



# GAMMA Flex

NIA Closedown Report

June 2022 – January 2023

**Electricity  
Distribution**

**nationalgrid**

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## 1. Executive Summary

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GAMMA Flex was a Network Innovation Allowance (NIA) funded project that was carried out between June 2022 and January 2023 with a total budget of £340,865. Through five work packages the project aimed to design a set of market designs and blueprints that would simplify the process of enabling new marketplaces that could be integrated with DSO systems, policies, and processes.

Work Package two, the core of the project, was split into two distinct areas. The first involved developing an initial Market Design Document and the second designing a set of Market Blueprints that would particularise how each service could interact and fit in a future flexibility market place.

The initial market design was presented at a virtual stakeholder workshop, published on NGED's website, and circulated to stakeholders, together with a set of questions. Starting early July 2022 through to mid-September 2022 the project team held 1 to 1 interviews, with stakeholders who were willing to participate, where the market design was presented at high level and the stakeholder feedback questions were stepped through, this was where most of the feedback was received. The project team sought feedback from DNO's, Flexibility Service Providers (FSPs), market operators and energy market consultants.

Overall, there was a positive response to the draft market design published. With respondents welcoming the development of the new market and recognising that this is a complex and evolving area. The Final Market Design document, was published in October, containing updates to the Initial Market Design, based on feedback received from stakeholders. Like the Initial Market Design document, this document set out the background to the thinking on market design and outlined the market design proposals. It also contained details of the stakeholder feedback we received and the adjustments that we made to the market design in response to that feedback.

The second part of work package two entailed developing a blueprints document to set out the compatibility terms for potential Independent Market Operators (IMOs) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs. These blueprints were intended to harmonise key requirements on IMOs, thereby making it easier for FSPs to act across different markets. The IMOs blueprints were published for review by existing market operators and DSO during December 2022 with the finalised blueprints completed mid-January 2023.

Work Package three was expected to be an ESO Co-ordination Analysis to ensure that the development of market mechanisms reflect a wider inclusion of other network conditions and requirements outside of immediate network constraints. This has been an ongoing barrier to market development of flexibility since the DNOs first started to develop capabilities. During the period that elapsed between the initial proposals for Gamma Flex and project initiation a new initiative was

commenced within Open Networks. Workstream 1A-P5, otherwise known as Primacy<sup>1</sup> with an objective to address conflicts between DSO, TSO & ESO requirements. As a result, the Gamma Flex project scope was adjusted to reflect the adoption of any outputs rather than duplication or dissonance with the work already underway at an industry level.

Work Package four - Operational Trials Design will form the basis of one of the final outputs of the project with a view to taking the design of the market and the blueprints and implementing these alongside Flexible Power. In order to achieve this, it is necessary to have the general agreement of key stakeholders including NGED, NODES and potential participants within the flexibility market on the viability of the market design. If there is sufficient consensus among the stakeholders a suitable trial scope will be authored and submitted for funding approval via one of the funding sources available to the NGED to demonstrate the market in operation in parallel with the current arrangements, so as to confirm that it brings enhanced value and liquidity.

Work Package five - BAU Handover is a very important aspect of any innovation funded trials to ensure that there is a clear focus on real benefits and not just academic learning as they are ultimately funded through customers. To help ensure this, the project has been carried out in close collaboration and consultation with the Network Strategy department at NGED who would ultimately become the BaU owner. To this end, the market timescales, rules, and blueprints have been developed in line with NGED's November 2022 Publication, 'Evolution of Distribution Flexibility Services Procurement'<sup>2</sup>

GAMMA Flex has been delivered within the initial timescales and within its stated budget. During this project, the majority of the aims, objectives and success criteria have been met. Further information such as project documentation, the Market Design, the Neutral Market Facilitators Blueprints, and the closedown report can be found on the NGED Innovation project website [National Grid - Generating Additional Markets for Mature Access to Flexibility \(GAMMA Flex\)](#)

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<sup>1</sup> [https://www.energynetworks.org/assets/images/Resource%20library/ON22-WS1A-P5%20Primacy%20Draft%20Rules%20Report%20\(28%20Apr%202022\)%20published.pdf](https://www.energynetworks.org/assets/images/Resource%20library/ON22-WS1A-P5%20Primacy%20Draft%20Rules%20Report%20(28%20Apr%202022)%20published.pdf)

<sup>2</sup> <https://www.nationalgrid.co.uk/downloads-view-reciteme/445993>

## 2. Project Background

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The IntraFlex project, which trialled closer to real-time flexibility procurement, identified several areas that need to be further developed for the market to mature. As part of IntraFlex, NGED purchased flexibility services as 30-minute products, starting 7 days ahead of delivery and up until 90 minutes ahead of delivery, in a marketplace operated by NODES.

Whilst the project demonstrated that closer to real time flexibility procurement works and adds value, the project also identified a number of gaps that need to be addressed to build a liquid, well-functioning market.

The gaps that were identified included:

- **Need for secondary trading** – IntraFlex only allowed flexibility service providers (FSPs) to sell flexibility services. This prevents FSPs from trading out positions, e.g., in case an FSP is operationally unable to deliver flexibility it has sold or wishes to trade out of its position for commercial reasons. Over the longer term, secondary trading would be expected to build market liquidity and is a key Ofgem expectation.
- **Need for demand turn up services** – IntraFlex included up regulation (generation upturn/demand downturn) only. In areas of the network with a high penetration of renewable generation, including down regulation (generation downturn/demand turn up) this service could help free up network capacity and enable new renewable assets to connect.
- **Need for baselining methodology to develop** - IntraFlex applied a default baseline, calculated as a simple average across historic meter readings, and gave FSPs the option of overriding the default baseline with a baseline calculated by the FSP (submitted prior to trading). Feedback from FSPs that relied on the default baseline highlighted that a baseline based on historic meter readings can get distorted when the calculation includes periods for which the FSP has already delivered flexibility services. There is value in exploring the impact of different baselining methodologies further to better reflect positions.
- **Need for a link to longer term flexibility procurement**- There needs to be a link between the near-term market and flexibility purchased as longer term availability agreements, such as Flexible Power. The link is needed to ensure that the lowest cost flexibility is activated, whether that means activating a longer-term agreement or purchasing flexibility in the near-term market.
- **Need for cooperation with the ESO** – At present there is no direct link between DNO level flexibility procurement and ESO procurement of balancing services. A link would help ensure flexible resources are activated where they add the most value to the system as a whole. A link would also be expected to help build liquidity in the DNO level flexibility market,

as it would encourage FSP participation by enabling FSPs to participate with assets located both inside and outside of WPD's congestion zones and enable revenue stacking. Part of this is also being covered as a desktop research exercise under Project COMMANDER with ESO and will feed into GAMMA Flex.

The intention was to address these needs through the project where the near-term procurement developed as part of IntraFlex is continued and the five points above are addressed, through market designs. At the end of GAMMA Flex, it will be decided whether a trial will be undertaken, either through innovation or part of business as usual.

### 3. Scope and Objectives

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The project has met the majority of the objectives set out when the project was first registered and is outlaid below in table 3.1.

**Table 3-1: Status of project objectives**

<b>Objective</b>	<b>Status</b>
Develop a blueprint to allow secondary market trading	✓
Develop a blueprint to allow demand turn up services	✓
Create a blueprint for longer flexibility procurement linked to short term flexibility.	✓
Co-create a blueprint to link to ESO procurement of balancing service	✗

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## 4. Success Criteria

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The project has performed and met the majority of the success criteria outlined at the registration phase of the project. The success criteria are shown in table 4.1 below.

**Table 4-1: Status of project objectives**

<b>Success Criteria</b>	<b>Status</b>
Market blueprints designed for secondary trading services	✓
Market blueprints designed for demand turn-up services	✓
Market blueprints designed for linking of long-term flex with short-term flex.	✓
Successful engagement and coordination with stakeholders	✓
Successful designs for cooperation with the ESO.	✗

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## 5. Details of the Work Carried Out

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The GAMMA Flex project set out with the aim of building on the learning of IntraFlex and seeking to push our understanding of what is needed for a liquid flexibility market by including some key new industry designs centred around secondary trading, Demand Turn Up (DTU), and other services, which would give participants the opportunities that they need to stack revenues from adjacent markets. The project was to be delivered by designing a set of market blueprints that would envisage how each service will interact and fit in the future flexibility market place. This project will also deliver vital insights that we need to progress our aims and understanding for flexibility markets. It also supports our strategic consultation on flexibility and has potential to easily transition into business as usual if proven.

### 5.1 WP1 - Project Management and Reporting

This work package ran for the duration of the project and ensured the project ran smoothly and progressed adequately. This also tracked and managed risks to maximise the chance of successful delivery.

All regular reporting, weekly project meetings and logs were maintained in a timely manner as required.

### 5.2 WP2 - Final Market Design & Blueprints

Work Package two, was the core of the project and was split into two distinct areas, the first involved developing a Draft Market Design Document then a Final Market Design document and the second designing a set of Market Blueprints that would particularise how each service could interact and fit in a future flexibility market place.

The work package key outputs included completion of the [Final Market Design](#) document and [Neutral Market Facilitators Blueprints](#) document.

#### WP2 – Draft Market Design

The project team developed, between July and August 2022, a draft market design document which focussed on the following areas:

1. Application of flexibility by the DSO
2. Market structure limitations
3. Development landscape and architecture
4. Proposed market design
5. Stakeholder feedback questionnaire

The objective of the market design was to establish a set of rules that could enable the range of interactions between the associated parties and expand the scope of opportunities for participation, while enhancing the current arrangements. To achieve this, the design was developed along the timeline of initial assessment of the network requirements through to the real-time support of flexibility events and post-operative settlement of payments, figure 1 below shows this timeline.

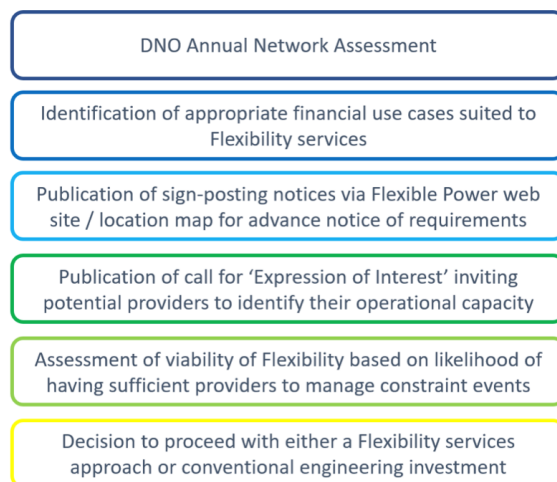


Figure 1- Assessment process for viability of Flex Services

The draft market design document was evaluated by NGED, NODES & SGC to ensure it agreed with the future flexibility market trajectory as recognised by NGED. The deliverable being a Draft Market Design document. <https://www.nationalgrid.co.uk/downloads-view-reciteme/607149>

The draft market design document was examined and further developed via the engagement of a wide group of industry stakeholders. This was to ensure that project teams understanding of the market corresponded with the current market participants' ambitions.

This was accomplished via the following steps:

- 1) A review of the above document with a wider group of stakeholders via:
  - a. Online Webinar – hosted by NODES and SGC were attended by circa 25 people as seen in figure 2.
  - b. Interviews – One to one engagement with a wide group of stakeholders to ensure that market to be developed can produce value.



Figure 2 GAMMA Flex Online Workshop

## WP2 - Final Market Design

Overall, there was a positive response to the draft market design published. With respondents welcoming the development of the new market and recognising that this is a complex and evolving area. Where relevant the draft market design document was updated based on the stakeholder feedback and issued as the Final Market Design.

### What We Heard from Our Stakeholders (learning from 1-2-1 interviews / workshops)

During the interviews, the team took the attendees through a process of the draft market designs with the intention to host a questionnaire on the specific elements towards the end. The outputs can be summarised below with an example of the questions seen in figure 3.

#### Availability Payments (long-term and mid-term contracts)

- For competitive bidding the preferred option was price should be based on a fixed Availability payment and allowing competition on the Utilisation price.
- Availability payments should be clawed back if utilisation thresholds aren't achieved.
- The market should use delivery volume % to calculate the availability payment on a per month basis.

**GAMMA FLEX – MARKET DESIGN FEEDBACK**

**5 DETAILED RESULTS - THE SURVEY QUESTIONS**

**5.1 AVAILABILITY PAYMENTS (LONG-TERM AND MID-TERM CONTRACTS)**

**5.1.1 For competitive bidding which would be most appropriate in order that a clearing price can be established**  
**A) Fixed ratio between Availability & Utilisation and total price**  
**B) Fixed Availability price and competition on Utilisation Price**  
**C) Fixed Utilisation price and competition on Availability Price**

**Feedback:**

<b>FSP's</b>	<ul style="list-style-type: none"> <li>Preference for option B</li> <li>You want to choose a cost minimisation to the customer, which is to minimise the sum of Availability payment + expected utilisation * utilisation payment. This has to take into account accepting different contracts will vary the expected utilisation of any one contract</li> <li>Fixed Availability and competition on utilisation.</li> </ul>
<b>Energy Market Consultants</b>	<ul style="list-style-type: none"> <li>Fixed Availability and competition on utilisation - The value of the in-balance price at same time as the DSO requirement may need to be considered.</li> </ul>
<b>Market Developers</b>	<ul style="list-style-type: none"> <li>Fixed Availability and competition on utilisation - Maybe implement a different ratio of Availability to Utilisation dependent on technology type.</li> </ul>

**5.1.2 Should market design specify award on 'pay as bid' or 'clearing price' basis or should this be at discretion of each DSO's individual terms?**

**Feedback:**

<b>FSP's</b>	<ul style="list-style-type: none"> <li>A consistent approach is preferable. No strong opinion on pay as clear vs pay as bid.</li> <li>Pay as clear is the normal economic solution – economic theory says this is correct. However, there are examples where it doesn't work too well.</li> <li>Pay as clear is the preferred solution.</li> </ul>
<b>Energy Market Consultants</b>	<ul style="list-style-type: none"> <li>Pay as clear is the preferred solution</li> </ul>
<b>Market Developers</b>	<ul style="list-style-type: none"> <li>Pay as clear is the preferred solution but could be dependent on service dynamic and timing.</li> </ul>

Figure 3 Questionnaire Survey Questions

### Non-Delivery Penalties (separate from partial / under delivery)

- To avoid unintentional barriers, to the development of liquidity in the market, no additional financial penalties should be deployed.
- If financial penalties were to be applied, they should be actioned on ½ hourly basis.
- The % level where partial delivery becomes non-delivery was regarded as being acceptable at the current trigger point of 63%.
- Thought could be given to developing a different trigger point depending on the size of the contracted volume to reflect the impact of smaller volume FSP's.
- The threat of suspension from bidding was seen to be an appropriate penalty and a good prompt for the participant to enter the secondary market.
- Suspension should be implemented to allow the FSPs to rectify any ongoing issues.
- Specific contract termination should be invoked for repeated delivery failure, but noting that contract termination should not mean market expulsion.

### Secondary Trading Arrangements

- The market should allow for evidenced “Planned Assets” to bid for “Long Term” contracts on the understanding that at the start of “Mid Term”, 1 year ahead where contracts become binding, these assets are in place.

### Market Blueprints

- The market blueprints should think about “Cyber Security” and “Load Controllers” security.
- Existing industry standards, where feasible, should be adopted to allow a common approach.

## Final Market Design

The new proposed Final Market design was developed to run in parallel with the existing Flexible Power process to compliment the actions that already take place within the DNO / DSO and increase the scope for providers of different types to sell their flexibility.

The established processes are linear with very specific actions occurring at predefined time horizons. This can be very limiting as, in order to be in a position to provide services to the DSO, it is necessary to be engaged as much as a year in advance to identify suitable locations and respond to the procurement department's requests. While this has been succesful in attracting and engaging adequate providers to progress many CMZ (Constraint Management Zones), as seen in figure 4, a greater number have been unable to contract sufficient capacity to make non-engineering interventions viable.

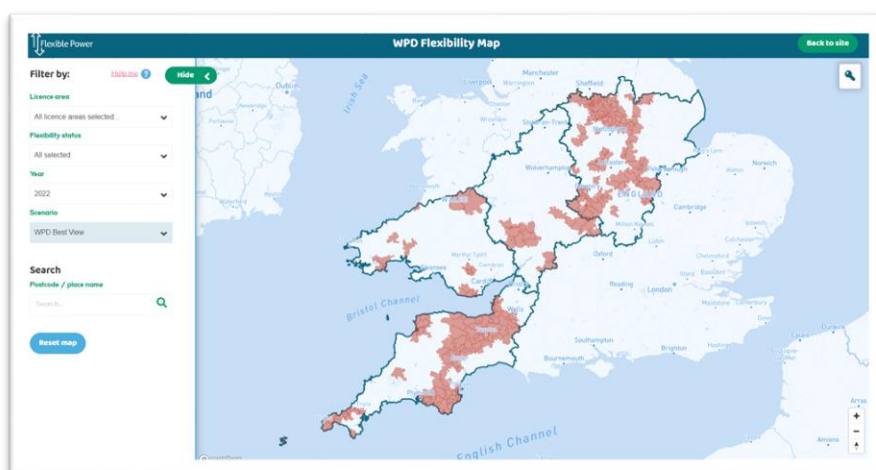


Figure 4 – Flexible Power interactive constraint map outlining future requirements

Stakeholders and potential providers intimated that even when they are aware of a CMZ that they could support through the existing service models, there is insufficient total value for them to commit so far in advance. In many instances, they would rather await the results of other commercial opportunities before contracting with the DSO in case they miss out on a more valuable opportunity, particularly in an environment which can change quite quickly.

## Expanded Access to Markets

The expanded access to markets facilitates the ability to allow additional market access points along the timeline so that providers are given multiple chances to secure a service contract. In addition to the Flexible Power existing services, we introduced three additional service categories which reflect the time horizons at which they take place. The logic to separating them in this way was not just for convenience, but instead reflected the certainty of the need at that time against potential value.

## Long-Term Market (Several Years – 1 Year Ahead)

- Contracts awarded 'in principle' up to four years ahead of delivery and become binding one year ahead.
- FSPs with planned assets participate in long-term market.
- FSPs respond with offer, including parameters like duration, rest time, price, volume.
- Hand-back: Contracts can be partially or completely surrendered during long-term market without penalty if specific conditions are met.
- Fixed Ratio Pricing: includes both a utilisation and availability payment.
- DSO awards in line with Flexible Power contracts, offering a parallel opportunity to participate. DSO does not submit counter bids.
- Pricing published by DSO which reverts to a 'clearing' competition if oversubscribed.

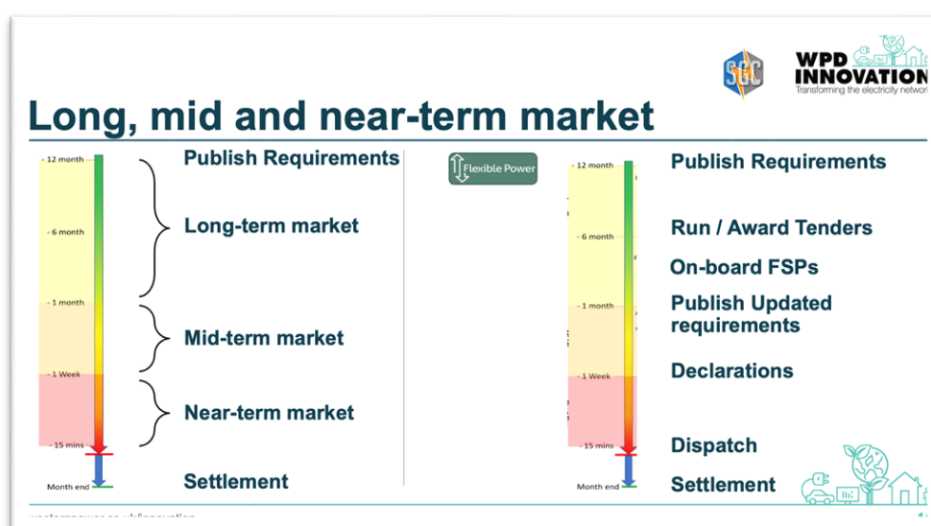


Figure 5 Long, mid and near term market design timescales

## Mid-Term Market (1 Year to 1 Month Ahead)

- Long-term contracts become binding 1 year ahead of delivery
- Award window of additional mid-term contracts: 1 year to 1 month ahead
- DSO updates contract requirements 1 year ahead
- FSP offers placed in long-term market remain valid for mid-term market unless cancelled
- Fixed Ratio Pricing: includes both a utilisation and availability
- DSO does not submit counter bids and will accept or leave FSP offers.
- NO Hand-back ability: Contracts are binding, changes must be addressed through secondary trading
- Secondary trading: FSP can sell partial or whole contracts through the secondary market
- FSPs can submit multiple offers as long as assets aren't duplicated.

## Near-Term Market (1 Month to 15 Mins ahead)

- Market open/close 1month to 15min ahead of delivery
- Capacity traded in 30 min blocks
- Pricing: Utilisation price only
- Allocation: Continuous matching of bids & offers
- NO Hand-back ability: Contracts are binding
- Secondary trading: Whole or Partial Contracts can be traded in the secondary market
- Payment Mechanic reduces payment on partial delivery in line with Flexible Power
- Non-delivery potentially subject to additional penalty.

Within the Final market design, we also completed the design of the other functional areas originally identified as needed.

## Secondary Trading

Secondary trading via market platform is possible from the point that contracts become binding, i.e., 1 year ahead.

- Prior to 1 year ahead, contracts can apply to be surrendered to DSO.
- On platform:
  - FSP 1 trades with FSP 2, by placing buy and sell orders that match.
- Contractually:
  - Contract with DSO transfers from FSP 1 to FSP 2. DSO remains the counterpart.
  - FSP 2 who obtains new contract is bound to service delivery.



Figure 6 Draft Secondary Trading Design



## Penalties

- For long- and mid-term contracts, the reduction to availability payments will be based on the average delivery percentage per month.
- The decrease in the availability payment will follow the same payment scale as the payment scale for utilisation payments but will be based on the average monthly delivery percentage.
- We will not introduce additional financial penalties, other than reductions to availability and utilisation payments.
- A DSO may terminate contracts, or the market operator can suspend access to trade if an FSP consistently fails to deliver.
- Market suspension or termination, actioned by the market operator, would depend on a wider set of factors.

## Demand Turn Up

- DTU can be used as an opportunity to mitigate curtailment during excess renewable generation
- Could be used as a more market-based alternative to Automatic Network Management (ANM) schemes or in conjunction with ANM schemes, to facilitate new connections in constrained areas.
- Attract users with an ANM connection
- Benefits the DSO with reduced curtailment events

The resulting finalised Market Design following the detailed stakeholder feedback is summarised in detail in the Market Design report available on our website.

<https://www.nationalgrid.co.uk/downloads-view-reciteme/621899>

### **5.3 WP2 - Detailed Blueprints**

The purpose of the Blueprints document was to set out the compatibility terms for potential Independent Market Operators (IMO) looking to establish a market where DNOs/DSOs trade flexibility services with FSPs.

Rather than having each potential third-party market operator attempt to negotiate their own technical requirements, there was a compelling case to standardise some of these arrangements. In doing so, this would ensure there is an equitable set of arrangements that all IMOs could abide by and that they would only be differentiated by their offerings to providers. A uniform approach should encourage IMO's to innovate and strive to create attractive environments to attract FSPs (Flexibility Service Providers).

Our aim is that this will lead to greater interoperability and harmonisation between marketplaces, thereby reducing the barriers to entry for FSPs. This should not be to the detriment of any markets operator's desire to innovate, and it is the reason for offering blueprints to establish harmonisation of elements that make it easier for FSPs to participate rather than a fully defined service model. Market operators require to retain the ability to differentiate their offerings to potential FSPs and attract liquidity based on a merit-based approach.

We identified a number of areas where blueprints would be required. For each of these we outlined their purpose as well as an indicative list of the parameters to be contained within each.

#### **Legal Framework**

The legal framework is the relationship between flexibility providers and the platform operator and will be required to capture specific terms and conditions that ultimately link the purchasing DSO and the assets that will deliver service.

#### **Data Protection / Storage / Access**

Relating to data handling was intended to ensure that all data is appropriately categorised and any rules relating to how it is transferred, processed, or stored are clear to ensure that there are no breaches of rules, which may be set within the contracts or broader legislations such as General Data Protection Regulation (GDPR).

#### **Asset registration / Tracking**

This ensures any asset register takes the operation of Flexibility Markets into consideration. The main objective was to ensure that all assets regardless of size can be verified as to their suitability for providing services, including such parameters as location, asset type, permits and authorisation to operate. This needs to be possible, regardless of whether the asset is operated directly or within a portfolio with multiple intermediaries, which highlights the need to create a unique identifier that can be used to track who has control of every asset and avoid conflicts such as duplication.

## **Realtime Operational Data Exchanges / API**

This identified all the functions and potential data fields that could be contained within the library of functional commands and would be associated with a resource very similar to a 'GitHub' or 'API Library' that would enable platforms to comply with industry standards without limiting their own scope to enhance and develop operational advantage between platforms.

A very limited number of fields within the library would be mandatory for inclusion in all API data exchanges.

### **5.4 WP3 - ESO Co-ordination Analysis**

Only very limited results have been achieved within the scope of the project in relation to improving the coordination between DSO and ESO but to dismiss it as not having been progressed would be a disservice to wider progress. During the initial project registration and initial design phase of the GAMMA Flex project the need to coordinate was still seen broadly as the responsibility of the project to initiate a dialogue with the ESO.

### **5.5 WP4 - Operational Trials Design (Optional)**

See section 7.1

### **5.6 WP5 - BAU Handover**

See section 7.2

## 6. Performance Compared to Original Aims, Objectives and Success Criteria

### 6.1 Objectives

Objective	Status	Performance
<ul style="list-style-type: none"> <li>To develop a blueprint to allow secondary market trading</li> </ul>	Complete	The associated Market Design and Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs, in relation to secondary market trading were published as planned.
<ul style="list-style-type: none"> <li>To develop a blueprint to allow demand turn up services</li> </ul>	Complete	The associated Market Design and Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs, in relation to demand turn up services were published as planned.
<ul style="list-style-type: none"> <li>To create a blueprint for longer flexibility procurement linked to short term flexibility.</li> </ul>	Complete	The associated Market Design and Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs, in relation to longer term and short-term flexibility procurement were published as planned.
<ul style="list-style-type: none"> <li>To co-create a blueprint to link to ESO procurement of balancing service</li> </ul>	Superseded	<p>After commencement of the project, it was identified that Open Networks were in parallel launching an initiative as part of Workstream 1A Product 5, called 'Primacy' which had already identified a wider range of objectives.</p> <p>This development necessitated a review of the objectives set out within GAMMA Flex and whether there would be merit in maintaining the original approach or whether it was necessary to revise the approach.</p> <p>The final decision from the GAMMA Flex project partners and steering committee was conclusive, that due to the change in wider industry environment we would avoid any unnecessary conflicts and save the portion of the project budget allocated to system coordination.</p>

### 6.2 Success Criteria

Success Criteria	Achieved	Performance
<ul style="list-style-type: none"> <li>Market blueprints designed for secondary trading services.</li> </ul>	Yes	The Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs, in relation to secondary market trading were designed as planned.
<ul style="list-style-type: none"> <li>Market blueprints designed for</li> </ul>	Yes	The Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for

Success Criteria	Achieved	Performance
demand turn-up services		trading of flexibility services on behalf of DNO/DSOs, in relation to demand turn up services were designed as planned.
<ul style="list-style-type: none"> <li>Market blueprints designed for linking of long-term flex with short-term flex</li> </ul>	Yes	The Blueprints document, that sets out the compatibility terms for potential Independent Market Operators (IMO) who wish to establish a market for trading of flexibility services on behalf of DNO/DSOs, in relation to longer term and short-term flexibility procurement were designed as planned.
<ul style="list-style-type: none"> <li>Successful engagement and co-ordination of stakeholders</li> </ul>	Yes	Stakeholders were successfully engaged during the development of the draft market design and the blueprints via webinar and one to one interview.
<ul style="list-style-type: none"> <li>Successful designs for co-operation with the ESO</li> </ul>	Superseded	<p>After commencement of the project, it was identified that Open Networks were in parallel launching an initiative as part of Workstream 1A Product 5, called 'Primacy' which had already identified a wider range of objectives.</p> <p>This development necessitated a review of the objectives set out within GAMMA Flex and whether there would be merit in maintaining the original approach or whether it was necessary to revise the approach.</p> <p>The final decision from the GAMMA Flex project partners and steering committee was conclusive, that due to the change in wider industry environment we would avoid any unnecessary conflicts and save the portion of the project budget allocated to system coordination.</p>

## 7. Required Modifications to the Planned Approach during the Course of the Project

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### 7.1 Modifications to the ESO workstream

After commencement of the project, it was identified that Open Networks were in parallel launching an initiative as part of Workstream 1A Product 5, called 'Primacy' which had already identified a wider range of objectives. This development necessitated a review of the objectives set out within GAMMA Flex and whether there would be merit in maintaining the original approach or whether it was necessary to revise the approach.

The initial concerns were to avoid confusion around the wider goal of a collaborative approach to coordination as well as any duplication that would feasibly be regarded as a poor use of innovation funding. Further investigation confirmed that there was likely to be elements of both and that it would be more efficient for GAMMA Flex to report its outputs to the NGED representative on Open Networks and request that they undertake a document review role on the market design to ensure that there is internal coordination between innovation and NGED network strategy.

This does not entirely negate the necessity to work with ESO as well as other potential actors within a flexibility market, as the approach within Open Network is still primarily focussed on the development of products. The underlying principle for IntraFlex and now GAMMA Flex have been the shift away from products or at the very least the parallel development of a service-based arrangement between system operators and flexibility providers. This is partly to fulfil the objective set out by Ofgem to facilitate neutral markets, but more directly, this should be recognised as one of the key initiatives to increase liquidity, which is ultimately a key metric of success for DSO Flexibility.

Both ESO and DSO have been primarily focussed on the development of services as this is a more direct way to engage with providers and allows the DSO to detail requirements with a high degree of specificity. Unfortunately, this approach is not desirable for all potential providers and in fact, can be problematic for a broad spectrum of providers and asset types. Another reason that that DSOs are more advanced in the development of products is due to a decision taken by the regulator to prevent them from owning any markets or market platforms.

The final decision from the GAMMA Flex project partners and steering committee was conclusive, that due to the change in wider industry environment we would avoid any unnecessary conflicts and save the portion of the project budget allocated to system coordination.

If sufficient progress has been made, then it will be likely that a short project will be proposed specifically to engage both ESO & DSO in mapping their functional requirements to identify

synergies and conflicts. The intention would be to do this in a concentrated manner, rather than through a protracted series of workshop sessions that is typical of Open Networks, in order that it can include a large group of stakeholders.

## **7.2 Operational Trial**

With a project of this nature, it is vital that the outputs receive support from the majority of key stakeholders as the ultimate metric of success for a market design will be whether or not it attracts additional liquidity, increases competition, and ultimately enhances the wider landscape for flexibility services. With that in mind, the agreed, pragmatic approach is to break the lifecycle of a new service into appropriate stages with 'gate approvals' necessary to ensure that objectives are being met before committing further time and resources to the process. Through our ongoing consultations and engagement with stakeholders, we believe there has been a sufficient consensus on the need to continue with the market development activities. A suitable trial scope has been authored and submitted for Network Strategy sponsorship and funding approval based on the positive outcomes of the Gamma Flex design exercise.

## **7.3 BaU**

In order to ensure the designs created within Gamma Flex and that there is sufficient engagement with potential flexibility providers there is an expectation that an operational trial is a necessary step before rolling out through BaU. This was also the approach for Flexible Power and the interim phase of using the new services while still refining the propositions is an important stage to ensure that the final BaU implementation meets the outlined needs.

This also includes the need for the DSO to further develop its own processes and where appropriate develop new tools to ensure a successful roll out. In the proposed operational trial, it is expected that NGED will examine its need for enhanced capabilities in forecasting, network analysis, procurement, and optimisation to ensure the

## 8. Project Costs

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The final costs for the GAMMA Flex project can be seen in table 8.1 below.

**Table 8-1: Project Spend**

<b>Activity</b>	<b>Budget (£)</b>	<b>Actual (£)</b>	<b>Variance (£)</b>	<b>Variance (%)</b>
NGED Project Costs	<b>38,790</b>	<b>36,887</b>	<b>1,903</b>	<b>4.9%</b>
Contractors	<b>294,075</b>	<b>105,541</b>	<b>188,534</b>	<b>64.1%</b>
Dissemination	<b>8,000</b>	-	<b>8,000</b>	<b>100%</b>
Contingency	<b>34,086</b>	-	<b>34,086</b>	<b>100%</b>
<b>Total</b>	<b>374,951</b>	<b>142,428</b>	<b>232,532</b>	<b>62.0%</b>

The total project cost came to £142,428 with a variance of 62.0% compared to its budget. Prior to the commencement of the project, a re-scoping exercise had to be carried out in order to fit the delivery timescales within the RIIO-ED1 period. Although the budget had been considerably reduced from the initial scope of work to the one used for GAMMA Flex, an overestimation of the time to be spent on the project has been made. This does not mean however, that a lack of effort has been carried out, purely down to the nature of the shift in workload for the project partners.



## 9. Lessons Learnt for Future Projects and outcomes

The learning from the GAMMA Flex project has been gathered from several areas and can be broken down into some key areas.

- The stakeholder workshop carried out during the summer of 2022.
- The subsequent interviews and feedback gathering.
- The overall market designs, what went well and what didn't.
- Seeking internal business engagement.
- General project management.
- Sourcing a path for the BaU transition.

A summary of the learning generated from the project is outlined in table 9-1 below.

Table 9-1 GAMMA Flex Learning

Subject Area	Learning Details
Dissemination	The stakeholder workshop was carried out virtually due to UK wide train strikes at the time of the event. Although the event, generated useful outputs, it seems there would've been more brought to the table if it were held in person. This will be one to consider in future projects.
Stakeholder engagement	Within the project, we have found that gathering feedback from stakeholders yields a greater output if carried out in a 1-2-1 style interview / discussion. Although this method is time consuming
Stakeholder engagement	Gathering feedback took a lot longer than originally anticipated. Relying on emails for correspondence leads to a drop in respondents, leading to us sourcing 1-2-1 feedback.
Business Engagement	Due to the nature of the flexibility subject area and the limelight that it is in, it is imperative that regular continuous engagement is carried out with the internal business. Although engagement was carried out, there was too much time in between where developments were made. It is recommended on future projects that an engagement program is implemented to make sure both (internal parties) are aligned correctly.
Market design (penalties)	Regarding penalties, most stakeholders agreed that it is sensible to reduce availability payments in the scenario that their delivery falls below a threshold.
Market design (penalties)	The majority of FSP respondents suggested that incorporating additional penalties on top of reduced payments would discourage participation.
Market design (penalties)	Several stakeholders' voices that threat of contract or market termination / suspension would provide a sufficient incentive for FSPs to participate in the secondary market.
Long term market design	Several respondents to the questionnaire were made suggesting that FSPs with planned, but not yet existing assets should be allowed to participate in the long-term market.
BaU transition	From the experience of this project, implementing / proposing a BaU solution is timelier than first thought. Needs extra wording.

## 10. The Outcomes of the Project

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The comprehensive details of the project outcomes are in line with the work carried out and detailed in section 5. There were no operational trials as the scope of the project was to complete a design exercise with the significant outputs being contained within the blueprints which have been published following peer review. This section of the document will avoid repetition by directing the reader back to section 5 for a detailed breakdown of the methods and the outcomes are summarised below.

### 10.1 Market Design

The market design was intended to an ongoing evolution of the short-term market that was designed and tested within the IntraFlex project. Due to the success and positive feedback that was received the market design was to be expanded to include the following additional features.

- Updates to Short-Term market principles (T- 1 month to T- 15 mins)
- Mid-Term market (T- 1 yr. to T- 1 month)
- Long-Term market (T- greater than 1 yr.)
- Secondary Trading (during mid and short-term market windows, primarily through volume reallocation principles)
- Penalties (for partial and entire non-delivery and embedded with secondary trading for avoidance on a partial or total volume reallocation)
- Demand Turn-Up capabilities (bi-directional service capability)

The market was specifically designed to complement the established procurement of the standardised products (Sustain, Secure, Dynamic & Restore) through Flexible Power. The design has been published and reviewed with feedback incorporated where appropriate. This design should form the basis of an operational trial to establish if it can achieve additional liquidity by offering an alternative market-based access to participants than currently on offer through the Flexible Power product procurement.

### 10.2 Stakeholder Feedback

As with section 10.1 above, the stakeholder feedback has previously been reported in detail. Please see section 9 above.

### 10.3 Blueprints

The blueprints are some of the key output from the Gamma Flex project and are intended to establish standardised requirements that aim at making it easier for FSPs to act across multiple markets. This doesn't limit them from their own ability to innovate and develop attractive propositions that attract liquidity as well as offering services to other potential buyers such as the TSO and ESO.

The Blueprints set out many of the parameters that require to be in place between the 3<sup>rd</sup> party market place, who have the responsibility of neutral market facilitator, with the counterparty to the trades with the DSO. This could be the asset owner or an intermediary such as an energy supplier

or aggregator, so it is important that the nature of all the variables can be accommodated and all FSPs given equal opportunity to trade with the DSO. The blueprints cover 4 key categories and there is an acceptance that these will probably evolve over time to include additional parameters to those identified during the project.

### **Legal Framework**

The legal framework is the relationship between flexibility providers and the market operator and will be required to capture specific terms and conditions that ultimately link the purchasing DSO and the FSP that will deliver service.

### **Data Protection / Storage / Access**

Relating to data handling was intended to ensure that all data is appropriately categorised and any rules relating to how it is transferred, processed, or stored are clear to ensure that there are no breaches of rules, which may be set within the contracts or broader legislations such as General Data Protection Regulation (GDPR).

### **Asset registration / Tracking**

This ensures any asset register takes the operation of Flexibility Markets into consideration. The main objective was to ensure that all assets regardless of size can be verified as to their suitability for providing services, including such parameters as location, asset type, permits and authorisation to operate. This needs to be possible, regardless of whether the asset is operated directly or within a portfolio with multiple intermediaries, which highlights the need to create a unique identifier that can be used to track who has control of every asset and avoid conflicts such as duplication.

### **Realtime Operational Data Exchanges / API**

This identified all the functions and potential data fields that could be contained within the library of functional commands and would be associated with a resource very similar to a 'GitHub' or 'API Library' that would enable platforms to comply with industry standards without limiting their own scope to enhance and develop operational advantage between platforms.

A very limited number of fields within the library would be mandatory for inclusion in all API data exchanges

## 11. Data Access Details

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No new data was generated from the project, only existing data had been used to carry out the project.

## 12. Foreground IPR

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The following foreground IPR generated from the project is outlined below:

- UK Market design
- UK Market design technical Blueprints documentation to support data interfaces for provision of services from external Flex Market.

## 13. Planned Implementation

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The outputs of the project have been published and shared with the wider industry at a very pertinent time, just ahead of RIIO ED2. There is increased interest from the Ofgem and other industry bodies in seeing DSOs play their vital role in facilitating neutral markets. This includes consultations from other DSOs who are also keen to see increased participation and liquidity within flexibility procurement. The outputs of Gamma Flex should help guide the wider industry debate around the best model that offers a balance between sometimes competing factors, such as ESO coordination, operational conflicts, and revenue stacking. It is not within the control of NGED unilaterally implement a DSO-wide market or set rules on behalf others but offers the blueprints as a template to assist any others who have a similar view as to the potentially valuable role of third-party market operators.

NGED can continue to develop the Gamma Flex market model by building on the success of IntraFlex which did carry out operational trials and demonstrating a competitive market platform in partnership with NODES. The next stage towards implementation will be an operational trial of the IntraFlex short-term market in live BaU constraints zones in parallel with existing Flexibility Procurements with the option to introduce mid-term and long-term trading dependent on results.

## **14. Contact**

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

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## Glossary

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<b>Abbreviation</b>	<b>Term</b>
BaU	Business as Usual
DNO	Distribution Network Operator
DSO	Distribution System Operator
ESO	Electricity System Operator
FSP	Flexibility Service Provider
NGED	National Grid Electricity Distribution
NIA	Network Innovation Allowance
IMO	Neutral Market Facilitator
OFGEM	Office of Gas and Electricity Markets



