

SOLAR DEVELOPMENT ON THE WOODS RD. LANDFILL

PRESENTED TO
THE FALMOUTH TOWN COUNCIL
BY:

Pete LaFond
Chair, Recycling and
Energy Advisory Committee

October 16, 2019

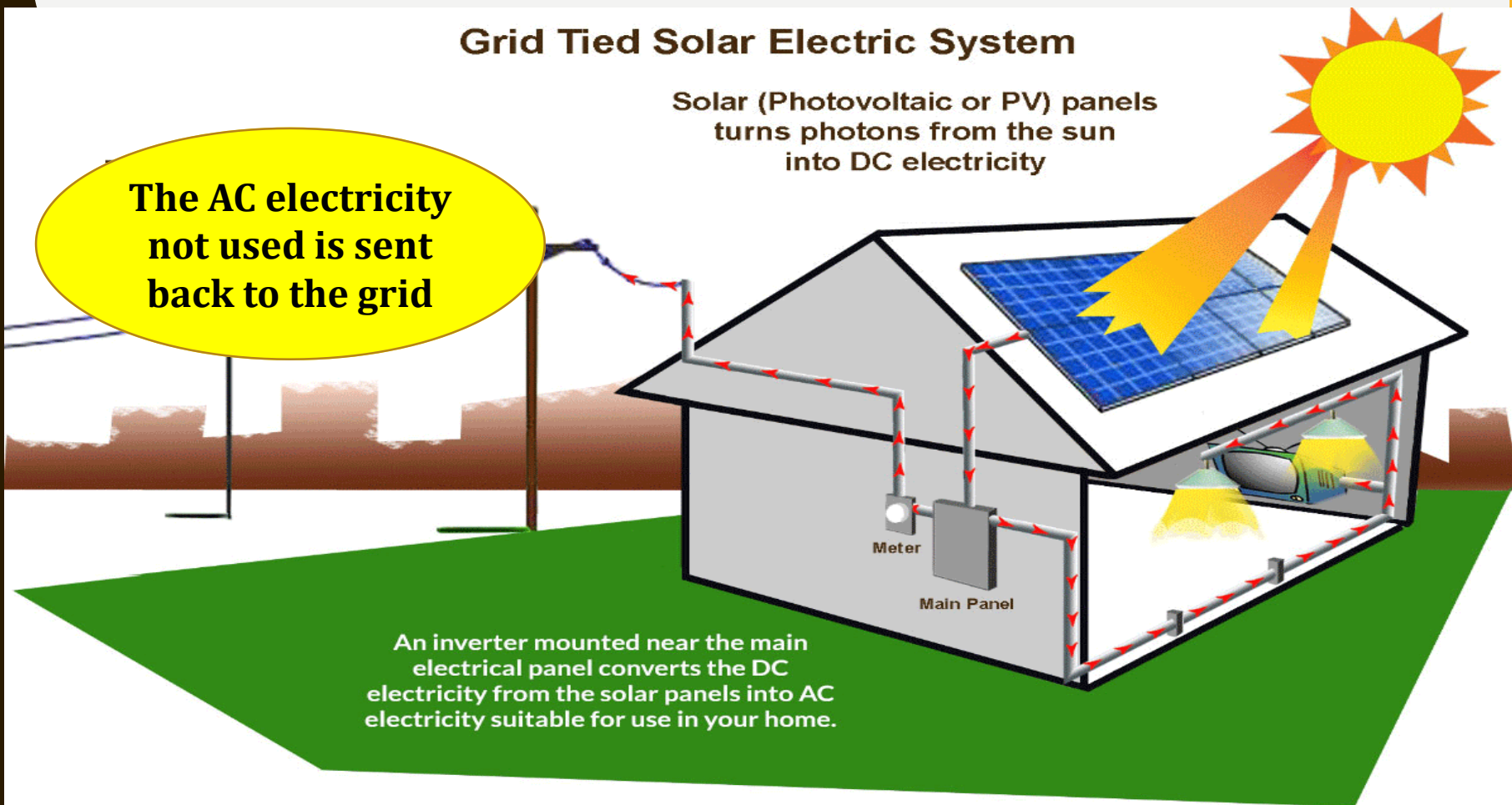
GENERAL OUTLINE

- **SOLAR PV AND
ELECTRICITY BASICS**
- **BRIEF HISTORY OF
MAINE'S SOLAR POLICY**
- **HOW BILLING WORKS WITH SOLAR**
- **COMPONENTS OF THE RFP**
 - **POTENTIAL
FINANCING OPTIONS**
 - **EXPECTED
PROJECT TIMELINE**

Grid Tied Solar Electric System

Solar (Photovoltaic or PV) panels turn 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 1,000 kilowatts= 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.

Town Hall	Public Works	Fire Department	Waste Water	School Department
147,820 kWh	102,494 kWh	114,708 kWh	166.403 MWh	2,018.071 MWh

SOLAR/NEB BRIEF HISTORY IN MAINE

CHAPTER 313

- **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)
- **127th 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.
- **128th 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)

NEW SOLAR LEGISLATION WITH THE PASSAGE OF LD 1711



2018-2019 NEW SOLAR LEGISLATION

- System sizes expanded under NEB from 660kW → 1
- Expansion of NEB accounts from 10 → unlimited
- Net Energy Billing tariff finalized Dec. 2019

With this new legislation and rule making, we will see an expansion in Maine's solar energy market to include the following benefits:

- Cost competitive energy markets
- Capturing economies of scale of technology
- reduced barriers of billing/accounting
- Environmental benefits

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

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

Current Account Balance: Please pay before 02/24/16 **\$103.41**

Central Maine Power Delivery Service Account Detail

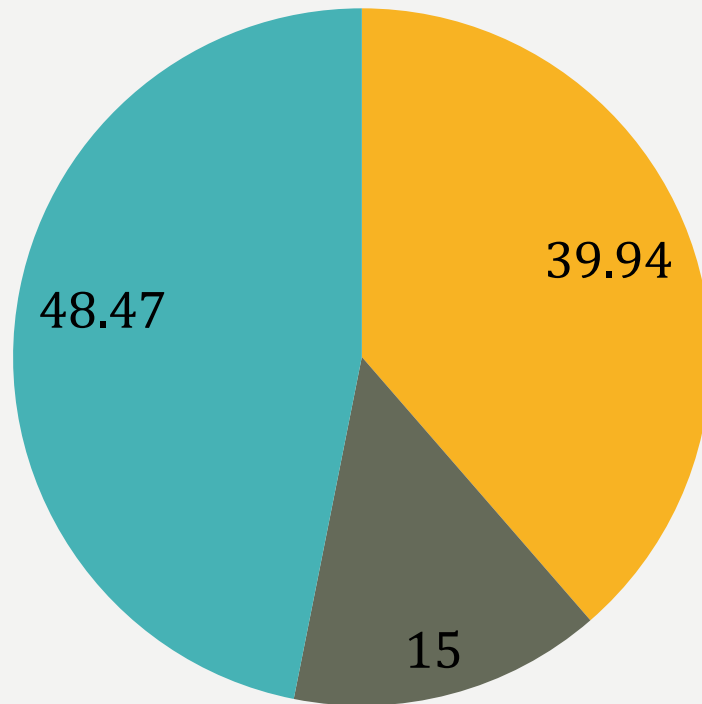
Prior balance for Central Maine Power delivery		\$50.70
Payments received - thank you	\$50.70-	
Balance forward		\$0.00
Current delivery charges		
Delivery Charges: Small General Service 1 Phase		
Service charge	\$15.00+	
Delivery Service: 739 KWH @ .054040	\$39.94+	
Total current delivery charges		\$54.94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

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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 HOT LINE
Monday - Friday 7:30 - 5:00
1-800-565-3181
To report a power outage: 1-800-696-1000



180 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

Prior balance		\$632.35	\$632.35
Payments received through 01/28/16 - thank you		\$632.35-	
Balance forward			\$0.00
New charges			
Electricity Delivery: Central Maine Power (see detail below)		\$219.12+	
Electricity Supply: Constellation Energy Svc Inc (see page 3)		\$365.28+	
Total new charges			\$584.40
Current Account Balance:	Please pay before 02/24/16		\$584.40

Central Maine Power Delivery Service Account Detail

Prior balance for Central Maine Power delivery		\$219.97	\$219.97
Payments received - thank you		\$219.97-	
Balance forward			\$0.00
Current delivery charges			
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			
Total current delivery charges			\$219.12
Central Maine Power account balance			\$219.12

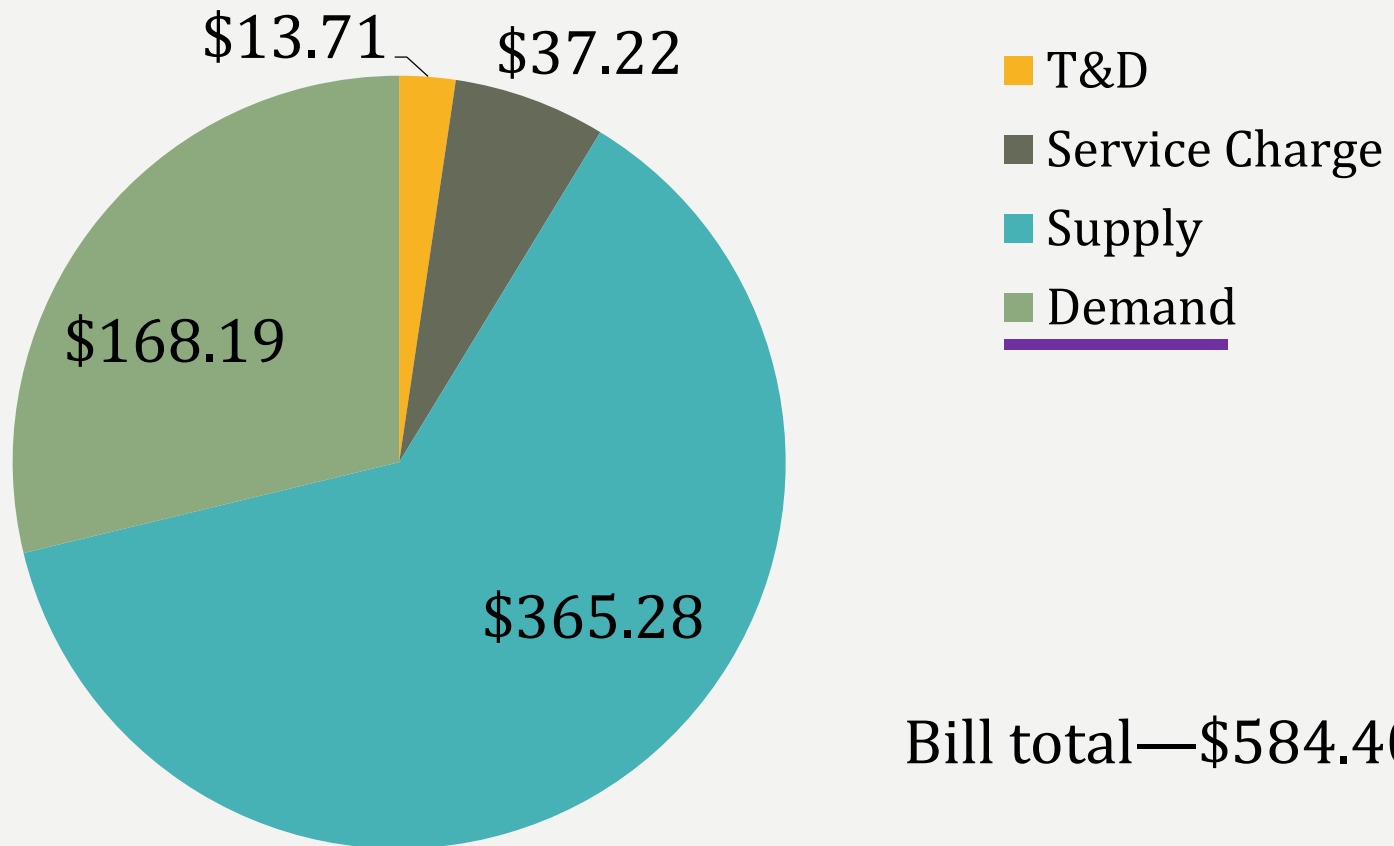
NEB could only work with kWh charges, and nothing else. \$168.19 of this bill is a demand charge, which could not be offset with solar.

The NEW tariff will allow 75% of these charges to be offset.

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



COMPONENTS OF THE REQUEST FOR PROPOSALS (RFP)

- Background Information
- Project Scope and Standards
- Qualifications and Experience
- Proposed Project Costs
- Submittal Requirements and Timeline
- Selection Criteria

COMPONENTS OF THE RFP ATTACHMENTS

- **Appendix A— Photovoltaic solar array feasibility study Woods Rd. landfill to include:**
 - Memorandum titled “Suggested Natural Resources Studies and Preliminary Analysis of Potential State and Federal Permitting Requirements”
 - Memorandum titled “Geotechnical/Landfill Assessment for a Solar Installation at the Woods Road Landfill”
 - Memorandum titled “Electrical Generation/Interconnection Assessment for a Solar Installation at the Woods Road Landfill”
 - PUC Chapter 324—Forms and Agreements: Level 2, Level 3 and Level 4 Interconnection Application
 - Memorandum titled “Delineation of Protected Natural Resources at Falmouth Transfer Station Property”
 - 900KW AC Single Line Diagram
 - US Fish and Wildlife Service: Review of threatened and endangered species
 - Maine Dept. of Agriculture, Conservation, and Forestry: Review of rare botanical features
 - Maine Historic Preservation Commission: Review of site for historical significance.
 - Maine Department of Environmental Protection: Guidance document for installing solar panels on a closed landfill
- **Appendix B— Falmouth’s electricity totals and associated costs**
- **Appendix C— Project proposal form**
- **Appendix D—Maine Department of Environmental Protection: landfill closure certificate**
- **Appendix E—Landfill closure site plan: As-built/Record Drawing**

POTENTIAL FINANCING OPTIONS

The Town is interested in understanding the variety of options for financing this project in order to make the best decision for the Town. Options may include, but not be limited to, the following:

- **Bonding opportunities, e.g. Clean Renewable Energy Bonds, Qualified Energy Conservation Bonds Energy Credits for power generated;**
- **Tax-exempt leasing;**
- **Third party financing;**
- **Power Purchase agreement;**
- **Direct ownership**

The Town will also consider any alternative approaches and other financing options not mentioned above. The Town is however, interested in offsetting the municipal energy load generated from the system to the fullest extent practicable.

SOLAR POWER PURCHASE AGREEMENTS (PPA) & LEASING MODELS

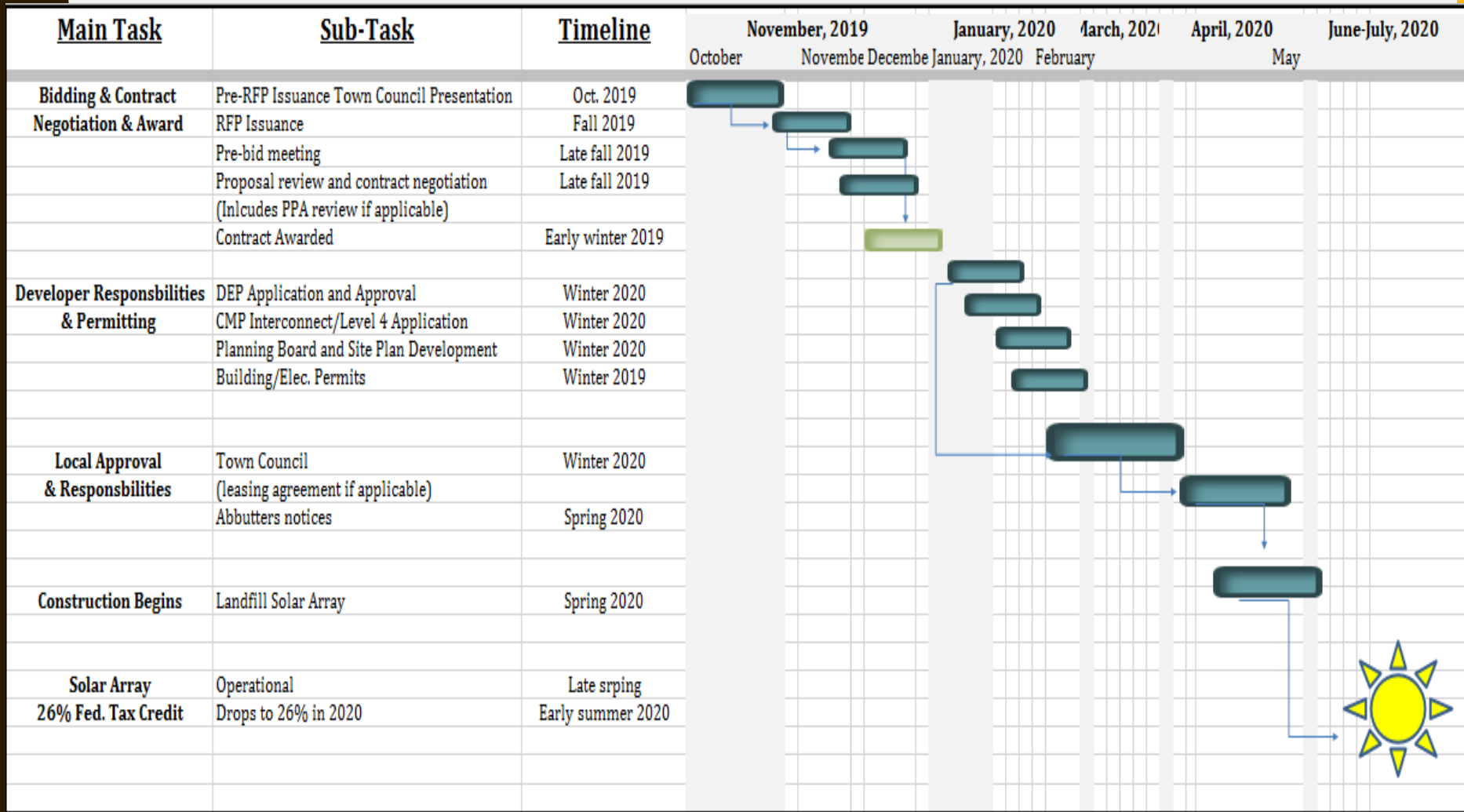
- **In the PPA model**, developer builds the array and the power generated offsets the user's electric bills, and the developer sells the power to the customer at a fixed rate
 - At the end of the contract term, the system can be bought at a negotiated cost, or the contract can be extended
- **In the 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

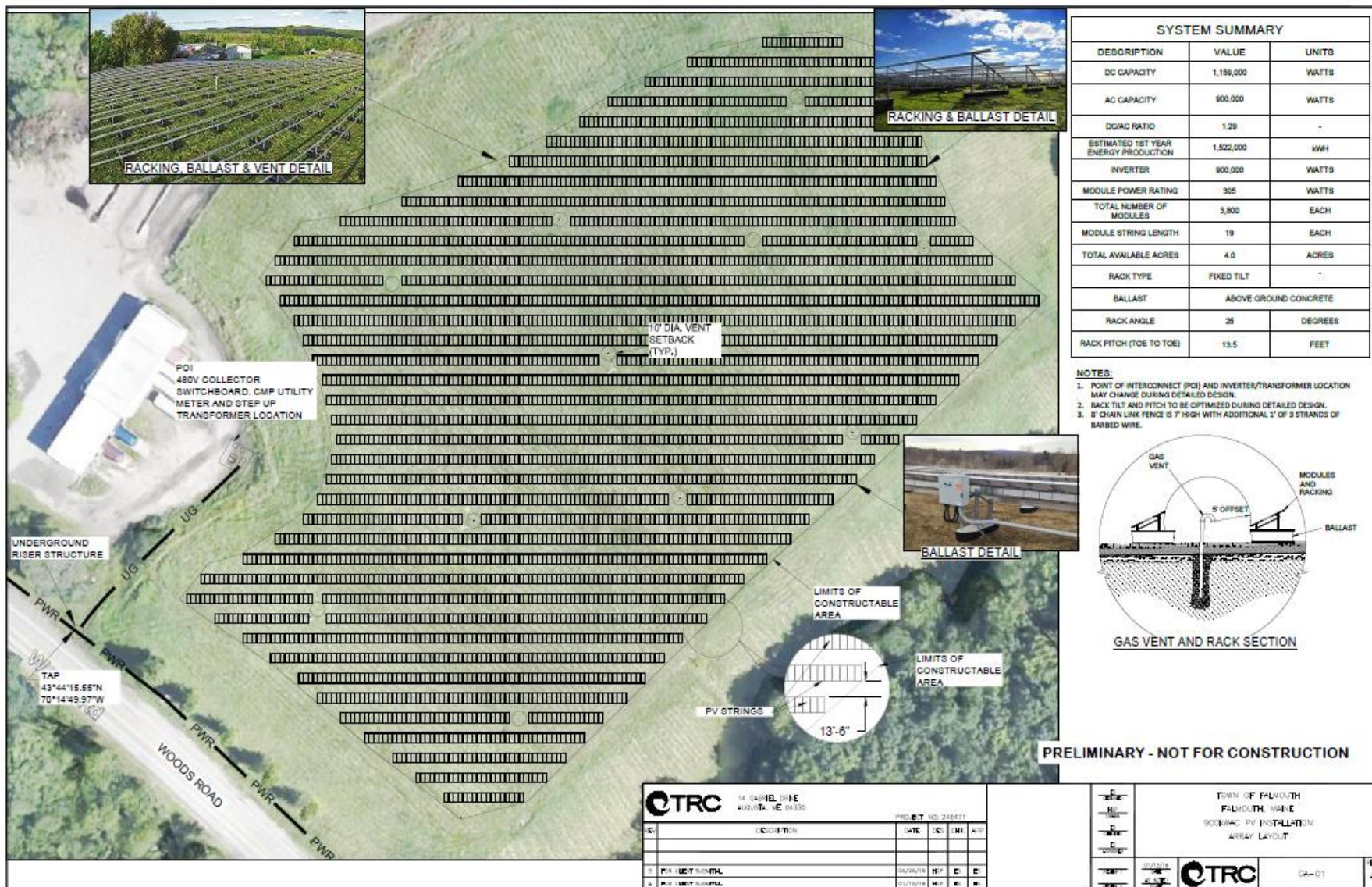
RETURN ON INVESTMENT

THE FOLLOWING FACTORS ARE MAJOR DRIVERS IN THE ROI ANALYSIS AND WHEN ANALYZING PROPOSALS

- 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?

EXPECTED PROJECT TIMELINE



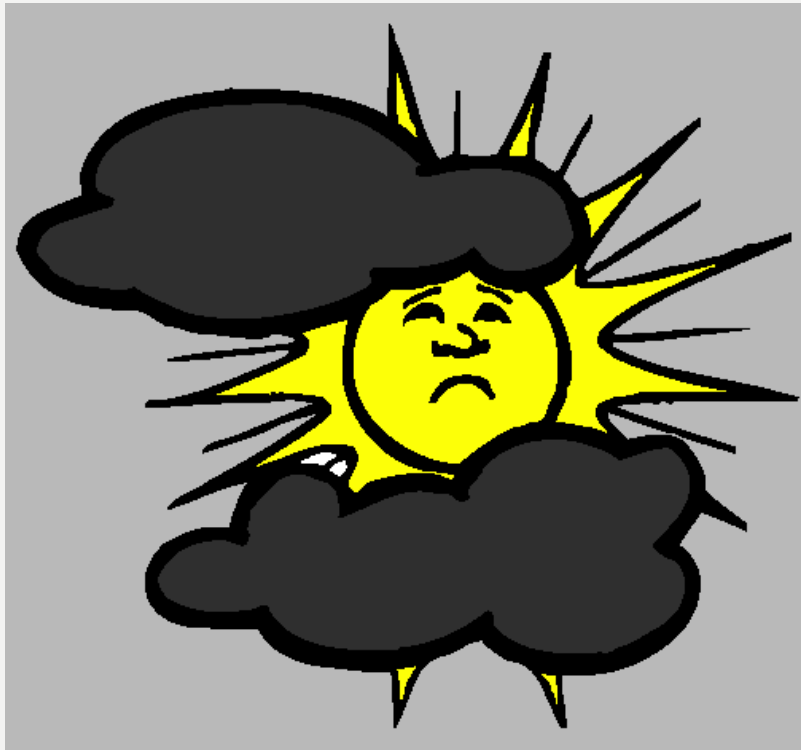


System size (max build)—1.159 MW = 1,522,000 kWh produced annually

Municipal load—(2015) 4,159,481 kWh

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

**MAINE HAS
GONE FROM
THIS....**



to THIS!
(Finally!)





THANK YOU.

Questions?