Demand Flexibility Product Proposal

Consultation Document
ESB Networks

DOC-191223-HVV

22nd October 2024

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1 GLOSSARY OF THE TERMS AND ABBREVIATIONS

Abbreviation	Explanation
CAP	Climate Action Plan
CI/CML	Customer Interruptions/Customers Minutes Lost
CRU	Commission for Regulation of Utilities
DAM	Day-Ahead Market
DFP	Demand Flexibility Product
DUoS	Distribution Use of System
FPN	Final Physical Notifications
FSA	Flexible Service Asset
FSP	Flexible Service Provider
PN	Physical Notification
RFT	Request for Tender
SEC	Sectoral Emissions Ceiling
SEM	Single Electricity Market
TSO	Transmission System Operator

2 DEFINITIONS

The section below sets out definitions for terms that are relevant to the Demand Flexibility Product Proposal. Please note a thorough list of terms and definitions will be provided at RfT stage.

Term	Definition
Demand weighting factor	A factor that adjusts the monthly Demand Flexibility Product payment in line with the foreseen utilisation of the Flexible Service Asset (FSA) per month
Event	One or more consecutive half hourly periods where the operating envelope lower and upper limits are above the maximum export capacity and/or below the maximum import capacity of the FSA respectively.
Full completion	The energisation of the contracted capacity and duration set out in an FSP's contract.
Minimum completion	The energisation of at least 50% of contracted capacity, or at least 5 MW for each site.
Operating Envelope	Comprises a definition of the upper and lower MW limits for export and/or import within which a FSA may be safely operated while maintaining distribution system security, primarily managing distribution system network congestion. Therefore, it represents the range within which a FSA may be utilised in other market arrangements, taking into account already committed/utilised or limited capabilities on the distribution network. These limits can be different for each FSA for each Period.
Performance scalar	A factor that adjusts the Demand Flexibility Product payment based on the monthly performance
Pre-energisation delivery	Meeting critical milestones such as the construction of the FSA, the connection of the FSA to the distribution network, and energisation.
Post-energisation delivery	Providing the Demand Flexibility Product according to the operating envelope as issued by ESB Networks.

3 EXECUTIVE SUMMARY

Ireland faces significant climate change challenges, including increased temperatures, more intense storms, and rising sea levels[1]. The country, through the Climate Action Plan, is working to electrify heat and transport, with ambitious targets for electric vehicles and heat pumps by 2030. Additionally, it's crucial to provide additional electrical capacity to meet ambitious housing targets and support the continued expansion of the economy. The National Energy Demand Strategy aims to ensure energy demand aligns with carbon emissions targets and promotes demand flexibility. The Irish policy framework for storage supports the integration of electricity storage to enhance grid stability and renewable energy use. To effectively manage the increasing load on the distribution network, a comprehensive suite of new tools is essential.

Through the Distribution Management and Systems Operations Programme, ESB Networks is engaging customers to provide demand responses from all community sectors, and technology will be an additional tool in this effort. In line with this, ESB Networks has developed the Demand Flexibility Product to manage the challenges facing the electricity system with the aim of addressing congestion management on the distribution network.

This document represents ESB Networks second consultation on the Demand Flexibility Product (DFP). This initial consultation, published on 20th December 2023, provided an overview of the guiding principles of the product, proposals for high-level product characteristics and the associated procurement approach. This consultation was open for a period of eight weeks, closing 14 February 2024 following a public webinar with stakeholders on 8th February 2024. Thirty-two consultation responses were received.

On 10th May 2024, ESB Networks submitted a Recommendations Paper to the Commission for Regulation of Utilities (CRU) summarising the responses and providing recommendations to CRU on the product characteristics. On 12th July 2024, the CRU published their decision on this Recommendation Paper approving the DSOs procurement proposal and noting a separate consultation was to be developed that would contain further details on the Demand Flexibility Product. The topics that are included in this paper are primarily a result of the feedback received from industry. These topics are:

- A day in the life of a Flexible Service Asset (FSA)
- Incentive regime
- Sharing Factor technoeconomic analysis
- Contract termination
- Proposal for tendering of locations
- Early energisation
- Potential Off-ramp clause
- Phasing the Delivery of Capacity Over-time

This consultation will be open for a duration of six weeks until 04 December 2024. Please submit your responses to flexibility@cru.ie and engagement@esbnetworks.ie.

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[1] https://www.epa.ie/environment-and-you/climate-change/what-impact-will-climate-change-have-for-ireland/

4 INTRODUCTION

The decarbonisation of Irish society relies on fundamental changes to how energy is generated and consumed. Given the scale and pace of change needed to enable this transformation at the right pace and the right cost, every Irish home, farm, community, and business will play a part.

The Demand Flexibility Product has been developed with the purpose of congestion management on the distribution network. This is the primary purpose of this product. As a secondary benefit, the product will also assist in delivering government policy objectives and Climate Action Plan Targets.

The Climate Action Plan 2023 (CAP23) established an interim target of 15-20% demand side flexibility by 2025, building on the existing target of 20-30% by 2030. The introduction of this target reflected the need for a renewed, accelerated, concerted effort by all stakeholders to increase demand flexibility on the electricity network and meet the level of emissions reduction required by the carbon budget programme and sectoral ceilings for the electricity sector. This policy puts a more immediate spotlight on the role of a flexible system in supporting renewables integration and electricity demand management. In line with the Climate Action Plan, the Electricity Storage Policy Framework for Ireland paper which was published in 2024 references the need for "improving the overall operation of the electricity network through the provision of targeted demand flexibility". The paper details a policy framework which presents 10 government actions to support the role of electricity storage systems in Ireland's energy transition. One of the policy actions referenced in the paper is to "Support the immediate procurement of Demand Flexibility Products and of (long duration) electricity storage to meet specific network needs, in the distribution and transmission systems respectively".

In July 2024, the CRU published their National Energy Demand Strategy Decision Paper (CRU202467). The objectives of the strategy are as follows:

- Set out measures to ensure that overall electricity and gas demand is consistent with Ireland's carbon sectoral emissions ceilings;
- Deliver demand flexibility, particularly non-fossil fuel flexibility, and demand response initiatives, as outlined in CAP23 and CAP24,
- Support the delivery of Ireland's transition to reach net-zero by 2050.

The introduction of these policies as well as the DSO licence conditions has resulted in the development of a Demand Flexibility Product by ESB Networks. In this document, we outline specific provisions for the Demand Flexibility Product and further detail on the associated characteristics to be procured in locations where there is a defined system need, as part of an overall programme to meet the capacity requirements summarised in ESB Network's "Electricity Distribution Network Capacity Pathways" report[2]. The specific medium-term product being procured is for demand

[2] https://www.esbnetworks.ie/docs/default-source/publications/safety-statement-esb-networks-dtis-130199-avt.pdf?sfvrsn=45092a37_7

reduction, demand shifting or an injection of power, at or near their full contracted service capacity, for a specified duration of hours in a day and across a 15-year contract. The product has been designed to meet the specific network need arising at this time and while doing so will also contribute to the delivery of the CAP23 2025 and 2030 targets.

This procurement is expected to commence in Q4' 2024 with publication of a qualification system questionnaire, in parallel to this consultation. Subject to the outcome of this consultation and CRU approval, a Request for Tender is due to be published in Q2 2025. The volumes of the product sourced and contracts issued will depend on a successful tender process ensuring that requisite volumes of technically acceptable solutions can be sourced efficiently. It is anticipated that approximately 100 MW would be sourced in the first procurement batch, and this will inform subsequent procurement batches with a view to have up to 500 MW of Demand Flexibility Product contracted across the distribution system by 2030.

Future volumes of demand flexibility may address different technical characteristics (e.g. smaller size, location, reliability, voltage, frequency and duration of delivery, months/years confidence of service delivery). These additional locations may also be more focused on consuming excess renewable energy (in effect demand up) than addressing congestion due to high demand or may be smaller in scale, addressing congestion at lower voltages of the electricity network, or directly connected with new demand connections. In some locations where a smaller scale demand flexibility product is required, the viability of stacking will be considered and may not be required.

In addition to the channels currently available for providers to contract to provide demand flexibility (for example "Beat the Peak Business"[3] and other competitions as announced on ESB Networks website and e-tenders on a rolling basis) a range of channels are in development and will be opened for different flexibility providers to participate, offering different technical solutions to different technical needs. For more detail, please refer to ESB Networks Flexibility Multiyear Plan which is to be published shortly following the publication of this consultation.

[3] https://www.esbnetworks.ie/who-we-are/beat-the-peak/overview/beat-the-peak-business#:~:text=What%20is%20Beat%20The%20Peak,Friday%2C%20excluding%20public%20holidays)

5 A DAY IN THE LIFE

5.1 OVERVIEW

The objective of the day in the life section is to provide clarity on the options available to Flexible Service Providers (FSPs) to participate in other markets (e.g. balancing, capacity and wholesale) and the potential revenue streams available to them. This section provides worked examples of a day in the life of an FSP that is contracted to the ESB Networks Demand Flexibility Product (DFP). We use the term FSP in this context instead of Flexible Service Asset (FSA) as an FSP can control multiple FSAs but the contract is between the Distribution System Operator (DSO) and the FSP. There are three scenarios included here and these are all demand driven scenarios:

- ESB Networks schedules the FSP for full discharge;
- ESB Networks schedules the FSP for partial discharge; *and*
- ESB Networks schedules the FSP for a broad use case.

This day in the life section aims to set out how FSPs can stack revenues from the time they contract with the DFP up until delivery. The scenarios that we demonstrate are based on the assumption that the FSP is contracted for the DFP and is also a participant in the wholesale markets. The scenarios also assume that the FSA has a 10MW capacity. In this paper we use the term FSP as the descriptive term in all scenarios and technologies.[4]

5.2 ACTIONS APPLICABLE FSPS IN ALL SCENARIOS

The following actions are applicable to all scenarios. The first step is for ESB Networks to conduct a procurement process for the DFP in various identified locations. ESB Networks will select successful bids based on defined assessment criteria which will be available in the Request for Tender (RfT). FSPs will submit bids for individual locations but they are eligible to bid for more than one location in a batch. The term batch here refers to a round of procurement which includes multiple locations. Bids will be assessed and evaluated against a reserve price. There will be a different reserve price for each location. FSPs may be successful in one location and unsuccessful in another. FSPs may also be successful in more than one location in the same batch.

In terms of actions required by the FSP, in addition to delivering against the defined assessment criteria, a bid will only be accepted where it is below the pre-determined reserve price for a given location. The FSP will submit a bid for an availability payment that is in €/MW/Year format. If an FSP is successful at this tender stage they can be contracted for 15 years. It is expected that it will also be possible for the FSP to bid into the capacity market where we assume FSPs secure a 1-year capacity

[4] FSP includes technologies denominated as, for example, Generating Unit (GU) in the wholesale markets or Demand Side Unit (DSU) in system services, among others.

market contract. ESB Networks and EirGrid are collaborating at present to determine how these market interactions will happen in practise and any potential market implications.

ESB Networks is working with EirGrid to establish primacy rules in line with the TSO-DSO Operating model. Further information will be available in the RfT.

ESB Networks has developed three scenarios to demonstrate a range of potential instructions that may be issued to FSPs through the DFP operating envelopes. While our procurement process will be technology neutral, for these scenarios, we will take an example of a lithium-ion battery storage FSA with a contracted capacity of 10MW and an ability to discharge 40MWh daily. Storage is a useful example because it allows for us to show interactions with other markets through both the import and export of energy.

Our working assumptions are:

1. The DFP will be stackable (FSPs can participate across markets and receive revenues subject to delivering on their obligations in each) with other markets (either with the requested flexible capacity or spare FSA capacity); *and*

2. The distribution network capacity will be congested.

Therefore, we propose to provide the FSPs with a (active power) dynamic operating envelope[5] in line with the operating model. Figure 1 displays an illustrative example of a 24-hour operating envelope. ESB Networks will set the upper and lower limits of the operating envelope which indicate the range in which the FSA can operate at a given half hour. These limits will be based on studies that ESB Networks will conduct relating to the congestion management needs in each location and are also reflective of the available station capacity in each location. ESB Networks will 1) restrict the operating envelope for congestion management purposes when necessary, as part of the scheduling process only, and 2) will ensure, at a minimum, that the operating envelope respects the technical characteristics of the FSA and will not constrain the asset operation outside of scheduled network congestion purposes.

Definition An Operating Envelope comprises a definition of the upper and lower MW limits for export and/or import within which a Flexible Service Asset may be safely operated while maintaining distribution system security, primarily managing distribution system network congestion. Therefore, it represents the range within which a Flexible Service Asset may be utilised in other market arrangements, taking into account already committed/utilised or limited capabilities on the distribution network. These limits can be different for each Flexible Service Asset for each Period.

[5] In this report, we will use the terms dynamic operating envelope and operating envelope interchangeably

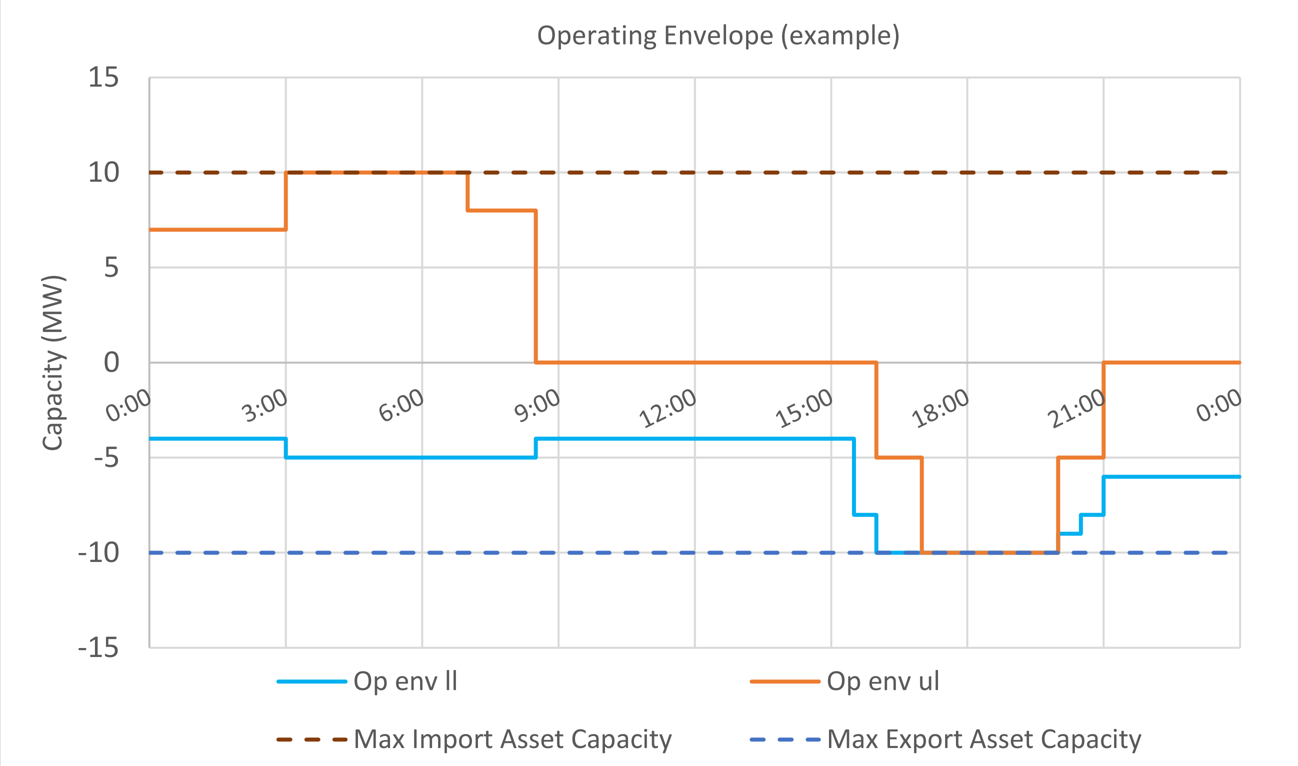

Figure 1 Illustrative example of operating envelope that will be shared with the FSPs. The chart depicts the operating envelope lower and upper limits (op env ll and op env ul respectively). The chart also depicts the maximum FSA capacity for context. The sign convention is positive capacity for the FSA to import from the network, and negative capacity for the FSA to export into the network. In this example, the FSA would need to export 5MW between 17:00 and 18:00, 10MW between 18:00 and 20:00, and a minimum of 5 MW between 20:00 and 21:00. On the other hand, the FSA is allowed to import power from the network between 00:00 and 08:30 subject to the maximum and minimum levels as set out in the operating envelope.

ESB Networks will share the operating envelope with the FSP at least 24 hours ahead of day-ahead market closure, so the FSP will have time to factor in the DFP requirements before bidding into the day-ahead market and balancing market. As such, the FSPs will be able to select their preferred capacity level within the limits of the operating envelope.

The operating envelope represents the available station capacity at a location, and it will be the responsibility of the FSP to ensure that they remain within the upper and lower limits. For example, in Figure 1 above, the FSP must ensure that they charge sufficiently at night in order to meet their required discharge levels between 17:00 and 21:00.

Approximately 7 days ahead, ESB Networks will issue an indicative schedule to give the FSP advanced indicative notice of their likely requirement for the DFP.

- At least 24 hours ahead of day-ahead market closure ESB Networks will issue an operating envelope that will not change again unless there are unforeseen circumstances such as an unexpected fault. It is envisaged that penalties will not apply if an asset cannot perform at shorter notice. By providing operating schedules at least 24 hours ahead of day-ahead market closure, it gives the FSP approximately a 12-hour window to submit bids and offers in the day-ahead market.

- To comply with their DFP contract, the bids and offers submitted by the FSP will need to clear in the economic merit order for the wholesale market.

- The FSP must always operate within the operating envelope, failure to do so will result in reduction of the monthly performance and hence a negative impact on the monthly DFP payment. This is laid out in the incentive regime section of this document in section 6.2.2.

Below is a summary of how the operating envelope[6] will work and what the process will look like from the perspective of the FSP:

- ESB Networks issues the operating envelope to the FSP at least 24 hours ahead of day-ahead market closure.
- The operating envelope specifies upper and lower limits across a 24-hour period whereby the asset must stay within the upper and lower limits at all times.
- These limits reflect the import and export possibilities available to the asset across the 24-hour period. If the asset operates outside of these limits, they will be subject to the damages set out as part of the post energisation damages section 6.2. These damages will be applied to the asset's monthly payment.

In the following sections we detail three scenarios where the operating envelopes have been simplified to show high level possible operating envelopes. In Appendix A more detailed operating envelopes have been included that may be more reflective of how the actual operating envelopes might look.

5.3 SCENARIOS

5.3.1 Scenario 1: ESB Networks schedules the FSP for full discharge

In this first scenario, ESB Networks schedules the FSP for full discharge. ESB Networks has issued an operating envelope (see Table 1 and Figure 2) to the FSP that has requested that the FSA discharge between 16:00 to 21:00 the following day and to provide its full contracted capacity. Non-compliance with operating envelopes (charging and discharging) will impact performance and hence payment as described in Section 6.2.

[6] A TSO-DSO Operating Model is under development by EirGrid and ESB Networks. The Operating model will include an operating envelope for scheduling of these assets. See TSO-DSO Operating Model Webinar Slides for further details. This operating envelope will create a range within which units can be safely operated while maintaining distribution system security.

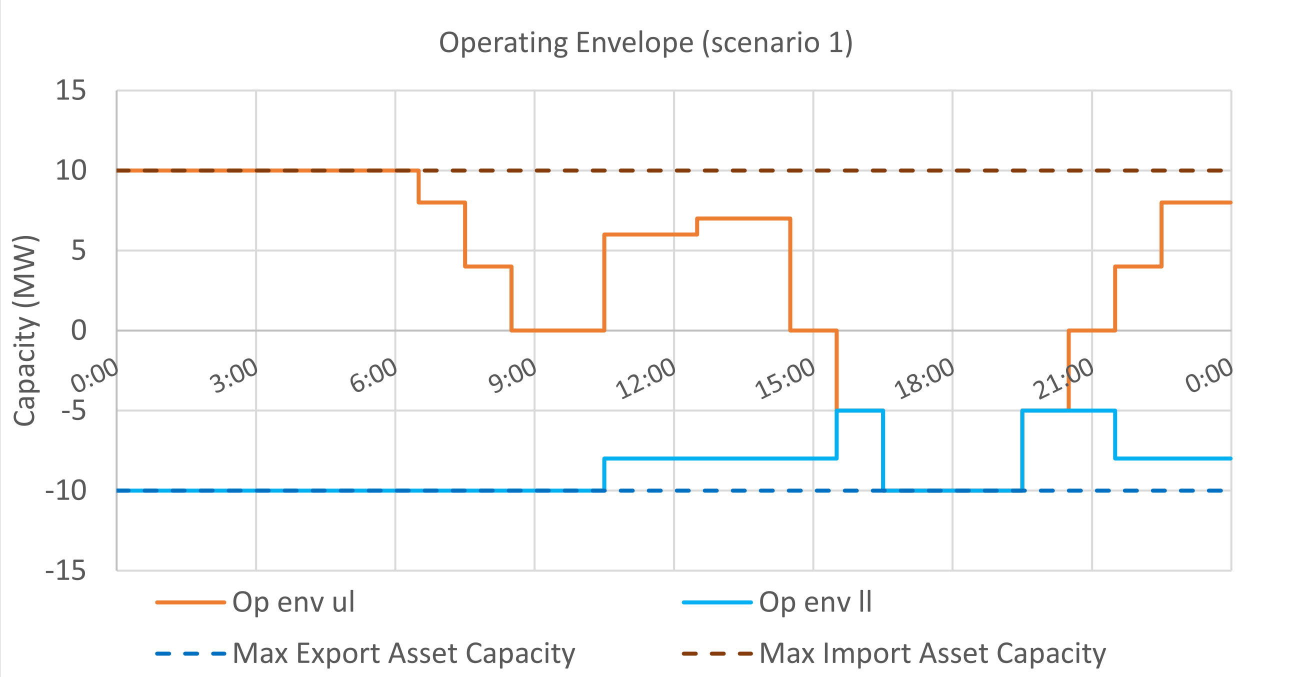

Figure 2 Scenario 1 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into from the network. In this scenario, the FSA would need to export 5MW between 16:00-17:00 and 10MW between 17:00-20:00. The FSA is allowed to import power from the network between 00:00-07:30, 10:00-14:00 and 23:30-00:00 subject to a minimum and a maximum as set out in the operating envelope.

Table 1 Scenario demonstrating ESB Networks scheduling the FSP for full discharge. Operating Envelope issued by ESB Networks would requests the FSP to discharge their entire contracted capacity of 10 MW (40 MWh)

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	10	-10
00:30	10	-10
01:00	10	-10
01:30	10	-10
02:00	10	-10
02:30	10	-10
03:00	10	-10
03:30	10	-10
04:00	10	-10
04:30	10	-10
05:00	10	-10
05:30	10	-10
06:00	10	-10
06:30	10	-10
07:00	8	-10
07:30	8	-10
08:00	4	-10
08:30	4	-10
09:00	0	-10
09:30	0	-10

10:00	0	-10
10:30	0	-10
11:00	6	-8
11:30	6	-8
12:00	6	-8
12:30	6	-8
13:00	7	-8
13:30	7	-8
14:00	7	-8
14:30	7	-8
15:00	0	-8
15:30	0	-8
16:00	-5	-5
16:30	-5	-5
17:00	-10	-10
17:30	-10	-10
18:00	-10	-10
18:30	-10	-10
19:00	-10	-10
19:30	-10	-10
20:00	-5	-5
20:30	-5	-5
21:00	0	-5
21:30	0	-5
22:00	4	-8
22:30	4	-8
23:00	8	-8
23:30	8	-8

ESB Networks will also issue an operating envelope to provide available capacity for charging times at each location. The lower limits of the operating envelopes can be positive or negative, when they are positive, they are instructing FSPs to charge when demand is low and there is capacity available. The above operating envelope includes for a range of acceptable charge and discharge levels ensuring that the minimum level is the requirement for ESB Networks to manage the identified locational congestion. In this example, the minimum discharge over the 16:00-21:00 period is equal to the maximum capacity of the FSA but this will not always be the case as is demonstrated in scenario 2. When the lower limit of the operating envelope is positive it details the available station capacity, and it is up to the FSP to decide when it chooses to charge and utilise that available capacity. The FSP is free to choose any available capacity within the limits of the operating envelope as long as it has recovered sufficient charge to meet the discharge obligation arising from ESB Networks' next operating envelope. Once the operating envelope is issued, the FSP must submit bids and offers in the ex-ante energy markets, including the day-ahead and intraday markets, and in the future can submit offers to the day-ahead system services auction, in ways where they can gain energy and system services positions which comply with the operating envelope. These can then be reflected in balancing market submissions which also comply with the operating envelope, including physical notifications, commercial offer data, technical offer data, and availability declarations.

In scenario 1, the participation of FSPs in other markets will be limited by their need to be fully charged and ready to discharge under the DFP. In this first scenario, there is potential for an overlap in which the FSP performs when scheduled by ESB Networks and is simultaneously dispatched in the balancing market due to a system and local peak overlap. From a balancing market perspective, the TSO will schedule and dispatch the FSP within their operating envelope. As per the TSO-DSO Operating Model, TSO dispatch instructions which are issued will reflect the limits of the operating envelopes issued by the DSO for the active power element. The detailed design of how this will work is now being worked out through the Joint System Operators Programme.

5.3.2 Scenario 2: ESB Networks schedules the FSP for partial discharge

In this second scenario, ESB Networks schedules the FSP for partial discharge.

Table 2 Scenario demonstrating ESB Networks scheduling the FSP for partial discharge

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	10	-10
00:30	10	-10
01:00	10	-10
01:30	10	-10
02:00	10	-10
02:30	10	-10
03:00	10	-10
03:30	10	-10
04:00	10	-10
04:30	10	-10
05:00	10	-10
05:30	10	-10
06:00	8	-10
06:30	8	-10
07:00	7	-8
07:30	7	-8
08:00	6	-8
08:30	6	-8
09:00	0	-10
09:30	0	-10
10:00	8	-10
10:30	8	-10
11:00	9	-9
11:30	9	-9

12:00	9	-9
12:30	9	-9
13:00	9	-9
13:30	9	-9
14:00	8	-8
14:30	8	-8
15:00	6	-8
15:30	6	-8
16:00	-4	-6
16:30	-4	-6
17:00	-8	-9
17:30	-8	-9
18:00	-5	-7
18:30	-5	-7
19:00	-5	-5
19:30	-5	-5
20:00	-5	-5
20:30	-5	-5
21:00	0	-8
21:30	0	-8
22:00	0	-8
22:30	0	-8
23:00	0	-8
23:30	0	-8

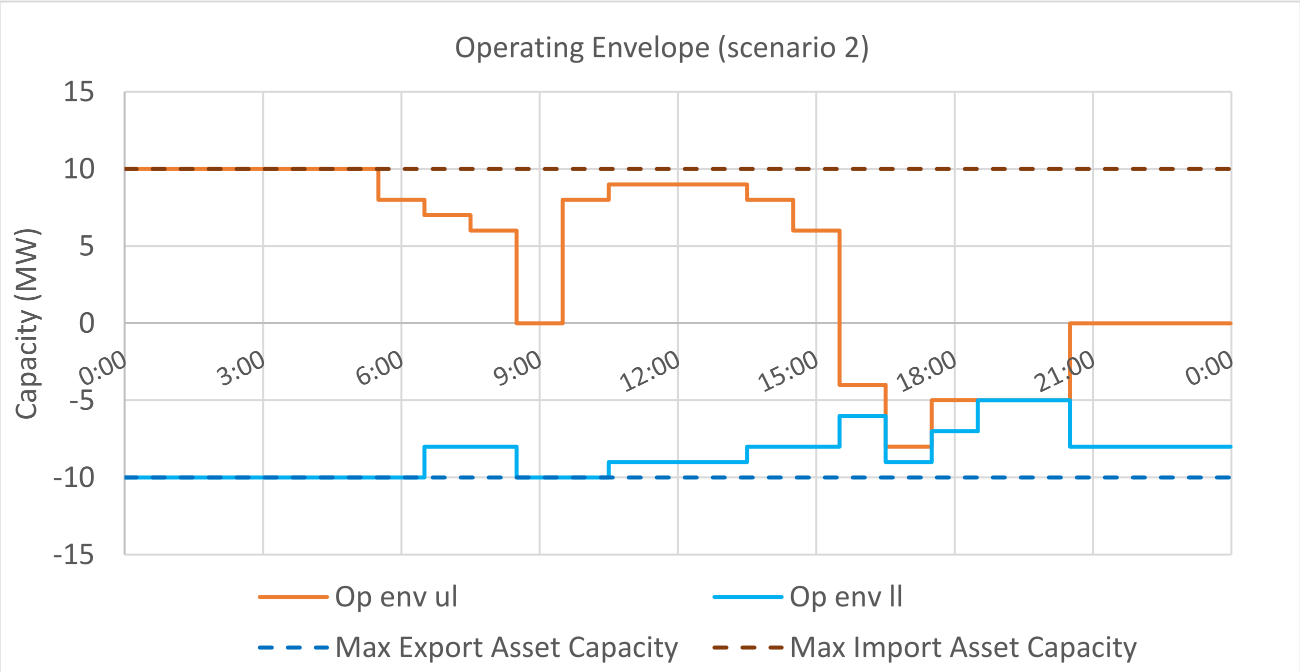

Figure 2 shows the Scenario 2 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10 MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into the network. In this scenario, the FSA would need to export between 4 to 9MW between 16:00-21:00. The FSA has no restrictions to import/export power between 00:00-05:30.

In this example, the FSP now has spare capacity that it can use in other energy markets, because the operating envelope requires it to deliver less than 40MWh in a consecutive period for ESBN. The operating envelope allows for a range of acceptable discharge levels ensuring that the minimum level is the requirement for ESB Networks to manage the identified local congestion. The only difference in this scenario is that the operating envelope specifies a much broader requirement than the FSA maximum capacity and so this allows increased opportunity for the FSP to participate in other markets on a commercial basis (it provides a larger in difference between upper and lower limits allowing for greater freedom). Once again in this scenario when the lower limit of the operating envelope is positive it details the available station capacity for utilisation by the FSA and it is at the discretion of the FSP to decide when it chooses to charge and utilise that available capacity. The FSP is free to choose any available capacity as long as it is sufficiently charged to meet ESB Networks next required discharge period as set out in the operating envelope. Once the operating envelope is issued, the FSP will be aware of the operating envelope requirement for the following day. There is less restriction on the FSP in this scenario due to the requirement to partially discharge when scheduled by ESB Networks and so it has more freedom to participate in other markets to a higher capacity. This means that it can operate at any time in other markets as long as it stays with the limits of the operating envelope. In this scenario, the FSP performs as required by ESB Networks but also has the opportunity to participate in the day-ahead market, intra-day market and balancing market.

5.3.3 Scenario 3: ESB Networks schedules the FSP but provides a much broader range between the upper and lower limits than in scenarios 1 and 2.

In scenario 3 ESB Networks issues the operating envelope, but it is much less restrictive and the FSP has a much wider range between the upper and lower limit than in scenarios 1 and 2. While it may be less restrictive than the first two scenarios, the FSP must still stay between the upper and lower limits set out in the operating envelope.

Table 3 Scenario demonstrating ESB Networks not scheduling the FSP

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	10	-10
00:30	10	-10
01:00	10	-10
01:30	10	-10
02:00	10	-10
02:30	10	-10
03:00	10	-10
03:30	10	-10
04:00	10	-10
04:30	10	-10
05:00	10	-10
05:30	10	-10
06:00	10	-10

06:30	10	-10
07:00	9	-10
07:30	9	-10
08:00	9	-10
08:30	9	-10
09:00	8	-10
09:30	8	-10
10:00	8	-10
10:30	8	-10
11:00	8	-10
11:30	8	-10
12:00	8	-10
12:30	8	-10
13:00	8	-10
13:30	8	-10
14:00	8	-10
14:30	8	-10
15:00	8	-10
15:30	8	-10
16:00	4	-10
16:30	4	-10
17:00	0	-10
17:30	0	-10
18:00	0	-10
18:30	0	-10
19:00	0	-10
19:30	0	-10
20:00	4	-9
20:30	4	-9
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22:00	8	-8
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23:00	10	-10
23:30	10	-10

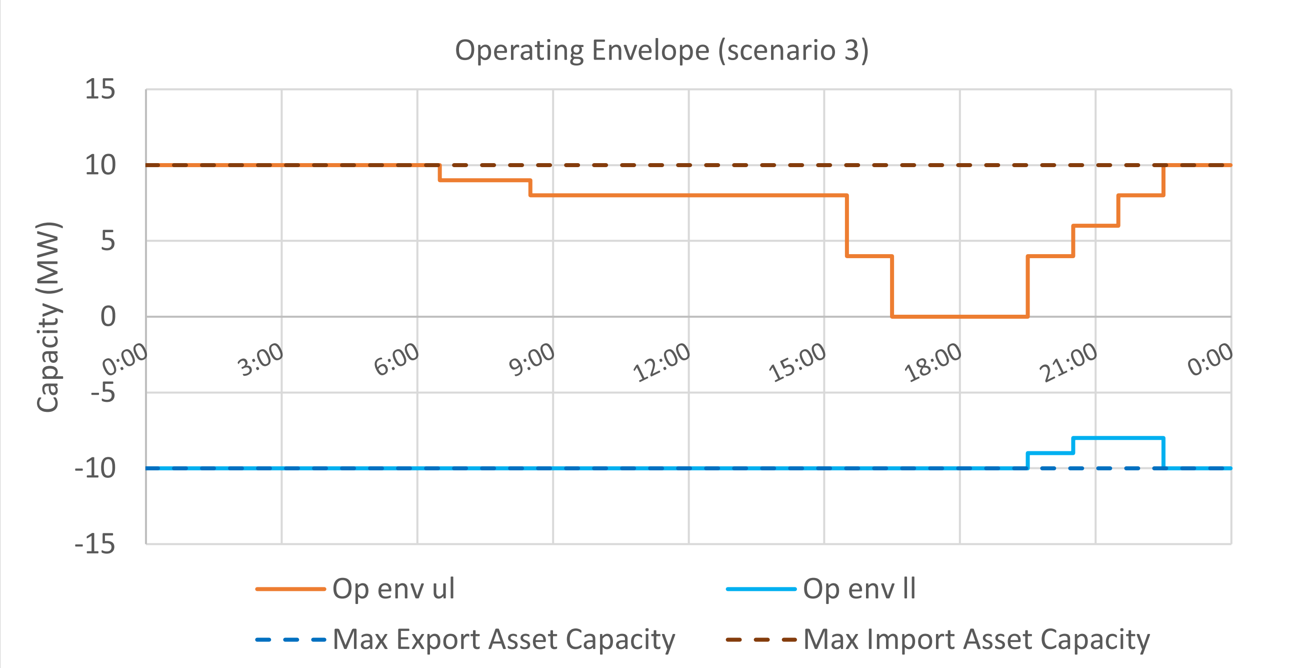

Figure 3 shows the Scenario 3 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10 MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into the network. In this scenario, the FSA is not required to export any power, but has the possibility to do at any time. The FSA is allowed to import power from the network all day except between 17:00 and 20:00. The FSA has no restrictions to import/export power between 00:00-07:00 and 22:30-00:00.

The FSP can submit bids and offers in the ex-ante energy markets, including the day-ahead and intraday markets as long as it recovers in time to stay within the limits of the operating envelope for the DFP. The TSO will be aware of the requirements that an asset has as part of its operating envelope, and will dispatch the asset in a manner that respects those limits[7]. If there are scenarios where there is a requirement for the TSO to dispatch an asset in excess of its operating envelope limits, then this will be communicated to the FSP, and they will not be subject to damages from the DSO as a result. This will be coordinated between the DSO and TSO in a manner that is communicated clearly with the FSP.

Consultation questions:

1. Do you think that the market timings described in the scenarios above allow an FSP to participate in the DFP and also stack revenues in other markets?
2. Do you see any barriers to doing so?
3. Do you have any concerns with the current proposal for revenue stacking and market participation?

[7] ESB Networks & EirGrid Joint System Operator High Level Design Webinar

6 INCENTIVE REGIME

This section builds on our proposals of pre-energisation and post-energisation incentives (previously referred to as "penalties"), introduced during the first consultation in December 2023. The purpose of this section is to ensure timely delivery of flexibility services by FSPs.

Pre-energisation and partial delivery damages are incentives which relate to the construction phase of the project to ensure that the FSA is not delayed in meeting its energisation date, and that construction risks are appropriately managed by FSPs. These damages will not apply to existing FSAs that are already energised on the network.

Post-energisation incentives will apply after the FSA is energised and available to provide flexibility services to the network. It is essential that FSPs are reliable and can be utilised when dispatched to provide congestion management services to ESB Networks.

6.1 PRE-ENERGISATION

6.1.1 *Principles & Approach*

The primary purpose of procuring flexibility services is to actively manage local congestion and energy flows on the distribution network while providing secondary benefits from a carbon emissions reduction perspective.

We have set out guiding principles to ensure our approach in setting pre-energisation damages are proportionate, transparent, and effective.

1. Damages for late, partial, and non-delivery[8], as well as mitigating non-financial measures (e.g. reporting milestones) should send strong signals to encourage tender applications to ensure it has the capabilities (e.g. supply chain) and risk mitigation measures in place to meet critical milestones and discourage any deviation from the energisation date[9].
2. Where there is a need to manage congestion on the distribution network with immediate effect, there is value in encouraging ambitious and early energisation dates.
3. FSPs should not benefit from delay or non-delivery.
4. Damages should not act as a barrier to entry for efficient developers or deterrence to competition. Where possible, these damages should reflect costs to the network and end consumer, as much as possible.
5. Damages on late delivery should be calibrated proportionately to incentivise delivery of service provision rather than termination.

[8] In this context, delivery relates to construction of a FSA, establishing a connection and energising the FSA to the full MW capacity of the DFP contract.
[9] This may not include early energisation.

To inform our thinking, we considered existing and comparable markets such as the capacity market in Ireland and the UK. The capacity markets in these regions are mature and have enabled a competitive procurement processes for securing services to manage system supply. The design of the capacity market, including termination figures has also previously been consulted on and tested with the market.

Consultation question:

4. Do you agree with our guiding principles? Do you think that we are missing any principles or considerations?

6.1.2 Delivery Schedule, mitigations & enabling success

ESB Networks is proposing that energisation occurs no later than a maximum of 32 months[10] after contracting for flexible services as indicated in the CRU's "ESB Networks Demand Flexibility Product Procurement Recommendation Paper."[11]

Definition
In this circumstance, pre-energisation delivery means meeting critical milestones such as the construction of the FSA, the connection of the FSA to the distribution network, and energisation.

To ensure the flexibility service is delivered on time, ESB Networks is proposing that applicants submit additional project evidence to ensure tenderers submit a well-considered and deliverable bid as part of their tender application. This may include risk registers, project plans, and periodic reports (post tender selection) on the progress against delivery milestones.

The requirements and evidence required to demonstrate value for money, deliverability and operability will be detailed at RfT stage which is expected to occur in April 2025.

By requesting this information, ESB Networks is seeking assurance that tenderers are considering major critical milestones, risks, and mitigations to their proposed project to enable the best chance for successful delivery. We expect FSPs to disclose early the potential risks and to identify mitigation measures. This approach is aimed at minimising the risk of contract termination and associated higher fees. Tenderers will be asked for progress reports and updates as they progress through the delivery phase.

Once the FSP is selected, we are proposing that they submit periodic updates on delivery against their critical milestones and any changes to their risk register. These measures will enable ESB

[10] Please note that where there may be delays outside of the control of the FPS (e.g. connection delays), the energisation date may also be delayed and may be treated as "Exceptional Events" upon investigation.
[11] https://www.cru.ie/publications/28111/

Networks and the FSP to identify delays at the earliest opportunity and give the FSP sufficient lead time to implement mitigations to manage risk and ensure termination only happens as a last resort.

The table below sets out proposed evidence we expect applicants to submit for completeness, as part of its tender, as well as reporting obligations for the FSP, once a contract is issued. Please note this table is not exhaustive, tenderers must also submit other evidence related to financeability, data protection policies, etc.

Table 4 Description of reporting evidence

Evidence	Timing	Description
Risk register & mitigation measures	RfT	A detailed risk register that includes ratings, mitigation actions of risks, risk owners, cost of risk if it materialises, and how the risk register will be governed. As part this evidence, applicants should also include, where applicable, any examples of past force majeure events, mitigation strategies in place, and success rates of those mitigations
Project plan	RfT	A realistic and detailed project plan that sets out critical milestones and anticipated completion dates. Critical milestones include: • Pre-construction activities • Design and engineering • Construction commencement • Testing & commissioning • Grid connection and operational readiness
Periodic progress report	Periodically after contracting	If successful, the FSP may be tracked and held accountable to its submitted project plan. Periodically, as required by ESB Networks, we expect the FSP to re-submit its: • Updated project plan and report on progress and any delays, including rationale and mitigating actions. • Updated risk log on any changes in risks and risk ratings, and if any risks have materialised and how it is being addressed.

Consultation questions:

5. Do you agree that the proposed mitigation measures are reasonable and proportionate to encourage timely delivery of FSA and flexibility services?
6. In your view, are there any other critical milestones FSP should provide progress reports on?
7. In your view, what is a reasonable period to provide progress reports?

6.1.3 Initial Proposal for delay damages:

Trigger

We are proposing where the FSP does not meet its energisation date with the full contracted capacity, delay damages will apply. Damage amounts will increase as delays continue.

As part of periodic progress reports that will be submitted by the FSP, we expect the FSP to identify any potential risks of delays, and report on the mitigation of delays.

Structure

We are initially proposing that where there are delays in energising the FSA, the life of the contract is not extended, unless the delay is caused by exceptional circumstances outside the control[12] of the successful tender. We think by not extending the life of the contract, the loss of potential revenue provides an additional incentive to deliver the FSA on time.

We note that regardless of delays, and subject to legal consideration, ESB Networks plans to include a provision for extending the FSP's contract beyond 15 years in the procurement for this service, should it be in the interest of the network. We note that if a contract is extended, the FSP's connection agreement may need to be re-visited and the FSA would need to be re-studied.

It is our initial view that the value of delay damages should not surpass the value of the termination damages, to ensure there remains an incentive for the FSP to complete delivery rather than to terminate the contract. At the same time, we recognise the need to balance incentives so that where energisation is not possible, to terminate the contract at the earliest possibility.

At the same time, ESB Networks retains the right to terminate contracts where critical milestones are delayed to the extent that expected delivery timescales be missed[13]. We are proposing that the critical milestones include:

- Completion of pre-construction activities;
- Completion of design and engineering;
- Construction commencement;
- Completion of testing & commissioning; and
- Completion of grid connection and operational readiness.

[12] These delays may include for example a delay in receiving a connection agreement from ESB Networks.
[13] Please note this does not include any delays due to Force Majeure events which are set out in ESB Network's standard Terms and Conditions.

Definitions of these milestones can be found in Appendix A: .

We recognise that there are scenarios where partial energisation may be an outcome. We are proposing concepts of Minimum Completion and Full Completion, which will inform delay damages amounts. This is set out in the Other Considerations section below.

We are proposing that delay damages and termination damages are mutually exclusive – either one or the other will apply. Where a contract is determined to be terminated due to delays, we will follow the proposals set for termination damages.

Consultation questions:

8. Do you agree with the proposed structure of delay damages?
9. In your view, are there any other critical milestones ESB Networks should consider to inform delay damages and/or termination damages?

Value

We are proposing to cap the delay damages at a percentage of the minimum termination damages. In addition, the foregone revenue due to delays in energisation will also serve as a strong incentive to mitigate any delays that are within the control of the successful contractor.

Table 5 Proposed delay timings and value

Delay timing	% of Minimum termination damages[14]
1-3 month delay (inclusive) from energisation date	20-39%
3-6 month delay (inclusive) from energisation date	40-59%
6-9 month delay (inclusive) s from energisation date	60-79%
9-12 month delay from energisation date	80-98%
Missed energisation date by 12+ months	99%

Other Considerations

ESB Network's intention is to encourage the delivery of the full contracted capacity and the full contracted duration.

We recognise from a local congestion and carbon abatement perspective, that additional capacity on the network is better than none. Therefore, in instances where an FSP can only partially deliver its contracted capacity, we are introducing a minimum completion value of 50% of contracted capacity, or at least 5 MW, whichever is higher, for each site ESB Networks is tendering for flexibility services, where applicable.

[14] This relates to the lower range of the proposed penalty amounts (i.e. €24,000/MW) Please see Section Contract Termination for more details on Termination Damages.

Definition In this circumstance, Minimum Completion means the energisation of at least 50% of contracted capacity, or at least 5 MW for each site. Full Completion means the energisation of the contracted capacity and duration set out in an FSP's contract.

It is our view that 5 MW is the minimum technical requirement for each site to assist in addressing network congestion, regardless of the capacity needed at each site. Our proposals relating to delay and termination damages are targeted at deterring partial completion where possible.

The Minimum Completion measure will recognise that whilst the intended contracted flexibility services are delayed, partial delivery of capacity has provided some relief for network congestion, which benefits the network.

As such, where the FSP meets its Minimum Completion at its energisation date, the delay damages will only apply to the remaining capacity or duration not delivered. Floor payments will not be made for any capacity that is not delivered. We set out in the table below the application of delay damages and termination damages for partial delivery.

To account for any duration not delivered, we are proposing that damages may be calculated as €/MWh, where necessary.

Table 6 Impact of partial delivery

	Minimum Completion met at Energisation Date	Minimum Completion not met at Energisation Date
Delay damages	Applied to remaining capacity or duration undelivered. Floor payments not issued to remaining capacity or duration undelivered for the remainder of the contract.	Applied to full capacity or duration undelivered. Floor payments not issued.
Termination damages	Applied to remaining capacity or duration undelivered. Floor payments not issued.	Applied to full capacity or duration undelivered. Floor payments not issued.

We are proposing that in circumstances where the Minimum Completion is not met after a long-stop energisation date, ESB Networks retains the right to terminate the contract.

As well, in circumstances where Minimum Completion is met, but Full Completion is not met by the energisation date, ESB Networks may consider revising the contracted capacity.

Consultation questions:

10. Do you have any views regarding the proposed MW value for Minimum Completion?

6.2 POST-ENERGISATION – FLEXIBILITY SERVICE DELIVERY

We are proposing an incentive regime to ensure that FSPs deliver the DFP per contractual arrangements. The incentive regime will be based on performance and will be applied to the availability payments that FSPs would receive monthly. The incentive regime has been set with the Distribution Use of System (DUoS) customer in mind to ensure that ESB Networks avoids paying for a FSA that does not provide a reliable flexibility service delivery.

Definition
In this circumstance, post-energisation flexibility service delivery means providing the Demand Flexibility Product according to the operating envelope as issued by ESB Networks.

The payment structure for the DFP will consist of a monthly availability payment based on the FSP annual floor price and contracted capacity, a demand weighting factor, and a performance scalar:

Equation 1

$$\textbf{Monthly ESBN payment} = (\textbf{Annual floor price} \times \textbf{Capacity} \times \textbf{Demand Weighting factor}) \times \textbf{Performance scalar}$$

Whereby:

- Annual floor price (€/MW/Year) and capacity (MW) as per FSP contract.
- Demand weighting factor (%) adjusts the monthly DFP payment in line with the foreseen utilisation of the FSA per month. See section below for more information.
- Performance scalar (%) adjusts the DFP payment based on the monthly performance. See section below for more information.

An example of the monthly ESBN payment calculation is included in Example 1 in Section 6.2.2.

6.2.1 Demand weighting factor

We propose to include a demand weighting factor to incorporate expected DFP utilisation throughout the year. This will improve the proportionality of the monthly DFP payments and so encourage delivery of the DFP, to relieve congestion on the distribution network, in critical months of the year. In other words, this factor would allow for the payment to reflect if the DFP is more demanding in certain months than others by increasing the payment in such months (while maintaining the total annual payment the same as the annual floor price). When the DFP utilisation does not vary considerably across the months of the year, the demand weighting factor will be set to an even percentage across the year. The demand weighting factor will consist of a percentage based on the expected relative DFP utilisation.

For example, if the network is in higher need of flexibility in the winter months, the demand weighting factor will be higher during the winter months. Table 7 below illustrates an example demand weighting factor with heavier weighting in winter.

On the other hand, if in a certain location the needs are similar throughout the year, the demand weighting factor will have the same weight throughout all months of the year.

Table 7 Illustrative example on demand weighting factor for a location where demand is highest in January to March and October to December

Months	Demand Weighting Factor
January	12.5%
February	12.5%
March	12.5%
April	4.2%
May	4.2%
June	4.2%
July	4.2%
August	4.2%
September	4.2%
October	12.5%
November	12.5%
December	12.5%
TOTAL	100%

The demand weighting factor may be updated yearly based on the forecasted utilisation per month per location. The demand weighting factor update will be shared with FSPs in advance of the start of the relevant year.

Consultation questions:

11. Do you consider that the use of a demand weighting factor can ensure proper flexibility service delivery incentives?
12. What are your views on the proposed principle in calculating the demand weighting factor?

6.2.2 Performance scalar

We propose to apply a performance scalar to the monthly Demand Flexibility Product (DFP) payment. This factor will be calculated based on the FSP monthly performance. The monthly performance is the average of half hour performance over the course of the month. Half hour performance will be evaluated by checking whether the average measured power is within the operating envelope for all Demand Flexibility Product (DFP) events. The monthly performance calculation is explained below.

We propose to use the sliding scale method to calculate the performance scalar, whereby the following will apply:

- Monthly performance between 100% - 80% → Performance scalar is calculated using a sliding scale with reduction factor equal to 5, i.e. for a reduction in monthly performance of 1%, the performance scalar reduces by 5%, following Equation 2
- Monthly performance ≤ 80% → Performance scalar= 0%

Given ESB Networks expects high performance, i.e. that the FSP will always respect the operating envelope limits, we are exploring setting the performance cut off at 80%, as visualised in Figure 5. The reason that ESB Networks are proposing a minimum performance of 80% is because the value case for this service is reduced significantly if the service is unreliable. The purpose of procuring this product is congestion management and to achieve this, it is essential that assets perform within the limits of their operating envelopes. However, the parametrisation and continuity of the performance scalar shown in Figure 5 is just an example and it is still under consideration. Please refer to question 13 and 14 at the end of this section.

Equation 2 $$Performance\ scalar\ (\%) = 100\% - 5 \times (100\% - Monthly\ performance(\%))$$

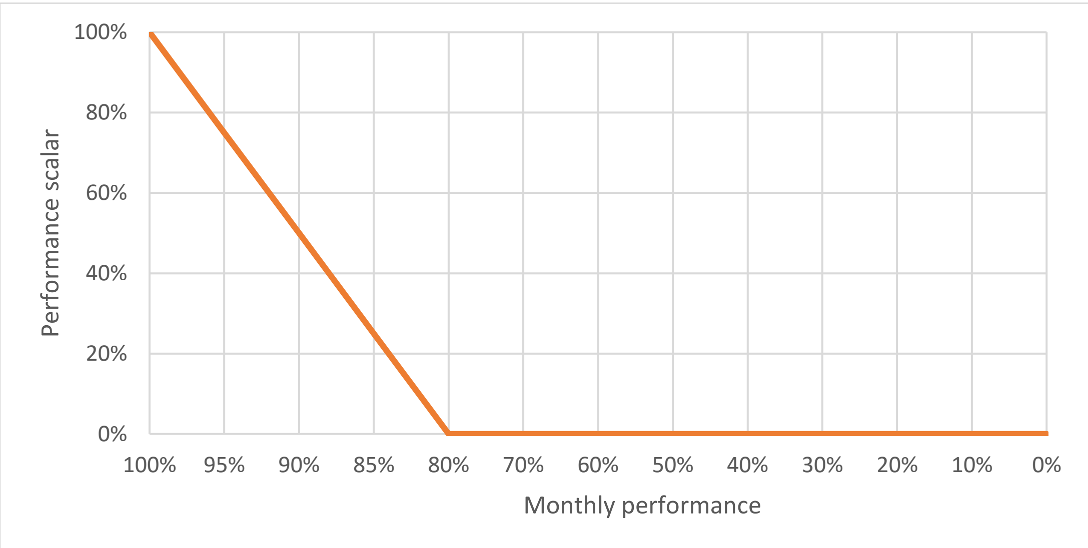

Figure 4: Performance scalar as a function of monthly performance.

Table 8 Monthly performance values will be translated to a performance scalar

Monthly Performance	Performance scalar
100%	100%
95%	75%
90%	50%
85%	25%
80%	0%
70%	0%

60%	0%
50%	0%
40%	0%
30%	0%
20%	0%
10%	0%
0%	0%

Example 1: Monthly ESBN payment calculation

In this example we assume a given monthly performance of 95% to calculate the Monthly ESBN payment. To calculate the payment, we apply equation 1:

$$\text{Monthly ESBN payment} = (\text{Annual floor price} \times \text{Capacity} \times \text{Demand Weighting factor}) \times \text{Performance scalar}$$

The given information is the following:

Month: *January*
Annual floor price: *€100/MW* (this floor price is an arbitrary value for calculation illustrative purposes only and does not reflect ESB Networks floor price expectations in any way)
Capacity: *10 MW*
Monthly performance: *95%* (in this example, the monthly performance is given value for simplification purposes)

To calculate the ESBN payment, we follow these steps:

1. Identify the Demand weighting factor based on the month. In this case, the month is January. Using the illustrative example in
2. Table 7, we can check the applicable Demand Weighting Factor.

Demand weighting factor (January – example): **12.5%**

3. Calculate the HH performance and the monthly performance. In this case, the monthly performance is given at 95%

4. Translate monthly performance to performance scalar:
$$\text{Performance scalar} = 100\% - 5 \times (100\% - 95\%) = 75\%$$

5. Calculate the ESBN payment applying **Equation 1:**

$$\textbf{Monthly ESBN payment (January)} = \frac{€100}{\text{MW}} \times 10\ \text{MW} \times 12.5\% \times 75\% = \textbf{€93,75}$$

6.2.2.1 *Monthly performance calculation*

As mentioned above, the monthly performance is the average of half hour event performance over the course of the month (Equation 10). Half hour performance will be evaluated by checking whether the average measured power is within the operating envelope for all DFP events. [15]

Equation 10 $$Monthly\ Performance = \frac{\sum(Performance_{HH})}{\#\ HHevent}$$

Definition
An event is defined as 1 or more consecutive half hourly periods where the operating envelope lower and upper limits are above the maximum export capacity and/or below the maximum import capacity of the FSA respectively.

Figure 5 below illustrates the definition of event based on an example 24 hour-operating envelope instruction.

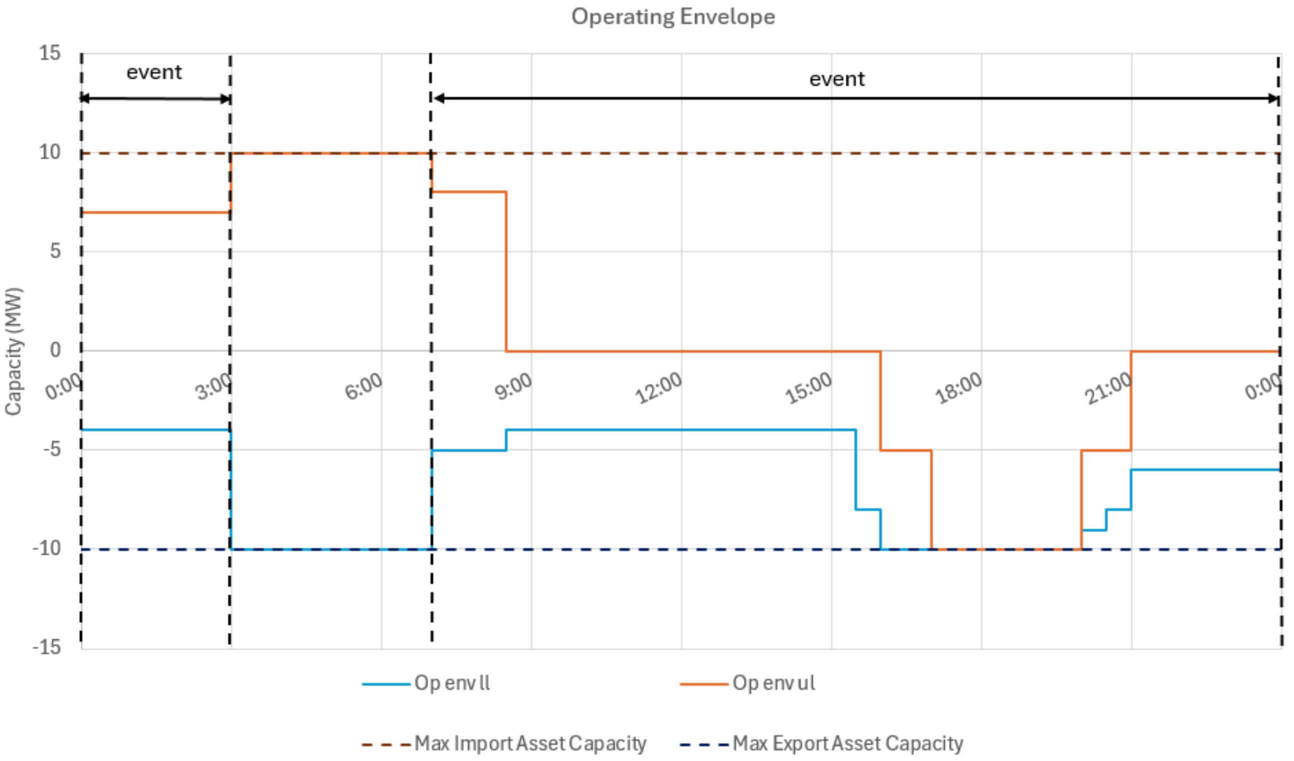

Figure 5 Illustration of the definition of "event". In this example there are two events, one event from 00:00 to 03:00 and another event from 07:00 to 00:00. Between 3:00 and 7:00, the operating envelope limits are equal to the maximum FSA export and import contracted capacity, meaning that the FSA operation is not constrained. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into the network.

The HH performance will be evaluated as follows:

- For each half hour (HH) within an *event*:
    - If "HH Average Measured Power" is within the operating envelope limits, the half-hourly performance (HH performance) would be 100% **(Equation 3)**
    - If "HH Average Measured Power" is outside the operating envelope limits, the HH

[15] The exceptions are presented in Section 6.2.3.1

Performance is defined as the ratio (a) deviation of HH measured power with respect the closest limit of the operating envelope and (b) the contracted capacity of the Flexible Service Asset (FSA) **(Equation 4 and Equation 5.)**

- There are four exceptions to the application of **Equation 4 and Equation 5.**
  - when the operating envelope specifies that the FSA should be importing/exporting, and the measured power indicates that FSA is doing the opposite (exporting/importing), the FSA would have not only not delivered the service, but aggravated the network problem, therefore the HH performance is 0% *(exception 1 and 2).*
    - **Exception 1:** If the lower operating envelope limit is greater than or equal to 0 (i.e. the FSA should be Importing) AND the “HH Average Measured Power” is lower than 0 (the FSA is Exporting), then the HH performance is 0% **(Equation 6)**
    - **Exception 2**: If the upper operating envelope limit is lower than or equal to 0 (i.e. the FSA should be exporting) and the “HH Average Measured Power” is higher than 0, (the FSA is Exporting) then the HH performance is 0% **(Equation 7)**
  - when the operating envelope specifies that the FSA should be importing/exporting, and the measured power is 0, it is considered that the FSA would have not delivered the service, and hence the performance is 0% *(exception 3 and 4*).
    - **Exception 3**: If both, upper and lower limits, are greater than 0 and the “HH Average Measured Power” is 0, then the HH performance is 0% **(Equation 8)**
    - **Exception 4**: If both, upper and lower limits, are lower than 0 and the “HH Average Measured Power” is 0, then the HH performance is 0% **(Equation 9)**

Equation 3 $$Op\ env_{ul} \geq \overline{Power}_{HH} \geq Op\ env_{ll} \rightarrow Performance_{HH}(\%) = 100$$

Equation 4 $$\overline{Power}_{HH} < Op\ env_{ll} \rightarrow Performance_{HH}(\%) = \left(1 - \frac{Op\ env_{ll} - \overline{Power}_{HH}}{P_{contr}}\right) \times 100$$

Equation 5 $$\overline{Power}_{HH} > Op\ env_{ul} \rightarrow Performance_{HH}(\%) = \left(1 - \frac{\overline{Power}_{HH} - Op\ env_{ul}}{P_{contr}}\right) \times 100$$

Equation 6 $$Op\ env_{ll} \geq 0 \wedge \overline{Power}_{HH} < 0 \rightarrow Performance_{HH}(\%) = 0$$

Equation 7 $$Op\ env_{ul} \leq 0 \wedge \overline{Power}_{HH} > 0 \rightarrow Performance_{HH}(\%) = 0$$

Equation 8 $$Op\ env_{ul} > 0 \wedge Op\ env_{ll} > 0 \wedge \overline{Power}_{HH} = 0 \rightarrow Performance_{HH}(\%) = 0$$

Equation 9 $$Op\ env_{ul} < 0 \wedge Op\ env_{ll} < 0 \wedge \overline{Power}_{HH} = 0 \rightarrow Performance_{HH}(\%) = 0$$

Where:
$Op\ env_{ul}$ is the upper limit of the operating envelope
$Op\ env_{ll}$ is the lower limit of the operating envelope
$\overline{Power}_{HH}$ is the half hourly (HH) average measured power
$Performance_{HH}$ is the performance in each half hour
P_{contr} is the FSP contracted capacity
$\wedge$ means "AND"

Once the half hourly performance is calculated, we propose to calculate the monthly performance as the average HH performance in a month. To that end, the HH performance of all half hours identified as events will be summed up, for the selected month, and will be divided by the number of HH identified as events (Equation 10):

Equation 10 $$Monthly\ Performance = \frac{\Sigma(Performance_{HH})}{\#\ HHevent}$$

An illustrative example of HH performance calculation can be found in Example 2 below.

Consultation questions:

13. Do you agree with the proposed performance scalar methodology?
14. Are there alternatives to ensuring proper flexibility service delivery incentives that ESB Networks should consider?

Example 2: HH performance calculation

In the figure below, we show the metered power of a FSA against the operating envelope sent by ESBN. Based on the FSA minimum and maximum capacity, the DFP “events” occurred between 00:00 to 03:00 and between 07:00 to 00:00 of the following day (this is illustrated in figure 3).

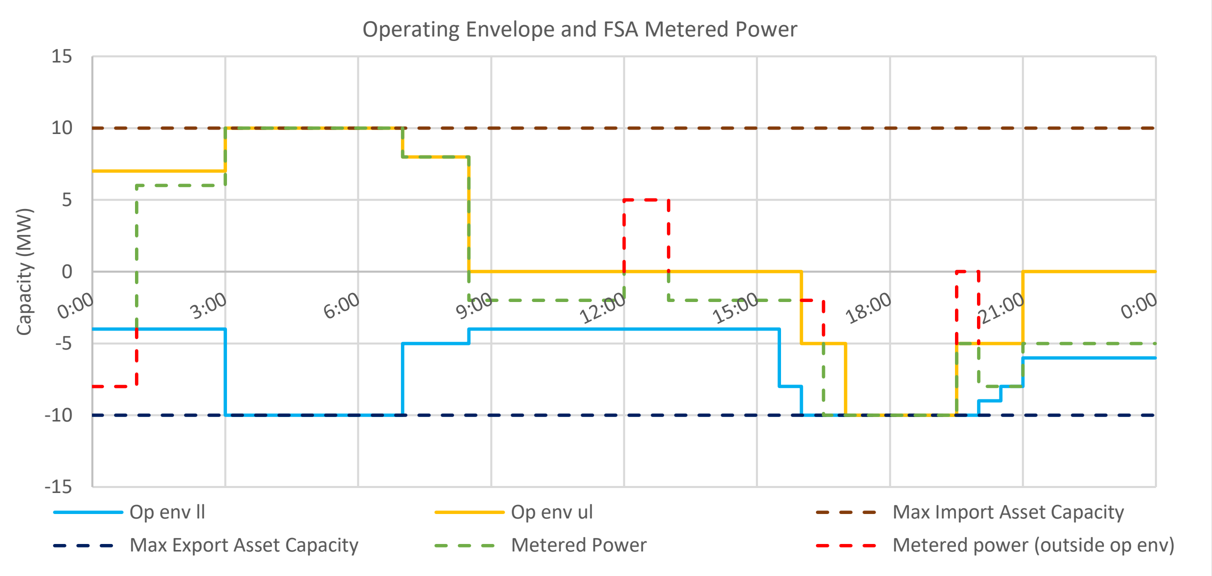

Figure7 Example operating envelope and FSA metered power (10 MW 4h duration battery system)

In this example, the performance needs to be calculated in the half hours corresponding to events, i.e. all half hours except the ones between 03:00 and 07:00 since the FSP is allowed to import/export without constraint. The detailed operating envelope, metered power and HH performance is shown in Table 9 below. As seen in the table, there are different performance levels within the example day:

- In all instances where the metered power (in green) is within the upper and lower limit, the performance is 100%. That occurs in the periods 1) 01:00 -12:00, 2) 13:00 -16:00, 3) 16:30 – 19:30 and 4) 20:00 – 00:00

- Between 00:00 and 01:00, the metered power (in red) is below the operating envelope lower limit, therefore **Equation 4** applies, which results in 60% performance

$$Performance_{HH} = \left(1 - \frac{-4-(-8)}{10}\right) \times 100 = 60\%$$

- Between 12:00 and 13:00 the metered power (in red) is 5 MW (i.e. the battery is charging), whereas according to the operating envelope limits, the battery should be between 0 and (– 4 MW) (i.e. discharging). Because the FSA is doing the opposite of what is indicated, **Equation 6** applies and the HH performance is set to 0%

- Between 16:00 and 16:30 the metered power (in red) is above the operating envelope upper limit, therefore **Equation 5** applies, which results in 70% performance

$$Performance_{HH} = \left(1 - \frac{-2-(-5)}{10}\right) \times 100 = 70\%$$

- Between 19:30 and 20:00 the metered power (in red) shows that the FSA is not exporting or importing (0 MW), whereas the operating envelope indicates that it should be discharging at 10 MW. Because the FSA is not active, **Equation 8** applies and the HH performance is set to 0%

The **monthly performance** calculation would consist of averaging all HH performance values within a given month.

Table 9 Example HH performance calculation

Period starting	Op env ul (MW)	Op env ll (MW)	Metered Power (MW)	HH performance (%)
00:00	7	-4	-8	60%
00:30	7	-4	-8	60%
01:00	7	-4	6	100%
01:30	7	-4	6	100%
02:00	7	-4	6	100%
02:30	7	-4	6	100%
03:00	10	-10	10	N/A
03:30	10	-10	10	N/A
04:00	10	-10	10	N/A
04:30	10	-10	10	N/A
05:00	10	-10	10	N/A
05:30	10	-10	10	N/A
06:00	10	-10	10	N/A
06:30	10	-10	10	N/A
07:00	8	-5	8	100%
07:30	8	-5	8	100%
08:00	8	-5	8	100%
08:30	0	-4	-2	100%
09:00	0	-4	-2	100%
09:30	0	-4	-2	100%
10:00	0	-4	-2	100%
10:30	0	-4	-2	100%
11:00	0	-4	-2	100%
11:30	0	-4	-2	100%
12:00	0	-4	5	0%
12:30	0	-4	5	0%
13:00	0	-4	-2	100%
13:30	0	-4	-2	100%
14:00	0	-4	-2	100%
14:30	0	-4	-2	100%
15:00	0	-4	-2	100%
15:30	0	-4	-2	100%
15:30	0	-8	-2	100%
16:00	-5	-10	-2	70%
16:30	-5	-10	-2	100%
17:00	-10	-10	-10	100%
17:30	-10	-10	-10	100%
18:00	-10	-10	-10	100%
18:30	-10	-10	-10	100%
19:00	-10	-10	-10	100%
19:30	-10	-10	0	0%
20:00	-5	-9	-8	100%
20:30	-5	-8	-8	100%
21:00	0	-6	-5	100%
21:30	0	-6	-5	100%
22:00	0	-6	-5	100%
22:30	0	-6	-5	100%
23:00	0	-6	-5	100%
23:30	0	-6	-5	100%

6.2.3 Additional measures and exceptions

6.2.3.1 Setting sharing factor at 100%

There may be instances where the FSP deviates from ESB Networks operating envelope to leverage opportunities in other markets. ESB Networks is considering applying a mitigation measure for avoiding this potential gaming behaviour. The mechanism would be applied if ESB Networks detects that the FSP failed to deliver the required flexibility services on a certain day while they were dispatched in other markets. In this case, ESB Networks would set the sharing factor at 100% for that day which would result in the FSP keeping 0% of the net revenue earned in other markets for the day. If ESB Networks decides to implement this mitigation measure, there will be a clear set of rules defined that will be published alongside the RfT.

6.2.3.2 Exceptions

We propose to apply the following exceptions to the post-energisation damages scheme:

- Damages will not apply when non-delivery is due to outages on the distribution system due to a fault (or in some cases maintenance).
- Damages should not apply when the FSP has declared unavailability due to maintenance with a sufficient notice period and agreed by ESB Networks. Efforts should be made to align FSP plant maintenance with scheduled outages on the distribution system.
- Damages should not apply when FSPs deviate from operating envelope while following instructions laid out by DSO-TSO communications.

Consultation questions:

15. Do you agree with the proposed additional measures?
16. Do you agree with the proposed exceptions?
17. Do you agree with the proposed flexibility service delivery incentive scheme?

7 SHARING FACTOR TECHNOECONOMIC ANALYSIS

7.1 SCOPE OF TECHNOECONOMIC ANALYSIS

As noted in the CRU Decision and ESB Network's Recommendation paper published in July 2024, ESB Networks will be using a floor-and-share payment structure through which a fixed proportion of net revenues from other markets are shared with the DUoS customer. The sharing factor is designed to i) ensure the DUoS customer does not foot the bill for excessive returns to FSPs and ii) ensure flexible assets have appropriate incentives to participate in other markets (revenue stack) in order to deliver the maximum benefit to the wider system. The sharing factor is not intended to be the main incentivisation mechanism for assets to deliver at times needed by ESB Networks. Rather, that is done via the incentive regime.

To inform an appropriate level of sharing factor, ESB Networks has undertaken in-depth technoeconomic modelling of operating the FSA in the Single Electricity Market (SEM) under varying levels and duration of constraints to revenue stacking. The results of this modelling, in conjunction with relevant regulatory precedent and other available evidence, have been used to determine the appropriate sharing factor.

ESB Networks has undertaken analysis to identify a maximum floor reserve price for each location and will only proceed with locations where the bids submitted by FSPs are below the reserve price. We will aim to ensure that the combination of floor price and sharing factor provide strong incentives to providers to make optimal use of the FSAs across the markets they operate in, achieving the most efficient outcomes for electricity and DUoS customers.

The objective of this section is to provide a high-level overview of this technoeconomic analysis and to consult on a proposed sharing factor range for the DFP. The sharing factor that is ultimately decided upon will provide ESB Networks with a revenue recovery mechanism. ESB Networks is proposing that when FSPs contract under the DFP, they will need to provide evidence of their trading balance sheets each month in existing energy markets so that ESB Networks can ensure that the correct amount of revenue is recovered. This is expected to be a mandatory part of the settlement process. ESB Networks will calculate the minimum expected revenue recovery based on appropriate wholesale market prices and the FSAs metered position. ESB Networks will reserve the right to audit the trading behaviour of the FSA under the contracted FSP, for example where reported revenues do not appear in line with the revenues that would be expected to follow from commercial (profit-maximising) market participation. If non-competitive or gaming behaviour is identified, damages may be applied.

7.2 TECHNO-ECONOMIC ANALYSIS CONSIDERATIONS

The sharing factor has been estimated based on the result of the technoeconomic analysis. The sharing factor must fulfil the following requirements:

- Ensures the DUoS customer shares the benefit of the efficient operation of the FSAs which they

are supporting, thus minimising the net cost to the DUoS customer, and limiting the risk of customers paying for above-competitive-level returns.
- Ensures sufficient incentive for the contracted FSPs to participate efficiently in other markets, when not conflicting with the DFP operating envelope instructions.

To determine the sharing factor, ESB Networks considered the following:

- Cost to ESB Networks (different scenarios consider different cost levels)
- FSP revenue earned in other markets (different scenarios consider various market/service prices)
- FSP capital and operational costs
- FSA financial viability, i.e. positive return of investment in line with industry

7.2.1 Cost to the DUoS Customer

The "cost to the DUoS customer" can be defined as the total cost that will be paid for the flexibility service procured or the "Floor Payment" that ESB Networks will provide the FSP for offering their flexibility minus the revenues attained through the sharing factor.

The "Floor Payment" is an availability payment (i.e., €/MW/year). The FSP bids in at the RfT stage and if this bid is accepted, it then becomes their floor payment which will form part of the RfT. Each FSP participating in the RfT, will need to include their proposed availability payment as part of their tender submission.

As the "Floor Payment" is unknown until RfT stage, we use several levels of the reserve price to estimate the potential cost to ESB Networks. We have used three cost scenarios per location to determine scenarios for the cost to ESB Networks:

A. Floor Payment at 100% of reserve price. This indicates ESB Network's maximum willingness to pay.
B. Floor payment at 90% of reserve price
C. Floor payment at 80% of reserve price

The above analysis gives us an understanding of the range of potential gross costs that ESB Networks faces before a sharing factor is applied.

7.2.2 FSP Net Revenues in Other Energy Markets

As noted above, it is envisaged that FSPs will have the option to access additional revenue sources other than ESB Network's Demand Flexibility Product by participating in other existing energy markets (e.g. Balancing, Capacity and Wholesale). As outlined above, it is in the interest of the DUoS customer to ensure that these revenues resulting from efficient market operation are shared at a level which can minimise their costs while still ensuring that FSPs are incentivised to participate in other markets. In other words, the portion of revenue that is retained by the FSP should be sufficient to cover the costs of participating in other markets plus the provider's required expected return. It is therefore important to estimate:

- how much the FSP can earn in other markets;
- the level of revenue retained under different sharing factors; and
- whether this level of revenue is sufficient to ensure FSPs retain an incentive to participate in other existing energy markets.

Three scenarios were analysed to determine the revenue of FSPs earned in other markets:

- High Revenue
- Medium Revenue
- Low Revenue

The modelling work was commissioned by ESB Networks, and delivered by Frontier Economics and LCP Delta to estimate the potential revenues that can be earned in other markets, using LCP Delta's whole system dispatch model of the Irish electricity system. This modelling work resulted in a central revenue scenario which assumes that FSPs can participate in the Balancing, Capacity, Wholesale Markets at times that do not inhibit their participation in the DFP. We then undertook two additional sensitivities to leave us with three revenue scenarios:

- High Revenue: A sensitivity applied to the medium revenue scenario
- Medium Revenue: Based on the commissioned work from Frontier Economics
- Low Revenue: A sensitivity applied to the medium revenue scenario

The medium scenario was based on assumptions that FSPs can perform in the Balancing, Capacity and Wholesale Markets at times that do not inhibit their participation in the DFP. High and Low Revenue scenarios were estimated based on applying sensitivities to the medium scenario.

It was also important for ESB Networks to understand if there are any additional operational costs to the FSP for participating in existing energy markets as, while FSPs have the opportunity to earn revenues by participating in other energy markets, they may also incur additional operational costs to do so. It is envisaged that the sharing factor will only be applied to net revenues earned in other markets. By applying the sharing factor to net revenues rather than gross revenues this should further ensure that there is sufficient incentive for FSPs to participate in these existing energy markets. The term "net revenues" will be defined in more detail at RfT stage as well. The sharing factor we choose must allow the FSP to cover its cost inclusive of a normal rate of return. If this condition is not fulfilled the FSP will be unlikely to participate in other energy markets, as the costs of doing so would be greater than the additional revenues it would keep.

ESB Networks had calculated the scenarios for gross cost to ESB Networks, the scenarios for revenue earned by FSPs in other existing energy markets, and a high-level calculation for the operational costs faced by FSPs. ESB Networks acknowledges that FSPs will have a more comprehensive understanding of the costs that they may incur as a result of participating in additional markets (additional to DUoS tariffs) and so invites industry feedback on this area so that ESB Networks can use this to potentially refine its calculations.

7.3 METHODOLOGY

Using the above information and associated scenarios, ESB Networks applied sharing factors ranging from 10% to 90% to the revenues earned in other markets to assess their impact on the net cost to the DUoS customer and the likely net revenues retained by the FSP from participation in other markets.

To understand the impact of FSPs participating in other markets, ESB Networks reviewed the projected network need (hours and days) for the DFP in each location and in each scenario noted above. The expected revenue the FSP will earn in other markets, including revenues earned at times when needed by ESB Networks and when the FSP is expected to be operating commercially, was then calculated and multiple scenarios were developed.

To determine the minimum possible sharing factor, the primary analysis was to assess the DUoS customer's projected net cost at varying sharing factors. A second analysis was also done to understand how lower sharing factors may result in FSPs deviating away from ESB Networks schedules and performing in other markets at times that conflict with the FSP's ability to meet those schedules. To understand this, ESB Networks compared the marginal revenue earned in other markets by the FSP to proposed floor payments and subsequent damages that can be applied. This was done using an analysis of the forecasted schedules for each location. ESB Networks used these forecasted schedules to understand the expected use case in each location and then looked specifically at days where market prices were significantly higher than average.

The objective of the analysis was to establish at which sharing factors there is a potential for marginal revenue to be higher for the FSP even after damages are applied. This analysis was done for high, medium, and low revenue scenarios as referenced previously. The methodology used for the analysis involved a detailed analysis into half hourly prices in existing energy markets over a one-year timeframe and comparing these half hourly prices to the ESB Networks floor payments after damages have been applied. ESB Networks then applied a range of sharing factors to understand how effective the proposed damages would be under this variable. It was established that sharing factors below 70% allowed for a small potential incentive to deviate from the DFP scheduling when prices in other markets are high[16]. The potential to deviate from schedules may also be prohibited by the connection agreement that an FSP enters into. ESB Networks is also considering whether to impose a 100% sharing factor at times when the FSP deviates from the operating schedule set out by ESB Networks as seen in Section 6.2.3.1. While the potential to deviate was one factor that fed into the calculation of the minimum sharing factor, the main driver was to minimise the net cost to the DUoS customer and limiting the risk of customers paying for above-competitive-level returns. A sharing factor of below 70% also provided a higher level of net cost to the DUoS customer than ESB Networks feels is acceptable.

[16] Note - the term "deviate" refers to the potential for the FSP to take the damages from ESBN and still earn profits in other existing energy markets.

To determine the maximum possible sharing factor, ESB Networks calculated the profitability of FSPs at different sharing factors and floor payment levels. ESB Networks calculated the total revenues earned by the FSP, inclusive of the floor payment and revenue earned in other existing energy markets. ESB Networks then compared this to the expected capital and operational costs that the FSP is estimated to incur both for the DFP and when participating in other existing energy markets. This provided ESB Networks with an estimate of the high-level potential profitability of the FSP when participating in other markets under varying revenue and cost scenarios. ESB Networks welcomes stakeholder feedback on their expected costs so that we can strengthen and refine our analysis and use this information to move from the sharing factor range that we will provide in this paper, to an exact sharing factor percentage.

The second part of the analysis indicated that a sharing factor of above 85% may result in a disincentive to participate in other existing energy markets given the cost of market participation.

7.4 RESULTS

Following on from the techno-economic analysis carried out, ESB Networks' view 70% to 80% manages the cost for the DUoS customer whilst providing an additional return to the FSP for a limited incremental cost; we invite stakeholders to provide feedback on this. The stakeholder feedback will be used to inform ESB Networks decision in refining the current range to move towards a set sharing factor percentage for the RfT stage. Note that the sharing factor percentage will be applied to all locations.

Consultation questions:

18. What are stakeholders’ views on the proposed sharing factor range of 70-80%?
19. What would the expected impact of a sharing factor within this range be on the incentives for FSPs to participate in existing energy markets? Please provide specific evidence to support your views.
20. If you disagree with the proposed sharing factor range please outline your reasoning and the proposed sharing factor that you would suggest.
21. What are stakeholders’ views on the additional operational costs that will be incurred as a result of participating in other existing energy markets? Please provide detailed responses on both the type of costs and level of costs that FSPs would incur.

This information will inform ESB Networks decision on a set sharing factor percentage that will be applied to all locations.

8 CONTRACT TERMINATION

It is our initial view that, under certain circumstances, ESB Networks may terminate the contract.

8.1 TERMINATION SCENARIOS

There are scenarios where it may be justified for ESB Networks to terminate the contract, at any point with a FSP. Some of these scenarios include, but are not limited to:

- No longer satisfying the technical eligibility criteria as will be set out in the RfT documents;
- FSP is engaging in prohibited activities (e.g. fraud);
- Any evidence submitted as part of tender or progress report is false;
- Failure to secure Conditional Bond (see below for more details); and
- Unreliable flexibility service delivery performance: ESB Networks will include more detail on this at the RfT stage of the procurement process. ESB Networks will specify the exact criteria necessary for “unreliable flexibility service delivery performance” to result in contract termination. Although the exact criteria are not yet defined, the main factor feeding into this will be the consistency of the unreliability. FSPs found to be consistently unreliable may have their contracts terminated. The unreliability will be measured based on the monthly performance metric (Section 6.2.2.1). This DFP is being procured for congestion management purposes and so reliability is of paramount importance.

Timing of the termination will inform the damages amount. Where there is a proposal to terminate the contract for rationale other than the above, an Off-Ramp clause may apply. This is set out in further detail in Section 11.

8.2 PRE-ENERGISATION TERMINATION

8.2.1 Structure

In circumstances where ESB Networks terminates the contract ahead of the energisation date, ESB Networks believe damages should apply to reflect costs to the network and consumers as much as possible.

We propose that the termination damages increase progressively as the energisation date approaches. The termination damages should not increase sharply, as we would want to discourage premature termination of the contract. It is our view that delayed energisation of a FSA is preferred to termination of a potentially successful contract. A progressive increasing approach to setting the termination damages reflects the increasing sunk costs and opportunity costs to replace the FSA with an alternative solution.

ESB Network’s intention is to encourage the energisation of both the full contracted capacity and the full contracted duration. We are proposing to calculate damages valued in €/MWh, to account for the contracted duration of the Demand Flexibility Product (DFP). This will ensure that FSPs can deliver the MWh requirement set out in their operating envelopes.

The table below sets out our proposed increments and associated values noting that the values are discussed in more detail in the next section.

Table 910 Progressive termination damages values and timeframes of application

Timeframe	Damages Value (€/MW)	Damages Value (€/MWh)
From successful contract signing to 27 months prior to the beginning of the energisation date	€24,000/MW - €60,000/MW	€6,800/MWh - €17,000/MWh[17]
27 – 13 months prior to the beginning of the energisation date		
13 months to the beginning of the energisation date		
From the beginning of the energisation date		

8.2.2 Value

Terminating an FSP's Demand Flexibility Product (DFP) contract will mean that an alternative solution to address local congestion will need to be identified and implemented, and as a result there may be a delay in ESB Network's ability to manage local congestion. The consequences of terminating an FSP may reduce ESB Network's capacity to provide new connections to customers.

To set the termination damages, we considered various alternative solutions and their costs (i.e. proxies)

Where a contract is terminated, our working assumption is that ESB Networks cannot immediately connect additional network capacity such as a new network station or new transformers in existing stations. In the short term, ESB Networks may be able to shift load to manage congestion. In the medium to long term, re-tendering for alternative flexibility services will take significant time and if it requires the development of a new asset this may take several years

We recognise that there is no one proxy to measure these costs, and that each proxy requires various assumptions. We set out a number of assumptions and principles to guide our thinking in determining a reasonable proxy:

- To manage local network congestion, alternative option should align with parallel policy goals of ESB Networks, including Climate Action targets;

[17] These figures assume 4 hour dispatch daily

- Proxies should consider practicality and how realistic alternative solutions are to implement on the distribution network; and
- Proxies should consider differences in managing system level and local network congestion.

We considered various proxies to base the termination damages on. Ultimately, we recognise that each proxy has its merits, and its own set of assumptions. Many of the alternative solutions we explored are not realistic proxies that are applicable or suitable on the distribution network in the required timeframe.

We consider that using SEM's capacity market range (i.e. €20,000/MW - €50,000/MW)[18] is a reasonable benchmark on which to base termination damages, as it provides a tested level of damages that does not deter participation in a market, whilst also ensuring there are strong incentives for FSP to fulfil its contract.

Furthermore, it is important to recognise that local network congestion may be more difficult to manage than system level congestion. This is because system level congestion can be addressed by procuring services across a wide number of locations, whereas local congestion requires active management at a local level, based on power flows and capacity at a specific location.

Taking the complexities of managing local congestion, and the wide range of figures from alternative proxies (e.g. from €24,000/MW - €1.5mil/MW), we think that an acceptable range to base termination damages for medium-duration FSPs is around €24,000/MW - €60,000/MW, which is a 20% uplift from the rates in the capacity market. This figure reflects the challenge of procuring local congestion compared to a system wide level.

Consultation questions:

22. Do you agree with the assumptions and principles ESB Networks used to consider termination damages?
23. What are your views on the proposed value range for the termination damages?
24. What are your views on calculating termination damages based on €/MWh versus €/MW to enable consideration of both contracted MW capacity and duration of flexibility service?

Other Considerations

We are proposing that the conditional bond is posted up front as part of contract award, where it is based on 100% of the termination damages, to ensure that the damages can be fully covered from the FSP.

We note that where a successful contract is terminated, and where the connection agreement was provided the Flexible Service Asset (FSA) must apply for a modified connection agreement and the

[18] https://www.sem-o.com/documents/general-publications/IAIP2829T-4.pdf

FSA may be disconnected while it is re-studied. Modification studies may identify additional reinforcement works that are required if the FSA is to remain connected to the distribution system.

The reasoning for this is that as this Demand Feedback Product (DFP) is a location specific congestion management product, the connection agreement is provisional based on the FSA providing a service that enables this congestion management.

Consultation question:
25. Do you have any views on the conditional bond value?

8.3 POST-ENERGISATION TERMINATION DAMAGES

When considering post-energisation termination damages, our working assumption is that the contracted Flexible Service Assets (FSAs) under the Demand Flexibility Product (DFP) will be of the highest necessity towards the end of its contract life, as local network congestion is increasing as demand increases. We expect that physical reinforcements may be near deployment towards the end of a FSP's contract. The consequences of post-energisation termination for ESB Networks may include loss of ability to manage local network congestion.

For the FSP, the consequences of post-energisation termination may include loss of connection agreement, as it may be disconnected while the FSP's connection agreement is re-visited, and the FSA is re-studied.

8.3.1 Structure

Aligning with capacity markets in the UK and Ireland, we are proposing a flat damages rate for any termination post-energisation.

8.3.2 Value

Where a contract is terminated after energisation, for reasons other than the scenarios listed above, in Section 8.1, we propose that the termination damages are set at the rate of €60,000/MW. It may be more costly for ESB Networks to mitigate termination during the duration of the contract life, compared to pre-energisation. Therefore, we think it post-energisation termination damages reflect a higher value than pre-energisation termination damages.

8.3.3 Other Considerations

Termination of contract would also result in foregone floor payments for the FSP, as well as potentially losing its connection agreement, subject to re-studying Flexible Service Asset(s) (FSA). These elements should also serve as strong signals and help reflect costs to the network and customers.

Consultation questions:

26. Do you agree with the proposed list of example scenarios that ESB Networks would consider as grounds for terminating the contract with the FSP?
27. Are there other scenarios where you think ESB Networks should consider terminating the contract with the FSP?
28. Do you have any views on how the financial value should be set for the termination circumstances?

9 PROPOSAL FOR TENDERING OF LOCATIONS

ESB Networks is exploring the option of including all locations that would benefit from the Demand Flexibility Product (DFP) in the first batch of procurement as part of the RfT document. An initial list of such stations has been published and this will be finalised (possibly adding further locations) when issuing the RfT[19]. Initially ESB Networks suggested, in the first consultation, that the locations would be batched in small groups. This also formed part of the CRU Decision.[20] However, following further consideration ESB Networks is of the view that including all locations in the first batch may allow for a wider range of applicants. This in turn is expected to increase the competitiveness of the bidding and ultimately ensures better value for money for the DUoS customer. Only the most economically advantageous applications will be accepted in this first batch. By economically advantageous this refers to the value for money in a particular location. The value case differs across locations and so this may not always be the lowest bid price but instead may represent the difference between the bid price and reserve price in some circumstances. In other words, for the locations where bids are not accepted these may feature again in future procurement batches. This may give FSPs the opportunity to revise their bids if they are rejected in the first batch of procurement and if the required capacity at that location is not procured in the first batch.

Consultation question:

29. Do you agree with the proposed method of locational procurement, and if not please specify your reasoning?

[19] Published as Appendix A in CRU's decision paper
CRU202469_DSO_Demand_Flexibility_Product_Procurement_Decision_Paper.pdf (divio-media.com)

[20] CRU DSO Demand Flexibility Product Procurement Decision (CRU202469) "Procurement rounds will be staggered so that the procurement process can learn from past outcomes and iteratively improve. A location may be included in more than one procurement round if there is a continued need for flexibility that has not been fully addressed in a previous round."

10 EARLY ENERGISATION

ESB Networks is proposing that energisation occurs no later than 32 months[21] after contracting as indicated in the CRU's "ESB Networks Demand Flexibility Product Procurement Recommendation Paper" [22].

However, there may be value where FSPs are able to energise their FSA before the proposed energisation (i.e. before the 32-month period) in areas where congestion management is needed immediately (e.g. at the time of tender).

Earlier energisation of FSAs on the distribution network may deliver additional capacity on the distribution network which may attract new connection requests to avail of this capacity (e.g. public EV charging). Also, increased capacity enables smoother operation of the network during fault conditions, therefore may also reduce customer outages.

As this is the first procurement for this DFP, early energisation may enable ESB Networks to build up practical knowledge and capability to use the DFP, embedding new processes at an earlier stage. While doing may contribute to Ireland's 20-30% flexibility targets by 2030 and has the potential to mitigate dispatch of carbon intensive generation sources.

While ESB Networks may be pre-disposed to enabling early energisation, eligibility for early energisation will need to be assessed on a case-by-case basis if the ask arises, based on network need during the tender process. The consequences for early energisation to the DUoS customer will be considered as part of this assessment.

We are proposing that energisation before the 32-month energisation date is optional. Delay damages would not apply ahead of the 32-month energisation date.

Consultation questions:

30. What are your views on early energisation incentives, where congestion management is needed immediately (e.g. at time of tender)?
31. Do you think there should be additional incentives (other than floor payments) that should apply to early energisation?
32. Do you see any technical challenges of new Flexible Service Assets (FSAs) being able to have a lifetime of greater than 15 years?

[21] Please note that where there may be delays outside of the control of the FPS (e.g. connection delays), the energisation date may also be delayed and may be treated as "Exceptional Events" upon investigation.
[22] https://www.cru.ie/publications/28111/

11 POTENTIAL OFF-RAMP CLAUSE

ESB Networks is considering the option of including an off-ramp clause. The off-ramp cause would allow for the contract to be terminated by mutual agreement. The logic behind this consideration is that as with all future projections, there is an element of uncertainty in predicting future congestion.

Future congestion is forecasted based on load growth assumptions and as with all forecasted analysis there is a risk this may not materialise. This may result in an overpayment compared to the societal benefit achieved. If an off-ramp clause is included, it may allow ESB Networks to reduce the fixed availability payment while also reducing the sharing factor to allow the FSA to perform and earn higher revenues in other markets and also reduce the burden of payment on ESB Networks. ESB Networks acknowledges of course that at this stage it will have already entered into a contract with an FSP and so any changes to this payment structure will require agreement from both parties. Ultimately there are scenarios where both parties will benefit by making those adjustments. ESB Networks are seeking feedback on whether industry may be open to a review at some stage through the contract, possibly a halfway review. While the exact details of this review are still under consideration, the purpose of this section is to get industry feedback on this initial high-level concept.

Consultation question:

33. Are there any benefits or risks you see in having a clause like this in the contract? What are your views?

12 PHASING THE DELIVERY OF CAPACITY OVERTIME

Following on from Section 11 where we discussed a potential off-ramp clause to account for the uncertainty of long-term congestion management forecasting, ESB Networks is also considering the potential for a phased approach to the delivery of capacity of the flexibility services in each location. In this situation there would be a ramp up of capacity to closer match the network need across the 15 years of the contract.

If we take an example of a requirement in a location of 15MW. In a phased approach, the full infrastructure provision for 15 MW would be put in place at energisation with the exception of the full MW FSA capacity. This, therefore, would reduce the time needed to increase the MW capacity when it was required. In addition, if the FSP wished, at their own expense, to install the full 15MW capacity from day one and use the additional capacity to trade in wholesale markets, ESB Networks would accept this but would not be paying the floor price for capacity of the flexibility services that is in excess of the phased level of capacity. In addition, ESB Networks would not be looking to recover any of the wholesale market revenues achieved by the FSP from capacity in excess of the phased level of capacity.

Example on “Location X”

To give an example of this let’s look at a location that we can call “Location X”

In Location X we have a forecasted requirement of 15 MW of flexible demand in order to manage congestion in 2035. If we were to ask for a phased delivery, the FSP would not, for ESB requirements, install 15 MW in 2027. Instead, the FSP would deliver a phased delivery to match ESB Networks requirements; for example, to deliver 5 MW in 2027, an additional 5 MW in 2032 and a final 5 MW in 2037 if the forecasted congestion does materialise as expected. However, if it turned out that only 10 MW of the 15 MW materialised then ESB Networks would not procure the final 5 MW and so the risk for ESB Networks and ultimately the DUoS customer is reduced.

Consultation question:

34. What are your views on how this phased approach would impact the proposal of this DFP?

Appendix

Appendix A: A Day in the Life

12.1.1 Scenario 1: ESB Networks schedules the FSP for full discharge

In this first scenario, ESB Networks schedules the FSP for full discharge. ESB Networks has issued an operating envelope (see Table 1 and

) to the FSP that has requested that the Flexible Service Asset (FSA) discharge between 16:00 to 21:00 the following day and to provide its full contracted capacity. Non-compliance with operating envelopes (charging and discharging) will impact performance and hence payment as described in Section 6.2.

Table 11 Scenario demonstrating ESB Networks scheduling the FSP for full discharge. Operating Envelope issued by ESB Networks would requests the FSP to discharge their entire contracted capacity of 10 MW (40 MWh)

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	10	-4
00:30	10	-4
01:00	10	-4
01:30	10	-4
02:00	10	-4
02:30	10	-4
03:00	10	-4
03:30	10	-5
04:00	10	-5
04:30	10	-5
05:00	10	-5
05:30	10	-5
06:00	6	-7
06:30	6	-7
07:00	4	-8
07:30	4	-8
08:00	4	-8
08:30	0	-10
09:00	0	-10
09:30	0	-10
10:00	0	-10
10:30	0	-10
11:00	6	-4
11:30	6	-4
12:00	6	-4
12:30	6	-4

13:00	7	-4
13:30	7	-4
14:00	5	-4
14:30	5	-4
15:00	0	-4
15:30	0	-6
16:00	-5	-5
16:30	-5	-5
17:00	-10	-10
17:30	-10	-10
18:00	-10	-10
18:30	-10	-10
19:00	-10	-10
19:30	-10	-10
20:00	-5	-5
20:30	-5	-5
21:00	0	-6
21:30	0	-6
22:00	0	-6
22:30	0	-6
23:00	0	-6
23:30	0	-6

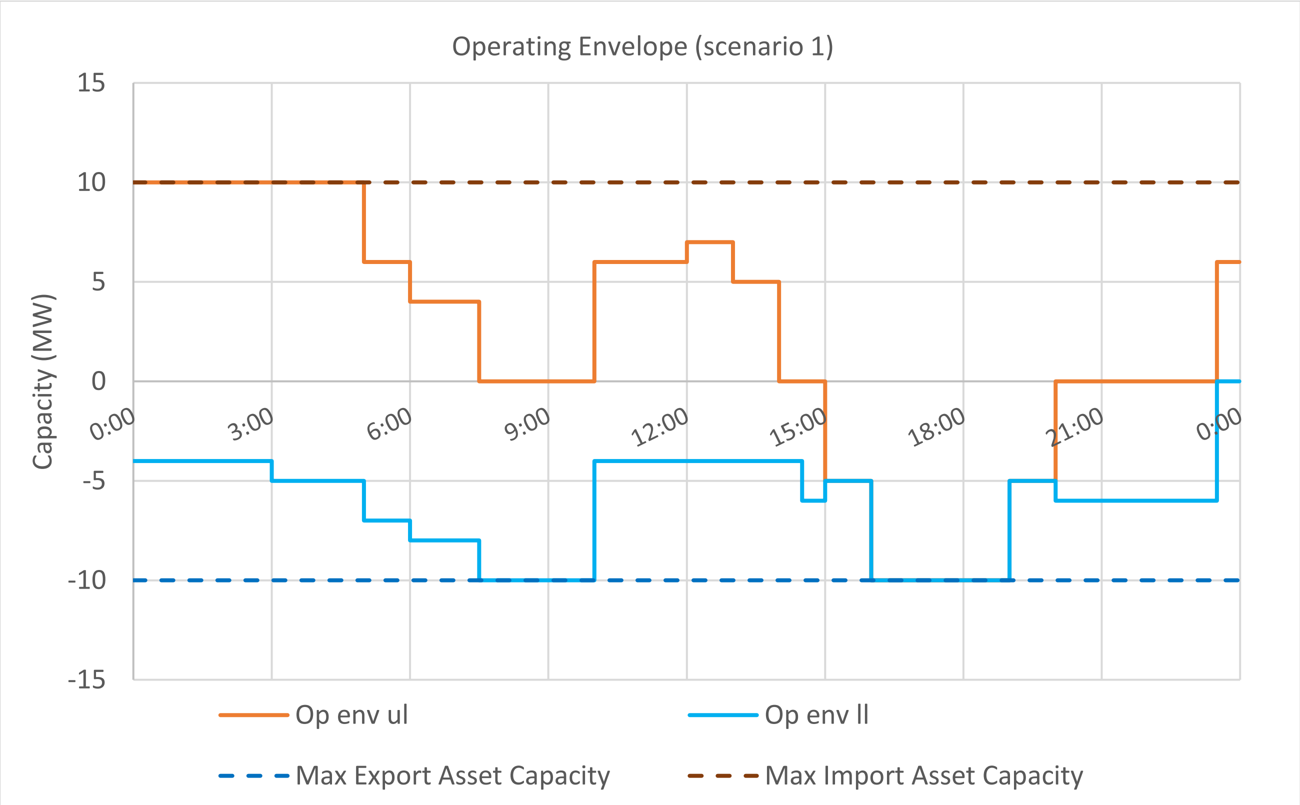

Figure 6 Scenario 1 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10 MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into from the network. In this scenario, the FSA would need to export 5 MW between 15:00-16:00 and 19:00-20:00, 10 MW between 16:00-19:00. The FSA is allowed to import power from the network between 00:00-07:30, 10:00-14:00 and 23:30-00:00

subject to a minimum and a maximum as set out in the operating envelope.

12.1.2 Scenario 2: ESB Networks schedules the FSP for partial discharge

In this second scenario, ESB Networks schedules the FSP for partial discharge.

Table 12 Scenario demonstrating ESB Networks scheduling the FSP for partial discharge

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	9	-4
00:30	9	-4
01:00	9	-4
01:30	10	-4
02:00	10	-4
02:30	10	-4
03:00	10	-4
03:30	10	-5
04:00	10	-5
04:30	10	-5
05:00	10	-5
05:30	10	-5
06:00	8	-5
06:30	8	-5
07:00	7	-5
07:30	7	-5
08:00	6	-5
08:30	6	-4
09:00	0	-10
09:30	0	-10
10:00	7	-7
10:30	7	-7
11:00	6	-6
11:30	6	-6
12:00	6	-6
12:30	6	-6
13:00	6	-6
13:30	7	-7
14:00	7	-7
14:30	4	-4
15:00	2	-4
15:30	2	-4
16:00	-4	-6
16:30	-4	-6
17:00	-8	-9
17:30	-8	-9

18:00	-5	-7
18:30	-5	-6
19:00	-5	-6
19:30	-5	-5
20:00	-5	-5
20:30	0	-8
21:00	0	-6
21:30	0	-6
22:00	0	-6
22:30	0	-6
23:00	0	-6
23:30	0	-6

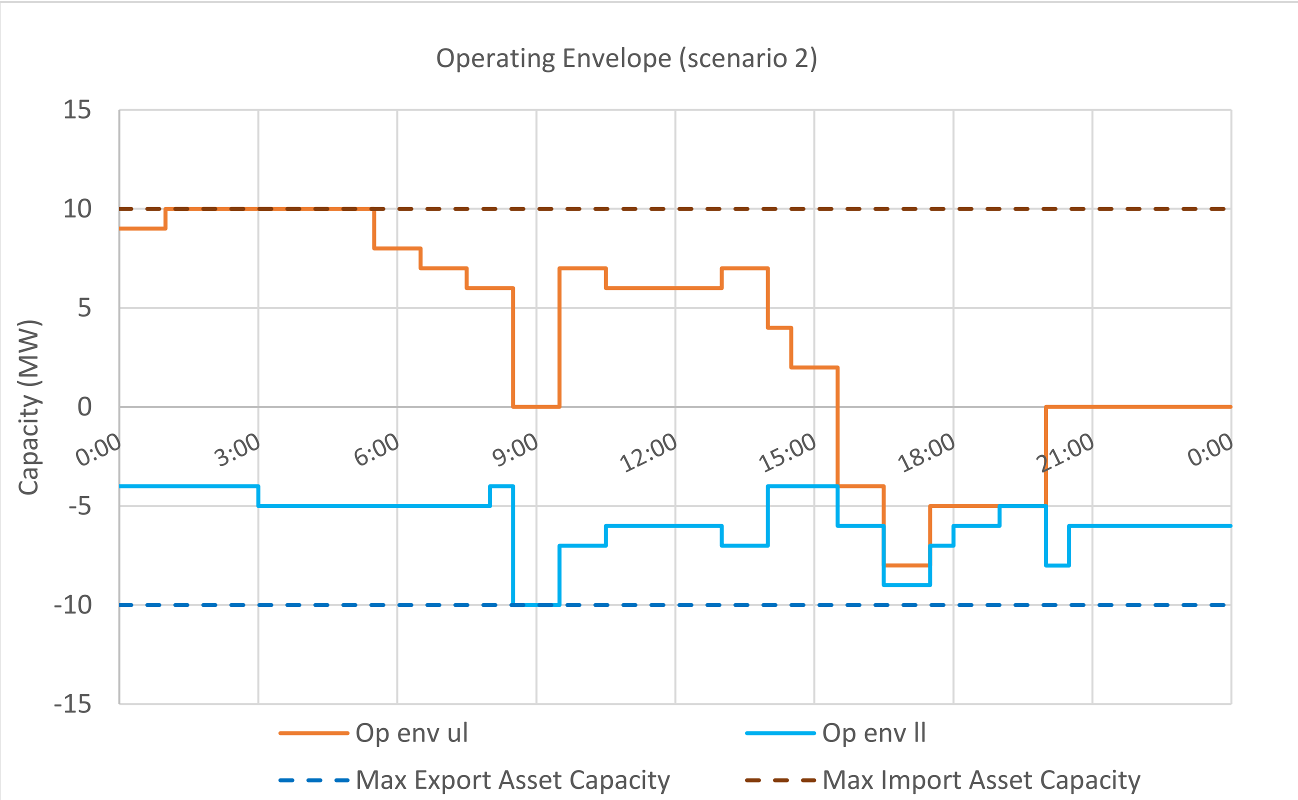

Figure 7 shows the Scenario 2 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10 MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into the network. In this scenario, the FSA would need to export between 4 and 8 MW between 15:30-20:00. The FSA is allowed to import power from the network all day except between 08:30-09:30 and 15:30-00:00 subject to a minimum and a maximum as set out in the operating envelope.

12.1.3 Scenario 3: ESB Networks schedules the FSP but provides a much broader range between the upper and lower limits than in scenarios 1 and 2.

In scenario 3 ESB Networks issues the operating envelope but it is much less restrictive and the FSP has a much wider range between the upper and lower limit than in scenarios 1 and 2.

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Table 13 Scenario demonstrating ESB Networks not scheduling the FSP

Time of the day	Operating Envelope Upper Limit (MW)	Operating Envelope Lower Limit (MW)
00:00	10	-5
00:30	10	-5
01:00	10	-5
01:30	10	-5
02:00	10	-5
02:30	10	-5
03:00	10	-5
03:30	10	-5
04:00	10	-5
04:30	10	-5
05:00	10	-5
05:30	10	-5
06:00	10	-10
06:30	10	-10
07:00	10	-10
07:30	9	-10
08:00	9	-10
08:30	9	-10
09:00	9	-10
09:30	8	-10
10:00	8	-10
10:30	8	-10
11:00	8	-10
11:30	7	-10
12:00	7	-10
12:30	7	-10
13:00	6	-10
13:30	6	-10
14:00	5	-10
14:30	5	-10
15:00	5	-10
15:30	3	-10
16:00	3	-10
16:30	2	-10
17:00	0	-10
17:30	0	-10
18:00	0	-10
18:30	0	-10
19:00	0	-10
19:30	0	-10
20:00	2	-9
20:30	4	-8
21:00	4	-6

21:30	6	-6
22:00	6	-6
22:30	8	-6
23:00	10	-6
23:30	10	-6

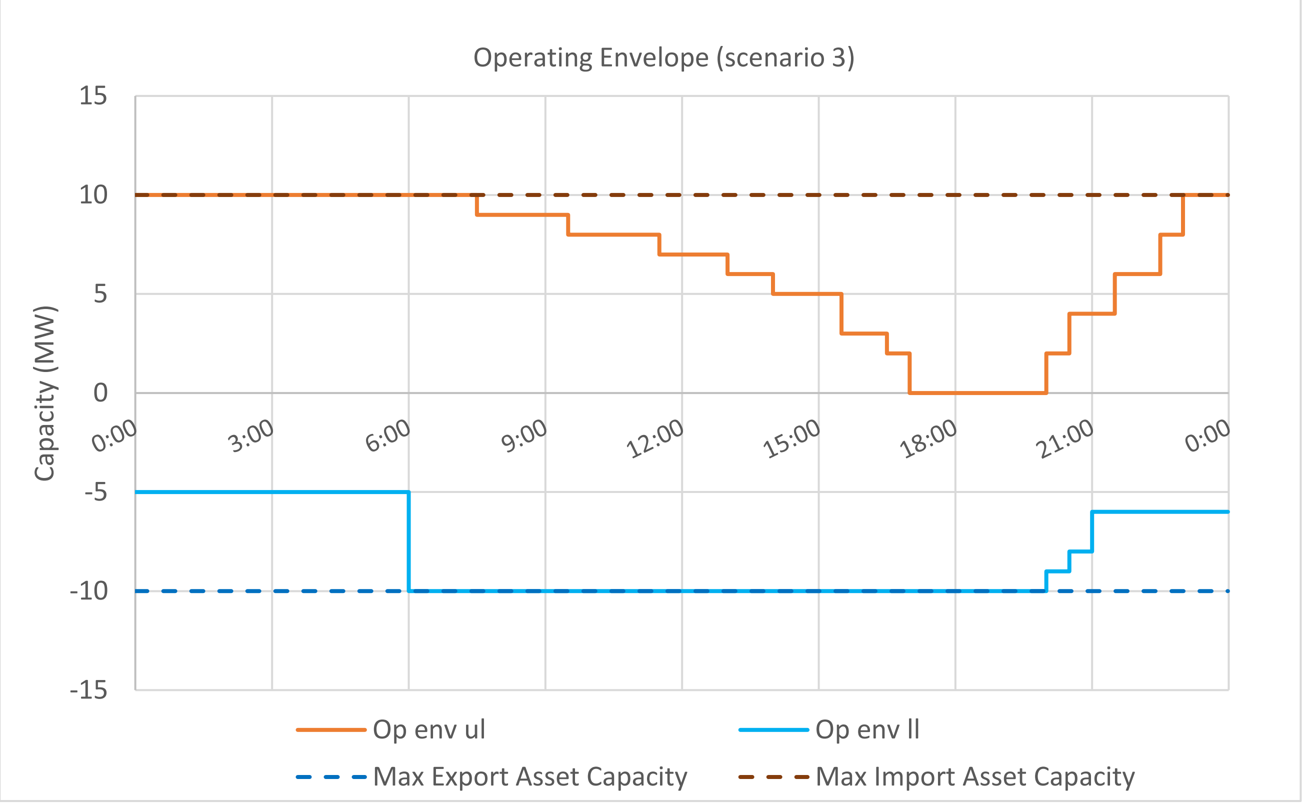

Figure 8 shows the Scenario 3 operating envelope, including lower and upper limits (op env ll and op env ul respectively) for a 10 MW (4h) battery system. The sign convention is positive capacity for FSA to import from the network, and negative capacity for the FSA to export into the network. In this scenario, the FSA is not required to export any power, but has the possibility to do at any time. The FSA is allowed to import power from the network all day except between 17:00 and 20:00.

Appendix B: Critical Milestones

ESB Networks is proposing periodic updates on the below critical milestone categories. As part of the incentive regime, ESB Networks retains the right to terminate contracts that miss critical milestones.

Table 14 Critical development milestone categories

Critical Milestone Categories	Section	Detailed Description
1: Pre-Construction Activities	1: Project Initiation	1: Project scoping and stakeholder identification
		2: Project team establishment and roles definition
	2: Feasibility Assessment	3: Feasibility study completion
		4: Site selection finalized
	3: Land Acquisition	5: Suitable land parcels identified
		6: Land acquisition agreements finalized
	4: Permitting and Regulatory Approvals	7: Permitting strategy developed
		8: Permits and regulatory approvals obtained
2: Design and Engineering	5: Detailed Design	9. Connection studies
		10: Engineering plans and specifications finalized
		11: Procurement strategy developed
	6: Engineering Procurement	12: Equipment procurement completed
		13: Contractor selection finalized
3: Construction	7: Site Preparation	14: Site cleared and prepared
	8: Infrastructure Installation	15: Foundations and infrastructure installed
		16: Electrical wiring and cabling completed
	9: Equipment Installation	17: Major components installed
		18: Safety systems integrated
	10: Quality Assurance and Safety	19: Regular inspections conducted and signed-off
		20: Compliance with safety standards ensured
4: Commissioning and Testing	11: System Integration	21: Components integrated
		22: Functional testing initiated
	12: Performance Validation	23: Performance validated against specifications
		24: Commissioning completed
5: Grid Connection & Operational Readiness	13: Utility Coordination	25: Grid connection agreements finalized
		26: Energization procedures initiated
	14: Synchronization	27: Synchronization with the grid achieved
		28: Initial grid testing completed
	15: Personnel Training	29: Training programs implemented
		30: Emergency response plans developed
	16: Monitoring and Control	31: Monitoring systems implemented
		32: Control systems optimized

Appendix C: Consultation Questions

Section 5: A Day in the Life

1. Do you think that the market timings described above in Scenario 2 allow an FSP to participate in the Demand Flexibility Product (DFP) and also stack revenues in other markets?
2. Do you see any barriers to doing so?
3. Do you have any concerns with the current proposal for revenue stacking and market participation?

Section 6: Incentive Regime

4. Do you agree with our guiding principles? Are we missing any principles or considerations?
5. Do you agree that the proposed mitigation measures are reasonable and proportionate to encourage timely delivery of Flexible Service Asset (FSA) and flexibility services?
6. In your view, are there any other critical milestones FSPs should provide progress reports on?
7. In your view, what is a reasonable period to provide progress reports?
8. Do you agree with the proposed structure of delay damages?
9. In your view, are there any other critical milestones ESB Networks should consider to inform delay damages and/or termination damages?
10. Do you have any views regarding the proposed MW value for Minimum Completion?
11. Do you consider that the use of a demand weighting factor can ensure proper delivery incentives?
12. What are your views on the proposed approach to calculating the demand weighting factor?
13. Do you agree with the proposed performance scalar methodology?
14. Are there alternatives to ensuring proper flexibility service delivery incentives that ESB Networks should consider?
15. Do you agree with the proposed additional measures?
16. Do you agree with the proposed exceptions?
17. Do you agree with the proposed service delivery incentive scheme?

Section 7: Sharing Factor Technoeconomic Analysis

18. What are stakeholders' views on the proposed sharing factor range of 70-80%?
19. What would the expected impact of a sharing factor within this range be on the incentives for FSPs to participate in existing energy markets? Please provide specific evidence to support your views.
20. If you disagree with the proposed sharing factor range please outline your reasoning and the proposed sharing factor that you would suggest.
21. What are stakeholders' views on the additional operational costs that will be incurred as a result of participating in other existing energy markets? Please provide detailed responses on both the type of costs and level of costs that FSPs would incur.

Section 8: Contract Termination

22. Do you agree with the assumptions and principles ESB Networks used to consider termination damages?
23. What are your views on the proposed value range for the termination damages?

24. What are your views on calculating termination damages based on €/MWh versus €/MW to enable consideration of both contracted MW capacity and duration of flexibility service?
25. Do you have any views on the conditional bond value?
26. Do you agree with the proposed list of example scenarios that ESB Networks would consider as grounds for terminating the contract with the FSP?
27. Are there other scenarios where you think ESB Networks should consider terminating the contract with the FSP?
28. Do you have any views on how the financial value should be set for the termination circumstances?

Section 9: Proposal for Tendering of Locations

29. Do you agree with the proposed method of locational procurement, and if not please specify your reasoning?

Section 10: Early Energisation

30. What are your views on early energisation incentives, where congestion management is needed immediately (e.g. at time of tender)?
31. Do you think there should be additional incentives (other than floor payments) that should apply to early energisation?
32. Do you see any technical challenges of new assets being able to have a lifetime of greater than 15 years?

Section 11: Potential Off-Ramp Clause

33. Are there any benefits or risks you see in having a clause like this in the contract? What are your views?
34. What are your views on how would this phased approach might impact the proposal of this Demand Flexibility Product (DFP)?