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An international review of markets for voluntary green electricity tariffs

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ABSTRACT

As many countries reduce or abolish centralised government support mechanisms for renewables, such as feed-in-tariffs, it is critical that researchers and policy makers examine other ways of supporting their development. Green electricity tariffs are one possible alternative, using the power of consumer demand to stimulate green electricity supply. This review is the largest ever study of markets for green electricity tariffs, covering 25 jurisdictions including many which have not been examined previously. The research finds that markets have grown significantly in recent years and, compared to the last comprehensive international study in 2002, the products are now available in many more countries. Those countries where green electricity tariffs have been on sale for longer periods of time have also seen significantly increased consumer uptake. A mixed methods approach is used to explore why some markets have seen more growth than others, as there is clear variation across the countries studied. High competition in energy markets is found to be a key driver of green tariff success, with the countries where consumers switched regularly more likely to have high enrolment. This factor has not been previously identified in the literature and highlights the importance of viewing green electricity tariffs in their wider regulatory context. Green tariffs are also found to be almost always more expensive than conventional electricity. While this may seem obvious, it highlights a weakness in some previous research which counter-intuitively found that in many cases green electricity is cheaper than conventional electricity. The difference is explained by a change in methodology to one which recognizes that most consumers switching to green electricity are likely to be comparing against the cheapest conventional electricity supplier rather than simply the market average.

1. Introduction

This review is the largest ever study of international markets for green electricity tariffs, covering twenty five jurisdictions where the products are now sold. The findings provide a major update to the literature as markets have changed significantly since the last thorough international review by Bird et al. [1]. Voluntary green tariffs, where the electricity supplied is generated from renewable sources, are worthy of examination as they are a decentralised consumer focused mechanism to support renewables and are beginning to be purchased by increasing numbers of consumers. The first aim of the paper is to review the growth of international markets for green electricity tariffs, both in terms of the number of enrolled customers and the number of countries where green products are sold. This will also include several jurisdictions which have not been previously included in international comparisons, such in Eastern Europe where green electricity tariffs have only just become available. The second part of the study uses a mixed methods approach to explain the variance in enrolment levels across

the regions studied. No previous work has taken this approach, which is made possible by the large number of case studies included. Several of the factors explored as drivers of green tariff enrolment have also not been substantially addressed in the literature before, such as the impact of market competition or interaction effects with other green electricity support schemes. The paper also sets out a number of methodological improvements for the calculation of price premiums, which help to ensure that estimated premiums are accurate and consistent with consumer experiences.

Voluntary green electricity tariffs come in a wide variety of formats, some of which are new and some of which have been established and studied for decades. For the purposes of this study green electricity tariffs only include those where the electricity is generated from renewables, not including nuclear. ‘Grey’ tariffs will be defined as those where the household receives electricity which is sold with no green claims, and may be from any source, though sometimes clearly this may be from renewables. Green electricity tariffs are not a new phenomenon, Germany has had green electricity tariffs since the mid 1990s [2]

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whereas other countries such as Latvia have only just introduced schemes. The research in this paper is a significant addition to the body of academic literature on this topic due to its scope, encompassing 25 regions where green electricity products are now sold. The majority of the data has been gathered from new sources, which is important as any older literature can become quickly outdated. Even relatively recent research on this subject, such as Hast et al. [3], is now out of date due to changing markets and regulations. This paper also focuses only on household purchasing of green electricity. There is an interesting body of work around non-domestic purchasing of green electricity, but it is beyond the scope of this research. While the findings will still be relevant, particularly for SMEs who engage with the retail market in a similar way to households, decision making processes and motivations for purchasing green electricity are likely to be different in larger businesses [4].

The existing literature on green electricity tariffs suggests a number of factors can explain the variance in enrolment levels seen across the world. As there have not been many previous international studies, many of these concepts come from consumer research which analyse the barriers to individuals signing up to green tariffs. The areas to be explored include; competition and switching, price premium levels, interaction effects with other renewable energy policies, regulation and labelling, and policies to directly support green electricity sales. These areas, along with the key historical developments, will be outlined more thoroughly in the theoretical framework. The data gathered to investigate these areas is outlined in the methods section.

This is an important area of research as voluntary green electricity tariffs are currently helping to reduce carbon emissions and promote sustainable development across the world. For example, green electricity certified under the EKOEnergy label helps to fund the construction of renewables in developing countries and finances the protection and preservation of waterways affected by hydropower development [5]. As the price of renewable electricity generation decreases [6], the price differential between green electricity and electricity from conventional sources will fall. This process is already beginning in many jurisdictions and is leading to governments seeking to reduce subsidies such as feed in tariffs [7]. Under these conditions, the importance of this research is increased, as it becomes possible that the gap between grid parity and the cost of renewables could be met through the voluntary market for green electricity tariffs. Of course, from a generator perspective, feed-in tariffs have the advantage of long term price certainty, which a voluntary market is unlikely to replicate [8,9]. Some research has also suggested that the voluntary sale of green electricity, and the associated Renewable Energy Certificate (REC) market, has a negligible influence on decisions to invest in renewable energy or on the economic feasibility of these facilities [9,10]. Furthermore, the experience of the Netherlands has reinforced this view, with 64% of consumers purchasing green electricity [11] and only around 10% of electricity generated from renewables [12]. It is because of this uncertainty of the impact of green electricity sales on the wider market that many tariffs also include additional elements such as a contribution to a renewable energy fund. Due to this, the extent to which voluntary tariffs can replace mandated support mechanisms

completely is uncertain and merits further research. It is therefore important that attention is paid to the mechanisms which drive the success of markets for green electricity in both the short and the long term.

2. Green electricity tariffs

Before exploring the relevant literature, it may be useful to briefly define exactly what ‘green electricity tariffs’ are for the purpose of this paper. The academic literature has inconsistent definitions, perhaps indicative of the variation in types of product available to customers. In order to capture the wide variety of products available in the markets studied, green tariffs will be defined to be any mechanism by which consumers can purchase green electricity from an electricity retailer as part of their electricity tariff and in proportion to their electricity usage. The element of proportionality is important to differentiate green tariffs from other forms of carbon offsetting which can be purchased separately in any quantity regardless of electricity usage. For example, a monthly set contribution to a carbon offsetting scheme that does not vary by energy consumption would not be classified as a green tariff, even if it was sold as a way to balance out the impact of the consumer’s energy usage. In a country where a very high proportion of electricity in the general mix is green, such as Norway or Iceland, it would be misleading to term these as “green electricity tariffs” as there is no grey alternative.

Some previous work has differentiated between consumption based green tariffs, where electricity usage is matched with certified green supply, and contribution based green tariffs, where the retailer pays into a fund for environmental projects [13, 14, 15 p. 15]. Given the definition above, only consumption based tariffs are included in this study. This also excludes other types of ‘ethical’ electricity tariffs not related to green energy, such as the Woodland Trust energy supplier in the UK. This definition and approach is not universal, but is consistent with most regulators’ thinking when defining a green tariff and the form green characteristics should take. This research also defines ‘green’ electricity sources to include all renewables and exclude nuclear, which is the usual practice in green electricity tariffs. A third type of tariff, which will be looked at briefly in this paper in the section on market structures, is a ‘decoupled’ type of green electricity product such as Bullfrog energy in Canada. With these types of product consumers continue to purchase energy from their usual supplier, but pay a certain amount, proportional to their usage, in order to offset the carbon emissions. These types of tariff are one way in which consumers can purchase green electricity, despite not being able to do so in conventional ways due to the monopolistic model of their electricity market. Similar types of tariff also exist in Australia under the GreenPower scheme [16]. While these schemes are similar to other forms of carbon offsetting, it is the fact that they are purchased in proportion to electricity usage which qualifies them as green electricity tariffs under the definition used in this paper.

There have been few previous studies which have attempted international comparisons of green electricity tariffs. The most comprehensive, and among the oldest, is Bird et al. [1] which reviews the development of green electricity tariffs across a wide number of countries.

Table 1

Conclusions made by Bird et al., 2002 (pp.18–22) regarding the state of the green electricity market.

1	Successful market penetration rates have typically been about 1%, more successful markets have achieved penetration rates of between 5% and 15%.
2	Consumer education and aggressive marketing is necessary.
3	Green power marketers have offered a range of products to appeal to consumers with varying price sensitivities and resource preferences.
4	The impact of green power marketing on new renewables development has been limited so far.
5	While price is not the only important driver of demand, companies offering lower priced products have generally obtained more customers.
6	Retail competition can stimulate green power marketing activity.
7	Many customers have purchased green power without switching suppliers.
8	Certification and labelling programmes can play an important role in shaping products.
9	Government support can be an important facilitator of green power market development.
10	The impact of purchase obligations and similar policies designed to support renewables is still unclear, but uncertainty in policy development can stifle markets.

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