



+4.5%

*the growth of electricity from solid biomass
in the UE between 2013 and 2014*

SOLID BIOMASS BAROMETER

A study carried out by EurObserv'ER.



The European Reanalysis and Observations for Monitoring (EURO4M) project experts report that the year 2014 was unusually hot on the European continent, with the highest temperatures on record, following on from 2013 whose winter conditions were also exceptionally mild, and ahead of 2015 which is also set to be very warm. This situation led to a fall in solid biomass consumption for heating across the European Union. In 2014 electricity output increased by 4.5% on its 2013 level to 84.8 TWh, as the vagaries of climate have less impact on demand and it was also boosted by the expansion of biomass cogeneration and new coal-fired power plant conversions.

89.1 Mtoe

*Primary energy consumption from solid biomass
in the EU in 2014*

84.8 TWh

*Electricity produced from solid biomass
in the EU in 2014*

84.1 Mtoe

*Primary energy production from
solid biomass in the EU in 2014*



The Mannheim solid biomass plant, in Germany.

Solid biomass includes all the solid organic components to be used like fuels like wood, wood waste (wood chips, sawdust, etc.), wood pellets, black liquors, straw, bagasse, animal waste and other plant matter and residues. Energy recovery from solid biomass results in the production of heat and electricity. Combustion in boilers is the main technique used to recover energy

from solid biomass, which produces hot water or steam used in industrial processes, district or multi-occupancy or service sector heating networks. Steam can also be piped to turbines to produce electricity or to a cogeneration plant that combines electricity and heat production. A sizeable proportion of solid biomass is directly used by households and other end consumers (businesses) in wood-fired boilers, inserts or stoves.

EUROPE'S SOLID BIOMASS CONSUMPTION FALLS...

... BUT ITS IMPORTS RISE

Solid biomass is the renewable energy resource that covers more of the European Union's energy requirements than any other. EurObserv'ER puts its consumption as primary energy in the EU of 28 at 89.1 Mtoe in 2014, which is a little less than

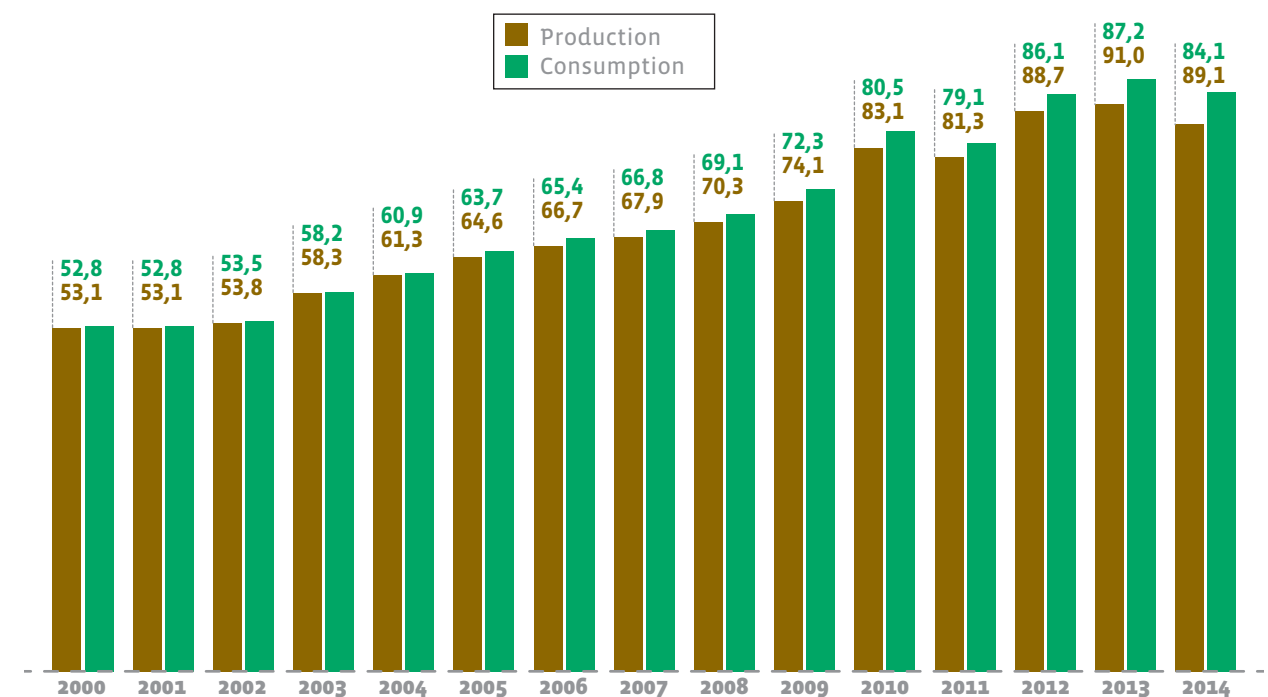
half the internal market's gross renewable energy consumption (the Eurostat estimates for 2013, its latest published figures, were 186.7 Mtoe). EU solid biomass consumption has grown vigorously since the start of the millennium, (graph 1). However, since the 2010s, this growth has faced more obstacles and been prone to irregular patterns, yet it seems to have evened out over the past three years. The data gathered by EurObserv'ER suggest that this consumption may be 2.1% lower than in 2013. The exceptionally mild winter of 2014 which reduced heating requirements over much of Europe (the Northern, Western and Central European countries) is the main culprit for this slowdown, but it is also partly due to major EU efforts to improve energy efficiency, although this is much harder to gauge. New construction standards and tax incentives for insulating old stock housing, combined with the on-going replacement of domestic wood-fired heating appliances reduce the average household's wood energy consumption every year. The drop in solid

biomass consumption in 2014 can no longer be viewed as one-off as it is fairly analogous to that of 2011 when unusual weather conditions prevailed. The fall in primary energy output from internal market-sourced solid biomass was sharper (3.6%, or 84.1 Mtoe in 2014). The difference, accounted for by net imports, has been on an upswing for the past three years, rising from 2.6 Mtoe in 2012, to 3.8 Mtoe in 2013 and 5 Mtoe in 2014. AEBIOM's Statistical Report Bioenergy Outlook 2015 affirms that wood pellets account for about 47% of these imports by volume, with the remainder fairly evenly distributed between wood chips, firewood and other types of solid biomass. The main sources are North America (37.9%, 5.23 million tonnes), non-EU European countries (34.1%, i.e. 4.72 million tonnes), Russia (19.3%, i.e. 2.67 million tonnes), and South America (1.04 million tonnes). EurObserv'ER distinguishes the final energy uses, namely electricity and heat in tables 3 and 4. Furthermore solid bio-

mass heat is broken down by distribution method – district heating networks (sold heat) and final consumer direct consumption using heating appliances (boilers, burners, inserts, etc.). EurObserv'ER asserts that at about 9.1 Mtoe, gross solid biomass heat output sales to district heating networks were stable over the twelve months to 2014. This contrasts with final consumers' direct heat consumption which dropped (by 4.4%) to 60.8 Mtoe in 2014. Taking the two together, total final biomass heat energy consumption fell by 3.8% to 69.9 Mtoe. Solid biomass electricity output across the EU is higher, mainly thanks to a sharp increase in production by the UK and Poland. It rose by 3.6 TWh over the twelve month study period to 84.8 TWh (4.5% more than in 2013). The other countries' outputs are very inconsistent with drops in output registered in Belgium, Sweden, Finland, the Netherlands,

Graph. n° 1

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



*Estimate. Decimals are written with a comma. Sources: years 2000-2011 Eurostat, years 2011, 2012 and 2013 EurObserv'ER.

Austria and Spain, while Germany put on slight growth in 2014 but has not recovered its 2012 level.

18.8 MILLION TONNES OF PELLETS USED IN THE EUROPEAN UNION

The European Union has the distinction of being the world's top wood pellet producer and consumer. The quoted AEBIOM report states that it was roughly half of global output put at 27.1 million tonnes 2014, which rose from 24.5 million tonnes in 2013 (source: EPC survey, Hawkings Wright, FAO). Global output has grown constantly and steadily since the mid-2000s and increased by a factor of 7 in ten years (from 4 million tonnes in 2004). The same source claims that EU wood pellet output increased 11% over 2013 to 13.5 million tonnes in 2014. The top 5 producer countries are: Germany (2.2 Mt), Sweden (1.6 Mt), Latvia (1.3 Mt), France (1 Mt) and Portugal (1 Mt). The EPC (European Pellet Club) and Hawkings Wright's data show that the European Union had the highest wood pellet consumption in the world at about 18.8 million tonnes in 2014, compared to 18.3 Mt in 2013. This breaks down as 11 million tonnes for direct heating needs (i.e. 8.2 Mt for residential buildings and 2.8 Mt for business premises) and 7.8 Mt for industrial needs, which include power plants (5.6 Mt) and industrial CHP plants (2.2 Mt).

At 2.9 million tonnes, Italy is the biggest pellet consumer for heating purposes, followed by Germany (2 Mt), Sweden (1.4 Mt), France (0.9 Mt) and Austria (0.8 Mt). The popularity of domestic wood pellet burners that are highly suitable for the country's heating needs, account for the scale of Italy's wood pellet consumption.

The EPC's market analysis is that the recent years' overall momentum for using wood pellets heating in residential and business sectors has been highly positive (with annual growth running at 29% since 2011), however between 2013 and 2014 growth was poor (about 1%). To be more precise, growth was slightly negative in the residential sector yet was offset by positive growth in the business sector. As for the use of "industrial" pellets in CHP and power

plants, consumption, according to the EPC study data, declined by 1.6%, because of lower demand in Belgium and the Netherlands. The UK's strong growth in pellet consumption failed to match this decline. Belgium's falling pellet consumption growth (from 1.3 to 0.6 Mt) stems from the decision of the Flanders region to exclude solid

biomass-sourced electricity from its green certificate system. The setback led Electrabel to halt production at its "Max Green" plant on the Rodenhuize site and in 2014 it also decided to close its small "Awirs" power plant in Wallonia for economic reasons. The

Tabl. n° 1

Primary energy production and gross consumption of solid biomass in the European Union in 2013 and 2014 (in Mtoe)*

Country	2013		2014*	
	Production	Consumption	Production	Consumption
Germany	10,902	10,902	11,425	11,425
Sweden	9,211	9,211	8,958	8,958
France**	10,383	10,383	8,853	8,853
Finland	8,113	8,141	8,105	8,125
Italy	7,448	8,848	6,539	8,066
Poland	6,837	6,837	6,179	6,755
Spain	4,582	5,356	4,562	5,276
United Kingdom	2,746	3,912	3,048	4,724
Austria	4,700	4,918	4,378	4,542
Romania	3,657	3,591	3,423	3,591
Denmark	1,431	2,446	1,304	2,350
Portugal	2,684	2,355	2,685	2,364
Czech Republic	2,293	2,173	2,301	2,222
Belgium	1,389	2,016	1,104	1,689
Hungary	1,454	1,407	1,537	1,474
Latvia	1,749	1,269	2,044	1,334
Bulgaria	1,122	1,028	0,902	1,197
Netherlands	1,206	1,263	1,290	1,154
Lithuania	1,041	1,026	1,117	1,084
Greece	0,847	0,928	0,869	0,930
Slovakia	0,818	0,813	0,836	0,831
Estonia	1,067	0,793	1,122	0,789
Slovenia	0,628	0,628	0,560	0,560
Croatia	0,700	0,500	0,700	0,500
Ireland	0,183	0,218	0,210	0,252
Luxembourg	0,048	0,049	0,066	0,064
Cyprus	0,005	0,009	0,005	0,009
Malta	0,001	0,001	0,001	0,001
European Union 28	87,246	91,024	84,125	89,121

* Estimate. ***Overseas departments not included for France. Decimals are written with a comma. Source: EurObserv'ER 2015.



Tabl. n° 2

Gross electricity production from solid biomass in the European Union in 2013 and 2014 (in TWh)*

Country	2013			2014		
	Electricity only plants	CHP Plants	Total electricity	Electricity only plants	CHP Plants	Total electricity
United Kingdom	9,866	0,000	9,866	13,852	0,000	13,852
Germany	5,199	6,444	11,643	5,333	6,535	11,868
Finland	1,490	9,968	11,457	1,227	9,927	11,154
Poland	0,000	7,924	7,924	0,000	9,174	9,174
Sweden	0,000	9,609	9,609	0,000	9,077	9,077
Italy	2,142	1,537	3,679	2,031	1,792	3,823
Spain	2,906	1,238	4,144	2,856	0,965	3,821
Austria	1,109	2,590	3,699	1,129	2,308	3,437
Denmark	0,000	3,103	3,103	0,000	3,004	3,004
Belgium	2,218	1,136	3,354	1,244	1,388	2,632
Portugal	0,736	1,780	2,516	0,765	1,765	2,530
Netherlands	1,669	1,230	2,899	1,436	0,662	2,098
Czech Republic	0,015	1,668	1,683	0,054	1,938	1,992
France**	0,069	1,297	1,367	0,095	1,543	1,637
Hungary	1,377	0,093	1,470	1,265	0,165	1,430
Slovakia	0,000	0,722	0,722	0,000	0,758	0,758
Estonia	0,030	0,615	0,645	0,061	0,652	0,713
Romania	0,000	0,411	0,411	0,000	0,637	0,637
Latvia	0,007	0,208	0,215	0,007	0,312	0,319
Lithuania	0,000	0,279	0,279	0,000	0,293	0,293
Ireland	0,210	0,014	0,224	0,248	0,014	0,262
Slovenia	0,000	0,119	0,119	0,000	0,125	0,125
Bulgaria	0,001	0,093	0,094	0,001	0,099	0,100
Croatia	0,000	0,048	0,048	0,000	0,060	0,060
Luxembourg	0,000	0,002	0,002	0,000	0,021	0,021
European Union 28	29,045	52,129	81,173	31,603	53,212	84,815

* Estimate. Decimals are written with a comma. **Overseas departments not included for France. Source: EurObserv'ER 2015.



A train is dedicated to bring pellets to the 100% solid biomass units of the Drax plant, United Kingdom.

«Max Green» plant restarted and has been operating normally since the Q4 of 2014. As for the Netherlands, the drop in consumption coincided with the end of the aid for using biomass in co-combustion plants (the MEP scheme), which drove down pellet consumption to 0.2 Mt in 2014 from 1 Mt in 2013. Since 2015, co-combustion has become eligible funding system called SDE+. However, no applications for biomass co-combustion have been granted in 2015. The perspectives for co-combustion, and the options to safeguard that sufficiently sustainable biomass is used for it, is an ongoing

point of discussion in Dutch policy and society. The sharp UK rise in pellet consumption from 3.5 to 4.7 Mt was driven by the Drax power plants at Selby, North Yorkshire and the E.on plant at Ironbridge, Shropshire. Drax converted a second coal-fired plant in 2014 into a 100% biomass pellet plant to supplement its first plant converted in 2013. The succession of two exceedingly mild winters, and the low rise in consumption compared to production, has also resulted in plummeting wood pellet prices in a number of European Union countries. The EPC reports that they fell

from € 246 to € 234 per tonne in Austria, and from € 263 to € 245 per tonne in Germany, between May 2013 and May 2015, or respective drops of 5 and 7%.

NEWS FROM AROUND THE PRODUCER COUNTRIES

THE UK – TOP-RANKED SOLID BIOMASS ELECTRICITY PRODUCER

By converting a number of coal-fired power plants to biomass, the UK has become the European Union's top-ranked solid biomass electricity producer in

next to no time. According to the DECC, the UK generated 13.9 TWh in 2014, up from 9.9 TWh in 2013 (40.4% more)... a remarkable achievement given that solid biomass electricity output was only 4.6 TWh in 2010. The spurt put on between 2013 and 2014 can essentially be ascribed to the conversion of the second Drax coal-fired power plant unit on the Selby site. A third unit at the same site should start up in co-combustion regime in 2015, heralding its outright conversion subject to obtaining aid with production. The UK's increase in biomass electricity production is heavily reliant on biomass fuel imports, primarily wood pellets

from North America. According to DECC data, nett imports were about 1.7 Mtoe in 2014 compared to 1.2 Mtoe in 2013. The development of biomass electricity is linked to the take-up of the UK's new Contract for Differences. The system, which has already been rolled out in England, Wales and Scotland, will be implemented in Northern Ireland in 2016. Until 31 March 2017, renewable electricity producers will be able to choose between the legacy RO (Renewable Obligation) quota system and the Contract for Differences (CfD) system, but from April 2017, the CfD system will be the sole vehicle for >5-MW renewable energy projects.

The Renewable Heat Incentive system promotes biomass heat through the domestic (RHI Domestic) and non-domestic (non-domestic RHI) schemes that target the public, industrial and commercial sectors. The RHI Domestic incentive is a heat premium payment system based on 'deemed' heat use (no measuring required). A degression mechanism has been in force since its 9 April 2014 launch. On 30 November 2015 a further 20% reduction for biomass-fuelled heating appliances was introduced, which will apply to systems authorized

Tabl. n° 3

Gross heat production from solid biomass in the European Union in 2013 and in 2014* (in Mtoe) in the transformation sector**

Country	2013			2014		
	Heat plants only	CHP plants	Total Heat	Heat plants only	CHP plants	Total Heat
Sweden	0,745	1,608	2,353	0,716	1,585	2,301
Finland	0,544	1,184	1,728	0,557	1,202	1,759
Denmark	0,412	0,596	1,008	0,397	0,592	0,989
Austria	0,454	0,378	0,833	0,468	0,325	0,793
Italy	0,074	0,444	0,517	0,065	0,528	0,593
Germany	0,184	0,350	0,534	0,178	0,359	0,537
France***	0,213	0,318	0,530	0,071	0,359	0,431
Lithuania	0,181	0,087	0,268	0,261	0,095	0,355
Poland	0,025	0,320	0,345	0,025	0,320	0,345
Slovakia	0,052	0,122	0,174	0,055	0,128	0,183
Estonia	0,074	0,119	0,193	0,049	0,132	0,181
Romania	0,014	0,107	0,121	0,014	0,162	0,176
Czech Republic	0,024	0,095	0,119	0,022	0,117	0,139
Latvia	0,093	0,061	0,154	0,095	0,008	0,103
Hungary	0,021	0,051	0,072	0,021	0,051	0,072
Netherlands	0,002	0,030	0,032	0,009	0,017	0,025
Bulgaria	0,025	0,000	0,025	0,040	0,000	0,040
Belgium	0,000	0,024	0,024	0,000	0,023	0,023
Slovenia	0,008	0,012	0,020	0,006	0,014	0,019
Luxembourg	0,002	0,001	0,003	0,003	0,008	0,011
United Kingdom	0,004	0,000	0,004	0,004	0,000	0,004
Croatia	0,000	0,003	0,003	0,000	0,003	0,003
European Union 28	3,151	5,911	9,062	3,053	6,028	9,081

* Estimate. ** Heat sold in district heating. Decimals are written with a comma. ***Overseas departments not included for France. Source: EuroObserv'ER 2015.

between 1 January and 31 March 2016, i.e. a tariff of 5.14 p/kWh (€ 0.0719/kWh). Originally it was more than twice that level at 12.2 p/kWh (€ 0.17/kWh). The non-domestic RHI tariffs, valid for 20 years, have also changed. For <200 kWth units the tariff from 1 January 2016 has been set at 3.76 p/kWh (€ 0.0526/kWh), for 200 kWth–1 MWth units it is 5.18 p/

kWh (€ 0.0725/kWh) and 2.03 p/kWh (€ 0.0284/kWh) for >1 000 kWth units. For >1-MW units, automatic degression is applied from an annual operating time of 1 314 hours at full load (or a load factor of 15%), the tariff is then reduced to 1 p/kWh (€ 0.04/kWh) for <200-kWth units and 2.24 p/kWh for >1 MWth units (€ 0.03/kWh). This degression acts as a

safeguard to avoid any unwarranted use of heating systems.

French forestry harnessed

The French Sustainable Development Ministerial Statistical Department (SOeS) confirms that the drop in the country's solid biomass primary energy consumption was unusually sharp (14.7% down on 2013) falling to 8.9 Mtoe in 2014 and was mainly caused by the plunge in the domestic segment's heating needs. However the fall should not be interpreted as a rejection of solid biomass energy in France. The French government actually ramped up the initiatives to encourage the use of biomass for heating requirements, primarily through the heat fund mechanism.

On 20 April 2015, the Élysée announced it was boosting the mechanism by doubling the credits allocated to these funds for three years. They will rise to 520 million euros in 2017. The heat fund results for 2009-2014 are excellent with 640 biomass boiler plants funded in the collective and industrial sectors, equating to 1.1 Mtoe of biomass consumption. ADEME says that biomass took up 48% of a total of 1.2 billion euros of aid granted under the heat fund over the period.

The government also launched the "Dynamic bois" call for expressions of interest on 17 March 2015 to boost biomass use. It led to the selection of 24 projects for a combined value of 35 million euros financed by the heat fund. The projects involve 200 wood sector players and several thousand forest owners, mobilising 4 million m³ over three years, half of which will supply the wood boiler plants supported by the heat fund. The projects will also improve the quality of forest stands over the medium and long term to ready French forests for the consequences of climate warming. The Ecology Minister announced another EOI (resource harnessing), to be launched early in 2016 with at least 20 million euros earmarked. As for domestic wood-fuelled heating, most of the effort is directed at improving installation energy efficiency, by renewing the existing appliance base and using better quality fuels, with the aim of taking the equipped dwelling

base figure from 5.75 million in 2006 up to 9 million in 2020 while maintaining consumption at around 7.4 Mtoe. To fast-forward this renewal process, high-performance "Flamme verte" ("Green Flame") wood heating appliances attract a 30% tax credit.

Sweden's consumption drops further

Statistics Sweden claims that solid biomass energy consumption fell to 9 Mtoe in 2014 and has declined for the second year running, 2.8% down on its 2013 (9.2 Mtoe) and 6.3% down on its 2012 (9.6 Mtoe) levels respectively. Electricity production has fallen dramatically, by 5.5% between 2013 and 2014 (i.e. 9.1 TWh in 2014), and by 13.6% between 2014 and 2012. Solid biomass energy use as heat (7.5 Mtoe including 2.3 Mtoe in district heating networks) is also declining but to a lesser extent (1.8% between 2013 and 2014, 5.5% between 2012 and 2014). This consumption matches its heating needs. According to the Swedish Energy Agency, energy consumption for heating was exceptionally low in 2014 – the lowest rate observed since the 2000s, because of a remarkably warm year. Sweden has encouraged the use of biomass heat since 1991 by introducing a carbon tax that is exempt for heat applications. The tax on CO₂ has been raised several times since its inception and is currently at 1.07 SEK per kg of CO₂, or about € 115 per tonne of CO₂ and has doubled the price of oil-fired heating compared to the market price. Biomass electricity benefits from the green certificate mechanism that it shares with Norway. The system's cost is borne by electricity consumers, except for major electricity-consuming businesses. The tax on electricity raised by this system is about 0.03 SEK/kWh (i.e. about € 0.32/kWh).

More detail knowledge on biomass consumption in Germany

Germany was one of the few major solid biomass users to have increased consumption in 2014, despite the particularly mild winter. According to the ZSW, which provides the Federal Ministry for Economic Affairs and Energy with renewable energy statistics, solid

biomass energy consumption rose to 11.4 Mtoe in 2014 (4.8% up on 2013). This increase could be challenged because it is the result of an improvement for 2014 of the statistical monitoring of the use of biomass in the service sector, subsequent data (2013 and before) will be subject to consolidation in the coming months. The electricity production data

should not be affected. They indicate growth of 1.9% between 2013 and 2014 is a production of 11.9 TWh. For the part of domestic heat, Germany's <100-kW biomass heating systems benefit from the market incentive programme for dwellings, the "Marktanzreizprogramm"

Tabl. n° 4

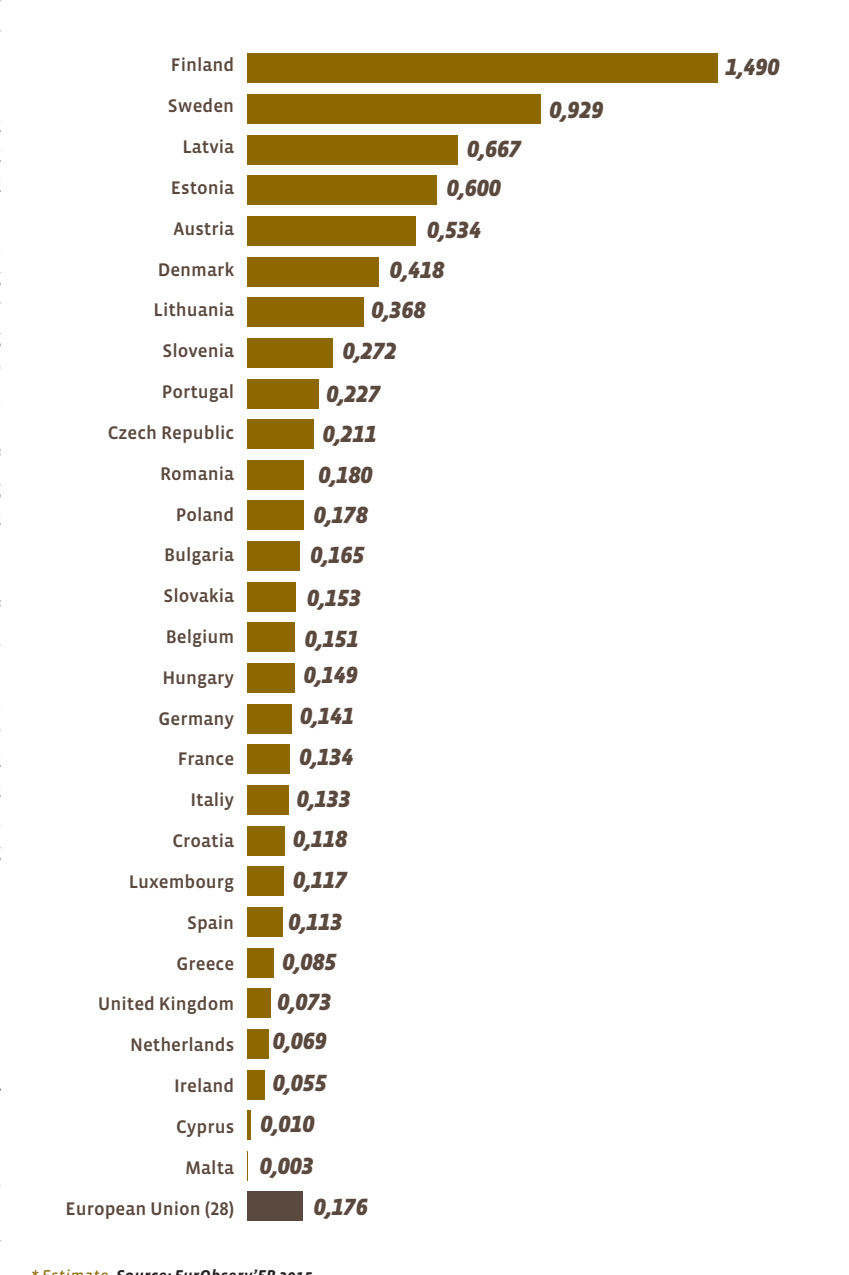
Heat consumption* from solid biomass in the countries of the European Union in 2013 and 2014**

Country	2013	Of which district heating	2014	Of which district heating
Germany	8,022	0,534	8,375	0,537
France***	9,727	0,530	8,150	0,431
Sweden	7,626	2,353	7,487	2,301
Italy	7,383	0,517	6,594	0,593
Finland	6,396	1,728	6,454	1,759
Poland	5,084	0,345	4,783	0,345
Austria	4,096	0,833	3,758	0,793
Spain	3,745	0,000	3,735	0,000
Romania	3,502	0,121	3,417	0,176
United Kingdom	1,966	0,004	2,036	0,004
Denmark	2,022	1,008	1,948	0,989
Czech Republic	1,794	0,119	1,794	0,139
Portugal	1,838	0,000	1,742	0,000
Bulgaria	1,028	0,025	1,211	0,040
Belgium	1,292	0,024	1,151	0,023
Hungary	1,087	0,072	1,143	0,072
Latvia	1,141	0,154	1,110	0,103
Lithuania	0,938	0,268	0,990	0,355
Greece	0,922	0,000	0,927	0,000
Estonia	0,665	0,193	0,653	0,181
Slovenia	0,604	0,020	0,537	0,019
Slovakia	0,496	0,174	0,512	0,183
Netherlands	0,603	0,032	0,651	0,025
Croatia	0,438	0,003	0,438	0,003
Ireland	0,169	0,000	0,196	0,000
Luxembourg	0,048	0,003	0,059	0,011
Cyprus	0,007	0,000	0,007	0,000
Malta	0,001	0,000	0,001	0,000
European Union 28	72,641	9,062	69,859	9,081

* 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. Decimals are written with a comma. Source: EurObserv'ER 2015.

Graph. 2

Gross energy consumption of solid biomass by toe per inhab in the European Union in 2014*





RWE Innogy UK has commissioned in February 2014 a new cogeneration plant in Markinch (50 MWe), Scotland, to supply steam and electricity to Tullis Russel, a paper manufacturer.

(MAP) set up by BAFA (the Federal Office for Economic Affairs and Export Control). The MAP incentives were revised in 2015. Pellet burners combined with a hot water tank are now eligible for a lump-sum grant of € 2 000 for 5–25 kW systems. Higher-capacity systems of up to 100 kW can receive a grant of € 80/kW, when they are in the 5–35 kW range, the lump-sum grant is € 3 000, rising to € 80/kW for systems from 35.1 to 100 kW. Pellet boilers in the 5–43.7 kW range with a buffer storage tank (of at least 30 l/kW), are eligible for a lump-sum of € 3 500. Systems with a design capacity of 43.8–100 kW get € 80/kW. Automatic systems that use wood chips get a basic lump-sum grant of € 3 500. Special grants can be given for installing innovative systems such as condensing boilers or particle separators. Thus particle separator stoves are eligible for a lump sum of € 3 000. Condensing pellet and particle separator boilers may be eligible for a lump sum of € 4 500 and € 5 250 if they are coupled with a buffer storage tank of at least 30 l/kW, as well as wood chip boilers. New build housing is also eligible for innovation incentives,

but at lower levels. The lump sum for pellet boilers with a hot water tank is € 2 000, € 3 000 for pellet boilers and € 3 500 if they are combined with a buffer storage tank and wood chip boilers. An additional € 500 grant may be awarded for combination systems, such as a biomass boiler coupled with a heat pump or solar thermal collectors.

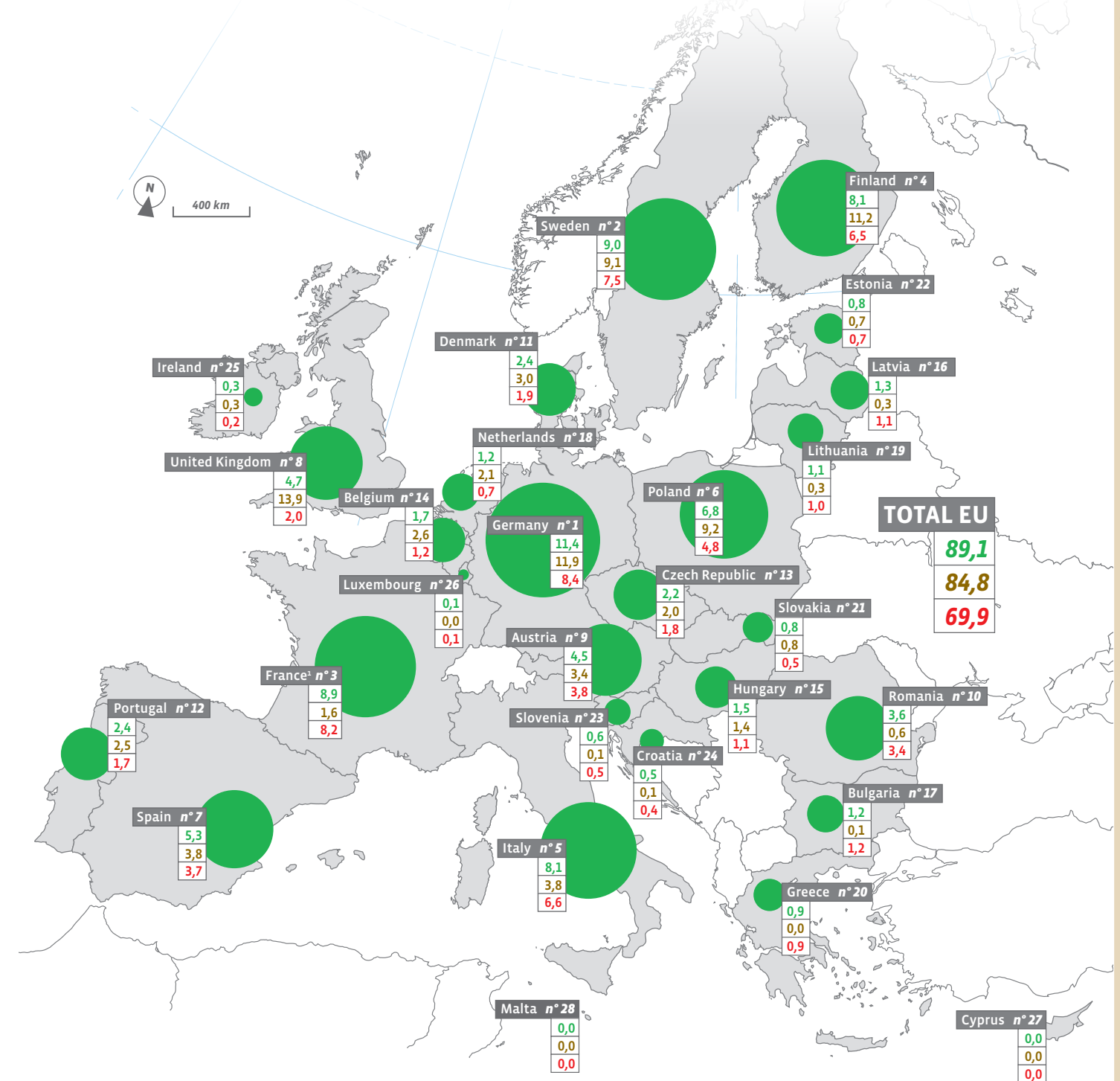
A MAINSTREAM INDUSTRY

Bioenergy is at the heart of many EU countries' environmental strategies, and for more than a decade has revived the wood energy industry across all the market segments from production, fuel conversion, electricity production, supplying district heating networks or individual heating appliances. This European Union policy, embraced by a number of member states has handed Europe its technological leadership in the area of biomass energy conversion. Europe's industry is naturally highly active in the European market, but also ideally positioned in the global market. "Biomass Boiler Market – Global & UK

Analysis, Size, Share, Growth, Trends and forecast 2014–2022", a recent market survey published by Transparency Market Research, predicts that the global wood boiler market will keep expanding at an annual rate of about 20% through to 2022. Its authors reckon that the market (residential, commercial and industrial segments) should expand from 1.8 billion dollars in 2013 to 8.9 billion dollars in 2022. The commercial heat production sector is by far the best represented segment, and in the short term should continue to dominate the market. The survey claims that 80% of the applications are for heat. The last of the three main types of boiler, bubbling fluid bed, circulating fluidized bed and Stoker boilers (automatic load), dominated the market in 2013 and will maintain its stronghold until 2022. There are myriad European players in business in the European and global markets. It follows that the majors are based in the most buoyant markets, namely Sweden, Finland, Denmark, Germany and Austria, France, the UK and Italy.



Primary energy consumption, gross electricity consumption and heat consumption from solid biomass in the European Union in 2014*



Key

- 9,2 Primary energy consumption of solid biomass in the European Union in 2014* (in Mtoe).
- 8,7 Heat consumption from solid biomass in the European Union in 2014* (in Mtoe).

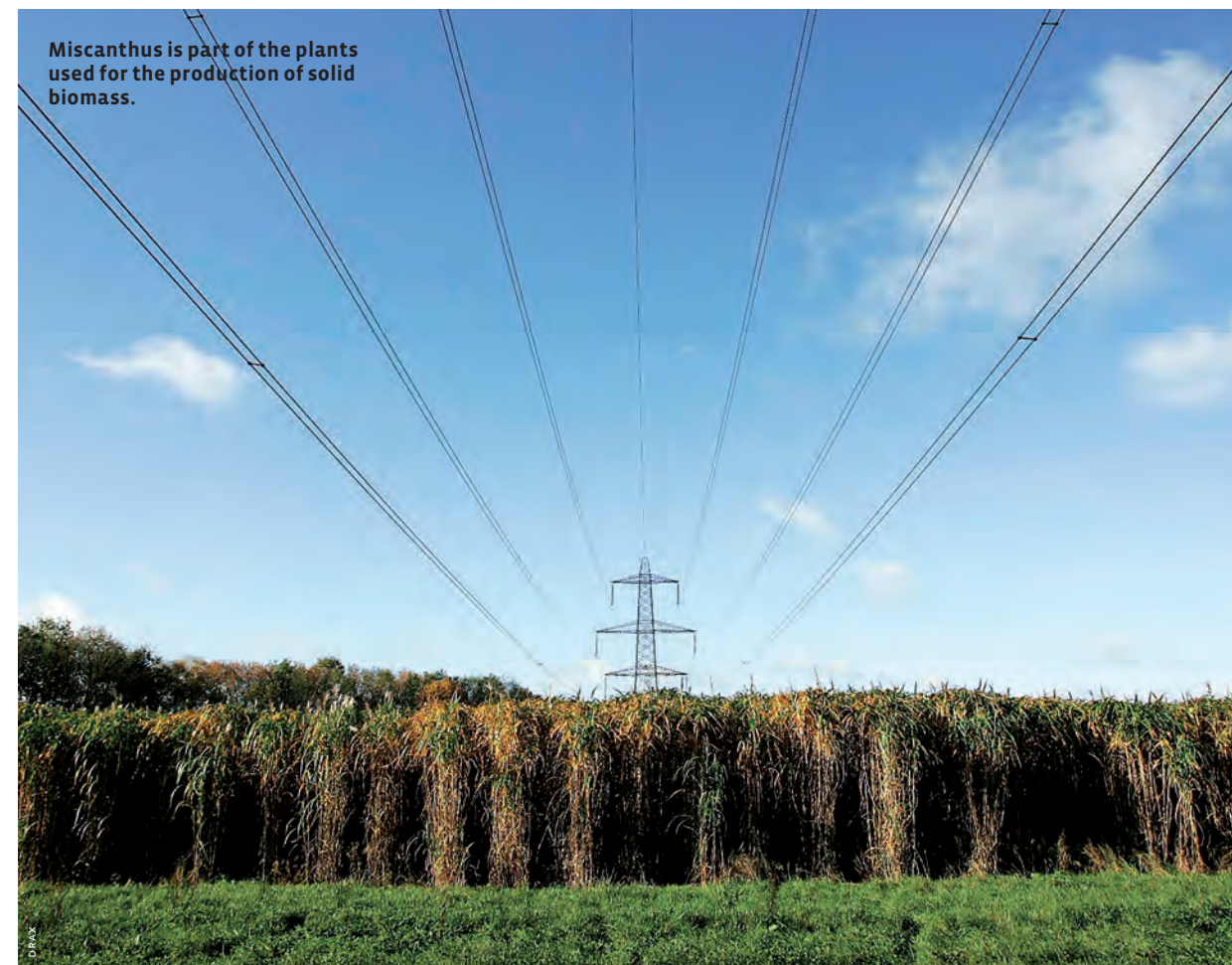
- 3,5 Gross electricity production from solid biomass in the European Union in 2014* (in TWh).

* Estimate. † Overseas departments not included. Decimals are written with a comma. Source: EurObserv'ER 2015.

Boiler manufacturers generally market a broad range suitable for the residential, collective and service sectors. A few have specialized in the low-capacity residential segment (up to a few hundred kW), such as Janfire of Sweden, Fröling, KWB and ETA Heiztechnik of Austria, and Fumo Aps of Denmark. Others have their niche in the small and medium-capacity segments (from the tens of kW to a few MW), such as Enertech AB of Sweden, Nolting of Germany, Schmid AG of Switzerland and Compteur of France. KPA Unicom Ltd of Finland, Weiss Kessel of Germany and Justsen of Denmark specialize in the medium and very high capacity segment (from one to tens of MW). The biomass CHP market segment will no doubt expand. In Sweden, the SVEBIO (Swedish Bioenergy Association) reckons that an annual 1-TWh increase in biomass electricity output is feasible until 2040, with a goal of 40 TWh. The association feels that CHP still has significant development potential ahead of it, not only for large district heating networks and major industries, but also for rural district heating networks and smaller industries. A preliminary study made in 2013 that was funded by the Swedish Energy Agency and the

Swedish District Heating Association, demonstrated that 80 small CHP plants could be installed in Southern Sweden, drawing on local biomass supplies. The UK is also particularly active in this sphere. In February 2014, RWE Innogy UK commissioned a new high capacity combined heat and power plant at Markinch (50 MWe), a small Scottish town. The plant has been built to supply the Tullis Russell paper mill with steam and electricity thereby replacing the site's coal-fired plant. The CHP that required a £ 2 million (272 million euros) investment, will be fuelled by about 400 000 tonnes of biomass per annum (90% recycled wood waste and 10% virgin wood). In addition to steam, the plant will supply 17 MWe of electricity to the site while 25 MWe will be exported. Valmet (formerly Metso Power) supplied the 155-MWth circulating fluidized bed boiler. According to RWE, the plant will reduce the region's carbon footprint by 72%, by reducing CO2 emissions by 250 000 tonnes. Converting coal-fired plants to 100% biomass plants is another major development priority. In Denmark, Dong Energy has already converted two plants to biomass, Herning and

Avedore 2 and is planning to convert three others: Studstrup 3, Skaerbaeck and Avedore 1. In March 2015, Dong Energy announced it was converting the last Avedore CHP plant unit that will burn wood pellets instead of coal from 2016. When the Avedore plant is 100% biomass-fuelled, it will supply green heat to 65 000 additional of a total of 215 000 homes in the Greater Copenhagen area. The plant's two units will also supply electricity to more than 600 000 homes. Conversion work will kick off in autumn. The Dong Energy press release points out that it has reduced its coal consumption by 65% since 2006 by investing in biomass plants and wind farms. The group also confirmed in June 2014 that it would be investing in the conversion of three of its plants at Studstrup and Skaerbaeck. The energy company announced that in 2020, biomass would account for more than 50% of the fuels used in its CHP plants (more than 40% in 2016) compared to 28% in 2014. Taken together, it will pour about 4 billion Danish Krone into these conversions (431 million euros).



Tabl. n° 5

Largest Biomass plants in Europe 2014

Plant name	Country	Configuration /Fuel	Operator	Electrical Capacity (in MW)	Status / operational since
Drax	UK	Pellets	Drax Group Plc	1260	2013-2014
Ironbridge	UK	Pellets	E.on	740	2013
Alholmens	Finland	Coal and biomass / CHP	Metso	265	1996
Polianec	Poland	Wood chips, agricultural waste	GDF	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
Seinäjäki	Finland	Wood chips, peat	Pohjolan Voima Oy	125	1990
Arneburg	Germany	Wood waste, Black liquor	Zellstoff Stendal GmbH	100	2004

Source: EurObserv'ER 2015.

Tabl. n° 6

Major European operators of biomass plants 2014/2015 (incl. CHP and co-firing)

Biomass Plant Operators	Country	Electrical capacity 2014 (MWe in operation, including CHP)	Biomass fuel used
Drax Group Plc	UK	1260	Pellets
UPM/Pohjolan Voima Oy*	Finland	752	Wood, black liquor, peat
E.on	Germany	783 (2013)	Pellet, wood chips
Fortum	Finland	986	Solid biomass, bio wastes, bio oil.
Vattenfall	Sweden	362	Solid biomass, waste
Metso	Finland	265	Biomass co-firing
Electrabel/GDF-Suez	Belgium	175	Wood chips
Veolia (Dalkia)	UK	250	Biomass co-firing
Engie(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 2015.

LOFTY AMBITIONS FOR 2020

Will climate warning affect the European Union's solid biomass energy growth forecasts to 2020? It may be too early to say, but the string of mild winters seems to have checked the almost continuous growth in solid biomass consumption observed over the last decade. Consumption trends have also been affected, which is a good thing, by

the energy efficiency efforts made by the European Union countries, primarily by renewing the domestic heating system base. Another factor muddies interpretation of the consumption trends prompted by the European Commission, increasing numbers of member states are conducting detailed surveys on households' wood energy consumption. The surveys may lead to consolidations, and significant ones at that. In 2014, the Spanish, UK and

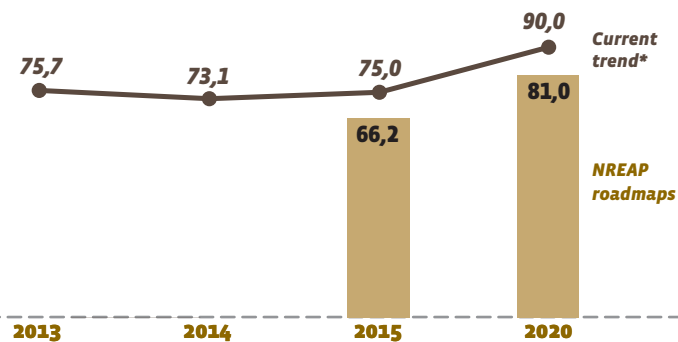
French statistics had to be thoroughly revised, while in previous years, other surveys primarily led Germany and Italy to revise their statistics. This more detailed knowledge of consumption should make it easier to monitor each member state's objectives.

As it stands, most of the countries appear to be on track for achieving their 2020 biomass heat consumption targets set in their National Renewable Energy Action Plans (NREAP). Some countries like Austria, Poland, Italy, Slovenia and Estonia have already fulfilled their commitments. No doubt it will be harder for France and the UK, with their particularly ambitious targets, to make target. Nonetheless, the common aim set out in the NREAPs, which includes renewable heat from household refuse incinerators, should be easily exceeded by 2020. However biomass heat development will soon run out of steam, which has prompted EurObserv'ER to scale back its forecasts for 2020.

Turning to electricity production, achieving the NREAP 2020 targets, namely 155 TWh of output, will depend on the pace of coal-fired power plant conversions and the increase in the amount of biomass used in CHPs. Once again, while a few countries will easily reach their targets, such as Germany, Italy, Austria, Finland, Sweden and Denmark, others, such as France, Poland, the Netherlands, Belgium and Spain have a lot of ground to cover. The current very keenly priced tonne of coal on the global market compounded by the European community system's very low CO2 emissions trading price are not conducive to accelerating the conversion pace or use of biomass fuel. Solid biomass fuels also suffer from competition from other renewable electricity-generating sectors, which have posted very high competitiveness gains in recent years. Lastly, Europe's electricity production facilities' overcapacity, caused by the drop in European electricity consumption, is no incentive to rush into investing in biomass electricity. In the absence of any additional GHG emission constraints on coal-fired plants, the achievement of the NREAP targets hangs in the balance. Another factor is a disincentive to the

Graph. n° 3

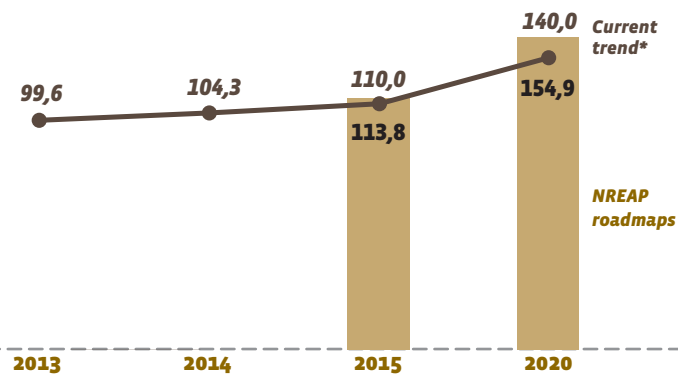
Comparison of the current trend of heat consumption from solid biomass against the NREAP (National Renewable Energy Action Plan) roadmaps (in Mtoe)



These data include an estimate of the renewable heat from incineration plants of municipal waste. Source: EurObserv'ER 2015.

Graph. n° 4

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



These data include an estimate of the renewable electricity from waste incineration units. Source: EurObserv'ER 2015.



development of biomass power plants that plan their pellet procurements on the world market. These imports, whose volume increases every year, have become increasingly contentious since environmental groups such as the European Environmental Bureau singled out certain shortcomings in pellet production methods, primarily in North America. While it cannot be determined whether they affect a minority of the total import volumes into the European Union, they do cast doubt on the sustainability of these supplies and their impact on CO2 emissions. These suspicions have primarily rekindled the controversy surrounding the lack of binding European legislation on solid biomass sustainability criteria.

Introducing criteria of this kind is far from consensual within the European Union's ranks. The major forest countries such as Sweden and Finland that do not use imports are fiercely opposed to such legislation, and refuse to conform to any on forestry management conditions imposed by the European legislator. Importing countries such as the UK have introduced their own sustainability criteria in line with the European Commission's recommendations made in 2010 to make up for their absence and secure their investments. As it stands, the EU does not plan to introduce harmonized European legislation on solid biomass sustainability criteria before 2020 and is awaiting the debates on the future

contribution of solid biomass to the 2030 timeline before making a move. Effectively after 2020, the potential and availability of sustainable biomass at a reasonable price will take on more gravitas. The European Commission's working document "Impact assessment on the energy and climate policy up to 2030" suggests that the demand for biomass could increase after 2020, for heat and electricity needs, primarily through imports. Thus the debate on the future contribution of solid biomass to these new targets cannot be put off for long. □

Sources : Statistics Austria, SPF Economie (Belgique), APEE (Bulgarie), Ministère de l'Industrie et du Commerce (République Tchèque), ENS (Danemark), Statistics Estonia, Statistics Finland, SOeS (France), ZSW AGEE-Stat (Allemagne), CRES (Grèce), Université de Miskolc (Hongrie), SEAI (République d'Irlande), Ministère du Développement économique (Italie), Statistics Netherlands, Statistics Lithuania, STATEC (Luxembourg), MRA (Malte), CSB (Lettonie), GUS (Pologne), DGGE (Portugal), AHK Romania, ECB (Slovaquie), IJS (Slovénie), IDEA (Espagne), Statistics Sweden, DECC (Royaume-Uni).

Translated from the French by Parlance.

The next barometer will cover wind power

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Caisse des Dépôts

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