

Joint Wood Energy Enquiry: 2015 data

Publication date: 1 February 2018
Coverage: United Kingdom
Geographical breakdown: None

Introduction

The Joint Wood Energy Enquiry (JWEE) collects data on woodfuel supply and use. Statistics are collected every 2 years by the United Nations Economic Commission for Europe (UNECE).

UK data that is submitted to UNECE via the Joint Wood Energy Enquiry is published biennially at: www.forestry.gov.uk/forestry/infd-8ekjqc

The attached tables show data for 2015 that was submitted to UNECE in early 2017. Estimates for table T IV are shown for the first time in this return. Estimates for tables T I and T II have been previously published by the Forestry Commission (Joint Forest Sector Questionnaire: final 2015 data), but may not reflect more recent revisions.

Notes:

The following sheets are provided:

Overview	Summary results and time series.
T I fibre sources	Estimates of production, imports and exports of wood. Covers wood for energy and material use.
T II processed woodbased fuels	Estimates of production, imports and exports for wood charcoal and wood pellets
T IV energy use	Estimates of wood used for energy production by the different sectors, by source of fibres.
Conversion factors	Conversion factors assumed in this return. Many are default factors supplied by UNECE.
User information	Guidance from UNECE on data quality categories and on definitions.

Next update: Date to be confirmed

Issued by: IFOS - Statistics, Forest Research,
232 Corstorphine Road, Edinburgh, EH12 7AT
Enquiries: Jackie Watson 0300 067 5238
statistics@forestry.gsi.gov.uk
Statistician: Sheila Ward
www.forestry.gov.uk/statistics

UNECE/FAO FORESTRY AND TIMBER SECTION JOINT WOOD ENERGY ENQUIRY v 6.21

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Please select country:	United Kingdom
Year:	2015

Content

All sheets are protected but without a password

Overview	Introduction	Overview sheet, please choose your country here.
	Aggregate data	This table is meant to provide an instant presentation of the results provided when filling in the JWEE Tables T IV. Only in the case of insufficient resources to complete Tables I-IV, countries are invited to enter aggregated data directly into this table.
Reporting: Wood Supply	T I fibre sources	Partially pre-filled table with 2013 data from the Joint Forest Sector Questionnaire as of November 2014. Assessment of wood available for energy and material use at national level.
	T II processed wood based fuels	Assessment of national production of processed wood based fuels (pwb), solid fuels (charcoal, pellets, briquettes, ethanol) and liquid fuels (pyrolysis oils, biodiesel and ethanol from wood).
Reporting: Wood Energy	T IV energy use	Core table of the enquiry - assessment of fibre origin and amounts used for energy production by the different sectors.
Conversion Factors	Conversion Factors Energy	Suggested set of default conversion factors. Country correspondents are invited to adjust the set of conversion factors to national circumstances.
	Conversion Factors Volume	Volume to volume conversion factors used in JWEE.
User information	Data Quality	The JWEE offers the possibility for rating the data quality for almost every figure submitted. This tables provides a short overview on the choices and their meaning.
	Definitions	Set of international definitions for each item, commodity, source, user, classification, etc. used in the JWEE.

AGGREGATED RESULTS

Timeseries

NOTE: This table will be auto-filled when entering data, notably in table T IV ENERGY. Filling tables T I - T IV should be given priority. Only in case of restricted resources and/or data availability, this table offers member states the possibility to submit some aggregated data on wood energy supply and use.

reference year	Wood energy total as published [1 000 m3]		Share of total wood energy in TPES (%)	Share of total wood energy in RES (%)
2005	1,562		0.1%	7.9%
2007	2,274		0.2%	9.7%
2009	5,004		0.5%	16.7%
2011	10,333		1.1%	26.5%
2013	13,364		1.4%	25.5%
2015	34,129		3.4%	50.4%
Source:	JWEE		JWEE data divided IEA TPES	JWEE data divided IEA RES

Note: As a result of changes in data availability and data sources, the time series is likely to overestimate the increase in wood energy use in the UK.

Aggregated Data

NOTE: This table will be auto-filled when entering data, notably in table T IV ENERGY. Filling tables T I - T IV should be given priority. Only in case of restricted resources and/or data availability, this table offers member states the possibility to submit some aggregated

[1 000 m3]		USES								Sum [U1;U2;U3;U4]	%
		U1 Power & heat	DQ	U2 Industrial	DQ	U3 Residential	DQ	U4 Other	DQ		
SOURCES	S1 Direct	520	...	77	...	7,199	...	n/a	...	7,796	23%
	S2 Indirect	16,009	...	6,775	...	1,379	...	497	...	24,660	72%
	S3 Recovered	863	...	15	...	796	...	n/a	...	1,674	5%
	S4 Unspecified	n/a	...	n/a	...	n/a	...	n/a	...	n/a	n/a
Sum [S1;S2;S3;S4]		17,393		6,866		9,373		497		34,129	
%		51%		20%		27%		1%			
Memorandum item (Source: IEA/OECD data for 2014) Solid Biofuel excluding charcoal (1000 m³)*										*Conversion factor TJ to m³: 0.198 1000 m³ / TJ	
		14,201.50		5,447		11,325		1,451			

Explanations on Aggregated Data

S1 Direct	Any wood fibre entering energy production without any further treatment or conversion. It comprises removals from forests and outside. This comprises also any wood defined by the FAO as coming from "Other Wooded Land" (OWL) and "Trees Outside Forests", but is wider than these two definitions. It comprises any woody biomass from any land use and covers amongst others infrastructure maintenance (roads, railway, power transmission lines, pipelines, etc.), hedgerows, agricultural residues from fruit tree orchards, wood from gardens and parks, etc. It comprises any form of woody biomass, such as green chips, roundwood or split, stacked or loose from any part of the trees such as roots, stemwood and branches, fruits and shells.
S2 Indirect	Processed and unprocessed co-products (residues) from the wood processing industries are considered as indirect supply. These co-products can be solid (sawdust, chips, slabs, etc.) or liquid from the pulp industry (black liquor or tall oil). Processed wood fuels with improved energy content per bulk volume (compressed), such as wood pellets, briquettes but also wood charcoal are also included under indirect supply.
S3 Recovered	The so-called post consumer recovered wood comprises any waste wood fibre after at least one life cycle. It comprises wood from construction, renovation and demolition, but also packaging as well as old furniture. Countries often apply different classifications to distinguish between different wood waste categories (contaminated with colours, glue, etc.).
S4 Unspecified	Many countries know something about the amount of wood used but not its source. These households' surveys are often conducted by the energy statistics and are hence not interested in detecting the different sources and origin of the wood fibres. This category represents a further step in making the JWEE more compatible with the energy statistics.
U1 Power & heat	The definition of U1 refers to "Main Activity Producers" (IEA definition), which refers to plants which are designed to produce electricity/combined heat and power (CHP) or Heat only. If one or more units of the plant is a CHP unit (and the inputs and outputs can not be distinguished on a unit basis) then the whole plant is designated as a CHP plant. However a sawmill, for example, which produces heat for itself as well as selling it outside, would fall under the next (U2) category. Main activity supply undertakings generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the main activity grid.
U2 Industrial	This refers to "auto producer" (IEA definition) undertakings that generate electricity and/or heat, wholly or partly for their own use as an activity which supports their primary activity. They may be privately or publicly owned. It includes mainly the forest based industries.
U3 Residential	In the first version of the JWEE this user group was referred to as "Private households". For consistency reasons with energy statistics it was renamed to "Residential". It is referred to by the IEA as all consumption by households, excluding fuels used for transport. It includes households with employed persons (ISIC Division 95) which is a small part of total residential consumption.
U4 Other	This definition comprises any other economic sector that is not included in the above mentioned (e.g. agriculture, forestry and fishing, commercial and public services and transport).

TABLE I:	fibre sources
Country:	United Kingdom
Year:	2015

Table I: fibre sources												
			For all purposes, not only energy									
Fibre SOURCES		Fibre TYPES		Unit [1 000]	Domestic production	Imports	Exports	Gross Domestic supply				
					DQ	DQ	DQ					
Wood Sources	Primary solid biomass	Woody Biomass from Forests	Industrial Roundwood (C & NC)	m ³	8,629	...	473	...	271	...	8,830	
			Fuelwood (C & NC)	m ³	1,921	...	146	...	573	...	1,494	
			... of which from short rotation coppice	m ³	...	...				
		Woody Biomass Outside Forests	Industrial Roundwood (C & NC)	m ³	...	...				
			Fuelwood (C & NC)	m ³	1,896	...						
			... of which from short rotation coppice	m ³	...	...				
	Industrial waste (co-products)	Forest based Industry	Solid co-products (C & NC)	Chips and particles	m ³	2,334	...	212	...	128	...	2,419
				Wood residues	m ³	778	...	0	...	0	...	778
				Bark	m ³	1,011	1,011
			Liquid co-products (C & NC)	Black liquor (without crude tall oil)	t					
Crude tall oil				t	...	...	2	...	0	...	2
Municipal solid waste biodegradable	Wood waste	Post-consumer recovered wood	Non-hazardous wood waste	t	2,071	...	...	...	...	...	2,071
			Hazardous wood waste	t	4	4	
			Unspecified wood waste	t	
Wood from unknown sources				m ³		

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For EU 28 Member countries	
Imports from EU 28 countries	DQ
460	...
144	...

212	...
0	...
...	...

...	...
-----	-----

...	...
-----	-----

...	...
-----	-----

...	...
-----	-----

...	...
-----	-----

Units:
t = metric tonnes [megagram]
m ³ = solid cubic metre, underbark
bv = m³ bulk volume
rwe. = Roundwood equivalent in m ³
L = Litre
t d.m. = Metric tonnes dry matter

TABLE II:	processed wood-based fuels
Country:	United Kingdom
Year:	2015

Table II: processed wood based fuels										
	Fibre TYPES		Original unit	Domestic production		Import		Export		Gross Domestic supply
					DQ		DQ		DQ	
Processed wood-based fuel production	Processed solid biofuels from wood	Wood Charcoal	t (thousand)	5	...	107	...	2	...	109
		Wood Pellets	t (thousand)	343	...	6,548	...	88	...	6,803
		...of which: torried	t (thousand)	...	...	...	...	...	...	...
		Wood Briquettes	t (thousand)	...	...	...	...	...	...	...
	Processed liquid biofuels from wood	Pyrolysis Oils	L (million)	...	...	...	...	...	...	...
		Cellulose based ethanol	L (million)
		Wood based biodiesel	L (million)
Gaseous Wood-based Fuels	Synthesis Gas									

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Units:
t = metric tonnes [megagram]
m³ = solid cubic metre, underbark
bv = m³ bulk volume
rwe. = Roundwood equivalent in m³
L = Litre
t d.m. = Metric tonnes dry matter

For EU 28 Member countries

Imports from EU 28 countries	
	DQ
44	...
1,814	...
...	...
...	...
...	...
...	...
...	...

TABLE IV:	energy use
Country:	United Kingdom
Year:	2015

TIV: energy use

		Unit		Net Domestic supply		Wood used for energy		Energy use of wood fibres by ISIC-sectors (in 1000 t.d.m or t)																
		[1 000]	[t d.m. or t]	[t d.m. or t]		Energy Transformation Sector					Industry Sector					Other direct final consumption								
				Main Activity Producer					Direct Final Consumer and Autoproducer (Heat, CHP and Electricity)					Residential	Agriculture, Forestry and Fishing	Commercial and Public services	Transport Sector	Other	Unspecified	Total				
				Electricity	CHP	Heat	Unspecified	Total	Pulp & Paper [ISIC No.21]	Wood & wood products	Other Industry	Unspecified	Total											
				DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ				
Primary solid biomass	Woody Biomass from Forests	Industrial Roundwood (C & NC)	t d.m.	2,208	0	...	...	0	...	...	...	...	0	...	...	...	...	...	...	0	
		Fuelwood (C & NC)	t d.m.	679	2,218	...	193 B	...	...	193 B	28 B	...	...	31 B	1,994 C	...	...	...	...	...	1,994 C
	Woody Biomass Outside Forests	Industrial Roundwood (C & NC)	t d.m.	0	0	...	...	0	...	...	...	...	0	...	...	...	...	...	...	...	0
		Fuelwood (C & NC)	t d.m.	1,005	1,005	...	...	0	...	...	...	...	0	...	1,005 C	...	...	...	...	...	1,005 C
	Unspecified primary solid biomass	t d.m.	0	24	24 B	...	...	24 B	...	...	0.5 B	...	0 B	...	...	...	...	...	...	0	
Forest based Industry	Solid co-products (C & NC)	Chips and particles	t d.m.	466	2,314	703 B	178 B	...	...	882 B	...	...	1,315 C	59 B	...	1,373 C	60 C	...	...	...	60 C
		Wood residues	t d.m.	171	0	0	0	0		
		Bark	t d.m.	455	0	0	0	0		
		Unspecified solid co-products	t d.m.	0	137	0	137 C	137 C	0		
	Liquid co-products (C & NC)	Black liquor (without crude tall oil)	t d.m.	0	0	0	0	0		
		Crude tall oil	t	2	3	3 B	3 B	0	0		
	Unspecified liquid co-products	t d.m.	0	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	...	0
Processed wood-based fuel production	Processed solid biofuels from wood	Wood Charcoal	t d.m.	103	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	0
		Wood Pellets	t d.m.	5,687	5,650	5,184 B	...	...	...	5,184 B	181 B	22 B	...	...	203 B	51 C	...	212 C	...	...	263 C
		...of which: torrefied	t d.m.	0	0	0	0	0		
		Wood Briquettes	t d.m.	436	436	0	0	436 C	436 C		
	Processed liquid biofuels from wood	Pyrolysis Oils	t	0	0	0	0	0		
		Cellulose based ethanol	t	0	0	0	0	0		
	Wood based biodiesel	t	0	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	...	0
Post-consumer recovered wood	Non-hazardous wood waste	t d.m.	1,553	802	292 B	121 B	...	...	413 B	...	...	7 B	...	7 B	381 C	...	...	...	...	...	381 C
	Hazardous wood waste	t d.m.	3	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	...	0
	Unspecified wood waste	t d.m.	0	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	...	0
Wood from unknown sources	t d.m.	0	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...	...	...	...	0

TABLE IV:	energy use
Country:	United Kingdom
Year:	2015

Energy use of wood fibres by ISIC-sectors (1000 m3 solid)																				
		Energy Transformation Sector					Industry Sector					Other Direct final consumption								
		Main Activity Producer					Consumed and Autoproducer Heat, CHP and Electricity					Residential	Agriculture, Forestry and Fishing	Commercial and Public services	Transport Sector	Other	Unspecified	Total		
		Electricity	CHP	Heat	Unspecified	Total	Pulp & Paper [ISIC No.21]	Wood and wood products	Other Industry	Unspecified	Total									
DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ	DQ			
Primary solid biomass	Woody Biomass from Forests	Industrial Roundwood (C & NC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Fuelwood (C & NC)	0	464	0	0	0	68	0	8	0	0	0	0	0	0	0	0	0	4,786
	Woody Biomass Outside Forests	Industrial Roundwood (C & NC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Fuelwood (C & NC)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,413
	Unspecified primary solid biomass		57	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Forest based Industry	Solid co-products (C & NC)	Chips and particles	3,058	775	0	0	0	0	5,716	255	0	0	0	5,970	259	0	0	0	0	259
		Wood residues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Bark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Unspecified solid co-products	0	0	0	0	0	0	328	0	0	0	0	328	0	0	0	0	0	0
	Liquid co-products (C & NC)	Black liquor (without crude tall oil)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Crude tall oil	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Unspecified liquid co-products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Processed wood-based fuel production	Processed solid biofuels from wood	Wood Charcoal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Wood Pellets	#####	0	0	0	0	425	51	0	0	0	476	120	0	497	0	0	0	617
		...of which: torrefied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Wood Briquettes	0	0	0	0	0	0	0	0	0	0	0	0	999	0	0	0	0	999
	Processed liquid biofuels from wood	Pyrolysis Oils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Cellulose based ethanol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood based biodiesel		0										0	0	0	0	0	0	0	0	
Post-consumer recovered wood	Non-hazardous wood waste		610	253	0	0	0	0	0	15	0	0	0	15	796	0	0	0	0	796
	Hazardous wood waste		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Unspecified wood waste		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood from unknown sources		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

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Conversion Factors:	Energy and Volume
Country:	United Kingdom
Year:	2015

Conversion Factors

		Factors applied for conversion							
		* please adjust conversion factors where necessary							
		Original Unit [1 000]	conversion factor (tdm or t)	Unit	conversion factor (m³)	Unit	conversion factor (GJ)	Unit	
			Table I and II to IV		Table IV		Overview		
Primary solid biomass	Woody Biomass from Forests	Industrial Roundwood (C & NC)	0.25	tdm / m³	4.00	m³ / tdm	20.21	GJ / tdm	
		Fuelwood (C & NC)	0.52	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm	
	Woody Biomass Outside Forests	Industrial Roundwood (C & NC)	0.42	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm	
		Fuelwood (C & NC)	0.53	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm	
	Unspecified primary solid biomass		m³	0.42	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm
Forest based Industry	Solid co-products (C & NC)	Chips and particles	0.23	tdm / m³	4.35	m³ / tdm	20.21	GJ / tdm	
		Wood residues	0.22	tdm / m³	4.55	m³ / tdm	20.21	GJ / tdm	
		Bark	0.45	tdm / m³	2.22	m³ / tdm	19.84	GJ / tdm	
		Unspecified solid co-products	0.42	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm	
	Liquid co-products (C & NC)	Black liquor (without crude tall oil)	0.80	tdm / t	1.56	m³ / tdm	13.89	GJ / tdm	
		Crude tall oil	1.00	t / t	4.38	m³ / t	36.90	GJ / t	
		Unspecified liquid co-products				1.56	m³ / tdm	13.89	GJ / t
Processed wood-based fuel production	Processed solid biofuels from wood	Wood Charcoal	0.94	tdm / t	6.00	m³ / tdm p	30.00	GJ / tdm	
		Wood Pellets	0.90	tdm / t	2.35	m³ / tdm p	20.37	GJ / tdm	
		...of which: torrefied	0.97	tdm / t	2.70	m³ / tdm p	22.70	GJ / tdm	
		Wood Briquettes	0.92	tdm / t	2.29	m³ / tdm p	20.37	GJ / tdm	
	Processed liquid biofuels from wood	Pyrolysis Oils	880	t / Million L	8.39	m³ / t	36.90	GJ / t	
		Cellulose based ethanol	792.39	t / Million L	9.73	m³ / t	23.40	GJ / t	
		Wood based biodiesel	880	t / Million L	3.84	m³ / t	37.80	GJ / t	
Wood from unknown sources	Non-hazardous wood waste		0.75	tdm / t	2.09	m³ / tdm	20.21	GJ / tdm	
	Hazardous wood waste		0.80	tdm / t	2.09	m³ / tdm	20.21	GJ / tdm	
	Unspecified wood waste		0.80	tdm / t	2.09	m³ / tdm	20.21	GJ / tdm	
Wood from unknown sources		m³	0.42	tdm / m³	2.40	m³ / tdm	20.21	GJ / tdm	

* please feel free to adjust but be aware that this will char

Moisture content	Weighted density (dry weight/green volume) (tdm/m³)	CW & NCW
	0.25	100%
	0.42	100%
	0.42	100%
	0.42	100%
	0.42	100%
	0.42	100%
20%	0.42	100%
20%	0.42	100%
6%		
8%		
3%	0.42	100%
8%		
20%		
20%		
20%		
	0.42	100%

Table I: estimating black liquor production:

	Conversion factor applied in Table I	Unit
Black liquor / chemical wood pulp:	2.14	t / t

Formula applied:
 black liquor = chemical wood pulp * 0.9 * black liquor/unit chemical pulp / (1-moisture content of black liquor)

Volume to volume

1	m³ (solid u.b.)	split firewood	=	1.4286	m³ (stacked)
1	m³ (solid u.b.)	firewood	=	1.1765	m³ (stacked)
1	m³ (solid u.b.)	firewood	=	2.0000	m³ (loose/bulk)
1	m³ (solid u.b.)	wood chips G3	=	2.5000	m³ (loose/bulk)
1	m³ (solid u.b.)	wood chips G5	=	3.0303	m³ (loose/bulk)
1	m³ (solid u.b.)	sawdust	=	3.0303	m³ (loose/bulk)
1	m³ (solid u.b.)	wood shavings	=	5.0000	m³ (loose/bulk)
1	m³ (solid u.b.)	bark chippings	=	3.3333	m³ (loose/bulk)

1	m³ (stacked)	split firewood	=	0.7000	m³ (solid u.b.)
1	m³ (stacked)	firewood	=	0.8500	m³ (solid u.b.)
1	m³ (loose/bulk)	firewood	=	0.5000	m³ (solid u.b.)
1	m³ (loose/bulk)	wood chips G3	=	0.4000	m³ (solid u.b.)
1	m³ (loose/bulk)	wood chips G5	=	0.3300	m³ (solid u.b.)
1	m³ (loose/bulk)	sawdust	=	0.3300	m³ (solid u.b.)
1	m³ (loose/bulk)	wood shavings	=	0.2000	m³ (solid u.b.)
1	m³ (loose/bulk)	bark chippings	=	0.3000	m³ (solid u.b.)

Information on Data Quality

A	Excellent data quality (e.g. empirical data from a recent study)
B	Good data quality (e.g. older studies with widely recognized precision or a good expert estimate -based on more than one source)
C	Rough estimate (about right order of magnitude).
D	No information on data quality available
O	Official national statistics

**The "DQ" - Data Quality indicator enables correspondents to submit information from different data sources.

Defenitions

FIBRE SOURCES & TYPES:

C & NC	Coniferous and non-coniferous.	
m³	Cubic metres solid volume excluding bark.	
Woody biomass	Organic woody material both above-ground and below-ground, and both living and dead, measured to a minimum diameter of 0 mm (diameter breast height). Includes stem, stump, branches, bark, seeds and foliage, roots, shrubs and bushes. Excludes: litter (definition of "biomass" in FAO 2004, which is based on IPCC Good Practice Guidelines LULUCF Glossary 2003; term "woody" added, minimum diameter threshold as in TBFA 2000).	MCPFE "STATE OF EUROPE'S FORESTS 2007"
Above-ground (living) woody biomass	All living woody biomass above the soil, including stem, stump, branches, bark, seeds and foliage. (FAO 2004, based on IPCC Good Practice Guidelines LULUCF Glossary 2003; term "woody" added).	MCPFE "STATE OF EUROPE'S FORESTS 2007"
Below-ground (living) woody biomass	All living woody biomass of live roots and the below-ground part of the stump. (FAO 2004, based on IPCC Good Practice Guidelines LULUCF Glossary 2003; term "woody" added).	MCPFE "STATE OF EUROPE'S FORESTS 2007"
Forest	<p>Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.</p> <p>Explanatory notes:</p> <ol style="list-style-type: none"> 1. Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and a tree height of 5 m are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate. 2. Includes areas with bamboo and palms provided that height and canopy cover criteria are met. 3. Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of specific scientific, historical, cultural or spiritual interest. 4. Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 ha and width of more than 20 m. 5. Includes plantations primarily used for forestry or protection purposes, such as rubberwood plantations and cork oak stands. 6. Excludes tree stands in agricultural production systems, for example in fruit plantations and agroforestry systems. The term also excludes trees in urban parks and gardens. 	FAO 2004 - Global Forest Resources Assessment Update 2005 – Terms and Definitions
Short rotation coppice	(coppice forest) Woodland which has been regenerated from shoots formed at the stumps of the previous crop trees, root suckers, or both, i.e., by vegetative means. Normally grown on a short rotation for small material, but sometimes, e.g. some eucalypt species, to a substantial size.	IUFRO Silva Term Database
Woody Biomass Outside Forests	Any woody biomass outside areas defined as "Forest". It includes woody biomass form "Other wooded land" and "Trees outside forests".	
Other Wooded Land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.	FAO 2004 - Global Forest Resources Assessment Update 2005 – Terms and Definitions
Trees outside forests	Includes all trees found outside forests and outside other wooded lands: - stands smaller than 0.5 ha; - tree cover in agricultural land, e.g. agro forestry systems, home gardens, orchards; - trees in urban environments; - along roads and scattered in the landscape.	FAO 2004 - Global Forest Resources Assessment Update 2005 – Terms and Definitions
Industrial Roundwood (C & NC)	Coniferous and non-coniferous Industrial Roundwood: All roundwood except wood fuel. It is an aggregate comprising sawlogs and veneer logs; pulpwood, round and split; and other industrial roundwood. It is reported in cubic metres solid volume under bark (i.e. excluding bark). The customs classification systems used by most countries do not allow the division of Industrial Roundwood trade statistics into the different end-use categories that have long been recognized in production statistics (i.e. sawlogs and veneer logs, pulpwood and other industrial roundwood). (...) It excludes: telephone poles.	UNECE/FAO/EUROSTAT/ITTO JOINT FOREST SECTOR QUESTIONNAIRE DEFINITIONS 1.2.

Fuelwood (C & NC)	<p>Coniferous and non-coniferous Fuelwood: Roundwood that will be used as fuel for purposes such as cooking, heating or power production. It includes wood harvested from main stems, branches and other parts of trees (where these are harvested for fuel) and wood that will be used for charcoal production (e.g. in pit kilns and portable ovens). The volume of roundwood used in charcoal production is estimated by using a factor of 6.0 to convert from the weight (t) of charcoal produced to the solid volume (m3) of roundwood used in production. It also includes wood chips to be used for fuel that are made directly (i.e. in the forest) from roundwood. It excludes wood charcoal. It is reported in cubic metres solid volume underbark (i.e. excluding bark). It includes wood fibres from above-ground woody biomass and below-ground woody biomass (excluding bark).</p>	<p>UNECE/FAO/EUROSTAT/ITTO JOINT FOREST SECTOR QUESTIONNAIRE DEFINITIONS 1.1.</p>
Industrial waste (co-products)	In JWEE defined as primary industrial residues (liquid and solid).	
Chips and particles	Wood that has been reduced to small pieces and is suitable for pulping, for particle board and/or fibreboard production, for use as a fuel, or for other purposes. It excludes wood chips made directly in the forest from roundwood (i.e. already counted as pulpwood, round and split). It is reported in cubic metres solid volume excluding bark.	<p>UNECE/FAO/EUROSTAT/ITTO JOINT FOREST SECTOR QUESTIONNAIRE DEFINITIONS 3.</p>
Wood residues	The volume of roundwood that is left over after the production of forest products in the forest processing industry (i.e. forest processing residues) and that has not been reduced to chips or particles. It includes sawmill rejects, slabs, edgings and trimmings, veneer log cores, veneer rejects, sawdust, residues from carpentry and joinery production, etc. It excludes wood chips made either directly in the forest from roundwood or made from residues (i.e. already counted as pulpwood, round and split or wood chips and particles). It is reported in cubic metres solid volume excluding bark.	<p>UNECE/FAO/EUROSTAT/ITTO JOINT FOREST SECTOR QUESTIONNAIRE DEFINITIONS 4.</p>
Bark	E.g. European Waste 03 01 01 Waste bark and cork It is reported in cubic metres solid volume and includes bark unaccounted for in the under bark figures of primary solid biomass.	
Black liquor (without crude tall oil)	Alkaline spent liquor obtained from digesters in the production of sulphate or soda pulp during the process of paper production, in which the energy content is mainly originating from the content of lignin removed from the wood in the pulping process.	Unified Bioenergy Terminology - UBET (FAO)
Crude tall oil	Tall oil, also called liquid rosin or tallol, is a viscous yellow-black odorous liquid obtained as a byproduct of the Kraft process of wood pulp manufacture. The name originated as anglicization of Swedish "talloolja" ("pine oil"). Crude tall oil contains rosins, unsaponifiable sterols (5-10%), resin acids (mainly abietic acid and its isomers), fatty acids (mainly palmitic acid, oleic acid and linoleic acid), fatty alcohols, some sterols, and other alkyl hydrocarbon derivatives. By fractional distillation tall oil rosin is obtained, with rosin content reduced to 10-35%. By further reduction of the rosin content to 1-10%, tall oil fatty acid (TOFA) can be obtained, which is cheap, consists mostly of oleic acid, and is a source of volatile fatty acids. The rosin finds use as a component of adhesives, rubbers, and inks, and as an emulsifier. The pitch is used as a binder in cement, an adhesive, and an emulsifier for asphalt. TOFA is a low-cost alternative to tallow fatty acids for production of soaps and lubricants. When esterified with pentaerythritol, it is used as a compound of adhesives and oil-based varnishes. All the above tall oil components should be reported under this category, despite the fact that a very limited number of countries may have different tax schemes for each tall oil distillate.	Wikipedia
Post-consumer recovered wood	Used wood arising from construction of buildings or from civil engineering works. Recovered wood from transport (pallets), private households, as well as used wood arising from construction or demolition of buildings or from civil engineering works.	Unified Bioenergy Terminology - UBET (FAO)
Municipal solid waste biodegradable	Waste produced by households, industry, hospitals and the tertiary sector which contains biodegradable materials (...).	IEA Balance builder
Non-hazardous wood waste	<p>Post-consumer recovered wood generated by any ISIC Sectors (Rev. 3.1) EXCEPT wood wastes generated by ISIC 02, ISIC 2010 and ISIC 21 (corresponding to European Waste Classification 21.03 01 01 Waste bark and cork; 03 01 02 Sawdust; 03 01 03 Shaving, cuttings, spoiled timber/particle board/veneer; 03 01 99 Wastes not otherwise specified)</p> <p>This comprises: PACKAGING: (e.g. European Waste Classification (EWC) 15 01 03) Wooden packaging; CONSTRUCTION AND DEMOLITION WASTES (INCLUDING ROAD CONSTRUCTION): (e.g. EWC) 17 02 01 Wood MUNICIPAL WASTES AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES INCLUDING SEPARATELY COLLECTED FRACTIONS: (e.g. EWC 20 01 07) Wood Please note that wood in mixed-waste streams that are burnt should be included where possible.</p>	European Waste List
Hazardous wood waste	<p>Same definition and scope as non-hazardous wood waste.</p> <p>Hazardous waste as defined in ANNEX I & II in the Basel convention on transboundary movements of hazardous wastes and their disposal (www.basel.int). This definition shall be expanded to national waste classifications, if possible.</p>	Basel Convention

PROCESSED-WOOD BASED FUELS:

Processed wood-based fuel	Secondary (processed) biofuels in the form of solids (e. g. charcoal), liquids (e. g. alcohol, vegetable oil), or gases (e. g. biogas as a mixture of methane and carbon dioxide), can be used for a wider range of applications with higher efficiency rates on average, including transport and high-temperature industrial processes.	Unified Bioenergy Terminology - UBET (FAO)
Wood Charcoal	Wood carbonized by partial combustion or the application of heat from external sources. It includes charcoal used as a fuel or for other uses, e.g. as a reduction agent in metallurgy or as an absorption or filtration medium. It is reported in metric tonnes. ATTENTION: In CA and US wood charcoal is often referred to as "Briquettes" - This must not be confused with Wood Briquettes as defined below!	UNECE/FAO/EUROSTAT/ITTO JOINT FOREST SECTOR QUESTIONNAIRE DEFINITIONS 2.
Wood Pellets	Wood pellets is a fuel product compressed from milled wood. Raw materials are cutter shavings and sawdust, which are by-products of the mechanical wood-processing industry. (Combined Nomenclature 2009) Introduction of a new additional note to (Combined Nomenclature) chapter 44: For the purposes of (CN) subheading 4401 30 20, the expression 'pellets' means cylindrical products which have been agglomerated either directly by compression or by the addition of a small quantity of binder, having a diameter not exceeding 25 mm and a length not exceeding 45 mm. Includes: Steam exploded wood pellets.	Eurostat / CN 2009
Wood Pellets of which: torrefied	Torrefied wood pellets are produced in a controlled carbonization process in which biomass is heated with little or no oxygen at high temperatures to produce a black char-like substance. The usual process involves raw wood or other biomass being prepared and torrefied, and then pelletized or briquetted.	Canadian Biomass Magazine
Wood Briquettes	Densified biofuel made with or without pressing aids in the form of cubiform or cylindrical units, produced by compressing pulverized biomass. The raw material for briquettes can be woody biomass (...) are usually manufactured in a piston press. The total moisture of the biofuel briquette is usually less than 15 % of mass. (The JWEE assumes water content of 8 %) ATTENTION: In the US/CA this item is often referred to as "Pressed Logs" or any other compressed wood products for burning purposes. 2002 NAICS No. 321999: <i>"Pressed logs of sawdust and other wood particles, nonpetroleum binder, manufacturing."</i>	Unified Bioenergy Terminology - UBET (FAO)
Biofuel	Any solid, liquid or gaseous fuel produced from biomass.	FAO Forestry Paper 154 Forests and energy
Second-generation biofuel	Fuels produced from cellulosic materials, crop residues and agricultural and municipal wastes.	FAO Forestry Paper 154 Forests and energy
Pyrolysis	Pyrolysis is thermal degradation either in the complete absence of oxidizing agent, or with such a limited supply that gasification does not occur to an appreciable extent or may be described as partial gasification. Relatively low temperature are employed of 500 to 800 °C, compared to 800 to 1000 °C in gasification.	FAO 1996
Pyrolysis Oil	Bio-oil produced by fast pyrolysis of biomass. A dark brown, mobile liquid containing much of the energy content of the original biomass, with a heating value about half that of conventional fuel oil. Can be burned directly, either alone or co-fired with other fuels, gasified or otherwise upgraded. Conversion of raw biomass to pyrolysis oil represents a considerable increase in energy density and it can thus represent a more efficient form in which to transport it.	UK Biomass Energy Centre
Cellulose based ethanol	Biogasoline (IEA) - Includes bioethanol (ethanol produced from (woody) biomass (...), biomethanol (methanol produced from (woody) biomass(...), bioETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol; the percentage by volume of bioETBE that is calculated as biofuel is 47%) and bioMTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%). Biogasoline includes the amounts that are blended into the gasoline - it does not include the total volume of gasoline into which the biogasoline is blended.	IEA Balance builder
Wood based biodiesel	Includes biodiesel (a methyl-ester produced from woody biomass, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsch (Fischer Tropsch produced from biomass), (...) and all other liquid biofuels which are added to, blended with or used straight as transport diesel. Biodiesel includes the amounts that are blended into the diesel - it does not include the total volume of diesel into which the biodiesel is blended.	IEA Balance builder
Synthesis Gas	A mixture of carbon monoxide (CO) and hydrogen (H2) which is the product of high temperature gasification of organic material such as biomass. Following clean-up to remove any impurities such as tars, synthesis gas (syngas) can be used to synthesize organic molecules such as synthetic natural gas (SNG - methane (CH4)) or liquid biofuels such as synthetic diesel (via Fischer-Tropsch synthesis).	UK Biomass Energy Centre

ENERGY USE:		
ISIC Rev. 3.1	International Standard Industrial Classification of all economic activities. Revised version 3.1.	United Nations Statistical Division
NACE 1.1	Statistical Classification of Economic Activities in the European Community, Rev. 1.1 (2002) - corresponds to ISIC at 4 digit level	Commission of the European Communities (Statistical Office/Eurostat)
CN	8 digit code - The Combined Nomenclature(CN) is comprised of the Harmonized System (HS) nomenclature with further Community subdivisions. The CN also include preliminary provisions, additional section or chapter notes and footnotes relating to CN subdivisions. Each CN subdivisions has an eight digit code number, the CN code, followed by a description.	European Commission Taxation and Customs Union
HS	6 digit code - The Harmonized Commodity Description and Coding Systems generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO). - corresponds to CN at 6 digit level.	World Customs Organization - WCO
Energy Transformation Sector	The transformation sector comprises the conversion of primary forms of energy to secondary and further transformation (e.g. coking coal to coke, crude oil to petroleum products, heavy fuel oil to electricity).	IEA Balance builder
Electricity	Wood (in tdm and m ³) consumed to produce electricity (in Table IV). Electricity is generated by thermal power plants separated into electricity plants and CHP plants.	
Heat	Wood (in tdm and m ³) consumed to produce heat (in Table IV). Heat is generated by power plants separated into CHP plants and heat plants.	
CHP	Wood (in tdm and m ³) consumed for combined Heat and Power generation (in Table IV). It refers to plants which are designed to produce both heat and electricity. UNIPED refers to these as co-generation power stations.	
Main Activity Producer	Main Activity Plants plants refers to plants which are designed to produce electricity/CHP or Heat only. If one or more units of the plant is a CHP unit (and the inputs and outputs can not be distinguished on a unit basis) then the whole plant is designated as a CHP plant. Main activity supply undertakings generate electricity and/or heat for sale to third parties, as their primary activity. They may be privately or publicly owned. Note that the sale need not take place through the main activity grid. Note: This includes district heating by communities, and small producers. Note: Subsidiaries of wood industry companies that only sell power/heat should be included her. For example, a joint company (between sawmill and energy provider) would be a main activity producer.	IEA Balance builder
Direct Final Consumer and Autoproducer (Heat, CHP and Electricity)	Undertakings generating heat, CHP or electricity for their own use and/or for sale, as an activity which supports their primary activity (e.g. paper production). They may be privately or publicly owned. Note: This definition differs from IEA definition where autoproducers and direct final consumers are divided into two categories, namely the Transformation Sector and Final Energy Consumption (Industry sector), while in the JWEE both categories are combined for pulp & paper, wood & wood products and other industry. Note:	
Final consumption	The term final consumption (equal to the sum of end-use sectors' consumption) implies that energy used for transformation and for own use of the energy producing industries is excluded. Final consumption reflects for the most part deliveries to consumers (see note on stock changes). In final consumption, petrochemical feedstock are covered under industry as an of which item under chemical industry for those oil products that are principally used for energy purposes. Separated from these are the other oil products that are mainly used for non-energy purposes (see non-energy use), which are shown in the rows for non-energy uses and included only in total final consumption. Backflows from the petrochemical industry are not included in final consumption.	IEA Balance builder
Paper, Pulp and Print:	[ISIC Divisions 21 and 22].	IEA Balance builder
Wood and Wood Products:	Wood and wood products (other than pulp and paper) [ISIC Division 20].	IEA Balance builder
Residential	All consumption by households, excluding fuels used for transport. Includes households with employed persons (ISIC Division 95) which is a small part of total residential consumption.	IEA Balance builder
Agriculture, Forestry and Fishing	Agriculture/Forestry includes deliveries to users classified as agriculture, hunting and forestry by the ISIC, and therefore includes energy consumed by such users whether for traction (excluding agricultural highway use), power or heating (agricultural and domestic) [ISIC Divisions 01 and 02]. Fishing includes fuels used for inland, coastal and deep-sea fishing. Fishing covers fuels delivered to ships of all flags that have refueled in the country (including international fishing) as well as energy used in the fishing industry [ISIC Division 05]. Previously fishing was included with agriculture/forestry and this may continue to be the case for some countries.	IEA Balance builder
Commercial and Public services	All activities coming into ISIC Divisions 41, 50, 51, 52, 55, 63, 64, 65, 66, 67, 70, 71, 72, 73, 74, 75, 80, 85, 90, 91, 92, 93 and 99.	IEA Balance builder
Transport Sector	Consumption in the Transport sector covers all transport activity (in mobile engines) regardless of the economic sector to which it is contributing [ISIC Divisions 60, 61 and 62].	IEA Balance builder

CONVERSION FACTORS:		
Bulk Volume	Loose volume of a material including space between the particles.	Unified Bioenergy Terminology - UBET (FAO)
Dry Matter (d.m.)	Dry matter refers to biomass that has been dried to an oven-dry state, often at 70°C.	IPCC, 2003, Good Practice Guidance for LULUCF – Glossary
Higher heating value - of dry matter (d.m.) :	Higher heating value (HHV) of dry matter (d.m.) [MJ/kg] The higher heating value (HHV) of coniferous wood is around 20.4 MJ/kg d.m. Due to a lower resin and lignin content, the higher heating value of non-coniferous wood is somewhat lower than the HHV of coniferous wood and is around 19.3 MJ/kg d.m. For the calculation of the higher heating value of bark (coniferous wood, non-coniferous wood), the worksheet of the Austrian Energy Agency uses the same values as for coniferous wood and non-coniferous wood. However, in case of a high content of resin or other extractive compounds the higher heating value of bark can be up to 2.5 MJ/kg higher than that of the wood. Source: ÖNORM M 7132. For the conversion between MJ/kg and kWh/kg, a factor of 3.6 (1 kWh = 3.6 MJ) is used. ==> Further details see <i>klima:aktiv</i> publication (page 14).	Klima:aktiv Austrian Energy Agency Manual Wood Fuel Parameters Version 1.6. english
Lower heating value of dry matter:	The lower heating value (LHV) of a fuel can be derived from the higher heating value (HHV) via an approximation depending on moisture and hydrogen content. Details of the conversion from HHV to LHV are explained in the manual. According to the Austrian standard ÖNORM, the lower heating value of coniferous wood is 19.0 MJ/kg d.m.. Due to a lower resin and lignin content, the lower heating value of nonconiferous wood is somewhat lower than the LHV of coniferous wood and is 18.0 MJ/kg d.m. according to ÖNORM. For the calculation of the lower heating value of bark (coniferous wood, non-coniferous wood), the worksheet of the Austrian Energy Agency uses the same values as for coniferous wood and non-coniferous wood. However, in case of a high content of resin or other extractive compounds the lower heating value of bark can be up to 2.5 MJ/kg higher than that of the wood. Source: ÖNORM M 7132. For the conversion between MJ/kg and kWh/kg, a factor of 3.6 (1 kWh = 3.6 MJ) is used. ==> Further details see <i>klima:aktiv</i> publication (page 14).	Klima:aktiv Austrian Energy Agency Manual Wood Fuel Parameters Version 1.6. english
Mean oven-dry density [kg/m³] (at 0 % H2O)	Mean oven-dry density [kg/m³] (at 0 % H2O) The specified mean oven-dry densities refer to 1 m³ oven-dried solid wood mass. The oven dry density values used for the calculation and the respective data sources can be found in the data sheet (of the Austrian Energy Agency).	Klima:aktiv Austrian Energy Agency Manual Wood Fuel Parameters Version 1.6. english
Metric Tonne:	1000 Kilograms.	
Moisture Content - wet basis	The proportion of water in a sample of biomass, defined as the weight of water as a percentage of the weight of biomass. This can be defined on either a wet basis, as a percentage of the total (wet) weight of the sample, or a dry basis, as a percentage of the oven dry weight of biomass. Wet basis is usually used for fuel purposes. $Moisture_{wet\ basis} = 100 \times \left(\frac{WetWeight - DryWeight}{WetWeight} \right)$	UK Biomass Energy Centre Klima:aktiv (Austrian Energy Agency) Unified Bioenergy Terminology - UBET (FAO)
Tonne of oil equivalent	Is the amount of energy released by burning one tonne of crude oil, which is commonly defined as 41.868 GJ. For the conversion from 1000m³ to ktoe, a factor of 0.208 (=8.72 / 41.868) is used.	
Weighted density (dry weight/green volume) (tdm/m³)	Ratio between oven dry mass and fresh stem-wood volume without bark. It allows calculation of woody biomass in dry matter mass. NOTE: The Basic Wood Density shown in Table "T IV Conversion Factors" has been calculated by using the "Mean oven-dry density" and shrinkage factors from the Austrian Energy Agency.	IPCC, 2003, Good Practice Guidance for LULUCF – Glossary
MISCELLANEOUS:		
EWC	European Waste Classification	COMMISSION DECISION of 3 May 2000
FAO	Food and Agriculture Organization of the United Nations	www.fao.org
IEA	International Energy Agency	www.iea.org
IPCC	Intergovernmental Panel on Climate Change	www.ipcc.ch
IUFRO	International Union of Forest Research Organizations	www.iufro.org
LULUCF	Land Use and Land Use Change and Forestry	www.unfccc.int
NAICS	North American Industry Classification System (NAICS)	NAICS 2007
TBFRA	Temperate and Boreal Forest Resource Assessment	