transition
Moving to a smart future

Commercial Findings Workshop Report

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1 Executive Summary

This paper summarises the key outputs of two workshops held by Baringa and SSEN in early 2023. The workshops were designed to compile commercial learnings from the LEO and TRANSITION trials. The first workshop allowed LEO partners to share their insights on their business models for using flexibility and commercial learnings. The second workshop built on the findings of the first to explore the commercial arrangements for different business models and highlighted potential commercial solutions to the LEO partner's issues.

During the first workshop, each LEO partner presented on their business models and commercial findings. The partners were given guidance on the information required about income and cost for both DSO-Procured and DSO-Enabled Services, and the economics of delivering at scale. The second workshop was delivered in two parts: the first part looked at the different contractual mechanisms that could be used in place of those used in the TRANSITION trials, and the second part looked at the commercial solutions that could be developed to alleviate the barriers experienced by the participants during the Project Trials.

The workshops identified several key commercial issues, including:

- the comparatively low prices for DSO-Procured services;
- the baselining methodologies are not fit for purpose and exacerbate the low financial reward;
- the Flexibility Services Agreement (FSA) is a significant barrier to participation; and
- the inability to stack different revenue streams is detrimental to a liquid market in which both market participants and the network can benefit.

The following key recommendations are aimed at improving the flexibility market for Distributed Energy Resources (DERs) at lower voltages and increasing their participation in the grid:

1. Reviewing exclusivity clauses and developing primacy rules across all markets to ensure market participants can stack different revenue streams.
2. Revising the (FSA) to make it more accessible for DERs at lower voltages, reviewing its terms and conditions, exploring regulatory changes, and encouraging third-party market access.
3. Developing a simple and accurate baseline model for service stacking, exploring simpler baselining methods, and considering whether baselining is necessary for all DSO services.
4. Exploring automation and collaborating with manufacturers and aggregators to reduce the burden of using DERs to prove flexibility, developing industry standards, and outlining customer responsibilities and rewards in a fair manner.
5. Addressing the price ceiling as a major barrier to participating in DSO services by engaging with ENA Open Networks Project and Ofgem to determine alternative ways of valuing flexibility that represent wider societal and whole system benefits.

2 Introduction

Baringa and SSEN held a two-part workshop series in early 2023 with the aim to compile commercial learnings from LEO-TRANSITION trials (Project Trials). The first workshop (25-Jan) was used as an opportunity to allow the LEO partners to share their insights on their business models for using flexibility and commercial learnings. The second workshop (08-Feb) built on the findings of the first to explore the commercial arrangements for different business models and highlighted potential commercial solutions to the partner's issues. This paper provides a summary of these workshops and their key outputs.

2.1 Workshop 1: Commercial Findings

Each LEO partner who participated in the Project Trials were given a time slot to present on their business models and commercial findings in the context of the Project Trials. Prior to the workshop, the LEO partners were provided with guidance on the information required about income and costs when delivering both DSO-Procured and DSO-Enabled Services from their DERs, and the economics of delivering at scale. The following questions were also discussed to help each shape their presentation. The amalgamated responses to the below were used to provide the key outputs (Section 0) and recommendations (Section 0).

- **Table 1: Questions provided to each partner for their consideration**

Business Model Questions	Commercial Finding Questions
What is your business model and how do the Project Trials feed into this?	What are three main challenges that need to be overcome in Business as Usual (BaU) so that you can maximise the financial benefits from DSO-Enabled and DSO-Procured services?
What is the primary function of your Distributed Energy Resources (DERs), what are their revenue streams, and how do they contribute to your business model?	What were the costs of participating in the Project Trials and how would these reduce in BaU?
What will your business' cost structure look like once you have the appropriate level of automation and flexibility is a BaU activity?	What was the income from participating the Project Trials?
	Which services did you participate in, and which has scope to provide you with the highest profit?
	How would participating in the provision of DSO-Enabled and DSO-Procured services enhance your business model?

Workshop 2: Commercial Arrangements

The second workshop was delivered in two parts: the first part looked at the different contractual mechanisms that could be used in place of those used in the Project Trials, the second part looked at the commercial solutions that could be developed to alleviate the barriers experienced by the participants during the Project Trials. The outputs from these discussions are provided in Section 0.

2.2.1 Contractual Mechanisms

The following contractual mechanisms were presented to the participants to stimulate a discussion as to the advantages and disadvantages to each option.

- **Table 2: Potential Contractual Mechanisms for BaU**

Option	Name	Description
Option 1 (Used in Project Trials)	Current Arrangement (FSA)	Market Participant signs Flexibility Service Agreement (FSA) and provides services directly to the DSO, assuming contractual obligations and risks Financial settlement based on delivery performance
Option 1a (Used in Project Trials)	Current Arrangement (Aggregator)	Aggregator signs the FSA and takes on obligations and risks Flexibility owner provides services via an aggregator in line with a flexibility contract Settlement between aggregator and provider based on the flexibility contract
Option 2	FSA (light)	Market Participant signs slimmed down FSA and provides services directly to the DSO, assuming contractual obligations and risks Financial settlement based on delivery performance
Option 3	Industry Codes	Rethink some clauses, e.g., liability for flexibility failures could be socialised across all customers (needs regulatory change) Flexibility products standardised across all markets and T&Cs (including FSA) are absorbed into industry codes, e.g., Balancing Settlement Codes, Grid Code and Distribution Code, etc. Market Participant could offer flexibility through a third party which may not involve a flexibility contract, e.g., may be bundled as an add-on to an existing supply agreement May require a common platform for dispatch and data needs similar to Balancing Mechanism

2.2.2 Key Commercial Issues and Recommended Solutions

Recurrent and key issues identified during the first workshop were used to devise solutions which could meet the requirements of the LEO partners, see **Figure 1**. These were presented on the second workshop to instigate discussions as to whether they were the potential solutions, and what the advantages and disadvantages of each would be.

Issue	Solution	Advantages					
		Simplify Delivery Validation	Increase Accuracy of Delivery	Enables more Flexibility	Reducing Resource Costs	Better Valuing DER Flexibility	Increasing Income
Baseline	Use a diverse and more reliable Baselining Solution: e.g. Regression, Nomination and historical	x	x				
	Use simpler baseline approach e.g., Meter Before and Meter After start and end of delivery	x	x	x	x		
	Develop alternative Services which negate the requirement for baselining	x	x	x	x		
	Use alternative metering or non-metering solutions to avoid need for baselining	x	x	x	x		
Enabling Flex	Consider the use of aggregators to optimise and enable flex			x	x		
	Regulate aggregators to ensure they follow industry standards (technically and commercially)			x			x
	Use contracts to outlay the customers responsibilities and rewards			x			x
Optimization of Grid Capacity	Employ the Smart Community Energy Scheme (SCES) model to optimise and enable BTM flex			x			
	P2P trades to help optimize capacity and usage			x			
Simplify E2E process	Continue to develop APIs to increase automation				x		
Better Valuing Flex	Allow stacking of Flexibility Services with other revenue streams e.g. ESO, DSO ToU			x		x	x
	Re-evaluating the CEM CBA					x	x
	Increase the Price Ceiling for DSO Services			x		x	x

- **Figure 1: Slide used to discuss solutions to key issues during second workshop**

3. Key Outputs from Workshop 1

3.1 Market Participants' Business Models

The business models used within the Project Trials were varied, and the revenue streams available to the Market Participants included: Feed in Tariffs (FiT) or Smart Export Guarantees (SEGs) payments, Renewable Energy Guarantees of Origin (REGO), Power Purchase Agreements (PPAs), DSO-Enabled Services and DSO-Procured Services, ESO Services, Time of Use Tariffs (ToUT), and funding from central government grants, council tax, fees, and charges.

Table 3: Business Models used throughout the Trials

DER and Business Model	FiT[1]	SEG[1]	REGO[1]	PPAs[1]	DSO-Procured Services[1]	DSO-Enabled services[1]	ESO Services[1]	ToUT[1]	Funding
A community energy scheme that buys and installs low carbon DERs to provide energy to hosts (local schools and businesses) and uses these DERs to generate ongoing income which is reinvested in further carbon cutting projects.	X	X	X	X	X	X			
An aggregator of Vehicle to Grid (V2G) chargers aims to reduce the total cost of ownership for its customers by capturing and passing on revenue from ESO, Behind the Meter (BTM), and DSO-Procured services.					X		X	X	

[1] Please follow link on each revenue stream for further information

DER and Business Model	FiT[1]	SEG[1]	REGO[1]	PPAs[1]	DSO-Procured Services[1]	DSO-Enabled services[1]	ESO Services[1]	ToUT[1]	Funding
A residential Demand Side Response (DSR) aggregator who generates revenue from ESO, DSO and energy supplier's flexibility markets to reward their customers for DSR action.					X		X	X	
A local council who participated in DSO-Procured services to try and reduce energy costs.					X				X
A local council who participated in DSO-Enabled services to generate an additional revenue source and thereby reduce the amount of funding required.						X			X

3.2 Market Participants' Commercial Findings

Several of the partners highlighted the lack or limited amount of financial incentive to participate in the Project Trials. The amount of revenue received from a single DER participating in a DSO-Procured service during TP2 was quoted to range from £52 to £850 (both SEPM), see Table 1.

- **Table 4: Revenue for participating in the Project Trials**

DER	Revenue (£)	Services	Trial Period(s)
Solar PV 1	52	SEPM	TP2
Battery + Solar PV	259	SEPM, SPM	TP2 (excluding Sep)
Solar PV 2	850	SEPM	TP2 (excluding Sep)
DSR 1	68	DCM, SEPM, SPM	All
DSR 2	6	MIC / MEC	All
DSR 3	No Data	DCM, SCM, SPM	TP3

Comparatively, the costs to enable and participate in the Project Trials was high. DER enablement and staff time were amongst the highest costs for several of the participants. The estimated costs for enabling a single DER to provide flexibility ranged from £1,060 to c. £60,000, whilst operational costs for participating in DSO-Procured services throughout TP2 ranged from £315 to £653.

Other costs were attributed to quantifying the flexibility of a portfolio of buildings (a local council was quoted a circa £37,000 difference between the lowest and highest costs for a flexibility assessment of 5 buildings) and recruiting customers (with one participant subsidising the costs of participating in the Project Trials to attract customers).

- **Table 5: Costs for participating in the Project Trials**

DER	Type of Cost	Amount (£)	Time Period
Solar PV 1	Operational (including staff time)	315	TP2
	Costs of Trades (e.g., baselining cannibalisation.)	39	TP2
	Other	39	TP2
	Enablement *(per site)*	1,000	ALL
Battery + Solar	Operational (including staff time)	653	TP2 (excl. Sep)
	Costs of Trades (e.g., baselining cannibalisation.)	82	TP2 (excl. Sep)
	Other	82	TP2 (excl. Sep)
	Enablement	60,000	ALL
Solar PV 2	Operational (including staff time)	430	TP2 (excl. Sep)

DER	Type of Cost	Amount (£)	Time Period
	Costs of Trades (E.g., baselining cannibalisation.)	165	TP2 (excl. Sep)
	Enablement	40,000	ALL
DSR 1	Enablement	1,060	ALL
	Operational (including staff time) *(per event)*	50	ALL
DSR 3	Recruitment and Customer Top Up *(per customer)*	240	TP3
	Rewards, gamification costs / prizes *(per event)*	1,383	TP3

There was consensus that this financial reward for participating in DSO-Procured and DSO-Enabled services is not reflective of the overall benefit to the DSO, ESO and wider community (via reduced carbon, air quality, etc.).

Several participants highlighted the comparatively low prices for DSO-Procured services compared to other revenue streams[2]; for instance, the highest payment for DSO-Procured Services is £1,200 MWh (Dynamic Constraint Management, and a utilisation payment only) compared to National Grid's DFS service which has a guaranteed price of £3,000 MWh[3]. During the Trial the prices were uplifted in an to attract more participation, but the small volumes providers could offer made the uplifts insignificant versus the enablement costs.

Due to the inability to stack DSO and ESO services, either due to exclusivity clauses or baselining (see Section 0), the costs incurred by losing out on other, more profitable revenue streams meant that providing DSO services was unviable for several DERs. The ability to stack different revenue streams is therefore imperative to a liquid market in which both Market Participants and the network can benefit. This should consider how ToUT are reflected (if at all) as in one case this had a detrimental effect on the business model of a participant who was unable to stack other value streams; this resulted in them ending their participation at some sites as the DSO-Procured Services provided them with zero or little value compared to alternative revenue streams.

There are however several other factors which may have affected the ability of a DER to benefit financially from the Project Trials, these are discussed in the following section.

[2] Payments | SSEN Transition (ssen-transition.com)
[3] Demand Flexibility Service (nationalgrideso.com)

3.3 Commercial Barriers to Trial Participation

3.3.1 Flexibility Service Agreement

Several partners highlighted issues with the FSA used within the Project Trials, with two partners stating that they would not sign the FSA in BaU.

The well documented issues with the FSA (liabilities, complexity, length, etc.)[4] continue to be seen as a significant barrier to participation, especially by those who are utilising DERs with lower level of flexibility, or those that are not using flexibility as a core part of their business model.

In particular, the liability was highlighted as a barrier as the risk of this clause being implemented are significant compared to the income from participating in the Project Trials, and the insurance to mitigate against the liabilities would likely to be too expensive in BaU.

3.3.2 Baselining

Two of the partners highlighted that the baselining methodology used in the Project Trials is not fit for purpose, costly and time consuming for Market Participants. This is especially true for weather dependant DERs (e.g., solar PV) or those that need to alter their behaviour (e.g., charge / discharge) prior to participating in a service.

Market Participants were not able to realise the expected value of participating in the Project Trials as the baselining methodology cannot account for other services that the DSO is unaware of (e.g., ESO services) unless they are informed.

The baselining is not conducive to stacking other revenue streams, such a Time of Use Tariffs (ToUT).

The lack of an accurate baseline model for all DER types meant that the fulfilment of the requested capacity was low and thereby the settlement they received was reduced.

3.3.3 Enabling Flex

The ability of a flexibility provider to forecast and bid in a reliable manner (and thereby perform well against the settlement mechanism) is dependent on the capacity, type, and location of a DER.

One aggregator highlighted that they were unable to forecast reliably as the utilisation of each of their sites was inconsistent, and their small aggregation pool meant that they lacked redundancy.

Both aggregators stated that DSO services were not as attractive as ESO services as they have a higher level of redundancy at a national level.

3.3.4 End-to-End Process

The participants highlighted that the End-to-End (E2E) process is still too manual, which is costly and time consuming for DER owners.

[4] See Section 3.2 of Ofgem-Report-Trial-Period-1.pdf (ssen-transition.com)

Engaging in the E2E process requires a wide skillset (from quantifying the amount of flexibility the DER can provide, to dispatching the DER and quantifying the correct settlement) which means an organisation may have to employ multiple people to provide flexibility, i.e., a single person may not be able to fulfill the role. Both councils highlighted that this meant that they would not be able to participate in flexibility services in BaU without third party support.

3.3.5 Optimizing the Grid Edge

Several participants demonstrated a strong appetite for DSO-Enabled services, however there was limited opportunity to test these services due to the lack of counterparties with whom to trade.

The process used within the Project Trials to enable the trading of import or export capacity is aligned to regulated BAU processes which may present a barrier to entry.

4 Key Outputs from Workshop 2

Issue	Potential Solution(s)	Points Raised During Workshop
FSA	Market Participant signs slimmed down FSA and provides services directly to the DSO, assuming contractual obligations and risks	The FSA should be revised so it works for different types of DERs and Market Participants. The apportion and compensation of risk should also be re-considered.
	Flexibility products standardised across all markets and Ts&Cs (including FSA) are absorbed into industry codes, e.g., BSC, Grid Code and Distribution Code	The codes and standards need to be fundamentally revised, however using these in lieu of the FSA would make the market less transparent, as Market Participants who are unfamiliar with these documents would not know what they are signing up to.
Baseline	Use a diverse and more reliable Baselining Solution: e.g., Regression, Nomination and historical	Using diverse baselining methods to suit different DER types would increase the accuracy of the settlement amounts received. However, all baselining methods would require data to be sent to the DSO and DER owners would need to understand which baselining model best suited their DER type (if not prescribed by the DSO). A process to ensure baselining incorporates stacking and primacy rules should be implemented across the networks. A baselining method based on regression (the newest method tested during the Project Trials) would not necessarily be simpler or more efficient, as the accuracy of such models depends on the type and quantity of data being used to train it, which could take years.
	Use simpler baseline approach e.g., Meter Before and Meter After start and end of delivery	This would be a simpler and more accurate method to those currently used in the Project Trials whilst also having less data requirements. However, such a method would be easy to manipulate ("game") and may not be compatible with DER's that need to pre-condition prior to service delivery (depending on when measurements were required).
	Develop alternative Services which negate the requirement for baselining	Alternative services based on capacity (rather than energy demand / generation) could be introduced by the DSO. Such services would be based on a utilisation price for DERs to stay within a capacity limit during a given period. These could be stacked with DSO-Enabled services whilst increasing the benefit for weather dependent DERs and EVs participating in DSO-Services.

Issue	Potential Solution(s)	Points Raised During Workshop
	Use alternative metering or non-metering solutions to avoid need for baselining	Alternative, simplistic solutions to validate the provision of flexibility should be explored by the DSO, including using local metering to take measurements before and after flexibility events, smart metering as per the ESOs Demand Flexibility Service (DFS) service, or non-metering solutions to determine whether household appliances are on / off.
Enabling Flex	Consider the use of aggregators to optimise and enable flex	The use of third-party aggregators could lessen the burden on Market Participants using DERs with low levels of flexibility. However, LEO partners who approached aggregators noted that some were not interested in flexibility from small DERs. More pressure needs to be put on global manufacturers to incorporate the software and hardware required to enable grid edge flexibility. Industry standard solutions for coordination and automation, monitoring and delivering flexibility in response to price signals or market services should be brought to market to avoid issues with scaremongering.
	Regulate aggregators to ensure they follow industry standards (technically and commercially)	The regulation of aggregators could sterilise the market by pushing out small aggregators. Alternative arrangements were discussed, including: lementing the voluntary Code of Conduct as drafted by DSR aggregators in collaboration with the Association for Decentralised Energy (ADE)[5]. This solution was not seen as being fit for purpose as there is no incentive to be part of or abide by such schemes, and it is not clear who is responsible for this document or who it is aimed at. bling suppliers, who are already regulated, to offer flexibility services and ToUT.
	Use contracts to outlay the customers responsibilities and rewards	The use of customer contracts would ensure higher availability / reliability from customers, although this approach may have varying results depending on the customer's motivations for participating in the flexibility market.

[5] Demand Side Response Code of Conduct | Publications | The Association for Decentralised Energy (theade.co.uk)

Issue	Potential Solution(s)	Points Raised During Workshop
Optimization of Grid Capacity	Employ the Smart Community Energy Scheme (SCES) model to optimise and enable BTM flex	SCES awards solutions that maximize usage behind substations. This bottom-up approach is being used by one of the partners as it is more conducive to their business model compared to providing services to the DSO, although this may be more viable in the future.
	P2P trades to help optimize capacity and usage	P2P trades can help use under-utilised capacity, maximise what is on site, and allow financial benefit.
Simplify E2E process	Continue to develop APIs to increase automation	Simplifying the E2E process would reduce the burden and costs of participation whilst reducing the amount of automation required.
Better Valuing Flex	Allow stacking of Flexibility Services with other revenue streams e.g., ESO, DSO ToU	The ability to stack different revenue streams is imperative to a liquid market in which both Market Participants and the network can benefit. Primacy rules are required to ensure that Market Participants can participate in all markets.
	Re-evaluating the CEM CBA	The CEM model limits the amount that the DSO can pay for flexibility. This model should be revised to consider the wider societal and whole system benefits. However, concerns were raised that the DSO still needs to procure on a need's basis.
	Increase the Price Ceiling for DSO Services	The price ceiling for DSO-Procured services is consistent with reinforcement, although revised amounts should incorporate the benefit that DSO flexibility provides to the ESO and suppliers. The price ceiling is a major barrier to participating in DSO service and could sterilise the market, although this may be less of an issue at higher voltage levels, where the is more flexibility.

5 Key Learnings and Recommendations

The ability to stack different revenue streams is imperative to a liquid market in which both Market Participants and the network can benefit:

Review the exclusivity clauses for ESO and DSO services

Develop primacy rules across all markets

The FSA is still seen as a significant barrier to participation, especially by those who are utilising DERs with lower level of flexibility:

Revise the FSA to ensure the length and language is fit for purpose

Review the terms and conditions of the FSA

Explore the regulatory changes required to socialise risk, e.g., the liability for flexibility failures could be socialised across all customers

Encourage participants to consider a third party to provide market access as this avoids them signing the FSA

The lack of an accurate, simple baseline model which is conducive to service stacking reduces the financial reward:

Explore simpler and more accurate baselining methods to those currently used in the Project Trials, in particular the Meter Before and Meter After approach

Consider whether baselining is a requirement for DSO services in BaU; the value from such services may not merit validating services in this way

Enabling and using DERs to prove flexibility is difficult, costly and time consuming

Explore automation can reduce the burden on Market Participants

Review the E2E process to determine whether this can be reduced

Collaborate with global manufacturers to identify the software and hardware requirements to enable grid edge flexibility

Collaborate with aggregators to develop contracts which outlay the customers responsibilities and rewards (in a fair manner)

Develop industry standards for coordinating, automating, monitoring, and delivering flexibility

The price ceiling is a major barrier to participating in DSO services

Engage with ENA Open Networks Project and Ofgem to determine if there is an alternative way of valuing flexibility that represents wider societal benefits and whole system benefits not directly attributable to the DSO.