

Betavoltaic Cell Market – Global Industry Size, Share, Trends, Opportunity and Forecasted, 2018-2028 By Isotopes Type (Tritium, Strontium, Krypton, Nickel, Others), By Shape (Rectangular and Cylindrical), By End User Industry (Aerospace, Electronics & Communication, Healthcare, Defense, Others), By Region, By Competition

<https://marketpublishers.com/r/B5D75CAE32BAEN.html>

Date: April 2023

Pages: 118

Price: US\$ 4,900.00 (Single User License)

ID: B5D75CAE32BAEN

Abstracts

Global Betavoltaic Cell Market is anticipated to grow at a steady pace in the forecast period, 2023-2028, and grow at a solid CAGR in the forecast period.

A betavoltaic device, also known as a betavoltaic cell or battery, is a form of nuclear battery that uses semiconductor junctions to convert beta particles (also known as electrons) generated from a radioactive source into electric current. Tritium, an isotope of hydrogen, is a frequent source. Betavoltaic systems employ a non-thermal conversion mechanism, turning the electron-hole pairs created by the ionization path of beta particles passing a semiconductor, comparing most nuclear power sources, which use nuclear radiation to generate heat which is then used to generate electricity. In low-power electrical applications, such as implanted medical devices or military and space applications, where longevity of the energy source is required, betavoltaic power sources (and the related technology of alpha voltaic power sources) are particularly compatible.

Betavoltaic power sources for mobile device applications

A stacked design of isotope layers and energy conversion layers is included in a betavoltaic power source for mobile devices and mobile apps. The half-lives of the

isotope layers are between 0.5 and 5 years, and they produce radiation with energies ranging from 15 to 200 keV. The betavoltaic power source is set up to deliver enough power to run the portable gadget for the duration of its useful life. So, as the population grows, the need for mobile devices increases due to usage. Consequently, it is anticipated that the betavoltaic cell market will expand in the approaching year and register a significant CAGR in the projection.

Military & Defense Offer High Market Potential and Implantable Medical Devices Register Remarkable Betavoltaic Cell Consumption

Notable adoption by the healthcare sector has contributed significantly to the market expansion for betavoltaic cells. Betavoltaic batteries have a wide range of useful uses in the fields of surgery and healthcare. The market for implanted medical devices offers several options in addition to cardiac implantables like pacemakers and defibrillators. Several medical device manufacturing firms have shown a preference for creating robust, scalable, portable, low-power devices that rely heavily on betavoltaic cells. The development of in-vivo medication delivery systems, cerebral neurostimulators, intraocular and cochlear implants, and infusion pumps are only a few of the extremely appealing fields. Other possible application areas for betavoltaic battery manufacturers include in-vivo electronic medical tags and brain-to-computer interface systems. Additionally, there are many prospects in the fields of defense and military applications. Betavoltaic cells are anticipated to have a substantial potential application in tamper-proofing military equipment. These cells might effectively power the encryption keys in Realm Programmable Gate Arrays, which is relevant to the field of defense (FPGA).

Nuclear Batteries and Other New Applications for Betavoltaic Cells Continue to encourage interest in research.

The industry's biggest problem with nuclear batteries is that they provide energy at a rate that gradually decreases over time. Additionally, if the electricity created is not used, it expires. While this has always been the weak point of betavoltaic cells, manufacturers have had a difficult time upping the power. There has been significant, active research underway on improving the power conversion efficiency of betavoltaic batteries to meet this challenge and unlock the full application potential of these batteries. These cells are increasingly seen as the batteries that will bring a revolutionary change in the tiny device market. Further strengthening R&D initiatives are anticipated to support this transformation in the upcoming years.

In August 2020, the California-based NDB company released a nuclear battery that can

recharge on its own. The battery supposedly lasts an astounding 28,000 years, especially with the carbon-14 nuclear waste that has been encapsulated in an artificial diamond casing. According to NDB, the battery can power a variety of gadgets, including electric cars, cameras, drones, cellphones, other mobile devices, household appliances, and medical devices.

A company founded by the University of Bristol academics presented a revolutionary strategy to produce nuclear diamond betavoltaic batteries in September 2020. A device's lifespan might possibly reach decades because of the energy-efficient (diamond-based) betavoltaic battery technology that Arkenlight Limited is working to commercialize. The idea behind this diamond betavoltaic battery is to turn the radioactive waste carbo-14 into a self-sustaining energy source. These batteries may eventually replace the necessity of the need for charging in directly powered devices.

Market Segmentation

The Global Betavoltaic Cell Market is divided by isotope type, shape, and end-user industry. Based on Isotopes Type, the market is divided into Tritium, Strontium, Krypton, Nickel, and Others. Based on Shape, the market is segmented into Rectangular and Cylindrical. Based on the End User Industry, the market is divided into Aerospace, Electronics & Communication, Healthcare, Defense, and Others.

Market Players

Major market players in the Global Betavoltaic Cell Market are Widetronix Inc, Qynergy Corporation, City Labs Inc, BetaBatt Inc, Arkenlight, Direct Kinetic Solutions, and NDB Inc.

Report Scope:

In this report, the Global Betavoltaic Cell Market has been segmented into the following categories, in addition to the industry trends, which have also been detailed below:

Global Betavoltaic Cell Market, By Isotopes Type:

Tritium

Strontium

Krypton

Nickel

Others

Global Betavoltaic Cell Market, By Shape:

Rectangular

Cylindrical

Global Betavoltaic Cell Market, By End User Industry:

Aerospace

Electronics & Communication

Healthcare

Defense

Others

Global Betavoltaic Cell Market, By Region:

Asia-Pacific

North America

Europe

Middle East & Africa

South America

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Betavoltaic Cell Market.

Available Customizations:

Global Betavoltaic Cell market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

Contents

1. PRODUCT OVERVIEW

2. RESEARCH METHODOLOGY

3. IMPACT OF COVID-19 ON THE GLOBAL BETAVOLTAIC CELL MARKET

4. EXECUTIVE SUMMARY

5. VOICE OF CUSTOMERS

5.1. Brand Awareness

5.2. Factors Considered for Choosing Global Betavoltaic Cell Market

5.3. Current Need Gaps in Global Betavoltaic Cell Market

6. GLOBAL BETAVOLTAIC CELL MARKET OUTLOOK

6.1. Market Size & Forecast

6.1.1. By Value

6.2. Market Share & Forecast

6.2.1. By Isotopes Type (Tritium, Strontium, Krypton, Nickel, and Others)

6.2.2. By Shape (Rectangular and Cylindrical)

6.2.3. By End User Industry (Aerospace, Electronics & Communication, Healthcare, Defense and Others)

6.2.4. By Region

6.2.5. By Company (2022)

6.3. Market Map

7. ASIA-PACIFIC BETAVOLTAIC CELL MARKET OUTLOOK

7.1. Market Size & Forecast

7.1.1. By Value

7.2. Market Share & Forecast

7.2.1. By Isotopes Type

7.2.2. By Shape

7.2.3. By End User Industry

7.2.4. By Country

7.3. Asia-Pacific: Country Analysis

- 7.3.1. China Betavoltaic Cell Market Outlook
 - 7.3.1.1. Market Size & Forecast
 - 7.3.1.1.1. By Value
 - 7.3.1.2. Market Share & Forecast
 - 7.3.1.2.1. By Isotopes Type
 - 7.3.1.2.2. By Shape
 - 7.3.1.2.3. By End User Industry
- 7.3.2. Japan Betavoltaic Cell Market Outlook
 - 7.3.2.1. Market Size & Forecast
 - 7.3.2.1.1. By Value
 - 7.3.2.2. Market Share & Forecast
 - 7.3.2.2.1. By Isotopes Type
 - 7.3.2.2.2. By Shape
 - 7.3.2.2.3. By End User Industry
- 7.3.3. India Betavoltaic Cell Market Outlook
 - 7.3.3.1. Market Size & Forecast
 - 7.3.3.1.1. By Value
 - 7.3.3.2. Market Share & Forecast
 - 7.3.3.2.1. By Isotopes Type
 - 7.3.3.2.2. By Shape
 - 7.3.3.2.3. By End User Industry
- 7.3.4. South Korea Betavoltaic Cell Market Outlook
 - 7.3.4.1. Market Size & Forecast
 - 7.3.4.1.1. By Value
 - 7.3.4.2. Market Share & Forecast
 - 7.3.4.2.1. By Isotopes Type
 - 7.3.4.2.2. By Shape
 - 7.3.4.2.3. By End User Industry
- 7.3.5. Australia Betavoltaic Cell Market Outlook
 - 7.3.5.1. Market Size & Forecast
 - 7.3.5.1.1. By Value
 - 7.3.5.2. Market Share & Forecast
 - 7.3.5.2.1. By Isotopes Type
 - 7.3.5.2.2. By Shape
 - 7.3.5.2.3. By End User Industry

8. NORTH AMERICA BETAVOLTAIC CELL MARKET OUTLOOK

8.1. Market Size & Forecast

- 8.1.1. By Value
- 8.2. Market Share & Forecast
 - 8.2.1. By Isotopes Type
 - 8.2.2. By Shape
 - 8.2.3. By End User Industry
 - 8.2.4. By Country
- 8.3. North America: Country Analysis
 - 8.3.1. United States Betavoltaic Cell Market Outlook
 - 8.3.1.1. Market Size & Forecast
 - 8.3.1.1.1. By Value
 - 8.3.1.2. Market Share & Forecast
 - 8.3.1.2.1. By Isotopes Type
 - 8.3.1.2.2. By Shape
 - 8.3.1.2.3. By End User Industry
 - 8.3.2. Canada Betavoltaic Cell Market Outlook
 - 8.3.2.1. Market Size & Forecast
 - 8.3.2.1.1. By Value
 - 8.3.2.2. Market Share & Forecast
 - 8.3.2.2.1. By Isotopes Type
 - 8.3.2.2.2. By Shape
 - 8.3.2.2.3. By End User Industry
 - 8.3.3. Mexico Betavoltaic Cell Market Outlook
 - 8.3.3.1. Market Size & Forecast
 - 8.3.3.1.1. By Value
 - 8.3.3.2. Market Share & Forecast
 - 8.3.3.2.1. By Isotopes Type
 - 8.3.3.2.2. By Shape
 - 8.3.3.2.3. By End User Industry

9. EUROPE BETAVOLTAIC CELL MARKET OUTLOOK

- 9.1. Market Size & Forecast
 - 9.1.1. By Value
- 9.2. Market Share & Forecast
 - 9.2.1. By Isotopes Type
 - 9.2.2. By Shape
 - 9.2.3. By End User Industry
 - 9.2.4. By Country
- 9.3. Europe: Country Analysis

- 9.3.1. Germany Betavoltaic Cell Market Outlook
 - 9.3.1.1. Market Size & Forecast
 - 9.3.1.1.1. By Value
 - 9.3.1.2. Market Share & Forecast
 - 9.3.1.2.1. By Isotopes Type
 - 9.3.1.2.2. By Shape
 - 9.3.1.2.3. By End User Industry
- 9.3.2. United Kingdom Betavoltaic Cell Market Outlook
 - 9.3.2.1. Market Size & Forecast
 - 9.3.2.1.1. By Value
 - 9.3.2.2. Market Share & Forecast
 - 9.3.2.2.1. By Isotopes Type
 - 9.3.2.2.2. By Shape
 - 9.3.2.2.3. By End User Industry
- 9.3.3. France Betavoltaic Cell Market Outlook
 - 9.3.3.1. Market Size & Forecast
 - 9.3.3.1.1. By Value
 - 9.3.3.2. Market Share & Forecast
 - 9.3.3.2.1. By Isotopes Type
 - 9.3.3.2.2. By Shape
 - 9.3.3.2.3. By End User Industry
- 9.3.4. Spain Betavoltaic Cell Market Outlook
 - 9.3.4.1. Market Size & Forecast
 - 9.3.4.1.1. By Value
 - 9.3.4.2. Market Share & Forecast
 - 9.3.4.2.1. By Isotopes Type
 - 9.3.4.2.2. By Shape
 - 9.3.4.2.3. By End User Industry
- 9.3.5. Italy Betavoltaic Cell Market Outlook
 - 9.3.5.1. Market Size & Forecast
 - 9.3.5.1.1. By Value
 - 9.3.5.2. Market Share & Forecast
 - 9.3.5.2.1. By Isotopes Type
 - 9.3.5.2.2. By Shape
 - 9.3.5.2.3. By End User Industry

10. MIDDLE EAST & AFRICA BETAVOLTAIC CELL MARKET OUTLOOK

10.1. Market Size & Forecast

- 10.1.1. By Value
- 10.2. Market Share & Forecast
 - 10.2.1. By Isotopes Type
 - 10.2.2. By Shape
 - 10.2.3. By End User Industry
 - 10.2.4. By Country
- 10.3. Middle East & Africa: Country Analysis
 - 10.3.1. Saudi Arabia Betavoltaic Cell Market Outlook
 - 10.3.1.1. Market Size & Forecast
 - 10.3.1.1.1. By Value
 - 10.3.1.2. Market Share & Forecast
 - 10.3.1.2.1. By Isotopes Type
 - 10.3.1.2.2. By Shape
 - 10.3.1.2.3. By End User Industry
 - 10.3.2. UAE Betavoltaic Cell Market Outlook
 - 10.3.2.1. Market Size & Forecast
 - 10.3.2.1.1. By Value
 - 10.3.2.2. Market Share & Forecast
 - 10.3.2.2.1. By Isotopes Type
 - 10.3.2.2.2. By Shape
 - 10.3.2.2.3. By End User Industry
 - 10.3.3. South Africa Betavoltaic Cell Market Outlook
 - 10.3.3.1. Market Size & Forecast
 - 10.3.3.1.1. By Value
 - 10.3.3.2. Market Share & Forecast
 - 10.3.3.2.1. By Isotopes Type
 - 10.3.3.2.2. By Shape
 - 10.3.3.2.3. By End User Industry

11. SOUTH AMERICA BETAVOLTAIC CELL MARKET OUTLOOK

- 11.1. Market Size & Forecast
 - 11.1.1. By Value
- 11.2. Market Share & Forecast
 - 11.2.1. By Isotopes Type
 - 11.2.2. By Shape
 - 11.2.3. By End User Industry
 - 11.2.4. By Country
- 11.3. South America: Country Analysis

- 11.3.1. Brazil Betavoltaic Cell Market Outlook
 - 11.3.1.1. Market Size & Forecast
 - 11.3.1.1.1. By Value
 - 11.3.1.2. Market Share & Forecast
 - 11.3.1.2.1. By Isotopes Type
 - 11.3.1.2.2. By Shape
 - 11.3.1.2.3. By End User Industry
- 11.3.2. Argentina Betavoltaic Cell Market Outlook
 - 11.3.2.1. Market Size & Forecast
 - 11.3.2.1.1. By Value
 - 11.3.2.2. Market Share & Forecast
 - 11.3.2.2.1. By Isotopes Type
 - 11.3.2.2.2. By Shape
 - 11.3.2.2.3. By End User Industry
- 11.3.3. Colombia Betavoltaic Cell Market Outlook
 - 11.3.3.1. Market Size & Forecast
 - 11.3.3.1.1. By Value
 - 11.3.3.2. Market Share & Forecast
 - 11.3.3.2.1. By Isotopes Type
 - 11.3.3.2.2. By Shape
 - 11.3.3.2.3. By End User Industry

12. MARKET DYNAMICS

12.1. Drivers

- 12.1.1. High Demand for Alternative Power Supply
- 12.1.2. Compact and Small Size of the Cells
- 12.1.3. Increasing Investments in the Space Industry

12.2. Challenges

- 12.2.1. High Costs, Limited Availability and Regulatory Concerns
- 12.2.2. Shortage of raw material
- 12.2.3. Disruption in the supply chain

13. MARKET TRENDS & DEVELOPMENTS

- 13.1. Increasing Conversion Efficiency of Betavoltaic Cells
- 13.2. Increasing use in the space industry
- 13.3. Increasing investment by various governments across the globe in R&D Activities
- 13.4. Technological Advancement

13.5. Government Initiatives

14. POLICY & REGULATORY LANDSCAPE

15. COMPANY PROFILES

15.1. Widetronix Inc

- 15.1.1. Business Overview
- 15.1.2. Key Revenue and Financials (If Available)
- 15.1.3. Recent Developments
- 15.1.4. Key Personnel
- 15.1.5. Key Product/Services

15.2. Qynergy Corporation

- 15.2.1. Business Overview
- 15.2.2. Key Revenue and Financials (If Available)
- 15.2.3. Recent Developments
- 15.2.4. Key Personnel
- 15.2.5. Key Product/Services

15.3. City Labs Inc

- 15.3.1. Business Overview
- 15.3.2. Key Revenue and Financials (If Available)
- 15.3.3. Recent Developments
- 15.3.4. Key Personnel
- 15.3.5. Key Product/Service

15.4. BetaBatt Inc

- 15.4.1. Business Overview
- 15.4.2. Key Revenue and Financials (If Available)
- 15.4.3. Recent Developments
- 15.4.4. Key Personnel
- 15.4.5. Key Product/Service

15.5. Arkenlight

- 15.5.1. Business Overview
- 15.5.2. Key Revenue and Financials (If Available)
- 15.5.3. Recent Developments
- 15.5.4. Key Personnel
- 15.5.5. Key Product/Services

15.6. Direct Kinetic Solutions

- 15.6.1. Business Overview
- 15.6.2. Key Revenue and Financials (If Available)

15.6.3. Recent Developments

15.6.4. Key Personnel

15.6.5. Key Product/Services

15.7. NDB Inc

15.7.1. Business Overview

15.7.2. Key Revenue and Financials (If Available)

15.7.3. Recent Developments

15.7.4. Key Personnel

15.7.5. Key Product/Services

16. STRATEGIC RECOMMENDATIONS

16.1. Key focus on North America Region

16.2. Key focus towards Isotopes Type

17. ABOUT US & DISCLAIMER

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