NATIONAL GRID ELECTRICITY DISTRIBUTION

GAMMA FLEX

(GENERATING ADDITIONAL MARKETS FOR MATURE ACCESS TO FLEXIBILITY)

INDEPENDENT MARKET OPERATORS BLUEPRINTS

FINAL VERSION – 23/02/2023

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Document Control	Name	Date
Authored & revised by:	Gary Swandells	23/02/2023
Reviewed by:	Sofia Eng	23/02/2023
Approved by:	Jacob Lynch	23/02/2023

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2 INTRODUCTION TO THE BLUEPRINTS

The purpose of having a Blueprints document is to set out the compatibility terms for potential independent market operators who wish to establish a market for trading of flexibility services, where DNO/DSOs purchase flexibility services from Flexibility Service Providers (FSPs) . Independent Market Operators is a term that is interchangeable with Neutral Market Facilitator but is employed in this document to ensure clarity. There has previously been some confusion between the DSO's responsibility to facilitate neutral markets and the role of a market operator as the IMO, which we are keen to avoid. While there are products already offered by most DSOs directly to asset owners through the 'Flexible Power' collaboration it is widely recognised and in agreement with Ofgem, that market operators should be encouraged to develop attractive propositions that help ensure openness and promote liquidity within this burgeoning industry sector. Rather than having each potential third-party market operator attempt to negotiate their own technical requirements, there is a compelling case to standardise some of these arrangements. In doing so it ensures that there is an equitable set of arrangements that all market operators abide by and that they are only differentiated by their offerings to providers. A uniform approach should encourage market operators to innovate and strive to create attractive environments to attract FSPs (Flexibility Service Providers) to use one platform over another.

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.

As markets evolve over time it is likely that the Blueprints will require revisions and therefore it is expected that a stakeholder group will be necessary to carry out occasional reviews of the efficacy Blueprints and suggest recommendations for updating where appropriate. On this basis, we welcome any feedback on the completeness of the suggested range of categories and their content as set out in section 4 of this document[1].

3 PROJECT OVERVIEW

NGED along with other DNOs have committed to a 'Flexibility First' approach to network investment and will increasingly see that capital investments will be deferred to sweat existing assets ahead of inevitable reinforcement. This will become more and more important for managing asset replacement as we see the impact of the changing behaviours right across the electricity networks. Due to the combination of growth within

[1] Any feedback should be directed to jlynch@nationalgrid.co.uk

the demand and generation on the distribution network, it is likely that they will experience unprecedented levels of work to expand the network and accommodate national plans to facilitate Net Zero.

Fortunately, much of the new demand requirements are for low carbon technologies such as transportation, heating, hydrogen, and energy storage schemes, which mean that as well as presenting challenges, their inherent latency can potentially be harnessed, and contribute to flexibility schemes.

The situation is similar with renewable generation schemes where there appears to be an unabated appetite to install solar, wind and other technologies on the lower voltage areas of the distribution network, as opposed the old convention of large thermal plants on the transmission network. This can already be observed across the DNO industry with most now publishing their requirements and procuring flexible capacity in areas of forecasted constraints rather than automatically opting to replace and upgrade assets.

NGED has been at the forefront of this movement and in doing so developed a flexibility toolkit called 'Flexible Power' to facilitate this new approach. Flexible Power was created through strategic innovation work and specifically as an output from 'Project ENTIRE'[2]. Its purpose is to be more than just an exclusive NGED service and has been successfully expanded in its use through the creation of a collaboration that utilise Flexible Power which currently includes six of seven UK DNOs:

The collaboration group is highly aware of the change that this approach presents over the traditional attitude to customers, where DNOs have very limited direct contact. Unless there is a power cut or some form of new connection required, most customers have no necessity to contact their DNO and in many cases households and business may even be unfamiliar with the role of the DNO. This is understandable as DNOs typically don't have any real relationship with most customers, although there are exceptions in the case of vulnerable customers or large developers, who represent the extreme edge cases. For the vast majority, the only DNO interactions relate to the payment of network usage fees and these and these are levied indirectly through a customer's supplier.

The Flexible Power toolkit has provided DNOs with a system that addresses many of the challenges to the provision of Flexibility Services and established a direct capability between the network control room and providers with flexible assets. Much of this has been achieved in a manner that has ensured very low barriers to entry and provision of services, without the need for any proprietary hardware or significant burden on manpower resources.

In the absence of any existing marketplace that DNOs could access, Flexible Power was originally established around a limited number of specific services. These were created to address specific needs and productised to simplify how they are communicated to

[2] Full details of ENTIRE can be accessed via ENA (Energy Networks Association) Smarter Networks Web Portal - https://smarter.energynetworks.org/projects/nia_NGED_017/ and NGED Website https://www.nationalgrid.co.uk/innovation/projects/project-entire

providers. These services are called ‘Secure’, ‘Dynamic’, ‘Restore’ and ‘Sustain’ and are detailed later in this document. As a result of the productisation approach the services are heavily constrained in terms of the operational rules that limit the ability of some potential providers to participate in network support activities.

However, as the wider industry is evolving it is within the remit of DNOs to act as ‘Independent Market Operators’ and help enable other services such as the ones demonstrated by IntraFlex. Rather than just having the initial services as created by the DNO, plurality of service options further lowers barriers to entry and increases potential to address structural challenges such as the continued difficulties of engaging multiple markets and stacking revenues.

External marketplaces are committed to enabling market participants to access opportunities within distribution, transmission, system level and even commodities trading. This has the added attraction of creating a single access point to achieve greater value for providers through a single contract and technical interface. By taking a ‘whole system’ approach that can offer more value to providers it is likely that we will see more capacity made available, leading to greater liquidity, and improving overall efficiency, in turn reducing the overall cost to customers.

The scope of IntraFlex was mainly limited to establishing whether or not there was appetite for a near term continuous flexibility market, rather than the direct procurement approach of Flexible Power.

With that now confirmed it is the objective of GAMMA Flex to ensure that any external marketplaces can be effectively integrated into the Flexible Power toolkit. By standardising this through the creation of a technical and commercial blueprint, the DNOs can fulfil their mandate to facilitate markets and establish a consistent and fair mechanism for trading.

With Flexible Power acting as the “hub”, it is then possible for a DNO / DSO that uses Flexible Power to allow multiple markets act as spokes and easily utilise the blueprints, including API’s and standardised contracts, to submit offers or respond to bids submitted by the DNO. This should allow the developers of external marketplaces to design their services to attract providers on a legitimate basis and without bias resulting from differing DNO agreements. It is the expectation of the project team that when this is successfully demonstrated then it will be possible to roll this out across all the DNOs who already collaborate on Flexible Power. The benefits of this would be significant, not only in sharing costs, but the more standardised the environment around flexibility services across Great Britain the easier it should be for providers to participate.

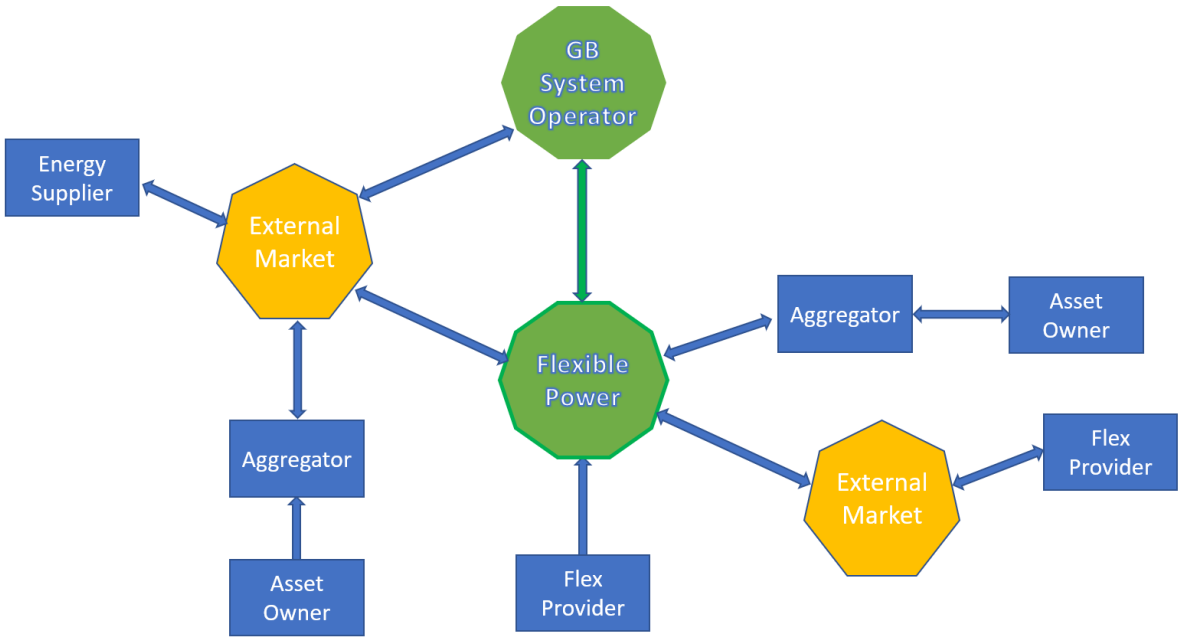

Figure 1- Simplified schematic of interactions within a hub and spoke arrangement

4 BLUEPRINTS FOR MARKET INCLUSIVITY

In order to fulfil the regulatory requirement of facilitating neutral markets, it is the expectation that there needs to be a fair and transparent structure on which all markets are based. Markets can then differentiate themselves through the offerings they present to providers whilst maintaining consistent standards in the way they interact with the DSO and the Flexible Power hub which encompasses all the operational tools they require. Managing this conflict between the desire to standardise some aspects of the interactions while granting market platforms the autonomy to innovate and compete with each other is a significant challenge. For this reason, we have adopted the principle of 'blueprints' that set out the minimum requirements in many of the key areas that require coordination without becoming overly prescriptive. The blueprints will provide guidance and a compliance checklist that should make it relatively simple for any new platforms to ensure that they will be able to contract with the DSO without the need to negotiate individual terms or that they will be limited by another platform being granted exclusive rights.

We have identified a number of areas where blueprints would be required. For each of these we have included a section outlining their purpose as well as an indicative list of the parameters to be contained within each. Over time this may be refined with the addition of further required areas that support the continued development of the market and with operational processes

4.1 LEGAL FRAMEWORK

The legal framework is not the contract that will require to exist between the DSO & the market platform but instead, reflects the relationship between flexibility providers and the platform operator. There may then be a further relationship that exists between the asset owner and the asset operator if, for example, an aggregator or other such entity is in place to manage the bidding and commercial operation of assets as highlighted in Figure 1, Section 2 of this document. On this basis it is important that we ensure that whatever the contractual relationship between the actual asset and the organisation buying or selling flexibility, the legal framework will be required to capture specific terms and conditions that ultimately link the purchasing DSO and the assets that will deliver service. Some of these may be able to be lifted from the DSO / Market Operator contract to ensure that they ensure a back-to-back of responsibilities while others could require to be tackled differently to ensure that they don't restrict the ability to innovate and create novel offerings that enhance the services that are developed.

Ref	Title	Purpose
L1	Counterparty Details	The platform provider should ensure they have validated all the necessary information relating to FSP to ensure that they can be pursued appropriately in the event of a contractual breach.

Ref	Title	Purpose
L2	Business readiness	Both the IMO platform and the asset owner should be registered organisations that have all the necessary registration complete with companies house and any other governance such as VAT that would be expected of an organisation legitimately trading in the UK.
L3	Compliance with laws and regulations	In order for some assets to operate legitimately and legally they will require to obtain permits to ensure they are compliant with wider legislation. Examples include Environment Agency permits and generation connection permissions to the network which set out very specific parameters which are intended to make sure assets are safe. The DSO does not wish to be associated with any assets that are not fully compliant with all of the conditions necessary, relating to asset type and location.
L4		
L5		
L6		
L7		

It is important to note that the blueprint tables are likely to be reviewed occasionally to ensure their fitness for purpose and ensure that the compliance for NMFs and Flex Providers remains relevant withing the development environment for flexibility services. To that ends we considered the requirement for the blueprint to include a category for liquidated damages and to ensure that counterparties and providers had appropriate cover in the event of a default. Following several discussions and analysis of the current market conditions it was agreed that introduction of such parameters at this stage would be premature and that it would be more pragmatic to address this in future through engagement with all the key stakeholders, potentially by means of a consultation exercise. This will seek to establish agreement around what would define specific trigger events that would require liquidated damages as a remedy for service failures and the appropriate level of penalties that sets a fair balance between incentivising providers and protecting the network.

4.2 Data Protection / Storage / Access

Data is a critical aspect of the services and relationships between the multiple parties that interact in order to create the capabilities that make up the Flexibility Markets. These could feasibly transfer between asset owner, asset operator, supplier, aggregator, market platform and DSO, so it is important to ensure that any data is handled appropriately. The blueprint relating to data handling is 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).

Ref	Title	Purpose
D1	Penetration Test	Should the DSO wish to conduct penetration tests, the financing and organisation of such tests would be the responsibility of the DSO.
D2	GDPR	Platform provider must be able to demonstrate, via a statement of compliance, that they have a suitable approach to GDPR. This should cover the seven key principles as defined by the Information Commissioners Office: 1) lawfulness, fairness, and transparency. 2) purpose limitation. 3) data minimisation. 4) accuracy. 5) storage limitation. 6) integrity and confidentiality (security). 7) accountability
D3	Reporting	The platform provider must agree to promptly inform the DSO of any data breaches or data related incidents along with details of remediation. An appropriate reporting form and standardised process will be developed for this purpose.
D4	Cyber Security	The market operator should be able to demonstrate that it has adequate Cyber Security measures in place if the DSO requests this information.
D5		
D6		
D7		

4.3 ASSET REGISTRATION / TRACKING

The actual registration of assets and the ability to track them is out of scope for the GAMMA Flex project itself and there has already been some level of discussion within the energy industry, highlighting the need for such capabilities due to the continued growth of Distributed Energy Resources (DER). DER can range from very small 'behind the meter' devices at a domestic level through to relatively large assets such as generators or batteries of several tens of MWs connected to distribution networks. Many of the use cases behind having comprehensive registers are intended to ensure that the DNO/DSO can operate the networks safely and ensure reliability in spite of so many potentially active users. This may result in registers developed by each DNO/DSO or a more coordinated approach involving organisations with a national view such as National Grid, Elexon, ENA or Electralink to highlight just some of the potentially interested parties.

We would therefore expect that the blueprint for the Flexibility Market Design should only represent a stakeholder view that ensures that any register that addresses the wider challenges of tracking DER takes the operation of Flexibility Markets into consideration.

The main objective is to ensure that all assets regardless of size can be verified as to their suitability for providing services, which will include 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 for each asset that can be used to track who has control of every assets and avoid conflicts such as duplication.

These field are required for asset registration but it is not the responsibility of the market operator to create a registry, but it is vital they can access any future registry.

Field Ref	Title	Purpose
A1	MPAN	The Meter Point Admin Number is a 21 digit reference that DNOs use and provides a quick and reliable mechanism that DSO / DNO can identify a site and can assist with gathering and validation some of the other fields. MPANs tend to be accurate and very quick to locate assets to a specific area of the network.
A2	DSO Area	The DSO licence area the asset is located in.
A3	Unit	While the MPAN is a unique code to identify a site, there may be multiple assets on a site and in order to allow these to act independently of each other, they need to be able to be individually addressed. The Unit

Field Ref	Title	Purpose
		data is intended to allow the separation of assets at a more granular level than A1 MPAN.
A4	Type	There is a growing range of asset types that have the potential to participate in flexibility services, but their abilities vary greatly by type and in some cases such as with generators, require additional permits to operate. Knowledge of asset types can help with the optimisation of choosing which assets to use when managing a constraint event.
A5	Maximum operating Capacity conventional	For some assets there may be a variance between the potential capacity of an asset and the level that an asset owner is willing to provide for flexibility services. The purpose of requesting this value specifically can assist with planning and avoid errors being derived from assumptions. A4 specifically relates to demand reduction / increased generation
A5	Maximum operating capacity DTU	For some assets there may be a variance between the potential capacity of an asset and the level that an asset owner is willing to provide for flexibility services. The purpose of requesting this value specifically can assist with planning and avoid errors being derived from assumptions. A4 specifically relates to demand increase / reduced generation
A6	Name Plate Capacity conventional	The nameplate rating represents the maximum capacity that an asset can potentially deliver and may vary from that which if traded on an operational basis. The term ‘name plate’ is recognised nomenclature for generators but may not be readily available for other assets such batteries, deferring of demand consumption or EVs. Where this is the case then a manufacturers specification can be substituted. A6 specifically relates to demand reduction / increased generation
A7	Name Plate Capacity DTU	The nameplate rating represents the maximum capacity that an asset can potentially deliver and may vary from that which if traded on an operational basis. The term ‘name plate’ is recognised nomenclature for

Field Ref	Title	Purpose
		generators but may not be readily available for other assets such batteries, deferring of demand consumption or EVs. Where this is the case then a manufacturers specification can be substituted. A7 specifically relates to demand increase / reduced generation
A8	Location	Street address including postcode or latitude/longitude
A9	Connection Agreement / Permits	Confirmation from the asset owner that they have all the necessary permits and in particular, an up-to-date connection agreement for generating assets
A10	Owner	Contact details for a representative of the asset ownership
A11	Operator	Contact details for a representative of the asset operator such as aggregator or supplier if different from the asset owner
A12	Industry Ref	Not yet applicable, but it is likely that a national registration scheme for assets will be created and issue all assets with their own unique reference. This could potentially also act as a source for much of the other necessary data to be drawn from or validated against.
A13		

4.4 REALTIME OPERATIONAL DATA EXCHANGES / API

Data exchanges and in particular APIs have been the subject of industry discussions as to whether there is a benefit to standardisation across multiple industry bodies including the ESO, TSO and DSO. As with the previous section on registration, it is deemed 'out of scope' for this project to attempt to set a full API specification. Instead, the blueprint identifies all the functions and potential data fields that could be contained within the library of functional commands that should be included. A small number of these will be mandatory but the majority are there to enable market providers to create environments that support a broad range of service capability.

The leading principle of the GAMMA Flex design is to open up the opportunity for market operators to retain the ability to build their platforms as they wish and as much as possible, we should avoid introducing limits on their creativity. The proposal would therefore be to create a blueprint that 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. The data exchanges with the 'E' prefix in general are used to manage any flexibility events whereas the 'T' prefix is for the interaction with the trading activity on a market operator platform.

Ref	Title	Purpose	Mandatory
E1	Timestamp	Timestamps reflect the time that an event happens, e.g. that an order is received or a transaction is executed. Where time stamps relate to data exchange, timestamps shall be created and recorded by the recipient of data. Format will be specified but likely to be in UTC. *E1 is mandatory for all API exchanges*	Y
E2	API Key	All data exchanges must at the very minimum be secured by and API key. Each exchange requires they key to be included in order to validate authenticity. *E2 is mandatory for all API exchanges to ensure security and integrity of data*	Y
E3	Asset ID	An asset ID allows the DSO to identify the specific asset or assets, for the purpose of asset registration and validation and for metering and settlement. This is assumed to be the A12 blueprint field used when registering assets. If a lone asset is trading, then it may be sufficient to use E3 to identify the location and associated operational information. If multiple assets are being traded, then a series of asset IDs could be listed. Alternatively, they could be grouped within a 'portfolio' (see E4)	
E4	Portfolio ID	A portfolio is sometimes referred to as a 'Dispatch Group' and is used by the market operator to identify a group of assets being aggregated together to achieve the capacity being traded.	
E5	Metering – Readings1	For the majority of flexible services, it is necessary to provide performance data in the form of metering	

Ref	Title	Purpose	Mandatory
		at 1 min intervals to ensure a consistent service is being delivered to maintain predictable and reliable constraint management capability. A common standard will be agreed for format and frequency of the metering data being sent. This requires including units, decimal places and a clear definition of what is positive and negative for conventional and DTU services.	
E6	Metering – Readings30	In some instances, if agreed in advance it may be acceptable for a DSO to receive ½ hourly metered readings. Where this is acceptable then the Readings30 standards will be applied. A common standard will be agreed for format and frequency of the metering data being sent. This requires including units, decimal places, and a clear definition of what is positive and negative for conventional and DTU services.	
E7	Dispatch Notification	The dispatch notification will for many services be superfluous as the trading arrangements in advance rather than through a products approach should mean that the Flexibility Provider should know what the specifics of the requirement are. Such as start time, capacity, and event duration. However, to assist with ensuring the best possible quality of service an optional reminder notification can be provided.	
E8	End Notification	The end of event notification will for many services be superfluous as the trading arrangements in advance rather than through a products approach should mean that the Flexibility Provider should know what the specifics of the requirement are. Such as start time, capacity, and event duration. It is also not necessary for an asset to cease operation at the end of an event and may wish to continue. The dispatch notification will for many services be superfluous as the trading arrangements in advance rather than through a products approach should mean that the Flexibility Provider should know what the specifics of the requirement are. Such as start time, capacity, and	

Ref	Title	Purpose	Mandatory
		event duration. However, for added assurance that an asset will not overrun an optional reminder notification can be provided.	
T1	Availability price limit	DSO ability to set or adjust maximum availability price for an order or period. *T1 is mandatory for all DSO initiated orders*	Y
T2	Utilisation price limit	DSO ability to set or adjust maximum utilisation price for an order or period. *T2 is mandatory for all DSO initiated orders*	Y
T3	Capacity Limit	DSO ability to set or adjust desired capacity of flexibility for an order or period. *T3 is mandatory for all DSO initiated orders*	Y
T4	Minimum capacity requirement	DSO ability to set or adjust minimum capacity on any individual order. This is to avoid acquiring flexibility that if below a certain level will still require an alternative action to address constraints and supersede a flexibility event.	
T5	Date / Time of Service	DSO ability to set or adjust dates and times of service requirements. *T5 is mandatory for all DSO initiated orders*	Y
T6	Minimum Duration	DSO ability to set or adjust minimum duration of service delivery, typically in 30-minute increments. *T6 is mandatory for all DSO initiated orders*	Y
T7	CMZ / Location	DSO ability to identify the point of constraint or the area in which flexibility providers will impact the constraint. The locational element of constraints and flex providers is critical to service delivery. When flexible assets and portfolios are registered with a platform it must be possible to verify that all of the assets a provider is bidding fall within the correct portions of the network to address the constraint issues. When a DSO inputs an order, it is necessary that any platform ensures that only appropriate flex providers can match that order. There are various mechanisms which can achieve this, from MPAN or postcode lookup, to vector files on a map. At this stage there is not a preferred	Y

Ref	Title	Purpose	Mandatory
		method which may be the subject of industry standardisation at a later date. *T7 is mandatory for all DSO initiated orders*	
T8	Price Response	DSO ability to view FSP pricing on bids and accept availability / utilisation price for an order or period as set in a flex provider-initiated order.	
T9	Capacity Response	DSO ability to view FSP capacity on bids and accept some or all capacity for an order or period as set in a flex provider-initiated order.	
T10	Time Response	DSO ability to view FSP time and duration conditions on bids and accept for an order or period as set in a flex provider-initiated order.	