



Reaching RES targets – critical success factors

Eurelectric annual convention and conference

Stephen Woodhouse

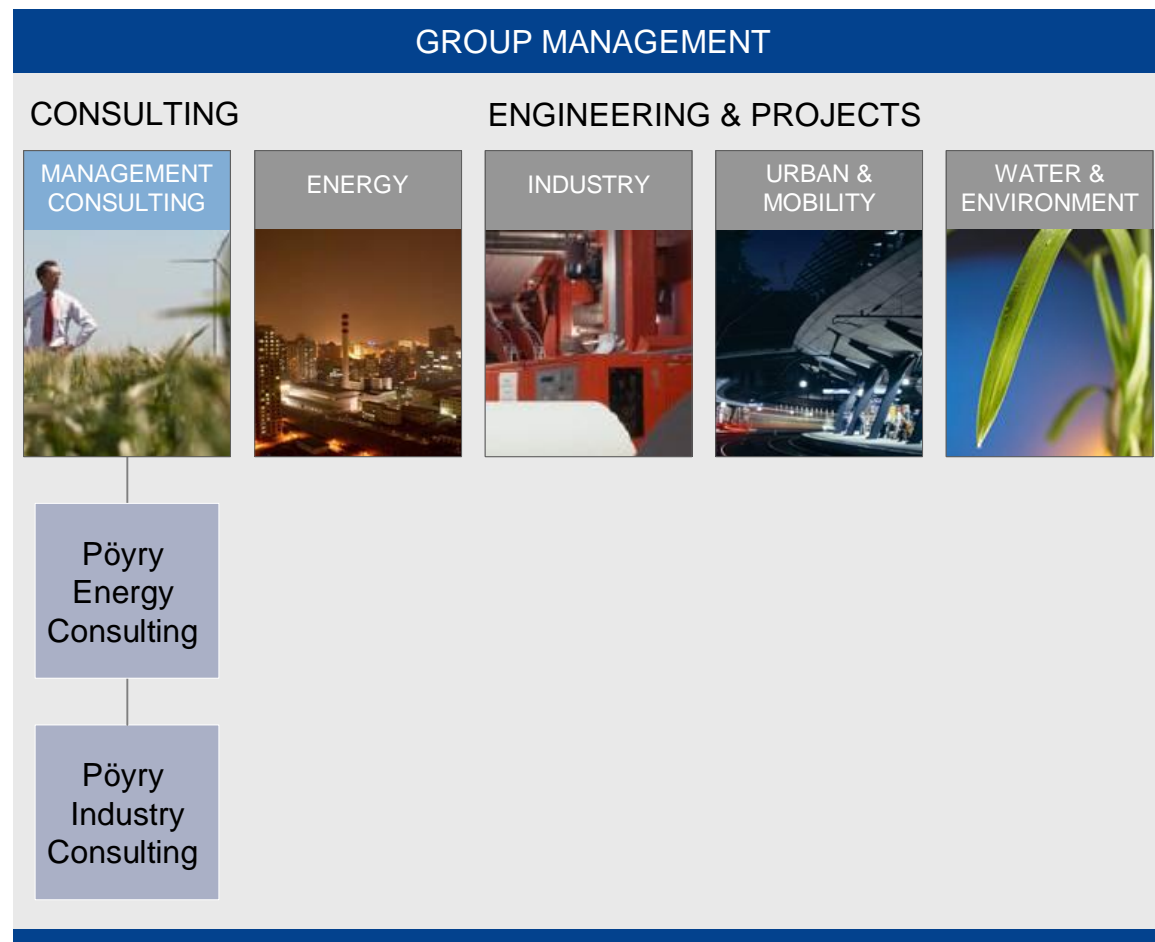
15 June 2010

Agenda

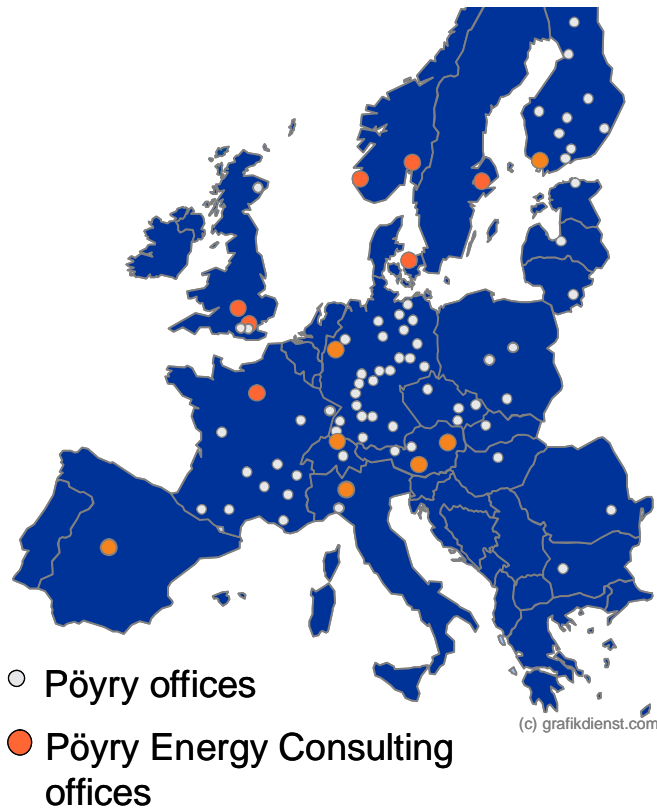
1. > About Pöyry
2. Implications of RES targets
3. Options for delivering necessary flexible capacity

Five business groups

Pöyry employs 7000 experts in 50 countries. In 2009, annual net sales were €674million. Our core operations are based on five know-how clusters.



Pöyry Energy Consulting is the leading energy consultancy in Europe



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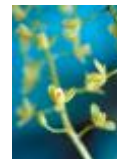
Strategy



Business Operation



Valuation &
Financing



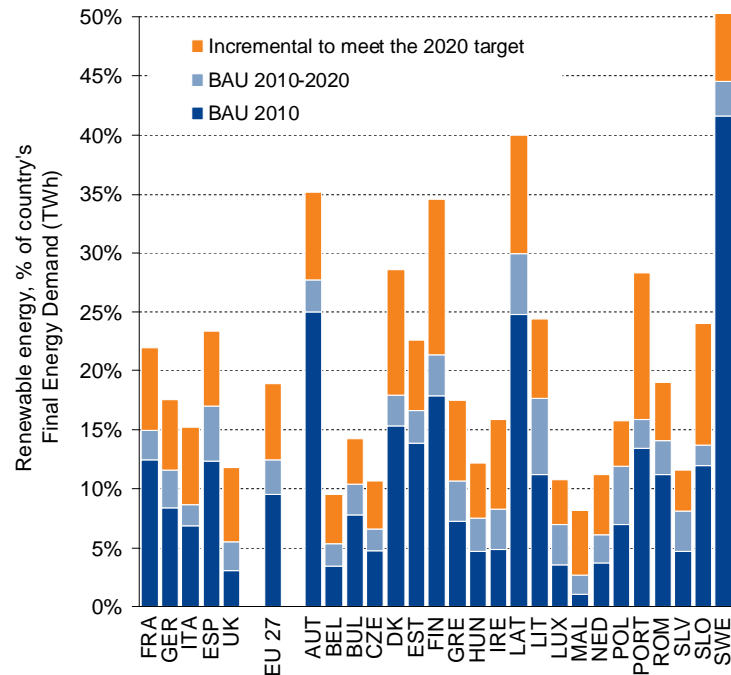
Sustainability

Agenda

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2. Implications of meeting RES targets
3. Options for delivering necessary flexible capacity

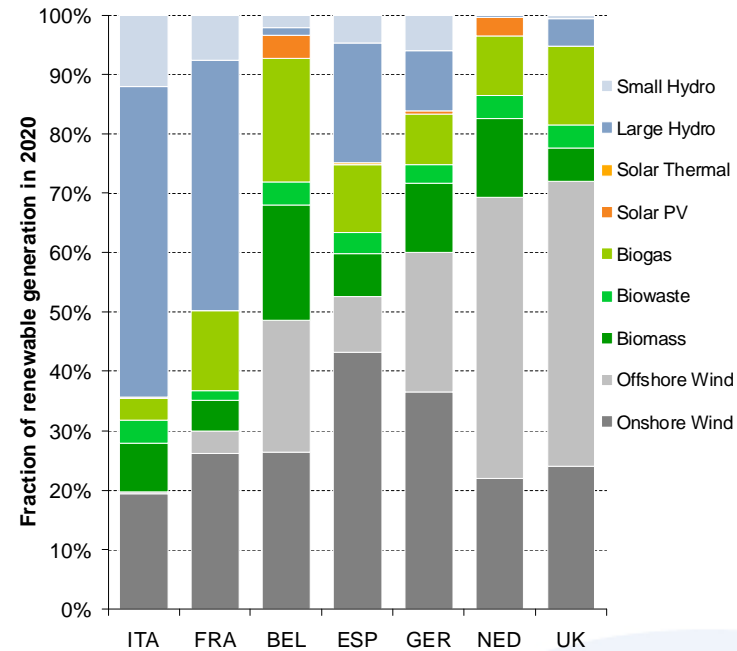
EU renewable energy targets imply a significant expansion in wind generation

Significant renewable capacity required to meet 2020 targets*



*Increment calculated assuming maximum compliance and no green certificate trading, on a least cost basis

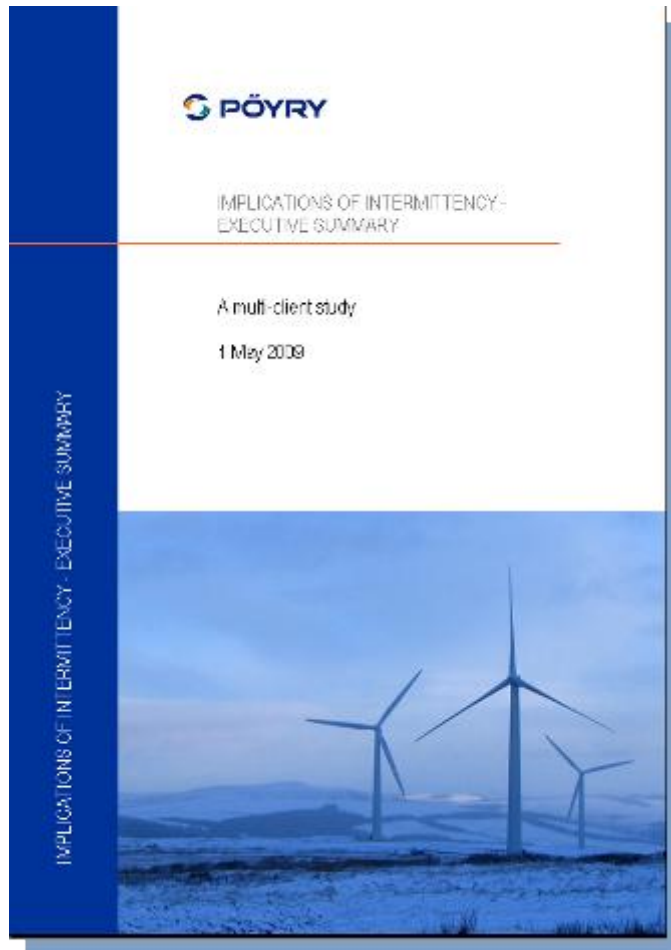
Some countries will rely heavily on wind to meet their targets**



**Calculated assuming partial compliance with domestic targets on a least cost basis

Assuming first order issues are dealt with (planning, grid access, financing...):
what will be the impact of deploying large amounts of variable wind and other inflexible low-carbon generation?

Our UK and Ireland intermittency study addressed questions in three key areas



Market and investment

- Market price levels and volatility
- Thermal operation and revenues
- New generation capacity
- Wind revenue
- Demand side response

System operation and other issues

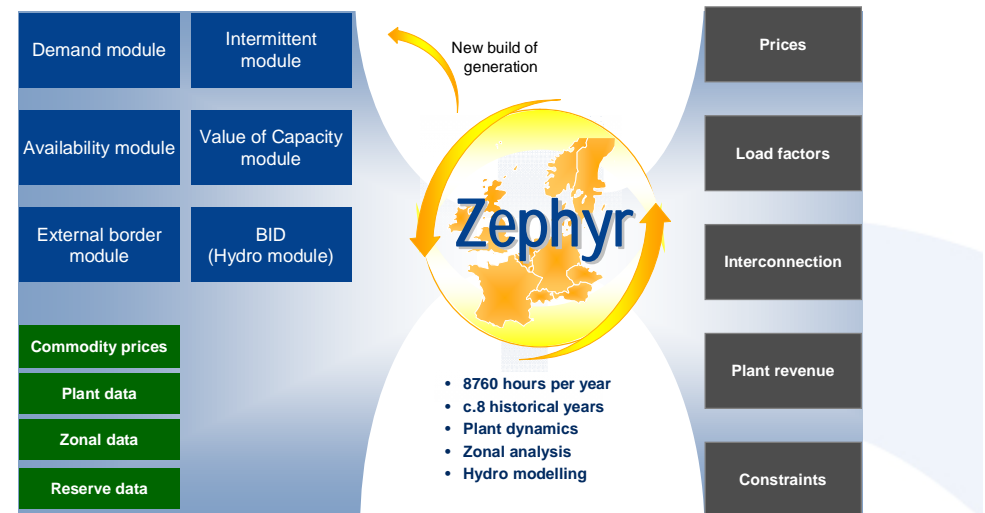
- Reserve and response provision
- Inertia constraints
- Interconnection
- Transmission network flows

Regulation and policy

- Market design
- Security of supply

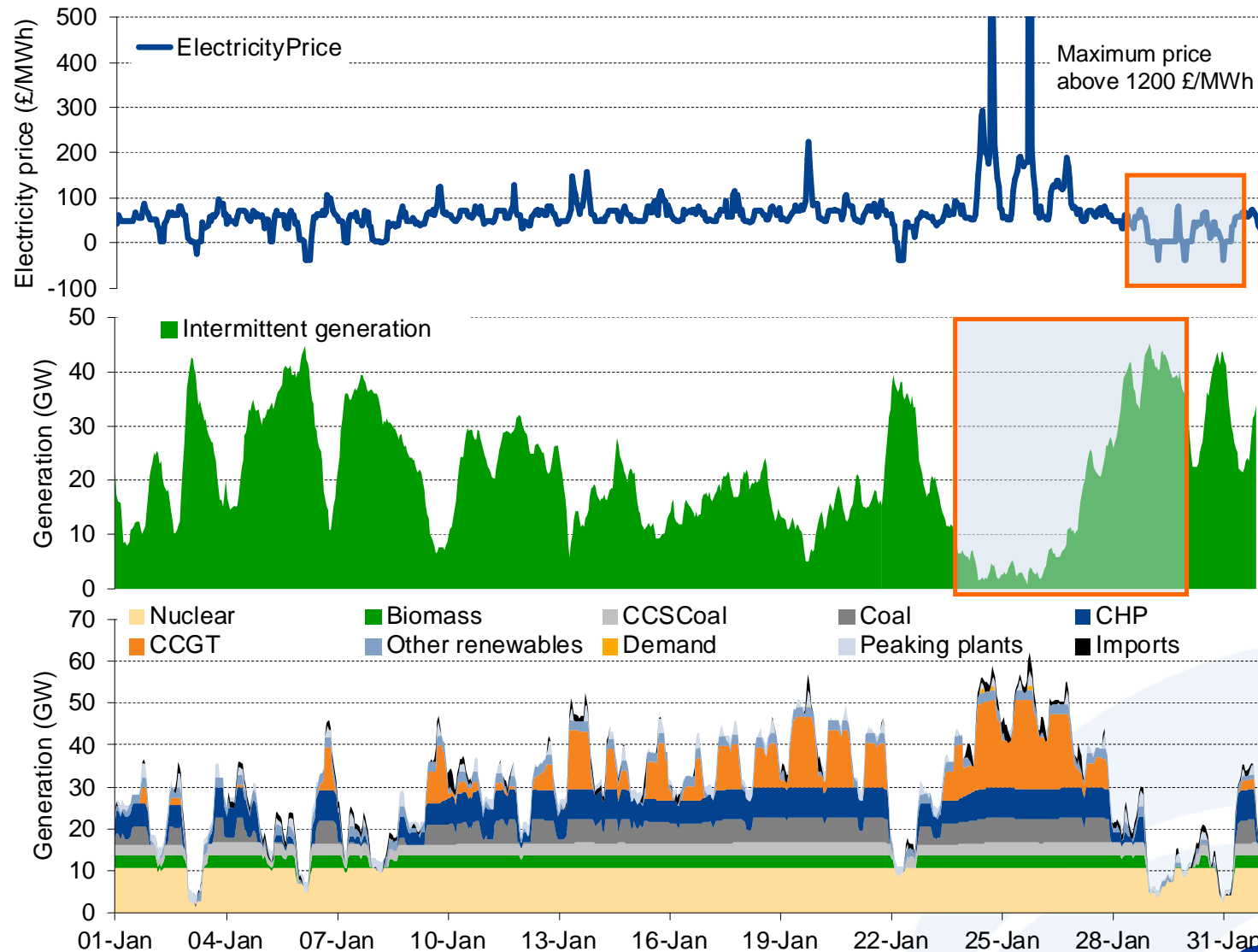
While our new NW Europe Intermittency study will take the investigation to the regional level

- A high wind world will look very different to today and it will raise fundamental questions on market and investment environment, regulation and locational issues in North-West Europe
- The Pöyry UK / Ireland Impact of Intermittency study has shown that a large amount of wind generation changes the nature of electricity systems, affecting prices, volatility, revenues and risk
- The issues associated with intermittency will impact different parts of NW Europe in different ways, due to differing generation types, regulation, and installed wind capacity
- The project will provide the fundamental insights and understanding required to manage these market challenges



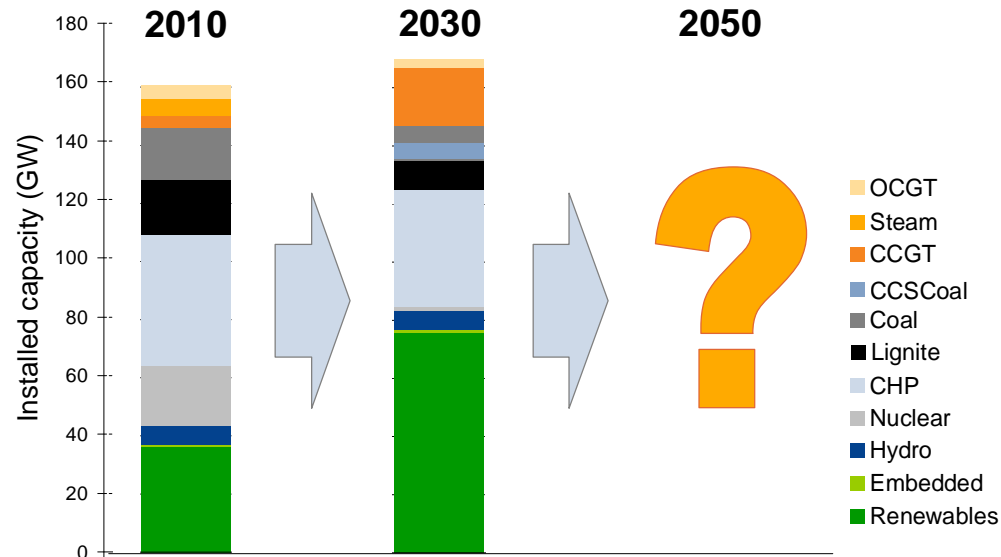
What is intermittency? GB market in 2030 (with weather of 2000)

Price and volume volatility (for thermal plant) will increase, while there will be only small reductions in average prices



The longer term is even more challenging across Europe, with flexibility continuing to reduce

Reaching a low carbon electricity system



- Closure of older, flexible, generation (particularly coal)
- Introduction of new technically and/or commercially inflexible forms of low-carbon generation (nuclear, renewables and CCS)
- Deployment of intermittent renewable technologies (wind and solar)

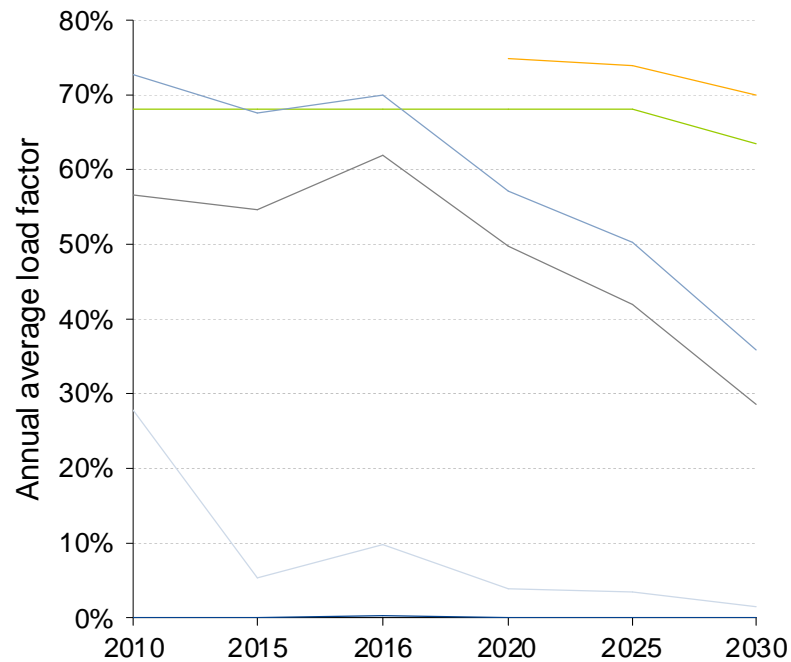
There is a requirement for reliable capacity and flexibility over all time frames – and a need to ensure that market arrangements reward these

Agenda

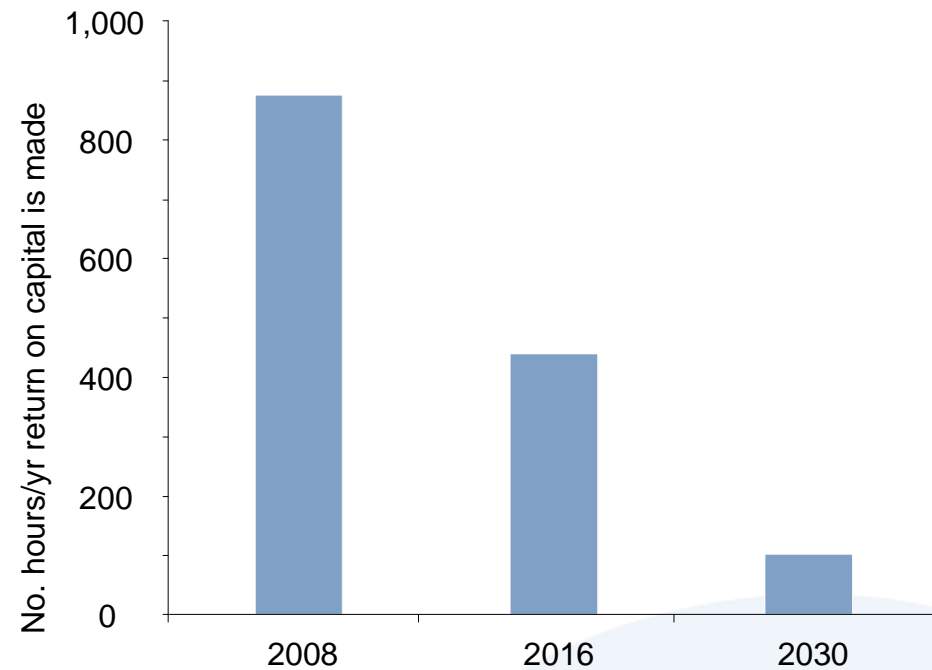
1. About Pöyry
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 - a) Flexible thermal capacity
 - b) Interconnection
 - c) Smart Grids

Returns on capital for thermal generation will be squeezed into a few hours a year

Load factors in GB



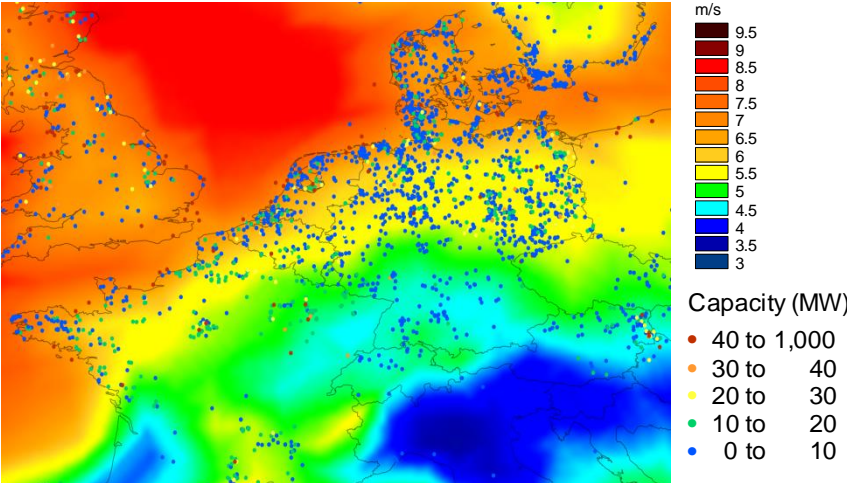
Hours of significant fixed cost recovery



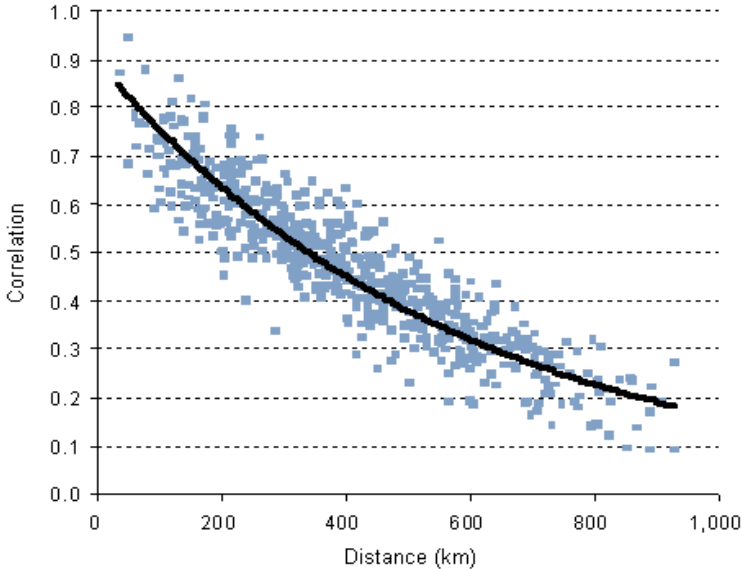
Energy only markets do not pay appropriate value to peaking plants

Allowing power flows to travel over large distances could mitigate the impacts of intermittency

Current wind capacity and average wind speeds in Europe



Wind correlation GB/Ireland data



But at what cost...and to whom?

Interconnectors can reduce overall costs, BUT:

Costs and benefits are not evenly distributed

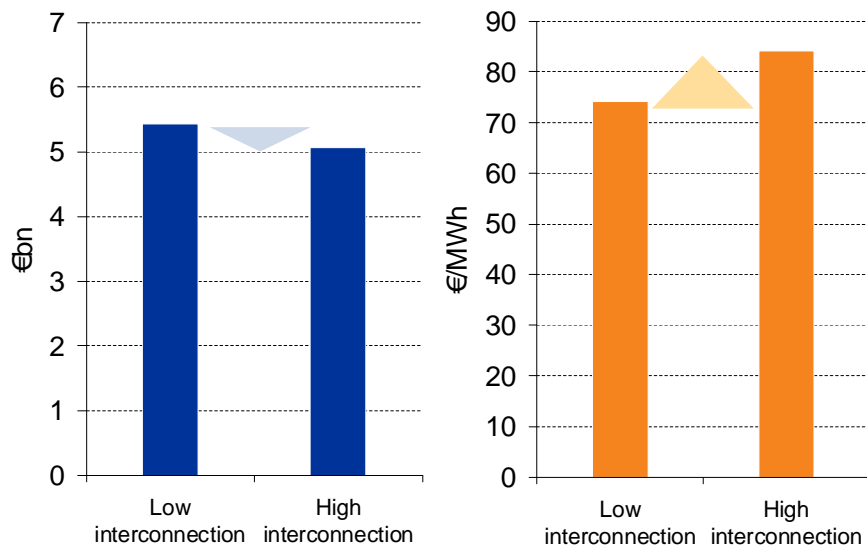
- Interconnectors can import price spikes
- They can increase costs to end users

Commercial case may not be attractive

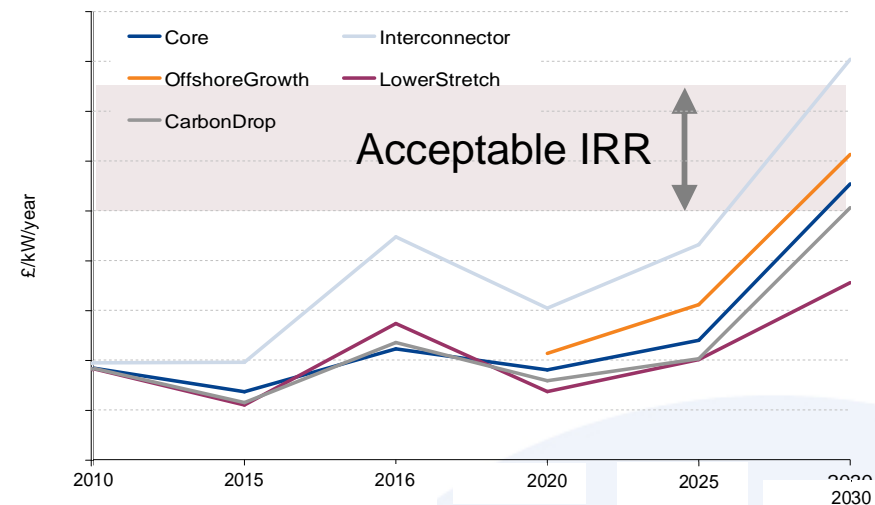
- Revenue for IC may be insufficient

Lower total generation costs

But higher end-user prices



Source: Pöyry analysis for 2035

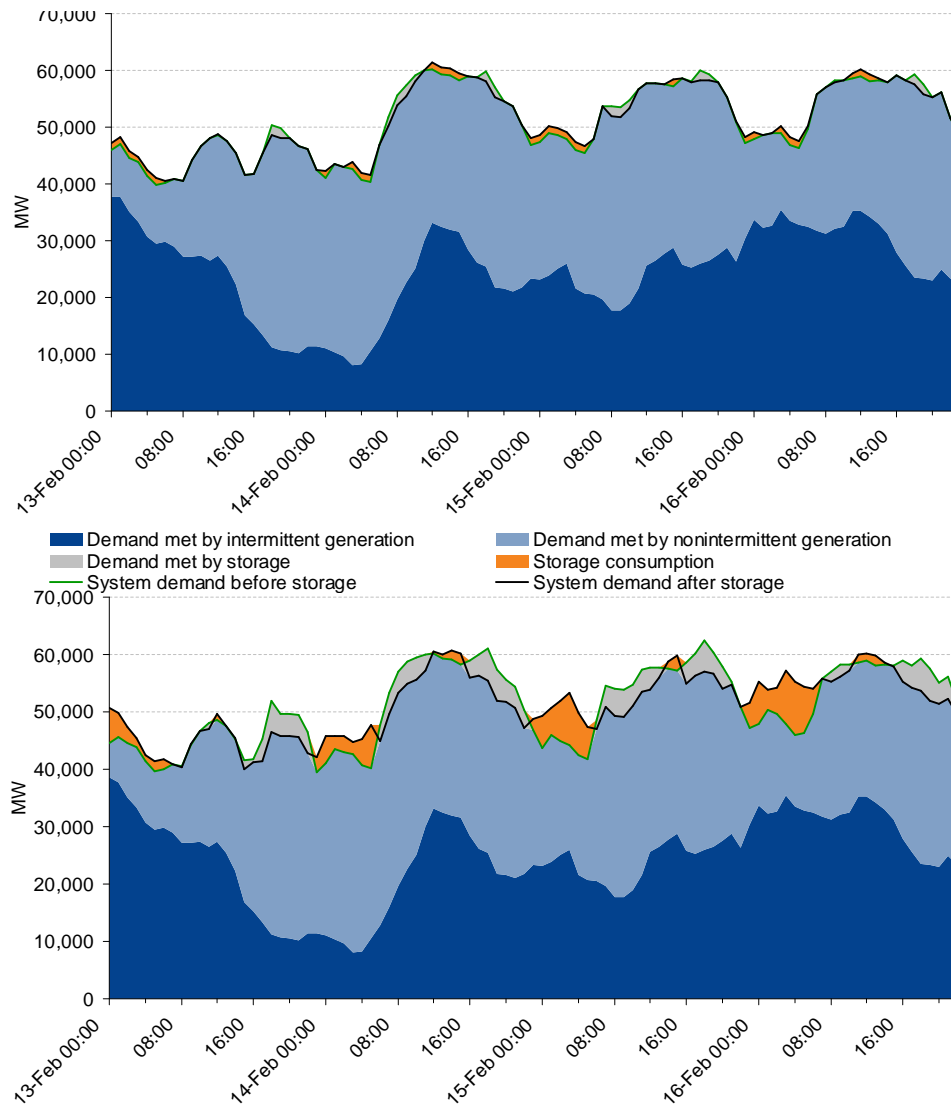


Source: Pöyry analysis for 2030

The benefits of interconnection (lower prices) may not go to the country that pays for the interconnector.

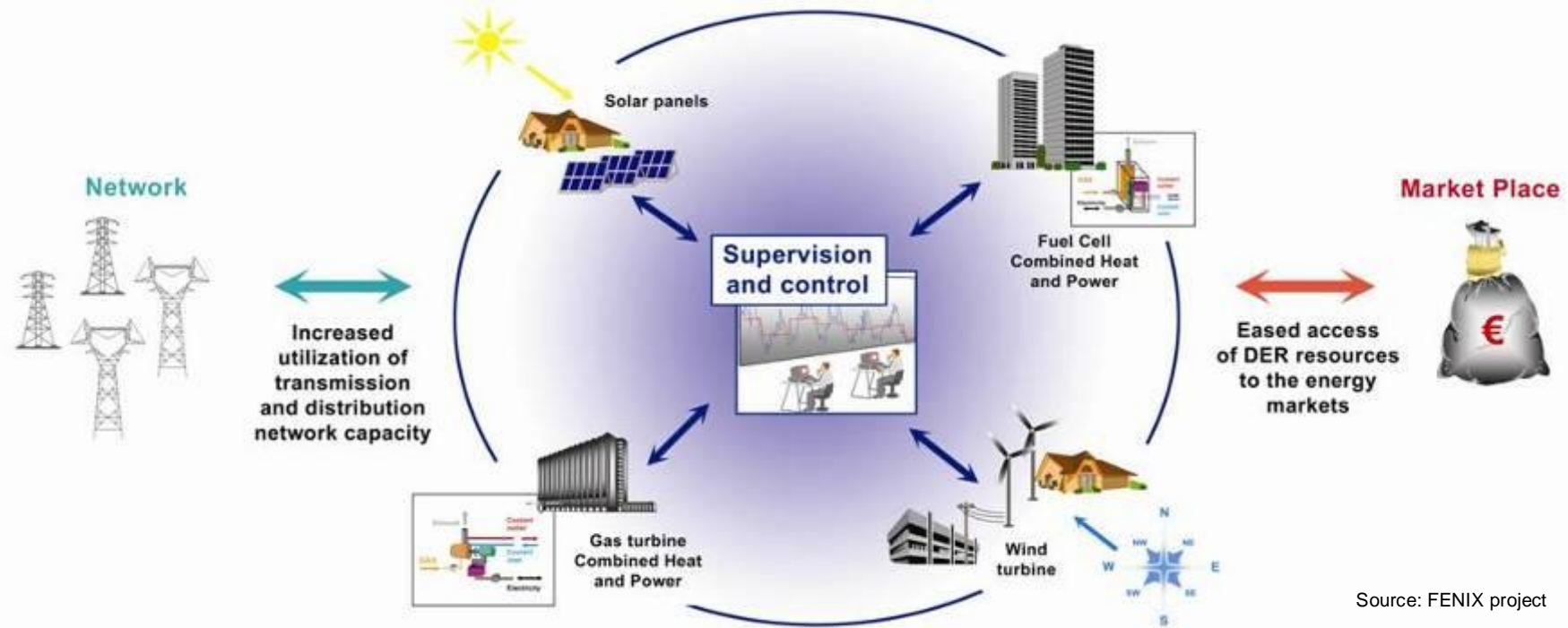
This needs to be taken into account at the inter-market level

Demand response can have a significant impact on the market



- Sensitivity on GB as part of intermittency study
- 10GW, 50GWh of price-responsive storage by 2030
- Prices are 5% lower
 - Price volatility is significantly reduced
- Annual system cost savings of over £100m
- 50% reduction in thermal plant starts
- Several GW investment avoided in new plants

But smart grids are at a very early stage of development



The successful smart grid will require a high degree of cooperation between market players, network companies and consumers. There are significant consumer acceptance issues

Conclusions

- Flexibility (in all forms) will be required to deal with a low carbon world with significant deployment of variable low carbon generation to ensure a robust generation system

- In order to succeed, policy, regulation and market design must:
 - Support the implementation of all forms of flexibility – there are no silver bullets
 - Recognise the importance of both national interest and trans-national issues e.g. investment in interconnection

- Public acceptance is the most important issue of all, underpinning
 - Planning
 - Grid build (and planning permission)
 - Support scheme
 - Smart grids

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