

Renewable Energy at Closed Landfills

June 17, 2009

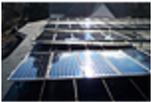
Jim Christo

Massachusetts Renewable Energy Trust



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PRESENTATION OVERVIEW

- What is the MA Renewable Energy Trust?
- Summary of Commonwealth Solar
- Summary of Commonwealth Wind Program



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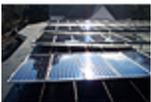
THE TRUST

- Renewable Energy Trust was established by the Massachusetts Legislature in 1998 to:
 - increase the supply of & demand for electricity generated from clean sources (***generate power***)
 - promote the development of a Massachusetts renewable industry cluster (***generate jobs***)
- MRET has supported **over 1,500 projects**, companies, and related activities
- Over **\$300 million awarded**
- Projects installed in **238+ communities**



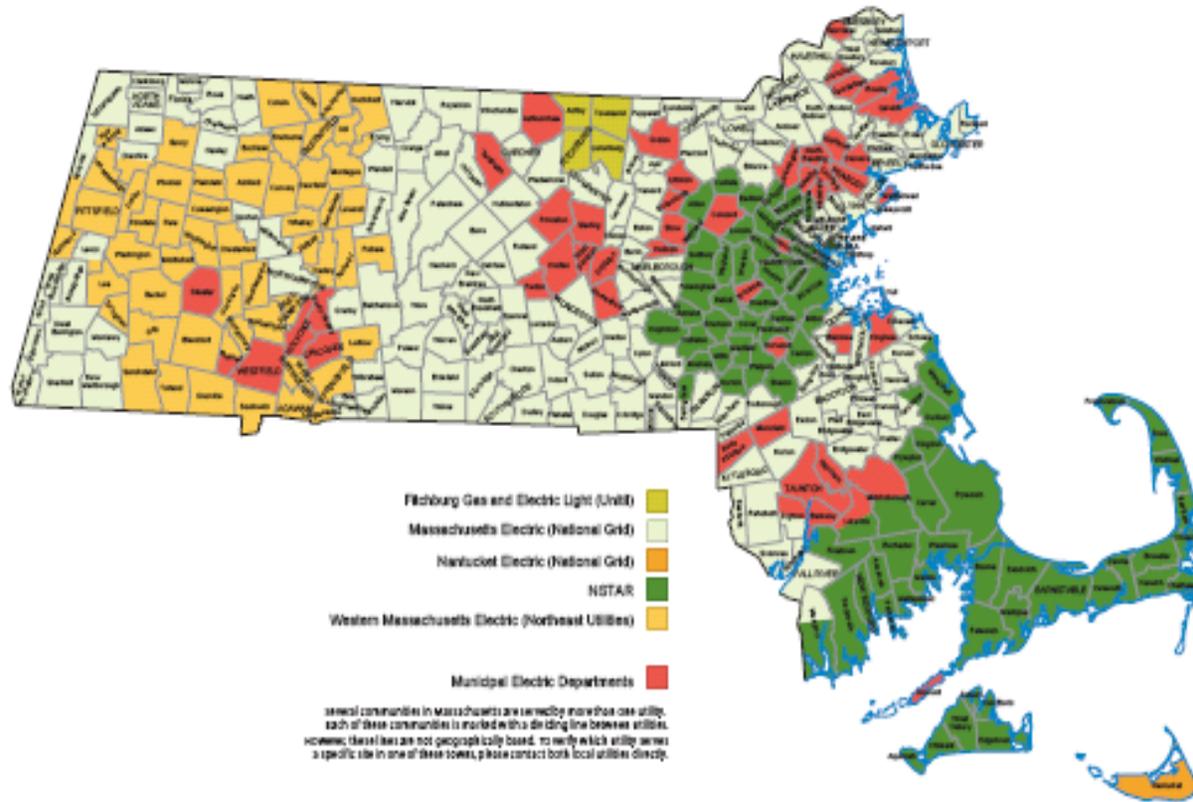
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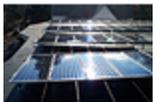
SOURCE OF FUNDS & ELIGIBLE LOCATIONS

- Source of funds is a surcharge  \$24 million/yr
- Only customers in investor owned utility service territories:



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Massachusetts PV Rebate Program

Commonwealth Solar

- \$68 million over ~4 years
- Goal of **27 MW installed** by 2012
- PV market on a trajectory to achieve the Governor's 2017 goal of **250 MW**
- Easy application process
 - Streamlined, non-competitive, rolling
- Results thru May 2009:
 - 11.2 MW Installed in MA
 - 6.5 MW Awarded – Install is pending



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Commonwealth Solar Commercial Rebate Levels

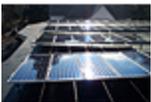
- Rebate based on a cap of 500 kW
- 50% of production must be used onsite
- A single Applicant Entity cap = \$1,200,000 per CY
- Tiered rebate structure (larger projects that benefit from economies of scale require less rebate per watt)

Commercial Rebates for Incremental Capacity (\$ per watt (dc))				
Incremental Capacity	First: 1 to 25 kW	Next: > 25 to 100 kW	Next: > 100 kW to 200 kW	Next: > 200 kW to 500 kW
Base Incentive	\$3.15	\$3.00	\$2.00	\$1.40
PLUS: Additions to Base				
Massachusetts Company Components Adder	\$0.15	\$0.15	\$0.15	\$0.15
Public Building Adder	\$1.00	\$1.00	\$1.00	\$1.00



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Commonwealth Solar **Commercial Rebate Levels**

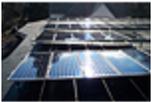
Example Project Size (kW) and Rebate Using Base Incentive and MA Company Component Adder		
Project Size	Total Incentive	Rebate Level (~\$/watt)
25	\$82,500	\$3.30
50	\$161,250	\$3.23
100	\$318,750	\$3.19
200	\$533,750	\$2.67
300	\$688,750	\$2.30
400	\$843,750	\$2.11
500	\$998,750	\$2.00

Example Public Project Size (kW) and Rebate Using Base Incentive, Public and MA Company Component Adders		
Project Size	Total Incentive	Rebate Level (\$/watt)
25	\$107,500	\$4.30
50	\$211,250	\$4.23
100	\$418,750	\$4.19
200	\$733,750	\$3.67
300	\$988,750	\$3.30
400	\$1,243,750	\$3.11
500	\$1,498,750	\$3.00



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PV Financial Model in Massachusetts

Commonwealth Solar

Assumptions:

- System size: 100 kW
- Installed cost: \$7.00 / Watt
- Incentive: \$3.18 / Watt *(45% from Comm Solar)*
- Avoided e-: \$0.15 / kWh
- Elec. escalator: 3%
- Project life: 30 years

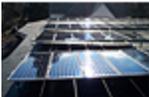
Results:

- Payback: Year 5
- Est. Return: 10%



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Commonwealth Solar

www.masstech.org/solar

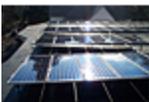
508-439-5700

<p>Renewable Energy Trust</p> <p>Overview</p> <p>News Room</p> <p>Programs for:</p> <ul style="list-style-type: none"> Individuals Businesses and Nonprofits Communities Clean Energy Entrepreneurs Energy Generation Project Developers Affordable Housing Developers Purchase Clean Energy (Clean Energy Choice) Education and Outreach Resources Policy Efforts Information on Clean Energy Technologies Search/View Trust Projects Solicitations/Consulting Opportunities Receive Email Updates <p>Energy Information</p> <ul style="list-style-type: none"> Introduction Why Clean Energy Is Important Technologies Green Buildings MA Installations 	<p>Overview</p> <p>In January 2008, the Patrick Administration and the Massachusetts Renewable Energy Trust introduced a bold new initiative, Commonwealth Solar, to accelerate the number of solar electric photovoltaic (PV) projects within the Commonwealth and spur growth of the Massachusetts solar industry. Commonwealth Solar provides rebates through a non-competitive application process for the installation of PV projects at residential, commercial, industrial, and public facilities. commercial projects are eligible for rebates for PV projects up to 500 kilowatts (kW) and residential projects are eligible for up to 5 kW. The applicant (and project site) must be a customer of a Massachusetts investor-owned electric utility.</p> <div> </div> <div> </div> <div> <p>Welcoming Letter from Secretary of Energy and Environmental Affairs Ian Bowles</p> </div> <div> <p>Solar for Your Home</p>  <p>If you are interested in installing a solar PV system on your home, follow this link >></p> </div> <div> <p>Solar for Your Business</p>  <p>If you are interested in installing a solar PV system for your business, follow this link >></p> </div> <div> <p>Solar Installers and Integrators</p>  <p>If you are an installer and would like information on submitting an application for your clients, follow this link >></p> </div> <p>For more information on the Renewable Energy Trust and Commonwealth Solar, view the left navigation and items below:</p>
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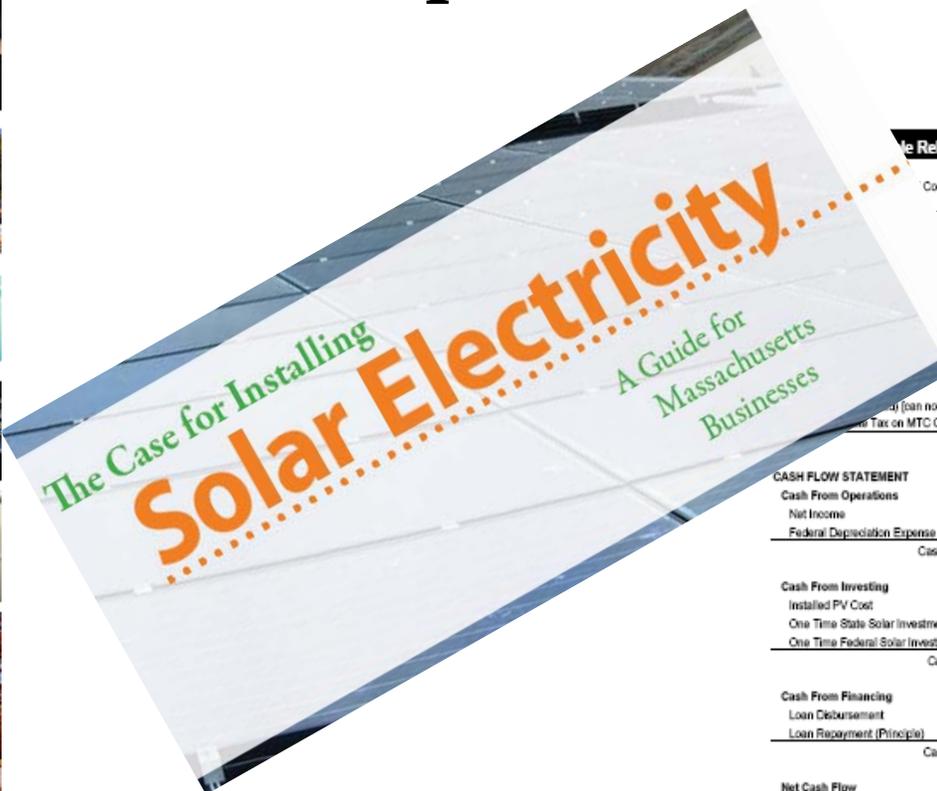


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Step 2: Educate Yourself



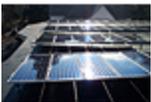
Capital Cost Rebate: Pro Forma Project Economics											
Cost	\$	8,585	\$	8,798	\$	9,017	\$	9,241	\$	9,470	\$
	\$	3,096	\$	3,051	\$	3,035	\$	3,020	\$	-	\$
Revenue (Avoided Costs)	\$	11,651	\$	11,849	\$	12,052	\$	12,261	\$	9,470	\$
	\$	(500)	\$	(515)	\$	(530)	\$	(548)	\$	(563)	\$
	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Operating Expenses	\$	(500)	\$	(515)	\$	(530)	\$	(548)	\$	(563)	\$
EBITDA	\$	11,151	\$	11,334	\$	11,522	\$	11,715	\$	8,908	\$
	\$	(72,250)	\$	(115,800)	\$	(69,360)	\$	(41,616)	\$	(41,616)	\$
EBIT	\$	(61,099)	\$	(104,266)	\$	(57,838)	\$	(29,901)	\$	(32,708)	\$
	\$	-	\$	-	\$	-	\$	-	\$	-	\$
EBT	\$	(61,099)	\$	(104,266)	\$	(57,838)	\$	(29,901)	\$	(32,708)	\$
	\$	21,736	\$	36,850	\$	20,606	\$	10,834	\$	11,728	\$
(can not deduct federal depreciation expense)	\$	(1,004)	\$	(1,020)	\$	(1,037)	\$	(1,054)	\$	(802)	\$
Net Income	\$	(116,961)	\$	(68,436)	\$	(38,269)	\$	(20,121)	\$	(21,781)	\$
CASH FLOW STATEMENT											
Cash From Operations											
Net Income	\$	(116,961)	\$	(68,436)	\$	(38,269)	\$	(20,121)	\$	(21,781)	\$
Federal Depreciation Expense	\$	72,250	\$	115,800	\$	69,360	\$	41,616	\$	41,616	\$
Cash Flow From Operations	\$	(44,711)	\$	47,164	\$	31,091	\$	21,495	\$	19,835	\$
Cash From Investing											
Installed PV Cost	\$	(237,500)									
One Time State Solar Investment Tax Deduction (Actual Cash Value)	\$	38,250									
One Time Federal Solar Investment Tax Credit	\$	127,500									
Cash Flow From Investing	\$	(237,500)	\$	165,750	\$	-	\$	-	\$	-	\$
Cash From Financing											
Loan Disbursement	\$	-									
Loan Repayment (Principle)	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Cash Flow From Financing	\$	-	\$	-	\$	-	\$	-	\$	-	\$
Net Cash Flow	\$	(237,500)	\$	121,039	\$	47,164	\$	31,091	\$	21,495	\$
Cumulative Cash Flow	\$	(237,500)	\$	(116,461)	\$	(69,297)	\$	(38,206)	\$	(16,711)	\$
											\$
											3,124

<http://www.masstech.org/cleanenergy/cando/howto.htm>



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Commercial Flat Roof Mount



Large Onsite Renewables Initiative – 24.3 kW
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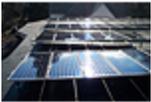


Flat Roof w/ Pitched Mounting



Large Onsite Renewables Initiative – 117 kW
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FLAT ROOF W/ PITCHED MOUNTING



Large Onsite Renewables Initiative - MIT- 40 kW

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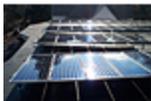
Commonwealth Wind (CommWind) Program Summary

- **Governor Patrick's Goal**
 - 2000MW by 2020
- **Strategic Plan – 3 Segments**
 1. Commercial
 2. Community
 3. Small or Micro
 - Funding via rebates, grants, loans



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CommWind

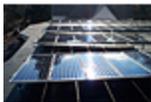
Commercial

- Wholesale projects
- Multiple turbines
- Work with development community to identify sites including state lands
- Solicitation due in July 2009
- Offerings:
 - Feasibility study grant
 - Unsecured pre-development loans
 - Levels similar to previous Pre-Development Financing Initiative



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CommWind

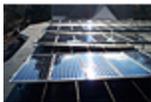
Micro

- Under 100kW
 - Currently 1-10kW
 - Expanding to 1-99kW in Summer 2009
- Replaces Small Renewables
- Funding via rebate hybrid:
 - Part based on system capacity
 - Part based on actual production



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CommWind

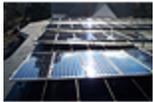
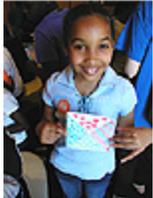
Community Scale

- 100kW and up
- 50% onsite use of energy or net-metered
- Typically 1 or 2 turbine projects
- Replaces:
 - Wind portion of Large Onsite Renewables
 - Community Wind Collaborative
- Funding for:
 - Site Assessment,
 - Feasibility Studies
 - Design & Construction



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Community Scale

Block 1

- Competitive
- Applications due June 4th
- Under review

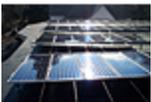
Block 2

- Non competitive, rolling
- Solicitation in late summer
- Some changes from Block 1



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Community Scale – Block 1

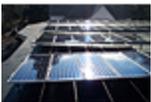
Site Assessment Services

- Eligible Applicant = public entities only
- Eligible sites:
 - 6.0 meters per second @ 70M AGL (effective) per wind map
- Service performed by MRET consultants at no charge to entity
- Entity must:
 - Submit a complete application
 - Assign primary contact
- Entity receives:
 - Desktop analysis of potential project site
 - Site visit
 - Site Assessment Report



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Community Scale – Block 1

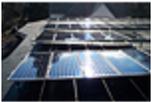
Feasibility Study Grant

- Eligible Applicant = any ratepayer
- Eligible Projects $\geq 100\text{kW}$ & net metered or BTM
- Eligible Sites:
 - Wind speed ≥ 6.0 mps @ 70 AGL (actual)
 - Setbacks:
 - Local zoning or
 - 1.1x max tip height from property lines
 - 2.0x max tip height from residences
 - Otherwise; project support from affected abutters
- Complete applications
 - including site assessment



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Community Scale – Block 1

Feasibility Study Grant - continued

- Funding Levels

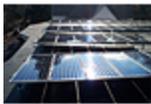
100-599kW
600kW+

Non-Public		Public	
Basic	With Met Tower	Basic	With Met Tower
\$20,000	\$30,000	\$30,000	\$50,000
\$40,000	\$55,000	\$65,000	\$85,000



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Community Scale – Block 1

Feasibility Study Grant - continued

• Project Timeframes

Projects **with** Met Towers:

- Obtain Building permit: 4 months
- Draft Report: 18 months
- Final Report: 21 months
- Public Biz Planning: 30 months

Projects **without** Met Towers:

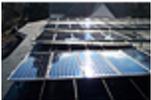
- Draft Report: 6 months
- Final Report: 9 months
- Public Biz Planning: 18 months

No exceptions, no extensions



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Community Scale – Block 1

Design & Construction Grant

- Eligible Applicant = any ratepayer
- Eligible Projects $\geq 100\text{kW}$ & net metered or BTM

Eligible Sites:

- Wind speed thresholds @ Hub heights

Hub Heights	Wind speed (m/s)
30 - 39	5.2
40 - 49	5.4
50 - 59	5.6
60 - 69	5.8
70+	6.0

➤ Setbacks:

- Local zoning or
- 1.1x max tip height from property lines
- 2.0x max tip height from residences
- Otherwise; project support from affected abutters

- Complete applications



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Community Scale – Block 1

Design & Construction Grant - continued

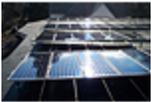
- Funding Levels

Capacity (kW)	Non-Public	Public
100	\$150,000	\$225,000
225	\$300,000	\$450,000
250	\$310,000	\$465,000
600+	\$400,000	\$600,000



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Community Scale – Block 1

Design & Construction Grant - continued

- **Project Timeframes**

- File applications for all major permits: 6 months
- Public entities – Issue RFP for construction: 12 months
- Execute all construction contracts: 18 months
- Order Turbine and commence construction: 24 months

One-time extension of 3 months for any of the milestones



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Community Scale – Block 1

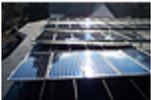
Design & Construction Grant - Payment process

- Design phase 20% of grant
- Order Equipment 15%
- System Installation 50%
- Commissioning & PTS 15%



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Massachusetts Maritime Academy

Vestas V47 660 kW



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Jiminy Peak Ski Resort

1,500kW Hancock, MA



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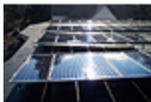
Holy Name High School

Worcester, MA Vestas RRB 600kW



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Massachusetts Renewable Energy Trust

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