WHAT CAN WE LEARN FROM EXPERIENCE, PAST AND PRESENT?

International Roundtable on the Future of Coal: The International Thermal Coal Sector at a Crossroads

27 February 2019, Cape Town, South Africa

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Technische Universität Berlin, Research group CoalExit
German Institute for Economic Research (DIW Berlin)
Development of coal and renewables: Employment and electricity share in Germany from 1980-2018

Source: Own calculations and illustration based on DIW et al (2018)
Managing a ‘just transition’
Possible Effect on Exporting Countries (e.g. South-Africa)

Demand for Coal is shrinking fast in Europe and the US.
Looking for cooperation and joint research for the next 3 years

Enabling a coal transition in South-Africa
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The International Thermal Coal Sector at a Crossroads

26 February 2019, Cape Town, South Africa

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German Institute for Economic Research (DIW Berlin)
Long history starting with the European Coal and Steel Community in 1951 and coming to an end in 2018

- 150 million t hard coal production
- 600,000 employees in hard coal mining

“German Economic miracle”

1951
Foundation of the ECSC & co-determination law

1956
Suez crisis & liberation of coal price

1957
Re-integration of Saarland Foundation of Saarbergwerke AG

1958
Begin of the coal crisis

1964
Import coal cheaper than domestic coal

1968
1st oil crisis
- Begin of subsidies for domestic coal sale
- First structural policy program for Ruhr area & Foundation of RAG AG

1973
“Action program Ruhr” → End of “ground lock”

1974/75
Begin of the steel crisis

1979
2nd oil crisis

1980
Reunification & EU influence in structural policy grows

1989
Begin of “IBA Emscher Park”

1990

~ 2000
Growth orientation of EU structural policy, focus on “lead markets”, increased decentralization & participation

2007
Law to end hard coal subsidies & RAG foundation

2012
End of coal production in Saarland

2018
End of hard coal subsidies → end of production

Historic case study on coal transition in Germany
23.09.2018
The carbon lock-in of coal regions and actors originates from various sources

- Energy security issues
- Disruption of business concepts
- Identification with coal mining
- Distributional effects
- Short-sightedness of election terms
- Employment effects

Source: Own illustration.
The upcoming coal phase out effects countries differently and therefore needs a combination of various political instruments

Need to differentiate between countries:

- **that only mine coal (e.g. Colombia)**
  - employment
  - income from exports

- **those burning coal (e.g. UK and many countries in Europe)**
  - energy security
  - (employment)

- **those doing both (e.g. US, China, India, South-Africa, Germany)**
  - energy security
  - employment
  - (income from exports)
Energy transition needs to incorporate different regional aspects

<table>
<thead>
<tr>
<th>Region</th>
<th>Specific Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. Colombia</td>
<td>Financial payments as compensation for a moratorium on new mines</td>
</tr>
<tr>
<td></td>
<td>Support for RES to meet rising energy demand, enable energy access &amp; create jobs</td>
</tr>
<tr>
<td></td>
<td>Active &amp; passive labour market instruments to enable a just transition</td>
</tr>
<tr>
<td>e.g. Europe or US</td>
<td>Moratorium on new mines</td>
</tr>
<tr>
<td></td>
<td>Existing coal power plant fleets need to be closed</td>
</tr>
<tr>
<td></td>
<td>Support for RES to replace fossil capacities &amp; create jobs</td>
</tr>
<tr>
<td></td>
<td>Active &amp; passive labour market instruments to enable a just transition</td>
</tr>
<tr>
<td>e.g. China or India</td>
<td>Moratorium on new mines; maybe linked with compensations</td>
</tr>
<tr>
<td></td>
<td>Moratorium for new plants to prevent (stranded) assets</td>
</tr>
<tr>
<td></td>
<td>Support for RES to meet rising energy demand, enable energy access &amp; create jobs</td>
</tr>
<tr>
<td></td>
<td>Active labour market instruments to create new jobs</td>
</tr>
</tbody>
</table>

Support for active labour market instruments to enable a just transition in e.g. Europe or US could be linked with compensations in e.g. China or India.
Research outline and methodology

Starting point
Analysis

Germany can look back on a decline of over 60 years in hard coal production with accompanying policies. Besides the hard coal mining phase-out, Germany experienced a significant reduction in its lignite sector after the Reunification.

Research Questions

Which policies were implemented and helped to address the challenges created by the reduction in the coal sector?
Which was the right level of governance that enabled an effective implementation of the policy measures and instruments?

Approach

A historic meta analysis of the two biggest hard coal regions in Germany: Ruhr and Saarland from 1950 to 2018. The analysis of the hard facts is extended by a literature research regarding the implemented policies.

Results
## Comparison of the two hard-coal regions

<table>
<thead>
<tr>
<th></th>
<th>Ruhr area (in North-Rhine-Westfalia)</th>
<th>Saarland (next to France &amp; Luxemburg)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>Most densely populated area in Germany, &gt;5 million people</td>
<td>~1 million people</td>
</tr>
<tr>
<td><strong>Phase-out date</strong></td>
<td>2018</td>
<td>2012</td>
</tr>
<tr>
<td><strong>Ownership of the coal production</strong></td>
<td>Private</td>
<td>Public</td>
</tr>
<tr>
<td><strong>Regional resistance against transition</strong></td>
<td>Protests against coal reduction in the mining regions; strong connection and identification with jobs in hard coal production; resistance of coal corporations to give land to new ones”</td>
<td>Less resistance; measures to provide land for new corporations; security concerns due to earthquakes</td>
</tr>
<tr>
<td><strong>Competition in the region</strong></td>
<td>Strong intra-regional competition of the cities in the Ruhr area</td>
<td>Early realization to connect with other cities across the border in France and Luxemburg to overcome the fringe status</td>
</tr>
</tbody>
</table>
Hard coal phase-out was economically driven and replaced by cheaper imported hard coal.
Nominal values in billion € for measures implemented for conservation of hard coal and economic reorientation in NRW

- Financial aid for hard coal
- Tax cuts for hard coal
- Subsidies for hard coal in ETS
- Incomplete competition for hard coal in electricity market
- Development programs of NRW
- EU-EFRD for NRW
Only Increasing Renewables is not sufficient - Development of coal and RES employment and electricity share in Germany

Source: Own calculations and illustration based on DIW et al (2018).
Development of unemployment rates

%  

Ruhr area  
NRW  
Saarland  
(West-)Germany


0 2 4 6 8 10 12 14 16 18
# Coal crisis 1958 and the first structural policy program in NRW

<table>
<thead>
<tr>
<th>Events</th>
<th>Challenges</th>
<th>Measures</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1956 End of Suez crisis; Liberation of coal price</td>
<td>• Uncontrolled job losses (over 300,000; most of them in the Ruhr area)</td>
<td>• Former miners shift into metal industry</td>
<td>• Stabilization of decline in coal sector</td>
</tr>
<tr>
<td>• 1958 start of coal crisis</td>
<td>• High sectoral dependency</td>
<td>• Early retirement</td>
<td>• Infrastructural programs lead to highway system</td>
</tr>
<tr>
<td>• Economic miracle until approximately mid-60s</td>
<td>• Low mobility of citizens due to mining and steel orientated infrastructure (limited interconnections between cities)</td>
<td>• Coal mining united in one company and subsidies for coal sale</td>
<td>• First university</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Infrastructure programs to enhance mobility</td>
<td>• Settlement of new enterprises failed due to the resistance network of the mining and steel companies, politicians and unions (<em>ground lock</em>)</td>
</tr>
</tbody>
</table>

1957: 150 million
1970: 110 million
1957: 19 million
1970: 10 million
1957: 607,349
1970: 252,742
1957: 0.5%*
1970: 0.6% (0.5*)

*Data not available for Ruhr area; Figure for North Rhine-Westphalia

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**Historic case study on coal transition in Germany**

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23.09.2018
# Oil crisis 1973 and re-& neo-industrialization of the Ruhr area

<table>
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<tr>
<th>Events</th>
<th>Challenges</th>
<th>Measures</th>
<th>Effect</th>
</tr>
</thead>
</table>
| • Economic miracle ended  
• Oil crises 1973 and 1979  
• Steel crisis mid-1970s | • Job losses & increasing unemployment  
• Regional resistance against structural change by powerful network of companies, unions and politicians (ground lock)  
• Missing soft location factors  
• Migration  
• High sectoral dependency | • Modernization programs of *existing* industry (coal, steel, energy)  
• Innovation and technology support  
• Implementation of a property fund to buy and restore former mining sites | • Creation of several technology centres  
• But no substantial diversification of the economy since large sums still went into the preservation of the mining and steel industry  
• End of the ground lock due to the property fund |

| 1971: 110 million  
1985: 80 million | 1971: 8 million  
1985: 11 million | 1971: 244,388  
1985: 166,225 | 1971: 0.9%  

1971: 244,388  
1985: 166,225  
1971: 8 million  
1985: 11 million  
1971: 0.9%  
1985: 14.2%  
1971 – 1985: - 251,550
# Regionalization of the structural policy since the mid-1980s

<table>
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<tr>
<th>Events</th>
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<th>Measures</th>
<th>Effect</th>
</tr>
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</table>
| • 2nd oil crisis 1979  
• Reunion of Germany 1990 | • Further job losses & increasing unemployment (tripled)  
• Failure of previous attempts to attract companies into the region  
• Environmental problems and missing soft location factors (e.g. cultural activities)  
• Migration | • Regionalization of the structural policy and participation and consensus of local stakeholders in the process  
• Innovation and technology funding, education of workers and infrastructure  
• IBA Emscher Park: 120 small projects to improve soft location factors and employment | • Image change in the Ruhr area beyond the perception as a mining and steel region  
• Stabilizing the migration (even positive for short time)  
• Helped creating several universities and research institutions |

| 1986: 80 million  
1999: 40 million | 1986: 11 million  
1999: 66,414 | 1986: 14.2%  
1999: 13.5% | 1986 – 1999:  
+ 231,271 |
Increasing EU influence and end of subsidies for domestic hard coal production

<table>
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<tr>
<th>Events</th>
<th>Challenges</th>
<th>Measures</th>
<th>Effect</th>
</tr>
</thead>
</table>
| • Increasing environmental concerns  
• Introduction of the Euro  
• EU expansion  
• Deployment of competitive renewable energy technologies | • EU´s competition legislations forbids substitutions of the coal sector (estimated subsidies from 1950 to 2007 around €300 billion)  
• *Socially compatible* hard coal mining phase-out  
• Phase-out date at 2018  
• Each worker above the age of 42 was secured against unemployment  
• RAG foundation to finance the eternity costs | • No worker became unemployed during the phase-out process  
• Higher total costs for the late phase-out (2018) compared to proposals from different institutes during the phase-out process (e.g. 2012)  
• There still exists the risk of not applying the polluter-pays principle |

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal Production</th>
<th>Year</th>
<th>Coal Production</th>
<th>Year</th>
<th>Emitted CO₂</th>
<th>Year</th>
<th>Emitted CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>4 million</td>
<td>2017</td>
<td>5.711</td>
<td>2017</td>
<td>11.5%</td>
<td>2017</td>
<td>– 2014: +42,194</td>
</tr>
</tbody>
</table>
Transfer to coal phase-out in Germany

- Age structure in lignite mining sector
- → Decline of employment along the age structure
Transfer to coal phase-out in Germany

- Largest part is over