

Where does wood energy come from?

Long-term trend of more efficient use of wood resource

Detailed data on energy wood sources confirm indirect wood supply a primary source

The UNECE/FAO Joint Wood Energy Enquiry (JWEE) 2019 was sent out to all UNECE member states. Overall 26 countries replied to the enquiry representing 46% of the countries in the UNECE region¹. Although overall country replies slightly decreased compared with 2017, the number of countries providing good quality data remained stable.

Wood energy supply

Final results reveal that wood energy accounts for 3.9% of the total primary energy supply (TPES) and 34.6% of the renewable energy supply (RES) in the UNECE region, remaining the leading source of renewable energy. Woody biomass plays a major role in domestic energy consumption in Finland (27.1% of the primary energy demands) followed by Sweden (20%). Woody biomass accounts for over half of the renewable energy supply in Austria, Belarus, Czech Republic, Finland, Lithuania, Portugal, Poland Serbia, Slovenia and Ukraine. Around 42.9% 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 seventh 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

Indirect sources including co-products and residues² from the forest-based industries and processed wood-based fuels contribute 46.5% of the wood fibres for energy generation. The source of wood fibre for wood pellets³ is 47.8% from indirect sources, 52.2% from direct sources.

46.3% of the wood fibres for energy generation derive directly from woody biomass from forests and wooded areas outside forests. The proportion varies among countries with Armenia, Croatia, Czech Republic, Georgia, Poland, Serbia and Ukraine relying heavily (60% or more) on direct supplies of wood fibres whereas countries such as Austria, Bulgaria, Bosnia and Herzegovina, Canada, Cyprus, Finland, Greece, Iceland, Sweden, United Kingdom and the United States of America rely mainly (60% or more) on wood supply from indirect sources.

The Finland (44.9%), Sweden (40.9%), the United States (39.7%) and Portugal (29.2%) have large shares of wood energy generated from black liquor reflecting the relative importance of the pulp and paper industries in the forest sector. Across all countries that reported data for 2019, black liquor accounted for 19.6% of energy generated from wood.

Overall, recovered post-consumer wood (mainly wood waste from construction, but also packaging and old furniture) constitutes a minor category contributing 6.2% 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 France, Germany, the Netherlands Switzerland and the United Kingdom (10% or more).

¹ Armenia, Austria, Belarus, Bulgaria, Croatia, Cyprus, Czech Republic, Finland, France, Georgia, Germany, Greece, Iceland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Serbia, Slovenia, Sweden, Switzerland, Ukraine, United Kingdom, United States. These are not necessarily the same reporting countries as in past years.

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

³ Weighted average of available information in 2019 for Austria, Finland, France, Serbia, Slovenia, Switzerland, United Kingdom and the United States of America.

Users of wood energy

Households are the main consumer of wood energy, with overall 38.2% of wood consumed in 2019. The wood processing sector ranks second with 33.3% of wood used for energy followed by the power and heat sector with 27.9%. The highest shares of wood energy use in the power and heat sector were reported from Belarus, Lithuania, the Netherlands and the United Kingdom. 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 Bulgaria, Finland, Sweden and the United States of America therefore have a higher share of industrial consumption. Residential use, mainly dependent on primary solid biomass sources, is most important in Western Balkan, Eastern Europe, Caucasus and Central Asian countries but also the Czech Republic, France and Italy with all more than 2/3 of their wood energy generated by households.

Main Trends⁴

Based on a subset of 10 countries that have responded to all rounds of the enquiry (Austria, Cyprus, Finland, France, Germany, Serbia, Slovenia, Sweden, Switzerland and the United Kingdom) it was possible to assess the development of the use of wood energy across all reporting years. The results from these countries confirm the continuing predominant role of wood in renewables. Total wood energy consumption increased from 200 million m³ in 2009 to 279 million m³ in 2019. The role of wood energy in the overall contribution to the Total Primary Energy Supply (TPES) in the ten reporting countries increased from 4.4% in 2007 to 6.9% in 2019. The share of wood in renewables (RES) decreased slightly over the past ten years due to strong support to other sources of renewable energy such as wind and solar. The share of wood energy in the renewable energy portfolio decreased from 44.6% in 2009 to 42.9% in 2019.

The trends assessed based on the set of ten countries providing data for the last ten years indicates that the wood processing industries were the most dynamic in increasing the wood energy generation in absolute and relative terms, outcompeting private households and the main activity producers. The forest-based industries increased the use of wood for energy from 58.7 million m³ in 2009 to 85.7 million m³ and increase by 27 million m³ (46%). The second most dynamic sector were the commercial power and heat producer, which increased the wood used for energy generation from 54.5 million m³ in 2009 to 77.8 million m³ in 2019 and increase be 23.3 million m³ (43%). Wood energy consumption by households evolved at a slower pace, but households are still the main consumer of wood energy. Households consumed 101.3 million m³ in 2019 and increase by 19.7 million m³ (24%) from the 81.6 million m³ in 2009.

Consumption of wood pellets dramatically increased again in 2019. In 2009 19.2 kg wood pellets were consumed per capita while this figure increased to 67.9 kg in 2019. The leading consumer of wood pellets was the United Kingdom.

One of the biggest movers, in relative terms, is the United Kingdom where wood now accounts for 12.2% of TPES (up from 3.2% in 2009). 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. However, in 2015 the share almost doubled to 41.4%. In 2017 the share of wood energy in RES dropped to 40.4% and recovered to 42.7% in 2019.

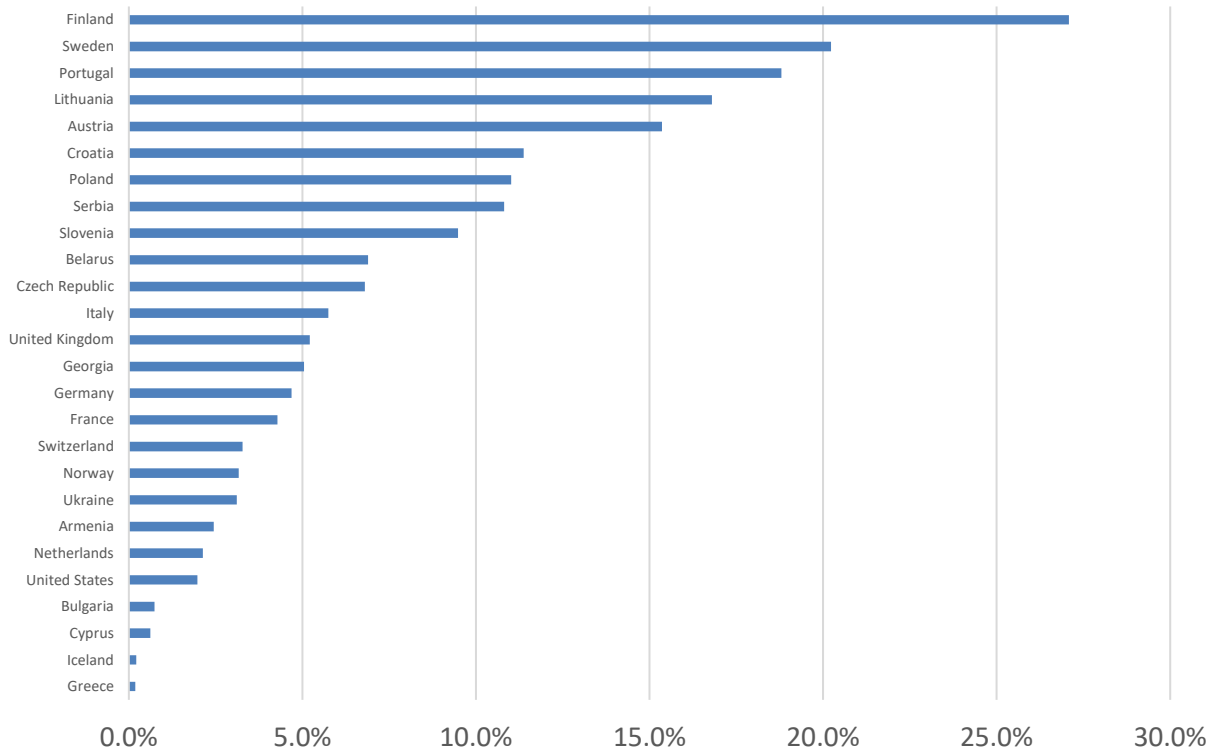
Further Info:

Trends can best be seen at the national level using the country profiles available at <http://www.unece.org/forests/jwec> along with a complete database. For any additional comments or questions kindly contact:

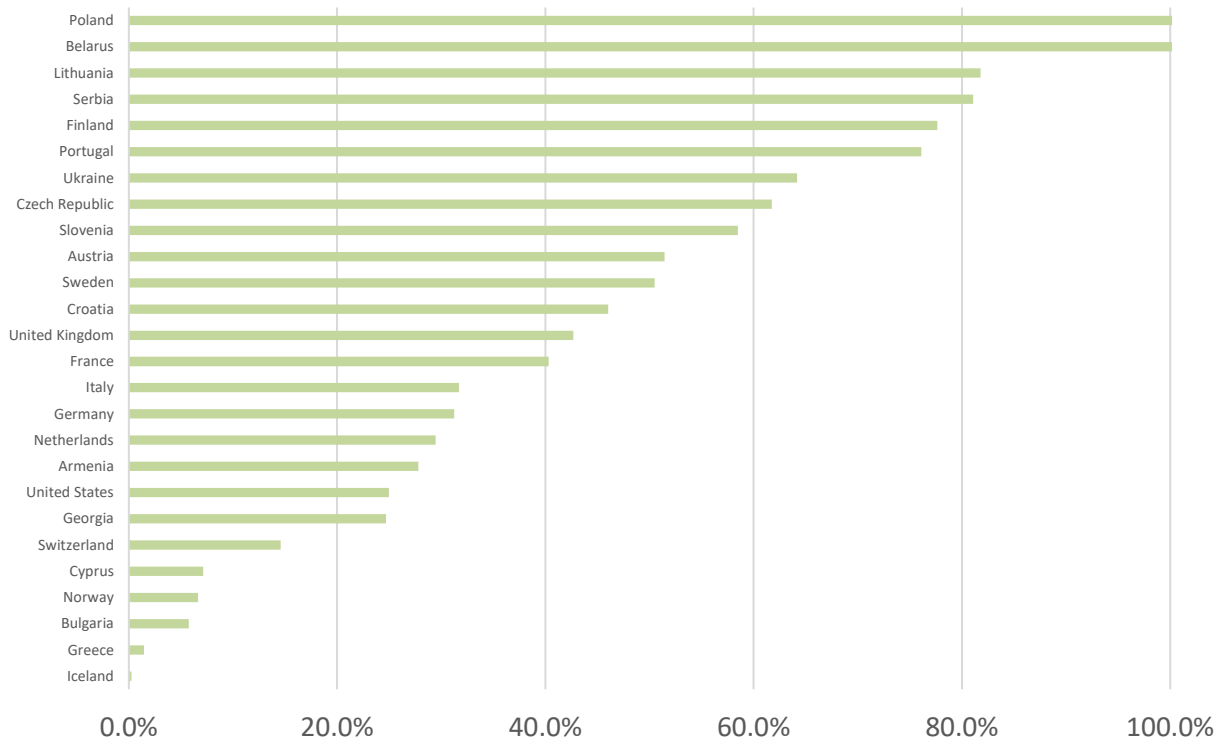
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⁴ Trends are only indicative as technical factors such as conversion factors and structural changes in national and international methodologies have an influence on results.

Share of woody biomass in Total Primary Supply (%) in 2019



Share of woody biomass in Renewable Energy Supply RES (%) in 2019



Relative share of wood energy sources (2019)



Relative share of wood energy users (2019)

