

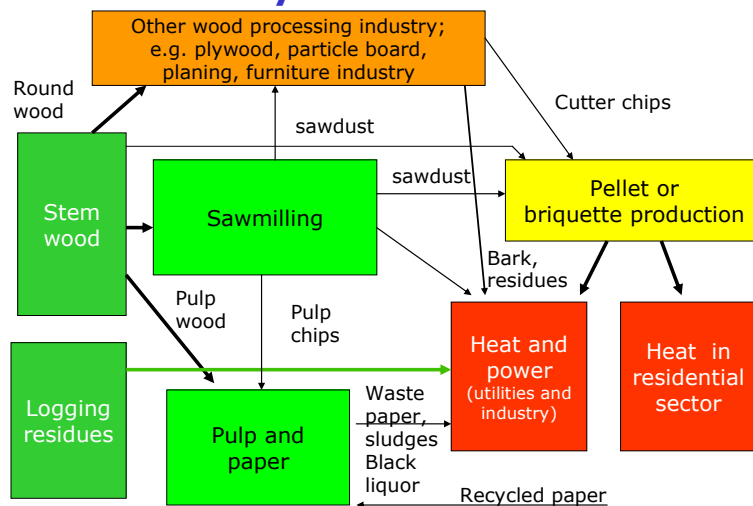
## Report on policy instruments affecting on the forest industry sector and wood availability, survey result report - D7.2

VTT-R-02885-11

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### Use of woody raw material



Jyväskylä, Finland, June 2011



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## Preface

This publication is part of the EUBIONET III Project (Solutions for biomass fuel market barriers and raw material availability - IEE/07/777/SI2.499477, www.eubionet.net) funded by the European Union's Intelligent Energy Programme. EUBIONETIII is coordinated by VTT and other partners are Danish Technological Institute, DTI (Denmark), Energy Centre Bratislava, ECB (Slovakia), Ekodoma (Latvia), Fachagentur Nachwachsende Rohstoffe e.V., FNR (Germany), Swedish University of Agricultural Sciences, SLU (Sweden), Brno University of Technology, UPEI VUT (Czech), Norwegian University of Life Sciences, UMB (Norway), Centre wallon de Recherches agronomiques, CRA-W (Belgium), BLT-HBLuFA Francisco Josephinum, FJ-BLT (Austria), European Biomass Association, AEBIOM (Belgium), Centre for Renewable Energy Sources, CRES (Greece), Utrecht University, UU (Netherlands), University of Florence, UNIFI (Italy), Lithuanian Energy Institute, LEI (Lithuania), Imperial College of Science, Imperial (UK), Centro da Biomassa para a Energia, CBE (Portugal), Energy Restructuring Agency, ApE (Slovenia), Andalusian Energy Agency, AAE (Spain). EUBIONET III project will run 2008 - 2011.

The main objective of the project is to increase the use of biomass based fuels in the EU by finding ways to overcome the market barriers. The purpose is to promote international trade of biomass fuels helping demand and supply meet each other. At the same time the availability of industrial raw material is to be secured at reasonable price. The EUBIONET III project will in the long run boost sustainable, transparent international biomass fuel trade, secure the most cost efficient and value-adding use of biomass for energy and industry, boost the investments on best practice technologies and new services on biomass heat sector and enhance sustainable and fair international trade of biomass fuels.

This discussion paper shows the inputs given by the industry and associations that are used when following two goals are targeted:

1. Understanding the competition situation of woody biomass between forest industry and energy use
2. Understanding the impacts of different policy instruments on wood availability and price level

In this survey some forest industry -related industrial operators and associations were asked how they feel about the competitive situation of the biomass at the moment. Survey type was questionnaire with open questions on a general level. Responses were analysed so that no single respondent can be identified from results.

Eija Alakangas & Janne Keränen, Jyväskylä, Finland, May 2011

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# 1 Introduction and background

This paper summarises the results of a free survey where some forest industry related industrial operators and associations were asked how they feel about the competitive situation of the biomass at the moment. The survey type was a questionnaire with open questions in a general level. Responses were analysed so that no single respondent can be identified from results.

The European biomass use in 2007 was 98 Mtoe according to EUROSTAT, see Fig. 1. According to AEBIOM & Renewable heating and cooling Energy Technology platform (RHC-ETP) target in 2020 is 220 Mtoe (estimation), target in 2030 is 300 Mtoe and in 2050 370 Mtoe. Import of biomass is expected to grow to 40 Mtoe by year 2050 from current 4.2 Mtoe in 2007. Input to electricity and CHP was about 33 Mtoe in 2007 and it is expected to grow to 112 Mtoe by year 2050. Transport biofuels use in 2007 was 7.9 Mtoe and it is expected to grow to 70 Mtoe in 2050. Households and services use 35 Mtoe of biomass in 2007 and it is expected to grow to 130 Mtoe by year 2050. Industrial biomass use in 2007 was 18.6 Mtoe and it is expected to grow to 50 Mtoe by year 2050. These targets are challenging.

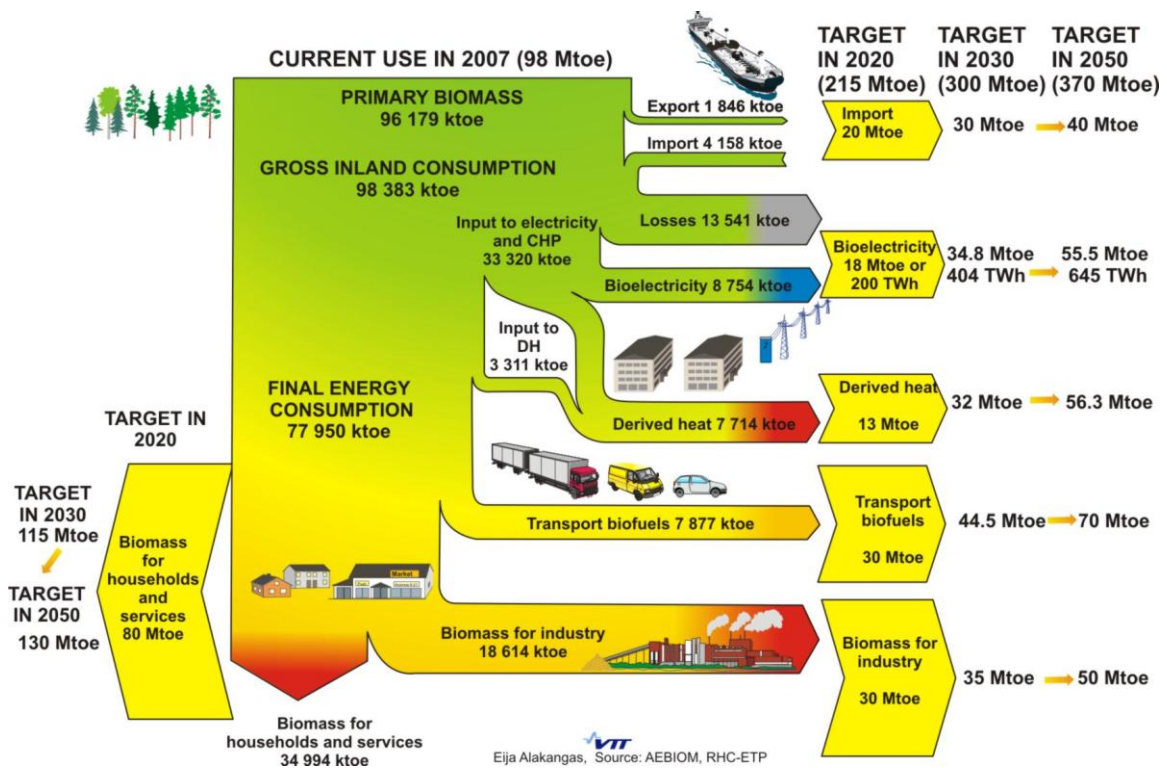


Figure 1. Biomass use in EU and targets in 2020, 2030 and 2050 [4].

The annual average growth of bioenergy consumption in European pulp and paper industry has been 2.6% in 1996-2008. In the same period, the growth of primary energy use was 1.2%/a. In CEPI<sup>1</sup>-countries the share of bioenergy of the total primary energy consumption in the European pulp and paper industry has increased from 43 to 53 % during 1990 - 2008. The realisable potential from European forests is estimated at 747 million m<sup>3</sup> (overbark) in 2010 and could range from 625 to 898 million m<sup>3</sup> (overbark) in 2030. Wood energy potential is about 187 million

<sup>1</sup> The Confederation of European Paper Industries (CEPI)

m<sup>3</sup> (36 Mtoe) in 2030. Woody biomass is not enough to cover the European biomass need, but it can provide noticeable part of it.

There are more than 950 pulp and paper mills in EU-27. These are ideal sites to increase bioenergy business rapidly: there are existing logistical and raw material procurement systems, industrial sites with less NIMBY (Not In My Back Yard), providing integration possibilities with stable heat loads. These are opportunities to consider on European level as well. However, the role of pulp and paper industry in the national primary energy production from biomass and waste in 2008 is very heterogeneous. In other words, some opportunities can be better utilised in certain European countries, like for an example, CHP utilisation in Scandinavia where heating is needed during wintertime.

European woodworking industries have over 380,000 companies (EU-27). They can provide the carbon storage using wood materials and substitution of carbon intensive materials. Therefore, sustainable products from wood needs to be developed, which in part will help to fight against climate change.

The importance of forest industry in EU is different in each country; countries where forest industry is most important are Finland, Sweden, Estonia, Latvia and Lithuania. Lowest importance is in Malta, Greece, Luxembourg, United Kingdom and Ireland. In countries where forest industry is important, the share of the products for export is also high.

Wood biomass demand has increased during the last decade, and is expected increase in the future (e.g. see Fig. 1). The use of woody material between industries plays an important role, since some of the industries significantly depend on other field of industries.

Use of woody material and main raw material flows between industries are shown in figure 2. The accurate demand and potential of wood material is illustrated in EU wood report edited by Mantau (Mantau, EUwood - Wood Resource Balance 2010).

## Use of woody raw material

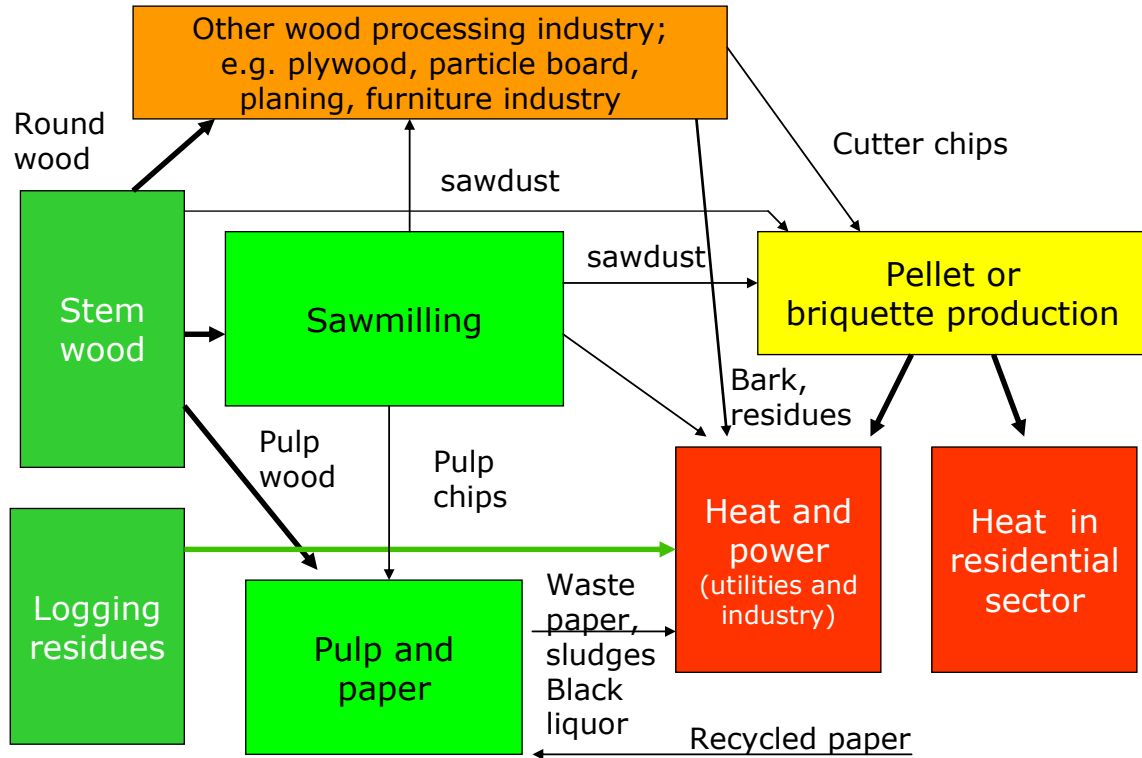


Figure 2. Use of woody raw material.

## **2 Survey**

The use of woody biomass for energy vs. raw material use was analysed using a survey made for forest industry and bioenergy industry stakeholders.

### **2.1 Goal of the survey – from the industry & association point of view**

The survey focuses on two topics:

1. Understanding the competition situation of woody biomass between forest industry and energy use
2. Understanding the impacts of different policy instruments on wood availability and price level

These topics were covered with open questions given below. Questions were kept general, so the answers would give a good overview of the situation in each country. Survey was made in during second quarter of 2010.

### **2.2 Questions of the survey**

The following six questions were asked via email or in phone interviews.

1. In your opinion, what is the biomass resource availability for your industrial sector and impacts of price level on the competitiveness of your sector, explain how?
2. How would you describe the impacts of different policies to your sector, would you say that they affect competitive position of your sector against other sector?
3. Are there any policy action or support scheme for wood, which takes care of your industrial sector?
4. Should there be any other policy actions in your sector and if should, what kind of incentives should be considered?
5. Is bioenergy an opportunity or threat for your industry? Please explain.
6. Other comments

Last question was given for the purpose of open free form to reply on any topic uncovered that needed to be said. The questions were very "wide" and covered many different aspects and therefore may have been difficult to answer. On the other hand, because they were "wide", there should have been place for all the operators in the field to give a proper response to the survey.

## **2.3 Methodology**

Survey results were gathered using phone interviews or by email. Questions were made by each national partner to the industrial operators in the field, which was thought to increase the reliability of the survey responses and give a better European dimension.

Partners of the project helped to conduct this survey. The project partners were:

VTT, Finland

DTI, Denmark

ECB, Slovakia

Ekodoma, Latvia

FNR, Germany

SLU, Sweden

VUT, Czech Rep.

UMB, Norway

CRA-W, Belgium

BLT, Austria

AEBIOM

CRES, Greece

UU, the Netherlands

UNIFI, Italy

LEI, Lithuania

IC, UK

CBE, Portugal

ApE, Slovenia

AAE, Spain



## 2.4 Results of the survey

The results were categorised by industries, see Figure 3.

The industry categories were the following (total number 8 categories):

- pulp, paper or board industry
- sawmill or planing industry
- particle and ply wood industry
- other mechanical industry (furniture, wooden houses, wood design products etc.)
- solid biofuel producer (e.g. residues which are sold outside the mill, e.g. bark, sawdust, chips, cutter shavings)
- pellet or briquette producer
- bioenergy producer (e.g. if mill is using own wood residues to producer process heat, steam or electricity)
- association, specify (e.g. pulp and paper, sawmill, pellet)

This method highlights the differences of the industries in each country, but also certain concern inside industry and it also shows the coverage of survey. Each country in the EU has different market for each product and therefore the competitive situation inside industry is different. For some products the operations are local and markets are global.

Total number of respondents was 38. The target of responses was set to 28, so the level was adequate. One can notice that most of the responses were obtained from Belgium, due to many institutions or associations representing the producers located in the country.

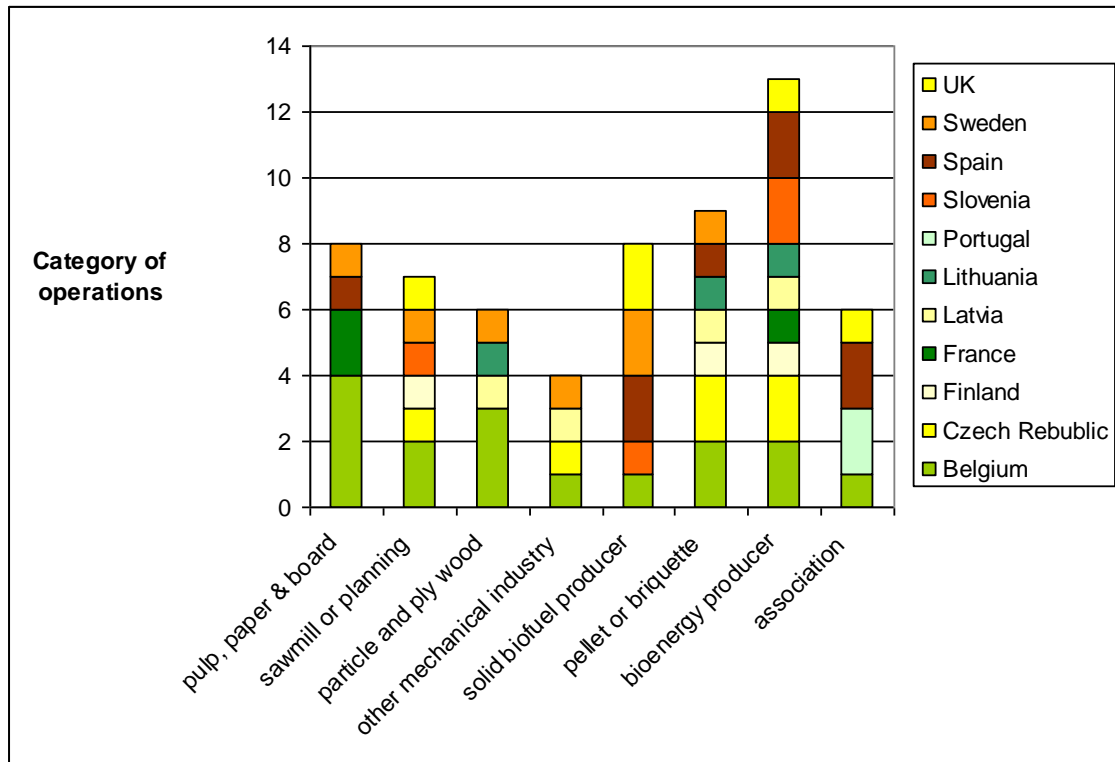


Figure 3. Survey responses obtained from each country and categorized by operations.

### 2.4.1 Summary of Pulp & Paper industry viewpoints

Wood is a critical resource for European pulp and paper industry. Pulp and paper industry uses wood and recycled fibre in their production to prolong the lifetime of fibre. Moreover, renewable energy is generated from fibres at the end of their product's life. This can be called as the full carbon cycle of the wood. Pulp and paper industry emphasizes that fibre should be recycled many times before energetic use and use wood wastes should be used primarily as fuel. Need of a "level playing field" and equal access to wood for different sectors were pointed out.

It was mentioned by some of the respondents that biomass use for energy production leads to higher prices of wood via changed balance of supply and demand from market actors and policies, thus highlighting the criticality of wood resource for pulp and paper industry. This can happen when forest biomass, including stem wood, is cheaper to be utilised on energy production than for other uses due to support policies for energy use. This can increase competition of the forest biomass between pulp & paper and energy production. Feed in tariffs for residual biomass should be higher to avoid this. Physical availability of wood resource alone is not enough, but the economic availability is required as well. Mobilisation of wood from forest needs also to be secured in a sustainable and efficient way.

Also it was mentioned by respondents in the pulp and paper industry that non-energetic use of wood should be prioritised. At the same time small-scale heating systems should still be supported, by defining what kind of wood (species, parts of tree) to use and what kind not and where (e.g. no granting for recyclable wood). A harmonised binding European approach is seen more favourable than approaches made by individual member states, which would lead to EU-level market of biomass.

Long processing time by the authorities is seen to restrain the market development faster reaction would lead to faster development. On the other hand, investments in pulp & paper industry are large and capital costs change slowly and if markets change too quickly, then the unfair unbalance between sectors may occur. Policies applied should be similar for all, long-term and they should primarily aim at reducing emission levels.

Overall, bioenergy is seen as an opportunity – but all companies need to develop their business, especially when biofuels share increases and shortage of wood in the EU region arises. This can be avoided in part by using short rotation crops and developing other RES as well together with increasing the wood production. Energy efficiency and raw material efficiency need development and the policies set must help to fulfil this target.

The summary of pulp and paper industry viewpoints is as follows:

- Biomass availability for energy production leads to higher prices of wood (competitiveness)
- Fibres should be recycled many times should be done before burning
- Long processing time by the authorities (faster reaction – faster development) restrains market development
- All companies need to develop their business (seen as an opportunity)
- Non-energetic use of wood should be prioritised, but small-scale heating systems should still be supported. Define what wood to use (species, parts of tree) and where (e.g. no granting for recyclable wood)
- High capital cost equipment are slow to adapt to changing market
- Avoiding unbalance between sectors is important
- Large volumes (e.g. 10% biomass fuels share) will change the current operational environment and lead to shortage of wood in the EU region
- Threat, if everything is burned, opportunity, if wood wastes are used as fuel
- Increase wood production
- Apply short rotation crops
- Other RES should be developed

#### 2.4.2 Summary of Sawmilling & other wood processing industry viewpoints; Plywood, particle board, planing, furniture industry

European forest-based industries make the needed products that are renewable and recyclable, thus paying attention to sustainable use of wood. Sustainable wood energy course development is needed - Potential studies are usually to some extent unrealistic (inaccessible areas, unrealistic sources) and overestimate the commercial potential of usable material.

“Market should handle this itself. It’s our concern to develop the market.” – Argument was laid on the table. Trade should be free but fair for all players.

Different sectors have to co-exist in a balanced and sustainable market; maybe a segmentation of the wood (with National support actions) could be initiated. Value-adding of the wood should also be done inside the country minimizing unnecessary transports.

Wood panel industry traditionally has used lower value forest products, and this is now threatened by the bioenergy support actions – increase biomass and wood production (production support for wood). It was proposed that EU-level use of wood in each kind before it is burnt thus obtaining the benefits from processing rather than using as a fuel. For now the policies set are seen as threat – policies favour the energy sector, but whole value chain should be considered. Wood market should be fair and mobility of wood should be high enough. Sufficient round wood trade creates available biomass via side-streams for all players.

Biomass recycling before burning is needed, to promote the use of wood in each kind. This would reduce the market impacts seen in raw material strained availability. Strained availability is reality because all commercial material flows are already used and increased demand from mainly from energetic use leads to higher prices. Therefore assessment of the flows before implementing new policies should be made carefully to avoid additional burden for companies.

Industry would like to see that CO<sub>2</sub>-reduction and carbon storage of wood are part of the trade mechanism, and even consideration of carbon negative products when replacing some product that needs more energy to manufacture could be considered. Promoting this kind of use of wood and wood-based products and also to substitute the non-renewable materials with help of wood and its products, and new products can be developed from this.

Employment aspect as a whole should be considered. Industry provides jobs in rural areas. Also, more education is needed in the area which could be done in part by associations.

As summary, sawmilling & other wood processing industry viewpoints are bulleted next.

- Market should handle this itself. It's our concern to develop the market.
- Different sectors have to co-exist in a balanced and sustainable market, maybe a segmentation of the wood (with National support actions?)
- Sustainable wood energy course development is needed - Potential studies are usually to some extent unrealistic (inaccessible areas, unrealistic sources)
- CO<sub>2</sub>-storage of wood
- Strained availability- all material flows are already used (increased demand – higher prices)
- Threat – policies favour the energy sector, but whole value chain should be considered
- Wood panel industry traditionally has used lower value forest products, and this is threatened by the bioenergy support actions – increase biomass and wood production (production support for wood)
- EU-level use of wood in each kind before burnt (obtain the benefits from processing rather than using as a fuel)
- Value-adding of the wood should be done inside the country

- Sufficient round wood trade creates available biomass (side-streams)
- More education is needed / Associations
- Employment aspect as a whole should be considered

### 2.4.3 Summary of heat, power and pellet & briquette producers

It was stated by the respondents that renewable energy policies of the EU have led to good availability of woody biomass. Lack of wood fuel causes increased prices of all biomass. Competition is mainly seen against other countries. Low forest residues feed-in tariff leads to use of cheaper logs – higher support level is needed for forest residues to prevent this mechanism. Higher feed-in tariff for residual and young biomass would reduce the logs market price and increase overall production. Other energy sectors influence on the use of wood biomass, such as coal, oil, gas etc. Bioenergy is seen as an opportunity, mainly since bioenergy can be cheaper than fossil fuel energy when market share is sufficient. However, this is not always the case.

CO<sub>2</sub>-tax was seen as positive, since it leads to greater demand for RES. When decreasing the dependency of fossil fuels is aimed the mechanism was seen as functional one. So maintaining the granting as it is was hoped for. Some operators mentioned possible market distortion caused by support to renewable energy production.

Important issues for the industry were ash use as soil enrichment which is now prevented by legislation. Ash evacuation is now a cost factor.

Policies have huge impact on the forestry sector – they should be long term, and implemented wisely so that all players have time to adapt the changes. National regulation of woody material specification for biomass was mentioned as a possible method to guide the wood material flows. This is a clear difference to e.g. pulp and paper industry where a harmonised European system was hoped for.

Long transport distances for large operators lead to higher costs, so there is a need also for smaller units.

To summarise, heat, power and pellet & briquette producers industry viewpoints as bullets:

- Good availability (lack of wood fuel causes increased prices of all biomass)
- Competition against other countries (e.g. other countries have better and larger markets and when import from those countries impacts on markets inside country or influences the ability to export with competitive price)
- Low forest residues feed-in tariff leads to use of cheaper round wood – higher support needed
- Higher feed-in tariff for residual and young biomass would reduce the logs market price and increase overall production
- Other energy sectors influence (coal, oil, gas etc.), CO<sub>2</sub>-tax positive (greater demand for RES, when decreasing the dependency of fossil fuels is aimed)
- Maintain support mechanisms as they are

- Opportunity, bioenergy is cheaper than fossil fuel energy when market share is sufficient
- Ash use as soil enrichment (legislation prevents today), ash evacuation is now a cost
- Market distortion by support to renewable energy production
- Policies have huge impact on the forestry sector – they should be long term to provide wanted impacts, short term policies cause more harm
- Long transport distances for large operators (need also for smaller units)
- National regulation of woody biomass material specification (what kind of woody material can be used and where)

### 3 Summary of legal incentives for forestry sector support

Table 1 comprises the summary of legal incentives for forestry sector support in EUBIONET III partner countries [3]. The majority of support actions relate taxation, feed-in-tariffs, forestation, thinnings and harvesting support, especially for energy production purposes.

*Table 1. Summary of different legal incentives to support forestry sector in EUBIONET III partner countries [3].*

Country	Explanation
Austria	<p>The integration of forestry subsidisation measures into rural development represents an important method to expand the forest cultivation and to reach national renewable energy targets.</p> <p>State-aided are activities like reforestation. The sum of the aid depends on the composition of the tree species and the habitat. The reforestation has to be geared to the natural tree ecotypes.</p> <p>The opening of forests by building new logging roads and reconstruct or update old forest roads is also included in the forest subsidy program. New and modern logging roads force the use of forests for fuel production and round wood supply. New building activities are financed by 40% of the investment cost, reconstruction activities by 25%.</p> <p>Activities like pest control, the advancement of protection forests and thinning are subsidized and part of the forestal subsidy program.</p> <p>The klima:aktiv programme, running from 2004 to 2012, aims to support energy efficiency and increased use of renewables in all sectors of the economy through direct grant support, information, and advice.</p>
Belgium	<p>Certificate system for renewable electricity using green power certificates. For (regional, e.g. Flanders) woody resources not eligible for green electricity certificates if they can be used by the wood processing industry (audit needed). Biomass from waste not eligible if it can have a valorisation by recycling into materials, fodder, etc.</p>
Czech Republic	<p>A proposal of financial support for founding and growing of fast-growing wood for energy biomass production is under discussion. It should be realized as part of Agricultural Fund for Rural Development. The produced biomass must not be used within the plant, but it should be possible to sell it to another subject. The support relates to expense of founding and growing of fast-growing wood (between 40% – 60%). The support is still under preparation, and programme start is supposed in 2011.</p>

Country	Explanation
Finland	<p>Non-industrial, private forest owners are entitled to seek governmental grants for the afforestation of understocked areas, prescribed burning, tending of young stands, harvesting of energy wood, forest recovery, fertilisation etc. Loans can be granted for joint ventures involving improvement ditching and forest road construction.</p> <p>In December 2010 the Parliament separated the financing of sustainable forestry and energy support for small trees. The support for fuel timber harvesting and chipping will be combined. The Ministry of Agriculture and Forestry will pay support for the harvesting, forestry transport and chipping of timber sold for fuel as part of the management of young plantations.</p> <p>Support for electricity production by renewable energy sources . Subsidies for electricity production are the following: wind 0.69, biogas 0.40, forest chips 0.69 and solid recovered fuels 0.25 € c/kWh. As of 1 January 2011 this support will be paid only plants which are not in new feed-in-tariff system. Wind power and forest chips plants will get support 6.9 €/MWh.</p> <p>Through the feed-in tariff scheme, electricity producers would receive support for a period of twelve years to cover the difference between the actual production costs of electricity and the market price of the energy source in question, or the costs of alternative fuel if plant is accepted in the system. Feed-in tariff is granted for wind power plants (up to total 2500 MVA), power plants fuelled by forest chips, power plants fuelled by wood fuels; forest chips, industrial wood residues (until 50 plants and 150 MVA) and biogas plants (up to 19 MVA).</p> <p>The target price would be €83.5 per MWh for wind power, biogas and wood fuel plants. The level of the feed-in tariff for forest chips plant is based on the market price of emission allowance and maximum is €18 per MWh. If market price of electricity is less than 30 €/MWh, feed-in-tariff is calculated as follows: target price – 30 €/MWh. In forest chips plant the feed-in-tariff will be 18 €/MWh, if the 3 months average emission allowance price is maximum 10 €. The level of the feed-in tariff is based on the market price of emission allowance using the formula <math>18 - 18/13 * (P_e - 10)</math>, in which <math>P_e</math> is three-months average price of emission allowance. No feed-in-price will be paid if the average price of emission allowance is 23 €.</p> <p>Premium price for useful heat production is paid for biogas 50 €/MWh and for forest chips plants 20 €/MWh.</p>
Greece	<p>Members of forest cooperatives are able to use fuelwood harvested in state forests (or forests owned by public legal entities) located in areas where they live, in order to cover their needs for heating. Fees or taxes for the exploitation of these fuelwood quantities, estimated by the forest management plan, are not required.</p> <p>Farmers of "mountainous" and "other disadvantageous" areas are supported in their activities to cultivate non-food crops (energy crops). The level of the financial support depends on the age of the farmers and the location and type of the area (mountainous/disadvantageous).</p>
Italy	<p>Financial support for the production of woody biomass are available at regional level through the Rural Development Programmes (PSR) the tool of the European Community to reach the targets of the EC Regulation 1698/2005.</p>
The Netherlands	<p>The Program Sustainable Biomass Import is developed to stimulate, support and facilitate the sustainable production, processing, use and import from biomass that is produced outside the Netherlands.</p> <p>The program has to contribute to: i) enhancing sustainable production of biomass; ii) development and adaptation of certification systems for imported biomass; iii) counteracting undesired negative impacts of biomass production.</p>

Country	Explanation
Norway	Subsidy is given for the following types of harvest/forest activities: pre-commercial thinning, harvest of broadleaves, tending of young stands, harvest residues, tending of the cultural landscape, and clearance along roads.
Portugal	<p>The Permanent Forest Fund (FFP) seeks to support projects aimed at forest planning, management and intervention, forest sustainability and research and technical assistance. The FFP has been indicated to be a financing mechanism to increase the production of forest biomass for energy production.</p> <p>The Rural Development Programme (PRODER) is a strategic and financial instrument for supporting the rural development of mainland Portugal, e.g. to improve the competitiveness of the agricultural and forestry sectors. This includes a financing mechanism to increase the production of forest biomass for energy production.</p>
Sweden	<p>Much of the Swedish legal framework does not directly support bioenergy. The legislation is in many cases supporting the use of bioenergy by making the alternative energy sources, such as fossil fuels, more expensive, or for example forcing the buyers of electricity to buy a certain quota of electricity from renewable energy sources.</p> <p>Sweden's Green Electricity certificate system is a market-based support system to assist expansion of production of electricity from renewable sources and from peat in Sweden. Investment support in the form of grants for conversion of heating systems to reduce the dependence of oil.</p>
UK	<p>In England, the Energy Crops Scheme provides grants for establishing short rotation coppice and miscanthus under the new Rural Development Programme England (RDPE; 2007 – 2013).</p> <p>Farmers can also receive the Single Payment for energy crops grown on set-aside.</p> <p>The Bio-energy Infrastructure Scheme helps develop the supply chains required to harvest, store, process and supply energy crops and woodfuel to energy end-users.</p> <p>The Forestry Commission and other government departments in England, Wales and Scotland have a range of grant schemes to help new suppliers and users with the cost of equipment, and to help woodland owners get started on woodfuel production. Some of these schemes are not specifically directed at woodfuel, but can be applied to it.</p> <p>A key, UK-wide government support scheme due to come into effect in 2011 is the Renewable Heat Incentive (RHI), which will subsidise heat production from renewable sources. This has the potential to transform the finances of the woodfuel industry, and make it a much more attractive business proposition.</p>

## 4 Wood availability and price

More than 70% of the bioenergy consumed in Europe has its origins in woody biomass (AEBIOM, 2009). Therefore wood fuels are the most important solid biofuel in Europe today. The share of wood energy & wastes from inland energy consumption varies greatly in the member states, as shown in Fig.4 [4]. In many countries the share does not exceed 5%, and in EU-27 the level is barely over 5%.



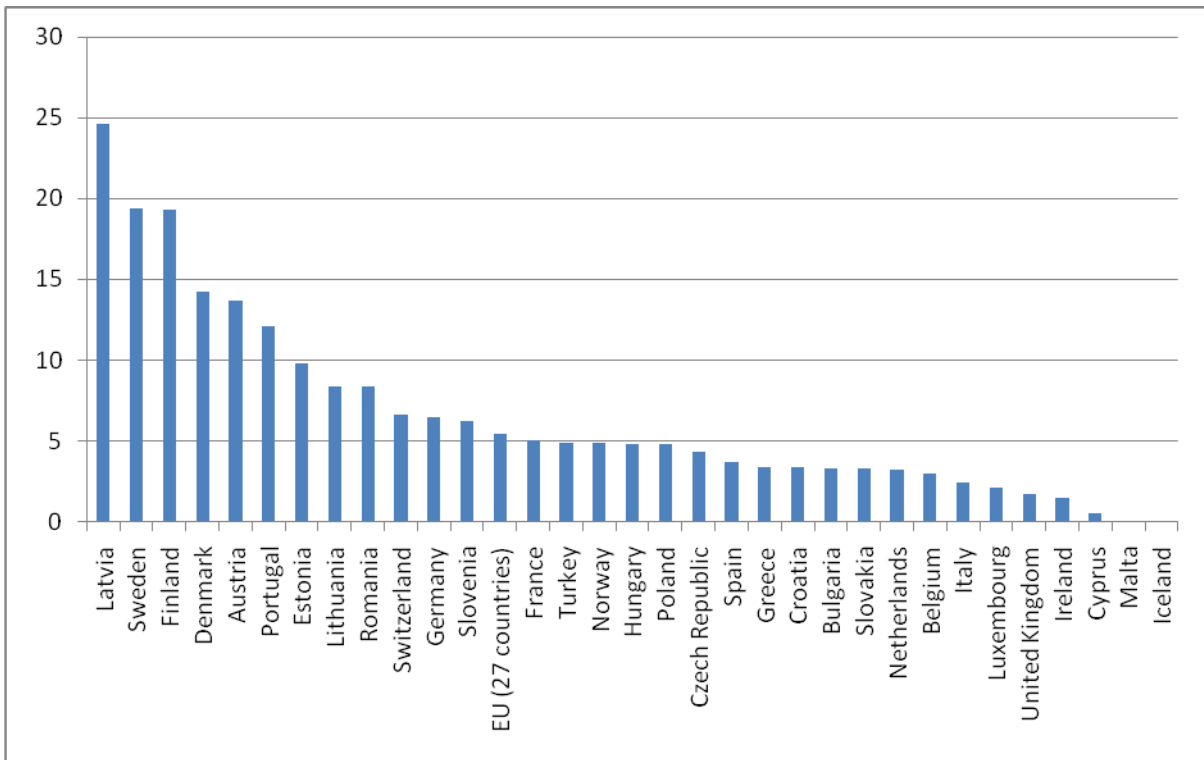


Figure 4. Share of "biomass & wastes" in gross inland energy consumption in the EU-27 + Switzerland, Turkey, Norway, Croatia and Iceland (Eurostat, 2008), D3.2 [4]

In EUBIONET III –project the biomass resources and uses were estimated (see fig. 5. [5]) The uses of biomass against resources, in combination with current biomass & waste shares from total inland energy consumption (as shown in Fig.4) provides possibility to estimate the countries which have highest possibility to fulfil the 20% renewable in 2020 share from biomasses and wastes. Examples of countries, where biomass and waste based energy share is sufficient are Sweden, Latvia, Finland and Austria, whereas biomasses and wastes are not enough to fulfil the need in Germany, France, Spain, Italy and UK. This indicates that there will be increased need for biomass, which will have an impact on the price. Most likely highest impact will exist on countries, where difference between resources and use is smallest, utilisation of more "difficult" biomass needs to be done.

There are some specific factors driving the price development of wood fuels, in short term and in long term. In long term, with time span of years, the linkage between oil price and wood fuels exist. In shorter term the production costs of wood fuels are more dominant. As trade in wood fuels increases, factors such as freight rate and exchange rate fluctuations will become increasingly important, and these factors are now emerging of wood fuels as well, which are more deeply analysed in [4].

Earlier wood price was determined more by production costs, leading to price fluctuations. Since demand is increasing and stabilising due to energy production, the connection between wood price and fossil fuels price is expected to strengthen. After all, other than renewable energy sources, like fossil fuels, will still be 80% of total energy use and production. The price changes are more likely to follow fossil fuel prices changes, whereas earlier the changes were more seasonal. This can be seen from e.g. in Finland. In Finland price increase, due to availability changes mainly caused by closure of paper mills & taxation change in Russia, is observed (Figure 5) as an indication of increase in competition. Pellet price changes in 2010 in Finland are smaller (see Figure 6), and in line with average electricity prices for industrial consumers (Figure 7).

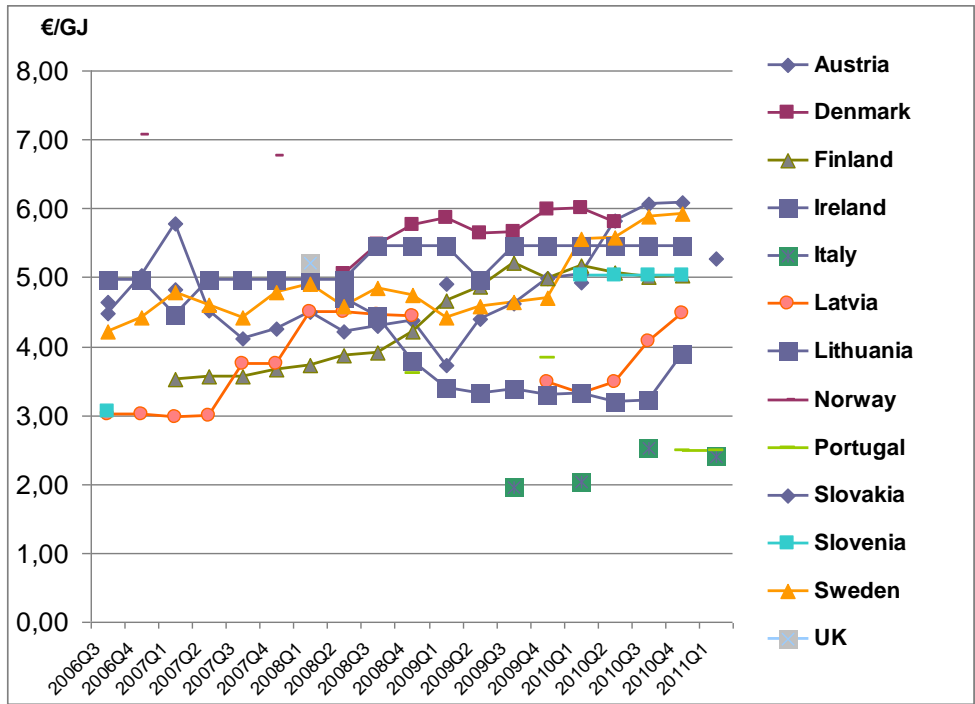


Figure 5. Wood chips price development (industrial market), €/GJ (=3.6 €/MWh) [5].

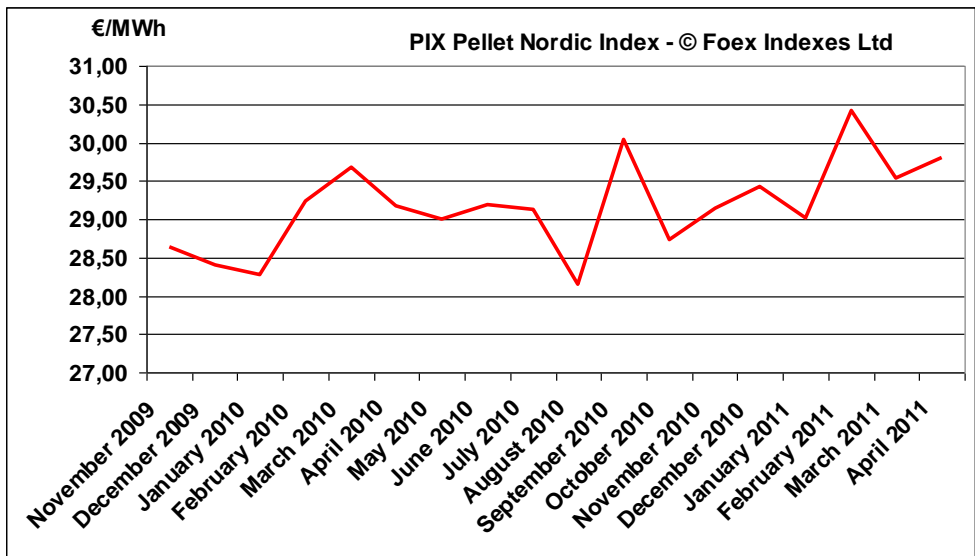


Figure 6. Price development of industrial wood pellets (€/MWh) during November 2009 – April 2011. Note 1 €/MWh equals to 0.28 €/GJ. Source: FOEX Indexes Ltd.

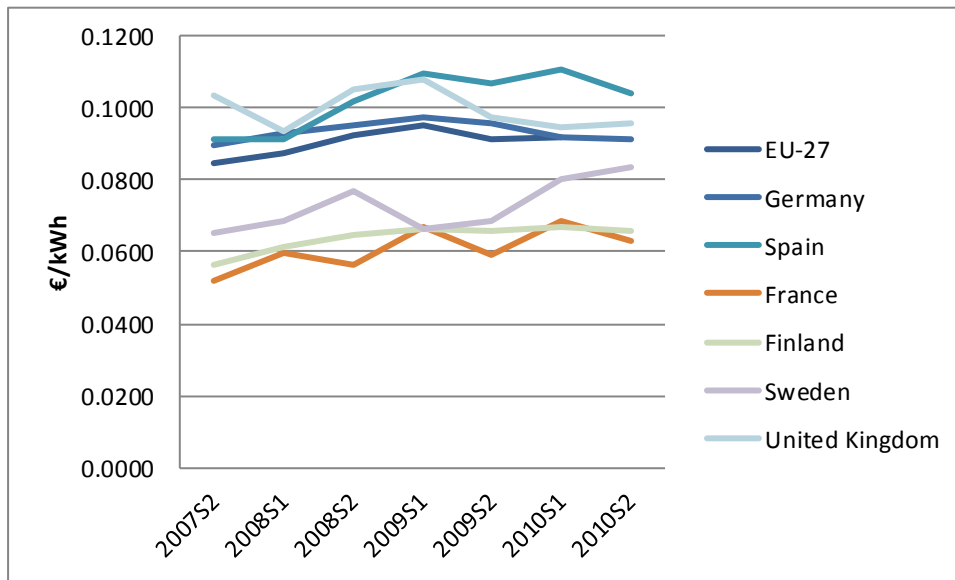


Figure 7. Electricity price in some European countries (second half of 2007 - second half of 2010) [6].

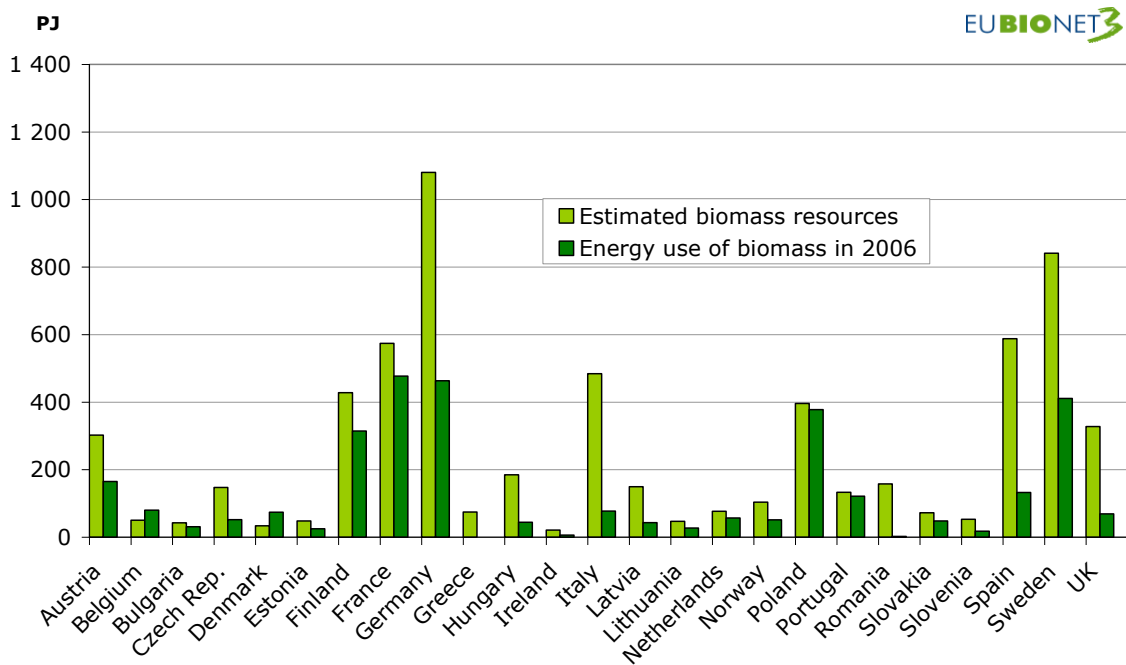


Figure 8. Biomass use compared to resources in different countries. (D2.2.) [4]

## 5 Discussion & Conclusions

Responses of the survey show that concern exist regarding the future supply of wood for the industry at a competitive price due to foreseen increased demand of biomass. Decreasing the dependency of the fossil fuels was seen positive. Incentives were seen as positive and they can be both in national and in European level. On the other hand, the market was said to handle the situation and everyone can develop business based on the situation at hand. This makes possible for every actor in this game to play in a fair field.

- Forest industry is an opportunity, especially in countries, where industry share of GDP traditionally has been low
- Forest industry offers significant benefits for future bioenergy investments: wood procurement and logistic systems, process integration and industrial CHP
- New green electricity and biomass fuels will have lowest production costs when integrated to forest industry operations
- New technologies, like biorefineries, will increase the profit and business volume of forest industry
- EU SET-Plan and European Industrial Bioenergy Initiative will accelerate the development of the bioenergy market to 2020.

It has been said by many actors that to decrease the competition of biomass the supply of it needs to be increased. This means that more wood needs to be mobilised from existing forests, which may require increasing the harvesting levels, and using more parts of the tree. One must remember that there is also below ground biomass as well as tops and branches that could be better utilised. Also residues outside from forest industry can be considered as a potential source, like for an example reused wood, recovered from consumer use and agroindustrial residues, see Figure 9 [7]. Supply increase can be done also by increasing the forest area, which could in part utilise short rotation coppice. And of course, imports from outside Europe can be increased.

To decrease demand of biomass, overall energy efficiency can be promoted and other types of renewable energy sources can be used including solar power and wind energy.

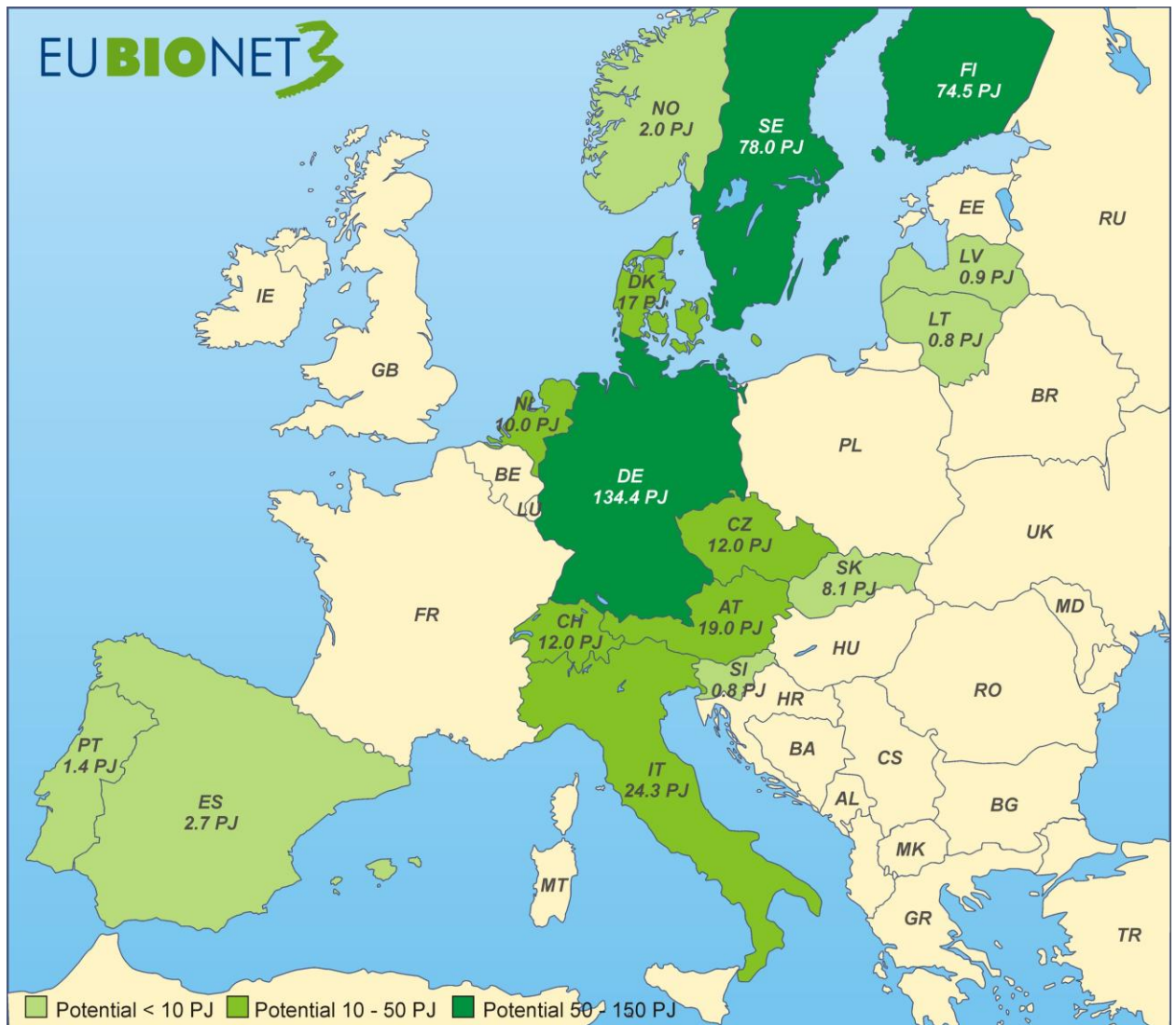


Figure 9. Potential of unexploited biomasses in Europe [7].

## 5.1 Conclusions from expert group meetings

Responses show a common concern regarding the future supply of wood for the industry at a competitive price. The analysis shows that majority of forestry support actions relate forestation, thinnings and harvesting support, especially for energy production purposes. Careful analysis of the commercial potential is always needed before implementing new policies. Mobilisation of the wood from forests needs to be promoted, and raising the harvesting levels is also needed to fulfil the targeted RES levels. This will mean better use of wood, above ground and below ground. No one mentioned that supply of wood from outside the forest industry residues is also needed, probably due to structure of the survey. Also import not was mentioned as a possible source of new wood. However, some see that importing the wood means importing the land area.

Although incentives were seen as positive, some differences of the level (national or EU -level) was noticed. Pulp and paper industry is more favourable towards a harmonised system, whereas energetic use of wood would promote national regulations.

The market was said to handle the situation and everyone can develop business based on the situation at hand, so that every actor in this game should be allowed to play. Energy efficiency requirements in the future will be higher, and other

sources of renewables besides wood will also be considered. Decreasing the dependency of the fossil fuels was seen positive among all the respondents.

In an EUBIONET III -workshop in Brussels on 28 June 2010) the discussion gave the following conclusions (Keränen & Alakangas. 2010):

- Forest industry is an opportunity and it offers significant benefits for future bioenergy investments: wood procurement and logistic systems, process integration and industrial CHP. New green electricity and biofuels will have lowest production costs when integrated to forest industry operations. New technologies will increase the profit and business volume of forest industry. EU SET-Plan and European Industrial Bioenergy Initiative will accelerate the development of the bioenergy market to 2020.
- Bioenergy is both opportunity and threat for the forest based industry: higher use increases wood prices and availability of raw material for industry becomes more strained. It offers new business opportunities. Evaluation of the whole value chain is needed when cost efficient wood use for different sectors is being considered. This means also environmental, social and economical aspects, which will improve the sustainability of the sector even further. It was noticed that there might be a gap between EU targets and reality, since most of bioenergy will be wood also in the future. There is a common challenge how to mobilize more wood for all sectors and renewable waste or recovered wood to fulfil the targets set?
- Policy should "level field" for bioenergy and fair competition for all wood users. Policy should support R&D e.g. large-scale demonstration of biorefineries and efficient technologies. Importing wood from developing countries can be a two-step process: 1st step; import is opportunity for developing countries and 2nd step; help in development of forest sector in these countries and local use in the long run. Availability of land; also land is "imported" when biomass is imported. Carbon taxes for fossil fuels could play a major role, but the system needs to be global. Good information is needed when policies are developed. Information needs to be continuous, accurate and up-to-date. Motivation of forest owners to sell wood is needed. Sustainability for all sectors is needed.

So, as the final remark we need more wood and better wood, fitted for the needs of the user. A short summary reads as:

- **Bioenergy is both opportunity and threat for forest based industry**
  - wood prices and availability of raw material for industry;
  - new business opportunities
- **Evaluate the whole value chain**
  - cost efficient wood use for different sectors
  - Environmental, social and economical aspects - sustainability
- **There might be a gap between EU targets and reality**
  - most of bioenergy will be wood also in the future
  - how to mobilize more wood for all sectors and renewable waste, recovered wood
- **Policy should**
  - level field for bioenergy and fair competition for all wood users
  - Policy should support R&D e.g. large-scale demonstration of biorefineries and efficient technologies

- **Wood from developing countries**
  - 1st step; import is opportunity for developing countries
  - 2nd step; help in development of forest sector in these countries and local use in long run
  - Availability of land; also land is "imported" when biomass is imported
- **Carbon taxes for fossil fuels could play a role**
- **Good information is needed**
- **Motivation of forest owners to sell wood**
- **Sustainability for all sectors; food, coal, etc.**

Second expert group meeting was organised on 15t of April, 2011, presenting different options for bioenergy in forest industry. It showed that potential exist e.g. in pellets and torrefied wood. Interest was placed towards prices, their indexes and trade in general. National examples of energy systems were found interesting as well. Company approaches toward businesses were found couraging.

Conclusions from the second expert group meeting was that more information about prices is needed, as well as trade flows. Price collection and it's mechanisms need consideration in the future. Torrefaction was emerging as a topic in the discussions. And latest, dimensions of sustainability in forest biomass supply should be given consideration as well [8].

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