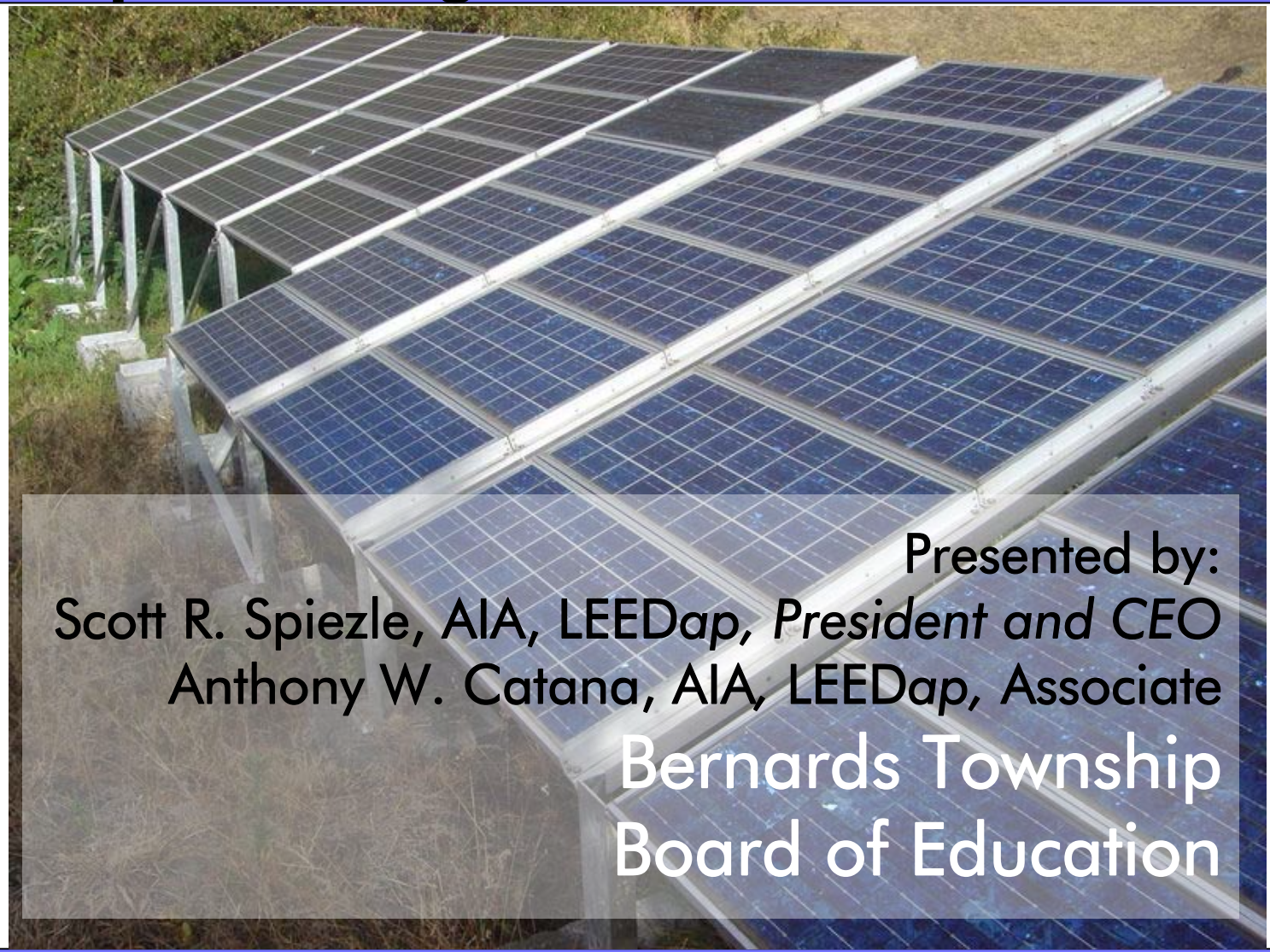
Implementing Photovoltaic Panels



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Bernards Township
Board of Education

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What are Photovoltaic (PV) Panels?

- Panels made of silicon convert sun's light directly into electricity.
- Two main types, thin-film and Crystalline.
  - Thin film is about 6-9% efficient but more flexible in applications such as roof shingles, roof membranes, and solar glass film.
  - Crystalline panels are more common, bluish green, 14-18% efficient and used in 2x4 panel arrays on roofing or mounting systems.

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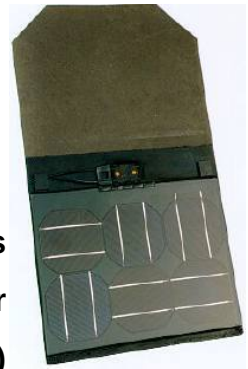
Experience with PV Systems

- Thin Film:



10KW Solar Shingles (Proposed for Rider University 150-bed dorm)

Solar Glass (Installed 2.5 KW Microsoft School of the Future, Philadelphia, PA, 2006)

EPDM/Rubber Roof with Integrated Thin Film Panels

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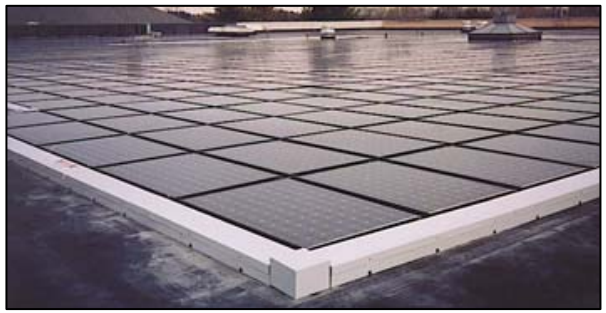
Experience with PV Systems

- Crystalline:



Flat Mounted Roof System (2 50KW Systems installed @ Howell Twp., 2003)

40KW Free Standing System & Parking Structure Cover (Center for Great Expectations, 2006)

Tilt Angle Flat Mounted Roof System (2 50KW Systems Hopewell Twp., 2006/07; 8KW MSOTF 2006)

Slope Mounted PV (8KW Holmes Residence, Manchester, NJ, 2007)

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Benefits of PV Systems

- Economic
  - Reduce operating costs by offsetting electric use.
  - Generate income through SREC's (Solar Renewable Energy Credits-
    - Currently $300 moving to $500/credit by end of 2008):
    - Each time a solar electric system generates 1000kWh (1MWh) of electricity, an SREC is issued which can then be sold or traded separately from the power.
    - *Example:* 100KW = 100MWh or $50,000 SREC value
- Environmental
  - Reduce fossil fuel consumption and lowering greenhouse gas emissions.
- Social
  - Educate students, staff, and parents on renewable energy.
  - Integrate lessons into science, math, and environmental studies.

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Available Funding for PV

- NJ Clean Energy Program (NJCEP)*
  - Sliding scale based on size of system:
    0 to 10,000 watts (10KW) = $4.10/watt
    10.1KW to 40KW = $3.15/watt
    40.1KW to 100KW = $2.50/watt
    100.1KW to 500KW = $2.30/watt
    500.1KW to 700KW = $1.85/watt
  - Maximum Public School rebate calculated based on enrollment and State aid per year
  - Bernards Township School District
    Maximum Approved incentive is $287,340

* Based on current program regulations. Note current year funding is exhausted. New projects are in queue until new funding is approved for 2008/2009. Rates are subject to change.

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Economics of PV for Bernards:

Solar Power Financing Worksheet:

	Project Cashflows		
Year	1	2	3
	Avoided Cost of Grid Energy	Solar REC's	Project Income
1	$ 14,315	$ 58,399	$ 72,714
2	$ 14,956	$ 56,636	$ 71,591
3	$ 15,625	$ 54,889	$ 70,514
4	$ 16,324	$ 53,239	$ 69,563
5	$ 17,055	$ 51,604	$ 68,659
6	$ 17,818	$ 50,064	$ 67,882
7	$ 18,615	$ 48,539	$ 67,154
8	$ 19,448	$ 47,186	$ 66,634
9	$ 20,319	$ 45,541	$ 65,860
10	$ 21,228	$ 43,954	$ 65,182
11	$ 22,178	$ 42,422	$ 64,600
12	$ 23,170	$ 40,944	$ 64,114
13	$ 24,207	$ 39,517	$ 63,724
14	$ 25,290	$ 38,140	$ 63,430
15	$ 26,422	$ 36,811	$ 63,233
16	$ 27,605	$ -	$ 27,605
17	$ 28,840	$ -	$ 28,840
18	$ 30,130	$ -	$ 30,130
19	$ 31,479	$ -	$ 31,479
20	$ 32,887	$ -	$ 32,887
21	$ 34,359	$ -	$ 34,359
22	$ 35,897	$ -	$ 35,897
23	$ 37,503	$ -	$ 37,503
24	$ 39,181	$ -	$ 39,181
25	$ 40,935	$ -	$ 40,935
	$ 635,786	$ 707,885	$ 1,343,671
Average	$ 25,431.4	$ 28,315	$ 53,747

Expected 7 year Average

$69,725.00

*** Based on *Capital Financial Advisors, Inc*

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Economics of PV for Bernards:

SIMPLE PAYBACK:

100KW system cost installed: *$814,742.00

NJCEP incentive: **($287,340.00)

Estimated District System First Cost: $527,402.00

Expected 7 year Average Revenue***: $69,725.00

Simple Payback: 7.56 years

* Actual Proposal from Seacoast Builders, Inc.

** Based on NJCEP approved and assigned rebate MM05885

*** Based on *Capital Financial Advisors, Inc*

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Environmental Benefits of PV

100KW:

- 820 tons CO2 emissions avoided
- 246 Acres of trees planted
- Not driving 2,255,000 miles

* 30 year impact extrapolated from OK Produce Case Study at http://www.powerlight.com/success/okproduce.php

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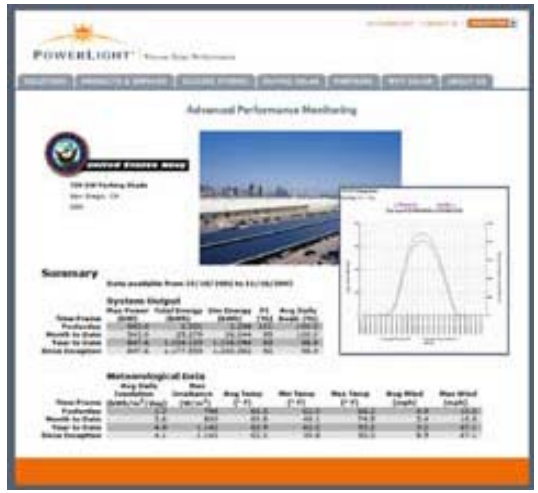
Social Benefits of PV for Bernards Township

- Interactive teaching tool for math and natural sciences:
  - Online, real time energy generation data collection and display.
  - Weather impacts on power generation and available sun days.



- Public Education and Awareness
  - Interactive kiosk for display in lobby area.

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