

The impact of a single European energy market on the economics and operation of wind power in Scotland

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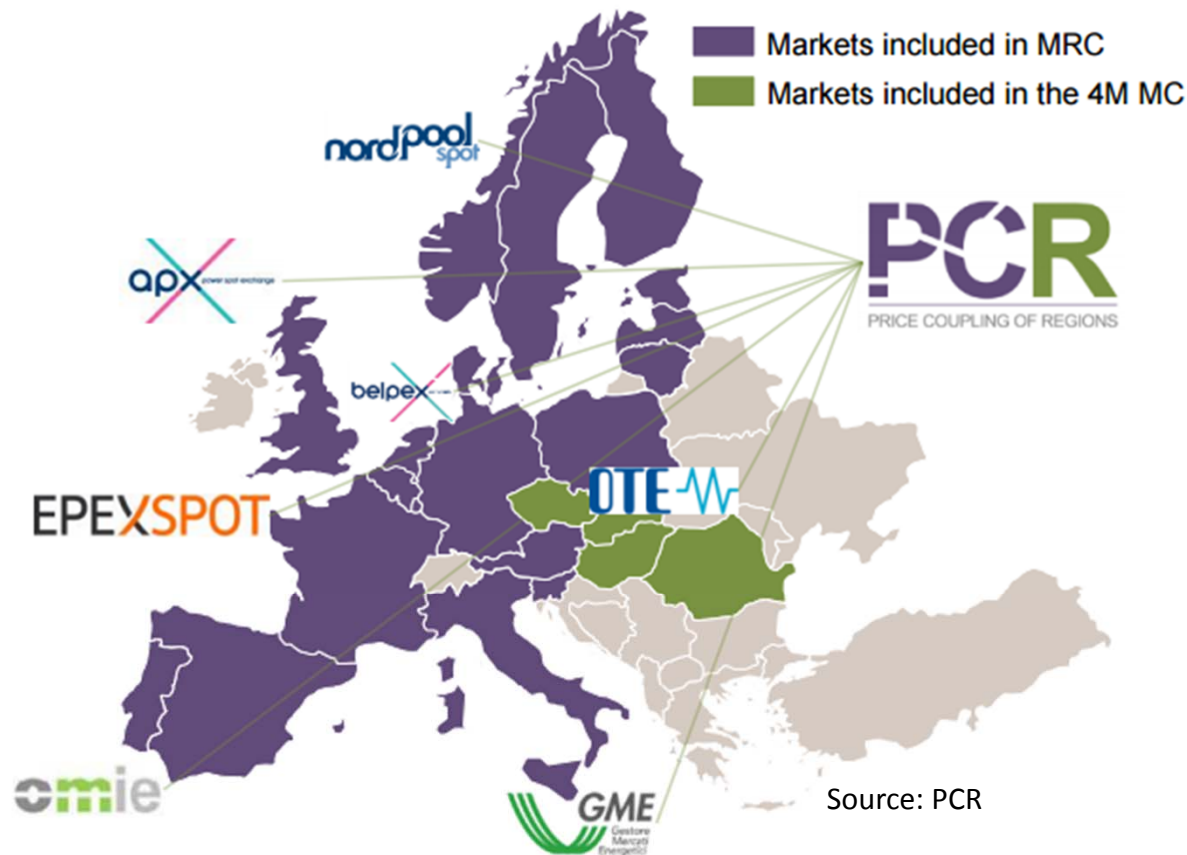


Content

- Project Context
 - Single European Energy Market
 - Electricity Market Reform
- Modelling
 - Introduction to SEDM
 - Example Outputs
 - Work Completed
- Future Plans

Project Context

- Single European Energy Market



Project Context

- Single European Energy Market

“Capacity Allocation and Congestion Management” (CACM) sets out the IEM design based on four key elements:

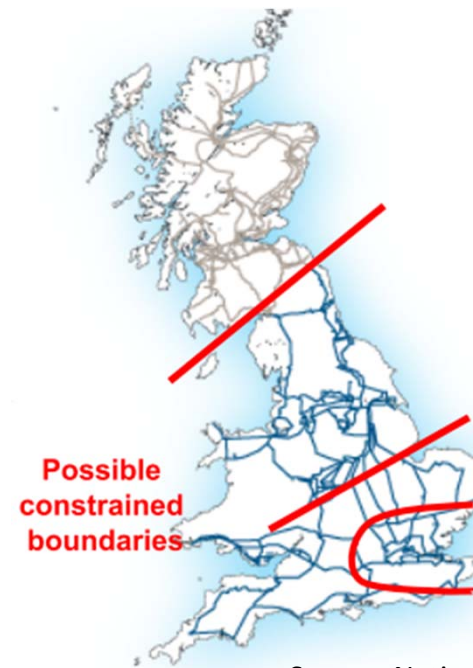
- A day ahead market in which electricity and transmission capacity are auctioned together
- Intraday markets
- A coordinated flow-based capacity calculation
- Designating bidding zones for congestion management

ENTSO-E define a bidding zone as:

“the largest geographical area within which market participants are able to exchange energy without capacity allocation”

Project Context

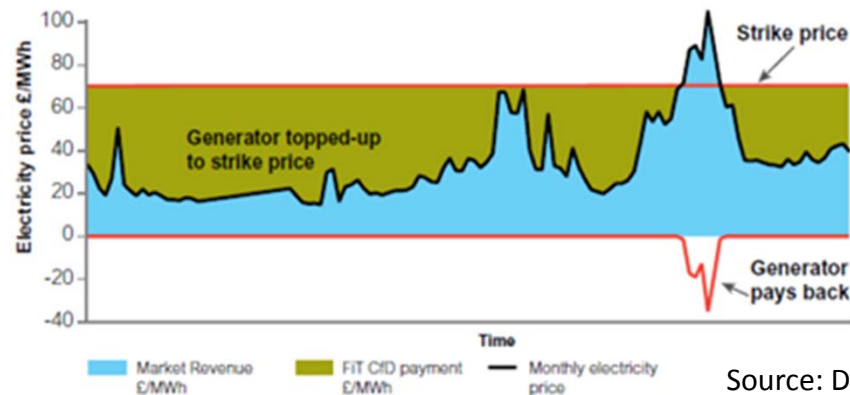
- Single European Energy Market price zones



Source: National Grid

Electricity Market Reform

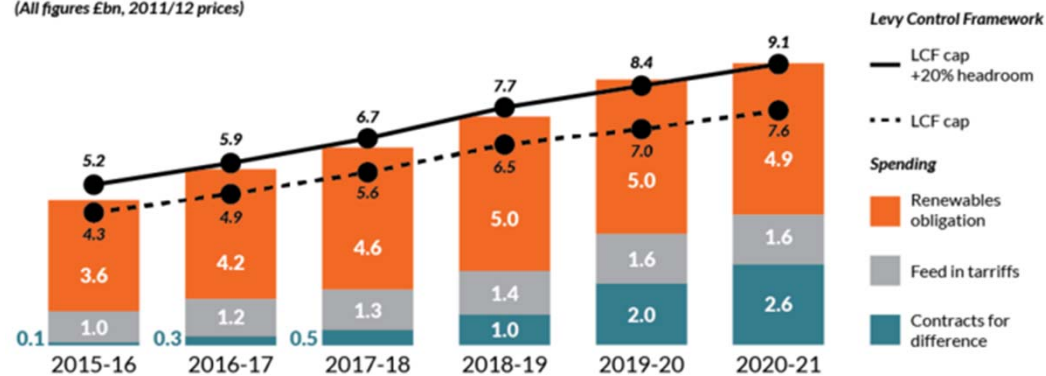
- Feed-in Tariff with Contracts for Difference (CfDs)



Source: DECC

- Limited by Levy Control Framework (LCF)

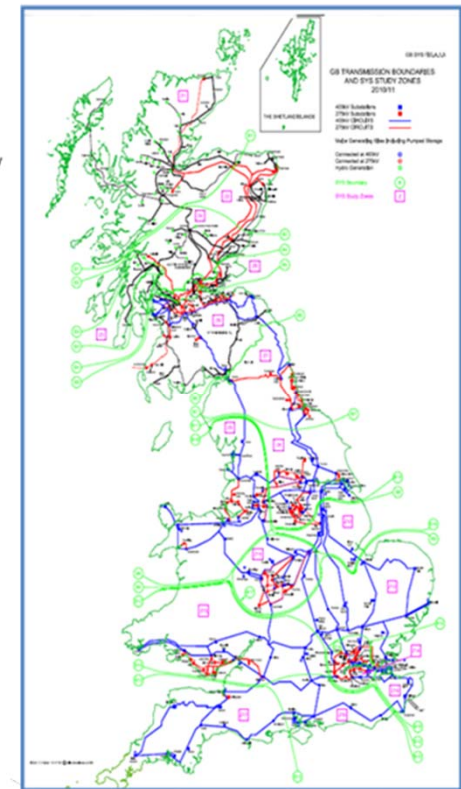
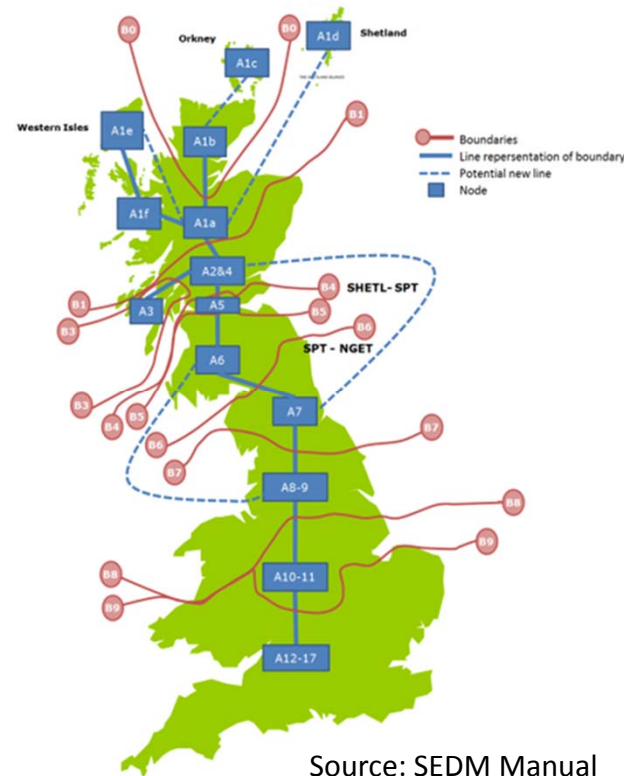
(All figures Ebn, 2011/12 prices)



Source: OBR, Policy Exchange analysis

SEDM and Basecase

- SEDM – Introduction to Model
- Investment model
 - Minimises NPV of system costs
 - Constraints include NTC, min gen, max CO₂
- Short term system operation model
 - Unit commitment

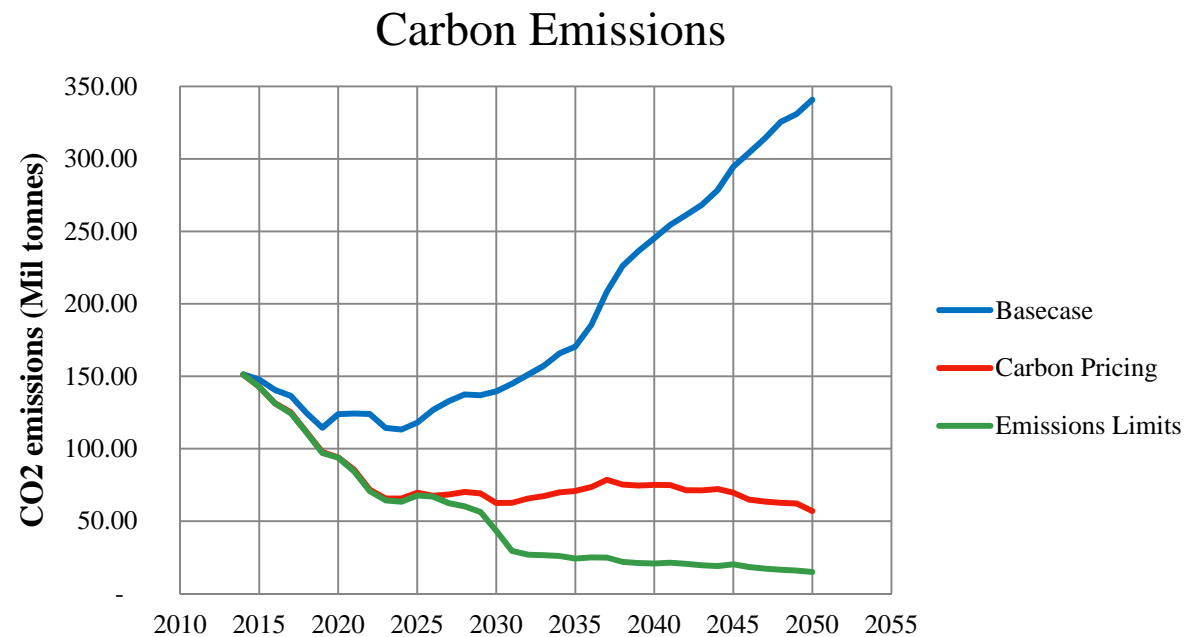


SEDM and Basecase

- SEDM – Work Completed
 - Model Basecase
 - Updates of model inputs
 - Representation of solar
 - Validation
 - Comparison of basecase results with NG FES

SEDM and Basecase

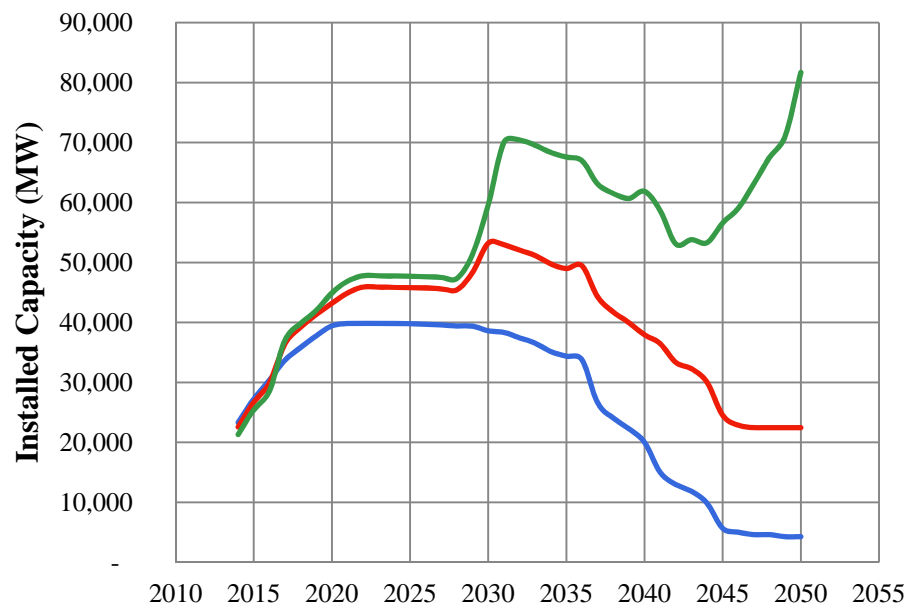
- SEDM – Example Outputs



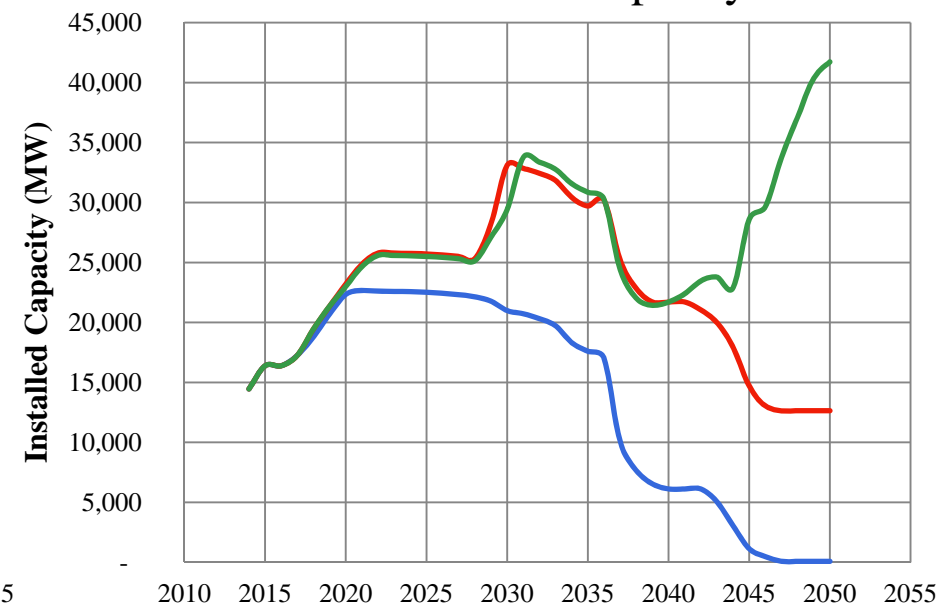
SEDM and Basecase

- SEDM – Example Outputs

Renewable Installed Capacity



Wind Installed Capacity



Basecase

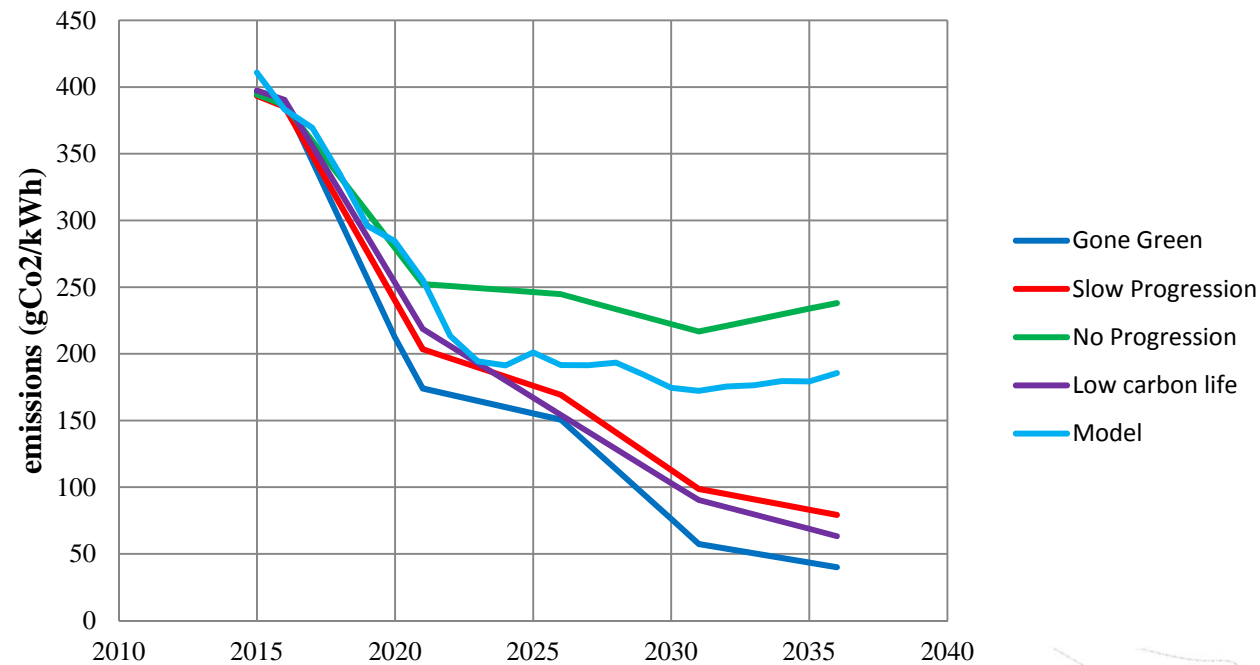
Carbon Pricing

Emissions Limits

SEDM and Basecase

- SEDM – Validation

Carbon Emissions



Future Work

- Zonal pricing simulations
 - investigate the impacts of having two price zones on investment in generation, CfD payments and carbon emissions
 - investigate the further impact of using a zonal reference price for CfD top-up payments
- Sensitivity Analyses
 - Investigate the sensitivity of these results to the Levy Control Framework
 - investigate the sensitivity of these results to additional interconnection, e.g. GB-Norway link

Questions



futurewind

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