



An examination of voluntary green power programs at U.S. utilities using behavioral science principles



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ABSTRACT

Green programs currently have minuscule market penetration and little impact on emissions reductions. They could be tweaked to drive demand to cleaner sources if they were structured to take advantage of behavioral science principles shown to increase enrollment.

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1. Introduction

Utility green power programs encourage consumers to choose clean energy resources to power their homes and business instead of the traditional, dirtier, fuel mix used by many utilities today. “Clean energy” sources are defined as those that generate electricity from renewable energy sources, such as wind and solar power, geothermal, hydropower, and various forms of biomass (EPA, 2014). These programs, normally offered at a slight premium, allow environmentally conscious consumers to source their electricity from a renewable resource if they so choose. Examples include Los Angeles’s Green Power for a Green L.A. or Portland’s Green Source, and others discussed in this article. Expanding these programs could assist in transitioning the U.S. electricity grid to renewable energy resources by increasing demand for cleaner power. To date, the author is not aware of any case studies that analyzed United States programs through a behavioral science lens.

These programs, typically offered in states with regulated electricity markets, go by names like “green pricing programs,” “green power programs” and “voluntary green energy programs” (U.S. Dept. of Energy, 2015a). Once enrolled in these programs, the consumer can choose some variation of a cleaner electricity portfolio, usually at a premium. Variations of these programs are offered in all 50 states by nearly 850 utilities, including investor-owned utilities, municipal utilities, and cooperatives (U.S. Dept. of

Energy, 2015b). It is important to note in states with competitive electricity markets, customers can often buy electricity generated from renewable sources by switching to an alternative electricity supplier that offers green power (Heeter et al., 2014). This article discusses mostly programs offered in non-competitive electricity markets.

If enough consumers choose to switch from a dirtier mix this change in preferences should help mitigate U.S. carbon emissions from the electricity sector. For every kWh generated from zero-emitting sources, 2 pounds of carbon dioxide is not emitted from a coal-fired power plant (Energy Information Administration, 2015). However, these programs have such low enrollment numbers the electricity they collectively purchase is nearly negligible in comparison to total U.S. consumption. The largest program of this type, Portland General Electric’s Green Source Program, only purchased a collective 1.2 million MWh in 2014 or only one-tenth of PGE’s sales (National Renewable Energy Laboratory, 2015). By comparison, that is the equivalent purchased output a utility might buy from one medium-sized combined cycle gas plant (Calpine, 2014).

In 2014, U.S. participation in these types of programs grew at about 5% and sales of green electricity grew at 1% in non-competitive markets. In total, the National Renewable Energy Laboratory (NREL) estimates that these types of programs purchased about 7 million MWh and reached 743,000 customers in 2014 (O’Shaughnessy et al., 2015). For comparison, 7 million MWh is the equivalent generation of a handful of large, baseload natural gas plants (Calpine, 2014). In short, these programs represent a minuscule share of the U.S. electricity market.

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Normally, these types of programs come at a premium to the customer who chooses to enroll. The average residential and nonresidential net green pricing premiums were \$0.0170/kWh and \$0.0174/kWh (O'shaughnessy et al., 2015). These premiums reflect the net value the customer pays, relative to the conventional retail electricity rate. Every state has a unique regulatory structure dependent on whether it is a regulated or deregulated market and the combination of public and private utilities which operate within its jurisdiction (Federal Energy Regulatory Commission, 2015). So making generalization about the legality of defaulting green energy options is difficult and beyond the expertise of this author. Generally, though, utilities are required to purchase clean electricity that is of least cost to the consumer and offer to customers a fair market value price for their electricity, as, for example, via California's least-cost best-fit rules (California Public Utilities Commission, 2012). Many states have a patchwork of state and federal oversight that ensures electricity is offered at fair and reasonable prices to the consumer.

However, legal or regulatory considerations aside, with the right restructuring of these programs voluntary green power purchasing programs could be a powerful tool to shift demand to more renewable electricity sources in the U.S. The goal of these programs is to provide customers an option to choose cleaner energy sources. With green power programs, the biggest barrier is how to convince the most consumers to choose or enroll in these programs.

This analysis aggregates data from the most successful programs to assess trends in program implementation and use of behavioral strategies to facilitate consumer choice in enrolling. By studying program efficacy, barriers, costs, and available online tools this article demonstrates green power programs in the United States that have effectively used all these behavioral science tools tend to be more successful in the amount of and percentage of customers who enroll in these programs. Programs that do not use all the tools outlined in this article tend to have lower participation rates.

2. Background and literature review

Summaries of relevant behavioral strategies to facilitate consumer choice in enrolling in these programs are offered in subsequent sections. The two most important strategies to green power programs are defaults and social marketing. More specifically, social marketing can be broken down into price sensitivity and social norms, both of which play an important role in encouraging and maintaining enrollment in green power programs.

2.1. Defaults

A default is where a desired outcome is made the automatic option by the policymaker when an individual is presented with many choices. In one famous example, employees were automatically enrolled in the best savings plan when they did not respond with a preferred choice (Thaler and Benartzi, 2004). In this case, a default would automatically enroll a customer to receive their electricity from a green power program, and they could stay enrolled as they move from one property to another unless they request to opt out or some variation of this idea.

The academic literature on European electricity markets suggest the most successful programs with the highest enrollment are the ones that make voluntary green power purchasing programs the default option (Momsen and Stoerk, 2014; O'shaughnessy et al., 2015; Pichert and Katsikopoulos, 2011). When these programs were set up in Europe and made the default, at least nine out of 10 customers stay enrolled. This conclusion seems quite logical, given evidence in environmental psychology suggesting that

making a behavior more convenient, reducing the physical demands required for an action by making the pro-environmental behavior the default, can lead to significant changes in behavior (Schultz, 2014).

For example, in one survey experiment in Germany, defaults proved the most effective nudge to encourage customers to sign up for a renewable versus conventional energy program. Social norms had some effect but were not nearly as strong. By contrast, it was found that other nudges, such as priming with memory or mental accounting, actually had a negative effect, discouraging people from enrolling in the programs (Momsen and Stoerk, 2014).

Another study conducted four lab experiments that found establishing a green default or just establishing a neutral choice situation resulted in a significantly higher percentage of customers buying green electricity (Pichert and Katsikopoulos, 2011).

In addition, a few "natural experiments" in Germany have further demonstrated the importance of defaults, where entire communities made enrollment in a green tariff the primary option. A small town named Schonau in Germany voted in the late 1990s to switch its electricity to green defaults. After eight years of running the program, nearly every customer remained with the green default option after having the option to opt out at any time. Meanwhile, nearby towns without defaults only had about 1% of their customers enrolled in a green option (Pichert and Katsikopoulos, 2011).

In another German example, a utility decided to diversify its services and offer three new tariffs where there had only previously offered one. Interestingly, the company decided the default tariff would be the green option. It mailed out letters to 150,000 customers and those who did not respond automatically were directed to the green option. There were three different tariffs, the default green tariff, a more expensive, greener tariff, and a grey tariff composed of conventional resources. After two months, only 4.3% of customers switched to the economical grey tariff, less than 1% switched to the greener tariff, and 0.7% switched to a new electricity provider (Pichert and Katsikopoulos, 2011). Despite the limitations of natural experiments, the results from these real-life anecdotes suggest switching the default power option is a powerful tool for changing a community's behavior.

In an analogous type of program at the local government level called community choice aggregation (CCA), local governments aggregate electricity demand within their jurisdictions and procure alternative energy supplies while maintaining the existing electricity provider for transmission and distribution services. Defaulting customers to renewables when communities choose to aggregate demand is a highly effective means of maintaining high participation rates and procuring renewable energy. Customer participation in default CCAs is typically above 75% and exceeds 90% in several programs (O'shaughnessy et al., 2015).

2.2. Social marketing

Any successful social marketing campaign must contain aspects of incentive, convenience, and communication/convenience (McKenzie-Mohr et al., 2011). Incentives or disincentives (price in the case of this article) have been shown to have a substantial impact on a variety of sustainable activities (McKenzie-Mohr et al., 2011). The literature indicates that successful pro-environmental programs must have a strong marketing campaign that helps shape community attitudes (Maibach, 1993; McKenzie-Mohr, 2011). For green power programs, cheaper prices incentivize the purchase of more electricity from these programs (O'shaughnessy et al., 2015). Social norms guide how members of a community behave in a sustainable manner. If members of a community see others acting sustainably, they are more likely to

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