

NREL reports examine economic trade-offs of owning versus leasing a solar photovoltaic system

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Two new reports from the Energy Department's National Renewable Energy Laboratory (NREL) examine the economic options customers face when deciding how to finance commercial or residential solar energy systems. NREL analysts found that businesses that use low-cost financing to purchase a photovoltaic (PV) system and homeowners who use solar-specific loans can save up to 30 percent compared with consumers who lease a PV system through a conventional third-party owner.

The first report, "[Banking on Solar: An Analysis of Banking Opportunities in the U.S. Distributed Photovoltaic MarketPDF](#)," provides a high-level overview of the developing U.S. solar loan product landscape. The analysis covers the range of consumer and commercial loan products available for [financing](#) solar in the United States, discusses the potential and active market players in the distributed solar loan space, and provides qualitative and quantitative analyses of how solar loans of varying maturities stack up against third-party financing. Key findings include:

The levelized cost of energy (LCOE) for residential systems with solar loans was lower than the LCOE for residential systems with power purchase agreements (PPAs) by 19-29 percent (varying by the term of the loan), because of the higher cost of capital necessary for the sponsor and tax equity in a PPA transaction. There are additional operational and

financial risks associated with owning a solar asset, and many of the savings calculated depend on market environment and the specific situation of an individual homeowner or business. For example, changes in a homeowner's credit rating and the term of the loan can more than double the interest rate payments on the loan.

"Market interest rates on solar-specific loans currently range from 2 percent with special provisions to 8 percent," said Travis Lowder, an energy analyst and coauthor of the report. "Compare this to a weighted average cost of capital of 9-10 percent for third-party systems financed through tax equity investments. Using the lower cost rates provided by the loans could help to make solar power more affordable to more consumers, and more competitive with utility rates in more states."

The second report, "[To Own or Lease Solar: Understanding Commercial Retailers Decisions to Use Alternative Financing ModelsPDF](#)," examines the tradeoffs between financing methods for businesses installing onsite PV systems. The authors present case studies of PV financing strategies used by two large commercial retailers that have deployed substantial PV capacity in the United States: IKEA, which owns its PV, and Staples, which leases its PV through PPAs. In addition to carrying out in-depth interviews with both organizations for the report, the authors analyze the considerations that influence any company's choice of PV-financing strategy using corporate and solar industry data. The report's goal is to clarify the economic and institutional costs and benefits of financing strategies and to inform other companies that are considering launching or expanding similar PV programs. Key findings include:

The LCOE for the modeled self-financed system is approximately 30 percent lower than the LCOE for the PPA-financed system, given a commercial customer's pre-tax discount rate of 10 percent; however the LCOEs are equivalent when the discount rate rises to 23 percent. Companies may view the risks of ownership differently than those for a

PPA-financed system. If a company assumed a 10 percent pre-tax discount rate for a PPA versus a 23 percent pre-tax discount rate for self-financing, then the LCOE would be 14 percent lower using the PPA.

"The most appropriate PV financing option for a particular business depends on the characteristics and circumstances of that business," said David Feldman, a senior financial analyst and lead author of the report. "A company must work across its different business groups to decide what is most appropriate for its situation. With that said, if a company has less expensive sources of financing and is comfortable with the risks, it can often save on its energy bills by owning a PV system."

Provided by National Renewable Energy Laboratory

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