Wood chip transport.

CO'FELY

+ 6.1%

The growth of primary energy production from solid biomass in the UE between 2012 and 2013

SOLID BIOMASS BAROMETER

A study carried out by EurObserv'ER

Consumption of solid biomass in the European Union increased once again in 2013, this time by 2.9 Mtoe year-on-year to 91.5 Mtoe. However there was no straight-out trend as the increase in demand for solid biomass energy was particularly sharp in France and the UK and to a lesser degree in Spain and in Italy ... in deep contrast with the needs of a number of major wood-energy consumers, such as Sweden and Poland, whose consumption slipped.

71.7 Mtoe
Heat consumption from solid biomass in the EU in 2013

81.7 TWh
Electricity produced from solid biomass in the EU in 2013

91.5 Mtoe
Primary energy consumption from solid biomass in the EU in 2013

SOLID BIOMASS BAROMETER – **EUROBSERV'ER** – JANUARY 2015

Biomass heating plant commissioned by the Compagnie de chauffage urbain de Cergy-Pontoise (Cyel) that provides urban district heating to the town of Cergy-Pontoise (Val d'Oise) and its surroundings via a heating network.

STÉPHANE LAVOUE/PHOTOTHEQUE VEOLIA

Solid biomass includes all the solid organic components to be used as heat- and electricity-producing fuels ... wood, wood waste, wood pellets, black liquors, bagasse, animal waste and other plant matter and residues.

Every year the European Union increases its solid biomass consumption to produce electricity and heat. According to data gathered by EurObserv'ER, in 2013 the European Union's primary energy consumption stood at about 91.5 Mtoe, which is a 3.3% increase on 2012 **(see table 2)**. Growth has been almost uninterrupted since the beginning of the millennium (53.1 Mtoe), apart from the sharp drop recorded in 2011 as a result of the exceptionally mild winter across the European Union **(see graph 1).** Most of the solid biomass consumed has been produced on European soil. EU primary energy production is put at 88.1 Mtoe, which is a 2.4% rise **(see table 1)**. The differential, that is made up by net imports has tended to increase in the last few years, mainly as a result of rising wood pellet imports from the United States and Canada **(see box).**

The solid biomass consumption trend was rather patchy across the European Union Member States. This year it declined in Sweden, because of lower forestry industry activity and in Poland and Nertherlands because of the drop in biomass electricity production. On the other hand, its consumption is rising sharply in countries that promote wood-fuel heating such as France and in countries like the UK that encourage electricity recovery from biomass. The UK along with Italy spearheaded the expansion in European Union biomass electricity production in 2013, and made up for the drop in Swedish, Polish and Dutch output. At the end of the day, European Union biomass electricity production increased by 1.8% in 2013 to 81.7 TWh or about 1.5 TWh more than in 2012 **(see table 3)**.

Growth in solid biomass heat was slightly higher in the European Union (2.7% up on 2012) and reached 72.4 Mtoe (1.9 Mtoe more than in 2012), and this with an increase in solid biomass sales to heating networks by 2.5% **(see table 4)**.

The EU used 18.3 million tonnes of wood pellets in 2013

The European Union's wood pellet market is the biggest in the world. According to data published by AEBIOM (European Biomass Association) in its 2014 report, European Bioenergy Outlook, European Union wood pellet consumption should rise to 18.3 million tonnes in 2013 compared to global consumption put at 23.2 million tonnes. Wood pellet production by the European Member States is put at 12.2 million tonnes in 2013, which means that the EU imported exactly one third of its consumption (33.3%) in 2013. Data from the GTIS (Global Trade Information Services) shows that since 2012 the United States has been the leading wood pellet exporter to the EU. In 2013, it sold 2 766 000 tonnes (1 764 000 tonnes in 2012) to the EU, ahead of Canada which exported 1 921 000 tonnes in 2013 (1 346 000 tonnes in 2012). The other top suppliers to the EU are Russia (702 000 tonnes), the Ukraine (165 000 tonnes) and Belarus (116 000 tonnes). The extent of wood pellet use is country-dependent. In the British, Dutch and Belgian markets, wood pellets are mainly used as fuel in high-capacity power plants, regardless of whether they are coal-fired plants converted into biomass co-firing plants, or new plants purpose-designed to burn biomass. In the Nordic countries of Sweden and Denmark, wood pellets are used both in heating appliances, boilers and stoves, and also in large cogeneration plants. In Germany, Italy, Austria and France, the main growth vector is wood pellet consumption in residential heating systems, and they are also used in industrial boilers for heat production.

SOLID BIOMASS CONSUMPTION IN THE EUROPEAN UNION

THE UK PUT THE PRIORITY ON CONVERTING COAL-FIRED POWER PLANTS

According to the DECC (Department of Energy & Climate Change), it was wood that made the highest contribution to the increase in UK renewable heat consumption in 2013. The reason proffered by the government is the increase in household consumption, due to a slight increase in heating requirements caused by the longer winter, the commissioning of new cogeneration plants in 2013 and the build-up of the RHI (non-domestic) incentive system. The Renewable Energy Association claims that this system has already financed 4 926 wood-fired boilers and brought capacity to date in excess of one gigawatt (the gigawatt mark was passed in August 2014). Over the course of 2013, total solid biomass heat consumption thus increased by 20.8%, to 1.1 Mtoe (0.9 Mtoe in 2012).

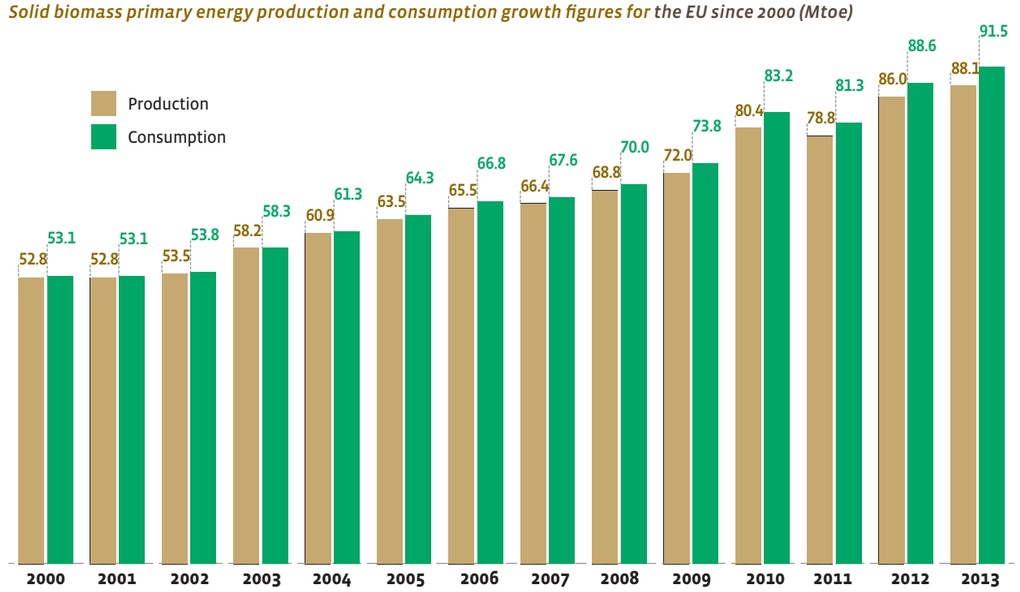
In 2013, the increase in solid biomass electricity output outstripped that of 2012 (by 50.9%), thanks to the conversion and start-up in June of the first of the UK's biggest power plants to biomass, Drax, North Yorkshire. A second 630-MWe biomass plant went on stream in May 2014, which should again significantly boost biomass electricity production over the year. For the time being the UK's policy is to convert existing coal-fired plants that will have to run as cogeneration plants and so limit new biomass plant construction to 400 MWe.

FRANCE USED MORE WOOD HEATING IN 2013

Primary solid biomass production, almost entirely accounted for by the wood-energy sector (97% of the total), increased by a clear 10.9% in 2013 over the previous twelve months. The only reason for this is an increase in heating requirements. The French Observation and Statistics Directorate (SOeS) explains that biomass heat requirements increased through the combined effect of colder than average winter temperatures and the continuing rise in the number of wood-fire heating appliances installed boosted by the tax credit mechanism. In 2013, 524 000 stoves were sold, compared to 489 000 in 2012 and 467 000 in 2011. Wood-energy consumption also benefitted from support mechanisms such as the Ademe heat fund (regional support mechanisms and calls for BCIAT [biomass heat industry agriculture and tertiary] projects). In September 2014, Ademe published an update on the heat fund mechanism. Out of the five calls for BCIAT projects filed between 2009 and 2013, 129 projects were successful, 39 projects are up and running, 71 are underway and 19 have been abandoned. The combined thermal output of the completed projects

Graph. n° 1

Solid biomass primary energy production and consumption growth figures for the EU since 2000 (Mtoe)



Estimate.* ***Sources: years 2000-2011 Eurostat, years 2012-2013 EurObserv'ER*


DECC GOV.UK

Tabl. n° 1

Primary energy production of solid biomass in the European Union in 2012 and 2013 (Mtoe)*

	2012	2013
Country		
Germany	10.931	10.902
France**	9.779	10.842
Sweden	9.563	9.211
Finland	7.937	8.117
Italy	7.249	7.452
Poland	6.988	6.497
Spain	4.964	5.443
Austria	4.806	4.749
Romania	3.795	4.233
Portugal	2.342	2.347
Czech Republic	2.153	2.293
United Kingdom	1.849	2.153
Latvia	1.870	1.750
Denmark	1.489	1.518
Hungary	1.385	1.454
Belgium	1.413	1.408
Bulgaria	1.109	1.300
Netherlands	1.112	1.118
Estonia	1.012	1.067
Lithuania	0.992	1.041
Greece	1.000	0.847
Slovakia	0.801	0.818
Croatia	0.694	0.700
Slovenia	0.560	0.583
Ireland	0.196	0.195
Luxembourg	0.047	0.055
Cyprus	0.005	0.005
Malta	0.001	0.001
European Union	86.043	88.100

** Estimate. **Overseas departments not included for France.* ***Source: EurObserv'ER 2014***

and projects in progress is 586.7 ktoe for 1 152 MWth of combined capacity. The sixth call for BCIAT projects 2014, launched in September 2013 has set an annual target of 125 ktoe. Regional support, another mechanism of this fund, financed 539 projects over the same period (investments worth 1 023 million euros), amounting to 426.4 ktoe of wood consumption.

ITALY'S SOLID BIOMASS CONSUMPTION UNDERSTATED

A new ISTAT (National Institute for Statistics) survey published on 15 December 2014, eloquently demonstrated that domestic wood-energy consumption was wildly underestimated in Italy. On the basis of these findings the Italian Ministry of Economic Development now puts household consumption of wood, wood pellets and charcoal for heating at 6.6 Mtoe in 2012 and 2013, as opposed to the previous estimate of 3.6 Mtoe for 2012. If the other uses of solid biomass are factored in, Italian solid biomass consumption should stand at about 8.8 Mtoe in 2013, signifying a 5.4% increase, having benefitted from a significant 42.6% increase in electricity output, to reach 3.7 TWh in 2013 (compared to 2.6 TWh in 2012). The reason given for this upward revision is the surge in wood pellet and wood fuel consumption in heating appliances in recent years, intensified by the very high price of gas and heating oil in Italy, but most of all the strong political determination to develop the use of wood pellets and biomass in general. According to AIEL (the Italian Agriforestry Energy Association), the cost of wood pellets (inclusive of all taxes) varied in September 2013 from € 69/MWh for bulk pellets including delivery to € 72/MWh for pellets purchased by the sack. These prices need to be compared to € 86/MWh for natural gas and € 145/MWh for heating oil. Wood chips (at € 33/MWh) and logs (at € 54/MWh) are even cheaper. Wood pellet consumption is also encouraged by the authorities. In addition to its competitive pricing, a tax reduction applies for a 10-year period to up to 50% of the expenses incurred for the purchase and installation of a wood-fired heating system, or by the payment of a Feed-In Tariff for producing heat. The system, called Conto termico, was implemented on January 3 2013 (in compliance with decree no. 28/2011 that transposed the European renewable energies directive), and is used to finance new efficient biomass systems (that run on pellets, woodchips and certified logs) to replace heating systems running on heating oil, coal or traditional biomass.

Tabl. n° 2

Gross consumption of solid biomass in the European Union in 2012 and 2013 (Mtoe)*

	2012	2013
Country		
Germany	10.931	10.902
France	9.779	10.842
Sweden	9.563	9.211
Italy	8.383	8.837
Finland	7.963	8.146
Poland	6.988	6.497
Spain	4.964	5.443
Austria	5.021	4,971
Romania	3.655	4.233
United Kingdom	2.512	3.319
Denmark	2.473	2.523
Portugal	2.342	2.347
Czech Republic	2.057	2.173
Belgium	1.993	2,036
Hungary	1.330	1.407
Bulgaria	1.019	1.334
Latvia	1.255	1.270
Netherlands	1.350	1.125
Lithuania	1.003	1.026
Greece	1.136	0.928
Slovakia	0.786	0.813
Estonia	0.814	0.793
Slovenia	0.560	0.583
Croatia	0.497	0.500
Ireland	0,213	0.230
Luxembourg	0,043	0.049
Cyprus	0,009	0.009
Malta	0.001	0.001
European Union	88.639	91.459

** Estimate.* ***Source: EurObserv'ER 2014***

The Feed-In Tariff is calculated making allowance for a number of elements – rated output, theoretical utilization period (depends on predefined climate zones), the emissions level and a subsidy coefficient. The FiT is payable for two years for a stove (≤35 kW) and for five years for a boiler (≤1 000 kW). By way of illustration a 10-kW wood pellet burner will be eligible for a two-year annual subsidy of 524 euros in Turin (Northern Italy), 431 euros in Rome and 339 euros in Bari, further south.

GERMANY'S NEW EEG LAW DOES FEW FAVOURS FOR BIOMASS ELECTRICITY

Electricity production through biomass plants is no longer a priority of Germany's new renewable energy law (EEG), whose annual target for all biomass sectors taken together (including biogas plants) has been limited to 100 MW. This annual target is much lower than those set for land-based wind power (2 400-2 600 MW) and solar power (2 400-2 600 MW), because of lower production costs. The law has some more new twists to it … as from 1 August 2014, only small installations, with installed capacity of ≤500 kW are eligible for Feed-In Tariffs and from 1 January 2016, the eligibility threshold will drop to <100-kW installations.

The incentive will still be guaranteed for a 20-year term; however, the rate will be reduced annually by 0.5% from 2016 onwards. Furthermore <100-kW plant operators will be obliged to sell their electricity directly as of 1 January 2016. Thus renewable energy producers with new plants will be responsible for selling their electricity and subject to market prices. They will have to communicate their production forecasts a day in advance and make a contribution towards the supply/demand adjustment costs on the electricity market. In so doing, the government hopes to achieve the most efficient production integration, improve the accuracy of production forecasts and production flexibility to adjust to needs.

In the direct sales system, the producer is paid a market premium to offset the loss of revenue. A reference value defined by the EEG law is set to calculate this premium in line with the Feed-In Tariff.

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It includes a management premium that partly compensates for the risks and costs incurred by direct sales (€ 0.02/kWh for biomass). The amount of the premium is calculated from this reference value every month fluctuating in line with the price of electricity on the EPEX Spot market. The renewable electricity producers are then responsible for selling their electricity in line with that price. The eligibility criteria for this premium are that the electricity must be produced by a remotely-controllable plant that is also part of a balancing zone that only incorporates renewable electricity. From 1 January 2016 onwards, the premium will not be paid out if the EPEX Spot market prices are negative for at least 6 consecutive hours.

POLAND GIVES PREFERENCE TO ELECTRICITY OVER HEAT

Although solid biomass electricity output dropped sharply in 2013 (by 1.5 TWh, i.e. 8 TWh produced in 2013), Poland is still one of the top European Union biomass electricity producers. According to the Institute for Renewable Energy (EC BREC IEO), most of this output comes from coal/biomass co-firing plants. Coal plants operating in co-firing are old (35 years old on average) offering fairly low-efficiency in their biomass energy recovery with a few exceptions, such as the November 2012 conversion of one of Polaniec coal plants into a 100% biomass plant (205 MW).
A new renewable energy has been on the table in Poland for four years and is

Tabl. n° 3

Gross electricity production from solid biomass in the European Union in 2012 and 2013 (TWh)*

	2012			2013		
Country	Electricity only plants	CHP plants	Total electricity	Electricity only plants	CHP plants	Total electricity
Germany	5.288	6.803	12.091	5.199	6.444	11.643
Finland	1.220	9.485	10.706	1.490	9.968	11.457
United Kingdom	7.008	0.000	7.008	10.577	0.000	10.577
Sweden	0.000	10.507	10.507	0.000	9.609	9.609
Poland	0.000	9.529	9.529	0.000	8.024	8.024
Spain	1.587	1.809	3.396	1.703	2.086	3.789
Austria	1.365	2.400	3.765	1.124	2.635	3.759
Italy	1.545	1.024	2.569	2.132	1.532	3.664
Belgium	2.609	1.076	3.684	2.218	1.136	3.354
Denmark	0.000	3.175	3.175	0.000	3.025	3.025
Netherlands	2.383	1.577	3.960	1.699	1.230	2.929
Portugal	0.786	1.710	2.496	0.736	1.780	2.516
Czech Republic	0.468	1.348	1.816	0.015	1.668	1.683
France**	0.039	1.586	1.625	0.069	1.529	1.599
Hungary	1.218	0.115	1.333	1.377	0.093	1.470
Slovakia	0.008	0.716	0.724	0.000	0.722	0.722
Estonia	0.374	0.611	0.985	0.030	0.615	0.645
Lithuania	0.000	0.176	0.176	0.000	0.279	0.279
Romania	0.053	0.140	0.193	0.000	0.263	0.263
Ireland	0.164	0.020	0.184	0.215	0.014	0.229
Latvia	0.006	0.059	0.065	0.007	0.208	0.215
Slovenia	0.000	0.114	0.114	0.000	0.119	0.119
Bulgaria	0.000	0.065	0.065	0.000	0.065	0.065
Croatia	0.000	0.037	0.037	0.000	0.048	0.048
Luxembourg	0.000	0.000	0.000	0.000	0.002	0.002
European Union	26.122	54.082	80.204	28.591	53.093	81.684

** Estimate. ** Overseas departments not included for France.* ***Source: EurObserv'ER 2014***

Production of pellets in Germany.

Tabl. n° 4

Heat production from solid biomass in the European Union in 2012 and in 2013 (Mtoe) in the transformation sector***

	2012			2013		
Country	Heat plants only	CHP plants	Total Heat	Heat plants only	CHP plants	Total Heat
Sweden	0.802	1.628	2.430	0.745	1.608	2.353
Finland	0.476	1.143	1.619	0.503	1.184	1.688
Denmark	0.391	0.552	0.943	0.398	0.561	0.959
Austria	0.413	0.401	0.814	0.454	0.380	0.834
Germany	0.251	0.304	0.555	0.184	0.350	0.534
France***	0.159	0.275	0.434	0.213	0.318	0.530
Poland	0.034	0.428	0.462	0.025	0.320	0.345
Italy	0.074	0.272	0.345	0.073	0.268	0.341
Lithuania	0.180	0.060	0.240	0.181	0.087	0.268
Estonia	0.071	0.108	0.179	0.074	0.117	0.191
Slovakia	0.050	0.122	0.173	0.052	0.122	0.174
Latvia	0.090	0.019	0.110	0.093	0.061	0.154
Czech Republic	0.022	0.048	0.070	0.024	0.095	0.119
Romania	0.032	0.015	0.047	0.044	0.073	0.117
Hungary	0.017	0.042	0.059	0.021	0.051	0.072
Netherlands	0.000	0.043	0.043	0.000	0.040	0.040
Bulgaria	0.002	0.003	0.005	0.000	0.030	0.030
Belgium	0.000	0.008	0.008	0.000	0.024	0.024
Slovenia	0.008	0.012	0.020	0.008	0.012	0.020
United Kingdom	0.033	0.000	0.033	0.009	0.000	0.009
Croatia	0.000	0.002	0.002	0.000	0.003	0.003
Luxembourg	0.002	0.000	0.002	0.002	0.001	0.003
European Union	3.106	5.485	8.591	3.103	5.705	8.809

** Estimate. ** Heat sold in district heating. *** Overseas departments not included for France.* ***Source: EurObserv'ER 2014***

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intended to transpose the renewable energies directive. The government filed a draft bill in April 2014 that again gives preference to the country's top electricity utilities. It provides for developers and owners of new renewable installations to auction their energy for a specified price that should be guaranteed for a fifteen-year term without reference to the market price. The proposal will also set an upper limit for the subsidy. Renewable energy producers already in business will be allowed to retain their current subsidies or join the auction system.

THE HIGH-CAPACITY INDUSTRY MUST FIND ITS WAY

For several years the significant increase in solid biomass consumption has been largely driven by the development of huge cogeneration and other plants. The major forest countries of Northern Europe (mainly Finland and Sweden) chose high-capacity plants in the past. They were the first to construct plants with capacities upwards of 100 MWe running as cogeneration plants supplied by their forestry industry **(see table 6)**. For a few years, the construction of high-capacity biomass plants has also been stimulated by the enforcement of more binding legislation on polluting emissions from thermal plants, primarily through the transposition of the 23 October 2001 directive on major combustion plants (2001/81/EC). This draconian regulation hardened the polluting emission limits of thermal plants (for sulphur dioxide, nitrogen monoxide and dioxide and dust). Operators are obliged to make investments to meet these standards or construct new plants wherever compliance with the standards is considered too costly. Some countries have seized the opportunity offered by retrofitting their coal-fired power plants to meet their European renewable output commitments. They have thus encouraged the operators of these plants, via production support, to convert part of their old plants into biomass or co-firing plants. So far this conversion movement has only been started by a handful of countries (primarily the UK, Germany, Denmark, Belgium, the Netherlands and Poland) and has not been all plain sailing.
For instance in April 2014, the operator of the Drax power plant decided to take the British Government to court, after the latter refused to award the Contracts for Difference (CfDs) incentive system to the second tranche of the plant converted to biomass, although it was awarded

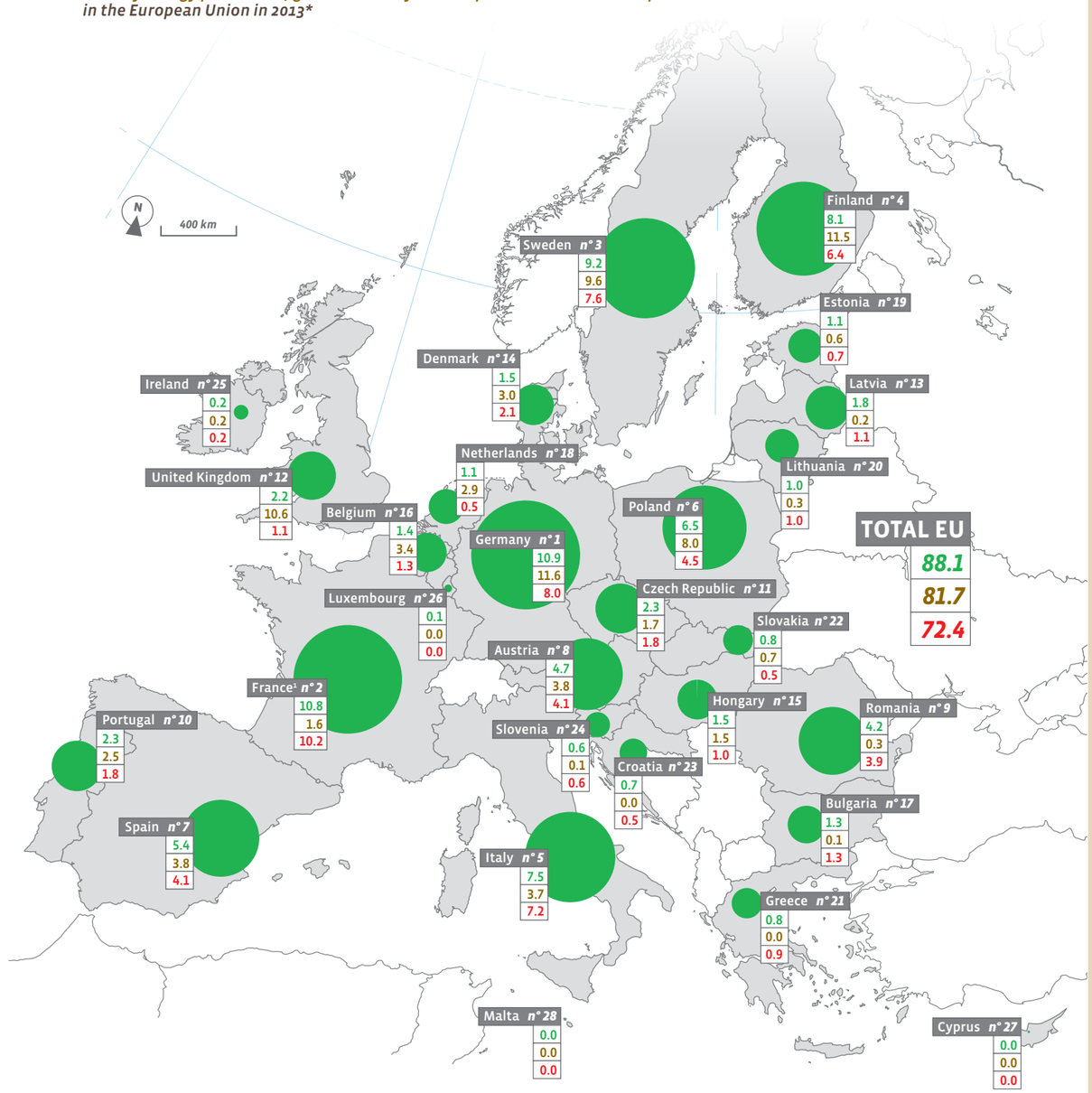
No European legislation on solid biomass sustainability criteria before 2020

The future growth of solid biomass fuel is largely linked to the implementation of sustainability criteria. In the light of the economic issues, this question is at the heart of very intense Union negotiations. On 28 July 2014, the European Commission presented a new report entitled the "State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling". This working document was accompanied by two other reports – one from the JRC (Joint Research Centre) and a report by the Forestry Commission Research Agency. All these documents toe the same line of introducing sustainability criteria for solid and gaseous fuels produced from solid biomass. Similar criteria have been in place for liquid biomass since 2009. But the European Commission has already warned that no Europe-wide harmonized legislation on these criteria is planned before 2020. The Commission feels that current legislation, regardless of whether its scope is national or European is sufficiently binding to provide sustainable operation conditions. Nonetheless for several years the sector's professionals, primarily EURELECTRIC (the European Union of the Electricity Industry) and AEBIOM have been clamouring for the introduction of a European framework to rule on the sustainability criteria. Investors find the lack of European legislation on this issue dissuasive, as they need to have a clear view of the regulatory developments after 2020.

In the interim, the biggest solid biomass importers (plant operators and main importing countries) are developing their own verification and certification system and imported wood pellets are right in the firing line. In the case of wood pellets for domestic use, the European Pellet Council (EPC) and AEBIOM are trying to impose the EN Plus standard, that already accounts for more than half Europe's demand in the heating sector. In the case of pellets and other type of biomass used in industry, the SBP (Sustainable Biomass Partnership) is trying to develop a certification system based on both the existing sustainable forest management programmes (such as the PEFC), and current legislation in the main importing countries, namely the UK, Denmark, the Netherlands and Belgium.

For the time being the UK is the only country to have decided to introduce its own sustainability criteria on the basis of the European Commission recommendations of February 2010. Under the ROCs (Renewable Obligation Certificates) system, the utilities are already obliged to collect information on the sustainability of the fuels they use tied to obligation to publish an annual report (Annual Sustainability report). The utilities must also be able to trace the origin of the biomass and calculate the GHG emissions. For the purpose, the British Government has provided a proprietary tool on the OFGEM (Office of Gas and Electricity Market) site to calculate the CO_2 and other GHG emissions based on the calculation methods of the European Renewable Energy Directive. From 1 April 2015, the renewable electricity producers' data collection obligation will take the form of mandatory adherence to these criteria to continue to benefit from the ROCs system. The Dutch, Danes and Belgians are also developing their own legislation to ensure the sustainability of their biomass feedstock.

***Primary energy production, gross electricity consumption and heat consumption** from solid biomass in the European Union in 2013**



Key

9.2 Primary energy production of solid biomass in the European Union in 2013* (Mtoe).

1.5 Gross electricity production from solid biomass in the European Union in 2014* (TWh).

8,.7 Heat consumption from solid biomass in the European Union in 2013* (Mtoe).

** Estimate. [1]Overseas departments not included.* **Source: EurObserv'ER 2014**

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to the third plant that will be converted in 2016. The revenue shortfall is considerable because the ROCs system values a megawatt hour of biomass electricity at 0.9 ROCs, and one ROC was worth about £ 41.5/MWh in April 2014. This contrasts with the strike price for the Contracts for Difference set at £ 105/MWh for conversion of coal plants to biomass. This second plant that came on stream in May 2014 started operating in biomass co-firing (85% pellets) because of supply problems, and it was only in October that it was entirely converted to biomass.

In addition to the third Drax plant, the British Government announced in April 2014 that two further biomass projects could benefit from the Contracts for Difference mechanism – the converted Lynemouth coal-fired power plant (420 MW) operated by RWE, which will attract the same strike price as the third Drax plant, and the construction (in contrast to a conversion) of the MGT Power's Teesside Renewable Energy Plant, a biomass cogeneration plant. Its strike price was set at £ 125/MWh. This 299-MW plant will produce about 2.4 TWh annually and supply 600 000 homes with electricity. Its annual woodchip consumption will stand at about 2.5 million tonnes and it is due to come on stream in 2016. Lastly, the operators of the Drax plant also announced in July 2014 that they were considering converting a fourth plant to biomass. This will depend on whether they can secure their supplies after investing in pellet production plants in the United States.

At the start of the year, Belgium's Electrabel announced the closure of the Max Green plant at Rodenhuize, the country's biggest biomass plant (215 MW) capable of covering the electricity consumption of 320 000 households. In this instance, Electrabel had been unable to obtain green certificates for the period 2014-2016, as the prior declaration of the Belgian federations of industries active in the wood and paper sector did not come through. The plant finally restarted on 28 August 2014, following an agreement between the stakeholders and the Flemish Government.

Local opposition, despite administrative authorizations, is also a source of uncertainty.

In France, the partial conversion of the Gardanne coal plant, planned for 2015, has been fraught with controversy about its energy efficiency as it was not designed to operate in cogeneration.

Despite these challenges, the development of major biomass and co-firing plants will continue over the next few years judging by the regular announcement of new projects. One such project comes from the Belgian company Belgia Eco Energy (Bee), which announced at the beginning of November that it would be constructing the world's biggest biomass cogeneration power plant with a design capacity of 215 MW of electricity and 100 MW of thermal capacity in Ghent, Belgium. Its main feedstock will be woodchips and agrifood industry residue. The Spanish firm Abengoa has been selected to design and construct this plant, which will be running at the end of 2017.

Tabl. n° 5

Heat consumption from solid biomass in the countries of the European Union in 2012 and 2013***

Country	2012	Of which district heating	2013	Of which district heating
France***	9.087	0.434	10.186	0.530
Germany	7.862	0.555	8.022	0.534
Sweden	7.921	2.430	7.626	2.353
Italy	7.198	0.345	7.198	0.341
Finland	6.347	1.619	6.412	1.688
Poland	4.913	0.462	4.484	0.345
Austria	4.003	0.814	4.139	0.834
Spain	3.850	0.000	4.054	0.000
Romania	3.658	0.047	3.874	0.117
Denmark	2.030	0.943	2.079	0.959
Portugal	1.802	0.000	1.829	0.000
Czech Republic	1.642	0.070	1.794	0.119
Bulgaria	1.003	0.005	1.342	0.030
Belgium	1.183	0.008	1.311	0.024
Latvia	1.166	0.110	1.141	0.154
United Kingdom	0.923	0.033	1.115	0.009
Hungary	0.977	0.059	1.015	0.072
Lithuania	0.918	0.240	0.958	0.268
Greece	1.133	0.000	0.922	0.000
Estonia	0.657	0.179	0.663	0.191
Slovenia	0.537	0.020	0.556	0.020
Slovakia	0.493	0.173	0.496	0.174
Croatia	0.466	0.002	0.473	0.003
Netherlands	0.459	0.043	0.460	0.040
Ireland	0.175	0.000	0.181	0.000
Luxembourg	0.042	0.002	0.048	0.003
Cyprus	0.007	0.000	0.007	0.000
Malta	0.001	0.000	0.001	0.000
European Union	70.451	8.591	72.378	8.809

** Consumption of the end user (either as heat sold by the district heating or self-consumed, either as fuels for the production of heat and cold) ** Estimate. *** Overseas departments not included for France.* ***Source: EurObserv'ER 2014***

WHAT TARGETS FOR 2030?

The recent publication of the working document on the State of play on the sustainability of solid and gaseous biomass used for electricity, heating and cooling in the EU recalled the European targets set in the National Renewable Energy Action Plans (NREAPs). According to the NREAPs estimates, biomass supply is projected to increase by nearly 37% to 132 Mtoe by 2020. The summary of the 28 plans indicates that by that time line the Member States intend to have increased their mobilization of wood-energy by a further 95 million m³ compared to 2006. This breaks down into 83 million m³ directly supplied by wood (logs) and 12 million m³ by wood industry residue (woodchips, sawdust). This scale is similar to the equivalent of the total wood mobilized in Finland and Sweden for energy uses in 2010. Wood-energy consumption would thus rise from 336 million m³ in 2006 to 431 million m³ in 2020. The working document points out that while for a majority of the countries biomass consumption will still essentially rely on domestic resources, imports from third countries are bound to increase at the end of the decade. As it stands, according to the NREAPs and Eurostat, biomass-sourced primary energy consumption in the electricity, heating and cooling sectors could rise to 140 Mtoe in 2020 (for 110.5 Mtoe of final energy consumption) with European feedstock estimated at 118.6 Mtoe. This 21.4 Mtoe shortfall will naturally have to be made up by imports from third countries, primarily in the form of woodchips and pellets. The same document points out that pellet imports into the European Union, which have already increased from 2.7 million tonnes in 2010 to 4.3 million tonnes in 2013, could rise to between 15 and 30 million tonnes (namely, 6-12 Mtoe) by 2020.

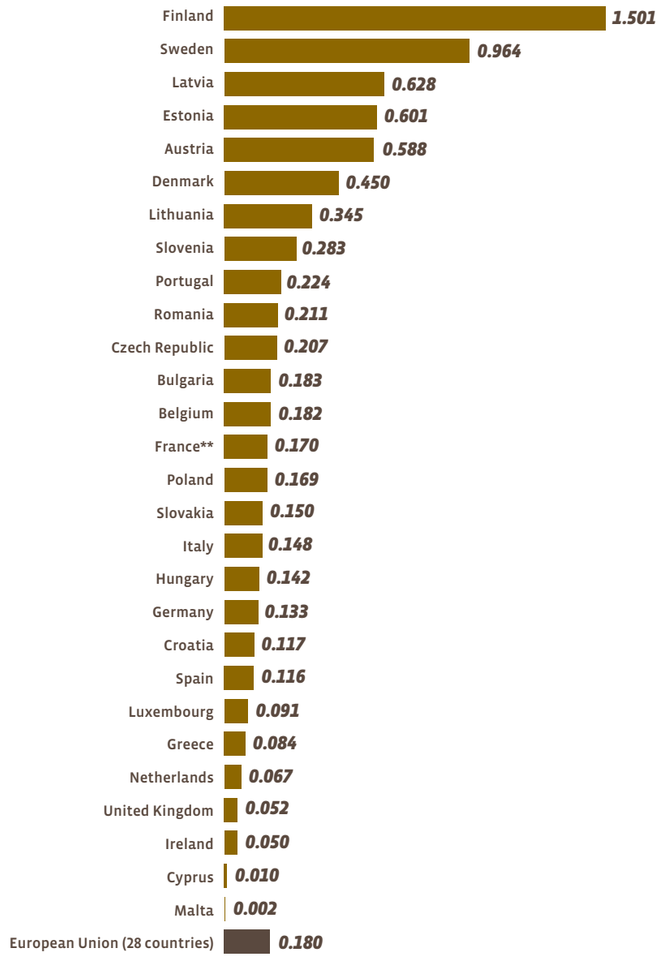
This data is still theoretical and it is hard to tell whether the European Union will be able to meet these targets.

As for electricity production achieving the 2020 NREAP targets, i.e. output of 155 TWh **(see graph 3),** the likelihood is looking increasingly doubtful given the current inauspicious economic and energy context for biomass electricity. One of the main curbs is the very competitive price of the per tonne coal price on the global market, which can be ascribed to massive shale gas and oil consumption in the United States. Another factor is that the European Community CO_2 emission quota exchange system is no longer playing its role because the price of emission permits is now extremely low. Europe's weak growth that reduces businesses' demand for quotas is once again the reason for this price drop. Biomass electricity plants are also in competition with the other renewable electricity production sectors that have largely outstripped the competitiveness gains made by biomass electricity over the past few years.

As for heat production, the situation is much more advantageous **(see graph 4),** as wood, woodchip, logs and wood pellets are all very competitively priced in comparison to heating oil, natural gas and

Graph. n° 2

*Gross energy consumption of solid biomass by toe per inhab in the European Union in 2013**



** Estimate. ** Overseas departments not included.* ***Source: EurObserv'ER 2014***

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electricity. This should encourage increasing numbers of households to migrate to biomass heating. Heat consumption should also benefit from some countries' clearly stated political commitment to encourage the development of heating networks.
After 2020, the issue of the potential and availability of reasonably-priced sustainable biomass will be more acute. According to the "Impact assessment of the energy and climate policy up to 2030", another European Commission working document, biomass demand could continue to increase for heating and electricity requirements after 2020, primarily through imports. What level of contribution will be demanded of biomass in the future? We need to bear in mind that during the night of last 23-24 October, the European Council agreed to increase the renewable energy contribution of final energy to 27% by 2030. This last point, which touches on securing fuel supplies, is critical for operators of large plants that require large amounts of biomass. A survey by RISI (a consultant specializing in forestry industry product) suggests that the global demand for wood pellets, which accounts for the bulk of international wood exchanges, should rise to 50 million tonnes by 2020. Europe will be largely responsible for this increase, but the global wood pellet market is opening up to new countries such as Japan and South Korea. North America could also limit its wood pellet exports to meet its own GHG emission reduction commitments. In the recent GHG reduction agreement signed between the United States and China on 12 November 2014, the former committed to a 26-28% reduction by 2025 compared to the reference year of 2005 and the latter set a target to peak emissions around 2030. In the long term this agreement could deprive the European market of pellet fuel and raise the commodity price on the global market. As a result, biomass plant operators are pressing European countries to invest in production organizations and biofuel supply sectors in their own lands to guarantee the sustainability of their investments. □

Tabl. n° 6

Largest Biomass plants in Europe 2013/2014

Plant name	Country	Configuration/Fuel	Operator	Electrical capacity (MW)	Status/ operational since
Ironbridge	UK	Pellet (two units converted)	E.ON	740	2013
Drax	UK	Pellet (two unit converted)	Drax Group plc	630 x 2	2013-2014
Alholmens	Finland	Coal and biomass/CHP	Metso	265	1996
Polaniec	Poland	Wood chips, agricultural waste	GDF Suez	205	2013
Rodenhuize	Belgium	Wood chips	Electrabel/GDF Suez	180	2011
Kymijärvi II	Finland	Wood, solid recovered fuel, paper cardboard	Lahti Energy	160	2012
Wisapower	Finland	Black liquor	Pohjolan Voima Oy	140	2004
Vaasa	Finland	Bio gasification	Pohjolan Voima Oy	140	2012
Kaukaan Voima	Finland	Wood, peat/CHP	Kaukaan Voima Oy	125	2010
Seinäjoki	Finland	Wood chips, peat	Pohjolan Voima Oy	125	1990
Arneburg	Germany	Wood waste, Black liquor	Zellstoff Stendal GmbH	100	2004

Source: EurObserv'ER 2014

Tabl. n° 7

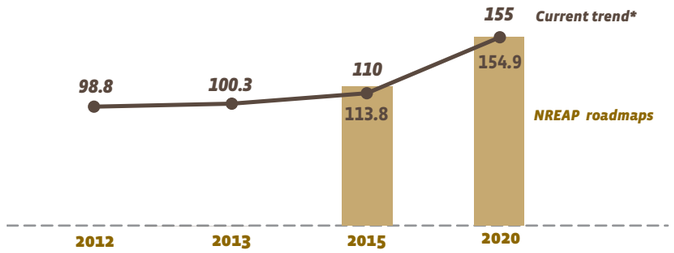
Major European operators of biomass plants 2013/2014 (incl. CHP)

Biomass plant operators	Country	Electrical capacity (MWel in operation, including CHP)	Biomass fuel used
Drax Group plc	UK	1260	Pellet
UPM/Pohjolan Voima Oy*	Finland	955	Wood, black liquor, peat
E.ON	Germany	783	Pellet, wood chips
Fortum	Finland	610	Solid biomass, bio wastes, bio oil
Vattenfall	Sweden	444	Solid biomass, waste
Metso	Finland	265	Biomass co- firing
Electrabel/GDF Suez	Belgium	260	Wood chips
Veolia (Dalkia)	UK	250	Biomass co-firing
GDF Suez/Cofely	France	223	Biomass co-firing
Dong Energy	Denmark	220	CHP (wood chips, wood pellets, straw)
Kaukaan Voima Oy	Finland	125	Biomass CHP (wood, bark, stumps, forest residues, peat)

Source: EurObserv'ER 2014

Graph. n° 3

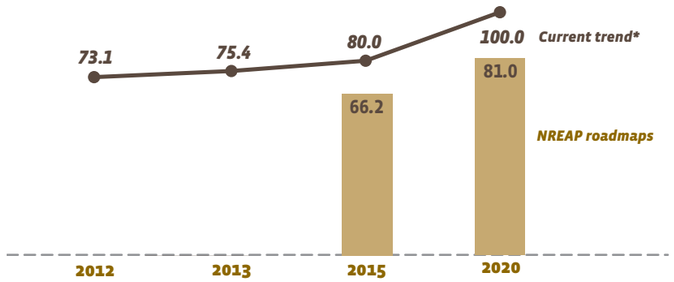
Comparison of the current trend of elrctricity production from solid biomass against the NREAP (National Renewable Energy Action Plan) roadmaps (TWh)*



** These data include an estimate of the renewable electricity from waste incineration units.*
Source: EurObserv'ER 2014

Graph. n° 4

Comparison of the current trend of heat consumption from solid biomass against the NREAP (National Renewable Energy Action Plan) roadmaps (Mtoe)*



** These data include an estimate of the renewable heat from incineration plants of municipal waste.*
Source: EurObserv'ER 2014

Sources: *Statistics Austria, SPF Economie (Belgium), APEE (Bulgaria), Ministry of Industry and Trade, Statistics Estonia, Statistics Finland, SOeS (France), ZSW (Germany), CRES (Greece), SEAI (Ireland Republic), Ministry of economic development (Italy), Central Statistical Bureau (Latvia), Statistics Lithuania, NSI (Luxembourg), NSO (Malta), Statistics Netherlands, IEO (Poland), DGEG (Portugal), Econet Romania, University of Miskolc (Hungary), Energy Center Bratislava (Slovakia), Jozef Stefan Institute (Slovenia), IDAE (Spain), Statistics Sweden, DECC (United Kingdom), FER (Croatia).*

The next barometer will cover wind power

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