

# Hydrogen Turbine Market Forecasts to 2034 – Global Analysis By Turbine Type (Turbojet, Turbofan, Turboprop, and Turboshaft), Design Type (Heavy-duty Gas Turbines, and Aero-derivative Gas Turbines), Capacity, Hydrogen Fuel Composition, Application, End User, Distribution Channel, and By Geography

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## Abstracts

According to Statistics MRC, the Global Hydrogen Turbine Market is accounted for \$1.5 billion in 2026 and is expected to reach \$11.6 billion by 2034 growing at a CAGR of 29.2% during the forecast period. Hydrogen turbines are advanced power generation systems designed to operate on hydrogen or hydrogen-natural gas blends, enabling low-carbon electricity production. These turbines leverage existing gas turbine infrastructure while supporting the global transition toward decarbonized energy. Applications span utility-scale power plants, industrial cogeneration, and aviation propulsion. The market is propelled by net-zero commitments, hydrogen infrastructure investments, and the need for flexible, dispatchable clean power.

### Market Dynamics:

#### Driver:

Global decarbonization targets and net-zero commitments

Governments and corporations worldwide are establishing aggressive carbon neutrality goals, directly accelerating hydrogen turbine adoption. Hydrogen turbines offer a viable pathway to decarbonize power generation and hard-to-abate industrial sectors without requiring complete infrastructure overhauls. Existing gas turbine fleets can be retrofitted

to burn hydrogen blends, reducing stranded asset risks. Policy incentives, carbon pricing mechanisms, and green hydrogen subsidies further strengthen the business case. This alignment between policy ambition and technological readiness positions hydrogen turbines as a cornerstone of the evolving clean energy landscape.

**Restraint:**

High production cost of green hydrogen

The economic viability of hydrogen turbines remains constrained by the high cost of producing low-carbon hydrogen, particularly electrolytic green hydrogen. Current production costs significantly exceed those of natural gas, limiting fuel affordability for power generators. Supply chain immaturity, limited electrolyzer manufacturing capacity, and high renewable electricity input costs contribute to the price gap. Without substantial cost reductions or sustained policy support, utilities may delay turbine conversions or hydrogen-only operations, slowing market penetration despite growing environmental commitments.

**Opportunity:**

Retrofitting existing natural gas turbine fleets

A substantial opportunity lies in retrofitting thousands of installed natural gas turbines to operate on hydrogen blends or pure hydrogen. This approach extends asset life, avoids stranded investments, and enables incremental decarbonization with lower upfront capital than new builds. Original equipment manufacturers are developing retrofit packages and burner upgrades compatible with increasing hydrogen concentrations. As hydrogen supply scales up, fleet owners can progressively transition, aligning investment cycles with fuel availability. This retrofit pathway significantly expands the addressable market while accelerating near-term deployment.

**Threat:**

Competition from alternative low-carbon technologies

Hydrogen turbines face intensifying competition from other clean power solutions, including battery storage, advanced nuclear, and grid-scale renewable installations paired with storage. Solar and wind costs continue declining, while battery durations extend, potentially reducing the need for dispatchable hydrogen generation.

Furthermore, fuel cells offer higher efficiency for certain distributed applications. If competing technologies achieve faster cost reductions or regulatory advantages, hydrogen turbines may capture a smaller share of the decarbonized power market, limiting long-term growth expectations.

### **Covid-19 Impact:**

The pandemic temporarily disrupted hydrogen turbine projects through supply chain delays, labor shortages, and postponed investment decisions. However, the crisis reinforced strategic focus on energy resilience and clean recovery stimulus packages. Governments incorporated hydrogen infrastructure funding into post-pandemic economic recovery plans, accelerating pilot projects and demonstration facilities. Supply chain diversification efforts initiated during the pandemic improved component availability. Overall, Covid-19 acted as a catalyst for policy support, offsetting short-term deployment delays and strengthening long-term market fundamentals.

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

The Turbofan segment is expected to account for the largest market share during the forecast period, driven by aviation industry demand for lower-emission propulsion systems. Turbofan engines dominate commercial and military aviation, making them the primary focus for hydrogen combustion research and retrofit development. Major aerospace manufacturers are investing heavily in hydrogen turbofan prototypes to meet decarbonization timelines. The segment benefits from established manufacturing infrastructure and regulatory momentum supporting sustainable aviation fuels and hydrogen propulsion pathways.

The Aero-derivative gas turbines segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the Aero-derivative gas turbines segment is predicted to witness the highest growth rate, fueled by their operational flexibility, rapid startup capabilities, and suitability for hydrogen blending. Derived from aircraft engine technology, these turbines excel in grid balancing, peaking power, and industrial applications requiring frequent load changes. Their compact footprint and lower capital cost compared to heavy-duty turbines appeal to developers seeking hydrogen-ready distributed generation. As renewable penetration increases, demand for flexible, low-carbon balancing assets will accelerate adoption.

### **Region with largest share:**

During the forecast period, the North America region is expected to hold the largest market share, underpinned by strong policy incentives, extensive natural gas infrastructure suitable for hydrogen blending, and active utility decarbonization programs. The United States has launched multiple hydrogen hubs funded through federal infrastructure legislation, accelerating turbine demonstration projects. Canada's hydrogen strategy complements cross-border supply chain development. Major turbine manufacturers headquartered in the region drive technology innovation, while early-mover utilities are committing to hydrogen co-firing and full hydrogen conversion pilots.

### **Region with highest CAGR:**

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR, led by Japan, South Korea, and China's aggressive hydrogen economy roadmaps. These countries are investing heavily in hydrogen production, import infrastructure, and power generation demonstration projects. Japan and South Korea aim to commercialize hydrogen turbines for utility-scale power, supported by government subsidies and public-private partnerships. Rapid industrialization, coal-to-gas transitions, and energy security concerns further drive adoption. The region's manufacturing capacity and commitment to hydrogen leadership ensure sustained growth.

### **Key players in the market**

Some of the key players in Hydrogen Turbine Market include Siemens Energy, GE Vernova, Mitsubishi Heavy Industries, Ansaldo Energia, Kawasaki Heavy Industries, MAN Energy Solutions, Baker Hughes, Solar Turbines, Rolls-Royce Holdings, Doosan Enerbility, Capstone Green Energy, OPRA Turbines, Bharat Heavy Electricals, Shanghai Electric Group, and IHI Corporation.

### **Key Developments:**

In February 2026, Siemens Energy announced an investment of \$1 billion in the United States aimed at expanding manufacturing capacity and creating highly skilled jobs to support the growing demand for clean energy infrastructure.

In January 2026, Mitsubishi Power secured a significant gas turbine order for Qatar's

Facility E IWPP project, featuring turbines designed with high hydrogen-blending capabilities.

In July 2025, GE Vernova and IHI Corporation completed the construction of a large-scale combustion test facility in Japan to accelerate the development of turbines capable of operating on 100% ammonia/hydrogen.

#### Turbine Types Covered:

Turbojet

Turbofan

Turboprop

Turboshaft

#### Design Types Covered:

Heavy-duty gas turbines

Aero-derivative gas turbines

#### Capacities Covered:

Less than 60 MW

60–150 MW

150–300 MW

300–400 MW

Above 400 MW

#### Hydrogen Fuel Compositions Covered:

Up to 20% hydrogen blending

20% to 60% hydrogen blending

60% to 100% hydrogen

#### Applications Covered:

Power generation

Oil & gas

Steel and heavy industries

Aerospace & defense

Refineries and petrochemical

Marine and transportation

Other Applications

#### End Users Covered:

Utilities

Industrial sector

Energy & power companies

Aerospace sector

Marine sector

#### Distribution Channels Covered:

Direct sales

Indirect sales

## Regions Covered:

### North America

United States

Canada

Mexico

### Europe

United Kingdom

Germany

France

Italy

Spain

Netherlands

Belgium

Sweden

Switzerland

Poland

Rest of Europe

## Asia Pacific

China

Japan

India

South Korea

Australia

Indonesia

Thailand

Malaysia

Singapore

Vietnam

Rest of Asia Pacific

## South America

Brazil

Argentina

Colombia

Chile

Peru

Rest of South America

## Rest of the World (RoW)

## Middle East

Saudi Arabia

United Arab Emirates

Qatar

Israel

Rest of Middle East

## Africa

South Africa

Egypt

Morocco

Rest of 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 2023, 2024, 2025, 2026, 2027, 2028, 2030, 2032 and 2034

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

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