

Capital Project 0966

Step 2 Stakeholder Presentation: Identifying the need and solution options

June 2018

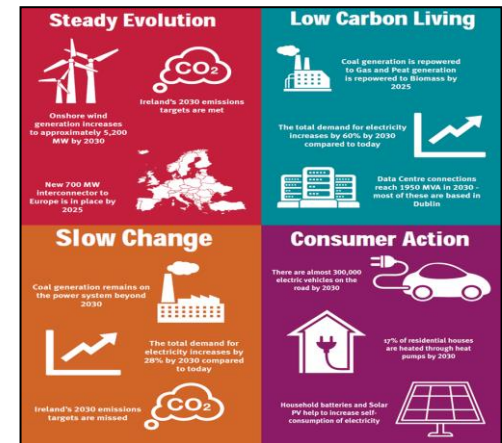


Agenda

- How do we plan for the future electricity need?
- How do we develop solutions and reinforcements?
- Project Drivers
- Need Identified
- Technology Overview & Long list of options
- Proposed refined Long List
- Next steps

How do we plan for the future electricity need?

- Tomorrow's Energy Scenarios
 - Four scenarios developed
 - Published in July 2017 after nine weeks public consultation
- Capital project 0966 need
 - Drivers for the need are consistent with scenarios



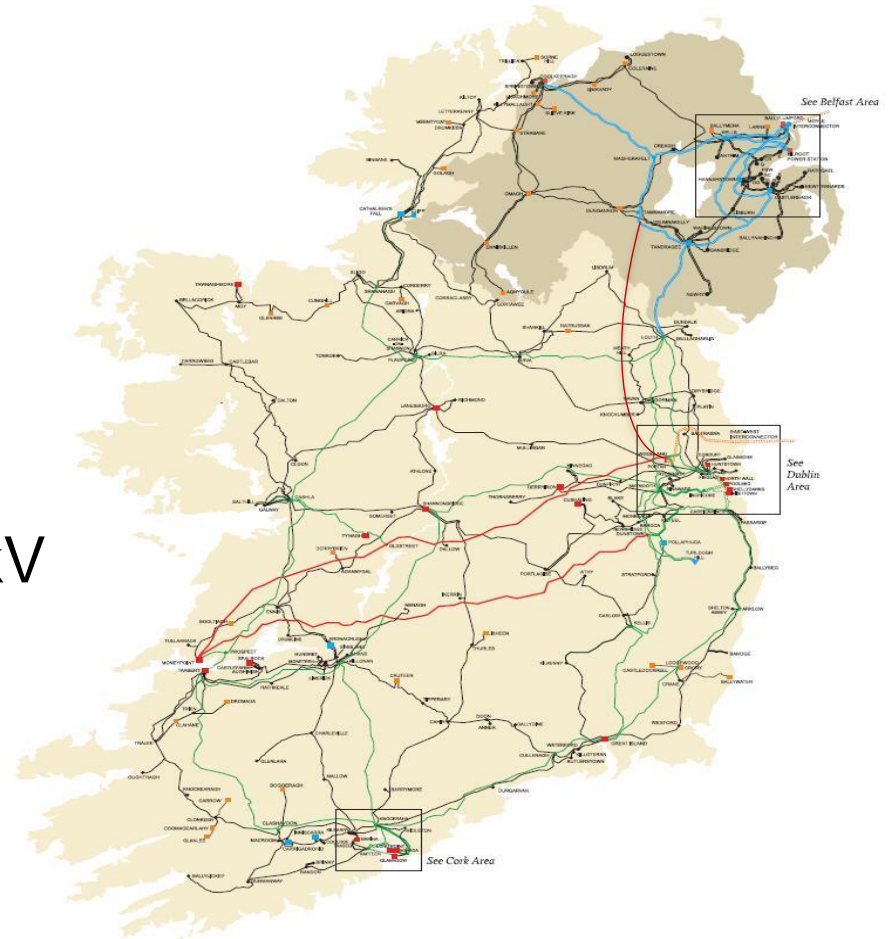
Scenario Planning = better forecast how electricity generation and consumption change over time

How do we plan for the future electricity need?

- Transmission System Security & Planning Standards (TSSPS)
 - Technical criteria and standards to which we adhere
 - Sets out the adequacy tests of network security for a number of common and less common situations

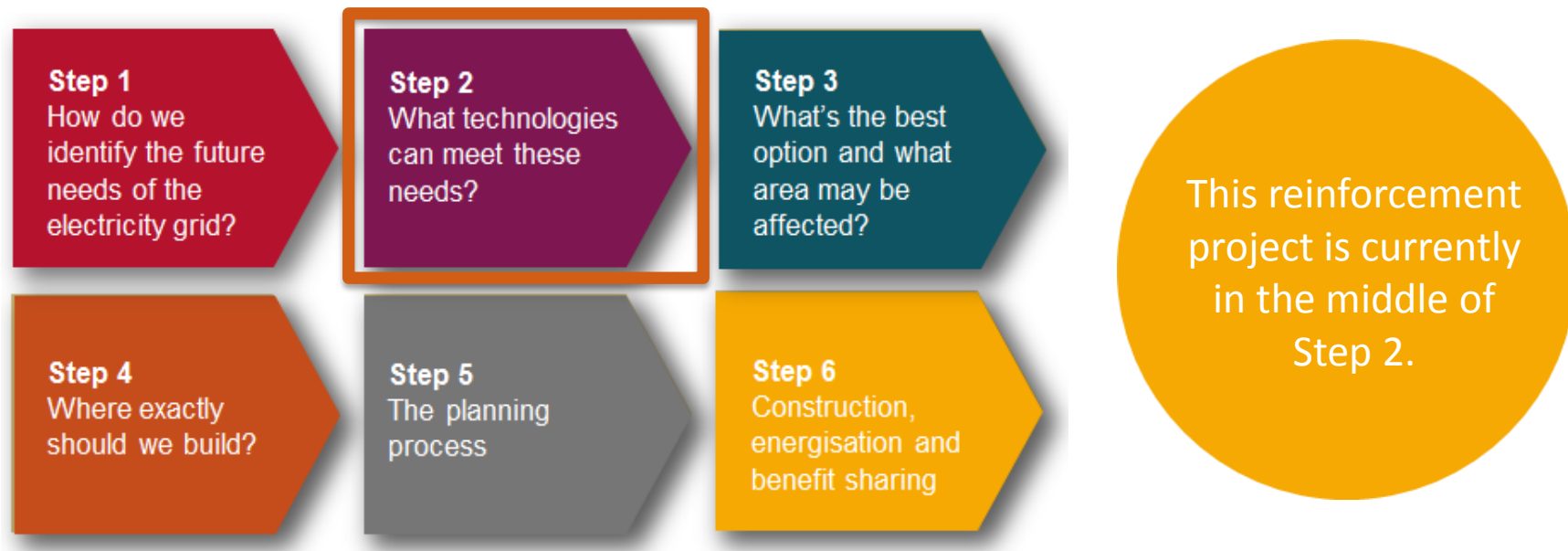
Map of Transmission System

- Legend
 - 110 kV – Black lines
 - 220 kV – Green lines
 - 400 kV – Red lines
 - NI has 132 kV and 275 kV



How do we develop solutions and reinforcements?

- Framework for Grid Development*



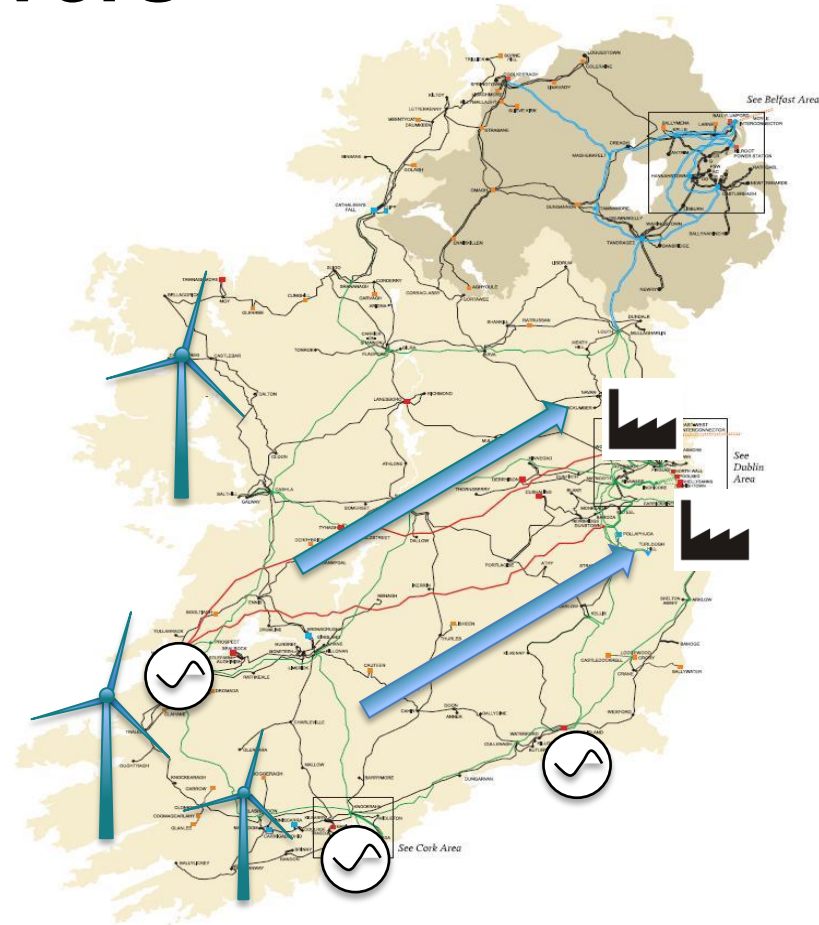
*Have Your Say, published 2017

Project Drivers

- Increased demand on the East coast
 - Natural growth & connection agreements
- Integration of generation
 - Renewable and conventional generation in South and West of the island

Drivers introduce large cross-country power flows to the East coast.

Issues transferring this power within counties Dublin, Kildare and Meath



Need Identified

- These drivers cause three power system issues that need to be resolved:
 - Voltage Collapse
 - Thermal Overloads
 - Phase Angle Issues
- This happens when:
 - Either of the 400 kV circuits from the West are lost
 - When a circuit is out for maintenance and then another is lost

This affects security of supply and has to be addressed



Technology overview & Long list of Options

- The Technology Overview took account of the following to create the long list of options:

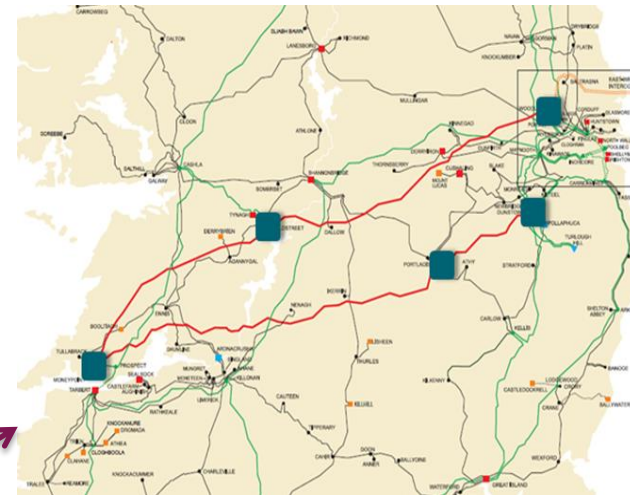
Voltages of 220 kV and 400 kV

Underground cable and overhead line

Range of technologies providing reactive power

A range of connection points on or around the 400 kV network

Alternating Current (AC) and Direct Current (DC)



15 different solution options in long list

Long list of solution options

Options	Technical Performance	Economic Performance	Combined Performance in Part A
New <u>Coolnaback</u> – <u>Dunstown</u> 400 kV OHL	Blue	Light Green	Green
New <u>Dunstown</u> – <u>Moneypoint</u> 400 kV OHL	Blue	Dark Blue	Dark Blue
New second <u>Oldstreet</u> – <u>Woodland</u> 400 kV OHL	Light Green	Blue	Green
New <u>Moneypoint</u> – <u>Woodland</u> 400 kV OHL	Yellow	Dark Blue	Green
<u>Upvoltage</u> existing 220 kV circuits to 400 kV to create new <u>Dunstown</u> – <u>Woodland</u> 400 kV OHL	Light Green	Light Green	Light Green
New <u>Dunstown</u> – <u>Woodland</u> 400 kV OHL	Yellow	Light Green	Light Green
<u>Upvoltage</u> existing 220 kV circuits to 400 kV to create new <u>Kilpaddoge</u> – <u>Killonan</u> – <u>Shannonbrige</u> 400 kV OHL	Dark Blue	Dark Blue	Dark Blue
New <u>Coolnaback</u> – <u>Oldstreet</u> 400 kV OHL	Blue	Green	Blue
New <u>Dunstown</u> – <u>Woodland</u> 220 kV OHL	Green	Yellow	Light Green
New <u>Moneypoint</u> – <u>Woodland</u> 220 kV OHL	Light Green	Blue	Green
New <u>Maynooth</u> – <u>Woodland</u> 220 kV OHL	Blue	Yellow	Green
New <u>Dunstown</u> – <u>Woodland</u> 220 kV UGC	Light Green	Light Green	Light Green
New <u>Dunstown</u> – <u>Woodland</u> 400 kV UGC	Yellow	Green	Light Green
New HVDC circuit between <u>Moneypoint</u> – <u>Woodland</u>	Yellow	Dark Blue	Green
New HVDC circuit between <u>Dunstown</u> – <u>Woodland</u>	Yellow	Dark Blue	Green

Proposed refined Long List

- Long list was assessed using two criteria:
 - Technical performance
 - Capital Cost
- Stakeholders to feed into proposed refined list
- Best performing options connects the stations Woodland in Co. Meath and Dunstown Co. Kildare
- The proposed refined list of options:
 - up voltage existing 220 kV circuits to 400 kV
 - new 400 kV overhead line
 - new 220 kV overhead line
 - new 220 kV underground cable
 - new 400 kV underground cable

Stakeholders
to feed in to
proposed
refined list

Five options
proposed for
refined list

Best performing
options:
Connects stations
Woodland and
Dunstown

Next Steps in Step Two

- Stakeholders to feed into proposed refined list and feedback reviewed
- Remaining options will be assessed using five criteria:
 - Technical performance
 - Economic performance
 - Environmental aspects
 - Deliverability aspects
 - Socio-economic aspects
- Refine options to short list of best performing options to bring to Step Three for further analysis
- A short list will be known by end of September

Aim
of Step Two is to
present a short
list of best
performing
options

Expected
project will
move into Step
Three in
September
2018