

Global Flexible PV Cell Market Research Report 2022

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Abstracts

The global Flexible PV Cell market was valued at 1.85 Million USD in 2021 and will grow with a CAGR of 4.53% from 2021 to 2027, based on HNY Research newly published report.

The prime objective of this report is to provide the insights on the post COVID-19 impact which will help market players in this field evaluate their business approaches. Also, this report covers market segmentation by major market vendors, types, applications/end users and geography (North America, East Asia, Europe, South Asia, Southeast Asia, Middle East, Africa, Oceania, South America).

A flexible PV cell which is also known as thin film solar cell that is made by depositing very thin layers of photovoltaics material on any kind of substrate, such as, paper, tissue, plastic, glass or metal. It is one of the most revolutionary and epoch making technologies in the sector of solar energy. The significance of the word 'flexible' is that, these kind of solar cells are not like those traditional big, bulky solar panels which is very common nowadays, these are literally flexible, very thin, lightweight, have very little installation cost and can be installed anywhere without going much trouble. Thickness of a typical cell varies from a few nanometers to few micrometers, whereas its predecessor crystalline-silicon solar cell (c-Si) has a wafer size up to 200 micrometers. In this report, we define flexible PV cells as PV modules fabricated on flexible substrate materials (most commonly used substrates are polyimide, polyethylene terephthalate (PET), polyethylene naphthalate (PEN), and metal foils such as stainless steel (SS) and titanium (Ti)), including flexible a-Si thin film cells, flexible CIGS cells, flexible CdTe cells, OPV cells, flexible DSSC and flexible perovskite PV. Silicon (Si) solar cells dominate the PV market (92%) followed by cadmium telluride (CdTe, 5%), copper indium gallium selenide (CuInGaSe₂ or CIGS, 2%) and amorphous silicon (a-Si:H,

~1%). Si wafer with thickness around 180 μm is the traditional material being used for module manufacturing and it has attained significant level of maturity at the industrial level. Its production cost is a major concern for energy applications. About 50% of the cost of Si solar cells production is due to Si substrate, and device processing and module processing accounts for 20% and 30% respectively. An alternate to Si solar cells is the thin μm solar cells fabricated on glass substrates. The main demerits of using glass substrates are fragile nature of modules, cost of glass wafer having thickness of 300-400 μm , and low specific power (kW/kg) etc. Specific power is an important factor when solar cells are used in space applications. A high specific power exceeding 2 kW/kg can be achieved by flexible solar cells on polymer μm s which is useful for terrestrial as well as space applications. Production cost can be lowered by using flexible substrates and roll-to-roll production (R2R) technique. Apart from light weight, flexibility and less cost of installation, flexible cell processing involves low thermal budget with low material consumption. Other than solar cell applications, smaller specialized applications are beginning to become more viable independent markets, including applications for mobile power and building or product integration, which can benefit greatly from flexible thin μm options. Flexible cells on buildings (known as building integrated photovoltaics or BIPV) can minimize the cost of support, shipments etc., and installations can be handled easily. However, flexible solar cell technology is less mature when compared to the cells fabricated on rigid substrate counterpart. Due to four main requirements - high efficiency, low-cost production, high throughput and high specific power, a major research and development focus has been shifted towards flexible solar cells. It can offer a unique way to reach terawatt scale installation by using high throughput R2R fabrication technique. Most commonly used substrates are polyimide, polyethylene terephthalate (PET), polyethylene naphthalate (PEN), and metal foils such as stainless steel (SS) and titanium (Ti). The performance of flexible solar cells is comparable to rigid substrates. Flexible substrates are more advantageous than standard soda-lime glass (SLG) substrates. As mentioned below, there are several merits of using flexible substrates:

- Flexible modules are best suited for curved surfaces and used in BIPV. Since modules are produced from thin μm materials it is suitable for mass production.
- An important benefit is that it has potential to reduce the production cost. R2R deposition is beneficial in terms of production cost than that of rigid substrates. Glass cover is an added expense when rigid substrates are used.
- Materials required to produce CIGS, CdTe and a-Si:H flexible modules are much cheaper than conventional Si wafer, glass cover, frames used in Si modules.
- For roof top application, flexible modules are ideal due to light weight. Using lightweight support, it can be installed over the rooftop where glass covered conventional heavy and bulky Si modules are not suitable when roof test fails due to an added weight and structural issues. Flexible modules can also be installed over the roof of the vehicle,

uneven surfaces of building. ? Installation/labor cost is much lower for ?exible modules due to less installation time since racking assembly, glass cover etc. aren't required. ? Low power output ?exible modules for example a-Si:H require large number of modules to get desired output which can be installed easily above the roof top. ? Glass covered rigid modules are fragile. Flexible modules are not fragile it can be rolled up, transported and handled easily. Photovoltaic (PV) technologies are basically divided into two big categories: wafer-based PV (also called 1st generation PV) and thin-film cell PV. The emerging thin-film PVs are also called 3rd generation PVs, which refer to PVs using technologies that have the potential to overcome Shockley-Queisser limit or are based on novel semiconductors. The 3rd generation PVs include DSSC, organic photovoltaic (OPV), quantum dot (QD) PV and perovskite PV. The cell efficiencies of perovskite are approaching that of commercialized 2nd generation technologies such as CdTe and CIGS. Other emerging PV technologies are still struggling with lab cell efficiencies lower than 15%. In the industry, Sun Harmonics shipments most in 2019 and recent years, while HyET Solar and PowerFilm, Inc. ranked 2 and 3. The top 3 Flexible PV Cell manufacturers accounted for around 62% revenue market share in 2019. The manufacturer headquarters is mainly distributed in North America, Europe, China and Japan. There are six types of Flexible PV Cell including Flexible CIGS Solar Cells, Flexible a-Si Solar Cells, Organic Solar Cells (OPV), Flexible CdTe Solar Cells, Flexible DSSC, Flexible Perovskite Solar Cells. In addition, the application consists of BIPV, Transportation & Mobility, Defense & Aerospace, Consumer & Portable Power. BIPV occupied nearly 51% of global flexible PV Cell sales market share in 2019.

By Market Vendors:

PowerFilm, Inc.

Panasonic

infinityPV

Flisom

Sun Harmonics

F-WAVE Company

Heliatek GmbH

HyET Solar

Ascent Solar Technologies, Inc

By Types:

CIGS

a-Si

OPV

By Applications:

BIPV

Transportation & Mobility

Defense & Aerospace

Consumer & Portable Power

Key Indicators Analysed

Market Players & Competitor Analysis: The report covers the key players of the industry including Company Profile, Product Specifications, Production Capacity/Sales, Revenue, Price and Gross Margin 2016-2027 & Sales with a thorough analysis of the market's competitive landscape and detailed information on vendors and comprehensive details of factors that will challenge the growth of major market vendors.

Global and Regional Market Analysis: The report includes Global & Regional market status and outlook 2016-2027. Further the report provides break down details about each region & countries covered in the report. Identifying its sales, sales volume & revenue forecast. With detailed analysis by types and applications.

Market Trends: Market key trends which include Increased Competition and Continuous Innovations.

Opportunities and Drivers: Identifying the Growing Demands and New Technology

Porters Five Force Analysis: The report provides with the state of competition in industry depending on five basic forces: threat of new entrants, bargaining power of suppliers, bargaining power of buyers, threat of substitute products or services, and existing industry rivalry.

Key Reasons to Purchase

To gain insightful analyses of the market and have comprehensive understanding of the global market and its commercial landscape.

Assess the production processes, major issues, and solutions to mitigate the development risk.

To understand the most affecting driving and restraining forces in the market and its impact in the global market.

Learn about the market strategies that are being adopted by leading respective organizations.

To understand the future outlook and prospects for the market.

Besides the standard structure reports, we also provide custom research according to specific requirements

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OPV Features

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