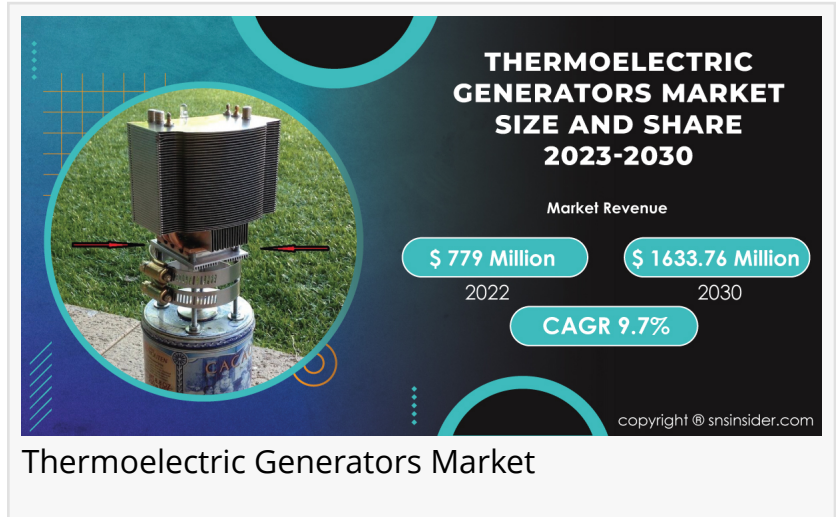


Thermoelectric Generators Market Set to Reach \$1633.76Mn by 2030, Fueled by Advancements in Sustainable Energy

Thermoelectric Generators: Meeting Demands for Efficiency in a Sustainable Energy Landscape.

AUSTIN, TEXAS, UNITED STATES,
February 20, 2024 /EINPresswire.com/
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The growing demand for fuel-efficient vehicles and stringent emission regulations propel the [Thermoelectric Generators Market](#), driving innovation and sustainable energy solutions.



Thermoelectric Generators Market

The Thermoelectric Generators Market is poised for growth as it expands beyond traditional domains and finds applications in diverse sectors. The ongoing developments in material science, coupled with the increasing focus on sustainable energy solutions, position TEGs as a key player in the transition towards cleaner and more efficient energy sources.



Revolutionizing energy:
Thermoelectric Generators
meet demand for efficiency
and sustainability.”

SNS Insider

According to the SNS Insider report, the Thermoelectric Generators Market was valued at USD 779 million in 2022 and is projected to reach USD 1633.76 million by 2030, showcasing a robust CAGR of 9.7% during the forecast period of 2023-2030.

Market Report Scope

The global Thermoelectric Generators Market is witnessing remarkable growth driven by an increasing demand for fuel-efficient vehicles and the implementation of stringent government regulations aimed at curbing carbon dioxide emissions. While the high cost of thermoelectric materials and a lack of technological expertise may pose challenges, the market is thriving due

to heightened vehicle production and a growing demand for cleaner energy sources. The rise in the adoption of thermoelectric generators is a testament to the global shift towards greener energy solutions, with increased attention on sustainability and environmental impact.

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Key Market Segmentation

□ Component

- Heat Source
- Thermoelectric Module
- Cold Side
- Electric Load

□ Wattage

- Low Power (<10W)
- Medium Power (10-1 kW)
- High Power (>1 kW)

□ Application

- Waste Heat Recovery
- Energy Harvesting
- Direct Power Generation
- Co-generation

□ Temperature:

- Low (<80°C)
- Medium (80°- 500°C)
- High (> 500°C)

Market Analysis

Thermoelectric generators (TEGs), traditionally popular in the space domain, have found expanded applications in sectors such as transportation, oil & gas, industrial, and healthcare. Despite lower efficiency, TEGs provide compactness and low maintenance, making them increasingly viable in the transportation industry. Their ability to harness waste heat, a significant issue in this sector, positions TEGs as valuable contributors to overall efficiency and reduced environmental footprint.

Innovations in material science are crucial to making TEGs more cost-effective for widespread adoption. New materials with lower costs and broader working ranges are on the horizon, presenting opportunities for TEGs in vehicles, maritime applications, and even in the aerospace

industry, where efficient waste heat utilization is gaining importance. Additionally, the rising need for self-powered microsensors in the automotive industry is expected to drive the development of microTEGs. Ongoing research on solar thermoelectric generators further expands growth opportunities for the TEG market, promising sustainable energy solutions for the future.

Segment Analysis

□ In terms of wattage, the low-power segment (<10 W) is projected to witness the highest CAGR during the forecast period, driven by increased usage in wearables and handheld consumer electronic devices. In terms of type, the single-stage TEGs hold a significant share, with the multi-stage segment expected to have the highest CAGR. The low-temperature segment (<80°C) is anticipated to register the highest CAGR, driven by stringent regulations to reduce CO₂ emissions. Bismuth telluride, the most widely used thermoelectric material, is projected to have the highest CAGR in the material segment. The thermoelectric module component is expected to have the highest CAGR, reflecting increased demand for efficient materials in manufacturing.

□ In verticals, the industrial segment is projected to record the highest growth during the forecast period, attributed to the adoption of TEGs in smelters, blast furnaces, and other chemical processing applications. In applications, waste heat recovery is expected to lead the market, driven by the growing trend of vehicle electrification, increasing the demand for TEGs that generate power from waste heat in automobiles.

Growth Factors

□ Historically popular in space exploration, TEGs have now found diverse applications in sectors such as transportation, oil & gas, industrial processes, and healthcare. The versatility of thermoelectric modules positions them as a key player in the broader energy landscape.

□ Despite their relatively lower efficiency, TEGs have demonstrated the ability to enhance overall efficiency in the transportation industry. Waste heat, a significant challenge in this sector, can be harnessed by TEGs to reduce environmental impact. The compact design and low maintenance of TEGs make them a favorable choice in vehicles, though cost remains a consideration.

Key Players

Key industry contributors include Gentherm, Inc., II-VI Incorporated, Ferrotec Corporation, Laird PLC, Komatsu Limited, Yamaha Corporation, Evident Thermoelectrics, Tecteg, Alphabet Energy, Tellurex Corporation, and additional players.

Key Regional Development

The Thermoelectric Generator Market is divided into North America, Europe, Asia Pacific, and

Latin America. North America currently holds the largest market share, with Asia-Pacific following closely, experiencing high growth at a significant CAGR. The dominance of North America is attributed to the increasing demand for generators in the automotive industry, enhancing fuel efficiency and driving industrialization in the region, particularly in the auto sector.

Key Takeaway

- Low-power TEGs (<10 W) witness the highest CAGR, driven by wearables and handheld devices.
- Single-stage TEGs dominate, while multi-stage TEGs exhibit the highest CAGR.
- Low-temperature TEGs (<80°C) experience the highest CAGR due to stringent emission regulations.
- Bismuth telluride emerges as the dominant material, showing the highest CAGR.
- Industrial vertical records the highest growth, fueled by TEG adoption in chemical processing.

Recent Developments

In November 2022: Laird Thermal Systems, Inc. unveiled a new 5000-watt liquid-to-air water heat exchanger solution series, LA5000, designed for data centers and industrial applications.

In February 2022: Laird Thermal Systems, Inc. launched the PowerCycling PCX Elongated Thermoelectric Cooler, enhancing PCR testing speed in DNA amplification, analytical, and medical applications.

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