

# **Tidal Stream and Wave Energy Market Forecasts to 2032 – Global Analysis By Component (Turbines, Generators, Control Systems, Substructures, and Mooring & Anchoring), Deployment, Technology, Application, End User and By Geography**

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## **Abstracts**

According to Statistics MRC, the Global Tidal Stream and Wave Energy Market is accounted for \$1.0 billion in 2025 and is expected to reach \$2.2 billion by 2032 growing at a CAGR of 12.3% during the forecast period. Tidal stream and wave energy refers to the harnessing of ocean movements to generate usable power from natural water dynamics. Tidal stream energy captures the kinetic force of moving tides through underwater turbines, while wave energy converts the rise and fall of surface waves into mechanical or electrical output. Both approaches rely on predictable and renewable ocean forces, offering a consistent and sustainable way to create energy. These methods emphasize the natural rhythm of marine environments to provide long-term solutions.

According to Ocean Energy Systems, this market harnesses the predictable kinetic energy of ocean currents and waves to generate reliable renewable electricity.

Market Dynamics:

Driver:

Increasing shift to renewable sources

The global energy sector is undergoing a decisive transition toward sustainable power, with tidal stream and wave energy emerging as reliable alternatives to fossil fuels.

Spurred by mounting concerns over carbon emissions and climate change, governments are actively supporting renewable integration into national grids. This transition enhances the commercial viability of ocean-based power projects. Moreover, the consistent availability of marine resources ensures stable energy generation, further accelerating industry adoption. Consequently, the renewable shift remains a central driver shaping market expansion.

Restraint:

High installation and maintenance costs

Despite promising growth, the tidal stream and wave energy market faces notable financial barriers due to expensive installation and upkeep. Offshore construction requires specialized equipment, subsea cabling, and corrosion-resistant infrastructure, all of which elevate initial capital expenditure. Furthermore, maintenance in harsh marine conditions entails complex operations and significant downtime, limiting profitability. Smaller developers struggle with funding access, delaying large-scale commercialization. As a result, the high cost burden remains a primary restraint, restricting widespread deployment and slowing competitive scalability within the sector.

Opportunity:

Advancements in marine energy technologies

Technological innovations are unlocking new pathways for tidal and wave energy development. Enhanced turbine efficiency, advanced materials, and predictive maintenance systems are improving reliability and reducing operational costs. Additionally, digital monitoring solutions and AI-driven performance optimization enable real-time adjustments, maximizing energy output. Collaborative R&D initiatives are fostering pilot projects that validate scalability. These advancements also enhance investor confidence, drawing more capital into the sector. Therefore, continuous technological progress presents a major opportunity to propel commercial adoption and global market growth.

Threat:

Environmental and ecosystem disruption risks

Marine energy projects, while renewable, pose risks to delicate ecosystems, sparking

environmental concerns. Turbine installations may affect fish migration, benthic habitats, and marine biodiversity. Furthermore, underwater noise and electromagnetic fields can disturb aquatic species, leading to stricter regulatory scrutiny. Opposition from conservation groups and local communities often delays project approvals. Such ecological uncertainties create reputational and compliance risks for developers. Consequently, ecosystem disruption remains a critical threat, potentially hindering project scalability and challenging the sector's long-term sustainability and acceptance.

#### Covid-19 Impact:

The pandemic temporarily disrupted the tidal stream and wave energy sector, as lockdowns delayed construction, supply chains, and R&D initiatives. Funding was redirected toward immediate economic recovery, limiting capital for experimental marine projects. However, the crisis also reinforced the urgency of clean energy transition, with governments accelerating post-COVID green policies. This renewed emphasis on resilient renewable sources positioned tidal and wave energy as strategic assets. Therefore, while short-term setbacks emerged, the pandemic ultimately reinforced the long-term growth outlook for the market.

The turbines segment is expected to be the largest during the forecast period

The turbines segment is expected to account for the largest market share during the forecast period, owing to its proven reliability and high energy conversion efficiency. Turbine systems capture consistent tidal flows, ensuring steady power output compared to wave converters. Their modular designs also support scalability across diverse geographies. Supported by ongoing innovations in materials and blade designs, turbines demonstrate cost competitiveness over time. Consequently, this segment is expected to account for the largest market share, driving industry commercialization.

The onshore segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the onshore segment is predicted to witness the highest growth rate, propelled by cost advantages and ease of installation. Onshore wave energy converters and tidal systems benefit from lower infrastructure demands compared to offshore projects, reducing capital intensity. Additionally, proximity to coastal grids facilitates faster integration of generated power. Governments and private developers are increasingly focusing on near-shore pilot projects to de-risk operations. Consequently, onshore solutions are predicted to witness rapid adoption, driving significant market acceleration globally.

### Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share, attributed to abundant coastal resources and strong government support. Nations like China, Japan, and South Korea are leading investments in ocean energy research and demonstration projects. Expanding electricity demand and renewable integration policies further support regional adoption. Additionally, public-private collaborations are fostering infrastructure development. Collectively, these factors strengthen Asia Pacific's position as the dominant hub for marine energy.

### Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR associated with favorable regulatory incentives and accelerating R&D activities. The United States and Canada are leveraging robust coastal zones and supportive funding frameworks to advance marine pilot projects. Technological startups and collaborations with universities are fueling innovation, reducing system inefficiencies. Furthermore, sustainability-focused investors are channeling capital into emerging ocean energy solutions. Consequently, North America's growth momentum is expected to outpace global peers.

### Key players in the market

Some of the key players in Tidal Stream and Wave Energy Market include Ocean Power Technologies, Carnegie Clean Energy, Seabased, CorPower Ocean, EHL Azura, AW-Energy, Wave Swell Energy, OceanEnergy, Eco Wave Power, Orbital Marine Power, Sinn Power, Verdant Power, Marine Power Systems, Minesto, Tocado, and Atlantis Resources

### Key Developments:

In July 2025, Orbital Marine Power announced the successful deployment and grid-connection of its new 4MW 'O2-X' tidal turbine at the European Marine Energy Centre (EMEC) in Orkney, Scotland. This next-generation platform features a simplified mooring system and improved rotor blades, designed to significantly reduce the levelized cost of energy (LCOE) for tidal stream projects.

In July 2025, CorPower Ocean completed the first phase of its commercial-scale pilot

farm in Portugal. The project, featuring four of its C4 wave energy converters, successfully withstood a major Atlantic storm, validating the company's storm-protection technology and proving the durability of its hull and hydraulic power take-off system in extreme conditions.

In June 2025, a partnership between Minesto and Atlantis Resources was formed to co-develop a hybrid tidal and ocean thermal energy conversion (OTEC) platform. The project aims to create a multi-technology marine energy hub, leveraging Minesto's 'Deep Green' kite technology for tidal streams and Atlantis's expertise in large-scale project development to provide a more consistent and reliable power output.

#### Components Covered:

Turbines

Generators

Control Systems

Substructures

Mooring & Anchoring

#### Deployments Covered:

Onshore

Offshore

#### Technologies Covered:

Tidal Stream

Oscillating Water Column

Overtopping Devices

Point Absorbers

Attenuators

Hybrid Systems

Applications Covered:

Power Generation

Desalination

Marine Operations Support

Island Electrification

Coastal Protection

End Users Covered:

Utilities

Independent Power Producers

Government Projects

Remote Communities

Industrial Users

Naval Installations

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2024, 2025, 2026, 2028, and 2032
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

#### Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

#### Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

## Contents

### **1 EXECUTIVE SUMMARY**

### **2 PREFACE**

- 2.1 Abstract
- 2.2 Stake Holders
- 2.3 Research Scope
- 2.4 Research Methodology
  - 2.4.1 Data Mining
  - 2.4.2 Data Analysis
  - 2.4.3 Data Validation
  - 2.4.4 Research Approach
- 2.5 Research Sources
  - 2.5.1 Primary Research Sources
  - 2.5.2 Secondary Research Sources
  - 2.5.3 Assumptions

### **3 MARKET TREND ANALYSIS**

- 3.1 Introduction
- 3.2 Drivers
- 3.3 Restraints
- 3.4 Opportunities
- 3.5 Threats
- 3.6 Technology Analysis
- 3.7 Application Analysis
- 3.8 End User Analysis
- 3.9 Emerging Markets
- 3.10 Impact of Covid-19

### **4 PORTERS FIVE FORCE ANALYSIS**

- 4.1 Bargaining power of suppliers
- 4.2 Bargaining power of buyers
- 4.3 Threat of substitutes
- 4.4 Threat of new entrants
- 4.5 Competitive rivalry

## **5 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY COMPONENT**

- 5.1 Introduction
- 5.2 Turbines
- 5.3 Generators
- 5.4 Control Systems
- 5.5 Substructures
- 5.6 Mooring & Anchoring

## **6 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY DEPLOYMENT**

- 6.1 Introduction
- 6.2 Onshore
- 6.3 Offshore

## **7 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY TECHNOLOGY**

- 7.1 Introduction
- 7.2 Tidal Stream
- 7.3 Oscillating Water Column
- 7.4 Overtopping Devices
- 7.5 Point Absorbers
- 7.6 Attenuators
- 7.7 Hybrid Systems

## **8 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY APPLICATION**

- 8.1 Introduction
- 8.2 Power Generation
- 8.3 Desalination
- 8.4 Marine Operations Support
- 8.5 Island Electrification
- 8.6 Coastal Protection

## **9 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY END USER**

- 9.1 Introduction
- 9.2 Utilities

- 9.3 Independent Power Producers
- 9.4 Government Projects
- 9.5 Remote Communities
- 9.6 Industrial Users
- 9.7 Naval Installations

## **10 GLOBAL TIDAL STREAM AND WAVE ENERGY MARKET, BY GEOGRAPHY**

- 10.1 Introduction
- 10.2 North America
  - 10.2.1 US
  - 10.2.2 Canada
  - 10.2.3 Mexico
- 10.3 Europe
  - 10.3.1 Germany
  - 10.3.2 UK
  - 10.3.3 Italy
  - 10.3.4 France
  - 10.3.5 Spain
  - 10.3.6 Rest of Europe
- 10.4 Asia Pacific
  - 10.4.1 Japan
  - 10.4.2 China
  - 10.4.3 India
  - 10.4.4 Australia
  - 10.4.5 New Zealand
  - 10.4.6 South Korea
  - 10.4.7 Rest of Asia Pacific
- 10.5 South America
  - 10.5.1 Argentina
  - 10.5.2 Brazil
  - 10.5.3 Chile
  - 10.5.4 Rest of South America
- 10.6 Middle East & Africa
  - 10.6.1 Saudi Arabia
  - 10.6.2 UAE
  - 10.6.3 Qatar
  - 10.6.4 South Africa
  - 10.6.5 Rest of Middle East & Africa

## **11 KEY DEVELOPMENTS**

- 11.1 Agreements, Partnerships, Collaborations and Joint Ventures
- 11.2 Acquisitions & Mergers
- 11.3 New Product Launch
- 11.4 Expansions
- 11.5 Other Key Strategies

## **12 COMPANY PROFILING**

- 12.1 Ocean Power Technologies
- 12.2 Carnegie Clean Energy
- 12.3 Seabased
- 12.4 CorPower Ocean
- 12.5 EHL Azura
- 12.6 AW-Energy
- 12.7 Wave Swell Energy
- 12.8 OceanEnergy
- 12.9 Eco Wave Power
- 12.10 Orbital Marine Power
- 12.11 Sinn Power
- 12.12 Verdant Power
- 12.13 Marine Power Systems
- 12.14 Minesto
- 12.15 Tocardo
- 12.16 Atlantis Resources

## List Of Tables

### LIST OF TABLES

Table 1 Global Tidal Stream and Wave Energy Market Outlook, By Region (2024-2032) (\$MN)

Table 2 Global Tidal Stream and Wave Energy Market Outlook, By Component (2024-2032) (\$MN)

Table 3 Global Tidal Stream and Wave Energy Market Outlook, By Turbines (2024-2032) (\$MN)

Table 4 Global Tidal Stream and Wave Energy Market Outlook, By Generators (2024-2032) (\$MN)

Table 5 Global Tidal Stream and Wave Energy Market Outlook, By Control Systems (2024-2032) (\$MN)

Table 6 Global Tidal Stream and Wave Energy Market Outlook, By Substructures (2024-2032) (\$MN)

Table 7 Global Tidal Stream and Wave Energy Market Outlook, By Mooring & Anchoring (2024-2032) (\$MN)

Table 8 Global Tidal Stream and Wave Energy Market Outlook, By Deployment (2024-2032) (\$MN)

Table 9 Global Tidal Stream and Wave Energy Market Outlook, By Onshore (2024-2032) (\$MN)

Table 10 Global Tidal Stream and Wave Energy Market Outlook, By Offshore (2024-2032) (\$MN)

Table 11 Global Tidal Stream and Wave Energy Market Outlook, By Technology (2024-2032) (\$MN)

Table 12 Global Tidal Stream and Wave Energy Market Outlook, By Tidal Stream (2024-2032) (\$MN)

Table 13 Global Tidal Stream and Wave Energy Market Outlook, By Oscillating Water Column (2024-2032) (\$MN)

Table 14 Global Tidal Stream and Wave Energy Market Outlook, By Overtopping Devices (2024-2032) (\$MN)

Table 15 Global Tidal Stream and Wave Energy Market Outlook, By Point Absorbers (2024-2032) (\$MN)

Table 16 Global Tidal Stream and Wave Energy Market Outlook, By Attenuators (2024-2032) (\$MN)

Table 17 Global Tidal Stream and Wave Energy Market Outlook, By Hybrid Systems (2024-2032) (\$MN)

Table 18 Global Tidal Stream and Wave Energy Market Outlook, By Application

(2024-2032) (\$MN)

Table 19 Global Tidal Stream and Wave Energy Market Outlook, By Power Generation (2024-2032) (\$MN)

Table 20 Global Tidal Stream and Wave Energy Market Outlook, By Desalination (2024-2032) (\$MN)

Table 21 Global Tidal Stream and Wave Energy Market Outlook, By Marine Operations Support (2024-2032) (\$MN)

Table 22 Global Tidal Stream and Wave Energy Market Outlook, By Island Electrification (2024-2032) (\$MN)

Table 23 Global Tidal Stream and Wave Energy Market Outlook, By Coastal Protection (2024-2032) (\$MN)

Table 24 Global Tidal Stream and Wave Energy Market Outlook, By End User (2024-2032) (\$MN)

Table 25 Global Tidal Stream and Wave Energy Market Outlook, By Utilities (2024-2032) (\$MN)

Table 26 Global Tidal Stream and Wave Energy Market Outlook, By Independent Power Producers (2024-2032) (\$MN)

Table 27 Global Tidal Stream and Wave Energy Market Outlook, By Government Projects (2024-2032) (\$MN)

Table 28 Global Tidal Stream and Wave Energy Market Outlook, By Remote Communities (2024-2032) (\$MN)

Table 29 Global Tidal Stream and Wave Energy Market Outlook, By Industrial Users (2024-2032) (\$MN)

Table 30 Global Tidal Stream and Wave Energy Market Outlook, By Naval Installations (2024-2032) (\$MN)

Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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