



Original research article

## Does positive framing matter? An investigation of how framing affects consumers' willingness to buy green electricity in Denmark

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## ABSTRACT

We investigate how framing affect consumers' willingness to buy green electricity using a contingent valuation method. A sample of 1022 respondents was divided into two nearly equal sized sub-samples chosen from an Internet panel. One subsample received a positively framed version of the questionnaire regarding signing up to a green electricity contract, and the other subsample received a negatively framed version of the questionnaire. As expected, consumers displayed stronger intention to buy green electricity when the situation was framed in a positive manner (i.e., most Danish households have already bought it), as compared to the situation framed in a negative manner (i.e., only a few Danish households have bought green electricity). The theoretical explanation can be formulated in terms of the theory of social norms. The framing effect also signals the public good side of green electricity in that there seems to be a free rider problem. The relatively low intention to buy green electricity in the negatively framed question indicates that the free-rider incentive is particularly powerful in large groups, where an individual may perceive that her or his behavior will have only little influence on the collective outcome. The managerial implications are also discussed.

## 1. Introduction

The green power industry is an emerging industry because of the electricity market deregulation and the increasing share of renewable energy in Denmark. Electricity suppliers are now able to differentiate their product offerings (i.e., electricity services in the form of service contracts) so they appeal to consumers' environmental concerns. A core feature of these products is the environmental profile, e.g. electricity delivered to the household come from wind power or hydro power.<sup>1</sup> Alternatively, households can also choose to offset the CO<sub>2</sub> emission that is equivalent to their electricity consumption through buying and removing the total CO<sub>2</sub> quota in the market. The offsetting of CO<sub>2</sub> will reduce the total CO<sub>2</sub> quota in the market and eventually it can help ensure that more renewable energy will be produced. In this study, we define those electricity products with an environmental profile as "green" electricity services. After signing up to a form of green electricity product consumers will receive a guarantee of origin/certification indicating the environmental effect from electricity generation (i.e. where and how the electricity is produced or whether the electricity consumed by the household has been CO<sub>2</sub> offset). Due to the inter-dependability and inter-connectivity of the electricity network, the grid

contains a mix of fossil-fuel fired electricity, green electricity and nuclear electricity. This guarantee will then be used to write off the amount of green electricity sold from the total green electricity generation account in the grid or in the CO<sub>2</sub> quota market, by doing so it prevents the same amount of green electricity from being sold more than once and hence it enhances the credibility of the green electricity sales. However, from a consumer perspective, any type of electricity functions exactly the same way, i.e. an intangible electron flow for powering the electric equipment. The homogenous nature at the point of consumption diminishes consumers' motivation to pay a higher price for obtaining green electricity and eventually it can threaten the success of the green power marketing. Besides, although electricity possess the features of a public good, namely, its non-rivalry and non-excludability in consumption [1] and the externalities associated with the electricity generation is borne by the society collectively, electricity is also a private good. For a public good, the free rider problem is well known. For a private good, the financial constraint is an often-mentioned issue for individuals' decision making, and individuals are likely to drop the high-priced alternative when two products are homogenous in nature. Thus, this mixed product nature can complicate the promotion of green energy.

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E-mail addresses: [yya@sam.sdu.dk](mailto:yya@sam.sdu.dk) (Y. Yang), [hso@sam.sdu.dk](mailto:hso@sam.sdu.dk) (H.S. Solgaard), [jzhren@polyu.edu.hk](mailto:jzhren@polyu.edu.hk) (J. Ren).<sup>1</sup> Wind power and hydro power have already existed in the electricity market for decades, but there has never been marketed as a single product to directly household before the electricity market was deregulated. Although the product and production process are not new to consumers, the marketing of wind power or hydropower to consumers is new.

In principle green power marketing practice is quite like the marketing of any other environmentally friendly product such as organic food marketing; both have put emphasis on minimizing the environmental impact in the production process. The way they differ is that consumers do not receive a physically different product when buying electricity; thereby consumers receive no social identity in a physical format. As consumers' environmental concerns increase prior studies have revealed that there is great potential for green electricity [2–4], but the sale of green electricity has only seen slow growth in the actual market place [2,5]. This may be attributed to the fact that the electricity sector has traditionally been a natural monopoly. In a natural monopoly consumers do not have the possibility to choose neither product nor supplier. This is bad because energy policy makers hope that consumers are willing to subscribe to green electricity on a volunteer basis. The higher the demand for green electricity, the more attractive it will be for energy investors to invest in green electricity. The back up from consumers can eventually help Denmark to implement its goal of being a fossil fuel independent nation. The aim of this study is therefore not only to investigate the WTP for green electricity but also the effect of question framing on willingness to pay. Specifically, we are trying to identify the determinants that will influence consumers' WTP for various types of green electricity services. The research setting is Denmark.

The long-term energy goal of Denmark is to become a fossil fuel independent nation by 2050 [6]. Fig. 1 illustrates the progress of primary energy production in Denmark over the past decades. As is shown the share of fossil-fuel in the total primary energy production appears to fall continuously while the share of renewable energy production has been increasing since 2005. Fig. 2 presents the share of renewable energy production from different renewable energy sources. Biomass and wind energy are two dominant forms of renewable energy over the past decades. The potential of biomass to replace fossil fuels is limited, as seen from the global and national perspective. Wind energy thus has been placed as one of the important renewable energy forms to achieve this goal due to its abundance and local availability. Wind, however, is unpredictable and non-storable. Thus, the amount of wind energy that flows into the grid varies dramatically depending on weather conditions making it difficult to fully utilize the generated power. Furthermore, the expansion of wind farms requires a large amount of capital investment, which will become a cost for consumers. Are consumers willing to subscribe to a green electricity contact? If so, what factors will motivate them to buy?

The extant literature shows that consumers' environmental concerns are important for adopting environmentally friendly products such as green electricity [8–10]. In addition, consumers' attitudes are another significant factor that has an influence on their willingness to pay for

green electricity [4,9,11–14]. Furthermore, norms have been found to be significant influencers on consumers' willingness to pay for green electricity [4,15,16]. The influence of norms has been examined based on what consumers' important referent group thinks about their adoption of green electricity [4,17]. Norms may function as a “moral compass” for guiding individuals to take responsible action [18–20]. However, Tversky and Kahneman [21] argued that consumers tend to reveal inverse preferences under different framings of problems, complications or outcomes. Usually, positive framing signals benefits while negative framing indicates risks. According to Tversky and Kahneman [21], decision makers are prone to minimize risk (i.e., being “risk averse” when contemplating benefits, but are prone to take risks (i.e., displaying “risk seeking”) when contemplating losses. It is therefore logic to assume that consumers' willingness to adopt green electricity will be different under different problem framings. Put differently, our research hypothesis is that the willingness to adopt green electricity is higher under positive framing than under negative framing.

Given this, the aim of this study is to investigate consumers' willingness to adopt green electricity services in Denmark with positively or negatively framing information regarding the willingness to buy green electricity in the market. The current study does not only explore the factors influencing the willingness to adopt green electricity among Danish residential energy consumers but also explicitly addresses the influence of positive and negative framing on consumers' willingness to adopt green electricity. The paper is organized as follows. Section 2 provides a review of the literature and outlines the theoretical framework for explaining consumers' WTP for green electricity. Section 3 presents the research method and specifies the model for the analysis. Section 4 presents the results of the statistical analyses. In Section 5, we highlight the research findings, and discuss the managerial implications of the study as well as possible further research.

## 2. Literature review

The adoption of green electricity service is a typical “green consumerism” behavior. One of the distinguishing features of the green consumerism is that the consumers' decision making is heavily relying on individuals' environmental consciousness and the environmental product information [8,22]. Previous studies have suggested that individuals' socio-economic factors, knowledge about the product, values, attitudes and routine consumer behavior are important factors influencing consumers' willingness to pay for environmentally friendly products [15,23–25]. Ozaki [4] categorized that the adoption of green electricity can be explained from various perspectives, an innovation diffusion perspective, a cognitive perspective, a normative perspective

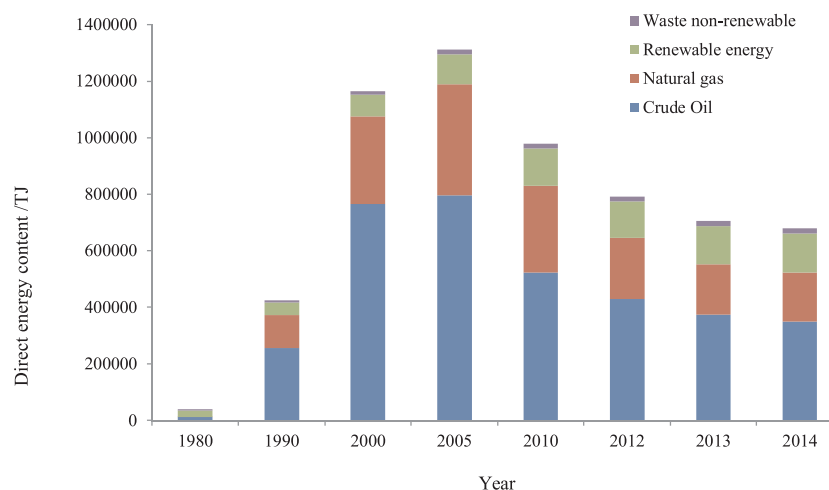


Fig. 1. Development of primary energy production in Denmark. Source: [7].

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