

Wood continues to be the primary source of renewable energy in Europe

Wood energy supply

Wood energy accounts for 3.5% of the total primary energy supply (TPES) and 38.2% of the renewable energy supply (RES) in the UNECE region¹, making it an important source of renewable energy. Woody biomass covers 21 to 23% of the primary energy demands of Finland and Sweden and 14 to 16% of the primary energy demands of Estonia and Austria. Woody biomass accounts for over half of the renewable energy supply in the Nordic and Baltic states as well as in Armenia, Republic of Moldova, Serbia, Slovenia, Czech Republic and Luxembourg. Around 42% of the total mobilised woody biomass supply is used for energy purposes.

These are the main conclusions of the UNECE/FAO Joint Wood Energy Enquiry (JWEE), a biennial questionnaire that aims to shed light on the real role of wood energy within the region by promoting cross-sectoral communication and cooperation between the energy and forestry sectors in the member States. Now in its fifth round since 2005, the JWEE has become a reference source of information on wood energy, drawing responses from an increasing number of countries.

Sources of wood energy

Co-products and residues² from the forest-based industries contribute 62% of the wood fibres for energy generation. Processed wood fuels with improved energy content such as wood pellets, briquettes and charcoal are also included under this category. 31% of the wood fibres for energy generation derive directly from woody biomass from forests and wooded areas outside forests. However, the proportion varies among countries with Armenia, Hungary, Macedonia, Moldova, Azerbaijan, Serbia, Croatia, Bosnia and Herzegovina, Slovenia and Czech Republic relying heavily (60% or more) on direct supplies (such as firewood) of wood fibres whereas countries such as the United States, Canada, United Kingdom, Ireland, Sweden, Austria and Finland rely mainly (60% or more) on wood supply from indirect sources such as co-products. The United States (48%), Sweden (42%), Finland (41%) and Canada (29%) have large shares of energy generated from black liquor reflecting the relative importance of the pulp and paper industries in the forest sector for the generation of wood energy. Overall, recovered waste wood (mainly waste from construction, but also packaging and old furniture) constitutes a minor category contributing 4.5% of wood energy. It is mainly consumed in power applications and waste to energy plants. In general, however, data on recovered wood is difficult to obtain and often not discernible from generic waste statistics. It is reported as a significant source of wood energy in the Netherlands, Germany, Switzerland, Ireland, Croatia and France.

12 member States³ provided information on the wood sources of processed wood fuels with improved energy content (wood charcoal, wood pellets, wood briquettes and cellulose based ethanol). 70% of wood for wood charcoal derives from primary solid biomass while 28% derives from solid co-products. Wood pellets as well as wood briquettes are mainly produced out of solid co-products (74% and 92%). Only a minor share of wood (20%) for wood pellets derives from primary solid biomass. The only country which reported raw material input for the production of cellulose based ethanol was Canada where cellulose based ethanol is produced out of 100% non-hazardous wood waste.

Uses of wood energy

Wood energy is consumed in roughly equal measure by industry (49.2%) and final consumers (34.2%). Forest-based industries account for 75% of industrial use and households account for 93% of final consumption. The highest shares

¹ The JWEE 2013 was sent out to all the UNECE member states (except Andorra, Monaco and San Marino). Overall 27 countries replied to the enquiry representing 48% of the countries in the UNECE region: 26 countries provided good quality data (Armenia, Austria, Azerbaijan, Bosnia and Herzegovina, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Luxembourg, Netherlands, Norway, Republic of Moldova, Serbia, Slovenia, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, the United Kingdom and the United States).

² These co-products can be solid (sawdust, chips, slabs, etc.) or liquid (e.g. black liquor or tall oil).

³ Bosnia and Herzegovina, Canada, Croatia, Cyprus, Finland, France, Ireland, Netherlands, Serbia, Slovenia, Switzerland and the United Kingdom

of industrial use are in Canada, the United States, Ireland, Sweden and Finland. The forest products industry typically consumes energy generated from the solid and liquid co-products of its manufacturing processes. Countries with important forest industries, such as Finland, Sweden, Canada and the United States therefore have a higher share of industrial consumption. Residential use, mainly dependent on primary solid biomass sources, is prevalent in most reporting countries except Canada, Cyprus and Iceland where mainly wood charcoal is used for energy generation in the residential sector. The power and heat sector is the most important consumer of wood energy in Denmark, Netherlands and the United Kingdom, and has relatively large shares in Estonia, Switzerland, Sweden, Finland, Austria and Ireland.

Main Trends⁴

To assess the development of the use of wood energy and to provide a comparison the group JWEE12 is based on the 12 countries that have responded to all rounds of the enquiry (Austria, Cyprus, Finland, France, Germany, Ireland, Luxembourg, Serbia, Slovenia, Sweden, Switzerland and the United Kingdom). The results from these countries confirm the increasing total amount of wood used for energy in the ECE region and the continuing predominant role of wood in renewables. Between 2007 and 2013, the amount of wood used for energy purposes grew annually by 5.4%. The role of wood in TPES grew from 4.4% to 5.8% during this period. The share of wood in renewables (RES) was 48.6% in 2013 - a decline of 1.5 percentage points recorded between 2007 and 2013. This perhaps reflects the faster rates of growth of other sources of renewable energy such as wind and solar and the overall growth of renewables.

A larger share of the wood supply is being mobilised for energy purposes as confirmed by the substantial increase in the reported energy use of wood (38.9% in 2007 to 46.5% in 2013). The share of the sources of wood energy is relatively stable whereas in the use of wood energy there has been a drop of 4% in the power and heat category from 2007 to 2013 combined with a 5% increase in use of wood energy in the wood processing industry. Wood energy used in the residential sector decreased by 2% in this period.

Consumption of wood pellets further increased in 2013 as 38.8 kg wood pellet were consumed per capita in the 12 countries that reported figures from 2007 to 2013. In comparison to wood pellet consumption in 2007 the amount increased by 144%. In 2013 the United Kingdom (3.5 million mt), the United States (2.9 million mt), Denmark (2.3 million mt), Sweden (1.9 million mt) and Germany (1.9 million mt) were the countries with highest wood pellet consumption.

One of the biggest movers, in relative terms, is the United Kingdom where wood now accounts for 1.4% of TPES (up from 0.1% in 2005). After a sharp increase of the share of wood energy in the RES between 2005 and 2011 (from 7.9% to 27.4%), a slight decrease (1%) was recorded between 2011 and 2013.

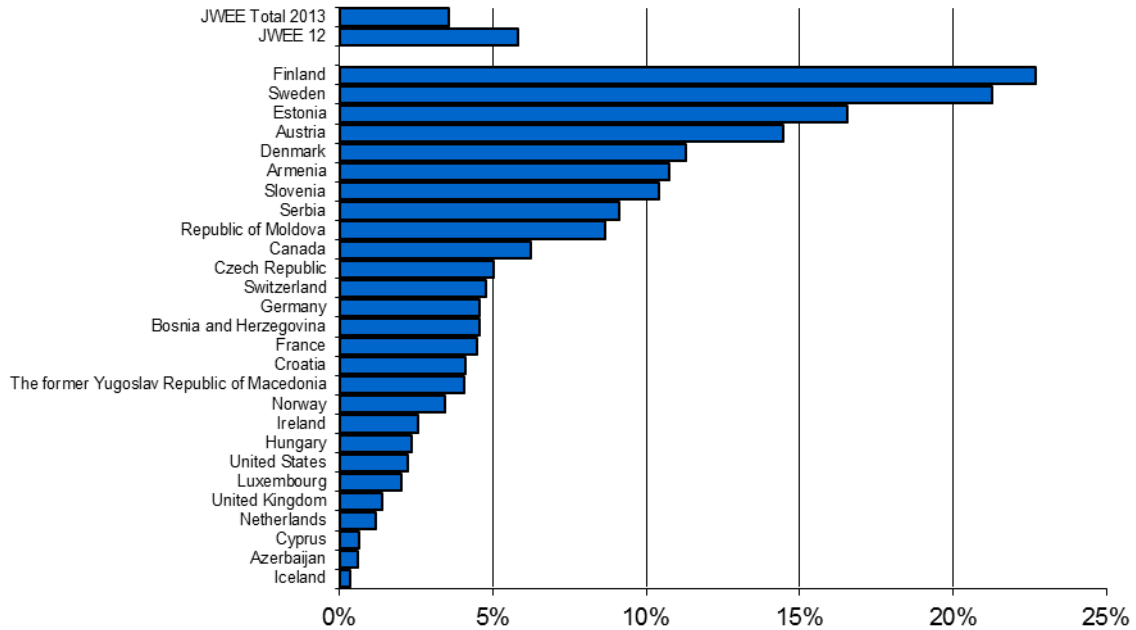
Further Info:

The complete datasheets can be downloaded at <http://www.unece.org/forests/jwee> For any additional comments or questions kindly contact:

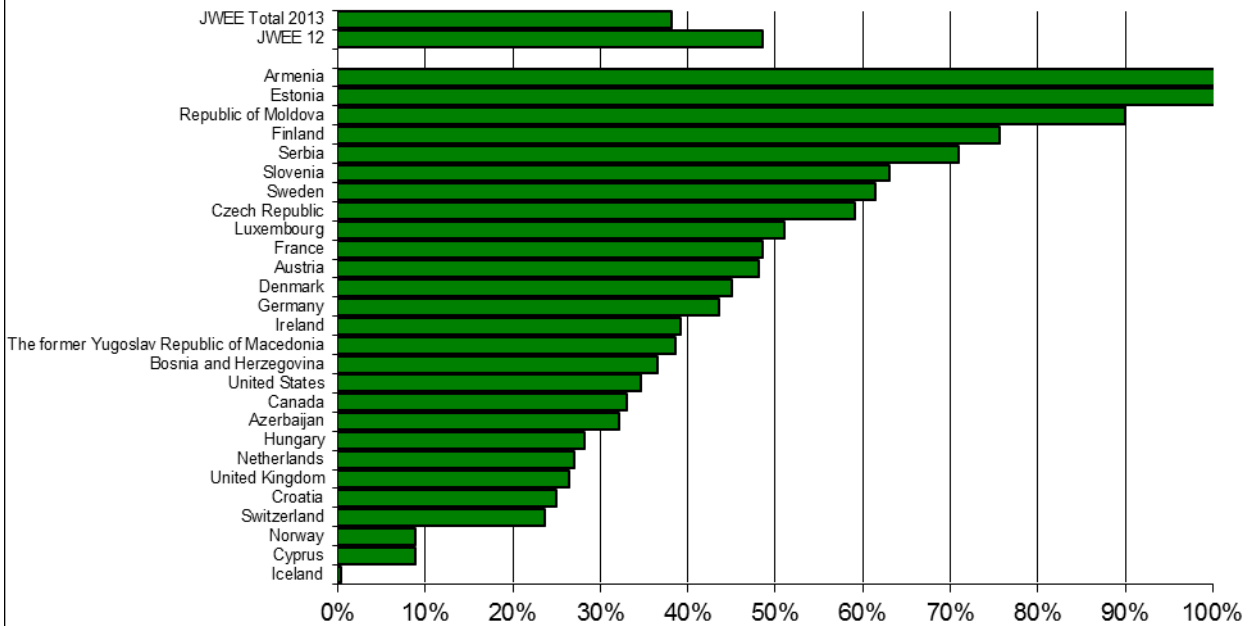
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⁴ Trends are only indicative as technical factors such as conversion factors and structural changes in national and international methodologies have an influence on results.

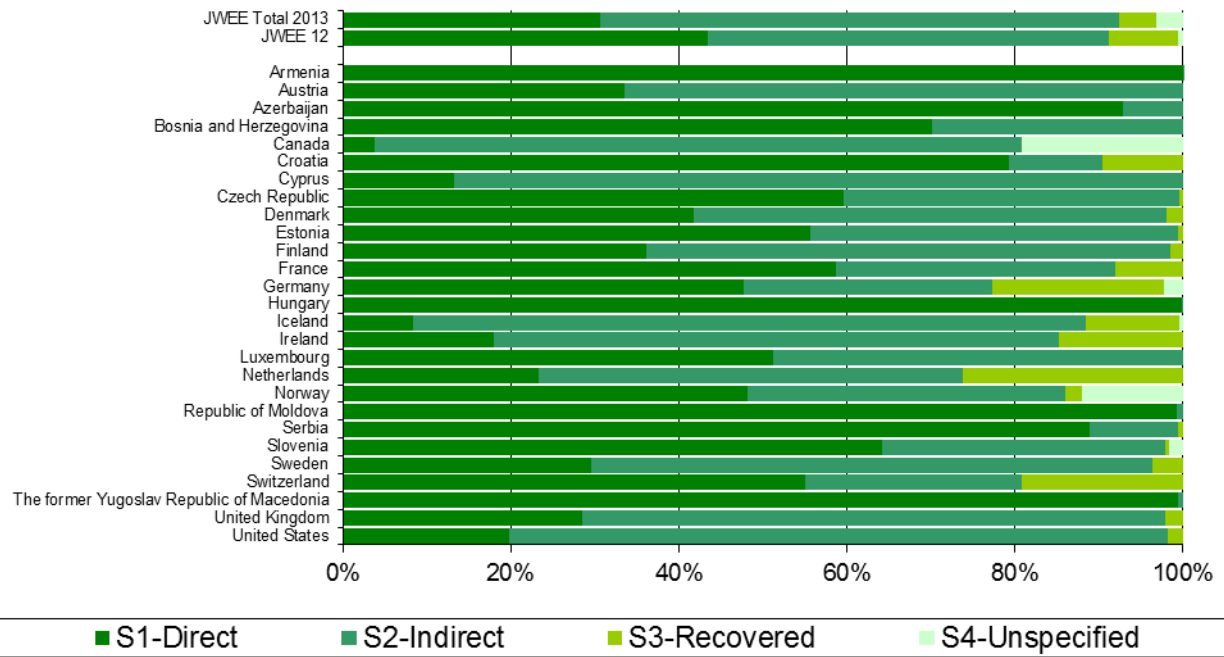
Share of woody biomass in total primary energy supply 2013



Share of woody biomass in renewable energy situation, 2013



Relative share of wood energy sources, 2013



Relative share of wood energy uses, 2013

