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MIND THE GAP

Mapping hidden subsidies for the coal and lignite industry

a snapshot report for Czech Republic, Germany and Poland

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Cover photo: Turow lignite mine, Greenpeace/Zewlakk

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1 Introduction and summary

The coal industry is thirsty and toxic. Coal and lignite fired thermal combustion plants are responsible for 60% of the EU's point source industrial CO_2 emissions[1] and cause 20 000 premature deaths, as well as thousands of cases of chronic bronchitis and asthma, in Europe each year due to their release of sulphur dioxide, nitrous oxides and fine particulate matter[2]. Lignite mines are abstracting huge quantities of groundwater to keep the pits dry, with effects on the groundwater table kilometers around, as well as causing pollution of ground and surface waters. Coal and lignite combustion plants also abstract large amounts of water for cooling purposes and the intake and discharge of water has negative impacts on the ecological status of the source/recipient water bodies. Lignite and coal combustion also have a negative effect on the chemical status of water bodies, as they are the top source of anthropogenic mercury released to the environment, a very toxic and persistent pollutant subject to phase out under the international Minamata Convention Treaty and the EU Water Framework Directive. The main emission route is via the air (stack), but it can also be deposited to water bodies. Hard coal extraction also has significant impacts on groundwater water, including elevated concentrations of chlorides in groundwater, but this report focuses on the water impacts from open pit lignite mining.

The Water Framework Directive (WFD) is the key piece of EU legislation aimed at ensuring Europe's water bodies to reach good status. It was one of the first directives to explicitly require the use of economic instruments to reach its goals. According to the WFD, cost recovery of water services should include environmental and resource costs taking into account the polluter pays principle,

This report aims to investigate to what extent the cost recovery principle is being implemented in coal and lignite mining countries across the EU. This first report focusses on Germany, Poland and Czech Republic: EU's three biggest lignite countries. It presents the different national approaches on water pricing for mine drainage and cooling water abstraction. It also presents findings in relation to availability of water abstraction data in public registers and its user-friendliness.

1 EEA, European Pollutant Release and Transfer Register
2 Europe Beyond Coal, Sandbag, EEB, Greenpeace CEE, CAN Europe, 2018, Last Gasp: The coal companies making Europe sick

The main results of this report are the following:

- The EU's three biggest lignite countries (including the majority of the German lignite-mining federal states) exempt the abstraction of groundwater from open pit lignite mines (mine drainage) from fees despite its negative impact of both groundwater and surface waters. Lignite operators therefore escape the cost recovery principle. This is the case in **Poland** and in the federal states Saxony and Saxony-Anhalt in **Germany** (in Brandenburg mine drainage is exempt from fees if the drained water is not further used). Only the federal state of North-Rhine Westphalia has introduced a fee of € 0.05/m^3 for mine drainage, which was introduced only as from 2011.

- In Czech Republic, due to an outdated mining law from the 1980s, mine operators can use the water abstracted from mines for free.

- Abstraction of cooling water is typically subjected to lower fees than abstraction for industry or public water use, sometimes without distinguishing between open and closed loop cooling systems

- Availability of water (abstraction) related information as well as information to assess the implementation of the cost-recovery principle at facility level is generally very poor and un-transparent. Only the Czech Republic provides for a user-friendly system where information of volume of water abstraction and discharge for many industrial and commercial activities is available online. There are no open access online databases providing data in Germany or Poland.

2 Water-related environmental impacts of coal mines and plants

Why the power sector needs to think about the water footprint of energy

Freshwater resources are essential to ensure people's food and water needs, as well as sustain freshwater and water-dependent ecosystems and their biodiversity. Currently, large amounts of freshwater are also being used to produce and generate energy. Globally, the energy sector accounts for 10% of global water withdrawals and 3% of water consumption[3], but the water use has large geographical differences. Estimates for water withdrawal for the EU energy sector range between 72.6 and 74 billion m^3 for the year 2015[4]. There seem to be an incompleteness in Eurostat data[5] for this year making it difficult to estimate the percentage of total water abstractions that power production and generation accounts for. An earlier study estimated that a third of EU water withdrawal was for energy production and transformation in the year 2000[6]. The water required to produce the energy consumed by an average person in the EU is much greater than the water directly used in an average household[7].

> ***"Transitioning towards a net-zero emissions scenario does not necessarily mean a reduced water footprint, as biofuels, nuclear power, concentrated solar power and carbon capture, utilization and storage techniques all have large water footprints"***

Energy production requires water both in the **production stage** (e.g. mining of coal and extraction of oil and gas) as well as in the **energy transformation stage** (e.g. production of electricity and heat). The water footprint of different energy sources varies greatly (see Table 1). Hydropower, nuclear and combustion processes top the list of water footprint during the production stage. As an example, 76% (25,176 million m^3) of total water abstraction (33,036 million m^3) in Germany in 2015 was

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3 Walton, M.A., 2018, Commentary: Energy has a role to play in achieving universal access to clean water and sanitation

4 Medarac et al., 2018, Projected freshwater use from the European energy sector

5 For the year 2015, In Eurostat only 11.4 billion m3 withdrawn are reported abstracted for power generation and quarrying in the EU for 2015. This is considerably lower than other estimates as well as the number Eurostat reports for 2016 when 24.7 billion m3 were. These gaps in Eurostat data are also pointed out by Medarac et al.,

6 Medarac, 2018, Projected fresh water use from the European energy sector

7 Vanham et al. 2019 The consumptive water footprint of the European Union energy sector, Envrion. Res. Lett 14

for cooling water[8]. In addition, coal and lignite have a large water footprint in the fuel production stage, i,e. during the mining phase.

The water footprint of energy production can also be divided between the **water 'abstracted' (or used)** and the **water 'consumed'**. For cooling water, abstracted (or used) water refers to the volume of water withdrawn and returned to the same source, while water consumed refers to the difference between the volume withdrawn and the volume returned to the source. In this report we also use the term abstracted water for the water obtained through mine drainage, despite the fact that the water is not returned to the same source We would therefore also like to introduce the term **displaced water** to refer to water that is moved from one source to another.

Climate change is resulting in increased occurrences of drought, which is adding pressure on water bodies but is also affecting power production**.** The 2007 drought in south-east US resulted, the 2015 heatwave in Poland and the European hot and dry summer of 2018 all lead to coal and nuclear plants to reduce output or shut down due to low flows of rivers supplying cooling water. In addition, supply of hard coal was disrupted due to low flows, mainly in the Rhine.

> ***"A heatwave during the summer months accompanied by a period of drought caused not only a higher power demand but also a reduction of hydro generation, complications for river-cooled nuclear plants as well as waterborne deliveries to coal plants."***
>
> EPH consolidated annual report for the year 2018

Despite this, the EU currently does not explicitly take into account the water footprint of different energy source in its energy policies[9]. Existing EU reporting requirements such as the European Pollutant Release and Transfer Register (EPRTR) does not report any water related impacts of the covered mining activities e.g., water abstraction volumes[10].

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8 FGG Elbe, 2015, Hintergrunddokument zu den WichtigenWasserbewirtschaftungsfragen „Ausrichtung auf ein nachhaltiges Wassermengenmanagement" und „Berücksichtigung der Folgen des Klimawandels" *(Background document on the important water management issues "Orientation towards sustainable water volume management" and "Consideration of the consequences of climate change").*

9 Vanham et al. 2019 The consumptive water footprint of the European Union energy sector, Envrion. Res. Lett 14

10 See more information on the need of the PRTR overhaul

Transitioning towards a net-zero emissions scenario does not necessarily mean a reduced water footprint, as biofuels, nuclear power, concentrated solar power and carbon capture, utilization and storage techniques all have large water footprints[11], but the right policies could reduce the water withdrawn by power plants by 95%[12].

Table 1: Water footprint of energy production (m^3/ TJ) Source: Vanham et al. 2019[13]

	Fuel supply	Construction	Operation	Total
Hydropower	0	1	9113	9114
Wood	848	1	547	1396
Nuclear	60	0.3	567	627
Coal and lignite	134	1	437	572
Gas	5	1	130	136
Solar	0	90	27	117
Wind	0	1	0.2	1

NOTE: The high water footprint for fuel supply in case of wood is due to consumption of rain and groundwater for the plants and depend on variation of wood species. While hydropower uses the highest share of water in operation, that water is normally returned to the same water body, which is not the case for coal/lignite combustion (see paragraph on 'displacement of water').

Apart from the amount of water withdrawn and consumed by the energy sector, there are a range of other impacts on water quantity and quality as well as on aquatic life.

11 IEA, Energy and water: Exploring the interdependence of two critical resources
12 Lohrmann, A., Farfan, J., Caldera, U. et al. Global scenarios for significant water use reduction in thermal power plants based on cooling water demand estimation using satellite imagery. Nat Energy 4, 1040–1048 (2019).
13 Vanham, 2019, The consumptive water footprint of the European Union energy sector, Environmental Research Letters 14 (10)

Heat stress, oxygen depletion and impacts on aquatic life: the issues of once-through cooling

Once-through cooling systems use large volumes of water to operate. Only a small fraction of the water is evaporated so the main share of the water is returned to the recipient after use. However, heated water causes stress, higher susceptibility to diseases, interferes with metabolism (e.g. winter hibernation becomes shorter and less effective) and reproduction of fish and other animals. It also enables permanent settlement and reproduction of invasive species (including invasive parasites and other pathogens) that prefer warmer water, decreased oxygen content, disrupts natural balance in water ecosystems, increases algae and cyanobacteria blooms and changes the composition of the ecosystems, which all together causes the populations of local species to decrease[14].

> ***"A recent study on power plants in Poland estimate that hundreds of millions of fish, eggs, larvae and early fry die during the April to July reproduction period either by being sucked onto crates and filters or by mechanical or thermal shock after getting entrained into the cooling system itself."***

A recent court ruling[15] against Vattenfall's only five-years old Moorburg plant in Hamburg clarified that the plant's permit for abstracting up to 64.4 m^3/s of Elbe water was not in line with the Birds and Habitat's directives, the Water Framework Directive and special species protection laws. The ruling would force Vattenfall to switch to the more expensive closed-circuit cooling.

Purified post-cooling water contains chemical additives, especially for recirculating cooling systems[16] and is deprived of bacteria (e.g. nitrogen cycle bacteria), zooplankton and phytoplankton, that are necessary to keep the natural habitats healthy. If the cooling water constitutes a large part of the river's flow, the whole river's ecosystem is impacted from the lowest level up. Once-through cooling also has direct physical impact on

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14 Among others:
Craddock, 1976, Impact of cooling waters on the aquatic resources of the Pacific Northwest, Marine Fisheries Review Paper 1220
Walkuska and Wilczek, 2010, Influence of discharged heated water on aquatic ecosystem fauna, Polish Journal of Environmental Studies 19(3), 547-552
Maciaszek and Łabęcka, 2020, Online article in Gazeta Lubuska Retrieved 2020/11/13

15 https://www.welt.de/regionales/hamburg/article214846416/Hamburg-Elbwasserkuehlung-des-Kraftwerks-Moorburg-rechtswidrig.html

16 TNO, Delares, Ecofys, 2014, Pilot project on availability, use and sustainability of water production of nuclear and fossil energy –Geo-localised inventory of water use in cooling processes, assessment of vulnerability and of water use management measures

aquatic life if not operated with caution. A recent study[17] on power plants Kozienice (Vistula river) and Ostroleka B (Narew river) in Poland estimate that hundreds of millions of fish, eggs, larvae and early fry die during the April to July reproduction period either by being sucked onto crates and filters or by mechanical or thermal shock after getting entrained into the cooling system itself. Several of the species studied are protected by national and/or EU law. The economic loss for fisheries management is estimated to be nearly 1 million euro due to Kozienice and 0.14 million euro due to Ostroleka B power plant. Damages could be reduced by decommissioning old units and retrofitting them with new systems as well as reduce abstraction of water at night time during spawning season.

Displacement of water

After mine waters are pumped out from the ground they are discharged to rivers, used as cooling water, for industrial purposes or even drinking water. This means that millions of cubic metres of water are being removed from the groundwater aquifers and either washed away with rivers or evaporated through cooling towers. As an example, it is estimated that 12 billion m^3 - or the equivalent of 70% of the combined volume of all Poland's lakes - have been abstracted in the Wielkopolska region in Poland and flowed out with the Warta and Oder rivers to the Baltic Sea since lignite mining started there[18]. Czech Republic is a landlocked country and all its major rivers are flowing out of its territory. For German lignite mines, it is estimated that the annual abstraction volume is close to 1 billion m^3 annually (See Table 2). Abstracting groundwater and discharging it to rivers therefore means displacing precious groundwater from the region.

Power generation (in particular combined heat and power district heating plants), iron and steel, refineries and chemical sector all rely on cooling water for operation. While generally surface waters, or even more so, sea water, is preferred due to lower price and larger availability, lignite plants typically use the extracted mine waters for their cooling purposes. For example, LEAG uses 30% of their mine waters for cooling purposes and steam generation[19]. Therefore, lignite plants are linked to their mines not only through the fuel but also through the water route. In the Konin coal basin in Poland, groundwater is pumped out into a local system of interconnected lakes (*Jeziora Koninskie* - Konin lakes). The water table is

17 Pracownia, 2020, Wpływ elektrowni termicznych na ichtiofaunę. Współczesne zagrożenia dla ekosystemów rzek powodowane przez energetykę węglową,
18 RT-ON, 2017, What ZE PAK: Social and health impact of companies owned by ZE PAK and external costs of open-pit lignite mines planned by ZE PAK
19 LEAG website, Geschäftsfeld Bergbau: Wasserwirtschaft Accessed 2020/10/05

artificially kept at a level which enables the power plants to use them for cooling in once-through system[20]. Water in these lakes has been heated for decades which has altered the ecology. In practice this essentially means a large-scale displacement of groundwater that is lost from the region through evaporation or flow.

Keeping groundwater levels intact is essential for climate change mitigation. Many wetlands, surface waters and terrestrial ecosystems depend on groundwater sources. Even a slight decrease of a couple of centimetres of groundwater levels can disturb the vegetation by making it less drought resistant. Wetting "from above" does not have the same effect as maintained groundwater levels. As climate change is inducing more drought events, it is even more important to retain water in our landscapes, allow aquifers to recharge and protect our groundwater resources.

Direct impact of mines: Lowering of groundwater tables and groundwater pollution

Lignite mining requires the removal of large amounts of soil to reach down to the brown coal. As an example, each year, 8 million tons of coal and 32 million m^3 of overburden are extracted from the Turow mine in Poland[21]. The digging disrupts the underground landscape and allows the intrusion of pollutants to the groundwater aquifers.

As open pit mines can extend several hundred metres deep, groundwater is pumped out to avoid the mine being swamped. A single lignite mine can require millions of cubic metres of groundwater to be pumped out in a year. There is currently no consistent overview of the fate of the abstracted groundwater and practice varies from mine to mine. The water can be discharged to rivers or other surface bodies, used for public water supply or industry. As lignite combustion plants are often located near the mine that feeds them, abstracted groundwater is typically also used as cooling water. This is for example the case in Janschwalde power plant[22]

The drainage of the Turow lignite mine in Poland lowers the groundwater table extending across the German and Czech border. The mine abstracts 40 L/s, or the equivalent of the water consumption of the entire Liberec region in Czech Republic. The Liberec region, in cooperation with the North

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20 After serving the cooling system, the water is discharged to Warta river, a tributary to the Oder, and then further to the sea
21 PGE GiEK, Kopalnia Wegla Brunatnego Turów (Turów Brown Coal Mine), https://pgegiek.pl/Nasze-oddzialy/Kopalnia-Wegla-Brunatnego-Turow
22 FGG Elbe, November 2013, Darstellung der Bewirtschaftungsziele für die vom Braunkohlenbergbau beeinflussten Grundwasserkörper der FGG Elbe

Bohemian Water Company and the Frydlant Water Company, has calculated the costs that will need to be spent on measures to protect drinking water sources in the Czech Republic. According to current estimates, the amount is around 1.5 billion CZK (approx. 55 million euros)[23].

> ***"Perpetual Obligations: A enormous financial burden with a highest share for 'eternity costs' for pit water management (pumping of water) and polders management. The RAG Stiftung fund covers annual costs of 280 million euros to cover remediations, of which 200 million is used for pit water management."***

The effect of the lowered groundwater tables remains after the lignite mine is closed; the water tables needs to be restored. By end of 2017, 11,2 billion euros had been invested in the remediation of the mines that closed in Eastern Germany after the reunification of Germany. The highest share of the expenditure was from the state (55,6% ~ 6,16 billion euros) This is done through the company LMBV with financing from German federal government and the eastern German lignite states of Brandenburg, Saxony, Saxony-Anhalt and Thuringia. For the period of 2013-2017 LMBV received grants or allocation of 1.23 billion euros from these funds and are expected to receive the same for the next cycle 2018-2022.24

Hardcoal mining requires continuous pumping of the deep pit waters to ensure the polluted water does not come in contact with the shallow drinking water aquifers. This affects the groundwater quality and availability and continues even after the mining operations have ended. In Germany the hard coal mining activities in the Ruhr generate "perpetual obligations", a very unique burden that requires enormous financial resources, the highest share of those so called 'eternity costs" are due to pit water management (pumping of water) and polders management. The RAG Stiftung (a post hard coal mining fund managed by Evonik) covers annual costs of 280 million euros to cover remediations, of which 200 million is used for pit water management related expenses. Today, Poland is the only country in Europe where hard coal mining is still carried out to

23 Liberec region, press statement, 8 October 2020
24 Lausitzer- und Mitteldeutsche Bergbau-Verwaltungsgesellschaft (LMBV) mbH website; LBVV, Sanierung, Sicherung und Rekultivierung von Bergwerken und Tagebauen and StuBA.; Finanzierung, Bund-Länder-Geschäftsstelle für die Braunkohlesanierung. Data retrieved 2020-11-18

a major extent. The mines are cause for elevated levels of chloride in groundwater[25].

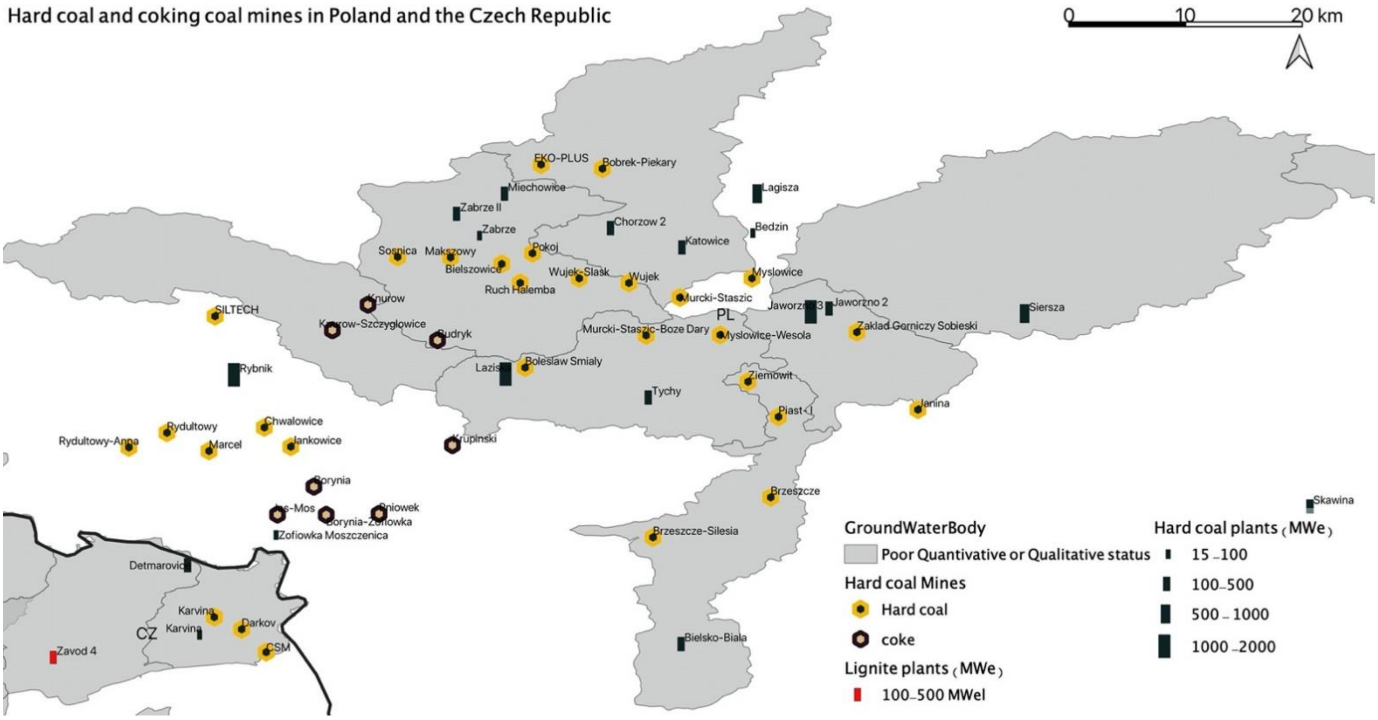


Figure 1: Status of groundwater bodies which are quantitatively or qualitatively poor in the Silesian hard coal region of Poland and adjoining areas of the Czech Republic. Based on data from WISE database

In Poland dewatering of all decommissioned mines and some active mines are handed over to the state run in Spolce Restrukturyzacji Kopaln S.A. (SRK). As of 2017, the mine drainage managed by SRK covers 14 closed mines and 7 more mines may be added in the following years. The total amount of pumped out water by SRK is about 160 million m^3 / year and is expected to reach 182 million m^3 [26]. The costs related to this are rising every year. (refer Figure 1)

Acid mine drainage and sulphate pollution of rivers: Threats to drinking water

Digging of the open cast mines exposes pyrite (FeS_2), a mineral found in deeper layers, to air and oxygen. This results in the oxidation of the mineral and release of iron and sulphate ions. When the groundwater

25 Eureau, email conversation 18 June 2020
26 Program dla sektora górnictwa węgla kamiennego w Polsce, Published by the Ministry of Energy, 2019.

level rises, as is the case with abandoned mines, these ions dissolve in water and lead to a decrease in its pH. Acidic water leaches out other toxic elements, such as heavy metals and radionuclides, from the ground, so called acid mine drainage. Once this contaminated groundwater enters the surface waters with higher pH, the ion oxides will precipitate and cause "browning" of the water. While iron precipitates can relatively easily be filtered out, sulphate pollution remains an issue for drinking water quality[27].

The problem is prevalent in the federal state of Brandenburg in Germany where the soil is low in buffering capacity. The regional sulphates drinking water limit is set to 250 mg/L (in line with the German drinking water law and the EU Drinking Water Directive), but the sulphate management decree for the river Spree allowed a higher limit of 280 mg/L[28], which [29]due to LEAG's Lausitz lignite mining activities. Reportedly, 51% of the sulphate pollution comes from LEAG's active mines in Lausitz, and 28% from former mining activities. Treatment costs to address sulphate pollution in drinking water is estimated to be between 0.55 and 0.7575 €/m^3. The problem had been dealt with by diluting the polluted water with low-sulphate waters from other regions something that is becoming less feasible due to increased drought events. An upgrade of the drinking water treatment plant Mullrose is estimated to cost 10 million euros[30]

Indirect impact of thermal power plants: Mercury emissions

After the completion of the second cycle of RBMPs, less than 40% of EU's surface water bodies were in good chemical status. In most Member States, it is just a few substances that are the cause for the failure of reaching good chemical status, in particular, mercury[31]. Thermal

> ***"Thermal combustion plants were responsible for 61% of reported mercury emissions to air (15.6 tonnes per year) in the EU28. The societal cost of mercury pollution in the EU is estimated to be 8-9 billion euros a year due to reduced IQ among children"***

27 IGB dossier "Sulfatbelastung der Spree", 2016
28 Bewirtschaftungserlass Sulfat (Spree),
29 and is exceeded far beyond those limits in other water bodies, see recent analysis by Greenpeace here
30 Der Tagespiegel, online article published 23 May 2020
31 EEA Report No 7/2018, European Waters: Assessment of status and pressures 2018

combustion plants were responsible for 61% of reported mercury emissions to air (15.6 tonnes per year) in the EU28[32], and atmospheric deposition of mercury is one of the main significant pressures on surface water bodies according to EEA. The EEA has also warned that further effort is needed to reduce emissions of mercury as a result of atmospheric emissions by the energy sector[33].

As an example, the vast majority of surface water bodies in the Oder River basin breach mercury EQS limits. 17 power plants in the Oder river basin report emissions of 3.8 tonnes mercury to air per year, which represents 76% of total reported emissions in the catchment. Turow lignite-fired power plant is one of the significant emitters of mercury emissions to air (334 kg/year) in the area. If it was legally compliant with the upper range of BAT-AEL[34] (7 µg/Nm³ yearly average), its air emissions would be halved. If it was fitted with Best Available Techniques and obliged to comply with the set EU BAT / Minamata BAT/BEP[35] level of 1µg/Nm³, its mercury emissions to air would be reduced more than tenfold (remaining emissions would still be 27,6 kg[36]).

Remediation of contaminated sediments of a lake and a Baltic Sea bay in Sweden were estimated to be 20 000-25 000 US$/kg of Hg (16 800 –21 000 €/kg Hg) secured (costs estimated in the years 2002 and 2004))[37]. Due to the large costs associated and the vast scale of the problem, the current mercury pollution of lakes and sediments are often left, but the cost is born by the society. The societal cost of mercury pollution in the EU is estimated to be 8-9 billion euros a year due to reduced IQ among children[38]

32 E-PRTR data 2018
33 EEA Report No 18/2018, Chemicals in European Waters: Knowledge developments
34 BAT-AEL: Best available techniques- Associated Emission levels, http://www.mercuryconvention.org/Portals/11/documents/publications/BAT_BEP_E_interractif.pdf

35 BAT/BEP: Best available techniques/ Best environmental practices
36 EEB, Industrial Plant Data Viewer plant number PL0064
37 Hylander and Goodsite, 2006, Environmental costs of mercury pollution, Science of the Total Environment 368, 352-370 doi:10.1016/j.scitotenv.2005.11.029
38 Bellanger M, et al. 2013. Economic benefits of methylmercury exposure control in Europe: Monetary value of neurotoxicity prevention. Environ Health; doi:10.1186/1476-069X-12-3

3 Europe’s top 3 lignite addicts: Pressure on water bodies

The lignite extractive industry is concentrated to central north continental Europe (Germany, Poland, Czech Republic) and south-east Europe (Western Balkans, Greece, Bulgaria and Romania). Germany is by far the biggest lignite producer in Europe with nearly 40% of the share of total extraction (167 million tonnes per year), followed by Poland (58 million tonnes per year) and Czech Republic (39 million tonnes per year)[39]. Hard coal extraction is today all but ceased in Europe with major activity only in Poland (48 million tonnes per year). The coal industry in the EU comprises 137 GW operated by 223 plants[40].

The location of coal mines is mirrored in water withdrawals. 14 of the top 20 regions ranked by water withdrawal for coal production are located in Germany, Poland or Czech Republic, as are 12 of the top-20 regions for water withdrawal for solid-fuel power plants [41]. Table 2 lists the main lignite extractive companies as well as reported water abstraction volumes. It stands out that the reported abstracted volumes for CEZ is considerably lower than reported values from Poland or Germany. CEZ reports and abstraction of mine water almost twenty times lower than MIBRAG, despite the fact that each company operates two mines each with similar production volumes.

39 Euracoal, Country Profiles, 2020
40 Europe Beyond Coal: European Coal Plant Database, 17 Jul 2020
41 Medarac, 2018, Projected fresh water use from the European energy sector

Table 2: The major lignite operators in Germany, Poland and the Czech Republic[42]

Company	Location	Coal extraction (million tonnes/year)		Coal capacity (MWe)	Water abstraction (million m^3/year)	
		Hard coal	Lignite		Groundwater (mine drainage)	Surface water (cooling)
RWE POWER	DE		86	17 165	519	232[1]
EPH		1,5	80	11 750		
- of which LEAG	DE		61[2]	8095	360	108
- of which MIBRAG	DE		19[2]		103	
PGE	PL					
- of which PGE GiEK			51	14 449	212[3]	917[3]
CEZ	CZ		21	5 597	5.57[4]	589

1) Only consumption 2) 2019 value 3) only discharge (cooling water from open circuits only) 4) water originating from the organization's activities (e.g., mine water)

Germany, Poland and Czech Republic all reported mines and mining as a significant pressure in the latest RBMP cycle (Table 3). The WISE database[43] does not distinguish between different types of mines so the numbers do not refer exclusively to coal and lignite mines. It stands out that Poland does not report any point pressures on surface water bodies caused by mine water and Czech Republic did not report any pressures on groundwater bodies by mine water.

Abandoned mines can continue to attribute pressure on water bodies, notably through leaching of heavy metals and sulphate pollution. Restoration of natural groundwater levels can take decades. Historical pollution is reported as a pressure for more than 200 surface water bodies

42 Euracoal, Country Profiles, 2020
Europe Beyond Coal: European Coal Plant Database, 17 Jul 2020
RWE, Our Responsibility: 2019 CR Report
Mine specific data from: MIBRAG.de, LEAG.de
PGE, Report on non-financial data of PGE Polska Grupa Energetyczna S.A. for 2018
CEZ, CEZ Group 2019 Sustainability report
43 The Water Information System for Europe –WISE.

and more than 250 km^2 of groundwater bodies in Germany. However, historical pollution is not attributed only to mining sites.

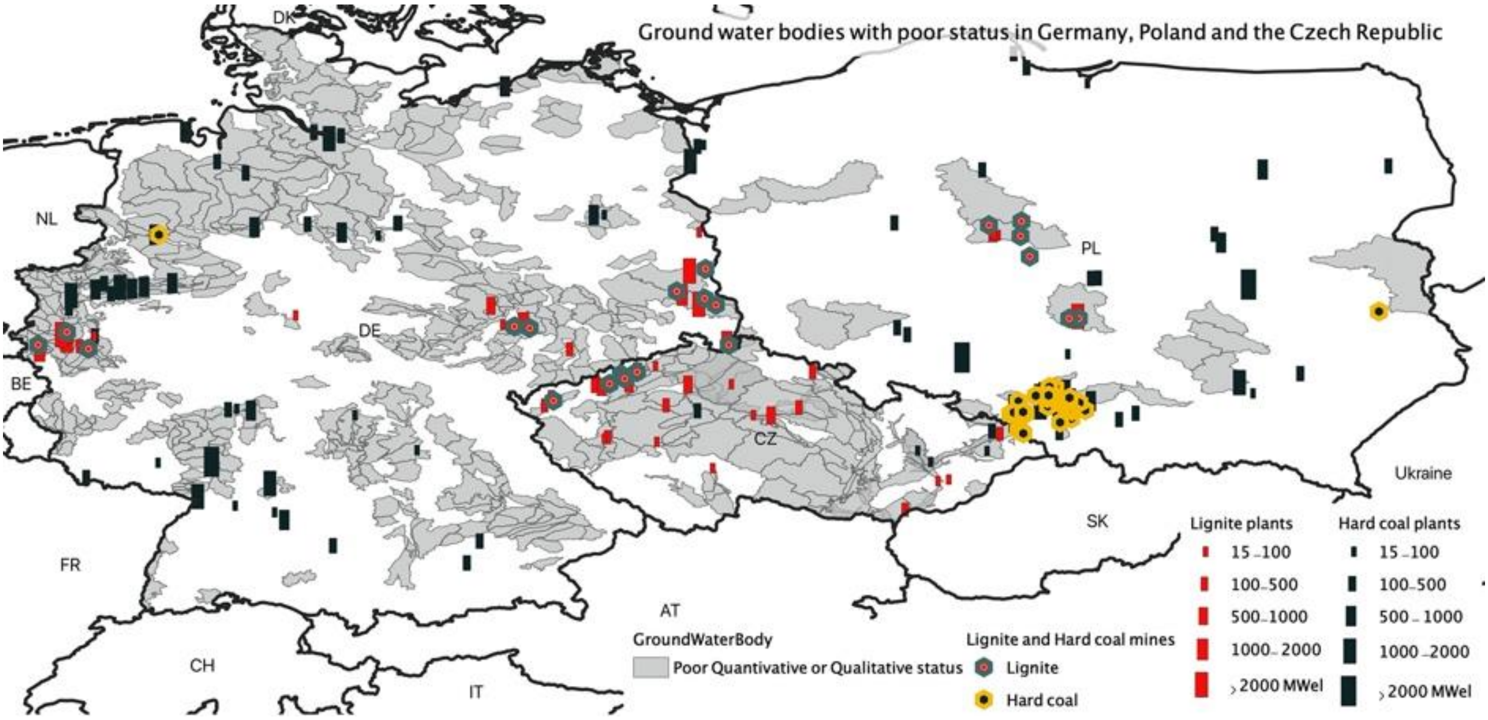
Table 3: Pressures on water bodies reported in the latest RBMP cycle[44]

	Point pressure: Mine waters	Diffuse pressure: Mining	Anthropogenic pressure: Historical pollution
Surface water (number of water bodies)			
Germany	125	110	207
Poland		28	81
Czech Republic	29	10	
Groundwater body area (km^2)			
Germany	2838	13 553	252
Poland	7656	16 747	
Czech Republic		1340	

Lignite mining and power plants are not the sole pressure on groundwater bodies, agriculture and other industries add pressure as well. But it is virtually impossible to conduct lignite mining without disturbing the groundwater status. Exemptions are applied to water bodies due to active mines and abandoned mines as well as deposits. For example, nine groundwater bodies as well as 11 surface water bodies were listed for less stringent objectives due to lignite mining in the 2nd round of RBMPs for the German part of the Elbe catchment[45]. **Figure 2** outlines the status of groundwater bodies in Germany, Poland and Czech Republic as well as indicates the location of lignite mines and plants.

44 EEA, WISE database
45 FGG Elbe, 2013, Darstellung der Bewirtschaftungsziele für die vom Braunkohlenbergbau beeinflussten Grundwasserkörper der FGG Elbe

Figure 2: Status of groundwater bodies which are quantitatively or qualitatively poor status in Germany, Poland and Czech Republic. Based on data from WISE database.



4 Protection of Europe's waters: Water Framework Directive

The Water Framework Directive (2000/60/EC) (WFD) is the key piece of legislation for the protection of Europe's waters and regulates the status of surface waters and groundwaters. The ambitious aim of the WFD was that all water bodies should reach good status by 2015, but the allowed use of exemptions up until 2027 has been widely implemented. Around half of EU's water bodies are covered by exemptions under Article 4[46] that allows for exemption of the objective of the WFD under certain conditions; Article 4.4 allows for an extension of the deadline after 2015 for the achieving of the objectives, Article 4.5 allows for less stringent objectives to be applied, Article 4.6 allows for temporary breaching of the objectives due to natural causes or *force majeure* and Article 4.7 sets out the conditions in which deterioration of status or failure to achieve the objectives may be permitted as the result of new modifications or alterations of a water body.

The WFD sets out a framework for the assessment and management of water bodies through River Basin Management Plans (RBMPs) that are developed for each river basin. The RBMPs outlines how every river basin should be managed and builds on an initial characterisation of each water body and a definition of measures to reach the environmental objectives. The process includes an assessment of pressures, impacts and the status of the aquatic environment as well as an economic analysis and the use of economic instruments to reach the objectives.

To achieve good status, a water body needs to fulfil standards for the chemistry, ecology and quantity of waters. Surface waters need to be in good chemical and ecological status to achieve good status, while groundwaters need to fulfil good chemical status and good quantitative status. The so called one-out, all-out principle states that all the status criteria need to be "good" for a water body to be assigned good status. After the completion of the second round of RBMPs in 2015, the status of EU's waters was still far from satisfactory:

Surface waters

- 38 % in good chemical status
- 40 % in good ecological status

Ground water

- 74% in good chemical status
- 89 % in good quantitative status

46 European Commission, Commission Staff Working Document: European Overview – River Basin Management Plans, 2019

The cost recovery principle

Economic analysis of measures and the use of economic instruments to reach the objectives are core elements of the WFD. The three general economic concepts are: cost recovery (fees for water use, including negative environmental impact), incentive pricing (as water pricing affects the behaviour of users) and the polluter pays principle (ensuring fair contribution by different water users to cover environmental costs).

> ***"Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted according to Annex III, and in accordance in particular with the polluter pays principle."***
>
> Article 9.1 of the Water Framework Directive

Article 9 of the WFD requires Member States to: (i) take into account the polluter pays principle and the principle of cost recovery of water services, including the financial, environmental and resource costs; and (ii) ensure an adequate contribution of the different water uses to the recovery of costs.

Full cost recovery should cover[47]:

- Supply cost (investments, infrastructure, operation, and maintenance etc.)
- Resource cost (the so-called foregone opportunities, i.e. "foregone opportunities that other uses suffer for to the depletion of the resource beyond its natural rate of recharge or recovery)
- Environmental costs (damages on the environment and aquatic ecosystems)

The definition of what a water service is has been a matter of dispute between the European Commission and Member States. The European Commission has argued that the definition of water services can include, for example, abstraction of water for cooling water, irrigation in agriculture and wells drilled for industrial consumption[48]. The disagreement ultimately led the Commission to bring Germany to the European Court of Justice as Germany had not implemented this broad definition of water services. The German government found that the

47 Farmaki, 2018, Analysis of the implementation of full cost recovery of water services and water pricing in Greece under the provisions of the Water Framework Directive 2000/60/EC. Focusing on the Legal Aspect, IOSR Journal of Economics and Finance

48 C-525/12 of 11 September 2014.

definition of water service "was not meant to cover water use for navigation or flood protection measures but is established for water supply activities and waste-water treatment". The Court however, ruled against the Commission, arguing that the WFD provides that Member States "may, subject to certain conditions, opt not to proceed with the recovery of costs for a given water-use activity, where this does not compromise the purposes and the achievement of the objectives of that directive"[49].

In its evaluation of the second round of RBMPs, the Commission stated that the "progress on the implementation of the principle of cost recovery and the use of economic instruments has been limited, which limits the potential of promoting efficient water management". The recent fitness check evaluation of the WFD[50] also found significant room for improvement in the application of Article 9 in most Member States, in particular on cost recovery and the use of volumetric charging and incentive water pricing.

Although water pricing is seen as an instrument that can strongly contribute to sustainable water use, the 'adequate contribution' of certain water uses remains low to non-existent. Incomplete cost recovery represents a hidden cost to society, especially when the environmental and resource costs are not taken into account. It also puts a strain on a potential source of revenue to finance measures to tackle water pollution and to restore water bodies.

On the other hand, the European Commission services are not consistent when ensuring their "guardian of the Treaty's" role. The following two illustrations are highlighted in the context of hidden subsidies to lignite operators:

Illustration 1: In a recent EU state aid decision (2019) linked to merger of Polish hard coal mines, the European Commission accepted the Polish government exemption of environmental charges from the operator, Spolce Restrukturyzacji Kopaln S.A (SRK), such as water cost recovery fees, contrary to the requirement of the Water Framework Directive[51]. The main rationale for allowing that exemption is that "*if SRK had to pay these*

49 InfoCuria, ACTION for failure to fulfil obligations under Article 258 TFEU, brought on 19 November 2012, Paragraph 57
50 European Commission, 2019, Fitness check of the Water Framework Directive, Groundwater Directive, Environmental Quality Standards Directive and Floods Directive
51 see notable paragraph 27 and 29 of State Aid decision SA.52832 (2019/N) of 19.7.2019 on Amendments to the closure plan in the Polish coal mining in the period 2015-2023;

charges, an increase in the costs of mining unit closures would result, which would nevertheless have to be covered by the grant received by SRK from the state budget. The introduction of these exemptions eliminates un-necessary cash flows between SRK and public bodies". SRK is a state-owned company that manages the activities related to mine close and asset management. This decision is one illustration of how DG Competition is undermining set principles of polluter pays and the cost recovery principle for water services.

Illustration 2: In autumn 2020, the government of Germany notified a state aid to the European Commission for its 2039 coal/lignite phase out law, providing significant financial "compensations" to its lignite operators (RWE and LEAG). It is very likely that the European Commission services will not require the German government to first internalise or subtract the negative impacts of these mines affecting EU's water quality. This could be by adding conditionalities to the state aid like,

a) requiring the government to strengthen its national rules on Large Combustion Plants which is currently under review by applying stricter the air emission limits for mercury in coal combustion to the maximum limit of 1µg/Nm^3, which is in line with the Minamata Convention obligations and the mercury phase-out obligation under the Water Framework Directive.

b) a subtraction of costs related to damages to water bodies, (e.g. Sulphates pollution affecting drinking water quality and triggering de-pollution costs) prior to the provision of state aid. 52.

The EU state aid regime has so far only taken a short-sighted approach to assess state aid against internal market impacts and not its compatibility of the EU environmental protection acquis, namely prevention at source and polluter pays principle.

Water management

A) Principles of the WFD on prudent use of water resources

Fresh water is a limited resource and a fair allocation between water users must be ensured. The economic instruments under WFD are set in place to ensure an efficient use of water resources, i.e. to avoid over-abstraction.

52 see joint NGO letter to the European Commission

Identification of groundwater or surface water abstractions sources is part of the initial characterisation and identification of pressures on water bodies (Annex II) and the setting up of a register of abstractions for surface and groundwaters is a minimum requirement in the outlining of program of measures that has to be established for each river basin (Article 11.3). But the WFD also requires that an economic analysis of the water use must be performed to ensure a fair contribution by all water users.

> ***“ [Basic Measures should include] registers of water abstractions and a requirement of prior authorisation for abstraction and impoundment.”***
>
> Article 11.3 (e) of the Water Framework Directive

B) lignite mining related water management issues

The Polish national water management authority, Polish Water, identifies the abstractions and drainages in mining regions and the status of depression cones in the main usable aquifers as significant water management issues for the Oder river basin. At the same time, water resource efficiency and financing of water management activities are listed as issues of very significant concern. Water management is financed mainly from public budgets in Poland, and Polish Water states that “the problem of financing has an impact on the achievement of environmental objectives”, and that the lack of economic efficiency of water management measures is not comparable with the reaching of the environmental protection measures required by national and EU policies[53].

> ***“Financing has an impact on the achievement of environmental objectives [and] lack of economic efficiency of water management measures is not comparable [with] environmental protection measures.”***
>
> Polish Water Management Authority

53 *Polish Water*, 2019, draft review of significant water management issues for river basins districts material for public consultation

5 Results: Water pricing for the coal and lignite industry in Europe

The cost recovery principle has been implemented to different extents in the three countries studied.

Water pricing differentiates the type of water used (groundwater or surface water) and for the purpose of the use of that water (e.g. cooling water, other industrial use, drinking water supply).

Groundwater is defined in the WFD as: water below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil

Surface water is considered to be: inlands waters, except groundwater, transitional water ands and coastal waters

*Considering that the lignite pits can go as deep as 300 metres we consider the "**mine drainage** water" to mean "groundwater" in the definition of the Water Framework Directive.*

In Europe's largest lignite-extracting country, **Germany,** water fees are regulated at the federal state level. The lignite mines are mainly located in the federal states of Brandenburg, North Rhine-Westphalia, Saxony and Saxony-Anhalt, but they have imposed different fee systems. In Saxony-Anhalt, water abstraction for all mining purposes is exempt from fees, while in Saxony lignite mines are exempted from the fee of 0.015 €/m^3 which is applied to drainage of other types of mines. In Brandenburg, mine drainage (abstraction) is exempt from fees, unless if the drained water is being used, i.e. for public water supply, production, or cooling water, where the standard rates for the water use has to be paid. North Rhine-Westphalia "stands out" with a fee of 0.05 euro per cubic meter of drained water which was imposed in regional law after pressure from environmental groups in 2011. Now, in North Rhine-

How much does the industry pay for ground water drained by lignite mines ?

- ***Germany – North Rhine Westphalia: 5 eurocents for 1000 litres***
- ***Germany – Brandenburg: 11 eurocents, only if used***
- ***Germany- other lignite states: 0 cents***
- ***Poland: 0 cents***
- ***Czechia: 0, if it's used by the mine***

Westphalia, the same fee applies for the abstraction of groundwater, whether the purpose is to keep a mine dry, to supply public water or use it for industry.

In **Poland** water fees are regulated through the Water Law 1566/2017 (last amended November 8, 2019) and the Ordinance 2502/2017. The Water Law stipulates that fees for water services shall be paid for abstraction of groundwater and surface water in the form of a fixed and a variable fee, but also specifies several exemptions. The fees are based on the amount of water used, the regions (e.g. a region poor in water has higher fees), the treatment methods required, (the less treatment the higher the fee) as well as available resources[54]. Both the variable and fixed abstraction fee for lignite, hard coal and other mining and quarrying purposes shall only be imposed when the source of water is not from mine drainage. Essentially, mine drainage from lignite mines and other mines are basically exempt from fees.

An economic analysis of the former Polish Water Law from 2001 showed that only 22-24% of the cost for water services were recovered due to vast exemptions from water fees, especially for the energy sector[55]. Facing to lose out of EU funding, Poland updated its Water Law in 2017 and introduced new fees. However, there is significant room for improvement for the implementation of cost recovery in Poland.

In **Czech Republic**, water management is regulated mainly through Act No. 254/2001 on Water and Amendments to certain Acts (the Water Act). The situation with mine waters, is however complex as they are also regulated by a decades old law, Act No. 44/1988 Coll., on the Protection and Utilization of Mineral Resources (Mining Act). The Water Act stipulates that fees are to be paid for the abstraction of groundwater and surface water. The fee for groundwater abstraction is set nationally and is specified in Annex 2 of the Water Act and the groundwater fees are administrated by the State Environmental Fund of the Czech Republic. The fee for surface water abstraction is set by the watercourse administrator through five state-owned enterprises (River Boards) following Act no. 526/1990 ("The law on prices"). According to the Mining Act, mine operators are entitled to use mine water "for its own needs", including production (e.g. for sprinkling the mine area, for floating and washing the extracted material) free of charge during mining activities. They can also use it free of charge as an alternate source for the needs of those who

54 Magdalena Ukowska, FrankBold, response to survey 21 April 2020
55 Polish Water, 2019, IP Draft review of significant water management issues for river basin districts: Material for Public Consultation

have been damaged by water loss caused by the organization's permitted activities. The legal text allows for the interpretation that mine waters can be used for free also for cooling water needs by plants operated by the same organization, we therefore assume that this is indeed the case (exempted).

The lignite extractive industry in the top-3 lignite extracting countries is benefitting from generous exemptions to pay for the main part of the water they abstract, the mine drainage (in essence groundwater). A fee has only been introduced to the regional water law in North Rhine-Westphalia in 2011 after demands from environmental groups. The benefits given to the lignite industry in these countries become even more evident if compared to a country where the lignite industry is not as prominent, such as Hungary, where the fee for abstraction for mine drainage is the same as the fee imposed on any other industrial activity. The industrial fee ranges (0.012-0.483 €/m³)[56] depending on the class of the water source. Abstraction fees of surface water for cooling water use are multiplied with a factor ranging between 0.2 and 0.4 depending on the class of water, while groundwater cannot be used directly for cooling in Hungary as it would be considered over-abstraction of aquifers.

Table 4: Fees applied for groundwater abstraction (in €[57]/m³)

Location	Standard rate/Other uses	Lignite mine drainage	Industry	Cooling water	Public water	Agriculture (irrigation)
Germany						
Brandenburg	0.115	0.00	0.115	not specified	0.1	Exempted
North Rhine-Westphalia	0.05	0.05	0.05	0.035/0.0035[1]	0.05	Exempted
Saxony	0.076	0.00	0.076	0.076	0.015	0.025
Saxony-Anhalt	0.07	0.00	0.07	0.02	0.05	0.02
Poland	0.03	0.00	0.03	0.03	0.02	0.01
The Czech Republic	0.11	0.11	Not specified	Not specified[2]	0.07	Not specified

1) Once-through cooling, 2) mine drainage water can be used free of charge by the organisation, including for cooling water

56 General Directorate of Water Management in Hungary, email response, 16 April 2020

57 All conversions from other currencies to euro are dated as of 25th September 2020

Notes on mine drainage: In **Brandenburg**, standard rates apply if the drained water is further used (e.g. for public water supply, cooling water). The mine drainage fee applied in **North Rhine-Westphali**a is the standard rate that is applied to abstraction of groundwater. In **Saxony**, a fee of 0.015€/m^3 is applied to mine drainage other than lignite. In **Poland**, water abstraction fees only apply to mining activities that are not mine drainage (I.e. a very small share). In **Czech Republic**, drained mine waters can be used free of charge for the organisation's own needs, we assume that this includes cooling water.

When it comes to cooling water charges, the situation also differs between federal states/regions as well as between countries. Generally, cooling water abstraction from surface water is charged much less than other industrial uses, sometimes only 25% of the standard rate as in Saxony and Saxony-Anhalt. Some regions only offer reduced cooling water fees for once-through cooling, such as in the Elbe and Ohre River Boards in **Czech Republic,** while in other places, such as in Brandenburg, Saxony and Saxony-Anhalt, the reduced fee is set regardless of cooling technique. Table 5 only shows the fees for abstraction of surface water, but in Saxony, Saxony-Anhalt and North Rhine-Westphalia there are also cooling water fees specified for groundwater. In **Poland**, However, the variable fee for abstraction of cooling water is applied only for the fraction of the water 'consumed' by the plant. This means that for a plant with an open cooling system, the main part of the water abstracted is for free. The Polish law is also giving a generous exemption for the discharge of cooling waters. Cooling waters can be discharged without fees at a temperature up to + 26°C or at a difference of up to 11°C between the intake and discharge water temperature.

The implications of once-through and closed circuit are different for the water cycle. While the once-through cooling does not consume large amounts of water it does have direct negative impact on the aquatic life due to heat stress, physical impacts and habitat destruction. Almost some 75-80% of the abstracted water for closed circuit cooling is evaporated to air and therefore "consumed" by the plant. It therefore seems reasonable to not offer any discounts for this type of water abstraction.

Table 5: Cooling water fees compared to standard or other use rates (€/m^3 surface water abstracted)

Location	Standard rate/ Other uses	Industry	Cooling water	Public water	Agriculture (irrigation)
Germany					
North Rhine-Westphalia	0,05	0,05	0,035/ 0.0035[1]	0,05	Exempted
Brandenburg		0,023	0,0058	Not specified	Exempted
Saxony	0,02	0,020	0,005	0,015	0,005
Saxony-Anhalt	0,04	0,04	0,01	0,05	0,005
Poland[58]	0,013	0,013	0,013[2]	0,009	Not specified
Czech Republic[59]					
Elbe	0,17		0,03[1]		
Ohre	0,18		0.18[3]		
Vltava	0,14		0,05[1]		
Oder	0,17		0,17[3]		

1) Once-through cooling, 2) Only applied to the volume of water consumed by the plant, 3) No plants use once-through cooling in administrative region of Ohre or Oder River Boards

58 Polish Water Law (Ustawa Prawo Wodne) Art. 279 states that discharge of cooling water <26°C or where the ΔT <11°C is exempt from fees
Ordinance on water fees (Rozporzadzenie 2502/2017) §5.1
59 Ministry of Agriculture of the Czech Republic, State of the Water Management Report 2018, 2019

6 Estimating the gap: How much is the coal industry saving by benefitting from water subsidies?

The coal industry is already unprofitable and is partly kept alive by state support. Reduced or non-existing water fees is adding to the list of subsidies offered to the sector. Estimating the gap that represents the contribution for water services currently not collected from the coal industry is made difficult by hurdles in access to information on water abstraction by mines and plants.

For the purpose of estimating the gap we assume that the water abstraction for lignite mining (drainage) is to be considered as "groundwater".

Information for the water abstraction volumes is based on reported official data like public registers and as a second option, from annual reports of the utilities. In the absence of any data, abstraction volumes are based on estimations (see methodology, Annex I).

To estimate the revenues currently not collected from the coal and lignite industry for mine drainage, specifically when mine drainage is exempted from any fees, we assume the same structure as in North Rhine-Westphalia, i.e., that the standard rate applied to other industrial abstraction of groundwater in the country/region is also applied to mine drainage. For cooling water, we use the fees currently applied and calculate the gap for the fraction of cooling water that is not currently subjected to fees.

The following main results can be provided for illustration in relation to lignite mining and lignite-fired power plants (cooling water):

Germany

Total water abstraction volume for lignite mining is estimated to be in the range of 1000 million m^3, and for cooling water use at 274 million m^3.

Detailed data on water abstraction and levels of fees paid is poor and not publicly available online in Germany[60]. Some estimates can still be made based on available data:

LEAG abstracts 360 million m^3 of groundwater every year, 30% of which is used for steam production and cooling purposes[61]. LEAG's mines are located in Brandenburg and Saxony. In Saxony mine drainage is for free, while in Brandenburg fees only apply to the shares of the drained water that is used (e.g. for public water supply, industry). That leaves approximately 252 million m^3 abstracted for free.

If a fee at the same rate as in North Rhine Westphalia (0,05€/m³) would be imposed the company would pay at least 13 million euros annually. Coincidentally, this roughly equals the estimated cost to upgrade the waterworks to deal with the sulphate pollution of the river Spree.

MIBRAG operates 2 mines, Profen and Vereinigtes Schleenhain, that abstract 59 and 44 million m^3 per year respectively. Applying the same rate as in NRW would mean that 3 million euros annually could be collected for Profen and 2.2 million euros for Vereinigtes Schleenhain,

In total, that means that at least 18 million euros could be collected for water management from the Lusatian and Central German lignite districts annually by imposing the same fee as is applied in North Rhine-Westphalia.

RWE: was exempted from paying any fee up to 2011, which was estimated[62] to about 25 Million € per year of saved water related operation costs.

Poland

A) abstraction for lignite mining

445 million m^3 of water were drained from lignite mines, and 289 million m^3 for hard coal mines in 2017[63]. Applying the same rate as applied for other industrial groundwater abstraction (0,03€/m³) would bring in

60 A recent request regarding "effects of mining and combustion plants" from Oct. 28, 2020, put forward by several Green members of the German Bundestag to the government, points to this gap and includes a number of specific questions on these data.
61 LEAG, Die Lausitzer Tagebaue (The Lusatian open pit mines)
62 BUND North Rhine-Westphalia https://www.bund-nrw.de/themen/braunkohle/hintergruende-und-publikationen/braunkohle-und-umwelt/braunkohle-und-wasser/
63 Polish Geological Institute, 2018, presentation during local government geology meeting in Bogatynia 3-4 October 2018, Last accessed, 19 November 2020

around 22 million euros annually to Polish water management. (Note: this totals to 734 million m^3 per year, but water abstraction for mining and quarrying is reported to be only 52-53 million m^3 in Eurostat over the years 2015 to 2017 indicating a major data reporting gap).

B) abstraction for cooling water use (lignite combustion plants)

PGE GiEK reported a discharge of 917 million m^3 of cooling waters for 2018. The discharge represents the difference between abstracted and consumed water, i.e. the fraction obtained for free. As plant operators currently only pay for the water consumed by the plant that would represent a value of close to 52 million PLN (12 million euros) exempt from cooling water fees annually.

Czech Republic

The Czech Republic offers a public water management portal[64] with registers of water abstractions and discharge for permitted facilities. However, for mine waters only discharge and not the abstracted volumes are reported.

A) abstraction for lignite mining

CEZ reported 5.57 million m^3 withdrawn by the organization's own activities (e.g. mine water) in 2019[65], while 1.28 million m^3 are reported as discharged by the company's two mines the same year. If the difference is assumed to be used by the company, i.e. for free, then CEZ is saving 13 million CZK (around 472 000 euros) annually for the operation of its two lignite mines (assuming the application of the standard fee of 11 €cent/m^3).

B) abstraction for cooling water use (lignite combustion plants)

There are about 7.3 GW of lignite power plants operating in the Czech Republic. Since power plants located close to the lignite mines could use the water drained by the mines for their cooling needs and since drained mine waters can be used free of charge for the organisation's own needs under Czech laws, this could constitute a reduction in actual fees collected. Based on this assumption, Sokolovska Uhelna which also has two power plants of about 700 MW could be benefiting from an exemption of a water fee of € 1.6 million annually.

64 Czech Ministry of Agriculture, Water Management Information Portal
65 CEZ Group 2019 Sustainability report

Taking these 3 regional country examples show that the lignite industry is benefitting from hidden subsidies at least amounting to 54.2 million euros annually due to non-internalization of the water service costs due to abstraction.

The calculated figures do not take into account external damage costs due to lignite mining activities or the clean-up costs of the widespread exceedance of the EU's mercury biota standards, to which lignite combustion is a main contributor (via the stack emission route).

7 Recommendations

General conclusion

Cost recovery and polluter pays principles are not properly applied to Europe's coal and lignite sector

This report looked at how the principle of cost recovery is applied in Czech Republic, Germany and Poland specifically in relation to the coal and lignite mining. The EU's three biggest lignite countries are giving substantial reductions of water fees for their coal and lignite industries, from the mining to the combustion stage despite the fact that the same activities are often recognized as putting significant pressure on water bodies and are often the subject of poorly justified exemptions from reaching the WFD objectives. Considering the significant negative impact these activities have on the health of the water bodies, it is imperative they are subject to the polluter pays principle and the principle of cost recovery of water services.

EU governments must stop delaying and finally establish adequate water pricing as a means to allocate environmental and resource costs to polluters. In relation to lignite/coal mining and combustion activities, the following specific recommendations can be made:

Recommendation 1

Revise economic analysis and put in place economic instruments for water service and cost recovery linked to lignite / hard coal mining and combustion

The environmental impacts of coal mining and combustion that directly and indirectly affect surface and groundwater bodies have been recognized as a Significant Water Management Issue (SMWI) in the major river basins of the region- Vistula and Oder River Basins in Poland, in Elbe river basin in Germany and Czech Republic. The long-term negative implications of lignite mining are also clear from the decision to set less stringent environmental objectives (according to article 4 paragraph 5 WFD) to several water bodies affected by mining- for example in the German Elbe River Basin. Yet, the basic measure of establishing adequate water fees applied to lignite mining has not been implemented. Exemptions should only be granted after all measures, including correct fees, have been implemented. This must be addressed most urgently in the 3rd cycle River Basin Management plans that are currently being prepared, or in national policies setting water pricing.

Hidden subsidies for the coal sector (in the form of reduced or non-existing fees) should be discontinued and adjusted. Before claiming lack of funding to address the Significant Water Management Issue or main barrier to meet the environmental objectives of the WFD, Member States should revise water fees and make sure that an adequate contribution is made by all water users. When lignite mining is listed as a pressure on water bodies, we expect water management authorities to also present an overview of water abstractions and discharges by the lignite sector primarily in the RBMPs as well as description on how polluter pays and cost recovery principles have been applied.

While full cost recovery is usually applied to the drinking water supply, which has been acknowledged as a universal human right, water abstracted for coal and lignite mining, which is clearly an environmentally unsustainable activity harming the mitigation efforts towards climate change, cannot be seen to have an overriding public interest which deserves a large number of exemptions from the obligation to bring all our waters to good status by 2027. EEB recommends that mine drainage and cooling water are recognized as a water service and adequate fees at least in line with those set for other industrial water abstraction are applied for these activities[66]. This recommendation extends to all cooling water use, and is not limited to coal and lignite combustion, as the impact on water bodies is regardless of fuel.

Recommendation 2

Ensure coherent approach at EU level as to the correct implementation of the polluter pays principle (in relation to water costs) in State aid decisions

At EU level, the European Commission shall make sure that any state aid is conditional to full internalization of negative externalities and the correct application of the water service cost recovery principle (which is based on the polluter pays principle). In the precited example linked to the German coal phase out law and pending state aid decision, the European Commission shall therefore require the subtraction of the unpaid water

66 Whilst the setting of an "adequate" level depends on many factors such as local conditions, the uptake of best water efficient techniques and proper internalisation of external water related costs, the Land of NRW has set a fee of 0,45€cents/m³ back in 2011 for mine drainage abstraction. A standard rate of 11,5 cents/m3 is applied in Brandenburg for groundwater use in industrial purposes (these levels are meant to be indicative, nor as endorsed by the EEB)

abstraction costs as well as the sulphate depollution costs, as suggested by the coalition of NGOs (EEB, CAN-EU and Greenpeace)[67].

We also expect the EU Commission to overhaul its EU state aid approach to consider the impacts of achievement of the Water Framework Directive objectives, and restrict the granting of state aid to a correct and full application of its main principles such as the water cost recovery principle. The exemption from water fees granted to the Polish hard coal mine merger (see p. 11) that was given green light from the Commission should be withdrawn. Any state aid compensation must take into account the subsidies already granted by the state to the companies.

Recommendation 3

Recommendations linked to data access, reporting and transparency

Setting up of registers of water abstractions is a basic measure under WFD (Article 11)., Access to this information, however, differs between countries. In Poland and Germany water abstraction data are not yet made publicly available in a user-friendly manner. Water abstraction data has also been lacking or non-complete in reference documents for Significant Water Management Issues (SWMI) consultations. Some companies present water abstraction data in their sustainability reports, but reporting is not coherent. From the countries assessed, only the Czech system allows access to data in a user-friendly way where data, including water abstraction and discharge volumes, can be downloaded in Excel format. Similar data access systems should be set up centrally in Germany and Poland.

The information shall contain at least:

- IED registry ID code of the installation (mine, plant or waste disposal site)
- Pressure and key type of measures for the associated or affected water body as reported in the RBMPs
- Water abstraction and consumption per installation including source of water (e.g. surface water or groundwater) and their water body codes (WISE database code)
- Water discharge per installation and the codes of receiving water bodies, information about the pollutants subject to monitoring

67 EEB, [Annex to the letter to the European Commission on German state aid for coal phase out]

under WFD, E-PRTR reporting and other monitoring obligations, in the format of concentrations and loads, including annual average of pH and max temperature at release point, and flow rates.

- Details on derogations above the permitted emission levels and exemptions provided for the installations/ facilities and annual compliance reports information (e.g. Art 14 of the IED) to be included in the reporting under the IED)

The online system can be accompanied by publications giving an overview of the state of water management, including surface and groundwater abstraction per sector, money spent on watercourse management, development of water fees over time as well as revenues collected from different sectors, such as being provided by Czech Ministry of Agriculture through a yearly report (in English). Defining the right reporting shall also be addressed at the level of the RBMPs, keeping in mind that the reporting should be harmonized on the key parameters and metrics so to allow comparability.

In order to overcome language barriers and enable an EU-wide comparison, the data access and reporting should be improved at EU level. The minimal expectations apply therefore to national as well as EU portal reporting level: Monitoring results on water abstraction, discharge and quality monitoring shall be tele-reported to a centralised EU database, e.g. the WISE/IED Registry / Revised PRTR, and shall be made actively available online within one month after the information has been generated.

There is a current policy opportunity arising through the review of the EU PRTR review, in which the European Commission shall ensure the reporting metrics are adapted so to cover the items highlighted above. See further and more specific requests on access to information in Section 6 of EEB publication and EEB submission brought to the E-PRTR review[68]

68 EEB Input to the E-PRTR Impact Assessment

Annex

Methodology

Water fees are taken from national and/or regional legislation wherever possible and then on secondary sources like official reports of utilities.

Information for the water abstraction volumes is based on reported official data e.g. public registers, where not available information was retrieved from annual reports of the utilities and in the absence of reported data, abstraction volumes are based on estimations. Findings are made available in a separate document, which will be updated over time and is available online[69].

The gap was calculated using the following estimations:

Mine drainage

Germany: The gap was calculated by multiplying the volumes of water abstracted by mines in the Lusatian and Central German lignite districts with the mine drainage fee applied in North Rhine Westphalia (Table 4).

Poland: The gap was calculated by multiplying the volumes of water abstracted by Polish lignite mines and multiplied by the fee applied to industrial abstraction of groundwater (Table 4).

Czech Republic: The gap was calculated as the difference between the volumes abstracted for mine drainage and the volumes reported as discharged per mine. The difference was assumed to have been used for the organisation's own needs, i.e. for free. The difference was multiplied by the fee applied to industrial abstraction of groundwater (Table 4).

Cooling water

Poland: The gap was estimated from the cooling water discharges reported by PGE GiEK and assuming that the discharged water is equivalent to the volume of cooling water abstracted but not consumed. The fee for cooling water was then applied to it to estimate the gap.

Czech Republic: It was assumed that water obtained from mine drainage cover the cooling water needs for the lignite plants (which are part of the same company) and that this water is used free of charge. The gap was

[69]Czech Republic: https://eeb.org/library/water-abstraction-data-czech-republic/
Germany: https://eeb.org/library/water-abstraction-data-germany/
Poland: https://eeb.org/library/water-abstraction-data-poland/

estimated as the product of existing cooling water fees and the volumes of cooling water used per plant (Table 5).

Cooling water estimation was also done based on the following methodology where official information was not available.

The withdrawal and consumption volumes of lignite power plants was estimated earlier by the Greenpeace study in 2016, The Great water grab, How the coal industry is deepening the global water crisis, March 2016. The data was updated with the recent list of coal power plants from Europe Beyond Coal database available here. The Greenpeace study uses the water factors from a 2013 study by Meldrum, J., Nettles-Anderson, S.,Heath, G. & Macknick, J., which provides an estimation of six factors, minimum, median and maximum withdrawal volumes and consumption volumes. For this study we have used the median withdrawal and median consumption volumes of the power plants.

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