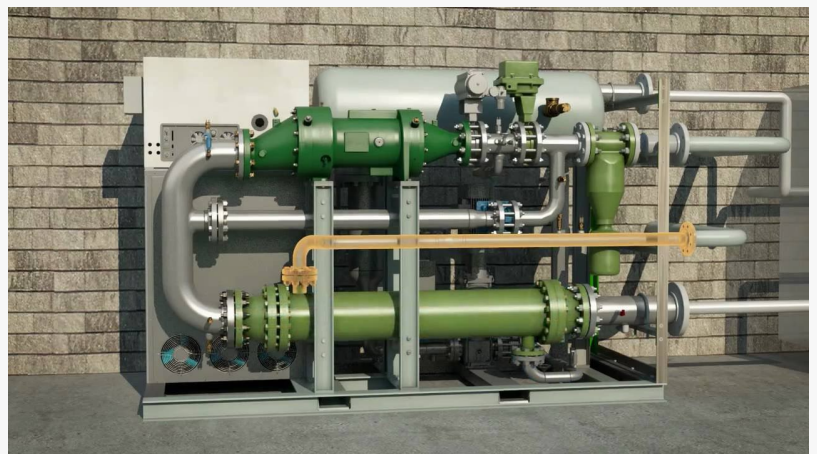


Organic Rankine Cycle (ORC) Waste Heat to Power Market to grow at CAGR of 11.8 % By 2031 | DataM Intelligence

Organic Rankine Cycle (ORC) Waste Heat to Power Market is driven by rising industrial decarbonization, energy efficiency initiatives, and policy support.

NEW YORK, NY, UNITED STATES, August 22, 2025 /EINPresswire.com/ -- The global [Organic Rankine Cycle \(ORC\) waste heat to power market](#) is projected to grow at a robust CAGR of 11.8% from 2024 to 2031. ORC technology utilizes waste heat produced by industrial processes such as petroleum refining, metal processing, and marine engines using organic fluids as the working medium to generate electricity. By harnessing low- to medium-temperature waste heat, the ORC process helps industries reduce energy consumption, operational costs, and carbon footprints, reinforcing their role in the renewable energy sector.



Organic Rankine Cycle (ORC) waste heat to power market

Market Dynamics

Drivers

Rising Demand for Renewable Energy:

Accelerated adoption of ORC systems is fueled by the pressing need for cleaner energy solutions. This transition enables industries to convert waste heat into valuable electricity, supporting both environmental sustainability and economic efficiency.

Energy Efficiency and Cost Savings:

ORC allows industries to lower reliance on fossil fuels, reduce energy bills, and improve profitability by transforming unusable heat into productive power.

Restraints

High Installation and Maintenance Costs:

ORC system deployment requires specialized turbines, generators, organic fluids, and trained personnel, resulting in substantial upfront investments. These cost barriers can challenge broader adoption, especially for small and mid-sized enterprises.

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Market Segment Analysis

The ORC waste heat to power market is segmented by product type, application, and region:

By Product (Steam Rankine Cycle, Organic Rankine Cycle, Kalina Cycle)

By Application (Petroleum Refining, Cement Industry, Heavy Metal Production, Chemical Industry, Others)

In Application segment the petroleum refining sub segment leads in value, as these facilities generate significant volumes of low-temperature waste heat (often above 80°C) ideally suited for ORC integration.

By Region

- North America

North America is driven by funding momentum: Federal decarbonization grants and programs (DOE Industrial Efficiency & Decarbonization Office) plus IRA/BIL-enabled funding streams are catalyzing industrial efficiency and WHP pilots/scale-ups.

- Europe:

Europe dominates the ORC market, driven by strict environmental regulations, ambitious renewable energy targets, and government incentives encouraging adoption.

- Asia-Pacific:

Identified as the fastest-growing region due to rapid industrialization, greater energy demand, and rising adoption of energy-efficient technologies.

- Latin America

Latin America is at an early stage of adoption, with activity mainly concentrated in cement, mining, and process industries; while economics and financing remain constraints, rising energy prices and stricter environmental regulations are creating new opportunities.

- Middle East & Africa

The Middle East & Africa is witnessing emerging adoption, driven by cement and steel industries; although deployment is still limited, energy diversification goals, water scarcity favoring air-cooled ORC, and flagship projects such as Saudi Arabia's first ORC waste-heat-to-power plant are opening new growth avenues.

Key Players

Major global companies driving innovation and adoption in the ORC waste heat to power market include:

- Turboden S.p.A
- Kaishan USA
- Siemens AG
- Boustead International Heaters
- TransPacific Energy Inc.
- General Electric
- Strebl Energy Pvt Ltd
- Mitsubishi Hitachi Power Systems, Ltd.
- Climeon AB
- IHI Corporation

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Notable Developments

- Mitsubishi Heavy Industries Marine Machinery & Equipment:
Developed binary ORC systems for marine waste heat recovery, enabling decarbonization with outputs between 200kW and 700kW for diverse vessel types.
- Climeon AB:
Introduced the Climeon HeatPower 300 Marine to convert marine waste heat into onboard electricity.
- Siemens Energy & TC Energy:
Launched a waste heat-to-power pilot in Alberta, with advanced sCO₂ systems utilizing upgraded Rankine Cycle principles.

Conclusion

The ORC waste heat to power market is rapidly expanding as industries pursue sustainability, energy efficiency, and operational savings. Though high installation costs remain a challenge, tightening regulations, technological advances, and government support continue to propel

market growth—especially in Europe and Asia-Pacific. With increasing applications in petroleum refining, marine, and industrial sectors, ORC technology is poised to play a central role in global waste heat recovery initiatives and the broader shift towards clean energy.

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Sai Kumar

DataM Intelligence 4market Research LLP

+1 877-441-4866

sai.k@datamintelligence.com

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