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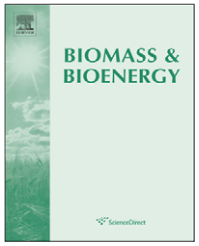

Consumer willingness-to-pay for biopower: Results from focus groups

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ARTICLE INFO

Article history:
Received 7 May 2007
Received in revised form
20 June 2007
Accepted 4 July 2007
Available online 27 August 2007

Keywords:
Biopower
Green energy
Willingness-to-pay

ABSTRACT

To find out whether consumers are willing to pay a surcharge for biopower, the Alabama Department of Agriculture and Industries hosted consumer focus groups at four locations in Alabama. Results showed that consumers were willing to pay a premium in line with the costs, but that most did not have much prior information about green energy options.

1. Introduction

Co-firing biomass with coal to produce electricity offers multiple benefits, including reduction of emissions such as CO_2, NO_x, SO_x and mercury, and generation of new markets for agriculture. These benefits could be particularly helpful in southeastern states where most of the electricity produced is from coal-fired power plants, and where rural economies are in crisis. Alabama serves as a good example. About 70% of the electricity in this state is produced from coal. Ten years ago all the coal used for this purpose was mined in Alabama, but because local coal is high in sulfur by 2002 the state imported 62% of the coal it needs from other states.

Even though there are many benefits of co-firing biomass with coal to produce electricity in southeastern USA, on an energy basis, the cost of the energy in biomass typically is considerably higher than that of coal. Bituminous coal at $50/ton amounts to a cost of around $2.03/GJ. By contrast, hay, at a price of $50/ton, translates to a cost of $3.77/GJ.

Currently, Alabama Power offers residential consumers the option to purchase 100 kWh blocks generated from renewable sources (switchgrass) for an additional $6/month. However, the great majority of consumers in the state have not opted to pay the additional fee for renewable energy. For market success, either the energy produced must be economically competitive with traditional energy sources or consumers must be willing to pay more for "green energy". Given the current discrepancy in energy costs between biomass and coal, consumers' willingness to pay (WTP) extra for bioenergy is an important consideration. The purpose of this research was, therefore, to investigate Alabama consumers' WTP for green energy and also to discover what factors may be impediments to subscription to green energy programs in Alabama.

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doi:10.1016/j.biombioe.2007.07.002

2. Background

Co-firing involves burning a biomass feedstock simultaneously with coal to produce electric power. Co-firing replaces a portion of the coal used to produce energy, typically 2–20% [1]. Existing power plants can be retrofitted to allow co-firing, and the technical feasibility of co-firing biomass and coal has been well demonstrated (see, for example, Aerts and Ragland [2] or Tillman and Hughes [3], among others). Although there are many potential sources of biomass feedstocks including wood chips and poutry litter, the Department of Energy's Bioenergy Feedstock Development Program has focused on switchgrass (*Panicum virgatum*), a high-yielding perennial grass species with a broad geographic distribution and positive environmental attributes [4].

Although market research has been conducted on consumer WTP for renewable energy, much of the research is proprietary and not released to the public. Fahrar [5] provides a review of the findings of market research in this area, summarizing reports provided by utility companies to the US Department of Energy. She concluded that while consumers favor renewable energy programs, most knew little about them. Of consumers surveyed, 52–95% reported being WTP at least a small amount for increased renewable energy and that WTP increased with knowledge. The work she reviewed also indicated that offering renewable energy programs may increase positive attitudes of consumers toward their utility companies.

3. Methods

Because our research was exploratory in nature, focus groups were the primary method used in the project. The concept for the focus group methodology was introduced into the sociology literature by Merton and Kendall [6], and has since gained broad acceptance as a research tool by a wide range of social scientists [7,8]. Focus groups consist of a small group of targeted audience (in our case, electricity consumers), and a moderator, who steers a discussion around the topic under consideration.

Between May 24 and June 25, 2005, four focus groups were conducted for the project in different Alabama cities: Opelika, Montgomery, Huntsville and Mobile. The focus groups were conducted after researchers obtained input from industry and government officials. The Auburn University Center for Government Studies (CGS) was engaged to scientifically recruit participants for the groups. To augment the information typically garnered from a focus group, questionnaires were administered to participants both before and after the sessions. The questionnaires followed a standard open-ended contingent valuation (CV) format. CV is a survey method often used to value hypothetical or intangible goods, such as water quality improvements [9] and hydrogen power buses used for public transportation [10]. Biopower, though not a hypothetical good, is not well understood by consumers, and so CV is a useful strategy to use in measuring WTP.

3.1. *Industry group meeting*

Before the focus groups were conducted, an industry meeting was held in Montgomery at the Beard Federal Building. In attendance were representatives from the state Department of Agriculture and Industries, Alabama Power, and the Utility Commissioner's office. The purpose of the meeting was to narrow down the types of questions that would be asked at the focus groups, and to obtain input from these representatives as to any questions they might think appropriate.

After the industry meeting was conducted a presentation was developed to be used by the focus group moderator to guide the focus group discussion. The presentation provided factual information on energy use in Alabama and about the use and costs of green energy alternatives.

3.2. *Recruiting of focus group participants*

To recruit participants, the Center for Government Services (CGS) purchased random phone number lists. Individuals on the lists were called at random by a team of phone survey specialists. Calls were made in the early evening hours, and an attempt was made to obtain a representative mix of citizens of each of the counties where the groups were to take place, including those living in unincorporated surrounding areas.

In the initial calls, participants were tentatively recruited. A short questionnaire was used in this first contact. Potential participants were asked their age category, their racial identification, their gender and how far they lived from the host city. In addition, a screening question was used to eliminate employees of public utilities, cooperative extension, newspapers, the Auburn University College of Agriculture and their family members. Because of unbalanced acceptance rates, it was necessary to over-recruit, and then to make a second call in which the desired individuals were confirmed. On average, the CGS tentatively recruited about 25 individuals for each group, of whom 20 were ultimately invited to participate. Potential participants were offered a $25 payment, along with either a meal for the two evening groups (Auburn-Opelika and Montgomery) or snacks for the morning groups (Huntsville and Mobile).

Although the participants were randomly recruited, it is a stylized fact that certain types of people are generally more likely to agree to participate in focus groups, creating a potential for selection bias. This is true even when participants receive compensation. Generally, individuals willing to participate in focus groups may be considered to be more publicly aware, or they may be seeking social interaction. Nonetheless, focus groups are still the norm in exploratory analysis of potential policies or for market research, and the random, scientific, recruiting method used should help mitigate selection bias in the groups conducted for this project.

3.3. *Focus groups*

Two questionnaires were used at the focus groups. The purpose of the questionnaires was to elicit knowledge about alternative energy sources of the focus group participants