WESTERN POWER DISTRIBUTION

INNOVATION

NEXT GENERATION NETWORKS

Project Entire

SERVICE DESIGN REPORT

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Contents

Executive Summary

Project Entire aimed to demonstrate the commercial viability of flexibility services for both the Distribution Network Operator (DNO) and the service provider. Building on learning from the FALCON and SYNC projects, the project looked to develop DNO services that could sit alongside existing Electricity System Operator (ESO) services and allow participants to stack revenues, easing access to the service.

A key focus of the trial was the development of the services to be procured by Western Power Distribution (WPD).
The design started with understanding of network use-cases, understanding where the benefits are to the network. The fell into three categories: constraints requiring pre-fault intervention, Constraints requiring post fault intervention to aid restoration and restoration beyond security standards. These were then adapted into products based on a weekly process to fit alongside a flexible Short Term Operating Reserve (STOR) contract. This resulted in the development of three services, Secure, Dynamic and Restore. The aim was to develop the simplest and most accessible products possible.
Alongside the services a new payment mechanism was developed. This was designed to reward full delivery and disincentivise under delivery. A simple baseline was also created that aimed to estimate the value to a DNO. Where possible, processes were designed for as much participant self-service as possible. This aimed to reduce the resource burden for both WPD and the participant.
The trial delivered a brand new service design which has since been fed into the WPD Business as Usual (BaU) flexibility services as well as cross industry processes via the Open Networks project.

1 Project Background

Previous trials have shown the technical potential for Demand Side Response (DSR) services to provide value to DNOs. However the roll out of such services has been limited by the commercial complexities of doing so. These are primarily focussed on the challenges customers face when attempting to stack multiple revenue streams. As such project Entire focussed on the development of a simple commercial framework that makes services easily stackable in order to widen the potential market and make the utilisation of DSR as part of BaU more viable.

In order to deliver such a framework, the project delivered a wide range of supporting measures such as:

- Network use case development
- Investigations into underlying networks
- Operational system and process development
- Product development
- Stakeholder engagement
- Participant recruitment
- Operational trials

The project focussed on the recruitment of larger Industrial and Commercial customers to flexibility services as this was deemed a more mature market than that for domestic flexibility.

This report focusses on the development of the services themselves. This includes the understanding of the specific network needs and the development of such needs into marketable propositions. This process aimed at developing solutions that are as easy as possible for the market to access whilst still remaining valuable to the DNO.

Further reports detailing the systems built, the participant recruitment, the results of the operational trials, as well as the project closedown are also available.

1.1 Project Review

The initial project focussed on delivering the simplest customer offering while providing the largest value to its participant's. As such, alongside the WPD Constraint Management Zone (CMZ) offering (which would be aimed at existing DSR market participants), the intention was to offer a fully managed service, aimed at bringing new entrants into the market. This service would require the installation of control equipment in customer premises as well as provide additional value through triad management and providing STOR services to National Grid, demonstrating the ability to stack the services. By utilising the customer trust in the WPD brand, and the accountability associated with a regulated business, the aim was also to widen the pool of potential participants, boosting the volume available to WPD for the management of network constraints.

However following discussions with Ofgem this element of the trial was de-scoped as Ofgem did not consider the model in which DNO acts as a commercial operator as being in the long-

term interest of customers. As such the project was redesigned to focus on the delivery of the core WPD network management service. This impacted the services offered, the systems built as well as the customer engagement process. In addition, the project was shortened to a single operational season to ensure that any learning was delivered as quickly as possible and at the lowest cost.

2 Network use cases

The project focussed on potential constraints on WPD's higher voltage networks, specifically on the 132kV network. This was prioritised as the value of reinforcement is high and the target areas are relatively large.

The target area for the project was selected by the system design team as potentially benefitting from flexibility in the medium term. These were all areas nearing the limits of system security as defined by Engineering Recommendation P2.The area was focused in the East Midlands along the M1-M40 corridor, where significant load growth is being seen. In total 14 potential constraints were identified.

More detailed analysis broke the constraints into two main categories: those requiring pre-fault intervention, and those requiring post-fault intervention to aid restoration. An additional category of restoration support beyond security standards was also identified.

2.1 Constraints requiring pre-fault intervention

Most networks at Extra High Voltage (EHV) and 132kV levels are built to n-1 redundancy. This allows them to provide the security of supply required as part of Engineering Recommendation P2/6. A typical example would be a Bulk Supply Point (BSP) fed by two transformers as shown by the Daventry network in Figure 1 (Black - 132kV, Green 33kV, Red 11kV). The Daventry 33kV busbar (DAVE3J) is fed by two 132/33kV transformers (between buses DAVE1K-DAVE3Y and DAVE1J-DAVE3X). Traditional design would ensure that the total site loading did not exceed the rating of a single transformer. This would prevent any assets from being overloaded if a transformer faults. This also allows supplies to be maintained in that scenario.

Where the loading on the site could potentially exceed the rating of a single transformer, DSR could be used to reduce loading back below the rating to ensure n-1 compliance. In this mode of operation actions are taken pre-event to ensure network integrity.

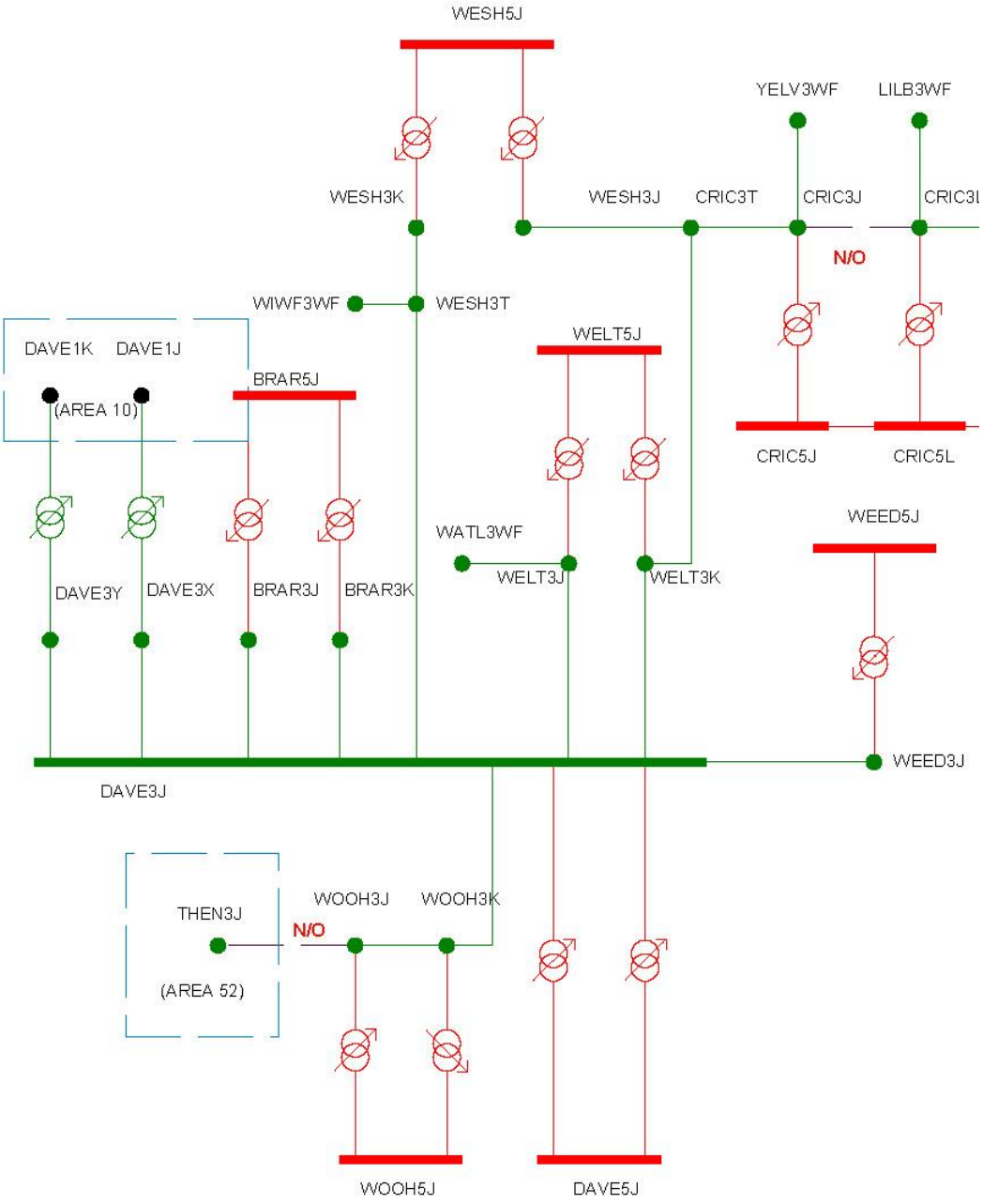

Figure 1: Diagram of a network requiring pre-fault intervention

2.2 Constraints requiring post-fault intervention to aid restoration

As the loading on network group increases, the security of supply requirements increase to also cover second circuit outages. In this case during an outage on one asset (not a fault), there are requirements on network operators to restore load following a subsequent fault. For network classified as within Category D as per P2/6 (with a group demand between 60MW and 300MW) the smaller of group demand minus 100MW or a third of group demand within three hours.

This can be shown with an example, in this case the Warwick-Harbury network in Figure 2.

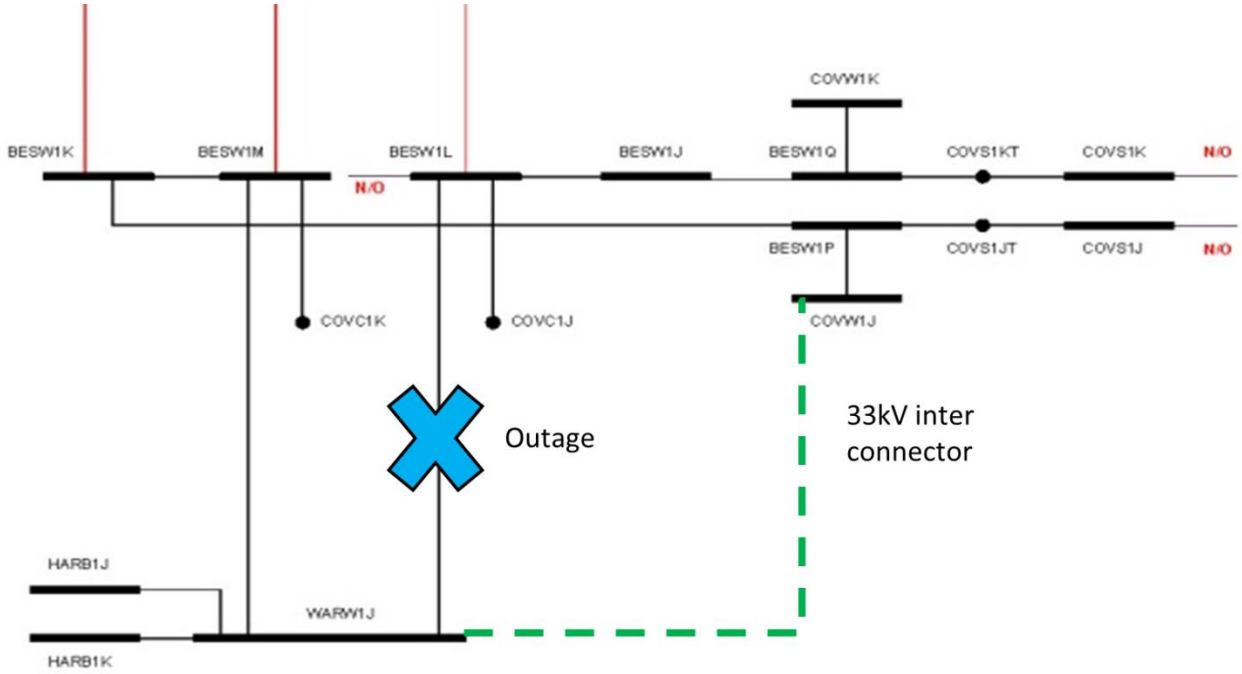

Figure 2: Diagram of a network requiring post-fault restoration support

Under this scenario, for a fault on the circuit between BESW1M and WARW1J, during an outage on the parallel circuit supplies are lost to the group; hence pre-fault running is not appropriate. Services are required following the fault as part of a restoration plan, in this case following the restoration of the network via the 33kV interconnector (normally open between COVW1J and WARW1J). Generation can be used to reduce the loading on the interconnector and maintain supplies to a wider group of customers whilst the circuit under outage is returned to service.

2.3 Restoration support beyond security standards

The final use case identified was that of value beyond the security standards identified in P2. This acknowledged several scenarios where the reduction of loading on a network may benefit the network operator beyond compliance with P2 with the mitigation of IIS liabilities.

This can be demonstrated with the network in section 2.2. Whilst the minimum security standard would be to secure load under an outage followed by a fault, there is still a risk of lost load under a double fault. DSR could help the management of such a network during restoration. In such a scenario, the value per MW is linked directly to the avoided Customer Minute Lost (CML) liability which in turn is linked to the average kW/Customer on the network. This is a high value, but very low likelihood event.

3 Previous learning

3.1 Previous trials

WPD has developed significant learning and experience with regards to the development of DSR services through a series of strategic trials. Preceding project Entire, WPD completed three related innovation projects. Full details are available on the WPD website;

- **Seasonal Generation** [1]**-** The Seasonal Generation Deployment project looked to explore the opportunity to utilise temporary generation, used for festivals and events in summer, installed in to primary substations to mitigate the effects of winter peaks on the system. Traditional solutions for these winter peaks include expensive network reinforcement of transformers and circuits.
- **Project FALCON** [2]**-** (Flexible Approaches for Low Carbon Optimised Networks) investigated how new 11kV network techniques worked in practice and, by simulating their use in different scenarios, tried to determine the best ways of managing network problems expected to arise from the increased use of low carbon technologies and generation.
  The project broadly divided into two main parts:
  - The technique trials which involved installing equipment, creating commercial frameworks and operating the techniques on our network in the Milton Keynes area. From a DSR perspective this included both generation turn-up and demand turn-down.
  - The simulation tool and the supporting elements,that calculated the likely load increases, determining constraints on the network and modelled the result of applying those possible techniques.
- **Project SYNC** [3]**-** (Solar Yield Network Constraints) As part of the SYNC project WPD looked to test a range of DSR techniques to help address many of the different challenges being posed by PV generation. By engaging with industrial and commercial customers the project aimed to release additional capacity or even improve power quality.
  - (T1) - Automated demand increase / generation limiting in line with variation in solar yields.
  - (T2) - Directly matching flexible load with flexible generation
  - (T3) - Manually dispatched response signals from a WPD control facility (DSR)
  - (T4) - Creation of suitable ToU (Time of Use) tariffs to encourage appropriate demand

Based on the outcomes of these and the valuable learning generated, WPD recognised the opportunity to carry out a more advanced arrangements with customers to develop new DNO DSR capabilities that would result in BaU applications. The prior learning had clearly

[1] https://www.westernpower.co.uk/innovation/projects/seasonal-generation
[2] https://www.westernpower.co.uk/innovation/projects/falcon
[3] https://www.westernpower.co.uk/innovation/projects/sync

demonstrated that in order to get to this important milestone for the industry the scope of the project required to be much wider than merely testing new devices or engaging third parties to act as an intermediary to operate services on their behalf. It was this level of complexity that inspired the project name 'Entire'

In order to meet the aspirations of the final project outcome leading to BaU operation, the trial would, wherever feasible, avoid sterilizing the trial conditions and apply real-world conditions The project included the following activities;

- Regulatory approvals to enable operational phase
- Design and deploy remote asset interface
- Control room capabilities, central dispatch
- Metering and data collection
- Setting of incentive rates on the basis of underlying costs
- Back Office Systems (performance / financial)
- Customer account management -contact and communication
- Use cases for when and how DSR should be used
- Policy development of how services should be funded
- Staff training and responsibilities to support new activities
- Market engagement and third-party participant recruitment
- Facilitating access to external DSR programmes such schemes to trial participants
- Organisational changes to support new business activities
- Establishing analytics to offer energy demand forecasting
- Improving the quality of underlying network data, particularly in relation to existing embedded generation

3.2 Design considerations

Building on the learning from previous trial several key themes and focusses arose for any services utilised within the Entire trial. These can be split into general categories.

Technical requirements

- The cost of set up and operation should be kept very low as it would be unlikely to yield significant standalone revenues that would act as sufficient incentive for a participant to make any significant investment to be able to enrol.
- New system specification should avoid using proprietary technology and any expensive hardware to avoid presenting participants with unnecessary barriers to service.
- Wherever feasible systems should be automated or intelligent to avoid expensive manpower resources to manage or operate internally.
- Every endeavour should be taken to ensure that the DNO constraint management services do not conflict with third-party services so as to indirectly facilitate revenue stacking

- Multiple constraint management 'use cases' should be addressed to extract greater value from the systems and increase potential value to participants.
- Reliability significantly increases with the amount of notice that is offered to participants. Moving to week-ahead notifications from a dynamic dispatch with just 30 minutes notice demonstrated an improvement in the reliability factor from 66.3% to 96.3%.

Commercial requirements

- A new service offering would still require to be simple for participants to enrol into, setup and operate.
- The contract framework should include a payment mechanism that rewards reliability and penalises under-delivery without being overly punitive so as to deter participants.
- Services should continue to be open to all potential industrial and commercial types, including aggregators and energy supplier who wish to resell so as to comply with acting as a 'neutral market facilitator'.
- The contractual arrangements should wherever possible avoid terms that establish exclusivity of service to the DNO.
- The services should fit alongside the provision of flexibility to any third parties or additional commercial opportunities such as Distribution Use of System (DUoS) & Transmission Network Use of System (TNUoS) charge avoidance.

These themes were used as design criteria to evaluate the propositions developed.

4 Services developed

4.1 Weekly process

The starting point for the service design was to adjust the advanced-notice services developed as part of the FALCON project and adapt them to fit within the existing marketplace. The design focused primarily on accommodating an existing flexible STOR contract offered by National Grid. This service has a flexible participation option offered on a weekly acceptance and rejection process. Participants submit their pre-agreed capacity for acceptance by midnight on Thursday evening with National Grid accepting or rejecting requirements by 12.00 on the Friday. A similar weekly process was developed with participants declaring capacity by Wednesday at midnight with the DNO accepting or rejecting capacity by 12.00 on the Thursday as shown in Figure 3. This advanced warning would give participants certainty over revenue and allow them to participate in multiple markets.

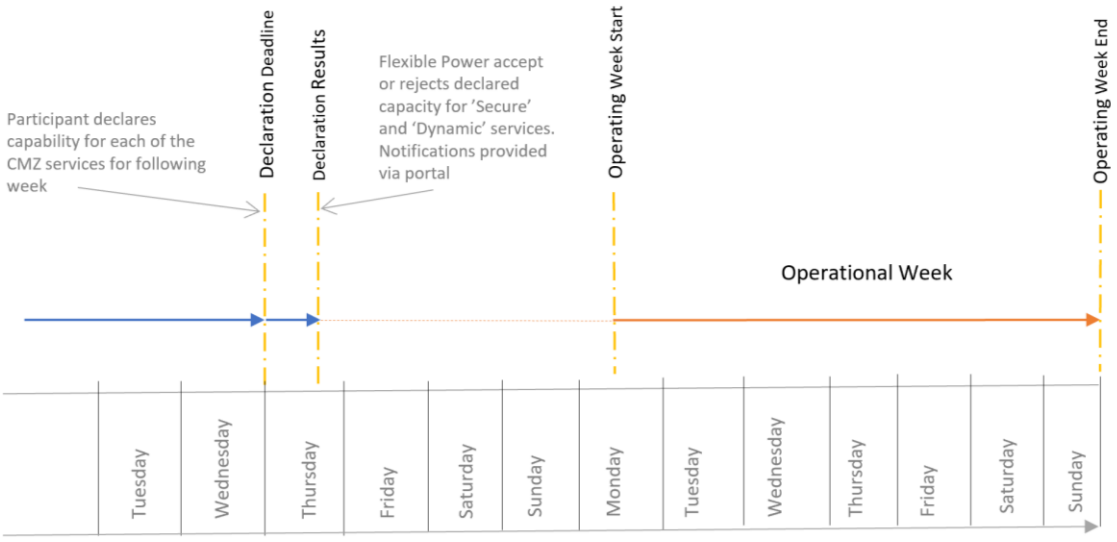

Figure 3: Declarations and Operational Timescale

This weekly process was central to all services and allowed participants to know ahead of time what the DNO requirements would be, to then participate in other revenue streams.

4.2 Three Services

Within the weekly process, three services were designed to align with the three use cases identified. These were called Secure, Dynamic and Restore.
These are summarised in Table 1.

The **Secure** service was based on the pre-fault intervention and the week-ahead commitment to requirements trialled in the FALCON project. As such the DNO would indicate at the week-ahead stage exactly when the participant is required to run. This aimed to give both participant and the DNO maximum notice to maximise possible reliability. Payments were split between an advanced "arming" payment and a utilisation payment.

The **Dynamic** service acknowledged that for certain post-fault interventions week-ahead notification of the specific running requirements were not appropriate. However the times of heightened risk (outages) could be identified. As such an advanced "availability" fee was proposed to ensure flexibility is available, with actual utilisation triggered by a real time signal.

The Secure and Dynamic were designed as the main services, with every zone having either a Secure or a Dynamic service.

In addition all zones had a **Restore** service. As this is to mitigate general risk on the network, there is no period of heightened requirement and hence no advanced fee was made. However as utilisation would offset customer minutes lost, a premium utilisation price could be offered.

These services are summarised in Table 1.

Table 1: Flexible Power Services Summary

	Secure	Dynamic	Restore
Original Use case	Pre-fault intervention	Post-fault intervention	Post-fault network restoration
Advanced payment	Yes, an arming payment for the declared run time £75-118/MW/h	Yes, an availability fee for the duration of potential requirement £5/MW/h	No
Utilisation payment	£150/MWh	£300/MWh	£600/MWh
Dispatch Notice	Week Ahead, on acceptance of availability	15 minutes ahead of requirement.	15 minutes ahead of requirement.

4.3 Pricing philosophy

Within the trial a fixed pricing policy was utilised. This was designed around the pricing seen to be acceptable to the market as part of the FALCON project, providing higher per unit value than the competing services, but remaining within a realistic value range for the DNO. The fixed price was intended to simplify the process for new participants. With no previous market information, initial pricing would have been very challenging for participants. Fixed pricing simplified the process and reduced a barrier to entry. This removed some of the cost, but also the risk of participation. This strategy was considered appropriate for the formation of flexibility markets within specific geographic areas. It was acknowledged that other options would be required in the long term once a liquid market had been established.

4.4 Configuration parameters

The service as designed to be as configurable as possible to allow participants to match their declarations as possible to their operational capabilities.

Within the weekly process participants could choose when to be available, for how much volume as well as setting maximum and minimum event run parameters as well as a weekly maximum run limit.

4.5 Location

The trial took place in the East Midlands as shown in Figure 4. The wider area was split into 14 zones based on differing constraints. The area was chosen due to the high expected load growth. It also allowed the focussing of recruitment resource to a single geographic area.

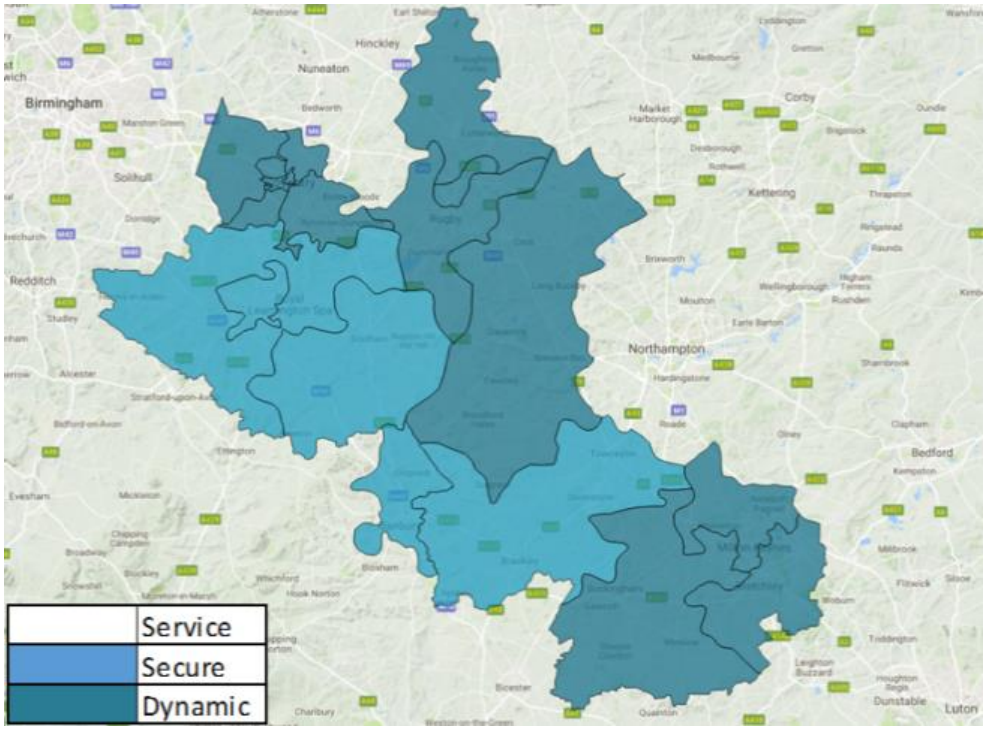

Figure 4: Trial location

4.6 Flexible Power Brand

As part of the project a separate brand was created to front the customer engagement for flexibility (see Figure 5). This was done to clearly segregate the service procurement activities from the more traditional business communications around of connections and network operation. This would also allow other DNOs to share the branding of service requirement if desired.

Flexible Power
By Western Power Distribution

Figure 5: Flexible Power Logo

This branding was used on all communications and a separate website was created (www.flexiblepower.co.uk).

5 Payments and contracts

5.1 Payment Principals / Mechanism

Significant effort was deployed in order to develop a payment scheme that managed to achieve an appropriate balance between sufficient incentives to attract participants with sufficient punitive measures to encourage reliability. If a simple linear approach was implemented, it would be likely that participants could overstate their potential capacity, knowing that they would most likely receive a relatively similar level of income. If for example a participant is paid a flat rate of £100 per MWh, then regardless if they declare 1MW or 5MW they will still receive £100 for delivering 1MWh. The project therefore focussed on trying to ensure the payment structure actively solicited the type of behaviours we were seeking the features of the payment mechanism included;

- Accurate advance forecasting of likely capacity when enrolling to the programme
- Accurate weekly declarations against the monthly baseline
- Reward of participants for successful delivery
- Avoidance of punitive response that would result in a participant abandoning delivery during an event if they encountered difficulties
- Elimination of any potential opportunities for 'gaming' by participants
- Provision of advance certainty of earnings where possible

Each of the three services has a different payment mechanic intended to encourage the desired behaviour associated with each use case. The services are summarised in Table 2.

Table 2: Payment Mechanic Summary

	Secure	Dynamic	Restore
Advance Payment	Arming	Availability	None
Utilisation	Medium	High	Premium
Declaration Notice	Week Ahead	Week Ahead	Week Ahead
FP Accept / Reject	Week Ahead	Week Ahead	Automatic Accept
Dispatch Notice	Week Ahead	15 minutes	15 Minutes
Seasonal Requirement	All	Summer	All
Site Type	Half Hourly Metered	Half Hourly Metered	Half Hourly Metered
Generation	✓	✓	✓
Load Reduction	✓	✓	✓

5.1.1 Advance Payments

Two of the services carried advance payments to reflect that forecasts can be made by WPD as to when they may be required, but with each case they are offered for different purposes and therefore had different names and were valued in different ways.

Secure Arming

The term "Arming" was associated with the Secure service and was intentionally adopted so as to differentiate with Availability that is paid for in the Dynamic service and in other existing DSR programmes. The reason for this was to reflect the greater certainty in the forecasting for the participating assets to run within the Service. The Arming fee related to a payment made to participants to have a default status to deliver their capacity at the point of accepting their declaration rather than just be in a state of readiness. An armed participant wouldn't have to await a dispatch signal to see if they were required but could confidently schedule their assets to provide DSR for the entire duration of the armed period (see Figure 6).

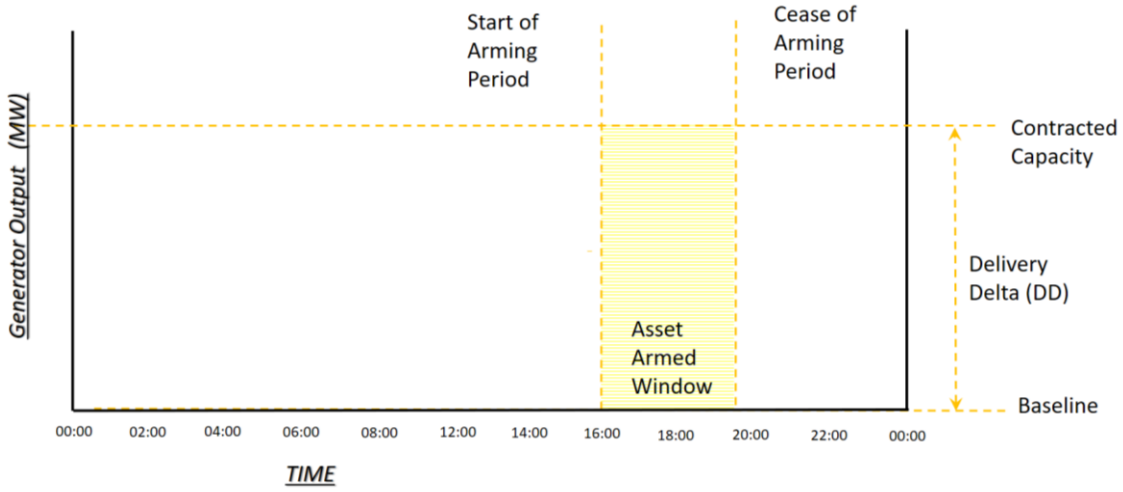

Figure 6: Secure Arming Window

In the unlikely event that the requirement to run changed, the participant would be notified to prevent wasted run hours and would retain the arming payment. The Arming Windows were identified on the basis of a week-ahead forecast and communicated by midday on the preceding Thursday.

At the point of notification on the Thursday the arming fee is awarded in full to the participants who had their declaration to provide DSR accepted. The Arming Fee reflects the majority of the profit aspect of the total CMZ payment.

Unlike DSR for balancing services for National Grid, the delivery requirements for CMZ don't require an immediate change in behaviour to reduce demand on the network based on a real-time baseline. Baselines are covered in a following section of the document, but it is important to recognise that the baseline is established in advance and not directly related to the participant's actual demand preceding the event. By calculating this in advance, it overcomes the potential issue that with the prior knowledge of when a Secure event would occur they could alter their behaviour in their favour if establishing the baseline at a later stage. For many participants the Secure CMZ service would be compatible with other commercial opportunities as they would be able to plan with greater certainty. Secure therefore doesn't sterilise the participant's asset for exclusive use by WPD as the advance establishment of the baseline also enables the participant to operate freely both before and after the scheduled Secure event.

Dynamic Availability

The Dynamic service had a more recognised payment principle of Availability for its advance payment. This operated in a similar manner as availability payments within established DSR programmes such as STOR. Availability was paid for maintaining a state of readiness as it was not clear at the time of accepting declarations as to whether the asset would be required to operate. In the majority of cases Dynamic availability was required to increase resilience and would require a relatively rare secondary issue to trigger the need to dispatch DSR. The arming is paid for the duration of an accepted declaration window, anytime during which a dispatch notice may be issued, with the expectation that the participant will ramp up their delivery to >95% of capacity within 15 minutes. A Dynamic Availability Window would generally be longer than a more defined Secure Arming Window

Restore Availability

The Restore service operated post-fault, beyond networks security standards. As such it was not possible to predict when this may occur in advance and did not include an advanced payment. Participants were still required to declare their capacity and when it would be available to allow them to manage operational restrictions. However as there was no financial impact on WPD to hold the Restore capacity it was all automatically accepted.

5.1.2 Utilisation Payments

Utilisation payments related to the earnings achieved during the period where a participant delivered a DSR behavioural change, whether that was a reduction in demand, an increase in generation or both.

The payment itself was settled based upon the metering data received back from the participant at one minute granularity. With all three services, they adopt the same principle, that each minute during the event is treated as its own individual performance calculation with a payment accrued for each. A performance algorithm then establishes the payment for that minute that rewards reliability but applies a multiplier to the reduction, which should encourage participants to carefully forecast their declared capacity.

Secure Utilisation

Utilisation relates specifically to the period between the start and cease of a Secure event. Participants are expected to achieve delivery of the agreed demand reduction by the start of an event. It was expected that a site should be delivering 95% or above of its declared Delivery Delta (DD). This could be done by scheduling the event in advance or in response to the dispatch signal sent by Flexible Power 15 minutes in advance of the event start time as a reminder. Slower responding assets could participate in the Secure services as they should be able to accommodate a longer ramp time by scheduling to start earlier. Late delivery or under performance was automatically penalised through the design of the payment mechanism. Below the 95% threshold the payment is reduced by 3% for every additional 1%

they under deliver by (see Figures 7 & 8).

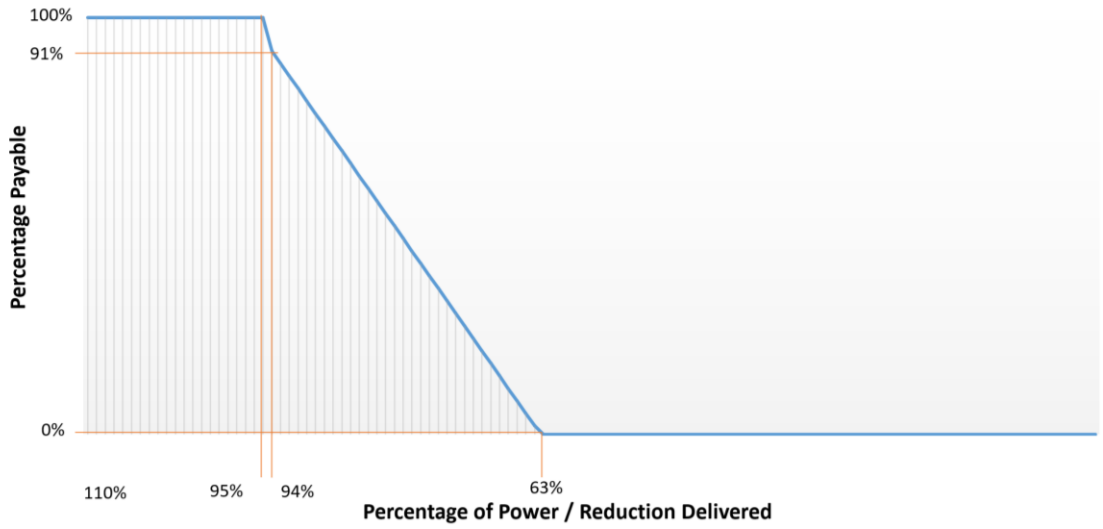

Figure 7: Secure Utilisation adjustments

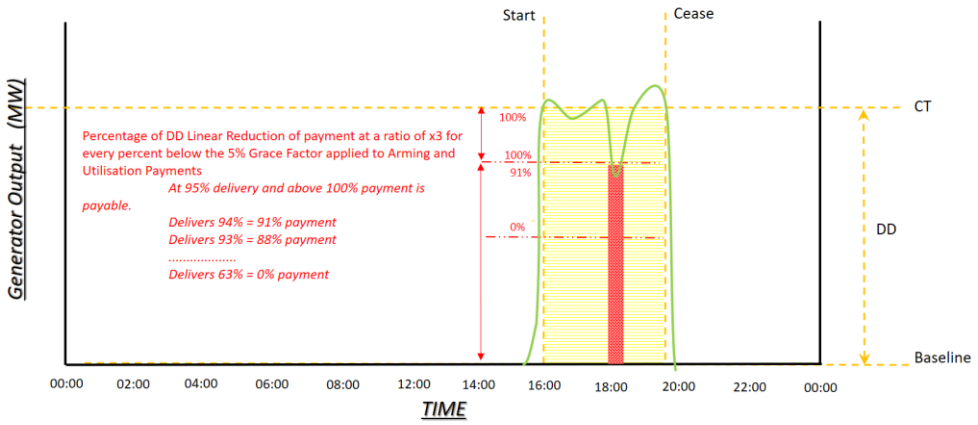

Figure 8: Secure Generation Site Utilisation Example

The utilisation payment was designed to reimburse the approximate operating cost of generating assets that are commonly used to provide the DSR response. This aimed to convey to participants that the utilisation covers their costs, whilst profit was derived primarily by the Arming payment.

Dynamic Utilisation

The Dynamic utilisation payment is set at a different level than that offered by 'Secure' utilisation which reflects the difference in certainty, duration and response time. As outlined in the previous section, this is due to the lower likelihood of Dynamic being required and the extended period over which it could be called.

The utilisation element relates specifically to the period between the start and cease of a CMZ Dynamic event. Participants were expected to achieve delivery of the agreed demand reduction within 15 minutes of receiving their dispatch notice. It is expected that a participant should be delivering 95% or above of it expected Delivery Delta. If they can't

achieve the 15-minute ramp speed, this will not arbitrarily preclude them for participating, but they would be subject to the ratcheted reduction in earnings for each minute beyond the notice period until they achieve 95%. Late delivery or under performance was automatically penalised through the design of the payment mechanism. Below the 95% threshold the payment is reduced by 3% for every additional 1% they under deliver by (See Figure 9 & 10).

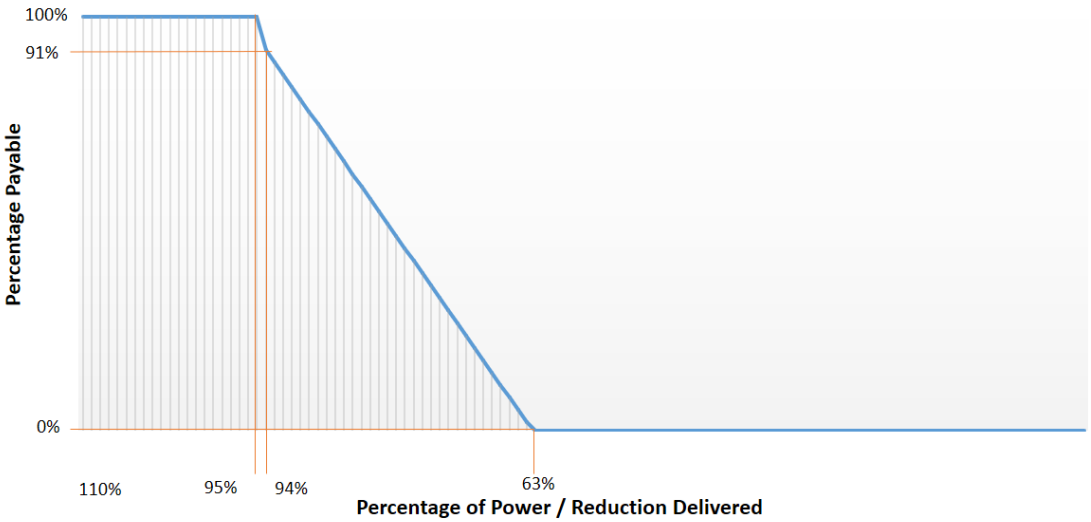

Figure 9: Dynamic Utilisation adjustments

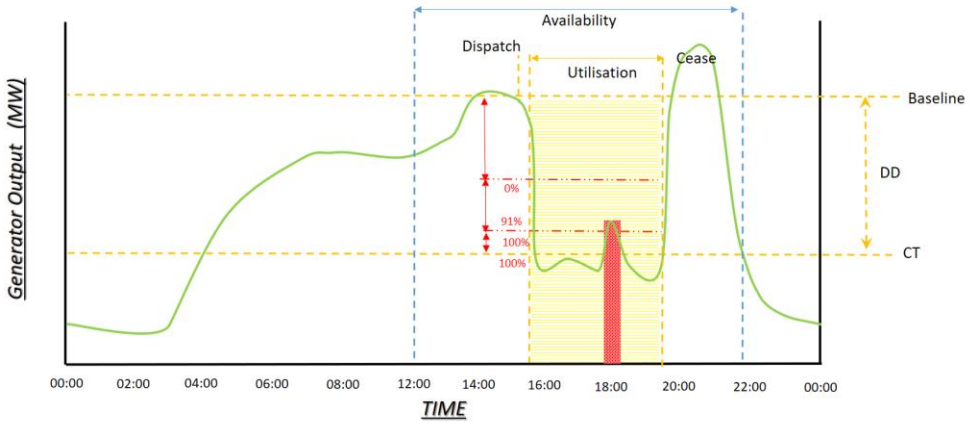

Figure 10: Dynamic Demand Reduction Site Utilisation Example

Restore Utilisation

Restore utilisation payments operate in a similar manner to that of the Dynamic service but was likely to only be called very rarely and probably without any prior indication of increased threat of a fault occurring. As this would be a rare occasion and of great urgency, but without any advance payment, it would rewarded with a premium payment level and is subject to a different penalty mechanism that is less punitive. The ratchet effect occurs at 80% rather than 95% and is only 2% for each 1% shortfall, as well as introducing recognition and reward for over-delivery by up to 10% (See Figure 11).

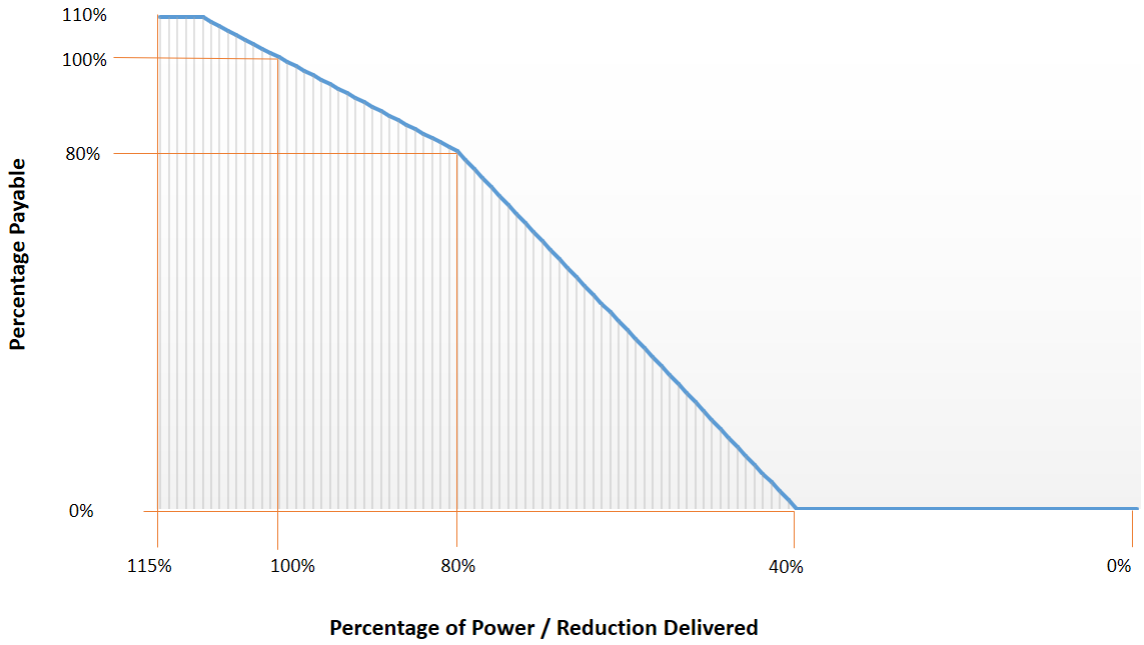

Figure 11: Restore Utilisation adjustments

5.2 Performance related reconciliations

The purpose of the monthly volume reconciliation was to recover availability payments in the event that a site failed to deliver the capacity it declared over the duration of the utilisation periods. This is a very important component to the overall payment mechanism as it would encourage a participant who may be having difficulty delivering during an event to endeavour to rectify any issues and complete an event.

Each event has a theoretic delivery volume of electricity and is based upon delivery of 100% of the declared capacity for the duration between start and cease. Any shortfall on the delivered capacity percentage for each event was then calculated as an average for all events within a month. This is demonstrated in the diagram below, where the blue shading represents the energy delivered and the box for each event represents 100%. Unlike the utilisation calculation, each minute interval is permitted to exceed 100% but the total event delivery cannot exceed 100%.

This echoes the principle within the utilisation payments where each minute is treated as a discrete earning opportunity. The maximum that a participant can achieve during each minute is 100%, so any shortfall during one interval cannot be rectified by over-delivery in another. Similarly, it is not possible to make up a shortfall in total volume delivered in one event by over-delivering in another. In the example in Figure 12, the total volume of electricity delivered in each event over a month is represented as a percentage of the total expected. In event 1 & 4 only 80% was achieved and the others at 100% despite event 2 over-delivering.

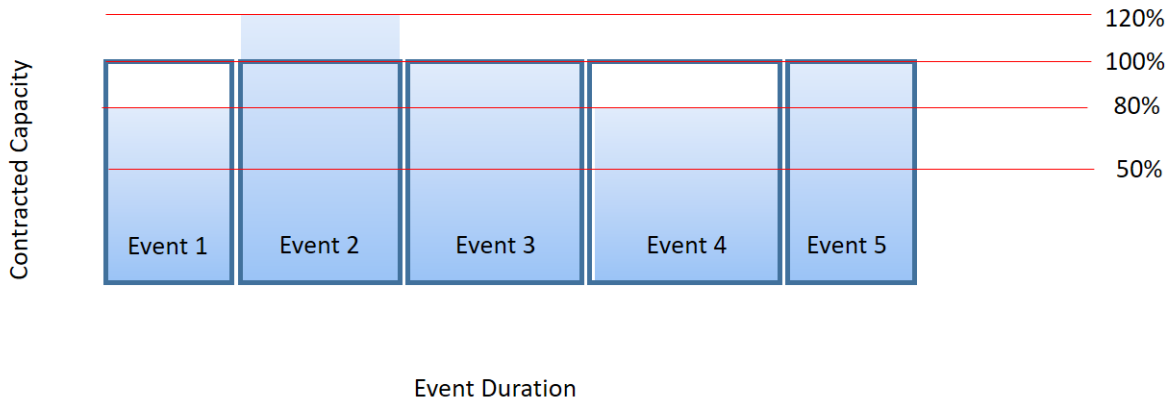

Figure 12: Monthly Reconciliation example

Based on the five example events above, the site achieved a total monthly volume equivalent to 92% based on the event average performance.

$$\frac{(80\%+100\%+100\%+80\%+100\%)}{5} = 92\%$$

The Monthly Volume Reconciliation did not affect utilisation payments and was only applied to the Gross Monthly Availability or Arming Fees. Based on this performance the total Availability Payments accrued over the month will be multiplied by 92% to calculate the final settlement payable.

5.3 Baseline

For all the above calculations a Delivery Delta was needed. This was determined from a baseline. The Flexible Power method of calculating the baseline was intended to achieve a number of objectives:

- Vary monthly to reflect operational and seasonal trends by participants
- Reward participants for largest impact they can offer
- Avoid penalising for calling at a time when demand isn't high
- Target delivery to a fixed value
- Easy for participants to know what is expected
- Simple to forecast for declarations
- Provide a baseline in advance of making declarations, rather than measure at the time of the event

In order to satisfy the above criteria a system has been created where the participant will set their DSR capacity themselves, against a monthly baseline. This was measured slightly differently for generators and demand reduction sites.

Both types of participant had the opportunity to vary their declared capacity each week if they wish, and would be advised to review each month when a new baseline was calculated.

The point of measurement on a demand reduction site would typically be at the point of supply and potentially located alongside the fiscal meter. The point of measurement on a generation site was expected to be the output terminals of the generator. This is common within other DSR programmes and WPD were keen to avoid deviating from such standards and as a result requiring additional investment from existing DSR providers.

The system focused on establishing an average demand over a period of weeks taken from period of the day where demand is typically higher than average. This should ensure that the DD used to calculate payments should be consistently greater than if data from across the whole day were to be used. This was intended to reflect the expected running conditions at the expected times of calls whilst erring on the side of generosity towards participants.

The data used for the baseline was from the first three full weeks of the month, between 3pm and 8pm, giving a sample over a total of 75 hours as shown in Figure 13.

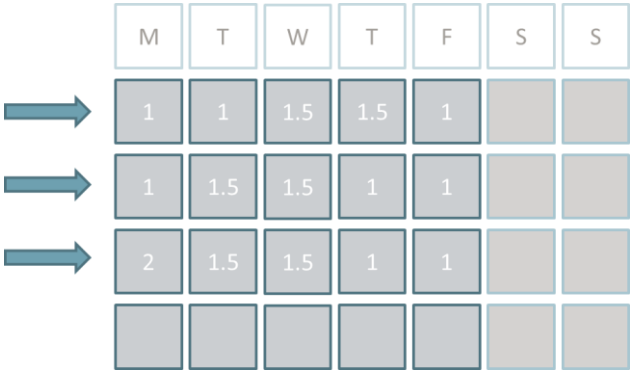

Figure 13: Baseline example

The consumption during the five-hour period for each day was totalled and divided by the 75 to establish the monthly average demand which then becomes the baseline for the following month.

5.4 Self-Service Principals

In order to keep the cost of the service operations low while fulfilling the objective to ensure accessibility to all potential participants, the service was intended to be self-service and automated wherever possible. Much of this was facilitated through the application of technology that was developed within the trial. Full details on the systems built can be found in the project systems report.

From an operational and commercial perspective it was recognised that initially WPD would have limited resource to allocate to the process. Similarly, we wanted to develop propositions for participants that while not being a 'managed service' would not require a large investment either at a financial level or that of committing resources.

On this basis we approached the main activities and interactions that would be required by both DNO and participant with a view to establishing simple interactions that would require minimal input.

5.4.1 Participant Set Up

Every participant needed to be set up on the system and learn how to operate the services. Rather than having physical installations of proprietary hardware WPD adopted virtual interfaces to connect to sites through a software-based Application Programing Interface (API) which would manage the exchange of metering data and dispatch instructions. Full instructions were provided to enable participants to carry out the setup without the need to be in direct communication or having a Flexible Power representative present for the whole commissioning process. Each participant was also provided with their own account where they access the Flexible Power customer portal. This not only provides them with tools to set up and test their API, but also acts as a hub for all their interactions.

5.4.2 Customer Portal

The Customer Portal (see Figure 14) enabled customers to manage their service offering to the DNO at any time without the need to interact with and Flexible Power staff, unless they encountered any problems. The portal included a diary-based facility for participants to complete their declarations and if they desire, alter what they offer on a weekly basis. For some participants, particularly those that were active in existing DSR programmes or aggregators they could use this to tweak and refine their earning potential. For other participants who preferred a 'light-touch' approach, they could set this up initially and it will then just repeat their declarations automatically each week without the need for any further intervention.

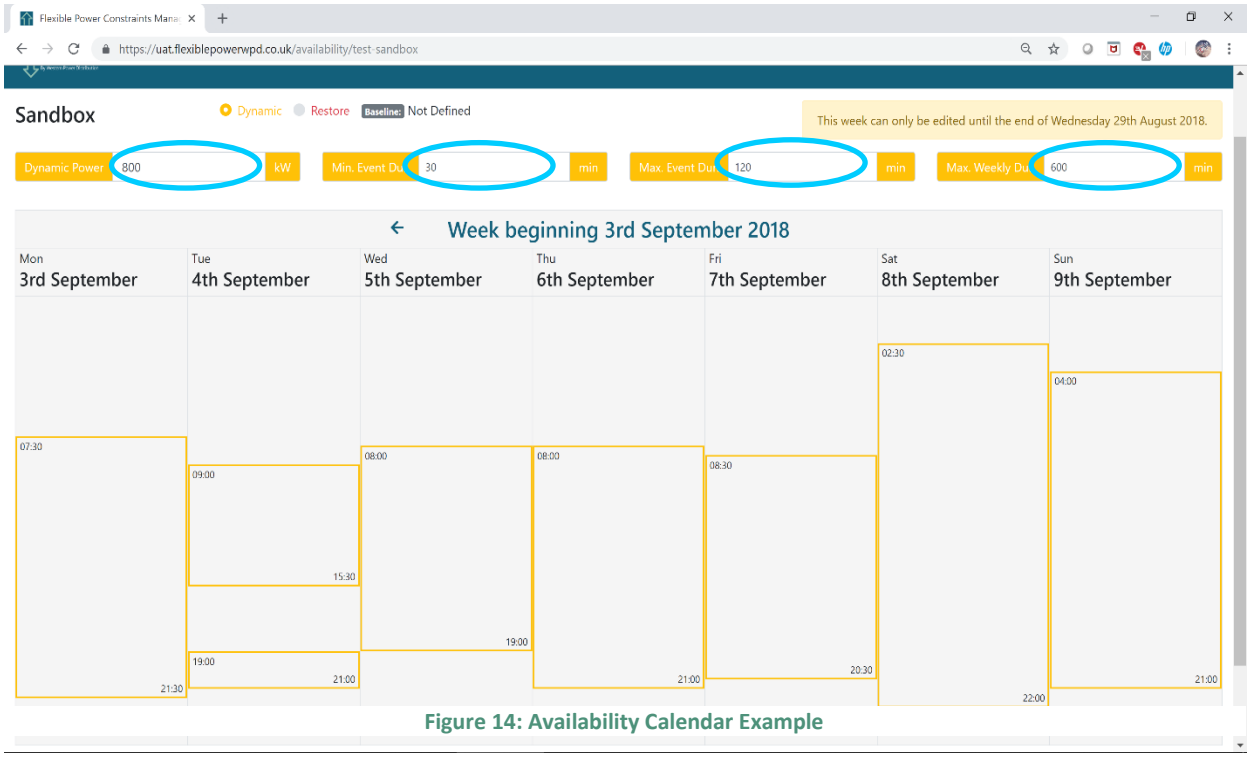

Figure 14: Availability Calendar Example

5.4.3 Automated processes

The declarations process for participants was one of several processes that were automated and applied time-based triggers and exception statuses within the protocols to deliver an automated operational service.

Declarations

Participants could access their diary at any point during the week from a Thursday at midday, through to midnight on Wednesday the following week to make any changes they wished to their declaration's diary. They did not need to authorise this or submit it, as this is automatically triggered at midnight on the Wednesday when it is locked down and offered for assessment by the control room. Each participant had access to all of the zones that they had capacity within, and they were selected via a drop down menu showing only the zones in which they are contracted to offer flexibility. When they selected the appropriate zone to update from the drop-down menu it automatically showed a pre-populated declaration carried over from the previous week. For participants who had a stand-by generator or a relatively consistent capacity offer, this process ensured that they needed very minimal interaction with the system and could concentrate on their core business without major distraction. For those that wished to manage more actively they were able to go in and edit the transposed declaration from the previous week, with the ability to revise the calendar as well as all parameters as they required:

- Capacity
- Minimum event duration
- Maximum event duration
- Total duration over a week

By offering this level of control through the web portal interaction a participant could develop their own preferred strategy rather than a default approach. For example, a participant could opt to declare a lower capacity that they could offer at all times and simplify the calendar completion so that they offered it at all times. Alternatively, they might prefer to offer a higher capacity that is only achievable at certain times and therefore the diary will need to reflect the periods when it is available. The payment mechanism already detailed earlier in the document should have acted as a strong incentive to ensure that the capacity declaration was carried out as accurately as possible to avoid over committing and incurring reductions for falling below 95% at any time during an event.

Accept / Reject

The control room engineers and operational planning at the DNO responsible for using DSR services were given a 12-hour window during which they could contract capacity for the following week. All declarations had a default status that will be applied if an engineer did not intervene. For Secure and Dynamic declarations, these would be automatically rejected from the following week's requirements. With Restore, all declarations were automatically accepted. At midday on Thursday the statuses were locked down and participant's calendars for the following week updated with notices for any accepted service windows. Participants could then log into their portal to see the status, as well as make any adjustments to declarations for the following week.

DSR Event Management

As detailed in the earlier section, each service requirement was either notified to participants so that they can schedule their response in advance or via a dispatch signal being sent via the API. The services at no point relied on manual intervention by the DNO to make calls or send specific messages such as emails or texts to operate the service. All interactions were therefore recorded centrally for simple auditing purposes, as well as avoiding any unnecessary and costly resources being required to operate an event.

Reporting

Several reports were produced automatically following any event. Examples are shown in Figure 15.

Event Performance Reports: were produced immediately following an event. These don't carry any financial information as the intended audience was the participant's operational staff who were responsible for managing the declarations and assets associated with Flexible Power. The performance report aimed to provide them with a very quick summary of how well they performed against the expected delivery profile.

Event Earnings Reports: were created and available shortly after an event. The earnings report has been developed with a very specific audience in mind. This is likely to be the management of the operational staff or someone with specific financial responsibilities. Within a third party such as an aggregator this could be the accounts department or even an account manager. The Earning report was focussed on determining what benefit was achieved, potentially if it could be improved, but also to validate that they are in agreement with the payment they would receive.

Monthly Invoice: at the end of each month a statement is produced and made available to participants for them to review. It references the individual event reports should a participant want detailed breakdowns and any reconciliation applied.
It is prepopulated with all the relevant information for payment purposes so that after approval from the participant it becomes the invoice. Invoices can then be submitted for payment without the need for any further action by the participant.

Figure 15: Example Reports

Billing & Settlement

Finally, the monthly billing cycles were also automated, utilising a predictable time-based process with specific triggers that occurred on a predictable monthly basis. These did not require intervention unless to highlight an exception. After the statement was created at the end of the month, a participant had up to 14 days to review this in conjunction with the individual event reports. If there are any issues raised the process allowed for a further 14 days to investigate and if necessary revise the data held in the vault which then automatically generated new event reports and revised monthly statements. This is shown in Figure 16.

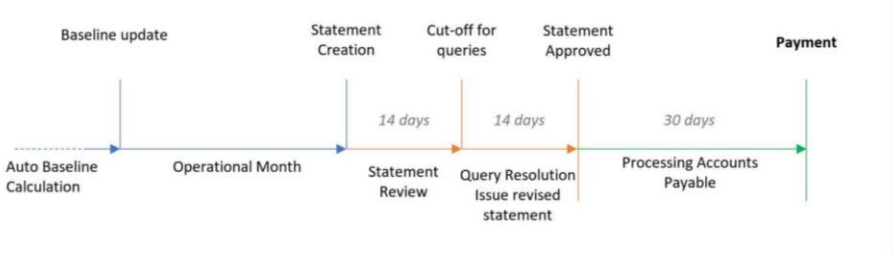

Figure 16: Billing Cycle

At the end of the resolution period, all invoices for that month were then automatically transferred to WPDs accounts department where they are then processed using their regular systems and fulfilling payments on 30 day terms via bank transfer. This whole process was therefore paperless and where interventions were not necessary could be operated automatically within the system.

5.5 Contract

It should always be the objective when developing a service proposition, to attempt to keep a contract as simple as feasible, as unnecessary complications or prohibitive terms can often serve as delays or even barriers to entry. Experience within previous trials had resulted in praise for the attempts made by WPD and its legal teams to make contracts clear, concise and straight forward for approval. This becomes increasingly difficult, the more complex the service proposition that is being developed. Some of these key factors included;

- Multiple services included in a single contract
- Complex performance assessment and payment calculations
- Contract for single sites, multi-sited direct contracts as well as third party aggregators
- Uncertain requirements for service delivery parameters
- Potentially multiple zones with varying requirements

Due to these complexities the published contract ending up in excess of 20 pages, but much of this reflected the standard conditions that any performance service would expect. A copy of the contract is available in appendix 1. Predictably the greatest concerns raised with it were not in relation to the size of the contract but the difficulty in comprehending the payment algorithms that due to the number of variables each had to encompass. It was

therefore vital that a comprehensive set of assistance notes[4] were authored alongside the contract. Supported by this it was possible for all interested participants were able to digest, approve and return their completed contract without any major issues.

[4] A comprehensive document library is published publicly via the Flexible Power web site. This includes the contract and associated assistance notes https://www.flexiblepower.co.uk/tools-and-documents

6 Learning Generated

6.1 Known limitations

As part the service design, various trade-offs were made to ensure the service remained as simple and understandable as possible. As such there are some known limitations to the services developed including areas such as baselining, limiting declarations, etc. These should be investigated in further work; however any solutions must continue to weigh up the benefits of a more optimal solution versus the costs of complexities.

6.1.1 Baselining

One limitation was with the baseline. Due to the monthly update of the baseline, changes in participant operations can take time to filter into changes in the baseline. As such a demand site, whose load increases over winter might not be reimbursed for the full level of the response as the baseline would be lower than actual usage. Participants could mitigate the potential impact on operational performance by lowering declared responses; however this would reduce potential earnings. A solution to such an issue could be to move to a weekly baseline; however this would be far more volatile and may be easier to game. It should be acknowledged that any baseline is always a compromise between various factors such as cost reflectivity, simplicity, limiting volatility etc. and as such any changes to baselines would need to be designed carefully.

6.1.2 Fixed MW declarations

Within the service, participants declared a single MW value for their volume available. This works well where response is provided by a single fixed asset such as a standby generator. However for load response, or the turn up of a normally a running generator, the magnitude of response that can be provided may vary over time depending on the activities being carried out. For example, an organisation may be able to provide a higher response when their demand is higher as there is more load to shift. The single declaration gave participants choices to make between being available for longer durations with lower magnitudes, or shorter durations with higher magnitudes. The fixed declarations were chosen to simplify the process, both from participant perspective and form a systems perspective. In reality it posed challenges. This could be resolved by adding the ability for variable MW declarations over time, or by providing better market information on the potential usages to help participants inform their choices.

6.1.3 All or nothing acceptance

Another known limitation was the requirement for WPD to accept or reject whole declarations. As such if WPD a single 4MW bid were available, and WPD's requirements were only for 1MW, WPD would have to accept the full 4MW. This has costs impacts as well as potential environmental issues and could even have perverse effects of future meritocracies. Again this limitation was added to limit the permutations possible and make things simpler for participants. This allowed for simple binary communications of acceptance. In future it might be possible to allow more flexible acceptance, however this must be done within constraints of participant operation as certain sites may operate in an all or nothing manner.

6.1.4 Weekday operations

Within the project services were limited to weekday operations. This coincided with the expected times of requirements as well as reducing operational burden for all parties by avoiding weekends. Weekend running could be added, however impacts on baselines and the fixed volume declarations should be considered.

6.1.5 Fixed Pricing

One of the most visible limitations of the service was the fixed prices utilised. However these were also one of the best received. Fixed pricing limits price competition and mean that the services could be provided at a lower cost. However the simplicity afforded by the pricing strategy was very well received by participants as it simplified participation, removing the burden of price setting. As DNO markets develop and become more liquid, it may become appropriate to add price competition into the services, however this should focus on the simplicity of price setting and encourage participants to enter true marginal running costs (potentially with a pay as clear auction).

6.1.6 Meritocracy

Within the project, no dispatch meritocracy was utilised. This was done to increase the volume of calls to help WPD understand participant reliability. As the services transition to BaU a meritocracy will need to be established to ensure the correct participants are dispatched in the correct order. This should aim to minimise the costs of running the service, whilst also encouraging reliability and network redundancy. The addition of variable pricing could also facilitate this meritocracy

6.2 Learning generated

Understandably, with such a diverse project with a wide scope, there were many different aspects to the learning that was acquired.

6.2.1 DNO role in flexibility

The project review highlighted a clear direction from the regulator on the role of a DNO in the provision of flexibility services. This was to avoid involvement in any potentially competitive processes and to focus on the procurement of services to help manage the distribution network.

6.2.2 Information

Understandably, good information is vital in services such as those described in this document. Key feedback included the value of improving the information available on when calls may happen. As such a great deal of work had taken place in parallel with this trial improving the quality of data and understanding new ways to use it to better understand how the network is operating and identifying limits. This is not isolated within the scope of Entire, and new projects are commencing to improve the way in which DNOs can forecast the demand on the network, rather than just managing the infrastructure through which it

flows. With good forecasting data it will then be possible to use this in optimisation tools that will help advise all sorts of operational and investment decisions.

6.2.3 Contract improvements

Several comments and suggestions were made on the contract and how it could be improved. This included the removal of several references to non-essential wider WPD policies (such a reference to a WPD legal policy). In addition, several other improvements were identified such as the removal of the contract as the documents for the declaration of new sites. The customer portal was identified and the better means of communicating this information.

6.2.4 Pricing Structure

The payment principals were generally well received by those who have offered feedback on the Flexible Power service. Any concerns expressed have related to the perceived 'fixed price' and concern it doesn't create a market. However other feedback has also identified this very same aspect as a positive. This is because there is generally an immoderate quantity of administration required to undertake to win a contract, often with diminishing profits due to competition. Knowing in advance what they would be likely to receive for some is very appealing. This will continue to evolve as the service grows and could result in competitive auctions taking place where there is more capacity being offered than is required for a CMZ.

6.2.5 Market compatibility

One of the overriding objectives of the trial was to ensure that the services in development would be compatible with the current market and structured in a manner that would allow it to be adaptable within the developing market conditions to remain that way. For this reason there was a focus on:

- contracting non-exclusively,
- developing stackable service propositions,
- endeavouring to develop ubiquitous services that could be accessed by the majority of potential participants
- understanding and avoiding conflict with existing services

In particular with this last point, it was identified at an early stage that National Grid had specific times each week which required their participants to submit declarations by. For STOR this was on a Friday and Frequency services were Thursday afternoon. This effectively determined the midnight Wednesday midnight cut-off for our automated declarations process and that we would release capacity that wasn't accepted, back to participants enabling them to try again with National Grid.

6.2.6 New use-cases

The Flexible Power services were created with specific use cases in mind. There are however further potential use cases of which have been identified as the project progressed. These include the utilisation of the Dynamic service to manage use cases with pre-fault intervention. This could sit alongside Secure services but be called at a later point to reduce cost exposure. A Demand Turn Up service could also be developed.

6.2.7 Complexities of non-standard customers.

In spite of all the efforts made in the design and development of a service that would encourage participation from all interested parties, even within the limited geographies of the trial we encountered anomalies. In particular, there were sites which due to complexities in how they currently operate that prevented us from being able to enrol them at this time. The first was due to a complex configuration of multiple feeders onto a large estate that could not resolve a metering arrangement that could work with the programme. The other had existing running regimes that conflicted with our baseline methodology and therefore inoculated them from being able to offer capacity at other times. These examples highlight the diversity of potential participants and the likely need to develop variations on the current service and associated systems to increase the opportunities for inclusion.

6.2.8 Service development – Change control

As the service develops it is vital for a change management and document control process to sit behind this. With so much published information in relation to the services, assistance notes and contracts it is vital that all service developments are tested against a process that assesses their wider impact. Flexible Power has a publicly available library contained within the Flexible Power web site, and the documents contained within this are subject to the change control process, therefore we recommend that participants did not download and rely upon local document records and rely upon obtaining them from the library in order to ensure that they always work with the most recent version. This was particularly true of the contract which has been subject to several revisions already to reflect some of the operational enhancements that have been introduced.

6.3 Potential for development

During the trial the decision was taken by WPD to continue the progress in further development of Flexible Power and to fund the next tranche of work necessary so that the systems capability would allow the services to be rolled out under BaU conditions. Every attempt was made during the design phases to ensure that the services during the trial would only require minimal revisions if they were to be adopted. There are however a few enhancements that could be considered that are detailed below.

6.3.1 Managing Relationships

The conventional role of the DNO can broadly be described as that of an asset owner and manager. In this respect there is limited direct contact between a DNO and its customers unless there is a fault, a new connection or maintenance taking place in their area. With the introduction of the new service propositions it is necessary for new roles to be created within the DNO to manage such relationships and offer a point of contact where related communications can be addressed. Even with as much automations and self-service principles developed to minimise the burden on the current business, with new activities there is a need to introduce new skills to support them. As part of WPD's decision to further invest in the Flexible Power proposition and introduce it to BaU a full time role was created to oversee operations and publicly represent the service.

6.3.2 Signposting

Throughout the trial, Flexible Power representatives were in regular contact with participants and through this gained valuable feedback that has led to developing greatly increased intelligence to be published. It has become increasingly apparent that the more detail that can be provided to participants of when they might be required, they will make extended efforts to be available to provide capacity. As such, WPD has been rapidly developing analytical capabilities alongside improved communications capability to regularly publish signposting notices. These cover multiple time horizons ranging from future tendering requirement through to forecasts of specific days when services will be desirable.

6.3.3 Variable pricing

The current pricing is determined upon savings that can be achieved, largely through delaying the costs of expensive capital upgrades. This ultimately means there is a cost threshold above which capital upgrades become more economically attractive. Therefore there is a ceiling for the price that a DNO should pay to contract flexibility and that is the starting price that can be offered to the market as a published price. This is then effective up until a point where a DNO has a liquid market and is offered a greater capacity than it requires. In such circumstances, participants are required to submit a bid with their tender to provide lower price at which they would still be willing to contract. An auction would then be processed with all successful contracts being awarded at the highest clearing price.

6.3.4 Wider Industry Sharing

As the dialogue within the industry has increased and gained momentum it has become apparent that the work being carried out by WPD has a very direct relevance to other DNOs and a great deal of learning has already been shared both directly and via the Open Networks project. With all DNOs faced with the challenge of developing their own flexibility programmes there is a clear opportunity to extend the sharing beyond the knowledge and gain greater value from Project Entire by facilitating access for other DNOs to the developed technology. Collaboration meetings have been arranged with all DNOs to demonstrate the capabilities and open Flexible Power for use by any who wish to adopt it. By sharing the ownership of the complete service, including technical systems Flexible Power can reduce overall costs of operating flexibility for the industry and therefore cost to customers.

6.3.5 Faster dispatch

For simplicity the trial operated all the services with a 15-minute dispatch notice, but in the case of Restore it would be beneficial if this could be delivers quicker. It is therefore updated post-trial to dispatch participants instantly with a link directly from the DNO control room main systems. Payments to participant then commence from the next full minute, rather than having to ramp up and wait before starting to receive payment, bringing increased benefits to both parties.

6.3.6 Weekend operation

Within the trial the service was restricted to week days only to ensure that any commercial participants were not excluded as they wouldn't be able operate at the weekend. This would become a restriction going forward as fault conditions and maintenance work for

which DSR could be used is not restricted and can occur over periods including weekends. The BaU services have therefore been revised to include the ability to operate the service at weekends. This presented the potential complication of many organisations having reduced operations at weekends, inviting a different baseline to be used. While this has been recognised, it does not require an immediate modification and could be impacted by other potential enhancements. For these reasons it will remain under observation.

6.3.7 Wider Market Integration

Flexible Power has been very specifically designed as a tool set for the management of new relationships and encompassing many of the functionality challenges of supporting such services. There can only be a single system in the control room to operate the functional aspects but it is also recognised that with a growing number of opportunities within an increasingly distributed energy market, there may be other developments with which Flexible Power will require to interact. Currently the services are based upon commercial providers on a week-ahead basis but Flexible Power has been designed with a view to enabling further development which may include domestic flexibility or integration with wider flexibility platforms.

7 Contact

Further details on replicating the project can be made available from the following points of contact:

Future Networks Team
Western Power Distribution,
Pegasus Business Park,
Herald Way,
Castle Donington,
Derbyshire
DE74 2TU
Email: wpdinnovation@westernpower.co.uk

Glossary

Abbreviation	Term
API	Application Programming Interface
BaU	Business as Usual
BSP	Bulk Supply Point
CML	Customer Minute Lost
CMZ	Constraint Management Zone
DD	Delivery Delta
DNO	Distribution Network Operator
DSR	Demand Side Response
DUoS	Distribution Use of System
EHV	Extra High Voltage
ESO	Electricity System Operator
FALCON	Flexible Approaches for Low Carbon Optimised Networks
PV	Photo-Voltaic
STOR	Short Term Operating Reserve
SYNC	Solar Yield Network Constraints
TNUoS	Transmission Network Use of System
UAT	User Acceptance Testing
WPD	Western Power Distribution

Appendix A: Participant Contract

Constraint Management Zone (CMZ) Services Agreement

Between:

(1) **Western Power Distribution (East Midlands) plc** (company number: 02366923 whose registered office is at Avonbank, Feeder Road, Bristol BS2 0TB (**"WPD"**); and

(2) _____ **Limited** (company number: _____) whose registered office is at _____ _____ (the **"Participant"**).

Date of Agreement (date of signature by both parties)	
WPD Authorised Person(s)	[insert name(s), address and email address of WPD individual(s)]
Participant Authorised Person(s)	[insert name(s), address and email address of Participant individual(s)]

1. General Acknowledgement

The Participant hereby acknowledges that: (a) the provision of, or the permitting by the Participant of the remote despatch by WPD of, Demand Response pursuant to this Agreement and (b) the participation in CMZ service programme is entirely voluntary.

2. Participant Warranty and Indemnity

2.1 The Participant warrants to WPD that the provision by it, or the permitting by the Participant of the despatch by WPD, of Demand Response will not cause the Participant:

(a) to be in breach of the Electricity Safety, Quality and Continuity Regulations 2002 (as amended from time to time) (available from WPD on request) or of any regulations made under Section 29 of the Electricity Act 1989 or of any other enactment relating to safety or standards applicable in respect of the business of the Participant;

(b) to be in breach of any provisions of the Grid Code or (where applicable) the Distribution Code or make its compliance with any provision of either of these impossible;

(c) (where any Site is Embedded (as defined in the Grid Code)) to be in breach of or to otherwise be non-compliant with any connection agreement governing the terms of connection of any plant and apparatus to, and/or any agreement for the supply of electricity to the plant or for the acceptance of electricity into, and its delivery from, any electrical distribution or transmission system;

(d) to be in breach of any restrictions and conditions attaching to relevant authorisations of the Environment Agency; or

(e) to be in breach of any other agreement or arrangement of whatever nature with any other person.

2.2 If at any time during the term in which Demand Response may be provided by the Participant or despatched by WPD, this would cause the Participant to be in breach or non-compliance as described in clause 2.1, the Participant agrees that it will, in advance of any despatch by WPD or Instruction to despatch issue a notification of unavailability or, following the despatch by WPD or receipt of an Instruction, not comply with such Instruction or operate the Manual Override.

2.3 In the event that, in contravention of clause 2.2, Demand Response is despatched which causes the Participant to be in breach or non-compliance as described in clause 2.1 above, then Demand Response shall be deemed to be unavailable from the Site during any Contracted Arming Window or Contracted Availability Window (as relevant) and the Participant shall indemnify WPD against all and any claims made against WPD arising out of or resulting from such breach or non-compliance. Such indemnity shall include any legal costs and expenses reasonably incurred in the contesting of such claims including court costs and reasonable attorney's fees and other professional advisors' fees.

2.4 In the event of any such claim referred to in clause 2.3 above being made against WPD, WPD shall as soon as reasonably practicable give notice of the claim together with all relevant supporting documentation to the Participant. The Participant shall be entitled, upon written notice to WPD and subject to WPD receiving from the Participant such reasonable undertakings as WPD shall reasonably require to assume, at its own expense, sole conduct of all proceedings relating to such claim including the right to contest such claim in the name of WPD and WPD shall supply the Participant with all information, assistance and particulars reasonably required by the Participant in connection therewith. WPD shall not accept, settle, pay or compromise any such claim without the prior written approval of the Participant (such approval not to be unreasonably withheld or delayed). The Participant shall reimburse WPD's reasonable expenses incurred in connection with the provision of any such information, assistance or particulars in the contesting of any such claim.

2.5 The amount or amounts for which the Participant may be liable to WPD pursuant to paragraph 2.3 shall not exceed the sum of £250,000, provided that, in the event that the Participant's liability pursuant to paragraph 2.3 equals or exceeds £250,000, WPD may by notice in writing immediately terminate this Agreement.

3. Electricity Regulations

To the extent that the terms of this Agreement conflict with any of the rights or obligations of the parties under the Electricity Act 1989, the Utilities Act 2000, the Energy Acts 2008 – 2016, the National Terms of Connection and any other licences, codes or industry agreements related to such legislation (the **"Electricity Regulations"**), the terms of the Electricity Regulations shall prevail.

4. Site(s) / Group

Site(s) / Group	**MPAN(s)**	**Initial Contracted Capacity (MW)**	**CMZ**

WPD and the Participant agree to be bound by the terms of this Agreement (as defined in paragraph 1.1 (Definitions and Interpretations) of the terms and conditions attached at Schedule 3).

Signed on behalf of Western Power Distribution (East Midlands) plc: *Signature*: _____ *Name*: _____ _____ *Role*: _ _____ _____
Signed on behalf of: _____: *Signature*: _____ *Name*: _____ _____ *Role*: _ _____ _____

Schedule 1

1. (CMZ Services)

1. By 23:59 hours on each Wednesday (or as otherwise agreed between the parties), the Participant shall notify Central Control of any Site(s) / Group that is **available** for the despatch of Demand Response, the Service(s) that the Site(s) / Group is available for and the capacity it is declaring in respect of such Site(s) / Group and Service during the following Week. In the absence of any notification to the contrary in respect of a particular Site(s) / Group, WPD shall be entitled to assume that that Site(s) / Group is **available** for the despatch of Demand Response at all times and for the most recently declared capacity (or the Contracted Capacity set out in Clause 4 of this Agreement if no declarations or updated capacity declarations have been made).

2. By 1200 hours on each Thursday (or as otherwise agreed between the parties), Central Control shall confirm to the Participant the Arming Windows and/or Availability Windows available during the following Week.

3. If, at any time, the Participant becomes aware that:

3.1 Demand Response will not be available for despatch from a Site(s) / Group for any time during a Committed Arming Window, Committed Availability Window and/or any other period of time for which availability was declared pursuant to paragraph 1 above and/or paragraph 3.2 below; or

3.2 Demand Response will be available for despatch from a Site(s) / Group for any time during any Arming Window or Availability Window that was notified as unavailable and/or any other period of time for which unavailability was declared pursuant to paragraph 1 above and/or paragraph 3.1 above,

then it shall update Central Control of such change as soon as reasonably practicable, including details of the Site(s) / Group, the Service, the relevant period of time that will be available or unavailable and (where declaring availability), the contracted capacity it is declaring. Any period during an Arming Window or Availability Window previously notified as unavailable and updated as a Committed Arming Window or Committed Availability Window may (at the discretion of WPD) become a Contracted Arming Window or Contracted Availability Window (as relevant).

4. Notwithstanding any notification or deemed notification that Demand Response is available for despatch:

4.1 WPD may determine that, based on any Site(s) / Group and asset status monitoring data and information available to it (including where no data or information is available as a result of a failure of the control or communications systems), and taking into account any asset or Site(s) / Group operational capabilities agreed between WPD and the Participant from time to time, Demand Response is unavailable for despatch for any period during any Contracted Arming Window, Contracted Availability Window and/or other period of time which has not been declared or deemed to be unavailable;

4.2 in the event that the Manual Override is operated by the Participant during a Contracted Arming Window, Contracted Availability Window and/or other period of time, or if no Demand Response is provided for a period of time during a Contracted Arming Window, Contracted Availability Window and/or other period of time following an Instruction, then Demand Response shall be deemed to be unavailable following operation of the Manual Override or for the period of failure to provide any Demand Response during that Contracted Arming Window, Contracted Availability Window and/or other period of time; and

4.3 unless otherwise agreed with the Participant, Demand Response shall be deemed to be unavailable from a Site(s) / Group during each Contracted Arming Window, Contracted Availability Window and/or other period of time previously notified, or deemed to be notified, as being available that overlaps with a Recovery Period or in respect of which, were Demand Response to be despatched during such Contracted Arming Window, Contracted Availability Window or other period of time previously notified ,or deemed to be notified, as being available, the number of Utilisations would exceed the relevant Weekly Limit, Monthly and/or Annual Limit.

5. Where:

5.1 WPD has determined, in accordance with paragraph 4(a) above, that Demand Response is not available for despatch from a Site(s) / Group (s), then it shall notify the Participant of this as soon as reasonably practicable thereafter. Upon such notification (and without prejudice to paragraph 5 of Schedule 3), the Participant shall investigate and shall provide a report to WPD setting out the reasons why Demand Response was unavailable for despatch;

5.2 the Participant operates the Manual Override during a Contracted Arming Window, Contracted Availability Window or other period of time or if no Demand Response is provided for a period of time following an Instruction from WPD, then the Participant shall, as soon as practicable thereafter, provide a report to WPD setting out the reasons why such Manual Override was operated or Demand Response not provided following an Instruction.

6. WPD may, in any Contracted Arming Window, Contracted Availability Window or other period of time in respect of a Site(s) / Group which has not been declared or deemed to be unavailable at that time, issue a notice (an "**Instruction**") requiring the Participant to provide Demand Response, or may itself remotely despatch Demand Response from that Site(s) / Group (s).

7. Where WPD remotely despatches Demand Response this shall be notified by Central Control to the Participant and shall continue continuously for a minimum of the Minimum Utilisation Period until the earlier of:

7.1 the expiry of the Maximum Utilisation Period;

7.2 any other time as required by WPD; and

7.3 the end of the relevant Arming Window or Contracted Availability Window (as relevant).

8. Where WPD issues an Instruction requiring the Participant to provide Demand Response the Participant shall, within the Response Time, provide Demand Response from the Site(s) / Group continuously for a minimum of the Minimum Utilisation Period until the earlier of:

8.1 the expiry of the Maximum Utilisation Period;

8.2 any other time as required by WPD; and

8.3 the end of the relevant Arming Window or Contracted Availability Window (as relevant).

9. In the event that, in respect of the despatch of Demand Response in any Contracted Arming Window, Contracted Availability Window or other period of time previously notified ,or deemed to be notified, as being available at any Site(s) / Group:-

9.1 Demand Response is not provided at a level of at least the required level of Contracted Capacity less any applicable grace factor (each as set out in Part E of Schedule 2) as measured at the minute in which the Response Time ends;

9.2 the volume in MWh of Demand Response provided following despatch in accordance with paragraph 6 is less than the required level of Contracted Capacity less any applicable grace factor (each as set out in Part E of Schedule 2) as multiplied by the number of hours (including

parts thereof) comprised in the period from the expiry of the Response Time until the first to occur of the times described in paragraphs 7.1, 7.2 or 7.3 or 8.2(a), (b) or (c) (as relevant); or

9.3 Demand Response is not provided continuously at a level of at least the required level of Contracted Capacity less any applicable grace factor (each as set out in Part E of Schedule 2) from the expiry of the Response Time until the first to occur of the times described in paragraphs 7.1, 7.2 or 7.3 or 8.2(a), (b) or (c) (as relevant),

then the WPD Service Charges otherwise payable by WPD to the Participant shall be reduced in accordance with Schedule 2.

Schedule 2

(Payment and Performance Calculations)

PART A: Introduction

1.1. Definitions and interpretation

In this Schedule 2, terms shall be defined and interpreted in accordance with the Terms and Conditions in Schedule 3, unless the context otherwise requires or such terms are defined below:

"Arming Fee" has the meaning given in to it in Paragraph 3) of this Part A of Schedule 2 below;

"Arming Payment" means any payment calculated in accordance with Paragraph 2 of Part B of this Schedule 2 below;

"Arming Settlement Period" means each full thirty (30) minute period within a Contracted Arming Window, as described in Paragraph 1.2.2 of this Part A of Schedule 2 below;

"Availability Fee" has the meaning given in to it in Paragraph 1.3(d) of this Part A of Schedule 2 below;

"Availability Payment" means any payment calculated in accordance with Paragraph 3 of Part B of this Schedule 2 below;

"Availability Settlement Period" means each full thirty (30) minute period within a Contracted Availability Window, as described in Paragraph 1.2 of this Part A of Schedule 2 below;

"Constraint Event Delivery Proportion" has the meaning given to it in Paragraph 1.6 of Part B of this Schedule 2 below;

"Delivery Proportion" has the meaning given to it in Paragraph 1.5.2 of Part B of this Schedule 2 in respect of WPD Dynamic Services and/or WPD Secure Services, and/or in Paragraph 2.2 of Part C of this Schedule 2 in respect of WPD Restore Services below;

"Delivery Target Threshold" has the meaning given to it in Paragraph 2.1 of Part C of Schedule 2;

"Event Delivery Proportion" has the meaning given to it in Paragraph 1.6 of Part B of this Schedule 2 below;

"Grace Factor" has the meaning given to it in Paragraph 0 of Part B of this Schedule 2;

"Monthly Delivery Proportion" has the meaning given to it in Paragraph 1.6 of Part B of this Schedule 2 below;

"Payable Overdelivery" means the % of overpayment above 100% that will be available in respect of Utilisation Payments for WPD Restore Services as set out in Paragraph 2.1 of Part C of this Schedule 2;

"Payment Proportion" means the value calculated in accordance with Paragraph 1.5 of Part B of this Schedule 2 in respect of WPD Dynamic Services and/or WPD Secure Services, and/or in Paragraph 2 of Part C of this Schedule 2 in respect of WPD Restore Services below;

"Penalisation Multiplier" has the meaning given to it in Paragraph 1.5.3 of Part B of this Schedule 2 in respect of WPD Dynamic Services and/or WPD Secure Services, and/or in Paragraph 2.3 of Part C of this Schedule 2 in respect of WPD Restore Services below;

"Reconciliation Grace Factor" has the meaning given to it in Paragraph 1.6.5 of Part B of this Schedule 2 below;

"Utilisation Cost" has the meaning given to it in Paragraph 2) of this Part A of Schedule 2 below;

"Utilisation Payment" means any payment in respect of WPD Dynamic Services and/or WPD Secure Services calculated in accordance with Paragraph 1.4 of Part B of this Schedule 2 below, and/or any payment in respect of WPD Restore Services calculated in accordance with Paragraph 1 of Part C of this Schedule 2 below;

"Utilisation Settlement Period" means each full one (1) minute period during a Utilisation event, as described in Paragraph 1.2.2 of this Part A of Schedule 2 below.

1.2. General

1.2.1. For WPD Dynamic Services, there are two primary payments: Utilisation Payments and Availability Payments. For WPD Secure Services, there are two primary payments: Utilisation Payments and Arming Payments. For WPD Restore Services, there is one payment: the Utilisation Payment. Utilisation Payments are made when Demand Response is despatched where a *constraint event* is in progress. Arming Payments are paid for every Contracted Arming Window in respect of the Site(s) / Group (s). Availability Payments are paid for every Contracted Availability Window in respect of the Site(s) / Group (s).

1.2.2. Arming Payments, Availability Payments and Utilisation Payments are calculated at a different granularity called the Arming Settlement Period, the Availability Settlement Period and the Utilisation Settlement Period. The constants used to convert between MWh values and the individual time segments are (SP_u) and (SP_a), which correspond to the fraction of an hour for Utilisation, availability and arming. The Utilisation Settlement Period is 1 minute. The Arming Settlement Periods and Availability Settlement Periods are 30 minutes i.e.:

$$SP_u = \frac{1}{60} \text{ and } SP_a = 0.5$$

1.2.3. In respect of each Site(s) / Group there are four constant values:

1) The Contracted Capacity (CC_s), given in MW;

2) A Utilisation Cost (UC_s), which is the payment per MWh delivery by the Site(s) / Group during a Utilisation. The Utilisation Cost will be determined by WPD from time to time in respect of each of the WPD Dynamic Services, the WPD Secure Services and the WPD Restore Services and confirmed by Central Control, provided that any change to the then exiting rate shall be notified by Central Control to the Participant no later than 1 month before such changed rate will take effect;

3) An Arming Fee (AF_s), which is the payment for arming availability in respect of a Contracted Arming Window at a Site(s) / Group (s). This is a payment per MW per hour of availability. The Arming Fee will be determined by WPD from time to time and confirmed by Central Control provided that any change to the then exiting rate shall be notified by Central Control to the Participant no later than 1 month before such changed rate will take effect;

4) An Availability Fee (AC_s), which is the payment for availability in respect of a Contracted Availability Window at a Site(s) / Group. This is a payment per MW per hour of availability. The Availability Fee will be determined by WPD from time to time and confirmed by Central Control provided that any change to the then exiting rate shall be notified by Central Control to the Participant no later than 1 month before such changed rate will take effect.

1.2.4. Payments are calculated on a month-by-month basis. The calculations in this Schedule 2 determine the Utilisation Payments, the Availability Payments and the Arming Payments due to a Site(s) / Group for a given month.

1.2.5. For WPD Dynamic Services and WPD Secure Services, for each month, (m), there is a list of Arming Windows or Availability Windows (as appropriate) and a list of constraint events, which are written as (AW_m) and (E_m) for Arming of Secure services and (AP_m) and $(E_m)$for Availability of Dynamic services. The top-level calculations will loop through these lists, but the bulk of the work is performed for an individual Arming Window or Availability Window and an individual constraint event.

PART B: WPD Dynamic Services and WPD Secure Services

1. **WPD Secure Services Arming Payment**

1.2.6. Arming Payments for a Contracted Arming Window are determined as the sum for all Arming Settlement Periods in that Contracted Arming Window, based on binary values for availability during each Arming Settlement Period.

1.2.7. ST_{aw} and FT_{aw} are written for the start and finish time of the given Contracted Arming Window.

1.2.8. The raw Arming Payment given to a Site(s) / Group for a Contracted Arming Window is as follows:

Where the Arming Fee is a payment per MW per hour:

$$AWP_{aw,s} = (\sum_{j=ST_{aw}}^{FT_{aw}} AF_{s,aw} . SP_{aw} . CC_s . SA_{s,j})$$

Where:

$AWP_{aw,s}$ is the Arming Window Payment for Site(s) / Group (s) during Contracted Arming Window (aw)

$\sum_{j=ST_{aw}}^{FT_{aw}}$ sums the payment for every Arming Settlement Period in the Contracted Arming Window, from start to finish time inclusive

AF_s is the Arming Fee for that Site(s) / Group and Contracted Arming Window on a per MW per hour basis

SP_{aw} is the Arming Settlement Period

CC_s is the Contracted Capacity

$SA_{s,j}$ is the availability for each Arming Settlement Period for the Site(s) / Group within a Contracted Arming Window which is supplied as binary data into the system, based on the reporting and the conditions outlined elsewhere in the Agreement

1.3. WPD Dynamic Services Availability Payment

1.3.1. Availability Payments for a Contracted Availability Window are determined as the sum for all Availability Settlement Periods in that Contracted Availability Window, based on binary values for availability during each Availability Settlement Period.

1.3.2. ST_{aw} and FT_{aw} are written for the start and finish time of the given Contracted Availability Window.

1.3.3. The raw Availability Payment given to a Site(s) / Group for a Contracted Availability Window is as follows:

Where the Availability Fee is a payment per MW per hour:

$$AP_{s,w} = (\sum_{j=ST_w}^{FT_w} AC_s . SP_a . CC_s . SA_{s,j})$$

Where:

$AP_{s,w}$ is the Availability Payment for Site(s) / Group (s) during Contracted Availability Window *(w)*

$\sum_{j=ST_w}^{FT_w}$ sums the payment for every Availability Settlement Period in the Contracted Availability Window, from start to finish time inclusive

$AC_{s,w}$ is the Availability Fee for that Site(s) / Group and Contracted Availability Window on a per MW per hour basis

SP_a is the Availability Settlement Period

CC_s is the Contracted Capacity

$SA_{s,j}$ is the availability for each Availability Settlement Period for the Site(s) / Group within a Contracted Availability Window which is supplied as binary data into the system, based on the reporting and the conditions outlined elsewhere in the Agreement

1.4. Utilisation Payment

1.4.1. For a Site(s) / Group (s), Utilisation Payments for WPD Dynamic Services and WPD Secure Services are calculated per-constraint Utilisation event (e). Each constraint Utilisation event has a start time (ST_e) and a finish time (FT_e), such that $ST_e < FT_e$.

1.4.2. The Utilisation Payment for a Site(s) / Group (s) per constraint Utilisation event *(e)* is calculated as follows:

$$U_{s,e} = \sum_{j=ST_e}^{FT_e} CC_s \,.\, UC_s \,.\, SP_u \,.\, PP(CC_s, AD_{s,j})$$

Where:

$U_{s,e}$ is the Utilisation Payment for Site(s) / Group (s) during each constraint Utilisation event (e)

$\sum_{j=ST_e}^{FT_e}$ sum of the Utilisation Settlement Periods during the constraint Utilisation event

CC_s Contracted Capacity,

UC_s Utilisation Cost,

SP_u Settlement Period of the Site(s) / Group , as defined above. $AD_{s,j}$ is the actual, metered MW delivery of the Site(s) / Group (s)for each Utilisation Settlement Period during the constraint Utilisation event (*j*). In the payment calculations, there is no difference between Generator Sites and Demand Reduction Sites, since this value is the 'reported to grid' value

PP is the Payment Proportion and works out what fraction of the full price is due to the Site(s) / Group for every Utilisation Settlement Period based on the Contracted Capacity and the actual delivery.

1.5. Payment Proportion

A margin of error as set out in Part E of this Schedule 2, known as the Grace Factor ***(***GF) is allowed in respect of under-delivery of the Contracted Capacity (CC) .

1.5.1. at a Site(s) / Group (assessed against each of the metrics set out at paragraph 9 of Schedule 1). Delivery of equal to or greater than the required level of Contracted Capacity less the applicable Grace Factor is awarded the full Utilisation Payment. A deduction from the full payment will be made for delivery of less than the required level of Contracted Capacity less the applicable Grace Factor.

1.5.2. The Delivery Proportion ($DP_{s,j}$) is defined as the ratio of actual MW delivery (calculated from the baseline set out in Part C of this Schedule 2) to Contracted Capacity. This ratio is a value that represents a percentage and rounded to two significant figures to ensure it represents a whole percentage.

1.5.3. The Grace Factor determines the acceptable under-delivery for a Site(s) / Group. For every % point under that level, a fixed proportion as set out in Part E of this Schedule 2, called the Penalisation Multiplier, (PM) of the full payment is deducted. Over-delivery is capped, and paid at Contracted Capacity.

1.5.4. Thus, the Payment Proportion is a value between 0 and 1 (or 0 and 100%). The calculation contains two separate cases:

1) $if\ DP_{s,j} \geq (1 - GF\ ),PP_{s,j} = 1$

2) $if\ DP_{s,j} < (1 - GF\ ), PP_{s,j} = Max(0,\ 1 - GF\ - PM\ .[1 - GF\ - DP_{s,j}]\ )$

1.6. Monthly Reconciliation

1.6.1. In addition to the above, the Arming Payments and Availability Payments for a Site(s) / Group are subject to a monthly reconciliation based on the Site's / Group's individual Utilisation performance over the month.

1.6.2. This is calculated as follows: the Monthly Delivery Proportion ($MDP_{s,m}$) for a Site(s) / Group for a given month is

$$MDP_{s,m} = \frac{\sum_{e\ \epsilon\ Em} Min(1, EP_{s,e})}{\#E_m}$$

i.e. the capped proportion of average deliveries in a given month.

Where:

$e\ \epsilon\ E_m$ is the Delivery Proportion during each and every constraint Utilisation event in the set of constraint Utilisation events for the month (*m)*

$\#E_m$ is the number of constraint Utilisation events in the month

$Min(1, EP_{s,e}\ )$ caps the Delivery Proportion during each and every constraint Utilisation event at 100%, even if the Site(s) / Group over-delivers. The Constraint Event Delivery Proportion $EP_{s,e}$ for a Site(s) / Group and a Utilisation event is defined below.

1.6.3. In order to define the Constraint Events Monthly Delivery Proportion, we first need the Event Delivery Proportion (*EDP)*. For each individual constraint Utilisation event the total, uncapped Delivery Proportions for each Utilisation Settlement Period are summed.

$$EDP_{s,e} = (\sum_{j=ST_e}^{FT_e} = DP_{s,j})\ /(FT_e - ST_e + 1)$$

1.6.4. As such, the Delivery Proportion for each Utilisation Settlement Period of the constraint Utilisation event is calculated. It is important to note that this is uncapped. This does not

apply across constraint Utilisation events in the month, as shown in the $MDP_{s,m}$ calculation.

1.6.5. When calculating the Constraint Event Delivery Proportion, the Event Delivery Proportions are also given a grace factor, called the Reconciliation Grace Factor (RGF). Thus the Constraint Event Proportion is:

1) $if\ 1 \leq EDP_{s,e} + RGF < 1 + RGF, EP_{s,e} = 1$

2) $otherwise\ EP_{s,e} = EDP_{s,e}$

1.7. Monthly Arming Window and Availability Window Payments

The monthly Arming Payment and Availability Payment for a Site(s) / Group for a given month is calculated as follows:

$$AP_{s,m} = (\sum_{w \epsilon M} AP_{s,w}) . MDP_{s,m}$$

That is, the total Arming Payments and Availability Payments due for the Site(s) / Group for the month multiplied by the Constraint Event Delivery Proportion.

1.8. Monthly Utilisation Payments

Similarly, the monthly Utilisation Payments due for a given Site(s) / Group in a month is calculated as the sum of the individual Utilisation Payments:

$$UP_{s,m} = (\sum_{e \epsilon M} UP_{s,e})$$

PART C: WPD Restore Services

1. **Utilisation Payment**

1.8.1. For a Site(s) / Group (s), Utilisation Payments for WPD Restore Services are calculated per-constraint Utilisation event (e). Each constraint Utilisation event has a start time (ST_e) and a finish time (FT_e), such that $ST_e < FT_e$.

1.8.2. The Utilisation Payment for a Site(s) / Group (s) per constraint Utilisation event (e) is calculated as follows:

$$U_{s,e} = \sum_{j=ST_e}^{FT_e} CC_s \,.\, UC_s \,.\, SP_u \,.\, PP \quad (CC_s, AD_{s,j})$$

Where:

$U_{s,e}$ is the Utilisation Payment for Site(s) / Group (s) during each constraint Utilisation event (ce)

$\sum_{j=ST_e}^{FT_e}$ sum of the Utilisation Settlement Periods during the constraint Utilisation event

CC_s Contracted Capacity,

UC_s Utilisation Cost,

SP_u Settlement Period of the Site(s) / Group , as defined above.

PP is the Payment Proportion and works out what fraction of the full price is due to the Site(s) / Group for every Utilisation Settlement Period based on the Contracted Capacity and the actual delivery.

$AD_{s,j}$ is the actual, metered MW delivery of the Site(s) / Group (s) for each Utilisation Settlement Period during the constraint Utilisation event j. In the payment calculations, there is no difference between Generator Sites and Demand reduction Sites, since this value is the 'reported to grid' value

1.9. Payment Proportion

1.9.1. Delivery of the Contracted Capacity at a Site(s) / Group (assessed against each of the metrics set out at paragraph 9 of Schedule 1) of equal to or greater than the target delivery threshold set out in Part E of this Schedule 2, the Delivery Target Threshold (DTT) is awarded the Utilisation Payment "at rate" (i.e. the payment % will equate to the delivery %), provided that delivery over the required level of Contracted Capacity will be paid up to a maximum Payable Overdelivery (PO) of the Contracted Capacity as set out in Part E of this Schedule 2. A deduction from full payment of will be made based on the rules below for delivery of less than target delivery threshold of Contracted Capacity.

1.9.2. The Delivery Proportion $(DP_{s,j})$ is defined as the ratio of actual MW delivery (calculated from the baseline set out in Part C of this Schedule 2) to Contracted Capacity. This ratio is a value that represents a percentage and is rounded to two significant figures to ensure it represents a whole percentage.

1.9.3. The Delivery Target Threshold (DTT) determines the acceptable under-delivery for a Site(s) / Group . For every % point under that level, a fixed proportion as set out in Part E of this Schedule 2, called the Penalisation Multiplier, (PM) of the full payment is deducted.

2.5 Thus, the Payment Proportion is a value between 0 and 1+*PO* (or 0 and 100%+*PO*%). The calculation contains three cases:

1) $if\ DP_{s,j} \geq (1 - DTT)\ and\ DP_{s,j} \leq 1 + PO,\ PP_{s,j} = DP_{s,j}$

2) $if\ DP_{s,j} < (1 - DTT),\ PP_{s,j} = Max\left(0,\ 1 - DTT - PM.\left[1 - DTT - DP_{s,j}\right]\right)$

3) $if\ DP_{s,j} > 1 + PO,\ PP_{s,j} = 1 + PO$

PART D: Baseline for Measuring Actual Delivery

1. For Demand Reduction Sites, delivery of Demand Response will be measured at the point of supply. The lowest level of demand that a Site can reliably reduce its demand to at any point during weekdays will be established on a month by month basis (unless otherwise agreed by the parties) by taking demand between 3pm and 8pm (Monday to Friday) over a period of the first three (3) weeks of the previous month. This consumption will then be totalled and divided by any de-rating factor agreed between WPD and the Participant and will be used to establish the monthly average demand which will then become the baseline from which delivery of Demand Response will be measured.

2. For Generation Sites, delivery of Demand Response will be measured at the output terminals of the generator. In respect of "standby generators", the baseline will be set at 0. In respect of "parallel operation generators" including, for example, CHP installations, then a distinction will be made between a Site that does **not** generate to the extent that it exports during the hours of 3pm to 8pm on any weekday, in which case the Site will be treated in the same way as a Demand reduction Site above, and a Site that does export, in which case the same principles as used in respect of Demand Reduction will be apply to data collected from the generator during the three week period.

PART E: Payment Mechanism Values

This Part E may be updated from time to time in writing as agreed between the parties. Any agreed update shall be deemed to be incorporated into this Part E and this part E shall be read and construed accordingly.

1. WPD Dynamic Services:

Attribute	**Value**
Grace Factor *(GF)*	5%
Penalisation Multiplier (*PM*)	3
Reconciliation Grace Factor (*RGF)*	0%

2. WPD Secure Services:

Attribute	**Value**
Grace Factor *(GF)*	5%
Penalisation Multiplier *(PM)*	3
Reconciliation Grace Factor *(RGF)*	0%

3. WPD Restore Services:

Attribute	**Value**
Delivery Target Threshold *(DTT)*	80%
Payable Overdelivery *(PO)*	10%
Penalisation Multiplier *(PM)*	2

2. Schedule 3

3. (Terms and Conditions)

It is agreed as follows:

1. Definitions and interpretation

1.1 In this Agreement, unless the context otherwise requires, the following words have the following meanings:

"Agreement" means this agreement (including the Terms and Conditions and any other schedule or annexure to it) made between the parties;

"Annual Limit" means, in relation to any calendar year in respect of any Site(s) / Group , the annual limit as set out in Schedule 4;

"Applicable Legislation" means all Policies and laws, statutes, acts, regulations, codes, judgments, orders, directives or determinations applicable to the performance of the Services;

"Arming Window" means, for each Site(s) / Group , the window of time during which WPD Secure Services may be required to be available as notified pursuant to paragraph 2 of Schedule 1;

"Authorised Persons" means the individuals of WPD and the Participant specified as the authorised person on the front page of this Agreement;

"Availability Window" means, for each Site(s) / Group , the window of time during which WPD Dynamic Services may be required to be available as notified pursuant to paragraph 2 of Schedule 1;

"Business Day" means any day other than a Saturday or a Sunday on which banks are open for domestic business in the City of London;

"CDM Regulations" means the Construction (Design and Management) Regulations 2015 and any amendment thereto;

"Cease Time" means the end of the minute during which WPD ceases, or requires the cessation of, the despatch of Demand Response in accordance with this Agreement;

"Central Control" means the WPD control facility from where the network is monitored and managed. Unless otherwise set out in this Agreement or agreed between parties from time to time, any notice or other communication with Central Control shall be via the Contact Method;

"Committed Arming Window" means an Arming Window (or any part thereof) in respect of which a notification or assumption of availability pursuant to paragraphs 1 or 3 of Schedule 1 corresponds;

"Committed Availability Window" means an Availability Window (or any part thereof) in respect of which a notification or assumption of availability pursuant to paragraphs 1 or 3 of Schedule 1 corresponds;

"Contact Method" means the password protected customer area of the flexible power website accessible via http://www.flexiblepower.co.uk/;

"Contracted Arming Window" means a Committed Arming Window in respect of a Site(s) / Group which is allocated by WPD for WPD Secure Services;

"Contracted Availability Window" means a Committed Availability Window in respect of a Site(s) / Group which is allocated by WPD for WPD Dynamic Services;

"Contracted Capacity" means the target net MW of Demand Response at a Site(s) / Group as set out in Clause 4 of this Agreement and as may be updated by the Participant in its declarations made pursuant to paragraph 1 and/or 3 of Schedule 1;

"Date of Agreement" means the date specified as the date of signature on the front page of this Agreement;

"Demand" the demand of MW and Mvar of electricity;

"Demand Response" means the increase of net export of active power to, or the reduction of net import of active power from, WPD's distribution system. The delivery method for providing Demand Response for a particular Site(s) / Group is set out in Schedule 4;

"Despatch Equipment" means any equipment (including any routers, computers, input / output notes and cables) owned by WPD and provided in respect of the provision of the Services under this Agreement;

"Distribution Code" means the Distribution Code of Licensed Distribution Network Operators of Great Britain (available to view at www.dcode.org.uk);

"Event End Time" means the earlier to occur of the events set out in paragraphs 7 or 8 (as relevant) of Schedule 1;

"Expected Availability" means those Arming Windows and Availability Windows which it is agreed between WPD and the Participant from time to time would be likely to be declared or deemed available and constitute a Committed Arming Window or Committed Availability Window (as appropriate);

"Generation" means the electrical output (in MW) of any apparatus which produces electricity;

"Good Industry Practice" means the degree of skill, care, prudence and foresight and operating practice that would reasonably and ordinarily be expected from time to time of a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances and conditions;

"**Group"** means a multiple of sites as set out in the table at clause 4 of this Agreement and as further detailed in Schedule 4, that are otherwise aggregated and regarded as a single entity.

"Instruction" has the meaning given in paragraph 6 of Schedule 1;
"Manual Override" means the inhibit switch installed at each Participant Site(s) / Group which may be operated to prevent the despatch of Demand Response by WPD;
"Maximum Utilisation Period" means the period of time in respect of a Site(s) / Group beginning at the time at which either the output of that Site(s) / Group is greater than 0MW or the Demand is less than the Contracted Capacity as set out in Schedule 4 as the same may be updated from time to time;
"Minimum Utilisation Period" means the period of time in respect of a Site(s) / Group beginning at the time at which either the output of that Site(s) / Group is greater than 0MW or the Demand is less than the Contracted Capacity (including any ramping period) as set out in Schedule 4 as the same may be updated from time to time;
"Monthly Limit" means, in relation to any calendar month in respect of any Site(s) / Group , the monthly limit as set out in Schedule 4;
"Operational Day" means the period from 0500 hours on one day to 0500 hours on the following day;
"Policies" means any instructions, rules or policies issued by WPD from time to time, including without limitation Policy Document: LE7 Relating to Bribery;
"Recovery Period" means the period specified in Schedule 4, which commences upon expiry of the Cease Time, for which the Site(s) / Group is not available to be despatched;
"Response Time" means the maximum period of time (in minutes) which is permitted to elapse from despatch of Demand Response by WPD or issue of an Instruction by WPD (as relevant) to achieving the Contracted Capacity at the relevant Site(s) / Group in connection with the Services at set out in Schedule 4**;**
"Service Charges" means the charges for the Services calculated in accordance with Schedule 2;
"Services" means any or all of the WPD Dynamic Services, WPD Restore Services and/or the WPD Secure Services;
"Settlement Period" means the period defined as such in of Schedule 2;
"Site" means each of the sites set out in the table at clause 4 of this Agreement and as further detailed in Schedule 4;
"Term" means the duration of this Agreement;
"Utilisation" means, in respect of a Site(s) / Group , any despatch of Demand Response which is provided continuously until the Event End Time and "**Utilised**" shall be construed accordingly;
"VAT" means value added tax chargeable under English law for the time being and any similar, additional tax;
"Week" a period of seven Operational Days commencing at 05.00 hours on a Monday and terminating at 05.00 hours on the next following Monday;
"Weekly Limit" means, in relation to any Week in respect of any Site(s) / Group , the weekly limit as set out in Schedule 4;
"WPD Dynamic Services" means the WPD 'dynamic' constraint management zone services (as further explained in WPD's "CMZ Payment and Contract Assistance Notes" document) required in the areas identified by WPD to be provided by the Participant pursuant to Schedule 1 including, for the avoidance of doubt, the permitting by the Participant of remote despatch of Demand Response by WPD from a Site(s) / Group ;
"WPD Restore Services" means the WPD 'restore' constraint management zone services (as further explained in WPD's "CMZ Payment and Contract Assistance Notes" document) required in the areas identified by WPD to be provided by the Participant pursuant to Schedule 1 including, for the avoidance of doubt, the permitting by the Participant of remote despatch of Demand Response by WPD from a Site(s) / Group ;
"WPD Secure Services" means the WPD 'secure constraint management zone services (as further explained in WPD's "CMZ Payment and Contract Assistance Notes" document) required in the areas identified by WPD to be provided by the Participant pursuant to Schedule 1 including, for the avoidance of doubt, the permitting by the Participant of remote despatch of Demand Response by WPD from a Site(s) / Group .

1.2 In this Agreement, unless the context otherwise requires: (a) words in the singular include the plural and vice versa and words in one gender include any other gender; (b) a reference to a statute or statutory provision includes: (i) any subordinate legislation (as defined in Section 21(1), Interpretation Act 1978) made under it; (ii) any repealed statute or statutory provision which it re-enacts (with or without modification); and (iii) any statute or statutory provision which modifies, consolidates, re-enacts or supersedes it; (c) general words shall not be given a restrictive meaning where they follow one or more specific terms indicating a particular category of act, matter or thing or where they are followed by examples, and the words "including" and "in particular" (or similar) shall not limit the generality of any preceding words, and (d) references to: (i) any party include its successors in title and permitted assigns; (ii) a "person" include any individual, firm, body corporate, association or partnership, government or state (whether or not having a separate legal personality); (iii) clauses and schedules are to clauses and schedules of this Agreement and references to sub-clauses and paragraphs are

references to sub-clauses and paragraphs of the clause or schedule in which they appear; and (iv) the headings are for convenience only and shall not affect the interpretation of this Agreement.

2. Commencement and Duration

2.1 This Agreement shall commence on the Date of Agreement and shall (unless terminated at an earlier date in accordance with paragraph 12 (Termination)) continue in force until 30 April 2019 (the "**Initial Term**"), and then terminate automatically without notice unless it is extended in accordance with paragraph 2.2.

2.2 Either party may extend the Term at its sole discretion for one further period to be agreed at the time (the "**Renewed Term**") by giving not less than three (3) months' notice in writing to the other party before expiry of the Initial Term. Upon giving such notice this Agreement shall remain in full force and effect until the earlier of the end of the Renewed Term (unless otherwise agreed by the parties) or termination in accordance with paragraph 12 (Termination) subject to the agreement by the parties of the terms of such extension

3. Services

3.1 The Participant and WPD shall during the Term of this Agreement, carry out their obligations as set out in Schedule 1 in accordance with Applicable Legislation and the terms of this Agreement.

3.2 WPD may sub-contract its obligations under Schedule 1 to any third party.

3.3 The Participant may not assign, transfer, charge or otherwise encumber, declare a trust over or deal in any other manner with this Agreement or any right, benefit or interest under it without the prior written consent of WPD.

3.4 The Participant shall maintain the plant and apparatus comprising each Site(s) / Group to such a standard that the Participant can meet its obligations to provide, or permit the despatch by WPD of, Demand Response in accordance with the terms of this Agreement, and otherwise in accordance with Good Industry Practice.

4. Payment

4.1 In consideration of the provision by the Participant of the Services in accordance with the terms of this Agreement, WPD shall pay to the Participant the Service Charges.

4.2 WPD will, within 1 week following the end of each month calculate the Service Charges for the preceding month in accordance with Schedule 2 in respect of the provision of Services and provide a statement setting out the calculations to the Participant.

4.3 By the end of the month in which the Service Charges calculations statement is received from WPD, the Participant shall either raise an invoice in respect of the amount shown in the statement, or confirm if the calculations are disputed and provide full details of the same to WPD. If the Participant disputes any calculations, then within 1 month following resolution or determination of such dispute it shall raise an invoice for the agreed amount.

4.4 Each invoice must: (a) contain all the following information: (i) the Site(s) / Group where the Services have been carried out; (ii) the period to which the invoice relates; (iii) the Participant's or, as relevant, WPD's details for payment; (iv) the Service Charges for the period of the invoice, excluding VAT; and (v) any other information that may reasonably be requested; and (b) in respect of an invoice sent to WPD, be sent to: Western Power Distribution, Accounts Payable, Elliott Road, Prince Rock, Plymouth, Devon, PL4 0SD or, in respect of an invoice sent to the Participant, be sent to the Participant Authorised Person identified on page 1 of this Agreement, and (c) be dated the date that it is issued.

4.5 All invoices shall be paid within 28 days of the date of invoice.

4.6 All sums payable under this Agreement shall be exclusive of VAT. The payor of any sums shall pay an amount equal to such VAT to the payee in addition to any sum or consideration on receipt of a valid VAT invoice from the payee.

4.7 If the payor fails to pay to the payee any undisputed amount payable by it under this Agreement, the payee may charge the payor interest on the overdue amount from the due date up to the date of actual payment at the rate of 4% per annum above the base rate of the Bank of England. Such interest shall accrue from day to day.

4.8 The payor may, without limiting any other rights or remedies it may have, withhold or set off any amounts owed to it by the payee against any amounts payable by the payor to the payee under this Agreement.

5. Performance

5.1 Where, in respect of any Site a Service Failure (as defined in paragraph 5.4) occurs, WPD may serve a notice on the Participant requiring the Participant to (a) put forward within the time period set out in the notice, and subsequently implement in accordance with its terms, a rectification plan for improving performance and/or reducing the number of occurrences of unavailability, which such rectification plan may include (at the discretion of WPD) a repeat of any commissioning tests undertaken on initial installation of the relevant plant or apparatus, (b) propose a variation to the Contracted Capacity or (c) take any other action as may be specified by WPD (acting reasonably).

5.2 Where (a) (i) no acceptable rectification plan has been provided within the required time period, or (ii) the rectification plan has not been implemented in

accordance with its terms, and (iii) in respect of either (i) or (ii), the Participant's performance in respect of the Service Failure the subject of the notice given under paragraph 5.1 has not significantly approved (as determined by WPD) in the month following the date of the notice, (b) no acceptable variation to the Contracted Capacity has been proposed by the Participant, or (c) any other action specified by WPD has not been taken, then WPD may, at its discretion, terminate (with immediate effect by notice) this Agreement or to require a variation.

5.3 Where WPD requires a variation to the Agreement pursuant to paragraph 5.2 above, WPD shall give notice of this to the Participant. If the Participant disputes or does not accept (in accordance with its terms) any required variation, then WPD shall have the option to terminate (with immediate effect by notice) the Agreement.

5.4. For the purposes of this paragraph 5, a **Service Failure** shall mean where, in respect of a Site(s) / Group , (a) WPD has been entitled, in accordance with this Agreement, to make performance adjustments of 20% or more to the Service Charges in any 2 consecutive months or in three or more months in any six (6) month period; or (b) the number of Arming Windows and Availability Windows which are subject to a declaration or notification of unavailability, or which are otherwise deemed to be unavailable, is greater than 20% of the Expected Availability.

6. Contract Management

6.1 The Participant hereby appoints the Participant's Authorised Person who shall have the authority contractually to bind the Participant on all matters relating to this Agreement.

6.2 The Authorised Persons shall be available to meet at least once every quarter to review the parties' performance under this Agreement if required in writing (email sufficient) by either party.

7. Monitoring and Metering and Despatch Equipment

7.1 The Participant's provision of Demand Response and the amount of Demand Response provided shall be monitored, metered and determined by reference to the minute by minute metering data communicated to Central Control and for such purpose the Participant shall permit WPD to collect, and on request shall provide or procure the provision to WPD of, accurate minute by minute metering data in respect of each Site(s) / Group .

7.2 The Participant shall (a) permit and grant free and unrestricted rights of access to and over and egress from the Sites to WPD and/or its agents or sub-contractors (upon reasonable notice) in order to install, inspect, maintain, test, repair, replace, renew, alter, use and remove any Despatch Equipment; (b) take proper care of the Despatch Equipment and ensure that it is properly protected and either insured to its full replacement value (and ensure that WPD's interest is noted on the relevant insurance policy) or, if damaged or destroyed as a result of the Participant's failure to do so, pay for the cost of its repair and/or replacement; (c) notify WPD immediately upon becoming aware of any failure or likely failure of the Despatch Equipment to monitor the provision of Demand Response; (d) notify WPD as soon as reasonably practicable upon becoming aware of any adverse conditions which may affect the Despatch Equipment and comply with WPD's instructions relating to its care in such conditions; (e) not change the location of the Despatch Equipment without WPD's prior written consent; (f) comply with any reasonable instructions of WPD in respect of such Despatch Equipment.

7.3 The Participant shall indemnify WPD for any costs incurred by WPD as a result of any failure by the Participant to comply with the provisions of paragraph 7.4. The Participant shall reimburse to WPD the reasonable costs incurred by WPD in installing, and maintaining the Despatch Equipment from the Sites if this Agreement is terminated due to an act or default by Participant.

8. Liability

8.1 Subject to paragraph and 8.3 and without prejudice to paragraph 8.2, WPD's liability to the Participant (save in respect of payment of the Service Charges) shall not exceed two million pounds sterling (£2,000,000) and WPD shall not be liable for any other payments incurred by the Participant in the provision of the Services.

8.2 Subject to paragraph 8.3, and save where this Agreement provides for an indemnity, neither party shall be liable to the other for any losses arising from a breach of this Agreement other than for losses directly resulting from such breach and which, at the date of this Agreement was reasonably foreseeable as not unlikely to occur in the ordinary course of events from such breach in respect of physical damage to the property of the other or any third party, and provided further that liability for such losses shall not exceed one million pounds sterling (£1,000,000) per incident or series of related incidents.

8.3 Nothing in this Agreement shall limit or exclude either party's liability for death or personal injury caused by its negligence, or the negligence of its employees, agents or subcontractors; its fraud or fraudulent misrepresentation; and any other liability which cannot by law be excluded or limited.

8.4 Subject to paragraph 8.3 above, and save where this Agreement provides for an indemnity, neither party shall be liable to the other for (a) any loss of profits, loss of revenue, loss of use, loss of contract or loss of goodwill; (b) any indirect or consequential losses; or (c) loss resulting from the liability of the

other party to any other person save as provided for in paragraphs 8.2 and/or 8.3 above.

9. Confidentiality

Except with the consent of the disclosing party or as required by law, a court order or by any relevant regulatory or government authority or to the extent that information has come into the public domain through no fault of the receiving party, each party shall treat as strictly confidential all commercial and technical information relating to the other party received or obtained as a result of entering into or performing this Agreement including but not limited to information which relates to the provisions or subject matter of this Agreement, to any other party or to the negotiations of this Agreement.

10. Anti-Bribery

The Participant shall not engage in any activity, practice or conduct which would constitute an offence under the Bribery Act 2010 and shall promptly report to WPD any request or demand for any undue financial or other advantage of any kind received or offered by the Participant in connection with this Agreement.

11. Force Majeure

Neither party shall be deemed to be in breach of this Agreement, or otherwise be liable to the other, by reason of any delay in performance or non-performance of any of its obligations under this Agreement to the extent that such delay or non-performance is due to an event beyond the reasonable control of that party.

12. Termination and consequences of termination or expiry

12.1 Either party may by notice in writing immediately terminate this Agreement, if the other party commits a material breach of this Agreement which in the case of a breach capable of remedy shall not have been remedied within 30 days of the receipt of a notice identifying the breach and requiring its remedy.

12.2 WPD may by notice in writing terminate the Agreement with immediate effect by notice on or at any time after the happening of any of the following: (a) the passing of a resolution for the Participant's winding-up or the making by a court of competent jurisdiction of an order for the winding-up or the dissolution of the Participant; (b) the making of an administration order or the appointment of an administrator under the out-of-court procedure under the Enterprise Act 2002 or the appointment of a receiver or an administrative receiver over, or the taking possession or sale by an encumbrancer of, any of the Participant's assets; (c) the Participant making an arrangement or composition with its creditors generally or making an application to a court of competent jurisdiction for protection from its creditors generally; or (d) the Participant ceasing to do business at any time for 30 consecutive days.

12.3 Without affecting any other right or remedy available to it, either party may terminate this Agreement on written notice to the other provided that such termination shall not occur until the date falling one month after the date of the notice.

12.4 All rights and obligations of the parties shall cease to have effect immediately on termination or expiry of this Agreement except that termination or expiry shall not affect: (a) the accrued rights and obligations of the parties at the date of termination; (b) the continued existence and the validity of the rights and obligations of the parties under paragraphs 1, 8, 9, 13 and 14; and (c) any provisions of this Agreement necessary for the interpretation or enforcement of this Agreement.

12.5. On expiry or termination, however caused, the Participant will remove and return to WPD the Despatch Equipment within 2 months of such expiry or termination. If the Participant fails to remove and return the Despatch Equipment to WPD within 2 months of expiry or termination, with without prejudice to WPD's right to enter the Site in order to recover the same (in which case the Participant will reimburse to WPD the reasonable costs incurred by WPD in such removal), the Participant shall pay to WPD a late return fee of £5000.

13. Dispute Resolution

13.1 Subject to paragraph 13.3, if a dispute arises out of or in connection with this Agreement, the parties shall: (a) within 30 days of written notice of the dispute being received by the receiving party in good faith seek to resolve the dispute through negotiations between the parties' senior representatives who have the authority to settle it; and (b) not pursue any other remedies available to them until at least 30 days after the first written notification of the dispute.

13.2 The appointed representatives shall use reasonable endeavours to resolve the dispute. If the dispute is not resolved in accordance with this paragraph, either party may propose to the other in writing that the matter be referred to a non-binding mediation. If the parties are unable to agree on a mediator either party may apply to the Centre for Dispute Resolution (CEDR) to appoint one.

13.3 Nothing in this paragraph shall prevent any party from having recourse to a court of competent jurisdiction for the sole purpose of seeking a preliminary injunction or such other provisional judicial relief as it considers necessary to avoid irreparable damage.

14. Intellectual Property

14.1 All intellectual property rights owned by or licensed to WPD shall at all times both during the term of the Agreement and after its termination or expiry, belong to WPD and the Participant shall not

make any use of such intellectual property other than to the extent reasonably necessary in performing its obligations pursuant to this Agreement provided that nothing in this paragraph 14 shall operate so as to exclude any non-excludable rights of the Participant. The Participant shall indemnify WPD against any costs or losses arising from any breach of this paragraph 14.1.

14.2 If WPD agrees, the Participant may be permitted to take such copies of the data from Despatch Equipment as may be reasonably necessary in performing its obligations pursuant to this Agreement. Upon termination or expiry of this Agreement, the data and any copies of the data in any medium taken by the Participant shall, at WPD's option, be returned to WPD or disposed of in such manner as WPD in its absolute discretion may deem appropriate.

15. CDM Regulations

15.1 WPD and the Participant agree that the Participant is to be treated for the purposes of the CDM Regulations as the only Client (as defined in the CDM Regulations).

15.2 The Participant agrees to undertake all the obligations of a Client (including appointing any Principal Contractor and/or Principal Designer (as defined in the CDM Regulations)) and to ensure that the installation of the Despatch Equipment is carried out in accordance with the CDM Regulations.

15.3 The Participant shall indemnify and keep WPD indemnified against liability for any breach of the Participant's obligations under or in connection with this paragraph 15.

16. General

16.1 This Agreement (and any appendices attached to it) sets out the entire agreement and understanding between the parties and supersedes all prior agreements, understandings or arrangements (whether oral or written) in respect of the subject matter of this Agreement.

16.2 To the extent that any provision of this Agreement is found by any court or competent authority to be invalid, unlawful or unenforceable in any jurisdiction, that provision shall be deemed not to be a part of this Agreement, it shall not affect the enforceability of the remainder of this Agreement nor shall it affect the validity, lawfulness or enforceability of that provision in any other jurisdiction.

16.3 The rights, powers and remedies conferred on either party by this Agreement and the remedies available to either party are cumulative and are additional to any right, power or remedy which it may have under general law or otherwise.

16.4 Either party may, in whole or in part, release, compound, compromise, waive, or postpone, in its absolute discretion, any liability owed to it or right granted to it in this Agreement by the other party without in any way prejudicing or affecting its rights in respect of that or any other liability or right not so released, compounded, compromised, waived or postponed.

16.5 The Participant acknowledges that it has entered into this Agreement in reliance only upon the representations, warranties, conditions and promises specifically contained or incorporated in this Agreement and, subject to paragraph 8.3, WPD shall have no liability to the Participant in respect of any other representation, warranty, condition or promise made prior to the date of this Agreement, unless it was made fraudulently, or implied into this Agreement.

16.6 No single or partial exercise, or failure or delay in exercising any right, power or remedy by either party shall constitute a waiver by that party of, or impair or preclude any further exercise of, that or any right, power or remedy arising under this Agreement or otherwise.

16.7 No announcement concerning the terms of this Agreement shall be made by or on behalf of either party without the prior written consent of the other, such consent not to be unreasonably withheld or delayed.

16.8 Nothing in this Agreement or in any document referred to in it or in any arrangement contemplated by it shall create a partnership or joint venture between the parties or render a party the agent of the other, nor shall a party hold itself out as such (whether by an oral or written representation or by any other conduct) and neither party shall enter into or have authority to enter into any engagement, or make any representation or warranty on behalf of, or pledge the credit of, or otherwise bind or oblige the other party.

16.9 This Agreement may be executed in any number of counterparts and by the parties on separate counterparts, but shall not be effective until each party has executed at least one counterpart. Each counterpart, when executed, shall be an original of this Agreement and all counterparts shall together constitute one instrument.

16.10 Unless otherwise set out in this Agreement, any notice to either party under this Agreement shall be in writing signed by or on behalf of the party giving it and shall, unless delivered to the party personally, be left at, or sent by prepaid first class post or prepaid recorded delivery to the address of the party as set out on the front page of this Agreement or as otherwise notified in writing from time to time. A notice shall be deemed to have been served at the time of delivery, if delivered personally, or 48 hours after posting.

16.11 No term of this Agreement is enforceable pursuant to the Contracts (Rights of Third Parties) Act 1999 by any person who is not a party to it.

16.12 Unless otherwise expressly provided, no variation of this Agreement shall be valid unless it is in writing (which excludes email) and signed by or on behalf of each of the parties by its respective

authorised representatives. The expression "variation" includes any variation, supplement, deletion or replacement, however effected.

16.13 This Agreement and any dispute, claim or obligation (whether contractual or non-contractual) arising out of or in connection with it, its subject matter or formation shall be governed by the laws of England and Wales.

16.14 Subject to paragraph 13, the parties irrevocably agree that the courts of England and Wales shall have exclusive jurisdiction to settle any dispute or claim (whether contractual or non-contractual) arising out of or in connection with this Agreement, its subject matter or formation.

This Agreement has been signed on the date stated as the "Date of Agreement" on the front page of this Agreement.

Schedule 4

(Site Details)

Site: [ ]

Address: [ ]

CMZ Group: [ ]

Unit	Capacity (KW)	Delivery Method	[Metering]	Minimum Utilisation Period (in minutes)	Maximum Utilisation Period (in minutes)	Response Time (in minutes)	Weekly Limit (in minutes)	Monthly Limit (in minutes)	Annual Limit (in hours)	Recovery Period (in hours)
A		Gen / Reduce								
B		Gen / Reduce								
C		Gen / Reduce								
D		Gen / Reduce								

(Site Details)

Site: [ ]

Address: [ ]

CMZ Group: [ ]

Unit	Capacity (KW)	Delivery Method	[Metering]	Minimum Utilisation Period (in minutes)	Maximum Utilisation Period (in minutes)	Response Time (in minutes)	Weekly Limit (in minutes)	Monthly Limit (in minutes)	Annual Limit (in hours)	Recovery Period (in hours)
A		Gen / Reduce								
B		Gen / Reduce								
C		Gen / Reduce								
D		Gen / Reduce								

(Site Details)

Site: [ ]

Address: [ ]

CMZ Group: [ ]

Unit	Capacity (KW)	Delivery Method	[Metering]	Minimum Utilisation Period (in minutes)	Maximum Utilisation Period (in minutes)	Response Time (in minutes)	Weekly Limit (in minutes)	Monthly Limit (in minutes)	Annual Limit (in hours)	Recovery Period (in hours)
A		Gen / Reduce								
B		Gen / Reduce								
C		Gen / Reduce								
D		Gen / Reduce								