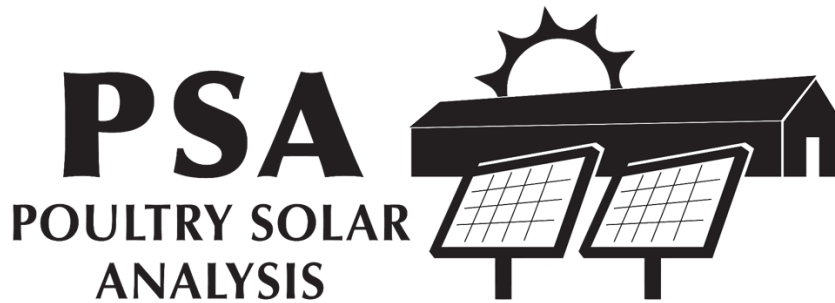


# USER GUIDE FOR



Written and developed by Dr. M. Popp, B. Bateman, and M. King

Start

Collaborators: Dr. John Anderson, Dr. Yi Liang, Byron Louk, Douglas Hutchings, Dr. Greg Thoma, Dr. Michael Kidd, Dr. James Mitchell



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*Disclaimer: The information provided within represents estimates that are a result of a set of complex calculations that are described in more detail in information provided on the download site. Changes in parameter values and its implications on profitability differences are estimates. The user should use their own reasonable judgment to determine whether results are appropriate before acting on the results. As such, this software is provided 'as is' and without warranties as to performance of merchantability. Further, statements may have been made to you about this software. Any such statements do not constitute warranties and shall not be relied on by the user in deciding whether to use the program or act on its results. This program is provided without any expressed or implied warranties whatsoever. Because the diversity of conditions and hardware under which this program may be used, no warranty of merchantability or warranty of fitness for a particular purpose is offered. The user is advised to test the program thoroughly before relying on it. The user assumes the entire risk of using the program. The University of Arkansas will not be liable for any claim or damage brought against the user by any third party, nor will the University of Arkansas be liable for any consequential, indirect or special damages suffered by the user as a result of the software.*

Update provides a way to specify REAP grant and solve for financing options that improve cashflow compared to previous version.

## Version 2.0

January 19, 2024

Prepared by

Michael Popp

## Specifying Electricity Use and Billing, Location, Federal Income Tax Credit, Installation Year and Access Fee/Demand Charges

The screenshot displays the Poultry\_Solar\_v2.0 spreadsheet. It features a data table for electricity usage, a line graph showing combined use and costs, and several input fields for user-defined parameters. Callouts A through G highlight specific features and data points.

Date	Meter 1 kWh	Meter 1 \$	Meter 2 kWh	Meter 2 \$	Combined Meters kWh	Combined Meters \$	Est. \$
Jan '21	16,760	2,589			16,760	2,589.44	2,262.07
Feb '21	17,024	2,611			17,024	2,611.26	2,292.98
Mar '21	34,667	4,250			34,667	4,249.50	4,358.42
Apr '21	22,395	3,512			22,395	3,512.04	2,921.75
May '21	24,287	3,771			24,287	3,771.04	3,143.25
Jun '21	33,412	4,514			33,412	4,513.77	4,211.50
Jul '21	30,692	4,334			30,692	4,333.80	3,893.07
Aug '21	48,760	5,575			48,760	5,575.09	6,008.27
Sep '21	32,073	4,545			32,073	4,544.67	4,054.74
Oct '21	73,186	7,783			73,186	7,783.43	8,867.79
Nov '20	23,428	3,859			23,428	3,858.90	3,042.69
Dec '20	17,561	2,722			17,561	2,721.64	2,355.84
					374,245	50,064.58	47,412.37

Graph: Combined Use and Costs for Electric Meters. The graph plots monthly kWh (x-axis, 0 to 80,000) against monthly cost in dollars (y-axis, 0 to 9,000). A blue line represents the estimated cost, showing a positive correlation between usage and cost. Callout D points to the graph, and callout C points to the 'Est. \$' column in the table.

Input Fields:

- Zip: 72727 (Callout E)
- Federal Income Tax Credit: 30% Federal Income Tax Credit (2023 through 2033)
- Installation Year: 2025 (Callout F)
- Access Fee: \$300.00 (Callout D)
- Total kWh: 374,245
- Estimated Access Fee: \$1,419.74
- kWh rate: \$0.1171

Navigation: Start (left arrow), Next (right arrow), Fit to Screen (button).

Disclaimer: The information provided within represents estimates that are a result of a set of complex calculations that are described in more detail in information provided on the download site. Changes in parameter values and its implications on profitability differences are estimates. The user should use their own reasonable judgment to determine whether results are appropriate before acting on the results. As such, this software is provided 'as is' and without warranties as to performance of merchantability. Further, statements may have been made to you about this software. Any such statements do not constitute warranties and shall not be relied on by the user in deciding whether to use the program or act on its results. This program is provided without any expressed or implied warranties whatsoever. Because the diversity of conditions and hardware under which this program may be used, no warranty of merchantability or warranty of fitness for a particular purpose is offered. The user is advised to test the program thoroughly before relying on it. The user assumes the entire risk of using the program. The University of Arkansas will not be liable for any claim or damage brought against the user by any third party, nor will the University of Arkansas be liable for any consequential, indirect or special damages suffered by the user as a result of the software.

### Notes:

- Use regular Excel® features to save the file with a different name once downloaded from the internet. You may need to Unlock attributes in the General tab of Properties associated with the file in the directory where you saved the file.
- After consulting your last 12 months of utility bills, please enter monthly kWh and associated charge from the electric company. Note that there can be debt recovery, fuel surcharges, access fees and demand charges on your bill in addition to the charge per kWh. If you have several bills given several meters, please add up charges per month across bills. Room is provided for two meters that are automatically summed in the Combined Meters columns. This allows for meter aggregation.
- Your combined meter information is plotted on a graph and a line is fitted through the data to estimate your monthly fixed charges (access fee, demand charges, etc.) that are expected to remain once the solar panels are installed on the operation. Those charges are shown in column R, row 3 just above the box highlighted in blue.
- You can set the access fee or monthly fixed charge you expect to remain, with the solar panels in place, to a value of your choice (perhaps an estimate provided by the solar installer or your utility company) or you can set it to zero to accept the estimate from the graph of your electricity bills. If the estimated access fee provided by the tool is negative, please enter \$5 per month. Note that the box will turn green if you choose zero. The green highlighting is intended to showcase that you can modify the cell. Changing the access fee from the computer estimate alters the per unit electricity charge in \$/kWh in column R, row 2. This is important as that per unit electricity charge or variable rate for electricity is used for valuing the electricity generated from the solar panels as net metering is assumed.
- The ZIP code information is there for you to use the National Renewable Energy Lab web-based tool to determine the expected kWh generated per kW of system size to estimate how big a system you would need to build to meet the total kWh you use in a year.
- As of late 2022, the U.S. modified legislation to allow for a 30% federal income tax credit on solar installations. There are provisions for an additional 10% federal income tax credit if the installation site is in a low-income region or on Indian land. Bonus depreciation legislation allows for faster depreciation and allows half of the income tax credit to be depreciated but is being phased out by 2027. As such, the installation year plays a role for determining income taxes given depreciation allowances.
- Use the arrows to go back to the Title page (Start) or move to the next entry screen to set loan details and other information. The Fit to Screen button resizes the pages to fit all information on one screen.

## Specifying Panel Productivity, System Expansion, Financing Terms, Use of Tracker Technology, Depreciation method, Electricity rate, Inflation, Federal and State Income Tax rates, Time to realize the federal income tax credit and Opportunity cost of Capital

File Home Insert Page Layout Formulas Data Review View Automate Developer Help

D12 : 85%

Please enter input below in the cells highlighted in green. Graphs will update automatically. To ensure proper calculations have been performed, you can also push the 'Refresh' button.

	without tracking	with tracking
PVWatts Estimate	1,384	
Annual Electricity Use - kWh	374,245	
Total House Square Ft.	215,000	
kWh/1000 sq ft.	1,741	
Expected kW <sub>DC</sub>	270	
Additional kW	0	
Tracker System	No	
Specify REAP (% of Initial Cost)	25%	
Initial Cost	\$435,357	
Amt. Financed (1st Loan)	85.0%	
Loan Length (yrs)	20	
Debt Financing Rate	9.60%	

Grant awarded: \$108,839

Second loan: \$48,978

Annual P&I on first loan of \$277,540: \$31,262

Interest rate: 8.10%

Potential Bonus Depreciation	\$148,021
Useful Life	20
Zip	72727
Exp. Elec. Rate (¢/kWh)	11.71
Electricity Inflation	2.00%
O & M Inflation	1.00%
Monthly Est. Base Fee	\$300.00
Income Tax Rate (Federal)	20.00%
Income Tax Rate (State)	5.00%
Years to Realize Tax Credit	5
Depreciation	MACRS
Discount rate	6.0%

PSA POULTRY SOLAR ANALYSIS

Fit to Screen

Refresh

Monthly Bills

Optimize Loan Amounts with **Immediate Tax Benefit vs.** **Delayed Tax Benefit**

Notes:

(A) [PVWatts Estimate](#) is a clickable link. Please enter your ZIP code in the box (1) shown :

**PVWatts® Calculator**

Get Started:  **1** **GO »**

Then click on "Go to System Info" (2)

Now specify the direct current (DC) System size in kW by entering a 1 in place of 4 (3)

**SYSTEM INFO**

Modify the inputs below to run the simulation.

DC System Size (kW):  **3** **i**

and proceed to the next screen (4) to get system results



The results screen will tell you how many kWh/year to expect per 1 kW<sub>DC</sub> :

**1,384 kWh/Year\***

System output may range from 1,338 to 1,447 kWh per year near this location. Click [HERE](#) for more information.

- (B) Using the kWh/year per kW<sub>DC</sub> can now be used to determine the system size in kW<sub>DC</sub> based on your annual kWh you determined with your monthly utility bills as shown in column D rows 4 (annual kWh) and column D row 7 (system size in kW<sub>DC</sub>). Note that you can overwrite the kWh/year in column D row 3 as your solar installer may have a different estimate based on the system they are installing. Altering electricity generated per year affects system size and thereby cost of installation.
- (C) You can also specify additional capacity for the system if you expect your electricity needs to increase over time. Net metering (selling electricity to the grid applies only to the amount you plan to use from the grid and solar panels do not directly supply to your energy need). The solar panels deliver energy to the inverter, which converts DC to AC and supplies the electricity to the grid such that the grid acts as the battery for your farm operation. If you size your system too large (supplying more energy to the grid than what you use), the electric company may not reimburse at the rate at which you buy from the grid. Instead, excess electricity may be reimbursed from the grid at a lower rate. Once system size is determined, you can opt to employ tracker system technology such that solar panels follow the sun's orbit to create more kWh/year. Such systems are typically larger than 500 kW<sub>DC</sub>. Turning on tracker technology now uses kWh/year as shown in column F row 3 and column D row 3 fades away. System size or expected kW<sub>DC</sub> also changes as panel efficiency increases by 18%.
- (D) Initial cost is based on a sliding-cost scale and is based on system size and tracker technology (+10%). Included are system installation and electric system upgrade costs. The estimated cost of the system is thus based on \$1.70 per kW<sub>DC</sub> for systems up to 199 kW<sub>DC</sub>, a cost of \$1.61 per kW<sub>DC</sub> for systems from 200 – 499 kW<sub>DC</sub>, a cost of \$1.51 per kW<sub>DC</sub> from 500 – 999 kW<sub>DC</sub>, a cost of \$1.35 per kW<sub>DC</sub> for 1MW systems, with further cost breaks to \$1.25 per kW<sub>DC</sub> for 20 MW systems.
- (E) You can specify financing terms in this section. You can use your mouse to highlight extra information provided in places with red triangles. You can have two loans to optimize financing of the acquisition (net of grants awarded) using one loan to finance the equipment and a second loan to be repaid with income tax credits, such that cash outflows after tax without investment are similar to those with solar investment. Click on the relevant 'Optimize Loan Amounts with' button pending your time required to realize your income tax credit. Current model input has 85% of the installation (net of REAP grant) financed with a 20-yr loan at 9.6% and 15% with a second loan at 8.1%.
- (F) Potential bonus depreciation is the first-year depreciation possible pending income tax credit rate and time of installation. Please consult your accountant for verification.

Specifying Panel Productivity, System Expansion, Financing Terms, Use of Tracker Technology, Depreciation method, Electricity rate, Inflation, Federal and State Income Tax rates, Time to realize the federal income tax credit and Opportunity cost of Capital (cont'd)

Notes: See notes for items (A) through (F) on p. 2

File Home Insert Page Layout Formulas Data Review View Automate Developer Help

D12

B C D E F G H I J K L M

Please enter input below in the cells highlighted in green. Graphs will update automatically. To ensure proper calculations have been performed, you can also push the 'Refresh' button.

PSA  
POULTRY SOLAR  
ANALYSIS

	without tracking	with tracking		
PVWatts Estimate	1,384		Potential Bonus Depreciation	\$148,021
Annual Electricity Use - kWh	374,245		Useful Life	20
Total House Square FT.	215,000		Zip	72727
kWh/1000 sq ft.	1,741		Exp. Elec. Rate (c/kWh)	11.71
Expected kW <sub>oc</sub>	270		Electricity Inflation	2.00%
Additional kW	0		O & M Inflation	1.00%
Tracker System	No		Monthly Est. Base Fee	\$300.00
Specify REAP (% of initial Cost)	25%		Income Tax Rate (Federal)	20.00%
Initial Cost	\$435,357		Income Tax Rate (State)	5.00%
Amt. Financed (1st Loan)	85.0%		Years to Realize Tax Credit	5
Loan Length (yrs)	20		Depreciation	MACRS
Debt Financing Rate	9.60%		Discount rate	6.0%

Grant awarded: \$108,839

Second loan: \$48,978

Interest rate: 8.10%

Annual P&I on first loan of \$277,540: \$31,262

Fit to Screen

Refresh

Monthly Bills

Optimize Loan Amounts with Immediate Tax Benefit vs. Delayed Tax Benefit

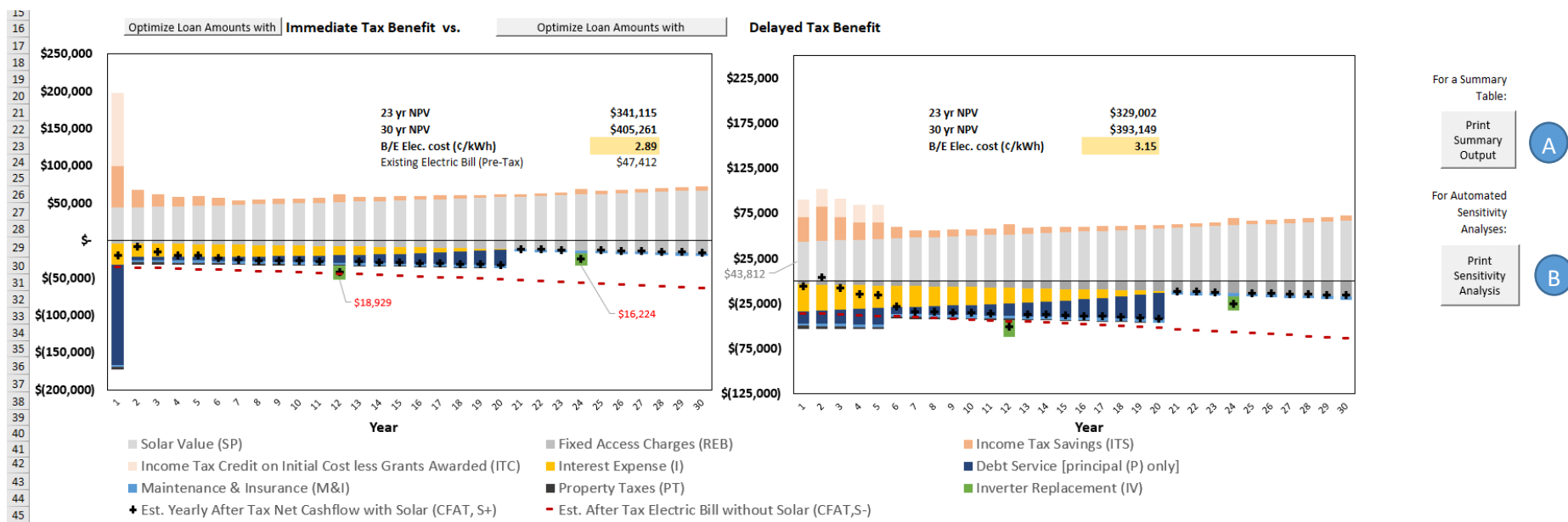
(G) You can modify the electricity rate as estimated by the computer from p. 1 (accessible by clicking on the "Monthly Bills" arrow or column R row 2 on that screen) to use both a modified access fee (p. 1 item D) and a different variable electricity rate. Clicking on the "Reset" button reestablishes the link to the computer estimate from the prior page.

(H) While inflation is high in 2022, such expectations hopefully will not persist over the next 30 years. An electricity inflation rate between 1 and 3 percent per year is suggested. By the same token, inflation for Operations and

Maintenance (O & M) is expected to be minimal as new technology becomes available (i.e. new inverters). The monthly base fee for access fees, demand charges, and other electric utility company costs that are expected to prevail with a solar system installation can be modified using the prior input screen (p. 1).

- (I) Please consult with your accountant to determine an appropriate federal and state income tax rate. The same rate is applied over the 30-year investment horizon associated with the solar system.
- (J) The federal income tax credit has a 3 year carry back and 22 year carry forward period per latest [federal rules](#). As such, pending taxable income, you may need more than 1 year to reap tax benefits associated with bonus depreciation and income tax credits. Column J row 12 allows you to spread tax benefits over a longer time period. Note that this tool still allows depreciation of ½ the income tax credit but no longer accelerates depreciation by allowing maximum potential bonus depreciation in year 1.
- (K) The tool allows use of 5-yr Modified Accelerated Cost Recovery (MACRS) which depreciates the solar system for tax purposes over the course of 6 years (with or without bonus depreciation considerations pending on time chosen to realized income tax credit benefits and installation year). You can also specify straight line depreciation (SLN) which applies the same level of annual depreciation over the useful life of the system. You can specify the useful life in column J row 4. Using either MACRS or SLN, the salvage value of the system is zero. Property taxes on the solar installation are assessed based on the useful life specified in column J row 4 using straight line depreciation even when MACRS is chosen.
- (L) The discount rate chosen accounts for time value of money and risk. Choosing a higher discount rate assumes you think of the investment as risky and vice versa with a lower discount rate. Since cashflows before and after solar installation and different income tax benefit realization periods occur over a period of 30 years, we discount all future cashflows using the discount rate to reflect the financial impact over the 30-year period in today's dollars as shown on the next page (p. 4).

## Comparing Cashflows on the Basis of Time to Realize Income Tax Credits and in Relation to Current Electricity Bill Information



Note: The graphs above continuously update with changes to financing terms, system size, use of track technology and other system parameters discussed on p. 1-3. On the left is a cashflow scenario where all income tax benefits are realized in the first year whereas the graph on the right showcases cashflow implications with delayed realization of income tax benefits. A tabular presentation of these cashflows can be printed as a pdf file or a printer of your choosing by clicking on the “Print Summary Output” button (A). The red minus signs on the graphs indicate the current state of affairs with solar investment. They represent the *after tax* cost of electricity using the electricity rate and base fee assumptions as explained above (p.1-2). The black plus signs represent *after-tax* cashflows with the solar panel investment. They summarize income tax benefits of the federal income tax credit and bonus depreciation (if all can be realized in year 1) and sales of solar energy to the grid at the variable electricity rate specified. Subtracted are principal and interest payments on the loan, operating and maintenance charges, the cost to replace the inverter(s) in years 12 and 24, and property taxes. To make the system installation profitable, the + signs need to be above the – signs. In general, that occurs early when realizing accelerated depreciation benefits and income tax credits and again once the loan is paid off. The net effect of the difference in cashflow between the +’s and –’s is summarized across 23 and 30 years in the graph in rows 21 and 22, respectively, and labeled as the 23 yr NPV and 30 yr NPV. Those two numbers reflect the net cashflow effect of investing in solar panels up to year 23 (before the second inverter replacement) and over the entire 30 years. The B/E Elec. Cost in cents per kWh, in row 23, is the cost of electricity with the solar system to compare to the electricity rate in the like-shaded box in column J row 6 or item G on p. 3 of this user guide. So the user hopes to have positive NPV numbers, the larger the better, and low B/E Elec. cost for the investment to be beneficial. Even if positive NPV can be achieved and the B/E Elec. Cost is low, the decision maker needs to take the impact of borrowing money (as specified on p. 2 in section E) into account. The investment amount can tie up substantial borrowing capacity. A REAP grant may help as a down payment and would add to NPV and lower B/E Elec. cost further. Since a large number of parameters can be changed above the graphs, an **automated sensitivity analysis can be performed (B)** by clicking on the “Print Sensitivity Analysis” button. Generating that 1-page report **takes a couple of minutes and leads to unavoidable screen flickering**. The output can be directed to a printer of your choice or printed as a pdf file. The sensitivity analyses reflect on loan length, amount financed, use of tracker technology, interest rate on the loan, changes in electricity inflation rate, alternative base fees, and time period to realize income tax benefits. Outcomes are summarized using NPV and B/E cost information. Sample reports are attached below.

**Summary of Output with Current Selections on  
 Interest Rate, Amount Financed, etc.**

IMMEDIATE TAX BENEFIT WITH ALL BONUS DEPRECIATION REALIZED												
30 yr NPV:	\$405,261											
B/E Elec. Cost (¢/kWh):	2.89	Inverters:	\$35,153	Grant(s) awarded:	\$108,839							
Install Year/ITC rate	2025 / 30%	Size (kW <sub>DC</sub> ):	270	Second 1 Year Note @ 8.1% :	\$48,978							
Est. System Install Cost:	\$435,357	1,384 kWh/kW	\$277,540 financed @9.6% over 20 years.									
Tracking:	No											
Year	Investment Tax Credit	Accounting Depreciation	Total Solar kWh	c/kWh	Loan Interest	Debt Service (Principal)	Utility Bill without Solar	Utility Bill with Solar	Est. Prop. Tax for Solar System	Est. Maint. & Insurance for Solar System	Annual After Tax Benefit of Solar	
1	\$97,955	\$192,428	374,245	11.71	-\$30,402	-\$53,805	-\$47,484	-\$3,672	-\$3,102	-\$2,839	\$96,010	
2	\$0	\$71,050	372,374	11.94	-\$25,951	-\$5,311	-\$48,434	-\$3,969	-\$2,939	-\$2,868	\$21,399	
3	\$0	\$42,630	370,512	12.18	-\$25,418	-\$5,844	-\$49,403	-\$4,275	-\$2,775	-\$2,896	\$15,056	
4	\$0	\$25,578	368,659	12.42	-\$24,831	-\$6,431	-\$50,391	-\$4,591	-\$2,612	-\$2,925	\$11,436	
5	\$0	\$25,578	366,816	12.67	-\$24,186	-\$7,076	-\$51,399	-\$4,916	-\$2,449	-\$2,955	\$11,901	
6	\$0	\$12,789	364,982	12.93	-\$23,476	-\$7,786	-\$52,427	-\$5,251	-\$2,286	-\$2,984	\$9,289	
7	\$0	\$0	363,157	13.18	-\$22,695	-\$8,567	-\$53,475	-\$5,597	-\$2,122	-\$3,014	\$6,668	
8	\$0	\$0	361,341	13.45	-\$21,835	-\$9,427	-\$54,545	-\$5,953	-\$1,959	-\$3,044	\$7,105	
9	\$0	\$0	359,535	13.72	-\$20,889	-\$10,373	-\$55,636	-\$6,320	-\$1,796	-\$3,075	\$7,529	
10	\$0	\$0	357,737	13.99	-\$19,849	-\$11,414	-\$56,748	-\$6,698	-\$1,633	-\$3,105	\$7,939	
11	\$0	\$0	355,948	14.27	-\$18,703	-\$12,559	-\$57,883	-\$7,087	-\$1,469	-\$3,136	\$8,331	
12	\$0	\$0	354,168	14.56	-\$17,443	-\$13,819	-\$59,041	-\$7,488	-\$1,306	-\$3,168	-\$5,682	
13	\$0	\$0	352,398	14.85	-\$16,057	-\$15,206	-\$60,222	-\$7,901	-\$1,143	-\$3,199	\$9,055	
14	\$0	\$0	350,636	15.14	-\$14,531	-\$16,731	-\$61,426	-\$8,326	-\$980	-\$3,231	\$9,381	
15	\$0	\$0	348,882	15.45	-\$12,852	-\$18,410	-\$62,655	-\$8,763	-\$816	-\$3,264	\$9,679	
16	\$0	\$0	347,138	15.76	-\$11,005	-\$20,258	-\$63,908	-\$9,213	-\$653	-\$3,296	\$9,945	
17	\$0	\$0	345,402	16.07	-\$8,972	-\$22,290	-\$65,186	-\$9,676	-\$490	-\$3,329	\$10,176	
18	\$0	\$0	343,675	16.39	-\$6,736	-\$24,527	-\$66,490	-\$10,153	-\$327	-\$3,363	\$10,367	
19	\$0	\$0	341,957	16.72	-\$4,275	-\$26,988	-\$67,819	-\$10,643	-\$163	-\$3,396	\$10,512	
20	\$0	\$0	340,247	17.05	-\$1,567	-\$29,696	-\$69,176	-\$11,148	\$0	-\$3,430	\$10,608	
21	\$0	\$0	338,546	17.40	\$0	\$0	-\$70,559	-\$11,667	\$0	-\$3,464	\$42,125	
22	\$0	\$0	336,853	17.74	\$0	\$0	-\$71,970	-\$12,200	\$0	-\$3,499	\$42,766	
23	\$0	\$0	335,169	18.10	\$0	\$0	-\$73,410	-\$12,749	\$0	-\$3,534	\$43,416	
24	\$0	\$0	333,493	18.46	\$0	\$0	-\$74,878	-\$13,313	\$0	-\$3,569	\$31,746	
25	\$0	\$0	331,826	18.83	\$0	\$0	-\$76,376	-\$13,894	\$0	-\$3,605	\$44,746	
26	\$0	\$0	330,167	19.21	\$0	\$0	-\$77,903	-\$14,490	\$0	-\$3,641	\$45,427	
27	\$0	\$0	328,516	19.59	\$0	\$0	-\$79,461	-\$15,103	\$0	-\$3,678	\$46,117	
28	\$0	\$0	326,873	19.98	\$0	\$0	-\$81,050	-\$15,734	\$0	-\$3,714	\$46,818	
29	\$0	\$0	325,239	20.38	\$0	\$0	-\$82,671	-\$16,381	\$0	-\$3,752	\$47,529	
30	\$0	\$0	323,613	20.79	\$0	\$0	-\$84,325	-\$17,047	\$0	-\$3,789	\$48,251	

The current estimated electric rate is 11.71 cents per kWh with an estimated monthly base fee of \$300.

DELAYED TAX BENEFIT WITH ITC REALIZED OVER 5 YEARS AND 5-yr MACRS DEPRECIATION												
30 yr NPV:	\$393,149											
B/E Elec. Cost (¢/kWh):	3.15	Inverters:	\$35,153	Grant(s) awarded:	\$108,839							
Install Year/ITC rate	2025 / 30%	Size (kW <sub>DC</sub> ):	270	Second 1 Year Note @ 8.1% :	\$48,978							
Est. System Install Cost:	\$435,357	1,384 kWh/kW	\$277,540 financed @9.6% over 20 years.									
Tracking:	No											
Year	Investment Tax Credit	Accounting Depreciation	Total Solar kWh	c/kWh	Loan Interest	Debt Service (Principal)	Utility Bill without Solar	Utility Bill with Solar	Est. Prop. Tax for Solar System	Est. Maint. & Insurance for Solar System	Annual After Tax Benefit of Solar	
1	\$19,591	\$74,011	374,245	11.71	-\$30,099	-\$13,108	-\$47,484	-\$3,672	-\$3,102	-\$2,839	\$30,152	
2	\$19,591	\$118,417	372,374	11.94	-\$28,919	-\$14,289	-\$48,434	-\$3,969	-\$2,939	-\$2,868	\$41,125	
3	\$19,591	\$71,050	370,512	12.18	-\$27,631	-\$15,576	-\$49,403	-\$4,275	-\$2,775	-\$2,896	\$30,054	
4	\$19,591	\$42,630	368,659	12.42	-\$26,226	-\$16,981	-\$50,391	-\$4,591	-\$2,612	-\$2,925	\$23,509	
5	\$19,591	\$42,630	366,816	12.67	-\$24,694	-\$18,513	-\$51,399	-\$4,916	-\$2,449	-\$2,955	\$23,761	
6	\$0	\$21,315	364,982	12.93	-\$23,476	-\$7,786	-\$52,427	-\$5,251	-\$2,286	-\$2,984	\$11,336	
7	\$0	\$0	363,157	13.18	-\$22,695	-\$8,567	-\$53,475	-\$5,597	-\$2,122	-\$3,014	\$6,668	
8	\$0	\$0	361,341	13.45	-\$21,835	-\$9,427	-\$54,545	-\$5,953	-\$1,959	-\$3,044	\$7,105	
9	\$0	\$0	359,535	13.72	-\$20,889	-\$10,373	-\$55,636	-\$6,320	-\$1,796	-\$3,075	\$7,529	
10	\$0	\$0	357,737	13.99	-\$19,849	-\$11,414	-\$56,748	-\$6,698	-\$1,633	-\$3,105	\$7,939	
11	\$0	\$0	355,948	14.27	-\$18,703	-\$12,559	-\$57,883	-\$7,087	-\$1,469	-\$3,136	\$8,331	
12	\$0	\$0	354,168	14.56	-\$17,443	-\$13,819	-\$59,041	-\$7,488	-\$1,306	-\$3,168	-\$5,682	
13	\$0	\$0	352,398	14.85	-\$16,057	-\$15,206	-\$60,222	-\$7,901	-\$1,143	-\$3,199	\$9,055	
14	\$0	\$0	350,636	15.14	-\$14,531	-\$16,731	-\$61,426	-\$8,326	-\$980	-\$3,231	\$9,381	
15	\$0	\$0	348,882	15.45	-\$12,852	-\$18,410	-\$62,655	-\$8,763	-\$816	-\$3,264	\$9,679	
16	\$0	\$0	347,138	15.76	-\$11,005	-\$20,258	-\$63,908	-\$9,213	-\$653	-\$3,296	\$9,945	
17	\$0	\$0	345,402	16.07	-\$8,972	-\$22,290	-\$65,186	-\$9,676	-\$490	-\$3,329	\$10,176	
18	\$0	\$0	343,675	16.39	-\$6,736	-\$24,527	-\$66,490	-\$10,153	-\$327	-\$3,363	\$10,367	
19	\$0	\$0	341,957	16.72	-\$4,275	-\$26,988	-\$67,819	-\$10,643	-\$163	-\$3,396	\$10,512	
20	\$0	\$0	340,247	17.05	-\$1,567	-\$29,696	-\$69,176	-\$11,148	\$0	-\$3,430	\$10,608	
21	\$0	\$0	338,546	17.40	\$0	\$0	-\$70,559	-\$11,667	\$0	-\$3,464	\$42,125	
22	\$0	\$0	336,853	17.74	\$0	\$0	-\$71,970	-\$12,200	\$0	-\$3,499	\$42,766	
23	\$0	\$0	335,169	18.10	\$0	\$0	-\$73,410	-\$12,749	\$0	-\$3,534	\$43,416	
24	\$0	\$0	333,493	18.46	\$0	\$0	-\$74,878	-\$13,313	\$0	-\$3,569	\$31,746	
25	\$0	\$0	331,826	18.83	\$0	\$0	-\$76,376	-\$13,894	\$0	-\$3,605	\$44,746	
26	\$0	\$0	330,167	19.21	\$0	\$0	-\$77,903	-\$14,490	\$0	-\$3,641	\$45,427	
27	\$0	\$0	328,516	19.59	\$0	\$0	-\$79,461	-\$15,103	\$0	-\$3,678	\$46,117	
28	\$0	\$0	326,873	19.98	\$0	\$0	-\$81,050	-\$15,734	\$0	-\$3,714	\$46,818	
29	\$0	\$0	325,239	20.38	\$0	\$0	-\$82,671	-\$16,381	\$0	-\$3,752	\$47,529	
30	\$0	\$0	323,613	20.79	\$0	\$0	-\$84,325	-\$17,047	\$0	-\$3,789	\$48,251	

Disclaimer: The information provided within represents estimates that are a result of a set of complex calculations that are described in more detail in information provided on the download site. Changes in parameter values and its implications on profitability differences are estimates. The user should use their own reasonable judgment to determine whether results are appropriate before acting on the results. As such, this software is provided 'as is' and without warranties as to performance of merchantability. Further, statements may have been made to you about this software. Any such statements do not constitute warranties and shall not be relied on by the user in deciding whether to use the program or act on its results. This program is provided without any expressed or implied warranties whatsoever. Because the diversity of conditions and hardware under which this program may be used, no warranty of merchantability or warranty of fitness for a particular purpose is offered. The user is advised to test the program thoroughly before relying on it. The user assumes the entire risk of using the program. The University of Arkansas will not be liable for any claim or damage brought against the user by any third party, nor will the University of Arkansas be liable for any consequential, indirect or special damages suffered by the user as a result of the software.



**Sensitivity Analyses for Immediate to Distant Income Tax Credit Realization Periods,  
 Loan Length, Interest Rate, Tracker Technology, Amount Financed, Electricity Inflation  
 Rate, and Base Fee.**

<b>Income Tax Credit &amp; Bonus Depreciation Tax Benefits Realized in Year 1</b>											
<i>Loan Length</i>	5	10	15	20	25	<i>% Amt. Financed</i>	30%	40%	50%	60%	70%
<i>NPV</i>	\$429,732	\$420,754	\$412,555	\$405,261	\$398,931	<i>NPV</i>	\$422,386	\$419,273	\$416,159	\$413,045	\$409,932
<i>B/E c/kWh</i>	2.36	2.55	2.73	2.89	3.03	<i>B/E c/kWh</i>	2.52	2.58	2.65	2.72	2.79
<i>Interest Rate</i>	7.70%	8.20%	8.70%	9.20%	9.70%	<i>Elec. Inflation Rate</i>	1.00%	1.25%	1.50%	1.75%	2.00%
<i>NPV</i>	\$439,227	\$430,508	\$421,629	\$412,596	\$403,413	<i>NPV</i>	\$350,025	\$363,023	\$376,545	\$390,616	\$405,261
<i>B/E c/kWh</i>	2.15	2.34	2.53	2.73	2.93	<i>B/E c/kWh</i>	3.22	3.13	3.05	2.97	2.89
<i>Tracker</i>	Yes	No	See note below for baseline assumptions			<i>Mtly Base Fee</i>	\$240.00	\$270.00	\$300.00	\$330.00	\$360.00
<i>NPV</i>	\$416,588	\$405,261				<i>Elec. Rate c/kWh</i>	11.86	11.78	11.71	11.63	11.55
<i>B/E c/kWh</i>	2.64	2.89				<i>NPV</i>	\$412,357	\$408,809	\$405,261	\$401,713	\$398,166

<b>Income Tax Credit Realized in Years 1-2</b>											
<i>Loan Length</i>	5	10	15	20	25	<i>% Amt. Financed</i>	30%	40%	50%	60%	70%
<i>NPV</i>	\$425,104	\$416,126	\$407,926	\$400,633	\$394,302	<i>NPV</i>	\$422,200	\$418,278	\$414,357	\$410,436	\$406,515
<i>B/E cost</i>	2.46	2.65	2.83	2.99	3.13	<i>B/E c/kWh</i>	2.52	2.6	2.69	2.78	2.86
<i>Interest Rate</i>	7.70%	8.20%	8.70%	9.20%	9.70%	<i>Elec. Inflation Rate</i>	1.00%	1.25%	1.50%	1.75%	2.00%
<i>NPV</i>	\$434,598	\$425,879	\$417,001	\$407,967	\$398,784	<i>NPV</i>	\$345,396	\$358,394	\$371,917	\$385,987	\$400,633
<i>B/E c/kWh</i>	2.25	2.44	2.63	2.83	3.03	<i>B/E c/kWh</i>	3.33	3.24	3.16	3.07	2.99
<i>Tracker</i>	Yes	No	See note below for baseline assumptions			<i>Mtly Base Fee</i>	\$240.00	\$270.00	\$300.00	\$330.00	\$360.00
<i>NPV</i>	\$412,274	\$400,633				<i>Elec. Rate c/kWh</i>	11.86	11.78	11.71	11.63	11.55
<i>B/E c/kWh</i>	2.74	2.99				<i>NPV</i>	\$407,728	\$404,181	\$400,633	\$397,085	\$393,537

<b>Income Tax Credit Realized in Years 1-5</b>											
<i>Loan Length</i>	5	10	15	20	25	<i>% Amt. Financed</i>	30%	40%	50%	60%	70%
<i>NPV</i>	\$417,619	\$408,641	\$400,442	\$393,149	\$386,818	<i>NPV</i>	\$413,933	\$410,154	\$406,375	\$402,596	\$398,817
<i>B/E c/kWh</i>	2.62	2.81	2.99	3.15	3.29	<i>B/E c/kWh</i>	2.7	2.78	2.86	2.95	3.03
<i>Interest Rate</i>	7.70%	8.20%	8.70%	9.20%	9.70%	<i>Elec. Inflation Rate</i>	1.00%	1.25%	1.50%	1.75%	2.00%
<i>NPV</i>	\$427,114	\$418,395	\$409,516	\$400,483	\$391,300	<i>NPV</i>	\$337,912	\$350,910	\$364,432	\$378,503	\$393,149
<i>B/E c/kWh</i>	2.41	2.6	2.8	2.99	3.19	<i>B/E c/kWh</i>	3.51	3.42	3.33	3.24	3.15
<i>Tracker</i>	Yes	No	See note below for baseline assumptions			<i>Mtly Base Fee</i>	\$240.00	\$270.00	\$300.00	\$330.00	\$360.00
<i>NPV</i>	\$405,297	\$393,149				<i>Elec. Rate c/kWh</i>	11.86	11.78	11.71	11.63	11.55
<i>B/E c/kWh</i>	2.89	3.15				<i>NPV</i>	\$400,244	\$396,696	\$393,149	\$389,601	\$386,053

<b>Income Tax Credit Realized in Years 1-10</b>											
<i>Loan Length</i>	5	10	15	20	25	<i>% Amt. Financed</i>	30%	40%	50%	60%	70%
<i>NPV</i>	\$406,857	\$397,879	\$389,680	\$382,387	\$376,056	<i>NPV</i>	\$401,949	\$398,392	\$394,835	\$391,278	\$387,722
<i>B/E c/kWh</i>	2.85	3.05	3.23	3.39	3.52	<i>B/E c/kWh</i>	2.96	3.04	3.11	3.19	3.27
<i>Interest Rate</i>	7.70%	8.20%	8.70%	9.20%	9.70%	<i>Elec. Inflation Rate</i>	1.00%	1.25%	1.50%	1.75%	2.00%
<i>NPV</i>	\$416,352	\$407,633	\$398,754	\$389,721	\$380,538	<i>NPV</i>	\$327,150	\$340,148	\$353,670	\$367,741	\$382,387
<i>B/E c/kWh</i>	2.65	2.84	3.03	3.23	3.43	<i>B/E c/kWh</i>	3.77	3.67	3.58	3.48	3.39
<i>Tracker</i>	Yes > 500 kW	No	See note below for baseline assumptions			<i>Mtly Base Fee</i>	\$240.00	\$270.00	\$300.00	\$330.00	\$360.00
<i>NPV</i>	\$395,265	\$382,387				<i>Elec. Rate c/kWh</i>	11.86	11.78	11.71	11.63	11.55
<i>B/E c/kWh</i>	3.11	3.39				<i>NPV</i>	\$389,482	\$385,934	\$382,387	\$378,839	\$375,291

<b>Income Tax Credit Realized in Years 1-15</b>											
<i>Loan Length</i>	5	10	15	20	25	<i>% Amt. Financed</i>	30%	40%	50%	60%	70%
<i>NPV</i>	\$397,884	\$388,906	\$380,707	\$373,413	\$367,083	<i>NPV</i>	\$391,869	\$388,513	\$385,158	\$381,802	\$378,447
<i>B/E c/kWh</i>	3.05	3.24	3.42	3.58	3.72	<i>B/E c/kWh</i>	3.18	3.25	3.33	3.4	3.47
<i>Interest Rate</i>	7.70%	8.20%	8.70%	9.20%	9.70%	<i>Elec. Inflation Rate</i>	1.00%	1.25%	1.50%	1.75%	2.00%
<i>NPV</i>	\$407,379	\$398,660	\$389,781	\$380,748	\$371,565	<i>NPV</i>	\$318,177	\$331,175	\$344,697	\$358,768	\$373,413
<i>B/E c/kWh</i>	2.84	3.03	3.22	3.42	3.62	<i>B/E c/kWh</i>	3.99	3.89	3.78	3.68	3.58
<i>Tracker</i>	Yes	No	See note below for baseline assumptions			<i>Mtly Base Fee</i>	\$240.00	\$270.00	\$300.00	\$330.00	\$360.00
<i>NPV</i>	\$386,900	\$373,413				<i>Elec. Rate c/kWh</i>	11.86	11.78	11.71	11.63	11.55
<i>B/E c/kWh</i>	3.29	3.58				<i>NPV</i>	\$380,509	\$376,961	\$373,413	\$369,865	\$366,317

NOTE: Sensitivity analyses are in comparison to a loan length of 20 years @9.6%, with 85% of net purchase cost financed, without tracker technology, expected electricity inflation of 2%, O&M inflation of 1%, a base fee of \$300.00/month, and Fed. and State Income tax rates of 20 and 5%, respectively. Install Year is 2025 and you are using 30% Federal Income Tax Credit (2023 through 2033). The remainder of the purchase price is financed with 25% REAP or other grant and a 1-year note of \$48,978 @ 8.1% interest.

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