

Joint Wood Energy Enquiry 2008 Background Data Analysis

As of 24 March 2009



Geneva



This report supplements the official note by the secretariat on the Joint Wood Energy Enquiry 2008(ECE/TIM/EFC/WP.2/2009/3). It aims at providing an in-depth quantitative data assessment on the national data supplies. This document is only available in English.

Please note that although data have been checked for consistency by the UNECE/FAO Timber Section, national correspondents may still revise the figures. Further updates would be made available on the wood energy web site of UNECE/FAO

(<http://www.unece.org/timber/mis/energy/welcome.htm>)

Content:

Acknowledgements:.....	4
Executive summary.....	5
1. Responses overview.....	6
a. Response rate and data coverage	6
b. Data comparability JWEE I & JWEE II	6
c. Data supply	6
d. Data quality	7
2. Forest sector and wood energy	8
a. Sources of woody biomass for energy	8
b. Share of different woody biomass sources.....	9
c. First trend assessments - sources	10
d. Material vs. energy use of wood fibres	11
3. Energy sector and wood energy	12
a. Users of wood energy	12
b. Share of different wood energy user	13
c. First trend assessment - user.....	14
d. The role of woody biomass for the energy sector.....	15
4. Wood energy indexes	16
5. Discussion of results/achievements/comments/feedback.....	17
6. Future actions	18
7. Question for delegates.....	18
8. Annex I – Response Overview:.....	19
9. Annex II – Country Data:.....	20

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Executive summary

This quantitative in-depth data assessment on the national data supplies to the second edition of the Joint Wood Energy Enquiry (JWEE II) supplements the official note by the secretariat on the issue (ECE/TIM/EFC/WP.2/2009/3).

More than 50% of the national correspondents responded to the JWEE II sent by the secretariat in summer 2008. 15 countries accounting for 46% of roundwood consumption in the ECE region supplied a complete dataset to the second edition of the JWEE¹. Nine of the responding countries did so for the second time. Despite structural changes between JWEE 2006 and JWEE 2008 the results of the two enquiries are comparable which enabled for the first time a trend assessment of the wood energy developments at national level based on the responses of the nine countries responding for the second time.

The share of cells filled, as well as data qualities varied considerably between different tables from country to country. However, $\frac{3}{4}$ of the data submitted had an indication of their quality. Most of the data were rated of good quality.

Woody biomass removals from forests account for only 25% of fibres supply for energy generation. Most of the woody biomass is first used by the forest based industries for material purposes before it enters energy generation. On average 46% of the nationally available wood fibres is used for energy purposes often after having served for material purposes in the forest based industries.

Wood energy developed strongly in most countries. Based on the set of countries responding for the second time wood energy grew annually by +3.5% on average. Wood energy from post consumer recovered wood (waste) seemed to grow twice that fast with an annual increase of 7%. The first JWEE II trend assessment indicates that the energy sector increased its woody biomass consumption for energy generation at an annual growth rate of 18.8 % between the two reference years 2005 and 2007. Projecting these first trends into the future show clearly that consumption pattern of wood energy will change in the coming years.

The energy and forest sector are very different respective structure, the way how they are organized and their economic size. The 3.5% annual increase of woody biomass use for energy generation has almost no effect on the share of wood energy in the total primary energy supply (+ 0.15% percentage points annually).

In some countries where woody biomass already contributes already a high share to the total energy consumption (e.g. Finland and Sweden), the overall importance of wood energy seems to be stagnating or even slightly decreasing. The enquiry could not explain the reasons whether this was influenced by reduced availability of raw material, high raw material prices or substitution by other renewable energy sources (e.g. palm oil).

Overall, these results seem to confirm that good information on wood energy supply and use is scattered, but available at national level. The JWEE II seems to be the appropriate tool to harmonize and collect this scattered information. Even though there is scope for further improvements in its structure and conversion factors, the revised version of the JWEE successfully proved that it is now fully operational.

¹ Germany submitted data on 21 March and could not be included in the draft assessment (Only country sheet available). Further the secretariat received a confirmation that the United States will submit a complete dataset by mid May 2009.

1. Responses overview

a. Response rate and data coverage

The JWEE II was sent to 47 of the 56 member states of the UNECE. Currently 25 (JWEE I: 24) national correspondents responded to the data request, representing a response rate of about 50%. However, only 15 (JWEE I: 14) of these responses contained sufficient data points and are presented in this report: Austria, Switzerland, Finland, France, Ireland, Netherlands, Sweden, Slovakia, Slovenia, Serbia, United Kingdom, Cyprus, Canada, Liechtenstein, Russian Federation.

Correspondents of four countries (Baltic States and Albania) informed the secretariat that work on the enquiry is under way, but no response has been received, so far.

Correspondents from six further countries' stated that they did not have sufficient means for submitting any data. The explanations ranged from "lack of methodology at national level" over "wood energy plays no role at national level" to "no updated data available". However, the Norwegian correspondent stated that a national study on wood energy is under way and that updated data will become available in the future.

At present the JWEE II represents a data coverage corresponding to 46 % (63% JWEE I) of the roundwood consumption of the UNECE region (54% EU27; 50% Europe; CIS 88% and North America 32%). Even though the JWEE II showed a slight increase in total number of responses, the coverage in terms of wood markets' coverage, the JWEE II still remains below the result from 2006. This is caused by the fact that two important member states, Germany and the United States did not provide any data, so far¹. In case the secretariat succeeds in receiving data from the United States and Germany, the data coverage would increase to 84 % of the UNECE roundwood consumption.

b. Data comparability JWEE I & JWEE II

The first data assessment indicates that despite some significant changes in the enquiry structure, it was possible to provide a first trend assessment on the development of the use of wood energy between the two reference years 2005 and 2007. Nine out of the above mentioned fifteen countries supplying data for the JWEE II already responded to the first wood energy data collection exercise in 2006. Hence these nine countries have been assessed with particular interest in the changes of the woody biomass for energy generation (Austria, Switzerland, Finland, France, Netherlands, Sweden, Slovenia, United Kingdom, Canada).

c. Data supply

The total number of cells filled per table varied according to the tables "T I" – "T IV" and from country to country. Compared to the average number of cells filled per table the number of data points submitted to the tables T I (fibre sources) and T III (fibre origin wood fuels) varied less than (min. 0 / max. 7) for the tables T II (processed wood-based fuels) and T IV (energy use) (min. 2 / max. 35).

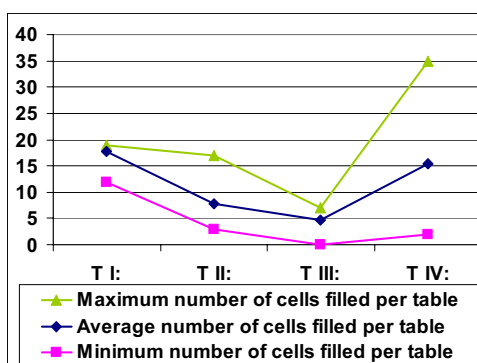


Table 1: Cells filled per table

T I seemed to have caused generally little difficulties as often the set of pre-filled “official data” needed only some supplementary information on woody biomass outside forests.

In contrast to that seemed table T III (fibre origin wood fuels) cause particular difficulties for the correspondents. Apparently little information is available about the wood fibres’ origin for the production of charcoal, wood pellets and briquettes (and liquid biofuels).

The difficulty of supplying data in particularly for T III (fibre origin wood fuels) becomes even more apparent when comparing the share of cells that have been filled with information. Only 10% of the theoretically possible cells were filled with data and even when excluding any data on liquid biofuels only 20% of the cells on wood fibres’ origin for processed wood fuels could be supplied.

Table JWEE II:

- T I fibre sources:** Domestically available woody biomass.
- T II processed wood-based fuels:** Transformation of woody biomass to wood based fuels such as pellets, briquettes, charcoal, etc.
- T III fibre origin wood fuels:** Detailed information on which wood fibres are used to produce processed wood fuels.
- T IV energy use:** Final wood energy transformation and consumption by ISIC classification.
- T V** conversion factors

Table 2: Content of the four data tables of the JWEE

d. Data quality

The JWEE II offered country correspondents the possibility to indicate the data quality of each single figure provided at national level. Correspondents could choose between the following indicators:

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

Table 3: Data quality indicators

Correspondents used this opportunity quite consistently. About ¾ of all data provided have been supplied with an indication of their quality. This possibility of quality information is of particular interest as the JWEE II brings together “official” data and data from more or less independent sources and experts’ estimates.

The first assessment shows clearly that in official national data could help to supply more than half of the information requested. 70% of the data supplied in table T I (fibre sources) and 50% of the data provided in table T II (processed wood-based fuels) derive from official sources.

It seems as if there is very limited official national information available on the use of woody biomass for energy generation. The data quality pattern changes in tables T III (fibre origin wood fuels) and table IV (energy use) and unofficial data sources of good quality takes over.

However, it seems that countries hold some quite good information on wood energy and hence correspondents could derive quite some details from e.g. recent empirical studies (“A” rated data quality) for the JWEE II.

When considering data quality rating “O” and “A” as good data, it could be concluded that more than 75 % of the total data supplied in table T I (fibre sources) and more than 60% of data in table T II (processed wood-based fuels) – are of quite reliable quality. The smaller number of good quality data in table T III (fibre origin wood fuels) seems to confirm that the questions on the fibre origin of processed wood fuels has so far not been in the focus of assessments in many countries and hence the data request can not be easily answered at national level

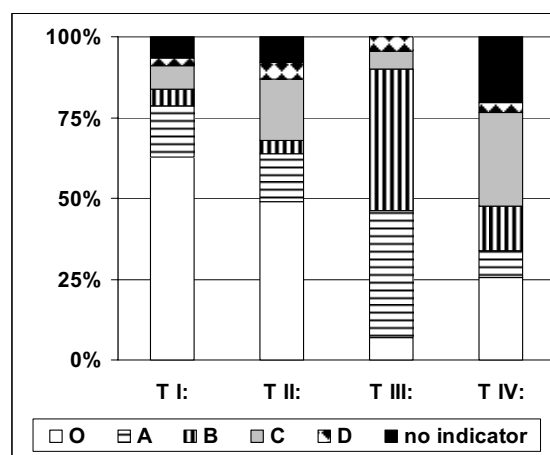


Table 4: Data qualities of the JWEE

Most of the data contained in table T IV (energy use) was given a poor data quality rating. However, this figure is misleading, because correspondents filled about 50% of the cells with a 0.00 and flagged it with a poor or no data quality rating.

The other half of the cells containing real figures and were rated with “A” or even as official with an “O”. Hence it could be concluded, that any data other than a zero were of good quality.

Overall, these results seem to confirm that good information on wood energy supply and use is scattered, but available at national level. The JWEE II seems to be the appropriate tool to harmonize and collect this scattered information.

2. Forest sector and wood energy

a. Sources of woody biomass for energy

The Joint wood energy enquiry covers any flows of wood fibres that can be used in one way or another for energy purposes. It goes far beyond the “traditional” fuelwood supply as referred to in the Joint Forest Sector Questionnaire.

S1 Direct supply:

The definition of this source comprises any wood fibre that enters the 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 supply:

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 wood supply:

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.).

S Unspecified:

Since the last JWEE I the secretariat introduced a fourth category in order to reflect the fact that 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.

b. Share of different woody biomass sources

The results below refer to the 15 responses. It indicated that 43% of the wood fibres for energy generation derive directly from woody biomass from forests and outside. However, the structure in the different countries varies significantly. Direct wood supply accounts for less than 20% in Ireland and the Netherlands and for over 70% in France, Slovenia and Serbia.

The most important share of wood fibres for energy generation derive from the indirect sources, indicating that the some parts of the wood have been used for material purposes, before. The indirect sources play a minor role (<25%) in France, Serbia, Slovenia and Switzerland, whereas they account for more than 65% in Finland, the Netherlands, Sweden and the United Kingdom.

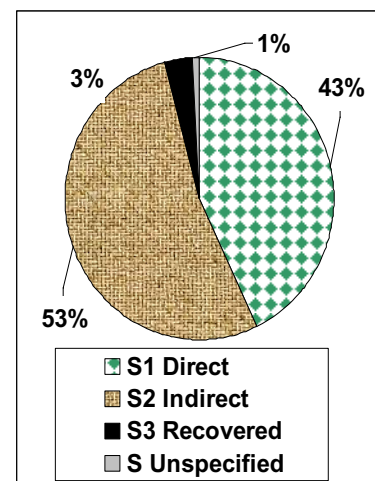


Table 5: Sources of woody biomass for energy

Data on post consumer recovered wood are difficult to obtain and the international databases do not provide data for 2007, yet. Therefore wood from the waste streams account for only 4% in the average of the 15 countries assessed. The dataset from the Netherlands, Slovakia and the United Kingdom indicate that recovered wood contributed about 10%. Post consumer recovered wood contributes 27% of the woody biomass for energy production.

Countries with a high share of "unspecified" wood sources are the Russian Federation and Canada.

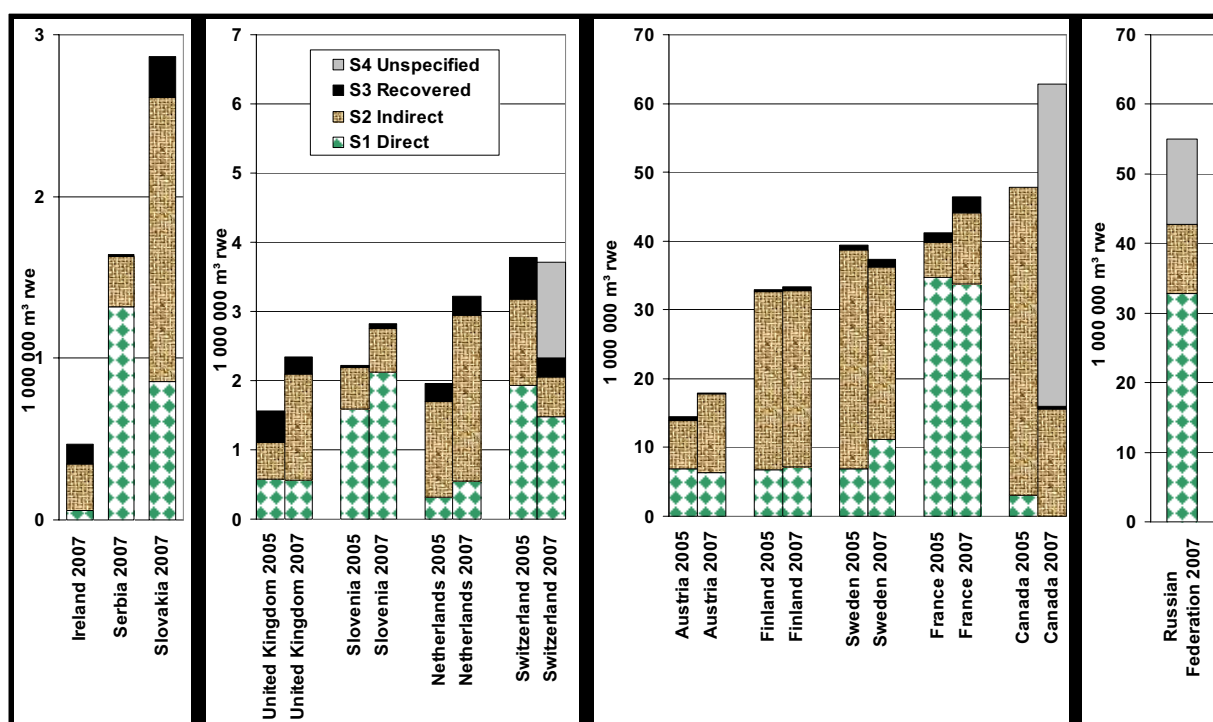


Table 6: Countries' overview of woody biomass sources

c. First trend assessments - sources

One major goal of the second edition of the JWEE II was to assess the development of wood energy in the member states. Nine countries responded for the second time to the JWEE and hence enabled the very first trend assessment. Eight countries will be considered in the following assessment (Austria, Switzerland, Finland, France, Netherlands, Sweden, Slovenia, United Kingdom)².

When presenting results of this first trend assessment it is important to consider that also technical factors such as conversion factors and structural changes may have had a certain influence. However, it can be said that the result do not show any inconsistent jumps in one way or another and the changes remain in a reasonable range.

1 000 m³	2005	2007	annual change
S1 Direct	59 860	63 081	+ 2.7%
S2 Indirect	73 337	77 668	+ 3.0%
S3 Recovered	4 324	4 920	+ 6.9%
S4 Unspecified	...	1 393	...
Total	137 521	147 062	+ 3.5%

Table 7: Trend of woody biomass sources

² Canada did not provide a full dataset and was hence excluded from the sources assessment

Based on the data of the above mentioned countries, it can be concluded that wood energy increased between 2005 and 2007. The total increase of about 10 million m³ represents an average annual growth rate of + 3.5% of the eight countries. The biggest increase in wood energy came from recovered wood which increased by almost twice the annual growth rate.

In some countries, however woody biomass for energy stagnated or even decreased slightly. Finland, Sweden and Switzerland showed this trend and one could wonder whether, in particular for the two Nordic countries, a limit of easily accessible woody biomass for energy has been reached?

Despite the total increase in woody biomass use for energy generation, this does not automatically imply that the role of woody biomass did increase when compared to the overall increase in total primary energy consumption and the increase of other renewable energy sources. (see chapter 3).

Despite this first result, it would be highly desirable to conduct a further study to confirm whether these first assumptions and conclusions are sound and consistent.

d. Material vs. energy use of wood fibres

The previous chapter described the total amount of woody biomass used for energy generation. In previous years, with high energy prices and strong emphasis on renewable energy sources by the energy sector, prices for woody biomass increased significantly. The forest based industries expressed their concerns about the high raw material prices and alarmed policy makers about a potential future scarcity of wood raw material. The industries promoted the idea of the so-called cascaded use, implying a priority of material use and re-use of woody biomass to final energy use.

The JWEE II enables an assessment on which share of the direct woody biomass removals from forests and outside are used for energy generation. These fibres do not enter national wood processing industries, such as sawmills, pulp or panel producers.

About ¼ of the total wood removals enter the energy production directly. This figure is the average of 13 of the 15 responding countries as Canada and Russian Federation could not be considered due to lacking data. However, the JWEE did not collect information on which woody biomass assortments enter the energy use directly (e.g. roots, small branches, bark, hog fuel, roundwood, etc.).

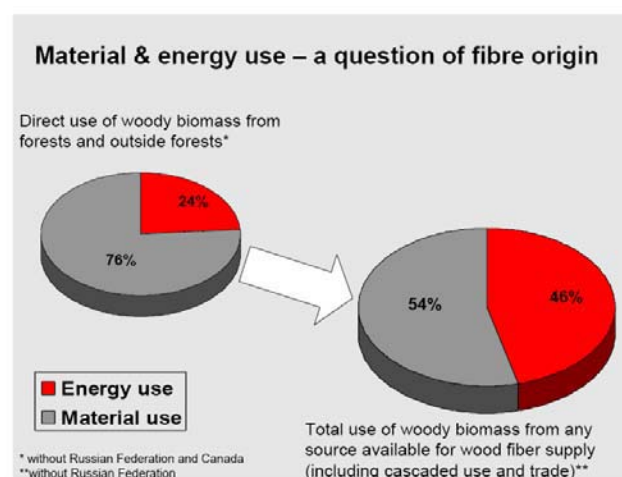


Table 8: Fibre origin for material and energy use

While 25% of the woody biomass from forests enters energy production, this share increases significantly when considering the co-product and residues from the forest based industries. The basic structure of the JWEE II is based on the Wood Resource Balance approach and hence enables a comparison between the amounts of wood used for material purposes and energy uses. In average, about 46% of wood fibres that enter the national wood processing chain end

up end up in energy production for final use. This figure includes the cascaded use approach (without Canada and Russian Federation because of unspecified sources in the submitted dataset).

3. Energy sector and wood energy

a. Users of wood energy

The JWEE II collects data on wood energy consumption by different market actors. In the data collection table T IV (energy use) it is very specific and detailed. However, for the presentation and comparison, these detailed ISIC definitions (International Standard Industrial Classification of all economic activities, version 3.1) are too detailed. Therefore the presentation of the wood energy consumption by different users groups follows mostly the structure as suggested by the FAO Unified Bioenergy Terminology.

U1 Power and heat:

The definition of U1 refers to “Main Activity Plants” (IEA definition), which 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. 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”³ 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, namely the (chemical) pulp producers who sell some of their energy to third parties (real or virtual sales are considered). Ideally the data should also include the process heat that is used for the production of the good at the specific plant.

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).

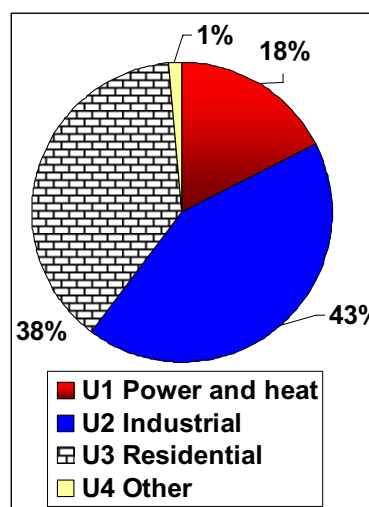
³ IEA definition.

b. Share of different wood energy user

The results below refer to the 15 responses (2007) that contained sufficient data for an assessment. Commercial heat and electricity power producer account on average for 18 % the woody biomass consumption for energy generation. However, this share varies widely so that this sector of commercial power and heat production accounts for over 65% of the wood consumption in the Netherlands and the United Kingdom.

The forest based industries consumed 43% of the woody biomass for energy generation. In Canada, Ireland, Slovakia and Sweden the industry internal energy generation from woody biomass exceeds a share of 50%.

Households represent (with 38 %) an additional significant user of woody biomass. In some countries this exceeds 50%.



of

Table 9: User of woody biomass for energy generation

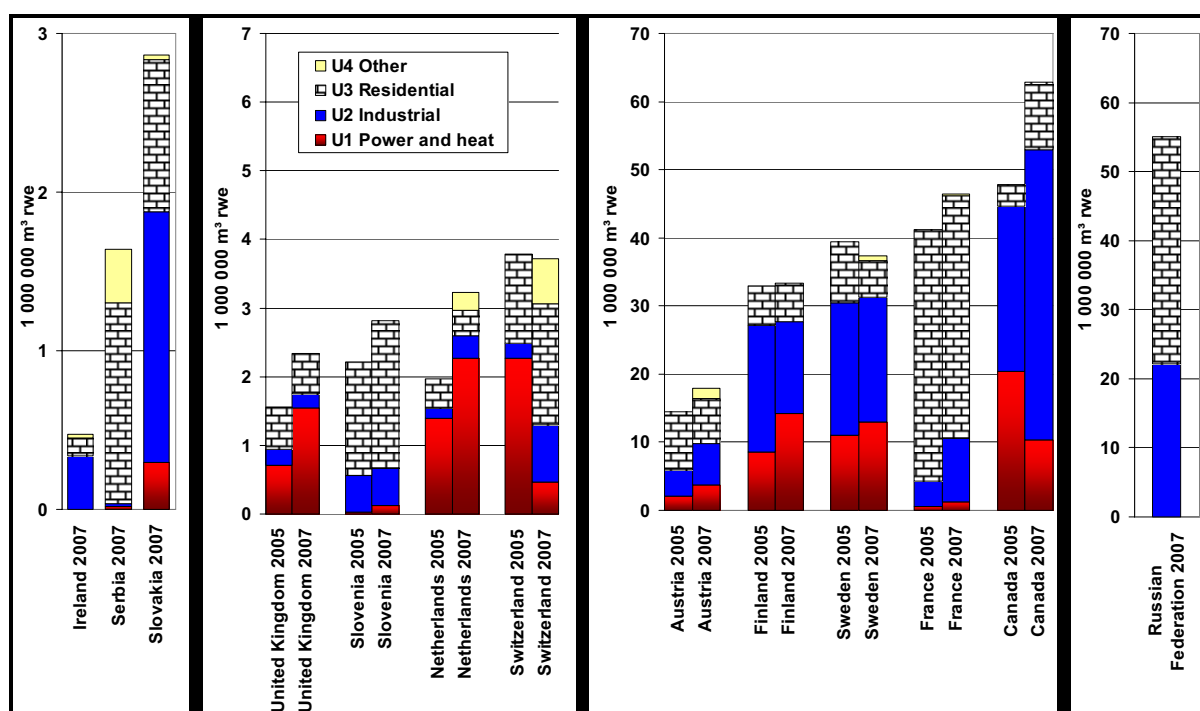


Table 10: Countries' overview of woody biomass user

c. First trend assessment - user

The dataset again refers to the eight countries that submitted data for 2005 as well as 2007 (excluding Canada for comparability reasons).

The trend assessment of the different sources above showed that woody biomass consumption for energy purposes increased by 3.5% annually. The first part of the trend assessment showed from which sources this increased woody biomass came from.

When looking at the trends of wood energy users and generators, it seems that many commercial energy producers switched to woody biomass. Woody biomass consumption for energy generation by power and heat producers grew by almost 19 % annually between 2005 and 2007. The developments in the United Kingdom and Netherlands influenced strongly this development.

1 000 m ³	2005	2007	annual change
U1 Power and heat	26 557	36 525	+ 18.8%
U2 Industrial	46 873	48 952	+ 2.2%
U3 Residential	64 091	58 326	- 4.5%
U4 Other	...	3 257	...
Total	137 521	147 060	+ 3.5%

Table 11: Trend of woody biomass user

The industry internal consumption (forest based industries) of woody biomass for energy generation increased by only 2%. According to the data submitted, woody biomass consumption for energy generation in private households decreased by 4.5%. However it must be said, that some of the decrease of households' wood energy consumption may also be caused due to the introduction of "U4 Other" which includes public and commercial services, agriculture, fisheries and forestry. This choice was not given to data providers in the first version of the enquiry and therefore the comparability between JWEE I & II, particularly for households, might be limited. However, when comparing developments of residential wood energy consumption the overall development was influenced by a -20% annual reduction in Sweden and -11 % in Slovenia. The positive developments in the Netherlands (+15% annual increase) and France (+18% annual increase) could not fully outweigh the negative developments. However the question remains, whether these data can be so easily compared or whether it also is an issue of measurements and conversion factors?

Commercial power and heat producers are still the smallest consumer group of the three but the growth rate of woody biomass consumption in combination with a decreasing/stagnating consumption by the residential sector indicates clearly that the consumption pattern will change in the next years. The JWEE is hence a good tool to assess further this change in consumption pattern in the future. By 2011 the commercial power and heat sector could become the most important consumer of woody biomass for energy generation.

d. The role of woody biomass for the energy sector

The results mentioned in the previous paragraph clearly showed that commercial heat and power producer showed the fastest growth rate in woody biomass consumption for energy generation.

However, it must be clearly said that with the strong political push for renewable energy sources for different purposes (supply security, climate change mitigation, high energy prices, etc.) the energy sector moved into closer contact with the forest sector.

However these two sectors are very different from many perspectives. The forest sector is long term oriented with a huge capital bound in the forest for growth. The energy sector is very fast moving and decisions are much more responsive to the changing market conditions. Above all, the energy sector has a much bigger financial field of manoeuvre and is of different economic scale than the forest sector

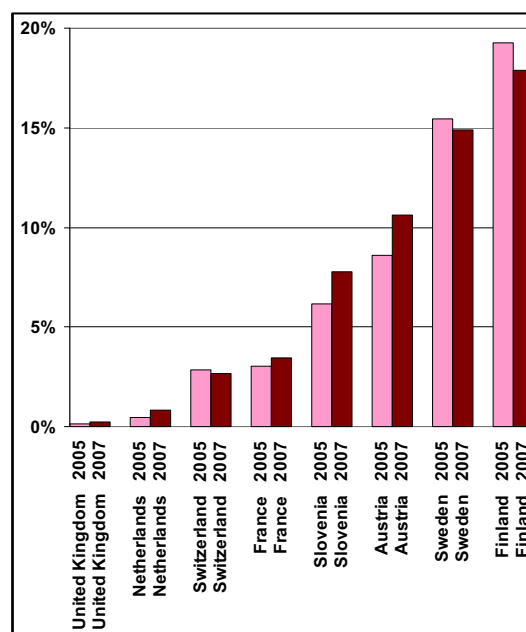


Table 12: Share of woody biomass in total primary energy supply (TPES %)

The above mentioned 3.5% average annual increase of woody biomass for energy generation corresponds to an annual increase by 0.15% points share in the total primary energy supply. One could say a big step for the forest resource, but only a little in the energy sector. The effect to the energy sector is more that 20 times less than it is for the wood sector.

Also here it is necessary to take a detailed look at the specific developments at national level. The share of wood energy in the total primary energy supply (TPES) as well as the share of wood energy compared to other renewable energy sources (RES) changed very differently. In the two Nordic countries the overall importance of wood energy seems to have slightly decreased over the last two years (even though the Finnish woody biomass consumption had increased).

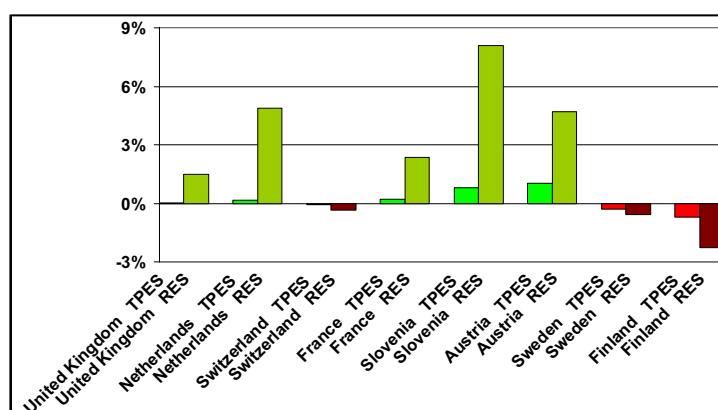


Table 13: Change of wood energy share in TPES and RES between 2005 and 2007 (% points)

For the future developments of wood energy, the presented developments need to be seen in the context of the political goals for energy from renewable sources. The share of energy from renewable sources of 8% of the Total Primary Energy Supply for the European member states in 2007 need to be seen in light of the European goal to produce 20% of its energy from renewable sources by 2020. Wood energy contributed about 50% of the renewable energy. This indicates clearly that the policy decisions will have a strong influence on wood energy.

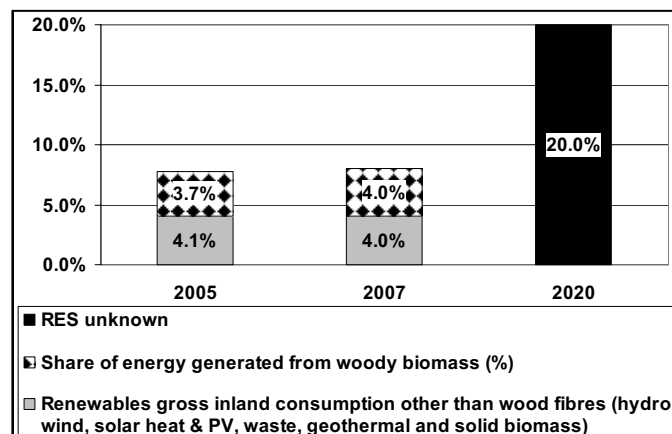


Table 14: Share of RES and wood energy 2005, 2007 and 2020

4. Wood energy indexes

During the European Forest Week in Rome the secretariat presented an overview of the JWEE II activities and presented very first qualitative results. Participants of the meeting requested which index the UNECE/FAO Timber Section was planning to use in order to compare the absolute figures from the member states. The following chapter is a first attempt to present reasonable some first wood energy indexes, going beyond the simple “wood energy per capita” approach from the first JWEE as presented in 2007.

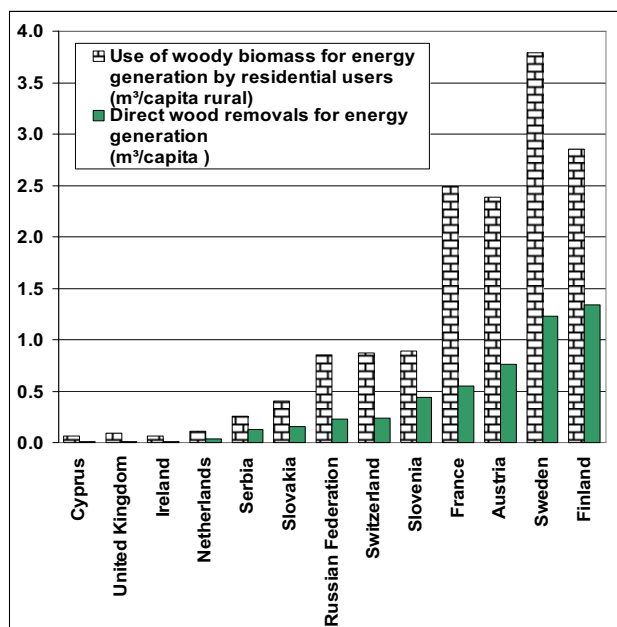


Table 15: Wood energy index per residential / rural inhabitant

In many countries wood energy still seems to play an important role in rural areas. Short transportation distances and sufficient storage space are two important criteria that give advantage to wood energy. The secretariat therefore developed the first index as “**use of woody biomass for energy generation by (rural) residential users**”⁴. This index is helpful as it puts the very large figures of direct wood removals by residential users in context of the number of rural users. Hence France can be grouped together with Austria and Finland with a wood energy index of 2.5-3.0 m³ roundwood equivalent used for energy generation per capita rural citizen. Sweden with a per rural capita consumption of almost 4 m³ roundwood equivalent exceeds significantly the previous three countries.

A first interpretation of the index might also raise the question, why countries like Serbia, Slovakia, Slovenia, or Switzerland range far

⁴ Data extracted from UN population division "World Urbanization Prospects: The 2007 Revision Population Database" on 25 February 2009. Rural population: De facto population living in areas classified as rural. (by national definition).

below these values. A very first result from the German response allows the conclusion that its index ranges around 1.5 m³ / rural inhabitant, which seems to be a good value for this big and relatively densely populated country.

The second index “**Direct wood removals for energy generation m³/capita**” is less significant and does not allow any grouping or interpretation.

Another wood energy indicator was developed in reference to the forest area available for wood supply. Each of the two sub-indexes refers to the same forest area, but compares two totally different figures to this “standard”. The first compares the direct (physical) extraction of woody biomass for energy use per hectare (which with the exception of France) remains below 2 m³ roundwood equivalent/ha.

The second sub-index compares the “theoretical” amount of wood that one would need to be extracted from the forest area if the reported total amount of woody biomass reported for energy supply (from any source to any user) was to be produced domestically.

The difference between these two sub-indexes could give an indication of how well the national forest based sector is integrated with an applied cascaded⁵ use. However this index fails in countries where woody biomass trade, notably a high net import is an issue. This is clearly the case for the Netherlands, where the national forest resource plays an smaller role in the woody biomass supply.

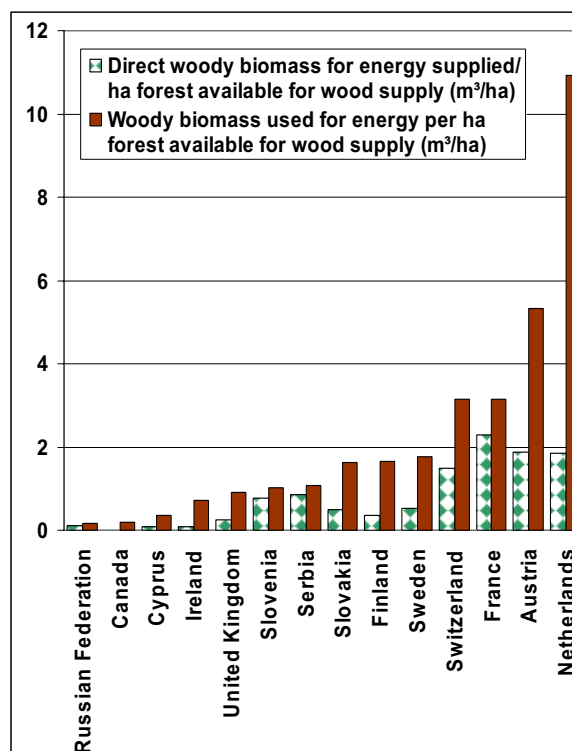


Table 16: Wood energy index per forest area

5. Discussion of results/achievements/comments/feedback

Even though there is scope for further improvements in its structure and conversion factors, the revised version of the JWEE successfully proved that it is now fully operational. It is a unique tool that provides data on wood energy that are requested by the energy, climate and forestry sector. It is compatible with international questionnaires from energy and forestry statistics. Thus it is best placed to collect data on how current and future global economic conditions as well as decisions in energy policies will find their repercussion in the use of woody biomass for energy generation. It will be a unique source of information and will facilitate assessment of the development of wood energy in the future.

Consequently, this information will be very valuable to assess the actual wood potentials in member states and might also be of interest for the national Renewable Energy Action Plans that will be compulsory for any EU member state by 2013.

⁵ Cascaded use describes the fact that wood fibres can be used and re-used and recycled several times for material purposes. The volumes reported under cascaded use can be significant higher than the amount of wood fibres from removals and trade. A higher re-use and recycling will increase the cascaded use factor.

Even though quite a few member states encountered difficulties in supplying all data requested, the main tenor was that the structure provided helpful guidance, pulling together scattered information on wood energy at national level. Most of the UNECE member countries seem to be working on improved wood energy information and assure being able to supply a more complete dataset for a future enquiry.

The timeline and the deadlines of the JWEE 2008 proved to be quite ambitious – the latest responses were sent in late December. Based on this experience, the secretariat therefore would like to suggest that, in case delegates are in favour of a repetition on a biannual cycle, the deadline for submitting wood energy data should be set for the end of November and aim at presenting the results to the Working Party of the subsequent year.

The secretariat would also propose to improve the linkage between Joint Wood Energy Enquiry with the Joint Forest Sector Questionnaire. Sending out the JWEE to member states for the next edition (requesting 2009 data) could be linked with the sending of the JFSQ (requesting 2010 data). This would remove some of the above mentioned reporting difficulties on renewable energy due to tight timelines.

6. Future actions

The UNECE/FAO Timber Section will follow-up important missing states and might consider directly contacting experts on wood energy data (Belarus, Germany, Italy, Romania, Spain, Ukraine and United States). The secretariat will circulate a draft report for data revision – with the final aim of a Discussion Paper and an on-line database on wood energy statistics.

In cooperation with the Latvian Ministry of Agriculture and Riga University, the secretariat will prepare a workshop on improved wood energy data collection on 3-4 June 2009 in Riga. The organizers are considering inviting specialists and experts from neighbouring countries. Financing for this action is still being sought and any contributions would be welcomed.

Wood energy is one of the sub-criteria of the Ministerial Conference on the Protection of Forests in Europe (MCPFE) report on the “State of Europe’s Forests”. Results from the JWEE will be best placed to provide data on the criterion C 6.9 “Energy from wood resources” (share of wood energy in total energy consumption, classified by origin of wood). By request of the MCPFE process, the secretariat will provide the related data for the next State of Europe’s Forest.

The data of the JWEE will provide very useful information to a future Forest Sector Outlook Study and other studies on current and future wood markets.

The secretariat will promote the knowledge and use of JWEE data, results and methodology to all relevant groups - researchers, official representatives (energy, forestry, waste etc.).

The secretariat will further improve and intensify cooperation and communication with the energy sector.

7. Question for delegates

The delegates of the Working Party are invited to:

- express their opinion on the JWEE process so far (structure / communication / timeline / improvements, etc.).
- inform the Working Party about efforts to improve knowledge on wood energy at national level and whether JWEE had contributed to this process.
- provide guidance on future of the JWEE (repeat exercise in two years).

8. ANNEX I -Responses Overview:

Country	JWEE 2005	JWEE 2007	JFSQ Roundwood consumption 2007 (1 000 m3 r)
Albania	no response	data promised	240
Armenia	no capacity	no capacity	69
Austria	good dataset	good dataset	27 791
Azerbaijan	no capacity	no response	27
Canada	good dataset	partial data	189 212
Cyprus	no capacity	good dataset	8
Czech Republic	good dataset	no response	15 992
Estonia	no response	data promised	5 554
Finland	good dataset	good dataset	64 923
France	good dataset	good dataset	60 180
Germany	good dataset	good dataset	58 871
Ireland	no response	good dataset	2 571
Italy	no capacity	no response	14 187
Kazakhstan	no capacity	no capacity	1 027
Kyrgyzstan	no capacity	no response	31
Latvia	no response	data promised	10 239
Liechtenstein	no response	partial data	22
Lithuania	good dataset	data promised	4 937
Netherlands	good dataset	good dataset	898
Norway	good dataset	no capacity	10 358
Poland	no response	no capacity	33 722
Russian Federation	no response	partial data	140 016
Serbia	no response	good dataset	2 914
Slovakia	no response	good dataset	6 986
Slovenia	good dataset	good dataset	3 042
Sweden	good dataset	good dataset	68 449
Switzerland	good dataset	good dataset	4 292
The former Yugoslav Republic of Macedonia	no capacity	no response	815
Turkey	no response	no capacity	20 336
Ukraine	no capacity	no response	12 720
United Kingdom	good dataset	good dataset	8 047
United States	good dataset	data promised	450 367

9. ANNEX II -Country Data:

Austria

Land Area (square kilometres)	82 450
Total population	8 315 427
Population density, pers. per sq. Km	101
Urban population (%)	66%
Rural population (%)	34%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	29 044	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	36 964	...
Total wood energy generation (1 000 m³)	17 853	14 443
Average wood energy consumption (m³/capita)	2.1	1.7
Use of woody biomass for energy generation by residential users (m³/capita rural)	2.4	3.1
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	2.0	...

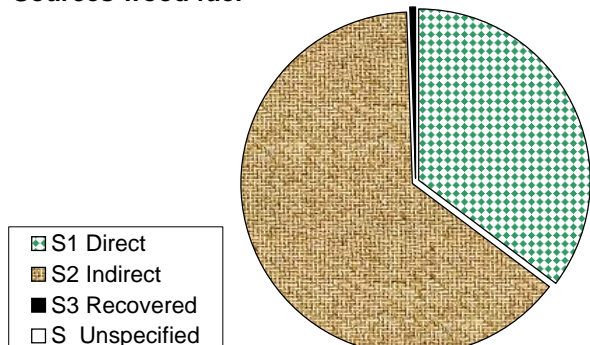
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	5.3	4.3
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	1.6	1.7
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	22%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	36%	...

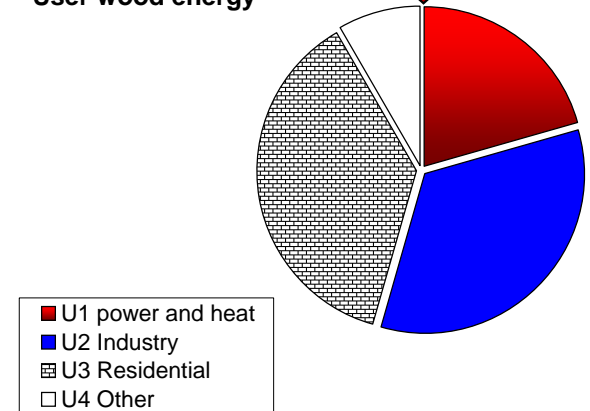
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	1 427 188	1 427 924
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	20.6%	20.4%
Share of energy generated from woody biomass (%)	10.6%	8.6%
Share of energy generated from black liquor (%)	1.8%	...

Austria (2007) Sources wood fuel



Austria (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	4	401	5 438	455	6 298	35.3%
S2 Indirect	3 686	5 640	1 152	989	11 467	64.2%
S3 Recovered	...	...	67	21	88	0.5%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	3 690	6 041	6 657	1 465		
%	21%	34%	37%	8%		
					17 853	

9. ANNEX II -Country Data:

Canada

Land Area (square kilometres)	9 093 507
Total population	32 976 026
Population density, pers. per sq. Km	4
Urban population (%)	80%
Rural population (%)	20%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	198 236	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	199 894	...
Total wood energy generation (1 000 m³)	62 847	47 810
Average wood energy consumption (m³/capita)	1.9	1.4
Use of woody biomass for energy generation by residential users (m³/capita rural)	1.5	0.5
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	...	...

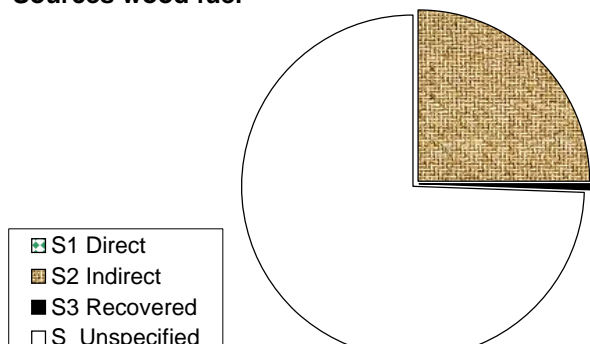
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	0.2	0.2
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	...	0.0
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	...	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	13%	...

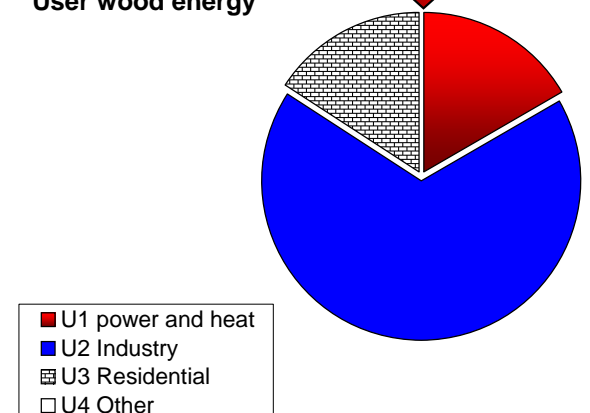
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	8 436 946	8 436 946
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	5.3%	5.3%
Share of energy generated from woody biomass (%)	6.3%	4.8%
Share of energy generated from black liquor (%)	1.5%	...

Canada (2007) Sources wood fuel



Canada (2007) User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	...	...	...	...	...	...
S2 Indirect	...	15 024	612	...	15 636	24.9%
S3 Recovered	348	...	...	...	348	0.6%
S4 Unspecified	10 047	27 434	9 383	0	46 864	74.6%
Sum (S1+S2+S3)	10 395	42 457	9 995	...		
%	17%	68%	16%	...		
					62 847	

9. ANNEX II -Country Data:

Cyprus

Land Area (square kilometres)	9 240
Total population	783 971
Population density, pers. per sq. Km	85
Urban population (%)	69%
Rural population (%)	31%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	25	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	26	...
Total wood energy generation (1 000 m³)	16	...
Average wood energy consumption (m³/capita)	0.0	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.1	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.0	...

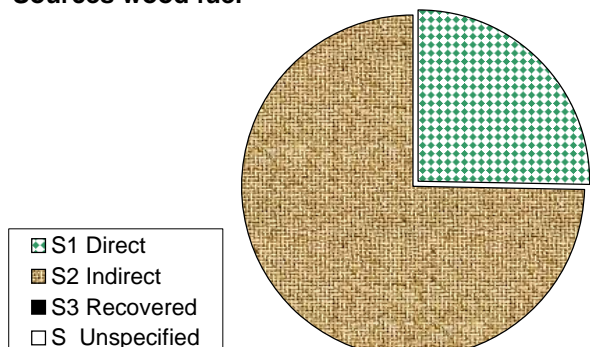
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	0.4	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.0	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	16%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	30%	...

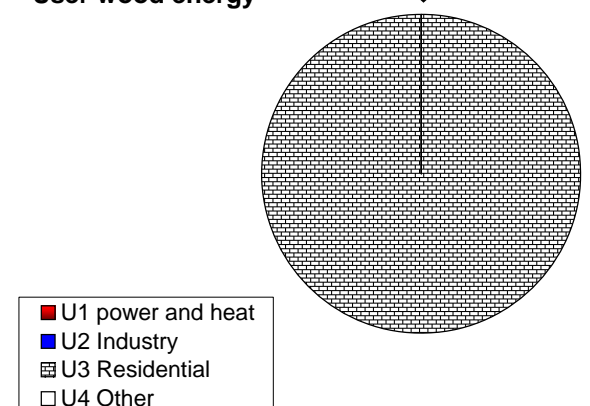
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	109 229	103 245
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	1.9%	1.9%
Share of energy generated from woody biomass (%)	0.1%	...
Share of energy generated from black liquor (%)	...	...

Cyprus (2007) Sources wood fuel



Cyprus (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	4	...	4	25.3%
S2 Indirect	12	...	12	74.7%
S3 Recovered
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	16	...		
%	100%	...		
					16	

9. ANNEX II -Country Data:

Finland

Land Area (square kilometres)	304 590
Total population	5 288 720
Population density, pers. per sq. Km	17
Urban population (%)	62%
Rural population (%)	38%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	56 870	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	69 311	...
Total wood energy generation (1 000 m³)	33 338	32 913
Average wood energy consumption (m³/capita)	6.3	6.2
Use of woody biomass for energy generation by residential users (m³/capita rural)	2.9	2.9
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	2.3	...

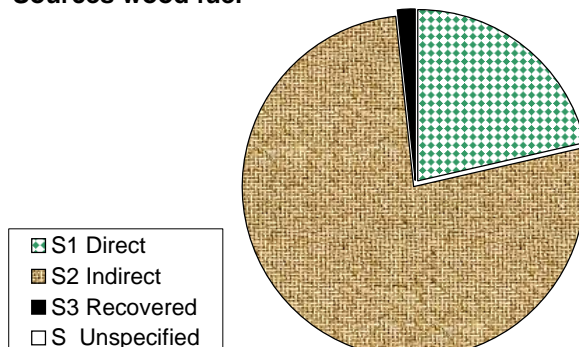
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	1.7	1.6
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.3	0.3
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	12%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	32%	...

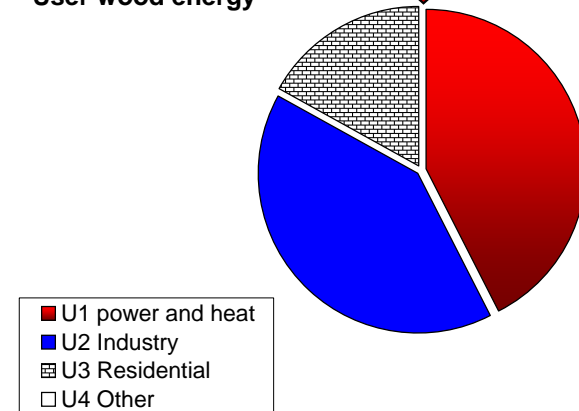
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	1 583 488	1 451 417
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	22.9%	23.3%
Share of energy generated from woody biomass (%)	17.9%	19.2%
Share of energy generated from black liquor (%)	7.5%	...

**Finland (2007)
Sources wood fuel**



**Finland (2007)
User wood energy**



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	2 127	358	4 620	...	7 105	21.3%
S2 Indirect	11 539	13 093	1 063	...	25 695	77.1%
S3 Recovered	510	29	...	...	538	1.6%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	14 176	13 480	5 683	...		
%	43%	40%	17%	...		
					33 338	

9. ANNEX II -Country Data:

France

Land Area (square kilometres)	550 100
Total population	61 707 072
Population density, pers. per sq. Km	112
Urban population (%)	77%
Rural population (%)	23%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	63 191	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	62 021	...
Total wood energy generation (1 000 m³)	46 457	41 265
Average wood energy consumption (m³/capita)	0.8	0.7
Use of woody biomass for energy generation by residential users (m³/capita rural)	2.5	2.6
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	2.3	...

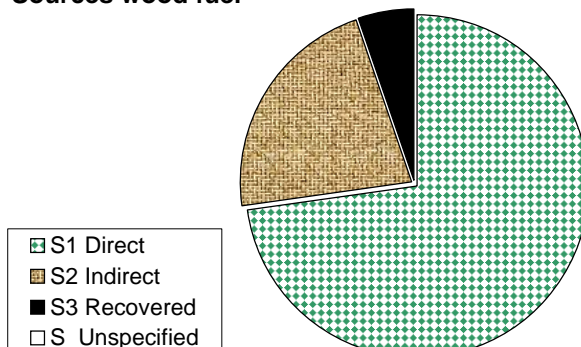
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	3.2	2.8
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	2.0	2.0
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	53%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	44%	...

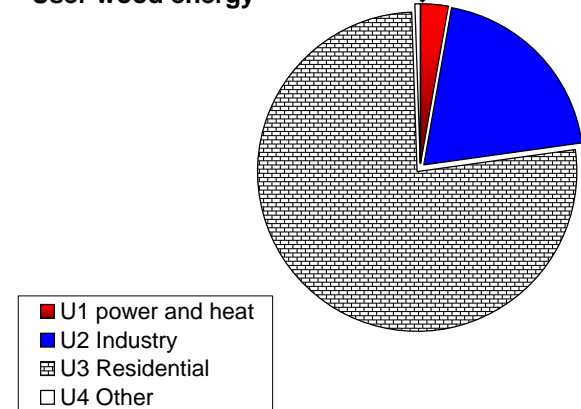
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	11 432 915	11 573 929
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	6.3%	6.1%
Share of energy generated from woody biomass (%)	3.4%	3.0%
Share of energy generated from black liquor (%)	0.3%	...

France (2007)
Sources wood fuel



France (2007)
User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	250	...	33 397	111	33 757	72.7%
S2 Indirect	519	9 274	500	13	10 306	22.2%
S3 Recovered	499	...	1 784	111	2 394	5.2%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	1 268	9 274	35 681	234		
%	3%	20%	77%	1%		
					46 457	

9. ANNEX II -Country Data:

Germany

Land Area (square kilometres)	348 770
Total population	82 217 837
Population density, pers. per sq. Km	236
Urban population (%)	73%
Rural population (%)	27%

Note that these data were received too late to be included in the current analysis and should be considered preliminary.

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	81 178	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	78 880	...
Total wood energy generation (1 000 m³)	53 749	30 271
Average wood energy consumption (m³/capita)	0.7	0.4
Use of woody biomass for energy generation by residential users (m³/capita rural)	1.3	0.6
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.9	...

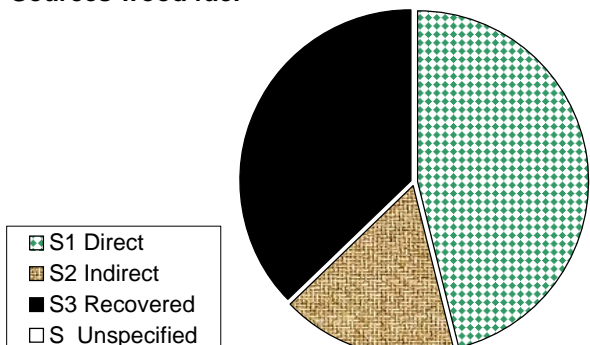
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	4.9	2.8
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	2.3	1.2
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	31%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	27%	...

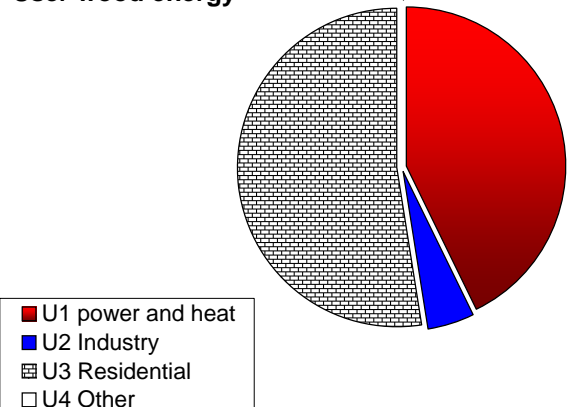
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	14 613 017	14 534 363
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	6.0%	5.0%
Share of energy generated from woody biomass (%)	3.1%	1.8%
Share of energy generated from black liquor (%)	0.1%	...

Germany (2007) Sources wood fuel



Germany (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	5 066	...	19 772	...	24 838	46.2%
S2 Indirect	1 383	2 618	4 971	...	8 972	16.7%
S3 Recovered	16 479	...	3 460	...	19 938	37.1%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	22 928	2 618	28 203	...		
%	43%	5%	52%	...		
					53 749	

9. ANNEX II -Country Data:

Ireland

Land Area (square kilometres)	68 890
Total population	4 356 931
Population density, pers. per sq. Km	63
Urban population (%)	60%
Rural population (%)	40%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	2 775	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	2 829	...
Total wood energy generation (1 000 m³)	471	...
Average wood energy consumption (m³/capita)	0.1	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.1	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.0	...

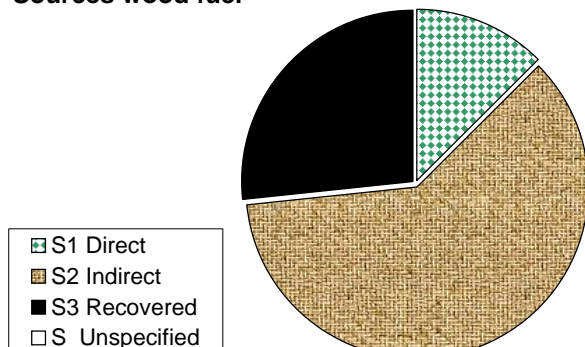
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	0.7	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.1	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	2%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	10%	...

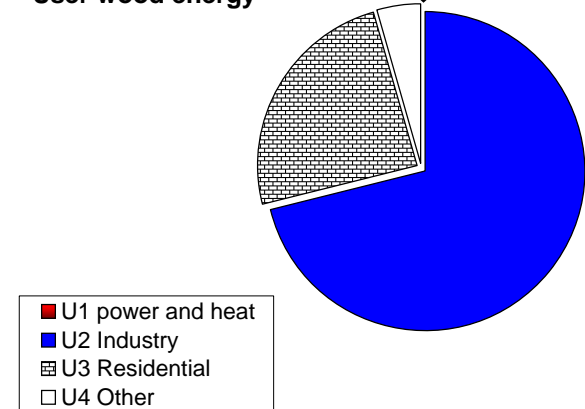
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	649 696	633 152
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	2.7%	2.4%
Share of energy generated from woody biomass (%)	0.6%	...
Share of energy generated from black liquor (%)	...	...

**Ireland (2007)
Sources wood fuel**



**Ireland (2007)
User wood energy**



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	38	21	60	12.6%
S2 Indirect	...	210	76	...	286	60.6%
S3 Recovered	...	126	...	...	126	26.8%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	...	336	114	21		
%	...	71%	24%	5%		
					471	

9. ANNEX II -Country Data:

Liechtenstein

Land Area (square kilometres)	160
Total population	35 262
Population density, pers. per sq. Km	220
Urban population (%)	14%
Rural population (%)	86%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	13	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	7	...
Total wood energy generation (1 000 m³)	14	...
Average wood energy consumption (m³/capita)	0.4	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.0	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	...	...

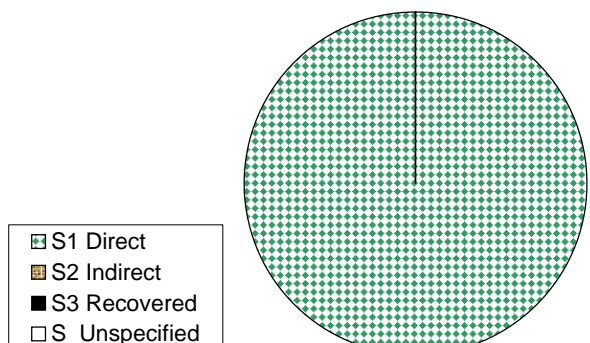
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	3.5	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	1.9	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	108%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	97%	...

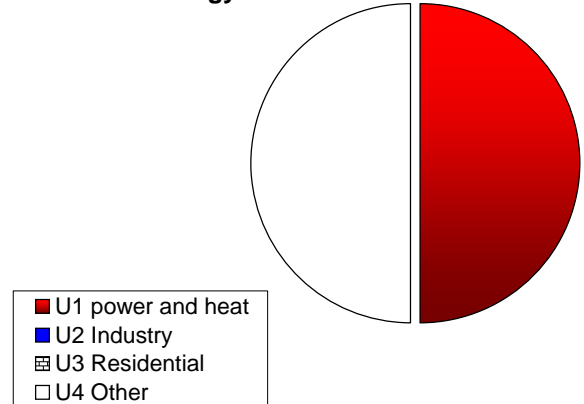
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	...	...
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	...	...
Share of energy generated from woody biomass (%)	...	...
Share of energy generated from black liquor (%)	...	...

Liechtenstein (2007) Sources wood fuel



Liechtenstein (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	7	...	...	7	14	100.0%
S2 Indirect	...	...	...	...	...	...
S3 Recovered	...	...	...	...	...	...
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	7	...	...	7		
%	50%	...	...	50%		
					14	

9. ANNEX II -Country Data:

Netherlands

Land Area (square kilometres)	33 880
Total population	16 381 696
Population density, pers. per sq. Km	484
Urban population (%)	80%
Rural population (%)	20%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	1 222	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	998	...
Total wood energy generation (1 000 m³)	3 224	1 962
Average wood energy consumption (m³/capita)	0.2	0.1
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.1	0.1
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.1	...

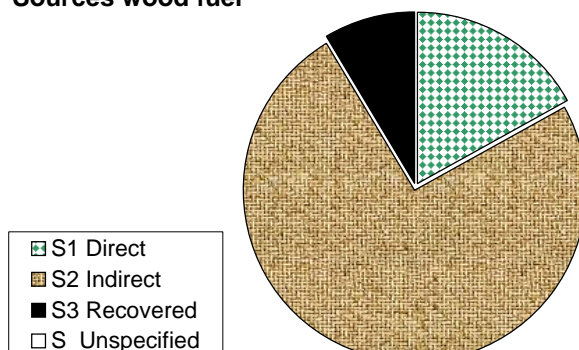
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	10.9	6.7
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	1.5	0.9
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	45%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	62%	...

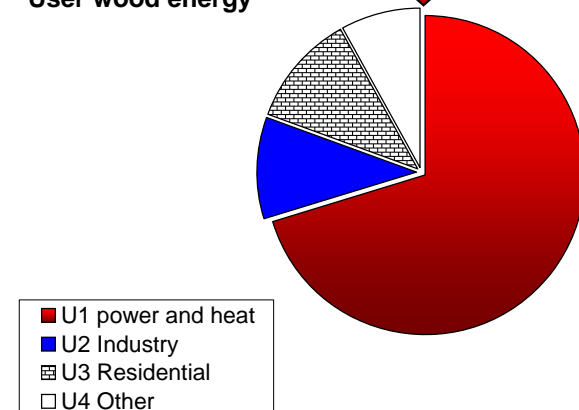
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	3 372 373	3 453 235
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	3.0%	2.7%
Share of energy generated from woody biomass (%)	0.8%	0.5%
Share of energy generated from black liquor (%)	...	...

Netherlands (2007) Sources wood fuel



Netherlands (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	207	...	250	90	548	17.0%
S2 Indirect	1 821	333	112	131	2 398	74.4%
S3 Recovered	238	...	...	40	279	8.6%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	2 267	333	362	262		
%	70%	10%	11%	8%		
					3 224	

9. ANNEX II -Country Data:

Russian Federation

Land Area (square kilometres)	16 381 390
Total population	142 114 903
Population density, pers. per sq. Km	9
Urban population (%)	73%
Rural population (%)	27%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	207 000	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	158 024	...
Total wood energy generation (1 000 m³)	42 800	...
Average wood energy consumption (m³/capita)	0.3	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.9	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.9	...

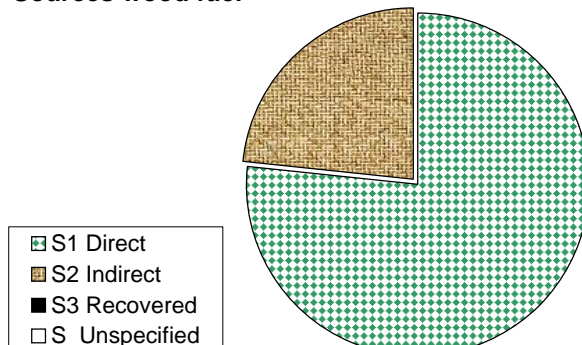
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	0.1	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.0	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	16%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	22%	...

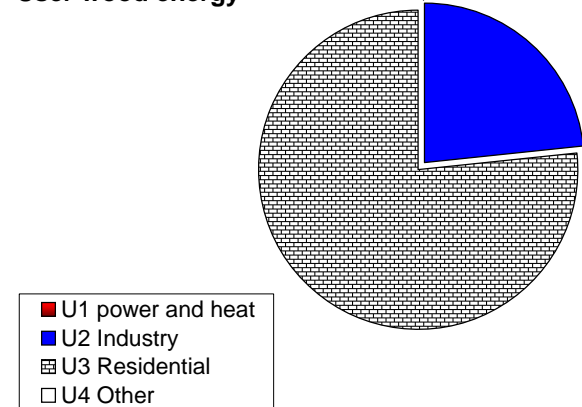
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	18 075 797	18 075 797
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	0.6%	0.6%
Share of energy generated from woody biomass (%)	2.0%	...
Share of energy generated from black liquor (%)	0.5%	...

Russian Federation (2007) Sources wood fuel



Russian Federation (2007) User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	32 800	...	32 800	76.6%
S2 Indirect	...	10 000	...	...	10 000	23.4%
S3 Recovered
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	...	10 000	32 800	...		
%	...	23%	77%	...		
					42 800	

9. ANNEX II -Country Data:

Serbia

Land Area (square kilometres)	88 250
Total population	10 159 046
Population density, pers. per sq. Km	115
Urban population (%)	51%
Rural population (%)	49%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	3 156	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	3 159	...
Total wood energy generation (1 000 m³)	1 642	...
Average wood energy consumption (m³/capita)	0.2	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.3	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.2	...

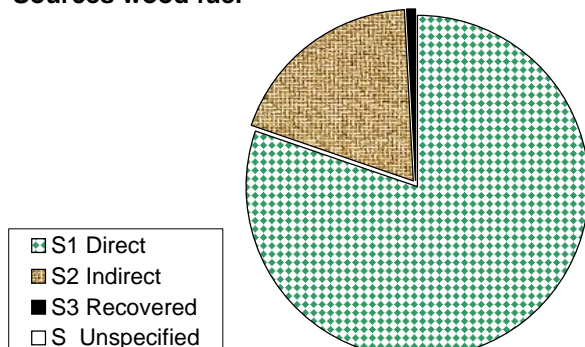
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	1.1	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.7	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	42%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	44%	...

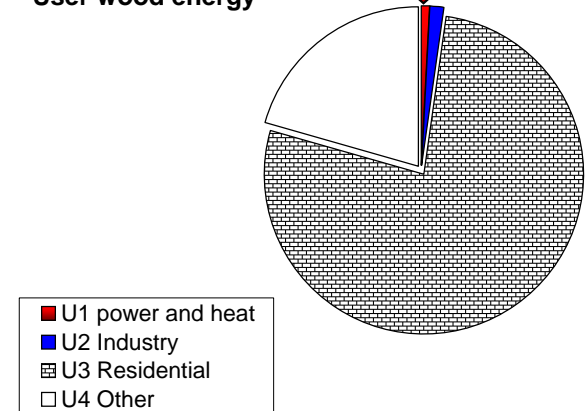
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	430 612	430 612
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	7.8%	7.8%
Share of energy generated from woody biomass (%)	3.2%	...
Share of energy generated from black liquor (%)	...	...

Serbia (2007) Sources wood fuel



Serbia (2007) User wood energy



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	12	6	1 145	154	1 317	80.2%
S2 Indirect	3	17	108	185	313	19.1%
S3 Recovered	...	...	12	...	12	0.7%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	15	23	1 265	339		
%	1%	1%	77%	21%		
					1 642	

9. ANNEX II -Country Data:

Slovakia

Land Area (square kilometres)	48 100
Total population	5 397 318
Population density, pers. per sq. Km	112
Urban population (%)	56%
Rural population (%)	44%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	8 212	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	7 089	...
Total wood energy generation (1 000 m³)	2 866	...
Average wood energy consumption (m³/capita)	0.5	...
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.4	...
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.2	...

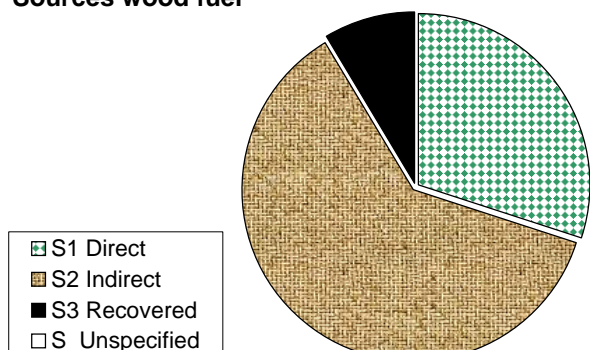
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	1.6	...
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.4	...
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	10%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	25%	...

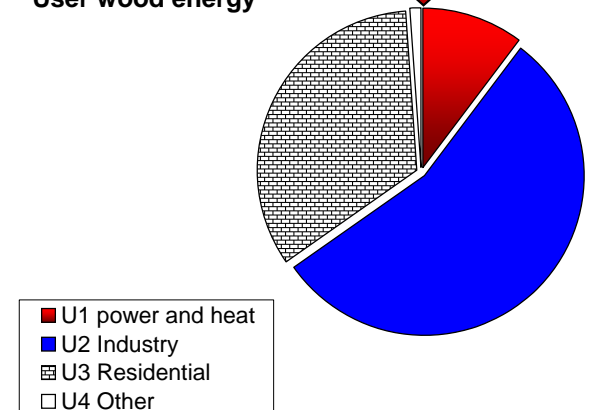
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	788 506	798 034
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	4.7%	4.6%
Share of energy generated from woody biomass (%)	3.1%	...
Share of energy generated from black liquor (%)	0.8%	...

Slovakia (2007) Sources wood fuel



Slovakia (2007) User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	229	49	558	20	857	29.9%
S2 Indirect	69	1 412	266	12	1 759	61.4%
S3 Recovered	...	114	136	...	250	8.7%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	298	1 576	960	32		
%	10%	55%	33%	1%		
					2 866	

9. ANNEX II -Country Data:

Slovenia

Land Area (square kilometres)	20 140
Total population	2 018 122
Population density, pers. per sq. Km	100
Urban population (%)	50%
Rural population (%)	50%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	3 159	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	2 707	...
Total wood energy generation (1 000 m³)	2 819	2 214
Average wood energy consumption (m³/capita)	1.4	1.1
Use of woody biomass for energy generation by residential users (m³/capita rural)	2.1	1.6
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	2.1	...

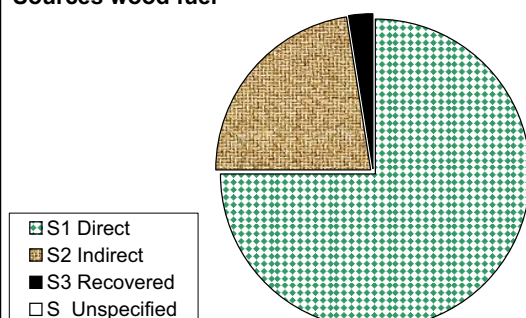
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	2.4	1.9
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	1.6	1.2
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	67%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	100%	...

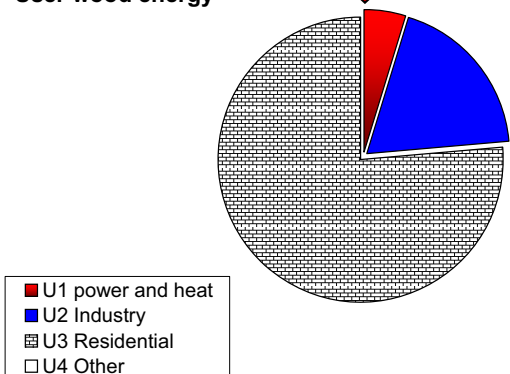
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	307 383	305 595
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	10.5%	10.6%
Share of energy generated from woody biomass (%)	7.8%	6.1%
Share of energy generated from black liquor (%)	...	...

Slovenia (2007) Sources wood fuel



Slovenia (2007) User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	6	...	2 111	...	2 117	75.1%
S2 Indirect	56	536	43	...	635	22.5%
S3 Recovered	67	...	...	...	67	2.4%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	129	536	2 154	...	2 819	
%	5%	19%	76%	...		

9. ANNEX II -Country Data:

Sweden

Land Area (square kilometres)	410 330
Total population	9 148 092
Population density, pers. per sq. Km	22
Urban population (%)	84%
Rural population (%)	16%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	78 057	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	81 587	...
Total wood energy generation (1 000 m³)	37 310	39 377
Average wood energy consumption (m³/capita)	4.1	4.3
Use of woody biomass for energy generation by residential users (m³/capita rural)	3.8	6.2
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	3.1	...

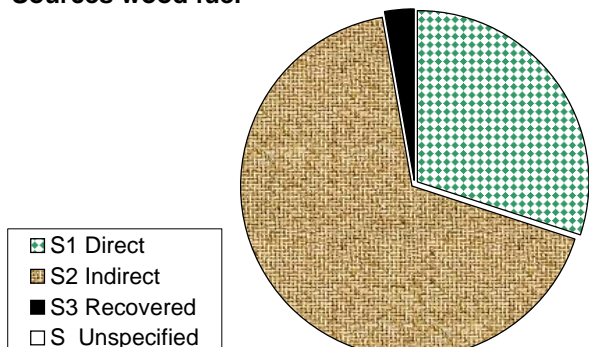
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	1.8	1.9
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.4	0.2
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	14%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	30%	...

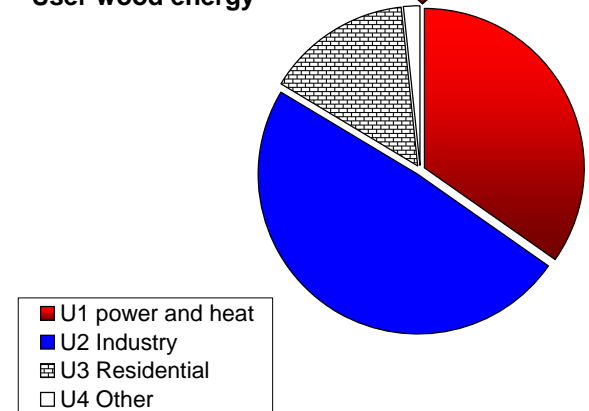
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	2 128 117	2 164 125
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	29.1%	29.6%
Share of energy generated from woody biomass (%)	14.9%	15.4%
Share of energy generated from black liquor (%)	4.6%	...

**Sweden (2007)
Sources wood fuel**



**Sweden (2007)
User wood energy**



[1 000 m3]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	6 274	...	4 514	429	11 217	30.1%
S2 Indirect	5 669	18 255	919	210	25 053	67.1%
S3 Recovered	1 040	...	...	...	1 040	2.8%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	12 983	18 255	5 433	638		
%	35%	49%	15%	2%		
					37 310	

9. ANNEX II -Country Data:

Switzerland

Land Area (square kilometres)	40 000
Total population	7 551 117
Population density, pers. per sq. Km	189
Urban population (%)	73%
Rural population (%)	27%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	6 491	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	5 328	...
Total wood energy generation (1 000 m³)	3 715	3 785
Average wood energy consumption (m³/capita)	0.5	0.5
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.9	0.6
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.6	...

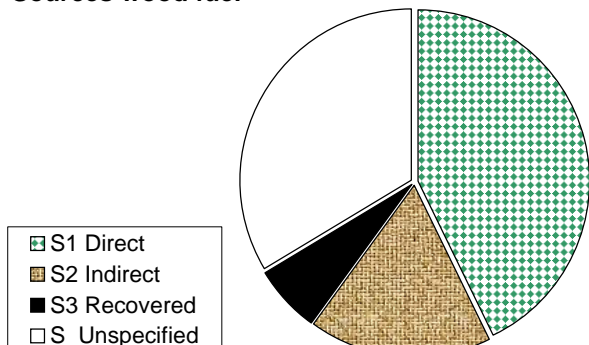
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	3.1	3.2
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	1.4	1.5
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	27%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	42%	...

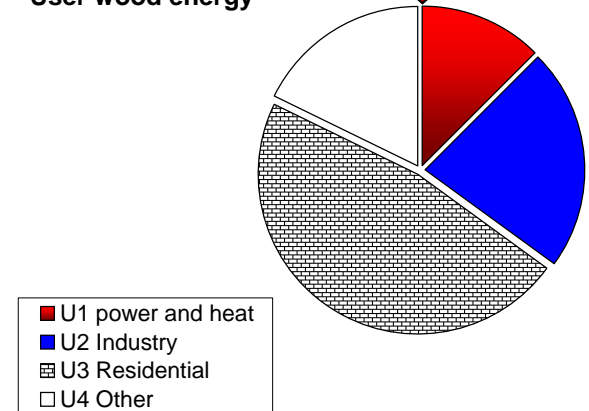
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	1 176 291	1 125 929
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	16.3%	16.7%
Share of energy generated from woody biomass (%)	2.7%	2.9%
Share of energy generated from black liquor (%)	...	...

**Switzerland (2007)
Sources wood fuel**



**Switzerland (2007)
User wood energy**



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	...	...	1 120	358	1 771	47.7%
S2 Indirect	...	...	308	273	717	19.3%
S3 Recovered	265	...	...	...	265	7.1%
S4 Unspecified	202	831	331	26	1 391	...
Sum (S1+S2+S3)	467	831	1 760	657		
%	13%	22%	47%	18%		
					3 715	

9. ANNEX II -Country Data:

United Kingdom

Land Area (square kilometres)	241 930
Total population	61 001 341
Population density, pers. per sq. Km	252
Urban population (%)	90%
Rural population (%)	10%

	2007	2005
Woody biomass removals from forests and outside forests (1 000m³)	9 118	...
Gross domestic supply (including trade) of woody biomass from forests and outside forests (1 000 m³)	8 659	...
Total wood energy generation (1 000 m³)	2 344	1 562
Average wood energy consumption (m³/capita)	0.0	0.0
Use of woody biomass for energy generation by residential users (m³/capita rural)	0.1	0.1
Direct woody biomass removal for energy generation in residential use (m³/capita rural)	0.0	...

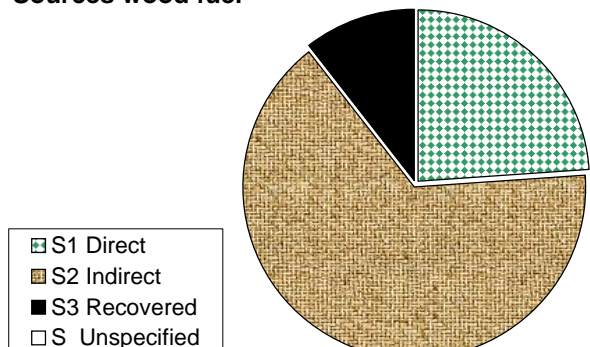
Role of wood energy for the forest sector:

Total woody biomass used for energy per ha forest available for wood supply (m³ roundwood equivalent/ha)	1.0	0.7
Direct mobilization of woody biomass for energy production from forests and outside forests (m³/ha)	0.2	0.2
Share of direct woody biomass removals for energy purposes from forests and outside forests (%)	6%	...
Share of woody biomass for energy production in total domestic woody biomass supply (including cascaded use) (%)	10%	...

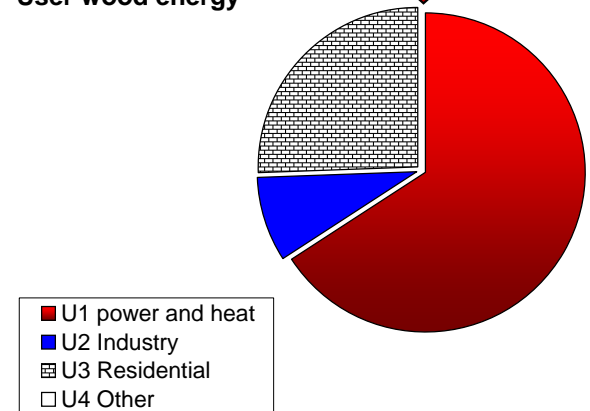
Role of wood energy for the energy sector:

Total gross inland consumption (TJ)	9 609 764	9 768 256
Share of renewable energy sources (hydro, wind, solar heat & PV, waste, geothermal and solid biomass) (%)	1.8%	1.6%
Share of energy generated from woody biomass (%)	0.2%	0.1%
Share of energy generated from black liquor (%)	...	...

United Kingdom (2007) Sources wood fuel



United Kingdom (2007) User wood energy



[1 000 m³]	U1 Power and heat	U2 Industrial	U3 Residential	U4 Other	Sum (U1+U2+U3)	%
S1 Direct	216	111	235	...	562	24.0%
S2 Indirect	1 081	92	362	...	1 534	65.4%
S3 Recovered	248	...	...	...	248	10.6%
S4 Unspecified	0	0	0	0	0	...
Sum (S1+S2+S3)	1 545	202	596	...		
%	66%	9%	25%	...		
					2 344	