Welcome DS3 Advisory Council Members

- Please log in with Mic muted
- Questions can be logged using chat
- There will be 5 minutes at end of each topic to cover questions / comments

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DS3 Advisory Council – Meeting 27

Skype – Virtual Meeting

20 May 2020

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Agenda

Topic	Time	Speaker
Introduction & Welcome	10:30	Jonathan O' Sullivan, EirGrid (10 min)
Industry Discussion **o Hydrogen analysis**	10:40	Paul Blount, Coillte (20 min)
o ESO Coronavirus Preparedness	11:00	Graham Stein, National Grid (20 min)
Impacts on demand due to COVID 19'	11:20	Kenneth Conway, EirGrid (15 min)
AEMO Renewable Integration Study	11:35	Marta Val Escudero, EirGrid (15 min)

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Agenda

Topic	Time	Speaker
DS3 Programme Update o General o RoCoF o Control Centre Tools o Procurement	11:50 12:00 12:10 12:20	Ian Connaughton, EirGrid (10 min) Tony Hearne, ESBN (10 min) Mary Hennessey, EirGrid (10 min) Joe Deegan, EirGrid (10 min)
REST	12:30	ALL (5 min)
Priority Dispatch	12:35	Jonathan O' Sullivan, EirGrid (10 min)
Future Arrangements Update	12:45	RA / TSO (10 min)
DS3 Advisory Council Membership / Open positions	12:55	Jonathan O' Sullivan, EirGrid (10 min)
AOB	13:05	Jonathan O' Sullivan, EirGrid (5 min)

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Industry discussion

20 May 2020

Managing Curtailment in 2030 & 2040

May 2020

Project Team

Paul Blount

Company/Institution: Coillte
Job Title: Portfolio Director
Project Role: Model Development & Analysis
Background: Civil Engineer with 10 year's experience in renewables.

Rory Mullan

Company/Institution: Mullan Grid
Job Title: Senior Consultant
Project Role: Project Lead
Background: Consultant on grid connections to the renewable industry for the past 12 years and worked for Irish Utilities

Peter Lynn

Company/Institution: Mullan Grid
Job Title: Senior Engineer
Project Role: Project Support
Background: Chartered Engineer with 18 years experience in the Irish engineering consultancy sector and has spent the past 10 years specialising in grid connections for renewable generation in Ireland and Northern Ireland.

Dr James Carton

Company/Institution: DCU
Job Title: Assistant Professor
Project Role: Project Support
Background: Co-leader of The Climate Change Task Force, and member of Future Energy Leaders programme of the World Energy Council.

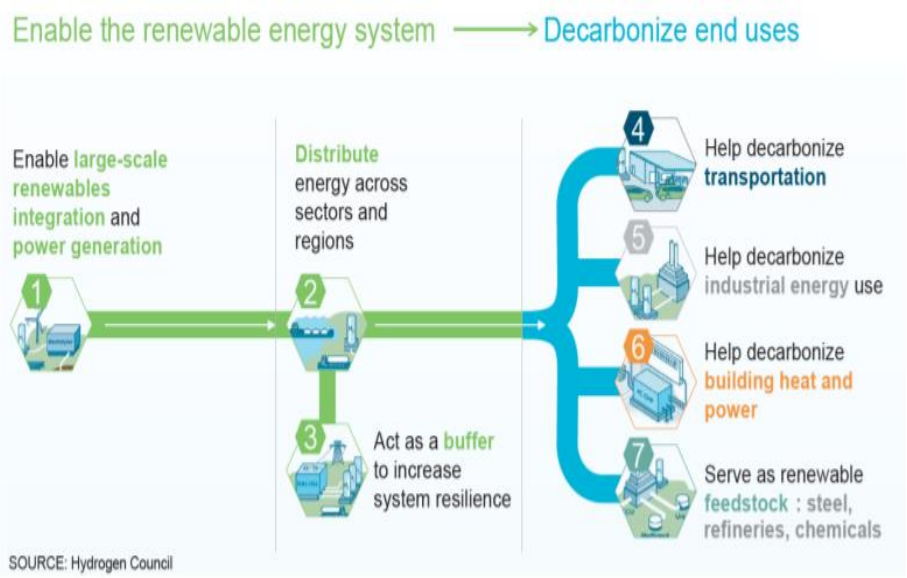
Conor Forde

Company/Institution: Mullan Grid
Job Title: Project Engineer
Project Role: Project Support
Background: Recent DCU graduate in Mechanical Engineering, currently undertaking a research masters on hydrogen storage in DCU.

Presentation Overview

Project Team and Scope
What is Curtailment
Historical Curtailment
Policy Context
Demand Forecasting
Adding Wind to reach High RES-E %
Adding Solar to reach High RES-E%
Introduction to Curtailment Mitigation Measures up to 2030
SNSP and Min Gen Improvements on 70% RES-E System
The Impact of Additional Interconnector and Storage Capacity on 70% RES-E System
Demand Side Management Improvements on 70% RES-E System
The Impact of Improved Wind Capacity Factor on 70% RES-E System
Proposals for High RES-E at Low Curtailment Levels in 2030
Role of Hydrogen in 2040
Recommendations

Introduction to Hydrogen



Key Notes on Hydrogen

- Most abundant element on earth is typically found in compounds such as methane (CH4) and water (H2O)
- Production Methods include:
  - Steam Methane Reforming (SMR) via Natural Gas
  - Electrolysis
- Hydrogen is of interest as a transport fuel because hydrogen vehicles are zero emission, similar to battery electric vehicles, and hydrogen can be produced with low or zero CO2 emissions.
- High energy density, suitable fuel for long-range heavy-duty vehicles.
- The challenge of hydrogen vehicles is that the current low volumes of production mean that they are expensive and not widely available.
- Power-to-Gas (P2G) is a concept that facilitates long term energy storage and produces fuel for the transport, industry and heat sectors.

Hydrogen in Ireland Today

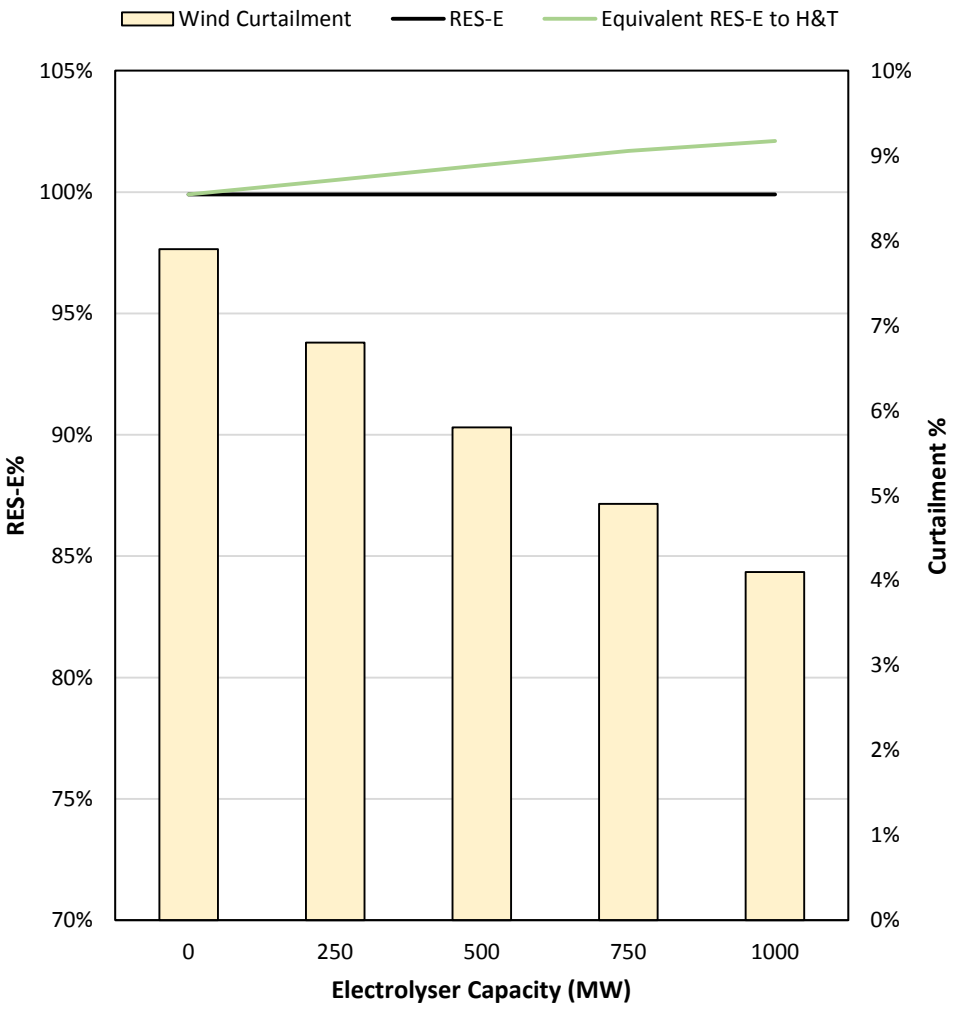
- **Gencomm (160kg/day)** - Planned 500kW electrolyser coupled with a wind farm to utilise curtailed electricity
- **Belfast HRS** – OLEV funded project in planning to support 3 FCEV buses with hydrogen from Gencomm project
- **Indaver WTE (3,000 kg/day)** – Existing facility at Meath producing electricity from waste, 9 MW Electrolyser proposed to avoid curtailment
- **BOC Electrolyser (200 kg/day)** – Dublin plant producing Hydrogen for Aerospace, Pharmaceuticals, Electronics and Biomedical industries.
- **Whitegate Refinery (hundreds tonnes/day)** – Existing refinery producing hydrogen for internal use. Currently exploring the option to increase production to meet internal demand with the option to sell to the mobility market if demand is clear (this option will need to include CCS in the future to remain a viable option in Ireland's increasing decarbonised economy)

In a recent report on Ireland by the IEA some comments are notable[1]:

- "The Irish government should intensify research on hydrogen"
- "Emerging international research areas such as those relating to hydrogen also offer potential benefits and align well with the Irish resource endowment and its energy sector policies."
- "The efforts to decarbonise the Irish gas infrastructure by the admixture of biomethane could potentially be supported by the use of hydrogen."

1. Energy_Policies_of_IEA_Countries_Ireland_2019_Review Hydrogen

P2G Curtailment Reduction 100% RES-E System



Benefits of Electrolyser Deployment on 100% RES-E system

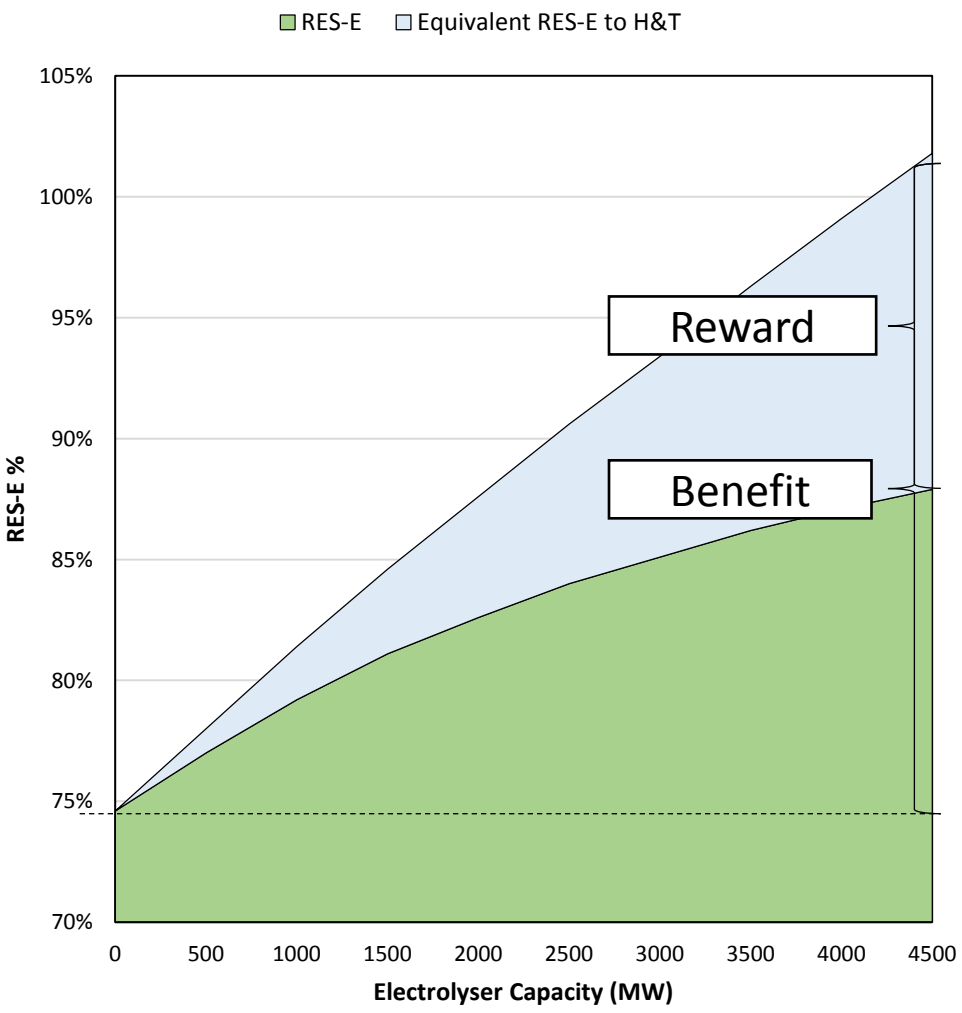
- Curtailment reduction
- Facilitates higher RES-E levels
- Decarbonisation Benefit for Heat & Transport system

Key Modelling Assumptions

- 100% - SNSP
- 0 MW – Min Gen
- 90% - Interconnector Effectiveness
- 44% - Wind Capacity Factor

Installed Wind	Wind Curtailment	Electrolyser Capacity	Electrolyser CF	RES-E	Equivalent RES-E to H&T	Equivalent RES-E
(MW)	(%)	(MW)	(%)	(%)	(%)	(%)
13890	7.90%	0	0.00%	100%	0.00%	100%
13890	6.80%	250	28.50%	100%	0.60%	100.60%
13890	5.80%	500	27.10%	100%	1.20%	101.20%
13890	4.90%	750	25.80%	100%	1.80%	101.80%
13890	4.10%	1000	24.60%	100%	2.20%	102.20%

P2G Energy System Benefits



Wider Benefits on 100% RES-E system

- Offsetting higher operational constraints
- Offsetting lower interconnector effectiveness
- Offsetting lower wind capacity factors

Key Modelling Assumptions

- 90%- SNSP
- 700 MW – Min Gen
- 50% - Interconnector Effectiveness
- 38% - Wind Capacity Factor

Installed Wind	Wind Curtailment	Electrolyser Capacity	Electrolyser CF	RES-E	Equivalent RES-E to H&T	Equivalent RES-E
(MW)	(%)	(MW)	(%)	(%)	(%)	(%)
11000	5.00%	0	0.00%	74.60%	0.00%	74.60%
11740	5.00%	500	21.60%	77.00%	1.00%	78.00%
12500	5.00%	1000	23.80%	79.20%	2.20%	81.40%
13240	5.00%	1500	25.80%	81.10%	3.50%	84.60%
13970	5.00%	2000	27.50%	82.60%	5.00%	87.60%
14700	5.00%	2500	29.10%	84.00%	6.60%	90.60%
15430	5.00%	3000	30.50%	85.10%	8.30%	93.50%
16150	5.00%	3500	31.70%	86.20%	10.10%	96.20%
16900	5.00%	4000	33.00%	87.10%	12.00%	99.10%
17620	5.00%	4500	34.00%	87.90%	13.90%	101.80%

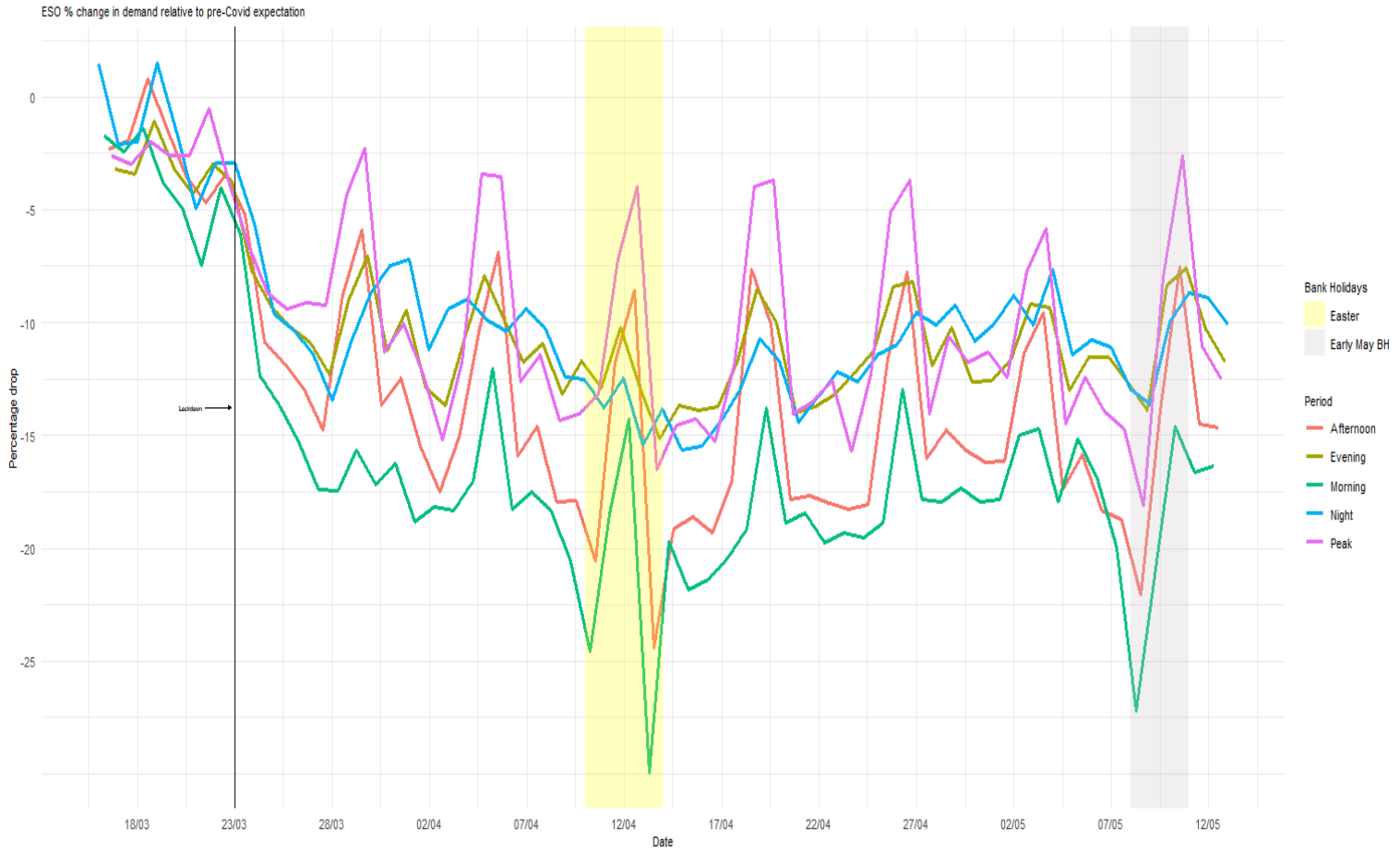
ESO Coronavirus Preparedness

Brief for DS3

nationalgridESO

ESO assessment of demand reduction

Graph shows % drop between what we have observed & what we would expect from our models had there was no Covid-19. Demand referred to is our proxy for the total demand in GB; not just the demand on the transmission system.



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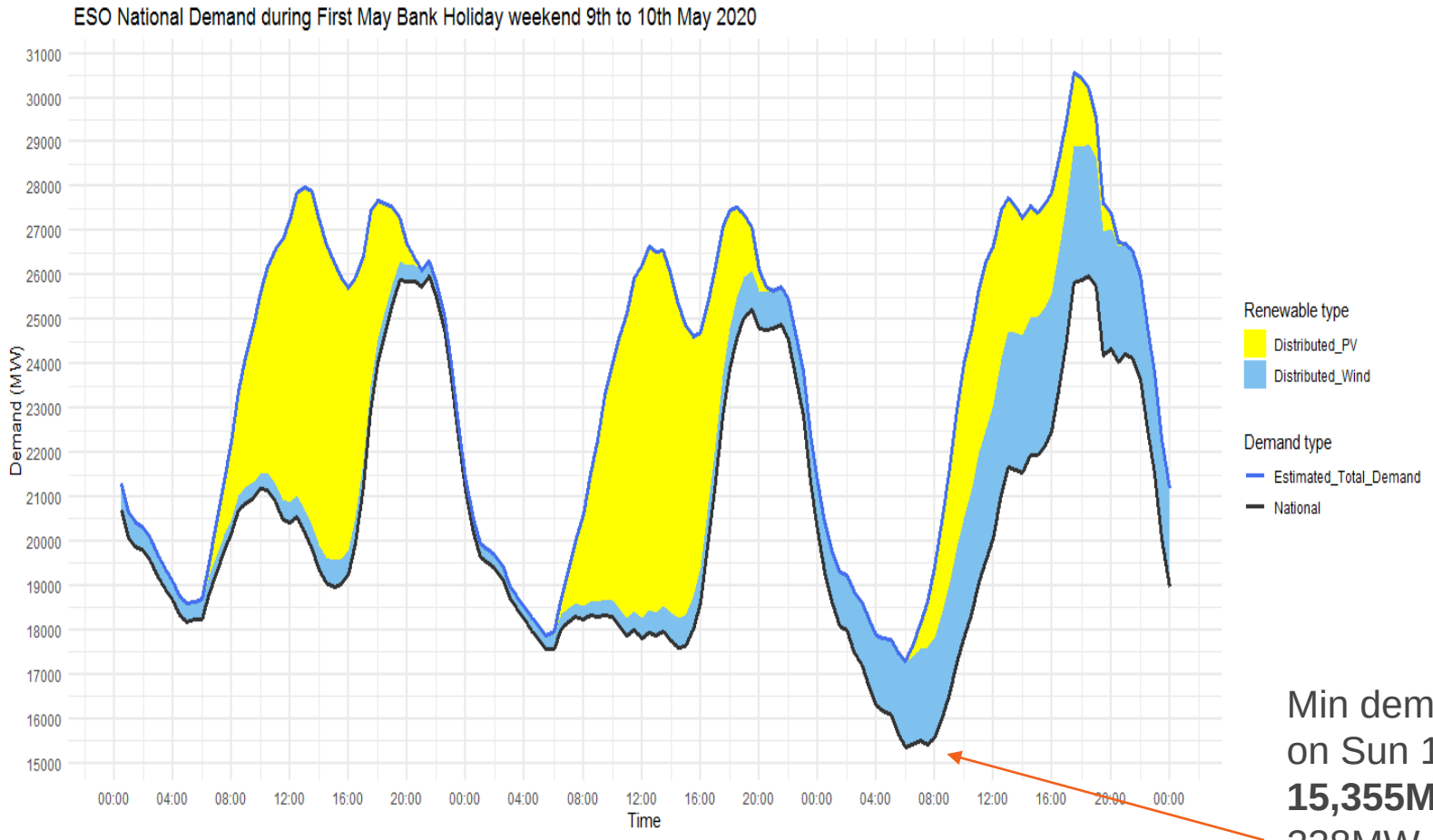
Bank Holiday Weekend (8th to 10th May) | Outturn



Min demand at 6:00 on Sun 10th May **15,355MW** including 238MW of ODFM

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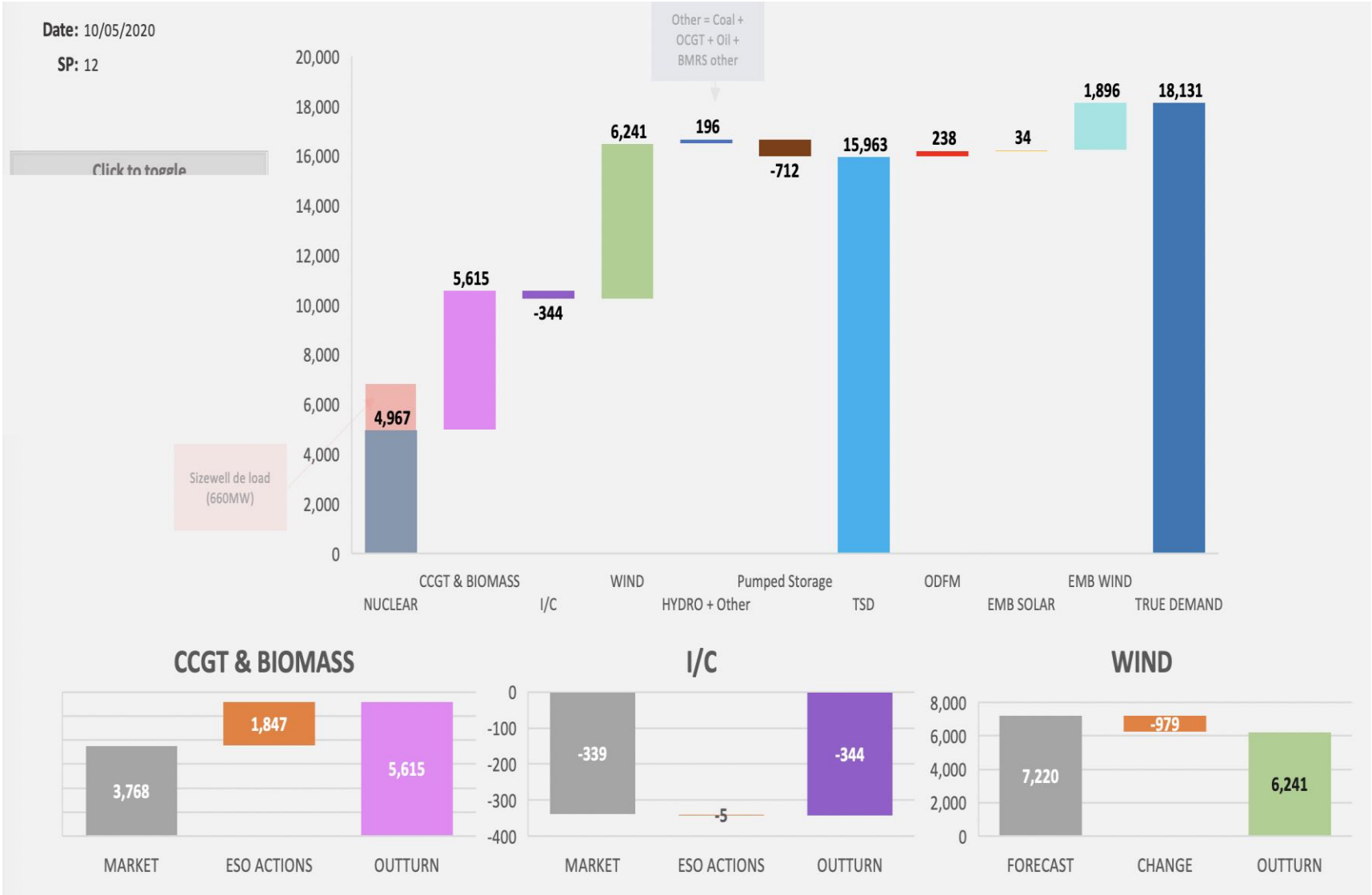
Bank Holiday Weekend | Low Demand Point



***The numbers on these graphs are for indicative purposes only.**

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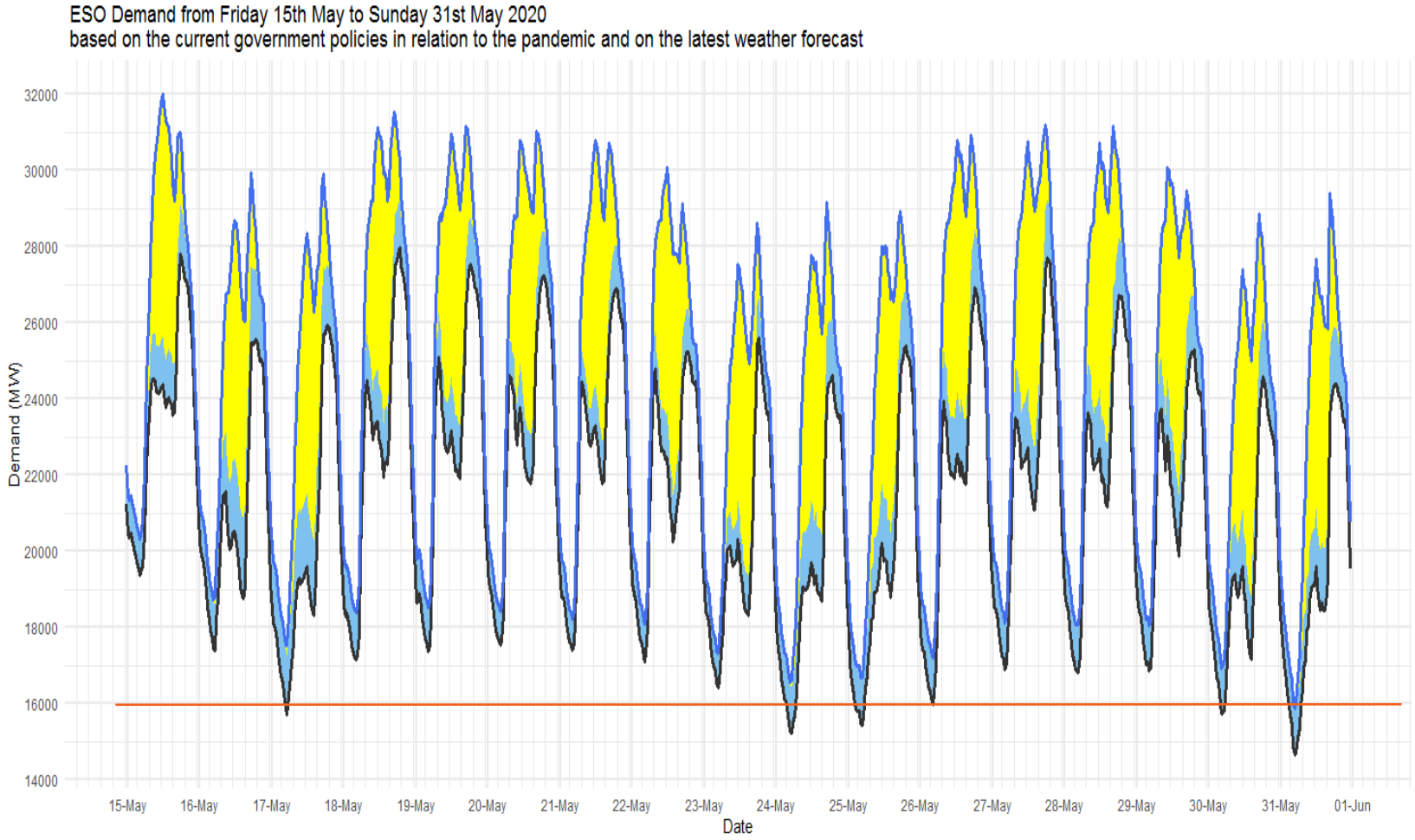
ESO Forecast from Fri 15th to Sun 31st May



Date	National Demand (GW)
Sun 17th	15.7
Sun 24th	15.2
Mon 25th	15.4
Sat 30th	15.7
Sun 31st	14.6

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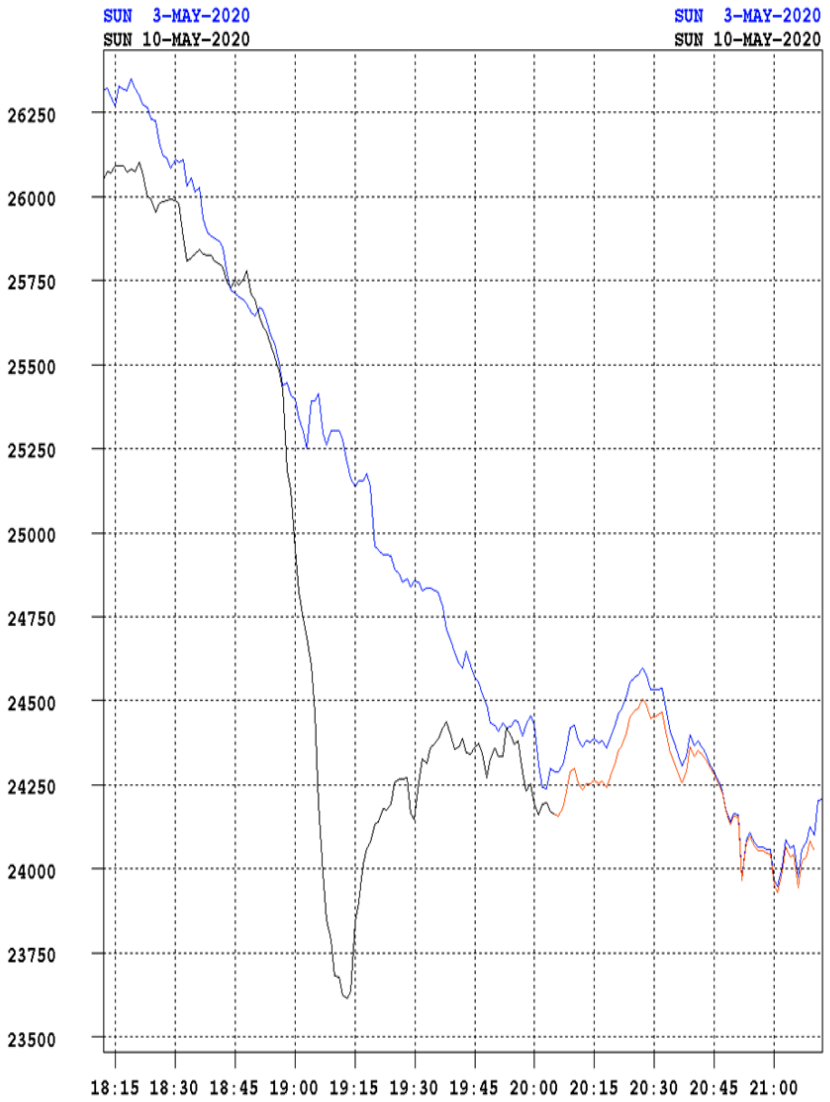
Demand Suppression | Sunday PM Briefing



Over 1.5GW rapid demand drop off was experienced during the Prime Minister's speech to the nation at 1900hrs manging by reductions in wind and other units and an increase in pumping demand.

Once the speech concluded, the system demand increased by 700MW (from 23600MW to 24300MW) and demand returned to the expected levels based on the previous Sunday.

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Current impacts on demand due to COVID 19

Kenneth Conway, EirGrid

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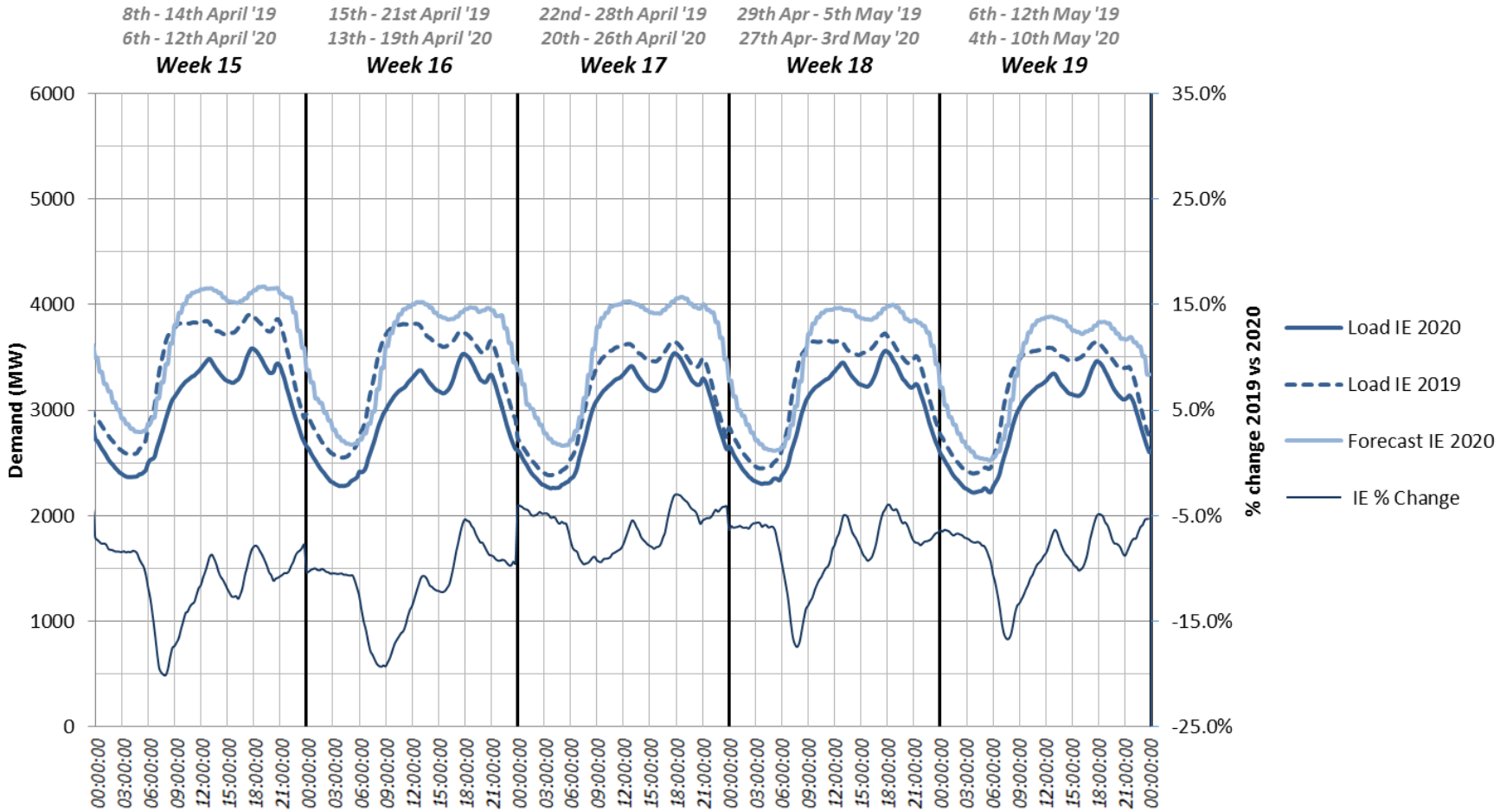
IE Demand 2019 and 2020



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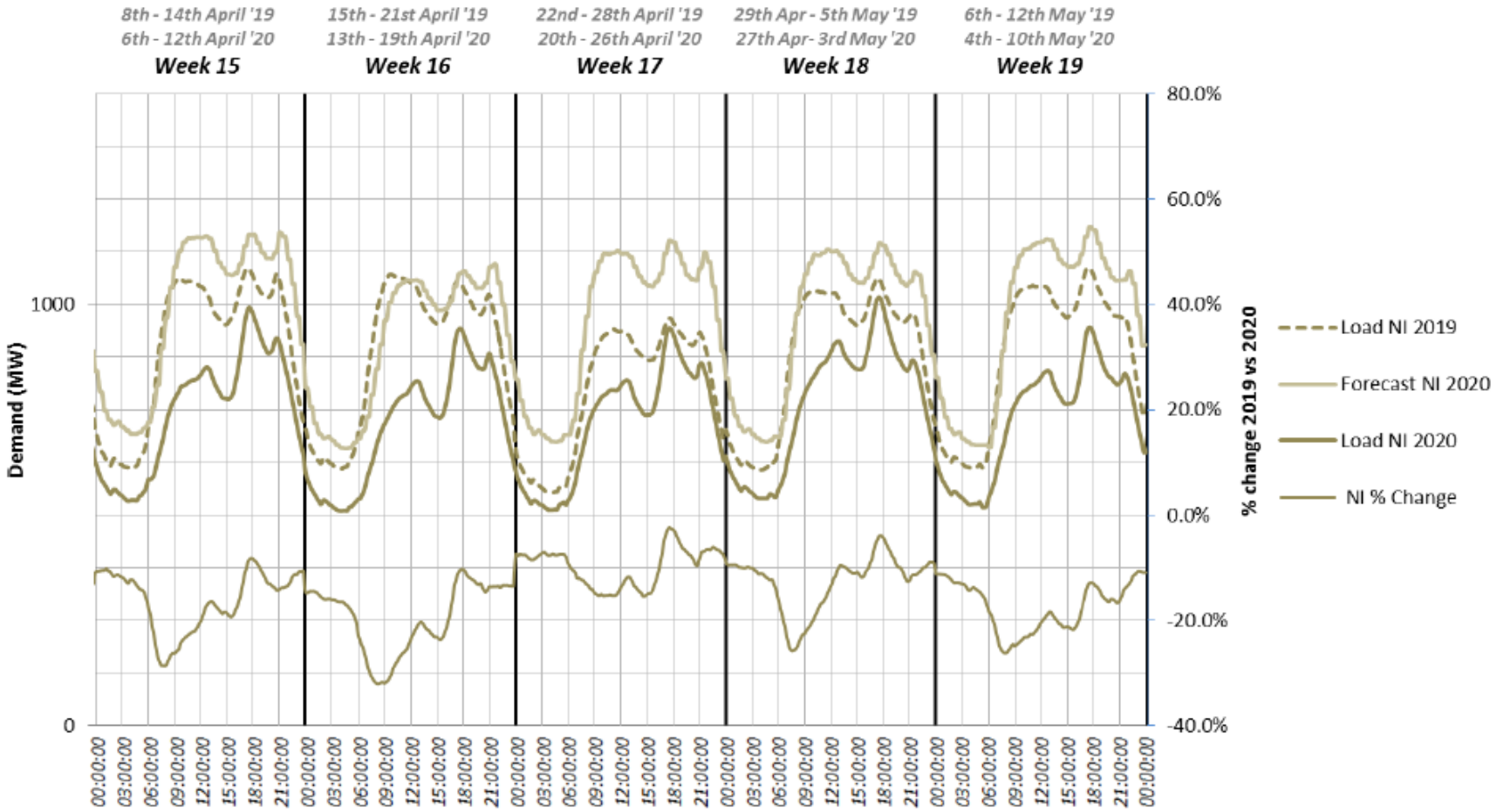
NI Demand 2019 and 2020



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Commentary

- Clear drop in demand of approximately 15% can be attributed to COVID-19. This can be seen by comparing the data from 2019 and 2020.
- There has been a change in the load profile. In particular, the morning load rise is slower, which can be attributed to staggered waking times. These staggered waking times may in part be due to schools being off and certain workers not being required to start at the same times as previously required.
- There has continued to be a slow but steady increase in TSO Connected Customer demand in Ireland in the last couple of weeks. This may suggest that large energy users are gradually adapting to the lockdown rules and are finding ways to increase output whilst adhering to government guidelines.
- Further increases in demand are expected as restrictions are lifted. However, demand levels are expected to stay below 2019 levels for some time as restrictions in some form are expected to be in place until August.

Weekly Data

Region	Week 15	Week 16	Week 17	Week 18	Week 19	Wk 19 vs Wk 15 five week % change
AI Peak demand 2020 (MW)	4791.9	4594.3	4634.5	4750.7	4614.8	-3.7%
AI Peak demand 2019 (MW)	5218.6	5640.6	5004.1	5224.8	5170.4	-0.9%
AI GWh 2020	634.1	613.7	615.8	628.3	607.4	-4.2%
AI GWh 2019	724.0	708.4	662.3	691.1	680.2	-6.0%
NI Peak demand 2020 (MW)	1095.1	995.5	1009.4	1085.0	972.9	-11.2%
NI Peak demand 2019 (MW)	1220.7	1265.1	1072.4	1250.7	1225.0	0.4%
NI GWh 2020	125.4	119.4	120.3	128.5	122.0	-2.7%
NI GWh 2019	150.3	148.9	133.6	147.2	148.4	-1.3%
IE Peak demand 2020 (MW)	3704.0	3623.3	3638.0	3777.8	3648.2	-1.5%
IE Peak demand 2019 (MW)	4091.4	4388.4	3959.8	3990.8	3981.1	-2.7%
IE GWh 2020	508.7	494.2	495.6	499.9	485.4	-4.6%
IE GWh 2019	573.6	559.5	528.7	543.9	531.8	-7.3%
TSO connected customer peak demand 2020 (MW) [IE only]	473.8	449.6	446.6	458.3	468.3	-1.2%
TSO connected customer peak demand 2019 (MW) [IE only]	439.1	443.0	442.0	443.1	418.7	-4.6%
TSO connected customer GWh 2020 [IE only]	73.9	74.7	71.9	72.1	72.6	-1.7%
TSO connected customer GWh 2019 [IE only]	68.7	70.1	70.6	69.6	68.3	-0.6%

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AEMO Renewable Integration Study

Marta Val Escudero, EirGrid

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AEMO Renewable Integration Study (RIS)

- The RIS is the **first stage of a multi-year plan** to maintain system security in a future National Electricity Market (NEM) with a high share of renewable resources.
- It investigates the challenges in the **short term, to 2025**, of integrating high levels of renewable resources.
- The report builds on international approaches to operating power systems with high penetrations of wind and solar generation (e.g. Ireland).
- Reviewed by an External Advisory Panel.
- It **recommends actions and reforms** needed to keep operating the NEM securely.

https://aemo.com.au/energy-systems/major-publications/renewable-integration-study-ris

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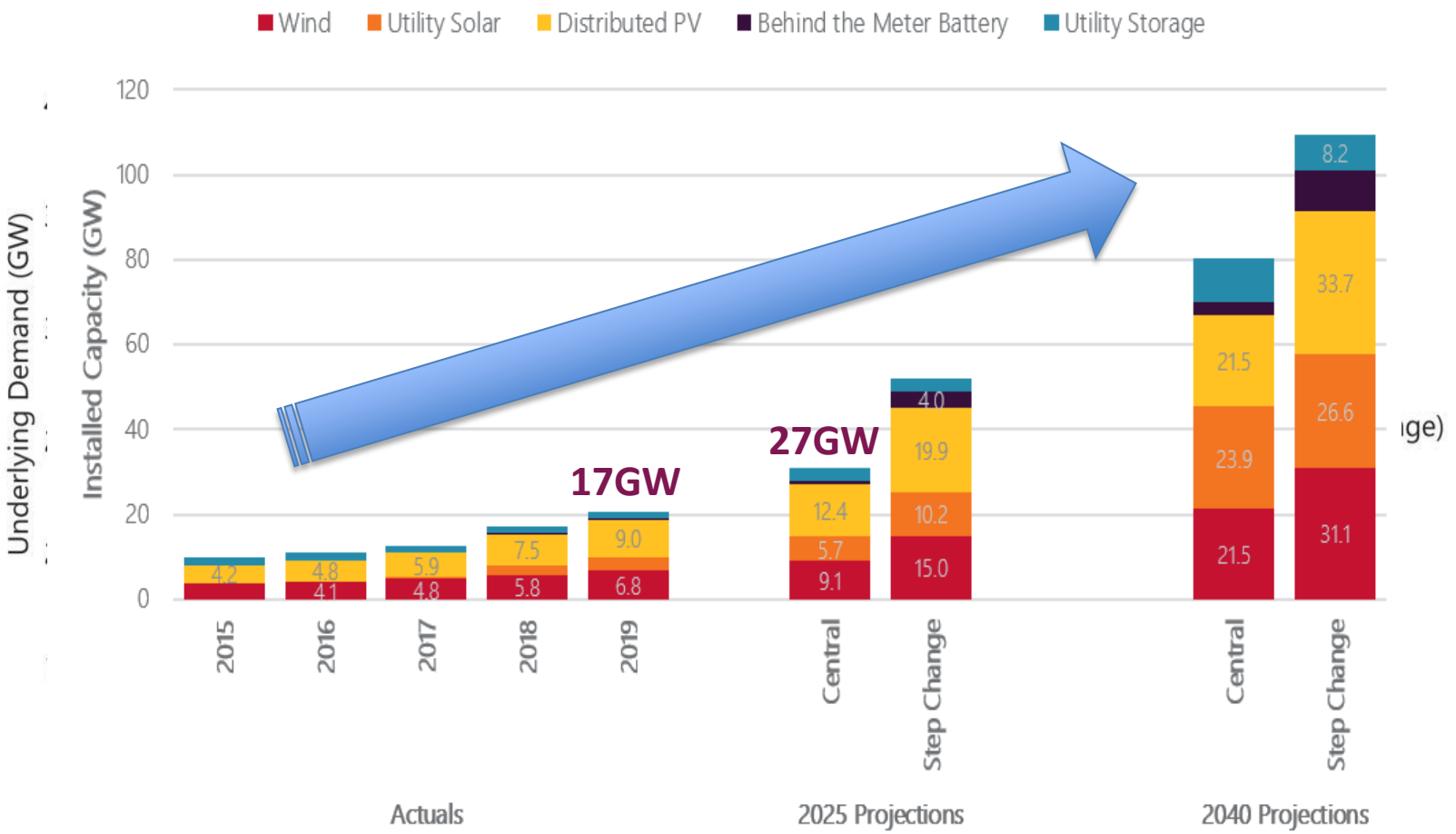
Background


Wind
Utility Solar
Distributed PV
Behind the Meter Battery
Utility Storage
Underlying Demand (GW)
Installed Capacity (GW)
120
100
80
60
40
20
0
17GW
27GW
4.2
4.8
4.1
5.9
4.8
7.5
5.8
9.0
6.8
12.4
5.7
9.1
4.0
19.9
10.2
15.0
21.5
23.9
8.2
33.7
26.6
31.1
2015
2016
2017
2018
2019
Central
Step Change
Central
Step Change
Actuals
2025 Projections
2040 Projections

RIS Objective

- To identify **system security limits** *(*)* that affect how much wind and solar PV generation can operate at any one time, and what the limits are NEM-wide and for individual regions
- To identify **how close** NEM regions are to these security limits now, and how close they are expected to be by 2025.
- To identify **actions to overcome** those barriers

(*) Only curtailment related limits are considered in the RIS.

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RIS Key Study Areas

Area of study	RIS approach
System operability – predictability and dispatch ability	• Assessed how increasing wind and solar are impacting operability of the system, including the challenges of managing increasing uncertainty and interventions.
Integration of distributed solar PV (DPV)	• Surveyed issues identified by distribution network service providers (DNSPs) as levels of DPV increase. • Assessed bulk system limits for actual and 2025 projections of DPV penetration in each NEM region.
Frequency management	• Assessed potential changes in online system inertia under a range of plausible future dispatch configurations • Analysed frequency control outcomes for different combinations of inertia, primary frequency response, load relief, and secondary risks.
Stable voltage waveform (system strength)	• Compared historical synchronous machine dispatch against potential 2025 dispatch outcomes. • Summarised parallel system strength work programs assessing emerging fault level shortfalls, minimum synchronous machine requirements, and local stability challenges for wind and solar.
Resource adequacy	• Conducted statistical analysis of historical system variability and forecast uncertainty. • Created 2025 synthetic data set using projected generation build and a spatial weather model. • Conducted statistical analysis of future variability and sensitivities on the system's flexibility to accommodate this.

RIS Outcomes

RIS details a range of actions to manage the technical challenges identified. These actions can be broadly categorised into:

- Development of **processes, tools, and training** to support secure operation.
- **Regulatory and market reforms** to support secure operation.
- **Investigations** to better understand secure or more efficient operation.

RIS Key Challenges and Actions (i)

Key Challenge	Action
System operability Existing **operational processes** not suitable to manage minimum limits conditions. Without effective and standardized operational process, tools, and training to schedule system strength and inertia services, the risk of human error grows and the level of intervention becomes unsustainable. The **market design** needs to adapt so all essential security and reliability services are provided efficiently, when required, and without operator intervention.	• 2.1: Identify and evaluate standard **operational process, control room tools, and operator training** for managing system strength and inertia services under the current framework . • 2.2: Redevelop existing scheduling systems to better account for system needs. • 2.3: **Stablish new system services and ahead market** to ensure system security. • 2.4: Extend high-speed monitoring network (PMU) to allow better visibility of performance of the system. • 2.5: **Collaborate with industry and world lead power system operators**.
Integration of distributed solar PV (DPV) Increase of **size of largest single contingency** and reduction in the daytime load profile. **Governance structures** for setting and enforcement of technical performance standards. **Lack of visibility and dispatch ability** of large share of generation.	• 3.1: Fast-track requirements for LVRT for all new DPV inverters. • 3.2: Update **national standards** for DPV inverters. • 3.3: Industry **collaboration in standardisation**. • 3.4: Industry collaboration defining for minimum device level requirements to enable generator shedding and regulatory arrangements. • 3.5: Develop aggregate predictability or real-time visibility requirements for DVP systems available for curtailment.

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RIS Key Challenges and Actions (ii)

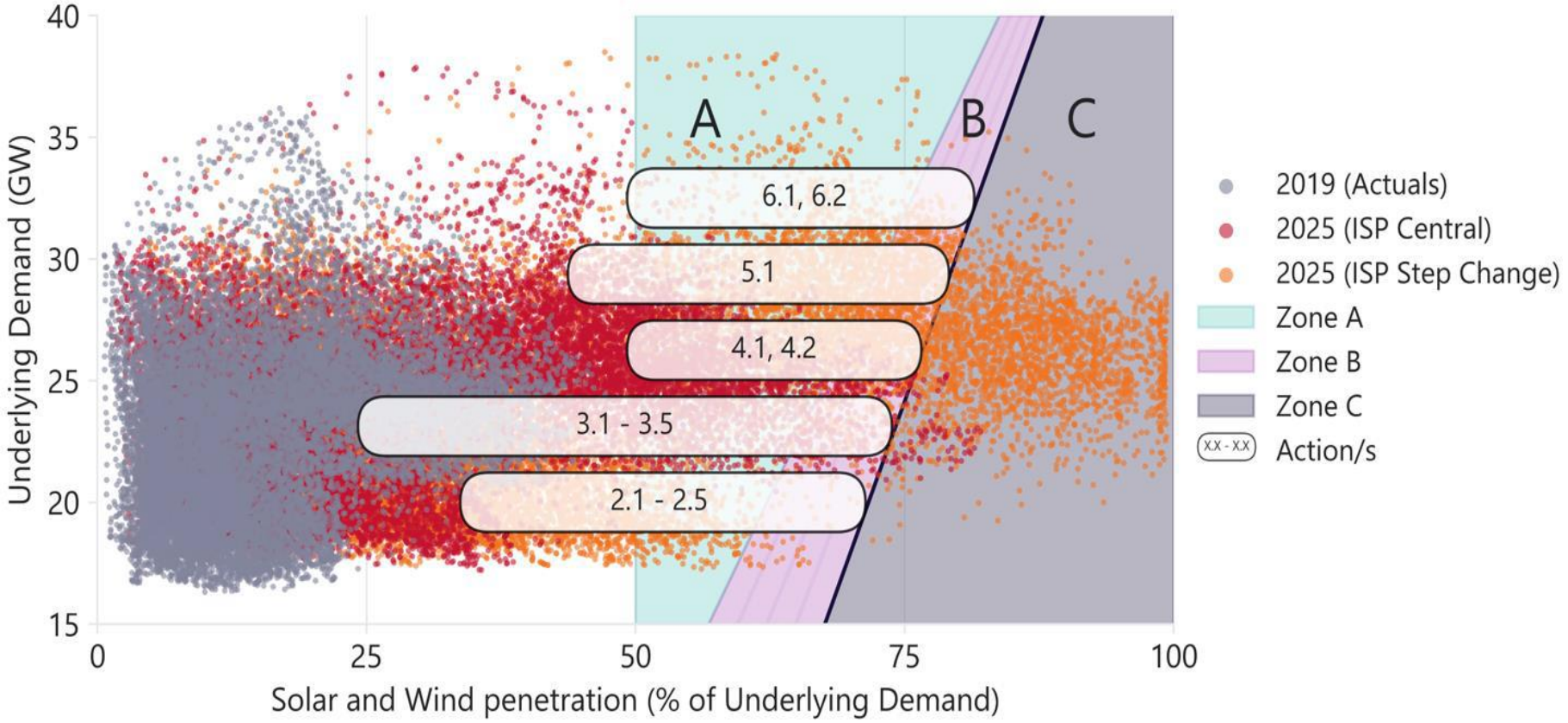
Key Challenge	Action

Frequency management
 	
Decline in PFR provided by conventional generation in NEM.
 	
Decline in system inertia.
 	
DPV behaviour, IBR and run-back schemes **increase complexity**.
	• 4.1: Implementation of **Mandatory Primary Frequency Response** rule.
	• 4.2: Publication of detailed **Frequency Control Work plan**
	  • Revised ancillary service arrangements.
	  • Investigate introduction of **system inertia safety net**.
	  • Investigate consequences of higher RoCoF and recommend new limit.
	  • Update AEMO's existing **system frequency model**.

Stable voltage waveform (system strength) **System strength gaps** in certain regions. Localised system strength challenges introduces **additional hurdles for generators** seeking connection in weak parts of the grid.	• 5.1: Improve **Minimum System Strength Framework** and co-ordination across the NEM.

Resource adequacy
 	
Increase **magnitude of peak ramps**.
 	
Limited **accuracy of deterministic forecast** of expected ramps.
 	
Ensuring **sufficient flexible system resources** are available to enable increased variability at times of high wind and solar penetration will become increasingly challenging.
	• 6.1: Improve understanding of system uncertainty and risk:
	  • Implementation of a **ramping forecast and classification prototype**
	  • Deploy additional **weather observation infrastructure**.
	• 6.2: Improve the **reliability of information provided by participants** to support security-constrained dispatch.

System Limits and Remedial Actions



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RIS Key Messages

- Integration of increasing levels of renewable generation in Australia will **test boundaries of system security and current operational experience**.
- If the recommended actions are taken, the NEM could be operated securely with **up to 75% instantaneous penetration of wind and solar**.
- This includes the ongoing **need for system limits that at times constrain the output of various generation sources**.
- If, however, the recommended actions are not taken, the identified operational limits will constrain the maximum instantaneous penetration of wind and solar to **between 50% and 60%**.
- The RIS highlights **the need for flexible market and regulatory frameworks that can adapt swiftly and effectively as the power system evolves.**

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DS3 Discussion

February 2020

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Wind Generation

- At the end of 2019, a total of 5,403 MW of wind capacity was installed across Ireland and Northern Ireland.
- In terms of renewable electricity as percentage of demand in the 12-month period ending Jan-2020, renewable energy accounted for 38%.
- In February of 2020, a new all-island wind record of 4249 MW was set, with over 56% of the islands demand being met from wind.
-
- The power system successfully operated at 60% SNSP or above for 44% of the time in February 2020 which is an amazing achievement given that the maximum allowed is 65%.

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DS3 COVID Impact Slide

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ROCOF Implementation Programme

DS3 Advisory Group meeting 20/05/20

Tony Hearne

TSO-DSO Interface Manager

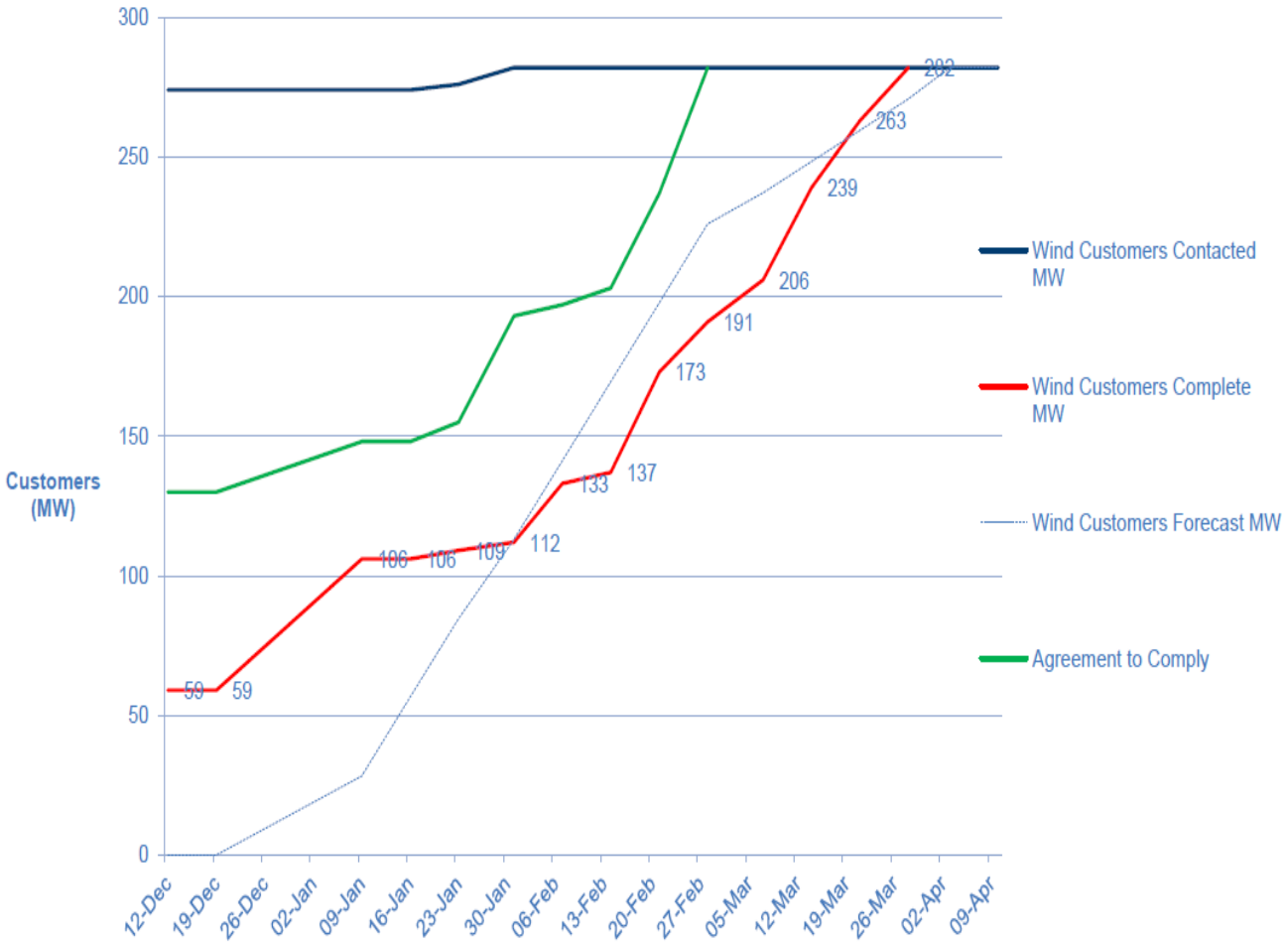
Update since Mis-communication on ESBN ROCOF targets

- **Much dialogue between ESBN - CRU – UR**
- **Two main strands of work identified**
- **[1] TSO-DSO Validation strand – Now complete**
- **[2] Major project to bring the remaining generators to compliance**

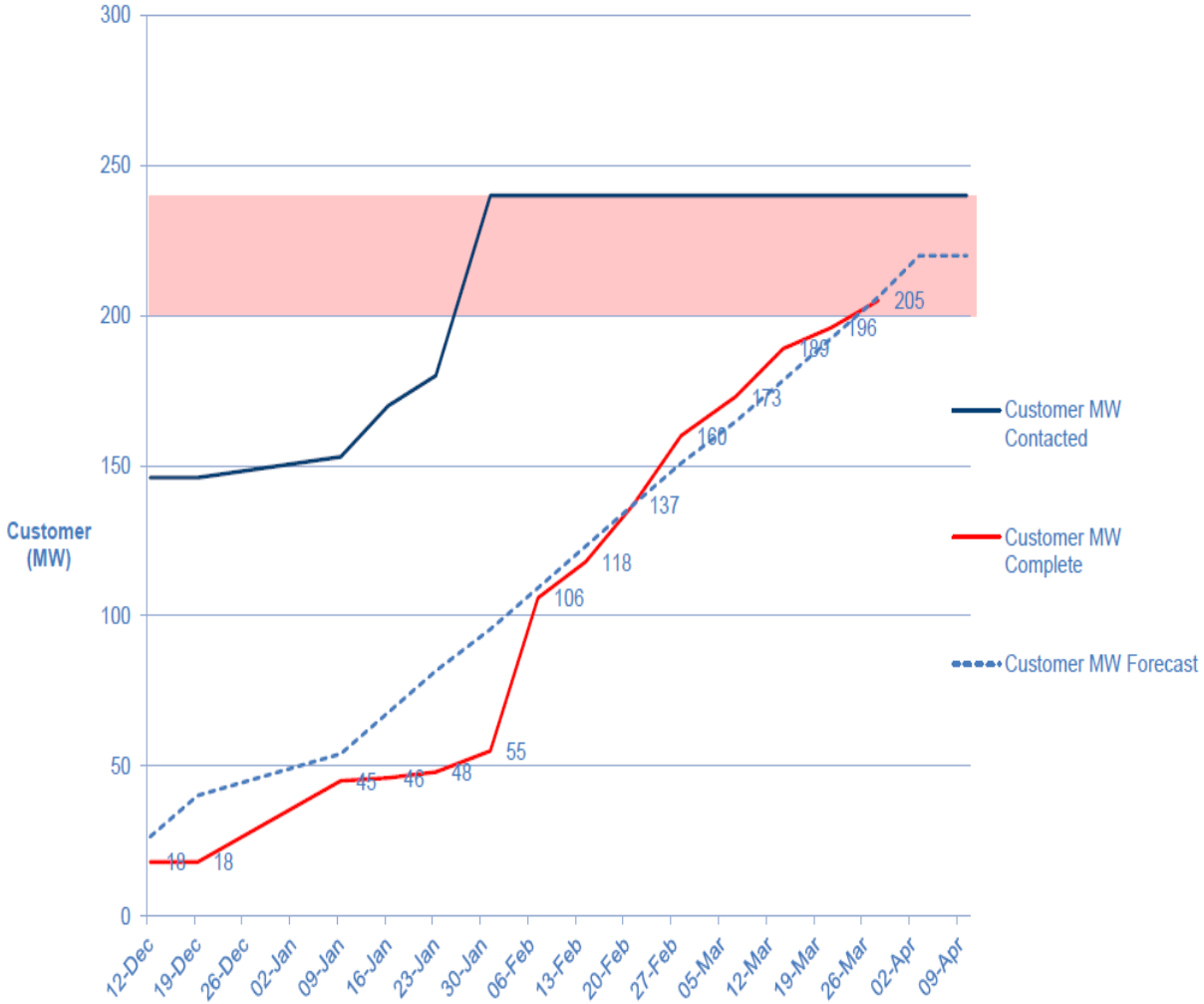
ESBN Summary Position (as of 27/03/20)

Total Phase 2 (522 MW) 498 MW (95%) Complete	24 MW Remaining
Wind Vector Shift (282MW) 282 MW (99.9%) Complete	0.25 MW Remaining (1 sites)
Non Wind VS & RoCoF (240MW) 205 MW (85%) Complete	24 MW Remaining (89 Sites)
Verification Required (120MW; 180sites) 45MW (37%) 18 sites (10%) Verified	Verification Complete based on 10% of Sites and 37% of MW
Phase 1 Total (1609 MW) Wind Complete (1266MW) Non Wind Complete (343 MW)	Phase 1 Completed 2018

Wind Vector Shift progress



NON-Wind ROCOF progress



Summary status

- Windfarms remain: 0.25 MW, 1 site
- Non Wind: 24MW, 89 sites
- It is ESB Network's understanding, that this comprises sufficient progress to allow the SNSP trials to commence
- Some previously scheduled work has been hampered due to site restrictions arising from Covid19.
- Since March 31st and taking due consideration of the national status due to Covid19, ESBN continues to engage with customers with non compliant generators, taking all necessary action to ensure compliance with Government advice.

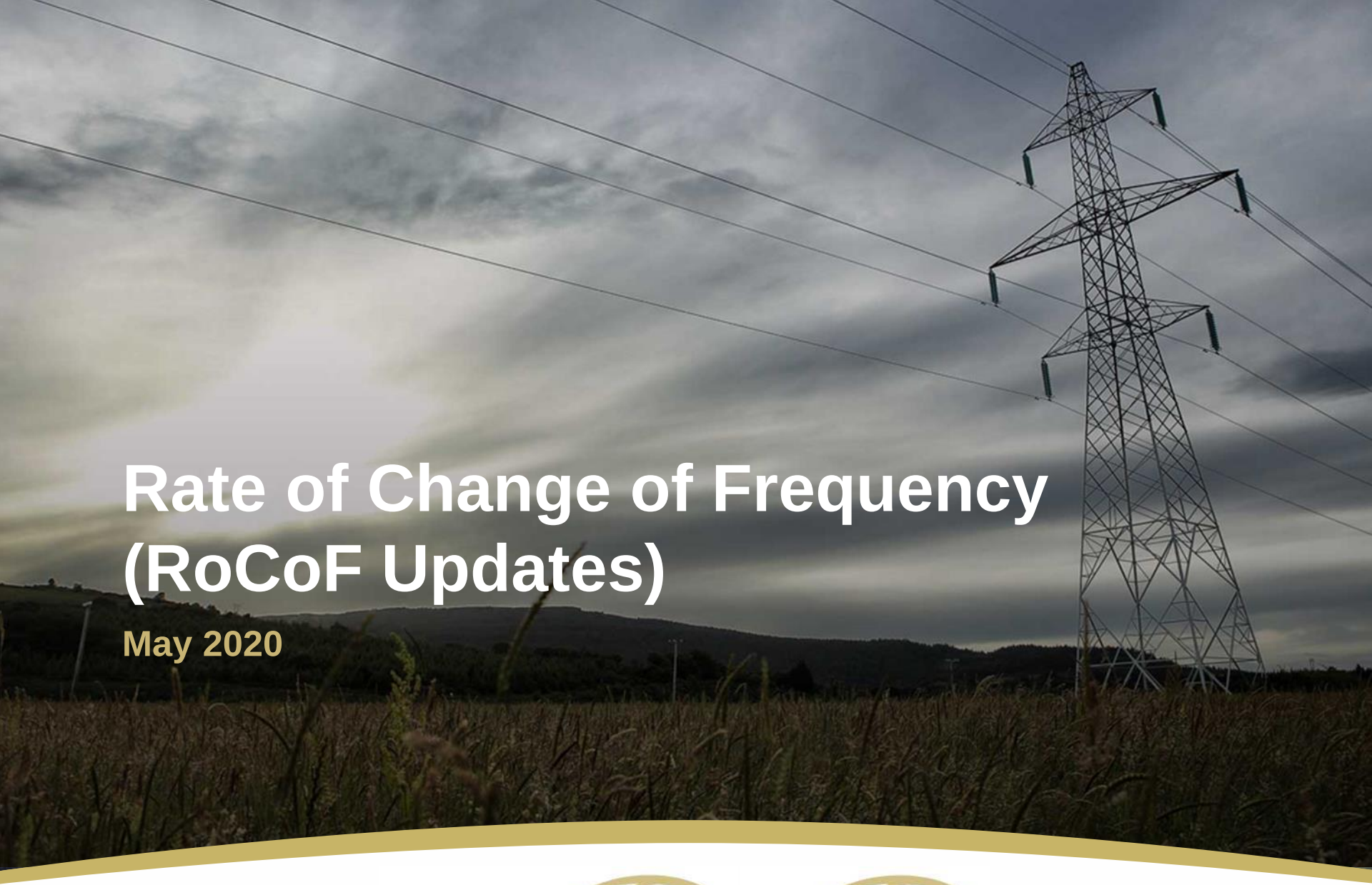
Closing remarks and acknowledgements

- Huge team effort
- Many challenges
- Necessary to move from a collegiate approach with OEMs to a more enforcement based approach with customers with varying degrees of threat of sanction
- Full use made of ESBN customer service network to re-enforce messaging of need to comply

Particular call-outs:

- Eoghan O'Callaghan team lead
- Gary Mooney, Matt Cunningham Engineering and Major Projects
- All ESBN Regional Technical Services Managers
- Synchronous Generators Ireland and their membership – particular call out for Ger Beatty

Questions?



Rate of Change of Frequency (RoCoF Updates)

May 2020

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RoCoF Physical Changes Status – May 2020

Overall TOTAL (approx. 11,889 MW)
11,616 MW (98%) complete

273 MW remaining

Conventional Generation (8,638MW total)
8389 MW (97%) complete
Roll-out completed in IE

249 MW (1 Units) remaining in NI

Wind (2,223 MW total)
2223 MW (100%) complete
Roll-out completed in NI and IE

Small-scale/embedded (approx. 908 MW total)
884 MW (98%) complete
400MW in NI Complete (confirmed by D. Hill, NIEN)

24 MW (106 sites) remaining of non-wind

Sites where further information is needed (120 MW)
45MW (100%) completed
following further investigation no additional changes are required

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TSO RoCoF Validation Status

	Complete Information	Evaluated by TSO	RoCoF Go/No go
TX Consumers Ireland			
TX Generation Ireland			
DX LSG Generation Ireland			
DX SSG Ireland			
TX Generation Northern Ireland			
DX LSG Generation Northern Ireland			
DX SSG Ireland Northern Ireland			
System Interactions Trial Readiness			

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DS3 Milestone plan

Ian Connaughton, EirGrid

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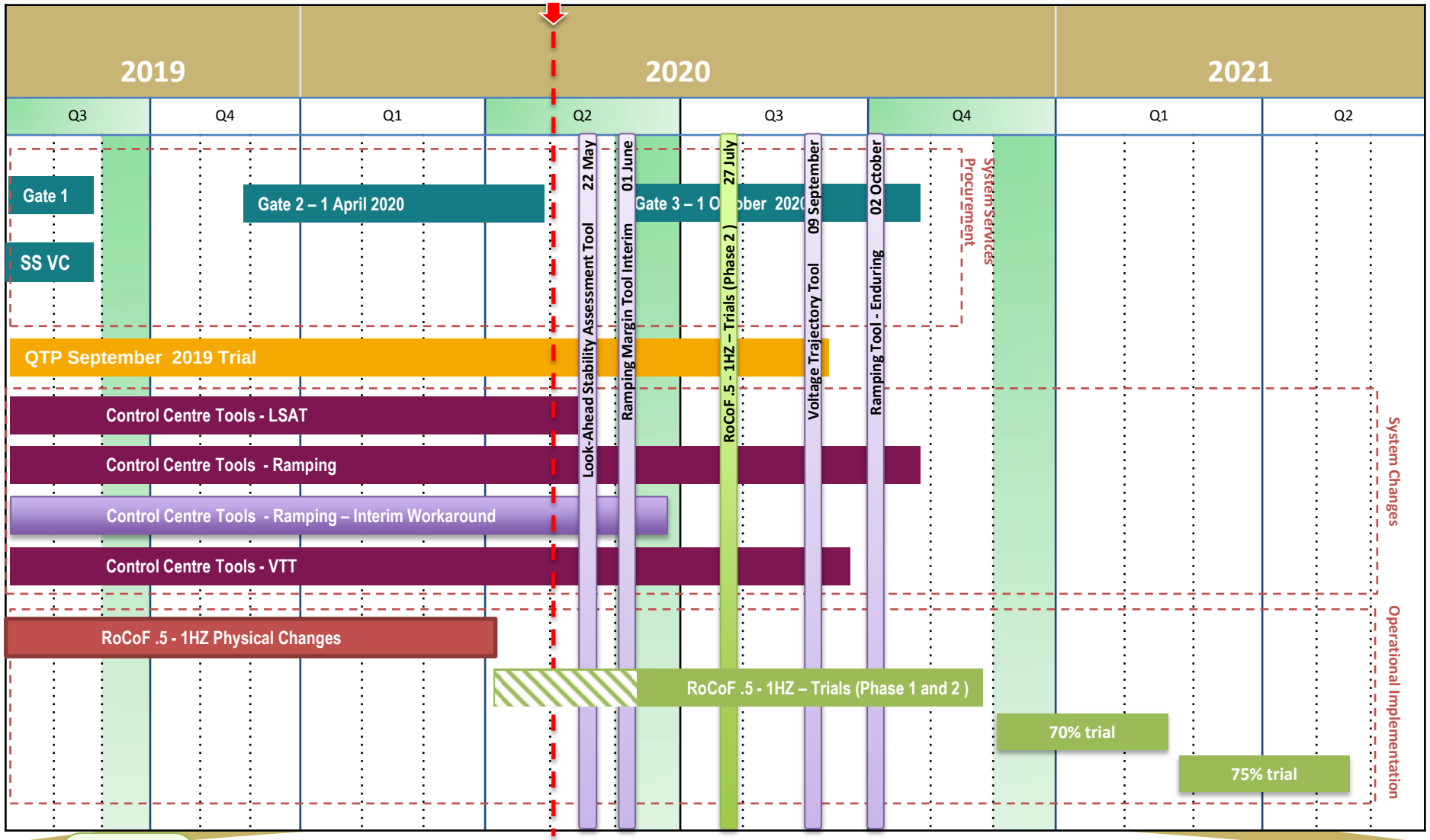
DS3 Plan May 2020 DS3 Milestone V10.0



C.A.P Milestone: Flex Tech Integration Initiative

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Control Centre Tools Update

Mary Hennessy, EirGrid

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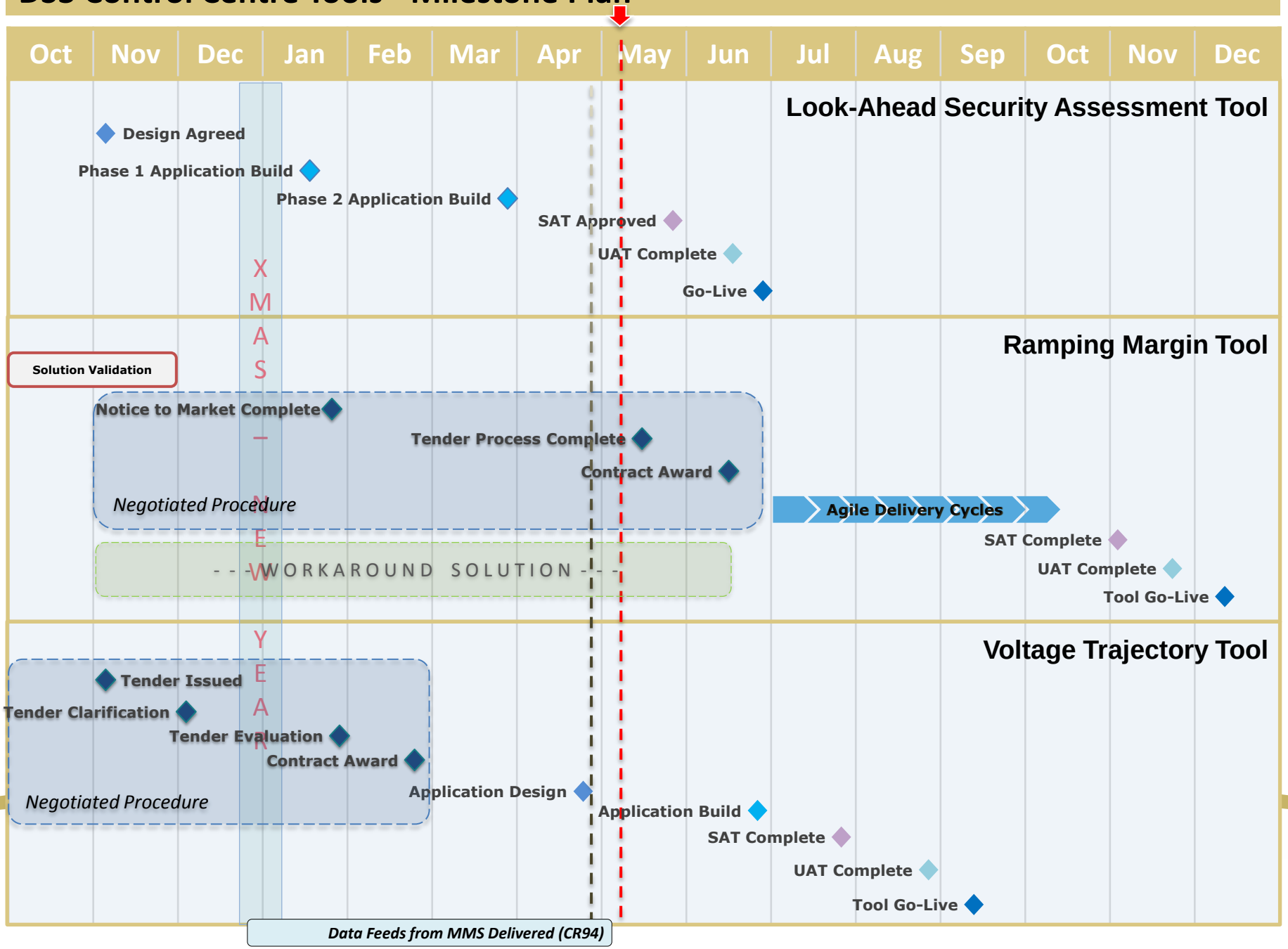
DS3 Control Centre Tools - Milestone Plan



Control Centre Tools - Status Update

Look-ahead Security Assessment Tool:

- Project delivery phase commenced in Nov 2019.
- Development has completed and Acceptance testing is in progress.
- Go live in both control centres is due in Jun 2020.

Ramping Margin Tool - Interim:

- Project delivery has moved into the Testing phase.
- Full rollout in both control centres is due by Jun 2020.

Ramping Margin Tool - Enduring:

- Design for Ramping Margin Tool has been validated by third party in Dec 2019.
- Procurement is underway and go live in both control centres is due in Q4 2020.

Voltage Trajectory Tool:

- Procurement is in final stage and go live in both control centres is due Sep 2020.

Procurement Update

Joe Deegan

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Volume Uncapped Gate 2 Outcomes

- New / amended contracts for 39 Providing Units were implemented effective 01/04/2020
- This figure is net of tender withdrawals, testing failures and tender outcomes that did not impact any contracted capability
- EirGrid / SONI contract execution via DocuSign
- Procurement outcome published on OJEU and on EirGrid and SONI websites

Volume Uncapped Gate 2 Outcomes

New Units	Number	Reserve	SSRP	Ramping
Wind	10	✓	✓	
DSU	4	✓		✓
Battery	1	✓	✓	
Hybrid PPM	1	✓		

Existing Units – New Service	Number	Reserve	SSRP	Ramping
Wind	2	✓		

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Volume Uncapped Gate 2 Outcomes

Existing Units – Amend Service	Number	Reserve	SSRP	Ramping
Conventional	4	✓		
Wind	3	✓	✓	
DSU	8	✓		✓

Existing Units – New & Amend Service	Number	Reserve	SSRP	Ramping
Wind	2	✓		
DSU	4	✓		✓

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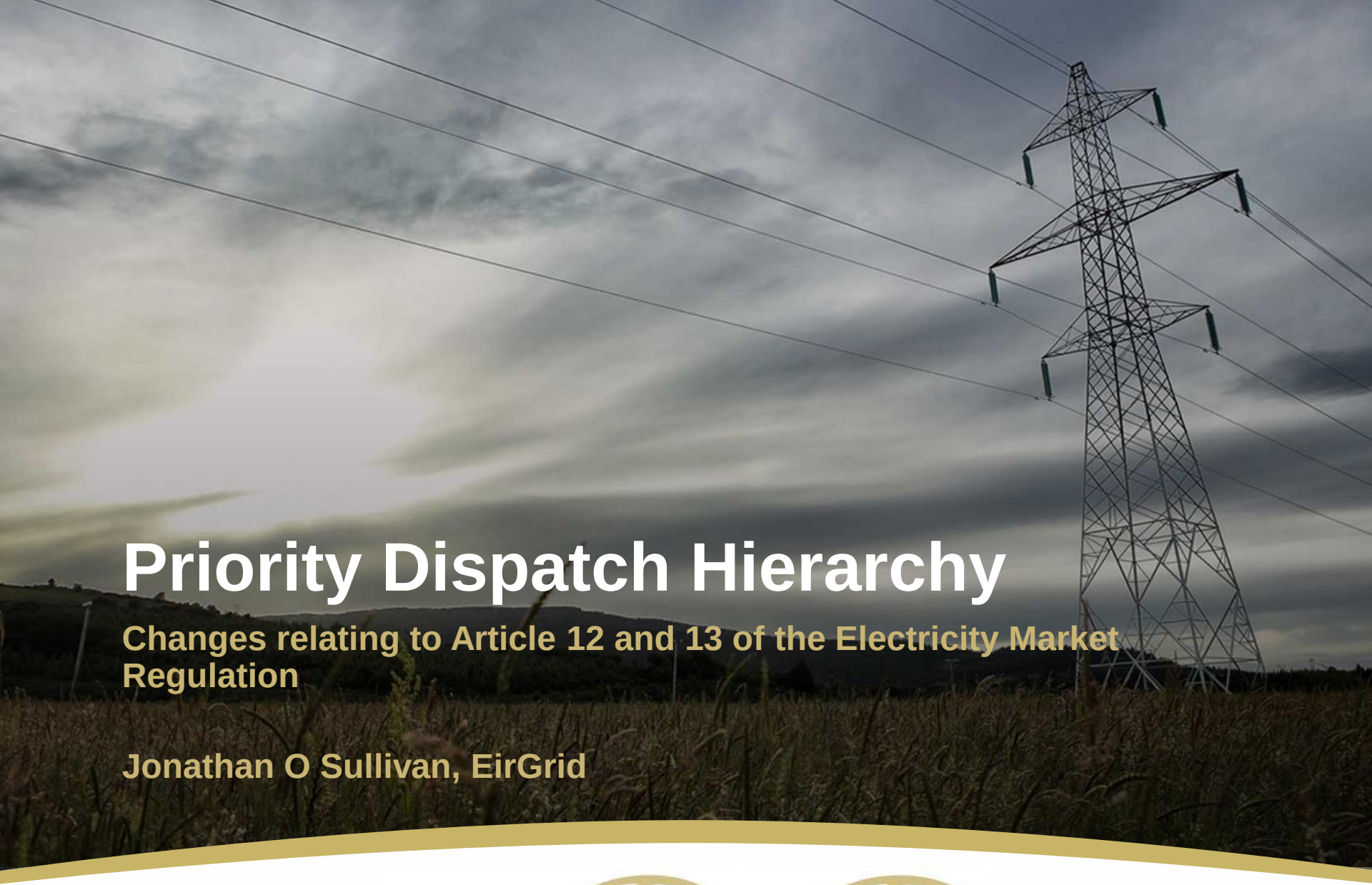

Priority Dispatch Hierarchy

Changes relating to Article 12 and 13 of the Electricity Market Regulation

Jonathan O Sullivan, EirGrid

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Introduction

- **Regulation EU/2019/943 introduced on 5 June 2019**
  - First EU legal regulations to avail of Lisbon Treaty Energy Co-competence
  - In development between 2016-2019 through ACER, Commission, MS
  - Regulation needs no transposition to National Law
  - But MS has rights to clarify implementation
    - European Court of Justice (ECJ) ultimate arbiter
    - EU Commission is the Enforcement Agent
  - Implemented across EU at the same time
  - Regulation commences from 1st Jan 2020 in Ireland and Northern Ireland

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Introduction

- **Article 12 Introduces material change to Priority Dispatch**
  - Concept of Priority Dispatch removed for all new RES-E
  - Existing units keep it until they make a material change
  - Market position main determinate of running position (EU self dispatch concept)

- **Article 13 Introduces material change to compensation for re-dispatch downwards for RES-E**
  - SO shall compensation for dispatch down from “Market positon”
  - Unless the connection agreement has no guarantee of firm delivery
  - But SO still needs to build network capable of 50% RES-E with less than 5% constraint
  - Price of compensation combination of
    - Operational cost
    - Net revenues from supports

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Current MS Interpretation of the Regulation

1. Newly commissioned renewable generation or high efficiency cogeneration >400kW will not be given Priority Dispatch

2. Renewable generation or high efficiency cogeneration commissioned prior to 4 July 2019 will maintain their Priority Dispatch status in SEM schedules

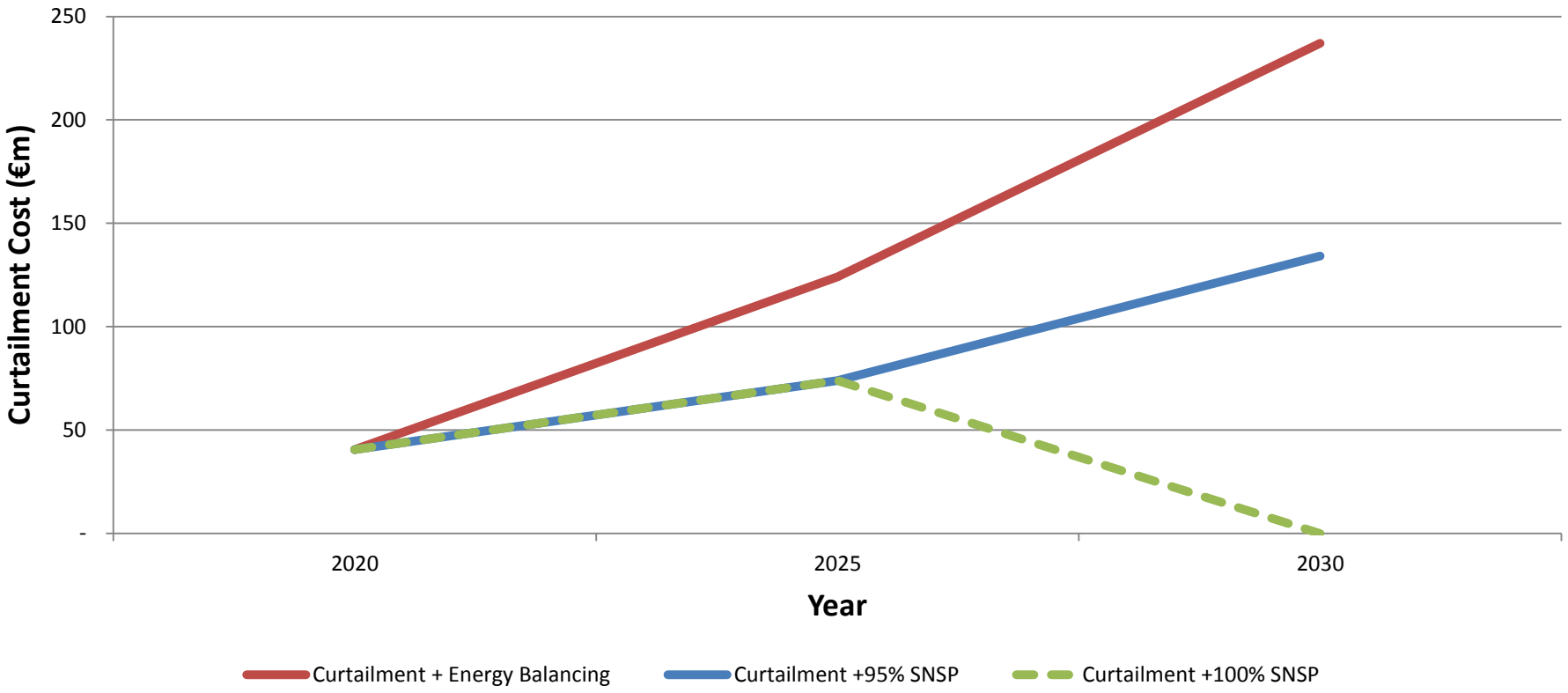
3. Curtailment can be pro-rated across old and new wind units

4. Wind Units need to be fully compensated up to support price by TSO for market redispatchment

5. Any dispatch associated with constraints will be linked to firm access of wind unit

Interpretation is probably a good answer but the reason may not be correct

Potential Re-dispatch Costs to TSO



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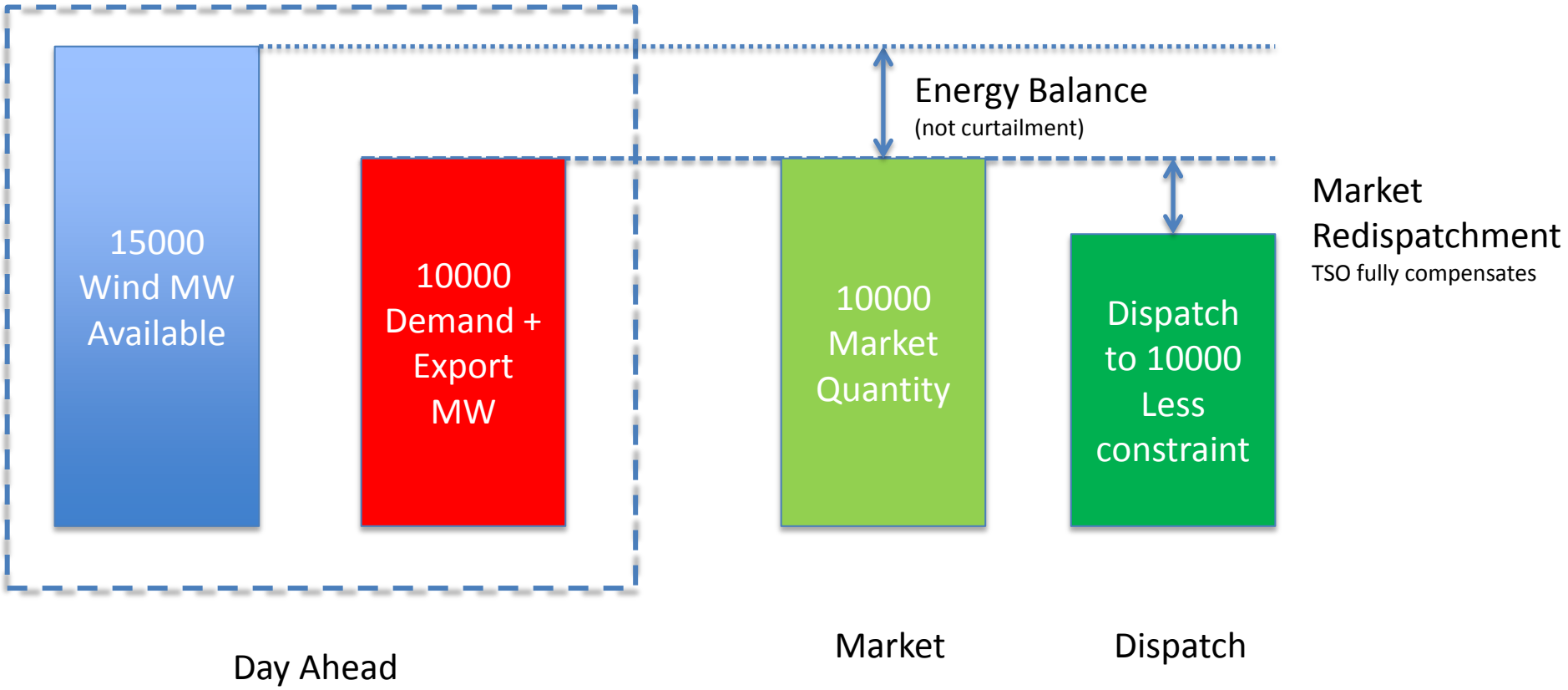
EU Consider too much wind like this…



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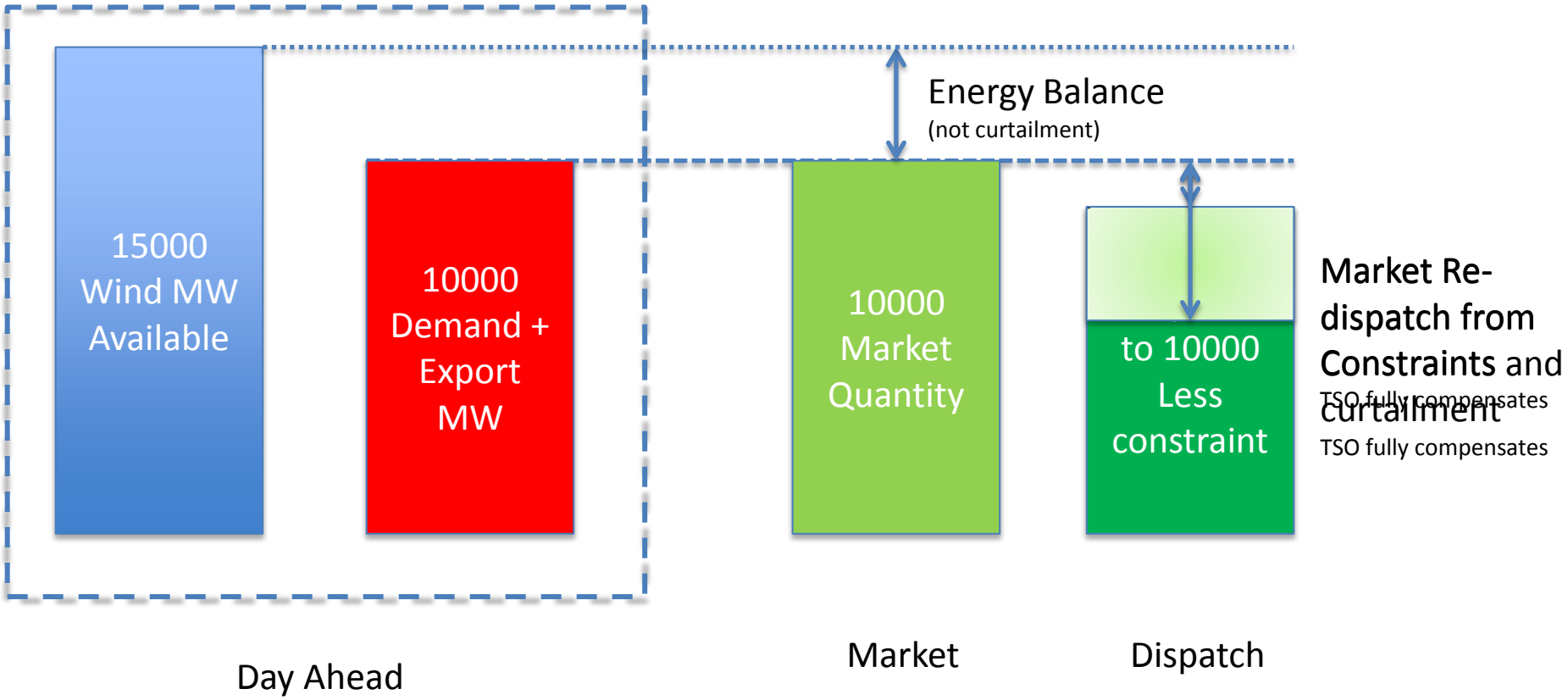
..but we have too much RES-E for pioneering operations…!



Options for Implementing Articles 12 and 13

- Options
  1. Seek implementation clarification with no compensation for re-dispatch
  2. Compensate for re-dispatch fully for renewable generation
  3. Align pioneering operational levels with market position

- Option 3 most suitable
  1. Set SNSP trajectory to 2030 and commit day ahead limit to respect this.
  2. Reduces unjustifiable re-dispatch costs
  3. Aligns market and real dispatch considerably – incentives work now
  4. Provides a strong lever for why we need to achieve network and DS3+ programmes to 2030

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Next Steps

- Feed into RA consultation
  - Outlining options and implications
  - Noting implementation timeframe will be a minimum of 3 years if system changes required
  - Providing a non-market re-dispatch hierarchy that is in keeping with 2010 security of supply decision
- Estimate exposure until clarification achieved
  - Regulation is in place since 1st January 2020.
  - Depending on market position interpretation already exposure
  - Review operating practice in light of this regulation

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Future Arrangements – CRU

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DS3 Advisory Council Membership / Open positions

Jonathan O Sullivan

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Current Open Positions

- Academic / Research
- Conventional x 2
- Storage
- Renewable

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DS3 Advisory Council meeting dates 2020/2021	
Q1	26 February 2020
Q2	20 May 2020
Q3	30 September 2020
Q4	20 January 2021
Dates may be subject to change	

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