

Main challenges for grid development in North Sea Region

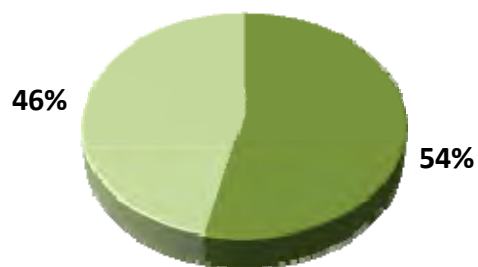
North Sea Regional Workshop with Stakeholders on
“TYNDP & RgIP 2012 results”

December 15, 2011

Regional Group North Sea (RGNS)

- Regional Group North Sea covers: Belgium, Germany, Denmark, France, Great Britain, Ireland, Northern Ireland, Luxembourg, Netherlands & Norway
- About 55% of the European electrical demand is consumed within the North Sea region

Electrical demand 2010

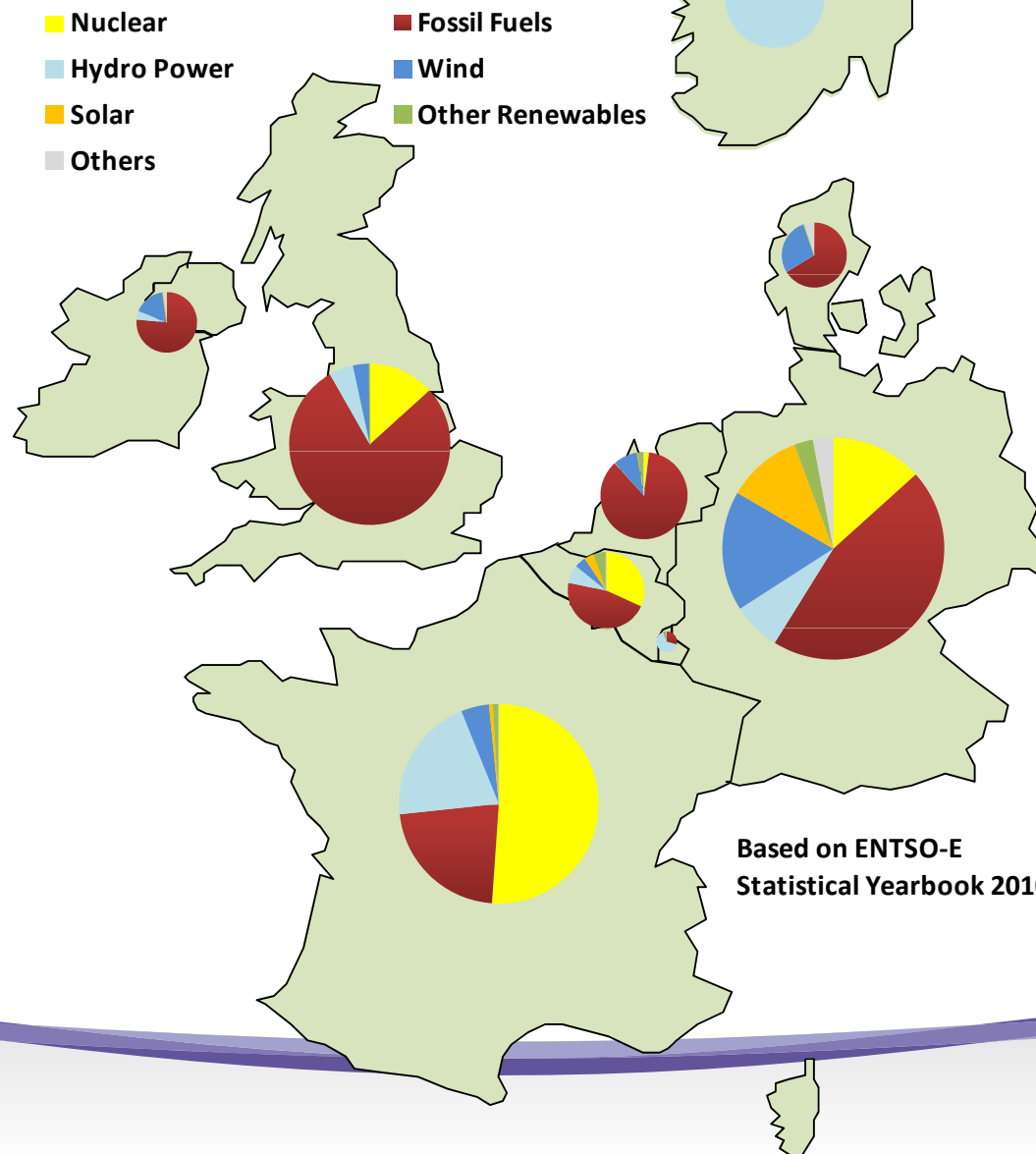


■ North Sea Region ■ Other ENTSO-e countries

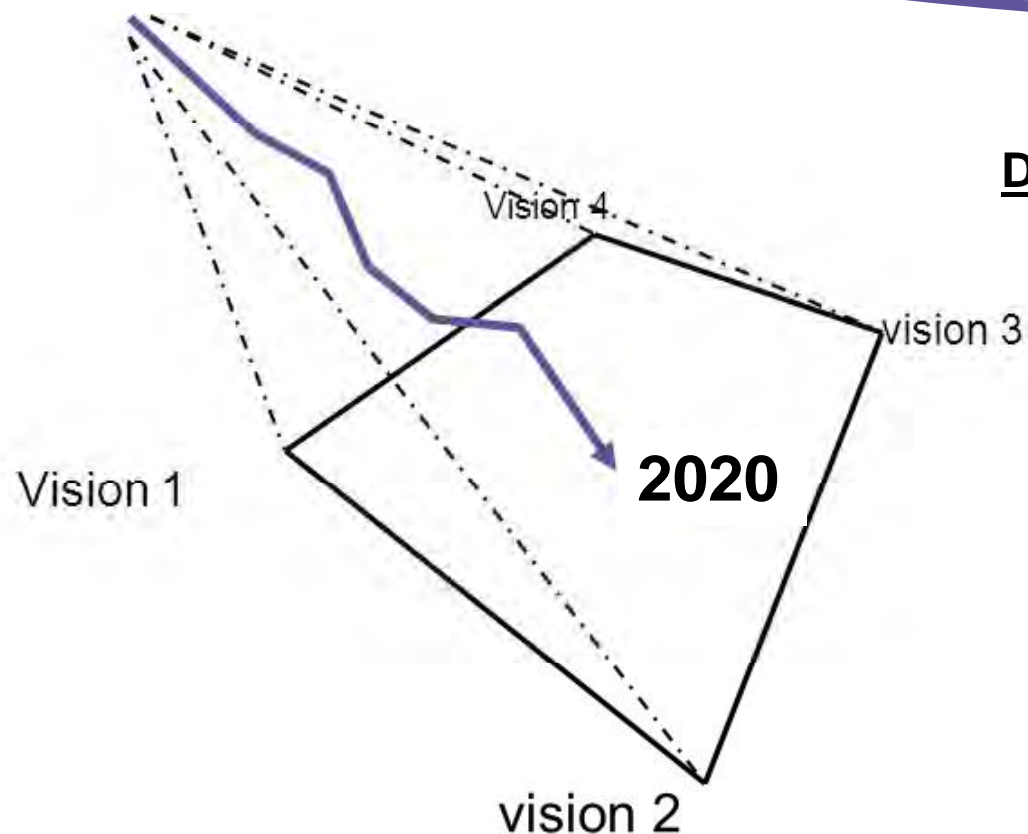
Based on ENTSO-E Statistical Yearbook 2010

Distribution of installed generation capacity in 2010

- North Sea Region has a diverse mix of installed generation capacity:
- Fossil-fired plants
- Nuclear plants
- Hydro power plants
- Wind power
- Photovoltaic systems



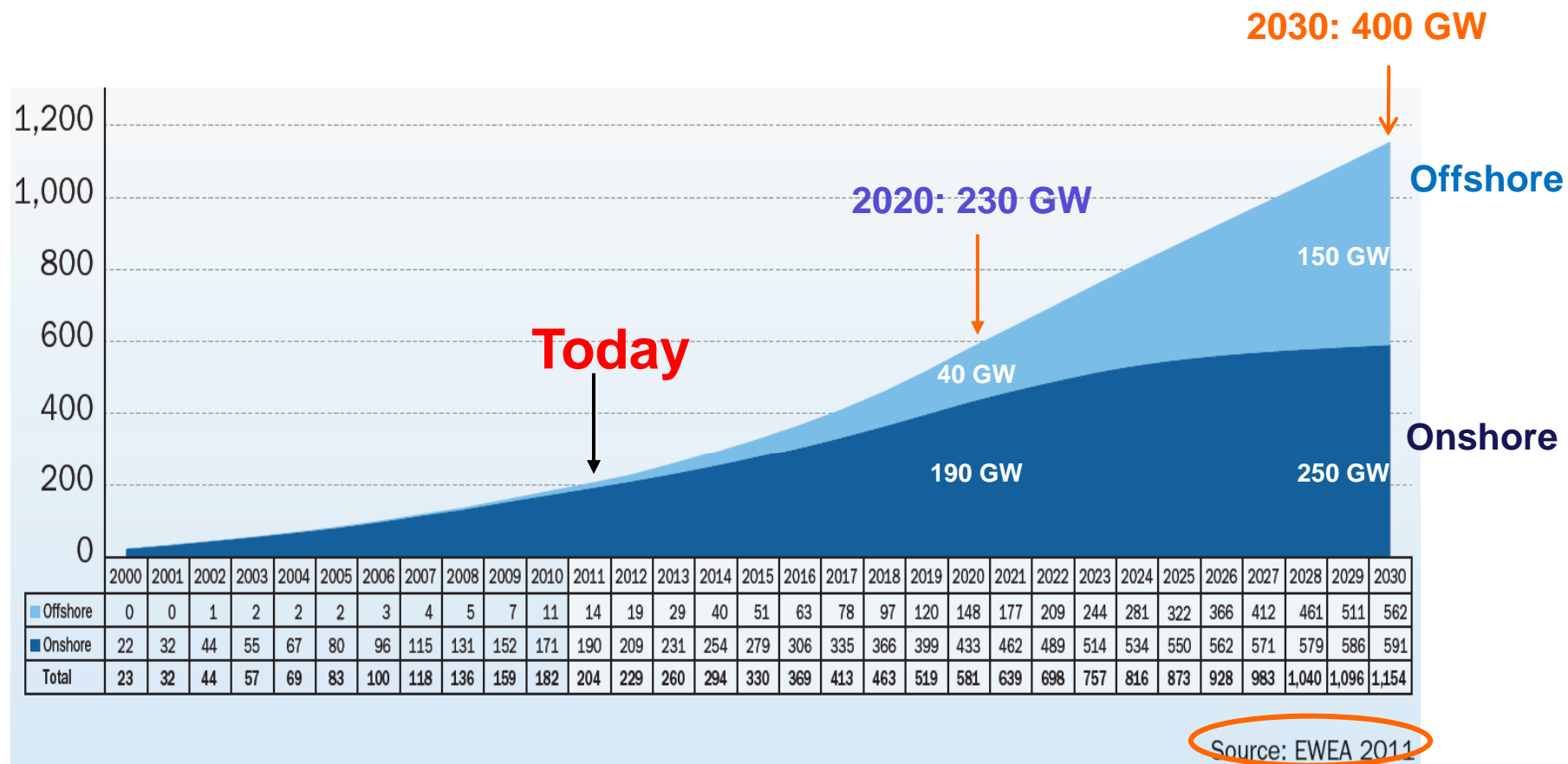
Use of scenarios



Dealing with uncertainties regarding:

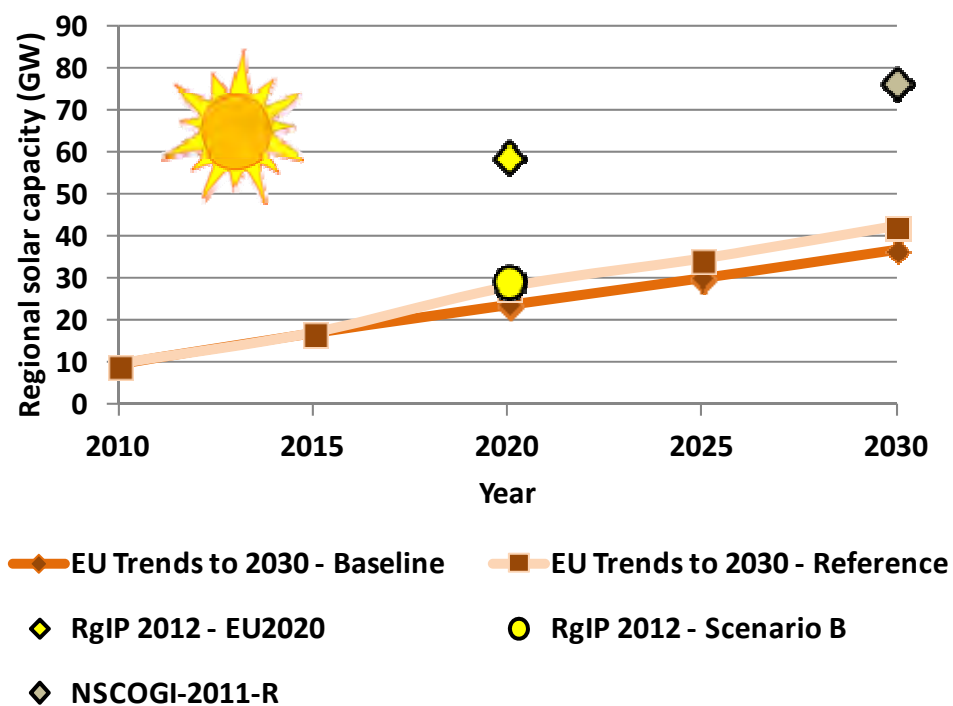
- Timing and siting of generation
- Fuel mix
- Electricity demand
- EU & National Policies
- Economic background
- Fuel prices
- CO2 prices

Evolution of electrical energy system: wind capacity

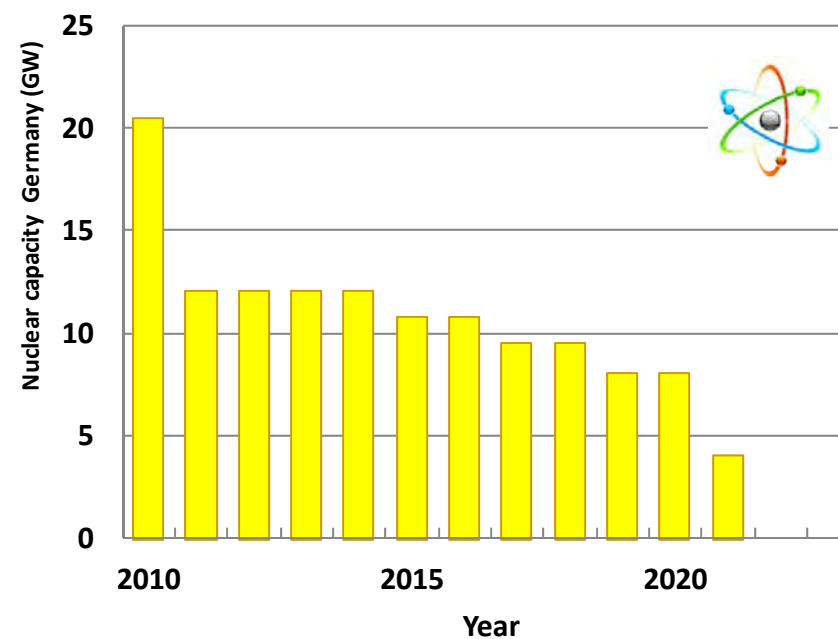


Evolution of electrical energy system

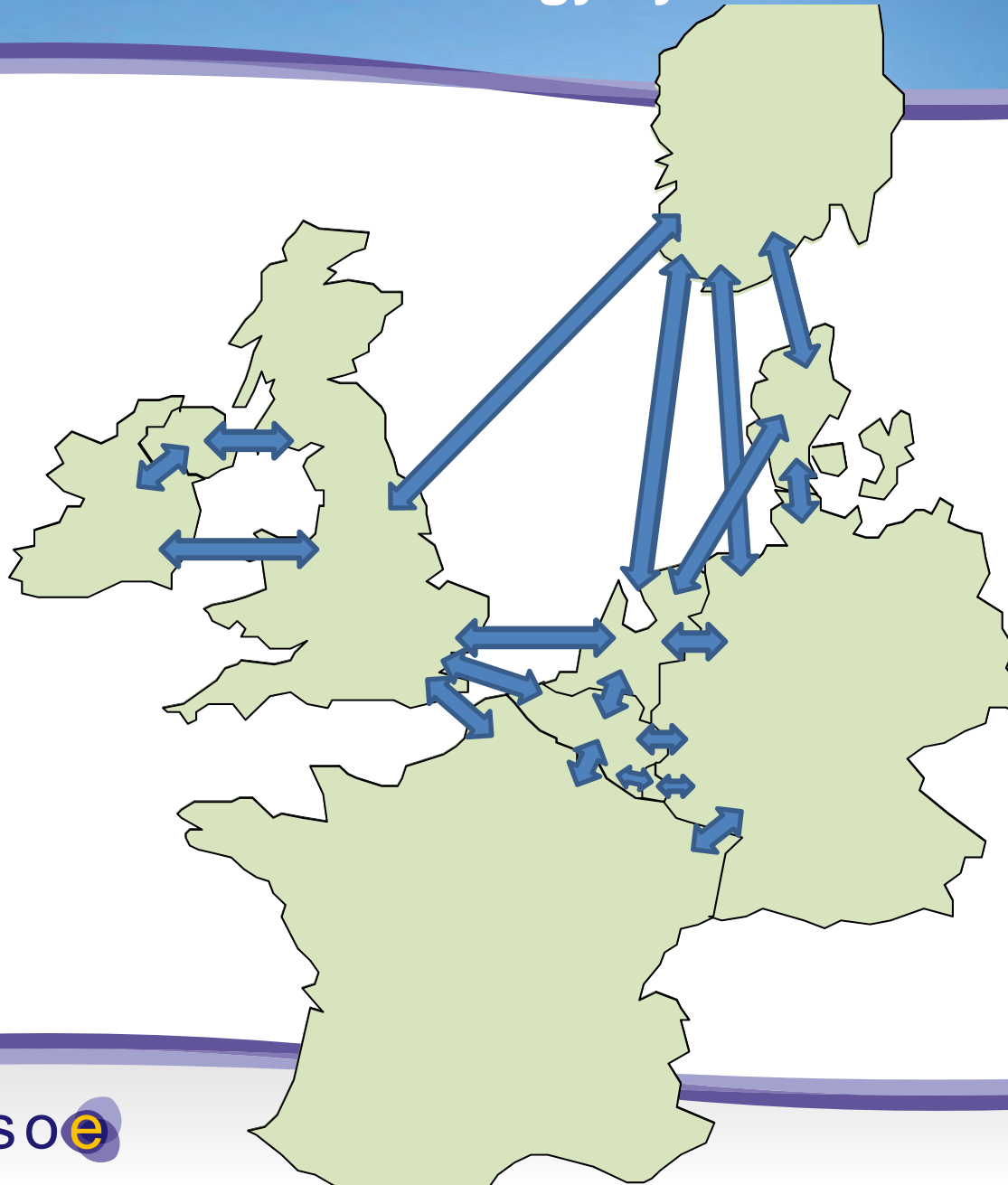
Regional installed photovoltaic capacity



Evolution nuclear phase-out in Germany



Evolution of electrical energy system



Main challenges for grid development



- Uncertainty within timing/location of generation projects
- Unaligned regulatory frameworks mainly between Member States
- Proven technology for integration of high volumes of offshore wind not yet available
- Heavy legal framework creating long lead times for permitting procedures
- High costs due to the additional effects of the permitting process (compensation cost, increased environmental requirements)
- Un-harmonised timeframe between the erection of e.g. power plants, and the necessary grid infrastructure
- Reduced social and environmental acceptance