



New England Wind Issues Forum Summary

November 7, 1997
Boston, Massachusetts

SUMMARY

Objectives: Learn about issues associated with wind energy development facing New England; introduce NWCC to New England wind stakeholders; and determine how the NWCC can address regional constituents needs

Welcome and Introductions *John Zimmerman, Green Mountain Power (GMP)*

On behalf of John Saintcross, John Zimmerman welcomed NWCC members to New England, and thanked regional wind stakeholders for participating. He noted that 1997 marked several milestones for GMP – notably the commissioning and dedication of its 6 MW wind power facility in Searsburg. Additionally, in August, half of the company's senior management left to form Green Mountain Energy

Resources and sell renewable energy at the retail level nationwide, starting in the California market.

Dialogue on Regional Barriers & Opportunities for Wind Development

Moderator: Abby Arnold, RESOLVE

Overview of New England Wind Development

- *What is the history of wind development in the region? How have projects performed?*

Harley Lee, Endless Energy: New England's mountainous terrain has proven to be a difficult environment for developing wind power. Projects have shown performance improvement over time, as technology has evolved. Public reception has varied, between "rah-rah" support for wind and opposition to spoiling views of ridges and coastlines. Wind resource data is not in the public domain for the most part, though New Hampshire has launched an assessment program that will release data publicly.

James Manwell, UMass Renewable Energy Research Laboratory: Permitting issues have slowed development in the region, but public perception has become more positive. Remote mountain sites raise accessibility and grid operation questions, particularly in the winter with snow, ice, and lightning – machines must be designed for extreme conditions. New England winds are variable with complex flow, and high towers are needed to elevate blades above trees lines and turbulence. Machine performance data is hard to get.

Roundtable Discussion: An NWCC member asked where New England wind data is archived. While many sites have been monitored, much of the data is not in the public domain or is not organized. Nils Bolgen of the Massachusetts Division of Energy Resources noted that his agency is considering pulling together and organizing regional data; others suggested that this might be an effort the NWCC can help with. John Zimmerman pointed out that GMP has collected extensive wind data since the late 1970s, and there are no secrets -- wind speeds increase with elevation. For inland sites, the higher the better; exposure from all directions is preferable. GMP only looks at sites above 2,500 feet (and below 15,000).

- *What are the current trends affecting wind development in New England?*

Michael Tennis, ReGen Technologies: Restructuring legislation, and therefore consumer choice, will be delayed compared to expectations. Rate cut guarantees will stifle pure cost savings-based competition. Climate change mitigation will be required sooner than we expect. Government-sponsored action on climate change will be "too little, too late." Most of the public will "get it" before governments act.

Policy development to support renewables will continue to consume valuable stakeholder time. The incentive value of systems benefit funds or portfolio standard policies will undershoot expectations – slow and burdensome availability, in-fighting, unintended consequences. Support for green consumer choice from the grassroots environmental community will lag behind the opening of markets and is likely to be cautious and negative – critical of bad offerings rather than supportive of good.

In spite of all this, a well-informed and committed public and business community will appreciate the benefits of renewable energy, and will choose the "green" industry to provide its power.

Roundtable Discussion: Another NWCC member disagreed with such a pessimistic outlook, pointing to green choices to be offered in California and advocates working together on certification efforts (Green-E). Other participants discussed risks and potential benefits of utility restructuring, including Pennsylvania's approach. Without subsidies and set-asides for renewables, customer motivation is the only driver remaining. Public concern about impacts of their energy use on land and water will lead to

greater involvement in resource decisions.

- *How will utility restructuring developments affect the use of wind energy?*

Rick Weston, Vermont Public Service Board: Markets will be threatening to wind, at least initially. Customers will see renewables as more expensive; public policies are still important to assure the continued development of wind resources. According to the Energy Information Administration:

- In 1994, renewable resources produced 66 billion kWh nationally; in 1998, output is expected to total only 49 million kWh.
- In 1993, investor-owned utilities spent \$650 million on R&D (all resources) but in 1995, that investment fell to \$500 million.
- Spending on DSM, LIHEAP, and weatherization has been reduced by a comparable magnitude, 20-45%.

These cutbacks are the obvious result of the uncertainty surrounding restructuring and in particular, the recovery of potentially stranded costs. In the absence of mechanisms to support certain public benefits investments and programs – whose private financial costs reflect, in some degree, environmental and other costs they avoid – markets will likely fail to fully support the development of wind and other renewable resources in the region. This is why AWEA advocates a 10-year extension of the 1.5¢/kWh production tax credit for wind, a national renewables portfolio standard, \$60 million annually in federal R&D, and other policies. However, there is good news: the average total unit cost of wind (cents/kWh) is coming down and is now close to being competitive on a straight market basis.

The Vermont Public Service Board has reached similar conclusions. In December 1996, the Board issued a comprehensive report and set of legislative recommendations to guide the restructuring of the Vermont electric industry. That plan described five initiatives designed to encourage the development of renewables in the Vermont market:

1. A renewables portfolio standard.
2. An emissions portfolio standard.
3. A small wires charge to support R&D and targeted commercialization efforts. The idea is for Vermont to raise funds to be aggregated with other monies—from other states, the federal government perhaps, or other grants.
4. Customers' "right-to-know" and information disclosure standards.
5. National System Benefits Trust – a proposal for a federal/state matching grants program (like the federal USF in telecommunications) to encourage states to implement and continue funding public benefits programs.

Changing markets drive policy development, and changing policies facilitate market development. We must always be aware of the interaction between the two, as we strive to improve the environmental "footprint" of the electric industry.

Roundtable Discussion: An NWCC member noted that the average levelized cost of wind energy in New England (4.5¢/kWh) is higher than wind prices currently being bid in the Midwest and Texas (3-4¢/kWh) due to terrain and siting difficulties. Another noted that by 2000, wind energy is projected to cost 2.5¢/kWh. A participant pointed out that marketers will need to be inventive in states like Pennsylvania without public policies supporting wind development; consumers' demand for the product will drive commercialization.

Challenges in Developing Wind in New England

- *What are the region's wind resources estimated potential and constraints?*

Bruce Bailey, AWS Scientific (see overhead): Less than 1% of land in the Northeast is attractive for large-scale wind development (class 4 or greater winds, excluding environmentally sensitive areas). Still, there is potential for several thousands of megawatts of wind-generated electricity. The windiest areas are shorelines, hills/ridges and mountains. Terrain complexity stifles wind resource generalizations. Available data is limited; site specific monitoring is essential. Wind prospecting must incorporate sound siting principles (good wind resource, accessible to roads and transmission lines, environmentally compatible with local concerns). High elevations are prone to severe weather, especially in the winter; this impacts both wind data collection and turbine operation. Terrain and wind resource variability favors the small clustered wind development approach, which may have a cost impact.

Mike Jacobs, Second Wind: Some class 5 and 6 sites exist in New England, but developers may have to count on the added value of wind to customers to create more variability of sites. Experience in Germany and the UK has shown that wind power may be able to serve unique demands even in areas not known to have great wind resources. Offshore development has been discussed in Massachusetts and Rhode Island, and this may help overcome siting obstacles and NIMBY opposition.

Roundtable Discussion: Participants pointed out that the European wind industry benefits from strong incentives, government support policies, and electric rates up to 18 ¢/kWh, and noted that above-market prices may pose risks in retaining long-term customers. A participant noted that Madison Gas & Electric's initial idea of installing a 1-2 turbine demonstration project within Dane County, Wisconsin, was dropped in lieu of building a 12 MW facility 150 miles away from town to achieve better resources and economics to deliver wind power to customers and a lower price. The concept of local ownership was helpful, but cost determined the location.

An NWCC member noted that the Union of Concerned Scientists (UCS) has prepared a wind resource assessment for New England, and is seeking feedback on the draft report. Most attractive sites for wind development are on ridges, shorelines, or offshore; factoring in transmission accessibility, UCS estimates that 714 MW of wind development in the region (322 MW in Massachusetts) is currently economically feasible. Exclusion criteria were based on input from local environmentalists; few locations were without objection. Other participants noted that floating systems will be developed in the future, and turbines on near-shore sites such as jetties and islands may become more common.

David Blittersdorf, NRG Systems: Terrain and weather pose considerable constraints for measuring wind resources. Within interior New England, the critical problem is ice buildup on instrumentation. A 16-fold increase in icing has been found between 2,000 and 4,000 ft elevations. Wind power equipment may require modifications such as heated anemometers and black turbine blades to perform well in cold climates. The other problem is trees, often 80 feet or taller. But at higher elevations, trees are shorter; prospectors should be on the lookout for windy areas with short trees! Remote sites should not be excluded for long-term measurement, as this limits understanding of the region's resource.

- *How can transmission and power pool requirements be addressed for wind?*

Ed Neuhauser, Niagara Mohawk (see overhead): The region will likely see few large-scale wind installations due to resource, terrain, land use/ownership, and transmission issues. Niagara Mohawk has developed many remote small-scale hydropower facilities, and would like to integrate existing personnel when developing wind resources on isolated ridges for regular maintenance site visits and remote

monitoring and control.

Interconnection capacity is limited by voltages available; high voltage lines of 115 kV cost \$80-100,000 per mile and are becoming standardized industry-wide. Lower voltage connections of 4.8 and 13.2 kV are being replaced, which affects the cost of transformers. Wind project developers should consider this when signing interconnection contracts, as upgrades could later add unexpected costs. Tilt up turbines are preferred for utility serviceability in remote areas, as getting cranes to sites and towers requiring climbing for maintenance pose obstacles. Wind development may be attractive for rural economic development, and can be built into zoning plans in smaller communities interested in tax revenues.

Roundtable Discussion: Participants pointed out that tilt-up towers require guy wires which may be objectionable to land owners, and require more land area, thus leaving a larger footprint. They are only feasible for small-scale turbines; tubular towers with ladders inside and protected from the weather are preferable over lattice towers for maintenance in cold climates.

An NWCC member noted that with grid expansion, 34.5 kV lines are now considered part of the distribution system, supporting semi-rural areas. As part of utility planning, wind power's distributed benefits can help meet growth demands and reinforce voltages. Participants discussed experience with power quality issues; some local effects have been seen in houses adjacent to turbines, but filters have been used to minimize harmonics.

Dave Nickerson, New England Electric System (see overheads): Wind will likely serve retail end-users rather than wholesale spot or bilateral markets. Serving the retail load requires seven products: energy, installed capability, operable capability, 10 minute spinning reserve, 10 minute non-spinning reserve, 30 minute operative reserve, automatic generation control (flows and frequency to follow loads). Suppliers must allocate these obligations between hourly loads, monthly peak ratio shares, reserves, and load ratio shares of the total New England need. Prices are set by the marketplace, depending on hourly supplies and demand. Under current ISO rules, wind projects can provide the first three products, but may need to secure additional capacity from spot/bilateral markets; or excess of these can be sold to generate revenue. Reserves and generation control will need to be supplied by other resources.

Roundtable Discussion: Transmission congestion issues and power pool tariffs may add pricing concerns. Disclosure of data will be important to build markets; net purchasers from the pool during a given hour must pay market rates. Wind is typically given capacity credit for 30% of its nameplate, about the same as its capacity factor. Its ability to meet peak loads is usually given about 1¢/kWh value; under current ISO rules wind is considered "must run" and its power is accepted into the system whenever available.

- What challenges do capacity-based tariffs and wheeling charges present for wind?

Bob Grace, ReGen Technologies (see overheads): Most renewables built in this region have sold to the local utility under PURPA rates, with no need to deal with wheeling. Wind facilities are located by optimizing among many tradeoffs: windy location; site control; permissibility; local acceptance; interconnection (access, voltage, upgrades required); etc. The bottom line is that the best sites may not be in convenient locations for transmission & distribution lines. Here in New England, under existing tariffs, transmission and distribution wheeling costs may play a very big part in the location decision; and may rule out some of the windiest sites! Policies may be able to address some challenges.

New England has three categories of wheeling:

- *Pool Transmission Facilities (PTFs)*
Generally 115+ kV; network (not including radials like Cape Cod); access under ISO-NE RTG

network tariff, postage stamp rate, anywhere in New England; paid for by retail customers! However, these "backbone" grid sites are not often located near wind resources; upgrades to higher voltage systems and costly substations are only justifiable with large-scale wind farms.

- *Non-PTF Transmission*
Generally 69+ kV; point-to-point service from local network owner; depending on location, may still be pancaking rates (multiple tolls). Capacity-based tariffs are firm or non-firm, without much difference in price. Non-firm capacity can be scheduled per kWh (1-2 mills), but this is not very useful for intermittent wind power. Projects either have to pay for service when it's not needed (4-8 mills), or risk not having reserves when used (steep penalty charges may apply). Overhead is incurred if winds are attempted to be predicted and capacity is reserved hourly/daily/weekly. Existing tariffs cost approx. \$10-\$25 per kw-yr; due to RTG phase-outs some may be going up, others down.
- *Distribution*
Less than 69 kV, many more sites. DISCOS have filed rates to date; most companies haven't dealt with it. Capacity based charges are likely in addition to point-to-point non-PTF transmission service. Where filed, these so-called "up-charges" can be very high, for example NEP tariffs in effect today, "rolled-in distribution surcharges," amount to \$61-\$71/kW-year (some exclusions for local load on the same feeder).

All New England wheeling (with the exception of the ability to schedule non-firm hourly use) is capacity-based, "**take-or-pay**," which discriminates against intermittent (low capacity factor) resources. Where no congestion is present (the vast majority of cases in New England), or to the extent congestion charges are separated out, no engineering, economic or policy reasoning can be used to support this treatment over an energy-based charge. Steven Stoff, Carrie Webber, and Ryan Wisner have written a report on take-or-pay, capacity-based transmission tariffs, demonstrating them to be unfair (see example table).

For distributed generation, a more important question is, should there be charges at all? Should there be payments to generation? Many of the best sites for new renewable (and other) generation will be interconnected to a distribution system. Distributed generation resources often provide support to the distribution systems, or distributed benefits, deferring distribution upgrades, decreasing line losses, or increasing reliability. In many cases these resources are to be charged significant fees for the use of the distribution system, which is otherwise fully paid for by load, even if it supports rather than burdens the system. This provides counterproductive price signals, and daunting barriers to intermittent generation such as wind. Particularly if these resources actually lower distribution costs, even if distributed generation isn't given credits it shouldn't be saddled with extra costs.

There is some hope: In its 10/1/97 divestiture filing, NEP filed to eliminate its "up-charges" (for non-PTF & distribution), with the justification of sending appropriate locational price signals for generation siting, better reflecting real costs associated with a given site for new generation. As of yet, there is no critical mass supporting this among others in NEPOOL, and some are opposed to this approach.

Action steps to address challenges: A 2-pronged approach could include involvement in the ISO process, soliciting support from participants to eliminate unfair charges, along with a legislative lever to recognize distributed benefits (see sample language).

Regional Wind-Related Environmental Considerations

- *What siting concerns create local opposition from land protection advocates?*

Can Appalachian Mountain Club's (AMC) siting guidelines affect local public acceptance?

Kevin Knobloch, Appalachian Mountain Club: The AMC felt compelled to weigh in on wind development due to siting concerns. In the northeast, the best consistent strong winds are found on summits and ridges of mountains. Even when sited with environmental sensitivity, commercial-scale facilities will detract from the recreational, scenic and ecological value of region's mountains. However the AMC is also concerned about air pollution in mountains downwind of urban centers – smog, soot and acidity tracking in the White Mountains – and understands the need for renewable, clean energy to displace fossil fuel.

Environmental groups were particularly divided over Kenetech's proposal to install up to 700 turbines along 26 miles of ridgeline in the Boundary Mountains on the Quebec-Maine border. The AMC was not eager to address each new wind project on ad hoc basis. So, the AMC decided to develop policy guidelines for wind power development.

With all the development pressures, resource extraction and mismanagement in the north woods, it is easy to oppose large- and mid-scale wind projects. Wind farm sites in alpine zones have especially fragile vegetation and soils, are highly visible by recreationists, harm or disturb wildlife facing shrinking habitat, and require the cutting of roads and transmission lines into pristine areas. Unlike in the West, public land is sparse and over-visited in the Northeast. AMC's wind guidelines recognize the positive contribution wind can have to solving air quality problems by accepting that every project will have negative environmental impacts; they set up a matrix to help select the least intrusive sites.

The guidelines will help wind development because they implicitly ask the toughest questions up front:

- How do we balance the impacts of wind power with its benefits, which may or may not accrue to mountain regions?
- How do we assure that wind power does not simply contribute to an ever increasing demand for energy in New England, or displace or undercut energy conservation and efficiency efforts?
- How do we ensure that wind does displace existing oil or coal?

This is key to the deregulation debate; *assurance of fossil fuel offset is key to accepting negative environmental impacts of wind development.* The AMC encourages state policies that assess cumulative impacts, set criteria for determining suitable sites and put in place regulations for wind development, operation and decommissioning. This will advance public discourse and understanding of wind power's potential and key issues well ahead of most siting reviews.

Pamela Prodan, Renewable Energy Assistance Project (REAP): REAP represented groups and individuals opposed to the Kenetech project; public acceptance of wind development in the region faces fundamental challenges. With Kenetech's bankruptcy, met towers and other equipment were abandoned in the Boundary Mountains and have been vandalized. The term NIMBY may be convenient, but it is alienating and is not the real issue. Northern Maine is not densely inhabited; opposition is just as likely to come from the outside. Friends of the Boundary Mountains, working to save the area from development, is not a local group. Addressing environmental issues requires a continuing process of education. Wind projects must go through all the steps to make ecological sense; fast-tracks or permit guarantees are not appropriate.

NWCC's efforts at building consensus are to be commended; it is hard to bring all sides to the table. The permitting process is designed to allow for public involvement; however it very well may be that those who raise opposition can't get involved early. This input is still needed; developers have been unwilling to recognize the complexity of the northern forests. This is not California, and the wind industry needs to

overcome the reductionist approach that all renewables are good and all wind is good. Utility restructuring is increasing the sophistication of customers, and energy labeling alone may not alleviate concerns as it doesn't address issues of sustainability.

Other issues *not* being addressed include the scale of energy problems and risk, the need for energy avoidance and impacts of decisions, ownership and control of projects. Out of state developers create friction; siting choices are easier close to electric loads rather than in remote locations. Better technology will not solve all problems; the "bigger is better" era is over. The message of utility restructuring is that we must look beyond the paradigm of the past, and look more to distributed generation and the European development model.

- *What lessons can be learned from the Nantucket and Maine projects?
How can local concerns be balanced against desired visibility?*

Nils Bolgen, Massachusetts Division of Energy Resources: Coastal Massachusetts is characterized by relatively dense population, vacation homes and upper end year-round homes, and special land uses – scenic areas and parks, wildlife sanctuaries, and recreation areas. In Nantucket, shorelines are "back yards." This results in hyper-sensitivity to the usual concerns of land use, aesthetics, and noise.

Strategies to overcome local opposition of wind development include seeking "industrial" sites such as landfills or sewage treatment facilities, and identifying local benefits of on-site generation (power valued at retail rate), tax revenues/jobs, and educational opportunities. Teachers, particularly at the middle school level, are hungry for involvement in such environmental technology projects. Other local "institutional" advocates such as utility, business, or municipality sponsors would have been helpful in Nantucket. Off-shore sites may be more successful, although unless they are far from shore, aesthetics will still be an issue.

Harley Lee, Endless Energy: Many positive lessons were learned through the Maine experience. Public education must start early; it is important to talk to local residents and follow media coverage. However, it is possible to do too much outreach and have unanticipated affects. The biggest concern is that U.S. wind power development was too much too fast, with a lack of candor. Scale is important, and projects should start small. Letters to the editor can help sway public opinion, but meeting with concerned individuals in person is needed.

- *Can wind development produce objectively measurable improvements in air quality?*

Bruce Biewald, Synapse Energy Economics (see overheads and reports at www.synapse-energy.com): The measurability of avoided air emissions due to wind power and determining the cause and affects of base-load reductions can be tricky, but wind has clear benefits over the existing NEPOOL margin and new combined cycle gas. Load growth in the region could increase CO2 emissions by 10 million tons, but early retirement of fossil plants could achieve substantial reductions. Nuclear retirements must also be considered; in 1995 New England's generation mix included nearly 47% nuclear power, and by 2010 only Millstone 3 and Seabrook are expected to remain on-line. Considerable increases in zero carbon sources including wind and energy efficiency will be needed even to stabilize emissions.

- *What are the key concerns about wind power for environmentalists?
How are local impacts of wind projects evaluated against regional and global benefits?*

Paul Jefferiss, Union of Concerned Scientists: Is it possible to evaluate the local impacts of wind development against a backdrop of the regional and global environmental benefits they bring? If so, how

might that evaluation be achieved? Can we go beyond the mere setting of guidelines?

Most of the negative environmental impacts of wind power are local. These have included:

- Avian and other mortality
- Noise
- Visual impacts
- Erosion and water quality
- Some solid and hazardous wastes
- Development of greenfield sites, especially in unspoiled elevated areas
- Intrusive and extensive, but not intensive, land use
- Cultural impacts
- Other impacts
- Public services and infrastructure

Many of these impacts are site-specific, rather than universal, and many have already been mitigated by technical or logistical solutions. But some persist, and may continue to persist, since they ultimately depend upon the perspective of the observer.

Many, but not all, positive environmental impacts of wind power are regional, or even global. These include:

- Reduced climate change emissions
- Reduced criteria air pollutants, including NO_x, SO_x, CO, VOCs, toxins, heavy metals, particulates
- Reduced groundwater pollution
- Reduced soil contamination
- Reduced primary impacts on land (mining, etc.)
- Reduced secondary impacts on terrestrial and aquatic ecosystems, including fish and wildlife
- Reduced impacts on human health and safety

Historically, most siting decisions have actually been made locally. This had led to two problems for wind power and one repetitive result: negative local considerations have often prevailed over positive regional and global considerations; individual sites have not been compared with other, alternative sites; and projects have been pushed from one site to the next, each one more problematic because of the precedent set by the previous rejection. The best example of this in New England is the Maine Kenetech project.

This problem has been partly mitigated by encouraging more complete public participation earlier, and by developing consensus guidelines for wind development. Although it is crucial to evaluate site-specific impacts, evaluation of sites individually and in isolation from regional and global considerations can lead to an imbalance where no site, in itself, is perfect. The problem is not the focus on local impacts per se, but the failure to provide a comparative context for evaluation.

To redress the balance, instead of evaluating each site without regard to regional benefits and goals, and separately from alternative sites, it may be possible to establish some kind of informal body to develop a "regional site banking system." This panel would compare and rank many individual sites within a region by assigning them credits and debits according to how well each site provided regional or global benefits, and how badly each site affected the locality. It would:

- Start by defining regional benefits and goals, and determine whether, in general, they were worth

- pursuing;
- Identify which of many specific wind sites best capture regional benefits and determine whether, if developed, those benefits would be captured;
 - Develop local siting criteria and guidelines (such as those endorsed by the AMC, the NWCC, and UCS);
 - Compare the local impacts of many specific sites; and
 - Rank individual sites according to how effectively they maximize regional benefits and minimize local impacts.

Such a ranking would at least give local opponents a context in which to evaluate their own opposition to a particular site, and would create a context for policymakers to evaluate alternative sites. The process would become comparative. Although this approach might work better in a regulated system, with a "bank" and "bankers" that enjoyed formal regional jurisdiction, the judgment of an informal but impartial group with regional responsibility may carry some weight with policymakers and the public even in the context of competition. One potential negative consequence of any such public banking program would be that it could act to drive up land rents for promising sites.

Markets for Wind in New England: Opportunities and Obstacles

- *What is the potential for new wind development in New England through green offerings? What plans are in the works?*

Tom Rawls, Green Mountain Energy Resources (GMER): GMER, a Vermont utility spin-off, has launched a "Wind for the Future" project to serve California's market. A call center is based in a converted K-Mart in LaCrosse, WI. Every 3,000 customers who sign up will trigger a new turbine at PacifiCorp's site in Wyoming; an initial agreement for three turbines was signed, requiring 9000 customers. The site has been permitted for 41 MW; it is developable up to 72 MW. GMER hopes to unleash demand for renewables and change the way power is made with the message "Do you want cheaper electricity or a cleaner environment?" Customers are asked to pay about \$11 per month premium for a distant benefit. Energy disclosure and education about choices and consequences will help. Technical environmental language needs to be translated into simple, understandable language.

Steve Rothstein, Environmental Futures: The potential for green power is much greater than what can be provided. Customers will eat up every kWh that can be produced, both at the retail and wholesale levels. The three primary drivers are wholesale, retail and state mandates. Large users and municipalities are interested in green power. Market access pilot programs and green pricing utility programs have shown that if marketers are clear about their products and provide adequate consumer education, demand always surpasses supply. A small percentage (3-7%) is likely to be willing to pay significantly higher prices for clean power, and 30-60% may be willing to pay just a little more. This will create enormous opportunities, and a collective force of marketing and education for all renewables rather than just for wind will help create a bigger pie in the long run.

Hap Boyd, Enron Wind Corporation: Enron's CEO, Ken Lay, has supported climate change mitigation, the Renewable Portfolio Standard (RPS), the extension of the Production Tax Credit for wind, and customer choice. Reliable product information is needed so customers know what they are purchasing and that they are not being cheated. In a market-based environment, mechanisms are needed to value the attributes of renewables. Policies such as the RPS will help drive down the price of wind and make it more competitive with other resources. Project size, transaction costs and transmission availability are key factors in the economics of wind power. The environmental community's support is needed.

- *What are the market risks and uncertainties facing wind development?*

Bob Grace, ReGen Technologies (see overheads): The combination of restructuring, and the relative lack of experience in this region with successfully building wind projects, presents several risks and uncertainties for wind developers and those who would finance them. In lieu of a RPS, reliance on the market will create interesting transition problems and dilemmas. The first projects will take all the bullets – high development costs, initial fixed costs and interconnection investments, forthcoming technological advancements, meaning that early projects may later be stranded. It is difficult to get investors interested in a declining-cost environment. Market representations will create timing risks – with project lead time vs. the timing of markets opening; whether to follow or lead the demand; fulfilling promises in a timely manner (customers want instant gratification and won't tolerate "back orders").

Using an already permitting site, such as the Wyoming project, is the best way to proceed; if marketers wait for customers they will have no credibility. Wind's modular nature helps, as incremental investments can reduce risks in matching demand. Viewshed impacts must be weighed against desired visibility; appropriate placement is needed to reinforce market success. However, lowest-cost long-term financing requirements are mismatched with customers who will commit for only a few years; managing expectations for unit costs can be challenging.

- *What wind-related certification issues need to be addressed?*

Karl Rábago, Environmental Defense Fund: Some environmentalists have realized that 1% of the residential market is twice the annual federal wind energy budget. Rather than trying to get more public funds for renewables, customers can be a direct source. Not choosing is a choice.

Disclosure does not compete with other issues, it complements them. Revealing facts about energy supply, like food labels, does not require compromise on principles, but can strengthen them. It provides a mechanism to connect the public to their use of electricity, and lays the ground for green choice. There are no credible, principled arguments against disclosure; opponents always look like fools or worse. Simple analogies in ordinary life can be made, and it helps the "good guys." It fits with populist, free market, conservative and liberal political philosophies, and is best implemented with government substantiation.

Efforts for disclosure legislation are underway in several states and at the federal level, but have not yet been widely successful. The Texas bill failed, and California passed a fuel mix (not emissions) disclosure policy, SB 1305. Significant issues to grapple with include handling utility green pricing programs in a regulated world; whether disclosure should be universal or only for green products, and whether it should be mandatory or voluntary. The Green-E web site has tapped into considerable grass roots interest, but the necessary level, amount and format of information is still being debated. Concerns have been raised about tracking and technical concerns, and disclosure is often confused with certification – there is a big difference. The biggest need is getting disclosure on the table during restructuring.

Certification is a third-party, subjective, and objective evaluation and reporting on green power products. All green power product providers want certification, as an aid to marketing, but they all want different standards. There is little government role in certification outside substantiation of claims, raising the risk of inclusiveness. Self-certification is pure marketing, today's sellers need authenticity. Endorsement by environmental organizations is technically different, but the public may not see the difference.

Ongoing certification activities include development of the "Green group" protocols by early 1998, which will provide an adjustable mechanism like a stereo equalizer to meet resource requirements. The Center for Resource Solutions' Green-E project has developed standards, a code of conduct and legal contracts

with marketers in California; there is interest in expanding this effort to New England.

Remaining questions include how certification can address green pricing programs; how to define "green"; how to match delivery of funds for new vs. old renewables; evaluating direct benefits vs. by-products such as donations for social causes; and whether multiple parties should certify products individually, with multiple tiers. Environmentalists want to differentiate between offerings, and Green-E is attempting to clear the chaff and create momentum.

- *What are the benefits and drawbacks of disclosure/labeling policies?*

Cheryl Harrington, Regulatory Assistance Project (RAP) (see overheads): Disclosure must be uniform, universal, credible, and effective in bringing together buyers and sellers. RAP has conducted extensive research and found that customers think electricity is much cleaner than it really is. A proposed electric label has been developed for Massachusetts and is being tested in shopping malls to determine if consumers can understand the information and differentiate between resources. Pie charts have been found to be a good visual format for representing the supply mix. Several states are considering bills or rules to require labeling; New England commissioners are interested in moving the issue forward.

- *What premium value is realistic for wind? What are the pros and cons of tradable tag schemes? What are customers asking for?*

Ed Holt, Holt & Associates (see overheads): Premiums depend on the product and value added, and may range from 50¢ to \$10/month. Tradable tags may pose risks in undermining consumer credibility and acceptability; however all electricity would be tagged. "Light green" customers want to do the right thing, but with little effort, no hassle, and low or no cost. "Dark green" customers are discriminating and will differentiate among sources even among particular wind projects. Large customers want recognition for being good corporate citizens, environmental credits, and to avoid additional regulation.

Overcoming Barriers: State Renewable Support Policies

- *How will wind energy fit into the Massachusetts SBC and other New England state policy proposals? What lessons can be learned from California's experience?*

Alan Noguee, Union of Concerned Scientists (see overheads): Massachusetts is now considering a Renewables Portfolio Standard bill with tiers to preserve existing renewable and foster new development as a percentage of total sales, with tradable credits and a cost cap. The Renewable Energy Trust Fund is a systems benefit charge to provide \$150 million over five years. UCS's scenario predicts 750 MW of wind by 2007, totally nearly 2% of the state's generation.

- *Is there a role for wind incentives and requirements in state policy? What do restructuring-related policies mean for wind in New England?*

Mary Kilmarx, Rhode Island Public Utilities Commission: State policies can help overcome barriers for wind development and aid in commercialization. Response to Rhode Island's RFP included 4 wind bids (one offshore); more site-specific studies will be needed. The state expects to spend only \$1 million on renewable energy in 1998, but more in 1999. Net metering policies can encourage investments by allowing owners to get the retail rate for offsetting their own electric use with wind or solar power.

- *What implications does Maine's 30% RPS have for the region? How will the affiliates marketing*

limits affect wind development?

Rep. Kyle Jones (Maine): Maine is the exhaust pipe of the U.S., with the highest ozone levels in the country. The state already has 49% renewables, but wanted to protect communities from lost tax revenue. Markets will undoubtedly take off, as the majority of customers want clean power. One approach would be to send restructuring policies to public referendum.

Elements of a Common Agenda: Next Steps

- *How can the NWCC build from this dialogue?*
- *What NWCC outreach efforts could assist regional stakeholders?*
- *What are the next steps for NWCC members and local stakeholders?*

*NWCC Steering Committee Members: Ron Lehr, NARUC
Randy Swisher, AWEA
Ed DeMeo, EPRI
Chuck Linderman, EEI
Heather Rhoads, NWCC Outreach Coordinator*

Abby Arnold called on NWCC members to help pull lessons from the day, and to think about next steps. Randy Swisher noted that this forum has provided NWCC members with a better grounding in regional concerns, how the market is evolving, and the set of issues that the collaborative needs to engage. Chuck Linderman reminded participants not to lose sight of the climate change issue; not only to think globally and act locally, but also to act globally in local applications. If steps aren't taken, New England may have a much different coast line.

Ron Lehr suggested that the NWCC's new Green Marketing Study can be a way to work with New England stakeholders to explore demand and supply issues, and determine how wind can provide what customers want. As NWCC's Outreach Coordinator, Heather Rhoads will continue to identify ways the Committee can address regional concerns and needs such as helping coordinate resource mapping efforts or offering siting workshops.

Closing Remarks *Rich Sedano, Vermont Department of Public Service*

Rich Sedano offered thanks to the NWCC and all of the participants for meeting in New England, and for visiting the wind project in Vermont. The rules for competition present a great opportunity for wind power to penetrate the electricity market. Disclosure rules which inform consumers about the fuel and air quality characteristics of the power they are buying are important for society to recognize the value of wind power.

A market window in New England is closing – 6000+ MW of efficient natural gas fired projects are under construction, under review, or have been announced. The wholesale power market will become increasingly competitive. Renewable energy advocates should view this situation with some urgency. The development of progressive retail electric sellers will help wind energy, and consumer controlled co-ops will have a useful role. States and wind advocates should pay attention to distributed planning policy advances—these will benefit wind power.

Special thanks to Green Mountain Power for co-sponsoring the NWCC site visit to their Searsburg 6 MW wind power facility November 8, 1997.

**National Wind Coordinating Committee
New England Wind Issues Forum Participants**

November 7, 1997, Boston, Massachusetts

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- Larry Alexander, *Environmental Futures*
- Dick Anderson, *California Energy Commission*
- Jim Anderson, *New Hampshire Consumer Advocate Office*
- Abby Arnold, *RESOLVE, Inc.*
- Bruce Bailey, *AWS Scientific, Inc.*
- Alan Barak, *Penn. Energy Project*
- Jim Bartis, *Rand Corporation*
- Larry Bean, *Iowa Department of Natural Resources*
- Bruce Biewald, *Synapse Energy Economics, Inc.*
- David Blittersdorf, *NRG Systems, Inc.*
- Nils Bolgen, *Division of Energy Resources*
- R.T. "Hap" Boyd, *ZOND Corporation*
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- Nicholas Goodman, *University of Vermont*
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- Peter J. Howe, *The Boston Globe*
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- Michael B. Jacobs, *Second Wind, Inc.*
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- Una McGeough, *SEED Ohio*
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- Michael Morrill, *PA Consumer Action Network*
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- Dave Nickerson, *New England Electric System*
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- Jeff Peterson, *New York State Energy R & D Authority*
- Pamela Prodan, *Renewable Energy Assistance Project*
- Karl Rabago, *Environmental Defense Fund*
- Nathan Ravell, *Lakeview Neurorehabilitation Center*
- Thomas H. Rawls, *Green Mountain Energy Resources*
- Robin Read, *New Hampshire Governor's Office of Energy & Community Services*
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- Heather Rhoads, *RESOLVE, Inc.*
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- Steven Rothstein, *Environmental Futures*
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