



Analysis of the global pellet market

Including major driving forces and possible technical and non-technical barriers

Deliverable 6.2
February 2009

Martin Junginger
Richard Sikkema
André Faaij

Copernicus Institute, Utrecht University

With contributions from
Alen Bukvić (Gratenau & Hesselbacher)
Staffan Melin (Wood Pellet Association of Canada WPAC)
Anton Ovsyanko (Russian National Bioenergy Union NBU)
Olga Rakitova (Russian National Bioenergy Union NBU)

Intelligent Energy  Europe

EIE/06/020/SI2.448557

Analysis of the global pellet market
Deliverable 6.2 for the Pellets@las project

Report available from the pellets@las website at www.pelletsatlas.info

Supported by the European Commission under the EIE programme

The sole responsibility for the content of this report lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

Table of content

1.	Introduction and objective	2
1.1	Introduction and background	2
1.2	Aims and scope of the report	2
2.	Production, use and trade in Russia, Ukraine and Belarus	4
2.1	Overview of production capacities and domestic markets 2007-2008	4
2.2	Export markets 2007 / 2008.....	7
2.3	Summary and discussion.....	10
3.	Production, use and trade in the Western Balkan area.....	12
3.1	Overview of production capacities and domestic markets 2007-2008	12
3.2	Export markets 2007-2008.....	14
3.3	Summary and discussion.....	15
4.	Production and trade in North America	17
4.1	Overview of production capacities and domestic markets 2007-2008	17
4.2	Export markets 2007-2008.....	21
4.3	Summary and discussion.....	24
5.	Barriers and opportunities for international pellet trade.....	25
6.	General discussion and conclusions.....	33
	Reference list	35
	Annex 1 Workshop programme	36
	Annex 2: Participants list	37

1. Introduction and objective

1.1 Introduction and background

The general aim of PELLETS@LAS is to develop and promote transparency in the European fuel pellets market. This is done to facilitate the trade in pellets and to remove market barriers, mainly information gaps but also local supply bottlenecks, production surpluses and uncertainties in quality assurance management. The project (www.pelletsatlas.info; EIE/06/020), is supported by the European Commission und the Intelligent Energy – Europe programme. The aim of the project is to contribute to the development of a transparent European pellets market through the creation of a European Pellet Atlas. The core of the action is data and information collection in all EU 27+2 countries (plus Norway and Switzerland) from wood and mixed biomass pellet (MBP) producers, traders and consumers. The obtained data is disseminated via an internet platform containing graphic interfaces and thus functioning as a pellets atlas. Additionally, as part of work package six, the aim is to sketch a picture of the global pellet market.

1.2 Aims and scope of the report

The aims of this report are:

- to present a general overview of the international wood pellet trade outside / towards the European Union, and
- to discuss current and future drivers, barriers and opportunities for wood pellet trade.
- to briefly discuss the pellet logistics behind these international trade flows.

Due to the scope of the Pellets@las project, the main efforts for data collection on production and export of wood pellets for export to the European Union were limited mainly to Eastern Europe, i.e. Russia, Belarus and Ukraine. The data collection was

carried out by sub-contractors Olga Rakitova and Anton Ovsyanko. Several comprehensive market reports are available (Rakitova, 2008), also available for download from the Pellets@las website, www.pelletsatlas.info.

In addition, the report contains a section focusing on the Western Balkans; an area together with (with the exception of Slovenia) a number of non-EU countries, which have shown a remarkable growth in wood pellet production and export in the last years. Valuable data and information was obtained from Alen Bukvic (Gratenau & Hesselbacher) on the production and export of wood pellets in the Balkan area.

While the focus of the Pellets@las project is mainly on the (larger) European geographical region, an analysis of international wood pellet trade would not be complete without a description of the North American market. As no resources within Pellets@las were available to collect data outside Europe, the analysis in section 4 relies heavily on information kindly provided by Staffan Melin (Canadian Wood Pellet Association) on the production and export of wood pellets from Northern America.

Regarding the identification of trends, barriers and opportunities, on June 17th 2008, a workshop on international pellet trade was held in Utrecht, the Netherlands, organized by the Copernicus Institute, Utrecht University. The number of participants was limited to 50 to enable a fruitful debate. A limited number of international pellet traders, large scale users and scientists were present, including members of IEA Bioenergy Task 40 on sustainable international bioenergy trade (see appendices 1 and 2 for a participants list and the workshop program).

The main author would like to thank all contributors of this report and the workshop for generously sharing information and insights, and Sandra Hayes for giving a draft of this report a thorough grammar and spelling check.

2. Production, use and trade in Russia, Ukraine and Belarus

2.1 Overview of production capacities and domestic markets 2007-2008

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. An overview of the production capacities and domestic consumption is presented in Table 2.1.

Table 2.1 The Russian, Ukraine and Belarus production and domestic consumption of wood pellets – 2007. All numbers are estimated.

Country	Production 2007 tonne/year	Production Jan- September 2008	Nominal capacity, tonne/year	Estimated Domestic consumption 2007
Russia	550 000	300 000	1 200 000	30 000 – 50 000
Ukraine	60 000	40 000	140 000	6 000- 9 000
Belarus	40 000	25 000	60 000	0

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 (but some plans exist to develop the domestic market). Prices on the domestic market may vary, and depend on location of the plant and the vicinity to consumers and retailers. In general,

wood pellets for residential heating is currently a niche-market, limited to several thousand household boilers (15-100 kW_{th}) and several dozens professional boilers (100-1000 kW_{th}).

However, the domestic market for fuel pellets keeps growing in Russia as well as in Ukraine and Belarus. The main growth markets in 2008 were

- (1) private boiler-house owners such as production enterprises, warehouses and logistics centers switching to pellets to decrease fuel costs and improve heat supply reliability
- (2) municipal boiler houses
- (3) private house owners

In *Russia*, boiler suppliers claim to have supplied over 1000 pellets boilers (below 200 kW_{th}) in 2008 and several dozen professional pellets boilers (over 200 kW_{th}) had been installed in different regions of Russia by the autumn of 2008. While in 2006-07 there were no more than 10 companies offering pellets heating systems, by autumn 2008, the number of pellet boiler suppliers has risen to over 50 companies, mainly covering regions of Russia where pellets are produced. Unfortunately, the growing Russian market hardly gets any consequent support or even serious attention from the state – but for rare exceptions on a local level. As a result, the market is developing voluntarily - without any plan. Pellet market infrastructure is almost absent and has to be established every time by interested pellet producers or boiler suppliers. Pellets can in most cases only be purchased from producers or from boiler suppliers. Retail chains do not sell pellets, because of the relatively low turnover of this product. Total domestic consumption of fuel pellets in Russia for the 2008-09 season is 30-50 thousand tons, and grows quickly. Pellets producers actively promote the use of pellets in Russia also because the export market was less profitable at the end of 2008 than it was in 2006. Some retailer companies have tried so sell pellets on the domestic market in 2008, e.g. retailer company "Karusel" (a supermarket chain) in St.Petersburg and some companies in Moscow. However, pellets were sold only in supermarkets in big cities. During the end of 2008, Karusel has stopped

the distribution of fuel pellets. Moscow retailer companies are still trying to sell some small amount of fuel pellets.

The *Ukrainian* domestic pellets market is largely disorganized, but is also growing rapidly because of increasing fossil fuel prices, which are higher than in Russia. At the same time, the cost of transportation of pellets to Western Europe from Ukraine is lower than from Russia, which makes export more profitable. Specific features of the Ukrainian market compared to Russia are determined by another structure of biomass resources. The share of sunflower husk pellets is relatively high. Many of them are sold to Ukrainian consumers, because this product is less well known in Western Europe. Few figures are available on the domestic consumption of pellets in Ukraine. However, equipment suppliers in Russia, Baltic States, as well as in Central Europe, are getting a lot of inquiries for pellet boilers from the Ukraine. State support for the use of pellets is not very high in the Ukraine, except for the VAT exemption for energy saving projects realized in Ukraine. Pellet production in Ukraine develops slower than in Russia. This is mainly due to less investment resources and less wood waste and other suitable biomass resources.

Belarusian authorities claim to pursue a significant policy aimed at the development of renewable energy. This also has political meaning in terms of avoiding too much dependency on oil and gas imported from Russia. However, this does not seem to contribute to the development of a pellet industry in the country. All operating pellets producers are owned by SME's. Most of them have been constructed without significant state support. Also, there is still little internal demand for pellets. Most pellets produced in Belarus are exported via the Baltic States or via Poland. All pellet factories in Belarus were established with very tough budget limitations. As a result most or all of them are using domestic, second hand equipment and experience a lot of down time. No state of the art pellets production facilities are known in Belarus - even compared to what has been built in the Ukraine and Russia.

2.2 Export markets 2007 / 2008

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%. An overview of recent prices of wood pellets for domestic and export is given in Table 2.2.

Analysis of the global pellet market
Deliverable 6.2 for the Pellets@las project

Table 2.2 September 2008 prices for pellets in/from Russia, Ukraine and Belarus

	Russia	Ukraine	Belarus
Non industrial small bags (< 25 kg) Unit: € / ton including VAT.	160-165 Euro/ton in Europe. (prices went up approx 10%) 17000 Rub\ton in the resale supermarket KARUSEL for 5 kg small bags (One bag costs 89 RUB)	15kg bags on FCA 90 Euro/ton 110\$/ton inside Ukraine (wood	The price for industrial pellets is 90-100 Euro/ton in DAF.
Non industrial bulk Unit: € / ton including VAT	110 Euro/tonne (4000 Rub/ton) ex Works (domestic market to private households)	115 Euro/ton on the location of consumer (wood in big-bags by trucks) inside Ukraine	98% of produced pellets are exported to Europe through Baltic states mostly Non-industrial pellets are sold by 105-125 Euro/tonne on the border in big-bags.
Industrial bulk, delivered volume of 5.000 tons at international harbor,	Prices went up to 95-105 € / ton excluding VAT on FOB SPb in September 2008. Danish traders have came to the market	95-100 Euro/ton FOB in Baltic harbors, transfer by trucks through Poland to Baltic harbors, then delivered to Sweden by ship	n.a.

2.2.1 Export routes over water to the EU

For *Russia*, more than 50% of all pellet exports are going through different harbors of the seaports of St. Petersburg and Ust-Luga. The terminal facilities for pellet transfers in St. Petersburg harbor are indicated on the map in figure 2.1. below. Some pellets are exported though ports in Lithuania, Latvia and Estonia: Klaipeda (Lithuania), Liepaya, Ventspils (Latvia), Paldiski, Sillamae and Tallinn (Estonia) (see also Osterström, 2008). Pellets from *Ukraine and Belarus* are also exported through these Baltic ports. Probably, some pellets go via Black Seaports, but as far as it is known, not regularly.

Based on anecdotal information, the main exports of wood pellets by sea vessel are to Denmark and especially to Sweden, possibly also to other countries. Exports may be carried out either in bulk or in marine containers.

Порт Санкт-Петербург



Figure 2.1 Harbor of St. Petersburg

2.2.2 Export by trucks and train to EU countries

Some pellets producers in all three countries are selling their product to small European traders and retailers, which offer better prices for small batches of consumer quality pellets. In this case the product may be delivered to the EU by trucks. Sometimes the producer pays for transportation, and delivers the pellets to the EU; other producers sell the product ex works. In all cases return trucks or containers have to be used to enjoy low freight rates. This leads to certain geographical limitations. To make this channel profitable, the producer has to be located close to transport ways with much empty truck / container traffic going towards the EU. Truck / container delivery also allows for pellets packed into small bags in production to be transported and simplifies the logistics inside the EU, which may result in better profitability over the whole chain. It is very hard to estimate the exact share of this channel within the whole export volume, but it is deemed substantial for all three countries, especially for Ukraine and Belarus given the vicinity of the EU. The main destinations for truck deliveries are Southern Germany, Austria, Switzerland, Italy, Poland, Czech Republic and Slovakia.

In addition, pellets are also transported to Europe by railway, but exact routes and volumes, especially for trains are unknown, given the relatively small volumes.

2.3 Summary and discussion

As described above, the Eastern European pellet market is rapidly developing. Especially from 2006 onwards, both production facilities and export has been increasing strongly. The total reported production and export volumes for 2007 were doubted by some experts. One stated that given the rather bad year of 2007, they estimated that export volumes of 200-300 ktonnes were probably more realistic than the 500-600 ktonnes projected above. However, these estimates may also be based only on the St. Peterburg exports, ignoring exports through the Baltic harbors. In the end, as there are no reliable production and trade statistics available, the exact amounts traded remain unclear.

What is however evident is the rapid growth of wood pellet production facilities. Given the potentially very large woody feedstock sources, the region may well see future growth if the required logistics and market demand in the EU allow it. The reported export routes by truck to countries as far as Switzerland are remarkable, and certainly questionable from an energy balance point of view.

3. Production, use and trade in the Western Balkan area¹

3.1 Overview of production capacities and domestic markets 2007-2008

In this section, a brief overview of the Western Balkan pellet production capacity and domestic markets is presented. All pellet plants included in this overview are shown on a map in figure 3.1. An overview of the production capacities per country is given in figure 3.2

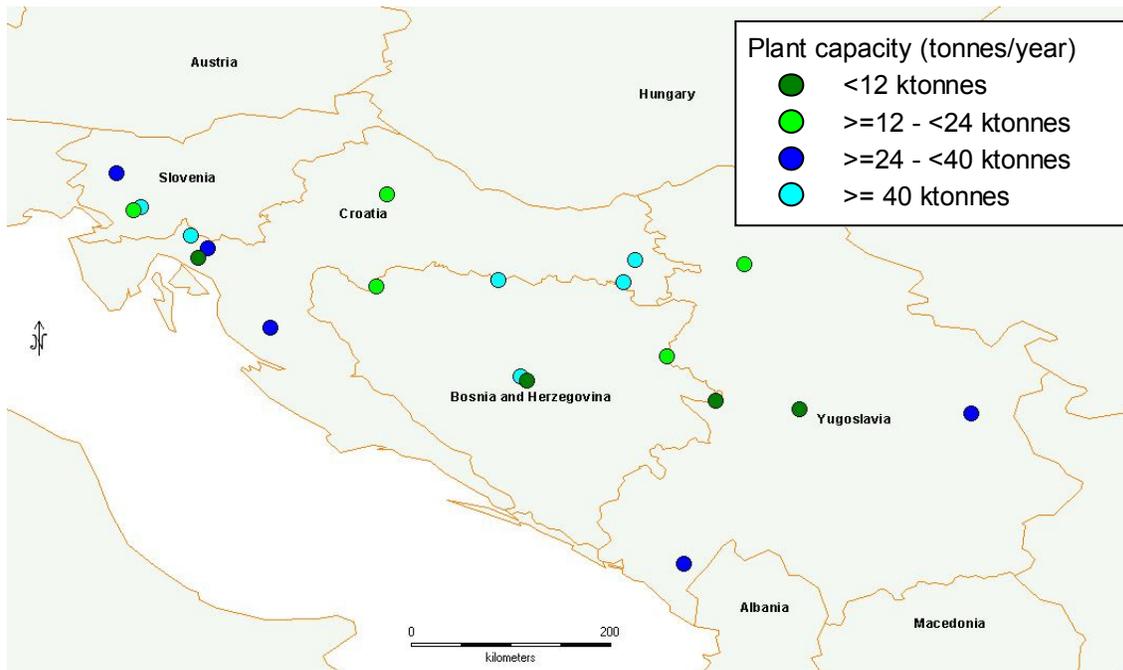


Figure 3.1 Overview of wood pellet production plants in the Western Balkan area (Source: Bukvić, 2008).

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.

¹ Section 3.2 is largely based on a presentation given by Alen Bukvić, presented at the Wood Energy Workshop in Belgrade, 2nd of December 2008

In *Montenegro*, there is currently a single pellet plant, with a capacity of 25 ktonnes/year. Sawdust from the adjacent sawmill is used for the production of wood pellets. The wood pellets 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.

Finally, in *Slovenia*, three pellet plants currently have a combined production capacity of 89 ktonnes/year. The largest started the production in 2005 and exports 90% of its production mainly to Italy and sells the remaining amount onto the domestic market, using spruce and fir for pellet production. The other plants use mixed sawdust from hardwood (beech). Contrary to most other Balkan countries, a feed-in tariff for electricity from biomass is in place. This is the main reason that the power plant Sostanj in Slovenia is a big consumer of wood pellets and in 2008 used about 40 ktonnes of wood pellets. Furthermore, there is currently also a domestic market developing, as the financial support for the private households can reach up to 5,000.-€.

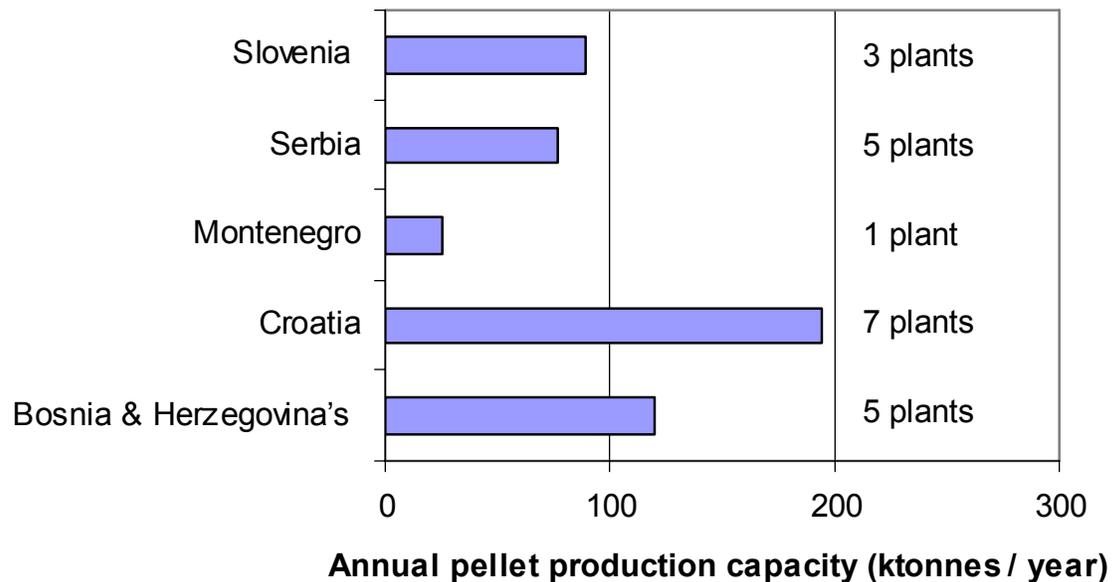


Figure 3.2. Overview of wood pellet production capacity in the western Balkan area (Source: Bukvić, 2008).

3.2 Export markets 2007-2008

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 North-western part of the region (i.e. Slovenia, Croatia and parts of Bosnia-Herzegovina).

Transportation costs can contribute significantly to the total cost of wood pellets delivered to Austria and Italy. In an example presented by Bukvic (2008), a producer situated in Eastern Croatia delivering wood pellets to Milano, Italy by truck has transportation costs of approximately 40 Euros/tonne, compared to only 25 Euros/tonne transportation costs for a producer situated in Slovenia.

Depending on the request of the final consumer, pellets can be transported by truck in different forms. Especially for the Italian market, small wood pellet bags of 15 kg are placed on pallets - a truck can transport up to 25 tonnes. Other possibilities are transportation in big bags or in bulk, the later being the general rule for exports to Austria.

No information regarding export by train or boat (e.g. over the Adriatic Sea or the Danube) was available.

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).

3.3 Summary and discussion

Overall the Western Balkan area has built up over 500 ktonnes of wood pellet production capacity – roughly equaling the total production capacity in Italy. Despite the tremendous growth of this Western Balkan production capacity, the industry faces a number of barriers:

- The domestic market only develops slowly, as the high investment costs for pellet heating systems make the combustion of wood logs more attractive. There are no strong financial incentives for private households to overcome these high investment costs. Furthermore, pellets are relatively unknown as a heating option to large parts of the population.
- Regarding the export markets to Austria and Italy, the need to comply with ÖNorm M7135 and DINplus standards is a barrier. These standards allow a maximum ash content of 0.5%. At the moment, most of the producers are not able to match these standards. Another important issue is the color of the pellets. Italian and Austrian citizens are used to combusting white colored wood pellets.

Pellets with a darker color are often associated with a higher bark content – which is not necessarily true, depending on the feedstock used for pellet production.

- Minimizing transport distances and optimizing logistics are important issues. For example, larger warehouses and the (re-)construction of roads could improve the competitiveness of the Western Balkan pellet industry.
- Much as in the rest of Europe, the last two warm winters and the strongly increasing capacity all over Europe have resulted in large pellets stocks and declining prices, causing producers revenues to fall short of expectations.

Nevertheless, the overall prospects of the Western Balkan pellet market are positive. As most of the medium scale pellet heating systems in Italy do not require pellets below 0.5% ash content (and the Italian Pellet Gold label requires an ash content of below 1%), this market may provide opportunities for further growth. Last but not least, there is also a huge opportunity to utilize agriculture residues.

4. Production and trade in North America

4.1 Overview of production capacities and domestic markets 2007-2008

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.

The data shown in figures 4.1 and 4.2 is based on statistics produced by Staffan Melin (Melin, 2008a) of the Wood Pellet Association of Canada (WPAC) for actual production, claimed production and projections for the future. It is compiled based on the best available data on a national level at the time and sourced from major producers, major buyers, bioenergy associations, government agencies and independent statistical resources. Figure 4.1 and 4.2 indicate the production (claimed and actual) and consumption of pellets (almost exclusively whitewood pellets) in North America. Figures 4.3 and 4.4. show the location of wood pellet plants in Canada and the USA respectively.

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 a 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 (Swaan 2008a).

In 2008, Canada did experience some expansion including Pinnacle Pellet's new plant in Meadow Bank (BC) with capacity of about 200 000 t/y. All pellet producers in British Columbia are using mountain pine beetle (MPB) wood in their pellets, as this wood is being harvested and processed by related industries at the moment. There is an effort being made to collect the MPB affected material while it still has a merchant value. However, to utilize MPB directly and solely for wood pellet production would require

higher pellet prices, as the feedstock supply of MBP is more expensive than sawdust (Verkerk, 2008).

In the past Canada has typically always produced to its capacity, which today is more than 2 million tonnes. This year it will not be possible. Plants in the province of Quebec simply cannot obtain enough material to feed their plants, due to high competition from other industries. After the sawmill industry pulled back, the plants in Quebec have not been able to be cost affective with their operations. In contrast, the west coast does not have a resource problem (Swaan, 2008a).

Analysis of the global pellet market
 Deliverable 6.2 for the Pellets@las project

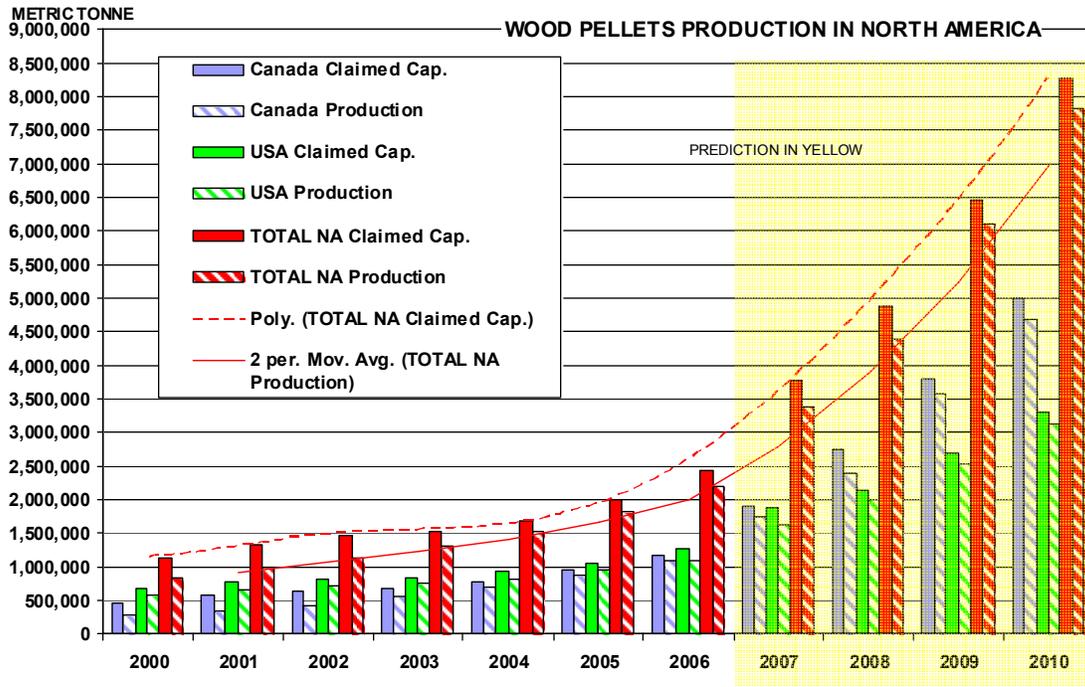


Figure 4.1 Wood pellet production in the USA and Canada. Numbers from 2007 onwards are estimates. Source: (Melin, 2008).

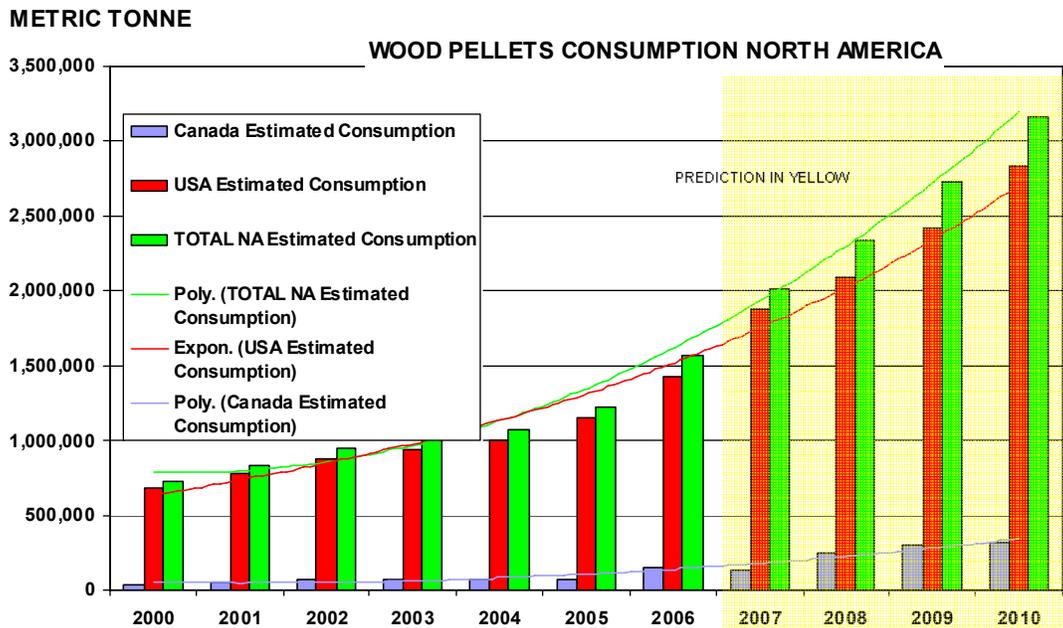


Figure 4.2 Wood pellet consumption in the USA and Canada. Numbers from 2007 onwards are estimates. Source: (Melin, 2008).

Analysis of the global pellet market
 Deliverable 6.2 for the Pellets@las project

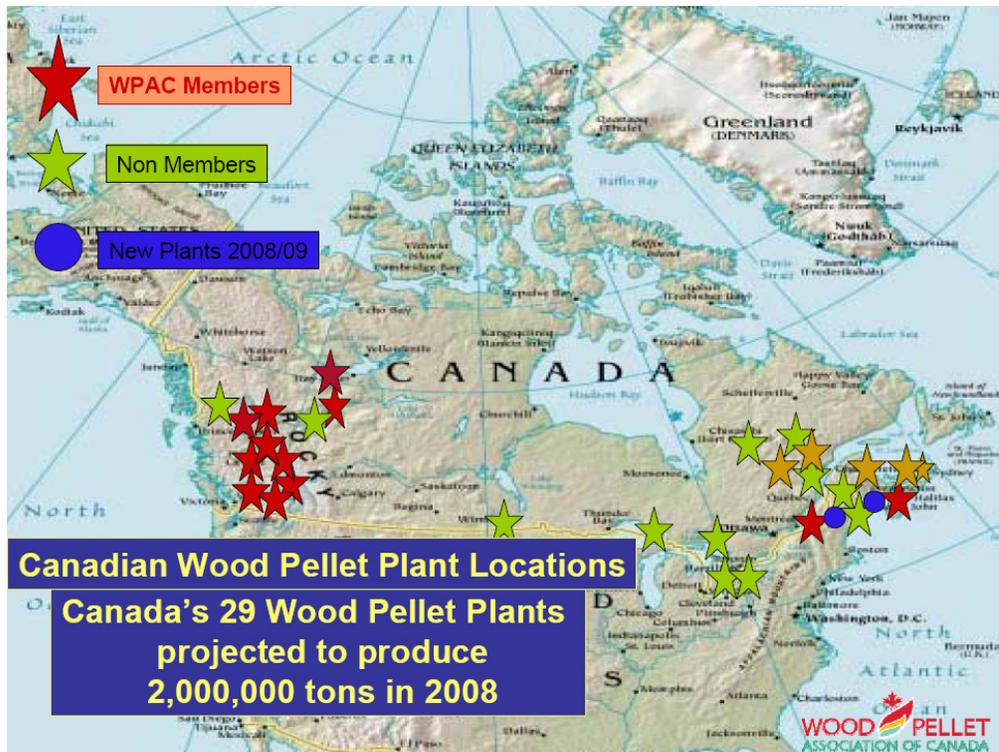


Figure 4.3 Location of Canadian Wood pellet plants. Source: (Melin, 2008).



Figure 4.4. Wood pellet plants situated in the USA (and some Canadian Plants). Source: Strimling (2008).

4.2 Export markets 2007-2008

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 skyrocketing 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 (Bradley 2008, Swaan, 2008b). 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 (Melin, 2008). 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).

Regarding the USA, 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 (B.I., 2008). The Green Circle Pellet Plant is located south of the border between Florida and Alabama and has a capacity of 550, 000 tonnes/year. It uses mainly timber from Southern yellow Pine pulpwood and sawdust as feedstock. This and other plants may lead to the export capacity from the USA until mid-2009 reaching possibly up to one million tones, depending on how much of the projected increase in capacity will actually be implemented (Melin, 2008)

Analysis of the global pellet market
 Deliverable 6.2 for the Pellets@las project

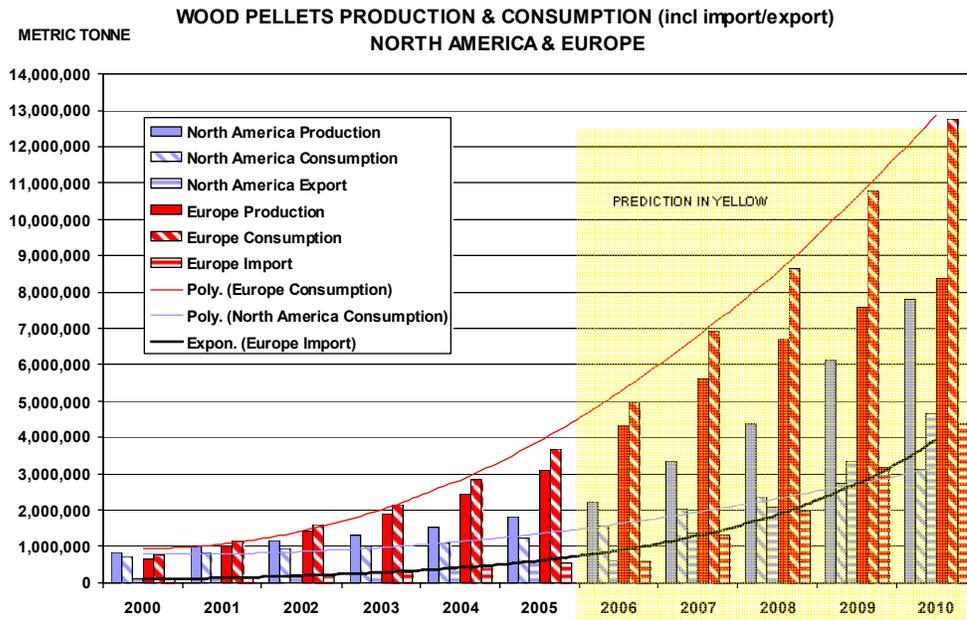


Figure 4.5 Overview of production, domestic consumption and exports of wood pellets in Canada. Numbers from 2008 onwards are estimates. Source: (Melin, 2008).

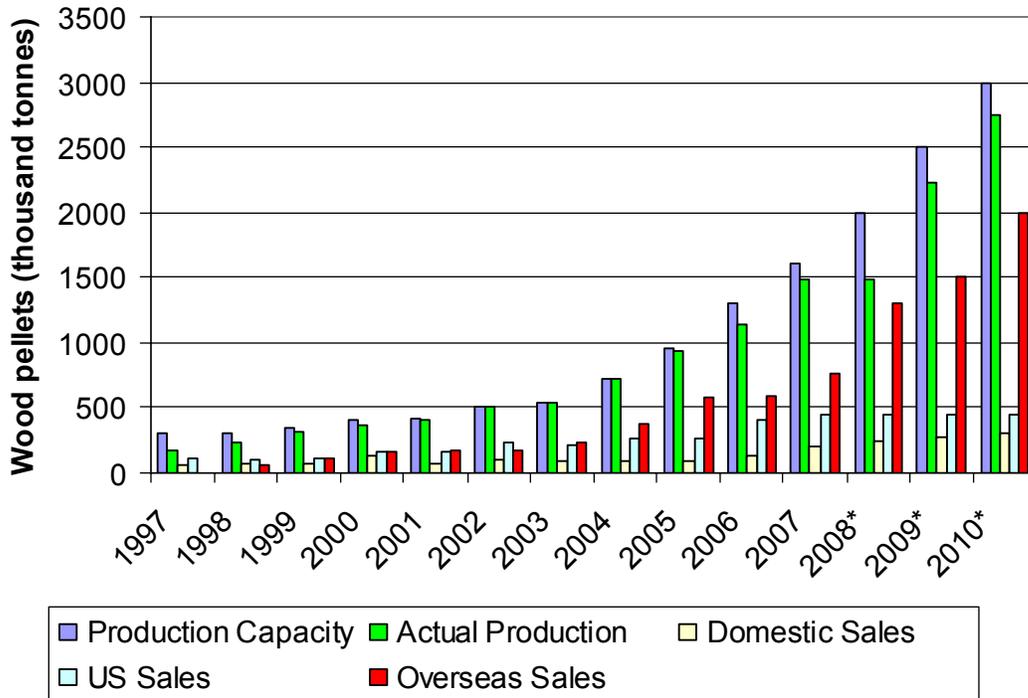


Figure. 4.6 Production, domestic sales and export of the Canadian pellet market. Source: (Swaan, 2008b).

4.3 Summary and discussion

As was shown in the previous sections, the success of the Canadian wood pellet industry in particular is largely linked to the growing demand for wood pellets in Europe, initially in Sweden, later also in other European countries such as the Netherlands and Belgium. Lately, it looks like the USA is taking giant steps to become a second large exporter of wood pellets to Europe.

Whether these trends will persevere, is likely to depend on many factors, but especially on:

- the pellet price in Europe and the increasing supply from other regions, such as Eastern Europe and Latin America
- climate change mitigation policies in the USA after the election of President Obama and their translation into the stimulation of biomass fuels for domestic purposes. Already, it is reported that a first incentive is in place in the USA, in which appliance buyers can benefit from a consumer tax credit of 300 dollars (Kaiser, in B.I. 2008). An increasing domestic demand may curb further exports to Europe.
- ocean freight rate development. With sharply decreasing dry bulk transport prices, exports will become more attractive.

5. Barriers and opportunities for international pellet trade

To get an insight into the current barriers and opportunities for international pellet trade, a workshop was held in Utrecht, in the Netherlands on the 17th June 2008. It was organized by the Copernicus Institute, Utrecht University. More than 40 pellet traders, large scale users and scientists were present; including members of IEA Bioenergy Task 40 on sustainable international bioenergy trade (see appendices 1 and 2 for a participants list and the workshop program).

The workshop was set-up to cover the entire pellet supply chain, including the current general trends in Europe (Dahl), developments on the pellet supply side (Junginger, Schouwenberg), the logistical issues (Sikkema, Schonewille and Ostermeijer), the developments in wood pellet demand (Schlagitweit), and overarching issues such as the development of sustainability criteria and the need for certification (Hoekstra) and the difficulties in designing support policies for large-scale co-firing of pellets (van Tilburg). In many of the presentations, it became evident that the wood pellet market is growing strongly (especially in North-America and Russia), but that is also still an immature market, influenced by factors such as subsidy schemes, resource availability/scarcity, fossil fuel prices and seasonal influences. With the possible advent of 2nd generation biofuels, there may be an increased focus of sourcing woody feedstocks other than sawdust (e.g. forest floor residues or entire trees), or other residue streams such as bagasse, rice husk or coffee husk pellets. On the demand side, further growth can be expected, mainly due to rising (heating) oil prices – the potential market for substituting heating oil is 150 Mtonne/yr. The presentations of Schonewille and Ostermeijer clearly showed that logistical issues of inter-continental pellet trade should not be underestimated. Certification of wood pellets is not (yet) a hot topic, but may become so in future years as increasingly over Europe, sustainability requirements for biomass are being formulated. Finally, while fluctuating policy support is often blamed for rapidly changing pellet prices and changing trade flows over Europe, the immature pellet market makes it also

hard to develop adequate policy support systems which bridge the financial gap to fossil fuels but prevent over-stimulation at the same time.

In order to kick-off the discussion at the workshop, beforehand, the participants were asked to fill in a short questionnaire regarding opportunities and barriers to international pellet trade, the largest producing and consuming regions, and which logistical challenges were deemed most important. Of the 45 participants, 23 filled in the questionnaire. The results are presented and discussed below.

As can be seen in figure 5.1, most participants deemed rising feedstock costs as the most **important barrier** to near future development, closely followed by fluctuating support measures for large-scale co-firing of wood pellets with coal. Sustainability criteria, competition with coal, gas and other fossil fuels were expected to be minor barriers, as were lack of transparent price statistics. Interestingly, meeting quality standards and overcoming logistical barriers were not regarded as major obstacles by any of the participants.

Furthermore, when asked for the **main drivers** for the wood pellet trade, policy support for both large- and small scale were deemed very important, only surpassed by (further increasing) oil prices. Interestingly, increasing CO₂ prices were seen only as a minor driver, which contrasted with the presentation of van Tilburg, which indicated that a CO₂ price of 25 Euro/tonne could significantly increase the economic reliability of pellets for co-firing compared to coal.

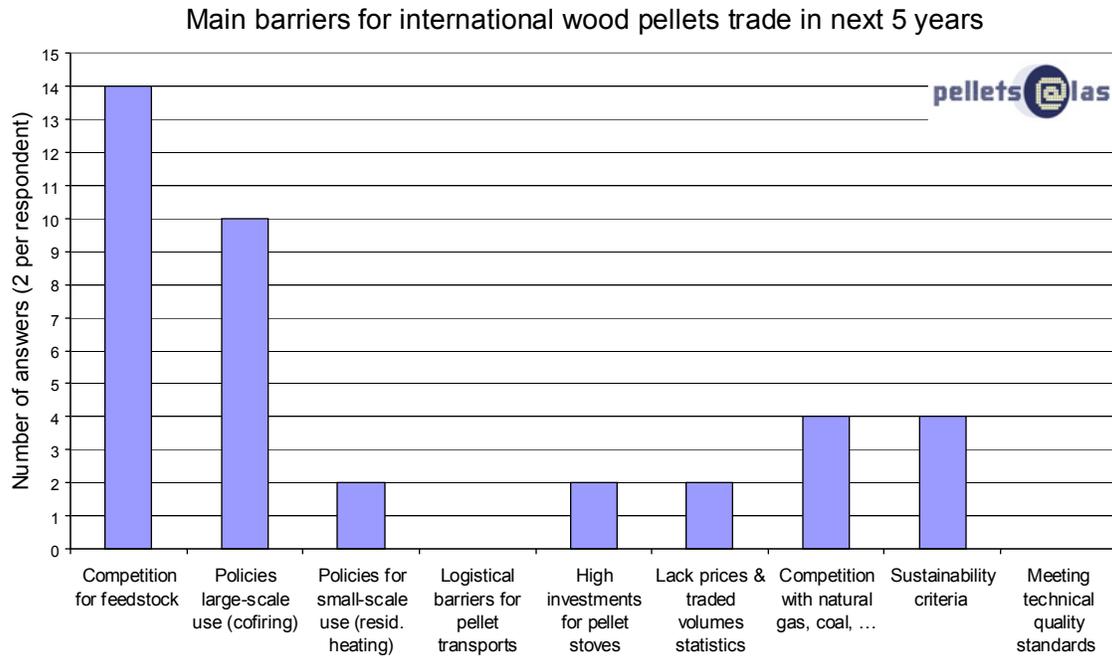


Figure 5.1 Main barriers on the short term for international wood pellet trade

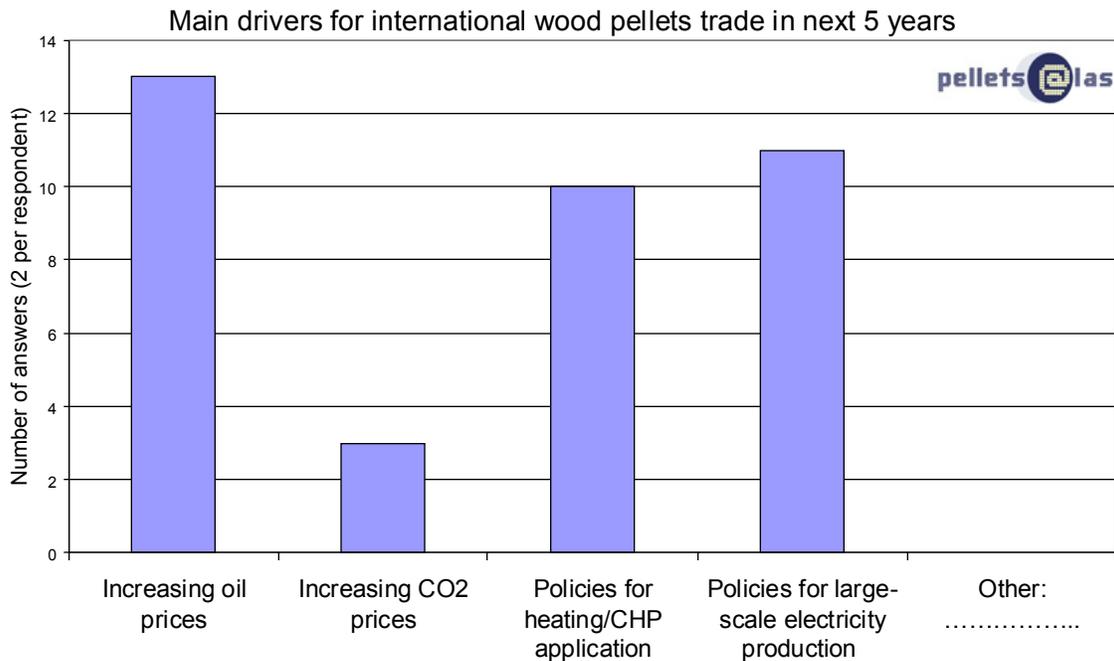


Figure 5.2: Main drivers for international wood pellets trade in next 5 years.

Even though **logistical barriers** had not been selected as a major barrier, when asked specifically about challenges to be tackled, the development of dedicated pellet terminals at major harbors was deemed to be an important step, as was the development of pretreatment options such as torrefied pellets (see figure 5.3).

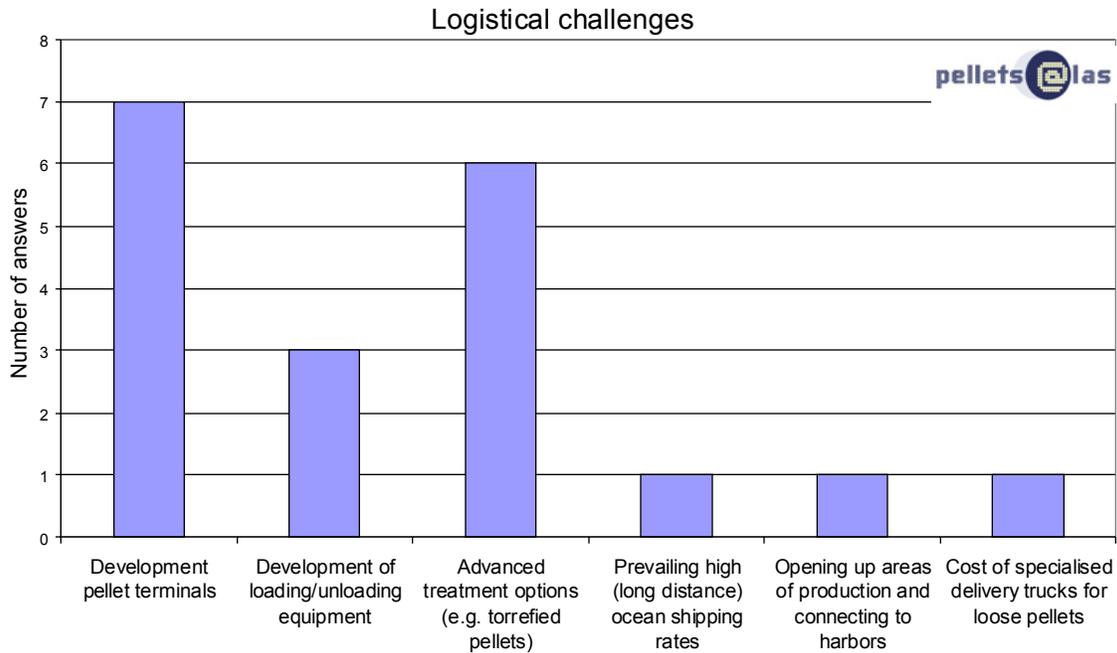


Figure 5.3: Anticipated logistical challenges to be tackled

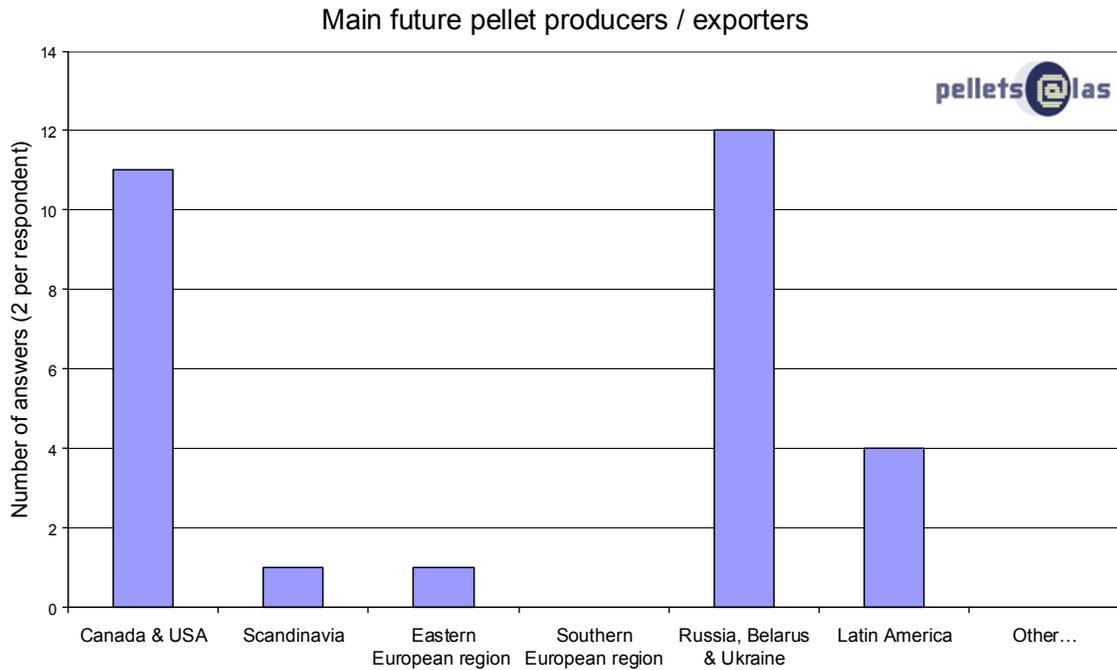


Figure 5.4: Expectations for the main growth in wood pellet production in the coming 5 years

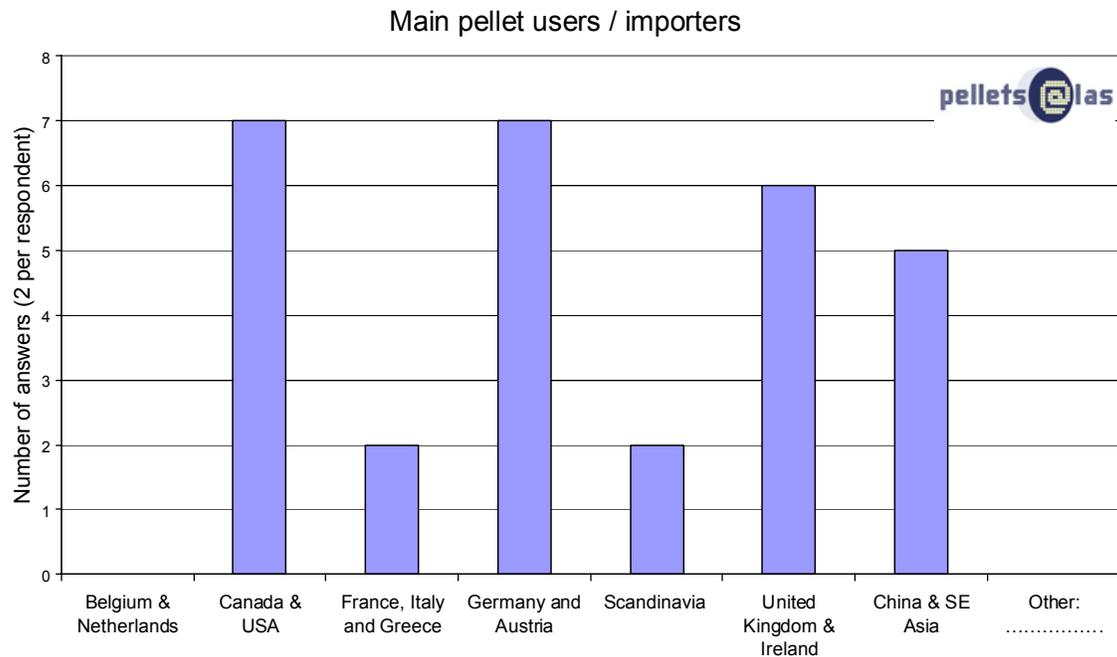


Figure 5.5: Expectations for the main growth in wood pellet demand in the coming 5 years

Finally, the participants were asked in which geographical region the largest growth in wood pellet production and consumption would occur in the next 5 years. Expectations regarding production were very clear: Canada and the US, and Russia, Belarus and Ukraine were selected as the most important producing and exporting regions for the global pellet market (see figure 5.4). The picture for pellet demand was more heterogeneous: interestingly, for the US and Canada a large increase in (domestic) pellet consumption was also expected. Many participants also expected pellet demand to grow strongly in Germany and Austria. Remarkably, South-East Asia was also indicated by some experts as a possible growth area for pellet consumption (see figure 5.5). In addition to this, Staffan Melin (2008) commented in writing on the barriers for global trade. On future supply and demand, he mentioned that some of the determining factors would be:

- how fast are the Russian and South American supply going to develop?
- how fast is the buying power in the most populous parts of the world going to grow such as China, India, Africa etc?
- how fast is Japan going to expand the use of biomass for energy generation?

Following the presentation of the results of the workshop, a lively discussion developed, to which many participants contributed. Below, the main points made were summarized²:

On competition for the raw material:

- **Demand of timber products.** In North America the availability of raw material is affected by the housing market. Less building of wooden houses led to a downfall in lumber production and the byproducts sawdust and shavings. The total effect was a reduced supply of raw material for the pellet producers.
- **Second generation biofuels.** Another new development is the use of biomass for biofuels. In the future, this may cause extra shortage of raw material for the production of pellets in the heating & electricity sectors. Consequently, the pellet producers are already looking upstream for new sources of raw materials.

² In addition, a number of observations from Staffan Melin (2008) were added)

- **Re-allocation of supply.** Other workshop participants voiced the opinion that the scarcity of sawdust is not a structural one. The audience believed that a more dynamic relocation of unused resources to existing pellet production facilities is a realistic option.
- **Diversification of feedstocks and technical bottlenecks.** Not every raw material is suitable for the production of pellets. The power and heat producing companies allow only a limited number of (by) products, due to their rigid boiler specifications and ash requirements.
- How fast is the **agro-pellet industry** going to develop and potentially compete with wood pellets? Or alternatively, will the woody and the agro based materials become complementary as raw materials for pellets production. This is an interesting question in view of the current “food vs. energy” debate. For ethanol only about 50-60 % of the biomass can be used while in pellet production 100 % can be used. Even though only a fraction of the agro-crop is used for energy there is a perception issue to deal with (Melin, 2008).
- **Logistic bottlenecks.** Not every geographical area with a surplus of sawdust and other wood residues supplies the market. For example, Latin American pellet supply (from forest residues) is currently hampered due to bad and expensive logistics across the continent.

On sustainability & certification:

- **New certification issues.** If pellet producing factories have to look further upstream for new raw material, they will come up with the use of forest residues in the forest or even the chipping of trees for further processing. In this case, the certification requirements (e.g. based on the Dutch framework of the Cramer Commission) will be higher. The land use change, biodiversity and greenhouse effects from the using forest materials will become a major factor to be taken into consideration. This belief was not widespread amongst the audience of the pellet workshop; however, others state that current FSC & PEFC certification may be enough for easy compliance with sustainability requirements.

- **Closing the nutrient cycle in forests.** An extra incentive may be the prevention of forest fires by taking away forest residues. However, the question was raised whether this may be sustainable due to the loss of forest nutrients. The Swedish pellet market solves this by returning the ashes (from heating & electricity plants) back the forest.

On support policies:

- **Policy goals** are determining factors (electricity, heat). The international character of policy goals (renewable electricity; green heat), will be one of the key factors in further price changes in the near future and the search for new resources. Very important will be to what extent and with what speed the USA and Canada are going to embrace the climate change mitigation trend (Melin, 2008)
- **Relationship between the fossil fuel market & biomass resources.** When reserves of fossil energy sources are getting lower, the need for renewable energy sources will grow and, consequently, the price of biomass. In this case government support is still valid, depending on the kind of biomass. In the case of forest and wood residues, the audience stated that there is a certain relationship between fossil fuel prices and wood residues. In the case of some of the main agricultural commodities (sugar cane, maize), the relationship with the bio-energy market is not clear enough to support this hypothesis.
- **Heating market characteristics.** The heating oil is a rather fluctuating market and in this case subsidies may be very helpful. In Austria investment subsidies for boilers have been very successful.
- **Electricity market characteristics.** Co-firing of wood pellets is capital intensive and electricity production costs are mainly determined by the price of coal, the price of CO₂ and the price of wood pellets. While price indexes for the first two are well-established, the current lack of a pellet price index makes it extremely hard to develop an adequate governmental support system.

6. General discussion and conclusions

Based on chapters 2-5, we summarize a number of observations:

From 2006-2008, both the Eastern European and the Western Balkan region have seen a strong growth in pellet production capacity, triggered by a combination of readily available feedstock, relatively low production costs and (temporary) high prices and demand especially in north-western Europe, Austria and Italy.

The supply from outside Europe is still largely dominated by imports from Canada and (increasingly in 2008) the USA. Other promising regions, such as Latin America are only developing slowly, probably hampered by logistical issues.

An interesting variety of logistical chains can be observed: whereas inter-continental trade is carried out using compartments of large dry-bulk carriers, trade within Europe occurs using smaller coaster-type vessels and trucks. Interestingly, transport by train, commonplace in e.g. British Columbia, is seldom or never mentioned in the European context. This probably has several reasons: in Canada, trains represent the only viable form of transport for getting wood pellets to the harbors, and this is also the typical route for other wood products. In Europe on the other hand, wood pellets are often destined for small-scale consumers, frequently pre-packaged in small bags (and transported on pallets). This allows for more flexibility and less logistical transactions to deliver the pellets to the end-consumer or retailer. As wood pellet prices for end-consumers are often (much) higher than wood pellets delivered large quantities, this makes transport by truck economically possible over large distances, like Belarus-Germany. On the other hand, as shown in chapter 3, transport costs can contribute a significant share of the total costs. It could therefore be of interest to investigate increasing transport by rail – which would also make more sense when considering the energy balance of the entire chain and the linked avoided greenhouse gas emissions. .

When it comes to estimating the future (European) market for wood pellets, it is mainly a question of what fuels wood pellets would be replacing. Assuming that roughly 75 Million tonnes of fuel oil used for heating would be replaced, this would represent a demand of 150 million tonnes for wood pellets. If wood pellets were to be co-fired (or fully replace) coal in current electricity plants, this number would probably be far higher than 150 million tonnes. In addition, with the advent of second-generation biofuels, lingo-cellulosic biomass would be in even higher demand. Thus, in theory there are tremendous growth markets for wood pellets in European markets. Wild (2008) demonstrated that by simply extrapolating current growth, varying between 18-25% per year, wood pellet demand could be between 130-170 million tonnes per year by 2020.

It is however highly doubtful that the EU will have sufficient feedstocks to supply these amounts. A further increase of internationally-traded wood pellets is therefore likely. How fast this trade will develop, is highly uncertain. During the workshop in June 2008, the high oil price was seen as a major driver for wood pellet trade, while especially the intercontinental trade was suffering from high dry bulk shipping rates. By the end of 2008 however, oil prices have fallen to levels lower than 40 US\$/barrel, but also the Baltic Exchange Dry Index has fallen by more than 90%. How this (and the general economic crisis) will affect global pellet markets, is yet to be seen.

Reference list

- B.I. (2008) Bioenergy International Pellet map 2008. Issue 35, (Nr.6 2008), December 2008. www.bioenergyinternational.com
- Bradley, D. (2008), Canada Report on Bioenergy 2008, For Environment Canada. As required by IEA Task 40- Biotrade. June 2008, p. 49. Available at www.bioenergytrade.org.
- Bukvić, A. (2008) Study of pellet market in Western Balkans. Gratenaus & Hesselbacher. Presented at the Wood Energy Workshop in Belgrade, 2nd of December 2008.
- Melin, S. (2008) Personal written communication with Martin Junginger, June 2008. Research director, Wood Pellet Association of Canada.
- Osterström, P. (2008), Bio energy trade in the Baltic Sea, Presentation at the Joint task 30 / 32 /40 workshop, as side-event of the World Bioenergy conference and exhibition, May 28 2008, Jönköping Sweden. Available at www.bioenergytrade.org
- Rakitova, O., Ovsyanko A., Wood Pellets Production and Trade in Russia, Belarus & Ukraine, update 1 November 2008, edited by Martin Junginger (Utrecht University). Available at www.pelletsatlas.info
- Strimling, J. (2008) An update on U.S. markets. Presentation at the 8th Pellets Industry Forum, Stuttgart, Germany, October 28-29. Stuttgart, Germany
- Swaan, J. (2008a), Executive director, Wood Pellet Association of Canada. Interview in B.I. (2008).
- Swaan, J. (2008b) Canada's Role in Developing the International market for Wood Pellets. Presentation at the 8th Pellets Industry Forum, Stuttgart , Germany, October 28-29. Stuttgart, Germany.
- Verkerk, B. (2008). Current and future trade opportunities for woody biomass end-products from British Columbia, Canada. MSc thesis, Utrecht University and University of British Columbia, March 2008, p. 137.
- Wild, M (2008) Entwicklung der europäischen Märkte für Heiz- und Verstromungspellets Rohstoffe und VerbrauchsperspektiveVerbrauchsperspektiven. Presentation at the 8th Pellets Industry Forum, Stuttgart , Germany, October 28-29. Stuttgart, Germany.

Annex 1 Workshop programme

- 9:00 *Registration and coffee*
- 9:15 Martin Junginger (Utrecht University) Introduction and workshop setting
- 9:30 Jonas Dahl (FORCE Technology) European production, trade and consumption of wood pellets – first results from the Pellets-@las project
- 9:55 Richard Sikkema (Utrecht University) From producer to end-consumer: typical local and international European pellet chains evaluated first results from the Pellets-@las project
- 10:20 Martin Junginger (Utrecht University, IEA Bioenergy Task 40) Global saw dust and wood pellet potentials: almost unlimited supply for Europe?
- 10:45 *Coffee break*
- 11:15 Peter-Paul Schouwenberg (Essent, IEA Bioenergy Task 40) The importance of global sourcing of wood and coffee husk pellets for co-firing
- 11:50 Christian Schlagitweit (Propellets) Local pellet markets in Europe for residential heating
- 12:15 Tjipke Hoekstra (Control Union) Certifying sustainable wood pellets
- 12:40 *Room for questions and discussion*
- 13:00 *Lunch* *A free lunch will be served*
- 14:00 Wijnand Schonewille (Harbor of Rotterdam) What it takes to become a global pellets hub
- 14:25 Ger Ostermeijer (Peterson) Large-scale pellet logistics
- 14:50 Xander van Tilburg (ECN) Policy design to support the large-scale use of wood pellets
- 15:15 *Coffee break*
- 15:45 Open workshop
- Barriers and opportunities for global pellet trade:
- Where do the participants see the European / global wood pellet market heading within the next 5-10 years?
 - What are the main barriers for the international trade? What the main drivers?
 - How does large-scale import of wood pellets affect the European markets?
- 17:00 *Closing and drinks*

The presentations can be downloaded at the Pellets@las website:
<http://www.pelletcentre.info/cms/site.aspx?p=7202>

Annex 2: Participants list

	First name	Surname	Affiliation
1	Jonas	Dahl	FORCE
2	Christian	Schlagitweit	ProPellets
3	Richard	Sikkema	Copernicus Institute
4	Martin	Junginger	Copernicus Institute
5	Morten Tony	Hansen	FORCE
6	Sandra	Hayes	NEF
7	Wilfried	Pichler	HFA
8	Monika	Steiner	HFA
9	Filippo	Vivarelli	ETA
10	Adrienn	Csekő	Geonardo
11	Maria	Habicht	ISE
12	Athanasios	Balafoutis	AUA
13	Stamatia	Voulgaraki	AUA
14	Malgorzata	Bastian	Baltic Energy Conservation Agency
15	Peter-Paul	Schouwenberg	Essent
16	Ger	Ostermeijer	Peterson
17	Wijnand	Schonewille	Port of Rotterdam
18	Tjipke	Hoekstra	Control Union
19	Xander	van Tilburg	ECN
20	Marcel	Gorris	Port of Amsterdam
21	Eddy	Francot	Nuon
22	Willem	Kloosterman	Nuon
23	F	van de Paauw	Broflame
24	Nico	Leek	Probos
25	Tjasa	Bole	ECN
26	Paul	Wouda	Electrabel
27	Didier	Marchal	CRA
28	Frank	Rens	Van Hall Larenstein College
29	Martin	Mulder	Van Hall Larenstein College
30	Minouche	Klaver	GF Energy B.V.
31	Marc	Vitria	Oxbow Coal BV
32	Bas	Verkerk	Control Union
33	Chris	Peltz	GUSCO Handel
34	Mindaugas	Karalius	MK LAIVYBA UAB
35	Martijn	Sinke	Capgemini Nederland B.V.
36	Rickard	Dreimanis	Mitsubishi Corporation Stockholm
37	Arne	Spliet	The Clean Energy Company B.V
38	Michael	Gudera	GEE Energy GmbH & Co. KG
39	Mi-Rong	Wu	TU Delft
40	Alper	Elmas	First Bioenergy AB
41	Henrik	Lundberg	First Bioenergy AB
42	Paul	Hendrix	Eneco
43	Ruth	Timmermans	Essent
44	Christine	de Mulder	goalXport