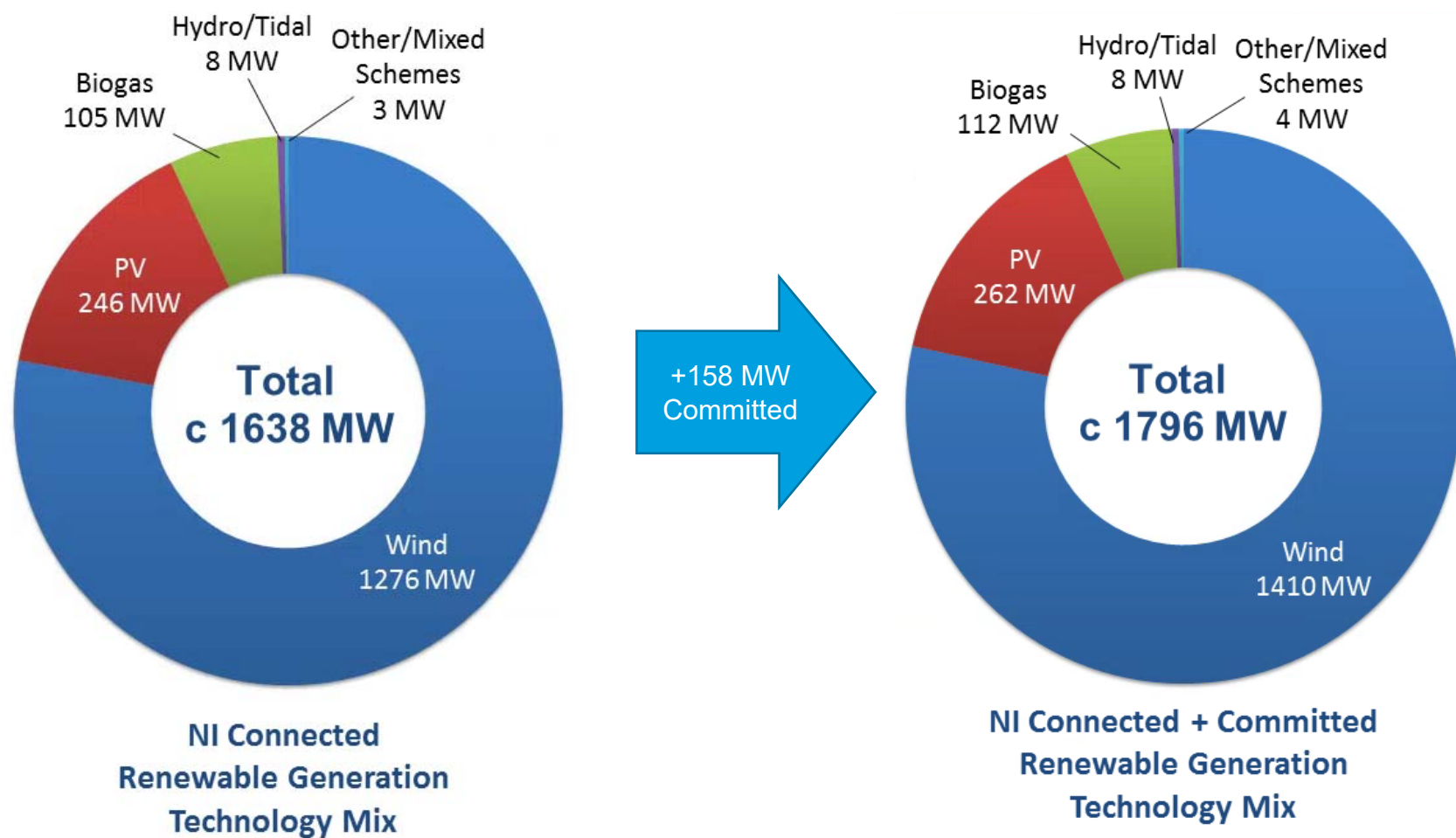


RENEWABLE STATUS UPDATE

RGLG 4th December



Q3 2018 Renewable Generation Status





2020 RES Target Projection

RGLG Tuesday 4th Sept 2018 (Update with sensitivities)



2020 Target Calculation

	Energy Produced	Capacity Installed	Capacity Factor
Wind	3113	1295	20% SSG 30% LSG
AD/CHP/Biogas	626	100	70%
Solar	210	246	10%
Hydro	18	6.3	33%
TOTAL RES Energy	3967		
TOTAL Energy Requirement	9170		

5% curtailment and constraints level for wind and solar assumed



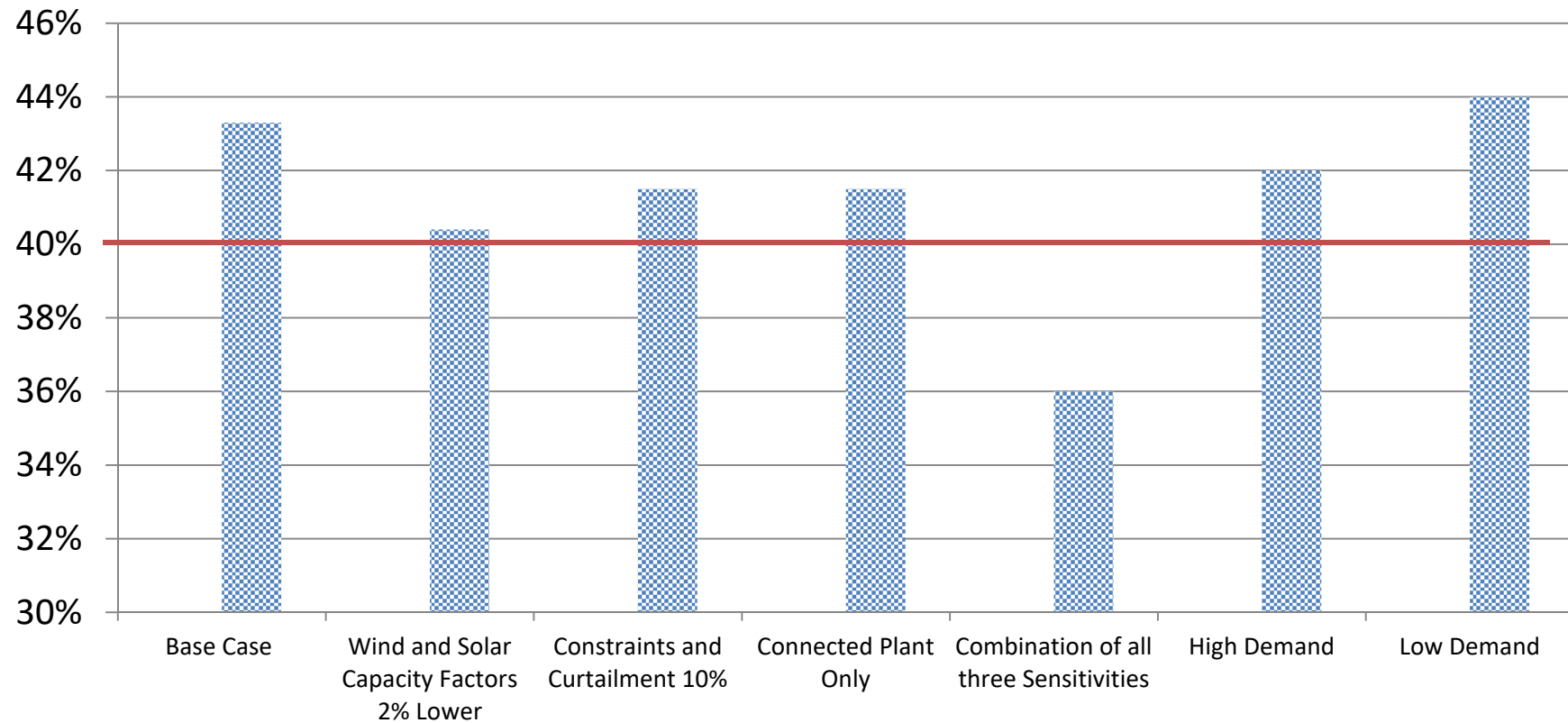
Sensitivities on Base Case

1. Wind and Solar capacity factors 2% lower
2. Constraints and Curtailment for wind and solar at 10%
3. Only plant already connected counted towards target
4. Combination of all three above
5. Higher demand level 9410 GWh
6. Lower demand level 8920 GWh



Results of Sensitivities

RES as % of Total
Consumption



Sensitivities Applied

2020 Target Sensitivities	2020 Median	Use historic capacity factors	Constraints and curtailment >5% (10% used as stress)	Only Connected Plant	Combination of all three sensitivities	High Demand	Low Demand
365 Day TER Demand (GWh)	9170	9170	9170	9170	9170	9410	8920
Total RES Energy Forecast (GWh)	3967	3708	3802	3808	3311	3967	3967
Projected RES Proportion of TER (365 Day Demand)	43.3%	40.4%	41.5%	41.5%	36%	42%	44%
<u>ASSUMPTIONS</u>							
Constraints & Curtailment as Per NI Constraint Report 2016*	5%	5%	10%**	5%	10%**	5%	5%

*Constraints applied to wind and solar only

**Arbitrary estimate for sensitivity purposes





Transmission Applications and Offers

RGLG - 4 December 2018



Transmission Applications

Project Name	Developer	MEC/MIC
Applications		
Drumkee Battery Storage	Low Carbon	50MW MEC & MIC
Mullavilly Battery Storage	Low Carbon	50MW MEC & MIC
Offers Issued		
BPS 100MW BESA	AES Ballylumford Limited	100MW MEC & MIC
Atlantic Gateway	Atlantic Gateway Property Ltd.	100MW MIC
Curraghamulkin Wind Farm (also called Dooish)	DW Consultancy	42MW MEC
Doraville Wind Farm	SSE Renewables (UK) Limited	138.6MW MEC
Belfast Power Limited	Evermore Energy	489.6MW



CONNECTION INNOVATION WORKING GROUP (CIWG) UPDATE

CIWG Members

Name	Company	Title	Membership Status
David McDonald	NIE Networks	Network Connection Design Manager	Chair
Helen Gallagher	SONI	Access Planning Manager	Secretary
Karen O'Doherty	SONI	Senior Lead Engineer	Member
Sarah Foster	SONI	Access Planning Engineer	Member
Johnny Pollock	NIE Networks	Future Networks Manager	Member
Lisa O'Neill	NIE Networks	Network Connection HV Design Engineer	Member
Jody O'Boyle	NIAUR	Manager Compliance and Network Operations	Member
Kelly McKenna	DfE	Head of Renewable Electricity Branch	Observer
Rory Mullan	Mullan Grid	Senior Consultant & Director	Member
John Rodgers	Innovation Automatic Solutions	Director	Member
Michael Burke	Saliis	Bid Manager	Member
David McMullan	Brookfield	NI Project Manager	Member
Eddie McGoldrick	PowerOn Technologies Limited	Director	Member
Chris Osbourne	UFU	Senior Policy Officer	Member
David McElrea	Si Energy Limited	Founder	Member
Joe Dunn	Scottish Power	Grid & Regulation Manager	Member

Aim of CIWG (Draft)

“To find solutions that facilitate the connection of further Distributed Energy Resources (DER - Generation & Storage) in Northern Ireland, which are technically and commercially feasible for the Network and System Operators and for DER developers/operators of both new and existing projects.”

ToR: Area 1 - Connection Offers with No Firm Access Quantity on a Long Term Basis

This area will include investigation of:

- The technical feasibility of allowing connections to be made on a potentially permanent basis with no firm access quantity and how this can be managed by the TSO.
- The commercial viability of such connections for DER operators of new and existing projects, taking account of factors including:
 - Constraint/curtailment information and forecasting;
 - Network chargeability issues.
- How these connections sit within current and future market arrangements.
- How the network capacity allocation and connection process would operate for these connections.

ToR: Area 2 – Active Network Management

This area will include investigation of:

- Identifying areas on the network with sufficient potential for ANM
- The technical feasibility of such schemes
- The commercial viability of such connections for DER operators, including:
 - Constraint/curtailment info and forecasting;
 - Network chargeability issues.
- How the capacity allocation, queuing and connection process would operate for these connections (e.g. Individual or Clustering approach, Last-In-First-Out vs shared constraint etc.)
- Contractual arrangements
- Potential to scope area(s) for trial dependent on progress made in the areas above

Distribution Offer Process

Past, Present & Potential Future

Time of Process	Pre 2015 Influx	Present	Potential Future
Distribution Offers Issued in:	All Areas of the Network	Only Areas with Firm Access	All Areas of the Network
NIE Networks Distribution Assessment	Connection Method defined by NIE Networks	Connection Method defined by NIE Networks	Connection Method defined by NIE Networks – including ANM
SONI Transmission Assessment	SONI determined Associated Transmission Network Issues for Gen >5MW, BSP capacity checks <5MW	SONI determined the Areas of Network with Firm Capacity for Gen export. Over-install and Zero export limit applied	SONI determined Associated Transmission Network Issues identified for Gen >5MW, BSP capacity Checks <5MW
Offer	Offers issued with FAQ with ATRs identified (planning permission pre requisite for application)	Offers only issued for generation export where capacity available. FAQ issued for LSG on receipt of planning	Offers issued regardless of Capacity. FAQ issued on receipt of planning permission

SONI STUDY +500/+1000MW RES

Summary Impact	Constraints	Curtailment
Study Results*	Increase \approx 1%	Up to additional 5%*
Impact on Generators	Increased instances of network related output reductions – compensated as per FAQ level	<u>All</u> RES <u>new</u> and <u>existing</u> will experience increased output reductions which are no longer compensated in ISEM
Sensitivities	ISEM treatment of Non Firm – balance responsibility may provide risk or opportunity	Level of curtailment sensitive to GB pricing impact, volume of additional RES, increases in demand, interconnector availability

*Assuming implementation of RoCoF change and additional RES is controllable

Next Steps

- Get feedback from WG on Terms of Reference
- Date of next meeting – January 2019

Contestability Update

Distribution and Transmission



Update on TDPNI and Renewable Developments

RGLG - 4 December 2018



Transmission Development Plan NI 2018-2027

- 10 year plan detailing all asset replacement, uprates and reinforcement projects anticipated by 2027
- New statutory document, to be updated annually
- Includes Strategic Environmental Assessment
- TDPNI and SEA out to **consultation until 31 January 2019**
- SONI will respond to consultation and submit TDPNI to UR for further consultation



NW Renewable Integration/Phase Angle Issue

- SONI now commencing report requested at previous meeting on NW phase angle issues
- Long-list of options for NI NW renewable integration/phase angle mitigation included in TDPNI
- All feedback welcome during consultation period



NW Project longlist (from TDPNI)

New circuit(s):

- HVDC link from Kilroot to Coolkeeragh
- 275kV or 110kV circuit from Magherafelt to Coolkeeragh
- 275kV or 110kV circuit from Magherafelt to Strabane (new substation)
- 110kV circuit from Agivey cluster – Limavady

110 kV Uprate(s):

- Strabane – Omagh
- Coolkeeragh – Strabane
- Coolkeeragh – Killymallaght
- Coolkeeragh – Limavady
- Killymallaght – Strabane

Technological options:

- Series compensation/modular power flow control
- Back-to-back HVDC connection at Coolkeeragh or Magherafelt
- Batteries



Thanks for your attention
Any questions?

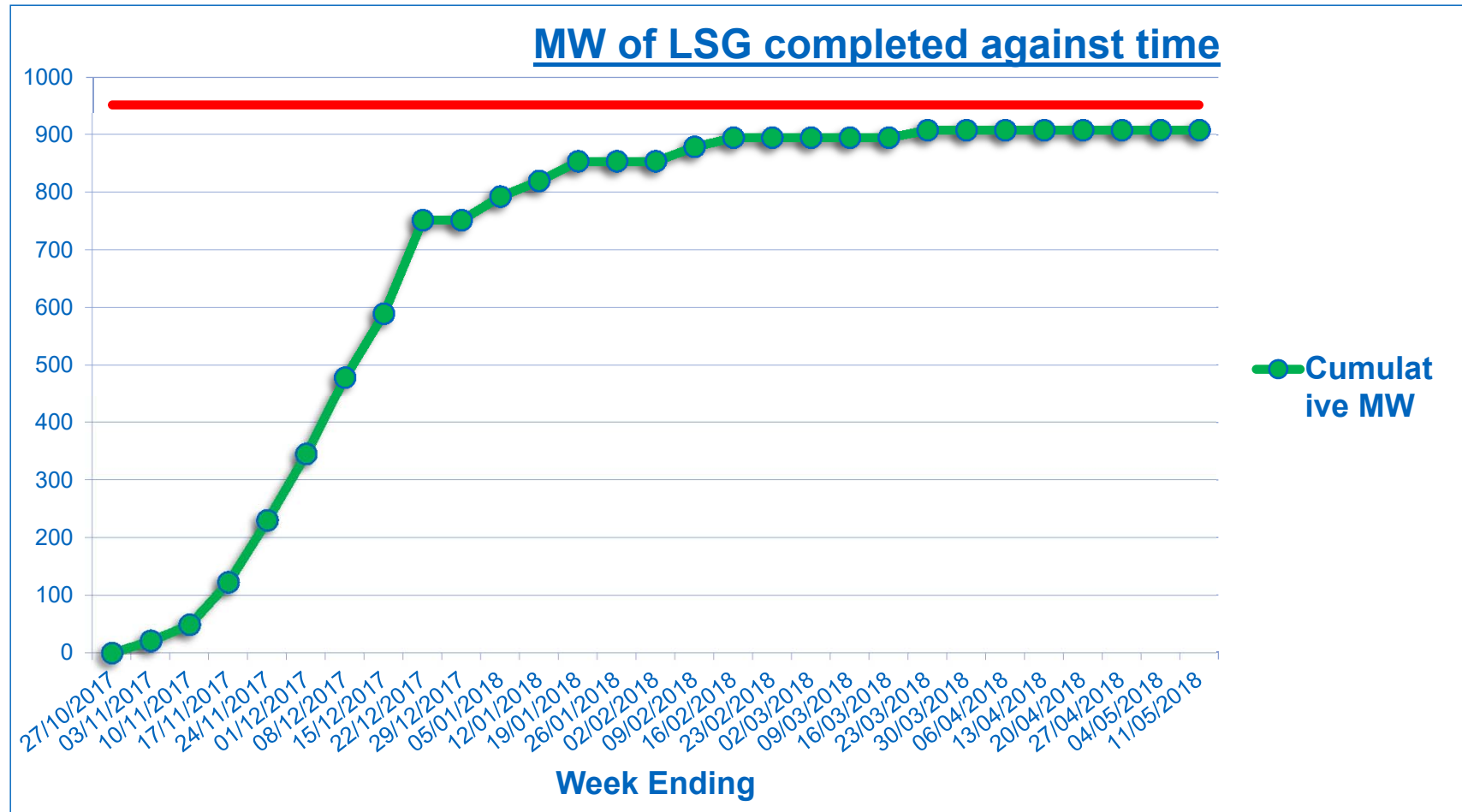


OPERATIONAL UPDATE

RoCoF & SSG SCADA



LSG RoCoF Progress



LSG RoCoF Progress



- To date 96% (936MW) has been changed to new RoCof setting
- 1105 MW of 1Hz/s RoCoF compliant Large Scale Generation (including sites that have connected since the programme started)
- 3 LSG sites still to change
 - 3 remaining sites date back to 1990's and require G59 relay changes
 - Work underway at all 3 sites with testing booked in for 13th & 14th December

SSG RoCoF Implementation



- **Letters requesting G59 changes sent out 01 June 2018**
- **SSG owners to acknowledge receipt by 29 June 2018**
 - 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**
 - c20 contractors on list
- **SSG owners to make the changes by 30 September 2019**
- **Costs associated with making the changes borne by SSG owners**

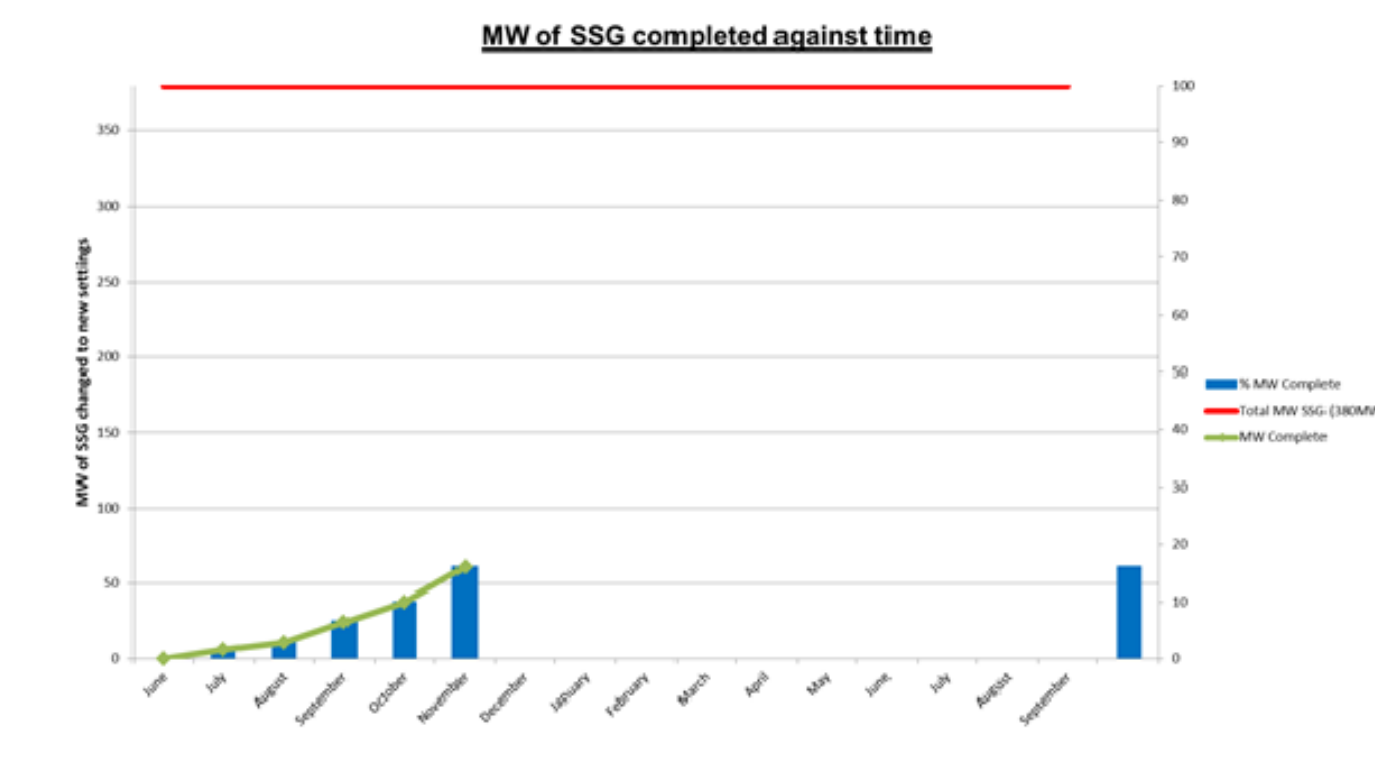
SSG RoCoF Progress – Correspondance



- **c1500 letters sent to SSG owners**
 - c1000 (66%) acknowledgement responses – 302 MW
- **c500 follow up letters sent to non-responders at the end of October**
 - c150 acknowledgment responses – 40MW
- **Total acknowledgments to date 1148 – 342MW**
- **c340 generators (70MW) still to acknowledge either letter**
 - 190 Wind (37MW)
 - 95 PV (6MW)
 - 23 AD/Biogas (8MW)
 - 30 Diesel (17MW)

SSG RoCoF Progress – Totals

Letter 1 Returns	Letter 1 Acknowledgement (kW)	Letter 2 Returns	Letter 2 Acknowledgement (kW)	Total Returns	Total Acknowledgement (kW)	Changes Complete	Changes Complete (kW)	Changes Complete (% kW)
994	302276	154	39678	1148	341954	199	60658	16



SSG RoCoF Progress – Next Steps



- UR – SONI – NIE Networks progress review meetings.
- Continued engagement with the approved G59 contractors to ensure effective programme delivery.
- January 2019 – Re-engagement with NIRIG, UFU, Industry, multiple site owners.
- January 2019 – 3rd letter to non-responders pointing out that non-compliance will lead to 3 month de-energisation notices being issued which could impact on Generator revenues.
- March 2019 – Follow up letter to all Generators that haven't made the changes reminding them of the need to be compliant by 30th September 2019 and pointing out that non-compliance will lead to 3 month de-energisation notices being issued which could impact on Generator revenues.
- UR & NIE Networks currently developing a plan to deal with Generators still non-compliant at the end of the 3 month de-energisation period.