Effect of price controls on investment incentives

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## Analysing the decision to invest under uncertainty – the ‘real option’ method

<table>
<thead>
<tr>
<th>Cash Flow ($)</th>
<th>Gross Margin</th>
<th>Capital cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost of Delaying Investment</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Avoided loss</strong></td>
<td></td>
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</tbody>
</table>

**Option to wait before deciding whether or not to invest**

**New investment rule:** *Invest NOW if: cost of delaying > value of delaying*
Investment thresholds when CO$_2$ and fuel prices are uncertain

![Bar chart showing investment thresholds for different power plants under various price uncertainties.](chart_image)

- **Coal on margin**
- **Gas on margin**
- **Mixed plant on margin**

Key:
- **CO2 price uncertain**
- **Fuel price uncertain**
- **CO2 and fuel price uncertain**
CO\textsubscript{2} price uncertainty

![Graph showing CO\textsubscript{2} price uncertainty over years.](image)
Effect of CO$_2$ price uncertainty on investment threshold

CO$_2$ price $/t

5 years

Additional net revenue required as a % of capital costs

1. Nuclear

2. CCS
Effect of CO₂ price uncertainty on investment threshold

CO₂ price $/t

Additional net revenue required as a % of capital costs

1. Nuclear
2. CCS

5 years
Effect of CO$_2$ price uncertainty on investment threshold

CO$_2$ price $/t

- Cap only
- Lower expected value

5 years

time

Additional net revenue required as a % of capital costs

1. Nuclear
2. CCS
Effect of CO$_2$ price uncertainty on investment threshold

CO$_2$ price $/t

Additional net revenue required as a % of capital costs

10% 20% 30% 40% 50%

10 years

100% 80% 60% 40% 20%

1. Nuclear

2. CCS
Conclusions

- CO₂ price uncertainty matters for some technologies in some types of market.

- CO₂ price caps decrease the expected average income for low-C technologies.

- Price caps and floors can reduce effects of uncertainty, if:
  - Caps and floors themselves are certain.
  - They are ‘tight’ – i.e. expected to be exercised for a significant amount of time.

- Extending the period of ‘stable’ prices from 5 to 10 years has the strongest effect in reducing the investment threshold.
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