standards organizations have promulgated a similar set of codes and standards for photovoltaics within the European Union. For solar home systems in the developing countries, the PV Global Acceptance Program (PV/GAP) establishes a testing certification protocol. The adoption of these codes and standards is one of the keys to future financing of PV, as they will build credibility with lenders and investors.

On the basis of the above, one sees that the characteristics of photovoltaics present a complex case. The financial merits of photovoltaics depend on location, cost and quality of the system, efficiency output of the system, useful lifetime, O&M cost, residual value, tax treatment, regulatory treatment, viability of the end-use application, adherence to codes and standards, and credit worthiness of the end user.

24.4 FINANCING PV FOR GRID-CONNECTED RESIDENCES

A major opportunity for PV growth in European, Japanese, and US markets is the grid-connected, residential rooftop system, typically 1.0 to 4.0 kW each. Approximately 110 MW of grid-connected systems were installed in Japan, 75 MW were installed in Germany, and 15 MW were installed in the United States in the year 2001.

24.4.1 Impact of Loan Terms on End-user Cost

Table 24.2 illustrates how the terms of financing can drive monthly payments on a PV system. The example uses a 2.5 kW residential grid-connected PV system costing $8.00 per installed watt (Wac). Credit card type debt (10 year, 18% interest) on a $20 000 residential rooftop PV system would yield payments of $437/month. The monthly payment drops to just $121/month if the PV system is included in a new home mortgage or financed with a low-interest loan.

It is clear from the above analysis that the preferred way to finance a residential PV system is the primary home mortgage loan, if possible. A longer-term loan results in lower monthly payments, but increases interest paid and hence the total amount of money paid for the system. As a rule of thumb, the cost of money is approximately equal to the cost of the PV system with an 11-year, 11% loan. A longer-term loan or a higher interest rate would cause the interest payments to be more than the cost of the PV system, illustrating once again the impact of financing on the viability of photovoltaics.

Table 24.2 Monthly payments on a 2.5-kilowatt rooftop PV system

Loan type	Term [Years]	Interest rate [%]	Monthly payment [$/month]
Credit card	7	18	437
Credit line	10	12	295
Home equity loan	15	8	195
Home mortgage	30	6	121