EirGrid Group Annual Conference

Planning for our Energy Future

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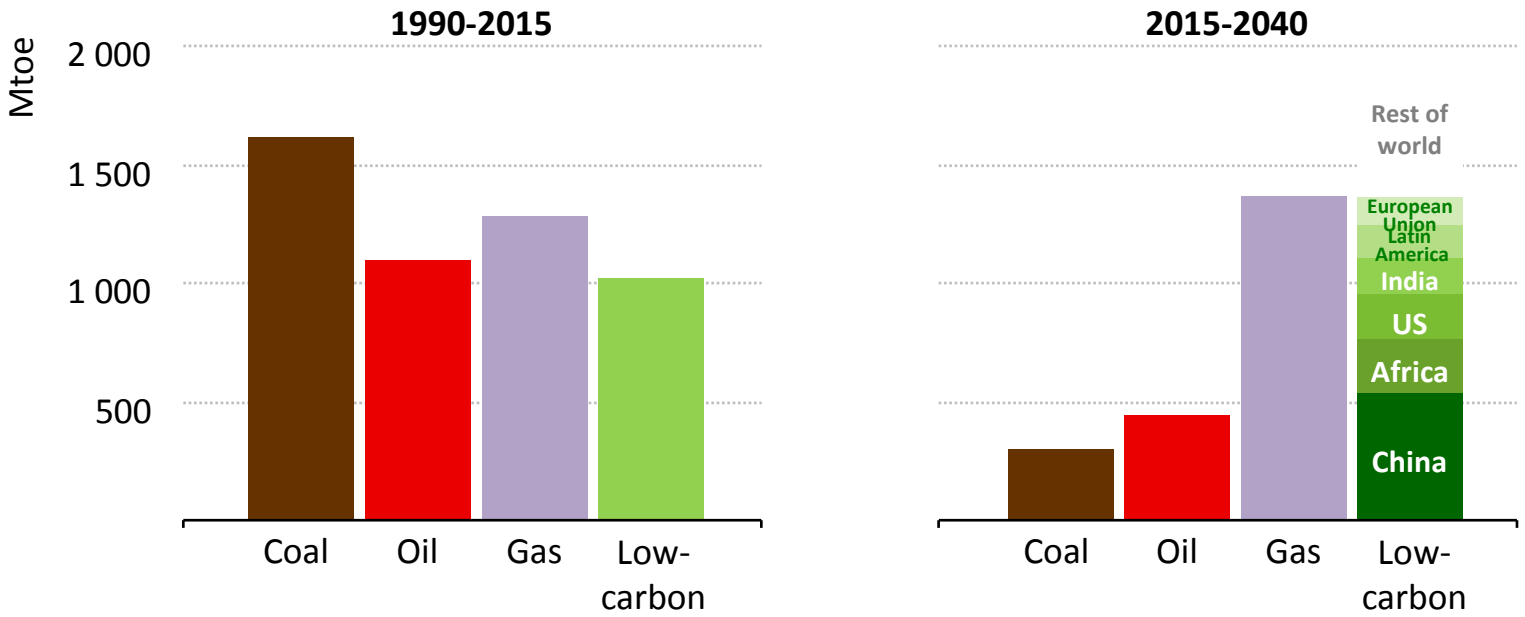
Key factors that will shape world energy markets

Dr. Fatih Birol, Executive Director

Dublin, January 26 2017

A new ‘fuel’ in pole position

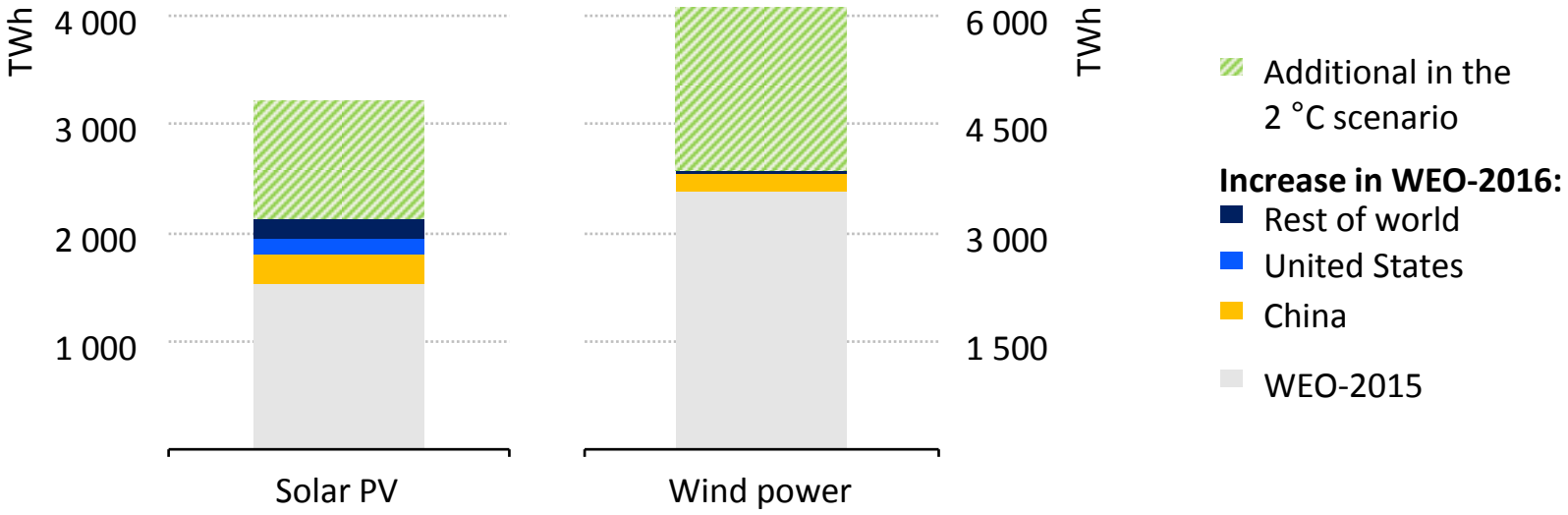
Change in total primary energy demand



Low-carbon fuels & technologies, mostly renewables, supply nearly half of the increase in energy demand to 2040

Greater policy support boosts prospects for solar PV and wind

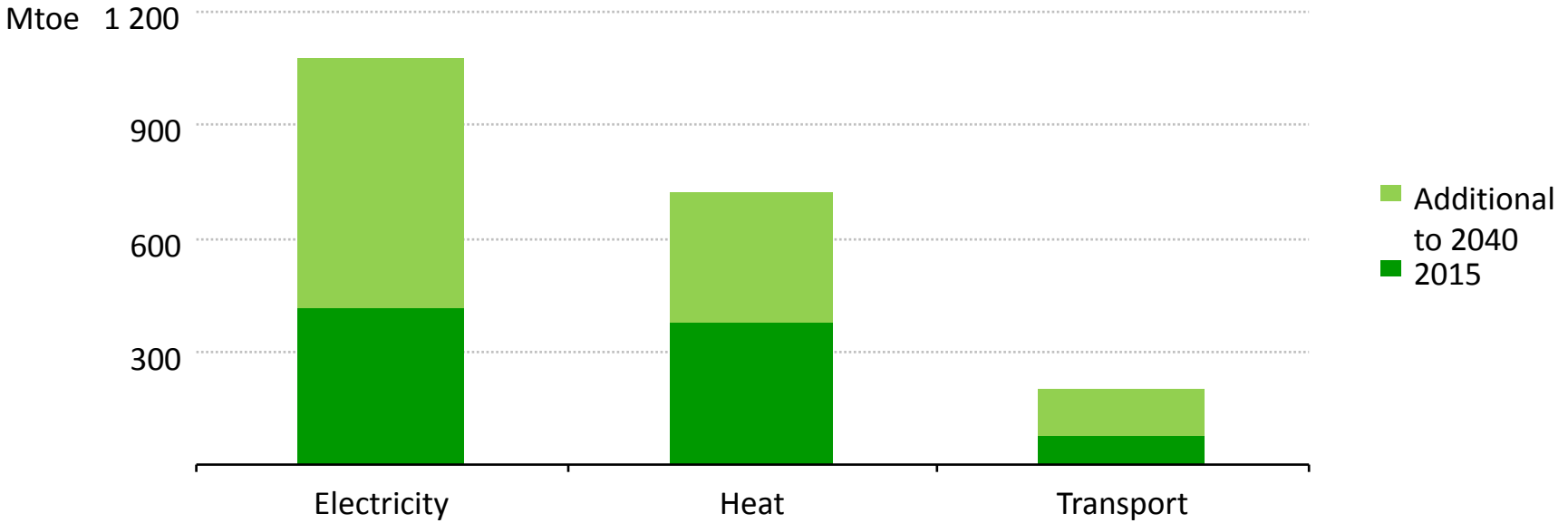
Solar PV and wind generation, 2040



Stronger policies on solar PV and wind help renewables make up 37% of electricity generation in 2040 in our main scenario – & nearly 60% in the 2 °C scenario

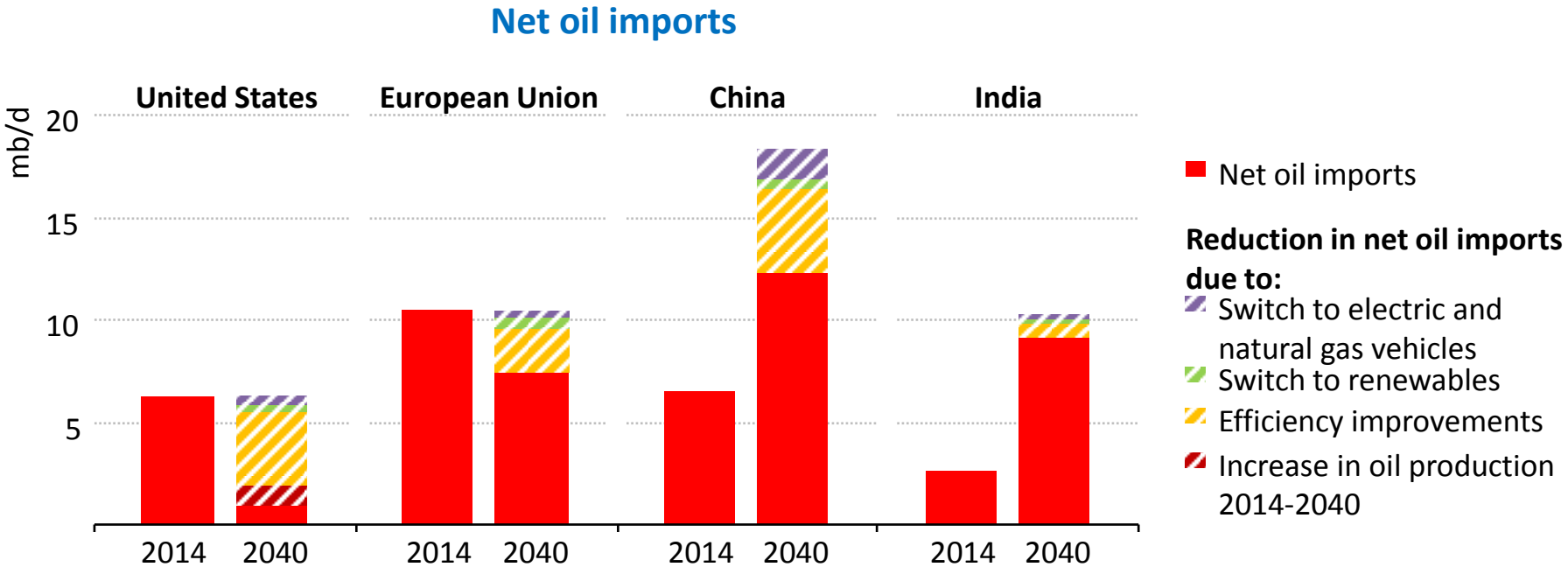
The next frontiers for renewables are heat and transport

Renewable energy use by sector



Today renewables in electricity and heat use are nearly at par; by 2040, the largest untapped potential lies in heat and transport

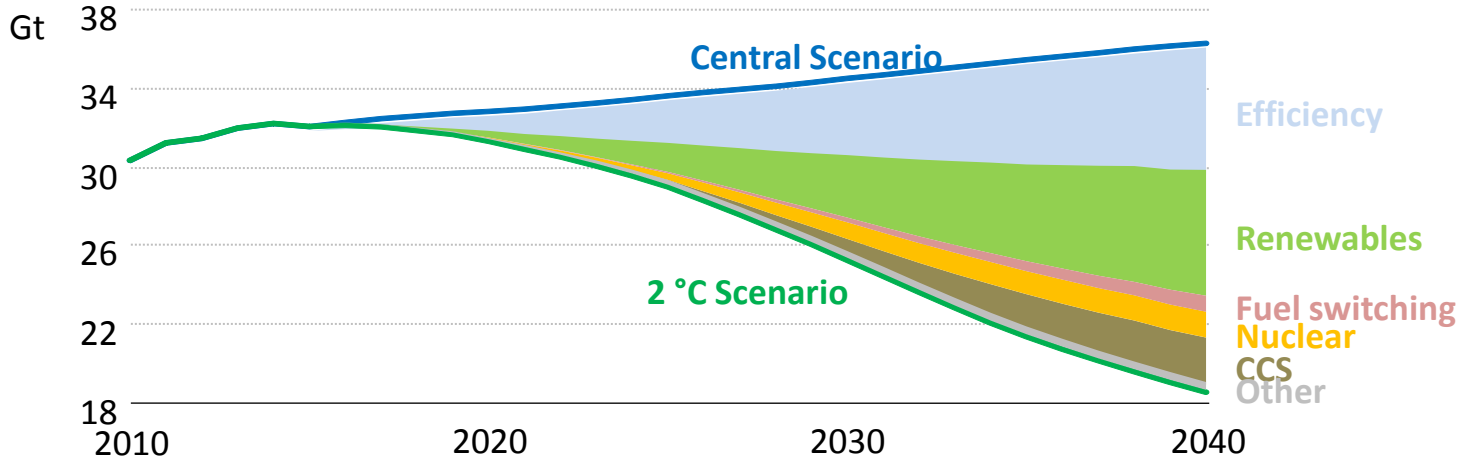
A suite of tools to address energy security



The energy transition provides instruments to address traditional energy security concerns, while shifting the spotlight onto electricity supply

A 2 °C pathway requires further efforts

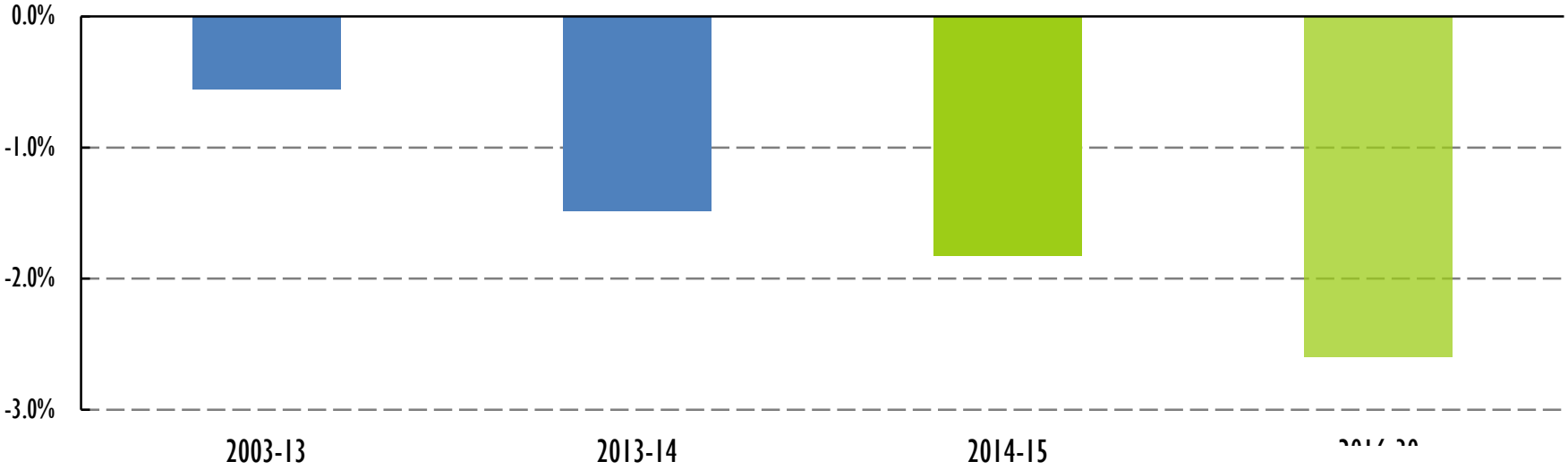
Global CO_2 emissions reductions in the Central & 2 °C Scenario by technology



Energy efficiency & renewables are central to achieve climate targets; required rate of decarbonisation in the 2 °C Scenario is highest in the power sector

Intensity is improving, but not enough

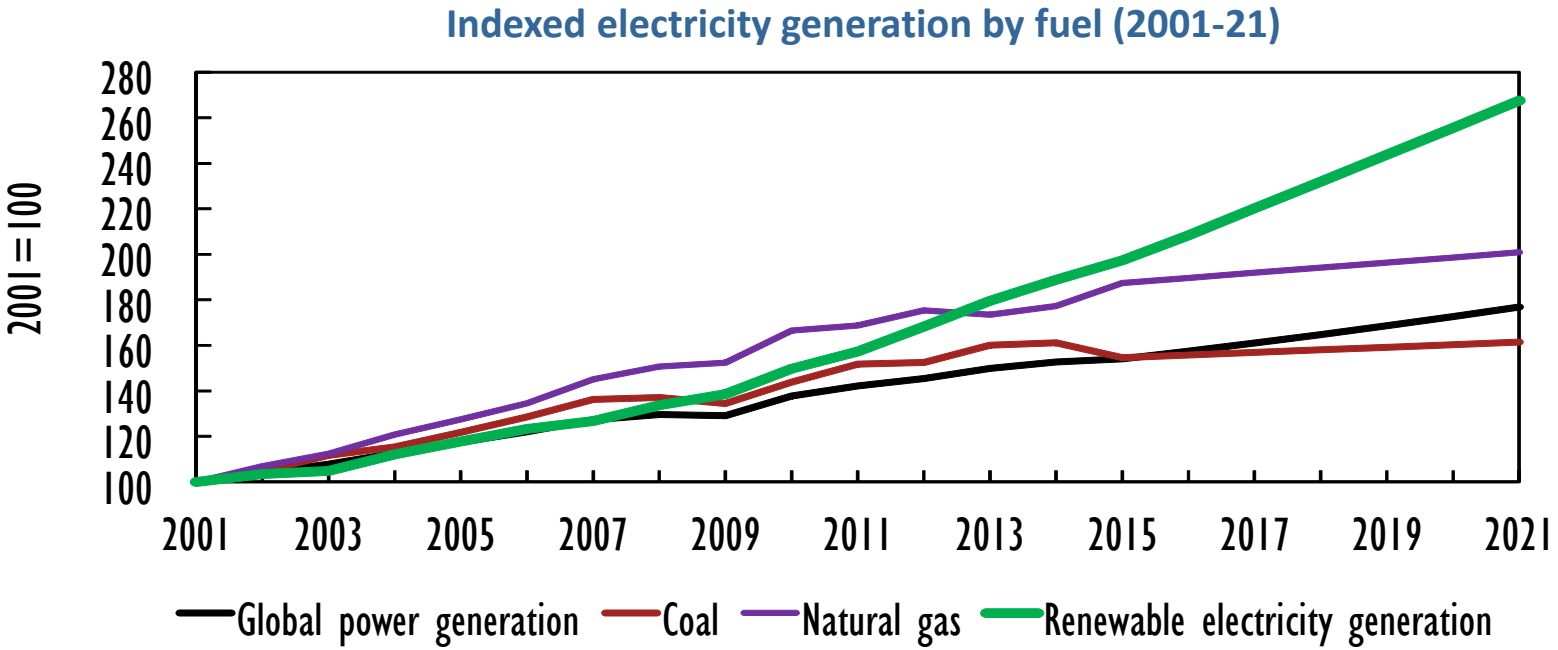
Global annual energy intensity gains



In 2015, global intensity improved by three times the average of the last decade, despite a low price environment. Intensity gains need to increase to 2.6% to achieve our climate goals.

Renewables remain the fastest growing source of electricity generation

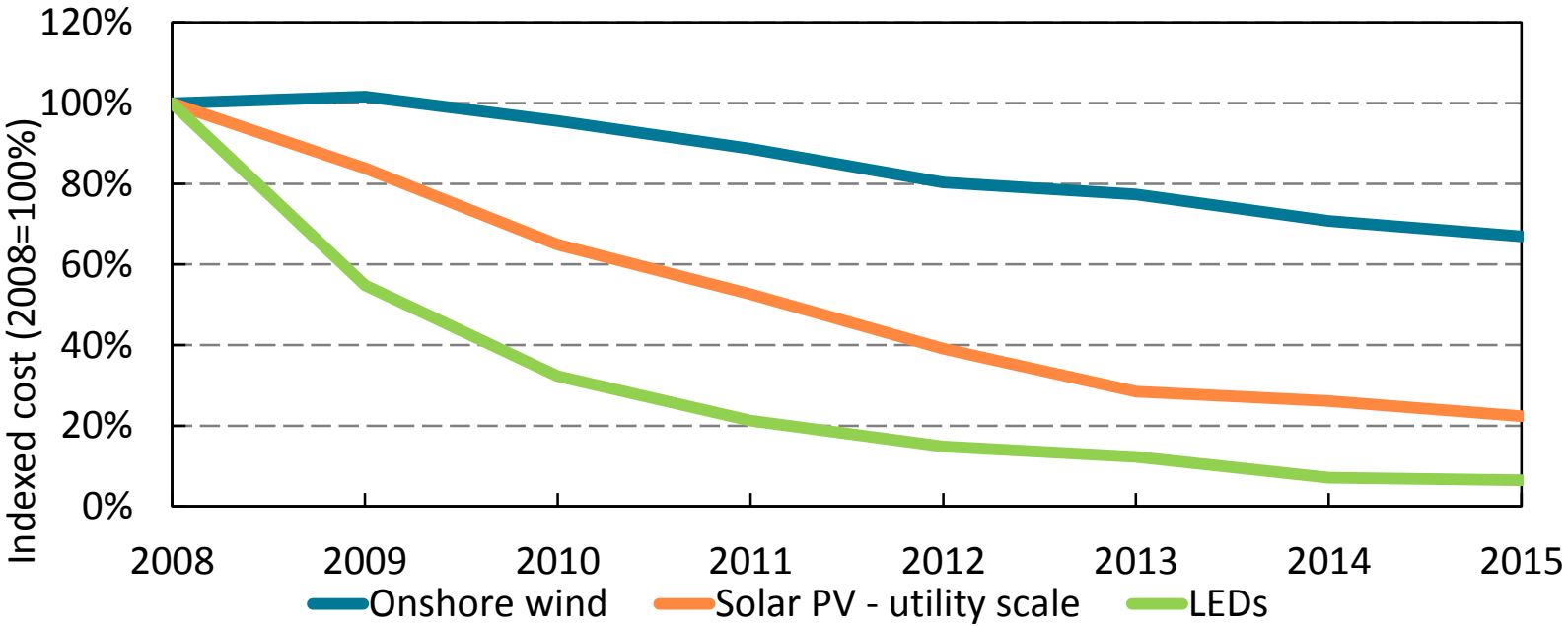
International Energy Agency
Secure Sustainable Together



Generation from renewables to rise by almost two-fifths over 2015-2021, pushing their share of total electricity generation from 23% to 28%

The cost of clean energy continues to fall

Indexed cost of onshore wind, utility scale PV and LED lighting



The falling cost of clean energies opens new opportunities but appropriate market design and regulatory frameworks remain critically important

Integrated thinking the key to success

- Efficiency and renewables policies must be aligned and must avoid contradictory signals
- Systems integration in electricity requires new thinking
- Focus only on generation cost no longer enough, policies need to consider system-wide impact
- Planning and investment required, from grid and generation, to storage and demand shaping
- Integrated thinking in policy and market design will be essential

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A new Approach to Developing the Grid

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Thursday 26th January 2017

What Is Our New Approach?

- End to end process for all grid development projects
- Conception to energisation
- Engagement and consultation at the heart of new process

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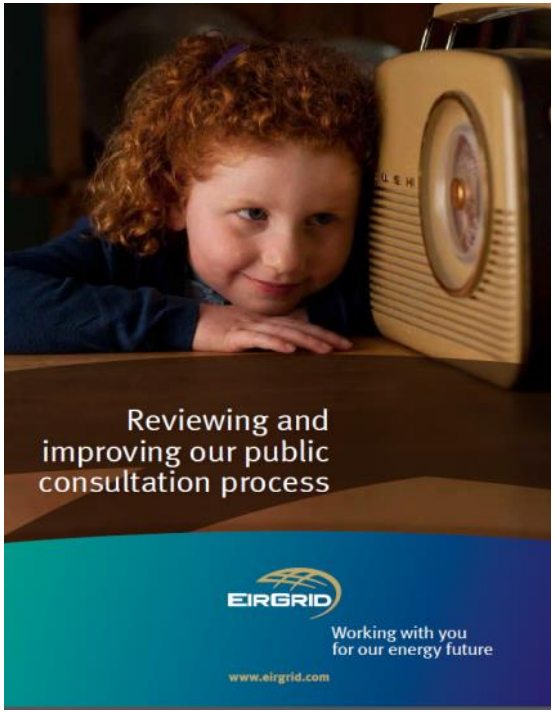
Review of our Consultation Process



Process for Consultation in Project Development

Demonstrate Consideration of Social Impact

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EirGrid's Strategy Statements

Inclusive consultation will be central to our approach

Consider all practical technology options

Optimise existing network to minimise requirements for new infrastructure

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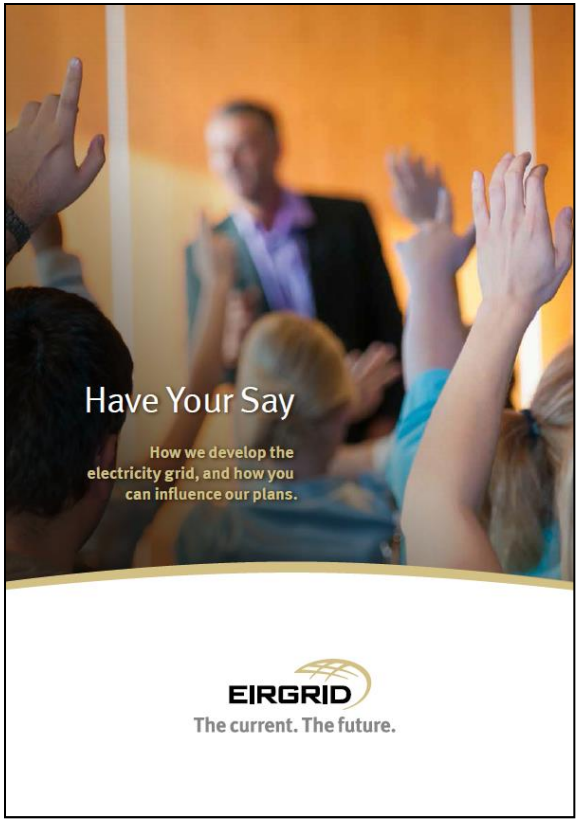
EirGrid's '*Have Your Say*'

- Summarises new approach
- Sets out how and when you can have your say and influence the decision



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Six Steps in the New Approach

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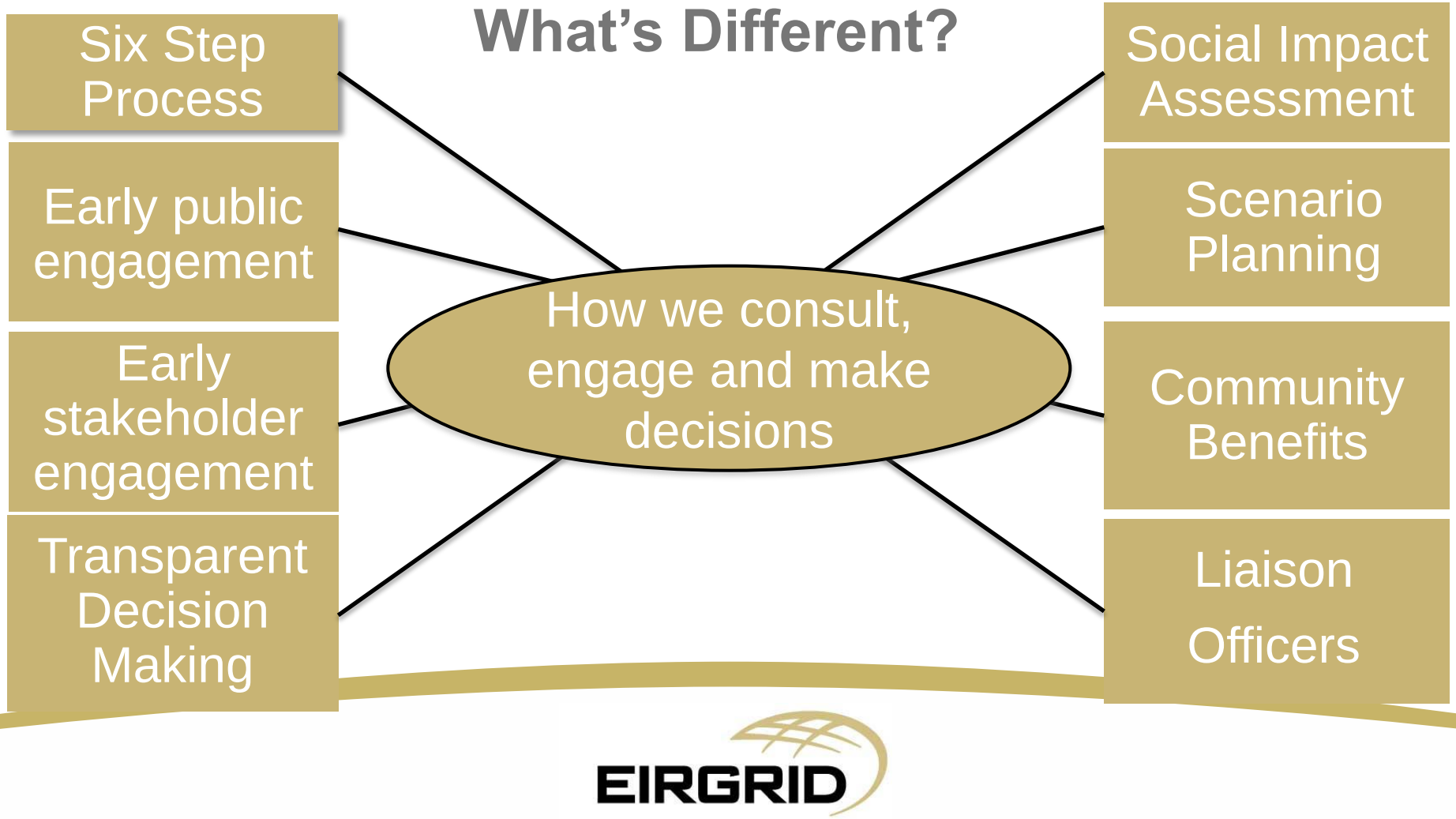
What's Different?



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Renewable Delivery

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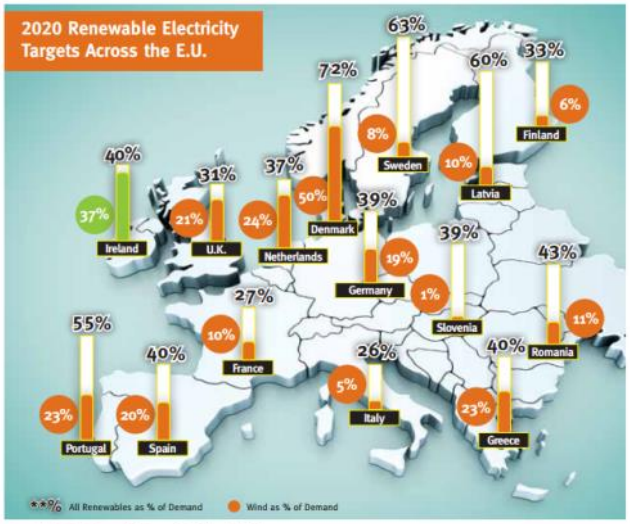
ESB NETWORKS

Policy Landscape



Source: The National Renewable Energy Action Plans (NREAP) January, 2012
Note: The Danish wind target was increased subsequenty in quarter 2 of 2012

- European Renewable Energy Directive 2009/28/EC sets a mandatory target for Ireland of 16% of gross final consumption to come from renewables by 2020
- Ireland's National Renewable Energy Action Plan (NREAP) set out a target of 40% contribution from renewable energy (RES-E) to this target
- Strategic Energy Framework in Northern Ireland sets a similar target of 40% of electricity generation from renewable sources by 2020

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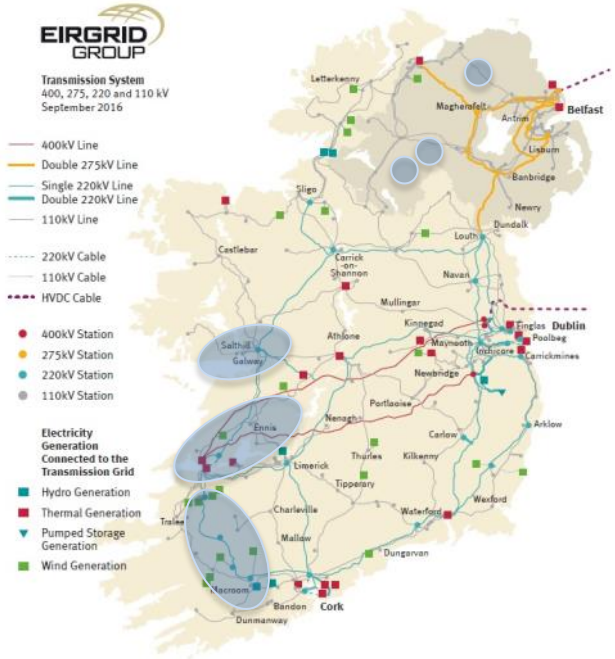
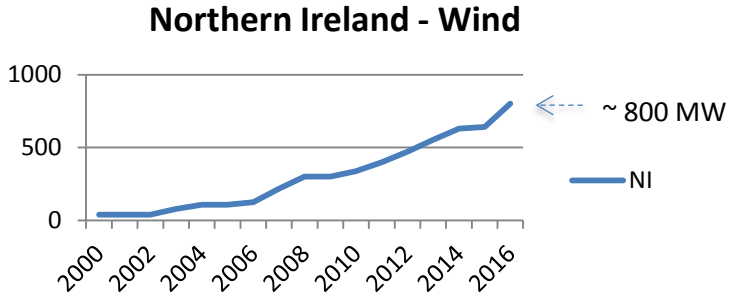
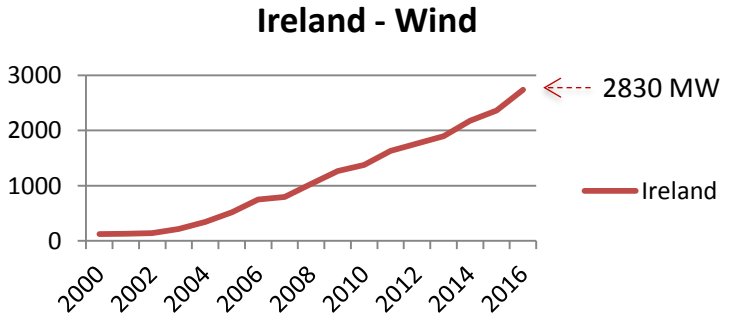
ESB NETWORKS

Renewable Delivery to Date







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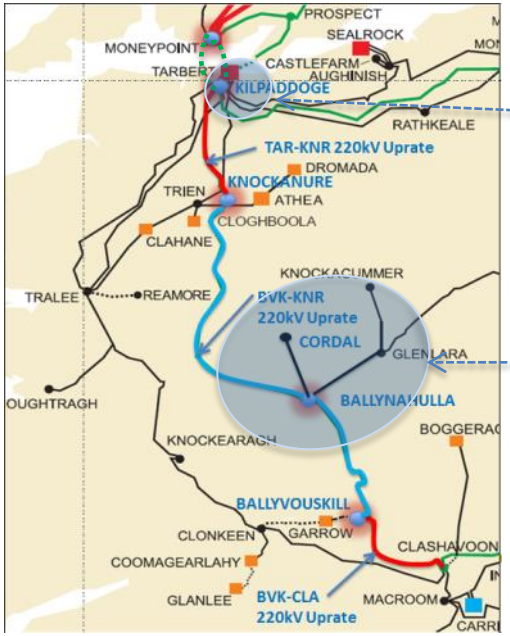
South West

- Significant transmission network delivery program to accommodate additional wind:
  - Two new submarine circuits
  - Five new transmission stations
  - 220kV line uprate from Clashavoon – Tarbert.
- Facilitating ~ 1025 MW of shallow connection in the region



Moneypoint / West Clare

Ennis – Booltiagh – Tullabrack 110 kV Uprate Energisation

22 MW (Moneypoint WF)

New 110, 220, 200 kV GIS Substation and sub-sea cable energisations

72 MW

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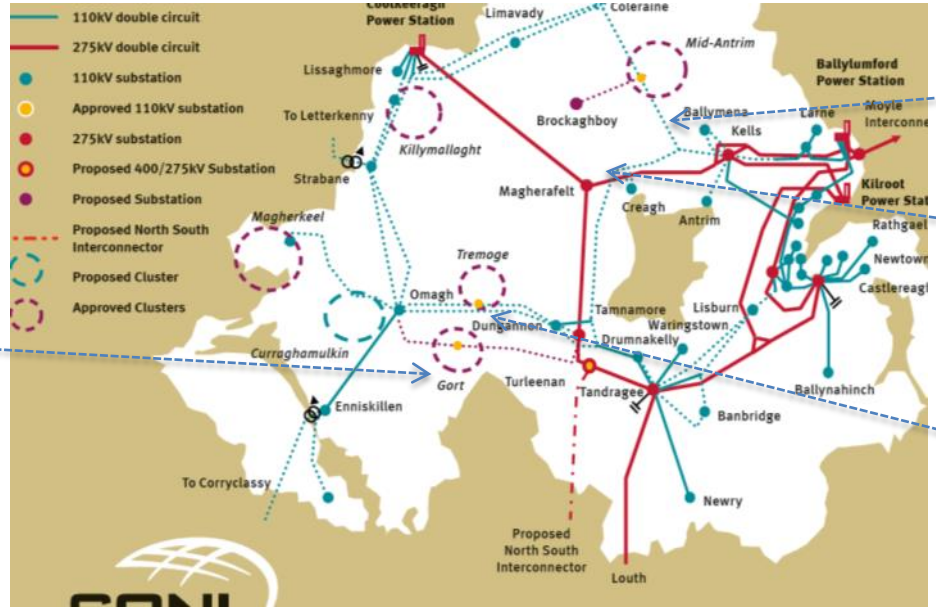
West Galway

- West Galway (Knockranny) is the largest Gate 3 Sub Group connection
- ~ 300 MW of transmission and distribution wind connecting
- ~Staged energization underway; next phase of energization March 2017 (105 MW)

Northern Ireland



Gort – 63.6 MW

Rasharkin - 38 MW

Brockaghgboy 46.5 MW

Tremoge 41 MW

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ESB NETWORKS

ESB Networks Update

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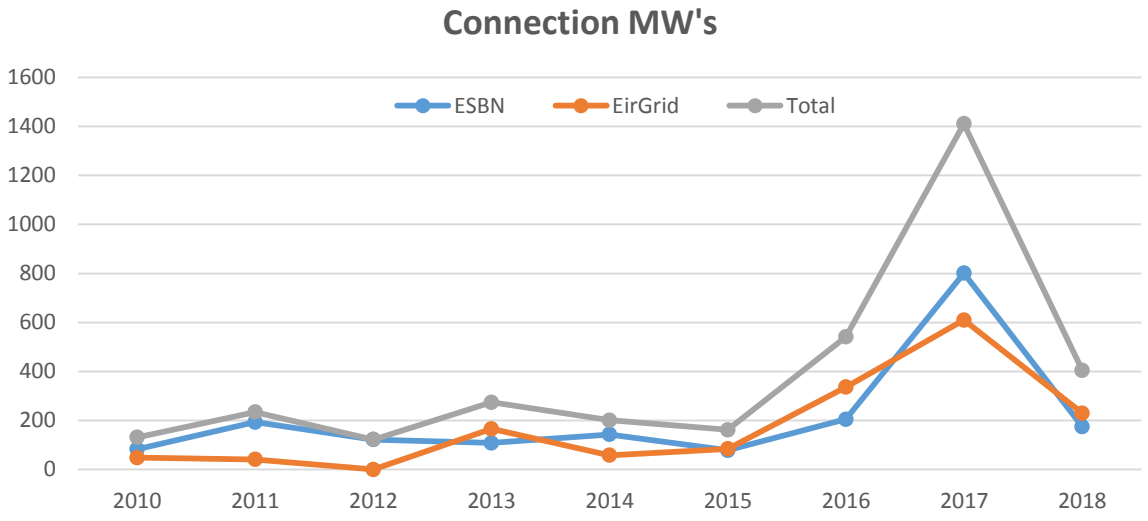
Renewables Delivery

- Safety
- Developer Programmes
- Contestable Construction
- Legal & Planning
- REFIT Extension
- Solar Connections



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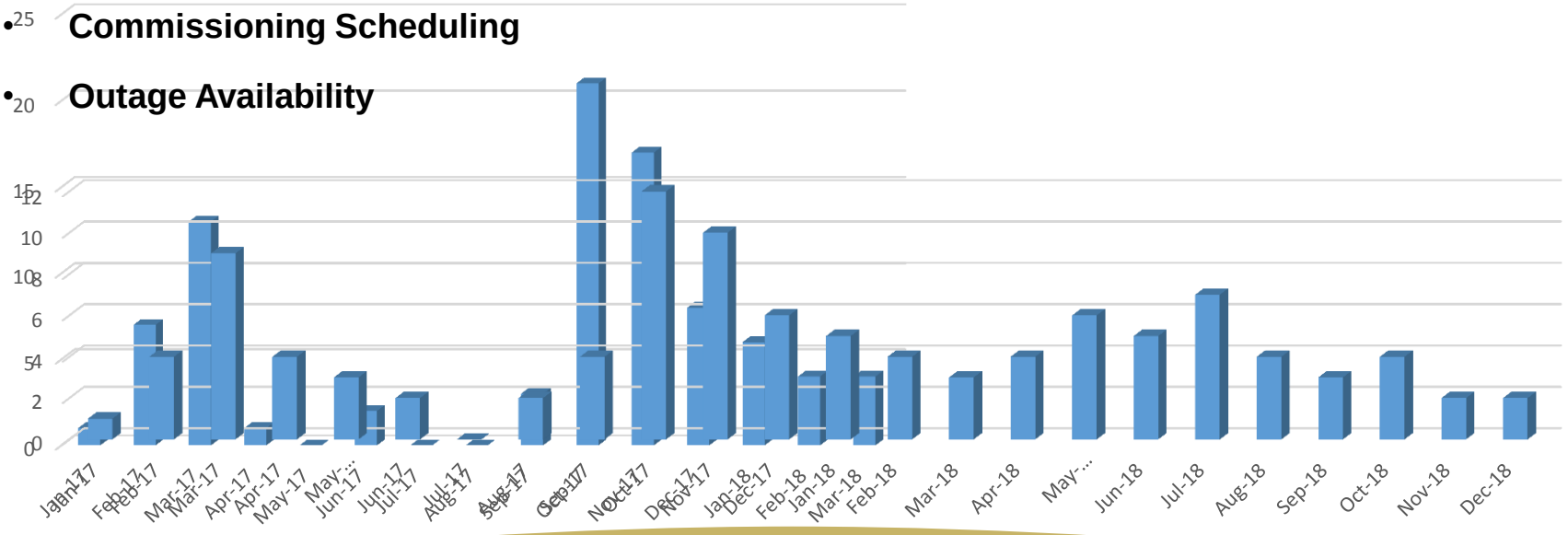
REFIT Extension

- **Design & Construction Resourcing**
- **Commissioning Scheduling**
- **Outage Availability**



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Contestable Construction

- Quality Installation
- Construction Standards
- Pre-Commissioning
- Lifetime Maintenance

- Operational Safety
- Commissioner Resourcing
- Outage Scheduling

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Conclusions

- Installed capacity of wind generation has grown from 145 MW at the end of 2002 to approx 2,830 MW in Ireland and 800 MW in Northern Ireland by end of 2016

- The exact actual amount of renewable energy required to reach targets in 2020 will depend on the demand in future years

- Probable requirement of 3800 MW – 4,100MW of wind for Ireland and circa 1250 MW for Northern Ireland, along with smaller contributions from other renewables such as solar photo-voltaic and biomass

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ESB NETWORKS

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Celtic Interconnector Update

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Gary Nolan

"explore and develop opportunities to interconnect the transmission system with other systems"

– TSO Licence

MoU Signing July’16

- Transmission system operator in France
- Responsible for operation, maintenance and development
- 105,000 km of power lines and 2,710 substations – Europe’s largest system
- 8,500 employees
- Existing interconnection with Belgium Great Britain, Italy, Spain, Switzerland
- Further interconnection in development

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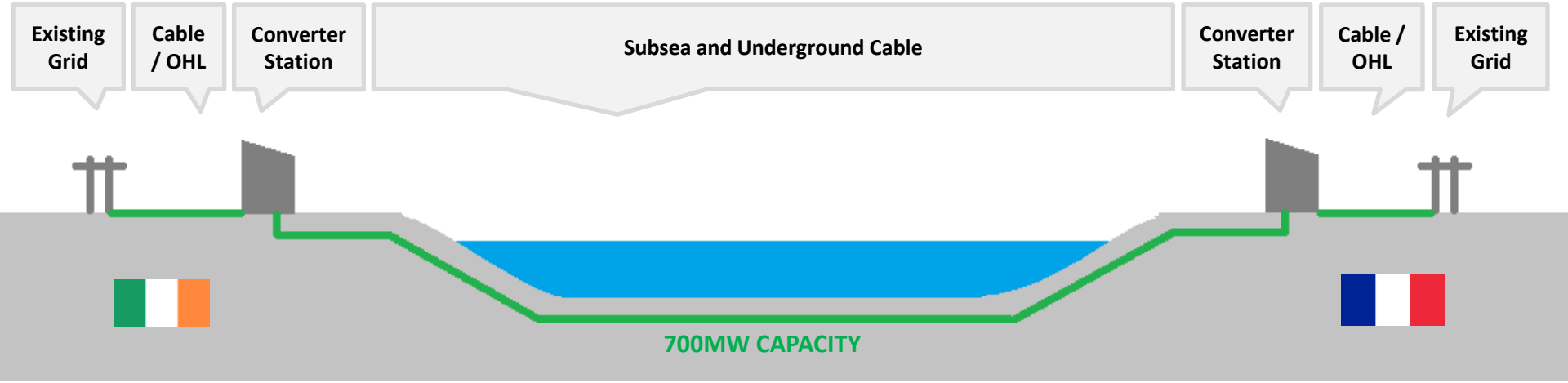
Celtic Interconnector



HVAC ELECTRICTY | HVDC ELECTRICITY | HVAC ELECTRICITY

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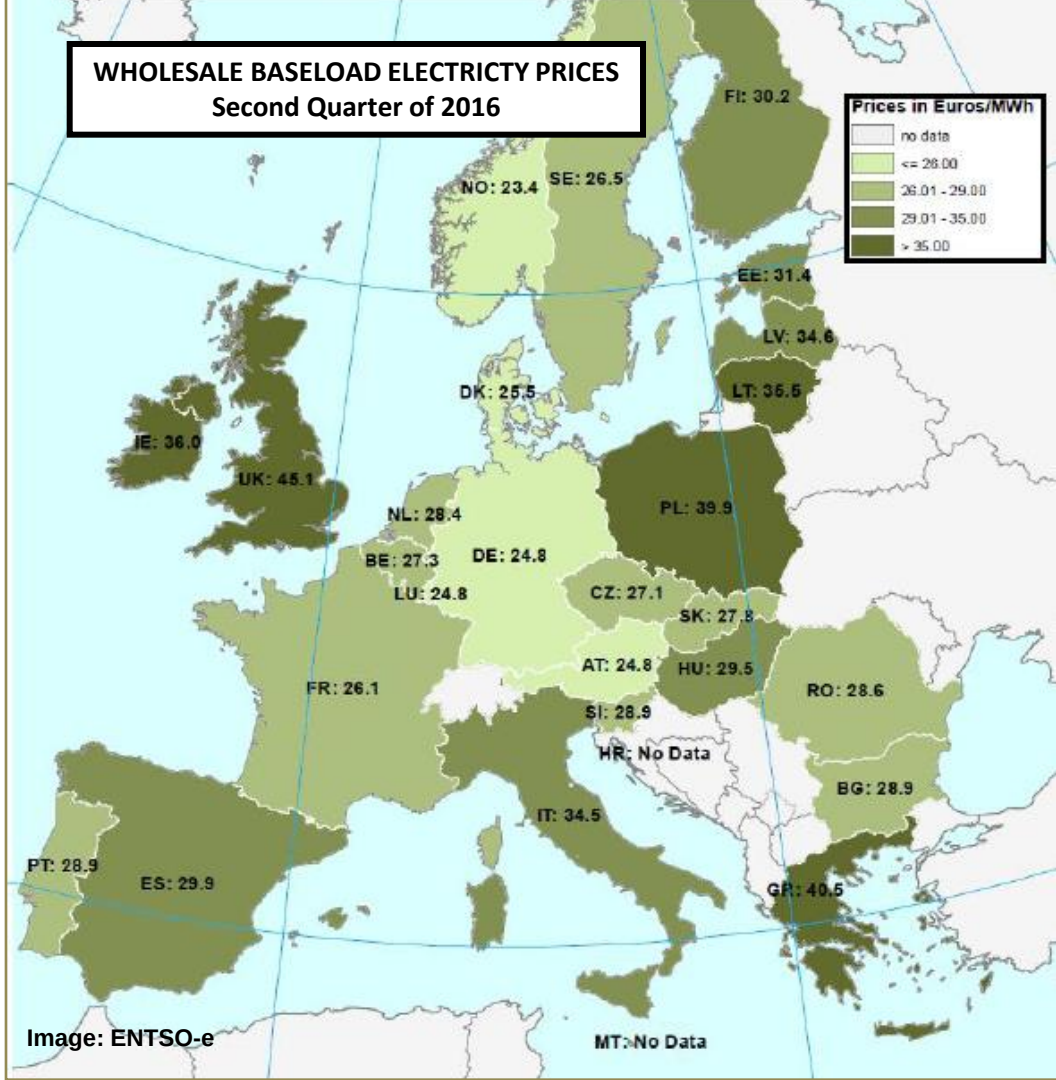
What are the benefits?

1. Competition



2. Security of Supply

3. Sustainable Energy

European Context

European Commission

Project of Common Interest

HIGHWAY 2050

Co-financed by the European Union

Connecting Europe Facility

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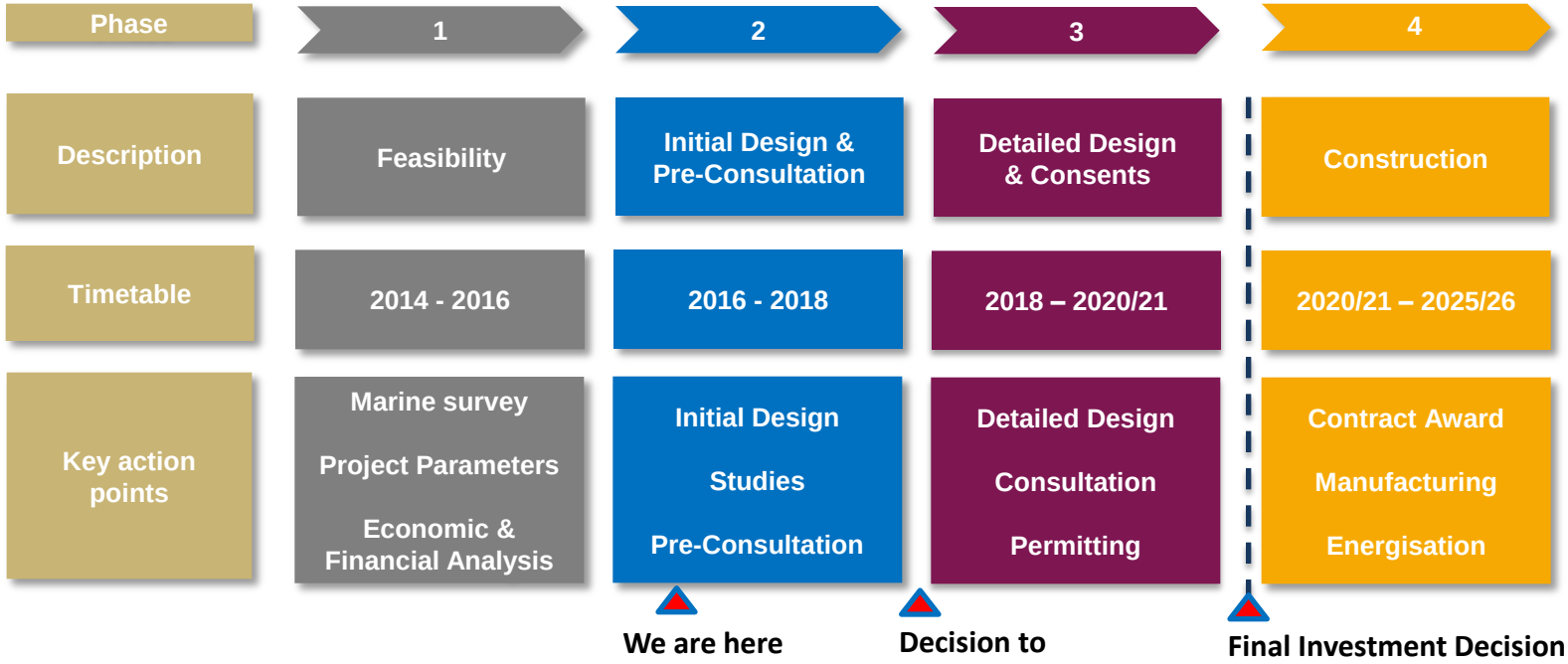
Feasibility

Project Roadmap



Summary

EirGrid & RTE

Feasible

Competition

Sustainability

Security of Supply

Initial Design & Pre-Consultation Phase

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