

Development and promotion of a transparent European Pellets Market
Creation of a European real-time Pellets Atlas

Pellet market country report NORWAY



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August 2009

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This report is available at the pellets@las website at www.pelletsatlas.info

The pellets@las project is supported by the European Commission under the EIE programme (EIE/06/020/SI2.448557). 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.

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1. Introduction

The Norwegian wood pellet market is very limited considering the amounts of forest in the country. The reason is that Norway has based the electricity production on hydropower and that Norway is also self-sufficient with oil and gas from the North Sea.

Almost all electricity is generated at hydro power plants in the north. Electricity is used for heating purposes in 75 % of the houses. Annually only around 40,000 tonnes of wood pellets are used in Norway. Pellets are used solely for heating purposes - in pellet stoves and in a few district heating systems.

The national energy policy includes measures that will support use of bioenergy and the consumption of pellets can be expected to increase in the coming years.

The pellet production capacity is more than 160,000 tonnes annually, however only a small share of this capacity is currently used as the feedstock availability limits the production. In 2008 the Norwegian wood pellet production was 35,000 tonnes.

In close future - from 2010 - Norway can be expected to become a large exporter of wood pellets as the production capacity is currently increasing. Especially a mega-size plant with an annual capacity of 450,000 tonnes will change the current picture.

2. History of market development

The Norwegian launch pad for the use of wood pellets is formed by a large share of hydropower based electricity, widespread use of electrical space heating and finally, self sufficiency with oil and gas. Cheap electricity and the lack of water based heating system in three fourths of the residential sector form barriers for a strong development of a pellet market for heating and abundant hydropower has made thermal power plants irrelevant. More than 95 % of the electricity consumed is generated by hydro power plants. The rest is to a large extent imported from Denmark and Sweden.

As increasing Norwegian energy consumption cannot be accommodated by further hydropower plants and as Norway in recent years has seen increasing electricity prices, alternative energy sources have become more relevant.

New housing is built with water based heat distribution systems and district heating systems are developing. This has paved the road for an emerging pellet market. Figure 1 shows the development of the Norwegian wood pellet combustion in recent years.

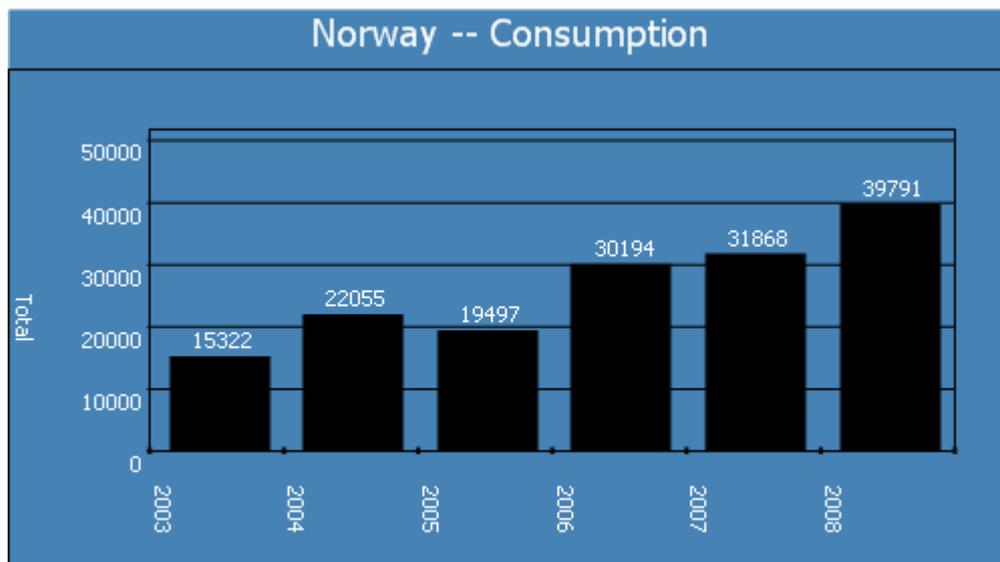


Figure 1: Norwegian wood pellet consumption 2003-2008. Source: NOBIO/PELLETS@LAS

Wood pellet production in Norway does not particularly reflect that Norway has large forest resources and numerous associated wood processing industries. However, the production capacity has developed to be much larger than the current domestic consumption. Figure 2 shows the development of the Norwegian wood pellet production capacity in recent years.

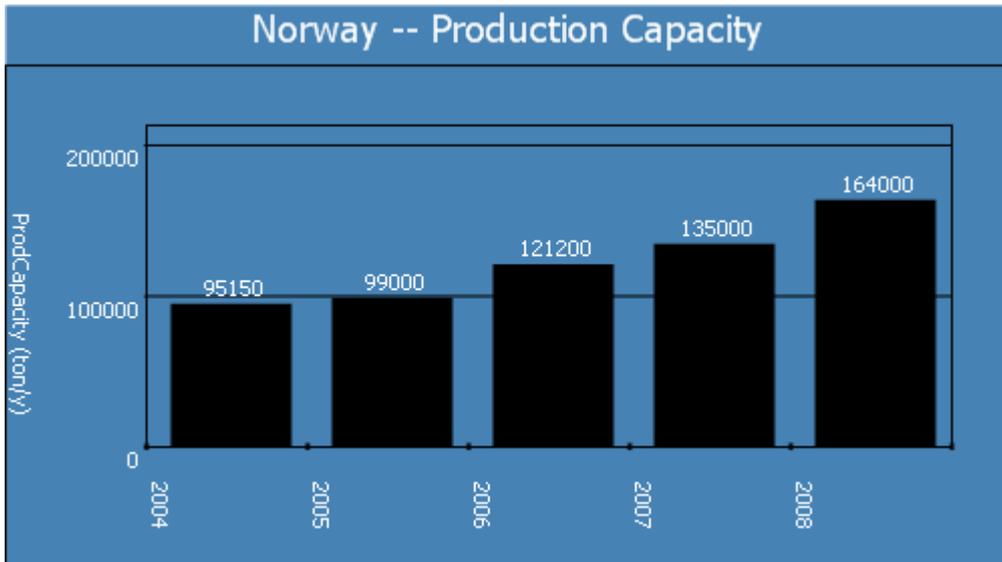


Figure 2: Norwegian wood pellet production capacity 2004-2008. Source: NOBIO/PELLETS@LAS

Figure 3 shows the development of the Norwegian wood pellet production in recent years. The figure reveals that the capacity has only been used to a limited extent. The reason is to be sought in the accessibility of feedstock for pellet production.

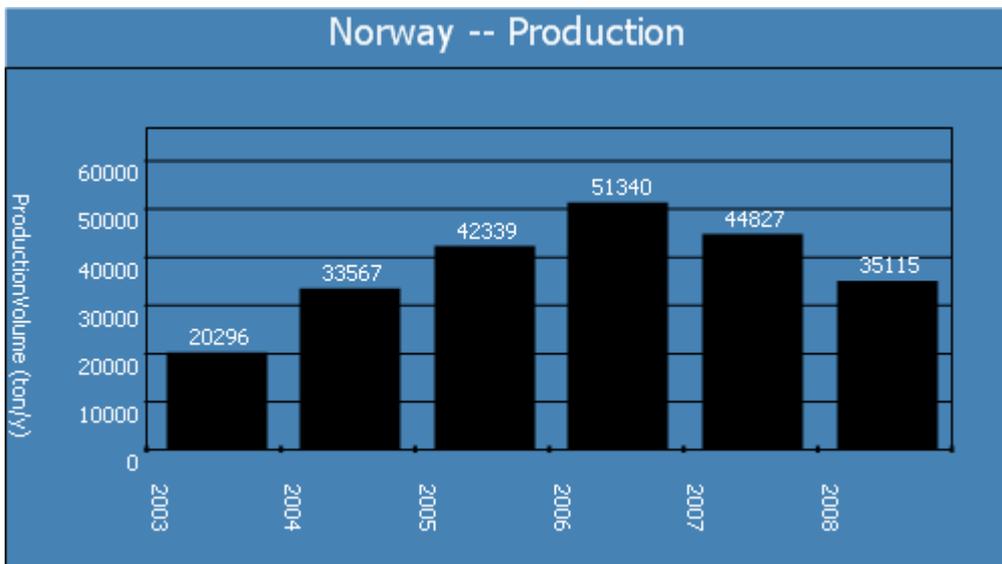


Figure 3: Norwegian wood pellet production capacity 2004-2008. Source: NOBIO/PELLETS@LAS

3. Pellet production

Wood pellet production in Norway is based on residues from wood processing industries. Both dry residues such as shavings and wet residues from saw mills are used in the various factories.

Eight companies produced wood pellets in 2008 and had an annual production capacity of more than 164,000 tonnes. Due to changes in the availability of feedstock the eight manufacturers have produced only around 35,000 tonnes of pellets in 2008 which is two third of the production in the peak year 2006.

During 2009 and 2010 the Norwegian production capacity is expected to grow significantly making Norway a potentially large wood pellet exporting country. In Meråker east of Trondheim a large plant - Merpellets A/S - with an annual capacity of 80,000 tonnes is expected to start production in 2009.

In Averøy south of Kristianssund a mega plant with an annual capacity of 450,000 tonnes is being built by Biowood Norway in co-operation with a Swedish market actor. The plant is expected to start production in 2010. The total annual feedstock requirement will be imported from countries around the Atlantic Ocean for the first few years. Later on a larger proportion is expected to be sourced in Norway which requires a development of especially the logistics part of the value chain.

In Norway quality standards are in place:

- NS 3165 Edition 1, 1999, Biofuel - Cylindrical pellets of pure wood - Classification and requirements
- NS 3166 Edition 1, 1999, Biofuel - Determination of mechanical strength of pellets.

The standards match the Swedish pellet standards. Table 1 shows the criteria.

Table 1: Norwegian wood pellet standards.

Property	Testing method	Unit	Class 1	Class 2	Class 3
Diameter	To be calculated as the average of ten randomly chosen pellets	mm	Noted	Noted	Noted
Length			Max 4 times Ø	Max 5 times Ø	Max 5 times Ø
Density	SS 18 71 78	kg/m ³	≥ 600	≥ 500	≥ 500
Mech. strength (in prod. stock)	SS 18 71 80	% of fines ≤ 3 mm	≤ 0.8	≤ 1.5	> 1.5
Heating value (delivered)	SS ISO 1928	MJ/kg	≥ 16.9	≥ 16.9	≥ 15.1
Water content (delivered)	SS 18 71 70	weight % a.r.	≤ 10	≤ 10	≤ 12
Ash content	SS 18 71 71	weight % dry basis	≤ 0.7	≤ 1.5	> 1.5
Ash melting temp.	SS ISO 540	°C	Noted		
Sulphur content	SS 18 77 77	weight % dry basis	≤ 0.08	≤ 0.08	Noted
Chloride content	SS 18 71 85	weight % dry basis	≤ 0.03	≤ 0.03	Noted

4. Pellet trade and logistics

Export and import of pellets is in Norway used to balance production and demand. The total sale of wood pellets can be found in Table 2, which also shows the annual import and export of wood pellets.

In 2008 an increased sale of pellets combined with a reduced production required a decreased export and an increased import compared to the previous years.

Table 2: wood pellet supply (tonnes/year). Source: NOBIO.

	2004	2005	2006	2007	2008
Pellet production	33567	42339	51340	44827	35115
Import	237	232	0	0	9080
Export	5566	17980	29003	15672	7800
Sale in Norway	22055	19497	30184	31868	39791

As mentioned in chapter 3 it is expected that two new large production facilities will be producing pellets from 2009 and 2010 respectively which will make Norway a large exporting country.

In Norway pellets are mainly traded in small bags which are delivered to the consumer or collected by the consumer himself or - for the larger consumers - in bulk delivered by tipping lorries or blower lorries. Table 3 shows the volumes divided by packaging type.

Table 3: Norwegian wood pellet supply by packaging type (tonnes/year). Source: NOBIO.

	2004	2005	2006	2007	2008
Small bags	9573	15675	33128	23356	17025
Big bags	2312	3235	5335	3999	2484
Bulk	15736	17425	20871	20187	28082

5. Pellet consumption

The wood pellet consumption in Norway is hardly significant. Pellets are used in the residential sector - mostly in pellet stoves - and in some larger boiler plants or district heating systems that have been developed in recent years. There is no pellet fuelled electricity production in Norway.

According to the Norwegian Biomass Association (NOBIO), the total consumption in 2008 was 39,791 tonnes. This figure covers a large increase, as it was 25 % larger than in 2007.

One of the reasons for this increase is that during 2008 more pellet fuelled heating plants have been put in operation. This has furthermore caused that the volume of pellets traded in bulk has increased by 40 % from 2007 to 2008.

Please refer to Figure 1 in chapter 2 for an illustration of the recent consumption development.

Pellet prices in Norway are relatively high and have been steadily increasing during the last five years. Figure 4 and Figure 5 show the recent price development calculated by NOBIO.



Figure 4: Norwegian pellet prices. Annual weighted average price per tonne of pellets in 25 kg bags on pallets. Excludes delivery and transport, includes VAT (25%)

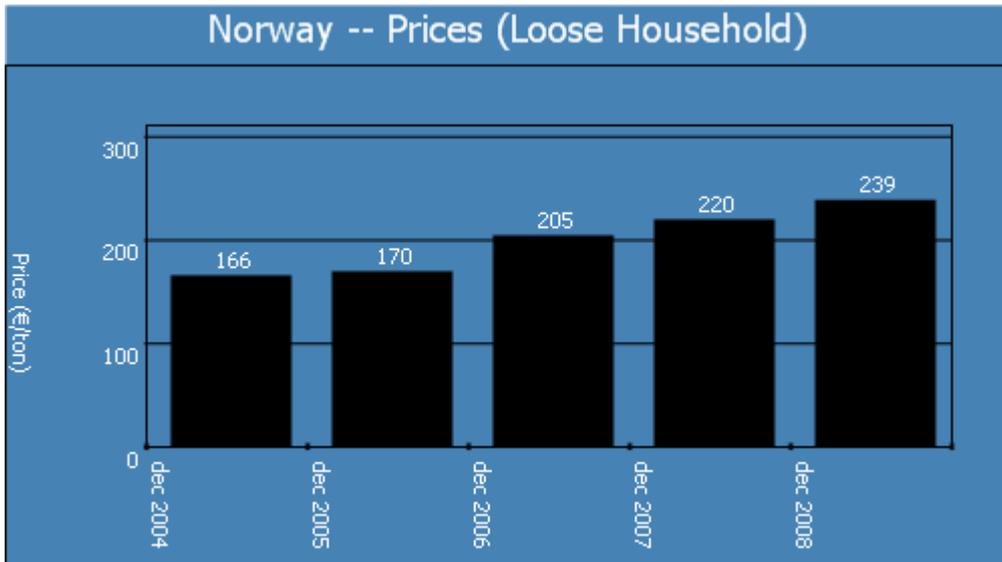


Figure 5: Norwegian pellet prices. Annual weighted average price per tonne of pellets delivered in bulk volume. Excludes delivery and transport, includes VAT (25%)

6. Mixed biomass pellets

Norwegian biomass consumption is mainly in the shape of wood logs for residential heating and wood pellets in a so far small, but growing pellet market. According to NOBIO and some interviewed wood pellet market actors, there is no production and no market for MBPs in Norway.

7. Legal framework & Policy

Even though Norway is almost self-sufficient with hydro electricity, natural gas and mineral oil, there are policies to become carbon neutral by 2030 and to use more bioenergy. This is relevant as the possibilities to increase the hydro based power production are limited and the mineral fuel findings in the North Sea are not everlasting.

The Norwegian policy is a general climate and renewable energy policy that has effects on the bioenergy market and specifically the pellet market by setting up a framework for the applications and systems which use wood pellets.

The climate change targets in Norway are apart from becoming carbon-neutral to reduce the annual greenhouse gas emissions by 15–17 million tons of CO₂-equivalents by 2020, including the carbon taken up in forests. The government has proposed an increase of 14 TWh (50 PJ) in the use of bioenergy by 2020 which is a doubling of the current consumption.

In order to reach the bioenergy target, Norway wants to increase the use of bioenergy for heating and increase in the supply of wood fuels. The measures that are expected to make Norway reach the aim are described in a strategy from April 2008:

- Establishment of a bioenergy forum lead by the Minister for Petroleum and Energy
- Regulatory energy and climate planning by all municipalities
- Compulsory water based central heating distribution in public buildings above 500 m²
- Removal of compulsory reduction in transmission tariffs for spot electricity used for central heating
- Investment support for district heating, central heating based on renewable energy and conversion of fossil fuel based heat production in industry
- Increased investment support for pellet stoves in private households
- Banning of installing or replacing oil-burners in new and existing buildings
- Increase budgets for R&D in renewable energy
- Development of efficient logistics and supply changes for forest and wood waste based fuel
- Various information and advisory measures

District heating and other bio-based energy systems can be supported with 20-40% of the investment costs.

Norwegian emission thresholds for combustion of wood pellets

The Large Combustion Plants Directive (2001/80/EC) has been implemented in Norway and applies to systems with a thermal input of 50 MW or above. For these large plants the Norwegian Pollution Control Authority is the emission authority. The thresholds are shown in Table 4.

Table 4: Norwegian emission thresholds for biomass fired plants with a thermal input of 50 MW or above (6 % O₂).

Existing plants		50 - 100 MW	100 - 300 MW	> 300 MW
Dust	mg/Nm ³	50	30	30
NO _x	mg/Nm ³	400	300	200
SO ₂	mg/Nm ³	200	200	200

The emission thresholds that apply to combustion of wood pellets in plants below 50 MW emerge from the Norwegian Pollution Law and an Order regulating pollution from industry. For these plants the county ("Fylke") is the authority. The emission thresholds are shown in Table 5.

Table 5: Norwegian emission thresholds for biomass fired plants with a thermal input from 1 to 50 MW (6 % O₂).

Existing plants		1 < 5 MW	5 < 20 MW	20 < 50 MW
Dust	mg/Nm ³	225	225	30
NO _x	mg/Nm ³	-	450	450
CO	mg/Nm ³	350	350	200
New plants		1 < 5 MW	5 < 20 MW	20 < 50 MW
Dust	mg/Nm ³	225	30	30
NO _x	mg/Nm ³	-	300	300
CO	mg/Nm ³	200	150	150

8. Projections on future development

In short term Norway is developing to become a large wood pellet producing and exporting country. The very large Averøy plant is designed to produce more than twelve times the current Norwegian consumption. After this leap, the author expects the supply side of the Norwegian wood pellet market to grow in a more moderate manner - similar to the recent development.

On the demand side Norway is likely to see a strong growth rate in the residential sector and in district heating systems. However, from the rather low starting point it will take some years for Norway to become a large wood pellet consuming country.

Regarding large scale pellet consumption for electricity generation, it is more likely that natural gas fired plants will cover an increasing electricity demand while pellets on the other hand will cover heat demands and possibly release hydro based electricity previously used for heating purposes.

9. Summary and conclusions

With an annual wood pellet production that is expected to grow from 35,000 tonnes to around 500,000 tonnes within a few years, Norway is going to become more visible in the global pellet market.

The wood pellet demand side is still rather insignificant but will see a strong development in the coming years.

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