

Regional wood energy overview

The participants of the 27th JWPFS meeting in Geneva in March 2005 asked the secretariat to provide a region wide overview on wood energy using publicly available data¹. The secretariat has pulled together available information on wood energy from different sources (Timber Section database on wood products and IEA database on energy and renewable energy and waste).

- The Joint Forestry Sector Questionnaire (JFSQ) contains information on direct wood fuel from the forest to the user. It does not cover the different many other (indirect) flows of residues for energy generation. Information on chemical pulp production played an important role in the comparison of the two databases (black liquor).
- IEA data on national energy balances and energy statistics from OECD- and Non-OECD countries and the questionnaire on Renewables and Waste (issued annually for OECD countries since 2001).

The country tables show the use of energy and the wood supply. Based on energy statistics the theoretical amount of round wood equivalent for energy production is known to its rough extent. The limitations of the presented data make it impossible to track down “missing” volumes. How the volumes of wood fibre enter into energy use and their ultimate sources remains unclear.

The comparison between a forestry products database and an energy database is challenging, as differences between the two institutions (definitions, units etc) made it difficult to set up a direct balance.

To overcome these difficulties it has been necessary to make assumptions to integrate the IEA energy statistics, the Renewable and Waste Questionnaire and the Joint Forest Sector Questionnaire of the FAO/UNECE Timber Section, as follows:

- The secretariat set up a correlation factor for energy produced per tonne pulp, based on average correlation factors in Austria, Finland, France, Portugal and the USA. The factor of 20 TJ per ton chemical pulp was necessary to improve some country data on energy derived from black liquor.
- The country tables show wood energy as from share of national TPES (Total Primary Energy Supply - including all kinds of energies used for every purpose). The indigenous energy production shows the total energy produced within the country.
- The renewable energy excludes (due to the definitions of the IEA) hydro-power, but includes all kinds of renewable energy forms, such as Geothermal, Solar Thermal, Industrial Waste (Non-Renewable), Renewable Municipal Waste, Non-Renewable Municipal Waste, Solid Biomass, Gas from Biomass (all TJ) and liquid Biofuels (1000 tonnes).

¹ Please note that that the objective was to use publicly available data and we did not incorporate data from the “draft questionnaire” of the UNECE/FAO Timber Section, except for the case of Austria and USA. Some of the national replies from sample countries show that the delivered content could have helped to clarify some of the national wood flows.

- Wood energy derived from the wood content in the renewable municipal waste and the solid biomass. The share of wood energy in the two items was calculated from the information contained in the IEA questionnaire on Renewables and Waste. For renewable municipal waste, the wood content has been estimated at 30 %. For solid biomass, the content of wood has been calculated per country and per year.
- The data on roundwood and wood fuel were restricted to production and here excluded trade flows. This may be the reason, that in some countries the resulting round wood equivalent used for energy production is more than the total national annual roundwood production (e.g. Denmark and Netherlands).
- Another problem to deduct the flows of wood chips and pellets can not be found in the described dataset, as the JFSQ is based on items being classified in the HS (Harmonized System)². This lack of information is a major blind area that should be resolved in the future.

Conversion factors from the World Energy Council³ and the Unified Bioenergy Terminology⁴:

29.3	TJ/MTOE
18.5	TJ/1000 m ³
0.315	TOE/ m ³
0.5	mt/m ³

Definition TPES (Total Primary Energy Supply):⁵

Energy supply

“An analysis of energy problems requires a comprehensive presentation of basic supply and demand data for all fuels in a manner which will allow the easy comparison of the contribution each fuel makes to the economy and their interrelationships through the conversion of one fuel into another. This type of presentation is suitable for the study of energy substitution, energy conservation and forecasting.

The table refers to total primary energy supply (TPES). TPES equals production plus imports minus exports (...). The IEA energy balance methodology is based on the calorific content of the energy commodities and a common unit of account. The unit of account adopted by the IEA is the tonne of oil equivalent (toe) which is defined as 107 kilocalories (41.868 giga joules). This quantity of energy is, within a few per cent, equal to the net heat content of 1 tonne of crude oil. The difference between the "net" and the "gross" calorific value for each fuel is the latent heat of vaporisation of the water produced during combustion of the fuel. (...) The IEA balances are calculated using the physical energy content method to calculate the primary energy equivalent.”

² World customs organization: <http://www.wcoomd.org/ie/En/search/search.html>

³ <http://www.worldenergy.org/wec-geis/publications/reports/ser/conv.asp>

⁴ <ftp://ftp.fao.org/docrep/fao/007/j4504e/j4504e00.pdf>

⁵ OECD Factbook 2006 - Economic, Environmental and Social Statistics
(<http://thesius.sourceoecd.org/vl=2435304/cl=46/nw=1/rpsv/factbook/04-01-01.htm>)

Northern America				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	2 556	2 507	2 538	2 541
	Indigenous production	MTOE	IEA	2 049	2 075	2 050	2 017
	Total Renewable Energy	MTOE	IEA	125.9	114.4	107.2	108.9
	Total Wood Energy Used	MTOE	IEA	41.3	40.1	31.1	31.1
	Total Wood Energy Used	1000 m ³	conversion	131 126	127 400	98 838	98 591
Wood energy % from TPES		%		1.62%	1.60%	1.23%	1.22%
Wood Supply	Total roundwood	1000 m ³	JFSQ	666 833	636 705	642 532	642 786
	of which: wood fuel	1000 m ³	JFSQ	48 917	48 857	48 804	46 051
	Pellets and briquettes	1000 m ³	Draft questionnaire	66 700	66 700	66 700	66 700
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	190 439	177 689	178 195	178 958
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	6 900	6 900	6 900	6 900
	Total Wood Energy Supply	1000 m ³		312 956	300 146	300 599	298 610
	Total Wood Energy Supply	MTOE	conversion	98.6	94.5	94.7	94.1
	Total Wood Energy Supply/total roundwood produced	%		46.9%	47.1%	46.8%	46.5%
Difference (energy use minus wood supply)		1000 m ³		-184 480	-175 322	-203 760	-202 012

Europe				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	2 373	2 414	2 408	2 472
	Indigenous production	MTOE	IEA	1 909	1 937	1 973	2 036
	Total Renewable Energy	MTOE	IEA	94.8	96.9	99.0	105.0
	Total Wood Energy Used	MTOE	IEA	74.4	74.1	74.4	77.6
	Total Wood Energy Used	1000 m ³	conversion	236 241	235 218	236 184	246 402
Wood energy % from TPES		%		3.14%	3.07%	3.09%	3.14%
Wood Supply	Total roundwood	1000 m ³	JFSQ	550 539	524 561	531 957	544 230
	of which: wood fuel	1000 m ³	JFSQ	96 364	98 417	92 772	93 456
	Pellets and briquettes	1000 m ³	Draft questionnaire	1 550	1 550	1 550	1 550
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	82 073	79 771	84 033	87 396
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	426	426	426	426
	Total Wood Energy Supply	1000 m ³		180 413	180 164	178 781	182 828
	Total Wood Energy Supply	MTOE	conversion	56.8	56.8	56.3	57.6
	Total Wood Energy Supply/total roundwood produced	%		32.8%	34.3%	33.6%	33.6%
Difference (energy use minus wood supply)		1000 m ³		51 052	50 298	52 628	58 593

Russian Federation				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	614	621	618	640
	Indigenous production	MTOE	IEA	967	996	1 035	1 107
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	MTOE	IEA	5.0	4.7	4.7	4.6
	Total Wood Energy Used	1000 m ³	conversion	15 973	14 859	14 852	14 478
Wood energy % from TPES		%		0.82%	0.75%	0.76%	0.71%
Wood Supply	Total roundwood	1000 m ³	JFSQ	158 100	164 700	165 000	168 500
	of which: wood fuel	1000 m ³	JFSQ	49 000	52 300	46 900	46 400
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	11 857	12 528	13 423	14 012
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		60 857	64 828	60 323	60 412
	Total Wood Energy Supply	MTOE	conversion	19.2	20.4	19.0	19.0
	Total Wood Energy Supply/total roundwood produced	%		38.5%	39.4%	36.6%	35.9%
Difference (energy use minus wood supply)		1000 m ³		-45 207	-50 269	-45 771	-46 226

Austria				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	28.9	30.7	31.1	33.2
	Indigenous production	MTOE	IEA	9.7	9.8	10.0	10.0
	Total Renewable Energy	MTOE	IEA	4.1	4.5	4.5	4.9
	Total Wood Energy Used	MTOE	IEA	3.7	4.0	4.0	4.3
	Total Wood Energy Used	1000 m ³	conversion	11 661	12 633	12 675	13 645
	Wood energy % from TPES	%		12.69%	12.97%	12.83%	12.95%
Wood Supply	Total roundwood	1000 m ³	JFSQ	13 276	13 467	14 846	17 055
	of which: wood fuel	1000 m ³	JFSQ	3 095	2 860	2 905	3 036
	Pellets and briquettes	1000 m ³	Draft questionnaire	1 550	1 550	1 550	1 550
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	2 857	2 793	3 577	3 639
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	426	426	426	426
	Total Wood Energy Supply	1000 m ³		7 928	7 629	8 457	8 650
	Total Wood Energy Supply	MTOE	conversion	2.5	2.4	2.7	2.7
	Total Wood Energy Supply/total roundwood produced	%		59.7%	56.6%	57.0%	50.7%
Difference (energy use minus wood supply)				3 497	4 749	3 962	4 719
Belgium				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	58.9	58.6	56.5	59.2
	Indigenous production	MTOE	IEA	13.5	13.1	13.3	13.4
	Total Renewable Energy	MTOE	IEA	0.7	0.8	0.8	1.1
	Total Wood Energy Used	MTOE	IEA	0.4	0.4	0.4	0.6
	Total Wood Energy Used	1000 m ³	conversion	1 256	1 392	1 312	1 796
	Wood energy % from TPES	%		0.67%	0.75%	0.73%	0.96%
Wood Supply	Total roundwood	1000 m ³	JFSQ	4 510	4 215	4 500	4 765
	of which: wood fuel	1000 m ³	JFSQ	550	550	550	550
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	741	767	940	1 050
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		1 291	1 317	1 490	1 600
	Total Wood Energy Supply	MTOE	conversion	0.4	0.4	0.5	0.5
	Total Wood Energy Supply/total roundwood produced	%		28.6%	31.2%	33.1%	33.6%
Difference (energy use minus wood supply)				-60	47	-205	160
Canada				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	251.9	248.3	249.2	260.6
	Indigenous production	MTOE	IEA	372.4	376.8	384.1	385.3
	Total Renewable Energy	MTOE	IEA	16.2	15.2	16.5	16.5
	Total Wood Energy Used	MTOE	IEA	16.0	15.0	16.2	16.2
	Total Wood Energy Used	1000 m ³	conversion	50 674	47 465	51 353	51 471
	Wood energy % from TPES	%		6.34%	6.02%	6.49%	6.22%
Wood Supply	Total roundwood	1000 m ³	JFSQ	200 284	187 591	194 532	194 727
	of which: wood fuel	1000 m ³	JFSQ	2 902	2 927	2 902	3 009
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	41 856	39 881	41 354	41 452
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		44 758	42 808	44 256	44 461
	Total Wood Energy Supply	MTOE	conversion	14.1	13.5	13.9	14.0
	Total Wood Energy Supply/total roundwood produced	%		22.3%	22.8%	22.7%	22.8%
Difference (energy use minus wood supply)				4 891	3 697	6 059	5 969
Czech Republic				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	40.4	41.4	41.7	44.1
	Indigenous production	MTOE	IEA	29.9	30.5	30.7	33.0
	Total Renewable Energy	MTOE	IEA	0.6	0.7	0.8	1.4
	Total Wood Energy Used	MTOE	IEA	0.5	0.5	0.7	1.2
	Total Wood Energy Used	1000 m ³	conversion	1 486	1 726	2 300	3 899
	Wood energy % from TPES	%		1.16%	1.31%	1.74%	2.78%
Wood Supply	Total roundwood	1000 m ³	JFSQ	14 441	14 374	14 541	15 140
	of which: wood fuel	1000 m ³	JFSQ	840	940	1 010	1 007
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	1 657	1 751	1 873	1 869
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		2 497	2 691	2 883	2 876
	Total Wood Energy Supply	MTOE	conversion	0.8	0.8	0.9	0.9
	Total Wood Energy Supply/total roundwood produced	%		17.3%	18.7%	19.8%	19.0%
Difference (energy use minus wood supply)				-1 041	-1 000	-629	944

Denmark				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	19.4	20.0	19.7	20.8
	Indigenous production	MTOE	IEA	27.8	27.2	28.7	28.5
	Total Renewable Energy	MTOE	IEA	2.3	2.4	2.6	2.9
	Total Wood Energy Used	MTOE	IEA	0.9	0.9	1.0	0.9
	Total Wood Energy Used	1000 m ³	conversion	2 777	2 831	3 031	2 925
	Wood energy % from TPES	%		4.50%	4.47%	4.85%	4.44%
Wood Supply	Total roundwood	1000 m ³	JFSQ	2 952	1 613	1 446	1 446
	of which: wood fuel	1000 m ³	JFSQ	324	460	617	657
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	33	32	48	49
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		357	492	665	706
	Total Wood Energy Supply	MTOE	conversion	0.1	0.2	0.2	0.2
	Total Wood Energy Supply/total roundwood produced	%		12.1%	30.5%	46.0%	48.8%
Difference (energy use minus wood supply)				1000 m ³			
				2 364	2 282	2 305	2 160
Estonia				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	4.5	4.7	4.5	4.9
	Indigenous production	MTOE	IEA	2.9	3.0	3.2	3.7
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	MTOE	IEA	0.5	0.5	0.5	0.6
	Total Wood Energy Used	1000 m ³	conversion	1 491	1 641	1 617	1 814
	Wood energy % from TPES	%		10.38%	11.01%	11.28%	11.62%
Wood Supply	Total roundwood	1000 m ³	JFSQ	8 910	10 200	10 500	10 200
	of which: wood fuel	1000 m ³	JFSQ	804	1 640	1 880	1 900
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	174	172	210	201
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		978	1 812	2 090	2 101
	Total Wood Energy Supply	MTOE	conversion	0.3	0.6	0.7	0.7
	Total Wood Energy Supply/total roundwood produced	%		11.0%	17.8%	19.9%	20.6%
Difference (energy use minus wood supply)				1000 m ³			
				483	-204	-506	-324
Finland				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	33.0	33.8	35.6	37.6
	Indigenous production	MTOE	IEA	15.1	15.2	16.1	16.0
	Total Renewable Energy	MTOE	IEA	9.3	9.1	9.8	10.0
	Total Wood Energy Used	MTOE	IEA	9.3	9.1	9.7	9.9
	Total Wood Energy Used	1000 m ³	conversion	29 399	28 815	30 836	31 420
	Wood energy % from TPES	%		28.07%	26.84%	27.27%	26.36%
Wood Supply	Total roundwood	1000 m ³	JFSQ	54 262	52 210	53 011	53 779
	of which: wood fuel	1000 m ³	JFSQ	4 044	4 115	4 483	4 482
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	17 947	16 395	17 733	17 804
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		21 991	20 510	22 216	22 286
	Total Wood Energy Supply	MTOE	conversion	6.9	6.5	7.0	7.0
	Total Wood Energy Supply/total roundwood produced	%		40.5%	39.3%	41.9%	41.4%
Difference (energy use minus wood supply)				1000 m ³			
				6 814	7 722	7 996	8 500
France				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	257.5	266.3	266.0	271.3
	Indigenous production	MTOE	IEA	131.2	132.8	134.5	136.3
	Total Renewable Energy	MTOE	IEA	14.6	15.2	14.2	15.4
	Total Wood Energy Used	MTOE	IEA	13.1	13.7	12.6	13.7
	Total Wood Energy Used	1000 m ³	conversion	41 609	43 548	39 932	43 558
	Wood energy % from TPES	%		5.09%	5.15%	4.73%	5.06%
Wood Supply	Total roundwood	1000 m ³	JFSQ	45 828	39 831	35 449	36 850
	of which: wood fuel	1000 m ³	JFSQ	2 771	2 388	2 360	2 713
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	5 690	5 332	5 286	5 379
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		8 461	7 720	7 646	8 092
	Total Wood Energy Supply	MTOE	conversion	2.7	2.4	2.4	2.5
	Total Wood Energy Supply/total roundwood produced	%		18.5%	19.4%	21.6%	22.0%
Difference (energy use minus wood supply)				1000 m ³			
				32 307	34 948	31 478	34 586

Germany				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	343.6	353.5	346.0	347.1
	Indigenous production	MTOE	IEA	135.3	134.7	134.9	134.5
	Total Renewable Energy	MTOE	IEA	8.8	9.4	10.0	10.5
	Total Wood Energy Used	MTOE	IEA	4.3	4.4	4.4	4.8
	Total Wood Energy Used	1000 m ³	conversion	13 735	13 838	13 837	15 346
	Wood energy % from TPES	%		1.26%	1.23%	1.26%	1.39%
Wood Supply	Total roundwood	1000 m ³	JFSQ	53 710	39 483	42 380	42 380
	of which: wood fuel	1000 m ³	JFSQ	2 571	2 622	2 981	4 625
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	2 454	2 457	2 518	2 381
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		5 025	5 079	5 499	7 006
	Total Wood Energy Supply	MTOE	conversion	1.6	1.6	1.7	2.2
	Total Wood Energy Supply/total roundwood produced	%		9.4%	12.9%	13.0%	16.5%
Difference (energy use minus wood supply)				1000 m ³			
				8 432	8 479	8 057	8 030
Greece				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	27.8	28.7	29.0	29.9
	Indigenous production	MTOE	IEA	10.0	10.0	10.2	9.9
	Total Renewable Energy	MTOE	IEA	1.5	1.5	1.6	1.5
	Total Wood Energy Used	MTOE	IEA	1.0	1.0	1.0	1.0
	Total Wood Energy Used	1000 m ³	conversion	3 210	3 186	3 186	3 301
	Wood energy % from TPES	%		3.63%	3.50%	3.46%	3.48%
Wood Supply	Total roundwood	1000 m ³	JFSQ	2 245	1 916	1 591	1 673
	of which: wood fuel	1000 m ³	JFSQ	1 403	1 601	1 401	1 093
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	15	12	11	11
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		1 418	1 613	1 412	1 104
	Total Wood Energy Supply	MTOE	conversion	0.4	0.5	0.4	0.3
	Total Wood Energy Supply/total roundwood produced	%		63.2%	84.2%	88.7%	66.0%
Difference (energy use minus wood supply)				1000 m ³			
				1 727	1 508	1 710	2 130
Hungary				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	25.0	25.4	25.8	26.3
	Indigenous production	MTOE	IEA	11.3	10.9	11.2	10.4
	Total Renewable Energy	MTOE	IEA	0.7	0.6	1.2	1.3
	Total Wood Energy Used	MTOE	IEA	0.5	0.5	1.0	1.1
	Total Wood Energy Used	1000 m ³	conversion	1 645	1 497	3 285	3 464
	Wood energy % from TPES	%		2.07%	1.85%	4.01%	4.14%
Wood Supply	Total roundwood	1000 m ³	JFSQ	5 902	5 811	5 836	5 785
	of which: wood fuel	1000 m ³	JFSQ	2 576	2 597	2 319	2 398
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	0	0	9	51
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		2 576	2 597	2 328	2 449
	Total Wood Energy Supply	MTOE	conversion	0.8	0.8	0.7	0.8
	Total Wood Energy Supply/total roundwood produced	%		43.6%	44.7%	39.9%	42.3%
Difference (energy use minus wood supply)				1000 m ³			
				-964	-1 130	891	945
Italy				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	172.8	173.4	173.6	181.0
	Indigenous production	MTOE	IEA	28.2	26.9	27.5	27.7
	Total Renewable Energy	MTOE	IEA	8.9	8.8	8.9	10.1
	Total Wood Energy Used	MTOE	IEA	1.7	1.8	1.5	1.6
	Total Wood Energy Used	1000 m ³	conversion	5 342	5 574	4 834	5 074
	Wood energy % from TPES	%		0.97%	1.01%	0.88%	0.88%
Wood Supply	Total roundwood	1000 m ³	JFSQ	9 329	8 099	7 511	8 219
	of which: wood fuel	1000 m ³	JFSQ	6 925	5 680	5 150	4 883
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	112	112	121	121
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		7 037	5 792	5 271	5 004
	Total Wood Energy Supply	MTOE	conversion	2.2	1.8	1.7	1.6
	Total Wood Energy Supply/total roundwood produced	%		75.4%	71.5%	70.2%	60.9%
Difference (energy use minus wood supply)				1000 m ³			
				-1 804	-332	-534	-33

Ireland				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	14.3	15.2	15.3	15.1
	Indigenous production	MTOE	IEA	2.2	1.8	1.6	1.9
	Total Renewable Energy	MTOE	IEA	0.2	0.3	0.3	0.2
	Total Wood Energy Used	MTOE	IEA	0.2	0.2	0.2	0.1
	Total Wood Energy Used	1000 m ³	conversion	617	690	690	475
	Wood energy % from TPES	%		1.36%	1.43%	1.42%	0.99%
Wood Supply	Total roundwood	1000 m ³	JFSQ	2 673	2 455	2 647	2 684
	of which: wood fuel	1000 m ³	JFSQ	73	73	32	34
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	43	49	49	28
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		116	122	81	62
	Total Wood Energy Supply	MTOE	conversion	0.0	0.0	0.0	0.0
	Total Wood Energy Supply/total roundwood produced	%		4.4%	5.0%	3.1%	2.3%
Difference (energy use minus wood supply)				488	553	594	404
Latvia				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	3.9	4.2	4.2	4.4
	Indigenous production	MTOE	IEA	1.5	1.7	1.8	2.0
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	MTOE	IEA	1.2	1.3	1.5	1.7
	Total Wood Energy Used	1000 m ³	conversion	3 845	4 226	4 739	5 305
	Wood energy % from TPES	%		31.16%	31.35%	35.53%	38.19%
Wood Supply	Total roundwood	1000 m ³	JFSQ	14 304	12 841	13 466	12 916
	of which: wood fuel	1000 m ³	JFSQ	2 490	1 680	1 580	1 198
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	33	40	36	39
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		2 523	1 720	1 616	1 237
	Total Wood Energy Supply	MTOE	conversion	0.8	0.5	0.5	0.4
	Total Wood Energy Supply/total roundwood produced	%		17.6%	13.4%	12.0%	9.6%
Difference (energy use minus wood supply)				1 245	2 420	3 027	3 960
Lithuania				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	7.2	7.9	8.6	8.9
	Indigenous production	MTOE	IEA	3.2	4.2	4.9	5.2
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	MTOE	IEA	0.6	0.6	0.6	0.6
	Total Wood Energy Used	1000 m ³	conversion	1 876	1 885	1 990	2 021
	Wood energy % from TPES	%		8.22%	7.53%	7.30%	7.13%
Wood Supply	Total roundwood	1000 m ³	JFSQ	5 500	5 700	6 115	6 275
	of which: wood fuel	1000 m ³	JFSQ	1 124	1 450	1 480	1 295
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	5	11	21	24
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		1 129	1 461	1 501	1 319
	Total Wood Energy Supply	MTOE	conversion	0.4	0.5	0.5	0.4
	Total Wood Energy Supply/total roundwood produced	%		20.5%	25.6%	24.5%	21.0%
Difference (energy use minus wood supply)				709	387	449	661
Luxembourg				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	3.7	3.8	4.0	4.3
	Indigenous production	MTOE	IEA	0.1	0.1	0.1	0.1
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.1
	Total Wood Energy Used	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	1000 m ³	conversion	91	92	88	91
	Wood energy % from TPES	%		0.78%	0.75%	0.69%	0.67%
Wood Supply	Total roundwood	1000 m ³	JFSQ	260	142	140	136
	of which: wood fuel	1000 m ³	JFSQ	18	18	7	4
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	0	0	0	0
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		18	18	7	4
	Total Wood Energy Supply	MTOE	conversion	0.0	0.0	0.0	0.0
	Total Wood Energy Supply/total roundwood produced	%		6.9%	12.7%	4.8%	2.9%
Difference (energy use minus wood supply)				71	72	80	85

Netherlands				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	75.8	77.8	78.6	80.8
	Indigenous production	MTOE	IEA	57.2	60.9	60.5	58.5
	Total Renewable Energy	MTOE	IEA	1.6	1.7	1.9	1.8
	Total Wood Energy Used	MTOE	IEA	0.7	0.6	0.7	0.3
	Total Wood Energy Used	1000 m ³	conversion	2 073	2 044	2 073	815
	Wood energy % from TPES	%		0.86%	0.83%	0.83%	0.32%

Wood Supply	Total roundwood	1000 m ³	JFSQ	1 039	865	839	914
	of which: wood fuel	1000 m ³	JFSQ	162	160	136	136
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	0	0	0	0
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		162	160	136	136
	Total Wood Energy Supply	MTOE	conversion	0.1	0.1	0.0	0.0
	Total Wood Energy Supply/total roundwood produced	%		15.6%	18.5%	16.2%	14.9%
Difference (energy use minus wood supply)				1 869	1 843	1 895	662

Poland				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	89.4	89.9	89.1	93.7
	Indigenous production	MTOE	IEA	79.6	80.3	80.2	80.6
	Total Renewable Energy	MTOE	IEA	5.2	5.5	5.6	5.7
	Total Wood Energy Used	MTOE	IEA	4.2	4.5	4.5	4.4
	Total Wood Energy Used	1000 m ³	conversion	13 382	14 256	14 223	14 104
	Wood energy % from TPES	%		4.71%	4.99%	5.03%	4.74%

Wood Supply	Total roundwood	1000 m ³	JFSQ	26 025	25 016	27 137	28 835
	of which: wood fuel	1000 m ³	JFSQ	1 426	1 536	1 641	2 142
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	2 365	2 367	2 490	2 574
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		3 791	3 903	4 131	4 716
	Total Wood Energy Supply	MTOE	conversion	1.2	1.2	1.3	1.5
	Total Wood Energy Supply/total roundwood produced	%		14.6%	15.6%	15.2%	16.4%
Difference (energy use minus wood supply)				9 320	10 065	9 804	9 103

Portugal				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	25.3	25.4	26.5	25.8
	Indigenous production	MTOE	IEA	3.8	4.1	3.6	4.3
	Total Renewable Energy	MTOE	IEA	4.0	4.0	4.1	4.1
	Total Wood Energy Used	MTOE	IEA	2.9	2.9	3.0	3.0
	Total Wood Energy Used	1000 m ³	conversion	9 331	9 261	9 566	9 495
	Wood energy % from TPES	%		11.62%	11.47%	11.39%	11.60%

Wood Supply	Total roundwood	1000 m ³	JFSQ	10 831	8 946	8 742	8 742
	of which: wood fuel	1000 m ³	JFSQ	600	600	600	600
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	4 317	4 220	4 511	5 787
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		4 917	4 820	5 111	6 387
	Total Wood Energy Supply	MTOE	conversion	1.5	1.5	1.6	2.0
	Total Wood Energy Supply/total roundwood produced	%		45.4%	53.9%	58.5%	73.1%
Difference (energy use minus wood supply)				4 225	4 254	4 261	2 916

Russian Federation				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	614.0	621.3	617.8	639.7
	Indigenous production	MTOE	IEA	966.5	996.1	1 034.5	1 106.9
	Total Renewable Energy	MTOE	IEA	0.0	0.0	0.0	0.0
	Total Wood Energy Used	MTOE	IEA	5.0	4.7	4.7	4.6
	Total Wood Energy Used	1000 m ³	conversion	15 973	14 859	14 852	14 478
	Wood energy % from TPES	%		0.82%	0.75%	0.76%	0.71%

Wood Supply	Total roundwood	1000 m ³	JFSQ	158 100	164 700	165 000	168 500
	of which: wood fuel	1000 m ³	JFSQ	49 000	52 300	46 900	46 400
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	11 857	12 528	13 423	14 012
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		60 857	64 828	60 323	60 412
	Total Wood Energy Supply	MTOE	conversion	19.2	20.4	19.0	19.0
	Total Wood Energy Supply/total roundwood produced	%		38.5%	39.4%	36.6%	35.9%
Difference (energy use minus wood supply)				-45 207	-50 269	-45 771	-46 226

JFSQ shows 2,5 times more black liquor equivalent than is reported to IEA

Slovak Republic				2000	2001	2002	2003
Energy se	Total Energy (TPES)	MTOE	IEA	17.8	18.5	18.5	18.5
	Indigenous production	MTOE	IEA	6.3	6.6	6.6	6.4
	Total Renewable Energy	MTOE	IEA	0.1	0.4	0.4	0.5
	Total Wood Energy Used	MTOE	IEA	0.1	0.4	0.4	0.4
	Total Wood Energy Used	1000 m ³	conversion	452	1 229	1 140	1 379
	Wood energy % from TPES	%		0.80%	2.10%	1.94%	2.34%
Wood Supply	Total roundwood	1000 m ³	JFSQ	6 163	5 788	5 782	6 355
	of which: wood fuel	1000 m ³	JFSQ	261	277	268	259
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	1 442	1 692	1 094	1 136
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		1 703	1 969	1 362	1 395
	Total Wood Energy Supply	MTOE	conversion	0.5	0.6	0.4	0.4
	Total Wood Energy Supply/total roundwood produced	%		27.6%	34.0%	23.6%	22.0%
Difference (energy use minus wood supply)				1000 m ³			
					-1 260	-766	-245
							-44
Spain				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	124.7	127.8	131.6	136.1
	Indigenous production	MTOE	IEA	31.7	33.5	31.8	33.0
	Total Renewable Energy	MTOE	IEA	5.6	5.7	5.9	6.4
	Total Wood Energy Used	MTOE	IEA	4.9	4.4	4.3	4.6
	Total Wood Energy Used	1000 m ³	conversion	15 671	14 028	13 732	14 691
	Wood energy % from TPES	%		3.96%	3.46%	3.29%	3.40%
Wood Supply	Total roundwood	1000 m ³	JFSQ	14 321	15 131	15 839	16 105
	of which: wood fuel	1000 m ³	JFSQ	1 650	1 600	1 855	1 989
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	4 782	4 775	4 787	5 360
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		6 432	6 375	6 642	7 349
	Total Wood Energy Supply	MTOE	conversion	2.0	2.0	2.1	2.3
	Total Wood Energy Supply/total roundwood produced	%		44.9%	42.1%	41.9%	45.6%
Difference (energy use minus wood supply)				1000 m ³			
					8 923	7 369	6 813
							7 045
Sweden				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	48.5	51.5	52.8	51.5
	Indigenous production	MTOE	IEA	30.8	34.3	32.5	31.7
	Total Renewable Energy	MTOE	IEA	11.8	11.1	11.3	12.1
	Total Wood Energy Used	MTOE	IEA	10.5	9.7	10.1	10.7
	Total Wood Energy Used	1000 m ³	conversion	33 192	30 674	31 926	33 904
	Wood energy % from TPES	%		21.58%	18.76%	19.03%	20.72%
Wood Supply	Total roundwood	1000 m ³	JFSQ	63 300	63 200	66 600	67 300
	of which: wood fuel	1000 m ³	JFSQ	5 900	5 900	5 900	5 900
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	24 595	23 421	24 426	25 012
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		30 495	29 321	30 326	30 912
	Total Wood Energy Supply	MTOE	conversion	9.6	9.2	9.6	9.7
	Total Wood Energy Supply/total roundwood produced	%		48.2%	46.4%	45.5%	45.9%
Difference (energy use minus wood supply)				1000 m ³			
					2 026	733	955
							2 307
Switzerland				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	26.5	28.0	27.1	27.1
	Indigenous production	MTOE	IEA	11.8	12.4	11.9	12.0
	Total Renewable Energy	MTOE	IEA	1.5	1.6	1.6	1.6
	Total Wood Energy Used	MTOE	IEA	0.2	0.2	0.2	0.2
	Total Wood Energy Used	1000 m ³	conversion	517	548	543	539
	Wood energy % from TPES	%		0.61%	0.62%	0.63%	0.63%
Wood Supply	Total roundwood	1000 m ³	JFSQ	9 238	5 662	4 557	4 800
	of which: wood fuel	1000 m ³	JFSQ	980	1 626	1 122	991
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	364	378	357	356
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		1 344	2 004	1 479	1 347
	Total Wood Energy Supply	MTOE	conversion	0.4	0.6	0.5	0.4
	Total Wood Energy Supply/total roundwood produced	%		14.6%	35.4%	32.4%	28.1%
Difference (energy use minus wood supply)				1000 m ³			
					-838	-1 468	-947
							-819

Turkey				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	77.5	71.6	75.6	79.0
	Indigenous production	MTOE	IEA	26.7	25.1	24.6	23.6
	Total Renewable Energy	MTOE	IEA	10.7	10.5	10.3	10.0
	Total Wood Energy Used	MTOE	IEA	7.4	7.1	6.8	6.5
	Total Wood Energy Used	1000 m ³	conversion	23 430	22 523	21 513	20 522
	Wood energy % from TPES	%		9.52%	9.91%	8.97%	8.19%
Wood Supply	Total roundwood	1000 m ³	JFSQ	15 939	15 337	16 122	15 810
	of which: wood fuel	1000 m ³	JFSQ	6 543	5 510	5 361	4 931
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	590	467	514	514
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		7 134	5 977	5 876	5 445
	Total Wood Energy Supply	MTOE	conversion	2.2	1.9	1.9	1.7
	Total Wood Energy Supply/total roundwood produced	%		44.8%	39.0%	36.4%	34.4%
Difference (energy use minus wood supply)				15 823	16 091	15 202	14 662
United Kingdom				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	233.0	234.6	228.5	232.0
	Indigenous production	MTOE	IEA	272.5	262.0	257.9	246.4
	Total Renewable Energy	MTOE	IEA	2.6	2.9	3.1	3.6
	Total Wood Energy Used	MTOE	IEA	0.7	0.7	0.7	0.7
	Total Wood Energy Used	1000 m ³	conversion	2 181	2 224	2 266	2 341
	Wood energy % from TPES	%		0.29%	0.30%	0.31%	0.32%
Wood Supply	Total roundwood	1000 m ³	JFSQ	7 481	7 559	7 360	7 566
	of which: wood fuel	1000 m ³	JFSQ	234	234	234	233
	Pellets and briquettes	1000 m ³	Draft questionnaire	0	0	0	0
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	0	0	0	0
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	0	0	0	0
	Total Wood Energy Supply	1000 m ³		234	234	234	233
	Total Wood Energy Supply	MTOE	conversion	0.1	0.1	0.1	0.1
	Total Wood Energy Supply/total roundwood produced	%		3.1%	3.1%	3.2%	3.1%
Difference (energy use minus wood supply)				1 902	1 945	1 986	2 061
United States				2000	2001	2002	2003
Energy Use	Total Energy (TPES)	MTOE	IEA	2 304.2	2 258.6	2 289.0	2 280.8
	Indigenous production	MTOE	IEA	1 676.4	1 698.4	1 666.0	1 632.0
	Total Renewable Energy	MTOE	IEA	109.7	99.2	90.8	92.4
	Total Wood Energy Used	MTOE	IEA	25.3	25.2	15.0	14.8
	Total Wood Energy Used	1000 m ³	conversion	80 453	79 936	47 485	47 120
	Wood energy % from TPES	%		1.10%	1.11%	0.65%	0.65%
Wood Supply	Total roundwood	1000 m ³	JFSQ	466 549	449 114	448 000	448 059
	of which: wood fuel	1000 m ³	JFSQ	46 015	45 930	45 902	43 042
	Pellets and briquettes	1000 m ³	Draft questionnaire	66 700	66 700	66 700	66 700
	Byproducts used for energy (black liquor, internal use)	1000 m ³	IEA	148 583	137 808	136 842	137 507
	Recovered wood for energy (aside from own use)	1000 m ³	Draft questionnaire	6 900	6 900	6 900	6 900
	Total Wood Energy Supply	1000 m ³		268 198	257 338	256 344	254 149
	Total Wood Energy Supply	MTOE	conversion	84.5	81.1	80.7	80.1
	Total Wood Energy Supply/total roundwood produced	%		57.5%	57.3%	57.2%	56.7%
Difference (energy use minus wood supply)				-189 372	-179 019	-209 819	-207 981

Note: The high difference between the energy use compared to wood supply derives mainly from missing data on black liquor for energy