



US Mandatory REC Markets – An Established Environmental Infrastructure

Reiner Musier, APX Inc.
rmusier@apx.com
617.699.0929

Call it “environmental currency.” It has a unique serial number, like the dollar. It is valid in a specific territory, like the dollar. It has real value. It is bought, sold, brokered, and traded. It is trusted, like the dollar. It represents 1 MWh of metered power produced by a renewable resource at a certified facility, and it’s called a Renewable Energy Certificate (REC).

What is new for RECs in 2006 is the dramatic geographic expansion of the nation’s regional market infrastructure to manage RECs. What’s also new is that some of the regional REC markets are expanding into new environmental policy instruments, such as energy efficiency and demand management-related certificates. Further, there is more interest in the tracking of additional environmental attributes, such as generation related emissions, as well as avoided carbon and other greenhouse gas (GHG) avoidance with the REC – as least for voluntary markets. Let’s review the history of the mandatory REC markets, and then explore some of these recent developments.

Texas REC

Mandatory REC trading goes back to at least 1999 and Texas’ legislative mandate. Although Texas was the sixth state to adopt a Renewable Portfolio Standard (RPS), it was the first to promulgate meaningful implementation rules¹. These rules made it the responsibility of electricity retailers to acquire and retire RECs based on their pro rata share of state-wide retail electricity sales. The rules also led to the invention of tradable electronic RECs that allow electricity retailers from any area of the state to seek out the lowest cost renewable resources without having to take physical delivery of the associated electricity. By any measure, the Texas REC (www.texasrenewables.com) market has been a large success and a positive contributor to the dramatic growth of wind and renewable generation in Texas – this year Texas surpasses California as the nation’s largest wind generator² with a cumulative capacity of 2,370 MW, followed by California’s 2,323 MW. The US total wind capacity surged to 9,971 MW in the first half of 2006.

NEPOOL GIS

The Texas experience with RECs was watched closely by regulators and markets across the nation, including the New England Power Pool (NEPOOL), an association of more than 290 participants in the New England bulk power system. NEPOOL advises ISO New England, Inc. on the operation and administration of the New England transmission system and wholesale power markets in Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. NEPOOL followed with its Generation Information System (GIS) which began operation July 1, 2002. The GIS (www.nepoolgis.com) verifies and manages the RECs which serve as the currency for environmental trading and investment incentives in the New England states.

A noteworthy aspect of the NEPOOL GIS is that it monitors emissions of all generators selling power through ISO New England’s market system, and is not limited to renewable generation. A



web-based system, the NEPOOL GIS records all generation for all fuel sources. It also records greenhouse gas (GHG) emissions and other attributes associated with generation and creates a unique, traceable digital certificate for every MWh generated within or imported into the ISO New England Control Area. Retail electric suppliers use the system's certificates to report compliance with requirements set by New England states that include RPS requirements, as well as disclosure of fuel sources. To date, the NEPOOL GIS has created and managed about 700 million certificates.

PJM GATS

In 2005 PJM, which spans all or parts of 13 states including Pennsylvania, New Jersey, Chicago-area and the District of Columbia, followed with its Generation Attribute Tracking System (GATS), which tracks environmental, emissions, and fuel attributes in PJM. Within PJM, state policies differ significantly – some have an RPS, requiring a percentage of the electricity sold to be produced from a renewable or other qualifying resources. Some require sellers of electricity to tell buyers what fuels were used to generate electricity or what emissions were created. This is a good example of the discussion within our industry regarding the bundling and unbundling of electricity and its environmental attributes. Experience has shown that differing and changing public policy approaches are best managed through an underlying technology that enables the environmental markets to handle both bundled and unbundled attributes. This flexibility gives policy makers the ability to apply either approach, depending on the policy drivers.

PJM GATS (<https://gats.pjm-eis.com/>) produces between 52 million and 73 million certificates monthly. With Pennsylvania, Delaware, and DC slated to expand their RPS programs in 2007, further growth of GATS is expected. Wind is a rapidly growing segment with 336 MW of wind generation in PJM in place, an additional 828 MW of wind generation under construction, with more than 9,600 MW in proposed wind projects under consideration³.

WECC WREGIS

The most significant new REC market development has been in the West, where the California Energy Commission (CEC), working with the Western Electricity Coordinating Council (WECC), has begun work on the Western Renewable Energy Generation Information System (WREGIS) project. The system will verify and manage the WREGIS Certificates that will be the currency for environmental trading and investment incentives across the WECC region served by WREGIS. WECC comprises the entire Western Interconnection. With a footprint of 1.8 million square miles and members operating in 14 states in the Western U.S., two Canadian provinces, and Baja Norte, Mexico, WECC is the largest geographically of the eight North American Electric Reliability Council regions. Project implementation is already underway.

As with the other REC markets, WREGIS (www.westgov.org/wieb/wregis/) will create and track a unique, traceable digital certificate for MWh of renewable energy generated within or imported into WECC Control Area. Retail electric suppliers will use the system's certificates to report compliance with requirements set by the states, including power purchases to meet Renewable Portfolio Standards (RPS). The system will also record ownership and facilitate transfers of the certificates to support the effective operation and integrity of the environmental market.

Additional Programs. In addition to the regional market programs mentioned above, smaller state REC markets include the Wisconsin Renewable Resource Credit Program, New Jersey Solar Renewable Energy Certificate Program.



New “Environmental Commodities”: Energy Efficiency & Conservation Certificates

These markets continue to evolve, with leadership in the environmental markets coming from the state and regional level. A stellar example of innovation enabled by a certificate-based market approach is the State of Connecticut’s new Distributed Resources Portfolio Standard (Class III). In a nutshell, Connecticut is using the existing infrastructure of the REC market to create a new class of environmental commodity – an Energy Efficiency & Conservation certificate.

The Class III Standard establishes a market-based system that will enable the state to achieve increasingly demanding tiered targets in energy efficiency, demand-side resources and conservation through 2010. Eligible Class III resources include:

- Conservation & Load Management measures
- Combined Heat and Power resources, such as co-generation facilities that achieve average annual fuel-conversion efficiency of 50 percent will be eligible.
- Demand Response (DR) resources, based on MWh savings. The credits will be issued to resources registered and participating in the ISO New England DR programs, based upon the MWh reductions monitored by ISO-New England.

Clever. This is a highly creative solution that combines energy efficiency and demand response resources in a single market structure to achieve specific environmental objectives. Electric suppliers and electric distribution companies are required to obtain 1 percent of their generation supply from Class III resources beginning January 1, 2007. This increases to 2 percent in 2008, then to 3 percent in 2009, and finally 4 percent in 2010.

Cost Effective. The State of Connecticut determined that extending the existing regional market infrastructure – the NEPOOL GIS -- was by far the most cost effective way to deliver and manage the Class III Program, rather than reinventing the wheel and creating a new parallel infrastructure. Class III Certificates will adhere to the same principles as all other Certificates issued in the NEPOOL GIS, particularly, that a single Certificate will be created for each 1 MWh of generation or load reduced.

National Progress – From the Bottom Up

As the underlying technology infrastructure provider for the largest mandatory markets (PJM GATS, NEPOOL GIS, Texas REC, and WECC WREGIS) my firm -- APX Inc -- has been in a unique position to observe the development of the nation’s REC markets since their inception. Today 22 states plus the District of Columbia have renewable portfolio standards in place, a number that is up from 18 just last year⁴. This number will continue to grow.

The cross-regional nature of the market participants has been an interesting development. If we sum the number of account holders in the three operating major regional markets (PJM GATS, NEPOOL GIS, and TEXAS REC; the WECC WREGIS system is still in the implementation phases) we see that today there are about 625 account holders in these market systems. This is the total count of the generation companies, load serving entities, and brokers/traders who participate in these markets. Some of these firms have multiple roles. For example, a utility can be both a generator and a load serving entity. Companies with multiple roles are represented in the list only once for each market. When you look at the number of unique account holders



across markets, the number drops to less than 400! The data show that more than 200 of the regional stake holders have cross regional interests in these environmental markets, and that's a significant fraction.

Table 1. Comparisons of Existing APX Environmental Technology Deployments

Programs and Capabilities	Texas REC	NEPOOL GIS	PJM GATS	WECC WREGIS
Tradable Certificates	√	√	√	√
RPS Compliance Reporting	√	√	√	√
Renewable Generation Verification	√	√	√	√
Non-Renewable Generation Verification		√	√	
Emissions Tracking – CO2, SO2, NOx	√	√	√	
Emissions Tracking – CO2, SO2, NOx, and CO, PM, VOC, Hg		√		
Verification of Marketing Claims	√	√	√	√
Energy Imports/Exports		√	√	√
System Operator Interface	√	√	√	√
Bulletin Board for Certificate Exchange		√	√	
Administrative Tools	√	√	√	√
Multi-State Account Management		√	√	√
Certificate Banking and Borrowing	√	√	√	
Customized Reporting	√	√	√	√
Energy Efficiency Certificates		√	√	
Voluntary Market Reporting	√	√	√	√
Certificate-Only Import/Export			√	√
Green-e		√		√
Standing Orders			√	√
Forward Transfers		√		√
Generation Self-Reporting	√	√	√	√
State Agency Interface	√	√	√	√
Load Data Verification		√	√	
Registry Billing		√	√	√

Table 1 summarizes the major functional capabilities of the PJM GATS, Texas REC, NEPOOL GIS, and WECC WREGIS technology deployments. Taken together, this infrastructure represents a rich capability for managing environmental commodities and generation information across North America's major regional markets.

Differences. Differing state and regional requirements have had important implications for the underlying REC market technology. The important differences have been related to the extensive jurisdictional complexity of the REC and all its attributes. What I mean by "jurisdictional complexity" is that a REC is a complex commodity that is applicable only in certain states and potentially limited to certain programs within a state. In addition, it has a long list of environmental and other attributes that may be associated with it. Learning to manage that complexity in software technology has been one of the keys to successful deployments of the market technology.

Similarities. Many similarities across market regions have emerged in certificate creation and retirement, certification tracking, transfers, and compliance reporting. The need to handle high volumes of certificates and transaction activity in a very cost effective manner has been important in each market, and a general “cost consciousness” has meant that the market regions have looked to leverage existing technology when building out new capabilities, rather than starting from scratch.

Trends

Allow me now to get out on the limb a bit, and make some observations regarding trends taking shape in the marketplace:

“REC” Markets Transitioning to “Environmental” Markets. With the creation of new environmental commodities, such as Connecticut’s energy efficiency and conservation certificates managed in the NEPOOL GIS, it is likely that states and market areas will increasingly look for logical extensions of the successful REC market infrastructure to manage additional environmental commodities to achieve their policy objectives. Could this extend to carbon allocations and credits in the future? Certainly the current technology infrastructure is in place to handle additional environmental commodities, and already tracks CO, CO₂, SO₂, NO_x, particulates, VOCs, and mercury emissions in some of the markets.

Fewer “Borders” for Environmental Commodities. Over time, it appears likely that REC market forces will first drive greater consistency in approaches within a regional market. At the same time, greater consistency across the regional markets will be driven by the desire of the larger generators, load serving entities, and consumers with cross-regional business to have greater fungibility of environmental commodities across markets. Jurisdictional complexity will remain a reality for years to come and in fact is likely to increase in the next several years as more states and control areas expand environmental policies. Market forces -- brokers, generators, and LSEs -- will be looking to increase their flexibility in the management of environmental commodities, and this means that they will be encouraging policy makers to iron out some of the differences with their neighbors on environmental policy. Some of the barriers to be cleared are made of paperwork. The American Bar Association is working with others in our industry on the concept of a standard national contract to facilitate the sale of RECs and related attributes. Other commodity markets have embraced the “standard contract”, which has proven to greatly streamline the effort – less time and less paperwork - involved in a transaction, so why not RECs?

Importance of “Trust and Integrity in the Environmental Commodity” Will Grow. Whether it’s a REC, an Energy Efficiency Certificate, avoided Carbon, other emissions or allowances, the integrity of the environmental commodity is essential for the development of effective markets. Brokers and buyers won’t participate in a market where the integrity of the underlying commodity can be called into question. For mandatory REC markets where there are state or regional policies, enforcement and penalties, and where nearly all of the data is metered, a solid foundation of market trust has been established. For voluntary markets and for the new commodities, such as energy efficiency and carbon related commodities, the role of trusted verification and certification entities, such as Environmental Resources Trust (www.ert.net) the Center for Resource Solutions (www.resource-solutions.org) among others, will grow in importance, as will the role of companies with specific technology or analytics, such as Sterling Planet’s energy efficiency approach (www.sterlingplanet.com). The technology implication for market systems is that the commodity, its pedigree, and its verification attributes need to be managed in a unified, transparent manner for market participants.



On the Hunt for Greater Price Transparency. Both buyers and sellers would like to have greater price transparency for their environmental commodities, including RECs. As with any maturing commodity market, that will happen over time as additional infrastructure develops and liquidity improves. Companies who are cross-regional market participants will want a cross-regional consolidated view of their portfolios of environmental commodities and positions.

The REC as a Bundle of Environmental Attributes. Increasingly, voluntary market buyers are asking sellers to quantify the avoided carbon that is associated with a REC, especially for the voluntary markets where buyers often purchase RECs for a social purpose that has multiple facets. A University buyer in the voluntary REC market, for example, wants to inform their stakeholders regarding the specific wind development project that was supported with the REC, how much carbon emission was avoided by that project (which can be approximated given the typical emissions footprint of generation in that state or area), and what was the national security benefit related to the amount this lowered our dependence on foreign oil. The fact that policy makers have differing and strong opinions on the relationship between RECs and carbon-not-emitted does not keep the University buyer from asking the question, and marketers/brokers from having to look for the answer.

Conclusion

The successful growth in the US mandatory REC markets over the last 7 years has been achieved with the thoughtful “watch and learn” attitude of state regulators, who have observed the successes of other states and learned from them to design programs to meet the needs and objectives of their own state. As a result, today a well proven, richly functional infrastructure is in place to create, track and manage RECs and related environmental commodities across the nation’s largest regional markets. This infrastructure will continue to expand in use around its original purpose – to manage RECS and generation-related information – but will likely be extended to handle new environmental commodities, like energy efficiency & conservation credits, and may play a cost effective role in supporting future greenhouse gas initiatives. No one knows what the future holds, but by all accounts you can expect continued double or triple digit growth in the markets for environmental commodities. I’ll bet you a REC.

Footnotes:

- 1 Renewable Energy Credits: A Success in Texas, Environmental Finance April 2000.
- 2 AWEA: Quarterly Market Report, Texas Overtakes California, September 2006.
- 3 Creating a Tracking System for Renewable Energy, Joe Kerecman, North American Windpower, May 2006
- 4 Emerging Markets for Renewable Energy Certificates: Opportunities and Challenges, Ed Holt and Lori Bird, National Renewable Energy Lab, 2005.