



ASSET MANAGEMENT WEBINAR SERIES



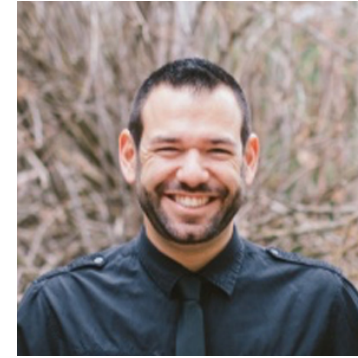
Local
Government
SUSTAINABLE ENERGY
Coalition

TerraVerde
ENERGY



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| INTRODUCTIONS

TerraVerde Energy

- ▶ An independent energy advisory firm
- ▶ Feasibility, project development, and asset management services
- ▶ Solar, battery storage, and energy efficiency
- ▶ 10 years: \$390 Million in projects
- ▶ Solar: 70 MWs, Battery: 13 MWs, Energy Efficiency: 300+ buildings
- ▶ CEC & NREL Projects, working with CCAs developing software and programs to incentivize implementation of DERs

Today's Session:

HOW TO ASSESS & EXECUTE A PPA BUYOUT

Did you miss part 1:

BEST PRACTICES IN MANAGING SOLAR ASSETS?

Find the recording at lgsec.org/events

AN INTRODUCTION TO SOLAR

POWER PURCHASE AGREEMENTS





- ▶ The system is owned, operated, and maintained by a third party, your PPA Provider
- ▶ They sell your agency the energy produced by the system
- ▶ They also harvest the rebates (CSI), incentives (ITC), and RECs connected to the system

These agreements have stated energy rates, and often include rate escalators

Section 1.2 Energy Charges

Subject to the provisions hereof, Customer shall pay an aggregate monthly charge equal to the Energy Charge for all Solar Electricity delivered hereunder pursuant to Exhibit "C" and Section 6.2 hereof, provided that during the first year of the Initial Term the applicable energy rate ("Energy Rate") shall be \$0.125 per kwh, and annually thereafter during the Initial Term and any the Additional Extension Periods the Energy Rate shall escalate on the anniversary of the Operations Commencement Date by 3.9% over the prior year's Energy Rate.

These agreements typically include options to for the power purchaser (your agency) to buy the system.

The windows for these buyouts typically begin after the 6th year, based on IRS requirements around the ITC

Purchaser Option to Purchase. At the end of the sixth (6th), eight (8th), and tenth (10th) Contract Years and at the end of the Initial Term and each Additional Term, so long as Purchaser is not in default under this Agreement, Purchaser may purchase the System from Seller on any such date for a purchase price equal to the Fair Market Value of the System.

SOLAR PPA BUYOUTS

WHY CONSIDER?

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- ▶ Bottom line, in many cases, a buyout can save your agency money
- ▶ The cost of solar has dropped considerably, lowering the market value of these systems
- ▶ Your PPA rate likely has an escalator, and you may be upside down relative to your avoided energy costs
- ▶ In some cases, agencies have had difficult experiences with their PPA providers, and want to break away

SOLAR PPA BUYOUTS

HOW TO APPROACH



1. Review Your Existing Power Purchase Agreement
2. Explore Your Options for Sources of Capital for the Purchase
3. Assess the System's Current Condition
4. Understand the Costs & Risks of Ownership
5. Analyze the Financial Benefit of a Buyout
6. Reach an Agreement with Your Provider on the Buyout Price



- ▶ **Power Purchase Rate & Escalator** - Are you upside down?
- ▶ **Buyout Options & Procedures** - Are you able to buyout your provider? What steps have they outlined?
- ▶ **Purchase Amount / Valuation Process** - How will the purchase price be established?



- ▶ Cash
- ▶ Certificate of Participation (COP) Financing
- ▶ Tax Exempt Loan
- ▶ Bond
- ▶ A new PPA Provider



- ▶ **Physical Condition of the Solar Facility** - What (if any) deferred maintenance, repairs, or upgrades may be needed?
- ▶ **System Performance** - To what extent is the solar project producing the amount of electricity guaranteed in the warranties on the panels and inverter?
- ▶ Request a **maintenance log** from the PPA provider, along with **warranties**? Are they still intact (maintenance requirements)?



- ▶ Will the **inverters** need to be replaced?
How soon? Cost?
- ▶ What other **repairs** are required to bring the system back into optimal working condition
- ▶ What will the strategy be for **managing the system** (monitoring, preventive maintenance, corrective maintenance, performance analysis & reporting)
- ▶ How much will it cost to **insure**?

- ▶ Performance Monitoring
- ▶ Preventive Maintenance: annual inspections & maintenance
- ▶ Corrective Maintenance: outages, underperformance, soiling
- ▶ Energy & Financial Performance Analysis



ANNUAL REPORTS

Financial Performance



2016-2017 Fiscal Year Solar Performance Executive Summary

I. Financial Performance

Metric (Phase I)	Projection	Actual	Percentage
Avoided Cost of Electricity	\$549,035	\$508,283	93% ¹
CSI Rebate Payments	\$428,117	\$916,856	214% ²
REC Sales	\$6,517	---	--- ³
O&M Costs	(\$84,394)	(\$73,106)	86%
Financing Costs	(\$566,544)	(\$566,544)	100%
Net Savings	\$332,731	\$785,489	236%

Metric (Phase II) ⁴	Projection	Actual	Percentage
Avoided Cost of Electricity	\$163,410	\$147,807	90% ⁵
CSI Rebate Payments	\$128,178	\$106,040	78% ⁶
REC Sales	\$1,053	---	---
O&M Costs	(\$31,953)	(\$24,969)	78%
Prop 39 Grant	\$462,898	\$462,898	100%
Solectria Outage Payment	---	\$15,600	---
Net Savings	\$723,586	\$707,376	98%

II. Technical Performance

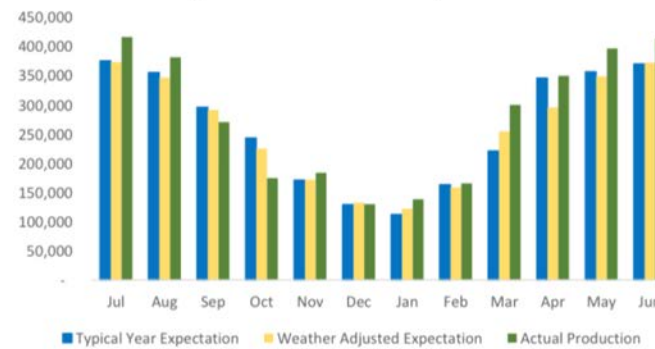
Metric	Projection (kWh)	Actual (kWh)	Percentage
Solar Energy Production I	3,142,545	3,322,565	106%
Solar Energy Production II	937,626	830,638	89%
Client Energy Usage I	3,429,614	2,861,165	83%
Client Energy Usage II	1,045,939	970,266	93%

ANNUAL REPORTS

Energy Performance

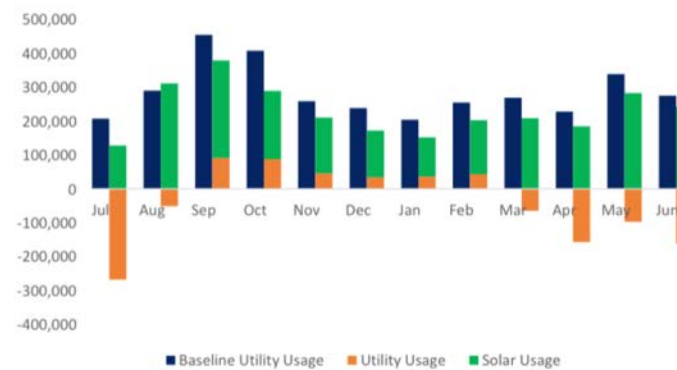
Client Phase I Total

Solar Energy Production Relative to Expectations 105.7%



Utility Usage Relative to Baseline: -113.5%

Total Usage Relative to Baseline: -16.6%



ANNUAL REPORTS

Annual Inspection

Preventative Maintenance Summary

Preventative maintenance and inspection was performed at each site. This preventative maintenance is necessary to maintain inverter warranties and to ensure the long term functionality of the systems. The preventative maintenance includes:

- I-V Curve Tracing
- Checking for burned fuses
- Checking for electrical hot spots
- Validating torque marks
- Visually inspecting inverters, disconnect switches, combiner boxes, pyranometers, and array racking
- Performing inverter maintenance according to manufacturer's specifications
- Testing ground fault values at the inverters

Site	Finding	Recommended Action	Status
Site 1	Bird nests found in the back of the inverter and under the array.	Client should remove bird nests when possible.	Open
Site 2	No maintenance issues found during the annual inspection.		
Site 3	I-V Curve showed string anomaly. Likely broken module or wire connection issue.	TerraVerde will work with our maintenance team to determine the best solution.	Open
Site 4	Inverter 1 has a blown fan capacitor.	TerraVerde has provided a work order to replace the damaged fan. At the time of writing our maintenance team is preparing to schedule the visit once the fan parts are delivered.	Open
	Bird nests found in the array racking.	Maintenance technician cleared the bird nests from the array.	Complete
Site 5	No maintenance issues found		
Site 6	There is tree overgrowth near the inverter and disconnects.	Client should trim tree near the inverter equipment pad.	Open
	Inverter equipment pad gate can be opened without opening the lock	Client should address issue with gate lock	Open

ANNUAL REPORTS

Maintenance Record

Corrective Maintenance Summary

TerraVerde monitors the system production and alarms in 15 minute increments every day of the year. TerraVerde determined many of these alarms to be false positives and did not escalate those issues. Of the remaining alarms, several issues were related to site connectivity and were resolved through contact with the District IT team. The remaining alarms required corrective action. In general, TerraVerde detects an issue through the online portal and then works with client personnel to fully diagnose the situation on site. TerraVerde works with the client to ensure that installers and manufacturers are held to their warranties, minimizing the cost of corrective maintenance work. The following table is a list of the detected alarm events, the corrective action taken, and the result of the corrective action.

Site	Issue and Resolution	Status
Site 1	In December, TerraVerde alerted installer that production was lower than normal. Installer dispatched a technician who initiated a replacement of one inverter under warranty.	Complete
	In January, the installer monitoring system stopped transmitting data. TerraVerde alerted installer who confirmed that a case had been created and a technician scheduled to visit the site.	Complete
Site 2	No issues identified from July 2016 through June 2017.	
Site 3	In January, the PV system stopped transmitting data. TerraVerde identified the issue and worked with district IT to restore data communication.	Complete
	In April, the inverter began intermittently derating or shutting off. TerraVerde identified the issue and after initially working with the client to power cycle the inverter, we dispatched installer under a client signed work order to repair the inverter.	Complete
	In June, the PV system stopped transmitting data. TerraVerde identified the issue and worked with our maintenance team during the site's annual inspection visit to restore power the monitoring equipment.	Complete
Site 4	No issues identified from July 2016 through June 2017.	
Site 5	No issues identified from July 2016 through June 2017.	
Site 6	No issues identified from July 2016 through June 2017.	



FINANCIAL MODEL THAT ACCOUNTS FOR

- ▶ PPA rate / escalator
- ▶ Projected solar performance (factoring degradation)
- ▶ Cost of capital
- ▶ Asset management & module washing
- ▶ Inverter Replacement
- ▶ Insurance
- ▶ Revenues from REC sales

EXAMPLE BUYOUT ANALYSIS

PPA PAYMENTS

vs

OWNERSHIP: PPA BUYOUT W/ TAX EXEMPT LOAN

ANNUAL DIFFERENCE

Year	PPA Price	PPA Payments	Debt Service Private Tax Exempt Loan	Asset Management Services	Module Washing	Inverter Replacement Year 21	Insurance	Annual Cost of Ownership	Annual Difference PPA vs. Ownership	Cumulative Difference PPA vs. Ownership
2009	\$ 0.1250	\$ (146,616.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2010	\$ 0.1299	\$ (150,802.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2011	\$ 0.1349	\$ (152,869.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2012	\$ 0.1402	\$ (165,203.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2013	\$ 0.1457	\$ (156,486.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2014	\$ 0.1514	\$ (171,832.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2015	\$ 0.1573	\$ (177,195.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2016	\$ 0.1634	\$ (182,725.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2017	\$ 0.1698	\$ (188,427.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
BUYOUT PRICE		\$ 2,314,550								
2018	\$ 0.1764	\$ (194,307.00)	\$ (129,846)	\$ (20,000)	\$ (2,750)	\$ -	\$ (1,700)	\$ (154,296)	\$ 40,011	\$ 40,011
2019	\$ 0.1833	\$ (200,371.00)	\$ (129,846)	\$ (20,700)	\$ (2,819)	\$ -	\$ (1,734)	\$ (155,099)	\$ 45,272	\$ 85,283
2020	\$ 0.1904	\$ (206,624.00)	\$ (129,846)	\$ (21,425)	\$ (2,889)	\$ -	\$ (1,769)	\$ (155,929)	\$ 50,695	\$ 135,978
2021	\$ 0.1978	\$ (213,072.00)	\$ (129,846)	\$ (22,174)	\$ (2,961)	\$ -	\$ (1,804)	\$ (156,786)	\$ 56,286	\$ 192,264
2022	\$ 0.2055	\$ (219,722.00)	\$ (129,846)	\$ (22,950)	\$ (3,035)	\$ -	\$ (1,840)	\$ (157,672)	\$ 62,050	\$ 254,314
2023	\$ 0.2136	\$ (226,579.00)	\$ (129,846)	\$ (23,754)	\$ (3,111)	\$ -	\$ (1,877)	\$ (158,588)	\$ 67,991	\$ 322,304
2024	\$ 0.2219	\$ (233,650.00)	\$ (129,846)	\$ (24,585)	\$ (3,189)	\$ -	\$ (1,914)	\$ (159,535)	\$ 74,115	\$ 396,419
2025	\$ 0.2305	\$ (240,941.00)	\$ (129,846)	\$ (25,446)	\$ (3,269)	\$ -	\$ (1,953)	\$ (160,513)	\$ 80,428	\$ 476,847
2026	\$ 0.2395	\$ (248,461.00)	\$ (129,846)	\$ (26,336)	\$ (3,351)	\$ -	\$ (1,992)	\$ (161,525)	\$ 86,936	\$ 563,783
2027	\$ 0.2489	\$ (256,215.00)	\$ (129,846)	\$ (27,258)	\$ (3,434)	\$ -	\$ (2,032)	\$ (162,570)	\$ 93,645	\$ 657,428
2028	\$ 0.2586	\$ (264,210.00)	\$ (129,846)	\$ (28,212)	\$ (3,520)	\$ -	\$ (2,072)	\$ (163,651)	\$ 100,559	\$ 757,987
2029	\$ 0.2687	\$ (272,456.00)	\$ (129,846)	\$ (29,199)	\$ (3,608)	\$ (43,736)	\$ (2,114)	\$ (208,504)	\$ 63,952	\$ 821,939
2030	\$ 0.2701	\$ (280,059.00)	\$ (129,846)	\$ (30,221)	\$ (3,698)	\$ (43,736)	\$ (2,156)	\$ (209,659)	\$ 71,200	\$ 893,139



SYSTEM VALUATION CONSIDERATIONS

No single valuation methodology should be employed to value an aging/operating asset; rather, a “blend” of methodologies should be employed to consider key variables related specifically to aging/operating assets.

- ▶ **Income Approach** – value based on the capitalization of the net earnings or cash flows expected from the property, discounted to adjust for time value of money
- ▶ **Market “Comps” Approach** – value based on analysis of recent sales of comparable property
- ▶ **Cost Approach** – value based on the proposition that an informed purchaser would pay no more for property than the cost of producing a substitute property with the same economic utility

ONE FINAL THOUGHT

BEFORE Q&A

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“REFINANCING YOUR PPA”

A new transaction type, engaging a new PPA Provider to provide you with the cash needed to buyout your existing provider and offer you a PPA with better rates & terms

Thank You! If you're interested in...

- ▶ Copies of this presentation
- ▶ An example asset management reports
- ▶ “Top 5 Ways Solar Owners Lose Money”
- ▶ Continuing this conversation

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