Beyond the coal phase-out: Industry in a zero-carbon economy.

Timon Wehnert
Overview

- A quick historic view on phasing-out coal in Germany

- The next challenge: a climate neutral industry
The Wuppertal Institute

- Founded 1991
- Think tank dedicated to applied research and sustainability
- 250 staff members

Transition Research: from problem assessment to real world experiments
A quick history view on phasing-out coal in Germany

Are we really planning well ahead?
Strong protests against coal phase-out

*We resist! – Against the social black-out of whole regions!*

Wir wehren uns!

Gegen den sozialen Blackout ganzer Regionen!
Regional disparities in Germany

Income (per capita)

Unemployment

Coal fired power plants

http://library.fes.de/pdf-files/wiso/12390.pdf
21st February 2020
Coal jobs over the time in Germany

Coal mining jobs decreased from over 750,000 to less than 21,000 in 2016. This was driven by purely economic reasons.

Source: own calculations based on Statistik der Kohlenwirtschaft e.V. (2016a, 2016b, 2017)
Example - Rhenisch Lignite Mining Area:
9,000 jobs in coal – 90,000 job in energy intensive industry

21st February 2020
The next challenge: a climate neutral industry
Climate Pathways for Germany:
Study by Boston Consulting Group and Prognos on behalf of the German Industry Association (BDI)

- **80% Reduction Pathway**
  (target in 2050 compared to 1990):
  Technical feasible
  and can be achieved at no extra costs

- **95% Reduction Pathway**
  Doable but challenging,
  needs international collaboration and commitment

Carbon emissions in industry in Germany did not decline for more than a decade.

Emissions of the industrial sector 1990-2018 (sector definition based on German Climate Protection Plan) and sector targets 2030/2050 of the industrial sector

UBA, 2019a; BMU, 2016; Sector target 2030 according to government draft Federal Climate Protection Act; sector target 2050 according to climate protection plan 2050

* remaining emissions in 2050 must be offset for climate neutrality

Investments in energy intensive industry must be in carbon neutral (compatible) technologies – from now on
Technologies will become available within next 10 years

Regulatory framework is crucial!

<table>
<thead>
<tr>
<th>Steel</th>
<th>Key technology</th>
<th>Earliest possible market readiness</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Direct reduction with hydrogen and smelting in the electric arc furnace</td>
<td>2025 – 2030 (phase-in with natural gas)</td>
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<td>Alkaline iron electrolysis</td>
<td>Likely after 2050</td>
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<td>Hiscore process in combination with CO₂ capture and storage</td>
<td>2035 – 2040</td>
</tr>
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<td>CO₂ capture and utilisation of waste gases from integrated blast furnaces</td>
<td>2025 – 2030</td>
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</tbody>
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<th>Chemicals</th>
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<th>Earliest possible market readiness</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Heat and steam generation from power-to-heat</td>
<td>From 2020</td>
</tr>
<tr>
<td></td>
<td>CO₂ capture at combined heat and power plants</td>
<td>2035 – 2045</td>
</tr>
<tr>
<td></td>
<td>Green hydrogen from renewable energies</td>
<td>2025 – 2035</td>
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<tr>
<td></td>
<td>Methanol-to-olefin/-aromatics-route</td>
<td>2025 – 2030</td>
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<td>Chemical recycling</td>
<td>2025 – 2030</td>
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<td>Electric steam crackers</td>
<td>2035 – 2045</td>
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<td>CO₂ capture with the oxyfuel process (CCS)</td>
<td>2025 – 2030</td>
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<td>CO₂ capture in combination with electrification of the high temperature heat at the calciner</td>
<td>2030 – 2035</td>
</tr>
<tr>
<td></td>
<td>Alternative binders</td>
<td>2020 – 2030 (depending on product)</td>
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Agora Energiewende/Wuppertal Institute, 2019
IN4CLIMATE is a massive innovation program by the state government of North-Rhine Westphalia

Key objectives:

Keep energy intensive industry in the region, use the necessary climate transition as a motor for innovation and investment

Flexible production processes – to prepare for high shares of renewable power supply

The aluminium smelter as “virtual battery”
The EU Green Deal – is a paradigm shift in the EU’s economic policy:

- Climate targets are to be mainstreamed across all policy fields
- Climate policy is seen as a strategy to direct and attract investments and create jobs

“The European Green Deal is our new growth strategy. It will help us cut emissions while creating jobs.”

Ursula von der Leyen, President of the European Commission

Coal phase-out was the low-hanging fruit of the energy transition

Key challenges to reach Germany’s climate targets are:
Substituting natural gas,
zero emissions in transport, agriculture and industry

Energy intensive industry will not invest in new production facilities, which are not in line with a zero carbon pathway

Industrial players increasingly perceive climate action as an opportunity to attract investment, support innovation and keeping jobs in Germany
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All you ever wanted to know about ...

Coal in Germany

https://wupperinst.org/a/wi/a/s/ad/4468/

Coal Regions in Transition in Europe

https://ec.europa.eu/energy/en/topics/subtopic/97
Further Reading on climate neutral industry

Climate Neutral Industry

Industrial Transformation 2050
https://materialeconomics.com/publications/industrial-transformation-2050