WPD INNOVATION
Transforming the electricity network

Intraflex

NIA Major Project Progress Report

April 2021 to September 2021

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

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1. Executive Summary

The IntraFlex project is funded through Ofgem's Network Innovation Allowance (NIA). IntraFlex was registered in October 2019 and will be complete by November 2021.

The IntraFlex project aims to understand how to deliver a link between Distribution Network Operator (DNO) procurement activity and Balance Responsible Party (BRP) imbalance positions. It will test a short-term market for DNO flexibility which actively accounts for the imbalance it creates in the electricity market. The project is looking to lower supplier exposure to imbalance costs and decrease the costs of providing flexibility in the long run.

Whilst this is primarily a technology and process trial, it is initially focusing on areas where Constraint Management Zone (CMZ) procurement is already underway. This should maximise any network benefit and facilitate any potential roll out to Business as Usual (BaU).

The project is using a market platform developed and operated by NODES. This has and will continue to be developed as the trial continues. In addition, Western Power Distribution (WPD) developed a link between the platform and existing metering functionality.

This report details progress of the project, focusing on the last six months, April 2021 to the end of September 2021.

1.1.Business Case

The current method of procuring DNO flexibility services does not actively account for the imbalance caused by the action. This simplifies procurement from the perspective of the buyer of flexibility but adds complexity on the seller side.

For many participants this isn't managed directly and is accounted for through loose supply contracts, pushing a poorly quantified risk to the Balance Responsible Party (BRP). Whilst volumes of flexibility have been low this has been seen as a viable method of managing the risk. However, as volumes increase, the associated risk also increases.

There is a risk that reflecting the true cost further increases the costs of flexibility in the short term, as costs that are currently borne by BRPs across whole portfolios are allocated to specific actions. However, this should create a more cost reflective system that reduces overall risk for participants which should in turn reduce costs in the long run.

If the problem were solved, the risk associated with the provision of flexibility services could be reduced. In the long run we would expect to see increased liquidity within DNO Demand Side Response (DSR) markets and a corresponding reduction in pricing.

This project is seeking to provide better tools for managing the imbalance risk, via a direct rebalancing tool (via integration to the intraday markets) as well as information sharing at the day ahead stage. This should minimise the risk (at the intraday timescale) or provide the means for mitigation (at the day-ahead timescale) for the BRP. Reducing this risk should encourage participation from BRPs, as well as make it easier for non-BRPs to work alongside the BRP.

It is anticipated that the value of DNO DSR could reach £12.1m/year by the end of ED1 (£3.38m/year within WPD). If the increased liquidity drove a 10% saving in this value, the savings would be £340k/year across WPD or £1.21m/year across the UK.

- Base cost = 12.1m/year
- Method cost = 12.1*0.9= £10.9m/year
- Financial benefits = £1.21m/year

The costs of roll out across the UK would be limited. This would simply require each DNO licencing the required platform which is a commercial product from NODES.

1.2. Project Progress

This is the fourth progress report covering progress from April 2021 to October 2021. This phase has focussed on the delivery of the Phase 2 live trials implementing the identified learnings from the first phase of the live trials and pushing the project into intraday trading.

This can be broken down into the below tasks (and is further detailed in section 2.2);

Phase 2 Live Trials Design;

1. Complete the development of the phase 2 live trials identify and implement system improvements needed and implementation of UCR compliance.
2. Actively run a live flexibility trading platform to procure the required flexibility at Intraday.

The next tasks for the project during the remaining months is to document the learnings and disseminate these learnings to the participants and then the wider energy industry.

1.3. Project Delivery Structure

1.3.1. Project Review Group

The IntraFlex Project Review Group meets on a bi-annual basis. The role of the Project Review Group is to:

- Ensure the project is aligned with organisational strategy.
- Ensure the project makes good use of assets.
- Assist with resolving strategic level issues and risks.
- Approve or reject changes to the project with a high impact on timelines and budget.
- Assess project progress and report on project to senior management and higher authorities.
- Provide advice and guidance on business issues facing the project.
- Use influence and authority to assist the project in achieving its outcomes.
- Review and approve final project deliverables; and
- Perform reviews at agreed stage boundaries.

1.3.2. Project Resource

The original project scope was proposed by NODES building on their experience in other European countries. WPD subsequently formed a project team led by NODES to deliver the IntraFlex project, with the assistance of Smart Grid Consultancy (SGC) who are assisting with the Project management aspects of the project and providing subject matter expertise.

One key subcontractor continued to be used in this phase of the project: Kiwi Power to help manage the integration with existing Flexible Power metering systems.

Project Partners	
NODES	**NODES** developed and deployed the platform. This is based on their experience of delivering flexibility markets across Europe. Platform improvements developed as part of their existing R&D program and will not be funded under the NIA.
SGC	**Smart Grid Consultancy**: provided detailed technical assistance on service design, building on previous trial learning and participant recruitment support.
Project Sub Contractors	
kiwipower	**Kiwi:** Delivered the system build requirements for baselining, metering and links to the NODES system.

1.4.Procurement

No procurement of project partners was carried out for the project delivery.

In phase 2 we have however completed 1,198 trades procuring 774 MWh of flexibility with offers from 5.1MWh down to 7kWh and we traded at prices of £360 per MWh down to £60 per MWh via the NODES marketplace.

The cost of this procured flexibility was £87,543

1.5.Project Risks

A proactive role in ensuring effective risk management for IntraFlex is taken. This ensures that processes have been put in place to review whether risks still exist, whether new risks have arisen, whether the likelihood and impact of risks have changed, reporting of significant changes that will affect risk priorities and deliver assurance of the effectiveness of control.

Contained within Section 7 of this report are the current top risks associated with successfully delivering IntraFlex as captured in our Risk Register. Section 7.2 provides an update on the most prominent risks identified at the project bid phase.

1.6.Project Learning and Dissemination

Project lessons learned and what worked well (and less so) are captured throughout the project lifecycle. These are captured through a series of on-going reviews with stakeholders and project team members and will be shared in lessons learned workshops at the end of the project. These are reported in Section 5 of this report.

The key dissemination activities held in this reporting period have focussed on communicating the learnings and gaining participants feedback from the Phase 1 live trials. We have also engaged the potential Phase 2 participants with the proposed design of the Phase 2 live trials and commenced on-boarding.

These activities were:

- Phase 1 Live Trials
    - IntraFlex Stakeholder end of trials feedback roundtable
    - Completion of Phase 1 via LinkedIn, Email, Websites, Energyst
    - IntraFlex Phase 1 Learning Webinar
    - IntraFlex presentation WPD's Innovation Showcase and at Solar Storage Live
- Phase 2 Live Trials
    - Webinar - stakeholder design review and feedback.
    - Webinar - detailed trials plans stakeholder cascade.
    - Expressions of Interest Communication, LinkedIn, Email, Websites, Energyst.
    - Phase 2 Tests NODES Platform development demo to stakeholders
- Ongoing 1 on 1 FSP conversations guiding participants through the onboarding process and
- Industry wide promotion of the trials, via LinkedIn, email distribution lists, industry newsletters and targeted communications.

2. Project Manager's Report

2.1.Project Background

IntraFlex aims to understand how to deliver a link between DNO procurement activity and Balance Responsible Party (BRP) imbalance positions.

As such the project is looking to trial a short-term marketplace for the procurement of DNO flexibility. The original plan was to trial an active rebalancing link to the Nord Pool intraday market as well as an information exchange with day-ahead markets. As detailed in the previous report the active rebalancing link was removed from the scope of this project due to feedback from market participants and the perception that at the moment it would be of limited value.

The value of procuring services in the short term is also being investigated, as it is hoped this can facilitate the participation of new assets.

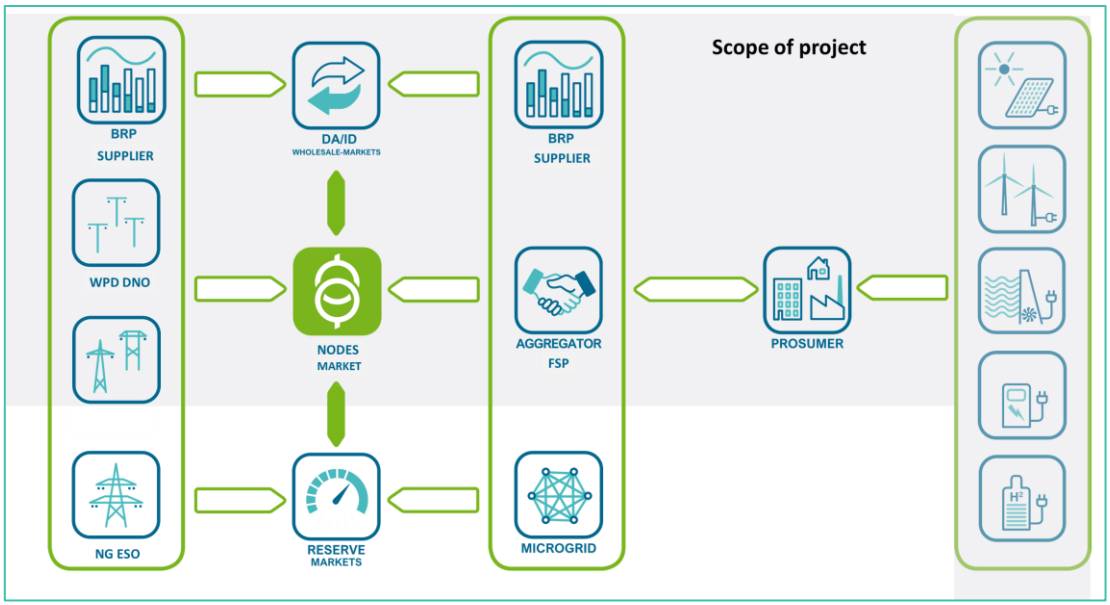

Figure 2-1: Scope of IntraFlex

The trial is broken into five work packages based around two trials. These trials consisted of an initial test of NODES' ShortFlex service for DNO flexibility, followed by a more comprehensive trial with flexibility requirements being signposted then subsequently confirmed Intraday.

	Timeline												
Activity	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20
WP1 PM and Reporting													
WP2 Detailed Stakeholder Engagment and Market Design													
WP3 NODES Build													
WP4 WPD Build													
WP5 Trial													
	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21
WP1 PM and Reporting													
WP2 Detailed Stakeholder Engagment and Market Design													
WP3 NODES Build													
WP4 WPD Build													
WP5 Trial													

Figure 2-2: Project Timeline

The objectives of the project are to develop learning on;

- The operability of short-term flexibility markets
- The value of increased information at the day ahead stage to suppliers
- The value of an integrated link for rebalancing in the intra-day market.

The success criteria of the project are;

- Development of a UK Market design for short term flexibility market that reflects imbalance costs
- WPD access to ShortFlex products that have the potential to benefit the distribution network
- Procurement of ShortFlex via the NODES platform
- Demonstration of services linked to the ShortFlex market that limit supplier exposure to imbalance costs
- Delivery of the project on time and on budget.

The work packages are:

WP1 Project Management and Reporting

Led by SGC, this work package covered the management of the project and included the maintenance of the necessary logs as well as the project reporting. This ran throughout the project. NODES and WPD have feed into this work package.

The key outputs included monthly project management reports (including the latest logs), 6 monthly project progress reports, project review groups and the final closedown report.

WP2 Detailed Stakeholder Engagement & Market Design

This joint work package was aimed at specifying and verifying the market design for the project and was primarily aimed at understanding current processes for the handling of imbalance risk as well as the systems in place to mitigate them.

The verification has been via extensive engagement with potential stakeholders to refine the proposed market design and validate assumptions and value flows.

The key outputs of this work package included:

1) An initial market design document,
2) Detailed feedback on this design
3) A final Market design and technical requirement specification documents.
4) Expressions of interest for participation
5) There was a go/no-go stage gate at the end of this work package which will consider the viability and potential value of the market design proposed.

WP3 NODES System & Process Build

This work package was led by NODES and built out the technology platform to help deliver the trial. It was split into 3 phases.

- WP3a – Implementation of ShortFlex at WPD
- WP3b – Implementation of Wholesale Intraday rebalancing
- WP3c – Investigation into ESO integration

WP4 WPD System & Process Build

This work package was led by SGC and aimed to ensure that WPD had the required systems and processes to utilise the NODES marketplace effectively. Including the design of new Payment Mechanics, the building of a link between the NODES platform and WPD dispatch processes, a review of procurement law and analysis on the ability to target future audits with existing WPD data.

The outputs of the work package included a defined contractual relationship with NODES and participants, a live working link to the NODES platform, a procurement review document highlighting the viability of a short-term marketplace.

WP5 Trial

This work package was led by SGC and was aimed at delivering a trial of the developed tools. The trial was split into two sub-trials: an initial Phase 1 - ShortFlex trial and a more comprehensive Phase 2 - intraday trial.

Alongside each trial, significant stakeholder engagement has been implemented and following each trial, a summary learning report will be produced. The initial phase 1 stakeholder engagement has been incorporated into the phase 2 trials. The stakeholder feedback for phase 2 is ongoing at the time of writing this report so findings will be included in the closedown report.

2.2. Project Progress

2.2.1. Work Package 1- Project Management and Reporting

Progress within this Reporting Period

This work package runs for the duration of the project and looks to ensure the project is running smoothly and is progressing adequately. This also looks to track and manage risks to maximise the change of successful delivery. Key elements of this are mentioned in Sections 3-7.

Next steps

This work package will continue for the duration of the project.

2.2.2. Work Package 2: Detailed Stakeholder Engagement & Market Design

Progress within this reporting period

This work package has now completed with the key outputs including; completion of the final Market Design document and Technical Requirement Specification document.

Both of these documents were reviewed during the Phase 1 learnings stage with no adjustments seen to be required.

2.2.3. Work Package 3: NODES System & Process Build

Progress within this reporting period

The first phase of this work package has now been completed with the live market platform used during the Phase 1 live trials. WPD were able to procure flexibility closer to real-time than the current Flexible Power process.

This second phase of the work package has now completed with the development and implementation of the improvements identified as part of the learnings from the phase 1 live trials.

NODES market platform

Project specific development work for Phase 2

During Phase 1 the participants suggested several platform improvements. WPD/SGC also identified a number of platform features that would be needed to support the Phase 2 trial. These features were developed and delivered by NODES for Phase 2 as listed below.

Platform Area	Development
Posting orders	Ability to post multiple orders at once
	An all or nothing order type
	Ability to edit an existing order
	Restriction to so that it is possible to place orders only in an orderbook that corresponds to a congestion zone where the flexibility service provide has assets
	Restriction so that orders can only be placed for periods where a baseline is available
Notifications	Notifications sent via the platform to users, when WPD posts/edits bids or publishes information required by the UCR
Settlement	Pricing on an hourly basis rather than half hourly
Filtering orders and trade	Ability to “jump” to a selected day when viewing market orders
	Ability to sort the order/trades by date, volume, price in ascending/descending order
	View that displays all orders in all zones
Market opening time	Setting that can be altered by WPD, enabling Phase 2 opening 7 days ahead
Statistics for WPD	Statistics (anonymous and aggregated) to enable WPD to assess the effectiveness of notifications

Table 2-1: Development improvements

NODES have also implemented a number of process improvements, in response to Phase 1 participant suggestions and WPD needs for Phase 2. These included:

- Alignment of participant onboarding steps and terms and conditions (NODES Rulebook) with UCR requirements
- More frequent settlement reports
- Streamlined and standardised communication to platform users in the event of unplanned downtime
- Clarifications where detail was missing in operational guidance documentations, including on time zones and dispatch notifications

Next steps

This work package has now completed with the key developments being delivered as detailed previously.

2.2.4. Work Package 4: WPD System & Process Build

Progress within this reporting period

The first and second phase of this work package have now been completed with the metering API, Baselining and Payment Mechanics developed and in use by participants in conjunction with the NODES Market Platform.

This work package has implemented the improvements identified as part of the learnings from the Phase 1 live trials and the design of the Phase 2 live trials.

Project Specific Development work

WPD development work has focussed less on the participant interface, and more on how WPD interacts with the marketplace. For this phase it included the building of an API to allow easier provision of multiple daily interactions to the NODES market platform.

In simple terms this API enabled the batch upload of multiple daily bids at differing volumes and values by utilising the ability to link cloud-based data to the NODES platform reducing the number of man hours needed to manage the trial.

Next steps

This work package has now completed with the key developments being delivered as detailed previously.

2.2.5. Work Package 5: Trial

Progress within this reporting period

The first live trial phase of this work package was completed at the end of October 2020 and was reported in the previous reporting period. The project during this reporting period concluded the development of the phase 2 sub tests and saw the completion of the sub tests which ran from the start of May 2021 until the end of August 2021.

During the Phase 1 trials we were able to establish the technical robustness of the software and demonstrate the ability of FSPs to set up and use the NODES market platform. The Phase 2 sub tests were designed to determine the optimal usage patterns to encourage competitive trading of flexibility and grow the liquidity on offer. For this reason, we attempted to, and were successful in, encouraging FSPs to make proactive offers on the platform as opposed to them relying on responding to bids placed by WPD.

The following information, pertaining to what has been delivered during this reporting timescale, will mainly focus on the phase 2 live trials as these lasted for the majority of the timeframe this report covers.

Phase 2 Live Trials - Summary

Phase 1 of the IntraFlex trial created a flexibility market that operated close to real time. This provided a unique opportunity to determine the veracity of a continuously clearing market where FSPs can place offers on the platform when it suited their own operational conditions, rather than in response to an arbitrary auction deadline. The week ahead model doesn't necessarily suit all FSPs as they may have other commercial services that they are engaged in or unsure about asset availability and baselines until closer to real time.

Therefore, the Phase 2 tests have focussed on:

- Driving closer to a BaU behaviours with focus on peak demand delivery windows
    - ✓ Delivery windows were fixed each day of the week throughout the tests so the FSPs could get used to the bidding patterns.
- Delivering a longer duration trial with more value on the platform.
    - ✓ The phase 2 tests were split across 6 sub tests lasting for 5 months with circa 303 MWh (£91k) available.
    - ✓ For comparison the phase 1 tests were split across 4 sub tests which lasted for 2 ½ months with circa 133 MWh (£40k) available.
- Moving to confirm flexibility requirements at Intraday.
    - ✓ Tests 5 & 6 confirmed WPDs flexibility requirements by 10:00 the morning of delivery day (Intraday).
- Increasing liquidity and hence competition.
    - ✓ The phase 2 tests saw an increase in FSPs to 7 with a number having large generating assets mixed with others having EV charge points and one with free standing batteries.
- Active bids from FSPs to create competition on price rather than just speed.
    - ✓ We were encouraged to not only see some FSP pre bidding but we also saw some competitive pre bidding towards the end of the phase 2 tests.
- Platform and process improvements to make things simpler and easier to scale.
    - ✓ All the implemented initiatives greatly improved the interaction with the platform for both WPD and the FSPs
- Re engaging the BRP Information Service.
    - ✓ The information service was relaunched but did not acquire any FSP sign up. Feedback on why is currently being sought as part of the trials 1 to 1 feedback.

Phase 2 Live Trials – Trading Outcomes

The phase 2 tests ran for 18 weeks with an average of 79% (795 MWh) of the volume that we posted being traded and with an average of 80% (617MWh) of this being delivered. There was circa 20% (158MWh) of the traded volume under delivered, 21% (201MWh) was not taken up and 529 MWh was over delivered.

This means during the phase 2 tests on average we needed to post on the market 137% of the flexibility volume that needed to be procured.

During the phase 2 tests we also had access to Webstats enabling us to ascertain the timings of the FSPs interaction with market. The busiest times for FSP interaction on the market platform were between 10:00 – 11:00 (this is just after the new volumes and prices are posted) and 16:00 – 18:00 (assumed placing offers for next morning's price updates).

During the phase 2 live trials we had 7 FSP's registered and actively taking part at various times across the live trials successfully placing offers to WPD bids on the NODES market platform.

In phase 2 we have completed 1,198 trades procuring 795 MWh of flexibility with offers from 5.1MWh down to 7kWh and we traded at prices of £360 per MWh down to £60 per MWh via the NODES marketplace.

Reviewing the number and volumes of bids posted by WPD that were fulfilled in Phase 2 it can be seen that overall;

- 987 MWh of volume requirements were posted with 795 MWh (79%) being traded.
- Of this 617 MWh was successfully delivered which is equivalent to 63% of the volume posted.
- There was an above average take up of the bid size bands
    - 1.5 MWh → 3.99 MWh,
    - Then above 4.5MWh
- There was below average take up of the bid volume bands
    - Less than 1 MWh
    - 1MWh → 1.49 MWh
    - 4 MWh → 4.49 MWh

Bid Size Band (MWh)	Volume Placed	Volume Fulfilled	Volume Expired	% Traded
<1 MWh	10.6	4.57	6.03	43.1%
1.0 --> 1.49 MWh	234.6	167.39	67.21	71.4%
1.5 --> 1.99 MWh	216.0	167.63	48.37	77.6%
2.0 --> 2.49 MWh	212.4	187.05	25.35	88.1%
2.5 --> 2.99 MWh	136.8	120.57	16.24	88.1%
3.0 --> 3.49 MWh	63.8	47.14	16.66	73.9%
3.5 --> 3.99 MWh	32.9	28.83	4.07	87.6%
4.0 --> 4.49 MWh	8.2	0.24	7.96	2.9%
4.5 --> 4.99 MWh	31.6	31.60	0.00	100.0%
>= 5 MWh	40.3	40.25	0.00	100.0%
Totals	987.1	795.27	191.88	

Table 2-2 : Volume placed by banding size

On reviewing the delivery windows, of the bids posted by WPD that were fulfilled in Phase 2, there were specific times of day when we achieved good fulfilment much higher than we achieved in Phase 1.

As can be seen from the table below during phase 2 all delivery windows were between 15:00 - 20:30 and were signposted at 7 days before the delivery window. We have seen circa 72% of the WPD bids placed being completely fulfilled with 28% being partially filled.

There is a clear delivery window that attracted less interest being the 15:30 – 16:00 window. The reason for this will be sought during the FSP feedback sessions.

Delivery Window	Bids Placed	Bids Totally Filled	Part Filled	% Filled
15:00	1	1	0	100%
15:30	54	24	30	44%
16:00	18	11	7	61%
16:30	35	20	15	57%
17:00	55	48	7	87%
17:30	35	29	6	83%
18:00	36	30	6	83%
18:30	35	27	8	77%
19:00	90	67	23	74%
19:30	88	62	26	70%
20:00	55	41	14	75%
20:30	19	14	5	74%
Totals	**521**	**374**	**147**	

Table 2-3: Delivery windows bid counts

Some of the interesting FSP behaviours seen were:

- Some bids (requirements) placed by WPD were matched by offers (from Participants) within 10 minutes of submission; others matched within 2 hours of real time.
- Participant behaviour varied over the trial with different levels of engagement. Some of this was to do with the limited nature of the trial.
- We also believe that annual leave and unprecedented disruption due to Covid-19 during the tests had an impact on the ability for participants to place offers.
- The participants with large generating assets appear to post offers in batches as soon as they can following the publishing of the Market Information email.
- The smaller generating asset participants with small batteries and or EV's are posting offers much closer to real time than the larger generating asset owners and are not necessarily reacting to the market emails.
- FSPs started to place pre offers onto the market ahead of WPD placing requirements onto the market based on the bidding pattern that was used in phase 2.
- FSPs during the latter sub tests started posting competitive price and volume offers in anticipation of the WPD requirements being posted.

The following information lays out the steps that were taken as part of FSP onboarding followed by the summaries from each of the individual phase 2 tests.

On-boarding

Prior to the tests themselves any new participants needed to undergo the 'onboarding process' which was detailed separately in the Onboarding document, which is available to download from IntraFlex Phase 2 Onboarding.

This included:

1. Submitting Registration Forms
2. Signing Membership agreements
3. Completing relevant technical builds
4. Test Zero (End to End System testing)
5. Confirmation of Pre-Qualification
6. Asset Approvals

The first three steps needed to be completed prior to the end of March 2021 to be ready for the end- to-end tests scheduled for April 2021.

Any flexibility service providers who took part in Phase 1 did not need to re-register or re-sign the Membership Agreement with an updated Rulebook being circulated. Providers were instead asked to confirm their continued participation and participating assets via email to NODES.

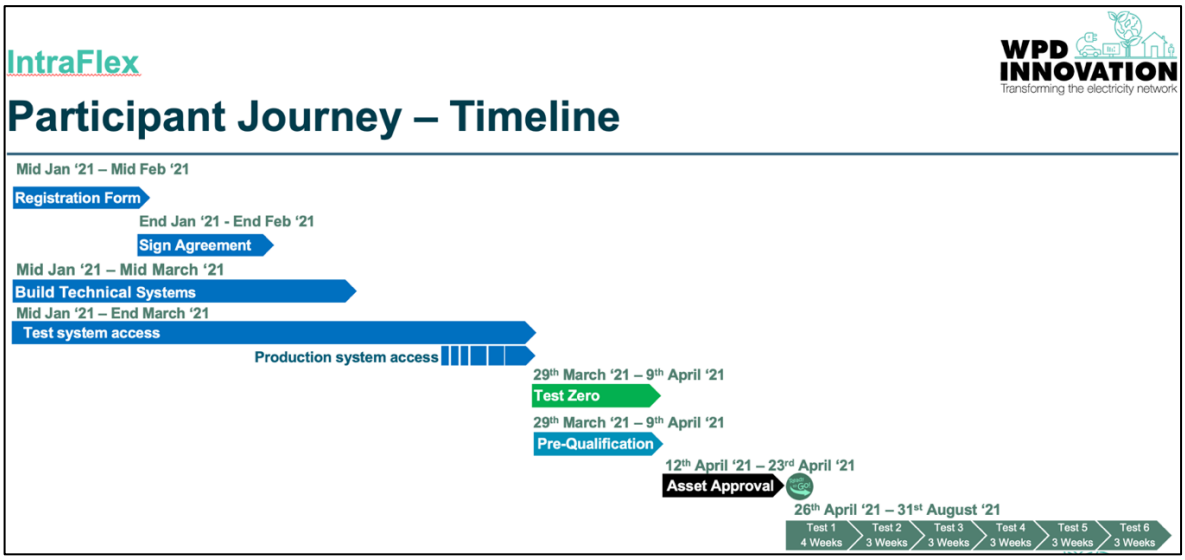

Figure 2-3: Phase 2 Tests timeline for Onboarding

Phase 2 Live Trial – Sub Tests Summaries

The overall structure of the phase 2 tests initially required FSPs to complete a commissioning test (Phase 2 Test Zero (P2T0)) and thereafter to proceed through the 6 subtests. Each of the 6 subtests included a variation on some key principles and different combinations to establish the most effective.

Phase 2 Tests 1-6b Overview

The phase 2 market operation sub tests were designed to help develop understanding and learning about the relative importance of various elements in the operation of a continuously clearing market. These started with a relatively simple example, with more features added as the trial developed.

The figure below highlights the basic bidding structure that was used for Phase 2 Test 1.

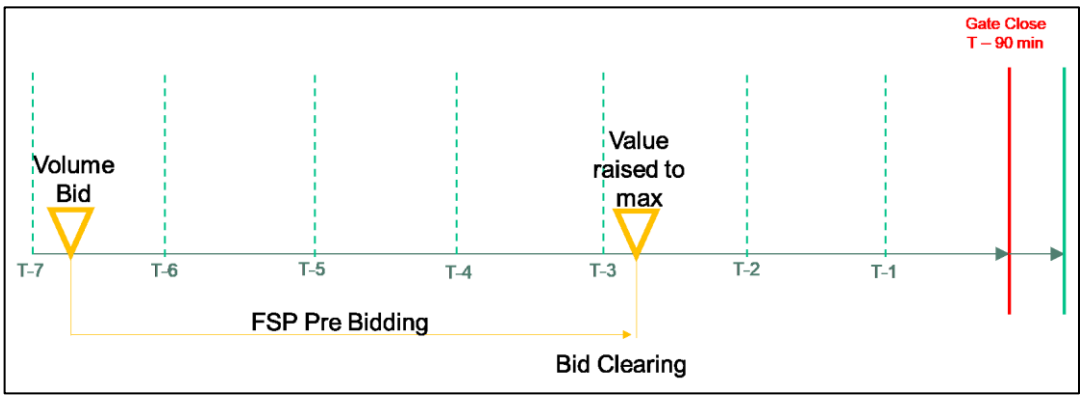

Figure 2-4: Basic bidding structure

The subsequent sub tests were designed so we could introduce, by the time we reached phase 2 test 6 (P2T6), more advanced concepts such as variable pricing increments and intraday bids.

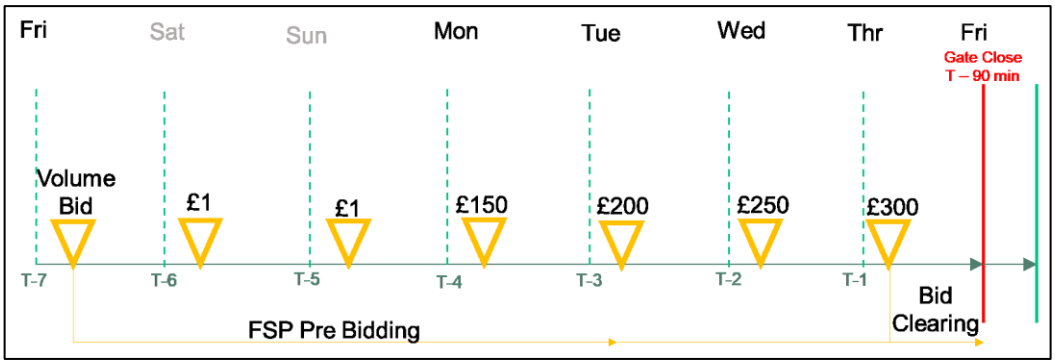

Figure 2-5: Intraday bidding structure

The Table below describes the evolution of the bidding mechanisms as the trial developed.

Test	Market Opens	Gate Close	Bid Alerts	Bid Time	Bid Increment	Scarcity Pricing	Max Value	Weekend Offers	Weekend Bids
1	7 days	90 mins	✓	10am	single	✗	T-3 days	✓	✗
2	7 days	90 mins	✓	10am	linear	✗	T-3 days	✓	✗
3	7 days	90 mins	✓	variable	variable	✗	T-3 days	✓	✗
4	7 days	90 mins	✓	10am	linear	✓	T-3 days	✓	✗
5	7 days	90 mins	✓	10am	linear	✗	Intraday	✓	✗
6a	7 days	90 mins	✓	10am	linear	✓	intraday	✓	✗
6b	7 days	90 mins	✓	variable	variable	✓	intraday	✓	✗

Table 2-4: Evolution of the bidding mechanisms

During test 4 we decided whether to implement tests 6a or 6b depending on how the FSPs were interacting with the platform and if we had witnessed any offer gaming or several cancelled offers. We decided that we would go with the simpler test 6a.

Phase 2 Test 0 (P2T0) End to End System testing

This test was carried out for one asset per FSP in an orderbook, ZONE 0, which was dedicated to testing and included trade, dispatch and validation of delivery. The test trades were for a minimum of a half hour and maximum two hours at £300 per participant. This was implemented in this way to avoid any confusion with the live market place.

After delivery, NODES and WPD validated the delivery by comparing meter values to baselines and the FSP received confirmation that the test has been completed within a day by using the settlement information.

This successfully ran between the 7th April to the 15th April. We did allow 2 further FSPs to join the tests late facilitating them undertaking P2T0 on the 20th and 28th April. The method of enforcing a drop-dead date to complete the test 0 was seen to be successful and a marked improvement from the phase 1 trials.

Phase 2 Test 1 (P2-T1) Simple Bidding 3 weeks

This test was designed to get the FSPs back into the behaviours of placing offers to WPD bids with the following strategies:

- Retaining a predictable timing for all actions,
- System notifications (Market Messages) of any activity,
- Initial WPD bid placed at T – 7 days with volume required and a nominal value of £1 placed by 10:00 each weekday.
- FSP submit offers when they are ready with baseline and asset availability
- Max bid £value published at T - 3 days ahead by 10:00.
- The maximum bid value was fixed at £300/MWh
- Uncleared bids remain to T – 90mins
- No Weekend Bids

The following table shows the bidding pattern for this sub test.

PHASE 2 TEST 1	P2 T1 Week 1							P2 T1 Week 2							P2 T1 Week 3							P2 T1 Week 4						
	Sun 25 Apr	Mon-26-Apr	Tue-27-Apr	Wed-28-Apr	Thu-29-Apr	Fri-30-Apr	Sat-01-May	Sun-02-May	Mon-03-May	Tue-04-May	Wed-05-May	Thu-06-May	Fri-07-May	Sat-08-May	Sun 09 May	Mon-10-May	Tue-11-May	Wed-12-May	Thur-13-May	Fri-14-May	Sat-15-May	Sun-16-May	Mon-17-May	Tue-18-May	Wed-19-May	Thu-20-May	Fri-21-May	Sat-22-May
Bids Zero Value (T-7)		Mon wk 2	Tue wk 2	Wed wk 2	Thur wk 2	Fri wk 2			Mon wk 3	Tue wk 3	Wed wk 3	Thur wk 3	Fri wk 3			Mon wk 4	Tue wk 4	Wed wk 4	Thur wk 4	Fri wk 4			Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1	
Bids Max @£300 (T-3)						Mon wk 2			Thur wk 2	Fri wk 2			Mon wk 3			Thur wk 3	Fri wk 3			Mon wk 4			P2 T1 Thur wk 4	P2 T1 Fri wk 4				
						Tue wk 2							Tue wk 3							Tue wk 4								
						Wed wk 2							Wed wk 3							Wed wk 4								
Bid Delivery Day		Mon wk 1	Tue wk 1	Wed wk 1	Thur wk 1	Fri wk 1			Mon wk 2	Tue wk 2	Wed wk 2	Thur wk 2	Fri wk 2			Mon wk 3	Tue wk 3	Wed wk 3	Thur wk 3	Fri wk 3			Mon wk 4	Tue wk 4	Wed wk 4	Thur wk 4	Fri wk 4	

Table 2-5: P2-T1 bidding pattern

This test lasted for 3 weeks and ran at an average of **87.5%** (133 MWh) of the volume posted being traded, with an average of **62%** (82.29MWh) of this being delivered. There was circa **38.2%** (51MWh) of the volume traded under delivered, 12.5% (19MWh) wasn't taken up and 44.9 MWh was over delivered.

This means during this test we needed to post onto the market **146%** of the flexibility volume needing to be procured.

The busiest times for FSP interaction on the market platform were between 10:00 – 11:00 (this is just after the new volumes and prices are posted) and 16:00 – 18:00 (assumed placing offers for next morning's price updates).

Test 1 Week 1	£	MWh	%
Traded	£5,588.70	37.26	83.4%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£2,947.91	21.33	57.3%
Sub Total	£2,947.91	21.33	47.7%
Under Delivered	£2,640.79	15.92	35.6%
Expired	£1,116.30	7.44	16.6%
Active	£0.00	0.00	0.0%
Sub Total	£3,757.09	23.37	52.3%
Total	£6,705.00	44.70	100%
Over Delivered		19.64	

Test 1 Week 2	£	MWh	%
Traded	£7,242.90	48.29	91.3%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£5,190.26	36.30	75.2%
Sub Total	£5,190.26	36.30	68.6%
Under Delivered	£2,052.64	11.98	22.6%
Expired	£694.20	4.63	8.7%
Active	£0.00	0.00	0.0%
Sub Total	£2,746.84	16.61	31.4%
Total	£7,937.10	52.91	100%
Over Delivered		16.25	

Test 1 Week 3	£	MWh	%
Traded	£7,155.15	47.70	87.4%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£3,130.82	24.65	51.7%
Sub Total	£3,130.82	24.65	45.1%
Under Delivered	£4,019.89	23.05	48.3%
Expired	£1,034.85	6.90	12.6%
Active	£0.00	0.00	0.0%
Sub Total	£5,054.74	29.95	54.9%
Total	£8,185.56	54.60	100%
Over Delivered		9.00	

Table 2-6: P2-T1 Weekly volume trading summaries

Test 2 (P2-T2) Introducing Increments 3 weeks

This test was designed to get the FSPs used to a linear daily increase in bid values between T-7 and T-3 with the following strategies:

- Retain a predictable timing for all actions
- Initial bid at T – 7 days
- System notifications of any activity
- Fixed schedule for bid increments each day at set time
- Fixed increase in bid price increments.
- Max bid value reached by 3 days ahead
- No Weekend Bids

The following table shows the bidding pattern for this sub test.

PHASE 2 TEST 2	P2 T1 Week 4							P2 T2 Week 1						
	Sun 16 May	Mon-17-May	Tue-18-May	Wed-19-May	Thu-20-May	Fri-21-May	Sat-22-May	Sun-23-May	Mon-24-May	Tue-25-May	Wed-26-May	Thu-27-May	Fri-28-May	Sat-29-May
Bids Zero Value (T-7)		Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1			Mon P2T2 wk 2	Tue P2T2 wk 2	Wed P2T2 wk 2	Thu P2T2 wk 2	Fri P2T2 wk 2	
Bids Incremental @£75 (T-6)			Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1			Mon P2T2 wk 2	Tue P2T2 wk 2	Wed P2T2 wk 2	Thu P2T2 wk 2	Fri P2T2 wk 2
Bids Incremental @£150 (T-5)				Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1			Mon P2T2 wk 2	Tue P2T2 wk 2	Wed P2T2 wk 2	Thu P2T2 wk 2
Bids Incremental @£225 (T-4)					Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1			Mon P2T2 wk 2	Tue P2T2 wk 2	Wed P2T2 wk 2
Bids Max @£300 (T-3)		P2 T1 Thur wk 4	P2 T1 Fri wk 4			Mon P2T2 wk 1 Tue P2T2 wk 1 Wed P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1			Mon P2T2 wk 2 Tue P2T2 wk 2 Wed P2T2 wk 2	Tue P2T2 wk 2
Bid Delivery Day		Mon P2T1 wk 4	Tue P2 T1 wk 4	Wed P2T1 wk 4	Thur P2T1 wk 4	Fri P2T1 wk 4			Mon P2T2 wk 1	Tue P2T2 wk 1	Wed P2T2 wk 1	Thu P2T2 wk 1	Fri P2T2 wk 1	

PHASE 2 TEST 2	P2 T2 Week 2							P2 T2 Week 3						
	Sun 30 May	Mon-31-May	Tue-01-Jun	Wed-02-Jun	Thu-03-Jun	Fri-04-Jun	Sat-05-Jun	Sun-06-Jun	Mon-07-Jun	Tue-08-Jun	Wed-09-Jun	Thu-10-Jun	Fri-11-Jun	Sat-12-Jun
Bids Zero Value (T-7)		Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3								
Bids Incremental @£75 (T-6)			Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3							
Bids Incremental @£150 (T-5)				Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3						
Bids Incremental @£225 (T-4)		Fri P2T2 wk 2			Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3					
Bids Max @£300 (T-3)		Thu P2T2 wk 2	Fri P2T2 wk 2			Mon P2T2 wk 3 Tue P2T2 wk 3 Wed P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3				
Bid Delivery Day		Mon P2T2 wk 2	Tue P2T2 wk 2	Wed P2T2 wk 2	Thu P2T2 wk 2	Fri P2T2 wk 2			Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3	

Table 2- 7: P2-T2 bidding pattern

This test lasted for 3 weeks and ran at an average of **68.2%** (146 MWh) of the volume posted being traded, with an average of **86.9%** (127MWh) of this being delivered. There was circa **13%** (19MWh) of the volume traded under delivered, 32% (68MWh) was not taken up and 26 MWh was over delivered.

This means during this test we needed to post onto the market **141%** of the flexibility volume needing to be procured.

The busiest times for FSP interaction on the market platform continued to be between 10:00 – 11:00 (this is just after the new volumes and prices are posted) and 16:00 – 18:00 (assumed placing offers for next morning's price updates).

Test 2 Week 1	£	MWh	%
Traded	£3,660.83	24.67	58.0%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£2,795.72	19.79	80.2%
Sub Total	£2,795.72	19.79	46.6%
Under Delivered	£904.60	4.88	19.8%
Expired	£2,674.65	17.83	42.0%
Active	£0.00	0.00	0.0%
Sub Total	£3,579.25	22.71	53.4%
Total	£6,374.97	42.50	100%
Over Delivered		7.18	

Test 2 Week 2	£	MWh	%
Traded	£8,785.65	58.57	82.5%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£6,399.25	50.24	85.8%
Sub Total	£6,399.25	50.24	70.8%
Under Delivered	£2,224.40	8.33	14.2%
Expired	£1,864.35	12.43	17.5%
Active	£0.00	0.00	0.0%
Sub Total	£4,088.75	20.76	29.2%
Total	£10,488.00	71.00	100%
Over Delivered		9.54	

Test 2 Week 3	£	MWh	%
Traded	£9,308.93	62.83	62.3%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£8,574.51	56.94	90.6%
Sub Total	£8,574.51	56.94	56.5%
Under Delivered	£755.15	5.97	9.5%
Expired	£5,683.05	37.89	37.6%
Active	£0.00	0.00	0.0%
Sub Total	£6,438.20	43.86	43.5%
Total	£15,012.72	100.80	100%
Over Delivered		9.64	

Table 2-8: P2-T2 Weekly volume trading summaries

Test 3 (P2-T3) Variable increments at variable timing 3 weeks

This test was designed to get the FSPs used to a further reduction in the structure of the bidding process, by introducing variable bid increments and timings of bids being placed onto the market, thus encouraging FSPs to be more responsive to activity alerts from NODES system;

- Initial bid at T – 7 days
- System notifications of any activity
- ~~X Fixed schedule for bid increments each day at set time~~
- ~~X Fixed increase in bid value.~~
- Max bid value reached by 3 days ahead
- No Weekend Bids

The following table shows the bidding pattern for this sub test.

PHASE 2 TEST 3	P2 T2 Week 3							P2 T3 Week 1							P2 T3 Week 2							P2 T3Week 3						
	Sun 06 Jun	Mon-07-Jun	Tue-08-Jun	Wed-09-Jun	Thu-10-Jun	Fri-11-Jun	Sat-12-Jun	Sun-13-Jun	Mon-14-Jun	Tue-15-Jun	Wed-16-Jun	Thu-17-Jun	Fri-18-Jun	Sat-19-Jun	Sun 20 Jun	Mon-21-Jun	Tue-22-Jun	Wed-23-Jun	Thu-24-Jun	Fri-25-Jun	Sat-26-Jun	Sun-27-Jun	Mon-28-Jun	Tue-29-Jun	Wed-30-Jun	Thu-01-Jul	Fri-02-Jul	Sat-03-Jul
Bids Zero Value (T-7)		Mon P2T3 wk 1	Tue P2T3 wk 1	Wed P2T3 wk 1	Thu P2T3 wk 1	Fri P2T3 wk 1			Mon P2T3 wk 2	Tue P2T3 wk 2	Wed P2T3 wk 2	Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T3 wk 3	Fri P2T3 wk 3								
Bids Incremental random			Mon P2T3 wk 1	Tue P2T3 wk 1	Wed P2T3 wk 1	Thu P2T3 wk 1	Fri P2T3 wk 1			Mon P2T3 wk 2	Tue P2T3 wk 2	Wed P2T3 wk 2	Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T3 wk 3	Fri P2T2 wk 3							
Bids Incremental random				Mon P2T3 wk 1	Tue P2T3 wk 1	Wed P2T3 wk 1	Thu P2T3 wk 1	Fri P2T2 wk 1			Mon P2T3 wk 2	Tue P2T3 wk 2	Wed P2T3 wk 2	Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T2 wk 3	Fri P2T3 wk 3						
Bids Incremental random					Mon P2T3 wk 1	Tue P2T3 wk 1	Wed P2T3 wk 1	Thu P2T2 wk 1	Fri P2T3 wk 1			Mon P2T3 wk 2	Tue P2T3 wk 2	Wed P2T3 wk 2	Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T2 wk 3	Fri P2T3 wk 3					
Bids Max @£300 (T-3)						Mon P2T3 wk 1 Tue P2T2 wk 1 Wed P2T2 wk 1			Thu P2T3 wk 1	Fri P2T3 wk 1			Mon P2T3 wk 2 Tue P2T3 wk 2 Wed P2T3 wk 2			Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3 Tue P2T3 wk 3 Wed P2T3 wk 3			Thu P2T3 wk 3	Fri P2T3 wk 3				
Bid Delivery Day		Mon P2T2 wk 3	Tue P2T2 wk 3	Wed P2T2 wk 3	Thu P2T2 wk 3	Fri P2T2 wk 3			Mon P2T3 wk 1	Tue P2T3 wk 1	Wed P2T3 wk 1	Thu P2T3 wk 1	Fri P2T3 wk 1			Mon P2T3 wk 2	Tue P2T3 wk 2	Wed P2T3 wk 2	Thu P2T3 wk 2	Fri P2T3 wk 2			Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T3 wk 3	Fri P2T3 wk 3	

Table 2-9: P2-T3 bidding pattern

This test lasted for 3 weeks and ran at an average of **96%** (180 MWh) of the volume posted being traded, with an average of **81%** (147MWh) of this being delivered. There was circa **19%** (34MWh) of the traded volume under delivered, 4% (8MWh) was not taken up and 87 MWh was over delivered.

This means during this test we needed to post onto the market **122%** of the flexibility volume needing to be procured.

During this test we started to see FSPs placing pre offers based upon the bidding pattern we had established in the previous tests.

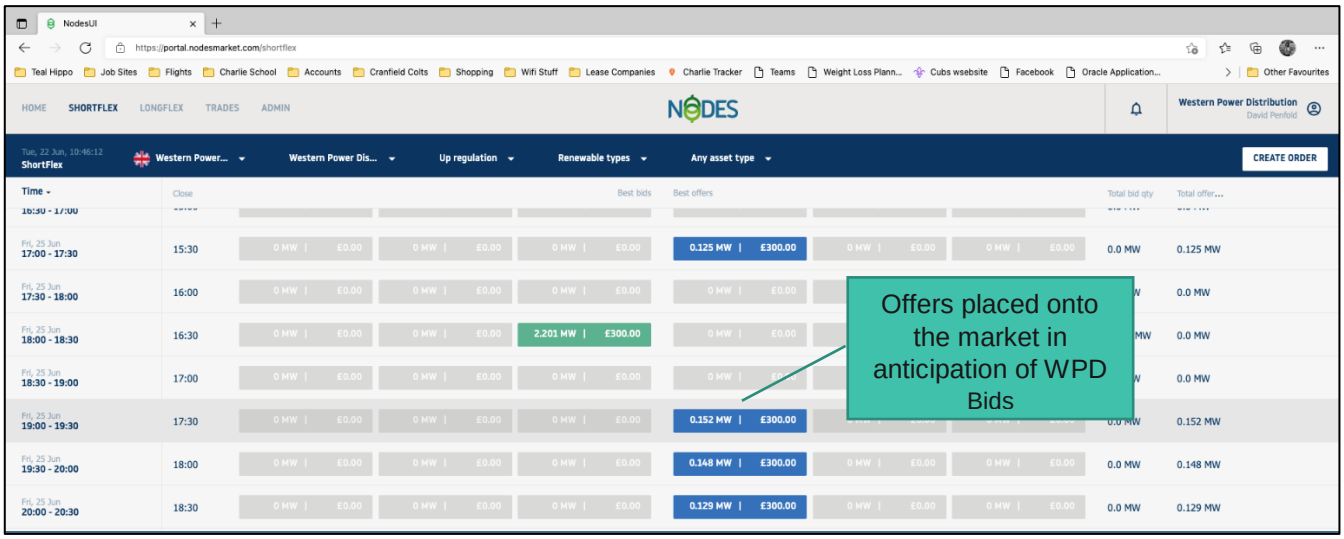

Figure 2-6: NODES market platform screen

The busiest times for FSP interaction on the market platform switched to be between 16:00 and 17:00 with between 10:00 – 11:00 now the second most popular. The number of interactions on the market platform remained at the same levels seen in the tests prior.

Test 3 Week 1	£	MWh	%
Traded	£10,701.58	71.59	94.1%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£8,138.21	46.35	64.7%
Sub Total	£8,138.21	46.35	60.9%
Under Delivered	£2,570.72	25.24	35.3%
Expired	£676.80	4.51	5.9%
Active	£0.00	0.00	0.0%
Sub Total	£3,247.52	29.75	39.1%
Total	£11,385.74	76.10	100%
Over Delivered		13.66	

Test 3 Week 2	£	MWh	%
Traded	£8,712.09	61.21	97.6%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£7,790.26	56.18	91.8%
Sub Total	£7,790.26	56.18	89.6%
Under Delivered	£940.39	5.02	8.2%
Expired	£223.95	1.49	2.4%
Active	£0.00	0.00	0.0%
Sub Total	£1,164.34	6.52	10.4%
Total	£8,954.60	62.70	100%
Over Delivered		39.78	

Test 3 Week 3	£	MWh	%
Traded	£6,897.89	47.52	95.8%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£6,192.38	44.19	93.0%
Sub Total	£6,192.38	44.19	89.1%
Under Delivered	£705.51	3.33	7.0%
Expired	£311.40	2.08	4.2%
Active	£0.00	0.00	0.0%
Sub Total	£1,016.91	5.41	10.9%
Total	£7,209.29	49.60	100%
Over Delivered		33.44	

Table 2-10: P2-T3 Weekly volume trading summaries

Test 4 (P2-T4) Scarcity Pricing model 3 week

This test was designed to get the FSPs used to a further reduction again in the structure of the bidding process encouraging FSPs to be more responsive to activity alerts from NODES system.

- Initial bid at T – 7 days
- System notification of bid activity
- Price increments relative to volume requirement
- Max bid value reached by 3 days ahead
- No Weekend Bids

The following table shows the bidding pattern for this sub test.

PHASE 2 TEST 4	P2 T3 Week 3							P2 T4 Week 1							P2 T4 Week 2							P2 T4 Week 3						
	Sun 27 Jun	Mon-28-Jun	Tue-29-Jun	Wed-30-Jun	Thu-01-Jul	Fri-02-Jul	Sat-03-Jul	Sun-04-Jul	Mon-05-Jul	Tue-06-Jul	Wed-07-Jul	Thu-08-Jul	Fri-09-Jul	Sat-10-Jul	Sun 11 Jul	Mon-12-Jul	Tue-13-Jul	Wed-14-Jul	Thu-15-Jul	Fri-16-Jul	Sat-17-Jul	Sun-18-Jul	Mon-19-Jul	Tue-20-Jul	Wed-21-Jul	Thu-22-Jul	Fri-23-Jul	Sat-24-Jul
Bids Zero Value (T-7)		Mon P2T4 wk 1	Tue P2T4 wk 1	Wed P2T4 wk 1	Thu P2T4 wk 1	Fri P2T4 wk 1			Mon P2T4 wk 2	Tue P2T4 wk 2	Wed P2T4 wk 2	Thu P2T4 wk 2	Fri P2T4 wk 2			Mon P2T4 wk 3	Tue P2T4 wk 3	Wed P2T4 wk 3	Thu P2T4 wk 3	Fri P2T4 wk 3								
Bids Incremental 1 (T-6)			Mon P2T4 wk 1	Tue P2T4 wk 1	Wed P2T4 wk 1	Thu P2T4 wk 1				Mon P2T4 wk 2	Tue P2T4 wk 2	Wed P2T4 wk 2	Thu P2T4 wk 2				Mon P2T4 wk 3	Tue P2T4 wk 3	Wed P2T4 wk 3	Thu P2T4 wk 3								
Bids Incremental 2 (T-5)				Mon P2T4 wk 1	Tue P2T4 wk 1						Mon P2T4 wk 2	Tue P2T4 wk 2						Mon P2T4 wk 3	Tue P2T4 wk 3									
Bids Incremental 3 (T-4)					Mon P2T4 wk 1				Fri P2T4 wk 1			Mon P2T4 wk 2				Fri P2T4 wk 2			Mon P2T4 wk 3				Fri P2T4 wk 3				
Bids Max according to scarcity model (T-3)						Mon P2T4 wk 1 Tue P2T4 wk 1 Wed P2T4 wk 1			Thu P2T4 wk 1	Fri P2T4 wk 1			Mon P2T4 wk 2 Tue P2T4 wk 2 Wed P2T4 wk 2			Thu P2T4 wk 2	Fri P2T4 wk 2			Mon P2T4 wk 3 Tue P2T4 wk 3 Wed P2T4 wk 3			Thu P2T4 wk 3	Fri P2T4 wk 3				
Bid Delivery Day		Mon P2T3 wk 3	Tue P2T3 wk 3	Wed P2T3 wk 3	Thu P2T3 wk 3	Fri P2T3 wk 3			Mon P2T4 wk 1	Tue P2T4 wk 1	Wed P2T4 wk 1	Thu P2T4 wk 1	Fri P2T4 wk 1			Mon P2T4 wk 2	Tue P2T4 wk 2	Wed P2T4 wk 2	Thu P2T4 wk 2	Fri P2T4 wk 2			Mon P2T4 wk 3	Tue P2T4 wk 3	Wed P2T4 wk 3	Thu P2T4 wk 3	Fri P2T4 wk 3	

Table2-11: P2-T4 bidding pattern

This test lasted for 3 weeks and ran at an average of **75%** (88MWh) of the volume posted being traded, with an average of **83%** (73MWh) of this being delivered. There was circa **17%** (15MWh) of the traded volume under delivered, 25% (29MWh) was not taken up and 143 MWh was over delivered.

This means during this test we needed to post onto the market **138%** of the flexibility volume needing to be procured.

During this test not only were FSPs placing pre offers based upon the bidding pattern, we had established in the previous tests, they were placing offers at the price they anticipated it would reach.

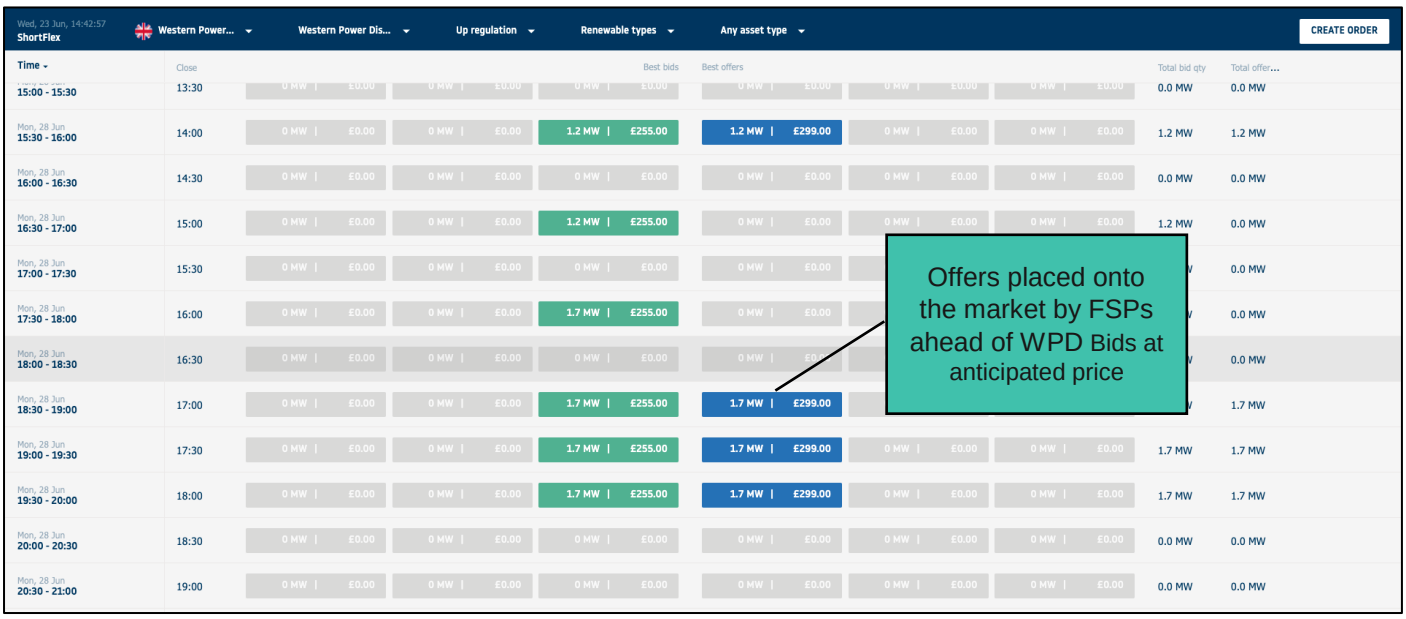

Figure 2-7: NODES market screen showing price offers

The busiest times for FSP interaction on the market platform reverted back to being between 09:00 and 14:00 with another spike between 15:00 – 17:00. The number of interactions on the market platform remained at the same levels seen in the tests prior.

Test 4 Week 1	£	MWh	%
Traded	£6,062.90	38.40	81.7%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£4,700.98	31.39	81.7%
Sub Total	£4,700.98	31.39	66.8%
Under Delivered	£1,361.92	7.01	18.3%
Expired	£1,160.59	8.59	18.3%
Active	£0.00	0.00	0.0%
Sub Total	£2,522.52	15.61	33.2%
Total	£7,223.50	46.99	100%
Over Delivered		46.35	

Test 4 Week 2	£	MWh	%
Traded	£3,117.38	19.87	56.1%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£2,211.50	14.94	75.2%
Sub Total	£2,211.50	14.94	42.2%
Under Delivered	£905.88	4.93	24.8%
Expired	£2,255.42	15.53	43.9%
Active	£0.00	0.00	0.0%
Sub Total	£3,161.31	20.46	57.8%
Total	£5,372.81	35.40	100%
Over Delivered		31.77	

Test 4 Week 3	£	MWh	%
Traded	£4,764.10	29.71	85.12%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£4,046.36	26.39	88.84%
Sub Total	£4,046.36	26.39	75.6%
Under Delivered	£717.74	3.32	11.2%
Expired	£623.16	5.19	14.9%
Active	£0.00	0.00	0.0%
Sub Total	£1,340.90	8.51	24.4%
Total	£5,387.26	34.90	100%
Over Delivered		64.54	

Table 2-12: P2-T4 Weekly volume trading summaries

Test 5 (P2-T5) Intraday with Predictable Increments 3 weeks

This was the first test delivering intraday confirmation of flexibility required with the maximum bid price only reached by 10:00 on the delivery day.

- Initial bid at T – 7 days
- System notification of bid activity
- Fixed schedule for bid increments each day at set time
- Fixed increase in bid value.
- **Max bid value only reached Intraday**
- Bids will be focussed on early afternoon and evening
- No Weekend Bids

The following table shows the bidding pattern for this sub test.

PHASE 2 TEST 5	P2 T4 Week 3							P2 T5 Week 1						
	Sun 18 Jul	Mon-19-Jul	Tue-20-Jul	Wed-21-Jul	Thu-22-Jul	Fri-23-Jul	Sat-24-Jul	Sun-25-Jul	Mon-26-Jul	Tue-27-Jul	Wed-28-Jul	Thu-29-Jul	Fri-30-Jul	Sat-31-Jul
Bids Zero Value (T-7)		Mon P2T5 wk 1	Tue P2T5 wk 1	Wed P2T5 wk 1	Thu P2T5 wk 1	Fri P2T5 wk 1			Mon P2T5 wk 2	Tue P2T5 wk 2	Wed P2T5 wk 2	Thu P2T5 wk 2	Fri P2T5 wk 2	
Incremental Bid 1 @£60/MWh			Mon P2T5 wk 1	Tue P2T5 wk 1	Wed P2T5 wk 1	Thu P2T5 wk 1			Fri P2T5 wk 1	Mon P2T5 wk 2	Tue P2T5 wk 2	Wed P2T5 wk 2	Thu P2T5 wk 2	
Incremental Bid 2 @£120/MWh				Mon P2T5 wk 1	Tue P2T5 wk 1	Wed P2T5 wk 1			Thu P2T5 wk 1	Fri P2T5 wk 1	Mon P2T5 wk 2	Tue P2T5 wk 2	Wed P2T5 wk 2	
Incremental Bid 3 @£180/MWh					Mon P2T5 wk 1	Tue P2T5 wk 1			Wed P2T5 wk 1	Thu P2T5 wk 1	Fri P2T5 wk 1	Mon P2T5 wk 2	Tue P2T5 wk 2	
Incremental Bid 4 @£240/MWh						Mon P2T5 wk 1			Tue P2T5 wk 1	Wed P2T5 wk 1	Thu P2T5 wk 1	Fri P2T5 wk 1	Mon P2T5 wk 2	
Final Max Bid at Intraday (Before 10:00) @£300MWh									Mon P2T5 wk 1	Tue P2T5 wk 1	Wed P2T5 wk 1	Thu P2T5 wk 1	Fri P2T5 wk 1	
Bid Delivery Day		Mon P2T4 wk 3	Tue P2T4 wk 3	Wed P2T4 wk 3	Thu P2T4 wk 3	Fri P2T4 wk 3			Mon P2T5 wk 1	Tue P2T5 wk 1	Wed P2T5 wk 1	Thu P2T5 wk 1	Fri P2T5 wk 1	

PHASE 2 TEST 5	P2 T5 Week 2							P2 T5 Week 3						
	Sun 01 Aug	Mon-02-Aug	Tue-03-Aug	Wed-04-Aug	Thu-05-Aug	Fri-06-Aug	Sat-07-Aug	Sun-08-Aug	Mon-09-Aug	Tue-10-Aug	Wed-11-Aug	Thu-12-Aug	Fri-13-Aug	Sat-14-Aug
Bids Zero Value (T-7)		Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3								
Incremental Bid 1 @£60/MWh		Fri P2T5 wk 2	Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3			Fri P2T5 wk 3					
Incremental Bid 2 @£120/MWh		Thu P2T5 wk 2	Fri P2T5 wk 2	Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3			Thu P2T5 wk 3	Fri P2T5 wk 3				
Incremental Bid 3 @£180/MWh		Wed P2T5 wk 2	Thu P2T5 wk 2	Fri P2T5 wk 2	Mon P2T5 wk 3	Tue P2T5 wk 3			Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3			
Incremental Bid 4 @£240/MWh		Tue P2T5 wk 2	Wed P2T5 wk 2	Thu P2T5 wk 2	Fri P2T5 wk 2	Mon P2T5 wk 3			Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3		
Final Max Bid at Intraday (Before 10:00) @£300MWh		Mon P2T5 wk 2	Tue P2T5 wk 2	Wed P2T5 wk 2	Thu P2T5 wk 2	Fri P2T5 wk 2			Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3	
Bid Delivery Day		Mon P2T5 wk 2	Tue P2T5 wk 2	Wed P2T5 wk 2	Thu P2T5 wk 2	Fri P2T5 wk 2			Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3	

Table 2-13: P2-T5 bidding pattern

This test lasted for 3 weeks and ran at an average of **82%** (120MWh) of the volume posted being traded, with an average of **85%** (102MWh) of this being delivered. There was circa **15%** (18MWh) of the traded volume under delivered, 18% (26MWh) was not taken up and 132 MWh was over delivered.

This means during this test we needed to post onto the market **130%** of the flexibility volume needing to be procured.

The busiest times for FSP interaction on the market platform continued between 09:00 and 14:00 with another smaller spike starting earlier than before of between 14:00 – 16:00. The number of interactions on the market platform remained at the same levels seen in the tests prior.

Test 5 Week 1	£	MWh	%
Traded	£7,273.44	51.82	86.74%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£6,533.03	47.93	92.49%
Sub Total	£6,533.03	47.93	80.2%
Under Delivered	£740.41	3.89	7.5%
Expired	£1,187.85	7.92	13.3%
Active	£0.00	0.00	0.0%
Sub Total	£1,928.26	11.81	19.8%
Total	£8,461.29	59.74	100%
Over Delivered		27.12	

Test 5 Week 2	£	MWh	%
Traded	£4,887.66	36.67	75.60%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£3,779.42	26.28	71.68%
Sub Total	£3,779.42	26.28	54.2%
Under Delivered	£1,108.24	10.39	28.3%
Expired	£1,775.10	11.83	24.4%
Active	£0.00	0.00	0.0%
Sub Total	£2,883.34	22.22	45.8%
Total	£6,662.76	48.50	100%
Over Delivered		54.46	

Test 5 Week 3	£	MWh	%
Traded	£4,427.70	31.86	83.63%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£4,116.53	28.22	88.58%
Sub Total	£4,116.53	28.22	74.1%
Under Delivered	£311.17	3.64	11.4%
Expired	£935.55	6.24	16.4%
Active	£0.00	0.00	0.0%
Sub Total	£1,246.72	9.88	25.9%
Total	£5,363.25	38.10	100%
Over Delivered		50.06	

Table 2-14: P2-T5 Weekly volume trading summaries

At the end of this trial it was decided that we would slightly adjust Test 6 to enable FSPs to continue placing competitive pre offers.

Test 6 (P2-T6a) Intraday Bids 3 weeks

- Initial bid at T – 7 days
- System notification of bid activity
- Fixed schedule for bid increments each day at set time
- Fixed increase in bid value
- Max bid value only reached Intraday
- No Weekend Bids

PHASE 2 TEST 6a	P2 T5 Week 3							P2 T6a Week 1						
	Sun 08 Aug	Mon-09-Aug	Tue-10-Aug	Wed-11-Aug	Thu-12-Aug	Fri-13-Aug	Sat-14-Aug	Sun-15-Aug	Mon-16-Aug	Tue-17-Aug	Wed-18-Aug	Thu-19-Aug	Fri-20-Aug	Sat-21-Aug
Bids Zero Value (T-7)		Mon P2T6a wk 1	Tue P2T6a wk 1	Wed P2T6a wk 1	Thu P2T6a wk 1	Fri P2T6a wk 1			Mon P2T6a wk 2	Tue P2T6a wk 2	Wed P2T6a wk 2	Thu P2T6a wk 2	Fri P2T6a wk 2	
Incremental Bid 1 @ £/MWh Set by scarcity model			Mon P2T6a wk 1	Tue P2T6a wk 1	Wed P2T6a wk 1	Thu P2T6a wk 1			Fri P2T6a wk 1	Mon P2T6a wk 2	Tue P2T6a wk 2	Wed P2T6a wk 2	Thu P2T6a wk 2	
Incremental Bid 2 @ £/MWh Set by scarcity model				Mon P2T6a wk 1	Tue P2T6a wk 1	Wed P2T6a wk 1			Thu P2T6a wk 1	Fri P2T6a wk 1	Mon P2T6a wk 2	Tue P2T6a wk 2	Wed P2T6a wk 2	
Incremental Bid 3 @ £/MWh Set by scarcity model					Mon P2T6a wk 1	Tue P2T6a wk 1			Wed P2T6a wk 1	Thu P2T6a wk 1	Fri P2T6a wk 1	Mon P2T6a wk 2	Tue P2T6a wk 2	
Incremental Bid 4 @ £/MWh Set by scarcity model						Mon P2T6a wk 1			Tue P2T6a wk 1	Wed P2T6a wk 1	Thu P2T6a wk 1	Fri P2T6a wk 1	Mon P2T6a wk 2	
Final Max Bid at Intraday (Before 10:00) @ £/MWh Set by scarcity model									Mon P2T6a wk 1	Tue P2T6a wk 1	Wed P2T6a wk 1	Thu P2T6a wk 1	Fri P2T6a wk 1	
Bid Delivery Day		Mon P2T5 wk 3	Tue P2T5 wk 3	Wed P2T5 wk 3	Thu P2T5 wk 3	Fri P2T5 wk 3			Mon P2T6a wk 1	Tue P2T6a wk 1	Wed P2T6a wk 1	Thu P2T6a wk 1	Fri P2T6a wk 1	

PHASE 2 TEST 6a	P2 T6a Week 2							P2 T6a Week 3						
	Sun 22 Aug	Mon-23-Aug	Tue-24-Aug	Wed-25-Aug	Thu-26-Aug	Fri-27-Aug	Sat-28-Aug	Sun-29-Aug	Mon-30-Aug	Tue-31-Aug	Wed-01-Sep	Thu-02-Sep	Fri-03-Sep	Sat-04-Sep
Bids Zero Value (T-7)		Mon P2T6a wk 3	Tue P2T6a wk 3	Wed P2T6a wk 3	Thu P2T6a wk 3	Fri P2T6a wk 3								
Incremental Bid 1 @ £/MWh Set by scarcity model		Fri P2T6a wk 2	Mon P2T6a wk 3	Tue P2T6a wk 3	Wed P2T6a wk 3	Thu P2T6a wk 3			Fri P2T6a wk 3					
Incremental Bid 2 @ £/MWh Set by scarcity model		Thu P2T6a wk 2	Fri P2T6a wk 2	Mon P2T6a wk 3	Tue P2T6a wk 3	Wed P2T6a wk 3			Thu P2T6a wk 3	Fri P2T6a wk 3				
Incremental Bid 3 @ £/MWh Set by scarcity model		Wed P2T6a wk 2	Thu P2T6a wk 2	Fri P2T6a wk 2	Mon P2T6a wk 3	Tue P2T6a wk 3			Wed P2T6a wk 3	Thu P2T6a wk 3	Fri P2T6a wk 3			
Incremental Bid 4 @ £/MWh Set by scarcity model		Tue P2T6a wk 2	Wed P2T6a wk 2	Thu P2T6a wk 2	Fri P2T6a wk 2	Mon P2T6a wk 3			Tue P2T6a wk 3	Wed P2T6a wk 3	Thu P2T6a wk 3	Fri P2T6a wk 3		
Final Max Bid at Intraday (Before 10:00) @ £/MWh Set by scarcity model		Mon P2T6a wk 2	Tue P2T6a wk 2	Wed P2T6a wk 2	Thu P2T6a wk 2	Fri P2T6a wk 2			Mon P2T6a wk 3	Tue P2T6a wk 3	Wed P2T6a wk 3	Thu P2T6a wk 3	Fri P2T6a wk 3	
Bid Delivery Day		Mon P2T6a wk 2	Tue P2T6a wk 2	Wed P2T6a wk 2	Thu P2T6a wk 2	Fri P2T6a wk 2			Mon P2T6a wk 3	Tue P2T6a wk 3	Wed P2T6a wk 3	Thu P2T6a wk 3	Fri P2T6a wk 3	

Table 2-15: P2-T6 bidding pattern

This test lasted for 3 weeks and ran at an average of **67%** (106MWh) of the volume posted being traded, with an average of **81%** (86 MWh) of this being delivered. There was circa **20%** (21MWh) of the traded volume under delivered, 32% (51MWh) was not taken up and 97 MWh was over delivered.

This means during this test we needed to post onto the market **146%** of the flexibility volume needing to be procured.

During this test the behaviours of the FSPs and offers they were placing developed to the extent that we were seeing a live competitive intraday market. FSP's started placing competing offers in ahead of WPD final bid pricing.

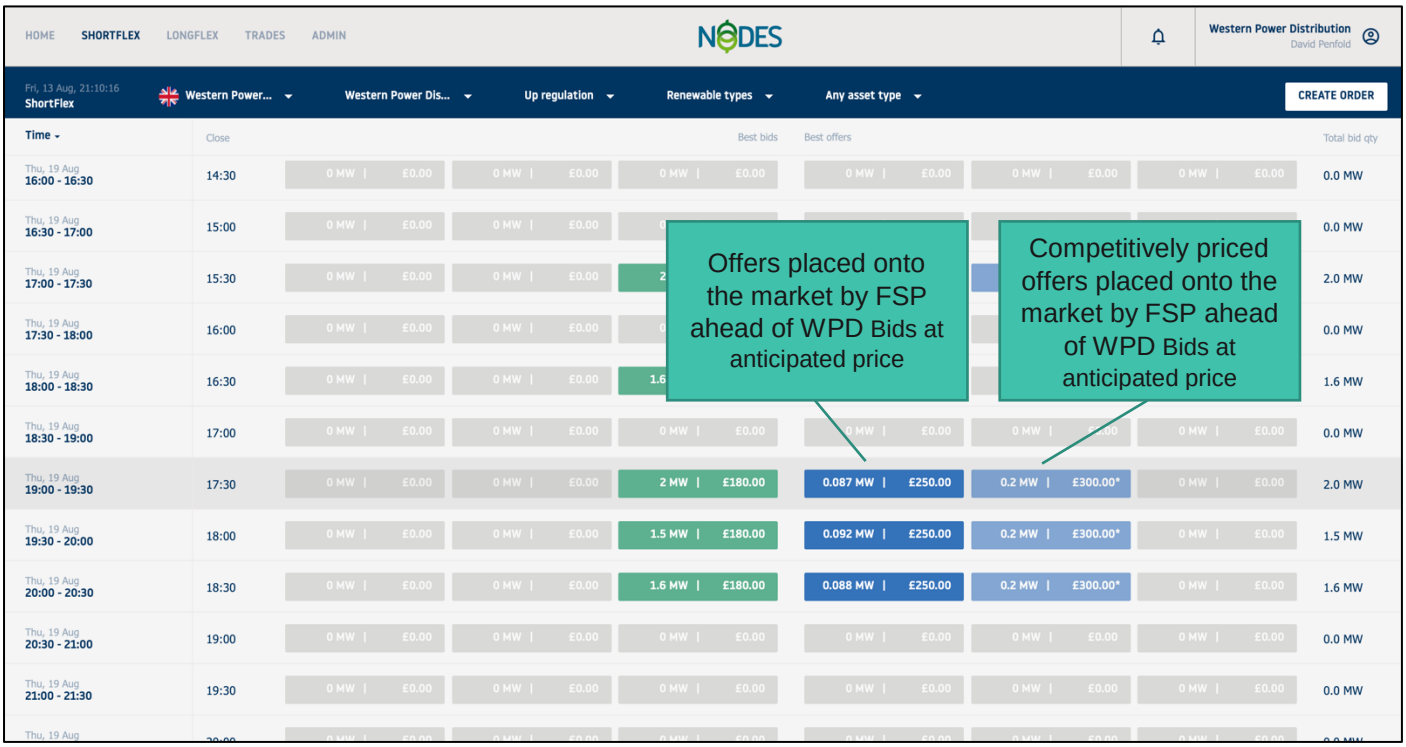

Figure 2-8: NODES market showing competitive offers placed by FSPs

The busiest times for FSP interaction on the market platform continued between 09:00 and 14:00 with another smaller spike starting earlier than before of between 13:00 – 15:00. There was a marked reduction in the number of interactions on the market platform which is believed to have been driven by summer holidays.

Test 6 Week 1	£	MWh	%
Traded	£3,945.66	28.07	64.10%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£2,986.41	20.43	72.77%
Sub Total	£2,986.41	20.43	46.6%
Under Delivered	£959.25	7.64	27.2%
Expired	£2,358.90	15.73	35.9%
Active	£0.00	0.00	0.0%
Sub Total	£3,318.15	23.37	53.4%
Total	£6,304.56	43.80	100%
Over Delivered		25.99	

Test 6 Week 2	£	MWh	%
Traded	£3,514.85	24.83	57.88%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£2,580.58	14.86	59.86%
Sub Total	£2,580.58	14.86	34.6%
Under Delivered	£934.27	9.97	40.1%
Expired	£2,710.35	18.07	42.1%
Active	£0.00	0.00	0.0%
Sub Total	£3,644.62	28.04	65.4%
Total	£6,225.20	42.90	100%
Over Delivered		33.01	

Test 6 Week 3	£	MWh	%
Traded	£7,897.32	53.19	75.08%
Outstanding Traded	£0.00	0.00	0.0%
Delivered	£5,429.10	50.63	95.19%
Sub Total	£5,429.10	50.63	71.5%
Under Delivered	£2,468.22	3.11	5.8%
Expired	£2,566.35	17.11	24.1%
Active	£0.00	0.00	0.0%
Sub Total	£5,034.57	20.22	28.5%
Total	£10,463.67	70.85	100%
Over Delivered		37.74	

Table 2-16: P2-T6 Weekly volume trading summaries

Information Service Relaunch

We continued to seek feedback on the BRP Information Service. Feedback included a suggestion that the recent BSC Code modification P375 could address some of the imbalance problem. (The modification enables Virtual lead parties (VLPs) to register asset level meters with Elexon and use these for settlement.) We continued to discuss the impact of P375 on the need for the BRP Information service with IntraFlex participants during this reporting period.

During this reporting period NODES reviewed the functioning of the Information Service and developed a sign-up process for participating FSPs to identify their BRPs. During this phase of the trial no FSPs identified their BRPs.

Next steps

Completion of the live trials this project has now moved into the feedback, dissemination and closedown reporting phase.

3. Progress against Budget

Spend Area	Budget(£k)	Expected Spend to Date (£k)	Actual Spend to Date (£k)	Variance to expected (£k)	Variance to expected %
WPD Project Management	£131,435	£107,935	£74,542	£33,393	69%
Contractors	£585,244	£553,834	£419, 056	£134,778	76%
Payments to Users	£100,000	£100,000	£93,862	£6,138	94%
Dissemination	£30,000	£20,000	-	-	-
Contingency	£116,473	-	-	-	-
TOTAL	**£963,152**	**£781,769**	**£587,460**	£194,309	75%

Table 3-1: Progress against Budget

Comments around variance

Project Management - Less time was used than expected earlier in the project. Dissemination also cost less than expected.

Contractors- Development costs allocated to solution developer were not required. These were needed for the API build for Phase 2. Impact of COVID-19 also affected over costs for contractors especially with regard to travel and expenses.

4. Progress towards Success Criteria

The tables below detail progress against stated Success Criteria

Table 4-1: Objectives log

Objectives	Status
The operability of short-term flexibility markets	**Completed:** This has been tested through both the phase 1 and phase 2 trials. Participant engagement very positive with further feedback being sought during dissemination.
The value of increased information at the day ahead stage to suppliers	**Completed:** Stakeholder feedback across both phase 1 and phase 2 clearly indicated that this could be a valuable service for suppliers. However there was no take up of this service within either phase 1 or phase 2 trials. This is probably due to the disconnect between the party needing action (the FSP) and the beneficiary (the BRP) and the market size.
The value of an integrated link for rebalancing in the intra-day market	**Complete:** During the ongoing review of the potential to develop this service, the feedback from the current participants and stakeholders, has very clearly informed the project team that this auto rebalancing service is of no interest at current market volumes. The costs and risk of such a system far outweigh any benefit.

Table 4-2: Success Criteria log

Success Criteria	Status
Development of a UK Market design for short term flexibility market that reflects imbalance costs	**Completed:** The development has been completed as part of work package 2 and is now being validated via the trials.
WPD access to ShortFlex products that have the potential to benefit the distribution network	**In progress:** WPD access to ShortFlex products has been validated as part of the phase 1 and phase 2 trials with network benefits and further learnings being identified for the close down report and dissemination.
Procurement of ShortFlex via the NODES platform	**Completed:** Shortflex has been procured as part of the phase 1 trials and the Phase 2 trials.
Demonstration of ShortFlex products that limit supplier exposure to imbalance costs	**Completed:** The provision of a BRP information service was relaunched and validated via the phase 2 trials.
Delivery of the project on time and on budget.	**In progress:** Both timescales and overall budget have been adhered to with dissemination and closedown reporting to be finalised.

5. Learning Outcomes

Within this reporting period we have completed the phase 2 trials with the next steps being dissemination and close down report. Therefore, the key learnings generated during the project are as follows:

- Converting a platform designed for market wide transactions to a platform based on locality of transactions requires detailed design of user documentation.
- BRPs do not currently see DNO imbalance as having a material impact on business costs
- BRPs do not currently support other entities automatically rebalancing their positions.
- BRPs do see benefit in an information system that helps them act on imbalance created.
- FSPs have so far not expressed that they see the benefit to signing up for the information service. Potentially, ongoing industry development, including the BSC Mod P375, could at least partially address the issue, in cases where the FSP has signed up to the BSC as a VLP.
- The onboarding process benefitted greatly from having defined and regularly communicated deadlines for participants to act by.• ..... Bids are being accepted at a lower volume than expected when taking into account known system sizes. This may be being influenced by there being no penalty for over delivery.
- Participants are interested in discussing baseline clarification post-delivery. This needs to be thought through especially the need for the "Burden of proof" that would be needed to enable this.
- Clarity should be given on the use of MWh or MW when procuring flexibility.
- We should be clear, at the outset of such trials, about the quantum of volumes we would be looking to trade thus avoiding signed up participants being unable to offer flexibility due to size of the asset.
- Metering captured via existing Flexible Power standards appears to maintain a low technical barrier to entry
- Most participants required multiple meetings in order to address their queries and ensure that they were correctly enrolling onto the system.
- Participants were requested to complete a questionnaire after each trial phase but in spite of multiple prompts and requests, the response level was less than 50%
- Participants typically appointed one person internally to manage the trial, so when on holiday, absent or too busy there was a direct impact on the trial response levels
- There is a need to give FSPs the greatest possible opportunity to respond to bids of volume needed.
- When transposing energy minute by minute granularity data to 1/2 hourly ensure the amount used in the 1/2 hour is allocated in a consistent manner (i.e. energy used from 19:00 to 19:29 inclusive is shown as 19:00 or 19:30 consistently)
- During Phase 2 stakeholder engagement it was determined that there is no need to place Bids on the platform during weekends to avoid driving additional workload and complexity for the trial participants bearing in mind FSP don’t have active weekend desks
- Stakeholders very positive in relation to the price discovery and moving closer to real-time; creating a level playing field for less predictable baselines and capacities e.g. EV's and domestic sites.
- Moving to a 7 day market has increased the opportunity for FSP involvement and simplified the bidding process as volumes will now be posted 7 days ahead of requirement
- Trial design following feedback has been developed to forward signal bid increments and timings but with an element of jeopardy to discourage market gaming. This was supported as the right thing to do by all stakeholders engaged with and offered opinions
- When working with third-party applications which hold data that could identify individuals or companies it is best to allow the third-party application owner to develop reports that animalizes the information to avoid any GDPR or anti-competitive implications.

- Ongoing developing Industry protocols look like they may negate the requirement for a separate Information Service as scoped in this project.
- ESO Dynamic Containment pricing @ Circa £400/MWh could be a price barrier to DSO Flexibility trading
- Communication text for the various tests and legal requirements need to be understood and written early to avoid a lot of time bound wasted effort.
- PQQ step added for UCR compliance acts as a bigger barrier to participation than we thought it would be, as it's another step for the FSPs to complete.
- The penalties being applied when flexibility requirements are either under or over delivered need to be strengthened.
- Some FSP's have been entering baselines well in advance of the market future signals. This needs to be guarded against.
- The tests outturn so far is pointing towards needing to post 135% of the volume required to account for under delivery and volume not being taken up
- Posting Market Messages does seem to drive interaction on the market portal so is key to gaining FSP usage.
- Due to the nature of the trial the lack of liquidity could be restricting competitive offers from the participating FSPs.
- Pre Publishing the final price the WPD requirement will be posted at when we reach T-3 is causing the FSP behaviour of waiting for the WPD requirement to reach this final price.
- The EV asset FSPs (<0.5MW) seem to be able to place offers a week at a time with the larger asset (>1MW) owners being able to place offers intraday
- The larger asset (>1MW) FSP's seem to be content to take any residual volume after the smaller asset FSP's (<0.5MW) have taken what they require.
- Some FSP's are missing the market messages - potential for all signed up FSP's to be automatically registered to receive the messages and de register if not wanted.
- The lager FSP asset owners seem to be comfortable trading at below the £300 MWh value.
- The EV FSP asset owners seem to be comfortable trading lower than the value of the large asset owners.
- Onboarding: The PQQ form was relatively easy to complete. This was added for WPD's UCR compliance, so it seems this additional step isn't too big of a hurdle for participation
- Over/under deliveries: Dialogue with the FSPs around over/under deliveries can help improve delivery percentages. Some over/under deliveries are caused by FSPs not fully utilising platform features, such as uploading their own baselines and making full use of the dispatch notifications.
- Pre-offering: The trial nature of the market, with limited value on screen, limits the resources FSPs can dedicate to participation, with more active participation like pre-offering being more resource intensive. A move to BaU -assuming this means more volumes on screen- could in itself encourage more active participation, such as pre-offering.
- Market timings: For EV chargers, ability to predict what flexibility they can make available is at day ahead stage. Ideal market timings would be that they get a notification of what the volume requirements are at a day ahead stage and after that they submit orders until GTC.
- Meter data: It would be useful to be able to provide metering data retroactively, e.g in case of technical failure but where metering data is still recorded.
- Complication around treatment and application of VAT as WPD are paying the VAT to customers via a 3rd party who are not UK VAT registered and therefore VAT treatment needs to be approved by qualified experts not the project team.
- Flexibility procured via the platform is out turning at a lower cost than anticipated at £288/MWh

6. Intellectual Property Rights

A complete list of all background IPR from all project partners has been compiled. The IP register is reviewed on a quarterly basis.

Table 6-1: IPR Log

IPR	Category	Owner	Progress
NODES Platform	Background	NODES	Developed before the project
NODES Intraday link	Foreground	NODES	No longer being developed
NODES day ahead information	Foreground	NODES	First version has been developed
Flexible Power documentation and Processes	Background	WPD	Developed before the project
Audit Targeting	Relevant Foreground	WPD	Still to be developed
UCR review	Relevant Foreground	WPD	In development
Link to FP dispatch	Relevant Foreground	WPD	Developed
UK Market design	Relevant Foreground	All partners	First version developed and published. To be revised following trials
NODES Market design	Background	NODES	Developed before the project
UK Market design technical adaption white paper.	Relevant Foreground	All partners	Still to be developed

7. Risk Management

Our risk management objectives are to:

- Ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- Comply with WPDs risk management processes and any governance requirements as specified by Ofgem; and
- Anticipate and respond to changing project requirements.

These objectives will be achieved by:

- ✓ Defining the roles, responsibilities and reporting lines within the Project Delivery Team for risk management;
- ✓ Including risk management issues when writing reports and considering decisions;
- ✓ Maintaining a risk register;
- ✓ Communicating risks and ensuring suitable training and supervision is provided;
- ✓ Preparing mitigation action plans;
- ✓ Preparing contingency action plans; and
- ✓ Monitoring and updating of risks and the risk controls.

7.1. Current Risks

The IntraFlex risk register is a live document and is updated regularly. The project has completed its live trials and is now in the dissemination and close down report period therefore there are no live risks to report.

7.2. Update for risks previously identified

Descriptions of the most significant risks, identified within the previous report are provided in Table 7 4 with updates on their current risk status.

Table 7-1: Risks identified in the previous progress report

Details of the risk	Previous risk rating	Current risk rating	Mitigation Action Plan	Progress
Recruitment risk - Cannot recruit enough flex providers trial Phase 2	Major	N/A	Ongoing reach out communications, and spreading the net wider	Live trials completed so risk has been closed
WP5 – Longer to onboard/contract participants Phase 2	Major	N/A	Detailed engagement with stakeholders early in the onboarding process	Live trials completed so risk has been closed

Details of the risk	Previous risk rating	Current risk rating	Mitigation Action Plan	Progress
Phase 2 Trials - API Design and delivery to manage the Phase 2 tests is not on time or is not able to fulfil the required interface actions	Major	N/A	Semi-automatic/manual method to manage the Phase 2 test to be developed using CSV's if possible	Live trials completed so risk has been closed
WP3 - Phase2 Scale of work to deliver more than anticipated	Major	N/A	Early engagement with stakeholders and participants	Live trials completed so risk has been closed
WP5 - Closer to real time creates operational issues - Speed of interaction could this cause operational difficulties	Major	N/A	Development of API being progresses to avoid this.	Live trials completed so risk has been closed

8. Consistency with Project Registration Document

There have been a number of changes to the project as it has progressed. These have been logged within WPD's Change Management process and are all aimed at maximising the value of the project and limiting any development of services with limited ongoing value.

In addition to the changes mentioned in the previous report, this month, following the BRP survey we decided to de-scope the auto-rebalancing services. With consistent feedback that it provided little value, and no feedback to the contrary, building and testing such a service would not have provided good value for money. Instead, the project has focussed more on the information service.

9. Accuracy Assurance Statement

This report has been prepared by the SGC IntraFlex Project Manager (David Penfold), reviewed by the WPD Project Manager (Stuart Fowler) and approved by the Innovation Manager (Yiango Mavrocostanti).

All efforts have been made to ensure that the information contained within this report is accurate. WPD confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

Glossary

Abbreviation	Term
ABSVD	Applicable Balancing Services Volume Data - The data representing volume of Active Energy associated with Applicable Balancing Services.
API	Application Programming Interface - API is the acronym for Application Programming Interface, which is a software intermediary that allows two applications to talk to each other. Each time you use an app like Facebook, send an instant message, or check the weather on your phone, you're using an API.
BaU	Business as Usual
BEIS	Department for Business, Energy and Industrial Strategy
BM	Balancing Mechanism - The balancing mechanism is used to balance supply and demand in each half hour trading period of every day.
BRP	Balance Responsible Party – Are financially responsible for maintaining the balance between supply and demand of energy within their portfolio.
BSP	Balancing Service Provider - Balancing Service Providers (BSPs) are remunerated for balancing services provided to the System Operator (SO). The balancing energy costs are allocated to the Balance Responsible Parties (BRPs) in the form of imbalance costs.
CMZ	Constraint Management Zone - This is a geographic region served by an existing network where network requirements related to network security of supply are met through the use of flexible services, such as Demand Side Response, Energy Storage and stand-by generation.
COVID-19	2019 Novel Coronavirus
DNO	Distribution Network Operator - Any Electricity Distributor in whose Electricity Distribution Licence the requirements of Section B of the standard conditions of that licence have effect (whether in whole or in part).
DA/ID	Day Ahead/ Intra Day
DSO	Distribution System Operator - Are the operating managers of energy distribution networks, operating at low, medium and high voltage levels (LV, MV). Transmission grids transport large quantities of high (and extreme high) voltage (HV, EHV) electricity across vast distances, often from large power plants to the outskirts of large cities or industrial zones, where it is transformed into lower voltages distributed to all end-users through the distribution network. Over-head and underground cables leading to your home or business are operated by DSOs.
DSR	Demand Side Response- Is the modification of consumer demand for energy through various methods such as financial incentives and behavioural change through education.
EOI	Expressions of Interest
ESO	Electricity System Operator - is an entity entrusted with transporting electrical power on a national or regional level, using fixed infrastructure.
FSP	Flexibility Service Provider

Abbreviation	Term
GUI	Graphical User Interface - is a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicator such as primary notation, instead of text-based user interfaces, typed command labels or text navigation.
IPR	Intellectual Property Rights - All industrial and intellectual property rights including patents, utility models, rights in inventions, registered designs, rights in design, trademarks, copyrights and neighbouring rights, database rights, moral rights, trade secrets and rights in confidential information and know-how (all whether registered or unregistered and including any renewals and extensions thereof) and all rights or forms of protection having equivalent or similar effect to any of these which may subsist anywhere in the world and the right to apply for registrations of any of the foregoing.
ISP	Imbalance Settlement Period
kW	Kilowatts
LongFlex	Long Term Flexibility (before day ahead timeframe)
MW	A megawatt (MW) is a unit of electric capacity or electric load. A MW is equal to 1,000 kilowatts (kW).
MWh	A megawatt hour (Mwh) is equal to 1,000 Kilowatt hours (Kwh). It is equal to 1,000 kilowatts of electricity used continuously for one hour.
NIA	Network Innovation Allowance
OFGEM	Office of Gas and Electricity Markets
SAT	Site Acceptance Test - is a useful tool to determine the functionality of the equipment at the user site before its installation
ShortFlex	Short Term Flexibility (on a day ahead or intra-day timeframe)
UCR	Utilities Contracts Regulations
WP#	Work Package

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