SOEF Advisory Council Meeting 1

via MS Teams

Wednesday 4 May 2022 @ 13:30–16:30

EIRGRID GROUP

Delivering a cleaner energy future

Agenda

Topic	Time	Speaker
Introduction & Welcome	13:30	Liam Ryan (10 min)
Advisory Council Initiation Discussion	13:40	Robbie Aherne (15 min)
Operations Programme Overview	13:55	Eoin Kennedy (30 min)
Markets Programme Overview	14:25	Jon O'Sullivan (30 min)
BREAK	14:55	
Networks Programme Overview	15:10	Derek Carroll / Matthew Staunton / Paul Moran (30 min)
Engagement Programme Overview	15:40	Sinead Dooley / Natasha Sayee (30 min)
Plans for SOEF 1.1	16.10	Robbie Aherne (15 min)
Close	16:20	Liam Ryan (10 min)

Meeting Chair: Liam Ryan

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SOEF Advisory Council Initiation

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Shaping Our Electricity Future

- Develop an integrated vision of the electricity system and market in 2030
- To be used as the basis for developing a deliverable, economic, robust solution for 2030……on a clear pathway towards net zero
- The work will be used to:
  - Articulate the plan for its delivery
  - Create the framework for an informed discussion with stakeholders

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Integrated System Plan

Shaping Our Electricity Future

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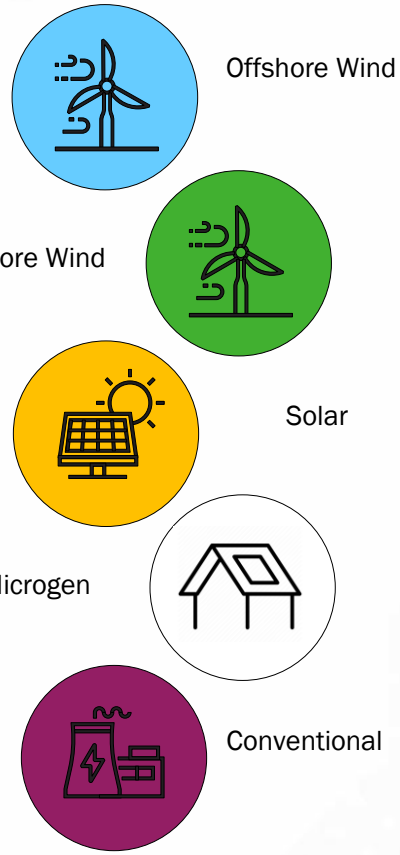
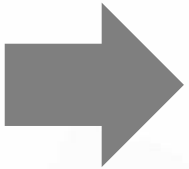
Whole of Electricity System Challenge

Supply





Demand

Shaping Our Electricity Future

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Scope of Advisory Council

Shaping Our Electricity Future
Advisory Council

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Remit of Advisory Council

- The Advisory Council will not be a decision making or policy formulation body.
- The remit and purpose of the Advisory Council is to:
  - Discuss, review and ultimately help facilitate the progress of the Shaping Our Energy Future (SOEF) Programme
  - Share relevant information related to the implementation of the Programme
  - Communicate with stakeholders
  - Provide a forum to discuss stakeholder views and concerns on those issues which impact on the implementation of the Programme and;
  - Provide input, advice and assistance on matters related to the Programme and its implementation.

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Membership

- Academic/ Research
- Regulator
- Government
- Conventional Generation
- Distribution System Operator (DSO)
- Transmission Asset Owner (TAO)
- Demand Side Management
- New Technology
- Renewable Generation
- Wind Association
- Solar Association
- Storage Association

- We are seeking to invite additional representatives to the SOEF Council and as such will seek expressions of interest from those who would like to become members.
  - The invitation will be published on the EirGrid and SONI websites.
- Following review of the applications received, we will issue invitations to suitably experienced candidates in order to join this council.
- Members are appointed ad personam and primarily for their competences – no alternates as continuity is essential for success of the Council

Operating Principles

- The Council shall operate in accordance with the need for a high level of transparency.
  - A draft agenda shall be drawn up by the Chair and circulated to the members of the Advisory Council no later than five business days before the meeting;
  - Documents that are necessary for the meetings shall be normally circulated to the members of the Council at least five business days before the meeting;
  - Subsequent to the meeting, and within ten business days, EirGrid and SONI will circulate draft minutes from the meeting to all advisory Council members by e-mail;
  - A summary of each meeting will be published and
  - The list of members of the Advisory Council shall be made public.
- All costs incurred by members of the SOEF Advisory Council associated with their participation will be at their own expense.

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Schedule and Format

- The Advisory Council will meet every 4 months (three times a year)
- The meetings will be chaired by the EirGrid Group Chief Innovation and Planning Officer
- Minutes and actions will be recorded and kept under review. A summary of each meeting will be published
- Ad-hoc meetings outside the regular schedule will be held on an exceptional basis as required.

SOEF Advisory Council provisional meeting dates	
1	04 May 2022
2	15 September 2022
3	18 January 2023
4	10 May 2023
5	13 September 2023
Dates may be subject to change	

Operations Programme

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System Operations – Multi-Year Plan

Operational Policy

Includes:
- Operational policy roadmap to 2030
- Studies & analysis
- Reduction in min gen
- SNSP 75%→85%→95%
- Probabilistic operations
- New interconnector operational protocols

Standards & Services

Includes:
- Procurement of low carbon inertia services
- Future Arrangements for System Services
- Grid Code evolution
- Enhanced performance monitoring

Operational Tools

Includes:
- Control Centre of the Future planning
- Enhanced scheduling & dispatch
- Integration of new grid technologies
- Interconnector integration
- European integration

Technology Enablement

Includes:
- Demand Side strategy
- Residential demand response trial
- Treatment of hybrid connections
- Code modifications
- Qualification Trial Process (QTP)
- I&R strategy

TSO-DSO Partnership

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Overall Operations Programme RAG Status

Operational Policy	RAG
DS3 Close Out Programme operational trials	
Operational Policy Roadmap to 2030	
Detailed studies and analysis to support progress towards the 2030 targets	
Min Set / Inertia	
Greenlink Operational Procedures	
85% SNSP	
Celtic Operational Procedures	
Probabilistic Operations	
95% SNSP	

Standards and Services	RAG
Low Carbon Inertia Services	
System Services Future Arrangements - Technical Requirements and Volumes	
Grid Code Evolution to Support the 2030 RES-E Ambition	
Enhanced Performance Monitoring	

Operational Tools	RAG
CCT Enhancement	
Control Centre of the Future - Operational Tool Development Plan	
Operation of Devices within the Grid Technology Toolbox	
HVDC Interconnector Integration	
Future Arrangements for System Services	
Enhanced European Integration	

Technology Enablement	RAG
Demand Side Strategy	
Hybrids	
Qualification Trial Process	
Technology Enablement - Code Modifications	
Energy Storage Power Station (ESPS)	
Low Carbon Inertia Services	
Protection Settings for Our Largest Customers	
Understanding DER Behaviour	
New Innovation & Research strategy	

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Operational Policy

Current projects:

- DS3 Close Out Programme operational trials
- Operational Policy Roadmap to 2030
- Detailed studies and analysis to support progress towards the 2030 targets
- Min Set / Inertia

Operational Policy

1. Close-out of on-going DS3 Programme Operational Trials

- 75% SNSP trial completed; enduring operational policy as of 31 March
- 1 Hz/s RoCoF trial extended
- IE Nodal Controller trial completed
- NI Nodal Controller trial commissioning ongoing

2. Operational Policy Roadmap to 2030

- Will be completed in two phases:
  - Phase 1: Roadmap to 2023
  - Phase 2: Roadmap to 2030 (to consider 80% RES-E)

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Operational Policy

3. Detailed studies and analysis to support progress towards the 2030 targets

- Examples of recent / ongoing studies:
  - Low Carbon Inertia Services
  - Fast Frequency Response
  - 8 to 7 min sets and 23,000 MWs to 20,000 MWs
  - Publication of report on operational challenges and possible mitigations for 2030 – Dec 2021
    - EirGrid website link
    - SONI website link

4. Reduction of the operational constraints related to the minimum number of large synchronous units and the system inertia floor

- Suite of studies ongoing to identify the capability to reduce the minimum number of large synchronous units from 8 to 7 and the inertia floor from 23,000 MWs to 20,000 MWs
- Delay to Voltage Trajectory Tool (VTT) means it will not be possible to start a trial in Q2 2022 as planned

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Standards and Services

Current projects:

- Low Carbon Inertia Services
- Grid Code Evolution to Support the 2030 70% RES-E Ambition
- System Services Future Arrangements - Technical Requirements and Volumes

Standards and Services

1. Low Carbon Inertia Services

- Extensive set of studies currently being concluded
- Consultation covering technical and locational requirements, as well as high-level commercial and procurement aspects planned for launch by End May
- c. 2 months behind schedule relative to the procurement plan shared during the December webinar

2. Grid Code Evolution to Support the 2030 RES-E Ambition

- EirGrid and SONI have initiated a new Grid Code Strategic Development Group
- Internal initiative between Innovation & Planning and Operations to ensure coordinated strategic development of the Grid Codes is prioritised and advanced

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Standards and Services

3. System Services Future Arrangements - Technical Requirements and Volumes

- Timelines set out in the plan were based on a SEMC HLD decision in Q4 2021
- Plan for technical requirements and volumes work being considered in light of recent SEMC decision
  - Potential changes to existing product designs/definitions dependent on the auction design
  - SEMC decision calls for the development of a Generation Capacity Statement-style annual publication on volumes, as well as shorter term forecasts; similar intent to the SOEF initiatives but with an expanded scope
- 2030 Volumes paper published in December 2021
  - EirGrid website link
  - SONI website link

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Operational Tools

Current projects:

- Control Centre Tools Enhancement
- Control Centre of the Future - Operational Tool Development Plan

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Operational Tools

1. Implementation/enhancement of already planned/existing Control Centre Tools

- Enduring Ramping Margin Tool (RMT) went live in October 2021
- Delivery of Voltage Trajectory Tool (VTT) delayed
- RMT, VTT and Look-Ahead Security Assessment Tool (LSAT) tools critical for future challenges

2. Control Centre of the Future - Operational Tool Development Plan

- Aim is to develop a delivery plan for the tools and capability we need to operate the power system to 2030, building on the roadmap already developed in 2021
- The development of a roadmap for the tools and associated IT, data management and physical infrastructure to support the tools was completed in April 2022
- Ongoing engagement and information sharing with other TSO members of the Global Power System Transformation initiative (e.g. AEMO, Energinet, National Grid ESO, California ISO)

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Technology Enablement

Current projects:

- Demand Side Strategy
- Hybrids
- Qualification Trial Process
- Energy Storage Power Station (ESPS)
- Low Carbon Inertia Services - Development of Arrangements
- Protection Settings for Our Largest Customers
- New Innovation & Research strategy

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Technology Enablement

1. Demand Side Strategy

- Aim is to develop a strategy that enables industrial, commercial and residential demand to fully participate in meeting the needs of the system with high levels of renewable generation
- Development is on-going

2. Hybrids

- Plan to submit paper (jointly with ESBN) to CRU on contractual approach to accommodate Multiple Legal Entities behind a single connection point very soon
- Reviews of the Over-Install Policy in Ireland / Northern Ireland are ongoing with ESBN / NIEN with a view to submitting recommendations to CRU / UR in Q2 2022
- Scoping of work package for sharing of Maximum Export Capacity (MEC) behind a single connection point in Ireland delivered in Q1 2022 (jointly with ESBN); next step is to undertake a technical assessment of options (Q4 2022, also jointly with ESBN)

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Technology Enablement

3. Qualification Trial Process

- Call for Information closed in Q1 2022 – 9 responses
- QTP will continue under Future Arrangements as per SEMC decision

4. Energy Storage Power Station (ESPS)

- Project underway to implement Grid Code changes (building on the Implementation Note) for batteries
- Work ongoing on a guidance note describing the interim arrangements currently in place for batteries
- Systems and tools changes for ESPS are covered in the Markets roadmap

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Technology Enablement

5. Low Carbon Inertia Services - Development of Arrangements

- Development of an Implementation Note is ongoing
- System and tools changes for Low Carbon Inertia devices are covered in the Markets roadmap

6. Protection Settings for Our Largest Customers

- Seeking to formalise arrangements for coordination of the protection settings of our largest customers to ensure that system security is maintained
- Engagement with customers has commenced

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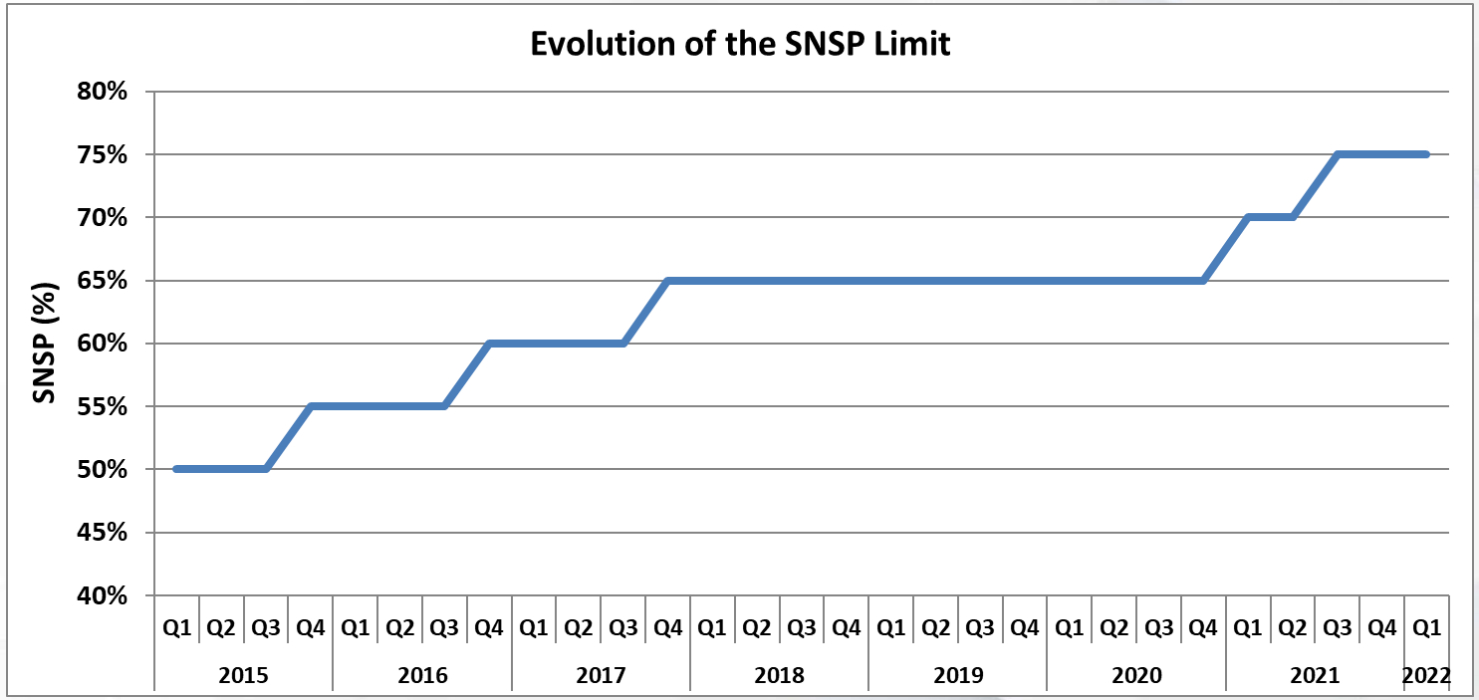
Technology Enablement

7. New Innovation & Research strategy

- Report published in December 2021
- EirGrid website link
- SONI website link

Summary

- In March 2022, we confirmed 75% SNSP as enduring operational policy – significant milestone and the culmination of over 10 years of work
- The Operations Programme under Shaping Our Electricity Future is underway with the aim of delivering the changes needed to evolve the SNSP limit to enable achievement of our 2030 RES-E targets



$$SNSP = \frac{Wind + Solar + Imports}{Demand + Exports}$$


Operational Policy
DSO_TSO Partnership
DSO_TSO Partnership
Technology Enablement
System Operations
Standards & Services
DSO_TSO Partnership
DSO_TSO Partnership
Operational Tools

Questions?

Markets Programme

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Overarching Vision

- In large scale investments the best outcomes are when those who are best able to manage the risk are responsible for the risk.

- There are 4 risks outside of the control of investors in electricity – **oversupply, constraints, curtailment and TLAF**

- If the markets do not explicitly deal with these risks the outcome is a false economy

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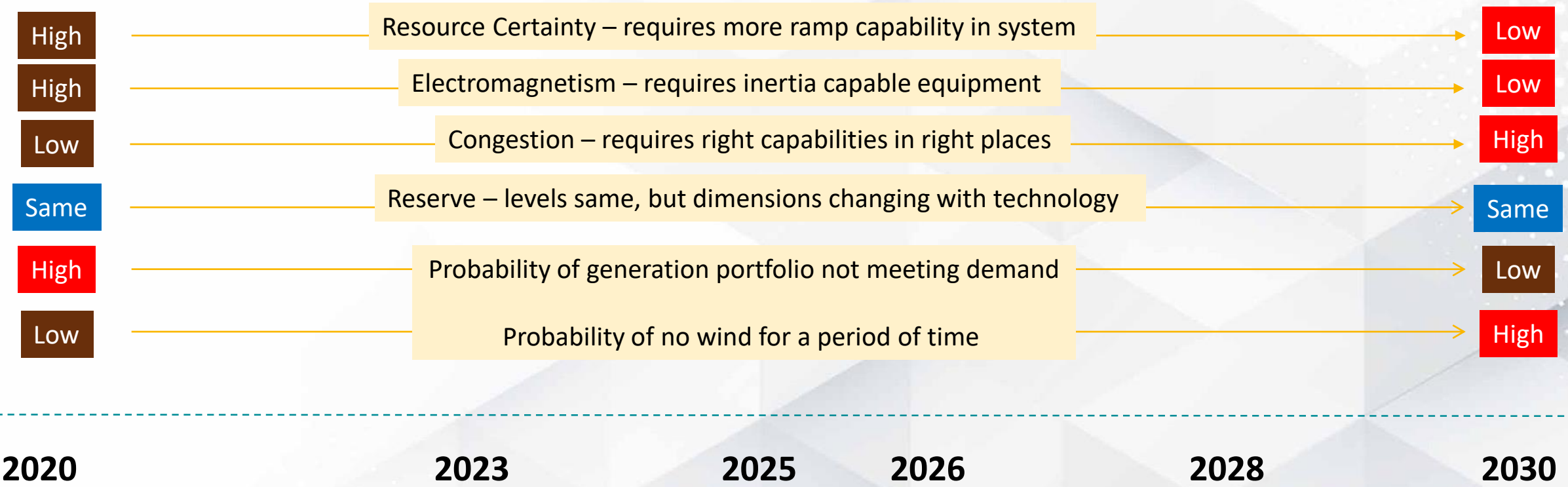
Challenges to the System over the Decade



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Moving through the stages

SNSP	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Year
0%	100	0	0	0	0	2000
<50%	90	10	0	0	0	2010
50<75%	50	30	20	0	0	2020
75%<100%	10	20	30	30	10	2030
>100%	5	10	35	35	15	2040

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Indicative Operating Policy - Volumes

Operating Stage	Reserves	Ramping	Electro-magnetism	Adequacy
Stage 1	500 MW (75% LSI)	None	8 -1000, Sys 20000 MWs	Probability of loss of con plant
Stage 2	500 MW(75% LSI)	None	8 -1000, Sys 20000 MWs	Probability of loss of con plant
Stage 3	500 MW (200 MW FFR) (75% LSI)	1-3-8	8 -1000, Sys 20000 MWs	Probability of loss of con plant
Stage 4	500 MW (200 MW FFR) (75% LSI)	1-3-8-12	8 -1000, Sys 20000 MWs	No wind
Stage 5	500 MW (200 MW FFR) (75% LSI)	12	8 -1000, Sys 20000 MWs	No wind

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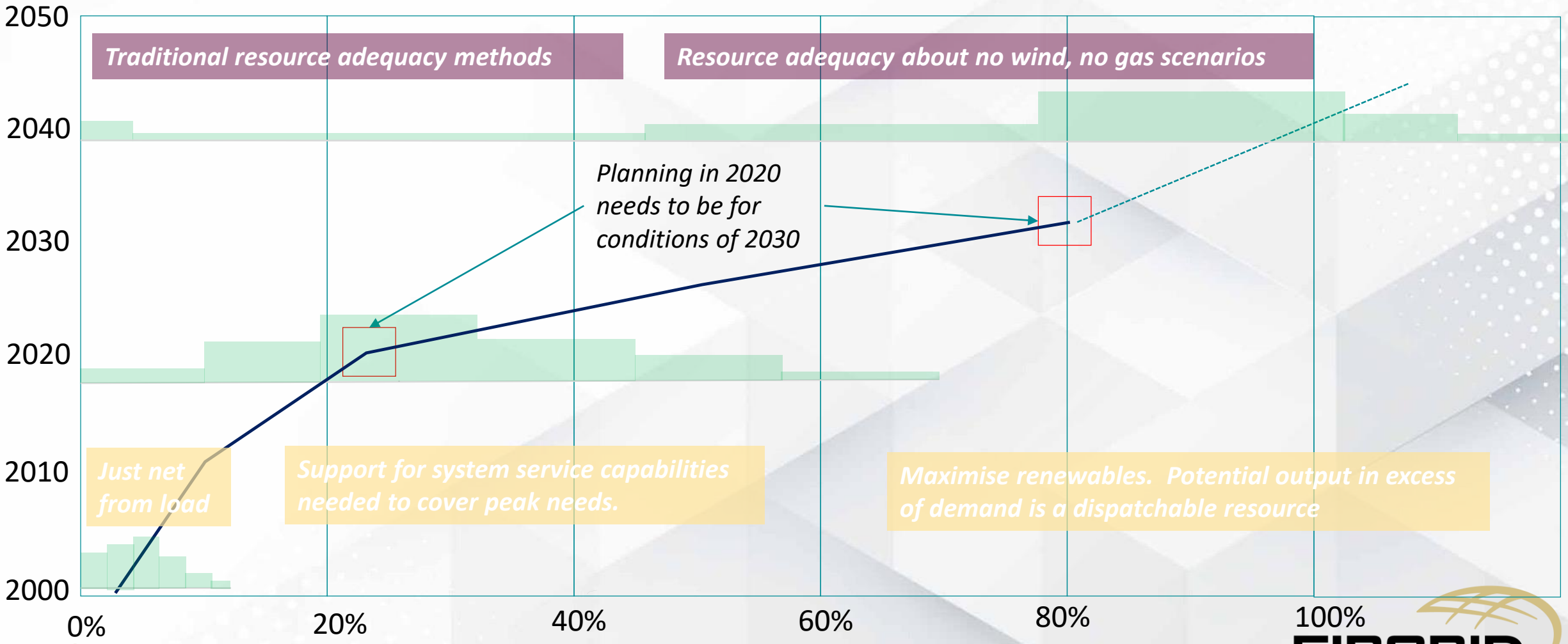
The Impact of Increased RES-E



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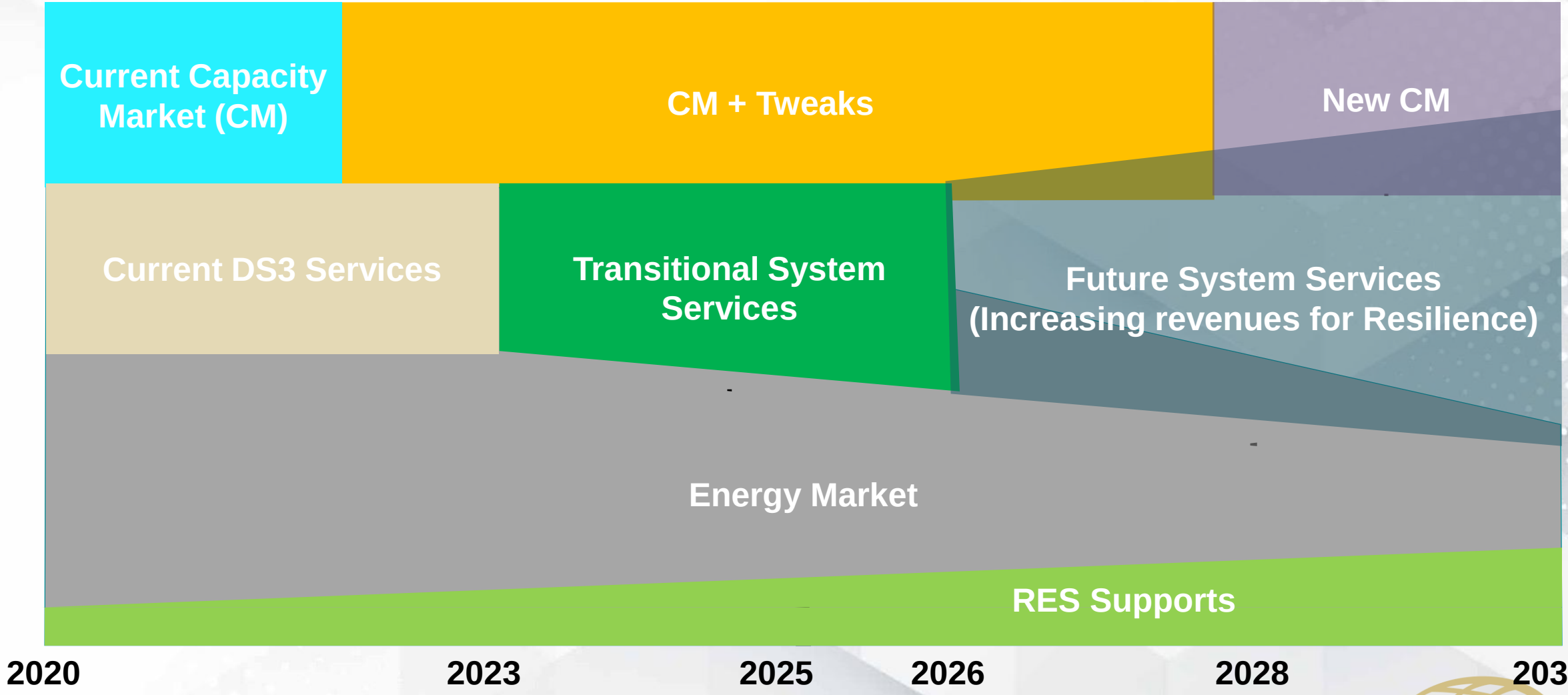
Investment challenges over the decade



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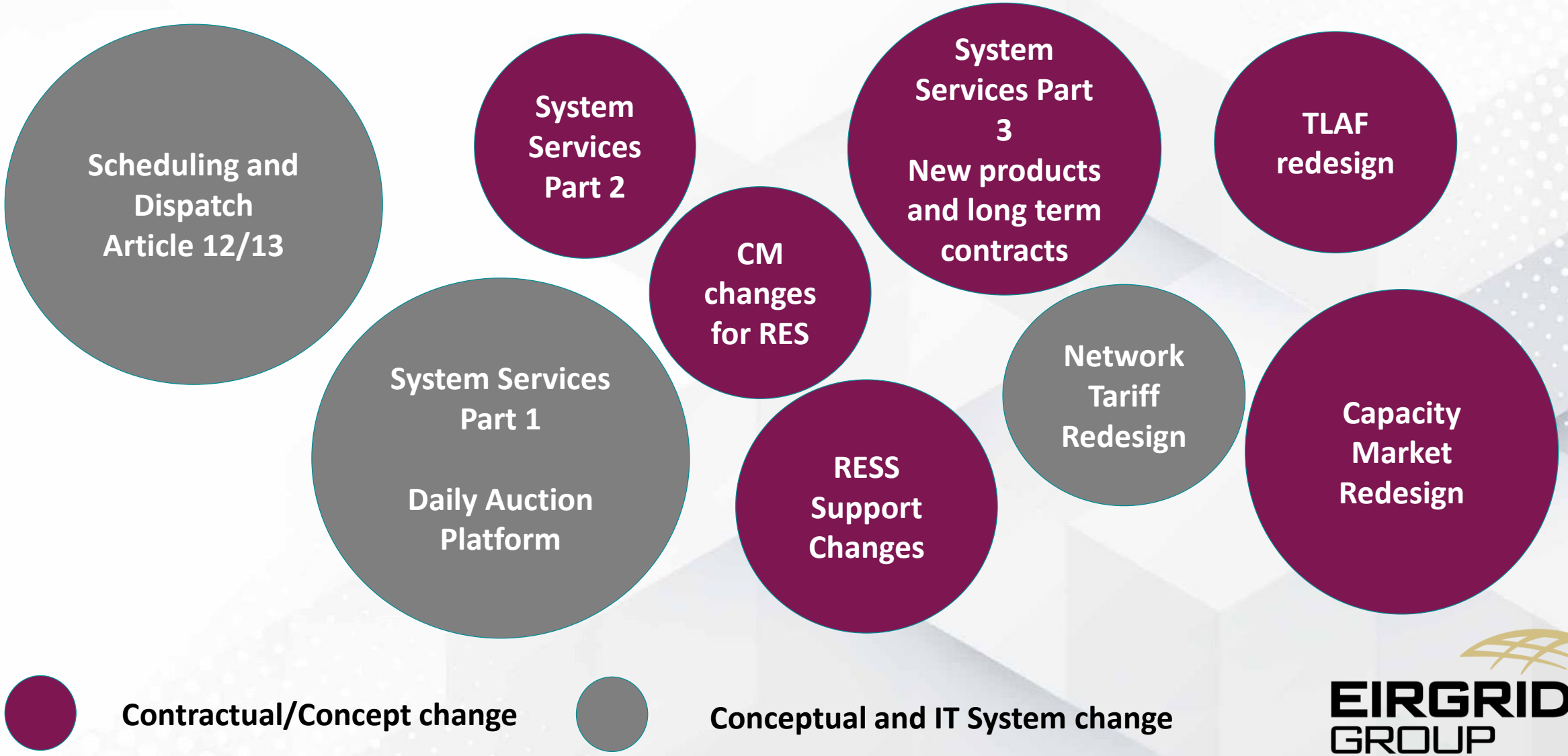
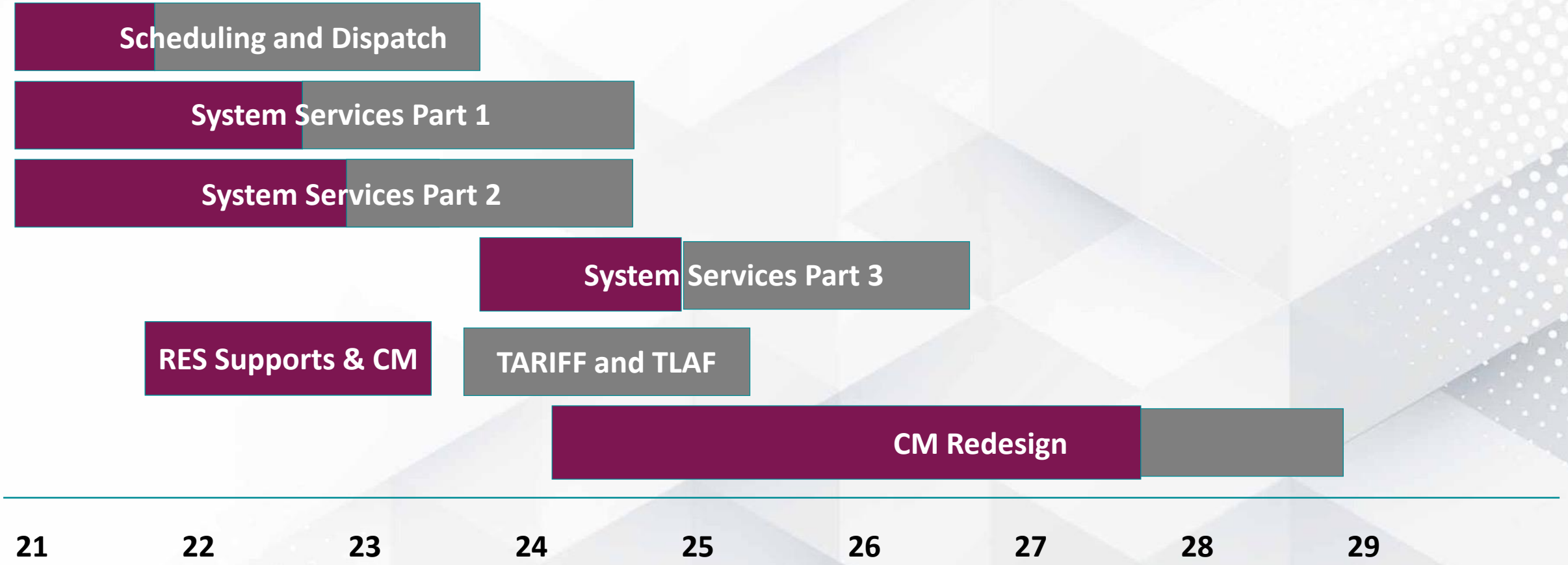
Aligning Markets to challenges of high RES



SOEF Markets – Aligning Pillar



Full Integration of the SEM to GB and EU Markets

Day ahead Trading with Forwards

SEM-GB

Balancing Arrangements

SEM-GB

Full entry into EU Balancing platforms in all timeframes

Central/Self Dispatch
Ex ante/ex post imbalance setting

SOR/RSC/CACM/CORE

SEM-EU

CB in Capacity Markets

SEM-EU

Contractual/Concept change

Conceptual and IT System change

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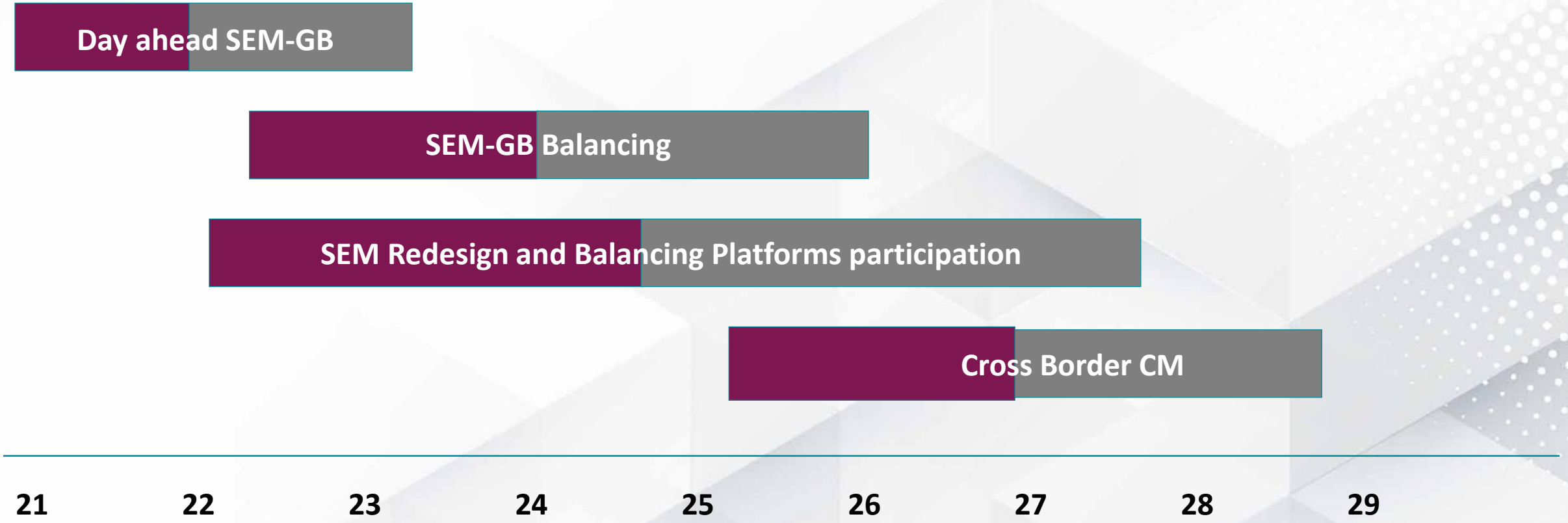
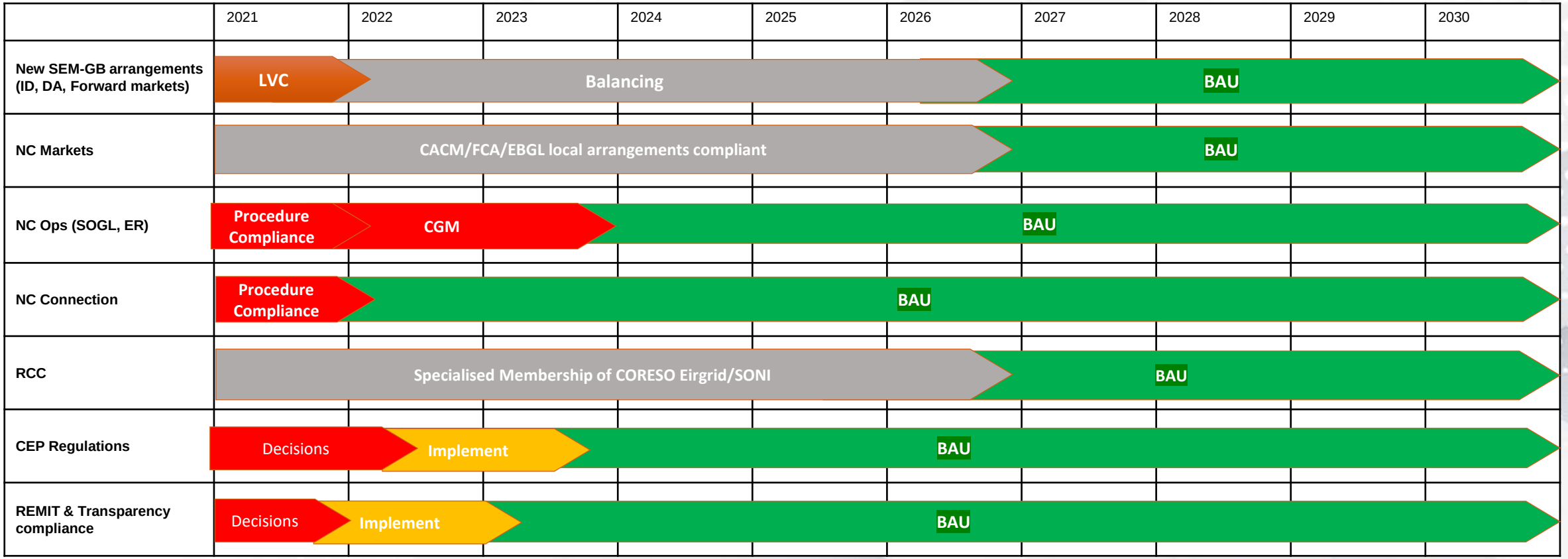
SOEF Markets – Full Integration Pillar



Agree a plan to deliver for our partner…

Re-coupling to Europe with Celtic I/C



Scheduling & Dispatch Programme

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Scope of the SDP

The scope of the Scheduling & Dispatch Programme (SDP) is comprised of:

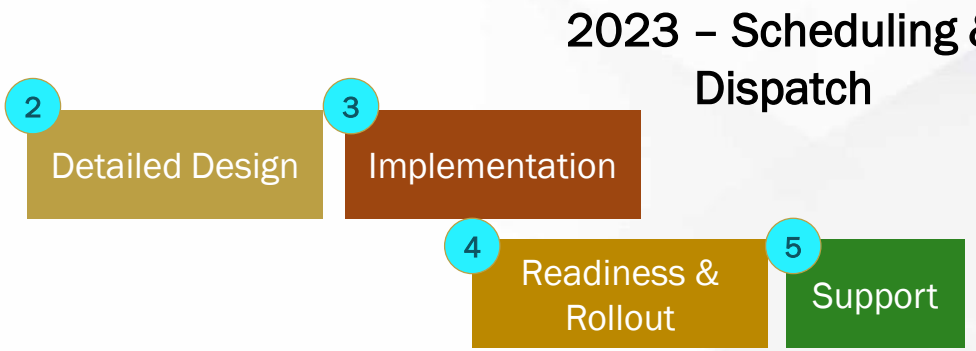
- Operation of non-priority dispatch of renewables (Clean Energy Package Article 12, 13.1 – 13.6)
- Energy Storage Power Station (ESPS) integration
- Fast Frequency Response (FFR)
- Wind dispatchability improvements
- Reserve services scheduling and dispatch
- Synchronous condenser scheduling and dispatch

Two distinct delivery timeframes for major market projects:

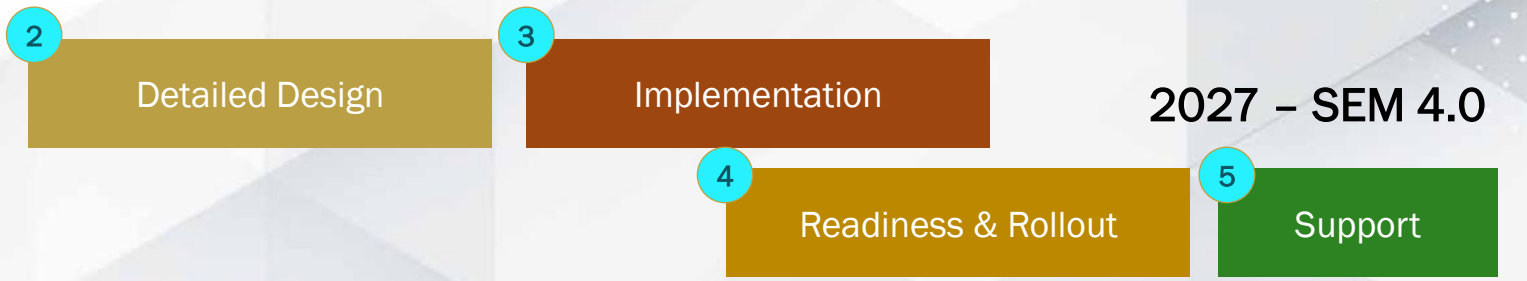
- **Scheduling & Dispatch in late 2023**: driven by expected connection of significant additional wind resource
- **SEM 4.0 in 2027**: driven by the expected commissioning of the Celtic Interconnector, and re-integration of arrangements in Ireland to the rest of the EU.

Programme Phases

1. Analysis & Planning: this phase … and then, for each principal target date for each project:



2. Detailed Design: detailed market design; process definition; detailed definition of solution requirements; selection of solution/service providers; rule/code change definition, etc.
3. Implementation: implementation of system and service provider solutions; testing; data; procedure definition; operational capability changes, etc.
4. Readiness & Rollout: training; market and operational readiness; trialling/commissioning; rollout and cutover.
5. Support: enhanced support through operational stability; planning for deferred items.



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Phase 1

Phase 1a ☑

- *Impact Analysis*: high-level impact on EirGrid group capabilities.
- *ICT Planning Support*: specific assessment of ICT Impact; 'heatmap'
- *Phase 1 Work Planning*: Definition of a plan for Phase 1.

Phase 1b

- *Market Design*: of required design/code changes, as well as associated consultation with stakeholders on design options and impacts.
- *Business Analysis & Requirements Definition*: of solution options and high-level business requirements for key required system/process changes.
- *Programme Planning & Structuring*: definition of programme scope, workplan, governance, organization and risks. Also definition of resourcing plan and financial projections through completion of analysis and detailed design.
- *External Stakeholder Engagement*: Package proposed design, impacts, and programme plan into a report/proposal for the SEM Committee. Present on report as required to SEMC and stakeholders.

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FASS Programme Plan

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FASS Programme Plan

The FASS Programme detailed design will be carried out in 2 phases:

Phase 1: Internal 12 week mobilization of resources and planning for the industry-facing detailed design. This phase will deliver the governance arrangements for FASS, an industry engagement plan, high level roadmap for implementation and a top-down resource and cost estimate for implementing this new market;

Phase 2: This is an industry- and regulatory-facing consultation phase, in which we will be carrying out industry workshops, establish working groups, shaping the programme to draft the new System Services code and modifications to the existing codes, carrying out an impact assessment of the required changes and working internally to commence vendor selection. This phase is scheduled to conclude in early 2023.

Implementation: The implementation phase will follow the detailed design and will be scoped when there is a clearer understanding of system requirements and impacts.

SEM Committee High Level Decisions

#	Decision
1	Daily Auction Framework: for the reserve type products (POR, SOR, TOR1, TOR2, RRS & RRD) and at a later stage all other products; other products on 12 months. Missing decision on value and transition arrangements and price caps – need RA decisions on this.
2	Rolling Registration Process: there will no longer be two annual windows, but a rolling registration process that will allow all participants to register within 90 days.
3	System Services Code: the system services market code will be required to be drafted and legally signed off.
4	System Services Panel: This will be a representative group for the system services code changes – needs to be established.
5	DSO Interaction: the DSO will have a role in SSFA on a TSO-led basis.
6	System Services Requirement Reporting: the system services requirements need to be reported on long and short term basis.

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What's This All About?

- TSO are recommending to the RA to introduce a new ramping service.
- This will be initially a Fixed Term contract.
- We will explain the rationale and need for the product, why it is Fixed term and what are the next steps.

FASS Programme Next Steps

The next steps are as follows:

- Onboard and mobilize project team into EirGrid
- Establish programme governance and schedule recurring meetings
- Schedule design workshops

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Questions?

Break – 15 minutes

Networks Programme

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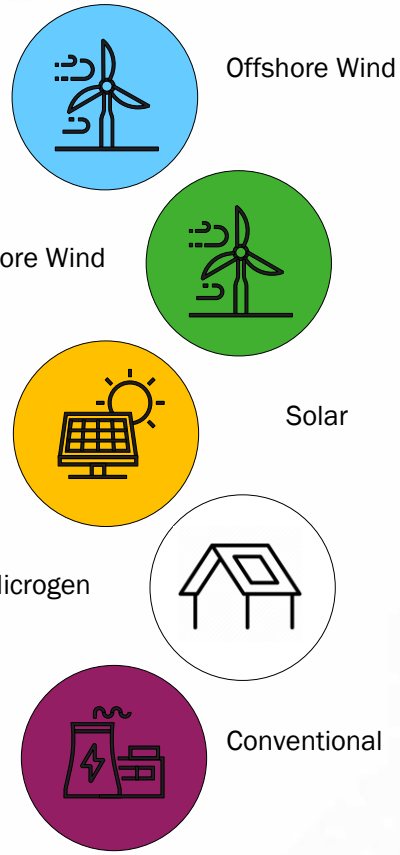
Whole of Electricity System Challenge

Supply



Demand

Shaping Our Electricity Future

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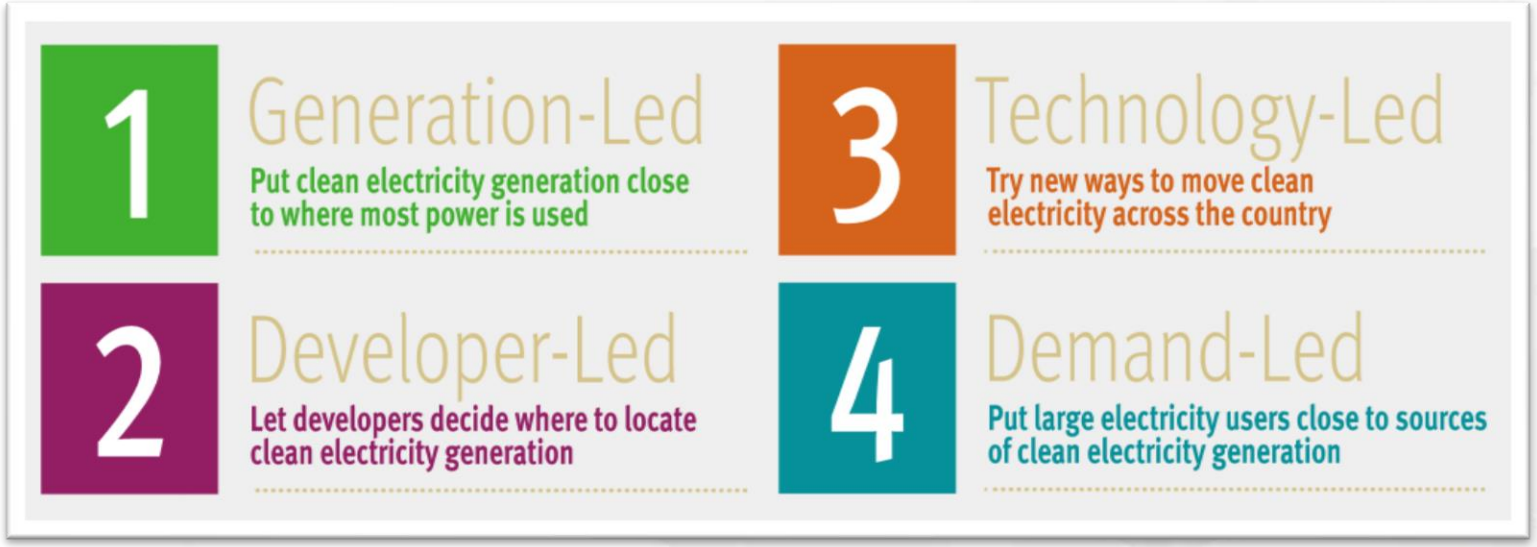
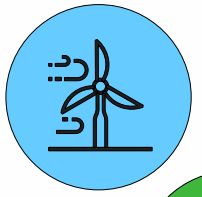
Consultation – Informed Final Scenario



Blended Scenario

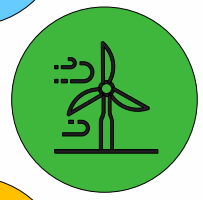
Whole of Electricity System Challenge

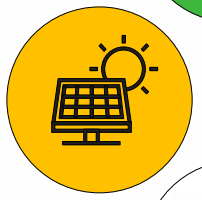
Supply
(IE/NI)



Offshore Wind
(+ 5 / 0.1 GW)

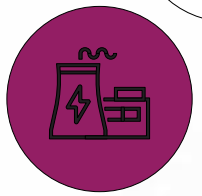
Onshore Wind
(+ 1.3 / 1 GW)





Solar
(+ 1 / 0.3 GW)

Microgen
(+ 0.5 / 0.1 GW)



Conventional
(+2.2 / 0.6 GW)

Demand (+50%)
(IE/NI)

Large Energy Users
(~1.6 GW)

Electric Vehicles
(~950 / 270 k)

Heat Pumps
(~600 / 70 k)

Economic Growth
(High Scenario
46.5 / 10.1 TWh)

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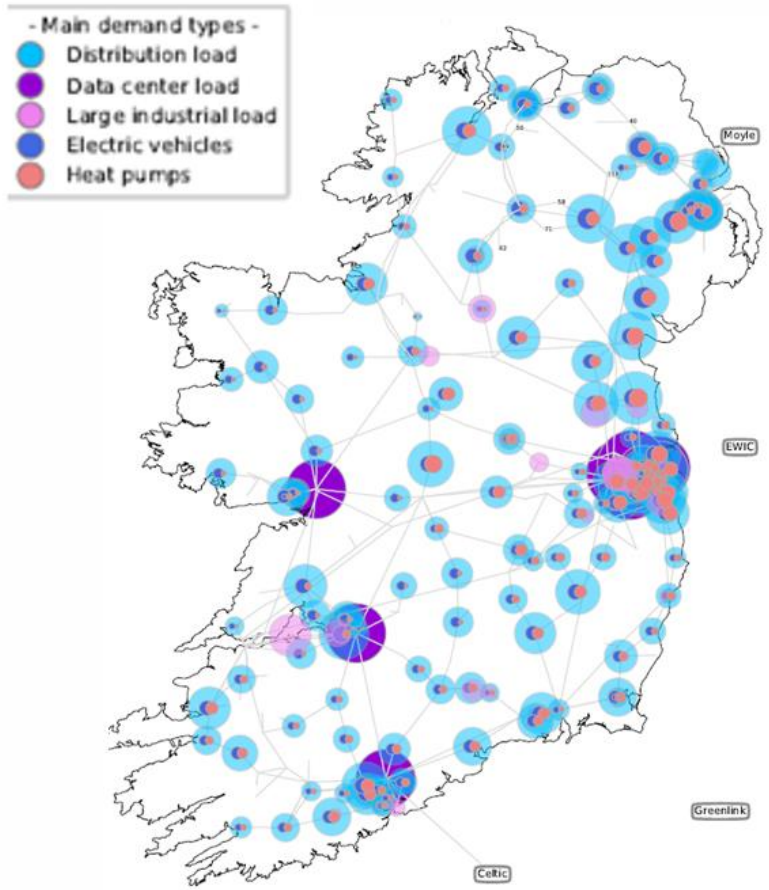
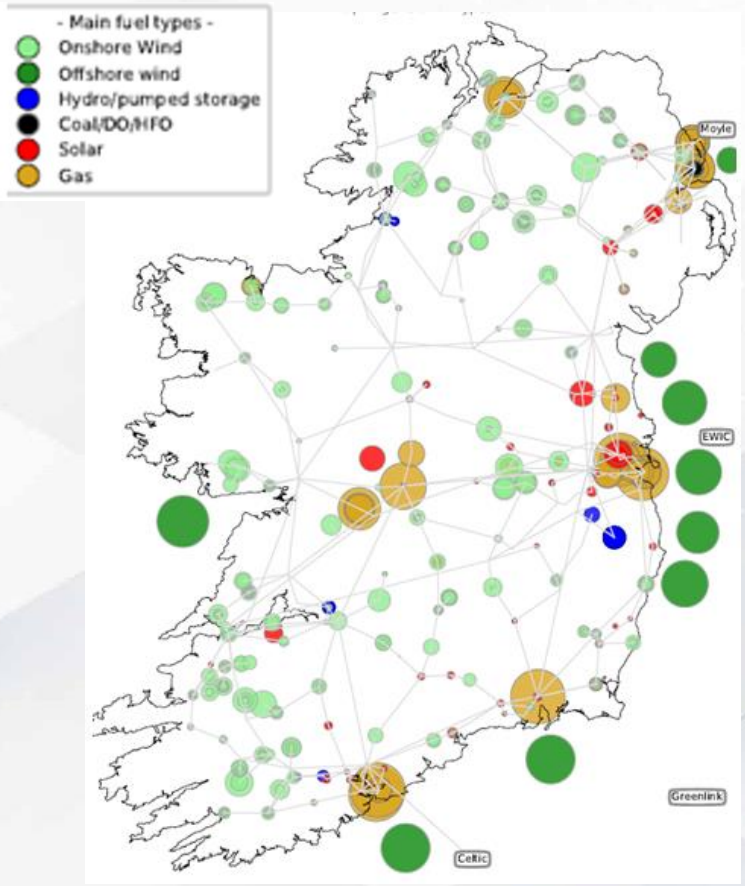
Demand & Generation – Widespread Growth

2030 Demand



High demand scenario
1550 MW Large Energy Users (including 300 MW across Cork, Limerick and Galway)

2030 Generation

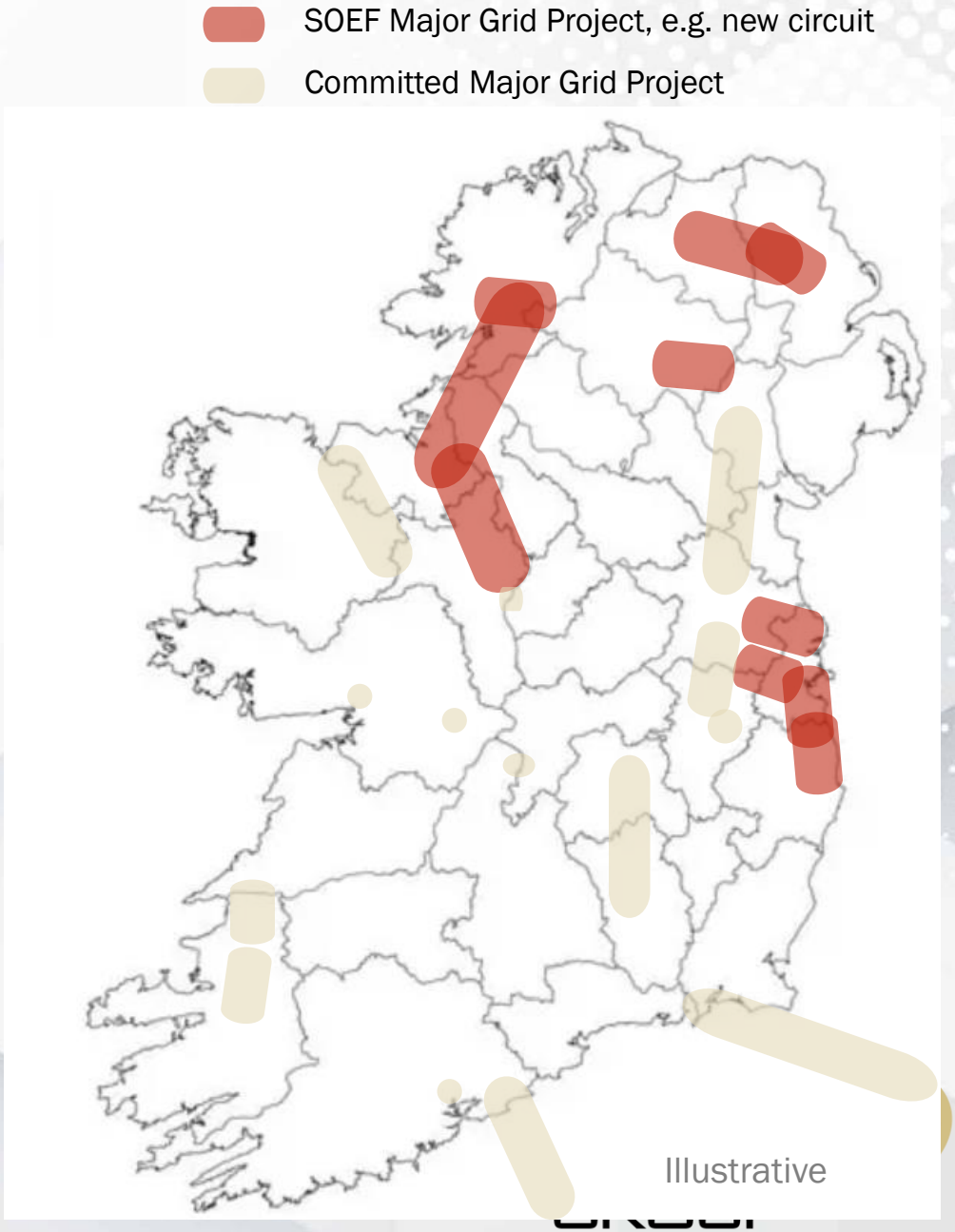


Main concentration of new generation:

- Offshore wind off east coast
- Solar in south and east
- Onshore wind in north west and midlands
- Conventional generation in Dublin, West, South, Belfast

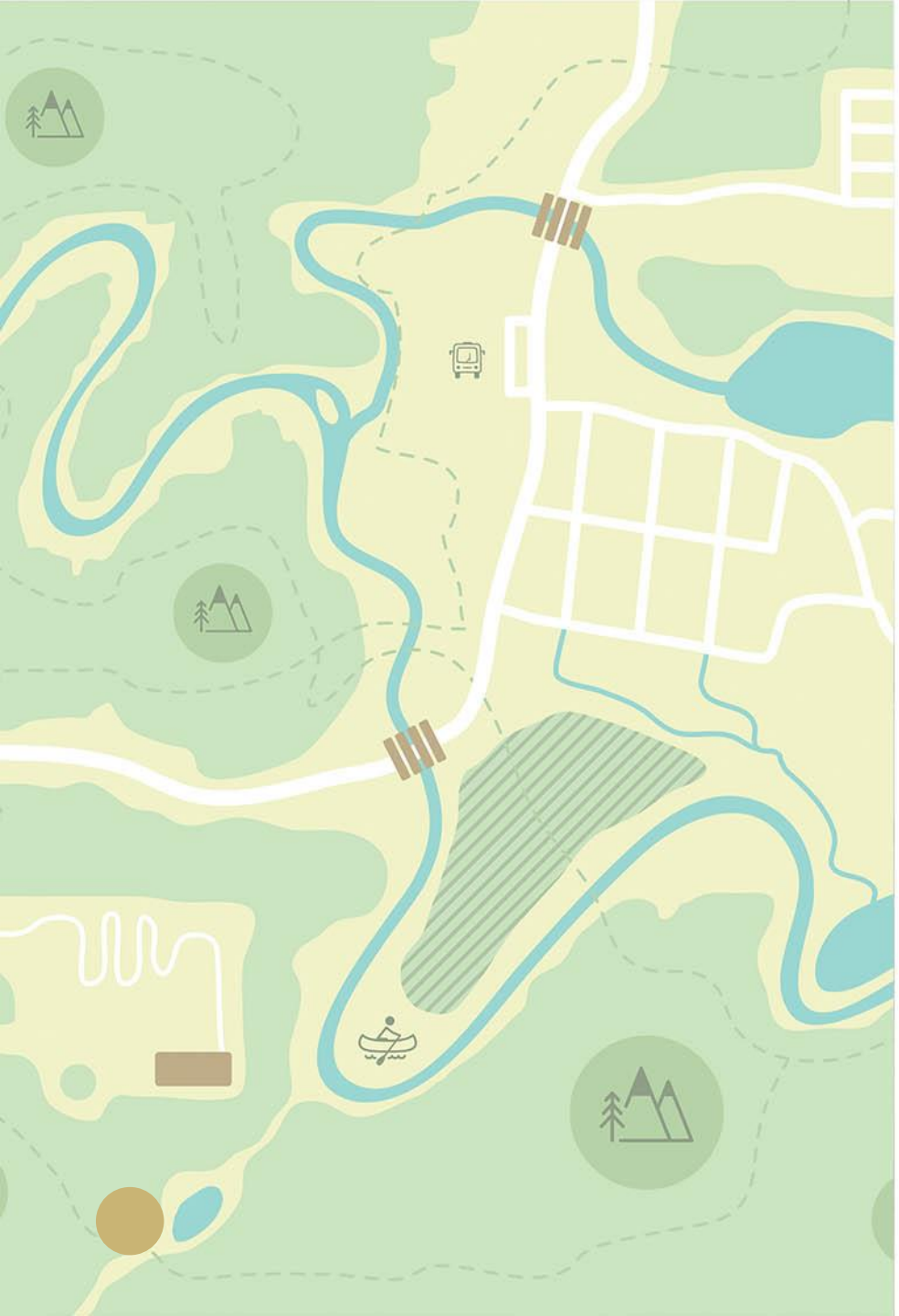
Grid Development

- Approx. 50 new projects (~€1.2 bn)*
- Public acceptance at the heart of future grid development
- Have maximised use of existing grid and focussed on publicly acceptable, deliverable solutions
- However significant new grid infrastructure required – complex, contentious and takes many years to deliver.
    - Particular concentration in Greater Dublin area



* In addition to committed pipeline of approx. 100 significant projects (~€2.3 bn).

Excludes customer projects.



Progress on Candidate Reinforcements

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52 Shaping Our Electricity Future Candidate Solutions NI & ROI

6 new circuits

Woodland- Finglas
South Dublin
Donegal Sligo
Binbane - Clogher- Cathleen Falls
Mid-Tyrone
Mid- Antrim

32 upgrades of existing circuits

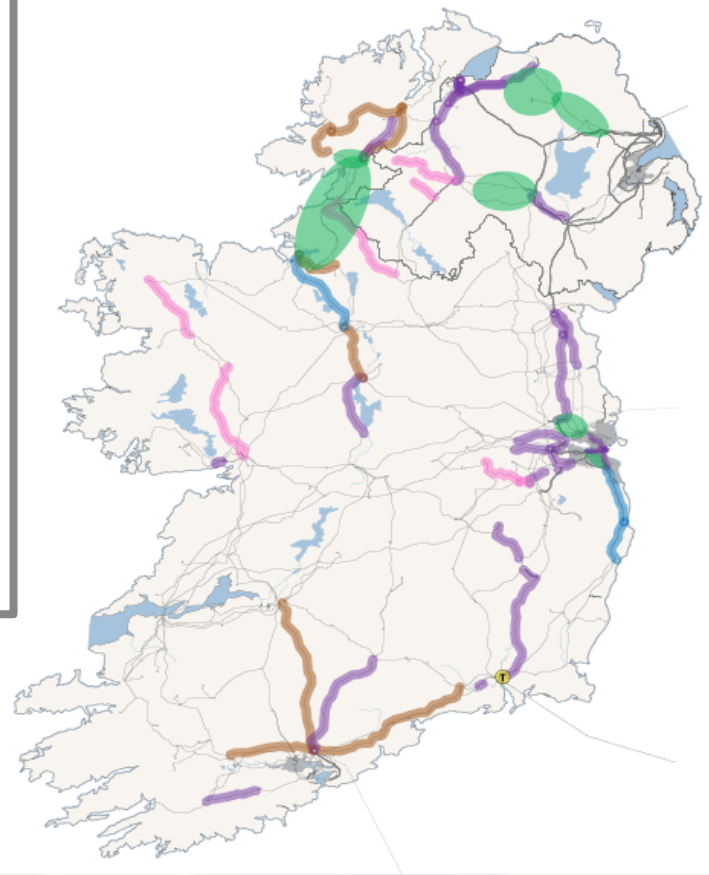
5 x Dublin cable replacements
Upvoltage x 2
Flagford – Srananagh
Arklow-Ballybeg-Carrickmines
Uprates x 17

1 new transformer

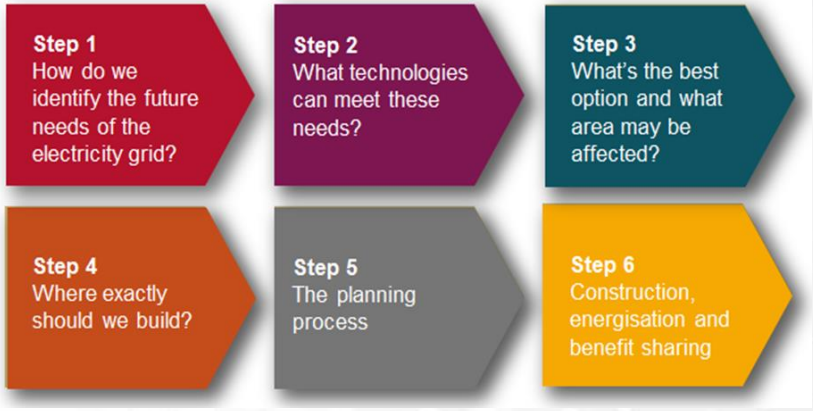
Great Island 220/110 kV Transformer

13 new technology projects

Power Flow Control x 6
Dynamic Line Rating x 7



All candidate projects go through Framework for Grid Development for detailed analysis and are included in the Network Delivery Programme (NDP)



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SOEF Project List Progress	Process Step	
	Option Design & Optioneering Steps 1,2,3 Part 1	Project Implementation Steps 4,5,6 Parts 2, 3
Mid Antrim Upgrade		
Mid Tyrone Project		
North West of NI project		
Drumnakelly - Tamnamore 110 kV circuit		
Bandon - Dunmanway 110 kV circuit		
Drybridge - Louth 110 kV circuit		
Galway - Salthill 110 kV circuit		
-Galway area 110 kV network needs		
-Cashla - Salthill 110 kV circuit uprate		
Inchicore - Carrickmines 220 kV circuit		
-South Dublin Reinforcement		
Poolbeg - Carrickmines 220 kV circuit		
Finglas - North Wall 220 kV circuit		
Poolbeg South - Inchicore 220 kV circuit 1		
Poolbeg South - Inchicore 220 kV circuit 2		
North Wall - Poolbeg 220 kV circuit		
Louth - Oriel 220 kV circuit		
Woodland - Oriel 220 kV circuit		
Carrickmines - Great Island Corridor network corridor needs		
-Great Island - Kellis 220 kV circuit		
-Arklow - Ballybeg - Carrickmines 220 kV circuit		
Woodland - Finglas 400 kV cable cct		
-CP1021 East Meath to North Dublin Network Reinforcement		
Letterkenny – Tievebrack - Binbane 110kV lines		
Donegal - Srananagh Network Corridor Needs		
-Clogher - Srananagh 220 kV circuit		
-Drumkeen - Clogher 110 kV circuit		
-Binbane - Clogher - Cathaleen's Fall 110 kV Clogher tie-in		
Great Island 220/110 transformer No.3		
-Great Island Transformers Upgrade project		
Flagford - Sligo 110 kV Circuit Capacity Needs		
-Flagford - Srananagh 110 kV circuit		
-Sligo - Srananagh 110 kV circuit 3		

Progress on Key Candidate Solutions

In Project Implementation

- 5 x 220 kV Dublin cable replacement/uprate
- 3 x 110 kV circuit uprates
- 2 x 220 kV circuit uprates
- 1 x new 110 kV circuit
- 1 x Powerflow controller

In Design & Optioneering

- 1 x new 400 kV circuit
- 2 x new 220 kV circuits
- 2 x new 110 kV circuits
- 2 x circuit voltage upgrade
- 1 x 220 kV circuit uprate
- 4 x 110 kV uprates
- 1 x new 220/110 kV transformers

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Network Pillar Strategic Enablers Multiyear plan

6.1.3 Multi-year plan

6.1.3.1 Ireland

Table 29: Networks - Ireland multi-year plan

Project Name	Description	Parties	Start Date	Finish Date
Incentivising Location	Government and regulatory policies in place to support locating generation and large energy users where electricity grid capacity is available or where it will be available in the future.	DECC, EirGrid, CRU	Q4 2021	Q2 2023
Planning Consents	Engagement with planning authorities at a strategic level to enable expeditious delivery of strategic electricity infrastructure, e.g. development of grid masterplans at regional and local authority levels and enhanced multi-level engagement by planning and environmental experts with consenting authorities, prescribed bodies and other relevant stakeholders.	EirGrid, DECC, DHPLG, local and regional authorities	Q4 2021	Q4 2022
Optimal Joint Programme Delivery (TSO/TAO)	Implementation of an end – end TSO/TAO joint approach to optimise programme delivery time of electricity infrastructure[15]	EirGrid, ESBN, CRU	Q4 2021	Q4 2022
Transmission Outage Review and Transformation	Implementation of a transmission outage review and transformation programme	EirGrid, ESBN	Q4 2021	Q4 2023
Technology Toolbox	Deliver electricity grid Technology Toolbox solutions for enhanced flexible network operation[16].	EirGrid, ESBN	Q4 2021	Q4 2026
Flexible Network Strategies	Develop flexible networks strategy for deployment of "non-wires" electricity grid technologies[17]	EirGrid	Q4 2021	2023/24 /25/26
Future Dublin				
Road N				

Table 30: Networks - Northern Ireland multi-year plan

Project Name	Description	Parties	Start Date	Finish Date
End-End TSO/ TO Approach to delivery	Work is underway to develop joint processes, and relevant amendments to subsidiary documents to support this. (i.e. Transmission Interface Arrangements). Moving into implementation.	UR, SONI, NIEN	Already commenced	Q1 2022
Technology Toolbox	Deliver electricity grid Technology Toolbox solutions for enhanced flexible network operation	SONI, NIEN	Q4 2021	Q4 2026
Flexible Network Strategy	Develop flexible network strategy for deployment of "non-wires" electricity grid technologies	SONI, NIEN	Q4 2021	2024/25/26

1. Delivery on List of 52 Candidate Solution projects is on track.
2. Progress being made on all of the strategic enablers identified in roadmap.
3. The candidate solutions are being delivered in partnership with TAO and we will continue to report on progress as part of our Joint Network Delivery Programme. (NDP).

Reference:
Shaping_Our_Electricity_Future_Roadmap.pdf (eirgridgroup.com)

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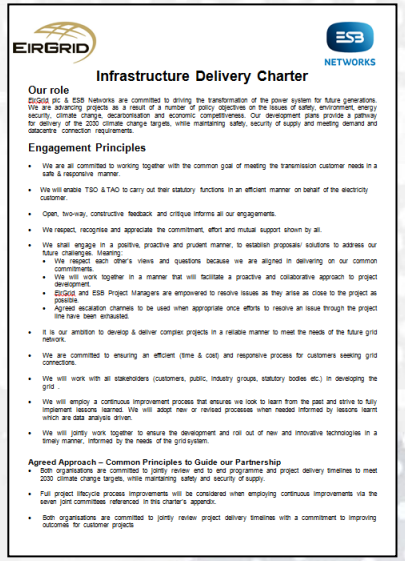
Matthew

Optimal Joint Programme Delivery

1. **Joint Infrastructure Delivery Charter** with agreed principles to optimise delivery.
2. **Joint Network Delivery Programme (NDP)** for Transmission Capex programme which includes SOEF projects.
3. **Approach is to mitigate the risks which can impact delivery** e.g schedule, cost, third party issues or delays,
4. **Improvements already implemented on early engagement & paralleling of activities.**



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ESB NETWORKS

Infrastructure Delivery Charter

Our role

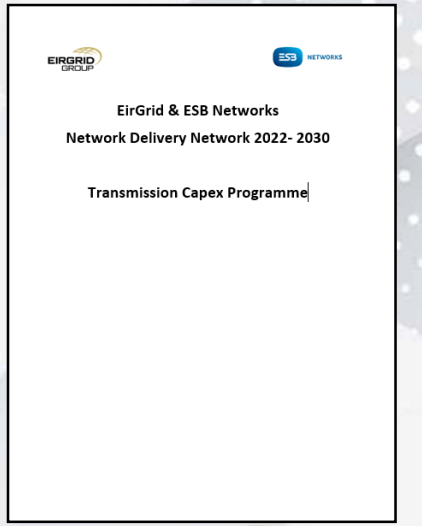
EirGrid plc & ESB Networks are committed to driving the transformation of the power system for future generations. We are advancing projects as a result of a number of policy objectives on the issues of safety, environment, energy security, climate change, decarbonisation and economic competitiveness. Our development plans provide a pathway for delivery of the 2030 climate change targets, while maintaining safety, security of supply and meeting demand and datacentre connection requirements.

Engagement Principles

- We are all committed to working together with the common goal of meeting the transmission customer needs in a safe & responsive manner.
- We will enable TSO &TAO to carry out their statutory functions in an efficient manner on behalf of the electricity customer.
- Open, two-way, constructive feedback and critique informs all our engagements.
- We respect, recognise and appreciate the commitment, effort and mutual support shown by all.
- We shall engage in a positive, proactive and prudent manner, to establish proposals/ solutions to address our future challenges. Meaning:
  - We respect each other's views and questions because we are aligned in delivering on our common commitments.
  - We will work together in a manner that will facilitate a proactive and collaborative approach to project development.
  - EirGrid and ESB Project Managers are empowered to resolve issues as they arise as close to the project as possible.
  - Agreed escalation channels to be used when appropriate once efforts to resolve an issue through the project line have been exhausted.
- It is our ambition to develop & deliver complex projects in a reliable manner to meet the needs of the future grid network.
- We are committed to ensuring an efficient (time & cost) and responsive process for customers seeking grid connections.
- We will work with all stakeholders (customers, public, industry groups, statutory bodies etc.) in developing the grid .
- We will employ a continuous improvement process that ensures we look to learn from the past and strive to fully implement lessons learned. We will adopt new or revised processes when needed informed by lessons learnt which are data analysis driven.
- We will jointly work together to ensure the development and roll out of new and innovative technologies in a timely manner, informed by the needs of the grid system.

Agreed Approach – Common Principles to Guide our Partnership

- Both organisations are committed to jointly review end to end programme and project delivery timelines to meet 2030 climate change targets, while maintaining safety and security of supply.
- Full project lifecycle process improvements will be considered when employing continuous improvements via the seven joint committees referenced in this charter's appendix.
- Both organisations are committed to jointly review project delivery timelines with a commitment to improving outcomes for customer projects



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ESB NETWORKS

EirGrid & ESB Networks

Network Delivery Network 2022- 2030

Transmission Capex Programme

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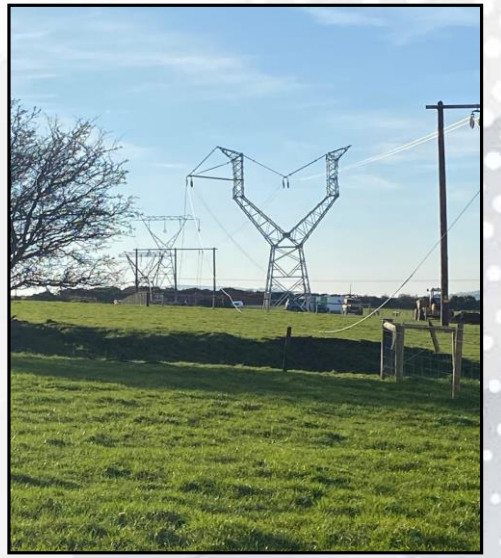
Technology Toolbox Updates & Progress

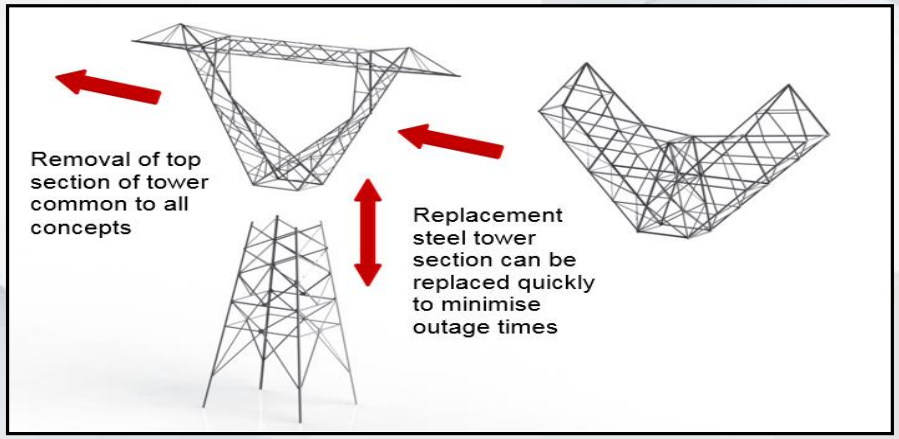
1. **Dynamic Line rating.** Technical Specifications agreed. Procurement underway.
2. **Power Flow Controllers**. Functional Specification issued. Procurement commenced.
3. **Cables with cross section > 3,000 mm^2 for high loading situations**: Market engagement completed, with positive outcomes and confirmed dates. Strategic Projects identified.
4. **Distributed Temperature Sensor (DTS)**: Proposed for two upcoming cable projects. Moneypoint – Kilpaddogue 400 kV cable, Belcamp 220 kV cable.
5. **Voltage Uprate Trial now complete**, technology ready for deployment into projects

Example: Voltage Uprate Trial Completed

Before – 220 kV

After – 400 kV





Questions?

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Engagement Programme

What did we consult on?
Four draft approaches

1 Generation-Led

Put clean electricity generation close to where most power is used

2 Developer-Led

Let developers decide where to locate clean electricity generation

3 Technology-Led

Try new ways to move clean electricity across the country

4 Demand-Led

Put large electricity users close to sources of clean electricity generation

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How did we consult and engage?

14-week
Consultation and Engagement Programme

Ireland and Northern Ireland

100+ Virtual Consultation Events

- Local Authorities
- Chambers of Commerce
- Rural Communities
- Agricultural Organisations
- Community and Voluntary Groups

500
Over 500 Consultation Responses

2
Civil Society Forums

2
Industry Forums

TEDxStormont Youth Event

National Youth Assembly in Ireland

99
Deliberate Dialogue Participants in Ireland

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What did the response look like?

492
Public Responses

Questionaires	225
Submissions	169
Campaigns	98

80
Industry Responses

Questionaires	20
Submissions	60

- Relatively high level of both public and industry responses (usually, responses to strategic consultations are very low).
- Fewer responses from opposition campaigns (often, these would be more than 80% of responses).
- Deep interest by the public in the future of the electricity system and a desire to play an active role in the transition to a low-carbon system.
- Increased understanding of EirGrid and SONI's role and willingness to trust us.
- Support from public and industry for our open, transparent consultation approach.

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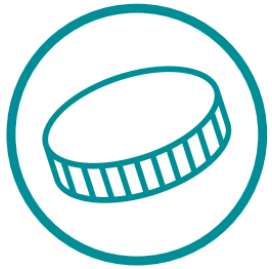
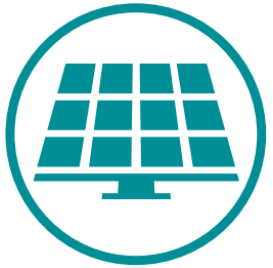
What did the public say?

Benefits for regional and rural communities

Community ownership



Keeping costs manageable



Microgeneration

Social acceptance

Onshore-generation

Ecology

Security-of-supply

Public-engagement

New-technology

Landowner-concerns

Role-of-SONI

Environment

Offshore-wind

Role-of-EirGrid

Future-proofing

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What is the outcome?

Ireland Approach

Generation-led approach with aspects of Demand-led and Technology-led

Northern Ireland Approach

A balance of all approaches, leaning towards Developer-led.

40 projects in Ireland

4 new circuits
24 upgrades to existing circuits
1 new transformer
11 new technology projects

12 projects in Northern Ireland

3 new circuits
7 upgrades to existing circuits
2 new technology projects

10-year plans for

Engagement | Markets
Operations | Networks

A plan to deliver at least 70% renewable energy by 2030, an important step on the journey to 80%, on the island of Ireland.

Expected Generation

- 5.1 GW of Offshore Wind
- 2.4 GW of Onshore Wind
- 600 MW of Micro-generation Solar
- 1.3 GW of Large Scale Solar
- 1.65GWof Battery Storage
- 2.6 GW of Derated Gas

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Launch at COP26 – UN Climate Change Conference

Engagement Roadmap Ireland

Policy and Politics

- **Engage for Better Outcomes for All**
- **Local Authority Rollout**
- AILG Future Energy Needs Conference
- EU Collaboration and Engagement Working Group
- **COP26**

Rural and Regional Communities

- **EirGrid Energy Citizen Roadshow**
- **Our Energy Future Project (RGI / FOE)**
- Energy Advocates / Champions
- Collaborate with SEAI

Young People

- Activation programme delivered locally with youth partner.
- **Young Social Innovators Partnership commenced.**

Skills and Transition

- Collaborate with NGOs and stakeholders to identify skills gap in Renewable Development.
- Support upskilling and apprenticeships at regional level.
- Energy Tourism Initiative

Landowners

- Landowner workshop series on energy (/climate) transition and Biodiversity Initiatives
- Explore expansion of Community Benefit to support transition projects.

Communications

- EirGrid Awareness Raising Campaign
- EirGrid Knowledge Hub
- Focus on Regional Media campaigns

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Engagement Roadmap Northern Ireland

Policy

- Continued briefings with DfE and UR in relation to roadmap roll out and evolution
- Briefings with New Ministers and New/existing Permanent Secretaries/HOCS

Industry

- Engagement with key bodies such as SGI, Renewable NI and developers
- NI Chamber & SONI Energy Fora (Rolling schedule)
- Dedicated industry SOEF webinars (every 4 months) and fora (every 6 months)
- Shaping Our Electricity Future Advisory Council briefings.

Regional

- Biennial Cycle of Council engagement to support individual projects and SOEF roll out
- Annual SONI Council Planning Officials Workshop
- Continued engagement with NILGA and SOLACE
- Establish NW presence (subject to funding)
- Continued collaborative working with NIE Networks on grid project engagement and communication

Civil Society

- Embed SONI's Enhanced 3 Part Process for Developing the Grid
- Establish Community Fora pilot on forthcoming Mid Antrim Upgrade/ NW Reinforcement (subject to funding)
- Publish our public engagement commitments

Landowners

- Ongoing engagement with UFU and NIAPA
- Landowner workshop series on energy/ climate transition
- Develop and implement a landowner engagement strategy as an extension of our Enhanced 3 Part Process for Developing the Grid
- Senior Landowner Engagement Officer

Communications

- SONI Knowledge Hub
- Cost effective Regional Media campaigns in support of projects in 'part 2' of our engagement process
- Revised SONI Website

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Questions?

SOEF
Version 1.1

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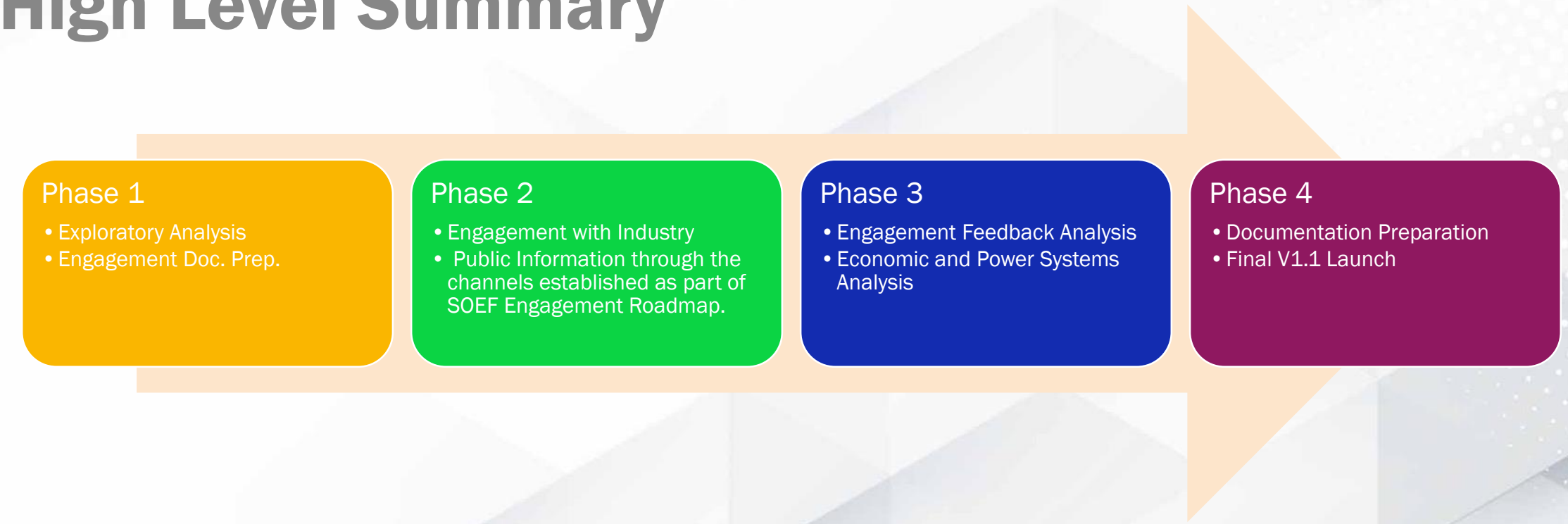
Shaping Our Electricity Future – Look Forward

High Level Summary



SOEF V1.1 – Challenges

- Exploratory analysis indicates oversupply plays an increasingly dominant role at higher levels of RES-E
- The economics of higher levels of RES-E require careful consideration
- SOEF V1 outlined a very challenging programme of network reinforcements – further projects limited

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Shaping our electricity future

A roadmap to achieve our renewable ambition

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AOB

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Closing

- Thanks for your time today
- For publication on the website early next week
  - Presentation
  - Minutes
  - Terms of Reference
  - Call for Expressions of Interest
- Date for your diary – in person meeting 15 Sept 2022

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Thank you,

Next meeting:

15 September 2022

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