The carbon price thaw
Post-freeze future of the GB carbon price
Report for non-subscribers
1. **Historical context:** Introduction of the CPS was the main driver behind the phase out of coal generation since 2012

2. **Future scenarios:** The carbon price will be determined by UK policy goals and the UK’s participation in the EU ETS

3. **Market impacts to 2025:** Maintaining the carbon price at the current level risks a revival of coal generation in the early 2020s

4. **Market impacts post 2025:** Carbon prices will affect the buildout of low-carbon technologies, counter-acting the impact on wholesale prices

5. **System impacts:** The differences between carbon scenarios expose the scale of the trade-offs faced by the Government
Announcement on the future of the CPS is expected in the upcoming Autumn Budget

**EU-ETS Price Drop**
- Financial crisis and economic downturn led to oversupply of EU ETS allowances
- EUA price fell from €20-30/tonne in 2008 to €10-15 in 2009

**Budget 2013**
- Introduction of CPS at a rate of £16/tonne
- Given the fall in the EU-ETS price, the UK carbon price was around 5 times higher than in rest of EU

**Budget 2014**
- CPS frozen at 2015/16 level of £18/tonne
- Rationale to limit rise in wholesale and retail prices

**Spring Budget 2017**
- Revealed plans to reform the current CPS regime
- Plan to target a “total carbon price” was mentioned

**Carbon Price Floor Consultation**
- Mooted in Coalition Agreement
- Objective “to support and provide certainty for low carbon investment”
- Carbon price trajectory to £30/tonne in 2020, £70/tonne in 2030

**Autumn Statement 2016**
- Industry expected announcement on long term trajectory for CPS
- But none was provided, except for extending current price freeze until 2020/21

**Autumn Budget 2017**
- Announcement expected about the future of the CPS
- Uncertainty remains about UK’s participation in the EU ETS

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1. The government confirmed it was maintaining the cap on CPS rates at £18t/CO2, updating this with inflation in 2020-21.
CPS was the key driver behind the rapid decline of coal generation since 2013

**Historical context**

Coal generation under different scenarios, TWh

- **April 2013:** Introduction Carbon Price Support
- **10 May 2016:** First hour without coal generation
- **21 April 2017:** First day without coal generation
- **July 2017:** Record low monthly contribution of 2%

**Coal share of total generation,**
% total generation, monthly figures


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Source: Aurora Energy Research
Four main scenarios seem plausible and primarily depend on GB policy goals

<table>
<thead>
<tr>
<th>Scenario</th>
<th>CPS</th>
<th>EU-ETS</th>
<th>Total CO₂ price Trajectory</th>
<th>Description and rationale</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong> Status Quo</td>
<td>Current</td>
<td>Base</td>
<td><img src="attachment" alt="Graph" /></td>
<td>• CPS top up remains constant post 2020/21  • Support coal phase-out and low carbon investment</td>
<td>High</td>
</tr>
<tr>
<td><strong>2</strong> Catch-up</td>
<td>Phase-out</td>
<td>Base</td>
<td><img src="attachment" alt="Graph" /></td>
<td>• Total UK carbon price remains flat with EU-ETS rising until convergence  • Ensure competitiveness with EU</td>
<td>High</td>
</tr>
<tr>
<td><strong>3</strong> Low</td>
<td>Removal</td>
<td>Low</td>
<td><img src="attachment" alt="Graph" /></td>
<td>• CPS is removed post 2020/21 and EU-ETS never recovers  • Lower electricity bills</td>
<td>Low</td>
</tr>
<tr>
<td><strong>4</strong> High</td>
<td>High</td>
<td>Base</td>
<td><img src="attachment" alt="Graph" /></td>
<td>• Government policy appraisal CO₂ price  • Meet 4th and 5th carbon budgets</td>
<td>Low</td>
</tr>
</tbody>
</table>

Source: Aurora Energy Research
Market impacts to 2025

Changing fuel price dynamics mean a revival of coal is likely in the early 2020s in all but the High scenario

Avg. coal share of total generation 2021-25, %

- Two factors are likely to improve coal's competitiveness post 2020
  - First, the LNG glut is likely to clear in the early 2020s, inducing higher gas prices.
  - Second, with the removal of China’s production restrictions, coal price is likely to fall

- Coal generation is limited by the level of capacity still in the market in early 2020s, as well as IED running hour constraint of 1,500hrs for all plant except Drax and Ratcliffe

- Only the High scenario leads to significantly lower coal generation. Even then, regulation may still be required to complete the coal phase out

Max possible generation based on IED

Status Quo | Catch-up | Low | High
--- | --- | --- | ---

Source: Aurora Energy Research
Given central commodity forecasts, the economic phase-out of coal would require CO₂ prices to rise above £40/tCO₂ by 2025.

Given our central commodity price assumptions, we would expect a revival of coal in the Status Quo scenario.

Phasing out coal using carbon prices alone would require CO₂ prices to double to at least £40/tonne by 2025 (as in High scenario).

However, the question remains as to how many coal plant will survive this long.

Clear and credible signalling of the future carbon price would critically influence decisions on whether to stay online or close.
In the long-term, several factors are likely to counter-act the impact of changes in the carbon price on wholesale prices

**Simplified causal mechanism**

1. **Example:** Higher wholesale price could increase deployment of subsidised and unsubsidised renewables

   - **Positive feedback:** amplifying factor
   - **Negative feedback:** stabilising factor

   - All else held equal, a higher carbon price would translate into a higher wholesale price
   - However, there are several factors which counteract this effect
   - For example, a higher UK wholesale price could incentivise more renewable deployment, exerting downward pressure on wholesale prices
   - As a result, the carbon price is likely to have a significantly smaller effect on wholesale prices than one would expect through adding the top-up to the marginal gas plant

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1. Short-run marginal cost.

Source: Aurora Energy Research
Without stabilising factors, wholesale price would be considerably higher in the High scenario.

Avg. wholesale baseload price 2026-35, £/MWh

- All else equal, increasing the carbon price would increase wholesale prices significantly.
- The entry of additional renewables and other factors would mitigate some of this increase.
- However, credible signalling of the long-term carbon price trajectory is key to incentivising additional deployment of renewables.

Source: Aurora Energy Research
If EU carbon prices catch up with the UK, interconnector imports will drop considerably

Net electricity imports to GB in 2035, TWh

- If EU ETS price converges with the current UK price, then this will undermine interconnector economics and imports
- Low carbon price in the Low scenario causes an increase in coal production in Europe, increasing UK imports
- Following Brexit, the UK may need to consider changes to carbon accounting rules to reflect UK production (rather than share of traded emissions)

<table>
<thead>
<tr>
<th>Status Quo</th>
<th>Catch-up</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>46 (29)</td>
<td>29 (29)</td>
<td>6 (6)</td>
</tr>
</tbody>
</table>

**Total UK CO₂ price 2035, £/tCO₂**
- EUA price 2035, £/tCO₂

Source: Aurora Energy Research
## System impacts

Differences between scenarios expose the scale of trade-offs faced by the Government

<table>
<thead>
<tr>
<th>Scenario</th>
<th>A Emissions</th>
<th>B Affordability</th>
<th>C Tax Receipts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Status Quo</strong></td>
<td>CO₂ intensity, 2030, gCO₂e/kWh</td>
<td>Avg. yearly total cost¹, 2021 – 2035, £bn</td>
<td>Avg. yearly CO₂ tax receipts, 2021 – 2025, £m</td>
</tr>
<tr>
<td><strong>2 Catch-up</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 Low</strong></td>
<td>100g/kWh</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4 High</strong></td>
<td>100g/kWh</td>
<td></td>
<td></td>
</tr>
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1. Considers wholesale, CfD and Capacity Market costs.

Source: Aurora Energy Research
Key takeaways

Introduction of the Carbon Price Support was the main factor behind the decline of coal generation in GB since 2012.

Changing fuel price dynamics could lead to a revival of coal in the early 2020s. Phasing out coal using carbon prices alone would require the price to double to over £40/tonne by 2025.

Maintaining the total UK carbon price around the current level would be sufficient to hit the 2030 power sector target of 100g/kWh, but the revival of coal in the early 2020s would undermine the achievement of the 4th Carbon Budget.

Source: Aurora Energy Research
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  - Regular policy updates and resulting implications
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- Revenue stream forecasts specific to your project and investment case stress-testing
- Capacity market and ancillary service auction bidding support
- Policy analysis, public reports, strategy and more
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  - **Forecast Data in xls** to build your own business case
  - Market, policy and technology outlook
  - Monthly FFR and balancing mechanism analysis package
  - Interaction with Aurora team to keep you up-to-date with this rapidly evolving market

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