National Wind Coordinating Committee
Renewable Energy Credits Workshop
Draft Meeting Summary

Chicago, Illinois
November 7-8, 2002

Introductions

After introductions of all participants, Abby Arnold, RESOLVE, reviewed the purpose of the meeting and the agenda. The purpose of the workshop was to:

- Educate stakeholders on current uses of and barriers to Renewable Energy Credits (RECs)
- Educate stakeholders on current uses of credit trading in pollution markets
- Examine linkages and overlap between air quality and energy markets
- Explore technical barriers and opportunities to translate RECs into Emission Reduction Credits
- Identify issues where collaboration would be useful to facilitate REC trading

Based on input from all stakeholders, the NWCC will consider possible activities that can assist the development of Renewable Energy Credits in the US. The workshop agenda is included in Attachment A.

Section I: Overview of Renewable Energy Credits in Energy Markets

Ed Holt, Ed Holt & Associates, provided an overview of Renewable Energy Credits (RECs). He began his presentation by describing the difference between the electric energy commodity and attributes of that energy. These attributes can be classified as either primary or secondary. Primary attributes include fuel source, location and vintage of the generator, and emissions from the facility. Secondary attributes would comprise characteristics such as avoided emissions, eligibility for state or federal emissions reduction credits or certification programs, and price stability. He stated that one major advantage of wind is its stabilizing effect on electricity prices, because the fuel source for turbines (wind) has no cost.

Mr. Holt compared RECs and green power. Both are similar because they are vehicles for clean energy generation. Neither green nor RECs delivers electricity generated from green sources directly to the consumer. Also, neither RECs nor green power are delivered in real time. That is they are not delivered at the instant when demand is highest, but rather over the course of a year.

RECs are different from green power because RECs may be generated far away from the location of the buyer. If the generator is located outside the air shed where the buyer

resides, benefits of the generation of green power might not directly accrue to the buyer, while RECs typically can be traded across great distances.

He described RECs as the embodiment of all attributes of renewable energy generation in an instrument that can be bought and sold and that conveys a contractual right to combine those attributes (a certificate). RECs are called different names, such as green tags, Tradable Renewable Certificates (TRCs), Tradable Renewable Certificates (T-RECs), etc.

There are multiple applications for RECs. For instance, RECs can be used to meet a Renewable Portfolio Standard (RPS) or other standard of regulatory compliance. Certificates can demonstrate and verify disclosure statements or to provide electricity labels to consumers. In order to accomplish this goal, attributes need to be established for all generation – coal, nuclear, renewables, etc.

Mr. Holt outlined several benefits associated with RECs. Some of these benefits are similar to those of green power. These benefits include:

- A reliance on market forces to distribute benefits from RECs
- Monetization of the value of RECs
- The ability to provide a choice to customers that don't have access to green power providers to purchase attributes, thus overcoming geographical constraints.
- Reduced transmission costs for renewable energy (since the attribute transaction involves no costs)

Mr. Holt explained how RECS are generated, who creates them, and who purchases them. RECs are created when a renewable energy generator produces electricity. RECs are typically bought by electric service providers and load-serving entities that want to verify their compliance with environmental regulations or to support marketing claims. Large customers, such as large industrial businesses, universities, and government agencies, are also beginning to purchase stand-alone RECs.

RECs can be tracked through establishment of certificate issuing bodies who would be responsible for monitoring renewable energy generation. The tracking system may be an electronic database that track trades and ownership. RECs may also be tracked through audits performed by organizations like Green-E and the Environmental Resources Trust. There is no single national tracking system for the U.S., but such systems are in operation in a few regions, and under development in others. Several decisions must be considered in the design of such a system, including:

- What is the denomination of certificate (how many kilowatt-hours is the certificate worth)?
- What is the certificate lifetime (one year, three years, indefinite)?
- Who will pay for the system (customers, generators, government)?
- Who responsible for creating the tracking system?

- Who will operate the tracking system?

Most RECs are traded through bilateral contracts, resulting in a lack of market liquidity. Because most trades are conducted by two parties who negotiate the price for the REC, deals fail to offer price transparency to other buyers without a mechanism that will provide average prices to market participants. Although tracking systems do not create markets, some way needs to be established to reveal typical prices or ranges

Mr. Holt described some of the barriers to the development of a REC system in this country. Among these barriers, Mr. Holt identified:

- Insufficient tracking and verification systems.
- Lack of market liquidity
- No consistent driver, such as a national Renewable Portfolio Standard (RPS), to establish national trading system
- Lack of understanding of linkages between emissions credits or offsets and REC systems to enable RECs to participate in emissions markets. Finally, Mr. Holt cautioned that any contract for energy should include explicit provisions regarding ownership of and payment for attributes.

How RECs Are Used in Energy Markets

Gabe Petlin, Green-E Program Manager at the Center for Resource Solutions, introduced the first morning panel by discussing how RECs are used in energy markets and the various types of market participants. Because only forty percent of the American population can choose renewable energy from their electricity provider, RECs provide an opportunity to bring renewable energy to customers who would otherwise have to settle for traditional energy sources. To date, RECs have been widely used across renewable energy markets in a number of ways:

- Investor-owned utilities purchase RECs to comply with RPS requirements and disclosure laws
- Renewable Energy Marketers rebundle the RECs with the electricity commodity to create green power
- REC brokers buy and sell RECs for profit
- REC marketers selling certificates for profit

Sale and purchase of RECs occurs on both regional and national levels, with many customers purchasing RECs out of a desire to mitigate global warming and clean their own local air sheds. RECs are available to residential and institutional customers. Some utilities are selling to customers outside of their service territories. Marketers may sell nationally or regionally, and some sell RECS in both markets. All sellers use the Internet for sales, while one company sells door to door. Customers tend to be large entities. Significant activity has occurred in Pennsylvania, where the state government has purchased RECs to meet a 5% emissions offset. Additionally, twenty-nine Pennsylvania universities have purchased RECs. Other state governments have purchased RECs,

including New Jersey and Maryland, and agencies such as the US Department of Energy and the US Environmental Protection Agency, have joined the effort.

Tom Rawls, Green Mountain Energy, described the role of RECs in his company's business activities. Green Mountain Energy is a retail electricity provider that offers bundled green power to customers. Green Mountain Energy uses RECs to define the fuel source and emission characteristics of electricity provided to its customers. RECs are guided by specific state disclosure regulations in places such as New Jersey, Texas, Ohio, and Oregon. Green-E provides guidance in states where no specific disclosure laws exist. When Green Mountain Energy sells its bundled power, RECs provide the customer with information about the particular fuel source. RECs also provide information that allows a derivation from other sources what emissions would be avoided. RECs also provide a source-to-sink chain of custody for the attributes of the electricity.

Mr. Rawls discussed various life spans of RECs. Texas regulations, for instance, allow RECs to last for three years from the dates of issuance, as long as the REC is in compliance with state Renewable Portfolio Standards. In New York State, RECs must be bundled and unbundled with the commodity electricity and cannot be sold elsewhere. These RECs have a life span of three months. In New England, all fuel sources receive credits for its environmental attributes, not just renewable energy. Depending on the particular state regulations, the REC can have a life of one year, where generation is based on one year average of generation.

Mr. Rawls noted that this hodgepodge of standards and practices creates problems for businesses such as Green Mountain that seek to sell RECs. Differing rules from state to state lessen market liquidity. Mr. Rawls stated that longer shelf lives for RECs are preferable to create a more liquid market, as RECs with shorter life spans may not be usable in the shorter time span and generators may have the value of RECs disappear quickly. Longer shelf lives do not affect REC financial transactions, since the money from REC sales move directly between consumer and generator.

Green Mountain sells bundled electricity, which must be created in the region in which it is sold, or transmitted into that region, thereby displacing generation that would otherwise occur in that region. A stand-alone REC can be sold or purchased outside of the region in which it was created. This concept is important to understand how purchasing RECs may mitigate air pollution. One cannot purchase a wind REC from Texas to address NOx emissions, elsewhere because the wind REC does not address environmental conditions; hence the difference between bundled power and the REC. However, if the purchasing entity is interested in mitigating carbon dioxide emissions, which is a global and not a local issue, a wind REC from any region will provide that environmental benefit. Ultimately, market participants need to now where the REC was created. A REC created in Texas will result in a have different level of emissions avoided than a REC generated in Oregon.

Mr. Rawls identified disaggregation of environment attributes embedded in a REC as a key policy issue that needs to be addressed. Specifically a question lingers about whether an entity that sells a discrete attribute from a REC, such as carbon, NOX, mercury, or particulates, can still use the REC to sell wind energy to customers. Mr. Rawls believes that once the entity sells off an essential element of a REC, then the REC becomes something else, and is no longer "wind," for example. Mr. Rawls noted that as we learn more about air markets, will affect disclosure. Today this disaggregation method is not used and not commonly accepted in green power markets.

Eric Blank, Community Energy Inc., discussed the use of RECs to market wind and build new facilities. He offered the PJM example, where the value of new wind supply is less than the costs of wind energy in the region. However, when the value of the green market premium is added, the fundamental economics of wind power change to make the resource cost effective.

Mr. Blank described the Exelon Energy deal as an example of the importance of wholesale purchases of electricity. Exelon signed twenty-year purchase power agreements, enabling the company to finance the development of wind energy facilities, from which Exelon produces electricity and RECs. Community Energy then markets both, bringing together supply and customers. To date, demand has consistently exceeded supply. By marketing wind energy certificates, a new industry is being created in Pennsylvania, providing a significant economic development benefit to local economies.

To move electricity from wind facilities to customers, bundling of electricity and attributes is necessary, rather than attempting to schedule generation and identify transmission pathways for electrons to travel to customers. Hence, Community Energy conveys certificates representing clean energy to customers. Contracts can be executed within a few weeks, and transactions are usually very simple.

CEI would prefer that verification and other efforts to reconcile wind energy generation with wind energy certificate sale occur on an annual basis. Given that wind energy generation is uneven over the course of a year (i.e., there is often more generation in the winter), quarterly reconciliation creates significant problems in terms of matching supply and demand. Mr. Blank also emphasized the importance of brining large distribution and generation entities into the wind energy industry as their credit and willingness to sign longer term contracts is essential for financing new projects.

Ben Feldman, NatSource, discussed how a brokerage firm may utilize RECs in its business operations. NatSource acts as an intermediary in wholesale REC markets. Mr. Feldman stressed the importance of liquidity in an immature market such as the REC market. He also noted that the life span of a REC is very important to buyers that may be concerned about the REC retaining its value over time. No uniform standards for large regional or national markets exist, and each state has its own rules that in some instances vary considerably, resulting in an undefined market. This environment leads to illiquidity in the REC market, so that systemic demand for RECs does not occur. In light of this

lack of systemic demand, voluntary demand must be increased to sustain the market for RECs in the short run, which may be very difficult to do.

Mr. Feldman provided examples of the difference the ways that REC markets emerge and how these markets are raised. In New Jersey, for example, generators cannot unbundle attributes from the commodity electricity. As a result, entities trade brown power and swap that power with renewable energy at a premium. In effect, these entities are now trading around the REC concept, so that the REC is not explicitly recognized. In Wisconsin, rules governing REC trading state that only load serving entities can purchase RECs, and then only after cover entire position. This requirement leads to suboptimization of the RECs, so that load serving entities (LSEs) would have to overbuild renewable energy facilities to optimize RECs, thus hampering liquidity. California continues to develop significant renewables programs and possess a significant systemic demand. However, market participants do not see a market mechanism at least cost to supply this demand, truncating market activity. The REC market will need more standard instruments for these markets to trade in liquid fashion. With more standardized rules across the board, market participants will recognize REC value and will be able to transact freely.

Mr. Feldman noted other challenges facing the establishment of a liquid RECs Market:

- Developers seek long-tern contracts for power purchases, which may act against the establishment of liquid REC markets. Clear value and the ability to bank RECs will be important to encourage REC trading.

- The REC market must address the challenging task of describing to customers what a REC is and how its purchase will reduce pollution.

Verification and Tracking Initiatives: How is the Market Organizing Itself?

Ashley Houston, APX Inc., provided an overview of the environmental registry system that are currently in place around the country. Development of the registries dates back to the mid-90's when electric restructuring discussions started. As renewable portfolio standards, generation performance standards, and disclosure requirements were adopted, the need for a data system to show compliance with these standards grew. Registry systems grew out of the resulting efforts to demonstrate compliance with environmental obligations.

Ms. Houston described two registry systems currently in operation, the Texas Renewable Credit Program and the NEPOOL Generation Information System (GIS). Based on the company's experience with green tag markets, APX built registries to track generation attributes and ownership. These systems support state environmental requirements and product verification.

Ms Houston spoke briefly about the environmental registry system that her firm developed for ERCOT. APX developed the Texas Renewable Energy Credit (REC)

program to provide an accounting mechanism for the Renewable Portfolio Standard (RPS) in that state. The Texas RPS has been extremely successful, with 1,000 MW of new wind power already on-line. The ability to trade RECs and thus create an additional revenue stream for wind power has been a significant factor in encouraging more developers to build wind sites.

The NEPOOL Generation Information System was developed for the six northeast states, each with a patchwork of environmental requirements. For each megawatt-hour of electricity generated, a certificate is created. Information on that certificate includes information regarding fuel source, air emissions and a wide range of attributes.

The New England system operates on a quarterly trading period. At the beginning of the trading period, all certificates are placed in generator accounts and by the end of the trading period all certificates move into in retail supplier accounts. At the end of the trading period, the system creates reports that provide the information for disclosure labels, which are used to back-up any marketing claims that may have made.

The NEPOOL Generation Information System was developed through a process of negotiation and stakeholder input. Market participants, environmental groups, and regulators were involved in the process. This stakeholder input continues today; as the GIS operating rules are reviewed every six months to determine any necessary changes.

To expand and to create seamless markets for certificates, regional compatibility will be of the utmost importance. Ms. Houston noted the importance of avoiding balkanized markets for certificates that limit transactions across regional boundaries, thereby reducing market liquidity. Also important to the development of a broad market for certificates will be the shelf life of the certificates. From the perspective of generators, long shelf lives are best, but regulatory needs may require somewhat shorter life spans. Ultimately, successful environmental registry systems will spread confidence in certificate trading and spur development of wind energy and renewable energy in general.

Leah Gibbons serves as co-chairperson of the **PJM Interconnection Generation Attributes Tracking System (PJM GATS) Working Group**. The PJM GATS Working Group is focusing on the development of a robust tracking system for the PJM Interconnection. The resulting system will be capable of assisting regulatory systems to meet market demand for RECs. The working group is focused on core PJM states: Maryland, Delaware, New Jersey, and Pennsylvania. Each jurisdiction has its own set of requirements, and therein lies the ultimate dilemma: the lack of broad environmental and renewable energy requirements across those core states presents a challenge to move these jurisdictions to decide on systems that meet regional needs while respecting jurisdictional variations. The working group is engaged in outreach and dialogue with decision makers in these jurisdictions to pique interest in developing a region-wide system.

A particularly vexing problem is the current preference among some jurisdictions to use the contract path approach to renewable energy, in which the commodity (electricity) remains bundles with its attributes and cannot be sold separately. One reason that some jurisdictions continue to prefer the contract path methodology is a belief that such a system provides a more accurate means to track electrons in power. According to Ms. Gibbons, reliance on the contract path mistakenly assumes that such a system can track electrons in bundle; however, electrons are not stored and thus cannot be tracked. The contract path disadvantages wind and other renewable energy resources further by placing limits on the import and export of renewable energy, creating more seams issues between states and regions and creating obstacles to bringing wind power in from other states.

Another major challenge for the PJM GATS group is the imposition of individual state policy preferences on a potential REC accounting system. Such requirements complicate the tracking system and increase system costs. The tracking system needs to be able to accommodate policy variations while simultaneously focus on the functionality of the system.

PJM is currently helping to design a REC system that addresses these challenges. A proof of concept design has been completed. However, this design – based on the contract path methodology – is not accurate because algorithms used to build the design incorrectly assume where electrons are based.

The working group is currently struggling with a laundry list of issues. Ultimately the group wants to create a flexible system that accommodate policy and regulatory needs of individual states, but acts in a regional manner. The group hopes to reach some decision point by the summer of 2003 and to present a fully developed concept to the PJM Energy Markets Committee later in 2003.

Jeff Burks, **Utah Energy Office**, described the efforts of that organization to establish a region-wide REC tracking system. The key objective of the WGA is to strengthen state and federal energy policy in the West. The groups goal is access to reliable, affordable and clean energy.

Mr. Burks described the Western policy landscape, where energy policy and environmental policy are converging. The Western Regional Air Partnership (WRAP) has initiated efforts to implement the Regional Haze Rule to improve visibility in the Grand Canyon air shed. Specifically, Section 309 of the rule recognizes emission control strategies that can be included in a regional haze State Implementation Program (SIP). As a result of section 309, nine states have agreed to participate in a commitment to increase renewable energy goals. Renewable Portfolio Standards have been passed in five western states, while several others are considering RPS legislation. Western electricity prices two years ago demonstrated the vulnerability of electricity markets to natural gas price fluctuations and renewed interest among electric utilities to diversify their energy portfolios to help hedge against natural gas price volatility. With the promise of renewable energy development, 45 green pricing programs have emerged in

the West over the past 8 years. Clear interest has emerged in a growing demand for green pricing, and a clear mechanism needs to be established to assure participation in these markets.

Western governors began to address renewable energy credits at its environmental summit in April 2000, where the governors considered the question of expanding renewables in the region. The governors concluded that green tags represent a desirable means of encourage renewable energy development. The governors agreed that an appropriate market architecture meeting the needs on buyers and sellers was important to facilitate an efficient and liquid green tags market. A robust trading market for RECs will improve the economics of renewable energy. To facilitate such a market, Mr. Burks noted the following needs:

- A standard definition for RECs
- A single registry to record attributes, ownership, and transactions
- A single institution to register, issue, and track RECs
- Western governors create single market for RECs – consult with tribal governors and
- Called on governors to adopt standard certificate
- An endorsement of a single accrediting body in the Western US
- Recognition of an appropriate geography (such as the Western Interconnect) for a broad market that provides sufficient demand and resources facilitate a liquid trading system.

As a result of its resolution adopted in August 2002, the WGA formed a steering committee to investigate the efficacy of a market for trading RECs in the Western US. Mr. Burks serves as chair of that group; the steering committee is seeking funds to move this process forward. The committee will convene experts and stakeholders in the summer of 2003 to begin to define institutional structure and operating guidelines for such a system.

Jan Hamrin, executive director of the **Center for Resource Solutions (CRS)**, spoke about efforts underway to establish voluntary standards for REC tracking systems and to coordinate tracking systems at a national level. The role of CRS is to help provide credibility to renewable energy markets. CRS projects seek to ensure customers that RECs are actually generated and not double-counted, so that the consumer can make inform choices. CRS efforts attempt to display the environmental benefits of these markets through front-end certification of marketers; simply put, the organization attempts to offer verification that marketers and generators did what they said they would do. CRS is particularly concerned that the environmental community supports current efforts to establish REC trading and tracking systems.

Any attempt to establish national coordination for REC tracking must allow for regional differences. The system must also be simple enough to allow for diverse participants and to keep system costs in check. Such a system will move the REC market forward. To

accomplish this goal, the system must enable customers to make informed choices. Ms. Hamrin pointed to two goals of a national system for tracking RECs: 1) well-informed customers that can participate in the market and purchase products that are of verifiable quality; and 2) regulatory disclosure and verification.

CRS is currently working to develop a coordinated national tracking system. The group held a first meeting in spring 2002 to discuss the possibility of creating an American Association of Issuing Bodies system. This system would focus on the collaborative joining of Independent System Operators (ISOs) to provide some organizing entity for REC tracking systems on a region-wide scale. The AAIB system would exist for all renewable energy resources and provide an accounting system for RECs nationwide. CRS is currently meeting with various organizations to establish a coherent network with a common protocol for RECs. Currently, no issuing body exists in the Midwest. CRS hopes to see some expansion of an issuing body in that region. In addition, CRS will work with various greenhouse gas registries and decision makers in the air quality arena to encourage interplay between RECs and the pollution reduction markets.

Section II: Overview of Emissions Trading to Address Air Pollution

Van Jamison, POWAIR and WindMontana, LLC, began the afternoon session with a discussion of basic concepts in emission reductions programs under existing air quality policy. Emission credits, as currently constructed, are based on the amount of pollution that is actually kept from reaching the air and the changes in actual emissions from monitored sources. This concept differs from renewable energy credits, which are based on a theoretical comparison between emissions from power generated by renewable sources and emissions from a hypothetical "dirty" source. To earn emissions credits under existing air quality policy, several factors must be considered:

- Time power displacement (if dealing with summer ozone project, and project is avoid NOx in winter, regulator won't be interested
- Location (large geographic areas are preferable to small areas)
- Emissions profile
- Status of displaced source
- Displacement of emissions within air quality air shed
- Ambient air quality conditions
- Attention to control measures
- Permanence of displacement
- Establishment of an accounting system that air quality directors required to enforce whenever air quality does not meet air quality standards.

Mr. Jamison then outlined the basic requirements for air quality planning under the Clean Air Act. These requirements include the establishment by the US EPA of National Ambient Air Quality Standards (NAAQS) to protect public health and an ambient air quality definition inclusive of all emissions within an airshed whether those emission originate from stationary, mobile, or area sources. NAAQS levels have been set for

criteria pollutants, which currently include nitrogen oxide (NOx), sulfur dioxide (SOx), ozone, particulate matter (PM), carbon dioxide, and lead.

States concurrently participate in ambient air quality monitoring within their jurisdictions, operating monitoring networks under grant agreements with the US EPA. EPA regulations define locations for monitoring, criteria for siting monitors, sampling frequency, and data handling requirements.

States also develop State Implementation Plans (SIPs) to establish programs to bring local areas into compliance with ambient air quality standards. Several types of SIPs exist; however, Mr. Jamison chose to focus on attainment and maintenance SIPs. The Clean Air Act requires states to prepare and submit an attainment SIP that resolves ambient air quality problems in areas found to be in "non-attainment" status. The Clean Air Act sets a deadline for submitting a SIP and a deadline for meeting the NAAQS. Once the state has met the NAAQS, a "maintenance" SIP is developed submitted to ensure the area stays in compliance with the NAAQS.

States use inventories of air pollution sources along with dispersion models using emissions and weather data to predict future air quality. Based on those estimate, additional control measures are established by state agencies to bring air quality below NAAQS before the attainment date. These control measures are then written into regulations and codes. Some SIPs have proven highly successful. Houston, notorious for air quality in the late 1990s, has been able to achieve a 93% reduction in emissions from stationary sources.

Mr. Jamison noted that if Houston had renewable energy resources, they could cut emissions further. As generating sources are forced to get cleaner, further reductions in air emissions become more difficult to obtain. One opportunity to obtain these further cuts in emissions may be to allow renewable energy sources to earn emission credits that can be traded across regions and used to meet NAAQS. These emission credits would be focused on permitted point sources within the emissions inventory and would fall into three potential categories:

- Non-attainment new source review
- Trading systems adopted under the EPA Economic Incentive Program guidance
- Allocation of allowances to renewable power sources

Credits under the Non-Attainment New Source Review category would require offset ratios, i.e. "emission reduction credits", set by the Clean Air Act. The offsets must provide net air quality benefits and must be permanent, enforceable, and quantifiable. Under this category, allowance allocations would be made to renewable energy sources, with the implicit suggestion that nonpolluting activities represent the appropriate behavior in non-attainment environments. The emissions reduction credits act as mechanisms for giving credit, in the form of allowances for not polluting.

Mr. Jamison discussed the advantage of output-based standards for allocation of emission allowances as opposed to input-based standards. Currently allowances under cap-and-trade and other programs are allocated to power generators based on heat input. Because wind energy generation involves little, if any, heat input, wind receives little by way of allowances under an input-based system. Hence, wind and other renewables require output-based systems to benefit in a cap-and-trade system. The output-based standards require that emission allocations be offered based on electrical output rather than fuel; thus, all generators receive allocation budgets based on the electricity that their facility produces. Such a system would theoretically benefit wind and other renewables.

Serpil Guran, New Jersey Department of Air Quality, offered an example of regulatory trading systems and their characteristics by highlighting the New Jersey NOx Budget System. Adverse health effects from ozone prompted the Ozone Transport Commission (OTC) to establish a NOx Budget Program in 1994 that would reduce levels of NOx, the precursor of ozone. This program established a cap in 2003 based on a 75% reduction from 1990 NOx emission levels. The memorandum of understanding that created the program was signed by all Northeastern states and the District of Columbia. In 1998, US EPA issued a NOx SIP call tat required New Jersey and 22 other jurisdictions to reduce NOx emissions under a cap-and-trade system, whereby US EPA establishes a numerical cap on emission levels and every state is given allowances. If sources meet the NOx budget, they can trade those allowances.
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To respond to these drivers, New Jersey has instituted a NOx budget program. The program includes 48 permitted power generation plants in New Jersey. The budget requires that 45% less NOx emitted than the 1999-2002 levels. To meet these requirements, control measures have been installed at facilities, and other methods have been instituted as well. Ms Guran noted that the purchase of allowances may now be the least desirable choice for meeting the 2003 requirements because of high costs. To date, New Jersey has been able to meet 2001 emissions requirements through the cap-and-trade program and is moving towards 2003 goals. At the same time, prices for allowances have leveled off.

David Wooley, AWEA, identified linkages between RECs and emission credits and several challenges to developing a system that allows the translation of RECs into emission credits. He noted that the next revision of the federal Clean Air Act (being considered in the current Congress) will provide a critical opportunity to change regulations to favor renewable energy in the emission reduction system.

Mr. Wooley noted several reasons that the current period may present an opportunity for inclusion of renewable energy prominently into air quality policy. He stated that, more than ever, public attention is focused on energy and environmental issues. Strong support exists for tighter air pollution controls and more access to clean energy. In particular, wind, solar and biomass lower the cost of CAA compliance, providing fuel diversity and electricity price security. He also noted that emission trading creates a financial base for expanded renewable energy development. Without incentives for renewables, compliance with new SOx and NOx caps will depend on fuel switching to natural gas,

which has shown significant price volatility in the recent past and will drive compliance costs for the next Clean Air Act. Renewables significantly reduce natural gas use and lower natural gas prices. In fact, the Union of Concerned Scientists' energy blueprint projects that a strong commitment to renewables will result in compliance cost savings that approach $30 billion a year by 2020. Emission trading done right can stimulate renewable energy markets and ensure such growth in renewable energy generation to secure cost savings.

Mr. Wooley predicted that emission cap-and-trade systems will dominant the regulatory mechanism. To ensure that renewables receive maximum benefit under this system, the current cap-and-trade mechanism will need to be adjusted. He provided an example that demonstrates how under a simple emission cap (e.g. One that allocate allowances emission allowances only to fossil generators and not to renewables), the addition of renewable generation to the mix will not lower the total amount of air pollution emission and can actually increase the emission and can actually increase the emission rate of fossil generators (on a pound per megawatt-hour basis). Such a result would be disastrous for renewables, especially if they are marketed to consumers as a means to reduce emissions. Under such a circumstance, renewables will lose the right to claim environmental values, and existing contracts for renewable energy sales will be impaired and effectively voided.

Using the Title IV acid rain program, legislators and regulators can build on that precedent to develop more robust programs that support green power marketing. Mr. Wooley suggested devising trading design parameters to promote renewables. He promoted the idea of including renewables in CO, SOx, and NOx emission trading mechanisms applicable to electric generation. He also proposed allocating emission allowances to renewables on the same basis as allowances are allocated to fossil generation. He stated that the new Clean Air Act should adopt a multi-pollutant allowance award system for renewables. Finally, Mr. Wooley argued for the establishment of both a floor and ceiling for cap-and-trade programs.

Rick Morgan, from the **Climate Protection Partnerships Division** of the **US EPA**, described the nature of the relationship between electricity and air quality and how that relationship helps or hinders renewables from earning emissions credits. Mr. Morgan interpreted the goal of REC proponents as seeking the opportunity to demonstrate the quantitative environmental benefits of renewable energy and to receive equal treatment with other fuel sources in emissions markets. He noted that the translation of renewable energy into emissions markets has been difficult due the inflexibility of the traditional command-and-control approach to environmental regulation. He also noted that the SIP process has many hurdles to incorporating renewables, including changing environmental attributes across regions that limit the usefulness of RECs from other regions in addressing SIP requirements. SIPs also include the requirement to quantify emission reductions in a direct one-to-one unit relationship. Offset and set-aside programs appear too limited to include renewables. Cap-and-trade programs, however, seem to provide an opening for renewables to participate in emissions markets, but almost all credit allocation goes to fossil fuels sources. No allocation of allowances has been made to

renewables, except in a few states that allow set-asides. A few states are currently exploring allocations based on electricity output.

One key issue for renewable energy will be the type of regulatory structure will emerge over the next few years and the impact of that structure on the renewable energy industry. The cap-and-trade system provides stronger incentives for the development of renewable energy (particularly wind) resources. However, the allocation of allowances under the cap-and-trade system is critical for renewables. Allowances are currently based on heat input levels from generating resources, typical of fossil fuel energy sources. As noted earlier, because wind energy generation involves little, if any, heat input, wind receives little by way of allowances under an input-based system. Hence, wind and other renewables require output-based systems to benefit in a cap-and-trade system.

Mr. Morgan identified bundling of RECs and emission credits as a significant challenge. Emission credits are legal instruments based in legislation, while RECs are a creation of the marketplace. Hence, they represent separate commodities. RECs and emission credits also have different shelf lives, making bundling of the two instruments more difficult. He also repeated a theme mentioned earlier in the workshop. He discussed the quandary of selling emission credits, which could potentially devalue the green product, since an allowance permits a generation to emit one ton of a pollutant. Green-E standards recommend retirement of emission credits to reduce the amount of emissions. If, however, generators purchase credits with the intent to produce electricity that generates emissions, the goal of improved air quality may not be achieved.

Several opportunities do exist, however, for RECs and emission credits to function in tandem. New multi-pollutant legislation is being considered by Congress that would place new nationwide caps on power plant emissions. A cap-and-trade approach would likely be employed administer the legislation, providing an opportunity for wind and other renewables. Also, the White House has embraced the Clear Skies Initiative, which places caps on NOx, SOx, and mercury that are much more stringent that existing limits. The Initiative does allow for trading and banking; however, initial allowance allocations are once again input-based, limiting the usefulness to renewable energy resources. The wind community will need to encourage changes in the Initiative to ensure balance for its resource.

Mr. Morgan noted several programs that offer opportunities to link emissions and renewables. These include:

- Western Regional Air Partnership – WRAP allows trading of renewables in states' regional haze SIPs and offers an example that can be replicated in other SIP programs.

- Supplemental Environmental Projects (SEPs) – Companies can agree to pollution settlements that are then used to fund green power as part of an enforcement action.

- Emission Performance Standards – Massachusetts and Connecticut have implemented these standards which require all power sold in the state to meet an output- based standard. The program uses the New England GIS system to provide the basic information for the program.

- Integrated Resource Planning – Public Utility Commissions (PUCs) explore resource procurement strategies that involve long-term procurement, providing an opportunity for renewables.

Each of these programs offers innovative means to include renewables in emission reduction program and offer examples for other air quality policy initiatives.

US EPA is currently developing new software tools to support clean energy markets. The E-GRID program maintains a database developed four years ago that provides a comprehensive source of emissions data, including emission profile tons and input/output rates for all electric companies in the country. The database will be updated in 2003 and can be accessed on the Internet. Questions and comments on the program can be delivered at comments.egrid@epa.gov. The Power Profiler is a web-based tool for businesses and households that calculates consumer emissions and fuel mix for their purchased electricity. The site can be accessed at www.epa.gov/cleanenergy. Finally, the Average Displaced Emission Rates (ADER) database estimates emission displaced by energy an renewable technologies. The software will be available in mid-2003.

Section III: How Can Wind Participate in Emissions Trading Markets

Examples of Voluntary Trading Systems and Their Characteristics

Michael Ashford, deputy director with **The Climate Trust**, gave an overview of the Oregon Carbon Dioxide Program for Wind Power. The Oregon program establishes the first legislative carbon dioxide regulatory standard in the US. The program requires new power plants to offset at least 17% of its carbon dioxide emissions. Mr. Ashford stated that the program encourages developers to build the most efficient plants possible. Developers meet the standard by implementing its own offsets through technological controls or by providing funds to a non-profit trust that acquires carbon dioxide offsets. The Climate Trust serves as the entity that receives funding from power plant developers choosing the monetary path for carbon dioxide compliance. The monetary path tends to be less expensive and time intensive. If the developer chooses the performance path, higher costs for control technology and more management time are involved. For many developers, the monetary path is the preferred route. According to Mr. Ashford, many developers like the program because it is cost effective, reduces regulatory burdens, and is based on a choice where each facility owner can choose the most appealing method.

The Climate Trust is one of three institutional buyers of carbon offsets worldwide and the only nonprofit institutional buyer in the US. The Climate trust is seeking to build market share by encouraging international companies to join their efforts. In such projects, the

Climate Trust would help companies identify carbon offsets around the world for purchase.

Each project has three phases. A Request for Proposals is issued to companies wishing to join the program. Next, the list of proposals is narrowed to seven participants who are then required to present longer proposals. Finally, contracts are then awarded to selected participants.

The initial implementation of the Oregon carbon dioxide standard occurred under the Klamath Cogeneration Project. PacifiCorp provided $1.2 million for offset contracts. Over 86% of the offset fund was used to purchase 850,000 metric tons of offsets, exceeding statutory requirements of 80%. The average portfolio cost $1.27 per short ton of carbon dioxide, meaning that approximately 45% of the Klamath Project's excess carbon dioxide was offset.

The Climate Trust efforts build on a Bonneville Environmental Foundation (BEF) program which markets environmental attributes in the form of green tags. In this program, BEF purchases green tags from wind projects owned by the Bonneville Power Administration (BPA). BEF in turn sells the carbon dioxide benefit to the Climate Trust and retires residual benefits. BPA then reinvests the funding in wind projects throughout its territory. Currently, the Climate Trust is working with the NIKE Corporation and Delta Airlines to develop offset programs for each company's carbon emissions. Through this joint project, NIKE donates $25,000 to the Climate Trust to offset its air travel on Delta. These dollars will be re-invested in renewable energy projects. Greenmarket Energy is also working with the Trust to buy offset operations. The company plans to donate and retire the offsets, working as a 501c3 to donate and assist with tax rules – a significant incentive for companies who are looking at bottom line, especially in absence of a regulatory driver.
The Climate Trust experience demonstrates that the market can support carbon dioxide mitigation, which offers real environmental and economic benefits. The Oregon policy allows for monetization of emissions reduction program, while also enabling a non-profit trust to administer regulatory responsibility for emissions reduction actions.
The Climate Trust looks to be flexible in considering different projects. Mr. Ashford noted that he would like to find ways to get dedicated funds to bring down transaction costs.

Dan Chartier, President of the **Emissions Marketing Association (EMA),** discussed characteristics of well-functioning trading markets. EMA promotes the use of market-based systems for environmental management. Members of the organization agree that environmental regulations need to include a market-based component that adds to the efficiency of the system. The importance of emission trading lies in its ability to reduce compliance costs, thus creating a more efficient environmental regulatory system.

Mr. Chartier described the three components of a well-functioning market: a defined commodity, liquidity, and transparency. Fungibility – one unit of the commodity is the same as another unit – is a key feature of a commodity. Fungibility allows for grading or

differentiation of the commodity, so that a buyer knows what he or she is receiving in that commodity. SOx credits, for instance, are defined by statute and issued by a single agency (USEPA). Ownership of the credit is "registered" under the allowance trading system. Offsets, on the other hand, vary by state due to differences in offset registries and protocols. Likewise, a REC in New Jersey may not be used in another state for compliance. These characteristics make both offsets and RECs market illiquid. The challenge to proponents for REC markets is to develop a single definition of a REC to move to a commodity market.

Liquidity in a market means the ability to transact in that market. Thus one may buy or sell the defined commodity at will to maximize value. An efficient market must allow an exit strategy for speculators and allow transactions that do not move the market price. Using the SOx market example again, this market is considered by most definitions a liquid market. The NOx market, by comparison, is much smaller due to geographical restrictions. Liquidity, then, is affected by several factors, including the size of the market and the number of players in that market, as well as the presence of a regulatory driver, such as compliance deadlines that force people to act. Liquid markets also feature some market maturity, where a learning curve has been traversed by participants, creating more sophisticated market players; and derivative instruments, contracts, and financial settlements emerge. Mr. Chartier suggested that proponents for a REC market may tag onto an existing liquid market.

Finally, Mr. Chartier discussed the importance of transparency in a well-functioning market. Transparency boils down to the ability of market participants to determine ownership of the commodity, to discern commodity prices, and to monitor transactions. He spoke of a need to track and record only those items needed for regulatory certainty to ensure environmental integrity of the system and the advancement of renewable energy development.

Conclusions

A significant amount of discussion occurred during the workshop. Much of that discussion was seeking clarification as participants attempted to understand the complex issues involved with linking air pollution policy and renewable energy markets. Most attendees appreciated the broad cross-section of attendees at the workshop. All agreed that the workshop helped define the questions and issues for future work. There was some concern about the breadth of the meeting versus depth in certain topics, especially the relationship between RECs and ERCs and transferability.

Participants considered next steps based on conclusions from the workshop. They agreed that while the Renewable Portfolio Standards (RPS) at the federal and state levels will be integral to the success of RECs markets, there are many groups promoting the establishment of RPS; hence, the NWCC may not view RPS policy as a focus area for activities. The participants were pleased by the interest of the air and energy regulators at the meeting and believe the NWCC can play a role in educating both parties. One of

the more looming questions is the implications/potential of crossover between RECs and ERCs.

The audience agreed that the NWCC has a significant opportuinity to educate a broad group of stakeholders on the linkages between RECs and air pollution policy. The workshop represented a first step by the NWCC in this arena. Most attendees expressed a need for the NWCC to promote narrowly focused activities with a focus on greater depth in certain areas.

- The NWCC should provide the necessary education to ensure a functioning market for RECs and allow air regulators to determine how the resulting REC program will affect their state air pollution programs.
- The above strategy will require cooperation between the NWCC, air and energy regulators, and emissions marketers. In particular, the NWCC could provide educational opportunities for air regulators to understand RECs, how they can work in air pollution mitigation, and what obstacles remain to utilizing RECs in such a manner.

Other ideas included:

- Considerable attention must be given to transference issues (crossover between RECs and ERCs)
- The NWCC should focus its efforts in specific states with opportunities for markets and work to educate potential market participants there about REC opportunities.
- NWCC research could include:
  - Creation of a model to examine impacts of RECs on air quality (increasing renewable sources and displacing dirty ones)
  - An evaluation of the implications of utilizing RECs in State Implementation Plans (SIPs) to lower the baseline (mathematical model).
  - Consideration of how RECs could be used to meet requirements of Supplemental Environmental Plans (SEPs)
- The participants suggested researching how RECs could be used in programs designed to address greenhouse gas and regional haze reduction. This work could then lead to similar investigations for criteria pollutant reductions.
- The NWCC should work with entities that have expressed interest in establishing attribute registration/accounting systems, such as PJM, the Western Governors' Association, and potentially MISO.