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Thermal Energy Harvesting Market Opportunity, Growth Drivers, Industry Trend Analysis, and Forecast 2024 - 2032

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Abstracts

The Global Thermal Energy Harvesting Market, valued at USD 158.6 million in 2023, is projected to grow at a CAGR of 8.1% from 2024 to 2032. This growth is primarily driven by the increasing demand for renewable energy solutions and advancements in thermoelectric materials and technology. By utilizing ambient heat sources and converting waste heat into usable energy, thermal energy harvesting plays a critical role in reducing reliance on fossil fuels. As a result, it contributes significantly to the global transition toward cleaner energy alternatives. Innovations in thermoelectric materials, particularly nanostructured thermoelectric technology, are propelling the market forward.

These materials offer enhanced energy conversion efficiency, making thermal energy harvesting more practical for commercial and industrial applications. Ongoing research in material science is expected to improve the performance and lower costs of these systems, encouraging their adoption across various sectors. In terms of components, the energy harvesting transducer segment is expected to exceed USD 136 million by 2032. These transducers are gaining popularity as they provide an ideal solution for powering remote locations where traditional energy infrastructure is either costly or challenging to implement. They can harness ambient heat to generate power, reducing reliance on traditional fuel sources and improving energy access in isolated areas.

The building automation segment is anticipated to witness a 7.5% CAGR through 2032. The increasing demand for smart building technologies and energy-efficient systems is driving the adoption of thermal energy harvesting. This technology powers self-sustaining sensors and devices, eliminating the need for battery replacements and reducing wiring requirements. These advancements lead to lower operational costs and simplified installations, making energy harvesting an attractive option in commercial and

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residential buildings. In the U.S. market, thermal energy harvesting is expected to surpass USD 80 million by 2032. The focus on energy efficiency and sustainability is driving industrial adoption of these technologies, particularly in sectors that benefit from capturing and reusing waste heat.

Government initiatives aimed at reducing carbon emissions, combined with advances in IoT and smart grid technologies, are further fueling market expansion. The Asia Pacific region is experiencing rapid thermal energy harvesting market growth, driven by industrialization and government efforts to improve energy efficiency. As countries in the region invest in renewable energy and smart infrastructure, the market for thermal energy harvesting continues to expand.

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Contents

Report Content

CHAPTER 1 METHODOLOGY & SCOPE

1.1 Research design
  1.1.1 Research approach
  1.1.2 Data collection methods
1.2 Base estimates & calculations
  1.2.1 Base year calculations
  1.2.2 Key trends for market estimation
1.3 Forecast model
1.4 Primary research and validation
  1.4.1 Primary sources
  1.4.2 Data mining sources
1.5 Market definitions

CHAPTER 2 EXECUTIVE SUMMARY

2.1 Industry 360° synopsis, 2021 - 2032

CHAPTER 3 INDUSTRY INSIGHTS

3.1 Industry ecosystem analysis
3.2 Regulatory landscape
3.3 Industry impact forces
  3.3.1 Growth drivers
  3.3.2 Industry pitfalls & challenges
3.4 Growth potential analysis
3.5 Porter's analysis
  3.5.1 Bargaining power of suppliers
  3.5.2 Bargaining power of buyers
  3.5.3 Threat of new entrants
  3.5.4 Threat of substitutes
3.6 PESTEL analysis

CHAPTER 4 COMPETITIVE LANDSCAPE, 2024

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4.1 Introduction
4.2 Strategic dashboard
4.3 Innovation & sustainability landscape

CHAPTER 5 MARKET SIZE AND FORECAST, BY COMPONENT, 2021 – 2032 (USD MILLION)

5.1 Key trends
5.2 Energy harvesting transducer
5.3 Power management integrated circuits (PMIC)
5.4 Others

CHAPTER 6 MARKET SIZE AND FORECAST, BY END USE, 2021 – 2032 (USD MILLION)

6.1 Key trends
6.2 Wireless sensor networks
6.3 Consumer electronics
6.4 Building automation
6.5 Automotive
6.6 Others

CHAPTER 7 MARKET SIZE AND FORECAST, BY REGION, 2021 – 2032 (USD MILLION)

7.1 Key trends
7.2 North America
  7.2.1 U.S.
  7.2.2 Canada
  7.2.3 Mexico
7.3 Europe
  7.3.1 Germany
  7.3.2 UK
  7.3.3 France
  7.3.4 Italy
  7.3.5 Spain
7.4 Asia Pacific
  7.4.1 China
  7.4.2 Australia

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7.4.3 India
7.4.4 Japan
7.4.5 South Korea
7.5 Middle East & Africa
7.5.1 Saudi Arabia
7.5.2 UAE
7.5.3 South Africa
7.6 Latin America
7.6.1 Brazil
7.6.2 Argentina

CHAPTER 8 COMPANY PROFILES

8.1 ABB
8.2 Advanced Linear Devices
8.3 Cedrat Technologies
8.4 EnOcean
8.5 Fujitsu
8.6 Honeywell
8.7 Kinergizer
8.8 Laird Thermal Systems, Inc.
8.9 Micropelt
8.10 Mide Technology
8.11 Mouser Electronics
8.12 Perpetua Power
8.13 Powercast Corporation
8.14 Renesas Electronics
8.15 STMicroelectronics
8.16 Texas Instruments
8.17 ZF Friedrichshafen

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