

## Future Balancing Services

Our Power Responsive campaign, launched in June, set out how we see our balancing services evolving over the next five to ten years. This note gives a more comprehensive explanation and will be useful for those looking to develop flexible demand or distributed generation sources of balancing services.

### National Grid and Balancing Services

At National Grid we value the creation of flexibility within your electricity demand as a fundamental part of our future low carbon grid, and we will pay you for the flexibility you make available to us. By joining us, you play an important part in the country's low carbon future, help reduce the costs of energy and keep Britain's electricity supply running reliably.

We spend around £850m each year on services to ensure the British electricity grid remains balanced and secure. By balanced we mean that supply always matches demand and that electricity flows within safe limits. It's a twenty four hour a day job, 365 days a year. We do this by adjusting flexible sources of supply and demand, both automatically and manually.

You can participate with whatever load or generation that you can make flexible. We can work with you on this either directly or through a number of companies that work with us. These companies create and then aggregate individual loads at your site, such as a pump, an air conditioning unit or a back-up generator, and combine them with others to provide a flexible service to us, for which we will pay a range of service fees.

We buy these services through tendered contracts which can be flexible to the capability of your site.

We can work with you to establish which services would best suit you.

If you'd like to discuss further you can contact your Balancing Services Account Manager or get in touch at [commercial.operation@nationalgrid.com](mailto:commercial.operation@nationalgrid.com) and one of the team will get back to you.

## Summary

In summary, we expect the underlying requirement for new balancing services provision to grow gradually over the next decade (incrementally, not exponentially). The single largest driver of this is the retirement and closure of existing older large generators and associated site diesel generators (OCGTs). Alongside this, our traditional sources of balancing services, large coal and gas generators will run less often as renewables form an increasing part of British electricity supplies. During times of higher renewable output we think that, on most occasions, it will be cheaper to maximise renewable running and procure flexible energy from balancing services from distributed or demand sources; it should be noted, however, that wind will be important in providing significant voltage support and some automatic frequency response. These two trends, closure of existing generation and less running of large fossil fuelled stations will be the biggest factor in our requirement for new sources of balancing services. We also expect our requirements across balancing services to change; however, total requirements will remain the same, as a result of increased renewable output.

Our obligation is to minimise our costs of balancing and to facilitate a competitive market. To do this we want to maintain our balancing activity as a small proportion of total supply. At present we actively balance the last 2-3 per cent of demand and supply, that is to say that 97-98 per cent of all demand supply matching is done by the wholesale market. We expect these proportions to hold broadly at this level over the next decade. It is expected, however, that the proportion of our balancing may increase during periods of transition (such as during a rapid growth in solar capacity or a change in demand trend) as the market may take several months or longer to adjust.

Although there is much discussion of renewables 'volatility' and uncertainty, we have been able to establish reliable and accurate forecasts for wind output. Through continued investment we expect to maintain and improve our accuracy for wind and the growing solar PV supply base. This forecast accuracy will be vital to minimising costs and minimising the growth in balancing service requirements. We see investment in accurate forecasting and transparent market information as key to minimising our balancing volumes and costs, and as important as expenditure on Balancing Services.

## Evolution of our balancing markets

### Automatic frequency response

Frequency response is designed to automatically correct the system frequency following a major loss of supply or demand. Over the next decade, changes in the system will mean that automatic services need to respond faster to contain the system frequency and at times, replicate system inertia. A significant proportion of our future frequency response will need to be supplied from sources that can deliver in less than two, and preferably less than one second. Historically the requirement of these services is to deliver within two to ten seconds.

We expect the total requirement for automatic response services to increase. We also envisage that a greater proportion of faster services from dynamic and static demand, storage, and interconnectors will work alongside a reduced volume of our traditional requirement over the next five years. As part of this growth strategy we expect that we will target our procurement structures towards the new growth areas of demand and energy storage; we will, however, remain energy neutral. Traditional provision of frequency response from large generators will remain important but will reduce at a national level over the same time frame. It is important to bear in mind that the reduction in the fleet of large generators is likely to mean that an individual provider may have no reduction in income opportunity, as the large generator frequency response market will be serviced by less players.

Alongside dynamic response, we expect to see increasing levels of static (relay triggered) response being delivered by demand (for primary and secondary response) and thirty second delivery secondary response from hot diesel generators. Growth in these static markets may become significant in segmenting frequency response into a fast/primary response market serviced and a separate thirty second secondary response market that has supply sources more closely aligned with Short Term Operating Reserve (STOR).

We see our Firm Frequency Response bridging product as an important mechanism in growing demand side provision of these services. We will also be seeking to grow faster provision from sources such as batteries. As markets change over time, we elected to increase more frequent pricing arrangements to allow greater flexibility to earn income and target provision and value.

## Fast reserve

Fast reserve is, and will remain, the service area that is hardest to forecast. It acts as a stop gap between fast, automatic services and the more routine ten to twenty minute delivery seen from STOR and our other reserve sources. We expect the sources of supply in this market to enlarge and change. The removal of regular network constraints between Scotland and England, occurring gradually from 2015-2017, will allow hydroelectric power located in Scotland to compete equally with pumped storage stations in England and Wales. Alongside this we see an opportunity for demand and new, faster, engines to participate in this market. These will be important factors in growing our sources of supply.

To help enable this, we are looking at how we can increase transparency across the fast reserve market, both for the procurement of tendered and options services.

## Reserve

Our reserve requirements are defined from day ahead through to real time. Typically the greater proportion of our longer term services have a response time of within ten to twenty minutes from STOR. We expected the volumes of reserve we buy through STOR to remain at least at their existing level, and probably grow gradually over the next decade. We expect that we will need to attract significant new volumes into the market as some older, existing providers close. Much of this older capacity provided firm, committed services and we expect that we will see greater separation of pricing for firm and optional services over time. Firm service availability will still be required over the highest demand peaks of the year and we expect to see high mobility from providers who will move between triad and red-zone network charges, STOR and even secondary response to maximise value. We see this mobility as positive as it brings greater liquidity across markets. It also provides greater opportunity and diversity of income sources, which we expect to support investment proposal for the developer and investors looking to bring additional flexible demand or generation capability into these markets. Over the decade we expect the use and value of STOR to shift away from peak demand periods towards periods of lower or more uncertain renewable output.

Alongside the major energy balancing services set out above, we hope to grow the provision of voltage and network congestion services from demand, energy storage and distributed generation over the next decade. Network congestion services consist of the instruction of a number of providers in the same geographic area to increase or decrease power in order to manage network flows to meet operational standards.

We believe that significant participation in these markets is likely to remain at least five years away, although growth may arise faster if opportunities arise to undertake longer term procurement to avoid network investment. Notwithstanding this, as current network upgrades are completed, we expect the costs of congestion to fall and therefore opportunities in this market to decline. Procurement of reactive power for voltage management will remain an important and growing service for us, with significant volumes procured from wind power and traditional generation sources.