Comments of William P. Short III\textsuperscript{1} on Work Session #1: RPS Class Requirements

March 15, 2010, 9:00 AM
Call-in Phone Number: 1-866-951-1151, Conference Room number: 5518132

I. Adequacy of sources to meet class requirements
A. Baseline data sources—what are they (ISO-NE, NEPOOL GIS, utilities, PUC, etc.)?

1. Should we measure supply in terms of energy (kWh) or capacity (kW)?

The New Hampshire RPS requirement should be measured in RECs. We should start with the current concept that one MWh of energy from a NH RPS renewable source as defined is equal one REC; then apply locational, time-of-day (“TOD”), time-of-year (“TOY”) and capacity value adjustments. These will reward renewable resources for being located in New Hampshire, operating when the ratepayers need them the most and solving the capacity needs of ISO-NE. The current NH RPS programs do none of these adequately.

2. NH sources vs. New England & New York resources

New Hampshire RPS should favor in-state sources over New England sources as well as those non-NEPOOL sources; essentially, using a locational adjustment. These adjustments should be tied to concepts such as Marginal Losses (transformer and line losses) and Congestion. In addition, an additional adjustment benefit should be given to in-state behind-the-meter generators while out-of-state behind-the-meter generators should receive an additional adjustment penalty.

3. What assumptions should be used to estimate current supply and demand?

The best public source of an estimate of current supply and demand of Class I sources is ISO-NE Regional System Plan analysis of RPS supply and demand. On its estimates, the ISO-NE will provide its assumptions. While the ISO-NE analysis is good for calculating RPS demand, however, its supply analysis is not adequate since it makes no attempt to determine the exact supply per RPS program after taking into account all other RPS programs.

I believe that I am the best private source on current supply and demand for the various New England RPS programs. I constantly track all but the very smallest supply sources in New England and adjacent control areas. From this, I prepare a very detailed report on each New England RPS program. These detailed reports, made available only to my clients, look at each New England RPS program, integrating those net supplies with the overall RPS requirements. This level of analysis and my detailed data base enabled me to be the first person to describe in 2004 the “binary” market feature of the Class I RPS programs as well as in 2009 the “water fall” tiered effect of the interrelated RPS programs. Unfortunately, given the large number of uncontrollable variable in the out years, my detailed supply forecast only goes out to 2011, a year beyond the current compliance year (2010).

B. Class I-IV: Where are the surpluses and shortfalls?

1. Factors contributing to surpluses and shortfalls

\textsuperscript{1} Background information on Mr. Short’s qualification as an expert on RPS design and their operation can be found in Appendix I.
2. Should surpluses/shortfalls be addressed? If so, how?

The oversupply in NH Class I is due to an oversupply in both the Massachusetts and Connecticut Class I programs. These oversupplies can be attributed to just two developments. The first is the emergence of imports of renewable energy from non-NEPOOL regions and the second is the ease of qualification of existing biomass plants as Class I sources. The former contributes about 30% of our Class I supply while the latter contributes about 45% of our Class I supply. For example, of the approximate 3 million MWh generated from biomass sources, 2.4 million MWh are from pre-1994 plants that are Class I sources, 0.3 million MWh are from post-2005 plants that are Class I sources (Schiller Station Unit #5) and only 0.3 million MWh are from biomass plants that have not to date attempted to qualify for a New England Class I RPS. At the dawn of the development of New England RPS programs (1999–2002), neither of these potential supplies was thought to be major sources of Class I supply.

A table of supplies of NH Class I REC from existing or under construction resources located in New Hampshire may be found in Appendix III to this memo. Such facilities are equal to approximately 9% of New Hampshire current RPS load and should satisfy the needs for NH Class I RECs until 2019. Accordingly, there is no justification for New Hampshire ratepayers to pay for above-market long-term power sales contracts for new New Hampshire Class I resources.

Other Questions:

a) Given that NH represents approximately 9% of the ISO-NE load, how much would an increase in Class requirements affect the market REC price (of each Class)? How would such an increase impact retail electricity rates?

New Hampshire is a small state with a series of small RPS requirements in light of the overall RPS requirement for New England. Its ability to influence New England REC prices does not exist. Consequently, no increase in New Hampshire RPS percentage other than those that are already mentioned in the statute should be considered. Instead, New Hampshire needs to adopt a RPS program similar to the UK ROC (Renewable Obligation Certificate) program where load is “taxed” (i.e., a finite sum would be collected for each MWh of retail load for each NH RPS class) and the NH PUC purchases with those sums all qualified RECs offered, paying each REC in that Class the same price.

b) Do you find the REC price of [insert Class] to be adequate toward viable financing of a renewable energy project located in NH?

For the aforementioned reasons, the New Hampshire RPS programs are simply not a viable means to finance (or even to maintain in operation) any renewable energy project either located in New Hampshire, the balance of NEPOOL or in adjacent control areas. In order to make the RPS a means for financing, an RPS program design similar to the UK ROC program must be adopted. In order to encourage New Hampshire renewable sources, a locational adjustment must be adopted along the lines discussed above.

c) What is the overall state of the current REC market [as a tool to increase renewable energy resources in NH]?

The current New Hampshire REC market(s) is (are) incapable of financing any renewable energy project.
II. Class requirements in light of current and expected market conditions

A. Factors influencing the REC market and retail electricity market

B. Forecasting and modeling
   1. Pros and Cons
   2. Available forecasting/modeling tools
   3. What assumptions do these tools employ?

Long-term forecasts (four years or longer) of REC prices and supplies are generally not very useful (said another way, worthless) due to the number of uncontrollable factors.\(^2\)

The New England renewable energy industry suffers from having too many variables subject to external factors beyond its control. Two examples of this are the initial versus the current amount of imported renewable energy and the upgrading of air emission controls at existing biomass projects in order to qualify as Class I facilities. Neither development was forecasted at the start of New England RPS programs; however, both have occurred, changing perceptions of RPS programs greatly.

Other Questions:
   d) If you could change the class requirements, would you? How?

The “start” date of the New Hampshire RPS should be moved from January 1, 2006 to January 1, 1998. This aligns the New Hampshire program with the start date for the Massachusetts and Rhode Island RPS programs. This change increases Class I supply while decreasing Class III supply.

Permit pre-1998 Class III facilities that have qualified for Class I to have an annual, once-a-year switch between Class I and Class III. The switch by the generator must be completed by March 31 of the compliance year.

Grant RPS treatment to station service production as behind-the-meter production provided that an Independent Monitor is used and proper on-line remote metering is installed.

Add the Class II percent requirement to the Class I percent requirement and abolish the Class II requirement.

Adjust the REC by the following cumulative factors (or until the NH PUC sets its own factors). (There is no change in the current requirement for delivery of the unit’s energy into NEPOOL if the unit is located in an adjacent control area outside of NEPOOL). An Excel spreadsheet for calculating the conversion of a facility’s MWh into RECs is attached to this memo.

Behind-the-Meter –
   • Located in New Hampshire, behind-the-meter—multiply by 1.1
   • Located not in New Hampshire, behind-the-meter – multiply by 0.9
   • Selling into the grid – multiply by 1.0

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\(^2\) Despite my reservations on long-term forecasts of REC supplies and prices, attached, as Appendix II, is a recent forecast of mine on long-term REC supplies for the period 2013 and thereafter.
Location –

- Located in New Hampshire – multiply by 1.0
- Located in Vermont, Maine or Massachusetts – multiply by 0.95
- Located in Connecticut, Rhode Island, Zones F-K in NYISO or the Maritimes – multiply by 0.90
- Located in Zones A-E in NYISO or Quebec – multiply by 0.85

Time-of-Day, Time-of-Year³ –

- Between noon and 6:00 p.m., Monday thru Friday, June through August and between 4:00 p.m. and 8:00 p.m., Monday thru Friday, December thru February – multiply by 4.0
- Balance of the time between 7:00 a.m. and 11:00 p.m., Monday thru Friday – multiply by 1.75
- All remaining hours – multiply by 0.0
- If a facility elects to not to present Time-of-Day, Time-of-Year production data -- multiply by 0.60

Capacity –

- The facility holds a ISO-NE capacity supply obligation – multiply by 1.0
- The facility does not holds a ISO-NE capacity supply obligation – multiply by 0.85

Set the reference point for the 2011 ACP for Class I, Class III and Class IV to $31.06/REC. (By setting the ACP for Class I REC at $31.05/REC lowers the overall maximum cost of the NH RPS by approximately 40%. This is offset by mandatory minimum payment arrangement described below. In addition, the need for above market long-term power contracts for new power plants is also eliminated).

Set up three RPS programs similar to the UK ROC program, corresponding to Class I, III and IV. Below is a discussion of how such a program would work for the Class IV program:

For the Class IV program, about $3.1 million would be annually collected from load by the NH PUC. That $3.1 million would be paid to the holders of qualified Class IV RECs that were tendered to the NH PUC during the compliance year. Assume that 80,000 Class IV RECs are tendered, the average payment is about $38.00; if 100,000 RECs are tendered, the average payment is about $31.00; and, if 120,000 RECs are tendered, the average payment is about $24.00. As you can see, large price swings disappear and the price will tend to float around the ACP, permitting RECs to become tools to enable financings to occur.

e) Where do you expect the REC market to go in the near term? Medium term?

Looking at the Class I market, for 2010, prices should approach $18.00/REC by 6/15/11; for 2011, prices should approach $27.50 by 6/15/12; and for 2012, same price as 2011. No medium term forecast is provided.

For Class II, add $2.00/REC to the Class I price unless Massachusetts Solar Carve Out Program is changed to accept out-of-state RECs; No medium term forecast is provided.

For Class III market, for 2010, prices should approach $18.00/REC by 6/15/11; for 2011, prices should approach $27.50 by 6/15/12; and for 2012, same price as 2011. No medium term forecast is provided.

³ Generators would be required to sell 100% of their GIS Certificates from their unit to the NH PUC for a particular compliance year in order to qualify for payment.
For Class IV market, for 2010, prices should approach $27.50/REC by 6/15/11; for 2011, prices should approach $27.50 by 6/15/12; and for 2012, price should approach $25.50/REC by 6/15/13. No medium term forecast is provided.

f) What role does the perception of the future REC market play in a decision to develop a renewable energy project in NH? Elsewhere in New England?

III. Increase (Extension) in requirements beyond 2025 (Class I & II, statute as a whole)

A. Should an increase be recommended? Why or why not?

No percentage increase in Class I or II requirement should be sought at this time.

B. Would an extension reduce the uncertainty of investing in renewable energy?

While the lack of a market after 2025 does create doubt for investors, it does not currently play a large role; nevertheless, a ten-year extension should be sought now. Longer extensions are not warranted at this time.

IV. Transition of new sources to existing sources (Class I & II)

A. When should new sources be re-classified as existing sources, if at all?
   1. Methodology for transition

Transition of any source at this time from Class I or II to Class III or IV would be unwise and counter-productive. However, as stated earlier, pre-1998 Class III facilities that have qualified for Class I would be permitted an annual, once-a-year switch between Class I and Class III.
APPENDIX I

Qualification of William P. Short III

William P. Short III is an independent consultant with a practice specializing in the field of renewable energy. He began his professional career with Philadelphia Electric Company (now Exelon Corporation) in 1973 where he was a project engineer in its Engineering & Research Department and worked on the design, construction and operations of nuclear power plants, specializing in the emergency core cooling systems for nuclear power plants. From 1978 until 1980, he worked, as project engineer, for EBASCO (now a part of Raytheon), designing nuclear power plant security systems. From 1980 until 1996, Mr. Short worked for a major investment bank, Kidder, Peabody (now part of UBS Financial Services), as an investment banker. He specialized in the financing of renewable energy companies and renewable energy projects. He financed wind farms, landfill gas power plants, geothermal power plants, geothermal companies, biomass plants and small hydro facilities. For ten years, he managed, on behalf of Kidder’s investors, the operations of several wind farms in which its clients had invested.

Mr. Short consulted during 1996 and 1997 on electric power de-regulation in California, advising Prudential Insurance, Deutsche Bank and CIGNA on their geothermal loan investments. During the same period of time, for Southern California Edison Company he performed analysis to support buy-out offers for above-market long-term power purchase agreements with renewable energy projects.

Mr. Short worked from 1997 through 2008 for Ridgewood Power Management Corporation (hereinafter referred to as “Ridgewood”), where he was its vice president of power marketing. He managed its sales of energy, capacity and renewable energy certificates (hereinafter referred to as “REC”) from its generating facilities, including two biomass plants, two landfill plants and 16 small hydro plants in New England. He represented Ridgewood in the legislative and regulatory process that created the various New England state Renewable Energy or Portfolio System programs (hereinafter referred to as “RPS”). He managed the regulatory effort to qualify the Ridgewood generating facilities in the various New England state RPS programs. He materially participated in the creation of the New England Power Pool Generation Information System (hereinafter referred to as “NEPOOL GIS”). Although Ridgewood was a small company, during the mid-2000s, with its generating assets, it, nevertheless, managed to control as much as 45% and 40% of the supply of Massachusetts and Connecticut RPS requirements, respectively, for “new” renewable facilities. For the period of 2002 through 2006, Ridgewood was the largest generator of “new” REC (hereinafter referred to as “New REC”) in New England. These efforts were quite successful and, by 2007, resulted in additional revenues between 66 2/3% and 100% of the combined energy and capacity revenues for Ridgewood’s New England facilities.

Concerning traditional power marketing activities, Mr. Short aggressively marketed the energy and capacity from Ridgewood’s New England power plants. In 1999, Ridgewood’s plants were the first

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4 The NEPOOL GIS is the tracking and trading system that was established for, among other things, the verification of compliance with the various New England state RPS programs. It also provides a data base of public reports on generator production.

5 “New” RECs may be defined collectively as Massachusetts Class I, Connecticut Class I, New Hampshire Class I and II, Maine Class I and Rhode Island New REC.
New England independent renewable generators to sell their energy into the ISO-NE markets. In 2004, Ridgewood’s plants became the first renewable generators to sell their generators’ gross energy production while at the same time purchasing all of their station service needs from ISO-NE. In 2007, Ridgewood became the first New England independent renewable generator to serve load under a Standard Offer Service (hereinafter referred to as “SOS”) agreement exclusively with energy from renewable generation. Through 2002 until he left Ridgewood, Mr. Short negotiated discounted transmission service, station service and metering service contracts with Ridgewood facilities’ local electric distribution companies. The SOS agreement raised Ridgewood’s energy revenues by approximately $10 per megawatt-hour (hereinafter referred to as “MWh”) over what they would have been otherwise while these other agreements reduced operating expenses approximately $5/MWh.

Since leaving Ridgewood in 2008, Mr. Short established a consulting practice. Given his knowledge of and experience with the New England power and REC markets, nearly all of his clients’ operations are located in New England. He represents the owners or developers of wind, biomass, solar, co-generation and hydro-electric projects. He qualifies, manages and sells for these clients some or all of their REC production. He also represents load serving entities in Connecticut, Massachusetts, Maine, New Hampshire and Rhode Island. He regularly manages and purchases for these clients all of their REC requirements. He maintains a proprietary data base on the supply and demand for the various New England RPS programs. He offers extracts of this data base to both his load and generator clients. He also acts as an Independent Monitor, qualifying behind-the-generation for the various New England RPS programs and then reading and verifying their production.

Mr. Short was graduated by Duke University with a Bachelor of Science in Engineering (Electrical Engineering) in 1973, the University of Pennsylvania with a Masters of Science in Engineering (Systems Engineering) in 1978 and New York University with a Masters of Business Administration (Finance and Accounting) in 1978.

Mr. Short has testified on matters pertaining to renewable energy policy at the Maine, New Hampshire, Massachusetts, California and Connecticut state legislatures. He has testified on matters pertaining to renewable energy policy or projects at the California Energy Commission, California Public Utilities Commission, New York Public Service Commission, New Hampshire Public Utilities Commission, Maine Public Utilities Commission, Massachusetts Department of Energy Resources, Rhode Island Public Utilities Commission and Connecticut Department of Public Utility Control.

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6 Ridgewood’s affiliate Indeck Maine Energy served load under the Maine Standard Offer Service arrangement, an arrangement similar to the Basic Service of Granite State Electric.
APPENDIX II

Forecast of Long-Term Supplies of Renewable Energy Certificates

By William P. Short III

The prices of New RECs in New England, which peaked four years ago at over $50/REC\(^7\) and are currently selling for less than $15/MWh,\(^8\) could have little value within as little as 4 years and negligible value within 7 years.

The supply of existing renewable resources in New England in 2003 was about 10.8% of the total New England consumption of energy.\(^9\) If all of this existing supply is converted to New renewable resources for one or more of the New England RPS programs, the RPS requirements for New renewable resources for nearly all of the New England states would be satisfied until the very end of this decade. With little fanfare, this has been slowly happening.

Since 2002, many existing renewable resources have qualified for one or more of the various “New” New England RPS programs as New resources; thus reducing the need for recently constructed (i.e., truly new) renewable resources in New England. For example, of the 21 biomass plants in New England that were built before 1998, 19 have been certified in one or more of the New England RPS programs for “new” renewable resources as being New. These biomass plants currently provide the plurality of the REC that qualify for the various New England state RPS programs as New renewable resources.

This trend of the qualification of existing biomass plants as New renewable resources has not abated. In the past two years, behind-the-meter production from biomass boilers located at paper mills has qualified for New treatment.\(^10\) To date, the potential annual production from just the three approved facilities totals 500,000 RECs. Eventually, all biomass boilers at paper mills will be qualified and would deliver a substantial supply of New RECs to the marketplace.

Since 2007, hydroelectric projects larger than 5 MW have been able to qualify for several of the New England state RPS programs.\(^11\) Although only three hydroelectric facilities have qualified to date,\(^12\) many are working on projects to expand their production or retrofit their facilities to qualify as New renewable resources.

\(^7\) In November 2006, I sold Massachusetts Class I REC for prices in excess of $54.00/REC.
\(^8\) Recently, I sold for my generator clients Maine Class I RECs for $13/REC while I purchased for my load clients Connecticut Class I REC for $14/REC.
\(^9\) New England renewable supply as measured by the NEPOOL GIS for 2003 was 13.5 million REC or 10.8% of total New England generation. For 2009 (the latest year for which full year data is available), New England REC supply was nearly 20.0 million REC or 15.8% of total New England generation.
\(^10\) See Maine PUC website (www.maine.gov/mpuc/electricity) for details of its decisions granting “New” RPS treatment to biomass boilers at the Lincoln, Old Town and Westbrook, Maine paper mills.
\(^11\) In Rhode Island, the hydro size limit is 30 MW. In Massachusetts, the hydro size limit is 25 MW incremental to the dam’s base generation. In New Hampshire, the hydro size limit is any incremental amount to the dam’s base generation. In Maine, the hydro size limit is 100 MW.
\(^12\) TransCanada recently qualified its 15-Mile Falls Hydroelectric Project on the Connecticut River in Grafton County, New Hampshire and Caledonia County, Vermont, as a Massachusetts Class I renewable resource. More details can be found at www.lowimpacthydro.org.
renewable resources. Since hydro currently produces about 50% of New England’s supply of renewable generation, if these qualifications become as commonplace as they have been with the biomass plants, then the current surplus of supply of RECs from existing renewable resources could more than double.

Since New Hampshire and all of the other New England RPS programs accepts RECs from renewable resources located outside of New England, one has to consider those supplies affecting the price of New REC in New England. In New York, where in its RPS uses long-term contacts to procure RECs, the contract terms are for ten-year terms.\textsuperscript{13} Nearly all of these contracts are with wind farms. The first of these contracts will expire in 2017 and the last should expire in 2024. While the first wave of contracts was small, only 300 MW, the total number of contracts should total around 3,000 MW. Once their contracts in New York expire, the owners of these wind farms will obviously seek the highest prices, as many of their New York competitors already do,\textsuperscript{14} and export their energy and RECs to New England.

A similar development should occur with eastern Canada wind farms, starting as early as 2013. To date, Hydro Quebec has executed 1,400 MW of 10-year contracts with wind farm developers.\textsuperscript{15} Hydro Quebec’s goal is to develop a total of 3,500 MW of wind farms. The earliest expiration date of these contracts is 2013. With no RPS requirement in Quebec or, for that matter, all of Canada, the closest market for these facilities’ RECs is the New England states RPS programs. Consequently, when these wind projects come off contract, their REC production will naturally seek buyers in the New England if no market for RECs exists in Quebec.

Outside of New England, the price of RECs used to satisfy other state RPS programs is currently substantially less than those for New England RPS programs for New RECs. Except for the New England RPS programs, nearly all state RPS programs are presently satisfied with REC costing less than $10/REC. In many jurisdictions, such as in Texas, the cost is already less than $2/REC. Over the long-term, unless changes are adopted in New England RPS programs, I foresee the price for New RECs approaching that of the balance of United States and not the other way around.

\textsuperscript{13} In addition, currently about 1/3 of all New York wind projects export their production to New England in order to satisfy the New RPS requirements of the various New England states, including that of New Hampshire’s Class I.

\textsuperscript{14} Currently, nine wind projects, with a generating capacity of 463.5 MW, from New York are already qualified as New England New renewable resources.

\textsuperscript{15} To date, Hydro Quebec only exports RECs from two wind projects under contract (total capacity of 108 MW) with it into New England. Both of these have been qualified as New England New renewable resources.
## Current Large Sources of New Hampshire Class I Renewable Energy Certificates Located in New Hampshire

<table>
<thead>
<tr>
<th>Name of Generating Unit</th>
<th>Capacity (MW)</th>
<th>Projected Energy (MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schiller Unit #5</td>
<td>47 MW</td>
<td>320,000 MWh</td>
</tr>
<tr>
<td>Indeck Alexandria(^{16})</td>
<td>14.5 MW</td>
<td>116,000 MWh</td>
</tr>
<tr>
<td>Springfield</td>
<td>14.5 MW</td>
<td>116,000 MWh</td>
</tr>
<tr>
<td>Lempster Wind</td>
<td>24 MW</td>
<td>60,000 MWh</td>
</tr>
<tr>
<td>Coos County Wind(^{17})</td>
<td>100 MW</td>
<td>250,000 MWh</td>
</tr>
<tr>
<td>Turnkey Landfill(^{18})</td>
<td>6 MW</td>
<td>48,000 MWh</td>
</tr>
<tr>
<td>UNH</td>
<td>12.5 MW</td>
<td>48,000 MWh</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>218.5 MW</strong></td>
<td><strong>958,000 MWh</strong></td>
</tr>
</tbody>
</table>

\(^{16}\) Indeck Alexandria and Springfield would be permitted to move between Class I and Class III.

\(^{17}\) Assumes proposed operation in late 2011.

\(^{18}\) Only the post-1998 portion of Turnkey Landfill is considered New Hampshire Class I.