

PRO Fact Sheet 5

TYPES OF ENERGY SOURCES AND TECHNOLOGIES

The attached table sets out the permissible energy sources and technologies.

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Renewable Source Electricity (Schemes: RECS and EECS-GoO)

Source	Technology	Type	Combustible?	CO ₂ ¹ Kg/GJ	Code	
Wind	Wind turbine	Onshore	No	0.0	01	
		Offshore	No	0.0	02	
Solar	Photovoltaic		No	0.0	03	
	Thermal		No	0.0	04	
Energy from water (excluding electricity used for pumping hydro)	Hydro power		No	0.0	05	
	Tidal energy	Onshore	No	0.0	06	
		Offshore	No	0.0	07	
	Wave energy	Onshore	No	0.0	08	
Offshore		No	0.0	09		
Geothermal			No	0.0	10	
Biomass, using gasification and non-gasification technologies ²	Energy crops		Yes	0.0	11	
	Forestry and agricultural by-products and waste		Yes	0.0	12	
	Biogas	Landfill gas		Yes	0.0	13
		Sewage gas		Yes	0.0	14
		Other		Yes	0.0	15
	Energy from by-products and waste (with varying levels of filtration) ³	Municipal solid waste		Yes	0.0	16
		Industrial by-products & commercial waste		Yes	0.0	17

¹ This reflects the IPCC statistics where available, and otherwise the Dutch table of standard CO₂ emission factors for energy production

² As variously defined in the Renewable Energy, Large Combustion Plants and Waste Combustion Plants Directives

³ Note that RES certificates will only be issued for the estimated non-fossil proportion (i.e. excluding plastics) of Energy from By-Products and Waste

PRO FACT SHEET 5
TYPES OF
ENERGY SOURCES AND TECHNOLOGIES



High-efficiency Cogeneration (Scheme: CHP-GO)

Source	Technology	Type	Combustible?	CO ₂ ⁴ Kg/GJ	Code	
Biomass, using gasification and non- gasification technologies ⁵	Wood fuels ⁶		Yes	0.0	30	
	Solid (biodegradable) waste & agricultural biomass ⁷		Yes	0.0	31	
	Liquid biodegradable waste (black liquor etc)		Yes	0.0	32	
	Liquid biofuels (Vegetable oils, biodiesel, bio-ethanol, bio-crude-oil etc)		Yes	0.0	33	
	Biogas		Yes	0.0	34	
Fossil	Solid fuel	Hard coal / coke Anthracite	Yes	98.3	50	
		Oil shale		Yes	106.7	58
		Lignite / lignite brickettes		Yes	101.2	59
		Peat / peat brickettes		Yes	106.0	60
	Gases	Natural gas		Yes	56.1	61
		Refinery gas, hydrogen (fossil sourced)		Yes	56.1	64
		Coke oven gas, blast furnace gas + other waste gases (including recovered waste heat)	Coke oven gas	Yes	41.2	68
	Liquid Fuel	Gas/diesel oil		Yes	74.3	70

⁴ This reflects the IPCC statistics where these are available, and otherwise the Dutch table of standard CO₂ emission factors for energy production

⁵ As defined in the Guidelines to the CHP Directive

⁶ **Wood fuels:** Firewood, wood chips, bark, wood pellets, briquettes, sawdust, shavings, chips, purpose grown crops like willow, industrial wood waste, demolition wood

⁷ **Agricultural biomass:** solid agricultural crops (perennial and annual herbaceous crops), residues and waste (straw, rice husks, nut shells, poultry litter, crushed grape dregs etc)

PRO FACT SHEET 5
TYPES OF
ENERGY SOURCES AND TECHNOLOGIES



Disclosure (Scheme: EECs-Disclosure)

Source	Technology	Type	Combustible?	CO ₂ ⁸ Kg/GJ	Code	
Wind	<i>Wind turbine</i>	Onshore	No	0.0	01	
		Offshore	No	0.0	02	
Solar	<i>Photovoltaic</i>		No	0.0	03	
	<i>Thermal</i>		No	0.0	04	
Energy from water (excluding electricity used for pumping hydro)	<i>Hydro power</i>		No	0.0	05	
	<i>Tidal energy</i>	Onshore	No	0.0	06	
		Offshore	No	0.0	07	
	<i>Wave energy</i>	Onshore	No	0.0	08	
Offshore		No	0.0	09		
Geothermal			No	0.0	10	
Biomass, using gasification and non-gasification technologies⁹	Non-HE CHP plant	<i>Energy crops</i>	Yes	0.0	11	
		<i>Forestry and agricultural by-products and waste</i>	Yes	0.0	12	
		<i>Biogas</i>	Landfill gas	Yes	0.0	13
			Sewage gas	Yes	0.0	14
			Other	Yes	0.0	15
		<i>Energy from by-products and waste (with varying levels of filtration)¹⁰</i>	Municipal solid waste	Yes	0.0	16
			Industrial by-products & commercial waste	Yes	0.0	17

⁸ This reflects the IPCC statistics where these are available, and otherwise the Dutch table of standard CO₂ emission factors for energy production

⁹ As variously defined in the Renewable Energy, Large Combustion Plants and Waste Combustion Plants Directives; and the Guidelines to the CHP Directive. In general, plant operators are likely to use RES terms for non-HE CHP plant, and HE CHP terms for HE CHP plant; however, this is not mandatory

¹⁰ Note that RES certificates will only be issued for the estimated non-fossil proportion (i.e. excluding plastics) of Energy from By-Products and Waste

PRO FACT SHEET 5
TYPES OF
ENERGY SOURCES AND TECHNOLOGIES



Source	Technology		Type	Combustible?	CO ₂ ⁸ Kg/GJ	Code
	HE CHP Plant	<i>Wood fuels</i> ¹¹		Yes	0.0	30
		<i>Solid (biodegradable) waste & agricultural biomass</i> ¹²		Yes	0.0	31
		<i>Liquid biodegradable waste (black liquor etc)</i>		Yes	0.0	32
		<i>Liquid biofuels (Vegetable oils, biodiesel, bio-ethanol, bio-crude-oil etc)</i>		Yes	0.0	33
		<i>Biogas</i>		Yes	0.0	34
	Gases		Hydrogen (non-fossil sourced)		Yes	0.0
Fossil	Solid fuel	Hard coal / coke	Anthracite	Yes	98.3	50
			Coking coal	Yes	94.0	51
			Coking coal (used in coke oven)	Yes	95.4	52
			Coking coal (used in blast furnace)	Yes	89.8	53
			Other bituminous coal	Yes	94.7	54
			Sub-bituminous coal	Yes	96.1	55
		BKB and Patent Fuel		Yes	94.6	56
		Coke Oven / Gas Coke		Yes	111.9	57
		Oil shale		Yes	106.7	58
		Lignite / lignite brickettes		Yes	101.2	59
		Peat / peat brickettes		Yes	106.0	60
	Gases	Natural gas		Yes	56.1	61
		Carbon monoxide		Yes	155.2	62

¹¹ **Wood fuels:** Firewood, wood chips, bark, wood pellets, briquettes, sawdust, shavings, chips, purpose grown crops like willow, industrial wood waste, demolition wood

¹² **Agricultural biomass:** solid agricultural crops (perennial and annual herbaceous crops), residues and waste (straw, rice husks, nut shells, poultry litter, crushed grape dregs etc)

PRO FACT SHEET 5
TYPES OF
ENERGY SOURCES AND TECHNOLOGIES



Source	Technology	Type	Combustible?	CO ₂ ⁸ Kg/GJ	Code	
		Methane	Yes	54.9	63	
		Hydrogen (fossil sourced)	Yes	56.1	64	
		Phosphor gas	Yes	149.5	65	
		Oxy gas	Yes	191.9	66	
		Blast furnace gas	Yes	247.4	67	
		Coke oven gas	Yes	41.2	68	
	<i>Liquid fuel</i>	Oil	Gas/diesel oil	Yes	74.3	70
			Residual fuel oil	Yes	77.4	71
			LPG	Yes	66.7	72
		Other oils	Crude oil	Yes	73.3	73
			Orimulsion	Yes	80.7	74
			Natural gas liquids	Yes	63.1	75
			Gasoline	Yes	72.0	76
			Jet kerosene	Yes	71.5	77
			Other kerosene	Yes	71.9	78
			Shale oil	Yes	73.3	79
			Ethane	Yes	61.6	80
			Naphtha	Yes	73.3	81
			Bitumen	Yes	80.7	82
			Lubricants	Yes	73.3	83
			Petroleum coke	Yes	100.8	84
			Refinery feedstocks	Yes	73.3	85

PRO FACT SHEET 5
TYPES OF
ENERGY SOURCES AND TECHNOLOGIES



Source	Technology	Type	Combustible?	CO ₂ ⁸ Kg/GJ	Code
		Refinery gas	Yes	66.7	86
		Chemical waste gas	Yes	66.7	87
		Other oil	Yes	73.3	88
		Non-renewable proportion of waste	Yes	73.6	89
Nuclear			No	0.0	90
Other			Yes ¹³	User specified	95 ¹⁴

¹³ **Other** might include both combustible and non-combustible energy sources, but defaults to “combustible” to provide necessary safeguards

¹⁴ Code “95” – Other” is only used for reporting purposes and will represent certificates with technology codes not listed in this document.