Black Diamond or Black Death: Diverging transition pathways towards a future without coal consumption in the United Kingdom, Germany and Poland

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CALEXT

Nachwuchsgruppe CoalExit

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Auftraggeber: BMBF, Globaler Wandel

Projektleiter: Dr. Pao-Yu Oei

Institutionen: TU Berlin, DIW Berlin, HU Berlin, Hertie School of Governance

Mentoren: Prof. Dr. Christian von Hirschhausen, Prof. Dr. Claudia Kemfert, Prof. Dr. Klaus Eisenack, Dr. Franziska Holz

4 Wissenschaftliche MitarbeiterInnen promovieren im Rahmen des Projektes.

Link zur Nachwuchsforschungsgruppe:

http://www.wip.tu-berlin.de/menue/nachwuchsforschungsgruppe_coalexit/

Geplante Arbeitspakete



Why analyse an EU coal phase-out through the UK, Germany & Poland?

The UK, Germany and Poland are the biggest producers, importers and consumers of coal.

Different dependencies on hard coal & lignite production and imports, as well as diverging transitions pathways.



Coal mining, electricity generation and number of employees in the UK, Germany and Poland from 1957-2016. Own depiction based on Own depiction based on Department for Business, Energy & Industrial Strategy (2017)(2017a), (Statistik der Kohlenwirtschaft e.V. (2017), Central Statistical Office of Poland (various years), Eurostat (2017), World Bank (2017) and own calculations. Note: For Poland no data for mining and employees before 1990 available.

Various quantitative analyses (Breevoort et al. 2015; Climate Analytics 2017; Shearer et al. 2017; Rockström et al. 2017; Oei et al. 2015, etc.) have shown that to comply with the Paris Agreement, coal consumption will have to end around 2030.
 Why are transition pathways diverging and how can a coal phase-out be achieved?

Necessity to phase-out coal vs. current status quo.

United Kingdom



- Installed coal capacity: 15 GW.
- Import dependence coal: 88%.
- First country to mainly use fossil fuels (steam engine 18th century).
- 52% drop in coal use in 2016 compared to 2015.
- Coal phase-out: by 2025.

Germany



- Installed coal capacity: 49 GW.
- Import dependence coal: 45%.
- Biggest lignite producer globally, biggest hard coal importer EU.
- Coal phase-out plans currently discussed on political level, no fixed date set.

Poland



- Installed coal capacity: 27 GW.
- Import dependence coal: -8%.
- EU's 1st hard coal & 2nd largest lignite producer.
- Bad mining conditions, domestic coal more expensive that imports.
- Expansion plans for coal mines and power plants.

Sources: See references pictures and relevant references at the end of presentation.

Starting point Analysis	A coal phase-out is crucial to reach emission reduce to be actively structured to enable a socially acce avoid e.g. capacity or grid constraints and to overco	ction targets. It needs eptable transition, to ome vested interests.
Research Questions		
Approach		
Results		
Hanna Brauers	- 5 -	Diverging EU coal phase-out strategies

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Results		
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Starting point Analysis	A coal phase-out is crucial to reach emission reduction targets. It needs to be actively structured to enable a socially acceptable transition , to avoid e.g. capacity or grid constraints and to overcome vested interests.
Research Questions	Which factors led to the diverging developments of the coal market in the UK, Germany and Poland? Which factors have enabled coal regime destructions in the past, and which ones have prevented the transition?
Approach	An approach needed that incorporates political, social, economic, environmental and technical factors. Application of a stakeholder analysis combined with the Triple Embeddedness Framework by Geels (2014).
Results	
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TEF analysis results for Poland as illustration for methodology



TU Berlin

Starting point Analysis	A coal phase-out is crucial to reach emission reduction targets. It needs to be actively structured to enable a socially acceptable transition, to avoid e.g. capacity or grid constraints and to overcome vested interests.
Research Questions	Which factors led to the diverging developments of the coal market in the UK, Germany and Poland, and to the East-West divide? Which factors have enabled coal regime destructions in the past, and which ones have prevented the transition ?
Approach	Approach necessary that can incorporate political, social, economic, environmental and technical factors. Application of a stakeholder analysis combined with the Triple Embeddedness Framework by Geels.
Results	What were the main factors influencing coal pathways?
Hanna Brauers	Diverging EU coal phase-out strategies

Main results of TEF analysis for each case study country

<u>UK:</u> The Carbon Price Floor and Emission Performance Standards were successful tools to drive coal out of the market. However, a strong influence had also **opposition to miners** in the **1980's** and available **domestic natural gas** resources. Cautionary tale: mere **switch to natural gas needs to be prevented** in other countries.

<u>**GER:</u>** The overall increase of **renewable energies** is **not enough** to drive coal out of the market. Coal's dominance sustained by **successful lobbying** of coal regime as well as major electricity corporations and unions against e.g. the climate levy and for **continued (financial) support** for **coal**.</u>

<u>POL:</u> Uneconomic coal is not enough to end its production due to strong relations between the state and corporations and powerful unions. Past negative experiences with restructuring programs and rising energy prices increase resistance to change. Dwindling resources and rising resistance against air pollution might accelerate coal's decline.

Main results as a basis for further research

Tailored solutions for each country need to be developed to **address concerns** about rising energy prices, job losses, energy security, etc.

Ending coal consumption is **technologically feasible** but **power**, **vested interests** and **social costs** need to be taken into account when designing and implementing coal phase-out strategies.

Hurdles but also opportunities to enable a coal phase-out for each case
study country have been identified and (preliminary) policy recommendations were derived.

Further research:

Implementation of findings as **realistic scenarios** in energy models (like e.g. dynELMOD).

In depth analysis of the **impact** of politically feasible **policies** on electricity prices, grid stability, system costs etc.

Thank you for your attention.

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Relevant References (1/2)

- Baer, Paul. 2002. 'Equity, Greenhouse Gas Emissions, and Global Common Resources'. In *Climate Change Policy: A Survey*, edited by Stephen H Schneider, A. Rosencranz, and J.O. Niles. Washington, DC: Island Press.
- Breevoort, van, Pieter, Kornelis Blok, Markus Hagemann, Hanna Fekete, Niklas Höhne, Bill Hare, Michiel Schaeffer, Marcia Rocha, and Louise Jeffery. 2015. 'The Coal Gap: Planned Coal-Fired Power Plants Inconsistent with 2°C and Threaten Achievement of INDCs'. *Climate Action Tracker*.
- Caldecott, Ben, and Jeremy McDaniels. 2014. 'Stranded Generation Assets: Implications for European Capacity Mechanisms, Energy Markets and Climate Policy'. *Working Paper. Smith School of Enterprise and the Environment, University of Oxford.*
- Caney, Simon. 2016. 'Climate Change, Equity, and Stranded Assets'. Oxfam America Research Backgrounder Series. http://www.oxfamamerica.org/explore/research-publications/climate-change-equity-and-stranded-assets.
- Carbon Tracker, and The Grantham Research Institute, LSE. 2013. 'Unburnable Carbon 2013: Wasted Capital and Stranded Assets'.

Carbon Brief. 2017a. 'Analysis: Just Four Years Left of the 1.5C Carbon Budget'. https://www.carbonbrief.org/analysis-four-years-left-one-point-five-carbon-budget.

- Carbon Brief (2017): <u>https://www.carbonbrief.org/analysis-uk-cuts-carbon-record-coal-drop?utm_source=CP+Daily&utm_campaign=efb8275e4e-CPdaily06032017&utm_medium=email&utm_term=0_a9d8834f72-efb8275e4e-110249805</u>
- Climate Analytics. 2017. 'A Stress Test for Coal in Europe under the Paris Agreement. Scientific Goalposts for a Coordinated Phase-Out And Divestment.' http://climateanalytics.org/files/eu_coal_stress_test_report_2017.pdf.
- Department for Business, Energy & Industrial Strategy. 2016. 'UK Energy Statistics: Statistical Press Release September 2016'. https://www.gov.uk/government/news/uk-energy-statistics-statistical-press-release-september-2016.
- Deutsches Polen-Institut Darmstadt und Forschungsstelle Osteuropa(2016): Polen-Analysen Nr. 175. 02.02.2016. www.laenderanalysen.de/polen/pdf/PolenAnalysen175.pdf.
- EndCoal (2016): Why coal. http://endcoal.org/about/why-coal/.
- European Commission. 2015. 'EU Energy in Figures Statistical Pocketbook 2015'. Luxembourg Publications Office of the European Union. doi:10.2833/77358.
 - ------. 2016. 'EU Energy in Figures Statistical Pocketbook 2016'. Luxembourg Publications Office of the European Union. doi:10.2833/670359.
- Euracoal (2015): Coal in Europe 2015. euracoal2.org/download/Public-Archive/Library/Charts-Maps/Coal-in-Europe/EURACOAL-Coal-in-Europe-2015-02.pdf.
- Geels, Frank W. (2014): Reconceptualising the co-evolution of firms-in-industries and their environments: Developing an inter-disciplinary Triple Embeddedness Framework. In; Research Policy 43 (2014), 261 -77.
- Greenpeace and CAN Europe (2015): End of an era: Why every European country Needs a coal phase-out plan.

http://www.caneurope.org/attachments/article/930/End%20of%20an%20Era%20report%20single%20pages%20final.pdf.

IEA. 2015a. 'CO2 Emissions from Fuel Combustion - Highlights. IEA Statistics.' OECD/IEA, Paris.

https://www.iea.org/publications/freepublications/publication/CO2EmissionsFromFuelCombustionHighlights2015.pdf.

-----.2015b. 'World Energy Outlook 2015'. OECD/IEA, Paris.

Relevant References (2/2)

IEA. 2016a. 'Coal Information 2016'. OECD/IEA, Paris.

 2016b. 'Energy and Air Pollution. Special Report World Energy Outlook'. OECD/IEA, Paris, 2016. <u>https://www.iea.org/publications/freepublications/publication/WorldEnergyOutlookSpecialReport2016EnergyandAirPollution.pdf</u>.
 IMF. 2015. IMF Survey : Counting the Cost of Energy Subsidies. <u>http://www.imf.org/external/pubs/ft/survey/so/2015/new070215a.htm</u>.
 International Energy Agency. 2014. 'World Energy Investment Outlook. Special Report'. OECD/IEA, Paris, 2014.

IPCC. 2014. 'Climate Change 2014 Synthesis Report - Summary for Policymakers'. https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

- Kahn, Matthew E. 2015. 'No More Free Riders? Lessons from the Paris Climate Change Mitigation Treaty', December. http://greeneconomics.blogspot.co.uk/2015/12/no-more-free-riders-lessons-from-paris.html.
- Kanitkar, Tejal, T. Jayaraman, Mario D'Souza, and Prabir Purkayastha. 2013. 'Carbon Budgets for Climate Change Mitigation a GAMS-Based Emissions Model'. Current Science 104 (9): 1200–1206.
- Krukowska, Ewa, and Maciej Martewicz. 2016. 'Poland to Bring Up Coal Mines Survival, Russian Gas With EU'. Bloomberg, January 14. http://www.bloomberg.com/news/articles/2016-01-14/nord-stream-2-coal-on-agenda-as-eu-energy-chief-heads-to-poland.
- McGlade, Christophe, and Paul Ekins. 2015. 'The Geographical Distribution of Fossil Fuels Unused When Limiting Global Warming to 2 °C'. *Nature* 517 (7533): 187–90. doi:10.1038/nature14016.
- Markandya, Anil, Iñaki Arto, Mikel González-Eguino and Maria V. Román (2016): Towards a green energy economy? Tracking the employment effects of low-carbon technologies in the European Union.
- Oil Change International. 2016. 'The Sky's Limit Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production'. *Washington*. http://priceofoil.org/content/uploads/2016/09/OCI_the_skys_limit_2016_FINAL_2.pdf.

Oxford University Environmental Change Institute. 2016. 'Current Global Warming Index'. Oxford University Environmental Change Institute.

- Reed et al. (2009): Who's in and why? A typology of stakeholder analysis methods for natural resource management. In: Journal of Environmental Management 90, 1933-49.
- TheNation(2015): With a 1.5 Degrees Celsius Target, the Climate-Justice Movement Is Poised to Score a Surprise Win. https://www.thenation.com/article/with-1-5degrees-celsius-target-climate-justice-movement-poised-to-score-surprise-win/.

WISE (2015): Whither are you headed, Polish coal? Development prospects of the Polish hard coal mining sector. Warsaw, 2015.

World Bank (2014): http://data.worldbank.org/indicator/EG.ELC.RNWX.ZS.

World Coal Association (2015): Coal Facts 2015. <u>http://www.worldcoal.org/coal-facts-2015</u>.

World Coal Association (2016): BASIC COAL FACTS.

http://www.worldcoal.org/file_validate.php?file=WCA_Basic%20Coal%20Facts_0.pdf.

References Pictures Presentation

Amazon (2016): No coal. <u>https://s3.amazonaws.com/s3.credoaction.com/images/campaigns/no_coal_200.gif</u>. Politico (2015): Polish government chokes on coal. <u>http://www.politico.eu/article/poland-duda-szydlo-coal-emissions-pollution-cop21/</u>. RBB 24 (2016): Debatte um Lausitzer Braunkohle. <u>http://www.rbb-online.de/wirtschaft/thema/braunkohle/beitraege/protestaktion-gegen-braunkohle.html</u>.