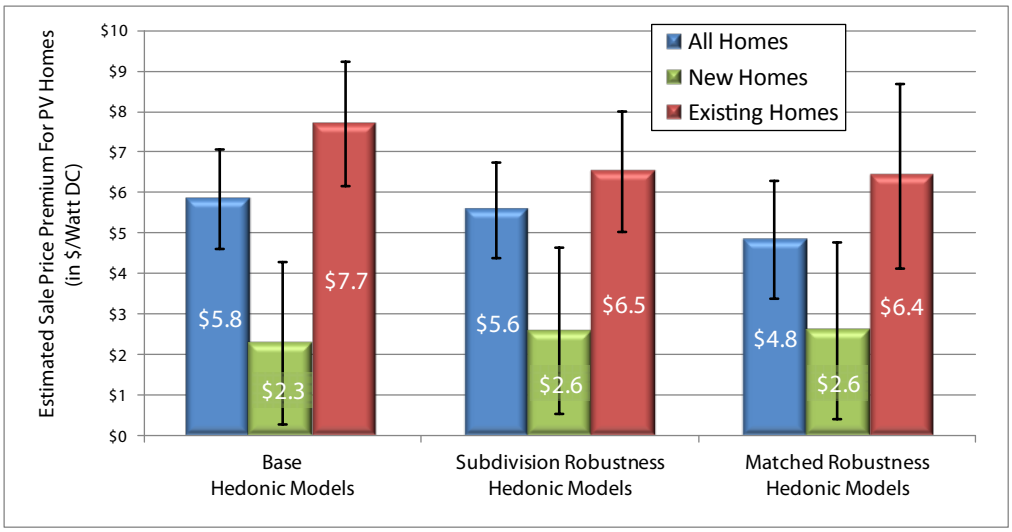
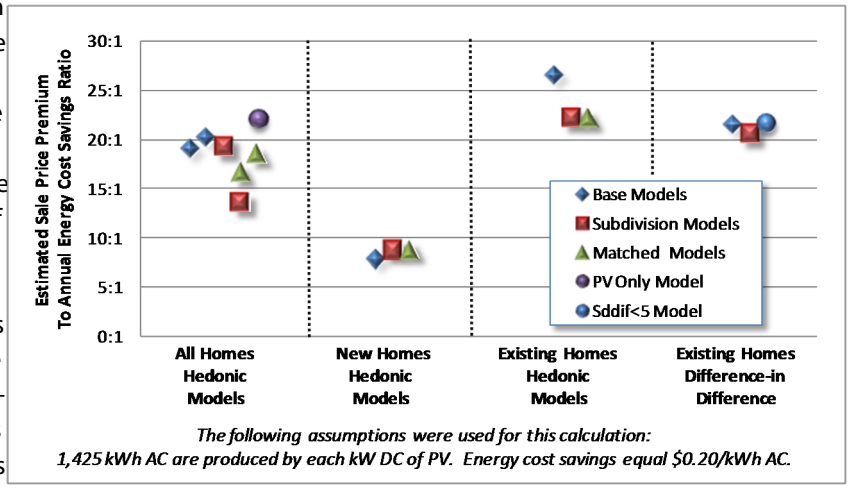


PV as a standard (as opposed to an optional) product on their homes and perhaps been willing to accept a lower premium in return for faster sales velocity and decreased carrying costs.

The research also finds that, as PV systems age, the premium enjoyed at the time of home sale decreases, indicating that buyers and sellers of PV homes may be accounting for the decreased efficiency and remaining expected life of older PV systems.

When the results are expressed as a ratio of the sales price premium to estimated annual electricity cost savings associated with PV (see figure below) they are consistent with those of the more-extensive existing literature on the impact of energy efficiency on home sales prices; the present research finds an averages range from 7:1 to 31:1, with models coalescing near 20:1.



Applicability

Although this research finds strong evidence that homes with PV systems in California have sold, on average, for a significant premium over comparable homes without PV systems, the authors recommend that extrapolation of these results to different locations or market conditions be done with care.

Further Research Warranted

The report outlines a number of additional questions that warrant further research, such as investigating more-recent home sales (the report's dataset spanned 1999 thru 2009) from a broader geographic area (the dataset included only California homes), and further investigating the difference in premium between new and existing PV homes.

References

Dastrop, S., Zivin, J. G., Costa, D. L. and Kahn, M. E. (2010) Understanding the Solar Home Price Premium: Electricity Generation and "Green" Social Status. UC Center for Energy & Env. Econ., Berkeley, CA. Dec 9, 10. WP-001.

Barbose, G., Darghouth, N. and Wiser, R. (2010) Tracking the Sun III: The Installed Cost of Photovoltaics in the U.S. 1998-2009. LBNL, Berkeley, CA. Dec, 10. LBNL -4121E.

What Is a Hedonic Pricing Model?

Hedonic pricing models are frequently used by real estate professionals and academics to assess the impacts of individual house and community characteristics on property values by investigating the sales prices of homes. A house can be thought of as a bundle of characteristics (e.g., number of square feet). When a price is agreed upon between a buyer and a seller there is an implicit understanding that those characteristics have value. When data from a large group of residential transactions are available, the average marginal contribution to the sales price of each characteristic can be estimated with a regression model. The contribution to the selling price of having a PV system can be thus be estimated, if other important housing market influences are adequately controlled for.

What Is a Difference-in-Difference Model?

A variant of the hedonic model, a difference-in-difference model compares inflation adjusted selling prices of homes that have sold twice, both before a condition exists (e.g., having a PV system installed) and after.

What Are Robustness Models?

Because models are built on assumptions, practitioners often test those assumptions by trying multiple model forms. In this research, "base" models, which used the full dataset and controlled for "neighborhood" effects at the census block group level, were compared with "robustness" models. Examples include models that controlled for "neighborhood" at the subdivision level (a potentially better proxy than the block group), models that "matched" PV and non-PV homes to be statistically identical in many respects (similar to what an appraiser might do when valuing a home), and models that only evaluated PV homes.

The general consistency in results across all of the models demonstrates the robustness of the study's findings.