

# Update on New England Renewable Portfolio Standards (RPS) and Renewable Resources Outlook

Rhode Island PUC

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ISO New England

# Objectives

1. Provide a projection of renewable energy needed to meet the Renewable Portfolio Standards (RPS) for the New England states through 2020
2. Summarize currently proposed renewable projects in the ISO New England Generation Interconnection Queue
3. Examine if renewable resources in the ISO's Queue will be sufficient to meet New England's renewable portfolio standards recognizing:
  - Uncertainty of renewable project completion
  - Other options can also meet RPS
4. Indicate potential renewable resource development in neighboring control areas
  - New York Independent System Operator (NYISO)
  - Eastern Canada

# Review of New England States' RPS

- RPS consists of state legislated targets for a specific percentage of energy to be supplied from renewable resources. RPS is generally applicable to electric utilities and competitive retail electric suppliers
- Alternatively, for any RPS energy deficiency, these entities can pay an Alternative Compliance Payment (ACP)
  - The ACP is used to fund new renewable projects
  - The ACP serves as a price cap
- The RPS target usually grows each year and is made up of specific classes for existing and new resources and, in some states, special technology categories
- Some states also have related goals for energy efficiency
  - This reduces the need for supply-side RPS resources

# New England States' RPS Technologies

State	Common Technologies	Special Technologies or Restrictions
Maine	Solar thermal, photovoltaic, ocean thermal, wave, tidal, wind, biomass, hydro (except in MA), landfill gas, fuel cells	Municipal Solid Waste (MSW) with recycling, cogeneration, and geothermal
Massachusetts		Biomass with advanced technology and low emissions, fuel cells only with renewable fuels, MSW
Connecticut		Hydro < 5 MW, sustainable biomass, MSW, fuel cells, energy efficiency and combined heat and power
Rhode Island		Fuel cells only with renewable fuels, geothermal
New Hampshire		Geothermal

# New England States' RPS Classes and Energy Efficiency Goals

State	Classes	RPS Target by 2020 (%)
<b>Maine</b>	"Existing"	30
	New Capacity	10% of capacity by 2017
<b>New Hampshire</b>	I New	11
	II Solar	0.3
	III Existing biomass	6.5
	IV Existing small hydro	1.0
<b>Massachusetts</b>	I New	15
	<b>NEW</b> IIa Existing	3.6
	<b>NEW</b> IIb Existing	3.5
	EE Goal	All new energy growth
<b>Rhode Island</b>	Existing	2
	New	14
<b>Connecticut</b>	I New	20
	II Existing	3
	III CHP and EE	4
<b>Vermont</b>	[Has no formal RPS]	Goal: 20% by 2017

EE – Energy Efficiency; CHP – Combined Heat and Power

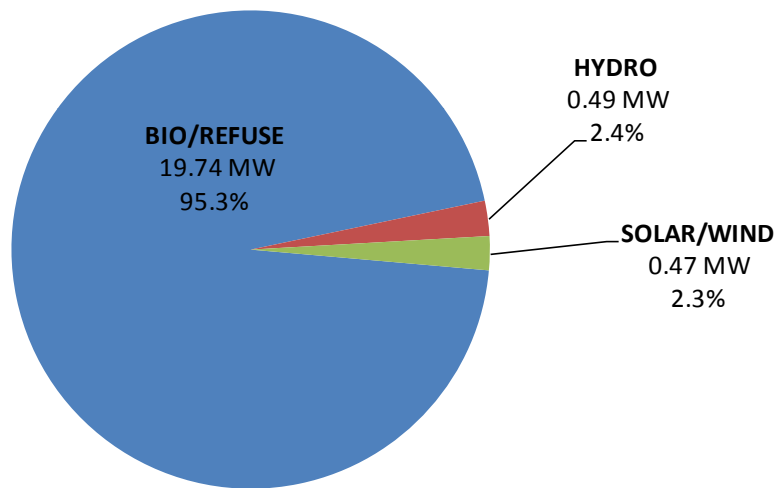
# New England Renewable Energy Supply\* to the ISO Grid in 2008

Type Resource	Capacity (MW)	Energy (GWH)
Hydro	1,693	8,549
Refuse	389	2,708
Wood	566	4,411
Landfill and Bio Gas	28	182
Wind	39	34
Solar	< 0.5	1
<b>Total</b>	<b>2,715 (8.2%)</b>	<b>15,885 (12.7%)</b>

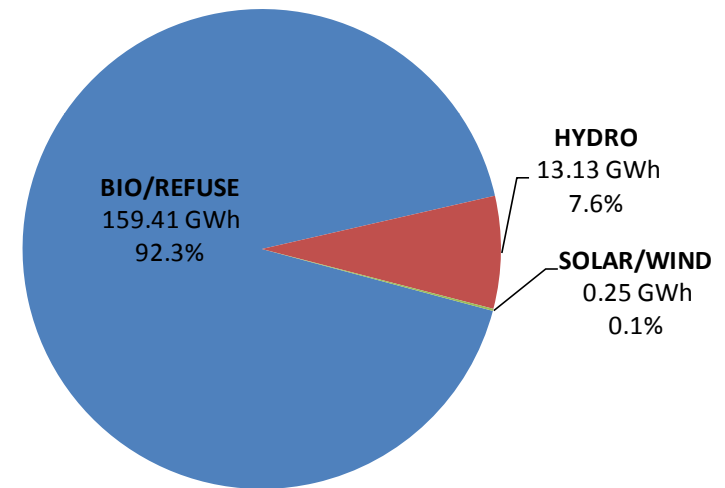
\* Data based on ISO-NE 2008 CELT and 2008 energy production

# Rhode Island Renewable Energy Supply to the ISO Grid in 2008

**Capacity = 20.7 MW**



**Energy = 172.8 GWh**



# ISO's Projection of RPS energy to 2020

1. Extrapolate state energy growth from ISO's 2009 forecast for 2018 to 2020
2. Deduct
  - Energy for “non-competitive” energy suppliers (i.e., municipals) that are exempt from RPS, i.e. CT, MA, RI and NH
  - Energy for state efficiency goals (MA only)
3. Apply states annual RPS percentages by RPS class to results of Step 2
4. Group results in Step 3 into the following RPS class categories
  - Existing renewables: CT II, MA II, ME, RI, and NH III & IV
  - New renewables: CT I , MA I, RI, NH I & II and ME I
  - Other renewables: VT Renewable Goal
  - Energy efficiency/CHP: CT III, MA EE Goal



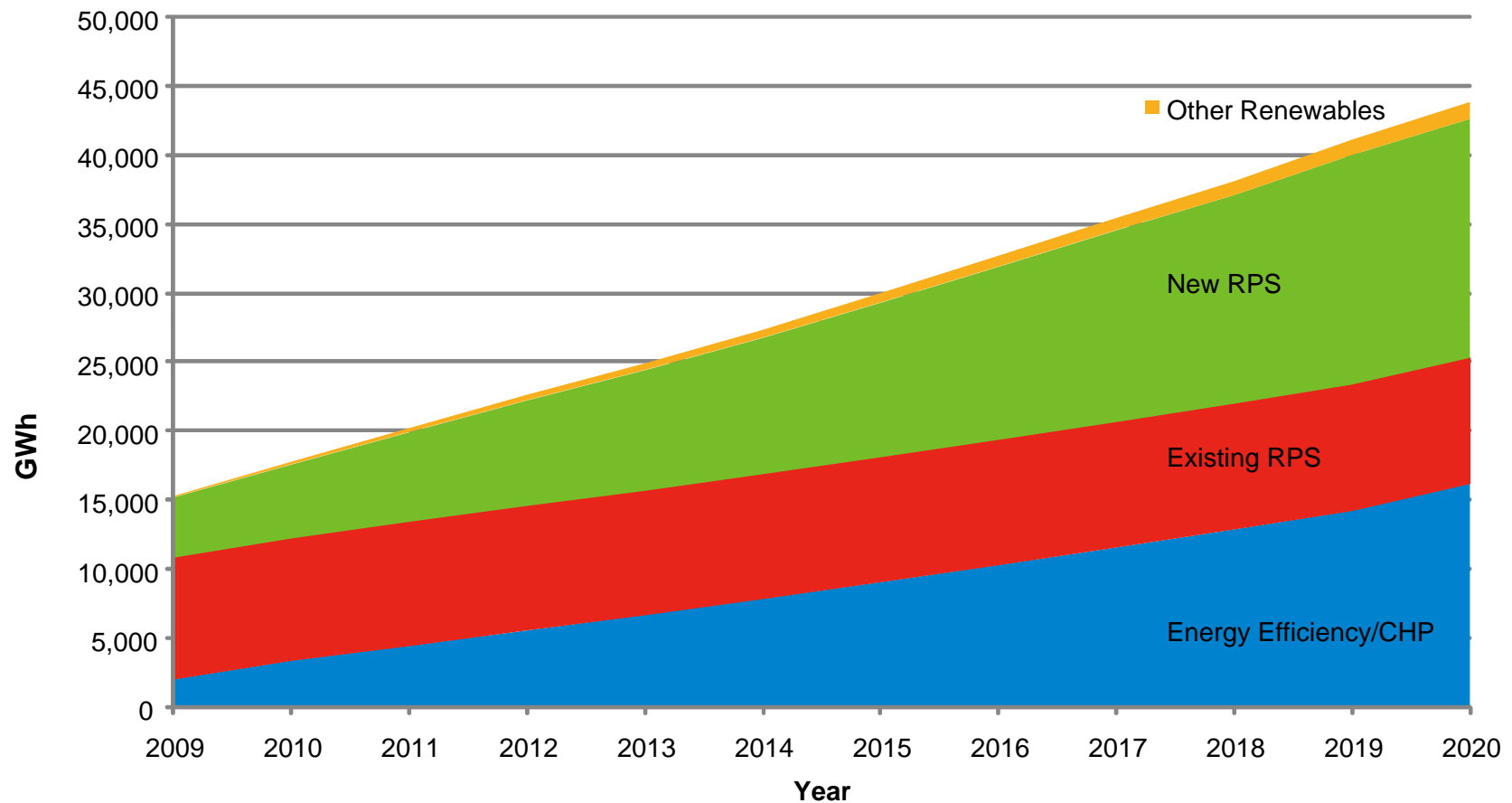
# Total RPS Energy and Percent of New England Projected Energy Use

Total New England				
	2009	2012	2016	2020
ISO 2009 Forecast of Energy (GWh)	131,315	134,015	139,025	145,310
Total RPS Energy (GWh)	15,312	22,619	32,663	43,767
Total RPS as a percent of NE Energy	11.7%	16.9%	23.5%	30.1%

# New England RPS Energy by Category as Percent of Total Energy

RPS Class/Category	2016 (%)	2020 (%)
Existing	6.6	6.3
New	9.0	11.9
Other	0.6	0.8
Energy efficiency/CHP	7.4	11.1
Total	23.5	30.1

# ISO Projection of New England's RPS Energy: 2009-2020

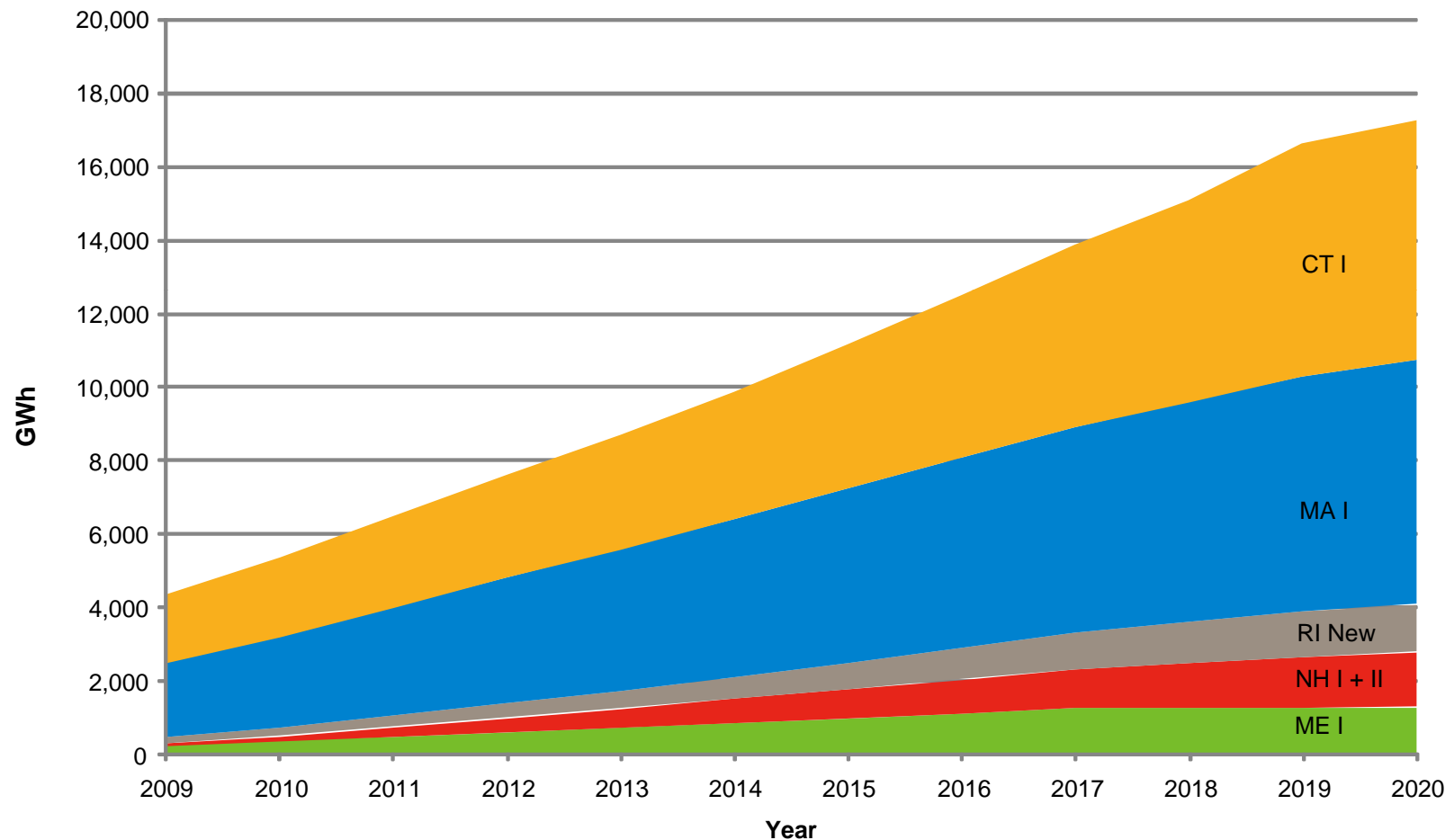


# ISO's Projected RPS Energy for New Resources

Based on ISO's 2009 RSP Energy Forecast

State RPS Class	New RPS Energy (GWh)			
	2009	2012	2016	2020
CT I	1,865	2,818	4,449	6,509
MA I	2,037	3,438	5,184	6,676
RI New	168	385	836	1,280
NH I & II	58	378	918	1,501
ME I	222	567	927	1,285
Total New RPS	<b>4,363</b>	<b>7,618</b>	<b>12,501</b>	<b>17,251</b>
2008 New RPS	3,624	3,624	3,624	3,624
<b>Net New RPS Energy</b>	<b>739</b>	<b>3,994</b>	<b>8,877</b>	<b>13,628</b>

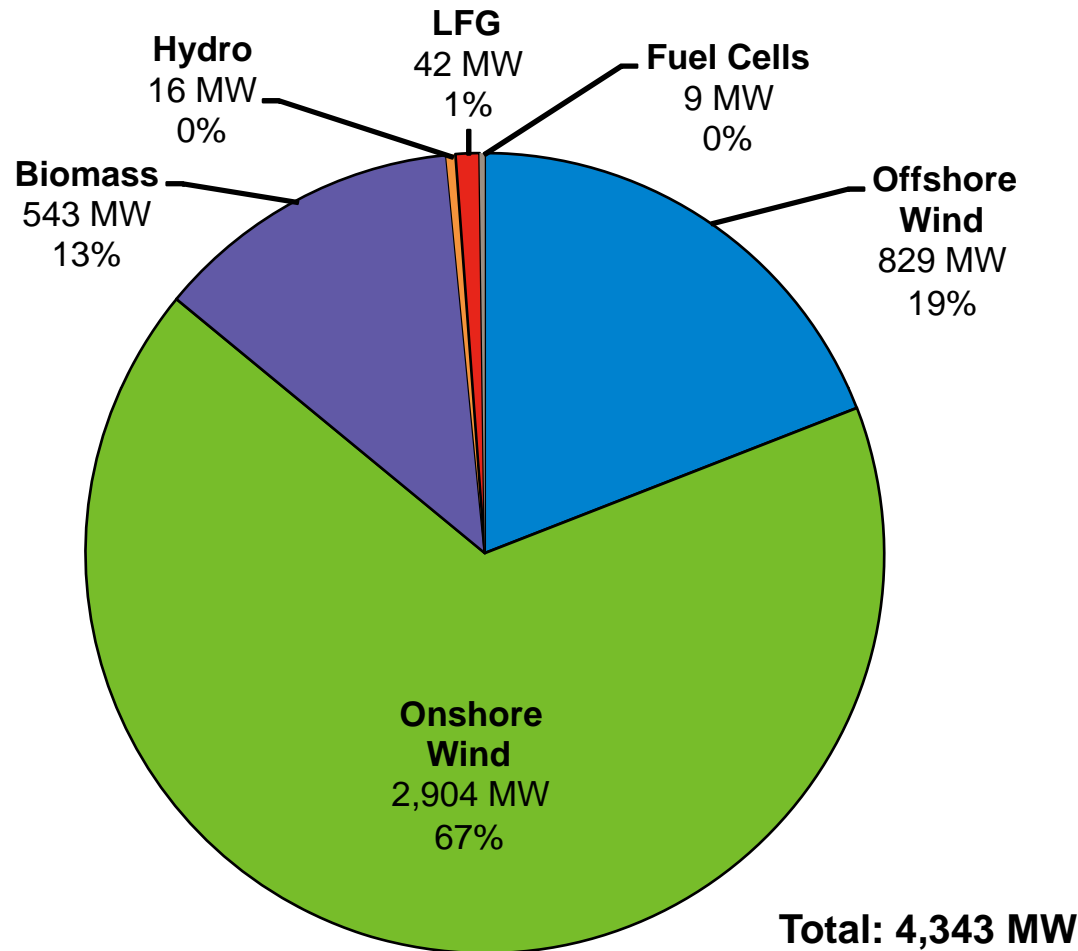
# ISO Projection of New England RPS Energy for New Resources by State (GWh)



# Summary of Projection of New RPS Energy by 2020

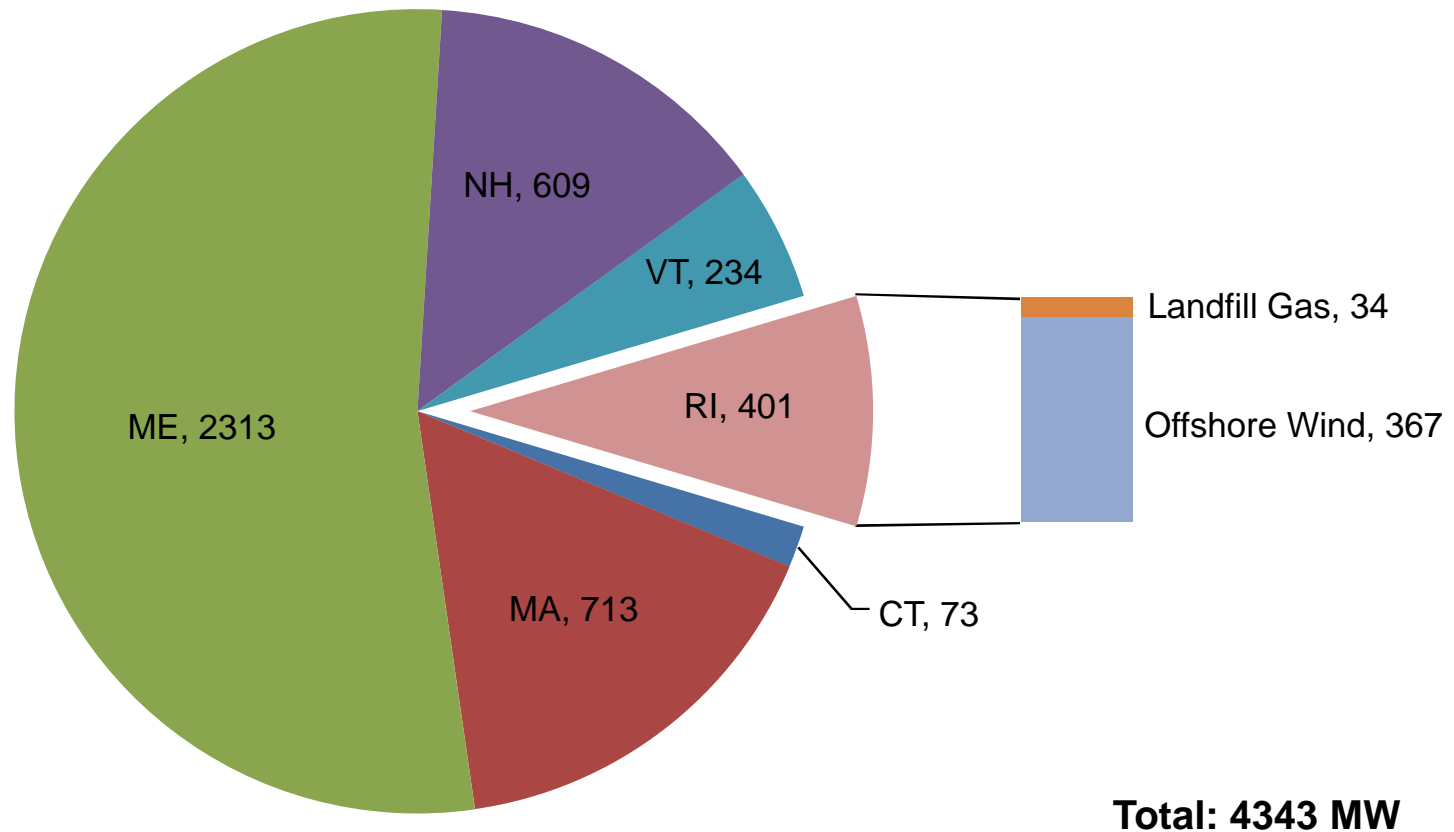
- New England
  - Total cumulative RPS for new resources: 17,300 GWh
  - Less RPS for new resources in 2008: 3,600 GWh
  - Net new RPS for new resources for 2020: **13,700 GWh**
- Rhode Island
  - Total cumulative RPS for new resources: 1,280 GWh
  - Less RPS for new resources in 2008: 125 GWh
  - Net new RI RPS for new resources for 2020: **1,155 GWh**

# Renewable Resources (MW) in the ISO Queue\* by Fuel Type



\* As of March 15, 2009. Includes all projects in New England

# Renewable Resources (MW) in the ISO Queue\* by State



**Total: 4343 MW**



# Renewable Energy Projects in the ISO Queue\*\*

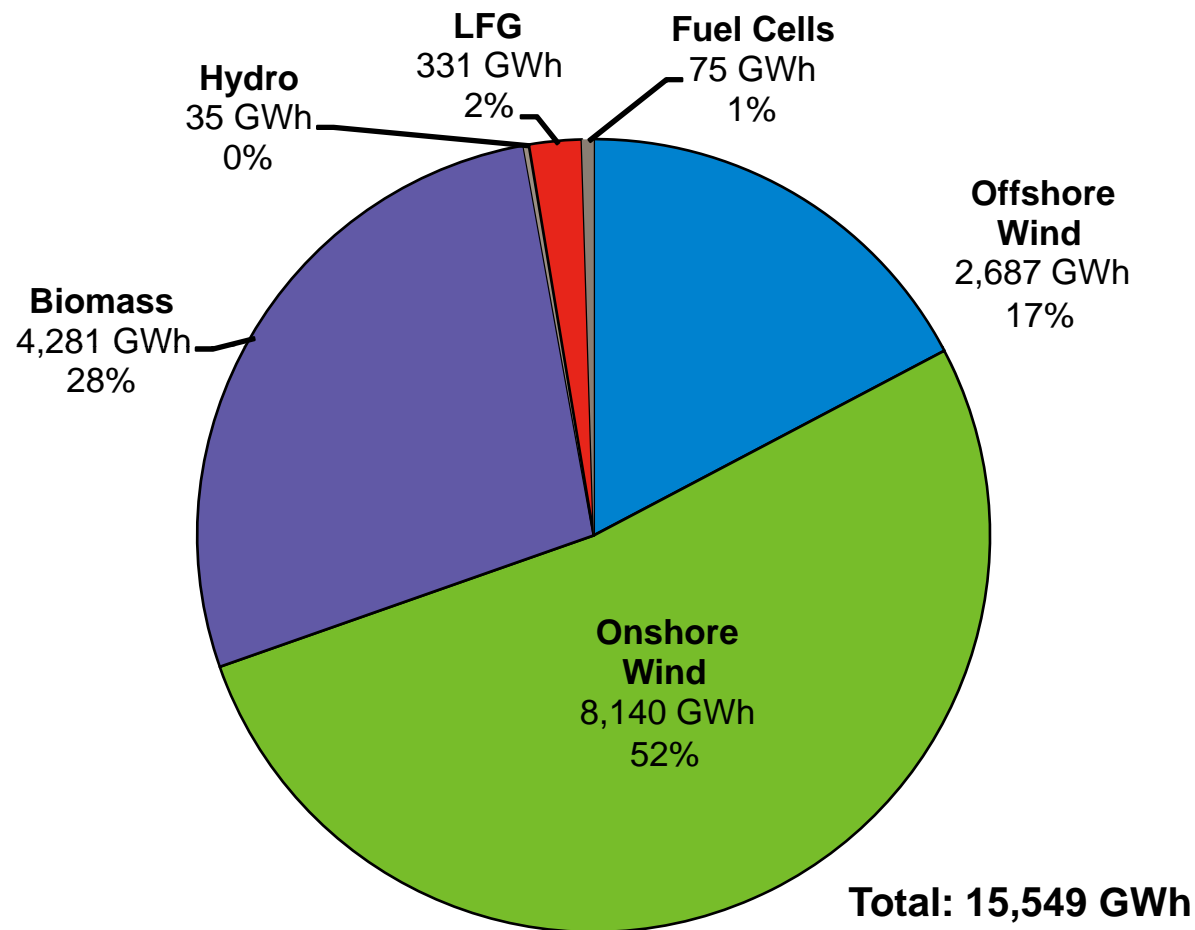
Queue as of March 15, 2009

Type (#) of Projects	Size – MW	Assumed Capacity Factor %*	GWh
Hydro (3)	16	25.0	35
Landfill Gas (3)	42	90.0	331
Biomass (14)	543	90.0	4,281
Wind Onshore (32)	2,904	32.0	8,140
Wind Offshore (3)	829	37.0	2,687
Fuel Cells (1)	9	95.0	75
<b>Total (56)</b>	<b>4,343</b>	<b>40.9</b>	<b>15,549</b>

\* These are consistent with the capacity factors used in ISO-NE's Scenario Analysis, but wind is adjusted for 90% turbine availability

\*\* Includes all projects in New England

# Estimated Energy from Renewable Resources in the ISO Queue\*



\* As of March 15, 2009. Includes all projects in New England

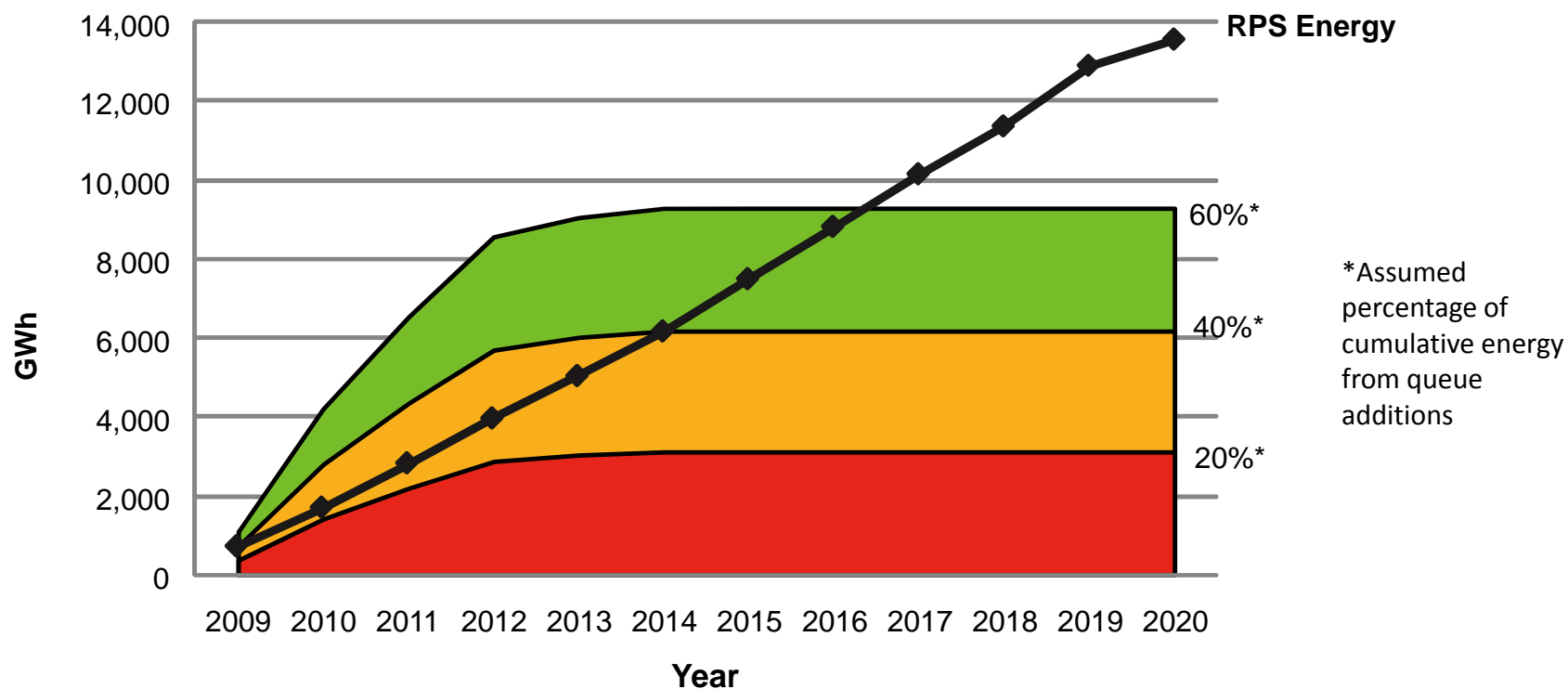
# Historical Attrition of Queue Projects

The table below shows the projects withdrawn since the Queue was published in November 1997 range from 45%, based on number of projects, to almost 60% based on MW

Similarly, for wind projects alone they range from 38% to 64%

Project Category	All Projects				Wind Projects			
	No.	%	MW	%	No.	%	MW	%
Commercial	60	20	13,976	20	2	3	83	1
Active	108	36	15,037	21	39	59	3,733	35
Withdrawn	135	45	41,684	59	25	38	6,914	64
Total <sup>(a)</sup>	303	100	70,697	100	66	100	10,730	100

# Uncertainty of Energy from Queue Renewable Projects vs. Projected NE RPS Energy for New Resources beyond 2008



# Rhode Island's Net New RPS Energy vs. Energy from Projects in the Queue

- Net New RPS Energy by 2020 (slide 14): 1155 GWh
- Energy from RI Projects in the Queue: 1460 GWh

Type of Project	Size – MW	Assumed Capacity Factor %*	GWh
Landfill Gas	34	90	268
Offshore Wind	367	37	1190
Total	401	41.5*	1458

\*Weighted Capacity Factor

# Outlook for Meeting NE New RPS with Renewable Projects in the ISO Queue

- The outlook for meeting the NE RPS with projects in the ISO Queue depends on the successful completion of projects
- For example:
  - Assuming 40% of the energy from Queue projects is available, the projects would likely meet the new RPS energy through 2014
- Other Options to meet the RPS:
  - Future projects not currently in the Queue,
  - Projects in adjacent regions,
  - Smaller projects outside of the ISO Queue
  - Alternative Compliance Payment

# Renewable Resources Proposed in Neighboring Regions

- New England states generally allow Renewable Energy Certificates (RECs) from adjacent control areas including the Eastern Canadian Provinces
  - The New York ISO Queue has over 8,000 MW of wind projects
  - The Eastern Canadian provinces are developing approximately 7,000 MW of wind projects and more are being planned

