NB: Unofficial translation; legally binding texts are those in Finnish and Swedish
Ministry of the Environment, Finland

Government Decree on Limiting Emissions from Large Combustion Plants

936/2014

Chapter 1 – General provisions

Section 1
Scope of application

This Decree lays down provisions on the limitation of emissions into the air from large combustion plants referred to in section 97 of the Environmental Protection Act (527/2014) that are covered by sections 98–106 of the Act.

Section 2
Definitions

For the purpose of this Decree:

1) *waste gases* means solid, liquid or gaseous emissions, the volumetric flow rates of which shall be expressed in cubic metres per hour at the standard temperature (273.15 K) and pressure (101.3 kPa) after correction for water vapour content $m^3(n)/h$;
2) *emission limit value* means the permitted amount of emissions that can be discharged into the air during a given period, and it is defined as mass per volume of waste gases, ($mg/m^3(n)$), assuming that the oxygen content by volume in the waste gases is three per cent when burning liquid or gaseous fuels, six per cent when burning solid fuels and 15 per cent when burning fuels in gas turbines and gas engines;
3) *energy production unit* means a boiler, gas turbine or combustion engine where the fuels are oxidised and which produces thermal energy that can be recovered;
4) *combustion plant* means one or more energy production units the waste gases of which are discharged through a common stack;
5) *existing combustion plant or energy production unit* means any combustion plant or energy production unit in operation for which the operating licence has been granted before 20 February 2013, or a plant or energy production unit for which the application for an environmental permit has been publicly announced before 20 February 2013 and which has been taken into operation by 20 February 2014;
6) *old, existing combustion plant or energy production unit* means a combustion plant or energy production unit referred to in paragraph 5, for which the operating licence has been granted before 27 November 2002, or a plant or energy production unit for which the application for an environmental permit has been publicly announced before said date and which has been taken into operation by 27 November 2003;

7) *new energy production unit* means an energy production unit other than that referred to in paragraphs 5 and 6, for which the environmental permit has been granted on or after 20 February 2013;
8) *multi-fuel firing unit* means an energy production unit which may be fired simultaneously or alternately by two or more types of fuel;
9) *gas turbine* means any rotating machine converting thermal energy into mechanical work that has a compressor, a thermal device in which the fuel is oxidised in order to heat air, and a turbine as its main parts;
10) *gas engine* means a combustion engine which operates according to the Otto cycle and uses spark ignition for the burning of fuel or, in the case of a dual-fuel combustion engine, compression ignition;
11) *diesel engine* means a combustion engine which operates according to the diesel cycle and uses compression ignition for the burning of fuel;
12) *emergency energy production unit* means a gas turbine or gas engine which is intended for emergency use and operated for less than 500 hours per year;
13) *stack* means a structure comprising one or more flues and used for discharging waste gases into the air;
14) *operating hours* mean the time in hours during which the combustion plant is fully or partly operational and releases emissions into the air, with the exception of start-up and shut-down periods;
15) *fuel* means any solid, liquid or gaseous substances burned in an energy production unit or combustion plant;
16) indigenous *solid fuel* means a naturally occurring solid fuel fired in a combustion plant specifically designed for that fuel and extracted locally;
17) *determinative fuel* means the fuel which has the highest emission limit value specified in Annex 2 among all the fuels used in a multi-fuel firing unit that uses products of crude oil refining, or if several fuels have the same emission limit value, the fuel that has the highest thermal capacity;
18) *biomass* means any vegetable matter from agriculture or forestry that as whole or partly can be used as a fuel for the purpose of recovering its energy content, and the following waste used as a fuel:
    a) vegetable waste from agriculture and forestry;
    b) vegetable waste from the food processing industry if the heat generated in the burning process is recovered;
    c) fibrous vegetable waste from virgin pulp production and from production of paper from pulp if it is co-incinerated at the place of production and the heat generated is recovered;
    d) cork waste;
    e) wood waste, with the exception of wood waste that may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coating, such as wood waste containing the above-mentioned substances that originates from buildings and from demolition sites.

Section 3
Determining stack height

Waste gases shall be discharged from combustion plants into the open air through a stack. The height of the stack shall be determined in such a way as to prevent the operations

from causing a health hazard or other considerable environmental pollution or risk thereof.

Chapter 2 – Limiting emissions in combustion plants

Section 4
Emission limit values for energy production units

(1) Emissions of sulphur dioxide, nitrogen oxides, dust and carbon monoxide from a new energy production unit shall not exceed the emission limit values specified in Annex 1.

(2) Emissions of sulphur dioxide, nitrogen oxides, dust and carbon monoxide from an existing energy production unit shall not exceed the emission limit values specified in Annex 2.

(3) Emissions of sulphur dioxide, nitrogen oxides and dust from an energy production unit for which the operating licence has been granted before 1 July 1987 and the operator of which has before 1 January 2008 undertaken to operate the plant for no more than 20,000 hours between 1 January 2008 and 31 December 2015, and which will be used after 1 January 2016, shall not exceed the emission limit values specified in Annex 1.

(4) The emission limit values for an energy production unit within a combustion plant referred to in section 98 of the Environmental Protection Act shall be determined in the environmental permit based on the rated thermal input of the combustion plant.

Section 5
Limiting of emissions in specific cases

(1) The emission limit values for nitrogen oxides and carbon monoxide specified in table 4 of Annex 1 and tables 12 and 13 of Annex 2 do not apply to emergency energy production units.

(2) The emission limit values in Annexes 1 and 2 do not apply to diesel engines or recovery boilers.

(3) This Decree shall apply to energy production units within combustion plants referred to in section 98 of the Environmental Protection Act, even in cases where the plant contains a waste co-incineration plant referred to in section 108(1)(2) of the Environmental Protection Act.

Section 6
Impact of remaining operational life time on emission limit values

(1) An existing combustion plant or an energy production unit within it may be exempted from compliance with the emission limit values referred to in section 4(2) between 1 January 2016 and 31 December 2023, if the operator undertakes to operate the plant for no

more than 17,500 hours during the period. The operator shall submit a written notification to that effect to the state supervisory authority by 1 January 2014 at the latest.

(2) Emissions into the air from a combustion plant or energy production unit referred to in paragraph 1 above shall not exceed emission limit values that are effective on 31 December 2015 and specified in Annexes 1 or 2 of the Government Decree on limiting emissions of sulphur dioxide, nitrogen oxides and dust from combustion plants and gas turbines with a rated thermal input of at least 50 megawatts (1017/2002), hereinafter *LCP Decree*, or emission limit values set in the environmental permit that are stricter than those provided in the LCP Decree.

(3) Emissions of sulphur dioxide, nitrogen oxides and dust into the air from an energy production unit or combustion plant referred to in paragraph 1 above which is operated after 1 January 2024 shall not exceed the emission limit values specified in Annex 1.

(4) However, an energy production unit referred to in paragraph 1 with a rated thermal input of more than 500 megawatts burning solid fuels and for which the operating licence has been granted after 1 July 1987, shall comply with the emission limit value for nitrogen oxides specified in Annex 2 from 1 January 2016.

(5) This section does not apply to energy production units referred to in section 4(3).

Section 7
Emission limit values for district heating plants

(1) An old, existing combustion plant with a maximum rated thermal input of 200 megawatts may be exempted from compliance with the emission limit values referred to in section 4(2)(1) between 1 January 2016 and 31 December 2022, provided that the operator undertakes to deliver at least 50 per cent of the useful heat production of the plant, as a rolling average over a period of five years, in the form of steam or hot water to a public network for district heating. The operator shall submit a notification to that effect to the state supervisory authority by 30 June 2014 at the latest.

(2) Emissions into the air from a combustion plant or energy production unit referred to in paragraph 1 above shall not exceed emission limit values that are effective on 31 December 2015 and specified in Annex 2 of the LCP Decree, or emission limit values set in the environmental permit that are stricter than those provided in the LCP Decree.

Section 8
Sulphur dioxide emission limit values for old, existing energy production units by annual operating time

(1) An old, existing energy production unit burning solid or liquid fuels may comply with sulphur dioxide emission limit values specified in table 8 of Annex 2, if the energy production unit is not operated for more than 1,500 hours a year, counted as a rolling average over a period of five years.

(2) If a combustion plant referred to in section 98 of the Environmental Protection Act consists of two or more energy production units referred to in paragraph 1, the operating hours of the units that are in operation simultaneously are only counted once, and each unit that operates on its own will reduce the number of operating hours available for all units.

Section 9
Nitrogen oxides emission limit values for old, existing energy production units by annual operating time

(1) An old, existing energy production unit burning solid or liquid fuels, or an old, existing gas turbine may comply with emission limit values for nitrogen oxides specified in tables 11 and 12 of Annex 2 if the energy production unit is not operated for more than 1,500 hours a year, counted as a rolling average over a period of five years.

(2) If a combustion plant referred to in section 98 of the Environmental Protection Act consists of two or more energy production units referred to in paragraph 1, the operating hours of the units that are in operation simultaneously are only counted once, and each unit that operates on its own will reduce the number of operating hours available for all units.

Section 10
Government decision on a transitional national plan

(1) The Government decision referred to in section 101 of the Environmental Protection Act shall cover at least one of the pollutants – sulphur dioxide, nitrogen oxides and dust – from a combustion plant referred to in the decision. With regard to gas turbines, only nitrogen oxides can be covered by the decision.

(2) The Government decision shall include the following information:
1) list of combustion plants the decision applies to and relevant information on their functional characteristics;
2) the maximum amounts of emissions within the plan in 2016–2019 and in the first half of 2020;
3) measures taken to ensure compliance with the requirements laid down in the Industrial Emissions Directive;
4) description of the monitoring of the decision.

Section 11
Emission limit values of a combustion plant referred to in the Government decision

(1) The emission limit values of a combustion plant referred to in the Government decision shall be based on emission limit values that are specified in sections 6 or 8 or section 10(1–2) of the LCP Decree and effective on 31 December 2015, or on emission limit values set in the environmental permit that are stricter than those provided in the LCP Decree.

(2) A combustion plant with a rated thermal input of more than 500 megawatts burning solid fuels and for which the operating licence has been granted after 1 July 1987 shall comply with the emission limit value for nitrogen oxides of 200 $mg/m^3(n)$ expressed as nitrogen dioxide.

Section 12
Determining maximum amounts of emissions from combustion plants referred to in the Government decision

(1) The maximum amount of annual emissions for plants referred to in the Government decision is calculated on the basis of the rated thermal input of the plant on 31 December 2010, in accordance with the provisions laid down in the implementing rules of the European Commission referred to in section 10(2). The calculation of the maximum emissions takes into account the assumed operating hours and the fuel used, calculated as an average from 2001–2010 on the basis of the annual operating hours and fuel usage.

(2) The maximum amount of emissions for 2016 is calculated using the emission limit values specified in Annexes III–VII to the Directive 2001/80/EC of the European Parliament and of the Council on the limitation of emissions of certain pollutants into the air from large combustion plants. The calculation of maximum amount for sulphur dioxide emissions in 2016 for plants that use peat and biomass as fuel is based on the emission limit values for sulphur dioxide for combustion plans burning peat and biomass, specified in Annexes 1 and 2 of the LCP Decree. The calculation of the share of the maximum nitrogen oxide emissions for the plants referred to in section 11(2) shall be based on the emission limit value specified in said paragraph.

(3) The calculation of maximum amounts of emissions for 2019 and 2020 shall be based on the emission limit values specified in Annex V Part 1 of the Industrial Emissions Directive. The maximum amounts of emissions for 2017 and 2018 are confirmed by linear reduction between 2016 and 2019.

Section 13
Determining start-up and shut-down periods

(1) The environmental permit of a combustion plant referred to in section 98 of the Environmental Protection Act or an energy production unit included in it shall specify the end of the start-up period and the beginning of the shut-down period, the separate processes related to these or the functional parameters and measures that are used to ensure that the start-up and shut-down periods are kept as short as possible and that all purification equipment is brought into operation as soon as is technically practicable, as provided in the implementing rules of the European Commission established by virtue of article 41(a) of the Industrial Emissions Directive.

(2) If the characteristics of a combustion plant affecting the start-up and shut-down periods change, the permit regulations concerning start-up and shut-down periods referred to in paragraph 1 shall be adjusted, where necessary.

(3) The start-up hours of the energy production unit starting up first and the shut-down hours of the energy production unit shutting down last are not included in the calculation of the start-up and shut-down periods of the combustion plant.

(4) If the combustion plant includes at least two energy production units referred to in sections 8 and 9, the start-up and shut-down periods shall be determined in accordance with the further provisions laid down in the implementing rules referred to in paragraph 1.

Section 14
Assessment of compliance with emission limit values

(1) The emission limit values of an energy production unit shall be regarded as having been complied with in continuous measurements if:

1) none of the validated monthly average values exceeds the emission limit values specified in Annexes 1 and 2;
2) none of the validated daily average values exceeds 110 per cent of the emission limit values specified in Annexes 1 and 2;
3) 95 per cent of all the validated hourly average values during the year do not exceed 200 per cent of the emission limit values specified in Annexes 1 and 2.

(2) The validated daily and hourly average values are calculated from the measured, validated hourly averages, which are obtained by deducting from the measured value the figure representing 95 per cent confidence intervals of the measurement result. The figures representing 95 per cent confidence intervals for the measurement result are 10 per cent for carbon monoxide, 20 per cent for sulphur dioxide and nitrogen oxides, and 30 per cent for dust of the relevant emission limit value.

(3) In discontinuous measurements, emission limit values shall be regarded as having been complied with if the results of each series of measurements or other similar procedure approved by the permit authority do not exceed the emission limit values.

(4) Start-up and shut-down periods of combustion plants or energy production units specified in the implementing rules referred to in section 13 or malfunctions of energy production units referred to in section 16 are not included when examining compliance with the emission limit values.

Section 15
Assessment of the compliance with emission limit values in certain existing energy production units

(1) Without prejudice to the provisions laid down in section 14(1), compliance with emission limit values in an energy production unit or combustion plant referred to in sections 6 and 7 as well as in the Government decision specified in section 101 of the Environmental Protection Act shall be examined during the period referred to in section 6(1) and section 7(1) of this Act and section 101(1) of the Environmental Protection Act, in accordance with this section.

(2) In continuous measurements, emission limit values shall be regarded as having been complied with in an existing energy production unit for which the environmental permit

has been granted on or after 27 November 2002, if none of the validated daily average values exceeds the emission limit values and if 95 per cent of the validated hourly average values over the year do not exceed 200 per cent of the emission limit values. Validated daily and hourly average values are determined according to section 14(2).

(3) In continuous measurements, emission limit values shall be regarded as having been complied with in an old, existing energy production unit if no calendar monthly average value exceeds the emission limit values during a calendar year and if 97 per cent of all 48-hour average values for sulphur dioxide and dust, and 95 per cent of all 48-hour average values for nitrogen oxides, do not exceed 110 per cent of the emission limit values.

(4) However, in continuous measurements, emission limit values shall be regarded as having been complied with in an energy production unit referred to in section 6(1) for which the operating permit has been granted before 1 July 1987, if no calendar monthly average value exceeds the emission limit values during a calendar year.

Chapter 3 – Exceptional situations

Section 16
Breakdown or malfunction of waste gas purification equipment

(1) If it is not possible to use low polluting fuels referred to in section 99(2) of the Environmental Protection Act, the operator shall limit the operation of the energy production unit, or close it down for a limited period or until further notice if the energy production unit cannot return to normal operations within 24 hours. The maximum amount of time the energy production unit is allowed to operate without waste gas purification equipment is 120 hours during a period of any 12 months.

(2) The notification of the breakdown or malfunction of an energy production unit's waste gas purification equipment referred to in section 99(1) of the Environmental Protection Act shall be submitted within 48 hours of the occurrence.

(3) Following the notification, the state supervisory authority can specify time limits that differ from those referred to in paragraph 1 if there is an overriding need to maintain the energy supply or if the damaged energy production unit would be replaced for a limited period by another energy production unit, resulting in an increase in the overall emission amounts.

Section 17
Problems with fuel availability

(1) If an energy production unit using low-sulphur fuels cannot comply with its emission limit values because a serious fuel shortage has caused an interruption in fuel supply, the state supervisory authority can permit the operator to deviate from compliance with the emission limit values set for the energy production unit for a maximum of six months.

(2) If an energy production unit burning gaseous fuels cannot comply with its emission limit values because of problems with the fuel supply and if it would therefore have to be equipped with waste gas purification equipment, the state supervisory authority can permit

the operator to use a fuel other than gaseous fuel in the energy production unit for a maximum of 10 days, or in exceptional situations, if there is an overriding need to maintain energy supply, the state supervisory authority can permit the use of the other type of fuel for a longer period. The state supervisory authority shall notify the derogations granted for the purposes of maintaining energy supply to the Ministry of Employment and the Economy.

Chapter 4 – Miscellaneous provisions

Section 18
Determining emission limit values in a multi-fuel firing unit

The emission limit value for a multi-fuel firing unit burning more than one type of fuel simultaneously is determined as the sum of the fuel-weighted emission limit values. Fuel-weighted emission limit values are calculated by multiplying the input of each fuel by the corresponding emission limit value and dividing the result by the sum of the inputs of all fuels used. The emission limit value is then obtained by aggregating these fuel-weighted emission limit values in accordance with the formula given in Annex 4.

Section 19
Determining emission limit values in a multi-fuel firing unit that burns products of crude-oil refining

(1) In multi-fuel firing units that use distillation and conversion residues from crude-oil refining for their own consumption, alone or with other fuels, the emission limit value for the determinative fuel can be applied instead of the emission limit value referred to in section 4(2) if, during the operation of the combustion plant, the proportion of that fuel is at least 50 per cent of the combined thermal input of all fuels.

(2) If the proportion of the determinative fuel in a multi-fuel firing unit referred to in paragraph 1 is less than 50 per cent, the emission limit value for the unit is determined on a pro rata basis as the ratio of the thermal input of each fuel to the thermal inputs of all fuels, by first calculating the emission limit value of the determinative fuel and then determining the sum of the fuel-weighted emission limit values. The emission limit value of the determinative fuel is calculated by multiplying the emission limit value of this fuel by a factor of two and deducting from the sum the emission limit value of the fuel with the lowest emission limit value. Weighted emission limit values are calculated as referred to in section 18.

(3) Instead of the emission limit values referred to in paragraphs 1 and 2 above, existing refinery units burning more than one type of fuel can, with the exception of gas turbines and gas engines, apply the average sulphur dioxide emission limit value of 1,000 $mg/m^3(n)$.

(4) Multi-fuel units of refineries other than those referred to in paragraph 3, with the exception of gas turbines and gas engines, can comply with the average emission limit value for sulphur dioxide of 600 $mg/m^3(n)$.

Section 20
Emission limit values in the event of substantial extensions or modifications to a combustion plant unit

(1) If a combustion plant is extended, the emission limit values of the extended part of the combustion plant shall not exceed the limit values specified in Annex 1.

(2) If a combustion plant is modified in such a way that the emissions resulting from its operation or the environmental impacts of the emissions increase and if the modifications affect a part of the combustion plant with a rated thermal input of at least 50 megawatts, the emission limit values of the modified part shall not exceed the emission limit values specified in Annex 1.

(3) The emission limit values for the extended or modified part referred to in paragraphs 1 and 2 above shall be determined on the basis of the rated thermal input of a combustion plant referred to in section 98 of the Environmental Protection Act.

Section 21
Providing information

(1) In addition to the provisions of the environmental permit, the operator shall, by the end of February each year, supply the state supervisory authority and the municipal environmental protection authority with the following information:

1) the total rated thermal input (MW) of the combustion plant and the rated thermal inputs (MW) of the energy production units included in it;
2) the type of energy production unit: boiler, gas turbine, gas engine, diesel engine or other;
3) the date of the start of operation of the energy production unit;
4) overall emissions of sulphur dioxide, nitrogen oxides and dust from the combustion plants and energy production units during the previous year as tonnes per year;
5) operating hours of the energy production unit during the previous year;
6) operating hours of the energy production unit referred to in sections 8 and 9 during the previous year;
7) the remaining operational life time of the energy production unit or combustion plant referred to in section 6 and information on how much of the time had been used by the end of the previous calendar year;
8) the useful heat production by the combustion plant referred to in section 7 as a rolling average over a period of five years;
9) the total amount of energy input during the previous year by the net calorific value (TJ) per year, broken down in terms of the following categories of fuel: coal, biomass, peat, other solid fuels, liquid fuels, natural gas, other gases.

(2) The information on the combustion plants in refineries shall be supplied separately.

Section 22
Monitoring emissions

(1) The operator shall monitor emissions from the energy production unit, control the installation and functioning of the monitoring equipment and carry out annual surveillance tests for the equipment, as specified in Annex 3. Emissions from an energy production unit referred to in sections 6, 8 and 9 and section 4(3) above shall be monitored separately.

(2) The operator shall measure the emissions from an emergency energy production unit when starting the operation and after any substantial changes to operations.

(3) The operator shall record and process all monitoring results and present them to the state supervisory authority in such a way as to allow the state supervisory authority to verify compliance with the requirements and emission limit values for the operations specified in the permit.

(4) The environmental permit or the approval decision of the monitoring plan shall specify the sampling and measurement locations to be used in the monitoring of emissions.

Section 23
Entry into force

(1) This Decree enters into force on 20 November 2014. It shall apply to combustion plants referred to in section 2(5) 5 from 1 January 2016 onward.

(2) This Decree repeals the Government Decree on limiting emissions from combustion plants with a rated thermal input of at least 50 megawatts (96/2013). However, the provision contained within section 26(2) on the application of the Government Decree (1017/2002) shall be applied to combustion plants referred to in section 2(5) of this Decree until 31 December 2015.

Annex 1

Emission limit values for new energy production units with a rated thermal input of at least 50 megawatts

Table 1. Emission limit values for sulphur dioxide for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

	Emission limit value mg $SO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)			
Rated thermal input (P) MW	Biomass	Peat	Coal and other solid fuels	Liquid fuels
50≤P≤100	200	300	400	350
100<P≤300	200	300 250[1]	200	200
P>300	150	150 200[1]	150 200[2]	150

[1] emission limit value for fluidised bed combustion
[2] emission limit value for circulating or pressurised fluidised bed combustion

Table 2. Emission limit values for sulphur dioxide for energy production units burning gaseous fuels, with the exception of gas turbines and gas engines

Fuel	Emission limit value mg $SO_2/m^3(n)$, 3% O_2
In general	35
Liquefied gas	5
Low calorific gases from coke oven	400
Low calorific gases from blast furnace	200

Table 3. Emission limit values for nitrogen oxides for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

	Emission limit value mg $NO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)		
Rated thermal input (P) MW	Biomass and peat	Coal and other solid fuels	Liquid fuels
50≤P≤100	250	300	300
100<P≤300	200	200	150
P>300	150	150	100

Table 4. Emission limit values for nitrogen oxides and carbon monoxide (CO) for energy production units burning gaseous fuel

	Emission limit value, 15% O_2 (gas turbines and gas engines) and 3% O_2 (other combustion plants)	
	mg $NO_2/m^3(n)$	mg $CO/m^3(n)$
Gas turbines (including CCGT)	501	100
Gas engines	75	100
Combustion plants other than gas turbines and gas engines	100	100

[1] For single cycle gas turbines having an efficiency greater than 35% – determined at ISO conditions – the emission limit value for nitrogen oxides shall be 50xη/35 where η is the gas turbine efficiency expressed as a percentage (in ISO conditions).

For gas turbines (including Combined Cycle Gas Turbines, CCGT), the nitrogen oxides and carbon monoxide emission limit values set out in table 4 only apply when the load is above 70%.

The emission limit value for nitrogen oxides is 50 mg $NO_2/m^3(n)$ and for carbon monoxide 100 $mg/m^3(n)$ for gas turbines (including Combined Cycle Gas Turbines, CCGT) using light or medium distillates as liquid fuel.

Table 5. Emission limit values for dust for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

Rated thermal input (P) MW	Emission limit value $mg/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)
50≤P≤300	20
P>300	10 20[1]

[1] emission limit value for biomass and peat combustion

Table 6. Emission limit values for dust for energy production units burning gaseous fuels, with the exception of gas turbines and gas engines

Fuel	Emission limit value $mg/m^3(n)$, 3% O_2
In general	5
Blast furnace gas	10
Gases produced by the steel industry which can be used elsewhere	30

Annex 2

Emission limit values for existing energy production units with a rated thermal input of at least 50 megawatts, from 1 January 2016

Table 7. Emission limit values for sulphur dioxide for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

	Emission limit value mg $SO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)			
Rated thermal input (P) MW	Biomass	Peat	Coal and other solid fuels	Liquid fuels
$50 \leq P \leq 100$	200	300	400	350
$100 < P \leq 300$	200	300	250	250
$P > 300$	200	200	200	200

Table 8. Emission limit values for sulphur dioxide for old, existing energy production units burning solid or liquid fuel by annual operating hours (of a maximum of 1,500 h/a as a rolling average over a period of five years), with the exception of gas turbines and gas engines

	Emission limit value mg $SO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)	
Rated thermal input (P) MW	Fuel	
$P \geq 50$	solid	800
$50 \leq P \leq 300$	liquid	850
$P > 300$	liquid	400

Table 9. Emission limit values for sulphur dioxide for energy production units burning gaseous fuels, with the exception of gas turbines and gas engines

Fuel	Emission limit value mg $SO_2/m^3(n)$, 3% O_2
In general	35
Liquefied gas	5
Low calorific gases from coke oven	400
Low calorific gases from blast furnace	200

The emission limit value for sulphur dioxide is 800 $mg/m^3(n)$ for old, existing energy production units burning gases with low calorific value, produced by the gasification of refinery fractions.

Table 10. Emission limit values for nitrogen oxides for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

	Emission limit value mg $NO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)		
Rated thermal input (P) MW	Biomass and peat	Coal and other solid fuels	Liquid fuels
50≤P≤100	300	300	450
100<P≤300	250	200	200[1]
P>300	200	200	150[1]

[1] The emission limit value for nitrogen oxides for old, existing energy production units with a maximum rated thermal input of 500 MW that use distillation and conversion residues from crude-oil refining for their own consumption is 450 $mg/m^3(n)$ as nitrogen dioxide (NO_2).

The emission limit value for nitrogen oxides for old, existing energy production units operating in the chemical industry with a maximum rated thermal input of 500 MW that use liquid production residues as non-commercial fuel for their own consumption is 450 $mg/m^3(n)$ as nitrogen dioxide (NO_2).

Table 11. Emission limit values for nitrogen oxides for old, existing energy production units burning solid or liquid fuel by annual operating hours (of a maximum of 1,500 h/a as a rolling average over a period of five years), with the exception of gas turbines and gas engines

	Emission limit value mg $NO_2/m^3(n)$, 6% O_2 (solid) and 3% O_2 (liquid)		
Rated thermal input (P) MW	Fuel	Emission limit value mg $NO_2/m^3(n)$	Note
50≤P≤500	solid or liquid	450	
P>500	liquid	400	
P>500	solid	450	Permit granted before 1 July 1987

Table 12. Emission limit values for nitrogen oxides for old, existing gas turbines (including CCGT) by annual operating hours (of a maximum of 1,500 h/a as a rolling average over a period of five years)

Fuel	Emission limit value mg $NO_2/m^3(n)$, 15% O_2
natural gas	150
other gaseous or liquid fuels	200

Table 13 Emission limit values for nitrogen oxides and carbon monoxide (CO) for energy production units burning gaseous fuel

	Emission limit value, 3% O_2 (gaseous), 15% O_2 (gas turbines and gas engines)	
	mg $NO_2/m^3(n)$	mg $CO/m^3(n)$
Energy production units burning natural gas, with the exception of gas turbines and gas engines	100	100
Energy production units firing blast furnace gas, coke oven gas or low calorific gases from the gasification of refinery residues, with the exception of gas turbines and gas engines	200[4]	-
Energy production units firing other gases, with the exception of gas turbines and gas engines	200[4]	-
Gas turbines (including CCGT) burning natural gas[1]	50[2, 3]	100
Gas turbines (including CCGT) burning gaseous fuels other than natural gas	120	-
Gas engine	100	100

[1] Natural gas consists mainly of methane with not more than 20% (by volume) of inerts and other constituents.

[2] Emission limit value 75 $mg/m^3(n)$ in the following cases, where the efficiency of the gas turbine is determined at ISO conditions:

i) gas turbines used in combined heat and power systems with an overall efficiency greater than 75%;
ii) gas turbines used in combined cycle plants with an annual average overall electrical efficiency greater than 55%;
iii) gas turbines for mechanical drives.

[3] For single cycle gas turbines not falling into any of the categories i) – iii) referred to in note 2, but having an efficiency greater than 35% – determined in ISO conditions – the emission limit value shall be $50x\eta/35$ where η is the gas turbine efficiency expressed as percentage (in ISO conditions).

[4] The emission limit value for old, existing energy production units with a maximum rated thermal input of 500 MW is 300 $mg/m^3(n)$.

The emission limit value for nitrogen oxides is 90 $mg/m^3(n)$ and for carbon monoxide 100 $mg/m^3(n)$for gas turbines (including Combined Cycle Gas Turbines, CCGT) using light or medium distillates as liquid fuel.

For gas turbines (including Combined Cycle Gas Turbines, CCGT), the nitrogen oxides and carbon monoxide emission limit values set out in table 13 only apply when the load is above 70%.

Table 14 Emission limit values for dust for energy production units burning solid or liquid fuels, with the exception of gas turbines and gas engines

	Emission limit value for dust mg/m^3(n), 6% O_2 (solid) and 3% O_2 (liquid)		
Rated thermal input (P) MW	Biomass and peat	Coal and other solid fuels	Liquid fuels[1]
50≤P≤100	30	30	30
100<P≤300	20	25	25
P>300	20	20	20

[1] The emission limit value for dust for old, existing energy production units that use distillation and conversion residues from crude-oil refining for their own consumption is 50 mg/m^3(n).

Table 15. Emission limit values for dust for energy production units burning gaseous fuels, with the exception of gas turbines and gas engines

Fuel	Emission limit value mg/m^3(n), 3% O_2
In general	5
Blast furnace gas	10
Gases produced by the steel industry which can be used elsewhere	30

Annex 3

Monitoring and measuring emissions

1. In energy production units with a rated thermal input of at least 100 megawatts, concentrations of sulphur dioxide, nitrogen oxides and dust in the waste gases shall be measured on a continuous basis.

   The carbon monoxide concentration of waste gases from energy production units with a rated thermal input of at least 100 megawatts burning gaseous fuel shall be measured on a continuous basis.

2. However, if the energy production unit has a remaining operational life of no more than 10,000 hours, no continuous measurements are necessary.

   Continuous measurements of sulphur dioxide or dust emissions are not required for energy production units burning natural gas.

   Measurements of sulphur dioxide emissions are not required for energy production units burning oil with a known sulphur content and have no desulphurization equipment.

3. Continuous measurements of sulphur dioxide emissions are not required for energy production units burning biomass if the operator can show, in a manner approved by the permit authority, that the sulphur dioxide emissions never exceed the relevant emission limit value.

4. If the emissions of an energy production unit are not measured continuously, discontinuous measurements shall be carried out at least every six months on the sulphur dioxide, nitrogen oxides and dust emissions of the energy production unit or the carbon monoxide emissions of the energy production unit burning gaseous fuel.

5. The total mercury emissions of an energy production unit burning coal shall be measured at least once a year.

6. The amount of sulphur dioxide and nitrogen oxides emissions can be assessed in a way approved by the environmental permit authority instead of using discontinuous measurements. The assessments should make use of relevant standards of the European Committee for Standardization (CEN), or if these are not available, of ISO standards or other national or international standards which ensure that the information supplied is of equivalent quality.

7. Any substantial changes in the type of fuel used or the way the energy production unit is operated shall be reported to the supervisory authority, which decides on the adequacy of the monitoring requirements or any changes in them.

8. Oxygen content, temperature, pressure and water vapour content of the waste gases shall be measured continuously in accordance with the requirements specified in item 1 above. However, it is not necessary to measure the water vapour content of

the waste gases on a continuous basis if the wastet gases are dried before the emissions are analysed.

9. Representative measurements of the relevant pollutants, process parameters, collection and analysis of samples, and the reference measurements used for calibrating the automatic measurement systems shall comply with CEN standards. If CEN standards are not available, ISO standards or national or international standards shall be used to ensure that all information supplied is of equivalent quality.

   In continuous measurements, the reliability and the quality of the measurement results shall be verified at least once a year by means of parallel measurements.

10. The value of the 95 per cent confidence interval for the measurement result shall not exceed the following percentages for emission limit values:

Carbon monoxide	10%
Sulphur dioxide	20%
Nitrogen oxides	20%
Dust	30%

    The validated daily and hourly average values are calculated from the measured, validated hourly averages, which are obtained by deducting from the measured value the figure representing 95 per cent confidence intervals of the measurement result. The figures representing 95 per cent confidence intervals for each measurement result are 10 per cent for carbon monoxide, 20 per cent for sulphur dioxide and nitrogen oxides, and 30 per cent for dust of the relevant emission limit value.

    If, in continuous measurements carried out on any given day, more than three hourly average values are invalidated due to malfunction or maintenance of the measurement system used, the measurement results for that day shall be invalidated. If the measurement results of more than 10 days are invalidated during one year, the state supervisory authority shall order the operator to carry out measures that help to improve the reliability of the continuous measurement system.

Annex 4

Determining the emission limit value for a multi-fuel firing unit

The weighted emission limit value (C_p) for a multi-fuel firing unit burning more than one type of fuel simultaneously is calculated according to the following formula:

$C_p = C_1 + C_2 + \ldots + C_n$, where

$$C_{1\ldots n} = \frac{Q_{1\ldots n}\, M_{1\ldots n} \times C_{1\ldots n}}{Q_1 M_1 + Q_2 M_2 + Q_n M_n,}$$

Q = the calorific value of each fuel (MJ/kg)

M = the amount of each fuel (kg/h or tonnes p.a.)

C_1...n = the emission limit value of each fuel in mg/Nm^3, reduced to take into account the oxygen content of the determinative fuel.