

COMMISSION DELEGATED REGULATION (EU) .../...

of XXX

Reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2004/8/EC of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU

THE EUROPEAN COMMISSION,

Having regard to the Treaty establishing the European Community,

Having regard to Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC¹, and in particular Articles 14(10), 22 and 23 thereof,

Whereas:

- (1) Directive 2012/27/EU empowers the Commission to review the harmonised efficiency reference values to be used for separate production of heat and electricity.
- (2) Pursuant to Article 4(1) of Directive 2004/8/EC the Commission established in Commission Decision 2007/74/EC² harmonised efficiency reference values for separate production of electricity and heat, consisting of a matrix of values differentiated by relevant factors, including year of construction and types of fuel, which were applicable until 2011.
- (3) Pursuant to Article 4(1) of Directive 2004/8/EC the Commission established in Commission Implementing Decision 2011/877/EC³ harmonised efficiency reference values for separate production of electricity and heat, consisting of a matrix of values differentiated by relevant factors, including year of construction and types of fuel, which are applicable until 2015.
- (4) Pursuant to Article 23(1) of Directive 2012/27/EU the Commission is empowered to review the harmonized efficiency reference values for separate production of electricity and heat to take account of technological developments and changes in the distribution of energy sources.
- (5) Pursuant to Article 14(10) of Directive 2012/27/EU the Commission is empowered to review the harmonized efficiency reference values for separate production of electricity and heat by 31 December 2014.
- (6) The Commission has reviewed the harmonized efficiency reference values for separate production of electricity and heat, taking into account data from operational use under realistic conditions, provided by the Member States and by stakeholders. Developments in the best available and economically justifiable technology which were observed during the period 2011-2015 covered by the review indicate that for the harmonised efficiency reference values for separate production of electricity, the

¹ OJ L 315, 14.11.2012, p. 1.

² OJ L 32, 6.2.2007, p. 183.

³ OJ L 343, 23.12.2011, p. 91.

distinction drawn in Commission Decision 2011/877/EC relating to the year of construction of a cogeneration unit should be maintained.

- (7) The review confirmed, based on recent experience and analysis, that correction factors relating to the climatic situation, as set out in Commission Decision 2011/877/EC, should continue to be applied.
- (8) The review confirmed, based on recent experience and analysis, that the correction factors for avoided grid losses set out in Commission Decision 2011/877/EC should also continue to be applied. In order to better reflect the avoided losses the voltage limits used and the value of the correction factors need to be updated.
- (9) The review has not produced evidence to indicate that the energy efficiency of boilers has changed in the period considered, and therefore the harmonized efficiency reference values for the separate production of heat should not relate to the year of construction. No correction factors relating to the climatic situation were required because the thermodynamics of generating heat from fuel do not depend significantly on the ambient temperature. In addition correction factors for heat grid losses are not required as heat is always used near the site of production.
- (10) The review has produced evidence indicating that the reference values for the energy efficiency of boilers category producing steam or hot water need to be differentiated.
- (11) The review has produced evidence regarding the existence of nuclear, waste heat, solar thermal and geothermal cogeneration units. Reference values for the separate production of electricity and heat using these fuels are added.
- (12) Data from operational use under realistic conditions has demonstrated a statistically significant improvement of the actual performance of state-of-the-art plants using certain types of fuels in the period under review.
- (13) Stable conditions for investment in cogeneration and continued investor confidence are needed. From this perspective it is appropriate to fix harmonized reference values for electricity and heat for the period 2016-2019.
- (14) Taking into consideration that one of the aims of Directive 2012/27/EU is to promote cogeneration in order to save energy, an incentive for retrofitting older cogeneration units should be given in order to improve their energy efficiency. For these reasons the efficiency reference values for electricity applicable to a cogeneration unit should become higher from the eleventh year after the year of its construction.
- (15) This approach is consistent with the requirement for the harmonised efficiency reference values to be based on the principles mentioned in Annex II (f) of Directive 2012/27/EU.

HAS ADOPTED THIS REGULATION:

Article 1

Establishment of the harmonised efficiency reference values

The harmonised efficiency reference values for separate production of electricity and heat shall be as set out in Annex I and Annex II respectively.

Article 2

Correction factors for the harmonised efficiency reference values for separate production of electricity

1. Member States shall apply the correction factors set out in Annex III(a) in order to adapt the harmonised efficiency reference values set out in Annex I to the average climatic situation in each Member State.

If on the territory of a Member State official meteorological data show differences in the annual ambient temperature of 5 °C or more, that Member State may, subject to notification to the Commission, use several climate zones for the purpose of the first subparagraph using the method set out in Annex III(b).

2. Member States shall apply the correction factors set out in Annex IV in order to adapt the harmonised efficiency reference values set out in Annex I to avoided grid losses.
3. Where Member States apply both the correction factors set out in Annex III(a) and those set out in Annex IV, they shall apply Annex III(a) before applying Annex IV.

Article 3

Application of the harmonised efficiency reference values

1. Member States shall apply the harmonised efficiency reference values set out in Annex I relating to the year of construction of a cogeneration unit. These harmonised efficiency reference values shall apply for 10 years from the year of construction of a cogeneration unit.
2. From the eleventh year following the year of construction of a cogeneration unit, Member States shall apply the harmonised efficiency reference values which by virtue of paragraph 1 apply to a cogeneration unit of 10 years of age. These harmonised efficiency reference values shall apply for one year.
3. For the purpose of this Article the year of construction of a cogeneration unit shall mean the calendar year of the first electricity production.

Article 4

Retrofitting of a cogeneration unit

If an existing cogeneration unit is retrofitted and the investment cost for the retrofitting exceeds 50% of the investment cost for a new comparable cogeneration unit, the calendar year of first electricity production of the retrofitted cogeneration unit shall be considered as its year of construction for the purpose of Article 3.

Article 5

Fuel mix

If the cogeneration unit is operated with more than one fuel the harmonised efficiency reference values for separate production shall be applied proportionally to the weighted mean of the energy input of the various fuels.

Article 6

Repeal

Decision 2011/877/EU shall be repealed from 1 January 2016.

Article 7

Entry into force and application

1. This Regulation shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Union.
2. It shall apply from 1 January 2016.

Done at Brussels,

For the Commission

[...]

Member of the Commission

ANNEX I

Harmonised efficiency reference values for separate production of electricity (referred to in Article 1)

In the table below the harmonised efficiency reference values for separate production of electricity are based on net calorific value and standard ISO conditions (15 °C ambient temperature, 1.013 bar, 60% relative humidity).

	Category	Type of fuel	Year of construction		
			2006-2011	2012-2015	2016-2019
Solids	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	44.2	44.2	44.2
	S2	Lignite, lignite briquettes, shale oil	41.8	41.8	41.8
	S3	Peat, peat briquettes	39.0	39.0	39.0
	S4	Wood fuels including processed wood pellets and chips, straw, nut shells, husks and cobs, olive stones, clean waste wood and bagasse	33.0	33.0	37.0
	S5	Agricultural biomass including logs, round wood, agricultural residues, pruning, milling residues, forestry residues and distillers grains, contaminated waste wood	25.0	25.0	30.0
	S6	Municipal and industrial waste (non-renewable) and renewable/ bio-degradable waste	25.0	25.0	25.0
Liquids	L7	Heavy fuel oil, gas/diesel oil, other oil products	44.2	44.2	44.2
	L8	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel, other liquid biofuels	44.2	44.2	44.2
	L9	Waste liquids including biodegradable and non-renewable waste (including pyrolysis oils, black and brown liquor, tallow)	25.0	25.0	29.0
Gaseous	G10	Natural gas, LPG and LNG	52.5	52.5	53.0
	G11	Refinery gases hydrogen and synthesis gas	44.2	44.2	42.0
	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment	42.0	42.0	42.0
	G13	Coke oven gas, blast furnace gas and other recovered gases (excluding refinery gas)	35.0	35.0	35.0
Other	O14	Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions)	-	-	30.0
	O15	Nuclear	-	-	33.0
	O16	Solar thermal	-	-	30.0
	O17	Geothermal	-	-	30.0

ANNEX II

Harmonised efficiency reference values for separate production of heat (referred to in Article 1)

In the table below the harmonised efficiency reference values for separate production of heat are based on net calorific value and standard ISO conditions (15 °C ambient temperature, 1.013 bar, 60% relative humidity).

The reference efficiencies in the table should only be used by plants constructed before 31/12/2015.

	Type of fuel:	Hot water and Steam	Direct use of exhaust gases (*)
Solids	Hard coal/coke	88	80
	Lignite/lignite briquettes	86	78
	Peat/peat briquettes	86	78
	Wood fuels	86	78
	Agricultural biomass	80	72
	Biodegradable (municipal) waste	80	72
	Non-renewable (municipal and industrial) waste	80	72
	Oil shale	86	78
Liquids	Oil (gas oil + residual fuel oil), LPG	89	81
	Biofuels	89	81
	Biodegradable waste	80	72
	Non-renewable waste	80	72
Gaseous	Natural gas	90	82
	Refinery gas/hydrogen	89	81
	Biogas	70	62
	Coke oven gas, blast furnace gas + other waste gases	80	72

(*) Values for direct heat should be used if the temperature is 250 °C or higher.

The harmonised efficiency reference values for separate production of heat (based on net calorific value and standard ISO conditions) **for plants constructed after 31/12/2015** are shown in the table below.

	Type of fuel:	Hot water	Steam (*)	Direct heat
Solids	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	88	83	80
	Lignite, lignite briquettes, shale oil	86	81	78
	Peat, peat briquettes	86	81	78
	Wood fuels including processed wood pellets and chips, straw, nut shells, husks and cobs, olive stones, clean waste wood and bagasse	86	81	78
	Agricultural biomass including logs, round wood, agricultural residues, pruning, milling residues, forestry residues and distillers grains, contaminated waste wood	80	75	72
	Municipal and industrial waste (non-renewable) and renewable/ bio-degradable waste	80	75	72
Liquids	Heavy fuel oil, gas/diesel oil, other oil products	85	80	77
	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel, other liquid biofuels	85	80	77
	Waste liquids including biodegradable and non-renewable waste (including pyrolysis oils, black and brown liquor, tallow)	75	70	67
Gaseous	Natural gas, LPG and LNG	92	87	84
	Refinery gases hydrogen and synthesis gas	90	85	82
	Biogas produced from anaerobic digestion, landfill, and sewage treatment	80	75	72
	Coke oven gas, blast furnace gas and other recovered gases (excluding refinery gas)	80	75	72
Other	Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions)	88	83	80
	Nuclear	86	81	78
	Solar thermal	86	81	78
	Geothermal	86	81	78

(*) Steam plants built after 31/12/2015 should use the reference heat efficiencies listed under the steam column. If such plants do not account for the condensate return in their calculation of CHP heat efficiencies, the steam efficiencies shown in the table above should be increased by 5 percentage points.

ANNEX III

Correction factors relating to the average climatic situation and method for establishing climate zones for the application of the harmonised efficiency reference values for separate production of electricity (referred to in Article 2(1))

(a) Correction factors relating to the average climatic situation

Ambient temperature correction is based on the difference between the annual average temperature in a Member State and standard ISO conditions (15 °C).

The correction will be as follows:

0.1 %-point efficiency loss for every degree above 15 °C;

0.1 %-point efficiency gain for every degree under 15 °C.

Example:

When the average annual temperature in a Member State is 10 °C, the reference value of a cogeneration unit in that Member State has to be increased by 0.5 %-points.

(b) Ambient temperature correction only applies to gaseous fuels (G10, G11, G12, G13)

(c) Method for establishing climate zones

The borders of each climate zone will be constituted by isotherms (in full degrees Celsius) of the annual average ambient temperature which differ at least 4 °C. The temperature difference between the average annual ambient temperatures applied in adjacent climate zones will be at least 4 °C.

Example:

In a Member State the average annual ambient temperature in place A is 12 °C and in place B it is 6 °C. The difference is more than 5 °C. The Member State has now the option to introduce two climate zones separated by the isotherm of 9 °C, thus constituting one climate zone between the isotherms of 9 °C and 13 °C with an average annual ambient temperature of 11 °C and another climate zone between the isotherms of 5 °C and 9 °C with an average annual ambient temperature of 7 °C.

ANNEX IV

Correction factors for avoided grid losses for the application of the harmonised efficiency reference values for separate production of electricity (referred to in Article 2(2))

Connection voltage level	Correction factor (Off-site)	Correction factor (On-site)
EHV (>345kV)	1	0.976
HV (200 - 345kV)	0.972	0.963
HMV (100 - 200kV)	0.963	0.951
MMV (50 - 100kV)	0.952	0.936
LMV (12 - 50kV)	0.935	0.914
LV (0.45 - 12kV)	0.918	0.891
ELV (<0.45kV)	0.888	0.851

Example:

A 100 kW_{el} cogeneration unit with a reciprocating engine driven with natural gas generates electricity at 380 V. Of this, 85 % is used for own consumption and 15 % is fed into the grid. The plant was constructed in 2010. The annual ambient temperature is 15 °C (so no climatic correction is necessary).

After the grid loss correction the resulting efficiency reference value for the separate production of electricity in this cogeneration unit would be (based on the weighted mean of the factors in this Annex):

$$\text{Ref } E\eta = 52.5 \% * (0.851 * 85 \% + 0.888 * 15 \%) = 45.0 \%$$