



STRATEGIES TO ENCOURAGE INVESTMENT IN RENEWABLE ENERGY GENERATION

NARUC ENERGY REGULATORY PARTNERSHIP WITH GEORGIAN NATIONAL ENERGY AND WATER SUPPLY REGULATORY COMMISSION

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PAUL J. ROBERTI COMMISSIONER, RHODE ISLAND PUBLIC UTILITIES COMMISSION





INTRODUCTORY BACKGROUND:



RHODE ISLAND AND NEW ENGLAND ELECTRICITY INDUSTRY STATISTICS





New England's Electric Power Grid at a Glance

- 6.5 million households and businesses; population 14 million
- 350+ generators
- 8,000+ miles of high-voltage transmission lines (115 kV and above)
- 32,000 megawatts of total supply and 2,000+ megawatts of demand resources
- 28,130 megawatts all-time peak demand, set on August 2, 2006
- 500 participants in the marketplace
- \$5 billion total energy market value in 2012







Supply & Demand: New England







Supply & Demand: Rhode Island



Source: http://www.iso-ne.com/nwsiss/grid mkts/key facts/index.html





Fuel Mix for New England – 2012







Fuel Mix: New England and Rhode Island



Source: http://www.iso-ne.com/nwsiss/grid_mkts/key_facts/index.html





Fuel Mix: New England & United States



Source: http://www.iso-ne.com/nwsiss/grid mkts/key facts/index.html





Regional Generation & Capacity

New England Generators by Fuel Type	% of Total Capacity 2012	% of Electric Energy 2012
Natural gas	43%	52%
Oil	22%	<1%
Nuclear	14%	31%
Coal	8%	3%
Hydro	5%	6%
Pumped storage	5%	1%
Other renewables	3%	7%

Source: http://www.iso-ne.com/nwsiss/grid_mkts/key_facts/index.html





Electricity Prices Track Natural Gas



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Average Day-Ahead Wholesale Electricity Prices



Source: http://www.iso-ne.com/nwsiss/grid_mkts/key_facts/index.html







RHODE ISLAND RENEWABLE ENERGY POLICIES







Obligation to Purchase Electricity from Renewable Energy Sources

- There is no federal mandate addressing this issue. Each state in the United States may pass laws governing these purchases where the end-user is located in that state.
- 43 states have renewable energy standards, although not are all the same and some provide voluntary targets rather than mandates.
- The obligation to purchase renewable energy is placed on any entity selling energy at retail to an end-user (i.e., electric distribution company or competitive supplier). These are known as obligated entities.





Most States Have Renewable Portfolio Standards or Goals



Source: Interstate Renewable Energy Council, Database of State Incentives for Renewables & Efficiency (accessed January 2013).







Renewable Portfolio Standard Policies







Rhode Island's Renewable Energy Standard

- Each Obligated Entity is required to procure a certain percentage of total electricity sold at retail to end-use customers by a target year.
 - In Rhode Island, an Obligated Entity is a person or entity that sells electrical energy to End-use Customers in Rhode Island, including, but not limited to: Nonregulated Power Producers and electric utility distribution companies that serve customers who choose not to buy electricity from a competitive provider (NPP).
 - Rhode Island's target is 16% by 2020.
- Of the 16%, at least 14.0% must be from "New" Renewable Energy Resources – units which entered commercial operation or repowered since December 31, 1997
- Amount increases annually on a set schedule with the 2014 obligation at 8.5%.





Renewable Energy Standard also called Renewable Portfolio Standard

- In New England, renewable Energy Resources can come from any State within the same Regional Transmission Organization or an adjacent RTO region provide that the the power is delivered into the New England RTO.
- Generally, renewable resources primarily include:
 - Solar
 - Wind
 - Small hydro (less than 30 MW)
 - Biomass (landfill gas, "clean" wood, and agricultural waste)
 - Anaerobic Digestion





New England Renewable Energy Targets, 2021

Today, Massachusetts accounts for 46% of the region's total electricity consumption; Connecticut 25%; Rhode Island 6%

With passive demand response forecasts (11.6% energy reduction in 2021), LSEs would need renewables to provide 20.2% of projected electric energy use to meet existing targets.

By 2021, 31.8% of region's projected electric energy consumption could be met by EE, RPS targets, and related renewable goals.



Source: ISO-NE RSP 2012, p. 135, 138-139.





State of Rhode Island Prescribes Regulations for RPS

- The Rhode Island Public Utilities Commission is responsible for certifying generating units as Eligible Renewable Energy Resources.
- Once certification is complete, the Renewable Energy Certificates ("RECs") are tracked through a Generation Information System ("GIS").
- These RECs then become tradable at different points during the year and may be purchased to meet the renewable obligation.
- 1 REC = 1 MWh of renewable electricity placed on the grid





Renewable Energy Standard Compliance

- If renewable energy supplies are inadequate to meet demand, compliance can also be demonstrated by making "Alternative Compliance Payments" (ACPs) to the State. The funds are use to provide grants to facilitate the development of new eligible renewable resources to grow supply.
- 1 ACP = 1 REC
- The ACP rate is adjusted annually by inflation
- Compliance Year 2013 ACP = \$65.27; New RECs have been tracking close to the ACP since 2011 when the renewable energy supply market began to tighten.
- The ACP mechanism is <u>NOT</u> a penalty or fine, but rather represents a market ceiling price to protect against price volatility.
- The obligated entities are required to file reports of compliance with the PUC to confirm compliance. PUC may penalize non-compliant obligated entities if the evidence demonstrates unreasonable actions were the cause of non-compliance.





Purchase of Renewable Energy Certificates

- Outside of the trading period:
 - Obligated entities may purchase RECs through long term energy contracts with an Eligible Renewable Energy Resource (delivery and payment during the trading period).
 - Obligated entities may purchase RECs through contracts with an Eligible Renewable Energy Resource for its RECs (delivery and payment during the trading period).
- Either during or outside of the trading period:
 - Obligated entities may purchase RECs through a broker who matches a buyer and seller.
- During the trading period:
 - Obligated entities may purchase RECs during the trading period based on the availability of RECs not yet contracted.





How Electric Distribution Company Meets Obligation

- 1. Renewable Energy Standard Procurement Plan
 - Periodic contracting for RECs throughout the year through a competitive process
 - Review of offers through brokers
 - Review of offers made directly from an Eligible Renewable Energy Resource
- 2. Long-Term Contracting Standard (LTC)
 - Four year procurement process to procure energy and RECs for 90MW of capacity.
- 3. Distributed Generation (DG) Standard Contracts
 - Requires 10% of the 90 MW Long Term Contract capacity be Distributed Generation, inclusive of solar capacity.





Long Term Contracting Standard

- Over a period of four years (2010-2013)
- Rhode Island's largest regulated electric distribution company has been required to annually solicit proposals from Renewable Energy Developers and, provided Commercially Reasonable proposals have been received.
- If deemed commercially reasonable, the distribution company may enter into Long-Term Contracts for the purchase of capacity, energy and attributes from Newly Developed Renewable Energy Resources at a minimum of ninety (90) megawatts adjusted by the capacity factor of each renewable generator.
 - By way of example, a contract with a one hundred (100) megawatt facility with a thirty percent (30%) capacity factor would be counted as providing thirty (30) megawatts to the minimum long-term contract capacity requirement.

Note: Competitive electricity suppliers (NPPs) have no prescribed process for meeting RES obligations.





Long Term Contracting Standard

- A portion of the Standard must be met through Distributed Generation (more on this later)
- The contracts must be for a period of ten (10) to fifteen (15) years, or longer if approved by the Rhode Island Public Utilities Commission.
- The Contracts are reviewed by the Rhode Island Public Utilities Commission for "commercial reasonableness" which is defined as terms and pricing an experienced power market analyst would expect to see for a particular renewable project based on size, location and technology.





Long Term Contracting Standard

- The electricity purchased by the electric distribution company under the long term contracts is sold back into the market and the electric distribution company is paid the market price for the electricity.
- The electric distribution company receives the RECs as part of the contract.
- The electric distribution company may either sell the RECs or retain them for purposes of complying with the Renewable Energy Standard.
- Costs of compliance plus 2.75% "remuneration" to the distribution company on the total payments made under the contracts are recovered in retail rates.





Distributed Generation Act

- Requires 10% of the 90 MW Long Term Contract capacity be Distributed Generation, inclusive of solar capacity.
- Requires three enrollments per year for a total of 40 MW nameplate capacity over 4 years
 - By December 30, 2011: 5 MW (nameplate)
 - By December 30, 2012: an aggregate of 20 MW
 - By December 30, 2013: an aggregate of 30 MW
 - By December 30, 2014: an aggregate of 40 MW
- Separate process has been developed
 - Three Open Enrollments per program year
 - Targets set by "class" (size/technology), e.g. small solar vs large
 - Ceiling Prices set annually
 - "Standard Contracts" are developed by PUC





- Prior to the first solicitation, the Commission reviewed and approved standard contracts to be used by the electric distribution company (buyer) and the distributed generation project developer (seller).
- One contract was approved for projects sized above 500kW (large DG projects) and another for projects sized 500kW or less (small DG projects).
- The purpose is to encourage the construction of small renewable projects and to reduce the burden and costs to renewable developers.





- The Distributed Generation Standard Contracts Act requires the Public Utilities Commission to review proposed renewable energy classes, renewable energy class targets, and ceiling prices for each renewable energy class.
- The State Office of Energy Resources, in support of its recommendations for 2013, set forth four objectives:
- 1. Increase opportunities for different technologies to participate;
- 2. Decrease, where appropriate, the technology class ceiling prices;
- 3. Reduce the overall program cost from the 2012 program;
- 4. Create a stable and predictable program.





- Ceiling prices for the 2013 program were set through use of a Cost of Renewable Energy Spreadsheet Tool ("CREST") Model. This model used data from renewable energy programs in four other states along with information from the electric distribution company in order to generate ceiling prices.
- Prior to Commission review, targets and pricing were reviewed with stakeholders on several occasions for their input.
- Results in an open, transparent, consensus building approach.
- PUC serves as backstop to make final judgments in the event that disputes arise.





- Pricing was ultimately affected by changes to certain tax incentives extended by the federal government on January 2, 2013. Pricing assumes a developer will take advantage of the best tax incentives available.
- Purpose of the ceiling price is to set the price high enough for the project to be developed, including a reasonable rate of return on investment, but not so high as to unreasonably harm ratepayers.
- Large DG projects are paid based on a bid price by the developer in response to periodic solicitations by the Distribution Company.
- For large DG projects, bids cannot be any higher than the targeted ceiling price.
- Small DG projects are paid the ceiling price.





- Like the electricity produced under Long-Term Contracts, the electricity produced by Distributed Generation Projects is sold directly into the market and the electric distribution company is paid the prevailing market price. The difference is netted and the electric distribution company ultimately recovers any shortfalls (unrecovered costs) through retail rates.
- Today, most projects are more costly than prevailing prices in the wholesale market, and thus require funding support in retail rates.
- Distribution Company gets added bonus: 2.75% "remuneration" to the electric distribution company on the total payments made under the contracts.





2013 Distributed Generation Target Classes

Technology & Class	Allocation (kW/MW)
Wind: 50 kW - 1.5 MW	1.5 MW
Small Solar PV: 50-100 kW	300 kW
Small Solar PV: 101-250 kW	250 kW
Small Solar PV: 251-500 kW	750 kW
Anaerobic Digestion: 400–500 kW	500 kW

Large DGSC Enrollment Program

Large Solar PV: 501 kW and above and Anaerobic Digestion: 501 kW and above

1.3 MW total (for 2 technologies)

Total MW

4.6 MW





2013 Distributed Generation Ceiling Prices

Technology, sub-class

2013 Proposed Ceiling Price w/ITC but Without Bonus Depreciation

Solar, 501 kW+	24.95
Solar, 251 – 500 kW	28.40
Solar, 101 – 250 kW	28.80
Solar, 50 – 100 kW	29.95
Wind, 1 – 1.5 MW	14.80
Wind, 200 – 999 kW	16.20
Wind, 50 – 100 kW	24.65
AD, 400 kW – 500kW	18.55
AD, 500 kW +	18.55
Hydro, $500 \text{ kW} - 1 \text{ MW}$	





Synergy Between the RES, Long-Term Contracts & Distributed Generation Contracts

- Under National Grid's 2013 RES Procurement Plan approved by the Commission – New RECs obtained through Long-Term Renewable Contracts and Distributed Generation Contracts will be used to help satisfy their state RES obligations
- National Grid determined that retaining those RECs minimized transaction costs for consumers by reducing need for RFPs, broker fees, administrative costs, etc.
- If sold back into market, transaction fees essentially double – costs can by avoided by retaining RECs
- Customers still charged market price for New RECs





Synergy Between the RES, Long-Term Contracts & Distributed Generation Contracts

- As of February 2012, National Grid's analysis of RECs obtained under Long-Term Renewable Contracts determined that most of their 2013 obligations could be met by forecasted output of those facilities
- Delays in project construction/permitting has changed that analysis, leaving National Grid with a shortfall to be procured through market solicitations in a tightening REC market
- National Grid could utilize RES Banking Mechanism in future years where REC production exceeded obligations
 - Law allows for 30% of New obligations in any year to be banked for use in the following two compliance years
- Changes in various assumptions could impact this analysis





Verification Process: Monitoring RPS Compliance

- Public Utilities Commission (PUC) has responsibility to monitor Obligated Entities' compliance with the RPS standards
- All obligated entities defined as any load serving entity serving end-users, are required to file an annual report with the PUC within one month after NE-GIS reports are available for the fourth quarter of each calendar year.
- NEPOOL-GIS is the generation information system which tracks all of the generation and associated renewable energy certificates including state-specific eligibility (www.nepoolgis.com)





Monitoring Compliance with RPS Regulations (continued)

- The compliance period is a calendar year (January through December)
- The trading periods are on a fiscal year (July through June)
 - First Quarter RECs produced from 1 January through 31 March are traded between 15 July and 15 September of that calendar year
 - Second Quarter RECs produced from 1 April through 30 June are traded between 15 October and 15 December of that calendar year
 - Third Quarter RECs produced from 1 July through 30 September are traded between 15 January and 51 March of the following calendar year
 - Fourth Quarter RECs produced from 1 October through 31 December are traded between 15 April through 15 June of the following year
- Obligated entities' annual reports are due to the PUC for review no later than 22 July covering the prior calendar year.





Monitoring Compliance with RPS Regulations (continued)

- In addition to its annual report, the utility provides load data for the other obligated entities
- The PUC compares the obligated entities' load data to that provided by the distribution utility
- The PUC reviews the load data in the various annual reports and by the utility against what was reported by the NEPOOL-GIS
- PUC resolves any discrepancies





Monitoring Compliance with RPS Regulations (continued)

- PUC compares annual reports to NEPOOL-GIS to ensure reported sources of RECs were appropriately categorized as reflected in the NEPOOL-GIS database
- For example, the PUC will compare the generator from which RECs are claimed by the obligated entity to the NEPOOL-GIS database to determine if the RECs are, indeed, RI-eligible (see next slide for screen shot)
- There is also a more detailed report available to the PUC that has load data for obligated entities and production data for generators which the PUC reviews in this process, but that data is considered competitively sensitive to the various entities.





Monitoring Compliance with RPS Regulations (continued)

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NON33162	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No
NON32581	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No
CLM32713	No	No	No	C&LM	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
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Screen Shot of NEPOOL GIS Data Base





Net Metering Policies Promote Incremental Renewable Energy Additions

- Incremental renewable energy net of RPS obligations
- Net metering is allowed for renewable systems with no greater than 5MW nameplate capacity
- Net metering is limited to 3% of the peak load in Rhode Island with 2MW reserved for projects less than 50kW in size.
- As of 4 December 2012, there were 260 such systems in Rhode Island ranging from 0.3 kW to 260 kW, for a total of 4.981 MW nameplate capacity with a total estimated annual generation of 8.9 GWh.
- The majority of Net Metering Systems are associated with residential accounts, although there are commercial and industrial accounts with Net Metering Systems as well.
- The largest systems are associated with industrial customers and those served on National Grid's back-up service rate.





Net Metering Policies (continued)

- Eligible Net Metering Systems must be reasonably designed and sized to annually produce electricity in an amount that is equal to or less than the renewable self-generator's usage at the eligible Net Metering System Site.
- Renewable Net Metering Credits apply up to 100% of a renewable self-generator's usage and are credited to the customer at the full retail rate less various statutory system benefits charges.
- Excess Renewable Net Metering Credits, based on avoided costs defined to be the Company's Standard Offer Service Rate, apply to that portion of the renewable self-generator's production of electricity beyond one hundred percent and no greater than one hundred twenty-five percent of the renewable self-generator's own consumption at the net metering site.





Net Metering Policies (continued)

- In the case of Net Metering Systems owned by or operated on behalf of a municipality or a multimunicipal collaborative through a net metering financing arrangement, all accounts designated by the municipality or multi-municipal collaborative are considered to be eligible for net metering.
- Utility may recover the lost distribution revenue associated with net metering credits (via revenue decoupling mechanism.





Projected Compliance Costs Borne by Rhode Island Ratepayers (does not include financial remuneration or administrative costs)

- Renewable Energy Standard
 - 2008-2012 \$26,716,080
 - 2015-2020 \$185,228,043 (projected)
- Long-Term Contracts and Distributed Generation Contracts
 - 2012 \$348,110
 - Total Estimated Above-Market Costs for Long-Term Contracts as of 25 October 2013
 - \$325,703,467 (Net Present Value \$100,931,962) through 2037
 - (Includes a 20-year off-shore wind contract mandated by the Rhode Island Legislature with an above-market cost of \$397,239,002)
 - Last Long-Term Contract Procurement Summer 2013
 - Total Estimated Above-Market Costs for Distributed Generation Contracts
 - \$39,561,019 through 2030 (NPV \$22,476,801) with two years left for enrollments





Rhode Island Renewable Energy Costs

On 26 March 2013, in response to a PUC request, National Grid provided the annual cost to customer over the prior five years of the RES, Net Metering, Energy Efficiency procurement, Renewable Energy program, and Long-Term Contracting (retail charges):

2008: \$22,919,889
2009: \$30,794,232
2010: \$33,859,181
2011: \$42,486,851
2012: \$56,671,675

RES compliance costs alone have more than doubled since 2007.







Costs of Renewable Portfolio Standards and Net Metering Credits for Massachusetts Electric Customers (1)



(1) RPS costs reflect estimates for both Basic Service customers and National Grid delivery customers receiving competitive supply at the same market values.





Projected RPS Regional Requirements as % of Net Energy Load 2013-2022**



** Does not include passive demand resources (energy efficiency)





Conclusion

- Laws can be passed that require the purchase of renewable electricity at prices higher than electricity produced by other energy sources.
- Each law in Rhode Island was passed with the intent to encourage the development of different kids of renewable energy with the hope of reducing long-term energy costs.
- Right now, there are two long-term contracts that provide savings to customers both were entered into after a competitive bidding process.
- Goal should be to integrate renewable energy into the system in a least cost manner.





THANK YOU!



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