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COMMISSION DELEGATED REGULATION (EU) 2015/2402

of 12 October 2015

reviewing harmonised efficiency reference values for separate production of electricity and heat in application of Directive 2012/27/EU of the European Parliament and of the Council and repealing Commission Implementing Decision 2011/877/EU

(OJ L 333, 19.12.2015, p. 54)

Amended by:

		Official Journal		
		No	page	date
►**M1**	Commission Delegated Regulation (EU) 2023/2104 of 4 July 2023	L 2104	1	4.10.2023

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COMMISSION DELEGATED REGULATION (EU) 2015/2402

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Article 1

Establishment of the harmonised efficiency reference values

The harmonised efficiency reference values for separate production of electricity and heat shall be those set out in Annexes I and 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 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.

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. If a Member State applies both the correction factors set out in Annex III and those set out in Annex IV, it shall apply Annex III before applying Annex IV.

Article 3

Application of the harmonised efficiency reference values for the separate production of electricity

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. Those harmonised efficiency reference values are applicable for 10 years from a cogeneration unit's year of construction.

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 are applicable for one year.

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3. For the purposes of this Article, a cogeneration unit's year of construction is the calendar year during which the unit first produces electricity.

Article 4

Application of the harmonised efficiency reference values for the separate production of heat

1. Member States shall apply the harmonised reference values set out in Annex II relating to the year of construction of a cogeneration unit.

2. For the purposes of this Article, a cogeneration's unit year of construction is the year of construction for the purpose of Article 3.

Article 5

Retrofitting of a cogeneration unit

If the investment cost relating to the retrofitting of a cogeneration unit exceeds 50 % of the investment cost for a new comparable cogeneration unit, the calendar year during which the retrofitted cogeneration unit first produces electricity shall be considered as the year of construction of the retrofitted cogeneration unit for the purpose of Articles 3 and 4.

Article 6

Fuel mix

If the cogeneration unit is operated with more than one kind of 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 7

Repeal

Decision 2011/877/EU is repealed.

Article 8

Entry into force and application

This Regulation shall enter into force on the first day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall apply from 1 January 2016.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

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ANNEX I

Harmonised efficiency reference values for separate production of electricity

(referred to in Article 1)

In the following table, the harmonised efficiency (%) reference values for separate production of electricity are based on net calorific value and standard atmospheric ISO conditions (15 °C ambient temperature, 1,013 bar, 60 % relative humidity):

	Category	Energy source	Year of construction		
			Before 2016	2016–2023	From 2024
Solids	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	44,2	44,2	53,0
	S2	Lignite, lignite briquettes, oil shale	41,8	41,8	53,0
	S3	Peat, peat briquettes	39,0	39,0	53,0
	S4	Dry biomass including wood and other solid biomass including wood pellets and briquettes, dried woodchips, clean and dry waste wood, nut shells and olive and other stones	33,0	37,0	37,0
	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.	25,0	30,0	30,0
	S6	Municipal and industrial waste (non-renewable, of non-biological origin such as plastics, rubber and other synthetic materials) 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	53,0
	L8	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel, other biofuels and all e-liquids	44,2	44,2	44,2
	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain).	25,0	29,0	29,0
Gaseous	G10	Natural gas, LPG, LNG and biomethane	52,5	53,0	53,0
	G11A	Traded hydrogen ([1])	44,2	44,2	53,0
	G11B	Refinery gases, synthesis gas, hydrogen (by-product), e-gases ([2])	44,2	44,2	44,2
	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment	42,0	42,0	42,0
	G13	Coke oven gas, blast furnace gas, mining gas, and other recovered gases (excluding refinery gas)	35,0	35,0	35,0

▼M1

	Category	Energy source	Year of construction		
			Before 2016	2016–2023	From 2024
Other	O14A	Waste heat, including process exhaust gases, product from exothermic chemical reactions (input temperature > 200 °C)		30,0	30,0
	O14B	Waste heat, including process exhaust gases, product from exothermic chemical reactions (input temperature < 200 °C)		30,0	20,0
	O15	Nuclear		33,0	33,0
	O16	Solar thermal		30,0	30,0
	O17	Geothermal		19,5	19,5
	O18	Other fuels not mentioned above		30,0	30,0

([1]) Hydrogen sold from its supplier to a cogeneration unit operator.
([2]) E-gases are understood as gaseous synthetic fuel originating from renewable hydrogen and carbon dioxide captured either from a concentrated source, such as flue gases from an industrial site, or from the air.

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ANNEX II

Harmonised efficiency reference values for separate production of heat

(referred to in Article 1)

In the following table the harmonised efficiency (%) reference values for separate production of heat are based on net calorific value and standard atmospheric ISO conditions (15 °C ambient temperature, 1,013 bar, 60 % relative humidity):

Category		Energy source	Year of construction								
			Before 2016			2016–2023			From 2024		
			Hot water	Steam (1)	Direct use of exhaust gases (2)	Hot water	Steam (1)	Direct use of exhaust gases (2)	Hot water	Steam (1)	Direct use of exhaust gases (2)
Solids	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	88	83	80	88	83	80	92	87	84
	S2	Lignite, lignite briquettes, oil shale	86	81	78	86	81	78	92	87	84
	S3	Peat, peat briquettes	86	81	78	86	81	78	92	87	84
	S4	Dry biomass including wood and other solid biomass including wood pellets and briquettes, dried woodchips, clean and dry waste wood, nut shells and olive and other stones	86	81	78	86	81	78	86	81	78
	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.	80	75	72	80	75	72	80	75	72

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Category		Energy source	Year of construction								
			Before 2016			2016–2023			From 2024		
			Hot water	Steam [1]	Direct use of exhaust gases [2]	Hot water	Steam [1]	Direct use of exhaust gases [2]	Hot water	Steam [1]	Direct use of exhaust gases [2]
	S6	Municipal and industrial waste (non-renewable, of non-biological origin such as plastics, rubber and other synthetic materials) and renewable/bio-degradable waste	80	75	72	80	75	72	80	75	72
Liquids	L7	Heavy fuel oil, gas/ diesel oil, other oil products	89	84	81	85	80	77	92	87	84
	L8	Bio-liquids including bio-methanol, bioe-thanol, bio-butanol, biodiesel, other biofuels and all e-liquids	89	84	81	85	80	77	85	80	77
	L9	Waste liquids including biode-gradable and non-renewable waste (including tallow, fat and spent grain).	80	75	72	75	70	67	75	70	67
Gaseous	G10	Natural gas, LPG, LNG and biomethane	90	85	82	92	87	84	92	87	84
	G11A	Traded hydrogen	89	84	81	90	85	82	92	87	84
	G11B	Refinery gases, synthesis gas, hydrogen (by-product), e-gases	89	84	81	90	85	82	90	85	82
	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment	70	65	62	80	75	72	80	75	72

▼M1

Category		Energy source	Year of construction								
			Before 2016			2016–2023			From 2024		
			Hot water	Steam [1]	Direct use of exhaust gases [2]	Hot water	Steam [1]	Direct use of exhaust gases [2]	Hot water	Steam [1]	Direct use of exhaust gases [2]
	G13	Coke oven gas, blast furnace gas, mining gas, and other recovered gases (excluding refinery gas)	80	75	72	80	75	72	80	75	72
Other	O14A	Waste heat, including process exhaust gases, product from exothermic chemical reactions (input temperature > 200 °C)	—	—	—	92	87	—	92	87	—
	O14B	Waste heat, including process exhaust gases, product from exothermic chemical reactions (input temperature < 200 °C)	—	—	—	92	87	—	92	87	—
	O15	Nuclear	—	—	—	92	87	—	92	87	—
	O16	Solar thermal	—	—	—	92	87	—	92	87	—
	O17	Geothermal	—	—	—	92	87	—	92	87	—
	O18	Other fuels not mentioned above	—	—	—	92	87	—	92	87	—

[1] Where steam plants do not account for the condensate return in their calculation of CHP heat efficiencies, the steam efficiencies set out in the table should be increased by 5 percentage points.
[2] Values for direct heat should be used where the temperature reaches 250 °C or higher.

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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 atmospheric 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 applies only 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:

If, for example, for a given Member State the average annual ambient temperature is 12 °C in a certain location and 6 °C in a different location within the Member State, then the Member State has the option to introduce two climate zones, separated by an isotherm of 9 °C:

A first climate zone between the isotherms of 9 °C and 13 °C (4 °C difference) with an average annual ambient temperature of 11 °C, and

A second climate zone between the isotherms of 5 °C and 9 °C with an average annual ambient temperature of 7 °C.

▼**M1**

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)
≥ 345 kV	1	0,976
≥ 200 – < 345 kV	0,972	0,963
≥ 100 – < 200 kV	0,963	0,951
≥ 50 – < 100 kV	0,952	0,936
≥ 12 – < 50 kV	0,935	0,914
≥ 0,45 – < 12kV	0,918	0,891
< 0,45 kV	0,888	0,851

Example:

A 100 kWel 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 2020. 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, on the basis of the weighted mean of the factors in this Annex:

$$\text{Ref } E\eta = 53\ \% \times (0{,}851 \times 85\ \% + 0{,}888 \times 15\ \%) = 45{,}4\ \%$$