



Evaluating renewable energy projects

BY MARKUS I. BRYANT, GENERAL MANAGER

Part 54

INTEREST IN WIND OR SOLAR renewable energy equipment has increased over the past few years. We neither promote nor oppose our members' purchase of this equipment. Our wholesale power supplier, Buckeye Power, is developing a cooperative-sponsored program where a member can contract to purchase the output of one or more solar panels in

a "community solar" project. We are in the planning stages and will publish the details when the project is ready to launch.

Our policy toward wind and solar equipment installed by our members is straightforward. We will accommodate members choosing to invest their own money in these systems, provided they meet the necessary technical and liability requirements for interconnection with our electric distribution system. However, we do not believe the rest of our members should subsidize these systems. As a not-for-profit cooperative, our mission is to provide services at cost.

Our website's landing page, www.ncelec.org, has a Renewable Energy tab where visitors will find three on-line brochures about renewable energy, wind energy and solar energy. These brochures provide general information a consumer needs to consider when evaluating a wind or solar project. Also on our website is the cooperative's policy on *Renewable Energy Distributed Resources, Technical Guidelines for Interconnection and Parallel Operation, Net Metering Rate Schedules, Application for Wind or Solar Project Interconnection, a Memo Regarding Liability Service, an Agreement for Electric Service* and one for *Interconnection*, and a worksheet to calculate a *Simplified Comparison of the Annual Cost of Self Generation*

versus *The Cost of Generated Power* supplied by your cooperative.

If a member does not have access to the Internet, call the office and this information will be mailed. If members want to discuss their proposed wind or solar project with a cooperative employee, call North Central Electric Cooperative's Energy Services manager at 1-800-426-3072.

Calculating savings from wind or solar generation

When evaluating the economics of a solar or wind generation project, the calculation of investment cost, tax credits, amount of electricity generated, etc., to determine the cost of power generated by the project is usually done by the equipment sales company. The member should get several quotes to compare. One area that is often missed is ongoing maintenance expenses. Since a member's payback period for his or her investment is directly related to the useful life of the wind or solar equipment, equipment warranties and equipment maintenance are really important factors to consider. However, the area where we see the most problems is with calculating the expected savings on the member's electric bill.

We do not believe the rest of our members should subsidize individual renewable energy systems.

We believe it is important that net metered wind or solar accounts pay their fair share of the costs of using the cooperative's electric distribution system, which must be in place to both receive the power generated by the member and to provide backup power to the member when the wind stops blowing or the sun isn't shining. We also charge for the extra metering needed to properly bill net metering consumers, which is a cost that should not be absorbed by other members.

The cooperative's rates must collect three broad categories of cost incurred by the cooperative:

1. local North Central distribution system costs;
2. Buckeye Power wholesale power generation costs; and
3. transmission costs to get the generated power to our distribution substations.

If members look closely at their electric bill, they also will see a reference to power cost adjustments. Since the rate charged for wholesale power generation



Table 1 - Calculation of annual electricity savings

	1	2	3	4		5	6
	kWh per PVWatts Calculator	kWh per Solar Dealer Projection	Previous 12 Months Use	1/1/16 Rate Schedule C-N Generation Charges/kWh		Net Metering kWh Bank	
				First 6,000 \$ 0.052790	Over 6,000 \$ 0.067757		
January	809	873	1,680	873	0	0	0
February	1,006	1,086	1,920	1,086	0	0	0
March	1,429	1,542	2,560	1,542	0	0	0
April	1,718	1,854	1,840	1,840	0	14	14
May	1,999	2,158	1,520	1,520	0	652	652
June	1,961	2,117	1,440	1,440	0	1,329	1,329
July	1,982	2,139	1,200	1,200	0	2,268	2,268
August	1,850	1,997	1,200	1,200	0	3,065	3,065
September	1,543	1,666	1,200	1,200	0	3,530	3,530
October	1,237	1,335	2,240	2,240	0	2,626	2,626
November	685	739	13,280	0	3,365	0	0
December	564	609	21,360	0	609	0	0
Totals	16,783	18,116	51,440	14,141	3,974		
Multiply Project Production by Appropriate Rate				\$ 746.50	\$ 269.27		
Electric Savings = Sum of First 6,000 and Over 6,000 kWh					\$ 1,015.78		
				Avoided Generation Cost / kWh	\$ 0.056073		

charges are based on historical averages, an adjustment is made for any differences between the actual month's generation cost and the average cost factored into the rate schedule.

When members generate their own electricity, the only cost savings to the cooperative are wholesale power generation costs and transmission costs. These savings show up as lower purchased power charges on their bill. The cooperative still incurs the cost of maintaining its electric distribution system

all the way from our substations to the meter. These costs are recovered through the basic service charge and the power delivery service charge on the bill. This is why the member's net metered monthly electric bill will never be less than the service charge, plus power delivery charges and applicable taxes. This also means if a member generates more electricity than was used in a given month, the excess kilowatt-hours (kWh) are "banked" and applied to a future bill when the member's electric use exceeds the generation that month. If any "banked" kWh are left after the member's December use billing, then the excess kWh are purchased by Buckeye Power at its avoided cost of generation.

Table 1 illustrates how this kWh "banking" process works using a 13.85-kW roof-mounted solar panel proposed for an actual farm account, which would be billed under North Central's small commercial net metering rate. In this example, the solar installer projects its panels will produce 18,116 kWh per year. (Note: I did not see any information for future decreases in generation as the panels age. This is a question that should be discussed before purchasing a system). The 18,116 kWh annual generation needs to be converted to monthly kWh generation to calculate the savings on the member's electric bills. To do this, one can use the National Renewable Energy Laboratory's PVWatts Calculator found at www.pvwatts.nrel.gov. The first column is the results for 13.95 KW of standard fixed roof-mounted panels at a location in central Lorain County. The monthly generation estimates from the PVWatts Calculator for each month was divided into 16,783 kWh and the result multiplied by the 18,116 dealer projection to estimate the solar kWh production

for the same month in column 2.

Column 3 shows the member's actual kWh use from December 2014 through November 2015. The large November and December use is typical of a farm account with a fall crop drying load. Columns 4 and 5 show how the solar generated kWh "offset" the cooperative's wholesale power generation kWh under its net metering schedule. The last column shows the cumulative balance of the net metering kWh "bank" for each month.

Finally, at the bottom of columns 4 and 5, the total solar generated kWh are multiplied by the appropriate generation charge for each column, and the result totals \$1,213.51. If you divide the \$1,213.51 by the projected 18,116 kWh solar production, the result is avoided cooperative-supplied wholesale power generation charges of \$.066988/kWh. This is the number that one should compare with the cost to generate electricity from your wind or solar project.

Another factor seen in proposals is an inflation projection going out as long as 30 years, which is a long time to project. In the above proposal, the installer estimated a \$0.070 per kWh cooperative generation cost, which, although a bit high, is certainly in the "ballpark." However, the assumed annual inflation rate over the next 30 years was 3.32 percent. Buckeye Power's projection is 2.05 percent per year for the 10 years 2016 to 2025.

Table 1 is from an Excel spreadsheet available on www.ncelec.org. Again, if you need information or assistance in considering a renewable energy project, call the office at 1-800-426-3072. ☺