
Professional Development Workshop #RECon16


Brick and Mortar Goes Solar: Successful Renewable Energy Initiatives

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An Evolving Mindset



Year	Vinyl record sales (millions)
2010	2.8
2011	3.6
2012	4.6
2013	6.1
2014	9.2
2015	11.9

Source: 2015 Nielsen Music U.S. Report




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Increased Interest in Green Buildings

Retail History and Forecast (\$billions)

Year	History (\$ billions)	Forecast (\$ billions)
2007	24	
2008	18	
2009	10	
2010	10	
2011	10	
2012	10	12
2013	10	14
2014	10	16

Share of Green Activity in Retail

Year	Green Activity (\$ billions)	Share (%)
2012	\$6 billion	35%
2013	\$7 billion	40%

Top Triggers for Green Building (All Respondents)

Trigger	2015 (%)	2012 (%)	2008 (%)
Client Demand	40%	35%	34%
Environmental Regulations	35%	23%	25%

Source: World Green Building Trends 2015; United States

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Green Market Research

Enough solar to cover?

1 MILLION from 1954 to 2010
2 MILLION by 2018
3 MILLION by 2019
1 MILLION ANNUALLY by 2025

Number of US solar installations is growing exponentially...

Source: SEIA

Equivalent CO₂ sequestration?

Of the 1,000,000 installations in the US:

- 942,000 RESIDENTIAL
- 56,500 COMMERCIAL
- 1,500 UTILITY

1 Million Installations OFFSET 34 Million Metric Tons of CO₂ Annually

Source: SEIA

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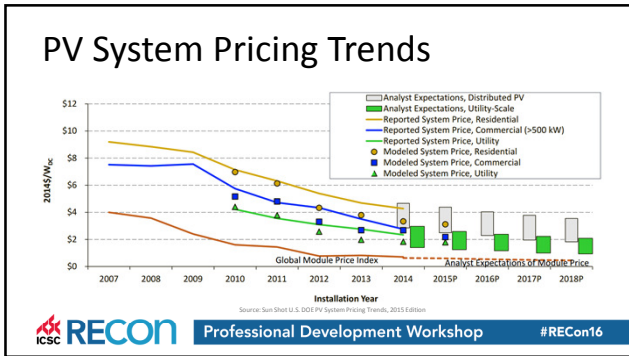
ITC Extension

ITC Eligibility

Year	% ITC
2015	30%
2016	30%
2017	30%
2018	30%
2019	30%
2020	25%
2021	20%
2022	10%
2023	10%

Source: % ITC

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- ### Top Obstacles
- Lack of political support/incentives
 - Higher perceived first costs
 - Lack of public awareness

 - Short term leases
 - Assignability/credit
 - Reroofing
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Reroofing

 <p>Standing Seam</p> <ul style="list-style-type: none"> • No penetrations • 50+ year life • Low cost PV installation 	 <p>Corrugated Steel</p> <ul style="list-style-type: none"> • 30+ year life • Require 2-4 penetrations/module • Older roofs often missing fasteners
 <p>Single Ply Membrane</p> <ul style="list-style-type: none"> • Attachments at corners • ~15-30 year life 	 <p>Built Up Roofing (B.U.R.)</p> <ul style="list-style-type: none"> • Attachments at corners • Max life span of 25 years

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Reroofing

Hot Mop Tar & Gravel



- Archaic roofing method
- Usually needs to be replaced
- Attachments at corners

Foam Roof



- Relatively delicate roof material
- Difficult to install on, as anchors are costly

Justifying a Reroof prior to PV

- Often the tendency is to put off PV contract due to not wanting to replace roof now
 - Prove that it makes financial sense to replace/not replace the roof now
 - Many cases, the annual PV generated savings are larger than the annual value of the roof

Calculating the Annual Value of a roof

- **Step 1:** Figure out how many SqF of the roof the PV system will cover (make sure to add some extra around the array)

	Membrane/Composition	Corrugated Steel	Standing Seam
Roof Replacement Cost	Multiply SqF by 3	Multiply SqF by 4.5	Multiply SqF by 6
Annual Roof Value	Divide cost by 30	Divide cost by 30	Divide cost by 50

- No. < 1 = You have a winner
- You will want to know how much roof life the old roof has left.
 - If you're unsure, a roofer might need to be sent out to determine
- The annual roof cost should only be deducted from the PV generated annual savings for the number of years left in the old roof

Option to Replacing a Roof

- The Henry Company makes a silicone coating that can be sprayed onto a worn out roof
- It is every bit as tough as a high quality single ply membrane roof and has a 20 year warranty
 - 30 year warranties available as well
- Just as thick as a single ply membrane
- Cost averages \$3.00 per square foot



Advantages of a Silicone Membrane

- It is a smart roof and reflects over 95% of heat from the sun
- Building will be cooler with this product installed
- Fast installation with no building down time
- Old roof does not have to be removed and dumped in landfill
 - More environmentally friendly
- IRS views it as roof maintenance so it can be fully depreciated in year 1
 - Normal reroof must be depreciated over 34 years



Solar Carports



Case Study #1 -- Whole Foods Market

- Retrofit 100 stores with solar power
- Locations such as CT, NJ and NY
- Purchasing power from SolarCity at a discount to current electricity costs, locking in low solar energy rates for years into the future.



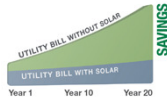
5 Ways You Can Go Solar

1. PPA (Power Purchase Agreement)
2. Shared Savings Model
3. Community Solar / Rooftop Lease
4. PACE (Property Assessed Clean Energy)
5. FIT (Feed-in Tariffs)

#1) PPA/Solar Lease -- (Full Service Properties/High CAM Charges)

	Solar PPA (Power Purchase Agreement)	Solar Lease
Monthly costs	Pay only for the power you produce	Pay a fixed monthly fee with annual true up
Upfront costs	No upfront costs	
Performance guarantee	100% Guaranteed system performance for the lifetime of the agreement	
Savings	Start saving on day one	
System Owner	Solar Provider/Developer	

- Deal Structure:**
- Investment grade credit or equivalent
 - Term length: Typically 10 – 20 years
 - Longer terms = larger savings
 - 20 Year terms are best option



#1) PPA/Solar Lease -- Continued

What Happens After PPA Term?

- Renew PPA/Solar Lease
- System is removed at no cost
- Purchase at FMV

#3) Community/Remote Solar & Rooftop Lease

Continued

Earn additional revenue through solar.

- Turn underutilized rooftop into a top-line revenue stream
- REIT receives an annual rooftop lease and the solar provider sells the power to off-site off-takers

No roof space? No problem.

- With virtual net metering, the solar provider can develop and install solar arrays on vacant land that feed into the grid
- In return, the utility will provide you with energy credits to offset your facilities' energy bill



#4 PACE (Property Assessed Clean Energy)

What is PACE?

- PACE was conceived for:
 - Public Good: Benefit society through lowering building's environmental impact
 - Equalized Incentives: Provide a structure for property owners (current & future) and tenants to share in the cost and benefits of property upgrades
- PACE is not a government program but a legal framework that allows for private financing of property assessments
- PACE has achieved strong growth across the nation
 - Almost \$2B in financed projects since 2008



(#4) PACE Pros & Cons

Pros:

- The PACE bond takes the form of a transferable assessment on the property, enabling the payment obligation and improvements to stay with the building even under a change of ownership
- The PACE bond is paid back through the PPA
- No upfront costs



Cons:

- Property tax assessments are "senior" to other types of debt, meaning they must be paid off first, even before mortgage debt

(#4) PACE Loan Vs. PACE Lease

PACE Loan:

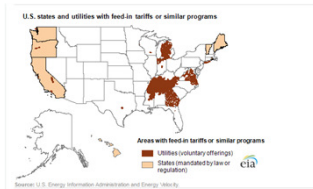
- \$0 Cap Ex
- Customer owns system from day 1
- Customer receives Federal Tax Credit + depreciation
- Ideal for properties with a tax appetite

PACE Lease:

- \$0 Cap Ex
- Lowest rate on day 1
- Federal Tax Credit & depreciation rolled into energy rate
- Ideal for properties with little/no tax appetite

#5 FiT (Feed-in Tariffs)

- A FIT program typically guarantees that customers who own a FIT-eligible renewable electricity generation facility
- Receive a set price from their utility for all of the electricity they generate and provide to the grid
- Performance based incentive
- Similar to that of a production tax credit and RECs of an RPS market



Case Study #2 -- BJ's Wholesale Club

SOLAR PROJECT HIGHLIGHTS	
Year	2013 and 2014
Location	MA, MD, NJ
Installation Type	Roof and ground mounted
Size	5.5 MW-DC total
Avg. Annual Production	4.8 million kWh across all sites
Electricity Offset	(1) ?
Monthly Bill Savings	(2) ?
Expected Payback	(3) ?
Financing	PPAs



BJ's Wholesale Club -- Project Keys/Thoughts to Success

1. [Redacted] (1) ?
2. [Redacted] (2) ?
3. [Redacted] (3) ?
4. [Redacted] (4) ?

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Battery Storage

- Solar PPA only addresses "energy" (\$/kWh) charges from the grid
- Utility tariffs also have demand charges based on \$ / kW costs
 - Able to store "over-generation" (e.g. when PV production exceeds the site load)
- Solar + storage technology offers peak demand reduction and a lower \$/kW rate than the utility

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Battery Storage continued

How DemandLogic works.

12 PM Your system is at full production, charging your battery and reducing your need for utility power.

5 PM As solar production decreases, the battery is intelligently discharged to reduce peak demand charges.

10 PM You draw power from the utility company at night at lower off-peak demand rates.

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