



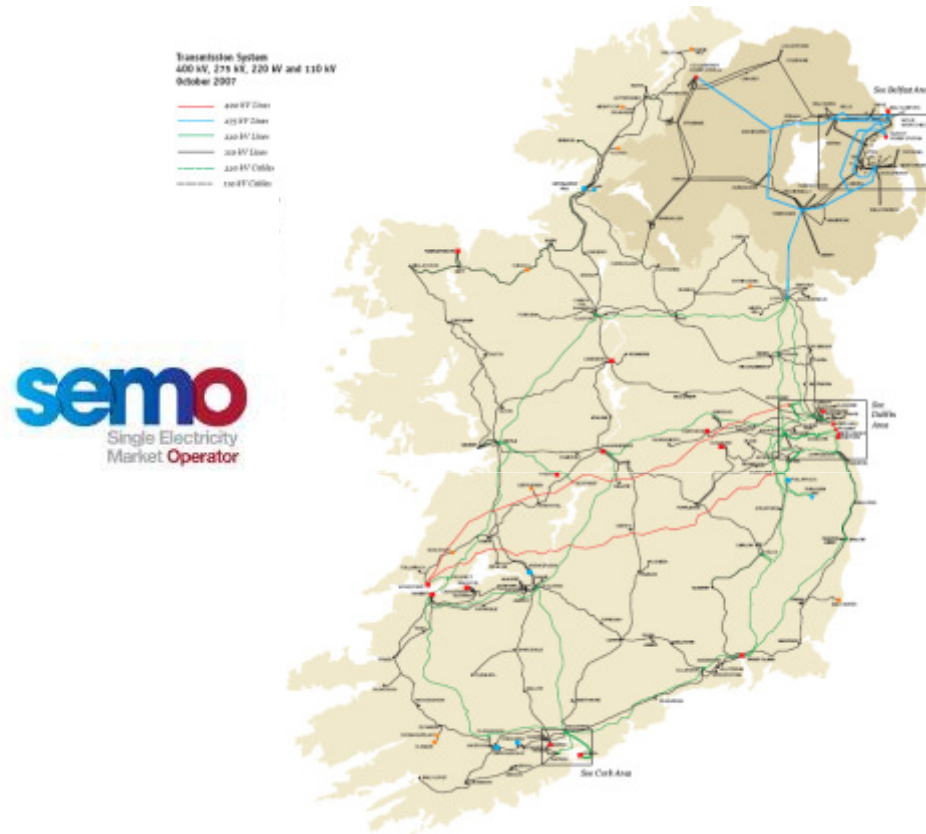
DS3 - RES Integration and System Services

Energy Cork - 3rd October 2018

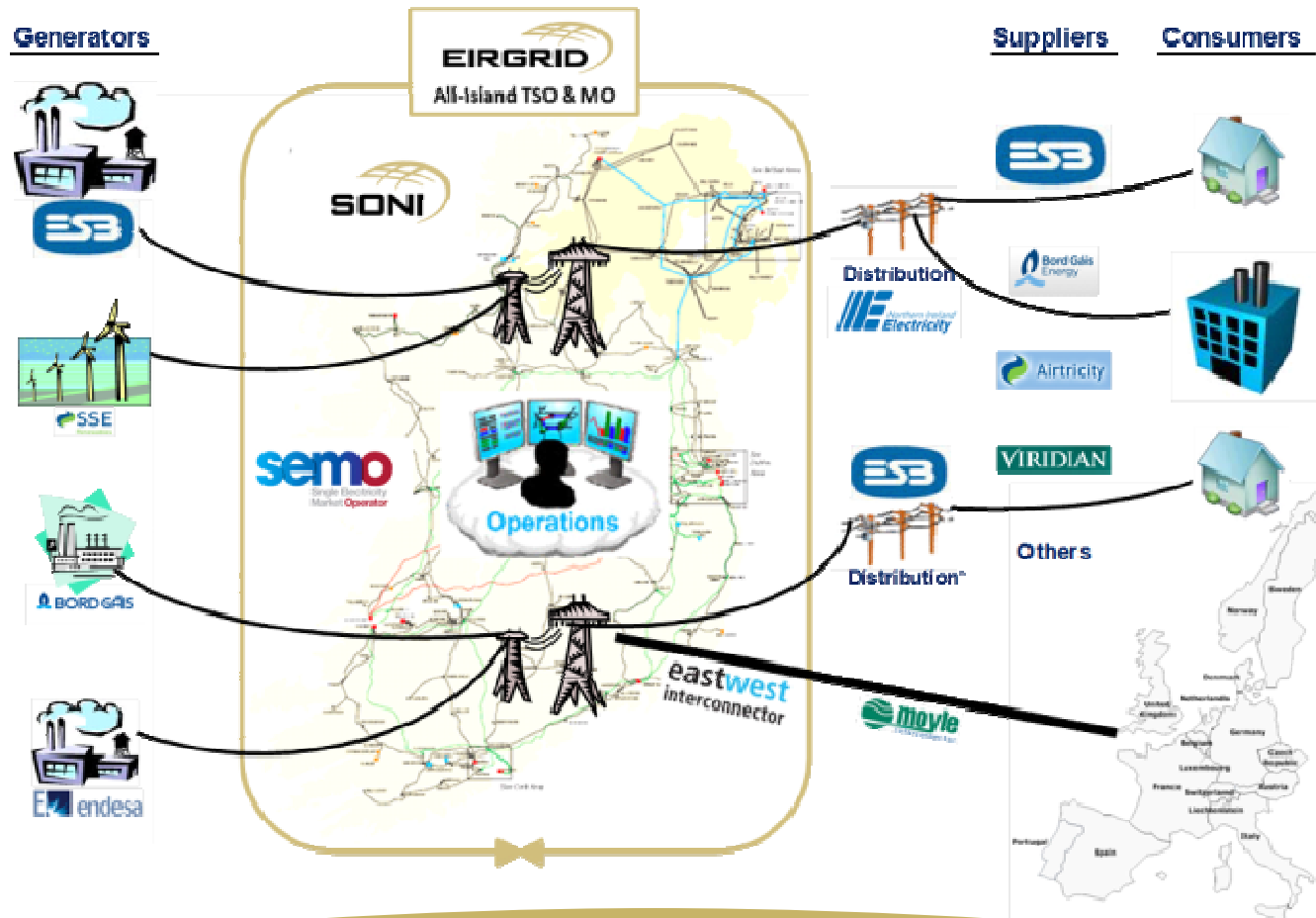
John Young



EirGrid – An All-Island Energy Company



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* Note: In Ireland ESB owns the transmission and distribution system

So why is Ireland relevant...?

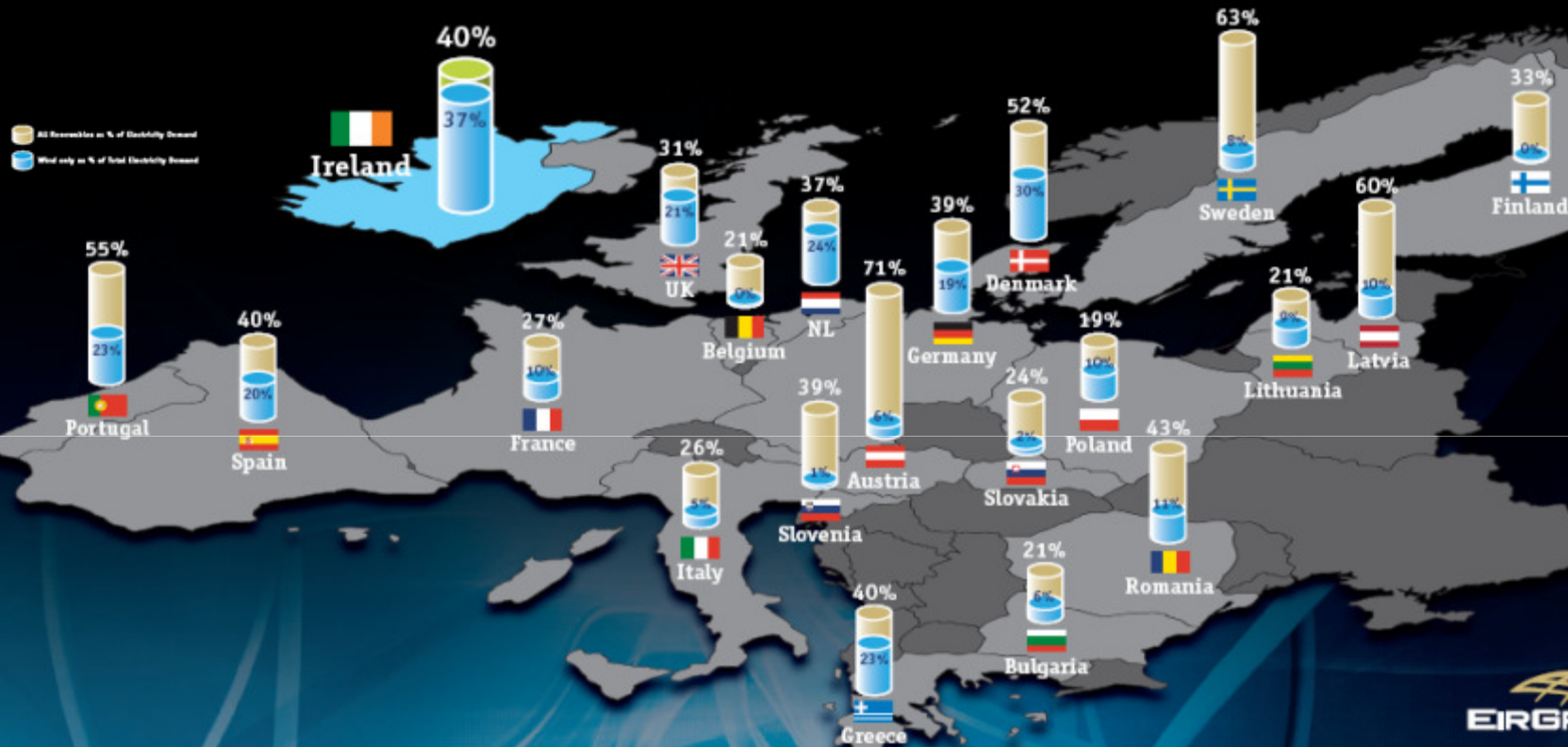
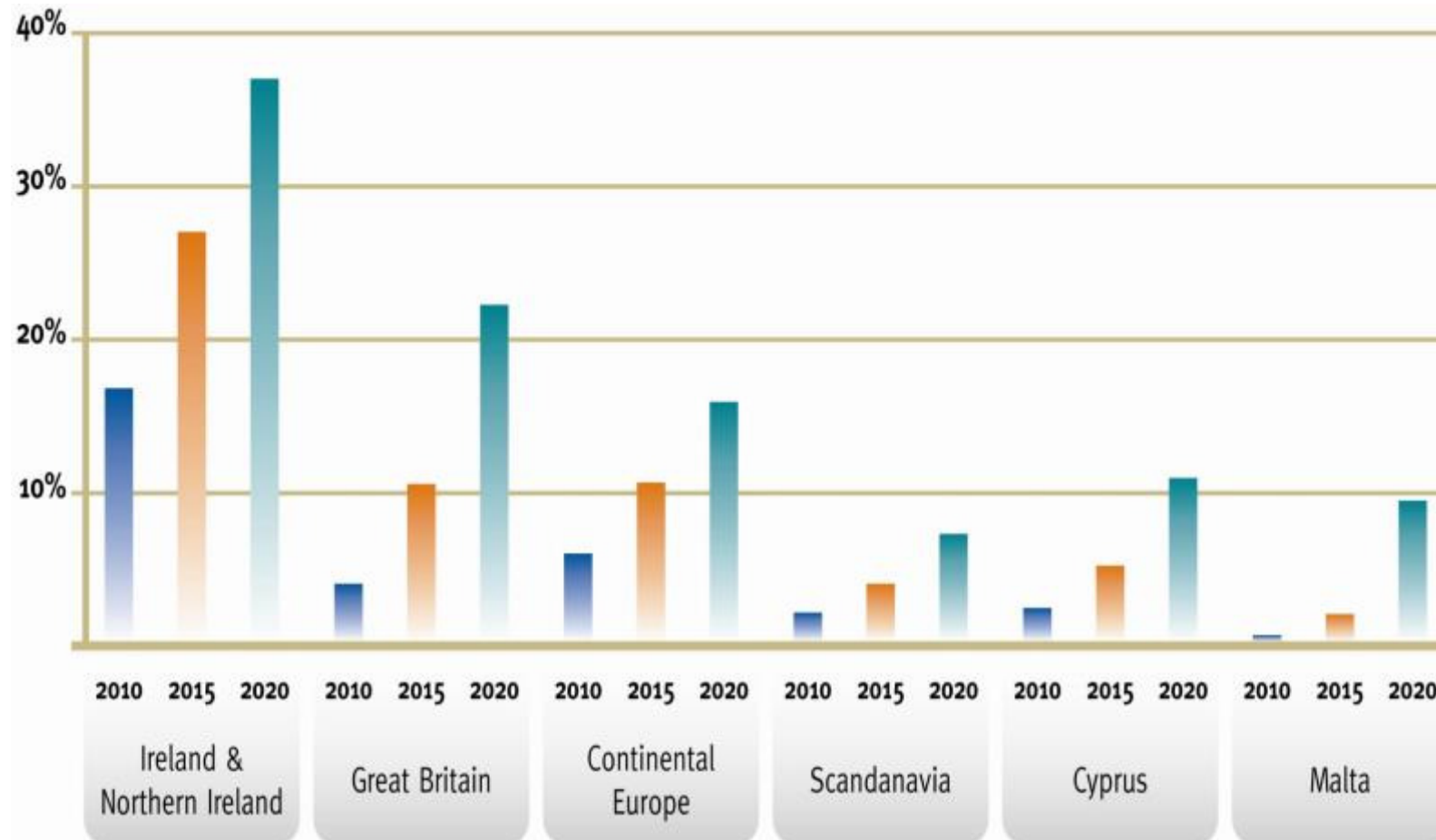


FIGURE 2: EU Wind and Renewable Percentage: 2020

Data collated from information submitted in the National Renewable Energy Action Plans by E.U. Member States to the EU Commission in June 2018

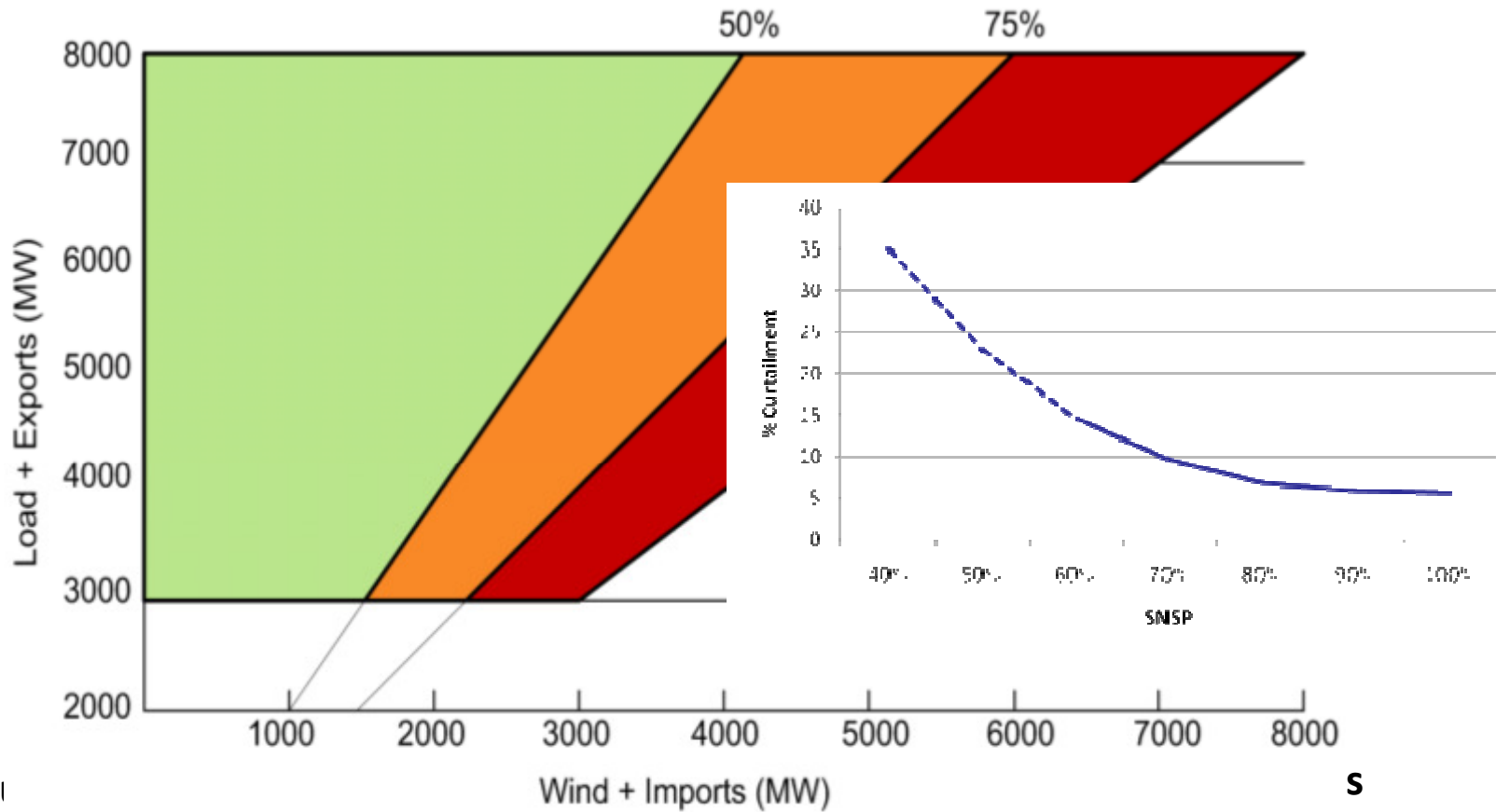


EirGrid is seeing the impacts first...



* Based on analysis of National Renewable Energy Action Plans (NREAPs) as submitted by EU Member States

which if not solved lead to operational limits...



Maximum

S

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



DS3 delivers transformational change

*Change in System Performance
which is incentivised by
System Services*



*Changes in System Policies
which leads to increases in
renewables*

System Tools enabling operational change in the Control Centre

Electricity Industry in Transition...



Renewable
Integration



Demand Side
Management

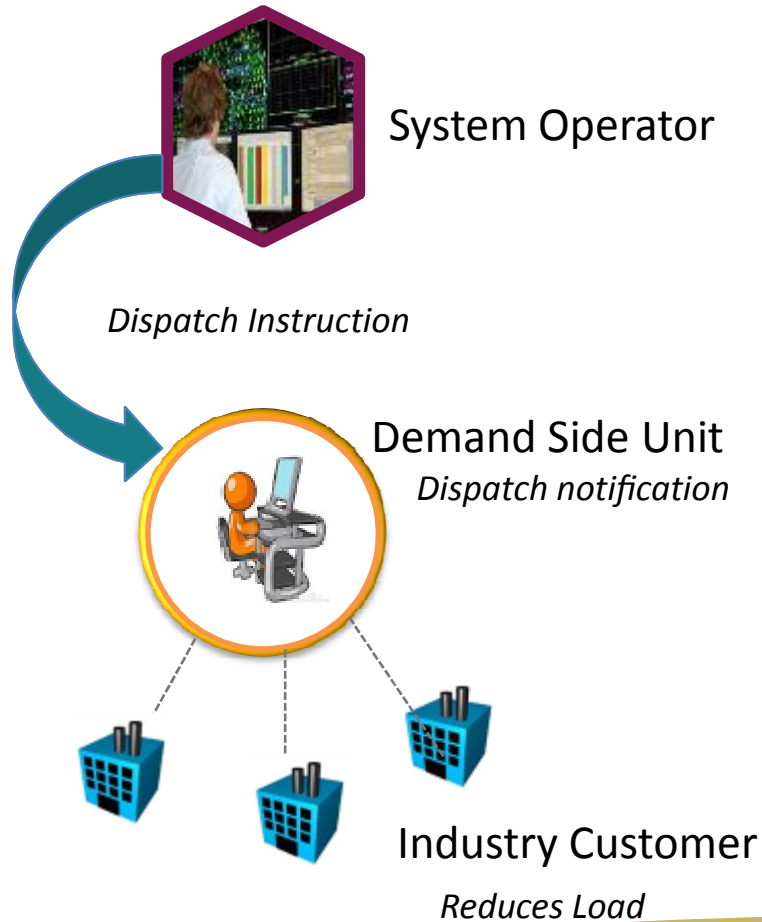


Electrification of
Vehicles



Consumer
Engagement

What is Demand Side Management



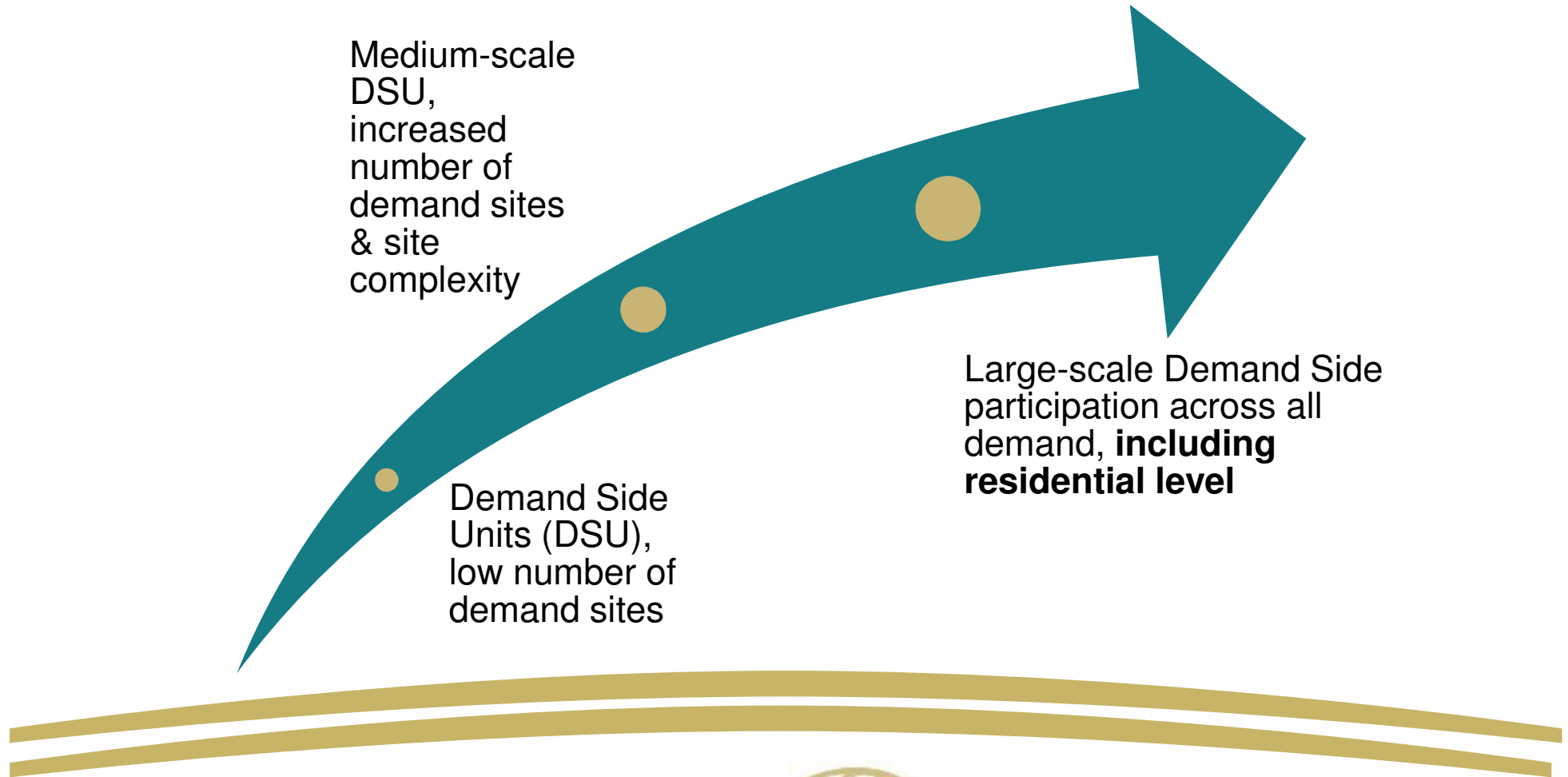
- Greater accommodation of variable RES
- Enhanced capacity adequacy
- Avoided / deferred network investment

System Benefit

- Reduced bills
- Greater control over and engagement with the energy they produce and consume

Consumer Benefit

The Evolution of Demand Side Management in Ireland...



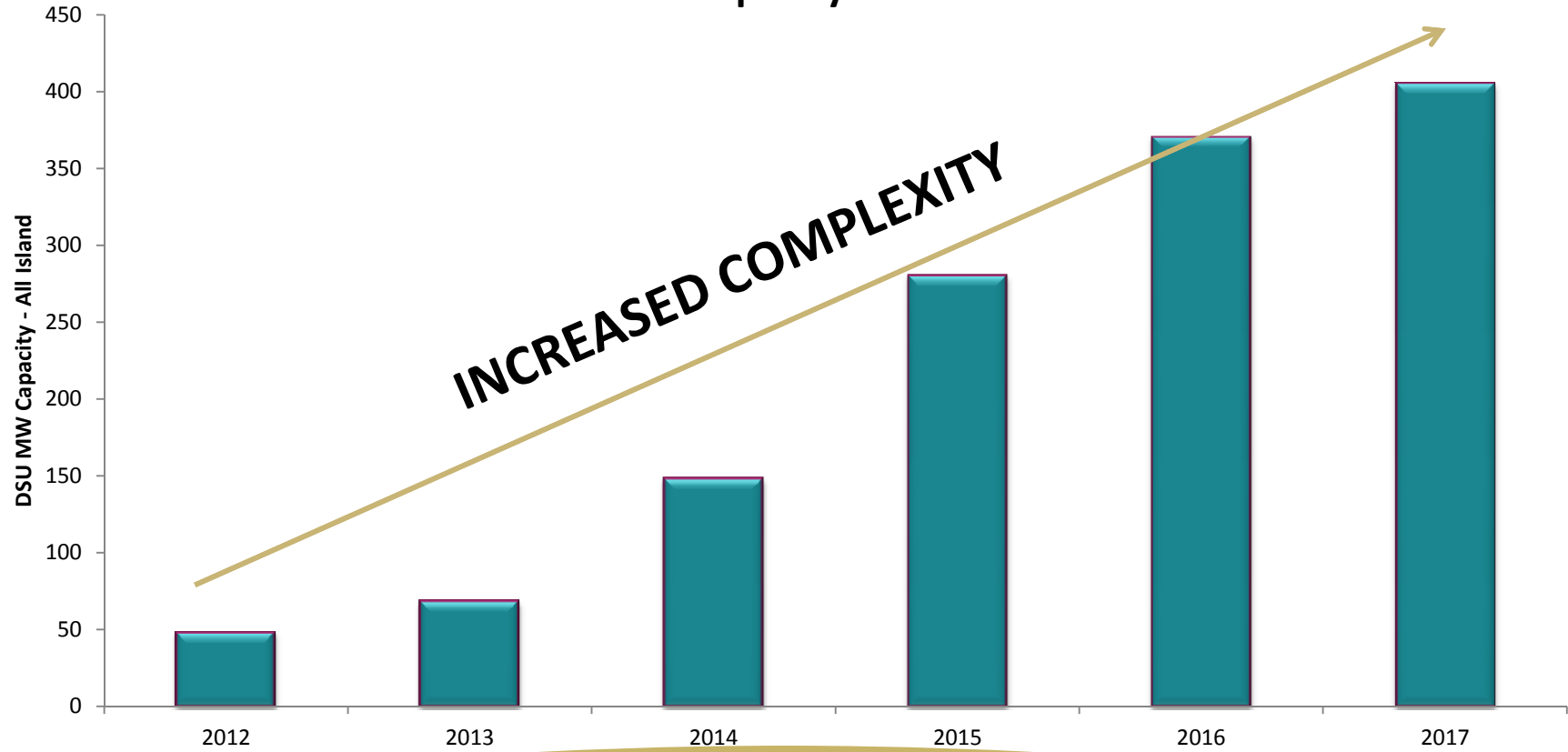
Medium-scale DSU, increased number of demand sites & site complexity

Demand Side Units (DSU), low number of demand sites

Large-scale Demand Side participation across all demand, **including residential level**

In Numbers....

DSU MW Capacity - All Island



....Expecting big change in domestic capabilities...

Technology Advancements



Future Energy Policy

- National & European Policy signalling changes
- Energy Efficiency Directive
- Energy White Paper

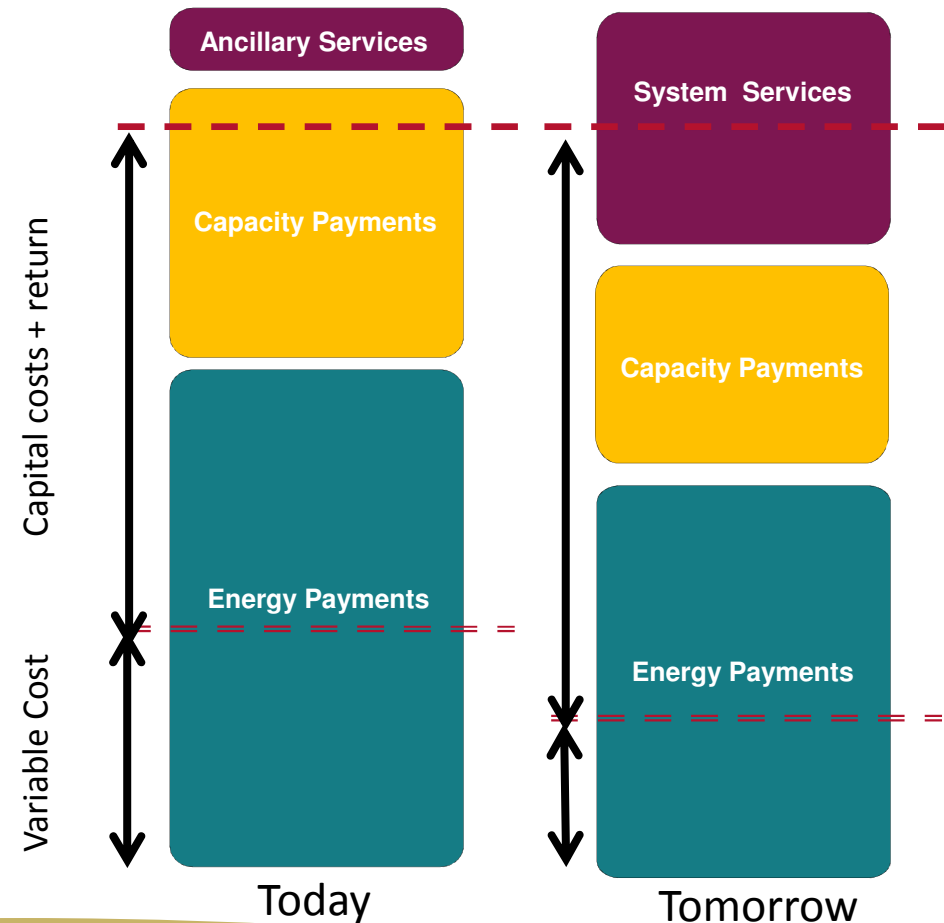


...So we are trialing residential services

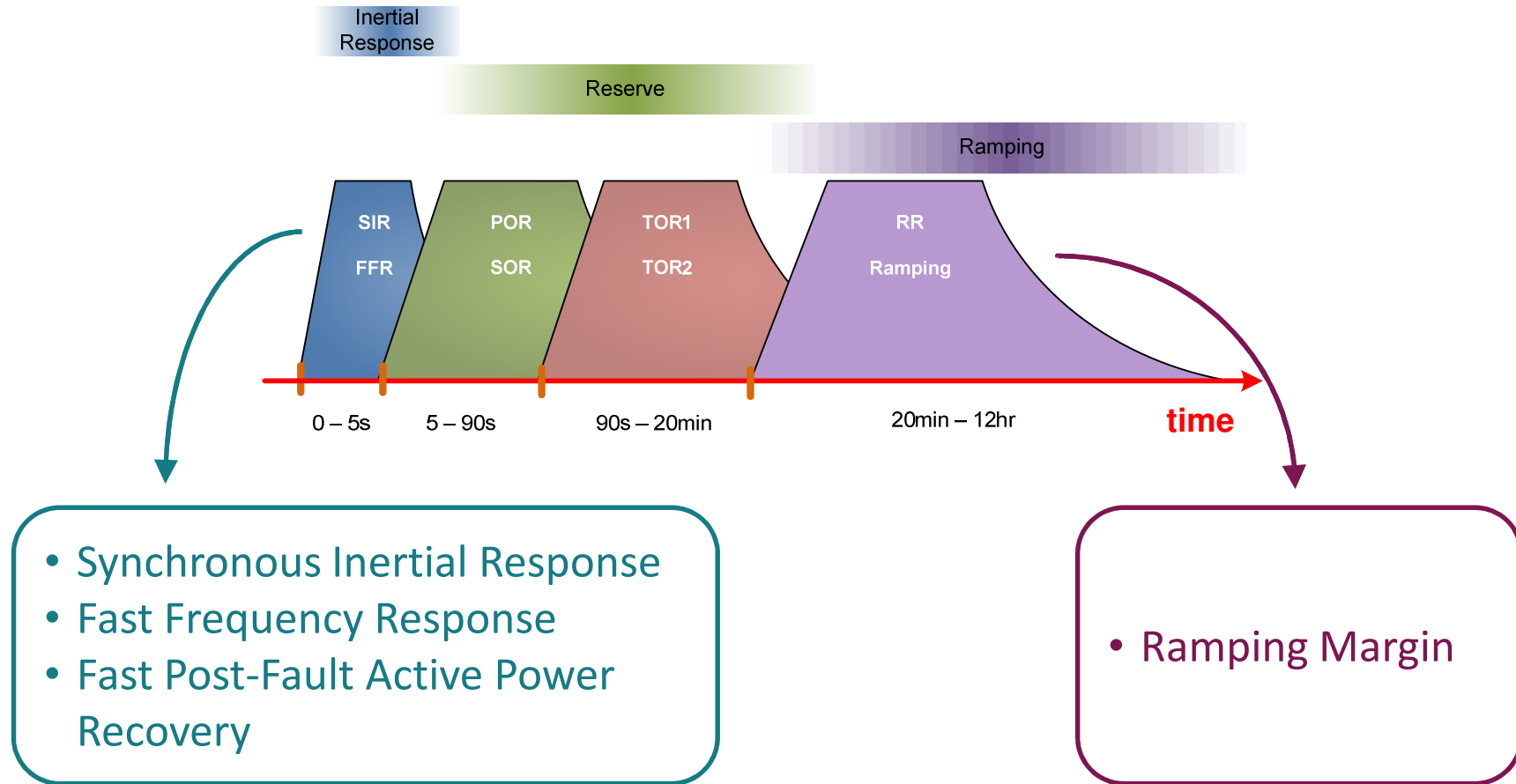


Changing the Market Design for investment

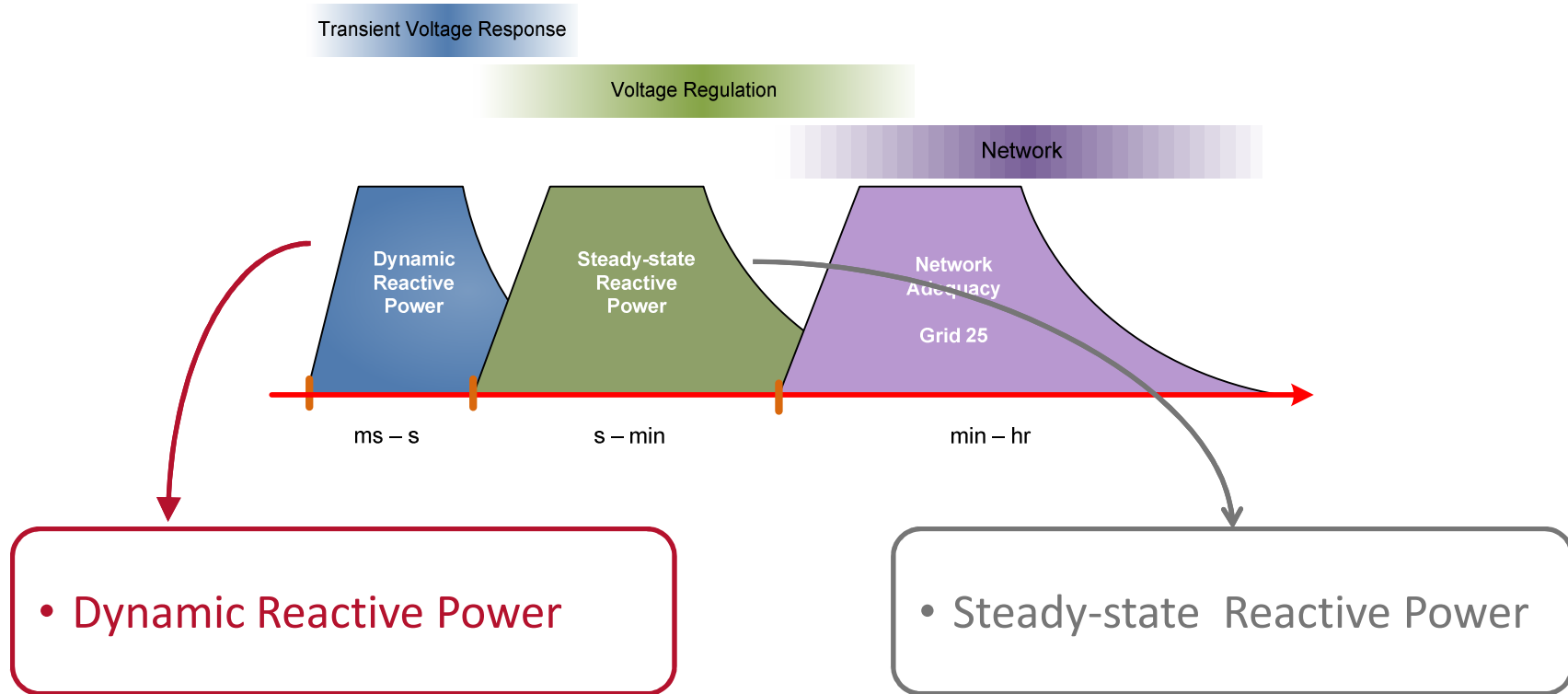
- Financial Mix will move to higher capital lower variable cost technologies
- Incentivise performance to obtain the plant mix that matches the system requirements and achieves the policy objectives



...with new products to meet system scarcities

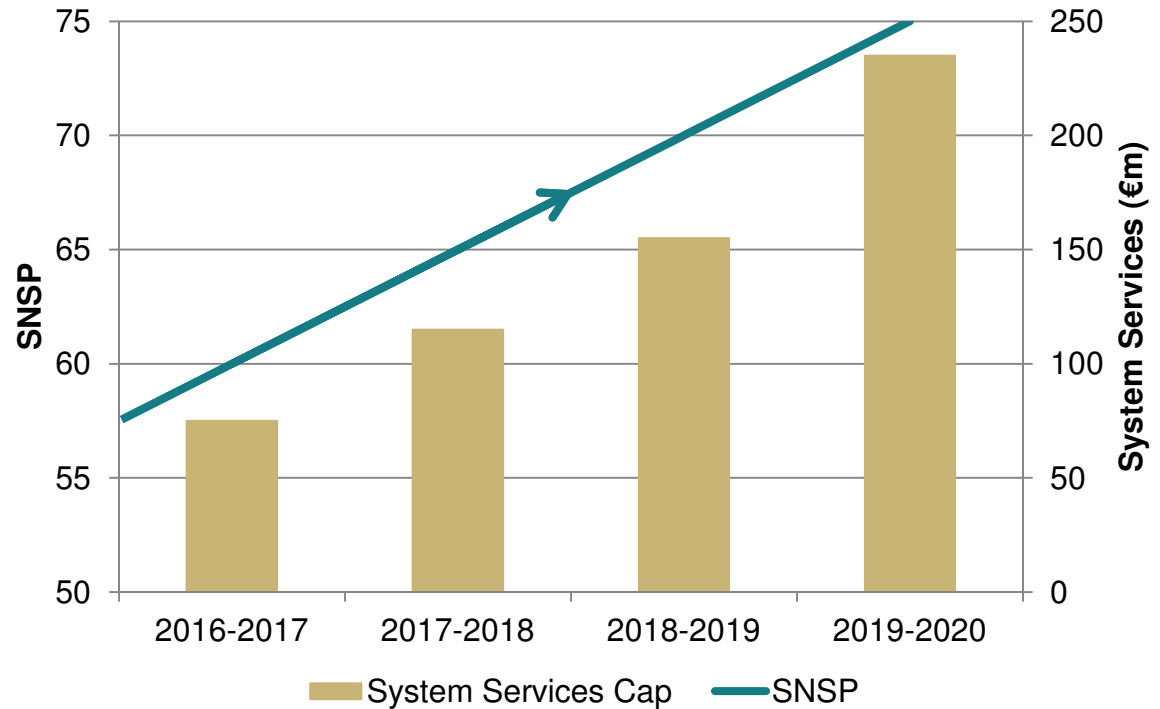


...and not just for frequency



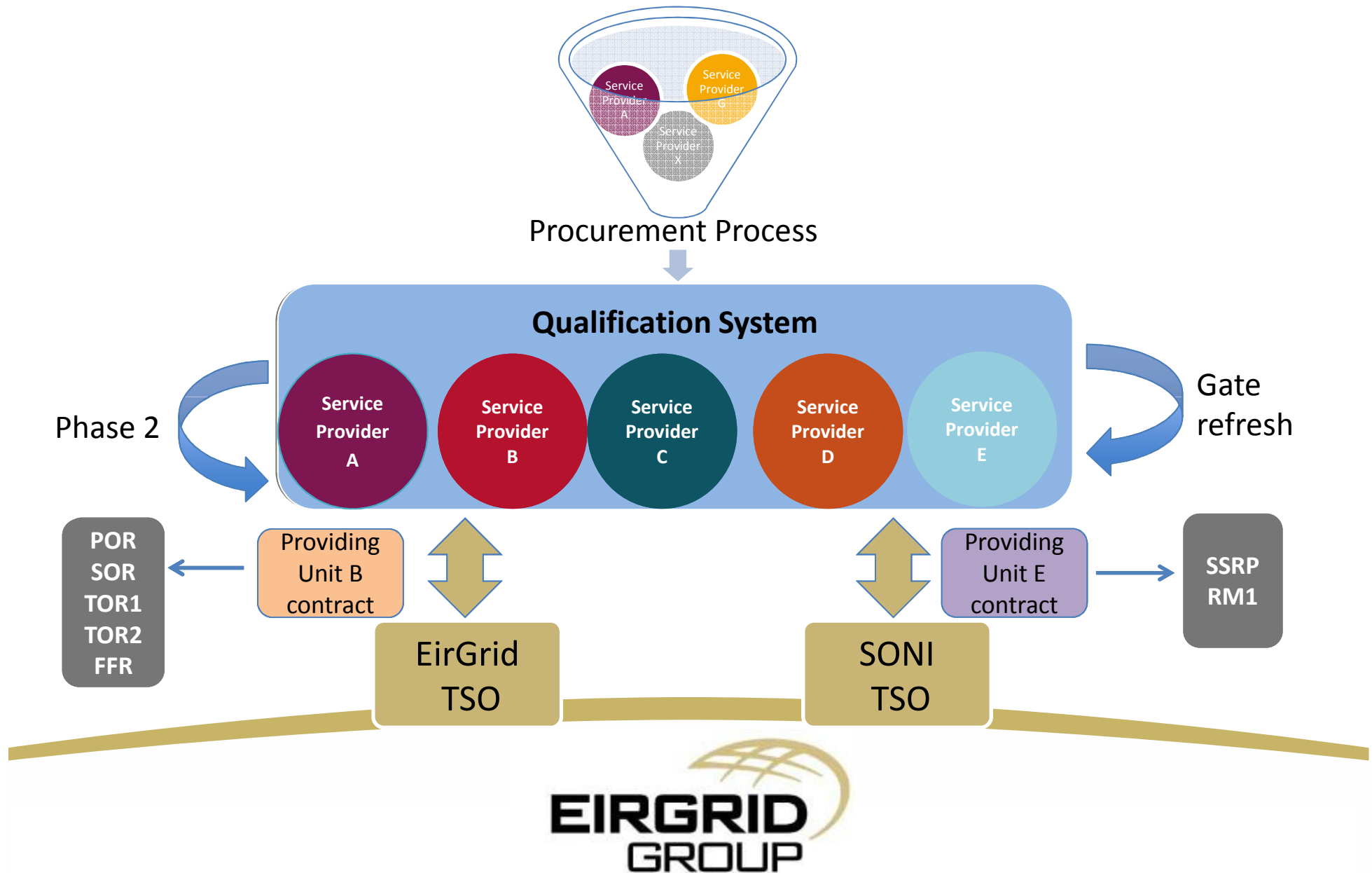
System Services Expenditure

- 14 System Services designed to enable system with high levels of renewables integration
- Provided by existing Service Providers & new Service Providers
 - Storage
 - DSM
 - new technologies



Increasing SNSP requires an increase in the volume of System Services

System Services Procurement



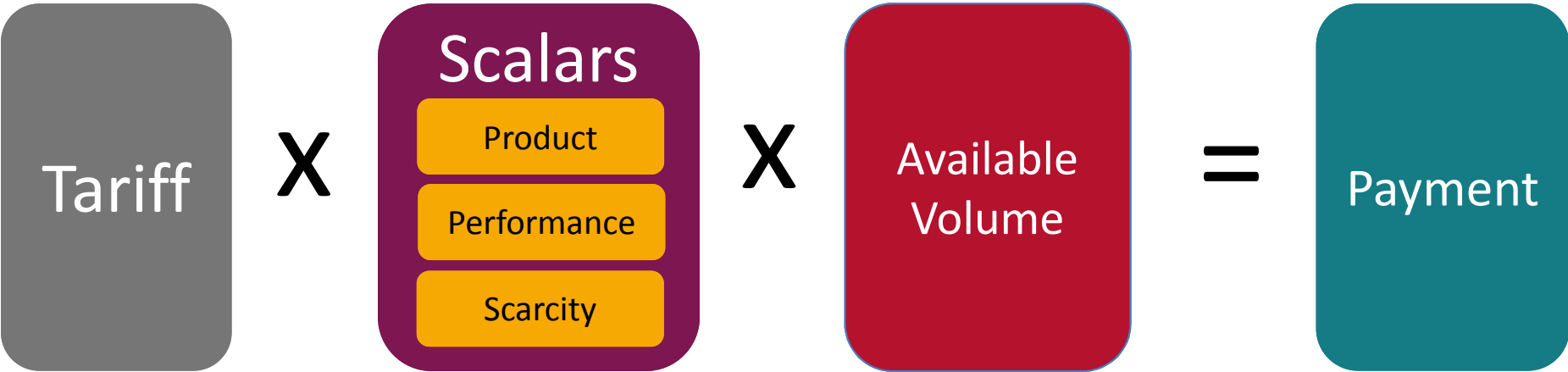
Base Tariff Rates

Service Name	Unit of Payment	Recommend Rate €
Synchronous Inertial Response (SIR)	MWs ² h	0.0050
Primary Operating Reserve (POR)	MWh	3.24
Secondary Operating Reserve (SOR)	MWh	1.96
Tertiary Operating Reserve (TOR1)	MWh	1.55
Tertiary Operating Reserve (TOR2)	MWh	1.24
Replacement Reserve – Synchronised (RRS)	MWh	0.25
Replacement Reserve – Desynchronised (RRD)	MWh	0.56
Ramping Margin 1 (RM1)	MWh	0.12
Ramping Margin 3 (RM3)	MWh	0.18
Ramping Margin 8 (RM8)	MWh	0.16
Steady State Reactive Power (SSRP)	MVarh	0.23
Fast Frequency Response (FFR)	MWh	2.16
Fast Post Fault Active Power Recovery (FPFAPR)	MWh	0.15
Dynamic Reactive Response (DRR)	MWh	0.04

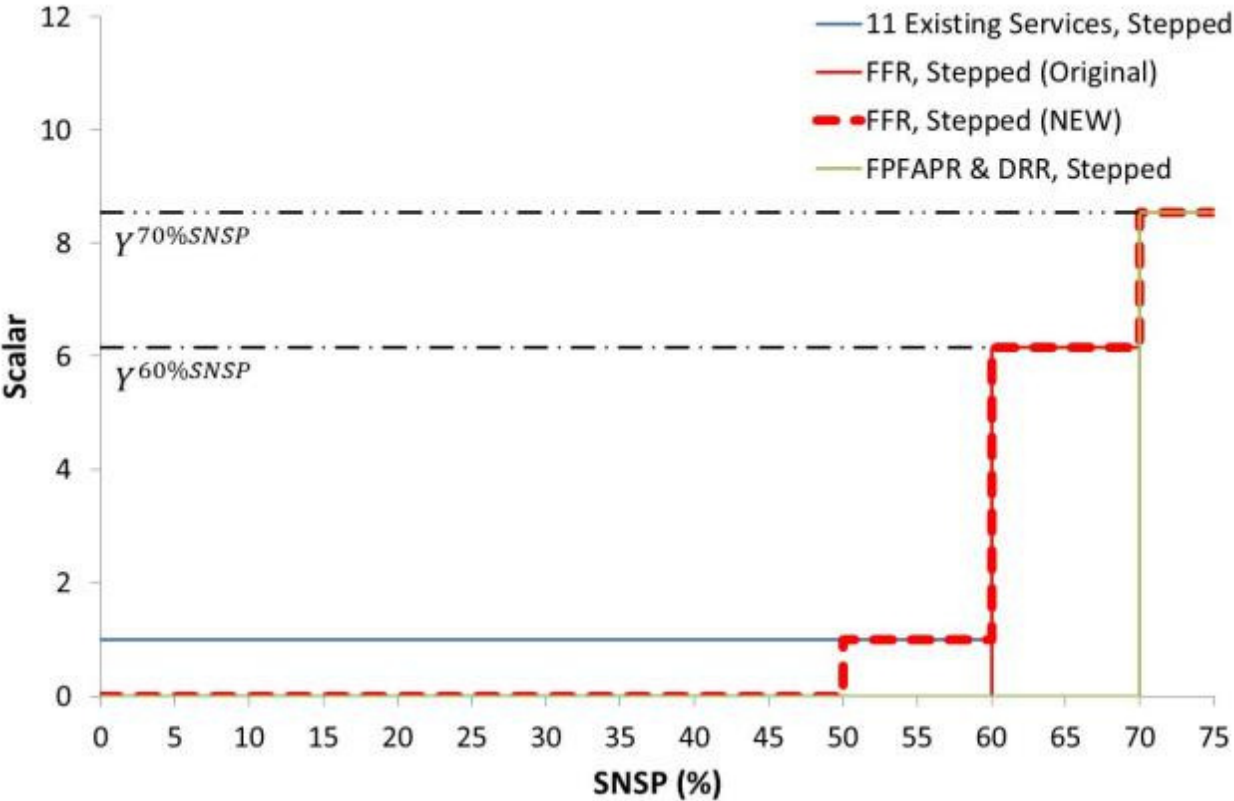
Payment based on availability



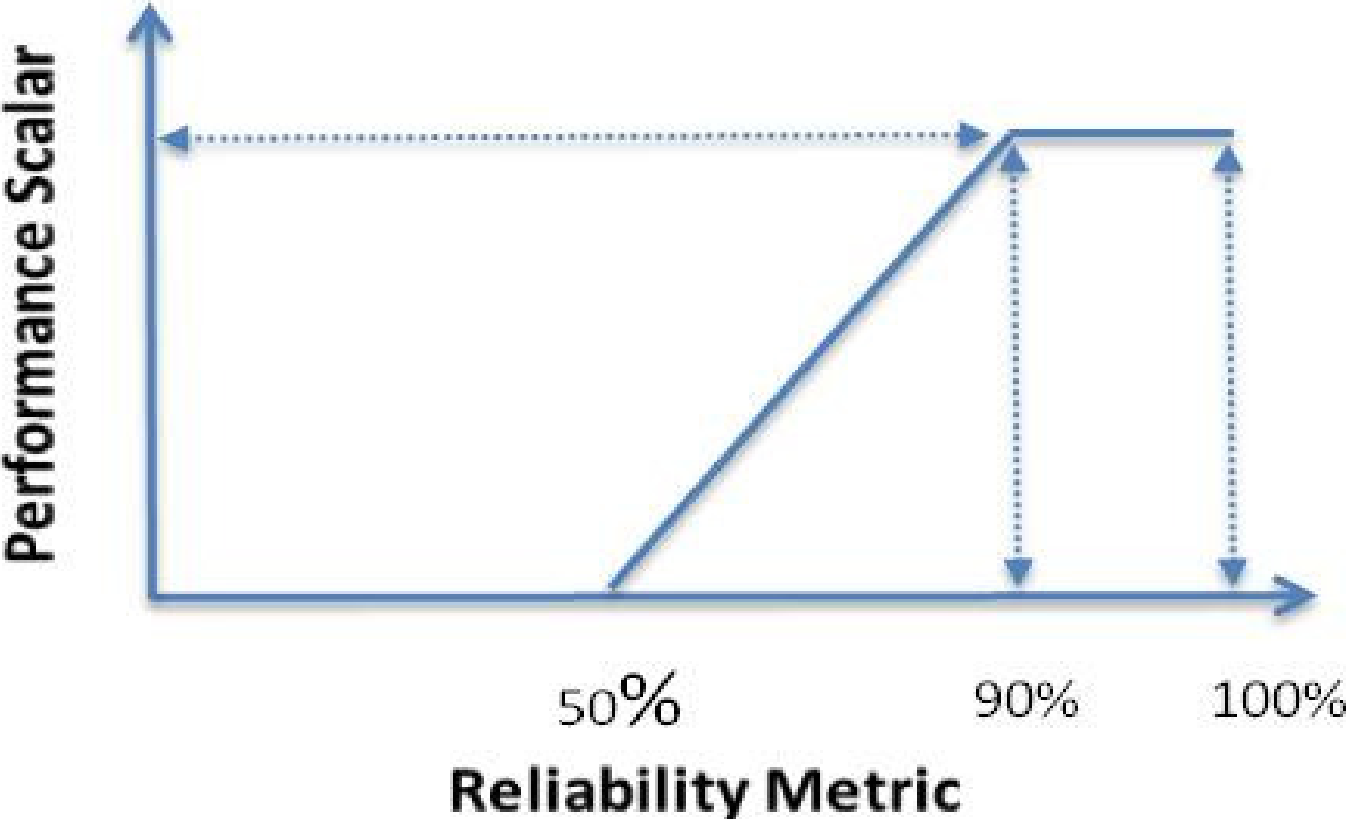
Payment Structure



DS3 – Focus on services at times of scarcity

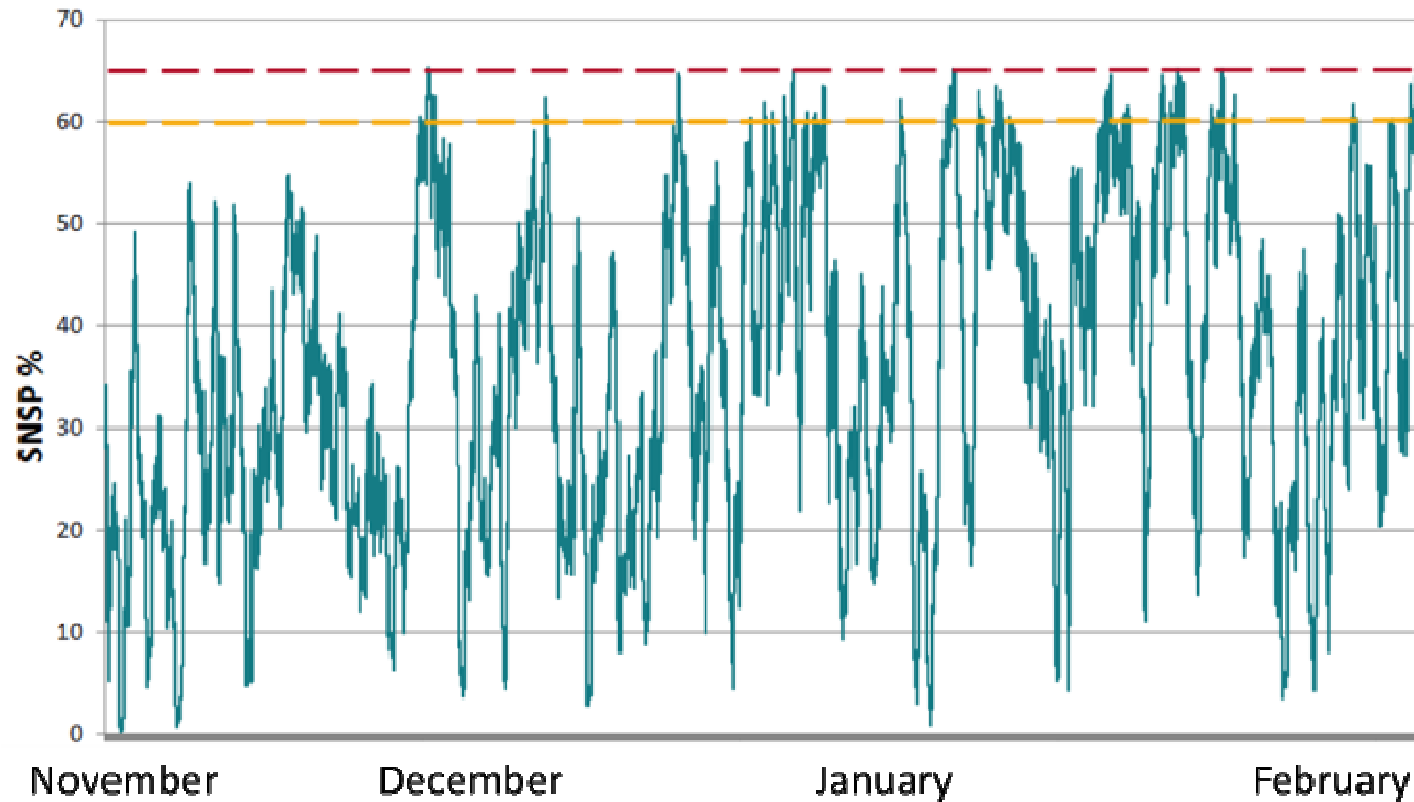


DS3 – Focus on reliable performance



What has DS3 delivered for us so far?

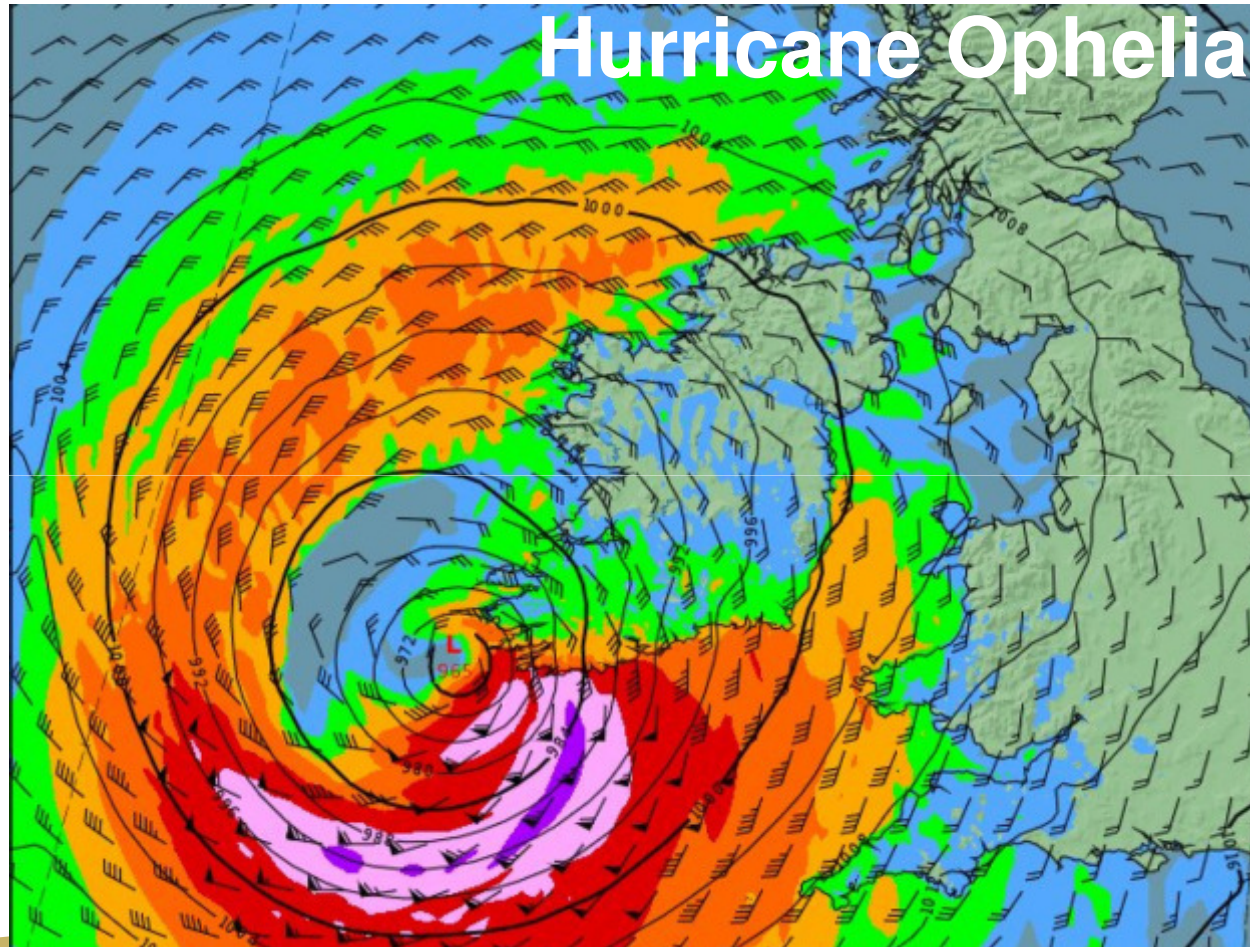
Safe, Secure Operation up to 65% SNSP with wind generation in excess of 4 GW



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

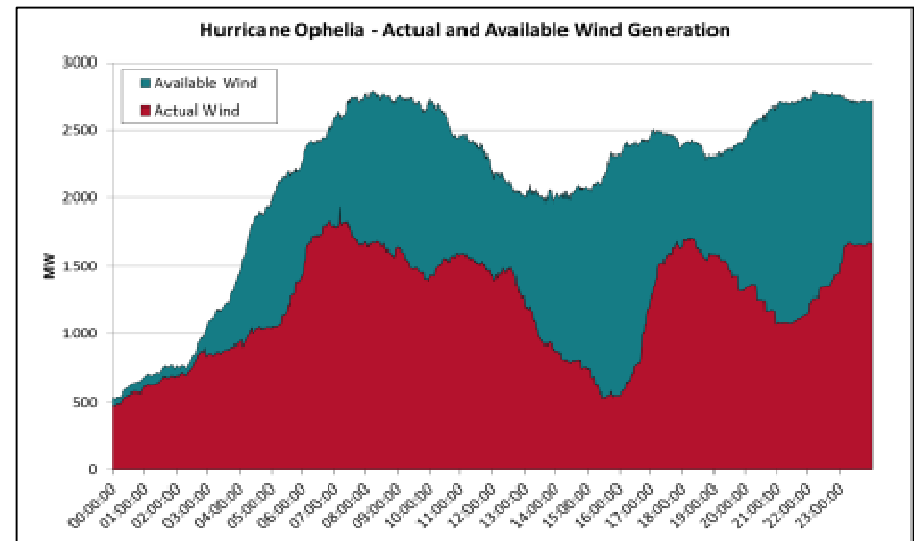
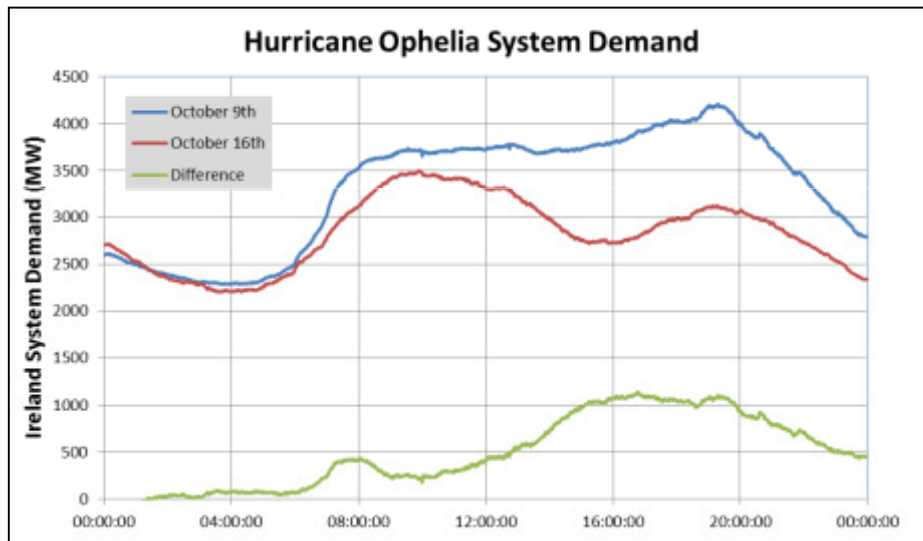


But have we really been tested?



Wind generation helped stabilise system

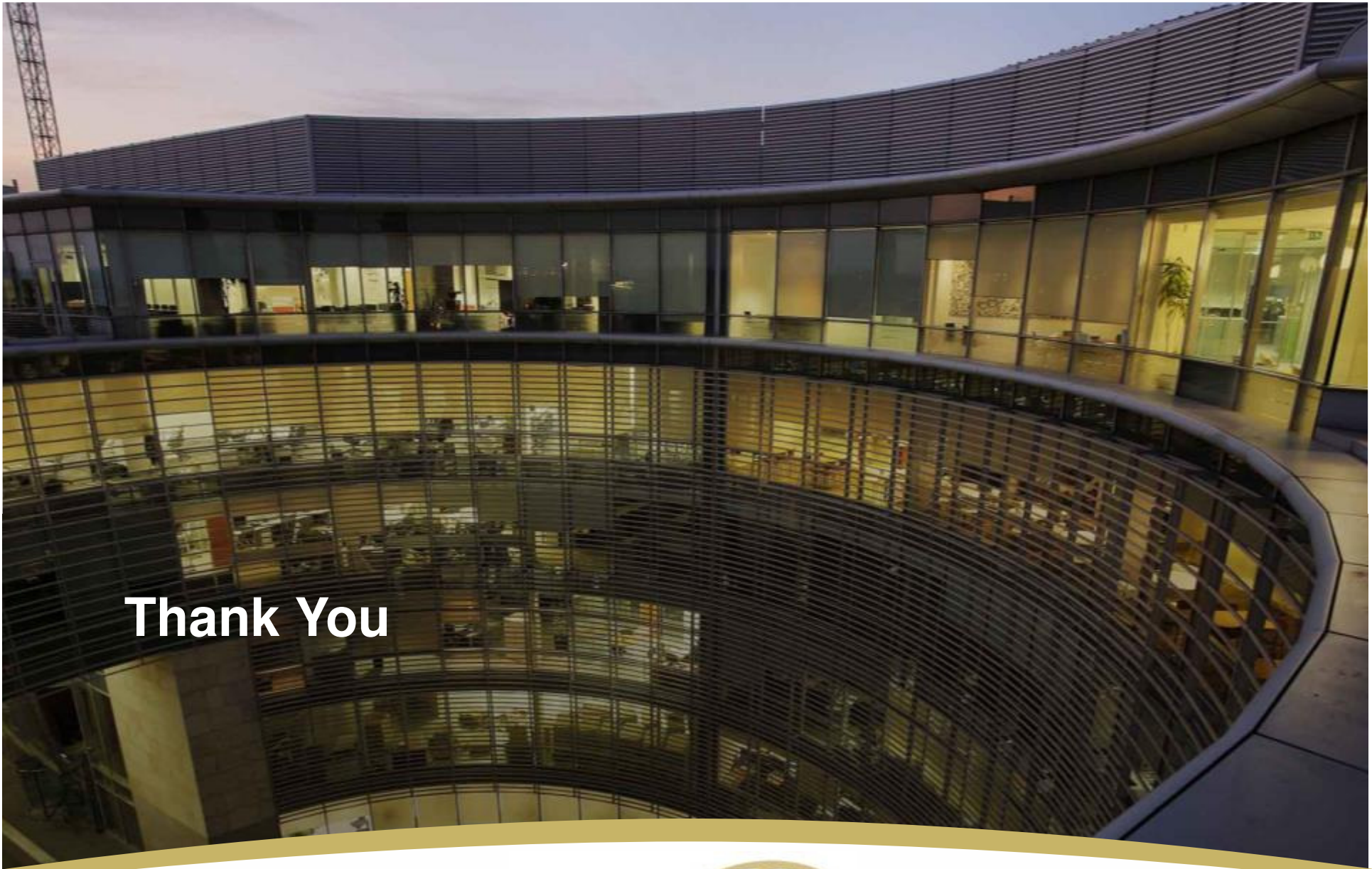
- System demand similar to a Christmas Day profile
- Pre-emptive wind curtailment improved system stability & security
- Multiple 110 kV faults but no system stability issues



EirGrid Conference

- **Conference Theme:** Innovative partnerships for a brighter tomorrow
- **Date:** 16th October'18
- **Venue:** Páirc Uí Chaoimh.
- **Link :** <https://www.eventbrite.ie/e/eirgrid-group-conference-innovative-partnerships-for-a-brighter-tomorrow-tickets-48199914241>





Thank You

