

**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**

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC <sup>(1)</sup>, and in particular the second subparagraph of Article 14(10) thereof,

Whereas:

- (1) Pursuant to Article 4(1) of Directive 2004/8/EC of the European Parliament and of the Council <sup>(2)</sup>, the Commission set out in its Implementing Decision 2011/877/EU <sup>(3)</sup> harmonised efficiency reference values for the separate production of electricity and heat, as a matrix of values differentiated by relevant factors, including year of construction and types of fuel. These values are applicable until 31 December 2015.
- (2) The Commission has reviewed the harmonised efficiency reference values for the separate production of electricity and heat taking into account data from operational use under realistic conditions, provided by Member States and by stakeholders. As a result of developments in the best available and economically justifiable technology, observed during the review period 2011 to 2015 the distinction drawn in Decision 2011/877/EU relating to the year of construction of a cogeneration unit should be maintained in relation to the harmonised efficiency reference values for separate production of electricity.
- (3) The review of the harmonised efficiency reference values confirmed that on the basis of recent experience and analysis, correction factors relating to the climatic situation, as set out in Decision 2011/877/EU, should apply only to plants using gaseous fuels.
- (4) That review confirmed, based on recent experience and analysis, that the application of correction factors for avoided grid losses set out in Decision 2011/877/EU should continue. In order to better reflect the avoided losses the voltage limits used and the value of the correction factors need to be updated.
- (5) The review has produced evidence to indicate that the harmonised efficiency reference values for the separate production of heat should be modified in some cases. In order to avoid retroactive changes for existing schemes, the new set of reference values only applies from 2016, while the current set of values is kept for plants constructed before that date. No correction factors relating to the climatic situation were required because the thermodynamics of generating heat from fuel do not significantly depend on ambient temperature. In addition, correction factors for heat grid losses are not required as heat is always used near the site of production.
- (6) That review has produced evidence indicating that the reference values for the energy efficiency of boilers that produce steam or hot water should be differentiated.
- (7) 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.
- (8) Stable conditions for investment in cogeneration and continued investor confidence are needed, therefore it is appropriate to fix harmonised reference values for electricity and heat.

<sup>(1)</sup> OJ L 315, 14.11.2012, p. 1.

<sup>(2)</sup> Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC (OJ L 52, 21.2.2004, p. 50).

<sup>(3)</sup> Commission Implementing Decision 2011/877/EU of 19 December 2011 establishing 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 Decision 2007/74/EC (OJ L 343, 23.12.2011, p. 91).

- (9) The reference values for the separate production of heat and electricity established in Decision 2011/877/EU are applicable until 31 December 2015, new reference values need to be applied from 1 January 2016. In order to ensure the applicability of the new set of reference values by that date the current Regulation shall enter into force on the first day following its publication.
- (10) Articles 14, 22 and 23 of Directive 2012/27/EU empower the Commission to adopt delegated acts updating the harmonised reference values for the separate production of electricity and heat. The delegation of power is conferred on the Commission for a period of five years from 4 December 2012. In order to avoid a situation where there was no extension of the delegation of power beyond 4 December 2017, the reference values laid down in this Regulation will continue to be of application. If new delegated powers were given to the Commission in the intervening period, it is the intention of the Commission to review the reference values laid down in this Regulation four years after its entry into force at latest.
- (11) Directive 2012/27/EU aims at promoting cogeneration in order to save energy, therefore there should be an incentive for retrofitting older cogeneration units in order to improve their energy efficiency. For those reasons, and in consistency with the requirement for the harmonised efficiency reference values which should be based on the principles mentioned in Annex II(f) of Directive 2012/27/EU, the efficiency reference values for electricity applicable to a cogeneration unit should increase from the eleventh year after the year of its construction,

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 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.

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.

Done at Brussels, 12 October 2015.

For the Commission  
The President  
Jean-Claude JUNCKER

## 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 atmospheric ISO conditions (15 °C ambient temperature, 1,013 bar, 60 % relative humidity).

Category		Type of fuel	Year of construction		
			Before 2012	2012-2015	From 2016
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	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	33,0	37,0
	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.	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 and other bio-liquids	44,2	44,2	44,2
	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain).	25,0	25,0	29,0
Gaseous	G10	Natural gas, LPG, LNG and biomethane	52,5	52,5	53,0
	G11	Refinery gases hydrogen and synthesis gas	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
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			19,5
	O18	Other fuels not mentioned above			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 atmospheric ISO conditions (15 °C ambient temperature, 1,013 bar, 60 % relative humidity).

Category	Type of fuel:	Year of construction						
		Before 2016			From 2016			
		Hot water	Steam (*)	Direct use of exhaust gases (**)	Hot water	Steam (*)	Direct use of exhaust gases (**)	
Solids	S1	Hard coal including anthracite, bituminous coal, sub-bituminous coal, coke, semi-coke, pet coke	88	83	80	88	83	80
	S2	Lignite, lignite briquettes, shale oil	86	81	78	86	81	78
	S3	Peat, peat briquettes	86	81	78	86	81	78
	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
	S5	Other solid biomass including all wood not included under S4 and black and brown liquor.	80	75	72	80	75	72
	S6	Municipal and industrial waste (non-renewable) and renewable/bio-degradable waste	80	75	72	80	75	72
Liquids	L7	Heavy fuel oil, gas/diesel oil, other oil products	89	84	81	85	80	77
	L8	Bio-liquids including bio-methanol, bioethanol, bio-butanol, biodiesel and other bio-liquids	89	84	81	85	80	77
	L9	Waste liquids including biodegradable and non-renewable waste (including tallow, fat and spent grain).	80	75	72	75	70	67
Gaseous	G10	Natural gas, LPG, LNG and biomethane	90	85	82	92	87	84
	G11	Refinery gases hydrogen and synthesis gas	89	84	81	90	85	82
	G12	Biogas produced from anaerobic digestion, landfill, and sewage treatment	70	65	62	80	75	72
	G13	Coke oven gas, blast furnace gas, mining gas, and other recovered gases (excluding refinery gas)	80	75	72	80	75	72

Category		Type of fuel:	Year of construction					
			Before 2016			From 2016		
			Hot water	Steam (*)	Direct use of exhaust gases (**)	Hot water	Steam (*)	Direct use of exhaust gases (**)
Other	O14	Waste heat (including high temperature process exhaust gases, product from exothermic chemical reactions)	—	—	—	92	87	—
	O15	Nuclear	—	—	—	92	87	—
	O16	Solar thermal	—	—	—	92	87	—
	O17	Geothermal	—	—	—	92	87	—
	O18	Other fuels not mentioned above	—	—	—	92	87	—

(\*) If steam 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.

(\*\*) Values for direct use of exhaust gases should be used if the temperature is 250 °C or higher.

## 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.

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## 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 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):

$$\text{Ref } \eta = 52,5 \% \times (0,851 \times 85 \% + 0,888 \times 15 \%) = 45,0 \%$$