

DS3 System Services

Regulatory Authorities' Open Forum

Crowne Plaza, Dundalk

Date: 29th July 2014

DS3 System Services Introduction

Jo Aston, Utility Regulator

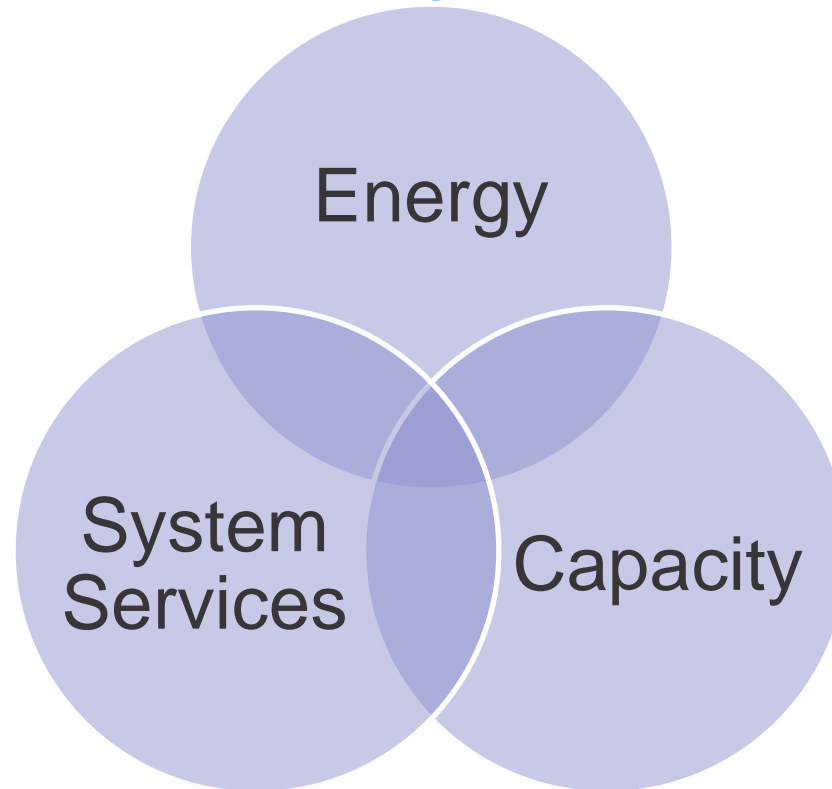
29th July 2014

Agenda

Purpose of today is to outline the SEM Committee's proposed approach and clarify any queries

10.30	Introduction	Jo Aston, UR
10.40	DS3 System Services <ul style="list-style-type: none">- Update since RA's open forum October 2013	Paul Brandon, CER
11.00	DS3 System Services Procurement Design Consultation <ul style="list-style-type: none">- Demand Side analysis and Supply Side analysis- Procurement Design Options	Andrew McCorriston, UR Robert O'Rourke, CER
12.00	Questions and Answers	
12.45	Lunch	
13.30	DS3 System Services Procurement Design Options <ul style="list-style-type: none">- Worked examples	Robert O'Rourke, CER
14.15	Questions and Answers	
14.45	DS3 Programme Update	Simon Tweed, EirGrid
15.15	Conclusion and Next Steps	Denis Cagney, CER
15.30	Finish	

Relevance of System Services



Optimised Electricity system providing:

- Value for money for consumers
- Appropriate, secure revenues for generators
- Correct entry/ exit signals for investors
- Correct level and type of services for reliable and secure operation of system

Background

- TSO Recommendations submitted to SEM Committee May 2013
- Decision Paper on Technical Definitions published 20th December 2013
- Consultation Paper on Procurement Design published 9th July 2014
 - Consultation closes Friday 22nd August 2014
- I-SEM High Level Design consultation closed 25th July 2014
 - 2 week overlap with DS3 Procurement Design Consultation

SEMC Considerations

- Criteria for System Services
 - Consumer Interest: SEMC's Principal Objective
 - Investment: Long-term stability of the industry
 - Curtailment: Statutory duty to minimise curtailment
 - Renewable Targets: Govt. 40% target in NI & Ire
- Preference for competitive approach
- Interaction with I-SEM and ensure overall approach is in the best interest of consumers

Procurement Design Options

1. Regulated Tariffs
 2. System Services Pot
 3. Regulated Competition
 4. Split Auction
 5. Multiple Bid Auction
- Option 5 is the SEMC preferred approach

Stakeholder Engagement

- Listen to all views today
- Clarify where possible
- Written responses – 22 August
- Decision by end 2014
- Bi-laterals 1st week of September

DS3 System Services Update on Progress

Paul Brandon, CER

Date: 29th July 2014

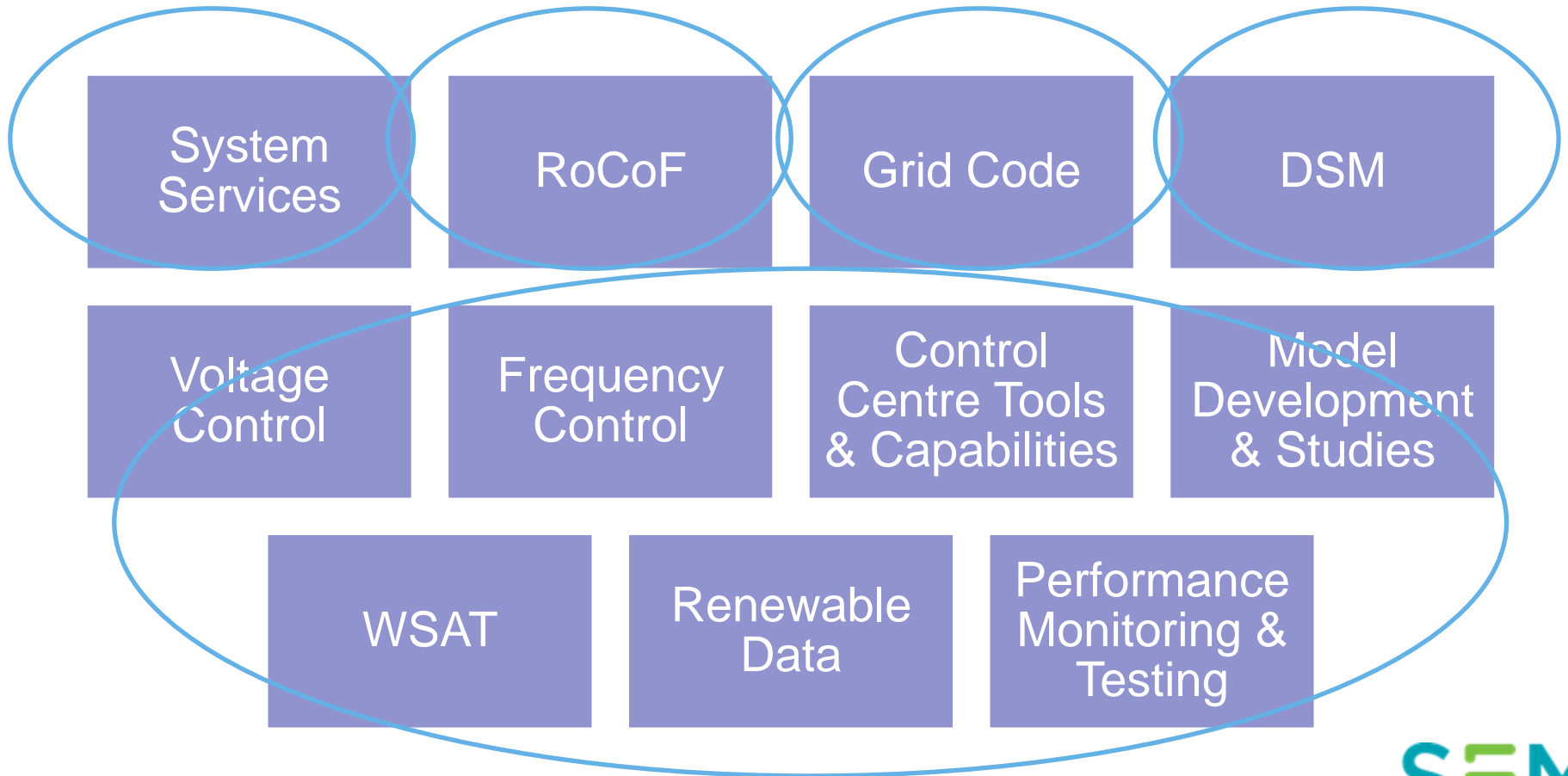
Context

- Ireland and Northern Ireland RES-E targets of 40% consumption from renewable energy by 2020
- ROI Gate 3 renewables and NI renewable connections
- RES directive requirements to minimise curtailment (Article 16)
- SEMC decision (2013) on Tie-Breaks in Curtailment (no payments for curtailment post 2017, emphasis on reducing curtailment)
- Impact of curtailment on the business case for investment
- Zero marginal cost of wind - reduce production costs and SMP

Challenge

- Increase SNSP from currently 50% to 75%
- Dispatch available wind more often reduces the economic loss associated with curtailment
- Facilitated through implementation of DS3, including system services

DS3 Programme



System Services Work Stream

Putting in place the appropriate services required to support an increase in SNSP and the mechanisms to ensure that those services are procured efficiently by the TSOs.

Background – TSO Process

- DS3 formally commenced Sept 2011
 - *All Island Grid Study* – 2008
 - *Facilitation of Renewables Study* – 2010
 - *Ensuring a Secure, Reliable and Efficient Power System Report* – 2011
- Three TSO run Consultations 2011-2013
- TSO Recommendations Paper – May 2013
- Public Workshop – June 2013

SEM Committee's consultation paper acknowledges the significant work put in by the TSOs on the system services review to date and the effort by industry stakeholders in responding to consultations and providing views.

Background – RA Process

- Consultation Paper – Sept 2013
 - *Technical definitions: minded to approve*
 - *Economic analysis: more work needed*
 - *Undertake a demand and supply analysis to guide SEMC with regard to appropriate costs and benefits associated with system services*
 - *I-SEM & DS3: remain separate but ensure no conflict*
- Public Workshop – Oct 2013
 - Call for evidence on capital costs associated with delivering services (plant enhancement or new build)
- TSO-RA agreement on demand side modelling – Nov 2013
- Technical Definitions Decision Paper – Dec 2013
- Economic Analysis approach approved – Dec 2013
 - Demand Analysis – Value of system services
 - Supply Analysis – Cost of system services
 - Procurement Mechanisms – How to procure the appropriate level of system services at least cost in order to release the benefits of system service provision?

Economic Analysis

- Economic Analysis approach approved – Dec 2013
 - Demand Analysis – Value of system services
 - ❑ TSOs recommendation of May 2013 indicated “value” of €355 million in 2020
 - ❑ SEMC considered that a range of scenarios should be examined and that the “value” of RoCoF compliance should be excluded
 - Supply Analysis – Cost of system services
 - ❑ Use DNV KEMA analysis (2012), RA’s call for evidence and desktop analysis to inform the likely capital cost of providing the required services
 - ❑ Existing capability, plant enhancements and new build
 - Procurement Mechanisms – How to procure the appropriate level of system services at least cost in order to release the benefits of system service provision?
 - ❑ Consider a range of approaches on the spectrum from fully regulated procurement to fully market based
 - ❑ I-SEM interactions

The Services

New Services		Existing Services	
SIR	Synchronous Inertial Response	SRP	Steady-state Reactive Power
FFR	Fast Frequency Response	POR	Primary Operating Reserve
DRR	Dynamic Reactive Response	SOR	Secondary Operating Reserve
RM1	Ramping Margin 1 Hour	TOR1	Tertiary Operating Reserve 1
RM3	Ramping Margin 3 Hour	TOR2	Tertiary Operating Reserve 2
RM8	Ramping Margin 8 Hour	RRD	Replacement Reserve (De-Synchronised)
FPFAPR	Fast Post-Fault Active Power Recovery	RRS	Replacement Reserve (Synchronised)

SEMC Consultation Paper

- Outcome of demand side analysis - TSOs
- Outcome of Supply Side analysis – IPA
- Options for procurement of system services

DS3 System Services Demand and Supply Analysis

Andrew McCorriston, Utility Regulator

29 July 2014

- Demand Side Analysis
 - Value of System Services
- Supply Side Analysis
 - Cost of providing System Services

Demand Analysis

- Overview of the TSO Modelling
 - Summary of scenarios and key assumptions
- Key results from TSO modelling
- Analysis of TSO Modelling by IPA

TSO Modelling

- To meet the RES-E targets whilst operating the system securely requires additional sources and types of system services
 - Inertia
 - frequency response
 - ramping capability
 - voltage control
- Analysis carried out by TSOs on benefits of increasing SNSP to 75%
- Number of scenarios agreed with RAs prior to modelling being carried out by TSOs

Scenarios & Assumptions

Wind levels	SNSP Levels	Assumptions	Outputs
<ul style="list-style-type: none">• 100% Contracted wind• 75% Contracted wind• 50% Contracted wind• 25% Contracted wind	<ul style="list-style-type: none">• 50% (business as usual)• 60% (BAU, RoCoF)• 70% (partial system services)• 75% (full system services)	<ul style="list-style-type: none">• Efficient use of IC• Revised demand• Sensitivity analysis	<ul style="list-style-type: none">• Production Cost• DBC• SMP• Consumer cost• Curtailment• CO₂ emissions

Key Results

Scenario	RES-E	Curtailement	Production Savings *	Consumer Savings *
Low Wind; RoCoF 3.5 GW; 60%	30.1%	4.8%	0	0
Med Wind; Partial DS3 4.6 GW; 70%	39.7%	2.8%	231	157
Med Wind; Full DS3 4.6 GW; 75%	40.1%	1.4%	241	177
High Wind; Full DS3 5.7 GW; 75%	48.7%	3.5%	399	144

* Modelled results based on current SEM design

Trends

- Curtailment
 - Falls as SNSP increases
 - Rises as installed wind increases
- Production costs:
 - Falls as SNSP increases
 - Falls as installed wind increases
- Consumer costs
 - Falls as SNSP increases
 - Relationship with installed wind is unclear

Analysis

- TSO's analysis of market cost shows lower system benefits than production cost savings
 - additional infra-marginal rents captured by generators, some €93m in the 70% SNSP case and €84m in 75% SNSP case
- Different production cost savings relative to SNSP level
- Lower minimum stable generation thresholds for CCGTs would increase infra-marginal rents

Supply Analysis

- Overview
- DNV KEMA Study
- IPA Supply Analysis
- Conclusions

Overview of Supply Analysis

- TSOs commissioned DNV KEMA to assess potential capital costs
- RAs commissioned IPA to:
 - Review DNV KEMA analysis
 - Conduct desk top cost analysis

DNV KEMA Studies

- DNV KEMA Study on behalf of TSOs to identify and provide cost estimates for upgrading generation unit to provide system services:
 - build cost for each asset type
 - estimated additional investment required to provide enhanced ancillary services.
- Network based solution too costly

DNV KEMA Findings

System enhancements by product

Technology	Capacity [MW]	Reduced minimum load €	Frequency response €	Ramp-up time improvement €
CCGT-New	450	5,074,950	20,000	8,351,222
CCGT-Existing	450	43,311,750	496,250	10,882,497
OCGT-New	50	3,659,940	39,500	not needed
OCGT-Existing	50	7,124,075	39,500	not needed
Thermal (Coal)	650	34,153,920	19,510,000	not proven
Wind	2	316,500	144,000	20,000

IPA Review

- IPA analysed DNV KEMA report findings:
 - Cost estimates for flywheels and STATCOMs are low.
 - Estimates for most technologies are reasonable
 - Estimate for OCGTs may be high
 - No estimates provided for operating costs for enhancements
 - Insufficient data to provide validation on the DNV KEMA proposals for enhancement costs
- IPA provided an estimated annual cost for enhancement at €70m – 84m

IPA Review (cont.)

- Investment costs are substantially less than production costs.
- Estimated cost of investments to provide system services from generation technologies
 - 75% SNSP estimated annual cost is €70- 84m p.a.
 - Capital costs only no operational costs included
 - Costs of meeting less than 75% SNSP not included

IPA Review (cont.)

- Cost of providing system services less than value to consumers
- Uncertainty over the required volumes of individual services
 - Questions identified relating to uncertainty over the inter-changeability of products
- Procurement mechanisms should allow for price discovery
 - Benefits of additional system services should be shared between service providers and customers

IPA Review

Main Sources of System Services	
SIR	CCGT
FFR	CCGT, Interconnector, Pumped storage
FPFAPR	CCGT
DRR	CCGT
SSRP	CCGT, Wind
Op. Reserve	CCGT, Interconnector, Pumped Storage
RRS	CCGT, Pumped storage
RRD	OCGT
RM1 & RM3	OCGT
RM8	CCGT

Note that other technologies will be able to provide each service, this list represents only the expected main sources

Supply Analysis Conclusions

- Generation investment significantly cheaper than network investment (€500m-€600m vs. €1.3bn)
- Annualised costs of €70m-€84m
- Highly concentrated market for all services (HHI)
- Services can come from a mix of technologies
- Savings exceed investment costs therefore it is possible to provide sufficient remuneration to attract investment

DS3 System Services Procurement Design Options

Robert O'Rourke, CER

29th July 2014

Considerations in Procurement Design

- SEM Committee Criteria:
 - Consumer Interest
 - Investment
 - Curtailment
 - Renewable Targets
- Nature of the Services
- Complexity of the interactions
- Difficulty in accurately pricing the services
- Optimising interactions between Energy Trading, System Services and CRM
- Competitive preference
- Technology neutrality
- Differing requirements of providers:
 - Existing units
 - Retrofitting units
 - New build
 - New technology & DSUs
- No relevant international experience

Procurement Options

SEMC considered a spectrum of options from regulated to competitive approaches

- Option 1: Regulated Tariff
- Option 2: System Services Pot
- Option 3: Regulated Competition
- Option 4: Split Auction
- Option 5: Multiple Bid Auction

Option 1: Regulated Tariff

- Similar to TSO Recommendation
- Individual tariff for each service (BNE: cost + regulated rate of return)
- Cap on total payments (informed by D & S analysis)
- 5 year prices & contracts
- Value & rates calculated every five years

	Consumer Interest	Investment	Curtailment	RES Targets
Option 1 Regulated Tariff	2 nd (Medium)	4 th (Low)	3 rd (Medium)	4 th (Low)

Option 2: System Services Pot

- Price based mechanism (similar to current CPM)
- System Services “pot” distributed between the services (as per TSO recommendations)
- Further distributed between all 12 months, then between each trading period
- All available units receive proportion of pot for that trading period
- No long-term contracts, payments levels change as quantity of service provided changes.

	Consumer Interest	Investment	Curtailement	RES Targets
Option 2 System Services Pot	4 th (Low)	5 th (Low)	5 th (Medium)	5 th (Low)

Option 3: Regulated Competition

- Services arranged in four groups
- Voluntary, pay-as-bid tender process for certain groups (those requiring longer term certainty – groups 1, 3, 4 per Poyry)
- Voluntary, pay-as-cleared, intraday auctions for ramping
- Long-term contracts for groups 1, 3, 4, short-term for group 2

	Consumer Interest	Investment	Curtailement	RES Targets
Option 3 Regulated Competition	5 th (Low)	1 st (High)	4 th (Medium)	1 st (Medium)

Option 4: Split Auction

- Services arranged in four groups (Could be as per Option 3 or different)
- Two distinct auctions for each group - long-term and annual
- Mandatory, sealed, pay-as-cleared auction for annual contracts
- Only operational costs recovered in annual auction
- Voluntary, pay-as-bid auction for long-term contracts to cover capital costs
- Only new investments can participate in long-term contracts

	Consumer Interest	Investment	Curtailment	RES Targets
Option 4 Competitive Split Auction	3 rd (Medium)	3 rd (High)	2 nd (Medium)	3 rd (Medium)

Option 5: Multiple Bid Auction

- Mandatory, sealed, pay-as-cleared, instantaneous auction for all services
- Multiple, mutually exclusive bids permitted
- Each bid includes price and capability for each service, provides a set of mutually exclusive outcomes for the auction
- TSO determines demand curve based on range of outcomes
- Least-cost outcome is selected, results in individual uniform prices for each service
- Units propose/decide contract length when bidding, existing capability of unit must be included as a bid and fixed one-year contract for existing capability.

	Consumer Interest	Investment	Curtailed	RES Targets
Option 5 Multiple Bid Auction	1 st (Med-High)	2 nd (High)	1 st (High)	2 nd (Medium)

Assessment of Options - Summary

	Consumer Interest	Investment	Curtailement	RES Targets
Option 1 Regulated Tariff	2 nd (Medium)	4 th (Low)	3 rd (Medium)	4 th (Low)
Option 2 System Services Pot	4 th (Low)	5 th (Low)	5 th (Medium)	5 th (Low)
Option 3 Regulated Competition	5 th (Low)	1 st (High)	4 th (Medium)	1 st (Medium)
Option 4 Split Auction	3 rd (Medium)	3 rd (High)	2 nd (Medium)	3 rd (Medium)
Option 5 Multiple Bid Auction	1 st (Med-High)	2 nd (High)	1 st (High)	2 nd (Medium)

Analysis of Option 5 – Multiple Bid Auction

- Competitive approach incorporates best elements of Options 3 & 4 (to a degree hybrid)
- Scores best against SEMC Criteria
- Provides greatest flexibility & certainty
 - Investors can propose multiple investment options
 - Status quo is included as option therefore only cost effective investments are made
 - TSO can assess interactions between services before entering into contracts
 - Technology neutrality, outcome of auction incentivises “right” technology
- Interactions with I-SEM can be optimised in detailed design

SEM Committee View

- Competitive approach preferred
 - Option 3: poor on consumer interest
 - Option 4: does not address complex interactions between services
 - Option 5: preferred option
- Market Power and Liquidity are concerns therefore regulated approach may be required
 - Option 2: not favoured, poor on investor certainty and consumer interest
 - Option 1: possibility where auction fails
- SEM Committee Proposed Approach:
 - Option 5: auction for all services, introduce regulated tariffs only for those services not provided by auction (or not provided in sufficient quantities)
 - Grouping services into competitive and regulated before auction risks diluting the effectiveness of option 5

Questions & Answers

DS3 System Services Workshop

29 July 2014

DS3 System Services Procurement Options: Examples

Robert O'Rourke

29 July 2014

Overview

- Payment Basis
- Interactions with I-SEM
- Examples
 - Options 1 & 5

Payment Basis

- **Dispatch:** Payment received when TSO “uses” the service
 - Distinct from “Utilisation” considered by TSOs
 - Physically providing service due to Market Dispatch or non-energy TSO action
 - E.G. Reserve services: TSO will have a reserve requirement in a period, units capable of delivering that requirement would be considered “used” (“surplus” units would not). Once the reserve is activated the unit is no longer providing reserve.
 - Dispatch based payments will require consideration for I-SEM detailed design
- **Availability:** Payment received when unit capable of delivering the service
 - Capable of providing service due to Market position or non-energy TSO action
 - Not explicitly linked to TSOs real-time requirement for the service
 - Availability based payments will require consideration for I-SEM detailed design
- **Capability**
 - Guaranteed payment regardless of physical delivery of service
 - Effectively a fixed annual payment with no interaction with I-SEM detailed design.

Example: Dispatch

Unit	Reserve	Price
Gen A	200MW	€1.00
Gen B	150MW	€1.50
Gen C	100MW	€2.00

- Availability determined by market position or TSO dispatch
- Price determined in annual auction

Trading Period	Trading Period 1	Trading Period 2	Trading Period 3
Reserve Requirement	350MW	400MW	250MW
Reserve Dispatch	A: 200MW B: 150MW C: 0MW	A: 200MW B: 150MW C: 50MW	A: 200MW B: 50MW C: 0MW
Clearing Price	€1.50	€2.00	€1.50

I-SEM Interactions

- Overall objective: Three revenue streams should work to reward the most efficient/valuable units
 1. Energy Trading (efficient generation)
 2. System Services (valuable generation)
 3. Capacity (missing money)

Energy and Non-Energy Payments

- Energy payments in market
 - Can System Service price be included in bid?
 - Pay-as-bid for non-energy TSO actions?
 - Opportunity cost of energy paid?
 - Local market power in energy market important
- All System Services are “non-energy”
- System Service payments separate from energy payments
- I-SEM detailed design will have to consider energy payments and bidding for units that receive system service payments

Potential Interactions with the Energy Market

Service	Regulated Tariff		Multiple Bid Auctions	
SIR	Capability	No interaction	Availability	Some interaction
FFR	Availability	Some interaction	Availability	Some interaction
FPFAPR	Capability	No interaction	Availability	Some interaction
SRP	Capability	No interaction	Availability	Some interaction
DRR	Capability	No interaction	Availability	Some interaction
Op Reserve	Dispatch	Some interaction	Dispatch	Some interaction
RRS/RRD	Dispatch	Some interaction	Dispatch	Some interaction
Ramping	Dispatch	Some interaction	Dispatch	Some interaction

Potential Interactions with the Capacity Remuneration Mechanism (CRM)

Service	Regulated Tariff		Multiple Bid Auctions	
SIR	Capability	Greater interaction	Availability	Interaction
FFR	Availability	Interaction	Availability	Interaction
FPFAPR	Capability	Greater interaction	Availability	Interaction
SRP	Capability	Greater interaction	Availability	Interaction
DRR	Capability	Greater interaction	Availability	Interaction
Op Reserve	Dispatch	Less interaction	Dispatch	Less interaction
RRS/RRD	Dispatch	Less interaction	Dispatch	Less interaction
Ramping	Dispatch	Less interaction	Dispatch	Less interaction

Procurement Process

DS3 System Services Workshop

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Option 5: Multiple Bid Auction

- Mandatory, sealed, pay-as-cleared, instantaneous auction for all services
- Multiple, mutually exclusive bids permitted
- Each bid includes price and capability for each service, provides a set of mutually exclusive outcomes for the auction
- TSO determines demand curve based on range of outcomes
- Least-cost outcome is selected, results in individual uniform prices for each service
- Units propose/decide contract length when bidding, existing capability of unit must be included as a bid and fixed one-year contract for existing capability.

Existing Unit:

- Unit submits bids for existing capability for 1-year contract (price/quantity for each service)
- Unit has option of submitting additional bids for enhanced capability for longer term contract
- Unit receives clearing price for each service

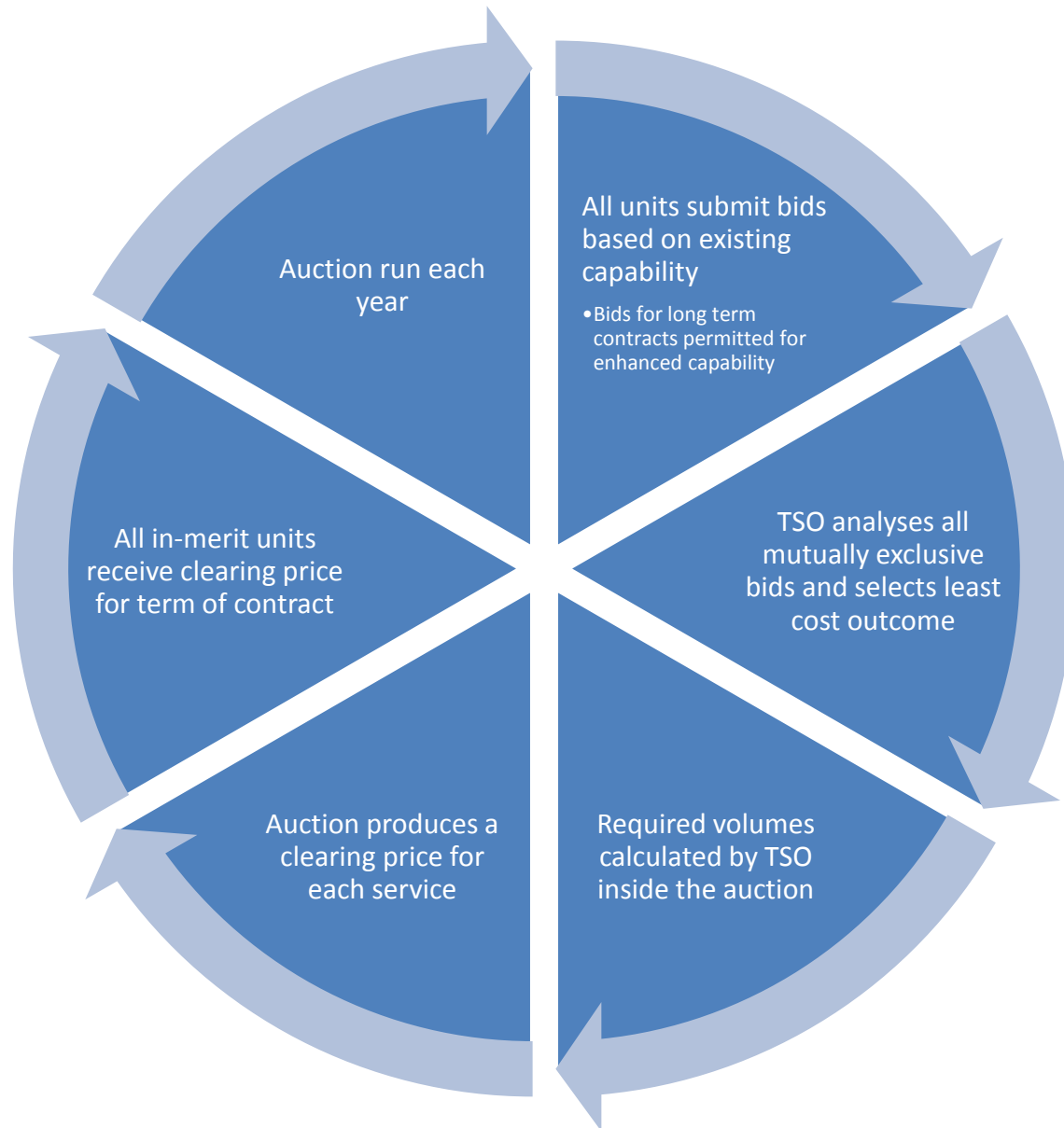
Retrofit:

- Unit submits bids for existing capability for 1-year contract (price/quantity for each service)
- Unit submits separate bids for enhanced capability for longer term contract (price/quantity/contract length for each service); multiple investment options can be bid in
- If enhanced capability is cost-effective bid will be accepted, all bids are mutually exclusive
- Investment decision made on basis of auction outcome
- Unit receives clearing price for each service
- Unit does not participate in auction again until contract expires

New Unit:

- Unit submits multiple (mutually exclusive) bids for the range of possible investment decisions
- Each bid contains price, quantity and contract length
- If bid is included in least-cost outcome, unit is offered a contract
- Investment decision made on basis of auction outcome
- Unit receives clearing price for each service
- Unit does not participate in auction again until contract expires

Enduring Process: Auction



Enduring Process: Long-term contracts

Auction will allocate some long-term contracts (for some services) if included in least cost outcome

Units paid the clearing price for the duration stated in their bid

Units do not participate in annual auction for services under long-term contract

As contracts expire units will be required to bid existing capability for those services not under long-term contracts

Option 1: Regulated Tariff

- Cost plus regulated rate of return
- BNE methodology to calculate cost
- Five-year contracts
- Tariffs reviewed every five-years
 - applies to new/renewed contracts only
- Applies to services where auction fails to provide sufficient volumes

Existing unit:

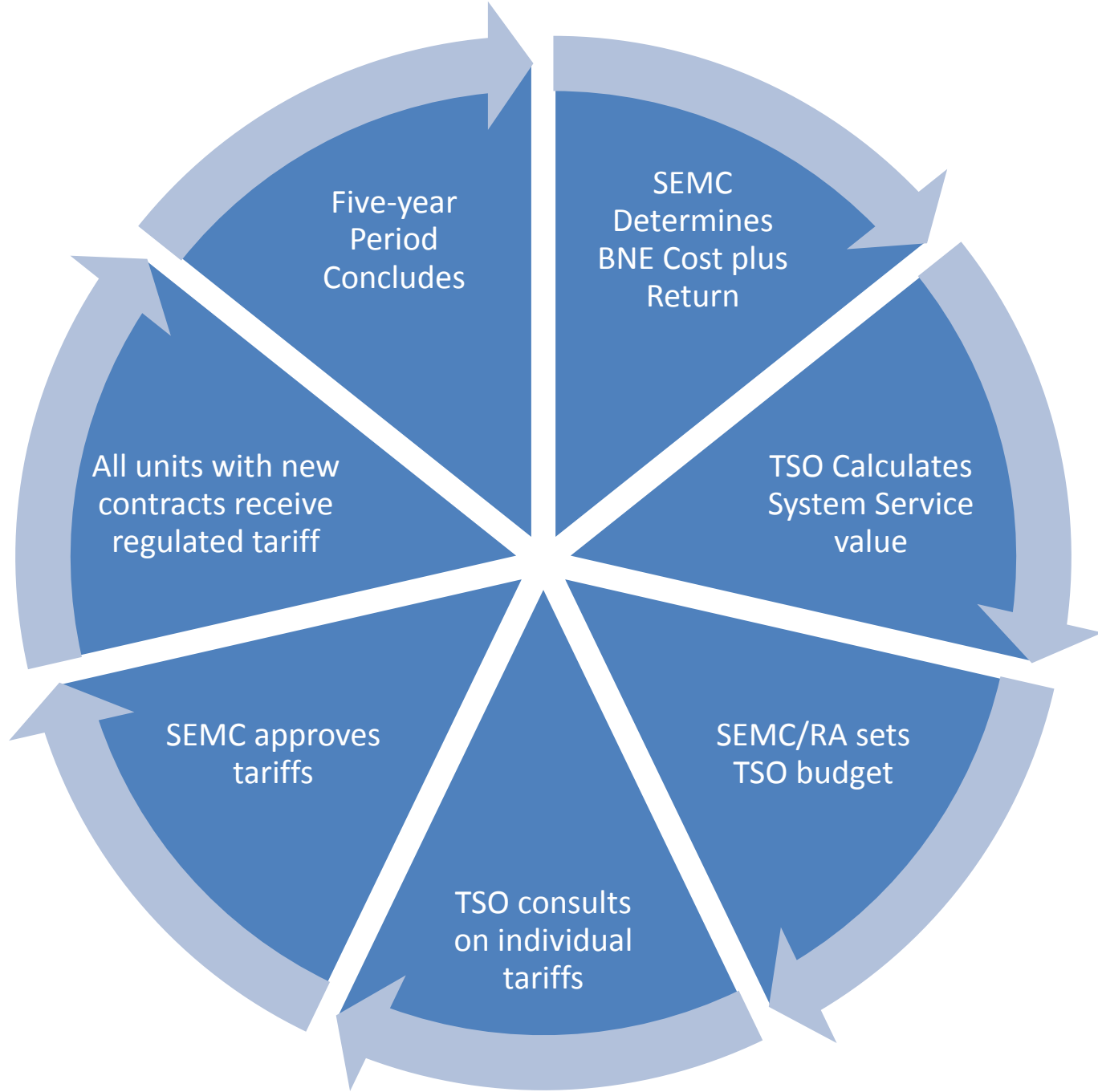
- Unit requests contract from TSO based on existing capability
- Unit receives regulated tariff

Retrofit:

- Unit observes regulated tariff, estimates revenue for next five years. Price risk beyond that period.
- Unit makes investment decision, negotiates (quantity/quality) with TSO for contract
- Unit receives regulated tariff

New Unit:

- Unit observes regulated tariff, estimates revenue for next five years (considers energy & capacity revenue). Price risk beyond that period.
- Unit makes investment decision, negotiates (quantity/quality) with TSO for contract
- Unit receives regulated tariff



SEMC
Determines
BNE Cost plus
Return

TSO Calculates
System Service
value

SEMC/RA sets
TSO budget

TSO consults
on individual
tariffs

SEMC approves
tariffs

All units with new
contracts receive
regulated tariff

Five-year
Period
Concludes

Questions and Answers

DS3 System Services Workshop

29 July 2014

TSO Presentation

Simon Tweed, EirGrid

29 July 2014

DS3 Programme Update

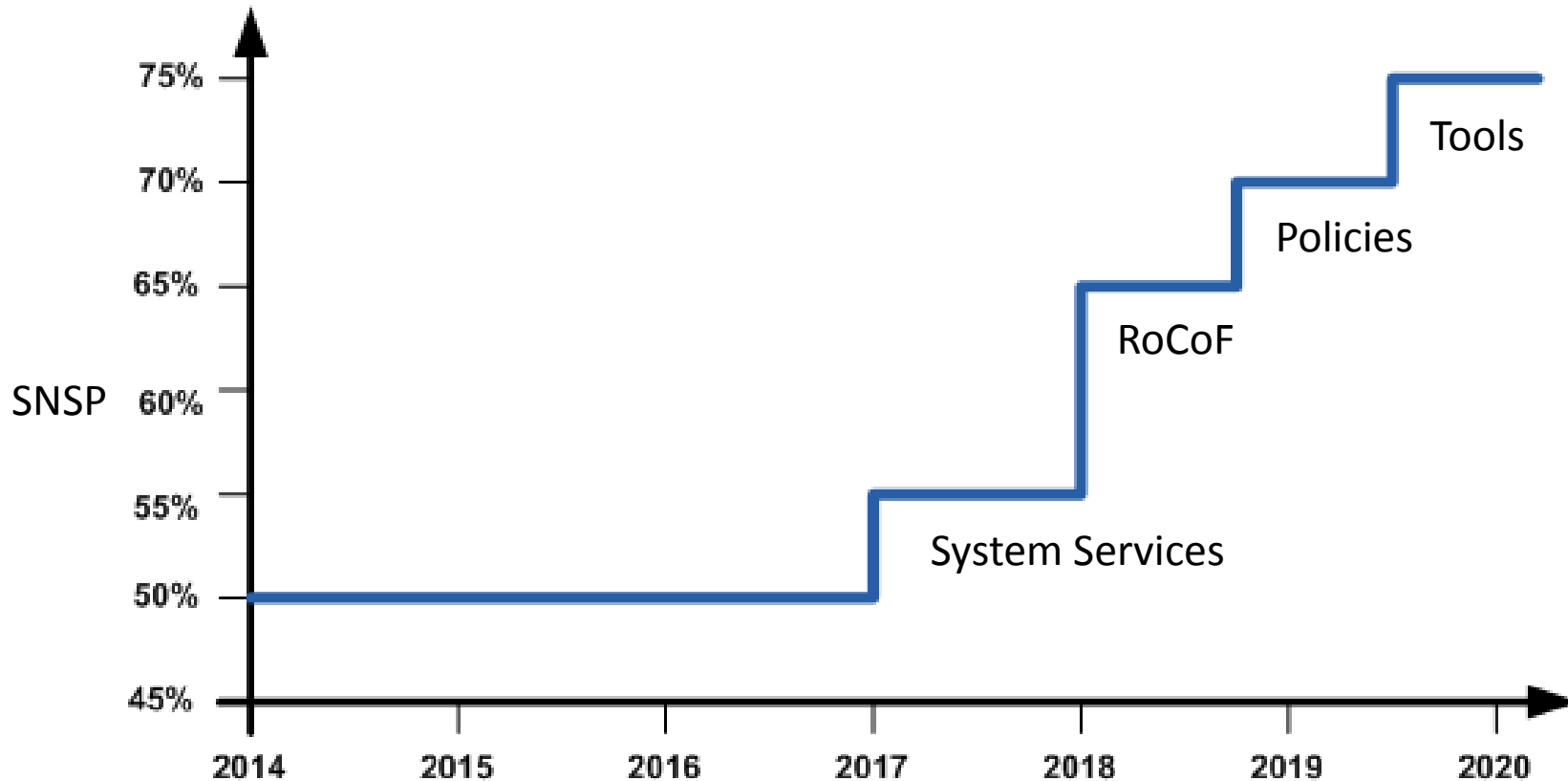
DS3 System Services Regulatory Authorities' Open Forum

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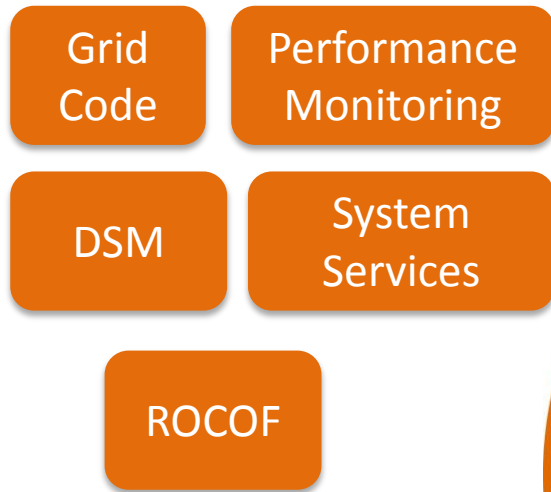
Simon Tweed



Operational Capability Outlook



DS3 - System Performance



EPM&T, DSM & Grid Code

Enhanced Performance Monitoring and Testing

- EPM system: implementation of requirements underway
- Industry workshop held in Belfast on 24th June
- Test procedures based on industry workshops published for comment

DSM

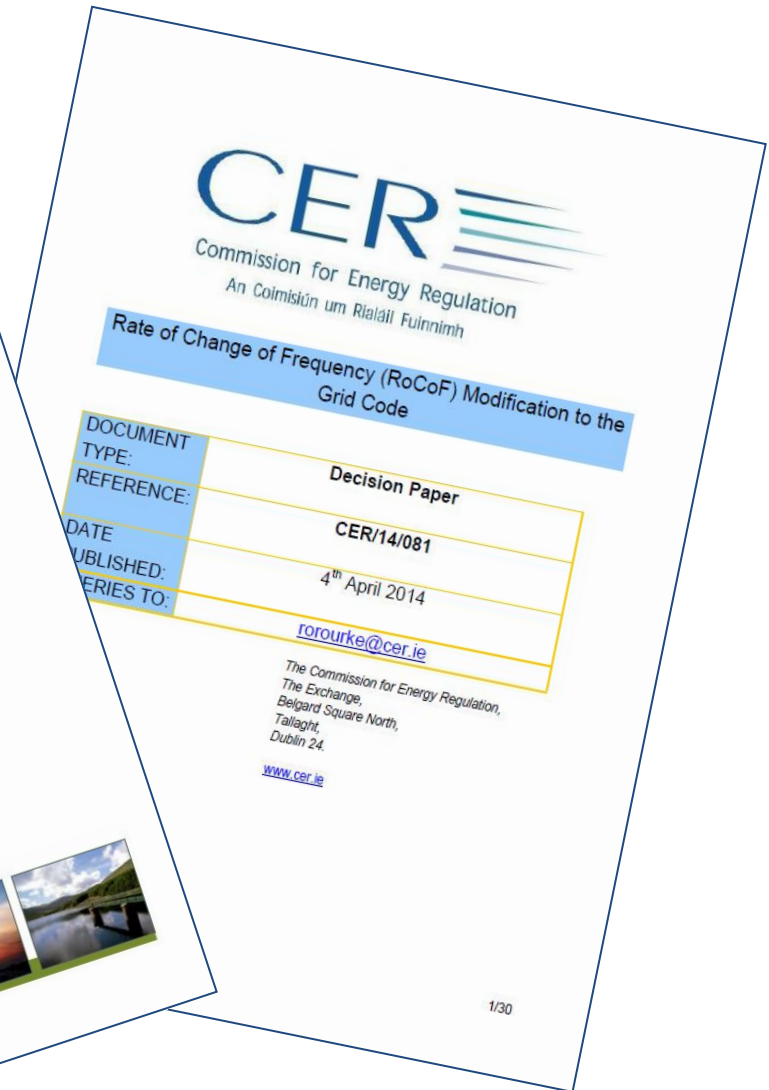
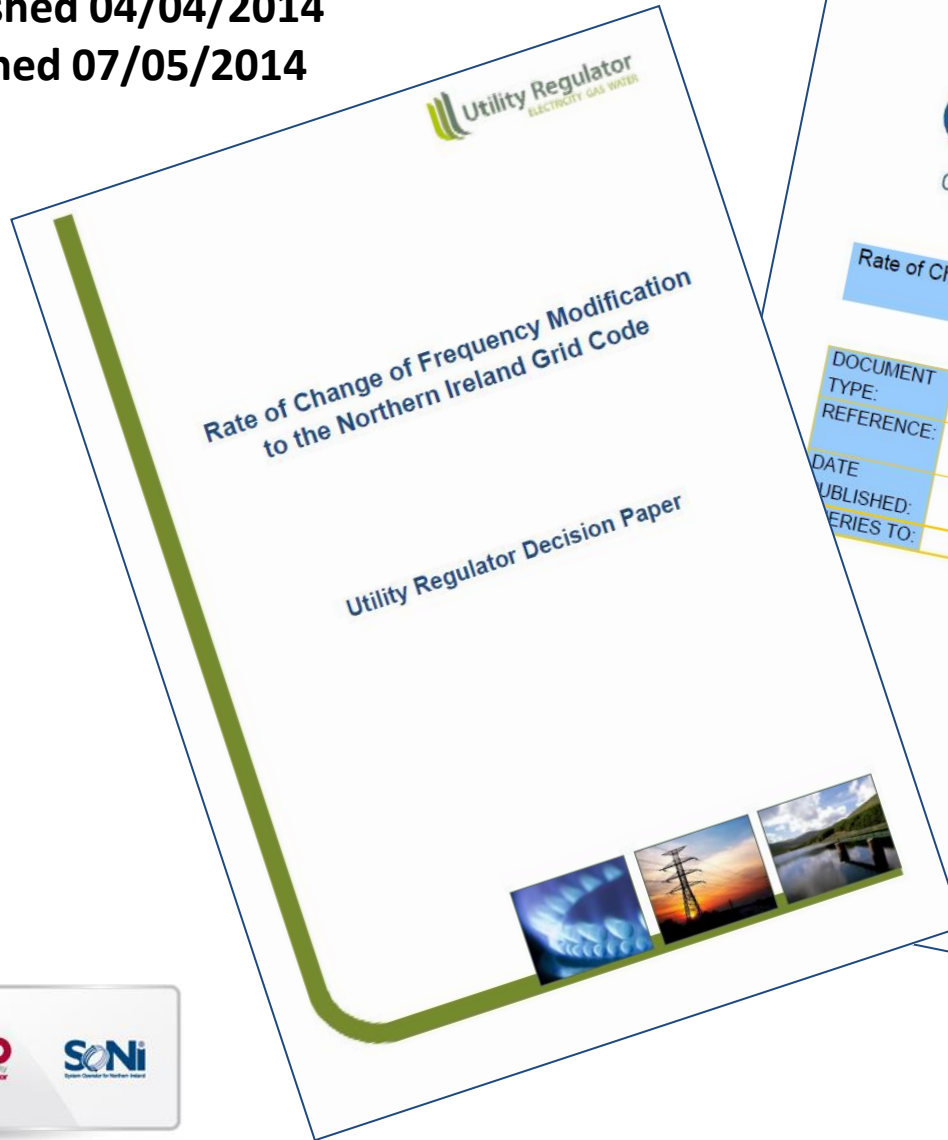
- Four Grid Code modifications proceeding in Ireland, six undergoing consultation in Northern Ireland.
- On-going work on application process, commissioning and testing



RoCoF Decisions

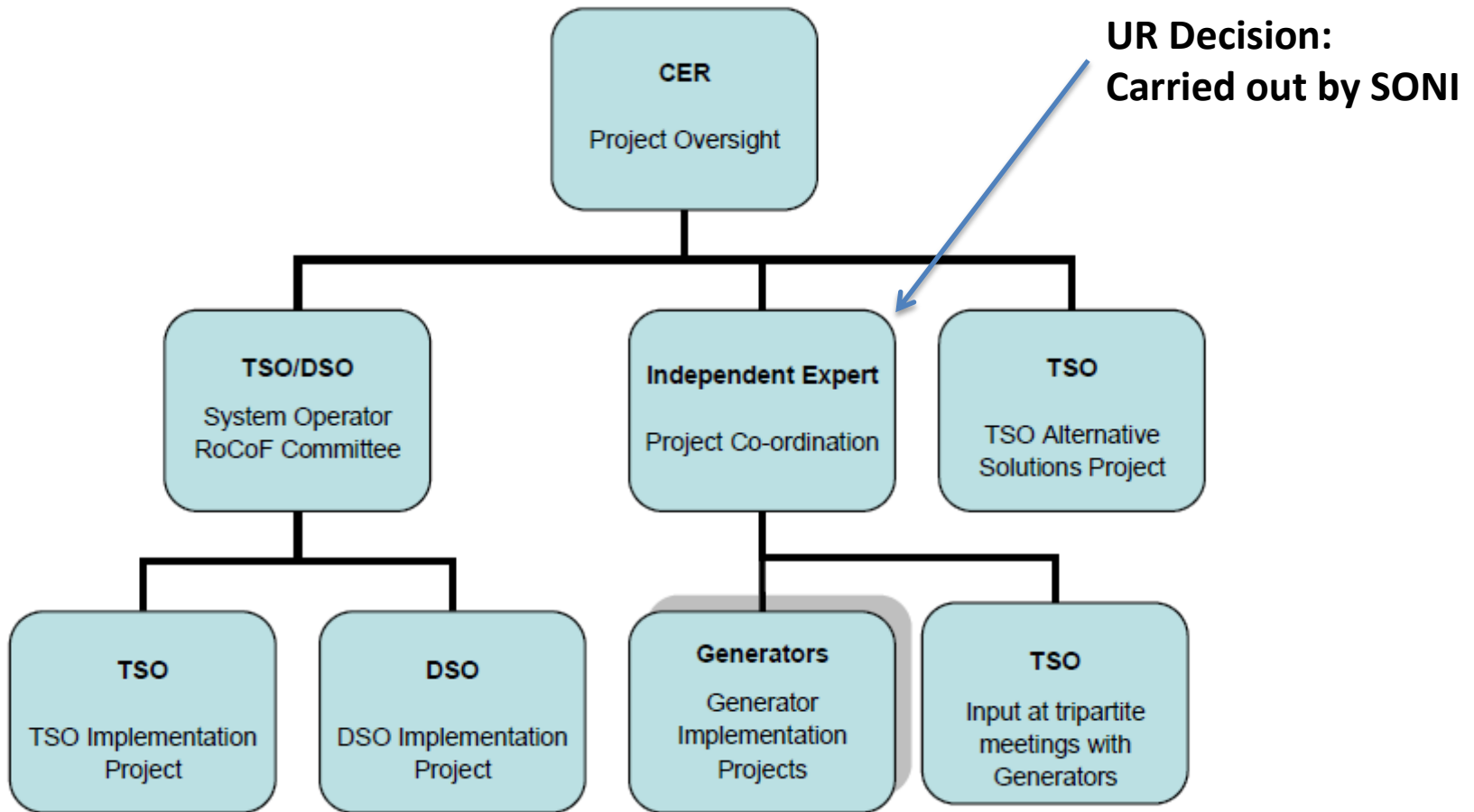
CER: Published 04/04/2014

UR: Published 07/05/2014



RoCoF Project Structure

(Structure as set out in CER decision)



RoCoF Implementation Projects

TSO-DSO Implementation

- High level plan agreed and published
- Data gathering / LoM setting changes progressing

Generator Implementation

- TSOs' proposed generator prioritisation to RAs
- Prioritisation discussed with NI generators

Alternatives

- TSOs' proposed study approach sent to RAs



DS3 - System Policies



Frequency

Model Dev.
& Studies

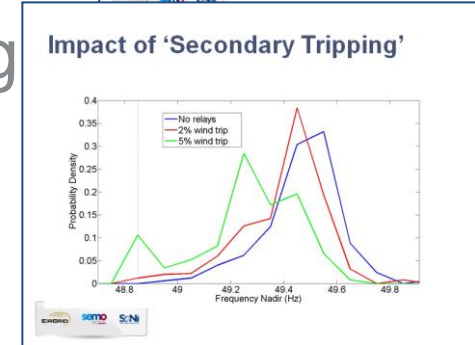
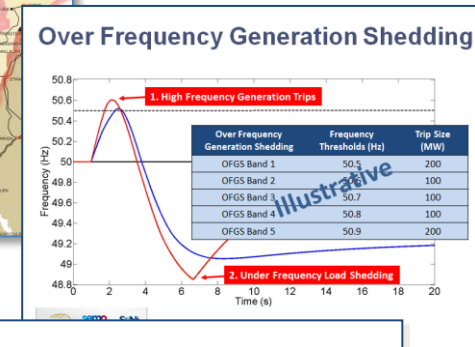
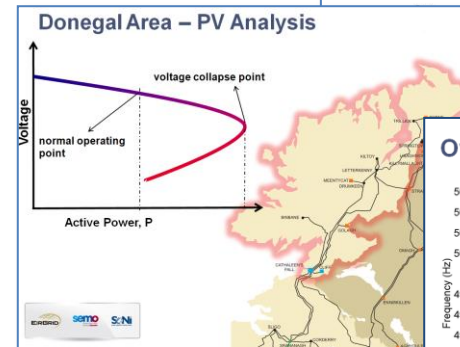
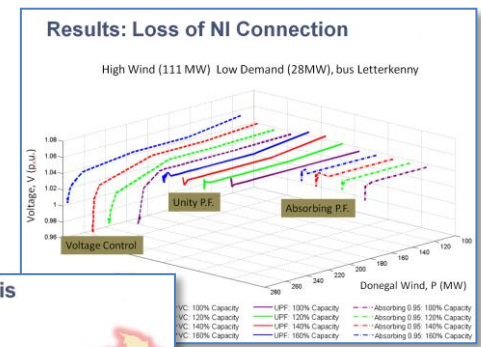
Renewable
Data

Voltage



Operational Studies

- Nodal Voltage Control
- Minimum Generation
- Secondary Tripping
- Over Frequency Generation Shedding
- SNSP metric review
- Pilot version of automated large scale dynamic analysis using PLEXOS as input underway



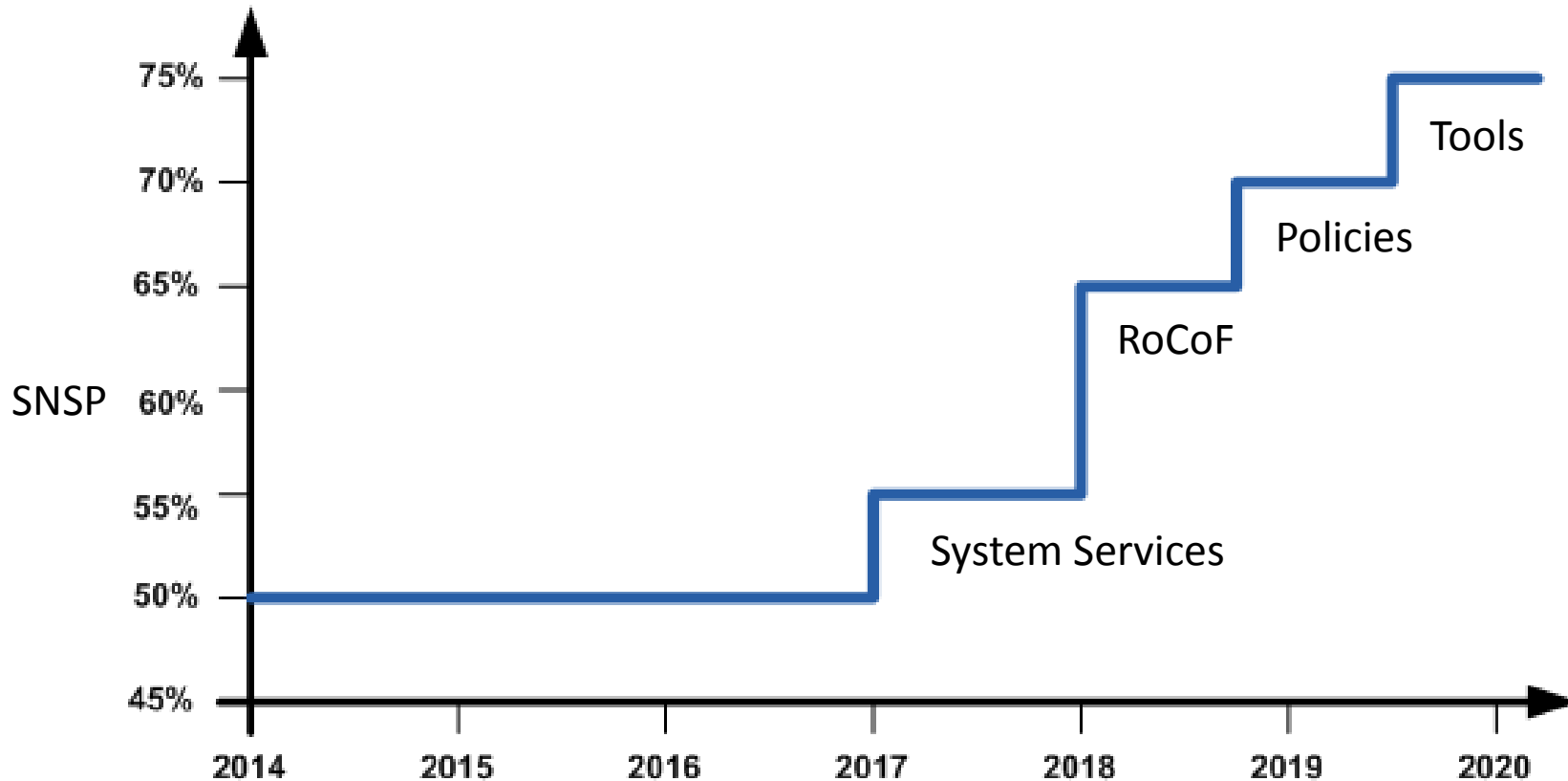
DS3 - System Tools



WSAT

Control
Centre Tools

Operational Capability Outlook





Concluding Remarks and Next Steps

Denis Cagney, CER

29th July 2014

Summary

- SEM Committee has approved system services technical design (SEM-13-098)
- Demand Side Analysis
 - System benefit (saving) of €241 million in 75% SNSP case
- Supply Side Analysis
 - Annual cost of €70 - €84 million for system service provision (capital cost)
- Five Procurement options considered:
 1. Regulated Tariff
 2. System Services Pot
 3. Regulated Competition
 4. Split Auction
 5. Multiple Bid Auction
- Spectrum from regulated to market based
- Proposing Option 5 – Competitive Multiple Bid Auctions

Next Steps

- Consultation closes Friday 22nd August
- RAs available for bilateral meetings first week of September
- SEMC Decision by end of 2014
- Detail of Implementation Phase will depend on SEMC Decision