An Effective Way to Evaluate the Economic Value of Solar Projects

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The BIG question for successful Solar project implementation:

In the Era of reduced budgets, how can you fund solar projects???

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An Effective Solution – the Power Purchase Agreement (PPA):

Principle:

1. Use other people's money to design, procure, construct, maintain and operate the solar system (owner),
2. Buy the generated energy from the owner via a PPA.

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Typical PPA Elements:

- Specified contract term, commonly 20 yrs,
- Energy sold to customer, usually below the local Utility rate in $/kWh (starting price),
- An annual escalator is applied (e.g. 3%/yr),
- A “buyout” may be offered.

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Example:

- Assumptions:
  - PPA Contract term: 10 years,
  - Local Utility rate: $0.12/kWh,
  - Annual Utility rate escalator: 5%,
  - Three PPA proposals received, all for solar photovoltaic (PV) generation,
  - Each has a different starting price, annual escalator, and system size.

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Example PPA Proposal Offers:

System Size	Starting PPA Price, $/kWh	PPA Annual Escalator
280 kW	0.105	3.00%
300 kW	0.097	4.00%
420 kW	0.085	5.00%

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Question

How can you economically compare the proposals for the best value?

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Example: 280 kW PPA Proposal, Performance over Contract Period

Year	Generation, kWh	Utility Cost	PPA Energy Cost	PPA Savings
1	348,190	$41,783	$36,560	$5,223
2	346,449	$43,653	$37,468	$6,184
3	344,717	$45,606	$38,400	$7,206
4	342,993	$47,647	$39,354	$8,293
5	341,278	$49,779	$40,332	$9,447
6	339,572	$52,007	$41,334	$10,673
7	337,874	$54,334	$42,361	$11,973
8	336,185	$56,765	$43,414	$13,352
9	334,504	$59,306	$44,493	$14,813
10	332,831	$61,960	$45,598	$16,361
Total		$512,839	$409,313	$103,526

PPA Proposal Comparison, 280, 300 & 420 kW System Sizes

System Size	Starting PPA Price	PPA Annual Escalator	Total PPA Energy Costs	Total PPA Energy Savings
280 kW	**$0.105 / kWh**	**3.00%**	**$409,313**	**$103,526**
300 kW	**0.097**	**4.00**	**$494,818**	**$146,230**
420 kW	**0.085**	**5.00**	**$635,706**	**$261,761**

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The Common Denominator: Net Present Worth

- $100 invested today at 5% = $163 in 10 years (Compound Amount)
- $163 in year 10 = $100 today at 5% (Net Present Worth)
- Net Present Worth allows a comparison of PPA proposals with different prices, escalators, contract periods, system sizes, and system types.

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Example: 280 kW PPA Proposal, Net Present Worth over Contract Period

Year	Generation	Utility Cost	PPA Cost	Savings	NPW factor	NPW PPA Cost	NPW PPA Savings
1	348,190	$41,783	$36,560	$5,223	0.9524	$34,820	$4,974
2	346,449	$43,653	$37,468	$6,184	0.9070	$33,984	$5,609
3	344,717	$45,606	$38,400	$7,206	0.8638	$33,170	$6,225
4	342,993	$47,647	$39,354	$8,293	0.8227	$32,376	$6,823
5	341,278	$49,779	$40,332	$9,447	0.7835	$31,600	$7,402
6	339,572	$52,007	$41,334	$10,673	0.7462	$30,843	$7,964
7	337,874	$54,334	$42,361	$11,973	0.7107	$30,106	$8,509
8	336,185	$56,765	$43,414	$13,352	0.6768	$29,382	$9,036
9	334,504	$59,306	$44,493	$14,813	0.6446	$28,680	$9,549
10	332,831	$61,960	$45,598	$16,361	0.6139	$27,993	$10,044
Total		$512,839	$409,313	$103,526		$312,954	$76,135

Summary: Net Present Worth of All Proposals

Size	PPA Price	Escalator	NPW PPA Cost	NPW PPA Saving	NPW Cost/Size (1)	NPW Save/Size (1)
280 kW	$0.105	3.00%	$312,954	$76,135	$1,118 / kW	$272 / kW
300 kW	$0.097	4.00%	$376,863	$109,498	$1,256	$365
420 kW	$0.085	5.00%	$482,308	$198,598	$1,148	$473

(1) Where trackers or other generation multipliers are used, use MWH vs. kW as unit.

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Thank You for Your Attention!

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