



Photovoltaic Presentation

School Committee September 11, 2017

Solar Options

1. Purchase Solar Panels
 - a. District owns panels outright.
 - b. District responsible for maintenance and repair.
2. Power Purchase Agreements (PPA)
 - a. District allows outside company to place panels on our property.
 - b. District purchases the energy produced from the company.
 - c. Vendor is responsible for maintenance and repair.
3. Net Metering
 - a. District purchases a fixed amount of energy from a vendor with off site generation.

Pros/Cons

Buying Panels

- Pro: Receive full benefit from the electricity generated without a 3rd party SREC Incentives for 10 years.
- Con: High upfront cost.
No benefit from depreciation or tax incentives.
Maintenance and upgrades paid by district.
20 to 30 year bond to finance.

PPA

- Pro: No upfront costs.
No maintenance/upgrade responsibility.
Lower fixed energy cost.
- Con: 20 year contract.

Net Metering

- Pro: No equipment to maintain or purchase.
Lower fixed energy cost.
- Con: Limited net metering available.
20 year contract.

Solar Panel Placement Options

1. Roof Panels

Requires structural analysis for extra weight.

1. Ground Mounted Panels

Requires available land with sun exposure.

1. Canopy Mounted Panels

Requires a canopy structure to be built or use of an existing canopy (such as a carport).

Buildings for 1st Round



- ❖ NMRHS- New school is solar ready
- ❖ SMS- Relatively new roof with 20+ years left on warranty
- ❖ AES- Relatively new roof with 20+ years left on warranty

Possible future solar projects include:

- ❖ VBES & SECC will consider at conclusion of Accelerated Repair Projects
- ❖ NMS & HBMS are not being considered at this time as the roofs have less than 20 years left

Procurement Process

Standard Procurement Process:

MGL Chapter 30B bid process (IFB) or Request for Proposal (RFP)

Collaborative Purchase Option:

PowerOptions consortium has performed the RFP process and selected Solect as their Small Systems Solar Energy provider. The District can join in this collaborative purchase by becoming a member of PowerOptions. No additional bidding process needed by the district. (We vetted the collaborative purchase through the District's attorney).

Massachusetts Solar Incentives Program

Current Program - SREC 2.2 (Solar Renewable Energy Credits)

This program ends around March 31, 2018. If a system is running under this program before it ends then the system is grandfathered and continues with the same incentives.

New Program - SMART (Solar Massachusetts Renewable Target)

Incentives for this program are not finalized yet but are anticipated to continue to decline as have each new program before it.

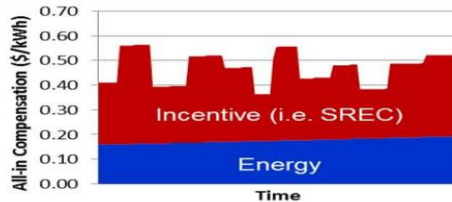
SRECs vs. SMART

SRECs vs. SMART

SREC

- SRECs are a tradable commodity with a value that fluctuates based on market conditions:
 - Long-term revenue uncertainty leads to higher financing costs,
 - A large portion of the program costs are going to a 3rd party to pay for financing,
 - Total program costs and ratepayer impacts are difficult to predict.
- SRECs are an additional revenue stream independent of the value of the energy.

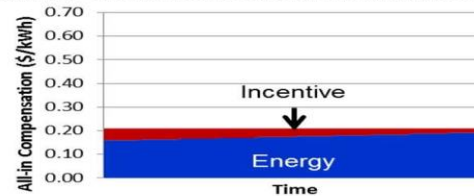
Example of the incentive level in a SREC program



Declining Block Program

- This program provides long-term revenue certainty (10-20 years) which reduces financing risks and in turn, lowers soft costs
 - Total program costs can be predicted with certainty.
 - Incentive declines with the declining cost of solar.
- A solar facility receives a single compensation rate that accounts for both the energy and the incentive.
 - The resulting value of the incentive is the net difference between the all in rate and the value of the energy.

Example of the incentive level in the new program





Solar Analysis & Proposal
North Middlesex Regional School District
9/11/207

Prepared by: Matt Shortsleeve
Vice President, Development

North Middlesex Regional School District



Solect Energy

- ❖ Solect Energy is a private developer, installer, financier, and manager of commercial scale solar energy systems
- ❖ Hopkinton based Solect has 70 employees who provide end to end services for solar projects in MA, RI, CT, NH
- ❖ Solect has completed 360 projects to date, and owns and operates dozens of systems. Solect also has a Services division that monitors and maintains projects installed by Solect and others. Solect is also an SREC Aggregator and is active in the ISO NE Capacity Markets
- ❖ Solect's Development division serves public and not for profit organizations through Power Purchase Agreements

Solect and Power Options

- ❖ PowerOptions is a not for profit, energy buying consortium, comprised of 500 members that include cities, towns, state agencies, and not for profits
- ❖ PowerOptions conducts RFPs for electricity, natural gas, and solar which allow members and eligible members to contract with their winning providers, and comply with state procurement requirements
- ❖ Solect is the solar energy provider to PowerOptions consortium
- ❖ Eligible members can join PowerOptions and contract for services with none, some or all of their programs
- ❖ To date, Solect has contracted with 25 clients for solar PPAs under the PowerOptions program, including many cities, towns, schools, and not for profits

North Middlesex RSD

- ❖ Solect has worked with the NMRSD PV Subcommittee to evaluate rooftop solar at “solar ready” schools in the district, and created proposal and savings analysis for each eligible school
- ❖ The proposals are for Power Purchase Agreements, where Solect will develop, finance, own and operate the PV system, and the school will agree to purchase the solar energy, and provide an easement for each project

High School - 296kWAC/444kWDC

PPA Savings Estimate - SREC 2.2 (3/31/2018 Complete)

Project: NMR High School

Cumulative Savings:	\$ 1,037,347
Average Annual Savings:	\$ 51,867



North Middlesex Regional School District



8/29/2017

Project: NMR High School

Cumulative Savings:	\$ 1,037,347
Average Annual Savings:	\$ 51,867



Est. Cost Grid Delivered Electricity	\$ 0.152 per kWh	System Size:	444.00 kW
Est. Cost Increase/Yr	3.0% annually	Production:	1,175 kWh/kW
		Output - 1st year:	521,700 kWh
Solect PPA Rate	\$ 0.098 per kWh	System Degradation:	0.55% annually
Annual Price Escalation:	0.0% annually		
Agreement Term:	20 Years	Electricity Demand:	1,000,000 annual (estimate)

years 1-10

Year	1	2	3	4	5	6	7	8	9	10
Current Cost Grid Delivered kWh	\$ 0.152	\$ 0.156	\$ 0.161	\$ 0.166	\$ 0.171	\$ 0.176	\$ 0.181	\$ 0.187	\$ 0.192	\$ 0.198
Net Meter Credit Price (\$/kWh)	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098
Solar Production kWh	521,700	518,831	515,977	513,139	510,317	507,510	504,719	501,943	499,182	496,437
Annual Savings	\$ 28,015	\$ 30,222	\$ 32,475	\$ 34,774	\$ 37,120	\$ 39,516	\$ 41,961	\$ 44,458	\$ 47,008	\$ 49,611
Cumulative Savings	\$ 28,015	\$ 58,238	\$ 90,713	\$ 125,486	\$ 162,607	\$ 202,122	\$ 244,083	\$ 288,541	\$ 335,549	\$ 385,160

years 11 - 20

Year	11	12	13	14	15	16	17	18	19	20
Current Cost Grid Delivered kWh	\$ 0.204	\$ 0.210	\$ 0.216	\$ 0.223	\$ 0.229	\$ 0.236	\$ 0.243	\$ 0.251	\$ 0.258	\$ 0.266
Net Meter Credit Price (\$/kWh)	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098
Solar Production kWh	493,706	490,991	488,291	485,605	482,934	480,278	477,636	475,009	472,397	469,799
Annual Savings	\$ 52,270	\$ 54,985	\$ 57,759	\$ 60,592	\$ 63,486	\$ 66,443	\$ 69,465	\$ 72,552	\$ 75,706	\$ 78,929
Cumulative Savings	\$ 437,430	\$ 492,415	\$ 550,174	\$ 610,766	\$ 674,252	\$ 740,696	\$ 810,160	\$ 882,712	\$ 958,418	\$ 1,037,347

Notes and Assumptions

1. Estimated costs - Electricity Demand pulled from client furnished electric bills
2. Production output based on HelioScope (advanced PV system design and performance modeling solution from Folsom Labs)
3. Model does not account for tax implications
4. Open shop merit labor
5. PPA Rate valid for project completed under SREC2.2
6. Calculations do not include costs associated with Utility impact studies or system modification charges, if any



Ashby Elementary School – 120kWAC, 150kWDC

PPA Savings Estimate - SREC 2.2 (3/31/2018 Complete)

Project: NMR Ashby Elementary School

Cumulative Savings:	\$ 355,965
Average Annual Savings:	\$ 17,798



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PPA Savings Estimate - SREC 2.2 (3/31/2018 Complete)

Matt Shortsleeve, MShortsleeve@solelect.com 617-797-7832

9/6/2017

Project: NMR Ashby Elementary School



Cumulative Savings:	\$ 355,965
Average Annual Savings:	\$ 17,798

Est. Cost Grid Delivered Electricity	\$ 0.152 per kWh	System Size:	150.00 kW
Est. Cost Increase/Yr	3.0% annually	Production:	1,195 kWh/kw
		Output - 1st year:	179,250 kWh
Solelect PPA Rate	\$ 0.098 per kWh	System Degradation:	0.55% annually
Annual Price Escalation:	0.0% annually		
Agreement Term:	20 Years	Electricity Demand:	208,225 annual

years 1-10

Year	1	2	3	4	5	6	7	8	9	10
Current Cost Grid Delivered kWh	\$ 0.152	\$ 0.156	\$ 0.161	\$ 0.166	\$ 0.171	\$ 0.176	\$ 0.181	\$ 0.186	\$ 0.192	\$ 0.198
Net Meter Credit Price (\$ /kWh)	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098
Solar Production kWh	179,250	178,264	177,284	176,309	175,339	174,375	173,415	172,462	171,513	170,570
Annual Savings	\$ 9,608	\$ 10,366	\$ 11,139	\$ 11,929	\$ 12,734	\$ 13,557	\$ 14,397	\$ 15,254	\$ 16,130	\$ 17,023
Cumulative Savings	\$ 9,608	\$ 19,974	\$ 31,113	\$ 43,041	\$ 55,776	\$ 69,333	\$ 83,729	\$ 98,983	\$ 115,113	\$ 132,136

years 11 - 20

Year	11	12	13	14	15	16	17	18	19	20
Current Cost Grid Delivered kWh	\$ 0.204	\$ 0.210	\$ 0.216	\$ 0.223	\$ 0.229	\$ 0.236	\$ 0.243	\$ 0.251	\$ 0.258	\$ 0.266
Net Meter Credit Price (\$ /kWh)	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098	\$ 0.098
Solar Production kWh	169,632	168,699	167,771	166,848	165,930	165,018	164,110	163,208	162,310	161,417
Annual Savings	\$ 17,936	\$ 18,869	\$ 19,821	\$ 20,794	\$ 21,788	\$ 22,803	\$ 23,841	\$ 24,901	\$ 25,984	\$ 27,091
Cumulative Savings	\$ 150,073	\$ 168,942	\$ 188,763	\$ 209,557	\$ 231,345	\$ 254,149	\$ 277,990	\$ 302,891	\$ 328,875	\$ 355,965

Notes and Assumptions

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North Middlesex Regional School District



Highlights of Solect PPA Benefits

❖ Zero Capital Costs

- Solect will finance and own the system – eliminating the need for North Middlesex RSD to use its capital

❖ Electricity Cost Savings and Price Hedge

- Hedge against volatile electricity and utility costs

❖ Zero Operation and Maintenance Cost

- Solect will maintain, repair, and operate the system – no operating expenses

❖ Value Add – Education enrichment programs

- Solect monitoring system can be displayed on any internet connected device
- Programs with teachers to enhance curriculum – STEM, Economics, Environment

❖ Local Expert as Provider, with services team to maintain system operation

❖ Procurement compliance and assurance

❖ Membership with Power Options, access to group purchasing programs, market insights and advocacy on energy matters that impact your operations and finances

North Middlesex Regional School District



Solect's Next Steps

- ❖ Execute Solect Power Options PPA
- ❖ Engineering and final designs
- ❖ File Interconnect Applications with Utility, permit applications
- ❖ Project planning, scheduling
- ❖ Installation, QC, C.O.C. by 3/31/2018, MA SREC 2.2 Solar Incentive Program
- ❖ Utility and Technical Commissioning
- ❖ Operational – Systems are Live!
- ❖ Orientation, Safety, Education, Marketing/PR

Thank you!

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Subcommittee's Next Steps

- ❖ Work with the HS Building Committee on final solar design.
- ❖ Review AES final solar design.
- ❖ Attorney to vet the contract.
- ❖ School committee to vote at the October 2, 2017 meeting.