



Performance & Financial Analysis

Sample Solar Proposal for residential Customers

Prepared June 13, 2012 for

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Executive Summary

Sample Solar Proposal for residential Customers

Electric Utility Savings: The purchase of electricity (kWh) from your utility is expected to be reduced 73%. Expect a savings of \$830 in electric bills (73%) at current utility rates. Annual utility electric costs will be reduced from \$1,134 to \$304. Savings will grow as electric utility rates are expected to rise 5.00% a year.

Over 25 years, annual utility savings are expected to average \$1,643, for a total utility savings of \$41,069. In gross income (pre-tax) dollars, savings average \$2,282 annually or \$57,041 over the system life.

System Performance Summary

Solar Electric (PV) System: 6.12 kW DC (5.845 kW AC) producing 8,301 kWh/Year

Purchase Price & Net Cost

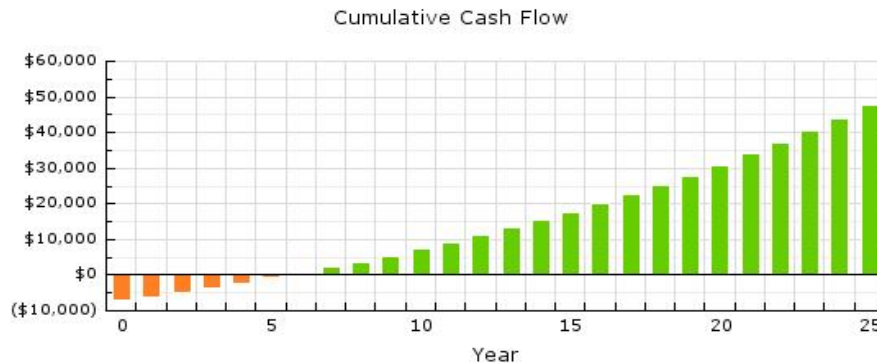
Contract Price: \$22,000
 Incentives to Customer: **(\$14,783)**
 Net Purchase Cost: \$7,217
 Cash Gained over Life: \$47,813
 Customer Type: Residential

Financial Ratios

Customer's Profitability Index: 3.8
 Cashflow Payback: 5.6 years
 Internal Rate of Return (IRR): 20.5%
 Net Present Value (NPV): \$20,219

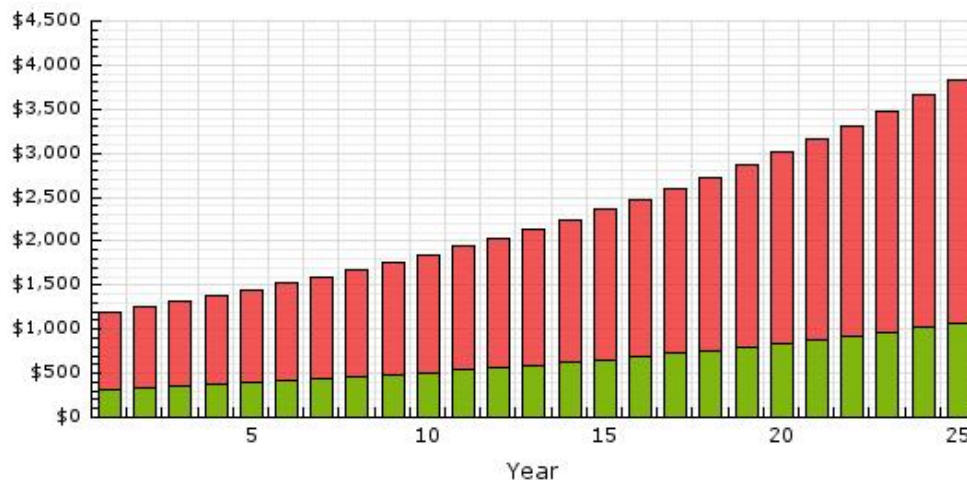
- Property Value Appreciation: \$24,220 (First-year utility savings x system life in years)
- CO2 Saved over System Life: 170 tons. Equivalent to driving 340,000 auto miles

Finance: Cash



The Cost of Doing Nothing

Utility Cost over Time

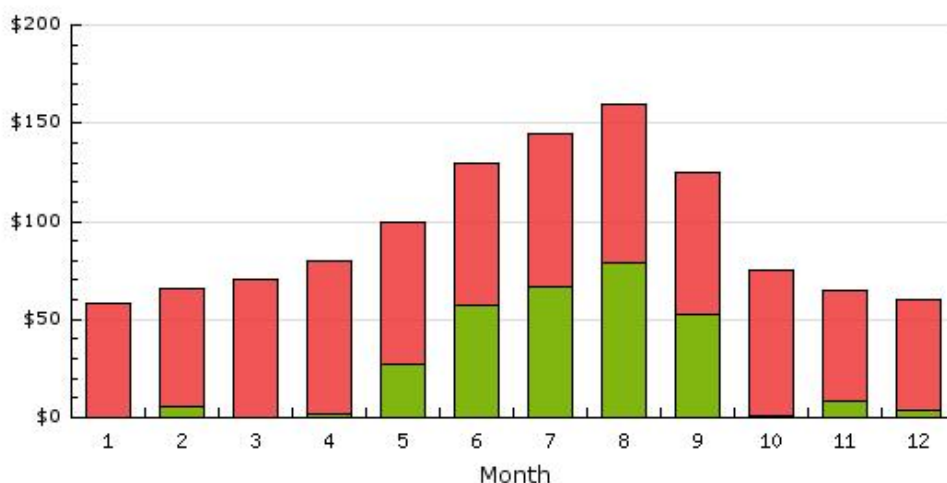


Your Hedge Against Utility Inflation: Your investment in this project will protect you from utility rate inflation. The graph above represents the cost of utility bills over time. The **red** area represents the utility bills you can expect if you do nothing. The **green** area represents the utility bills you can expect by making this investment.

Utility Cost by Month

Includes monthly Net-Metering "True-Up" to reconcile any net-meter credits accumulated in prior month(s).

Utility Cost by Month (typical)



Carbon Footprint

Your carbon footprint will be reduced.

Over the life of your system 170 tons of carbon dioxide (CO₂) will be eliminated from your footprint.

170 Tons of CO₂ is Equivalent to:



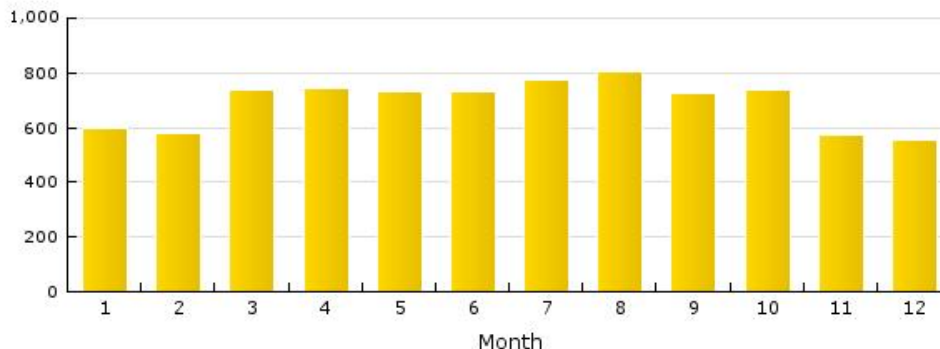
Planting 850 trees.



Reducing your driving by 340,000 auto miles.

Solar Electric (PV) System Summary

Solar Electric (PV) kWh Production by Month (typical)



Array Configuration: Tilt: 30° Azimuth: 180° 3" Standoff
 Shade: 0%

PV Panels: 24 x Siliken Modules, Model: SLK60P6L SLV/WHT 255Wp

Inverters: 1 x SMA America, Model: SB5000US (240V)

Included: * 8.25% Sales Tax: \$1,073

Total Panel Area: 420 sq-ft

System Peak Power: 6.12 kW DC (5.845 kW AC, 5.217 kW CEC)

Annual Production: 8,301 kWh. Supplying 73% of annual electric use

Contract Price Summary: Solar Electric (PV) System

Contract Amount: \$22,000 (\$3.59 per watt DC)

Less added cost items (as included): \$3.42 per watt DC

Incentives to be received by Customer in 1st Year

Austin Energy - Residential) Solar PV Rebate (\$ 2 per watt AC): (\$11,690)

Federal Tax Credit (30% of Net Cost at Installation): (\$3,093)

Net Cost at Install (after incentives): \$7,217

Net Installed Price per Watt: \$1.18 per watt DC (\$1.23 per watt AC)

Less added cost items (as included): \$1 per watt DC (\$1.05 per watt AC)

How to Interpret Financial Ratios and Measures

A Measure of Security: Cashflow Payback: 5.6 years - 5.6 years (modified)

The most common measure of the security of a proposed investment is its payback, defined as the length of time until one gets one's money back. Cashflow Payback is when cumulative cash flow stays positive for good. Modified Cashflow Payback is when the cumulative cash in-flows exceed the total of all cash out-flows (over the system life).

Profitability Index: 3.8

What PI Means: Generally, if $PI > 1$ then accept the project. If $PI < 1$ then "qualitative" factors may justify the project.

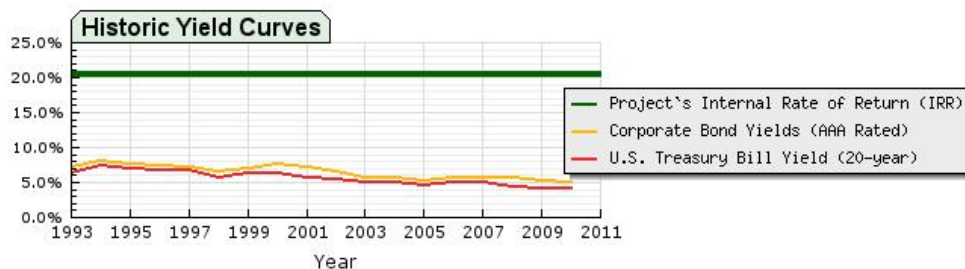
Profitability Index (PI) is a measure of investment efficiency. It identifies the relationship of investment to its return. Profitability Index (PI) is calculated as: (Net-Present Value of the Returns plus the Initial Investment) divided by the Initial Investment. For example: If \$10,000 is invested and the NPV of the returns is \$2,000, then the $PI = (\$10,000 + \$2,000)/\$10,000 = 1.2$

Net Present Value (NPV): \$20,219.

What NPV Means: NPV is an indicator of how much value an investment or project adds to the customer. If NPV is positive then the investment would add value. If NPV is zero or negative then other "qualitative" factors may be of adequate value to justify the project (for example, lengthening a swimming pool season). *Net Present Value (NPV)* is one way to account for the time value of money. NPV calculates the current value of each future cash flow. For example, \$1.00 received two years from now is equivalent to something less today, if it can be invested now at some interest rate. This allows us to "discount" the cash flows (whether positive or negative) that the proposed investment is expected to generate at various times in the future back to their equivalent value today (that is, their "present value"). If one then subtracts the cost of the proposed investment from the sum of the present values of the ongoing cash inflows, one obtains the net present value (NPV) of the investment.

Internal Rate of Return (IRR): 20.5%

Internal Rate of Return (IRR) is another common measure of investment efficiency. It is defined as the interest rate that causes the project's net present value (NPV) to equal zero, and is equivalent to the yield to maturity of a bond. The internal rate of return (IRR) on an investment or potential investment is the annualized effective compounded rate of return that can be earned on the invested capital.





Assessing Option Value

The option value of a proposed investment represents the value of future opportunities that would be made available only if the investment were made. Like the ante in a poker game, the investment may promise no return other than the opportunity to look at the cards being dealt, at which point one can either fold or "exercise the option" by making additional investments in an attempt to win the pot. To realize future value here new investments are not necessarily required to "exercise the options" - ownership is enough. In the case of renewable energy systems in general, there are primarily two opportunities, or options, which may have future value: Property value appreciation, and Renewable energy certificates (RECs or SRECs):

Property Value Appreciation: \$24,220

Installing a renewable energy system can result in increased property valuation. The (few) papers on this topic assume that by decreasing utility bills (operating costs) the property owner's cash flow can accommodate higher loan-to-value ratios. In other words, by reducing monthly expenses, a property owner can afford to take on more debt. According to one report by the Appraisal Journal a home's value can increase by \$20,000 for every \$1,000 reduction in annual operating costs due to energy efficiency improvements. This assumes a 5% cost of money ($\$20,000 \times 5\% \text{ interest} = \$1,000$).

Property value appreciation is estimated to be: $\$24,220 = 1\text{st-year utility savings of } \$1,211 \times 20 \text{ years}$

(Note: If system life is expected to be more than 20 years, then 20 years is used.)

The following factors should be kept in mind:

1. The annual savings will not be the same every year. Utility inflation rates, assuming the renewable energy system is grid connected, will alter the annual savings over time - more savings with utility rate inflation, less if utility rate deflation occurs.
2. At some point in the system's life, its value as a "saleable" asset will start to reduce to zero as the system comes to its end of life.
3. Property valuations are based upon many variables (external factors), many of which are location-specific and/or contingent upon macro-economic and micro-economic factors such as interest rates, the economy, new developments, changing lifestyle and living patterns, etc. A property's value can change by many percentage points as a result of these external factors and one needs to consider the amount of value a renewable energy system may add to a property vis-a-vis the overall property's value.

Renewable Energy and/or Carbon Credits or Certificate (REC or SREC)

Renewable Energy Certificates (sometimes called "solar renewable energy credits/certificates" - SRECs, S-RECs, or simply RECs) are a new and evolving method to ascribe future financial value to a renewable energy system. RECs represent the bundle of legal rights to the "green" part of each unit of energy produced by a renewable energy system. This green part can be sold for a value, which generates additional revenue for the seller. These certificates can be sold and traded or bartered and the owner of the REC can claim to have purchased renewable energy.

Utility Energy Summary: Electric

Electric Utility Rates

<u>Current Rate</u>	<u>Post Project Rate</u>
Fixed Price per unit \$0.1000/kWh	Fixed Price per unit
Average Cost: \$0.100 per kWh	Average Cost: \$0.100 per kWh
Tiered Rate: No	Tiered Rate: No
Time-of-Use Rate: No	Time-of-Use Rate: No
Demand Charges: No	Demand Charges: No

Summary of Utility & New Source Electricity

Electric by Month (kWh)	1	2	3	4	5	6	7	8	9	10	11	12	Total
<u>Entered into Software (historical)</u>													
Monthly Use	580	658	698	800	1,000	1,300	1,450	1,600	1,250	750	650	600	11,336
Historical Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<u>Estimated by Software at Current Rates</u> (Includes any planned energy increases)													
Estimated Use	580	658	698	800	1,000	1,300	1,450	1,600	1,250	750	650	600	11,336
Current Cost	\$58	\$66	\$70	\$80	\$100	\$130	\$145	\$160	\$125	\$75	\$65	\$60	\$1,134
Baseline Use after Efficiency	580	658	698	800	1,000	1,300	1,450	1,600	1,250	750	650	600	11,336
Baseline Cost after Efficiency	\$58	\$66	\$70	\$80	\$100	\$130	\$145	\$160	\$125	\$75	\$65	\$60	\$1,134
Post Project Use	(15)	78	(41)	55	267	567	674	794	525	12	76	43	3,035
Post Project Cost	\$0	\$6	\$0	\$2	\$27	\$57	\$67	\$79	\$53	\$1	\$8	\$4	\$304
Net-Meter Credit	\$(2)	\$0	\$(4)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Cash Flow Details for the System

Cash Flows in Year	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Gross Cost: PV	(22,000)				
O&M Cost: PV	0	(57)	(58)	(60)	(61)
Ref: Utility Bill Savings with Inflation Applied	0	872	913	958	1,003
Utility Bill Savings as Gross Income Dollars	0	1,211	1,268	1,331	1,393
<u>Solar Electric (PV) Incentives</u>					
Austin Energy - Residential) Solar PV Rebate (\$ 2 per watt AC)	11,690	0	0	0	0
Federal Tax Credit (30% of Net Cost at Installation)	3,093	0	0	0	0
Total Incentives	14,783	0	0	0	0
Net Annual Cash Flow	(7,217)	1,154	1,210	1,271	1,332
Cumulative Cash Flow	(7,217)	(6,063)	(4,853)	(3,582)	(2,250)

* - Indicates Contractor to receive this incentive.

Cash Flows in Year	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
O&M Cost: PV	(63)	(65)	(67)	(69)	(71)
Ref: Utility Bill Savings with Inflation Applied	1,052	1,104	1,158	1,214	1,273
Utility Bill Savings as Gross Income Dollars	1,461	1,533	1,608	1,686	1,768
Net Annual Cash Flow	1,398	1,468	1,541	1,617	1,697
Cumulative Cash Flow	(852)	616	2,157	3,774	5,471

Cash Flows in Year	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
O&M Cost: PV	(72)	(75)	(77)	(79)	(81)
Ref: Utility Bill Savings with Inflation Applied	1,336	1,403	1,472	1,544	1,620
Utility Bill Savings as Gross Income Dollars	1,856	1,949	2,044	2,144	2,250
Net Annual Cash Flow	1,784	1,874	1,967	2,065	2,169
Cumulative Cash Flow	7,255	9,129	11,096	13,161	15,330

Cash Flows in Year	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>
O&M Cost: PV	(83)	(86)	(88)	(90)	(93)
Ref: Utility Bill Savings with Inflation Applied	1,701	1,785	1,874	1,968	2,066
Utility Bill Savings as Gross Income Dollars	2,363	2,479	2,603	2,733	2,869
Net Annual Cash Flow	2,280	2,393	2,515	2,643	2,776
Cumulative Cash Flow	17,610	20,003	22,518	25,161	27,937

Cash Flow Details for the System

Cash Flows in Year	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>
O&M Cost: PV	(96)	(98)	(101)	(104)	(107)
Ref: Utility Bill Savings with Inflation Applied	2,169	2,277	2,391	2,511	2,636
Utility Bill Savings as Gross Income Dollars	3,013	3,163	3,321	3,488	3,661
Net Annual Cash Flow	2,917	3,065	3,220	3,384	3,554
Cumulative Cash Flow	30,854	33,919	37,139	40,523	44,077

Cash Flows in Year	<u>25</u>	<u>26</u>	<u>27</u>	<u>28</u>	<u>29</u>
O&M Cost: PV	(110)	0	0	0	0
Ref: Utility Bill Savings with Inflation Applied	2,769	0	0	0	0
Utility Bill Savings as Gross Income Dollars	3,846	0	0	0	0
Net Annual Cash Flow	3,736	0	0	0	0
Cumulative Cash Flow	47,813	0	0	0	0



Other Assumptions Used in this Analysis

Tax Effects Applied to Utility Savings: As a residential customer, we have assumed Pre-tax (gross income) dollars are saved. This means the Utility Savings are divided by 1 minus the effective income tax rate (28.00% federal and 0.00% state).

System Life: PV System: 25 years. Inverters: life of system.

PV System Derating: 0.777. (PVWatts reference).

Performance Degradation and O&M Costs: We have assumed performance will degrade by 0.75% per year due to soiling and general wear. Annual operating and maintenance (O&M) costs are inflated 2.80% per year, and are estimated as a percent of gross system price, as follows: Solar Electric (PV): 0.25%.

Income Tax Rates: Federal: 28.00%, State: 0.00%

Annual Inflation Rates: Consumer price index: 2.80%, Electric Rates: 5.00%

Net Excess Generation (NEG): Monthly NEG credited at Utility Rate. Annual NEG Not sold.

Discount Rate: 5.00%. Used to estimate net present value of future cash flows.

This quote does not include service panel upgrades or unique solar design exceptions.

The following renewable resource assumptions were used to develop estimates for the project location. These are typical values based upon observed data over several decades. Actual values (and system performance) will vary from month to month, and from year to year, in accordance to weather and climate pattern changes.

Solar Resources: Flat-Plate, South-facing Tilted at Latitude												
Month	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
kWh/m2/day	4.18	4.62	5.36	5.76	5.59	5.85	6.08	6.31	5.72	5.55	4.34	3.96