

# How Building Owners Save by Solar PV & SPF Roofing Systems

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- ▶ It is and shall remain the policy of the Spray Polyurethane Foam Alliance ("SPFA"), and it is the continuing responsibility of every SPFA member company, SPFA meeting or event participant, as well as SPFA staff and leadership to comply in all respects with federal and state antitrust laws. No activity or discussion at any SPFA meeting or other function may be engaged in for the purpose of bringing about any understanding or agreement among members to (1) raise, lower or stabilize prices; (2) regulate production; (3) allocate markets; (4) encourage boycotts; (5) foster unfair or deceptive trade practices; (6) assist in monopolization; or (7) in any way violate or give the appearance of violating federal or state antitrust laws.
- ▶ Any concerns or questions regarding the meaning or applicability of this policy, as well as any concerns regarding activities or discussions at SPFA meetings should be promptly brought to the attention of SPFA's Executive Director and/or its legal counsel.



# About Standard Solar, Inc.

- Founded in 2004
- Headquartered in Rockville, MD and offices in California, Florida, New Jersey, South Carolina and Texas
- Leading solar developer, EPC contractor & owner / operator
- Nearly 1500 PV installations around the country
- Full service support includes development, engineering, installation, financing and operation & maintenance; All needed solar services, provided thru one capable company.



► *Standard Solar was named one of the Fastest Growing Private Companies in America by Inc. magazine for four consecutive years.*



# Standard Solar -- A Leader in Solar PV; Focusing on C & I + M.U.S.H Markets in the USA, with in-house roofing expertise



Ground Mounts



Parking Structures



Roof Mounts

Customer Types and Services Offered					
Utility DG	Commercial/ Industrial	Government	Educational	Agricultural	Nonprofit
<ul style="list-style-type: none"> <li>• Turnkey Development</li> <li>• Interconnection Management</li> <li>• Financing</li> <li>• Cash</li> <li>• PPA</li> <li>• Incentive Mgmt</li> <li>• O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Turnkey Installation + Project Mgmt</li> <li>• EPC</li> <li>• Financing</li> <li>• Grants</li> <li>• PPA</li> <li>• Cash</li> <li>• Incentive Mgmt</li> <li>• O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Turnkey Installation + Project Mgmt</li> <li>• GSA Contract Member</li> <li>• ARRA</li> <li>• DOD Relationship</li> <li>• O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Turnkey Installation + Project Mgmt</li> <li>• Financing</li> <li>• PPA</li> <li>• Cash</li> <li>• Educational Programs</li> <li>• O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Turnkey Installation + Project Mgmt</li> <li>• EPC</li> <li>• Financing</li> <li>• Grants</li> <li>• PPA</li> <li>• Cash</li> <li>• Incentive Mgmt</li> <li>• O&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>• Turnkey Installation + Project Mgmt</li> <li>• EPC</li> <li>• Financing</li> <li>• Grants</li> <li>• PPA</li> <li>• Cash</li> <li>• Incentive Mgmt</li> <li>• O&amp;M</li> </ul>



# Roofing + Solar: A Collective Approach

- ▶ Buildings are typically owner occupied.
- ▶ Owners are often interested in energy efficiency measures, including the benefits of solar.
- ▶ Owners are typically concerned about their roofs, future leaks and longevity of their roofing system.
- ▶ Imagine a holistic approach; where great care is taken to collectively develop the project from a solar/roof integration perspective.
- ▶ An unbeatable combination.



# This Fundamental Match is the Foundation of the Client Saving Money.

- ▶ The host customer will save on physical energy consumption, by the nature of the SPF characteristics. They will also save on energy costs, by the nature of the Solar PV and financially feasible options to integrate both into their building environment.
- ▶ This collective approach will help companies reach their sustainability goals faster and with greater success.
- ▶ Roof restoration / repair can be included in the financing of the solar system, which requires no upfront capital from the host customer.



# Types of Roof Racking Systems: Penetrating

- ▶ Required for light construction, high wind zones & metal buildings.
- ▶ Typically requires fastening into roof structure.
- ▶ Penetrations readily sealed with SPF and Liquid Applied Membranes.



# Types of Racking Systems: Non-Penetrating or Ballasted.

- ▶ Panels are supported by skids resting on roof surface.
- ▶ Panels are held in place by ballast, aka concrete blocks & other weighted materials.
- ▶ Mounting panels in this way has not caused problems with the SPF roofs.
- ▶ Ballasted racking systems may delay the evaporation of water. This should be a design consideration when selecting your SPF liquid membrane system.





# There is a Marriage between the Roof and Roof Supported Solar PV Systems

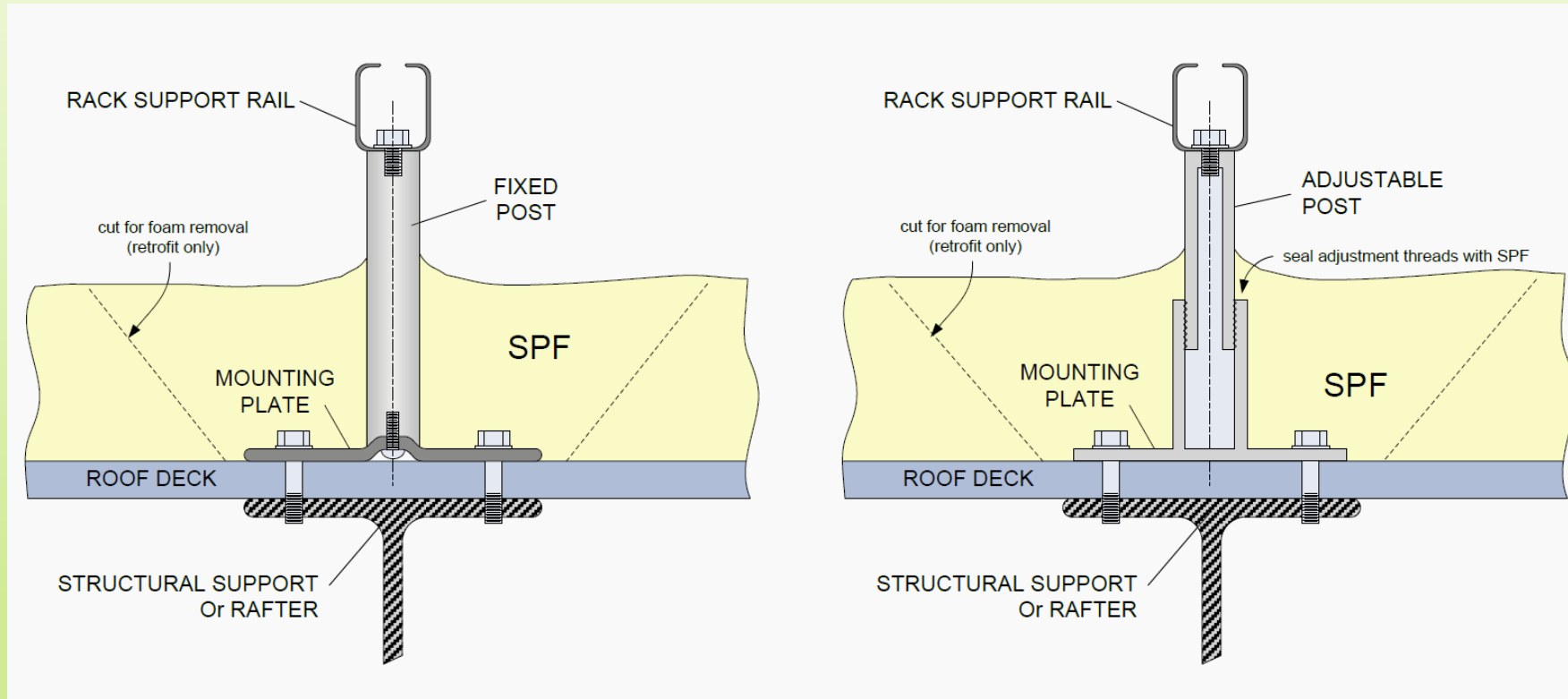


Typical Penetrating Rack-Mounted PV System



Typical Ballasted PV Rack System (prior to PV panel installation)

# Mounting Options with SPF & Liquid Membranes or Coating Systems



# Typical Roof Mounting Options



Penetrating attachments with post/beam.



# Additional Roof Mounting Options



Typical roof curb with truss supports.



Trusses between penetrating stand-offs.



# Ballasted Solar Racking



Non-penetrating, ballasted solar racking system

Ballasted solar racking systems can be utilized after the roof has been restored.



Non-penetrating, ballasted solar racking system

# The Best Solar PV & Roofing System

- ▶ Solar PV has amazing production characteristics. With nominal annual degradation, the system can still be producing above 85% after 25 years of service.
- ▶ The solar PV system will continue to produce energy for many years, beyond the “contracted period”.
- ▶ Matching a roofing system to the longevity of the Solar PV system is paramount to the success of the project.
- ▶ SPF and coatings play a very important role in achieving this.





# The Marriage between PV & the Roof

- ▶ On the solar side, work with a company of integrity; one who is focused on the clients' objectives. Confirm they are using Tier 1 components and their systems are financeable.
- ▶ Determine the "right path" for funding of the PV system. Matching the procurement method with what is most beneficial for the client is critical.
- ▶ Team up with like minded roofing companies that share the same client focus, goals and objectives.



# Overview of Solar Financing Options

	Pricing Options		
	Cash Purchase	Lease*	PPA
<b>Ownership of System</b>	Customer	Financier/Lessor	Financier/PPA provider
<b>Operation &amp; Maintenance Expenses</b>	Customer's responsibility & expense	Included in the lease	Included in the PPA rate [\$0.064/kwh]
<b>SREC Ownership</b>	Customer	Retained by Financier	Retained by Financier
<b>Ownership of Tax Benefits (ITC, depreciation)</b>	Customer	Financier/Lessor	Financier/PPA provider
<b>Contract Term</b>	None, outright purchase	7-20 year Lease, with option to extend or buy	20-25 year PPA , with option to renew or buy
<b>Capital Needs</b>	One-time upfront cost [\$5,834,880]	Zero or low upfront cost	No Upfront Cost
<b>Additional Benefits</b>	No recurring monthly payments unless client borrows to pay for the system	Fixed Monthly payments for the use of the system independent of electricity generation	Specified rate for energy generated by the system
	Hedge against future increases in the electricity rates	Fixed price of the electricity over the long term	Fixed price of the electricity over the long term

Notes: \* Lease product is available only to for-profit entities

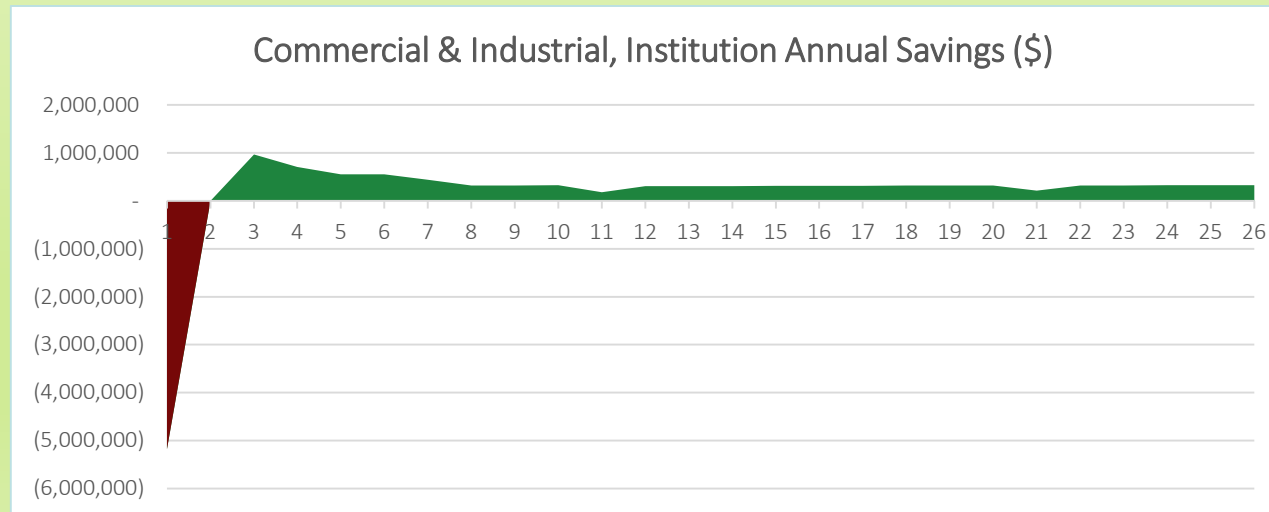


# An Outright Solar Purchase

- Requires upfront investment by the host customer
- Savings realized over the life of the solar asset
- Customer retains ownership of all tax credits and financial incentives
- No long-term contract required
- O & M (Operating & Maintenance) is the responsibility of the owner



# Outright Solar Purchase Analysis



# Power Purchase Agreement (PPA) Option

- No upfront investment required and savings are realized right away
- PPA provider takes care of the system maintenance and monitoring
- Customer indirectly benefits from the tax incentives utilized by Financier through lower PPA rates
- Customer pays only for the kW hours generated by the solar PV system
- Customer enters into long-term contract (15, 20 & 25 year terms )
- Great choice for non-profits, government agencies and those wanting to invest in operations, versus energy systems.

Note: Standard Solar has more than \$300 million available to finance solar + roof PPA's. More and more solar companies are exploring this trend.



# PPA Option Scenario; Significant Savings

	Utility Rate (\$/kWh)	PPA Rate (\$/kWh)	kWh Generated	Utility Payments	PPA Payments	Savings	Cumulative Savings
1	0.080	0.064	5,188,000	415,040	332,032	83,008	83,008
2	0.082	0.065	5,162,060	421,224	336,979	84,245	167,253
3	0.083	0.067	5,136,250	427,500	342,000	85,500	252,753
4	0.085	0.068	5,110,568	433,870	347,096	86,774	339,527
5	0.087	0.069	5,085,016	440,335	352,268	88,067	427,594
6	0.088	0.071	5,059,591	446,896	357,517	89,379	516,973
7	0.090	0.072	5,034,293	453,554	362,844	90,711	607,684
8	0.092	0.074	5,009,121	460,312	368,250	92,062	699,746
9	0.094	0.075	4,984,076	467,171	373,737	93,434	793,181
10	0.096	0.076	4,959,155	474,132	379,306	94,826	888,007
11	0.098	0.078	4,934,359	481,197	384,957	96,239	984,246
12	0.099	0.080	4,909,688	488,366	390,693	97,673	1,081,920
13	0.101	0.081	4,885,139	495,643	396,514	99,129	1,181,048
14	0.103	0.083	4,860,713	503,028	402,422	100,606	1,281,654
15	0.106	0.084	4,836,410	510,523	408,419	102,105	1,383,758
16	0.108	0.086	4,812,228	518,130	414,504	103,626	1,487,384
17	0.110	0.088	4,788,167	525,850	420,680	105,170	1,592,554
18	0.112	0.090	4,764,226	533,685	426,948	106,737	1,699,292
19	0.114	0.091	4,740,405	541,637	433,310	108,327	1,807,619
20	0.117	0.093	4,716,703	549,708	439,766	109,942	1,917,560
21	0.119	0.095	4,693,119	557,898	446,319	111,580	2,029,140
22	0.121	0.097	4,669,654	566,211	452,969	113,242	2,142,382
23	0.124	0.099	4,646,305	574,647	459,718	114,929	2,257,312
24	0.126	0.101	4,623,074	583,210	466,568	116,642	2,373,954
25	0.129	0.103	4,599,958	591,900	473,520	118,380	2,492,334





# Solar Friendly States; Not All Are.

- ▶ Important SEIA facts, using schools as an example:
  - ▶ Top 10 states with solar power systems (by capacity and by number)

State	Capacity (kW)
California	217,636
New Jersey	91,410
Arizona	66,288
Massachusetts	25,400
Nevada	15,215
Pennsylvania	10,812
Ohio	8,526
Connecticut	8,428
Maryland	8,349
New York	7,316

State	No. Schools
California	963
New Jersey	379
Illinois	268
Arizona	226
Massachusetts	181
Florida	163
New York	160
Nevada	147
Wisconsin	147
Utah	98

*Top Tens includes several 'northern' states*



# PV-Ready Roofs Help Your Client Plan for the Future

- Solar stanchions or legs can be installed prior to the installation of a polyurethane foam roof system to make the building “Solar ready”



Additional passes of SPF are applied, followed by protective elastomeric coating to finish “Solar Ready” roof

# In Summary

- ▶ SPF Roofs work extremely well with Solar Arrays.
- ▶ Solar is a very important part of saving on energy costs and protecting the environment.
- ▶ They can both be integrated into one PPA, where the client can avoid spending their money on roofs or solar arrays, yet benefit from both.
- ▶ Let's get started. There are so many building owners that can benefit from a collective and collaborative approach to solving roof and energy challenges together.
- ▶ There is no limit to project size, in taking advantage of collective solutions.



# Questions - Please





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# Standard Solar Provides All Aspects of Solar PV Integration, with Years of Experience



Client Name:

University of Maryland

Location:

College Park, MD

Type:

Power Purchase Agreement

Project Highlights:

- Use of Maryland Project Sunburst Grant
- Installation completed without interruption to normal school operations
- Provided full turn-key solution from engineering to construction
- Financing provided by third party financial partner
- Equivalent to eliminating emissions from more than 65,000 gallons of gas

System Performance at a Glance	
System Size/Type	632 kW
Yearly Generation	762 MWh
Supporting Structure	Ballasted
Modules	2,632 Panels
Completed	September 2011



# With More Than \$7 Billion in Assets, We Can Fund Your Next Project



Smithsonian Environmental  
Research Center

Client Name:

Smithsonian SERC

Location:

Edgewater, MD

Type:

ESCO

Project Highlights:

- Standard Solar provided the engineering, procurement, construction and commissioning. The project was financed using an ESCO contract
- LEED Platinum Laboratory facility

## System Performance at a Glance

System Size/Type	310 kW
Yearly Generation	400 MWh
Supporting Structure	Rooftop and Carport
Modules	1,050 Panels
Completed	Fall 2014





# Acknowledgement of content & data



MED | Ed 2017



August 24, 2017



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# Acknowledgement of content & data

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