D.7.2 Analysis of new, emerging and developed European pellet markets

EUROPE

etaflorence renewableenergies
Piazza Savonarola, 10 • 50132 Firenze • Italia
tel +39 055 5002174 • fax +39 055 573425 •
eta.fi@etaflorence.it • www.etaflorence.it

Intelligent Energy Europe

 ETA Florence Renewable Energies, srl
Piazza Savonarola 10
50132 Florence,
Italy

October 2009

Prepared by **ETA Florence Renewable Energies**
Mr. Stefano Capaccioli
Mr. Filippo Vivarelli

Contact filippo.vivarelli@etaflorence.it
Tel. +39-055-500 2174

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.

SUMMARY

1. Introduction

The general aim of PELLETS@LAS is to develop and promote transparency in the European fuel pellets market. This project wants to facilitate the pellet trading and to remove the market barriers. The project (www.pelletsatlas.info; EIE/06/020) is supported by the European Commission under the Intelligent Energy Europe programme. The main output is 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.
Based upon on the pellets@las data collections a unique classification method for the countries analysed was developed and used to classify the European Markets. This method was based upon the following pellets@las sources:

- Data collected from wood pellets producers and traders (WP4),
- Data collected from MBP producers (WP5),
- Data collected from traders and the analysis of the International pellet trade (WP 6);
- Inputs given from the European Country reports (deliverable 7.1 - "Overview on the pellet Market in EU"),

The countries involved in this investigation are the following:

1	**Austria**	**16**	**Lithuania**
2	**Belgium**	**17**	**Luxemburg**
3	**Bulgaria**	**18**	**Malta**
4	**Cyprus**	**19**	**Netherlands**
5	**Czech Republic**	**20**	**Norway**
6	**Denmark**	**21**	**Poland**
7	**Estonia**	**22**	**Portugal**
8	**Finland**	**23**	**Romania**
9	**France**	**24**	**Slovakia**
10	**Germany**	**25**	**Slovenia**
11	**Greece**	**26**	**Spain**
12	**Hungary**	**27**	**Switzerland**
13	**Ireland**	**28**	**Sweden**

14	**Italy**	**29**	**UK**
15	**Latvia**		

In this report, similarities and discrepancies between countries are highlighted. Based on this, a common approach and suggestions are defined for any class of countries.

2. Objective of the task

The main output of this task is the identification of a common methodology of classification available for every country of the European pellet market in order to facilitate a classification of the present and the future situation in every country. This methodology of classification was developed in the following way:

1. Selection of main parameters to be considered for each type of class;
2. Analysis of the existing data about each market;
3. Exceptions, etc.

As the approved and confirmed information of the project are various, it was reasonable to analyze the result we achieved until today.
The data collections developed between the wood pellets producers and traders, the MBP producers and traders and the analysis on the International pellet trade (WP 4, 5 and 6) were used.

The technical information about national markets collected during this months, are the following:

- **Business operating area (producers, traders, large scale consumer)**
- **Capacity per location (tonnes); Estimated capacity (tonnes); Capacity utilisation (tonnes) / location**
- **Product standards**
- **Storage capacity (tonnes); Loose (bulk) (January, April, July, October)**
- **End consumer prices 2008 incl. VAT (monthly for some countries, every 3 months for some other) - bulk, small bags,**
- **Total sales (tonnes); Sales in home country (%); Sales within home country :**
  - to other traders (%)
  - Loose (bulk) to small consumers (< 3.000 tonnes) (%)
  - bags < 25 kg to small scale consumers (%)
  - Large scale consumers (%)
- **CIF ARA prices 2008 excl. VAT : Loose (bulk), 5.000 tonnes**
- **Wood pellet consumption (large scale): total thermal net output (TJ); total electrical net output (GWh); total wood pellet consumption 2007, 2008 (tonnes); storage at power plants; storage at harbour**

The WP 6 – International pellets trading, investigated on the global pellet market, and how the trading between countries is working.
Big market producers and exporters were studied and logistics, especially for big plants, were defined. The following information was collected:

- **Production, use and trade in Russia, Ukraine and Belarus (overview of production capacities and domestic markets 2007-2008 and Export markets)**
- **Production, use and trade in the Western Balkan area (overview of production capacities and domestic markets 2007-2008 and Export markets)**

- **Production and trade in North America (overview of production capacities and domestic markets 2007-2008 and Export markets)**
- **Barriers and opportunities for international pellet trade**

After this classification also specific recommendations to each identified type of markets are listed.

3. Classification methods

The classification methods used in this analysis are various. In order to give a clear picture of the European pellets market the definition of market structure will be based on several criteria, as:

i. Relevance of the market in term of "consumption level":

The data related to the national consumption of every state were collected and compared. In fact the analysis of nowadays "industry sector" is normally based on "consumption level" of a product. Also statistical calculations are normally based on this parameter. So we decide to follow this approach during our calculation and to maintain "consumption level" as main parameters for the evaluation of the advancement status in pellet sector of each country involved in the investigation. So, the countries with a high internal consumption level will be considered as "Developed Countries". The countries with a limited or absent internal consumption will be classified as "New" or "Emerging" countries.

ii. Relevance of the market in term of "production level":

The level of production of pellets is surely a relevant parameter to be considered. There are several considerations that need to be done:

a. **High pellet production level for internal market (national consumption):** These countries normally have a good relation between national production and national consumption and can be classified as "Developed" or "Emerging" countries.

b. **High pellet production level for foreign markets (international consumption or export):** These countries have developed an industrial sector able to process relevant quantities of pellets, in fact their production level is becoming very relevant in term of tons produced per year. This production offers surely benefits for workers and entrepreneurs but the lack of a national internal market doesn't permit these countries to be classified as "Developed". These countries will be classified as "New" or "Emerging" countries depending on their production level and other parameters that will be mentioned in the following pages.

iii. Availability of historical data about pellet market about every country:

This criterion by itself is not appropriate or sufficient for a detailed classification. But if we consider a marginal relevance of this criterion, it can provide a useful element to be used in the classification. For example, if a country has no historical data concerning the production and consumption of pellets the respective national pellet market probably has been of limited importance in the past. Therefore, these countries can be classified as "New" or "Emerging" countries. If, on contrary, the historical data concerning production and consumption of pellets are available, it means that Scientific Institutions, Governmental authorities, or other entities have been paying significant attention to this sector since many years. These countries can be considered as "Developed"[1].

iv. Availability of national standards for production of solid biofuels:

The presence of a national normative concerning the production of solid biofuels is surely a relevant parameter for the classification of a country. Developed countries are

[1] If the other parameters used for classification are not in contrast with it.

using a standard qualification, even if national ones are not approved, yet. Today the countries with a national normative are only 3 in Europe:

1. Austria standard (ÖNORM M 7135),
2. Germany standard(DIN 51731; Din Plus)
3. National certification (examples):

   -Italy: (UNI/TS 11263 – Characterization of solid biofuels; PelletGold, even if it is not a real standard, but an attestation of qualified productions)

   -France: "Norme Française" better known by the French consumers than the German DINplus

At European level, the normative CEN/TS is available.

v. **Import / Export:**

As a general classification, we can define the following equation:

a. **Importer:** the countries that import pellets have a relevant internal demand, It normally permitted a clear identification and allocation between the Developed Countries;

b. **Exporter:** the countries that export their product due to their surplus can be considered as "Developed", while the countries that export pellets as profitable business can also be classified as "New" or "Emerging" countries**.** For example many Eastern countries or New Member States, are big exporters but it is not a sufficient reason to classify them as Developed Markets. Specific comments on this parameter are mentioned in the description of each country.

vi. **Exceptions:**

During this classification we found various exceptions due to the availability of data. These specific examples were classified by the interception of more criteria, in order to find the best methodology as possible.

vii. **Availability and prices of fossil fuels:**

This last parameters is not mentioned, but it was used to assess the propensity of a population to use biofuels. Normally, we can say that the utilization of solid biofuels is indirectly proportional to the cheapness and availability of fossil fuels.

viii. **Pro capita pellet utilization**:

This data can be considered as a relevant parameter for the analysis of a country. Surely this data has to be associated to the above ones, as classification mistakes can be done. The utilization per capita normally reflects the trend in a certain country.

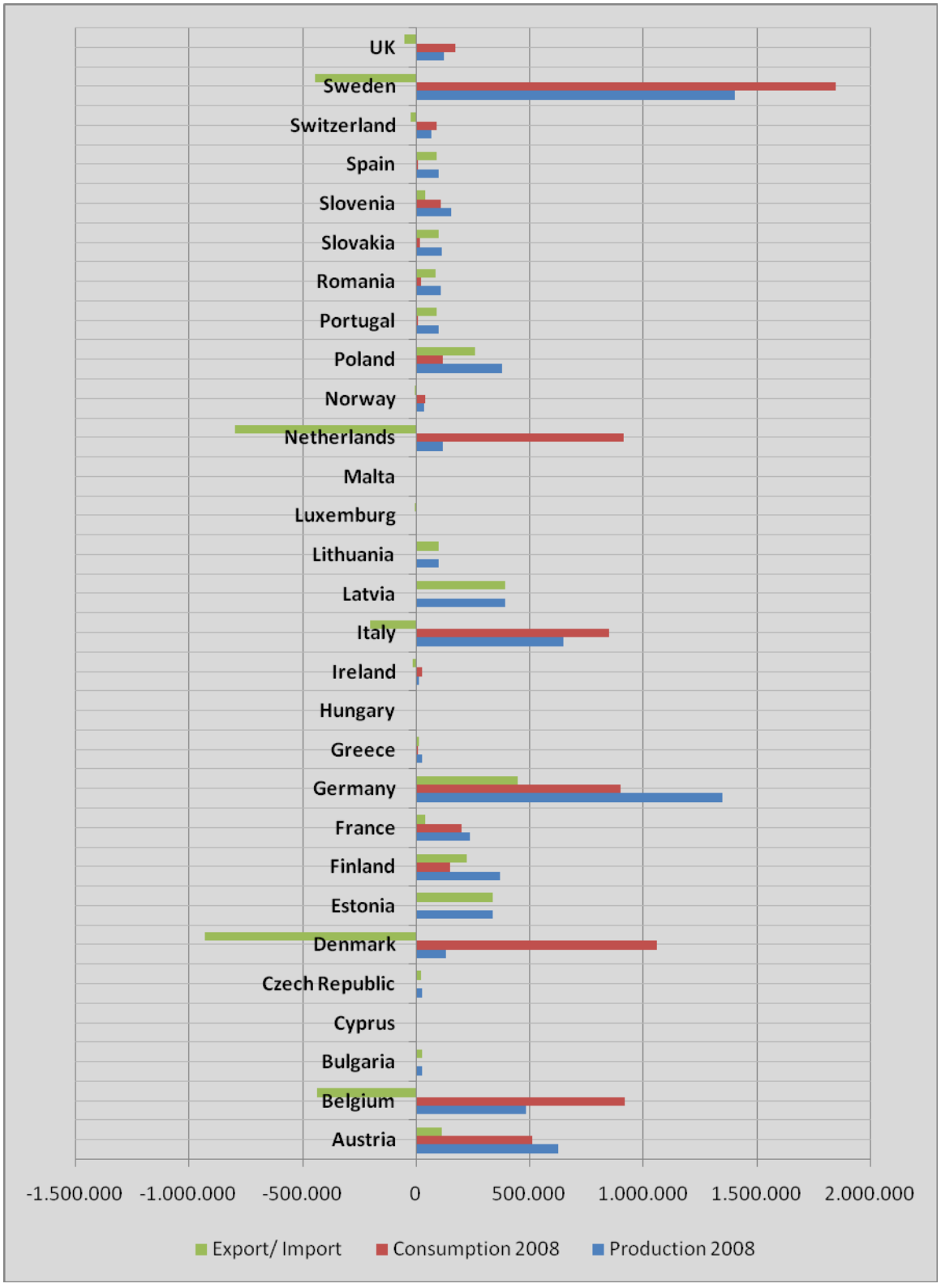
More detailed explanation about these criteria and exception will be given for any country involved in this analysis. The final classification of the European market is done following the inputs for all the data mentioned above.

In the following table we summarized most of the mentioned data and characteristics of any market, in order to have a global view of European market of pellets.

Countries	Num. producers	Production 2008	Consumption 2008	Export/ Import	Historical data available	Production capacity	National Standard
Austria	***25***	626.000	509.000	117.000	yes	1.006.000	yes
Belgium	***10***	325.000	920.000	-595.000	no	450.000	no
Bulgaria	***17***	27.200	3.000	24.200	no	62.300	no
Cyprus	***0***	0	0	0	no	0	no
Czech Republic	***12***	27.000	3.000	24.000	no	78.000	no
Denmark	***12***	134.000	1.060.000	-926.000	yes	313.000	no
Estonia	***6***	338.000	-	338.000	no	485.000	no
Finland	***19***	373.000	149.200	224.000	yes	680.000	no
France	***60***	240.000	200.000	40.000	no	1.391.800	no
Germany	***50***	1.460.000	900.000	560.000	yes	2.400.000	yes
Greece	***5***	27.800	11.100	16.7000	no	87.000	no
Hungary	***7***	5.000	1.000	4.000	no	5.000	no
Ireland	***2***	17.000	30.000	-13.000	no	77.500	no
Italy	***75***	650.000	850.000	-200.000	yes	750.000	yes
Latvia	***15***	379.000	39.000	340.000	no	743.600	no
Lithuania	***6***	120.000	20.000	100.000	no	152.600	no
Luxemburg	***0***	0	5.000	5.000	no	0	no
Malta	***0***	0	-	-	no	0	no
Netherlands	***2***	120.000	913.500	-793.500	yes	130.000	no
Norway	***8***	35.100	39.800	-4.700	yes	164.000	no
Poland	*21*	340.200	120.000	220.200	yes	674.200	no
Portugal	***6***	100.000	10.000	90.000	no	397.000	no
Romania	***21***	114.000	25.000	89.000	no	260.000	no
Slovakia	***14***	117.000	17.550	99.450	no	142.000	no
Slovenia	***4***	154.000	112.000	42.000	no	185.000	no
Spain	***17***	100.000	10.000	90.000	yes	250.000	no
Switzerland	***14***	70.000	90.000	-20.000	yes	171.000	no
Sweden	***94***	1.405.000	1.850.000	-445.000	yes	2.200.000	no
UK	***15***	125.000	176.000	-51.000	yes	218.000	no
(-) :represents a value between zero and 3.000 tons per year							

4. Classes of countries

The following paragraph will help to define the classes of countries on the basis of the data collected. In order to facilitate the understanding of the reader, here below a graphic summarized the gathered data of European countries investigated.

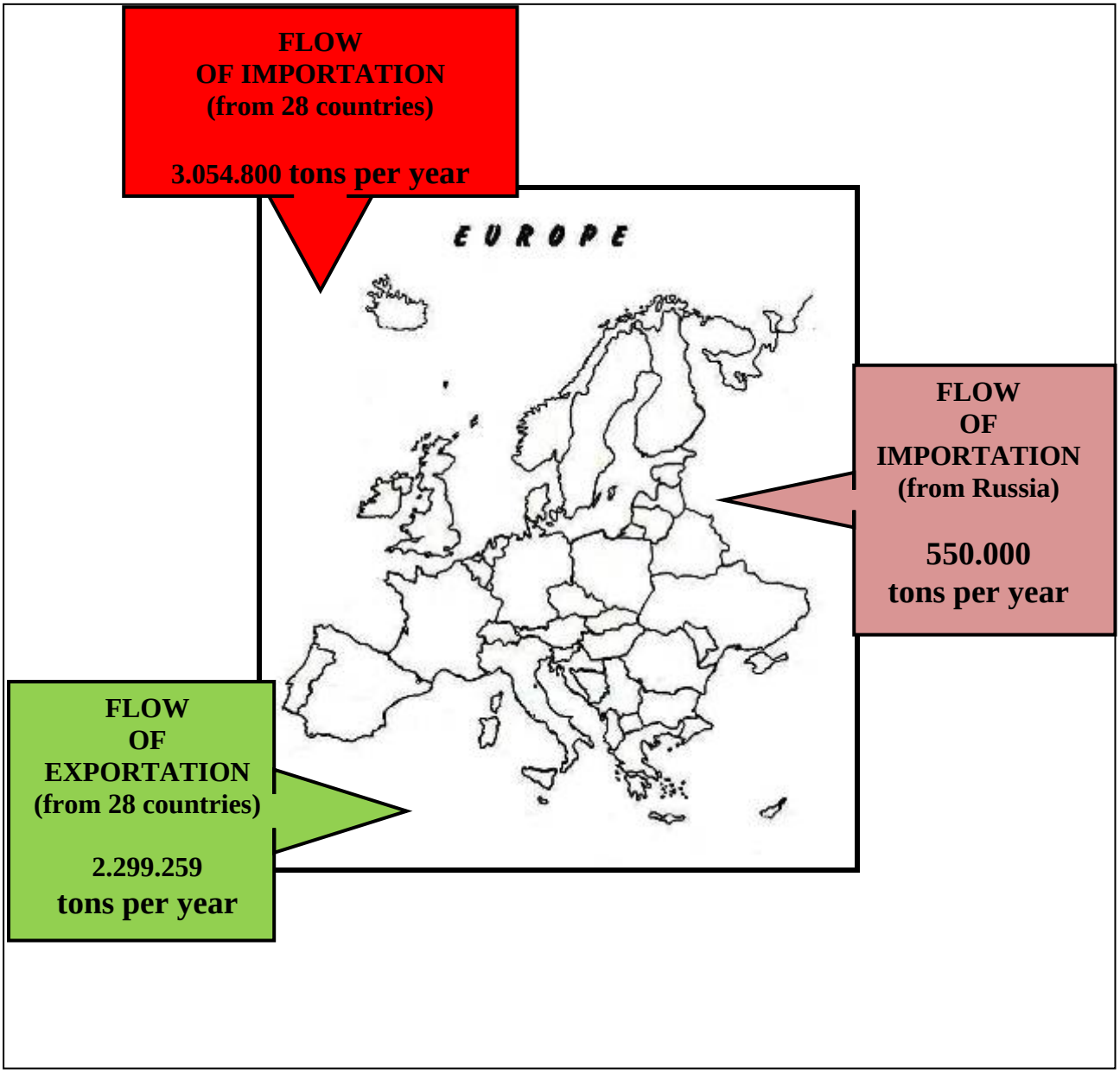


The classification of Importer and Exporter countries is available in the following table.

Import	Export
Belgium	Austria
Denmark	Bulgaria
Ireland	Czech Rep
Italy	Estonia
Ireland	Finland
Luxemburg	France
Netherlands	Germany
Norway	Greece
Sweden	Hungary
Switzerland	Latvia
UK	Lithuania
2.896.000 tons per year	Poland
	Portugal
	Romania
	Slovakia
	Slovenia
	Spain
	2.396.450 tons per year

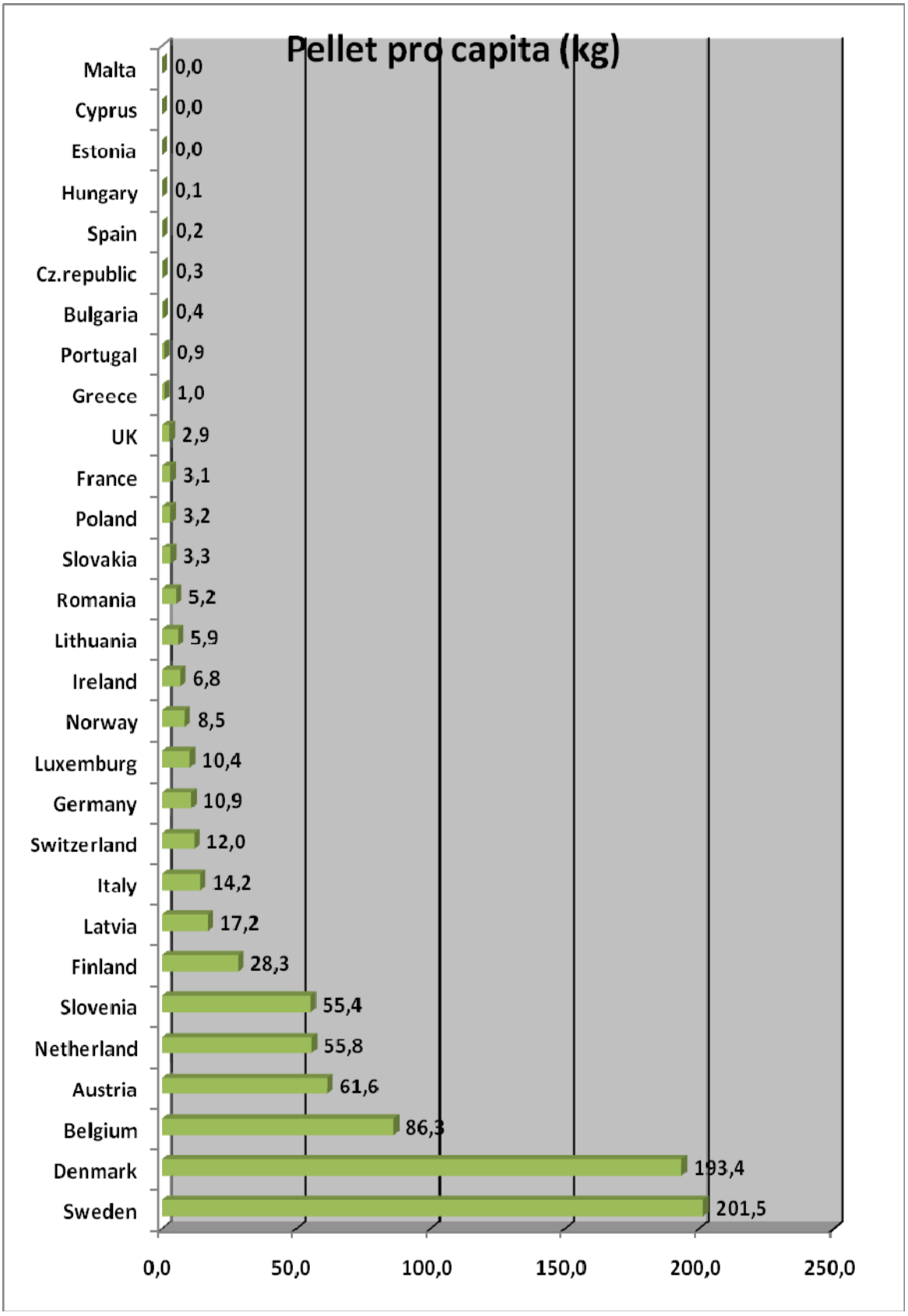
In the above table the countries with a propensity to importation or exportation are listed. The importation and exportation of pellets by themselves are not sufficient parameters to classify all the countries.
Normally the exportation of pellets is due to higher production compared to the national consumption and to business opportunity. There are several exceptions to this rules, in fact many Eastern countries are exporting their product only due to a high availability of raw material and not because of overproduction. In fact, many important exporting countries have no internal market at all.

In order to summarize the results of our calculation, the following data about “Importation and Exportation of Pellet in Europe” are expressed in the following page:



It must be noticed that our calculation considers only the European countries included in the Project. Even if Russia is not a Pellets@las country, it seems reasonable to provide the data of Russian exportation of pellets, as it is mainly destined to Europe. The amount of 550.000 tons per year is a reasonable assumption and also international literature confirms this number (Ratikova, Report 2008).

After the analysis of flows of Import / Export, the **Procapita utilization of pellets** is the following data to be considered.
In the following graphic, are listed the Procapita utilization of the country involved in our investigation.


Pellet pro capita (kg)
Malta 0,0
Cyprus 0,0
Estonia 0,0
Hungary 0,1
Spain 0,2
Cz.republic 0,3
Bulgaria 0,4
Portugal 0,9
Greece 1,0
UK 2,9
France 3,1
Poland 3,2
Slovakia 3,3
Romania 5,2
Lithuania 5,9
Ireland 6,8
Norway 8,5
Luxemburg 10,4
Germany 10,9
Switzerland 12,0
Italy 14,2
Latvia 17,2
Finland 28,3
Slovenia 55,4
Netherland 55,8
Austria 61,6
Belgium 86,3
Denmark 193,4
Sweden 201,5
0,0
50,0
100,0
150,0
200,0
250,0

After this last analysis based on data collected during the project, the following categories of countries are identified:

i. **Developed countries in EU pellet market.**

Countries where the pellet market is mature, well developed, with a good historical series of data about consumption, production, importation of pellets, with already developed national standards for pellet production; also countries that export their product due to a surplus of production can be considered as developed;

ii. **Emerging countries in EU pellet market,**

Countries with relevant actors in new markets, or countries that are finalizing their own national standards for pellet production and where there is a reasonable availability of historical series of data about consumption, production, import of pellets. These countries have still a limited consumption level, while the production in some cases is starting to be relevant (ex: Estonia);

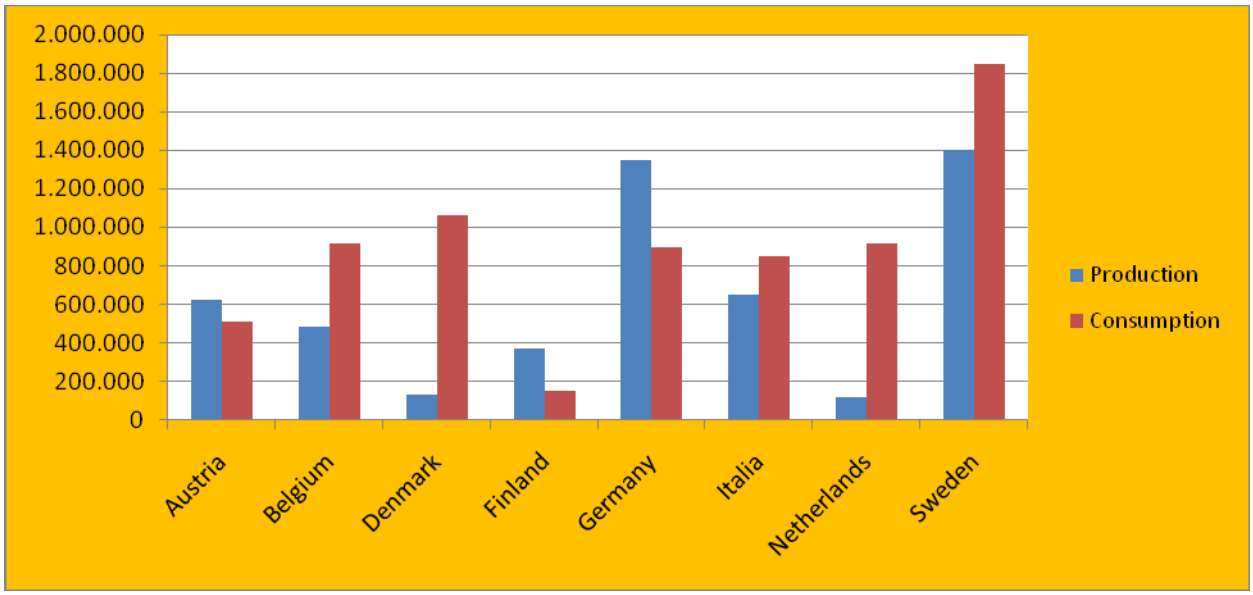
iii. **New countries in EU pellet market,**

Countries where opportunities concerning pellets are increasing, but with no historical series of data about consumption, production and export of pellets. New producers, traders, actors in any phase of the pellet supply chain, countries with no national standard for pellet production; exporters of pellets with a limited internal consumption";

In the following table it is possible to see the first results of our analysis expressed by the classifications requested from the contract:

Developed Pellet Market	Emerging Pellet Market	New Pellet Market
Austria	Estonia	Bulgaria
Belgium	France	Cyprus
Denmark	Norway	Czech republic
Finland	Poland	Greece
Germany	Romania	Hungary
Italy	Slovakia	Ireland
Netherlands	Spain	Lithuania
Sweden	Slovenia	Luxemburg
8 countries	Switzerland	Malta
	Latvia	Portugal
	UK	10 countries
	11 countries	

5. DEVELOPED PELLET MARKETS

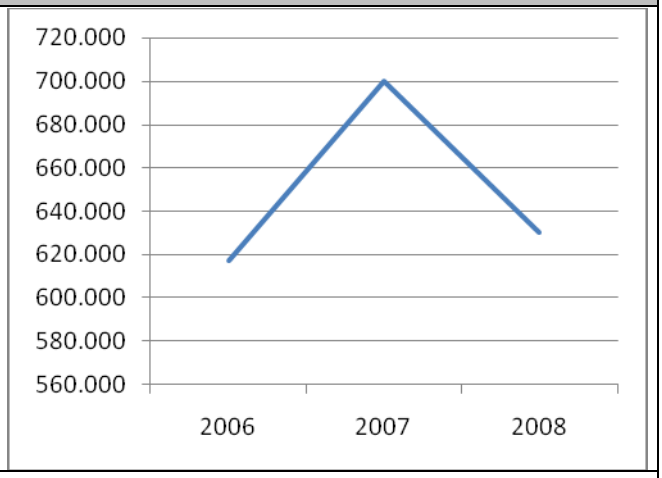


In the following pages each of these classified countries as "Developed Pellet Markets" are analysed and specific characteristics are explained.
It must be noticed that each national scheme includes:

- production level;
- graphic about real production;
- production capacity with existing plants;
- consumption level;
- importation/exportation;
- number of pellets producers;
- details about the structure of the national market.

Austria

Developed Pellet market



General Description:

In Austria a well established home market for pellets exists. The pellet consumption market is mainly confined to the residential heating sector. The main heating device for pellets is an automatically stocked pellet boiler with a heat output up to 50 kW.

The pellet production capacity increased from 410,000 tonnes in 2004 to around 1 Million tonnes in 2008. Sawmills directly provide the raw material for pellets and thus were the basis for the development of the pellet industry.

The national standard ÖNORM M 7135 is one of the most relevant in the European Market.

There is a good availability of historical data concerning the production and the consumption level of pellets, also due to the national association Propellets Austria.

In 2008 real production was lower than 2007. The reason for this gap is that in the first months of 2008 the oversupply caused very low prices and producers reduced the production as a consequence. In general fluctuations of the market are limited.

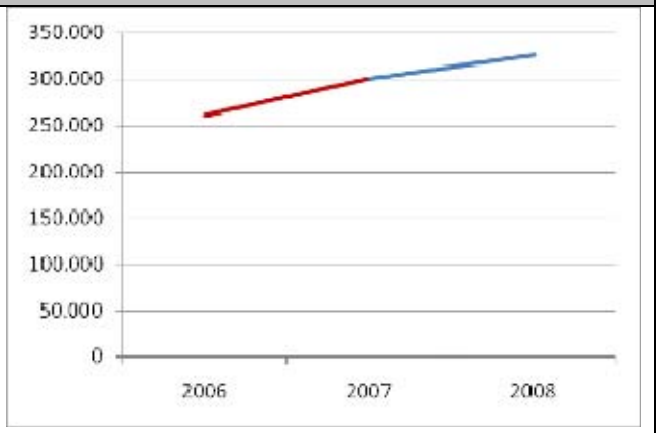
This country can be considered as a Developed Pellet market.

Number of plants for pellet production	25	**Production**	626.000 tons per year
Consumption	509.000 tons per year	**Production Capacity**	1.006.000 tons per year
Export	117.000 tons per year	**% Average growth (2006-2008)**	11.5
Num inhabitants	8.327.230	**Pellets Procapita**	61.6 kg pellets per habitant

Source: Pellets@las website; Holzforschung Austria; Country Report - Austria

Belgium

Developed Pellet market



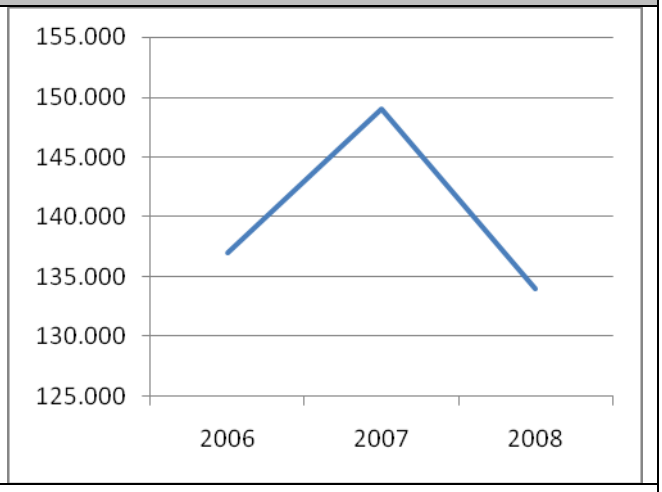
General Description:
Domestic pellet production in Belgium currently cannot satisfy their huge demand. The largest part of the industrial pellets used is imported, among others from Germany. In Belgium 10 pellets producers are operating, but most of market is managed by 7 biggest actors.
The Belgium market is surely well developed, as big users can guarantee a continuous demand. Also logistic and trading facilitations are relevant. Two big power plants using pellets (around 800.000 tons per year) are present today in Belgium.
The importation is relevant for this country, last year reached the level 595.000 tons.
The availability Green Certificate scheme in Belgium contributed to the stimulation of the demand for solid biofuels, including pellets, for electricity generation in co-firing.
Federal tax reductions and a grant system in Wallonia promote the development of this sector which was insignificant in 2006 and grew strongly, especially in 2008. Further growth can be expected especially in the pellet stove sector.
This country can be considered as Developed Pellet Market.

Number of plants for pellet production	10	**Production**	325.000 tons per year
Consumption	920.000 tons per year	**Production Capacity**	450.000 tons per year
Import	595.000 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents an assumption, so a realistic percentage can't be mentioned
Num inhabitants	10.660.770	**Pellets Procapita**	86.3 kg pellets per habitant

Source: D.7.1 – WIP; Pellets@las web data; Bioenergy International Journal.

Denmark

Developed Pellet market



General Description:

In 2008 the total wood pellet consumption in Denmark was around 1million tonnes. This very high level is due to the fact that more than half of the residential heat demand is supplied via district heating (DHs). Pellet production in Denmark is to a large extent based on dry wood residues from the numerous wood processing industries. The last year the national production capacity of around 135,000 t/y was able to cover 12.5% of the national demand.

Today Denmark has become the largest pellet importing country. The Danish wood pellet manufacturing companies vary in structure and comprise small, farm based pelletizing plants as well as large dedicated pellet plants operating close to all available hours. Currently 12 companies produce pellets in Denmark. The production decreased a bit for endogenous reasons, the country anyway is one of the most developed for what concerns all the aspect related to pellet, trading, logistics, etc. Two big power plants using pellets (around 355.000 tons per year) are present today in Denmark.

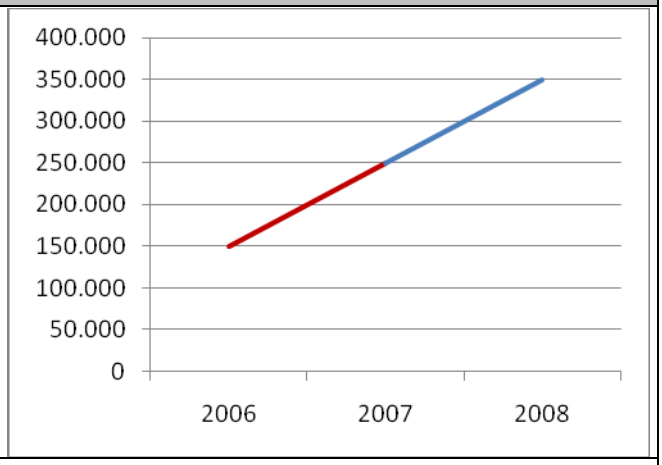
This country can be considered as a Developed Pellet Market.

Number of plants for pellet production	12	**Production**	134.000 tons per year
Consumption	1.060.000 tons per year	**Production Capacity**	313.000 tons per year
Import	926.000 tons per year	**% Average growth (2006-2008)**	-0.5
Num inhabitants	5.479.712	**Pellets Procapita**	193,4 kg pellets per habitant

Source: FORCE Technology; Pellet market country report – Denmark; Pellets@las web data.

Finland

Developed Pellet market



General Description:

Wood has been an important source of energy in Finland for centuries. Today about 90 % of the land area is covered by forests. The share of wood in total energy consumption is about 21 % in Finland.

Today there are around 19 plants with capacities from 2,500 (Punkaharju) up to 70,000 (Turenki owned by Biowatti Oy) tons per year. Total production was about 375,000 tons in 2008.

About 75 % of the produced pellets are still exported but the trend is changing rapidly. Exportation to power plants in Sweden, the Netherlands and Denmark are relevant. On the one hand the tough competition in the pellet market with new exporters like Latvia and Estonia is decreasing the profit of export. On the other hand, the domestic consumption is rising, especially the small scale consumption (<25 kW boilers). The Finnish domestic pellet market has developed more towards small scale consumption. The main reason for that is that the process has been fast and the large scale facilities need more time to scale up industrial pellet consumption. On the other hand the small scale consumption is the main target group of the national pellet promotion.

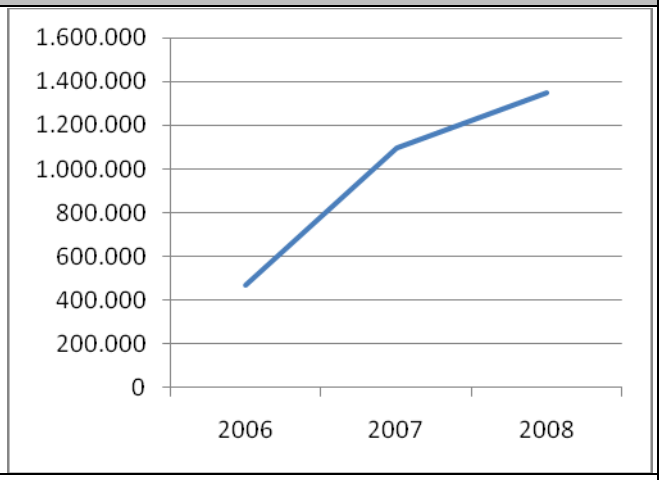
This country can be classified as Developed Pellet Market.

Number of plants for pellet production	19	**Production**	373.000 tons per year
Consumption	149.000 tons per year	**Production Capacity**	680.000 tons per year
Export	224.000 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num inhabitants	5.296.826	**Pellets Procapita**	28.3 kg pellets per habitant

Source: Letek; Pellets market country report -Finland; Pelllets@las web data.

Germany

Developed Pellet market



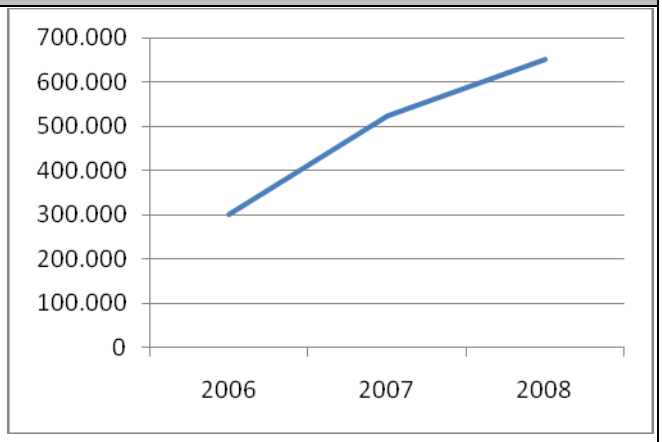
General Description:
Germany is one of the largest and leading pellet market worldwide in terms of produced and consumed volumes and installed production capacities. Also the number of pellets producers is high. Around 70 % of the producers are a small scale and their production capacities is lower than 30.000 tons per year. The large-scale producers (capacity: > 70.000 tonnes per year) represent around 60 % of the total pellet production capacity installed in Germany. In 2001, the German energy-pellet Association (DEPV) was founded. Pellet producers can have their products certified according to the stricter requirements of DINplus (this quality seal guarantees a higher quality than the original DIN).
Pellets are exclusively consumed by the residential small scale heating sector. Even if very good results are achieved in German market, the politic support is present and new market shares are foreseen in next years. The huge level of the production capacity confirm that this country is leader in Europe concerning the solid biofuel market.
This country can be considered as a Developed Pellet market.

Number of plants for pellet production	50	**Production**	1.460.000 tons per year
Consumption	900.000 tons per year	**Production Capacity**	2.400.000 tons per year
Export	560.000 tons per year	**% Average growth (2006-2008)**	178
Num inhabitants	82.200.162	**Pellets Procapita**	10.95 kg pellets per habitant

Source: WIP; Pellet market country report - Germany

Italy

Developed Pellet market



General Description:

The Italian production of pellets started in 1998, but today it shows very strong features. It developed almost exclusively for domestic heating with pellets typically packaged in small bags (15 kg), a comfortable option to feed little stoves of which Italy is the leading producers in Europe. Usually the pellet price in Italy is very volatile depending on the season: we touched the peak cost in middle to late winter and the lowest level during late spring and summer. The number of pellet producers has grown a lot during the last few years. Today in Italy over 75 producers of pellets are present, even if to define the correct number is very difficult, due to the lack of official documents. Some companies that until the year 2005 were classified as pellet producer stopped their production and started retailing activity. Certainly Italy has always been an importer country, as its production capacity has always been lower than the consumption. Most of the production (offer) is concentrated in Northern areas (73.3% of the national production comes from this area). The request (demand) of the product is distributed in a more heterogeneous way between the other regions of Italy. AIEL is the association that declares which companies produces pellets in accordance with the Pellet Gold standard, but it is not an independent certification agency. By now the lack of a real certification for wood pellets manufactured in Italy could generate distrust among users and so hamper the development of the market. At the same time the bigger producer in Italy stopped temporally its production as the raw material used was not 100% pure wood.

This fact made a bad advertisements to pellets fuel sector. Anyway Italy reached the production level of 650.000 tons per year, without considering the self producers. The demand as mentioned is always higher that the offer, but the importation from bordered countries increase year by year.

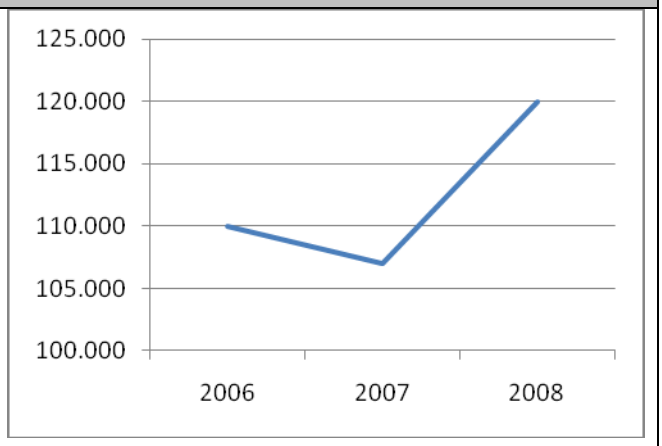
This country can be considered as Developed Pellet Market.

Number of plants for pellet production	75	**Production**	650.000 tons per year
Consumption	850.000 tons per year	**Production Capacity**	750.000 tons per year
Import	200.000 tons per year	**% Average growth (2006-2008)**	49
Num inhabitants	60.017.335	**Pellets Procapita**	14.6 kg pellets per habitant

Source: ETA Florence; Pellet Country report – Italy; www.aiel.cia.it;

Netherlands

Developed Pellet market



General Description:

The use of wood pellets in the Netherlands dates back about ten years, but due to its characteristics we can say that it is very different from other EU markets. Wood pellet consumption has increased from less than 200,000 tons in 2002 to over 900,000 tons in 2008. The peculiarity of this market is given by the final users.

The National market is formed from industrial users 95% (requiring less stringent quality standards) and 5% residential users. Due to this the production level is limited, but the consumption level increased constantly until 2006. During last 3 years, the market is stable with a positive rate of 4%. The quality of the produced pellets is mainly 'DIN 51731' based. The Dutch forest industry is merely based on large timber imports (Germany, Scandinavian countries, Indonesia, West African countries), because Dutch forests are relatively small (350,000 ha or about 8% of the country's land surface). As the Netherlands have very limited domestic resources of raw material freely available, it is unlikely that any new significant pellet production capacity will be built in the coming years. Given the ambitious Dutch policies for renewable energy and renewable electricity (20% renewable electricity production by the end of 2020), it is very likely that also in the future, import of biomass will be required to meet these targets. Today 5 large scale consumers are presents (with a annual consumption of over 850.000 tons) in Netherlands.

The main barrier for further increase in wood pellet consumption is the importation cost and the uncertain future policy support, especially for residential users.

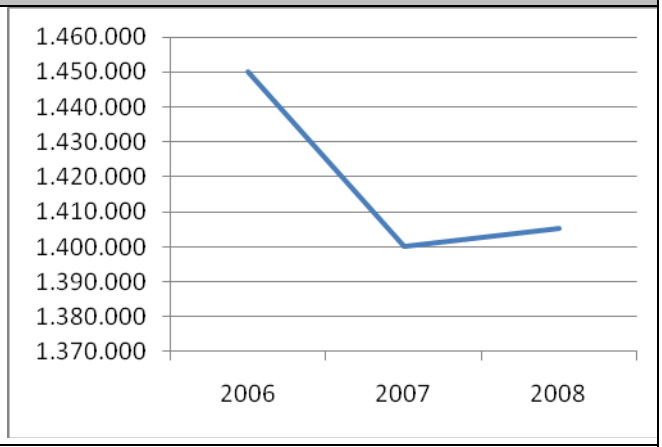
This country can be considered as Developed Pellet Market.

Number of plants for pellet production	2	**Production**	120.000 tons per year
Consumption	913.500 tons per year	**Production Capacity**	130.000 tons per year
Import	793.500 tons per year	**% Average growth (2006-2008)**	4.5
Num inhabitants	1.640.2047	**Pellets Procapita**	55.7 kg pellets per habitant

Source: Utrecht University Copernicus Institute; Pellet market country report – Netherlands; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Sweden

Developed Pellet market



General Description:

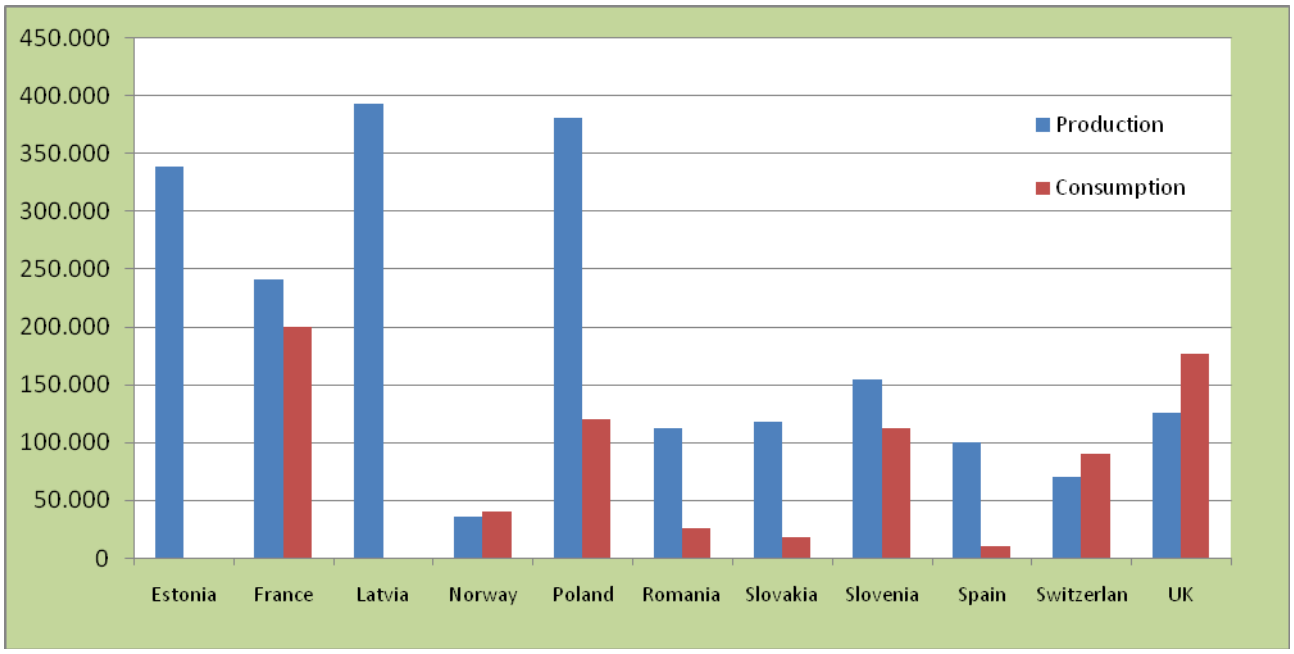
In 2008 the total wood pellet consumption in Sweden was around 1.85 million tonnes. The production is to a large extent based on residues from the numerous sawmills and wood processing industries and the production facilities are close to the feed stock generating industries. Pellets are produced at almost 95 sites, however the vast majority is produced by one third of these (33 producers). Main raw materials used for wood pellet production are sawdust, shavings, wood chips and other forestry by-products. Apart from being a large manufacturing country, Sweden also is a large wood pellet importing country. For the last year, Sweden has imported more than 440,000 t/y. The pellets are imported from Canada, Poland, Finland and the Baltic Countries. Some Swedish manufacturers also export pellets. Up to 150,000 t/y have been exported during the last years - the majority being shipped to Denmark and to the United Kingdom. Being a very well developed pellet market, all types of transportation modes and delivery types are in place. The Swedish wood pellet market will grow significantly in the years to come - both on the consumption side and the production side. The demand in the residential sector can be expected to increase due to high fossil fuel prices and high fossil fuel energy taxes. The pellet industry predicts a 50,000 t/y increase for the next years. The procapita utilization is the highest in Europe.

This country can be considered as a Developed Pellet Market.

Number of plants for pellet production	94	**Production**	1.405.000 tons per year
Consumption	1.850.000 tons per year	**Production Capacity**	2.200.000 tons per year
Import	445.000 tons per year	**% Average growth (2006-2008)**	-2
Num inhabitants	9.181.706	**Pellets Procapita**	201.49 kg pellets per habitant

Source: FORCE Technology; Pellet market country report – Denmark; Pellets@las web data.

6. EMERGING PELLET MARKETS

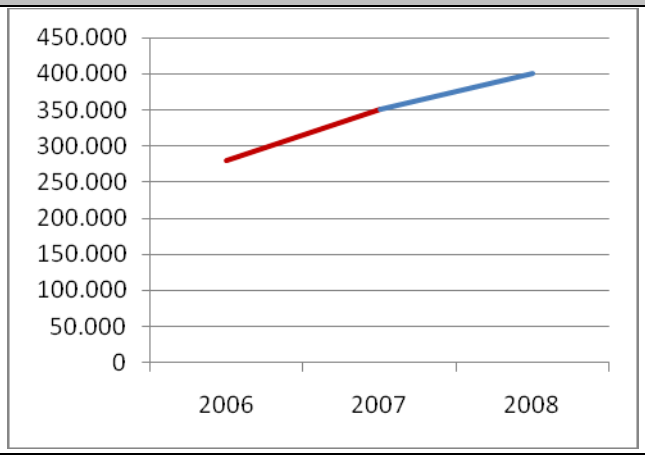


In the following pages each of these classified countries as "Emerging Pellet Markets" are analysed and specific characteristics are explained.
It must be noticed that each of the following national classification, includes:

- production level;
- graphic about real production;
- production capacity with existing plants;
- consumption level;
- importation/exportation;
- number of pellets producers;
- details about the structure of the national market.

Estonia

Emerging Pellet Market



General Description:
About 50% of the Estonian territory is covered by forests. Cheap labour and especially low energy costs in Estonia (but also generally good conditions for investments and low taxes) gave them good starting positions for entering the pellet market at the end of 1990's. In Estonia the domestic demand remained insignificant. Most of produced pellets are exported. In 2007, about 340,000 tons of produced pellets and briquettes was exported mainly to Denmark and Sweden. The number of pellets producers are 6, most of them located close to the capital, for logistic facilitations.
The production capacity could increase in next years, as the raw material has a limited prices, also due to the short distance with Russia.
This country can be classified as Emerging Pellet Market.

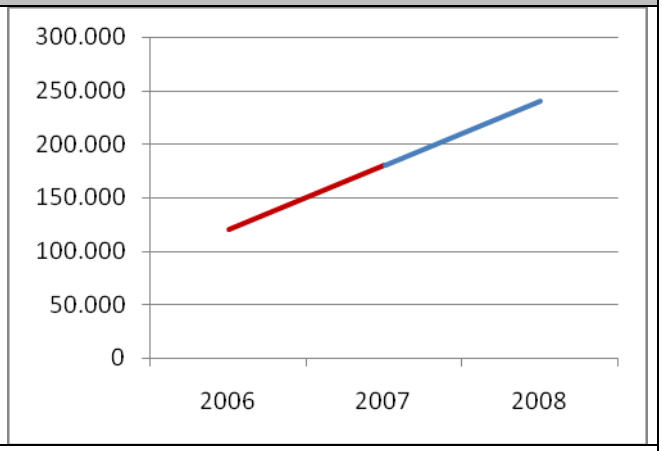
Number of plants for pellet production	6	**Production**	338.000 tons per year
Consumption	0	**Production Capacity**	485.000 tons per year
Export	338.000 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num inhabitants	1.338.617	**Pellets Procapita**	0 kg pellets per habitant

Source: Letek; Pellets market country report on Baltic countries –Estonia; 2009; Pelllets@las web data.

Please note: following to the classification used in this report, the countries with no internal demand should be classified as New Pellet Market. Anyway, the high level of production of Estonia (338.000 tons per year) and the fact to have a limited internal market convinced to make an exception, classifying Estonia as Emerging Pellet Market.

France

Emerging Pellet Market



General Description:

The large potential for pellet production and consumption in France is not reflected by the comparably slow market development. On the other hand, the slow growth in France avoided inconsistencies concerning pellet supply. Barriers to stronger growth in this sector are that wood for energy purposes doesn't have a strong tradition and that the prices for electricity and gas are regulated at a comparably low level. Furthermore, pellet appliances are produced only by a few companies in France and installers (who are a main driver in other countries) do not promote pellet heating systems. In 2008, the total pellet consumption in France was around 200,000 tonnes. This is accounted for exclusively by the residential sector since pellet use for power generation is not reported.

This demand is satisfied by around 30 small and medium scale companies who produced around 210,000 tonnes in 2008. The other producers are covering the missing quote; they can be saw millers or feed producers but more recently are emerging also dedicated pellet producers which collect raw materials from a number of small saw mills. France imported around 20,000 tonnes of wood pellets last year (from Germany, Spain, etc.) and exported around 40,000 tonnes to Italy, UK and some other countries. It must be noticed that the French production capacity is 6 times bigger than the real production. Probably some new producers will enter into the market from new year.

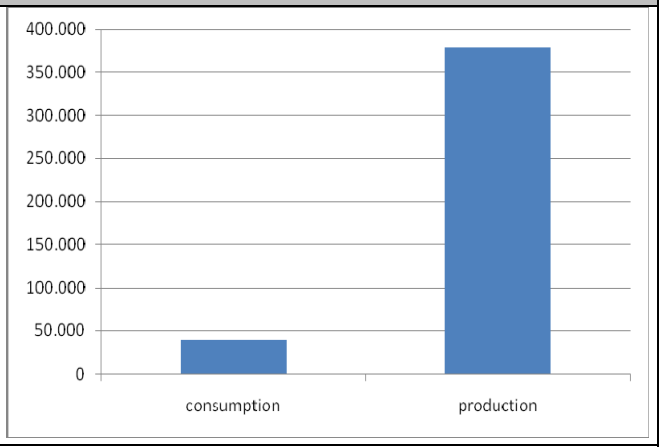
This country can be classified as Emerging Pellet Market.

Number of plants for pellet production	60	**Production**	240.000 tons per year
Consumption	200.000 tons per year	**Production Capacity**	1.391.000 tons per year
Export	40.000 tons per year t	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num habitants	63.779.059	**Pellets Procapita**	3.14 kg pellets per habitant

Source: Pellets@las wed data and short country report France
http://www.pelletsatlas.info/cms/site.aspx?p=10597 ; Bioenergy International Journal;
Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Latvia

Emerging Pellet Market



General Description:

About 32% of Latvian territory is covered by forests. The economical and social conditions are very similar to Estonia, with a low labour costs and facilitation from the logistic point of view (availability of cheap raw material from bordered countries, etc).

Lower prizes and good quality raw material caused the wood industry to focus on imported resources. This also applies to a number of pellet producers that are combining industrial by-products, wood waste, forest residues and timber.

The number of pellets producers are 15, even if at least 4 producers stopped their industry. The National production reached the level of 379.000 tons.

The production capacity is higher, due to recent investments in pellets production sector. During the next years Latvia is going to become more and more important in European market as their equipment has a very high potential not utilized at the moment. The consumption level is starting to increase and an amount of 39.000 tons was consumed last year. If the calculation per capita is considered, Latvia has already a reasonable internal consumption, compared to other countries, but if total numbers are taken in consideration, the internal market can still increase as most of the production is destined to exportation.

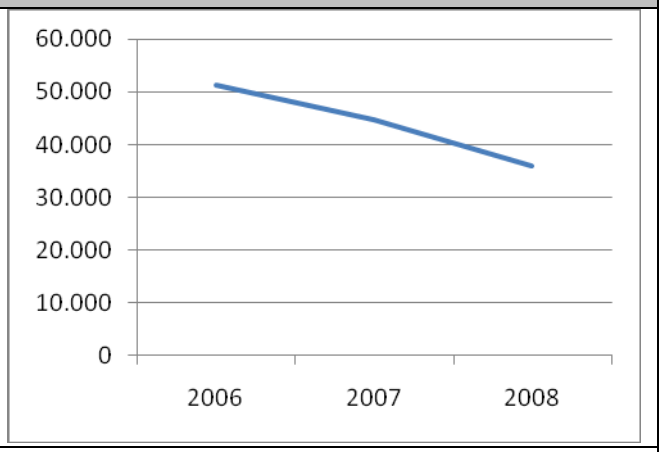
This country can be classified as Emerging Pellet Market.

Number of plants for pellet production	15	**Production**	379.000 tons per year
Consumption	39.000 tons per year	**Production Capacity**	743.600 tons per year
Export	340.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible
Num habitants	2.269.101	**Pellets Procapita**	17.19 kg pellets per habitant

Source: Letek; Pellets market country report on Baltic countries –Latvia; Pelllets@las web data.

Norway

Emerging Pellet Market



General Description:
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 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. At the same time this limited production reflects the market, otherwise main actors would act differently. 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.
This country can be considered an Emerging Pellet Market.

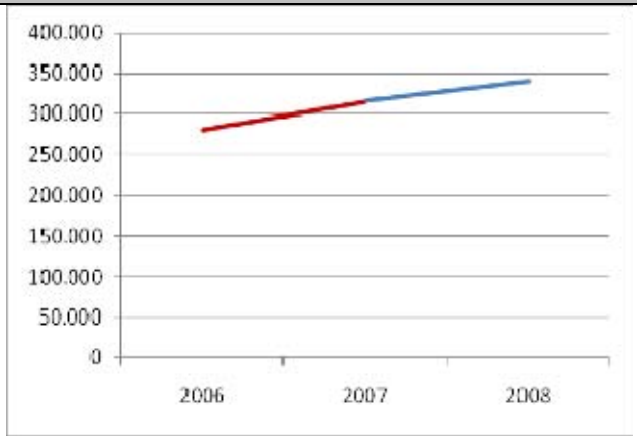
Number of plants for pellet production	8	**Production**	35.100 tons per year
Consumption	39.800 tons per year	**Production Capacity**	164.000 tons per year
Import	4.700 tons per year	**% Average growth (2006-2008)**	-16.5
Num habitants	4.695.134	**Pellets Procapita**	8.52 kg pellets per habitant

Sources: FORCE Technology, Pellets market country report on Norway; Pellets@las web data; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Please note: the Norwegian market is balanced, but due to its limited internal market and especially to their impressive possibility of growth (especially for production level), we prefer not to include this country in the list of Developed Pellet Markets, since now. It must be noticed that when new plants will start (2010), the country will become a Developed Market.

Poland

Emerging Pellet Market



General Description:

Pellet production has started in Poland in 2003. At the very beginning they were mainly exported. Then, the first pellet boilers were installed and domestic consumption started to develop. Today, due to legal regulations, even large energy producers like district heating (DH) companies or CHP plant operators become pellet consumers.

There are 21 pellet companies in operation, however some of them change the production profile or leave the market due to lacking profit and some new ones enter the market from time to time. The majority of Polish wood pellet producers have annual production capacities below 30,000 tons. These are small or medium companies that buy their raw materials from wood processing industries in their vicinity. They operate their own regional distribution system. In the large scale, only three sites are known. Two of them are operated by wood industry companies. The third one is a dedicated pellet company. There is no national standard for the quality control of pellets. The production level reaches 340.000 tons per year.

Some pellets meet the requirements of the German standard DIN 51731. Wood shavings and saw dust are the mainly used raw material for pellet production. The quality of the raw material originating from furniture or construction industry is generally good.

It is possible that some part of the consumption is industrial pellet, with a lower quality than pure wood pellets. This market is really close to become mature.

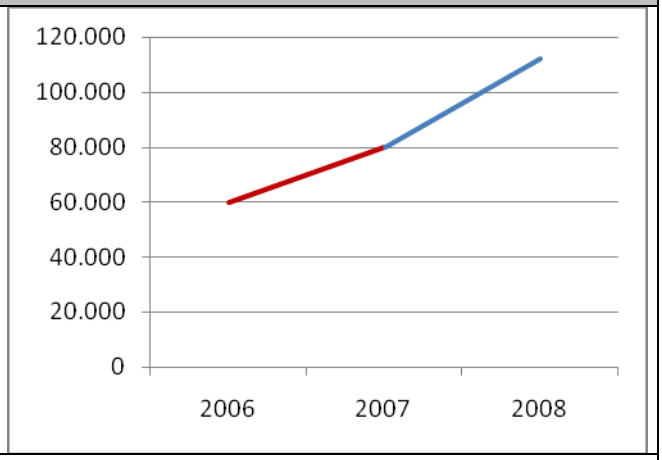
This country can be considered as an Emerging Pellet Market.

Number of plants for pellet production	21	**Production**	340.200 tons per year
Consumption	120.000 tons per year	**Production Capacity**	674.200 tons per year
Export	220.200 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible
Num habitants	37.996.168	**Pellets Procapita**	3.16 kg pellets per habitant

Sources: Baltic Energy Conservation Agency - BAPE, Pellet Country report – Poland, 2009; Pelllets@las web data; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Romania

Emerging Pellet Market



General Description:

Romania has 6.3 million hectares of forestland. Presently biomass, such as wood and wood chips, is used to heat private households and provide them with warm water. In addition, a small amount is used in modern and low-emission power plants. Although the number of newly built pellet plants had increased rapidly within the last few years, the use of wood pellets in Romania especially for private heating is still very limited.

At least 80 % of the production is exported. The most relevant export countries are Italy followed by Austria, Hungary and Germany. In Romania the renewable energy sources represent a new market with much less market actors than in the developed countries but with promising perspectives for the future. The consumption is still limited, but the production is starting to be relevant. The production plants (21) are predominantly small-sized companies with only two medium-sized plants. In 2008 the production capacity amounted to about 260.000 tons per year with a production of around 114.000 tons per year.

Romania is classified as Emerging Country, as the market is still very young but the producers have new equipments, the production capacity will permit to increase the market and production itself. At present there exist no national standards or regulations regarding pellets in Romania. Most producers state that their pellets meet the requirements of the German standard "DIN 51731". Pellets are made from wood chips or from by-products out of the industrial wood processing. The latter possibility is the currently most used in Romania. In 2008 a pellet association was formed with the intention to establish a home market for pellets. We consider Romania as one important actor in EU market, as soon as standardized methods will be defined for producers.

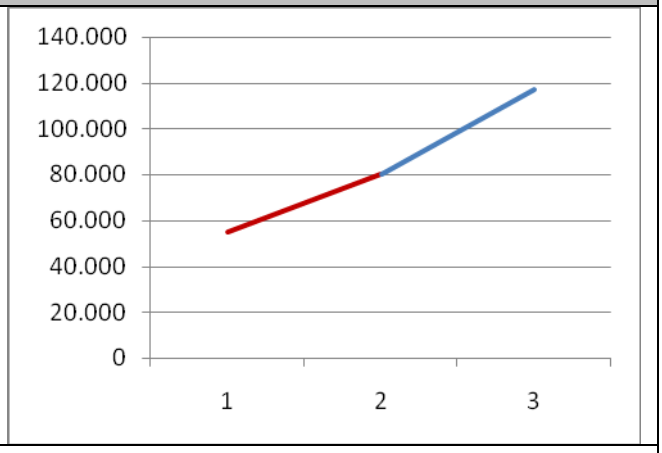
This country can be classified as Emerging Pellet Market

Number of plants for pellet production	21	**Production**	114.000 tons per year
Consumption	25.000 tons per year	**Production Capacity**	260.000 tons per year
Export	89.000 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num habitants	21.423.366	**Pellets Procapita**	5.23 kg pellets per habitant

Source: Pellets@las website; Holzforschung; Country Report - Romania 2009;
Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Slovakia

Emerging Pellet Market



General Description:

Pellet production in Slovakia reached 117.000 tonnes per year and hardly 10% of it is consumed in the domestic energy market while the raw material potential is estimated to allow for the production of 1 Million tonnes of wood pellets alone per year. The same amount of pellets can be expected for pellet production from agricultural residues.

In Slovakia pellets are used mainly in small and middle boiler-rooms in areas where no gas connection is available. Medium scale users are usually schools, municipal offices, companies, hotels and bigger residential units with demands of 10-1000 tonnes per year. This market share is growing most rapidly.

Expansion of the market started in 2006, when the sale price of pellets exported mainly to Italy and Austria was very high. In 2007 pellet prices decreased significantly and as a consequence several pellet production plants were shut down temporarily or perpetually. The pellet production began to recover gradually in 2008.

All pellet production plants in Slovakia are small in comparison to the European average. Therefore production costs are relatively high. Pellets which are exported to the power plants are sold for 100 EUR per tonne which means that the profit margins for pellet producers are very low. Nevertheless, it can be expected that 2 or 3 additional large wood pellet production plants and 4 or 5 large agripellet production plants will be established in the near future. Today 14 producers are operating in Slovakia and even if production capacity is balanced with production, Slovakia can be considered an interesting market for pellet industry sector.

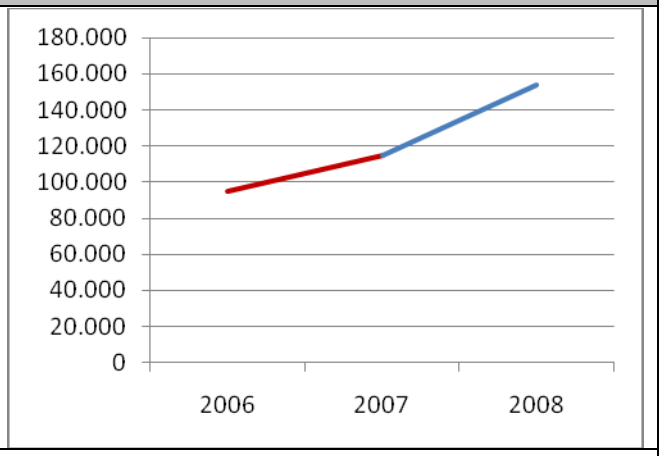
This country can be considered as Emerging Pellet Market.

Number of plants for pellet production	14	**Production**	117.000 tons per year
Consumption	17.550 tons per year	**Production Capacity**	142.000 tons per year
Export	99.450 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num habitants	5.398.759	**Pellets Procapita**	3.29 kg pellets per habitant

Sources: Pellets@las short report Slovakia http://www.pelletsatlas.info/cms/site.aspx?p=9320 ; Bioenergy Journal; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Slovenia

Emerging Pellet Market



General Description:

Slovenia is one of the most densely forested countries in Europe. More than a half of its territory (1,169,196 ha) are covered with forests (forestation amounts to 57.7 %). Today the production reach around 150.000 tons per year, a limited production that fit very well with the internal consumption and with the exportation quote. Biomass has been used mostly for heating and small-scale electricity production but we have found large-scale users substituting charcoal in power plants. However, pellets face significant competition in Slovenia as firewood and wood chips have been commonly used energy sources for a long time.

These major pellet producers rely on exports to the Italian market, for their surplus quote, as they produce according to Italian standards / certifications and are close to the border.

The production (154.000 tons per year) and the consumption (112.000 tons per year) are well balanced and also exportation is going to become a relevant business for Slovenian actors. Trbovlje and in Sostanj two power plants, are starting to use low quality pellets for combustion with coal, occasionally. In Slovenia, a well organized online trading platform has been working for years already and this positive instrument must be underlined (http://res.borzen.si/DesktopDefault.aspx).

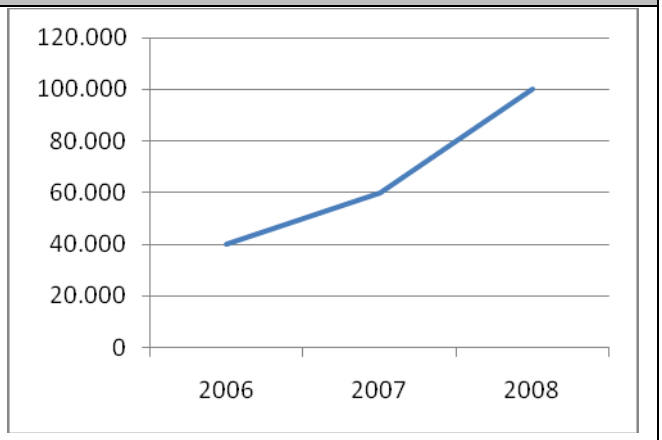
This country can be considered as a Emerging Pellet Market

Number of plants for pellet production	4	**Production**	154.000 tons per year
Consumption	112.000 tons per year	**Production Capacity**	185.000 tons per year
Export	42.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible
Num habitants	2.022.636	**Pellets Procapita**	55.37 kg pellets per habitant

Source: Geonardo Ltd, Pellet Country report – Slovenia; Pelllets@las web data;
Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Spain

Emerging Pellet Market



General Description:

The Spanish pellets market is quite new, since it started only in 2005. The production capacity has increased greatly from approx. 75,000 tons/year in 2006 to over 250,000 tons/year in 2008 and probably these numbers will continue to rise in the next years, as new pellet production plants are appearing in many regions.

This emerging production capacity did not result in an explosion of the national consumption so far. On the contrary this figure was very low, as only 10.000 tons were consumed in 2008 all over Spain. This quantity represents around 10 % of the total annual production; the obvious consequence is that Spain exports large quantities of pellets. The pellets price is lower than the average prices in Europe and this fact facilitated the development of the business. The magazine "Bioenergy International" declares that 17 production plants are operative, but at least six of them are still in a start up phase. Pellet consumption in Spain is almost negligible compared to other European countries where the market is fully developed. We calculated approx. 10,000 tons in 2008. It is mainly developed in small scale, with pellets used as fuel for small heating plants. The quality of Spanish pellets is generally good, but only one large company with an international certification (DINplus) was identified. The market is formed by small and medium scale boilers with an average nominal power of 25-35 MW.

There are no national incentives for pellets use in Spain, but Regional Governments, through their energy branches or energy agencies, provide various support. Further details can be found in chapter 8 – Recommendations.

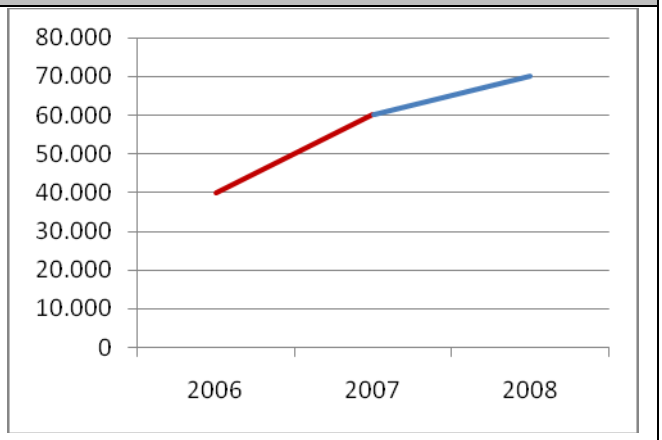
This country can be classified as Emerging Pellet Market.

Number of plants for pellet production	17	**Production**	100.000 tons per year
Consumption	10.000 tons per year	**Production Capacity**	250.000 tons per year
Export	90.000 tons per year	**% Average growth (2006-2008)**	58
Num habitants	45.257.696	**Pellets Procapita**	0.22 kg pellets per habitant

Source: Pellets@las website; ETA Florence; Country Report – Spain, 2009;

Switzerland

Emerging Pellet Market



General Description:

The Swiss association "Holzenergie Schweiz" estimates the annual production capacities at 170,000 tonnes (end of 2007) and the consumption in the last winter at 90,000 tonnes. However, considering the resulting per capita values of pellet consumption of almost 11 kg per person, Switzerland becomes comparable to Germany.

Wood pellets are mostly used in small scale applications for heating purposes in the residential sector. The pellet trading infrastructure is well developed and end-consumers are supplied reliably.

No big pellet producers exist in Switzerland but due to a high abundance of potential raw materials first experiences with pellet production were already gained during the 1980´s. From 1996 and later more pellet producers entered the market. Most of them operate the pellet business as a minor second activity in addition to their wood processing business. The installed production capacities tripled from 2003 to 2004 and reached 50,000 tonnes per year in 2005. The strong growth continues until today. The lack of big producers suggests to include this market into the Emerging Pellet Market, but the characteristic of the market are mature.

Despite the small scale, many independent brands are on the market and the distribution is often organized by the producers who deliver the pellets regionally by their own logistic park. In parallel, production and distribution networks are forming. Besides the small scale producers, two medium scale producers are dominating the market.

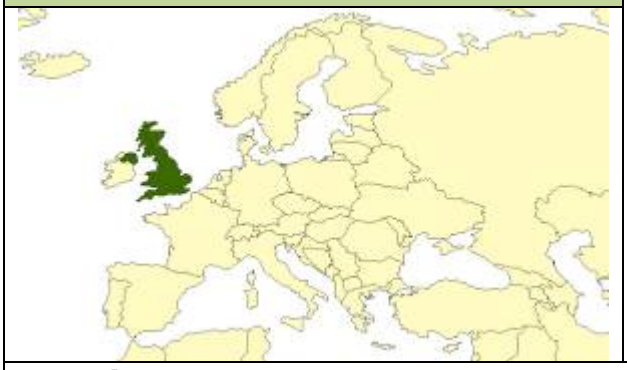
This country can be classified as Emerging Pellet Market

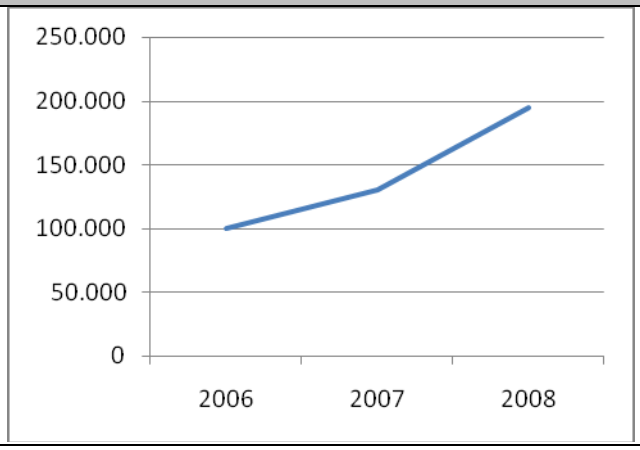
Number of plants for pellet production	14	**Production**	70.000 tons per year
Consumption	90.000 tons per year	**Production Capacity**	171.000 tons per year
Import	20.000 tons per year	**% Average growth (2006-2008)**	Due to the lack of historical data, the red line in graph represents our assumption, so a realistic percentage can't be mentioned
Num habitants	7.508.700	**Pellets Procapita**	11.99 tons pellets per habitant

Source: WIP; Pellet market country report – Switzerland, 2009;

UK

Emerging Pellet Market





General Description:

Having started in the late 1990's the pellet market in the UK is beginning to reach a developed stage, with approximately 68 suppliers of pellets and 15 manufacturers by the end of 2008. Pellets manufactured in the UK are generally made from sawdust, clean waste wood (diverted from landfill) and energy crops (such as willow grown on short rotation coppice) and forest thinnings. The first type of pellet is generally used for residential and commercial heating, while the second type of pellet is destined for co-firing.

The cost of sawdust (due to competition from other users) is thought to be relatively high in the UK. It is very difficult to find exact data about the large scale consumption of pellets, as the big power plants are able to process any kind of biomass, and input data is not easy to obtain. Emissions standards are very strict in the UK and for this reason and the reduction in the financial incentive for power generators to co-fire non energy crop pellets, it is though likely that the quantity of wood pellets co-fired will drop substantially, at least in the short term.

In general it can be said that the UK market is well developed in relation to trading and logistics, as large quantities of pellets arrive by ship every year. Today (October 2009) production capacity has increased to 429,500 with the opening this month of the Balcas Plant at Invergordan in Scotland (capacity 100,000 tonnes) and a 80,000 tonne plant by Silvigen at Goole on the Humber in the North East of England. Actual production might now be higher than the 2008 estimate of 125,000, but perhaps not by much until these new plants reach their full production capacity.

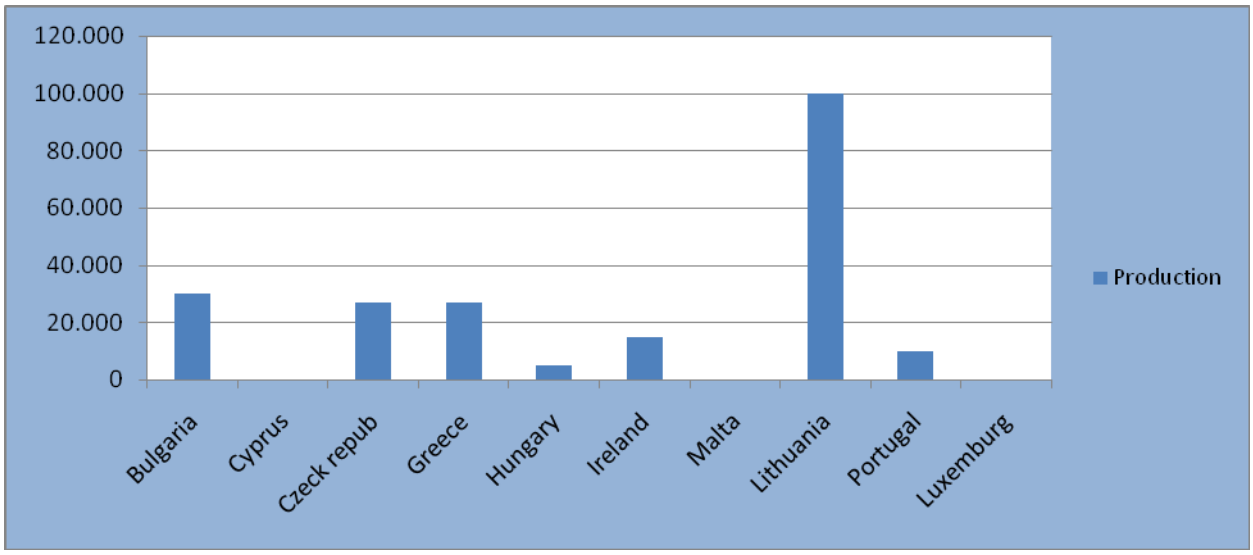
Due to presence of a number of coal power plants which can co-fire pellets and the building of dedicated biomass fired power station, the consumption of biomass (straw, other agricultural residues, woodchips etc) in the UK is set to grow substantially. How much of this biomass will be wood pellets, remains to be seen. Current indications are that much of this biomass might be in the form of straw pellets and woodchip.

This country can be classified as Emerging Pellet Market.

Number of plants for pellet production	15	**Production**	125.000 tons per year
Consumption	176.000 tons per year	**Production Capacity**	218.000 tons per year
Import	51.000 tons per year	**% Average growth (2006-2008)**	40
Num habitants	61.270.283	**Pellets Procapita**	2.87 kg pellets per habitant

Source: The National Energy Foundation NEF; Pellet market country report – UK

7. NEW PELLET MARKETS

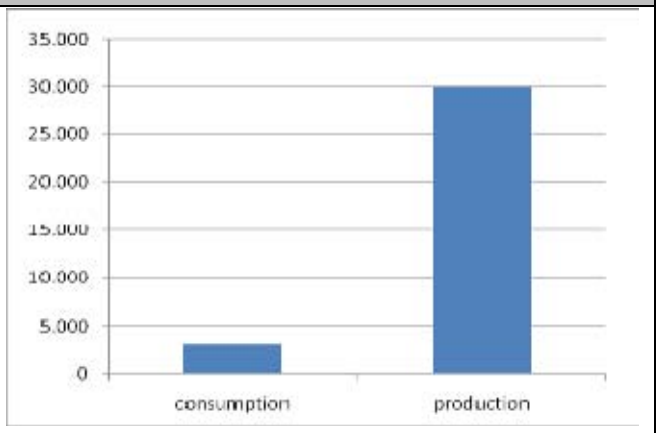


The countries Malta, Cyprus and Luxemburg are not listed with a specific national scheme as their pellet market is close to zero for Malta and Cyprus, and is relatively small in Luxemburg., but at the end of the chapter a short paragraph provide gathered information on these countries. So only a short comments will be added at the end of this chapter.
In the following pages each of these classified countries as "New Pellet Markets" are analysed and specific characteristics are explained.
It must be noticed that each national scheme, includes:

- production level;
- graphic about real production;
- production capacity with existing plants;
- consumption level;
- importation/exportation;
- number of pellets producers;
- details about the structure of the national market.

Bulgaria

New Pellet Market



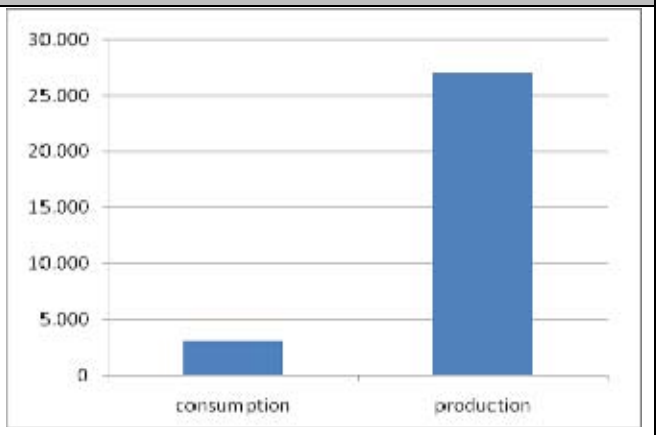
General Description:
Bulgaria's forests cover around 4.1 million ha, about 33 % of the national territory. This is the basis for wood pellet production in the country. Still the wood pellet market in Bulgaria is only at the beginning of development. There exist a number of rather small pellets manufacturers with a total production capacity of about 62,000 tons/year. 80-90 % of the pellets are exported (mainly to Italy). Unfortunately the most popular use of biomass in Bulgaria nowadays is combustion of fire wood. Due to the low Energy (incl. electricity) tariffs, the most popular heating sources were firewood and electricity. The overall situation of the Bulgarian pellet market is difficult to track, as there is no pellet Association. The producers (17 SMes) are diffuse on the territory, and even if the Bulgarian market is running at 50% of its maximum production capacity, there is a reasonable possibility in the future for the development of a national market.
Most producers stated that their pellets meet the requirements of the German standard "DIN 51731.
The procapita utilization of pellet is 0.39 kg per habitant.
This country can be considered as a New Pellet Market.

Number of plants for pellet production	17	**Production**	27.200 tons per year
Consumption	3.000 tons per year	**Production Capacity**	62.300 tons per year
Export	24.200 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: Holzforschung Austria; Pellet market country report- Bulgaria; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Czech Republic

New Pellet Market



General Description:
Currently 12 companies are producing pellets as their primary activity, with a total production of 27,000 tons per year. Pellets are also produced by few other companies, for which the pellets production represents only marginal interest and which usually use residues from their wood or agricultural production. Production volumes of these companies are negligible. Wood pellets are produced with very high qualities, some manufacturers possess the certificates Önorm M 7135 or DIN 51 731. High qualities are necessary to allow for the export of pellets. Pellet production potential in the Czech Republic is very high, but due to various reasons, e.g. a lack of raw material during winter, problems with machinery maintenance etc., production level remain low. The production capacity is about 78,000 tons per year, but the production is only 27,000 tons, 24,000 tones going to export (especially to Austria and Germany). Only 3,000 tons remain for domestic consumption. Anyway new investments in term of production capacity are required. Most of the pellets are produced from spruce or pine saw-dust. Only a few manufacturers produce agropellets and their production is actually insignificant but we can notice an increasing trend towards this kind of production. The country's biggest briquettes and pellets producer is Biomac with an annual production of as much as 80,000 tons of briquettes and 10,000 tons of pellets.
Still, only 45,000 tons of briquettes and 4,000 tons of pellets are consumed within the Czech market, with about 40,000 tons of briquettes and 3,000 tons of pellets consumed by households for individual heating.
The main reason why most of the production is exported to foreign markets is the lower purchasing power of Czech customers. High investment costs for residential pellet boilers are the main barrier to market growth in the residential sector.
The procapita utilization of pellet is 0.29 kg per habitant
This country can be considered as New Pellet Market.

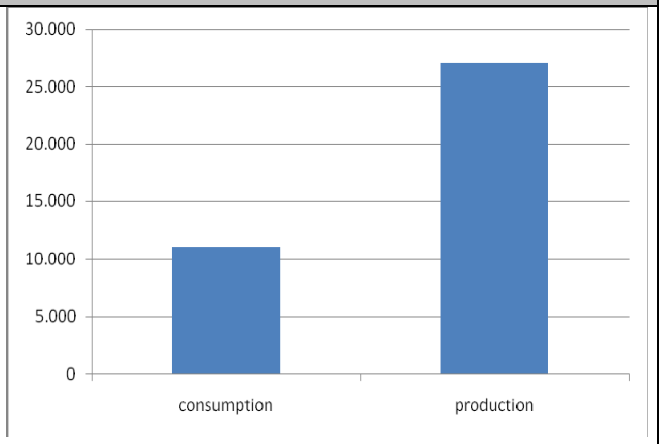
Number of plants for pellet production	12	**Production**	27.000 tons per year
Consumption	3.000 tons per year	**Production Capacity**	78.000 tons per year
Export	24.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Sources: Baltic Energy Conservation Agency; Country report – Czech Republic; 2009; Pellets@las web data ; short country report Czech republic http://www.pelletsatlas.info/cms/site.aspx?p=9318 ; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Please note: due to the relevant production of briquette it is difficult to define the exact production of pellets.

Greece

New Pellet Market



General Description:

The pellet industry in Greece is growing continuously but slowly. In general, the Greek energy policy is based on fossil fuels, which is proven by the fact that more than 90 % of the total energy consumption is derived from oil, natural gas and coal.

There are some wood industries that have already started pellet production mostly by using their own wood by-products. However, pellet consumption in Greece, especially in households, remains on very low levels. Wood by-products are usually being used without any processing, mainly for heating purposes in the agricultural sector. Until now, the lack of domestic pellet demand in Greece forces the producers to target European markets and to export the largest share of their production to Italy, the most relevant import market. Quality standards are not applied in the Greek production industry, but the plants follow a certain production procedure provided by pelletizing equipment manufacturers. Nowadays, the major raw material for pellet production is wood residues from wood industries (furniture producers, building materials, etc.). The current biomass availability covers the demand of the pellet industry, but biomass availability will become a limiting factor rather soon.

There is no legislative framework for pellet production and consumption in Greece.

The National consumption is very limited. The production is also very close to its maximum production capacity. New investments are required in order to increase the pellet market.

The procapita utilization of pellet is 0.98 kg per habitant.

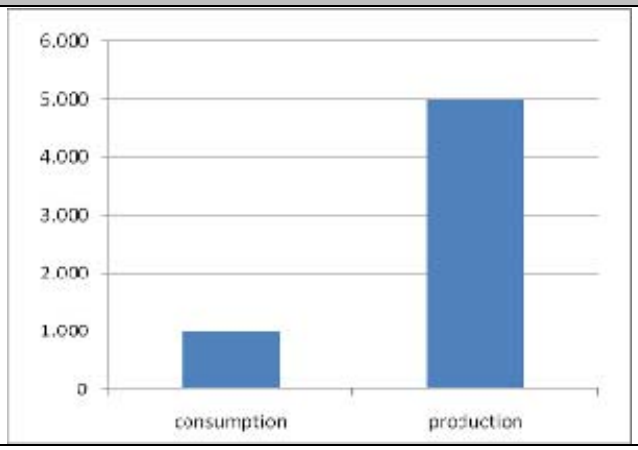
This country can be considered as New Pellet Market.

Number of plants for pellet production	5	**Production**	27.800 tons per year
Consumption	11.100 tons per year	**Production Capacity**	87.000 tons per year
Export	16.700 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: Agricultural University Of Athens, Country Report 2009 – Greece;

Hungary

New Pellet Market



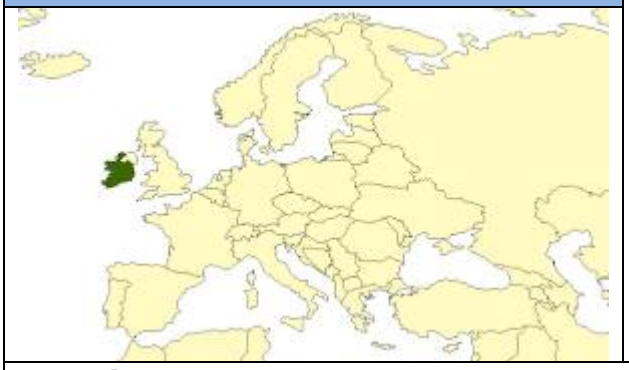
General Description:
The Hungarian pellet market is at an initial stage. The country can be divided into two main parts, both geographically and by the raw materials used for pelletizing. Both wooden and agricultural pellets are made. In Hungary, in fact , there is a reasonable availability of wood industry residues and also many cultivation of cereals (28% of cultivated land). In the second half of 2008 the Hungarian Pellet Association (www.mapellet.hu) was funded, it is also due to an higher interest into pellet fuel. The production and the consumption are still very limited, but the production capacity opens the possibility of higher increases in future years. Many investments on production are running and new pellet producers are going to start their production. Three major investments took place in recent year, which made the capacity 6.000 tons in Petıháza, 11.000 tons in Belezna and 80.000 tons in Lajosmizse. When the plants will be working at full time the production capacity of Hungary will be much higher. The first objective of this production will be exportation, but positive trend will be given also to internal market.
No National standard is available at the moment, but the new Association could start thinking to any standard. The market is formed in bigger part from boilers, than stoves.
The procapita utilization of pellet is 0.10 kg per habitant
This country can be classified as New Pellet Market.

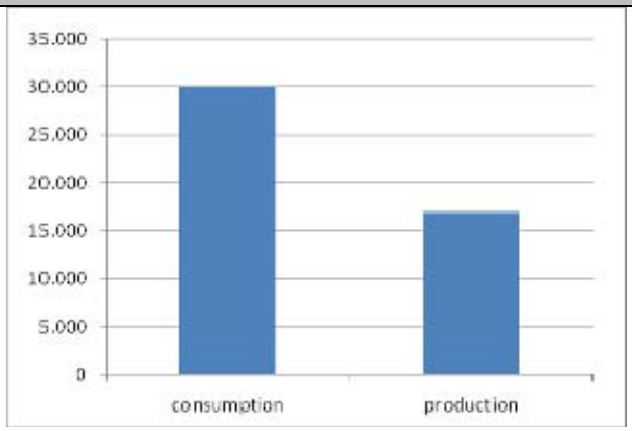
Number of plants for pellet production	7	**Production**	5.000 tons per year
Consumption	1.000 tons per year	**Production Capacity**	5.000 tons per year t
Export	4.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: Geonardo; Country Report – Hungary, 2009;
Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Ireland

New Pellet Market





General Description:

The use of pellets in Ireland was virtually unknown until 2006. The production and the consumption of wood pellets is relatively low due to the fact that there is no known co-firing (there is just one coal fired power station in Ireland) or use of wood pellets for the production of energy. However, the use of wood pellets for heating in the commercial and domestic sector is fairly well developed due to the high cost of alternative heating fuels and a number of government incentives that need to be highlighted. For example:

- The Greener Homes grant programme. Initially this scheme offered to householders 4,200 € against the cost of a pellet boiler (estimated installed cost 10,000 €); however in Phase III (which started in July 2008) householders have been able to obtain a grant of €2,500 against the cost of a pellet boiler and €800 against the cost of a pellet stove.
- The establishment of a Renewable Energy Installer Academy – a pan Ireland initiative
- A reforestations programme since the 1950's.

These initiatives have been very useful for the development of a wood pellet market in Ireland. There are now two pellet producers (with an estimated capacity of 77,500 tonnes p.a) and an estimated (2009) 4000 pellet heating systems (boiler and stoves) in the public and commercial sectors.

There is as yet no separate pellet trade association in Ireland that could facilitate the development of the market, although Sustainable Energy Ireland are doing a lot of work in this area, including quarterly collection of price data. In addition, there is the Irish Bioenergy Association who also works in conjunction with the pellet market. The relative newness of the use of pellets oblige us to consider Ireland as a new market, but the initiatives of national actors and government are very well balanced and effective in driving the market forward.

This country can be considered as New Pellet Market.

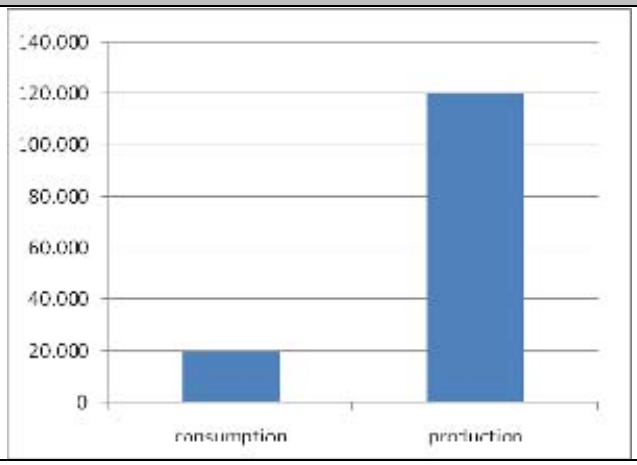
Number of plants for pellet production	2	**Production**	17.000 tons per year
Consumption	30.000 tons per year	**Production Capacity**	77.500 tons per year
Import	13.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: The National Energy Foundation; Pellet market country report – Ireland, 2009; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Please note: According to our classification, New Pellet markets have no internal consumption. However, due to the limited amount of production and consumption (although it is relatively high per capita at 6.80 per inhabitant) in Ireland, we have classified this country as a New Market with positive trend.

Lithuania

New Pellet Market



General Description:
The bioenergy market in Lithuania is very different to those in Latvia and Estonia. The main difference is that bioenergy products are less traded internationally. Less raw materials are imported and the share of firewood export was 3.5 % of the total consumption in 2003 (most of the export is industrial roundwood). Exports go to Scandinavian countries, Germany and UK.
One of the problematic issues for developing the pellet market is the lack of raw material. The annual increment of forests is about 6.4 million m3. The round wood production was 6.2 million m3 in 2007 – higher than in Estonia with twice the annual increment. It has reached the maximum level but inhibits the build-up of additional resources, in fact wood pellets as a by-product depend on the whole sector.
The number of producers is 6 (before they were 7 but one has stopped its production), located more or less around Vilnius, capital of Lithuania. A limited internal consumption is known, as 20.000 tons per years are used. The production (around 120.000 tons per year) is destined to exportation. The production capacity is around 150.000 tons per year, close to the actual production.
The procapita utilization of pellet is 5.94 kg per habitant.Also in this case (as Ireland) the data is very high.
This country can be classified as New pellet Market.

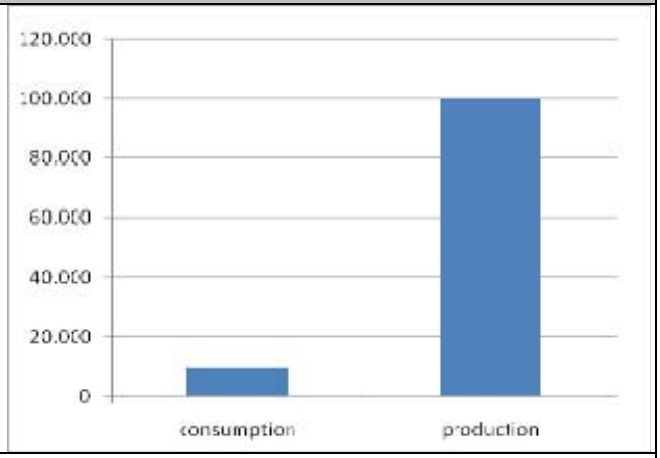
Number of plants for pellet production	6	**Production**	120.000 tons per year
Consumption	20.000 tons per year	**Production Capacity**	152.600 tons per year
Export	100.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: Letek; Pellets market country report on Baltic countries –Lithuania; Pelllets@las web data; Sikkema, R. et al, 2009. "The European market of wood pellets for heating and power production" , University of Utrecht [prepared for publication].

Please note: Also in this case the data about per capita value is very high. (see: Ireland)

Portugal

New Pellet Market



General Description:

Portugal has a limited internal market of pellets, as it is really new, since it moved its first steps in 2005. The production capacity is increased greatly from few thousand tons to approx. 400 000 tonnes/year in 2008, as 3 big plants just started their construction and they will start their production during 2009.

The growth rate of production in last years is impressive, approx. 200% in 2007 respect to previous year, especially if we consider the production capacity. Anyway the production is not related to an internal national market. In fact the national consumption is close to zero, even if the sold of stoves and boilers fuelled with pellets is increasing. The number of pellets producers that is currently working is today of 6 units. The journal Bioenergy International listed on its last pellets map a list of 11 producers as some plants for production are still under construction.

Quality of Portuguese pellets is divided into 2 classes:

- Industrial pellets: made form low quality residues, adapt for big power plants;
- Pellets for residential scopes: the DINplus standards is the most diffuse between Portuguese producers.

No national association of pellet exist at the moment. Due also to a mild climate, it's not foreseen a big increase the internal consumption.

The procapita utilization of pellet is 0.94 kg per habitant

We can consider this country as a New Pellet Market.

Number of plants for pellet production	6	**Production**	100.000 tons per year
Consumption	10.000 tons per year	**Production Capacity**	397.000 tons per year
Export	90.000 tons per year	**% Average growth (2006-2008)**	No historical data available. A realistic assumption is not possible

Source: ETA Florence; Pellet Country report – Portugal; Pelllets@las web data; Bioenergy International.

As previously mentioned these following countries can't even be mentioned as New Markets as their utilization and production is too limited. Anyway as they are listed in New Pellet Markets it is appropriated to describe their advancement status. Most of the following information are extracted from the Pellets Market Country Reports (http://www.pelletsatlas.info/cms/site.aspx?p=9180).

Cyprus: The Renewable Energy sector is starting to grow in Cyprus, but the biomass sector is not developed significantly. Consequently, wood pellets are not recognized as an alternative fuel for energy production at the moment and the domestic pellet consumption in Cyprus is insignificant. There is also no pellet production in the country. Until now, the use of biomass is mainly focused in wood log burning in household fireplaces and in special cases for energy purposes in the wood industries, where wood by-products are burned in large-scale boilers without any processing. The reasons for the lack of a pellet market in Cyprus are similar to other Mediterranean countries: The demand for heat in the residential sector is comparably low in the first place. In addition, the forested area is quite limited and the wood processing industry therefore is of minor importance. The availability of agricultural land is limited as well and the competition between food and fuel production poses a barrier to MBP production. Finally, policies concerning energy and the environment do not have a high priority in Cyprus and the public awareness of these issues in general is rather low. However, the development of a pellet market (especially MBP) could have positive impacts on the economical development in Cyprus. Namely, the reduction of energy import dependency and enhanced rural development can be seen as chances. For that reason, the Institute of Agricultural Research of Cyprus carries out research in order to determine the energy plants that can be cultivated in Cyprus for biofuel production. Other organizations involved in energy and bioenergy research and marketing are:

- Cyprus Institute of Energy (CIE)
- Applied Energy Centre (AEC)
- Cyprus Association of Renewable Energy Enterprises (SEAPEK)
- Cyprus Energy Agency (CEA)

Malta: Malta is a country with a negligible potential of agricultural and forestall biofuel production. Limited freshwater resources (50% of potable water is supplied from desalination), high population density and poor soil fertility are the reasons for low productivity. The major part of all wood products, including wood pellets, used in Malta is imported. Wood pellets are mainly imported from France, Italy and Germany. However, the use of wood pellets in Malta increases the diversity of fuel imports and therefore limits the risks of energy import dependency. In 2008, around 650 tonnes of sawdust, wood wastes and scraps (including pellets made thereof) were imported to Malta. Pellets are mainly used in the residential sector in stoves and pellets are bought by the customers in small bags (15 – 20 Kg). Organizations that are involved in energy and bioenergy research and marketing are:

- Institute of Agricultural and Energy Technology
- Malta Resources Authority (MRA).
- Commercial Department of Malta Embassy.

Luxemburg: Similar to the German market the consumption of wood pellets in Luxemburg is limited to residential heating. Customers use automated pellet appliances for central heating purposes so that pellets are mainly delivered in bulk by blower lorries. The trade with bagged pellets is of minor importance. With around 10 kg of wood pellets consumed per capita and year, the development of the market is also comparable to Germany. The total annual consumption in Luxemburg is around 5,000 tonnes.

However, on the other hand, no domestic pellet producers were identified. This means that all pellets consumed are imported. Around 50 % of the pellets consumed are imported by traders based in Luxemburg, while the other 50 % are directly delivered to the end-consumers by traders / producers operating in Germany or Belgium.

8. Recommendations

At the end of this analysis it is possible to start having the first conclusions of European Pellet Market. It must be noticed that with a total amount of 8.064.000 tons of pellet utilized, a relevant contribution to green target is given, the equivalent of 35 GWh of energy produced comes from wood resources, with the equivalent of 3.050 TOE saved.

Surely the countries with the higher percentage consumption of pellets are the following:

- Sweden, with 22,94% of consumed pellets;
- Denmark, with 13,14% of consumed pellets;
- Belgium, with 11,41% of consumed pellets;
- Netherlands with 11,34% of consumed pellets;
- Germany with 11,16% of consumed pellets.

Countries	% of EU consumption
Austria	6,31%
Belgium	11,41%
Bulgaria	0,04%
Cyprus	0,00%
Czech Republic	0,04%
Denmark	13,14%
Estonia	0,00%
Finland	1,85%
France	2,48%
Germany	11,16%
Greece	0,14%
Hungary	0,01%
Ireland	0,37%
Italy	10,54%
Latvia	0,48%
Lithuania	0,25%
Luxemburg	0,06%
Malta	0,00%
Netherlands	11,34%
Norway	0,49%
Poland	1,49%
Portugal	0,12%
Romania	0,31%
Slovakia	0,22%
Slovenia	1,39%
Spain	0,12%
Switzerland	1,12%
Sweden	22,94%
UK	2,18%

Table: Pellets consumption - %

The classification of European markets made during the previous pages will be used to provide recommendations targeting market behaviour to actors and stakeholders.

In order to use a "bottom – up" approach and facilitate the understanding of the reader, the New Markets are studied and recommendations for their growth to the level of Emerging Market are listed. The same procedure is used for providing recommendation to Emerging Markets for their growth to the level of Developed Market.

Recommendation for the Developed Markets focus on maintain their actual position in the European Pellet Market.

The questions that must be answered are the followings:

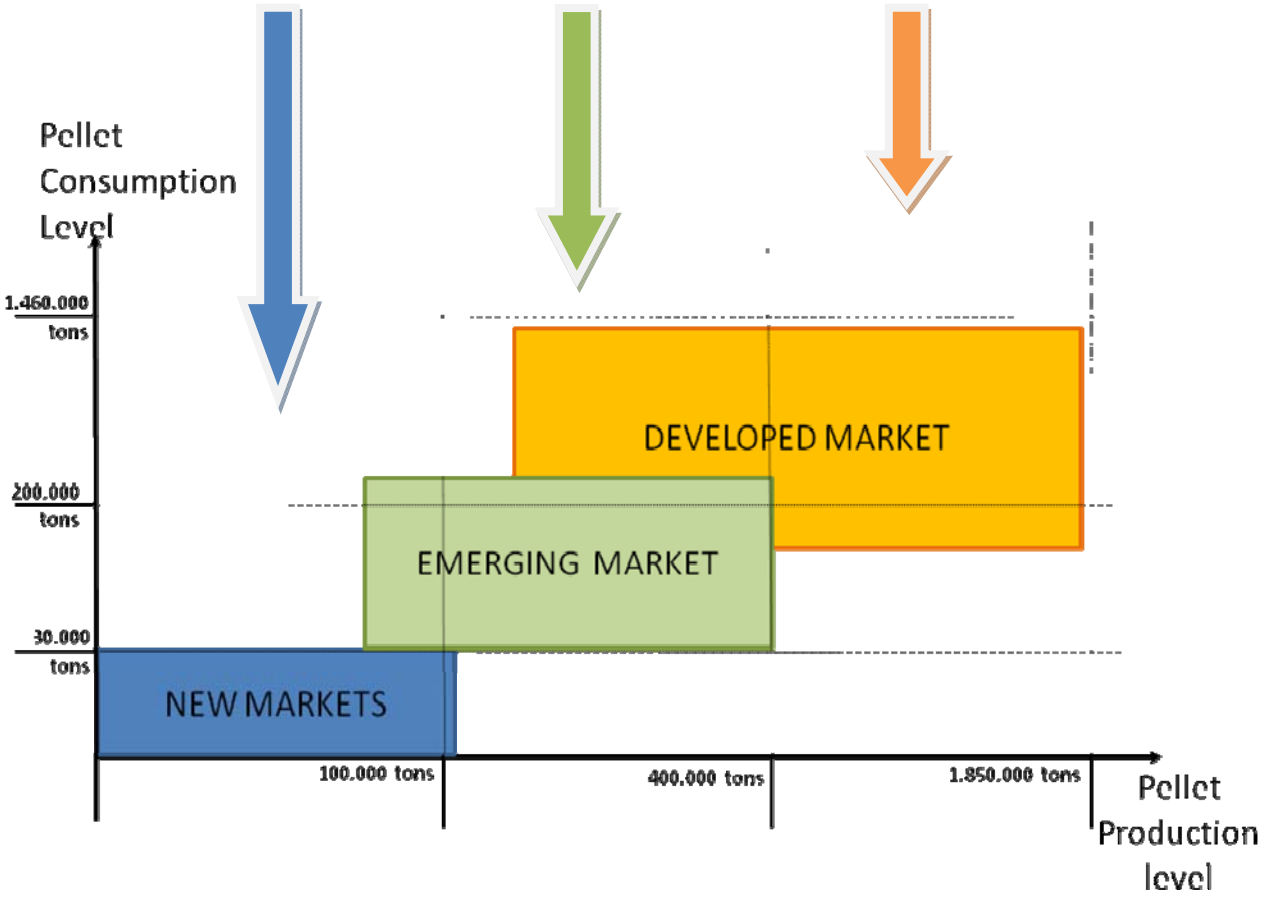
- Which kind of choices could facilitate the development of pellet market in these countries?
- How "best experiences" of developed markets could be exported to other markets?
- Which are the main facts to highlight in a market structure?

Answering to these questions could provide to interested markets some good considerations and themes to focus on. So, starting from this mentioned classification, here below are listed the best actions and recommendations for the European markets, also based on the following official documents:

- **Directive 2004/8/EC of the European parliament and of the council of 11 february 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending directive 92/42/eec;**
- **Communication from the commission, biomass action plan 2005.**

In the following page there is the table with the "classification of countries" and a graphic which summarize the parameters used for the scope. The graphic has only a representative scope, detailed information can be found in any country description in previous chapters. All the data mentioned in the graphic refers to the level of classes of market. An easy comparison can be made with table at page nr 11. Anyway the level of production and consumption of the class of countries is correct.

New Pellet Market	Emerging Pellet Market	Developed Pellet Market
Bulgaria	Estonia	Austria
Cyprus	France	Belgium
Czech republic	Norway	Denmark
Greece	Poland	Finland
Hungary	Romania	Germany
Ireland	Slovakia	Italy
Lithuania	Spain	Netherlands
Luxemburg	Slovenia	Sweden
Malta	Switzerland	8 countries
Portugal	Latvia	
10 countries	UK	
	11 countries	



Recommendation for NEW COUNTRIES in EU pellet market.

As specified in previous page, this chapter wants to suggest to the countries classified as New Market (Bulgaria; Cyprus; Czech republic; Greece; Hungary; Ireland; Lithuania; Luxemburg; Malta; Portugal) the correct actions to be develop in future years.

The countries classified as New Markets have an internal consumption that, in most cases, is close to zero, or in few cases it is few thousand tons of pellets. Their yearly production don't overpass the 100.000 tons of pellets.
To increase the level of consumption is the target for these countries. First objective to achieve is a more balanced utilization of pellets compared to their national production.
Here below are listed some recommendation for New Markets that comes from the analysis of market's structure but also from sensible interpretation of the trend of pellets in this countries.

A - To promote biofuels and the benefits related to its utilization.

To explain to population the environmental benefits related to pellets and the differences with the utilization of traditional wood logs, emphasizing the high efficiency of modern stoves. The strongest benefits related to pellets utilization can be found where natural gas piping is still missing, where traditional fuels are not available. For example Balkan and Eastern countries have a strong tradition of utilization of log wood, but not pellets. To start the conversion of old inefficient fireplaces, with high efficiency boilers, could be a reasonable solution. Also the supply chain related to pellet sector could benefit from these initiatives.
Sensible areas where no gas connection is available could be the more useful target for a first start up of pellet heating applications. These initiatives could be positively accepted from habitants, but also for municipal authorities.

B - To encourage governmental authorities to establish a National Association of Biofuels.

New Markets rarely have a National Association of Pellets. An Association has, as natural scope, the promotion of its sector. The benefits and outputs in term of visibility and information can be diffuse. National Pellets Association are slowly becoming a reality also in New Markets.
For example, during the second half of 2008 the Hungarian Pellet Association (www.mapellet.hu) was funded, it is also due to an higher interest into pellet fuel.
Bulgaria for example, has no Association of pellets, but some regional Agency promote biofuels and renewable energies in general. All other countries classified as New markets have no association at all. Data that could be provided from the Associations are relevant and could focus on:

- Historical data of a market: useful inputs for new investments as the trend of a pellets can be better defined;
- Quality of the product following to standards: in order to facilitate the trading of the product;
- Costs of biofuels and comparison with traditional fuels: profitability is the main benefits for the final users;
- Availability of pellet during all the year;
- Secure information about producers (number, contacts, production capacity, etc).

C - To use the richness related to the supply chain of raw material for local workers and to go on with infrastructural optimization of the supply chain.

The supply chain connected with pellets, foreseen various phases:

- Collection of residues;
- Transportation to pellet plants,
- Transformation (pellettization);
- Delivery of the product to traders or retailers.

Each of these phases creates richness among local populations and private companies. These positive results are not related to the method of supply of raw material, in fact any country make the most profitable choice. For example:

- in Greece the current biomass availability covers the demand of the pellet industry, but biomass availability will become a limiting factor rather soon;
- also Check Republic showed a lack of raw material during winter, problems with machinery maintenance etc. As main consequence the production level remain low.
- Lithuania is using mainly its internal wood resources for pellet production;
- other Balkan countries decided to import most of woody raw material from Russia, as the costs are cheap.

D - Financial support is a relevant parameters in order to increase the utilization of the biofuels.

Biofuels utilization is a good objective to achieve, but their utilization is strongly related to the high investment cost of the stoves and boilers. A financial support can facilitate in a relevant way the diffusion of biofuels and related machineries. For example:

Ireland developed some initiatives in this market that need to be highlighted.

- The offer to householders of a grant of 2,500 € since July 2008.
- In past 4,200 € were given to householders, against the cost of a pellet boiler (estimated installed cost 10,000 €);
- Acknowledgement for technicians; trained installers of pellet systems;
- Specific grants for the start up of pellet production and reforestations plans after 50’s.

These initiatives are very useful for the development of a pellets market. An opposite situation is offered from the Czech republic market.
In Czech republic the main reason why most of the production is exported to foreign markets is the lower purchasing power of Czech customers. High investment costs for residential pellet boilers are the main barrier to market growth in the residential sector.
This last consideration can be appropriate also for many other Eastern and Balkan countries, where social conditions are very similar between them.

E - To increase the production capacity of pellet sector.

With few exception, the new markets show that their production level is very close to their maximum production capacity (the only exceptions are Latvia, Czeck Republic and Portugal). New investments in this sector are required in order to increase the national market especially for

country like Greece and Lithuania. Another parameter that need to be considered is the appropriate storage capacity of a production plant, avoiding to stop the production for technical reasons. Portugal soon will become the more active countries between the New Market, as a new big plant will start working in 2009.

F - To create a common platform of acknowledgement between operators in biofuels sector for New Markets.

The production of solid biofuels increased a lot in all European countries, in the past ten years. New European Members are becoming big exporter/trader of biomass fuels and they will also become big users, soon. Even if production, technology and Market seem well developed everywhere in Europe, there are still some substantial deficiencies in many countries.

A clear example is given by the Baltic countries and Southern European countries where there is still a lack on Normative for production and utilisation together with the lack of standardised analysis method. Available and precise information on biomass fuels and ashes is a necessary condition for a rapid penetration of biomass as sustainable fuels in all the European Countries. For example, on behalf of the European Project named PHYDADES (Phyllis Database Dissemination, Education and Standardization – www.phydades.info), four public Workshops were done.

These events have been organized in New Member States, in order to stimulate the biomass market, the interest of main actors and create a diffuse knowledge on biofuels analysis methods. Speakers of the event were members of the consortium, CEN standardization experts and local experts. The presentations covered topics as fuel specification and classes, quality assurance, sampling and most important standards for analysing physical properties e.g. moisture content, particle size distribution, ash content, and mechanical durability of pellets.
Phydades partners also offer on-the-job training for laboratory personnel. Laboratory staff, like technicians, who want to be educated in the use of standardised analysis methods can work for 2-4 weeks in one of the laboratories of four Phydades partners. The scope of the training is to strengthen the knowledge about analysis methods for solid biofuels “standardised by CEN” in European countries, especially new member states.
Initiatives of high profile, as the ones we just mentioned, are very positive for the development of these countries which, in few years, could become relevant actors in European pellet market.

G – The renewal of district heating (Biomass Action Plan)

The Commission urges the Council to agree to its proposal to add the supply of district heating to the list of goods and services to which Member States may apply a reduced rate of VAT. It would then recommend Member States to extend to district heating any reduced VAT rate already applied to natural gas or electricity. In combined heat and power plants, biomass can provide heat and electricity at the same time. The Commission encourages Member States to take this double dividend into account in their support systems. DH are a primarily goal for New markets.

Recommendation for EMERGING COUNTRIES in EU pellet market.

As specified in previous page, this chapter wants to suggest to the countries classified as Emerging Market (Estonia; France; Norway; Poland; Romania; Slovakia; Spain; Slovenia; Switzerland; Latvia; UK) the correct actions to be developed in future years.

The countries classified as Emerging Markets have a production level that is becoming relevant and a consumption level that is normally balanced with the production (the only exception in this classification is given from Estonia and Latvia as their consumption is almost zero, but their production is relevant). The best recommendation for Emerging Market is the consolidation of their position in the market supporting scenarios that could also facilitate the development of this countries in next years. Here below are listed some recommendation for Emerging Markets with specific highlights for each country involved.

A - To support the market share that these countries have reached

This can be done analyzing the propensity of these country to the utilization of renewable energies and biofuels. Normally the trend of biofuels is indirectly related to the availability of traditional fuels. Data about supply of energy in these classified countries are listed here below. For example:

- **Norway**: 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. This fact surely influence the utilization of pellets. 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. This product will be used for co-firing or exported to interested countries.
- **Poland**: The Polish energy market is mainly based on coal. The cost of fossil coal is very low in Poland and this fact doesn't facilitate the utilization of pellet for domestic heating, as well for bigger power plants. Existing legal duties concerning the obligatory production of "green energy" (both heat and electricity) results in the increased interest of both DH companies and CHP plants in biomass utilization. Co-firing pellets with coal becomes an interesting option. As a result, significant growth of the national consumption occurred in 2008 and 120,000 tons of pellets were used in the national market.
- **Romania**: . The demand for energy from renewable raw materials is growing due to high dependency on fossil fuel imports and especially in view of the EU Renewable Energy Directive. Forestry areas became important only after the privatization of the national forests and there exists a substantial wood working industry. At least 80 % of the production is exported. The most relevant export countries are Italy followed by Austria, Hungary and Germany.
- **Slovakia**: Slovakia gas accounts for approximately 95% of the heating demand although heating with pellets today is already cheaper than heating with natural gas. Therefore, the potential of pellets as a major energy carrier is huge. However, only 117.000 tonnes of pellets are produced in Slovakia per year and hardly 10% of this is consumed in the domestic energy market while the raw material potential is estimated to allow for the production of 1 Million tonnes of wood pellets alone per year. The same amount of pellets

can be expected for pellet production from agricultural residues. In Slovakia pellets are used mainly in small and middle boiler-rooms in areas where no gas connection is available. Medium scale users are usually schools, municipal offices, companies, hotels and bigger residential units with demands of 10.000 tonnes per year. This market share is growing most rapidly.

- **Switzerland**: This market has great potential due to good raw material availability and a professional wood energy campaign organized by "Holzenergie Schweiz". The pellet trading infrastructure is well developed and end-consumers are supplied reliably. Today, the main competitor of pellet (and wood) heating is the heat pump technology since around 80% of the newly built single family houses are equipped with electricity driven heat pumps. Electricity in Switzerland is mainly done by hydro and the cost €/kWh is very competitive.
- **UK**: The UK Government is keen to support an uptake in the use of biomass. However, the high level of investment needed to install a pellet stove or boiler acts as a barrier for many. Today the production of wood pellets in the UK is estimated be about 195,000 out of a total production capacity that has now reached over 400,000 tons with the opening of two large pellet plants during 2009. In the short term, particularly as a result of the financial incentive to the coal fired power plant owners to burn pellets being reduced by half, there is likely to be an excess of supply over consumption in the UK. This is likely to be managed, at least in the short term, by exports to European markets where they will be burned for the production of electricity.'

B - To support the purchase of efficient pellets stoves and boilers to be fuelled with pellets.

The governmental authorities are the main decision maker in this contest and their effort (financial facilitations and other initiatives) is needed and recommended. Normally financial support permit a domino effect in term of number of stoves sold, in following years. For example:

- **Spain**: There are no national incentives for pellets use in Spain, but Regional Governments, through their energy branches or energy agencies, provide various support.
  1) Funding of installations, typically 20-30% of the eligible costs,
  2) Besides, in several regions there are other forms of financial helps as specific soft loans for companies, taxes reduction in the investment for companies in the "Companies Tax";
  3) The National Energy Agency (IDAE) provides variable incentives every year to renewable energies,
  4) Some Energy Services Companies (ESCOs) provide credits for investments. Comparing these data, it must be noticed that the pellet scenarios in Spain are positive.
- **UK**: In UK an interesting support mechanism is thought likely from 2011. This is the renewable heat incentive which the Government plan to introduce from April 2011. The consultation on this is yet to start, but the idea is that consumers are paid for producing renewable heat, in much the same way as consumers are paid for producing electricity from renewable sources via the feed in tariff (which should be introduced by April, 2010). Most bioenergy actors seem to think that the renewable heat incentive is likely to be offered instead of grants and have the effect of really increasing the uptake of wood fuel heating systems in the UK.

C - To increase the competences of the National Association of Biofuels.

They can have a relevant role in providing technical information and in communication with local authorities.

- **France**: The quality of the French production was heterogeneous in the past. Since early 2009, French standards are now also available, associated to the brand name "Norme Française" better known by the French consumers than the German DINplus. This development is also supported by the newly founded French pellet producer organisation (SNPGB: Syndicat National des Producteurs de Granulés de Bois).
- **Latvia**: The economical and social conditions are very similar to Estonia, with a low labour costs and facilitation from the logistic point of view (availability of cheap raw material from bordered countries, etc). Lower prizes and good quality raw material caused the wood industry to focus on imported resources. This also applies to a number of pellet producers that are combining industrial by-products, wood waste, forest residues and timber. A National Association could support the actors and optimize this trading.
- **UK**: The pellet sector anyway is becoming very competitive. For a couple of years, until May 2005 there was a trade association representing the interests of the UK pellet industry, known as the British Pellet Club. It then merged with the Renewable Energy Association which now represents the interests of the whole biomass sector and other many renewable energy industries.
- **Romania**: The national association of Pellet - Patronatului Producătorilor de Peleți, formed by around 15 producers is providing useful information about physical/chemical characteristics of pellets to be used in heating systems and technical data about the plants.

D - To develop the supply chain in order to maximize the natural resources of each markets and when not possible, to establish secure contract of supply with appropriate private companies;

- **Estonia**: Most of produced pellets are exported. In 2007, about 340,000 tons of produced pellets and briquettes was exported mainly to Denmark and Sweden. After the rise of VAT in July 2007 the pellet prizes have been stable during 2008. The production capacity could increase in next years, as the raw material has a limited prices, also due to the short distance with Russia. Russia provides woody resources at a reasonable prices. This fact surely facilitate the pellets production, even if it didn't permit to national actors to built an efficient supply chain for the collection of national resources.
- **Latvia**: also Latvia based its pellet production on commercial relation with Russia. Most of wooden residues are coming from this country. The availability and profitability of raw material is a very relevant parameters in pellet sector.

E - To create a market formed also from large scale users.

- **Slovenia**: Pellet consumption is relatively small in Slovenia except for one case. Two power plants are purchasing pellets to substitute charcoal. The power plants are in Trbovlje and in Sostanj and use low quality pellets for combustion. Slovenia has a great potential regarding woody biomass resulting from the abundance of forestland and the cut for woods for energetic purpose increased continuously during the last years.
- **UK**: In the UK it is estimated that the majority of pellets manufactured and imported are historically at least have been co-fired for the production of electricity. This fact is also confirmed from the high level of consumption of biomass.

Pellets manufactured in the UK are generally made from sawdust, clean waste wood (diverted from landfill) and energy crops (such as willow grown on short rotation coppice) and forest thinning.
Two different market (residential and large users) exist in UK. The first type of pellets market – high quality is used for residential sector, while the second type – industrial pellets is destined to co-firing.

F – The renewal of district heating (Biomass Action Plan)

The Commission urges the Council to agree to its proposal to add the supply of district heating to the list of goods and services to which Member States may apply a reduced rate of VAT. It would then recommend Member States to extend to district heating any reduced VAT rate already applied to natural gas or electricity. In combined heat and power plants, biomass can provide heat and electricity at the same time. The Commission encourages Member States to take this double dividend into account in their support systems.

Recommendation for DEVELOPED COUNTRIES in EU pellet market.

As specified in previous page, this chapter wants to suggest to the countries classified as Developed Market (Austria; Belgium; Denmark; Finland; Germany; Italy; Netherlands; Sweden) the best actions to be developed in future years.

The optimum results reached from these markets, showed that the pellet sector is well managed from private and public stakeholders. There are anyway some exception, as Italy. Even if it has a relevant market in term of production/consumption and it cans surely be classified as developed market, the pellet sector needs more transparency. For example the recommendations for these kind of countries focus on maintaining their market share, to guarantee a reasonable increase of their pellet utilization, to find solution to reduce the production cost, to standardize their process. Suggestions for this class of markets are listed here below:

A - The production should follow a specific standard for the quality of pellets.

All these countries have already developed a national standard or at least a certification concerning the quality of pellet. Countries like Italy still need to increase their qualitative production.

B - Large scale Utilities.

A common characteristic of Developed Markets (with the exception of Italy) is that they have some large scale consumer in their markets. This fact is positive for pellet sector as a constant demand of pellets facilitate the work of pellets producers. Moreover DH and co-firing in big plants fuelled with pellets are a good promotion for the bioenergy sector as the good energetic property of this fuels are clear for all the population. Here below some details of large scale utilities:

- **Belgium**: The Green Certificate Scheme in Belgium contributed to stimulating the demand for solid biofuels, including pellets, for electricity generation in (co)combustion in Belgium which is largely satisfied by pellet imports.[2] Electrabel (GDF Suez) is the major consumer of industrial wood pellets in Belgium with a large demand in Les Awirs (80 MW, 100 % biomass), 4 co-firing facilities and a number of smaller units.[3]
- **Denmark**: In Denmark more than half of the residential heat demand is supplied via district heating. The utilisations of wood pellets started in the district heating sector in the late 1980'es when coal fired heating plants were converted to use wood pellets. The Danish wood pellet market is one of the world largest and especially in relation to the number of inhabitants the consumption of wood pellets is significant. Strong drivers provide for wood pellets use in all sizes of combustion plants from small boilers in single family houses and small block heating centrals over medium sized district heating plants up to large power plants producing power and heat for large district heating systems.
- **Netherlands**: A large demand for wood pellets for co-firing in coal fired power plants is nowadays present in Netherland. This demand is almost exclusively caused by the so called MEP feed-in premium, which was in place between 2003-2006, and provided a subsidy of between 6-7 €ct per kWh electricity produced from clean woody biomass.
- **Sweden**: In Sweden district heating is very common and is used in most cities and towns. The Swedish wood pellet market is one of the world largest and especially in relation to

[2] Barel C., ADEME, France, Pellets@las country report Belgium, August 2009.
[3] www.electrabel.be (August 2009)

the number of inhabitants the consumption of wood pellets is significant. Strong drivers provide for wood pellets being used in all sizes of combustion plants from small boilers in single family houses and small heating centrals for residential houses, public service buildings and industry over medium sized district heating plants up to large power plants producing power and heat for large district heating systems. Large scale consumption of pellets takes place in large district heating plants and CHP plants. These plants reduced their consumption of fossil fuels due to energy taxes on fossil fuels. DH plants switched from combustion of oil to coal, then to pellets. The 40% of pellets demand is used by large scale users.

- **Italy**: the pellet market in this country is mainly formed by little stoves and by residential user. schools, hotels and some other utilities are starting to use pellet as well, but large scales utilities using pellets are still missing.

C - Financial support.

The governmental authorities should maintain a financial support for capital investment, but also the feed in tariff for green electricity production.

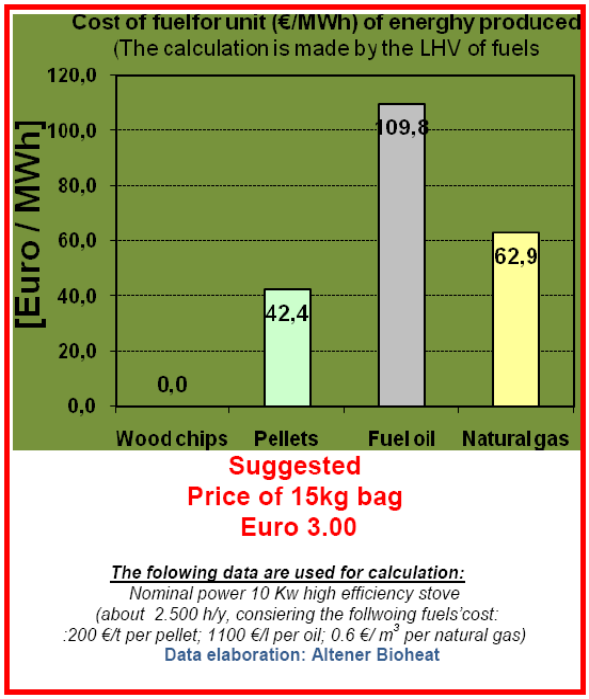
- **Germany**: support measures included reduced VAT rates on wood fuels (7 % instead of 19 %) and several information portals on renewables in general. The legal framework for wood heating is provided by the German Law for the protection against harmful effects on the environment (BImSchG). According to this law, small-scale heating installations do not need special approval. If units are operated with regular fuels, including wood pellets, approval is not necessary for units up to 1000 kW. In case other fuels (e.g. straw) are used, units need approval above the size of 100 kW.
- **Belgium**: Federal tax reductions and a grant system in Wallonia promote the development of this sector which was insignificant in 2006 and grew strongly, especially in 2008. Further growth can be expected especially in the pellet stove sector.
- **Finland**: The competitiveness of pellets is significantly dependent on taxation. The Finnish energy taxation system favours wood fuels since 1998. Contrary to the combustion of fossil fuels and peat, no energy tax is levied on the combustion of wood. About 78 % (in 2006) of the raw wood import to Finland is coming from Russia. But the trend is changing. Russia is planning to develop more its own wood industry and is using a special program for export duties for round wood in 2007-2011 to finance the process and consequently, the price will rise by 80 %.
- **Italy:** until 2011 will be possible to deduct the 55% of investment cost of heating plant fuelled with pellets - for the following 5 years the nominal share of 11% can be deduct from the national taxation called IRPEF. This initiative is included in the Energy Efficiency measure foreseen from the government.

D - Transparency of the market:

- **Germany**: The targets of the Federal Government for 2020 include the increase of the share of renewable heat generation from 7 % today to 14 %10. An important share of this target will have to be achieved in the residential heating sector mainly by an increased use of biomass and solar thermal technologies. In order to reach this target a renewable heat law is in force since 2009. It obliges owners of new houses to provide a certain share of their heat demand from renewable sources. Heating with wood pellets is one option. The law also includes the continuation of the established and successful Market Incentive Programme (MAP). This programme provides subsidies for the installation of renewable

heat appliances in new and old buildings which was one of the main drivers for the growth of renewable heating markets in the past.

- **Italy**: We can state that the pellet market in Italy has gone beyond its initial stage, but on the other hand we can't consider that it is fully developed. The causes of this lack of maturity are the imbalance between demand and supply, especially in some periods of the year, shortage of raw material, lack of real quality standards and lack of an important national association so far.
  As last input, we believe that the transparency in the market related to information on quality and final prices for users is a crucial parameters for the final users of pellets. To force producers to highlight the clear identification of the final cost of pellet could be an important initiative. Pellet is a biofuel and the main data to show to final users should be the profitability. The parameters of **"€/kWh"** should be clearly listed on the label of every pellet bag (25 kg), in order to present the economic benefits of using biofuels.



The stabilization of the market in general (quality of the product and final cost), could facilitate a governmental support to this sector and also increase the trust of final users. This label, that is only an example of how it could be, represent a graphic. The graphic compares the costs of various fuels with a suggested prices. Practically it offers to users a clear data about what they are buying. The label could be printed client by client in any shop depending on purchase prices.
The main consideration is that energy products are a primary goods and an high level of acknowledgement is requested to any users. This label could facilitate this scope, at least in markets that requires an increase in trading and management of energy products.

E - Balancing domestic production and imports (Biomass Action Plan)

Biofuels and their raw materials are traded on world markets. An autarkic approach to meeting the EU's needs is neither possible nor desirable. However, the Union has some discretion about how far to encourage domestic production or imports. The Commission prefers the balanced approach. Therefore, it will:

1) address the issue of amending the biofuels directive so that only biofuels whose cultivation complies with minimum sustainability standards count towards its targets;
2) support developing countries that wish to produce biofuels and develop their domestic markets.

Practically, to built a market on internal resources is the more adapt solution for a balanced market. If massive importation of biofuels is demonstrated, a progressive reduction of import must be foreseen. At the same time biofuels are well accepted from all the national Legislation and increase of biofuel market is still the main goal of EC. Stricter sustainability criteria will surely arrive in next years among EU countries.

9.References:

- Bioenergy International journal (http://www.bioenergyinternational.com/)
- "The European market of wood pellets for heating and power production" , 2009, University of Utrecht, R.Sikkema, H.M.Junginger, M. Steiner, W. Hiegl and A.P.C. Faaij;
- Pellets@las web site (http://www.pelletsatlas.info/cms/site.aspx?p=9107);
- D 7.1 - Pellet market overview report for all European countries; Pellets@las Partners; Country reports (http://www.pelletsatlas.info/cms/site.aspx?p=9186);
- European Project Phydades (www.phydades.info);
- DIRECTIVE 2002/91/EC of the European Parliament and of the council of 16 december 2002 on the energy performance of buildings
- DIRECTIVE 2004/8/EC of the European Parliament and of the council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC
- Communication from the Commission; Biomass action plan, 2005
- GREEN PAPER on market-based instruments for environment and related policy purposes, 2007
- KYOTO PROTOCOL to the united nations framework convention on climate change;
- AIEL (http://www.aiel.cia.it/) ;
- European Commission (http://ec.europa.eu/index_en.htm)