

Thermophotovoltaics Market Size & Share to Hit US \$400.2 million by 2032, Garnering 12.8% CAGR

WILMINGTON, DE , UNITED STATES, March 28, 2024 /EINPresswire.com/ -- The [thermophotovoltaics market](#) size was valued at \$120.3 million in 2022, and thermophotovoltaics industry is estimated to reach \$400.2 million by 2032, growing at a CAGR of 12.8% from 2023 to 2032.

TPV technology is gaining traction for space missions. It can convert the intense heat generated during reentry into electricity, reducing the need for heavy and expensive power sources. This could revolutionize satellite and spacecraft design, making space exploration more cost-effective.



Thermophotovoltaics Market

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Growing Demand for Hybrid Vehicles

In order to keep batteries at a constant state of charge, hybrid vehicles require electrical energy. The electric motor then uses the energy from these batteries to move the car forward. Hence, the electrical energy requires to keep constant the functioning of hybrid vehicles, thermophotovoltaics is used. Therefore, with the growing demand for hybrid vehicles, the market is also projected to grow.

Rise in Space Activities The number of satellites orbiting the Earth as of January 2022 was about 8,260 satellites. Moreover, with about 179 successful rocket launches into orbit, 2022 set a record for space travel and was approximately 43 more successful than 2021. Solar PV is being used for missions that are close to the sun (in Earth orbit or closer), allowing for power levels of several kW and mission durations of many years. However, solar thermal generators, which allow for extremely high energetically dense thermal storage, is projected to replace solar PV.

Surge in Number of People with No Electricity About 19 million of people all around the world lived without electricity in 2022. Therefore, a large number of off-grid is estimated to be

constructed further boosting the market growth for thermophotovoltaics.

Region wise, the market is analyzed across North America, Europe, Asia Pacific, and LAMEA. The Asia Pacific segment garnered the maximum revenue share in the market in 2022. India and China are significantly responsible for the market's growth in the Asia Pacific region. These nations are expanding rapidly in the photovoltaics sector. The market is growing as a result of advantageous government policies throughout Asia and the Pacific. Solar energy usage has increased as a result of countries like China, India, and Australia accelerating the deployment of renewable energy to achieve their emission targets.

The market research report covers the analysis of key stake holders of the market. Key companies profiled in the report include Tesla, Inc., Schott AG (Carl-Zeiss-Stiftung), Abengoa, BrightSource Energy, Inc., Spectrolab, Inc. (The Boeing Company), Acciona SA, ACWA Power (Vision Invest), Azur Space Solar Power GmbH (5N Plus, Inc.), Microlink Devices, Inc. and Alta Devices (Hanergy Hi-Tech Power Limited)

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Industries are increasingly focusing on energy efficiency and emissions reduction. TPV systems can capture waste heat from various processes, such as manufacturing, and convert it into electricity. This not only saves energy costs but also aligns with sustainability goals. Miniaturized TPV devices are being explored for portable power sources. These can be used in remote locations, disaster relief efforts, or off-grid scenarios, providing a reliable source of electricity without the need for traditional power infrastructure. TPV systems are being investigated for residential heating applications. By harnessing waste heat from furnaces, TPV could offer a clean and efficient way to supplement home heating, reducing energy bills and environmental impact. Beyond these applications, TPV is finding use in niche markets like night vision devices, ensuring a sustainable power source for military and surveillance applications.

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- Solar Photovoltaic
- Nuclear
- Thermal Power Plants
- Off-Grid Generators
- Vehicles & Submarines
- Commercial
- Portable Electronics
- Satellite & Space

Silicon Photovoltaic Cells
Crystalline Silicon Photovoltaic Cells
Thin-Film Photovoltaics Cells

Non-Epitaxial
Epitaxial

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Thermophotovoltaics (TPV) is an emerging technology that converts thermal radiation into electricity through photovoltaic cells. TPV systems consist of emitters, filters, photovoltaic cells, and thermal sources, and offer potential advantages such as high conversion efficiency and compatibility with various heat sources. The global pursuit of sustainable energy solutions has fostered increased investments in TPV R&D by governments and private entities. This heightened focus on renewable energy has created a favorable market landscape for TPV devices, driven by the need for efficient and environmentally friendly power generation alternatives.

Thermophotovoltaics represents a cutting-edge technology that harnesses heat from various sources and converts it into electricity through photovoltaic cells. Unlike traditional photovoltaic systems that rely solely on sunlight, TPV systems utilize heat sources such as combustion, concentrated solar power, or waste heat from industrial processes. This versatility makes TPV systems suitable for a wide range of applications, from power generation in remote locations to industrial energy recovery. Integrating TPV systems into existing infrastructure and scaling up production to meet market demand require careful planning, investment, and collaboration across stakeholders. Streamlining regulatory processes, establishing supportive policies, and incentivizing investments in TPV technologies are vital for fostering market growth and innovation.

Thermophotovoltaics are integrated into industrial processes to capture and convert waste heat, improving energy efficiency and reducing operational costs.

Miniaturized TPV systems are gaining attention for use in microelectronics and sensors, providing compact and self-sustained power sources.

TPV combines renewable technologies like solar and wind to create hybrid energy systems, enhancing reliability and grid integration.

Ongoing research explores new materials and designs for TPV cells, aiming to boost efficiency and performance while reducing manufacturing costs.

Stricter environmental regulations and sustainability targets drive interest in TPV as an eco-friendly energy solution in various industries beyond the mentioned applications.

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Crystalline silicon photovoltaic cells lead the thermophotovoltaics market due to their proven efficiency, durability, and widespread adoption.

In the thermophotovoltaics market, non-epitaxial fabrication methods dominate, offering cost-effective and efficient alternatives to epitaxial techniques.

In the thermophotovoltaics market, space applications, specifically satellites and space missions, dominate, harnessing TPV for efficient and sustainable power generation.

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- Acciona SA
- ACWA Power International S.A.O.C.
- Brightsource
- Alta Devices Inc.
- Spectrolab
- MicroLink Devices
- Abengoa Solar GmbH
- Schott AG.
- Tesla, Inc.
- Azur Space Solar Power

David Correa

Allied Market Research

+1 503-894-6022

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