Performance & Financial Analysis

Prepared March 20, 2020 for

Mr. Joe Solar

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Executive Summary

Electric Utility Savings: Anticipate a savings of approximately $3,578 in electric bills (92%) at current utility rates in the first year. Savings will grow as electric utility rates are expected to rise 3.78% a year. The purchase of electric energy (kWh) from your utility is expected to be reduced by 95%.

Over 25 years, annual utility savings are anticipated to average $5,971, for a total utility savings of $149,277.

Performance Summary

Solar Electric (PV) System: 15.54 kW DC producing 22,907 kWh/Year.

Purchase Price & Net Cost

Contract Price: **$38,850**

Incentives to Customer: ($10,101)

Net Purchase Cost: $28,749

Financial Ratios (Unlevered)

Customer`s Profitability Index: 2.6

Cashflow Payback: 0.9 years

Internal Rate of Return (IRR): 15.7%

IRR on Equity (initial cash in): 131.6%

Modified IRR (MIRR): 10.8%

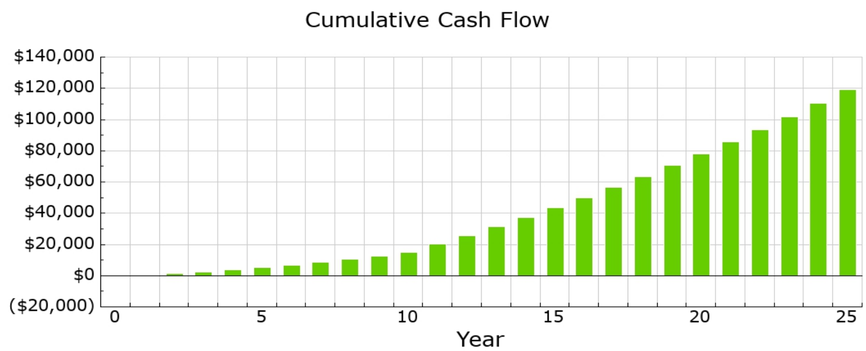
Net Present Value (NPV): $47,258

Cash Gained over Life: $119,152

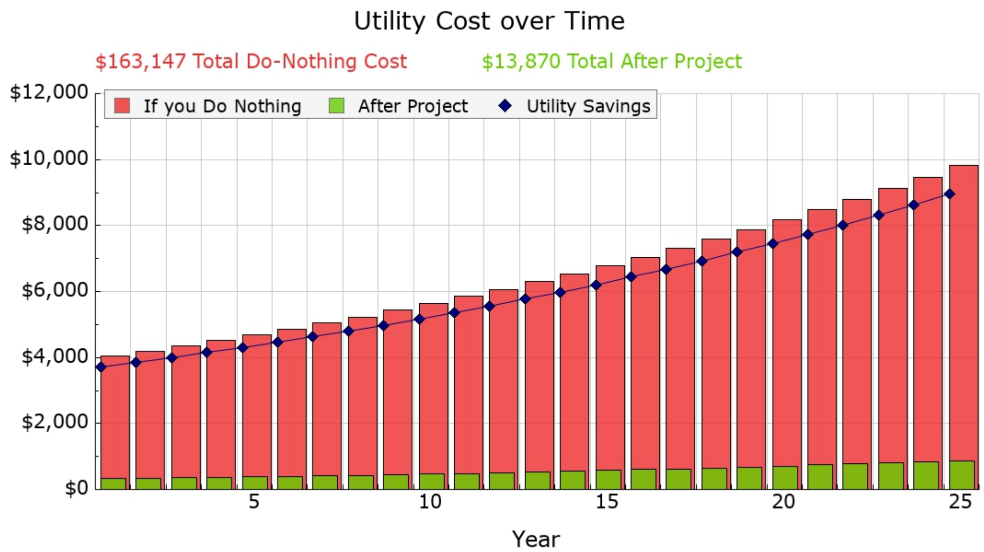
- Property Value Appreciation: $74,260 (first-year utility savings x 20 years)

- CO_2 Saved over System Life: 470 tons. Equivalent to driving 940,000 auto miles

Finance: Loan: "Same-As-Cash Fully-Amortized". $28,000 interest free payments of: $233 monthly over 120 months. Initial Cash Required: $749.



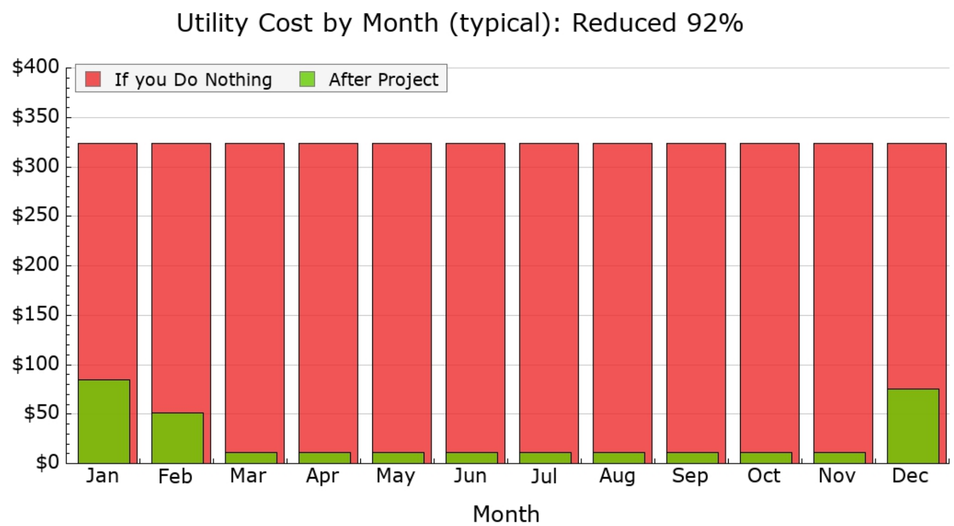
The Cost of Doing Nothing



Your Hedge Against Utility Inflation: Your investment in this project will protect you from utility rate inflation.

Utility Cost by Month

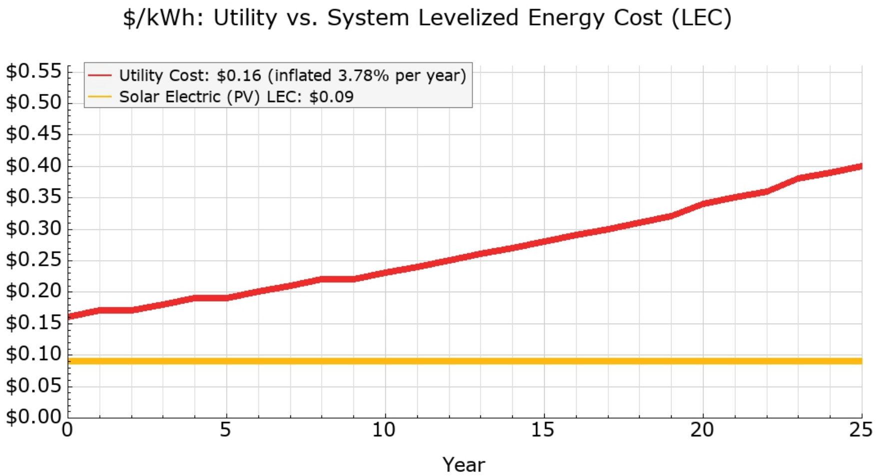
Includes monthly Net-Metering "True-Up" to reconcile any net-meter credits accumulated in prior month(s).



Levelized Energy Cost (LEC)

Your Hedge Against Utility Inflation: Your investment in this project will protect you from utility rate inflation. Levelized Energy Cost (LEC) analysis provides us with a "hurdle rate" (the levelized energy cost) which can be compared to the expected change in utility rates (by way of utility rate inflation). LEC is the average lifetime cost of energy produced by a particular system. We can compare the LEC to the current utility rate and its expected change in price as time goes on. In this manner one can judge the investment as a "better bet" than utility rates to contain energy costs. Represented below is the average cost of utility energy versus the cost of energy produced (LEC) by your system over time.

Electric: Levelized Energy Cost (LEC)



energy as sure as sunrise

Assured Solar Energy

Carbon Footprint

Your carbon footprint will be reduced. Over the life of your system 470 tons of carbon dioxide (CO_2) will be eliminated from your footprint. Equivalent to:

Planting 10,951 trees.

Driving reduced by 940,000 auto miles, or 47,940 gallons of gasoline.

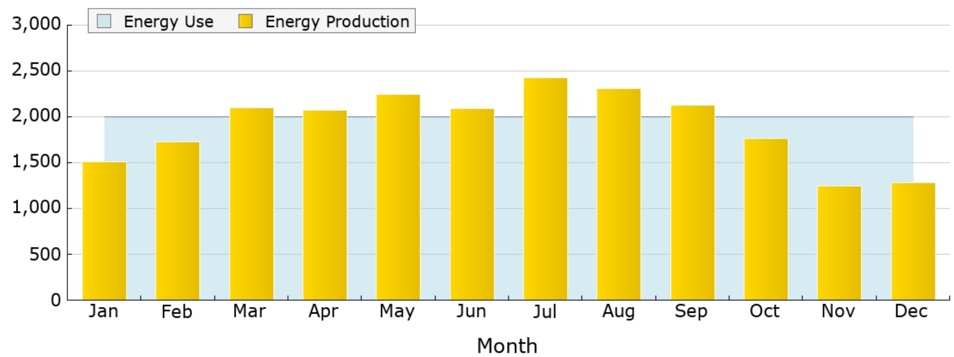
Recycling 1,485 tons of waste instead of sending it to landfill.

457,978 pounds (229.0 tons) of coal burned.

and you will help avoid the use of up to
11,453,500 gallons of water by Thermoelectric Powerplants.

Solar Electric (PV) System Summary

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



Tilt: 35º Azimuth: 180º Rack/Gnd/Pole Mount
Shade reduces production: 0%

PV Panels: 42 x REC Solar, Model: REC370AA

Inverters: 1 x SolarEdge Technologies, Model: SE11400H-US (240V)

Total Panel Area: 850 sq-ft

System Peak Power: 15.54 kW DC

Annual Production: 22,907 kWh. Supplying 95% of annual electric use

Contract Price Summary: Solar Electric (PV) System

Contract Amount: $38,850 ($2.50 per watt DC)

Incentives available to Customer in 1st Year

Federal Tax Credit: Year 2020 (26% of Gross Cost at Installation): ($10,101)

Net Cost at Install (after incentives): $28,749

Net Installed Price per Watt: $1.85 per watt DC

Sensitivity Analysis: Utility Rate Inflation Scenarios

Sensitivity Analysis is a process of analyzing possible future events by considering alternative possible outcomes.

The average change in utility rates (inflation) over the system life is perhaps the variable which may most affect the return on your investment. The following table summarizes how utility rate inflation may impact your investment. The project, as quoted, is compared to utility rate inflation that averages -5%, 0% and +5% over the system life.

	As Quoted	-5% Inflation	0% Inflation	+5% Inflation
Total Utility Savings:	$149,277	$48,931	$89,006	$178,230
Cash Gained over Life:	$119,152	$18,806	$58,881	$148,105
Return on Initial Cash Invested (IRR):	15.7%	5.8%	11.5%	17.1%
Wealth Created Over System Life (NPV):	$47,258	$1,617	$20,736	$59,511

Utility Inflation, as Quoted: Electric Rates: 3.78%

How to Interpret Financial Ratios and Measures

A Measure of Security: Cashflow Payback: 0.9 years - 0.9 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; future maintenance expenses are accommodated.

"<u>Unlevered</u>" ratios assume a cash purchase and take into account debt service (interest payments), including their tax deductions. However to calculate "IRR on Equity (initial cash in)" the project`s net cash flows are used (unaltered).

Profitability Index: 2.6 (Unlevered)

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

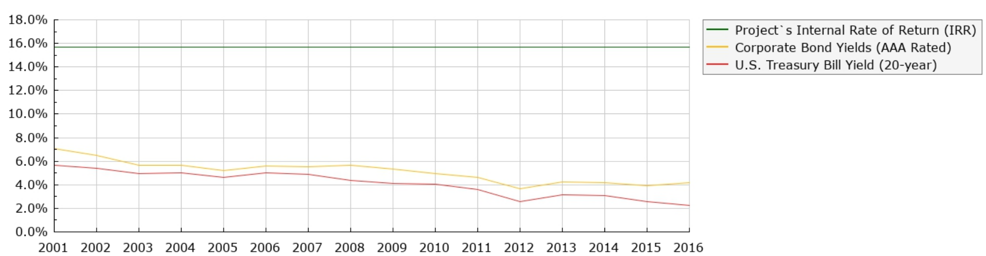
Profitability Index (PI) is a measure of investment efficiency. It identifies the relationship of investment to its return. Profitability Index (PI) is calculated as: (Net-Present Value of the Returns plus the Initial Investment) divided by the Initial Investment. For example: $28,749 is invested and the NPV of the returns is $47,258, then the PI = ($28,749 + $47,258)/$28,749 = 2.6, or more generically, for every $1 invested you received $2.6 in return.

Net Present Value (NPV): $47,258 (Unlevered).

<u>What NPV Means</u>: NPV is an indicator of how much value (wealth) an investment 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): 15.7% (Unlevered) **IRR on Equity (initial cash in): 131.6%**

Internal Rate of Return (IRR) is a common measure of investment efficiency. Equivalent to the yield to maturity of a bond. The internal rate of return (IRR) is the annualized effective compounded rate of return earned on the invested capital.



Modified Internal Rate of Return (MIRR): 10.8% (Unlevered) -- *Modified Internal Rate of Return (MIRR)*, as the name implies, is a modification of the internal rate of return (IRR) and as such aims to resolve some problems with the IRR. First, IRR assumes that positive cash flows are reinvested at the same rate of return as that of the project that generated them. A more likely situation is that the funds will be reinvested at a rate closer to the cost of capital. For determining MIRR, we assumed a finance rate of 5.00% and a reinvestment rate of 8.00%.

Measures of Predictability: Using "hurdle rates" Levelized Energy Cost (LEC)

Solar Electric (PV): $0.09 per kWh

Another dimension of concern about a proposed investment is the predictability of its anticipated costs and returns, which requires measures of the uncertainty associated with them. Levelized Energy Cost (LEC) analysis provides us with a "hurdle rate" (the levelized energy cost). LEC is the average lifetime cost of energy produced by a particular system. We can compare LEC to the current utility rate and its expected change in price as time goes on. In this manner one can judge the investment as a "better bet" than utility rates to contain energy costs.

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: $74,260

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 x 5% interest = $1,000).

Property value appreciation is estimated to be:

$74,260 = 1st-year utility savings of $3,713 x 20 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

Current Rate	Post Project Rate
Central Maine Power Co: Residential Service (Standard Offer)	Central Maine Power Co: Residential Service (Standard Offer)
Tiered Rate: Yes	Tiered Rate: Yes
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)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Entered into Software (historical)													
Monthly Use	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Historical Cost	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Estimated by Software at Current Rates													
Estimated Use	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	24,000
Current Cost	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$324**	**$3,888**
PV Production	(1,510)	(1,726)	(2,101)	(2,072)	(2,249)	(2,094)	(2,424)	(2,312)	(2,130)	(1,762)	(1,244)	(1,283)	
Post Project Use	490	274	(101)	(72)	(249)	(94)	(424)	(312)	(130)	238	756	717	1,093
Post Project Cost	**$85**	**$51**	**$11**	**$11**	**$11**	**$11**	**$11**	**$11**	**$11**	**$11**	**$11**	**$75**	**$310**
Production Self-Consumption Percent:													
	22%	23%	20%	23%	22%	25%	21%	20%	21%	23%	29%	27%	
Net-Meter Credit Values: Amounts Accrued and Applied to Post-Project Cost													
The Value of Net Meter Credits applied to the Post Project Cost totals take into account meter fees and minimum bill amounts.													
Value Accrued in Month at Utility Retail Rate:													
	$0	$0	$(13)	$(8)	$(36)	$(12)	$(64)	$(46)	$(17)	$0	$0	$0	$(196)
Value Applied	$0	$0	$0	$0	$0	$0	$0	$0	$0	$(34)	$(116)	$(46)	$(196)

Cash Flow Details for the System

Cash Flows in Year	0	1	2	3	4
Gross Cost: PV	(38,850)				
O&M Cost: PV	0	(40)	(41)	(42)	(43)
Utility Bill Savings with Inflation Applied	0	3,713	3,852	3,996	4,145
Solar Electric (PV) Incentives					
Federal Tax Credit: Year 2020 (26% of Gross Cost at Installation)	10,101	0	0	0	0
Total Incentives	10,101	0	0	0	0
Loan Principal & Payments	28,000	(2,796)	(2,796)	(2,796)	(2,796)
Net Annual Cash Flow	**(749)**	**877**	**1,015**	**1,158**	**1,306**
Cumulative Cash Flow	(749)	128	1,143	2,301	3,607

Net Annual Cash Flow is the sum of values in gray lines.

Cash Flows in Year	5	6	7	8	9
O&M Cost: PV	(45)	(46)	(47)	(48)	(50)
Utility Bill Savings with Inflation Applied	4,301	4,460	4,628	4,801	4,980
Loan Principal & Payments	(2,796)	(2,796)	(2,796)	(2,796)	(2,796)
Net Annual Cash Flow	**1,460**	**1,618**	**1,785**	**1,957**	**2,134**
Cumulative Cash Flow	5,067	6,685	8,470	10,427	12,561

Cash Flows in Year	10	11	12	13	14
O&M Cost: PV	(51)	(53)	(54)	(56)	(57)
Utility Bill Savings with Inflation Applied	5,166	5,360	5,560	5,767	5,983
Loan Principal & Payments	(2,796)	0	0	0	0
Net Annual Cash Flow	**2,319**	**5,307**	**5,506**	**5,711**	**5,926**
Cumulative Cash Flow	14,880	20,187	25,693	31,404	37,330

Cash Flows in Year	15	16	17	18	19
O&M Cost: PV	(59)	(60)	(62)	(64)	(66)
Utility Bill Savings with Inflation Applied	6,206	6,439	6,679	6,928	7,187
Net Annual Cash Flow	**6,147**	**6,379**	**6,617**	**6,864**	**7,121**
Cumulative Cash Flow	43,477	49,856	56,473	63,337	70,458

Cash Flow Details for the System

Cash Flows in Year	20	21	22	23	24
O&M Cost: PV	(67)	(69)	(71)	(73)	(75)
Utility Bill Savings with Inflation Applied	7,456	7,734	8,023	8,323	8,634
Net Annual Cash Flow	**7,389**	**7,665**	**7,952**	**8,250**	**8,559**
Cumulative Cash Flow	77,847	85,512	93,464	101,714	110,273

Cash Flows in Year	25	26	27	28	29
O&M Cost: PV	(77)	0	0	0	0
Utility Bill Savings with Inflation Applied	8,956	0	0	0	0
Net Annual Cash Flow	**8,879**	**0**	**0**	**0**	**0**
Cumulative Cash Flow	119,152	0	0	0	0

Other Assumptions Used in this Analysis

Customer Type: Residential.

Tax Effects Applied to Utility Savings: As a residential customer, we have assumed Post-tax (net income) dollars are saved. Therefore no tax effects are assumed.

System Life: PV System: 25 years. Inverters: 25 years.

PV System Modeling Variables (PVWatts references): System Losses: 9.5%, DC-to-AC Ratio: 1.36, Module Type: Premium (high efficiency), Inverter Efficiency: 99.00%.

Performance Degradation and O&M Costs: We have assumed performance will degrade by 0.50% 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): 0.10%.

Income Tax Rates: Federal: 28.00%, State: 5.00%

Annual Inflation Rates: Consumer price index: 2.80%, Electric Rates: 3.78%

Energy Metering Type: Net Metering

Net Excess Generation (NEG): Monthly NEG credited at Utility Rate. Monthly NEG may be carried forward to the next month for application to future utility bills. Annual NEG Not sold.

Discount Rate: 5.00%. Used to estimate net present value of future cash flows. This is also assumed to be the finance rate, as used to calculate MIRR.

Reinvestment Rate: 8.00%. Used to calculate MIRR.

Levelized Energy Cost (LEC) calculations do not include the cash effects of loans or leases to purchase the system.

Carbon Dioxide (CO2) Calculations: The following assumptions are used to calculate carbon dioxide (CO2) reductions: Electricity: 1.64 lbs. CO2 per kWh. Natural Gas: 0.12 lbs. CO2 per cubic foot (12 lbs. per Therm). Fuel Oil: 22.29 lbs. CO2 per gallon. Propane: 12.17 lbs. CO2 per gallon. Trees Planted: 0.0429 tons CO2 per Tree planted (23.3 Trees/Ton CO2). Automiles Saved: 1 lb CO2 per mile for medium passenger car (2,000 Miles/Ton CO2). Gallons Gasoline: 0.009812 tons CO2/gallon (102 Gal/Ton CO2). Landfill Tons: 3.16 tons CO2 per ton of waste recycled instead of landfilled. Single-family Homes (electric use): 8.82 tons CO2/home (0.11 Homes/Ton CO2). Tons of Coal Burned: 2.0525 lbs. of CO2 per lb. of Coal (2,000 lbs. per ton). Source: www.epa.gov/cleanenergy/energy-resources/refs.html

Water used by Thermoelectric Powerplants: Depending upon the technology used, natural gas and coal power plants withdraw up to 20 gallons of water for every kWh of energy produced and consume (via evaporation) about 0.47 gallons per kWh produced. Sources: http://nrel.gov/docs/fy04osti/33905.pdf and http://www.wri.org/resources/charts-graphs/typical-range-water-withdrawals-and-consumption-thermoelectric-power-plants which summarizes the Electric Power Research Institue`s report *Water & Sustainability (Volume 3): U.S. Water Consumption for Power Production - The Next Half Century*

Notice to Customer: In order to meet the requirements of UL 1741, grid tie inverters must shut down when the grid power goes out. Therefore, the output of this system will not be there during a power outage. If a standby generator is installed or used, the output of the generator must be electrically isolated from the inverters.

PV Production by Year

PV system production will vary according to weather patterns, changes in obstacles that may shade the PV panels, and the like. Over time system production may also "degrade" due to general soiling and other effects of aging. The table below provides a range (+/- 20%) of typical annual production values for the system, by year, with an annual performance degradation of 0.50% included. The "Typical" values were used to provide this report.

Year	Low Typical	Typical	High Typical
1	18,326 kWh	22,907 kWh	27,488 kWh
2	18,234 kWh	22,792 kWh	27,351 kWh
3	18,142 kWh	22,678 kWh	27,214 kWh
4	18,051 kWh	22,563 kWh	27,076 kWh
5	17,959 kWh	22,449 kWh	26,939 kWh
6	17,867 kWh	22,334 kWh	26,801 kWh
7	17,776 kWh	22,220 kWh	26,664 kWh
8	17,684 kWh	22,105 kWh	26,526 kWh
9	17,593 kWh	21,991 kWh	26,389 kWh
10	17,501 kWh	21,876 kWh	26,251 kWh
11	17,409 kWh	21,762 kWh	26,114 kWh
12	17,318 kWh	21,647 kWh	25,977 kWh
13	17,226 kWh	21,533 kWh	25,839 kWh
14	17,134 kWh	21,418 kWh	25,702 kWh
15	17,043 kWh	21,304 kWh	25,564 kWh
16	16,951 kWh	21,189 kWh	25,427 kWh
17	16,860 kWh	21,074 kWh	25,289 kWh
18	16,768 kWh	20,960 kWh	25,152 kWh
19	16,676 kWh	20,845 kWh	25,014 kWh
20	16,585 kWh	20,731 kWh	24,877 kWh
21	16,493 kWh	20,616 kWh	24,740 kWh
22	16,401 kWh	20,502 kWh	24,602 kWh
23	16,310 kWh	20,387 kWh	24,465 kWh
24	16,218 kWh	20,273 kWh	24,327 kWh
25	16,127 kWh	20,158 kWh	24,190 kWh
Totals	**430,652 kWh**	**538,315 kWh**	**645,977 kWh**

Renewable Resources

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.

Weather station referenced: "PORTLAND INTL JETPORT" (Maine)

Solar Resources: Flat-Plate, South-facing Tilted at Latitude												
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
kWh/m2/day	3.495	4.457	4.957	4.92	5.103	4.835	5.542	5.403	5.213	4.194	3.038	2.999