Photo by Werner Slocum, NREL 66338

Assessing the New Home Market Opportunity: Case Study and Cost Modeling for Solar and Storage in 2030

Jeffrey J. Cook, Kaifeng Xu, Vignesh Ramasamy, Minahil Qasim, and Matt Miccioli

This NREL study considers how solar and storage are incorporated into new home construction and identifies potential barriers and opportunities for scaling this model nationwide with the goal of creating pathways to reduce installation costs and expand solar and storage in new homes.

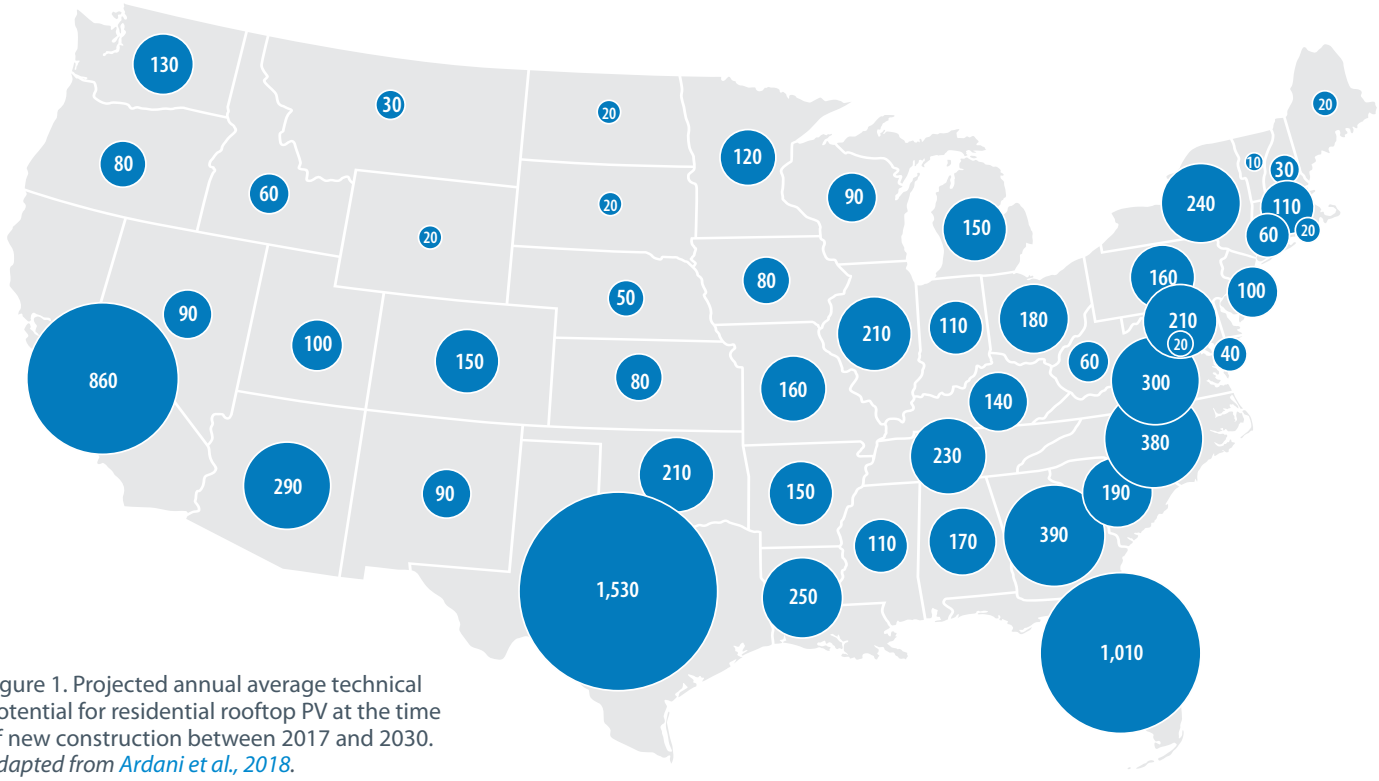

Figure 1. Projected annual average technical potential for residential rooftop PV at the time of new construction between 2017 and 2030. *Adapted from Ardani et al., 2018.*

Residential photovoltaic installation is increasingly being paired with on-site battery storage (called solar and storage) to optimize value for customers. New home construction presents a significant opportunity for solar and storage installations. But it is not clear how these installations are currently incorporated into the new construction process, and at what cost.

How NREL Gathered and Analyzed the Data

NREL conducted a case study of a new solar and storage community in Arizona to gather lessons learned. This analysis sheds light on how solar and storage can be incorporated into the new home construction process and what lessons can be gathered for similar projects in the future.

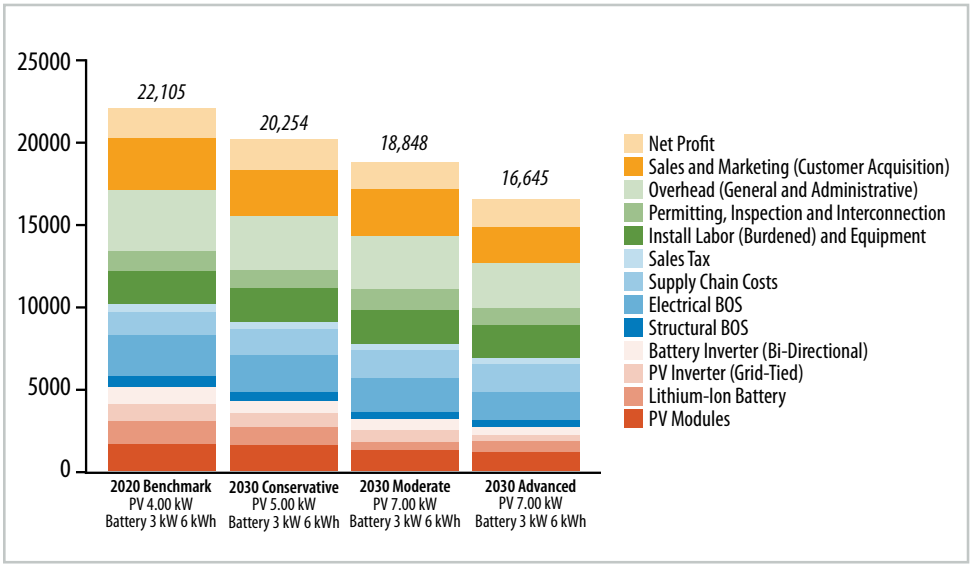

Figure 2. Comparison of current and 2030 residential solar plus storage costs.

To model current and 2030 solar and storage costs, the authors used an NREL-created, bottom-up cost model.[1] This modeling was further informed by 12 organizations that included new homebuilders, solar and storage contractors, equipment providers, and other subject matter experts.

Meanwhile, beyond installation cost savings, interviewees confirmed that changes in financing, rate design, resilience policies, deployment mandates, and distributed energy resource (DER) aggregation could all support more market adoption than is seen today.

Lessons Learned for Homebuilders

The report suggests three key considerations for homebuilders seeking to more efficiently incorporate solar and storage into new construction:

1. Homebuilders may need to educate local permitting, inspection, and—in some cases—utility officials on solar and storage products, designs, and code-compliant building practices. The need for education may decline as more local governments and utilities review and approve solar and storage projects.
2. Incorporating solar and storage systems into the homebuilding process can add complexity and related coordination challenges. This does not need to result in home construction delays, but can result in costly contractor "dry runs" to and from construction sites.
3. Deploying solar and storage at the time of new construction has significant economies of scale, which can improve the value proposition of the systems.

The study's results further suggest that there are four key cost-reduction opportunities, relating to solar and battery hardware, customer acquisition, overhead, and potentially labor. If contractors can maximize these cost reduction opportunities, residential new construction costs could decline by 8%–25% by 2030, depending on the modeled scenario (see Figure 2). These findings suggest that there are significant opportunities to expand new construction markets, and this research can serve as a baseline to assess progress in this segment through 2030.

[1] 2020 was used as the baseline for this project, given it was the most recent year for which cost data was available at the time of analysis.

More Information

For more information, download the full technical report: Jeffrey J. Cook, Kaifeng Xu, Vignesh Ramasamy, Minahil Qasim, and Matt Miccioli, 2022. Assessing the New Home Market Opportunity: Case Study and Cost Modeling for Solar and Storage in 2030. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-82511.
https://www.nrel.gov/docs/fy22osti/82511.pdf

For questions, contact Jeff.Cook@nrel.gov.

NREL Transforming ENERGY

National Renewable Energy Laboratory
15013 Denver West Parkway, Golden, CO 80401
303-275-3000 • www.nrel.gov

NREL prints on paper that contains recycled content.

NREL is a national laboratory of the U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
Operated by the Alliance for Sustainable Energy, LLC

NREL/FS-6A20-83513 • July 2022