

# 08.07 Fuel Use and CO<sub>2</sub> 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
<b>Total</b>	<b>1513</b>	<b>862</b>	<b>734</b>	<b>620</b>	<b>398</b>	<b>387</b>	<b>303</b>	<b>254</b>

**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 CO<sub>2</sub> emissions, compared by means of the common reference unit, Tonnes of Coal Equivalent (TCE).

For each TCE burned, the following tonnes of CO<sub>2</sub> 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

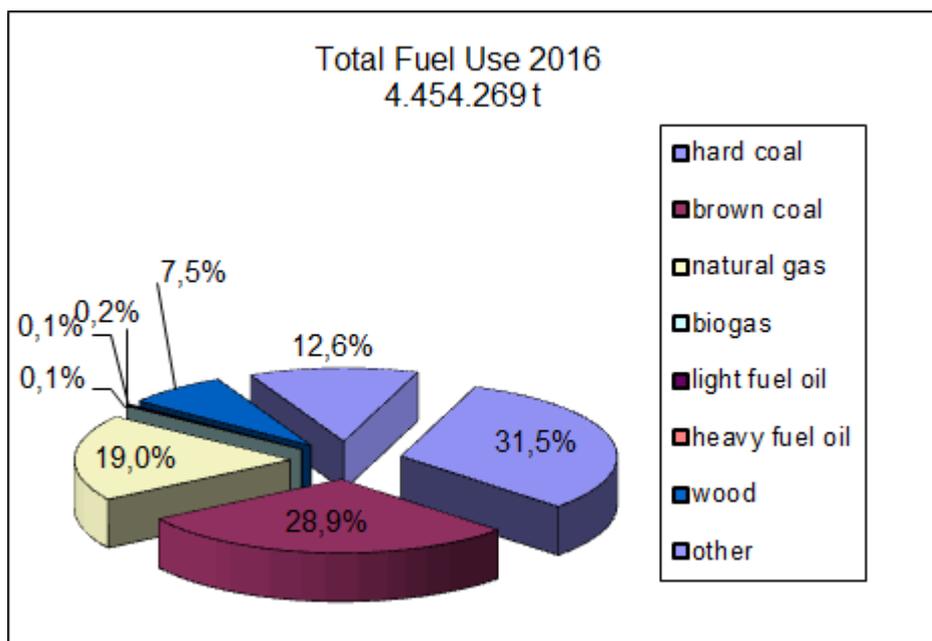


Fig. 1: Total fuel use and CO<sub>2</sub> emissions for all firing facilities in Berlin 2016 subject to mandatory licensing as per 11. BImSchV

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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 "CO<sub>2</sub>-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 CO<sub>2</sub> 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 16 September 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 CO<sub>2</sub> 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 16 September 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 16 September 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.

Table 2 shows all relevant information for the facilities registered in Berlin under the TEHG since the beginning of reporting in 2005.

Tab. 2: Development of CO<sub>2</sub> emissions of all heating and cooling supply plants in Berlin affected by the Greenhouse Gas Emissions Trading Act (ETEG) as the years 2005-2020

Reference German Emissions Trading Authority	Operator	Facility	Address (postal code, street)	Site number	Designation of the Statistical classification of economic activities	Plant coordinates ETR009 / UTM Zone 33 N, EPSG:25833		Emissions CO <sub>2</sub> equivalent in t according to VET (Verified Emissions Table)															
						X	Y	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
14310-1247	Bayer AG	Bayer heating plant	13553 Mühlentor 170	166.908.00	heat and refrigeration supply	389.835	5.822.330	58.682	59.768	56.163	50.853	48.303	45.132	40.203	40.275	41.281	42.056	40.961	40.517	39.245	41.353	39.898	46.426
14310-0525	Stöckchraftwerks-Träger- und Betreiber-gesellschaft mbH Berlin	Adelshof heating plant	12489 Albert-Einstein-Str. 22	172.368.00	heat and refrigeration supply	389.842	5.809.547	63.325	39.648	32.995	28.645	25.088	20.250	34.757	36.488	28.965	21.367	20.501	37.578	36.450	24.270	39.589	41.708
14310-0487	Fernheizwerk Heikölsb. AG	District heating plant	12059 Wiegandufer 49	181.711.00	heat and refrigeration supply	395.012	5.815.495	74.107	73.541	75.030	54.520	64.949	70.217	44.928	39.810	42.334	49.576	55.974	73.177	74.655	75.907	71.879	67.157
14310-0655	E.ON Energy Solutions GmbH	Heikölsb. (Rufow) wood heating plant	12355 Köpenicker Str. 32	184.913.00	heat and refrigeration supply	399.124	5.809.327	44.510	27.954	7.789	3.363	4.913	9.561	3.998	5.245	3.490	2.584	1.621	5.055	6.630	5.508	2.855	1.458
14310-0611	Vattenfall Wärme Berlin AG	Scharnhorstbasen district heating plant	10115 Scharnhorststr. 3a	172.680.00	heat and refrigeration supply	389.688	5.821.496	4.862	7.340	10.083	14.238	29.196	45.617	25.681	35.259	31.888	23.324	24.997	28.344	24.785	32.171	24.417	26.519
14310-0638	Vattenfall Wärme Berlin AG	Mitte Scharnhorstbasen district heating plant	10179 Köpenicker Str. 60	172.654.00	heat and refrigeration supply	392.833	5.819.106	794.076	902.539	967.489	1.033.222	916.755	1.002.887	1.012.243	890.800	823.868	796.776	831.156	672.230	974.109	935.834	935.432	824.739
14310-0612	Vattenfall Wärme Berlin AG	Klingenberg Scharnhorstbasen district heating plant	10217 Köpenicker Chaussee 42-45	189.739.00	heat and refrigeration supply	397.805	5.816.620	1.533.756	1.420.235	1.459.527	1.466.961	1.510.902	1.681.363	1.438.473	1.510.203	1.378.892	1.345.693	1.295.610	1.377.758	944.442	598.412	631.679	532.066
14310-0590	Vattenfall Wärme Berlin AG	Klingenberg gas and steam turbine heating plant	10217 Köpenicker Chaussee 40-41	214.979.00	heat and refrigeration supply	386.338	5.816.235																
14310-0590	Vattenfall Wärme Berlin AG	Charlottenburg heating plant	10589 An Spreewald 5	222.276.00	heat and refrigeration supply	385.444	5.820.361	120.930	152.823	77.389	89.841	112.542	151.729	99.884	134.638	96.977	50.207	36.872	143.140	103.828	76.591	136.140	36.887
14310-1063	Vattenfall Wärme Berlin AG	Lichterfelde heating plant, decommissioned	12207 Ostpreußenallee 61	173.097.00	heat and refrigeration supply	385.074	5.809.634	733.070	704.524	830.006	603.970	474.118	496.548	457.206	574.757	443.627	324.723	378.595	438.498	364.959	157.829	37.645	decommissioned
14310-1828	Vattenfall Wärme Berlin AG	Lichterfelde gas and steam turbine heating plant	12207 Ostpreußenallee 61	234.566.00	heat and refrigeration supply	385.186	5.809.794																
14310-0589	Vattenfall Wärme Berlin AG	Enckev Köpenick	12557 Widenerschießer 180	173.303.00	heat and refrigeration supply	405.577	5.816.423	23.859	23.496	19.708	20.473	20.856	24.658	19.893	18.688	16.148	16.295	19.083	19.842	21.858	21.761	20.167	20.896
14310-0619	Vattenfall Wärme Berlin AG	Marzahn heating plant	12681 Altes der Köpenicker 26 B	172.658.00	heat and refrigeration supply	399.854	5.820.232	80.375	74.021	28.949	18.804	47.728	82.387	82.889	73.283	123.021	94.738	115.610	151.961	134.704	133.111	127.182	818.147
14310-0608	Vattenfall Wärme Berlin AG	Buch heating plant	13125 Schwanebecker Chaussee 17	156.791.00	heat and refrigeration supply	396.212	5.832.713	37.698	40.218	38.275	33.536	35.827	39.417	31.794	31.143	32.562	27.451	35.822	41.353	36.514	37.822	36.796	35.533
14310-0618	Vattenfall Wärme Berlin AG	Island heating plant	13353 Friedrich-Krause-Ufer 10-13	173.145.00	heat and refrigeration supply	387.840	5.822.071	622.940	379.469	504.558	546.862	413.406	815.789	512.118	393.809	440.885	480.837	292.414	504.094	508.992	419.676	369.269	404.102
14310-0276	Vattenfall Wärme Berlin AG	Biomass heating plant	13435 Wälderoder Str. 2	172.927.00	heat and refrigeration supply	387.517	5.829.296	164.602	99.288	88.783	96.712	92.401	94.844	68.461	61.582	59.304	34.616	29.874	31.485	36.967	33.972	30.880	33.827
14310-0213	Vattenfall Wärme Berlin AG	Peak load plant	13437 Lange Enden 15 - 25	172.916.00	heat and refrigeration supply	386.193	5.828.767	18.990	16.771	19.724	13.798	18.882	27.301	35.959	42.386	43.153	37.240	34.447	37.259	23.555	27.840	26.545	25.504
14310-0622	Vattenfall Wärme Berlin AG	Reuter West heating plant	13599 Großer Spreeweg 5	166.928.00	heat and refrigeration supply	300.778	5.821.975	3.099.767	3.068.321	2.936.979	2.955.982	2.658.065	3.227.304	2.587.358	2.555.705	2.992.805	3.036.494	2.976.143	2.531.294	2.491.619	2.151.083	1.577.157	1.608.647
14310-0624	Vattenfall Wärme Berlin AG	Reuter heating plant	13599 Otternbuchtstr. 11	166.922.00	heat and refrigeration supply	301.063	5.821.705	603.197	606.947	578.966	500.423	448.949	297.683	505.772	588.072	602.793	532.607	471.540	414.886	458.537	216.722	0	6.111
14310-0625	Vattenfall Wärme Berlin AG	Wilmersdorf heating plant	14199 Forckenbeckstr. 3 - 6	132.279.00	heat and refrigeration supply	385.094	5.815.993	11.625	6.659	6.500	5.395	14.916	15.845	3.452	46.490	18.411	3.447	1.989	5.876	14.474	61.285	56.811	42.244
14310-1320	Bayrische Motoren Werke AG	BMW Am Jubiläum 14 - 38	12365 Kurt-Schumacher-Damm 200-224	22.365.00	heat and refrigeration supply	379.893	5.822.446	7.714	7.140	6.246	5.555	6.281	7.826	6.807	6.616	6.612	5.745	6.157	7.829	6.004	6.332	10.910	10.410
14310-0084	Berliner Flughafen GmbH	13465 Kurt-Schumacher-Damm 200-224	172.915.00	heat and refrigeration supply	384.260	5.823.639	6.332	6.551	6.090	6.309	6.716	10.388	8.500	9.319	9.379	6.060	6.975	9.233	6.070	8.999	7.818	6.870	
14310-0156	Stöckchraftwerks-Träger- und Betreiber-gesellschaft mbH Berlin KWK (part from Geddeke Net Spezialpapier GmbH)	formely Metta	12559 Wilmersdorfer 2	173.797.00	heat and refrigeration supply	384.860	5.813.433	21.218	21.196	17.618	20.828	17.128	18.420	17.164	13.916	97	126	269	303	388	328	356	336
14310-0427	Stöckchraftwerks-Träger- und Betreiber-gesellschaft mbH Berlin	Schönevalde heating plant	12439 Schönevalde 138	172.484.00	heat and refrigeration supply	386.483	5.813.369	48.654	79.792	99.658	63.821	73.871	78.967	59.706	70.150	74.934	65.630	73.965	77.545	76.155	64.327	58.006	61.264
14310-0627	Stöckchraftwerks-Träger- und Betreiber-gesellschaft mbH Berlin KWK Sportforum (Wilmersdorf)	Sportforum	13263 FRIE-Leich-Str. 29 - 35	183.909.00	heat and refrigeration supply	386.440	5.822.383																
14310-0627	Stöckchraftwerks-Träger- und Betreiber-gesellschaft mbH Berlin KWK Sportforum (Wilmersdorf)	Sportforum	13263 FRIE-Leich-Str. 29 - 35	183.909.00	heat and refrigeration supply	386.440	5.822.383																
14310-0852	Deutsche Rentenversicherung Bund	10709 Seesener Str. 62 - 64	15.686.00	heat and refrigeration supply	384.438	5.816.958	13.616	13.902	12.251	13.220	11.557	13.350	11.186	9.903	9.824	8.714	8.630	7.782	11.231	11.254	13.741	12.493	
14310-0592	HSE Brass Germany GmbH	13509 Wrause 10 - 14	11.642.00	heat and refrigeration supply	385.840	5.827.528																	
14310-0592	Messe Berlin GmbH	14555 Wessedamm 22	6.882.00	heat and refrigeration supply	382.980	5.818.285	13.267	10.566	12.486	12.817	12.901	12.858	11.838	12.670	10.857	9.880	8.830	10.624	12.235	10.184	10.588	7.918	
14310-0605	Vattenfall Europe Wärme AG	Altglienicke heating plant	12524 Heikowweg 106	172.517.00	heat and refrigeration supply	400.873	5.807.578	12.244	6.871	7.910	7.672	7.916	7.912	7.242	8.481	7.329	4.355	4.611	5.348	5.684	6.288	5.721	4.761
14310-0008	Vattenfall Europe Wärme AG	Friedrichshagen heating plant	12587 Söllnerstraße 10 - 12	173.938.00	heat and refrigeration supply	406.960	5.812.725	9.628	9.688	9.128	9.479	9.820	10.461	9.100	9.388	9.816	7.675	7.657	6.272	8.209	8.962	7.908	8.270
14310-0007	Vattenfall Europe Wärme AG	Blankenburger Strasse heating plant	13156 Blankenburger Str. 129/141	172.664.00	heat and refrigeration supply	393.324	5.827.586	12.537	12.582	11.887	12.867	13.489	15.678	14.072	15.384	13.340	9.288	9.771	10.571	9.485	8.481	7.950	7.559
14310-1908	Vattenfall Europe Wärme AG	Treptow heating plant	12436 Eichenstr. 7	172.621.00	heat and refrigeration supply	395.005	5.817.313																
14310-0627	Damier	Damier Heizhaus Nord	12277 Damierstr. 143	4.298.00	heat and refrigeration supply	388.878	5.809.878																

**Tab. 2: Development of CO<sub>2</sub> emissions at all Berlin plants subject to the Greenhouse Gas Emissions Law in the years 2005 - 2020**

Due to the ascertainment requirements, many facilities on Maps 08.07.1 and 08.07.2 correspond.

## Literature

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## Maps

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