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Harmonization of Renewable Energy Credit (REC) Markets across the U.S.

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Harmonization of Renewable Energy Credit (REC) Markets across the U.S.

Executive Summary

This study provides a comparative summary of the renewables portfolio standard (RPS) programs, associated trading of renewable energy credits (RECs) around the U.S., harmonization efforts and challenges with a particular focus on federal RES proposals. The evaluation is based on market and literature research, and interviews with market participants.

An RPS program exists in 29 states and the District of Columbia (DC); six more states have non-mandatory renewables goals. The experience with RPS programs is somewhat limited; 16 states and DC adopted RPS programs since 2004. The longest experience is about 7-8 years in a handful of states, including Texas.

According to researchers at the Lawrence Berkeley National Laboratory, the mandates apply to 40% of all electricity sales in the U.S. (will cover 56% when fully implemented) and require installation of 77 GW of new renewables capacity by 2025. If the mandates are met, about 6% of consumption will be from renewables in 2025. Most significantly, up to 42% of demand growth between 2006 and 2025 could be met by these investments given the downward revisions of load growth estimates due to economic recession.

State RPS programs differ significantly, which limit harmonization efforts, regional or federal. Fundamentally, there are a couple of reasons for these differences: states' desire to have local economic development and local emission reduction. Program elements are designed with these goals in mind and lead to interstate variations based on local factors such as resource availability, electricity market structure, environmental policy and rate impact tolerance. There are numerous design elements but few stand out in terms of their potential impact on harmonization of REC markets.

- Resource eligibility: most states use different definitions of eligibility to favor locally available resources or to comply with environmental policy, which may limit purchasing RECs from other states if the REC is associated with a resource that is not eligible in a particular state. Since any federal RPS program will have to depend on nationwide REC trading, these constraints on eligibility would likely undermine the efficiency of the program.
- Geographic eligibility: many states require renewable facilities to be located in the state, or within the independent system operator (or regional transmission organization) territory. Also, different operational requirements of ISOs can limit trading of RECs as they may constrain actual delivery of renewable electrons. Again, these constraints will make it difficult for a federal REC trading program to function most efficiently.
- Alternative compliance payments: some states set ACP low in order to cap cost increases to end users. This variation of ACP across states will distort a regional (or national) REC market, especially if demand for RECs is larger

than their supply. Investment will flow into states with highest ACP as developers would expect REC prices to approach ACP.

- Attributes: states attach different attributes to their RECs (e.g., emissions reductions). Federal RECs, as defined in the current bills, do not have any environmental attributes.

There are some particular concerns about proposed federal bills.

- REC ownership. There are existing contracts, which do not say anything about ownership of FRECs. Current bills only cover power purchase agreements of utilities, assigning FRECs to utilities buying the power; but there are REC-only contracts and bundled energy-REC contracts. Any federal legislation should clarify FREC ownership under all contingencies.
- Dual markets. Creating a dual market, one for FRECs and one for state RECs, could cause tracking problems and associated disputes about ownership of each. But, it is possible to build national trading capabilities upon existing regional tracking systems; there is already trading capability among regions based on these platforms. To prevent double counting of FRECs, a single federal generator registry may be necessary. Both bills appear to encourage the use of existing systems.
- States with higher mandates. Current bills include language respecting RPS programs in states. A particular concern is trading of excess FRECs from states with higher mandates. If such trading is allowed, individual state goals of new renewables may be undermined in both RPS and non-RPS states. In one bill, states are given the authority to decide what to do with these excess FRECs; a recommendation by stakeholders is to retire an FREC every time a state REC is used for state compliance.
- Voluntary markets. Voluntary buyers of RECs expect new renewables beyond mandates. But, if an FREC is not retired for each voluntary purchase, this expectation will not be met. The Renewable Energy Marketers Association, among others, recommends that federal RECs be retired whenever non-federal RECs are used for satisfaction of a voluntary renewable energy purchase.
- ACP. Both bills issue FRECs to utilities based on payments to the state including ACP. This may lead to double counting as the utility would get another REC for the same MWh purchased from a renewable generator, which was already assigned a REC for that MWh. Not counting state ACP towards federal mandate would eliminate this double counting.
- Energy efficiency, distributed generation and exemptions. Counting efficiency and DG towards RPS requirements will undermine the need for new renewables capacity. Issuing multiple RECs for a MWh from a DG resource would create problems in the REC market as well as tracking challenges.

However, the single most important challenge facing the expansion of the renewables capacity is the shortage of transmission capacity between areas of high quality resources and consumption centers. The Texas CREZ model may be adopted by other regions and there are bills in Congress with provisions to encourage more transmission capacity to be built. Differences about some of these provisions such as federal siting authority and grid-wide cost allocation are difficult to reconcile. CEE research on public participation in the siting process also indicate that it will be very difficult and will take a long time and large amounts of money to build any of the transmission lines the renewables industry needs. Without this expansion of transmission capacity, the REC markets will likely remain stunted and localized even with a federal RES legislation.

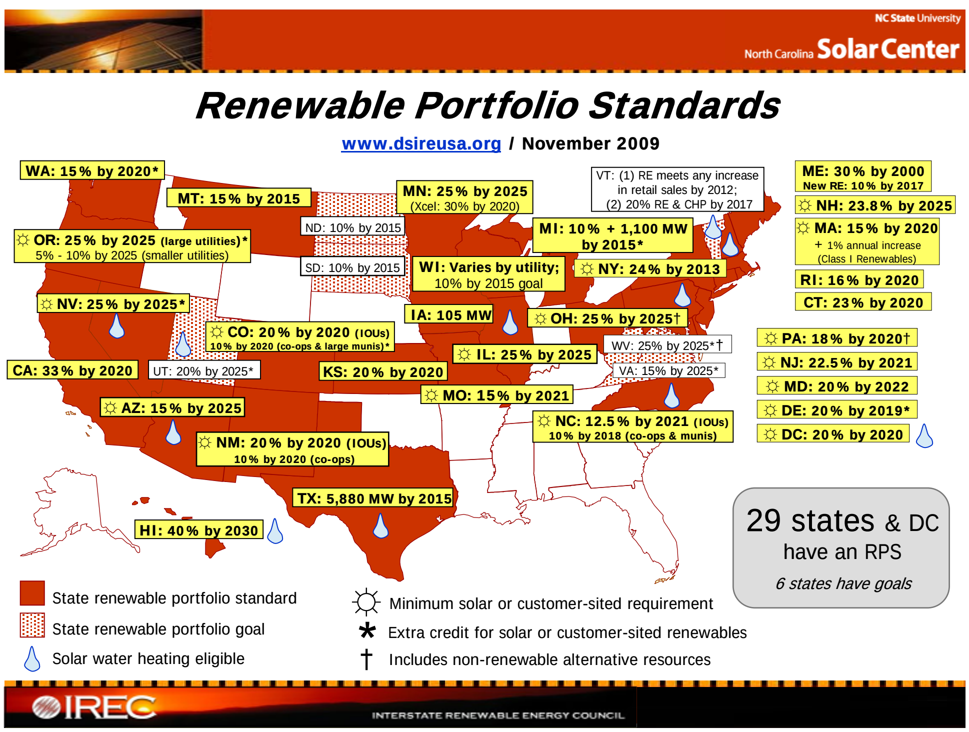
Harmonization of Renewable Energy Credit (REC) Markets across the U.S.

Introduction

In this report, we will review differences among state renewables portfolio standards (RPS) programs and the issues facing harmonization of REC markets across regions under the light of the federal RPS proposals. This review is done for the State Energy Conservation Office (SECO) in Texas based on market and literature research, interviews with market participants and industry observers, and participation in national activities such as the State-Federal RPS Collaborative.

There are 29 states and the District of Columbia (DC) with an RPS program and another six states with non-mandated renewables goals; and there are a couple of major federal RPS proposals. Texas has one of the most successful RPS programs when measured by installed renewables generation capacity relative to RPS mandates, albeit with certain challenges remaining;[1] but regional and federal developments, especially with respect to REC trading, may have significant impact on the Texas program and REC market.

Figure 1 – RPS programs in the U.S.

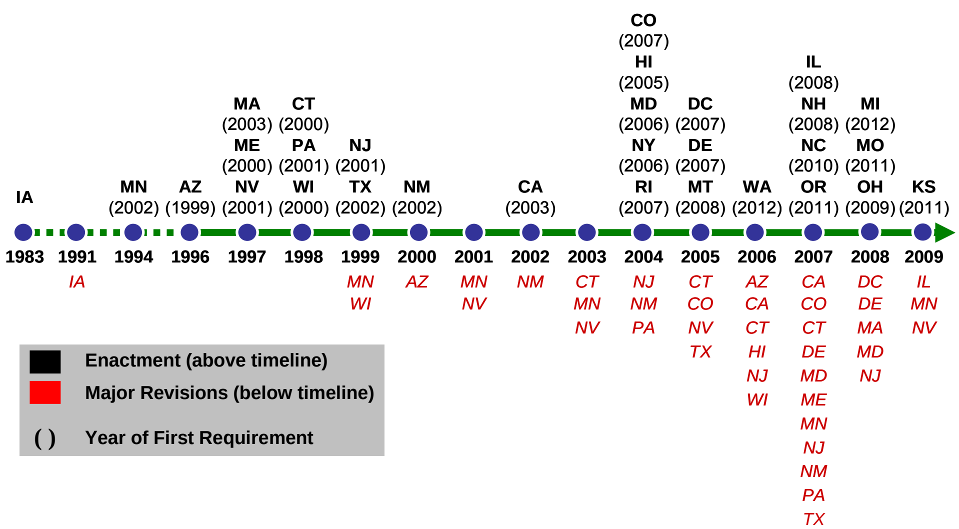


[1] CEE also prepared a report on Texas RPS program, "Lessons Learned from Renewable Energy Certificate (REC) Trading in Texas", for SECO. For details, please see that report.

Background

More than half of the states in the U.S. and the District of Columbia (as of November 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. There are two federal renewable electricity standards (RES) bills in Congress.[2] In June 2009, the House passed the American Clean Energy and Security Act (ACESA), or H.R. 2454 sponsored by Representatives Henry Waxman, Chairman of the House Energy and Commerce Committee, and Edward Markey. According to ACESA, renewables goal is gradual starting at 6% for 2012-13, and reaching 20% by 2020. There is also a bill sponsored by Senator Bingaman, S. 1462, American Clean Energy Leadership Act (ACELA). According to ACELA, renewables goal is again gradual, starting at 3% for 2011 rising to 15% by 2020. As they stand, these requirements are less than the mandates in some states, and, according to some modeling analyses they do not lead to more renewables than existing state programs would collectively. These issues are discussed further below.

Figure 2 – History of RPS programs in the U.S.



Source: Renewables Portfolio Standards in the United States: A Status Report, presentation by Galen Barbose, LBNL, 32nd IAEE Conference, San Francisco, June 23, 2009.

Evolution of RPS programs

In recent years, more states adopted RPS programs and many others modified their existing programs, often increasing targets or adding provisions to increase the diversity of renewable sources or technologies (Figure 2). After a dry spell in 2000-03, 16 more states and DC adopted RPS programs since 2004. In other words, more than half of existing programs have been instituted since 2004. Overall, RPS experience is varied and remains somewhat limited with only a handful of states

[2] In federal bills, instead of RPS, the preferred language is renewable electricity standards, or RES.

with more than five years of experience. Although states are learning from each other and from the experience of first movers, the design characteristics differ somewhat significantly even among the most recent adopters. These differences reflect individual states' objectives and resource base.

In Table 1 we compare analysis from an April 2008 report and a June 2009 presentation, both by researchers from the Lawrence Berkeley National Laboratory.[3] In the April 2008 report, state-level mandatory RPS programs announced by the end of 2007 were estimated to cover about 46% of total electricity sales in the U.S. That report calculated that about 60 gigawatts (GW) of new renewable capacity would be needed by 2025 to comply fully with the state RPS mandates; but this estimate was updated to 77 GW in June 2009, taking into account RPS programs announced since the end of 2007.

The state RPS requirements by the end of 2007 translated into an estimated 4.7% of total U.S. electricity sales in 2025, and 15% of demand growth between 2000 and 2025. The updated numbers account for about 6% of total U.S. sales in 2025 and, most significantly, 42% of load growth between 2006 and 2025. This considerable increase in load growth share is due to downward revision of overall electricity demand in the Annual Energy Outlook 2009 produced by the Energy Information Administration,[4] as a result of the current economic recession and new regulations and programs on energy efficiency and conservation.

Table 1 – Impacts of state RPS programs

	April 2008*	June 2009**
Total electricity sales	46%	56%
New renewables by 2025	60 GW	77 GW
Share of U.S. generation in 2025	4.7%	6%
Share of demand growth	15% (2000-2025)	42% (2006-2025)

* *Renewables Portfolio Standards in the United States: A Status Report with Data Through 2007*, Ryan Wiser and Galen Barbose, Lawrence Berkeley National Laboratory, April 2008.
** *Renewables Portfolio Standards in the United States: A Status Report*, presentation by Galen Barbose, Lawrence Berkeley National Laboratory at the 32nd IAEE Conference, June 23, 2009; and follow-up communication with Galen Barbose.

Trading renewable energy certificates

Many of these states with an RPS program have created markets where participants (generators, utilities, retail service providers) trade Renewable Energy Certificates, or Credits, known in short as RECs, or green tags. The federal version too will have REC trading; both bills call for a national REC market. Given this federal intention, it is important to note that not all states with an RPS program have required REC trading. We will address this issue later in the report as one of the state concerns regarding the federal RPS proposals.

[3] The data provided in the presentation will be used in an update of the April 2008 report by LBNL, expected to be released in fall 2009.
[4] The report can be obtained at http://www.eia.doe.gov/oiaf/aeo/.

As a market-based mechanism, REC trading is expected to allow meeting renewables goals most efficiently. Generation facilities will be built where the resources (e.g., wind, solar, biomass, geothermal) are most prolific and hence the cost of electricity production is the lowest. Typically, a REC represents one MWh of metered power produced by a renewable generator, which has to be certified as such by organizations such as the Green-e (Center for Resource Solutions) and Environmental Resources Trust among others.[5] Each REC has a unique serial number and is valid in the state it is generated. If the originating state and other states allow out-of-state REC trading and there are no other restrictions (such as resource or vintage requirements – see below for further discussion), the REC will be valid in these jurisdictions as well.

Some RECs are exclusive for generation by particular renewable resources or technologies; there could be restrictions on year of service to promote new projects (vintage); 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 reduction need to be clearly defined and RECs associated with those rights should be traded in the market accordingly.[6] Otherwise, both the renewable generator and fossil fuel generator can claim rights and try to trade associated RECs.

With the increased focus on greenhouse gas regulation as envisioned in the cap and trade provisions of ACESA; some are concerned about undermining interest in renewables if developers do not get credit for their emission reduction benefits.[7] One scenario is to add FRECs (federal RECs), energy efficiency, and carbon credits among others as attributes to existing RECs that can be unbundled and traded separately. The implementation of this approach may be difficult if it requires legislative rather than regulatory changes in states. Another option is to have separate certificates or credits for all of these attributes and trade them separately; this approach may create too many products that could be costly to track, measure and validate.

Markets for RECs created by policy (mandatory markets) are larger; but there is a growing voluntary market, accounting for about one fifth of the national demand for

[5] More information about these organizations is available at http://green-e.org/ and http://www.winrock.org/feature_ert_200802.asp.

[6] 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.

[7] For example, see the position paper by Renewable Energy Marketers Association (REMA): http://www.renewablemarketers.org/files/REMA_-_RECs_in_a_Capped_World.pdf. It is worth noting that REMA was formed in December 2006 based on concerns "about where renewable energy, and particularly voluntary renewable energy purchases, fit in new legislation regarding carbon offsets."

renewable energy demand according to the Renewable Energy Marketers Association (REMA).[8] Organizations such as REMA bring together companies interested in promoting voluntary trading. The feature of additionality, i.e., trading and retirement of RECs above and beyond mandates, is central to promoting investment in renewables generation.

States generate incentives for REC markets by requiring load serving entities (LSEs) to supply a certain percentage of their markets with electricity produced from renewable sources. In competitive electricity markets, demand for renewable energy is often created through the LSEs. By relieving buyers of renewable electricity from the obligation of arranging for physical delivery of such power (which could be geographically 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; unbundled REC sales increased from 660 GWh in 2003 to 15,600 GWH in 2008 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.[9]

In states where electricity markets are not restructured, investor owned utilities (sometimes along with municipally owned utilities and rural electric cooperatives) are required to add renewables into their portfolios by the mandated percentages. Often the renewables get built into the integrated resource planning process. Since investment in renewables will be included in the rate base, this approach spreads the cost across the customers. As such, it could conceivably make it easier for utilities to introduce relatively expensive technologies into the mix. But the rate impact can still be significant especially if there are carve outs for some of the more expensive technologies such as solar PVs. In many states, there are caps (often, 1-2%) on the rate increase that can be assigned to renewables to be built under the RPS mandate; and the rate impact calculations can be complicated when based on “avoided costs”. If a utility can show low avoided cost, it will be difficult to install solar PVs under a rate cap of 1-2% above the avoided cost with the current cost structure of solar PVs. Senate RES bill, ACELA, has a rate cap of 4%.

REC prices

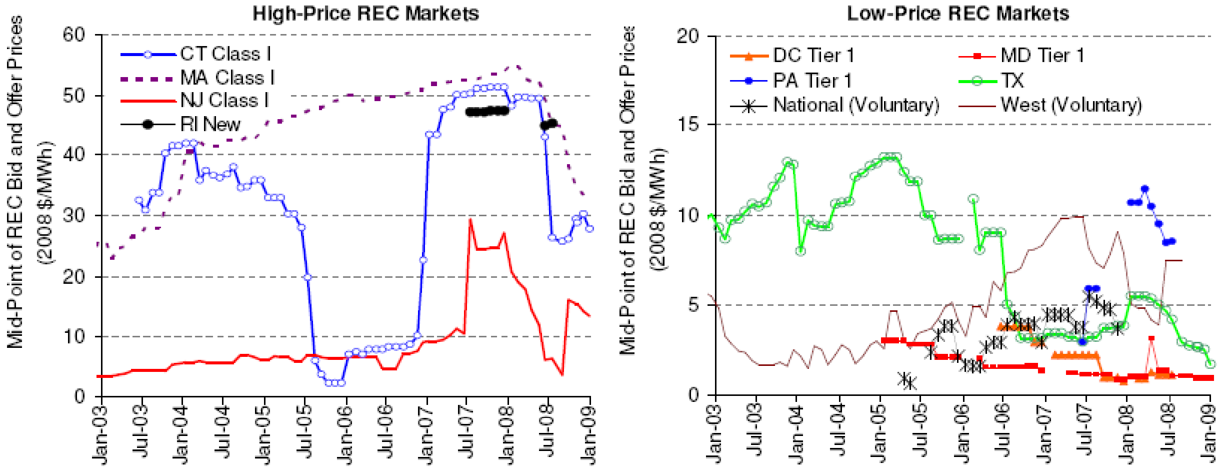
REC prices have not been helpful in promoting renewables in all jurisdictions (Figure 3). REC prices around or below $10 as seen in Texas, Maryland, New Jersey (Class 1) and DC are not strong signals to developers of renewables capacity. In Texas

[8] See REMA position paper from previous footnote, or www.renewablemarekters.org for updates.
[9] In *Green Power Marketing in the United States: A Status Report (2008 Data)*, Lori Bird, Claire Kreycik, and Barry Friedman from NREL estimated REC customers at about 30,000 while customers in utility green pricing were estimated at 550,000 with another 390,000 buying green power in competitive markets such as that of Texas.

and DC, REC prices are down to $1-2. On the other hand, prices in Massachusetts and Connecticut have been quite high, albeit highly volatile in the case of Connecticut. Volatility of REC prices is a common issue in most markets.

To a great extent, these price 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 in western parts of the state. The wind technology is the most advanced and competitive with conventional generation, especially with the help of the federal production tax credit. As such, low REC prices in Texas did not hamper wind development in the state. With prices above $170 and reaching as high as $700 per MWh, New Jersey's solar program underscores the relative high cost of the solar technology. Since 2001, 108 MW of solar capacity has been built with a rebate of more than $290 million. Average capital cost is $6,700 per kW.[10]

Figure 3 – REC prices have fluctuated widely



Source: *2008 Wind Technologies Report*, Energy Efficiency and Renewable Energy, DOE, July 2009. Main authors are Ryan Wiser and Mark Bolinger from Lawrence Berkeley National Laboratory. Data comes from Evolution Markets and Spectron.

Trading infrastructure

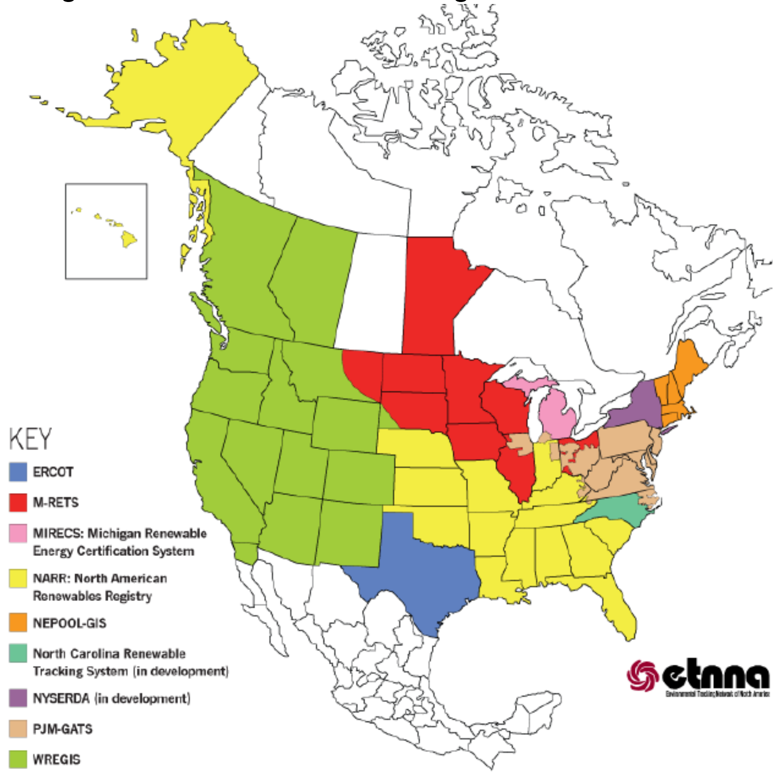
Jurisdictions have learned from each other as they establish and expand their trading schemes; the New England Power Pool (NEPOOL) established their system after observing the Texas REC market for few years; and PJM basically adopted the NEPOOL system with minor modifications.[11] Accordingly, industry standards have been developed 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

[10] "New Jersey's Solar Financing Model" by Anne Marie McShea, NJ Board Of Public Utilities, Office of Clean Energy, presented at the National Summit on RPS, November 18-19, 2009, Chicago, IL organized by Clean Energy Group for the State – Federal RPS Collaborative. For presentation: http://www.cleanenergystates.org/Meetings/RPS_Summit_09/MCSHEA_RPS_Summit2009.pdf.

[11] PJM Interconnection is a regional transmission organization that manages the grid in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia.

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 such as energy efficiency certificates (or credits, or white tags) or carbon credits (or offsets, or allowances). Today, with the recent announcement of the North American Renewables Registry by APX Inc, the whole country is now covered by a registry, all of which can be connected for REC trading (Figure 4).

Figure 4 – Environmental registries in the U.S.



Source: "The Intersection between Carbon, RECs, and Tracking," Webinar: Environmental Tracking Network of North America, November 20, 2009 http://www.etnna.org/images/PDFs/ETNNA%20Presentation_Nov%202009%20webinar%20FINAL.pdf

Although 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 state RPS programs are defined differently; RECs are defined differently in terms of environmental and other attributes; and sometimes states do not allow interstate trading. It is said that this restriction on interstate trading of RECs by states may be in violation of the interstate commerce clause but there has been no court case yet on this basis.

The current discussion in the Congress around various RES bills is a symptom of these differences and states' desire to protect their own goals and their own regulatory authority. Local economic development and local environmental benefits often become the central issues 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.[12]

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. As more and more states implement greenhouse gas policies, definitional differences will likely become more critical.[13] But, 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 or the federal government legislate, say GHG emissions. The Environmental Tracking Network (ETNNA) is a voluntary association of various stakeholders in environmental markets that are trying to promote harmonization among environmental registries in North America to accommodate larger markets for various products.

State RPS programs

As of August 2009, 29 states and the District of Columbia have implemented Renewables Portfolio Standard (RPS) programs and six other states have renewable goals that are not mandatory (Figure 1). Comparing the mandatory RPS programs, it becomes clear quickly that policies differ, sometimes significantly, across jurisdictions. Some of the potential areas where state policies may differ are listed below:[14]

- 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 set-asides or other tiers are used
- Use of credit multipliers for favored technologies

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[12] Detailed information on the State-Federal RPS Collaborative can be found at http://www.cleanenergystates.org/JointProjects/State-Federal-RPS.htm?locale=en-US.

[13] 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.

[14] From *Renewables Portfolio Standards in the United States: A Status Report*, presentation by Galen Barbose, Lawrence Berkeley National Laboratory, 32nd IAEE Conference, San Francisco, June 23, 2009. Also see the comparison at http://www.dsireusa.org/summarytables/rrpre.cfm.

- 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

These differences are driven by each state's priorities. Some of the common drivers are reduction of emissions and increasing energy security via diversity; but often the key political driver for RPS legislation is local economic development. The employment and tax revenue opportunities associated with new facility construction and potential for attracting manufacturing facilities (e.g., for wind turbines and blades) help garnering sufficient support for RPS policies in state legislatures.

As such, resource eligibility is often defined to favor local resources and local industries. States may limit out of state renewable generation that is eligible towards meeting their RPS mandates. Similarly they can restrict trading of RECs across state boundaries. The importance of these considerations has become clearer during the discussions surrounding regional harmonization efforts and the federal RES proposals.

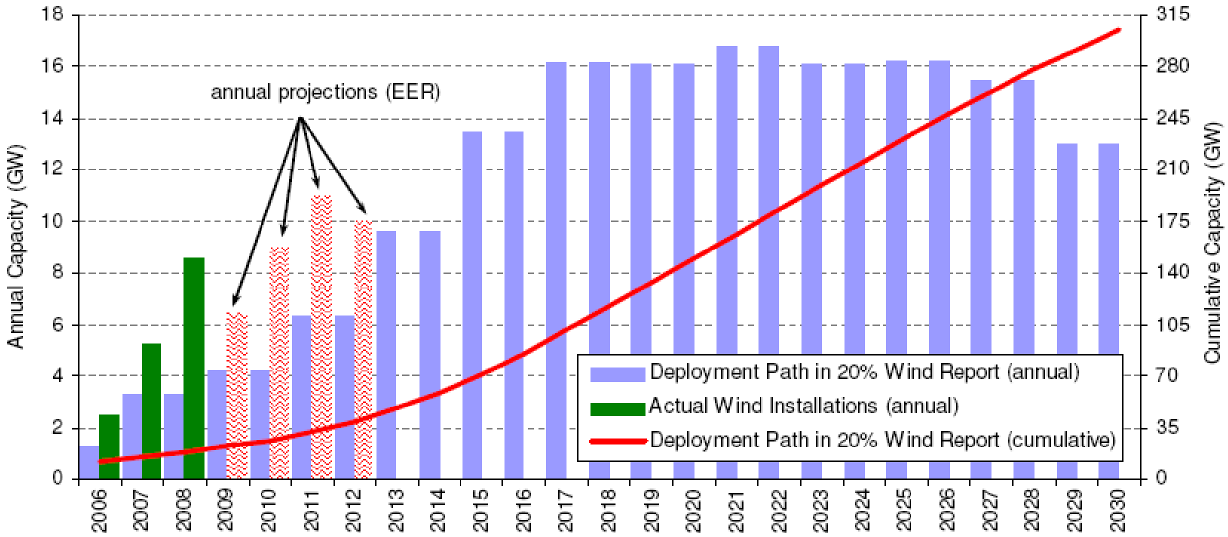
Enlarging RPS markets

The economic rationale behind regional or national REC trading is straightforward: renewable generation facilities will be built where the resources for most competitive technologies (e.g., wind) are most prolific in order to meet RPS mandates. This way, the share of renewables within the nation's generation portfolio can be increased most efficiently (least cost to consumers), excluding transmission constraints. A larger market for RECs will increase the number of buyers and sellers, leading to a more liquid market with competition driving down the price. Such a market could create more predictability in terms of the future value of RECs, which would help with the financing of renewable projects. It is also possible that administrative costs of compliance for LSEs, developers, and others may go down as they do not have to deal with individual state rules separately. Smaller states in New England and Mid-Atlantic have been moving in the direction of harmonizing their RPS programs to take advantage of these benefits.

The track record of the wind industry supports this argument of lowest cost renewables winning out in RPS markets. Wind capacity installed in recent years is significantly larger than anticipated under the 20% by 2030 goal (Figure 5). State RPS mandates have incented investment in wind but federal production tax credit (PTC) played the most crucial role; wind investment dropped in years when PTC was not renewed by the Congress (Figure 6). It also helped that wind generation can be competitive with conventional technologies especially in markets where natural gas is the marginal fuel and the price of natural gas is high (roughly

$7/MMBtu or higher). This cost competitiveness renders wind a significant supply option; increasingly utilities are building more of their own wind rather than meeting their RPS mandates through power purchase agreements (PPAs) or RECs.

Figure 5 – Actual wind installations compared to 20% Wind Report



Source: *2008 Wind Technologies Report*, Energy Efficiency and Renewable Energy, DOE, July 2009. Main authors are Ryan Wiser and Mark Bolinger from Lawrence Berkeley National Laboratory.

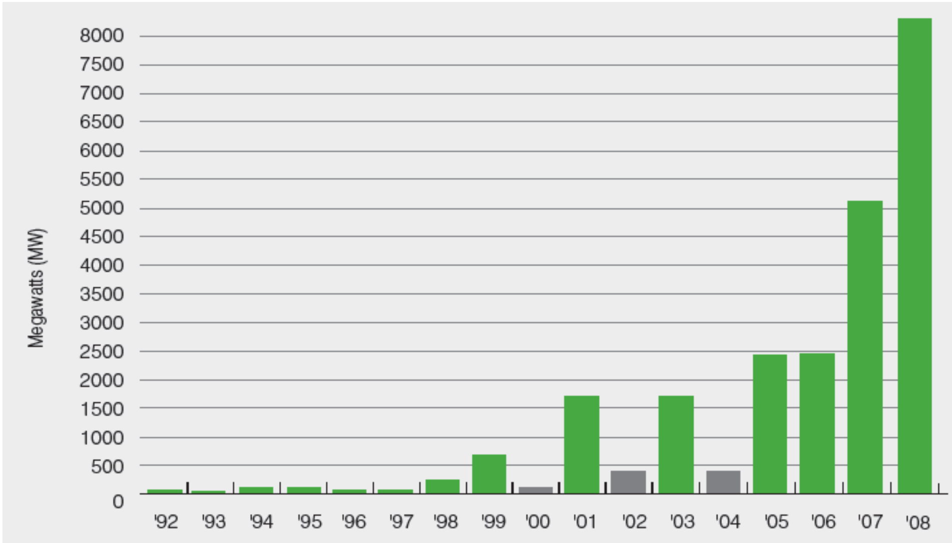
The future trend of wind investments, however, is by no means guaranteed. There are significant transmission constraints from many of the prolific wind areas to the load centers. The competitive renewable energy zones (CREZ) approach of Texas has led to the decision to build new transmission lines to basically accommodate 18 GW of wind capacity. This approach has been studied around the nation and now being adopted in Western states.[15] But, the need for new transmission capacity is reported to be much higher than what these projects are designed to deliver (see discussion in the next section).

Also, in recent times, cost competitiveness of wind has been challenged. Lower natural gas prices reduced competitiveness of wind in many markets. Operation costs appear to be lower for larger and more recent wind facilities. Given that more recent wind farms tend to be larger, their lower O&M costs may help overcome the impact of lower natural gas prices. But there is also an increase in capital cost of wind facilities. The installed cost per kW has increased by about $700 from 2001 to 2008, mostly due to an increase in turbine prices. In 2009, based on announced projects, an additional increase of $205/kW is estimated for an average cost of $2,120/kW.[16]

[15] In June 2009, Western Renewable Energy Zones Initiative, a joint effort of Western Governors' Association and the U.S. Department of Energy published its Phase 1 Report. The report and additional information can be found at the initiative's web site: http://www.westgov.org/wga/initiatives/wrez/.

[16] *2008 Wind Technologies Report*, Energy Efficiency and Renewable Energy, DOE, July 2009. Main authors are Ryan Wiser and Mark Bolinger from Lawrence Berkeley National Laboratory.

Figure 6 – Annual installed wind capacity and the impact of PTC



Source: data from American Wind Energy Association (AWEA) as reported on the web site of Union of Concerned Scientists. (http://www.ucsusa.org/clean_energy/solutions/big_picture_solutions/production-tax-credit-for.html)

Other renewable resources and technologies have not been able to penetrate the market as much as wind despite some additional incentives such as solar carve-outs in RPS programs of some states or extended federal investment tax credit for solar facilities. As such, wind deservedly attracts most of the attention when enlarging RPS markets and REC trading is discussed. But not all states with an RPS program have good wind resources; in such states, the RPS program is designed to promote locally available resources such as various biomass feedstock, small hydro, and geothermal among others.

Challenges to enlarging RPS markets

A recent report prepared for the Clean Energy States Alliance and the Northeast / Mid-Atlantic RPS Collaborative identifies some of the key market barriers to enlarging RPS markets and offers possible solutions.[17] Although the report focuses on harmonization of REC trading among a group of states in a region; its findings apply equally if not more forcefully to the federal RES proposals. In the report, the list of potential differences and market barriers are provided as follows (quite similar to the list by LBNL researchers provided above):

- Definition of resource eligibility
- Generator vintage requirements
- Incremental renewable generation
- Customer-sited facilities
- Geographic eligibility and energy delivery requirements

[17] *Increasing Coordination and Uniformity among State Renewable Portfolio Standards* by Edward Holt, Ed Holt & Associates, December 2008 (http://www.cleanenergystates.org/Publications/CESA_Holt-RPS_Policy_Report_Dec2008.pdf).

- RPS structure
- Credit multipliers
- Compliance mechanism: RECs or no RECs
- REC definitions
- Flexibility mechanisms (REC banking and borrowing)
- Cost caps and alternative compliance mechanisms

Some of these design elements are likely to be more important than others from the perspective of harmonization of regional markets, or development of a national market under a federal RPS program. Although not included in the list above, the shortage of transmission capacity is probably the single most important obstacle in front of expanding REC markets, especially at the national level; because it prevents building more renewables capacity where the resources are available.

Definition of resource eligibility

For example, states use different definitions of eligibility, primarily to favor locally available resources, which may limit purchasing RECs from other states if the REC is associated with a resource that is not eligible in a particular state. There are significant differences especially when defining eligible hydropower (e.g., nameplate capacity, no change of river flow, fish passage enabled, etc.) and biomass (fuel feedstock) facilities. Some states include wave energy or geothermal resources, which are geographically constrained.

The Mid-Atlantic RPS Collaborative developed standard resource eligibility definitions; member states now consider the acceptability of these definitions from the perspective of their state goals.[18] Developing such standard definitions that cover resource eligibility as well as vintage year, and whether generation is incremental or on-site will go a long way in enlarging REC markets. This standardization may initially focus on a particular group of resources (often called first tier, or Class I in states where there are multiple tiers, or classes), allowing states to pursue more localized resource development policies in other tiers.[19] Class I usually covers new, larger scale development, which can benefit from a more liquid REC market from the perspective of financing; REC revenues can be shown as another cash flow. Still, this process will be politically challenging as it will most likely need new legislation (amendments to existing RPS laws).

Geographic eligibility

Many states require renewable facility to be located in the state, or within the region (e.g., NEPOOL or PJM). This requirement applies to either the whole mandate or a large portion of it (often greater than 75%). Rather than requiring in-state generation, Colorado provides credit multipliers for in-state generation.

[18] See the Appendix of the report by Edward Holt, December 2008.
[19] Currently, there is only one group of renewables in Texas but it is possible for PUCT to add a second and a third tier to cover solar and biomass resources separately.

Although not a direct restriction on geographic eligibility, different operational requirements of independent system operators (ISOs) can also limit trading of RECs as they may constrain actual delivery of renewable electrons. For example, energy delivery requirements of ISOs or utilities may differ; this variation can create challenges to intermittent resources such as wind and solar in terms of compliance with hourly or less than hourly scheduling needs of the ISOs. If a renewable generator cannot deliver the promised amount during any operation time block of the ISO, it will not have a valid REC for the MWhs that are not delivered. If those RECs were already sold, the generator would have to mitigate the difference somehow; presumably, the REC sale contract will have a relevant clause. In any case, this situation will likely increase the cost. Also, the generator may have to meet the actual MWh gap in ancillary services markets, which will increase the cost. In short, different rules across ISOs can have cost implications and may limit REC trading.

Alternative compliance payments

Some states set penalties or alternative compliance payments (ACP) low in order to cap cost increases to end users. There could be tiered approaches to these payments. At the regional (or national) level, existence of such varied ACPs will distort the market, especially if mandates are high relative to resources (i.e., demand for RECs is larger than their supply). Investment will flow into states with highest ACP or penalty as developers would expect REC prices to approach ACP.

Attributes

For larger markets to yield utmost benefit it is also necessary for unbundled REC trading to be allowed in all participating states and for REC definitions to be consistent. States attached different attributes to their RECs; most significant may be emissions attributes. Since a cap and trade market for GHG emissions is proposed in ACESA, and about half of the states already have their own goals or policies to reduce GHG emissions, renewable generators would like to capture the value associated with emissions reductions due to renewable generation. FRECs, as defined in the current bills, do not have any environmental attributes. Hence, trading of FRECs should not interfere with states whose RECs have such attributes. But, if one wants to use RECs for environmental benefits as well (e.g., GHG emission reduction), they will have to retire both the state REC and FREC due to additionality requirement of emission reduction benefits (i.e., renewable investment would not have happened if not for emission reduction purposes).

Tracking and verification

Although there is some detailed discussion about technical issues such as tracking and verification across state boundaries (or with respect to federal RECs); these are, by all accounts, can be addressed relatively easily by building upon existing trading infrastructure (e.g. ERCOT, M-RETS, WREGIS, etc.) and by coding federal RECs and state RECs in a way to make it easier to track. For example, resource eligibility does not seem to be an issue from the perspective of tracking platforms. Systems already have identifiers for vintage, resource, and other characteristics based on state REC definitions. If a regional or federal RPS has different eligibility criteria than existing state definitions, a new data field can be easily added. Some of these are discussed further in sections below.[20]

Local development and environmental goals

The more fundamental concern about enlarging RPS markets and, particularly, of federal RPS rests on the risk of wider REC trading undermining individual state goals of local development and local emission reduction. The following paragraph from a recent article in The News & Observer in North Carolina is representative of what many other states think:[21]

> *"If we're burning coal in our power plants and buying wind credits in the prairie states, that doesn't give us any environmental advantage," said Rosalie Day, policy director at the N.C. Sustainable Energy Association in Raleigh. "The purpose is to create jobs and environmental benefits in our state."*

Transmission constraints

The shortage of transmission capacity from regions where wind resources are most productive is probably the single most significant obstacle in front of expanding wind capacity. A recent report by the two major renewable energy industry associations, American Wind Energy Association and Solar Energy Industries Association, identify some of the major impediments to nationwide transmission expansion. Some of the suggested remedies include pro-active transmission planning, interconnection-wide transmission cost allocation, and streamlined federal transmission siting processes.[22]

It will be difficult to reach a consensus around these issues. For example, a recent decision by the Midwest ISO (MISO) to temporarily remove all the network upgrade costs from transmission owners and put them onto generators is moving in the opposite direction of having interconnection-wide cost allocation. Two utilities, Otter Tail Power Company and Montana-Dakota Utilities, serve areas with some of the best wind potential in the U.S. Historically, the cost of transmission facilities was divided 50-50 between generators and transmission utilities. In the case of wind, however, most of the load will be outside of these utilities' service territories; as such utilities did not want to pay for 50% of the cost of connecting new wind farms to the grid and threatened of leaving MISO unless the cost allocation policy changed. In response, MISO changed cost allocation for one year: cost of lines with 345 kv and above would be covered 90% by generators and 10% by everyone on the grid on a postage stamp basis; generators are responsible for the full cost of smaller lines. MISO argues that most of the benefits will be enjoyed by the

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[20] The Environmental Tracking Network of North America (ETNNA) has been paying close attention to these technical issues and has developed a list of suggestions to accommodate federal RECs. These suggestions can be found in the ETNNA white paper, *System Changes to Serve a Federal RES*, which is available at http://www.etnna.org/images/PDFs/ETNNA-WHITEPAPER_System-Changes-to-Serve-a-Federal-RES-final1.pdf.

[21] The article by staff writer John Murawski was published on July 31, 2009 and can be found at http://www.newsobserver.com/business/story/1628333.html (accessed on August 3, 2009).

[22] *Green Power Superhighways Building a Path to America's Clean Energy Future*, a joint publication of American Wind Energy Association and Solar Energy Industries Association, February 2009.

generators and demand for wind will still be there due to RPS mandates. But, wind developers are raising concerns about increased costs and difficulty of financing.[23]

Many of these issues are similar to those addressed by the Order 2000 of FERC in December 1999, which developed a standard market design built around the regional transmission organization (RTO) concept. But, many states, including Texas, were not supportive of the federal authority brought about by this rulemaking. ERCOT is an extreme case as it is fully within Texas and mostly exempt from federal regulation.

Early in 2009, there were at least two bills in Congress to promote major interstate transmission projects (one by Senator Reid and the other by Senator Bingaman); they are now built into the overall energy-climate bill under discussion in the Senate. The ACESA that passed the House contains some provisions for transmission planning, but does not address the cost allocation and siting issues. Senator Reid's bill addresses many of the issues identified in the joint report by AWEA and SEIA. Senator Bingaman's bill used to be mostly the same as that of Senator Reid; but it has been amended by Senator Corker. The amendment undermined broad cost allocation provisions. Although the main discussion around the Senate version of ACESA surrounds the cap and trade provisions as well as federal RES structure, there are some heated discussions about transmission expansion provisions as well.

There is also support for transmission in the American Recovery and Reinvestment Act of 2009 in the form of $80 million to the Office of Electricity Delivery and Energy Reliability at the DOE to "facilitate the development of regional plans". This assistance would include a resource assessment and analysis of future demand and transmission requirements, presumably in collaboration with ISOs and utilities in each region. There are also more federal funds being made available for "smart grid" demonstrations although these funds are not likely to be used for construction of high voltage, long distance lines but rather for making existing grids "smarter".

Even if a federal law that supports nationwide transmission expansion along the lines of the joint AWEA-SEIA report passes, significant challenges to siting, permitting and constructing these facilities will likely remain as they represent local and private interests. The recent history of transmission expansion by utilities around the nation provides plenty of examples. It took American Transmission Company a total of 10 years to start operating a line of about 220 miles from Duluth, Minnesota to Wausau, Wisconsin at a cost of $440 million. Only two years of that time was spent on construction; the first eight years were spent to win the permits. The Interior Department took a year to approve the line crossing a wild river and required a $5 million contribution to a national park; this one-year delay raised costs by an additional $12 million. The latter example also questions the assumption of expediency of federal permitting.

There are many more examples. The International Transmission Company is trying to build a 26-mile line in Michigan. Some think that, this line could have prevented

[23] For details on this story, please see *Restructuring Today*, August 28, 2009.

the 2003 blackout if it were in place then. The Michigan officials have approved the project, but a homeowner is challenging it in court.[24]

In the absence of transmission lines from resource rich regions of the country to some of the load centers, renewables cannot get dispatched and generate RECs that can be traded. Also, without sufficient transmission capacity, they will not get built as they will not get financing. Chasing available transmission capacity may lead developers to select sites with lower resource quality or more expensive technologies that are not transmission dependent (e.g., solar PV, biomass). As a result, the cost of compliance with RPS mandates will increase.

Comparison of federal proposals

In early 2009, there were three federal RPS bills promoted by Senator Bingaman, Senator Udall, and Representative Markey. The latter was merged into the American Clean Energy and Security Act of 2009 (H.R.2454) sponsored by Representative Waxman, Chairman of the Energy and Commerce Committee, in addition to Representative Markey. This bill was approved by the House in June 2009. According to ACESA, renewables goal is gradual: 6% for 2012-13, 9.5% for 2014-15, 13% for 2016-17, 16.5% for 2018-19 and 20% by 2020. The Udall bill did not progress. Senator Bingaman sponsored S. 1462, American Clean Energy Leadership Act (ACELA). According to ACELA, renewables goal is again gradual, starting at 3% for 2011 rising to 15% by 2021.[25] In Table 2, some of the key differences between the two remaining bills are listed based on these studies.

Table 2 – Some of the key differences

Criteria	ACELA (S. 1462)	ACESA (H.R. 2454)
RES Target	3% (2011) rising to 15% by 2021	6% (2012) rising to 20% by 2020
Energy Efficiency Share	Up to 26.67% of requirement	Up to 25% of requirement with additional 15% by petition from Governor
Distributed Generation	3-fold credit for projects up to 1MW	3-fold credit for projects up to 2 MW
Exempted Utilities	Any below 4MM MWh/year + Hawaii	Any below 4MM MWh/year
Voluntary green power	Not addressed.	Not addressed.
Administrative Authority	Department of Energy	FERC
Allows state standards higher than federal	"…nothing diminishes any authority of a State…to adopt or enforce any law or regulation respecting	''(k) SAVINGS PROVISIONS.—Nothing in this section shall—''(1) diminish or qualify any authority of a State or political subdivision of a State to—

[24] Hurdles (Not Financial Ones) Await Electric Grid Update, by Matthew L. Wald, *New York Times,* February 7, 2009. CEE is developing a database of recent transmission projects around the country in order to identify typical siting challenges that delay these projects and typical duration of such delays. These issues will be discussed at a national transmission forum in Washington, D.C., January 26-27 to be organized by CEE.

[25] As compared to some state mandates, the targets in any of these bills are not high; yet, as discussed, there is opposition from some states.

	renewable energy or energy efficiency, or the regulation of electric utilities."	"(A) adopt or enforce any law or regulation respecting renewable electricity or energy efficiency, including any law or regulation establishing requirements more stringent than those established by this section, provided that no such law or regulation may relieve any person of any requirement otherwise applicable under this section
Definition of FREC	1 kWh, no further details.	One MWh of renewable electricity with unique serial number.
Disposition of "excess" federal RECs at state levels	Not directly addressed; assumed that states can decide what to do	Gives states discretion to trade, sell or retire
REC tracking	Unclear. Delegation of REC and Energy Efficiency Credit market to an "appropriate market making entity" but delegation of "the tracking of dispatch of renewable generation" to "regional entities."	Yes. "…rely upon existing and emerging State or regional tracking systems that issue and track non-Federal renewable electricity credits"
Banking	3 years	3 years
Alternative Compliance Payments	2.1¢/kWh ($21/MWh) adjusted for inflation	$25/MWh
Use of ACPs	Returned to Governors for 1) supporting renewable energy development, 2) rate relief to consumers or 3) energy efficiency support	Payments made directly to states for use in deploying renewable energy technologies or cost-effective energy efficiency programs and measures; reporting of fund use required.
Penalties	Federal penalties reduced by state penalties paid if state RES is higher	Federal penalties not reduced by state penalties
Retail Rate Cost Cap	4% above baseline rates	None specified

Primary Sources: 1- Clean Energy Group memo to State-Federal RPS Collaborative members, June 3, 2009; 2- "Comparative Analysis of Three Proposed Federal Renewable Electricity Standards" by P. Sullivan, J. Logan, L. Bird, W. Short, National Renewable Energy Laboratory, May 2009 (www.nrel.gov/docs/fy09osti/45877.pdf).

Market design issues and state concerns

There have been several studies comparing and evaluating these competing proposals. Some industry groups provided suggestions on how to modify the bills (especially ACESA) to be more consistent with existing state programs and tracking systems. For example, the Clean Energy Group that manages the State-Federal RPS Collaborative Project filed some comments on ACESA and provided information to Collaborative members to comment as well.[26] The Renewable Energy Marketers Association (REMA) has several objectives to ensure that a voluntary market for renewable energy continues to be supported under a federal RES: prevent double-counting of voluntary purchases and mandated renewable energy; encourage competitive, liquid markets for renewable energy credits; reduce confusion between state and federal RES requirements; and build on what states have already done to foster renewable energy markets. REMA's comments on ACESA reflect these objectives.[27]

Overall, the concerns about federal RES proposals seem to concentrate on a handful of design elements and the desire of states to maintain their authority. Following are detailed discussions of some particular issues, about which there seems to be a consensus although there are nuances.

Dual REC markets

Creating a dual REC market, one for federal RECs, or FRECs, and one for state RECs, could cause tracking problems and associated disputes about ownership of each. A possible solution is to bundle the FREC with a state REC; FREC can be defined as an attribute of the state REC (like environmental attributes). But neither bill considers this option. This FREC attribute can be unbundled and traded separately; but it will be easier to keep track as it will have the same serial number as the state REC. This will help with prevention of double counting. It will also help if RECs are sold together with the power: both REC and FREC will transfer together rather than having to keep track of them separately. The system can keep track a REC that also includes FREC attribute by modifying the serial number, say with a "D" at the end for dual. If and when FREC is sold or retired separately, "D" may be dropped.[28]

On ACELA, one particular concern is the provision for establishing and administering a new federal REC tracking and market mechanism. There are existing state and regional tracking systems and there is already trading capability among states or regions with these platforms. By all accounts, it will be relatively straightforward to build national trading capabilities upon these existing systems. According to evaluation of adaptation needs of existing tracking platforms to a federal RPS by ETTNA, it would be much easier to modify existing state or regional systems than to create a new national system. ACESA directs the Federal Energy Regulatory Commission to "rely upon existing and emerging State or regional tracking systems that issue and track nonfederal renewable electricity credits."

To prevent double counting of FRECs, a single federal generator registry may be necessary to ensure that each FREC is accurately associated with its issuing tracking system, renewable generator and REC. Most of the data needed for this registry is available publicly from existing tracking systems (e.g., age, technology,

[26] For information on the Collaborative and various documents including comments on ACESA, please see http://www.cleanenergystates.org/JointProjects/State-Federal-RPS.htm.
[27] *REMA Comments on ACESA – Title I: Clean Energy* can be found at http://www.renewablemarketers.org/siteadmin/images/files/file_52.pdf.
[28] For details, see ETNNA white paper, *System Changes to Serve a Federal RES*, which is available at http://www.etnna.org/images/PDFs/ETNNA-WHITEPAPER_System-Changes-to-Serve-a-Federal-RES-final1.pdf.

location); any confidential data that may be needed may be requested by the RES administrator.

States' with higher mandates and trading of excess FRECs

States would like to protect their existing programs, especially those with higher mandates than the federal goals. Both bills include language respecting RPS programs in states. The ACESA language is clearer in allowing states to have higher RPS mandates and recognizing states' experience in RPS market design. The bill allows the lawful holder of an FREC to "sell, exchange, transfer, submit for compliance,…or submit such credit for retirement by the Commission". The bill does not ban or restrict the sale of excess FRECs but acknowledges the authority of RPS states to "…require such retail electric supplier to acquire and submit to the Secretary for retirement Federal renewable electricity credits in excess of those submitted under this section…"

ACELA needs to be more explicit, especially with respect to status of excess federal RECs that will be generated in states with mandates higher than federal ones. If trading of these excess FRECs is allowed, individual state goals of new renewables may be undermined in both RPS and non-RPS states. Also, obligated entities in RPS states may buy these excess FRECs with the intention of selling them to obligated entities in non-RPS states trying to meet their federal RES requirements.

The REMA, however, recommends that the bill go further and require that federal RECs be retired whenever non-federal RECs are used for compliance with a state RPS or for satisfaction of a voluntary renewable energy purchase. Again, this is the same issue as before: if additional FRECs from states with larger mandates than federal are traded, it undermines the goal of building new renewables. Also, to protect additionality promise of voluntary purchases, REMA recommends retirement of FRECs associated with voluntary purchases as well.

Alternative compliance payments

ACELA envisages alternative compliance payments (ACPs) to be returned to states for investing in renewable energy, for supporting cost-effective energy efficiency applications or for providing rate relief to electric customers. The last option (rate relief) creates a loophole for an obligated entity to just pay the federal ACP (i.e., without buying RECs or building new renewables generation or investing in energy efficiency), and collect it back. The CEG recommended a change of language to eliminate "direct grants to electric customers" option.

Issuing FRECs to utilities making ACPs may be difficult and lead to confusion. If FREC is issued to the utility, the generators may be left with a state REC without an FREC attached to it. The generator may have already sold the state REC along with electricity based on a long-term contract. Stakeholder groups recommend that RECs are not issued based on ACP.

Energy efficiency, distributed generation and exemptions

Both bills allow energy efficiency to be counted towards federal RES obligations. Measurement and validation of energy efficiency gains are crucial factors in successful management of such a program. Some principles suggested by the

State-Federal RPS Collaborative are: 1- baseline electricity use should be calculated each year; 2- energy efficiency gains are counted only once and in the first year they were realized; and 3- energy efficiency gains get credit only once in their initial year. After a year, in which a part of the RES mandate was met through energy efficiency measures, the next year's base electricity demand should be reduced by the amount of energy efficiency gains. This way, the obligated entity would have to either further increase efficiency or build renewables or buy RECs.

A recent analysis by the National Renewable Energy Laboratory[29] models the provisions of ACESA and ACELA, and concludes that neither bill will lead to much incremental renewable capacity beyond what would otherwise occur under existing state RPS programs. In fact, both bills will result in less renewable energy than the base case (i.e., current state RPS programs) because their effective RES mandates are lower.[30] Effective RES requirements are lower than nominal targets in these bills because they allow for certain percentage of the mandate to be met by energy efficiency (if fully utilized); they call for credit multipliers for distributed generation and they exempt small utilities. Issuing multiple RECs for a MWh from a DG resource would create problems in the REC market as well as tracking challenges.

Including energy efficiency in an RPS program is consistent with the fundamental goals of reducing emissions and enhancing energy security. Energy efficiency offers a potentially cheaper and quicker option for reducing demand for electricity, especially during peak hours, and cutting emissions without building new facilities as compared to incenting renewables.[31] When implemented as part of the RES mandate, the efficiency option will likely reduce the need for investment in new renewables.

Voluntary markets

For voluntary markets to prosper, all RECs should be fully tradable separate from electricity. Many but not all states already allow such unbundled REC trading. The ACESA also allows unbundled REC trading. But, voluntary green power purchases are mostly ignored in both bills, especially when discussing the double counting issue.

Customers who buy renewable electricity voluntarily expect their purchases to be additional to RPS mandates, preferably both at the state and federal level. Many states already have language in their legislation or regulation that ban the use of RECs associated with voluntary purchases for compliance with mandates. The

[29] "Comparative Analysis of Three Proposed Federal Renewable Electricity Standards" by P. Sullivan, J. Logan, L. Bird, W. Short, National Renewable Energy Laboratory, May 2009 (www.nrel.gov/docs/fy09osti/45877.pdf). Another study also show that federal RPS provisions in ACESA will not add more renewables than either the existing state RPS programs or the cap-and-trade provisions of the bill: "The Merits of Combining a Renewable Electricity Standard with a Greenhouse Gas Cap-and-Trade Policy: An Analysis of the American Clean Energy and Security Act of 2009 (H.R.2454)" by Michael Neimeyer, Scott Bloomberg, and Ken Ditzel from CRA International, *USAEE Dialogue*, August 2009 (http://www.usaee.org/pdf/Aug09.pdf#d17).

[30] Note that the analysis was done on earlier versions of the Bingaman and Waxman bills which originally had higher RES targets (20% and 25%).

[31] The American Council for an Energy-Efficient Economy (ACEEE) has been promoting benefits associated with an increased focus on energy efficiency and has identified a large potential for improving efficiency across the country. For details on www.aceee.org/energy/national/eers.htm.

expectation is that, at the federal level as well, voluntary demand for renewable electricity or RECs should not be counted towards a federal requirement.

The ACESA prohibits using a federal REC more than once for compliance with the federal mandate; but it does not explicitly prohibit counting voluntary green power purchases towards federal RES compliance. In order to correct this shortcoming, for example, REMA suggest the following language in subsection (e)(7): "…a federal REC can only be used for compliance with mandates, *or for voluntary purchases*." (the text in italics is the suggested addition).

Ownership of FRECs

The ownership of and rights to FRECs should be clear in any federal RES legislation. Typically existing tracking systems issue the REC to the generator, which can then trade it along with power sales or separately to others. Current bills call for a separate FREC but are not fully clear on the issue of assigning the ownership of an FREC. There are several contingencies that need to be covered: REC only contracts, existing PPAs that are silent on RECs, existing PPAs that include RECs, existing contracts that are silent on FREC ownership, central RPS procurement, and FRECs for ACP. ACELA also prohibits trading of RECs from facilities that existed before January 2006; but some of these are already being traded under state RPS programs. To address all of these potential complications, stakeholder groups (e.g., REMA, CEG RPS Collaborative) suggest language that clearly assigns ownership under all contingencies.

Alternatively, the tracking systems can add protocols to keep track of FRECs. For example, a prefix/suffix can be added to identify the region where the original FREC was issued (e.g., E for ERCOT, etc.); federal RES retirement accounts will be created separate from their state RPS retirement accounts. In the case of central procurement, agency responsible for it will open an account and FRECs can be transferred to compliance accounts of responsible utilities. Similarly, the agency administering the ACP should provide the data for allocating FRECs proportionally to entities that paid ACPs (as discussed before, the preference of many is for not issuing FRECs to utilities paying ACPs). In the case of contracts (PPAs, REC contracts) that are silent on FREC ownership, the FREC would be issued and put into the generator's account by the tracking system but a new protocol would automatically transfer those FRECs to the power purchaser. The system would require the information on ownership from generators. Existing versus new resources preferences do not matter much either as date of service data is already collected by existing tracking systems. This data also helps with the banking provision.[32]

Undermining regional efforts

The most advanced among regional efforts of harmonizing RPS markets is probably the Northeast / Mid-Atlantic RPS Collaborative. There are 10 states in this initiative that are trying to enlarge the regional REC market by standardizing definitions and

[32] For details on these technical solutions, see ETNNA white paper, *System Changes to Serve a Federal RES*, which is available at http://www.etnna.org/images/PDFs/ETNNA-WHITEPAPER_System-Changes-to-Serve-a-Federal-RES-final1.pdf.

so on. These are mostly very small states with limited resources. Some of them have very ambitious goals for renewables. Enlarging the market area will probably reduce the cost of achieving these goals and may expedite the development of new capacity. Other regions are also considering similar collaboration but federal RES development slowed down some of these efforts such as those in the Midwest. The debate around federal RES creates uncertainty about the future structure of the REC market. Under such uncertainty, spending time, effort and money on regional collaboration is seen as potential waste.

Concluding Remarks

With about 35 states with either mandatory RPS programs or non-mandatory renewables goals, the U.S. is making good progress on expanding its renewables capacity. There are existing efforts to harmonize RPS programs and REC markets in certain regions. Current federal RES proposals are not likely to add a single MW of renewables capacity above and beyond what existing state programs require or what the cap-and-trade provisions of ACESA would incent. But, the renewables capacity that will be added under a federal RES program will likely be more efficient (i.e., least cost resources would be developed first). In such a system, Texas could benefit as excess RECs produced in the state can be exported.

Yet, there is a significant obstacle in front of this efficient development scenario: lack of transmission capacity from the best wind and solar regions in the country to load centers. Although there are provisions in ACESA and ACELA for easing regional transmission development and there is funding from the DOE under the stimulus package, challenges to transmission are more granular and concentrate around the siting of facilities and obtaining permits in the face of local opposition. There is increasing resistance to long distance, high voltage transmission lines even from some environmental groups; one concern is that, once they are built, the lines could be used to ship electricity from conventional thermal plants.

Also, the states are concerned about a federal RES program because it will likely undermine their individual goals of local economic development and emission reduction. Most state RPS programs are designed based on local conditions (e.g., resource availability and market structure) in order to achieve these goals. These perspectives of states are fully represented in Senate discussions.

Since ACESA was passed in the House in June 2009, the debate in Congress on climate change, federal RES and transmission slowed down significantly. Other issues such as the contentious health care reform took the center stage. As a result, Congress will produce neither a comprehensive bill such as ACELA nor a carve-out federal RES legislation in 2009. Copenhagen meetings on climate change will impact the future strategy of environmental and renewables legislation in the U.S. but issues such as health care reform and the recovery of financial and economic systems will determine the fate of major renewables/climate legislation.