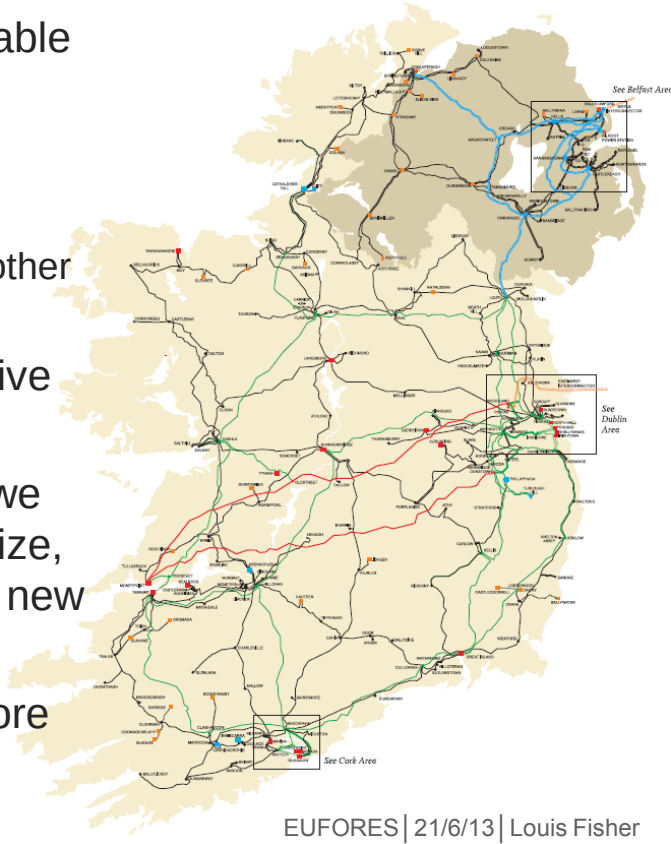
The North Seas as the Future Energy Pool of Europe

Grid Infrastructure Development

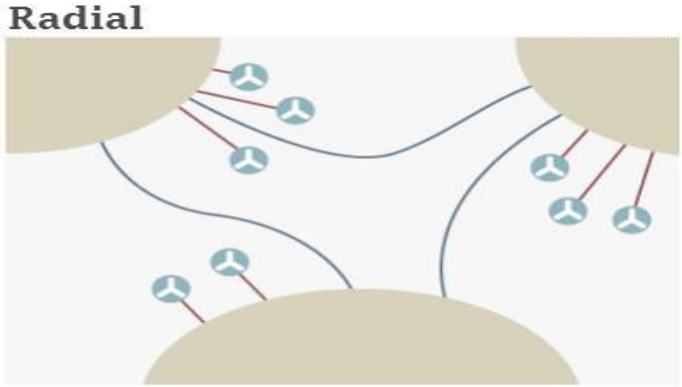
Louis Fisher,
Manager Network Planning, EirGrid
Member of ENTSO-E Regional Group North Sea
Member of NSCOGI Working Group on Grid Development

Grid Planning

- High capacity, efficient, reliable link between
  - Generation Plants
  - Demand centres
  - Points of Interconnection to other systems
- Changes in any of these drive need to develop grid
- To plan grid development, we need reliable forecasts of size, location, timing and type of new generation
- True for offshore and onshore

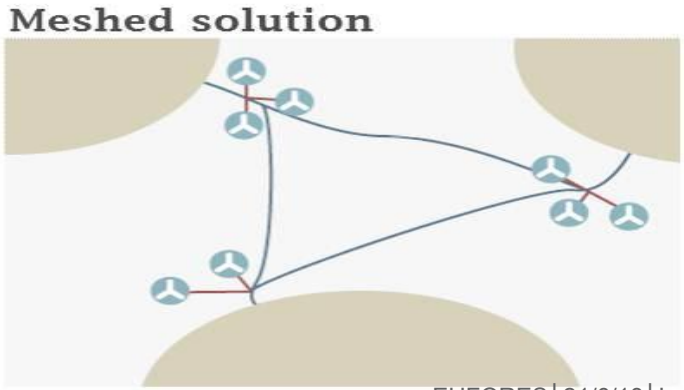


What type of Off-Shore Grid Design?

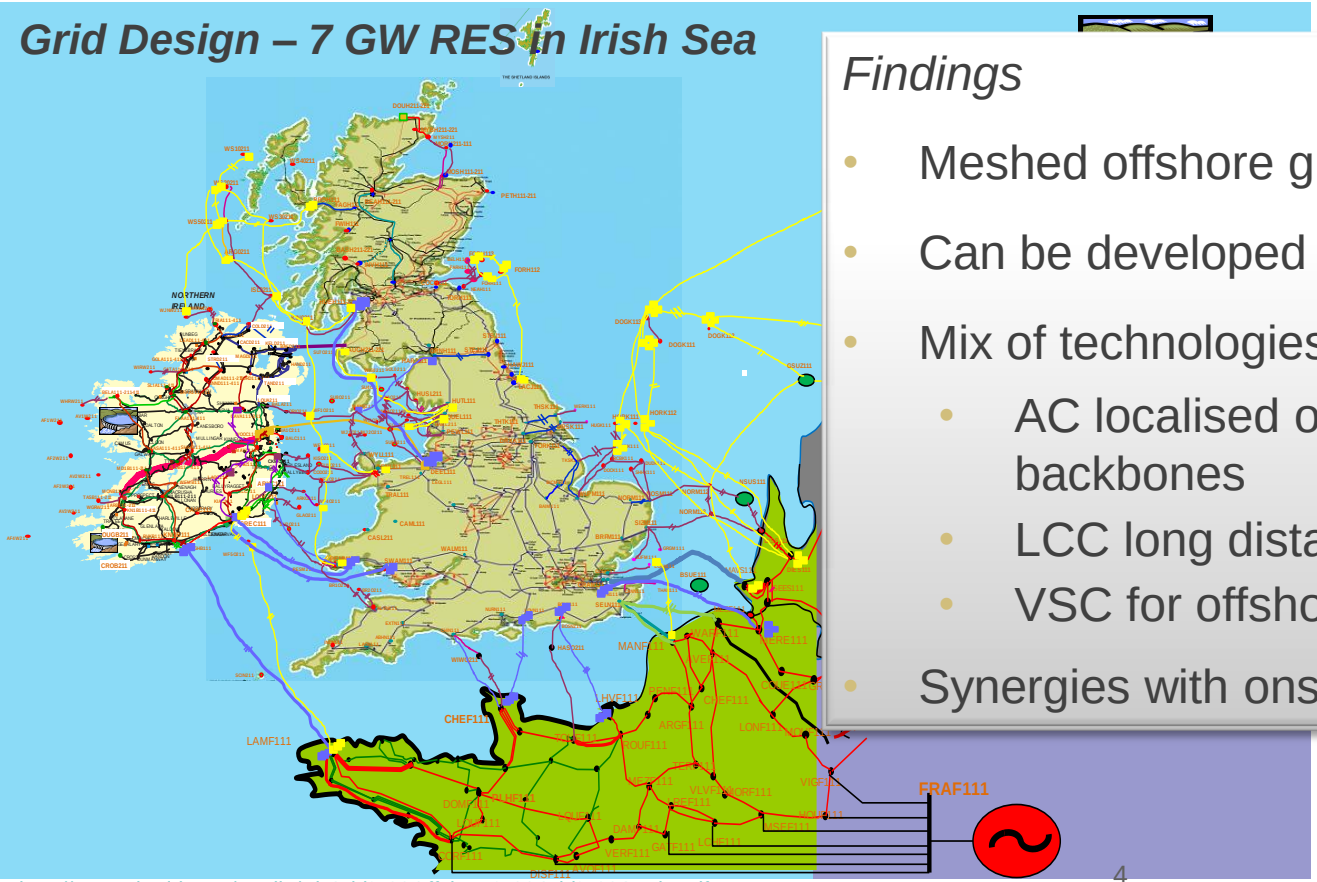


- Business as usual - continuing with **mainly uni- or bilateral** solutions between countries
- Simple from regulatory perspective
- Offshore grid investment likely to be sub-optimal
- Inefficient use of finite landing points

- Requires **multilateral cross-border cooperation** between countries
- Optimises flexibility and efficiency of grid assets
- Fewer cable routes and landing points
- Complex design and build
- Increased technical and operational risk
- Needs regulatory clarity



EirGrid Offshore Grid Study 2011



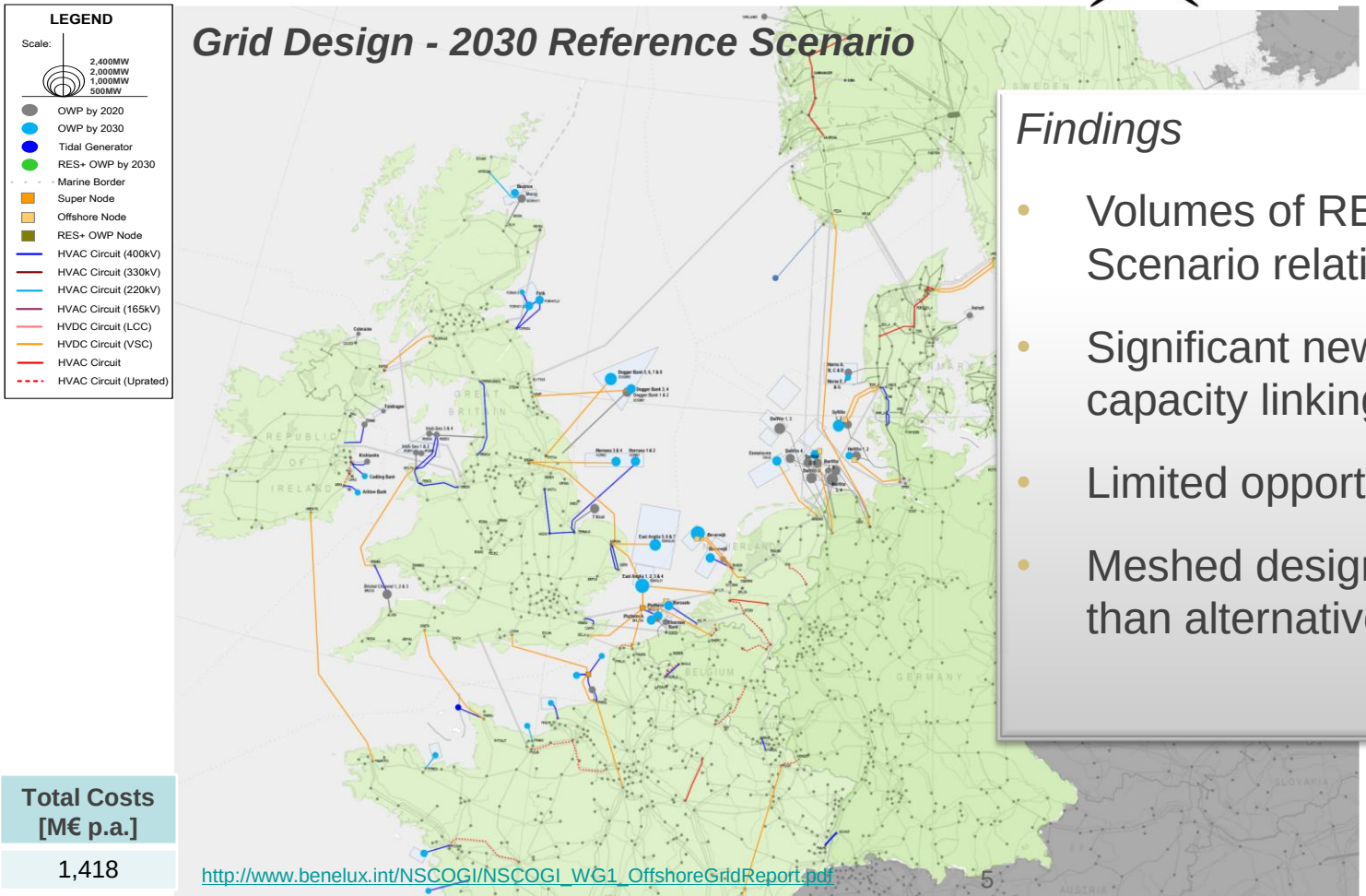
Findings

- Meshed offshore grid design preferred
- Can be developed incrementally
- Mix of technologies used
  - AC localised offshore/ DC long distance backbones
  - LCC long distances point to point
  - VSC for offshore connections
- Synergies with onshore network

http://www.eirgrid.com/media/EirGrid%20Offshore%20Grid%20Study.pdf

NSCOGI Grid Study 2012

Grid Design - 2030 Reference Scenario



Findings

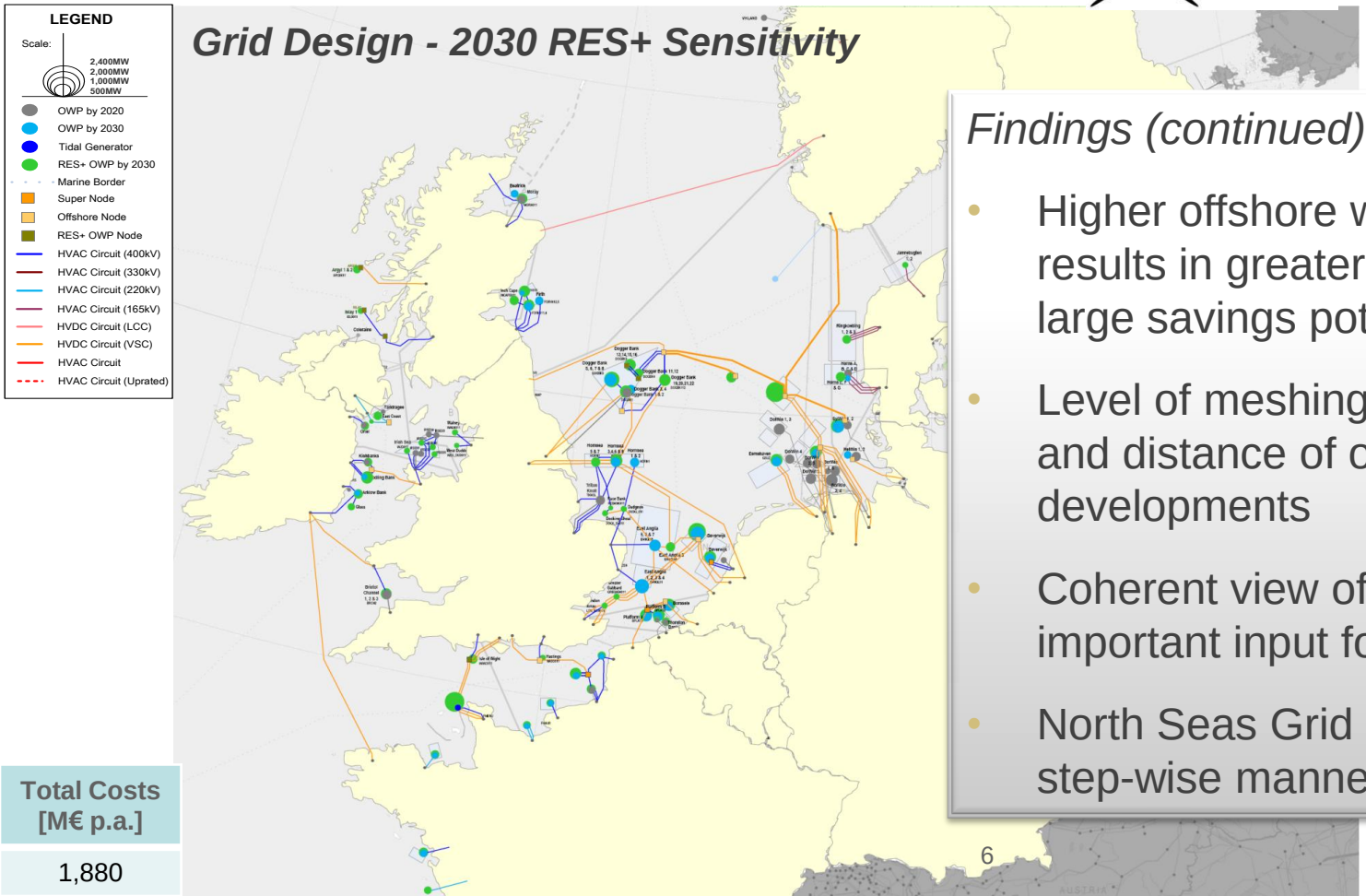
- Volumes of RES in Reference Scenario relatively small
- Significant new interconnection capacity linking market areas
- Limited opportunity for meshing
- Meshed design marginally better than alternative radial design

Total Costs [M€ p.a.]
1,418

http://www.benelux.int/NSCOGI/NSCOGI_WG1_OffshoreGridReport.pdf

NSCOGI Grid Study 2012

Grid Design - 2030 RES+ Sensitivity



Total Costs [M€ p.a.]
1,880

Findings (continued)

- Higher offshore wind capacity results in greater meshing and large savings potential
- Level of meshing depends on size and distance of offshore developments
- Coherent view of future is therefore important input for grid planning
- North Seas Grid likely to evolve in step-wise manner

Challenges for Development of a Meshed Grid

- Uncertainty regarding pace and scale of offshore developments
- Multiple parties / countries involved
- Anticipatory investment to ensure that first incremental offshore links are capable of integrating into future grid
- Marine is more challenging environment than onshore
- Limited track record of technology at required scale
- Materials, supply chain, ports, ships
- Additional operational complexity

What is required to overcome challenges

- Vision and political commitment beyond 2020 to provide basis for next stage of development
- Continuing international cooperation through NSCOGI
- Regulatory mechanisms to de-risk anticipatory investments
- Clear market rules
- Push to develop technical standards
- Manufacturing capacity increase