



# **Pellets for small-scale domestic heating systems**



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# Pellets for small-scale domestic heating systems

## May 2007

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source: KWB



source: KWB



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# About pellets

Pellets are an important renewable energy source that benefits the environment, provides jobs to local and national economies and is easily manageable in small-scale domestic systems. Domestic households cover about 27% of total energy consumption. The heat market related to domestic households can be best addressed by using pellets as this fuel is as convenient to use as fossil fuels. This section will give an overview on pellet structure, its advantages for domestic heating systems, as well as the pellet chain starting with raw material for pellet production to the pellet delivery to small houses as well as available technology to utilise pellets for home heating.

## Pellet structure

Pellets are a fuel in the form of short cylindrical or spherical units. It is usually 6-12 mm in diameter and 10-30 mm in length, with a moisture content of less than 10%.



source: REH

Pellets are generally produced from residues of wood processing industries and mainly used for heating and electricity production purposes. Pellets are especially suitable in small heating systems due to their automatic heating process, easy storage as they do not degrade, relatively low cost comparing with fossil fuels and a very low amount of ash and other emissions released.

Pellets heating technology is comparatively new, and was developed from wood chip boiler technology. At present, over 60 manufactures of pellet boilers are active in the market in the European Union, and the boiler technology is constantly being improved to reach a higher efficiency rate.

From the three most commonly used types of wood (logs, wood chips and wood pellets), pellets offer major advantages for small heating systems and together with wood chips (which, contrary to pellets, are best suited for a large-scale use) are a best alternative to fossil fuels in the future.

## Pellet advantages

This type of bioenergy is efficient, clean and reliable. In comparison with other solid biofuels, pellets provide the following advantages and disadvantages:

General advantages	Pellet advantages for domestic use	Disadvantages
Reduces EU dependence on oil and gas	More convenient to store than any other type of wood as it doesn't degrade due to low moisture content (less than 10%).	Pelletizing process requires a certain amount of energy input and results in a higher price comparing to wood logs, briquettes or other forms of wood.
Sustainable source of fuel: Wood pellets are a clean, environmentally friendly, natural, renewable fuel resource	High energetic value and, therefore, cost effective product: one ton of wood pellets has the heat value of more than one and a half tons of wood and stacks easily in one third the space. This makes it possible to easily store fuel for the entire season.	
Pellet fuel cost is not dictated by world events; therefore cost is more affordable and predictable	Requires less maintenance: heating process is automatic. Only minimal clearance (mainly removal of ash) is needed for appliance installation (due to the near total combustion (around 98.5%) pellet stoves produce virtually no creosote. This also allows installation of a pellet stove by direct vent without a chimney.	In comparison with oil, there is a need for a larger storage facilities, regular control and removal of ashes.
Reduces waste (as it is made from by-products of wood processing industry) and, therefore, diminish the cost of disposing waste.		
Provides employment opportunities as it is a native fuel	Cost-efficient: high energy efficiency (due to a low moisture content) which results in a reduced cost.	
Less ash and emissions - since pellet stove emissions are so low they can be burned in most areas even those with burning restrictions	Easier to handle - easiest fuel to transport and feed into burners – pellets are blown with a special pump from a truck to the storage room and are used in automatic machinery. Compared to wood or other types of wood, less volume to transport and store (due to higher energy density)	
	Easier to ignite due to a consistent size and low moisture content	
	Air quality - clean, CO <sub>2</sub> -neutral pellet fuel enhances the air quality by substituting wood log burners and in this way reducing fine dust emissions. Pellets have been proven to provide the cleanest combustion of any solid fuel	
	Standard technical characteristics and low moisture content – burns predictably and provide a consistent heat output.	
	Further, they have around 10% moisture content, considerably less than the 25 to 55% typical of chips, so that less energy is wasted boiling off water.	

# Pellet production

Pellets are generally manufactured from sawdust – a by-product of sawmilling, shavings, grinding dust, bark and finely reduced wood waste, some of which comes from further processing of wood chips. The demand for pellets is increasing and other biomass wastes will be considered as raw materials. Therefore, logging residues, energy crops and its residues (ex. straw), agricultural waste, and other organic fractions of household waste could be used for pellet production. However, these new fuels might release a higher amount of emissions due to incomplete combustion so their use must be studied carefully before introduction to the residential market. Furthermore, longer production process for pelletising alternative raw materials such as forest wood or forest residues where the material has to be chipped with a mobile chipper, then grinded and sifted before it is dried and pelletised, results in higher investment costs and a higher price of pellets. Agropellets give problems when burned and therefore will be of interest later on. In general, wood pellets can be produced from 4 main types of biomass: woody biomass, herbaceous biomass, fruit biomass and peat<sup>1</sup>.



source: CIMAJ

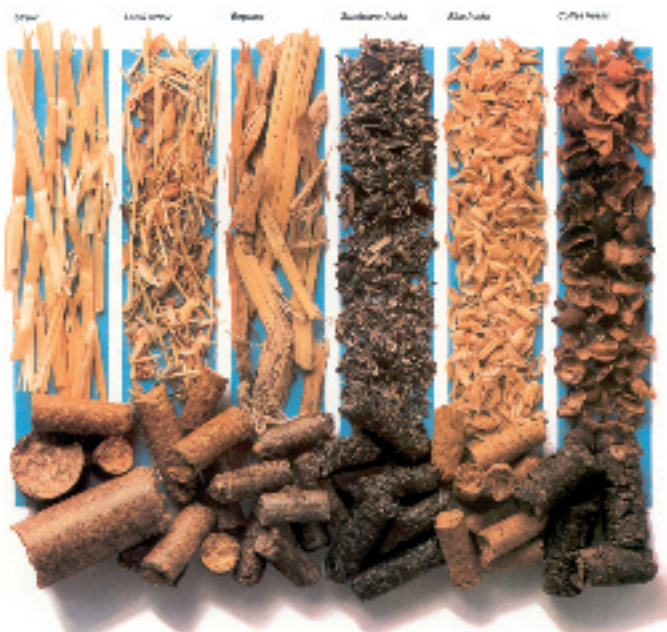
## Drying raw material

The waste from wood processing industries is mostly dried using the basic direct drying technique which is a simple and well functioning high capacity technique. This technique, however, is not that good from environmental point of view and presents a slightly greater fire hazard. The trend nowadays is to use indirect drying techniques where the material doesn't have direct contact with higher temperatures as well as flue gasses. Simple drying technique requires 0.8 MWh of heat to dry a tone of pellets to moisture content of 8-10% whereas indirect ones can significantly reduce the energy needed for the drying process. The energy is saved using a pre-dryer and a condenser which condenses the moist gases from the dryer directly. This drying process is more energy efficient but requires higher investment costs.

## Pelletising process

Pellets cost more to produce than other wood-based fuels and require a high capital investment in plant and machinery. Pellet production generally requires a supply of dry sawdust of a consistent moisture content and a uniform particle size. Therefore, it is more energy efficient to use by-products from wood processing industry rather than to grind up and dry freshly felled timber.

The pelletising process starts with dried sawdust being forced or pressed through holes in a rotating die. The pressure causes the wood to heat up, briefly liquefying the lignins which act as a glue and bind the pellets together. The extruded pellets are cut to length as they emerge from the die. The newly pressed pellets pass through a cooler to allow the lignin to harden. Refined wood fuels can be stored without risk of moulding or self-ignition. The energy content does not change during storage. The storage time is unlimited, but the refined fuel must be protected against rain.

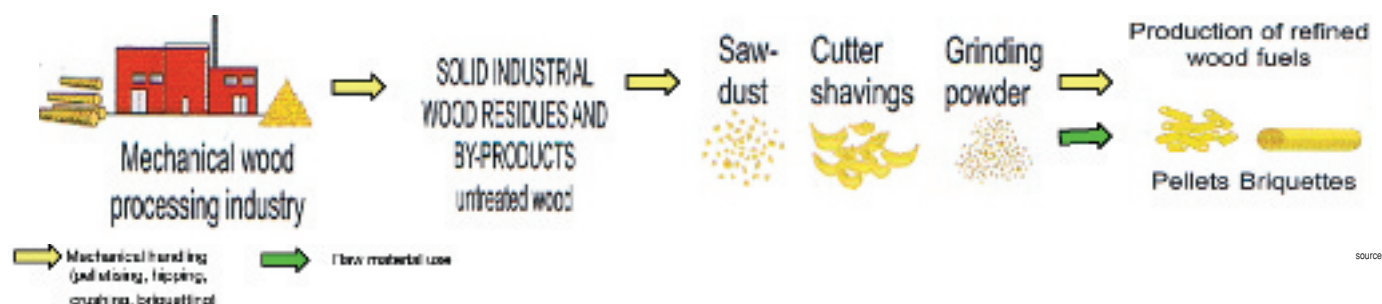


source: KAHN

Example of pellets produced from agricultural waste

## Pellet production chain

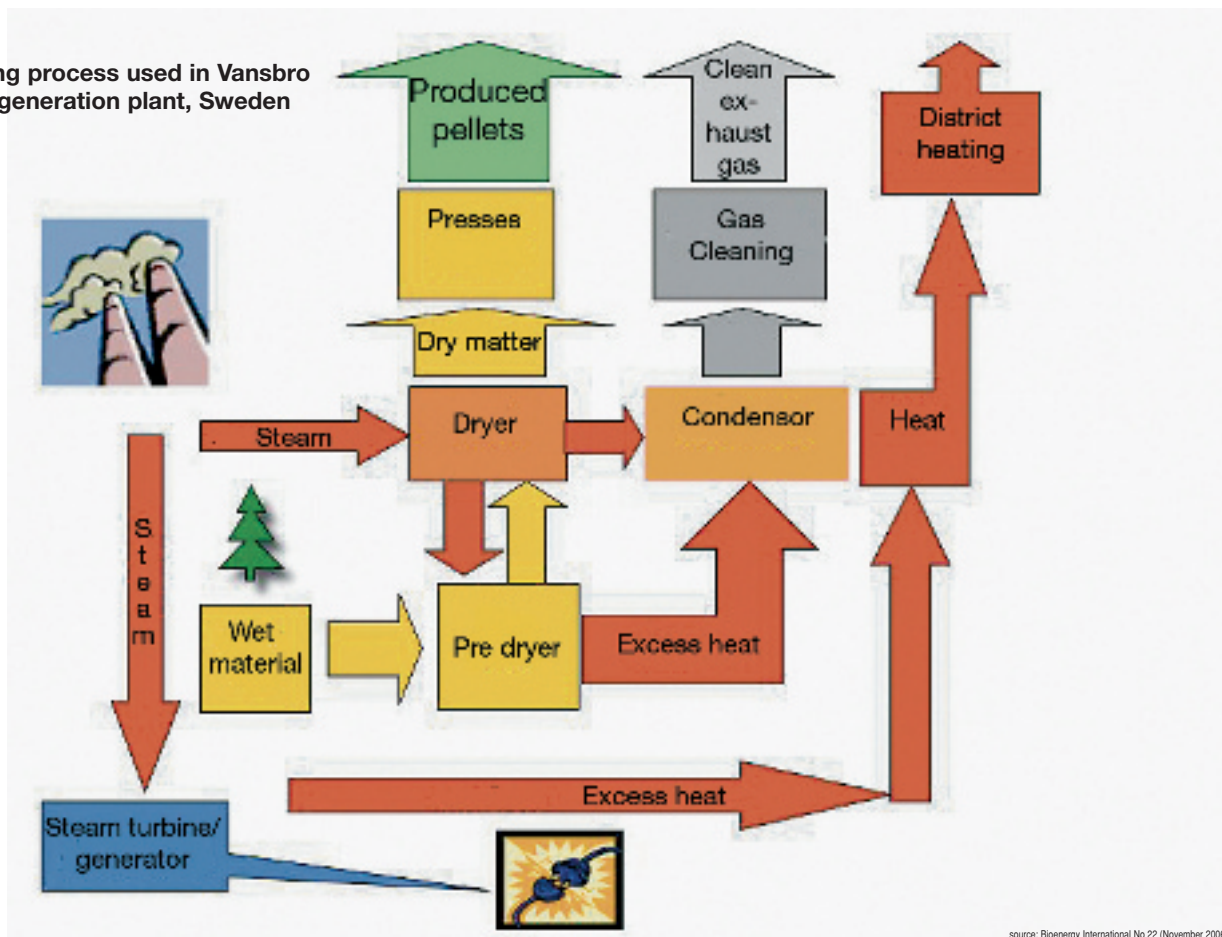
By products from wood processing industries (sawdust, shavings and grindings) go through three main stages of pellet production: storing and pretreatment of raw materials, drying the raw material and actual pellet production process. The overall process is pictured below:



source: VTT

<sup>1</sup> Although peat is not considered as biomass by the European Commission.

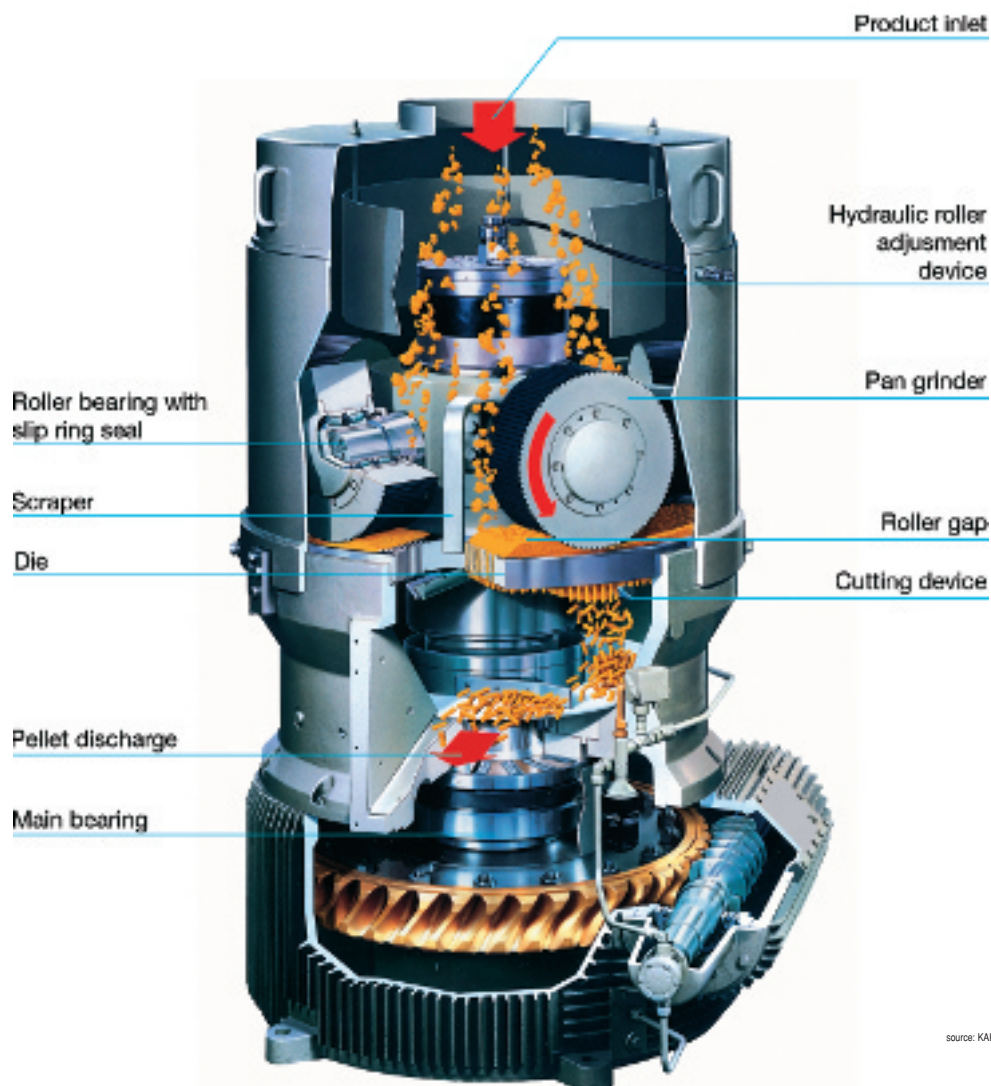
**Pellet drying process used in Vansbro pellet/cogeneration plant, Sweden**



source: Bioenergy International No 22 (November 2006)

In order to make a pellet plant economically viable, most pellets are produced in the large-scale industrial pellet manufacture with integrated large sawmill and/or heat user. If there is a supply of sawdust that is already dry, small-scale pellet machines are capable to produce pellets with an output of around 200-300 kg per hour. It is also sometimes possible to convert an existing animal grass-feed mill to produce wood pellets, as the equipment needed is similar and many feed factories have facilities to dry the feedstock. Such arrangement could bring economic benefits to the feed mill enabling the production to continue throughout the year especially during the winter when the grass is not growing. The production of pellets with feed mills is considerably lower than with a dedicated pellet plant but doesn't require high capital cost.

The tendency nowadays is to produce pellets in an efficient way in the combined pellet plants that simultaneously produces pellets, electricity and heat. These plants, however, require a higher investment cost and more attention has to be paid to the plant management as all the parts of the plant are inter-connected.



source: KAH

# Pellet distribution

After pellets are produced, they can be delivered in 3 ways to the small heating systems. Pellets can be packed either into 15 or 20 kg bags and distributed to the special shops where the customers can buy it at any time, packed into economy size bags of 500-1000 kg or transported loose by trucks and blown into the storage room by a special pump.

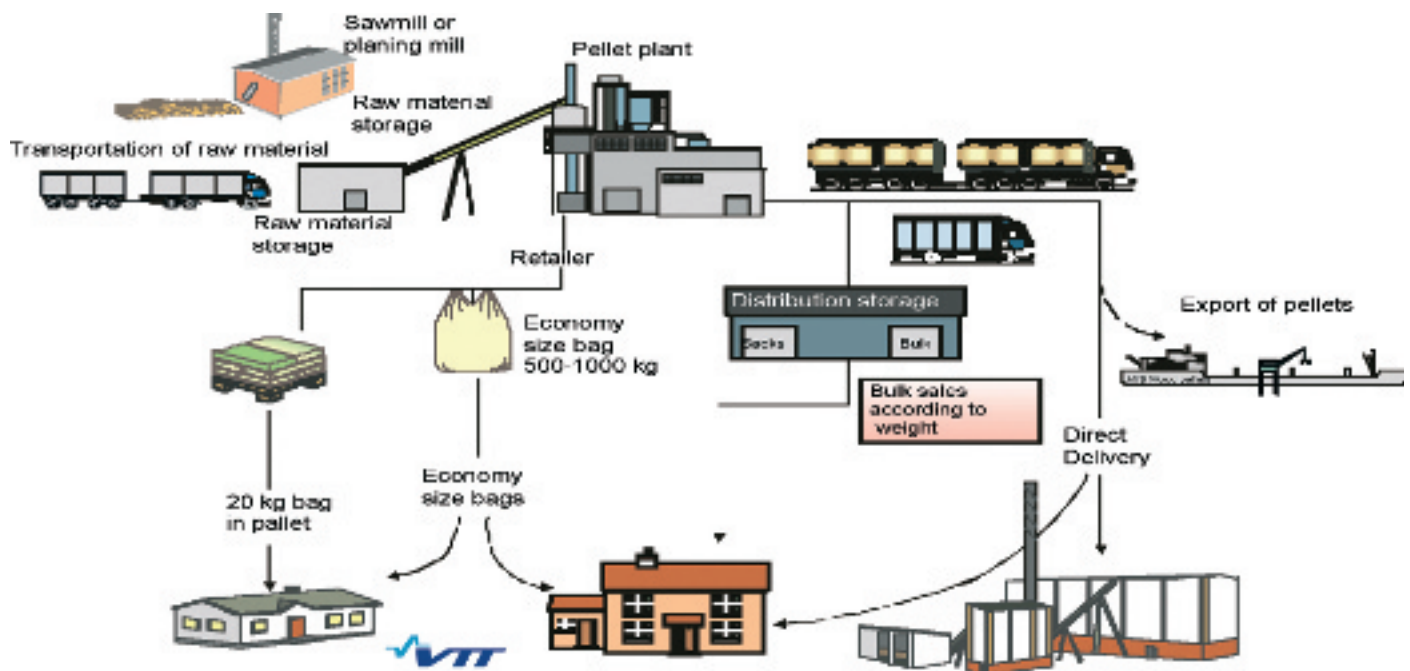


source : ITEBE



Pellet delivering with a special pumping truck - Renewable Energy House, Brussels

## Pellet production and distribution



source : VTT

# Pellet burning technology

In the small heating systems, houses can mainly be heated either by pellet stoves or pellet boilers.



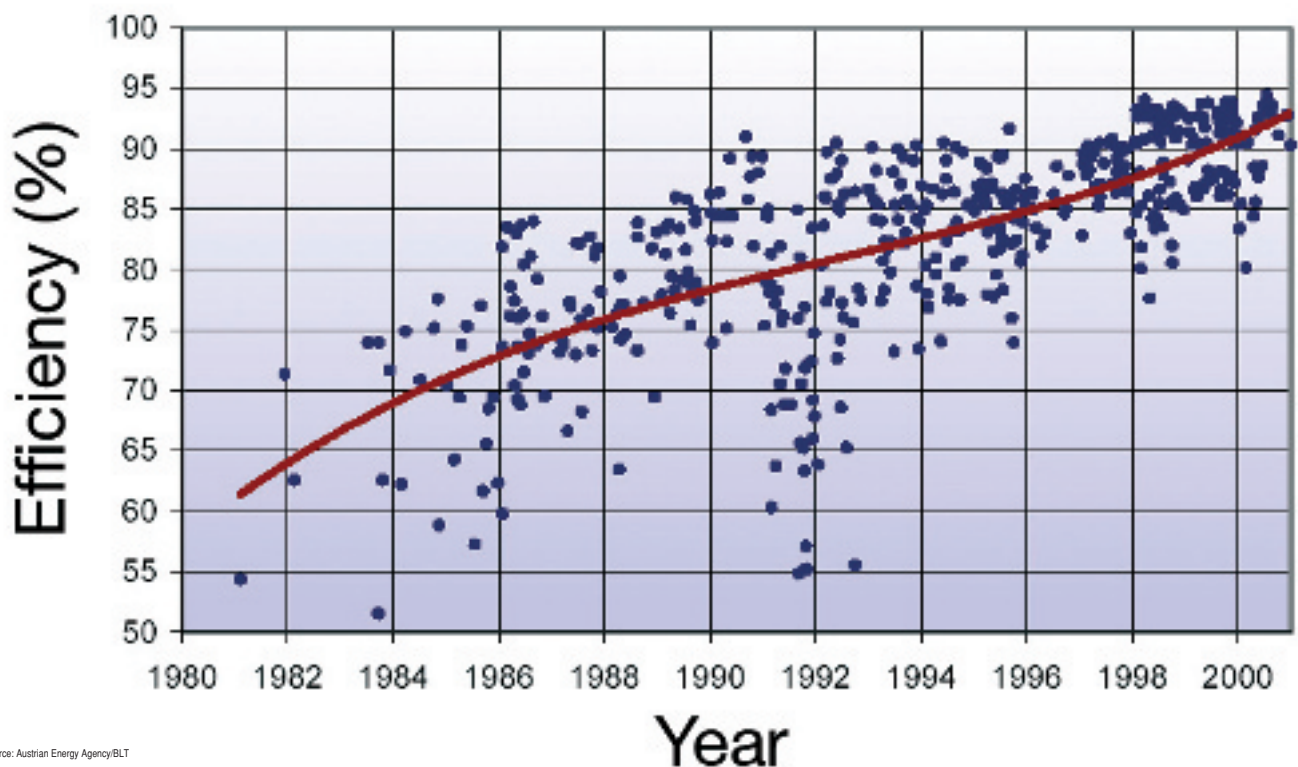
Pellet stove - source : AEBIOM



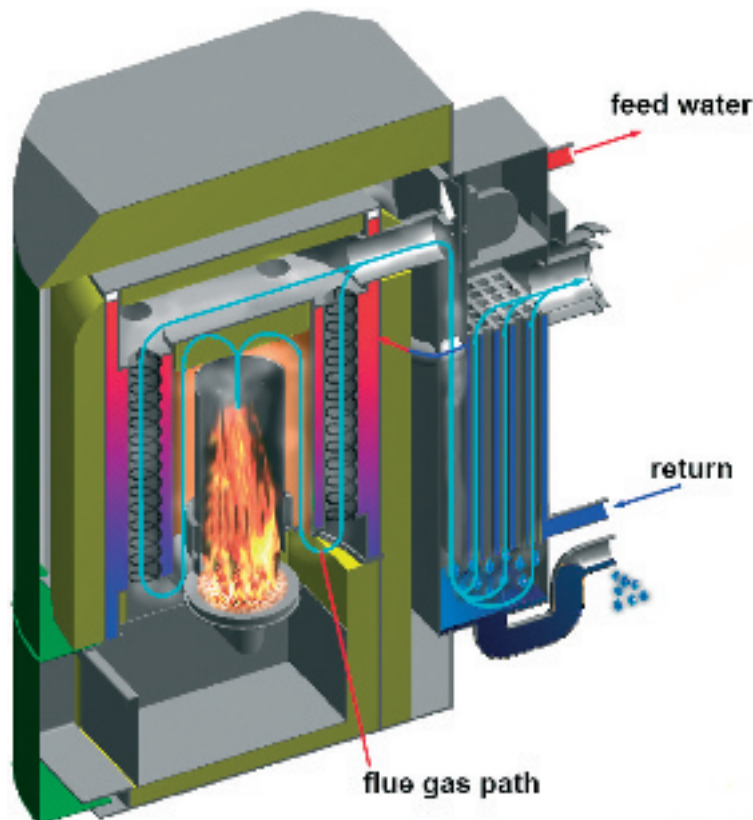
Pellet boiler - source : AEBIOM

Pellet stoves are more efficient, cleaner burning, and easier to use than conventional wood burning appliances. Pellet stoves are usually placed in the living area and have an esthetic value whereas pellet boilers in the non-living area of the house. Usually, the efficiency of the pellet stoves and boilers reaches 90%.

Efficiency of wood boilers for domestic use



Source: Austrian Energy Agency/BLT



Pellet boiler with integrated flue gas condensation  
(efficiency 103%, nominal capacities 8, 10, 15 and 20 kW)

Source: Okofen

The principle is the same as a gas condensing boiler. The combustion gases comprise energy which is recovered in the form of steam. The vapour existing in those gases is condensed and allows to recover energy, usually 10-15% of the lower calorific value. The temperature of the smoke varies between 130°C – 145 °C in the standard pellet boiler without a condensing system and is around 70 °C in a boiler with a condensing system. The efficiency of such a boiler can reach more than 100%.



Source: Kahl

The European Committee of Standardisation (CEN) has prepared 30 technical specifications on solid biofuels. The standards can be used as tools to enable both efficient trading of biofuels and good understanding between seller and buyer, as well as in communication with equipment manufacturers.

The following specifications have been published and available from national standardisation institutions: Terminology – CEN/TS 14588; Fuel specification and classes – CEN/TS 1461; Calorific value – CEN/TS 14918; Moisture content – 3 different (CEN/TS14774-1, 14774-2 and 14774-3); Ash content – CEN/TS 14775.

These technical specifications are pre-standards, which are in force for 3 years after publishing. At the moment, they do not invalidate national standards. After the three year period it will be decided whether these technical specifications will be updated to European Norms. The upgrading work has started in autumn 2006 and will be carried out until 2010. In the meantime, there are various possibilities (via international biomass conferences, articles etc.) for standard users to give their comments and further improve the European standards.

CEN committee prepared the specifications of properties for Pellets that can be found on the following website: [www.eubionet.net](http://www.eubionet.net).

The example for high quality wood pellets recommended for household usage is as follows:

Origin	Chemically untreated tree without bark
Moisture content	M10 (Moisture < 10 w-%)
Mechanical durability	DU97.5 (97.5 w-% of pellet batch of 100g shall be uncrushed after testing)
Percentage of fines	F1.0 or F2.0 (percentage of fines among pellets sieved through < 3.15 mm sieve shall not exceed 1 or 2 w-% at factory gate)
Dimensions	D06 or D08 (pellet diameter 6mm±0.5mm and length < 5x diameter or diameter 8±0.5mm, and length < 4x diameter). Maximum 20 w-% of the pellets may have a length of 7.5 x Diameter.
Ash content	A0.7 (<0.7 w-% of dry matter)
Sulphur content	S0.05(<0.05 w-% of dry matter)
Additives	<2 w-% of dry matter may consist of bio-based chemically untreated material, the type and amount to be given.
Net calorific value	E4.7 [kWh/kg] (net calorific value > 4.7 kWh/kg=16.9 MJ/kg)

Source : VTT



# Legislation and support schemes

## European legislation affecting the heating sector from renewable energy

Directive/communication	Date of publication	Purpose
Directive 2002/91/EC on the energy performance in buildings	Published on 16 December 2002	Measures on the energy performance in buildings.
Biomass Action plan COM (2005) 628 final (BAP)	This Commission communication was adopted 7 December 2005	Designed to increase the use of energy from forestry, agriculture and waste materials in three sectors: heating, electricity and transport.
Directive 2004/8/EC (CHP)	Published on 11 February 2004	Directive has the aim to promote cogeneration based on a needed heat demand in the internal energy market.
Renewables roadmap (within the Energy package)	Published on 10 January 2007 and accepted by the European Spring Council on 8-9 March 2007	The aim is to increase the share of renewables in the current energy mix to 20% by 2020.

EU existing legislation that already promotes renewable energy heating includes Directive 2002/91/EC on the energy performance of buildings (OJ L1/65, 4.1.2003), which for example, imposes a requirement on Member States to take necessary measures in order to ensure that new buildings meet the minimum energy performance requirements. Member states have to ensure the technical, environmental and economical feasibility for new buildings to use renewable energy, CHP and, if available, district or block heating and cooling.

Another directive 2004/8/EC on the promotion of cogeneration (OJ L52/50, 21.2.2004) also indirectly promotes RES-H as it obliges member states to establish an analysis of the national potential for the application of high-efficiency cogeneration, including high-efficiency micro-cogeneration. These analyses of national potentials have to consider the type of fuels that are likely to be used to realise the cogeneration potentials, including specific considerations on the potential for increasing the use of renewable energy sources in the national heat markets via cogeneration.

The European Commission has published the EU Biomass Action Plan (COM(2005) 628 final) in 2005 which is directly relevant to RES heating and cooling and lists a number of measures to be taken by the European Commission from 2006 onwards, including the preparation of a proposal for Community legislation in 2006 to encourage the use of renewable energy, including biomass, for heating and cooling. The legislative proposal, however, wasn't published in 2006 but will be included in the overall renewables directive which will be proposed by the Commission in the second half of 2007.

The European Commission has presented its energy package

on 10 January 2007. The package covers various energy areas including a proposal for a long term Renewable Energy Roadmap. The roadmap includes two main targets: to reduce greenhouse gas emissions by 20% by 2020 and an overall binding 20% renewable energy target with a minimum 10% target for transport biofuels for the EU by 2020. Even though the renewables roadmap didn't set up a target for heat, the production of heat will be necessary to reach the overall renewables target of 20% by 2020. According to European Biomass Association calculations, it is possible to propose a 25% renewable heat target for Europe, with a contribution of biomass for heat up to 120 millions toe by 2020.

### National policy

Contrary to fossil fuels, the market of which largely depends on geopolitical conditions, the pellet demand/supply depends mostly on national framework conditions. In most cases biofuels are cheaper than fossil fuels but it can become more expensive if the country decides, for example, to apply a reduced VAT rate on electricity and natural gas instead of supporting bioenergy. At a national level two important instruments to promote or slow down the use of biomass for heat can be distinguished: regulations and financial incentives. Regulations such as "Federal Building Code and Federal land Utilisation Ordinance" in Germany or "Permit Procedure" in Sweden limit the bioheat development whereas regulations like "Wood Fuel programme" in France or "Energy Saving Ordinance" in Germany have a positive impact on biomass development for heat. The pellet market largely depends on the financial incentives the country decides to implement. For example, the increased sales in Ireland are related to the Irish Government's aggressively subsidized, Bio Heat Boiler Deployment Programme. The scheme started with massive grants for wood fuels boilers which in some cases nearly covered total costs. As a result, the sales of the Irish boiler manufacturers have increased significantly (more than 50%).



Source: Kahl

Therefore, one of the most important criteria to develop bioheat in Europe is to make it competitive with fossil fuel systems. It can be done using the following measures:

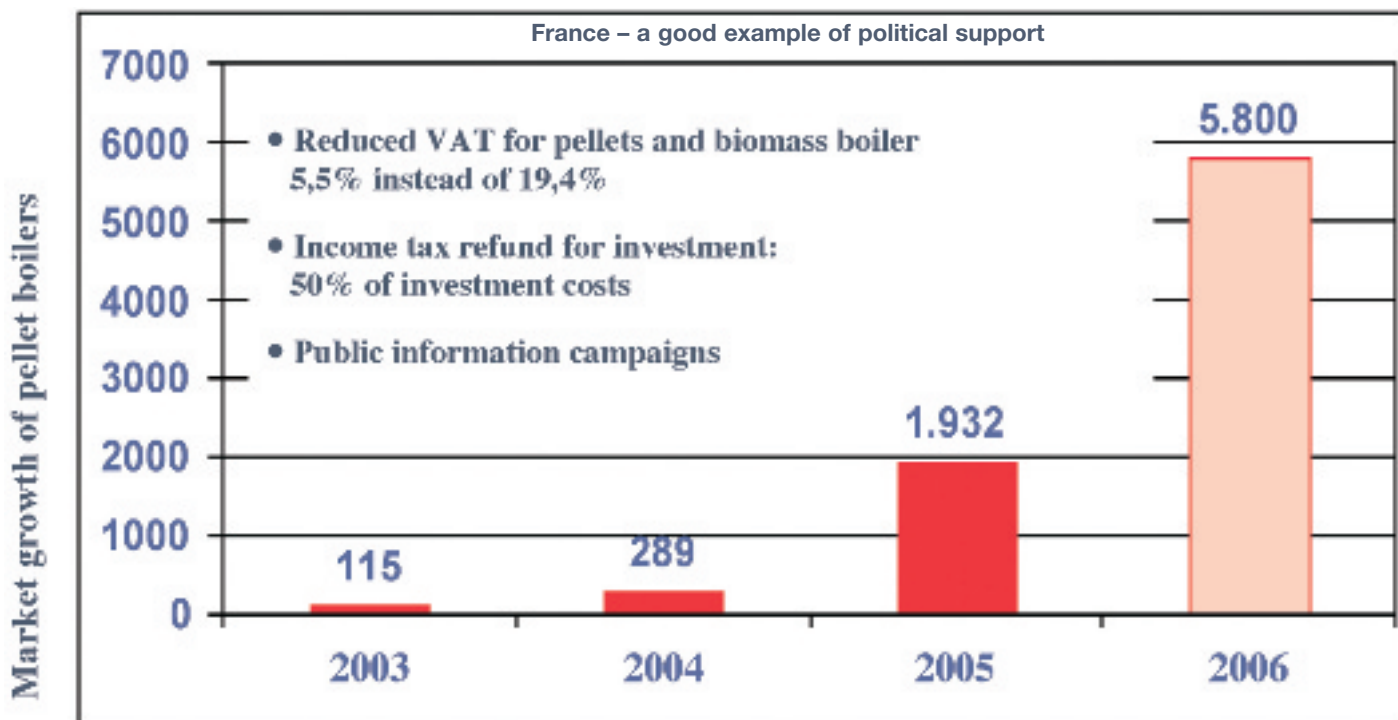
- High fossil fuel prices: even if barrel prices go down the price level of fossil fuel should be maintained high with a help of taxation policy. Directive 2003/96 is the first step towards minimum taxation. However a minimum of 21 €/1000 litres is far too low considering the fact that the EU-25 average is 128 €.

is room for significant improvements in the case of bioheat at household level that is still largely produced with wood logs based systems.

## Examples of national support schemes

### France – tax credit for sustainable development

The Finance Law from 2005 has introduced a tax credit for sustainable development and rational use of energy. The aim of this



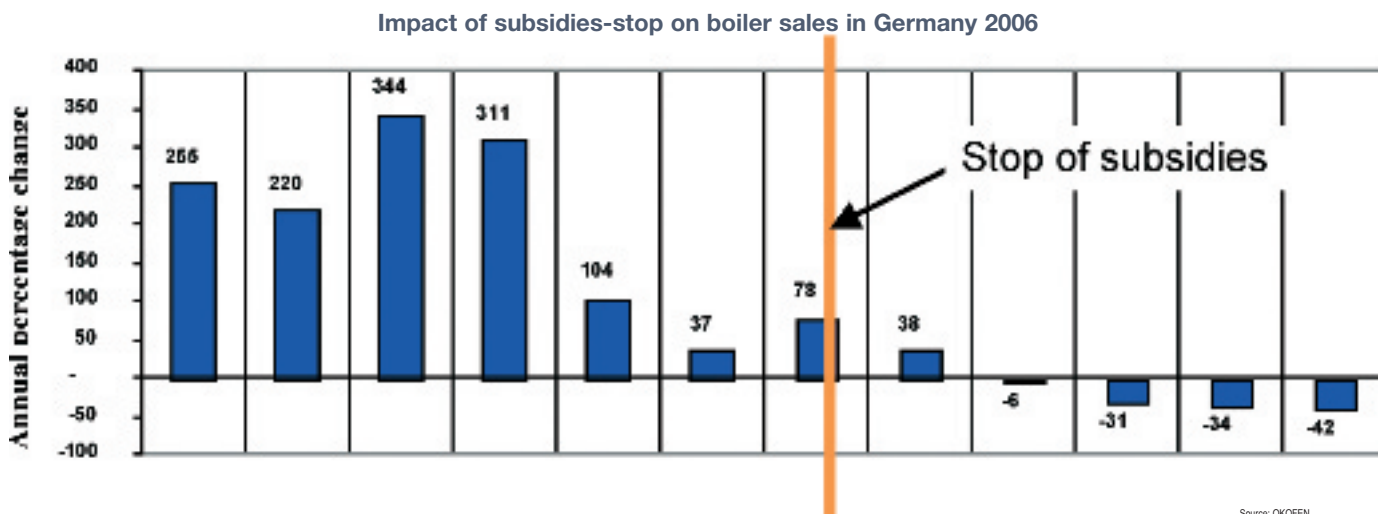
Source: ITEBE

- Lower biofuels cost: biofuels should be exempt from taxation and VAT should be reduced to the minimum level which is not the case in many countries.
- Subsidies to biofuels conversion systems: technologies to convert biomass to bioheat are generally more expensive but the fuel price is lower. This higher capital cost is a barrier for investors which can be overcome by using subsidies as a part of the investment.
- High efficiencies: efficiencies of modern automatic systems are already comparable to the ones of fossil systems, therefore, further improvements would have only a minor impact. But there

law was to favour high efficiency equipment and the use of renewable energy. The system applies from beginning 2005 to end 2009. Biomass equipment for heating is eligible for a tax credit up to 50%. However, the minimum efficiency of 65% is required and the equipments have to meet certain technical standards.

### Germany – market incentive programme MAP

The main steering instrument for the whole RES-heat market in Germany is the Programme to Promote Renewable Energies ("Market Incentive Programme") which supports biomass heating systems as well as electricity facilities and biogas plants.

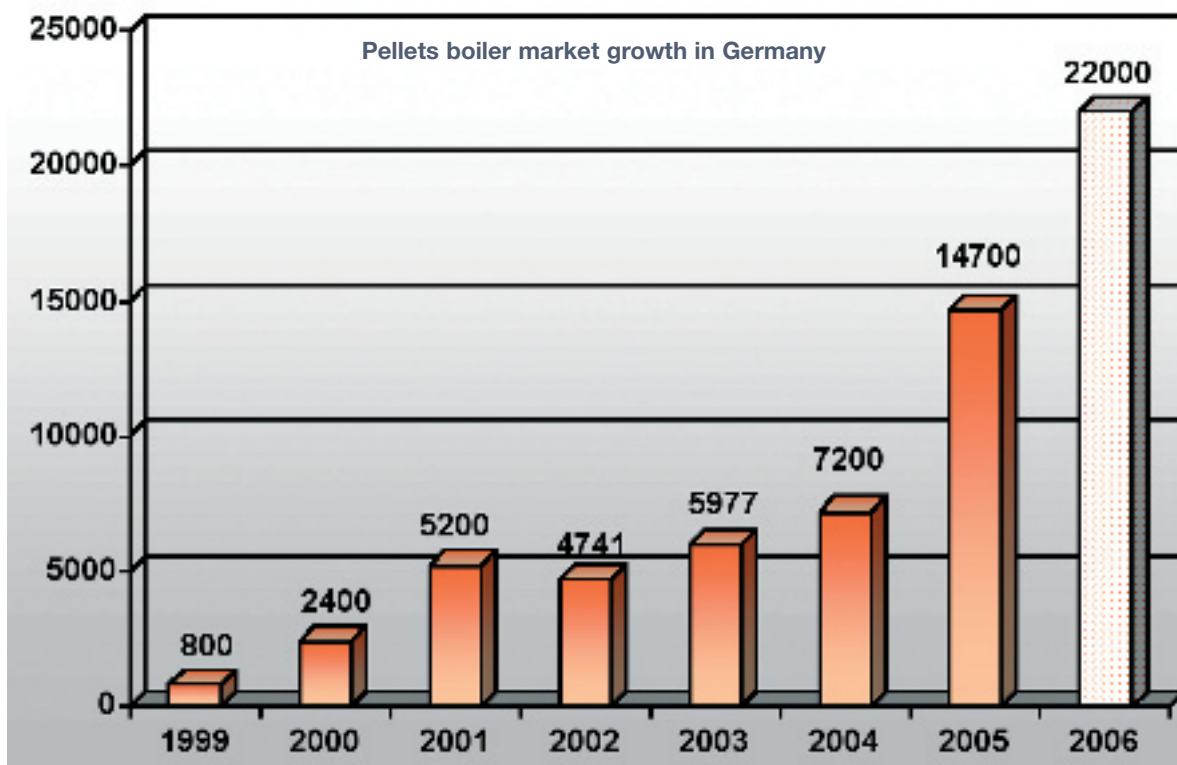


Source: OKOFEN

The main focus, however, is on the small scale heating systems in the heat sector.

The MAP came into force in September 1999. Every year the German government decides upon the budget of MAP for the following year as well as regulation behind the budget. The programme supports renewable heating systems with grants, long-

automatically operated wood pellet systems in a range of 8 to 100 kWth with a grant of 24 € per kW and at least 1.000 € for systems that reaches an efficiency of at least 90% (in 2007). In addition an innovation bonus was introduced in 2007: systems which meet particularly challenging environmental requirements (e.g. secondary measures for emission reduction) get a double



term and low-interest loans and/or partial release of debts and had a budget of 180 m € in 2005 and 2006 and will have 213 m € in 2007.

The programme is very successful, however, its' budget is limited. The budget is usually emptied long time before the year ends creating an insecure basis for investments and a negative impact on security of demand.

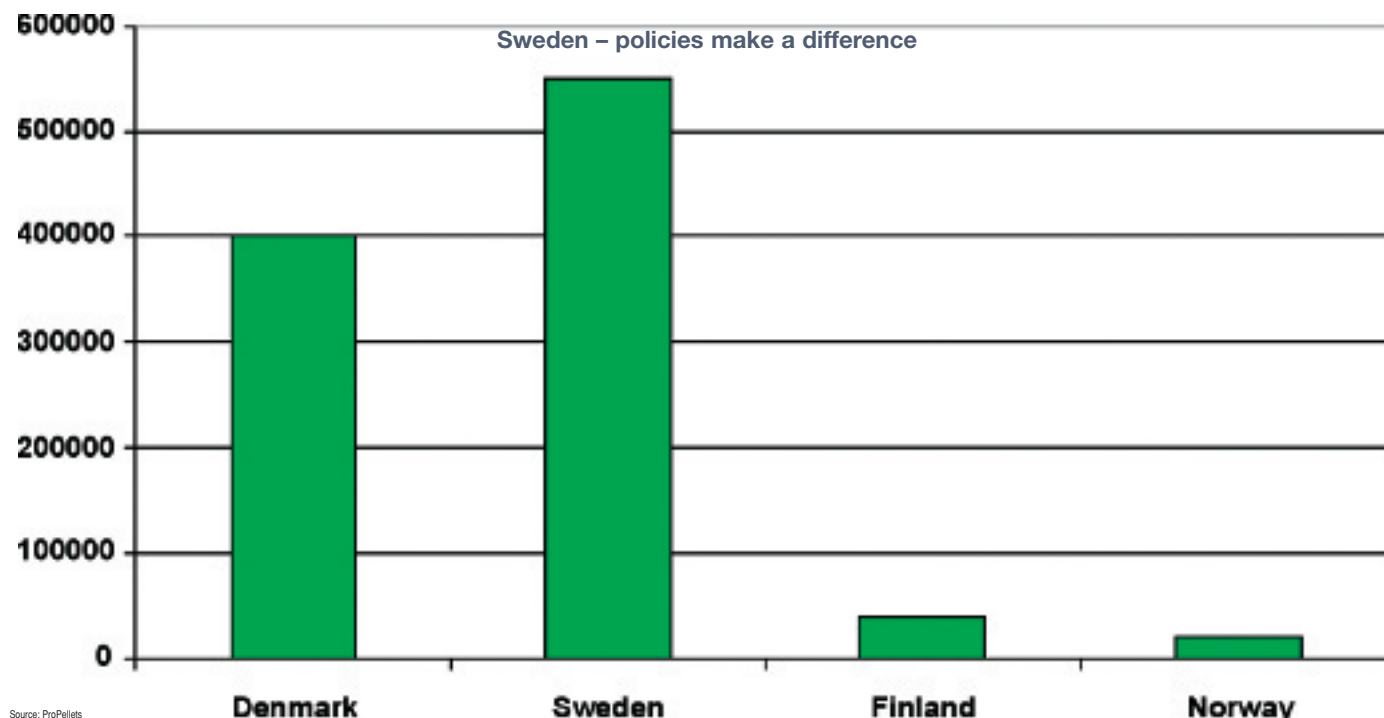
#### Small scale applications

As for small scale pellet heating systems, the MAP supports

amount of the basic grant. Administrative burdens are lowered to get the basic grant - it is already possible to invest without having applied for the support in advance. However, in order to get the innovation bonus one has to apply in advance and can start installing the RES systems only after the approval.

#### Sweden – taxation of fossil fuels

The Swedish energy taxation policy is aimed at encouraging the use of biofuels whilst improving energy efficiency and creating incentives for companies to reduce their environmental impact.



In the year 2000 it was decided to increase the taxes on energy emissions and reduce the labour tax instead. In this way, the Swedish carbon dioxide emissions are to be cut, which is in line with the Kyoto protocol.

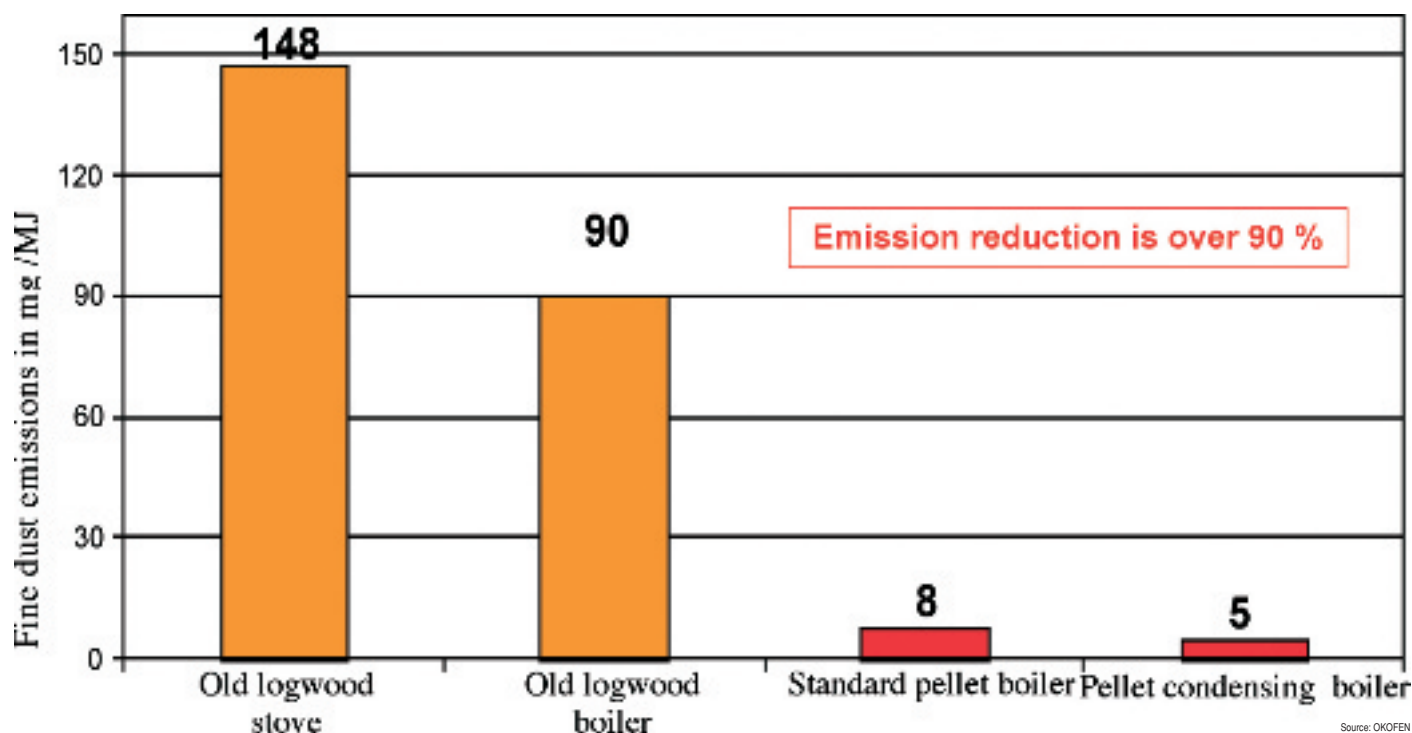
“Energy tax” covers all taxes on fuels and electricity and can be divided into fiscal taxes and those aiming to achieve environmental objectives. Carbon dioxide and Sulphur taxes (both introduced in 1991) are intended to achieve environmental objectives, while the general energy tax is essentially a fiscal tax. However there is no strict boundary between these two types, as both groups have an environmental effect as well as a fiscal one.

The general energy tax is levied on most fuels. The carbon dioxide tax, is levied on the emitted quantities of CO<sub>2</sub> from all fuels except biofuels and peat. The Sulphur tax is levied on sulphur emissions from coal and peat. In 1992 an environmental levy on NO<sub>x</sub> emissions was introduced. NO<sub>x</sub> emissions from boilers, gas turbines and stationary combustion plants supplying at least 25 GWh per annum.

comply with the EU laws.

The solar energy and biomass is a good combination as it offers the most economic way to realise 100 % renewable energy supply for domestic heating and hot water. Combined solar-biomass system allows to store the solar energy in summer in order to use it for residential heating in winter. In a way, biomass is also a seasonal store of solar energy, but its’ heat storage density is about 50 times higher than that of a water storage tank. The most economic and effective system to realise a full solar heating system for single family houses is the combination of a biomass boiler (e.g. pellets), a water tank (2-3 m<sup>3</sup>) and thermal solar collectors. In summer the solar system provides hot water and stores it in the tank.

In autumn and spring the solar system can also provide heating (dependent on its size). In winter the biomass boiler uses the heat store, which allows full power operation of the boiler and continuous heat retrieval at any required load.



### Tax deduction for biofuels appliance

Those who build a new house and install a biofuel appliance as the primary energy source for heating and hot tap water, are able to receive a tax deduction. The rule applies for single family houses, farm units and the houses with maximum two apartments. One precondition is that the heat is distributed to the house through a central heated water pipe network. The tax deduction is limited to maximum 15000 SEK (1613 EUR) per house. This scheme is directed to heating of dwellings at small scale. It is designed to impact on the small scale wood and pellets applications, but can also affect briquette, wood chips and agricultural crops.

### Fine dust emissions

Fine dust emissions of standard pellet boilers are very low comparing to the old logwood stoves and boilers, nevertheless, various regulations limiting fine dust emissions became a major barrier to the market growth of pellet boilers.

According to the EU regulation, the dust content in the air should not exceed 35 days a year, therefore combined heating systems using solar power and pellets is a good solution to



Source: VELUX - ESTIF

# Pellet market

The market of pellets use for small-scale heating systems increases every year. This trend is a result of growing prices for fossil fuels. Growing fossil fuels prices together with financial incentives are the key factors influencing the competitiveness of bioheat market.

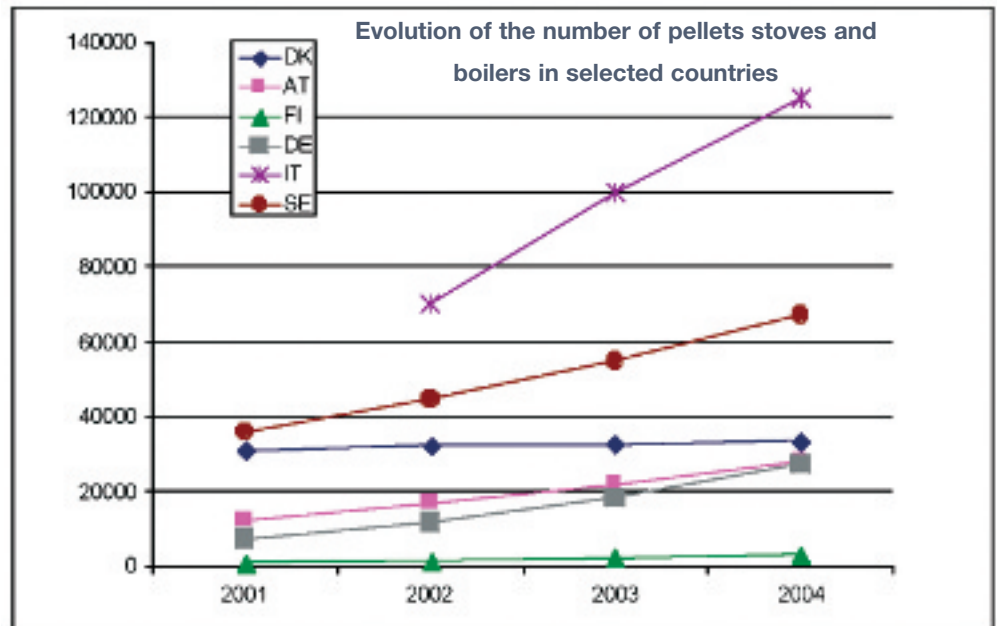
## European Pellet Market

### Scandinavia

The development of the pellet markets in Scandinavia draws a surprisingly heterogeneous picture. While Denmark and Sweden are big pellet markets – Sweden is currently the biggest pellet market in Europe – Finland and Norway use only insignificant pellet quantities for thermal energy production. These astonishing differences in countries which are similar in resources are evidence of the big influence of the political environment on the development of the pellet industry. In Sweden and Denmark centuries of active energy politics together with significant taxation of fossil energy has encouraged an early development of the pellet market. This development has taken place much faster than in Finland or Norway, where only recently first efforts have been taken to get the market moving. In these two countries significant economic incentives are missing, as competing sources of energy are cheap.

In Norway the thermal energy market is dominated by electrical heating systems, which makes it difficult to change to pellet burners, as central heating facilities are a prerequisite. When Norway suffered from first shortages of electricity three years ago in winter prices increased considerably and great demand for pellet stoves developed rapidly, a development which was supported by government subsidies. These subsidies, were stopped not much later, which caused a decline in the development of the market.

Finland is pursuing the introduction of pellet heating facilities



Source: European Pellet Centre

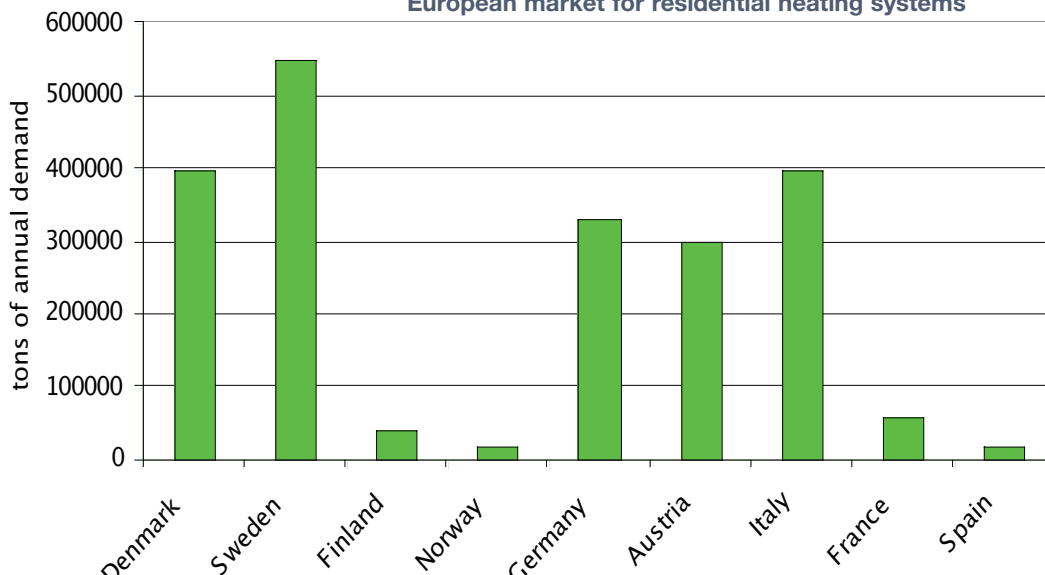
into the thermal energy market much more consequently. Conditions are not easy, however, as Finland does not have energy taxation and competing sources of energy are cheap. Nevertheless, Finnish experts predict a significant growth of the pellet market.

In Denmark one third of all pellets goes to district heating facilities, two thirds go to domestic pellet heating facilities. After a rapid growth in the late 1990s triggered by generous government assistance a change in Government brought about the end of subsidies. As a result there was a sudden decline of the market.

The development in Sweden is quite different. The continuous government support ensures stable market conditions. Along with energy taxes established many years ago, recent promotion programs for the implementation of pellet heating facilities have lead to a rapid rise in the number of domestic pellet heating systems.

### Market development in the Atlantic climate zone

#### European market for residential heating systems



Source: proPellets

In the past France, Ireland and England have been countries where there have not been any political measures to promote renewable energy on the thermal energy market at all. This has changed in the recent past. In 2006 Ireland introduced subsidies for pellet heating facilities for the first time, and England and France also grant subsidies now. Against the background of the mild climate in these countries it can be expected that especially pellet stoves will show a positive trend in the future.

At the moment, however, these markets find themselves “in statu nascendi” and will probably start to grow substantially in the next years. Especially France is expected to offer good chances for pellet stoves. There the thermal energy market is dominated by electrical heating systems, the implementation of central heating facilities therefore is disproportionately costly. There has been a long tradition in using conventional wood stoves - France is the biggest firewood market in Europe. As soon as the advantages of pellet stoves in handling and comfort in comparison to conventional stoves are communicated on a wider scale, a dramatic market growth can be expected. Conditions in France are especially favourable because of the huge availability of raw material. This is not true of Ireland and England. But the world market can easily supply these countries by sea.

#### Mediterranean area

In the Mediterranean zone Italy claims a special status. Italy is one of the biggest and fastest-growing pellet markets in Europe. Experts report sales of up to 100.000 pellet stoves this year. Because of the mild climate in wide parts of the country pellet burners play no significant role in Italy at all. The development of this market has definitely been supported by the good availability of pellets, which to a considerable extent have been imported from Austria. Decisive factors for the successful development of pellets in Italy have undoubtedly been high taxation on oil and high gas prices. There is no other Mediterranean country which shows a similar development.

Spain offers good opportunities, but the development is still in its beginning. So far no pellet supply infrastructure has been established, and home production is very low. The situation is similar in Portugal where there are hardly pellets on the market, although the situation with regard to the availability of resources is favourable. But there are good chances for a change also in these two countries. Stronger political focus on this subject, increasingly active and growing companies together with good availability of raw material could lead to a major growth of the

Spanish and Portuguese markets within the next couple of years. Even in Greece pellet production is reported. Instead of electric heaters pellet stoves can be an interesting and economical alternative there.

#### Central Europe

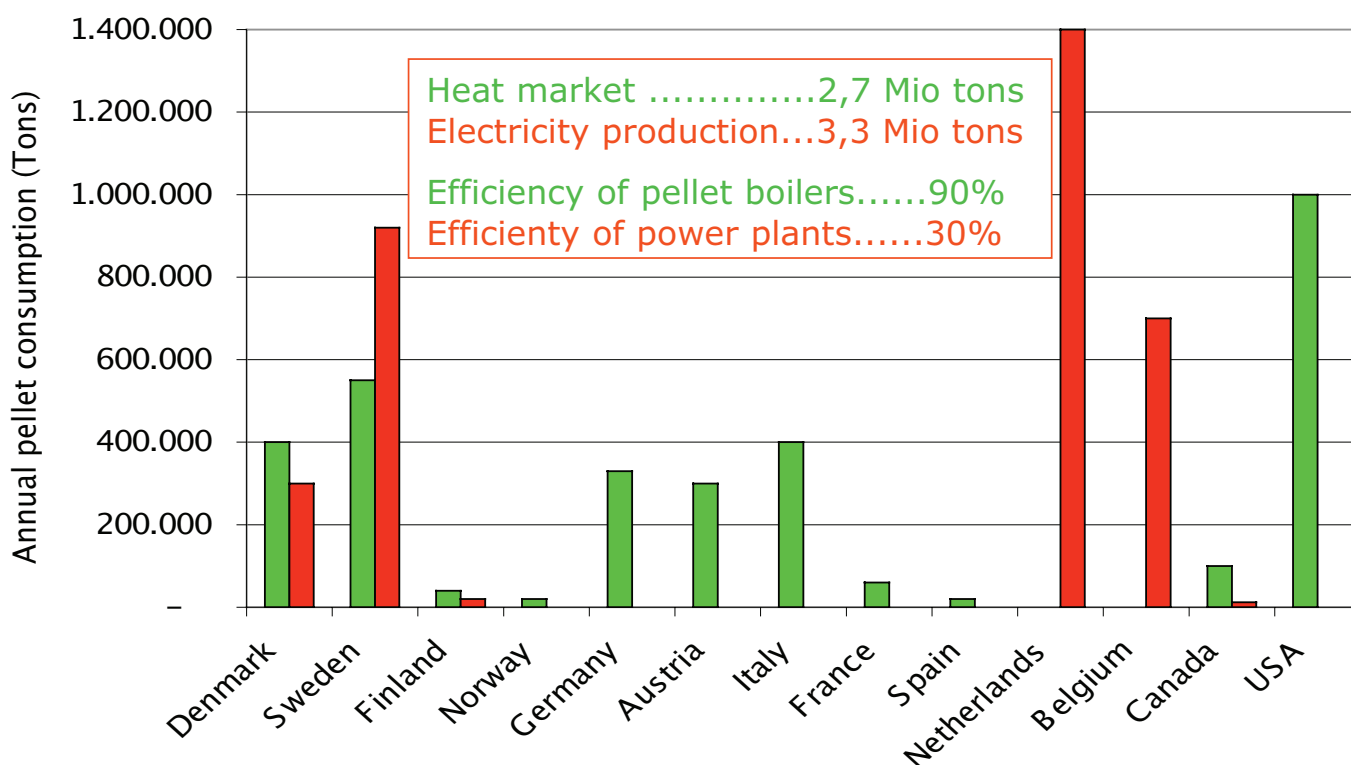
In Central Europe the pellet markets of Germany and Austria are predominant by far. After 8 years of dynamic market growth the Austrian pellet burner market had its peak in 2005 as a result from the oil price increase. Sales went up by 45% in comparison to the previous year. While in the years before the market had shown an oversupply of pellets and a continuous fall in prices, in autumn 2005 the situation in Austria changed suddenly. An enormous increase in the number of new facilities and a cold winter caused shortages in the supply of timber to the saw mills and to supply difficulties. All customers could be supplied, but had to accept partial shipments and considerable waiting times in many cases.

Since spring 2005 pellet prices in Austria have risen continuously, with exorbitant increases recently. Compared to September 2005 prices in September 2006 have increased by 50% and were at an average of € 243 per ton.

#### New member states

In some of the new EU member states we can see extraordinary raw material potentials, which could be used for pellet production. The current pellet production is mainly meant for export. Because of the high prices of heating facilities the development of pellet markets in these countries might take quite a while.

Comparison of International Pellet Markets



Source: proPellets



# About the project

RESTMAC project 'Creating Markets for Renewable Energy Technologies - EU RES technology marketing campaign' aims at developing and implementing a concise, well-targeted and thematic approach to ensure the dissemination and uptake of selected RES technologies in the market. In other words the consortium works towards establishing a technology marketing campaign for the different RE technologies involved. So far R&D formed a good basis for the outstanding industry development in the Renewable Energy area. Nevertheless, the market uptake of these R&D results is not always happening in the best possible way and therefore needs to be improved. Lack of information and limited use of synergies between various stakeholders (industries, governments, investors..) are still the key critical barriers towards Renewable Energy Technologies.

The renewable energy sectors to be marketed include: PV (photovoltaic), SHP (Small Hydro Power), Biomass, Geothermal, Solar Thermal and Wind Power.

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