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Building Integrated Photovoltaics Market Report by Product Type (Polycrystalline, Thin Film, and Others), Application (Roof, Facades, Glass, and Others), End Use (Commercial, Residential, Industrial), and Region 2024-2032

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Abstracts

The global building integrated photovoltaics market size reached US$ 23.0 Billion in 2023. Looking forward, IMARC Group expects the market to reach US$ 95.1 Billion by 2032, exhibiting a growth rate (CAGR) of 16.6% during 2024-2032. Rapid technological advancements resulting in improved photovoltaic materials, along with favorable government support encouraging product adoption and rise in green building practices, represent some of the key factors driving the market.

Building integrated photovoltaics (BIPV) refers to the seamless integration of photovoltaic materials into a building's structure or facade during its construction. Unlike traditional solar panel systems that are installed onto an already completed structure, BIPV systems are an integral part of a building's design from the outset. The key advantage of BIPV systems is their dual functionality: they serve both as the building envelope material and as a power generator. They convert sunlight into electricity, thereby reducing the building's reliance on the grid, minimizing energy costs, and lowering carbon emissions. BIPV systems can be incorporated into various parts of a building, such as the roof, facades, windows, and skylights. The wide variety of BIPV product options, ranging from semi-transparent modules that allow natural light into the building, to opaque photovoltaic panels, provide architects with greater flexibility in their designs while enhancing the building's energy efficiency.

One of the key factors driving the global building integrated photovoltaics market represents the growing interest in sustainable construction and renewable energy. This

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is further supported by the increasing construction of net-zero buildings. In addition to this, rapid urbanization, especially in developing countries, is leading to an increase in new construction, which is providing significant potential for the BIPV market. Besides this, there has been a substantial decrease in the cost of photovoltaic (PV) technology, which has made solar power more competitive with traditional energy sources. As a result, BIPV systems have become more financially viable for a wider range of construction projects. Moreover, the rising energy demand, driven by population growth and economic development, has spurred the need for reliable, sustainable energy sources, thereby driving interest in renewable energy solutions like BIPV. As these systems enable buildings to generate their own power, they help in reducing dependence on the grid and enhancing energy security, which is creating favorable growth opportunities for the market players.

Building Integrated Photovoltaics Market Trends/Drivers:
Government Initiatives and Favorable Regulations Driving Market Growth

Governments worldwide have recognized the importance of renewable energy sources in mitigating the effects of climate change and have implemented several initiatives to promote their adoption. These initiatives typically come in the form of incentives, such as tax breaks, subsidies, or feed-in tariffs. For instance, feed-in tariffs guarantee a certain payment for electricity generated from renewable sources, thereby providing a stable and predictable revenue stream for investors in BIPV. Furthermore, some governments have set regulatory mandates requiring new buildings or renovations to incorporate energy-saving designs, which often include BIPV systems. These government initiatives are playing a crucial role in accelerating the growth of the market.

Technological Advancements are Leading to Improved Adoption

Technology in the BIPV sector is continually evolving to increase the efficiency and aesthetics of photovoltaic materials. For instance, the development of thin-film photovoltaics, which are lighter and more flexible than traditional silicon panels, are creating new possibilities for BIPV applications. Similarly, advances in solar cell design have led to the development of colored and semi-transparent solar panels, thereby enabling architects to incorporate solar technology into building designs without compromising the aesthetics. In addition to this, there is ongoing research to improve the energy conversion efficiency of photovoltaic materials, which is projected to enhance the output of BIPV systems.

Rise in Green Building Practices Supporting the Demand for BIPV

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There is a growing shift toward green and sustainable building practices. Green building certifications, such as Leadership in Energy and Environmental Design (LEED) and Building Research Establishment Environmental Assessment Method (BREEAM) award points are offered with the aim of encouraging the integration of renewable energy systems, including BIPV. These certifications are often pursued by developers to improve a building's marketability. Furthermore, as societal awareness and concerns about climate change increase, many companies are choosing to 'go green' to enhance their corporate social responsibility profiles. This trend towards green buildings is boosting the demand for BIPV systems. Additionally, BIPV systems can significantly reduce a building's energy costs. They reduce the need for expensive grid electricity by generating electricity onsite, as well as provide additional energy savings by improving the building's thermal insulation and reducing cooling costs.

Building Integrated Photovoltaics Industry Segmentation:
IMARC Group provides an analysis of the key trends in each segment of the global building integrated photovoltaics market report, along with forecasts at the global and regional levels from 2024-2032. Our report has categorized the market based on product type, application, and end use.

Breakup by Product Type:

Polycrystalline
Thin Film
Others

Polycrystalline BIPV dominates the market

The report has provided a detailed breakup and analysis of the building integrated photovoltaics market based on the product type. This includes polycrystalline, thin film, and others. According to the report, polycrystalline represented the largest segment.

Polycrystalline silicon, also known as multi-crystalline silicon or polysilicon, is widely used in BIPV. They are typically less expensive to produce than monocrystalline PVs, which makes them a more cost-effective option, especially for larger installations. The manufacturing process for polycrystalline solar cells is less energy-intensive and wasteful as compared to that of monocrystalline cells. In addition to this, as polycrystalline panels have slightly better heat tolerance than monocrystalline panels, they do not degrade as quickly in high temperatures, which can be advantageous in

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warmer climates.

In recent years, other types of solar technology, such as thin-film and perovskite solar cells, have also gained traction for their use in BIPV applications due to their flexibility and aesthetic qualities.

Breakup by Application:

Roof
Facades
Glass
Others

Roofs hold the leading position in the market

The report has provided a detailed breakup and analysis of the building integrated photovoltaics market based on the application. This includes roof, facades, glass, and others. According to the report, roofs represented the largest segment.

BIPV are most commonly used in roofs as they experience the most direct and unobstructed exposure to sunlight, particularly in high-rise buildings. This makes them an ideal location for photovoltaic systems that require ample sunlight to generate electricity efficiently. Moreover, BIPV systems can be integrated with roofing materials during construction or renovation, replacing conventional alternatives. This helps in generating electricity but also provides weatherproofing and can enhance the building's aesthetic appeal. Furthermore, installing BIPVs on the roof is easier and less disruptive to the building's design and occupants. Roof-integrated photovoltaics can also contribute to the overall energy efficiency of a building. They can provide shading, thereby reducing cooling loads, and can contribute to thermal insulation.

Breakup by End Use:

Commercial
Residential
Industrial

Commercial represents the largest end use segment in the market

A detailed breakup and analysis of the building integrated photovoltaics market based

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on the end use has also been provided in the report. This includes commercial, residential, and industrial. According to the report, the commercial segment accounted for the largest market share.

BIPV have witnessed significant adoption in the commercial sector. Commercial buildings usually have larger roof areas and facades compared to residential buildings, providing ample space to install BIPV systems. These buildings also have higher energy usage during daylight hours, which coincides with the electricity production from BIPV systems. This alignment allows for more effective use of the generated electricity, reducing reliance on the grid and leading to substantial cost savings. In addition to this, many corporations and institutions are adopting sustainability targets as a part of their corporate social responsibility initiatives. Implementing BIPV helps them to lower their carbon footprint and demonstrate their commitment to renewable energy and sustainable practices.

Breakup by Region:

Europe
North America
Asia Pacific
Middle East and Africa
Latin America

Europe exhibits a clear dominance, accounting for the largest building integrated photovoltaics market share

The report has also provided a comprehensive analysis of all the major regional markets, which include North America, Europe, Asia Pacific, Latin America, and the Middle East and Africa. According to the report, Europe represents the leading market for building integrated photovoltaics.

The Europe BIPV market is primarily driven by a robust regulatory framework that supports the use of renewable energy sources. Additionally, many European countries offer incentives, such as feed-in tariffs and tax credits, to encourage the use of renewable energy. Moreover, Europe is at the forefront of the fight against climate change and has committed to significant greenhouse gas (GHG) reductions under the Paris Agreement (2015). This commitment has driven a strong push towards renewable energy sources, including BIPV. In addition to this, Europe is home to several key players in the BIPV market who are leading technological innovation in this field. The

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presence of these companies, along with strong research and development (R&D) capabilities, is driving the BIPV market in the region.

Competitive Landscape:
The key players in the global building integrated photovoltaics market are continuously innovating to further improve the energy conversion efficiency of their photovoltaic materials. They have also focused on making photovoltaic materials more aesthetically pleasing and versatile, such as photovoltaic glass that can be customized in terms of transparency, color, and size. Market players are also developing thin-film photovoltaic cells, which are lighter, more flexible, and more cost effective than traditional silicon cells. A number of key players are offering complete BIPV solutions that are designed to integrate seamlessly with specific parts of a building. They have also developed software systems to optimize the generation, storage, and use of solar power. These systems can monitor energy production in real-time, predict future production based on weather forecasts, and manage energy storage and distribution to maximize efficiency.

The report has provided a comprehensive analysis of the competitive landscape in the global building integrated photovoltaics market. Detailed profiles of all major companies have also been provided. Some of the key players in the market include:

Ankara Solar AS
Ertex Solartechnik GmbH
Viasolis
Hanergy Holding Group Ltd.
HermansTechniglaz
ISSOL sa
Sphelar Power Corporation
Navitas Green Solutions Pvt. Ltd.
NanoPV Solar Inc.
Polysolar Ltd.

Recent Developments:
In 2018, Hanergy Thin Film Power Group launched HanWall, the first global solar-powered wall solution using CIGS solar cell technology. The product is offered in four colors and multiple sizes, and can produce up to 326 kW of electricity daily.
In March 2023, Sphelar Power Corporation established a method for measuring the power generation performance of spherical solar cells (I-V characteristic measurement) as a JIS (Japanese Industrial Standard). The new standard will expand the utilization of spherical cells in commercial products, including BIPV.

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In October 2021, NanoPV announced a plan to invest more than $36 million in opening a manufacturing and distribution facility in Georgia, the United States.

Key Questions Answered in This Report

1. What was the size of the global building integrated photovoltaics market in 2023?
2. What is the expected growth rate of the global building integrated photovoltaics market during 2024-2032?
3. What are the key factors driving the global building integrated photovoltaics market?
4. What has been the impact of COVID-19 on the global building integrated photovoltaics market?
5. What is the breakup of the global building integrated photovoltaics market based on the product type?
6. What is the breakup of the global building integrated photovoltaics market based on the application?
7. What is the breakup of the global building integrated photovoltaics market based on end use?
8. What are the key regions in the global building integrated photovoltaics market?
9. Who are the key players/companies in the global building integrated photovoltaics market?

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