

Ameresco

Solar PV for the City of
Newton, MA



770 kW, Waltham HS,
Massachusetts



884 kW, Arizona Garage



210 kW, Hill AFB, Utah



2 MW, Arizona State University

Topics

1. Ameresco
2. Construction Steps
3. Solar PV Projects for Newton
4. Project Financials
5. Discussion



Ameresco: Company Overview



**62 offices in 34 states
and 5 provinces**

- Leading *independent* energy efficiency and renewable energy company throughout North America
- **2000**: year incorporated
- **2010**: year went public on NYSE
- **\$728.2 million**: 2011 Revenue
- **\$3 Billion**: constructed projects
- **900+**: employees
- Corporate Headquarters in Frammingham, MA

Ameresco: Award-Winning Expertise



Climate Change
Business Journal
Business Achievement
Award, Growth 2010
Silver Medal



Ameresco: Building Solar PV on Schools in MA



Newburyport, MA: 502 kW
2 Schools and DPW Bldg.



Waltham, MA: 1,931 kW
6 Schools and Muni Center.



Fall River, MA: 576 kW
3 Schools and Water Treatment



Lowell, MA: 348 kW
4 Schools and LMA



Natick, MA: 1,058 kW
5 Schools and Senior Center.



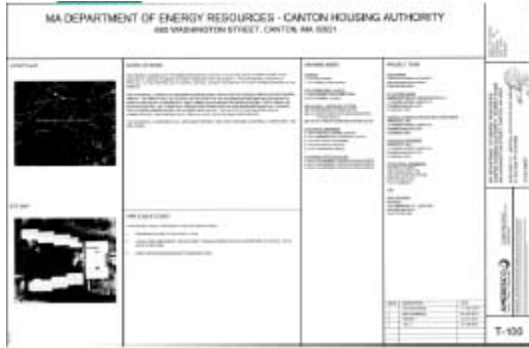
Milton Academy: 192 kW
Student Activity Center

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Construction Steps



Design & Permitting



Mobilization & Crane Ops



Ballast Layout



Panel Assembly & Wiring



Inverter Installation



Commissioning & Witness Test

Additional Structural and Roof Warranty Approvals



To: Building Owner
 Re: Letter of Compliance – Photovoltaic Installation on Carlisle Warranted Roof

This memo outlines Carlisle's recommendations concerning the installation of Photovoltaic (PV) systems over a Carlisle warranted roofing system in order to facilitate the installation of the PV system with limited disturbance to the Carlisle roofing system. The determination of the most suitable PV technology, racking and installation method is the responsibility of the Building Owner or its designated representative. Listed below are the recommendations along with conditions that may impact the Carlisle warranty.

Please note that this list is not an exhaustive one:

1. Determine the building's structural ability to withstand the PV system.
2. The roofing system should be protected during installation of the PV system to prevent damage. This includes the staging and assembly areas and other areas heavily traveled.
3. To avoid PV system removal costs to the building owner, the PV system should provide adequate clearance for access to the roof membrane should maintenance or repair be required.
4. Field seams that may be concealed by the PV system, and therefore harder to access, should be overlaid by a Carlisle authorized roofing applicator using approved details and products.
5. For non-penetrating PV racking systems, a protection course consisting of Carlisle's Pressure-Sensitive Molded Walkway Pads is recommended between the PV support system and the roofing membrane. Walkway pads of thickness and density equal or greater to those which can be provided by Carlisle SynTec may be used to prevent damage to the roofing membrane.
6. PV laminates must not be adhered directly to the Carlisle primary membrane. A compatible Carlisle membrane shall be used as a slip sheet and spliced to existing membrane.
7. Racking systems that require penetration of the roofing membrane must be flashed in accordance with the appropriate Carlisle published detail. All flashing details must be performed by a Carlisle authorized roofing applicator

It is recommended that areas frequently accessed for the purpose of operation or maintenance of the PV system be protected by walkways installed in accordance with the Carlisle published specifications and details. Should Carlisle be contacted to investigate a warranty claim, or to make warranty related repairs, providing access to the membrane (removal and replacement of the PV System) is the responsibility of the Building Owner.

The following table lists the roofing inspections during the PV system installation to ensure continuation of the Carlisle warranty. Upon completion of the roof alteration, an inspection must be scheduled and performed by a Carlisle Field Services Representative.

STRUCTURAL FINAL AFFIDAVIT

To the Commissioner, Town of Canton, MA,

I certify that I, or my authorized representative, have inspected the work associated with Permit No. B-11-729, issued November 22, 2011, located at 660 Washington Street on the dates used below or on at least One (1) occasions during construction, and that to the best of my knowledge, information, and belief the work has been done in conformance with the permit and plans approved by the Inspectional Services Department and with the provisions of the Massachusetts State Building Code, 780 CMR and all other applicable laws, regulations, statutes, and ordinances.

- Ballast weight agrees with design
- Attached system installed per design



Wayne R. Lawson

Wayne R. Lawson, P.E., SECB 35102
 ENGINEER – MASS REG. NO.

CBI Consulting Inc.
 COMPANY

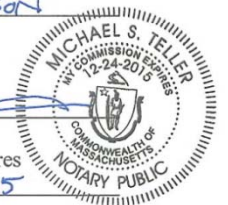
250 Dorchester Avenue, Boston, MA 02127
 ADDRESS

(617) 268-8977
 PHONE

Inspection Dates: December 13, 2011

Then personally appeared the above-named WAYNE R. LAWSON and made oath that the above statement by him is true.

Before me, *[Signature]*
 My Commission expires 12-24 2015



Topics

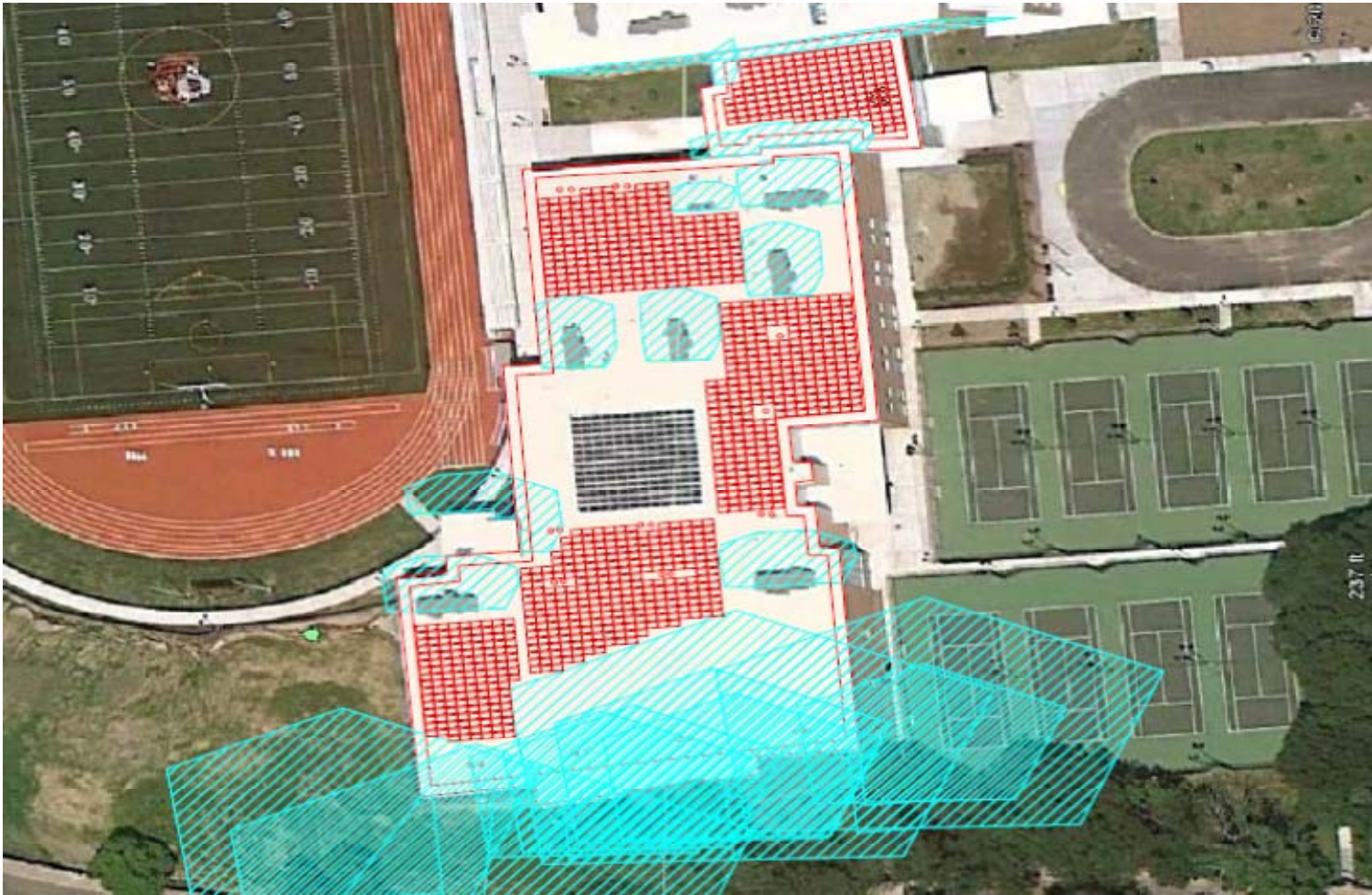
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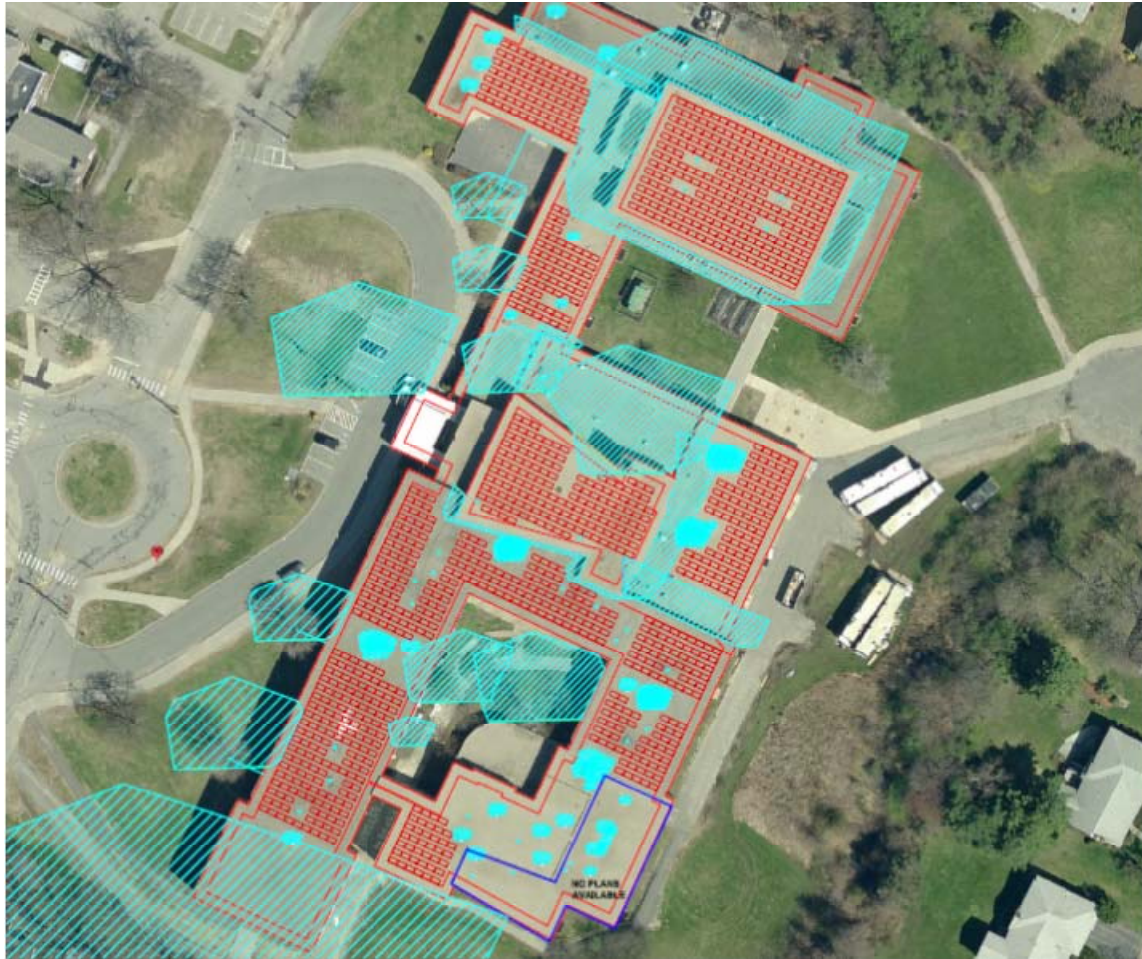
Project Summary

Site	kW	kWh (Year 1)
Newton North High School	262	300,600
Brown Middle School	262	309,250
Memorial Spaulding Elementary School	112	132,425
Countryside Elementary School	66	78,300
Bowen Elementary School	50	60,175
TOTAL	752	880,750

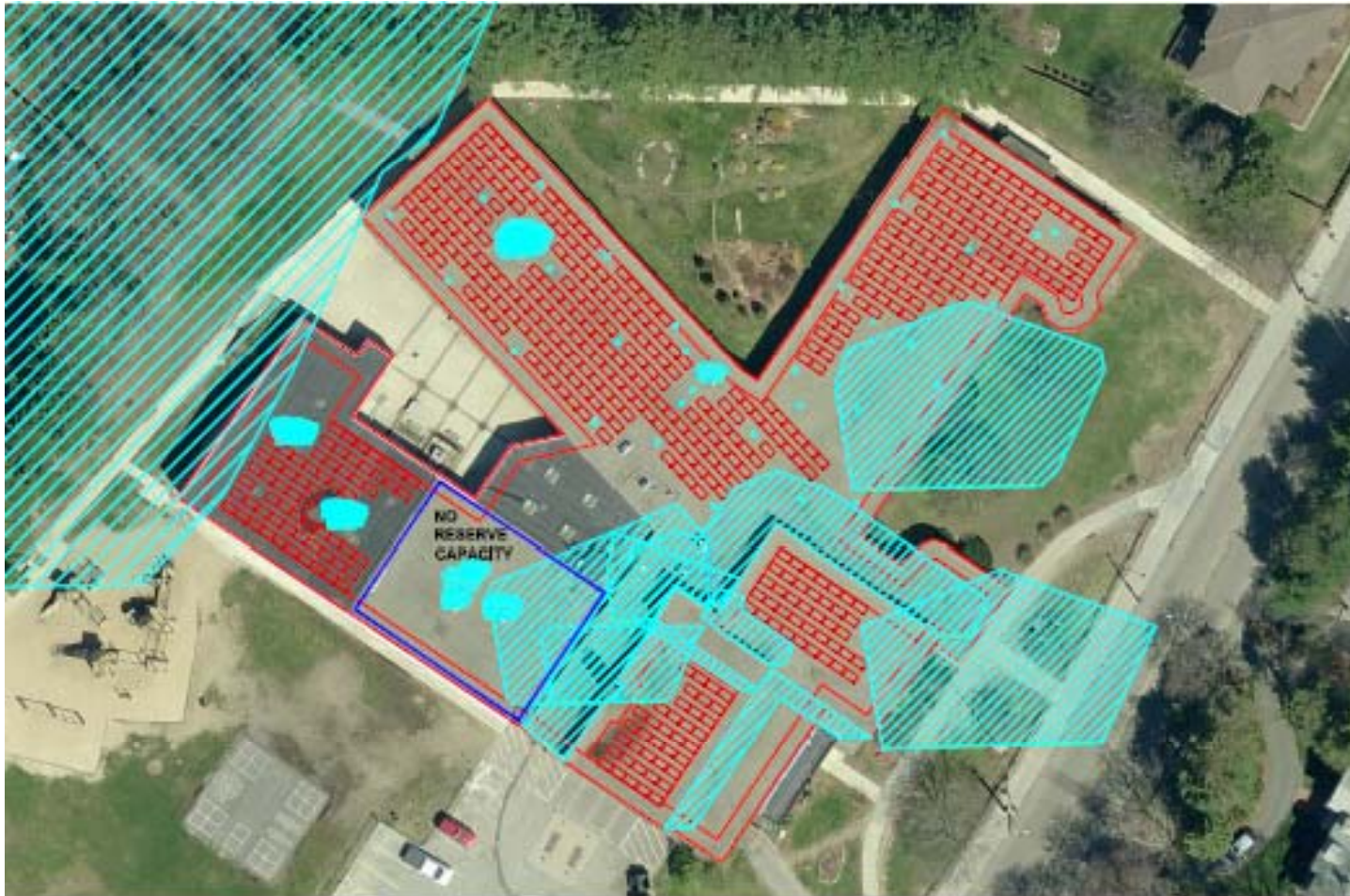
Newton North High School (262 kW)



Brown Middle School (262 kW)



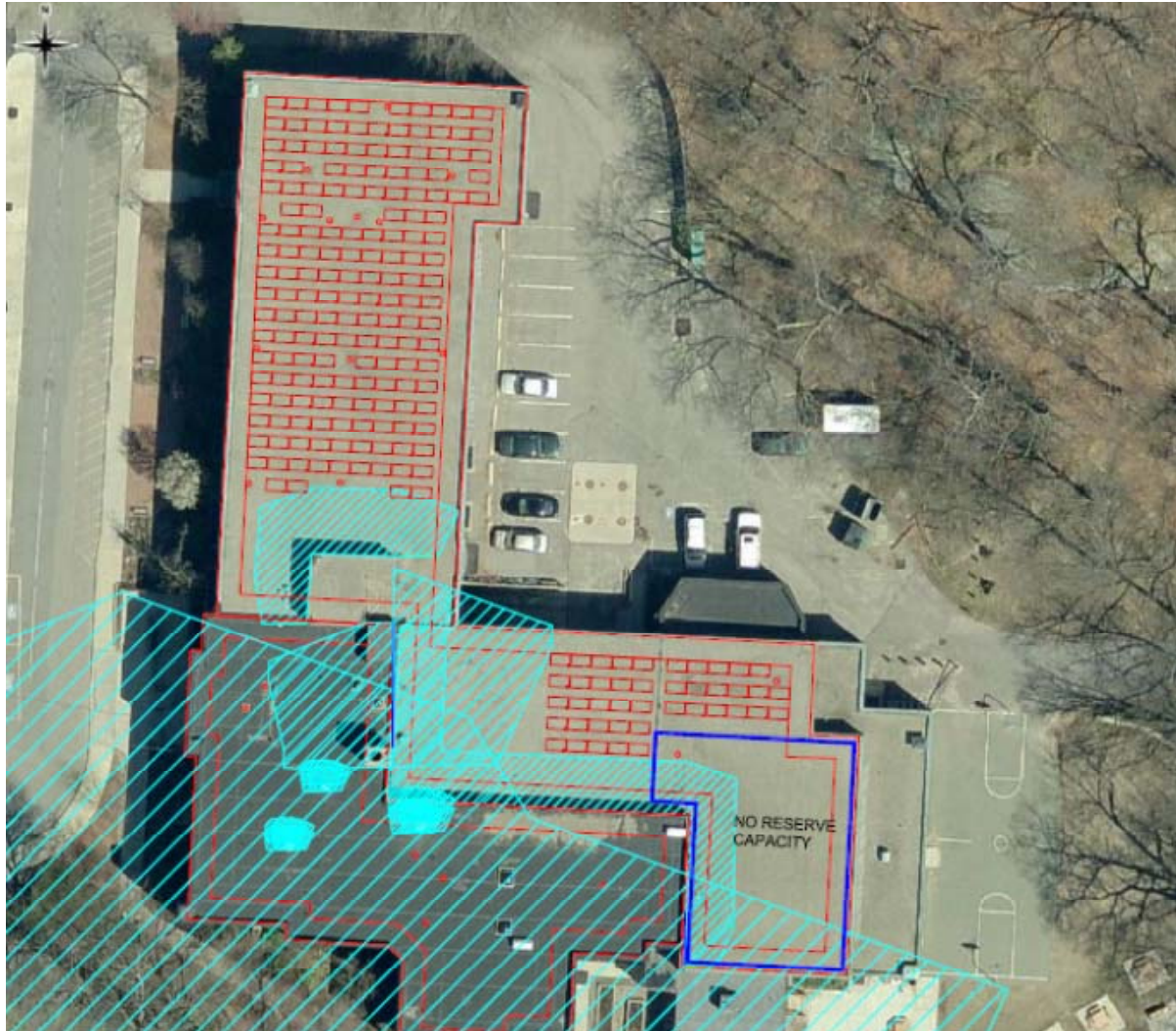
Memorial Spaulding Elementary School (112 kW)



Countryside Elementary School (66 kW)



Bowen Elementary School (50 kW)



Educational Program: Online Data & Teacher Curriculum

- 15 Solar PV Topics for K-12:
 - Renewable energy fundamentals
 - Solar PV design considerations
 - Data analysis
- Teacher topic summaries
- Topics matched with MA Learning Standards for Science and Technology/Engineering Frameworks
- Curricula accessible online



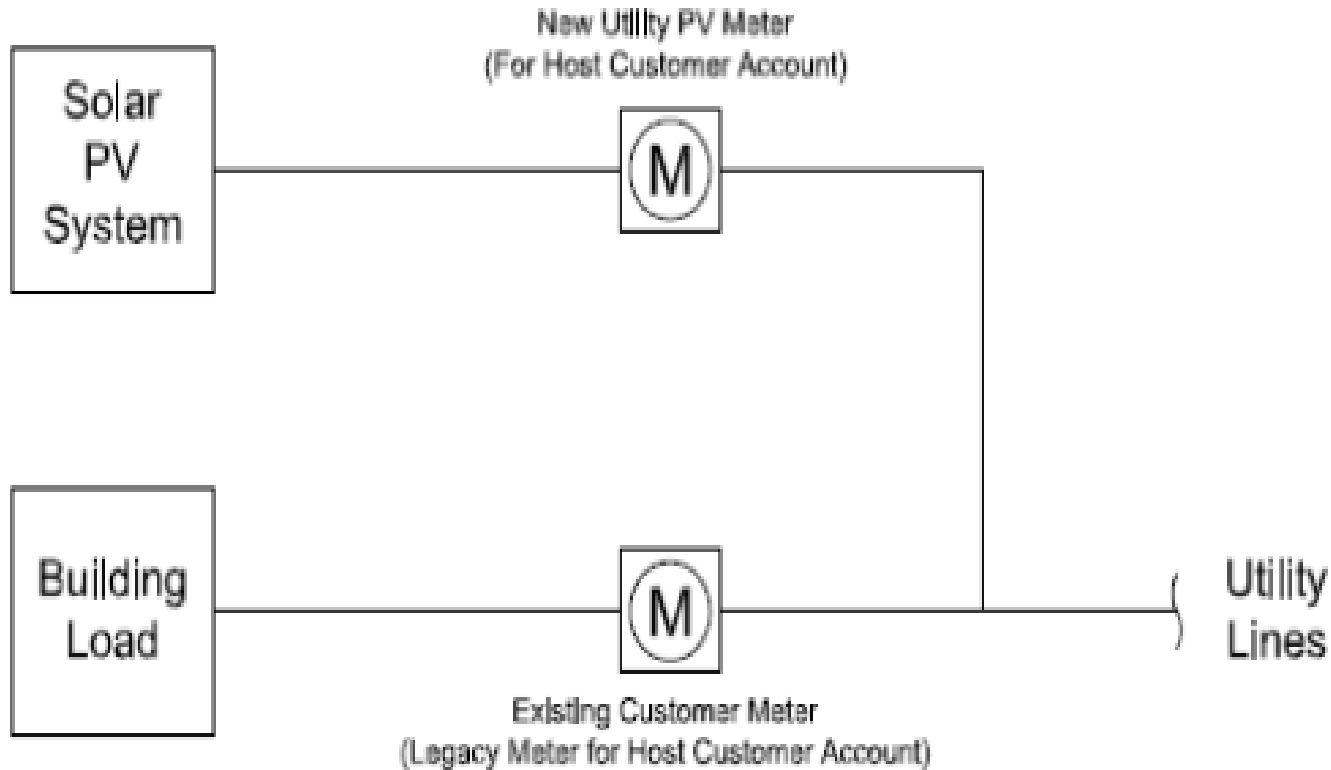
Middle school students showing solar panel to Mayor William A. Flanagan of Fall River

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Net Metering Provides Additional Energy Savings



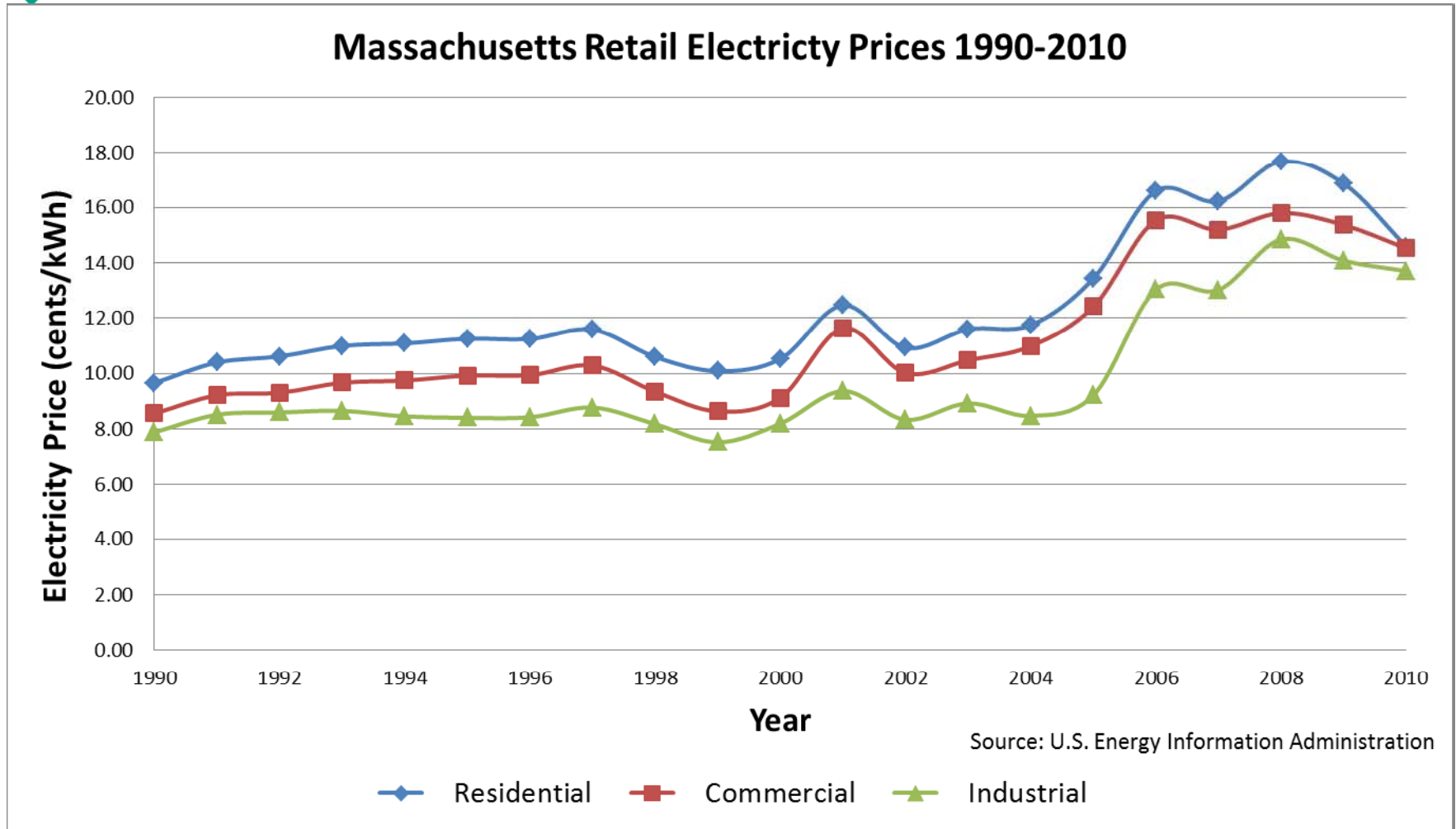
Connecting Solar PV Behind New Customer Meter

Solar PV Energy Savings

NSTAR Plus Supply Rate	\$	0.101
Plus Ameresco PPA Price (Year 1)*	\$	0.110
Total Rate Payments	\$	0.211
Less: Net Metering Credit	\$	0.153
Net Electricity Rate (\$/kWh)	\$	0.058
Electricity Rate Savings	\$	0.043

* 2.5% annual price escalator

Retail Utility Rates Have Trended Up, But Also Unpredictable



Discussion



Wholesale Electricity Prices Are Volatile

New England Electric Market: Eastern Index Prices

Federal Energy Regulatory Commission • Market Oversight • www.ferc.gov/oversight

Eastern Daily Index Day-Ahead On-Peak Prices

