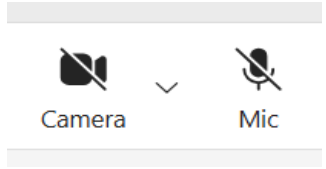
Welcome!

FASS Programme Industry Webinar - Non-Reserve Services Consultation

The webinar will begin at 10:00am

- Please remain on mute
- Please keep your camera turned off.
- Recording and the use of AI bots **are not permitted** during this workshop.

  Participants not adhering will be removed.



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We will take questions via **Slido.** Scan the QR code below:

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Thank you for your co-operation!

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May 2026

FASS PROGRAMME

Non-Reserve Services Consultation Industry Webinar

FASS Programme Industry Webinar – Non-Reserve Services Consultation

Meeting Guidelines

1. **Engage Fully:**
   - This session is for you!
2. **Stay on Topic:**
   - Keep the discussion focused on the Non-Reserve Services Consultation paper
   - Please save unrelated questions or comments for follow-up via email or at the Future Markets Workshop.
3. **Be Time-Aware:**
   - Questions are very welcome but may be time-limited to ensure we stay on schedule.
4. **Be Respectful:**
   - Allow everyone the time to contribute to the discussion.
   - Please use the “raise hand” function if you wish to ask a question verbally.

Slido Questions & Answers Access

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Non-Reserve Services Consultation Paper Webinar Agenda

TIME	DURATION	TOPIC	PRESENTER/S
TSOs			
10:00	5 mins	Introduction and Timelines	Calvin McCurley
10:05	5 mins	Context & Rationale	Calvin McCurley
10:10	15 mins	Ramping Margin & Q&A	Taulant Kërçi & Catherine Dillon
10:25	15 mins	Inertia & Q&A	Taulant Kërçi & Catherine Dillon
10:40	15 mins	Reactive Power & Q&A	Taulant Kërçi & Catherine Dillon
10:55	5 mins	Future Work & Roadmap	Calvin McCurley
11:00	5 mins	Q&A	
DotEcon			
11:05	30 mins	Economic Analysis Findings	Dan Maldoom & Roger Salsas
11:35	10 mins	Q&A	
11:45	3 min	Next Steps and Close	Calvin McCurley

We will take questions via **Slido.** Scan the QR code below:

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Non-reserves Consultation Process

Opened: Wednesday 08 April 2026

Duration: Six weeks

Workshop: Wednesday 06 May 2026
Presentation of Non-reserves proposals, DotEcon Economic Analysis and Q&A

Closes: **Friday 22 May 2026**

TSOs will submit a recommendations paper to the **SEMC for decision in October 2026.**

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1. Introduction

Non-reserves Consultation Paper Webinar

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Introducing Presenters

Calvin McCurley
SONI – Senior Lead Analyst

Catherine Dillon
EirGrid – Senior Analyst

Taulant Kërçi
EirGrid – Power System Specialist

Executive Summary Slide

Workstream Scope

Establish a structured framework for the procurement of non-reserve system services for the day one go-live and future system services arrangements.

Design Considerations

- Increasing SNSP levels, LCIS providers & lower levels of conventional plant require fundamental examination of required future levels of inertia, reactive power provision and managing ramping uncertainty.
- Product design assessment and analysis are required to determine future system need and potential changes to existing DS3 incentive-based product definitions.

TSO View

- Transition to competitive procurement raises challenges across product definitions, locational constraints, real time volumes and delivery logistics.
- Some services are not currently suited to competitive models.
- As system evolves procurement approaches will be kept under review.
- Focus remains on enabling competition where feasible while maintaining system security.

Recommendations

- Maintain regulated tariff arrangements for SIR, SSRP, RM1,3 and 8 for long stop date.
- Undertake product assessment to determine viable non reserve products that support competition whilst safeguarding system security.
- Progress a structured work programme to develop and implement appropriate procurement approaches once alternative products are defined.

Milestones

Analysis on Non-Reserve Procurement
October-December 2024

RA Discussion
19/02/2025

Consultation Paper
April-May 2026

Recommendation Paper
Sept 2026

Inputs to the Non-reserve Consultation

- SEMC decisions, including SEM-22-012 (HLD) and SEM-24-066 (DASSA Design)
- TSOs' considerations on system need, product design and available procurement mechanisms
- Extensive RA-TSO engagement throughout 2025 and 2026
  - Multiple RA-TSO project team workshops to discuss proposed design and procurement of non-reserves, and timeline for implementation of the respective arrangements
  - Executive-level engagement to resolve outstanding open queries and reach alignment on approach
- DotEcon (TSOs' external auction design partner):
  - Working with RAs to agree and deliver scope of Economic Analysis
- RAs and their economic advisors NERA:
  - TSOs have worked closely with RAs to incorporate their feedback into consultation paper
- Industry feedback to previous DASSA consultations

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Scope of Analysis of Non-Reserve Procurement

This consultation sets out the TSOs' approach to determining the most suitable procurement method for non-reserve services post September 2027, long stop date. The product design, locational methodology and volume forecasting methodology inform the feasibility of procurement methods. As the power system evolves with the introduction of Low Carbon Inertia Services (LCIS), new HVDC interconnectors, new Renewable Energy Sources (RES) and new Battery Energy Storage Systems (BESS) and Future System Needs Assessments progress, potential changes to product definitions may influence procurement pathways. Based on these findings, we assess the feasibility of implementing market-based procurement mechanisms for SSRP, SIR and RMX.

The products being reviewed in this assessment are as follows:

- Steady State Reactive Power (SSRP)
- Ramping Margin 1
- Ramping Margin 3
- Ramping Margin 8
- Synchronous Inertial Response (SIR)

**Note Dynamic Reactive Response and Fast Post Fault Active Power Recovery are not currently procured and are therefore excluded from this transition until a later stage, pending further evaluation of system need.*

2. Context & Rationale

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Compliance

The TSOs are instructed through the Electricity Directive to pursue market-based procurement and efficient solutions for grid stability. Market-based procurement applies to non-frequency ancillary services unless regulators determine it to be economically inefficient and grant an exemption.

EU legislation

SOGL (2017/1485)	Article 108 states that the TSO will use all available economically efficient and feasible means to procure the necessary level of ancillary services *(Ref:, Article 108-part c of Directive 2017/1485)*
Electricity Directive (2019/944)	Article 40 states that TSOs must procure balancing services through transparent, fair, and market-based processes, allowing participation from all qualified entities, including those providing renewable energy, demand response, energy storage, and aggregation services. *(Ref:Para.4, Article 40 of Directive 2019/944)* Market-based procurement is applied to non-frequency ancillary services unless the regulatory authority has assessed it to be economically inefficient and has granted a derogation. *(Ref:Para.5, Article 40 of Directive 2019/944)* The non-frequency ancillary services, include voltage control, reactive current injection, and grid stability measures. *(Ref: Definition, Article 40 of Directive 2019/944)*
SEMC (SEM-24-066)	SEM Committee decides that non-reserve services to be subject to a separate Product Review consultation in 2025 *(Ref: Para.2.1, SEMC Decision SEM-24-066)*
SEMC (SEM-25-031)	SEMC decides that TSOs to develop and implement an approach to ensuring procurement of defined volumes for all System Services products by 30th September 2027 using the mechanisms set out in the FASS HLD Decision. *(Ref: Decision 2, SEMC Decision SEM-25-031)*

Purpose of Consultation Paper

Set out the TSOs' evaluation of the non-reserve services' product design, locational methodology and volume forecasting methodology, and proposals for the procurement mechanisms

For each product

System Needs Analysis

- Assessed the operational need for SSRP, SIR and RMx under current and future system conditions.
- Considered requirements across normal operation, contingencies and high-SNSP scenarios.
- Reflected impacts of RES growth, storage, interconnection and LCIS delivery.

Product Review

- Reviewed the technical design and role of each non-reserve product.
- Assessed whether products deliver direct system services or incentive-based outcomes.
- Identified characteristics affecting forecastability, locationality and market integration.

Volume Forecast Methodology

- Tested whether system needs can be defined as clear, ex-ante volumes.

Procurement Method

- Assessed suitability of DASSA, LPF, fixed contracts and regulated pricing to procure non-reserve services
- Tested feasibility against deliverability, system security and market power risks.

+

Economic Analysis

- Modelled how DS3 tariffs modulate energy market outcomes
- Quantified the trade-off between tariff savings, higher energy prices and increased NEA costs.
- Tested whether removing or altering tariffs would impact total system costs, given the need to replace lost services through NEAs.

Summary of Procurement Methods in HLD

DASSA

Description:
Day-ahead procurement process, where services are procured daily based on current supply and demand conditions.

Advantages:
- Accommodates suppliers whose availability and costs are only clear shortly before delivery.
- Enables TSOs to set volumes more accurately in line with real-time requirements.

Considerations:
- Being a newer market mechanism, it may involve additional complexity for participants.

LPF (Shorter-Duration Contracts)

Description:
Annual or weekly auctions designed to balance long term stability with short term flexibility.

Advantages:
- Allows for quicker adjustments than long-term contracts.

Considerations:
- Cannot fully capture real-time needs (e.g., last-minute changes in availability).
- Not suitable for suppliers who only know their availability closer to real time.

Fixed Contracts

Description:
Agreement between two parties aimed to secure substantial volumes and prices over a longer horizon.

Advantages:
- Provides revenue certainty for new entrants.
- Suited to providers who can commit to long-term supply ("dedicated" providers).

Considerations:
- Contract durations may reduce flexibility if conditions change.

Regulated Pricing

Description:
Method where suppliers are awarded based on predefined rate and scalars.

Advantages:
- Fixed cost for TSOs.
- No market power concern.
- Supports system need.
- Delivery is less complex

Considerations:
- Requires derogation from Regulating authorities as stated in SEM 24-066.

3. Ramping Margins

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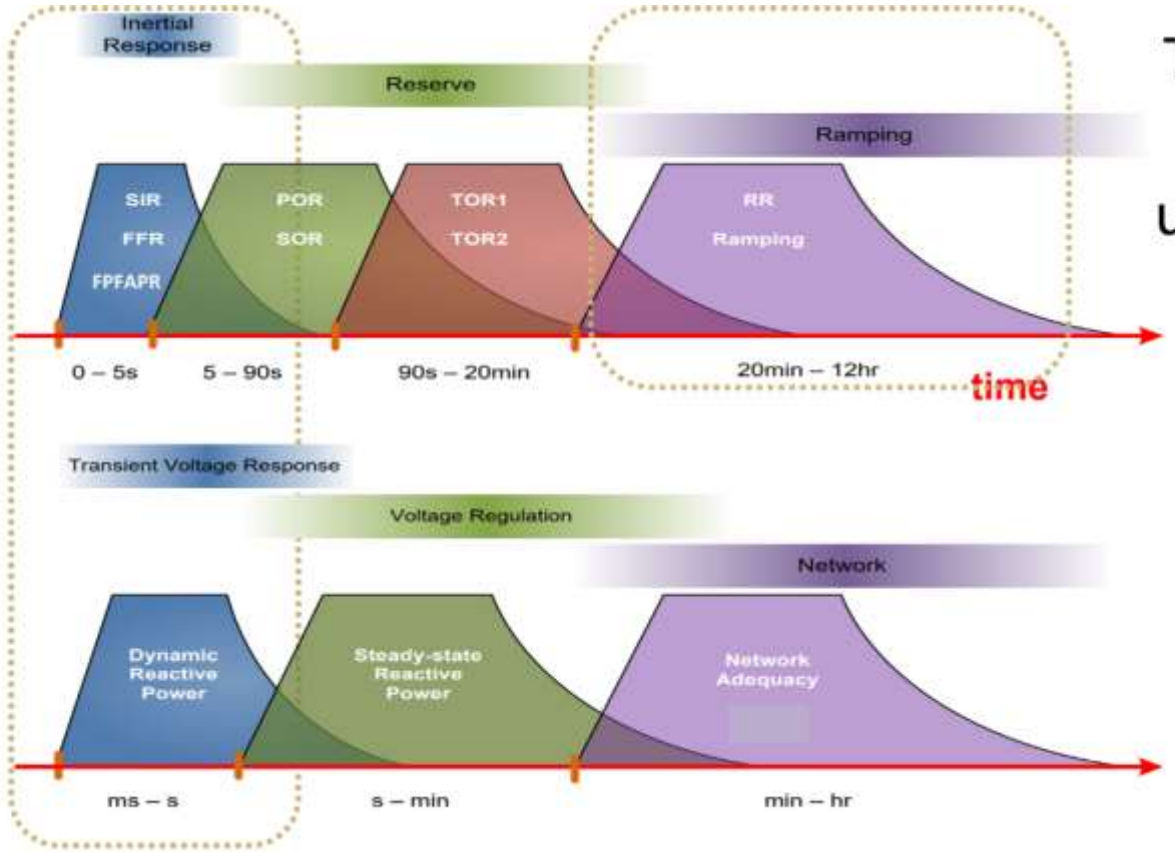
Current Ramping Margin Products

To ensure system security



To manage forecast uncertainty

Classification	Category	Delivery Within	Maintained For	Total Duration
Ramping Margin	Ramping Margin 1	1 Hour	2 Hour	3 Hour
	Ramping Margin 3	3 Hour	5 Hour	8 Hour
	Ramping Margin 8	8 Hour	8 Hour	16 Hour

Current Ramping Margin products - Utilisation

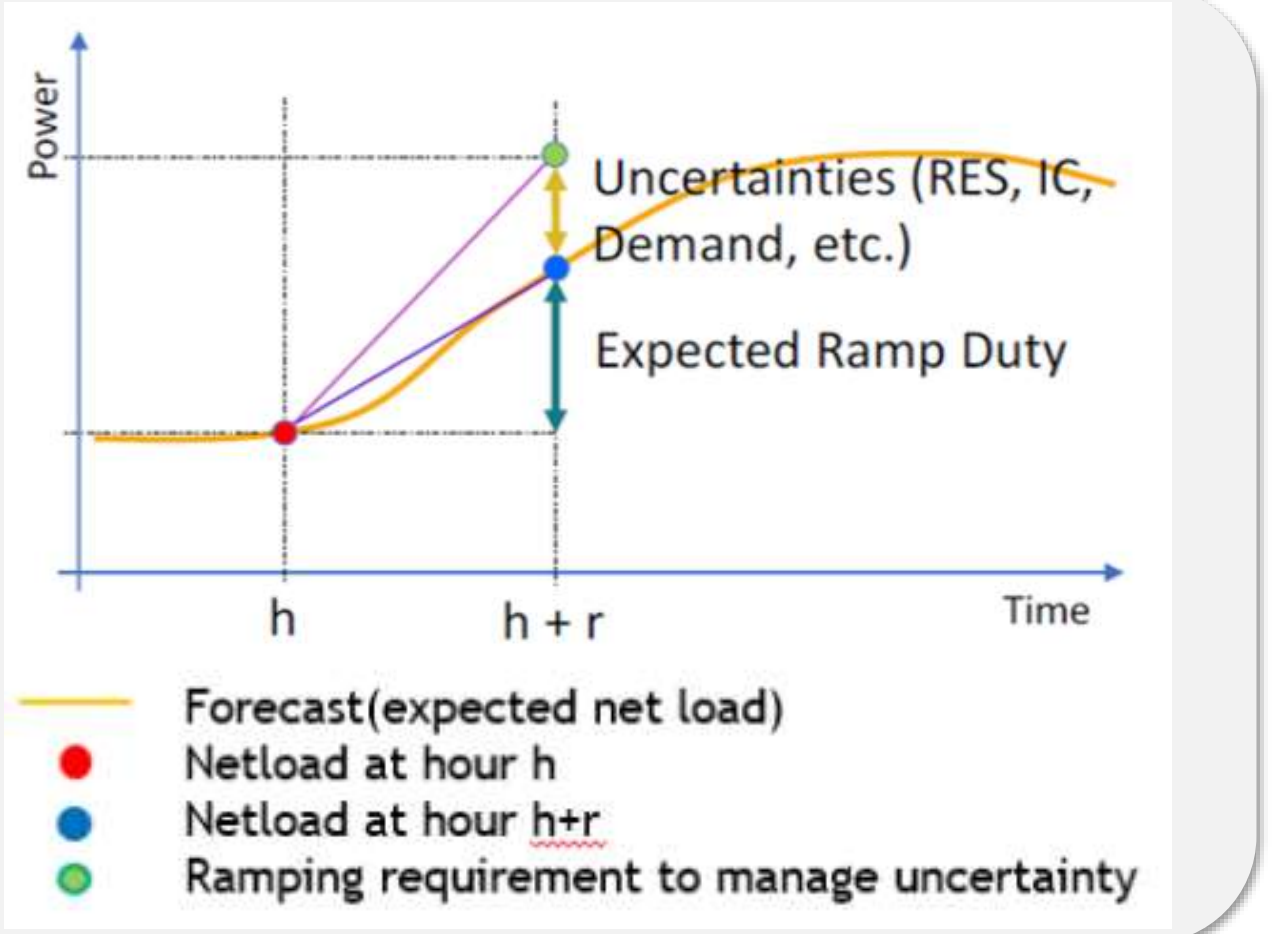
Ensuring sufficient ramping capability is essential to managing variability and uncertainty in generation, demand and interconnector flows, and net load variations. This helps to prevent frequency deviations and support grid stability.

System need Ramping Requirements / Close to Real-Time (LTS/RTC stage):

Dispatchers must ensure ramping can be achieved, taking into account both market results and system uncertainties.

Actions may include:

- Starting up additional units
- Deviating units from physical notifications



*Note Real Time Commitment = RTC Long-Term Scheduling = LTS

Ramping Margin tool

- A ramping margin tool has been developed by the TSOs to assist in the identification of upward ramping needs to manage ramping uncertainty and to assist in the forward-looking monitoring of upward ramping capability.
- The tool utilises D-2, D-1 RES forecasts (updated every 6 hours), and continually updated demand forecasts closer to real time, to forecast RM1, RM3 and RM8 uncertainty requirements.
- The ramping margin requirement is calculated on an on-going basis as follows:

$$RMRt(R) = LSI(t+R) + LFE(t+R) + \max(RR(t+R), Uncert(R)) + Tie\_uncert + IC\_Cap(t+R)$$

Where,

- **t** is the scheduling interval
- ***R*** *is the ramping margin category interval, (RM1 (t+1), RM3 (t+3), RM8 (t+8))*
- ***RMRt(R)*** *is the Ramping Margin Requirement for interval "t" for ramping margin category interval "R"*
- ***LSI(t+R)*** *is the Largest Single Infeed in scheduling interval "t+R"*
- ***LFE(t+R)*** *is the Load Forecast Error in scheduling interval "t+R"*
- ***RR(t+R)*** *is the Replacement Reserve in scheduling interval "t+R"*
- ***Uncert*** *is the variable generation uncertainty forecasted for each reserve category "R" in scheduling interval "t"*
- ***Tie_uncert*** *- Tie Line uncertainty flow, default value for each reserve category "R"*
- ***IC_Cap(t+R)*** *is the interconnector capability in scheduling interval "t+R"*

Ramping Requirement:
October 2023 (Storm event)

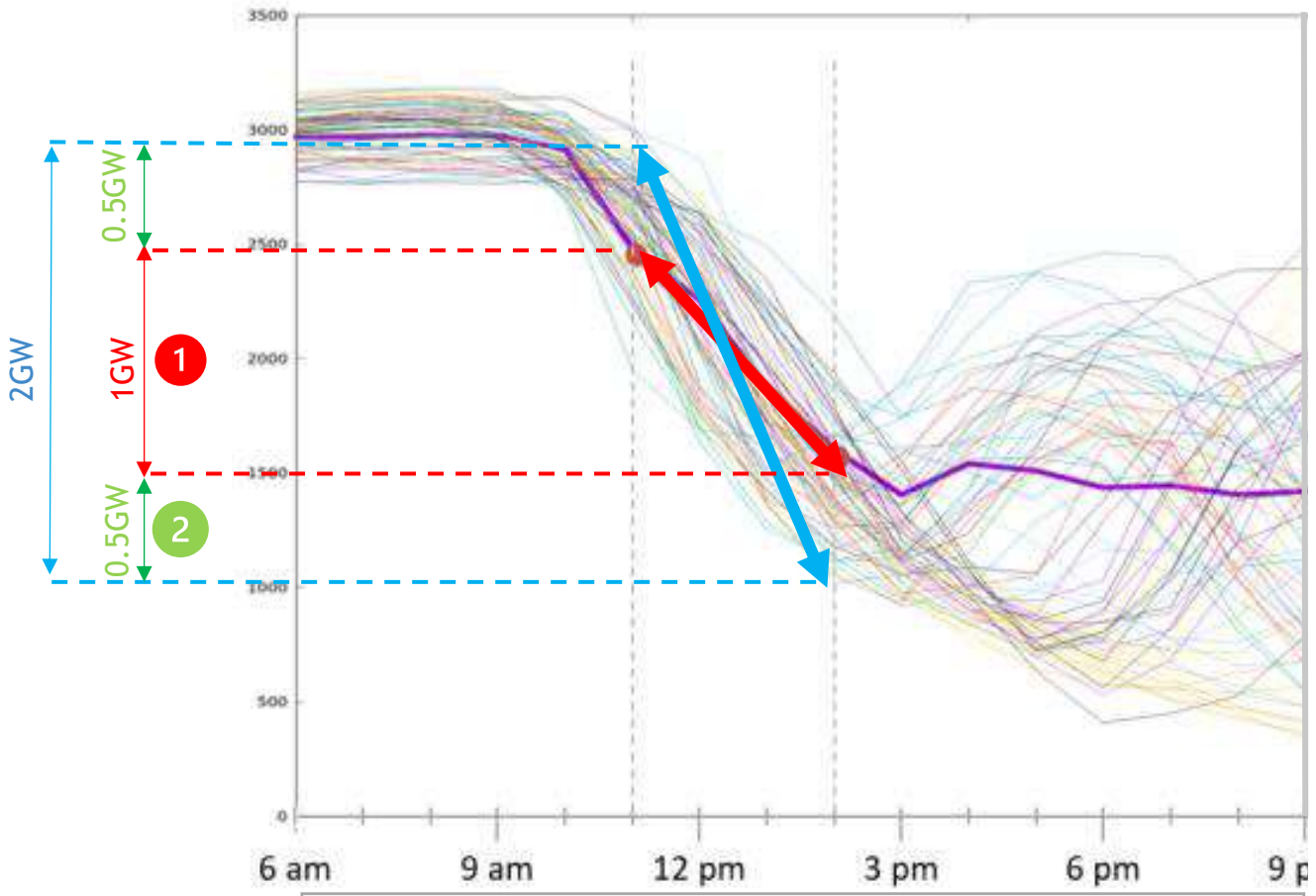
1. **Ramping Duty / Net load Variability:**
   This is the expected change in net load determined from known Demand, Renewable and Interconnector schedules.

2. **Ramping Uncertainty:**
   The level of uncertainty associated with each unit's final availability.

Ramping margin tool highlights gaps and Control centre team re-dispatches thermal, BESS or DSUs to meet RM needs.

Expected 3-hour ramp change at 11am -approx. 1000MW

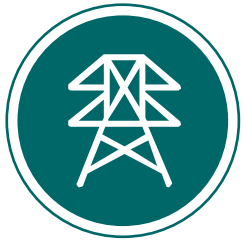
Largest possible 3-hour ramp change at 11am approx. 2000MW



Ramping Duty + *Ramping Uncertainty* = *Total Requirement*

$1000MW + (500 + 500)MW = \sim \mathbf{2000}MW$

Ramping Margins – Competitive Procurement Transition Challenges



Real Time
Are volume requirements known prior to real time?

✗

The Ramping duty would be known prior to real time however, there is a **dependency on wind, demand forecast errors** meaning that a large volume requirement would be required

Objective Function
Can system requirements be codified into an objective function?

✓

Supply Commitment
Can participants commit to supply ahead of Gate Closure?

✗

Participants need early TSO instructions before gate closure for timely commitment. They can adjust after receiving market positions, but earlier confirmation may improve readiness.

Day-ahead Volumes
Do participants have adequate time to plan their supply?

✓

Market Power
Is there no strong market power for the service?

✓

DASSA

RMX presents challenges in preparing participants for timely commitment, increasing complexity for suppliers balancing RM and ex ante positions. Opportunity costs may inflate prices while evolving system needs (e.g. Celtic and growing embedded generation) must be considered for future ramping requirements.

- ✓ Compliant with SEM 24-066.
- ✓ Appropriate framework for procuring volumes close to real-time
- x Not deliverable for day one go live.
- x Early TSO instructions required before gate closure for timely commitment.
- x Could be quite complex for participants balancing RM and ExAnte positions

LPF

Utilising LPF to resolve ramping raises further issues, as volumes rely on D-2 and near real time RES forecasts and IC schedules; therefore, a weekly or yearly approach would be inefficient. We also recognise the need to review evolving system requirements to inform future ramping needs , particularly with Celtic and increasing embedded generation

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- x Not deliverable for day one go live.
- x Having an auction at D-7 or D- 364 may lead to inefficient outcomes
- x Could be quite complex for participants balancing RM and Ex Ante positions

RMX

Similar to LPF utilizing fixed contracts to resolve ramping requirement raises further issues, nor does a multi yearly contract guarantee the TSOs volume commitments without over procurement

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- x Ramping margin volume requirements only understood closer to real time
- x Could be quite complex for participants balancing RM and Ex-Ante positions
- x Not deliverable for day one go live

Fixed Contract

This mechanism is the most appropriate for Ramping Margins. The alternatives create logistical challenges such as bidding and unit preparation complexities additionally ramping margins volumes are only understood closer to real time.

- ✓ Supports system need.
- ✓ Tried and proven method.
- ✓ Compatible with Ramping
- ✓ Clear Investment signal to stakeholders
- x Requires derogation from Regulatory authorities as stated in SEM 24-066.

Regulated Arrangements

Audience Q&A

4. Inertia

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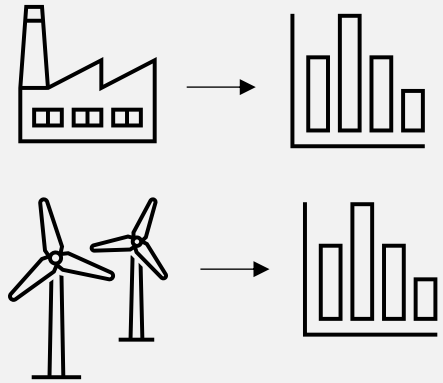
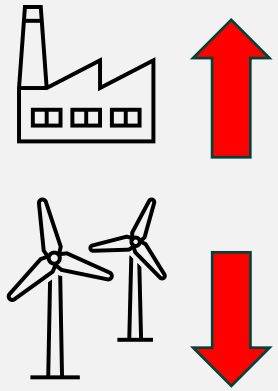
Today's management of the inertia constraint

1. **Market participants provide (F)PNs**



2. ***Close to real-time,*** **TSOs determine if (F)PNs result in an inertia level that meets *'Operational Limit for Inertia'***

3. **If (F)PNs result in too low level of inertia, TSOs deviate from (F)PN**



Increase synchronous (conventional) capacity on-line to increase inertia

To keep system balance, Reduce non-synchronous (RES)

This redispatch results in:
1. Higher cost,
2. Higher emission

SIR product intends to:
1. Incentivise conventionals to improve P_{min} performance
2. Limit redispatch and increase SNSP
3. Reduce emission, cost

<u>weekly constraint update</u> require minimum inertia (> 23,000 MWs)

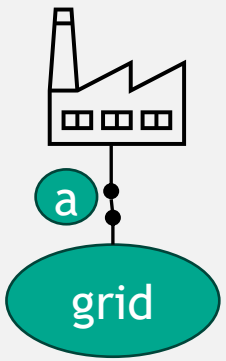
Active System Wide Constraints

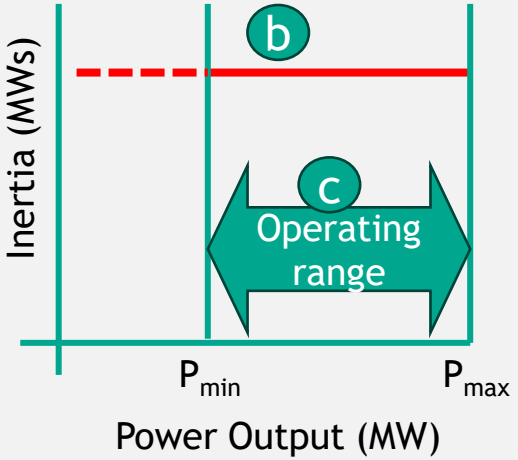
Name	TCG Type	Limit Type	Limit	Resources	Description
(S_RoCoF)					
Operational Limit for Inertia (S_INERTIA_TOT)		N:>=	23,000MWs	Ireland and Northern Ireland Power Systems	Ensures that all island Inertia does not fall below 23,000 MWs.

Source: weekly constraint update 2024/week 25

Conventional units dispatched to P_{min}

Conventional unit's inertia provision is independent on setpoint

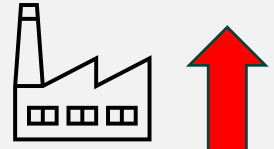




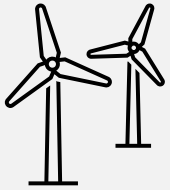
a) If a unit is connected to the grid and synchronised, it provides inertia
b) The level of inertia does not depend on the MW[1] set-point of the generation unit[2]
c) To provide inertia, the unit shall be scheduled within its Operating Range (between P_{min} and P_{max})

[1] or Mvar
[2] inertia of a unit only varies with system frequency

If (F)PNs result in too low level of inertia, TSOs deviate from (F)PN

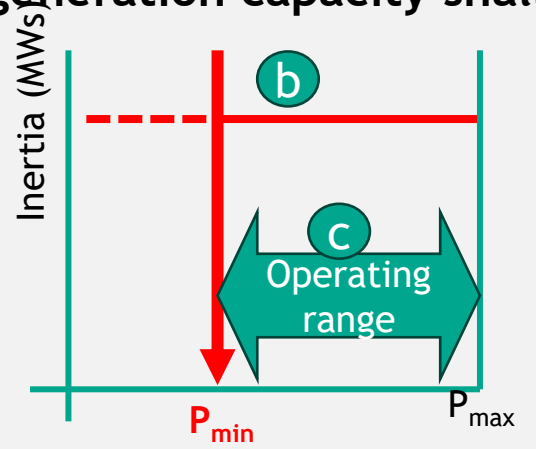


Increase synchronous (conventional) capacity on-line to increase inertia



To keep system balance, Reduce non-synchronous (RES)

To limit deviation from (F)PN, conventional generation capacity shall be dispatched at P_{min}



As additional conventional generators have to be scheduled at higher energy cost, the cost are minimized by dispatching them at P_{min}

Indicative example *SIR volume* comparison, with 250 MW units, providing same Inertia: 2000 MWs

$$SIR\ Volume = Stored\ Kinetic\ Energy \times (SIRF - 15) \times Unit\ Status$$

$$SIRF = \frac{Stored\ Kinetic\ Energy}{P_{min}}$$

Illustrative examples	Generation unit A	Generation unit B	Synchronous Condenser
(1) Registered Capacity	250 MW	250 MW	
(2) **Stored Kinetic Energy**	**2,000 MWs**	**2,000 MWs**	**2,000 MWs**
(3) P-min	100 MW	50 MW	
(4) SIRF (2)/(3) [15 ≤ SIRF ≤ 45s]	20 s	40 s	45 s
(5) **SIR Volume (2)*[(4) - 15] ***	**10,000 MWs²**	**50,000 MWs²**	**60,000 MWs²**

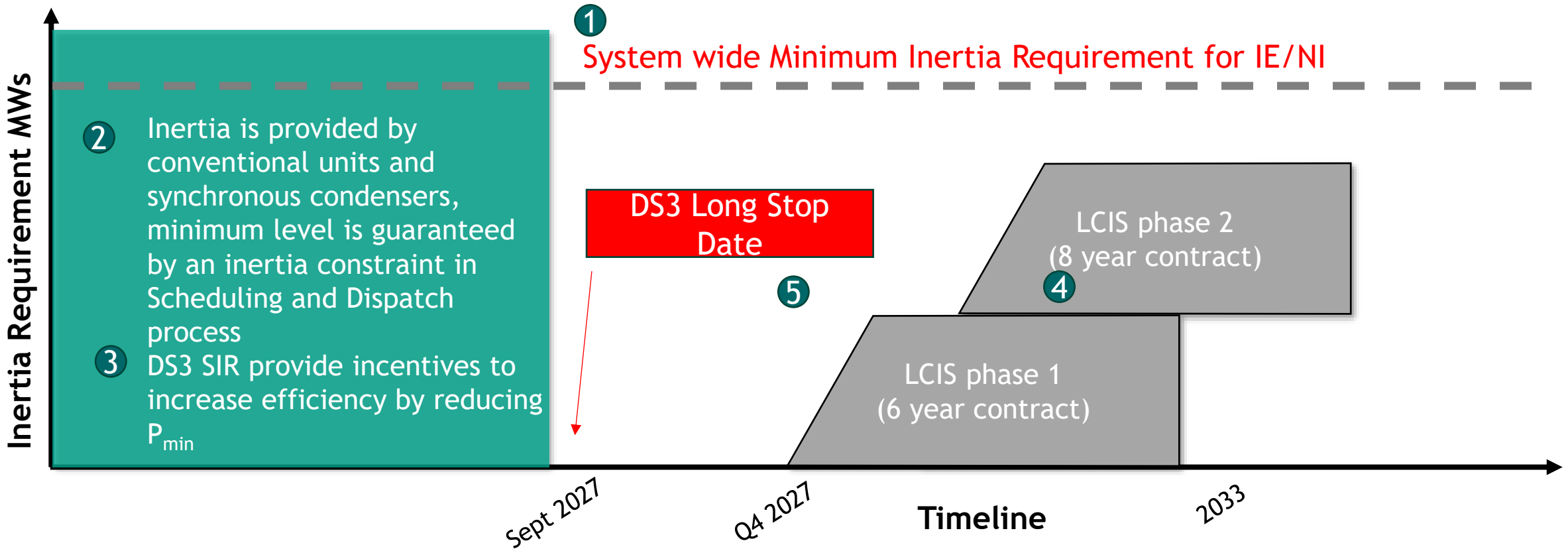
= Inertia (system need)

SIR (DS3 product)

* Unit Status is assumed 100%, which means that the Providing Unit is Synchronised to the Power System for 100% of the Trading Period

Sources: DS3 SYSTEM SERVICES AGREEMENT

Inertia Requirement Summary



1 Minimum Inertia requirement is a system wide need for the IE/NI synchronous area.

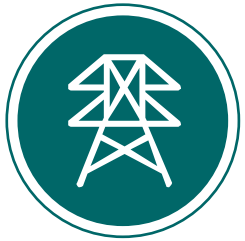
2 Currently mainly provided by conventional units. Scheduling and Dispatch process ensures the minimum inertia requirement is met by a minimum inertia constraint.

3 SIR provides capability incentives, especially for reducing Pmin.

4 In future, part of minimum inertia requirement will be covered by LCIS

5 Inertia not provided by LCIS units to be covered by other units (generators and/or non LCIS synchronous condensers)

Inertia - Competitive Procurement Transition Challenges



Real Time
Are volume requirements known prior to real time?

✓

Objective Function
Can system requirements be codified into an objective function?

✓

Supply Commitment
Can participants commit to supply ahead of Gate Closure?

✓

Day-ahead Volumes
Do participants have adequate time to plan their supply?

✓

Market Power
Is there no strong market power for the service?

✗

Jurisdictional requirements due to north south interconnector congestion may invite potential market power concerns

DASSA

SIR is incompatible as it is impossible to convert Inertia requirements into SIR, a change in product definition is needed.

- ✓ Approach compliant with SEM 24-066 which requires competitive procurement.
- ✓ DASSA provides an appropriate framework for procuring volumes close to real-time
- x SIR system requirement cannot be translated from Inertia.
- x Not deliverable for day one go live
- x Market power concerns

LPF

SIR is incompatible as it is impossible to convert Inertia requirements into SIR, a change in product definition is needed.

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- ✓ Securing volumes early
- x SIR system requirement cannot be translated from Inertia.
- x Not deliverable for day one go live
- x Market power concerns

SIR

SIR is incompatible as the requirement cannot be understood, a change in product definition is required.

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- ✓ Clearer Investment signal to Stakeholders
- x SIR system requirement cannot be translated from Inertia.
- x Not deliverable for day one go live
- x Market power concerns

Fixed Contract

Regulated arrangements, are the only existing mechanism for which SIR can be implemented, despite closure of DS3 this is the only option that the TSO implement under time constraints

- ✓ Supports system need.
- ✓ Tried and proven method.
- ✓ Compatible with SIR
- ✓ Clear Investment signal to stakeholders
- x Requires derogation from Regulatory authorities as stated in SEM 24-066.

Regulated Arrangements

Audience Q&A

5. Reactive Power

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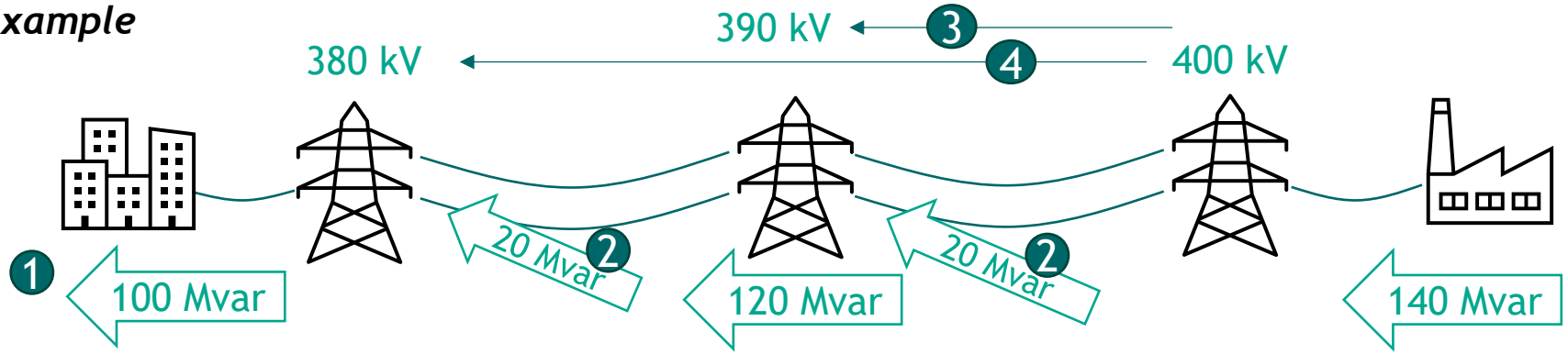
Reactive Power Fundamentals

Many load and grid components produce or absorb reactive power. Long-distance transport of Reactive Power would result in large voltage loss and voltage stability issues. Consequently, local compensation of reactive power is required.

Indicative example



1 Many loads absorb reactive power, e.g. motors, pumps, air conditioners

2 Also grid components[1] absorb or produce reactive power

3 Transport of reactive power results in Voltage difference between infeed and outfeed

4 The longer the line, the higher the Voltage difference

5 As Voltages must stay within range, reactive power compensation brings locational requirements

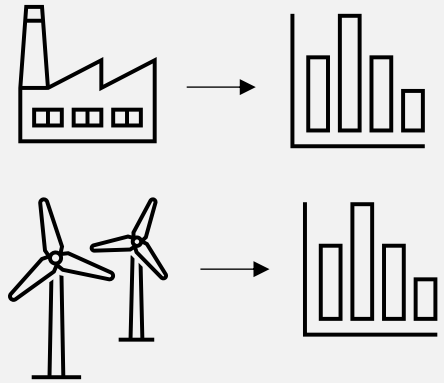
Requires Local Compensation

[1] Underground cables produce reactive power, overhead lines produce reactive power at low load, but absorb at high load. Transformers absorb reactive power.

Today's management of the reactive power constraint

1

Market participants provide (F)PNs

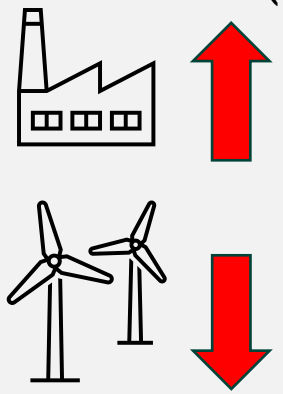


2

Close to real-time*, TSOs determine if schedule meets the *'Operational Limit for Voltage control'

3

If schedule does not meet constraint, TSOs deviate from (F)PN



1. *Start additional synchronous (conventional) unit(s)*
2. *Operate this units at P_{min} to keep deviation from PNs as small as possible.*
3. *To keep system balance, Reduce non-synchronous (RES)*

This redispatch results in:

1. *Higher cost,*
2. *Higher emission*

SSRP product incentivizes:

1. *Large Q_{range}*
2. *Improve P_{min} performance*
3. *Limit redispatch, increase SNSP*
4. *Reduce emission, cost*

weekly constraint update require minimum number of units in Dublin

Active Ireland Constraints

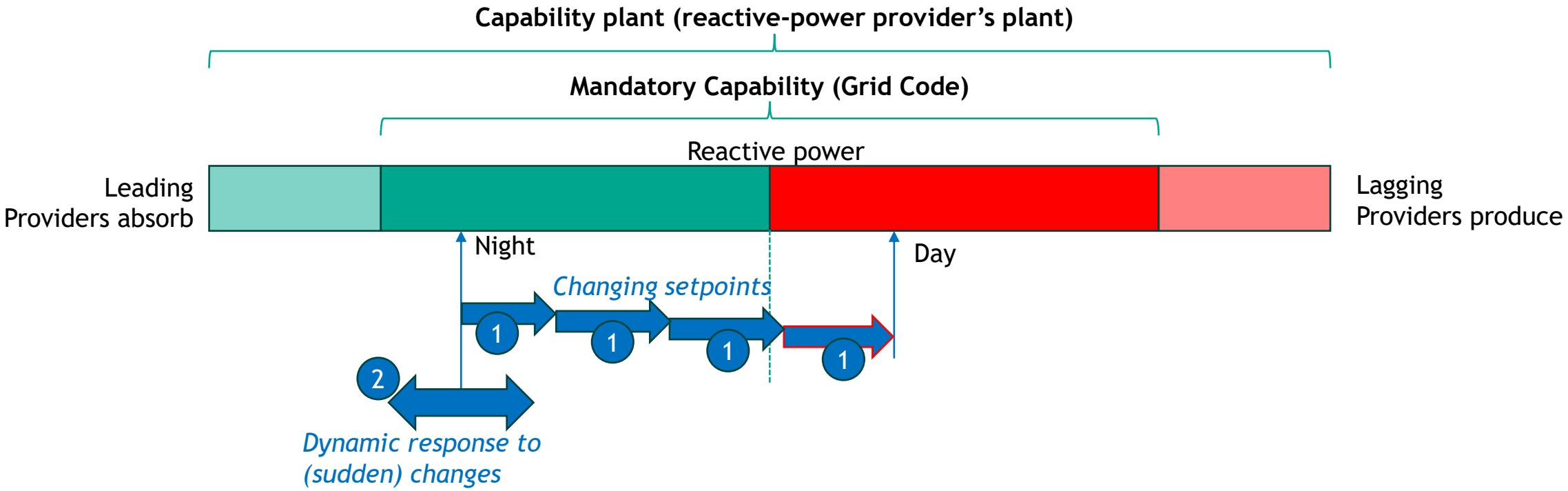
Name	TCG Type	Limit Type	Limit	Resources	Description
Dublin Generation (S_NBMIN_DubNB2)	NB	N:>= (not complete)	1 Units	DB1, HNC, HN2	There must be at least 1 large generator on-load at all times in the Dublin area. Required for voltage control.

Source: weekly constraint update 2024/week 25

Reactive Power activation Existing situation

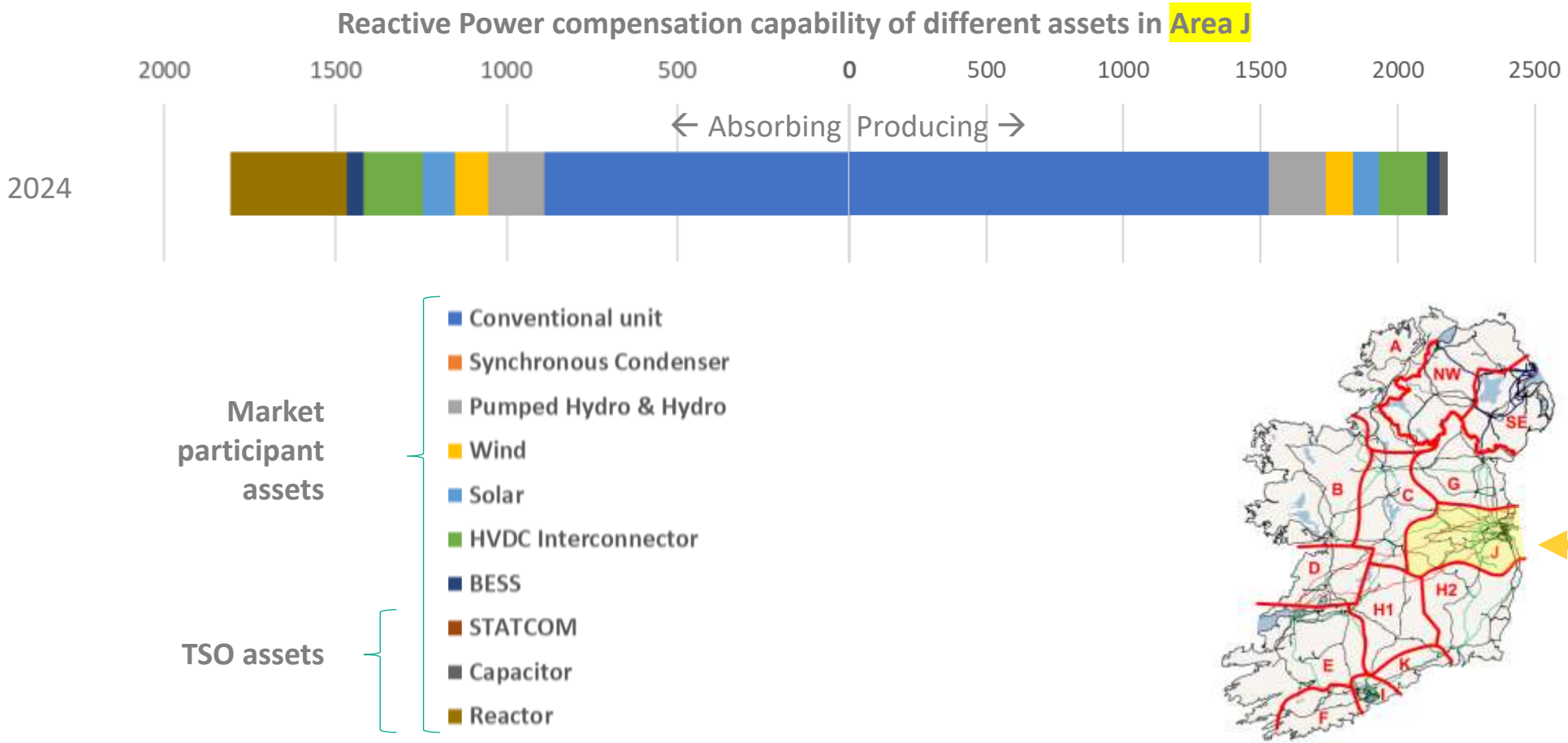
1 **Static settings** — *Settings changed based on real-time TSO's instructions, based on changing local needs of system (response in minutes)*

2 **Dynamic (AVR) response** — *Continuous automatic fast response to locally measured system change, for example due to a line trip or changing loading (response within seconds)*



Existing Reactive Power Providers / Capability

Reactive power compensation in two directions (absorbing and producing) by assets owned by market participants or TSOs. Some assets are automatically controlled, others are static.

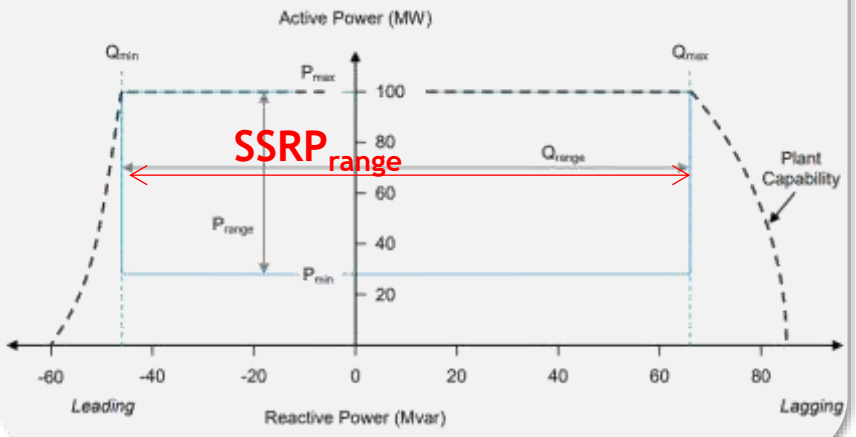


SSRP product incentivises reduction of P_{min} capability improving efficiency of redispatch

$$SSRP_{Volume} = SSRP_{range} \cdot RP_{factor} \cdot Unit\_status$$

availability

$SSRP_{range}$ incentives the reactive power compensation capability (Q_{range}) within the active power range (P_{range})



The RP-factor incentivizes reduction of P_{min} for conventional generation units

$$RP\ Factor = \frac{Power\ Output\ range\ (P_{range})\ that\ Q_{range}\ can\ be\ provided}{Registered\ Capacity}$$

Notes:

- RP Factor = 1 for dispatchable synchronous condensers and dispatchable loads
- P_{min} for wind farms assumed to be MAX(12%, capability)

Sources: DS3 SYSTEM SERVICES AGREEMENT. DS3 System Services Technical Definitions Decision Paper

SSRP Key Takeaways

- SSRP volume produced is dependent on a unit's characteristics such as mingen.
- Wattless scalar doubles payment if provider is capable and instructed to provide at 0 MW
- SSRP Incentivises the full Q_{range}, rather than separate leading and lagging values

Reactive power - Competitive Procurement Transition Challenges

Real Time
Are volume requirements known prior to real time?

✓

Objective Function
Can system requirements be codified into an objective function?

✗

Codifying reactive power requirements into an objective function may be complicated due to **the need for locational based requirements or applying locational scalars** to deliver supply at the desired locations

Supply Commitment
Can participants commit to supply ahead of Gate Closure?

✓

Day-ahead Volumes
Do participants have adequate time to plan their supply?

✓

Market Power
Is there no strong market power for the service?

✗

If a competitive framework were adopted, the **dilution on competition through zoning** could create opportunities for market power to arise.

SSRP

DASSA

SSRP is incompatible with a DASSA framework, a change in product definition is needed. Additionally, its needs are highly locational which results in market power concerns.

- ✓ Approach compliant with SEM 24-066 which requires competitive procurement.
- ✓ DASSA provides an appropriate framework for procuring volumes close to real-time
- x Not deliverable for day one go live.
- x Multilocation approach necessary
- x Impossible to define SSRP limit that translates into reactive power
- x Nodal clearing prices/scarcity prices for SSRP would be infeasible in the timelines.

LPF

SSRP is incompatible with the LPF, a change in product definition is needed. Additionally, a D-365 or D-7 view will exaggerate the existing challenges of quantifying SSRP volume requirements

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- x Not deliverable for day one go live.
- x Multizonal approach necessary
- x Market power concerns likely within regions /zones
- x Adding zonal clearing prices/scarcity prices for SSRP would be infeasible in the timelines.

Fixed Contract

SSRP is an incentive rather than a product and is incompatible with a Fixed Contract Framework. Additionally, a multi-year or monthly volume based contract will exaggerate the challenges of quantifying SSRP Volume requirements

- ✓ Compliant with SEM 24-066 which requires competitive procurement.
- ✓ Clearer Investment signal to Stakeholders
- x Not deliverable for day one go live.
- x Market power concerns
- x Time horizon could lead to capacity mismatches, jeopardizing security
- x SSRP limit cannot be defined nor translated into reactive power requirement

Regulated Arrangements

This is the most appropriate and economically efficient procurement method for SSRP, the alternatives are incompatible and expose consumers to market power concerns

- ✓ Supports system need.
- ✓ Implementation is trivial.
- ✓ Tried and proven method.
- ✓ Compatible with SSRP
- ✓ Clear Investment signal to stakeholders
- x Requires derogation from Regulatory authorities as stated in SEM 24-066.

Audience Q&A

6. Next Steps

Non-reserves Consultation Paper Webinar

Results and Considerations

We consider **Regulated Pricing** to be the only viable procurement method and therefore, the only available choice for Day 1 Go-live.

Conclusion of DS3

- SEMC – 25-031 states that DS3 must conclude September 2027.
- Transitional Procurement will require both the design and implementation of an alternative DS3 like proposal

System Security & Feasibility

- It is not feasible to implement secure, market-based methods within the available timeframe.
- To continue with regulated arrangements, derogation is required from the Regulators, to which economic efficiency must be demonstrated.

Pathway toward Competition

- EU Regulation calls for competitive procurement of these services.
- A parallel workstream will explore alternative products, enabling avenues toward competition, while ensuring system security.

Non-reserves Transitional Arrangements

Consultation on Non-reserves Design & Procurement

I: Proposed design and procurement mechanism - high level technical requirements, operational considerations, market interactions

II: Recommendations paper

III: SEMC Decision paper outlining the high-level approach.

Derogation Submission

Submission of Derogation application for RA review

Detailed Contractual consultation

Consultation on contractual arrangements and detailed design, detailed technical criteria and evaluation criteria.

II. Recommendations paper

III. SEMC Decision paper outlining detailed contractual requirements

Procurement Activity

Procurement activity for transitional procurement of non-reserves

Design & Procurement SEMC Decision October 2026

Derogation Confirmation October 2026

Contractual Arrangements June 2027

Procurement Activity July 2027 – February 2028 (TBC)

Go-live

Non-reserves Competition Arrangements

Non-Reserve Product Redesign

Product Design Assessment needed to revaluate the non reserve products and assess how alternatives could be used to fulfil:

I:system needs

II: align with the need for competitive mechanisms.

Non-Reserve Market Design

Explore and evaluate the potential avenues the revised non reserve products have toward competition, key outputs detailing:

I: Assessment criterion for each market

II: Proposed procurement mechanism for each product

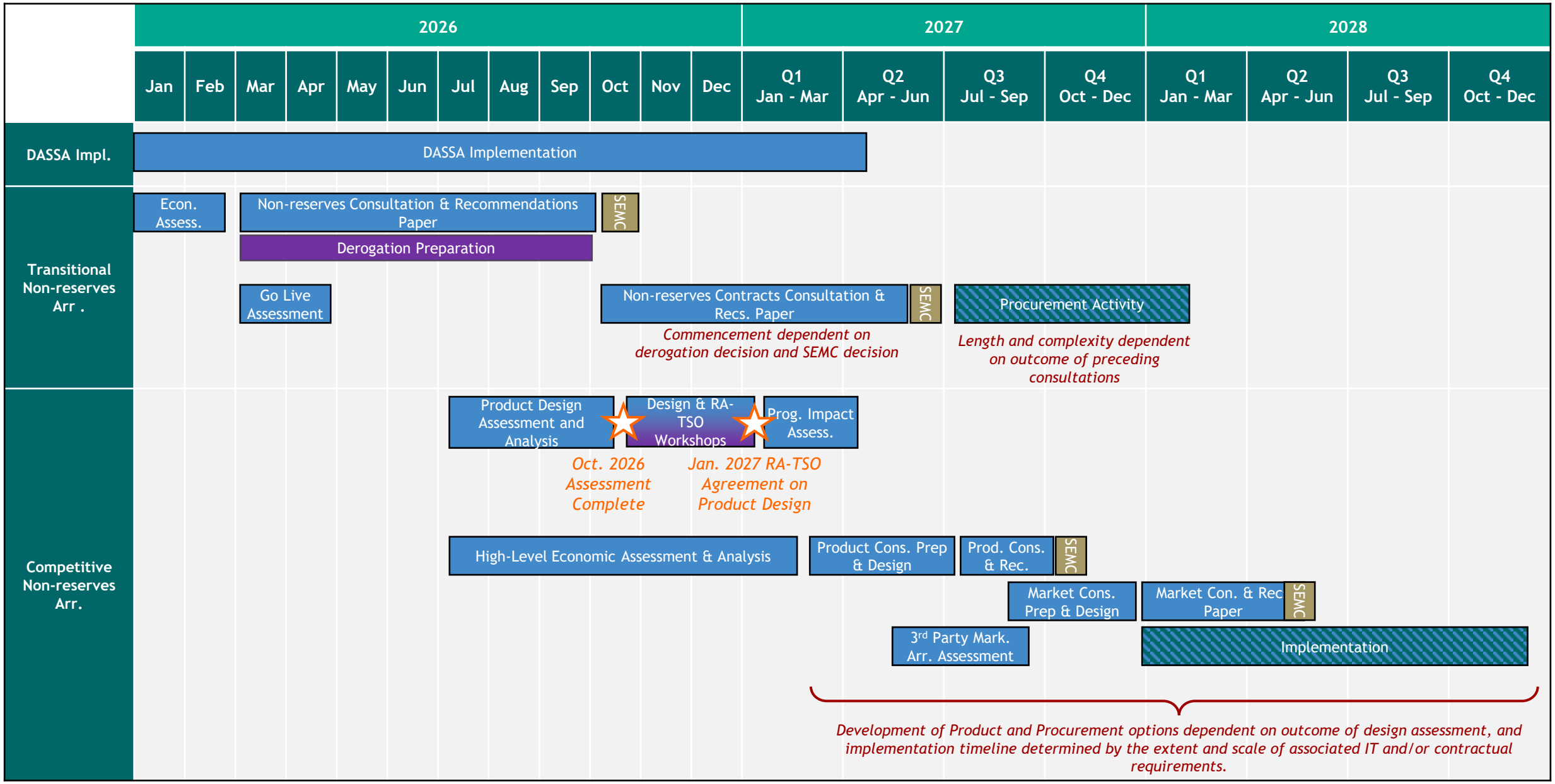
III: Roadmap toward implementation

Implementation

Procurement activity for Competitive procurement of future non-reserve products.

Product Design Assessment Oct 2026 → RA TSO Agreement Jan 2027 → SEMC Decision on Revised Products Q4 2027 → SEMC Decision on Market Design Q2 2028 → Future Non-Reserve implementation → Go-live

Non-Reserve Roadmap - (*Draft – Awaiting PIR v4*)



Audience Q&A

Ramping International Insights

System Operators in other EU jurisdictions do not apply specific ramping margin focused products.

Alternatively these TSOS appear to be able to manage fluctuations utilising a combination of strong balancing incentives, intraday market and balancing market products, interconnected balancing markets and processes.

We have considered procurement in the context of **Belgium**

Findings

Elia, the Belgian TSO, identified in in its 2024-2034 Adequacy and Flexibility study the need for upward and downward flexibility requirements will grow with greater levels of renewables, and identified three main requirements (note ramping flexibility does not equate to the DS3 ramping products)

- **Ramping flexibility** i.e. capacity which can be regulated upward or downward in a timeframe of 5 minutes,
- **Fast flexibility** i.e. ability to be regulated upward or downward within 5-15 minutes
- **Slow flexibility i.e.** ability to be regulated upward or downward within in 5 hours

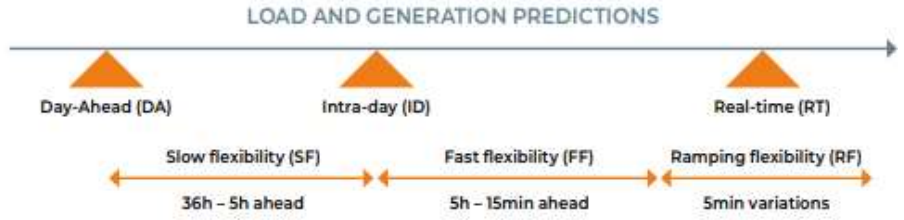
Market Approach

Slow flexibility:

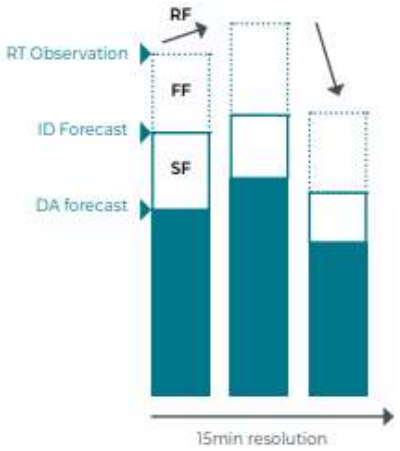
- Expected to be met via intraday trading.

Ramping & Fast flexibility:

- Cannot be met through the wholesale markets as they are identified after the last intraday market opportunity
- Will therefore rely on the Frequency restoration reserve (Manual Frequency restoration mFRR and automatic Frequency Restoration Reserve aFRR) to resolve the residual load imbalances that will occur as a result of flexibility requirements.



Type of Flexibility	SF Slow Flex	FF Fast Flex	RF Ramping Flex
Definition	Capacity which can be started or shut down in intra-day (until a few hours ahead)	Capacity which can be regulated up- or downward close-to-real-time	Capacity which can be regulated up- or downward in a timeframe of 5 minutes
Objective	Deal with intra-day prediction updates of residual load and forced outages	Deal with unexpected variations of residual load and forced outages	Deal with fast variations of residual load
Indicator	Future residual load forecast errors between day-ahead and intra-day	Future residual load forecast errors between intra-day and real-time	Variations residual load forecast errors between intra-day and real-time



Inertia International Insights

Traditionally, inertia services were typically not procured or paid for because sufficient inertia was historically inherently provided by conventional units.

In some countries, long-term contracts for inertia procurement are currently being concluded, prepared for or being studied. In addition, day-ahead procurement is of interest.

We have considered procurement in the context of **Great Britain** and **Australia.**

	Great Britain	Australia
System Need:	120,000 MVAs; NESO studying reduction to 102,000 MVAs	Distinguishing minimum inertia vs additional inertia; Assessing whether additional procurement is justified
What's in place:	12 synchronous condensers contracted under Stability Pathfinders and delivering inertia now	N/a; directions paper issued by AEMC on prospect of operational inertia procurement (e.g. spot market)
Procurement Approach:	Long-term tenders for stability services: • Y-4: First tender in 2025 for 2029 delivery • Y-1: First tender 2023-2025 for 2025/26 delivery • Short-term (D-1) market under development • Exploring Grid Code changes to mandate GFM capability in new PPMs	AEMC Directions Paper: • Minimum inertia - long-term contracts • Additional inertia - operational procurement may deliver benefits if cost-effective (subject to further technical detail and cost-benefit analysis)
Next Steps:	• Expand stability markets across timescales • Accelerate GFM adoption for zero-carbon operation	• Industry Consultation closed Feb 2025 • Draft determination extended to due to: *"complexities including understanding power system needs and technological capabilities"*

Reactive Power International Insights

Most TSOs apply mandatory provision of reactive power compensation, some with and some without a compensation payment for activation.

Some TSOs (GB, BE, NL procure reactive power compensation needs through tenders with contract terms of up to 10 years, often via bilateral contracts. This can cover part of their need beyond mandatory grid code or their full need

Short term markets have been studied (GB, ES), but are not implemented.

	Great Britain	Belgium	Netherlands
Mandatory			
Product	Obligatory reactive power service (ORPS) for transmission connected generators	Dynamic (AVR) response as per Grid Code requirement	Mandatory annual tendering for eligible units ≥ 110 kV
Procurement	None	None	annual tendering
Contract	Mandatory Services Agreement (MSA)	None	Individual negotiated bilateral contracts
Payment	Fixed regulated tariff for the use/activation (4.57 £/MVAr.h in October ’25)	No compensation payment	Prices subject to RA’s reasonability check. 8 different prices for activation possible.
Non Mandatory			
Product	Long term Tenders for new emission free reactive power compensation.	Stationary Reactive Power (‘stationair blindvermogen’)	Voluntary for units without mandatory requirement
Procurement	Incidental tenders initiated on locational need basis, TSOs/TAOs may participate	Annual Tender	Annual Tender
Contract	Typically 9-10 years contracts with 4 years lead time.	Individual negotiated bilateral contracts	Individual negotiated bilateral contracts
Payment	Price may be for available capability	Price as per bilateral contract	8 different prices for activation possible. Prices subject to RA’s reasonability check.

Procurement of Non-Reserve System Services

Interim options with current product definitions

May 2026

Incompatibility of current service definitions with competitive procurement

- DS3 payments for SIR and SSRP not structured around **physically meaningful quantities**
  - SIR is a non-linear relationship with Inertia relying on physical characteristics such as MINGEN
  - Various scalars apply
- Not meaningful to procure a "quantity" of SIR or SSRP …
- … and if we did there would be no guarantee that the TSOs' inertia floor and RP requirements would be met

- **Long-run options** compatible with competitive procurement must be based on 'physical' definitions of quantities reflecting the **TSOs's actual needs**
  - Inertia / KE
  - Injection/absorption of RE by location

Short run options considered

Study focuses on **short-run options** for procurement of non-reserve SS in the interim period (2-4 years) until new product definitions are developed

We consider the following two polar options:

- **Retain DS3 payments** for suppliers of non-reserve SS
- **Eliminate DS3 payments**

Our key considerations for evaluating these options are:

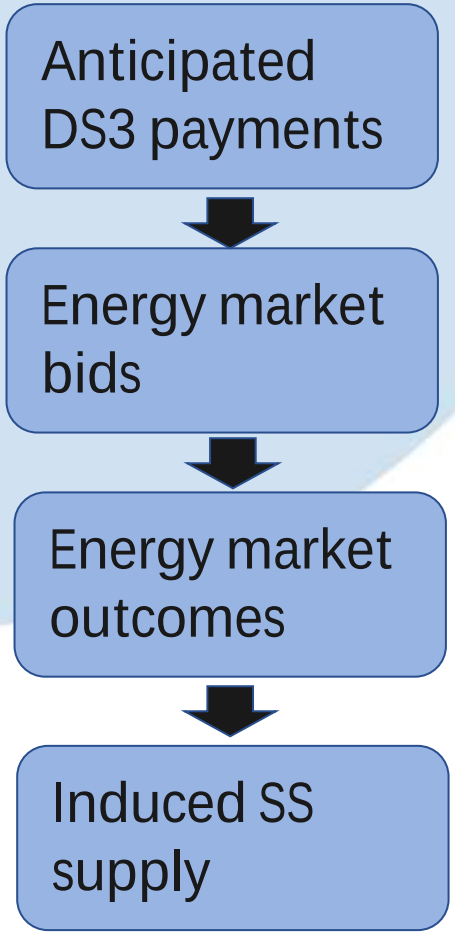
- **Achieving TSO requirements**
- **Cost efficiency**

Additionally, investment uncertainty may be caused if DS3 payments weer dropped before replacement revenue stream in place for SS providers, but this is not addressed in our study

We focus on procurement of **inertia** and **reactive power**

*There are similarities with **ramping margin**, but we have not specifically modelled RM due to the complexity arising from the product cutting across multiple periods of the energy market – we expect similar effects*

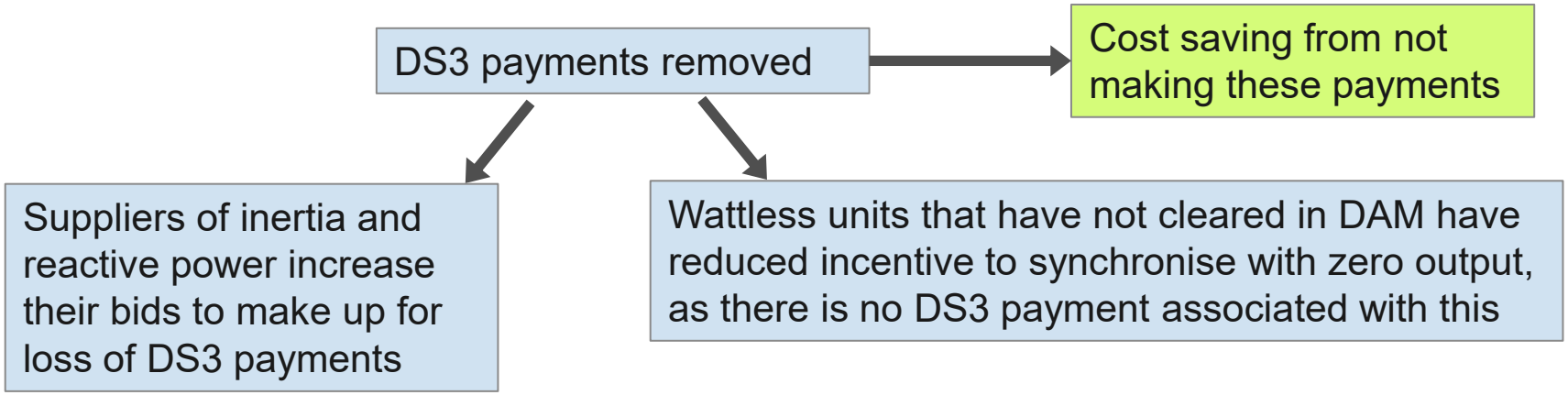
Basis of our model



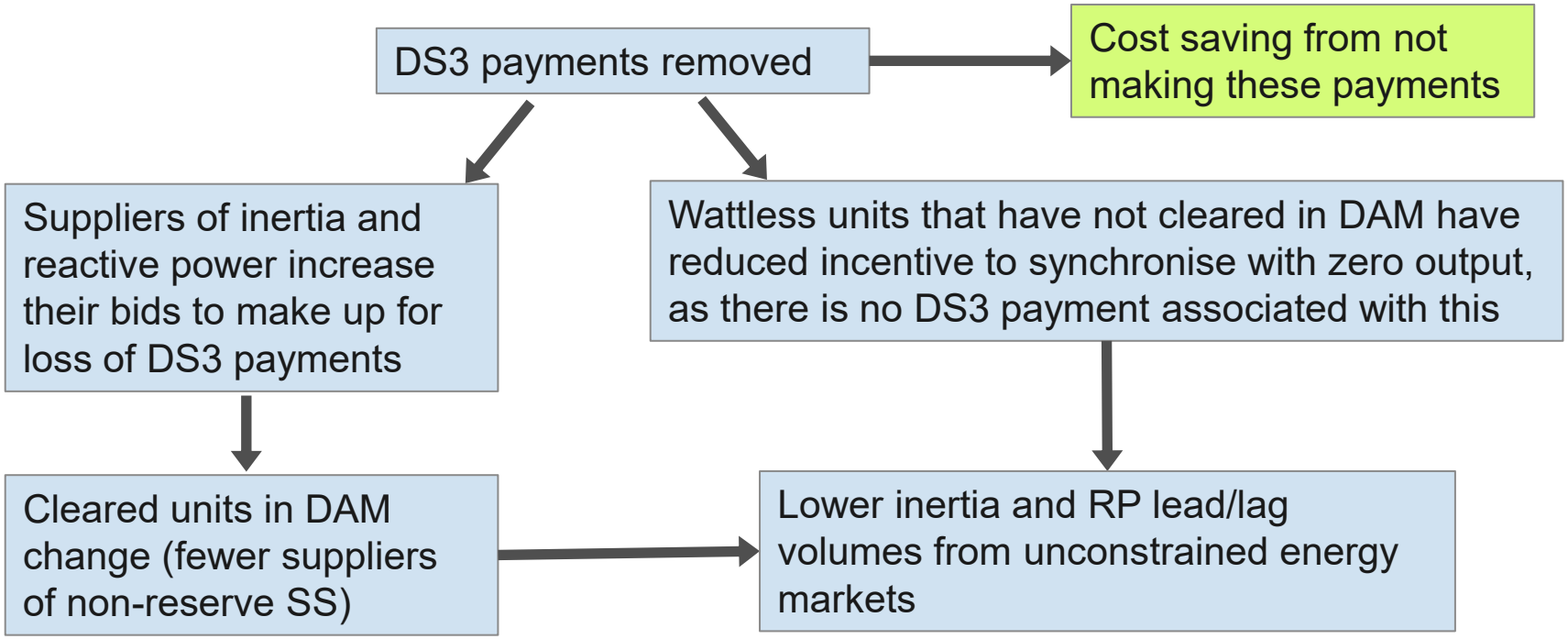
- Potential DS3 payments from SIR and SSRP **conditional on being synchronized** can be anticipated by units
  - Suppliers can anticipate **such payments when making energy bids**
  - This shifts a suppliers offer curve by the anticipated SIR and SSRP revenue (i.e. offering to synchronise at a lower price, but incrementally output above this is not affected)
  - This affects the **choice of units** made in energy market clearing, making those supplying SIR/SSRP more attractive
  - In addition, wattless suppliers have an **incentive to synchronise even if not cleared** in the energy markets to receive DS3 payments
- This is consistent with the original intention when DS3 tariffs were introduced
  - In 2014, the SEM-C considered possible competitive procurement of SSs before deciding to use regulated tariffs
  - The Decision explicitly acknowledges that suppliers need incentives to offer SSs and that the DS3 tariffs modulate energy market outcomes to such effect

Modelled impact of removing DS3 payments

Modelled impact of removing DS3 payments



Modelled impact of removing DS3 payments



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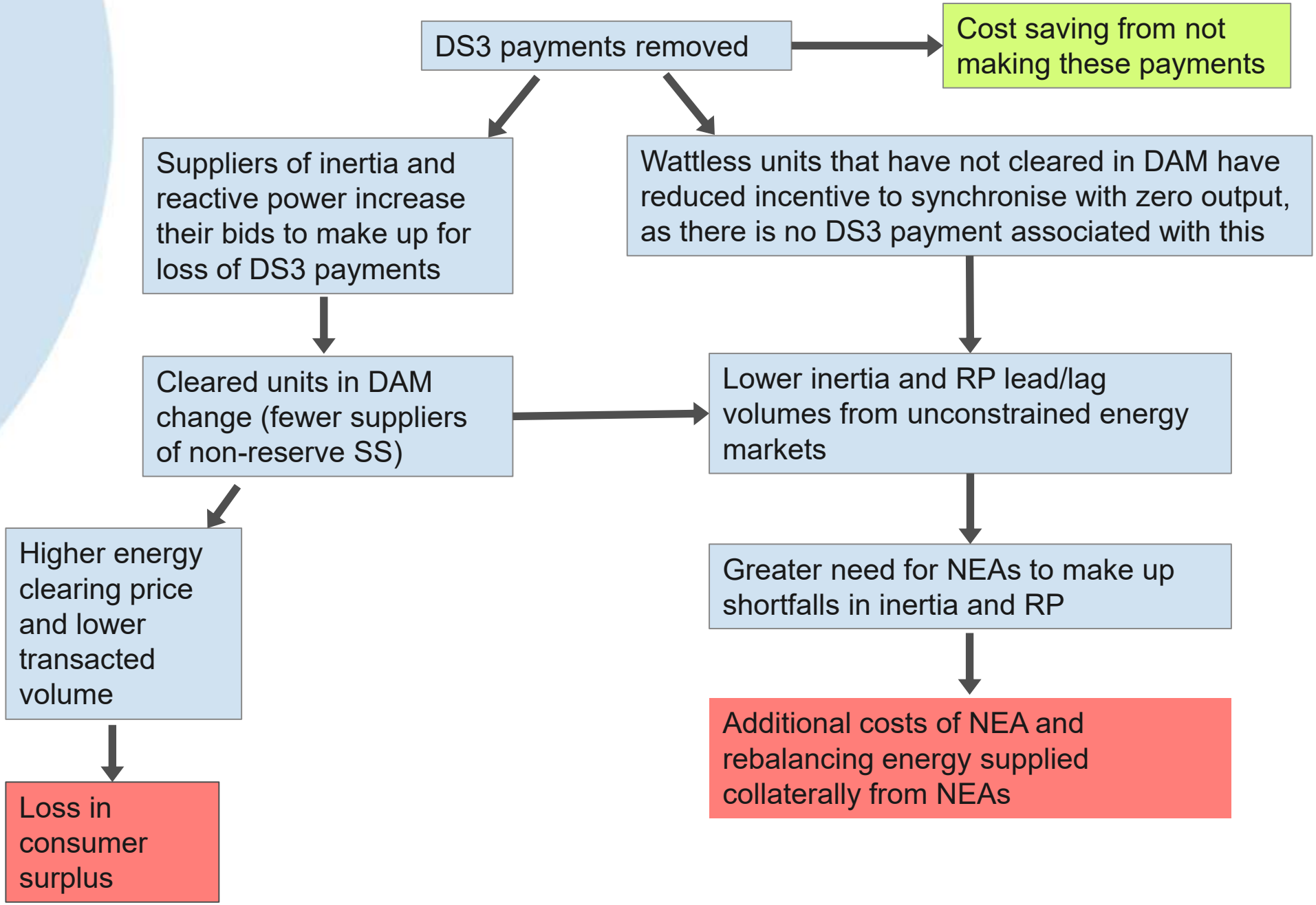

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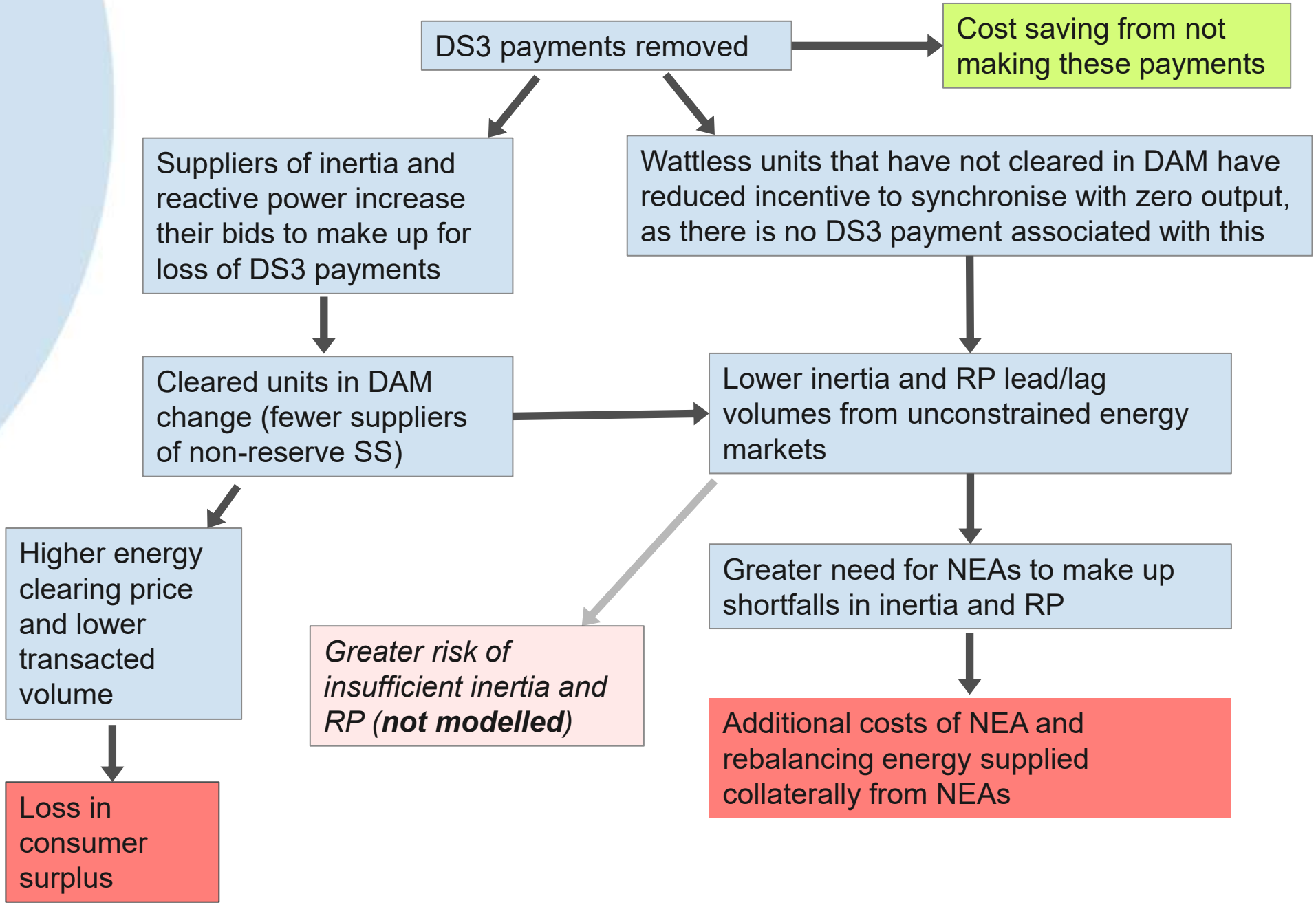
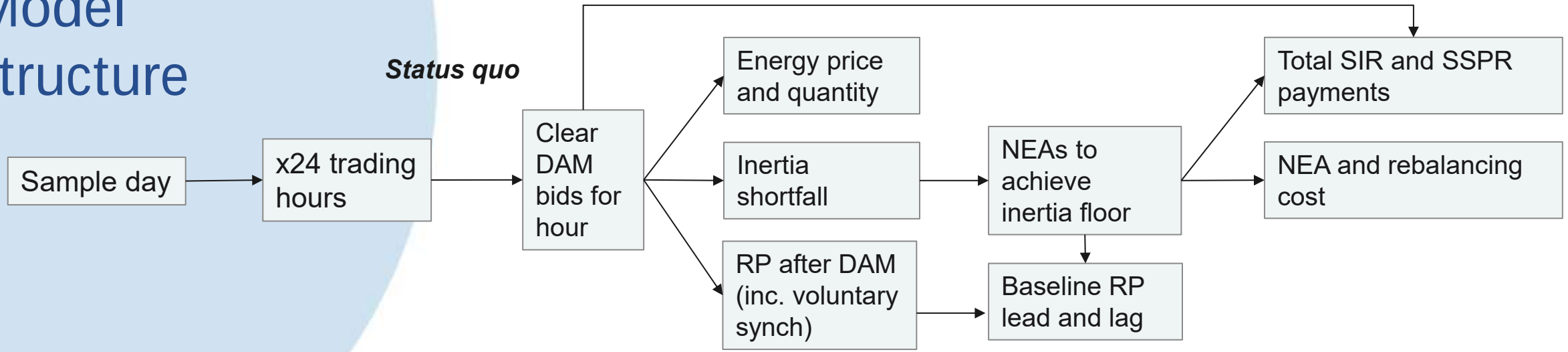


Model structure



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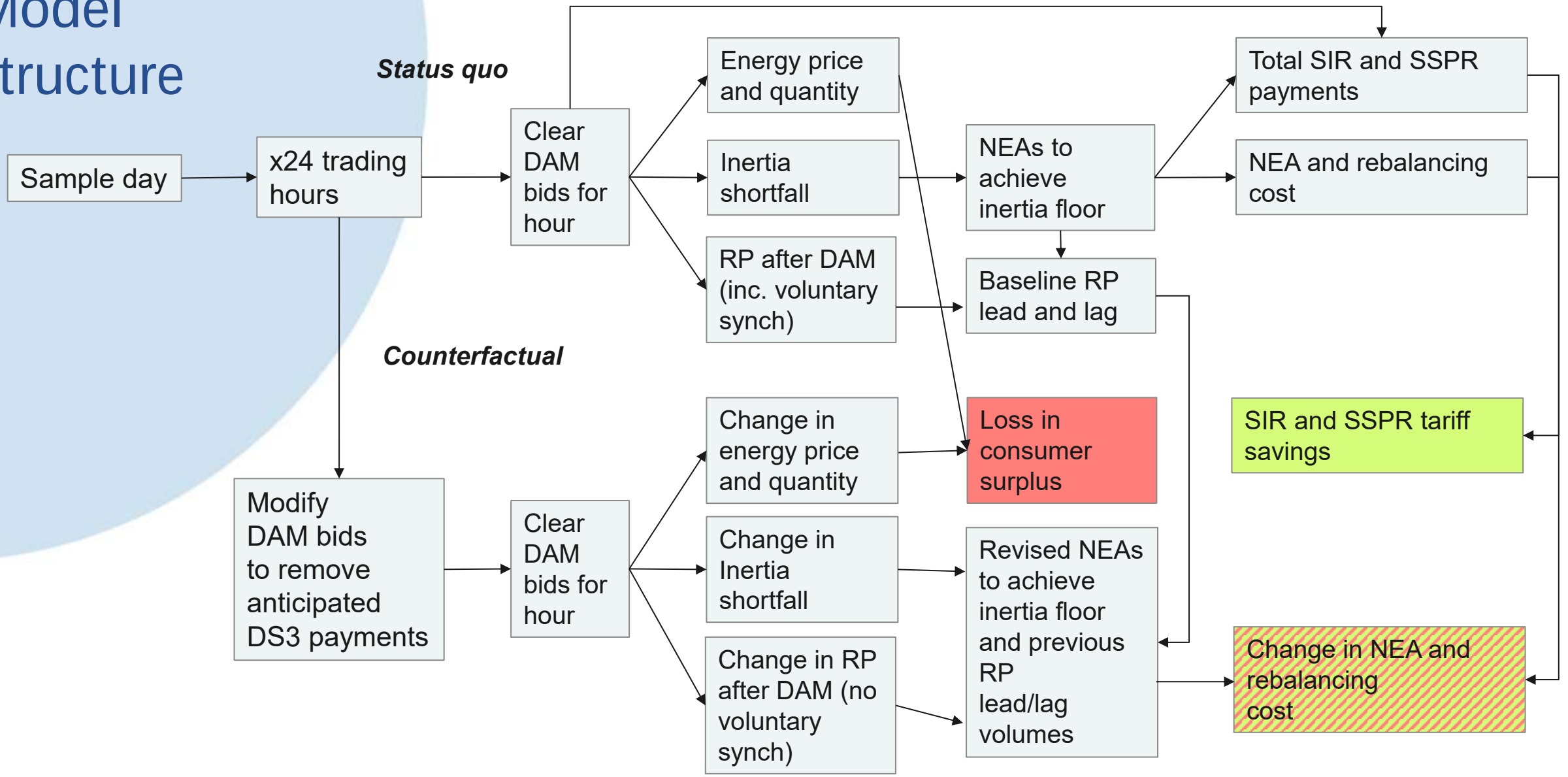


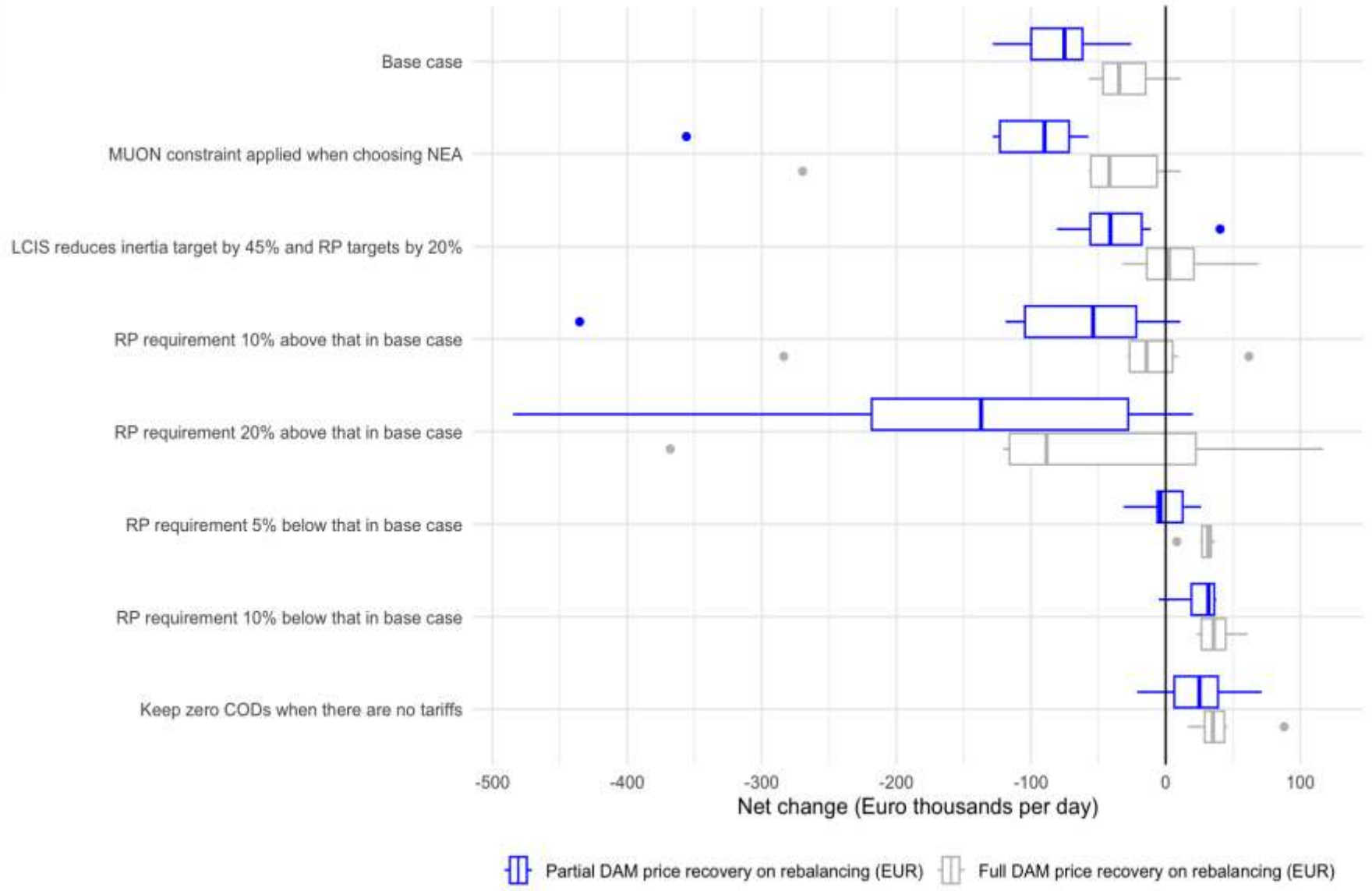
Assumptions and simplifications

- Simplified energy market model:
  - Focus on DAM outcome, ignoring IDMs
  - Ignore complex bid conditions when clearing
- Simplified calculation of DS3 payments
  - AVR scalar applied to all energy generators
  - Wattless scalar applied to RP suppliers that reported zero MINGEN
- Incentives to supply:
  - Wattless RP suppliers assumed to always synchronise to receive SSRP payments in factual, but only if in merit in the DAM in the counterfactual
  - Zero cost CODs only volunteered when units obtain revenue from DS3 tariffs
- Simplified approach to determine NEA
  - No localisation
  - Minimise costs sequentially for each period, and keep units synched if they would go off for a single hour
  - No explicit RP requirement, only restore levels achieved after NEA for intertia in factual
  - No MUON
- Simplified approach to calculating imbalance payments arising from NEA
- Ignoring additional risks for TSOs due to later resolution of SS requirements

Scenarios span a range of generating mixes

			Operating generation (MW - all Ireland)				SNSP (All Ireland)	
	Date	Comment	Average over day	Peak quarter hour	Average wind penetration	Average solar penetration	Average over day	Peak quarter hour
Scenario 1	03/07/2024	High wind, high solar	4075	5551	50.5%	4.0%	61.4%	71.4%
Scenario 2	21/12/2024	High wind, low solar	4934	5596	76.2%	0.3%	71.8%	74.6%
Scenario 3	01/08/2024	Low wind, high solar	3674	4087	16.9%	5.3%	39.3%	52.4%
Scenario 4	28/12/2024	Low wind, low solar	3765	4674	18.2%	0.5%	34.5%	50.3%
Scenario 5	07/03/2024	High wind, low solar	5074	5764	67.4%	0.9%	67.5%	73.1%
Scenario 6	08/01/2024	Low wind, low solar	4979	6285	33.4%	0.3%	41.7%	53.3%

Results and sensitivities



Conclusions

- DS3 payments for SIR and SSPR are **small** relative to energy market revenues **on average**, but still affect the supply of non-reserve SS resulting from unconstrained energy market in some situations
- **Impacts vary according to market conditions** and the mix of units in merit:
  - The interia shortfall is increased only for some hours on some days
  - Reductions in RP supply typically occurs in all hours (in part due to loss of wattless units), but magnitude varies
- Removing DS3 payments can be **costly** in some scenarios due to the need for additional NEAs, **offsetting savings** from not making these DS3 payments
- Even if DS3 payments are relatively small, **eliminating them would not be inconsequential**
- There is also additional **risk to achieving system stability requirements** from shifting the resolution of TSOs' needs closer to real time that we have not considered
- Impact of payments for **Ramping Margin** likely to be similar, but more complex due to length of notice and supply periods of these services

Audience Q&A

Thank you for your attendance!

Please feel free to reach out with any additional questions or comments to:

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

EirGrid SONI

Non-reserves Consultation Process

Opened: Wednesday 08 April 2026

Duration: Six weeks

Workshop: Wednesday 06 May 2026
Presentation of Non-reserves proposals, DotEcon Economic Analysis and Q&A

Closes: **Friday 22 May 2026**

The FASS - Non-reserve Services Consultation Paper is published on both the EirGrid here and SONI here websites

TSOs will submit a recommendations paper to the **SEMC for decision in October 2026.**

Non-reserves Consultation Webinar - Q&A

#	Question	Method	From	Slide Reference	Response
1	How does the ramping margin requirement definition interact with the actions of balance responsible participants in the intraday timeframe?	Slido	William Carr	Ramping Margins	Foreign Markets, dont feel compelled to have dedicated ramping products, and instead rely on Intraday markets and/or Interconnection to resolve this challenge. In Ireland our ramping margin timeframes can be as large 16 hours in total or (32 trading periods), the number of individual trading periods balance responsible participants must trade out of is therefore high. However, understanding the proportion of ramping requirements resolved by Intraday trades, will be a topic of discussion in upcoming product studies.
2	Are EirGrid confident that as the inertia requirement is increasingly met by Syn Comps the number of min sets can be reduced towards zero?	Slido	William Carr	Inertia	The TSOs' aim is to minimise the procurement of inertia from high-carbon conventional generation and source it from low-carbon units (i.e., LCIS Phase 1 and LCIS Phase 2 units). Please refer to the TSOs' 2025-2035 operational policy roadmap.
3	Any plan to procure inertia Grid Forming IBRs	Slido	Ismail	Inertia	We have a Grid-Forming Strategy published which provides the TSOs' roadmap for grid-forming capabilities Grid-Forming-Strategy-February-2026.pdf
4	How will Sync Comps participate in these services post LCIS contracts?	Slido	Phillip Blythe	Inertia	For LCIS contracted units there is no opportunity to enter into a System Services agreement for Related system services (such as SSRP or SIR) or any similar system service, unless otherwise explicitly established by the market rules, as indicated in the LCIS Agreement. Future participation of LCIS contracted units in appropriate market based procurement of a future inertia product (yet to be designed) will be considered in the development of such market based arrangements.
5	If the upper end of LCIS phase 2 volumes are procured, LCIS contracted units will meet the entire requirement. Is there any need for SIR in this case	Slido	Richard	Inertia	LCIS is expected to meet a significant proportion of the inertia requirement and therefore represents a significant contribution to the TSOs' inertia needs. However, the requirement for a dedicated inertia product will be assessed as part of future design activities and LCIS will be taken into consideration during the design phase .
6	Do you intend to include short-circuit contribution as a new system service in FASS?	Slido	Sergiu	Reactive Power	TSOs must conduct detailed system studies to determine the need for short-circuit contribution as a new system service in the future.

Non-reserves Consultation Webinar - Q&A

#	Question	Method	From	Slide Reference	Response
7	How long are Regulated Arrangements for all 3 likely to be in place- will the derogation be for a temporary duration?	Slido	Therese Lannon Crean	Reactive Power	The regulated arrangements are intended to be temporary; however, their length will vary across the individual system service products. The TSOs will introduce competitive procurement on a rolling, product-by-product basis, following the necessary design and implementation activities as per the timeline provided within the consultation paper. The length of the transitional arrangements (and therefore the derogation) will depend on the completion of these activities for each product.
8	General point, an important consideration will be the ability to align scheduling and dispatch outcomes with the results of future competitive procurement	Slido	William Carr	General	Noted, this will be considered in future non-reserves activities. Thank you for your comment.
9	An embedded incentive structure within SIR and SSRP at the outset of DS3 has resulted in significant investment and positive outcomes (e.g. reduced minimum generation). In addition to capital investment, there are ongoing OEM and opportunity costs. If the incentives are rescinded, there will be a corresponding response; participants will naturally assess these costs and decide whether it remains worthwhile to incur them.	Teams	William Carr	General	Noted, this will be considered in future non-reserves activities. Thank you for your comment.
10	Will Dotecon presentation be shared after the call? Did you use a dedicated platform/software to model these scenarios?	Slido	Sergiu	Econ. analysis	Yes, this will be shared. The software has been developed in-house.
11	Will FPFAPR and DRR be officially dropped going forward? Or are they being considered as part of product design phases?	Slido	Phillip Blythe	Econ. analysis	The procurement of FPFAPR and DRR will be examined during the future product design phase, based on the outcomes of the preceding system studies and analysis.
12	Expanding on Will Carrs Q: Are Eirgird confident that as the inertia requirement is increasingly met by Syn Comps the number of min sets can be reduced towards zero?	Teams	Justin Maguire	Inertia	In the operational policy roadmap, we outline the TSOs' overall procedures and processes which will evolve as the system develops. For example, the introduction of LCIS will contribute to the system's inertia requirements and there will be transparency as this progresses. In summary - yes, a reduction is expected and the broader implications of this will be addressed as part of operational policy roadmap activities.