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Barriers to green electricity subscription in Australia: "Love the environment, love renewable energy . . . but why should I pay more?"

Elizabeth V. Hobman*, Elisha R. Frederiks

CSIRO Adaptive Social and Economic Systems, 41 Boggo Road, Dutton Park, QLD 4102, Australia

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ABSTRACT

Although a large proportion of the Australian public express concern for the environment and support various 'green' initiatives, attitude-consistent behaviour is rarely observed. Rather, daily life illustrates that when pro-environmental action incurs personal risks, costs or losses, people often fail to behave in an environmentally friendly manner. One example of this divergence between self-reported attitudes and observed behaviour is the low subscription rate of Australian householders to low-emission 'green' electricity, which is typically perceived as more environmentally friendly but also more expensive than conventional 'grey' electricity. To identify some key factors underpinning this low subscription rate, a large national survey was conducted with over 900 Australian energy consumers who had not subscribed to the National GreenPower Programme. A quantitative analysis of qualitative data indicated that a range of self-reported reasons were significant barriers to subscription – including financial costs, limited knowledge, awareness and availability of green electricity programmes, and already engaging in other energy efficiency behaviour (e.g. renewable energy generation). Together, the results from this study suggest that currently low subscription rates may potentially be increased by improving public awareness and understanding of green electricity, alongside implementing behaviour change strategies and policies that harness principles from behavioural economics and social psychology.

1. Introduction

Green electricity programmes are considered one way to reduce greenhouse gas emissions, increase demand for green electricity,[1] and stimulate research and development in the renewable energy sector. These programmes involve offering customers the option of purchasing green electricity at a premium price (i.e. higher than the financial cost of electricity generated from conventional fossil fuels), with the electricity provider then adding the equivalent amount of new renewable energy to the electricity grid on behalf of the customer. A person's decision to subscribe to green electricity can be classified as one form of low carbon behaviour, aimed at reducing emissions. However, unlike other low carbon behaviours (e.g. recycling, using public transportation), subscribing to green electricity is *intangible* – subscribers only offset their use of conventional 'grey' energy by supporting an *overall* increase in the amount of green electricity fed into the grid, and they are not assured their own personal electricity consumption is derived from renewable sources. This unique aspect of purchasing the 'intangible' raises some interesting and complex questions about how human beings make decisions in a collective action situation that involves uncertainty, costs, risks and trade-offs – it is not a problem that can be defined in simple economic terms.

In this paper, we draw on the extant literature in social psychology and behavioural economics to conduct a mixed-methods study aimed at identifying some of the decision-making principles and social dynamics that might be most relevant to understanding a customer's choice to either purchase or not purchase green electricity. In an effort to extend prior research, which has tended to focus on the quantitative determinants of green electricity subscription, we instead start from first principles by conducting an examination of qualitative data coupled with quantitative analysis. In doing so, we aim to explore two overarching research questions: (1) what reasons do consumers provide for not subscribing to green electricity? and (2) what types of reasons are more or less likely to act as barriers to subscription in the future? In seeking to answer to these questions, we interpret our findings specifically through the lens of

* Corresponding author. Tel.: +61 7 3833 5744; fax: +61 7 3833 5505.
E-mail address: Elizabeth.V.Hobman@csiro.au (E.V. Hobman).

[1] We follow the precedent in the literature by using the term 'green electricity' to refer to electricity generated from renewable, non-polluting or low-emission sources of energy – such as the sun, wind, water and biomass waste [9].

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social psychology and behavioural economics – two domains of scientific research that provide a robust explanation for how human beings make decisions in complex scenarios.

It is noted up-front that while this study aims to identify how subscription rates to green electricity programmes might be increased, we do not intend to imply that green electricity programmes are the panacea or single 'best' solution to rising greenhouse gas emissions, in the sense that they will *always* succeed in achieving the overall environmental benefits (i.e. reduced emissions) that are intended or assumed. Indeed, there is a prevailing debate over whether the net environmental impact of green electricity programmes is positive or negative (for a discussion, see [1]), and more broadly, whether it does in fact 'pay to be green' [2]. As such, we appreciate that many critics remain sceptical of the actual (i.e. objective and measurable) benefits of such programmes, particularly when participating consumers may behave in the opposite way than is expected (e.g. increasing consumption, due to moral licensing effects).

1.1. Factors underlying low rates of subscription to green electricity

Research has already started to examine the factors that might influence consumers' participation in green electricity programmes [3–10]. Some studies have investigated *economic considerations* such as the price premium – for example, the proportion and types of householders willing to pay different premiums, the non-linear relationship between the amount of energy generated from renewable sources (i.e. electricity mix) and the premium amount [7,10–13]. Other studies have examined psychological predictors of willingness and intention to purchase green electricity [3,4,9,14]. For example, research has explored the role of direct, private and intrinsic rewards and benefits of green electricity subscription [3–7,15], such as feeling better about oneself (known as the 'warm glow of giving' [16]). Characteristics of green electricity programmes, features of the energy retailer/utility, and other external factors – such as the program's contract term and duration of operation, the utility's size, customers' perceptions of trust and integrity in the utility, the electricity mix, and the intensity of public marketing – have also been investigated [17,18].

While this research has helped improve our understanding of some of the conditions under which consumers may be more or less willing to subscribe to green electricity, we propose that even greater insights can be gained by explicitly drawing on the behavioural science literature to better understand how people actually make decisions and behavioural choices in the real world.

1.2. Human decision-making and behavioural choices

Despite a person's self-professed pro-environmental beliefs and attitudes, as well as personally held biospheric values and best intentions to engage in pro-environmental behaviour, a marked gap often exists between all of these psychological indices and *actual* behaviour. The pervasiveness of this phenomenon is reflected in variously entitled 'gaps' – for example, the *knowledge*–action gap [19–21], *value*–action gap [22–25], *attitude*–action gap [23], and *intentions*–action gap [26,27]. Green electricity is not immune to these phenomena, with research showing that although many people possess favourable attitudes towards renewable energy sources and express willingness to pay more for green electricity [28,29], only a very small fraction of the population follow through with the actual behaviour of subscribing to green electricity. To illustrate, the Australian Bureau of Statistics (ABS) 2011 Census indicated that were approximately 7,760,000 households across Australia in 2011, based on counts of place of usual residence [30]. Yet according to recent data from the first quarter of 2014, the GreenPower programme has fewer than 550,000 residential customers – which reflects a small portion of the overall number of households nationwide [31]. In addition, while sales of green electricity (MWh) might be increasing, the proportion of subscribers conversely appears to be declining [31].[2]

Considerable psychological research has examined a wide range of cognitive biases and decision-making heuristics[3] that contribute to the aforementioned gaps in different decision-making and behavioural domains, some of which might also apply in the context of green electricity subscription [32–37]. One of the cornerstone principles to this research is that people come to rely on these biases and heuristics, especially when faced with too much information (i.e. *cognitive overload*), too many options/choices (i.e. *choice overload*) and high levels of uncertainty. This dependency occurs because people have limited cognitive resources, and deferring to biases and heuristics essentially short-cuts the need for effortful, intensive information-searching and -processing – thereby saving these valuable cognitive resources. However, it is often the case that less optimal outcomes result from making decisions in these short-cut ways [38–40].

We propose that such dependence on biases is likely to occur in the rather complex, risky and uncertain decision-making situation of subscribing to green electricity. This is a situation that *claims* to provide benefits to the environment and broader society, but at personal cost. And even when the cost aspect is removed from the equation, the influence of psychological factors can still be present [72,73]) Our aim in this study, therefore, is to commence the exploration of potential biases and heuristics with the view to improving the design, depiction and delivery of green electricity programmes so that more customers act in accordance with their values, attitudes and intentions.

To date, researchers have suggested various behaviour change strategies to motivate subscription, with approaches typically centring on information-intensive strategies such as tailored marketing, promotional material and education campaigns designed to increase consumer knowledge/awareness [10,41], alongside offering customers a choice of different programme structures (e.g. point-provision or give-back options in donation-based green electricity programmes, fixed monthly premiums, leasing/ownership options of photovoltaic energy [7,17]). For example, in Australia, Mewton and Cacho [42] found that advertising campaigns were a cost-effective policy for increasing market penetration of green electricity. More recently, a comprehensive study across all U.S. utilities reported that the most powerful determinants of green electricity sales per customer are the price premium for this type of electricity, as well as the education of the customer base [43]. Thus, these authors concluded that green electricity programmes are most likely to succeed when they impose low financial costs to consumers and when they are offered to more educated, wealthy and liberal consumer householders.

In designing these targeted marketing strategies, however, we propose that there is the potential for even greater gains (and

[2] According to the National GreenPower Accreditation Programme Status Report (2014), in the 1st January to 31st March 2014 quarter, the number of GreenPower customers declined by ~5.6% (net change) to a total of 578,026 customers (548,346 residential and 29,680 commercial).

[3] Some examples of the biases that a person might employ include a general resistance to change (i.e. *status quo bias*, *sticking to defaults*); an aversion to loss and tendency to place disproportionately more emphasis on costs, risks and losses compared to equal-sized benefits/gains (i.e. *loss aversion*); and a tendency to be very short-sighted when either costs or benefits are nearby and immediate, but more farsighted when all costs and benefits are further away in the future (i.e. *spatial and temporal discounting*) [34,37,49–51,53,67,74]).