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CHANGING THE MIX: MEETING CUSTOMER EXPECTATIONS IN THE GREEN POWER MARKET

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ABSTRACT

The retail market for environmentally-preferred or 'green' power is growing dramatically. Because this market is still developing, a variety of issues regarding the quality and integrity of green power products remain unsettled. This paper explores one of the central issues in the green power quality debate: the mix of 'new' versus 'existing' renewable energy in the products being offered to the customer. Specifically, this paper:

- Discusses the implications to consumers of choosing a mix of new and existing resources;
- Describes efforts to certify green power products based (in part) on the mix of resources;
- Analyzes the advantages and disadvantages of including a high proportion of new renewables in the mix; and
- Proposes a mechanism for promoting a greater proportion of new renewables in green power programs, while maintaining the affordability of these programs.

The authors conclude that the long-term viability and credibility of voluntary green power markets depend on ensuring a substantial and increasing proportion of new renewables in the resource mix, and that consumers, green power marketers, and certifying agencies alike should consider changing the mix to better promote and support green power programs.

1. INTRODUCTION

According to the U.S. Department of Energy, about 40 percent of retail utility customers in the U.S. now have an option of purchasing a green power product directly from their electricity supplier, and virtually 100 percent of the public can support green power through the purchase of 'Green Tags,' known more generally as renewable energy credits (RECs) or Tradable Renewable Credits (TRCs).

What are these customers paying for? What sort of certification or other 'quality control' is there in this emerging, largely unregulated market? What criteria do customers (or regulators, or other certifying agencies) use in assessing and evaluating green power products?

This paper describes and analyzes one of the central issues in the green power quality debate: the mix of 'new' versus 'existing' renewable energy in the product being offered to the customer. For purposes of the voluntary market, 'new' resources are those that were developed in response to the price premiums available in the green power market,[1] while 'existing' resources are those that were previously developed without regard for any green power premium. The distinction is important to those concerned about the use of customer payments to support renewable resources that already have been bought and paid for, such as early-generation wind farms or older hydroelectric facilities.

[1] Generally, those projects built in 1997 or later, although the standards vary from region to region.

2. GREEN POWER MARKETS: A RECENT HISTORY

To understand the challenges facing the green power industry, it is essential to understand some of the history and terms used to describe the various products available in the marketplace.

2.1. The Emergence of the California Green Power Market

In 1996, California was aggressively pressing for the restructuring of its electricity industry, including the emergence of non-utility, retail marketers of electricity. Many of these marketers chose to offer customers the choice of electricity generated from renewable energy resources, usually referred to as 'green power.'

There were significant hurdles to overcome in the emergence of the green power market. One was the 'chicken and egg' problem: in order to sign up customers for green power products, there needed to be product available to sell; but it was difficult to finance the development of new renewable energy facilities without a reliable base of customers to pay for these resources.

In California, the solution was to allow renewable energy facilities that had once been part of the ratebase of utilities (but which had been sold off under deregulation) to sell their power into the emerging green power markets. Environmental and consumer advocates rightly expressed concern about this. The advocates noted that these facilities in many cases had been running for decades and were at no risk of shutting down. In effect, owners of these existing facilities would simply get a windfall if they were paid a green power premium. Given this, how could a customer be asked to pay a premium for these 'existing' resources? The advocates also pointed out that customers of green power products expected their purchases to improve the environment. Clearly the process of assigning part of the existing mix of resources to 'green' customers and assigning the remaining mix of 'brown' electrons to other customers accomplished nothing if the result was not additional renewable resource development.

2.2. The Creation of 'Green-e' Certification

In response to these events, a group of green power marketers, consumer advocates, and environmental advocates developed a voluntary certification for green power products to address these concerns. Administered by San Francisco's Center for Resource Solutions (CRS) and operating under the 'Green-e' label, this certification established voluntary rules for the green power marketplace. Perhaps the most important of these rules established clear guidelines for product content. Green-e recognized an important distinction between two types of renewable resources. Projects built before the 1997 restructuring, which were financed without anticipation or expectation of any green power premium, were referred to as 'existing' resources; while projects built in 1997 or later, which in most cases were developed with the understanding that a voluntary Green premium would be available, were referred to as 'new' resources.

CRS recognized that it was essential to 'get the market going' by ensuring products were available to sell to customers. At the same time, CRS also recognized that the point of the voluntary green power market was to allow customers to improve the environment by putting their dollars to work. That required 'new' resources to be built. The notion was that the development of the market would create an incentive to build new resources, and eventually, the existing resources would be phased out of the voluntary product mixes.

Accordingly, CRS defined a quality standard that required marketers to include a certain percentage of 'new' resources in their product to qualify for Green-e certification. (The percentage of new resources varied somewhat from region to region based on input from regional stakeholder groups.) More importantly, the percentage of 'new' resources required for Green-e certification would increase over time, as additional renewable resources were developed. The green power premiums paid by customers would be used to accelerate this transition. The schedule is as follows: [2]

State	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
California	5%	10%	10%	15%	TBD *	TBD *	TBD

Although California's green power market collapsed with the rest of the non-utility retail market in 2000-2001, the Green-e model developed and adopted by CRS for green power products has become a *de facto* national standard. Green-e certified electric products must contain a minimum of 50% renewable resources and a minimum of 5%-50% new renewable resources as defined by regional standards.

[2] Green-e's California advisory committee is meeting in May 2004 to review the California Green-e standard. One item on the agenda is to increase the new renewable requirement.

3. GREEN POWER STANDARDS AND THE '100 PERCENT RENEWABLE' PRODUCT

Green power marketers across the country are offering products (only some of which are Green-e certified) that are advertised as '100% Renewable.' Many of these products are comprised of significantly less than 50% new resources. Marketers of these products make two arguments in their support. First, they contend that customers are attracted to a 100% renewable product because it appeals to customers to have 100% of their electricity be from renewable resources, and that the 'new' versus 'existing' distinction is of little consequence to most customers. Second, the marketers content that the only way to offer a 100% renewable product that is inexpensive enough to be attractive is to blend in significant amounts of existing resources. Both of these arguments are likely correct, but each begs a question.

First, why does the customer prefer a '100% renewable' product? The most likely answer is that the customer does not understand the difference between new and existing resources. The customer assumes that 100% of her purchase benefits the environment. If the environmental benefits are not comparable – and we propose they are not – then the customer is at best being oversold and at worst deceived.

Second, why is the product less expensive than a product based on 100% new resources? There are two reasons. One is that the costs are lower. Most existing facilities are older facilities for which capital costs have been fully paid through utility rates. They typically need less financial return in order to remain in operation and economically viable. In this case, the payment of an incremental green premium is unnecessary and creates a windfall.

The other reason existing resources are less expensive is that they are less valuable in the market than new resources. In other words, well-informed customers do not value them as much, and are not willing to pay as high a premium. For instance, wholesale Green Tag prices for existing resources are often less than 0.05 cents per kilowatt-hour (kWh), which is many times less than the wholesale Green Tag price for new resources. Unfortunately, many green power markers are now dependent on inexpensive existing resources to support their operations, and strongly resist the efforts of CRS and others to increase the requirements for new content in their products over time.

Marketers also claim that they cannot find enough new resources to meet consumer demand. That argument is addressed in Section 6.2.

4. THE TROUBLE WITH EXISTING RESOURCES

We have identified four interrelated problems that derive from the green power market's reliance on existing resources. They are discussed in this section.

4.1 Market Disincentives to New Resource Development

The first problem with using existing resources in voluntary green power products is that from a public policy perspective it creates the wrong incentive. The initial purpose of allowing existing resources into green power products was to get the market moving in order to create an incentive to build new resources. What has happened instead is that rules allowing existing resources into the mix have created an incentive for existing resources, which have been supported by utility ratepayers for years, to leave the ratebase and sell their power -- or in some cases just their Green Tags -- into the voluntary market.[3] Existing resources flooding the voluntary market significantly reduce the incentive for development of new resources.

In the Pacific Northwest, for example, hydroelectric projects that have been supported and fully paid for by local utility customers are now seeking to sell their Green Tags in the voluntary market to meet the needs of green power marketers selling products that contain a mix of new and existing resources. These products are not Green-e certified.

The energy from these hydro facilities will continue to meet the needs of the customers of the respective municipal utilities. Those municipal utility customers will continue to believe that their energy is 'green,' when in fact, the 'greenness' is being sold to customers of the green power marketer. The utilities likely will use the premiums they receive to lower the rates of their customers. However, the customers of the green power marketer will never know, nor would they likely support the notion, that their dollars are simply being used to lower the rates of the municipal utilities' customers. The green power customers are also unlikely to understand that the energy facility from which they are buying Green Tags has been running for decades and is in absolutely no risk of reducing its operations. In short, the environmental benefits of these hydro projects will occur with or without the green power premiums paid by the marketer's customers.

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[3] Green-e and other voluntary market standards prohibit resources currently in the ratebase from being used in voluntary products. However, many of the products on the market are not Green-e certified.

The result is that we send exactly the wrong incentive to the developers of new renewable energy resources. By allowing old hydro facilities (and other existing renewable facilities) into products offered for voluntary purchase, we communicate that any new renewable project developer must compete for voluntary dollars against old resources whose capital costs were paid long ago. These existing projects can sell at premiums approaching zero, because the projects do not require a premium. New projects do require a premium to operate and are hence put at a tremendous competitive disadvantage.

In our view, these existing facilities have no place in voluntary products.[4]

We should be sending a signal that there are premiums to be had if a developer develops new resources. Instead, we send a signal that existing resources can get a windfall incentive if they can figure out a way to get out of the ratebase.

4.2 Less Funding for New Resources

The second problem with using existing resources in green power products is that consumers end up supporting less renewable energy development – not more.

Arguments have been made that it is better for voluntary customer dollars to support existing renewable generation than fossil generation. This argument misses the point. These are voluntary dollars. The customer has already agreed to spend them on 'renewable' energy. The question is, where should those limited dollars be directed? We argue that the choice is not between existing renewables and fossil fuels. The consumer has already made that choice. The choice is between changing the mix by supporting new projects, or siphoning off those dollars to support existing resources that would run regardless of the subsidy. We contend that those dollars should be directed to the result the customer wants and expects: new resource development. In the end, including existing resources in the mix actually *reduces* the amount of new resources that would be built because it strips dollars available in the marketplace away from new resource development.

4.3 Deceptive Advertising and Consumer Misinformation

The third reason existing resources should not be used in green power products is that this practice is deceptive to consumers. Following from the two previous arguments, we observe that voluntary green power consumers are likely to believe that all of their premium dollars are going to change the mix. This is simply not the case, and it raises serious consumer protection issues. It is unreasonable for the renewable energy community to expect green power customers to understand the difference between new and existing resources; to understand what resources are or were in the ratebase; etc. The customer simply wants to believe that their dollars are going to make the world a cleaner place. That is what they want to support, and that is what we should provide to them.

4.4. Existing Resources Would Swamp the Market

Some argue that as the voluntary market continues to grow, it will eventually absorb all existing renewable resources, leaving room for new resources. Regardless of the consumer protection issues and market signals this approach raises, it fails to recognize the relative size of the existing resource base in relation to the voluntary market.

Although there is no universal definition of 'existing' renewables, a reasonable proxy is those resources built and operating before 1997, when voluntary green power programs began in earnest.

The Energy Information Administration (EIA) defines non-hydro renewables to include wood, black liquor, other wood waste, municipal solid waste, landfill gas, sludge waste, tires, agriculture byproducts, other biomass, geothermal, solar thermal, photovoltaic energy, and wind.. According to the EIA's Electric Power Annual (2002), the existing mix of renewables in 1996 included:

Existing Hydro[5]	286,435,833 MWh
Existing Non-Hydro Renewables	75,796,000 MWh
Total	**362,231,833 MWh**

According to the National Renewable Energy Laboratory,(1) approximately 2.4 million MWh were sold in the voluntary green power markets in 2002.[6] Therefore, if the voluntary market is opened up to all existing renewable resources, approximately 350 million MWh of generation could be competing for a market that is currently under 3 million MWh. The 2002 voluntary market would

[4] We strongly believe that existing renewable resources have an important role to play in the ratebase and in the 'existing resources' portion of energy portfolio standards and other non-voluntary markets.

[5] This figure is the ten-year average from 1991-2002, which we used to compensate for the large annual fluctuations in water available for hydropower purposes.

[6] This does not include any non-certified sales of green power in competitive markets and any non-certified green tag sales, so the actual number is somewhat larger.

have to grow 100 times its current size just to absorb these broadly defined existing renewable resources.

Many suggest that large hydroelectric projects should be excluded from these calculations because Green-e excludes it from voluntary products on environmental grounds. This argument neglects several important issues. For instance, if the owners of large hydro facilities believe there is a potential premium available to them in the voluntary markets, they likely will pursue it. It is unclear how policymakers would respond to pressure from these project owners to be included in the voluntary resource mix if other existing resources are included. Also, some owners of large hydro facilities are pursuing Low Impact Hydropower Institute certification in the hope that it will allow them access to the voluntary markets. Finally, some marketers are indifferent to Green-e certification and may simply ignore its requirements in offering products with large hydro in the mix.

Even if hydro were excluded from the calculations, the result is grim for the integrity of the voluntary market.

Existing Non-Hydro Renewables	75,796,000 MWh
Voluntary Purchases	2,400,000 MWh

Even if one assumes that 10 percent of the existing (non-hydro) renewable resources have gone offline since 1996, that leaves over 68 million MWh competing for a 3 million MWh market. The voluntary market would need to grow to 20 times its current size to absorb those existing resources.

Finally, some argue that the best definition of existing resources eligible for inclusion in voluntary products would exclude all resources except geothermal, biomass, wind, solar thermal, and solar photovoltaic. While we seriously doubt that such definitions will withstand the regulatory efforts of those excluded, this narrower definition still fails to solve the problem.

Existing Biomass, Geothermal, Solar and Wind (2)	7,214,000 MWh
Voluntary Programs	2,400,000 MWh

Again, if we assume 10% of the 1996 resources have gone offline, we are left with approximately 6.5 million MWh chasing a 3 million MWh market. Even if the voluntary market grew to 4 times its current size, and advocates succeeded in excluding all but the most narrowly defined resources from voluntary products (a battle already lost in some places), more that half the resources supported by voluntary customer payments would be resources built without any consideration of receiving a voluntary premium.

5. SOLUTIONS

Solutions are not hard to come by. It is important, however, to distinguish between markets with available new resources and markets without available new resources.

5.1. Markets With Available New Resources

The Northwest in 2004 is an excellent example of a geographic market with numerous voluntary green power programs and abundant new wind and solar resources available to serve that market. From 1999 to 2004, approximately 400 MW of new wind energy was built in the region – the majority of it to meet the needs of emerging voluntary green power programs. However, at the end of 2002, significant amounts of the Green Tags from these new wind facilities remained unsold. At the same time, Green Tags from decades-old geothermal facilities in California were being sold in Oregon to meet the demands of voluntary green power customers. This sent a troubling message to the owners and developers of new wind energy facilities. Their new product was going unsold, while resources that had been fully paid for by California utility customers, and were economically viable in the absence of any green premium, were receiving subsidies from Oregon utility customers.

There are two approaches to solving this problem. The first is to rapidly ratchet up the requirements for new resources in the voluntary product mix, based on the availability of new resources in the region. This reduces the problem, but continues to send a signal to owners of existing facilities that there is a premium available to them if they get out of the ratebase. This approach also fails to address the misunderstanding of green power customers regarding the impact of their purchases.

A far better choice would be to eliminate existing resources from *voluntary* programs. (We again emphasize our belief that existing renewable resources have an important role to play in the rate-base and in the 'existing resources' portion of energy portfolio standards and other non-voluntary markets.) Products could remain inexpensive by simply allowing a customer to choose a price point based on the percentage of (now only new) renewable resources in the product they buy. For instance, if a customer wanted a product that cost less than $10/month, she might choose a product that was only 50% renewable. If she wanted a 100% renewable product, she might have to pay more, but at least she would be supporting a product that accomplishes what she believes it does – changing the mix in the proportion she chose.

This solution not only creates an incentive for new resources, it also removes the incentive for existing resources, while eliminating concerns regarding consumer deception.

5.2. Markets Without Available New Resources

Markets lacking available new resources pose a particular challenge. However, the example of the Pacific Northwest provides us with an elegant solution, simply by turning the clock back to 1998.

In 1998, regional leaders in the Northwest wanted to support the development of a voluntary green power market. They were faced with the same 'chicken and egg' problem that CRS discovered in California: there were no new resources to support, so the use of existing resources was required to get the market started. Environmental and consumer advocates were concerned because they wanted to see voluntary premiums used to create positive environmental outcomes from the beginning.

One result was the development of Environmentally Preferred Power (EPP). This product consisted of power marketed by the Bonneville Power Administration (BPA) from two existing hydro facilities. Three environmental organizations active in the region (the Renewable Northwest Project, the Northwest Energy Coalition and the Natural Resources Defense Council) studied the facilities and determined that they met stringent low-impact criteria. Those organizations endorsed those facilities with the additional requirement that BPA direct 100% of the premiums from the sale of EPP to new renewable energy development and watershed restoration. The result was that the voluntary green power market was able to develop, and the dollars consumers spent, were used to create environmental benefits. In addition, BPA agreed to add new renewable energy resources to the EPP mix as those resources become available, and has consistently done so.

5.3. The Role for Existing Resources

We recognize that existing renewables provide the same functional benefits (though not incremental benefits) as new renewables. We also recognize that in at least some instances, existing renewable projects – even those that have been in place for many years – may not cover their full costs (operating costs plus return on invested capital) through conventional power purchase agreements and may wish to see a 'green' premium to be economically viable.

We have already proposed that the value of existing renewable resources should be recognized by being included in a utility's portfolio of renewable resources. In this circumstance, the portfolio target can be set as the sum of existing renewable generation plus an explicit goal of incremental new renewable generation to be added. This approach fully recognizes that existing resources perform the same functions as new ones, without undermining the drive to add the new resources and create new environmental value. It is fully transparent to resource owners, regulators, ratepayers and voluntary consumers.

What about existing renewable resources whose owners claim that their operations can be marginally economic with the addition of a green premium, and not economic absent that premium? We have the example of a group of owners of older, smaller hydroelectric facilities in the Eastern United States who insisted they would be driven out of business without access to the voluntary premium. Doesn't the loss of such resources have the same net environmental effect as the inability to build a new project?

There are two problems with this argument.

The first is that these assertions come with no evidence attached of any such effect. We do not blame the owners for seeking the additional green return, but it should require more objective evidence than a self-interested speculation of this sort. In fact, when hydroelectric projects have been taken out of service, in most if not all instances of which we are aware the cause has been a combination of aging infrastructure and objections to the projects' effects on river and watershed environmental values.

Second, the concern of the voluntary green power customer should not be with the economic fate of any set of current owners, but with the operation or closure of the facility. It's entirely possible that an owner of a project could be driven out of business. It does not follow that the project will stop operating. If it continues to have marginal economic viability – that is, the market return from the project's output exceeds its operating costs, then another party is highly likely to purchase the facility at a cost that restores economic viability, and continue to operate it. If it does not have marginal economic viability, it is unlikely that the green power premiums will do more than extend its operating life for a time. These premiums would be better used, we argue, to create new renewable resources with a full operating lifetime ahead of them.

6. CONCLUSIONS

Green power consumers do not know, and should not be expected to know, the difference between new and existing resources. As consumer advocates, and participants in this

market, it should be our role to ensure that the consumer is protected. Consumers' lack of knowledge works against them when marketers seek to sell 100% renewable products. Consumers like the idea of a 100% renewable product. What they like even more is the knowledge that they are making a difference. A 100% renewable product that contains mostly existing resources leaves consumers with the impression that they are getting both. In fact, they are not.

There is little or no evidence that many existing resources will stop operating without the support provided by a voluntary green power premium. We send the wrong signal – in fact, the opposite of the incentive we should we creating – to developers of new resources when we force them to compete with cheap power (or Green Tags) from existing resources.

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8. REFERENCES

(1) E-mail and telephone correspondence with Lori Bird of the National Renewable Energy Laboratory, April 2004.

(2) EIA - Electric Power Annual 1996, Volume I - Table 10: Net Generation from U.S. Electric Utilities by Energy Source, Census Division, and State, 1995 and 1996.