



08.07 Fuel Use and CO₂ Emissions of Selected Facilities

Text Summary

The mandatory business environmental reports submitted by industrial plants and other relevant operators must include information about emissions into the air, water and soil.

Maps 08.07.1 and 08.07.2 refer to facilities subject to mandatory reporting either under

- the Federal Immissions Protection Law (BImSchG/ Map 08.07.1), or
- the Greenhouse Gas Emissions Trading Law (TEHG/ Map 08.07.2).

08.07.1 The use of fuel by firing plants subject to mandatory reporting

The Federal Immissions Protection Law (BImSchG), a law designed to provide protection against harmful environmental impacts through air pollution, noise, vibration and similar processes, stipulates that the establishment or operation of plants which are particularly prone to have damaging effects on the environment requires licensing. These **plants subject to licensing** are listed in the Appendix of the 4th Ordinance on the BImSchG (Ordinance on Plants Subject to Licensing/ 4. BImSchV). All plants which, due to their type or size are not contained in this category are considered plants not subject to licensing.

A part of these plants - approximately 50 % - demands emissions declaration as per 11. BImSchV at intervals of 4 years; the number of these plants in Berlin has dropped continually over the course of the time period during which they have been recorded (cf. Table 1).

Tab. 1: Number of plants in Berlin, 1989 to 2016, requiring emissions declaration as per 11. BImSchV								
Significance (Designation as per Appendix to 4th Ord. BImSchV)	Number							
	1989	1992	1996	2000	2004	2008	2012	2016
Heating, mining, energy	954	356	324	243	100	123	105	100
Bricks, clay, glass, ceramics, construction materials	55	40	37	60	47	29	28	28
Steel, iron and other metals, incl. processing	124	86	74	53	49	65	48	28
Chemical products, medicines, oil refinery & processing	58	38	32	28	25	12	10	4
Surface treatment with organic materials	70	28	13	13	18	31	29	14
Wood, cellulose	3	1	1	2	3	4	4	1
Food, beverages, feed	98	84	88	76	16	10	6	6
Recycling and disposal of waste materials	17	9	15	71	90	46	23	17
Storage and shipping	61	61	68	57	33	37	23	21
Other	73	159	82	17	17	30	27	35
Total	1513	862	734	620	398	387	303	254

Tab. 1: Number of plants in Berlin, 1989 to 2016, requiring emissions declaration as per 11th BImSchV

The total number of industrial plants requiring licensing has dropped considerably since the reporting year 1989, which represents the "status prior to the political change". The reasons for this differ by branch.

The facilities showing in map 08.07.1 The use of fuel by firing plants subject to mandatory reporting are all in the sector "**Heat production, mining, energy**". This source group is also primarily responsible for the major share of air pollutant emissions of all "mandatory-licensing facilities" in Berlin. During the early '90s, a large number of plants in this sector were closed down due to the changing political conditions, or refitted for more environmentally friendly fuels. With the amendment to 4. BImSchV in 2002, 143 facilities in the energy sector were excused from mandatory licensing, compared with the figure for 2000. The capacity limit in the firing plants sector was raised to a firing heat output greater than 10 MW for gaseous fuels, and greater than 20 MW for liquid fuels, so that small plants are no longer subject to mandatory licensing under §4 BImSchG , but are rather assigned to the source group "Home heating".

In § 27 and its 11th Ordinance (Emissionserklärungsverordnung - the Emissions Declaration Ordinance/11. BImSchV), it is stipulated that the operators of facilities subject to licensing must submit an emissions declaration, with continual follow-up information. These Emissions Declarations must include "all emissions-relevant materials handled", as well as all materials, such as hard coal and natural gas, which are used for combustion.

The **first declaration period for the emissions declarations was the calendar year 2008**. Subsequently, an emissions declaration is to be submitted every four calendar years (§ 4, 11. BImSchV).

The map 08.07.1 shows the 56 registered facilities in Berlin for which the criteria of the sector "Heat production, mining, energy" (No. 1 in Appendix 1, 4. BImSchV) apply, with their fuel uses. These are "firing plants for the purpose of generating electricity, steam, hot water, process heat or heated waste gas, through the use of fuels in a combustion facility (such as a power plant, cogeneration plant, heating plant, gas turbine facility, internal combustion facility or other firing facility)", with a firing heat output > 20 MW. Some of these facilities (19 sites) also fulfil the criteria of the Large-Scale Firing Facilities Ordinance (13. BImSchV).

Figure 1 shows the total fuel use in 2016, and the shares of fuels in total CO₂ emissions, compared by means of the common reference unit, Tonnes of Coal Equivalent (TCE).

For each TCE burned, the following tonnes of CO₂ emissions are applied for each of the following fuels:

- brown coal: 3.25 t
- hard coal: 2.68 t
- petroleum: 2.30 t
- natural gas: 1.50 t

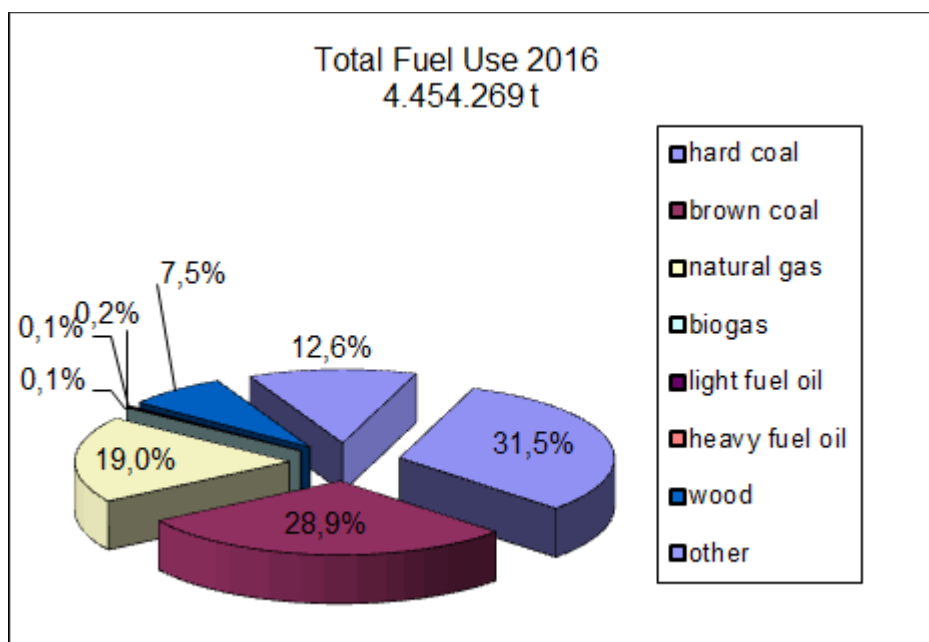


Fig. 1: Total fuel use and CO₂ emissions for all firing facilities in Berlin 2016 subject to mandatory licensing as per 11. BImSchV

The total fuel use for all 78 facilities in 2016 was more than 4.4 million t. The predominant energy source for the smaller facilities was natural gas, with approx. 21 % of the total fuel use, while the larger, especially the older facilities still used hard coal, which accounted for approx. 31.5 % of the total quantity. Brown coal accounts for approx. 28.9 % of the total quantity, with a decrease of 6 % in comparison to 2012; however, this energy source is now used almost nowhere but in the Klingenberg Heat Power Plant.

Approximately 1 t of carbon dioxide is emitted for each tonne of brown coal burned, which makes that energy source the most climate destructive of all fossil fuels. The quantities of fuels used are inseparably tied to the quantities of CO₂ emitted, regardless of the degree of effectiveness of the power station. That factor only determines the number of kilowatt hours generated per TCE, i.e. the specific CO₂ emissions per kilowatt hour.

In spite of the extent of the cogeneration system already achieved in Berlin, which is unique Europe-wide (cf. maps on building heat supply, 2010 edition) additional investments in the modernization of the existing power plant park, the expansion of the district and local heating networks, and of the cogeneration plants are planned.

The State of Berlin has committed itself to reduce CO₂ emissions by 40% over the 1990 figure by 2020. Among others the conclusion of numerous [climate protection agreements](#) with various partners has provided a binding basis for this, with mutual obligations.

Moreover, there has since March 2014 been a feasibility study "CO₂-neutral city Berlin 2050" available which investigates the preconditions under which the city could become climate-neutral by mid-century ([Download English Summary](#)).

Since June of 2017 the new Berlin Energy and Climate Protection Programme is concluded by the Senate of Berlin ([Download Information Paper - German only](#)).

The most important Berlin providers, [Vattenfall](#) (accessed on 16 September 2021, only in German) and [GASAG](#) (accessed on 16 September 2021, only in German) have, with their own concepts, contributed to further optimization of the supply and emissions situation.

08.07.2 CO₂ emissions from combustion plants subject to the Greenhouse Gas Emissions Trading Act

In the context of European efforts to reduce greenhouse gas emissions, which are primarily caused by the leading industrial nations, numerous directives have been promulgated which in turn affect the concretization of these efforts in the form of laws and ordinances passed at the national level. An overview of European climate protection policy is provided by the [Federal Ministry for the Environment](#) (accessed on 08 November 2021).

The EU directives on emissions trading (Directive 2003/87/EC) and the German Greenhouse Gas Emissions Trading Law (TEHG) of July 21, 2011 on the trade in CO₂ emissions certificates is a market economic instrument of EU climate policy. That policy is designed to support efforts to achieve the climate protection goals for reducing greenhouse gas emissions established in the Kyoto Protocol of (1997).

The TEHG establishes the prerequisites for an emissions trading law. A separate [Emissions Trading Office](#) (DEHSt) (accessed on 08 November 2021) at the Federal Environment Agency (UBA) supervises the distribution and cancellation of certificates.

For this purpose, a central [German Emissions Trading Register](#) (accessed on 08 November 2021) has been set up as an essential element of the emissions trading process. It provides information, sometimes in public reports, regarding the ownership of particular emissions certificates. "This is possible because each certificate has a definite serial number, which is registered at the time of transaction. Each transaction carried out in a national register must be checked and confirmed by the European central register, the so-called Community Independent Transaction Log (CITL), as well as in the central register of the United Nations (ITL). The national register is maintained by the German Emissions Trading Office, which is part of the Federal Environment Agency" (UBA 2011).

Essential elements for supervision and verification are the requirements stipulated in Section 2 (§ 4 - 6) and in Appendices 2 and 3, for the ascertainment of emissions and the reporting on them.

Laws and ordinances

- [3] **Eleventh Ordinance for the Implementation of the Federal Immissions Protection Law (Ordinance on Emissions Declarations) (11. BImSchV)**
Version issued March 5, 2007 (BGBl. I p. 289), amended by Art. 5 Clause 3 of the Ordinance of Nov. 26, 2010 (BGBl. I p. 1643);
Internet:
http://www.gesetze-im-internet.de/bimschv_11_2004/index.html
(Accessed on 16 September 2021)
- [4] **Law on the Trade with Greenhouse Gas Emission Rights (GHG Emissions Trading Law TEHG),**
of July 21, 2011 (BGBl. I p. 1475);
Internet:
http://www.gesetze-im-internet.de/tehg_2011/index.html#BJNR147510011BJNE003700000
(Accessed on 16 September 2021)
- [5] **Law for Protection against Harmful the Environmental Effects of Air Pollution, Noise, Vibrations and Similar Processes (Federal Immissions Protection Law/ BImSchG),**
Version issued September 26, 2002 (BGBl. I p.3830), last amended by Art. 8 of the Law of November 8, 2011 (BGBl. I p. 2178);
Internet: <http://www.gesetze-im-internet.de/bimschg/>
(Accessed 16 September 2021)
- [6] **Directive 2003/87/EC of the European Parliament and of the Council, of October 13, 2003, Establishing a Scheme for Greenhouse Gas Emission Allowance Trading;**
Internet:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:275:0032:0046:en:PDF>
(Accessed on 16 September 2021)
- [7] **Fourth Ordinance for the Implementation of the Federal Immissions Protection Law (Ordinance on Plants Subject to Licensing / 4. BImSchV)**
4th Ordinance on facilities subject to licensing, as per the Notification of May 02, 2013 (Fed. Journal. I p. 973);
Internet:
http://www.gesetze-im-internet.de/bimschv_4_2013/
(Accessed on 16 September 2021)

Maps

- [8] **SenStadt (Senate Department of Urban Development, Berlin) (Ed.) 2010:**
Berlin Environmental Atlas, updated and expanded edition, 2010, Maps 08.01 Building Heating Supply / 08.02 Predominant Heating Types, 1:50,000, Berlin;
Internet:
<https://www.berlin.de/umweltatlas/en/energy/building-heating/2005/maps/>