

Future Power Markets

Stakeholder Engagement

Industry Workshop: 16th October 2024

This presentation provides an update on the Future Power Markets Programmes.

Achievable - Valuable - “Simple”



Future Power Markets - Industry Outreach

Why Are We Here?



Inform

We are here to provide information about the ongoing programmes of work in the Future Power Markets space and the impact on the market participant community. We will provide a view of the programmes' drivers, functional details, structure, timelines, and stakeholder engagement.



Discuss

We will discuss the changes and how this impacts you and your portfolio. We will discuss the functional, technical, and formal arrangement changes, stakeholder engagement, and programme management updates. We are happy to field all questions - and we may not be able to answer all of them today.



Listen

We are here to listen. What are your thoughts on the FPM programmes, the functional, technical, and regulatory details and the impacts to your business? What questions do you need answers to? What clarity do you need?



Ask

We will ask for your participation throughout - we are better together.

FPM - Industry Workshop

Setting Expectations



Meeting Rules

1. **Engage:** actively listen and ask questions. This session is for you.
2. **Show Courtesy:** allow everyone the time and space to participate in the discussion. Don't talk over another speaker.
3. **Scope Discipline:** maintain focus on FPM.



FPM: Industry Workshop (16th October 2024)

Agenda for today's workshop





Time	Topic
10:00 - 10:05	Introduction & Housekeeping
10:05 - 10:20	Future Arrangement System Services - Status Update
10:20 - 11:50	FASS - DASSA Volume Forecasting Methodology
11:50 - 11:55	Break
11:55 - 12:10	Scheduling & Dispatch (SDP) - Status Update
12:10 - 12:40	Lunch
12:40 - 12:55	Long Duration Energy Storage (LDES) - Status Update
12:55 - 13:40	SMP - high-level design for the integration dispatchable consumption into the SEM balancing market

Future Arrangement System Services - Status Update

FASS: Programme Summary Status

■ As planned, no issues ↑ Improving
■ Minor - moderate concern → Steady
■ Significant issue / concern ↓ Worsening

 **FASS** Summary Status

Overall Status		The Future Arrangements for System Services (FASS) Programme continues at pace; however amber programme status reflecting uncertainty of final DASSA Design and risk to schedule until known.
Schedule		Programme schedule is amber reflecting risk of delay to schedule. Capacity challenges remain due to busy schedule with overlapping programme activities.
Resourcing		Resourcing status moved from amber to green, following notice of approval of programme funding. TSO programme teams are staffed and engaged to continue work at pace, final approval will allow TSOs to secure long term resourcing.
Finances		TSOs notified that programme funding has been approved. Formal approval and details expected shortly.

Key Messages



Service Provider Sentiment:

- TBC. Industry readiness survey to be issued later in calendar year which will inform High Level Readiness Scope (FASS.20).



Key Activities for Immediate Action

- SEMC Decision on DASSA Product Review & Locational Methodology Recommendations Paper
- RA/ TSO discussions on interim arrangements between DS3 end and DASSA go-live
- TSOs & RAs are exploring an alternative solution for key design components (Alternative to the FAM)



Positive Developments (Since Last Report)

- DASSA Product Review & Locational Methodology Recommendations Paper submitted to RAs
- TSOs notified that programme funding has been approved, formal notification to follow
- Volume Forecasting Methodology consultation published Friday 4th October
- New workstream for Real Time Security Arrangements (i.e., FAM alternative) has mobilised



Challenges (Since Last Report)

- Final DASSA Design uncertainty

Status of Consultations

As part of the FASS Programme there are a number of consultations in flight. PIR V2.0 was published on the 11th of October which provides clarity on the timing of future consultations in level 2 of the programme plan.

Consultations

Status

DASSA Design	SEM-24-066 Future Arrangements for System Services - DASSA Design Decision Paper was published along with the TSOs' DASSA Design Recommendations Paper on the 18 th of September.
Product Review & Locational Methodology (Reserves)	Product Review and Locational Methodology Recommendations Paper was issued to the RAs early September and published on the TSOs' websites on the 4 th of October. A SEM Committee Decision paper is expected in the coming days.
Volume Forecasting Methodology	The DASSA Volume Forecasting Methodology Consultation Paper was published Friday the 4 th of October. A 6-week consultation period is now open. Industry are encouraged to respond to the consultation, due to close November 15 th .
System Services Charge	System Services Charge Consultation has now closed with development of the System Services Charge Recommendations Paper underway. The paper is on track for issuing to the RAs by the end of November to facilitate a January SEMC Decision.
DS3 SS Tariffs to DASSA (Transition Period)	TSOs will publish a consultation on the arrangements to be in place for the period between the current DS3 Regulated Arrangements end date (April 2026) and DASSA Go Live (December 2026). Drafting of the paper to start in November.



Phased Implementation Roadmap (V2.0)

The FASS Programme Phased Implementation Roadmap V2.0 has now been published. PIR V2.0 outlines the programme roadmap for the delivery of the Future Arrangements for System Services (FASS) and focuses on the key programme activities and milestones leading to a December 2026 go-live date.

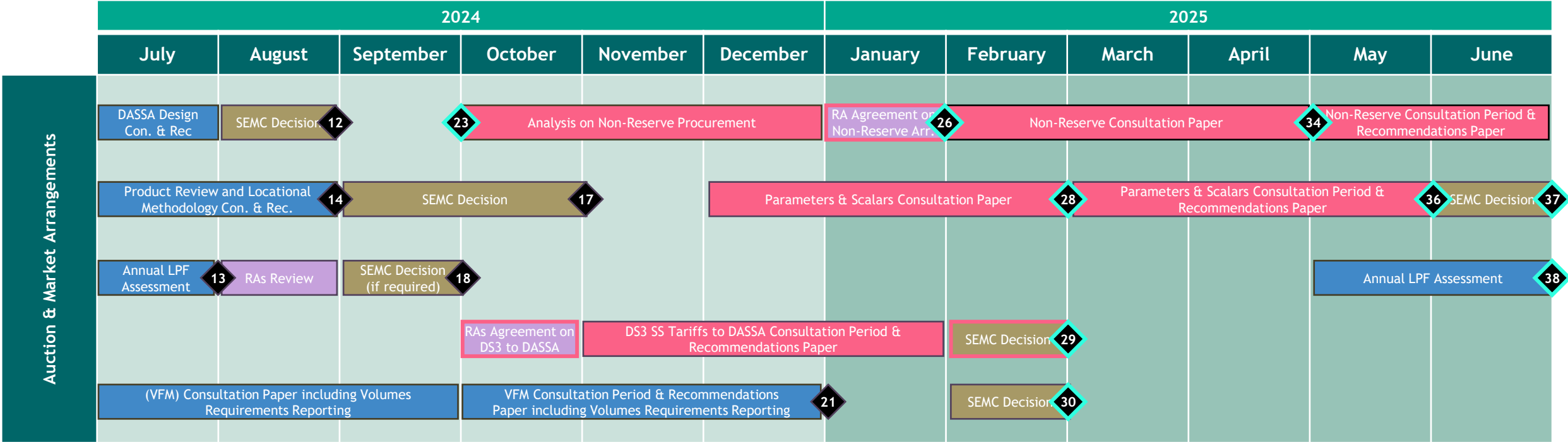
PIR V2.0

- ✓ A monthly granularity view of timelines provided from July 2024 until June 2025.
- ✓ The next iteration of the PIR (V3.0) will be published in March 2025.
- ✓ Outline programme milestones and descriptions.
- ✓ Outline programme risks / issues per direction of SEM-23-103.

Key Changes

-  New consolidated consultation and recommendations paper on the procurement mechanism, products, volumes and locational methodologies for non-reserve services post DASSA go-live.
-  Draft SS Code Plain English extended by one-month, revised target date January 2025. Addition of second draft now included in programme plan.
-  Addition of 'Parameters & Scalars' consultation, TSOs to commence work on this before end of calendar year.
-  Industry engagement and market readiness approach included for publication June 2025.
-  Additional Real Time Security Arrangements Workstream included to assess FAM alternatives.

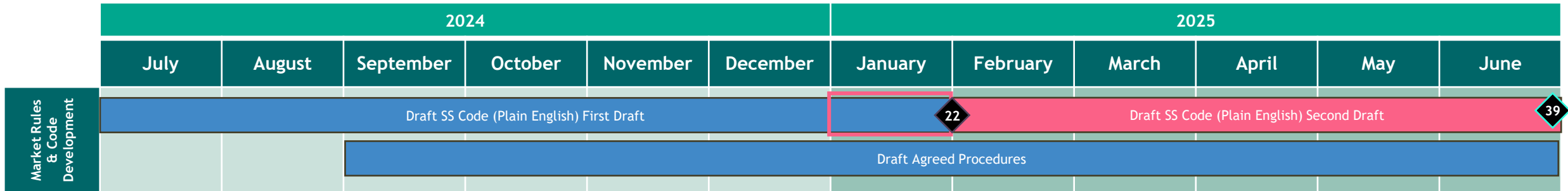
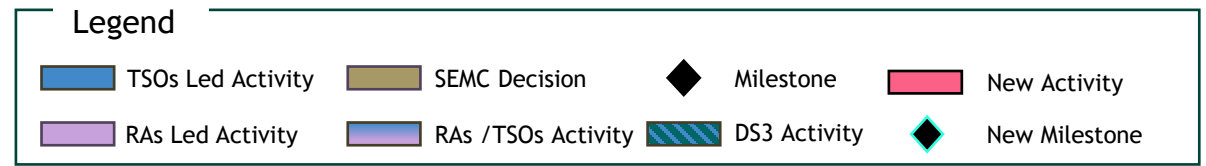
Auction & Market Arrangements



Workstream Summary

- Additional consultation and recommendations paper added for ‘parameters and scalars’
- In the interest of efficiencies and accounting for feedback received, the TSOs will endeavour to deliver the procurement, product and volume forecasting design for non-reserve products as a single consultation and recommendation paper. The TSOs reserve the right however to review this approach should it be required.
- SEMC Decision on the Volume Forecasting Methodology now expected in February 2025
- Addition of ‘DS3 System Services Tariffs to DASSA’ consultation concerning the arrangements to be in place for the period between the current DS3 Regulated Arrangements end date (April 2026) and DASSA Go Live (December 2026). SEMC decision expected in February.

Market Rules & Code Development

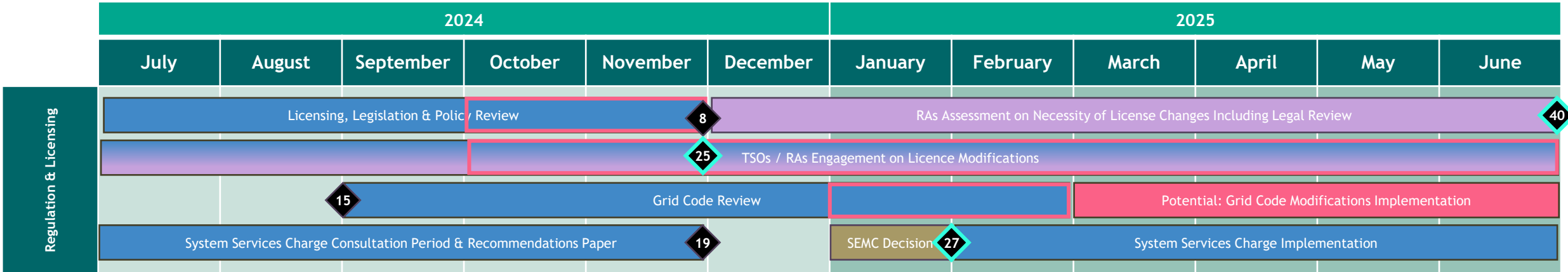
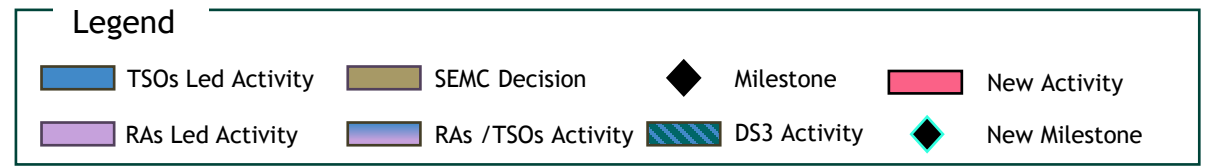


Workstream Summary

- System Services Code Plain English Version First draft extended to January 2025 due to extension of DASSA Design Consultation. Note: Where open design decisions remain, sections will be draft or left as placeholder until formal direction on design is received.
- Second draft of the code added to the plan and scheduled to conclude end of June (FASS.39).



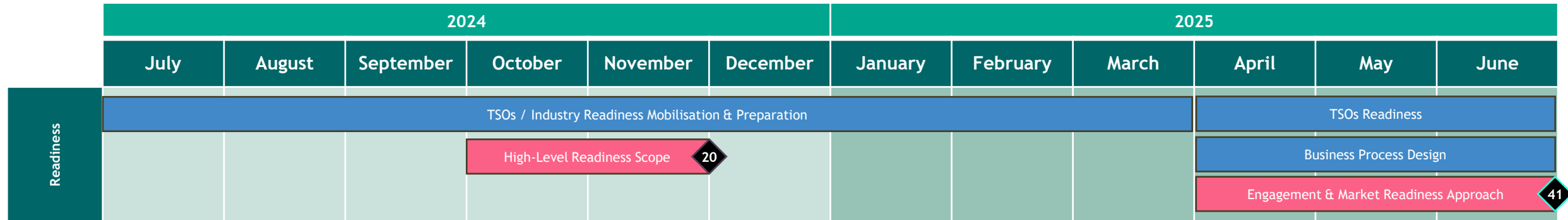
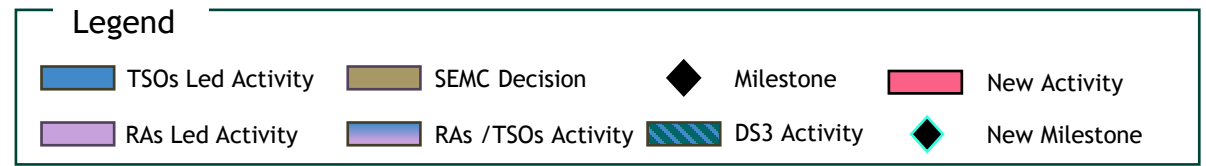
Regulation & Licensing



Workstream Summary

- SEMC Decision on the System Services Charge added due in January 2025.
- Milestone added for RAs to complete preparation for 28-day consultation on the license modifications required for FASS go-live.
- Milestone 8 has been re-baselined for November 24 pending further engagement between the TSOs and RAs. TSOs to conduct an analysis, with RA input, on the SEMC decision papers and relevant EU legislation to highlight where there are gaps which may require licence modifications to establish a licence framework that implements the SEMC decisions.

Business Readiness



Workstream Summary

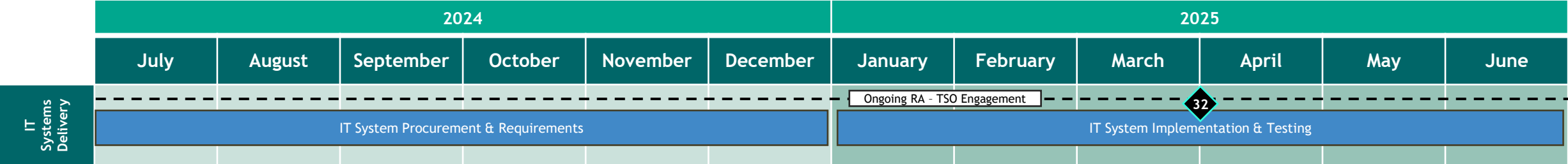
- TSOs to publish a high-level overview document setting out the candidate scope of the programme’s readiness activities for impacted stakeholders. Additionally, TSOs will issue an optional industry survey to gauge stakeholder readiness at this stage in the programme.
- TSOs to publish an initial overview document setting out the programme’s readiness approach for impacted stakeholders.
- Further activities will also be included as part of PIR V3.0.



IT System Delivery

Legend

- TSOs Led Activity
- SEMC Decision
- Milestone
- New Activity
- RAs Led Activity
- RAs /TSOs Activity
- DS3 Activity
- New Milestone

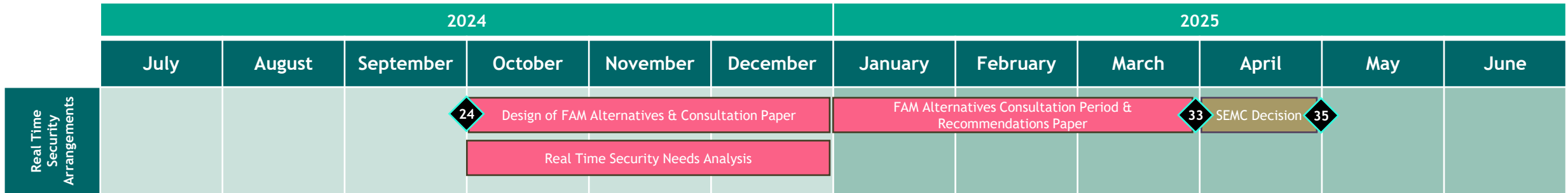
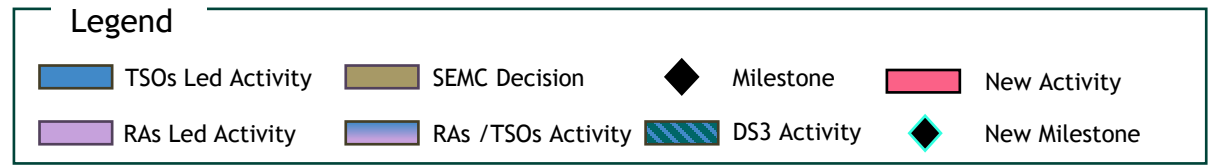


Workstream Summary

- New IT milestone added to the plan to be completed by March 2025 Post vendor onboard, TSOs to commence IT System Implementation and Testing of the DASSA platform. Early IT implementation activities for other systems to commence earlier where possible.
- Further activities will also be included as part of PIR V3.0.



FAM Alternatives



Workstream Summary

- New workstream added for work relating to the **Real Time Security Arrangements (i.e., FAM alternative)**. The RAs and TSOs to commence option analysis and assessment of FAM alternatives for delivery either alongside the scheduled DASSA go-live date or post go-live.
- TSOs to issue a Recommendations Paper on the Real Time Security Arrangements (FAM Alternatives). The paper will be informed by Industry’s feedback as collected in the consultation and RA input. TSOs to publish the Recommendation Paper, post engagement with the RAs for final SEMC Decision.



Phased Implementation Roadmap (V2.0)

SEM-24-066

SEM-24-066 directs the TSOs to consult further on a number of areas related to the DASSA Arrangement. These consultations have been added to V2.0 of the Phased Implementation Roadmap.

Element	TSO Consultation Requirement	PIR V2.0 Reference
Firm Access Policy	Directed to consult on the firm access policy for FASS.	Future DASSA Arrangements Consultation & Recommendations Paper ('Day 2')
Compensation Payment	TSOs are directed to conduct a consultation on the valuation and application of the compensation payment, including commitment obligations.	Parameters and Scalars Consultation
Price Caps	Directed to consult on the methodology and conditions to apply to the use of price caps in DASSA bidding.	Parameters and Scalars Consultation
DASSA Product Review	TSOs directed to confirm the specific Non reserve services to be procured following the outcome of the DASSA Product Review.	Non-Reserve Procurement Consultation
Alternative FAM Solution	Any alternative solutions the TSOs identify will need to be consulted on, however the SEM Committee is comfortable with the DASSA going live ahead of the introduction of any alternatives to the FAM.	Real Time Security Arrangements Workstream
Performance Scalars	The TSOs will consult further on measures to address issues of unit performance standards at the point of activation and the incentivisation of maintaining availability post gate closure up to real-time	Parameters and Scalars Consultation
Migration to DASSA Arrangements	The TSOs set out considerations for the migration of the procurement of system services into the daily auctions, from the arrangements in place prior to the DASSA. The SEM Committee acknowledges the points raised by respondents and welcomes the TSOs' commitment to consulting further on the migration to DASSA Arrangements	LPF Annual Assessment

Thank You

Questions can be submitted to

FASS@Eirgrid.com or
FASSProgramme@soni.ltd.uk

Next Steps:

- DASSA Volume Forecasting Methodology Consultation Period concludes November 15th
- The TSOs will publish the System Services Charge Recommendations paper in November.
- The third sitting of the **Code Development Working Group** will be scheduled following the publication of the Product Review SEMC decision paper. Working group members will be given 10 days notice ahead of scheduled workshop.



FASS - DASSA Volume Forecasting Methodology

16 October 2024

Day-Ahead System Services Auction (DASSA) Volume Forecasting Methodology Consultation

Industry Webinar



SEMC Asks for System (Reserve) Services Volume

The TSOs shall:

- Develop and consult on a methodology for determining system services volume requirements and the volumes to be procured across all timeframes;
- Annually publish a ten-year forecast of system service requirements by relevant location, and shall invite comments from stakeholders on the form of this report at least annually;
- Regularly publish short-term forecasts and volume information following public consultation on the form, frequency, and granularity of these reports; and
- Publish the volumes to be procured by auction on a daily basis.



SINGLE ELECTRICITY MARKET COMMITTEE

**System Services
Future Arrangements
High Level Design Decision
SEM-22-012**

14th April 2022



Source: [SEMC System Services Future Arrangements High Level Design Decision SEM-22-012](#)

Consultation Paper

FASS Programme

Day-Ahead System Services Auction
(DASSA) Volume Forecasting
Methodology Consultation Paper V1.0

October 2024



- Consultation paper focuses on the Volume Forecasting Methodology for the Reserve services that will be included in the initial Day-Ahead System Services Auction (DASSA).
- The paper details the TSOs' considerations in determining volume requirements on a day-ahead forecasting basis, where uncertainty on wholesale market outcomes, renewable forecasts and interconnector flows exists.
- This paper also sets out proposed methodologies for a weekly volume forecast and an annual, ten-year look-ahead forecast.
- Responses to the questions set out in this paper should be submitted through either the EirGrid or the SONI portal by 15 November 2024.

Future Volume Requirements presented in the paper, and replicated in this presentation, are indicative. Actual volumes to be procured will be determined in line with the approved methodology.

Agenda

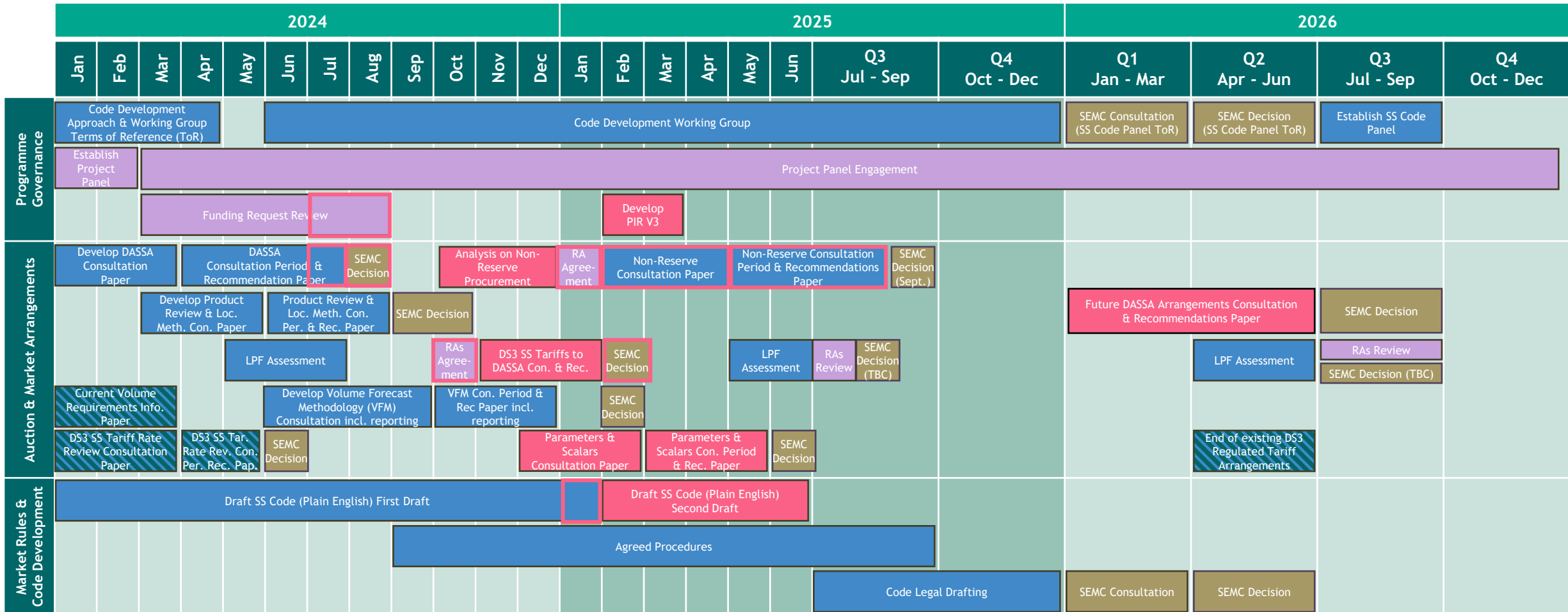
1. Introduction
2. Current Volume Requirements
3. System Needs
4. Volume Forecasting Methodology
5. Bundling
6. Summary Key Proposals
7. Next Steps
8. Q&A

1. Introduction

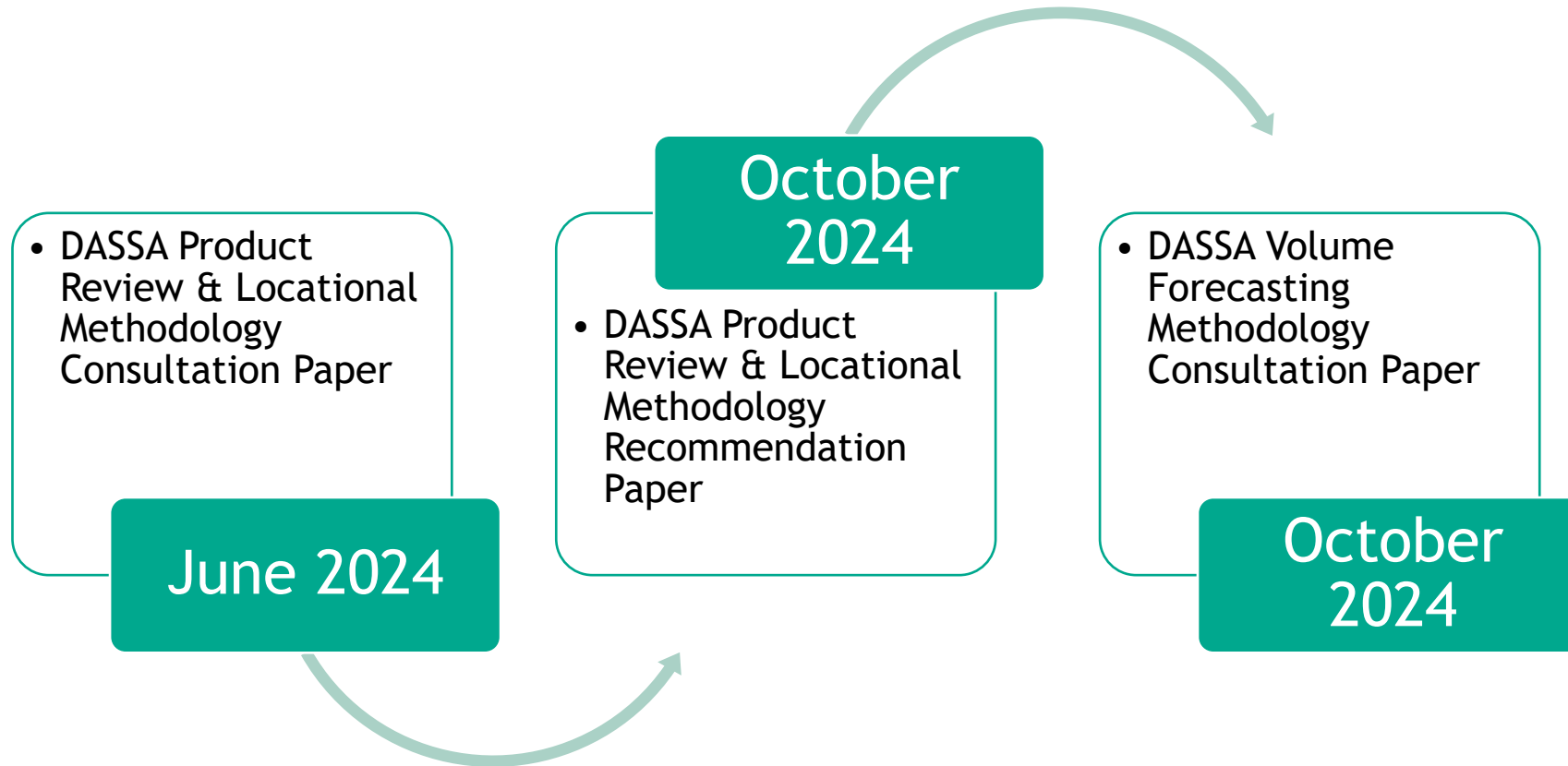


1. Phased Implementation Roadmap (PIR) Deliverables: Volume Forecasting Methodology Consultation Paper

Legend		
 TSOs Led Activity	 SEMC Decision	 DS3 Activity
 RAs Led Activity	 RA TSOs Activity	 New Activity



1. Work Done So Far



1. Volume Forecasting Methodology Consultation Paper: Reserve Services

Services covered in this paper	Services not covered in this paper
FFR - Fast Frequency Response	RM1 - Ramping Margin 1
POR - Primary Operating Reserve	RM3 - Ramping Margin 3
SOR - Secondary Operating Reserve	RM8 - Ramping Margin 8
TOR1 - Tertiary Operating Reserve 1	FPFAPR - Fast Post Fault Active Power recovery
TOR2 - Tertiary Operating Reserve 2	SSRP- Steady State Reactive Power
RR - Replacement reserve ¹	DRR - Dynamic Reactive Response
	SIR - Synchronous Inertia response

¹ subject to SEMC decision on the Product Review recommendation paper.

2. Current Volume Requirements



2. Current Volumes that need to be available in Real-Time

System Service	Minimum Volume Requirement			Downward
	All Island	Upward Ireland	Northern Ireland	
FFR	N/A	N/A	N/A	N/A
POR	75% of LSI ¹	155MW/ 150MW ³	50MW	N/A
SOR				N/A
TOR1	100% of LSI			N/A
TOR2				N/A
RRD + RRS	N/A ²	325MW	125MW	N/A

¹ At times more than 75% POR and SOR is held All Island (up to 80% for POR, up to 100% for SOR) in order to maintain system security standards based on transient security analysis (this will remain under review by the TSOs).

² EirGrid and SONI acting in conjunction with each other consider the overall RR requirement for the IE/NI synchronous area. Due to the existing north south tie line operational constraint, EirGrid maintains a minimum level of RR in Ireland and SONI maintains a minimum level of RR in Northern Ireland.

³ Lower volumes for POR, SOR, TOR1 & TOR2 apply in Ireland when there is at least one pump storage unit in pumping mode-
[Wk37_2024_Weekly_Operational_Constraints_Update_Rev1.pdf \(sem-o.com\)](#)

3. System Needs



Objectives of Reserves

- I. System frequency not outside the standard frequency range (49.8 to 50.2 Hz) for more than 15,000 minutes/year [1],[2]
- II. Maintain system frequency within 49.9 - 50.1 Hz range for 98% of time [4]
- III. Avoid Maximum instantaneous frequency deviation (from 50 Hz) larger than 1000 mHz [1],[2],[3]
- IV. Avoid exceeding the maximum time to recover frequency (1 minute) to the frequency recovery range (+/- 500 mHz) [1],[2]
- V. Avoid RoCoF larger than +/- 1 Hz/s [5]

As per regulations/agreements, reporting:

- [1] EU System Operation Guideline (SOGL)
- [2] Synchronous Area Operational Agreement (SAOA)
- [3] TSOs' Operating Security Standards (OSS)
- [4] All-Island Transmission Performance report
- [5] EirGrid and SONI Grid Codes

Summary of Reserve needs for DASSA



TSOs' interpretation of SOGL, art. 153

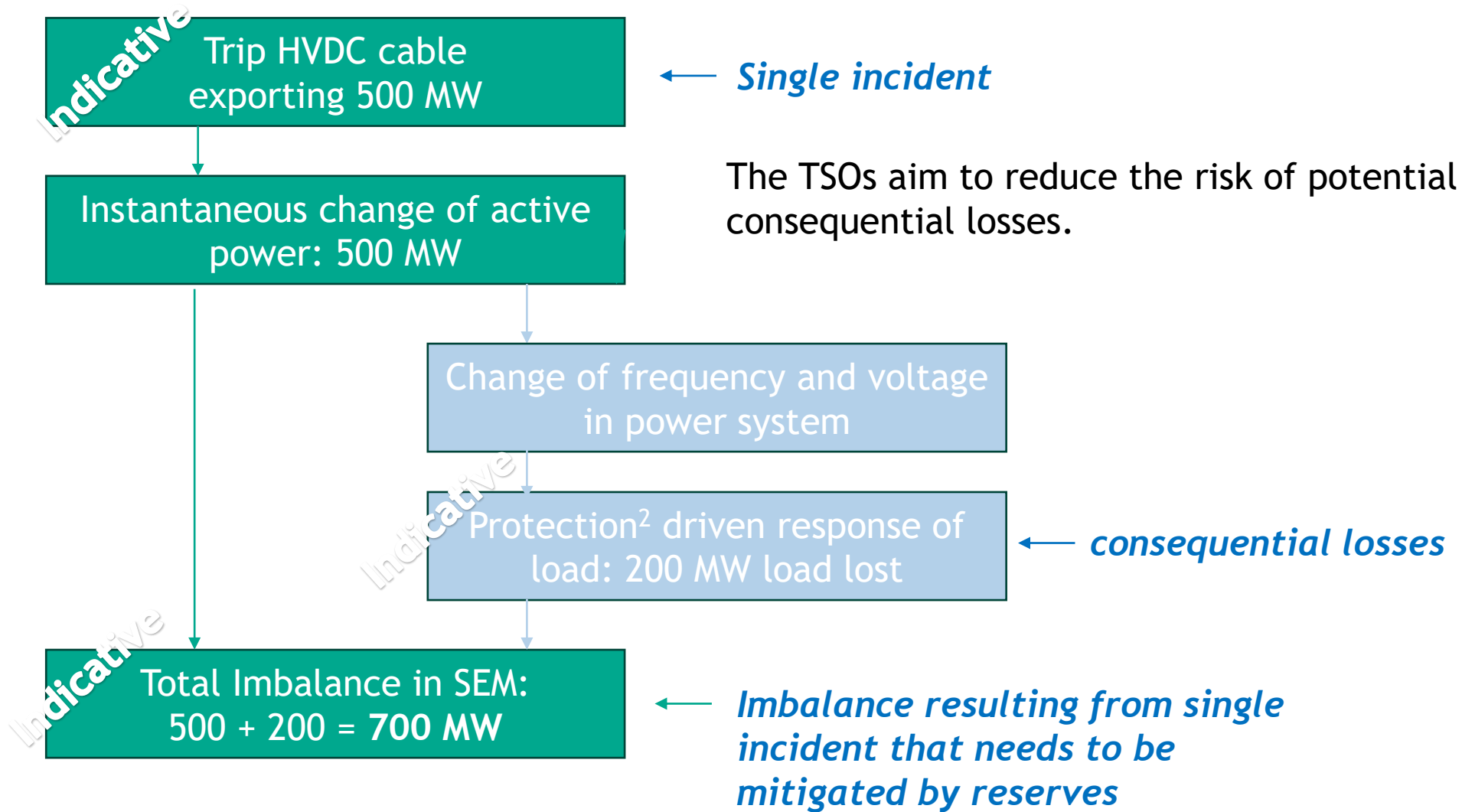
SYSTEM OPERATION GUIDELINE: (EU) 2017/1485 Article 153 FCR dimensioning

2(b) **the size of the reference incident shall be** determined in accordance with the following conditions:

[..]

- (ii) for the [...] IE/NL, [...] synchronous areas, the **reference incident shall be the largest imbalance** that may result from an **instantaneous change of active power such as that of a** single power generating module, single demand facility, or single **HVDC interconnector** or from a **tripping of an AC line** [...]

All Island Reference Incident - indicative example¹



¹ Starting from balanced position

² Over Voltage, Under Voltage, Over Frequency, Under frequency protection

Island Split Reference Incidents - Indicative (1/3)

SONI Operating Security Standards (OSS)

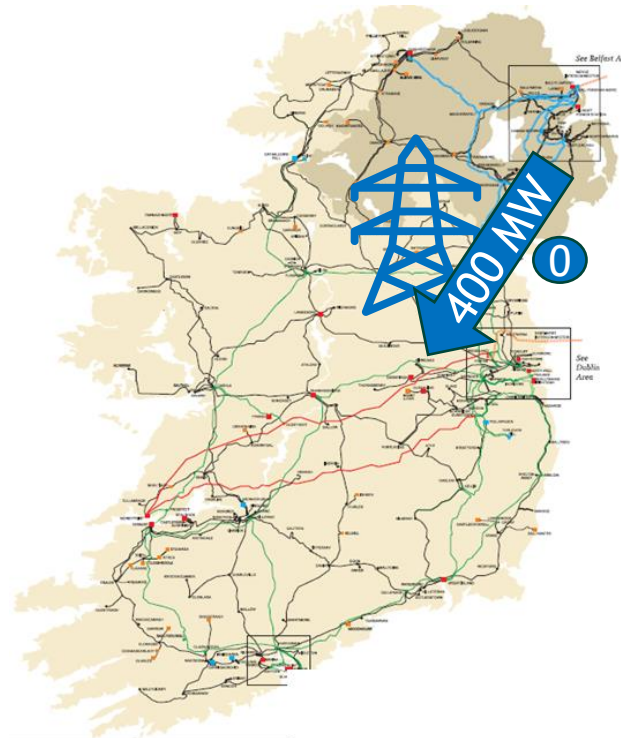
[..]

2.1 The transmission system shall be operated *under prevailing system conditions* so that for the secured event of a fault outage on the transmission system of any of the following:

[..]

2.1.3 a double circuit overhead line on the 275 kV network

→ North-South Interconnector (double circuit 275 kV overhead line)



Example (N → S flow)

0 Pre-event: North to South flow 400 MW

Island Split Reference Incidents - Indicative (2/3)

SONI Operating Security Standards (OSS)

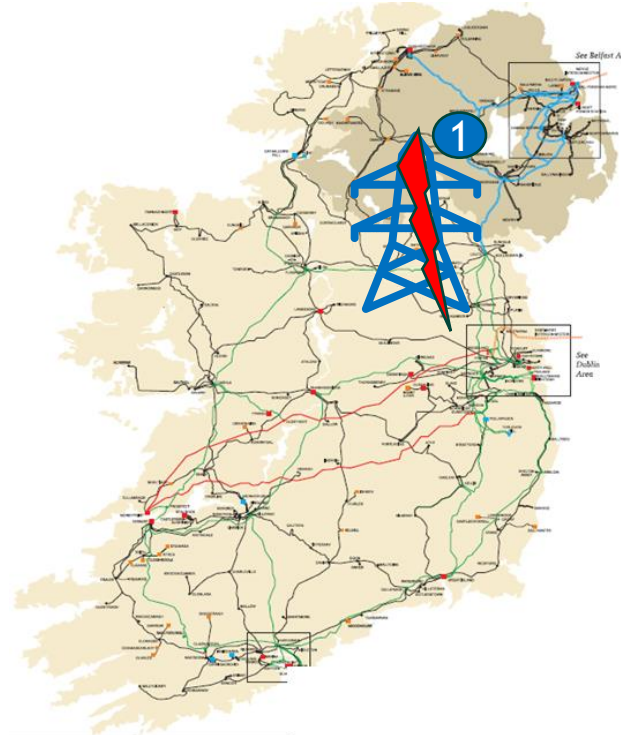
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→ North-South Interconnector (double circuit 275 kV overhead line)



Example (N → S flow)

- 0 Pre-event: North to South flow 400 MW
- 1 Trip of double circuit Tie-line

Island Split Reference Incidents - Indicative (3/3)

SONI Operating Security Standards (OSS)

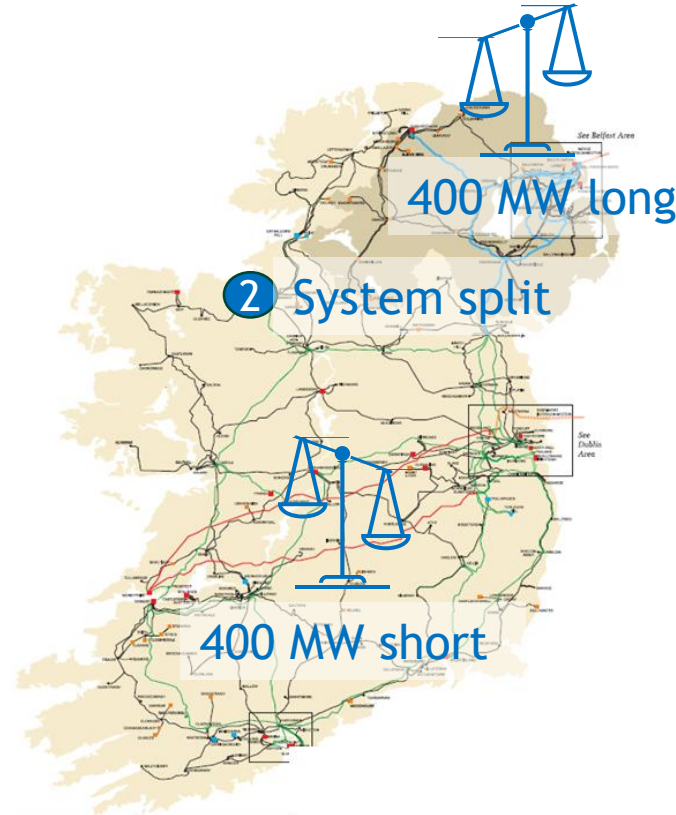
[..]

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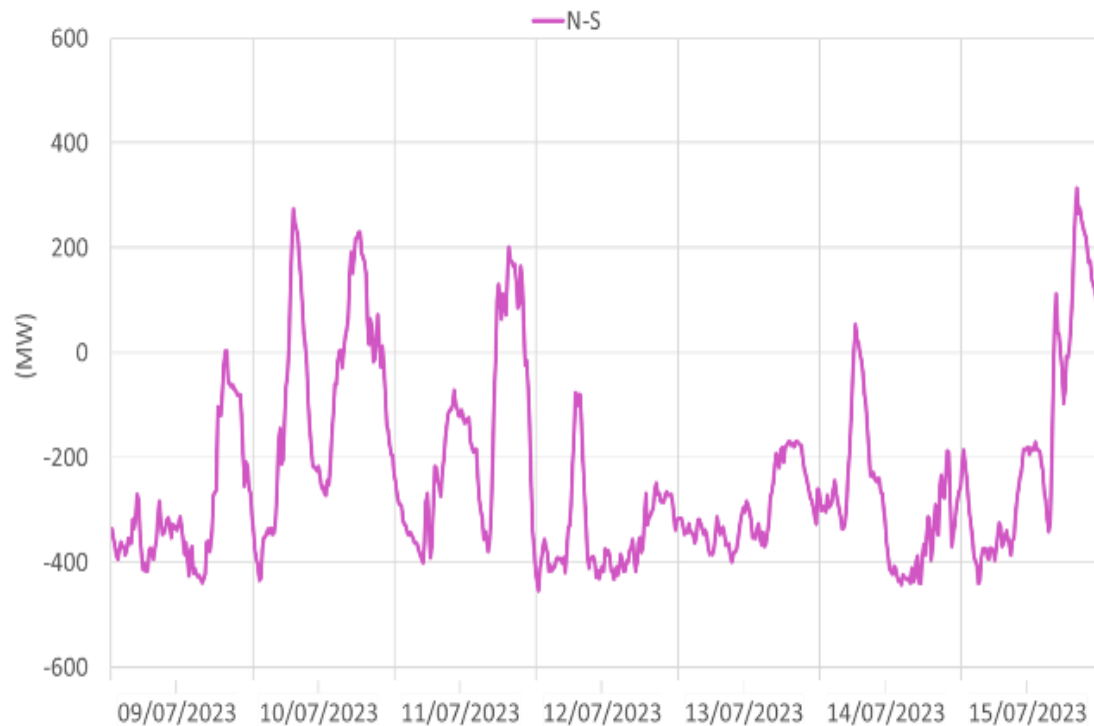


Example (N → S flow)

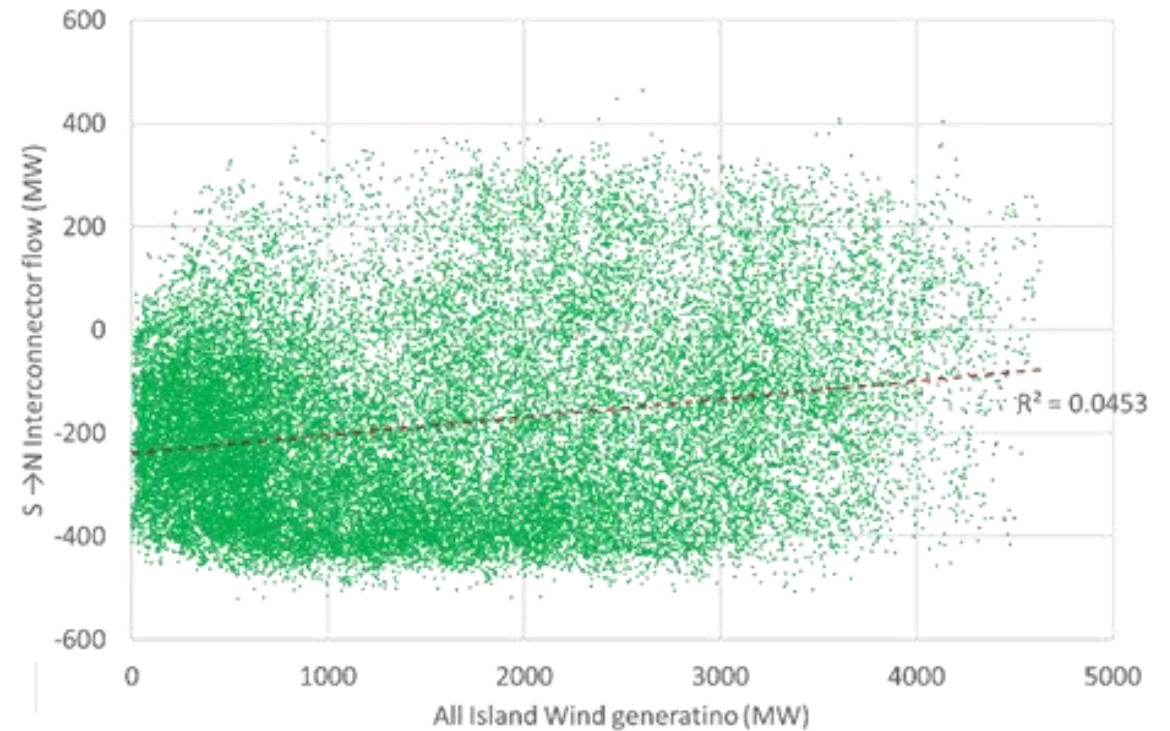
- 0 Pre-event: North to South flow 400 MW
- 1 Trip of double circuit Tie-line
- 2 System split:
 - NI 400 MW long / frequency ↑
 - IE 400 MW short / frequency ↓
- 3 Required reserves:
 - NI: 400 MW + Consequential losses
 - IE: 400 MW + Consequential losses

The RIs can be highly variable making it difficult to forecast at the day ahead stage

Example of flow on North-South interconnector for one week in 2023

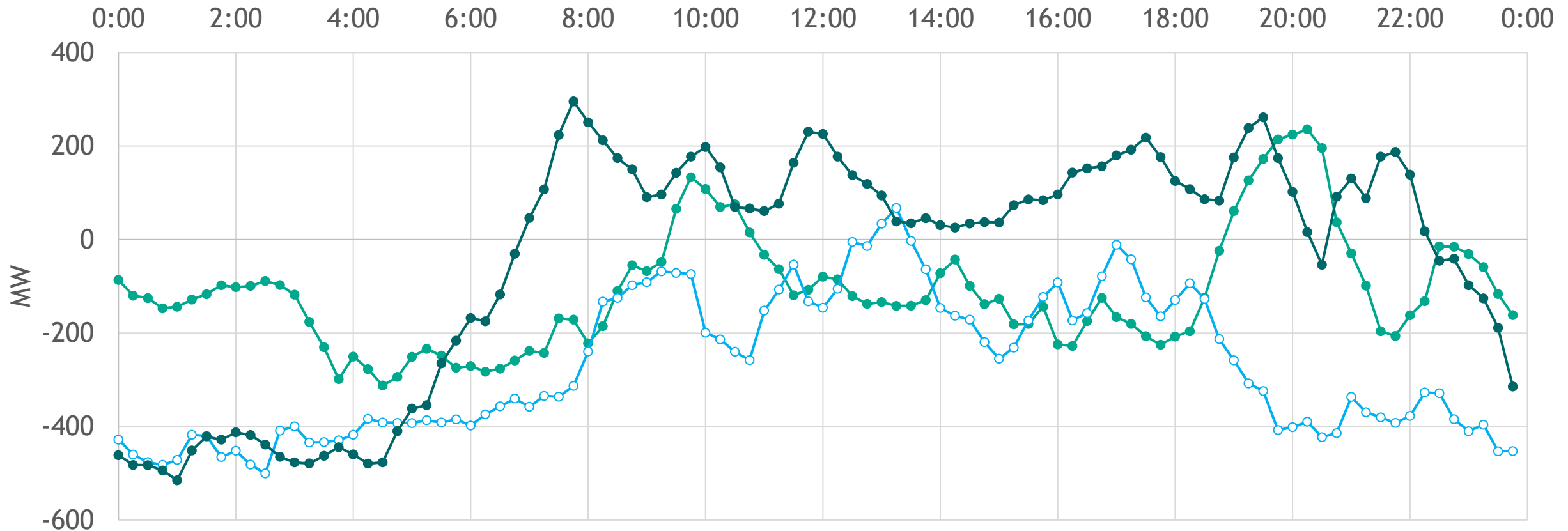


Correlation All Island Wind - N-S interconnector flow in 2023



The RIs can be highly variable making it difficult to forecast at the day ahead stage

North - South interconnector flow/Day, 3 Days Selected in January



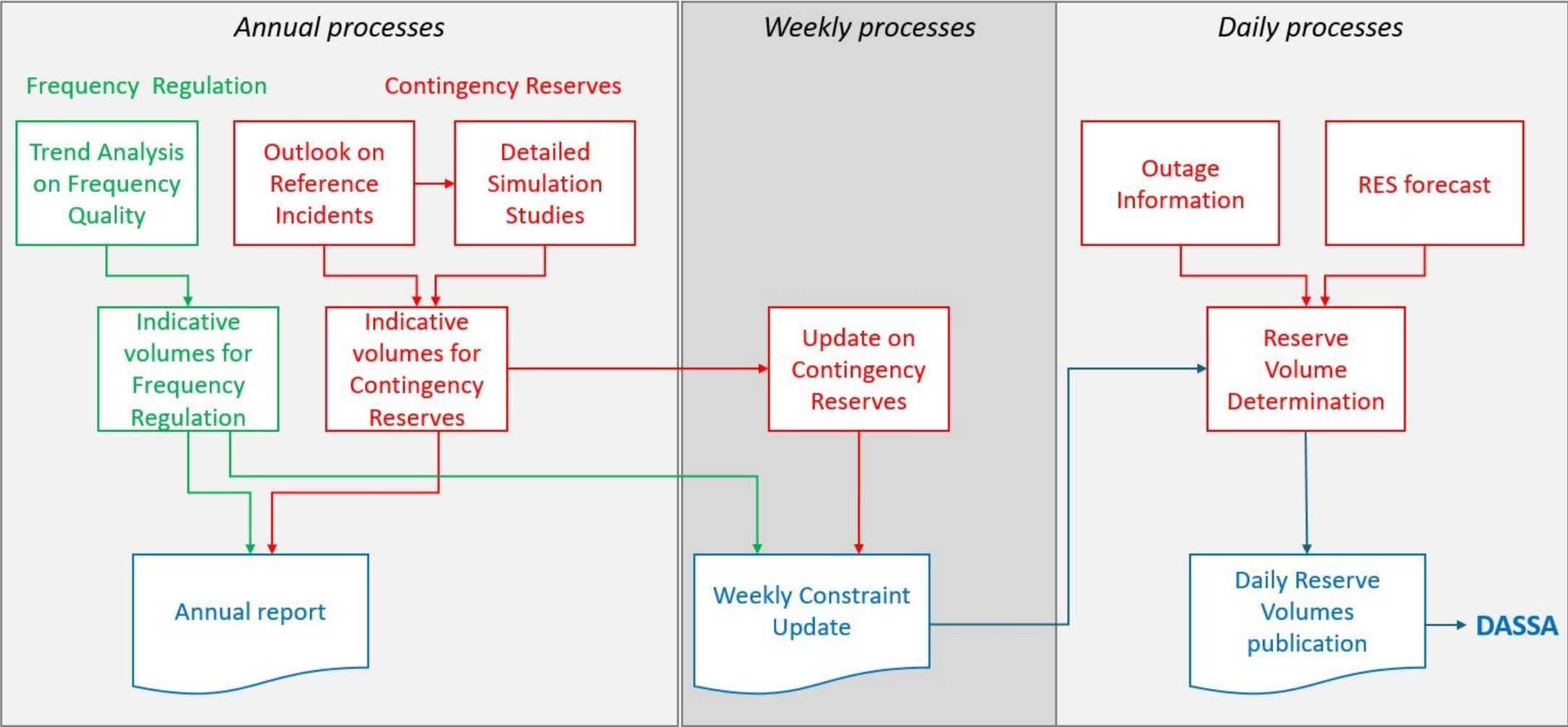
4. Volume Forecasting Methodology



4. Summary of Proposed Reserve Products

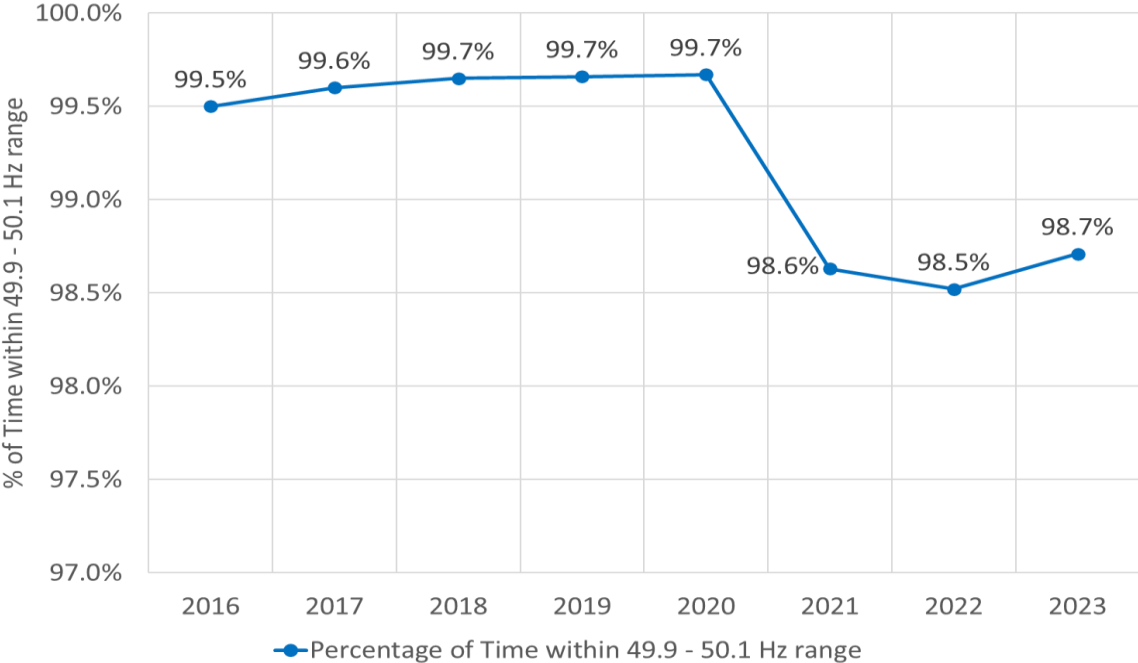
Reserve product	Category	FAT	Response duration
FFR - Static response	I	150 ms	Response sustainable up to 10 s after the event
	II	≤ 300 ms	
	III	≤ 1s	
FFR - Dynamic response	IV	150 ms	
	V	≤ 300 ms	
	VI	≤ 1s	
Static POR	I	≤ 5 s	up to 15 s after the event
Dynamic POR	II		
Static SOR	I	15 s	up to 90 s after the event
Dynamic SOR	II		
Static TOR1	I	90 s	up to 5 minutes after the event
Dynamic TOR1	II		
Static TOR2	I	5 minutes	up to 20 minutes after the event
Dynamic TOR2	II		
RR		20 minutes	up to 1 hour after the event

4. Volume Forecast Methodology - Overview

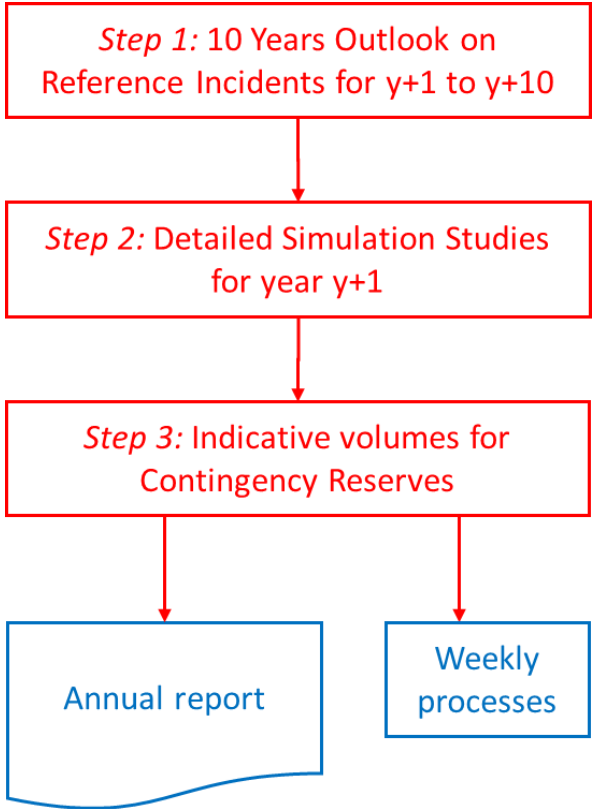


4. Volume Forecast Methodology - Annual Processes

Purpose 1: Maintain System Frequency within 49.9 - 50.1 Hz Range



Purpose 2: minimum reserve volumes required for mitigating contingencies



4. Example of Indicative Upward Reserve Dimensioning for mitigating Large Disturbances for year y+1

Indicative Upward	All Island		Ireland		Northern Ireland	
	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic
Reference Incident RI	EWIC Importing 500 MW + 0 MW Consequential losses		Trip of North-South Interconnector while flow is 450 MW N→ S + 0 MW Consequential losses		Trip of North-South Interconnector while flow is 400 MW S→ N + 0 MW Consequential losses	
FFR	70% of RI + C_{unav}	80% of FFR	80% of RI + C_{unav}	80% of FFR	100% of RI + C_{unav}	80% of FFR
FFR, cat. 1	60% of FFR	80% of FFR cat.1	70% of FFR	80% of FFR cat.1	80% of FFR	80% of FFR cat.1
FFR, cat. 2 or faster	70% of FFR	80% of FFR cat.2	80% of RI	80% of FFR cat.2	90% of FFR	80% of FFR cat.2
POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2
RR	100% of RI + C_{unav}	N/A	100% of RI + C_{unav}	N/A	100% of RI + C_{unav}	N/A

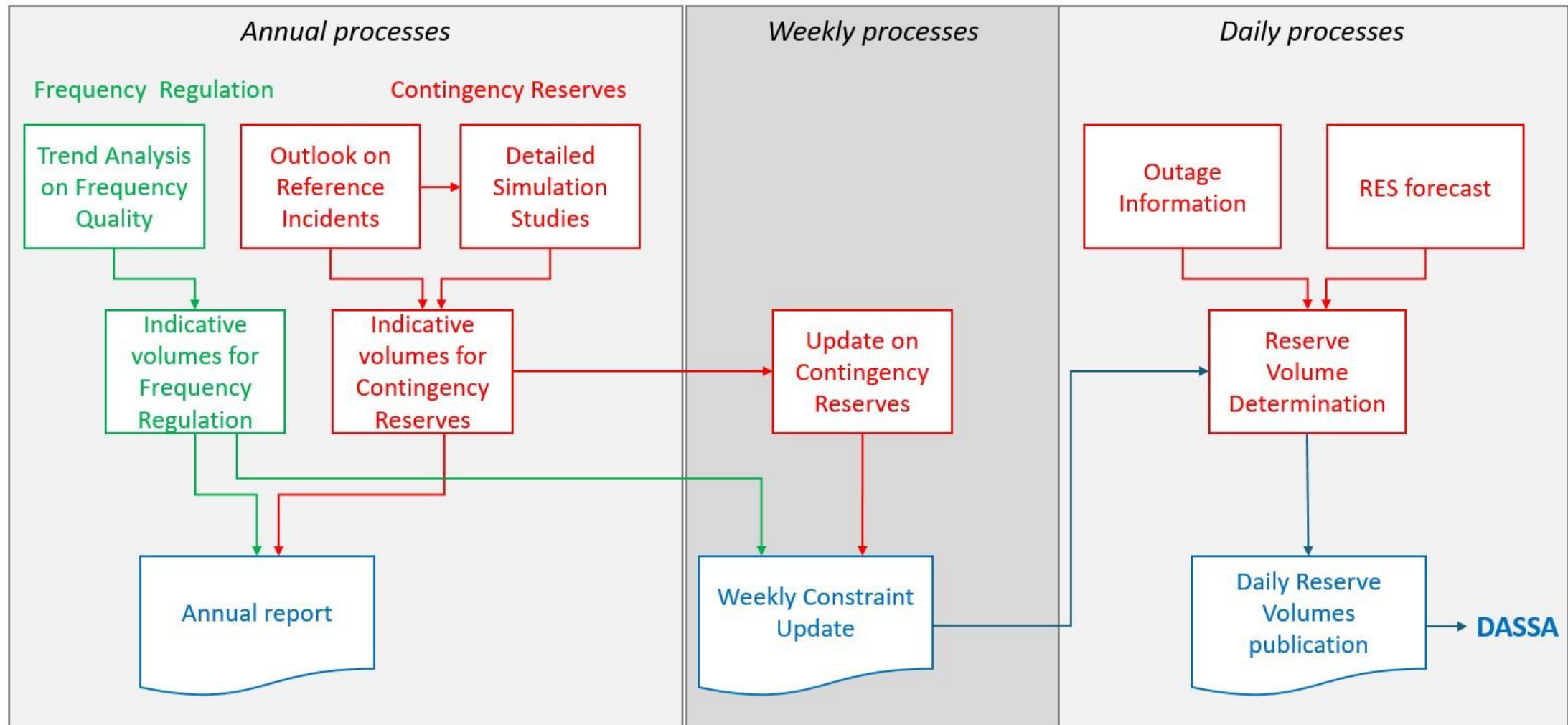
Similar table will be determined for downward reserves

4. Example of Indicative Upward Reserve Volumes for mitigating Large Disturbances for year y+1

Upward Indicative	All Island		Ireland		Northern Ireland	
	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic
Reference Incident RI	500 MW		450 MW		400 MW	
FFR	425 MW	340 MW	435 MW	348 MW	475 MW	380 MW
FFR, cat. 1	255 MW	204 MW	305 MW	244 MW	380 MW	304 MW
FFR, cat. 2 or faster	298 MW	238 MW	348 MW	278 MW	428 MW	342 MW
POR-TOR2	575 MW	460 MW	525 MW	420 MW	475 MW	380 MW
RR	575 MW	N/A	525 MW	N/A	475 MW	N/A

Similar table will be determined for downward reserves

4. Volume Forecast Methodology - Overview

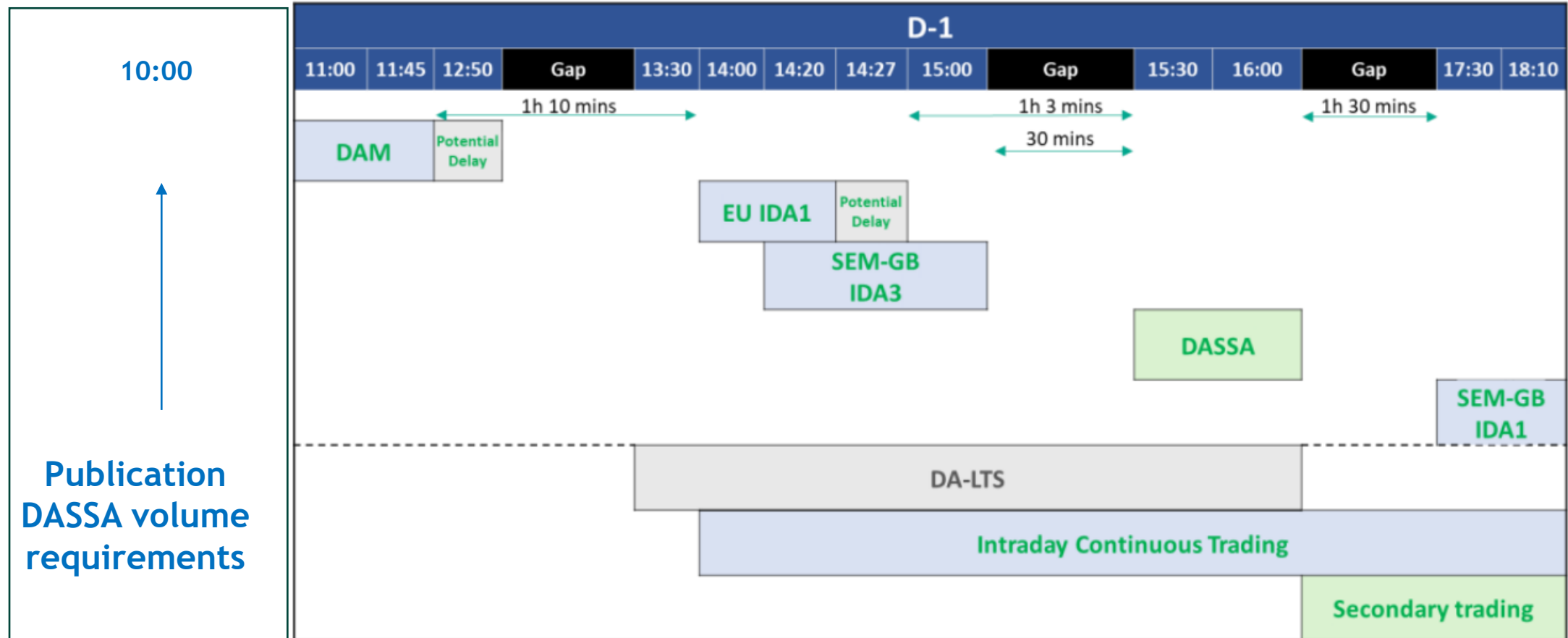


4. Weekly process: Indicative example of table in Weekly Constraint update for Upward Reserves

Indicative	All Island		Ireland		Northern Ireland	
	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic
FFR	70% of RI + C_{unav}	80% of FFR	80% of RI + C_{unav}	80% of FFR	100% of RI + C_{unav}	80% of FFR
FFR, cat. 1	60% of FFR	80% of FFR cat.1	70% of FFR	80% of FFR cat.1	80% of FFR	80% of FFR cat.1
FFR, cat. 2 or faster	70% of FFR	80% of FFR cat.2	80% of RI	80% of FFR cat.2	90% of FFR	80% of FFR cat.2
POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2	100% of RI + C_{unav}	80% of POR-TOR2
RR	100% of RI + C_{unav}	N/A	100% of RI + C_{unav}	N/A	100% of RI + C_{unav}	N/A

Similar table will be determined for downward reserves

4. Timing of the DASSA



4. Daily process: Indicative example minimum Upward reserve volume for large disturbances

Upward <i>Indicative</i>	All Island		Ireland		Northern Ireland	
	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic	Minimum Volume	Minimum dynamic
Reference Incident	500 MW		450 MW		400 MW	
Potential Loss of Reserves from RI	0 MW		0 MW		0 MW	
FFR	425 MW	340 MW	435 MW	348 MW	475 MW	380 MW
FFR, cat. 1	255 MW	204 MW	305 MW	244 MW	380 MW	304 MW
FFR, cat. 2 or faster	298 MW	238 MW	348 MW	278 MW	428 MW	342 MW
POR-TOR2	575 MW	460 MW	525 MW	420 MW	475 MW	380 MW
RR	575 MW	N/A	525 MW	N/A	475 MW	N/A

⇒ DASSA

5. Bundling



5. Bundling

Explicit bundles- not proposed

- Explicit bundles would require the identification of an additional balancing capacity product. **No specific operational need has been identified for 2026 DASSA go-live.**

Setting a requirement for implicit bundles could:

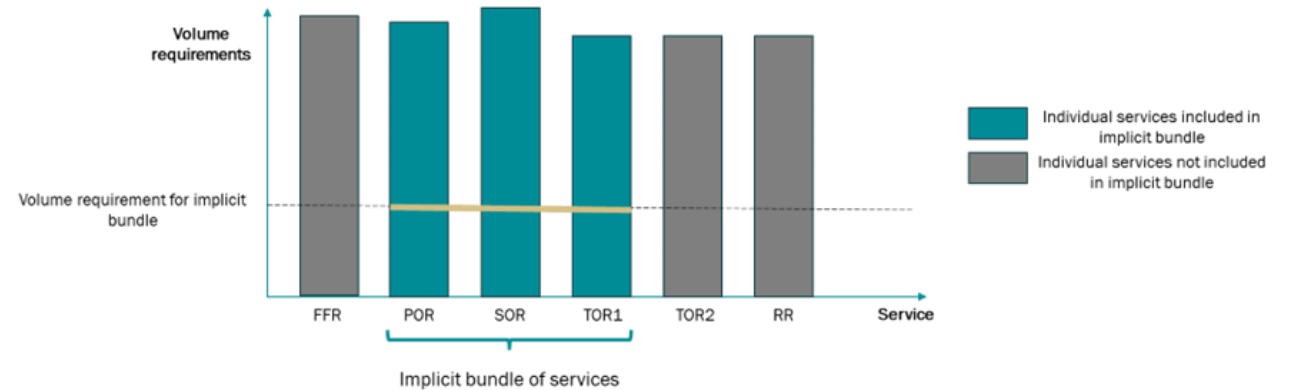
- **Prevent exclusion of excess volumes from ex-ante energy markets.**
 - This could occur whereby services are procured from multiple service providers, who are required to exclude this capacity from the ex-ante energy markets, when these services could have been provided by a single service provider in a continuous manner.
- **Prevent the activation of unnecessary excess volumes in the balancing energy market by submitting compatible FPNs.**
 - The procurement of implicit bundles could potentially decrease the number of incremental/decremental deviations that would need to be allocated to service providers in the balancing market, and thus reduce the total activation costs.

5. Bundling

Implicit bundling options proposed:

Option 1 - Simple % of overall product volumes. Proposed to be suitably lower than 100% of smallest product volume requirement to ensure providers not able to offer continuous provision are able to participate. Products eligible for bundling include FFR, POR, SOR & TOR1.

Option 2 - No minimum requirement (i.e. minimum volume of zero). This could still deliver implicit bundling - through the objective function of the auction (to be consulted on later in Parameters and Scalars paper). However, this would offer less visibility ex-ante to industry.



6. Summary Key Proposals



6. Summary Key Proposals (1/2)

The TSOs' proposals:

1. By 10:00 each day, the TSOs will publish the required reserves volumes that will be procured in the DASSA on that day D-1 for the following day D
2. The TSOs will specify for FFR, POR, SOR, TOR1, TOR2, RR separately:
 - a. upward and downward volumes separately
 - b. minimum volumes per jurisdiction
 - c. minimum volumes of dynamic response
 - d. minimum volume requirements for FFR category 1 and FFR category 2
3. The required reserves volumes will be published for all transaction periods of the following day D.
4. The required reserve volumes will be determined based on the system needs with the objectives of:
 - a. Maintaining frequency within 49.9 - 50.1 Hz range for 98% of time
 - b. Avoiding a maximum instantaneous frequency deviation larger than 1000 mHz
 - c. Avoiding a RoCoF larger than +/- 1 Hz/s
5. To meet the objective 4.a above, the TSOs will annually review the frequency quality trend
6. To meet the objective 4.b and 4.c above, required reserves volumes shall be dimensioned to consider the All Island Reference Incidents (RI) and a double circuit trip of the North-South Tie line

6. Summary Key Proposals (2/2)

7. When determining the Reference Incidents (RI) and the Reserve Volumes, the TSOs account for:
 - a. Lack of day-ahead foresight of market outcomes when determining the RIs, by assuming that system infeeds and outfeeds could be in service at their maximum capacity
 - b. Potential consequential losses of generation or demand triggered by the same incident
 - c. Potential loss of reserve provision from the units setting the LSI and LSO
 - d. Potential unavailability of reserve providing units
8. The TSOs aim to improve the accuracy of the reserve volumes forecasts over time and take steps to reduce the risk of consequential losses.
9. The TSOs will provide overviews or required reserve volumes:
 - a. In response to the SEMC decisions relating to a ten-year forecast, the TSOs have proposed a methodology that could enable the provision of an indicative forecast of potential future reserve volumes, i.e., ten-year forecasts would be updated annually to provide an overview of indicative required reserve volumes, including detailed assessments for the next year
 - b. Weekly updates of annual assessments
 - c. On a daily basis, publication of required DASSA volumes by 10:00 on D-1.
10. The TSOS have not identified a technical need for an additional explicit bundle product, so no explicit bundles are proposed. Implicit bundles could offer some market and cost related benefits in terms of facilitating continuous provision from providers and minimising ex-ante energy market volume exclusion and reducing excessive balancing energy activations. Two options are proposed
 - a) Option 1: Simple minimum % of product volume requirements for a required implicit bundles of services (eligible products FFR-TOR1)
 - b) Option 2: No minimum volume set- but value functions/objective function of auction can allocate a volume if compatible bids submitted

7. Next Steps



7. Next Steps

- This consultation paper outlines the TSOs' considerations on the Volume Forecast Methodology for the proposed Reserve Service products for a DASSA auction in 2026.
- The paper is open for responses until 15 November 2024 and the responses received will inform the final TSO recommendations on the Volume Forecast Methodology that will be proposed to the SEMC for procurement through the DASSA auctions.



Thank You!

Questions?

Responses to the questions set out in the paper should be submitted through either the EirGrid or the SONI portal by 15 November 2024.



Appendix



Quality Aspects (Upward Reserves)

- The TSOs propose to introduce minimum capability requirements on frequency deadbands, trajectories, reserve step sizes and reserve step triggers, that will remain configurable by the TSOs.

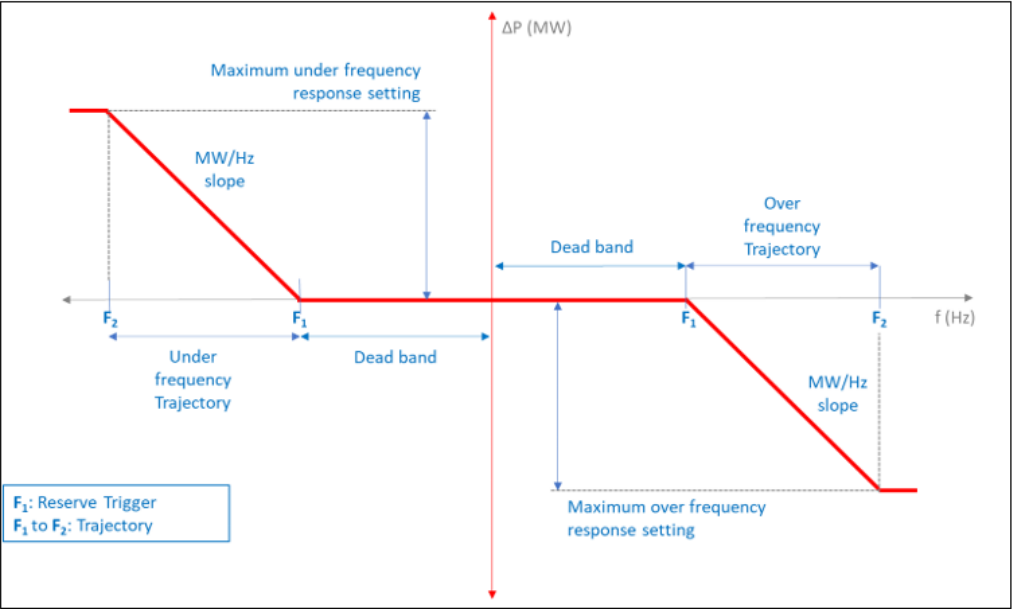


Figure 13: Illustration of Reserve Trigger F_1 and Trajectory $F_1 - F_2$

Criteria for	Trigger F_1	End of trajectory F_2	Reserve Steps Sizes	Reserve Step Triggers
Static FFR, POR, SOR, TOR1 and TOR2	configurable for each step between: $49.3 \leq F_1 \leq 49.8$ Hz	Not applicable	1 or more steps of ≤ 75 MW for a single discrete step.	Smallest available discrete step in response at any time must be no less than 20 % of the MW value of the Providing Unit's largest available step at that time
Dynamic FFR, POR, SOR, TOR1 and TOR2	configurable in range: $49.5 \leq F_1 \leq 49.985$ Hz	configurable in range: $49.3 \leq F_2 \leq 49.8$ Hz and $F_1 - F_2 \geq 200$ mHz	Not applicable	Not applicable

Table 31: Additional key requirements for Upward FFR, POR, SOR, TOR1 and TOR2 (refer to Figure 13)



Quality Aspects (Downward Reserves)

- The TSOs propose to introduce minimum capability requirements on frequency deadbands, trajectories, reserve step sizes and reserve step triggers, that will remain configurable by the TSOs.

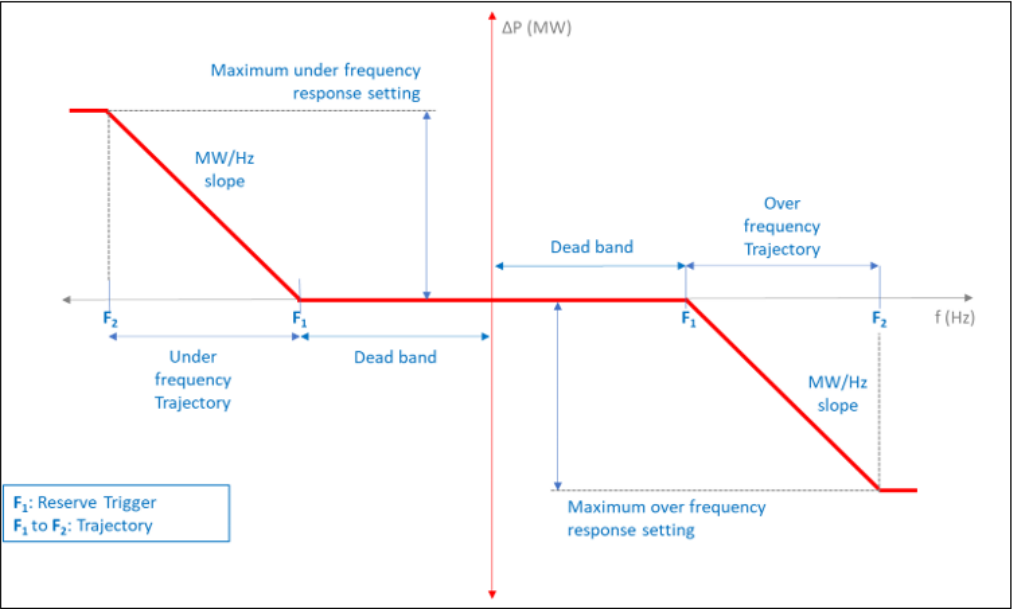


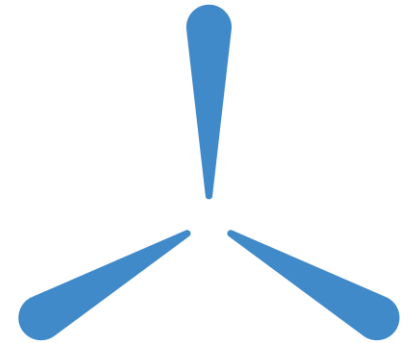
Figure 13: Illustration of Reserve Trigger F_1 and Trajectory $F_1 - F_2$

Criteria for	Trigger F_1	End of trajectory F_2	Reserve Steps Sizes	Reserve Step Triggers
Static FFR, POR, SOR, TOR1 and TOR2	configurable in range for each step: $50.2 \leq F_1 \leq 50.7$ Hz	Not applicable	1 or more steps of ≤ 75 MW for a single discrete step.	Smallest available discrete step in response at any time must be no less than 20 % of the MW value of the Providing Unit's largest available step at that time
Dynamic FFR, POR, SOR, TOR1 and TOR2	configurable in range: $50.015 \leq F_1 \leq 50.5$ Hz	configurable in range: $50.2 \leq F_2 \leq 50.7$ Hz and $F_2 - F_1 \geq 200$ mHz	Not applicable	Not applicable

Table 32: Additional key requirements for Downward FFR, POR, SOR, TOR1 and TOR2 (refer to Figure 13)








Scheduling and Dispatch Programme



Scheduling and Dispatch - Status

■ As planned, no issues ↑ Improving
■ Minor - moderate concern ⇌ Steady
■ Significant issue / concern ↓ Worsening

 SDP		Summary Status
Overall Status		Overall programme status is Amber as Target date for Tranche 1 Modifications approval of June 2024 has not been met and Publication of additional milestones for Tranche 2 in September 2024 has been delayed. Progress has been made on Mod_02_24 “Battery Integration” and Mod_13_23 “Treatment of NPDRs”, RAs and SDP working together in order to bring the final recommendation to SEMC in the near future Programme is working with its system vendor partners on the estimation and planning of Tranche 2.
Schedule		<p>Tranche 1: Target date for Tranche 1 Modifications approval of June 2024 has not been met. RAs, TSOs, and SEMO are working together to complete the modifications process as soon as possible. MMS build has completed, MMS FAT is in progress with SDP staff witnessing vendor execution. EMS Battery changes have completed build and FAT. Build of Wind changes to EMS changes are in progress, build of EDIL changes are in progress.</p> <p>Tranche 2: Publication of additional milestones for Tranche 2 in September 2024 has been delayed. The Programme is committed to delivering the Tranche 2 initiatives in quarter four of 2025 and at present the Programme is working with its system vendor partners on the estimation and planning of Tranche 2.</p>
Resourcing		TSO/MO programme teams are fully staffed and engaged to continue work at pace.
Finances		SEMC All-Island Programme sub-committee approved the full funding request for the S&D (phases 3-5) programme on 22nd March 2024.

Key Messages



MP Sentiment is Green (steady)

- 187 attendees at recent workshop. Positive engagement.
- The SDP participant survey was run from the 12th to the 26th of September to assess participant readiness.



Key Activities For Action Next Month

- Continue FAT execution
- Work with RAs to close out Tranche 1 Modifications
- Support Participants using SDP Sandpit environment



Positive Developments (Since Last Report)

- EMS Battery FAT completed; MMS FAT commenced
- SDP Sandpit environment is now available to Participants



Challenges (Since Last Report)

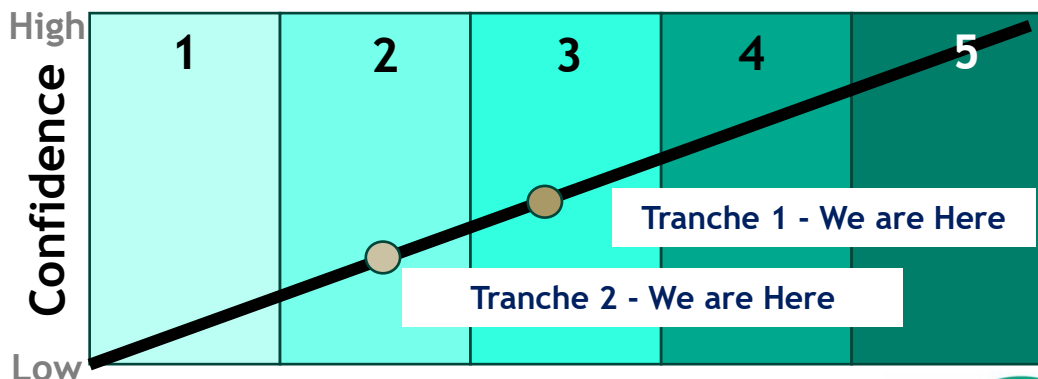
- Target date for Tranche 1 Modifications approval of June 2024 has not been met

Scheduling and Dispatch: Phase 2 Milestones

SOEF Milestone ID	Milestone	Dates
Tranche 1	Requirements Definition Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives	September 2023
Tranche 1	System Design Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives	March 2024
Tranche 1	TSC, CMS & GC Mods Review Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives by the relevant review group (Mods Committee, Grid Code Review Panel, Capacity Market Workshops respectively)	March 2024
Tranche 2	Requirements Definition Complete for Scheduling and Dispatch Programme Tranche 2 Initiatives	July 2024
Tranche 2	Publication of milestones for Scheduling and Dispatch Programme Tranche 2 Initiatives	September 2024

The “Publication of milestones for Scheduling and Dispatch Programme Tranche 2 Initiatives” milestone was not completed in September 2024.

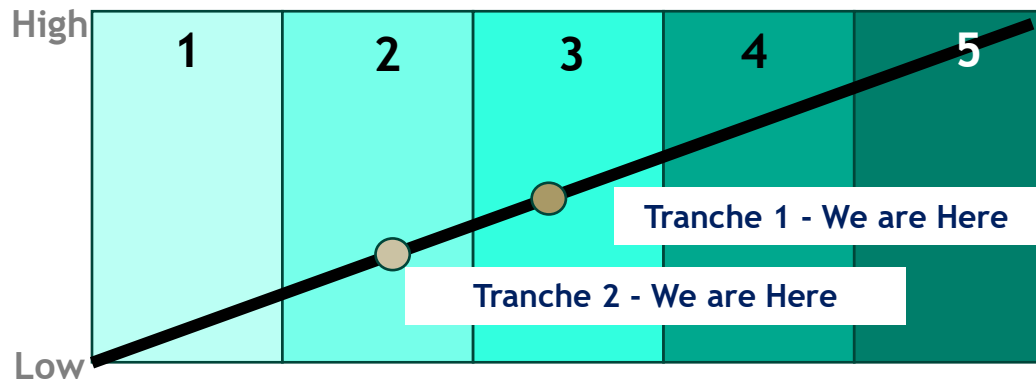
The Programme is committed to delivering the Tranche 2 initiatives in quarter four of 2025 and at present the Programme is working with its system vendor partners on the estimation and planning of Tranche 2. The programme is not currently in a position to provide additional details regarding the delivery plan and milestones for Tranche 2. The programme has revised the target date to publish additional milestones for SDP Tranche 2 from September 2024 to November 2024



We currently have an overall **low - medium** level of confidence on the timelines. Confidence levels will increase as milestones are achieved and programme progresses further into Phase 3 for Tranche 1 and Phase 2 for Tranche 2

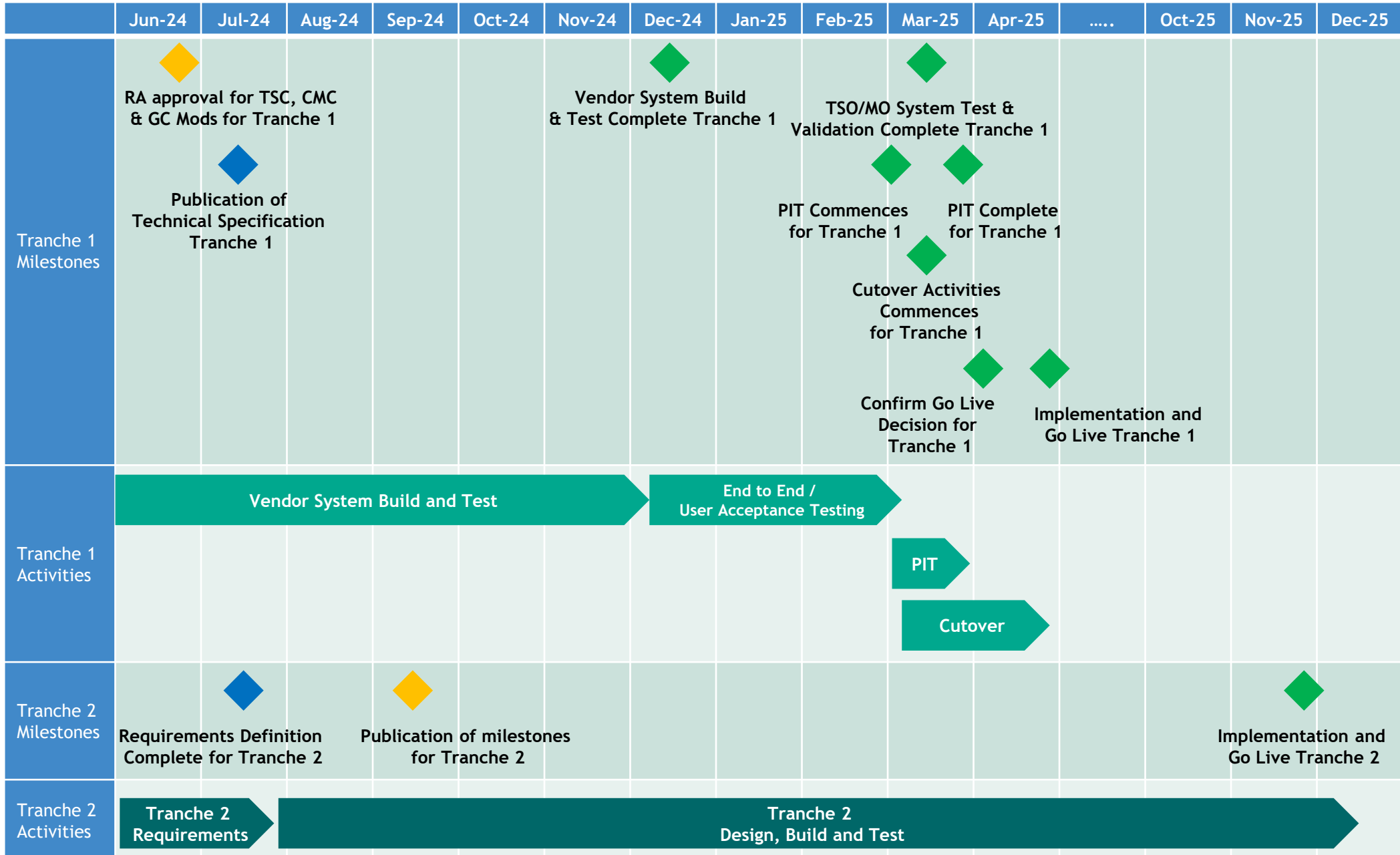
Scheduling and Dispatch: Phase 3 Milestones

SOEF Milestone ID	Milestone	Dates
Tranche 1	System Build Commenced for Scheduling and Dispatch Programme Tranche 1 Initiatives	March 2024
Tranche 1	Publication of key milestones for testing and go-live, including revised ISEM Technical Specification of Scheduling and Dispatch Programme Tranche 1 Initiatives	June 2024
Tranche 1	Regulatory Authority approval for Trading and Settlement Code (TSC), Capacity Market Code (CMC) & Grid Code Mods (GC) for Scheduling and Dispatch Programme Tranche 1 Initiatives	June 2024
Tranche 1	Publication of Technical Specification for Scheduling and Dispatch Programme Tranche 1 Initiatives	July 2024
Tranche 1	Vendor System Build and Test Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives	Dec 2024
Tranche 1	TSO/MO System Test and Validation Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives	Mar 2025
Tranche 1	Participant Interface Test (PIT) Commences for Scheduling and Dispatch Programme Tranche 1 Initiatives	Mar 2025
Tranche 1	Participant Interface Test (PIT) Complete for Scheduling and Dispatch Programme Tranche 1 Initiatives	Mar 2025
Tranche 1	Cutover activities Commences for Scheduling and Dispatch Programme Tranche 1 Initiatives	Mar 2025
Tranche 1	Confirm Go Live Decision for Scheduling and Dispatch Programme Tranche 1 Initiatives	April 2025
Tranche 1	Implementation and Go Live for Scheduling and Dispatch Programme Tranche 1 Initiatives	April 2025
Tranche 2	Implementation and Go Live for Scheduling and Dispatch Programme Tranche 2 Initiatives	Oct – Dec 2025



We currently have an overall **low - medium** level of confidence on the timelines. Confidence levels will increase as milestones are achieved and programme progresses further into Phase 3 for Tranche 1 and Phase 2 for Tranche 2

Scheduling and Dispatch - Milestone Plan



SDP Tranche 1 Initiatives - Modifications Update

SDP_01 Operation of Non-Priority Dispatch Renewables (NPDR)

SDP_02 Energy Storage Power Station (ESPS) Integration

SDP_04 Wind Dispatchability Improvements

Trading and Settlement Code

SDP_01 Mod_13_23 Treatment of NPDRs was recommended for approval by the Modifications Committee on 08-Feb.

NPDR Mod_13_23 sent to RAs for final decision on 15th March 2024.

RAs and Scheduling and Dispatch are actively working together in order to bring the final recommendation to SEMC in the near future

SDP_02 Mod_02_24 Battery Integration was recommended for approval by the Modifications Committee on 23-Apr.

ESPS Mod_02_24 sent to RAs for final decision on 24th May 2024.

RAs and Scheduling and Dispatch are actively working together in order to bring the final recommendation to SEMC in the near future

Public Consultation TSOs Definition of Curtailment, Constraint and Energy Balancing SEM-24-044 related to SEM-13-011 closed on 26-Jul-24.

Scheduling and Dispatch are supporting the RAs in the finalisation of the Definition of Curtailment, Constraint and Energy Balancing

Grid Codes

NPDR mod (MPID320) was recommended for Approval on 20-Mar-24.

NPDR mod (MPID320) was sent for decision on 24-Jun-24

NPDR mod (MPID320) is with the CRU for approval.

ESPS Phase 1 (MPID304) was recommended for Approval on 10-May-24

ESPS Phase 1 (MPID304) was sent for decision on 15-Jun-24

ESPS Phase 1 (MPID304) was approved by the CRU on 25-Sep-23

ESPS phase 2 (MPID318) will be submitted to the CRU for approval by end of Oct-24

SDP Readiness Workstream - FPM Industry Workshop High Level Update

The below information provides a high-level update on key activity for the SDP Readiness Workstream

✓ 1. What have we done?



1. BM Data Submission Training & Demo

Balancing Market Data Submission training provided at September FPM workshop followed by a separate demo session on 20th September.



2. SDP Sandpit Environment Access

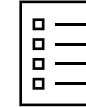
SDP sandpit environment access opened to interested market participants.



3. Market Participant Survey

Market Participant survey conducted during September to gather feedback on participant readiness and support required.

📊 2. What are we doing next?



1. SDP Tranche 1 Changes Summary

Publication of a summary document of SDP Tranche 1 changes as well as republication of existing material



2. SDP Tranche 1 Training Plan

Share the SDP Tranche 1 Market Participant Training Plan as part of FPM Industry Workshop



3. What were the key findings of the SDP Market Participant survey?

1. Understanding of SDP Changes

- A majority of survey respondents (57%) indicated they had a 'mostly clear understanding' of SDP changes however, 29% indicated they 'somewhat understand but require further information' while 14% responded that they were 'not very clear' on the SDP T1 changes.

2. Pre Go-Live Participant Testing Window

- Many participants highlighted the importance of having confirmed timelines for participant interface testing

3. MPI Training

- Several respondents requested training to be provided on the MPI in advance of go-live with training guides and material to be made available



4. Volume Of Q1/Q2 Change

- A number of participants highlighted the volume of market change planned for Q1/Q2 2025 alongside SDP changes, i.e. MTU, MATS

5. Other Support Requests

- Pre and Post Go-Live market participant workshops and forums
- Further information on cutover and associated timelines
- Further day in the life scenarios

Future Power Markets: Future Workshop Schedule



Future Discussion Topics

SDP

- Ongoing NPDR designation process updates
- Tranche 2 Overviews
- Tranche 2 Delivery Milestones

LDES

- Continuing to liaise with the RAs and Departments on next steps

FASS

- System Services Supplier Charge consultation - workshop on paper
- Code Development Working Group - ongoing updates

SMP

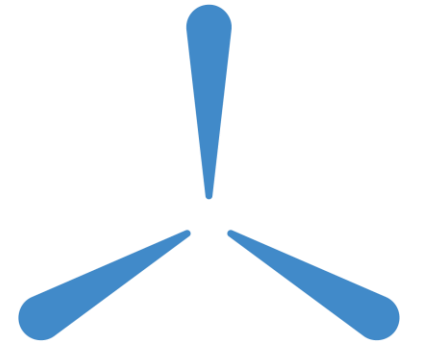
- Additional details on functional approach
- Overview of functional impacts of EU Reintegration on SEM Market Participants

EMP

- CACM 2.0
- Net Zero Further Update
- FCA 2.0
- CRM27 + (guided by SEMC)

Indicative Date	Location
12 November 2024	Virtual
12 December 2024	Virtual
14 January 2025	Virtual

Long Duration Energy Storage



LDES workstream update

1. LDES policy:

- Engagement with CRU and DECC: Seeking to procure 500 MW immediately in response to DECC's ESPF.
- Continued engagement with UR and DfE on LDES policy development in Northern Ireland.

2. LDES procurement option analysis in progress:

- Conducting a literature review of possible procurement mechanisms and financial mechanisms for consideration.
- Review of policy and procurement case studies worldwide for deployment of LDES, renewables, nuclear and interconnectors.

3. LDES modelling update in progress:

- Performed on an all-island basis.
- Analysing impact of LDES on dispatch down, network congestion and emissions.
- Consideration of locational impact.

4. LDES consultation document in progress:

- Written on an all-island basis.
- To be published in Dec-24.
- Timeline and structure to be reviewed: industry feedback welcome.



LDES Consultation timeline



16/10/2024

Strategic Markets Programme

Dispatchable Consumption



Executive Summary

The main objective of the implementation of Dispatchable Consumption within SEM is to efficiently manage surplus renewables and facilitating system decarbonisation.

The aim of the solution is to propose a new type of unit called Dispatchable Consumption Unit (DCU), that applies only to certain types of units that can increase consumption rather than production.

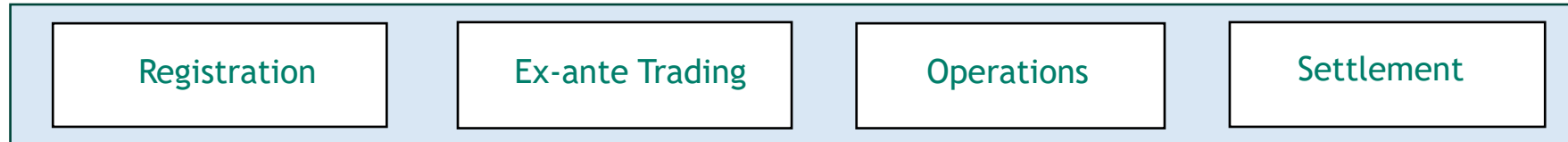
The enduring solution will optimise the use of increased consumption in a manner that is carbon-efficient and economically appropriate



Current implementation

- At present there is no unit type fully suitable for dispatchable consumption projects in the SEM.
- The solution applied at the moment is to register dispatchable consumption units as Demand Side Units (DSU) with a separate Trading Site and Trading Site Supplier Unit, either by the site owner directly themselves, or by a DSU operator engaged by the site owner.
- An enduring solution is needed to address the increasing rate of electrification mainly in industrial heat and transport

DCU in SEM Balancing Market: Summary

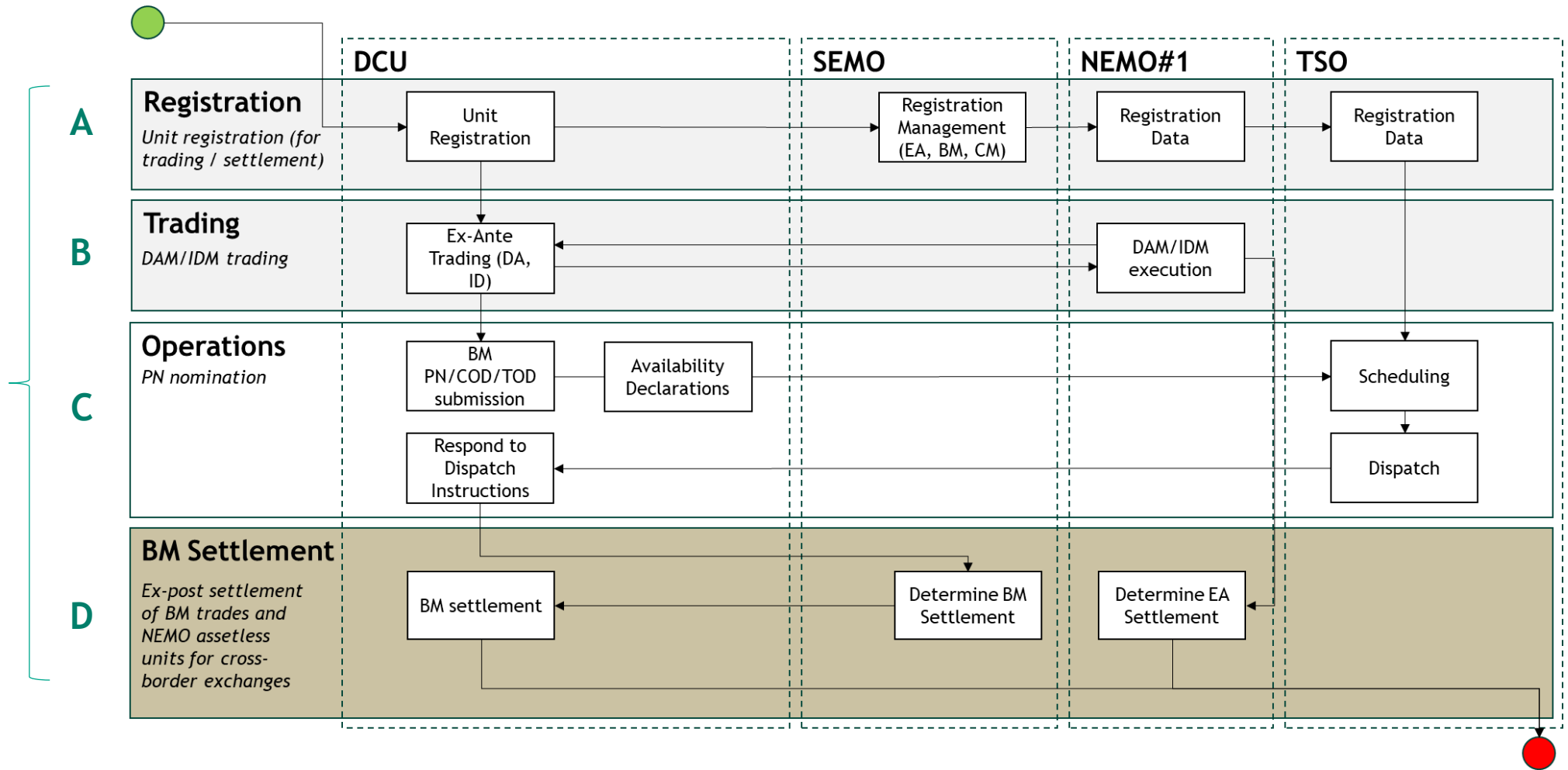


Below are the key areas of impact to the SEM Balancing Market due to the introduction of DCUs:

- **Registration:** Dispatchable Consumption units can be registered in Balancing Market, with attributes relevant to the unit type.
- **Ex-ante Trading:** Trading relates to ex-ante trading are out of scope of this initiative as the focus of these requirements is only Balancing Market and the interfaces with the ex-ante market.
- **Operations:** DCUs shall be able to participate in the Balancing Market and will be able to be scheduled and dispatched by TSOs. Activated DCU will result in QBOA/PBOA for inclusion in pricing.
- **Settlement:** DCUs shall be subject to the Balancing Market settlement processes.

DCU process flow: High Level Overview

Explained in subsequent slides



Operations

Input data

- Commercial Offer Data - SUC, NLC, PQ pairs
- Submitting divisible or indivisible bids
- Physical Notification Data
- Technical Offer Data
- Forecast availability (Max=0, MSG=0, Minout<0)
- Maximum availability of 0 MW
- Minimum output 0 MW (when not available) or negative
- Real-time declarations via EDIL (for energy, reserves)
- Reserve capability curves

Operational scheduling

- DCUs integrated in Operational Scheduling processes and merit orders
- TSO to monitor the impact of the extra demand when a DCU is dispatched

Dispatch

- Dispatched like any other dispatchable asset
- TSO to issue MWOFF=0 when consumption should end
- Divisible bids to be dispatched to any level between 0 and the submitted maximum

Operations - indivisible & divisible bids

The Solution shall incorporate scheduling (via Operational Scheduling processes) of DCUs as per the types of bids submitted by the participants. Each bid step (price-quantity pair) shall be marked divisible or indivisible:

Indivisible bids:

- only operate at MW levels at either end of the bid step (and not output levels in between).
- where a bid is marked to be indivisible the Operational Scheduling processes will only determine scheduling quantities that are at either end of the bid step.
- indivisibility restrictions specified in Participant bid/offer submissions need to be respected when dispatching

Divisible bids:

- operate at any MW level between 0 MW and its dispatchable capacity
- the Operational Scheduling processes can determine any scheduling quantity in the 0 MW to dispatchable capacity range
- these DCUs may be dispatched to any level between 0 MW and its dispatchable capacity

Pricing & Settlement

Calculation of PBOA/QBAO and conduct instruction profiling procedures for DCUs, just like any other registered units in the Balancing Market

Profiles and volumes must be calculated in the **negative** range

Bid divisibility - all DCUs

DCUs with divisible bids can be marginal

DCUs with indivisible bids are expected to be flagged as non-marginal

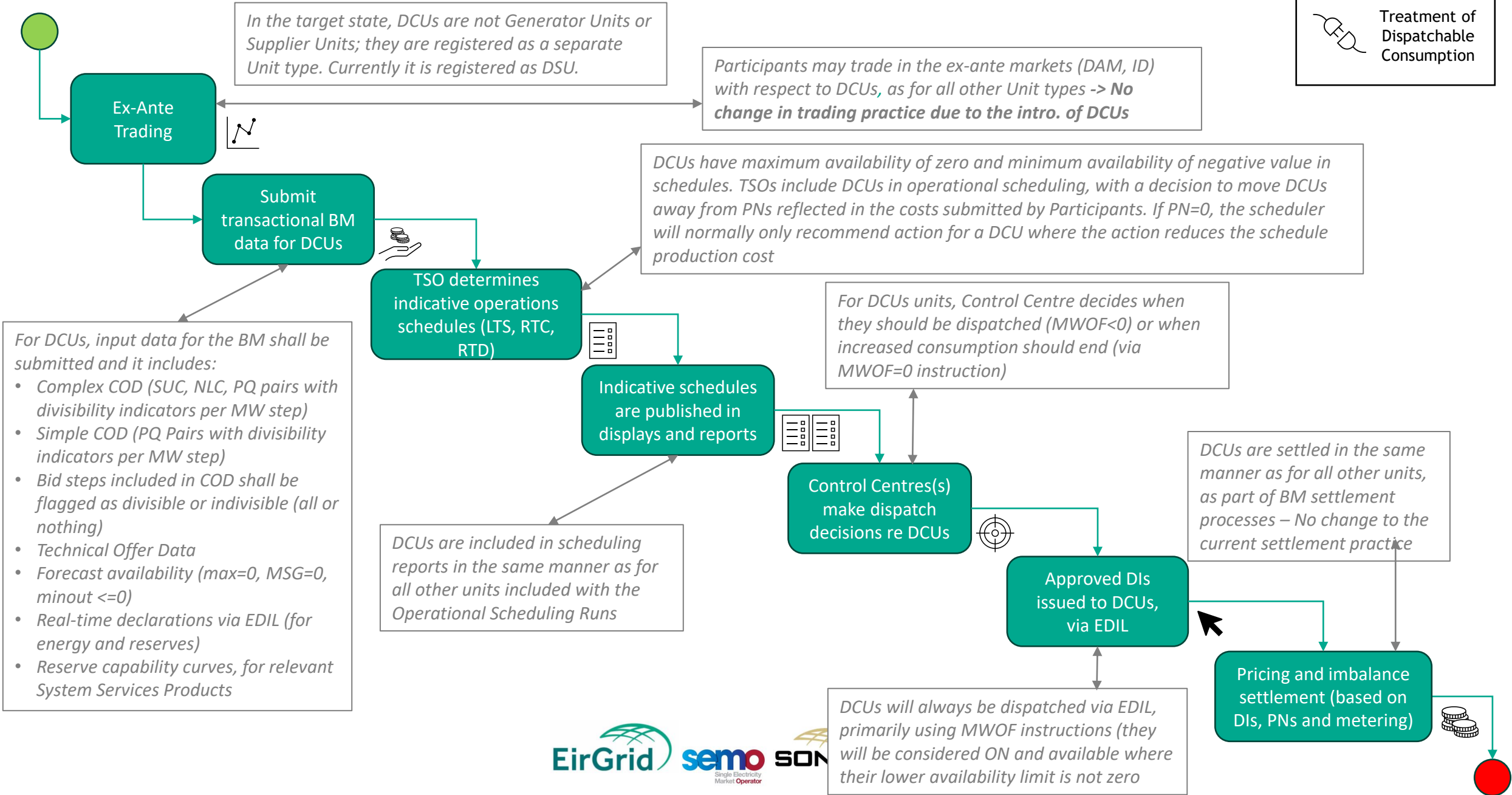
DCUs shall be subject to the Imbalance Settlement process rules



Dispatchable Consumption: Day in the life

Dispatchable Consumption

Treatment of Dispatchable Consumption



DCUs as part of demand response

Accurate reflection of the impact of DSUs - addressed in separate Demand Response workstream

Locational modelling

Currently: not modelled locationally in the EMS or MMS scheduling process.

The effect of DSU scheduling is spread across the entire network using the Load Distribution Factors (LDFs).

Modelling DSUs across multiple locations may be investigated further

Aggregation of smaller scale units

Improving the optimisation of the utilisation rate/schedules of the DSUs - additional information needed to more accurately represent the relationship between the overall unit and the individual sites - exact technical parameters and validations currently WIP

Impact on load forecast

Ensure the load forecasts are closer to reality and ensure sufficient decision support for Control Room Engineers in Scheduling and Dispatching

