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ORC Waste Heat to Power Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented, By Size (Small, Medium), By Application (Petroleum Refining, Cement Industry, Heavy Metal Production, Chemical Industry), By Product (Steam Rankine Cycle, Organic Rankine Cycle, Kalina Cycle), By Capacity (Less Than 1000 KW, 1001-4000 KW), By Region & Competition, 2020-2030F

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Abstracts

Market Overview

The Global ORC Waste Heat to Power Market was valued at USD 24.81 billion in 2024 and is projected to reach USD 51.21 billion by 2030, growing at a CAGR of 12.67% during the forecast period. This market involves the development and deployment of Organic Rankine Cycle (ORC) systems, which transform low-to-medium temperature waste heat into electrical power using organic working fluids with low boiling points. These systems are particularly effective for capturing residual heat from industrial operations, power plants, and engines—heat that would otherwise be lost—contributing to higher energy efficiency and reduced emissions. ORC systems are widely adopted across sectors such as cement, steel, oil & gas, automotive, and renewable energy. The market includes critical components like turbines, evaporators, condensers, and heat exchangers, supported by both specialized manufacturers and engineering firms. Key factors fueling market growth include industrial expansion, stricter environmental mandates, rising energy costs, and a global push for cleaner and more efficient energy solutions. These systems are gaining prominence as industries seek to optimize resource use and align with sustainability goals.

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Key Market Drivers

Increasing Demand for Energy Efficiency and Waste Heat Recovery Solutions

The growing emphasis on improving energy efficiency and sustainable operations is a major driver of the ORC waste heat to power market. A wide range of industries—including oil & gas, chemicals, manufacturing, and energy production—are under increasing pressure to cut energy use and reduce emissions. ORC technology offers an effective means to harness and convert low-grade waste heat from industrial processes into usable electricity. Unlike conventional systems, ORC units use organic fluids with lower boiling points, enabling them to recover energy from heat sources that steam-based turbines cannot efficiently utilize. As companies seek to meet regulatory requirements and reduce operational expenses, the implementation of ORC systems has become a strategic energy recovery solution across industrial facilities.

Key Market Challenges

High Initial Capital Investment and Economic Viability

The high upfront costs associated with the deployment of ORC systems present a significant challenge to broader market adoption, particularly among small and mid-sized enterprises. These systems require investment in specialized components like turbines, heat exchangers, and organic fluids, along with custom engineering for integration into existing operations. The financial burden is intensified by the complexity and cost of retrofitting existing infrastructure, leading to extended project timelines and increased implementation costs. Moreover, fluctuating energy prices and modest efficiency gains in some low-temperature applications can prolong the return on investment, limiting appeal. In many regions, the absence of consistent financial incentives or regulatory clarity further undermines the commercial viability of ORC projects, making it difficult for businesses to justify the expenditure without substantial policy support.

Key Market Trends

Increasing Adoption of Renewable and Waste Heat Recovery Technologies in Industrial Sectors Driving ORC Market Growth

A growing commitment to sustainability and emission reduction across industrial sectors

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is significantly propelling the adoption of ORC-based waste heat recovery technologies. Industries such as cement, steel, glass, and chemicals produce substantial quantities of low-grade waste heat that often go unused. ORC systems provide an efficient and scalable solution to convert this heat into electrical power, thereby reducing energy waste and environmental impact. Government regulations and incentives promoting renewable energy use and carbon reduction are further accelerating the integration of ORC systems into industrial operations. Their modular and flexible design enables customization for different capacities, making them suitable for a wide spectrum of facilities. Technological advances in working fluids and system configurations are also improving efficiency, reliability, and the economic feasibility of ORC installations, enhancing their attractiveness across both mature and emerging markets.

Key Market Players

Ormat Technologies, Inc.

Mitsubishi Heavy Industries Group

General Electric Company

Exergy S.p.A.

ElectraTherm, Inc.

Tennessee Valley Authority (TVA)

Siemens AG

Enogia SAS

Sundyne, LLC

Kalex Valves Pvt. Ltd.

Report Scope:

In this report, the Global ORC Waste Heat to Power Market has been segmented into the following categories, in addition to the industry trends which have also been detailed

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below:

ORC Waste Heat to Power Market, By Size:

Small

Medium

ORC Waste Heat to Power Market, By Application:

Petroleum Refining

Cement Industry

Heavy Metal Production

Chemical Industry

ORC Waste Heat to Power Market, By Product:

Steam Rankine Cycle

Organic Rankine Cycle

Kalina Cycle

ORC Waste Heat to Power Market, By Capacity:

Less Than 1000 KW

1001-4000 KW

ORC Waste Heat to Power Market, By Region:

North America

United States

Canada

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- Mexico

Europe

- France
- United Kingdom
- Italy
- Germany
- Spain

Asia-Pacific

- China
- India
- Japan
- Australia
- South Korea

South America

- Brazil
- Argentina
- Colombia

Middle East & Africa

- South Africa

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Saudi Arabia

UAE

Kuwait

Turkey

Competitive Landscape

Company Profiles: Detailed analysis of the major companies presents in the Global ORC Waste Heat to Power Market.

Available Customizations:

Global ORC Waste Heat to Power 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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