

# Unit price of solar power generation and energy storage in the United States

How much does a solar panel cost?

Note: Costs are expressed in constant 2024 US\$ per watt. Global estimates are used before 2010; European market benchmarks thereafter due to limited data availability. Solar photovoltaic module prices refer to the cost of the solar panel itself, and do not include installation or other system components.

Who are the authors of solar energy cost benchmarks Q1 2023?

Ramasamy, Vignesh, Jarett Zuboy, Michael Woodhouse, Eric O'Shaughnessy, David Feldman, Jal Desai, Andy Walker, Robert Margolis, and Paul Basore. 2023. U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023. Golden, CO: National Renewable Energy Laboratory.

What are solar energy cost benchmarks?

These benchmarks help measure progress toward goals for reducing solar electricity costs and guide SETO research and development programs. Read more to find out how these cost benchmarks are modeled and download the data and cost modeling program below.

How much does a solar module cost?

Average price of solar modules, expressed in US dollars per watt, adjusted for inflation. Data source: IRENA (2025); Nemet (2009); Farmer and Lafond (2016) - Learn more about this data Note: Costs are expressed in constant 2024 US\$ per watt.

Solar energy cost analysis examines hardware and non-hardware (soft) manufacturing and installation costs, including the effect of policy and market impacts. Solar energy data analysis ...

Cumulative solar PV capacity in the U.S. 2000-2024 Cumulative solar PV capacity in the United States from 2000 to 2024 (in megawatts) Solar power capacity additions share in the United ...

The cost of renewable energy has reached a historic tipping point in 2025, with solar and wind power now representing the cheapest sources of electricity generation in most regions ...

PPA prices have largely followed the decline in solar's LCOE over time, but newly signed longer-term PPA prices have increased since 2021, to an average of \$35/MWh (levelized, in 2023 ...

U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2022 Vignesh Ramasamy,<sup>1</sup> Jarett Zuboy,<sup>1</sup> Eric O'Shaughnessy,<sup>2</sup> ...

Energy storage systems for electricity generation have negative-net generation because they use more energy to charge the storage system than the storage system generates. Capacity: ...

The U.S. Department of Energy's solar office and its national laboratory partners analyze cost data for U.S.

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solar photovoltaic systems to develop cost benchmarks to measure progress ...

Solar photovoltaic module prices refer to the cost of the solar panel itself, and do not include installation or other system components. Prices are compiled from three sources: Nemet ...

Lawrence Berkeley National Laboratory compiled and synthesized empirical data on the U.S. utility-scale solar sector. The focus is on ground-mounted systems larger than 5M AC, including ...

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