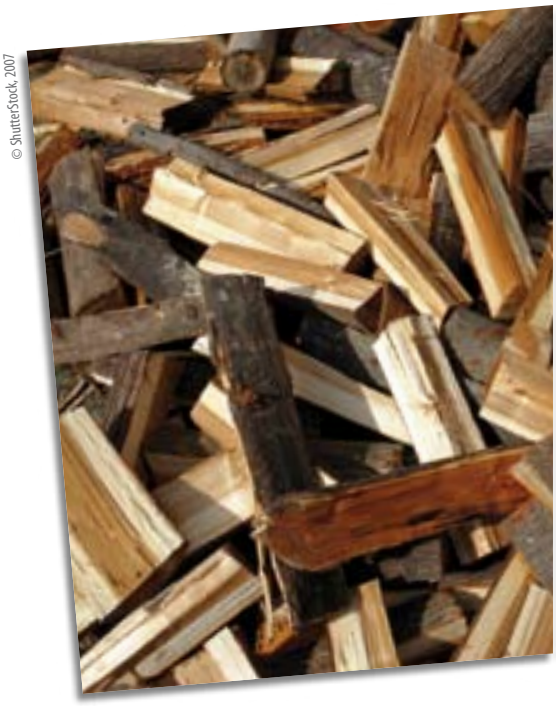
Potential of energy wood

The overall mission of the EU-funded Echaine project was to provide a comprehensive review as well as research and new insights into the production of wood fuel and its conversion to energy in Europe. One of its tasks was to estimate available quantities of energy wood in a medium time horizon (about 10 years) and discuss aspects which influence the potential in a long-range perspective (about 50 years).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Woody biomass and energy crops already contribute substantially to cover energy demands in many parts of the world, including Europe. Biomass is used to substitute fossil fuels, for example in heat supply and electricity generation. Presently, the utilisation of these materials, mainly forest and logging residues, is low compared with the estimated potential. A reason for this is the existence of different technical and non-technical barriers.

The research team found that the total potential of different biomass fuels in Europe is about 9 exajoules per annum (EJ/a) while the current use is about 2 EJ/a. This means that only about 20 % of the total resources are in use today. The practically available annual biomass fuel quantity in Europe is about 5 EJ/a.

According to the European Commission's White Paper *Energy for the Future* (COM(97)599 final), the overall aim is to double the share of renewable energy from 6 to 12 % of the total energy consumption in the EU by the year 2010. A major part of the additional renewable energy needed to reach this target could come from biomass.

This means that, additionally, over 160 million m^3 of woody biomass per year (1 EJ/a) could be used for energy in the EU. Biomass currently covers approximately 14 % of the world's final energy consumption and 6.8 % of the EU's final energy consumption (25 Member States). The corresponding share of all renewables is about 10.3 % in the 25 Member States. The share of wood in the energy supply (wood as fuel in households and wood as fuel in industry and power plants) in the 25 Member States is about 50 % of all renewables. This means that the share of wood in the EU's energy system is about 5.3 %.

As for the results of the research, estimation of total energy wood quantities proved a fairly straightforward process, requiring information about forests, forest yield and forest land, etc. Such information is in many cases available from national forestry statistics. Estimation of the practically available energy wood quantity proved more problematic, as it is dependent on information on the ecological, technical and economical restrictions deriving from the procurement system chain. There is also a lack of spatial forest information.

The conclusion of the study is that while it is usually possible to estimate the total quantity of biomass, the quantity practically available is still very difficult to estimate.

Increased use of wood fuel is expected to deliver a range of benefits.

- The global benefit of displacing fossil fuel with modern wood fuel use is clear, with life cycle analyses showing that energy wood supply systems are near-neutral in terms of emissions of greenhouse gases (GHGs), notably carbon dioxide (CO_2), to the atmosphere.
- The general conclusion of the main results is that there are a number of factors which have a positive influence on the potential energy wood supply in the future.
- Energy wood is going to be an important complementary product for the forest industry in the future.
- Wood as fuel is going to provide an important part of the energy needed to make the sustainable society possible in the future.


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Results of this part of the project's work have been disseminated in several ways, including the Echaine web page, presentations in two international workshops (Bulgaria and Russia), presentations in national and international seminars, workshops and conferences and scientific publications.

Innovative aspects: biomass, especially woody biomass, could contribute significantly to mitigation of GHG emissions, mainly CO_2 from fossil fuel combustion; the rapidly growing markets for energy wood and other renewables in Europe during recent years have already raised questions about their influence on the environment; an important aspect is the assessment of these potentials in the appraisal of these resources, which is included in the setting of targets and limits for their practical utilisation; extraction of more material from forests gives greater intensity and a higher risk of impact; all these impacts are manageable with fairly straightforward measures that are generally an extension of good conventional forestry practice; in most areas of the world, the current biomass use is clearly below the available potential — only in Asia does current use exceed available potential, i. e. non-sustainable biomass use; therefore, increased biomass use for energy purposes is possible in most countries; a possible alternative is to cover the future demand for renewable energy by increased utilisation of forest residues and residues from the wood-processing industry.

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Potential market applications: education, learning systems and distance teaching, forest management.

Collaboration sought: further research or development support.

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