

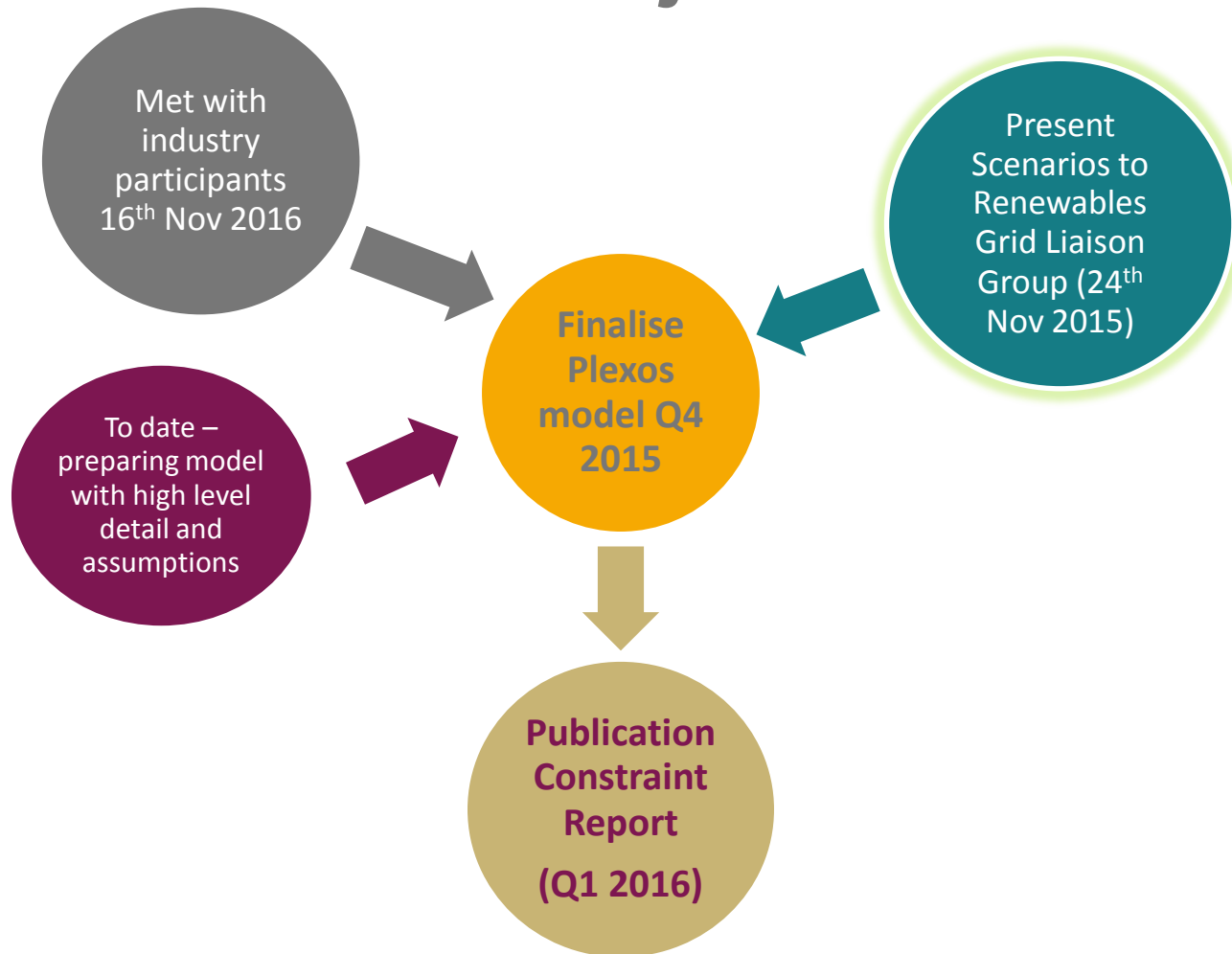
Northern Ireland Constraints Report 2016-2024 Assumptions

24th November 2015

Energy Systems Analysis

Philip O'Donnell, David McGowan, Andrew Gordon

Structure of Project / Timelines



Purpose

- Generator Output Reduction analysis is for new generation connections as part of the Generation connection process
- Northern Ireland network constraints and all island curtailment presented at a 110kV nodal level
- There is no Gate process in Northern Ireland. There are new parties requesting connection offers
 - There a number of new nodes to be considered
 - Lisburn, Magherafelt, Brockaghboy, Kells, Newtownstewart Rasharkin(Previously Mid-Antrim), Garvagh.

High Level Modelling Assumptions

Study Period 2016 - 2024

- ✓ Demand: Generation Capacity Statement 16-25
- ✓ Generation Portfolio: Generation Capacity Statement 16-25
- ✓ Climatic Profiles: Based on a number of years. (2009, 2013)
- ✓ Fuel & Carbon prices: World Energy Outlook 2014 Price 2020 Real-Terms, Fixed for all years
Wind, Solar, Tidal Modelled at € 0/MWh
Waste and Biomass modelled with a small fixed cost/MWh
- ✓ Operational rules: Operational Constraints Update (August 2015)
SNSP as Per Latest DS3 outlook
- ✓ Transmission & Interconnection :
 - ✓ Network infrastructure roll out based on All Island 10 Year Transmission Forecast Statement

Proposed Scenarios

1) Northern Ireland grace period wind roll out

- Build out based on planning approved and accepted offers, but a proportion of new connections are delayed by one year
- Nodal large scale wind & solar PV included
- Small scale generation modelled as a nodal fixed profile as per contracted position (*~119MW small scale gen & 1.5MW /month PV*)

2) Conventional technology innovation

- Coolkeeragh CCGT Min Gen Reduction (35% Max Capacity, 160MW)

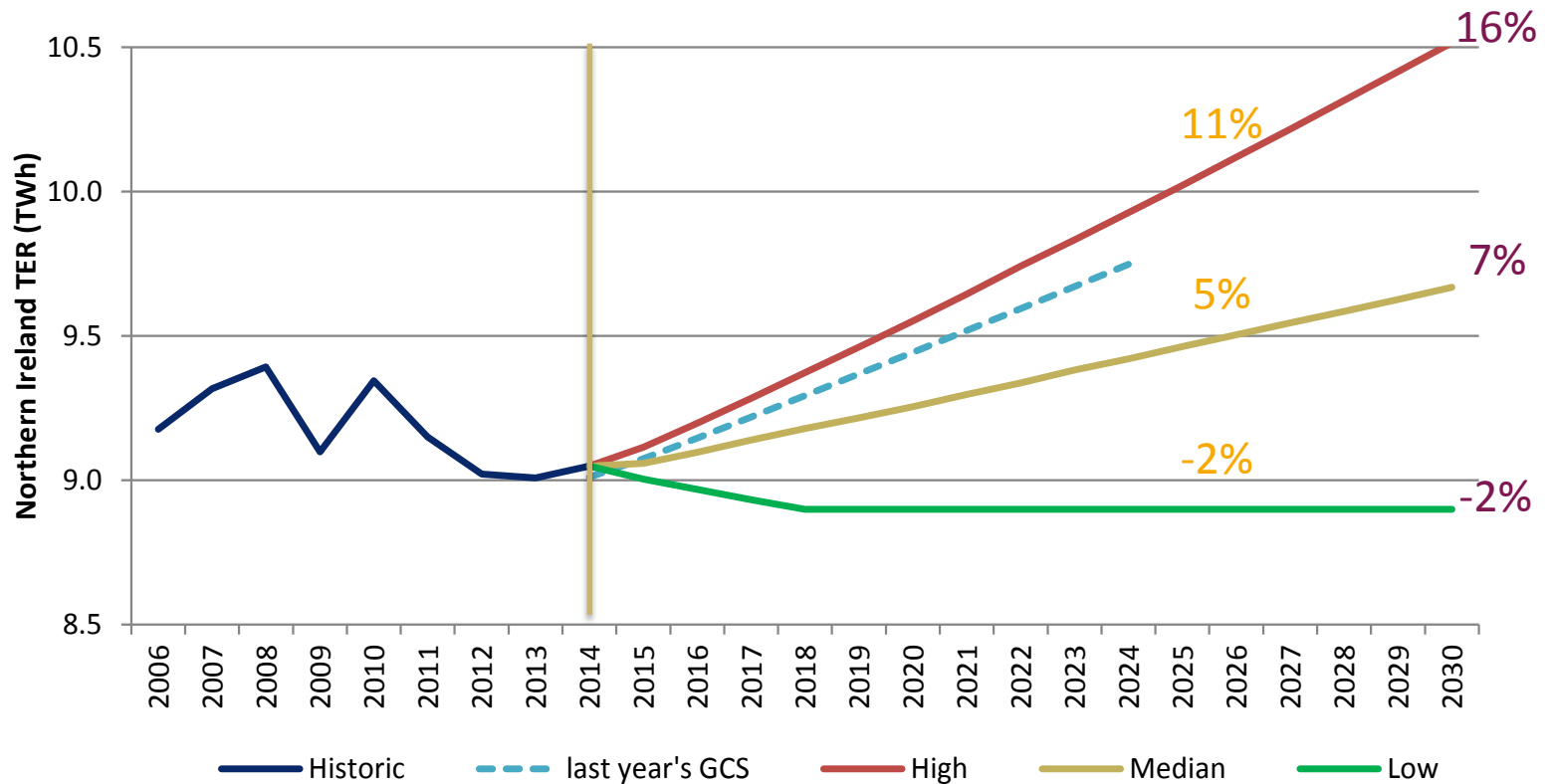
2 climatic years, a total of 4 scenarios

Other Issues

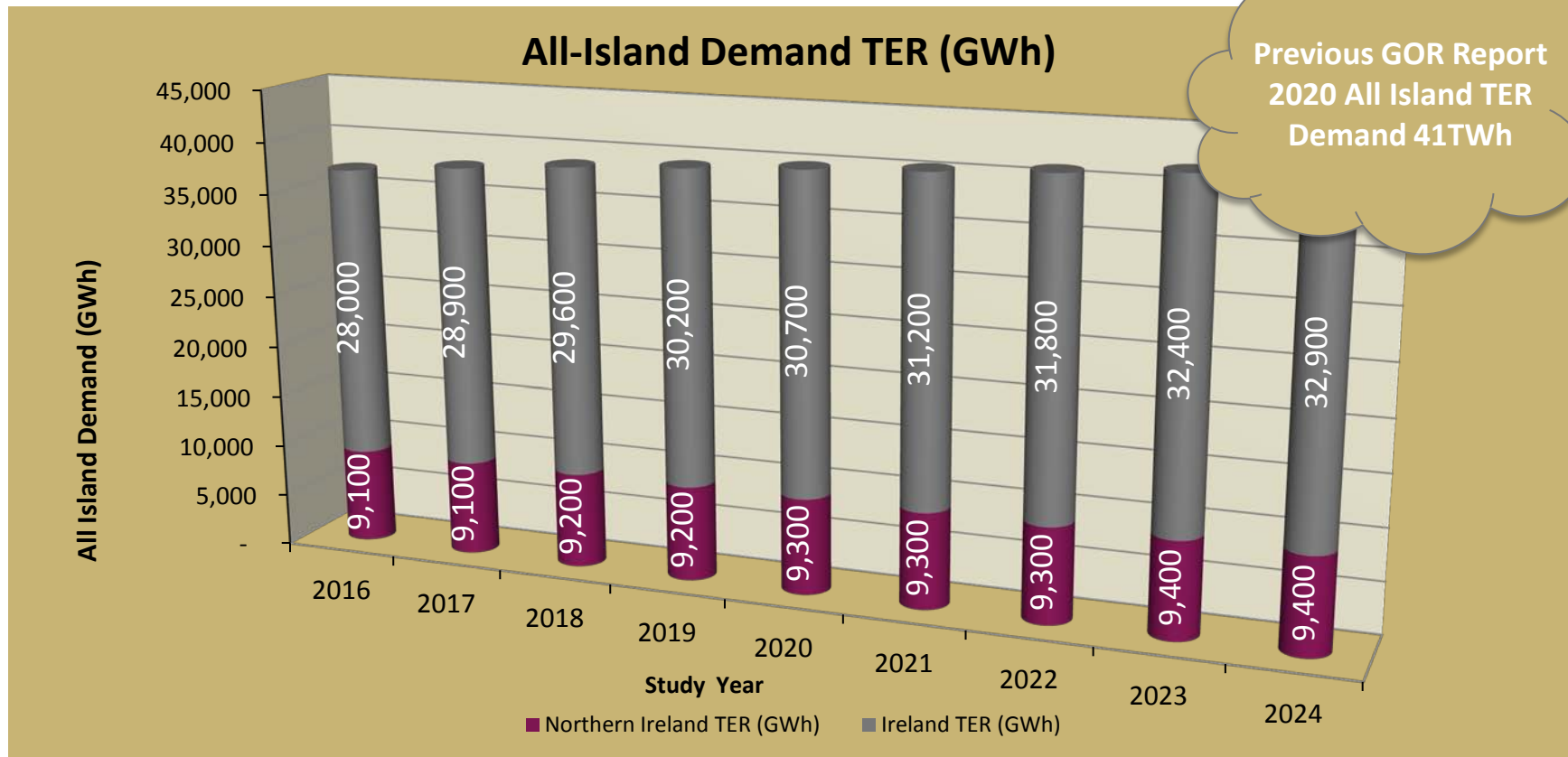
New Generation Applications:

- ~800MW of additional Generation has applied to connect to the grid.
- uncertainty in the grid connection process.
- uncertainty in grid delivery dates.
- ~550MW is large scale wind.
- ~250MW of large scale PV.
 - PV could potentially roll out quicker than wind connections due to location and type of connections.
 - However, the PV build out could be considered as an additional scenario.
- This additional tranche of generation could be considered with a new network development scenario at a later stage.
- **It is proposed at this stage, not to include the network development scenario in the current process.**

Northern Ireland Demand Median TER (GWh) (Source: *Draft GCS16-24*)

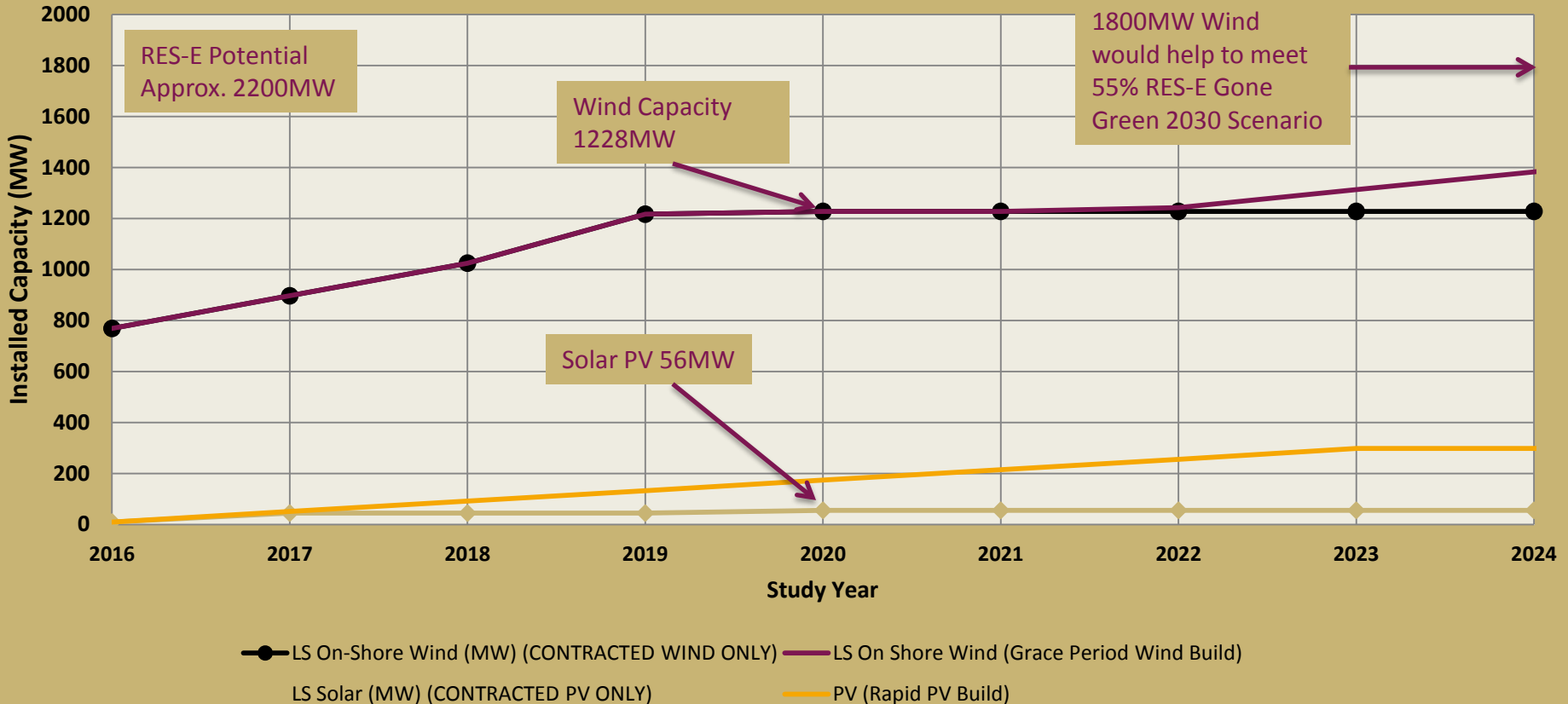


All Island Demand Median Forecast: TER (GWh) (Source: *Draft GCS16-24*)

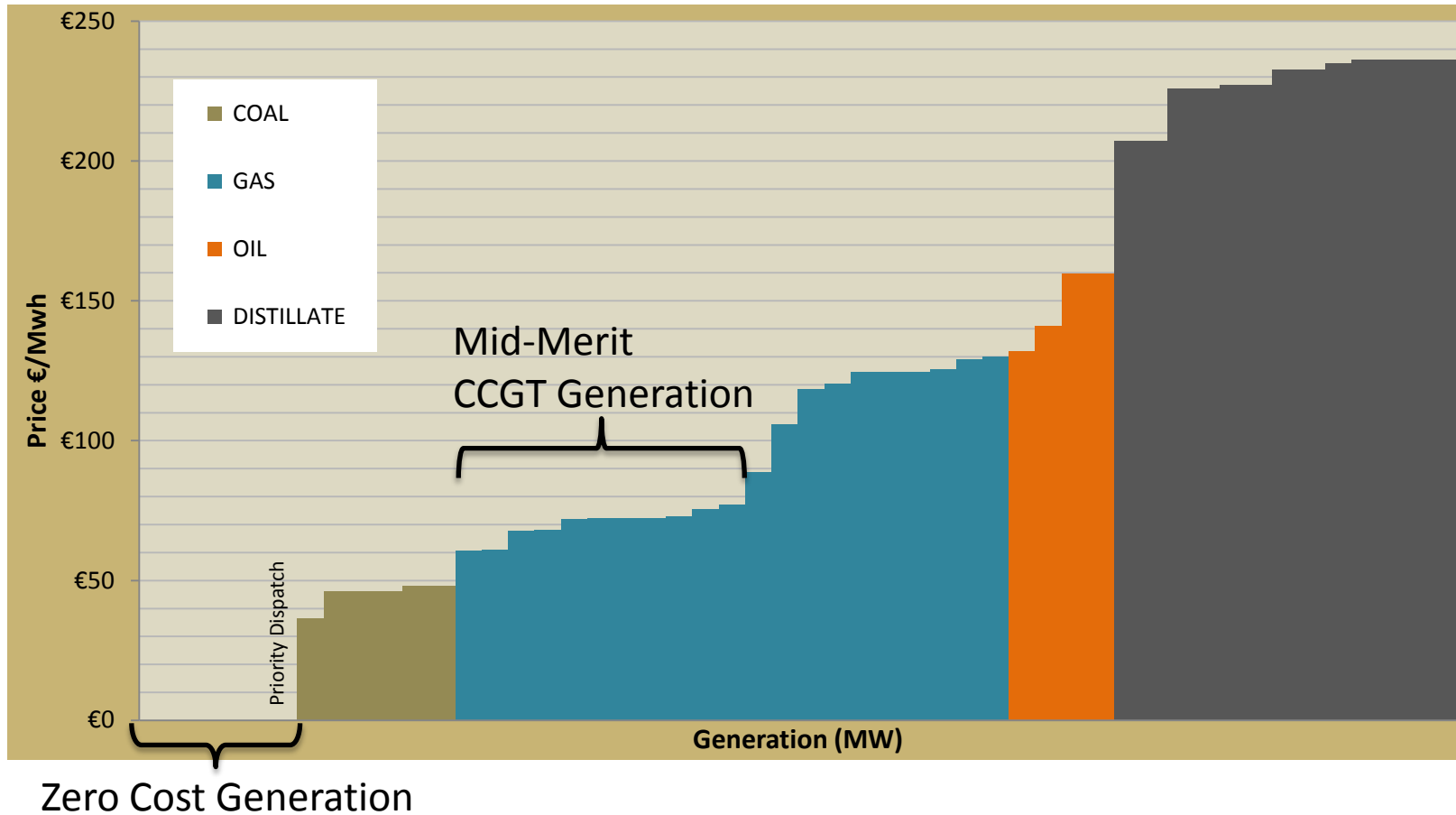


Generation Roll Out Scenarios across Study Horizon 2016-2024

Possible Northern Ireland generation build out rates

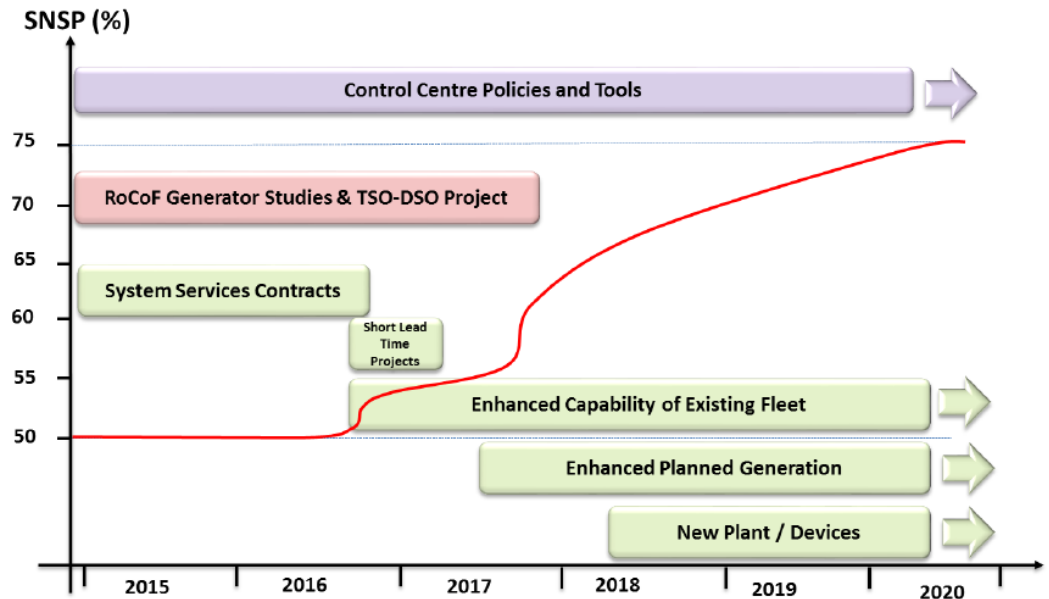


Generation Merit Order



Operational rules

- SNSP limits to reflect latest DS3 timeline.
- Increase from 55% (2016) to 75% (2020+) across the study years



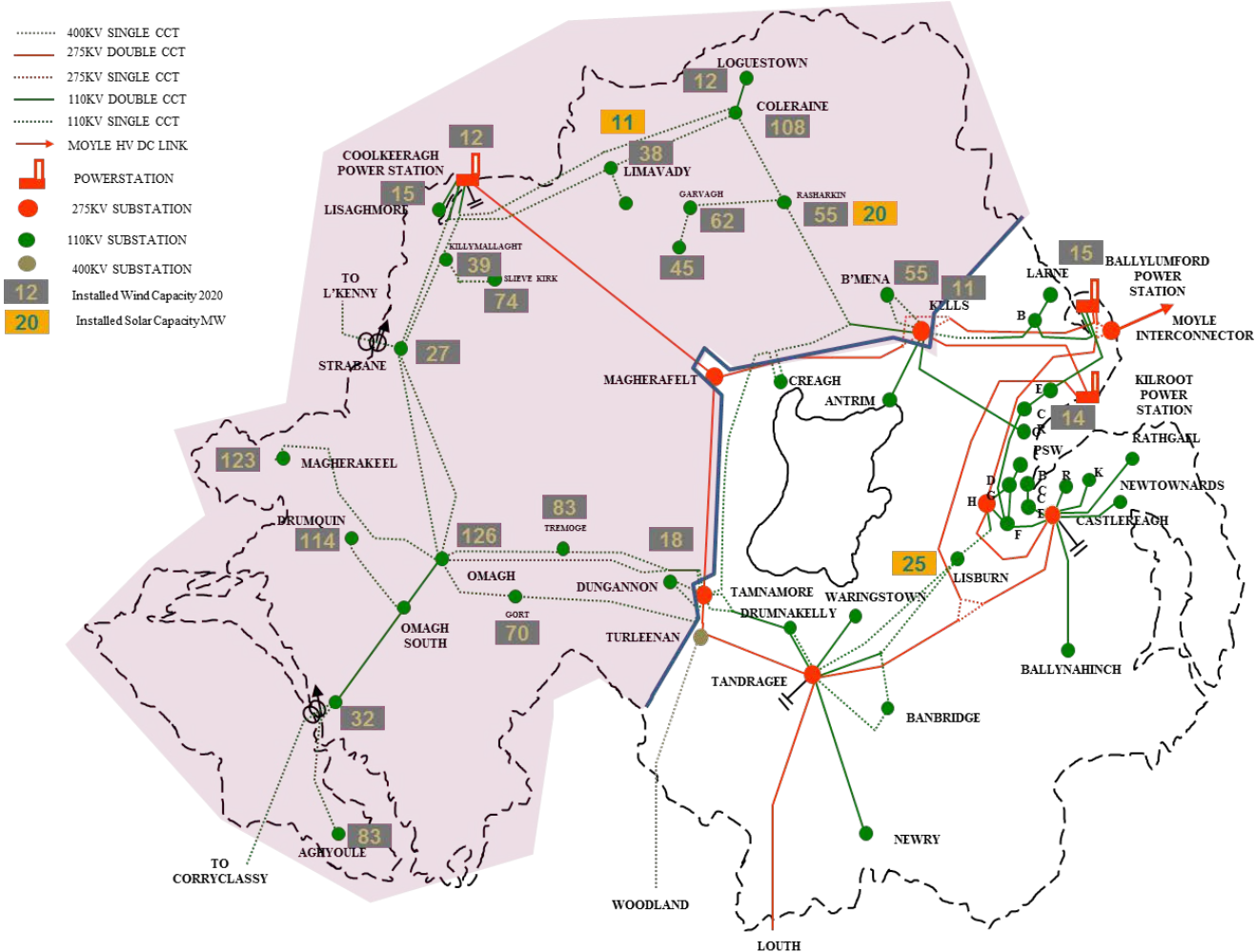
INTERCONNECTION CAPACITIES

TRANSFER CAPACITY	2016	2017	2018	2019	2020	2021	2022	2023	2024
NORTH-SOUTH	300	300	300	300	1100	1100	1100	1100	1100
SOUTH-NORTH	300	300	300	300	1100	1100	1100	1100	1100

MOYLE IMPORT/EXPORT CAPACITY	2016	2017	2018	2019	2020	2021	2022	2023	2024
IMPORT (WINTER)	450	450	450	450	450	450	450	450	450
IMPORT (AUTUMN & SUMMER)	410	410	410	410	410	410	410	410	410
EXPORT	200	80	80	80	80	80	80	80	80

EWIC IMPORT/EXPORT CAPACITY	2016	2017	2018	2019	2020	2021	2022	2023	2024
IMPORT	500	500	500	500	500	500	500	500	500
EXPORT	300	400	500	500	500	500	500	500	500

2020: Indicative Generation Locations

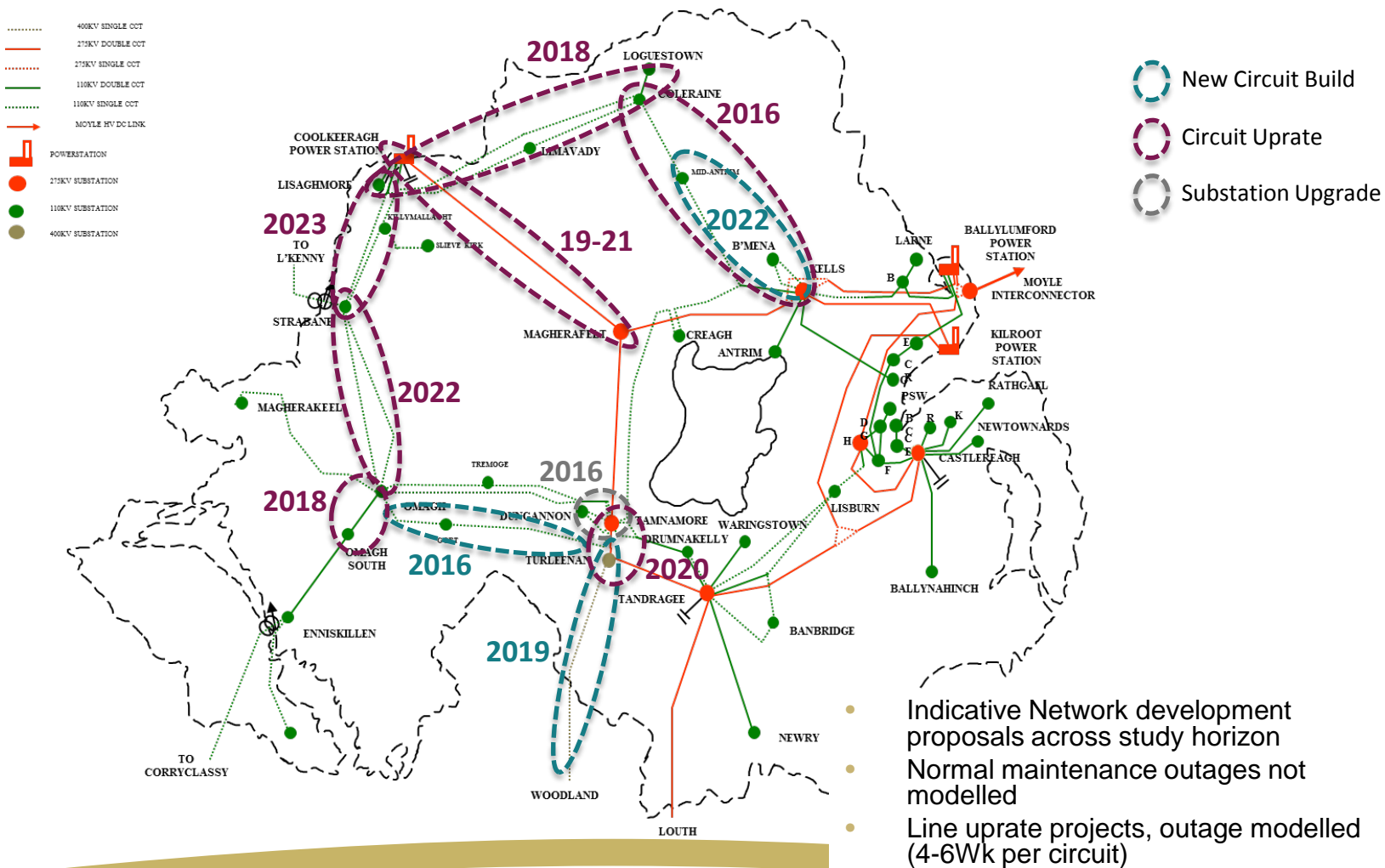


Indicative Generation Locations
for NI Constraints 2015 modelling purposes only

27/05/2016



Constraint Report: Indicative Transmission & Network Development Assumptions



Indicative Network Build out
for NI Constraints 2015 modelling purposes only

27/05/2016



Next Steps

- Finalise scenarios by 4th December 2015
- Deep check of assumptions and model build December 2015
- Interim Results Review February 2016
- Report & results End Q1 2016
- Your views on scenarios & assumptions are welcome please feedback by Monday 30th November 2015
- Contact us: david.mcgowan@soni.ltd.uk
andrew.gordon@soni.ltd.uk

