pellets@las

Development and promotion of a transparent European Pellets Market

Creation of a European real-time Pellets Atlas

THE PROJECT

Background

As a young and rapidly growing industry, the European pellet sector faces several challenges. Inconsistencies concerning e.g. supply security, fuel quality or sustainability of pellet supply chains are the main barriers to stable market development, hindering investments and affecting consumers´ confidence. A general lack of market intelligence at the European level used to be the main reason for harmful developments in the past. Both pellet producers and end-consumers need information on demand, supply, prices and quality as a basis for investment decisions. In addition, knowledge about market participants involved is necessary to facilitate market development in Europe.

Action

The general aim of the pellets@las project is to promote the development of a transparent and stable European pellet market. Therefore, the main action of the pellets@las is the collection and provision of pellet market data such as prices and production volumes.

For data collection in EU27+2, specific questionnaires were elaborated and sent quarterly to producers, traders and large consumers of wood pellets and mixed biomass pellets (MBP). In addition, existing data was used, wherever available.

In order to provide easy access to the produced results, all information is disseminated via a project homepage with public databases including all collected data as well as a comprehensive contact list of involved market actors.

In order to provide background information to raw data, several analytical reports were produced, including country reports, analyses of international pellet trade developments and updates on recent relevant developments such as the ongoing European standardisation of solid biomass.

Furthermore, the stakeholders´ need for information and advice was addressed by providing hotline services and information was transferred to less developed pellet markets by organising several workshops. The wider public was provided with general information on pellet usage by translating an existing pellet handbook to several European languages.

The project ended in December 2009. This brochure provides a summary of the main project results. The information presented here and on the project website will be kept up-to-date.

www.pelletsatlas.info

The central tool for the public provision of pellet market intelligence is the online information platform at www.pelletsatlas.info.

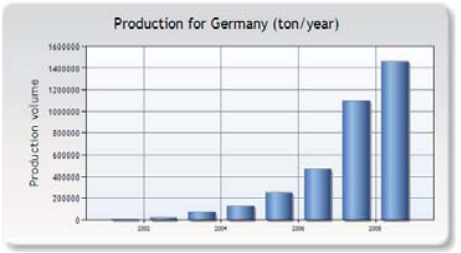
By selecting a country, all available data on market actors involved, pellet prices, produced and consumed volumes can be viewed without access restrictions.

Pellets@las data collections included information on monthly prices for different usage types (from small to large scale) and delivery types (loose, bags, CIF).

The example below shows prices for wood pellets delivered loosely to residential end-consumers.

Besides prices, additional information for the country selected is presented. This information includes volumes produced and consumed, production capacities and pellet appliances installed.

The example below shows volumes of wood pellets produced in Germany.



Another important part of the information platform is the stakeholder database. By selecting a country and a stakeholder category, contact details of numerous European market participants can be viewed.

The screenshot below shows the localisation of pellet producers in Germany.

In order to keep this stakeholder collection up-to-date, interested market actors are invited to create an account which allows administering own contact details and company information.

Besides detailed market intelligence, interested users can find numerous background analyses:

- Detailed country reports for individual European pellet markets
- Overview reports presenting summaries of collected data
- A market study for Russia, Belarus and Ukraine
- An analysis of the global pellet market
- Information on wood pellet logistics
- Information on European MBP markets
- Feasibility studies for MBP production plants
- Wood pellet handbooks in several European languages
- A heat cost calculation tool
- Information on the development of pellet quality standards and certification systems

EU pellet markets

Introduction

The importance of wood pellets for small and medium scale heat production and large scale power generation is continuously increasing across Europe. Pellet use can contribute substantially to renewable heat and electricity targets set by the EU Renewable Energy Directive.

Besides the established national pellet markets (e.g. Sweden, Austria), which are still growing strongly, additional pellet markets are emerging across Europe. This diversity regarding market development stages is accompanied by the development of heterogeneous demand and trade structures.

In countries such as Germany, Austria and Italy, wood pellets are exclusively used in heat production for the residential sector while the industrial use for power generation prevails in the United Kingdom, the Netherlands and Belgium. In Sweden and Denmark, both sectors are well established. In terms of trade, many of the developed national pellet markets depend on imports from countries with surplus pellet production. These are, besides Germany and Austria, mainly the Eastern European countries, Canada and, from 2009 onwards, also the USA.

This heterogeneity, together with the fast increase of pellet demand leads to inconsistencies mainly concerning supply security.

Already today, a shortage of raw materials for pellet production is reported from many European pellet markets and the broadening of the feedstock base, i.e. the use of residual wood, SRC (short rotation coppice) or agricultural biomass for pellet production, is becoming necessary.

However, it seems that an increased international pellet trade (i.e. pellet import from e.g. America to Europe) is, in the long run, essential for satisfying the growing demand in Europe.

Overview

The pellet production in Europe amounted to more than 7 million tons in 2008. The data collected during the pellets@las project suggests that even more than 7.5 million tons were produced. However, this data is partly based on estimations and therefore, uncertainties must be considered. The larger part of the produced pellets was of high quality, suitable for usage in small-scale residential combustion. Main producing countries are Sweden, Germany, Austria and Italy. Other pellets produced were “industrial” pellets of lower quality. Again, Germany and Sweden contribute large shares but also countries such as Belgium and the Eastern European countries (e.g. Poland and Estonia) are important industrial pellet producers.

Even more pellets were consumed in Europe in 2008. The pellets@las data suggests that the total demand in Europe amounted to roughly 8 million tons. However, it can be estimated that the consumption of high quality pellets in the heat sector (mainly Italy, Germany, Austria, Sweden and Denmark) roughly equals the consumption of industrial pellets by the power production sector (mainly Sweden, the Netherlands, Belgium, UK and Denmark).

In summary, the European demand for high quality pellets is currently covered by the domestic production while the use of industrial pellets partly depends on imports from countries such as Canada and Russia.

Concerning the future development, the demand for high quality pellets in the residential sector and particularly in the medium scale sector (e.g. community solutions) is likely to continue growing strongly, not only in the traditional markets (Germany, Austria, Italy) but also in currently small markets such as France, Spain and also in Eastern Europe. On the other hand it is unclear how the demand for industrial use (e.g. in CHP applications) will develop. In this sector, growth is anticipated in countries such as Poland but plants using pellets for co-firing are usually very flexible concerning the fuel used. Changes in pellet prices or other factors such as changes in support policies could have large influence on the future demand in this sector.

The uncertain demand development in the large-scale sector is accompanied by an ongoing build-up of additional production capacities for industrial pellets (Canada, USA and Eastern Europe, incl. Russia) while the increasing demand for high quality pellets is challenged by a difficult raw material supply situation in Europe.

Currently, the international trade with high quality pellets is of minor importance. High quality pellets are often exchanged between neighboring countries within cross-boarder retail and logistics networks. Long-distance transports of high quality pellets are rarely reported. The logistics of pellet supply to the residential sector therefore still seems to be mainly based on national or even regional supply chains. Exceptions are the pellet trade from e.g. the Baltic States to Denmark or the pellet transport from various European countries to Italy.

In contrast, the international trade with industrial pellets has reached impressive volumes. One reason for this of course is the fact that large-scale pellet consumption mainly occurs in countries without significant domestic pellet production (e.g. the Netherlands, UK and Denmark).

This picture might change in the future and the long-distance trade with high quality pellets (e.g. from Canada or Russia to Europe) might become necessary.

Residential heating markets

Austria is still the most developed market concerning residential pellet heating. Germany and Switzerland also have strong pellet industries and large consumer numbers but both countries considerably lag behind Austria when per capita values for e.g. consumption are compared. France and Ireland are only at the beginning of market development.

These countries have in common that wood pellets are currently exclusively used for heating purposes in the residential sector where central pellet heating appliances combined with loose pellet delivery and storage prevail. However, in France pellet stoves might be equally important and might become the main pellet appliance in the next years as it is the case in other Southern European countries.

Medium-scale pellet heating system (picture: WIP)

Southern Europe

Pellet market development in Southern Europe is generally hampered by limited availability of raw materials and a lower heat demand in households due to warm climates. The use of high-tech pellet central-heating appliances does not seem to be feasible in these countries. However, the market in Italy has shown the potential of pellet stove heating under these conditions but also that domestic pellet production in these countries cannot fully cover a large demand.

Other countries in Southern Europe (Greece, Spain and Portugal) are currently developing production capacities. Produced pellets however, are still exported due to a lacking domestic demand.

Typical pellet stove
(picture: proPellets Austria)

Scandinavia

Scandinavia is characterised by heterogeneous market development. Currently, Sweden is the only country in Scandinavia with a significant domestic pellet production industry. Pellet production in Denmark is limited by the availability of raw materials and pellet production capacities in Finland are rather small considering the huge raw material potential.

Denmark and Sweden belong to the largest pellet markets worldwide regarding per capita pellet consumption and in both countries, pellets are used for the whole spectrum of scale.

The pellet market in Norway is currently of minor importance while the market in Finland is rapidly developing towards a significant size.

Avedøre power plant, Denmark (picture: DONG Energy)

Industrial pellet use

In addition to Sweden and Denmark, Governmental incentives and obligations have lead to the use of wood pellets in co-firing in countries such as the UK, the Netherlands, Belgium and others like Poland.

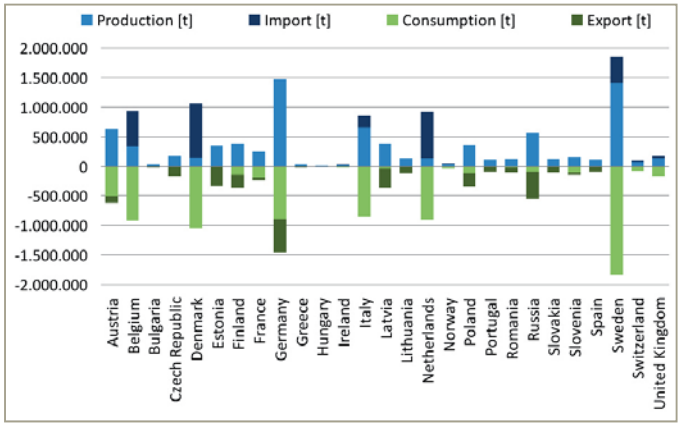
Apart from this, pellets are hardly used for other purposes (i.e. residential heating) in the UK and Netherlands and also the domestic production in these countries is rather marginal (as in Denmark) so that large quantities of pellets have to be imported.

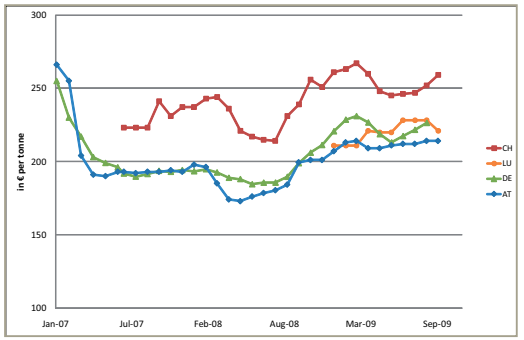
In contrast, Belgium is developing a considerable residential pellet heating market and pellet production capacities, besides the enormous pellet co-firing market.

Eastern Europe

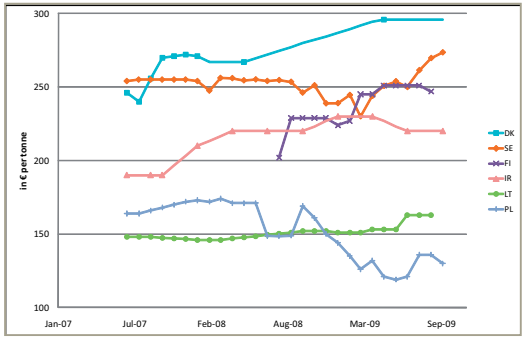
Pellet markets in Eastern Europe are generally characterised by insignificant domestic demand and rapidly growing pellet production. The currently installed production capacity is very small in some countries (e.g. Hungary) or already well developed (e.g. the Baltic States). All Eastern European countries have in common that the largest share of their production is currently exported to better developed pellet markets.

For detailed information on individual European countries, please refer to the pellet market country reports at www.pelletsatlas.info.

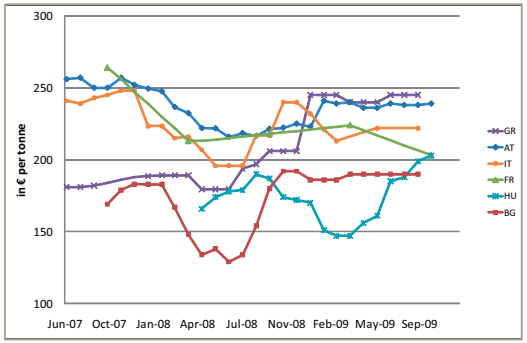




Prices of loose pellets for small scale (residential) heating in Central Europe (including delivery and VAT)



Prices of loose pellets for small scale (residential) heating in selected countries (including delivery and VAT)



Prices of pellets in bags (< 25 kg) for small scale (residential) heating (without transportation, including VAT)

Pellet trade outside the EU

The following chapter describes the status of international pellet markets by the end of 2008.

Russia, Ukraine, Belarus

The three pellet markets in Russia, Ukraine and Belarus are similar on one hand and different on the other hand. The Russian wood pellet market is the most developed. Russian pellet companies are concentrated mostly in the North-West and the central part of Russia, in regions with developed forests or woodworking industry. In general, pellet production started in the North-West of Russia in the presence of both forest industry and required export logistics (harbors). Consequently, it spread to central Russia and the Ural region. In addition to wood pellet production plants, some sunflower husk and peat pellet producers are also present in Russia but so far their numbers are limited. Similarly, in Belarus, producers also prefer woody material as feedstock for pellets. In the Ukraine, the situation differs. As agriculture is more developed here than the wood industry, sunflower husk pellet producers have approximately the same share in pellet production as wood pellet producers. Based on interviews with pellet producers, it seems that Russia and Ukraine use about 5-15% on their domestic markets, while domestic use in Belarus is non-existent.

Most pellet producers in all three countries are oriented toward exporting to Western Europe. There are no export duties on wood pellets so far, but the price crisis of 2007-2008 led to a fall in the rate that production was increasing in all countries as well as to a temporary decrease in the level of interest in investing in projects related to pellet production. Pellet producers are reported to be operating at or below break even point at the moment, meaning that their production costs exceed actual revenues. Other factories confirm that they are still profitable, but that business is not as attractive as it used to be when they had 100% profitably. Currently the profitability level of pellet production rarely exceeds 10-15%.

Western Balkan area

Currently, in Serbia there are 5 pellet plants located ranging between 10-35 ktonnes capacity per year, using hardwoods such as beech for pelletizing. The domestic market is not well developed, with only a few supermarkets in Novi Sad and Belgrade offering wood pellets.

In Montenegro, there is currently a single pellet plant, with a capacity of 25 ktonnes/year. The wood pellets produced are used both for sale to households and for the needs of the company itself.

In Bosnia-Herzegovina there are several pellet plants, ranging between 3-45 ktonnes/year. There is no significant domestic market yet, as a rough estimate 10-15% of the pellets produced are sold on the domestic market. Most of the export goes to Italy and Slovenia. The entire capacity is 120 ktonnes/year.

The largest production capacity in the western Balkan is situated in Croatia; in mid-2008, a total of 7 pellet plants had a combined capacity of 194.5 ktonnes/year, ranging from 7.5-40 ktonnes/year. Feedstocks for pellet production consist (amongst others) of sawdust from oak, beech and ash, and spruce and fir wood. The total potential of the forest biomass for the production of briquettes or pellets is estimated to be about 1 million cubic meters, so there is ample room for further expansion. As there is again a small domestic market, the large majority of wood pellets are exported.

As discussed above, basically all countries in the western Balkan produce pellets mainly for export. The main export markets are Italy and Austria. Export by truck is especially attractive to Northern Italy for pellet plants situated close to motorways in the Northwestern part of the region (i.e. Slovenia, Croatia and parts of Bosnia-Herzegovina).

While no data was available as to how large exact export volumes to Austria and Italy were in 2007 or 2008, as a rough estimate, between 300,000-350,000 may have entered these two markets (based on production capacities and estimated domestic consumption).

North America *

Canada and the USA both have a domestic pellet production capacity which no single European country can match at the moment, with the possible exception of Sweden.

It is noteworthy how weak the domestic Canadian market has been for biomass, including pellets, and is expected to remain so under the absence of national climate change and energy policies. This situation would however change quite rapidly if Canada were to implement their commitment under the Kyoto Protocol. However, the eastern part of Canada including the Maritime Provinces, has seen growth in domestic use during 2008. Unlike the rest of Canada, this region does not have a natural gas distribution network, and primarily uses heating oil and propane to meet heating demands. Wood pellets have been very competitive against these 2 options, and there has been increased demand for free standing stoves.

The North American market has developed in symbiosis with the European market, and they have to a certain degree become mutually dependent. Until the end of 2007, there had not been any influx of pellets from other markets to speak of. As can be seen in figure 4.5, the export from North America (Canada) is matching the import numbers in Europe. However, as more recent data shows (figure 4.6), the increase in wood pellet exports from Canada to Europe in 2007 has been far more moderate than initially expected. This is probably due to the fact that 2007 was a very bad year for the European pellet market with very low prices, coupled with a very strong Canadian dollar and sky-rocketing freight costs, in 2007 vs. 2006. Also, growth projections to 2010 will largely depend on the market development in Europe.

In British Columbia (BC), the pellet export potential is almost limitless. The annual surplus of mill residues is still 1 million bone dry tonnes, and vast amounts of harvest slash from Mountain Pine Beetle harvest are available. Domestic markets in BC are growing only marginally, so most of this new production would be exported. BC pellets destined for Europe are loaded onto 100 tonne rail hopper cars headed for the coast and then loaded into cargo ships holding 4,000-15,000 tonnes. The Fibreco Terminal and Kinder Morgan Terminal in North Vancouver have the capacity to handle 1 million tonnes of pellets annually and can be expanded to 2 million tonnes. Northern BC pellet plants would use rail to reach the Ridley terminal in Prince Rupert. The trade route is through the Panama Canal to Europe, with most in 2007 going to the Netherlands, Belgium, and Sweden, with some exports also to Denmark, the UK, Ireland and Italy. Next to exports to Europe, supply contracts for wood pellets have recently been signed between manufacturers in British Columbia and Japan and deliveries are now under way at a rate of 60 ktonnes per year. On the eastern side of Canada, Mactara in Nova Scotia exports primarily to Europe via the port of Halifax. Quebec mills also export by way of the port of Montreal; however, Montreal is not a winter port (Bradley, 2008).

Up until the end of 2007, the USA have been mainly producing and importing wood pellets for domestic consumption. However, several projects are under way in Southeastern USA, amongst which is the largest pellet production plant in the world. This and other plants may lead to the export capacity from the USA reaching possibly up to one million tonnes, depending on how much of the projected increase in capacity will actually be implemented.

For further information on international pellet trade, please refer to the “Analysis of the global wood pellet market” at www.pelletsatlas.info.

* The text mainly describes the situation in 2007.

The following table presents an overview on data collected on European pellet markets.

	Production/Storage 2008				Produced standards			Consumption 2008		
Country	Number of registered producers	Production capacity (tonnes)	Production (tonnes)	Storage capacity (tonnes)	ÖNORM M 7135	DINplus	DIN 51731	Total consumption (tonnes)	Number of registered largescale consumers	Largescale consumption (tonnes)
Austria	25	1.006.000	626.000	65.000	X	X		509.000		
Belarus	8	60.000	40.000*					< 3.000		
Belgium	10	450.000	325.000			X		920.000	2	800.000
Bulgaria	17	62.000	27.000	11.000				3.000		
Cyprus										
Czech Republic	14	260.000	170.000		X	X	X	17.000		
Denmark	12	313.000	134.000			X		1.060.000	2	355.000
Estonia	6	485.000	338.000*					< 3.000		
Finland	19	680.000	373.000					150.000		
France	54	350.000	240.000	10.000		X		200.000		
Germany	50	2.400.000	1.460.000	168.000	X	X		900.000		
Greece	5	87.000	28.000					11.000		
Hungary	7	5.000	5.000					1.000		
Ireland	2	78.000	17.000					30.000		
Italy	75	750.000	650.000	170.000	X			850.000		
Latvia	15	744.000	379.000					39.000		
Lithuania	6	153.000	120.000			X		20.000		
Luxembourg	0	0	0	0				5.000		
Malta										
Netherlands	2	130.000	120.000	12.000				914.000	5	876.000
Norway	8	164.000	35.000					40.000		
Poland	21	665.000	350.000	73.000		X	X	120.000	5	
Portugal	6	400.000	100.000					10.000		
Romania	21	260.000	114.000	22.000	X	X		25.000		
Russia	77	1.200.000	550.000*					100.000		
Slovakia	14	142.000	117.000					18.000		
Slovenia	4	185.000	154.000					112.000		
Spain	17	250.000	100.000			X		10.000		
Sweden	94	2.200.000	1.405.000					1.850.000		800.000
Switzerland	14	171.000	70.000*		X	X		90.000		
Ukraine	15	140.000	60.000*		X			10.000		
United Kingdom	15	218.000	125.000	57.000		X		176.000	5	166.000

not part of EU 27

no pellet market

*) Data of 2007

Data origin:
-) Country reports of the Pellets@las project
-) Rakitova O., Ovsyanko A. 2009: Wood Pellets Production and Trade in Russia, Belarus and Ukraine
-) Bioenergy International 6 (2008)

Pellet quality – standards and certification

Standardisation aims at removing trade and application barriers by establishing unification (of concepts, procedures and products) within a national or international community of concerned stakeholders. Standards increase economization, compatibility, user-friendliness and security in the application and exchange of products and services.

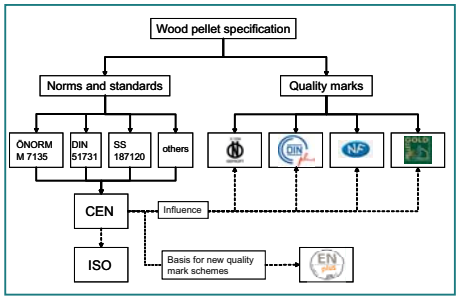
Quality is a central issue for the further development of pellet markets. Especially the residential heating sector depends on reliable fuel quality since it is crucial for a reliable and economic use of small-scale pellet heating systems.

The importance of quality standards and assurance became obvious in the last years in Germany and Austria where the early introduction of pellet-related standards and certification systems certainly was a stimulating factor for the dynamic development of residential pellet heating markets.

Now, a set of European standards related to solid biofuels is under preparation. This is a positive step towards the unification of the European pellet market and will contribute to enhancing market development all over Europe.

However, standards alone are not sufficient. Certification and the control of products and of the whole supply chain are desirable. Existing national and international certification systems such as DINplus contributed a lot to quality assurance and to gaining consumers´ confidence. However, they all have certain drawbacks and none of them covers the whole supply chain within one system.

Based upon the new European standards, the German Pellet Association (DEPV), together with other partners, is currently developing a new certification system (ENplus) with a European scope and a more holistic approach. The system claims the potential to replace the other existing certificates that are partly well accepted by stakeholders such as boiler manufacturers and end-consumers.



For further information on pellet-related quality standards and pellet certification, please refer to the report on pellet quality at www.pelletsatlas.info.

Mixed Biomass Pellets (MBP)

The growing consumption of wood pellets in Europe, especially in developed pellet markets such as Austria, raises the question of raw material supply for the pellet producing industry. The availability of the widely used sawdust and other wood wastes is limited. One option discussed is the production of pellets from raw wood, which might be unfavourable in means of sustainability, energy balance and a higher consumer price.

Furthermore, countries without large forestry industries and therefore a lack of sawdust sources will be forced to serve their domestic markets with pellets imported from countries with a better wood raw material base. Again, the energy and cost balances of the necessary supply and logistic chains are disadvantageous compared to the consumption of locally produced biomass fuels distributed over short distances.

One way to face these problems is the broadening of the raw material base for the pellet production. Technically, a wide range of agricultural wastes and herbaceous crops are suitable as raw materials for the pelletizing process. Namely agricultural residues such as straw, wastes of the food industries, dedicated biomass fuel crops (e.g. Miscanthus) and even wastes from other bio-energy processes (e.g. bio-gasification) have been used successfully for the production of mixed biomass pellets (MBP).

The availability of straw alone is enormous even when it can vary significantly between regions and the harvest seasons. Other biomass wastes are produced continuously and in constant amounts and could serve as more reliable raw materials. The use of biomass wastes of course would also allow keeping the pellet prices at low levels since most of the materials mentioned can be acquired at low costs.

The major drawback coming with the utilisation of MBP as fuel is the unfavourable chemical composition of most of the potential herbaceous MBP raw materials. Straw shows, compared to wood, high contents of e.g. chlorine and ash, posing technological problems during the combustion process. Corrosion of burner equipment, slagging and fouling are damaging and cost-intensive processes documented often during MBP combustion trials.

In addition, high contents of certain elements lead to high emission values for related pollutants. For example high ash contents can result in elevated dust emissions while high HCl emissions are caused by high chlorine contents in the fuel.

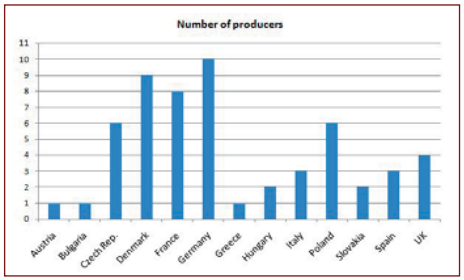
Today there are efficient ways to face both these problems. However, the application of such technologies is highly cost intensive and is no option for the small scale. Therefore the use of MBP as fuel in small boilers for heating purposes in the residential sector is hardly possible at the moment. Many boiler producers at the same time state that they are working on the development of boilers especially designed to fire MBP.

Until the addressed problems with the use of MBP in the small scale are solved the combustion of MBP is limited to large scale applications where the investment in gas cleaning technologies can be cost-effective. MBP seem to be an interesting alternative to wood pellets for co-firing, ideally in CHP plants.

MBP markets

Despite the large potential of pellet production from herbaceous biomass, MBP markets in Europe are developing very slowly.

During the pellets@las project, 56 companies were found producing MBP in 13 countries.



In most cases, these companies have small production capacities below 5000 tons per year. In addition, many of them produce MBP mainly for non-energy purposes such as animal feeding or littering. Only a small share is sold for combustion.

In France, for example, large MBP production capacities are installed but the capacities dedicated to fuel MBP production remains insignificant.

The most significant activity concerning MBP was found in Denmark and the UK, where large amounts of straw pellets are produced for co-firing. In some cases, the utility co-firing MBP is also producing them.

In Poland, energy producers are obliges to produce an increasing share of their energy from agricultural biomass. This promoted the installation of significant MBP production capacities (around 60,000 tons per year), which are used in medium-scale appliances and for co-firing.

Similar developments could be observed in other Eastern European countries such as the Czech Republic. Another large wood pellet producer in Latvia encourages farmers to produce large amounts of reed canary grass and switchgrass. It is foreseen to produce pellets from wood mixed with a certain amount of herbaceous biomass.

On the demand side, co-firing plants currently are the most important MBP producers. Consumption in Denmark, UK and Poland was already mentioned. In addition, Dutch utilities imported some 10,000 tons of various MBP (e.g. from soy husks) for co-firing purposes.

Finally, in countries such as Germany, France or Denmark, MBP are used in small and medium scale appliances in the residential or agricultural sectors but in insignificant amounts. This market probably will not develop rapidly in the next year, due to technical limitations.

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