

Delivering a Secure Sustainable Electricity System – a context

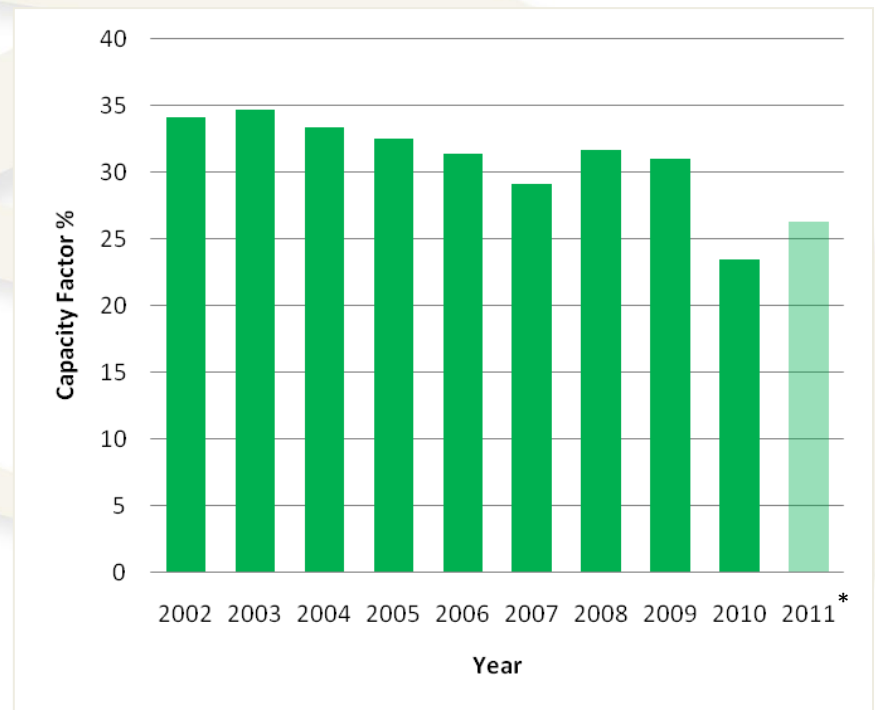
Dick Lewis

Ireland and Northern Ireland Wind Statistics

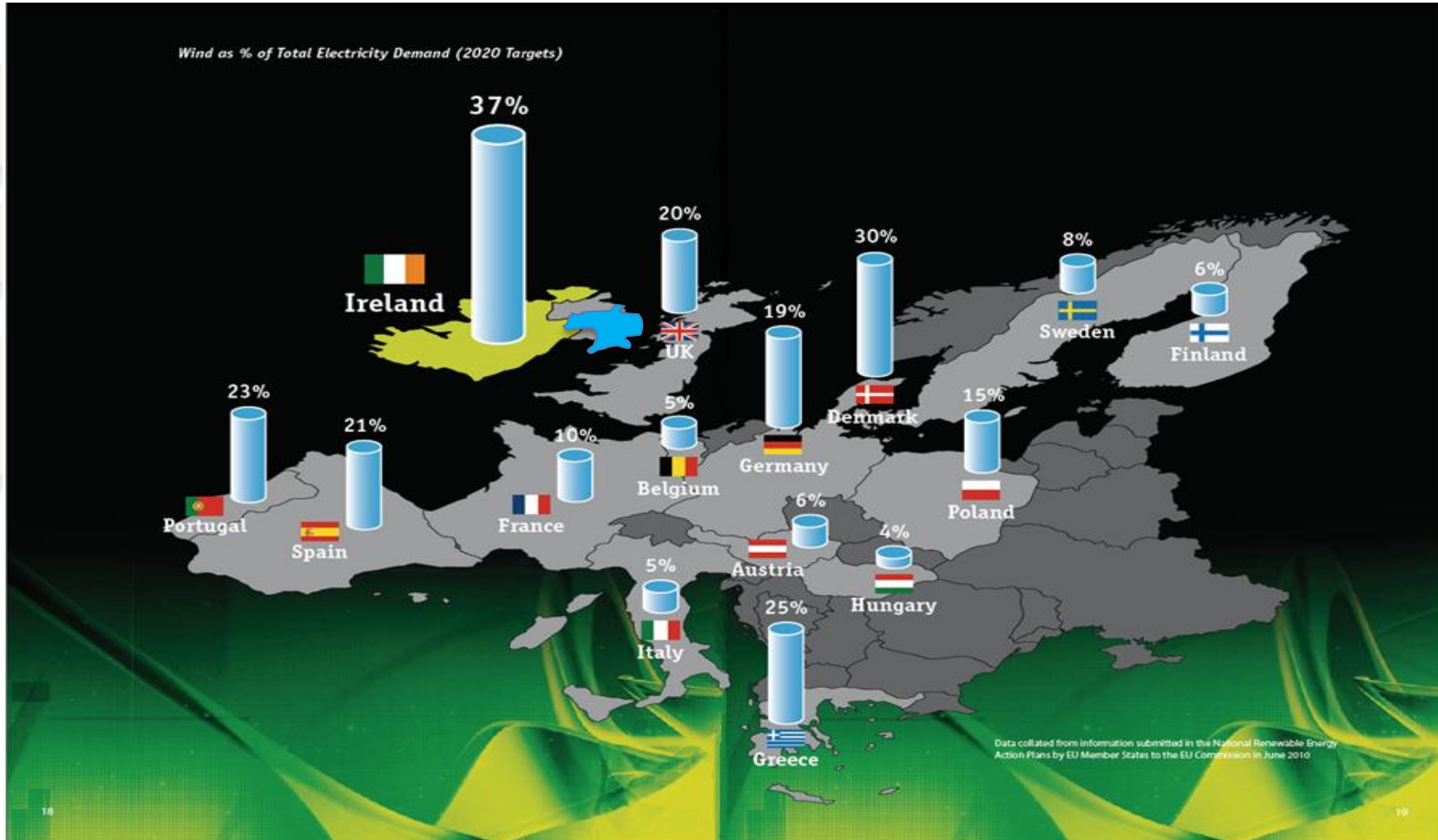
System Wind Records

	Ire	NI
Installed	1590 MW	370 MW
Maximum Output	1346 MW	341 MW
Highest instantaneous from wind %	52.1 %	42.8 %
Highest Monthly Capacity Factor	45.9%	41.3%
Maximum Wind Energy Output in a Month	505 GWhr	112 GWhr
Annual Energy output % 2010	505 GWhr	112 GWhr

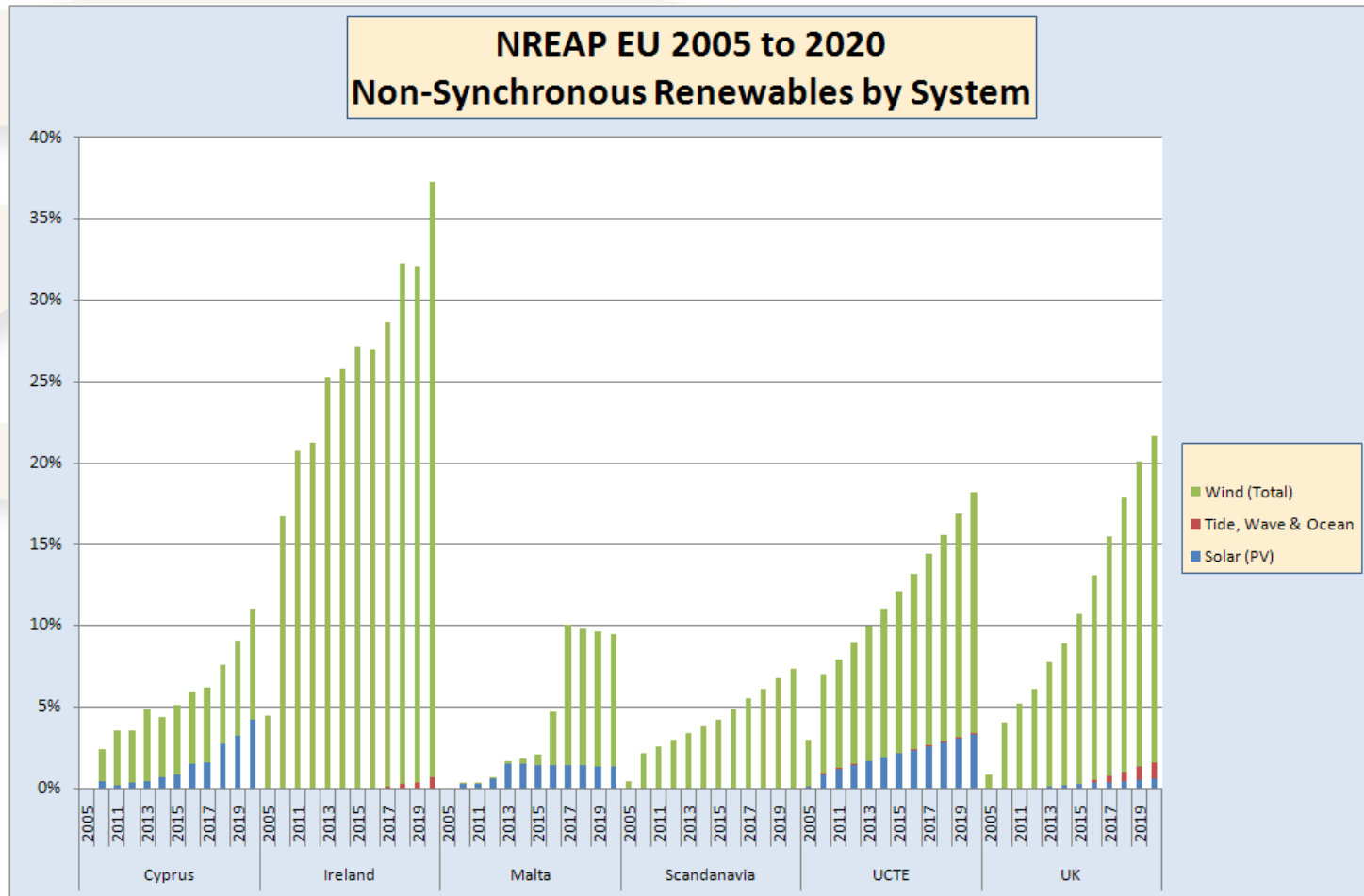
Wind Capacity Factor



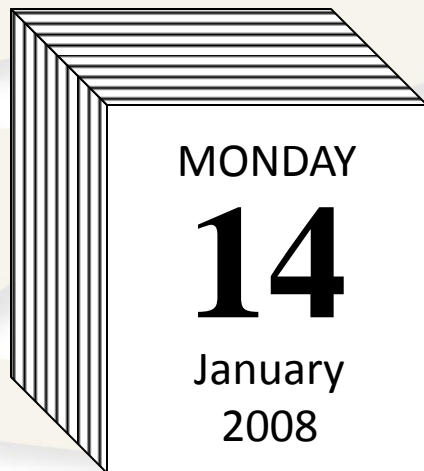
European NREAP 2020 Wind Figures



European NREAP 2020 Wind Figures



Identifying the Challenges



- All Island Grid Study

- DCENR-DETI Commissioned Study

“Limitations may affect the technical feasibility of the dispatches and consequently the economic performance of the portfolios.”

- The focus of technical follow up studies should be on the dynamic behaviour of the system accommodating high portions of renewable generation.***

Identifying the Challenges



- All Island Grid Study
 - DCENR-DETI Commissioned Study
- Facilitation of Renewables
 - EirGrid-SONI Commissioned study
 - Fundamental Issues
 - RoCoF
 - Future Study Required
 - Voltage Dip leading to energy imbalance
 - Frequency Regulation
 - Manageable Measures
 - Transient Stability
 - Voltage Stability
 - Voltage Control

Identifying the Challenges



- All Island Grid Study
 - DCENR-DETI Commissioned Study
- Facilitation of Renewables
 - EirGrid-SONI Commissioned study
- Ensuring a Secure, Sustainable System
 - EirGrid-SONI analysis building on FoR
 - Inertia
 - Ramping Services
 - System Reactive Power Portfolio

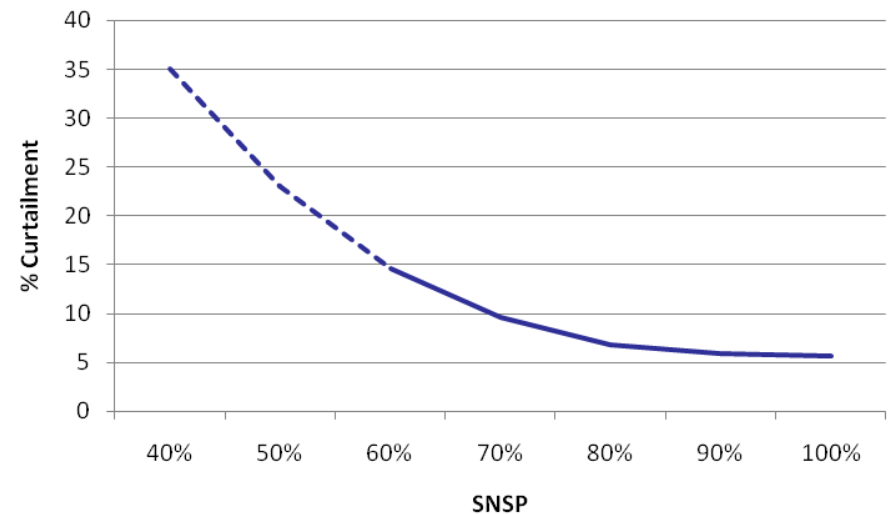
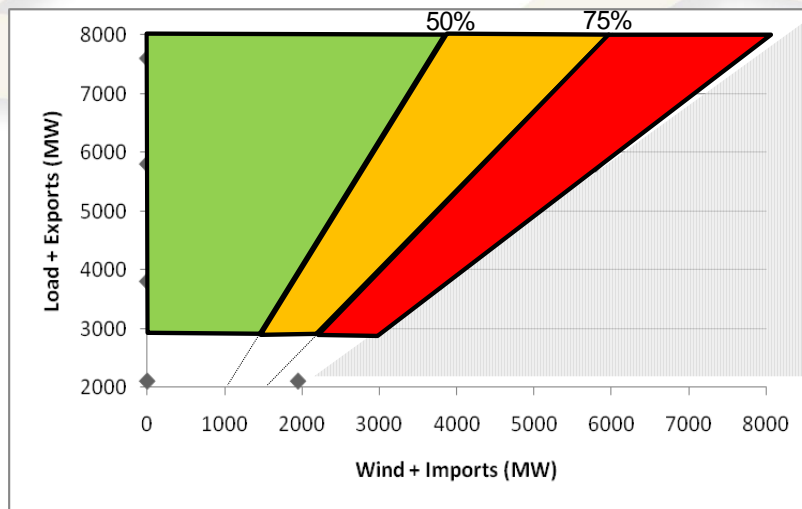
DS3: Facilitating Renewables

Challenges

- System Stability
- Resource Variability
- Uncertainty
- Complexity
- Portfolio Performance

Implementation Programme

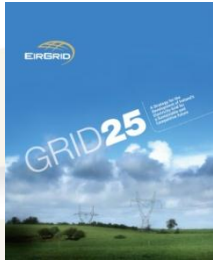
- Pioneering studies
- Operational Policy
- Decision support tools
- Codes / Protocols
- Performance Incentives



DS3 Programme Overview

Yvonne Coughlan

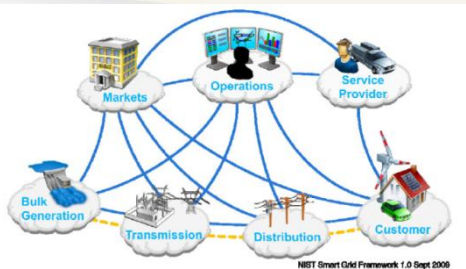
Facilitating Renewables: Four Key Elements



Network & Interconnection



Connection process



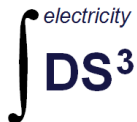
Smart Grid



Delivering a Secure Sustainable Electricity System

DS3* Programme

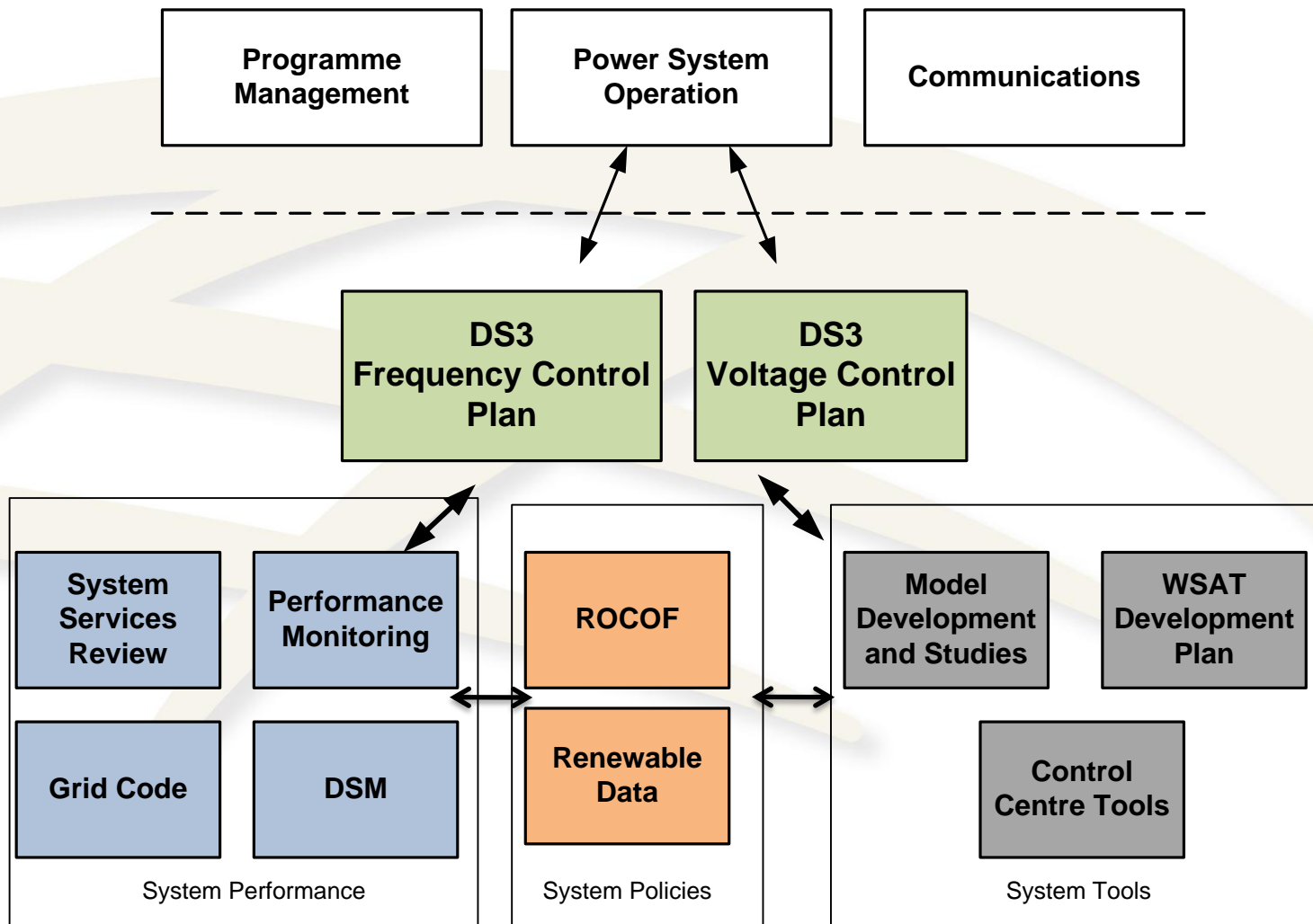
* **DS3**: Delivering a Secure Sustainable Electricity System



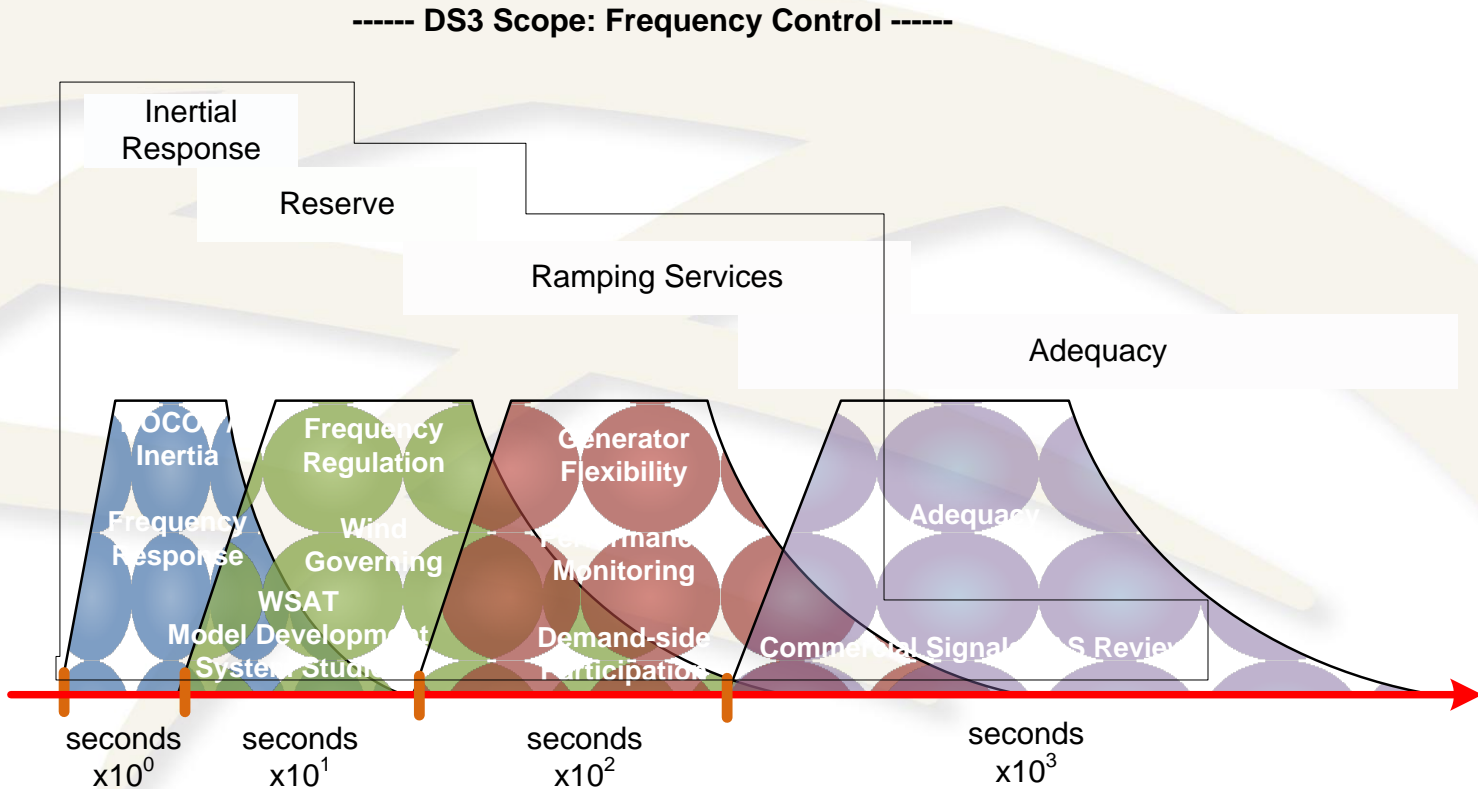
Delivering a Secure Sustainable Electricity System



DS3 Programme Overview

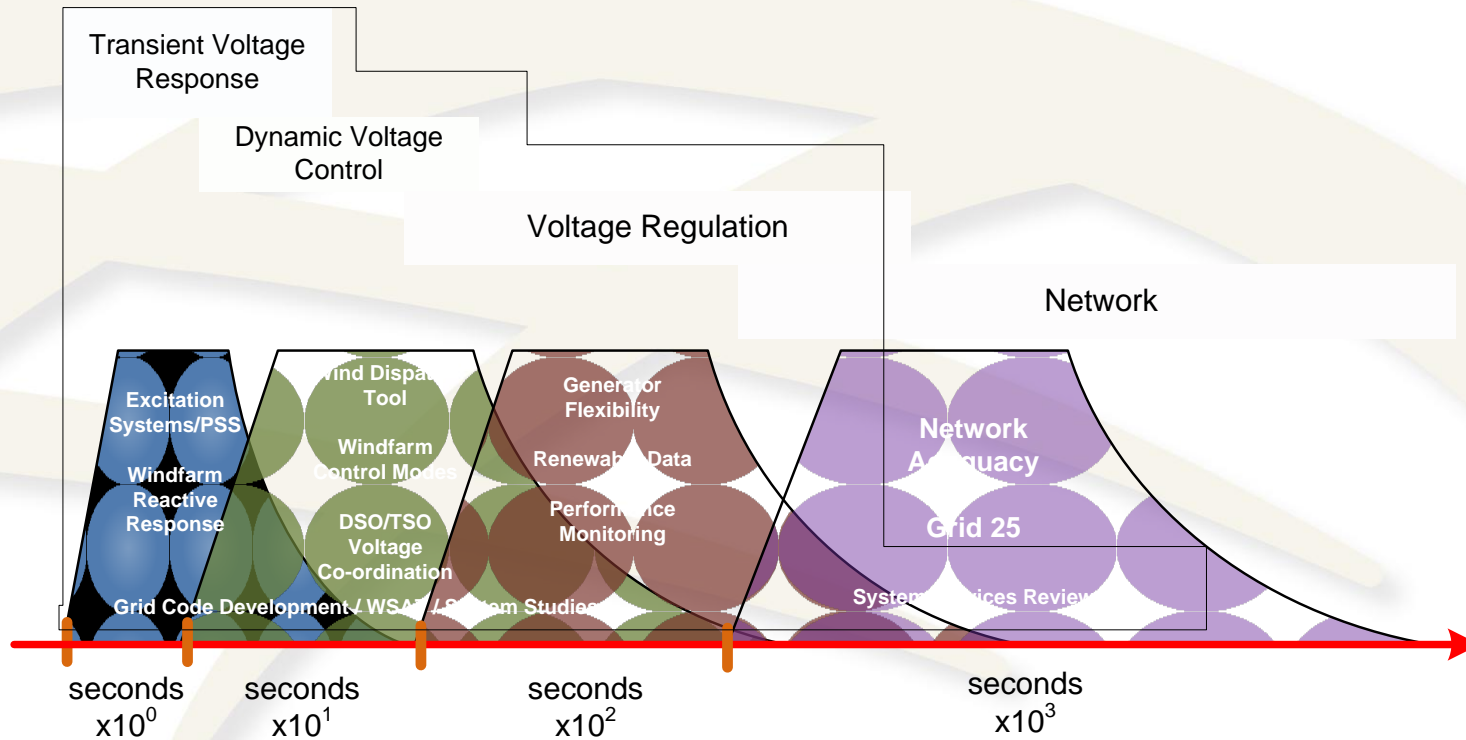


Frequency Control



Voltage Control

----- DS3 Scope: Voltage Control -----



Industry Engagement

	Year	2011	2012			
		Q4	Q1	Q2	Q3	Q4
Advisory Council		▲	▲	▲		▲
Industry Forums			▲		▲	
Grid Code Review Panel			▲	▲		▲
System Services Consultation 1			■			
System Services Consultation 2				■		
RA/TSO Meetings						
TSO/DSO Meetings						

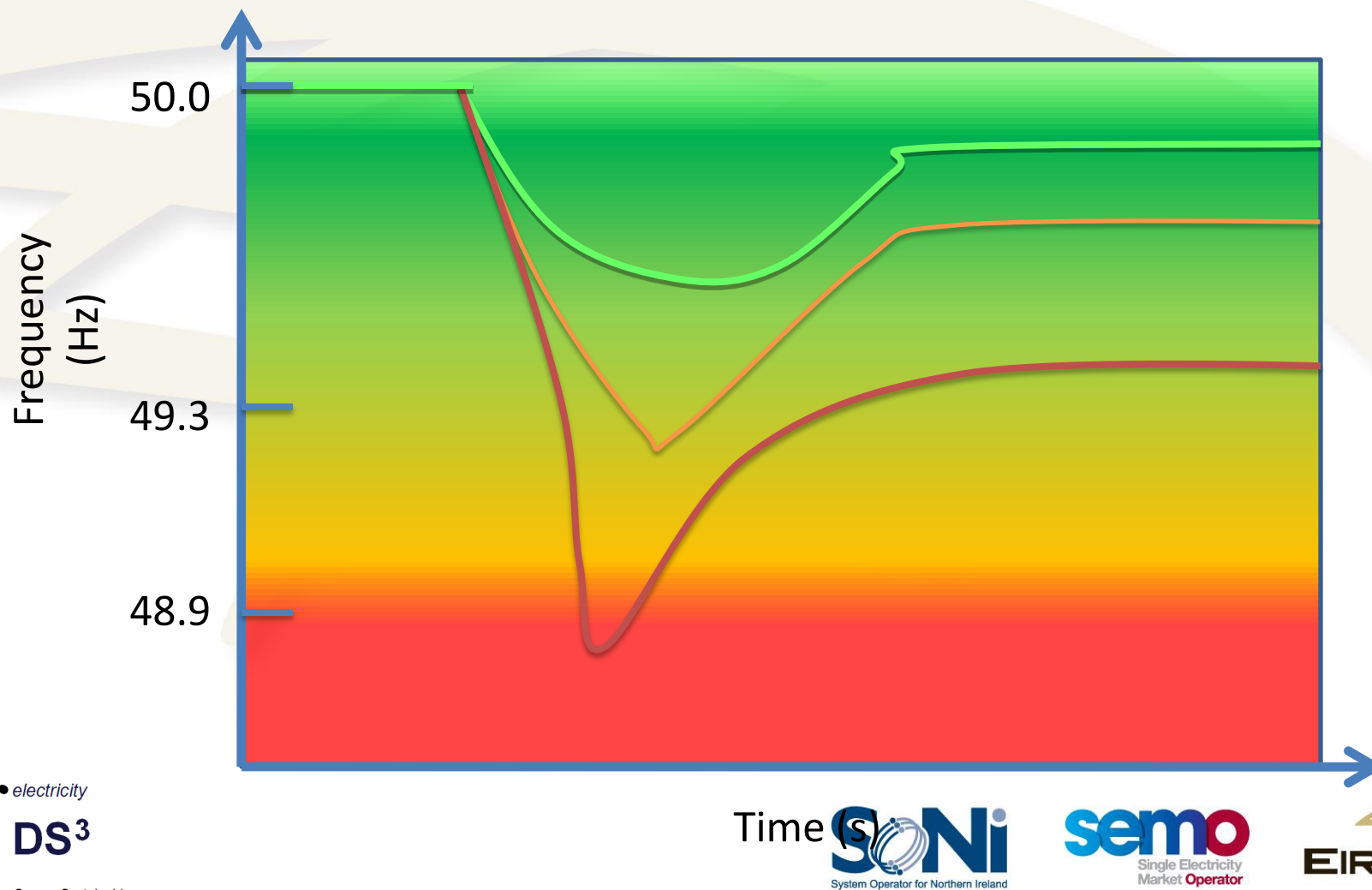
Questions?

- Are we missing anything from the plans? Is there anything else that should be considered?
- Is there sufficient stakeholder engagement?
- How do you want to engage with the programme? What updates are needed?

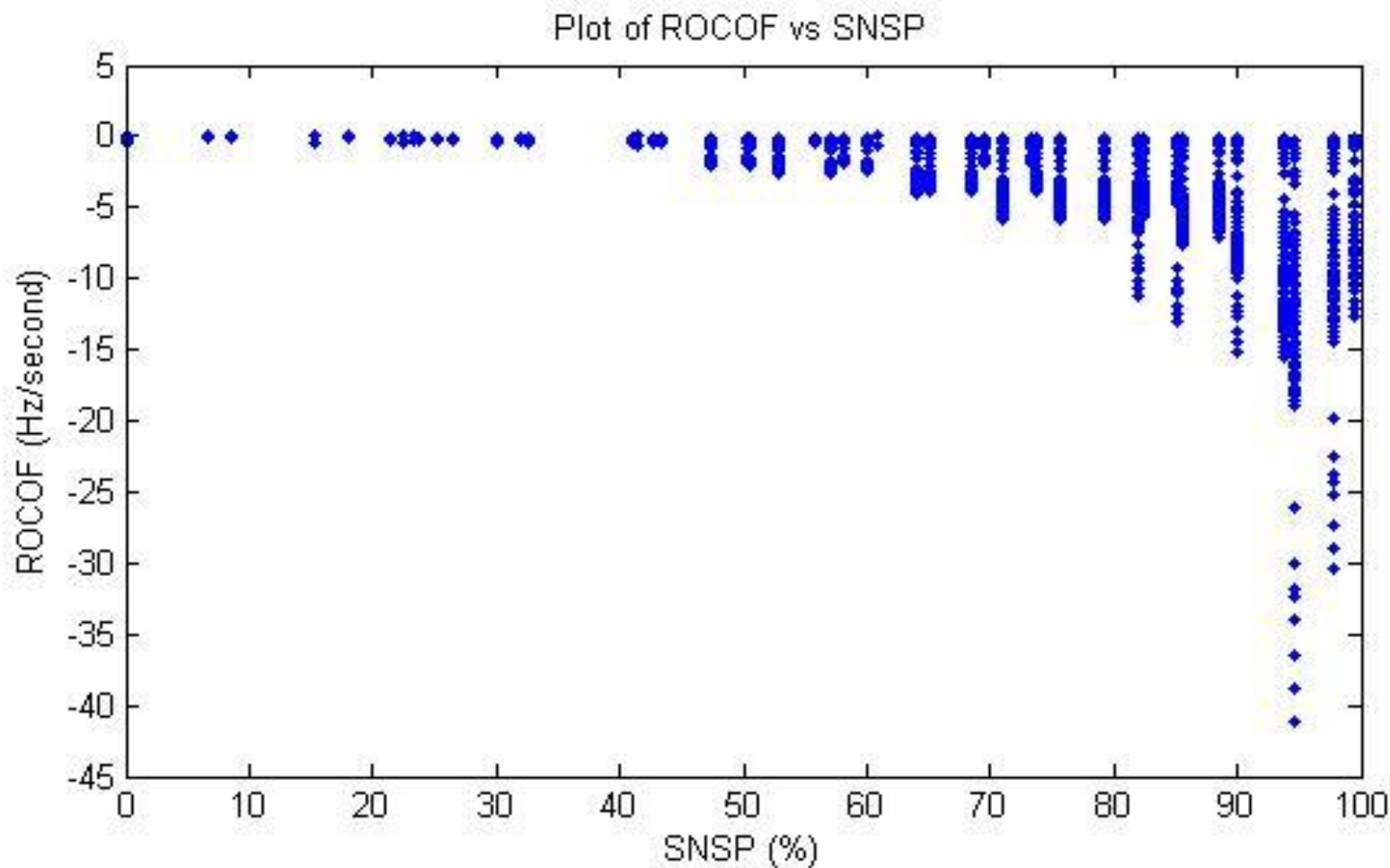
DS3 – Rate of Change of Frequency

Jonathan O'Sullivan

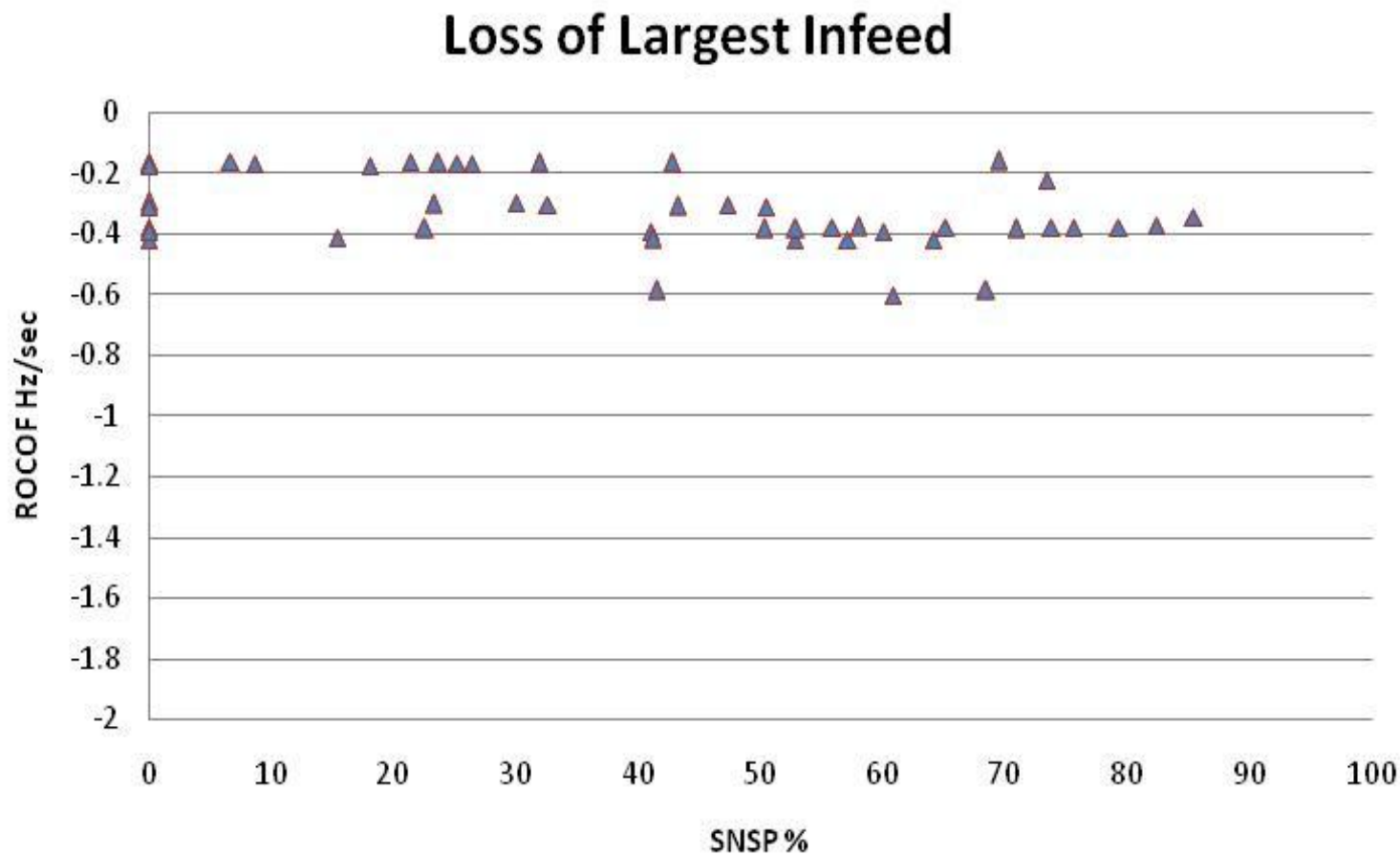
Frequency Concept



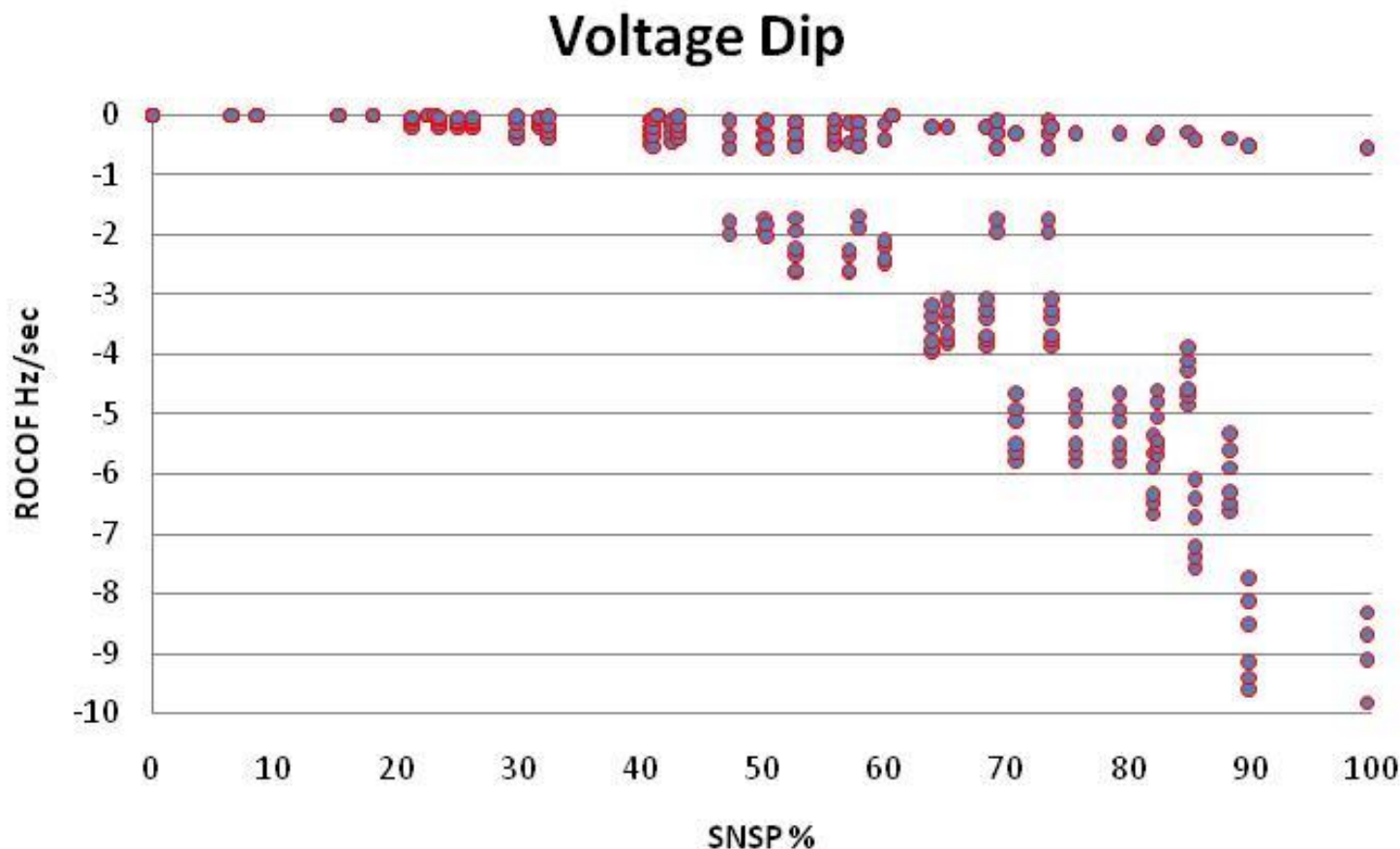
For Studies RoCoF



For Studies RoCoF – loss of infeed only



For Studies RoCoF – voltage dip losing wind gen



RoCoF Approach?

Increase ROCOF limit capability so no cascade tripping

- Grid Code Changes for Generators at Transmission
- Distribution Code changes for generators at Distribution
- Possible Connection agreement changes in Northern Ireland
- Loss of Mains protection changes

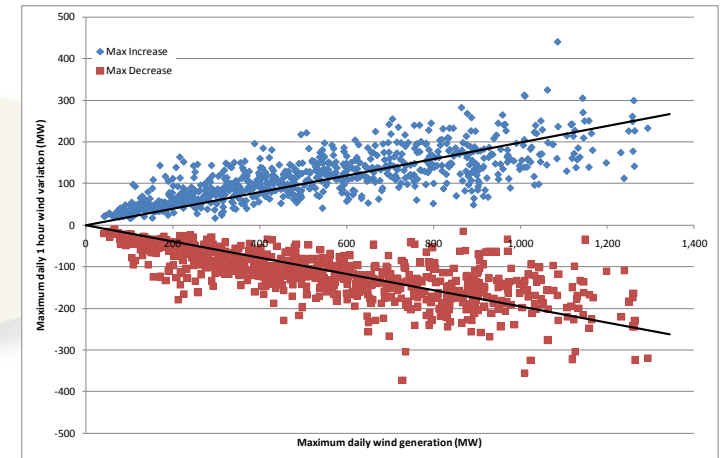
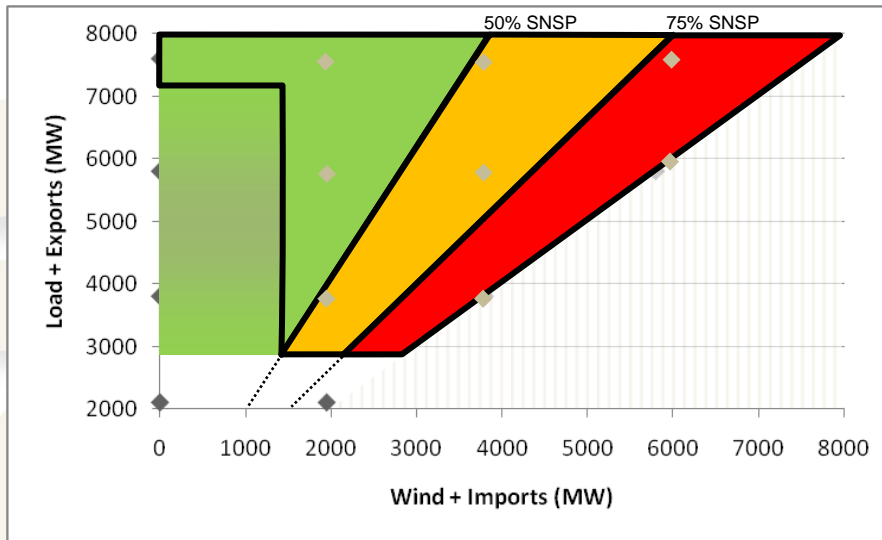
Keep sufficient inertia on the system so that ROCOF does not exceed 0.5Hz/s

- Significantly lower Min loads on conventional plant
- Purchase of Synchronous compensators

System Services Review

Shane Rourke

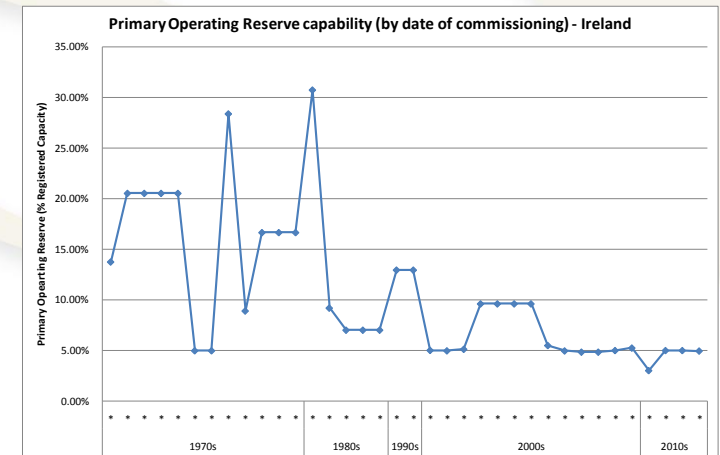
The Challenge



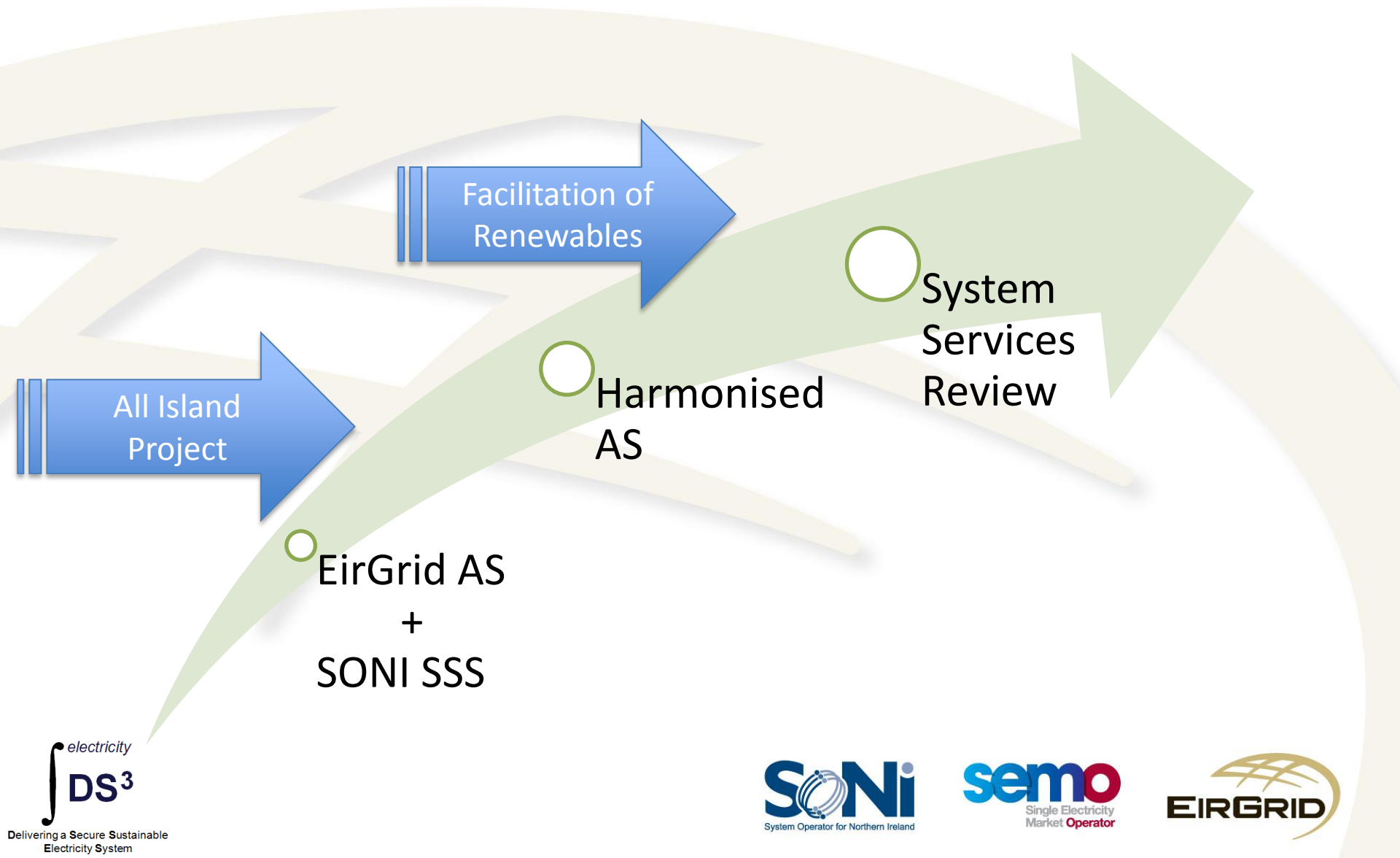
Issues to be addressed:

- Managing variability – Ramping services
- Frequency Control – Inertia and reserve
- Maintaining stability
- Voltage Control

System Services are the key



Context



Market Overview: SEM

€3bn

Energy Market

- Gross pool (*ex post*)
- Dual currency
- Regulated bids
- Co-ordinated dispatch

73%

Capacity Mechanism

- Explicit payment
- Fixed annual pot
- Paid to all available generation

20%

SEM

Balancing Mechanism

- Implicit
- Symmetric balancing prices (regulated)
- Transmission congestion and Ancillary Services

5%

Ancillary Services

- Mandatory Provision
- Explicit payments
- Regulated rates

2%

Objectives

Objectives of review

- Explore options for efficient procurement of system services in a system with changing needs
- Develop a proposal to achieve this and get appropriate SEMC approval
- Implement the solution

Questions for Advisory Council

- Is the level of engagement appropriate?
- Is the proposed approach reasonable?
- Are the key questions addressed?

Approach

- Industry engagement
 - Advisory Council
 - Consultations
 - Bilateral meetings
 - Industry forums
- International review of system services (underway)
- Review existing services and payment structures
- Studies and analysis
 - Identify system needs
 - Develop options for services
- Performance Monitoring
 - Enhancement of existing arrangements to support the potential new System Services

Proposed Timetable

Milestone	Timeline
Initial consultation paper issued	January 2012
Response deadline for initial consultation	February 2012
Industry engagement - bilateral meetings week	February 2012
Second consultation paper issued	May 2012
Industry forum: options for consideration	May/June 2012
Response deadline for second consultation	June/July 2012
Industry engagement - bilateral meetings week	July 2012
Industry forum: final recommendations	September 2012

Proposed Initial Consultation

- Issue in Jan 2012
 - Four to six week consultation period
- Will seek industry input on a broad range of issues:
 - Remuneration Approach
 - Contractual Arrangements
 - Eligibility of Providers

Proposed Questions (1)

- **Remuneration Approach**

- Should service provision be remunerated or mandatory?
- What services should be remunerated?
- What incentive should payments provide: investment or maintenance?
- Should payments be direct or indirect
- What payment mechanisms should be used?
- Should payments be based on capability, availability or utilisation?
- What interaction, if any, with other revenue streams?
- How should the “pot” be determined? How frequently should it be reviewed?
- How should the “pot” be allocated?

Proposed Questions (2)

- **Contractual Arrangements**

- How should arrangements be implemented? How frequently should agreements/contracts be reviewed?
- How should costs be recovered? Existing approach or move towards “causer pays”?
- What mechanisms should be used to incentivise performance

- **Eligibility of Providers**

- What types of providers should be considered?
- Does the demand-side or storage provide any unique services?
- How can new/emerging technologies contribute?
- Should Dx-connected providers be considered equivalent to Tx-connected?
- What services, if any, should non-firm generation be eligible for?

Discussion

Questions for Advisory Council

- Is the level of engagement appropriate?
- Is the proposed approach reasonable?
- Are the key questions addressed?