

Table 3 Changes needed to enable DSR and Renewables to participate in existing flexibility markets

Service	Description	Key barriers, what would need to change to be able to provide?
Mandatory frequency response	Mandatory Frequency Response is an automatic change in active power output in response to a frequency change and is a Grid Code requirement.	Commercial framework needs to change between DG and DSOs if reconfiguring smaller generators to provide FR is useful. Technical requirements on droop need to soften to accommodate new market entrants
Firm frequency response	Firm Frequency Response (FFR) is the firm provision of Dynamic or Non-Dynamic Response to changes in Frequency.	Need storage and aggregators to be able to compete and also to be co-located with renewables. TSO engaging with the industry to understand the dynamics of the sector in order to value and access the inherent flexibility that is available (when the asset is active) Planned reduction in threshold from 10MW to 1MW in April 2017 is welcomed. Ongoing, slow review of services undermines prosumer / developer
Frequency control by demand management	FCDM provides frequency response through interruption of demand customers.	TSO contracts team have indicated that they will be retiring the FCDM service meanwhile their review of services undermines prosumer / developer confidence
FFR bridging contract	Enabling smaller (<10MW contracted volume), demand-side providers a route to access the FFR tendered market	Bridging terms less relevant as a result of planned reduction in threshold from 10MW to 1MW in April 2017
Enhanced frequency response	A new service aimed predominantly at storage assets to provide frequency response in 1 second or less.	1 second response is too tight for renewable generators to be able to participate in this market. Call for a Fast Frequency Response product – 5 second delivery maintained for at least 10 seconds. Late changes to specification during the initial EFR procurement exercise meant npower activity was diverted on to other projects. The resultant low value outturn suggests that the EFR market is under-valued
Fast reserve	Fast Reserve provides the rapid and reliable delivery of active power through an increased output from generation or a reduction in consumption from demand sources, following receipt of an electronic despatch instruction from National Grid.	For wind - wind resource is the barrier here and storage again is the longer term answer. Need storage to be able to compete and also to be co-located with renewables For DSR Current 50MW volume threshold for participation is a barrier to entry
Short term operating	Short Term Operating Reserve (STOR) is a service for the provision of additional active power from	For wind - wind resource is the barrier here and storage again is the longer term answer.

reserve (STOR)	generation and/or demand reduction.	Need storage to be able to compete and also to be co-located with renewables Current market dynamics and low tender valuation means any STOR activity is entirely dependent on winter-peak price arbitrage (i.e. Triad Avoidance). A significant proportion of our STOR portfolio will be delivered through BtM Generation as STOR price signals are insufficient for a typical business to cease production when called.
BM start-up	The BM Start-up Service gives National Grid on-the-day access to additional generation BMUs that would not otherwise have run, and which could not be made available in Balancing Mechanism timescales.	Renewables do not sit idle – generators run when it can and therefore will not be suited to this product.
STOR runway	STOR Runway is a contracting opportunity for Demand Side Providers to support the growth of new volume in to the STOR market.	See STOR Notes above
Enhanced optional STOR	This service is where National Grid has a requirement for provision of a volume of an Enhanced Optional STOR Service from non-BM Providers on a trial basis for this winter (which winter? 2016/17?)	Enhanced Optional STOR is competing directly with winter-peak periods (inc Triad) and is therefore not commercially compelling for our DSR client base.
Demand turn-up	Demand Turn Up has been developed to allow demand side providers to increase demand (either through shifting consumption or reducing embedded generation) as an economic solution to managing excess renewable generation when demand is low.	DTU is not commercially compelling for our DSR client base currently but we would expect values to increase over time
Transmission Constraint Management	A transmission constraint arises where the system is unable to transmit the power supplied to the location of demand due to congestion at one or more parts of the transmission network.	Lack of commercial framework
Contingency Balancing Reserve	DSBR is targeted at large energy users who volunteer to reduce their demand. SBR is targeted at keeping power stations in reserve that would otherwise be closed or mothballed. DSBR is targeted at large energy users who volunteer to reduce their demand during winter weekday evenings between 4 and 8 pm in return for a payment. These services will act as a safety net to protect consumers, only to be deployed in the unlikely event of there being insufficient capacity available in the market to meet demand.	N/A
Maximum Generation	The Maximum Generation Service allows access to capacity which is outside of the Generator's normal	

	operating range in emergency circumstances.	
Intertrips	Intertrip services are required as an automatic control arrangement where generation may be reduced or disconnected following a system fault event.	
Black Start	Black Start is the procedure to recover from a total or partial shutdown of the GB Transmission System which has caused an extensive loss of supplies.	evaluate technical requirements to explore the use of multiple embedded service providers as well as individual large transmission connected generation and address the absence of a commercial framework required to justify the investment.
SO to SO	SO to SO services are provided mutually with other Transmission System Operators connected to the GB Transmission System via interconnectors.	N/A
Obligatory Reactive Power Service (ORPS)	The Obligatory Reactive Power Service is the provision of mandatory varying Reactive Power output.	<p>Rather than an obligation a new ancillary service market for Reactive Power Provision should be created. This is in line with the conclusions of Smart Grids Forum WG6.</p> <p>Note: Old machines are not technically capable.</p> <p>New turbines: no commercial/contractual framework inhibits optimising this service.</p>
Enhanced Reactive Power Services (ERPS)	The Enhanced Reactive Power Service is the provision of voltage support that which exceeds the minimum technical requirement of the Obligatory Reactive Power Service.	
<u>Demand Side Response</u>	For businesses and consumers, DSR is a smart way to save on total energy costs and reduce their carbon footprint. Through encouraging greater participation, NG envisages turning an industry problem into a customer opportunity.	Ongoing TSO review of services undermines system development confidence– i.e. risk of developing IT capability for a service which may become redundant or where value could deteriorate