EBC New Hampshire Chapter Program
New Hampshire’s Evolving Energy Future
Welcome

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New Hampshire’s Energy Future: Setting the Stage Statewide and Beyond

Jennifer Runyon

Chief Editor

RenewableEnergyWorld.com and
Renewable Energy World Magazine
The World’s #1 Renewable Energy Network

History

- Started in 1998 as Solar Access, by a group of renewable energy professionals who wanted to publish news and information about an industry they were passionate about.

- With the growth of solar and the growth of other markets, Solar Access became Renewable Energy Access and then was acquired by PennWell Corp in 2011 and became Renewable Energy World.

- I started with the company in 2007 as a news editor, then became the managing editor and then the chief editor. I have seen this industry grow for the past 8 years.
What Is Renewable Energy?

Five types of renewable energy technology

- Wind – Wind Power
- Sun – Solar Power
- Earth – Geothermal Power
- Water – Hydropower
- Vegetation – Bioenergy

- Energy storage – emerging, an enabling technology for renewable energy
Renewable Energy in New Hampshire – How Do We Measure Up?

WIND

- NH ranks 30th for installed wind capacity
- 171 MW of wind power capacity online and 14 MW under construction
- Potential for 990 MW to 12,500 MW of wind capacity based on our wind resource

*Source AWEA*
Solar

Three Types of Solar Power Technology – Two Use Heat

Solar Thermal for Hot Water (Not viable in NH)

Concentrating Solar Power (Used in Desert Locations)

Image: Ivanpah

Credit: Brightsource
Solar PV

Uses the light from the sun to excite electrons in a solar panel and create electricity.

Installed cost of solar PV has been dropping quickly – down 53% since 2010.

In 2014, NH had 10 MW of installed solar capacity ranking it 35th in the country according to the Solar Energy Industries Association (SEIA)

Enter solar leasing companies

Market approaching 50 MW quickly!
NH 50-MW Net-Metering Cap

Net-metering means whatever power you produce is credited to your bill at the retail rate you pay for electricity.

- Cap was set in 1998 – never imagined we would get there
- Liberty, NH Electric Coop, and Unitil have already hit their caps, Eversource approaching
- Future is uncertain – uncertainty is bad for business
- Solar industry is pushing legislature to lift or at least extend the cap beyond 50 MW. This is an issue playing out right now in NH and it’s very important for the future of solar energy in this state.
## Geothermal Power

**Heat from the Earth**

Two applications

<table>
<thead>
<tr>
<th>Electricity</th>
<th>Heating and Cooling</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Drill into pocket of heat and harness it to create power</td>
<td>• Pipes 5-6 ft underground, where temp is constant 40° and use that differential to heat or cool a building.</td>
</tr>
<tr>
<td>• California, Nevada, Africa, Indonesia, Japan</td>
<td>• Was gaining popularity in NH but slowing down due to low cost of oil.</td>
</tr>
<tr>
<td>• Not in NH</td>
<td></td>
</tr>
</tbody>
</table>

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**PennWell**

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## Bioenergy

### Wood and Waste

#### Two applications

<table>
<thead>
<tr>
<th>Electricity</th>
<th>Heat</th>
</tr>
</thead>
<tbody>
<tr>
<td>• NH is second in the nation for proportion of electricity we get from biomass – wood.</td>
<td></td>
</tr>
<tr>
<td>• 9 biomass power plants with a total generating capacity of 231 MW</td>
<td></td>
</tr>
<tr>
<td>• Carbon is an issue</td>
<td></td>
</tr>
<tr>
<td>• Pellets for residential and for commercial</td>
<td></td>
</tr>
<tr>
<td>• Tied to the price of oil - $80 barrel is key</td>
<td></td>
</tr>
<tr>
<td>• Froling Energy very concerned about the future</td>
<td></td>
</tr>
</tbody>
</table>

Waste-to-Energy – 2 plants in NH
Hydropower

NH has about 446 MW of installed hydropower capacity, which makes up about 10% of our energy supply.

Conventional [large] hydropower plants are not considered renewable.

Pre-2006 small (under 5 MW) hydropower plants that have put in environmental controls such as fish ladders are considered renewable.
NH RPS

Renewable Portfolio Standard of 24.8% by 2025. Complicated and it has been changed many times.

Under the NH RPS structure, applicable renewable energy sources are organized into four classes:

- Class I: New (after 2008): wind; hydrogen derived from biomass fuel or methane gas; ocean thermal, wave or tidal energy; methane gas; or biomass. Thermal energy from biomass, solar, and ground source heat pumps (geothermal) was recently added to this class. – first in the nation for this!
- Class II: New solar electric (PV) generation.
- Class III: Existing biomass or methane facilities that meet air emission criteria.
- Class IV: Existing small hydroelectric facilities that meet fish passageway criteria.
The RPS requirement increases to 7.5% for 2010, 8.9% for 2015 and 24.8% for 2025. The RPS obligations by class and year are:

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Total Requirement</th>
<th>Total Class I</th>
<th>Thermal Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>4.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>3.50%</td>
<td>0.50%</td>
</tr>
<tr>
<td>2009</td>
<td>6.00%</td>
<td>0.50%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>4.50%</td>
<td>1.00%</td>
</tr>
<tr>
<td>2010</td>
<td>7.54%</td>
<td>1.00%</td>
<td>0.00%</td>
<td>0.04%</td>
<td>5.50%</td>
<td>1.00%</td>
</tr>
<tr>
<td>2011</td>
<td>9.58%</td>
<td>2.00%</td>
<td>0.00%</td>
<td>0.08%</td>
<td>6.50%</td>
<td>1.00%</td>
</tr>
<tr>
<td>2012</td>
<td>5.55%</td>
<td>3.00%</td>
<td>0.00%</td>
<td>0.15%</td>
<td>1.40%</td>
<td>1.00%</td>
</tr>
<tr>
<td>2013</td>
<td>5.80%</td>
<td>3.80%</td>
<td>0.00%</td>
<td>0.20%</td>
<td>0.50%</td>
<td>1.30%</td>
</tr>
<tr>
<td>2014</td>
<td>7.20%</td>
<td>5.00%</td>
<td>0.40%</td>
<td>0.30%</td>
<td>0.50%</td>
<td>1.40%</td>
</tr>
<tr>
<td>2015</td>
<td>8.30%</td>
<td>6.00%</td>
<td>0.60%</td>
<td>0.30%</td>
<td>0.50%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2016</td>
<td>16.70%</td>
<td>6.90%</td>
<td>1.30%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2017</td>
<td>17.60%</td>
<td>7.80%</td>
<td>1.40%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2018</td>
<td>18.50%</td>
<td>8.70%</td>
<td>1.50%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2019</td>
<td>19.40%</td>
<td>9.60%</td>
<td>1.60%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2020</td>
<td>20.30%</td>
<td>10.50%</td>
<td>1.70%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2021</td>
<td>21.20%</td>
<td>11.40%</td>
<td>1.80%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2022</td>
<td>22.10%</td>
<td>12.30%</td>
<td>1.90%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2023</td>
<td>23.00%</td>
<td>13.20%</td>
<td>2.00%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2024</td>
<td>23.90%</td>
<td>14.10%</td>
<td>2.00%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
<tr>
<td>2025 and thereafter</td>
<td>24.80%</td>
<td>15.00%</td>
<td>2.00%</td>
<td>0.30%</td>
<td>8.00%</td>
<td>1.50%</td>
</tr>
</tbody>
</table>

Obligations highlighted in red indicate changes made with **SB148** and **HB542** and **Order No. 25,674** and **Order No. 25,768**.

*Class I thermal is a subset of Class I. The thermal requirements are subsumed in the Class I requirement and are not additional to Class I.*

Note that with **Order No. 25,674** dated June 3, 2014 under **Docket No. DE 14-104**, the Commission changed the Class III obligations in 2013.

Note that with **Order No. 26,768** dated March 13, 2015 under **Docket No. DE 15-035**, the Commission changed the Class III obligations in 2014 and 2015.

Note that with **Order No. 25,484** dated April 4, 2013 under **Docket No. DE 13-021**, the Commission changed the Class III obligations in 2012 and 2013 and the Class I and Class I thermal obligations in 2013.
Frequent changes to the RPS have led to market uncertainty

BAU scenario suggests the NH will not meet its goal of 25% by 2025

To meet the goal, “the state will need to ensure that all mechanisms for increasing renewable generation and investment are considered, from market-level adjustments to consumer level incentive.”
NH Renewable Energy Potential

Figure 25: Potential for Renewable Energy Capacity

Economic Gap = Market Inefficiency, Policy Effects and Awareness.
Technical Gap = Cost of Technology and Fuel

Questions?

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The New Hampshire Site Evaluation Committee Process: Key Developments and Issues

Barry Needleman

Partner

McLane Middleton
The New Hampshire Site Evaluation Committee

KEY DEVELOPMENTS
AND
ISSUES

BARRY NEEDLEMAN
Overview

- New Hampshire Site Evaluation Committee (SEC)
  - Ad Hoc Committee
  - 7 Agency heads; 2 public appointees
  - SEC Administrator

- Jurisdiction

- Statute Revised in 2014

- Rules Currently Being Revised
The Revised Statute Key Issues

- More Public Process
- Reconfigured Committee
- Added Administrator
- Public Interest Requirement
- Decommissioning
- New Rules
Revised Rules

• Current Process

• Key Issues
   Public Interest
   Cumulative Impacts
   Completeness
   Criteria
The siting process for large energy projects has become increasingly contentious and more difficult.

- Adversaries are better organized and more sophisticated.
- The hurdles to gain approval are higher.
- The trend will continue.
Fuel Optionality – Alternatives to Natural Gas Pipelines

Michael Nicoloro

Senior Vice President, Energy
Sanborn Head & Associates, Inc.
FUEL OPTIONALITY

ALTERNATIVES TO NATURAL GAS PIPELINES

EBC New Hampshire Chapter Program
November 20, 2015
Sanborn Head

- Privately held, multi-disciplinary firm of over 115 consulting engineers and scientists
- Providing a wide range of environmental, geotechnical and energy services
- Founded in 1993
Big Picture Fuel Options

Sustainable Gas Network

Source: National Grid
Fuel Options

- Pipeline Natural Gas
- Propane
- Liquefied Natural Gas (LNG)
- Compressed Natural Gas (CNG)
Pipelines

Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

Source: NGA
Projected Growth Areas

Natural gas consumption by sector, 1990-2040 (trillion cubic feet)

Source: EIA
Basic Properties

What is CNG?
• Pipeline gas compressed to 4,000 psig

What is Propane?
• not a cryogenic fluid
• volumetric reduction : 36.4 to 1
• Heating value = 2,522 BTU/scf

What is LNG?
• liquid methane @ -260 °F & considered cryogenic
• ½ the unit weight of water
• Volumetric reduction: 620 to 1
• 1 MMBTU = 1 MCF = 1 DTH = approx. 12 gal.
  (w/natural gas heating value of 1,000 BTU/scf)
NEW ENGLAND

- 45 tanks in 30 communities
- 16.3 BCF Storage (plus 3.4 BCF @ Distrigas)
- Liquefaction at 6 facilities
  - .051 BCF/day
- 1.4 BCF of vaporization capabilities

SOURCE: NGA
Propane

Non-Utility

Utility
CNG Facilities

Source: Algas-SDI

Source: NG Advantage
CNG Customer Delivery Site
LNG Supply Chain

Foreign LNG Supply → LNG Peak Shaver → Pipeline → End User

Liquefier → LNG Transport

Small Scale LNG Facility
Puget Sound Energy
Proposed LNG Fuel Bunkering Facility
Small Scale LNG Facility Layout
CAPEX
Estimated

- Un-named Power Generator (underway)
  - 100,000 gallon tank w/vaporization
  - Serves 140 MW spark ignited natural gas fueled reciprocating engine gen sets
  - Power plant design is for 8 to 16 hours/day of operation; 7 days/week
  - LNG system can support 18 hours of operation without resupply of LNG to tank
  - Estimated CAPEX, including contingency, design, construction phase support, is $3.5M

- UMass Amherst (underway)
  - Three vertical 18,000 gallon LNG tanks w/vaporization
  - Serves campus-wide heating needs
  - Estimated CAPEX, including contingency, design, construction phase support, is $5M
“Sure it’s a great invention, but does it comply with all government guidelines?”
Regulatory
Siting, Permitting & Safety

- 49 CFR 192 - transportation of natural gas by pipeline: minimum federal safety standards
- 49 CFR 193-liquefied natural gas facilities: minimum federal safety standards
The Good. The Bad. The Ugly.

- LNG
  - PROs: Provides days of storage and mature industry
  - CONs: CAPEX intensive, lack of liquid supply and governmental obstructions

- Propane
  - PROs: Cheap and available now and mature technology
  - CONs: Future pricing and supply concerns

- CNG
  - PROs: Low CAPEX and small footprint required
  - CONs: Just in time delivery and lack of storage
Screening Criteria

- What fuels do you use & consumption?
- What is max/min/avg hourly usage and for what duration?
- Is your operation 24/7/365?
- Are you locked into any contracts?
- Do you have a secondary fuel as a back-up?
- Are service interruptions problematic?
- How important are emission reductions and reducing carbon footprint?
- Are you space-constrained?
- Are you in a flood plain or located near/adjacent to wetlands?
- Describe truck access to/from/within site.
What’s Happening in NH?

- Liberty Utilities/iNATGAS CNG Facility in Concord
- Satellite LDC to serve Hanover/Lebanon
- NG Advantage/Clean Energy CNG Facility in Pembroke
“The Hurdle”
NIMBY Evolution

- NIMBY - Not In My Back Yard
- NINBY - Not In Neighbor’s Back Yard
- NOTE - Not Over There Either
- CAVE(men) - Citizens Against Virtually Everything
- BANANA - Build Absolutely Nothing, Anywhere, Near Anything (Anyone)
- NOPE -- Not On Planet Earth
What Do We Need?
A Strategic Blend of All Forms of Natural Gas
An Approach

- Strategically site LNG/CNG hub and spokes for delivery where pipelines are not yet economically viable
- Build out pipeline to serve the hubs
- Deliver LNG/CNG via transports until it becomes economically viable to extend a pipeline
Questions

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The Future of Wind Power

Jack Kenworthy

Co-founder and Chief Executive Officer
Eolian Renewable Energy
The Future of Wind Power in New Hampshire

EBC New Hampshire
November 20\textsuperscript{th}, 2015
Wind Energy in the US

- Largest new source of energy in the US in 2014
- Wind represented 28% of all new generating capacity in the US between 2010-2014
- 65,000 MW installed as of 12/31/14 and 13,000 MW under construction in 2015
- Wind industry supports over 50,000 well paying jobs in 43 states and pays over $180M/yr in lease payments to private landowners
- Cost of wind has decreased dramatically: more efficient turbines, lower turbine costs, lower capital costs (average 2015 US wind PPA was $23.50/MWh; in NE wind is transacting at between $75-85/MWh)
Wind Energy in NH

- Three large wind projects installed and operating: Lempster (24 MW), Granite Reliable (99 MW) and Groton (48 MW). Jericho Wind under construction (14.25 MW)
- Installed wind in NH currently avoids ~ 200,000 tons of CO2 emissions each year (~ 41,000 cars worth) and saves about 100M gallons of fresh water each year
- 2008-2012 saw all 171 MW of NH’s currently operating wind generation installed. Since that time only 14 MW in construction (and zero MW permitted by the State)
- Approximately $400M invested in wind energy in NH – bringing clean energy, jobs, lease revenues and other conservation benefits
- Significant challenges exist to continuing to grow NH’s wind energy industry
Benefits of Wind Energy

- With zero fuel costs, wind energy provides long-term, stable pricing to help mitigate energy price swings that hurt ratepayers
- Natural gas prices are low right now, but natural gas is a highly volatile commodity as seen in the many violent price spikes. The last price spike was in Winter 2014
- Wind energy saved rate payers in the Mid-Atlantic $1 billion in Winter 2014 alone

Benefits of Wind Energy

- Levelized Cost of Energy ("LCOE") compares generation technologies taking into account all costs and efficiencies.

- Wind is slightly cheaper than the most efficient technology in the maximum case\(^1\).

- Wind is more cost effective than any other renewable technology

- Not surprising that 28% of all new generation in the US over the past 5 years has been Wind.

\(^1\) Maximum case is appropriate as it takes into account both higher construction costs and higher fuel costs in New England.

Source: EIA. Analysis excludes benefits from Production Tax Credit and RPS.
Trends in Turbine Technology

EXHIBIT 20: TREND IN TURBINE SIZE IN THE 21ST CENTURY

ANTRIM WIND VISUAL ASSESSMENT

June 2016

Turbines drawn at same scale for comparative purposes

Lempster Wind Farm
Commissioning: 2007
No. of turbines: 12
Turbine model: Gamesa G87-2000
Hub height: 76m (250')
Rotor diameter: 87m (285')
Overall height: 121m (399')
Turbine capacity: 2.0 MW
Total project capacity: 24 MW

Graton Wind Farm
Commissioning: 2012
No. of turbines: 24
Turbine model: Vestas V90-3.0 MW
Hub height: 80m (262')
Rotor diameter: 90m (295')
Overall height: 125m (410')
Turbine capacity: 3.0 MW
Total project capacity: 72 MW

Kingston Community Wind
Commissioning: 2012
No. of turbines: 21
Turbine model: Siemens SWT-3.6-113
Hub height: 84m (276')
Rotor diameter: 113m (370')
Overall height: 140m (462')
Turbine capacity: 3.0 MW
Total project capacity: 63 MW

Antrim Wind
Commissioning: N/A
No. of turbines: 17
Turbine model: Vestas V112-3.3 MW
Hub height: 94m (309')
Rotor diameter: 112m (368')
Overall height: 150m (495')
Turbine capacity: 3.3 MW
Total project capacity: 56.1 MW
*Approved 2014, to be constructed

Bingham Wind
Commissioning: N/A
No. of turbines: 17
Turbine model: Vestas V117-3.3 MW
Hub height: 116.5m (382')
Rotor diameter: 117m (384')
Overall height: 175m (574')
Turbine capacity: 3.3 MW
Total project capacity: 56.1 MW
*Approved 2015, to be constructed

Notes:
1. "Overall height" is the height of the turbine from the base of the tower to the tip of the rotor blade at its highest point.
2. Two other wind projects that have recently been proposed in New Hampshire have taller overall heights than Antrim:
   - Spence Ridge: 490'
   - Wild Meadows: 492'
3. Turbines depicted are approximate and do not necessarily reflect particular design differences between different turbine models.
Wind Energy in the US

Wind is a mature technology that represents a significant opportunity to meet regional and national clean energy goals while saving ratepayers money
Challenges to Growth in NH

• Siting:
  – Last wind project submitted for review was deemed incomplete and subsequently withdrawn (Wild Meadows)
  – Previous wind project was denied due to aesthetic concerns (Antrim Wind)
  – Jurisdictional hearings on revised Antrim Project took 10 months
  – Uncertainty around new siting rules dissuades investment
  – New SEC structure leaves many problems unfixed – permitting wind in NH is extraordinarily expensive, time consuming and uncertain
Case Study: Antrim Wind

- Antrim Wind Energy ("AWE") is a 28.8MW wind project planned in the town of Antrim, New Hampshire, in Hillsborough County.
- AWE will generate $53.4 million of economic benefit to the region.
- AWE will create 84 full time jobs during construction and 12 full time jobs for the life of the project.
- Energy from AWE is enough to power 12,300 New Hampshire homes eliminating the state’s dependence on polluting fossil fuel power to supply these homes.
- AWE will conserve 908 acres of high value land and fund $100,000 for additional off-site land conservation efforts.
- AWE will have no significant impact on rare or endangered plant and animal species.
- AWE is the first project in NH to commit to employing radar activated FAA lighting.
- AWE has long standing and broad based support from the host community of Antrim.
Case Study: Antrim Wind

The local clean energy generated by the Antrim Wind Project will bring significant health, economic and climate benefits to New Hampshire.

- 54,000 tons of CO2 avoided annually (2 billion pounds in 20 yrs) and 138 tons/yr of SOx, NOx, CH4 and particulates avoided

- Clean energy output for 12,300 New Hampshire homes

- Equivalent of 9,750 passenger vehicles removed from the road

- 16,000,000 gallons of fresh water saved every year
New Hampshire’s Choice

- New Hampshire can fully participate from significant investments in new wind growth in the state, or it can miss this historic opportunity.
- New Hampshire would benefit significantly from additional grid-scale wind development in the state – which brings clean energy benefits, economic development benefits and energy price benefits to ratepayers.
- In order to promote investment, the State needs to send a different signal to developers by improving the siting process, maintaining or increasing RPS goals and advocating for new clean energy investment.
Thank you

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Large Scale Solar Power in New Hampshire

Kate Epsen
Executive Director
NH Sustainable Energy Association

Jeff Haydock
President & CEO
ecoCFO
SOLAR ENERGY IN NEW HAMPSHIRE

Presented to:
EBC-NE
November 20, 2015

Presented by:
Kate Epsen, NH CleanTech Council
Jeff Haydock, EcoCFO
NH Solar Drivers

- Customer Energy Goals and Needs
- Project Costs
- Site Considerations
- Financing Models
- Net Metering
- Grants & Rebates
- Renewable Portfolio Standard
- Federal Tax Incentives
Customer Goals & Needs

- Customer Energy Goals and Needs
  - Cost control
  - Environmental goals
  - PR
  - Tax savings
  - Energy use and load profile
Project Costs

- Solar costs have come down over 50% over the past 7 years
- $2.00-$3.00 per installed Watt
- Many cost considerations are site dependent
  - Roof-mounted (building integrity)
  - Ground-Mounted
  - Interconnection costs
Site Considerations

• Know your options
  • Muni/County – Wastewater treatment facilities, capped landfills, other brownfields, rooftops, schools, etc.
    • Special technical considerations for capped landfills

• Know your exposure
• Know your neighbors
Financing options

• Balance sheet financing

• Power Purchase Agreement

• Leasing
Net Metering

- 1 Megawatt AC project size cap, statewide
- Total cap of 50 MWs statewide
  - Approximately 2% of load
- The Cap is within reach
  - Liberty Utilities (4.2MW), NHEC (3.1 MW) hit caps
  - Unitil: 6.2 MW cap, 2 MW online or pending
    - July 5th Data
  - Eversource: 36.55 MW cap, 14.35 online, 10.2 pending, 10 MW preliminary = 32.6MW in Queue
    - September 2nd Data
Behind the Meter

- Install single project on single meter
- Load on that meter
- Power generated offsets consumption on that meter
- Excess generation credited on future bills
- Applications:
  - on-site at business
- Site must be feasible and have load
Group / Virtual Net Metering

- Install a project on one meter (load or not)
- Allocate power to multiple meters/accounts
  - Same utility territory
- Those account holders receive benefit
- Applications:
  - Residential neighborhoods, Municipalities, Business with multiple locations, etc.
- Massive growth in this segment
- Primary Benefits
  - Account holder doesn’t need feasible site
  - Account holder shares or entirely avoids installation cost
LEEPA

- RSA 362-A
- PUC Docket DE 15-068
  - Test case of Freedom Energy Logistics vs. Eversource to wheel power from Fiske Hydro to FEL
Grants & Rebates

• NH Public Utilities Commission
  • Residential: $0.50 per watt, max $2,500 or 30% of system cost
    • Just reduced in September. Effective October 2nd.
  • Commercial & Industrial (C&I):
    • Category 1: less than 100 kW AC
      • $0.75 per watt up to 25% of system cost
    • Category 2: 100 – 500 kW AC
      • $0.65 per watt up to 25% of system cost
      • Program currently CLOSED due to funding
Grants & Rebates

• USDA Rural Development (RD) Rural Energy for America Program (REAP) Grant
  • Agricultural business with 50% or more of income from Ag operations
  • Small business in eligible rural area (most of NH)
  • Renewable Energy & Energy Efficiency Upgrades
  • Loan Guarantees up to 75% of project cost
  • Grants up to $500k or 25% of project cost
Renewable Portfolio Standard (RPS)

- Intended to diversify generation sources of utilities to incorporate Renewables
- Utilities meet specific Compliance Obligation (CO) of renewables in their portfolio as % of load
- Invest and own renewables themselves, or...
- Buy Renewable Energy Certificates (RECs) generated by other systems
- 1,000 kWh = 1 REC.
- Market value based on Supply. CO = Demand.
- NH, MA, CT have viable RPS. Can sell across state lines.
Federal Tax Incentives

• Investment Tax Credit (ITC) worth 30% of project
  • Set to expire on 12/31/2016
• 5 Year MACRS (Accelerated Depreciation)
Project Examples

• Favorite Foods, Somersworth NH
• Town of Peterborough
Questions?

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Panel Discussion

Moderator: Jennifer Runyon

Renewable Energy World

Panelists

• Barry Needleman, McLane Middleton
• Michael Nicoloro, Sanborn, Head & Associates, Inc.
• Jack Kenworthy, Eolian Renewable Energy
• Kate Epsen, NH Sustainable Energy Association
• Jeff Haydock, ecoCFO
EBC New Hampshire Chapter Program
New Hampshire’s Evolving Energy Future