



Feature
Environment

Contributing to a Carbon-Neutral Society by Promoting Heat Pump Heating

Why is it important?

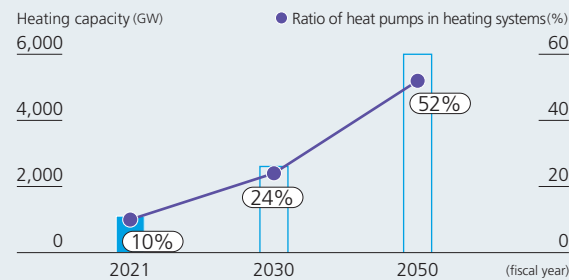
Since switching from combustion heating will help control global CO₂ emissions

At the 26th session of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 26) held in 2021, many countries around the world chose to increase their CO₂ emission reduction targets for 2030. As such, the conversion of heating systems are attracting attention as one way to achieve decarbonization. While temperature control is an important part of infrastructure for human health and productivity, it emits large amounts of greenhouse gases when used. It is important to have measures in place for both cooling as well as heating.

Looking at the global heating market, combustion heating, which is heated by direct burning of fossil fuels such as gas and oil, remains the current mainstream heat source because of its low initial cost and operational performance in cold regions. The global market share of heat pump heating systems remains at 10%. The IEA projects that switching to heat pump type heating systems, which require less energy to heat a room, could reduce CO₂ emissions by about 500 million tons by 2030.*

Daikin will contribute to global decarbonization by expanding its heat pump space and water heating business, as set out in the Fusion 25 Strategic Management Plan.

Heating demand forecast*



Note: Compiled by Daikin based on the IEA's *The Future of Heat Pumps* using projections from the NZE scenario (where emissions are reduced to net zero in 2050)

* Source: IEA *The Future of Heat Pumps*

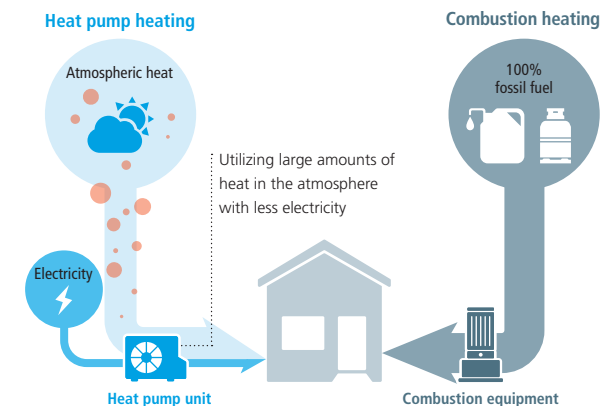
Daikin's Approach

Working to Promote Heat Pump Heating, Which Collects and Utilizes Heat from the Air

The heat pump is one of Daikin's core technologies. One advantage of heat pump technology is that it allows the collection and utilization of heat that is naturally present in the air. It also makes it possible to supply enormous amounts of thermal energy with low energy input. Heat pumps can significantly reduce CO₂ emissions compared with combustion-type systems.

In addition to the growing momentum toward decarbonization, rising energy prices and fears about the procurement of fossil fuels have led to a sharp increase in the number of countries adopting policies to encourage switching to heat pumps. Following this trend, Daikin has further strengthened its partnership with various stakeholders, including governments and industry groups, in establishing standards with the goal of promoting the technology. Daikin has strengthened its business, particularly in Europe and North America, with sales in our heat pump space and water heating business growing in fiscal 2021 greatly exceeding the previous year.

Heat Pump Heating and Combustion Heating Mechanisms



Daikin's Performance

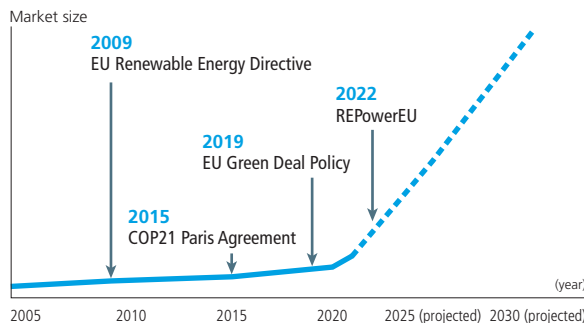
Transforming Heating Systems in Europe through Multifaceted Proposals

The switch to heat pump heating in Europe, where the climate is particularly cold and where heating and hot water supply account for a high percentage of household energy consumption, will lead to a significant reduction in CO₂ emissions. Since the release of Daikin Altherma, a heat pump space and water heater in 2006, we have continued to undertake various efforts to promote the shift toward heat pump heating.

One of the examples was our initiative to provide information and policy recommendations on the environmental performance of heat pump heaters to national governments and international agencies via dialogue in collaboration with industry groups. As a result, heat pumps became recognized by the EU as a technology that utilizes renewable energy in the 2009 Renewable Energy Directive. Since then, heat pumps have been recommended by the EU and member countries with the announcement of Green Deal Policy in 2019, and the rate of utilization has increased in the European market given the increasingly stringent regulations and incentives.

Furthermore, the EU announced REPowerEU in 2022, which sets the target of introducing a cumulative total of 10 million heat pump units within the next five years.

Diagram of Heat Up Heating Market Growth Influenced by European Environmental Policies



Daikin has paved the way for heat pumps to become popular by enhancing its product line up. For example, Daikin Altherma 3H HT improves the heating capacity in extremely cold regions as the only product in the industry capable of delivering hot water at high temperature without an electric heater in minus 15°C conditions. As some parts of existing combustion heating equipment can be used as they are, combustion heaters can easily be replaced by heat pumps.

At the same time, we are also strengthening our sales capacity. We have set up interactive showrooms in Europe, as well as rolled out a BtoBtoC business model that links Daikin with dealers and users through an online platform called Stand By Me. We support dealers throughout the life cycle, from model selection to maintenance, and propose solutions closely linked with customer needs.

Daikin reached the top share in the European heat pump heating market in 2019 and recorded more than 150% year on year growth in the number of heat pump space heaters sold in fiscal 2022.

Next Challenge

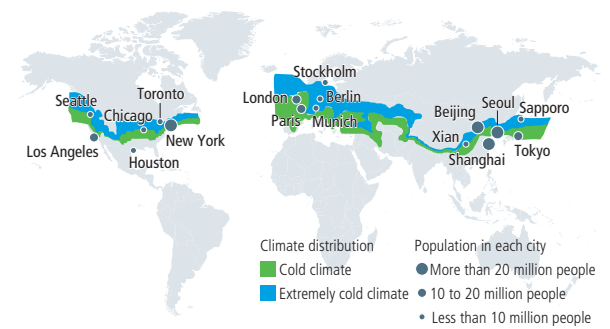
New Manufacturing/R&D Bases in Europe Pursuing Global Expansion

Heat pumps are expected to further reduce CO₂ emissions with the use of renewable energy sources. In this context, Daikin strives to contribute to the environment while expanding its business. In Europe, for example, we plan to begin operations of a new plant for manufacturing heat pumps in Poland in July 2024. Combined with our existing plant, this new facility will increase production capacity by four-fold in 2025 compared to 2021. In addition, in 2024 we will open a new research and development center, the EMEA Development Center, in Ghent, Belgium, to develop products tailored to regional characteristics, while keeping up with trends in Europe's advanced environmental policies.

Europe is not the only region looking to move away from combustion heating. There are cold and extremely cold regions on both continents of North America and Asia where growth of the heat pump heating system is

anticipated. Daikin will also develop products in North America, Japan, China and other parts of the world according to local needs and contribute to the reduction of global CO₂ emissions by further expanding the application of heat pump heating worldwide.

Areas with Expected Growth in Penetration Rate of Heat Pump Heating



Note: Compiled by Daikin based on ASHRAE CLIMATIC DESIGN CONDITIONS

The Spread of Heat Pumps is Essential as a Countermeasure to Climate Change

Laura Cozzi

Director of Sustainability, Technology and Outlooks, International Energy Agency (IEA)



Global sales of heat pumps grew by 11% in 2022, marking a second year of double-digit growth for the core technology as the world transitions toward secure and sustainable heating. At the same time, IEA analysis shows that their deployment must further accelerate if the world is to maintain a temperature increase of 1.5°C or lower.