Treatment of Environmental Attributes Across Tracking Systems
Final

Environmental Tracking Network of North America (ETNNA)

This is the fourth in a series of issue papers developed by ETNNA (formerly the North American Association of Issuing Bodies -- NAAIB).[1] The ETNNA mission is to create a forum for the coordination and cooperation of existing and emerging systems issuing, tracking or registering electric generation, conservation or other environmental attributes in North America and to foster the development of new systems. ETNNA is technology and policy neutral

Introduction

Generation and renewable energy certificate (REC) tracking systems have quickly spread across North America. Five regional certificate tracking systems cover most of the U.S., parts of Canada, and northern Baja California. These are:

- Electric Reliability Council of Texas – (ERCOT)
- New England Power Pool/Generation Information System (NEPOOL/GIS)
- PJM Generation Attribute Tracking System (GATS)
- Western Renewable Energy Generation Information System (WREGIS)
- Midwest Renewable Energy Tracking System (M-RETS)

In addition, New Jersey has operated a tracking system for solar RECs though it has now moved from its own system to using PJM GATS. New York State is planning to transition from a manual tracking system to an automated system more compatible with its neighbors. Early January 2009, APX, a commercial service provider, is launching a default tracking system for the remaining states in the U.S. not served by any of the existing systems.

Most of these electricity tracking systems were originally established to support environmental disclosure requirements, or to facilitate renewable portfolio standard (RPS) compliance, and most now also support voluntary renewable transactions.[2] As a result, depending upon when the system was designed, the definition of what environmental attributes are associated with a REC for the purpose of participating in the tracking system has sometimes been confused with individual state definitions of renewable energy credits that are eligible for specific RPS programs. Some state RPS programs define which attributes are required to be contained in their RECs, while other state policies are silent or very general regarding specific environmental attribute requirements. Likewise, many REC marketers, and the buyers of voluntary REC products, make claims about or define in contracts the environmental benefits of renewable power and greenhouse gas emission reductions that may or may not be consistent with REC definitions in tracking systems.

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[1] "Best Practices to Avoid Double Counting";" "Recommended Common Treatment of Behind the Meter Generators in Certificate Tracking Systems;" and "Best Practices for Transferring Certificates Across Tracking Systems."

[2] NREL estimates that in 2006, voluntary renewable energy sales represented approximately 20% of the U.S. market, on the order of 12 million MWh.
Bird, L. and E. Lokey, 2007. "Interaction of Compliance and Voluntary Renewable Energy Markets." NREL Technical Report / TP-670-42096 October 2007

Given recent activities to reduce greenhouse gases (GHG) by both individuals, companies, and other types of governmental and non-governmental institutions, there is increased interest in ensuring that consumers, regulators and other stakeholders know what they are buying when they purchase a REC, including the environmental attributes associated with the production of that REC.

The first question this paper addresses is: *Can tracking systems agree on a consistent definition of the environmental attributes that must be associated with a REC that is issued and/or tracked by these systems so that, should they desire to do so, imported RECs can be viewed as a common currency?*

Using RECs from one region to satisfy the private environmental goals of a voluntary buyer or state RPS in another region may be difficult to verify if the RECs convey different attribute information. Harmonizing the capabilities and types of environmental information tracked within the systems may create a more liquid market while reducing confusion and the potential for fraud.

A second question being explored is: *Are there other types of environmental or generation related data that could be added to the tracking system databases associated with RECs that would improve information transfer and liquidity in the marketplace?*

This paper is intended to provide guidance for tracking systems that would like to create uniformity in the treatment of environmental attributes associated with RECs in a manner that meets the needs of all state RPS programs and other compliance markets as well as the needs of the voluntary REC market. There are several opportunities presented here for tracking system operators to help increase liquidity in the larger marketplace, improve flexibility of the tracking systems and provide more accurate information for their clients.

The paper has three distinct parts:
Section 1 -- Certificate Definitions;
Section 2 -- REC Requirements versus Explicit Tracking; and
Section 3 -- the Regulatory Landscape.

Under *Section 1 -- Certificate Definitions* the paper describes (a) REC definitions used by state RPS programs and (b) REC definitions used by tracking systems. The paper then discusses REC requirements versus the explicit tracking of renewable attributes (direct, derived and regulatory allowances). This second section also discusses numerical values for derived attributes. *Section 3 The Regulatory Landscape* provides an example of the Regional Greenhouse Gas Initiative (RGGI) for how this cap-and-trade program might affect REC definitions and REC use in these northeastern states. A second example illustrates how the integrity of the REC can be maintained in a tracking system, regardless of individual state policies.

Section 1. Certificate Definitions

Tracking System REC Definitions

The certificate tracking systems all have definitions of what is included with a REC or certificate that they issue and track. For example, ERCOT, GATS, WREGIS and M-RETS are similar in that they all define a REC as encompassing "all of the attributes," "all of the renewable attributes," or "all renewable and environmental attributes." Although NEPOOL/GIS does not have a definition in its operating rules, the participating states generally use similar language. See Appendix A for the tracking system definitions.

An important difference among these tracking systems is the level of specificity about these attributes, in particular regarding derived attributes -- emission reductions, credits or allowances that are the result of the renewable power displacing an emitting resource. It is important to note that voluntary markets and most compliance markets are motivated by a desire or expectation of emission reductions. Where recognized, such emission reductions have monetary value in emission cap-and-trade markets, as well as in unregulated voluntary carbon offset markets.

The three most recently implemented tracking systems (GATS, WREGIS and M-RETS) have some common ancestry with regards to the handling of attributes. GATS and M-RETS specify that none of the renewable attributes have been separately sold, given, or otherwise transferred to another party by a deliberate act of the certificate owner. GATS, WREGIS and M-RETS further define these attributes as any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, (directly) attributable to the generation from the generating unit. GATS and M-RETS emphasize that these emissions reductions must be "directly" attributable to the generating unit. WREGIS has a similar definition, but omits the word "directly."

The WREGIS definition alone continues to explain what attributes are *not* included:
Attributes not included with WREGIS RECs are power attributes, financial incentives applicable to income tax obligations, tipping fees for disposal of certain fuels or pollutants, and (most relevant to this discussion) emission reduction credits encumbered or used by the generating unit for compliance with operating or air quality permits.

Validation of this requirement is accomplished through the use of an attestation signed by the renewable generator when the generator account is opened. However, most tracking systems do not require attestations by participants in later transactions so there is a risk that attributes may be stripped off after they are sold by the generator without the knowledge of the tracking system.

Recommendation

As state regulators oversaw the development of the various regional tracking systems that currently exist, they used a broad REC definition that encompassed the environmental attributes referenced by the most comprehensive state RPS and voluntary market definitions in order to

meet the needs of all state RPS and green power programs that would be using the system.[3] This approach is consistent across all the existing tracking systems and ETNNA recommends that this approach be continued. This broad REC definition accommodates the widest group of tracking system users while allowing for more restrictive definitions and eligibility requirements within individual programs.

The majority of the existing tracking systems are very close to a common definition of what is included in RECs they issue and track.[4] Moreover, not only are these definitions compatible, but they also accommodate the most comprehensive state RPS REC definitions (see below). Therefore from the perspective of REC compatibility when transferring a REC from one system to another, it seems the definitions presently used are adequate as long as they are backed up by an attestation or verification mechanism.

However, to the extent that other types of account holders that later take custody of the REC do not sign similar attestations, there is the possibility that the attributes associated with the REC may have changed. Therefore it might be advisable to add an attestation to account-holder application forms similar to that included in the generator forms.

Finally, as states, regions and ultimately the Federal government enact greenhouse gas reduction policies, the implementation details of these programs will inform the definition of what is included in a REC depending upon a number of factors such as where the generator is located, when the facility became operational, and who is buying the RECs. Therefore REC definitions may change over time and for specific jurisdictions depending upon future greenhouse gas policies. But for the present, the definitions currently in use should be maintained.

State RPS REC definitions

Many U.S. states have defined RECs[5] for the purposes of state policy implementation. From the state data publically available:

- Seven states (AZ, CA, CO, DE, NY, PA, and WA) have detailed definitions of a REC, including clear direction about whether emission reduction credits or allowances are required to be retired for compliance with their RPS.
- Seven states (CT, MA, MT, NJ, NM, RI, and TX) define RECs as including all the environmental attributes or all renewable and environmental attributes of generation, but are unclear whether environmental attributes refer only to the direct (onsite) emissions from the generator, include derived attributes such as avoided emissions, emission reductions, and/or regulatory allocated assets like NOx credits or allowances.
- Maine and Maryland refer to RECs as representing attributes of generation but do not provide any further description of what those attributes might be.

[3] This refers to the common attributes included in most definitions (indicated above) and does not refer to operational details necessary for eligibility of some types of renewable fuels/technologies.

[4] To the extent that New England states and the Texas PUC are using similar definitions, it can be said that everyone is very close.

[5] The authors were unable to determine if Canada or the Canadian provinces have specific REC definitions plus there are five new RPS states (Il, NH, ND, OR, OH) that have not, at this time, yet defined RECs.

- Wisconsin, Nevada and the District of Columbia define a REC simply as a unit of production.
- From the data available, it appears that three states, Iowa, Hawaii and Minnesota, do not yet define RECs.[6]

Recommendation

Harmonization of Regional RPS programs does not mean that everyone must have the same eligibility requirements for their programs. As long as the tracking systems use the most comprehensive definition of a REC they will still be able to accommodate RECs being used for RPS compliance in states and programs that have less comprehensive attribute requirements.

The most important action is for individual state RPS regulators to refine their own REC definition to ensure it is clear and understandable. Then they can engage in a broader dialogue with other states. Because there is a fairly large subset of states with somewhat ambiguous RPS REC definitions, it would be beneficial to improve the clarity as to the intention of each state REC definition for RPS compliance and tracking purposes. This activity can move forward even if some states do not participate. Each state has its own needs and policies, and regulators may benefit from interaction with other states that are addressing similar needs. Diversity of state RPS definitions can be accommodated by tracking systems and by program administrators. But uncertainty concerning what is intended can make it difficult for tracking system operators, program administrators and purchasers to know what is being purchased.

Section 2. REC Requirements versus Explicit Tracking

The following discussion covers primary and derived renewable attributes and outlines options for integrating some of these data into the system databases.

Primary Attributes

RECs include primary attributes and derived attributes. Primary attributes include:

- Energy Source
- Generation/Conversion Technology
- Plant Location
- Vintage (i.e., when the certificate was created)
- Direct Emissions from the facility

The first four attributes are already included in the REC database currently provided by all of the tracking systems. The only attributes not presently reported in these data sets, except by GATS and GIS, are direct emissions from the facility. However, this is only an issue for biomass, solar

[6] Holt, E. and R. Wiser, *The Treatment of Renewable Energy Certificates, Emission Allowances, and Green Power Programs in State Renewables Portfolio Standards*. LBNL-62574. Berkeley, CA: Lawrence Berkeley National Laboratory. April 2007. This categorization does not include New Hampshire, Illinois, North Carolina, Oregon or Utah, which adopted RPS requirements more recently.

thermal systems using natural gas assist, and geothermal facilities.[7] Other types of renewable energy facilities do not have direct air emissions and therefore have no need for this type of data reporting in a renewable (as opposed to all generation) tracking system.

Biomass and Geothermal Facilities

In the air quality context, the last primary attribute on the above list refers to "tailpipe" emissions from biomass, solar thermal and geothermal facilities. Although small compared to fossil facilities, some biomass, solar thermal and geothermal generators do have direct emissions. Depending upon the technology and fuel used, direct combustion biomass plant emissions can be significant, particularly with regards to nitrous oxides (NOx) and particulates. Biomass combustion facilities may emit carbon dioxide (CO_2), methane (CH_4), carbon monoxide (CO), NOx, volatile organic compounds (VOCs) and particulates. As a result, they require air quality permits before they can be constructed and these emission data are monitored and recorded by local air quality districts even if they are not presently included in renewable tracking system data bases.

Solar Thermal generating units that co-fire with natural gas assist are not issued RECs for the natural gas portion if it is more than 2 percent. However, in WREGIS if the natural gas portion is less than 2 percent of input, the facility is issued RECs for the total amount of the energy output and those RECs do represent a small amount of direct air emissions. The emissions from geothermal facilities are extremely small and are non existent in closed loop systems.

Tracking systems that track all generation, such as GATS and GIS, capture this information. Tracking systems that include only renewable generation, such as M-RETS, ERCOT and WREGIS, do not explicitly track primary emissions data from biomass, solar thermal and geothermal facilities.

This issue can be important for a direct combustion biomass facility that receives and sells GHG allowances or credits. Most state regulators consider biomass to have net zero emissions of GHG since there are such huge benefits from converting the basic fuel (material that would decompose to methane or biogas that would otherwise be degraded, released or flared) to the less potent CO_2. However, if the facility sells the GHG credits associated with fuel conversion, the generation side of the equation would change, resulting in the facility being a positive emitter of GHG rather than a zero emitter. California and some other states require that biomass combustion facilities (whether biogas or solid fuel) selling into the RPS market that wish to sell any GHG benefits they receive for fuel conversion, must first net out any GHG emissions from the generation side so the RECs from biomass facilities will be net zero. The question is whether there is a need for renewable generation information systems to monitor and track the sale of any GHG credits associated with biomass combustion generating facilities. In addition, a separate question arises: Since there are as many different ways of calculating these offsets as there are

[7] Solar thermal plants that co-fire with natural gas also have direct air emissions but WREGIS RECs are issued for the entire energy output as long as the natural gas portion is 2 percent or less. The same protocols can be followed for solar thermal co-fired plants as for biomass facilities if such facilities need to claim net zero emissions for GHG or other purposes. In the future biomass or biogas co-fired with a fossil fuel will also have direct emissions.

registries, would it be useful for potential purchasers to know if a facility is participating in a carbon registry program and registering GHG offsets?

Recommendation

At this time it is probably not administratively necessary or cost effective for renewable generation tracking systems to explicitly track direct GHG emissions from biomass, solar thermal and geothermal facilities. This information is generally captured and monitored by regional air resources boards (ARB). If stakeholders and tracking systems would like this information to calculate carbon neutral claims, it is recommended that these tracking systems interface with the air resources boards to provide the emissions data.

However with regards to facilities with direct air emissions participating in a GHG registry, it would be useful to add a new field for biomass and gas co-fired solar thermal projects to indicate if they are part of a GHG registry and if so, which one. In this way, potential purchasers can check on the specific registry rules and protocols in order to know how they might affect the GHG attributes associated with these RECs.

Derived Attributes

Derived attributes are the avoided emissions from fossil facilities displaced by renewable generation. These include CO_2, CH_4, nitrous oxide (N_2O), CO and particulate matter. Although sulfur dioxide (SO_2) is regulated by the Environmental Protection Agency (EPA) in the United States, Canada does not have the same cap-and-trade regulations, so this emissions benefit may be included with Canadian RECs. Nitrous oxides are also regulated in the U.S.; however, most renewable generators do not receive NOx allowances since the awarding of such allowances is region and project specific. In the current renewable energy marketplace, on a regional basis CO_2 and the other GHGs are the main emissions benefits in which regulators and voluntary consumers are interested.

As described in most of the tracking system certificate definitions, RECs within a system must include all environmental emissions benefits. However, the individual emissions benefits are not specifically called out or tracked within any of the regional renewable energy tracking systems.

How is this information currently handled? There are two mechanisms that are generally used by buyers and sellers of RECs: (1) *contracts* can specifically call out which emissions benefits, including CO_2, are included in a REC transaction; and/or (2) *attestation forms* may be filled out by each entity in the chain of custody to guarantee that none of the emissions benefits, including GHG benefits, have been stripped off or sold to another party.

There are at least four questions that need to be addressed with regard to derived attributes:

1. Is there a useful benefit for tracking systems to indicate in the REC dataset exactly what environmental benefits are associated with those RECs?

2. When a tracking system REC definition says the RECs must include all renewable and environmental attributes directly attributable to the generation of renewable energy, does this include NOx allowances that may have been awarded to some renewable generating facilities but not to other similarly situated renewable facilities? In other words, if some generators are awarded NOx allowances do they have to sell those allowances bundled with the REC if the REC transaction is going to continue to be tracked by the system?

3. If the environmental attributes have been separately sold or traded, is there any benefit of issuing a "Certificate of Generation" (CoG) for what is left?[8] What would be the purpose or use of such certificates and are they likely to improve the flexibility of the marketplace or might they just add confusion?

4. If some state RPS programs do not require RECs used for RPS purposes to include all environmental attributes, is there a role for renewable tracking systems to track the environmental benefits that are left?

Recommendations

1. It is important that buyers and sellers are clear about what is being sold. As mentioned earlier, this can be accomplished in a number of ways including contract language and/or a renewable energy database. Depending upon the existing tracking system design and the agreements in place for tracking system modifications, adding a new field or fields to include environmental data may be simple and relatively inexpensive or difficult and relatively expensive. For systems that are interested in exploring the addition of environmental data, one option is to explicitly track which emissions benefits are included in each REC through the use of checkboxes.[9] This method could be employed for tracking only carbon dioxide emissions benefits or for all avoided emissions. To the extent that a facility has been awarded NOx (or other types of) allowances that are being transferred with the REC, it would be useful to have this information as part of the dataset (as a check box), even though most REC transactions would not include such attributes. The default mode for each REC would be the inclusion of all emissions benefits. If a regulation was in place that stripped off a particular derived attribute, then the tracking system would be able to explicitly indicate that that benefit was not included.

   If using checkboxes for emissions benefits is not a desired method, tracking systems may also consider making the attestation form part of the information that is tracked. Each entity in the chain of custody would need to attest to the tracking system that none of the emissions benefits have been sold separately. Even though whole RECs are tracked by most systems, as evidenced by their operating rules, having the attestation form be a field (or fields) within the system would provide extra assurance to buyers that they are, indeed, receiving a whole REC. This method could also ease the administrative burden of buyers and sellers by automatically keeping the attestation with the certificate.

[8] A Certificate of Generation is used in the European marketplace as a mechanism to prove that a MWh of electricity has been generated by a renewable energy facility without conveying any environmental benefits.
[9] The American Bar Association uses this approach in their model REC contract.

2. It might be useful to include the topic of NOx allowances in the regulatory discussion of state RPS REC definitions recommended earlier in this paper. Not enough is presently known about state RPS compliance requirements in this area to make further recommendations.

3. The question of Certificates of Generation is a more complex issue. At this time there is no market for CoG in North America.[10] To the extent that a state regulatory body should decide that no environmental attributes are required for renewable energy to comply with a state RPS program, the relevant tracking system could consider issuing CoG for this specific purpose. Since tracking systems do not make policy but rather facilitate implementation, the question of CoG is not relevant at this time.

4. The question of generation tracking systems also tracking derived air emissions benefits or other environmental benefits is related to the use for such data – specifically whether generation tracking systems might be used as a tool for GHG cap-and-trade transactions as well as renewable energy transactions. This question is one that will be decided by regional and national cap-and-trade programs rather than by the individual tracking system itself. However it should be noted that the existing tracking systems do have the functionality to offer such a service should it be requested.

   If there is a need in the marketplace for generation tracking systems to track voluntary GHG offsets from renewable energy, and if they are not duplicating efforts of other agencies or organizations, they are certainly well positioned and designed to incorporate such a service. If tracking systems choose to track GHG offsets, in order to maintain integrity in the systems it is recommended that a unit of renewable generation be counted either as one megawatt-hour (MWh) or as the appropriate number of CO_2 tons associated with one MWh. To prevent double counting, it is advisable to convert the entire renewable energy output rather than sell the same product twice.

Numerical Values for Derived Attributes

One additional question related to those above is whether tracking systems would provide a useful service by including the numeric values of the derived environmental attributes (specifically GHGs, if those are included in the data set). There are several established methodologies for calculating the emissions benefits of renewable energy generation. However, at this point there is not consensus as to which value or methodology is universally acceptable.

Recommendation

It is not recommended at this time for tracking systems to include and/or track the numerical values of avoided emissions. Since the tracking systems implement policy rather than set policy,

[10] Certificates of generation (GO) are used in Europe in conjunction with compliance with renewable energy targets. But the rules for their use is still in flux. The GO may end up being used for disclosure purposes only. GHG emission trading rules in Europe awards any environmental benefits to the jurisdictional utility (most renewable projects are owned by jurisdictional utilities); as a result there is not an active market for voluntary RECs.

it is not advisable for them to assign these values.[11] If in the future consensus is reached among regulatory and market participants as to which methodology is appropriate, tracking systems may choose to explicitly track numerical GHG values along with RECs.

Intersection of Renewable Energy Certificate Tracking Systems and GHG Emissions Registries

As carbon markets further develop, the coordination between renewable energy certificate tracking systems and GHG emissions registries is expected to become more important. Coordination could help avoid double-counting and create more standardization for the treatment of renewable energy in these systems. It is beyond the scope of this paper to consider this issue in depth; this topic is expected to be covered by the Environmental Tracking Network of North America (ETNNA) in the future.

Section 3. Regulatory Landscape

It is important for buyers and sellers to know what is included in their renewable energy purchase, especially as regulations across states and regions change. As the compliance landscape for renewable energy and GHG reductions evolves, the tracking systems -- as implementation tools -- are the natural place to keep track of these changes.

If it were only a matter of keeping track of one or two regional regulations that affect what is included in a REC, most market participants would easily be able to understand which derived attributes were or were not included in each REC. However, as more regional and federal regulations are put in place, the marketplace becomes more complicated. While still remaining policy neutral, the tracking systems have an excellent opportunity to help facilitate understanding of the policies in their jurisdiction and build confidence in these markets.

Example: RGGI

Several states in the Northeast U.S. (currently Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont) are formally participating in the Regional Greenhouse Gas Initiative (RGGI). Although not in effect until 2009, RGGI rules will establish a regional cap-and-trade system for carbon dioxide emissions. To protect the voluntary market, some RGGI states (VT, NH, MA, CT, NY, NJ, RI, MD, ME) will set aside allowances for voluntary purchases of qualified renewable energy that, once retired in a RGGI state, will effectively lower the cap and allow purchasers to claim that their purchase is reducing greenhouse gas emissions. This claim will only be true if the renewable energy is generated in a RGGI state *and* purchased and retired in a RGGI state or if the generator is located outside the RGGI region in a state that does not have a greenhouse gas cap & trade program.

[11] The APX default tracking system does provide GHG emission values derived from two well regarded methodologies (EPA Climate Leaders and Green-e Climate). It will be interesting to see if account holders find this data useful.

What does this mean for voluntary renewable energy purchasers? Though the exact details will vary from state to state, in general for buyers located in a RGGI state that has adopted a voluntary market allowance policy, the carbon benefit will be credited to their REC purchase. If the purchaser is not located in a RGGI state and is making a purchase from generation located in a RGGI state, the carbon benefit will *not* be included with their REC purchase.

What does RGGI mean for tracking systems? The importance of this example lies in the transfers between tracking systems. While still remaining policy neutral the tracking system has an opportunity to help buyers understand what is or is not included in their REC purchase. Rather than relying on consumer knowledge of this increasingly complex marketplace, a tracking system could choose to explicitly track which derived attributes are included in each REC. Showing what is included can aid in the ongoing marketplace shift from a mode of buyer-beware to buyer-conscious, helping purchasers make informed decisions.

Example: Pennsylvania and Delaware

For RPS compliance purposes, neither Pennsylvania nor Delaware require that renewable energy include the carbon benefit. Since all RPS compliant Pennsylvania and Delaware RECs and accompanying energy deliveries are tracked in GATS, the RECs do, in fact, contain the carbon benefit. As long as the REC is in the tracking system, the carbon benefit may not be sold off as a separate commodity. This case is an example of maintaining the integrity of RECs in a tracking system regardless of individual state policies. An additional layer that may be helpful to consumers is making this distinction explicit in the tracking system as part of the tracking procedures to facilitate understanding.

Recommendation

If RGGI rules go into effect as they are currently drafted, there are a couple of options that tracking systems may want to consider. One option is to not allow the transfer of RECs from RGGI states to tracking systems outside of RGGI states, since they would no longer be whole RECs. Another option is to allow the transfer of the RECs between systems but to flag the REC to show that the carbon benefit is no longer included. Explicitly tracking what is included in the REC could be accomplished with a check box. This would alert buyers (voluntary or compliance) that the REC does not include the carbon benefit.

To extrapolate this recommendation further, tracking systems may also want to consider explicitly tracking which emissions benefits are included, especially as regional and national regulations change. Using a checkbox to indicate which emissions are no longer part of the REC as a result of legislation could help provide clarity in the marketplace.

Conclusion

There are many opportunities for tracking systems to create more uniform treatment of environmental attributes, should they choose to do so. It is important to note that tracking systems can still remain policy neutral while specifying what is included in a REC they issue and track. By increasing and harmonizing the capacities of each system, interregional transfers will become easier and consumer confidence will increase.

Possible Action Items

The following action items were suggested in the paper and reinforced by reviewers and commentators:

1. Facilitate a dialogue of state RPS regulators and administrators to clarify the definition and content of a REC eligible for compliance with each program.
2. Facilitate a dialogue between registry managers to determine if greater uniformity between rules and protocols for emission-producing renewable plants can be achieved.
3. Discuss with tracking system administrators the possibility of adding a new field for biomass and gas co-fired solar thermal projects that would indicate the direct emissions from these facilities thereby assisting buyers in making informed purchasing decisions. Also discuss the possibility of adding such a field to all renewable energy generating facilities even if they have zero air emissions.
4. In conjunction with tracking system administrators, adopt a standard process for identifying and tracking RECs that have been converted to CO_2 credits. Also adopt a standard process for retiring RECs that have had one or more environmental attributes stripped off.

Appendix A: Tracking System Certificate Definitions

- **ERCOT**: The Texas Public Utilities Commission (that governs ERCOT) defines a REC as "a tradable instrument that represents all of the renewable attributes associated with one (1) MWh of production from a certified renewable generator."[12]

- **NEPOOL GIS**: Operating rules provide no explicit definition.[13]

- **PJM GATS**: "The term 'Certificate,' as used in this document, refers to a GATS electronic record of generation data representing all of the attributes from one MWh of electricity generation from a Generating Unit registered with the GATS tracking system or a Certificate imported from a Compatible Certificate Tracking System. Blocks of related Certificates may be grouped together to simplify Certificate transactions and for reporting purposes. The GATS will create exactly one Certificate per MWh of generation. Additionally, the GATS will create one Certificate for each MWh related to Certificates that are imported from a Compatible Certificate Tracking System based on the conversion rules established by the GATS Administrator. See also definition of 'Whole Certificate.'"

  "A 'Whole Certificate' is one where none of the Renewable Attributes have been separately sold, given, or otherwise transferred to another party by a deliberate act of the Certificate owner. Renewable Attributes shall include the Environmental Attributes which are defined as any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, directly Attributable to the generation from the Generating Unit(s). Individual states may create different definitions of Renewable Certificates. The GATS Administrator may consider revision of the definition of a Certificate in the future if needed to better meet the needs of state programs." [14]

- **WREGIS**: "The term 'Certificate,' as used in this document, refers to a WREGIS Certificate. A WREGIS Certificate represents all Renewable and Environmental Attributes from one MWh of electricity generation from a renewable energy Generating Unit registered with WREGIS or a Certificate imported from a Compatible Registry and Tracking System and converted to a WREGIS Certificate.[15] The WREGIS system will create exactly one Certificate per MWh of generation that occurs from a registered Generating Unit or that is imported from a Compatible Registry and Tracking System. Disaggregation of certificates is not currently allowed within WREGIS.

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[12] ERCOT Protocols, Section 14: State of Texas Renewable Energy Credit Trading Program, March 1, 2008, http://www.ercot.com/mktrules/protocols/current

[13] New England Power Pool Generation Information System, Operating Rules, Effective 1/1/08, https://www.nepoolgis.com/GeneralDoc/NEPOOL%20GIS%20Rules%20-%201_1_08.DOC

[14] Generation Attribute Tracking System (GATS) Operating Rules, May 10, 2006, http://www.pjm-eis.com/documents/documents.html

[15] A renewable Generating Unit, for the purposes of WREGIS, includes any Generating Unit that is defined as renewable by any of the states or provinces in the WECC.

"Renewable and Environmental Attributes: Any and all credits, benefits, emissions reductions, offsets and allowances, howsoever entitled, attributable to the generation from the Generating Unit, and its displacement of conventional Energy generation. Renewable and Environmental Attributes do not include (i) any energy, capacity, reliability or other power attributes from the Generating Unit, (ii) production tax credits associated with the construction or operation of the Generating Unit and other financial incentives in the form of credits, reductions or allowances associated with the Generating Unit that are applicable to a state, provincial or federal income taxation obligation, (iii) fuel-related subsidies or 'tipping fees' that may be paid to the seller to accept certain fuels, or local subsidies received by the generator for the destruction of particular preexisting pollutants or the promotion of local environmental benefits, or (iv) emission reduction credits encumbered or used by the Generating Unit for compliance with local, state, provincial or federal operating and/or air quality permits."[16]

- **M-RETS**: "The term 'Certificate,' as used in this document, refers to an M-RETS Certificate of generation, or M-RETS Certificate. An M-RETS Certificate represents all of the attributes from one MWh of electricity generation from a renewable generating unit registered with the M-RETS tracking system or a Certificate imported from a Compatible Certificate Tracking System and converted to an MRETS Certificate. The M-RETS system will create exactly one Certificate per MWh of generation that occurs from a registered generating unit or that is imported from a Compatible Certificate Tracking System. See also definition of 'Whole Certificate.'"

  "A 'Whole Certificate' is one where none of the renewable attributes have been separately sold, given, or otherwise transferred to another party by a deliberate act of the Certificate owner. Renewable attributes shall include the environmental attributes that are defined as any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, directly attributable to the generation from the generation unit(s). Individual states and provinces may create different definitions of renewable Certificates. The M-RETS Administrator may consider revision of the definition of an M-RETS Certificate in the future if needed to better meet the needs of state and provincial programs. See also definition of 'Certificate.'" [17]

[16] WREGIS Operating Rules, June 4, 2007, http://www.wregis.org/index.php?option=com_docman&task=doc_download&gid=140

[17] Midwest Renewable Energy Tracking System Operating Procedures, July 2, 2007, https://www.nepoolgis.com/GeneralDoc/NEPOOL%20GIS%20Rules%20-%201_1_08.DOC