



MAY 2015

# BIOENERGY

A LOCAL AND RENEWABLE  
SOLUTION FOR **ENERGY SECURITY**



## State of play of EU energy dependency

Following the crises between Ukraine and Russia, energy security has become high on the EU political agenda. In fact, since the EU is more than 65% dependent on Russian gas, it has no choice other than to rethink its energy supply and distribution systems.



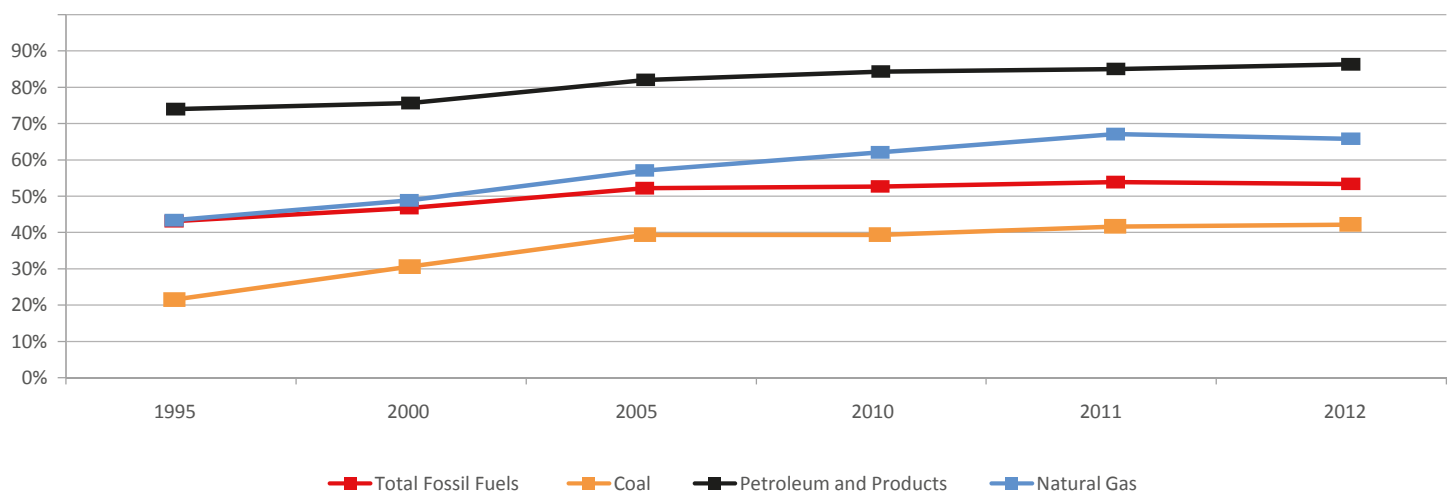
*"For years we have talked about energy security in terms of secure external suppliers and secure routes for fossil fuels – this is important but only half of the story. The secret to true energy security lies closer to home: clean, locally-produced renewable energy"*

Miguel Arias Cañete, Commissioner for Climate Action and Energy.

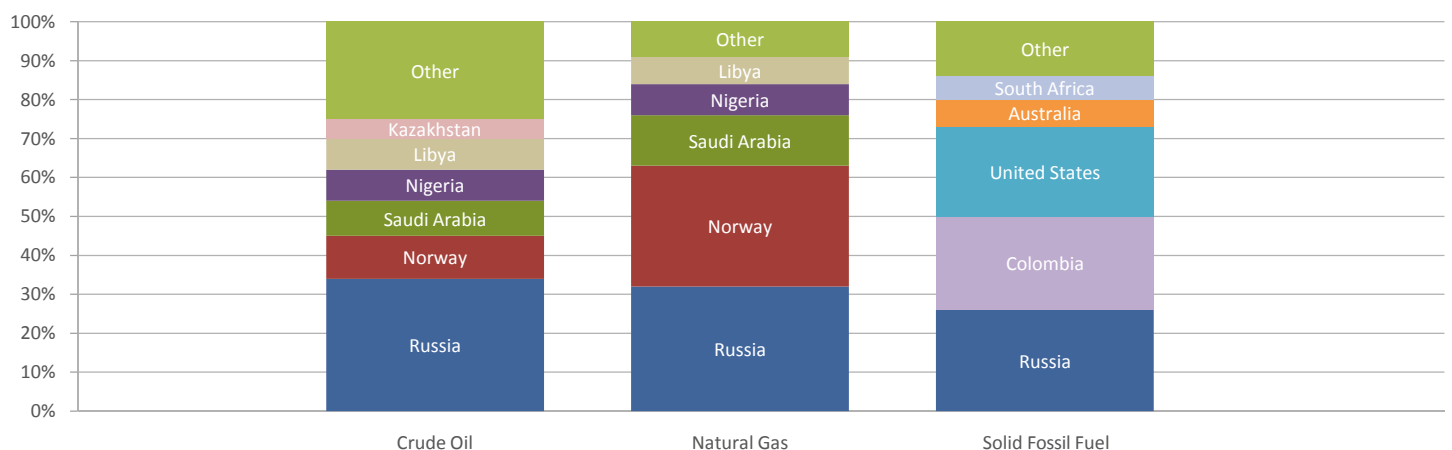
Knowing that only around 25% of the gas we consume in Europe goes to electricity production and the rest to heating (41% for heating of buildings and 31% for industrial processes), the EU gas security crisis is in fact a heating crisis.

The graph below shows the steadily increasing dependency rate of the EU for different fuels. Without additional measures, imports will continue to rise dramatically.

### The EU is highly dependent on fossil fuels imports (EU28 Energy import dependency by fuel (%))



### The EU is dependent on unstable countries supply of fossil fuels (EU28 Imports by country of origin)





A significant part of our energy imports comes from unstable regions, threatening the stability and security of the EU's supplies. The uncertainties over the current crisis in Ukraine show once again the limits of EU's energy dependency. According to Eurostat, about one third of the EU's total crude oil (34.5%) and natural gas (32%) imports in 2012 originated from Russia. These supplies appear to be less and less stable and secure, forcing the EU to think of a new strategy for its future energy security.

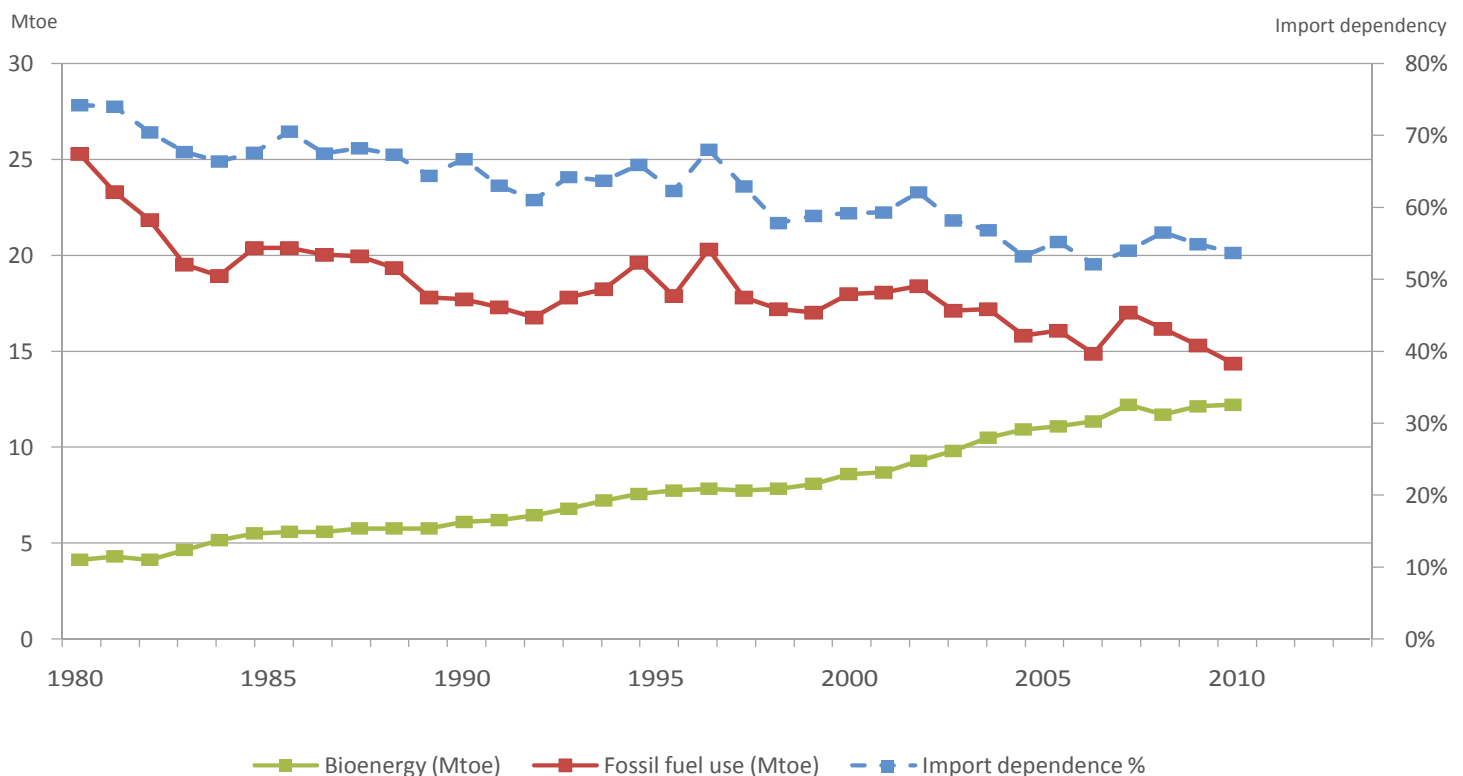
According to Eurostat, nuclear energy represented in 2012, 28.1% of the EU's "primary energy production" (227.7 Mtoe), giving a misleading impression that nuclear is an indigenous fuel. In fact, the EU is largely dependent on external uranium supply, mostly from mines in Canada, Australia and Kazakhstan. It is important to realize that nuclear energy is keeping the EU dependent on external supplies when too often it is considered as a European primary energy (unfortunately, Eurostat includes nuclear energy in its "primary energy production" statistics).

The dependency on different fossil fuels contributes not only to the weakening of the EU's geopolitical influence on the international arena, but also to the fueling of dramatic GDP-leakage, with the EU spending more than € 1 billion per day on importing fossil fuels, or around 4% of its annual GDP.

Solid biomass imports represent today only around 2-3% of the EU's gross inland consumption of biomass for heating and electricity. These imports are minor today and will remain marginal compared to fossil fuels imports. They also come from geopolitically stable countries such as the United States and Canada. In addition, imports of biomass to the EU are today subject to sustainability criteria (national sustainability schemes for solid biomass in NL, UK, DK, BE and private initiatives such as the Sustainable Biomass Partnership (SBP) scheme) and will be increasingly so in the future with an upcoming EU-wide sustainability criteria scheme announced by the European Commission in its communication on the Energy Union. This ensures the sustainability of increased biomass demand.

Sweden has been a pioneer in switching from fossil fuels to biomass. The graph below shows the increase of biomass use in Sweden over the past 33 years in comparison with the decrement of fossil fuel use. As a result, Sweden has managed to considerably reduce its import energy dependency.

### Increased use of bioenergy and reduced import dependency



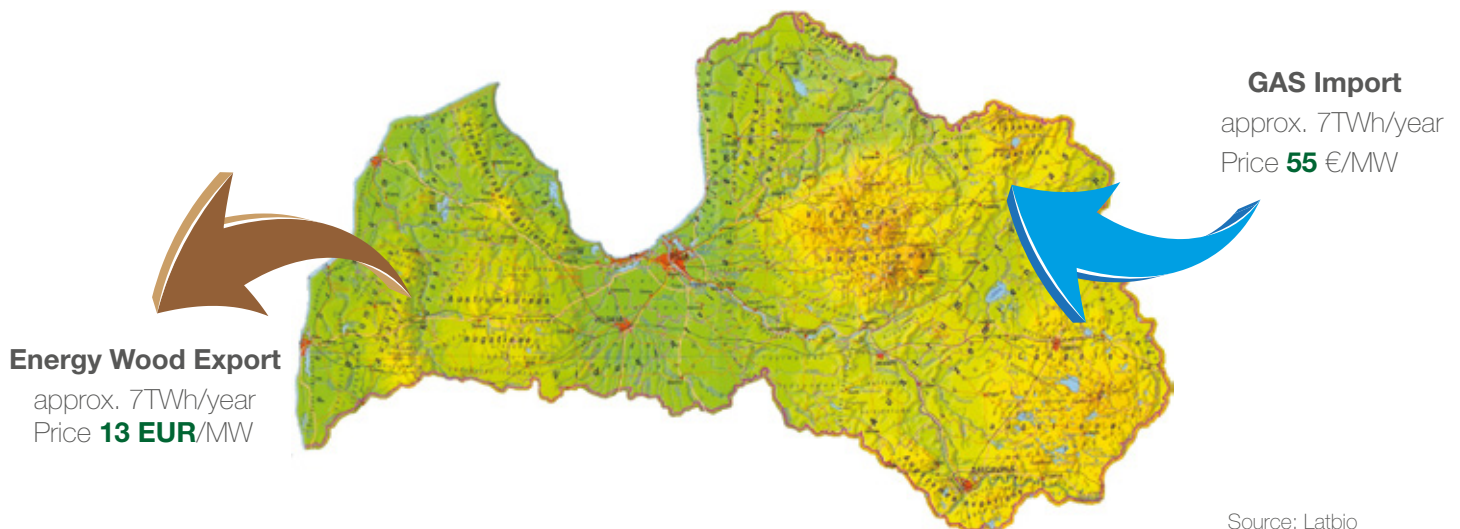


Latvia is another good example of how biomass could alleviate energy dependency, while avoiding GDP-leakage. In fact, the current situation in Latvia is quite striking. The country is importing around 7 TWh of a Russian natural gas at a price of € 55 /MWh and is exporting the same amount of energy wood at € 13 /MWh, losing approximately € 280 millions every year!



### Buying expensive, selling cheap

Import/Export balance of energy sources in Latvia



Latvia is losing approx. **280 mln. €/year**

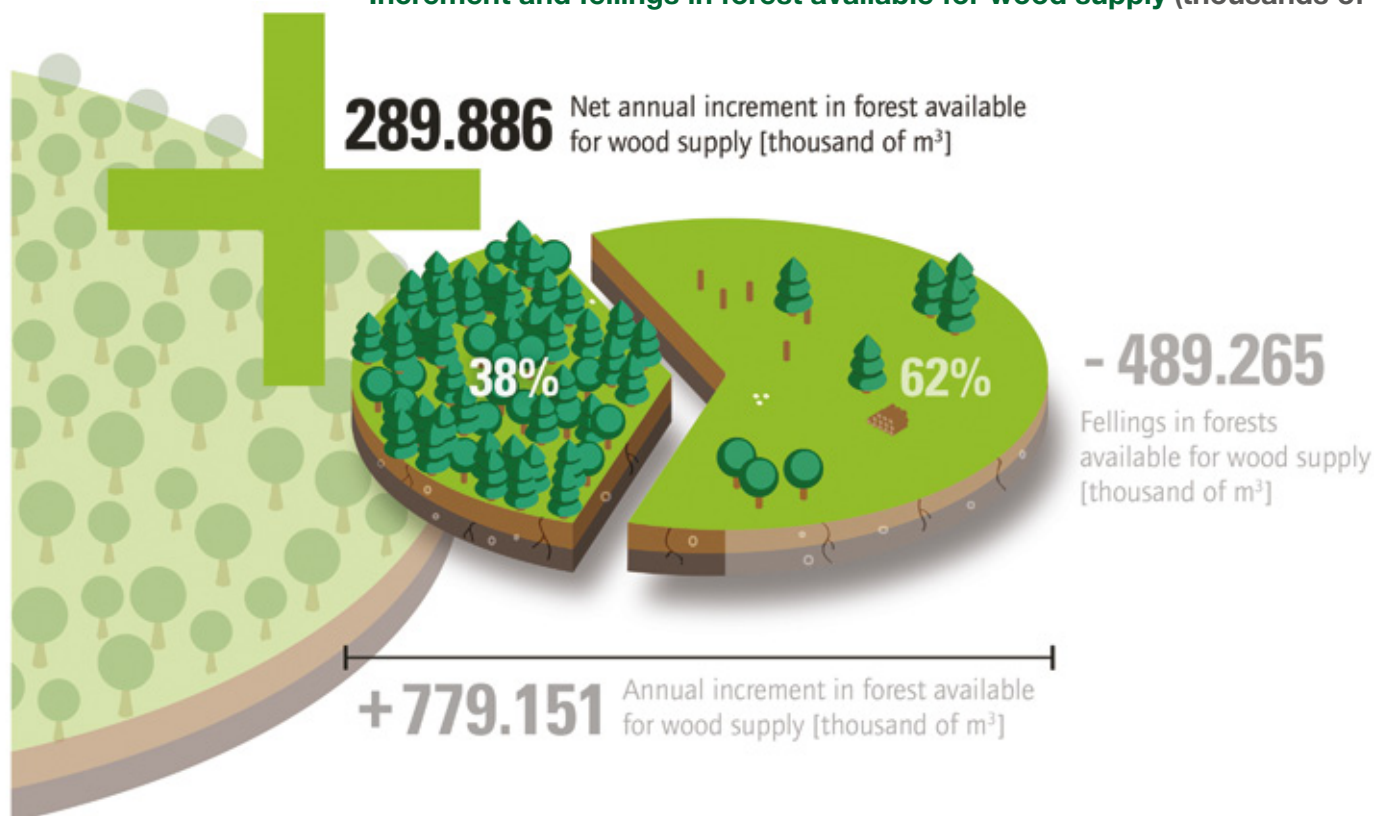
## Biomass as a solution to reduce EU energy dependency

Biomass has a significant role as part of the solution to reduce energy dependency. By encouraging a switch to renewable sources of energy, including biomass, in its energy security strategy, the EU will not only alleviate its external dependency and therefore improve its geopolitical situation, but it will also invest in a European SME based sector, creating growth and jobs in the EU, while decarbonizing its economy.

### 1. Biomass potential

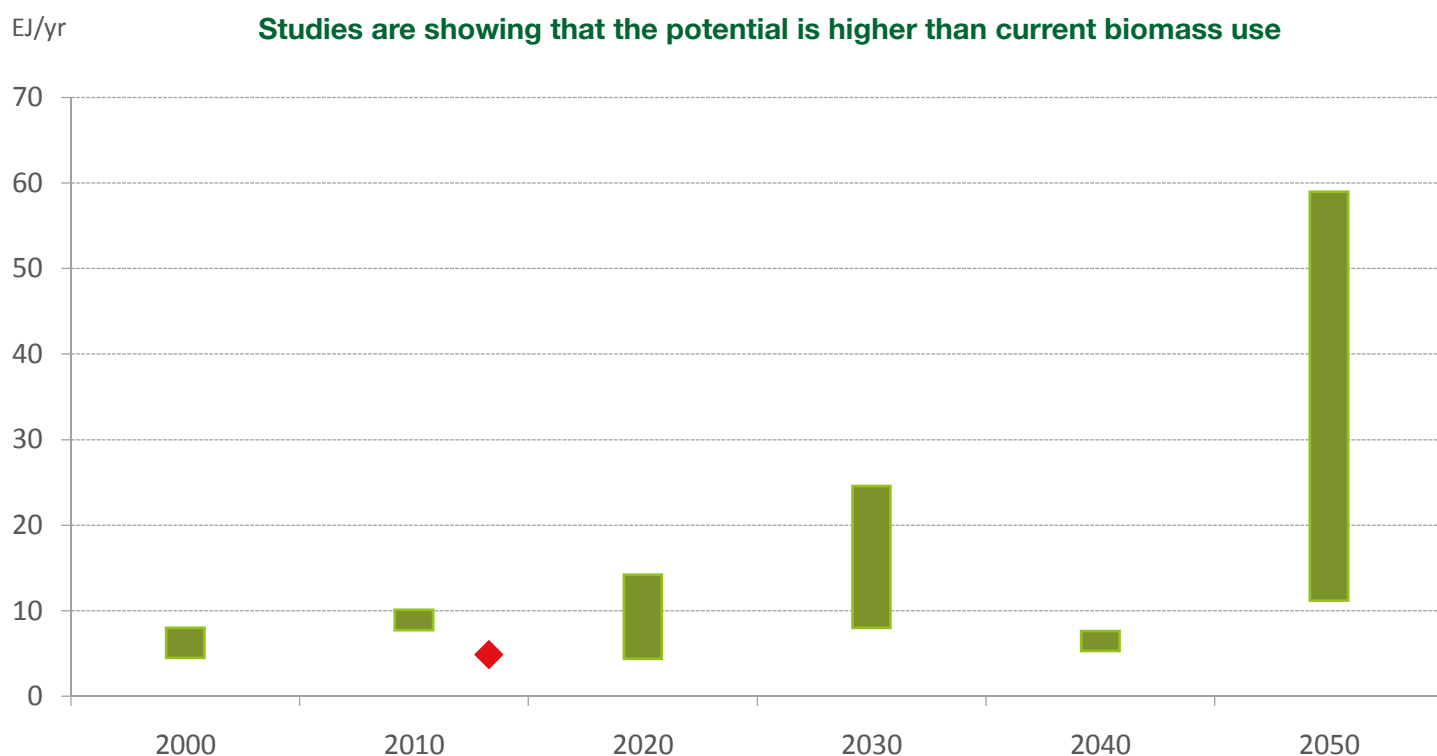
European forests are currently underutilized, as volume growth is significantly higher than the utilization, which can be seen in the following graph. In Europe, we are harvesting only 62% of annual forest growth. Every year, the wood stock in forest is increasing by almost 300 million m<sup>3</sup>.

## Increment and fellings in forest available for wood supply (thousands of m<sup>3</sup>)



The current and future biomass potential for energy use has been evaluated by numerous studies, at the EU and national levels. Different potentials have been concluded, depending on the initial assumptions, the approach, the methodology used and considered constraints. The methodologies for biomass resource assessments were compared in the Biomass Energy Europe (BEE) project which was financed by the European Commission. The graph below summarizes the potential of biomass (forestry and forestry residues, agricultural residues, organic waste).

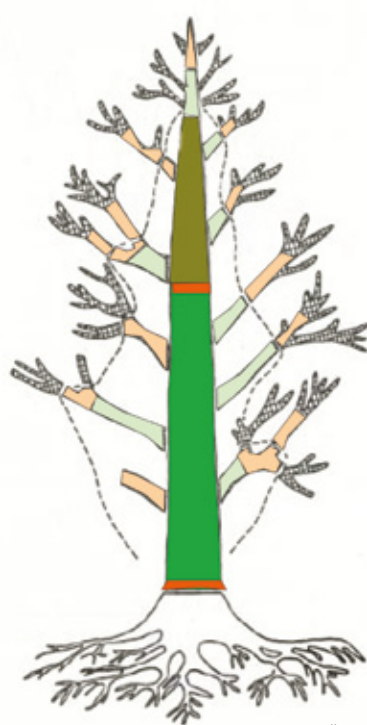
The red diamond in the graph shows the actual gross inland energy consumption of biomass in 2012, compared to the range of potentials evaluated. It clearly shows that the current use of biomass is below all evaluated potentials, even the most stringent ones. This is foreseen to remain the same in the future.



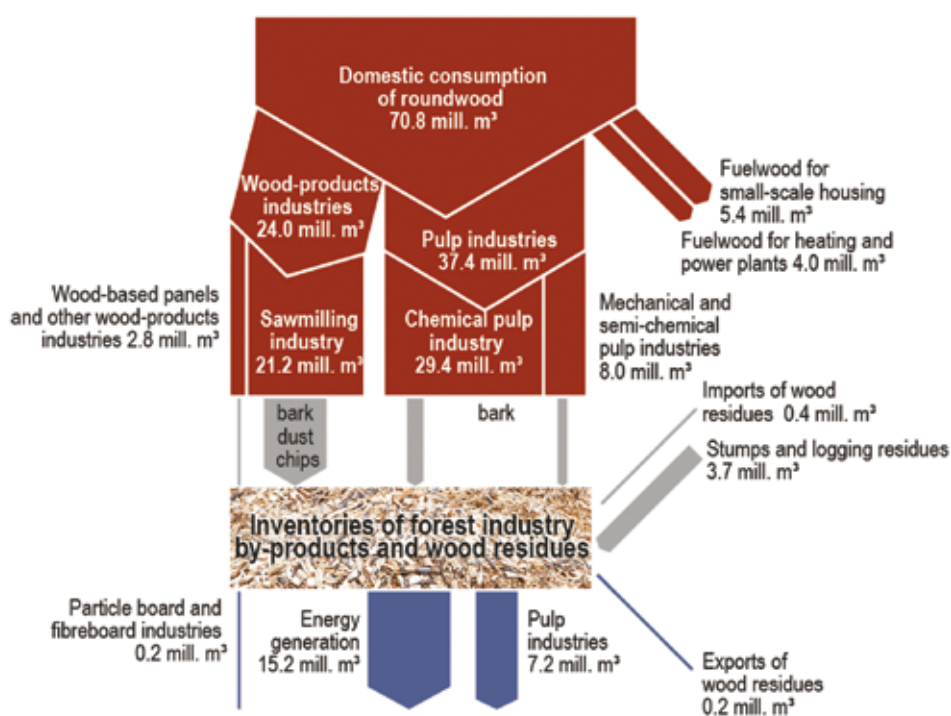
Counterintuitively, higher wood demand increases forest wood stock, as the owners see a higher value in wood, thereby managing forests more actively. More active forest management leads to increased volume increment as planting and thinnings are taken care of. Additionally, a stronger forest industry which creates sawn wood products and paper increases the biomass available for energy. Harvesting residues (branches and tree tops), small diameter wood, saw dust, wood shavings, bark and black liquor are among the by-products of the traditional paper and saw milling industries which can be used as bioenergy feedstocks.

The image below illustrates the different parts of a deciduous tree. The branches and tops can be used for bioenergy. The round wood is processed into sawn wood and cellulose, while their residues are used for energy purposes. The figure on the bottom-right depicts the wood consumption of an example country, Finland. The wood used for energy comes mainly from bark, dust and chips from the sawmilling and pulp industries. The fuel wood for heating and power accounts for a significantly smaller share and consists mainly of small diameter wood and harvesting residues.

### Wood used for energy comes mainly from tree branches and tops and from bark, dust and chips from the sawmilling and pulp industries



Source: LKÖ



Source: Metla

## 2. Technologies available

Readily available renewable energy solutions, combined with energy efficiency measures, are a quick, practical and versatile option to alleviate fossil fuels dependency. Biomass offers the possibility to replace every type of fossil fuel within every market: electricity, heating and cooling, and transport. Biomass represents today 9.25% of the total final energy consumption in Europe and 62.4% of the renewable energy consumed (Eurostat data for 2012).

### Biomass for Heat:

Of all possible renewable heating options, biomass has a great potential to deliver significant and cost-effective solutions to a concerning heat demand. Wood pellets, wood chips, briquettes, wood logs, and straw can be used for biomass heating, by using stoves or boilers.



**Stove:** Used for residential heating

**Boiler:** From small to large scale, heat can be used in buildings (through individual applications or district heating) and for industrial processes. Heat can also be produced through CHP (Combined Heat and Power).

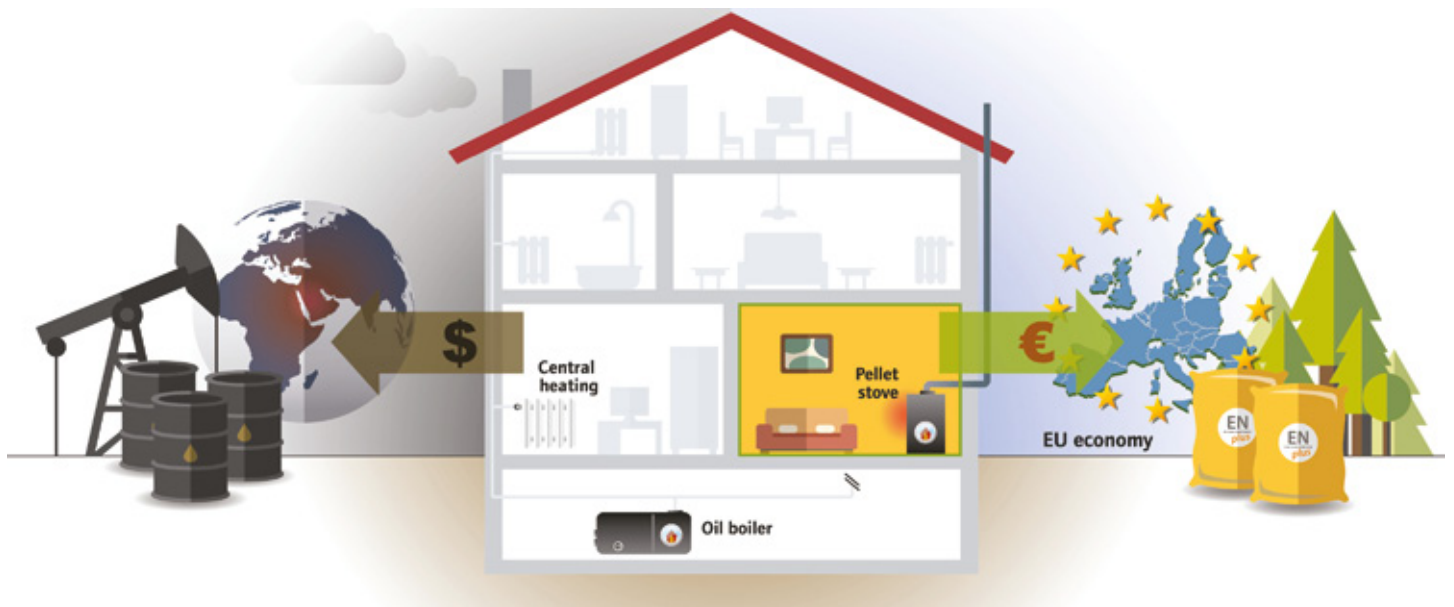
## Biomass for Electricity:

Biomass can be used to produce electricity for the grid or for self-consumption in industrial processes. It can be implemented in dedicated biomass power plants or through co-firing with fossil fuels. Dedicated biomass plants are plants specifically designed or converted to use biomass as fuel. They often use low cost fuels such as wood chips and, in some cases, agricultural by-products such as straw. Co-firing offers a possibility to produce large amounts of renewable electricity using existing power facilities. In the case of pulverized coal plants, high quality wood fuels such as pellets are used. Pellets are milled to powder and burned with coal in existing conventional power plants. In some recent cases co-firing plants have been converted to use 100% biomass.

By achieving the targets for renewables in heating and cooling (21.4% in 2020), the EU could reduce its gas imports by the equivalent of 28.7 Mtoe annually in 2020. With current average import prices, this would save the EU some € 9.6 bn. However, with more ambitious policies, it would be possible to cover 25% of the total heat demand by the end of this decade. The annual savings in reduced fossil fuel imports would amount to as much as € 21.8 bn compared to 2012. Instead of being paid to third countries, these amounts would be reinvested in EU industries developing technologies able to use indigenous and renewable sources of heating, such as biomass.



## Switching to a pellet stove means contributing to the EU economy







## Policy recommendations

Biomass can play an active role in reaching the EU's energy security objectives, while tackling at the same time growth and climate change objectives.

EU policies which can contribute to strengthen this role:



Subsidies to fossil fuels and nuclear should end and a carbon tax instrument should be promoted to drive consumption to a low carbon economy. With low oil prices, we have now a very good window of opportunity to increase fossil fuel taxes.



The Renewable energy Directive should be implemented properly, in particular articles 13 and 14 dedicated to renewables in buildings and to communication towards consumers and trainings of installers of small-scale equipment. Beyond 2020, these measures could be strengthened.



The development of renewable sources of energy should be combined with energy efficiency measures. For example, the buildings renovation policy should integrate both energy efficiency and renewable energy solutions.



Communication campaigns should be organized at the national / regional level with the support of the EU, so as to raise local "authorities", "industries" and "consumers" awareness on the benefits of switching from fossil fuels to biomass.



The European Commission should submit an analysis on how stable sources of renewable energy, such as sustainable biomass power, can complement variable renewable sources to increase the stability of the power sector.



The revision of Regulation (EU) 994/2010 on the security of gas supply should require Member States to establish a strategy to promote a switch from gas to biomass, including in district heatings.



Increase RD&I in renewable heat technologies to reduce costs, enhance systems' performance and reduce payback time.

## European Biomass Association

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AEBIOM is the common voice of the European bioenergy sector with the aim to develop the market for sustainable bioenergy, and ensure favorable business conditions for its members.