

Consumer Choice and Green Power in Washington State

By

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ABSTRACT

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In 2001, the Washington State legislature passed Engrossed House Bill 2247 thus mandating that all utilities with more than 25,000 customers offer consumers the option to purchase green power. The resulting green power pricing programs vary greatly in implementation strategies and participation rates. In order to determine if this mandate is successful policy, surveys of each utility were analyzed and interviews were conducted to evaluate each program. The results of this study determined that voluntary customer purchases are not currently driving increases of renewable energy and that green power programs with even a relatively small customer base would likely continue if the mandate were abandoned. While I conclude that the mandate was necessary to initiate the creation of successful green power pricing programs at Washington State utilities, eliminating the mandate a decade later would leave programs in place where there is customer demand and simplify the state's energy policy overall.

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1. Introduction

1.1 The Case for Renewable Energy

Abundant energy is essential to the American way of life. Ever since the 1973 oil crisis brought new interest to the sourcing and supply of the nation's power, energy policy has been an important and controversial topic. Securing abundant, affordable energy without war, rationing, or severe environmental degradation has become a policy priority. Efforts to decrease demand have not kept pace with Americans' growing appetite for energy. To solve two of the biggest energy problems, scarcity and pollution, renewable energy is an essential piece of the puzzle.

Renewable energy is desirable for environmental, economic, and social reasons, and is strongly associated with the environmental movement. As a replacement for fossil fuel energy renewable energy is called "clean energy" because it has negligible effects on air and water quality. The relatively low amount of carbon dioxide released from renewable energy makes it one of the major tools in battling climate change (UCS 2012, Moore, Lewis and Cepela 2010). While the extent of some economic claims are debatable, reasons to increase production of renewable energy include lowering long term energy costs, stabilizing electricity prices, providing economic benefits to counties and farmers, and creating high-quality "green" jobs (Reed 2006). The dream of national energy independence relies on increased renewable energy production.

Despite numerous policies aimed at increased renewable energy, the share of renewable energy (including hydropower) as a percentage of the country's supply has remained relatively constant, hovering around ten percent from the early 1990's through the early part of this millennium (Menz 2005)

The public prefers voluntary actions or soft regulations, such as market based incentives, over hard regulations to increase the use of renewable energy (Attari, et al. 2009). Socially, the people of Washington State identify their region with pride as a home to renewable energy and government policies aim to position the state as a leader in clean energy technologies. Utility Green Power Pricing Programs provide a way for consumers to control the type of power they use and reduce their ecological footprint while avoiding additional regulation and price premiums for consumers who choose not to participate and Green Power Programs have been mandated for large utilities since 2001. Have these programs sold a significant amount of renewable power? Have consumers chosen to participate in these programs at expected levels? Are there improvements that can be made in this policy? In order to answer these questions relevant literature, data from utility surveys, and interviews with program implementers were analyzed to determine the effect of the Green Power Program mandate.

1.2 Electricity in Washington

In Washington State there are two main types of utilities. Public Utility Districts (PUD's) are collaborative entities that are owned by the customers.

Originally authorized by a statewide initiative in 1930, these nonprofit entities were created to “*conserve the water and power resources of the State of Washington for the benefit of the people thereof, and to supply public utility service, including water and electricity for all uses*” (WPUDA 2009). Investor owned utilities (IOU’s) are corporations beholden to their stakeholders, ultimately designed to make a profit.

1.2.1 Current Fuel Mix

Generation

Washington State is unique in the U.S. when it comes to energy fuel mix as nearly three quarters of the electricity generated in Washington is hydroelectricity, making it the leading hydropower producing state by a large margin. The abundance of hydropower resources allows for some of the lowest energy prices in the nation and low greenhouse gas emissions; for example residential electricity costs an average of 8.18 cents/kWh in Washington while the U.S. average is 11.70 cents/kWh. In 2009, while Washington State’s population was approximately 2.2% of the total U.S., electric power industry emissions as a share of total U.S. emissions were only 0.6% of the Carbon Dioxide, 0.2% of the Sulfur Dioxide, and 0.8% of the Nitrogen Oxide (U.S. Energy Information Administration 2011).

The state currently generates 2.7% of the nation’s total electricity, including 27.8% of the hydroelectric and 3.4% of other renewable electricity (U.S. Energy Information Administration 2011). There is one coal-fired power

plant located in the state, which has recently agreed to stop burning coal by 2025 and convert to natural gas (Welch and Lindblom 2011). This plant, along with several natural gas-fired and a single nuclear power plant, account for approximately one quarter of the electrical generation in the state. Washington is a major producer of energy from wind, wood, and wood waste. Currently only about 3% of the state's total electricity generation is from nonhydroelectric renewable sources (U.S. Energy Information Administration 2011).

Washington is a major net exporter of electricity, and supplies electricity to the Western Interconnection, which is the largest electric transmission program in the U.S. Also known as the Pacific Inertie, the Western Interconnection covers at least part of 14 states and runs from Canada to Mexico (U.S. Energy Information Administration 2011).

Consumption

The fuel mix consumed in Washington is slightly different from the fuel mix that is generated. By comparing the generation data above with the consumption data in Figure 1, one readily sees that both the hydroelectric and nonhydroelectric renewables make up a smaller proportion of the total consumption of electricity than of the total generation. This occurs partly because the state is a net exporter of power but also imports some electricity each year. Washington relies on natural gas produced in Canada for a large amount of its residential heating, as well as for industrial and electric power generation (U.S. Energy Information Administration 2011). Many states have

adopted policies that encourage the use of renewable energy (sometimes including hydroelectricity in the definition). Some of these states choose to purchase renewable power generated in Washington, which leads to generation of renewable power within the state being higher than consumption of renewable power.

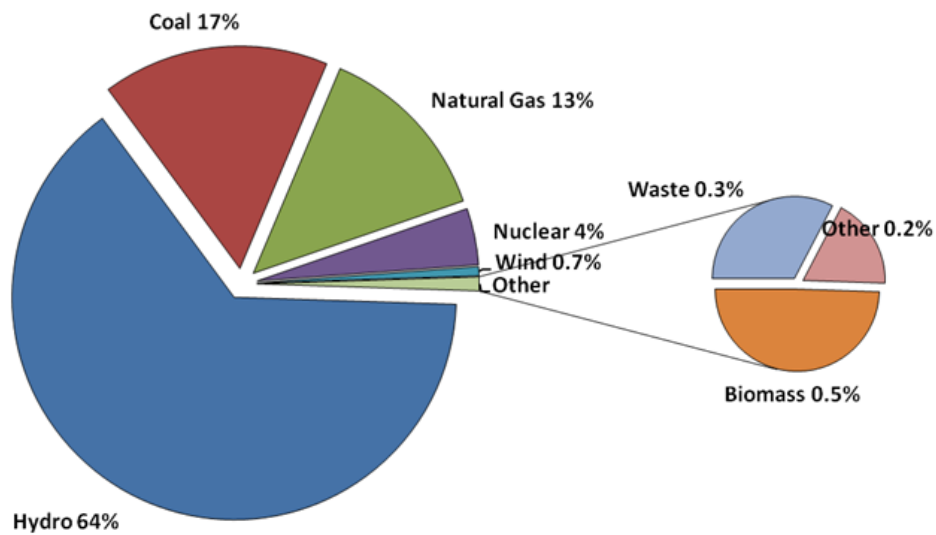


Figure 1 - 2009 Washington State Electric Utility Fuel Mix (WA Department of Commerce, 2009)

Renewable potential

Washington has an abundance of renewable energy resources. Over 1 million acres of land in the state with winds high enough for wind energy development translates into a generation potential of up to 62 million MWh/yr of electricity. Although many people associate the State with rain, Washington has the potential to generate 42 million MWh/yr of solar power, especially on

the east side of the state. Biomass sources include wood waste from the timber industry, methane gas from landfills, and agricultural crop residues, which together have the potential to generate approximately 11 million MWhr/yr of renewable energy (Nielsen, et al. 2002).

1.2.2 Current Law

Mandatory Voluntary Green Power Program

In 2001 the Washington State Legislature passed Engrossed House Bill 2247, unanimously in the House and with a single Nay in the Senate. Section 28 of this bill required electric utilities to provide customers with an option to purchase alternative energy resources (57th Legislature of the State of Washington 2001). During a time of widespread deregulation of the electricity industry, this bill gave consumers a choice to purchase renewable energy while staying with their single provider (Roe, et al. 2000). Under the law, the costs of these programs are covered entirely by consumers who signed up for them. Utilities are required to provide the option of signing up for the program at least quarterly with consumers' billing information, usually as an insert in the monthly electricity bill. For the first ten years of implementation (2002-2012) utilities were required to report information about their particular programs by completing a survey conducted by the Washington State Department of Commerce (for PUD's) or the Washington Utilities and Transportation Commission (for IOU's) (57th Legislature of the State of Washington 2001).

For the purpose of voluntary green power programs, qualified renewable energy is defined as: (a) wind; (b) solar energy; (c) geothermal energy; (d) landfill gas; (e) wave or tidal action; (f) gas produced during the treatment of wastewater; (g) qualified hydropower; or (h) biomass energy based on animal waste or solid organic fuels from wood, forest, or field residues, or dedicated energy crops that do not include wood pieces that have been treated with chemical preservatives such as creosote, pentachlorophenol, or copper-chrome-arsenic. Qualified hydropower includes energy produced as a result of modernizations or upgrades made after June 1, 1998, that have been demonstrated to reduce the mortality of anadromous fish, or by run of the river hydropower facilities that do not obstruct the passage of anadromous fish (57th Legislature of the State of Washington 2001). Renewable energy for this program may be generated by the utility, purchased directly as electricity from another provider, or purchased as renewable energy certificates (RECs, also known as Green Tags) which transfer ownership of the intangible properties of renewable energy without directly connecting to the renewable source (Gillenwater 2008).

Energy Independence Act

In November 2006 Washington state voters approved Initiative Measure No. 937, also known as the Energy Independence Act (EIA). The stated purpose of this initiative is to promote energy independence, stabilize electricity prices, provide economic benefits to counties and farmers, create high-quality jobs,

protect air and water quality, and position the state as a leader in clean energy technologies (Reed 2006). This initiative has two parts, one of which sets efficiency targets for major utilities and is called the Energy Efficiency Resource Standard. The second part of this law creates a Renewable Energy Standard for Washington State.

Often referred to as a Renewable Portfolio Standard (RPS) or a Renewable Energy Standard (RES), these policies will require utilities to include a minimum percentage of renewable energy sources in the energy mix they sell to consumers. In Washington, as in most other states, the percentage of renewable energy required increases over time (Wiser and Barbose 2008). In 2012 thru 2015 the required amount is 3%, for 2016 thru 2019 the amount is 9%, and beginning in 2020 the utilities will be required to use 15% renewable energy. All utilities that serve more than 25,000 consumers are affected by these requirements, encompassing 83% of total electricity sales in the state (Reed 2006).

Between 1998 and 2007 half of all new non-hydro renewable energy capacity in the United States was created in states with RPSs. Since it is likely that states already more inclined toward the production of renewable energy would be the first to implement an RPS, this is not a proof that the new capacity is attributable to the RPS. There are many other factors influencing the growth of renewable energy and it is difficult to tell the percentage increase driven by RPS. The average level for compliance with the early mandatory standards in

2006 was 94% (Wiser and Barbose 2008). This included states that use REC and thus may reflect the purchase of renewable energy from out of state which could be more difficult to procure as more states issue their own RPS.

Qualifying resources for Washington's RPS are defined as solar, wind, biomass, low-impact hydroelectric, geothermal electric, landfill gas, ocean, anaerobic digestion, and biodiesel fuel; RECs can also be purchased to meet this standard (American Council on Renewable Energy 2011). This RPS definition is slightly different from the definition of qualifying resources for the voluntary green power program, making a few sources qualify for the voluntary program that do not qualify for the RPS. In recent years there have been several attempts to include hydropower as a source of renewable energy in the EIA. However, if hydro were counted utilities would almost universally exceed the mandate with their current fuel mix and there would be no incentive to increase renewable generation (Kramer 2011). While many people consider large hydropower renewable it is not without significant environmental impact. The controversy about the "greenness" of large scale hydropower will continue to influence energy policy in the Northwest for the foreseeable future (Lindsey 2009).

Renewable Generation Incentive Programs

Other policies in Washington are designed to reduce the use of nonrenewable electricity including rebates, grants, loan programs, net metering, production incentives, and a sales tax exemption. Of the many rebates, grants and loans available, most focus on energy conservation for things such as

weatherization, solar water heaters, and efficient appliances or lighting (DSIRE 2011-2012, American Council on Renewable Energy 2011).

Renewable energy systems up to 100 kW may take advantage of net metering through their utility. All utilities in the state must offer net metering until the cumulative generating capacity reaches 0.25% of their peak demand in 1996, increasing to 0.5% on January 1, 2014. Half of the net metering capacity is reserved for renewable energy and is claimed on a first come first serve basis. Net excess generation (NEG) will be credited to the customer's bill at retail rate. Any NEG after twelve month billing period will be granted to the utility (DSIRE 2011-2012, American Council on Renewable Energy 2011).

Washington offers production incentives, up to \$5,000 per year, of \$0.12 to \$0.54 per kWh for entities that generate electricity from solar power, wind power or anaerobic digesters. Community solar projects with a capacity of up to 75 kW may qualify for state incentives of \$0.30 per kWh to \$1.08 per kWh. A 100% sales tax exemption on equipment used to generate renewable electricity for systems capable of producing at least one kW was reduced to a 75% exemption and will remain in effect until June 30, 2013 (DSIRE 2011-2012).

2. Market Based Green Power

2.1 Electricity Markets

The 1992 Energy Policy Act spurred the deregulation of electricity in the United States. By the year 2000, 24 states and the District of Columbia allowed millions of customers to choose among competing products for their electricity

needs (Roe, et al. 2000). Washington State chose not to restructure so consumers did not have a choice when buying power. For citizens who wanted the option to purchase a green power product, the legislature passed the green power mandate as part of Engrossed House Bill 2247 in 2001.

2.2 Demand for Green Power and Consumer Willingness to Pay

When consumers pay a premium for green energy, the physical product they receive does not change. The price they pay is for the intangible benefits they receive. Undoubtedly, there are people who place value on personal use of renewable energy (Menges 2003). Determining the consumers' willingness to pay (WTP) for this type of product has been the topic of numerous studies. A survey conducted for electric utilities in Texas shows fifty percent of people have a WTP at least one dollar per month for renewable energy and energy efficiency investments by utilities (Zarnikau 2003). The WTP is a highly variable number that is affected by demographics, the specific product, the payment vehicle and marketing.

Research shows that across demographics people value a reduction in air emissions and are willing to pay a small amount to accomplish this (Roe, et al. 2000). The consumers with the highest WTP for green power tend to be comparably wealthy, educated, and under 55 years old (Zarnikau 2003) (Roe, et al. 2000) (R. Wiser 2003). Figure 2 illustrates the finding that higher income correlates with a higher WTP (Roe, et al. 2000) (Zarnikau 2003). WTP increases with each level of education completed by the consumer, as evidenced in Figure

3 (Zarnikau 2003). The age of customers had little effect on WTP within the “Baby Boomer” and “Generation X” age groupings but declined with age after customers reached 55 (Zarnikau 2003). There are also regional variations in consumers’ WTP. WTP for a reduction in air pollution is higher in the Southeast United States than in the Southwest or Northwest (Roe, et al. 2000).

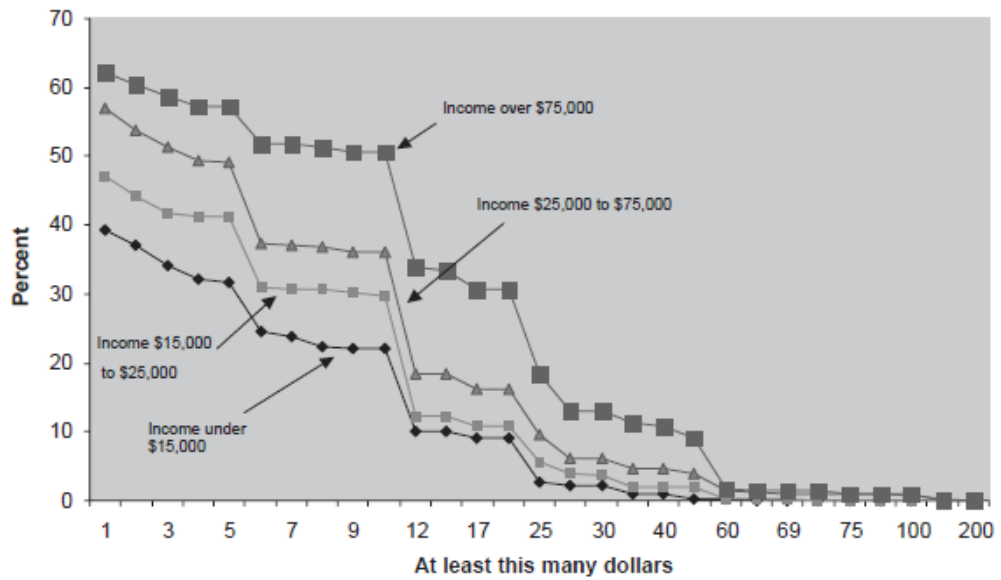


Figure 2- Willingness to pay for renewable energy by salary (Zarnikau 2003)

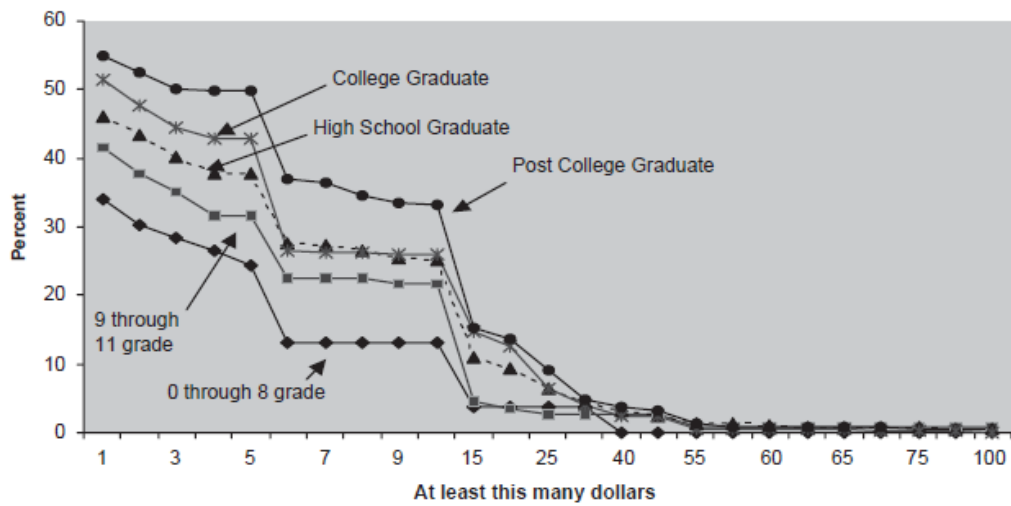


Figure 3- Willingness to pay for renewable energy by education level (Zarnikau 2003)

Renewable energy is a general term for several more specific products.

The nature of the product being purchased affects a consumer's WTP. A product that actually replaces fossil fuels in a consumer's personal portfolio draws a higher WTP than a product that simply reduces emissions (Roe, et al. 2000). When choosing between a solar, wind, biomass, farm methane, or a generic green power source consumers exhibit the highest WTP for solar power. The generic green power and wind power sources produce a lower but still significant WTP, while biomass and farm methane are the least preferred sources of green power (Borchers, Duke and Parsons 2007).

When it comes to payment it is safe to assume that people are more likely to purchase something when payment is simple. Customers might choose to pay a premium for green power when it can be included easily in their monthly electricity bill but lack the motivation to find a broker of green energy to pay separately. Research in charitable giving has shown that individuals cut voluntary purchases to benefit the public good when they are aware that policy uses a collective payment approach (Menges 2003). This suggests that when a state adopts a RPS, customers will be less likely to pay an additional voluntary premium for green energy. However, there is little evidence that the adoption of a RPS negatively affects sales of green energy on the voluntary market (Bird, Dagher and Swezey 2007).

In any consumer purchasing decision advertising plays a role.

Participation in green power programs is limited by a lack of awareness by the

consumer, uncertainty in the products actual environmental benefit, and utilities varied levels of marketing and promotion (Bird and Swezey 2005). In 2002, the cost of customer acquisition spent by utilities on green pricing ranged from \$1 to \$200 per customer, with an average of \$43 for programs nationwide (Bird, Swezey and Aabakken 2004).

Green power consumption is considered impure altruism because purchasing renewable energy provides electricity for personal consumption as well as a public good (Mewton and Cacho 2011). Consumers often choose to purchase green energy products because they receive satisfaction from buying an environmentally friendly product, not from any interest of the objective environmental impact their purchase may make; they may not set out to fix a particular environmental problem (e.g. climate change or acid rain) but choose to purchase renewable energy because they feel good about the product (Menges 2003). Consumers can also be motivated to behave ethically by their perception of what others are doing, a form of herd behavior (Mewton and Cacho 2011, R. Wiser 2003). This type of bandwagon effect may indicate that communicating ongoing community participation may encourage increased participation.

The way the product is presented can also play a role in a consumer's decision. Since consumers have a preference for a generic green power source in comparison to farm methane or biomass, generic promotion of products not generated generically may lead to higher WTP. In contrast, solar power

generates a higher WTP than a generic green energy product so failing to identify a product as solar could be unsuccessful in maximizing participation (Borchers, Duke and Parsons 2007). In one study, providing customers with additional information about green energy programs increased the percentage of people who are WTP a small premium for a green power product, yet decreased the percentage of people who are WTP a larger premium (Zarnikau 2003).

WTP as expressed in a survey does not demonstrate an actual commitment. Survey results consistently show a higher WTP than real world situations (Zarnikau 2003) (Roe, et al. 2000). In 2010, the average participation rate in utility green pricing programs nationwide was 2.1% with a median of 1.0%. The most successful programs had participation rates ranging from 5.3% to 21.5% in 2010, compared to the range for all programs of 3.9% to 11.1% in 2003, participation rates in these highly successful programs have remained relatively stable since 2007 (Heeter and Bird October 2011).

2.3 Problem

Since 2001, when Engrossed House Bill 2247 was enacted requiring utilities to offer a voluntary green power program, there have been major changes to energy policy in Washington State. Have mandatory voluntary green energy programs been effectively implemented? Is this requirement continuing to serve the citizens of Washington State? Or could a change in this regulation be more beneficial?

2.4 Data Collection Methods

2.4.1 Surveys

As part of the law, utilities are required to annually report the details of their programs by completing a survey provided by the Washington State Department of Commerce (formerly Community Trade and Economic Development) and the Washington Utilities and Transportation Commission. Aggregate survey data are summarized in an annual report to the legislature, and data contained in this report and the original surveys are further analyzed to determine the efficacy of the current mandatory voluntary green power program. Questions from the 2010 survey, which is similar to previous year's questions, are provided in Appendix A.

2.4.2 Interviews

The full effect of a policy cannot be fully understood by looking at survey statistics alone. As a result, I conducted qualitative interviews with subjects involved in the implementation of individual programs to gain a greater depth of understanding about program design, implementation, intra-organizational popularity, challenges, and future possibilities. Interviews were conducted over the phone using a general interview guide (Appendix B), but participants were encouraged to guide the discussion. Since subjects had different roles in each organization, they provided varying levels of knowledge, willingness to express personal opinions and ability to express those of the utility.

3. Overview of Voluntary Green Programs

3.1 Overall Growth

Since reporting began in 2002, voluntary green power programs in Washington have had tremendous growth as measured in sales, revenue, or customer participation. As growth has continued its upward trend, the rate of growth in all areas has been in steep decline in recent years. While these growth measurements tend to be correlated, this is not always the case. Table 1 illustrates that the growth in kWh sales and the growth in customer participation for each utility can, and does, fluctuate separately.

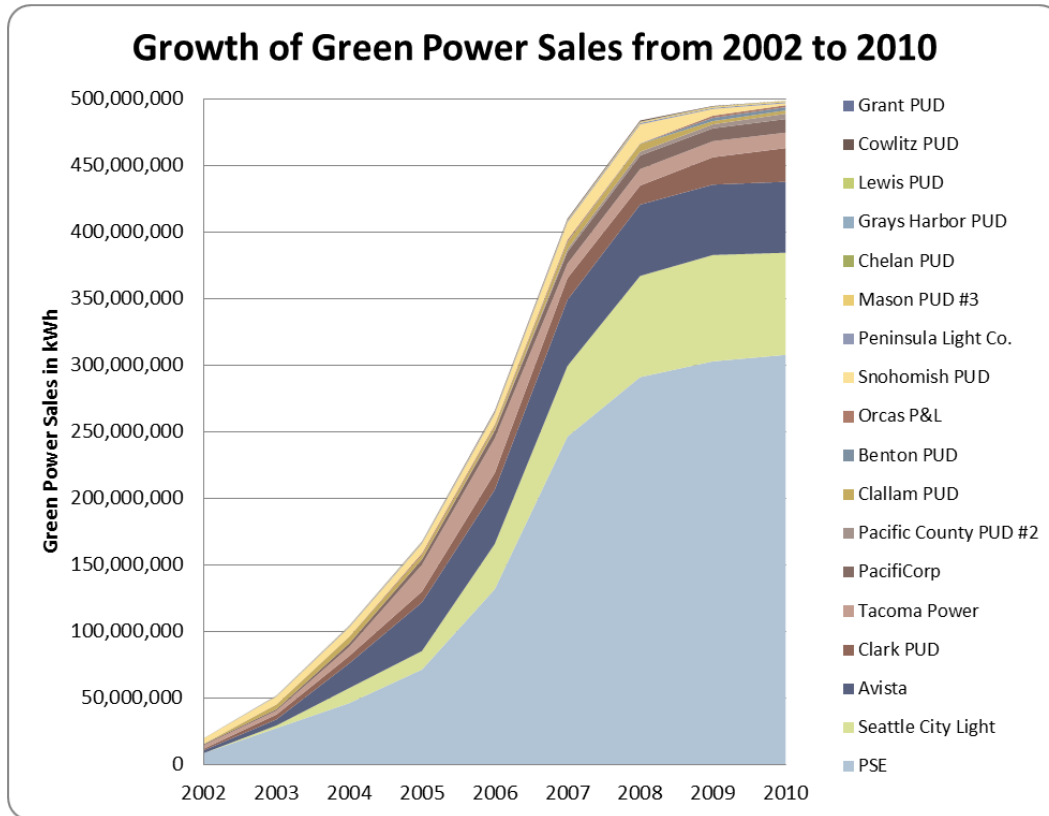


Figure 4- Total Green Power Sales for WA Utilities per Year

Total sales through these programs have grown from 19,762,528 kWh in 2002 to a projected 498,953,050 kWh in 2010, a factor of 25.2 in just eight years (Figure 4). As illustrated in Figure 5, the growth in kWh, while still positive, has plateaued recently. From an initial annual growth rate in 2003 of 163% over 2002, there has been a steep decline to just 0.8% growth from 2009 to 2010. Meanwhile, revenue from voluntary green power programs has gone from \$632,282 to \$5,788,367 in the same time frame. By this measure growth has occurred at a factor of 9.2 in eight years.

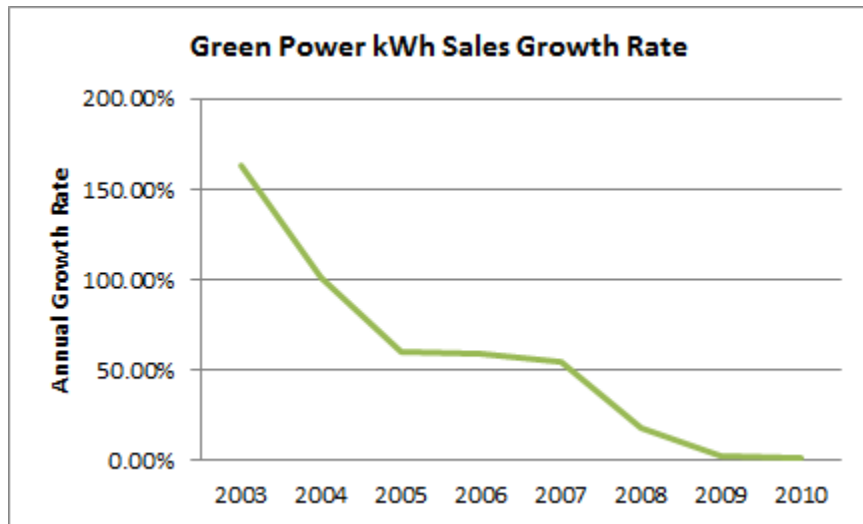


Figure 5- Growth Rate of Green Power Sales per Year

Utility	Owned by	Total Retail Sales 2009 in kWh	Total Retail Customers 2009	Max Participation Rate (start of program -2009)	Marketing Budget Reported (2009)	Cost of Customer Acquisition	Green Sales in kWh	Customer Participation %
Puget Sound Energy	Investors	21,903,731,000	1,072,837	2.40%	\$640,000	\$0.60		
Seattle City Light	Public	9,693,424,000	394,731	2.17%	varies	n/a		
Snohomish County PUD	Public	6,872,796,245	319,786	1.03%	\$30,000	\$0.09		
Avista	Investors	5,509,742,000	233,332	1.13%	\$35,000	\$0.15		
Tacoma Power	Public	4,824,116,940	168,207	0.94%	\$0	\$0.00		
Cowlitz County PUD	Public	4,625,321,000	48,200	0.18%	\$500	\$0.01		
Clark County PUD	Public	4,498,000,000	182,547	0.61%	\$25,000	\$0.14		
PacifiCorp	Investors	4,183,738,894	126,979	1.72%	not specific to WA	n/a		
Grant County PUD	Public	3,247,535,841	43,754	0.00%	\$0	\$0.00		
Benton County PUD	Public	1,726,340,981	45,857	1.15%	\$40,000	\$0.87		
Chelan County PUD	Public	1,637,457,685	41,565	2.06%	\$5,000	\$0.12		
Grays Harbor County PUD	Public	979,126,000	41,714	0.07%	\$0	\$0.00		
Lewis County PUD No 1	Public	964,294,000	30,723	0.04%	\$0	\$0.00		
Mason County PUD #3	Public	660,405,008	32,634	0.33%	\$0	\$0.00		
Clallam County PUD	Public	651,799,312	30,058	0.99%	\$5,000	\$0.17		
Peninsula Light Company	Members	600,281,800	30,631	1.45%	\$0	\$0.00		
Pacific County PUD #2	Public	298,190,793	17,091	4.53%	\$1,000	\$0.06		
Orcas Power and Light Cooperative	Members	203,256,968	11,493	5.05%	\$1,000	\$0.09		

Table 1- Individual Utility Profile

Statewide only 12,196 customers participated in voluntary green power programs in 2002. That number had grown to 47,320 by 2010. The growth factor in participation is just 3.9 in eight years but the growth rate has not had as steep a decline as has occurred in sales or revenue. Figure 6 shows the growth rate slowing but still strong when measured by number of customers participating. Initial annual growth of customers was 45% in 2003 over 2002, and remains steady at 7% from 2009 to 2010.

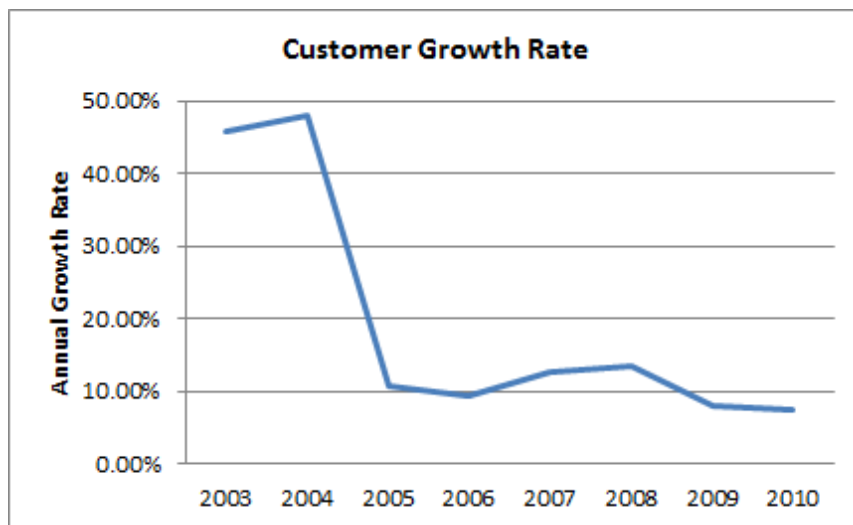


Figure 6 – Growth Rate of Customer Participation per Year

3.2 Individual Program Growth

Even though overall growth shows a successful voluntary green power market in Washington State, programs by different utilities vary widely in both implementation strategy and growth measurements. The simplest comparison of utilities, which range from 11,493 retail customers purchasing 203,256,968 kWh of electricity to 1,072,837 retail customers using 21,903,731,000 kWh, is to compare the percentage of green power program sales and participants versus all sales and total number of customers (Figures 7 and 8). Nine utilities had at least 1% of their customers participating in 2010, four had over 2% participation, and the two utilities that have chosen to offer the voluntary green power purchasing program despite being too small to qualify for the mandate each had over 4% participation.

In terms of green power consumption as a percentage of total sales, Puget Sound Energy (PSE) has been the most successful of the utilities, with 1.41% green energy. Seven utilities reported that less than 0.1% of their total sales resulted from voluntary green power purchases in 2010. Four of these utilities had no program to speak of, reporting less than 0.00% of their sales as voluntary green power purchases.

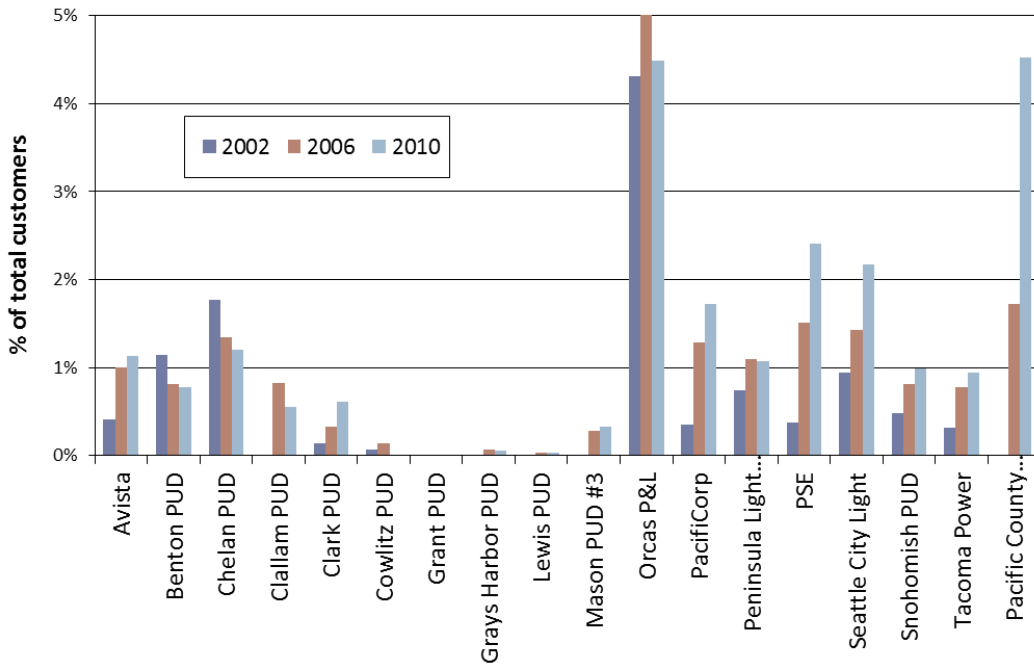


Figure 7- Customer Participation in Green Power Programs as a Percentage of Total Customers for 2002, 2006, and 2010

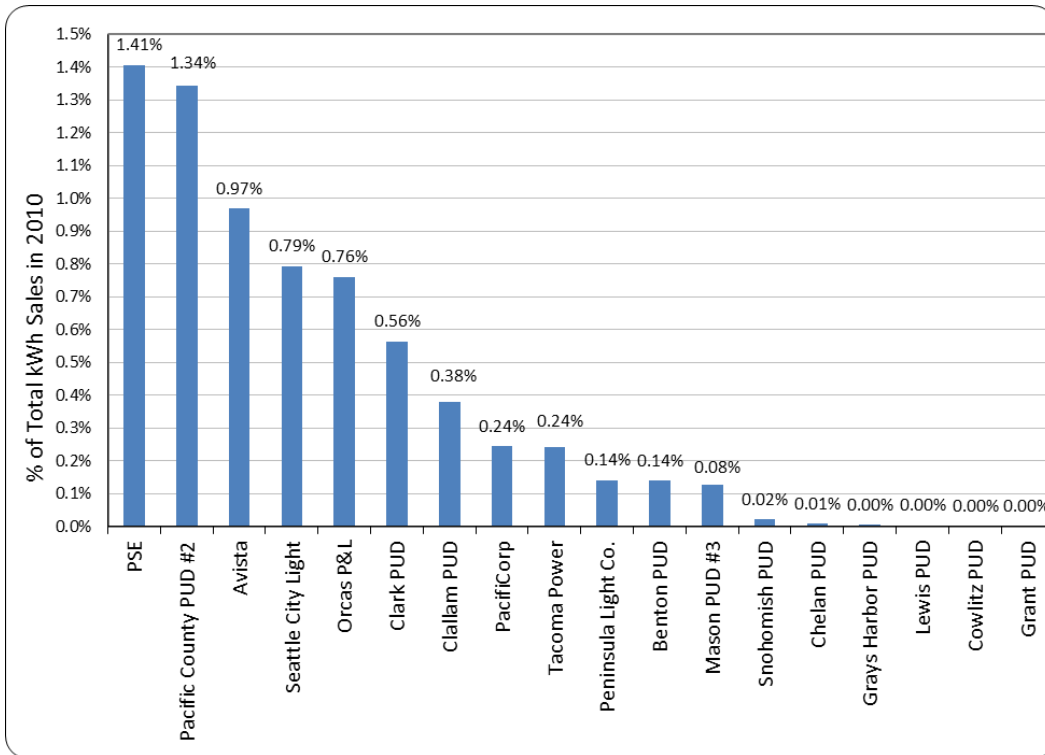


Figure 8- Green Power Sales as a Percentage of Total Sales in 2010

3.3 Types of Programs

Since legislation requires utilities to give customers the option to purchase green power but makes no specific directives, utilities have developed a range of programs. Depending on the program design, customers can purchase a block of green power for a preset price, buy a percentage of their power at a higher “green” rate, or make a donation of any amount to the program. Programs may offer one or all of these purchasing options. Benton County and Chelan County PUDs are the only programs that list donation as their sole green power purchasing option.

In general, these programs can be categorized as demonstration programs, direct power programs, or Green Tag programs. Demonstration programs use green power purchases to build and maintain small renewable energy generation facilities locally. Chelan County PUD’s SNAP (Sustainable Natural Alternative Power) program has been implemented so to provide a premium price to local producers of renewable energy and is an excellent example of a demonstration program, as all its resources are distributed to individuals, schools, and non-profits that locally generate wind or solar power. Several utilities have programs separate from their voluntary green power programs for demonstration purposes. Direct power programs use green power purchases to buy renewable energy directly from renewable energy producers. Mason County PUD #3 purchases power directly from Nine Canyons Wind Farm in Washington. A Green Tag program purchases renewable energy credits to

meet the green power requirements. Twelve of the eighteen utilities in this study report the purchase of RECs for all or part of their green power program.

Different implementation strategies partly account for the large price variation among programs. Table 2 shows the prices currently available for residential green power at each utility. The median price is a premium of \$0.017/kWh, but ranges from a low of \$0.003/kWh offered by Avista to a high of \$0.071/kWh offered by Clallam County PUD. Benton County PUD does not report a price/kWh because it uses donations to purchase RECs at market rate at years end and Chelan County PUD does not report a price/kWh because it divides any received donations among the local producers.

Utility	Premium/kWh
Avista	\$0.003
Mason County PUD #3	\$0.010
Tacoma Power	\$0.011
Snohomish County PUD	\$0.012
Peninsula Light Company	\$0.013
Clark County PUD	\$0.015
Puget Sound Energy	\$0.015
Seattle City Light	\$0.015
Median	\$0.017
Pacific County PUD #2	\$0.020
Cowlitz County PUD	\$0.020
Grant County PUD	\$0.020
Lewis County PUD No 1	\$0.020
PacifiCorp	\$0.028
Grays Harbor County PUD	\$0.030
Orcas Power and Light Cooperative	\$0.040
Clallam County PUD	\$0.071

Table 2 - Green Power Program Price Premiums, 2010

3.4 Marketing

With any voluntary purchase, education and marketing can play an important role in the success of a program. The law that requires utilities to have a voluntary green power program also requires that utilities provide information about the program at least quarterly in customers' regular bills- for some programs the only outreach there is for the program. The price of this minimal marketing may be small enough not to require a separate budget. In fact, six of the utilities surveyed report a marketing budget of zero. Utilities may have under, or over, reported their marketing budget for this program. PSE's green power marketing budget is by far the largest of any of the utilities at \$640,000. When adjusted for the total number of customers served by the utility to determine the cost of customer acquisition, Benton County PUD has the largest budget at \$0.87 per retail customer, with PSE a close second at \$0.60 per retail customer (Table 1). As shown in Appendix C, reported cost of customer acquisition could not account for much of the variability in customer participation ($R^2=0.02$).

These data may be unreliable due to inaccurate or incomplete budget information. In addition, the two small utilities that reported for this survey even though not required by law to have voluntary green power programs, have exceptionally high participation rates (4.53% at Pacific County PUD #2 and 5.05% at Orcas Power and Light Cooperative), but only modest marketing budgets (Table 1). Since these programs were implemented without a mandate there

was likely a preexisting demand for a voluntary green energy purchase option within the customer base. When these two programs are removed, the analysis indicates a stronger, yet still weak, connection between money spent on marketing and participation rate ($R^2=0.27$) (Appendix C).

3.5 The View of Utilities

For this study, nine utilities responded to an interview request, one of them asking to provide an email response instead of a phone call. The issues and views of each utility are unique, but some recurring themes came to prominence. The majority of these programs were created due to the legislative mandate.

Of the nine responding utilities, most predict, with varying degrees of certainty, that the programs would continue even if no longer a mandated. Legislation requires that all costs be covered by participants, and not passed on to other customers, so the programs are generally supported by customers whether or not they choose to participate. Since customers can buy RECs on the open market a few utilities do not see this program as necessary for customer choice, but most responders believe that these programs do have the value of convenience for small customers. Large customers can receive a custom deal on RECs from brokers and often choose custom deals when purchasing green energy since they can choose the type of power they are supporting or find a cheaper price.

The largest challenges to increasing participation in these programs are public perception of renewable power, especially for hydro based utilities, and the effect of I-937. The marketing message for green power is poor when utilities already tout their regular product as low emission. Many Washington State utilities pride themselves on their renewable hydropower. Encouraging customers to voluntarily pay a premium for other forms of renewable power conflicts with the message that hydropower is renewable. A strong marketing campaign for the voluntary green power program would be diluted by the overall renewable hydropower message. Adding to the confusion are the different definitions that state law has for renewable energy. The Energy Independence Act (I-937) uses a different definition of renewable energy for Washington's RPS than from that of the voluntary green programs. The EIA may cause another problem as a few respondents mentioned fears of price increases as competition from the portfolio market grows across the country.

In recent years, marketing of voluntary green power programs has been down across the board. Tacoma Power has stopped marketing its voluntary green power program in the last few years as a result of the utility's position on I-937. Some utilities are frustrated by the variety of renewable energy laws they must comply with, especially when such laws are inconsistent with each other. Though it did not respond to requests for an interview, Grant County PUD included this statement with their 2009 survey:

“This reporting requirement should be discontinued following the implementation of the Energy Independence Act since it would be duplicative of the reporting required for the Act and, in some aspects, it is inconsistent with the Act.

As it relates to this study, Grant County PUD is in a unique position with our Alternative Energy Resources program. As the owner/operator of the nation’s largest non-federal hydroelectric project, our customers are keenly aware of the renewable nature of hydropower. In the past year, Grant PUD generated more than 82,000 kwhs of renewable energy. We have an investment in the Nine Canyon Wind Project that delivers wind power to our customers. In addition, we have made a substantial investment in upgrading the turbines at Wanapum Dam to deliver more power by using the same amount of water. When these two items are paired, we find that our customers do not see the benefit in purchasing additional renewable power, when they consider their existing electricity to be provided by renewable resources.”

- Grant County PUD

The issues brought up in this statement (many requirements for inconsistent laws, energy portfolios the utility and customers already consider renewable, and lack of value to the customer) were mentioned by several of the utility representatives interviewed.

In explaining the type of programs the utilities chose to implement, respondents had one recurring theme: many utilities have moved to purchasing RECs’, mostly because they are cheaper. Local projects are still available through some utilities because they hold higher value for the customer. With a local project customers can see that their money is actually producing renewable

power. RECs can be quite difficult to explain to customers who don't always trust that they are contributing to increased renewable generation.

4. The Future of Voluntary Green Programs

Without a mandate most of the currently successful programs would continue to exist, but there is no proof that increased production of renewable power is resulting from the increased demand caused from voluntary green power programs. Utilities' future plans to increase renewable energy generation are largely guided by other policy measures, especially I-937, not the voluntary demand of their customers.

4.1 Policy Options and Trade-Offs

In light of this information, policy options regarding the mandate for voluntary renewable programs include major simplification of renewable policy on all levels, abandoning the mandate, strengthening the mandate, or supporting voluntary programs through education, recognition, or rewards.

4.1.1 Simplify Green Energy Policy

Navigating the numerous policies intended to promote green energy development can be a challenge for utilities. Coming from many different levels of government, these policies have not been crafted to work seamlessly together, nor do they always complement each other. While a comprehensive overhaul of energy policy to simplify it may be the goal of many working in the industry, political realities make this option unlikely.

The state could begin this process by ensuring that its own policies are consistent. Deciding on one definition of renewable energy may be a place to start. This clarification would help citizens more easily understand their own fuel mix portfolio and let policy implementers more easily coordinate programs and plan for the future. However, even this one simplification of policy would pit a strict voter approved definition against a more lenient legislated definition, likely resulting in political controversy.

4.1.2 Abandoning the Mandate

As with any regulation, one should always question whether the mandate is worth keeping. The mandate for voluntary green energy programs has been successful at establishing many programs that increase consumer choice and increase consumption of renewable power. As indicated in interviews with utility representatives, however, most of the programs that are successful currently would continue to exist without the need for a mandate. While several programs might cease to function without a mandate, most of these programs currently have little to no participation and would thus have little impact on renewable energy consumption in Washington.

The loss of programs with low participation would limit consumer choice for those who prize a green energy alternative but live in areas where there are too few consumers to convince the utility to continue the program. While other opportunities exist for consumers to purchase RECs outside of their utility, the ease of paying for renewable energy on their electric bill would be eliminated.

Larger businesses who may want to use green energy as part of their own marketing strategy would be more likely to use RECs than residential customers.

4.1.3 Strengthening the Mandate

The clear disparities between successful voluntary green power programs and unsuccessful programs may be, at least partially, explained by differences in consumer awareness. Currently the mandate only requires quarterly bill inserts as consumer outreach for the programs. Strengthening the mandate to require a minimum amount of marketing could potentially increase participation in areas where there is currently little to no participation. However, a mandated marketing campaign by each utility would cost money and raise the price of voluntary green energy to some degree. This cost increase could result in the loss of customers who already feel at the top of their own willingness to pay.

4.1.4 Supporting Voluntary Programs at the State Level

An option to increase awareness of voluntary green energy programs without increasing the cost to consumers would be a state level education program paid for by the taxpayers. This marketing campaign could be designed in a variety of ways to let the public know they have the option to buy green power through their own utility. Funding a new program like this would be a difficult proposition in the current state budgetary environment, however.

4.1.5 No Change

Keeping the current policy would likely result in modest growth of the voluntary green energy programs in the coming years. Utilities that currently

have little to no participation or internal support are unlikely to grow. The most successful programs are still growing at a modest rate that would likely continue in the near future, especially as the state experiences an uptick in economic growth. As utilities implement higher rates of renewable energy into their overall portfolio as required by I-937, they may find prices of green energy higher and consumer demand for a voluntary program lower.

4.2 Recommendation

To increase the success of the voluntary green energy programs in Washington, the state should provide an education/marketing program to increase citizen awareness of the programs. Only by letting consumers know they have the choice to purchase green energy as easily as their current fuel mix can participation be maximized. Unfortunately, in today's economic and political climate, funding for this type of program is likely to prove impossible.

Without increased support at the state level, abandoning the mandate is the best option. While the mandate was needed to initiate most of these programs, the successful ones will continue without it. The overall impact on participation is likely to be negligible, as the programs that are likely to be discontinued have very low levels of participation. In addition, abandoning the mandate will be one step forward in simplifying the State's energy policy.

5. Conclusion

A mandate that all utilities over 25,000 customers offer a green power purchasing option to their customers passed the Washington State legislature in 2001. Statewide these programs have been successful as measured by increased customer participation and sales growth. However, the rate of growth in both customer participation and sales has leveled off, and increased generation of renewable energy is not currently being driven by the still relatively small volume of voluntary customer purchases. While the mandate was necessary to initiate the creation of successful green power pricing programs at Washington State utilities, programs with even a relatively small green power customer base would likely continue if the mandate were abandoned. Abandoning the mandate would simplify the State's energy policy while having little effect on consumer's purchasing options or green energy consumption.

5.1 Future work

Many of the variables that affect the success of a voluntary green energy program like those mandated in Washington were not covered or not fully explored in this research. Future studies might look more closely at the marketing of green energy programs to determine the types and budget that work best in promotion. An exploration of the differences in the customer bases of each utility, including their politics, economic situation, environmental ethic, and beliefs concerning climate change, may provide valuable insight into why

some programs are more successful than others. Along these same lines, the standard fuel mix of each utility and how its “greenness” is viewed by customers within the district compared with the participation in the voluntary green energy program might determine whether some programs are viewed as higher value than others because of the avoided power sources.

An important yet difficult question that still needs answering is to what degree, if any, voluntary programs affect the amount of new renewable energy generation. Current MWh demanded by these programs are low in comparison to those needed to meet future portfolio standards. At what level of participation would voluntary purchases drive new development? Do programs like these increase awareness about renewable energy issues enough to drive political support for more stringent portfolio standards? What is the actual quantity of avoided emissions? In addition, similar policies in other states should be evaluated.

Much of this work is based on the surveys conducted by the Washington State Department of Commerce and the Utilities and Transportation Commission for their annual Report to the Legislature (Weed December 2010). At the time of publishing the new annual report has been released and shows the programs examined here are continuing to grow at low rates (Burrell December 2011).

Glossary of Terms

Cost of customer acquisition- the amount spent on marketing divided by the number of new customers that enroll

EIA – Energy Independence Act, also known as I-937

IOU – Investor Owned Utility

kWh – kilowatt hours

MWh/yr- Megawatt hours per year

NEG- Net excess generation

PUD – Public Utility District

REC – Renewable Energy Certificates

RPS – Renewable Portfolio Standard

UTC – Utilities and Transportation Commission

WTP – Willingness to pay

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Appendix A - 2010 Washington State Green Power Survey Questions

1. Name of your utility:
2. Name of green power program:

Retail customers

3. Please indicate the number of retail electric customers in Washington State served by your utility in 2009:
4. Please indicate the number of Washington State participants in your optional green power program in 2009?

Sales

5. What were your total utility retail kWh sales in Washington State in 2009?
6. What were your total kWh sales of green power (Washington sales only) through this optional program in 2009?
7. What are your current total kWh sales of green power (Washington sales only) in this program for 2010 (through September or please indicate otherwise)?
8. How much of the 2009 green power sales were purchased by bulk buyers (in kWhs)? How many bulk buyers are purchasing 100% green power? If you have a bulk rate, what is it? (\$/kWh)?

Revenues

9. Please indicate your utility's total electric retail revenues for 2009 (Washington revenues only):
10. Please indicate your utility's revenues (Washington State only) from this voluntary program in the following years:
2009 _____
2010 _____ ; through which month is this data current:

Green Power Product

11. Please briefly describe your green power product by completing the following questions or by including an additional sentence of narrative here:
12. Did your utility buy green tags for this program? Yes No
13. If yes, from whom did your utility purchase green tags?
14. If your utility bought green tags, are all of the non-power attributes* in tact or has any portion been sold separately, for example, as a carbon credit? Yes No
15. Did your utility buy BPA Environmentally Preferred product (EPP) Yes No
16. Do you know the resource mix of your qualified green power product? Yes No
17. If yes, what is the resource mix for 2009? (Include annual kWhs or percentages if possible.)
Wind _____

Solar energy
Geothermal energy
Landfill gas
Wave or tidal action
Gas produced by treatment of wastewater
Biomass
Qualified hydropower

Price

18. Please indicate the retail price of your green power product: (e.g., \$/block, \$/kWh, unrestricted donation, etc.)

Miscellaneous

19. Please indicate your total annual marketing budget for your optional green power program if it's available. \$
20. Are there any items that have notably changed within your program since we surveyed your utility in the fall of 2009?
21. When you separately report your fuel mix data to the state, do you include some or all of these green power resources in your overall utility mix? Yes No
22. Do you or your management have any comments that you would like to share regarding this program?

* (14) Non-power attributes is defined in RCW 19.285.030 as follows:

"Non-power attributes" means all environmentally related characteristics, exclusive of energy, capacity reliability, and other electrical power service attributes, that are associated with the generation of electricity from a renewable resource, including but not limited to the facility's fuel type, geographic location, vintage, qualification as an eligible renewable resource, and avoided emissions of pollutants to the air, soil, or water, and avoided emissions of carbon dioxide and other greenhouse gases.

Appendix B - Interview Questions, as posed by Jennifer Snyder during her interviews conducted with Washington State utility representatives February thru March 2011.

All interviewees were asked questions according to the following template.

What is your position with (Utility Name) and how does your position relate to the utility's green energy programs?

How long have you been working with the green power pricing program?

When was this program started? Why? (Because of legislative action?)

How was this program designed?

Why was this type of program chosen?

How is the program marketed?

Are there any commercial customers that rely on this program for use in their own marketing? (i.e. Do they actively promote their green power purchases?)

How popular is this program internally? Is it supported by the management? Is it seen as profitable or necessary for customer satisfaction?

Are there any plans for possible changes to the program?

What challenges does (Utility Name) face in implementing this program?

Are there any policy changes that you think would facilitate the growth of renewable energy in WA?

Is the current voluntary green program self-sustaining (do you believe it would continue if the mandate were dropped)?

Are there any other thoughts you would like to add?

Appendix C – Relationship between Marketing Budgets and Customer Participation in Voluntary Green Energy Programs

A simple linear regression was performed to check if there was evidence that marketing has an effect on participation rate. The following graphs illustrate that while there may be an effect, it is not strong. Figure 9 shows all reporting utilities, while Figure 10 leaves out Pacific County PUD #2 and Orcas Power and Light Cooperative because these small utilities are not mandated to have Green Power Programs and participation rates much higher than the mandated utilities.

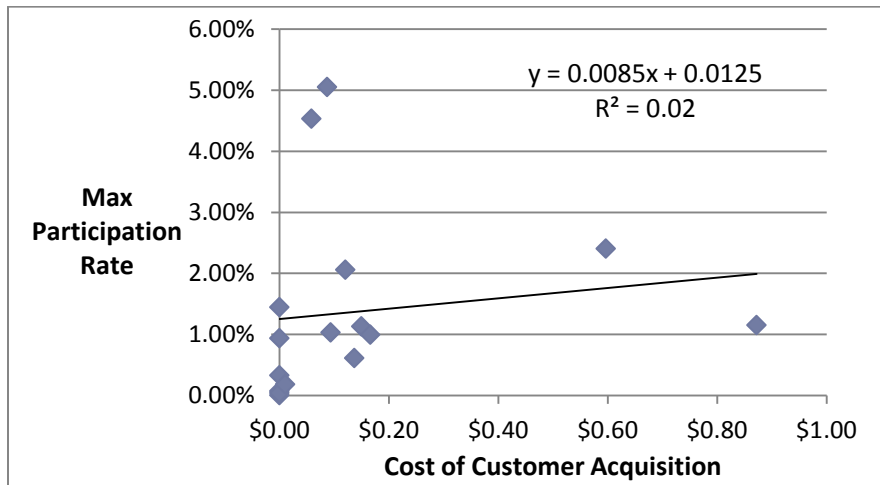


Figure 9- Strength of the Correlation between the Cost of Customer Acquisition and the Participation Rate Including All Reporting Utilities

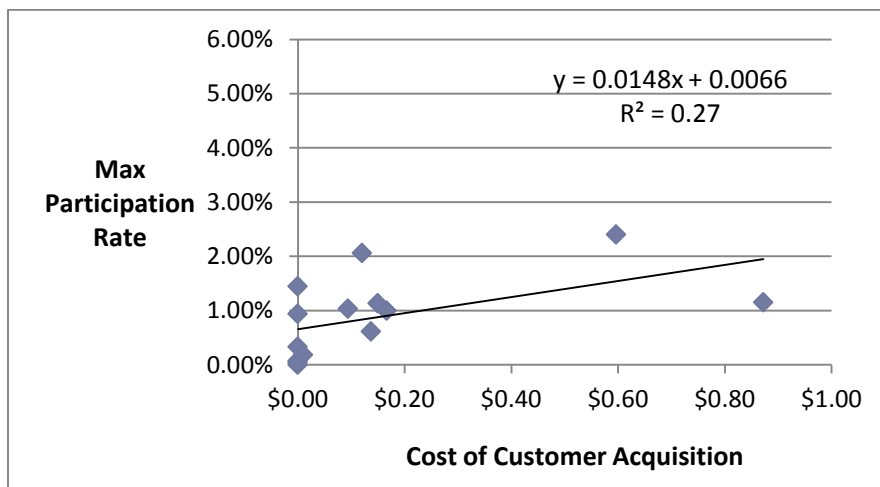


Figure 10- Strength of the Correlation between the Cost of Customer Acquisition and the Participation Rate Including Only Utilities with Mandated Programs