

ENV-724

Climate Economics for engineers

Coal industry in Poland -
Phase Out Policy



Belchatów coal mine & power plant (5.42 GW), Poland

Transition Pathways – *Why & How*

Lausitzer Seenland, Germany



- Research question
- **Historical background**
 - Coal industry in Poland
 - Ties to the government
- **Status Quo**
 - Today's situation
 - EU legislations
 - Polish coal phase-out policy
- **Route to 2050**
 - Challenges and Opportunities
- **Reference Cases**
 - Germany & England
- **Benefits**
- **Feasibility**

Outline

- Poland announced in 2018 to completely phase out coal energy by the year 2050



Good news, but what are the downsides?

- What led to the announcement of this policy in late 2018?
- How does the Polish power production sector look like, will it be able to make with the **transition**?
- What will be the short- & long-term consequences from phasing out coal for **Polish** society, **economy** and the **environment**?

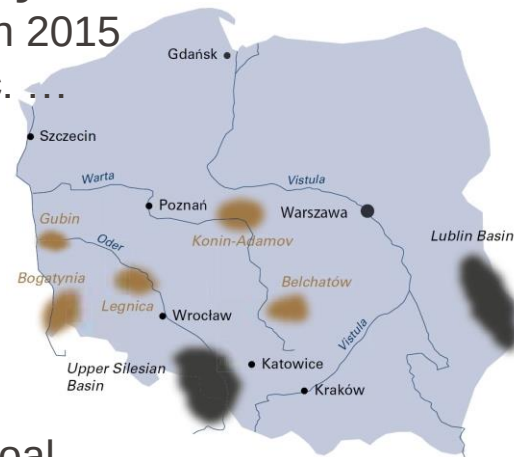
« *An-ill-prepared phase out of coal could send **shockwaves** through the **most affected regions**, causing businesses to close and more people losing their jobs* »

- **Poland's coal industry has its roots in 17th century**

- Employment over the years: 388 000 in 1990, 112 500 in 2015
- Industries affected: railway, mining equipment, steel, etc. ...

- **Ties to the government**

- PiS (engl. 'Law and Justice') won the election in 2015: promised to protect the coal industry
- Coal regions economically underdeveloped and depend on coal jobs, income and taxes
 - Reference case: coal regions of eastern Germany
- Duda, 2018: 'There is no plan today to fully give up on coal – Polish supply will last another 200 years'
- Workers organized in trade unions (100%), huge leverage on local politicians



euracoal.eu

▪ Today's numbers:

- Jobs directly or indirectly linked to the coal industry, estimated: 300 000 outside mining
- Energy production: Lignite+hardcoal: 33.2 GW (70%)
- Heavily subsidised: **Imports cheaper** than domestic production ...
- Estimation: lignite runs out by 2030, hardcoal few years later↓, electricity consump. 1.2 %/year↑, (divergence ...)

▪ EU legislation to stop energy generation from coal by 2030

- Intention: meet goal of reducing CO₂-emissions set by Paris climate agreement
- Introduced in 2018: CO₂ emission performance standard **of 550 g/kWh** per installed capacity



▪ New policy to phase out coal

- Poland wants to close the **last coal mines** by the end of **2049**, agreed with trade union (Sep. 2020)
- Still **not signed** and approved
- **Would make sense: 36 of the 50** most polluted EU cities are located in Poland

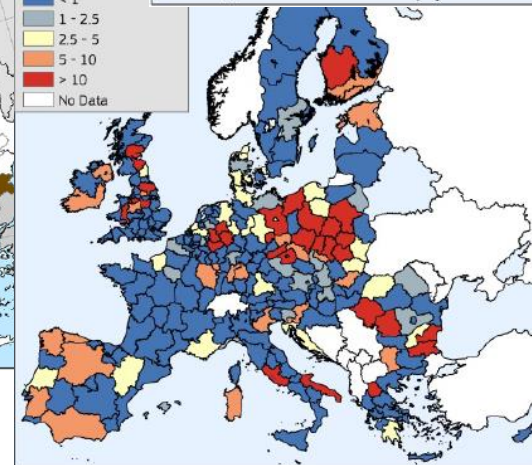
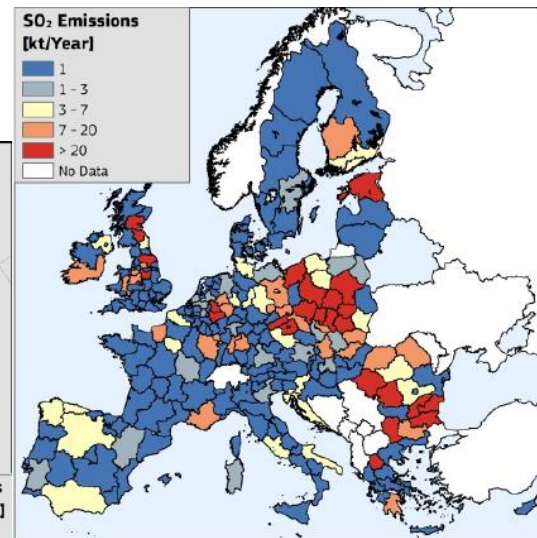
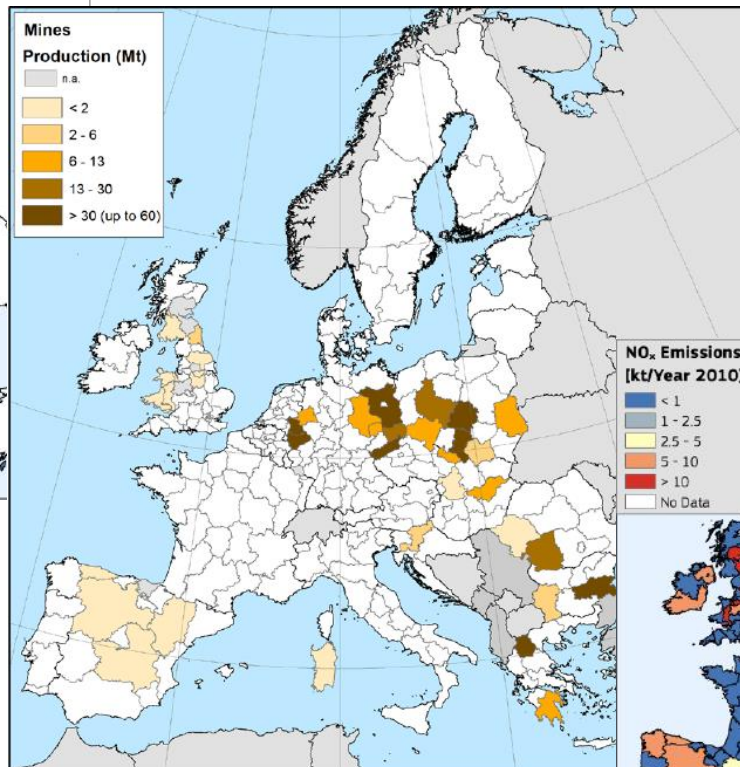
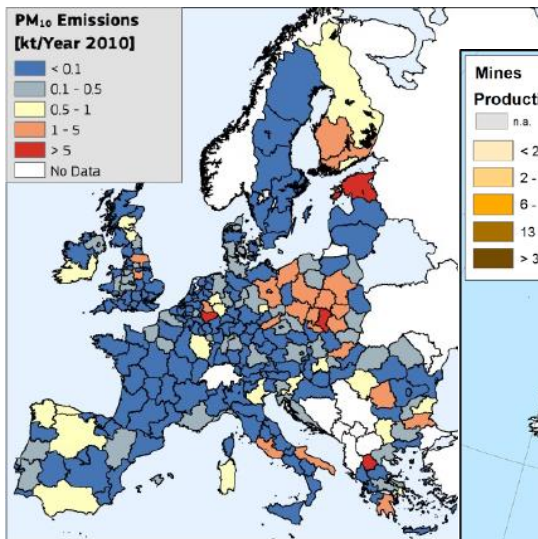
- **EU 2019/943 Article 22(4), 05.06.2019, on the internal market for electricity**

- (a) from **4 July 2019** at the latest, generation capacity that started commercial production on or after that date and that emits more than **550 g of CO₂** of fossil fuel origin per kWh of electricity shall not be committed or to receive payments or commitments for future payments under a capacity mechanism;
- (b) from **1 July 2025** at the latest, generation capacity that started commercial production before 4 July 2019 and that emits more than 550 g of CO₂ of fossil fuel origin per kWh of electricity and more than **350 kg CO₂** of fossil fuel origin on average per year per installed kW_e shall not be committed or receive payments or commitments for future payments under a capacity mechanism.

- **Exception Rule**

- 5. Member States that apply capacity mechanisms on 4 July 2019 shall adapt their mechanisms to comply with Chapter 4 without prejudice to commitments or contracts concluded by **31 December 2019**.
 - This enables Poland to continue to subsidise coal-fired power plants
 - Race to **sign capacity contracts** before 31.12.2019 was initiated

Why all of this?



PM₁₀ – Chronic bronchitis,
asthma symptoms

NO₂ – Bronchitis,
Respiratory problems

SO₂ – Acid rain

Joint Research Centre, 2018

■ Opportunities

- Restructure electricity mix and supply for the future → RES
- Learn from English, German mistakes and use them as examples
- Take coal phase-out as a chance → Germany (local recreation, tourism, location for new technology clusters (semi-conductors, East-Germany))

■ Challenges

- Transition of electricity grid **centralized** to **decentralized** grid structure (one-way to bi-directional power flow)
- Create jobs for employees affiliated to coal industry
- Development of former coal regions

The European Commission already figured out a way to save the day and future ...

■ Realistic approach?

- According to study, everything will be OK and Work out just fine

Sector	Skill	Region	Example
Same	Same	Same	Power plant operator working in biomass power plant after plant conversion
			Former coal miner working in an underground copper mine in the same region
Other	Same	Same	Geologist working in research centre in same region
Other	Other	Same	Industrial electrician retrained as wind farm technician working on wind farm located on the site of the former coal mine
Same	Same	Other	Coal miner working in competitive coal mine in other region
			Power plant operator working in coal power plant in other region
			Mining engineer in a similar role in a gold mine in other region
Same	Other	Other	Former janitor at coal power plant retrained as welder working in coal mine in other region
Other	Other	Other	Industrial electrician retrained as wind farm technician working on wind farm located in other region
Other	Same	Other	Shuttle car operator working in same role in mine in different region
Same	Other	Same	Geologist working as specialist tour guide after mine reclamation with museum

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Joint Research Centre, 2018

■ England

- Phased out coal under **Margret Thatcher** (knew about strength of trade unions + initiated liberalisation)
- 70 % of electricity in 1990 came from coal, 2020: 3 %

■ Germany

- Two active lignite mining regions, phased out **hardcoal mining in 2018**
- Transition commission to assess costs and compensation for coal regions
 - Step-wise phase out: 1/3 till 2022, 1/3 till 2030, 1/3 till 2038: Total: **12.5 GW**
 - **Not in line with Paris agreement of phasing out coal latest by 2030!**
- Compensation for electricity companies and in total ~40 B€ for regions
 - **RWE: 2.6 B€, Leag: 1.75 B€** for 'loss of income' and renaturation

Table 1 2016 model results for top ten coal companies

Rank	Company	Main country of coal	Premature Deaths	Asthma symptom days in children	Chronic bronchitis in adults	Hospital admissions due to respiratory or cardiovascular symptoms	Work days lost, working age population	Total Cost High Case [€M]	Total Cost Median Case [€M]	Health cost rate (€/MWh)
1	RWE		1880	30000	690	1320	500000	€5,400	€2,800	€48
2	EPH		1460	27000	680	1150	520000	€4,200	€2,200	€62
3	PGE		1180	20000	510	960	370000	€3,400	€1,800	€53
4	CEZ		730	13000	330	590	260000	€2,100	€1,100	€70
5	Uniper		520	9000	210	370	150000	€1,500	€800	€42
6	Endesa		410	14000	300	340	150000	€1,200	€700	€52
7	ENEA		410	6000	160	330	110000	€1,200	€600	€54
8	STEAG		370	6000	140	260	110000	€1,100	€500	€55
9	ZE PAK		340	6000	150	260	100000	€1,000	€500	€106
10	BEH		310	7000	150	240	80000	€900	€500	€93
Top 10			7600	137000	3320	5820	2350000	€22,000	€11,500	€56

Last Gasp - The coal companies making Europe sick, Nov. 2018

- **Real intention of Polish government?**
 - Close ties to local workers, and local companies (dependency)
 - Government not really future-oriented: unconscionable to take hard measures (e.g. veto: COVID recovery fund and EU budget, 11.2020)
 - Intention to build nuclear power plant
 - **War-torn history** of Poland with Russia (avoid gas dependency) and Germany (reject advice)

- Transition to green energy is not easy + very costly → e. g. Germany
- New industries: easy spots are taken: PV industry (D), H₂-industry (NOR)
- Is there a solution to put all employees in new jobs?

- Until now, only an intention/announcement ...
- State intervention in Poland, did and still does not work out
- Complete distortion of the energy market
- Long term consequences most definitely severe, next generations will have to pay the price

- Brauers et al. 2020, *Energy Policy* 144 (2020) 111621
- Brauers et al. 2020, *Environmental Innovation and Societal Transitions* 37 (2020) 238–253
- Oei et al. 2020, *Climate Policy*, 20:8, 963-979
- Oei et al. 2017, *DIW Economic Bulletin* 6 + 7.2017
- Vasev 2017, *Health Policy* 121 (2017) 1147–1153
- JRC112593, EUR 29292 EV, doi:10.2760/668092

- Questions?
- Remarks?
- Additions?

Thank you for your interest and the attention!

Bulletproof EU-financed study

Table 3A

Monetary values applied to mortality and morbidity endpoints

Health Impact	Median monetary value, EU-28 average Euro 2016 prices	High monetary value, EU-28 average Euro 2016 prices
Mortality from Chronic or Acute Exposure, VSL	1,335,915	2,720,854
Infant Mortality (1-12 months)	1,960,976	4,044,512
Hospital admissions due to respiratory or cardiovascular symptoms	2,721	
Chronic bronchitis in adults	65,693	
Work days lost, working age population	159	
Restricted activity days	113	
Minor restricted activity days	51	
Bronchitis in children	721	
Asthma symptom days in asthmatic children	51	

Last Gasp - The coal companies making Europe sick, Nov. 2018

Bulletproof EU-financed study

Table 3 Concentration response functions and population and morbidity data for non-fatal health impacts:						
Pollutant	Effect	Affected population fraction	Incidence rate	Response function	Concentration increase (10µg/m3)	HRAPIE group
PM ₁₀	Incidence of chronic bronchitis, population aged over 27 years	67.6 %	0.39 %	11.70 %	10	B*
PM ₁₀	Bronchitis in children, ages 6-12 years	7 %	18.6 %	8 %	10	B*
PM ₁₀	Incidence of asthma symptoms in asthmatic children, ages 5-19 years	0.6 %	62	2.8 %	10	B*
PM _{2.5}	Respiratory hospital admissions, all ages	100%	1.165 %	1.9 %	10	A*
PM _{2.5}	Cardiac hospital admissions, all ages	100%	2.256 %	0.91 %	10	A*
PM _{2.5}	Restricted activity days (RADs)	100%	19	4.7 %	10	B*
PM _{2.5}	Work days lost, working age population	42.5 %	9.4	4.6 %	10	B*
Ozone (SOMO35)	Minor restricted activity days, all ages	100%	7.8	1.54 %	10	B*
Ozone (SOMO35)	Respiratory hospital admissions, ages over 64 years	16.4 %	2.2 %	0.44 %	10	A*
Ozone (SOMO35)	Cardiovascular hospital admissions, ages over 64 years	16.4 %	5 %	0.89 %	10	A*
NO ₂	Bronchitis in children, ages 5-14 years	0.5 %	1.52 %	2.1 %	1	B*
NO ₂	Respiratory hospital admissions, all ages	100 %	1.165 %	1.8 %	10	A*

Last Gasp - The coal companies making Europe sick, Nov. 2018