Strategic Information for the Climate Change Industry

CLIMATE CHANGE BUSINESS JOURNAL®

REPRINT

Volume IV, No. 6/7

Compliance Market for RECs Expected to Grow Strongly as RE Standards Ramp Up

Mandatory market for renewable energy certificates is on an upswing; voluntary market slows, but growing in double digits.

Renewable energy certificates (RECs) were first envisioned in the mid-1990s by policymakers in California and New England as a mechanism to measure electric utilities' use of renewable power if renewable energy mandates were to be adopted. Competitive electricity suppliers also saw a chance to distinguish their products with green attributes in markets then being opened to retail choice.

But the challenge of verifying fuel mix in lightning-fast spot markets presented a daunting obstacle until in 1997 one stakeholder "suggested that the fuel and environmental attributes be traded separately from the commodity," according to a report on RECs by Ed Holt and Lori Bird for the Department of Energy's **National Renewable Energy Laboratory** (NREL).

In the United States, unbundled RECs were first traded in Massachusetts in 1998 by **AllEnergy Marketing** whose Regen product was sold separately from electricity as a "renewable upgrade," according to Holt and Bird. Wholesale RECs were sold the next year in California—as "green tickets" unbundled from electricity—by the **Automated Power Exchange** (APX) which had set up trading infrastructure for the state's restructured electricity market. In 2000, APX launched a similar green product on its power exchange in the Midwest, according to a 2000 paper by Janis Pepper.

Market for Renewable Energy Certificates

Supply and demand dynamics make trading of renewable energy certificates (RECs) a challenging business. REC prices are trending down as supply increases, and forward pricing for solar RECs are declining sharply in some states. Price fluctuations aside, from generator to wholesaler, broker and buyer, the REC value chain is growing more robust.

California's power market then suffered its epic implosion, and more than 10 years later, some REC detractors highlight the fact that the stakeholder with the bright idea for unbundled RECs was the same one that fleeced California utilities and consumers: Enron. The Institute for Energy Research uses this tidbit in an attack on renewable energy mandates; So do anti-big business activists (seeking to discredit the "100% renewable energy" claims of large corporate REC buyers) and groups opposed to large-scale wind projects (seeking to undermine RECs as a revenue stream for wind power development).

While the early REC markets were never tainted by Enron-style manipulation, it must be acknowledged that RECs are vulnerable to misunderstanding and specious characterizations. Without energy market expertise, it's difficult to grasp just how "environmental attributes" of electricity can be sold separately from the electricity. Or how an IT firm headquartered in California can legitimately claim to be running on 100% green power when it's buying RECs produced by wind farms, landfill gas to energy plants and other renewable generators spread across the country.

Industry groups like the **Renewable Energy Markets Association** have good answers to these and other skeptical questions and the REC market is widely viewed as a sound one. Standards and verification procedures, registries and other market infrastructure have become progressively more robust—enabling sellers and buyers to trade with confidence and facilitating growth of the voluntary green power market from 12 million MWh in 2004 to 30 million MWh in 2009, according to NREL (1 REC equals 1 MWh). NREL, citing data from Lawrence Berkeley National Laboratory, estimates that state RPS policies collectively called for utilities to procure about

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CLIMATE CHANGE BUSINESS JOURNAL®

Vol. 4, No. 6/7 ISSN 1940-8781
June/July 2011

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Climate Change Business Journal® newsletter is published 8 times a year (includes 4 double issues) by Environmental Business International Inc., 4452 Park Blvd., Suite 306, San Diego, CA 92116. Phone: 619-295-7685 or email info@climatechangebusiness.com

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29.5 million MWh of new renewable energy generation, so this "compliance" market was roughly the same in volume in 2009. NREL thinks voluntary markets will be hard pressed to keep up: In 2010, RPS policies collectively called for utilities to obtain 52 million MWh, increasing to more than 100 million MWh in 2014.

Mandatory Market Expected to Outpace Voluntary Market as Utilities Strive To Meet RPSs

The REC market consists of two distinct segments. 1) the voluntary green power market in which individuals, businesses, institutions and governments purchase RECs as part of their clean energy and sustainability strategies; and 2) the mandatory or compliance market in which distribution utilities (also known as load-serving entities) purchase RECs to comply with their state renewable energy mandates (commonly known as renewable portfolio standards or RPS).

The voluntary green power market is actually three separate segments: utilities (more than 850 of them, according to NREL) that offer green power options to their customers; competitive electricity suppliers operating in states with retail competition; and marketers who sell RECs wholesale or retail. (See table on page 15.) The competitive electricity suppliers seek customers willing to switch from incumbent providers to their green power products (in some Northeast states, customers can buy all their electricity from green power marketers without switching from their distribution utility).

The main players in the REC Industry are mostly listed as providers on the top green power purchaser list on page 8 and include wholesalers that purchase RECs for resale, brokers that facilitate REC trades, REC marketers, renewable energy generators who originate RECs, and REC buyers. There are also attorneys who advise on REC contract design, as well as providers of market infrastructure such as registries, certifiers, and verifiers.

Both compliance and voluntary markets have been growing strongly, although the rate of growth in the voluntary market declined in 2009 to 17% (reaching 30 million MWh) after seeing 40-50% growth from 2005 through 2008, according to NREL as shown on the table on page 14. NREL estimates 1.4 million U.S. electricity customers voluntarily bought green power through utilities or competitive suppliers or voluntarily purchased RECs directly from REC marketers.

The **Center for Resource Solutions** (CRS), whose Green-e Energy program has become the de facto standards and verification body in the North American voluntary REC market, reported that in 2009, Green-e Energy certified RECs exceeded 18 million MWh, an increase of 43% from 2008, indicating the stonger growth of the voluntary market. CRS Director Jennifer Martin told CCBJ that CRS's 2010 data won't be complete until the third quarter, but preliminary analysis shows that growth was more on the order of 20%. (Some portion of CRS's growth, especially in 2009, can be attributed to the market growth for certified RECs and increasing use of certification by existing and new REC sellers, not just the growth of RECs themselves.)

Going forward, however, the compliance REC market is expected to outpace the voluntary REC market due to the scheduled annual increases in renewable energy requirements that distribution utilities face in states with renewable portfolio standards (RPS). "Both markets will grow but the mandatory market will grow faster," said Lars Kvale, managing director of **NYSE Blue**, which runs the majority of REC registries nationwide. NREL estimates the compliance market will reach 128 million MWh in 2014, or roughly three times the volume today, driven by the rates of increase in RPS requirements.

Data on REC pricing and mar-

ket value is elusive because most REC transactions are over-the-counter (OTC) with prices known only to the counterparties. For solar RECs (SRECs) created by states, mostly in the Northeast, that incorporated solar "carve-outs" in their RPS requirements, there are two online auction platforms that disclose pricing data—SRECTrade and Flett Exchange—but OTC transactions are common in that market as well.

Some pricing trends for different classes of RECs can be seen in sample data from brokers **Evolution Markets** and **Spectron Environmental** as well as periodic disclosures in utility commission proceedings, but there are scores of different compliance and voluntary REC products and aggregation of gross value of the REC trade has not been done, at least not publicly. "I don't know anyone who's doing it," said Martin of CRS.

Prices for voluntary RECs are generally much lower than those for compliance RECs—voluntary RECs waver around the $1-2 mark, non-solar compliance RECs are often in the $20-40 range but can be as low as $1 and solar RECs mostly range $200-500—but the two markets are complementary and tend to follow similar price curves. Pricing for most types of RECs has been trending down since 2009 due to increased supply—stemming from the incentives to renewable energy developers provided by the Recovery Act funding and the grant-in-lieu of investment tax credit—and decreased demand as the Great Recession curtailed industrial renewable energy purchases.

"With the economy softening, electric generation was down which has enabled load-serving entities to hit their renewable targets with fewer RECs," said Steve McDougal, vice president for marketing and business development for **3Degrees**, one of the leading REC wholesalers in North America. (See profile on page 42.)

"In the very near term, we're seeing that continue," said McDougal, noting that stimulus funding is still priming the renewable development pump and that the ITC grant is valid through December 31, 2011. According to McDougal and other market participants, continuing economic recovery will translate into renewed load growth—and greater demand for RECs from compliance buyers.

"Among voluntary buyers, we've seen just a little bit of a slowdown in terms of brand new commitments but we we've seen companies who have made commitments in the past continue purchasing RECs, or increasing their purchases, in order to realize some of their sustainability goals," said McDougal.

2010 State Renewables Portfolio Standard (RPS) Developments

CA: Increase of RPS to 33% by 2020 under development

CO: Increased RPS to 30% by 2020; adopted new DG set-aside requiring 3% by 2020 (50% must be retail) replacing solar set-aside

DE: Increased RPS to 25% by 2025; raised solar target to 3.5% by 2025; ended blanket exemption for munis and coops

IL: Added interim targets for solar set-aside (2012-2015, IOUs only)

MA: Developed regulations for solar set-aside, including annual SREC auction

MD: Accelerated early-year targets for solar set-aside; raised solar ACP

NJ: Increased and extended targets for solar set-aside to 5,316 GWh by 2025; requires rolling 15-year SACP schedule; automatic solar target adjustment

NY: Increased RPS to 30% by 2015; augmented funding

General Trends in New/Revised RPS Programs

- Increased stringency of RPS purchase targets
- Expanded applicability to POUs, with greater leniency often provided
- Expanded use of more-aggressive solar/DG set-asides

State RPS Policies Feature Significant Design Differences

- Renewable purchase targets and timeframes
- Entities obligated to meet RPS, and use of exemptions
- Eligibility of different renewable technologies
- Whether existing renewable projects qualify
- Treatment of out-of-state generators
- Whether technology setasides or other tiers are used
- Use of credit multipliers for favored technologies
- Allowance for RECs, and REC definitions
- Methods to enforce compliance
- Existence and design of cost caps
- Compliance flexibility rules, and waivers from compliance
- Contracting requirements and degree of regulatory oversight
- Compliance filing and approval requirements
- Compliance cost recovery
- Role of state funding mechanisms

Source: Ryan Wiser, Lawrence Berkeley National Laboratory, State of the States: Update on RPS Policies and Progress

Solar RECs Priced at Steep Premium, But Declines Began in Q2 2011 Due to Rapid Growth in Solar Capacity

As described in CCBJ's April/May 2011 Solar Energy III edition, the prices for Solar RECs (SRECs) are much higher than those for RECs from wind and other renewables: generally from $200 to $650.

This is due to the fact that most Northeastern states require distribution utilities to use a specified portion of solar energy annually within their RPS—or face a stiff alternative compliance penalty (ACP).

Each state has different compliance rules, and they're quite complex in most cases: how in-state generation is credited vs. out-of-state generation; whether out-of-state generation must be in the same electricity balancing area; how ACPs are calculated; what authority regulators have to lower ACPs or make other program changes based on market conditions.

According to market participants and data posted online by SRECTrade and Flett Exchange, most SREC prices declined significantly in the second quarter of 2011. This was due to the rapid pace of investment in solar projects—a wave of development brought on in large measure by high SREC prices. "SREC programs have been so successful (maybe too successful) at promoting solar adoption that they have dramatically reduced the potential financial benefits going forward," wrote CleanTechnica.com in June 2011.

In New Jersey, the effect has been most dramatic. Anticipating a large increase in supply of SRECs starting in 2012 from projects coming online in 2011 forward pricing has declined sharply. Flett Exchange shows New Jersey SRECs for compliance in the state's June 2011-May 2012 year dropping to about $450 in April 2011 from $650 for current-year SRECs. Other market participants told CCBJ that New Jersey 2012 SREC pricing had declined to $300 in June 2011.

"For years going forward, it's clear that there will be oversupply in New Jersey, or at least much more abundant supply than had been anticipated," said Tauna Szymanski, senior associate in **Hunton & Williams**' Climate Change Law and Policy Practice. Szymanski said the New Jersey market was rattled by a Board of Public Utilities report in May showing "massive, massive growth in the pipeline of projects coming forward." To allow market participants to better anticipate the supply-demand balance, the Board of Public Utilities intends to require developers to obtain approval for a project's SREC eligibility before breaking ground. "That should provide more advance information about oncoming supply and hopefully avoid this kind of price crash," according to Szymanski.

Compliance Market Moves Towards Long-Term Agreements

Such fluctuations have been experienced in the broader REC market, although less dramatically because of the much lower prices for non-solar RECs. It's something that market participants say comes with the territory.

"Because building a new renewable energy facility can take a few years, the REC market is kind of clunky in terms of its ability to find a supply-demand equilibrium point," said Jay Carlis, vice president, retail division, for **Community Energy** and president of the trade group **Renewable Energy Markets Association**. "If demand is really pushing up and prices are going up, more projects are getting into the queue looking to get built. Then there may be a short-term glut of supply, prices will go down and projects will be shelved or won't come online. As demand begins to outstrip supply, the cycle begins again."

In June 2011, **Idaho Power**, which sells RECs from its owned wind farms, reported the Oregon Public Utility Commission that REC demand on the spot market had become so weak that it hoped—with commission approval—to sell RECs under long-term contracts to investor-owned utilities.

"Idaho Power said it had found that most of the compliance market has moved toward acquiring long-term agreements for RECs through RFPs," according to the June 21, 2011 Energy Prospects newsletter. "This would require committing the credits for up to five years … longer than the two-year term it currently uses, and freighted with some regulatory risk, were a federal renewable energy standard to be implemented in the near future." Citing U.S. Department of Energy, the newsletter reported that Public Service Co. of New Mexico and California's Pacific Gas & Electric had recently closed REC requests for proposals (RFPs).

REC Prices Are a Key Metric for Project Developers

For developers of new renewable energy projects, the forward price of RECs is a key metric for their project's rate of return. Wholesalers like 3Degrees and Community Energy sign many forward REC contracts, typically for three to five years but sometimes for as long as 15 years, that give project investors a predictable REC revenue stream.

Wholesalers as well as brokers and consultants also bring expertise to the table, helping renewable energy project developers with little REC market experience figure out what their RECs are worth and where they're valid for compliance. According to Kvale of **NYSE Blue**, the firm's Environmental Management Account software service also offers developers such expertise. "The rules of the different RPS programs are built into the software and updated regularly," he said. "Based on fuel type, project type, location, when the power was generated and other criteria, EMA can help you understand which market your RECs may qualify for."

Since wholesalers take on ownership of RECs and the inherent risks, they need intimate knowledge of market dynamics. According to Szymanski, change-in-law provisions are among the most contentious clauses to negotiate in REC purchase agreements. "What happens if there's a federal renewable energy standard or clean energy standard? How do the counterparties' obligations change if

a state changes the alternative compliance payment or adopts new requirements for meters? Who's responsible if all the registries merge and the generator has to pay a fee to re-register? There are a million issues that could come up."

The Dodd Frank Wall Street Reform and Consumer Protection Act has the potential to impact the REC market in rulemaking that's still underway, according to Szymanski.

Compliance Market Driven By State RPS Requirements

The compliance REC market is entirely driven by state RPS requirements; even the product set is determined by state regulations, with RECs categorized by state-designed classifications for the type of renewable resource and vintages for the compliance year. Most of the 30 states with RPS requirements (that includes the District of Columbia) have increasing targets, so unless governors or legislatures amend targets, the renewable energy industry can expect significantly increasing demand for RECs.

Market participants report that some additional states are considering adopting RPS's, although CCBJ was unable to confirm the information. "I've heard anecdotally that some states traditionally opposed to renewable energy requirements are starting to see a lot of potential economic benefits and jobs from supporting in-state solar energy," said Carlis. "It wouldn't shock me to see states that we currently think are not interested in renewable portfolio standards to find other reasons to support [such policies] and new ways of doing it."

Until 2010, many industry observers expected Congress to pass a federal renewable energy standard, such as that embodied in the Waxman Markey climate bill that passed the House in 2009. A clean energy standard embracing nuclear and cleaner coal was seen as a possibility under the current Congress—until the Japanese tsunami and nuclear disaster made nuclear power more difficult for federal legislators. Carlis estimates that it will be at least two years and as many as five before a federal renewable energy standard will have a good chance of passing Congress.

But as discussed above, market participants still have to be vigilant for pending changes in state regulations. "There is a history of states changing rules and requirements," said Kvale.

As shown on the list assembled by Ryan Wiser of Lawrence Berkeley National Lab on page 13, RPS program changes in 2010 were extensive, with a general trend toward increased stringency of targets and expanded use of solar and

How the REC Market Works

A renewable energy certificate (known as a renewable energy credit in California) represents the environmental attributes of 1 MWh of renewably generated power. Most RECs are *unbundled*, i.e., traded separately from the underlying electrical energy. The electricity, once stripped of its REC, is then considered non-renewable power and assigned average emissions characteristics. RECs provide renewable energy generators with revenue separate from their power sales.

RECs are sold directly by the generator to a wholesaler, or by a broker or marketer on the retail market. Buyers include voluntary purchasers such as corporations or institutions with environmental commitments, distribution utilities that are required to comply with state renewable portfolio standards (RPS), distribution utilities that provide green power options to their customers and green power marketers that sell renewably generated power directly to electricity consumers.

Voluntary buyers retire their RECs in order to make environmental performance claims, while utilities submit proof of retirement to state regulators to demonstrate compliance. Compliance buyers must follow specific state rules for REC eligibility, which include requirements for type of generation, location, year generated, and other criteria. As a result, compliance RECs are classified and priced as distinct commodities, for example: New Jersey distribution utilities must source proportional amounts of solar RECs, class I RECs (generated with wind, landfill gas, fuel cells, etc.) and class II RECS (hydropower <30MW and waste-to-energy facilities). Retailers usually aggregate voluntary RECs from multiple generators in different locations using different fuel types (i.e., wind, hydro, landfill gas, solar, etc.).

Most RECs are tracked and verified by regional REC tracking systems linked with independent system operators or other electricity market monitors. For example, in the Midwest, PJM runs the PJM Generation Attribute Tracking System; in the West, the Western Electricity Coordinating Council maintains the Western Region Electricity Generation Information System. These systems track RECs as they're generated, and the REC owners, who are participants in the tracking system, can transfer them to purchasers who can then move them into retirement accounts to demonstrate compliance with a state mandate, or to demonstrate delivery to a voluntary retail customer.

Sales of voluntary RECs are tracked and verified by independent third parties, most commonly the **Center for Resource Solutions**' Green-e Energy program. Green-e Energy relies on tracking systems, as well as audit procedures to assure that consumers, who generally do not have REC tracking system accounts, are receiving the RECs they purchase from sellers, be they distribution companies, REC marketers or competitive green power suppliers.

distributed generation mandates. But even regulatory fine-tuning can affect the markets. For example, in December 2010 New Jersey's Board of Public Utilities removed a 2 MW cap on solar projects, a move that will make it more difficult for developers of small projects to compete, according to Szymanski.

Shifting stakeholder perspectives can lead to further changes in an RPS, either through legislation or regulatory changes. Kvale points out that after the Manomet Center for Conservation Sciences published its critical study on the future biomass power in Massachusetts, state regulators began considering restricting the use of biomass for renewable generation—a move that could increase demand for other forms of renewable power.

California Starting to Apply Some Flexible Rules to RECs

In terms of new regulations affecting RECs, the big news in 2011 is that California regulators have begun allowing utilities to use unbundled RECs for up to 25% of their RPS obligations, with no cap on usage after 2013. The rules require that the RECs be generated in the Western Electricity Coordinating Council (WECC) territory by facilities that are certified as qualifying renewables by the California Energy Commission.

An early example of how this changes the California market: **Pacific Gas and Electric Co**. won utility commission approval in January 2011 for a 20-year contract for RECs from 150- and 300-MW wind farms in Alberta owned by Greengate Power.

Southern California Edison's Director of Contracts Mike Marelli told CCBJ that the utility is considering unbundled REC contracts in its pending renewable energy solicitation. "We haven't executed any REC-only transactions to date, but we may on a go-forward basis if RECs are more cost effective and offer a higher value," he said.

According to Marelli and REC market participants interviewed by CCBJ, much remains to be clarified about the California REC market because rulemaking is still pending for the legislation passed in spring 2011 that raises the RPS target for 2020 to 33%. (California's earlier 33% target was only an executive order.)

"It's not going to get sorted out until the commission finishes its rulemaking for the 33% RPS," said Brad Bowery, CEO of SRECTrade. Bowery advocates that the CPUC include a solar carve-out as New Jersey and other states have done. "It's currently designed as a generic REC market, so it will be saturated by RECs from wind and hydro projects that can offer a lot of capacity, and without solar carve-out provision it will be very tough for solar to access that market."

According to Bowery, to compete in a future California market—even one without a specific solar carve-out—SRECTrade is looking to aggregate multiple solar PV projects into one consolidated offering that would appeal to California utilities looking for large amounts of RECs. "We're already getting started with our first couple of megawatts currently signing up. We're going to work with mid-tier solar developers that have lots of projects."

Voluntary Market Healthy as Sustainability Becomes Core To Business

As mentioned above, the voluntary green power market is three segments: utilities offering green power options to their customers; competitive electricity suppliers marketing green power; and marketers who sell RECs wholesale or retail. (See table on page 14.)

The voluntary green power market is dominated by commercial sales of RECs. In 2009, this accounted for 18.7 million of the voluntary market's 30 million in sales, measured in MWh. Most of that volume is purchased by large corporations such as Intel, Kohl's Department Stores, Whole Foods Markets, Starbucks and Johnson & Johnson, as well as governments such as the state of Pennsylvania, District of Columbia and the cities of Houston and Dallas. (See list of top green power purchasers on the table on page 8 from the Environmental Protection Agency's Green Power Partnership) But it also includes lots of small businesses.

3Degrees' McDougal says that although his firm is known for selling RECs by the thousands to firms such as Starbucks and Safeway, "we also have current buyers of 10 RECs, which is what a larger house might use in a year."

As discussed above, most REC market observers say the compliance side of the market will outpace the voluntary side going forward as state RPS requirements ratchet up. But the voluntary market—made up mostly of large energy users whose fuel mix for power is not explicitly regulated—looks to be vibrant for many years as well.

"In the corporate world, the idea is becoming pervasive that sustainability isn't one of the things you do as an option. It's core to your business," said McDougal. He noted reports from Ernst & Young that showed resolutions focused on social and environmental issues now make up the largest percentage of shareholder resolutions.

While 2011 is still a buyer's market for labor, McDougal expects that a more competitive job market will find employers facing more pressure from prospective employees to demonstrate their green credibility. "People want to work for companies that have a soul. A Harris Interactive survey found 63 percent of full-time workers believe a company's impact on the environment is vital in evaluating a workplace."

While these concerns may be most prevalent on the West Coast and in the

Annual Green Power Sales by Market Sector, 2005–2009 (Millions of MWh)

	2005	2006	2007	2008	2009	2006 g	2007 g	2008 g	2009 g
Utility Green Pricing	2.5	3.4	4.2	4.8	5.2	36%	24%	14%	8%
Competitive Markets	2.2	1.7	3.2	5.3	6.2	-23%	88%	66%	17%
REC Markets*	3.9	6.8	10.6	15.6	18.7	74%	56%	47%	20%
Retail Total	8.6	11.9	18	25.7	30.1	38%	51%	43%	17%

Source: National Renewable Energy Laboratory; Green Power Marketing in the United States: A Status Report (2009 Data); Includes sales of new and existing renewable energy.
** Includes only RECs sold to end-use customers separate from electricity.*

Northeast, McDougal says 3Degrees voluntary REC customer base is spread nationwide. He cites one customer, Better World Books in Indiana, that buys RECs as part of its corporate sustainability program.

According to McDougal and others, the credibility of the voluntary REC market has been enhanced with the emergence of **Center for Resource Solutions**' Green-e Energy certification program and label. "There used to be more certifiers, but since 2003 there has definitely been a flight toward Green-e," he said. "All the large buyers require Green-e. They've done a good job and it's ultimately a good thing for the market to move toward one standard." (Compliance RECs are registered on regional registries; see box on page 10 for more on REC tracking and certification.)

Green Power Wholesalers Add Value to Utility Programs

In roughly half the United States, utility electricity customers have the option to purchase green power, either directly through a green power marketer or from their utility. Entrepreneurial REC wholesalers supply much of this green power. One leading firm is **Community Energy**.

According to Community Energy's Jay Carlis, the firm started selling RECs from Pennsylvania wind farms in 1999. Expanding first into New York and New Jersey, the firm had 200 MW of wind capacity in its REC portfolio in 2006. After expanding into wind power project development, Community Energy was acquired by Spanish energy giant **Iberdrola**. "After building out our pipeline, we spun out of Iberdrola in 2009 to focus more on solar development, although we still do some wind development," said Carlis.

Marketing green power has been a consistent focus throughout the firm's history, and today Community Energy has utility and competitive supplier green power programs in 22 utility territories in the Northeast and Midwest. For some customers, the firm develops the utility's marketing program, deploying customer service reps and call center service in addition to procuring and delivering RECs. Clients in this category include upstate New York distribution utilities NYSEG and Rochester Gas & Electric for whom Community Energy runs the Catch The Wind green power program.

As discussed in the profile on page 39, Community Energy's competitor 3Degrees has similar relationships with utility green power customers.

"At the other end of the spectrum, there are straight wholesale REC deals where there's a utility or a competitive supplier that needs RECs to supply its own green power program," said Carlis. "There are also programs that are managed by the utility commissions. The New Jersey Board of Public Utilities has a program with three different suppliers customers can choose from. National Grid has a similar program, and Connecticut has a program that has two suppliers chosen under RFP by the utilities in conjunction with regulators."

According to NREL, residential customers bought 7.2 million MWh of green power from utilities and competitive suppliers in 2009, while non-residential customers purchased 4.2 million MWh (the non-residential segment doesn't include bulk REC purchases which as noted above tallied 18.7 million MWh).

Retail price premiums averaged 1.75 cents per kWh, and the average consumer spent $5.40 per month above standard electricity costs, according to NREL. Growth slackened significantly for the utility side of the market, which was flat at 550,000 customers. The competitive supplier segment added 340,000 new customers to reach 830,000 total customers. Most of that growth was in Texas. The Texas market has seen dramatic growth in the number of green power offerings and participants in recent years," notes NREL in its 2010 Green Power Marketing report. "The number of green power offerings in Texas has increased from 4 in November 2005 to 50 as of February 2010.... In 2009, participation in the Texas competitive market was likely more than 500,000" electricity consumers.

Carlis acknowledges that consumers' interest in green power has tended to wane in the Great Recession: "We're asking them to pay a premium after all. In the 2008-2009 recessionary time period, these programs did not do as well as they had done in previous years," he said.

"Greater policy issues and current events also have an impact. The BP oil spill, violence in the Mideast, gasoline prices going up, all these things remind people that a fossil-fuel based energy future is unsustainable and that it's worth paying a little extra to bring more renew-

able energy to the grid," said Carlis. "When these kinds of topics are front and center we see slightly better responses."

But in mature green power markets, saturation also occurs and firms like Community Energy need to acquire new contracts to grow. "Our mass-market residential business will grow much more rapidly if we can add new programs," said Carlis. "With Catch The Wind, for instance, we're only marketing within NYSEG and RG&E territories. We've been doing it for about 10 years and the program isn't growing as fast today as it did in the beginning, no doubt about it."

A 2011 random survey of 1,000 utility customers by **EcoAlign** (a business unit of **DEFG LLC**) revealed that there are still large reservoirs of potential customers for green power. When asked which two new services—among the eight listed—residents would choose from their distribution utility or competitive energy supplier, 50% chose "solar programs" and 31% picked "green pricing." "Our research is beginning to point to increased levels of consumer engagement and a willingness to consider different options including premium services and pricing opportunities," stated Nat Treadway, DEFG managing partner.

Carlis says that environmentalist NGOs are often strong cheerleaders for green power programs. The NGOs avoid endorsing specific suppliers, but their support for locally produced power can benefit a firm like Community Energy that sources in-state power.

"We work with the Clean Air Council in the Greater Philadelphia area, and they are emphatic about their support of not just green power but Pennsylvania green power," he said. "There are plenty of companies in Pennsylvania, a recently opened competitive market, that are offering so-called green products but they're buying the least expensive national RECs from Texas, Nebraska and other places."

Carbon and RECs

In the voluntary market, generation that qualifies as having been built in response to or incented by the prospect of selling GHG reductions (they're called "additional" facilities) can sell carbon offsets or RECs. Some REC buyers prefer carbon offsets from these facilities because they can apply the GHG reductions to nonelectricity-related emissions sources, such as transportation and direct combustion of fossil fuels. "If any legitimate certifier was going to certify tons of emission reductions from a renewable energy facility in the U.S., they'd need to assure than any RECs associated with that generation were retired," said Martin of CRS. "You have to choose: do you want to sell tons or megawatt-hours."

Facilities that choose to sell GHG offsets "may think that there's more value in them for selling tons than in selling RECs. In some cases, these facilities were developed in concert with a company that wanted to sell offsets from renewable energy facilities, and they already had an off taker, an entity that wanted a lot of voluntary carbon offsets."

Lori Bird of NREL points out that the Regional Greenhouse Gas Initiative mandates that allowances are paired with RECs submitted from voluntary REC purchasers and both are retired. If a company makes a voluntary purchase of RECs from a renewable generator or a marketer in a RGGI state, they can submit evidence of the REC purchase to the state which will then retire an equivalent allowance that would have otherwise gone to a regulated entity, according to Bird. "In effect, it reduces the RGGI cap for the state and potentially the emissions from the power sector." Given how long the RGGI market has been, there may be little practical effect, however. ☼

3 Degrees Sees Steady Growth In RECs to Stimulate Renewable Energy Generation

As a wholesaler/retailer of renewable energy certificates, 3 Degrees takes title and can offer long-term price guarantees.

3 Degrees is ranked at the top of the Renewable Energy Credit (REC) and carbon offset markets in North America by energy and environment trade publications, and the U.S. Department of Energy has designated the San Francisco firm one of a handful of non-utility green power suppliers of the year—every year since 2007.

Green building is the "most exciting and dynamic segment of the voluntary market now," said McDougal.

3Degrees was founded in 2007, but CEO Dan Kalafatas founded the REC marketing division of 3 Phases Energy in 2002 before spinning off 3Degrees in 2007—with four of the firm's current five-member management team. "We're sort of the old men and women of this relatively young industry," said Vice President for Marketing and Business Development Steve McDougal.

"Since 2002, we've seen steady and at times explosive growth in the popularity of the REC as a mechanism to help stimulate more renewable generation." 3Degrees has more than 50 employees today, adding seasonal workers as needed for green power outreach campaigns.

According to McDougal, the REC space includes three distinct markets. "One is the compliance market for 30 states that have set renewable portfolio standards that are tightening and evolving over time," said McDougal. "Another is utility green power pricing programs. Roughly half of all Americans have some

access to a green power option through their utilities."

In the utility green power market, 3Degrees' role can range from simply supplying RECs to meet a load-serving entity's green power demand from customers to partnering with the utility to develop and market a green power program. In June 2011, the firm was advertising for part-time outreach workers ($10/hr plus commission or bonuses) to staff tables at storefronts and events and go door-to-door seeking green power customers in Oregon and Utah for Pacific Power and in Washington for Puget Sound Energy.

"The third major pillar is the voluntary REC market, the Starbucks and Whole Foods of the world who are buying RECs to help achieve sustainability goals," said McDougal.

In the industry taxonomy of the REC and carbon offset market, 3Degrees is a wholesaler and retailer, not a broker, project developer or investor. The firm takes title to RECs and carbon offsets and markets them using a wide variety of sales contracts.

3Degrees deploys proprietary algorithmic trading and portfolio management software to manage its portfolio in the complex and ever-changing markets. "Ultimately we manage a very large book of different environmental commodities from projects that we've made commitments to," said McDougal.

While 3Degrees doesn't disclose sales volume or revenue, it is clearly a top player in the REC and carbon markets. In 2010, the firm launched an internal *Research, Strategy, and Analysis* division to track and analyze U.S. renewable energy and carbon markets, calculate the firm's own risk profile, decipher and forecast market trends, state and national regulatory policy and to perform "selective regulatory advocacy," according to its website.

Leading Player Reflects on REC Market

3Degrees has more than 50 employees and is a leading player in the REC and carbon markets. On the supply side, it signs long-term REC purchase contracts with renewable generators. On the sell side, customers range from utilities and large corporate buyers to small businesses that purchase 10 RECs at a time. Recession and stimulus spending have softened REC pricing, but growth in REC trading remains steady.

On the supply side, 3Degrees signs long-term REC purchase contracts with renewable generators, and McDougal says the firm makes hundreds of such commitments annually. "We guarantee these projects a price they can bank on," he said. "That's an important distinction from what a broker can offer."

On the sell side, 3Degrees' customers range from investor-owned and publicly owned utilities and large CSR buyers such as Starbucks and Safeway to small businesses that purchase as few as 10 RECs at a time. (One REC is one MWh.) The market is highly competitive, with sellers like **Element Markets**, **Community Energy** and **Sterling Planet** competing for REC buyers. Energy companies, independent power producers, financial firms and even public power entities also play in the market. (See chart of top green power purchasers and their providers on page 8.)

McDougal says 3Degrees' longevity and track record give it an edge. "Our customers know they're dealing with a team that's been in this market for nearly 10 years and that knows this market very well."

Compliance-oriented buyers look primarily for reliability in supply and pricing, said McDougal. "We have partners who want to know we can provide them the RECs they need to help them meet their RPS obligations and that we know the markets well enough to advise them on what's coming in and around their region," he said. "This is expertise we've developed by participating in this market, making transactions on a daily basis both in the voluntary and RPS markets."

Supply & Demand Balance Softens REC Pricing

Each state's annual requirements for renewable generation are public, and this sets a baseline for future demand projections. However, changes in state policies can and do impact the market. A major question hanging over the market now is what rules California will adopt for its stated intention to let utilities to use out-of-state RECs for their RPS compliance.

In the last 18 months, the REC market has seen declining prices due to increased supply (courtesy of Recovery Act funding and the grant-in-lieu of investment tax credit for renewable energy projects) and decreased demand as the Great Recession curtailed industrial electricity usage. "With the economy softening, electric generation was down, which has enabled load-serving entities to hit their renewable targets with fewer RECs," said McDougal.

"In the very near term, we're seeing that continue," said McDougal, noting that stimulus funding is still priming the renewable development pump and that the ITC grant is valid through December 31, 2011. Renewed load growth should accompany an economic recovery, but it's too early to say when that will occur, according to McDougal.

"Among voluntary buyers, we've seen just a little bit of a slowdown in terms of brand new commitments, but we've seen companies who have made commitments in the past continue purchasing RECs to realize some of their sustainability goals," said McDougal.

While compliance RECs are commodities with their worth attached to

the buyer's mandatory renewable targets, voluntary buyers will often put value on a certain flavor of REC that resonates with their brand or is located in their market territory. McDougal reports that HostGator, a web hosting customer in Texas wanted to make sure they were supporting projects in Texas, while prAna, a yoga, climbing and sports apparel company, wanted to buy windpower RECs to resonate with their brand name, which means "breath" in ancient Sanskrit. "These are the kinds of things that people can create with RECs. In addition to the positive impact of the commodity itself, there are ways to tighten the bond between what they're doing to procure clean energy and what their company stands for."

A relatively new segment of demand for voluntary RECs is coming from building owners seeking to achieve LEED certification for existing buildings-operations and maintenance (EBOM). "That is the most exciting and dynamic segment of the voluntary market now," said McDougal. The U.S. Green Building Council gives from one to six points to applicants for demonstrating that they are buying RECs to match from 25% to 100% of their electricity demand.

While the commercial development market has been slow for several years, demand for LEED EBOM is strong according to McDougal. "We've seen a surge in class A office buildings seeking to achieve LEED certification," he said.

"More tenants want green buildings. I hear this from property managers all the time. Especially in this difficult market, they want whatever kind of differentiation they can get." McDougal advocates that USGBC require a longer performance period than the current two year minimum. "Commitments of five years would send a strong demand signal to the renewable energy market. It's our understanding that such a requirement is under consideration by the USGBC." ☼