Chapter 30
Adoption of Biomass Heating Systems: Cross-Market Segmentation of the European Region

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ABSTRACT

During the past decade, the European directives have been taking into consideration some compulsory objectives concerning the promotion of the use of energy from renewable sources (including biomass) within the European Union and its Member States. This chapter identifies the main socio-economic determinants that affect the adoption of biomass heating systems, as well as a description and listing of potential adopters of this type of systems in the European market. Based on the theories of adoption of innovations or of new systems and their personal factors, the practical was focused on potential adopters of biomass heating systems living in Spain, Germany, UK, France, Norway and Sweden. In particular, we conducted a cross-market segmentation of these countries. This study also includes interesting recommendations related to the commercialization and development of this type of heating for end-consumers.

INTRODUCTION

The entry into force of the Kyoto Protocol for the period 2008-2012 as an answer to the need to fight climate change provides the global reduction of the main greenhouse gas emissions. This goal of reducing gas emissions at the global level is specified in the new EU energy strategy, which includes a significant package of measures related to energy and climate, such as the goal of reaching 20% of energy savings and reducing by 20% the greenhouse gas emissions by 2020, the horizon year for achieving these goals (EC, 2010). In particular, the Directive 2009/28/CE of the European Parliament and the Council, of 23
April 2009 on the promotion of the use of energy from renewable sources includes a series of compulsory goals for the EU and all Member States, the development of national action plans to reach these goals and the notification of these plans to the European Commission.

In particular, some national action plans for renewable energies include specific measures for the promotion of the use of energy from biomass, under a household or a commercial perspective or in order to improve availability of biomass in the agricultural and forest sector (as stated in the Renewable Energy Action Plans under Directive 2009/28/EC; an example from the Ministry of Petroleum and Energy, 2012).

The products derived from biomass can be used for both thermal and electrical purposes. More exactly, biomass is used for water and space heating in households, as well as for producing heat in industrial processes (European Biomass Association, 2013). As general information, over 50% of the total energy consumption in Europe at present is used for generating heat for either domestic or industrial purposes.

Table 1 shows renewable energy and biomass consumption in the countries analyzed in the practical application of this chapter.

The adoption and diffusion of heating systems based on renewable energy such as biomass has had a strong impact during the last few decades, not only on climate change, but also on the energy supply security and the energy price increase (Michelsen & Madlener, 2012). Besides, heating systems are a key component of the home comfort maintenance and improvement. For private owners, for instance, the decision of renewing their heating system has an impact in the long term (Rouvinen & Matero, 2013).

Biomass systems as opposed to other types of heating equipments are better evaluated only in terms of environmental impact. When it comes to comfort (meaning time and effort required for making it work), the other systems – such as oil or gas-fired condensing boiler and heat pumps – are considered much better than the biomass system (Mahapatra & Gustavsson, 2008a; Lillemo, Alfnes, Halvorsen, & Wik, 2013).

Therefore, if the aim is for homeowners to adopt this type of heating, we need to appeal to their personal responsibility towards environment and society, with particular emphasis on the implications of a pro-environmental behavior. A more widespread use of innovative biomass heating systems would substantially reduce CO₂ emissions and reliance on oil and electricity for heating purposes gradually, while increasing energy efficiency on the domestic market (Mahapatra & Gustavsson, 2008a).

Table 1. Final energy consumption, total RES and biomass in 2011 (Ktoe*)

<table>
<thead>
<tr>
<th>Countries</th>
<th>Total Final Energy</th>
<th>RES</th>
<th>%RES/Total Final Energy</th>
<th>Biomass</th>
<th>%biomass/Total Final Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spain (ES)</td>
<td>86,532</td>
<td>13,614</td>
<td>15.73%</td>
<td>5,898</td>
<td>6.82%</td>
</tr>
<tr>
<td>Germany (DE)</td>
<td>207,093</td>
<td>26,616</td>
<td>12.85%</td>
<td>16,240</td>
<td>7.84%</td>
</tr>
<tr>
<td>United Kingdom (UK)</td>
<td>132,023</td>
<td>5,654</td>
<td>4.28%</td>
<td>3,021</td>
<td>2.29%</td>
</tr>
<tr>
<td>Sweden (SE)</td>
<td>32,168</td>
<td>15,452</td>
<td>48.04%</td>
<td>8,539</td>
<td>26.55%</td>
</tr>
<tr>
<td>France (FR)</td>
<td>148,065</td>
<td>18,236</td>
<td>12.32%</td>
<td>12,043</td>
<td>8.13%</td>
</tr>
<tr>
<td>Norway* (NO)</td>
<td>20,623</td>
<td>20,660</td>
<td>58.81%</td>
<td>1,258</td>
<td>6.10%</td>
</tr>
<tr>
<td>Total</td>
<td>626,504</td>
<td>100,232</td>
<td>16%</td>
<td>46,999</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Source: Prepared based on Eurostat data, AEBIOM calculations
*Ktoe: 1,000 tons of oil
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