Incentive Policy Mechanisms and Strategy for CCS – Current Practice and Future Options

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Policy is critical if CCS is to play a role in future

1. Enabling CCS as part of energy portfolio
2. Making CCS a legal activity & clarifying responsibilities
3. Ensuring safety and environmental viability of operations
4. Providing incentives for demonstration and deployment
   - Business models & financing of projects
5. Contributing to public acceptance
Incentives and financing are a particular type of policy

**INCENTIVE**

Policy push or market pull mechanism that provides an earning logic for CCS projects ("ensures bankability")

**FINANCING**

The way funds are provided for a specific project—where the "bankers" become involved. Becomes possible when incentives are established
Incentives play a role at two levels

1. ECONOMY / SOCIETY:

To meet the IEA CCS Roadmap ambitions, almost USD 5 trillion will need to be invested in CCS installations.

<table>
<thead>
<tr>
<th>Fuel</th>
<th>Coal (similar for all capture routes; relative to a pulverized coal baseline)</th>
<th>Natural gas (post-combustion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency penalty</td>
<td>10 % -points</td>
<td>8 % -points</td>
</tr>
<tr>
<td>Capital costs</td>
<td>3 800 USD/kW (74% increase)</td>
<td>1 700 USD/kW (82% increase)</td>
</tr>
<tr>
<td>Cost of CO₂ avoided</td>
<td>55 USD/tCO₂</td>
<td>80 USD/tCO₂</td>
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2. PROJECT / COMPANY:

Investment in early CCS facilities represents prohibitive capital cost and decreases efficiency leading to increased operating cost.
Incentive policy objectives must be clear

- Reducing emissions
- Ensuring technology learning
- Ensuring access to capital markets
Different types of policies address different objectives

<table>
<thead>
<tr>
<th>Reducing emissions</th>
<th>Technology learning</th>
<th>Access to capital markets</th>
</tr>
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<tbody>
<tr>
<td>Cap and trade</td>
<td>Capital grant</td>
<td>Co-investment equity</td>
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<tr>
<td>Carbon tax</td>
<td>Production subsidy</td>
<td>Provision of debt</td>
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<tr>
<td>Baseline and credit</td>
<td>Investment tax credit</td>
<td>Credit guarantees</td>
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<tr>
<td>Feebate</td>
<td>Production tax credit</td>
<td>Insurance products</td>
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<tr>
<td>Emissions performance standard</td>
<td>Feed-in tariff</td>
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<tr>
<td>CO2 purchase contract</td>
<td>Premium feed-in tariff</td>
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<td>Portfolio standard</td>
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CCS policy objectives should evolve over time

- Short to mid term focus on learning and access to capital
- Long term focus shifts towards emissions cuts
- Different objectives – different policy tools

<table>
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<tr>
<th>Policy objective</th>
<th>Example policies</th>
<th>Importance over time</th>
</tr>
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<tr>
<td>Emissions reduction</td>
<td>Carbon tax, emissions trading</td>
<td></td>
</tr>
<tr>
<td>Technology learning</td>
<td>Feed-in tariff</td>
<td></td>
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<tr>
<td>Access to capital market</td>
<td>Provision of debt, equity, insurance</td>
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</table>
Long-term policy architecture can enhance credibility and effectiveness
Examples of incentive policies today

**US:** Demo funding

**EU:** NER300, EEPR

**AUS:** Flagship pr.

**UK:** CCS competition

**NO:** Mongstad

Etc..

**UK:** 2011 Electricity Market Reform

**NO:** Carbon tax

**US:** EOR projects

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**First gateway**
- Technical feasibility
- First cost threshold
- Availability of required storage capacity confirmed

**Second gateway**
- Further cost reductions
- Infrastructure development
- Availability of required storage capacity confirmed
Incentivising CCS in non-OECD countries

- IEA CCS Roadmap scenario requires 55% of CCS investment to 2050 to be outside of the OECD

- Theses investments could be incentivized by:
  - carbon price may through baseline and credit scheme (CDM and/or others)
  - public-sector support from developed countries through Nationally Appropriate Mitigation Actions (NAMAs)
  - IFIs/MDBs through provision of concessional funds, risk mitigation instruments (possibly tailored to risks unique to CCS i.e. environmental liability, stewardship of storage sites), supporting development of market in carbon credits from CCS.
Reccomendations for development of incentive policy

1. Be clear about policy objectives
2. Suit incentive policy to technical maturity
3. Plan incentive strategy long-term
4. Plan for a coherent mix of incentives, not just one
5. As much as is possible, create certainty!
Thank-you!

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