

Condensing Unit Market Assessment, By Type [Air-cooled, Water-cooled, Evaporative Condenser], By Application [Residential, Commercial, Industrial, Transportation], By Function [Air Conditioning, Refrigeration, Heat Pump], By Compressors [Reciprocating Compressor, Screw Compressor, Rotary Compressor, Others], By Refrigerant Type [Fluorocarbons, Hydrocarbons, Inorganics], By Region, Opportunities and Forecast, 2017-2031F

Market Report | 2024-11-27 | 228 pages | Market Xcel - Markets and Data

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Report description:

Global condensing unit market is projected to witness a CAGR of 7.55% during the forecast period 2024-2031, growing from USD 40.06 billion in 2023 to USD 71.71 billion in 2031. Condensing units are crucial to heating and cooling solutions and heating, ventilation, and air conditioning (HVACs) such as air conditioners, refrigerators, and heat pumps. The latest technologies, such as connected appliances, artificial intelligence, advanced sensors, and efficient cooling/heating solutions, are shaping the future of condensing technology. Technological trends are likely to influence the market scope, including advanced refrigerants, technological integrations, modular designs, and enhanced energy efficiency. The evolution in heat exchangers and development in variable speed compressors are expected to enhance the performance of the condensing units, further leading to less energy consumption and lower operational costs. There is a growing trend towards the development of modular and custom condensing units, which facilitates the process of scaling up or down and integrating into current systems, making it easier to meet different application requirements.

Outdated technologies in thermal stations are being replaced with advanced condensing units. The rationale behind this is the growing demand for efficiency and emissions reduction. Condensing units are the scale of heat exchangers therefore they recover energy from waste and give it to contribute to greater energy output. This kind of operational efficiency helps in cutting down

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costs associated with operations and meets tough regulations that aim at decreasing the carbon footprint. Countries are adopting sustainable delivery condensers, specifically for energy plants usage.

For instance, in March 2023, the National Thermal Power Corporation (NTPC) commissioned India's first air cooled condenser at the North Karanpura Super Critical plant in Jharkhand, India. In comparison to a traditional water-cooled condenser (WCC), the air-cooled condenser (ACC) used in this project has a water footprint that is about one-third smaller. This would save about 30.5 mcm of water a year, which would meet the needs of about 1.5 million people in the area.

Proliferation of Industrial and Market Spaces to Propel Market Growth

The expansion of industries and their market space is contributing to the enhancement of the condensing unit market. With the growth of industries and the advent of new ones, including pharmaceutical, food and beverage, and renewable energy industries, the need for cooling and refrigeration systems is rising. In addition, urbanization and an increase in population call for the installation of sophisticated HVAC systems in commercial buildings. Also, there is an increase in the demand for dependable condensing units due to higher penetration of the Internet of Things and cold chain logistics. Furthermore, there is an increased emphasis on energy efficiency and sustainability, propelling innovation amongst developers and resulting in quite a few products suited for different industrial uses, which in turn propels market growth.

For instance, in February 2024, Panasonic Industry Co., Ltd.'s Panasonic Europe launched a new 20hp Co2 (R744) outdoor condensing unit in the European market. The unit is specially designed for the four supermarkets and industrial cooling spaces. In addition to providing support for food retail and process cooling applications, such as chilled and low-temperature display cases, walk-in cold rooms, freezers, and blast chillers, the 20 hp unit expands the company's current line of 2 hp, 4 hp, and 10 hp CO2 outdoor systems.

HVAC Growth and Adoption of Sustainable Refrigerants to Shape the Global Market

The ongoing growth of the HVAC market, attributed to growing urbanization levels and climate change factors will spur the adoption of condensing units across all the sectors, such as the residential, commercial and industrial sectors. Given the increasing consumer awareness and the general preference towards green products, the manufacturers will be forced to consider the aspect of sustainability in their products.

Sustainable refrigerants, such as R290 (propane), are rapidly transforming the condenser unit market through a higher focus on regulatory compliance, enhancing energy efficiency, and reducing environmental impact. With a low global warming potential (GWP), sustainable refrigerants deliver enhanced alternatives to traditional refrigerants, helping manufacturers meet stringent environmental regulations. The higher efficiency lowers operational costs while attracting environmentally driven end-users. Furthermore, the shift to sustainable options enables innovations in condenser design, addressing its unique properties such as flammability and safety measures. While the initial investment may be higher, the long-term savings and alignment with sustainability goals make R290 a compelling choice in the evolving market landscape.

For instance, in August 2022, Embraco, a company from Nidec Corporation, launched a new range of R290 condensing units for the European market. The product is especially for food service applications, such as under-counters, blast chillers, cold rooms, and reach-ins. Compared to the present HFC line of condensing units, the new portfolio can achieve an energy efficiency improvement of 7% to 9%. It has a series of highly energy-efficient Embraco compressors that run on R290, a natural refrigerant.

Air-cooled Segment to Lead Market Share with Easy Installation and Wider Application

The air-cooled segment leads the global condensing unit market share in revenue. This increased demand can be attributed to its simple setup and applicability in many fields. This increased demand can be attributed to its simple setup and applicability in many fields. For instance, in contrast to water-based mechanisms, air-cooling devices can easily do away with sophisticated piping and cooling water fittings, which makes the entire installation process speedier and easier. The simplicity of this installation is an advantage for small and mid-sized enterprises that may not have ample means to put up extensive facilities.

Furthermore, air-cooled units are often used in different sectors such as commercial refrigeration, HVAC, and industrial processes owing to their versatility. They perform well under different climate conditions, thus making them suitable for deep freezer cases and rooftop installations. With energy efficiency and sustainability becoming priorities, it is not surprising that innovations in air-cooled systems, such as using low GWP refrigerants and new designs of heat exchangers, have made them more attractive. The possibility of hassle-free installation combined with numerous use cases gives the air-cooled section the front-runner position in condensing unit sales.

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For instance, in May 2023, Industrial Water Cooling (IWC) Proprietary Limited launched a new range of air-cooled condensers. With climate action central to our growth strategy at IWC, we aim to develop an air-cooled condenser that minimizes environmental impact by reducing water consumption, energy use, and carbon emissions.

Asia-Pacific to Hold the Dominating Global Condensing Unit Market Share

Asia-Pacific leads the share of the global condensing unit market in terms of revenue. Asia-Pacific continues to lead the market for condensing units due to the confluence of different factors, such as industrial expansions, technological advancements, and policy changes. Over the years, many countries have become industrialized, creating a growing need for many cooling applications. This is especially true for industries such as HVAC, food and beverage, and pharmaceuticals. The food service industry boom is complemented by urban migration, which increases the concentration of the population in a small space, thus increasing the demand for air conditioning and refrigeration systems.

Furthermore, this region has emerged as a cluster for technological innovations, with constant improvements of energy-efficient designs by manufacturers due to the strict environmental regulations that must be adhered to. This focus on sustainability aims to satisfy legal requirements and responds to the increasing number of consumers who prefer green products. Moreover, the well-established manufacturing base in Asia-Pacific enhances low-cost production and rapid market entry, maintaining its dominant share in the global condensing unit market. Companies enter Asian markets to expand their businesses in countries such as India and China, which hold major growth potential.

For instance, in August 2024, Danfoss India (Danfoss A/S) launched a condensing unit, focused on transforming the dairy sector. The advanced twin-fan design of the Optyma™ Pack greatly improves cooling effectiveness and system longevity. Superior heat dissipation is ensured by this sophisticated setup, which keeps operating temperatures at ideal levels even in hot weather (up to 48°C).

Future Market Scenario (2024 – 2031F)

■ The incorporation of the Internet of Things (IoT) is going to enable real-time monitoring and diagnostics, optimizing energy use and improving system efficiency through predictive maintenance.

■ Next-generation condensing units are anticipated to leverage advanced refrigerants and innovative heat exchange technologies to reduce energy consumption and minimize greenhouse gas emissions.

■ Modular condensing units allow for scalability and flexibility, making adapting systems to varying cooling demands in commercial and industrial settings easier.

Key Players Landscape and Outlook

Key players in the condensing unit market strategically focus on innovation, sustainability, and market diversification to maintain their competitive edge. Many companies are investing heavily in research and development to enhance their products' energy efficiency and performance, often incorporating advanced technologies such as IoT for smart monitoring and predictive maintenance. Sustainability is a priority, with manufacturers transitioning to low-GWP refrigerants and developing energy-efficient designs that meet the evolving regulatory standards. Strategic partnerships and collaborations with technology providers are also being pursued to leverage expertise and expand product offerings. Geographic diversification is another crucial strategy, as companies seek to penetrate emerging markets in Asia-Pacific and Africa, where industrial growth and urbanization are driving demand. Companies launch products with lower operational and installation costs to expand their business around the globe. For instance, in August 2022, Baltimore Aircoil Company introduced the vertex evaporative condenser. Maximum up time is provided by the Vertex Condenser, which is easily and securely accessible. With the lowest operating, maintenance, and installation costs, it offers the lowest total cost of ownership.

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