

# Perovskite Market - Forecasts from 2021 to 2026

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## Abstracts

The perovskite cells market is expected to grow at a compound annual growth rate of 31.63% over the forecast period to reach a market size of US\$3,311.350 million in 2026 from US\$636.626 million in 2020.

Perovskite solar cell refers to the cell composed of the perovskite-structured compound. The cell compounds are made of tin halide-based material, and methylammonium lead halide material, and all-inorganic cesium lead halide. These compounds are economic in terms of cost, manufacturing process, and availability. As per the data by the Office of Energy Efficiency & Renewable Energy, United States, Perovskite Solar Cells have resulted in increased efficiency from 3% in 2006 to 25% in 2020, producing more energy and is recognized as a fast-emerging technology in the solar energy sector. The increase in the demand for perovskite cells can be attributed to its low-cost thermal absorption material, efficient conversion of solar energy to electricity. Moreover, the cells offer flexibility, transparency, light-weighted panels. With such qualities, the sector has gained market traction involving multiple institutions and company led projects.

Since the demand for perovskite cells is dependent on the solar energy sector, the demand and the projects of the perovskite solar cells been plummeted with the inception of lockdown events. The solar industry had witnessed hurdles such as low workforce, following social distancing norms, lack of raw materials, building equipment, and operating limitations delayed projects. The revival of the market is expected to follow as the government and the ministries constantly roll out plans to keep the economic activities in momentum. In fact, In India, in March 2020, MNRE has extended exemptions for the businesses working in the domain of solar energy to undertake installations project, movement of building materials and other supplies necessary for the overall operations for both the household non-commercial and commercial projects, As per data by International Renewable Energy, IRENA, In April 2020, The African Union Commission (AUC) and the International Renewable Energy Agency (IRENA)

have signed a contract for developing Solar panel farms and other renewable technology involving decentralized systems. And to increase the access to energy across the African continent. The collaboration aims to develop multiple sources of energy to improve the conditions of healthcare, water supply, and education sector for pulling the region out of the turmoil of the pandemic. Such efforts will increase the demand for solar energy which in turn shows a favorable outlook on emerging technologies such as perovskite cells.

### Increase in demand for clean and sustainable energy

With the increase in the demand for clean energy, the demand for solar energy increases which further increase the demand for innovative materials used for developing solar glass, PV films, and other supporting equipment, the development of perovskite cells have been in research and development trend and is now getting commercialized gradually. The material fulfills the need of consumers by offering them a material which increases the sustainability of solar energy and makes it economical. There are multiple organizations that are undertaking projects to explore the market of perovskites solar cells. For instance, In October 2020, Saule launched solar panels with perovskite solar cells. The product is to be marketed in Europe and then to other parts of the world. Similarly, In August 2020, Perovskite solar cells manufacturing facility is set in Quzhou, east China's Zhejiang Province. The manufacturing facility is backed by Microquanta Semiconductor with the production of 200,000 perovskite PV glass by the 2020 year-end. In September 2020, the commercial perovskite PV project is undertaken by Oxford PV to integrate Perovskite cells and Silicon Cells and introduce in the markets by 2021. Further more, The Office of Energy Efficiency & Renewable Energy holds open bids for external entities for innovating hybrid perovskites solar cells technology corresponding to the amount of \$4m as the award. Such advancements are expected to increase the demand for perovskite solar cells.

### Government funding for the development and commercialization of Perovskite Solar Cells

The government is forming entities and funding projects which encourage the commercialization of low-cost solar cells to increase the usage of renewable source of energy. For instance, The U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL) has formed an entity named the US-MAP for US Manufacturing of Advanced Perovskites Consortium, with a focus to speed the development of low-cost perovskite solar cells for the making it available for both industrial and commercial use. The National Renewable Energy Laboratory NREL has

developed Silicon-Perovskite cell by using perovskites atop a silicon solar cell to create a multijunction solar cell, the new cell increases the efficiency to 27% compared to 21% silicon cells. NREL also aimed to increase the longevity of Perovskite solar cells by modifying their chemical characteristics which limit the breakdown of the solar cells. As the developments increase the technology will get cheaper. According to the International Renewable Energy Agency (IRENA), solar power generation can be regarded as a fully developed low-cost alternative to conventional fuel such as petrol, diesel, as the global weighted average cost of electricity for utility-scale solar PV cells have declined 75% to below USD 0.10/kWh since 2010.

### Innovative technologies for Perovskites

There are innovative projects which increased the interest of consumers towards perovskite. For instance, in January 2021, Australian University of Queensland researchers have designed a perovskite solar cell with 21.1% efficiency and high moisture resistance. They have modified the characteristics by adding fluorinated lead salt in the processing solution which is used with methylammonium lead iodide. With these modifications, the cells became 21.1% more competent with an open-circuit voltage of 1.12V, a short-circuit current of 22.4mA/cm<sup>2</sup> and a fill factor of 84%. Similarly, to increase the efficiency, King Abdullah University of Science & Technology (KAUST) and the University of Toronto has produced double-sided perovskite cells which gathers more light and produce more energy as compared to normal perovskite cell. Such initiatives drive the demand and contribute to the utility of perovskite cells.

Though the demand for perovskite cells remains positive in the solar energy sector due to the increase in the efficiency of photovoltaic power conversion from almost 6% to 22%, with continuous improvement in design, structure, and other properties. There exist limitations in the fastest emerging and clean solar technology. The perovskites cells are criticized for their material toxicity. There remains a high concentration of lead which is pressing environmental concern. The utility of the solar perovskites' cells is also less as compared to the silicon alternative as it offers less power longevity. This is the major hurdle for making it commercial as it may offer less benefit when compared to cost.

### Regional Analysis

North American nations such as the US, Canada have demand for the Perovskite Cells which can be attributed to demand for sustainable solar power-generating devices. The change in consumer preference towards green energy is expected to drive demand in

North America. The use of cells in Automotive, Aerospace industry applications also contributes to the demand. Overall, China, the USA, Canada, and Germany leads the market for Perovskite Cells. China holds a significant share in manufacturing Perovskites and other types of solar cells. Countries such as India is seen as the emerging market for innovative solar technologies.

## Segmentation

### By Type

Hybrid

Flexible

Multijunction

### By Applications

Industrial

Residential

Aerospace

Others

### By Geography

Americas

USA

Canada

Others

Europe Middle East and Africa

Germany

Spain

United Kingdom

Italy

France

Others

Asia Pacific

China

Japan

India

Others

Note: The report will be delivered within 3 business days.

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