

THE PELLETT MARKET IN ITALY: MAIN BARRIERS AND PERSPECTIVES

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ABSTRACT: The Italian pellet market is living now a positive period, after a stage of technological and economic challenges; the technology for pelletising equipment seems now to have reached a good maturity, and enables the manufacturers to produce a good quality product. Pellet producers are consequently doubled in the last two years and many are going to enter into this market.

National production of pellet is increased in the last years from about 100,000 tons/year to about 160,000 tons/year, while the national consumption increased to about 210,000 tons, therefore a large fraction of the demand is covered by importing pellets for foreign countries. The potential of biomass from sawmills and wood industry has reached its limit, there is the necessity to invest more resources to obtain a good pellet also from agricultural residues.

During these years, the lack of specifications on the chemical and physical characteristics of pellets has been the main barrier to its affirmation: this "normative lack" enables the presence on the market of low quality pellets thus decreasing the good image of the product among the consumers. Now that these specifications have been issued, the different actors active in the market have the right tools to make pellet a product diffused among the Italian consumers as it is in other European countries.

Keywords: barriers to bioenergy, market implementation, pellets

1 INTRODUCTION

In this paper a description of the pellet market in Italy is given, pointing out the different issues related to the development of this particular biomass sector.

The first factor to consider is the biomass availability: during these years the Italian pellet producers have utilised most of the biomass available from sawmills and wood industry. The price of wood residues has then increased to a level that pellets producers cannot sustain. This explains the necessity to find different and new resources. The possible biomass sources are mainly two: biomass from forestry and from agriculture. However, biomass supply from sustainable management of woods can be hampered due to economic reasons, because of the morphological configuration of most of the Italian lands and the lack of a diffused and organized management system of the Italian forests. Agricultural biomass also can be considered a natural and suitable resource that can be utilised in pellet production: Italy has a very abundant agricultural production, residues from these productions being relatively low-cost. However, new investments and development projects are required in this field, in order to implement new solutions in the collection of those residues from the field and to investigate on how they can be pelletised in an efficient way.

2 NATIONAL PRODUCTION & CONSUMPTION

The pellets market has seen in Italy a slow but progressive development; even if its size is still modest, a remarkable growth occurred above all in the last 4 years: in this period the market passed from about 20 operators to over 40. In particular, it can be observed a notable positive trend in the first part of 2003: many actors among chips producers and sawmills operators decided to enter into the pellets market, guessing the large potential

of this kind of biofuel.

Table I: Number of pellet producers in Italy

REGION	2001	2003	Δ
Lombardia	9	10	+1
Veneto	5	4	-1
Trentino Alto Adige	2	2	
Friuli Venezia Giulia	2	3	+1
Piemonte	2	2	
Emilia Romagna	--	1	+1
TOTAL NORTH	20	22	+2
Toscana	3	4	+1
Umbria	2	2	
Abruzzo	3	5	+2
Lazio	1	1	
Marche	--	1	+1
TOTAL CENTRE	9	13	+4
Basilicata	--	1	+1
Campania	--	2	+2
Molise	2	2	
Puglia	1	1	
TOTAL SOUTH	3	6	+3
TOTAL ITALY	32	41	+9

Pellets producers are very variable in size and hence the production varies considerably: the smaller producer produces 300 t/year, while the biggest one produce 25-30,000 t/year. With this variability, the average production per producer is not a significant figure. Only two large producers that produce more than 20,000 ton/year have been identified, moreover others three with

a production around 8-10,000 ton/year; all the remaining producers have limited production capacity. So, it can be observed an important feature of the Italian market: most of the producers are small, with a range of action limited to a local dimension.

Regarding the distribution on the territory of pellets producers, nearly the 80% of them is located in the North of Italy, where the largest producers are located. In the North, the Veneto region covers about 35% of the market; in fact, the North-East is one of the most industrialised zone in Italy and it is also a "wood industrial district", that is an area specialised in the wood industry. With the market increasing, the proportion covered by the North Italy has decreased, passing from more than 80% to about 77%; this decreased has been in favour of the producers located in Central Italy, where the production has increased of about 4.5%. This situation, in which a certain type of industry expands from a restricted area to the entire national territory, is typical of sector that is going towards expansion.

Moreover, in South Italy are installed more and more plants for the energetic valorisation of biomass, thanks to the presence of abundant woods and regional and European funds that secure the necessary economical and financial resources. In perspective this is a good signal also for a future pellet production.

The production of pellets is the principal activity for about 60% of the producers, while for the remaining 40% pellets represents a secondary activity, to exploit and give value to residues otherwise worthless.

Finally, it should be remarked that probably many other producers have been added to the 40 registered: in fact, many sawmills and wood industries utilise the residues originated from their production to produce pellets for their own energy consumption. To this category must be added the pellet importers; these can be of two types: Italian manufactures that decide to decentralise the production in foreign countries (above all in the Eastern Europe) to exploit the abundant and less expensive wood resources available in these countries, and foreign producers that export a relevant percentage of their production in the Italian market (above all Switzerland and Austrian manufacturers). The import of pellet is favoured also by the growing selling price, that makes economically feasible the production of pellets outside the national boundaries. Considering these last category of pellets producers, the number can increase to nearly 100; however, this figure is not confirmed through statistical research, it is only a rough estimation.

People employed in pellets production are estimated in about 80, with an average number of two people per firm. This figure is actually difficult to estimate, because of the variability in the enterprise size: there is the "family enterprise" owned by one entrepreneur assisted by his familiars, the small enterprise with one worker that supervises 2 machines, and finally the big enterprise with 20 workers.

The national consumption of pellets has been estimated by CTI in 2001 in about 150,000 ton/year. This figure has been updated for 2002 and 2003 and indicates 210,000 tons of pellets consumption for the year 2002/2003. Estimations for the year 2003/2004 indicate a further increase, thus causing more and more difficulties to pellets distributors/producers in satisfying the demand.

Of this amount, about 160,000 tons are produced in Italy, while about 20-50.000 ton/year are imported (e.g.

Spain, Austria but also Accession Countries). However, accurate data about import of pellets in Italy are very difficult to achieve, since in the commercial statistics a precise codification of this product does not exist: it has been observed that, when imported, pellets are classified under different product voices, e.g. firewood, chips, etc.

3 PRODUCTION COSTS AND PRICES

Also the situation regarding the selling price of pellets shows a jeopardised framework, characterized by contrasting signals.

A survey carried out among producers has not given a homogeneous result: the trend is that of a general increase but, while for some producers the price has increased, for others the price remained substantially stable. This framework is probably linked to the different sources of supply: producers that have "free" biomass, or that have access to preferential channel of supply can maintain the same prices, while the others face more and more difficulties in finding biomass and are compelled to sustain costs more and more higher.

In the last two years the price has been stable, but a further increase can be easily foreseen in a short period. In the last years there has been a sort of "run" for achieving wood residues: as a consequence of the increasing importance that biomass will have in the coming years among renewable energies, sawmills and wood industry residues are seen as a precious resource. With the development of the market, the request for wood residues from industrial residues and from forestry management has continuously increased, and it has become a scarce resource. Moreover, there is the competition of the wood recyclers, which utilise the industrial residues to produce wood panels and pallets.

In previous research studies (e.g. CTI, PROBIO Program) the price for the retail market has been quantified within a range of 0.21 and 0.26 €/kg for years 2001-2002. For the year 2003, a selling price in a range 0.25 to 0.35 €/Kg prevails in the retail market, depending on seasonal variations. There are, however, minimum peaks of 0.18 €/kg and maximum peaks of 0.40 €/kg. These figures show a market not yet fully structured, with differences at regional level and, in the same region, among different producers. For the wholesale market, the price ranges between 0.15 and 0.25 €/kg.

Table II: Production Cost and Price for pellets production in 2001-2002

Pellet prices	Euro/kg
Production costs (incl. raw material)	0.07-0.10
Wholesale price	0.15-0.25
Retail price	0.25-0.35

4 PELLETISING EQUIPMENT MANUFACTURERS

The situation prevailing in the sector of pelletising equipment manufacturers reflects the uncertainties just explained for the pellets production, and typical of a market not completely structured.

As a consequence, in these years many plant manufacturers coped with similar problems, due to the lack of a precise technological knowledge and to the tendency to built plant on the basis of that used for the production of food pellets.

In Italy have been identified four national manufactures and two importers/distributors (both of US systems). Three further characteristics defines the Italian market.

The first is the tendency of pellet producers to assemble for their own the conversion plants, combining components from different enterprises.

Another issue specific of the manufacturers of pelletising systems is the attempt to create lines to treat biomass with a moisture percentage over 35%, in order to avoid the utilisation of drying systems.

A third characteristic that seems to distinguish the Italian technology for pellet production in comparison with other countries is the capacity of producing pellets with no binding agents.

After a transition period, presently the pelletising technology seems to have achieved the maturity required to enter into the market without many problems.

5 ENERGY CONVERSION SYSTEMS

Pellet is a biofuel traditionally used for three different applications: for civil heating uses, in large plants for energy production, and in district-heating systems.

The utilisation of pellets for civil heating purposes has experimented a remarkable increase in the recent years, as confirmed by the growing number of retailers selling pellets stoves and boilers: thanks to extensive researches, about 60 were identified, this figure being surely incomplete. In fact, as in the case of pellets producers, the Italian market is characterised by many small producers, with a limited range of action.

There are only five large size stove and boiler producers, on the entire Italian territory. These producers have created specific products and, thanks to their commercial image, have succeeded in publicising and selling these pellets equipments.

There are two principal factors that hinder the diffusion of pellet stoves and boilers:

1. the existence of rules and laws limiting the installation of heating equipments fuelled with biomass in urban areas;
2. the existence on the market of low quality pellets that cause the malfunctioning of the heating systems; this lowers the final consumer's confidence degree.

The first factor is linked to the old belief that biomass is more pollutant than other fuels; but this belief is, in its turn, linked to the use of old stoves with a very low efficiency.

The second problem can be solved with the introduction of specific normative for pellets that will regulate and standardise the products.

The utilisation of pellets as fuel in large plants for energy production is the second possible utilisation for pellets. It is very difficult to find information regarding the installed combustion capacity that uses pellet

produced from wood or agricultural residues as fuel. In fact, nearly all the plants registered as "biomass plant" use above all other kinds of biomass than pellets, like, for example, chips.

In 2003 there were 41 small size district-heating systems fuelled with wood biomass, in operation in small Alpine communities in the North of Italy, but the use of pellets is limited to small quantities.

Pellets is increasingly diffused in very small plants of mini district-heating networks, that must be added to the previous figures. These small plants serve public structures such as sporting centres, schools and fairs, and have boilers with an average power of 600-1000 kWth.

6 LEGISLATIVE MATTERS

Up to May 2004, Italy has not a specific discipline on solid Biofuels, therefore pellet is considered only in the framework of other legislative matters, and in particular, in legislation regulating "wastes".

Many actors active in this market consider that most of the problems that burdened the sector stay really in the actual legislative regulations or, to be precise, in the lack of a proper legislation.

The regulative regime actually in place, the Law Decree n.22/1997, also known as Ronchi Decree, establishes that any waste resulting from agricultural, agro-industrial, industrial and craft made activity must be considered "special waste", and treated as a consequence. This implies the necessity to use specific system to treat and digest these wastes, above all for energetic purposes. Nevertheless, the same decree allows some simplified rules and legislative procedures to deal with particular wastes identified as not-dangerous: among these residues there are vegetal waste and wastes from not-treated wood manufacturing industries. On the other side, the decree, including biomass in the more general category of waste, in some way prevents its economic valorisation and creates problems in their treatment.

Rules on pollutant emissions are a further argument to deal with. The imposition of very restrictive emission limits in the specification for technologies utilising pellets and biomass in general is a factor that heavily hinder the diffusion if these kind of equipments.

For all these reasons the Ronchi Decree has been emended by another governmental decree, the DPCM 02/03/2002 that defines in a clear way the characteristics of fuels and biofuels and the technological characteristics of the combustion plants. But, even if the DPCM has constituted a big step ahead in regulating a sector neglected by the previous legislation, it is not a definitive solution and it does not clarify some points that would require a more precise regulation. In particular, the Italian biofuels sector needs "specifications": specific rules that discipline the whole sector in each single part, e.g. the chemical-physical characteristics of the biofuels, the technical characteristics of the equipment producing and utilising biofuels. Moreover, these regulations need to be organised in an organic way by a legislative intervention that rationalise the whole matter.

The CTI (Comitato Termotecnico Italiano, Italian Thermotechnical Committee) is a technical body belonging to UNI, and it has been operating for many years in the sector of the energetic utilisation of solid fuels.

For this reasons, CTI constituted a “Specific Committee” to study specific rules and standards for the sector, in collaboration with the Ministry of Environment.

Moreover, CTI has constituted a round table with the principal actors active in the pellet market, to study specifications for pellets. This study has been conducted following the European rules defined by CEN, and has brought in May 2004 to the document: “Pellet characterization for energetic purposes”. Pellet has been clearly divided in three categories, “A”, “B” and “C”, each with different and precise indications for the definition of the quality of the product. Each category defines precise values for parameters like size, moisture, mechanical durability, ash content, particulates, nitrogen and sulphur content and presence of binding agents.

The first category has been divided in two sub-categories, “A without binding agents” and “A with binding agents”.

In this framework, category “A” seems to be ideal for a “civil use” in small boilers and stoves, while the other two define a pellet that can be used in the industrial sectors or in plants for energy production, where the combustion chambers are less sensitive to deposit formation (slagging, fouling), emissions (dust, gas and aerosols) and corrosion problems.

Even if these “specifications” are not binding, now that a precise quality for the product “pellet” has been defined, the market has finally the instruments to operate in the correct way: pellet equipment’s producers now know which characteristics their products should have and, in this way, also the manufacturers of stoves have the necessary guarantees for the operation of their equipments.

The production of a good product and the creation of synergies between manufacturers of pellets and heating equipments is the only way to generate in the consumer the confidence necessary to develop this market.

7 PELLETS FROM AGRICULTURAL RESIDUES

The pellet can also be produced by using agricultural residues as biomass source; an overview of this market is one of the main task to be performed in the frame of the European project “Pellets for Europe”.

The Italian agricultural pellets market is still in an experimental phase, based above all on pilot and demonstration plants. Today, there is only one national producer of pellets from agricultural residues and some other experimental projects carried out with public (national or European) funds.

Several problems need to be overcome in each single phase of the pellet chain in order to promote the large-scale valorisation of agricultural residues. The first and main barrier is the organisation of an efficient collection system that could be adapted to the single realities present on the Italian territory: even if traditional collection technologies and solutions can be utilised for collecting the residues from the fields, there is the necessity to stress the effort in experimenting new kind of machines and collection methods, to lower the costs and make the machineries already existing more reliable.

Also design and manufacturing of pelletising equipments needs to be improved: the production of pellets from agricultural residues still requires research

activity, to find the correct mixing of residues that assure the production of pellets considering the different chemical and physical characteristics of the agricultural biomass with respect to the traditional woody one.

Now that the specifications for pellets have been outlined, also the agricultural pellets has been clearly defined and can find a precise utilisation in the market.

A further important aspect needs to be considered and solved: this is a cultural factor, that sees the Italian farmers reluctant in utilising agricultural residues for energetic purposes. The farmers are used to utilise these residues for bedding for animals, or for reintegrate the soil of its chemical agents.

A change of this attitude requires both a campaign to make aware the public opinion on this issue, as well as the implementation of incentive mechanisms by the Government.

8 CONCLUSIONS

After nearly fifteen years during which this market has progressively increased in size remaining, however, quite limited, it is now on the point to do the definitive jump in the direction of a mature market. Many problems have affected the pellet market in these years:

- the high investments required, above all in the first phases;
- in some cases producers have met difficulties in the operation with the pelletising machine;
- the increasingly difficulties encountered in finding biomass; this is due both to the difficulty to collect biomass among many small properties and to competition with other wood utilisations;
- the presence of district-heating centrals fuelled by chips that use biomass potentially suitable for pellets production;
- the need of institutional incentives and supporting programmes
- the consumers’ scarce knowledge of the final product.

Some of these problems have been overcome, as the reliability of the pelletising units and the lack of a precise normative, while other remain. In particular, it is increasing the difficulty of finding biomass and this causes the continuous increase of its price, no longer sustainable for the producers. The solution to this problem could be represented by the possibility of pelletising agricultural residues, a resource abundant on the Italian territory but not still valorised from this point of view. Concerning the utilisation of biomass deriving from a sustainable management of forests, often the main problem is represented by the high costs of this kind of production: most of the available biomass, in fact, is located in mountain or hilly areas, hardly approachable with mechanic vehicles. Therefore, also in this sector there is the necessity to invest resources in research and demonstration activities, in order to create the knowledge and find the solutions resulting in technically and economically feasible projects.

A further important factor requires to be considered: the work carried out in the framework of the “Pellets for Europe” project has shown how the development of the pellet market in countries where it is a reality since many

years is depending on the presence of a sector that creates the principal demand for pellets, i.e. the utilisation of pellet in large-scale boilers in Sweden or in district-heating in Denmark. In Italy, even if the civil sector constitute the principal demand source, there is not a real sector that procure a constant and relevant demand of pellets for the producers.

A precise political and legislative intervention seems to be necessary, in order to create a framework that favoured the utilisation of pellet in targeted sectors, both through the predisposition of incentives and the elimination of the existing barriers.

Prampolini (BML Plants Engineering) for their kind contributions.

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ACKNOWLEDGMENTS

Information and data used in the elaboration of this paper have been collected in the frame of the European project “Pellets for Europe” (contract number ALT 2002-012-137-160), coordinated by Dk-teknik and co-financed by the European Commission in the frame of the ALTENER programme. Figures are based on a considerable (more than 100) amount of contacts and interviews with actors active in the Italian pellet market, carried out in the period from July to December 2003.

The authors wish to thank for their precious contribution Mr. Nocentini and Mr. Faini (ARSIA), Mr. Failoni (CIA), Mr. Luigi Pari (ISMA), Mr. Panvini (CTI) and Mr. Massari (AMGA Energia). Many thanks also to Mr. Aurelio Cupelli, Larus Impianti, Nazzareno Costruzioni, Kemyx, BS Bollareto Impianti and Mr.