

# Solar Development on Falmouth's Woods Rd. Landfill

*A State Policy Update and Project Overview*



Presented to the Falmouth Town Council by:  
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Energy & Sustainability Coordinator

September 2016

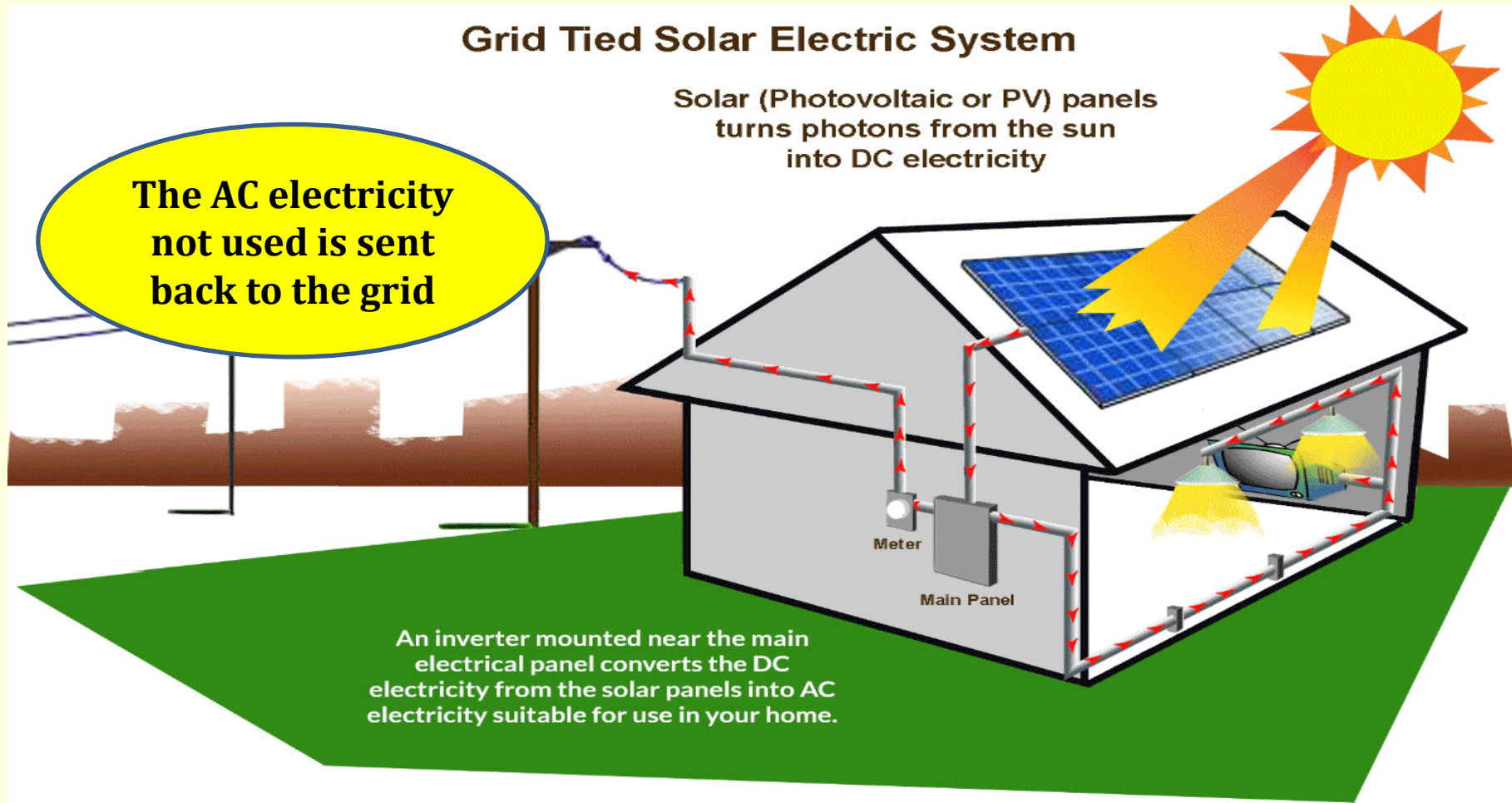
# General Outline

- Solar PV and electricity basics
- Brief history of Maine's solar policy
- Status quo—current policy Net Energy Billing
  - How billing works with solar
    - Pricing and financing
- What has been done and who we've worked with
- What are the barriers from keeping us moving forward?

## Grid Tied Solar Electric System

Solar (Photovoltaic or PV) panels turns photons from the sun into DC electricity

The AC electricity not used is sent back to the grid



Electricity flows in the path of least resistance. During the day, the power generated from an array will power the load **directly** on site—known as “behind the meter”

When panels aren't producing power (at night), electricity is pulled from the grid.

# Electricity Basics

- Watt = volts \* amps
- 1,000 watts = 1 kilowatt 1,000kilowatts= 1MW
- Kilowatt hour = the product of a certain amount of electricity times a period of time
- In direct current (**DC**), the electric charge (current) only flows in one direction. Electric charge in **alternating current (AC)**, on the other hand, changes direction periodically. The voltage in **AC** circuits also periodically reverses because the current changes direction.

# Solar/NEB Brief History in Maine

- **1998** Net energy billing rules adopted by Public Utilities Commission through Legislative rulemaking
- **1999** Deregulated electricity market—Transmission & Distribution can no longer produce power
- **2009** First adjustment to NEB directed the PUC to allow shared net metering; cap raised from 100kW→500 kW → 660 kW
- **2011** Legislature passed bill requiring PUC to include term limits on net energy billing contracts
- **2015** PUC Released “Value of Solar Study”. Legislature directed PUC to convene a Stakeholder Group
- **2015-2016** Stakeholder’s Report—“A Market Based Approach” influenced the language of LD 1649 (solar bill)
- **127<sup>th</sup> Legislative Session**—lawmakers failed to override Governor’s Veto
- **Summer 2016 PUC Issues Notice of Inquiry**—on NEB; utility request there be a review on NEB as the 1% peak demand cap has been met in their territory.
- **128<sup>th</sup> Legislative Session**—lawmakers likely to make another attempt at a Comprehensive Solar Policy (or treat market segments separately. i.e. residential, commercial, large scale/industrial)

# Chapter 313—Net Energy Billing

- **Net Energy**—is the difference between the kilowatt-hours consumed by a customer or shared ownership customers, and the kilowatt-hours generated by the customer's or shared ownership customers' eligible facility over a billing period
- **Net Energy Billing**—is a billing and metering practice under which a customer or shared ownership customers are billed on the basis of net energy over the billing period into an account of accumulated unused kilowatt-hour credits from the previous billing period.

# Chapter 313—Net Energy Billing

- **Eligible Facilities**— An eligible facility located in a service territory of an investor-owned transmission and distribution utility must have an installed capacity of **660 kW or less**.

# Chapter 313—Net Energy Billing

- **Non-use charges**—NEB only applies to kilowatt-hour usages charges. NEB customers or the shared ownership customers are responsible for all other charges applicable to the customer's rate class and recovered either through fixed amounts or over units other than kilowatt-hours.
- **Limit on accounts**—customers or shared ownership customers may designate no more than 10 accounts or meters for NEB.



# Chapter 313—Net Energy Billing

- **Commission Review**—a T&D utility shall notify the Commission if the cumulative capacity of generating facilities subject to the provisions of this Chapter reach 1.0 percent of its peak demand. Upon notification, the Commission will review this Chapter to determine if NEB pursuant to this Chapter should continue or be modified.

# NEB—Small General Service



**CENTRAL MAINE  
POWER**

Your CMP account number:  
**441-115-1277-011**



CMP customer assistance line  
Monday - Friday 7:30 - 5:00  
**1-800-565-3181**  
To report a power outage: 1-800-696-1000



**TOWN OF FALMOUTH**  
17 MILL GARAGE RD  
FALMOUTH ME  
Service location

**Billing date:** 01/28/16

Read cycle: 19

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## Customer Meter Summary

Meter Number	Read Date	Prior Read Date	Number of Days	Meter Reading	Prior Meter Reading	Total KWH
G045257997	01/27/16	12/29/15	29	43112	42373	739

## Account Summary

<b>Prior balance</b>						\$93.78
Payments received through 01/28/16 - thank you					\$93.78-	
<b>Balance forward</b>						\$0.00
<b>New charges</b>						
Electricity Delivery: Central Maine Power (see detail below)					\$54.94+	
Electricity Supply: Standard Offer Service					\$48.47+	
<b>Total new charges</b>						\$103.41
<b>Current Account Balance:</b>						<b>\$103.41</b>

Please pay before 02/24/16

## Central Maine Power Delivery Service Account Detail

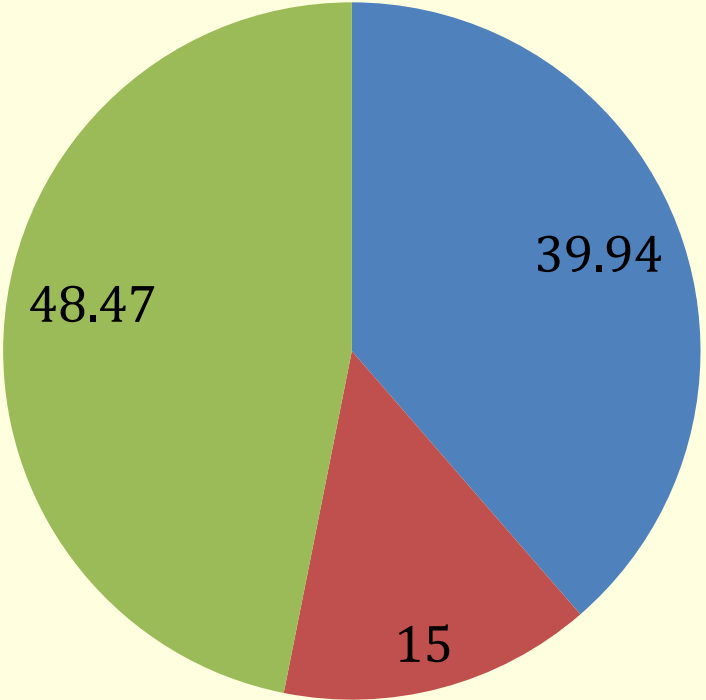
<b>Prior balance for Central Maine Power delivery</b>						\$50.70
Payments received - thank you					\$50.70-	
<b>Balance forward</b>						\$0.00
<b>Current delivery charges</b>						
Delivery Charges: Small General Service 1 Phase						
Service charge					\$15.00+	
Delivery Service: 739 KWH @ .054040					\$39.94+	
<b>Total current delivery charges</b>						\$54.94
<b>Central Maine Power account balance</b>						<b>\$54.94</b>

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If a customer is generating at least 739 kWh with their array, all they need to pay is the minimum delivery charge of \$15.00.

# Small General Service



- T&D
- Delivery Charge
- Supply
- Demand

Bill total—\$103.41

# NEB—Medium General Service



Your CMP account number:  
441-115-3905-012



CMP CUSTOMER SERVICE  
Monday - Friday 7:30 - 5:00  
1-800-565-3181  
To report a power outage: 1-800-696-1000



190 MIDDLE RD  
FALMOUTH ME  
Service location

196-5200

Billing date: 01/28/16

Read cycle: 19

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## Customer Meter Summary

Meter Number	Read Date	Prior Read Date	Number of Days	Meter Reading	Prior Meter Reading	Meter Multiplier	Total KWH
L112538087	01/27/16	12/29/15	29	4674	4614	80	4800

## Account Summary

<b>Prior balance</b>							\$632.35
Payments received through 01/28/16 - thank you						\$632.35-	
<b>Balance forward</b>							\$0.00
<b>New charges</b>							
Electricity Delivery: Central Maine Power (see detail below)						\$219.12+	
Electricity Supply: Constellation Energy Svc Inc (see page 3)						\$365.28+	
<b>Total new charges</b>							\$584.40
<b>Current Account Balance:</b>							<b>\$584.40</b>

Please pay before 02/24/16

## Central Maine Power Delivery Service Account Detail

<b>Prior balance for Central Maine Power delivery</b>							\$219.97
Payments received - thank you						\$219.97-	
<b>Balance forward</b>							\$0.00
<b>Current delivery charges</b>							
Delivery Charges: BSVA MGS Secondary 3 Phase							
Service charge						\$37.22+	
Delivery Service: 4800 KWH @ .002857						\$13.71+	
Demand charge						\$168.19+	
Measured 15.36 KW							
Billed 15.36 KW							
<b>Total current delivery charges</b>							\$219.12
<b>Central Maine Power account balance</b>							\$219.12

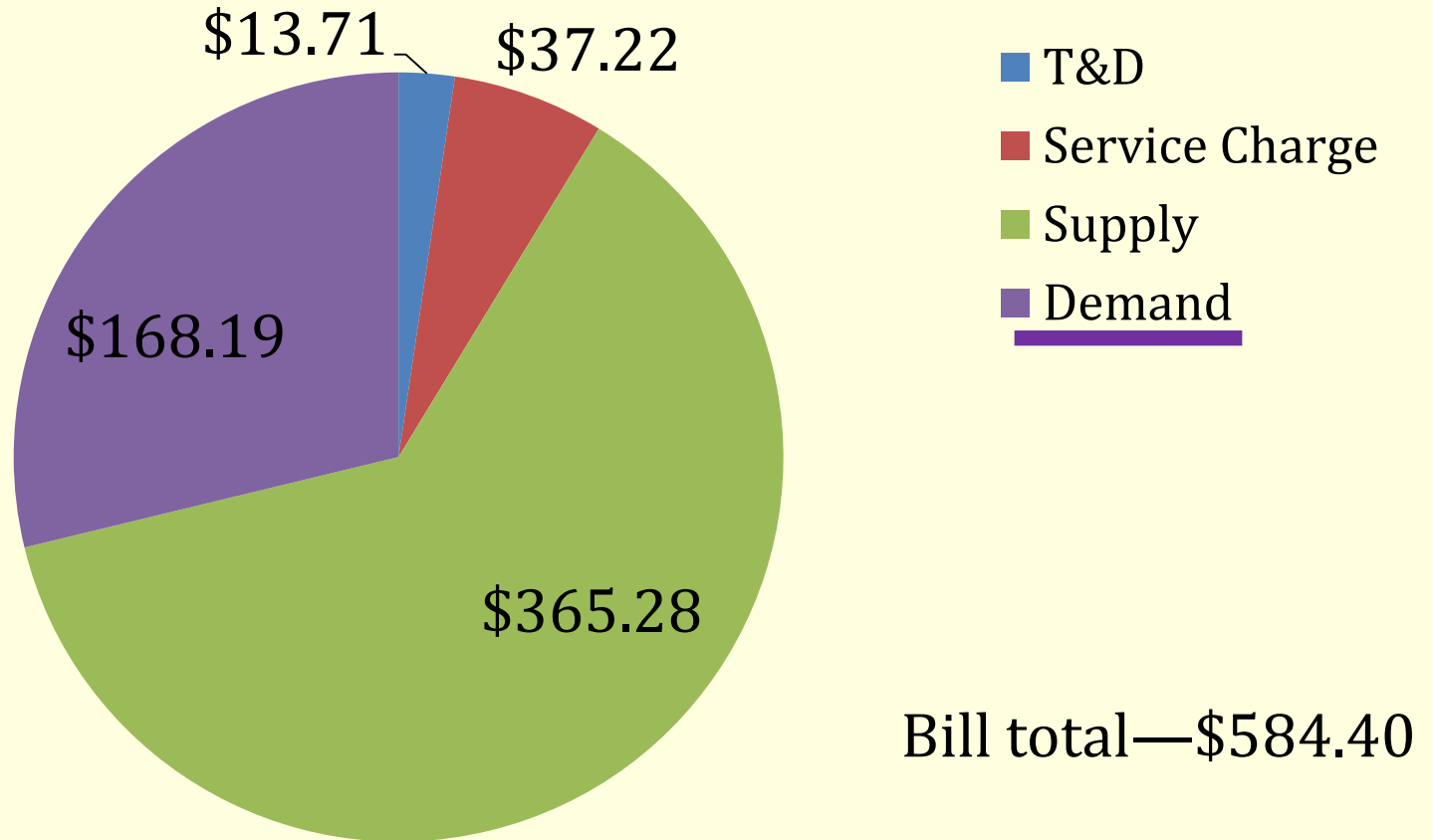
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NEB can only work with kWh charges, and nothing else. \$168.19 of this bill is a demand charge, which cannot be offset with solar; making it difficult to realize financial benefits of solar for larger accounts like these. This bill is from the Community Center at Mason-Motz

# What is a demand charge?

- Depending on how they use electricity, electric utility customers are charged for different electric services. Along with a basic customer charge – which is a set fee paid monthly or seasonally – most customers pay for the energy they use (measured in kilowatt-hours, abbreviated kWh).
- Larger users of electricity are also charged for something called demand (measured in kilowatts, abbreviated kW)
- Demand meters register the highest rate of electrical flow (or current) during a billing period; the meter records an average flow for every 15 minute interval. The customer is billed for the highest average 15 minute flow during the billing period.

# Medium General Service



## Waste Water Pump Stations

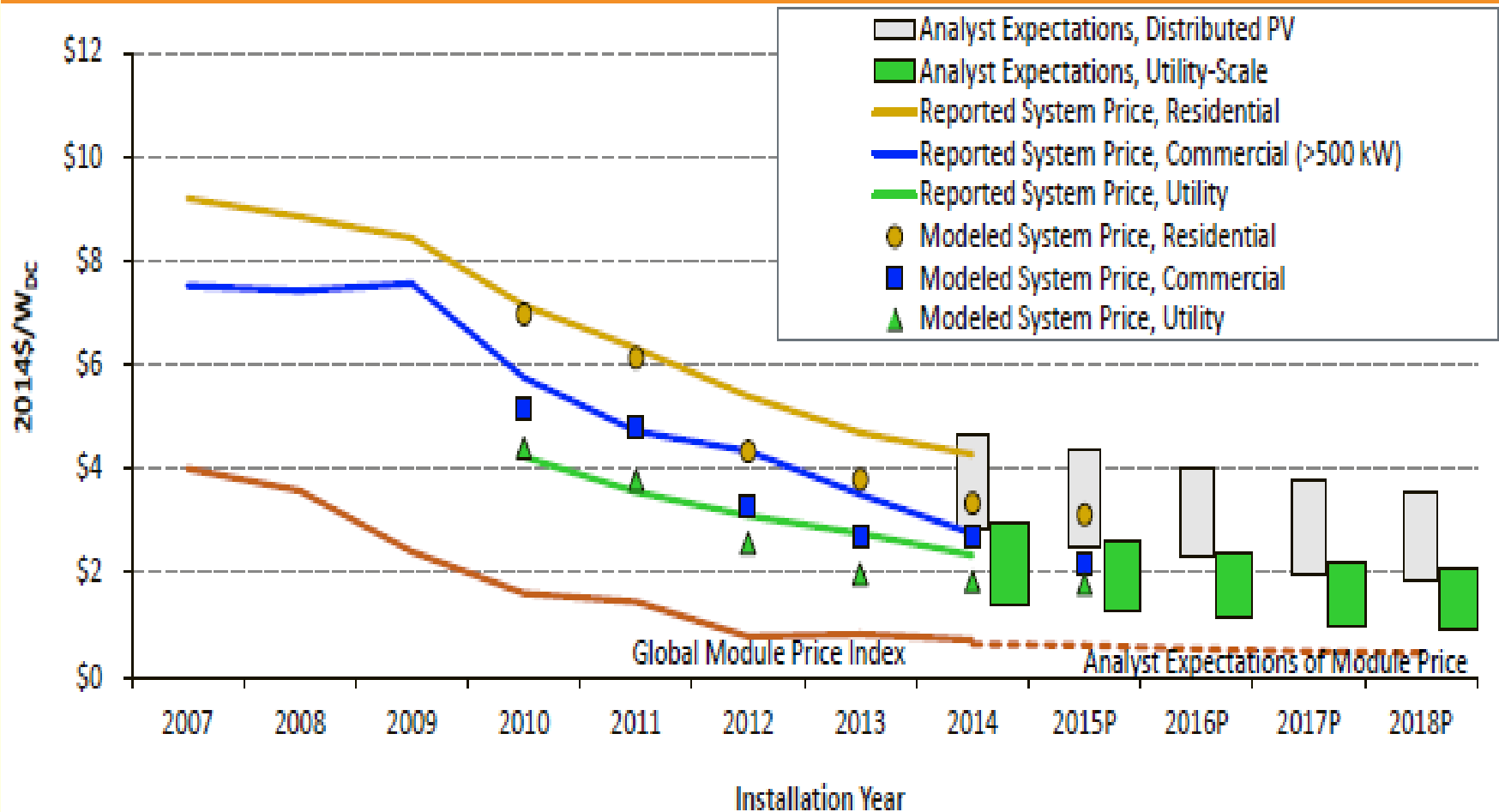
Account	Annual Usage kWh
1. Lunt Rd	45,477
2. Brown Rd	39,840
3. Middle Rd	32,421
4. Woodlands Dr	26,598
5. Pinehurst Ln Pump	25,166
6. Winn Rd	23,615
7. Birkdale Rd	22,785
8. Handy Boat Rd	21,800
9. Mill Rd	17,554
Total annual consumption	255,256 kWh

Each grid-tied solar kilowatt=  
1,250 kWh/year production in  
New England

With our largest  
9 SGS accounts,  
our system size  
under NEB could  
be **204 kilowatts**

(255,256kWh / 1,250  
kWh/year solar production)

# Reported, Bottom-up, and Analyst-Projected Average U.S. PV System Prices over Time





# Financing

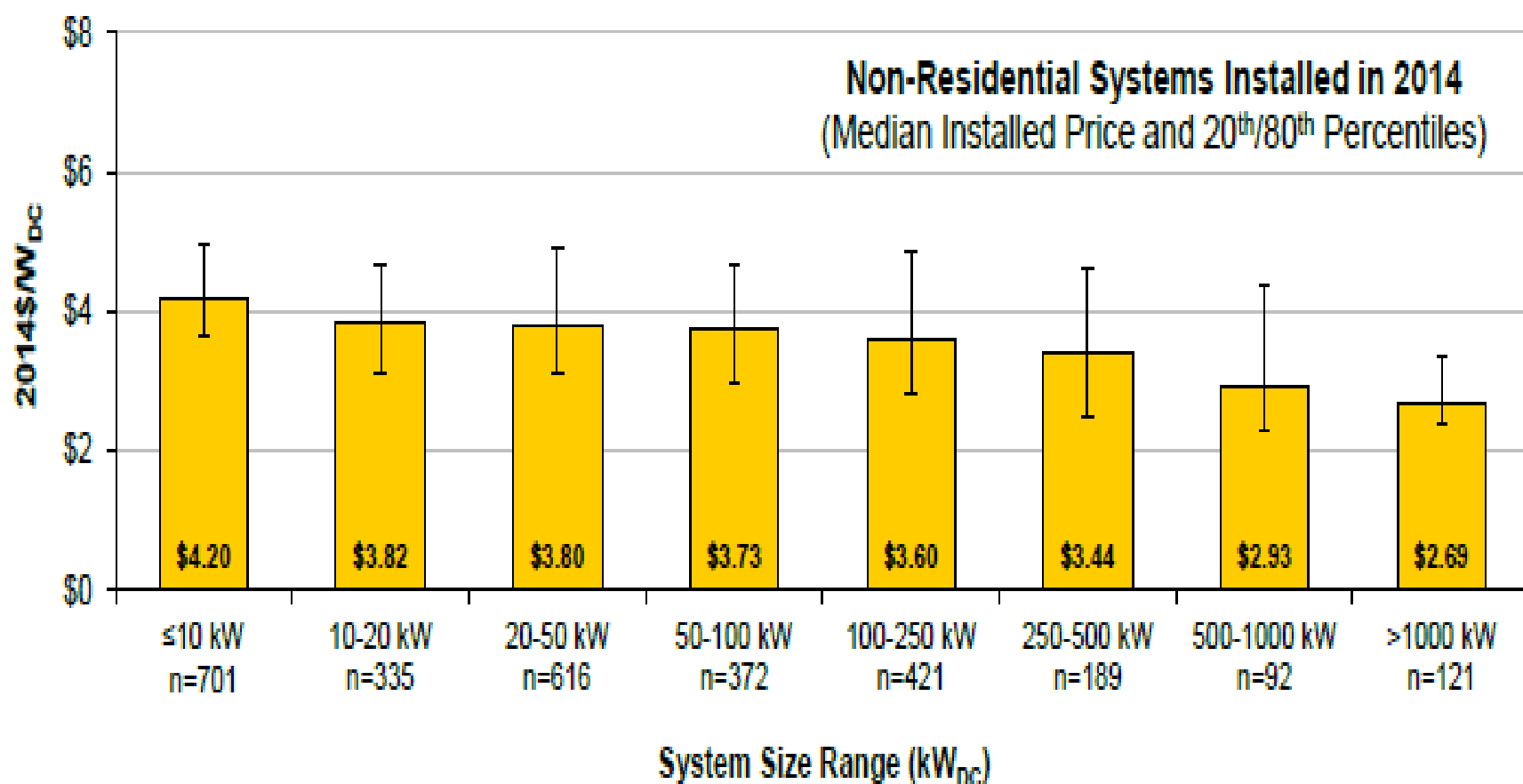
- Solar investment tax credit (ITC) is a 30% tax credit for solar systems—through 2023
- Accelerated depreciation—allows businesses to deduct the depreciable basis over five years which reduces tax liability and accelerates the rate of return on a solar investment
- *Third party financing is a necessity to capitalize on these incentives—Municipalities are tax exempt*

# Return on Investment

The following factors are major drivers in the ROI analysis

- The cost per watt of installed generating capacity
- How much do we pay for power?
- How much of the federal tax credit (ITC) goes to the developer?
- What is the value of Renewable Energy Credits?

# Variation in Reported Price by System Size: Non-Residential PV Systems in 2014



# **Solar at our Woods Rd. Landfill**

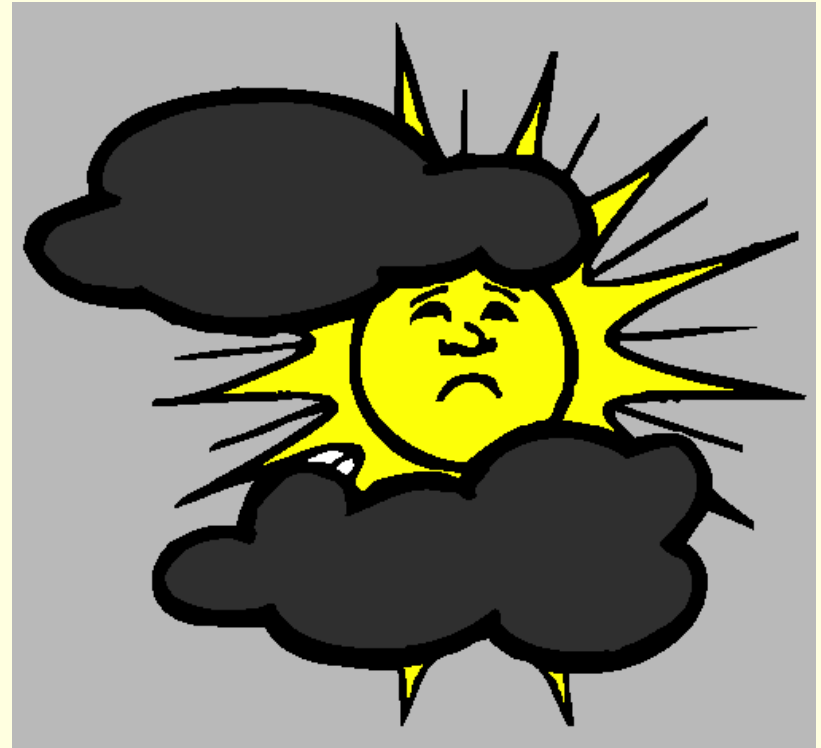
- Have been exploring the feasibility for 1-2 years
- Working with the Public Works Director
- Last summer (2015) met with the Department of Environmental Protection
- Hired legal help in writing an RFQ/RFP
- Hired TRC to conduct engineering analysis
- Began conversation with CMP on interconnection
- Was at the table for the PUC Stakeholder Process
- Was involved in the Legislative process, testimony
- Have been working with other communities

# Solar Power Purchase Agreements (PPA) & Leasing Models

- **In the PPA model**, developer builds the array and the power generated offsets the user's electric bills, and the developer sells the power to the customer at a fixed rate
  - At the end of the contract term, the system can be bought at a negotiated cost, or the contract can be extended
- **In the lease model**, a customer will sign a contract with an installer/developer and pay for the solar energy system over a period of years or decades, rather than paying for the power produced
  - These can be structured in a variety of ways

# Barriers to Moving Forward

- A comprehensive solar policy has yet to be adopted by the Legislature
- 660 kW limits economies of scale on solar equipment installed per watt
- Falmouth has 70+ municipal accounts
- Cannot offset demand charges on large accounts



# But There's Hope!

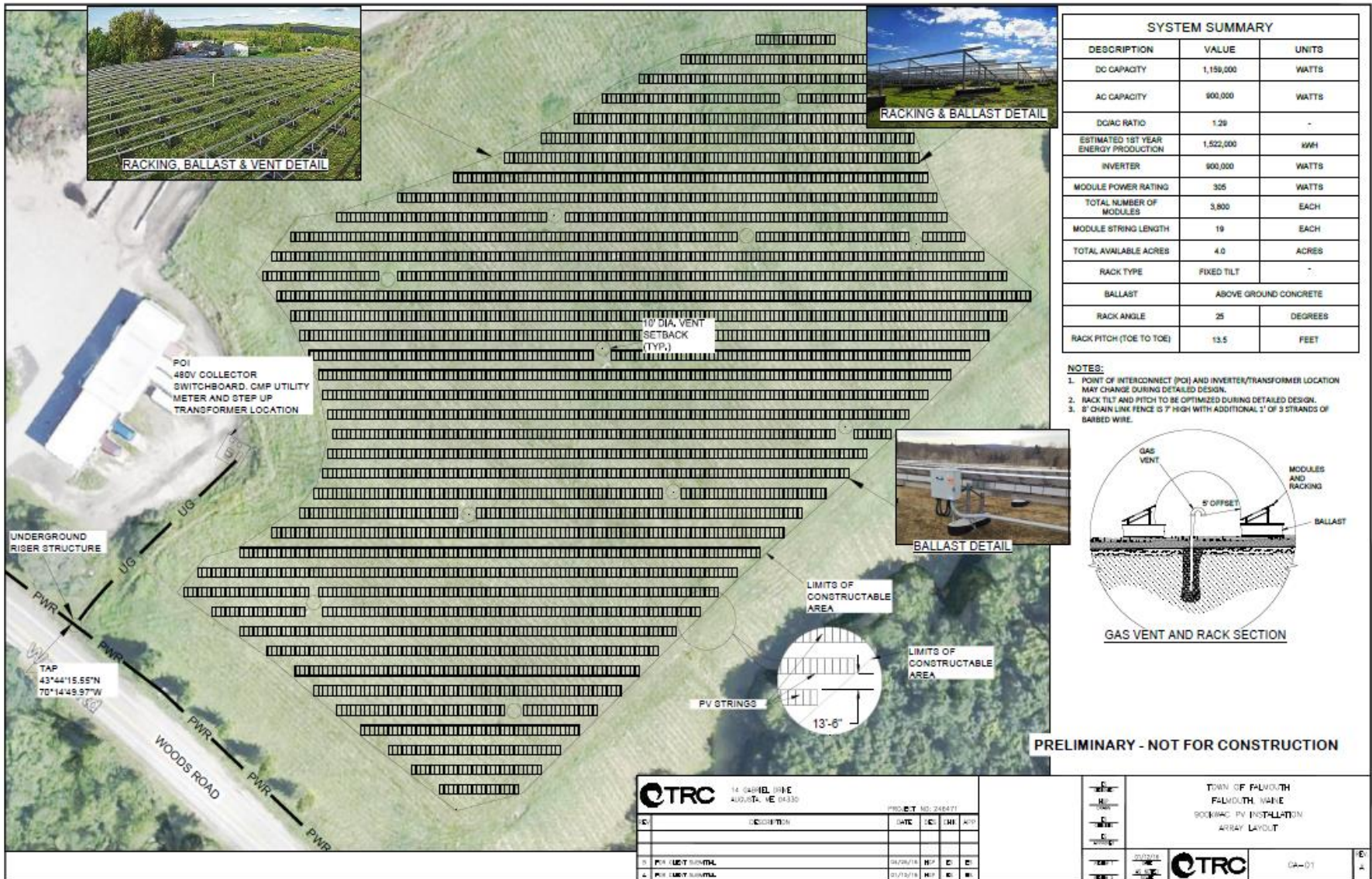


- We're continuing to move ahead anticipating a policy change that supports our project
- Began the conversation again with CMP—interconnection requirements
- After conversations with others, and the Public Advocate, it is likely there will be bills introduced in the next Legislative session that supports large-scale solar development

# Anticipated Next Steps

- Remain involved with the PUC's NEB Review
- Continue working with the utility (CMP) on interconnection requirements
- Start developing an RFQ when timing is right
- In the meantime, will work to contact solar developers and financiers to receive the RFP
- Will also explore solar potential on rooftops of municipal buildings





System size (max build)—1.159 MW = 1,522,000 kWh produced annually

Municipal load—(2015) 4,159,481 kWh

This system has the potential to offset municipal power load by 20-30%

*Thank you.*

Questions?