Integrating Offshore Wind into the Grid – A System Operators Perspective

IWEA Offshore Wind Forum

Noel Cunniffe

8th November 2018

EIRGRID

Challenges in integrating Offshore Wind

Network Capability

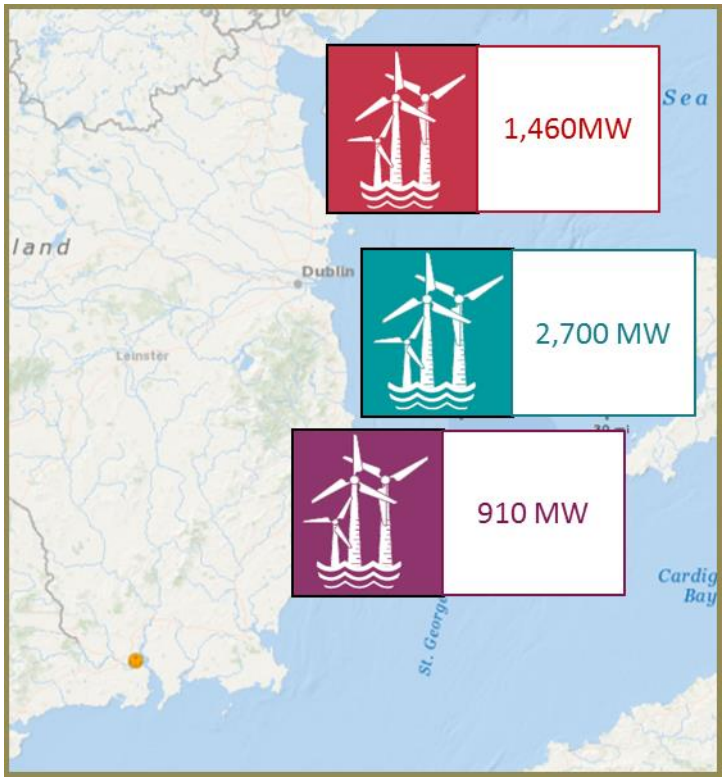
- Where can Offshore Wind be connected?
- Is the existing network capable of managing increased power flows?

Operational Capability

- Can the system operate securely with an increased largest single infeed?
- What are curtailment levels likely to be?

EIRGRID

Industry Landscape in Ireland

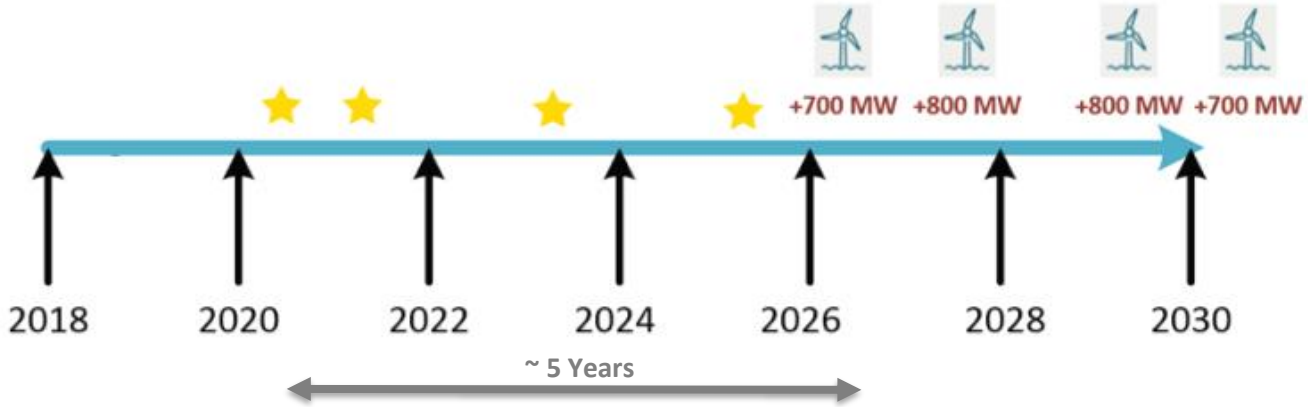


- 5.6 GW applied to connect
  - 75% on east coast – favourable depths and distances
- Foreshore consenting process needs amendment
- **Overhaul crucial to offshore development**
  - No mechanism to modify / obtain new licence

EIRGRID

Offshore Wind – Timelines

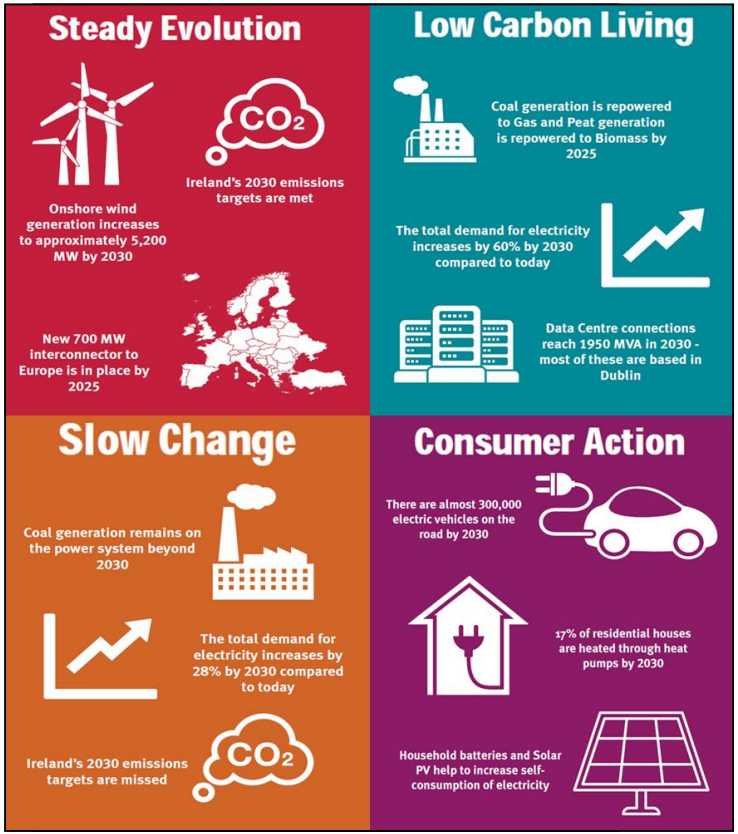
- Dependent on successful outcomes for applicants in forthcoming RESS auctions
- Estimated 4 to 5 years financing and construction lead time post auction
- 700 – 800 MW windfarm size typical for smaller jurisdictions



Indicative Roadmap – 3 GW by 2030 reflects the Tomorrow's Energy Scenarios ***Low Carbon Living*** *Scenario*

EIRGRID

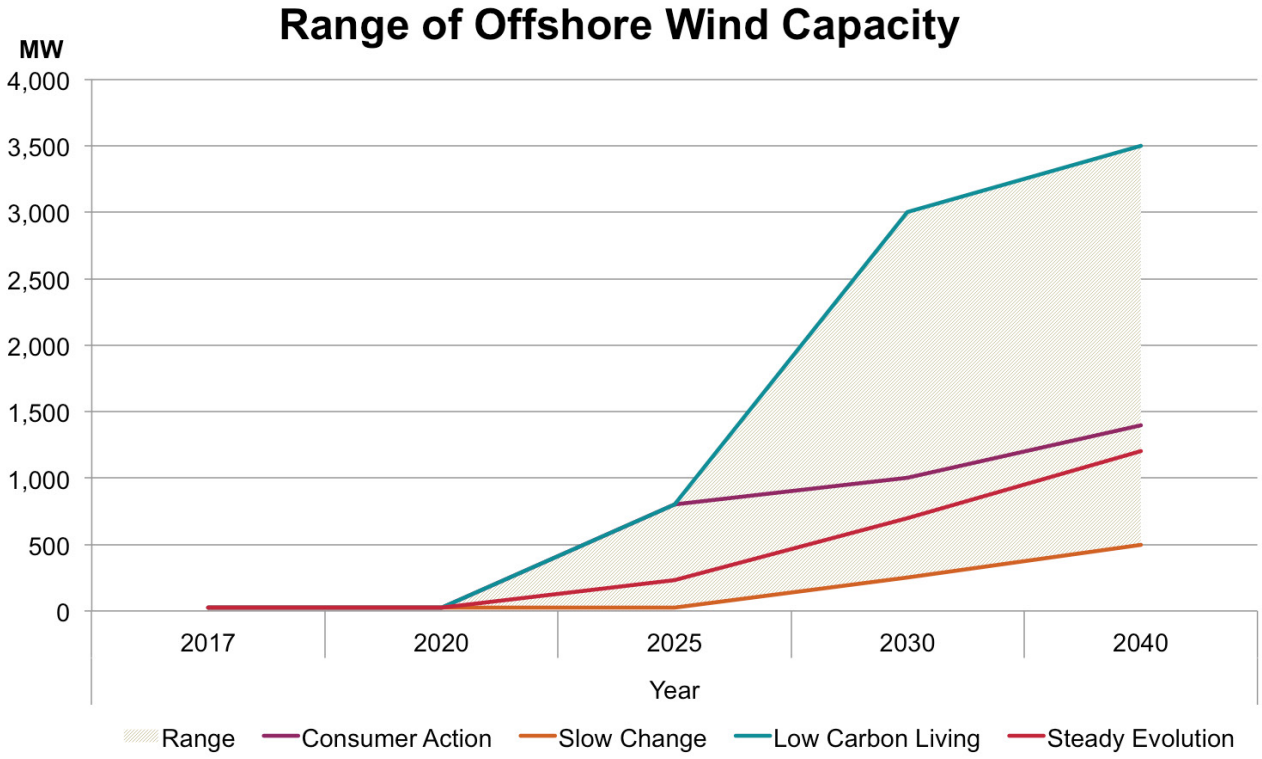
Tomorrow's Energy Scenarios



- Tomorrow's Energy Scenarios 2017 document published in July
- Sets out four scenarios from 2020 – 2040
- This publication covers scenarios for Ireland only – revised every two years
- A lot of focus on 2030 in our publications
  - Important year from climate change policy and future renewable energy targets
  - System needs identified in 2030 may require some projects to kick off now

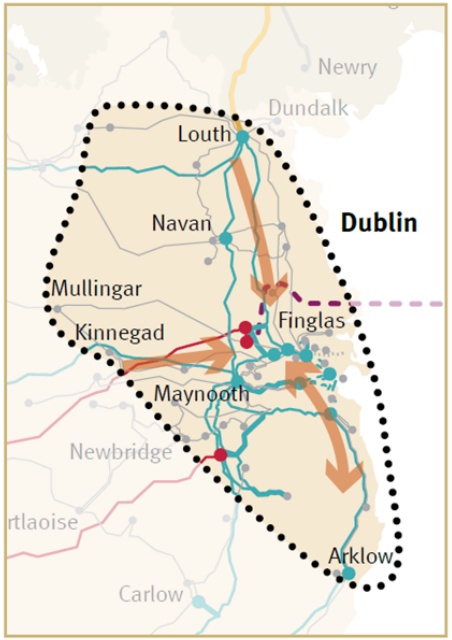
EIRGRID

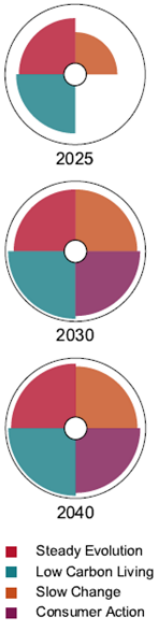
Tomorrow's Energy Scenarios



EIRGRID

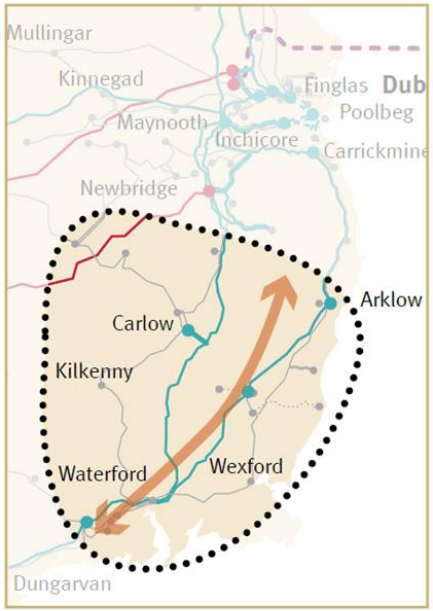
TES 2017 System Needs Assessment

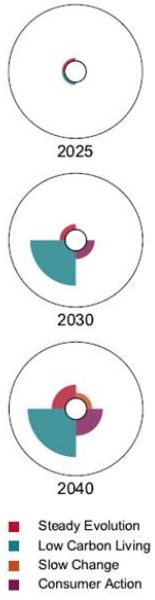




Driver(s)	Need(s)
Large energy user demand growth	Power transfer capacity
RES integration	Voltage support

Dublin Region





Driver(s)	Need(s)
Large energy user growth	Power transfer capacity
New HVDC interconnection	
RES integration	

South-East Region

EIRGRID

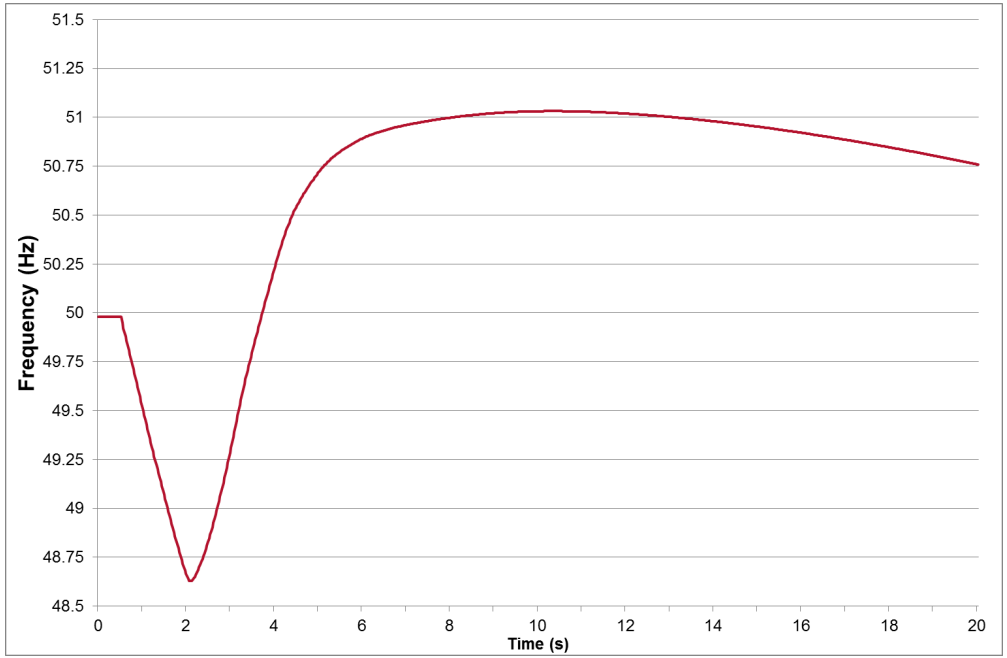
East Coast Generation Assessment

- **Background of Assessment**
  1. Electricity demand in Dublin is increasing significantly
  2. Multiple generator queries for feasibility studies
- **Deliverable – EirGrid Publication identifying:**
  1. The capacity available for new offshore wind at multiple locations along the east coast
  2. The capacity available for new conventional generation in the east coast
  3. Available space in existing substations for new connections
- **Publication currently undergoing approval**

EIRGRID

Operational Capability – Largest Single Infeed

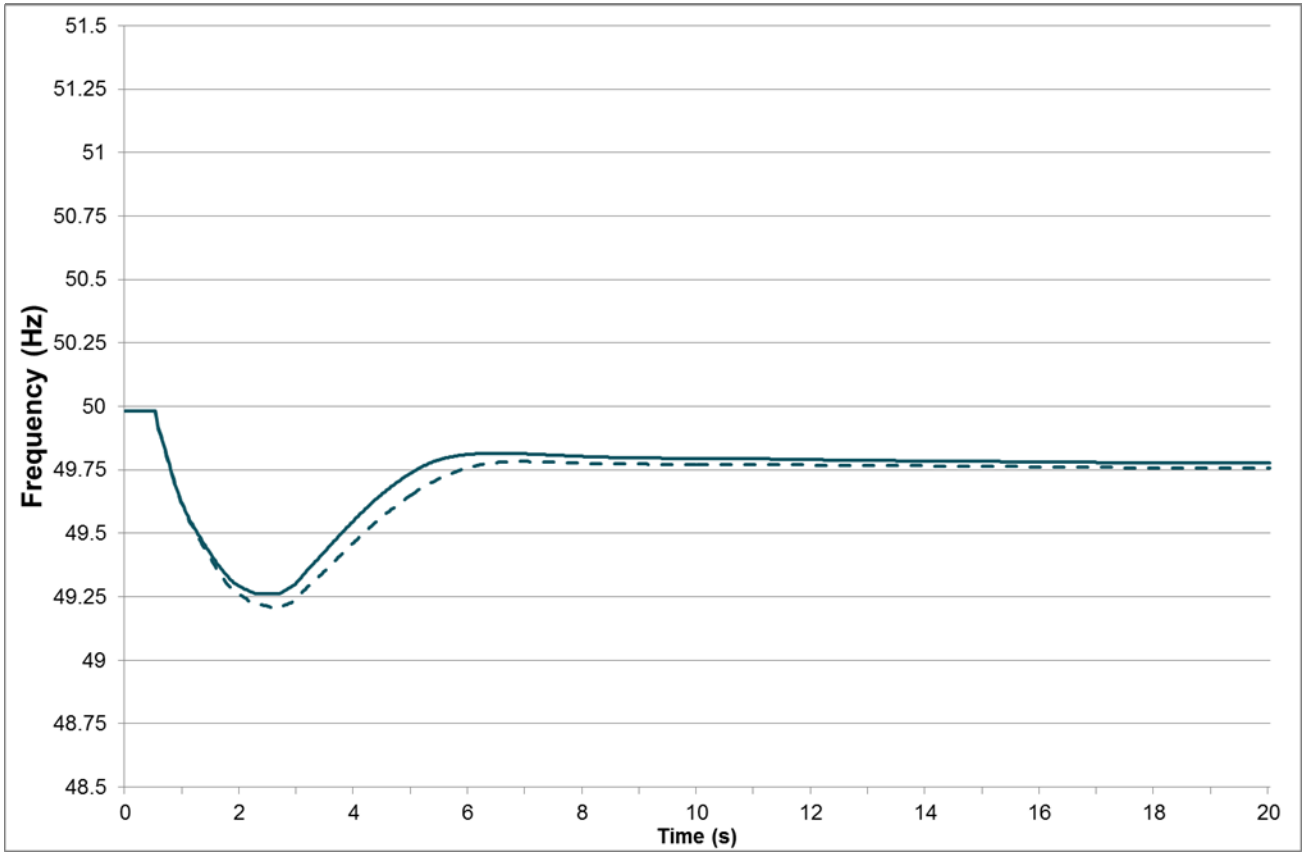
- Currently the Largest Single Infeed is set by two 500 MW interconnectors
- Increasing to 700 MW causes potential system instability



- Rate of Change of Frequency in excess of 1 Hz/s
- Customer load shedding @ 48.7 Hz following trip of connection

EIRGRID

Largest Single Infeed Study – What we need

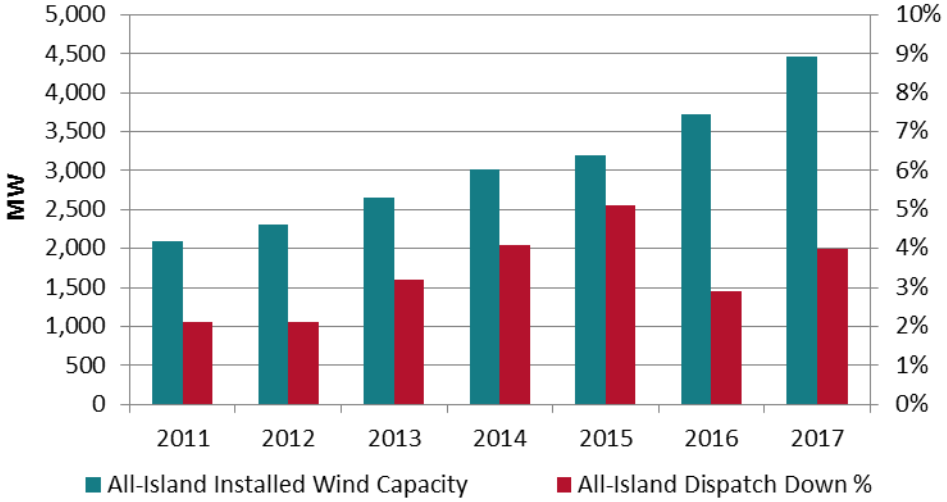


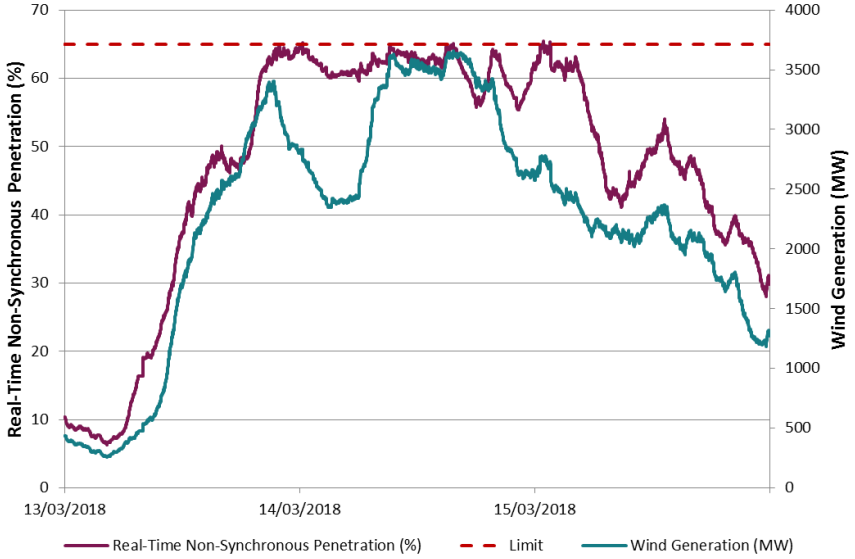
- New operational constraint for inertia levels
- Faster reserve response (< 1 sec)

Solutions are implementable within the timeframe of a new Largest Single Infeed development

EIRGRID

Curtailment Levels – The story so far





- Doubling of installed wind capacity
- No major increase in dispatch down

- Operating the system at 65% SNSP
- Goal to move to 75% SNSP in 2020

EIRGRID

Going beyond 40% Renewable Electricity

- Increased curtailment levels inevitable unless steps taken to minimise in future

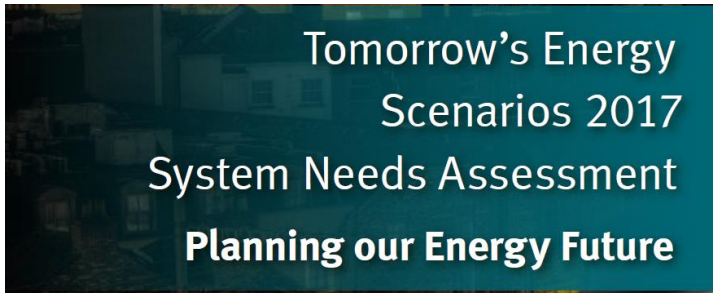
1. **Increase SNSP limit beyond 75%** → EU-SysFlex → **DS30**
2. **Increased levels of interconnection** →
   - Celtic Interconnector
   - Greenlink Interconnector
3. **Deployment of new technologies** →
   - DS3 System Services
   - DS3 Fixed Contracts
   - DS3 Qualification Trials

- **RES-E Policy alignment between IE and NI essential!**

EIRGRID

Solutions in integrating Offshore Wind

Network Capability



Operational Capability

EU-SysFlex

EIRGRID

The current. The future.