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Global Radioisotope Battery Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Radioisotope Battery market size is expected to reach $ 50.26 million by 2032, rising at a market growth of 21.5% CAGR during the forecast period (2026-2032).

A radioisotope battery (also known as a nuclear battery or atomic battery) is a power generation device that converts the energy released by the decay of radioactive isotopes into electrical energy. Its core principle is that unstable nuclides continuously release high-energy particles during alpha or beta decay. These particles collide with surrounding matter and convert their kinetic energy into heat energy. Subsequently, through physical mechanisms such as thermoelectric effects (e.g., thermocouples), thermionic emission, or photoelectric effects, the heat energy is further converted into usable electrical current. Unlike traditional chemical batteries, nuclear batteries do not depend on any external chemical reactions or environmental conditions, exhibiting extremely high energy density and independence.

The most significant advantage of this type of battery lies in its extremely long lifespan and excellent environmental adaptability. Because the half-life of radioactive isotopes typically lasts for years, decades, or even centuries (e.g., plutonium-238 has a half-life of approximately 87.7 years), nuclear batteries can provide electricity continuously and stably without external maintenance or refueling. This makes them an irreplaceable energy solution in extreme environments, and they are widely used in deep space probes (such as the Voyager and Perseverance Mars rovers), long-term seabed observation stations, and polar unmanned weather stations, where conventional charging or solar power generation is not possible.

In 2025, global radioisotope battery production reached approximately 752 units, with an average global market price of around US$ 15.88 thousand per unit. And global

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radioisotope battery production capacity reached approximately 950 units. The average gross margin in this industry reached 51.56%.

The upstream of the radioisotope battery industry centers on the production and processing of radioisotopes?mainly Plutonium-238, as well as encapsulation materials, thermoelectric materials, and high-reliability heat-to-electricity conversion components. This includes nuclear fuel fabrication, isotope refinement, and advanced materials for thermoelectric modules (e.g., SiGe, skutterudites). The supply chain is highly specialized and government-regulated. Representative upstream entities include Oak Ridge National Laboratory (Pu-238 production), Idaho National Laboratory (nuclear materials handling), and European Commission?s JRC (radioisotope research).

The downstream sector involves space agencies and aerospace manufacturers that integrate RPS into deep-space exploration missions, where long-life and high-reliability power is required. Applications include planetary probes, outer-planet orbiters, lunar systems, and surface exploration rovers. These users demand robust, radiation-resistant, and decades-long power sources. Key downstream organizations include NASA (deep-space missions), ESA (for European exploration programs), and aerospace integrators such as Lockheed Martin that assemble spacecraft using radioisotope battery units.

This report studies the global Radioisotope Battery production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Radioisotope Battery and provides market size (US$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Radioisotope Battery that contribute to its increasing demand across many markets.

Highlights and key features of the study
Global Radioisotope Battery total production and demand, 2021-2032, (Units)
Global Radioisotope Battery total production value, 2021-2032, (USD Million)
Global Radioisotope Battery production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Units), (based on production site)
Global Radioisotope Battery consumption by region & country, CAGR, 2021-2032 & (Units)
U.S. VS China: Radioisotope Battery domestic production, consumption, key domestic manufacturers and share

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Global Radioisotope Battery production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Units)
Global Radioisotope Battery production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Units)
Global Radioisotope Battery production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Units)

This report profiles key players in the global Radioisotope Battery market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include Teledyne (US), City Labs (US), NDB (US), Zeno Power (US), Infinity Power (US), Betavolt (CN), etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Radioisotope Battery market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US$ Millions), volume (production, consumption) & (Units) and average price (US$/Unit) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Radioisotope Battery Market, By Region:

United States

China

Europe

Japan

South Korea

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ASEAN

India

Rest of World

Global Radioisotope Battery Market, Segmentation by Type:

Radioisotope Power System

Betavoltaic Battery

Global Radioisotope Battery Market, Segmentation by Discharging Power:

110W

Others

Global Radioisotope Battery Market, Segmentation by Voltage:

6-8V

28-32V

Others

Global Radioisotope Battery Market, Segmentation by Application:

Defence & Aerospace

Civilian

Companies Profiled:

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Teledyne (US)

City Labs (US)

NDB (US)

Zeno Power (US)

Infinity Power (US)

Betavolt (CN)

Key Questions Answered:
1. How big is the global Radioisotope Battery market?
2. What is the demand of the global Radioisotope Battery market?
3. What is the year over year growth of the global Radioisotope Battery market?
4. What is the production and production value of the global Radioisotope Battery market?
5. Who are the key producers in the global Radioisotope Battery market?
6. What are the growth factors driving the market demand?

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