

**Lost in Transmission:  
The Current Status of Loans for Solar PV Installations**

By Rupert Ayton

Home and business owners increasingly believe that solar photovoltaic (PV) installations make sense, but they face challenges in qualifying for loans to finance them. Home and business owners assume that solar PV panels will increase the value of their properties. Despite the data PV experts cite to support the energy cost savings and environmental benefits of solar installations, bankers aren't yet convinced that PV panels sufficiently offset energy expenses to justify lending for an installation. One reason is that mainstream lenders have not yet created an accepted standard for valuing energy upgrades such as solar PV. This means that solar PV projects face an uphill battle for financing, at least in the near future.

**Value, Appraisals, and Cash Flow**

Home and small business lenders have standardized the loan qualification process to simplify and increase the wide availability of loans to borrowers. This process works well for most home and business improvement projects, but not so well for projects like solar PV installations. Here's why:

One simple widely-used lending standard is property valuation – the value of the property if it were sold today. Lenders won't loan where they cannot quantify the value of a physical structure or equipment.

The value of a property is determined through an appraisal. Appraisals are completed by trained and licensed professionals who apply a technical, data-driven approach to valuing a property. The accuracy of their work is made easy when they have abundant data on comparable properties, often referred to as "comps." Comps represent the recent sales of similar houses or buildings in the borrower's neighborhood, or recent auctions of similar used equipment. For homes, lenders typically lend on 80-90% of the appraised value. For commercial investment property, lenders typically lend 65-75% of the appraised value.

A less precise qualification standard is the measure of a borrower's cash flow. Lenders want to know the source of the loan repayment money. Home loans are usually repaid from the homeowner's personal net cash flow, while business loans are repaid from the business' net cash flow. Commercial building owners derive their repayment money from net rental cash flow.

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### **Cash Flow and PV Installation Value**

Home lenders don't actually examine the borrower's expenses, but measure cash flow by examining the ratio of debt payments, property tax, and other property owning expenses divided by gross income. Lenders expect a ratio of 33%, which assumes that everyone spends the remaining 67% in roughly the same way. This ratio of debt and expenses to income does not consider that with greater energy efficiency, expenses will be reduced, and more cash is available to pay the mortgage.

Commercial investment property lenders view cash flow in terms of the borrower's ability to pay, or service, debt. Debt service is determined by measuring the rental revenue less operating and maintenance expenses. Lenders expect debt service to be 125-150% of the loan payment depending upon the use of the property. While lenders will consider the benefits of solar projects in reducing energy expense, they will only allow 67-80% of the savings in calculating the debt service. This means that borrowers with sufficient appraised value to cover the added investment in solar PV may not have enough debt service to borrow what they need.

Commercial business owners may fare somewhat better. Business lenders are much more willing to examine the entire picture of cash inflows and outflows as EBITDA, or earnings before interest, tax, depreciation and amortization. Business lenders still consider debt service coverage ratios. The down side is that business loans are considered more risky than property loans, and therefore carry a higher interest rate than a property loan.

### **The Solar PV Financing Challenge**

Solar PV projects face three finance problems. Problem #1 relates to historical experience with solar PV installations. Appraisers and lenders have little documented experience with solar PV to enable agreement on to how to assess their value. Solar PV projects face a Catch-22 problem: Lenders are risk averse and rarely will lend to untried projects, therefore innovative projects aren't financed, which means that lenders lack statistics on the viability of solar PV loans.

Problem #2 is based on the fact that the lending business operates with very low profit margins. This means that lenders invest minimal time in loans that can't be evaluated by their standard qualification processes. To do so would reduce their profit margins. Basically, lenders can't invest the time needed to fully determine the financial parameters of complex transactions such as solar PV projects.

Problem #3 relates to the complexity of solar PV projects. Every installation differs slightly in the efficiency of the panels, the ways in which they are installed, and the amount of sun they receive per year. No installer can guarantee the economic outcome of the installation to the owner. Lenders don't like these types of uncertainties, so they take a very conservative view of the benefit to the borrower.

### Status of PV Finance Efforts

California has taken a lead in encouraging a wider adoption of alternative energies. In 2001, California legislators passed AB 549, which required the California Energy Commission (CEC) to examine energy efficiency opportunities in existing commercial and residential buildings. In 2003 a study commissioned by the public utilities concluded that the energy potential of the property market was significant and justified further research.<sup>1</sup>

In December 2005 the CEC released a comprehensive report detailing options for increasing energy efficiency in existing buildings, while noting that substantial opportunities remain to cost-effectively improve their energy efficiency. The CEC reported that financing and refinancing were appropriate approaches for undertaking energy upgrades, but they failed to discuss how such financing would be undertaken.<sup>2</sup> Aside from the CEC Global Energy Connection Special Program, little policy attention has been given to the challenge of financing solar PV projects.

Congress recognized the loan problem in the early 1990s and pushed for what is now the Energy Efficient Mortgage (EEM) offered by government-sponsored agencies such as Ginnie Mae, Fannie Mae, and Freddie Mac. That program for home loans addresses the cash flow issue by allowing the lender to increase the ratios by 2%. The program, however, is designed for small investments such as windows and lighting, rather than large investments, such as rooftop PV installations.

In addition, since the maximum agency-conforming loan amount is \$417,000, few single family dwellings in states with high housing costs, such as California, can take advantage of the program. The non-conforming or “jumbo” home loan market, while identical in all respects other than amount to the conforming loan market, completely lacks an EEM program.

If few California homeowners have access to an EEM product, how do jumbo lenders determine the value of the investment in energy upgrades? Appraisal value is a key component of loan approval. In 1998 Nevin and Watson,<sup>3</sup> and in 1999 Nevin, Bender, and Gazan,<sup>4</sup> tackled this issue and provided rationales for determining the increased property value resulting from energy efficiency upgrades. They based their evidence on the universally-accepted internal return on investment (IRR) as a tool for evaluating current and future cash flows. Their findings of increased value correlated with those resulting from other major home improvements as reported in *Remodeling Magazine*.<sup>5</sup>

While great in theory, the model developed by Nevin, et. al. hasn't been widely applied. A search of the American Society of Appraisers website ([www.appraisers.org](http://www.appraisers.org)) uncovered one inquiry about energy-efficiency appraisal methods. It appears that appraisers willing to take on the challenge of valuing solar PV installations face a scarcity of resources or collaborative partners with whom to work.

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That's not the only gap. The American Banking Association, the American Banker, and the Mortgage Banking Association websites are silent on the subject of solar PV appraisals.

For commercial property borrowers, the loan void is just as great. No standard method has yet been created for evaluating the financing of solar PV for any given property. Moreover, bankers today express persistent skepticism about the potential for financing solar PV projects.

Private financing, although complicated, may hold some promise for large commercial solar PV applications. Under private agreements, the solar equipment is owned by an investor group rather than the property owner. The property owner, however, is guaranteed a quantity of kilowatt hours per year at rates less than the local utility charges. The investor group benefits from the tax consequences of equipment depreciation, and also profits by selling their energy at a cost that exceeds their production costs.

### **Today's Solar PV Financing Options**

The best solar PV financing options for homeowners today are mortgage refinancing or home equity loans. In today's current economy, declining home values may limit this option as some homeowners face shrinking equity. Rising interest rates may further limit this option, especially for homeowners carrying adjustable rate mortgages, who are not building equity in their homes via loan repayment.

Just as homeowners may face a challenge of refinancing in an uncertain real estate market, homeowners may face a challenge of recapturing the value from their PV installation when selling their homes. Today appraisers likely rely only on the receipts for the original installation as a measure of value. The future cost savings to the new owner may not be factored into the overall appraisal of the property.

Commercial property owners face a situation similar to that of residential property owners. If the property is a rental and local rental rates are falling or vacancies are rising, an appraiser will be unable to justify a higher valuation. If the property is an owner-operated commercial business, the loan is more apt to be a business loan that considers the affect of solar energy on cash flow. Again, the loan underwriter has little guidance in determining the value expense reduction associated with a solar PV installation.

### **Solutions to the PV Financing Problem**

To expand the wider use of solar energy, bankers, appraisers, solar PV industry representatives, and renewable energy advocates need to come together and collectively recognize the finance problem. Several remedies are within reach, but require the participation and coordination among the various sector participants. These

proposed solutions start with the proponents of solar PV installations.

- Simplify the terminology used in solar PV installation proposals, and standardize installation descriptions and output estimates to increase the understanding of non-experts.
- Train bankers and appraisers on the mechanics of solar PV, the methods by which electric energy is billed.
- Create a method for measuring the cash flow before and after the installation of a solar PV project.
- Create a property registry that collects data on existing and new solar PV projects, to enable appraisers to extrapolate value when local comparisons are unavailable.

Legal protections must be established that secure the long-term value of existing and prospective solar PV installations. These would include building ordinances that protect existing access to sunlight, and regulatory changes that determine long-term rate and rebate rules. These changes would allow lenders to rely upon standard financial assumptions, and avoid the labor-intensive work of evaluating every solar PV project according to conditions specific only to that project.

The opportunities for solar energy are tremendous. The technology has been created and consumers are increasingly aware of the benefits of solar energy generation. The next great obstacle to expanding the use of solar PV energy is in the realm of finance. The solution is in implementing solutions that can bridge the gaps between bankers, the solar PV industry, and consumers.

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1. Hescong Mahone Group, Inc. for Southern California Edison. "Markets and Potential: An AB549 Project Interim Report." October 9, 2003.
  2. California Energy Commission. "Options for Energy Efficiency in Existing Buildings." CEC-400-2005-039-CMF. December 2005.
  3. Nevin, R. and G. Watson. "Evidence of Rational Market Valuations for Home Energy Efficiency." *The Appraisal Journal*. October 1998, 401-409.
  4. Nevin, R. and C. Bender, H. Gazan. "More Evidence of Rational Market Values for Home Energy Efficiency." *The Appraisal Journal*. October 1999, 454-460.
  5. See for example, Alfano, Sal. "2004 Cost vs. Value Report." *Remodeling Magazine*, January 11, 2004.
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