Solar Opportunities for Businesses and Non-Profits Starts at 3 pm



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Today's Agenda



Who, what, where, when, & why solar can help your business.

Define your goals for solar

- Prioritize...
 - Lower operating overhead
 - Increase sales
 - Hedge against rising electric costs
 - Utilization of tax credits and depreciation benefits
 - Additional revenue streams
 - Meet customer demand for sustainability
 - Show environmental leadership in your sector
 - Be "green"

Solar can help achieve All of the items listed above.

Find partners to develop and finance a project that meets most of your specific goals and needs.



What are photovoltaics (PV)?

Simple, Reliable, Proven Technology



Sunlight converted directly into electricity



Long lasting warrantied power production



No batteries necessary, works with the grid

2 Main Project Structures



On-Site Solar



Broomfield Detention Center, 100 kW

Modules create DC power

Inverters turn DC into AC power

Net Metering allows power to be used on site or sent to grid



- 1. Solar Electric Array
- 2. Inverter/s
- 3. Existing Electrical Service (Breaker Boxes)
- 4. Utility Electrical Grid Feeder Line

On-Site Solar

Ground Mounts



Source: Soltage, LLC

Ground-mounted arrays require clear flattish, uninhibited land on same lot as electric user.

Rooftops



Source: Soltage, LLC Roof-mounted arrays typically require newer roofs. Can be placed on almost any roofing material.

Carports



Source: Standard Solar Carport canopy arrays typically require relatively flat (<10° grade) parking lot.



Excess system production is automatically fed onto grid. You receive credit for the energy you put onto the grid and you save money when you consume the energy you produce.

Off-Site Solar



LaPorte Solar Farm 1 MW

Remote solar array sends energy to the grid

Solar production is measured

Distribution or transmission "delivers" energy to subscribing consumers

Customer/consumer gets credits on their electric bills



Lafayette Solar Garden 500kW x2

Off-Site Solar

Virtual Net Metering (VNM)



Virtual Net Metering refers to when solar is not used on-site but is instead externally installed and the subscriber receives bill credits from their utility.

Community Solar



Similar to Virtual Net Metering, **Community Solar** helps clients harness clean energy from remote solar assets via utility programs.

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Choose Your Method

	Buying	Lease	Solar PPA
Upfront Capital?	Yes	Little to None	Little to None
Performance Risk?	Yes	Yes	No
System Knowledge Required?	Yes	Generally, Yes	No
Maintenance Required?	Yes	Yes	No
Purchase Required?	Yes	Yes, with option to re-lease	No
Recognize ALL Tax Benefits?	Yes	Depends on Lease	No
Recognize ALL Savings?	Yes	Yes	No
Insurance or Prop Tax Payments?	Yes	Yes	No
Purchase Required?	Yes	Yes, with option to re-lease	No

- Strong partners will offer all options and assist in uncovering the best solutions for you
- Own and realize all benefits
 - Best for most profitable corporations
 - For on-site only
 - Appetite for tax credits and depreciation usually needed to pencil
 - All benefits pass to asset owner (you).
 - · Comfort in owning, monitoring, and maintaining equipment (however minimal)
 - Finance options:
 - Cash, Loan, Property Assessed Clean Energy finance ("PACE")
- Third Party Ownership
 - Can be on or off-site
 - Typically best for municipalities and non-profits
 - Also good for very risk averse corporations not wanting to utilize capital
 - Little to zero capital requirement
 - No tax credit or depreciation appetite necessary
 - No monitoring and maintenance requirement
 - Finance options:
 - Power Purchase Agreement ("PPA") a.k.a. Solar Services Agreement ("SSA")
 - Capital Lease (much like a loan)
 - Equipment Lease
 - Realize less benefits than ownership



Businesses are taking advantage of multiple incentives to go solar.



Current incentive climate creates excellent investment opportunities.

30% Federal Tax Credit

- Would you like some of your taxes back?
- Carry up to 20 years forward



50% Bonus Depreciation

Projects completed before 2018 will receive a year one 50% bonus depreciation

Plus Standard MACRS 5 Year Property Rules

Include Bonus Depreciation													
		Year 1 year 2		Year 3	Year 4	Year 5	Year 6						
Bonus Depreciation (if applicable)		\$137,067						TOTAL					
5 Year MACRS Rate		20.00%	32.00%	19.20%	11.52%	11.52%	5.76%	100.00%					
5 Year MACRS Amount		\$27,413	\$43,862	\$26,317	\$15,790	\$15,790	\$7,895						
Total Depreciation		\$164,481	\$43,862	\$26,317	\$15,790	\$15,790	\$7,895	\$274,135					
This is not tax-advice - si	imply SunMath's best gues	ss of how to calculate MACR	S										
For precise calculations on	how the MACRS depreci	ation ends up saving busine	ss's money, contact SunM	ath at 855.SUNMAT H.									

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Under these amendments, eligible property placed in service after January 1, 2012 and before January 1, 2018 qualifies for 50% first-year bonus depreciation.

REC (SREC) Sales

(some markets)

- REC/SREC = 1 MWh of solar production
- Open REC markets are growing in popularity
- Pricing varies between \$525 to \$20/SREC
- Can be worth more than energy savings



SREC Market Prices

Recent SREC Prices

State/Year	Last Sale	Auction
<u>Delaware</u>		
2010	\$40.00	July-2012
2011	\$45.00	July-2012
2012	\$40.00	Sep-2012
Maryland		
2010	\$140.00	Dec-2012
2011	\$140.00	Dec-2012
2012	\$140.00	Dec-2012
Massachusetts		
2012	\$206.96	Dec-2012
New Jersey		
2011	\$130.00	Aug-2012
2012	\$82.00	Dec-2012
2013	\$85.00	Dec-2012
<u>Ohio</u>		
2010 In	\$180.00	May-2012
2011 In	\$120.00	Aug-2012
2012 In	\$35.00	Dec-2012
2010 Out	\$30.00	Jan-2012
2011 Out	\$8.99	Dec-2012
2012 Out	\$8.99	Dec-2012
Pennsylvania		
2011	\$16.25	Aug-2012
2012	\$15.00	Nov-2012
2013	\$8.99	Dec-2012
Washington D.	<u>C.</u>	
2010	\$300.00	Aug-2012
2011	\$300.00	Dec-2012
2012	\$308.61	Dec-2012
View All	SREC Market	Prices

Notes: "In" refers to in-state SRECs, "Out" refers to SRECs generated by any eligible facility (can be in-state or out-ofstate). Prices listed reflect the last sale price of all SRECs eligible in current energy years.

http://www.srectrade.com/background.php

A bit about...
CHOOSING YOUR PARTNERS

To RFP or Not to RFP?

- Request for Proposals ("RFP")
 - May be requirement in large organizations
 - Typical for large projects
 - Adds to customer workload
 - Problematic before design is complete
 - May not be able to compare apples to apples
 - Low bid may not be most qualified
 - Best method is to pay for comprehensive design first
- Request for Qualifications ("RFQ")
 - Small to large projects
 - If going design-build route, only need to generalize project parameters
 - Easier to compare apples to apples
 - Increases likelihood of finding best partner for your chosen "method"
 - May not be the cheapest option
 - Allows for design to evolve for best results



Do you need local, regional, national, or international partners?

Installers and finance partners cover many varying market segments.



2008: Residential & Commercial? 2013: national expansion

2017: Hundreds of clients

Partners with some history of satisfied customers.

Most solar companies were formed after year 2000.

Partners must know the process for YOUR jurisdiction.

From concept to commissioning, they will manage the process for you and should make going solar easy, <u>BUT it does</u> take teamwork.



Financial and Technical Expertise Required



Extensive financing experience: Power Purchase Agreements, Leasing, Conventional Loans, PACE, new market tax

credits, and many more

Engineering is Critical: System engineering

team with experience in your scale of project is very important



Combined staff experience is irrelevant! Call on references! How many similar projects?

Some Additional Points...



Installers and finance partners that are members of state trade organization



Companies that are members of national trade organization



Raising Standards. Promoting Confidence.

North American Board Certified Energy Practioner ("NABCEP")

TECHNICAL SOLUTIONS





Ballasted Roof Mount Racking

Typically non-penetrating construction does not void roof warranty. Minimum burden and modular assembly. Meets or exceeds local wind rating.





Ground Mount Racking

Aluminum or galvanized construction. Pile driven, ground screws, or pour in place. Full stamped structural engineering. Meets or exceeds local wind rating.



Flush Mount Racking

All aluminum construction. Less than 2.5 lbs per square foot installed. Long manufacturer's warranties.



Production vs. Consumption Monitor

Your IT Department can link/embed display within your website and/or in your lobby helping enhance your sustainable image.

Best States for Commercial or Municipal Solar (markets change often, don't just pass)



Expanded Solar Campaign?

Identify and qualify maximum benefit locations and implement a National Solar Initiative.

ESTIMATE PROJECT RESULTS

Environmental Benefits (sample)

See your benefits over conservative 30 year System Life

12,355 Trees	15,222 Pounds	5,398,484 Pounds
Equivalent Full Grown Carbon Absorbing Trees	Amount of Smog & Acid Rain Pollutants Prevented	CO2 Emissions Prevented

Local Economy Benefits (sample)

During 20 year standard term

		GREEN
Approx \$8,560,000	Approx 3,160 days	Approx 6.5
Contributed to the local Economy	Full Time man days of work during construction	Long term jobs permanently created

Model Energy Cost Savings

Your PV Systems will produce about 97349 kWh per year. This results in first year kWh cost savings of ~\$4509 on your current rate, reducing your grid consumption by about 73.9%



Cost vs. Earnings: Solar via Loan



Model Rate Comparisons (sample)

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Annual kWh Offset System Tilt 73.97% select 15.0 degrees Avg Month Load Factor ummer On-Peak 70.0% estimated Annual On-Peak 29.9% percent >30% OK for SPVTOU Select 15.0 degrees Avg Month Load Factor ummer On-Peak 29.9% percent >30% OK for SPVTOU Select 29.9% percent >30% OK for SPVTOU Select 15.0 degrees Avg Month Load Factor Select 15.0 degrees Avg Month Load Factor Select 29.9% percent >30% OK for SPVTOU Select 29.9% percent >	STC 68	64 DC kW		\$ 0.100	\$/kWh		SG	3	SGL		C SG-	+PV SGL+P	C+PV SPV	/TOU
Annual kWh Offset System Tilt Select 15.0 degrees Avg Month Load Factor ummer On-Peak 29.9% percent Annual On-Peak 29.9% percent Sale of the setimated of the set match of						-\$5.0								
System Tilt 73.97% -\$10,000 select 15.0 degrees Avg Month Load Factor -\$10,000 ummer On-Peak 70.0% estimated 32.6% Before Solar After Solar After Solar Annual On-Peak 29.9% percent >30% OK for SPVTOU \$4,508 \$8,245 \$13,947 \$8,390 Estimated Future Annual Electric Bills Bill Savings			An	nual kWh Off	set	\$3,0		_						
select 15.0 degrees Avg Month Load Factor Before Solar After Solar	System T	ilt		73.97%		-\$10.0								
Avg Month Load Factor Before Solar Before Solar After Solar	select 1	5.0 degrees				-\$10,0	100							
Summer On-Peak 70.0% estimated 32.6% Before Solar After Solar After Solar Annual On-Peak 29.9% percent >30% OK for SPVTOU Before Solar After Solar			Avg	Month Load F	actor				_	_				
Annual On-Peak 29.9% percent >30% OK for SPVTOU Image: constraint of the system Standard S	ummer On-Peak 70.	0% estimated		32.6%				Be	fore	Sola	ar	Af	ter Solar	
Standed Future Annual Electric Bills SGL C SGL+PV C+PV SPVTOU SG+PV SGL+PV C+PV SPVTOU SG+PV SGL+PV C+PV SPVTOU Total Bills \$18,012 \$26,893 \$14,891 \$13,504 \$9,768 \$4,065 \$9,622 SGL+PV C+PV SPVTOU	Annual On-Peak 29.	9% percent	>30	% OK for SPV	TOU									
Estimated Future Annual Electric Bills Bill Savings B											\$4,508	\$8,245	\$13,947	\$8,390
Xcel Rate SG SGL C SG+PV SGL+PV C+PV SPVTOU SG+PV SGL+PV C+PV SPVTOU Total Bills \$18,012 \$26,893 \$14,891 \$13,504 \$9,768 \$4,065 \$9,622 SGL+PV C+PV SPVTOU	Estimated Future Annu	al Electric Bills									Bill Savings	Bill Savings	Bill Savings	Bill Savings
Total Bills \$18,012 \$26,893 \$14,801 \$13,504 \$9,768 \$4,065 \$9,622	Xcel Rate SG	SGL	С	SG+PV	SGL+PV	C+PV	SPVTOU				SG+PV	SGL+PV	C+PV	SPVTOU
	Total Bills \$18,0	12 \$26,893	\$14,891	\$13,504	\$9,768	\$4,065	\$9,62	22						
REC Reward N/A N/A N/A \$9,735 \$9,735 \$9,735 \$9,735	REC Reward	J/A N/A	N/A	\$9,735	\$9,735	\$9,735	\$9,73	35						
Net Bills \$18,012 \$26,893 \$14,891 \$3,769 \$33 -\$5,669 -\$112 (negative number indicates payment to Solar owner)	Net Bills \$18,0	12 \$26,893	\$14,891	\$3,769	\$33	-\$5,669	-\$11	12 (ne	egative	num	ber indicates	payment to So	lar owner)	
per kW Charge \$20.68 \$5.55 \$0.00 \$20.68 \$5.55 \$0.00 \$10.47 average annual weighted	per kW Charge \$20	.68 \$5.55	5 \$0.00	\$20.68	\$5.55	\$0.00	\$10.4	17 ave	average annual weighted					
per kWh Charg \$0.0463 \$0.1740 \$0.1099 \$0.0463 \$0.1740 \$0.1099 \$0.0824 average annual weighted	per kWh Charc \$0.04	63 \$0.1740	\$0.1099	\$0.0463	\$0.1740	\$0.1099	\$0.082	24 ave	erage a	annua	al weighted			
Note: This spreadsheet does not take into account peak demand changes from peak reduction due to PV because this cannot be guaranteed, therefore it is conservative estimate.	Note: This spreadsheet do	oes not take into a	ccount peak dei	mand changes	from peak redu	uction due to PV	because this	s canr	not be g	guara	nteed, therefor	e it is conservat	ive estimate.	
IF overgeneration is present in any month it is estimated as a credit on that months bill at full kWh value in this analysis, like "Continious Roll Over". Annual over production designs will skew analysis	IF overgeneration is prese	nt in any month it	is estimated as	a credit on that	months bill at t	full kWh value in	this analysis	s, like	"Conti	nious	Roll Over". An	nual over produ	ction designs wil	skew analysis
	SPVTOU Rates assume a	n input % of cons	umed On Peak	and remainder	consumed Off	Peak (Peak time	is Mon-Fri 1	2pm t	to 8pm	in Ju	ine thru Sep ON	ILY)		

Model Cash Flows (sample)

Financial Assur 1st Year k Turn h ITC In Federal Investr	Nick Perugini 303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 NPerugini@303-817-3104 Net Perugini@303-817-3104 Net Perugini@30-817-8104 Net Net Perugini@30-810-810-8104 Net Net Perugini@30-810-810-810-910-910-910-910-910-910-910-910-910-9							93.6%							
Year	Installation Cost and O & M	Estimated Loan Amount	30% Federal Tax Credit	Other Incentive	Depreciation Tax Shield MACRS Value	-0.50% Estimated kWh Solar Production	On-Site Avoided kWh Cost	REC, PBI, FIT Reward	Estimated IF Property Taxes (Some Exempt)	\$58,972.50 Estimated Insurance	Tax on Income Less Expenses	Loan Payments	Loan Interest Tax Deduction Value	Annual Effective Cash Flow	Sq. Ft. estimated Cumulative Cash Flow
0	-\$1,236,457	\$618,228	\$366,219	\$0		1,166,083	\$49,836	\$35,221	-\$13,745	-\$1,731	\$0	-\$76,887	\$10,574	-\$248,740	-\$248,740
1	-\$5,504				\$239,685	1,160,252	\$51,571	\$35,045	-\$13,458	-\$1,695	-\$5,469	-\$76,887	\$9,517	\$232,805	-\$15,934
2	-\$5,642				\$63,916	1,154,451	\$53,365	\$34,870	-\$13,177	-\$1,660	-\$5,470	-\$76,887	\$8,459	\$57,775	\$41,841
3	-\$5,783				\$38,350	1,148,679	\$55,222	\$34,696	-\$12,902	-\$1,625	-\$5,468	-\$76,887	\$7,402	\$33,005	\$74,846
4	-\$5,927				\$23,010	1,142,936	\$57,144	\$34,522	-\$12,633	-\$1,591	-\$5,462	-\$76,887	\$6,345	\$18,520	\$93,366
5	-\$6,075				\$23,010	1,137,221	\$59,133	\$34,349	-\$12,370	-\$1,558	-\$5,453	-\$76,887	\$5,287	\$19,436	\$112,803
6	-\$6,227				\$11,505	1,131,535	\$61,190	\$34,178	-\$12,112	-\$1,525	-\$5,440	-\$76,887	\$4,230	\$8,911	\$121,714
/	-\$6,383					1,125,877	\$63,320	\$34,007	-\$11,859	-\$1,494	-\$5,424	-\$/6,88/	\$3,172	-\$1,548	\$120,166
8	- \$0,543					1,120,248	200,523 \$47,804	\$33,837	-\$11,612	-\$1,462	- \$5,405	-\$76,887	\$2,115	- \$433	\$119,732
10	- \$6,706					1,114,040	\$70,004	\$33,000	-\$11,370	-\$1,432	- \$5,362	-376,007	\$1,057	\$78.898	\$120,405
11	-\$7.046					1 103 528	\$72,605	\$33,332	-\$10,900	-\$1,402	-\$5,326	50	50	\$81 291	\$280.674
12	-\$7,222					1.098.010	\$75,132	\$33,165	-\$10,673	-\$1,344	-\$5,293	\$0	50	\$83,764	\$364,438
13	-\$7,402					1,092,520	\$77,746	\$32,999	-\$10,451	-\$1,316	-\$5,257	\$0	\$0	\$86,320	\$450,758
14	-\$7,587					1,087,058	\$80,452	\$32,834	-\$10,233	-\$1,289	-\$5,217	\$ 0	\$0	\$88,960	\$539,718
15	-\$66,750					1,081,622	\$83,251	\$32,670	-\$10,019	-\$1,262	\$0	\$0	\$0	\$37,891	\$577,609
16	-\$7,972					1,076,214	\$86,149	\$32,507	-\$9,810	-\$1,236	-\$5,127	<u>\$0</u>	\$0	\$94,511	\$672,120
1/	-\$8,1/1					1,0/0,833	\$87,147	\$32,344	- \$7,606	-\$1,210	-\$5,077	<u>>U</u>	>U 50	\$7/,42/	\$/67,54/
10	- 30,373					1,005,477	\$72,247 \$95.459	\$32,103	- \$7,405	-\$1,105	- \$5,024	00	04	\$100,442	\$973 549
20	-\$8,799					1.054.851	\$98,781	50	-\$9.017	-\$1,136	SO	\$0	\$0	\$79,829	\$1.053.379
21	-\$9,019					1,049,577	\$102,219	\$0	-\$8,829	-\$1,112	\$0	\$0	\$0	\$83,259	\$1,136,637
22	-\$9,245					1,044,329	\$105,776	\$0	-\$8,645	-\$1,089	\$ 0	\$0	\$0	\$86,798	\$1,223,435
23	-\$9,476					1,039,107	\$109,457	\$0	-\$8,465	-\$1,066	\$0	\$0	\$0	\$90,450	\$1,313,885
24	-\$9,713					1,033,911	\$113,266	\$0	-\$8,288	-\$1,044	\$0	\$0	\$0	\$94,221	\$1,408,106
25	-\$9,955					1,028,742	\$117,208	\$0	-\$8,115	-\$1,022	<u>\$0</u>	<u>\$0</u>	\$0	\$98,115	\$1,506,221
26	-\$10,204					1,023,598	\$121,286	<u>\$0</u>	-\$7,946	-\$1,001	\$0 \$0	\$0 \$0	\$0 \$0	\$102,135	\$1,608,357
27	-\$10,457					1,018,480	\$125,507 \$129,875	<u> </u>	-\$7,780	-3780	ο ο ο ο ο ο ο ο ο ο ο ο ο ο	<u> </u>	20 50	\$106,288 \$110,576	\$1,714,044
29	-\$10,721					1.008.321	\$134,394	50	-\$7,459	-\$939	50	<u>50</u>	\$0	\$115.007	\$1,940,228
30	-\$11,264					1,003,279	\$139,071	\$0	-\$7,304	-\$920	\$0	\$0	\$0	\$119,584	\$2,059,812
20 Yr Total	-\$1,427,230	\$618,228	\$366,219	\$0	\$399,475	22,246,418	\$1,406,460	\$671,948	-\$226,677	-\$28,549	-\$95,618	-\$768,866	\$58,159	\$973,549	\$973,549
30 Yr Total	-\$1,525,810	\$618,228	\$366,219	Ş0	\$399,475	32,560,721	\$2,564,229	\$671,948	-\$308,840	-\$38,896	-\$95,618	-\$768,866	\$58,159	\$1,940,228	\$1,940,228

All figures are presented to the best of our ability and knowledge of facts and forecasts. We are not financial advisors. Verification with an independent third party financial analysis expert is recommended.

*REC, Rebates, and PPA electric payments are considered taxable income

This document may contain statements concerning taxation. These statements or any other estimated amounts are provided for standard illustrative purposes. They are not intended to constitute tax advice, and are not intended to be used or relied upon, to avoid penalties. Consult your tax advisor for verification on your specific circumstance.

On site surveys must be performed to verify existing conditions and exact final price.

Some Questions for You?

- What hurdles do you see for your business?
- Why wouldn't you go solar?



Your Future Install Here ???? kW

Next Steps...

Choose Your Method and Partners
 Letters of Intent or Term Sheets
 Interconnection/Incentive Applications
 Final Agreements and Contracts
 Approvals, Engineering, & Construction
 Reap the benefits of Going Solar!

Must Attend to Learn More:

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