EMISSIONS STANDARDS

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European Union (EU) legislation takes two main forms: regulations and directives. Once approved, regulations are directly applicable and binding on Member States. Directives establish targets to be achieved, and it is up to the Member States to decide the deadline, and the form and method of implementation. In 2016, the European Commission enacted Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC. Member states should comply with the emission reduction commitments set out in this Directive from 2020 to 2029 and from 2030 onwards. The national emission reduction commitments for any year from 2020 to 2029 in this Directive are identical to those set in the revised Gothenburg Protocol. The national emission reduction commitments for 2030 onwards are based on the estimated reduction potential of each Member state contained in the Thematic Strategy on Air Pollution (TSAP) Report no. 16 of January 2015.

MARKET LEGISLATION

The EU has an emissions trading scheme (EU ETS 2009/29/EC, amending 2003/87/EC) which is responsible for the reduction in greenhouse gas emissions from facilities with a net heat output greater than 20 MW, from 31 countries within the European Economic Area. The EU ETS was launched on 1 January 2005 under Directive 2003/87/EC, which has since been updated via Directive 2009/29/EC. The EU ETS operates on a 'Cap and Trade' system; this means there is an overall limit to the quantity of emissions possible but, within that limit, participants can buy and sell emission allowances, thus producing a marketable commodity and achieving emission cuts at the least cost. The purchasing of one emissions allowance permits the proprietor to emit 1 tonne of CO_2 or the equivalent of another greenhouse gas.

THE INDUSTRIAL EMISSIONS DIRECTIVE

The Industrial Emissions Directive (IED – 2010/75/EU) lays out the permitting procedures for a wide range of industrial activities, including coal-fired combustion plants with a rated thermal input greater than 50 MW, with the aim of preventing pollution by the implementation of the Best Available Techniques (BAT). Emission limits for combustion plants have also been specified within the IED for emissions of sulphur dioxide (SO_2), nitric oxide and nitrogen dioxide (NOx), and dust (particulate matter) from combustion plants with a rated thermal input equal to or greater than 50 MW.

Emission limit values for existing combustion plants

Total rated thermal input, MW	Dust (particulate matter), mg/m^3	SO_2, mg/m^3	NOx, mg/m^3
50 – 100	30	400	300 450 for pulverised lignite combustion
100 – 300	25	250	200
>300	20	200	200

These emissions values apply to coal, lignite and other solid fuels.

Notes:

1. Combustion plants using solid fuels which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1500 operating hours per year as a rolling average over a period of 5 years, are subject to an emission limit for SO_2 of 800 mg/m^3.

2. Combustion plants using solid fuels with a total rated thermal input not exceeding 500 MW which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003, and which do not operate more than 1500 operating hours per year as a rolling average over a period of 5 years, are subject to an emission limit value for NOx of 450 mg/m^3.

3. Combustion plants using solid fuels with a total rated thermal input greater than 500 MW, which were granted a permit before 1 July 1987 and which do not operate more than 1500 operating hours per year as a rolling average over a period of 5 years, are subject to a NOx emission limit value of 450 mg/m^3.

Emission limit values for new combustion plants

Total rated thermal input, MW	Dust (particulate matter), mg/m^3	SO_2, mg/m^3	NOx, mg/m^3
50 – 100	20	400	300 400 for pulverised lignite combustion
100 – 300	20	200	200
>300	10	150 200 for circulating or pressurised fluidised bed combustion	150 200 for pulverised lignite combustion

Minimum rate of desulphurisation

Existing or new combustion plants firing indigenous solid fuel, which cannot comply with the emission limit values for sulphur dioxide due to the characteristics of the fuel, may instead apply the minimum rates of desulphurisation, as set out below.

Minimum rate of desulphurisation for existing combustion plants

Total rated thermal input, MW	Minimum rate of desulphurisation, %	
	Plants operational prior to 2003*	Other plants
50 – 100	80	92
100 – 300	90	92
>300	96	96

* Plants which were granted a permit before 27 November 2002 or the operators of which had submitted a complete application for a permit before that date, provided that the plant was put into operation no later than 27 November 2003.

Minimum rate of desulphurisation for new combustion plants

Total rated thermal input, MW	Minimum rate of desulphurisation, %
50 – 100	93
100 – 300	93
>300	97

General notes

1. Plants referred to as "existing plants" are those combustion plants which were granted a permit before 7 January 2013, or the operators of which had submitted a complete application for a permit before that date, provided that such plants were put into operation no later than 7 January 2014.

2. Existing plants that were granted an exemption under Article 4(4) of the Large Combustion Plant Directive LCPD 2001/80/EC which are in operation after 1 January 2016 must meet the emission limits for new plants.

3. All emission limit values are expressed at a temperature of 273.15 K (0°C), a pressure of 101.3 kPa and on a dry flue gas basis with an oxygen content of 6%.

BEST AVAILABLE TECHNIQUES – ASSOCIATED EMISSION LEVELS (BAT-AEL)

The best available techniques (BAT) are the reference for setting permit conditions for installations under the Industrial Emissions Directive, and emission limit values should be set which ensure that, under normal operating conditions, emissions do not exceed the emission levels associated with the best available techniques.

Emissions levels associated with the best available techniques (BAT–AELs) for emissions to air refer to concentrations, expressed as mass of emitted substance per volume of flue-gas under standard conditions: dry gas at a temperature of 273.15 K (0°C), and a pressure of 101.3 kPa. For the combustion of solid fuels, the reference level for oxygen is 6%.

BAT-AELs for dust emissions to air from the combustion of coal and/or lignite

Total rated thermal input, MWth	Yearly average, mg/m^3		Daily average or average over the sampling period, mg/m^3	
	New plant	Existing plant[1]	New plant	Existing plant[2]
<100	2 – 5	2 – 18	4 – 16	4 – 22[3]
100 – 300	2 – 5	2 – 14	3 – 15	4 – 22[4]
300 – 1000	2 – 5	2 – 10[5]	3 – 10	3 – 11[6]
≥1000	2 – 5	2 – 8	3 – 10	3 – 11[7]

(1) These BAT-AELs do not apply to plants operated <1500 h/y.

(2) For plants operated <500 h/y, these levels are indicative.

(3) The higher end of the BAT-AEL range is 28 mg/m^3 for plants put into operation no later than 7 January 2014.

(4) The higher end of the BAT-AEL range is 25 mg/m^3 for pants put into operation no later than 7 January 2014.

(5) The higher end of the BAT-AEL range is 12 mg/m^3 for plants put into operation no later than 7 January 2014.

(6) The higher end of the BAT-AEL range is 20 mg/m^3 for plants put into operation no later than 7 January 2014.

(7) The higher end of the BAT-AEL range is 14 mg/m^3 for plants put into operation no later than 7 January 2014.

BAT-AELs for SO_2 emissions to air from the combustion of coal and/or lignite

Total rated thermal input, MWth	Yearly average, mg/m^3		Daily average or average over the sampling period, mg/m^3	
	New plant	Existing plant(1)	New plant	Existing plant(2)
<100	150 – 200	150 – 360	170 – 220	170 – 400
100 – 300	80 – 150	95 – 200	135 – 200	135 – 220(3)
≥300, PC boiler	10 – 75	10 – 130(4)	25 – 110	25 – 165(5)
≥300, fluidised bed boiler(6)	20 – 75	20 – 180	25 – 110	50 – 220

(1) These BAT-AELs do not apply to plants operated <1500 h/y.

(2) For plants operated <500 h/y, these levels are indicative.

(3) In the case of plants put into operation no later than 7 January 2014, the upper end of the BAT-AEL range is 250 mg/m^3.

(4) The lower end of the range can be achieved with the use of low-sulphur fuels in combination with the most advanced wet abatement system designs.

(5) The higher end of the BAT-AEL range is 220 mg/m^3 in the case of plants put into operation no later than 7 January 2014 and operated <1500 h/y. For other existing plants put into operation no later than 7 January 2014, the higher end of the BAT-AEL range is 205 mg/m^3.

(6) For circulating fluidised bed boilers, the lower end of the range can be achieved by using high-efficiency wet FGD (flue gas desulphurisation). The higher end of the range can be achieved by using boiler in-bed injection.

BAT-AELs for NOx emissions to air from the combustion of coal and/or lignite

Total rated thermal input, MWth	Yearly average, mg/m^3		Daily average or average over the sampling period, mg/m^3	
	New plant	Existing plant(1)	New plant	Existing plant(2)(3)
<100	100 – 150	100 – 270	155 – 200	165 – 330
100 – 300	50 – 100	100 – 180	80 – 130	155 – 210
≥300, FBC and lignite-fired PC boilers	50 – 85	< 85 – 150(4)(5)	80 – 125	140 – 165(6)
≥300, coal-fired PC boiler	65 – 85	54 – 150	80 – 125	< 85 – 165(7)

(1) These BAT-AELs do not apply to plants operated < 1500 h/y.

(2) In the case of coal-fired PC boiler plants put into operation no later than 1 July 1987, which are operated < 1500 h/y and for which SCR (selective catalytic reduction) and/or SNCR (selective non-catalytic reduction) is not applicable, the higher end of the range is 340 mg/m^3.

(3) For plants operated < 500 h/y, these levels are indicative.

(4) The lower end of the range is considered achievable when using SCR.

(5) The higher end of the range is 175 mg/m^3 for FBC (fluidised bed combustion) boilers put into operation no later than 7 January 2014 and for lignite-fired PC (pulverised combustion) boilers.

(6) The higher end of the range is 220 mg/m^3 for FCB boilers put into operation no later than 7 January 2014 and for lignite-fired PC boilers.

(7) In the case of plants put into operation no later than 7 January 2014, the higher end of the range is 200 mg/m^3 for plants operated ≥ 1500 h/y, and 220 mg/m^3 for plants operated < 1500 h/y.

BAT-AELs for CO emissions to air from the combustion of coal and/or lignite(1)

Total rated thermal input, MWth	CO emission level, mg/m^3
<300	<30 – 140
≥300, FBC and lignite-fired PC boilers	<30 – 100(2)
≥300, coal-fired PC boiler	<5 – 100(2)

(1) These BAT-AELs apply to existing combustion plants operated ≥1500 h/y, and to new combustion plants.

(2) The higher end of the range may be up to 140 mg/m^3 in the case of limitations due to boiler design, and/or in the case of fluidised bed boilers not fitted with secondary abatement techniques for NOx emissions reduction.

THE MEDIUM COMBUSTION PLANT DIRECTIVE

The Medium Combustion Plant Directive (2015/2193) of 25 November 2015 regulates the emissions of sulphur dioxide, nitrogen oxides and particulate matter from the combustion of fuels in plants with a rated thermal input equal to or greater than 1 MW and less than 50 MW. The Directive also lays down rules for monitoring emissions of carbon monoxide (CO). The emission limit values have applied from 20 December 2018 for new plants and will apply from 1 January 2025 for bigger existing plants (>5 – 50 MWth) and from 1 January 2030 for smaller existing plants (1 – ≤5 MWth).

Emission limit values for medium combustion plants

Pollutant	Existing plants, ≥1 and ≤5 MWth	Existing plants, >5 and <50 MWth	New plants, ≥1 and <50 MWth
Particulate matter, mg/m^3	50	30(1)	20(3)
SO_2, mg/m^3	1100	400(2)	400
NOx, mg/m^3	650	650	300(4)

(1) 50 mg/m^3 in the case of plants with a rated thermal input >5 MW and ≤20 MW.

(2) 1100 mg/m^3 in the case of plants with a rated thermal input >5 MW and ≤20 MW.

(3) 50 mg/m^3 in the case of plants with a total rated thermal input ≥1 MW and ≤5 MW; 30 mg/m^3 in the case of plants with a total rated thermal input >5 MW and ≤20 MW.

(4) 500 mg/m^3 in the case of plants with a total rated thermal input ≥1 MW and ≤5 MW.

General notes

1. "Existing plant" refers to a combustion plant put into operation before 20 December 2018 or for which a permit was granted before 19 December 2017, provided the plant was put into operation no later than 20 December 2018.
2. A "new plant" is a combustion plant other than an existing combustion plant.
3. Member States may exempt existing plants which do not operate for more than 500 operating hours per year, as a rolling average over a period of five years. However, an emission limit value for particulate matter of 200 mg/m^3 applies to plants firing solid fuels.
4. Member States may exempt new plants which do not operate for more than 500 operating hours per year, as a rolling average over a period of three years. However, an emission limit value for particulate matter of 100 mg/m^3 applies to plants firing solid fuels.
5. All emission limit values are expressed at 0°C, 101.3 kPa and on a dry waste gas basis with 6% of O_2 in the waste gas.

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