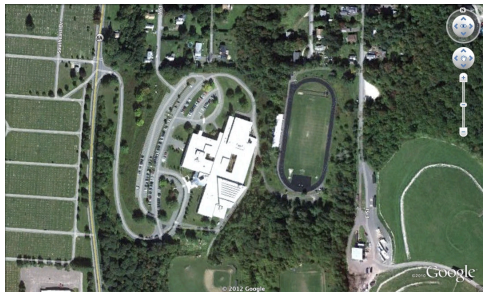
City of North Adams Solar Project:

All of the City's Electricity needs from the Sun for Years to Come



Drury HS

E Street Landfill

Harriman & West Airport

Old Waste Water Treatment Plant

BLUEWAVE CAPITAL

BlueWave Capital's goal is to be a long-term partner with the City to make North Adams a leader in the adoption of solar energy in the Commonwealth and thereby lower electricity bills for the City and its businesses and homeowners, as well as reduce the City's carbon emissions.

BlueWave Team

- Optimal partners for the City of North Adams:
  - **BlueWave Capital**: Project developer and a **leader in brownfield and landfill** redevelopment with current solar projects under development in Massachusetts in excess of **30MW**
  - **RGS Energy (Commercial division of Real Goods Solar and formerly known as Alteris Renewables):** Largest, most experienced solar installer in the Northeast, **4,000+ installations in the region** and 11,000+ nationwide; innovative residential program
  - **Tighe and Bond:** Experienced engineering firm with **deep knowledge of the North Adams' former landfill site**

BlueWave Capital

BLUEWAVE CAPITAL

- BlueWave develops distributed scale solar photovoltaic projects in the Northeastern United States and Canada with a special focus on municipal projects.
  - **Proven track record** in renewable energy – 30+ MW of projects under development in New Bedford, Taunton, Amherst, Bridgewater, Athol and North Adams
  - Innovative focus on integrated, **community-wide programs and benefits**
  - Deep involvement in the **development of the Green Communities Act** and related rules, regulations and policies
  - Extensive experience in the environmental **permitting of complex development projects for renewable energy and economic development**

RGS Energy

(Commercial division of Real Goods Solar, formerly known as Alteris Renewables)

RGS | ENERGY
Commercial Division of Real Goods Solar, Inc.

- Largest and most experienced solar installer in the Northeast; 60+MW installed capacity; more than 11,000 installations.
  - Formed through the merger of Alteris Renewables and Real Goods Solar with 30+ years of experience and industry partnerships
  - Serving residential, commercial, municipal and academic clients with solar PV and Wind energy solutions.
  - Ranked as one of the top 15 fastest growing energy companies by the Inc 500 in 2009 and 2010.
  - Zero Down Solar program for residential properties.
  - Leading Green Communities program for the City.
  - Extensive educational programming experience.

Tighe & Bond

A Leading Regional Engineering Firm

- Full service engineering and permitting firm with extensive experience in landfill closure, permitting, and Operation & Maintenance. Firm has a deep knowledge and understanding of North Adams former landfill facility and a long-term commitment to the City.
  - Site identification
  - Site assessment
  - Environmental impact analysis
  - Civil engineering
  - Electrical engineering
  - Structural engineering
  - Regulatory compliance
  - Site assessment and remediation
  - Permitting

Approach to Project Development Challenges

The BlueWave Capital team is well equipped to manage the complexities of solar development in the Commonwealth

- Financing environment is volatile and difficult to manage
  - BlueWave's capital partners are committed to solar development in Massachusetts
- Potential damage to existing landfill cap at landfill
  - BlueWave's engineering partner, Tighe and Bond, has extensive landfill management experience and knowledge of North Adams' facility
- Complex utility interconnection process
  - RGS Energy has interconnected hundreds of projects to the National Grid systems and recently completed interconnection of the largest solar project in New England
- Regulatory reviews
  - BlueWave's team has substantial experience with MA DEP, MA EEA, MA NHP, MA DOER, and MA DPU.

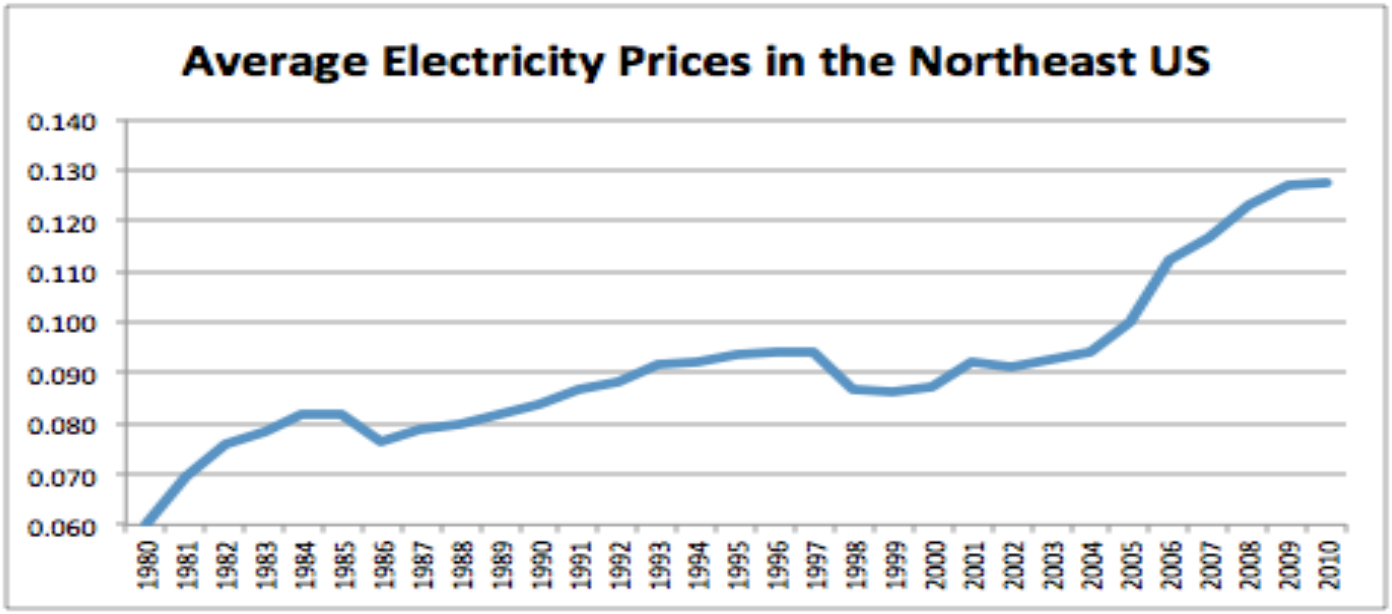
Benefits for City of North Adams

The City will receive financial, environmental and social benefits for years to come

- Financial
  - Substantial long-term cost savings
  - Electricity price stability and predictability
  - Rapid deployment and cost synergies
  - Financing flexibility and system ownership option
- Environmental & Social
  - Nearly 100% of Municipal load will be supplied by clean solar energy
  - Reduce the City's CO2 emissions by nearly 50,000 tons over the productive life of the photovoltaic system; equivalent to removing over 7500 cars from the road and planting nearly 80,000 trees
  - Third party-financed solar for commercial and institutional facilities
  - "Zero Down Solar" and "Leading Green Communities" for North Adams' homeowners and businesses

Benefits for City of North Adams

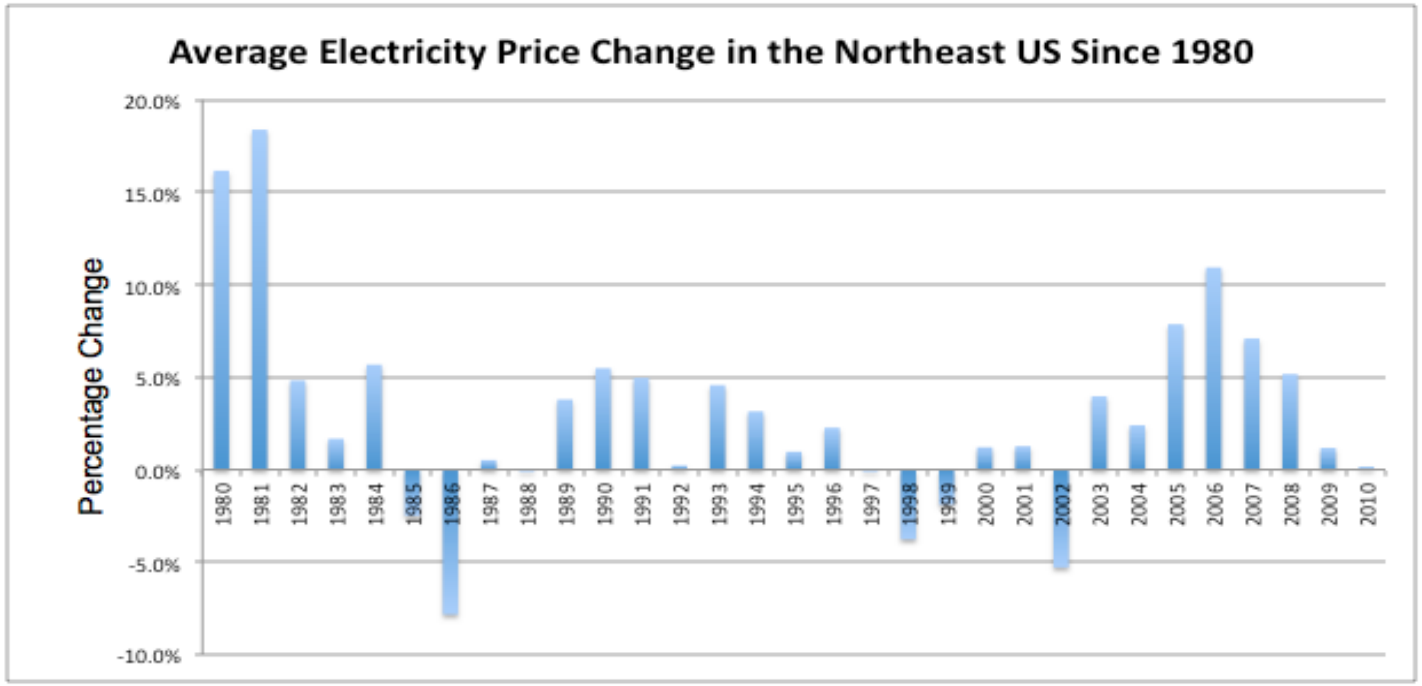
Rate offered to the City of North Adams will be lower than delivered power prices in the Northeast for the last 30 years or longer



Bureau of Labor Statistics
Consumer Price Index - Average Price Data
http://data.bls.gov/

Benefits for City of North Adams

Electricity prices have risen 3 out every 4 years since 1980, our PPA proposal will offer significant price protection and certainty over the life of the agreement



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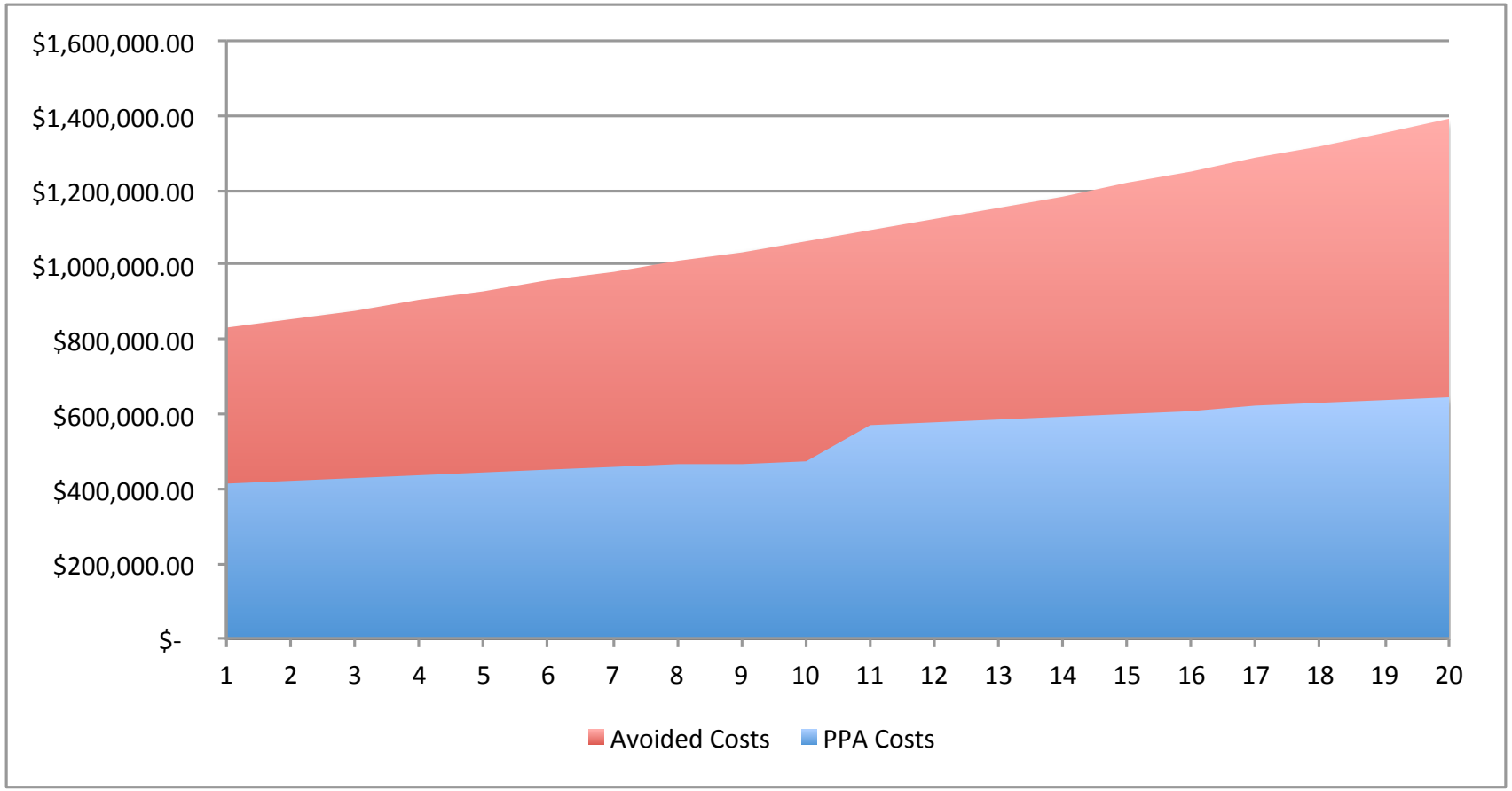
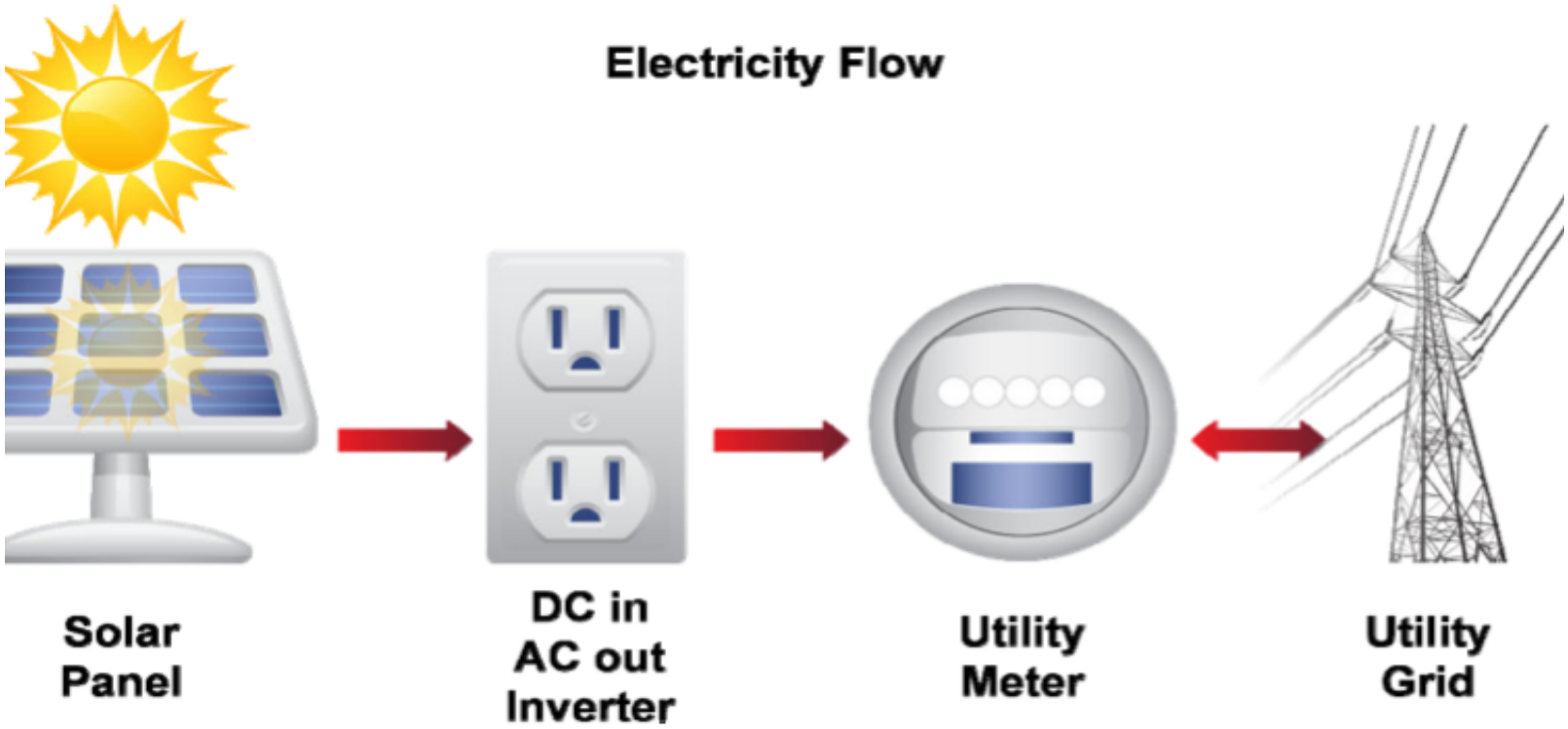
North Adams Estimated Savings

City of North Adams could save over $11 million over the life of the agreement based on a set of projects totaling 4.6MW in installed capacity.



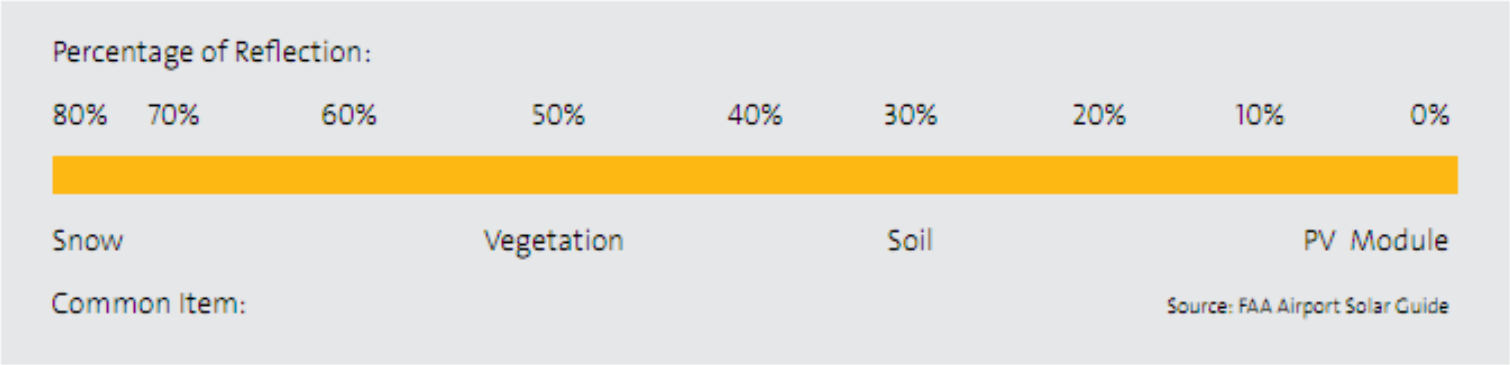
How Benefits flow to City of North Adams

City purchases Net Metering credits at a significant discount compared to the cost of electricity from National Grid. Credits are generated at project facilities and then allocated to City accounts.



Do Solar Panels Reflect Light?

According to the FAA, solar panels reflect light a bit more than black asphalt, less than water, much less than wood shingles or bare soil. Panels are designed to absorb light, not reflect it. Light that is reflected does not generate electricity and panels are designed to minimize it.



Do Solar Panels Make Noise?

Solar panels have no moving parts and make no noise. Noise is generated by inverters/ transformers during daytime when the sun is shining and the system is operating. PV system is silent at night. At 50 feet, an inverter/transformer is no louder than a quiet urban environment or a dishwasher operating in an adjacent room.

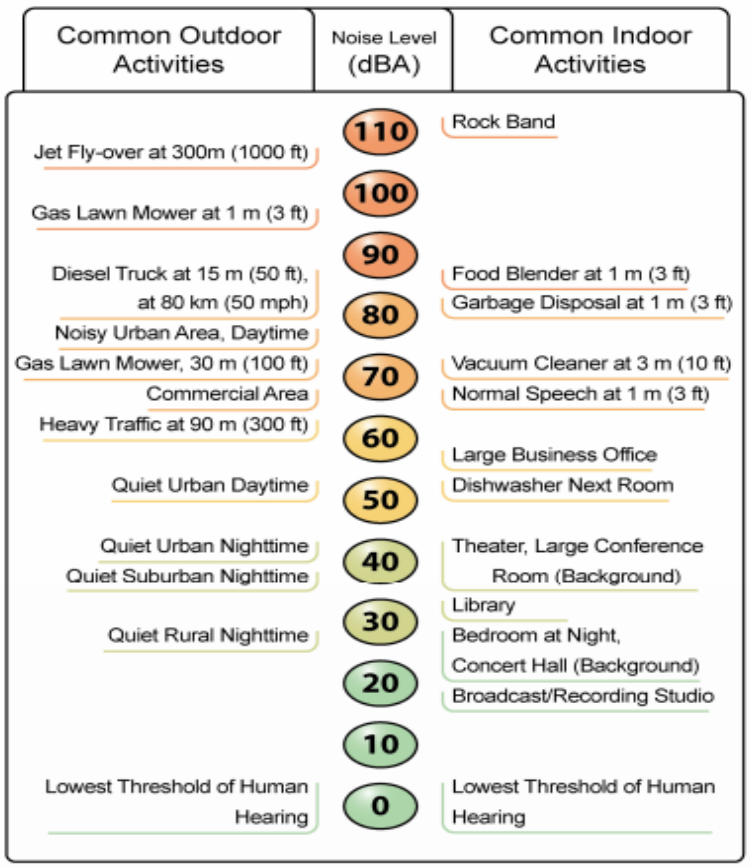


Table 1. Perceived Change in Noise Levels	
Change in Sound Level	**Perceived Change to the Human Ear**
+/- 1 dBA	Not Perceptible
+/- 3 dBA	Threshold of Perception
+/- 5 dBA	Clearly Noticeable
+/- 10 dBA	Twice (or Half) as Loud
+/- 20 dBA	Fourfold (4x) change

Table 2. Addition of Inverter Noise at 50 feet	
Number of Inverters	**Combined Noise Level (dBA)**
1	59
2	$10*\log10\hat{}(10^{(59/10)}+10^{(59/10)}) = 62$
3	$10*\log10\hat{}(10^{(59/10)}+10^{(59/10)}+10^{(59/10)}) = 64$
4	$10*\log10\hat{}(10^{(59/10)}+10^{(59/10)}+10^{(59/10)}+10^{(59/10)}) = 65$

How much noise exactly?

Incremental noise levels impacts are minimal. A change of 3dBA just crosses the threshold of being perceptible but is not clearly noticeable. Below are the results of a noise study carried out on the noise impact of PV inverters/transformers at 50 feet.

Season	Change in Noise Level (dBA)	Traffic Noise Period	Number of Hours That Experience Change	% of Day by Season
Winter (December, January and February)	0	Night time	13	54%
	1	peak noise hour am and pm	5	21%
	2	all other daylight hours	6	25%
Spring (March April)	0	Night time	10	42%
	1	peak noise hour am and pm	5	21%
	2	average daylight noise hour	8	33%
	3	quiet daylight noise hour	1 hour (7pm to 8pm)	**4%**
Summer (May, June and July & August)	0	Night time	8	33%
	1	peak noise hour am and pm	5	21%
	2	average daylight noise hour	8	33%
	3	quiet daylight noise hour	3 (5 to 6am & 7 pm to 9 pm)	**13%**
Fall (September, October and November)	0	Night time	12	50%
	1	peak noise hour am and pm	5	21%
	2	all other daylight hours	7	29%

Notes: For all seasons, peak am daylight traffic noise hour is assumed to be 7 am to 9 am and peak pm daylight traffic noise hour to be 3pm to 6pm; for nighttime hours, the solar inverters are not operating

North Adams Solar Project Approach

Utility interconnection underway, permitting about to begin

- Phase 1 (Completed)
  - Negotiate Power Purchase Agreement
  - Complete due diligence on sites proposed in RFQ
  - Site identification and feasibility analysis of initial sites
  - Preliminary designs and engineering by YE 2011
  - Identify additional sites suitable for development
  - File interconnection applications for initial sites
- Phase 2 (Underway)
  - Federal, State, and Local permitting
  - Outreach to community businesses, and homeowners
  - Additional site identification and feasibility analysis
  - Design, permit, construct, commission projects by YE 2012

North Adams Solar Project Permitting

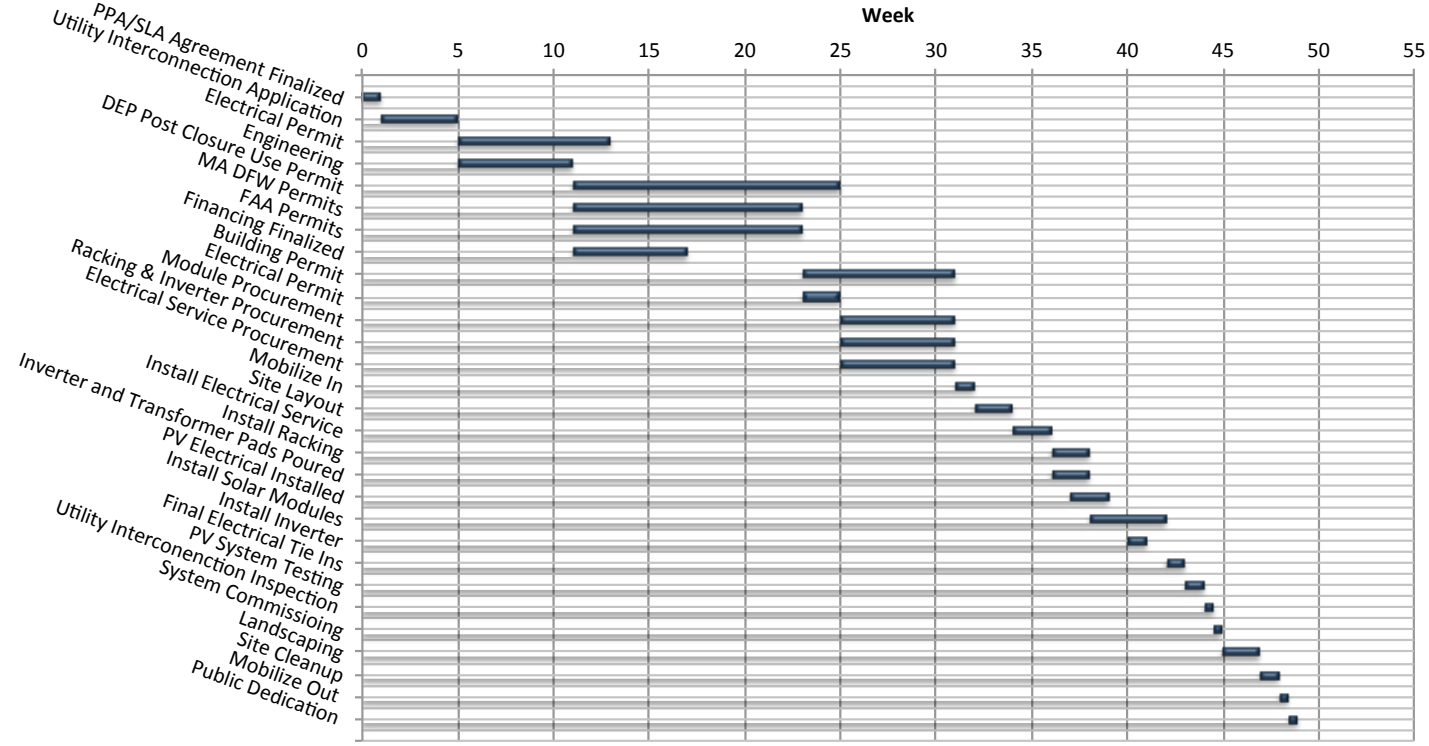
- Local
  - Conservation Commission Review – 2 Months
  - Special Permit Approval – 2-3 Months
  - Building Permit – 1 Month

- Federal, State & Utility
  - FAA No Hazard Determination, ALP Change, Form 7460 – 1-2 Months
  - MA DEP Post Closure Use Permit – 3-4 Months
  - MADFW MESA Filing – 1-2 Months
  - National Grid Interconnection – 5-6 Months

Preliminary Project Schedule (GANTT Chart)

North Adams Solar Project
Preliminary Development Schedule

BLUEWAVE CAPITAL



Timeline subject to change until final design and project size is determined.

Interconnection Study to be determined by National Grid, and duration included above is only our best estimate. Additionally, any changes to equipment that come as a result of the findings of this study (above and beyond what has already been assumed) may change the above schedule of events.

North Adams Solar Project Overview

Nearly 5MW of PV capacity that will supply the City's entire load

- E Street Landfill
  - Ballasted (Non-Penetrating) Ground Mounted System with 1.8MW of Capacity
  - 2.16 Million kWhs per year of output (40% of City's electricity load)
- Old Waste Water Treatment Plant
  - Ballasted (Non-Penetrating) Ground Mounted System with 1.2 MW of Capacity
  - 1.4 Million kWhs per year of output (25% of City's electricity load)
- Harriman & West Municipal Airport
  - Ground Mounted System with 1.2 MW of Capacity
  - 1.4 Million kWhs per year of output (25% of City's electricity load)
- North Adams Drury High School
  - Roof Mounted System with 200kW of Capacity
  - 240,000 kWhs per year of output (4% of City's electricity load)

1.8 MW E Street Landfill Project

Preliminary System Layout and Satellite Overview of Proposed Site

1.2 MW Old Waste Water Treatment Plant

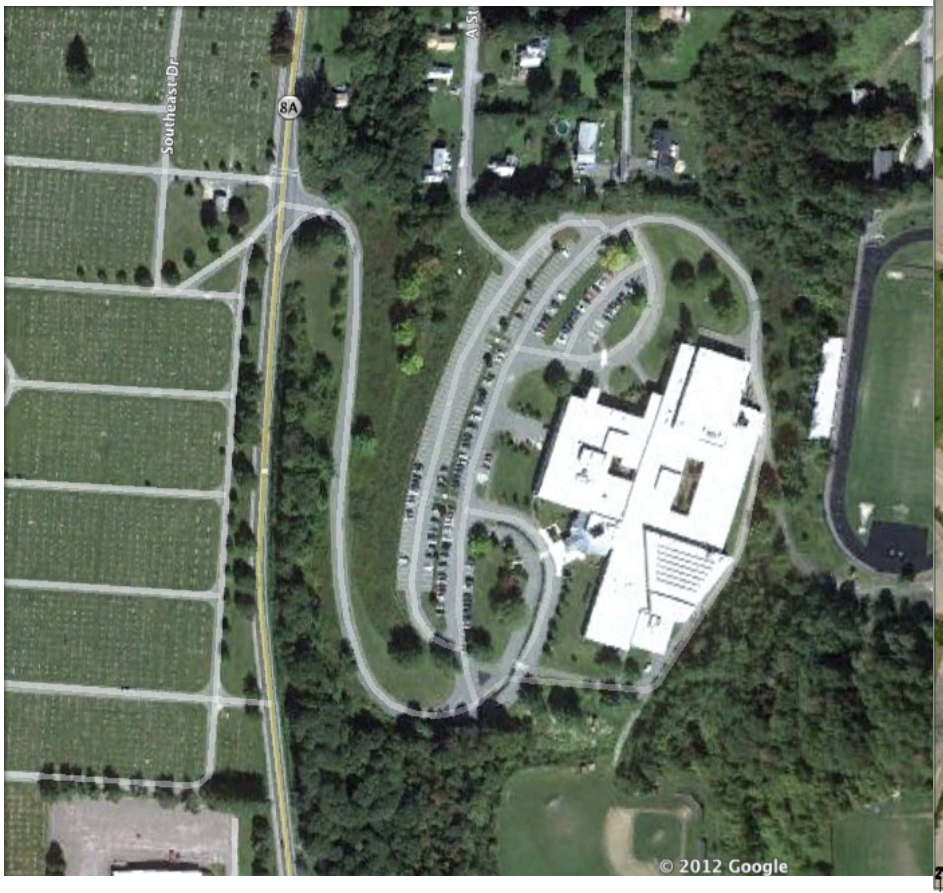
Preliminary System Layout and Satellite Overview of Proposed Site

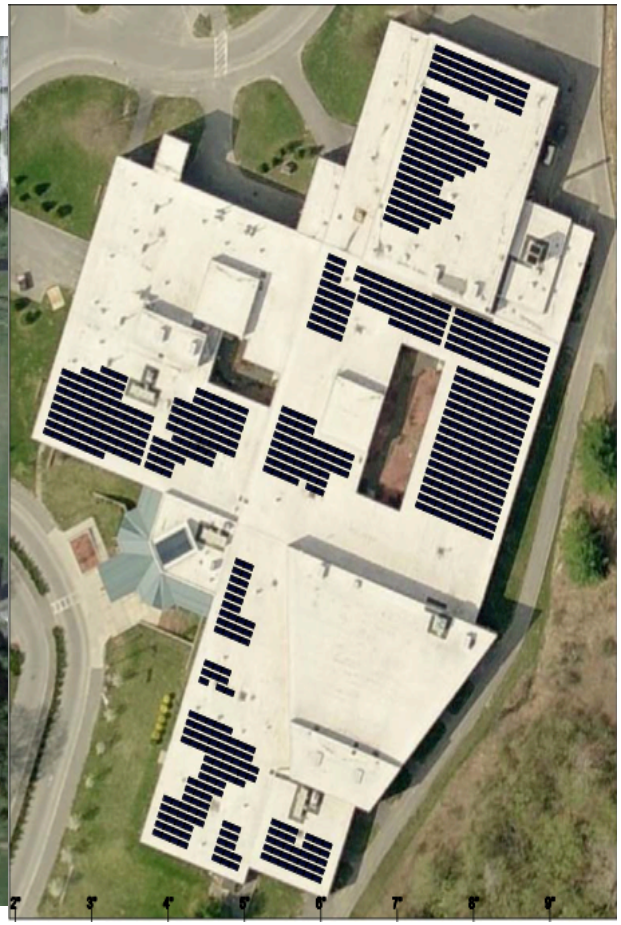
1.2 MW Harriman & West Airport

Preliminary System Layout and Satellite Overview of Proposed Site

200 kW Drury High School Project

Preliminary System Layout and Satellite Overview of Proposed Site





Operations & Maintenance

- Careful system component selection
- Equipment warranties and inverter service agreements
- Monitoring and data systems
- Local on-call resources for emergency/ service/remedial requests
- Quarterly performance reporting
- Routine site/component maintenance (string and switching tests, infrared scans, cleaning, filter replacement, panel washing)
- Annual mechanical inspection

Regulation/Incentives Are Now Aligned

- MA Renewable Portfolio Standard
  - 6% of electricity sales by 2011
  - 15% of electricity sales by 2019
  - 400MW Solar Carve-Out (1% of electric load)
- Financial Incentives, Grants
  - Production Based Incentives (SRECs, RECs)
  - Federal Investment Tax Credit/ 1603 Grant
  - New Market Tax Credits
  - State Investment Tax Credit
  - Accelerated depreciation
  - Grants and low interest loans
  - USDA REAP Initiative
  - USDA Loan Guarantees
  - DOE FIPP Loan Guarantees

Massachusetts' Net Metering Program

- Massachusetts has a Net Metering Program that allows up to 3% of historic peak capacity in the state to be net metered
- Net Metering: difference between the electricity supplied to a customer and the electricity fed back to the grid by an on-site generation system
  - Net metering allows customer to receive credits for the electricity produced by net metered systems, above what system owners consume on premises
  - Net metering credits can be assigned to other meters within the same utility service territory and load zone
- Net metering rules allow for up to 2MW of capacity per installation
  - Private entities are allowed up to 1MW per installation for full retail price net metering
  - Private entities are allowed up to 2MW per installation for retail minus distribution net metering
  - Public entities are allowed up to 2MW per installation for full retail price net metering`

Massachusetts SREC Program

- Available to any Massachusetts utility customer that installs a PV system
- SREC program is designed to expand Massachusetts' installed PV capacity from the current 25MW to 400MW by YE2016.
- Qualified facilities can be reach a capacity level of up to 6MW
- Qualified PV system owner has the right to put its kWhs of PV produced into an SREC auction each year for a predetermined term
  - SRECs for system's minted in 2010 will have a price floor of $0.30/kWh
  - Alternative Compliance Payment set at $0.55/kWh for 2012
  - Qualified systems will have an opt-in term of 10 years
  - Auction system charges a 5% fee
  - Minimum SREC value to system owner in DOER auction is $0.285/kW
- Revenues from the sale of SRECs help defray the upfront cost of a solar system and significantly enhance benefits to PV hosts and investors

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