

Large problem in these high renewable scenarios is the high levels of potential curtailment, e.g. **40GW** of wind & solar under Two Degrees in 2030.

Interconnection & demand turn-up can alleviate, but presents large opportunity for storage technologies, particularly longer-duration.

For system stability would also need synchronous generation (inertia & reactive power), but profile of this requirement is relatively predictable.



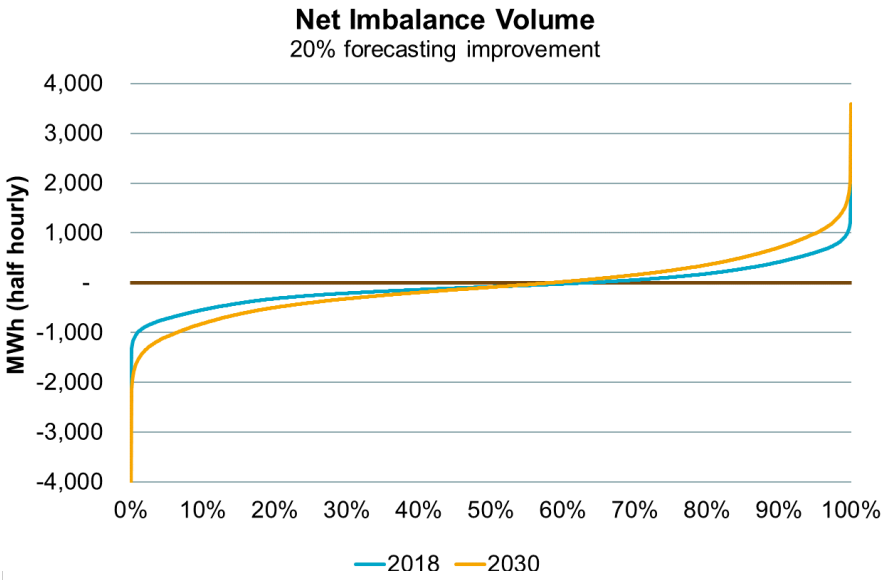
Opportunities for flexible assets

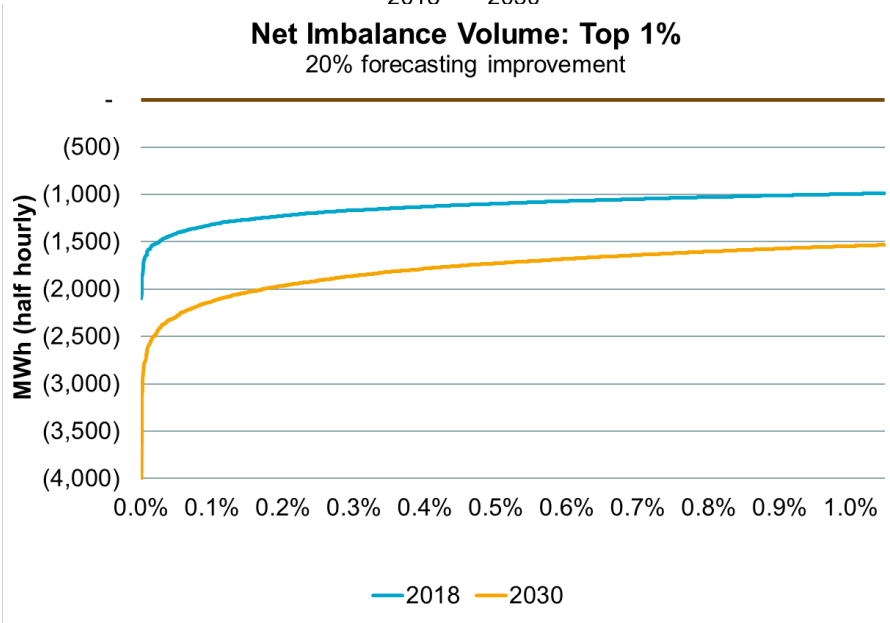
LCP flexibility simulation

Imbalance volumes set to significantly increase by 2030 due to renewable penetration. However, forecasting improvements are likely to alleviate this to some degree.

With a 20% forecasting improvement, and a diverse renewable mix, imbalance volumes are likely to increase by 50%-100%. Up to **8GW** of flexible plant required to turn up/down in most extreme cases.

Since the 1st September 2018 demand units have only contributed 0.29% of BM bid volume





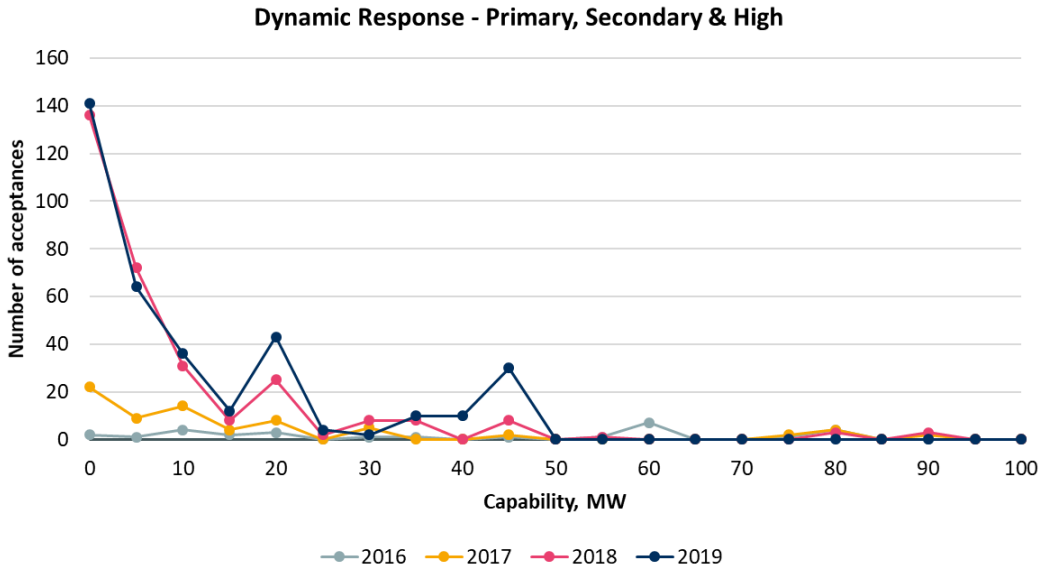
Flexibility markets - Firm Frequency Response

Price trends – Ancillary services

Gas reciprocating engines, Demand Side Response and batteries are providing more FFR services.

The impact of this means increased competition for contracts and potential cannibalisation of the value of FFR going forwards.

The amount of response that needs to be procured by National Grid is based on the **largest in-feed loss** which is expected to increase in the future but this is capped.



Summary

- Flexibility requirement for peak turn ups and ramping will increase but we don't see this requirement increasing significantly
- Turn down flexibility or footroom will be more important in the future as significant levels of renewables need to be curtailed
- The current and future generation mix looks to be able to deliver flexibility requirements with the potential for cannibalisation of prices across markets
- Improved BM access is a growth area for flexibility services
- A fundamentals driven approach should be used to assess value in flexibility markets

Contact us

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