



Data Article

Life Cycle Inventories datasets for future European electricity mix scenarios

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ABSTRACT

Datasets concerning the European electricity mix, built employing the Ecoinvent database v.3.3 processes, are reported in this paper. Foreseen future scenarios are modelled based on acknowledged projections for energy market in Europe in 2050. These electricity mix data inventories could be useful for any academic or stakeholder interested in performing long-term prospective assessment of innovative generation technologies in the future European energy market.

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Specifications table

Subject	Renewable Energy, Sustainability and the Environment
Specific subject area	Life Cycle Assessment and Energy Systems
Type of data	Tables
How data were acquired	Ecoinvent 3.3 Database and scientific literature
Data format	Raw Analysed
Parameters for data collection	Technological, temporal and geographical representativeness of data are described in Ecoinvent 3.3 reports
Description of data collection	Data collection is performed employing the Ecoinvent database v3.3. When the required information is not available from the Ecoinvent database, secondary data are acquired from literature
Data source location	Institution: Ecoinvent City/Town/Region: Zurich Country: Switzerland
Data accessibility	The Life Cycle Inventories are reported with this article

Value of the data

- Datasets for building Life Cycle Inventories of 2050 European electricity mix scenarios are provided.
- Comprehensive and up-to-date datasets are built based on the outcomes and recommendation of the NEEDS project and IEA-PVPS Task 12 technical reports.
- Technical data and averages concerning the energy sources for future European electricity mix scenarios are modelled and customised according to the Ecoinvent v 3.3 and ensuring easy employment and reproducibility also for successive versions of the life cycle inventory database.
- The usefulness of such data for the scientific community is fulfilled in the application of life cycle assessment for the calculation of the environmental burdens associated to different electricity generation technologies in a long-term prospective approach.

1. Data

The development of innovative technologies for energy production should be always supported by sustainability assessment to provide a reliable evaluation of their environmental performances and implications in the future energy market [1,2]. In this context, reliable Life Cycle Inventories (LCIs) of future energy mixes are pivotal in order to guarantee consistency and reproducibility of prospective Life Cycle Assessment (LCA) studies. Datasets presented in this article concern the LCIs of future European electricity mix. These datasets have been built employing the Ecoinvent database v 3.3 [3] energy production processes and modelling the three main scenarios that are foreseen to characterise the shares of energy sources employed in Europe in 2050. The three scenarios (Table 1) are business-as-usual (BAU), realistic (REAL) and optimistic (OPT) and they have been modelled according to the results of the NEEDS (New Energy Externalities Development for Sustainability) project [4–6] and as described in the IEA-PVPS (International Energy Agency Photovoltaic Power Systems Programme) reports [7,8].

To reproduce these shares of energy sources using the Ecoinvent database v 3.3 [3], a new European electricity mix process was built by specifying the percentages of the energy sources as inputs (Tables 2 and 3). This European electricity mix process features the same input and output flows of the “Electricity, high voltage [ENTSO-E] production mix” process provided by the Ecoinvent database v 3.3. The difference is the way in which each input is reported. In fact, in the Ecoinvent database, the European electricity production mix is built as a process with a long list of input flows. These input flows refer to the electricity generated by all the energy sources (e.g., hard coal, lignite, oil, natural gas, nuclear, biomass, hydropower, wind and other sources) in all the European countries. Differently, in this study the input flows referring to each

Table 1

Shares of energy sources for BAU, REAL and OPT scenarios of electricity mix production in Europe in 2050, based on the NEEDS project and IEA-PVPS reports.

	BAU	REAL	OPT
Hard coal	26.4%	5.9%	2.9%
Lignite	9.7%	0.05%	0.05%
Oil	0.6%	0.2%	0.05%
Natural gas	18.6%	41.5%	16.8%
Nuclear	22.0%	24.4%	0.05%
Biomass	3.6%	3.3%	15.8%
Hydropower	14.3%	15.1%	24.2%
Wind	4.6%	7.0%	32.3%
Others	3.4%	2.55%	7.85%

Table 2

Ecoinvent 3.3 dataset of electricity production mix in Europe (i.e., ENTSO-E countries).

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production mix	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {EURO} electricity production, hard coal	0.148	kWh
Electricity, high voltage {EURO} electricity production, lignite	0.119	kWh
Electricity, high voltage {EURO} electricity production, oil	0.016	kWh
Electricity, high voltage {EURO} electricity production, natural gas	0.159	kWh
Electricity, high voltage {EURO} electricity production, nuclear	0.270	kWh
Electricity, high voltage {EURO} electricity production, biomass	0.024	kWh
Electricity, high voltage {EURO} electricity production, hydropower	0.182	kWh
Electricity, high voltage {EURO} electricity production, wind	0.046	kWh
Electricity, high voltage {EURO} electricity production, other	0.036	kWh

energy sources are grouped to give the following percentage energy sources composition for the European electricity mix:

- Hard coal: 14.77%;
- Lignite: 11.93%;
- Oil: 1.56%;
- Natural gas: 15.94%;
- Nuclear: 27.04%;
- Biomass: 2.43%;
- Hydropower: 18.18%;
- Wind: 4.60%;
- Other: 3.55%.

In this context, a specific LCI has been built for each energy source. These datasets are reported in [Tables 3–11](#). The electrical losses during the transformation of electricity from high to medium voltage have been accounted for ([Table 12](#)) and they were taken from the Worldbank data website [9].

The LCI of European electricity scenarios in 2050 are reported in [Tables 13–18](#). Datasets provided in this work can be easily customised also for more recent version of the Ecoinvent database.

2. Experimental design, materials and methods

Data are shown in Tables divided in two sections: Inputs and Outputs

- In the first column, the name of the Ecoinvent process is reported.
- In the second column, the amount of energy is provided.
- In the third column, the unit of measure is described.

Table 3

Dataset concerning European electricity production by hard coal.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, hard coal	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, hard coal	8.97E-03	kWh
Electricity, high voltage {AT} heat and power co-generation, hard coal	7.24E-04	kWh
Electricity, high voltage {BE} electricity production, hard coal	7.53E-03	kWh
Electricity, high voltage {BG} electricity production, hard coal	5.97E-03	kWh
Electricity, high voltage {CZ} electricity production, hard coal	4.80E-03	kWh
Electricity, high voltage {CZ} heat and power co-generation, hard coal	5.40E-03	kWh
Electricity, high voltage {DE} electricity production, hard coal	2.16E-01	kWh
Electricity, high voltage {DE} heat and power co-generation, hard coal	3.17E-02	kWh
Electricity, high voltage {FI} electricity production, hard coal	6.15E-03	kWh
Electricity, high voltage {FI} heat and power co-generation, hard coal	9.31E-03	kWh
Electricity, high voltage {FR} electricity production, hard coal	4.08E-02	kWh
Electricity, high voltage {GB} electricity production, hard coal	3.15E-01	kWh
Electricity, high voltage {HR} electricity production, hard coal	4.73E-03	kWh
Electricity, high voltage {IE} electricity production, hard coal	1.20E-02	kWh
Electricity, high voltage {IT} electricity production, hard coal	1.05E-01	kWh
Electricity, high voltage {NL} electricity production, hard coal	3.85E-02	kWh
Electricity, high voltage {NL} heat and power co-generation, hard coal	1.48E-02	kWh
Electricity, high voltage {NO} heat and power co-generation, hard coal	8.30E-05	kWh
Electricity, high voltage {PL} heat and power co-generation, hard coal	1.68E-01	kWh
Electricity, high voltage {SE} heat and power co-generation, hard coal	1.07E-03	kWh
Electricity, high voltage {SK} heat and power co-generation, hard coal	2.75E-03	kWh

Table 4

Dataset concerning European electricity production by lignite.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, lignite	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {BA} electricity production, lignite	2.58E-02	kWh
Electricity, high voltage {BG} electricity production, lignite	5.30E-02	kWh
Electricity, high voltage {CZ} electricity production, lignite	7.78E-02	kWh
Electricity, high voltage {CZ} heat and power co-generation, lignite	2.43E-02	kWh
Electricity, high voltage {DE} electricity production, lignite	4.07E-01	kWh
Electricity, high voltage {DE} heat and power co-generation, lignite	1.69E-02	kWh
Electricity, high voltage {GR} electricity production, lignite	5.45E-02	kWh
Electricity, high voltage {GR} heat and power co-generation, lignite	2.23E-02	kWh
Electricity, high voltage {HR} electricity production, lignite	4.80E-05	kWh
Electricity, high voltage {HU} electricity production, lignite	1.67E-02	kWh
Electricity, high voltage {IT} electricity production, lignite	2.25E-03	kWh
Electricity, high voltage {MK} electricity production, lignite	1.13E-02	kWh
Electricity, high voltage {PL} heat and power co-generation, lignite	1.40E-01	kWh
Electricity, high voltage {RO} electricity production, lignite	6.04E-02	kWh
Electricity, high voltage {RS} electricity production, lignite	6.95E-02	kWh
Electricity, high voltage {SI} electricity production, lignite	1.59E-03	kWh
Electricity, high voltage {SI} heat and power co-generation, lignite	1.13E-02	kWh
Electricity, high voltage {SK} heat and power co-generation, lignite	5.30E-03	kWh

Table 5

Dataset concerning European electricity production by oil.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, oil	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, oil	4.00E-04	kWh
Electricity, high voltage {AT} heat and power co-generation, oil	1.51E-02	kWh
Electricity, high voltage {BA} electricity production, oil	5.60E-04	kWh
Electricity, high voltage {BE} electricity production, oil	1.39E-03	kWh
Electricity, high voltage {BE} heat and power co-generation, oil	5.36E-03	kWh
Electricity, high voltage {BG} electricity production, oil	8.50E-04	kWh
Electricity, high voltage {BG} heat and power co-generation, oil	3.59E-03	kWh
Electricity, high voltage {CZ} electricity production, oil	4.70E-04	kWh
Electricity, high voltage {CZ} heat and power co-generation, oil	1.32E-03	kWh
Electricity, high voltage {DE} electricity production, oil	9.48E-02	kWh
Electricity, high voltage {DE} heat and power co-generation, oil	5.89E-02	kWh
Electricity, high voltage {EE} electricity production, oil	1.09E-03	kWh
Electricity, high voltage {FI} electricity production, oil	2.55E-03	kWh
Electricity, high voltage {FI} heat and power co-generation, oil	3.87E-03	kWh
Electricity, high voltage {FR} electricity production, oil	5.68E-02	kWh
Electricity, high voltage {FR} heat and power co-generation, oil	3.16E-02	kWh
Electricity, high voltage {GB} electricity production, oil	2.42E-02	kWh
Electricity, high voltage {GB} heat and power co-generation, oil	3.96E-02	kWh
Electricity, high voltage {GR} electricity production, oil	9.54E-02	kWh
Electricity, high voltage {GR} heat and power co-generation, oil	1.92E-02	kWh
Electricity, high voltage {HR} electricity production, oil	4.96E-03	kWh
Electricity, high voltage {HR} heat and power co-generation, oil	6.77E-03	kWh
Electricity, high voltage {HU} electricity production, oil	3.55E-03	kWh
Electricity, high voltage {IE} electricity production, oil	4.24E-03	kWh
Electricity, high voltage {IE} heat and power co-generation, oil	8.90E-04	kWh
Electricity, high voltage {IS} electricity production, oil	8.00E-05	kWh
Electricity, high voltage {IT} electricity production, oil	7.29E-02	kWh
Electricity, high voltage {IT} heat and power co-generation, oil	3.16E-01	kWh
Electricity, high voltage {LT} heat and power co-generation, oil	4.84E-03	kWh
Electricity, high voltage {LU} heat and power co-generation, oil	2.00E-05	kWh
Electricity, high voltage {LV} heat and power co-generation, oil	2.00E-05	kWh
Electricity, high voltage {MK} electricity production, oil	1.77E-03	kWh
Electricity, high voltage {NL} electricity production, oil	2.27E-02	kWh
Electricity, high voltage {NL} heat and power co-generation, oil	2.27E-02	kWh
Electricity, high voltage {NO} electricity production, oil	8.50E-04	kWh
Electricity, high voltage {PL} heat and power co-generation, oil	4.03E-02	kWh
Electricity, high voltage {RO} electricity production, oil	1.51E-03	kWh
Electricity, high voltage {RO} heat and power co-generation, oil	1.36E-02	kWh
Electricity, high voltage {RS} heat and power co-generation, oil	1.35E-03	kWh
Electricity, high voltage {SE} electricity production, oil	1.32E-03	kWh
Electricity, high voltage {SE} heat and power co-generation, oil	1.23E-02	kWh
Electricity, high voltage {SI} electricity production, oil	1.70E-04	kWh
Electricity, high voltage {SK} electricity production, oil	3.30E-04	kWh
Electricity, high voltage {SK} heat and power co-generation, oil	9.65E-03	kWh

Table 6

Dataset concerning European electricity production by natural gas.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, natural gas	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, natural gas, combined cycle power plant	4.32E-03	kWh
Electricity, high voltage {AT} electricity production, natural gas, conventional power plant	2.03E-03	kWh
Electricity, high voltage {AT} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	1.03E-02	kWh
Electricity, high voltage {AT} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	3.14E-03	kWh
Electricity, high voltage {BA} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.03E-04	kWh
Electricity, high voltage {BE} electricity production, natural gas, combined cycle power plant	1.85E-02	kWh
Electricity, high voltage {BE} electricity production, natural gas, conventional power plant	4.31E-03	kWh
Electricity, high voltage {BE} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	7.73E-03	kWh
Electricity, high voltage {BE} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.80E-02	kWh
Electricity, high voltage {BG} electricity production, natural gas, conventional power plant	2.40E-05	kWh
Electricity, high voltage {BG} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	2.76E-04	kWh
Electricity, high voltage {BG} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	4.36E-03	kWh
Electricity, high voltage {CH} electricity production, natural gas, 10 MW	7.20E-14	kWh
Electricity, high voltage {CH} heat and power co-generation, natural gas, 1 MW electrical, lean burn	3.16E-04	kWh
Electricity, high voltage {CH} heat and power co-generation, natural gas, 200 kW electrical, lean burn	2.64E-04	kWh
Electricity, high voltage {CH} heat and power co-generation, natural gas, 500 kW electrical, lean burn	1.80E-04	kWh
Electricity, high voltage {CZ} electricity production, natural gas, combined cycle power plant	1.70E-05	kWh
Electricity, high voltage {CZ} electricity production, natural gas, conventional power plant	7.10E-05	kWh
Electricity, high voltage {CZ} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	2.24E-03	kWh
Electricity, high voltage {DE} electricity production, natural gas, 10 MW	5.10E-13	kWh
Electricity, high voltage {DE} electricity production, natural gas, combined cycle power plant	2.85E-02	kWh
Electricity, high voltage {DE} electricity production, natural gas, conventional power plant	2.85E-02	kWh
Electricity, high voltage {DE} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	1.76E-02	kWh
Electricity, high voltage {DE} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.75E-03	kWh
Electricity, high voltage {EE} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.05E-01	kWh
Electricity, high voltage {FI} electricity production, natural gas, combined cycle power plant	2.33E-04	kWh
Electricity, high voltage {FI} electricity production, natural gas, conventional power plant	1.84E-04	kWh
Electricity, high voltage {FI} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	1.60E-05	kWh
Electricity, high voltage {FI} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	2.18E-03	kWh
Electricity, high voltage {FR} electricity production, natural gas, combined cycle power plant	1.12E-02	kWh
Electricity, high voltage {FR} electricity production, natural gas, combined cycle power plant	1.24E-02	kWh
Electricity, high voltage {FR} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	2.39E-03	kWh
Electricity, high voltage {GB} electricity production, natural gas, combined cycle power plant	2.87E-02	kWh
Electricity, high voltage {GB} electricity production, natural gas, conventional power plant	6.84E-02	kWh
Electricity, high voltage {GB} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	9.92E-02	kWh
Electricity, high voltage {GB} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	2.31E-02	kWh
Electricity, high voltage {GR} electricity production, natural gas, combined cycle power plant	1.34E-02	kWh
Electricity, high voltage {GR} electricity production, natural gas, conventional power plant	1.70E-02	kWh
Electricity, high voltage {GR} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	5.20E-03	kWh
Electricity, high voltage {GR} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.41E-03	kWh
Electricity, high voltage {HR} electricity production, natural gas, combined cycle power plant	7.00E-05	kWh

(continued on next page)

Table 6 (continued)

Electricity, high voltage {HR} electricity production, natural gas, conventional power plant	1.50E-05	kWh
Electricity, high voltage {HR} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	3.76E-03	kWh
Electricity, high voltage {HR} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.12E-03	kWh
Electricity, high voltage {HU} electricity production, natural gas, combined cycle power plant	4.73E-03	kWh
Electricity, high voltage {HU} electricity production, natural gas, conventional power plant	3.02E-03	kWh
Electricity, high voltage {HU} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	8.65E-04	kWh
Electricity, high voltage {HU} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	9.97E-03	kWh
Electricity, high voltage {IE} electricity production, natural gas, combined cycle power plant	1.60E-02	kWh
Electricity, high voltage {IE} electricity production, natural gas, conventional power plant	7.62E-03	kWh
Electricity, high voltage {IE} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	4.06E-03	kWh
Electricity, high voltage {IT} electricity production, natural gas, combined cycle power plant	8.42E-02	kWh
Electricity, high voltage {IT} electricity production, natural gas, conventional power plant	2.26E-02	kWh
Electricity, high voltage {IT} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	9.51E-02	kWh
Electricity, high voltage {IT} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	5.86E-02	kWh
Electricity, high voltage {LT} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	2.20E-04	kWh
Electricity, high voltage {LT} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	5.47E-03	kWh
Electricity, high voltage {LU} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	3.96E-03	kWh
Electricity, high voltage {LU} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	9.64E-04	kWh
Electricity, high voltage {LV} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	1.93E-03	kWh
Electricity, high voltage {LV} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	2.13E-03	kWh
Electricity, high voltage {MK} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	4.97E-04	kWh
Electricity, high voltage {MK} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	9.10E-05	kWh
Electricity, high voltage {NL} electricity production, natural gas, 10 MW	1.20E-13	kWh
Electricity, high voltage {NL} electricity production, natural gas, combined cycle power plant	2.13E-02	kWh
Electricity, high voltage {NL} electricity production, natural gas, conventional power plant	1.07E-02	kWh
Electricity, high voltage {NL} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	4.47E-02	kWh
Electricity, high voltage {NL} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	3.70E-02	kWh
Electricity, high voltage {NO} electricity production, natural gas, combined cycle power plant	2.91E-03	kWh
Electricity, high voltage {NO} electricity production, natural gas, conventional power plant	2.28E-03	kWh
Electricity, high voltage {PL} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	9.08E-03	kWh
Electricity, high voltage {PL} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	3.03E-03	kWh
Electricity, high voltage {RO} electricity production, natural gas, conventional power plant	4.77E-03	kWh
Electricity, high voltage {RO} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	8.82E-04	kWh
Electricity, high voltage {RO} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.16E-02	kWh
Electricity, high voltage {RS} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	9.42E-04	kWh
Electricity, high voltage {SE} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.84E-03	kWh
Electricity, high voltage {SI} electricity production, natural gas, conventional power plant	1.30E-05	kWh
Electricity, high voltage {SI} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	9.80E-04	kWh
Electricity, high voltage {SK} electricity production, natural gas, combined cycle power plant	9.05E-04	kWh
Electricity, high voltage {SK} electricity production, natural gas, conventional power plant	6.90E-04	kWh
Electricity, high voltage {SK} heat and power co-generation, natural gas, combined cycle power plant, 400 MW electrical	2.22E-03	kWh
Electricity, high voltage {SK} heat and power co-generation, natural gas, conventional power plant, 100 MW electrical	1.52E-03	kWh

Table 7

Dataset concerning European electricity production by nuclear.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, nuclear	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {BE} electricity production, nuclear, pressure water reactor	4.74E-02	kWh
Electricity, high voltage {BG} electricity production, nuclear, pressure water reactor	1.86E-02	kWh
Electricity, high voltage {CH} electricity production, nuclear, boiling water reactor	1.57E-02	kWh
Electricity, high voltage {BR} electricity production, nuclear, pressure water reactor	1.78E-02	kWh
Electricity, high voltage {CZ} electricity production, nuclear, pressure water reactor	3.57E-02	kWh
Electricity, high voltage {DE} electricity production, nuclear, boiling water reactor	2.50E-02	kWh
Electricity, high voltage {DE} electricity production, nuclear, pressure water reactor	9.21E-02	kWh
Electricity, high voltage {FI} electricity production, nuclear, boiling water reactor	1.73E-02	kWh
Electricity, high voltage {FI} electricity production, nuclear, pressure water reactor	9.76E-03	kWh
Electricity, high voltage {FR} electricity production, nuclear, pressure water reactor	5.01E-01	kWh
Electricity, high voltage {GB} electricity production, nuclear, boiling water reactor	7.22E-02	kWh
Electricity, high voltage {GB} electricity production, nuclear, pressure water reactor	1.07E-02	kWh
Electricity, high voltage {HU} electricity production, nuclear, pressure water reactor	1.86E-02	kWh
Electricity, high voltage {NL} electricity production, nuclear, pressure water reactor	4.62E-03	kWh
Electricity, high voltage {RO} electricity production, nuclear, pressure water reactor, heavy water moderated	1.35E-02	kWh
Electricity, high voltage {SE} electricity production, nuclear, boiling water reactor	5.30E-02	kWh
Electricity, high voltage {SE} electricity production, nuclear, pressure water reactor	2.23E-02	kWh
Electricity, high voltage {SI} electricity production, nuclear, pressure water reactor	6.51E-03	kWh
Electricity, high voltage {SK} electricity production, nuclear, pressure water reactor	1.82E-02	kWh

Table 8

Dataset concerning European electricity production by biomass.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, biomass	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	5.24E-02	kWh
Electricity, high voltage {BE} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	5.13E-02	kWh
Electricity, high voltage {BG} heat and power co-generation, wood chips, 6667 kW	9.19E-04	kWh
Electricity, high voltage {CH} heat and power co-generation, wood chips, 2000 kW, state-of-the-art 2014	3.70E-03	kWh
Electricity, high voltage {CZ} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	2.53E-02	kWh
Electricity, high voltage {DE} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.68E-01	kWh
Electricity, high voltage {EE} heat and power co-generation, wood chips, 6667 kW	1.37E-02	kWh
Electricity, high voltage {FI} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.49E-01	kWh
Electricity, high voltage {FR} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	2.42E-02	kWh
Electricity, high voltage {GB} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	9.81E-02	kWh
Electricity, high voltage {HR} heat and power co-generation, wood chips, 6667 kW	5.57E-04	kWh
Electricity, high voltage {HU} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.86E-02	kWh
Electricity, high voltage {IE} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	2.51E-03	kWh
Electricity, high voltage {IT} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	3.59E-02	kWh
Electricity, high voltage {LT} heat and power co-generation, wood chips, 6667 kW	2.51E-03	kWh
Electricity, high voltage {LV} heat and power co-generation, wood chips, 6667 kW	9.75E-04	kWh
Electricity, high voltage {NL} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	5.51E-02	kWh
Electricity, high voltage {NO} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	3.61E-03	kWh
Electricity, high voltage {PL} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.33E-01	kWh
Electricity, high voltage {RO} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	2.65E-03	kWh
Electricity, high voltage {SE} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.46E-01	kWh
Electricity, high voltage {SI} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.59E-03	kWh
Electricity, high voltage {SK} heat and power co-generation, wood chips, 6667 kW, state-of-the-art 2014	1.01E-02	kWh

Table 9

Dataset concerning European electricity production by hydro.

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, hydropower	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, hydro, pumped storage	7.18E-03	kWh
Electricity, high voltage {AT} electricity production, hydro, reservoir, alpine region	2.02E-02	kWh
Electricity, high voltage {AT} electricity production, hydro, run-of-river	6.06E-02	kWh
Electricity, high voltage {BA} electricity production, hydro, pumped storage	9.00E-06	kWh
Electricity, high voltage {BA} electricity production, hydro, reservoir, alpine region	2.72E-03	kWh
Electricity, high voltage {BA} electricity production, hydro, run-of-river	5.05E-03	kWh
Electricity, high voltage {BE} electricity production, hydro, pumped storage	2.40E-03	kWh
Electricity, high voltage {BE} electricity production, hydro, run-of-river	6.58E-04	kWh
Electricity, high voltage {BG} electricity production, hydro, pumped storage	1.39E-03	kWh
Electricity, high voltage {BG} electricity production, hydro, run-of-river	5.95E-03	kWh
Electricity, high voltage {CH} electricity production, hydro, reservoir, alpine region	2.03E-02	kWh
Electricity, high voltage {CH} electricity production, hydro, run-of-river	1.93E-02	kWh
Electricity, high voltage {CZ} electricity production, hydro, pumped storage	1.35E-03	kWh
Electricity, high voltage {CZ} electricity production, hydro, reservoir, non-alpine region	9.81E-04	kWh
Electricity, high voltage {CZ} electricity production, hydro, run-of-river	2.94E-03	kWh
Electricity, high voltage {DE} electricity production, hydro, pumped storage	1.23E-02	kWh
Electricity, high voltage {DE} electricity production, hydro, reservoir, non-alpine region	6.25E-03	kWh
Electricity, high voltage {DE} electricity production, hydro, run-of-river	3.28E-02	kWh
Electricity, high voltage {EE} electricity production, hydro, run-of-river	7.70E-05	kWh
Electricity, high voltage {FI} electricity production, hydro, reservoir, non-alpine region	2.33E-02	kWh
Electricity, high voltage {FI} electricity production, hydro, run-of-river	7.77E-03	kWh
Electricity, high voltage {FR} electricity production, hydro, pumped storage	9.00E-03	kWh
Electricity, high voltage {FR} electricity production, hydro, reservoir, alpine region	1.82E-02	kWh
Electricity, high voltage {FR} electricity production, hydro, run-of-river	9.10E-02	kWh
Electricity, high voltage {GB} electricity production, hydro, pumped storage	5.47E-03	kWh
Electricity, high voltage {GB} electricity production, hydro, run-of-river	9.75E-03	kWh
Electricity, high voltage {GR} electricity production, hydro, pumped storage	3.47E-04	kWh
Electricity, high voltage {GR} electricity production, hydro, run-of-river	8.12E-03	kWh
Electricity, high voltage {HR} electricity production, hydro, pumped storage	2.97E-04	kWh
Electricity, high voltage {HR} electricity production, hydro, reservoir, alpine region	8.38E-03	kWh
Electricity, high voltage {HR} electricity production, hydro, run-of-river	1.71E-04	kWh
Electricity, high voltage {HU} electricity production, hydro, run-of-river	3.93E-04	kWh
Electricity, high voltage {IE} electricity production, hydro, pumped storage	3.91E-04	kWh
Electricity, high voltage {IE} electricity production, hydro, run-of-river	1.48E-03	kWh
Electricity, high voltage {IS} electricity production, hydro, reservoir, non-alpine region	4.92E-02	kWh
Electricity, high voltage {IT} electricity production, hydro, pumped storage	3.65E-03	kWh
Electricity, high voltage {IT} electricity production, hydro, reservoir, alpine region	4.94E-02	kWh
Electricity, high voltage {IT} electricity production, hydro, run-of-river	2.78E-02	kWh
Electricity, high voltage {LT} electricity production, hydro, pumped storage	9.53E-04	kWh
Electricity, high voltage {LT} electricity production, hydro, run-of-river	7.80E-04	kWh
Electricity, high voltage {LU} electricity production, hydro, pumped storage	1.96E-03	kWh
Electricity, high voltage {LU} electricity production, hydro, run-of-river	1.79E-04	kWh
Electricity, high voltage {LV} electricity production, hydro, run-of-river	6.84E-03	kWh
Electricity, high voltage {MK} electricity production, hydro, reservoir, alpine region	1.57E-03	kWh
Electricity, high voltage {MK} electricity production, hydro, run-of-river	3.46E-04	kWh
Electricity, high voltage {NL} electricity production, hydro, run-of-river	1.92E-04	kWh
Electricity, high voltage {NO} electricity production, hydro, pumped storage	1.98E-03	kWh
Electricity, high voltage {NO} electricity production, hydro, reservoir, alpine region	2.62E-01	kWh
Electricity, high voltage {PL} electricity production, hydro, pumped storage	7.89E-04	kWh
Electricity, high voltage {PL} electricity production, hydro, run-of-river	3.76E-03	kWh
Electricity, high voltage {RO} electricity production, hydro, pumped storage	5.05E-04	kWh
Electricity, high voltage {RO} electricity production, hydro, run-of-river	2.23E-02	kWh
Electricity, high voltage {RS} electricity production, hydro, pumped storage	2.29E-03	kWh
Electricity, high voltage {RS} electricity production, hydro, reservoir, alpine region	2.56E-03	kWh
Electricity, high voltage {RS} electricity production, hydro, run-of-river	1.34E-02	kWh
Electricity, high voltage {SE} electricity production, hydro, pumped storage	2.32E-04	kWh
Electricity, high voltage {SE} electricity production, hydro, reservoir, non-alpine region	2.91E-02	kWh
Electricity, high voltage {SE} electricity production, hydro, run-of-river	1.16E-01	kWh
Electricity, high voltage {SI} electricity production, hydro, pumped storage	3.47E-04	kWh
Electricity, high voltage {SI} electricity production, hydro, run-of-river	7.18E-03	kWh
Electricity, high voltage {SK} electricity production, hydro, pumped storage	6.20E-04	kWh
Electricity, high voltage {SK} electricity production, hydro, reservoir, non-alpine region	1.89E-03	kWh
Electricity, high voltage {SK} electricity production, hydro, run-of-river	5.67E-03	kWh

Table 10

Dataset concerning European electricity production by wind.

OUTPUT - Product

Electricity, high voltage {EURO} electricity production, wind	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, wind, <1 MW turbine, onshore	6.06E-04	kWh
Electricity, high voltage {AT} electricity production, wind, >3 MW turbine, onshore	5.95E-04	kWh
Electricity, high voltage {AT} electricity production, wind, 1–3 MW turbine, onshore	1.68E-02	kWh
Electricity, high voltage {BE} electricity production, wind, <1 MW turbine, onshore	2.87E-04	kWh
Electricity, high voltage {BE} electricity production, wind, >3 MW turbine, onshore	1.25E-03	kWh
Electricity, high voltage {BE} electricity production, wind, 1–3 MW turbine, offshore	7.96E-03	kWh
Electricity, high voltage {BE} electricity production, wind, 1–3 MW turbine, onshore	1.06E-02	kWh
Electricity, high voltage {BG} electricity production, wind, <1 MW turbine, onshore	1.48E-03	kWh
Electricity, high voltage {BG} electricity production, wind, >3 MW turbine, onshore	1.87E-03	kWh
Electricity, high voltage {BG} electricity production, wind, 1–3 MW turbine, onshore	5.56E-03	kWh
Electricity, high voltage {CH} electricity production, wind, <1 MW turbine, onshore	5.00E-07	kWh
Electricity, high voltage {CH} electricity production, wind, 1–3 MW turbine, onshore	5.00E-06	kWh
Electricity, high voltage {CZ} electricity production, wind, <1 MW turbine, onshore	3.29E-04	kWh
Electricity, high voltage {CZ} electricity production, wind, 1–3 MW turbine, onshore	2.70E-03	kWh
Electricity, high voltage {DE} electricity production, wind, <1 MW turbine, onshore	5.06E-02	kWh
Electricity, high voltage {DE} electricity production, wind, >3 MW turbine, onshore	3.04E-02	kWh
Electricity, high voltage {DE} electricity production, wind, 1–3 MW turbine, offshore	1.06E-02	kWh
Electricity, high voltage {DE} electricity production, wind, 1–3 MW turbine, onshore	2.78E-01	kWh
Electricity, high voltage {EE} electricity production, wind, <1 MW turbine, onshore	8.50E-05	kWh
Electricity, high voltage {EE} electricity production, wind, >3 MW turbine, onshore	1.26E-04	kWh
Electricity, high voltage {EE} electricity production, wind, 1–3 MW turbine, onshore	2.95E-03	kWh
Electricity, high voltage {FI} electricity production, wind, <1 MW turbine, onshore	2.03E-04	kWh
Electricity, high voltage {FI} electricity production, wind, >3 MW turbine, onshore	1.64E-03	kWh
Electricity, high voltage {FI} electricity production, wind, 1–3 MW turbine, offshore	1.21E-04	kWh
Electricity, high voltage {FI} electricity production, wind, 1–3 MW turbine, onshore	1.63E-03	kWh
Electricity, high voltage {FR} electricity production, wind, <1 MW turbine, onshore	6.54E-03	kWh
Electricity, high voltage {FR} electricity production, wind, >3 MW turbine, onshore	4.20E-04	kWh
Electricity, high voltage {FR} electricity production, wind, 1–3 MW turbine, offshore	6.50E-05	kWh
Electricity, high voltage {FR} electricity production, wind, 1–3 MW turbine, onshore	1.02E-01	kWh
Electricity, high voltage {GB} electricity production, wind, <1 MW turbine, onshore	9.76E-03	kWh
Electricity, high voltage {GB} electricity production, wind, >3 MW turbine, onshore	5.68E-03	kWh
Electricity, high voltage {GB} electricity production, wind, 1–3 MW turbine, offshore	4.65E-02	kWh
Electricity, high voltage {GB} electricity production, wind, 1–3 MW turbine, onshore	8.09E-02	kWh
Electricity, high voltage {GR} electricity production, wind, <1 MW turbine, onshore	8.94E-03	kWh
Electricity, high voltage {GR} electricity production, wind, >3 MW turbine, onshore	3.94E-03	kWh
Electricity, high voltage {GR} electricity production, wind, 1–3 MW turbine, onshore	1.52E-02	kWh
Electricity, high voltage {HR} electricity production, wind, <1 MW turbine, onshore	3.46E-04	kWh
Electricity, high voltage {HR} electricity production, wind, 1–3 MW turbine, onshore	2.05E-03	kWh
Electricity, high voltage {HU} electricity production, wind, <1 MW turbine, onshore	1.05E-04	kWh
Electricity, high voltage {HU} electricity production, wind, >3 MW turbine, onshore	2.09E-04	kWh
Electricity, high voltage {HU} electricity production, wind, 1–3 MW turbine, onshore	5.30E-03	kWh
Electricity, high voltage {IE} electricity production, wind, <1 MW turbine, onshore	5.39E-03	kWh
Electricity, high voltage {IE} electricity production, wind, >3 MW turbine, onshore	9.49E-04	kWh
Electricity, high voltage {IE} electricity production, wind, 1–3 MW turbine, offshore	3.30E-04	kWh
Electricity, high voltage {IE} electricity production, wind, 1–3 MW turbine, onshore	2.26E-02	kWh
Electricity, high voltage {IT} electricity production, wind, <1 MW turbine, onshore	2.74E-02	kWh
Electricity, high voltage {IT} electricity production, wind, >3 MW turbine, onshore	8.38E-03	kWh
Electricity, high voltage {IT} electricity production, wind, 1–3 MW turbine, onshore	6.20E-02	kWh
Electricity, high voltage {LT} electricity production, wind, <1 MW turbine, onshore	2.04E-04	kWh
Electricity, high voltage {LT} electricity production, wind, >3 MW turbine, onshore	2.04E-04	kWh
Electricity, high voltage {LT} electricity production, wind, 1–3 MW turbine, onshore	3.55E-03	kWh
Electricity, high voltage {LU} electricity production, wind, <1 MW turbine, onshore	1.10E-04	kWh
Electricity, high voltage {LU} electricity production, wind, 1–3 MW turbine, onshore	4.37E-04	kWh
Electricity, high voltage {LV} electricity production, wind, <1 MW turbine, onshore	4.40E-04	kWh
Electricity, high voltage {LV} electricity production, wind, 1–3 MW turbine, onshore	3.91E-04	kWh
Electricity, high voltage {NL} electricity production, wind, <1 MW turbine, onshore	9.61E-03	kWh
Electricity, high voltage {NL} electricity production, wind, >3 MW turbine, onshore	6.08E-03	kWh
Electricity, high voltage {NL} electricity production, wind, 1–3 MW turbine, offshore	2.83E-03	kWh
Electricity, high voltage {NL} electricity production, wind, 1–3 MW turbine, onshore	1.78E-02	kWh

(continued on next page)

Table 10 (continued)

Electricity, high voltage {NO} electricity production, wind, <1 MW turbine, onshore	2.26E-04	kWh
Electricity, high voltage {NO} electricity production, wind, >3 MW turbine, onshore	3.72E-04	kWh
Electricity, high voltage {NO} electricity production, wind, 1–3 MW turbine, offshore	2.70E-05	kWh
Electricity, high voltage {NO} electricity production, wind, 1–3 MW turbine, onshore	1.07E-02	kWh
Electricity, high voltage {PL} electricity production, wind, <1 MW turbine, onshore	1.28E-03	kWh
Electricity, high voltage {PL} electricity production, wind, >3 MW turbine, onshore	4.44E-04	kWh
Electricity, high voltage {PL} electricity production, wind, 1–3 MW turbine, onshore	3.29E-02	kWh
Electricity, high voltage {RO} electricity production, wind, <1 MW turbine, onshore	5.02E-04	kWh
Electricity, high voltage {RO} electricity production, wind, >3 MW turbine, onshore	4.12E-03	kWh
Electricity, high voltage {RO} electricity production, wind, 1–3 MW turbine, onshore	1.46E-02	kWh
Electricity, high voltage {SE} electricity production, wind, <1 MW turbine, onshore	7.34E-03	kWh
Electricity, high voltage {SE} electricity production, wind, >3 MW turbine, onshore	2.46E-04	kWh
Electricity, high voltage {SE} electricity production, wind, 1–3 MW turbine, offshore	2.10E-03	kWh
Electricity, high voltage {SE} electricity production, wind, 1–3 MW turbine, onshore	4.26E-02	kWh
Electricity, high voltage {SK} electricity production, wind, <1 MW turbine, onshore	4.40E-05	kWh

Table 11

Dataset concerning European electricity production by others (geothermal and biogas).

OUTPUT - Product		
Electricity, high voltage {EURO} electricity production, other	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {AT} electricity production, deep geothermal	1.00E-05	kWh
Electricity, high voltage {CH} electricity production, deep geothermal	7.00E-06	kWh
Electricity, high voltage {DE} electricity production, deep geothermal	2.87E-04	kWh
Electricity, high voltage {IS} electricity production, deep geothermal	4.78E-02	kWh
Electricity, high voltage {IT} electricity production, deep geothermal	5.13E-02	kWh
Electricity, high voltage {AT} heat and power co-generation, biogas, gas engine	6.10E-03	kWh
Electricity, high voltage {BE} heat and power co-generation, biogas, gas engine	7.77E-03	kWh
Electricity, high voltage {CH} heat and power co-generation, biogas, gas engine	2.49E-03	kWh
Electricity, high voltage {CZ} heat and power co-generation, biogas, gas engine	1.40E-02	kWh
Electricity, high voltage {DE} heat and power co-generation, biogas, gas engine	2.64E-01	kWh
Electricity, high voltage {EE} heat and power co-generation, biogas, gas engine	1.53E-04	kWh
Electricity, high voltage {FI} heat and power co-generation, biogas, gas engine	1.33E-03	kWh
Electricity, high voltage {FR} heat and power co-generation, biogas, gas engine	1.23E-02	kWh
Electricity, high voltage {GB} heat and power co-generation, biogas, gas engine	5.62E-02	kWh
Electricity, high voltage {GR} heat and power co-generation, biogas, gas engine	1.95E-03	kWh
Electricity, high voltage {HR} heat and power co-generation, biogas, gas engine	5.74E-04	kWh
Electricity, high voltage {HU} heat and power co-generation, biogas, gas engine	2.02E-03	kWh
Electricity, high voltage {IE} heat and power co-generation, biogas, gas engine	1.90E-03	kWh
Electricity, high voltage {IT} heat and power co-generation, biogas, gas engine	7.40E-02	kWh
Electricity, high voltage {LT} heat and power co-generation, biogas, gas engine	3.83E-04	kWh
Electricity, high voltage {LU} heat and power co-generation, biogas, gas engine	5.55E-04	kWh
Electricity, high voltage {LV} heat and power co-generation, biogas, gas engine	2.10E-03	kWh
Electricity, high voltage {NL} heat and power co-generation, biogas, gas engine	9.64E-03	kWh
Electricity, high voltage {NO} heat and power co-generation, biogas, gas engine	1.05E-04	kWh
Electricity, high voltage {PL} heat and power co-generation, biogas, gas engine	5.40E-03	kWh
Electricity, high voltage {RO} heat and power co-generation, biogas, gas engine	1.91E-04	kWh
Electricity, high voltage {RS} heat and power co-generation, biogas, gas engine	5.70E-05	kWh
Electricity, high voltage {SE} heat and power co-generation, biogas, gas engine	1.91E-04	kWh
Electricity, high voltage {SI} heat and power co-generation, biogas, gas engine	1.46E-03	kWh
Electricity, high voltage {SK} heat and power co-generation, biogas, gas engine	1.82E-03	kWh

Table 12

Medium voltage European electricity mix (assumption: network electricity losses = about 3%).

OUTPUT - Product		
Electricity, medium voltage {EURO} electricity production mix	1.000	kWh
INPUT - Electricity/heat		
Electricity, high voltage {EURO} electricity production, hard coal	1.030	kWh

Table 13

European electricity mix (high voltage) in 2050 according to BAU scenario.

OUTPUT - Product		
Electricity 2050-BAU, high voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity, high voltage {EURO} electricity production, hard coal	0.264	kWh
Electricity, high voltage {EURO} electricity production, lignite	0.097	kWh
Electricity, high voltage {EURO} electricity production, oil	0.006	kWh
Electricity, high voltage {EURO} electricity production, natural gas	0.186	kWh
Electricity, high voltage {EURO} electricity production, nuclear	0.220	kWh
Electricity, high voltage {EURO} electricity production, biomass	0.036	kWh
Electricity, high voltage {EURO} electricity production, hydropower	0.143	kWh
Electricity, high voltage {EURO} electricity production, wind	0.046	kWh
Electricity, high voltage {EURO} electricity production, other	0.034	kWh

Table 14

European electricity mix (medium voltage) in 2050 according to BAU scenario. Assumption: network electricity losses = about 1.5% (considering a technological improvement of the network in next decades).

OUTPUT - Product		
Electricity BAU, medium voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity BAU, high voltage {EURO} electricity production mix	1.015	kWh

Table 15

European electricity mix (high voltage) in 2050 according to REAL scenario.

OUTPUT - Product		
Electricity REAL, high voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity, high voltage {EURO} electricity production, hard coal	0.059	kWh
Electricity, high voltage {EURO} electricity production, oil	0.002	kWh
Electricity, high voltage {EURO} electricity production, natural gas	0.415	kWh
Electricity, high voltage {EURO} electricity production, nuclear	0.244	kWh
Electricity, high voltage {EURO} electricity production, biomass	0.033	kWh
Electricity, high voltage {EURO} electricity production, hydropower	0.151	kWh
Electricity, high voltage {EURO} electricity production, wind	0.070	kWh
Electricity, high voltage {EURO} electricity production, other	0.026	kWh

Table 16

European electricity mix (medium voltage) in 2050 according to REAL scenario. Assumption: network electricity losses = about 1.5% (considering a technological improvement of the network in next decades).

OUTPUT - Product		
Electricity REAL, medium voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity REAL, high voltage {EURO} electricity production mix	1.015	kWh

Table 17

European electricity mix (high voltage) in 2050 according to OPT scenario.

OUTPUT - Product		
Electricity OPT, high voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity, high voltage {EURO} electricity production, hard coal	0.029	kWh
Electricity, high voltage {EURO} electricity production, oil	0.005	kWh
Electricity, high voltage {EURO} electricity production, natural gas	0.005	kWh
Electricity, high voltage {EURO} electricity production, nuclear	0.169	kWh
Electricity, high voltage {EURO} electricity production, biomass	0.158	kWh
Electricity, high voltage {EURO} electricity production, hydropower	0.242	kWh
Electricity, high voltage {EURO} electricity production, wind	0.323	kWh
Electricity, high voltage {EURO} electricity production, other	0.079	kWh

Table 18

European electricity mix (medium voltage) in 2050 according to OPT scenario. Assumption: network electricity losses = about 1.5% (considering a technological improvement of the network in next decades).

OUTPUT - Product		
Electricity OPT, medium voltage {EURO} electricity production mix	1.000	kWh
INPUT – Electricity/heat		
Electricity OPT, high voltage {EURO} electricity production mix	1.015	kWh

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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