

Reading Municipal Light Department

BOARD OF COMMISSIONERS

SOLAR WORKSHOP

RMLD BOARD ROOM

JUNE 20, 2019



Overview:

Solar Economics and Impacts

System Examples

RMLD's Solar Goals and Objectives

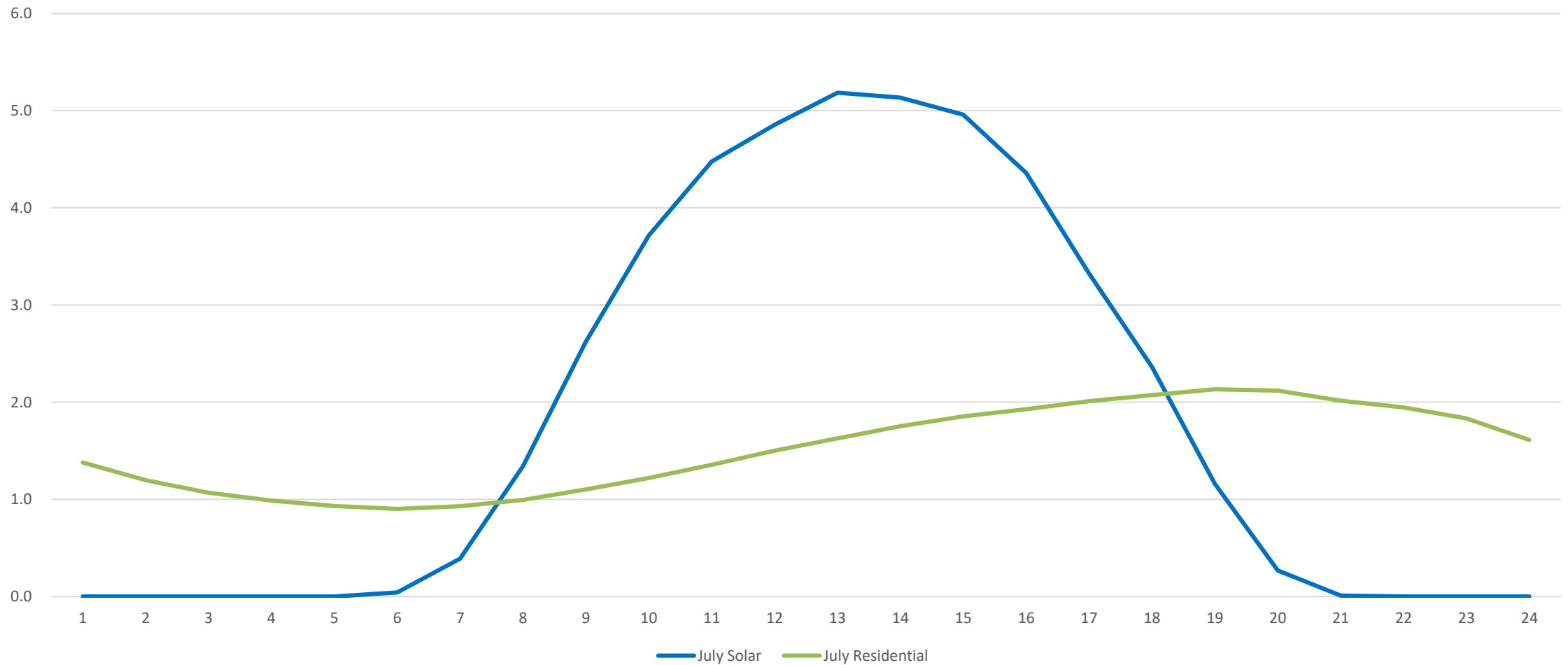
Current RMLD and Other Solar Programs

Solar Economics:

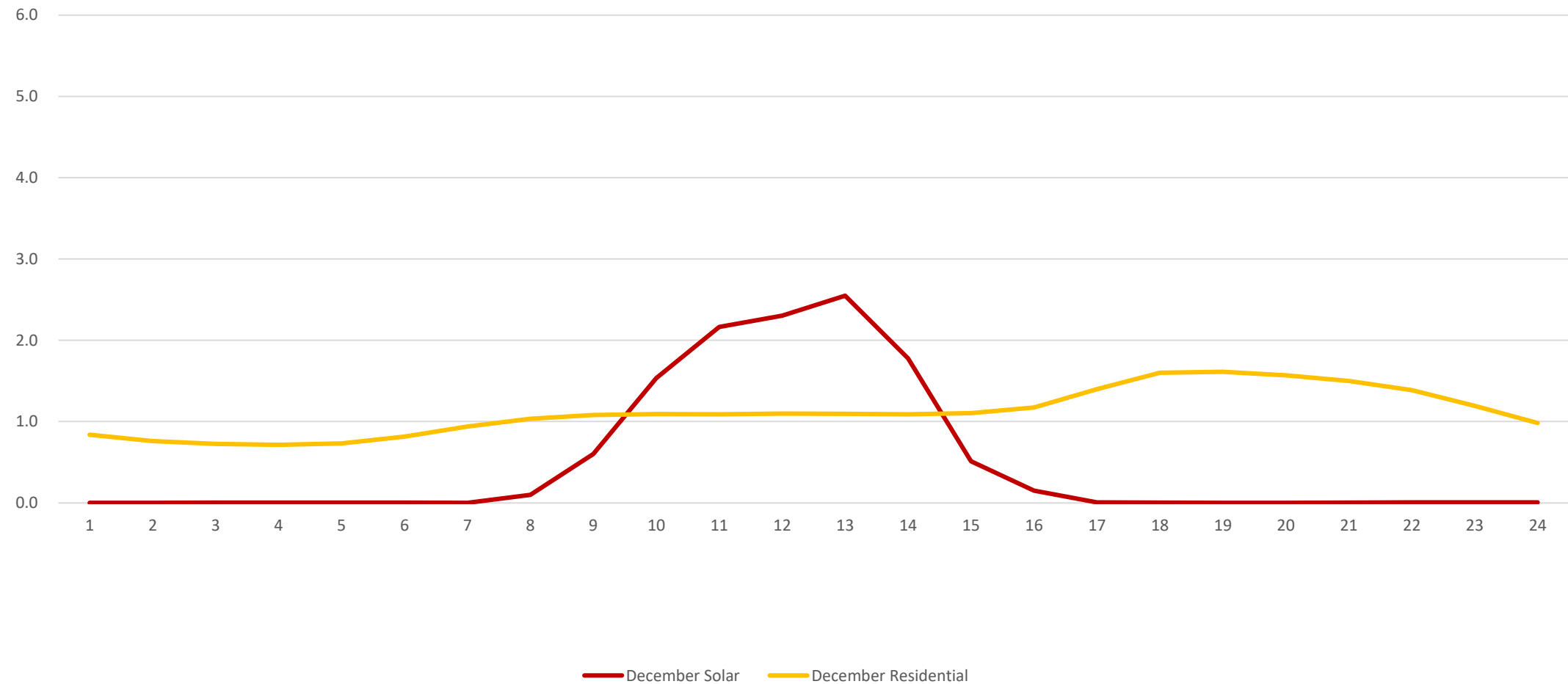
Fitting solar to the load profile

- System size to serve average residential load in MA: 6.3 kW
 - Produces 9,000 kWh per year at 16% generation efficiency
 - Requires storage capability to match load
 - Utility banking service
 - Associated storage facility
- Distribution Utility-based options
 - Net Metering
 - Not sustainable at same price in and out
 - Requires recognition and collection of a facilities charge
 - Purchase excess at wholesale
 - Decreases system efficiency and increases cost
 - System still must be constructed to serve phantom load

Solar Production and Residential Load Profiles - July



Solar Production and Residential Load Profiles – December



Solar Economics

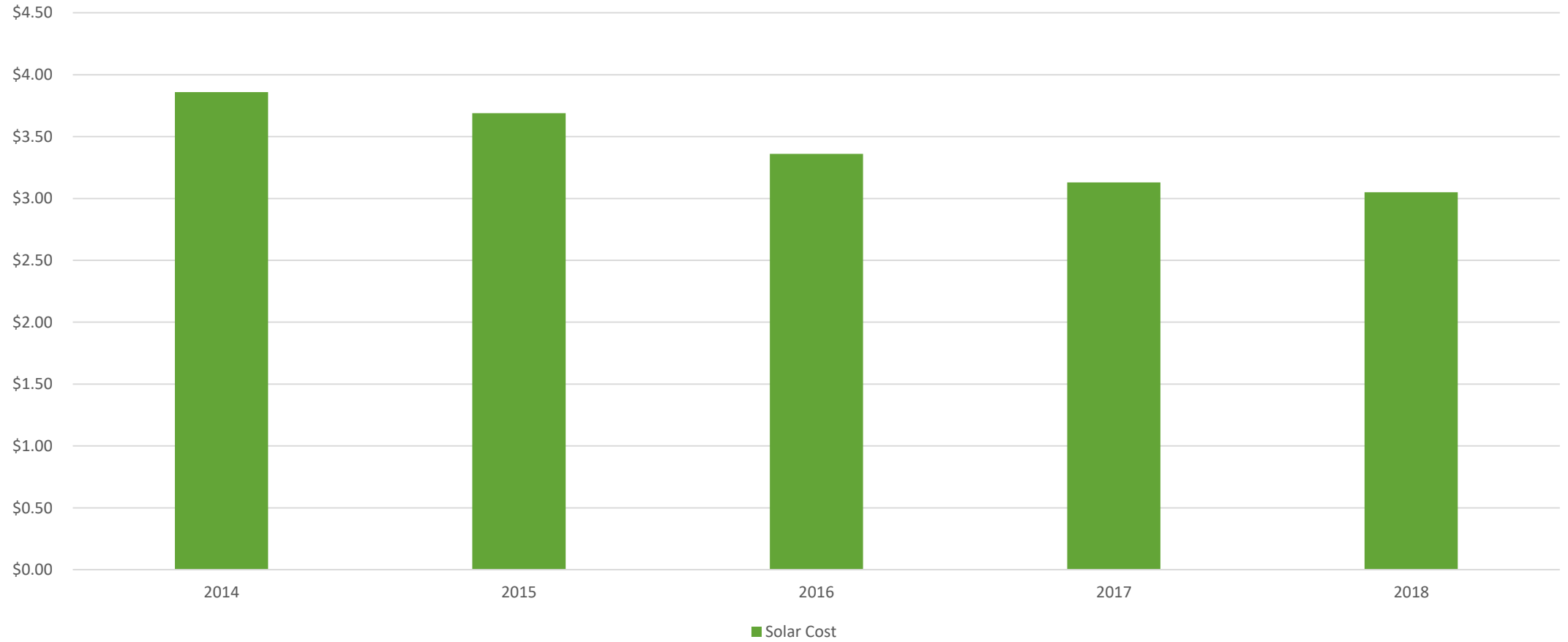
	Residential		Residential Solar System		
	Base kWh		Delivered	Received	Net
January	806.7		573.8	(179.5)	394.3
February	680.1		444.0	(175.3)	268.7
March	698.1		394.4	(447.9)	(53.5)
April	621.9		314.3	(671.4)	(357.1)
May	676.5		321.2	(909.4)	(588.2)
June	800.4		365.2	(749.4)	(384.2)
July	1,130.4		532.5	(772.4)	(239.9)
August	1,134.7		592.6	(541.7)	51.0
September	776.6		433.7	(419.5)	14.1
October	645.6		397.8	(345.7)	52.1
November	693.4		488.0	(81.6)	406.4
December	825.2		612.2	(150.7)	461.4
Total	9,489.7		5,469.6	(5,444.6)	25.0

Solar Economics:

Solar cost per watt

- \$3.05 per watt, installed national average
- \$3.29 per watt, installed in MA
- Declining cost over last 5 years
- \$1.05 per watt, panel only national average

Solar System Price per Watt (National)



Federal and state incentives

Federal tax credits are 30% of the net project costs in 2019, falling to 26% in 2020

MA tax credits are the lesser of 15% of net project costs or \$1,000

MLP Solar Rebate incentives are a rebate of project costs at the rate of \$1.20 per watt up to a maximum 25kW project scope; the funding for this comes 50/50 from MA DOER and RMLD.

RMLD incentives

RMLD matches DOER contribution of \$0.60 per watt installed for MLP Solar Rebate program participants with systems < 25 kW (1 year program).

RMLD pays up to \$50,000 to commercial customers who install systems > 25 kW.

RMLD credits customers the monthly fuel charge for any excess production over usage for that month.

Solar Economics:

MLP Solar Rebate Program (<25 kW):

		Base Cost	MLP Solar	Mass Tax		2019 FIT	Net Cost	2020 FIT	Net Cost
MLP Solar Rebate (<25 kW)		\$3.29	(\$1.20)	-15.0%	(\$1,000)	-30.0%	2019	-26.0%	2020
6,227 watts		\$21,714	(\$7,920)	(\$2,069)	(\$1,000)	(\$3,838)	\$8,956	(\$3,326)	\$9,468
							6.6		7.0

RMLD Commercial Rebate Program (>25 kW):

		Base Cost	RMLD	Mass Tax		2019 FIT	Net Cost	2020 FIT	Net Cost
RMLD (>25 kW)		\$3.29	(\$2,000.00)	-15.0%	(\$1,000)	-30.0%	2019	-26.0%	2020
25,000 watts		\$82,250	(\$25,000)	(\$8,588)	(\$1,000)	(\$16,875)	\$39,375	(\$14,625)	\$41,625
							7.7		8.1

Solar Impacts

Weather

- Cloud cover
- Precipitation
- Relative humidity

Capacity and transmission peaks

- Solar offset to capacity and transmission peaks depends on when peaks occur
 - Currently about 0-30% offset

Phantom load potential

System efficiency (i.e. power factor)

- How much foam do you want on your stein of beer?

Solar Impacts

Study underway to quantify RMLD solar potential (total and by feeder)

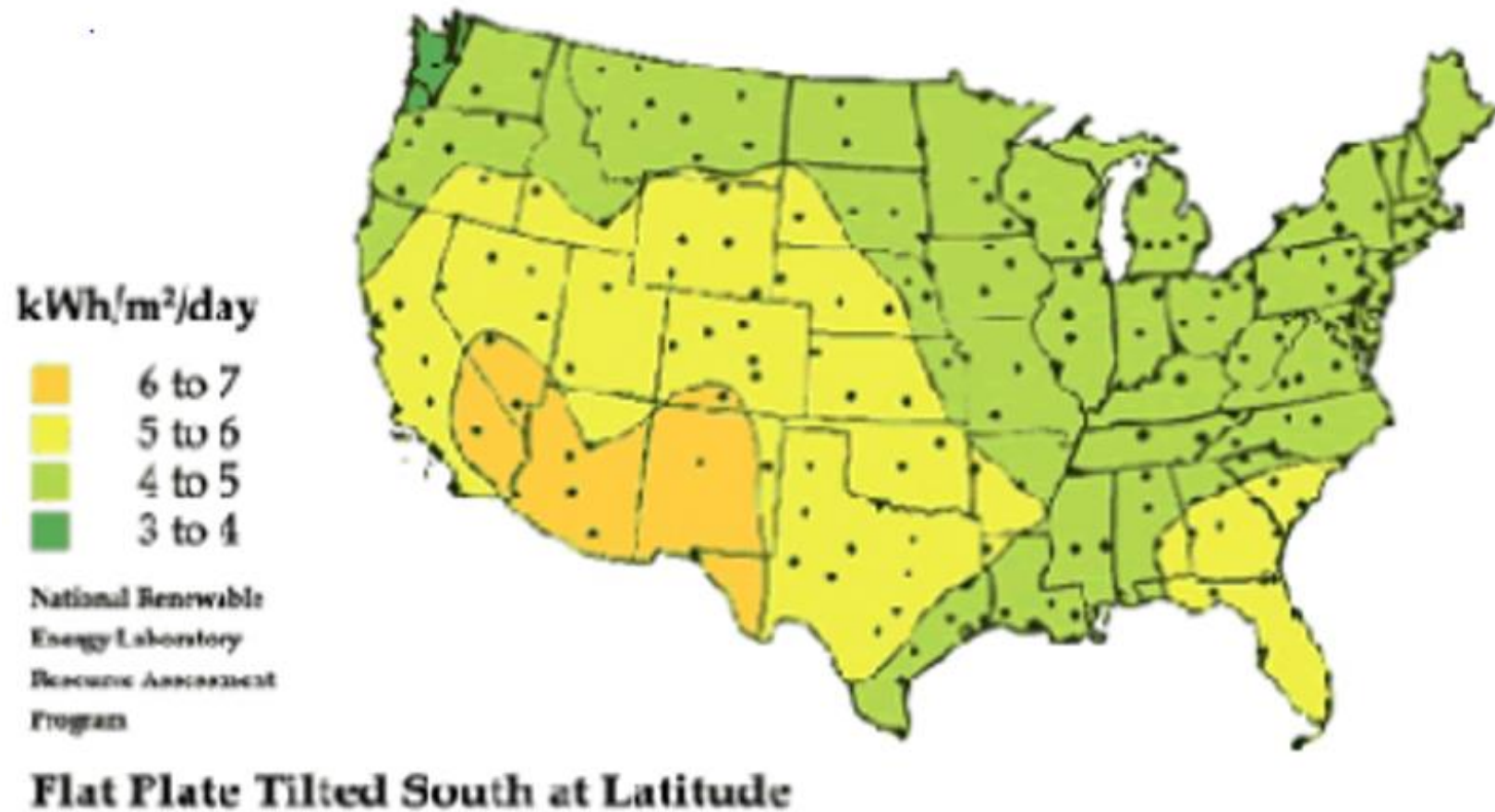
Meanwhile, maximum limit is set at 15% of each feeder

Projects evaluated on a case by case basis for impact on feeders and current feeder loadings

Location! Location! Location

- Orientation
 - Compass orientation
 - Tilt (slope)
- Shade

Solar Impacts



Solar Impacts

Per state law, no one else may sell electricity to retail customers of a Municipal Light Plant

Some solar vendors sell discounted kWh to retail customers; this approach cannot be used in a MLP service territory

- Historically, Blue Wave and Solar City used this approach and were denied access to RMLD customers

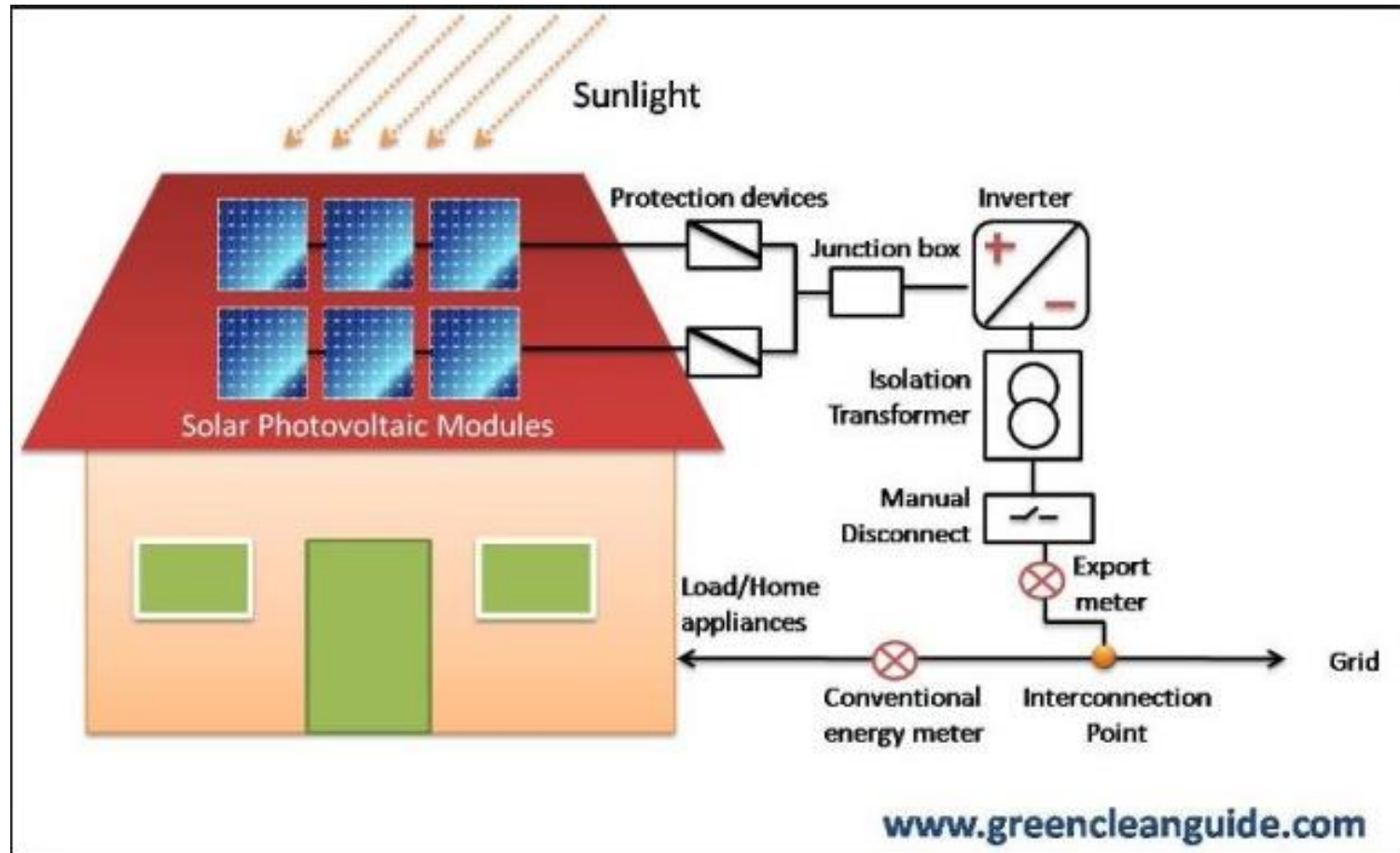
MLP retail customers must own or lease the solar equipment

Leasing offers municipal and other tax exempt customers access to tax credits

Solar Impacts

RMLD Solar Installations			
Residential	Customers		
Lynnfield	11	83.4 kW	
North Reading	26	204.6 kW	
Reading	35	204.4 kW	
Wilmington	49	358.4 kW	
	121	850.8 kW	
Commercial			
North Reading	10	1,406.9 kW	
Wilmington	7	728.5 kW	
	17	2,135.4 kW	
Wholesale			
Solar Choice I		1,044.0 kW	
Solar Choice II		2,000.0 kW	
Marina		1,665.0 kW	
		4,709.0 kW	
Total Installed		7,695.2 kW	

Solar System Components



RMLD Solar Goals and Objectives

Provide ratepayers with opportunities that meet their energy resource needs consistent with good stewardship and risk mitigation

Meet legislative objectives for carbon free generation/ Renewable Portfolio Standard (RPS)

- Currently under discussion at committee level (H-2863)
- Behind the meter generation does not count towards RPS goals

Develop sustainable rates that encourage non-carbon energy production and avoid cost-shifting to other ratepayers

Minimize adverse consequences to retail revenues, distribution system operations, and wholesale market resource portfolio

Current RMLD and Other Solar Programs

RMLD currently offers a variety of solar options:

- Solar Choice Program
- DOER MLP Solar Rebate Program
- Commercial rebates
- PPA agreements
- Generation behind the meter

RMLD is developing or supporting additional solar options:

- Solar Garden/Choice III
- Green Communities joint venture(s) to access other funding sources

MA Solar Program Examples

Other Solar Programs in MA

- Most MA MLPs have moved away from matched in and out pricing (Net Metering)
 - Fails rate design equity test by shifting costs to other ratepayers
 - Not sustainable because it fails to recover cost of service
- All MLPs limit installed system size to own use
- Two behind-the-meter pricing models currently in place:
 - MLPs purchase output at wholesale energy rate
 - MLPs charge a facility charge based on installed solar production size

MLPs purchase the output, delivered to the distribution grid, at fixed prices under a Power Purchase Agreement (PPA)

Tax exempt customers use leasing as an access path to tax credits

Solar Garden/Choice III Concept

RMLD (or an approved 3rd party vendor) will build a solar facility at a suitable location within the RMLD service territory

RMLD will sell the output from the Project into the ISO-NE wholesale market or, in the case of a 3rd party vendor, enter into a suitable PPA

RMLD will retire the RECs associated with the energy output from the Project

RMLD will determine a monthly facilities charge to recover its costs for all components of the Project, except the solar panels

Customers of RMLD may purchase panels in the Project, pay the pro-rated facilities charge, and receive a credit for the wholesale market offset (or PPA pricing) from their panels production

Develop a tracking and reporting system for economic activity under Program

Advantage: lower entry costs for participants

Municipal Solar Opportunities

Rooftop solar

- Behind the meter
 - Assist towns with RFP process as appropriate
 - Assist towns with capture of solar tax credits
- RMLD Project
 - Develop RFP to ascertain rooftop solar potential in RMLD service territory
- 3rd party solar
 - Develop RFP for 3rd party PPA
- Evaluate potential synergies with electrification activities

Building Owners in Private Sector

Encourage PPAs wherever possible

- Develop RECs Program in conjunction with PPAs
- Consider synergies with other RMLD energy resource programs

Sources and Resources

DOER MLP Solar Rebate Program:

- <https://ee.ene.org/solar/>

Finding an installer:

- <https://www.masscec.com/finding-solar-installer>

Solar pricing information:

- <https://news.energysage.com/how-much-does-the-average-solar-panel-installation-cost-in-the-u-s/>

General renewable information:

- <https://www.nrel.gov/>

Questions?

