Perovskite Solar Cell Market in Southeast Asia is Booming at a CAGR of 26.5% by 2033

The market is set for rapid growth, driven by demand for lightweight, flexible solar panels and rising renewable energy goals.

WILMINGTON, DE, UNITED STATES, November 19, 2024 /EINPresswire.com/ -- The Southeast Asia perovskite solar cell market size was valued at $12.0 million in 2023 and is estimated to reach $125.9 million by 2033, exhibiting a CAGR of 26.5% from 2024 to 2033.

Introduction
Perovskite solar cell is a photovoltaic device that utilize perovskite-structured materials as the active layer to convert sunlight into electricity. The perovskite structure refers to a specific arrangement of atoms within the material which allows it to efficiently absorb sunlight and generate electrical charge when exposed to light. Perovskite solar cell preferred for their potential to achieve high power conversion efficiencies at lower production costs compared to traditional silicon-based solar cell. They offer advantages such as flexibility, lightweight design, and the ability to be fabricated using low-cost solution-based processes.

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Market Dynamics
Governments and policymakers around Southeast Asia are setting ambitious renewable energy targets as part of their efforts to mitigate climate change and reduce dependence on non-renewable energy sources. In May 2023, the Vietnamese government launched a $135 billion energy strategy. Through a net-metering scheme, half of the country's residential rooftops are expected to be outfitted with photovoltaic (PV) systems. The scalability and efficiency of perovskite solar cell make them a particularly attractive option for meeting these targets. In addition, R&D efforts focused on enhancing the performance and stability of perovskite solar cell are thus receiving increased attention and investment. All these factors are expected to drive the demand for the Southeast Asia perovskite solar cell market.

However, the regulatory environment and incentive structures in countries of Southeast Asia favor established solar technologies such as silicon photovoltaics that create hurdles to the market entry for perovskite solar cell. Government subsidies, feed-in tariffs, and other support mechanisms often prioritize proven technologies with a track record of reliability and performance that makes it challenging for newer technologies to compete on a level playing

field. All these factors hamper the Southeast Asia perovskite solar cell market growth.

The integration of perovskite solar cell into building materials creates new opportunities for innovation and collaboration across industries. Architects, designers, material scientists, and solar technology developers collaborate to create novel building-integrated solar solutions that meet the evolving needs of the construction sector. This interdisciplinary approach fosters creativity and drives technological advancements, leading to the development of more efficient, durable, and cost-effective building-integrated photovoltaic systems. All these factors are anticipated to offer new growth opportunities for the Southeast Asia perovskite solar cell market during the forecast period.

Segments Overview
The Southeast Asia perovskite solar cell market is segmented into structure, product, method, end use, and country. On the basis of structure, the market is bifurcated into planar perovskite solar cell and mesoporous perovskite solar cell. By product, the market is divided into rigid perovskite solar cell and flexible perovskite solar cell. On the basis of method, the market is categorized into solution method, vapor-deposition method and vapor-assisted solution method. By end use, the market is segmented into aerospace, industrial automation, consumer electronics, energy, and others. Country-wise, the market is analyzed across Thailand, Malaysia, the Philippines, Indonesia, Vietnam, Singapore, Laos, Cambodia, Brunei, and rest of Southeast Asia.

On the basis of structure, the market is bifurcated into planar perovskite solar cell and mesoporous perovskite solar cell. The mesoporous perovskite solar cell segment is anticipated to grow at the fastest CAGR of 27.0% during the forecast period. The lightweight and flexible nature of mesoporous perovskite solar cell allows for integration into a wide range of surfaces and structures such as building-integrated photovoltaics (BIPV), portable electronic devices, and even wearable technology. This flexibility creates opportunities for new markets and applications, expanding the reach of solar energy beyond traditional installations.

By product, the market is divided into rigid perovskite solar cell and flexible perovskite solar cell. The rigid perovskite solar cell segment is anticipated to grow at the fastest CAGR of 26.8% during the forecast period. Rigid perovskite solar cell offer substantial opportunities in terms of performance and versatility. These cells have demonstrated impressive efficiencies in laboratory settings, with the potential for improvements through ongoing R&D. Their flexibility in terms of composition and structure allows for optimization to suit specific applications, such as integration into building materials or use in tandem solar cell to enhance overall efficiency. Moreover, the relatively simple fabrication processes enable the creation of lightweight and potentially semi-transparent solar cell creates new opportunities for innovative applications such as photovoltaic windows and facades.

On the basis of method, the market is categorized into solution method, vapor-deposition method and vapor-assisted solution method. The vapor-assisted solution method segment is anticipated to grow at the fastest CAGR of 27.0% during the forecast period. Vapor-assisted solution method allows for better control over the perovskite crystallization process. By carefully tuning the vapor environment, researchers optimize the nucleation and growth of perovskite crystals, leading to larger grain sizes and fewer defects within the film. This improved microstructure directly translates to enhanced charge carrier mobility and reduced recombination losses, both of which are critical for high-efficiency solar cell. Moreover, the method is adapted to various perovskite compositions, enabling the exploration of different material systems with tailored optoelectronic properties.

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By end use, the market is segmented into aerospace, industrial automation, consumer electronics, energy, and others. The consumer electronics segment is anticipated to grow at the fastest CAGR of 27.7% during the forecast period. Perovskite solar cell are fabricated on flexible substrates, allowing them to be seamlessly integrated into the curved surfaces of smartphones, tablets, smartwatches, and other wearables. By harvesting ambient light, these devices achieve longer operational times between charges, enhancing user convenience and experience. In addition, PSCs are designed to be transparent or semi-transparent, enabling their integration into displays or windows without obstructing the user's view.

Country-wise, the market is analyzed across Thailand, Malaysia, the Philippines, Indonesia, Vietnam, Singapore, Laos, Cambodia, Brunei, and rest of Southeast Asia. The rest of Southeast Asia is anticipated to grow at the fastest CAGR of 30.0% during the forecast period. The versatility and adaptability of perovskite solar cell (PSCs) present unique opportunities for integration into various applications in Southeast Asia. PSCs are incorporated into building-integrated photovoltaics (BIPV), portable solar devices, and even agriculture, through agrivoltaics. This adaptability is particularly beneficial in densely populated urban areas, rural regions without reliable grid access, and diverse agricultural landscapes.

Key players in the Southeast Asia perovskite solar cell market include Oxford Photovoltaics, Front Materials Co. Ltd., Xiamen Weihua Solar Co. Ltd., Saule Technologies, Hanwha Group, Toshiba Corporation, Panasonic Holdings Corporation, LONGi, SKY ENERGY INDONESIA, and Phono Solar Technology Co., Ltd.

Key Market Insights
- By product, the flexible perovskite solar cell segment was the highest revenue contributor to the market accounting for less than three-fifths of Southeast Asia perovskite solar cell market share in 2023.
- On the basis of structure, the planar perovskite solar cell segment was the highest revenue contributor to the Southeast Asia perovskite solar cell market share in 2023.
- On the basis of method, the vapor-deposition method segment was the highest revenue

contributor to the market accounting for less than half of the Southeast Asia perovskite solar cell market share in 2023.
• On the basis of end use, the energy segment was the highest revenue contributor to the Southeast Asia perovskite solar cell market share in 2023.
• Country-wise, Vietnam was the highest revenue contributor of Southeast Asia perovskite solar cell market share in 2023.

David Correa
Allied Market Research
+15038946022 ext.
email us here
Visit us on social media:
Facebook
X
