

# **Energy-efficient Desalination Market – Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Technology (Reverse Osmosis, Electrodialysis, Nanofiltration, Ultrafiltration, Multi-Stage Flash Distillation, Multi-Effect Distillation), By Energy Source (Renewable Energy, Conventional Energy, Hybrid Systems), By End-Use Industry (Municipal, Industrial, Military & Defense, Construction, Others), By Region & Competition, 2020-2030F**

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## **Abstracts**

### **Market Overview**

The Global Energy-efficient Desalination Market was valued at USD 4.87 billion in 2024 and is projected to reach USD 8.36 billion by 2030, growing at a CAGR of 9.27% during the forecast period. The market is expanding rapidly as the need for sustainable water treatment intensifies due to increasing freshwater scarcity worldwide. Traditional desalination processes are energy-intensive, prompting a shift toward more energy-efficient technologies that reduce operational costs and environmental impact. Regions facing water stress—particularly in arid and semi-arid areas—are investing in advanced desalination systems powered by renewable energy sources such as solar and wind. Innovations in energy recovery, membrane efficiency, and modular designs are enhancing system performance and affordability. Government support, coupled with private sector initiatives, is accelerating the adoption of energy-efficient desalination as a viable solution for long-term water security.

## Key Market Drivers

### Increasing Global Water Scarcity and Demand for Freshwater

Intensifying global freshwater shortages, driven by population growth, climate change, and urbanization, are a primary driver of the energy-efficient desalination market. As over 2 billion people live in water-stressed regions, demand for alternative water sources is escalating. Desalination offers a dependable solution, especially in areas like the Middle East, North Africa, and parts of Asia-Pacific and North America. Energy-efficient systems are increasingly preferred for their ability to minimize energy costs associated with traditional desalination, which can reach up to 25 kWh per cubic meter. Advanced technologies such as energy recovery devices improve cost-effectiveness and sustainability, aligning with global environmental goals and supporting the broader adoption of desalination systems.

## Key Market Challenges

### High Initial Capital Investment

A major challenge in the energy-efficient desalination market is the significant upfront investment required to construct and deploy advanced systems. Compared to conventional water treatment facilities, energy-efficient desalination plants incorporate complex components such as high-performance membranes, recovery devices, and renewable energy integration, driving up capital costs by 20–30%. These financial barriers are especially restrictive for developing nations and smaller municipalities. Lengthy planning and permitting processes further increase risk, deterring investment despite long-term operational savings. Limited access to financing options remains a hurdle, though public-private partnerships and government incentives are helping address the issue in select markets.

## Key Market Trends

### Adoption of Advanced Membrane Technologies

Technological innovation in membrane materials and configurations is a key trend reshaping the energy-efficient desalination market. Advanced membranes, including thin-film composites and graphene-based types, are offering greater salt rejection, higher water flux, and improved resistance to fouling. These improvements enable

plants to operate at lower pressures, cutting energy consumption and maintenance costs. Enhanced coatings and anti-fouling treatments are also reducing operational disruptions and extending membrane life. Furthermore, real-time monitoring and automated cleaning systems are being deployed to optimize membrane performance. The modular nature of membrane units supports scalability, making desalination more accessible for mid-sized industries and decentralized water systems.

### **Key Market Players**

Veolia Water Technologies

SUEZ Water Technologies & Solutions

Fluence Corporation

Aquatech International

Aqualyng

Ampac USA

Pure Aqua Inc.

Solar Water Solutions

Osmoflo

Genesis Water Technologies

### **Report Scope:**

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

Energy-efficient Desalination Market, By Technology:

Reverse Osmosis

Electrodialysis

Nanofiltration

Ultrafiltration

Multi-Stage Flash Distillation

Multi-Effect Distillation

Energy-efficient Desalination Market, By Energy Source:

Renewable Energy

Conventional Energy

Hybrid Systems

Energy-efficient Desalination Market, By End-Use Industry:

Municipal

Industrial

Military & Defense

Construction

Others

Energy-efficient Desalination Market, By Region:

North America

United States

Canada

Mexico

Europe

Germany

France

United Kingdom

Italy

Spain

South America

Brazil

Argentina

Colombia

Asia-Pacific

China

India

Japan

South Korea

Australia

Middle East & Africa

Saudi Arabia

UAE

## South Africa

### **Competitive Landscape**

Company Profiles: Detailed analysis of the major companies presents in the Global Energy-efficient Desalination Market.

### **Available Customizations:**

Global Energy-efficient Desalination Market report with the given market data, TechSci 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).

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