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Perovskite Solar Cells Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2025 - 2034

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Abstracts

The Global Perovskite Solar Cells Market was valued at USD 335.5 million in 2024 and is estimated to grow at a CAGR of 24.1% to reach USD 2.74 billion by 2034.

Perovskite solar cells are emerging as a cutting-edge photovoltaic (PV) technology that offers high efficiency, low production cost, and exceptional flexibility in design. These cells utilize a perovskite-structured compound as the active light-absorbing material, capable of efficiently converting solar energy into electricity. Their ability to be produced using low-temperature, solution-based fabrication techniques such as spin-coating, blade-coating, and inkjet printing significantly reduces manufacturing expenses when compared to traditional silicon-based solar technologies. The market is gaining strong momentum owing to continuous advancements in power conversion efficiency and scalability, alongside the ability of perovskite materials to maintain performance even with material impurities. The compatibility of these cells with large-scale manufacturing approaches, including roll-to-roll production, is further improving commercial viability. Increasing interest in integrating solar technologies into buildings, vehicles, and portable devices is also driving demand. With their capability to achieve higher energy output, reduced production complexity, and adaptability to diverse applications, perovskite solar cells are set to reshape the renewable energy landscape over the next decade.

The building-integrated photovoltaic (BIPV) segment held 35.8% in 2024, growing at a CAGR of 24.5% through 2034. This growth is supported by the rising preference for energy-efficient building materials that combine functionality and design flexibility. These cells provide architects and developers with aesthetic benefits such as color versatility, transparency options, and lightweight configurations, enabling smooth integration into building facades and roofs. Their multifunctional features are

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contributing to increased adoption across commercial and residential construction projects, particularly in energy-conscious regions, enhancing their role within the renewable energy transition.

The flexible module technology segment held 30.9% share in 2024 and is projected to grow at a CAGR of 24.5% through 2034. These modules leverage thin, lightweight substrates made of plastic or metal foils, making them ideal for curved, mobile, and weight-sensitive applications. The ability to achieve power conversion efficiencies surpassing 20% on scalable, flexible materials through roll-to-roll production is driving significant interest among manufacturers and end users. Their adaptability and ease of deployment make them a promising solution for next-generation solar systems, particularly in portable energy devices and transport applications.

Europe Perovskite Solar Cells Market will reach USD 800 million by 2034, supported by robust government initiatives, advanced research programs, and ambitious renewable energy policies. The region continues to lead the global commercialization of perovskite solar technologies, backed by pioneering research institutions and industry collaborations. The combined efforts of European universities, national laboratories, and private companies are ensuring rapid technological progress and maintaining Europe's leadership in perovskite innovation. The strong focus on integrating perovskite cells into various renewable applications is positioning Europe as a central hub for product development and market expansion.

Prominent companies participating in the Global Perovskite Solar Cells Market include Oxford Photovoltaics, Saule Technologies, Swift Solar, Microquanta Semiconductor, Frontier Energy Solutions, Energy Materials Corp., Heiking PV Technology, Dyenamo AB, Caelux, Fraunhofer ISE, FUJIFILM Wako Pure Chemical Corporation, Li Yuan New Energy Technology, Alfa Aesar, G24 Power Ltd., Hunt Perovskite Technologies, GCL Suzhou Nanotechnology, CubicPV, FrontMaterials Co. Ltd., Hubei Wonder Solar, and Sekisui Chemical. To reinforce their presence, key players in the perovskite solar cells industry are focusing on innovation, scaling production, and enhancing product efficiency through material optimization. Companies are investing heavily in research and development to improve stability, lifespan, and performance under real-world conditions. Strategic partnerships between research institutions and manufacturers are being established to accelerate commercial deployment.

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Contents

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CHAPTER 8 MARKET SIZE AND FORECAST, BY REGION, 2021 – 2034 (USD MILLION)

CHAPTER 9 COMPANY PROFILES

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