

# The Long-term Impact of Wind Power on Electricity Prices and Generating Capacity

## BACKGROUND

- Over the coming decade, many countries are likely to experience a significant increase in the amount of wind generation.
- The European Union is committed to obtaining 20% of its energy from renewable resources by 2020. This may involve nearly seven times the current level of wind generation.
- The UK's target for renewable energy is 15% of all kinds of energy consumption. Meeting the target could well require the addition of wind capacity.
- Output from wind generation is volatile since production is limited by the wind. Once wind power forms a significant part of an electricity market, this will feed through to short-run price volatility: when wind generation is high, prices will tend to be lower than normal, and when the wind is low, prices will tend to be higher.

## METHODOLOGY

- The authors use a market equilibrium model to calculate how the mix of generating capacity would change if large amounts of intermittent renewable are built in Great Britain.
- The implications of the model for operating patterns and the distribution of prices over time are derived.

## KEY FINDINGS

- If generators bid their marginal costs, changes to the capacity mix are much greater than changes to the pattern of prices.
- Thermal capacity falls only slightly in response to the extra wind capacity, and there is a shift towards power stations with higher variable costs but lower fixed costs.
- Changes to the pattern of prices, once capacity has adjusted, are relatively small.
- In an oligopolistic setting, strategic operators will choose lower levels of capacity.
- If wind output does not receive the market price, then mark-ups on thermal generation will be lower in a system with large amounts of wind power.

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CCP Executive Summary

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The ESRC Centre for Competition Policy (CCP), at the University of East Anglia, undertakes competition policy research, incorporating economic, legal, management and political science perspectives, that has real-world policy relevance without compromising academic rigour.

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