

24.4.5 Example Calculation

A 2.5-kW rooftop PV system costing \$8.00/Wac installed will cost \$20 000. Assuming an excellent location yielding a 22% capacity factor, the system will produce 1927 kilowatt hours per kW installed, per year, or 4818 kWh/year for the 2.5 kW system. The following is a brief assessment of the financial merits under several cases:

No incentives: If the government does not allow net metering, the value of the electricity will only be the wholesale rate that the utility pays for bulk energy. The PV system is not likely to be given capacity credit, so the value will be energy only, or about 2 to 4 ¢/kWh. The value of the output is therefore \$96.36/year to \$192.72/year. The system will have a simple payback in 103 to 207 years.

Net Metering: If net metering applies, then the value of the electricity is the retail rate (tariff), say, 10 to 15 ¢/kWh. In this case, the value of the output is \$481.80/year to \$722.70/year. The system will have a simple payback in 28 to 42 years.

Subsidy: If the government now provides a subsidy in the amount of \$4.50/Wac, leaving the owner's cost equal to \$3.50/Wac or \$8750, and net metering still applies, then the value of the output is still \$481.80/year to \$722.70/year, and the system will have a simple payback of 12 to 18 years, probably within negotiating range for an environmentally motivated end user.

Low-cost financing: The cost of financing will increase the total cost to the end user, and hence lengthen the payback period or rate of return on investment. A 10-year, 12% loan will add 72% to the total outlay by the owner, increasing system cost from \$8750 to \$15 486. The simple payback will be lengthened from 21 to 32 years. Conversely, if the interest rate is dropped to 5%, the financing will add only 15% to the total outlay by the owner, increasing system cost from \$8750 to \$10 105. Simple payback will be lengthened to 14 to 21 years, much more favorable than the higher-rate financing. While third-party financing lengthens the payback period, it makes the purchase more affordable by more people, based on monthly payments (see Reference [12]).

The analysis has shown that – with net metering, feed-in tariffs, tax credits, capital cost subsidies, and low-interest financing – residential rooftop PV can yield a payback in the range of 10 to 20 years, potentially enough for those who are motivated by the environment and sustainable development.

24.4.6 Improving the Financing of Residential PV

Several things can be done to improve the fit between photovoltaics and the home-mortgage lending industry. First, the debt/equity ratio should be relaxed, allowing a higher fraction of debt on a PV-powered home, reflecting the fact that the owner is prepaying the utility bill for 20 to 30 years. Second, the cost of the PV system should automatically increase the appraised value of the home. Third, the amount of savings on the borrower's utility bill should be added to the income for the purpose of the loan qualification calculation, reflecting the borrower's lower cost of living with the PV option. With these practices, the lending industry would become an enabler of, rather than a constraint on, PV growth.