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Qualitative insights into the commercialization of wood pellets: The case of Andalusia, Spain

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ABSTRACT

Pelletizing technology is gaining significance as an alternative for optimizing energy recovery from solid biomass. The large-scale implementation of wood pellets as a biofuel has the potential to replace fossil fuels for heat and power production.

This study explores the knowledge of different agents in the pellet supply sector regarding pellets made from wood, the major factors influencing the application of this energy source, and the potential demand for new formats and packaging. Such knowledge can help the sector develop strategies to better commercialize this biofuel.

A qualitative study among managers (producers and distributors) is carried out, together with a quantitative study of the biomass sector and the wood pellet market in particular.

The key findings are outlined. Firstly, that the pellet is mainly for the heating of family homes and other buildings, given its convenience, cleanliness, ease of use and stable characteristics. Secondly, that firms that work in the sector agree that the 15 kg pack is the most adequate, given its ease of use, transport and storage. Finally, results reveal how direct distribution to domestic users will predominate in this sector. Yet this calls for broader coverage through diverse points of sale.

The research makes an original contribution to the literature by generating in-depth knowledge about the logistics and future market potential of wood biomass. The final recommendations will contribute to formulate policies designed to stimulate more widespread take-up of heating systems based on this type of biomass.

1. Introduction

Amongst the costs of modern-day progress and development are socioeconomic imbalances and environmental impact worldwide [1]. A crucial environmental problem facing mankind at present – directly related to climate change – is energy use. In this critical context, the notion of sustainable development comes to the fore, as a means of satisfying current energy needs and improving access to energy for certain regions and populations – but not at the expense of future generations [1] and [2].

In the case of Spain, energy dependence for the year 2010 was about 80%, higher than the EU average (55%). The

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problem, therefore, is one of self-sufficiency [3]. By applying EU Directive 2009/28/CE, regarding the promotion of energy from renewable sources, forecasts for the year 2020 reflect how this sector will create 302,866 new jobs (180,175 directly and 122,691 indirectly). This would represent growth, in job creation, of around 104% compared to 2010 [3].

Biomass is one of the main types of renewable energy sources. In addition to producing energy, it contributes to local economic growth and overall sustainable development. From the environmental point of view, when making use of biomass the global emission of CO_2 in the atmosphere is negligible [2].

Pelletization is the process of making compact biomass that facilitates handling, cleanliness, and the increase of energetic value per unit of volume. The compact size is also an advantage in terms of storage and transport compared with other wood biomass [4].

The wide-scale use of wood pellets as a biofuel has great potential for replacing fossil fuels for the production of heat, hot water and electricity. Moreover, it represents a change in the energy model that points to positive economic and environmental consequences, according to the conclusions of the first World Conference on Pellets, organized in Sweden in September 2002 [5]. Energy efficiency and substitution of fossil fuels by renewable energies represent a pillar of sustainability [6].

Empirical evidence from Spain reveals that almost half of the energy (47%) used by families is for heating their households. The consumption of thermal energy from renewable sources (mainly biomass) in the domestic or residential sector in Andalusia increased by around 80% between 2000 and 2010 [7]. This explains the relatively high level of job creation in this sector in Spain, especially in rural areas [3].

Nevertheless, there are no specific studies on the biomass market for thermal use in Andalusia focusing on pellets. Pellets have been found to offer a number of benefits, for example that they low heating costs, their independence from fossil fuels, their environmentally friendly nature [8].

The biomass sector in Andalusia is very heterogeneous, given that many companies from this sector are small and medium-sized enterprises or have a family-based structure. Nevertheless, some of these companies are big enough to cover different energy sub-sectors, including a range of activities related to pellet production (engineering, promoters, R&D, construction and assembly, maintenance, exploitation, energy sector operations, acquisition and/or distribution) [9].

In the biomass sector, the only way to guarantee that investments in production, distribution and infrastructures are profitable is to make sure that there is a growing demand for this type of energy. This demands that this energy source is made more competitive compared to other fossil energies, such as diesel fuel.

The main objective of the present research is to analyze the logistics and future market potential of the wood pellet industry in Andalusia. More specifically, it intends to, first, identify the potential distribution channels for commercializing wood pellet, and secondly, to establish the new formats and types of packaging that would contribute to better commercialization of this product.

To this end, the study uses a qualitative research methodology, combined with a quantitative element, taking a mixed methods approach with flexible design [10]. Qualitative research has proved to be a valid methodological option to explore phenomena within the applied social sciences field [11].

The findings and resulting conclusions and recommendations may contribute to improving the outlook of the wood pellet sector. Recommended solutions include a coordinated communication effort that emphasizes the significant energy efficiency of wood pellet, improved marketing techniques to satisfy current demand and generate greater future demand, and enhanced product quality.

In light of these recommendations, the biomass industry needs to pay attention to two critical facets in particular, namely commercialization and distribution, based on in-depth market studies. This would enable firms in the sector to align their policies with the preferences of the target population, and thus make their commercial strategies more effective.

Within this context, the present study explores the levels of knowledge that different parties involved in the pellet supply sector (producers and distributors) actually have about the product. The paper focuses on pellets made from wood, and looks into the main factors affecting current demand for, and future potential of, this product. Such information about the present market situation may be useful when developing strategies to help boost sales in the sector.

First, the manuscript outlines the theoretical foundations of consumer behavior and, secondly, describes the extent to which biomass heating systems have been adopted by the general population. In the third section, the methodology applied for the qualitative study is explained. The fourth section presents the qualitative data analysis; and, finally, the fifth section offers the main conclusions and recommendations from the research.

2. Theoretical framework

Growing societal awareness of the problems caused by climate change, and greater knowledge about the existence of alternatives – renewable energy – have led a significant number of consumers to endeavor to behave in ways that respect the environment. Pro-environmental behaviors are often studied as a particular type of consumer behavior [12]. Hence, pro-environmental consumption may be characterized as a highly complex form of consumer behavior, both intellectually and morally as well as in practice [13].

Research into consumer behavior is essential for devising marketing strategies as it helps firms to induce certain (in this case, pro-environmental) behaviors by offering an array of products that are more likely to satisfy the wishes and preferences of the consumer. This raises the question of motivation, as consumers may be motivated not only by personal factors but also by their desire to care for the environment. Moisander [13] states that "… a motive is usually understood as a reason for behavior". Amongst motives that lead consumers to adopt biomass-based heating systems are the increasing cost of fossil fuels and