Sandia National Laboratories

Energy, Climate & Infrastructure Security

SAND2011-4566P

Photovoltaic Energy Valuation Tool

Vision

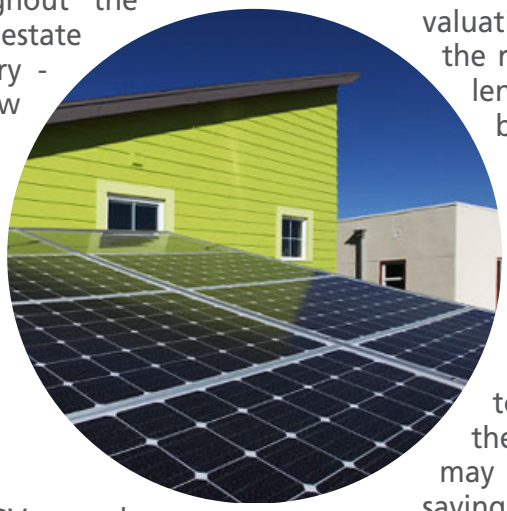
To enhance the nation's security and prosperity through sustainable, transformative approaches to our most challenging energy, climate, and infrastructure problems.

Introduction

Sandia National Laboratories, in partnership with Solar Power Electric™ of Port Charlotte, Florida, is working to develop a spreadsheet model that can calculate the energy output value for residential and commercial solar photovoltaic (PV) systems. This tool, "25- and 30-Year Present Value Estimate of Future Energy Production for Photovoltaic Systems," will assist real estate appraisers, mortgage underwriters, credit analysts, real property assessors, insurance claims adjusters, and PV industry sales staff in assessing the value of residential and commercial PV systems, a concern which has not previously been adequately addressed.

Background

The project was initiated by Kennecott Land Company of Salt Lake City, Utah, through its 2010 U.S. Department of Energy (DOE) Solar America Showcase award. One concern for Kennecott - shared throughout the real estate industry - is how to assign value to PV and solar hot water systems on new construction as well as existing properties. Because there are only a small number of properties within Salt Lake County with solar energy collectors that can be used for comparison, a methodology is needed that follows the appraisal industry's Income Approach.



Residential solar photovoltaic panels. Photo from Kennecott Land

The first phase of Sandia's work on this methodology is targeted at PV systems, with the next phase aimed at solar hot water systems. One of the overall goals of DOE's Showcase projects is to ensure replicability of the technical assistance. Key metrics of this tool's overall success are its availability to the wider appraisal community in the United States, and its level of adoption in practice and within continuing education materials provided by the industry.

Justification for a Valuation Tool

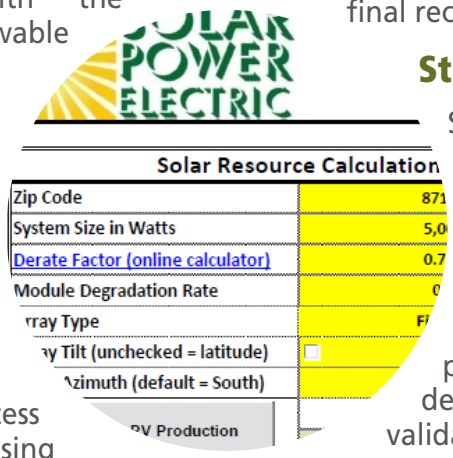
Being able to assign a credible valuation for an existing installed solar energy system is important for the distributed PV industry in its transition from the innovation stage through early adoption and, eventually, mainstream use.

With consequences of over-valuation still making headlines in the real estate market, mortgage lenders and appraisers have begun to question methods of assessing solar energy systems and their potential value to homeowners. There are also concerns that, if separate financing is obtained by the owner of a home or commercial building to pay for a PV installation, the monthly loan payment may exceed the monthly energy savings, thereby creating a potential negative effect on the value of a residential or commercial building on which a system is installed.

U.S. DEPARTMENT OF ENERGY

What Can this Tool Do?

This Microsoft Excel®-based tool interfaces with the National Renewable Energy Laboratory's PVWatts, a performance calculator for grid-connected PV systems. Sandia's valuation tool can access PVWatts using 10km satellite data for assessing the solar resource at any location within the United States.



A screenshot of Sandia and Solar Power Electric's PV valuation tool output

The spreadsheet then uses the first-year PV output data and degradation rate to calculate the present value of future energy production, including operations and maintenance costs for any year within either a 25- or 30-year module warranty period. To do this, the discount rate range is calculated using the weighted average cost of capital, which is automatically tied to the daily change in the Fannie Mae or Freddie Mac 30-year fixed rate 60-day commitment, as well as a user-defined risk spread. The tool also employs a user-defined or recent electric utility rate, as well as a long-term utility escalation rate for the state in which the installation will be located, calculated using a compound annual growth rate equation.

The results of this analysis are presented as an "Appraisal Range of Value Estimate" in the low, medium, or high category, which is a function of the risk spread and resulting discount rate available to the appraiser to use in their final reconciliation.

Strategic Partners

Sandia National Laboratories is seeking strategic partners from the financial and mortgage lending industry to participate in further development and validation of this model in accordance with current risk-based underwriting methodologies. Partners may be secondary marketing firms such as a nationally chartered mortgage association and/or investment bank as well as large mortgage originators such as commercial banks. The lab is currently exploring a partnership with Lawrence Berkeley National Laboratory (LBL) that will utilize LBL's strengths in electricity markets and policy issues to increase the robustness of the valuation tool. This partnership will also support LBL's on-going research of the influence of PV on home values in the United States.

Sandia National Laboratories is also seeking a strategic partner from a nationally-recognized appraisal training organization to support additional development and validation of this model in accordance with standard appraisal methodologies. Having this partnership will ensure that the valuation tool is a part of the industry's effort to adapt to the trend of adding energy efficient features to new and existing homes.

Availability

Sandia's PV valuation tool is expected to be available for use by the appraisal industry in late summer-early fall 2011. It is anticipated that it will initially be available from Solar Power Electric www.spefl.com and from the Sandia National Laboratories PV and Grid Integration Program website http://www.sandia.gov/pv/.

Sandia National Laboratories

Sandia National Laboratories is a globally-recognized leader in PV research and technical expertise to the solar PV industry. Through support from the U.S. Department of Energy as well as industry partnerships, the lab addresses complex issues in PV, including system performance, reliability, grid integration, market transformation, and barriers to high penetration of PV in the United States and around the world.

For more information about this tool please contact:

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