

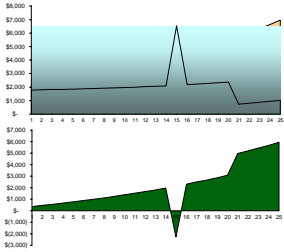
SOLAR FINANCIAL ANALYSIS CALCULATOR

Andy Black



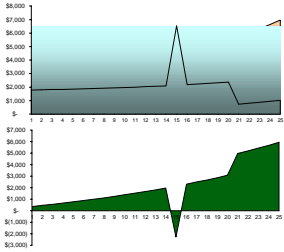
CSC Solar Forum

Santa Clara - September 13, 2005



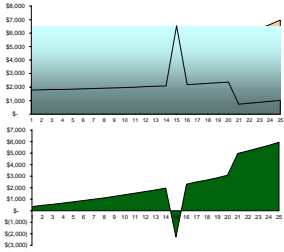
Introductions & Thanks

- ★ Tor Allen & California Solar Center
- ★ Everyone who helped
 - ☀ Mike Arenson, EcoEnergies
 - ☀ Customers
 - ☀ All those who've listened and given feedback at many events and on papers published
- ★ You for coming!



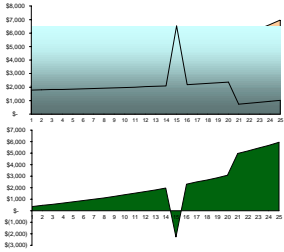
“What’s The Payback?”

- ★ Who’s been asked this?
- ★ Who would like an answer better than:
“What’s the payback on your swimming pool or SUV?”



About OnGrid Solar

- ★ 9 Years involved with Solar
- ★ 4.5 Years as salesman
- ★ Discovered the real reason people buy:
 - ★ PAYBACK!
- ★ Showing a Solar Financial Analysis Calculator to Prove the Payback
- ★ If your customers saw this, they'd buy!

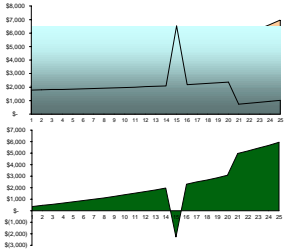


Solar Financial Payback

Speed Bump

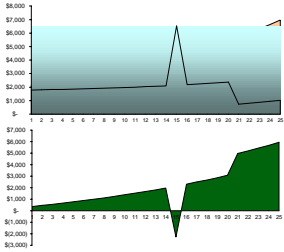
By Dave Coverly





Financial Payback

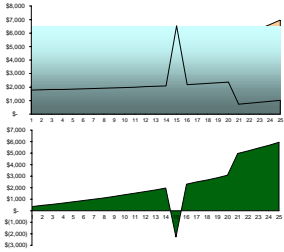
- ★ Payback on solar isn't the most important thing...
- ★ ... it's the only thing the vast majority of potential solar homeowners care about



Right or Wrong

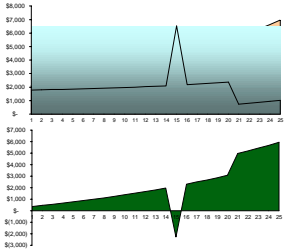
- ★ 95% see energy as a commodity
- ★ Few will pay more
- ★ Must meet them on their terms:

FINANCIAL!



Attractive Economics

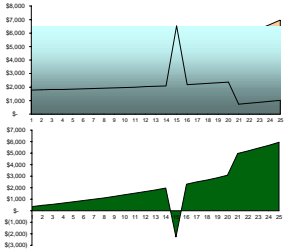
- ★ CA PV systems can be financially attractive to customers who use more than \$75/mo in electricity, defined as:
 - ★ Annual Rate of Return greater than 9%
 - ★ Property value increases more than the system cost
 - ★ Positive cash flow when financing compared to utility bill savings



Why is this Needed?

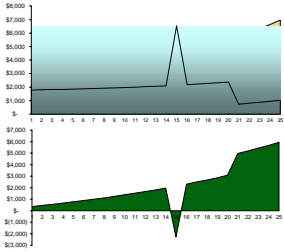
If we're going to put solar on every roof, it needs to make \$ense.





Factors That Make Solar Viable

- ★ Incentives: State Solar Rebate Program & 7.5% State Tax Credit for Solar or 30% Federal Tax Credit
- ★ Net Metering on an Annual Basis & Time of Use Billing
- ★ California's Tiered Rate System with High Electric Rates & High Inflation



Residential “E7” Time Of Use

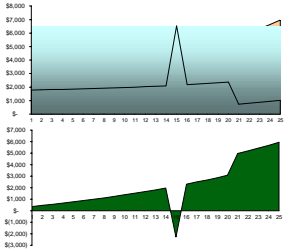
★ Peak rates are Summer Afternoons ...

Residential "E7" Time-of-Use Pricing Periods

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Midnight - 6am	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak
6am - Noon	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak
Noon - 6pm	Off-Peak	Peak	Peak	Peak	Peak	Peak	Off-Peak
6pm - Midnight	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak	Off-Peak

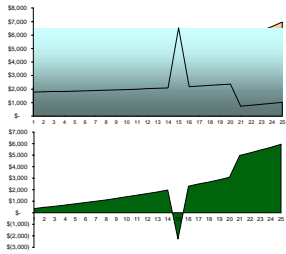
... the best time to sell

Available only in some areas
(e.g.. PG&E, but usually not municipal utilities)



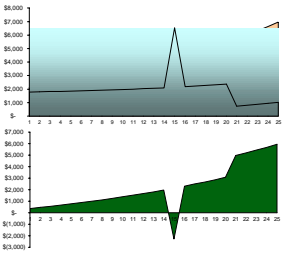
Time of Use with Annual Net Metering

- ★ Net Metering on an annual basis
- Combined with
- ★ Time Of Use metering
 - ☀ Sales during peak = 29.4¢
 - ☀ Purchases off-peak = 9¢
- ★ Can reduce system size up to 40%

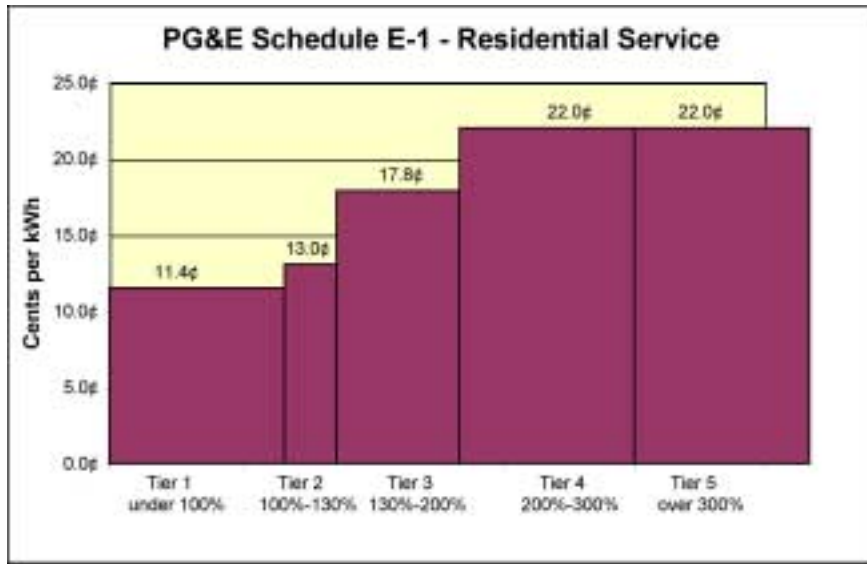


Time of day shading analysis

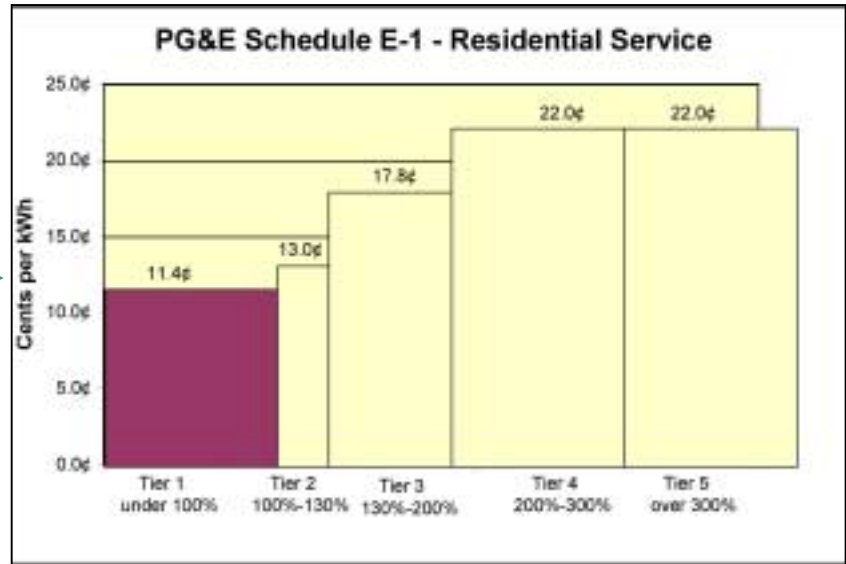




Tiered Rate Pricing

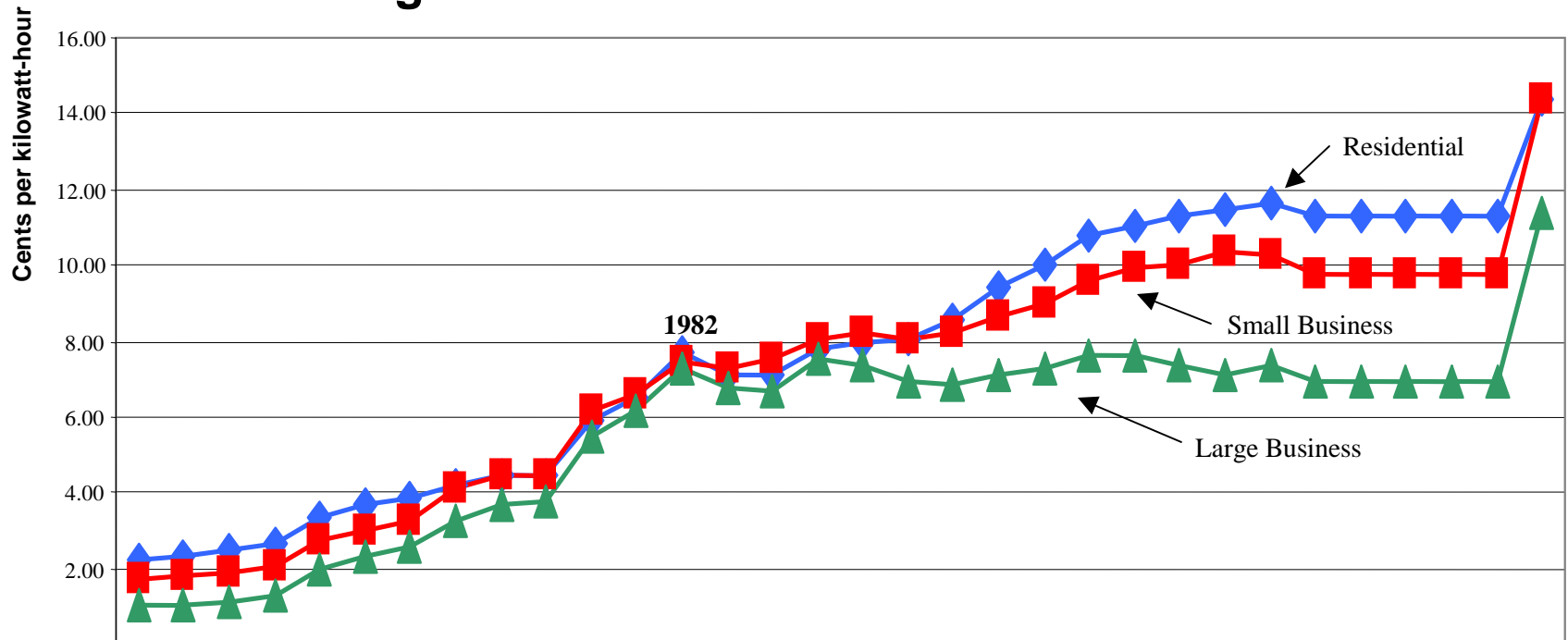


Use/Bill Before Solar
Marginal Use at 22¢



Small Net Use After Solar
Marginal Use at 11.4¢

California Electric Rates Residential, Small Business, and Large Business Sectors 1970 to 2001*



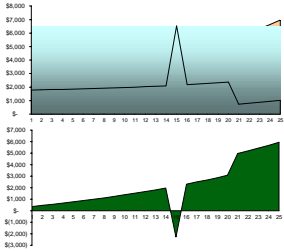
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Residential	2.23	2.31	2.46	2.63	3.37	3.64	3.82	4.23	4.48	4.47	5.86	6.51	7.67	7.12	7.07	7.78	7.94	8.04	8.54	9.45	9.98	10.79	11.08	11.30	11.43	11.61	11.32	11.32	11.32	11.32	11.32	14.40
Small Business	1.71	1.81	1.92	2.09	2.74	2.98	3.28	4.11	4.47	4.46	6.14	6.59	7.43	7.31	7.52	8.06	8.25	8.01	8.24	8.64	8.98	9.59	9.92	9.99	10.36	10.26	9.78	9.78	9.78	9.78	9.78	14.37
Large Business	0.99	1.03	1.13	1.28	1.96	2.29	2.60	3.23	3.67	3.74	5.47	6.18	7.25	6.77	6.68	7.51	7.38	6.95	6.88	7.13	7.28	7.58	7.59	7.33	7.09	7.37	6.93	6.93	6.93	6.93	11.42	

Source: Prepared by the CPUC Energy Division. Dataset from Energy Information Administration (EIA), DOE/EIA-0376(95), State Energy Price and Expenditure Report, 1995, Tables 36-38. 1996 through 2000 reflects AB 1890 frozen rates. 2001 rates include 4 cent increase in SCE and PG&E Rates.

*Rates only for SCE and PG&E.

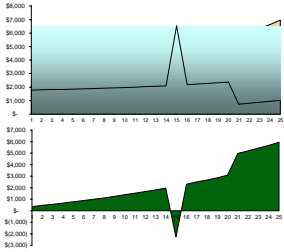
California Public Utilities Commission





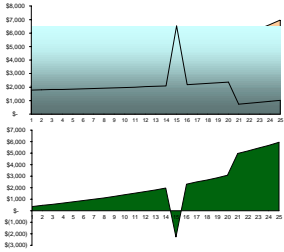
The Ideal Situation for Good Payback

- ★ Residential electric bill > \$75/month
- ★ No Shade
- ★ Facing Southwest, South, or West
- ★ 5:12 roof pitch
- ★ PG&E & other IOU Territory
 - ☼ Because of TOU & higher rates



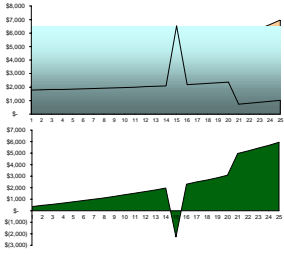
More On Payback Analysis

- ★ www.ongrid.net/papers - 1st Article
- ★ www.ongrid.net/payback
- ★ Upcoming classes:
 - ☀ www.ongrid.net/classes.html
- ★ **HOW DO YOU PROVE IT?**



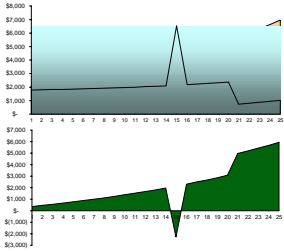
Prove the Payback for Solar

- ★ Total Lifecycle Payback
- ★ Rate of Return analysis
- ★ Cash Flow when financing
- ★ Increase in Appraisal Valuation
- ★ OnGrid Solar Financial Analysis Calculator demonstrates each



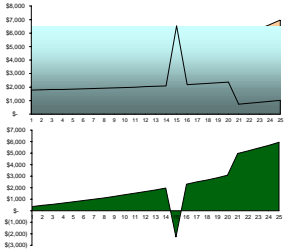
Calculator Controls / Inputs

- ★ Customized for customer
- ★ Residential, Commercial, Municipal, Non-Profit, & Affordable Housing
- ★ Tax brackets
- ★ Inflation
- ★ Rate schedules, territories
- ★ Usage, % on peak
- ★ Sun Hours / Location
- ★ Shading & other losses
- ★ Tilt & orientation



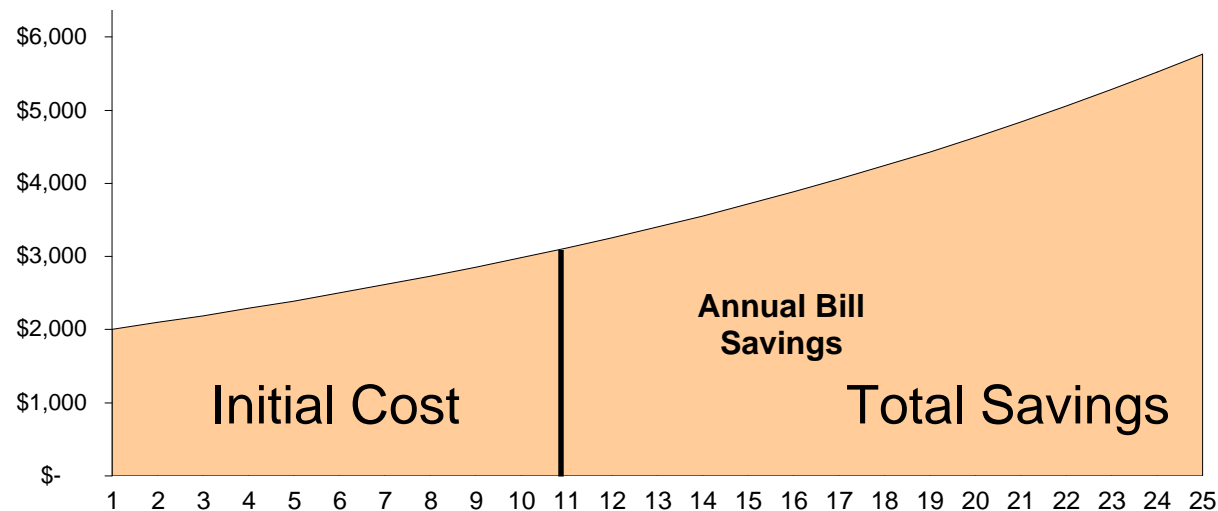
Calculator Controls / Inputs

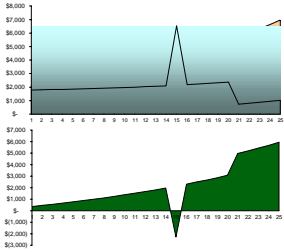
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- ★ Rate schedules, territories
- ★ Usage, % on peak
- ★ Sun Hours / Location
- ★ Shading & other losses
- ★ Tilt & orientation
- ★ System size, cost, parts, fees
- ★ Inverter replacement cost in future year
- ★ Rebate, Tax Credits, PBIs, Installation Year
- ★ RECs / Green Tag sales
- ★ Fully customize for each salesperson - including logo & contact info
- ★ Loan interest rate & term
- ★ Energy Efficiency Cost/Savings



Total Lifecycle Payback

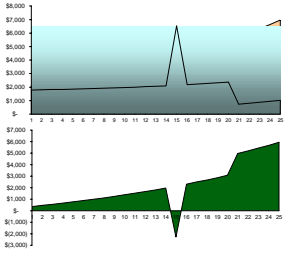
★ Total Savings (whole area) is much larger than Initial Cost





Rates of Return Residential Examples

Pre-Solar Bill	kWh per Month Usage	System AC Size	System Gross Cost	Final Net Cost w/ Tax Benefits & Rebate	Pre-Tax Annual Return
\$77	600	3.0 kW	\$26K	\$18K	9.2%
\$180	1100	5.2 kW	\$44K	\$29K	13.7%
\$268	1500	7.3 kW	\$60K	\$39K	15.2%



Spreadsheet For Customer To Review

Solar Electric System Analysis for:
Happy Customer
 August 31, 2005

Solar Electric System Financial Analysis Cash flow

3.6 kW AC Solar System



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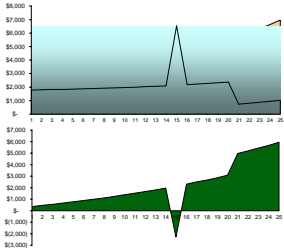
Andy Black
 OnGrid Solar
 Solar Financial Analysis
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 www.ongrid.net

Commercial:

Year:

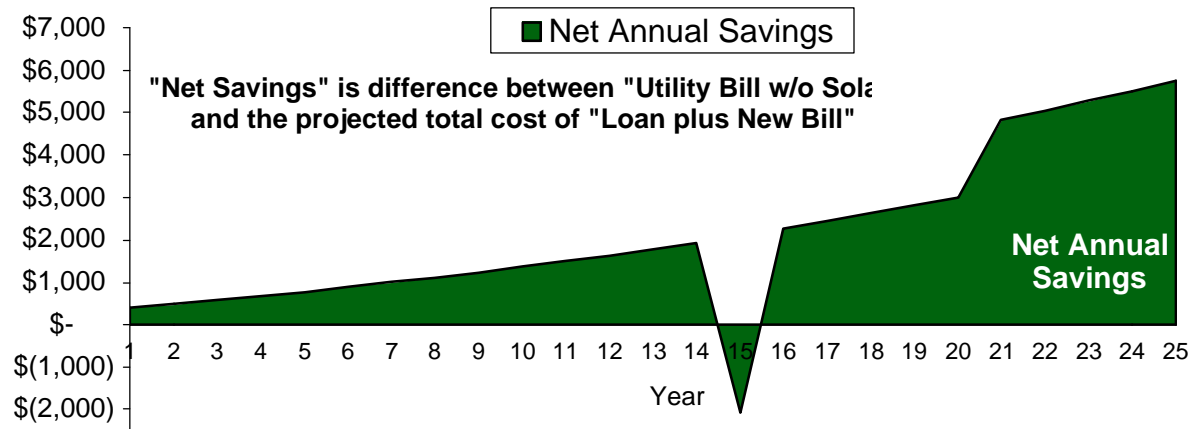
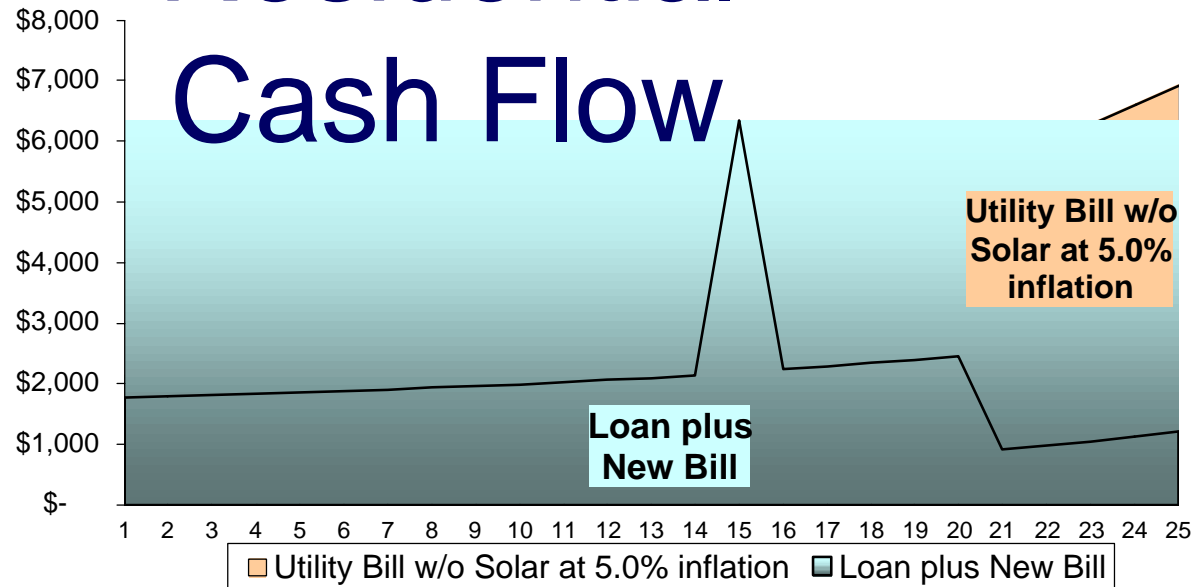
	0	1	2	3	4	5	6	7	8	9	10	11	12
Operating Savings:													
Avoided electricity Purchases	-	1,230	1,286	1,343	1,404	1,467	1,533	1,602	1,674	1,749	1,828	1,910	1,996
Operating Expenses:													
System Maintenance (about .25%/yr)	-	(80)	(84)	(88)	(93)	(98)	(103)	(108)	(113)	(119)	(125)	(132)	(138)
Capital Cost - Initial System	(22,243)												
Capital Cost - Inverter Replacement (about \$1,000/kW)													-
Operating profit (loss):	(22,243)	1,150	1,201	1,255	1,311	1,369	1,430	1,494	1,561	1,630	1,703	1,779	1,858
Federal & State Tax benefits													
30% Federal Investment Tax Credit thru 2007	6,673												
Remainder after Tax Credits to depreciate		15,570											
Depreciable amount		15,570											
MACRS 5 year Accel Depreciation (%)		20.0%	32.0%	19.2%	11.5%	11.5%	5.8%						
MACRS Accel Depreciation		(3,114)	(4,982)	(2,989)	(1,791)	(1,791)	(903)						
Taxable Income (loss) = Operating profit+depr		(1,964)	(3,781)	(1,735)	(480)	(421)	527	1,494	1,561	1,630	1,703	1,779	1,858
Income Tax (savings) on Taxable Income		861	1,658	760	210	185	(231)	(655)	(684)	(715)	(746)	(780)	(815)
Fed income tax on state tax credit		-											
Fed income tax on state depreciation		(71)	(113)	(68)	(41)	(41)	(21)						
Net Income after taxes	(15,570)	(1,174)	(2,237)	(1,042)	(310)	(277)	276	839	876	915	956	999	1,043
Add back depreciation		3,114	4,982	2,989	1,791	1,791	903						
After-Tax Net Annual Profit/Loss for IRR	(15,570)	1,940	2,746	1,947	1,480	1,513	1,179	839	876	915	956	999	1,043

7.6% IRR (After-Tax Rate of Return)

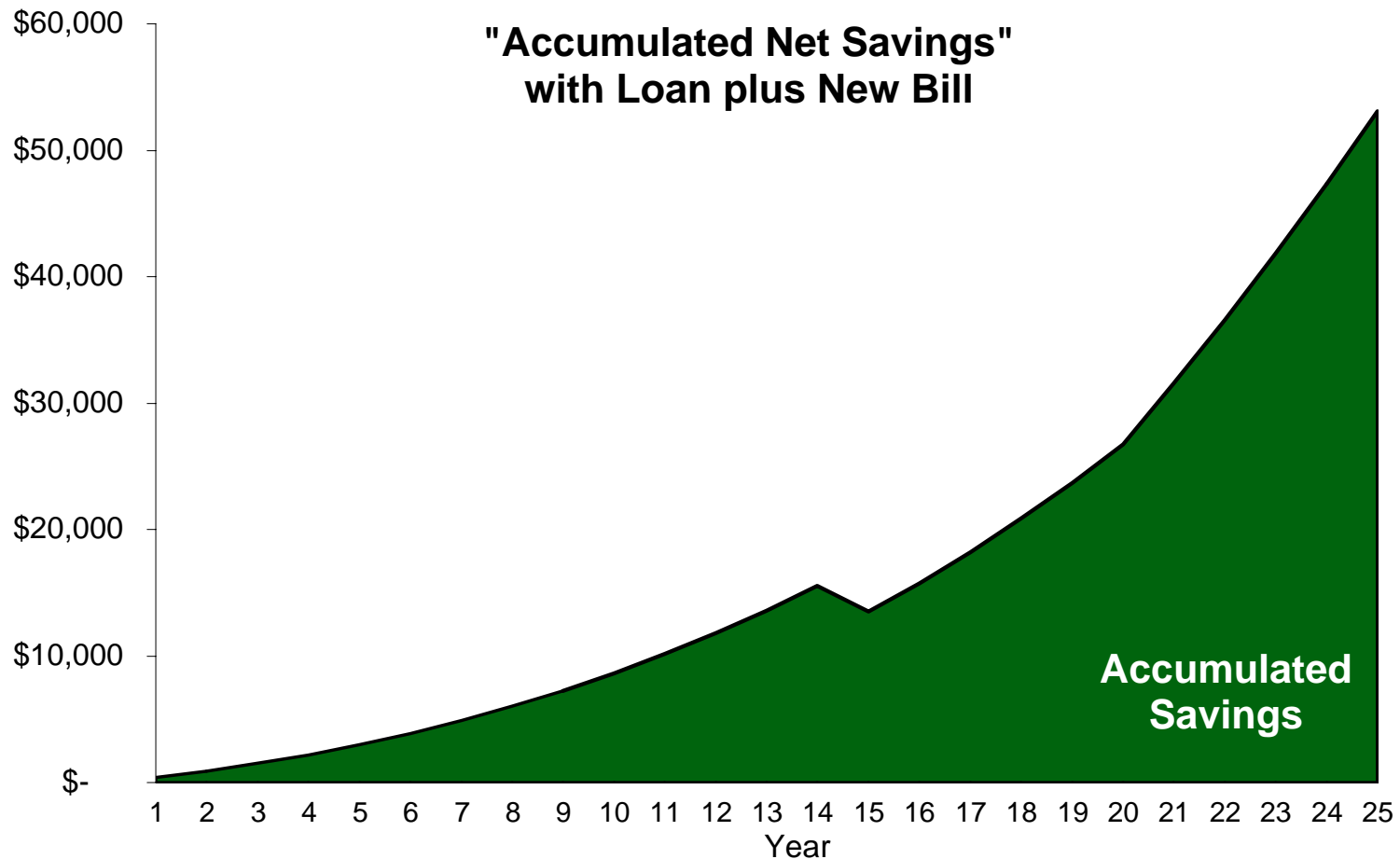
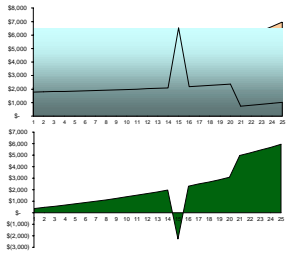


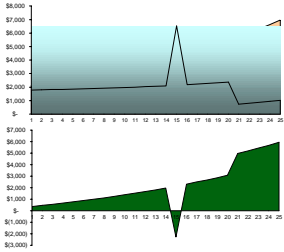
Residential Cash Flow

- ★ 5.2kW residential system offsetting a \$180/month bill
- ★ 6.5% 20 year loan
- ★ Many Systems are cash positive from Year 0
- ★ Spike is Inverter Replacement Cost



Cumulative Cash Flow

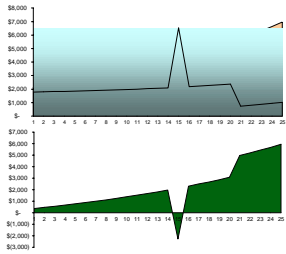


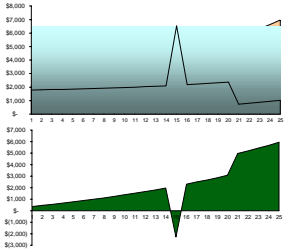


Resale of Other Remodel Projects Compared to Solar

Pre-Solar Bill	System Size	Net Cost	Equity Increase	% Return
\$77	3.0kW	\$17.6K	\$17.4K	99%
\$180	5.2kW	\$28K	\$40K	146%
\$268	7.3kW	\$39K	\$61K	156%
Deck Addition		\$6.3K	\$6.7K	104%
Bathroom Remodel		\$10.1K	\$9.1K	89%
Window Replacement		\$9.6K	\$8.2K	85%
Kitchen Remodel		\$44K	\$33K	75%

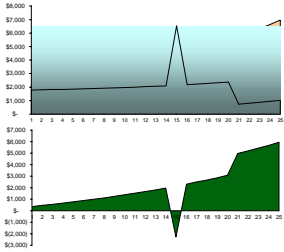
Resale Value Over Time





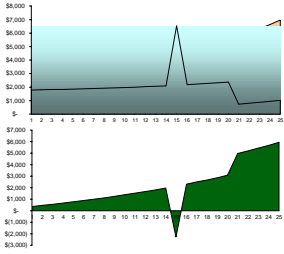
Calculator Output / Displays

- ★ Customized for customer
- ★ Recap of their input variables
- ★ System size, cost, parts, fees
- ★ Rebate, Tax Credits, PBI value
- ★ True effect of State Tax Credits (Fed Taxation)
- ★ Net Cost, all-in
- ★ System size & Production estimate



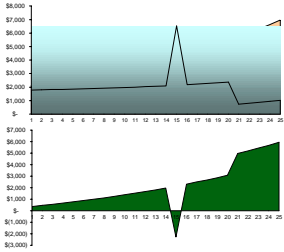
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- ★ System size, cost, parts, fees
- ★ Rebate, Tax Credits, PBI value
- ★ True effect of State Tax Credits (Fed Taxation)
- ★ Net Cost, all-in
- ★ System size & Production estimate
- ★ Old & New electric bill estimates, including shading, tilt, orientation & other real losses
- ★ Spreadsheet they can show their Accountant
- ★ Resale Value Graphic
- ★ Cash Flow Graphics
- ★ Lifecycle Payback Graphic
- ★ Environmental Benefit Graphic



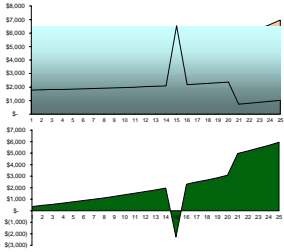
But Wait, There's More

- ★ The Solar Financial Analysis Calculator speeds the close:
- ★ Prepares the CEC R1 & Utility Interconnection & Authorization
 - ☀ Accurate & legible
 - ☀ No more CEC rejections
 - ☀ Fast & Professional
- ★ Sales Agreement Template



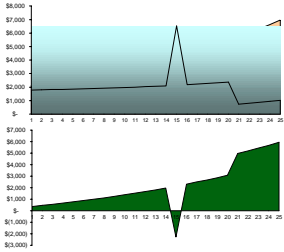
Conclusion

- ★ The Solar Financial Analysis Calculator demonstrates why Solar Electric systems:
- ★ Provide an attractive investment
- ★ Increase home value
- ★ Reduce risk of future electric costs
- ★ If that doesn't open your customer's checkbook, I don't know what will



Conclusion

- ★ If your customers saw this, would they buy your offerings?
- ★ Accepting Beta Testers now
- ★ Signup Sheets up front
- ★ Questions?



Andy Black

Solar Financial Analyst & Consultant

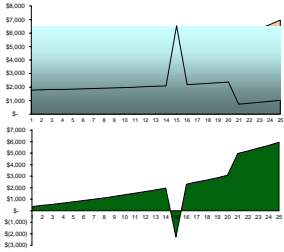


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www.ongrid.net/payback - OnGrid Solar
Financial Analysis Calculator, FREE Demo,
articles & papers available



How To Get It

- ★ FREE Demo: www.ongrid.net/payback
- ★ Beta Test until ~ Early October
- ★ Feedback Wanted & Rewarded
 - ☀ I want it to be Your Dream Sales Tool
- ★ Subscription Basis
 - ☀ Updates for Rebates, Taxes, Rate Schedules
- ★ Introductory Offer: \$100/month for up to 2 users at company (single billing point)
 - ☀ \$50 each additional user