

## Joint Wood Energy Enquiry 2006



### Purpose

The purpose of this enquiry is to gain better information about national patterns of fuelwood and woodfuel supply and consumption. It is a joint effort undertaken by the energy and timber sector.

The enquiry was tested as an initial draft version that was sent to a few sample countries to test its feasibility. The experience gained from the replies in this first phase was integrated to set up this "Joint wood energy enquiry 2006".

In longer term, the purpose of this enquiry is to build up an annual questionnaire that can provide better information to decision makers and may enable the private sector to react to market developments.

### Please Note

Please fill in the fields marked in yellow and orange (higher importance) in the worksheet "Joint Wood Energy Enquiry" with the most recent national data on wood energy. It would be ideal if you could provide data for 2005 and if available, for precedent years, too. If you use data from different years in one grid, please indicate the corresponding year.

Please use the units given in the worksheet, as far as possible. In case you are using other units, please indicate these by a short comment. If national data sets have to be converted, some conversion factors from the EFSOS report can be found below. [page 59: "conversion of product volume to initial volume of raw material"]

The energy content of wood highly depends on the moisture content of the raw material. The provided conversion factor can give only a first guideline for the conversion. Depending on the species, wood fuel may contain between 18 and 22 GJ per ton air-dry wood (water content 20-25 %).

If you need to use any other conversion factors give a short explanation about the changes that were made and which conversion factors were used. The structure of the table should remain unchanged. If you feel, that for your national woodfuel balance, there are important Items/Sources/Consumers missing (e.g. briquettes), indicate these un

### Procedure

The present structure has been conceived to set up an overarching enquiry that covers all sectors involved in wood energy production - in particular linking the energy with the timber sector. Wood raw material enters energy production in many different ways. In consequence all the sectors involved should contribute to improve the data on wood energy. This can only be achieved by good communication among the sectors involved.

Initially the enquiry is being sent to the national correspondents of the UNECE/FAO Timber Section who deal with the Joint Forest Sector Questionnaire. Wood energy might be beyond their personal area of expertise and therefore it will probably be necessary to reach out to national specialists in the field of energy.

In order to make the best estimates possible we recommend to contact national specialists for wood energy, waste, recovered wood and other fields concerned. The worksheet "Different statistical sources" indicates, which sectors might be concerned by the enquiry.

The UNECE/FAO Joint Forest Sector Questionnaire collects national information about wood energy on an annual basis. Fuelwood is often traded on informal markets, so that conventional statistics often underestimate the wood volume produced and consumed for this purpose. Therefore we would like to encourage you to assess realistically the quality of the official national data that are reported in the UNECE/FAO JFSQ.

Generally we encourage you to give priority to the most accurate and complete sources of information instead of the most official one. These may not derive from national statistics but could come from independent investigation or research, studies or estimations, which are equally accepted. In general we would strongly recommend you not to hesitate to make estimates for items instead of leaving blank fields. This is of particular interest for the highlighted fields. Please indicate the different sources of information by using background colour, footnotes etc.

The Joint Wood Energy Enquiry is undertaken as a special cooperation between UNECE/FAO with IEA. IEA agreed to provide the national correspondents of the Timber Section with the contact details of their national focal points. The aim is to improve the data quality and in particular to decrease the gap between the two databases. The Regional Overview on wood energy (see worksheet "Regional Wood Energy Overview") underlines the existing gap. Please make use of this offer to improve communication with the energy sector by getting in contact with your national counterpart in the energy sector to discuss how the data quality may be improved on the national level in each of the 27 countries covered by the regional overview.

Comments about this template will be welcome at any time along with any information you have about projects/studies going at the national level with a focus on fuelwood/woodfuel /biomass. This information and the contacts will help to avoid double work or overlapping with other sectors (especially energy sector). Our aim is not to reinvent the wheel, but to gather as much and as complete information available. Alliances and cooperation are most welcome.

## DEFINITIONS

SOURCES:		Row number
Industrial Roundwood	All roundwood except fuelwood (called wood fuel in the JFSQ). 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 underbark (i.e. excluding bark). (source: JFSQ)	1
Fuelwood - please include wood used to produce charcoal.	<p>Roundwood that will be used as fuel for purposes such as cooking, heating or power production: it is reported in cubic metres solid volume underbark (i.e. excluding bark). This includes wood harvested from main stems, branches and other parts of trees (where these are harvested for fuel) and wood chips to be used for fuel that are made from roundwood directly (i.e. in the forest or chipped at a heating/power plant). Please also include roundwood that will be used for charcoal production (e.g. in pit kilns and portable ovens): estimate the volume of roundwood used in charcoal production by converting the weight (t) of charcoal produced to the solid volume (m<sup>3</sup>) of roundwood using a factor of 6.0. (source: JFSQ)</p> <p>This figure for the charcoal production should appear again in 'J1' and the amount of charcoal production, import and export should be given in row 11 columns 'A' to 'C'. Even if the volume of fuelwood used in private dwellings does not appear in national trade statistics, it would be helpful to include an estimate and to indicate how this was derived (interview, estimation etc. ).</p> <p>IEA Bioenergy Task 31 "Biomass production for Energy from sustainable forestry" (<a href="http://www.ieabioenergytask31.org/">www.ieabioenergytask31.org/</a>). National specialists in: Belgium, Canada, Denmark, Germany, Norway, Sweden, UK, USA</p>	2
Logging residues	<p>Woody biomass by-products which are created during harvest of merchantable timber (Note: Logging residues include tree tops with branches and roots and they can be salvaged fresh or after seasoning). (Source: FAO: Unified Bioenergy Terminology)</p> <p>Unit: It is reported in cubic metres solid volume underbark (i.e. excluding bark). Please indicate if reported in metric tons.</p>	3
Thinnings	<p>Woody biomass by-products origination from thinning operations. (Source: FAO UBET)</p> <p>E.g. silvicultural and pre-commercial thinning and cleanings of trees. Please indicate if the reported unit is changed to metric tons.</p>	4
Short rotation energy coppice	<p>All woody biomass grown for specifically for their fuel value (Source: FAO: Unified Bioenergy Terminology).</p> <p>The raw material is grown for its energy content in short rotation forestry (SRF), often realized in short rotation coppice (SRC). (source: IEA Bioenergy Task)</p> <p>IEA Bioenergy Task 30 "Short Rotation Crops" specialists on that topic might be able to provide help in Canada, UK, USA and Sweden. See:<a href="http://www.shortrotationcrops.com/taskmembers.htm">http://www.shortrotationcrops.com/taskmembers.htm</a></p>	5
Primary industrial residues	<p>The volume of roundwood that is left over after the production of primary forest products in the forest processing industry (i.e. forest processing residues) or that has been reduced to chips or particles. It includes sawmill rejects, slabs, edgings and trimmings, veneer log cores, veneer rejects, sawdust. It comprises wood that has been reduced to small pieces and is suitable for pulping, for particleboard and/or fibreboard production, for use as a fuel, or for other purposes. 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). (source:JFSQ)</p> <p>It should be reported in cubic metres solid volume excluding bark but metric tons are accepted, too -Please indicate the value used</p>	6
Secondary Industrial residues	<p>Leftover from secondary wood processing and furniture industry - often contaminated residues. ISIC 2022, 2023, 2029 and 361(e.g. furniture production, packaging, windows, doors etc.)</p>	7
Wood from urban and amenity trees	<p>Gardening, landscape management, non-forest areas, agricultural land, city greening, etc.</p>	8
Post consumer recovered wood	<p>Used wood arising from construction of buildings or from civil engineering works. (Source: FAO: UBET).</p> <p>Recovered wood from transport (pallets), private households, as well as used wood arising from construction or demolition of buildings or from civil engineering works.</p>	9
Bark	<p>The loose volume of bark. Bulk volume ideal unit, but other units accepted. Please indicate.</p>	10
Charcoal [metric tons]	<p>Wood carbonised 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. (Source: UNECE JFSQ)</p>	11
Pellets [metric tons]	<p>Densified biofuel made from pulverised biomass with or without pressing aids usually with a cylindrical form, random length typically 5 to 30 mm, and broken ends. (...) The total moisture of biofuel pellets is usually less than 10 % of mass.(Source: FAO UBET)</p> <p>Pellets made from industrial residues (sawmill rejects, slabs, edgings and trimmings, veneer log cores, veneer rejects, sawdust, residues from carpentry and joinery production, etc.).</p>	12
Black liquor	<p>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. (Source: FAO UBET)</p> <p>As specific density and energy content are varying, no production is requested =&gt; see energy produced from black liquor (column P and Q)</p>	13

USER:			Column
<b>Non energy use by primary wood processors</b>			
	Sawmill industry	Roundwood used by the sawmill industry to produce sawn products.	E
	Panel production	Production of veneer sheets, plywood, particleboard, and fibreboard.	F
	Pulp production	Pulp production from pulpwood, wood chips, particles or residues by mechanical and/or chemical process for further manufacture into paper, paperboard, fibreboard or other cellulose products. In JQ1 and JQ2, it is an aggregate comprising mechanical wood pulp; semi-chemical wood pulp; chemical wood pulp; and dissolving wood pulp. (Source: UNECE JFSQ)	G
	Other		H
	Wood based pellets production	Production of densified biofuel made from pulverised biomass with or without pressing aids usually with a cylindrical form, random length typically 5 to 30 mm, and broken ends. (...) The total moisture of biofuel pellets is usually less than 10 % of mass. (Source: FAO UBET) Pellets made from industrial residues (sawmill rejects, slabs, edgings and trimmings, veneer log cores, veneer rejects, sawdust, residues from carpentry and joinery production, etc.).	I
	Charcoal production	Wood carbonised 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. Source: UNECE (JFSQ)	J
	Biofuel production	Amount of wood used to produce liquid or gaseous biofuels. Only biofuels are liquid fuels that derive from wood fibres should be considered (e.g. cellulose ethanol or 'sundiesel' or other product of bio-refineries) IEA Bioenergy has a group of specialists in Task 39: "Liquid biofuels from biomass". National specialist on the topic can be found in Austria, Canada, Denmark, Finland, the Netherlands, Sweden, UK, USA ( <a href="http://www.ieabioenergy.com/Task.aspx?id=39">http://www.ieabioenergy.com/Task.aspx?id=39</a> ) See also Task 33 "Thermal gasification of biomass" ( <a href="http://www.ieabioenergy.com/Task.aspx?id=33">http://www.ieabioenergy.com/Task.aspx?id=33</a> ) covering Austria, Denmark, Finland, Italy, the Netherlands, Sweden, Switzerland, United Kingdom, USA	K

## Energy use

Roundwood volumes used for energy production (columns 'M' and 'N') ideally correspond directly to the reported energy output (columns 'P' and 'Q'). It is important that the numbers between 'Input' and 'Output' correspond to each other by a distinct correlation. The conversion factors are depending on the average efficiency of the heating and electricity production facilities. Therefore no standard conversion factors can be given. Please contact your national IEA correspondent concerning the correlation factors. In case of a too wide gap between the energy and the timber statistics we would like you to agree using the better data set (often the higher figures) and to calculate the corresponding part of the columns.

The different sectors are defined according to the UN International Standard Industrial Classification (ISIC) Revised version 3.1.

			Column
<b>Wood for commercial energy production</b>			
The energy producer is not the energy consumer.			
<b>Input for transformation to produce...</b>		Wood used by the ISIC 'E'. Please use the original wood units.	<b>L</b>
	heat	Amount of wood used to produce heat.	<b>M</b>
	electricity	Amount of wood used to produce electricity.	<b>N</b>
	<b>Total (wood)</b>	SUM columns L+M+N in original units (per line). The total amount of wood used to produce any form of energy or energy carrier (heat, electricity and biofuels). This column is of particular interest for the enquiry. In case of no data coverage for the columns L-N please make estimates about the corresponding wood volumes based on the energy output. If estimates are used please indicate the methods used to derive the figures.	<b>O</b>
<b>Output after transformation</b>		Please use the given energy units to describe the 'output after transformation'. The differing units refer to the type of energy produced to facilitate the work of the energy statisticians. IEA Bioenergy Task 32 "Biocombustion and cofiring" with specialists in Austria, Belgium, Canada, Denmark, Finland, the Netherlands, Norway, Sweden, Switzerland, United Kingdom, USA.	
	heat	Heat produced from the amount of wood reported in column 'L'. The unit is TJ. (1TJ = 23.884 Toe)	<b>P</b>
	electricity	Electricity produced from the amount of wood reported in column 'L'. The unit is GWh (1GWh = 85.984 Toe).	<b>Q</b>
	<b>Total (energy)</b>	SUM columns P+Q in Tons oil equivalent (Toe). The total amount of energy in column 'R' should directly correspond to the wooden raw materials reported in column 'O'. This column is of particular interest for the enquiry. In case of no data coverage for the columns 'P', 'Q' and 'R' please make estimates derived from the corresponding wood volumes. If estimates are used please indicate the methods used to derive the figures.	<b>R</b>
<b>Wood for direct energy use</b>			
The columns 'S'-Y' ask for the original units of wood being used for energy production. The energy producer like wood processor, households, manufacturer, services and agriculture use the produced energy directly. The energy is not fed into any distribution facilities.			
	<b>Industry</b>		
	Forest based Industries	ISIC '20', '21' and '361' - If no information for the three digit code is available please use the two digit code ('36'). Please indicate the modification in a short explanatory note. e.g.: A sawmill burning part of its sawdust to produce heat for wood drying.	<b>S</b>
	Other industry	ISIC: 'C', 'D' and 'F' excluding '20', '21' and '361' : e.g.: Burning used wood products for heating (e.g. pallets)	<b>T</b>
	Total industry	SUM column S+T	<b>U</b>
	services	ISIC: 'G' to 'Q' : e.g.: Burning used wood and paper products for heating.	<b>V</b>
	agriculture	ISIC 'A' and 'B' (Rev.3.1.): e.g.: Self harvested fuelwood, burning horticultural waste or used wood products for heating	<b>W</b>
	households	e.g. Self harvested fuelwood, burning horticultural waste or used wood products for heating	<b>X</b>
	<b>Total</b>	<b>SUM columns S to X</b>	<b>Y</b>

**Conversion factors used in the fuelwood analysis**

Sub-region Product	Western Europe	Eastern Europe	CIS
Coniferous sawnwood	1.42-2.10	1.50-2.00	1.60-2.00
Non-coniferous sawnwood	1.46-3.52	1.40-2.10	1.45-2.00
Particleboard	1.20-1.80	1.40-1.80	1.40-1.60
Fibreboard	1.50-1.94	1.80-3.30	2.80-3.00
Plywood	1.50-3.10	1.80-2.90	2.50-2.70
Veneer sheets	1.20-3.10	1.70-2.90	2.00-2.90
Mechanical pulp	2.16-2.60	1.20-2.90	1.20-2.50
Chemical pulp	4.48-4.70	4.50-6.40	4.48-5.21
Semi-chemical pulp	2.20-2.90	2.30-3.20	2.86-2.90
Newsprint	3.2	3.2	3.5
Printing and writing paper	4	4	4.2
Other paper and paperboard	3.39-3.40	3.40-4.70	3.8
Recovered paper	3.8	3.8	3.8

Note: the above conversion factors show the amount of industrial roundwood (cubic metres underbark) required to produce one unit of output (one metric tonne of pulp or paper or one cubic metre of sawnwood or panels). Source: EFSOS main report page 59

m<sup>3</sup> [scu]= solid cubic metre, underbark

m<sup>3</sup> [bv]: bulk volume/ loose volume (volume of a material including space between the particles)

t air dry (12-20 % moisture content in the wood)

t abs. Dry/bone dry ( )