WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

nationalgrid

Demand Turn Up 2016

December 2016

1. Executive summary

The growth in distributed energy resources in recent years has been of unprecedented scale. This evolution brings opportunities for decarbonisation in Great Britain, and the energy industry must adapt in order to ensure the delivery of secure and affordable energy.

As more generation connects to the distribution network, Distribution Network Owners (DNOs) are becoming more active and innovative in managing their networks, for example, exploring demand side response as an alternative to building assets. With this in mind, greater collaboration between National Grid, in its role as System Operator (SO), and DNOs is required to understand how parties can work effectively together.

In addition to changing system needs, stakeholders with distributed energy resources, often new technologies, are looking to diversify their revenue streams by providing services to multiple parties.

An example of changing requirements and greater collaboration is the Demand Turn Up (DTU) service, introduced in 2016 to encourage large energy users and generators to either increase demand or reduce generation when there is excess energy and low demand on the system. After identifying similar requirements, National Grid and Western Power Distribution (WPD) trialled the sharing of DTU; the first time a Balancing Service had been shared between two parties.

The aim of the trial was to enhance understanding of how distributed energy resources can be shared to meet both transmission and distribution requirements, in a way that maximises value to participants (by offering different revenue streams) and also value to end consumers (by avoiding the need to duplicate processes).

The service was successfully operated over the summer of 2016 providing economic benefits to National Grid, with 323 instructions and 10,800 MWh called with an average utilisation price of £61.41/MWh. These calls were used primarily for footroom, in the overnight window. WPD successfully trialled the dispatch procedure but was limited by low availability in the relevant areas.

The trial will be continued in 2017, to build on previous learning points, for example, around conflicts, information and monetary flows, and contractual arrangements between both parties.

Sharing DTU between National Grid and WPD has been and will be an important step in understanding how parties can work together effectively to meet transmission and distribution requirements from sharing a single service and facilitate access to multiple revenue streams for market participants.

The purpose of this joint report is to share learnings and participant feedback from the 2016 trial and to explain how the service and sharing trial is evolving for 2017. We welcome your feedback on this – you can contact us via commercial.operation@nationalgrid.com or wpdinnovation@westernpower.co.uk

2. Demand Turn Up concept and use case

2.1 Demand Turn Up

To help manage economic and efficient electricity systems, significant value can be attributed to flexible demand and generation. This is set to only increase with the loss of traditional sources of flexibility and the continued move towards a more variable and less centralised system.

To date, most of the mechanisms encouraging flexibility have focused on turning demand down (or generation up) to benefit the system and provide value. These range from market participants proactively avoiding consumption during times of peak load, to automatically reducing load to help restore system frequency. There are a myriad of different products needing different types of response for different requirements. However these have mostly focussed on ensuring there is enough generation and capacity on networks to allow for the load.

With significant volumes of non-flexible renewable generation connected to the system in recent years there is now another potential use for flexible load: Demand Turn Up (DTU). By increasing demand, or reducing generation output, parties can provide benefit to both the System Operator (SO) and the Distribution Network Operator (DNO) as detailed in the sections below.

The aim of DTU is to economically secure negative reserve requirements, by encouraging shifting or increasing energy use or reducing net generation output.

2.2 National Grid use case

As SO, National Grid has a responsibility to maintain the balance of electricity supply and demand in an economic and efficient manner. Commercial Balancing Services, such as DTU, are one way of fulfilling this responsibility.

Whilst demand side response is often used to soften peaks in demand, DTU works in the opposite direction. The increasing level of non-flexible generation connected to both the transmission and distribution networks is offsetting the electricity demand seen at a transmission level. This is particularly apparent when high output from renewable generation coincides with times of already low demand, for example, during the day on non-working days and overnight. As a result, additional demand is required during these times. This type of energy balancing is often known as negative reserve or downward margin.

There are a number of solutions when there is a decrease in downward margin available, including the use of electricity interconnectors and bids taken to reduce wind output. DTU was introduced as an economically competitive alternative, with the added benefit of maximising renewable generation by encouraging flexibility from demand rather than supply.

In addition to the requirement for energy balancing, DTU was identified as an option for thermal constraint management. Unlike energy balancing, constraint management is highly locational.

2.3 WPD use case

The DNO use case for DSR is quite distinct from that of the SO. As the network operator, the DNO's priority is to provide a safe and secure supply to existing customers, whilst also allowing connections to new customers at the lowest cost. The DNO has no responsibility for national system balancing but may value DSR to help avoid network constraints. To allow for new or changing connections on the distribution network, the DNO may have to build new assets. DSR could be used to help defer or even avoid the costs of such assets. The particular use case identified for DTU is that of load reduction in networks with high penetration of PV.

When assessing the ability to connect generation to the network through a standard connection, an assumption of base load is used for system studies. This is combined with a scenario of maximum generation output and a relevant outage to determine the worst case impact of the generation. If the network remains within limits the generation is allowed to connect with minimal works. If there are breaches, the generator is assigned an apportioned cost for the required improvements. This connections process has led to many networks with significant amount of embedded generation connected and very little spare capacity.

In such situations changes in base demand may cause networks to breach limits. Whilst large individual loads are not considered in the base load, energy efficiency or the closure of smaller loads could push the network beyond its limits. A reduction in load could cause voltages to go above statutory limits or could put transformers beyond reverse power flow limits. This is of particular concern in areas with high PV loading where times of high generation and low load coincide.

Another form of load reduction would be the connection of multiple small scale generators under engineering recommendation G83 (up to 16A per phase). For individual connections, installers need only notify the DNO following the installation. Following the changes to the distribution licence condition 13C in the RIIO ED1 price control, the costs of any reinforcement from multiple G83 generators is still borne by the DNO. This scenario causes the same issues as a true reduction in load.

The ability to contract for additional demand at key times could allow the DNO to mitigate effects and potentially avoid network reinforcement. However WPD's requirement is very locational, to be of value to WPD the DTU provider must be electrically connected below the constraint. This will limit the number of potential providers. WPD would look to contract and dispatch pre-fault and expects to be able to dispatch with significant notice (potentially several days ahead).

This use case was the focus the technique 3 of the SYNC Network Innovation Allowance (NIA) project. The project was focussed on issues at the higher voltage levels (132kV and 33kV) in the South West and South Wales. The trial aimed to prove the concept of DTU and as such was not used to manage a real constraint.

2.4 Requirement for collaboration

With two services looking for similar type of response from similar participants at similar times, the requirement to collaborate was evident. Whilst a joint trial was not the original aim of either party, the requirement to develop services that could work together was.

Previous DNO DSR trials had highlighted the interaction between SO and DNO services as a key area of work for the growth of DNO led DSR. The Energy Networks Association's (ENA) Shared Services working group was established to give an electricity network operator perspective of how DSR could be utilised by different parties, with a particular focus on Short Term Operating Reserve (STOR). The DTU trial compliments the aims of the ENA group and provides learning from a real life example of service sharing. .

The benefits of enabling demand side participants to provide services to multiple parties in a coordinated way are numerous. By establishing processes and information flows between the parties that are using DSR, it is possible to manage instances of conflict, such as situations where two or more parties have a requirement for a distributed energy resource. In addition, the ability of distributed energy resources to diversify their revenue streams also enables them to derive greater value and realise business cases.

Beyond simply allowing shared services, closer collaboration can also allow for clear and coordinated customer interaction. Both parties could share recruitment and help grow total volume whilst presenting a simple and consistent message to customers.

This presented a clear imperative to collaborate on DTU, which then grew into a shared service proposition.

Prior investigations of shared service opportunities between DNO and National Grid requirements have shown there may be limited conflicts in the actual use of DSR participants' assets. Trials, such as sharing DTU between WPD and National Grid, will help to further understanding on instances of conflict. One of the key differences identified between DNO and National Grid usage is the period of advance notice for dispatch of a DSR event, with DNOs expected to be able to confidently predict requirements further in advance of the dispatch time for National Grid's Balancing Services. National Grid's energy balancing requirements also tend to be less locational and therefore if a DNO has a requirement to secure capacity in a specific area, National Grid may be able to use the next most economic option in a different location. It is important to note that whilst geographic location does not play a significant role in national energy balancing, it is vital for transmission constraint management. Due to the nature of constraints and the time frames over which National Grid and WPD identify their requirements, it is unlikely National Grid and WPD would take contradictory actions.

3. The Demand Turn Up service

3.1 Joint service development

The technical requirements and intent to trial a demand shifting/turn up based services were developed by both companies separately. Following the announcement of National Grid's DTU, the coordination of both trials was added to the scope of WPD's SYNC trial.

Whilst the original intention of both parties was the development of coordinated services, following multiple discussions it became apparent that the optimal way of reducing customer burden and sharing information was to operate a joint contracting and dispatch mechanism. Instead of both developing dispatch and settlement processes with continuous data sharing, as well as interlinking contracts, it was significantly more efficient to share the processes. Not only did it remove burdensome processes, it also significantly improved the simplicity of the customer facing proposition. Due to the requirement of DTU on a national scale, the dispatch and contracting was taken on by National Grid. WPD offered support in development of the contracts and signposting customers towards the service.

With a service start date of 1st May, service development began in winter 2015. Expressions of Interest were gathered during February, firm offers were submitted by providers and assessed by National Grid in April and contracting began following successful parties being notified.

3.2 Service Tendering and customer acquisition

DTU was available nationally to any large energy user or embedded generator that could provide the required response. WPD focussed on sites in its South West and South Wales areas. As per the other ancillary services, DTU is technology agnostic allowing customers to provide the response in the most cost effective manner. Providers were asked to classify the asset types used to help both providers understand the market better. In addition customers were asked to specify site operation details such as:

- Minimum contracted MW
- Maximum contracted MW
- Minimum utilisation period
- Maximum utilisation periods
- Response time to deliver full contracted MW
- Response time to a variation in utilisation instruction
- Recovery time
- Maximum number of Utilisation instructions in a single service window.

This information formed the basis of their contracted operational requirements.

In addition a minimum threshold of 1MW per grid supply point (GSP) was imposed to all participants to allow for a usable service for National Grid.

As per the other Balancing Services, the DTU service was a competitive service. Following publicity of the service, interested parties were invited to submit Expressions of Interest (EOI) in order to gauge possible participation in the service. Following this, interested parties were asked to submit their firm offers into a tender. As there was no commitment attached to the EOIs, the firm offers represented parties' intent and were used in the assessment to determine which parties were offered contracts for the 2016 service period. .

Following the decision to join the two services, WPD signposted any interested parties in the SYNC service towards National Grid and their EOI. The rapid turnaround from conception of the service to procurement and implementation meant that not all parties who originally verbally expressed interest in participating in the service were able to progress to formal EOIs or firm offers. EOIs were received from 20 parties, totalling 339- 420 MW (parties were asked to submit minimum and maximum offers). Firm offers were submitted by 12 parties, totally 309 MW. Following the assessment, all firm offers were accepted.

To provide context, EOIs for Enhanced Frequency Response, another new Balancing Services developed by National Grid in 2016, reached 68 submissions and totalled 1.3 GW. Several months later, 37 tender submissions were received for the service.

3.3 Pricing

The structure of payments to providers was similar to that of other Balancing Services, consisting of Availability payments (for being available to respond to an instruction) and Utilisation payments (for delivery of the service). The service offered £1.50/MW/h for Availability and three options for Utilisation: £60/MWh, £75/MWh, and above £75/MWh (with no Availability payment for the latter).

The payments above applied within the specified service windows (see section 3.4). The periods between service windows were classed as optional windows. During optional windows, providers received Utilisation payments if called upon, but no payment for Availability.

As National Grid takes the most economically efficient balancing actions, the use of DTU providers was considered against the cost of alternative actions. When DTU was identified as the appropriate action, providers were utilised in order of their Utilisation payment (lowest first).

Whilst WPD would also dispatch on economic merit, the locational elements create an amended price stack. This could result in sites with lower Utilisations not being called, when sites with higher Utilisations in the right area are.

3.4 Service windows

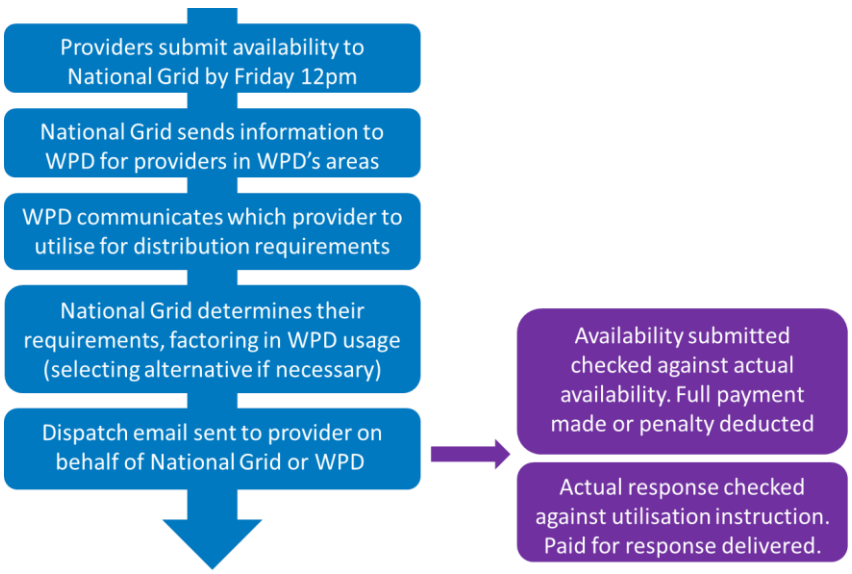
DTU offered a flexible service with windows that reflected the different use cases. This included the overnight window and the middle of a weekend day. Customers could declare their availability for the windows week ahead. Optional windows were also available for any providers able to offer additional flexibility in their operations. The service windows are summarised in figure 1 below. As WPD was seeking to mitigate issues around PV, it would not make any calls in Window 2.

Figure 1: table showing DTU service windows

	Overnight period Monday – Sunday (window 1)	**Weekend afternoon period Saturday, Sunday & bank holidays (window 2)**
May and September	23:30 – 08:30	13:00 – 16:00
June, July, August	23:30 – 09:00	13:00 – 16:00

3.5 Operational Process

For the operational process around the DTU trial in 2016, email communication played an integral role in facilitating communication flows. Figure 2 below illustrates the interface between DTU providers, National Grid and WPD.



DTU providers had until 12:00 on a Friday to submit their availability for the coming week of the service (Monday to Sunday). This information was emailed to National Grid via an Excel Visual Basic tool (see example in Appendix 1). The collated availabilities for WPD's areas were then forwarded on to WPD in order for WPD to determine which providers they wished to utilise.

To dispatch a unit, National Grid would email (see Appendix 2) the provider with a utilisation instruction, including the required MW response, the start time and the end time. A confirmation response was then required from the provider within 30 minutes of the utilisation issue being issued. Following this confirmation, the unit was deemed a confirmed instruction. As a number of providers' sites had fewer staff on site during DTU periods (overnight and weekends), SMS messages were also issued to notify staff that an email instruction had been issued.

Unlike other services, a number of technical parameters remained flexible for DTU, in order to remove barriers to entry. No minimum response time or duration of response were specified; instead, providers communicated the response time and duration they were capable of and utilisation instructions were always issued within these limits.

WPD could call a unit after 14:00 on the Friday until the response time of the unit, however in practice all calls would be identified and dispatched on the Friday. The actual dispatch mechanism was through an Excel Visual Basic tool that generated an automated email. Following the dispatch a confirmation or rejection email would be automatically sent from National Grid.

This simple mechanism allowed sufficient robust checks to be made on any dispatch, whilst also allowing some flexibility for changes.

3.6 Metering and settlement

Providers were asked to submit three documents:

- An availability report, submitted to National Grid before 12:00 on a Friday, detailing their availability for the coming Monday to Sunday
- A forecast report, submitted to National Grid by providers before 14:00 on a Friday, detailing their forecast electricity demand or output over the coming week (depending on whether DTU was being provided by an increase in demand or reduction in output)
- A performance report, submitted to National Grid monthly, containing metering data of the providers actual demand or output

Performance was assessed post-event, rather than monitored on a live basis. In order to assess delivery of the service, data in the performance report was compared to the instructions issued by National Grid. For full delivery, there should be an increase in demand or reduction in output that correlated with the timing and magnitude of the instruction issued. The forecast report was used to determine that an increase in demand or reduction in output was the result of a DTU instruction, rather than an action the provider would have taken as part of their normal activities.

To allow maximum site participation in the first season of DTU, providers could submit metering data on either a minute by minute or half hourly basis for each participating MPAN. If a provider failed to deliver full volume within the period requested, penalties were applied. Delivering 90% or more of the volume requested in the utilisation instruction resulted in 100% of Availability and Utilisation payments. Delivering less than 90% of the volume requested resulted in a reduction in both payments. For example, if a provider delivered 8.9 MW of a 10 MW utilisation instruction, they would be paid 89% of their Availability payment for that month and a Utilisation payment for 8.9 MW for the period in question.

The payment calculation for DTU can be found within the provider contract.

3.7 Legal

One of the key challenges of delivering the shared service was the development of a legal framework to support the arrangement. This was designed for customer simplicity whilst delivering the required information sharing and controls. It consisted to two parts and both were developed by setting out the general principles in Heads of Terms, prior to drafting complete contracts.

The provider contract: This set out the obligations on both National Grid and the DTU provider. This was based on standard terms for all participants and included a clause permitting data sharing with DNOs. Data sharing was necessary for multi-party use of distributed energy resources, as both National Grid and WPD required transparency on location, availability and prices in order to establish how requirements could be met and to coordinate utilisation.

The WPD-National Grid Bilateral: This set out the obligations on both National Grid and WPD in terms of operational processes and monetary flows.

Both contracts can be found in a separate document on National Grid's and WPD's websites.

4. Trial operation

4.1 NG operation

Across May to September 2016, 323 utilisation instructions were issued for DTU, totalling 10,800 MWh. Of these utilisation instructions, 317 were to address downward margin issues, 4 were to manage transmission constraints, and 2 were for WPD (figure 3).

The majority of utilisation instructions were issued by National Grid during window 1, the overnight period. There was a significant increase in utilisation of the service during July onwards, linked with an increase in overnight wind speeds during that time. This was in contrast to the trend over the last few summers; from 2012 to 2015, the highest overnight wind speeds were seen in May and June. Utilisation during window 2 (weekend day time) was significantly lower, due to lower than average solar radiation on weekends (figure 4).

Providers were asked to deliver DTU for 4.3 hours on average, the average notice of a utilisation instruction (i.e. the time between receiving an instruction and responding) was 7.3 hours, and the average price for utilisation was £61.41/MWh (availability was fixed at £1.50/MW/h).

Figure 3 – chart showing reasons for DTU utilisation instructions (MERSCON3 and SSHARN3 are constraints on the transmission network)

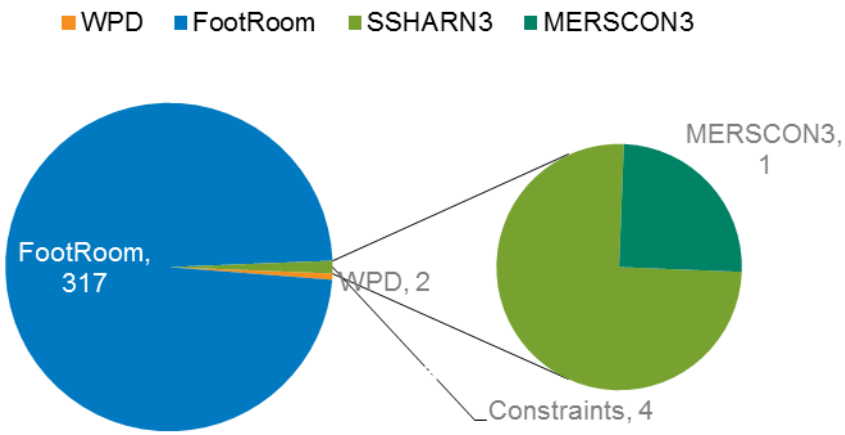
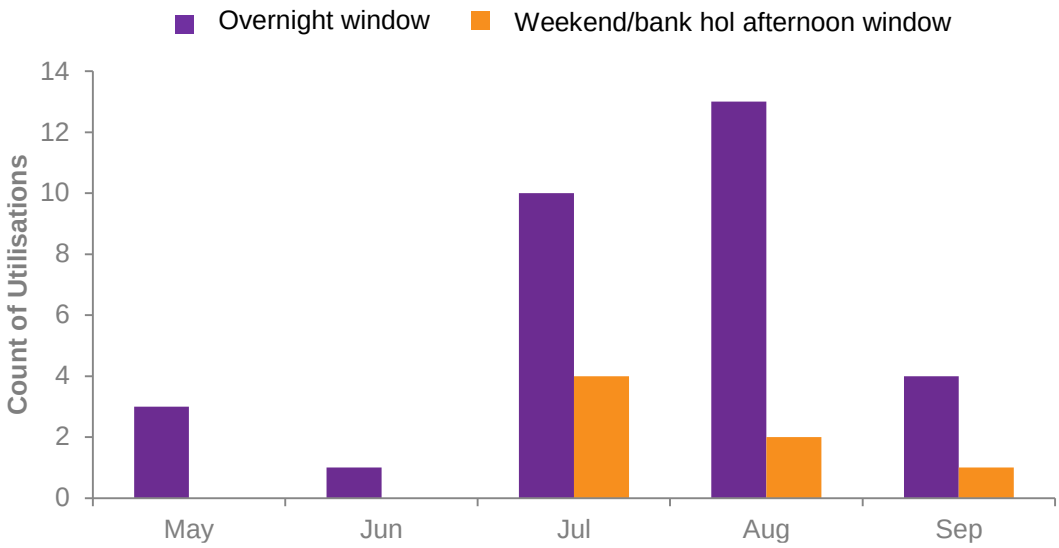


Figure 4 – DTU utilisations per month, by window



Overall, the introduction of DTU delivered significant savings for National Grid during the period May to September 2016, by providing an alternative solution to economically securing negative reserve.

4.2 WPD operations

Throughout the trial WPD experienced relatively low availability from providers in its South West and South Wales regions during window 2. There were multiple periods of little or no availability in the areas which limited WPD's ability to test the service. In addition the particular connection arrangements of some providers restricted the benefits they could provide the DNO. WPD attempted and made two successful calls that were dispatched through the National Grid customer interface to test the functionality of the service but did not proceed to more functional testing of constraint management.

The customer feedback, detailed in section 5.3 detailed some of the reasons behind the low availability. WPD will monitor the effect of addressing these concerns on availability in 2017.

5. Trial analysis

5.1 Availability

DTU was not introduced as a firm or committed service, providers were able to declare their availability on a Friday for the coming week (Monday to Sunday). In the first few weeks of the service in particular, there was a discrepancy between the volume of accepted firm offers and the volume being declared available for service provision. Verbal feedback suggests this was partly due to providers refining their operational processes following contracting. To increase availability from the start of the service in 2017, additional time will be factored to introducing the service requirements and the service start date.

5.2 Call reliability

Of the utilisation instructions issued during the first year of DTU, 88% of the expected volume was delivered.

5.3 Stakeholder Feedback

A number of providers shared feedback on their experience of the first year of DTU and this has been used to identify improvements that can be implemented to increase ease of participation in the service.

Several themes were identified:

General preference for a flexible service.

For 2016, DTU was procured as a flexible service. Providers were given the flexibility to decide a week ahead of real time which windows they wished to be available for. There was no long term commitment to provide the service and providers did not need to be available for every window.

Feedback indicated that most providers valued the ability to declare availability closer to real time, as they could not give as accurate a view of their availability more than a week ahead of real time. This was less challenging for businesses with steady and predictable demand or generation profiles.

Recruiting customers and getting internal approval were the most common time consuming/challenging steps identified by providers

In order to understand the challenges providers faced in preparing for service provision, feedback was gathered on the most time consuming steps. A number of aggregators identified growing their customer base as a challenge, particularly given that DTU was a new service, and gaining internal approval or sanction was also raised.

Alternative options to assessing delivery of the service should be explored

For 2016, delivery of the service was assessed based on providers' forecast activity (demand or output) and their actual activity. If the different between the two were equal to the MW volume specified in the utilisation instruction, the provider was deemed to have delivered the service.

Many providers did not produce forecasts routinely, or produce forecasts to the same level of detail, and therefore this was an additional activity to undertake. Others raised concerns about the accuracy of their forecast.

In order to address this feedback, a baseline methodology is under development, using the average demand or output of pervious days to establish a baseline. This is similar to other Balancing Services.

Barriers to entry included the locational requirement for achieving 1 MW and the length of the overnight period

National Grid specifies entry volumes for Balancing Services in order to make services usable. The threshold for DTU in 2016 was 1 MW, which could be aggregated at a Grid Supply Point (GSP) level. This meant that a number of sites could be combined to achieve 1 MW, providing they were located in the same GSP. A number of providers, for example those with sites in different locations, found this challenging. The 1 MW threshold will remain for 2017, however, in order to increase participation in the service, the locational restriction will be lifted, so sites can be aggregated from across the country.

Some providers also found it difficult to declare availability for the whole overnight window due to the 9.5-10 hour duration. To overcome this, there will be greater granularity within availability windows in 2017.

Increased participation with service maturity

Several providers highlighted the difficulty of committing resource to develop a capability associated with a trial. As the DTU service matures this will increase market confidence and grow participation. In addition increased industry understanding of the service will enable wider acceptance of the scheme as well as changes to operating practices such as maintenance schedules.

5.4 Conclusions

National Grid

For National Grid, DTU fulfilled the desired objectives of providing another economic alternative for negative reserve. Utilisation followed weather patterns and providers responded with good reliability. Providers gave useful feedback which will influence the next steps.

WPD

For a DNO, low availability of providers in the right areas limited the value of the service. In order to use DSR as an alternative to reinforcement, the DNO must be confident that a response can be triggered when required. In addition the number of utilisations required would be significantly lower than those provided by National Grid. As such WPD is keen to see how the service develops following the changes to better understand the potential to use DTU as part of business as usual.

6. Next steps

6.1 Additional NG requirements

As a result of the growth in distributed renewable generation, there is a growing requirement for negative reserve, which can be met through a number of services, including DTU. The total negative reserve requirement for 2017 is expected to be 3-5GW. This can be met through a number of services including DTU. The options will be considered in economic merit.

6.2 Additional WPD requirements

In addition to the base case for DTU identified in Technique 3 of the SYNC project, WPD has identified additional opportunities for DTU. This involves customer constraints during outages.

As part of WPD's standard offers, certain generators may be constrained off during certain abnormal running of the network. These conditions are used to allow segments of the network to be switched out for maintenance or the connection of new customers. If additional demand could be found on the network, this would allow the customer to stay connected and continue generating revenue. There are significant challenges around the identification of co-locational generation demand, as well as some commercial questions, however WPD will be looking to investigate the use of DTU to help alleviate constraints.

6.3 Next steps for DTU 2017

A number of changes will be implemented for the DTU service in 2017, as summarised in figure 5. These changes have been driven by feedback (as described above), and the requirement to remove barriers, introduce more flexibility into the service and grow participation.

Figure 5 – table summarising the changes to be introduced for DTU in 2017

	Position in 2016 service	**Position in 2017 service**
Procurement routes	Firm offers were assessed as part of a tender prior to the service start date. This volume met requirements and no additional volume was contracted during the season. Providers were paid availability payments for periods during which they declared themselves available. Price bands were set.	There will be two routes to market for DTU providers in 2017: Fixed and Flexible. There will be no Expressions of Interest in 2017; only tenders. 1) Fixed DTU This will be procured through a tender in February 2017. As part of the tender, interested parties will submit their availability and utilisation prices to National Grid. If successful, these prices will be fixed for the duration of the British Summer Time (BST), although utilisation prices can be lowered below the tendered price if desired, in order to be cost competitive with other solutions. The advantage of this service is guaranteed availability payments during the windows that providers declare themselves available (not including 'optional windows' – see explanation on page 5). 2) Flexible DTU This route will be open for the duration of BST. Parties that were unsuccessful during the Fixed tender or were not able to meet the February tender deadline, or parties that want the flexibility to change availability and utilisation prices frequently may choose this route. Assessments will be made by National Grid on Fridays and Tuesdays to determine which providers are required for coming Friday-Monday and Tuesday-Thursday, respectively. Availability payments will only be made to providers who are successful at this assessment stage. Unsuccessful parties will have the option to make themselves available for the service with a utilisation payment only. By choosing this option, it will have no impact on the outcome of the assessment but offers a possible route to market for providers who have the ability to provide the service for a utilisation payment only. The advantage of the Flexible route is that it offers the flexibility to change availability and utilisation payments frequently to reflect weather and market conditions.

Season	1st May to 30th September	27th March – 29th October. The service will be extended to cover the months of British Summer Time (BST).
Availability windows	Providers were required to declare availability for full availability windows, which in some instances were 10 hours in duration.	Providers will be able to submit different availabilities within the same availability window. Providers can declare themselves available for parts of the windows and unavailable for others. The granularity of these changes is based on the settlement periods.
Availability payment	Fixed at £1.50/MW/h for £60/MWh or £75/MWh utilisation payment. No availability payment for utilisation payment over £75/MWh. Paid during availabilities windows, when providers declared themselves available.	Customers choose their availability fee. Only paid during availabilities windows, when providers declared themselves available. Fixed DTU: Submitted during February tender and fixed for duration of BST. Not available for 'optional windows'. Flexible DTU: Submitted with availability declarations (see final row in table). Only guaranteed if accepted during Friday or Tuesday assessment. If unsuccessful at Friday or Tuesday assessment, can forego availability payment and be available for utilisation payment only. Not available for 'optional windows'.
Utilisation payment	£60/MWh, £75/MWh or above £75/MWh. Price selected for tender and fixed for the duration of the contract.	Fixed DTU: Submitted during February tender and capped for duration of BST (providers can reduce below tendered price when declaring availability if desired). Paid for megawatts delivered. Flexible DTU: Submitted with availability declarations (see final row in table). Paid for megawatts delivered.
Volume entry threshold	The threshold for DTU in 2016 was 1 MW, which could be	To be able to participate, the entry threshold is 1 MW, which can be aggregated from sites 0.1 MW and larger. Fractions of megawatts are fine e.g. 4.2 MW, providing they meet the

	aggregated at a Grid Supply Point (GSP) level.	entry threshold.
Dispatch	Providers will continue to be dispatched via email (with supporting SMS) until the new Electricity National Control Centre system has been rolled out.	
Speed of response and duration of delivery	As in 2016, the speed in which a provider needs to respond to an instruction and the duration of delivery will be in line with individual providers' capabilities.	
"Multi offers"	Only one offer could be submitted for a single asset, for example, a CHP unit could only offer 'turn down' or 'turn off', not both scenarios.	Providers will be able to submit multiple offers i.e. a CHP unit can offer 'turn down' and 'turn off' as options, with different notice periods and prices. National Grid will then select one option or the other, not both.
Settlement	Delivery of the service was assessed based on providers' forecast activity (demand or output) and their actual activity. If the different between the two were equal to the MW volume specified in the utilisation instruction, the provider was deemed to have delivered the service.	A baseline methodology is under development, using the average demand or output of pervious days to establish a baseline. This is similar to other Balancing Services. As per the 2016 service, providers with minute by minute or half hourly metering can participate.

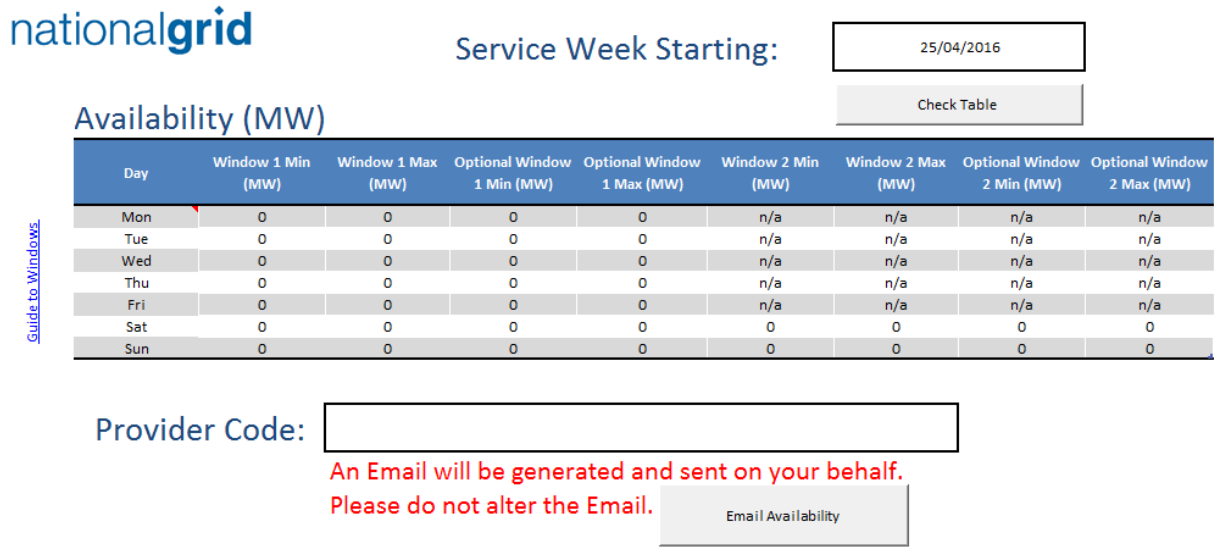
In addition to the evolution of the service, WPD and National Grid will continue to share DTU in 2017, in order to build on previous learnings and test the use of distributed resources for multiple use cases.

Greater volume within WPD's areas and subsequent utilisations for distribution requirements will help to maximise the learnings from the trial. Learning will again be shared with the industry and it is the intention that best practice will be used to inform future sharing approaches.

The key next steps for DTU are:

Next step	**Due date**
Create framework agreement (which needs to be signed prior to tender) and publish	20th January 2017
Parties interested in Fixed service to return framework agreement and assessment data for tender	17th February 2017
Tender deadline	17th February 2017
National Grid to inform providers of the outcome of the Fixed tender	24th February 2017
Flexible providers can continue to submit their framework agreement and assessment data	Ongoing throughout summer
Service start date	27th March 2017
National Grid and WPD commence service sharing trial	1st May 2017
Share outcomes of service and trial	Autumn/Winter 2017

Appendix 1 – Example template for declaring Demand Turn Up availability to National Grid



Day	Window 1 Min (MW)	Window 1 Max (MW)	Optional Window 1 Min (MW)	Optional Window 1 Max (MW)	Window 2 Min (MW)	Window 2 Max (MW)	Optional Window 2 Min (MW)	Optional Window 2 Max (MW)
Mon	0	0	0	0	n/a	n/a	n/a	n/a
Tue	0	0	0	0	n/a	n/a	n/a	n/a
Wed	0	0	0	0	n/a	n/a	n/a	n/a
Thu	0	0	0	0	n/a	n/a	n/a	n/a
Fri	0	0	0	0	n/a	n/a	n/a	n/a
Sat	0	0	0	0	0	0	0	0
Sun	0	0	0	0	0	0	0	0

Appendix 2 – Example of Demand Turn Up dispatch email send to providers

Dear Utility Operator,

In accordance with clause 7 within the Demand Turn Up contract, please consider this a notification of Demand Turn Up for site: **<Insert Provider Name>**

Please increase demand or reduce generation in line with your contract as shown in the table below

Start Date	Start Time	Instructed MW Change	End Date	End Time
25-Jul-16	02:00	40	25-Jul-16	06:00

Under clause 7.2 Please respond to this Email Instruction using the following procedure.

1. **Press reply to this email.**
2. **Copy and paste one of the subject lines from the below table, removing the previous subject line.**
3. **Ensure the correct subject line has been pasted in.**
4. **Send the response without editing the email.**

If there are technical issues that affect the fulfilment of this instruction please copy and paste the 'Reject' subject line.
Any other responses in the subject line will not be received as confirmation or rejection of this instruction.

Subject Lines	
Accept Subject Line Below	**Reject Subject Line Below**
Accept ~ Wa_1063415253	Reject ~ Wa_1063415253

Please do not edit the response.

If you are a provider with multiple emails for instruction please ensure only one operator replies to this email.

If you need any assistance please contact us at Trading@NationalGrid.com or call on (0)118 936 3077.
If out of hours please contact us at Ctr1.cosm@Nationalgrid.com or call on (0)844 892 0380.

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