

Pellets in Southern Europe – New resources, new products, new markets

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Abstract

The resounding success of wood pellets markets in European Countries such as Austria, Denmark and Sweden, has yet to be replicated elsewhere. In Southern European countries, the lack of available waste wood means that pellets from agricultural residues (“agri-pellets”) are the most promising solution. With raw material costs on a par with those for wood pellets, and an availability around ten times greater, the potential of this market is immense.

As part of the European project “Pellets for Europe”, a market assessment is being performed to investigate the European straw pellet and Southern European wood pellet markets. This assessment focuses on Europe, with more detailed studies of Italy, Spain and Greece. So far, this assessment has shown the agri-pellet market to carry much promise and enormous long-term potential, despite being impeded by significant technical barriers. These barriers are however surmountable in the short and medium term. This is especially true in medium to large scale applications of straw and straw pellet firing. In municipal heating for example, straw and in some cases even straw pellets have already found extensive application.

Introduction

As part of the European project “Pellets for Europe”, a market assessment is being performed to investigate the current state of the straw pellet and southern wood pellet markets. These assessments will form the basis for the analysis of barriers and formulation of market penetration strategies. This paper summarises the first results of this work.

A market potential assessment for agri-pellets was carried out in a wide range of European countries. More detailed information on the existing pellet markets (principally wood) has also been gathered for Spain, Italy and Greece. From these results, predictions and recommendations for these new and particularly promising marketplaces can be formulated. The first step of this analysis was the estimation of the total raw material potential and the current utilisation of residues from wood and agriculture. The second step was the in-depth analysis of pellet production and its related

socio-economic aspects by directly contacting market actors. Thereby, a more detailed and subtle understanding of expectations, plans and barriers was reached. Thirdly, an overview of the legislative aspects was gained in order to identify specific legislation, standards and recommendations relevant to biofuels. This study is on-going and will be complemented by trends analyses, assessments of barriers, market strategies and the identification of new market opportunities (especially in Eastern Europe).

Agri-pellets: Immense market potential

The European agri-pellet market, with a theoretical potential of hundreds of millions of tonnes, and a short-term potential of tens of millions of tonnes, is restricted neither by raw material nor price. The dominating barriers are in the area of technical combustion challenges.

Figure 1 shows a maximum theoretical pellets production (for 5 example countries) of about 128 million tonnes. This was calculated by first looking at the agricultural production for each country. To these figures, a range of crop:residue ratios were applied and wastagees were subtracted, in order to reach the values shown in Figure 1.

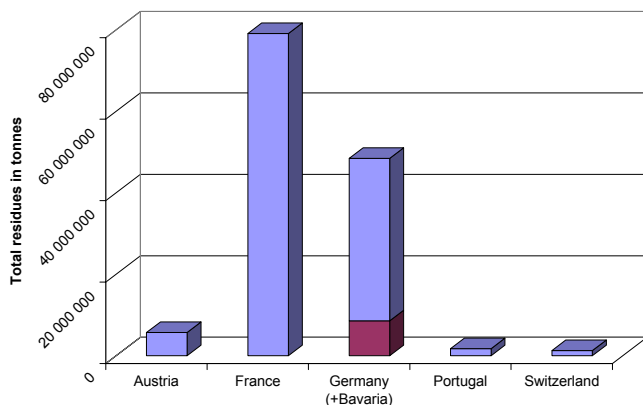


Figure 1 – Total agricultural residues production for selected countries

From these figures a first estimation of a medium and long-term potential market for energy from agricultural residues can be made. In the long term, this market would look at a ceiling close to 58 million tonnes (when subtracting use of residues for feed and other non-energetic purposes). If technical barriers are overcome, the medium term market for agri-pellets could be about 19 million tonnes in the target countries (accounting for competitive uses and logistical limitations). These are immense figures, when one considers that the upper limit for the largest wood pellet markets in these same countries is in the order of a few million tonnes.

But clearly, in evaluating the market potential of agri-pellets, price is at least as important a factor as availability. The 'theoretical' straw pellet costs was calculated from the researched figures for : Raw material costs (25-50 €/t), pelleting running costs per tonne (20-30 €/t), plus per-tonne capital investment costs and overheads. The calculated cost range that results from these figures is 94 €/t – 164 €/t. This corresponds to prices found in countries that have small straw pellets markets (such as Denmark where the production cost is found to

be around €135. It is also competitive with wood pellet and heating oil prices if converted to €/LOE.

Technical barriers

Agri-pellets' high ash, Nitrogen and Chlorine contents are highly problematic in combustion; the first because of complications in the combustion equipment, and the latter two because of their noxious/corrosive emissions.

Although little can be done to reduce ash content, adapted combustion equipment (with an efficient disposal of ash) can prevent ash 'sintering' and thus blocking up equipment. This phenomenon is basically a melting of ash in the boiler. This molten ash hardens on cooling and is then extremely difficult to remove. There are several methods that can be used to combat this problem. In general these however increase the hardware and/or operating costs. They are:

- Specially adapted grills that may be movable or constructed in such a way as to quickly transport the ash away from the combustion area.
- The addition of quicklime to the straw. This can raise the sintering temperature by up to a few hundred degrees Celsius.
- Water-cooled grills
- Mixing of straw with wood-pellets or wood-chips

Nitrogen and Chlorine are far more difficult to remove, and generally require filters that are only cost-effective in larger installations. However, concentrations of these constituents vary hugely and can be influenced by (for example) different fertilising habits.

The Chlorine-, Nitrogen- and ash-related problems can be more cost-effectively handled in larger installations. As a consequence, all straw-based energy production (almost exclusively from loose- rather than pelletised straw), takes place on a medium to large scale in for example, public buildings or district heating.

The Italian pellet market

In Italy there are 4 national manufactures of pelleting equipment (Larus, Kemix, Bollareto and La Meccanica) and 2 importers/distributors (both of CPM plants). Moreover, there is an engineering society, whose principal activity is to study the necessity of a particular firm that wants to install a particular plant; this engineering society is in association with "la Meccanica", that provide the pelletizing equipments.

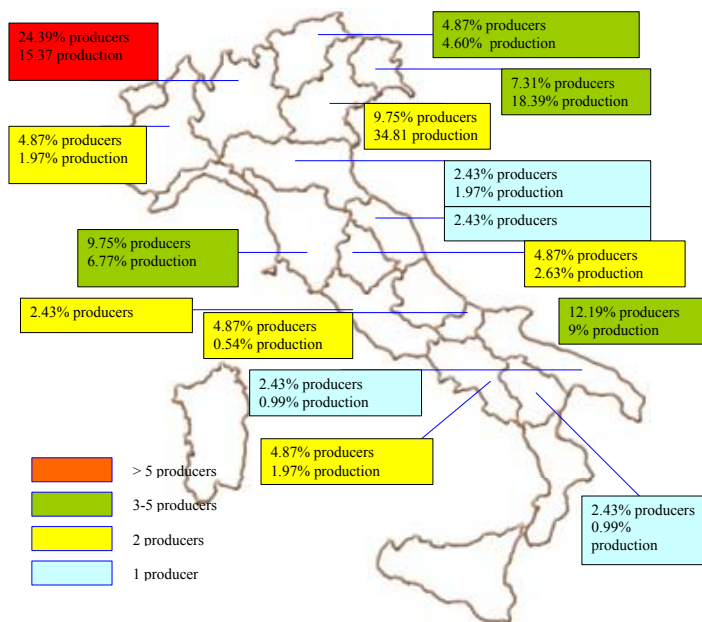


Figure 2 – Pellets production in Italy: concentrated in the North

There is only one enterprise that, until now, is trying to produce pellets from agricultural residues; this manufacturer has been producing since only 5 months, but it will probably produce 12-15,000 tons of agri-pellets per year.

GRTN (the national grid operator) has registered 55 plants already in activity fuelled with waste and vegetable residues, and 22 projected. Unfortunately, the category is large, and comprises plants fuelled with biogas, chips and waste. In a more precise classification we find 6 plants fuelled with “cultivation and agri-industrial waste” in the year 2000, and in 2001, 7 plants. During conversations with pellets producers it was found that there are at least two co-generation plants fuelled with pellets, but the producers would not reveal which plants.

The Spanish pellet market

The wood pellet market in Spain is extremely small (a few 10s of thousands of tonnes per annum). The country continues to face significant barriers to wood and agri-pellet penetration, ranging from a lack of available technology to low political support.

In the last decade a significant increase in compacted biomass fuels for domestic use has taken place. However, industrial consumption has not followed this tendency due to difficulties with the regular supply and prices of raw material.

Installations with an output higher than 2.000 kg/h have gone out of business due to the difficulties to have a guaranteed supply of raw material, both in quantity and quality. Therefore, the dependence on external biomass sources is the most serious problem in this type of factories.

On the other hand, wastes from the first and secondary wood processing industries are increasingly more and more unprofitable, since they are used and recycled in the factories where they are produced, or commercialised in other sectors, as in boards making.

The Greek pellet market

Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market (L283/27.10.2001) provides in its annex for Greece an indicative target of meeting by 2010 a part of its gross national electricity consumption from renewable energy sources (RES) equal to 20,1%, the contribution of the large-scale hydroelectric plants being included.

There is no current pellet production or use in Greece and therefore the market is completely undeveloped. Political support for the development of a pellets market is also severely lacking. As a consequence, Greece has significant untapped potential in not for agri-pellets but also for wood pellets.

Presence of European legislation

In the vast majority of European countries, there are few or no laws written specifically for pellets. Often these come under the jurisdiction of only very general biomass laws. Only four European countries have standards specifically for compacted biomass fuels:

Austria: ÖNORM M 7135 (briquettes and pellets)

Germany: DIN 51731 (briquettes and pellets)

Sweden: SS 187120 (pellets)
SS 187121 (briquettes)

Switzerland: SN 166000 (briquettes and pellets)

Conclusion

In southern countries wood pellet availability is lower and therefore the price (in the long term) will always be higher than for straw pellets due to increased transport costs.) This offers a significant opportunity for agri-pellets, which can be exploited if the remaining economic and technological barriers can be overcome.

The analysis in the framework of this project is uncovering the strengths, weaknesses, opportunities and threats, of an extremely promising agri-pellet market. Above all it has shown the barriers posed are surmountable, and what is needed is a coherent European strategy to nurture the growth of this market.

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