

## Where does wood energy come from? Long-term trend of more efficient use of wood resource

### Detailed data on energy wood sources show indirect wood supply now accounts for largest share

The UNECE/FAO Joint Wood Energy Enquiry (JWEE) 2017 was sent out to all UNECE member states. Overall 31 countries replied to the enquiry representing 54% of the countries in the UNECE region<sup>1</sup>. Although overall country replies slightly decreased compared with 2015, the number of countries providing good quality data remained stable.

#### Wood energy supply

Final results reveal that wood energy accounts for 3.8% of the total primary energy supply (TPES) and 35.4% of the renewable energy supply (RES) in the UNECE region, remaining the leading source of renewable energy. Woody biomass covers 26.2 to 19.6% of the primary energy demands of Finland and Estonia and 19.3 to 17.3% of the primary energy demands of Sweden and Lithuania. Woody biomass accounts for over half of the renewable energy supply in Austria, Belarus, Czech Republic, Estonia, Finland, Lithuania, Serbia, Slovak Republic, 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 residues<sup>2</sup> from the forest-based industries and processed wood-based fuels contribute 50.9% of the wood fibres for energy generation. The source of wood fibre for wood pellets<sup>3</sup> is 75.6% from indirect sources, 23.2% from direct sources and 1.1% from post-consumer wood.

33.8% 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, Azerbaijan, Croatia, Czech Republic, Georgia, Italy, North Macedonia, Serbia and Ukraine relying heavily (60% or more) on direct supplies of wood fibres whereas countries such as Austria, Bosnia and Herzegovina, Canada, Cyprus, Finland, Iceland, Liechtenstein, Luxembourg, Sweden and United Kingdom rely mainly (60% or more) on wood supply from indirect sources.

The United States (47.7%), Finland (42.4%), Sweden (40.0%) and Canada (31.6%) 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 post-consumer wood (mainly wood waste from construction, but also packaging and old furniture) constitutes a minor category contributing 5.3% 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 Germany, Ireland, Netherlands and Switzerland.

---

<sup>1</sup> Armenia, Austria, Azerbaijan, Belarus, Bosnia and Herzegovina, Canada, Croatia, Cyprus, Czech Republic, Estonia, Finland, France, Georgia, Germany, Iceland, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, Netherlands, North Macedonia, Norway, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Ukraine, United Kingdom and United States. These are not necessarily the same reporting countries as in past years.

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

<sup>3</sup> Weighted average of available information in 2017 for Belarus, Bosnia and Herzegovina, Canada, Croatia, Estonia, France, Ireland, Netherlands, Serbia, Slovak Republic, Slovenia, Switzerland and the United Kingdom.

## Uses of wood energy

Wood energy is consumed in roughly equal measure by industry (39.3%) and other final consumers (40.3%). The residential sector accounted for 89.3% of wood energy consumed by other final consumers. Wood energy consumption in the power and heat sector accounted for 20.4%. The highest shares of wood energy use in the power and heat sector were reported from Belarus, Estonia, Ireland, Lithuania, Luxembourg and 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 Bosnia Herzegovina, Canada, Finland, Sweden and United States therefore have a higher share of industrial consumption. Residential use, mainly dependent on primary solid biomass sources, is most important in central Asian countries, Liechtenstein, North Macedonia and Serbia.

## Main Trends<sup>4</sup>

Based on a subset of 12 countries that have responded to all rounds of the enquiry (JWEE12 - Austria, Cyprus, Finland, France, Germany, Ireland, Luxembourg, 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 193 million m<sup>3</sup> in 2007 to 265 million m<sup>3</sup> in 2017. The role of wood in TPES increased from 4.4% in 2007 to 5.9% in 2013. Since 2013 the share of wood energy in TPES remained constant at 6%. The share of wood in renewables (RES) was 43.0% in 2017 - a decline of 7.1 percentage points recorded between 2007 and 2017. 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 46.9% in 2017). Data reveals the tendency that member states increasingly source wood energy from indirect sources and less wood directly from the forests (from 46.5% in 2007 to 53.2% in 2017). Also wood energy use in the industry and residential sector decreased while power and heat sector consumed more wood for energy.

Consumption of wood pellets dramatically increased in 2017. In 2007 16.2 kg wood pellets were consumed per capita while this figure increased to 55.2 kg in 2017. 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 3.9% 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. However, in 2015 the share almost doubled to 41.4%. In 2017 the share of wood energy in RES dropped to 40.4%.

## Further Info:

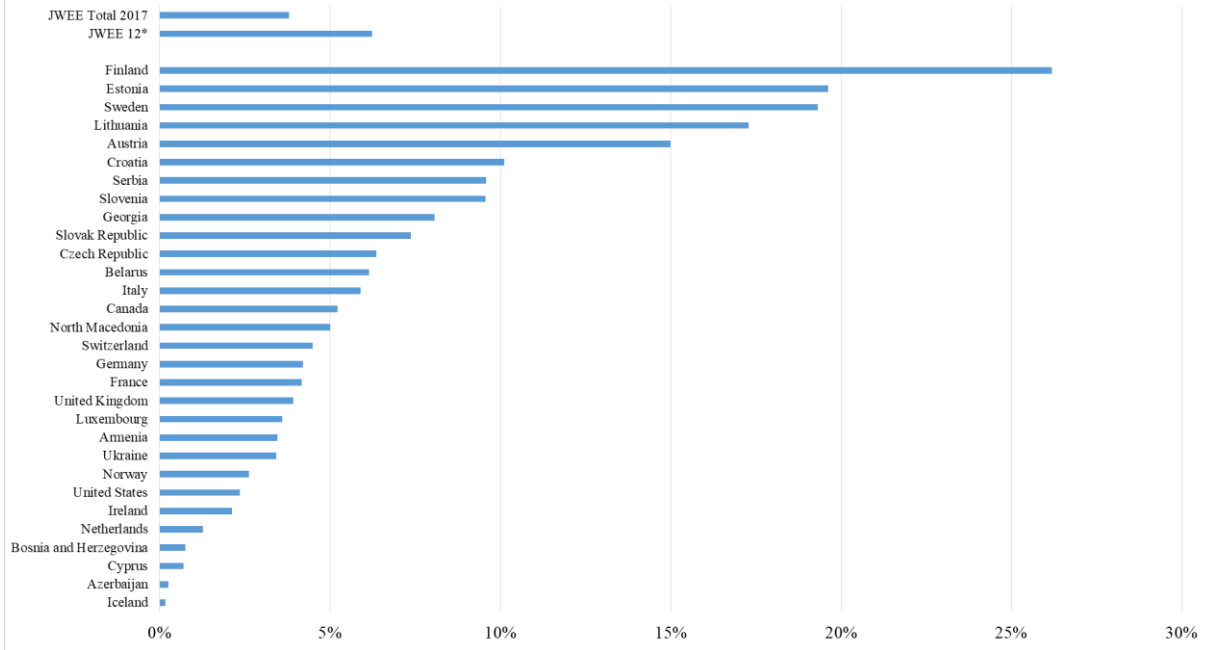
Trends can best be seen at the national level using the country profiles available at <http://www.unece.org/forests/jwee> along with a complete database. For any additional comments or questions kindly contact:

Sebastian Glasenapp  
Consultant  
UNECE/FAO Forestry and Timber Section  
Palais des Nations  
CH-1211 Geneva 10, Switzerland  
E-mail: [woodenergy.timber@unece.org](mailto:woodenergy.timber@unece.org)  
Website: <http://www.unece.org/forests>

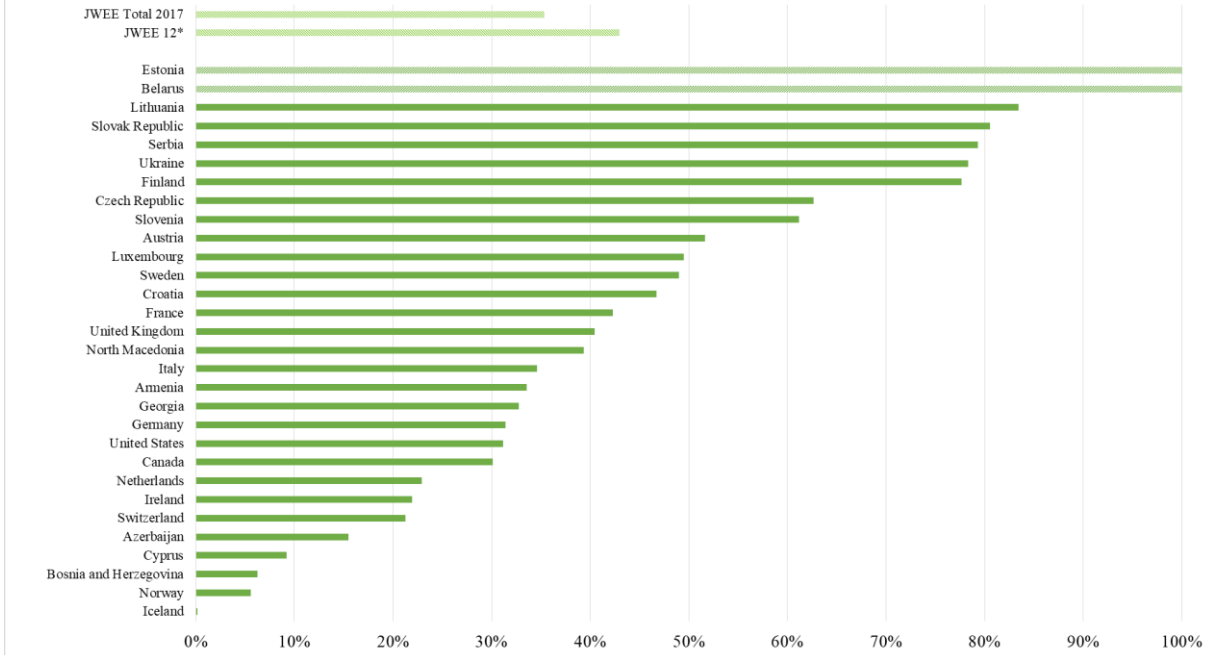
---

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

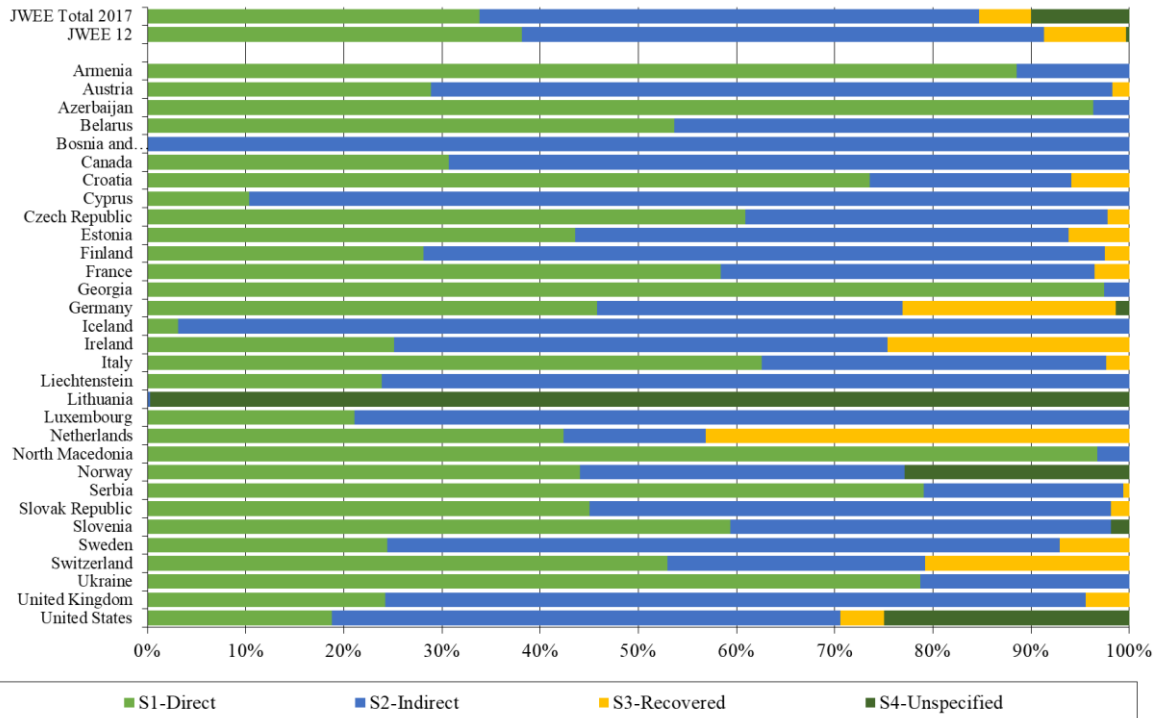
Share of woody biomass in TPES (%) in 2017



Share of woody biomass in RES (%) in 2017



Relative share of wood energy sources, 2017



Relative share of wood energy users, 2017

