



BIOENERGY EUROPE
**STATISTICAL
REPORT**
2019

REPORT
**BIOFUELS FOR
TRANSPORT**

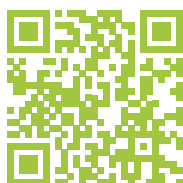


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STATISTICAL REPORT TIMELINE



Every year since its debut release in 2007, Bioenergy Europe's Statistical Report has provided an in-depth overview of the bioenergy sector in the EU-28 Member States.

Bioenergy Europe's Statistical Report has been enriched each year with new figures and information, collecting unique data on the developments of the European bioenergy market from a growing number of international contributors.

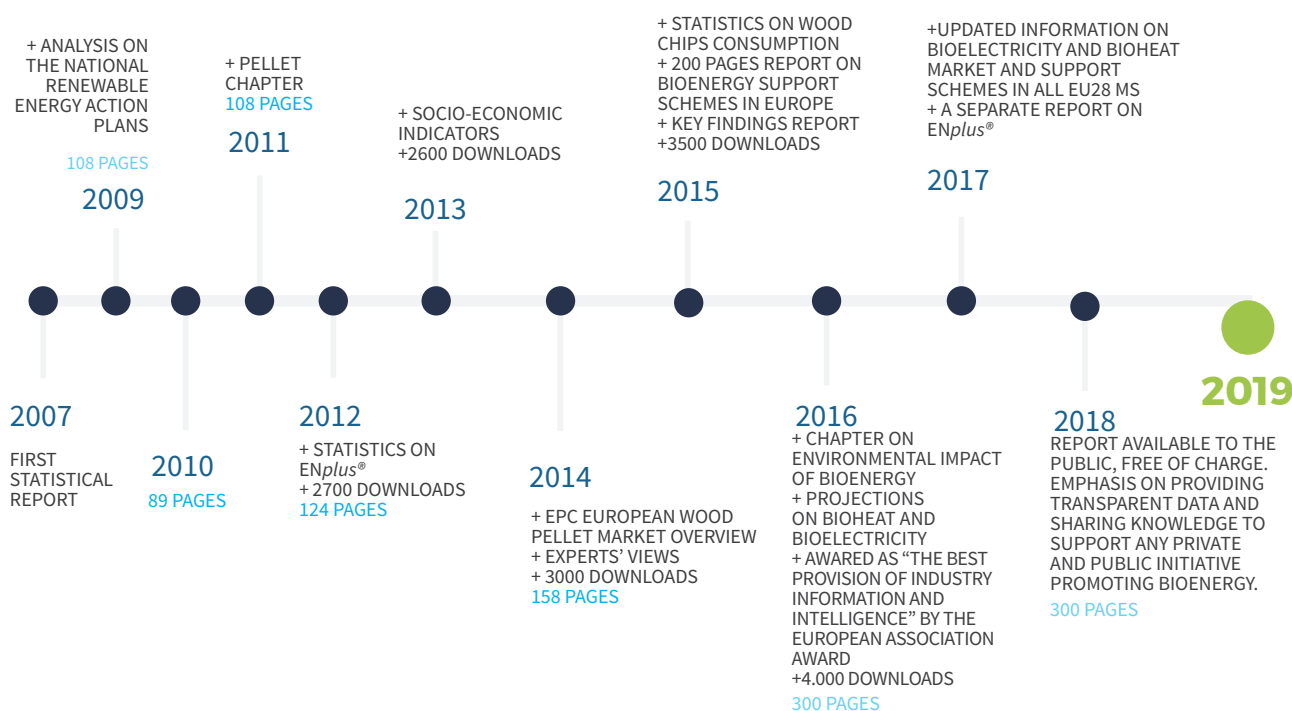
Bioenergy Europe is therefore able to develop a detailed report that helps industry leaders, decision makers, investors and all bioenergy professionals to understand the situation of bioenergy in Europe.

With more than 150 graphs and figures, readers of Bioenergy Europe's Statistical Report can get accurate and up-to-date information on the EU-28 energy system such as the final energy consumption of biomass for heat and electricity, the number of biogas plants in Europe, the consumption and trade of pellets, the production capacity of biofuels and other key information to help break down and clarify the complexity of a sector in constant evolution.

In 2017, the Report was rewarded by the European Association Awards for being the "best Provision of Industry Information and Intelligence", a recognition after a decade of collective work.



**THE EUROPEAN
ASSOCIATION
AWARDS 2017**



ABOUT OUR ACTIVITIES



Bioenergy Europe carries a wide range of activities aimed at supporting its members by informing them about latest EU and national policy developments, and by voicing their concerns to EU and other authorities. These include advocacy activities in key policy areas as well as the organisation of dedicated working groups acting as platforms where members can discuss common issues and exchange information on the state of play of bioenergy.

There are currently 7 active working groups:

- Agrobiomass & Energy Crops
- Biopower & CHP
- Competitiveness
- Domestic Heating
- Sustainability
- Pellets
- Wood Chips

In addition, Bioenergy Europe conceives and deploys targeted publications and communication campaigns to inform and educate about the potential of bioenergy for a decarbonised Europe.

Most notably, the association has several years of experience in data collection on the evolution of the bioenergy market and produce unique and tailored analyses along the year.

Thanks to the experience and authority acquired over the last 19 years, Bioenergy Europe successfully established two international certification schemes to guarantee high quality standard for fuels.



Bioenergy Europe is also the umbrella organisation of the European Pellet Council (EPC) and the International Biomass Torrefaction Council (IBTC). These networks have been created thanks to the dynamics of Bioenergy Europe members. Today, these networks bring together bioenergy experts and company representatives from all over Europe.



EUROPEAN PELLET
COUNCIL

A NETWORK OF
BIOENERGY EUROPE

The European Pellet Council (EPC) is an umbrella organisation of Bioenergy Europe founded in 2010, representing the interests of the European wood pellet sector. Its members are national pellet associations or related organisations from 18 countries.

The EPC is a platform for the pellet sector to discuss the issues related to the transition from a niche product to a major energy commodity. These issues include the standardisation and certification of pellet quality, safety, security of supply, education and training, and the quality of pellet-using devices.

EPC is managing the ENplus® quality certification.

www.pelletcouncil.eu
www.enplus-pellets.eu



INTERNATIONAL BIOMASS
TORREFACTION COUNCIL

A NETWORK OF
BIOENERGY EUROPE

The International Biomass Torrefaction Council (IBTC) is an umbrella organisation of Bioenergy Europe launched in 2012 and aims to building the first platform for companies having common interests in the development of torrefied Biomass markets. Currently, the IBTC initiative is supported by more than 23 companies active worldwide.

IBTC's objective is to promote the use of torrefied biomass as an energy carrier and to assist the development of the torrefaction industry. In this respect, IBTC's key activities are to undertake studies or projects, and to commonly voice its members' concerns to third parties to help to overcome barriers of market deployment.

www.ibtc.bioenergyeurope.org

ABOUT BIOENERGY EUROPE



BIOENERGY EUROPE is the common voice of the bioenergy sector with the aim to develop a sustainable bioenergy market based on fair business conditions.

BIOENERGY EUROPE is a non-profit Brussels-based international organisation founded in 1990 which brings together national associations and companies from all over Europe – thus representing more than 4000 indirect members, including mainly companies and research centers.

www.bioenergyeurope.org

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ABOUT BIOENERGY EUROPE

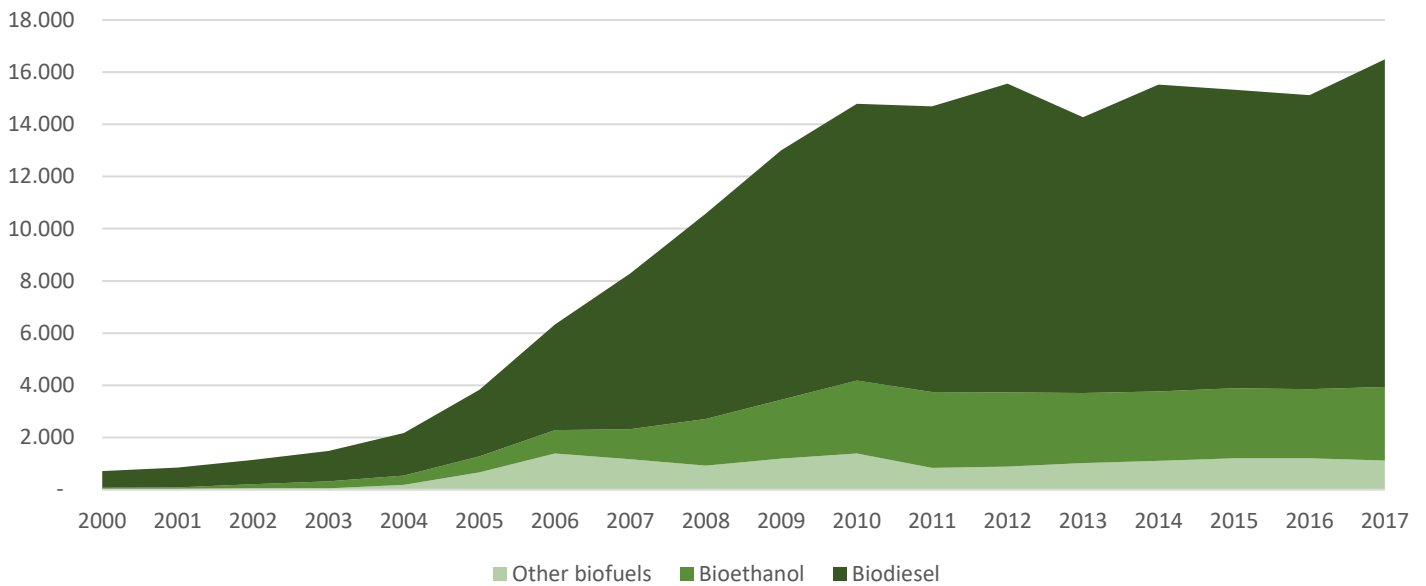


Companies



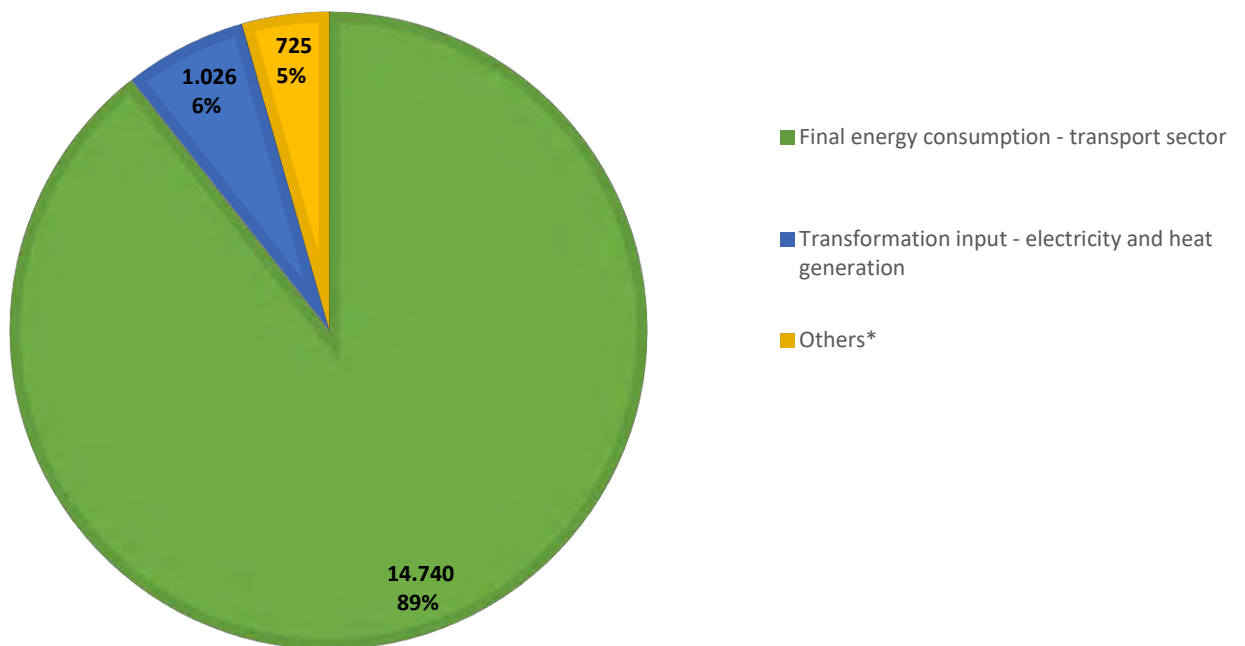
1. Biofuels in Europe

Figure 1 Evolution of the Gross Inland Energy Consumption of Biofuels (in ktoe)



Source: Eurostat

Figure 2 Biofuels Gross Inland Energy Consumption by end-use in 2017 in EU28 (in ktoe and %)



*Others include final energy consumption in additional sectors (industry, household, agriculture etc.) change in stock, internal energy consumption within the energy sector etc.

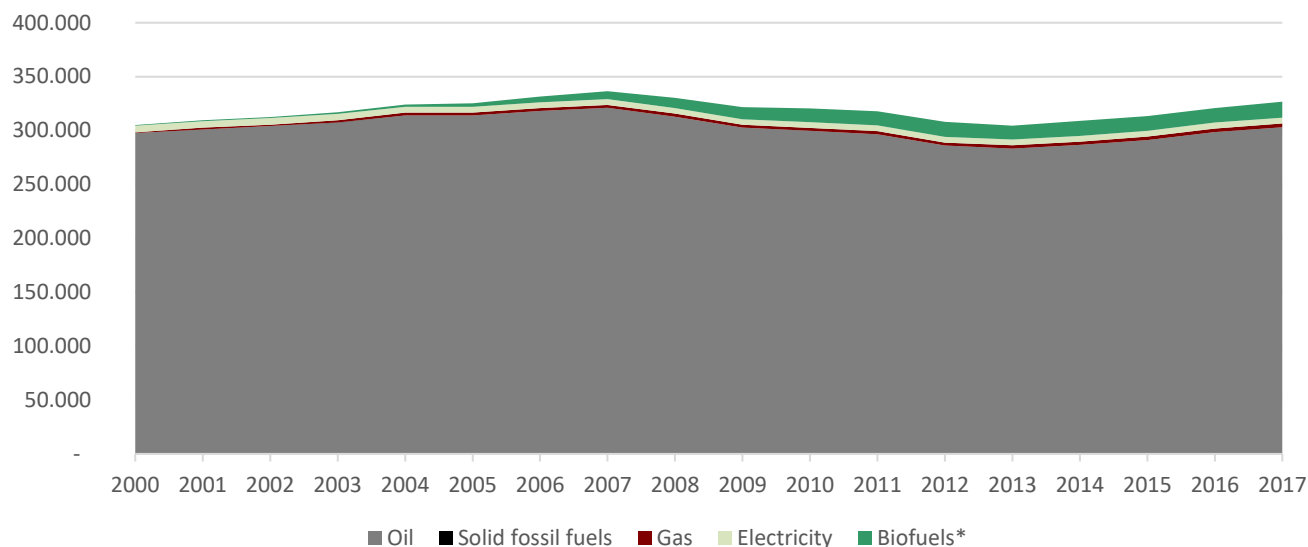
Note: For electricity and heat generation it is the 'other biofuels' that are used.

Source: Eurostat

With 89% of the biofuels gross inland energy consumption, the transport sector is clearly the prime end-user of biofuels as demonstrated in Figure 2. When we consider the gross final energy consumption of biofuels, it is again led by the transport sector which accounts for 95%.

2. Transport Sector in Europe

Figure 3 Evolution of the Final Energy Consumption by Energy type in the Transport Sector in EU28 (ktoe)



*Including biogas

Note: In 2017, solid fossil fuels accounted for 12 ktoe corresponding to less than 0,0004% of the energy consumed in transport

Source: Eurostat

Data taken from 2017 highlights that the final energy consumption used by the transport sector accounted for 326.872 ktoe, out of which 93% was from oil. (Both international aviation and shipping are not included in this number or the following report unless specified).

Table 1 Final Energy Consumption in the Transport Sector in EU28 in 2017 (ktoe)

	Total	Growth rate (2016-2017)	Solid fossil fuels	Natural gas	Oil and petroleum products*	Biofuels**	Electricity
Internal Transport	326.872	1,9%	12	3.383	303.031	14.890	5.557
Rail	6.532	0,2%	12	0	1.932	28	4.560
Road	306.247	1,8%	0	1.687	289.576	14.855	129
Domestic Aviation	6.139	4,2%	0	0	6.139	0	0
Domestic Navigation	5.052	4,1%	0	0	5.047	4	0
Pipeline Transport***	1.807	8,7%	0	1.638	9	0	160
Transport (not elsewhere specified)	1.095	4,7%	0	57	328	3	707
International transport	95.657	3,9%	0	27	95.630	0	0
International shipping	44.499	1,0%	0	27	44.472	0	0
International aviation	51.158	6,6%	0	0	51.158	0	0

*Excluding biofuel portion.

** Including biogas for transport (150 ktoe)

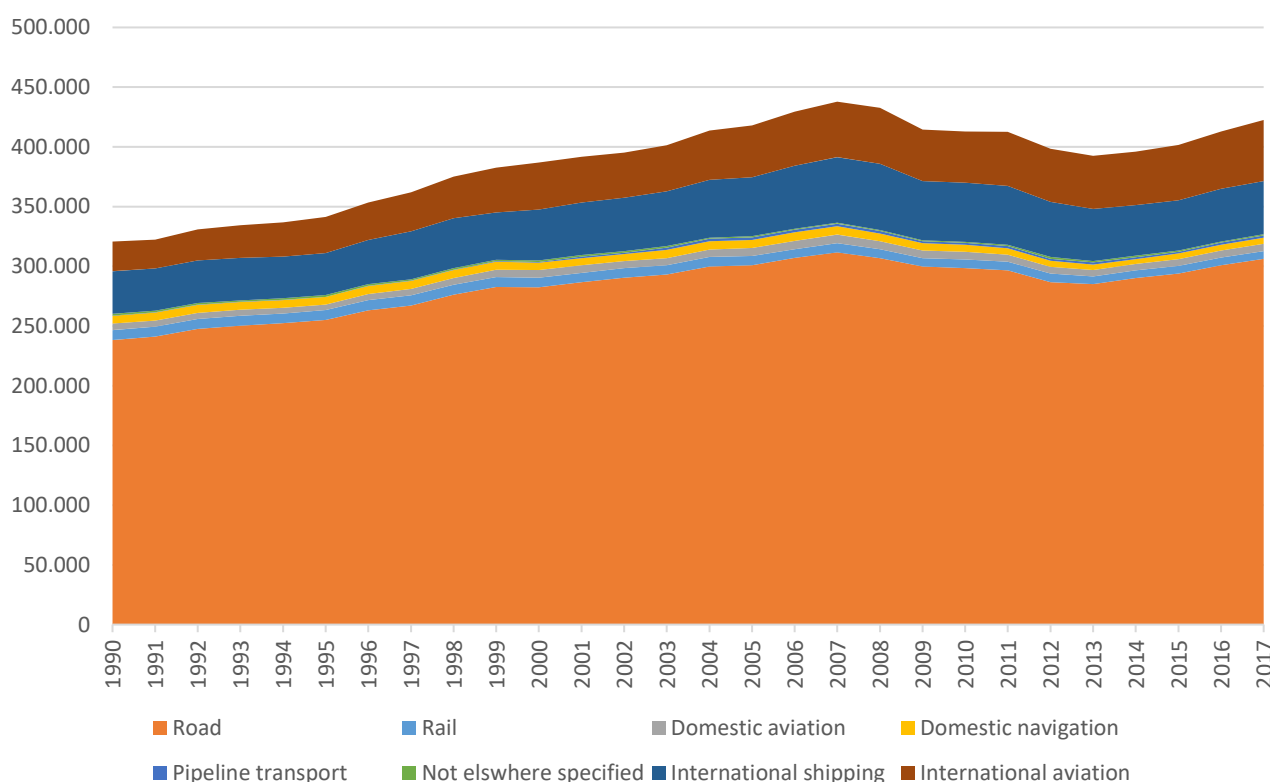
*** Excludes the energy used for pipeline distribution of natural or manufactured gas, including hot water and steam from the distributor to end users.

Source: Eurostat

Road transport represents 94% of the total energy consumed for internal transport within the EU. In absolute terms, road transport and international aviation reported the largest increment in 2017 compared to 2016, while rail transport reported the lowest. The annual increase of final energy consumption in road transport covers 89% of the total annual increase regarding EU internal transport.

International aviation is steadily increasing and is equivalent to 16% of the internal transport sector. It is the transport sector who has the highest growth rate, +24% from 2004 to 2017. On the other hand, the final energy consumption in rail transport has decreased by 18% since 2004.

Figure 4 Evolution of the Energy Consumption per type of Transport including International Transport (Aviation and Maritime) in EU28 (in ktoe)



Source: Eurostat

Table 2 Final Energy Consumption of the different Fuels used in the Transport Sector in 2017 in EU28 Member States (ktoe)

	Total	Solid Fossil Fuels	Natural Gas	Oil and Petroleum Products*	Biofuels**	Electricity
EU28	326.872	11,7	3.383	303.031	14.890	5.557
Growth rate (2016-2017)	2%	1%	3%	1%	11%	1%
AT	8.657	0,1	291	7.621	468	277
BE	8.856	0	38	8.197	479	143
BG	3.325	0	246	2.881	166	32
CY	677	0	0	668	9	0
CZ	6.616	1	70	6.086	314	146
DE	57.243	0	457	53.158	2.599	1.028
DK	4.220	0	6	3.963	216	35
EE	803	0	5	793	1	4
EL	5.815	0	13	5.621	166	16
ES	31.723	0	373	29.935	960	455
FI	4.194	0	9	3.728	391	66
FR	45.360	0	92	40.998	3.335	934
HR	2.189	0	4	2.161	0	23
HU	4.526	0	66	4.207	148	104
IE	4.043	0	0	3.863	175	4
IT	34.525	0	1.064	31.421	1.062	979
LT	1.962	0	34	1.861	61	6
LU	1.968	0	0	1.843	113	12
LV	1.081	0	0	1.063	9	9
MT	209	0	0	200	9	0
NL	10.674	0	46	10.155	307	167
PL	21.431	0	382	20.158	605	286
PT	5.794	0	15	5.495	242	42
RO	6.149	0	0	5.758	297	94
SE	8.360	0	18	6.497	1.631	213
SI	1.849	0,2	3	1.782	43	20
SK	2.773	0	151	2.422	149	50
UK	41.851	10,4	0	40.496	934	411

*Excluding biofuel portion

** Biogas for transport included (150 ktoe)

Source: Eurostat

3. Renewables in Transport: Towards the 2020 Targets

The Renewable Energy Directive (article 3(4)), establishes a calculation methodology including multipliers for the calculation of the share of renewables in transport in order to comply with the 2020 Renewable Energy Target. According to this methodology RES contribution to transport is accounted for as the sum of:

- Compliant biofuels (liquid and gaseous) in all modes of transport and where applicable, the **multiplier (2x)** is used (for categories indicated in Annex IX).
- Renewable electricity - **applying the national or European RES-E share to the total electricity consumption in transport** (proportionality of renewable electricity in the grid principle) with the multiplier **(2.5x)** for rail transport and **5X** for road transport as defined in Article 3(4)(c). The RES-E share of year n-2 is applied ('... as measured two years before ...').
- Hydrogen (of renewable origin) in all modes of transport.
- Synthetic fuels (of renewable origin) in all modes of transport.
- Other forms of renewable energy with reported consumption in the transport sectors.

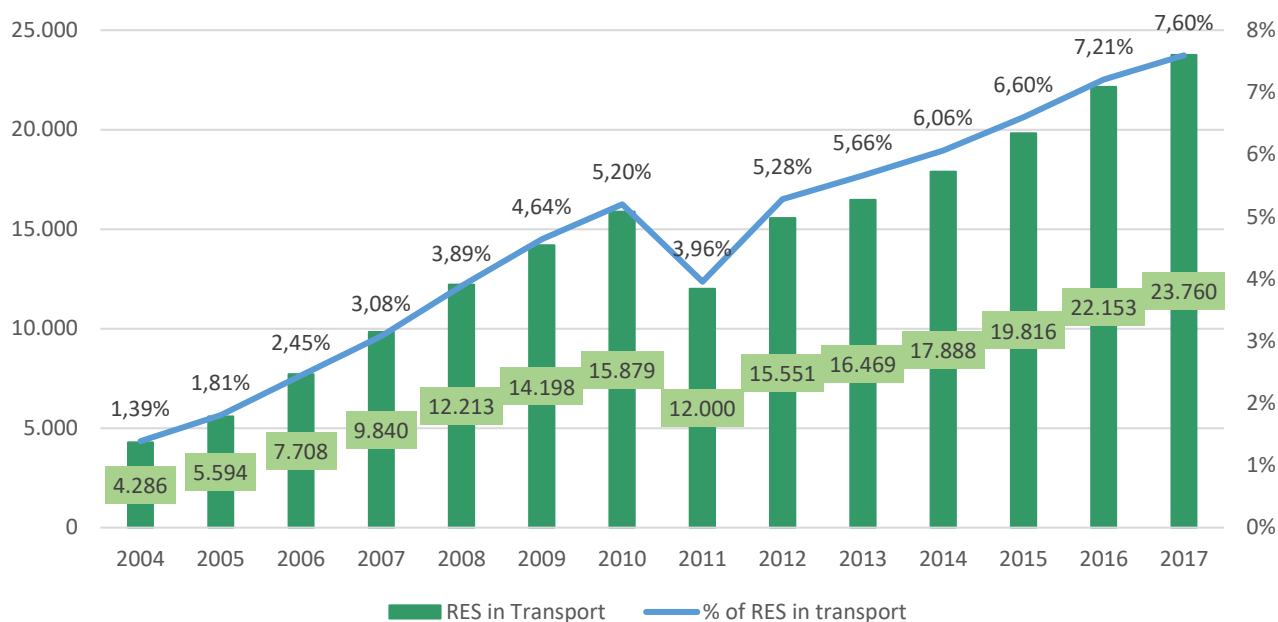
The denominator '*energy consumed in transport*' is, for the purpose of the %RES-T calculation, defined by the sum of the following elements: petrol in all modes of transport, diesel in all modes of transport (non-bio gas/diesel oil), all biofuels (compliant and non-compliant) (no multipliers) in road and rail transport and electricity in all modes of transport (including multipliers just for rail transport).

These multiplication factors create **hypothetical renewable energies**, which contribute towards the percentage target. However, as these renewable energies are nonexistent, they, therefore, do not aid towards in reducing the GHG emission within the transport sector nor do they act as a replacement to fossil fuels.

Figures 5, 6, 7 as well as table 3 represent the contribution of renewables in transport as referenced in per the above methodology. Please note that although the data within this section is also sourced from Eurostat, a different database (SHARES) has been used, consequently, the figures might have a slight variance.

The drastic drop in 2011, observed in the following graph, is due to the slow implementation of new sustainability legislations by Member States. Data recorded from 2011 onwards where countries report compliant biofuels, can only state those said biofuels and bio liquids which comply with Articles 17 (Sustainability criteria for biofuels and bioliquids) and 18 (Verification of compliance with the sustainability criteria for biofuels and bioliquids).

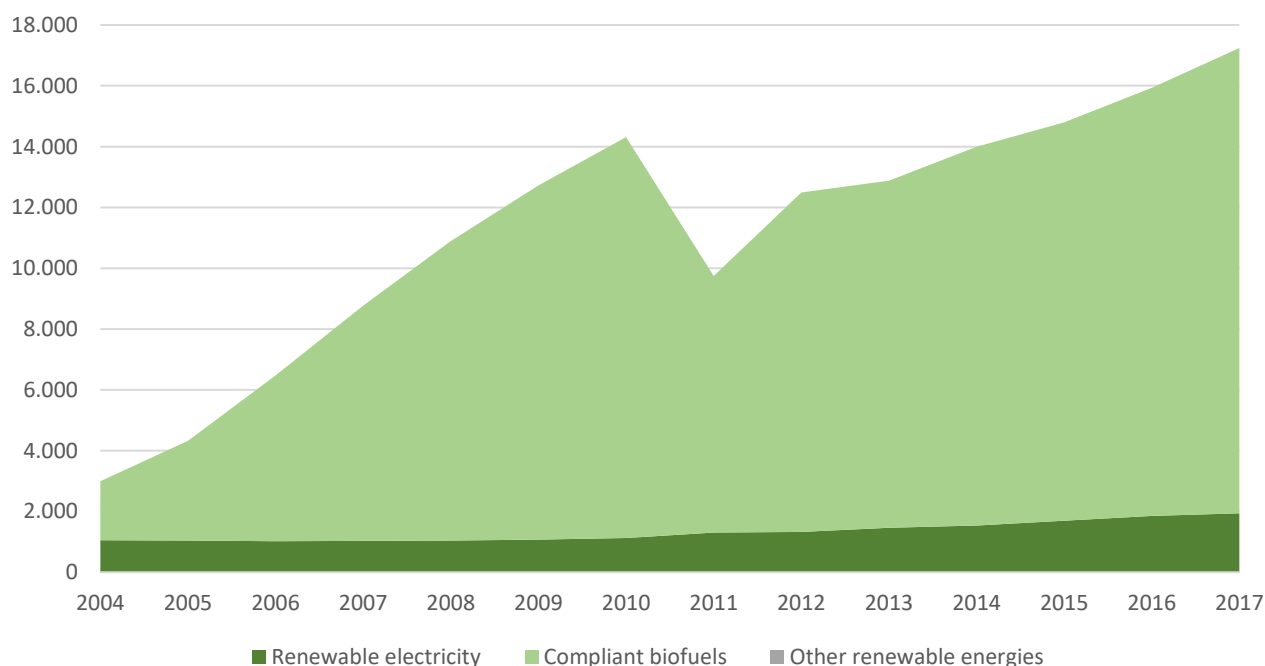
Figure 5 Evolution of Renewable Energy Consumption in the Transport Sector* in EU28 (ktoe and %)



*Multipliers applied

Source: Eurostat / SHARE 2017

Figure 6 Evolution of Renewable Energy Consumption in the Transport Sector* by Fuel Type in EU28 (ktoe)

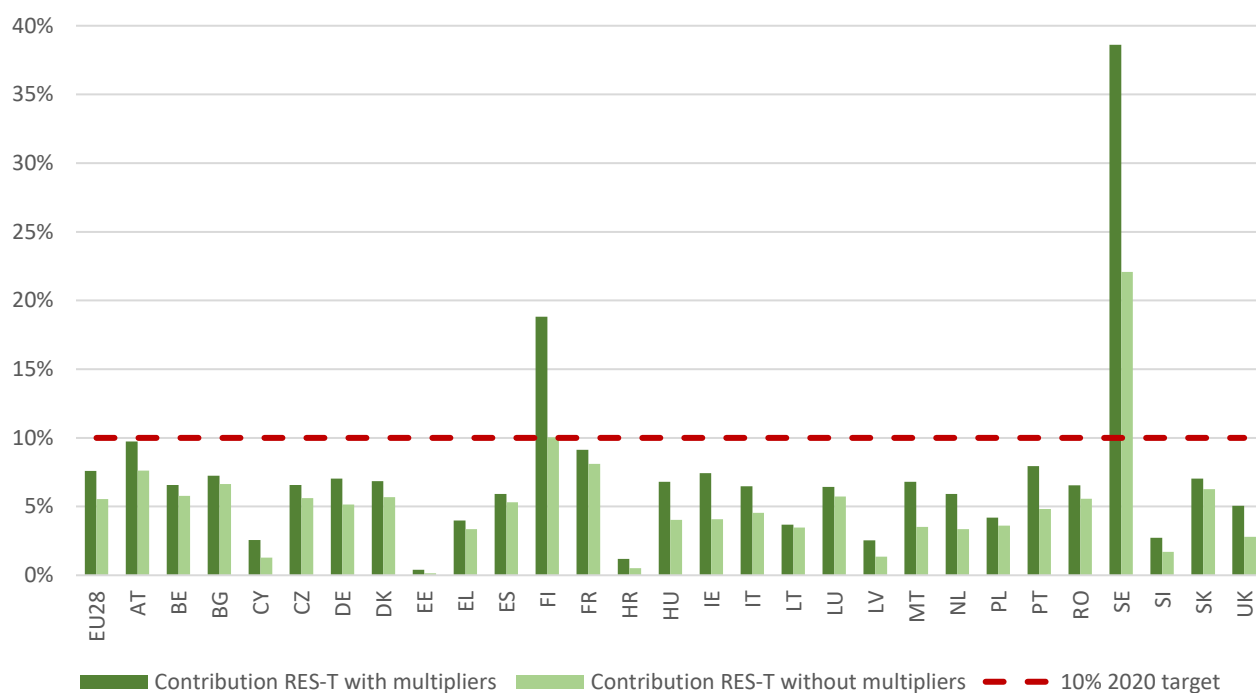


*Without multipliers

Source: Eurostat / SHARE 2017

Biofuels are by far the prime source of renewable energy that is used by the transport sector (89% of the renewable energy in transport) and this is steadily increasing (irrespective of 2011 data). 2017 data shows that the rail transport consumes the largest part of the renewable electricity for transport (more than 80%).

Figure 7 Status Towards Fulfilling the 2020 Targets for Renewable Energies in the Transport Sector in EU28 Member States in 2017 (%)



Source: Eurostat / SHARE 2017

The 23.760 ktoe of renewables within transport are, in reality, 17.240 ktoe without multiple counting rules. Table 3 highlights the raw data of renewables in transport (ktoe as well as contribution to the total energy used in transport) without applying multipliers in comparison with the official figures calculated using the methodology as defined by the European Commission.

Table 3 Share of Renewables in the Transport Sector in EU28 Member States in 2017 with and without Application of Multipliers (ktoe)

	RES in Transport According to European Commission Methodology		RES in Transport without Multipliers	
	RES in Transport (ktoe)	Contribution RES-T (%)	RES in Transport (ktoe)	Contribution RES-T (%)
EU28	23.760	7,60%	17.240	5,51%
AT	842	9,74%	644	7,45%
BE	581	6,58%	506	5,73%
BG	189	7,24%	172	6,61%
CY	17	2,57%	9	1,29%
CZ	421	6,58%	356	5,56%
DE	3.971	7,03%	2.879	5,10%
DK	286	6,85%	236	5,66%
EE	3	0,40%	1	0,14%
EL	201	4,00%	169	3,36%
ES	1.721	5,92%	1.537	5,29%
FI	778	18,83%	412	9,96%
FR	4.101	9,14%	3.604	8,03%
HR	25	1,18%	11	0,52%
HU	303	6,81%	178	4,00%
IE	295	7,43%	162	4,08%
IT	1.992	6,48%	1.388	4,52%
LT	67	3,69%	63	3,47%
LU	128	6,44%	114	5,71%
LV	26	2,54%	14	1,35%
MT	14	6,80%	7	3,52%
NL	620	5,91%	351	3,35%
PL	804	4,20%	687	3,59%
PT	436	7,93%	264	4,80%
RO	401	6,56%	338	5,53%
SE	3.246	38,63%	1.810	21,54%
SI	50	2,74%	31	1,69%
SK	185	7,03%	164	6,23%
UK	2.059	5,05%	1.134	2,78%

Source: Eurostat/SHARE 2017

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4. Liquid Biofuels for Transport

Table 4 Biofuels Capacity by EU28 Member States in 2017 (1000 tonnes/year)

	Bioethanol	Biodiesel	Other liquid Biofuels
EU28	7.067	21.962	4.882
Growth rate (2016-2017)	1%	3%	2%
AT	221	646	646
BE	408	450	69
BG	27	160	0
CY	0	5	0
CZ	180	420	0
DE	792	4.153	3.962
DK	0	0	0
EE	0	0	0
EL	0	1.045	0
ES	464	4.237	0
FI	50	490	51
FR	1.615	2.435	40
HR	0	41	0
HU	504	158	0
IE	0	30	0
IT	332	2.212	0
LT	20	140	0
LU	0	0	0
LV	19	173	0
MT	0	1	0
NL	468	2.058	0
PL	858	1.321	0
PT	0	721	52
RO	80	200	0
SE	190	132	63
SI	0	0	0
SK	118	125	0
UK	723	609	0

Source: Eurostat

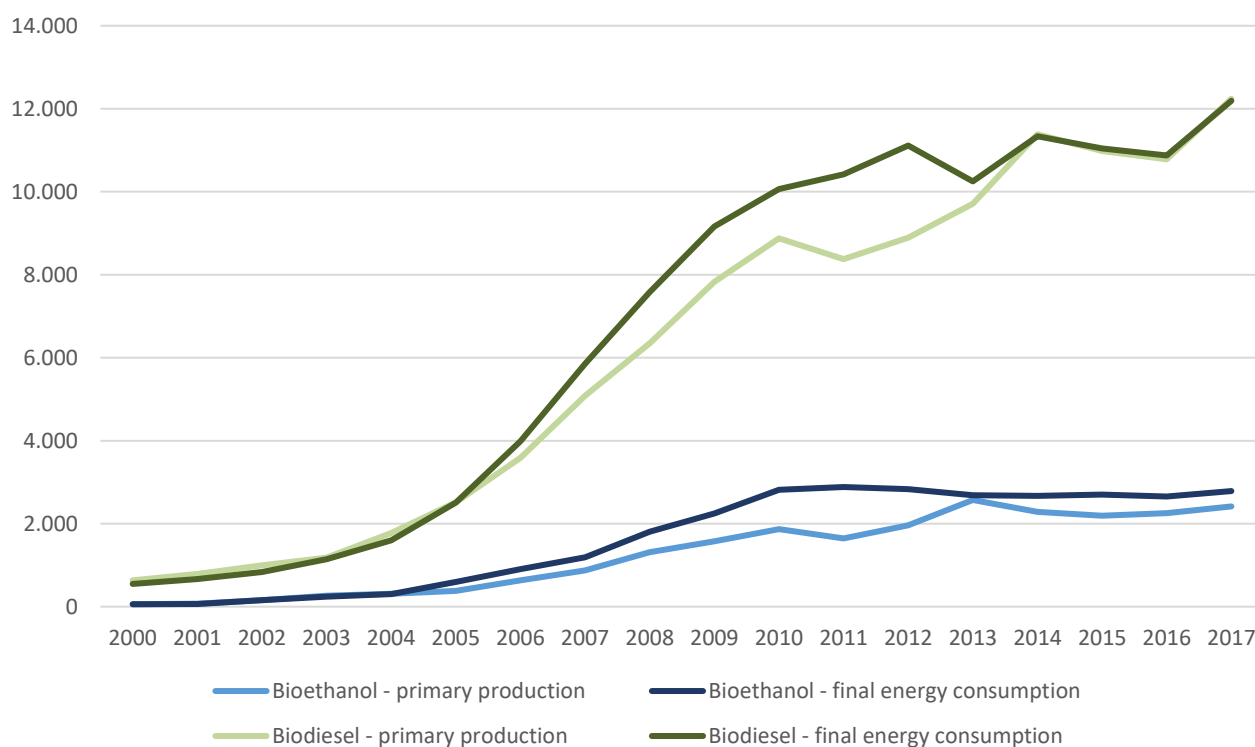
Table 5 Primary Production and Net Imports of Liquid Biofuels in EU28 Member States in 2017 (ktoe)

	Total Liquid Biofuels			Bioethanol		Biodiesel		Other Liquid Biofuels	
	Primary production	Net import	Biofuel Import Dependency	Primary Production	Net Import	Primary Production	Net Import	Primary Production	Net Import
EU28	15.104	1.297	8%	2.416	397	12.239	228	449	672
Growth rate (2016-2017)	11%	-10%	-18%	7%	-8%	14%	-33%	-13%	-1%
AT	382	115	23%	139	-81	243	196	1	0
BE	450	40	8%	185	-88	261	126	4	2
BG	97	72	43%	14	13	83	59	0	0
CY	1	9	87%	0	0	1	9	0	0
CZ	205	111	35%	66	-7	139	118	0	0
DE	3.337	-497	-18%	406	328	2.841	-877	90	51
DK	4	246	104%	0	0	0	246	4	0
EE	0	1	100%	0	1	0	0	0	0
EL	139	31	18%	0	0	139	31	0	0
ES	1.770	-588	-46%	213	-71	1.557	-517	0	0
FI	357	86	19%	0	86	310	0	48	0
FR	2.623	719	22%	425	114	2.190	606	8	0
HR	0	0	34%	0	0	0	0	0	0
HU	421	-267	-180%	280	-240	142	-27	0	0
IE	25	141	82%	0	42	25	99	0	0
IT	869	1.086	56%	17	16	612	451	240	619
LT	113	-54	-89%	9	-2	104	-52	0	0
LU	0	113	101%	0	7	0	107	0	0
LV	53	-46	-424%	6	2	47	-48	0	0
MT	0	6	62%	0	0	0	6	0	0
NL	1.705	-1.279	-386%	0	130	1.705	-1.410	0	0
PL	918	-308	-51%	123	55	793	-364	2	0
PT	316	-50	-20%	0	3	316	-52	0	0
RO	175	124	42%	28	62	146	61	0	0
SE	238	1.249	76%	119	-4	66	1.252	52	0
SI	0	45	102%	0	9	0	37	0	0
SK	162	-10	-7%	59	-38	103	27	0	0
UK	742	203	22%	328	59	414	144	0	0

* Import dependency is calculated as net imports divided by the gross inland consumption. Energy dependency may be negative in the case of net exporter countries.

Source: Eurostat

Figure 8 Evolution of Primary Production and Final Energy Consumption of Biodiesel and Bioethanol in EU28 (ktoe)



Source: Eurostat

Table 6 Share of the Total use of Biofuels in the Transport Sector by type in 2017 (ktoe, %)

	Consumption Indicator	Energy (in ktoe)	Share of the Fuel used in Transport (in %)
Bioethanol	Final energy consumption	2.785	99,8%
	Final energy consumption in transport	2.778	
Biodiesel	Final energy consumption	12.191	98,1%
	Final energy consumption in transport	11.961	
Other Liquid Biofuels	Final energy consumption	55	1,1%
	Final energy consumption in transport	0,6	
Biogas	Final energy consumption	3.014	5,0%
	Final energy consumption in transport	150	
Total	Final energy consumption	18.045	83%
	Final energy consumption in transport	14.890	

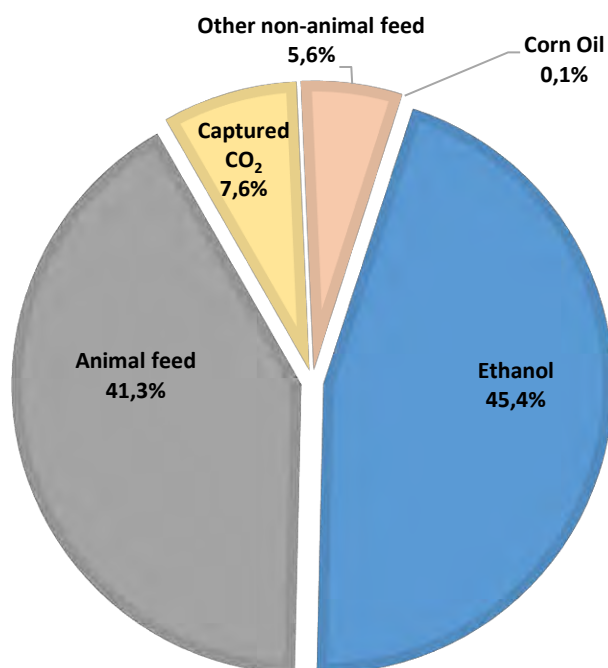
Source: Eurostat

Table 7 Final Energy Consumption of Biofuels and Biogas in the Transport Sector in EU28 Member States in 2017 (ktoe)

	Bioethanol	Biodiesel	Other liquid Biofuels	Biogas
EU28	2.778	11.961	0,6	150
Growth rate (2016-2017)	5%	12%	-87%	14%
AT	56	412	0	0,3
BE	97	382	0	0
BG	27	140	0	0
CY	0	9	0	0
CZ	59	255	0	0
DE	733	1.827	0,6	38
DK	0	215	0	0,3
EE	1	0	0	0
EL	0	166	0	0
ES	138	822	0	0
FI	81	310	0	0,3
FR	537	2.798	0	0
HR	0	0	0	0
HU	40	108	0	0
IE	44	131	0	0
IT	33	1.029	0	0
LT	7	54	0	0
LU	7	107	0	0
LV	8	1	0	0
MT	0	9	0	0
NL	129	178	0	0
PL	176	429	0	0
PT	3	239	0	0
RO	91	206	0	0
SE	99	1.421	0	111
SI	9	35	0	0
SK	20	130	0	0
UK	383	551	0	0

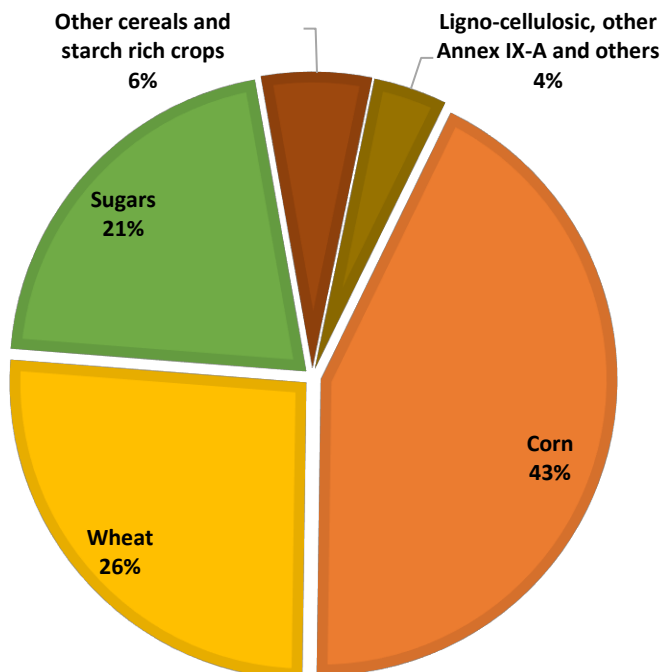
Source: Eurostat

Figure 9 Share of Mass Output of ePURE Members' Ethanol Plants in Europe in 2018 (in %)



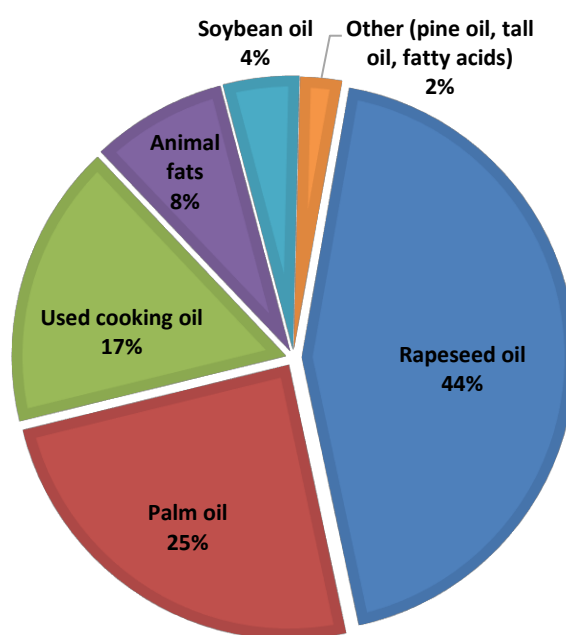
Source: ePURE audited 2018 data

Figure 10 Share of ePURE Members' Ethanol Produced from each Feedstock type in 2018 (in %)



Source: ePURE audited 2018 data

Figure 11 Repartition of the Feedstock for Biodiesel Production in EU28 in 2017 (in %).



Source: USDA and Bioenergy Europe's calculations

5. Annexes

Table 8 Country codes

EU28	European Union (28 members)
AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovak Republic
UK	United Kingdom

Table 9 Symbols and Abbreviations

Symbol	Meaning
,	Decimal separator
.	Thousand
n.a.	Data not available

Table 10 Table Decimal Prefixes

10 ¹	Deca (da)	10 ⁻¹	Deci (d)
10 ²	Hecto (h)	10 ⁻²	Centi (c)
10 ³	Kilo (k)	10 ⁻³	Milli (m)
10 ⁶	Mega (M)	10 ⁻⁶	Micro (μ)
10 ⁹	Giga (G)	10 ⁻⁹	Nano (n)
10 ¹²	Tera (T)	10 ⁻¹²	Pico (p)
10 ¹⁵	Peta (P)	10 ⁻¹⁵	Femto (f)
10 ¹⁸	Exa (E)	10 ⁻¹⁸	Atto (a)

Table 11 Table General Conversion Factor for Energy

to from	1 MJ	1kWh	1 kg oe	Mcal
1 MJ	1	0,278	0,024	0,239
1 kWh	3,6	1	0,086	0,86
1 kg oe	41,868	11,63	1	10
1 Mcal	4,187	1,163	0,1	1

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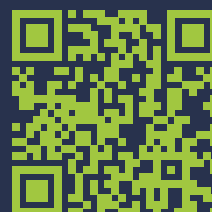
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