CCS for Industry

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EUROPE’S ZERO EMISSIONS PLATFORM (ZEP)

ZEP serves as advisor to the European Commission on the research, demonstration and deployment of CCS and CCU.

ZEP is explicitly not a sector/industry association, but a technology platform. A coalition of energy intensive industry, oil and gas companies, equipment suppliers, scientists, academics, environmental NGOs keeping CCS on the EU climate action agenda.

The objectives of ZEP are:
- Enabling CCS and where relevant, CCU to be key technologies for combating climate change for all CO₂ emitting sectors, including electricity, energy intensive industry and producers of hydrogen and biofuels.
- Putting in place a framework making CCS investible by 2020.
- Accelerating next generation RD&D of CCUS technology and the widespread deployment post 2020.

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Figure 1: Over the past few decades, the pace of emitting greenhouse gases has hastened substantially. We now only have about a quarter of our carbon budget left before we cross the 2°C mark.
INDUSTRIAL EMISSIONS SHARE

**CO₂ emissions per sector in 2015**
- Buildings: 30%
- Transportation: 13%
- Manufacturing: 19%
- Energy: 20%
- Agriculture: 12%
- Other: 6%

**Business as usual in 2050: Industry biggest emitter**
- Buildings: 31%
- Transportation: 17%
- Manufacturing: 52%
INDUSTRIAL CARBON CAPTURE & STORAGE (CCS)
WHERE CEMENT EMITS
WHERE STEEL EMITS
WHERE CHEMICALS EMIT
RECENT ZEP ANALYSES ON THE ROLE OF CCUS FOR MEETING EUROPE'S CLIMATE GOALS

ZEP reports could be downloaded from our website: http://www.zeroemissionsplatform.eu/
ROLE OF CCS IN A BELOW 2 DEGREES SCENARIO

- Paris Agreement net-zero – IPCC 1.5 – EU Long-Term Strategy → CCS essential

- Without CCS, Europe’s industrial regions face ever increasing risk as climate pressures mount, threatening the eventual exodus of process industries and millions of associated jobs – perhaps beautifying national emission inventories, but with no climate benefit

- Germany; over 50 million tonnes of CO₂ would remain unabated without CCUS
- Risking about 3.5 million steel-related jobs
- Several hundred thousand more in the chemicals and cement sectors.

- CCS enables a ‘just transition’

- Establishing a shared CO₂ infrastructure that links industrial regions with CO₂ storage will protect jobs, attract investment and create new economic opportunities for Europe
### Abatement Scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Low</th>
<th>Mid</th>
<th>Mid Newbuilt</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO₂ abated (Mt)</td>
<td>476</td>
<td>654</td>
<td>654</td>
<td>964</td>
</tr>
<tr>
<td>Mothballing*</td>
<td>133</td>
<td>216</td>
<td>120</td>
<td>474</td>
</tr>
<tr>
<td>Injection</td>
<td>1,499</td>
<td>2,740</td>
<td>4,154</td>
<td>3,382</td>
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<tr>
<td>Offshore Transport</td>
<td>740</td>
<td>764</td>
<td>764</td>
<td>1,404</td>
</tr>
<tr>
<td>Onshore Transport</td>
<td>366</td>
<td>366</td>
<td>366</td>
<td>376</td>
</tr>
<tr>
<td>Onshore compression (20 bar to HP)</td>
<td>1,490</td>
<td>2,072</td>
<td>2,072</td>
<td>3,072</td>
</tr>
<tr>
<td>Total Cost</td>
<td>4,229</td>
<td>6,158</td>
<td>7,477</td>
<td>8,707</td>
</tr>
<tr>
<td>€/tCO₂</td>
<td>8.9</td>
<td>9.4</td>
<td>11</td>
<td>9.0</td>
</tr>
</tbody>
</table>

*costs during transition period of infrastructure before being re-used for CO₂ transport
A CO2 NETWORK AS A PUBLIC GOOD

In the early 19th century, London planned to expand its sewage system, yet faced widespread public opposition. Particularly wealthier people, living uphill, did not see why a general sewage system was needed and hence did not want to pay to improve the property of private individuals ‘downhill’. In fact, sewage was not seen as a public good, and so the government initially considered it improper to use public money. It took several cholera epidemics, thousands of deaths, and the ‘Great Stink’ of 1858 for London to finally modernize and upgrade its sewage system, at last stopping the unchecked dumping of human waste into the city and the river Thames.

"[The principle] was of diverting the cause of the mischief to a locality where it can do no mischief."

Sir Joseph Bazalgette, Civil Engineer
INDUSTRY IN A CHANGING CLIMATE

WE HAVE A PROBLEM

A DIVERSITY OF OPTIONS, A LACK OF SOLUTIONS

THE DAWN OF A NEW INDUSTRY

A FAREWELL TO INACTION
Thank you!
Dziękuję!