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Delegations will find attached document C(2015) 6863 final - Annexes 1 - 4.

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EUROPEAN
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Brussels, 12.10.2015
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ANNEXES 1 to 4

ANNEXES

to the

COMMISSION DELEGATED REGULATION (EU)

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

{SWD(2015) 192 final}

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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

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
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.

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)
≥345kV	1	0.976
≥200 - <345kV	0.972	0.963
≥100 - <200kV	0.963	0.951
≥50 - <100kV	0.952	0.936
≥12 - <50kV	0.935	0.914
≥0.45 - <12kV	0.918	0.891
<0.45kV	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):

Ref Eη = 52.5 % * (0.851 * 85 % + 0.888 * 15 %) = 45.0 %