



# What is the growth rate of photovoltaic plus energy storage

What is solar-plus-storage?

For solar-plus-storage--the pairing of solar photovoltaic (PV) and energy storage technologies--NREL researchers study and quantify the unique economic and grid benefits reaped by distributed and utility-scale systems. Much of NREL's current energy storage research is informing solar-plus-storage analysis.

How much energy does a PV system cost in 2023?

The United States installed approximately 26.0 GWh /8.8 GWac of energy storage onto the electric grid in 2023, up 34% y/y. list of acronyms and abbreviations is available at the end of the presentation. The median system price of large-scale utility-owned PV systems in 2023 was \$1.27/Wac--relatively flat since 2018.

How does solar-plus-storage affect energy systems?

Solar-plus-storage shifts some of the solar system's output to evening and night hours and provides other grid benefits. NREL employs a variety of analysis approaches to understand the factors that influence solar-plus-storage deployment and how solar-plus-storage will affect energy systems.

Is energy storage a viable option for utility-scale solar energy systems?

Energy storage has become an increasingly common component of utility-scale solar energy systems in the United States. Much of NREL's analysis for this market segment focuses on the grid impacts of solar-plus-storage systems, though costs and benefits are also frequently considered.

How much bifacial energy gain does a PV system provide?

The bifacial module share remained at 5% or less for systems 2.5-100 kWdc. Ground-mount and flat-roof nonresidential PV installations can provide bifacial energy gain, but typical sloped residential rooftop installations do not provide bifacial gain. Installers may use bifacial modules to avoid tariff-related module costs.

How many battery energy storage systems were installed in 2023?

In 2023, EIA reports that the U.S. installed 67,700 battery energy storage systems, of which 66,700 were residential, 650 were C&I, and 122 were utility-scale. LBNL conducted a survey of 123 utility-scale wind and solar project developers.

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