



ELECTRICITY MARKETS & POLICY

Berkeley Lab Illuminates Price Premiums for U.S. Solar Home Sales

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January 1, 2015

Largest-ever study quantifies the value of rooftop photovoltaics on homes that sold across eight states and 12 years

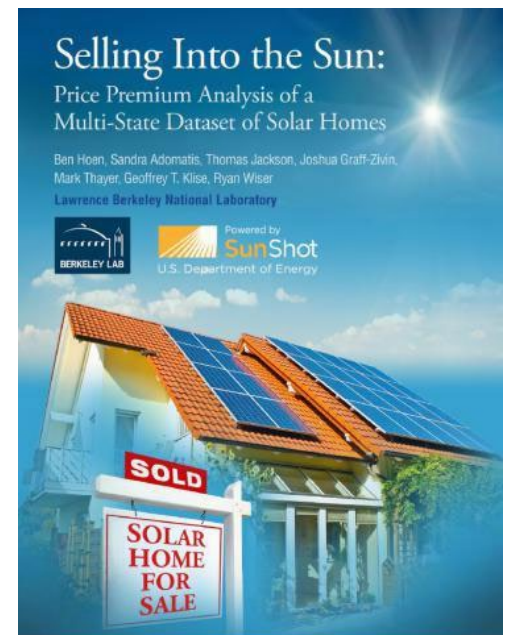
Berkeley, CA— A multi-institutional research team of scientists led by the U.S. Department of Energy's Lawrence Berkeley Laboratory (Berkeley Lab), in partnership with Sandia National Laboratories, universities, and appraisers found that home buyers consistently have been willing to pay more for homes with host-owned solar photovoltaic (PV) energy systems — averaging about \$4 per watt of PV installed—across various states, housing and PV markets, and home types. This equates to a premium of about \$15,000 for a typical PV system. The team analyzed almost 22,000 sales of homes, almost 4,000 of which contained PV systems in eight states from 2002 to 2013—producing the most authoritative estimates to date of price premiums for U.S. homes with PV systems.

"Previous studies on PV home premiums have been limited in size and scope," says Ben Hoen, the lead author of the new report. "We more than doubled the number of PV home sales analyzed, examined a number of states outside of California, and captured the market during the recent housing boom, bust, and recovery."

More than half a million U.S. homes had PV as of 2014, and the number is growing rapidly. The growth in home PV systems means that the real estate industry will need reliable methods to value these homes appropriately. Further, having greater certainty in those methods will likely facilitate additional growth in the residential PV market.

Hoen is a researcher in the Energy Technologies Area of Berkeley Lab, who collaborated with researchers from Adomatis Appraisal Services, Real Property Analytics/Texas A&M University, University of California at San Diego, San Diego State University, and Sandia National Laboratories.

[The study](#) also found only a small and non-statistically significant difference between PV premiums for new and existing homes. Additional findings include the existence of a PV "green cachet" (home buyers paying a certain amount for a PV system of any size and incrementally more as system size increases) and an apparent sharp depreciation rate for the PV premium in home sales transactions as those PV systems age. The study also finds that market premiums



are statistically similar to those estimated using the income and cost approaches, methods familiar to appraisers. This similarity to standard appraisal practices further bolsters the report's usefulness to real estate professionals and markets.

"As PV systems become more and more common on U.S. homes, it will be increasingly important to value them accurately, using a variety of methods," says co-author Sandra Adomatis, an appraiser who helped develop the Appraisal Institute's Green Addendum and who has written and spoken extensively on valuing green features. She noted, "Our findings should provide greater confidence that PV adds a quantifiable premium to a wide variety of homes in California and beyond."

The research was supported by funding from the U.S. Department of Energy SunShot Initiative. The [SunShot Initiative](#) is a collaborative national effort that aggressively drives innovation to make solar energy fully cost-competitive with traditional energy sources before the end of the decade. Through SunShot, DOE supports efforts by private companies, universities, and national laboratories to drive down the cost of solar electricity to \$0.06 per kilowatt-hour. Learn more at [energy.gov/sunshot](#).

Lawrence Berkeley National Laboratory addresses the world's most urgent scientific challenges by advancing sustainable energy, protecting human health, creating new materials, and revealing the origin and fate of the universe. Founded in 1931, Berkeley Lab's scientific expertise has been recognized with 13 Nobel prizes. The University of California manages Berkeley Lab for the U.S. Department of Energy's Office of Science. For more, visit [www.lbl.gov](#). DOE's Office of Science is the single largest supporter of basic research in the physical sciences in the United States, and is working to address some of the most pressing challenges of our time. For more information, please visit [science.energy.gov](#).

Additional Information:

Download the new 2015 report, "Selling into the Sun: Price Premium Analysis of a Multi-State Dataset of Solar Homes", as well as two fact sheets, and a summary slide deck [here](#).

Also see earlier LBNL reports on the same subject such as "Exploring California PV Home Premiums" [Download the 2013 LBNL Report](#) and "An Analysis of the Effects of Residential Photovoltaic Energy Systems on Home Sales Prices in California" [Download the 2011 LBNL Report](#). For more information on the report, contact Ben Hoen (bhoen@lbl.gov, 845-758-1896).

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