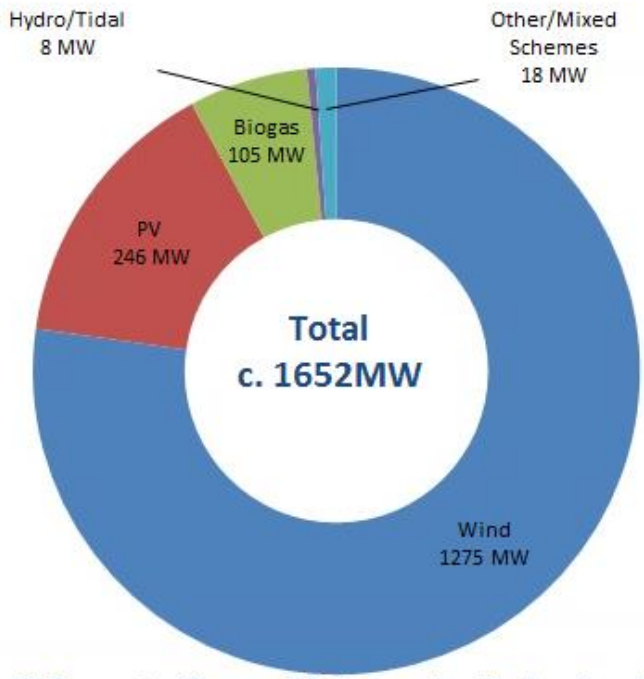
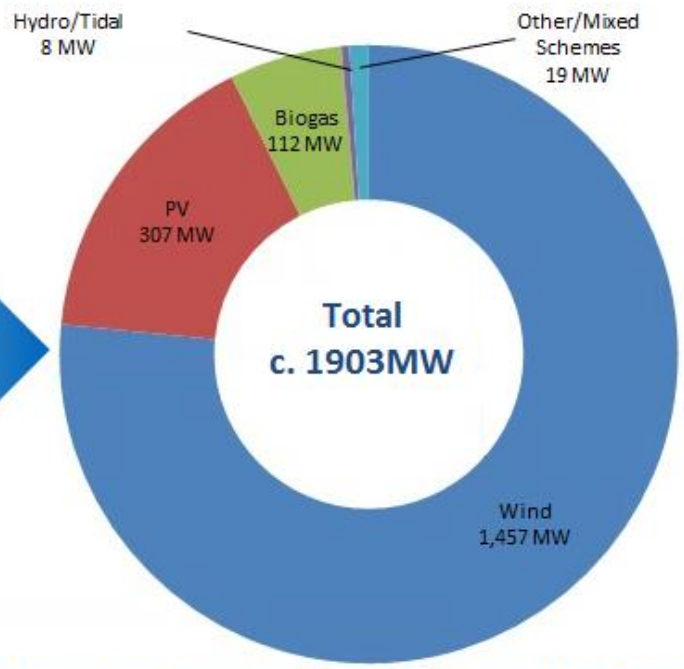
RENEWABLE STATUS UPDATE

RGLG 3rd September 2019

Renewable Generation Status – Q2 2019



NI Connected Renewable Generation Technology Mix



NI Connected and Committed Renewable Generation Technology Mix

+ 251MW to Connect

NIE NETWORKS CAPACITY MAP –DEMO

RGLG 3rd September 2019

NIE Networks Capacity Map –demo

https://www.nienetworks.co.uk/connections/capacity-map

Transmission Application & Offers

RGLG

3rd September 2019

Transmission Applications & Offers

Project Name	Developer	MEC/MIC
Applications		
EP Kilroot GT5 and GT6 OCGT's	EP Kilroot Limited	2 x 205MW MEC
Aught Wind Farm	Aught Wind Farm Limited	37.2MW MEC
Pigeon Top Wind Farm	Energia Renewables Company 1 Limited	51.6MW MEC
Islandmagee Gas Storage	Costain Oil, Gas and Process Ltd.	34.75MW MIC
Offers Issued		
BPS 100MW BESA	EP Ballylumford Limited	100MW MEC & MIC
Atlantic Hub	Atlantic Hub Property Ltd.	100MW MIC
Curraghamulkin Wind Farm (also called Dooish)	DW Consultancy	42MW MEC
Belfast Power Limited	Evermore Energy	489.6MW
Drumkee Battery Storage	Drumkee Energy Limited	50MW MEC & MIC
Mullavilly Battery Storage	Mullavilly Energy Limited	50MW MEC & MIC
KPS 50MW BESA	EP Kilroot Limited	50MW MEC & MIC
Castlereagh 50MW BESA	Energia Renewables Company 1 Limited	50MW MEC & MIC

Demand Erosion and Uncontrollable Generation Limit

RGLG 3rd September 2019

Agenda

- Overview of System issues with Uncontrollable Export
- Operational considerations
- Implications of further uncontrollable export
- Mitigation considerations
- Next Steps

Northern Ireland Electricity Networks

SONI

Key Principles

- SONI balances generation and demand on the system to maintain system stability.
- Min of 3 synchronous generators to be dispatched at all times.
- Excess generation results in system frequency > 50 Hz.
- Generation output must be reduced - dispatch down of controllable generation.
- Reduction may also be required for operating reserve requirements, including negative reserve, voltage control requirements and System Non-Synchronous Penetration limit

Northern Ireland Electricity Networks

SONI

Key Principles

- SONI Control room has seen continued year on year decline in min demand - multiple occurrences of min demand ≈ 450 MW
  - Uncontrollable generation (Micro/SSG) energy efficiency
- Uncontrollable generation cannot be curtailed - same effect as eroding system demand.
- Presents issues at low system demand even with minimal synchronous generation
  - Reliance on ability to export surplus via N-S or Moyle
- The total capacity of uncontrollable generation export is subject to an operational limit as a result.

Northern Ireland Electricity Networks

SONI

Operational Considerations

System Stability Requirement	At least 3 units on load at all times B10, B31, B32, C30, K1 & K2 Min Gen Total : 249 – 486 MW
Negative Reserve Requirement	>50 MW
Uncontrollable LSG	79 MW
Min Demand	450MW
Increasing reliance on export availability	
Moyle Export	80 MW
North – South Export	110 – 270 MW (inertia dependent)

Above must also consider outages and availability of Gen units, Moyle and N-S

Northern Ireland Electricity Networks

SONI

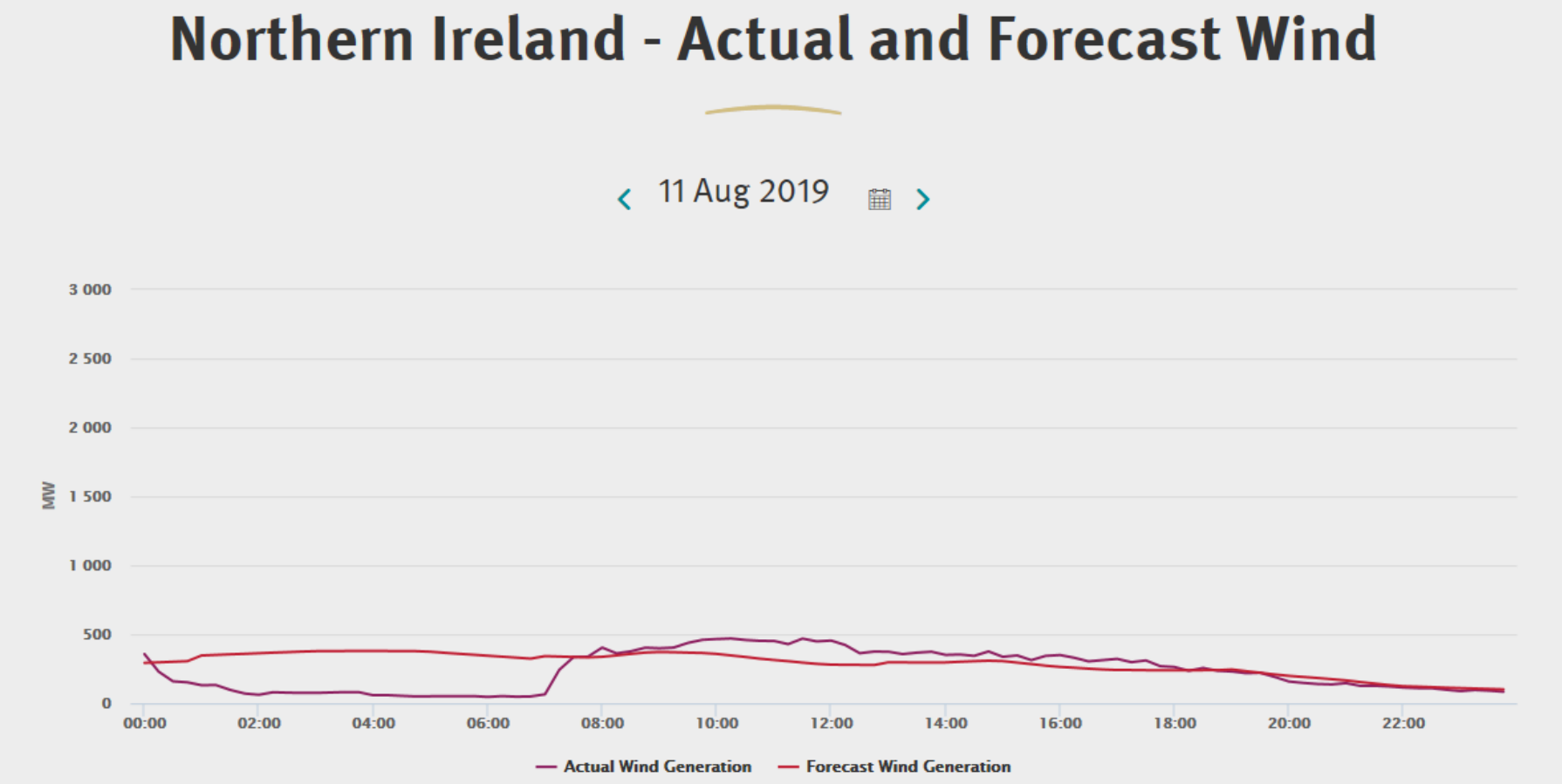
August 11th 2019

NI Min Demand (0000 – 0900)	456 MW
Total Conventional Generation (min gen + negative reserve)	295 MW
Moyle scheduled	440 MW import
North – South Flow	300 MW export
Wind forecasted	370 MW
Wind curtailed	Approx 300 MW remaining 70 MW uncontrollable
Request to Trade back on Moyle around 0430am	Refused (all trading on interconnectors is co-ordinated and only on firm market schedule)
Formal Emergency Assistance request issued to NG	Emergency Assistance trade back of 50 MW

Northern Ireland Electricity Networks

SONI

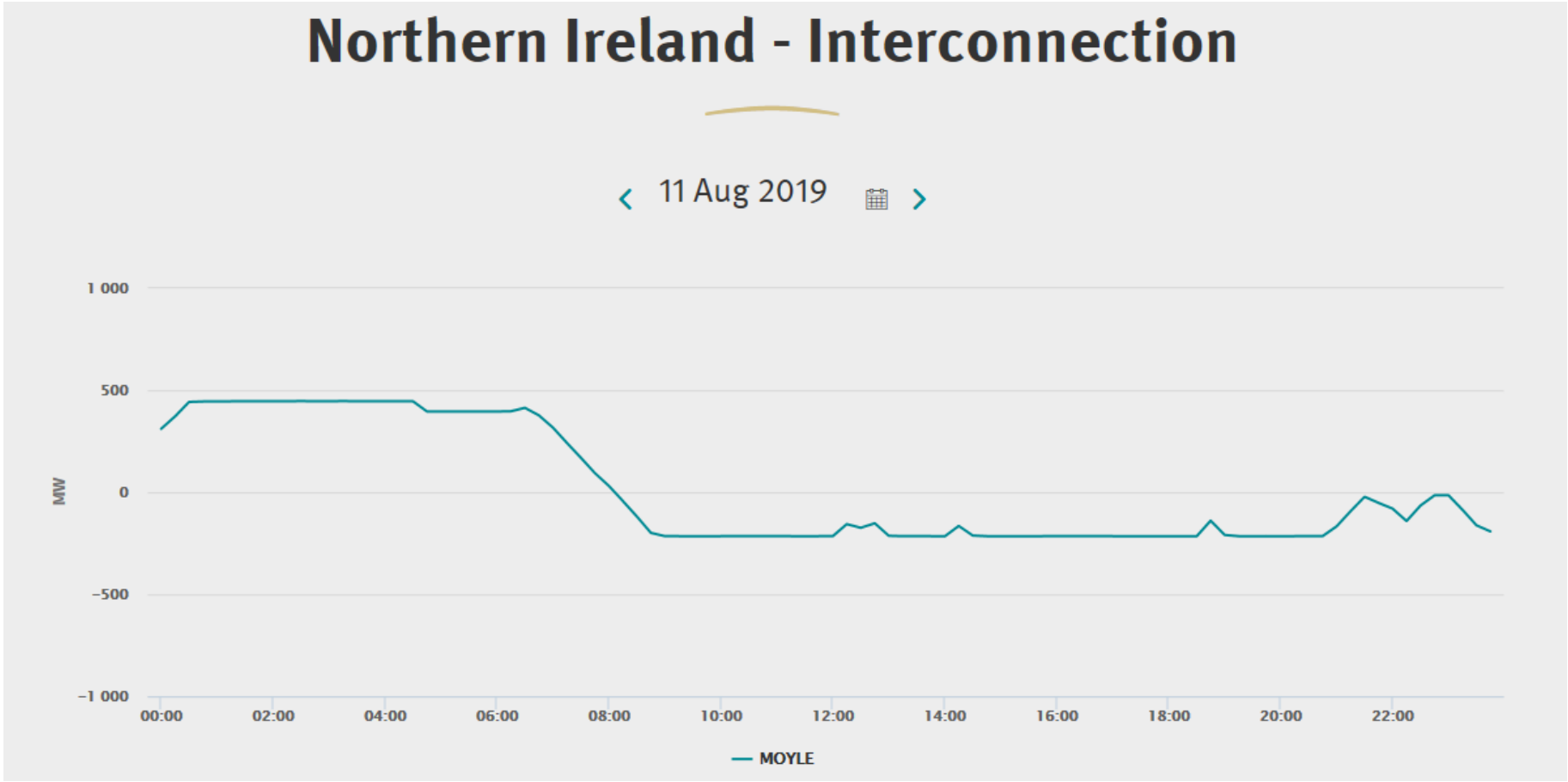
August 11th 2019



Northern Ireland Electricity Networks

SONI

August 11th 2019



Northern Ireland Electricity Networks

SONI

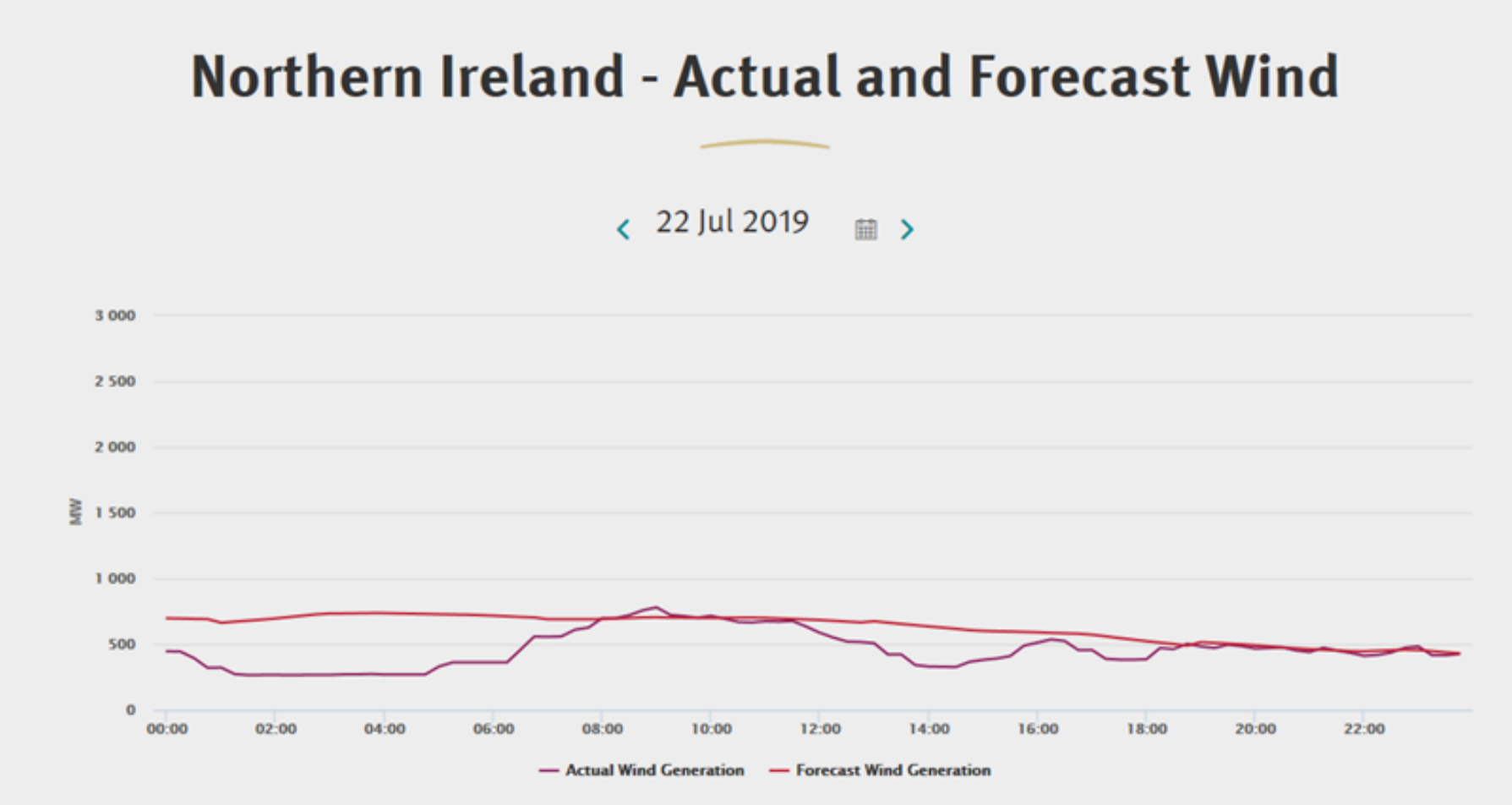
22nd July 2019

NI Min Demand (0000 – 0600)	456 MW
Total Conventional Generation (min gen + negative reserve)	459 MW
Moyle scheduled	83 MW export
North – South Flow	250 MW export
Wind forecasted	700 MW
Wind curtailed	Approx 376 MW
Wind post curtailment	324 MW remaining including approx 70 MW uncontrollable

Northern Ireland Electricity Networks

SONI

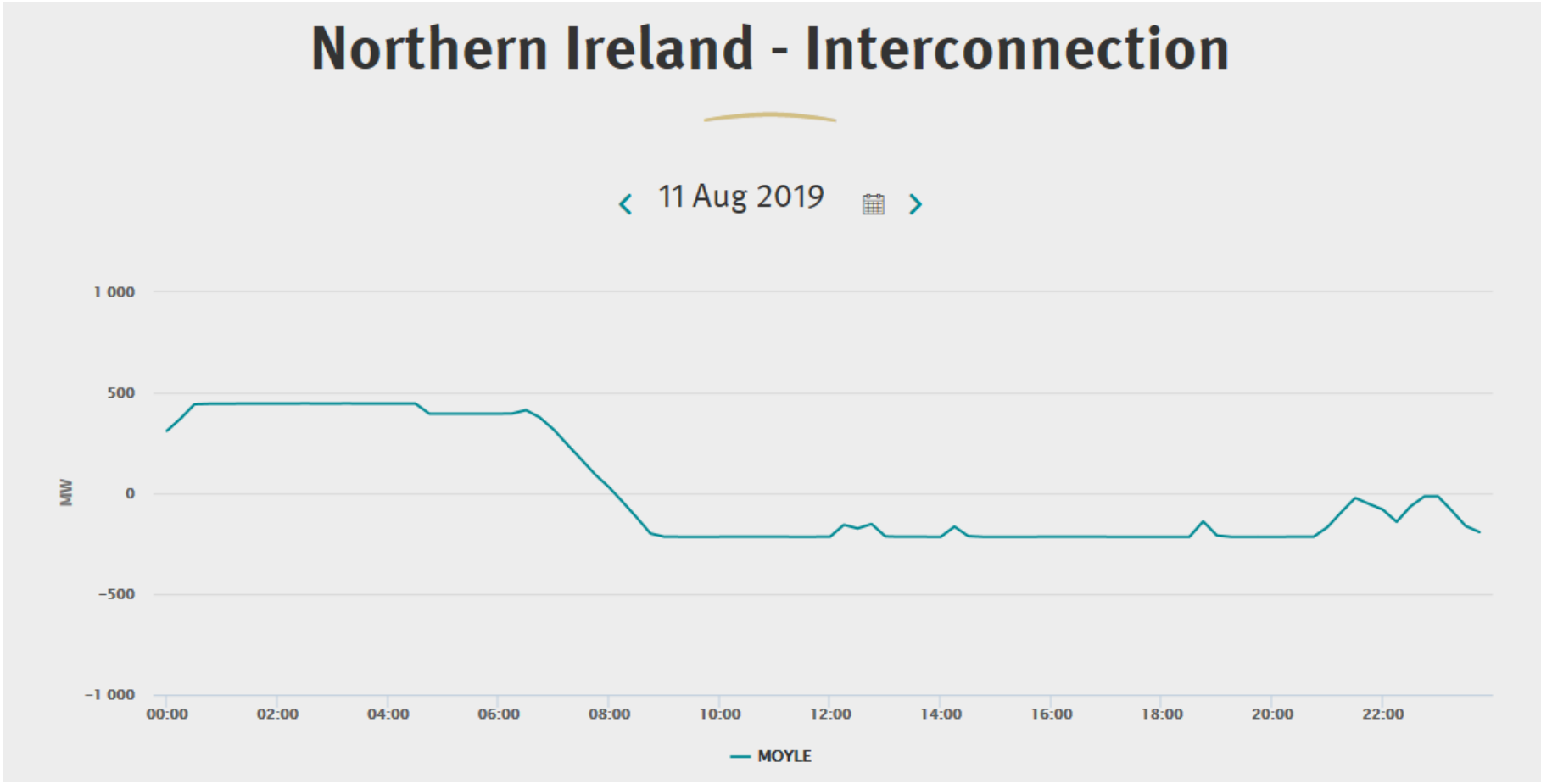
22nd July 2019



Northern Ireland Electricity Networks

SONI

22nd July 2019



Northern Ireland Electricity Networks

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Impact of Further SSG export

- Increased potential for system instability
- Increased likelihood of trade backs on Moyle – Cost to NI customer
- Deviation from priority dispatch rules
- Increased curtailment of LSG - may also undermine project commercials and future investment

Northern Ireland Electricity Networks

SONI

What would help?

- SSG and LSG export becomes controllable
- Min demand growth
- Conventional plant min gens reduce
- Ability to reduce to 2 sets in NI achieved
- 2nd N-S
- Additional Interconnector in NI

Northern Ireland Electricity Networks

SONI

What will make issue worse?

- Connection of further uncontrollable SSG export
- Continued reduction in min demand (including impact of self consumption)
- Replacement of ageing conventional generation fleet with high min gen plant

Northern Ireland Electricity Networks

SONI

Next Steps

- SONI to complete impact assessment and decision on uncontrollable
- Rationale and any restrictions will be included in CIWG consultation paper

Northern Ireland Electricity Networks

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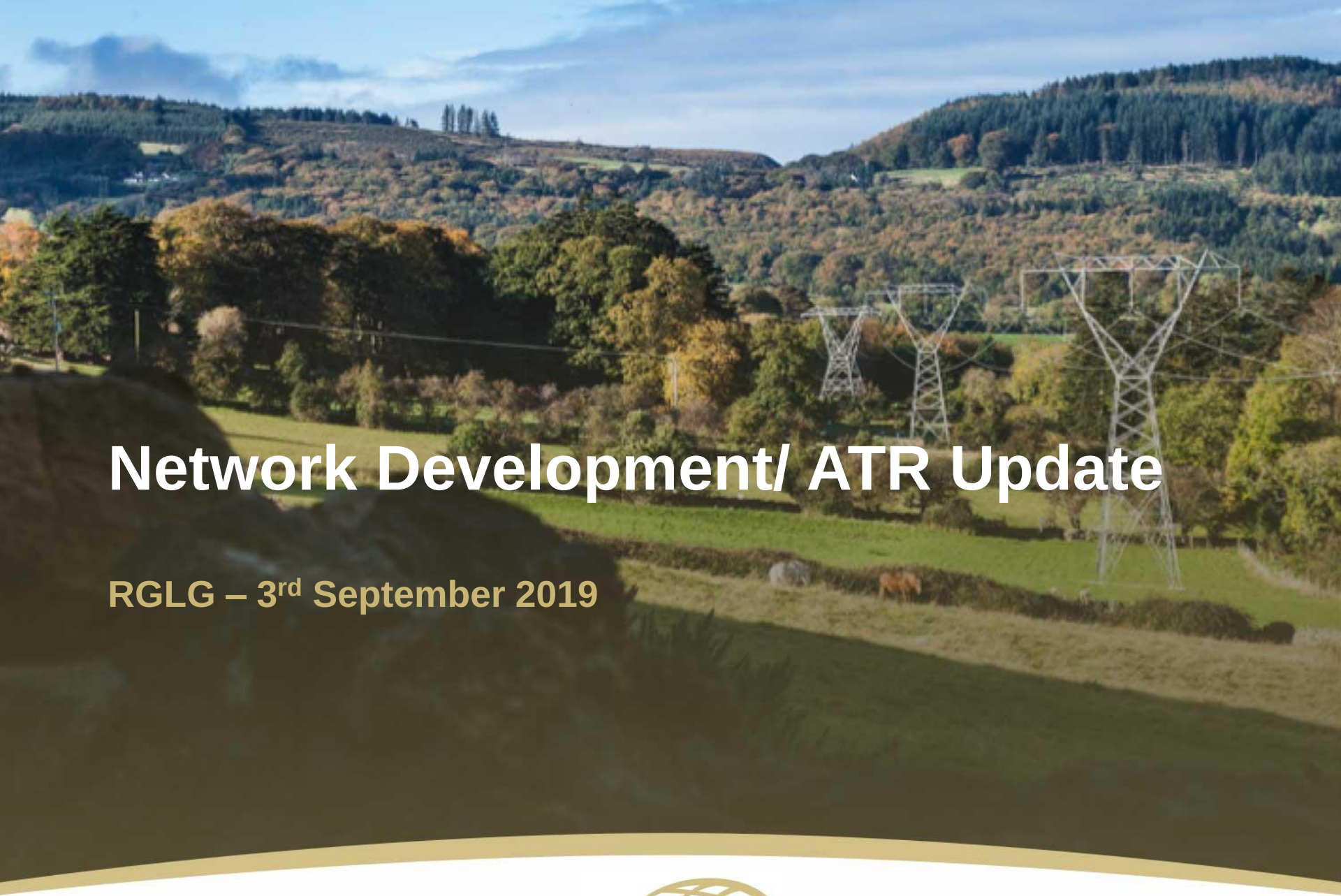
Contestability Update

Distribution and Transmission



Network Development/ ATR Update

RGLG – 3rd September 2019

Tomorrow's Energy Scenarios 2019 Consultation

RGLG

3rd September 2019

TESNI Aim

- Under Condition 40 of the TSO Licence, SONI are required to produce a reasonable number of future scenarios which reflect uncertainties
- TESNI aims to outline a range of credible pathways for Northern Ireland's energy transition with a specific focus on what this means for the electricity system over the next thirty years and beyond.

SONI publications

All Island Generation Capacity Statement

Ten year electricity demand forecast.

All Island Ten Year Transmission Forecast Statement

Detailed information on demand and generation opportunities.

Transmission Development Plan

Ten year network and interconnection development plan.

Ten Year National Development Plan - Scenarios Report

Possible energy scenarios for Europe out to 2040.

Tomorrow's Energy Scenarios

Credible electricity scenarios for Ireland out to 2040.

TES System Needs Assessment

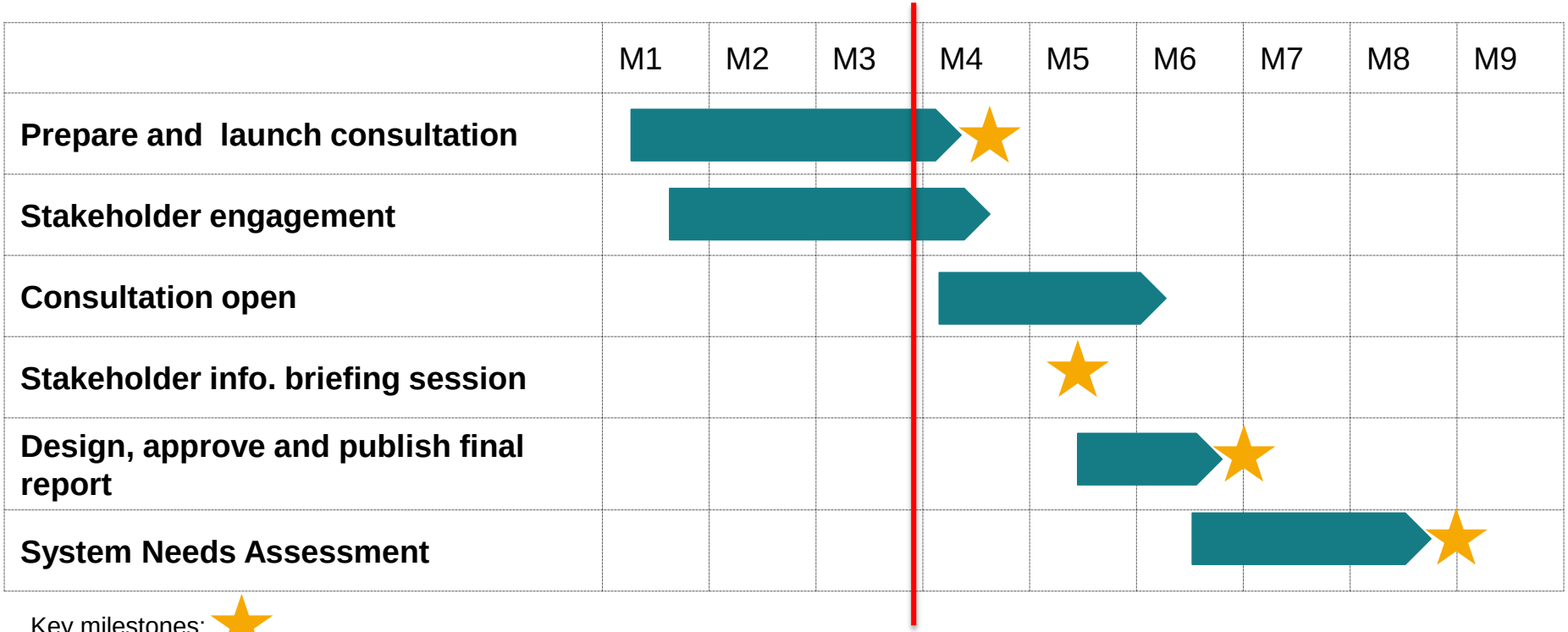
Long-term needs of the electricity transmission grid out to 2040.

Ten-year-horizon planning publications

Twenty-year-plus-horizon planning publication

SONI

Timeline



Key milestones: ★

- Consultation Period (7 weeks)
- Mid-consultation briefing session

Decarbonisation NI Context

NI scenarios

5th UK carbon budget

&

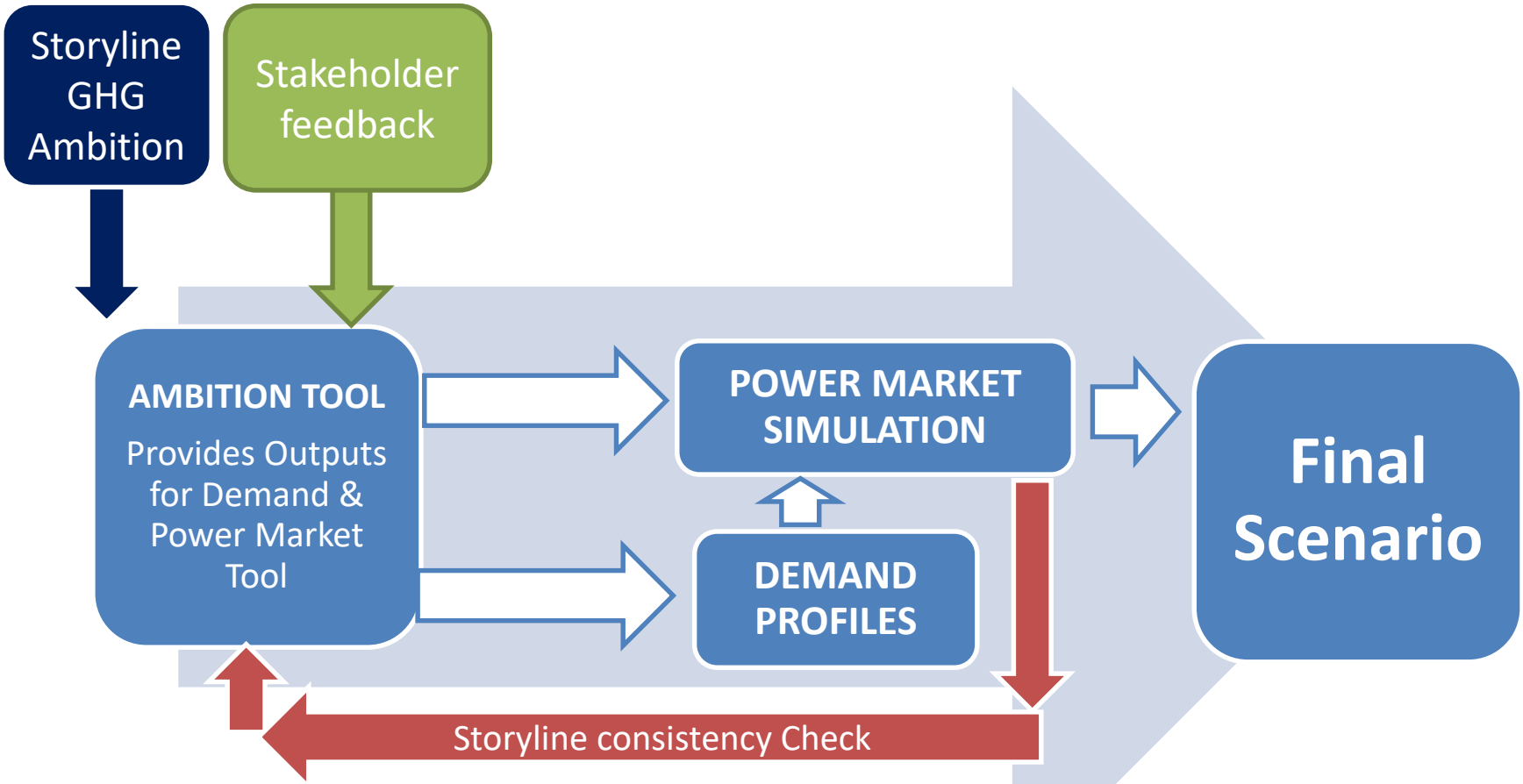
Amendment to Climate Change Act 2008

ENTSO-E's scenario building working group

Future Energy Landscape Uncertain

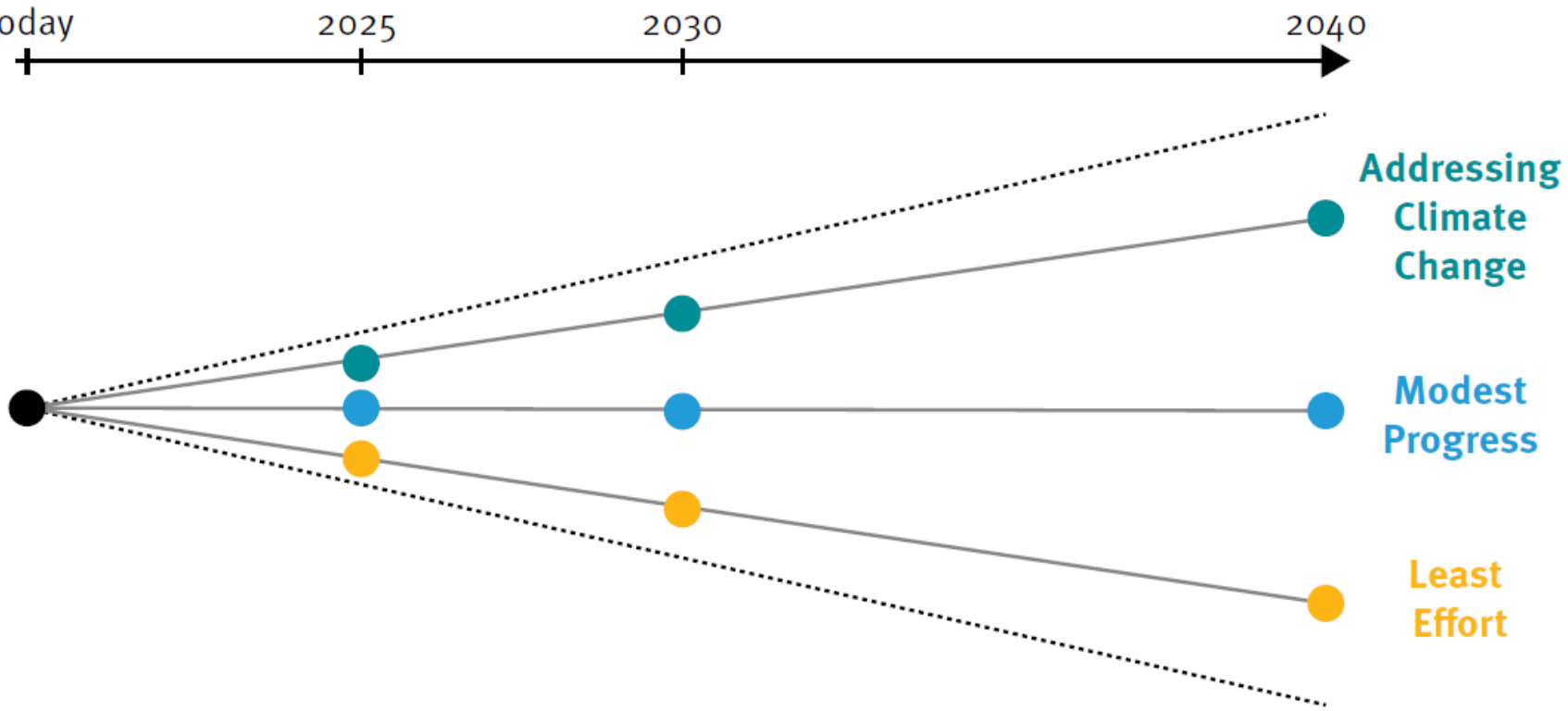
- Changes in NI consumers' future energy needs require understanding of:
  - What benefits exist through market integration by further interconnections
  - Impact on network and system operation with significantly higher levels of renewables and energy efficiency measures needed to achieve carbon neutrality
  - Interaction between the DSO and the TSO in the future planning and operation of the power system
  - Implications from energy storage both in battery technology and game changer technologies, such as Power to X

Scenario Quantification Process



SONI

TESNI 2019 Scenario Evolution



Scenario Design Matrix

	Least Effort	Modest Progress	Addressing Climate Change
Decarbonisation	**Low**	**Medium**	**High**
Toward a zero-carbon electricity system by 2050	No	Progress made	Yes
Percentage RES-E in 2030	50%	60%	70%
Coal generation phase-out	Timely	Timely	Timely
Greenhouse Gas emissions reduction by 2030	35%	40%	45%
Carbon capture and storage	No	No	Yes [2040]
Energy efficiency gains	Low	Medium	High
Electrification of heat and transport	Low	Medium	High
Decentralisation	**Medium**	**Low**	**High**
Distribution-connected generation growth	Medium	Low	High
Self-consumption	Medium	Low	High
Enablers	**Medium**	**Low**	**High**
Demand-side flexibility	Low	Medium	High
Smart Meter uptake	Low	Medium	High

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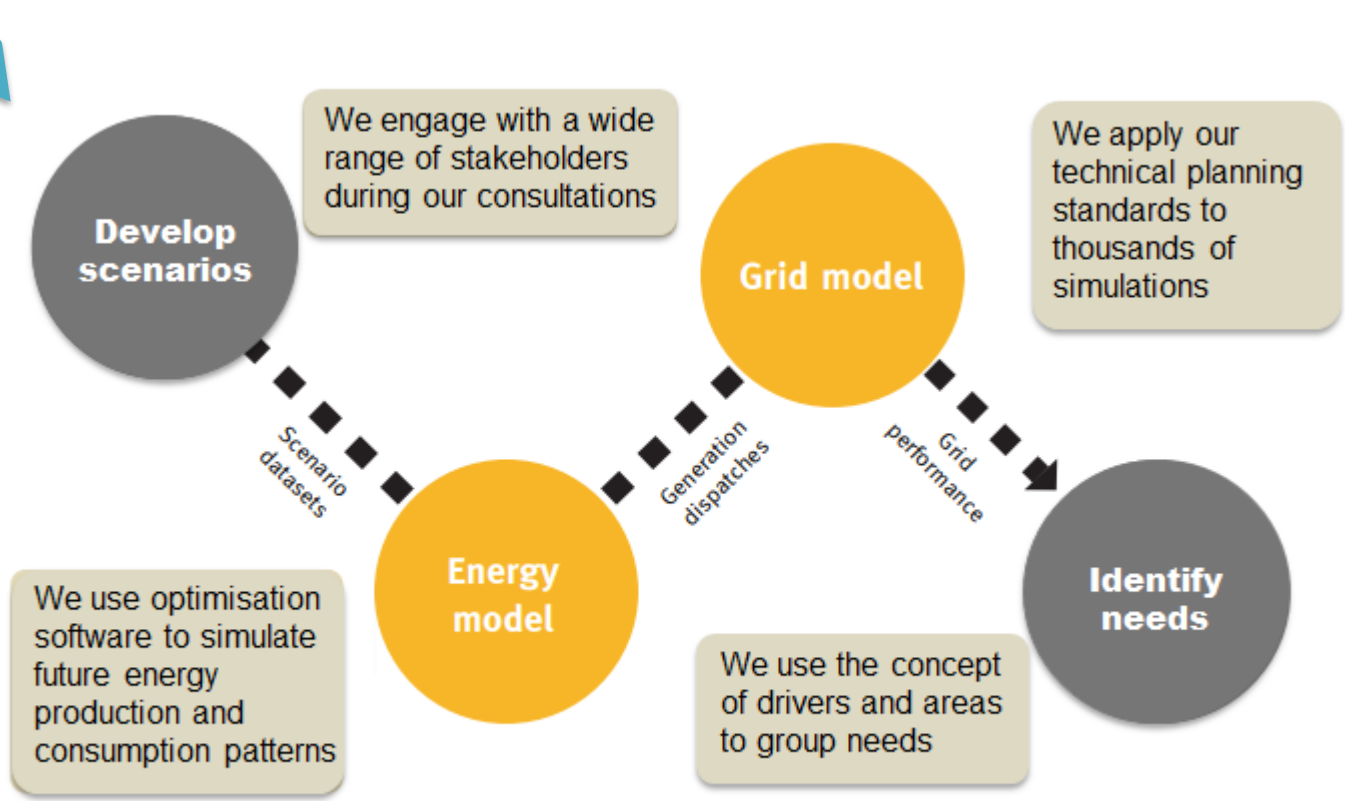
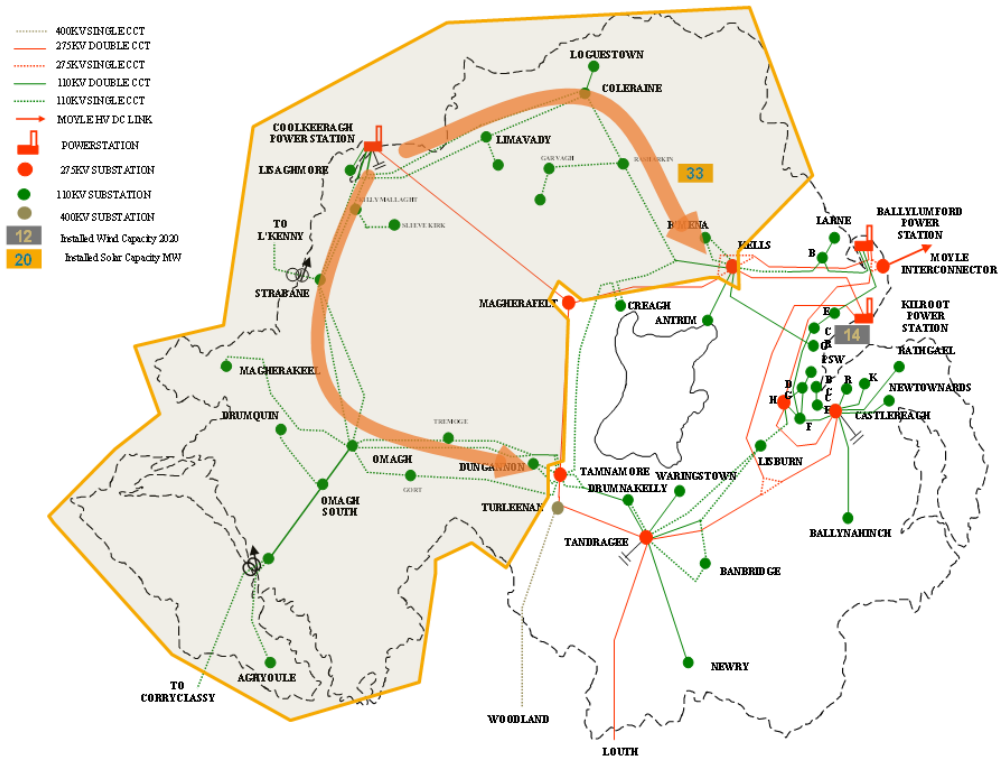
System Needs Assessment

Current Position



System Needs Example



2025

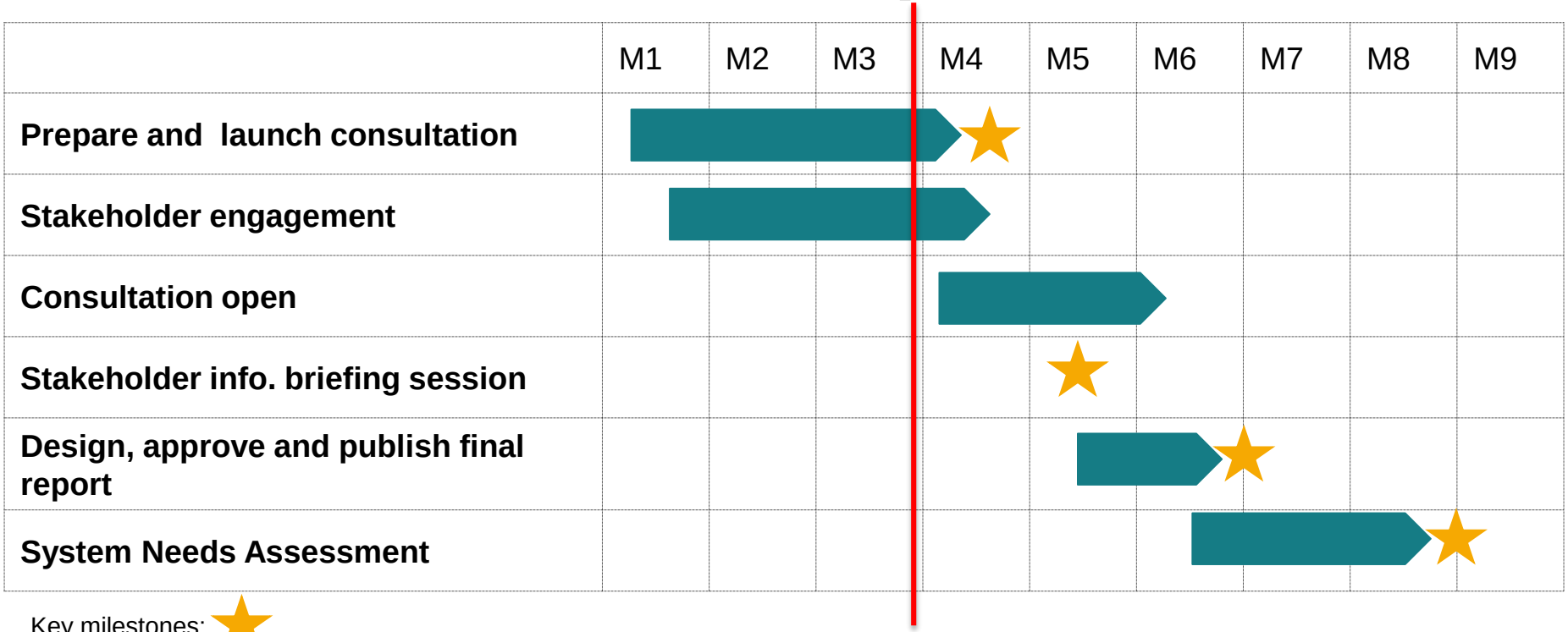
2030

2040

Driver(s)	Need(s)
RES integration	Power transfer capacity Voltage support

For illustrative purposes only.

Next Steps



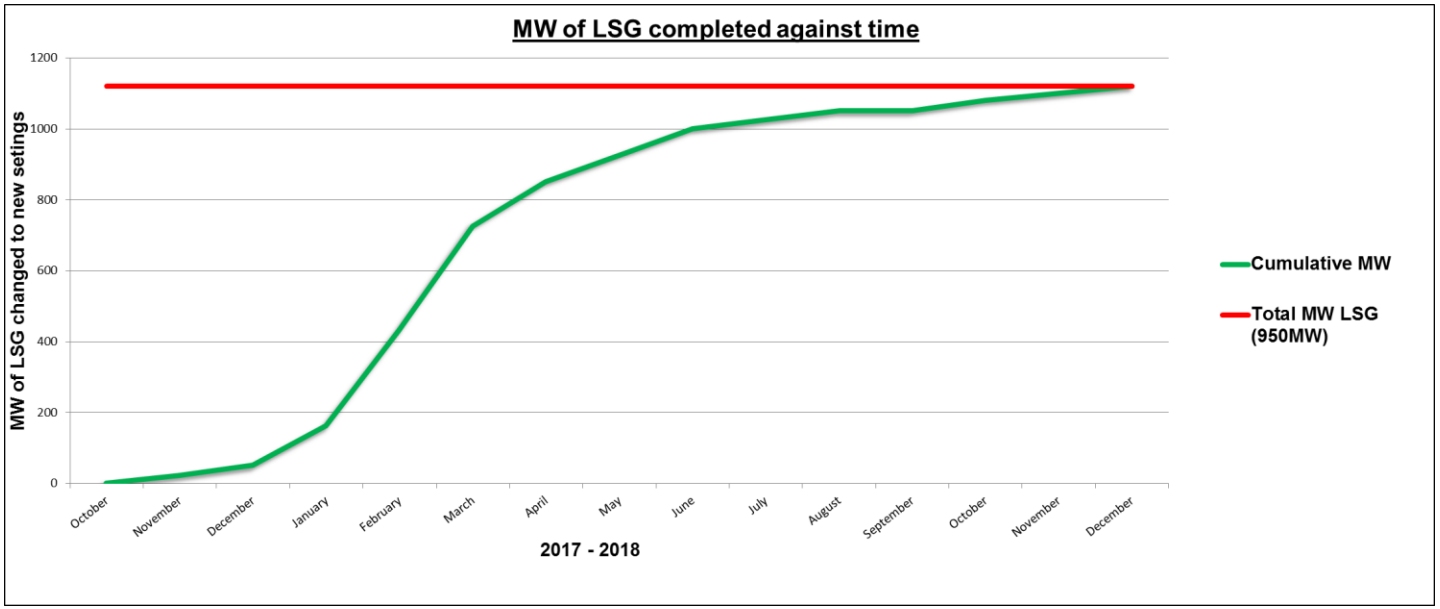
- Consultation Period (7 weeks)
- Mid-consultation briefing session

G59 ROCOF IMPLEMENTATION PROGRAMME

RGLG Update 03/09/19

LSG RoCoF Progress

- All LSG sites >5MW have been changed to new RoCof setting
- 1120 MW of 1Hz/s RoCoF compliant Large Scale Generation (including sites that have connected since the programme started)
- 68 LSG sites have been changed



SSG RoCoF Implementation

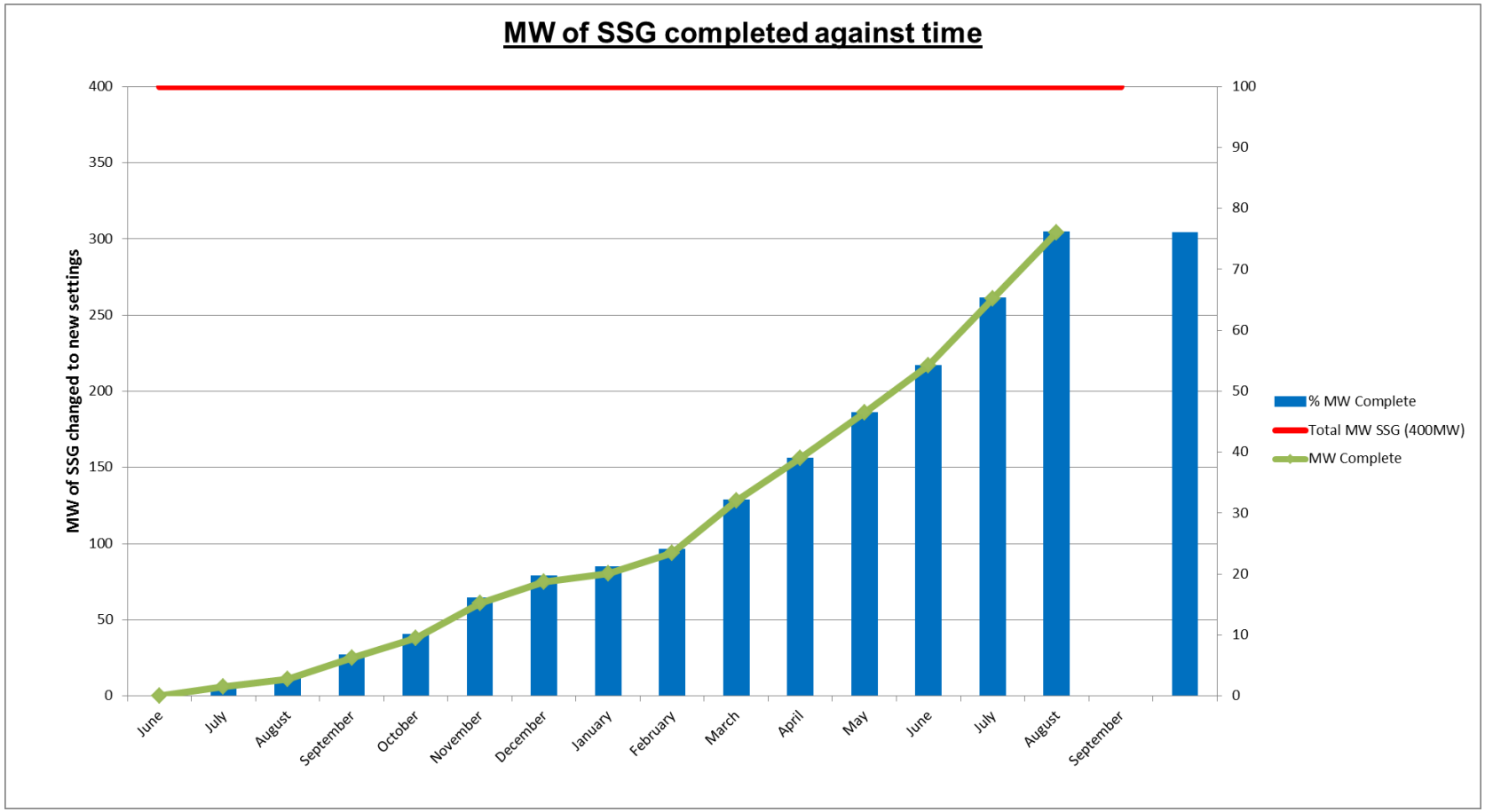
- **Letters requesting G59 changes sent out 01 June 2018**
- **SSG owners to acknowledge receipt**
  - Online or by return pre-paid envelope
- **For assurance purposes SSG owners to use G59 approved contractors**
  - List of approved contractors on NIE Networks website
- **G59 approved contractor list established following procurement exercise**
  - 23 contractors on list
- **SSG owners to make the changes by 30 September 2019**
- **Costs associated with making the changes borne by SSG owners**

SSG RoCoF – Current Status

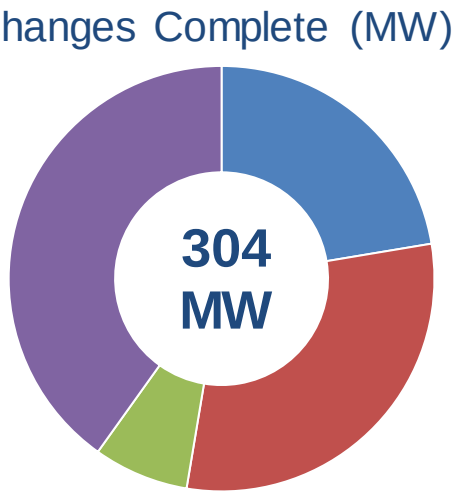
- **Currently engaged in programme**
  - 1305 SSG's (93%) – 394 MW (98%)

- **Already changed**
  - 967 SSG's (69%) – 304 MW (76%)

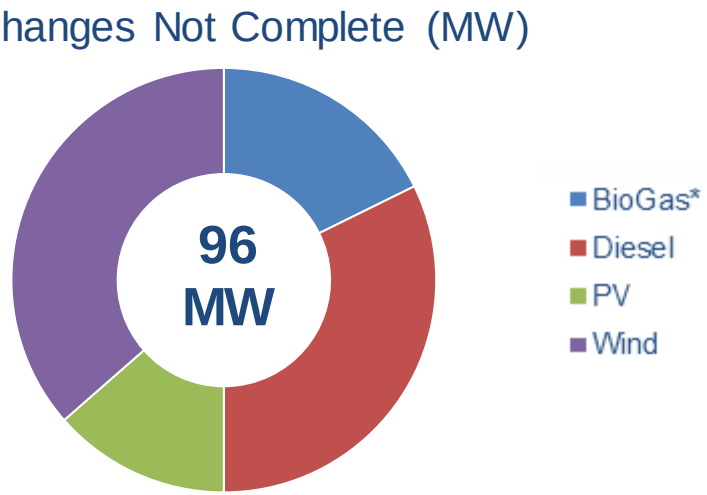
SSG RoCoF – Current Status



SSG RoCoF – Current Status



BioGas*	68
Diesel	92
PV	22
Wind	122



BioGas*	17
Diesel	31
PV	13
Wind	35

* BioGas includes LFG, CHP, AD & Hydro

SSG RoCoF – Customer Interactions

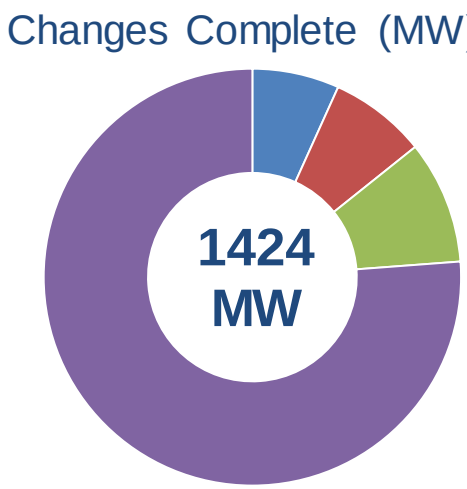
- Non-responders
  - Initial letter followed by October, February, April & July reminders
- Responders
  - Initial letter followed by February, April & July reminders
- March – May – Six Information Evenings
- May – G59 presence at Balmoral Show
- October – D Code breach notices to all SSG's not changed
- Dedicated G59 email address >1600 contacts
- Dedicated phone number

SSG RoCoF – 30 September 2019

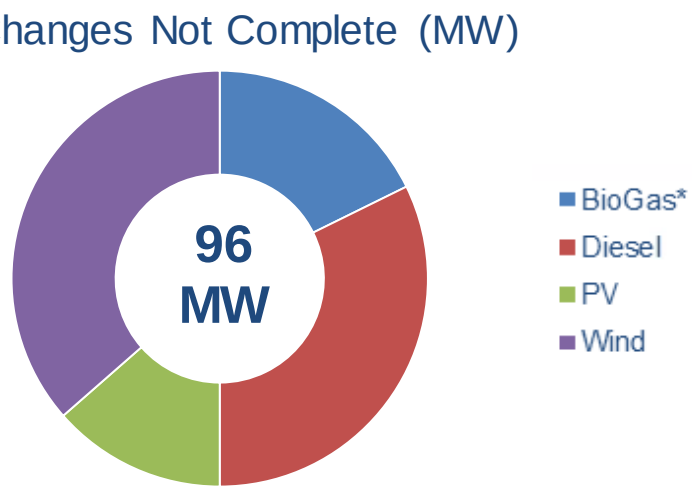
- NIE Networks expect there to be a significant number of SSG's and MW changed by 30th September 2019
  - Based on high level of engagement so far
  - Continued direct correspondence with SSG's
  - Impact of information evenings
  - Impact of clear messaging on the implications of non-compliance
    - De-energisation, Ofgem, DfE and supplier contract implications

Total RoCoF (LSG & SSG) – Current Status

G59 Changes have been completed at 94% of Generation Capacity on the NIE Networks' Distribution System



BioGas*	96
Diesel	107
PV	136
Wind	1085



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