Market design to facilitate investment

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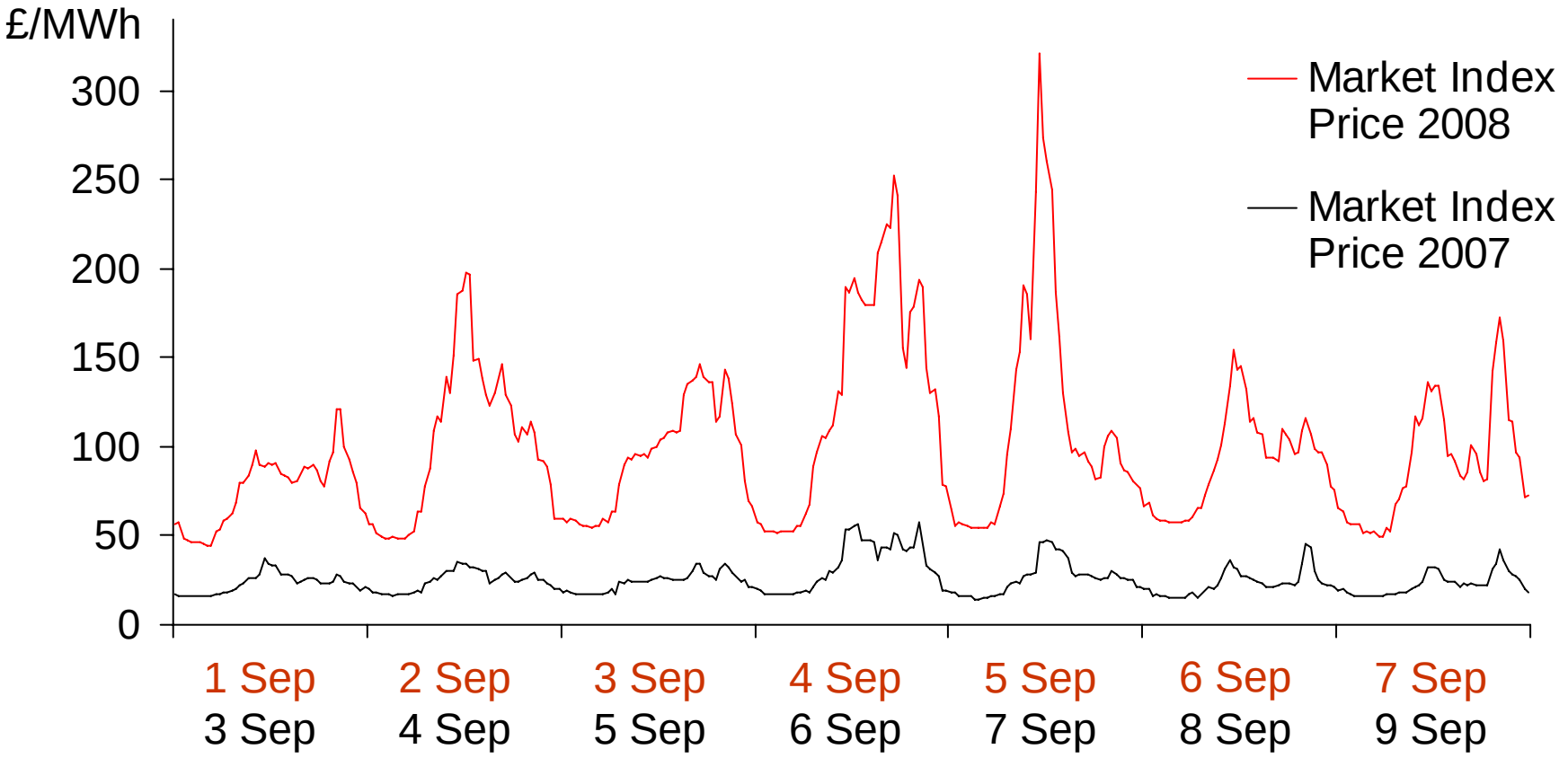
Or…

What's a nice power station like you…

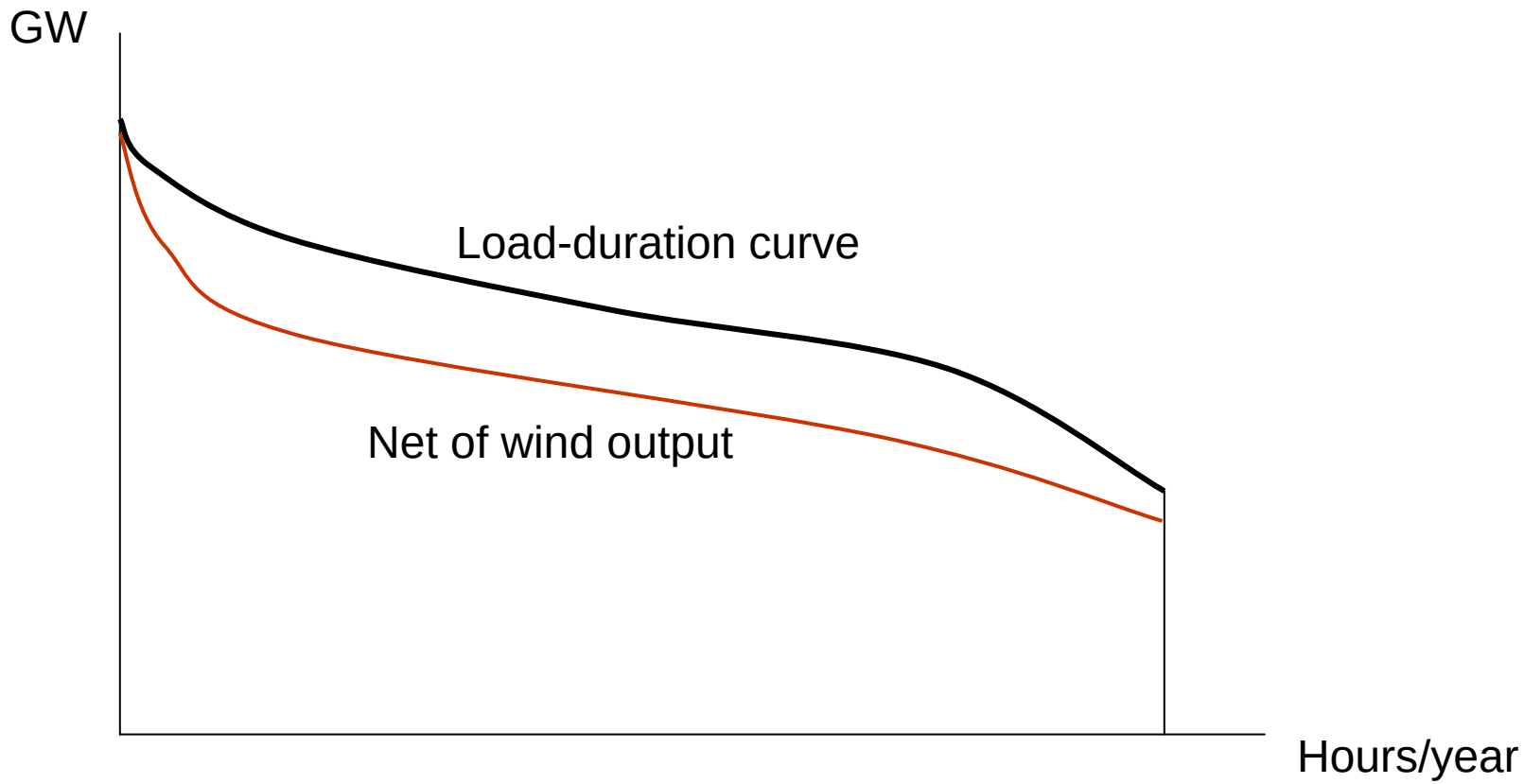
…doing in a market like this?



How we pay for plant

- Prices close to variable cost at most times
  - Infra-marginal plant make a surplus
    - Contribution towards fixed costs
- Prices must exceed variable cost to recoup fixed cost
- Most likely to happen at peak times

Wind and the thermal load



What *really* happens at Wokingham?

- In the “standard market design”, system controllers *ought* to pay high peak prices
- In reality, in the United States, they don’t
  - Out of market purchases
  - Shading reserve volumes
  - Reducing voltage
  - Bid caps (only) sometimes bind

The Missing Money Problem

- If peak energy prices won't cover the fixed costs of peaking plant, what do you do?
  - Accept market power?
  - Make money off-peak?
  - Run a portfolio?
  - Organise extra payments for capacity?

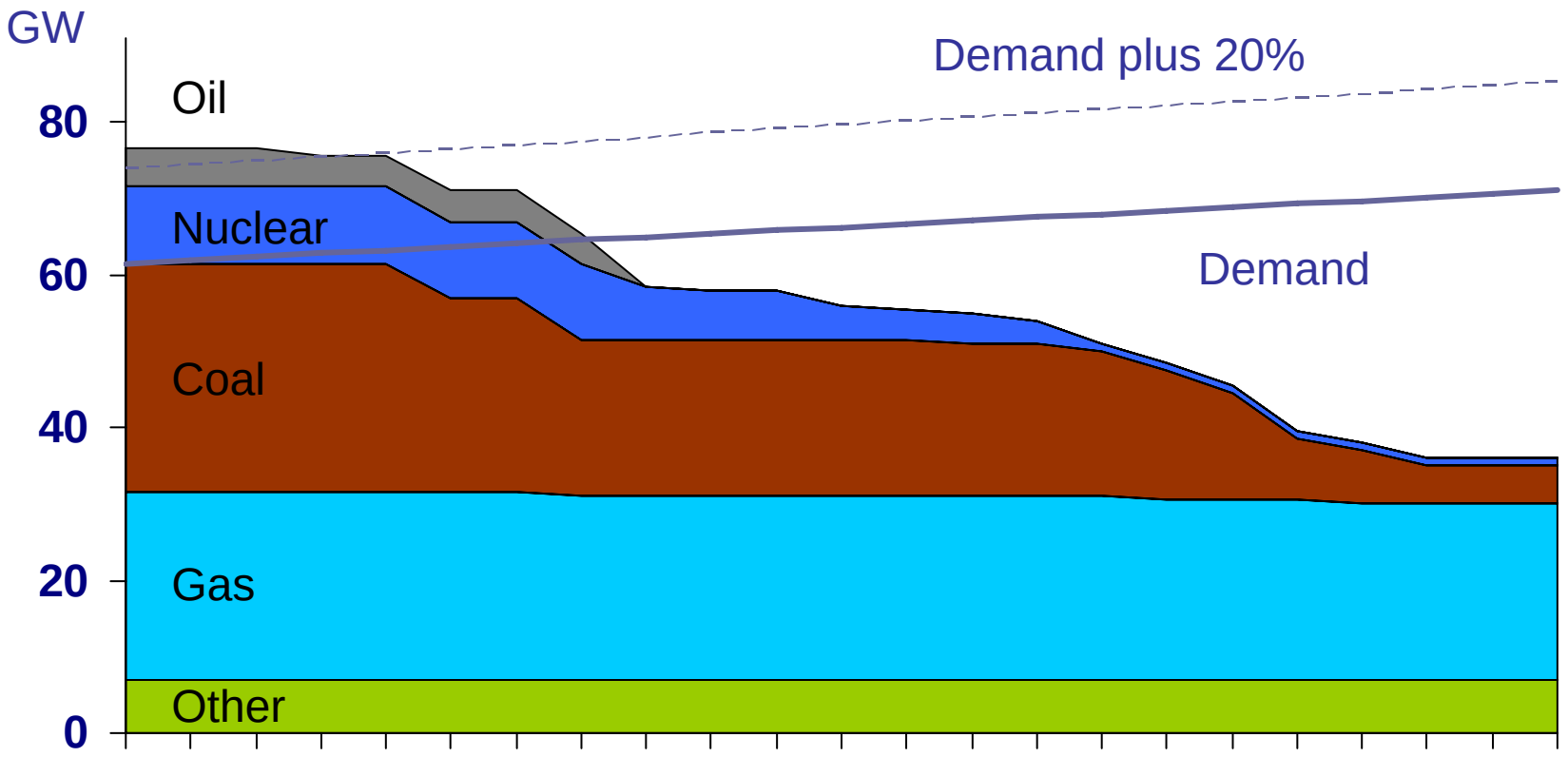
Reserve market arbitrage

- “But system operators pay separately for reserve…”
- Assume reserve contracts are organised before the energy market opens
  - What will happen to the supply of reserves if that market pays more than selling energy?
  - How will the reserve contracts affect energy prices bid by those who don’t hold them?

The LICAP Market

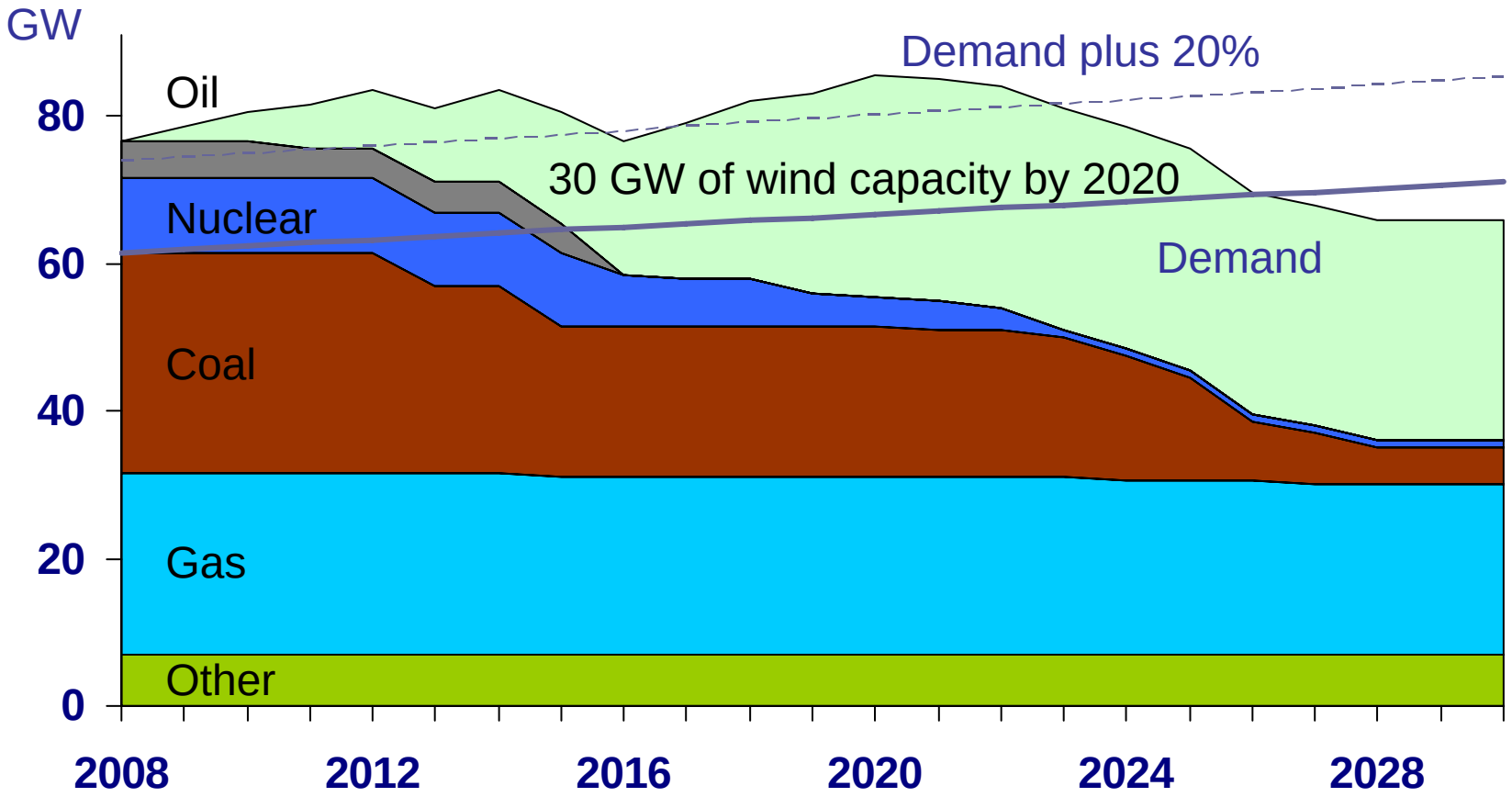
- Runs three years ahead
- Demand curves respond to price
  - Passes through [predicted demand + 15%, expected net cost of new entry]
  - Payments (& demand curve) subtract energy market rents (actual (NE) or expected (PJM))
  - Market-based penalty if not available

Plant closures

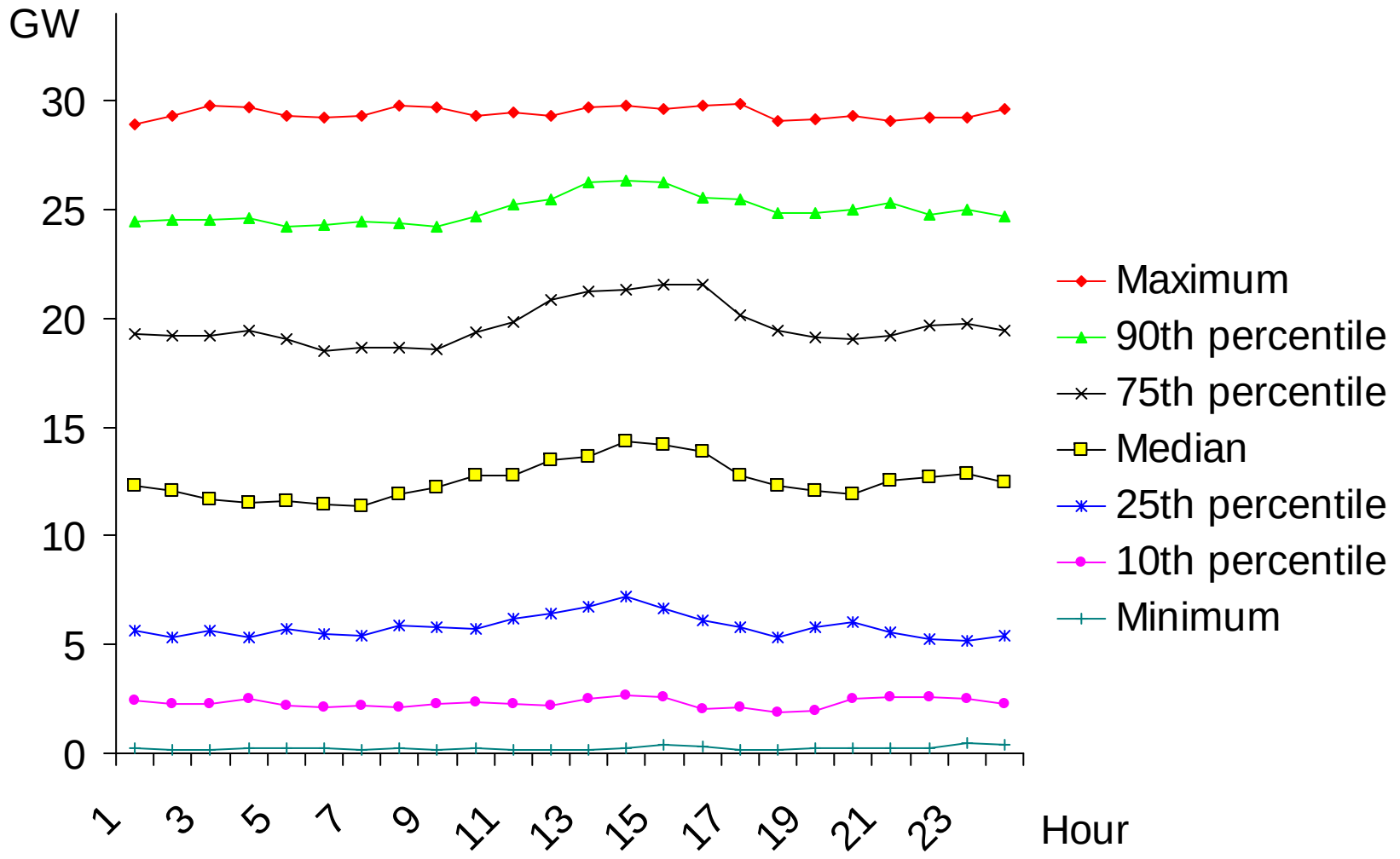


Source: E.ON

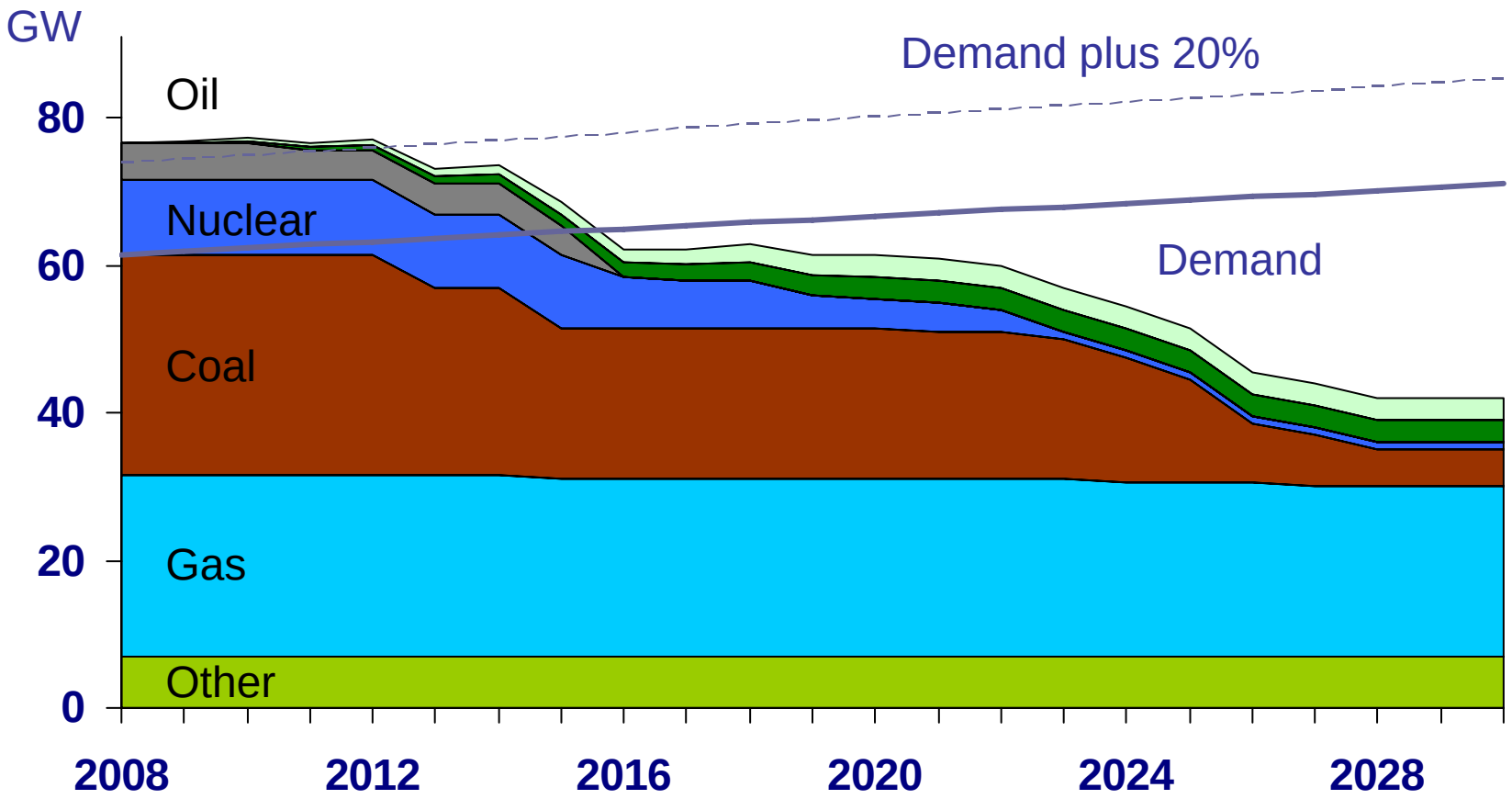
The growth of wind capacity



Wind output variation - January



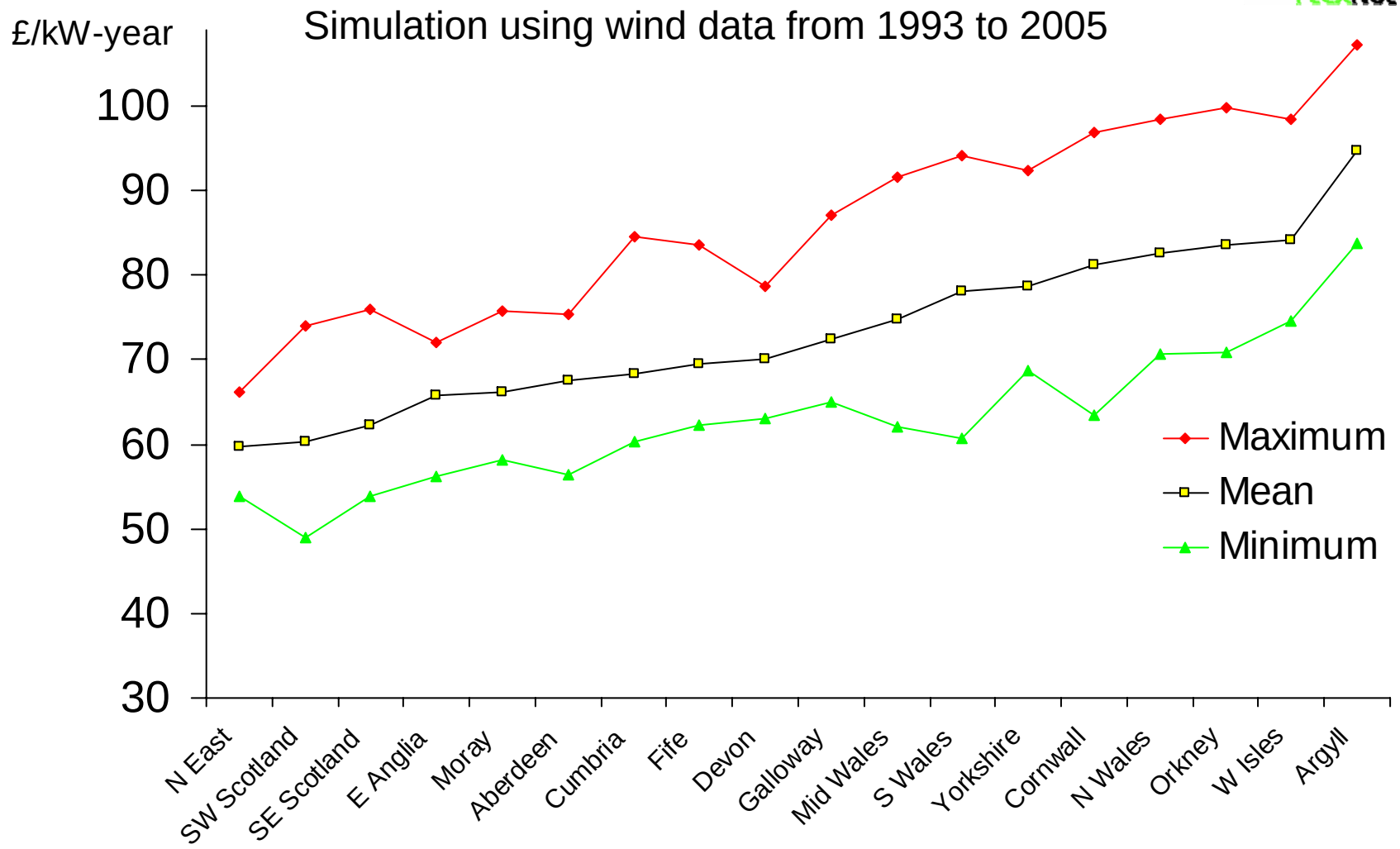
The wind capacity credit



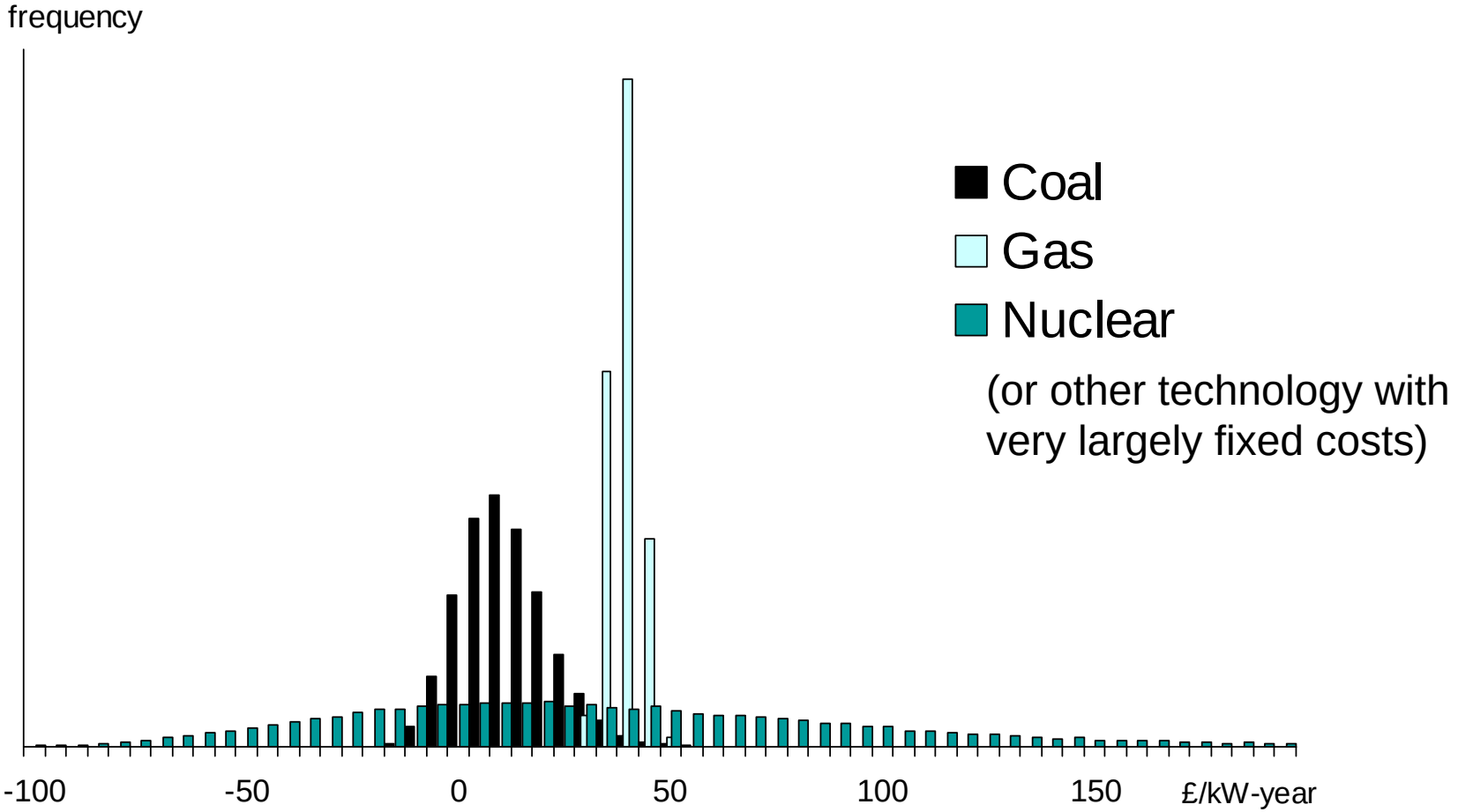
Wind in capacity markets

- Capacity market smoothes revenues for generators with high availability
- Impose a market-based penalty for unavailable generators?
- For a wind generator to sell more than a little capacity in the market may be risky!

Revenue variability from year to year



Profit variability due to fuel price uncertainty



Wind in the market

- A reasonable place for large players?
- Do we want smaller schemes to have a chance?
  - Feed-in tariffs are *much* better for small firms
- Market-based schemes may raise the cost of capital but encourage cost-reduction

Innovation policy

- Specific support may be needed for research, development and demonstrators
- Learning-by-doing cuts costs
  - Deployment support can fall over time
- Deployment support should include the following wholesale market rule changes…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