Triennial Plan III

(for FY2017-2019)

Renewable Energy Systems Webinar

July 22, 2015

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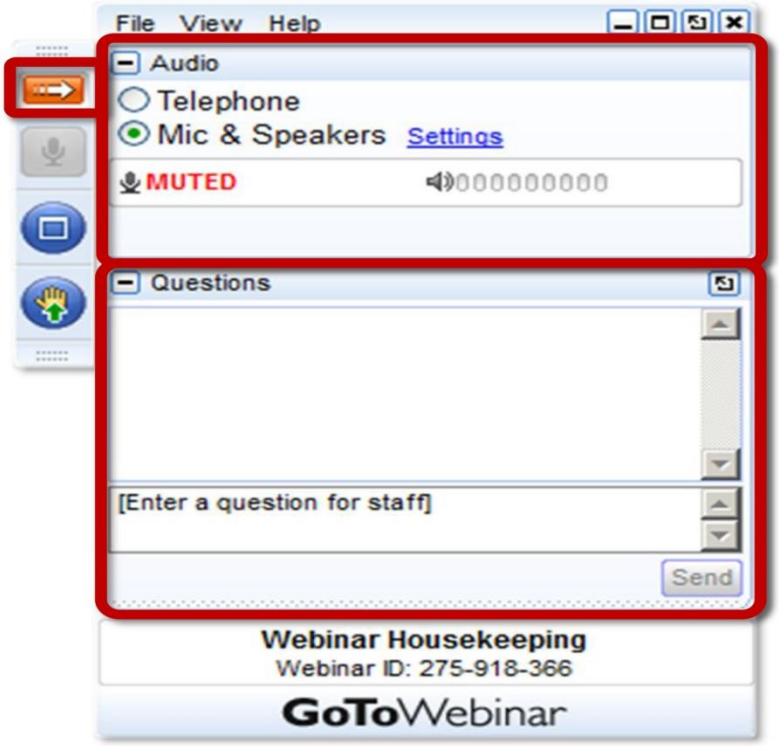
GoToWebinar Participation

GoToWebinar Participation:



How to Participate

Join audio:

- Choose **Telephone** and dial using the information provided

OR

- Choose **Mic & Speakers**

Submit questions and comments via the "Questions" panel

Note: Today's presentation is being recorded and will be posted on the Efficiency Maine Triennial Plan webpage.

Purpose and Mission

- Efficiency Maine Trust is the independent administrator for all energy efficiency programs in Maine.

- The Trust's Mission is to lower the cost and environmental impacts of energy in Maine by promoting cost-effective, customer-sited, energy efficiency and alternative energy systems.

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Webinar Structure

- Market overview
- Program overview,
- Program objectives, and results
- Stakeholder input

Market Overview

Renewable Energy – What counts

Definition from Maine Statute:

- **Alternative energy resources.** "Alternative energy resources" means nonfossil fuel energy resources, including, but not limited to, biomass, wood, wood pellets and solar, wind or geothermal resources.

Common options for "Behind the meter":

- Solar Electric (photovoltaic)
- Solar Thermal (Hot water and air)
- Biomass (pellets, chips, cord wood)

Less common options (few dozen installations in the state)

- Small wind
- Micro-hydro

Other

- Should Air Source Heat Pumps be included ???

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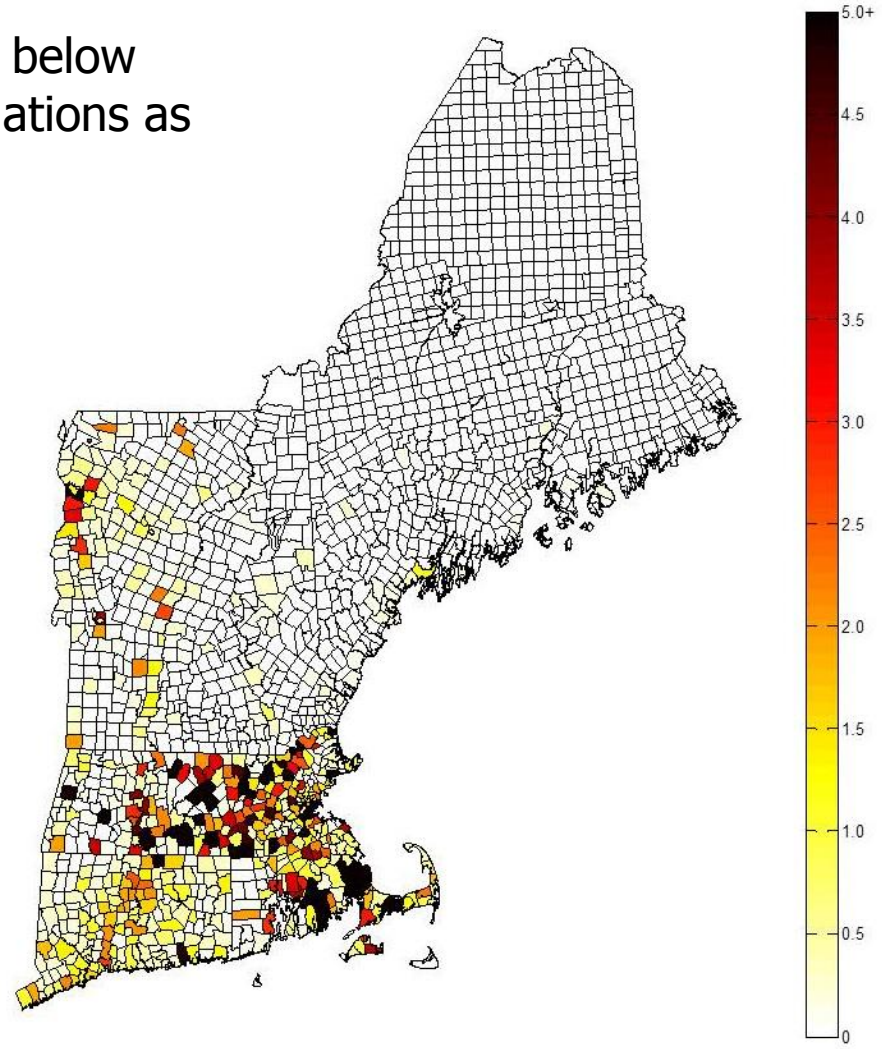
Solar Installation

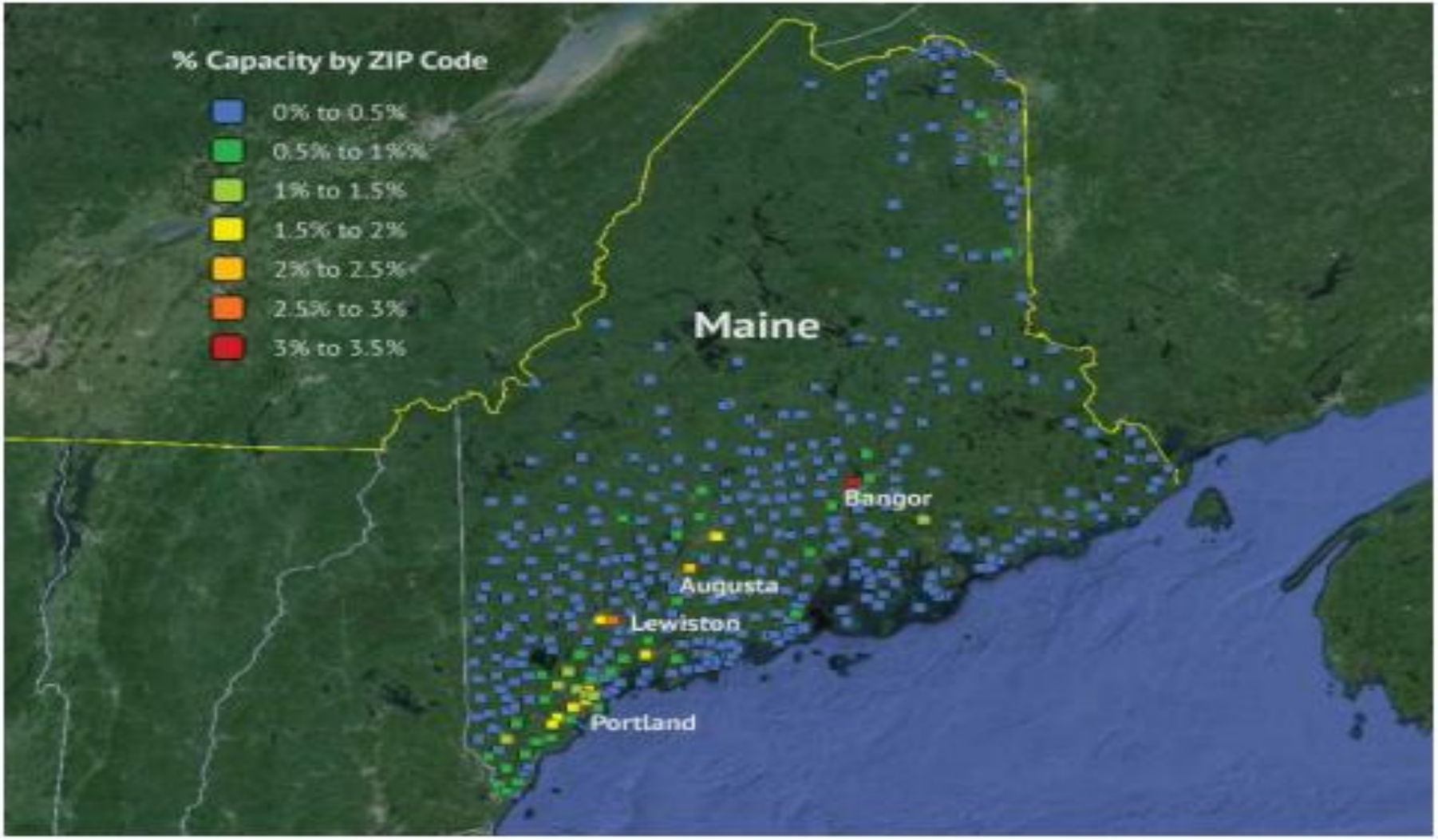
Approximate PV in service in New England as of December 31, 2014

Maine has yet to develop significant solar resources, but the potential remains. Map below from ISO NE includes both large PV installations as well as behind the meter residential and commercial projects.

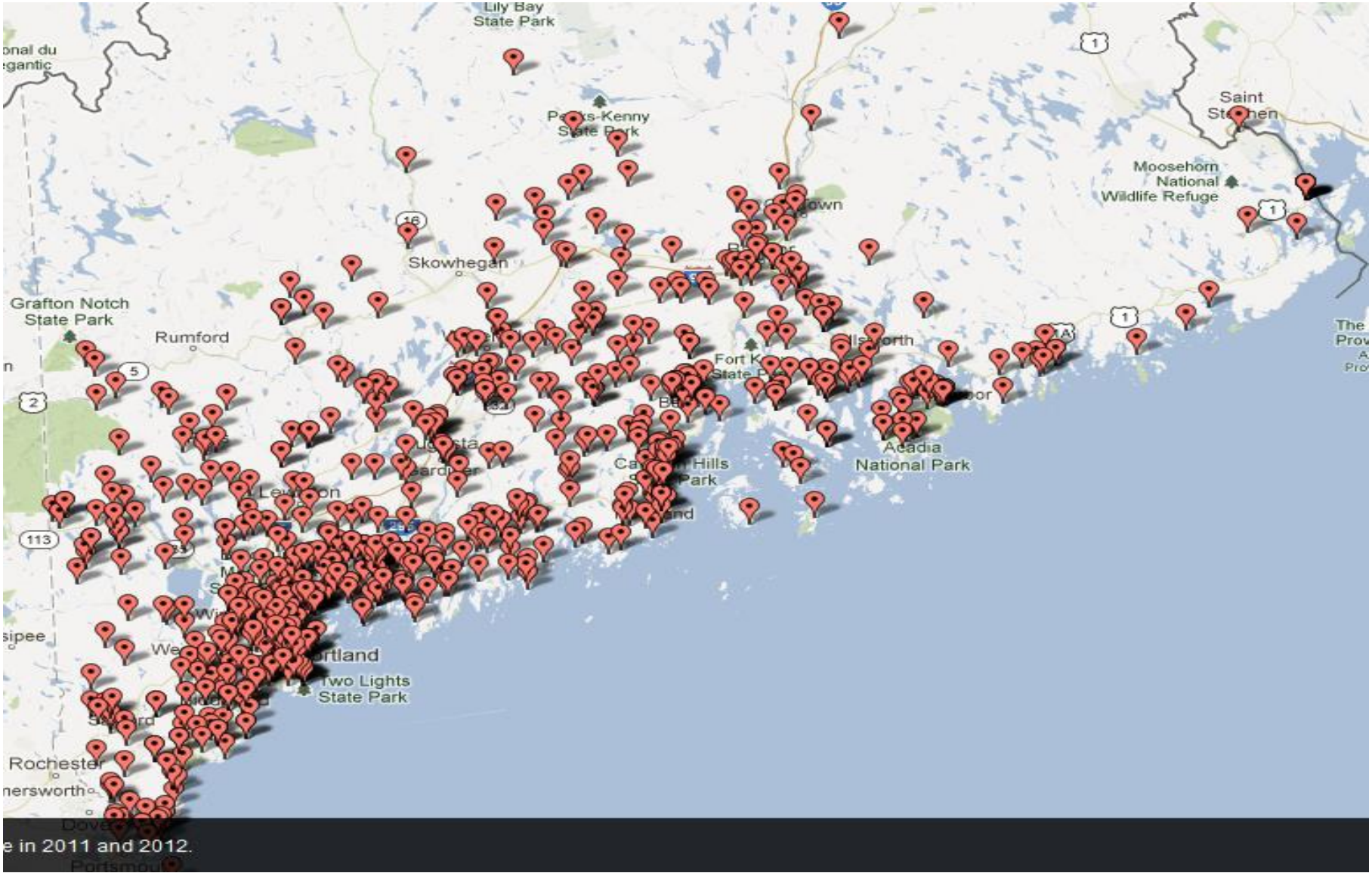
State	Installed Capacity (MW_{AC})	% of Total
Connecticut	118.8	13%
Maine	10.4	1%
Massachusetts	666.8	73%
New Hampshire	12.7	1%
Rhode Island	18.2	2%
Vermont	81.9	9%
New England Total	**908.8**	100%



Value of Solar Report:
Fleet Distribution Model to match demand pattern



Solar Rebates provided in 2011 and 2012



Maine Distributed Solar Value Study

Figure ES- 3. Base Case Results for CMP, BHD, and MPD – First Year

First Year		CMP	BHD	MPD
		$/kWh	$/kWh	$/kWh
Energy Supply	Avoided Energy Cost	0.061	0.061	0.061
	Avoided Gen. Capacity Cost	0.015	0.015	0.015
	Avoided Res. Gen. Capacity Cost	0.002	0.002	0.002
	Avoided NG Pipeline Cost			
	Solar Integration Cost	(0.002)	(0.002)	(0.002)
Transmission Delivery Service	Avoided Trans. Capacity Cost	0.014	0.017	0.000
Distribution Delivery	Avoided Dist. Capacity Cost			
	Voltage Regulation			
Environmental	Net Social Cost of Carbon	0.021	0.021	0.021
	Net Social Cost of SO_2	0.051	0.051	0.051
	Net Social Cost of NO_x	0.011	0.011	0.011
Other	Market Price Response	0.009	0.009	0.009
	Avoided Fuel Price Uncertainty	0.000	0.000	0.000
		0.182	0.184	0.168

Maine Distributed Solar Value Study

Figure ES- 2. CMP Distributed Value – 25 Year Levelized ($ per kWh)

25 Year Levelized		Gross Value A ($/kWh)	×	Load Match Factor B (%)	×	Loss Savings Factor (1+C) (%)	=	Distr. PV Value D ($/kWh)	
Energy Supply	Avoided Energy Cost	$0.076				6.2%		$0.081	Avoided Market Costs $0.138
	Avoided Gen. Capacity Cost	$0.068		54.4%		9.3%		$0.040	
	Avoided Res. Gen. Capacity Cost	$0.009		54.4%		9.3%		$0.005	
	Avoided NG Pipeline Cost								
	Solar Integration Cost	($0.005)				6.2%		($0.005)	
Transmission Delivery Service	Avoided Trans. Capacity Cost	$0.063		23.9%		9.3%		$0.016	
Distribution Delivery Service	Avoided Dist. Capacity Cost								
	Voltage Regulation								
Environmental	Net Social Cost of Carbon	$0.020				6.2%		$0.021	Societal Benefits $0.199
	Net Social Cost of SO_2	$0.058				6.2%		$0.062	
	Net Social Cost of NO_x	$0.012				6.2%		$0.013	
Other	Market Price Response	$0.062				6.2%		$0.066	
	Avoided Fuel Price Uncertainty	$0.035				6.2%		$0.037	
								$0.337	

Maine Distributed Solar Value Study

Subcategory	Implementation Examples
Direct Financial, Up-front Incentives	Grants, Rebates, or Buy-Downs
Direct Financial, Performance-Based Incentives (PBIs)	Feed-In-Tariffs, Standard Offer PBI Contracts or Tariffs, or PBIs
	Competitive Long-Term PPAs
	Long-Term Value of Solar Tariffs
	Technology-Specific "Avoided Costs"
Indirect Financial Incentives	Emissions Markets
Expenditure-Based Tax Incentives	Investment Tax Credits
Production Tax Incentives	Production Tax Credits
Demand-Pull/Solar Minimum Purchase Mandates	Renewable Portfolio Standards (RPS)
	Solar Set-Asides in RPS (SREC Market)
Net Metering	Net Metering Crediting Mechanism
	Virtual NM Crediting Mechanism
	Community-Shared Solar

Study outlines a number of mechanisms to support increased installation of solar.

Efficiency Maine currently structured to aid with grants and rebates but only where funding source allows for consideration of costs and benefits not included in TRC cost-effectiveness calculations.

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"Behind the meter" Market Barriers to Solar

1. High initial cost and aversion to debt
2. Location with good solar resource
3. Misinformation about effectiveness of solar in Maine
4. Interest varies with price of oil and electricity
5. Federal Income Tax Credit requires taxable income and owner to "front" 30% of costs until filing tax return.

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Program overview

Renewable Resource Fund:

1. Grants on Community Demonstration Projects
2. Rebates
3. Financing for projects on residential buildings
4. Renewable Energy Vendor Locator Tool
5. Information on Renewable Energy Technology

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Contractor Locator Tool

Webpage: At Home>Find a Residential Registered Vendor

Search and Sort Options

Start by entering your ZIP Code and a search radius.

ZIP Code: 04101

Radius: 25 miles

Sort by: completed EM projects*

* Ranked according to the quantity of projects that were completed and received a rebate from Efficiency Maine over the past four months.

What services do you need?

Hover over service icons below for more information on services and qualifications.

What services do you need?

Hover over service icons below for more information on services and qualifications.

- [x] All Services
- [ ] Energy Advisor
- [ ] Air Sealing & Assessment
- [ ] Insulation
- [ ] Heat Pumps
- [ ] Gas
- [ ] Oil
- [ ] Pellet Boilers
- [ ] Pellet/Wood Stoves
- [ ] Geothermal
- [ ] Heat Pump Water Heaters
- [ ] Solar

SEARCH

Vendor Locator

Find a Residential Registered Vendor

To find an Energy Advisor, Contractor, or Renewable Energy Installer near you, enter your ZIP code below and click Search.

Questions to ask a Registered Vendor

Print These Results

Search and Sort Options

Start by entering your ZIP Code and a search radius.

ZIP Code: 04330

Radius: any

Sort by: distance

* Ranked according to the quantity of projects that were completed and received a rebate from Efficiency Maine over the past four months.

What services do you need?

Hover over service icons below for more information on services and qualifications.

- All Services
- Energy Advisor
- Air Sealing & Assessment
- Insulation
- Heat Pumps

	Vendor	Services Provided	Miles	More Info
1	AFC Augusta, ME - 207-623-3851 www.afccomfort.com		0	
2	Maine Solar Engineering Palermo, ME - 207-993-2632 www.mainesolarengineering.com		16	
3	Maine Energy Performance Solutions Washington, ME - 207-845-6100 www.mepsenergy.com		19	
4	Teel Green Energy LLC Alna, ME - 802-291-2679		20	
5	Liberty East Liberty, ME - 2075894876		21	
6	ReVision Energy LLC - Liberty Liberty, ME - 207-589-4171 www.revisionenergy.com		21	
7	Solarwinds Northernlights Waldoboro, ME - 207-832-7574 www.SWNL.net		26	
8	Uprising Power Systems Bristol, ME - 207-380-5759		31	
9	Insource Renewables Pittsfield, ME - 207-659-1054 www.insourcerenewables.com		32	

Home Energy Savings Program Energy Upgrade Menu

Air Sealing with Assessment $400 rebate

Insulation $500 per zone; up to $1,000 rebate

Ductless Heat Pump $500 rebate

High Efficiency Central Heating Systems $500 rebate

Pellet and Wood Stoves $500 rebate

Renewable Central Heating Systems $5,000 rebate

Custom Whole Home Projects $1,000 or $1,500 rebates

Find a Registered Vendor

Renewable Energy

Efficiency Maine offers financing for eligible renewable energy projects, and incentives for renewable energy heating systems. Click on the links below to find out more about renewable energy technologies, financing, and incentives.

Pellet Boilers: Central wood pellet boilers are high-efficiency systems that use a local, renewable fuel resource. Find out more about pellet boiler systems here. High-efficiency pellet boiler projects may be eligible for a $5,000 incentive through the Home Energy Savings Program.

Pellet and Wood Stoves: High-efficiency and low-particulate wood and pellet stoves can be a renewable and cost-effective way to heat your home and may be eligible for a $500 incentive through the Home Energy Savings Program.

Geothermal Systems (also called ground source heat, ground source heat pumps, or geothermal heat pumps) take advantage of the constant temperature of the ground below the frost line to heat in the winter and cool in the summer. Efficiency Maine offers incentives up to $5,000 for geothermal systems through the Home Energy Savings Program.

Solar electric or photovoltaic (PV) systems can reliably produce electricity in Maine and have become an increasingly more affordable renewable energy option for homeowners interested in reducing energy bills and increasing energy independence. Learn more about solar electric systems.

Renewable Energy

Wood and Pellet Heating

Geothermal Heating and Cooling Systems

Solar Electric

Solar Hot Water

Find a Residential Registered Vendor

Financing Solutions

Solar Electric

Solar electric or photovoltaic (PV) systems can reliably produce electricity in Maine and have become an increasingly more affordable renewable energy option for homeowners interested in reducing energy bills and increasing energy independence. Because PV technologies use both direct and scattered sunlight to create electricity, they can generate electricity even on cloudy days. However, the amount of power generated by a solar system at a particular site depends on how much of the sun's energy reaches it.

A typical solar electric system is an array of solar modules or panels, mounted on racks and connected to the utility grid or to batteries through a power inverter. The performance of photovoltaic or solar electric systems is measured in terms of their efficiency at converting sunlight into electricity. There are a variety of solar electric systems and materials available, which vary in conversion efficiency.

Taking Action

1. **Registered Renewable Installers** – Click here to find installers in your area that sell solar PV systems.
2. **Get financing for your renewable project** – Click here to find out about Efficiency Maine's Home Energy Loans for renewable projects as well as energy assessments, air sealing, insulation, heat pumps and more.

Renewable Energy

Wood and Pellet Heating

Geothermal Heating and Cooling Systems

Solar Electric

Solar Hot Water

Find a Residential Registered Vendor

Financing Solutions

Wood and Pellet Heating

Renewable Energy

- Wood and Pellet Heating
- Geothermal Heating and Cooling Systems
- Solar Electric
- Solar Hot Water
- Find a Residential Registered Vendor
- Financing Solutions

Wood and pellet fuels are a renewable and cost-effective way to heat your home or business. Pellets and wood are a popular fuel choice due to their affordability over fossil fuels and the fact that Maine has significant, locally-produced wood fuel supplies. High-efficiency wood and pellet heating systems are eligible for Home Energy Savings Program (HESP) Incentives and Efficiency Maine Energy Loans.

A **wood or pellet stove** burns logs or pellets to heat a single room, although many homeowners locate these systems centrally and offset half or more of their primary fuel use. Pellet and wood stoves are typically fireplace inserts or free-standing models. Many different types are available. For example, pellet stoves can be fed from the top or the bottom and some models have longer fuel storage capacity and are easier to clean and remove ash. Advances in stove design have dramatically increased output efficiency and convenience, while reducing particulate emissions. Click here for Efficiency Maine's list of approved wood and pellet stoves.

A **pellet boiler** burns pellets and is connected to a central heating and hot water system. Many Mainers are familiar with pellet stoves, but pellet boilers are a

UL GHG Heating System Criteria

- Pellet Boilers
  - EPA Phase 2 or EN303-5 Class 3 or greater
  - Bulk automated pellet feed. Minimum 1 ton bulk bin or 500 pound bin with automatic switching on same distribution system.

- Geothermal Heat Pumps
  - Energy Star Tier 3 Criteria
  - ES Most Efficient Geothermal List

- 1/3rd of total project cost up to $5,000 rebate

Financing for Home Energy Upgrades

- Loans from $1,000 to $25,000
- No Fees
- 4.99% / 5.99% APR Fixed
- 5, 10, 15, 20 year terms
- Air sealing & Assessment plus at least one Eligible Upgrade
  - Heat Pumps, Insulation, Boilers, Solar

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Program objectives, and results

Statute for Renewable Resource Fund (RRF)

1. Funding for energy efficiency and renewable resource research and development; community demonstration projects; rebates for cost-effective energy efficiency and renewable energy technologies.

The trust by rule shall establish and administer a program … to fund energy efficiency and renewable resource research and development, to fund community demonstration projects using energy efficiency and renewable energy technologies and to fund rebates for cost-effective energy efficiency and renewable energy technologies.

<u>Current Revenue Sources</u>

- Voluntary contributions from utility ratepayers
  $50,751 in FY15 after 35% to MTI
- Alternative Compliance Payments
  $3,810 in FY15
- Solar/Wind Law Sunset in 2010.
- ARRA Federal Grant funds fully utilized.

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Renewable Resource Fund – Eligible Uses

- Provide for a distribution of the funds through a competitive bid process to the University of Maine System, the Maine Maritime Academy or the Maine Community College System for energy efficiency and renewable resource **research and development**;
- Provide for a distribution of the funds through a competitive bid process to Maine-based nonprofit organizations, consumer-owned electric utilities, community-based nonprofit organizations, community action programs, municipalities, quasi-municipal corporations or districts, community-based renewable energy projects (as defined in section 3602, subsection 1) and school administrative units for **community demonstration projects** using energy efficiency and renewable energy technologies;
- Provide for an annual distribution of **35% of the funds to the Maine Technology Institute** to support the development and commercialization of energy efficiency and renewable energy technologies; and
- Provide **rebates** for cost-effective energy efficiency and renewable energy technologies as determined by the trust.

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Renewable Rebate Policy Background

Solar / Wind Program

- Established 2005
- Incentive level changes
- Early gaps in funding and incentive availability disruptive
- Legislative renewals required / allowed to sunset Dec 2010.
- Provided $500 to $700K worth of incentives per year for hundreds of PV and solar thermal installations.
- Community of roughly 30 active solar installer firms statewide.

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Renewable Rebate Energy History

Solar Rebates January 2010 to November 2013

- $0.025 per modeled kwh over 20 year period
- Cap $2,000 residential / $4,000 commercial
- 2011 and 2012: $1.4M ARRA stimulus funds utilized
- 2013 Residual $800k from Solar/Wind SBC expended

- Rebate program suspended for lack of designated funding but program rules and authorization remain in place.

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FY13 RRF Demonstration Grants Awarded		
Project Recipient	Description	Grant Amount
The Chewonki Foundation	Cord wood gasification district heating system	$52,500
Cobscook Community Learning Center	Cord wood gasification district heating system	$19,635
Maine Solar Farm	Shared 53KW PV array	$48,000
City of Augusta	Combined 1,500 Solar Hot Air and Heat Pump System at Hartford Fire Station	$50,000
Western Maine Community Action (WMCA)	Initiative to install pellet boilers in community buildings in Farmington Area	$50,000
York School Department	9.5 KW solar array on York Middle School	$22,278
		$242,413
FY14 RRF Demonstration Grants Awarded		
Project Recipient	Description	Grant Amount
Lincolnville Library	8 KW PV System on low energy use library	$15,000
Biddeford PW	3,200 sq ft Solar Hot Air Panel Array on Public Works Facility	$62,500
MCC Firestation	Pellet Boiler installation on fire station shared by 3 towns in Aroostook County	$20,800
Wells - Public Works	PPA of 36 KW PV on Public Works Building	$31,620
Northern Forest	Pellet Boiler Incentives and promotion for Light Commercial Pellet Boiler installations	$80,000
Casco Bay Solar Ice	PPA 66 KW PV on Community Ice Rink in high electrical use district.	$50,000
		$259,920

Home Energy Savings Program

In the past 22 months:

- 500 pellet boilers
- 100 geothermal systems
- 9,000 ductless air source heat pumps
- 100 pellet and wood stoves

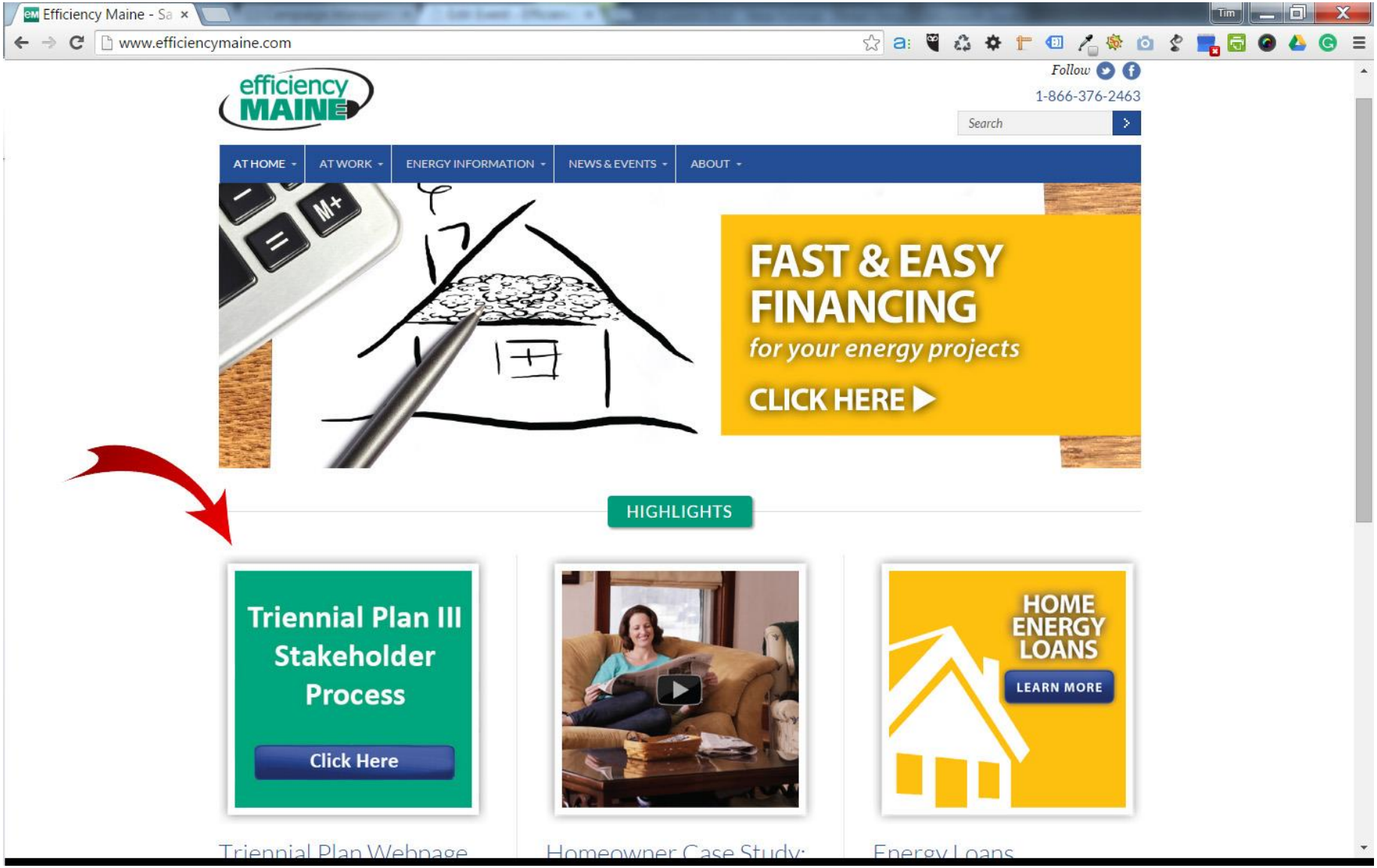
Stakeholder Input

Renewable Energy Suggestions and Discussion

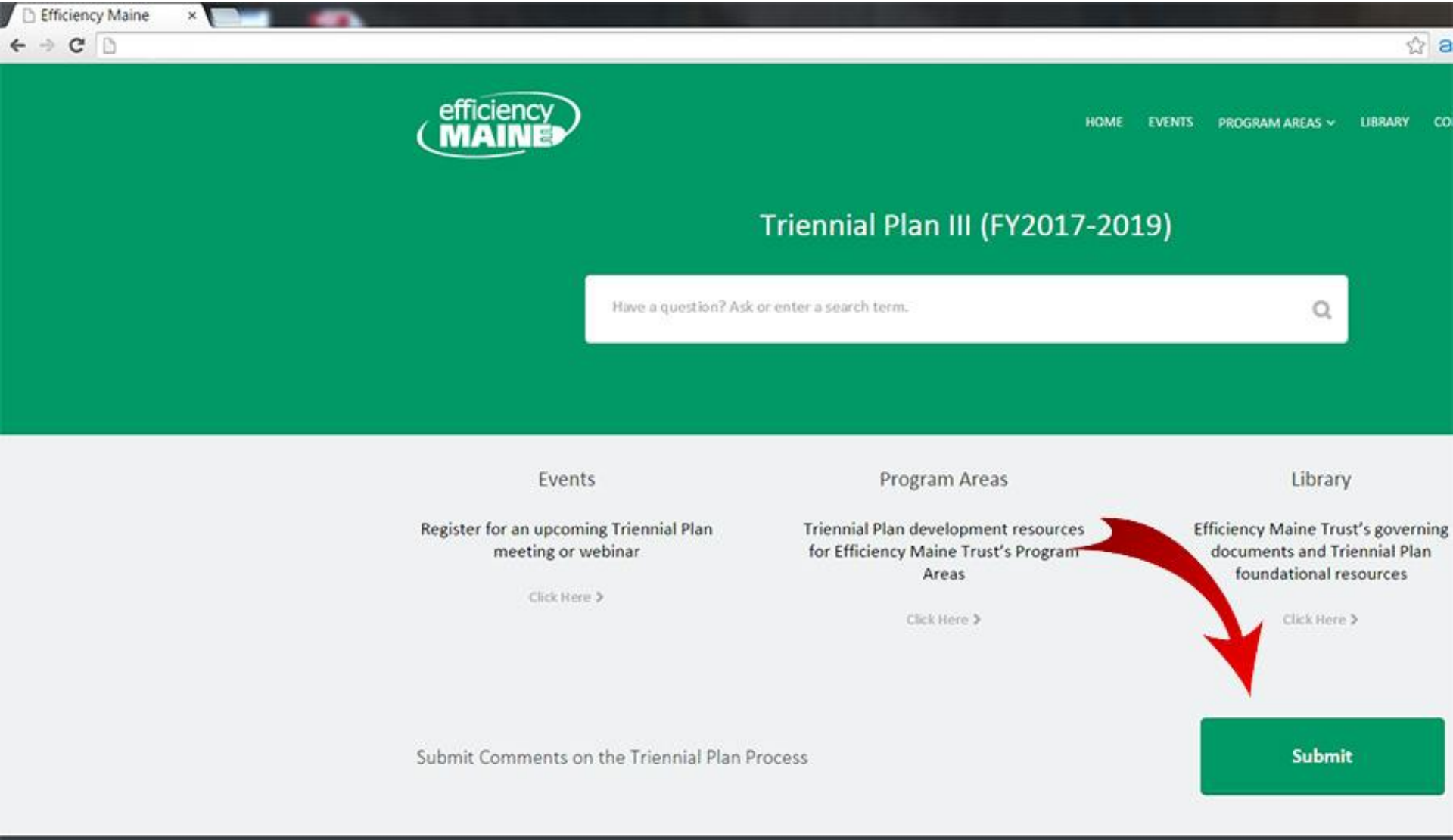
- What should Efficiency Maine focus on in the next 3 years?
- What renewable energy industries would have greatest benefit with resources available?
- Do R&D grants have a lower priority than demonstration grants?
- Should demonstration grants be more prescriptive instead of an open RFP?
- What should be the Trust's objective for renewable energy and what would make the best use of the Trust's limited funds to meet these objectives?

Next Steps

Triennial Plan III Dedicated Website



Submit Comments



Thank you!

Please Share Your Ideas:

- **Submit comments at http://efficiencymaine.com at the link for the "Triennial Plan III"**
- **Latest that comments will be considered before the draft plan is August 15**