For more energy information, go to http://energy.tennessee.edu.

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Costs

As a general rule of thumb, an installed, grid-tied residential solar electric system without batteries costs approximately $4,000 to $5,000 per kilowatt (kW). Using watt units, $4 to $5 per watt. Larger systems typically cost less per installed kilowatt. An "installed kW" price includes the purchase and installation costs. Using the Nashville home system sizing worksheet example, a 3.87 kW system that provides 50 percent of the home's electricity would cost about $17,500. (3.87 kW x $4,500 = $17,415)

Note: Be prepared to pay or finance the full purchase price because some incentives that lower the final cost are received after the system is installed.

Incentives That Lower Costs

There are a variety of federal, state and local government and utility incentives for energy efficiency and renewable energy. These incentives vary by state and in the length of time they are available. The Department of Energy's Database of State Incentives for Renewables and Efficiency (DSIRE) — http://dsireusa.org — keeps track of tax credits, rebates and other incentives available to reduce your system's final cost.

Estimating Cost Savings and Simple Payback for a Net-Metered System

First, calculate the yearly cost savings of your PV system using the formula:
(PV system size) x (Energy Production Factor) x (Electricity Rate) = $/year saved
For the Nashville example:

- PV system size: 3.87 kW
- Energy Production Factor: 4.9 kWh/m2/Day (find in Factsheet 5's Table A: Nashville's (Year) average or the NREL map on Page 3) x 365 days/year = 1,789 kWh/kW-year
- Electricity (utility) Rate: $0.09 per kWh

3.87 kW x 1,789 kWh/kW-year x $0.09/kWh = $623 saved per year

Simple Payback is calculated by dividing the system price by the amount saved per year. Examples below use the Nashville home numbers.

Without Incentives

- System Cost: $17,415 ÷ $623 saved per year = 28-year simple payback

With Current Incentives

- First, apply any utility rebates. Tennessee Valley Authority (TVA) customers through a participating distributor that meets the Green Power Providers Program qualification requirements are eligible for a one-time $1,000 rebate. In addition, a 20-year contract is entered into where the retail electric rate plus a premium payment will be paid from years 1-10. The retail electric rate is $0.09/kWh and the premium rate for 2014 is $0.04/kWh.

  $17,415 - $1,000 = $16,415

- Tax Credit (expires Dec. 31, 2016) is 30 percent of system cost (after utility/local rebates). $16,415 x 30 percent = $4,925

  $16,415 - $4,925 = $11,490

- Tennessee also applies a State Tax Credit that is 100 percent of sales and use tax.

System Final (Net) Cost: $11,490 ÷ $623 saved per year
= 19-year simple payback

You will also receive the premium rate of $0.04/kWh (for 2014 contracts) for the electricity you sell back to the utility, thereby shortening the payback period.

NOTE: Payback times decrease when electricity costs increase. Some conservation and efficiency measures (that can reduce PV system size) also qualify for a tax credit. Visit the DSIRE website for complete and up-to-date information: http://dsireusa.org

PV System Financing

There are a variety of financing options for solar electric systems:

- Bank Loan
- Home refinance — roll into a mortgage payment
- Construction loan
- Home equity loan
- Some PV system companies provide financing.

References

Department of Energy's Database of State Incentives for Renewables and Efficiency (DSIRE). (2011, February). *Residential Renewable Energy Tax Credit*; Residential Alternative Energy System Tax Credit. Retrieved March 28, 2014, from http://www.dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=TN.

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Notes

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