Flaws in and Solutions to Integrating Renewable Energy Resources in New England

William P. Short III
Consultant
November 18, 2008

Disclaimer

The viewpoints expressed herein are solely those of the author.

What were the Original Goals of State RPS Programs and RGGI?

- The **generation of energy** either from new renewable or "threaten" existing renewable generation.
- The **reduction of** Greenhouse Gas **emissions**.
- **Note the Absence of Qualifications.**

What are the principal causes of the need to integrate renewables?

State Renewable Portfolio Standards –

- One MWh of Renewable Energy equals one Renewable Energy Certificate ("REC").
- With no locational, time-of-day or time-of-year adjustments.
- Total focus on energy with no consideration of the reliability value or locational aspects of renewable generation.

Regional Greenhouse Program –

- Equal focus on renewable projects regardless of location or time of operation.

What are the principal results of the failure to integrate properly renewables?

The results –

- Transmission lines to nowhere.
- Encouraging unreliable, uncommitted renewable generation.
- Need for back-up generation and storage.

What is incrementally satisfying New England RPS programs?

- **Empty Renewables** – those renewables which provide limited capacity values.
- **Nowhere Renewables** – those renewables which require significant transmission upgrade costs to be borne by ratepayers.
- **Worthless Renewables** – those renewables which provide no long-term value to New England consumers and retain the ability to participate in their out-of-region RPS programs on a moment's notice.

What is not incrementally satisfying New England RPS programs?

- **Local Renewables**. Example, solar energy and off-shore wind.
- **Reliable Renewables**. Example, landfill gas and biomass.
- **Committed Renewables**. Example, resources committed to ISO-NE capacity market.

What are the other principal flaws of state renewable energy programs?

Other material flaws –

- A binary market.
- No price support (floor) mechanism.
- Alternative Compliance Payment not related to Value of the Renewable Generation.

What should be the public policy for the integration of renewables and correcting flaws in RPS policy?

A sound public policy that:

- Values more renewable sources built closer to load (**the locational argument**).
- Values these sources more if they generate during on-peak hours (**the time-of-day argument**).
- Values these sources more if they generate during on-season hours (**the time-of-season argument**).
- Requires that these sources be committed to deliver all of their energy and capacity to New England customers (**the capacity argument**).
- Sets a Floor Price for REC equal to the lower of Alternative Compliance Price or the Value Produced by the Renewable Generation (**the price taker argument**).

What should be solutions to the integration of renewables?

The solution –

- Locational, Time-of-Day, Time-of-Season Adjusted and Committed Capacity Renewable Energy Certificates.

What are the solutions for state renewable energy programs?

The solutions –

- An unlimited requirement for renewable energy based upon a payment equal to the lesser of the value of REC (for the hour or period of the year in question) or the Alternative Compliance Price.

- A Central Buyer of RECs who purchases any and all RECs under the preceding condition.

What is the Value of Renewable Energy Generation to the Public?

- **The NYISO/NYSERDA wind study** found that wind generation (primarily off-peak generation) would lower all energy prices by $1.80/MWh. Assuming a 6% RPS requirement, this value implies a price suppression value accruing to the wind generator of $30.00/MWh.
- **ISO-NE's RSP-06** found that price taker generation (base load) would lower all energy prices by $4.41/MWh. Assuming a 5.9% RPS requirement, this value implies an approximate price suppression value accruing to the price taker generation of $75.00/MWh.

What is the Value of Renewable Energy Generation to the Public?

- **An analysis of the RSP06** data indicates that the price suppression results are not the same for all hours. This analysis indicates that the price suppression values are worth approximately -
  - **$300-360/MWh** for super on-peak hours (Monday-Friday, noon to six p.m. in the summer months and Monday-Friday, 4 p.m. to 8 p.m. in the winter months).
  - **$90-120/MWh** for all other on-peak hours.
  - **$30-40/MWh** for all off-peak hours.

What is the Value of Renewable Energy Generation to the Public?

- **An analysis of the RSP06** data also indicates that the price suppression values ***in on-peak hours*** exceed an Alternative Compliance Price of approximately $60.00/REC. Thus, the more RECs purchased during these hours, the lower the price of energy to the ratepayer even when the cost of the RECs are included.

  For the other hours, when the price suppression is less than the ACP, it will be necessary to lower the payments to the renewable generator in order **to create ratepayer savings**.

- Since the public benefit exceeds the cost to the public, a Central Buyer scheme (similar to that of NYSERDA) should be implemented to ensure that the ratepayer receives the maximum amount of renewable energy ***that is cost effective***.

What is the Value of Renewable Energy Generation to the Public?

Normalizing these values, produces the following REC values from this renewable generation:

- **Three RECs** for each MWh of super on-peak hour energy produced (Monday-Friday, noon to six p.m. in the summer months and 4 p.m. to 8 p.m. in the winter months).
- **One and one-half RECs** for each MWh of energy produced during all other on-peak hours.
- **One-third RECs** for each MWh of energy produced during all off-peak hours.

What is the Value of Renewable Energy Generation to the Public?

How does this compare with what we have now in New England?

- Presently, a 1 MW generator operating at 100 % capacity factor makes 8,760 MWh and 8,760 RECs.

- As proposed, that same generator operating under identical conditions would make the same MWh and same RECs, **but with REC production focused on the on-peak periods:**

  1,950 RECs during the super on-peak hours (650 hours);

  5,265 RECs during the balance of the on-peak hours (3,510 hours);

  1,545 RECs during the off-peak hours (4,600 hours).

What are the Locational Adjustment Factors for Renewable Energy Generation?

- Generation built closer to load has **lower congestion and marginal loss.**
- Generation built closer to load will require **less transmission improvements.**
- Generation built closer to the host state of the RPS will produce **greater economic impact, jobs, property tax, electric infrastructure** to the host state than generation built further way.

What are the Locational Adjustments for Renewable Energy Generation?

Using these factors, what would be reasonable locational adjustment factors for Renewable Generation qualified for the Massachusetts RPS?

- Massachusetts – **no discount.**
- Adjacent New England state to Massachusetts - **5% discount.**
- Two states away from Massachusetts but still in New England – **10% discount.**
- Eastern New York – **20% discount.**
- Western New York and Canada – **30% discount.**

Combining these two ideas, what are the values for a Renewable Generator's RECs Under Central Procurement for the Mass RPS?

- **Massachusetts** -- $180/MWh on super on-peak REC, $90/MWh all other on-peak REC and $20/MWh for off-peak REC.
- **Adjacent NE State** - $171/MWh on super on-peak REC, $85.50/MWh all other on-peak REC and $19/MWh for off-peak REC.
- **Maine** – $162/MWh on super on-peak REC, $81.00/MWh all other on-peak REC and $18/MWh for off-peak REC.
- **Eastern New York** – $144/MWh on super on-peak REC, $72.00/MWh all other on-peak REC and $16/MWh for off-peak REC.
- **Western New York and Canada** – $126/MWh on super on-peak REC, $63/MWh all other on-peak REC and $14/MWh for off-peak REC.

What would be the outcomes if these policy changes were implemented?

- RECs would now be adjusted for their time-of-day, time-of-year and locational values.
- Central Buyer concept would stabilize the REC market and provide a better structure to permit long-term financing.
- RECs would always produce value to the ratepayer greater than the cost to the ratepayer.
- Lowest energy prices for ratepayers (with the savings largely paid for by fossil and nuclear generators).

What would be the outcomes if these policy changes were implemented?

- Transmission lines to nowhere would not be built.
- Storage projects for off-season, off-peak energy would not be needed.
- Back-up generation for unreliable or uncommitted renewable capacity would not be constructed.
- With less transmission requirements, less stress on the environment.

Questions,
Comments, Or
Most Appropriately
Praise!