

The Interaction Between Voluntary Markets for Renewable Energy Certificates and an Expedited California Renewable Portfolio Standard

To: Pam Doughman, et al. California Energy Commission

Fr: Arthur O'Donnell, Center for Resource Solutions

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In response to the set of questions posed by CEC staff for consideration in the IEPR process, please find our initial findings and some recommendations. As noted some of the data points requested are still being vetted by official sources and we'd like the opportunity to provide updated information when it becomes available. 2007 voluntary market sales figure will likely be finalized by mid-October, with more preliminary figures available from NREL in early October.

Introduction: Since the establishment of California's Renewable Portfolio Standard in 2003, both the voluntary and compliance markets for renewable energy within the state have experienced steady, complementary growth. As the demand for renewable energy purchases by regulated utilities and load-serving entities increases to meet the current mandatory requirement for 20 percent of electricity deliveries by 2011 and an espoused goal of 33 percent by 2020, there are unanswered questions about the continued interaction of voluntary and compliance markets. In particular, there is apparent concern that the demand from voluntary markets might compete for available resources and possibly impact the ability for utilities to meet the RPS goals, particularly under a higher target.

The voluntary market presents several options to consumers interested in purchasing green power:

- "Green pricing programs" in which regulated or publicly owned electric utilities offer to their ratepayers the ability to purchase some or all of their power from renewable energy resources.
- Competitive sales of fully bundled renewable electricity in markets that allow direct access between consumers and non-utility marketers.
- Sales of unbundled Renewable Energy Certificates

In the past several years, the increasing use of Renewable Energy Certificates (RECs) as tradable instruments has been a major factor in the growth of voluntary markets nationally. RECs represent the claim to the environmental attributes associated with renewable energy generation; they can be unbundled from commodity electricity and may be sold separately to consumers who wish to "green" their system energy purchases.

According to the Green-e Energy National Standard, Green-e Energy Certified RECs must contain all the greenhouse gas (GHG) emission reduction benefits, including CO₂ benefits, associated with the MWh of renewable electricity when it was generated. Emission reductions of capped and traded pollutants, however, where allowances are not routinely assigned to renewable electricity generators, which currently include SO₂



nationally, mercury (Hg) nationally, and the oxides of nitrogen (NOX) regionally, are not required to be included in Green-e Energy Certified renewable electricity or RECs. For more information on the verification procedure that ensures the inclusion of the required environmental attributes in Green-e Energy Certified RECs, please visit http://www.green-e.org/getcert_re_veri.shtml.

With regard to the GHG emissions avoidance value of renewable energy or RECs, please note that Green-e Energy does not assign or enforce specific emission rates per MWh of certified renewable energy. Rather the Green-e Energy program rules dictate that any emissions avoidance or equivalency claims used in the marketing of certified renewable energy must employ a credible, pre-approved methodology for assigning such emission rates, and that the source of such methodology be disclosed on any materials utilizing the resulting claims. Green-e Energy specifically recommends the non-baseload output emission rate of the NERC region of electricity generation as an appropriate CO₂/MWh conversion factor, though other methodologies can be used so long as adequate disclosure is provided.¹

Large commercial entities in California and across the nation, including Intel Corporation, Wells Fargo, Safeway and others, have made such commitments, with their individual commitments far exceeding the percentage of renewable energy delivered to them by their LSEs under RPS obligations. Intel, for example, recently committed to a purchase of over 1.3 million megawatt hours worth of RECs a year, estimated to meet 47% of the company's total annual electricity consumption.²

RECs enhance the ability to purchase renewable energy in several ways:

- The physical unbundling of environmental attributes from electrons means that REC delivery does not need to be scheduled, and RECs can be used to match any customer's or LSE's load profile;
- RECs transcend interconnection constraints, allowing for interregional financial transactions;
- RECs are not time sensitive and may be packaged and sold as future commitments;
- RECs may be purchased by consumers even in territories where their energy service provider(s) do not offer a renewable energy option, thus providing access to renewable energy nationwide, irrespective of their location or local electricity market.
- RECs may be purchased under a variety of contract terms and lengths, not requiring a long-term commitment. According to market sources, the trend of these contracts is moving from single-year purchases to three-year terms.

In addition to their use in voluntary markets, most states that have established RPS goals will allow utilities to employ RECs to substantiate compliance with the mandate, providing them with more flexibility based on some of the above factors³. California, as

¹ Aside from the aforementioned Green-e Energy methodology, another commonly employed methodology is the one advocated by programs such as the EPA Climate Leaders, which assigns the emissions avoidance value of renewable energy at the rate of non-baseload output emissions of the E-GRID Subregion of electricity generation.

² For more information on Intel's purchase, please visit <http://www.intel.com/pressroom/kits/green/rec/index.htm>.

³ CPUC Rulemaking R. 06-02-012.



yet, has not approved the use of RECs that are not tied to physical delivery of energy to the state's grid, but there is an ongoing proceeding at the California Public Utilities Commission to establish the rules that would allow use of tradable RECs for RPS compliance.⁴

Please note, however, that while Green-e Energy RECs can be used in making carbon reduction claims, this should only occur in a limited context. RECs should only be used as instruments to reduce the indirect emissions associated with electricity consumed from the grid. Green-e Energy RECs should not be confused with or used as carbon offsets, GHG emission reduction products that can be purchased and retired for the mitigation of the carbon impacts of other emitting activities such as driving an automobile or flying a plane.

However, renewable energy generated at facilities that meet specific criteria for "additionality" may be certified under the independent Green-e Climate program, and the emissions reductions resulting from the renewable energy generation from these facilities may be marketed as retail carbon offsets, although at present this is a nascent market with a relatively low volume of transactions. While these products are sold explicitly in terms of tons of CO₂ and not MWhs, RECs do serve as the mechanism for the tracking and substantiation of the ownership of the necessary environmental attributes and proof of electricity generated needed for such products to be verified by Green-e Climate. For more information on Green-e Climate, the programs protocol for assessing the "additionality" of eligible renewable energy facilities and the methodology employed by this protocol to convert MWh of generation "into" pounds of CO₂e avoided please visit www.green-e.org/climate.

The Tracking of REC Transactions

There is no single registry that documents all REC transactions in the United States, although there are several regional registries and tracking systems in operation, including the Western Renewable Energy Generation Information System. Under the auspices of the recently formed Environmental Tracking Network of North America (ETNNA), these tracking systems are working towards establishing common definitions and policies that will in the future allow for seamless tracking of RECs (and other environmental commodities) to prevent possible double-selling and to validate the pathway from creation to retirement of RECs.

In voluntary markets, however, tracking systems do not always provide the full coverage necessary to prevent this double selling of renewable energy attributes. With the exception of some particularly large commercial purchasers, most retail buyers of voluntary RECs do not hold accounts in these tracking systems. As a result, even with increased implementation of these software mechanisms to track wholesale REC inventories, third party certification programs are important tools for providing assurance to end-use REC buyers that their purchases are valid and not double-claimed.

⁴ For a complete list of State RPS policies, and for details on which states allow the use of unbundled RECs for policy compliance, please visit: <http://www.dsireusa.org/library/includes/seeallincentivetype.cfm?type=RPS¤tpageid=2&se arch=Type&EE=0&RE=1>



In certifying REC transactions made by marketers participating in the program, Green-e Energy is able to review reports generated by tracking systems to verify the REC supply used to substantiate a given marketers' sales. However, given that most, if not all, retail sales are made to customers who do not hold tracking system accounts, Green-e Energy is required to implement alternative, "manual" auditing measures to balance a marketer's supply reported through a tracking system with their retail sales to individual end use consumers.

Sources for Documenting the Market for RECs

The best source of aggregate data to describe the use of RECs and bundled green power in the voluntary market is the status report on "Green Power Marketing in the United States" produced by the National Renewable Energy Laboratory.

Another valuable source of information, specifically with respect to a regional breakdown of the generation and consumption of RECs and MWHs of renewable electricity that feed into the voluntary market, is the annual verification report produced by Green-e Energy, which highlights the certified renewable energy sales made by the growing number of electric service providers and REC marketers participating in the program. In 2006, Green-e Energy certified 63% of the renewable energy sold to end-use customers in the voluntary renewable energy market (up from 53% market share in 2005), a percentage that figures to continue to grow as voluntary market customers increasingly rely on REC transactions to green their electricity consumption.

Figures for the size of volume associated with compliance markets in RPS states has been documented by Lawrence Berkeley Laboratory.

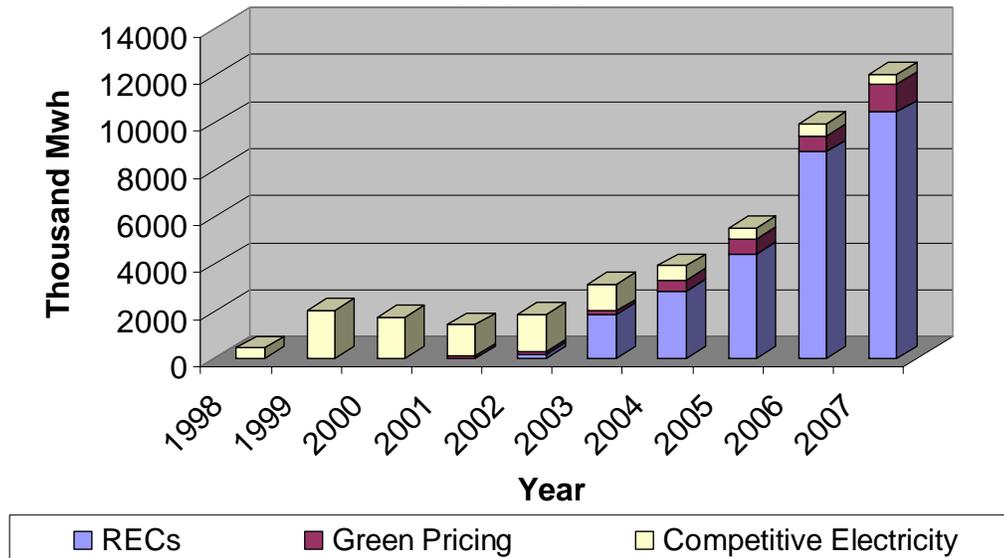
In both cases, the latest fully vetted actual figures represent market transactions in 2006; figures for 2007 transactions are now being evaluated and preliminary data is used.

The following chart represents the growth in the volume of distinct MWhs of certified Green-e Energy sales by year:

(Figure 1. Green-e Energy volume 1998-2007)



Green-e Energy Certified Sales by Product Type, 1998-2007



The chart⁵ indicates that in 2007, Green-e Energy Certified slightly more than 12 million MWh of the renewable energy sold into the voluntary market, of which roughly 87 percent, or 10.4 million were in the form of RECs.

Based on NREL estimates⁶, the voluntary market in 2007 should represent approximately 16.2 million MWh.

Q.1 Amount of national voluntary RECs from renewable facilities developed in California

Based on NREL and Green-e 2006 sales figures, at least 18.4 percent of the national voluntary market for RECs is supplied by generation based in California, or approximately 2.2 million MWh of a total of approximately 12 million MWh.

Q.2. "New" Generation in U.S. Devoted to Voluntary or Compliance Markets

It is difficult to completely answer the question of how much "new" renewable energy generation in the U.S. is being devoted to voluntary markets versus compliance markets because the definition of "new" varies. The CEC defined "new" as since the state RPS went into effect Jan. 1, 2003. For the 2007 sales year, Green-e Energy Participants reported approximately 1.5 million MWh of eligible supply that was generated in CA by post-1/1/03 facilities.

⁵ Please review page 1 for information on the distinction between the three types of renewable energy products that Green-e Energy certifies.

⁶ The NREL report projects 35% annual voluntary market growth on average over the next several years.



However, “new” under criteria evaluated for certification under Green-e Energy and by NREL represents renewable capacity brought into service since 1997, the presumptive start date for restructured electricity markets in several states. Given this caveat, several sources have offered estimates of new renewable capacity and generation on a national basis:

The Union of Concerned Scientists estimated that in 2006, 20.8 million MWh of “new” renewable generation was devoted to compliance with state RPS programs;

NREL’s 10th Annual Market Report states that 3,500 MW of capacity supplied the voluntary market in 2006, with 3,100 MW coming from “new” renewables.

Nationally, 34 percent of renewable energy from “new” facilities in 2006 was sold into voluntary markets. Further, NREL concludes that most RECs sales emanate from new wind projects, while other bundled green power products have a higher proportion of supply deriving from older projects of varied technologies.

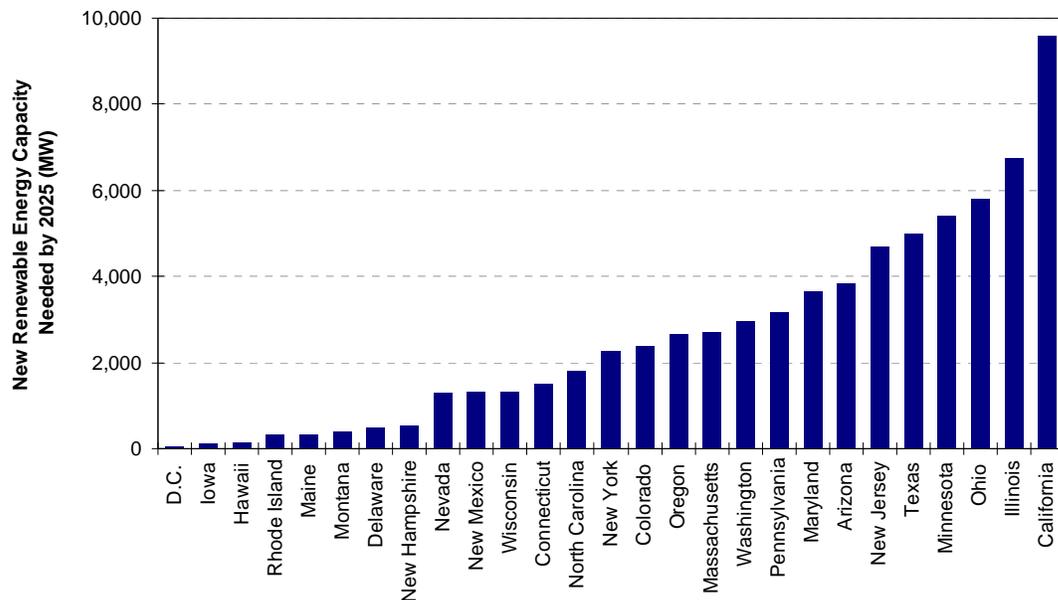
Projected Demand for RPS in California (source: LBL spreadsheet calculating energy requirements without reference to demand forecast adjustments)

RPS 20%			
Target (GWh)	2010	2015	2020
Large IOUs	37,332	40,150	42,959
SMJUs	331	355	379
ESPs	4,534	4,877	5,218
POUs	6,945	10,918	19,693
Total	49,142	56,300	68,249

Under a 33 percent target, the RPS demand statewide would be 105,729 GWh in 2020, or 155 percent of the 20 percent target.

New Renewable Capacity Needed by 2025 to meet current state RPS policies nationwide (LBL)





Comprehensive information on current state RPS policies, including the percentage and year targets for each state can be found at:
www.dsireusa.org/library/includes/type.cfm?Type=RPS&Back=regtab&CurrentPageID=7&EE=0&RE=1&Search=TableType

Future Capacity Devoted to Voluntary Markets

There is no data currently available to accurately project future demand for RECs or renewable energy generally outside of compliance markets. To date, increases in compliance demand have been associated with similar increases in voluntary markets, but it is uncertain whether that will continue in the future. The most important factors will include the ability of the market to provide new capacity, with a key consideration being the continued availability of investment tax credit/production tax credits (ITC/PTC).

In the Eastern U.S. market, especially the PJM area but also in New England, there are some price impacts on the compliance market because of the voluntary market, and vice versa. For example, voluntary market participants (end-use purchasers and/or wholesale aggregators) bought up a significant portion of the RECs generated early in the year, and later in the compliance period REC prices were driven uncharacteristically high, as a result of a shortage caused by the aforementioned voluntary market activity. Also contributing to the price was the difference in the compliance periods of the state RPS policies (quarterly) and that of national voluntary market, which is typically yearly or longer.⁷

⁷ "Hot Commodity: Voluntary buyers of renewable power are entering the market in droves, giving those utilities with compliance burdens under state-based clean electricity mandates a run for their money," US Carbon, Argus Media. Volume 1,15, 5 May 2008

In addressing this situation in policy, our recommendation would be to ensure a period for compliance verification of a year or longer, as this can reduce the opportunity for creation of artificial shortages that might influence price in the compliance market.



Q. 3. REC Contract Terms

While power purchase agreements under utility solicitations may be up to 30 years, the length of RECs purchase agreements is generally much shorter – at times just for a single year. Increasingly, however, purchasers of RECs are willing to commit to longer term purchase, with 3-year terms becoming quite common, according to market traders. Less common are 5- or 10-year terms from specified technologies (i.e., a large solar project that may be selling RECs separately from a utility energy PPA not related to RPS compliance). There have also been rare instances where unbundled RECs may be combined with system mix, undifferentiated energy (also referred to as null power) from another source for sale under a long-term contract. Longer contract terms provide greater financing ability for a developer.

Q.4. Building for compliance versus voluntary markets

A general presumption is that a developer of a new renewable project would devote energy output to the most secure market that supplies the best price. Currently, renewable energy in most competitive markets is sold at something of a premium, compared to utility system costs – although there are instances where the increase in fossil-fuel costs has brought renewable energy into comparable or favorable pricing (particularly wind energy). In such an instance, a developer of new capacity might be able to choose which market to serve.

In addition, some facilities have been developed that participate in both markets. Renewable energy developers have reported bringing facilities online earlier than required by RPS obligations in order to participate in the voluntary market, and some facilities sell a portion of their output to the voluntary market and the remainder to compliance markets.

Limiting factors, however, would include whether the project can obtain transmission interconnection, and whether it can win a utility power sales contract. In a market where the RPS obligation is fully subscribed, or which cannot accommodate the delivery of electrons from the renewable project because of transmission constraints, the sale of RECs represents one way the developer can capture some value for generation.

RECs are sold at varying prices, depending on local markets and availability, but represent only a fraction of the total value of a bundled product (perhaps 12 - 15 percent, according to market sources); only in rare instances would RECs by themselves command a market price that is equal to a bundled renewable energy price. According to NREL retail prices charged for REC products typically range from about 1 cent/kWh to 2.5 cents/kWh for residential and small commercial purchasers. In most cases, larger purchasers are able to negotiate lower prices.

As a result, revenues from sale of unbundled RECs could not support the requirements for long-term financing, although increasingly the marginal revenue associated with sales of RECs (on top of sale of electricity not applied to compliance) could “tip the scales” and make the project viable for financing.

If RPS programs carry an economic penalty for non-compliance, that would give covered utilities/LSEs more of an incentive to bid up the price of renewable energy or RECs –



with the expected outcome being that in tight supply situations, compliance markets would grow at the expense of voluntary markets – not the other way around.

In the NREL analysis through 2006, however, there has been little adverse impact seen on growth of voluntary markets because of RPS requirements, or vice versa. In fact, voluntary market demand in utility green pricing programs has demonstrated consumer support for renewable energy and contributed to the development or expansion of RPS policies in Colorado and Wisconsin. Because of the emphasis on marketing, voluntary green power programs can raise awareness and educate consumers about the benefits of renewable energy in general and provide support for RPS goals.

Q. 5. Implications of These Comparisons: Preliminary thoughts

- a. *If a large market share of CA RE going to the voluntary market, is this evidence that the current RPS procurement process needs to be augmented to help the state achieve 33 percent renewables by 2020?*

We do not see a need to augment procurement under current circumstances. The major limiting factors for meeting RPS requirements are structural (i.e., lack of transmission interconnections) and financial (uncertainty over continued ITC/PTC). In some cases, the voluntary market is comprised of resources that do not meet utility requirements for RPS⁸, or do not have direct interconnection in place.

However, attention should be paid to price levels offered by those who need to meet RPS, whether under a Market Referent Price or a potential Feed-in Tariff for larger facilities as is being considered by the CEC. We defer to the discussion of feed-in-policy design in the recently presented consultant's report.⁹

We also anticipate that even under an expedited RPS, there will continue to be a complementary role for voluntary markets, for individuals and entities that wish to go beyond requirements. So care should go into making sure that policies do not impair such actions.

- b. *Does this data indicate a need for additional options to support renewable energy development for 33 percent or even 50% renewables? If so, do you think the following options would be effective additions to the current RPS process? Tradeable RECs within the WECC (perhaps capped at a certain amount of MW per year)?*

There is increasing consensus that the use of tradable RECs from outside California are not only beneficial to meeting California RPS (even the current level) but also necessary, given physical constraints. A regional market for RECs will offer competitive price advantages over a market limited to physical interconnection or actual siting of resources within the state; it can also speed the process of compliance.

⁸ California distributed generation photovoltaic installations, for example.

⁹ Exploring Feed-In Tariffs for California, Rickerson Energy Strategies/ W. Rickerson in 08-IEP-1



c. Does this data indicate a need for a set aside of GHG emission allowances if a cap in trade system is set up to help meet AB 32 goals

We endorse a policy mechanism established within an eventual cap and trade system that ensures that the implementation of such a system will not eliminate one of the prevalent options that citizens and businesses have employed to reduce their greenhouse gas emissions – renewable energy bought through the voluntary green power market. Similar to what was proposed in the RGGI Model Rule, we recommend an “off-the-top” approach where pollution allowances are retired on behalf of voluntary market demand prior to any allocation of allowances takes place. We can provide a more detailed set of recommendations based on consensus positions developed in the context of the Western Climate Initiative and our comments to CARB on the Climate Change Draft Scoping Plan.

d. How should the voluntary REC market be taken into account in studies on changes to the electricity system needed to accommodate 33 percent renewables by 2020 while maintaining system reliability.

RECs, being unbundled from the physical electron, do not necessarily have the same extent of system or reliability impacts as fully bundled energy from variable resources, and in fact, may derive from sources that are not connected to the transmission grid (i.e., distributed photovoltaics). However, there is little financial incentive to sell RECs without being able to sell energy as well, so there could be impacts.

Currently the California ISO and other parties have studies underway (and Southern California Edison has proposed a research program for impacts by solar installations), so a complete assessment is preliminary.

At the very least, an understanding and more thorough documentation of the size of voluntary markets should be incorporated into analysis, and we hope we have begun to answer some of those questions with this document.

