

# RPS in Texas - Lessons Learned & Way Forward<sup>1</sup>

by

Gürcan Gülen, Michelle Michot Foss, Ruzanna Makaryan, Dimitry Volkov  
Center for Energy Economics, Bureau of Economic Geology, University of Texas at Austin  
1809 Allen Parkway, Houston, TX 77019  
713-654-5404 (o), 713-654-5405 (f), [gurcan.gulen@beg.utexas.edu](mailto:gurcan.gulen@beg.utexas.edu)

## Abstract

Most states have been supporting the expansion of renewable energy via mandates or requirements, known as Renewables Portfolio Standard (RPS), and have created markets where Renewable Energy Certificates (RECs) can be traded. Typically a REC represents one MWh of metered power produced by a renewable generator, and has a unique serial number and usually is valid in a specific jurisdiction. Although there are voluntary markets for RECs, markets created by policy are significantly larger. States generate incentives for REC markets by either requiring utilities to produce a certain amount of their power from renewable sources or retailers to supply a certain percentage of their markets with electricity produced from renewable sources. In competitive electricity markets like that of Texas, where even the residential users can choose their electricity supplier, creating demand for renewable energy through the retail providers appears desirable and useful. By relieving buyers of renewable electricity from the obligation of arranging for physical delivery of such power, RECs promote a greater demand for electricity generated from renewable sources.

Based on the success of the RPS program as manifested by the early satisfaction of 1999 RPS requirements, the Texas Legislature expanded the RPS goals of the state significantly in 2005. The goal for 2015 is already met. Despite this positive and encouraging record, the RPS program and the REC market in Texas went through cycles and revisions, offering valuable lessons. Also, going forward, there are several issues that need to be resolved. This paper summarizes some of the findings of our interactions with various RPS stakeholders in Texas.

## Background

More than half of the states in the U.S. (as of May 2009) have been supporting the expansion of renewable energy via mandates or requirements, known as Renewables Portfolio Standard (RPS). Figure 1 provides a summary of these programs. Currently, the U.S. Congress is working on a federal version with several bills under discussion.

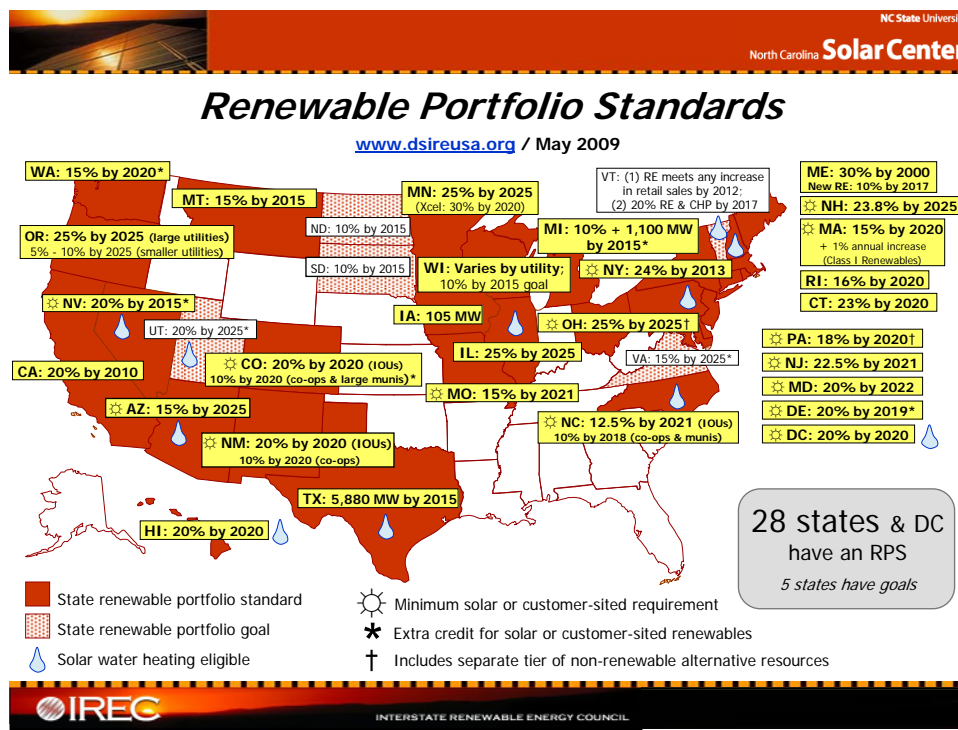
Existing state-level mandatory RPS programs are estimated to cover 46% of total electricity sales in the U.S. (programs announced by the end of 2007). About 60 gigawatts (GW) of new renewable capacity is needed by 2025 to comply with the

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<sup>1</sup> The content of this paper is based on work sponsored by the State Energy Conservation Office.

mandates. This requirement translates into an estimated 4.7% of total U.S. sales in 2025, and 15% of demand growth between 2007 and 2025.<sup>2</sup>

Figure 1 – RPS programs in the U.S.



Most states with an RPS program have created markets where generators or retailers trade Renewable Energy Certificates, or Credits, known in short as RECs, or green tags. The federal version too will have REC trading. As a market-based mechanism, REC trading is expected to allow meeting renewables goals most efficiently. A REC represents one MWh of metered power produced by a renewable generator, which has to be certified as such by organizations such as Environmental Resources Trust and the Center for Resource Solutions (Green-e) among others. Each REC has a unique serial number and usually is valid in a specific jurisdiction. With the federal RPS, nationwide REC trading should be available.

Some RECs are exclusive for generation by a renewable resource; others acknowledge environmental attributes associated with renewable generation such as reduced emissions from displaced fossil fuel generation. The latter is the definition by Green-e, which is the largest certifier in the nation.

A particular concern with the latter definition (or some interpretations of this definition), and associated trading practices, has been double counting of benefits such as emissions reductions. New renewable generation may displace fossil fuel generation, which will then lead to emissions reduction. Ownership rights of this

<sup>2</sup> Estimates from *Renewables Portfolio Standards in the United States: A Status Report with Data Through 2007*, LBNL, April 2008.

reduction need to be clearly defined and RECs associated with those rights should be traded in the market accordingly.<sup>3</sup> Otherwise, both the renewable generator and fossil fuel generator can claim rights and try to trade associated RECs. The regulators with input from market participants and industry have been developing procedures to address this concern.

Although there are voluntary markets for RECs, markets created by policy are significantly larger. States generate incentives for REC markets by either requiring utilities to produce a certain amount of their power from renewable sources or retail electric service providers to supply a certain percentage of their markets with electricity produced from renewable sources. In competitive electricity markets like that of Texas, where even the residential users can choose their electricity supplier, creating demand for renewable energy through the retail providers appears desirable and useful. By relieving buyers of renewable electricity from the obligation of arranging for physical delivery of such power (which would be geographically and technologically impossible for many customers connected to large grids), RECs promote a greater demand for electricity generated from renewable sources.

As a result of these RPS programs creating incentives for trading, large players including institutional investors such as hedge funds became interested and trading of RECs has expanded significantly in recent years. Most significant increase in sales of green power occurred through REC markets, increasing from 660 GWh in 2003 to 1,720 GWh in 2004 and 3,890 GWh in 2005 according to the National Renewable Energy Laboratory (NREL). Non-residential customers accounted for almost all of the REC sales; accordingly, the number of customers in REC markets is much smaller than those in programs run by utilities such as green pricing or retail products offered in competitive markets.<sup>4</sup> NREL also expects REC sales nationwide to reach \$900 million by 2010, as compared to less than \$200 million in 2004.<sup>5</sup>

But REC prices have not been universally helpful across jurisdictions (Figure 2). REC prices around or below \$10 as seen in Texas, Maryland, New Jersey (Class 1) and DC are not strong signals to developers of renewables capacity. On the other hand, prices in Rhode Island, Massachusetts and Connecticut have been quite high, albeit highly volatile in the case of Connecticut. These differences reflect the design of RPS programs (e.g., aggressiveness of goals and definition of resource eligibility) and availability of resources. For example, Texas benefited greatly from the large potential of highly prospective wind resources, especially given the fact that wind

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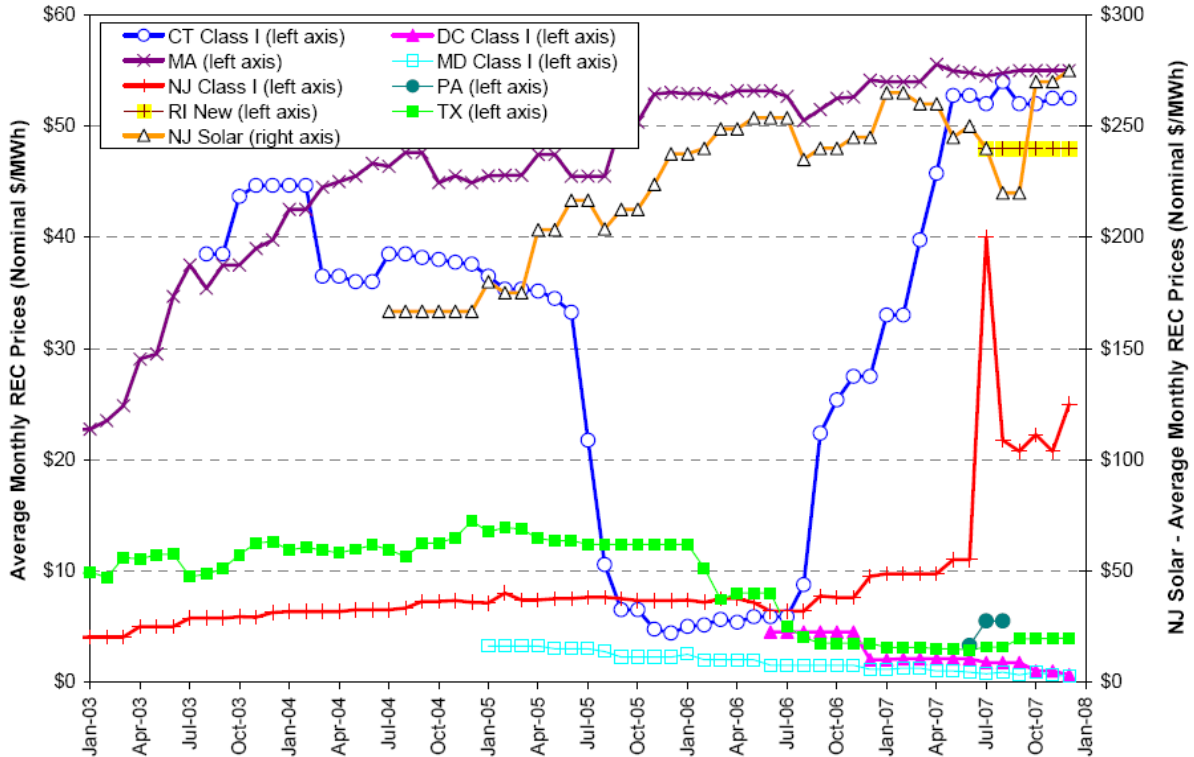
<sup>3</sup> For example, Qualifying Facilities that are built under 1978 Public Utility Regulatory Policies Act (PURPA) sell their power to utilities at avoided cost. Ownership of unbundled RECs has become an issue in states where QFs generate large amounts of electric power from renewable or low emission resources. An April 2006 study from Lawrence Berkeley National Laboratory by Ed Holt, Ryan Wiser and Mark Bolinger (*Who Owns Renewable Energy Certificates? An Exploration of Policy Options and Practice*) address ownership rights issues associated with QFs as well as those associated with net metering and facilities receiving financial incentives from states or utilities.

<sup>4</sup> In *Green Power Marketing in the United States: A Status Report (Ninth Edition)*, Lori Bird and Blair Swezey from NREL estimated REC customers at less than 10,000 in 2005 while customers in utility green pricing were estimated at 390,000.

<sup>5</sup> These estimates are taken from *Emerging Markets for Renewable Energy Certificates: Opportunities and Challenges*, a January 2005 report authored by Ed Holt and Lori Bird.

technology is the most advanced and competitive with conventional generation. With prices above \$200, New Jersey's solar program underscores the relative high cost of the solar technology.

**Figure 2 –REC prices have fluctuated widely**



Source: *Renewables Portfolio Standards in the United States: A Status Report with Data Through 2007*, LBNL, April 2008.

Jurisdictions are learning from each other as they establish and expand their trading schemes; NEPOOL established their system after observing the Texas REC market for few years; and PJM basically adopted the NEPOOL system with minor modifications. Accordingly, industry standards are developing across regions; certificate creation, retirement, tracking and transfers, and compliance reporting started to follow similar paths across regions; companies such as APX Inc and Clean Power Markets Inc have developed technologies (verification, tracking and trading platforms) and deployed these in various REC markets around the nation. Leveraging existing technology when developing capacity in new markets allows market participants to keep costs low. This technological infrastructure is flexible to expand and accommodate other environmental commodities.

Although these standards develop around the trading platforms and everyday trading operations of market participants, policy and regulatory differences across states create complexities for market participants. Renewables eligible under the RPS program and RECs are defined differently in terms of environmental and other

attributes in each state; and sometimes states do not allow interstate trading. Often, local economic development goals shape these design elements.

Technology companies and traders had to work together to develop software packages to handle these complexities. The technology challenge might have been overcome to a certain extent, but jurisdictional boundaries for renewables policies limits the potential of these markets to increase renewable investment further. As more and more states implement greenhouse gas policies, definitional differences will likely become more critical.<sup>6</sup> The current discussion in the Congress around various RPS bills is a symptom of these differences and states' desire to protect their own goals and their own regulatory authority. Local economic development often becomes the central issue as eligibility and mandates are defined to favor locally available resources or technologies. The State-Federal RPS Collaborative has been able to compare state programs and develop best practices recommendations with an eye towards harmonization a federal RPS program would necessarily require.<sup>7</sup>

Recently, some jurisdictions have been experimenting with new instruments, such as energy efficiency and demand management (or conservation) certificates, which are also known as white tags. There is also growing interest in trading other environmental attributes, such as avoided carbon and other greenhouse gas (GHG), through REC (or rather, environmental) markets. Information systems that are in place to facilitate REC trading are already keeping track of these attributes; it would be relatively straightforward to start trading in them. The trading may start on a voluntary basis but eventually may become mandatory if states legislate, say GHG emissions. Brokers and trading companies are closely following these developments and adapting their technologies to be flexible so that they can handle trading white tags.

So far, some states and regional initiatives have taken the lead in REC trading. In addition to Texas, certain states in the Northeast and West Coast are most active in REC trading and their ISOs have developed trading platforms to make it easier and more attractive to participate in these markets.

### ***Texas RPS and REC market***

Texas was one of the first states to enact an RPS. The Senate Bill 7 (SB 7) that was passed by the Texas Legislature in May 1999 mandated 2,000 MW of additional renewable generation capacity to be built by 2009. This mandate was supported by creating a REC market. Retail electricity providers (known in short as REPs) were required to acquire and retire RECs based on their share of state-wide retail electricity sales. This requirement created demand for renewable electricity and helped Texas achieve SB 7 target of 2,000 MW of new renewable generation in

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<sup>6</sup> An April 2007 study from Lawrence Berkeley National Laboratory by Ed Holt and Ryan Wiser (*The Treatment of Renewable Energy Certificates, Emissions Allowances, and Green Power Programs in State Renewables Portfolio Standards*) address three specific issues that may create differences across states: (1) degree to which unbundled RECs are allowed and ability of the systems to track attributes; (2) definitions of the renewable energy attributes such as emission reductions; and (3) ability to count RECs sold through voluntary markets towards RPS obligations.

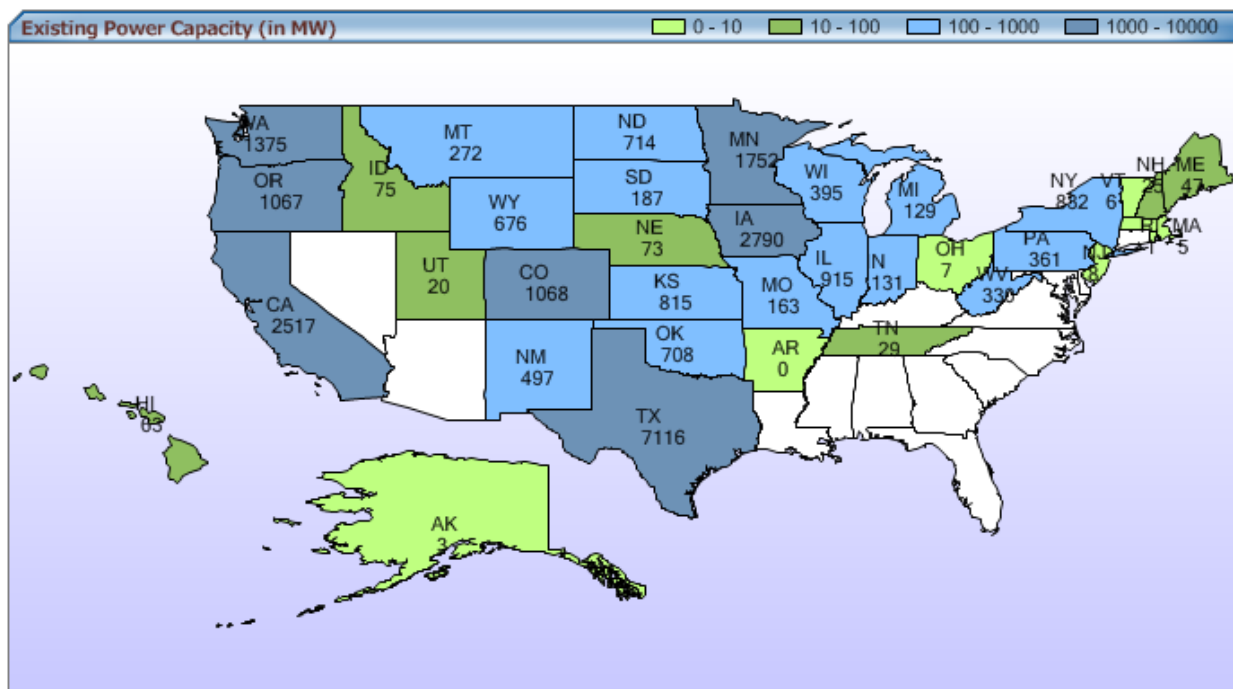
<sup>7</sup> Detailed information on the State-Federal RPS Collaborative can be found at <http://www.cleanenergystates.org/JointProjects/State-Federal-RPS.htm?locale=en-US>.

2005, four years earlier than the target date stipulated in the bill. Tradable RECs, issued quarterly, allowed electricity retailers from anywhere in the state to search for the lowest cost renewable resources in the state with no obligation to take physical delivery of electricity. The most prolific wind capacity in Texas happens to be in West Texas away from load centers in the north and east of the state. Thanks to unbundled REC trading, REPs were able to meet their RPS obligations while new wind generation capacity was built in the west. In 2006, Texas surpassed California as the largest generator of wind power in the U.S.

The REC market is administered by the Electric Reliability Council of Texas (ERCOT), the independent system operator (ISO). The Public Utility Commission of Texas (PUCT) has the authority to cap the price of RECs and, in consultation with ERCOT, may suspend the RPS requirements if necessary to protect the reliability and operation of the grid. The PUCT also enforces penalties for non-compliance with the RPS requirements.

Based on the success of the REC market leading to satisfaction of SB 7 RPS requirements in few years, the Texas Legislature expanded the RPS goals of the state significantly in 2005 with the passage of Senate Bill 20 (SB 20), which set a goal of 5,880 MW of renewable generation capacity by 2015. In order to diversify renewable sources, SB 20 set a non-binding target of 500 MW of non-wind renewable capacity. The bill's renewables generation capacity target for 2025 is 10,000 MW. Again, the developers were eager and the SB 20 target has already been surpassed: as of December 31, 2008 there is 7,116 MW of installed wind capacity in Texas (Figure 3).

**Figure 3 – Installed wind capacity in the U.S. (as of 12/31/2008)**



Source: American Wind Energy Association ([www.awea.org/projects/](http://www.awea.org/projects/))

Despite this positive and encouraging record, the REC market in Texas went through cycles and revisions, offering valuable lessons. In fact, due to success of building so much new wind capacity, REC prices collapsed and did not provide much incentive (Figure 2); rather it was the federal production tax credit (PTC) that fueled investment.

SB 20 included some language that led Green-e, a certification company, to declare RECs originating from Texas ineligible for its certification: “Notwithstanding any other provision of law, the commission shall ensure that all renewable capacity installed in this state and all renewable energy credits awarded, produced, procured, or sold from renewable capacity in this state are counted toward the renewable energy goal.” This language, which was deemed to undermine the goal of adding new renewables capacity, was fixed by the Texas Legislature in 2007 via the House Bill 1090 (HB 1090).

Transmission limitations slowed down the development of wind capacity in West Texas and Panhandle areas. PUCT developed the Competitive Renewable Energy Zones (CREZ) process to address this challenge. Under CREZ, several phases of transmission capacity expansion plans are developed by ERCOT. Companies to construct the lines of the first phase have been chosen.

However, there are issues. For example, some wind developers are arguing for dispatch priority once these lines are built; these companies have made certain investments in identifying and securing their sites and they would like to avoid losing market share to latecomers, some of whom could also be traditional generation facilities. Allowing certain generators priority dispatch is fundamentally inconsistent with open access transmission grid established by SB 7. The open access rule is crucial to making the competitive market to work. Also, some of the transmission companies selected to build the lines are merchant companies, not listed as utilities in Texas. According the Public Utilities Regulatory Act of Texas, there could be challenges to their participation.

### **Evaluating the Texas RPS program**

As part of this project, we interviewed and surveyed market participants. We adapted work done by the RPS Collaborative on ‘best practices’ to reflect the history and current state of the Texas RPS program. We also investigated issues going forward as perceived by various stakeholders. The following sections summarize the findings so far.

#### ***Purpose of the RPS***

Although not explicitly stated in SB 7 as a goal of the RPS program, local economic development for certain areas in West Texas and protecting and enhancing the environment were important aspects that were quickly recognized as benefits associated with new renewable generation investment. When SB 7 was being debated in early 1999, there were already numerous wind projects under various stages of development for West Texas worth roughly \$150 million. SB 7 had broader objectives and was presenting consensus among diverse interest groups who were addressing the restructuring of electric industry, requiring the inclusion of

other requirements such as energy efficiency and emission reduction that helped with environmental benefits.<sup>8</sup>

Although generally speaking local economic and environmental benefits are acknowledged, there is no formal measurement of such benefits. The exemption is energy efficiency goals. SB 7 included efficiency requirements in parallel with the RPS. IOUs were required to reduce their growth in demand by 10% through energy efficiency programs approved and monitored by the Commission. This goal was raised to 15% and 20% for 2008 and 2009, respectively.

### ***Design specifics***

#### *Goals*

There are basically two views on the original RPS target of 2,000 MW. According to one view, the Texas target was not ambitious, especially when compared to RPS programs initiated by other states. The 2,000 MW of additional renewable capacity set for 2009 would raise the share of renewable resources in total peak demand from 1.3% in 1999 to 3.6% in 2009. These numbers are much lower if calculated based on energy generation. For example, such share in 1999 was only 0.36%. In comparison, other states have set targets that reach much higher percentages, well in 15% to 30% by 2020. California is shooting for 20% in 2010.<sup>9</sup> The opposing view holds that given the history of low levels of investment in renewables and the lack of transmission capacity from West Texas, the goal was ambitious. It is also worth noting that the goal of 2,000 MW was more than the wind capacity operating in California, the leading wind capacity state, at the time.

Regardless of these views, the SB 7 target was achieved four years earlier than stipulated (2005 instead of 2009); the SB 20 target (5,880 MW by 2015) was achieved in 2008. Some believe that setting conservative targets has not been without negative consequences; for example, the REC market was undermined as more capacity than the mandated target was built and, as a result, the price of a REC collapsed.

#### *Resource definition*

Generally speaking, the resource definition is considered clear in SB 7, PUCT rule and ERCOT protocols: "technology that does not rely on energy resources derived from fossil fuels, waste products from fossil fuels, or waste products from inorganic sources." However, there were restrictions on hydro, originally counting only those less than 2 MW. This limit has been increased to 25 MW later. Facilities existing prior to September 1999 could not earn RECs. But, PUCT allowed these entities (mostly large hydro facilities) to receive REC offsets, based on their historical energy production that can be used by competitive REPs that had long-term contracts in place with the offset generators. Also, there are issues regarding qualifications of various feedstocks for biomass and biogas.

In SB 7 and implementing rules, there was no technology preference; but wind has been the predominant choice by investor because of low relative cost, maturity of

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<sup>8</sup> These interest groups included Environmental Defense Fund, Public Citizens, Texas Rose, and the IOUs among others.

<sup>9</sup> For more, please see: [http://www.pewclimate.org/what\\_s\\_being\\_done/in\\_the\\_states/rps.cfm](http://www.pewclimate.org/what_s_being_done/in_the_states/rps.cfm).

technology, ability to construct large capacities, short construction time, and high quality of wind in West Texas. In SB 20, a 500-MW of non-wind target (not mandatory) was put in place; but since 2005 passage of that bill, not much has been achieved (two biomass projects are expected to come online in the near future: 50 MW at Lufkin and 100 MW at Nacogdoches – some eligibility issues may remain in terms of their feedstock). PUCT is considering adding second tier and third tier renewable resources, third tier being mainly solar, as this technology, although very promising in terms of resource potential, remains the most expensive option.

Texas Renewable Energy Industries Association is supporting a bill for smaller renewables including wind in the current session of the Texas legislature. Such DG resources have been eligible since SB 7 but these are typically small units (e.g., solar PV). Legislation in 2005 enhanced the role of REC Aggregation companies allowing generation sites smaller than 1 MW in size (e.g., home and business solar) to be able to participate in REC trading. Only PV units qualify (passive solar thermal units used for water heating do not) because, by definition, they must produce electricity. The level of interest has been low so far. Austin Energy is the first utility that did some aggregation and voluntarily retired 700,000 RECs in 2007 although as a municipal utility that did not opt in the retail competition Austin Energy did not have any renewable obligations.

#### *Duration*

The duration of the program has been long enough to encourage long-term contracting. SB 7 target covered 10 years (1999-2009); and SB 20 in 2005 had a 2015 target and further targets. Also, the competitive market in Texas is often credited along with the RPS targets for making it easier to get into long-term bilateral contracts for renewable power as well as conventional generation. Each compliance period is one year, January 1 – December 31.

Each REC has a serial number that indicates:

- the facility where the electricity was generated;
- the type of renewable resource;
- the year and quarter of generation; and
- a unique identifier for specific MWh produced by the facility that quarter.

Each REC is valid for three years. This period was set to balance the need for creating incentive for new renewables investment and the need to make the REC trading liquid. Within three years, a REC may be terminated to meet a retailer's RPS requirement; or retired voluntarily by the current REC owner.

#### *Participation requirement*

Not all load serving entities were required to participate; municipal utilities and electric cooperatives that did not opt in the competitive market did not have renewables obligations. This exclusion has been somewhat of a concern to some market participants as these entities represent about one quarter of electricity use in Texas. But at the time of negotiating SB 7 with a goal of 2,000 MW of new renewables, this exclusion was the price for securing passage of SB 7. Going

forward, with the addition of non-wind requirements and perhaps increasing RPS targets, this exemption may have to be reconsidered. In any case, some municipal utilities such as Austin Energy and CPS of San Antonio are procuring significant amounts of renewables generation voluntarily.

#### *Program administration & tracking*

ERCOT is responsible for administering the RPS program and keeping track of the REC trading and retirement. The program has been fairly simple to administer although changes in laws, rules and protocols required additional software development; this has been the main but manageable challenge. It has also been very cost effective. The program requires 1.5 FTE to administer; their expenses are recovered through the ERCOT fees approved by the PUCT. At this time, there is no cost for market participants to establish trading accounts and participate in the program.

ERCOT tracking has been quite successful. There is a user-friendly online system for participants that is managed by ERCOT, and most importantly, meter data is very timely and accurate as they are used for financial settlement. In non-ERCOT areas, there is self-reporting and there has been concerns raised about accuracy of the data. ERCOT is auditing these facilities and is also working with SPP to standardize meter reading. Texas RECs can only be retired in the Texas program. This allows ERCOT to ensure that a REC can only be used once and for one purpose only (renewable generation).

There have been non-compliance penalties but only in a handful of cases, most of which involved REPs that went out of business. The penalty is \$50 per REC that is not retired for compliance. Since RECs are currently selling at \$2-5 each, the penalty is quite significant. Even in the early years, the highest REC price in Texas has been about \$20. There is a compliance payment associated with solar projects, which is equivalent to 1 REC. Hence, 1 MWh of solar project will get credit for 1 REC and 1 CP (=1 REC); in other words, there is multiplier of 2 for solar in Texas. But, this has not encouraged investment in solar yet.

#### ***Some other factors***

In addition to design elements discussed above, there were other factors, some of which quite significant, that contributed to the rapid expansion of renewables capacity in Texas.

1. If Texas did not have some of the best sites with reasonably good wind speed, the state would not have this much wind development. Wind developers in West Texas report capacity factor of 35% or more. Due to transmission constraints, however, generation had to be curtailed, lowering capacity factor in practice.
2. Federal investment tax credit (ITC) has been a significant factor according to developers. There is a new 8-year ITC for solar in Energy Independence and Security Act of 2007, which is expected to help solar projects nationwide.
3. Federal production tax credit (PTC) has been perhaps even a more significant factor. Over the years, one can see the decline in project activity as the PTC entitlement nears expiration at the Congress; and picking up again after the

extension of PTC. Despite the high quality of resources in Texas, PTC has been crucial for developers in Texas as in other locations.

4. Statewide tax abatement program has been used by some cities to create additional incentives to wind developers. In particular, Tax Code 312 (Property Redevelopment and Tax Abatement Act) & 313 (Texas Economic Development Act) provisions have been quite helpful for project developers as well as host communities.
5. The competitive market structure in Texas that encouraged bilateral long-term contracting for power supplies helped renewables as well. Not only the RPS program created demand for renewables, some REPs such as Green Mountain specialized in green energy and many other REPs included renewable or green products for their customers.
6. Ease of siting and permitting facilities in Texas has been a major factor. Of course, this is not unique to renewable projects; it applies to all kinds of generation facilities.
7. ERCOT's standard interconnection procedure helped to identify major transmission shortages, which was inputted into the CREZ process. But, CREZ has come about because of the rapid and massive development of wind generation in remote parts of Texas. Generation companies continued to come and build even when they knew there was not enough transmission capacity, essentially forcing the CREZ process.
8. The CREZ approach demonstrates the ability to develop timely solutions to problems in Texas. The CREZ is not without its opponents; and the price tag of \$4.93 billion for the first phase has been criticized. This cost, like other transmission projects, will be uplifted and paid by all Texas consumers. The previous experience with adding transmission to accommodate wind in McCamey has so far yielded mixed results: ERCOT curtails wind generators for operational and reliability reasons, which keeps the capacity conversion factor lower than wind generators would like. Nevertheless, the CREZ model is commonly seen as successful and is under evaluation by other jurisdictions for possible adoption.

### ***Current issues***

Although Texas has been able to quickly surpass its RPS mandates, the following issues have been raised in various forums.

1. Tracking RECs: verification of retirement, level of authentication (especially in non-ERCOT areas). Verification is controlled in that Texas RECs can only be retired in the Texas REC trading program regardless of the purpose of the retirement (in compliance with the mandates or voluntarily). The program will only allow retirement to occur one time and for one purpose. Once retired, REC no longer exists. Authentication is accomplished by gathering generation and load data from ERCOT EPS meters. Since over 90% of all generation and load in Texas is metered in ERCOT, the system operator has the highest level of authentication in the U.S. Those entities not metered in ERCOT but in the Texas market are obligated to self report their MWh of

production and are subject to random audits at the discretion of the PUCT and ERCOT. ERCOT is also working with SPP to develop standards to meter increasing amount of wind in the Texas Panhandle. The tracking system (Registry) in Texas is mainly used to meet regulatory requirements and does not provide any other benefits to the REC Holders. This is different from some other markets where more than one state is covered by tracking system. In such markets, given recent climate change initiatives in the Northeast and Western United States, transferability of RECs across state boundaries will become more valuable to market participants. In addition, the current tracking systems in those markets allow market participants to manage their environmental balance sheets, which may include RECs, EECs, Emission Reduction Credits (ERCs), and other forms of carbon Offsets, more effectively.

2. Non-wind renewables seem to need additional incentives (feed-in tariffs, multipliers for RECs). As discussed before, there is a compliance payment for solar (essentially a multiplier of 2 on RECs). Going forward, PUCT is considering having a tiered approach, adding two more tiers to existing renewables. One of them will target solar, and the other will cover the remaining technologies. There are also bills under consideration that would implement small renewables mandates and hence may introduce new elements into the RPS program in Texas.
3. Capacity conversion factor calculation (wind). The CCF is calculated by comparing the MWh of actual production over a specified time frame (last two years) against the installed capacity of the unit. The formula is clearly provided in ERCOT protocols. However, the wind industry challenged this approach in 2004, claiming that it yields a lower value (27%) than warranted (35% or more – 35% was set for the first two years of the program) due to curtailment by ERCOT for operational reasons. The Commission voted to maintain 35% for the next two years despite staff recommendations to follow the formula. REPs appealed the decision that increased their REC obligations and the court ruled in their favor. When the CCF formula was applied, the market was flooded with excess RECs, helping the collapse of REC price. When the new CREZ transmission lines are built, some of these objections may fade as curtailment may be reduced. But as long as there is curtailment, ERCOT cannot justify a higher CCF.
4. Reliability considerations by ERCOT as more wind capacity is built. Even when the transmission constraints are resolved, ERCOT will have to improve its ability to forecast wind generation to avoid reliability issues such as those experienced in early 2008. The wind in West Texas blows strongest at night when the electricity demand is low. Increasing amount of wind will complicate system operations and will probably require adjustments to the way ancillary services markets are run.
5. There is a request for dispatch priority for wind facilities already in queue once the CREZ transmission is built. PUCT is currently reviewing this issue (Docket # 34577) and will have to decide on it. With CREZ phase 1 under way, some wind developers argue that they should get priority dispatch as

they have been committed to the transmission project (in some cases, they put money down, which will be reimbursed in the form of congestion revenue rights once the transmission is built, or in full if transmission is not built). There are two issues with priority dispatch: 1- it conflicts with open access rules of the grid (as dictated by SB 7 and implementing rules and protocols); and 2 – it will likely disrupt the nodal market by causing out-of-merit order dispatch and therefore possibly creating congestion or other operational challenges.

6. Compatibility with a federal RPS. In general, Texas appears to be well positioned to be in compliance with a federal RPS, which will likely set a lower target to gather the support of most states. According one current bill in Congress, renewables goal is gradual, starting at 6% for 2012-13, 8.5% for 2014-15, 11% for 2016-17 and so on. In the other bill, renewables goal is again gradual, starting at 4% for 2011-12, 8% for 2013-15, 12% for 2016-18 and so on. Even at these rates, there is significant opposition from some states; and the targets will likely be lowered before any federal RPS bill can be enacted. It is expected that a consensus will be reached and a federal RPS bill will be issued in 2009. Although Texas is currently below these targets, though close to 4% target of the second bill, with the CREZ transmission lines, more renewables capacity will come online. There may even be an opportunity for the state to sell RECs in other states if more renewables generation than mandated is built in the state (depending on availability of transmission capacity in other reliability regions, primarily SPP). In any event, Texas policy makers, regulators and market participants need to follow federal RPS developments very carefully.
7. Perhaps surprisingly, high energy prices in ERCOT have not been a major factor in stimulating renewables development. Although average wholesale price of electricity in Texas has been relatively high over the recent years (\$70-80 per MWh) due to high natural gas prices, Western Zone prices have not always been that high, reflecting transmission constraints relative to amount of wind capacity. In fact, the price has on occasions been negative over the last two years: wind generators, which needed to be dispatched to collect PTC, submitted negative bids in certain hours (bids were roughly equivalent to the negative of PTC + REC price, or about -\$30/MWh).

### **Closing Remarks**

Texas leads the nation in installed wind capacity. Most of this capacity was built since the passage of SB 7 in 1999, which initiated the Texas RPS program. The program design has been simple and was implemented competently by PUCT and ERCOT. These agencies have been proactive in transmission planning as demonstrated by the CREZ process. The general pro-business environment of the state that helped the competitive electricity market to evolve also helped renewables investors. But at the end of the day, the high quality of wind in West Texas, federal tax credits, and state tax abatement programs are primarily responsible for the rapid expansion of wind capacity in the state. Other technologies such as solar, small hydro and biomass have not contributed much.

The RPS program or federal tax credits did not provide sufficient incentives for these technologies to prosper. Accordingly, new incentive structures are under consideration both at the state and federal levels. Going forward, Texas will probably continue building more wind farms as long as federal tax credits continue and CREZ transmission expansion happens as planned.