



TURBOCHARGING CHINA'S GREEN TRANSITION

A producer of **ELECTRIC VEHICLE COMPONENTS AND SMART BUILDINGS** is helping spur progress towards China's goal of hitting net zero by 2060.

China generates one third of all greenhouse gas emissions, meaning that a successful drive towards net zero will have far-reaching positive consequences for the world as a whole. In 2020, it announced its ambitious 'dual carbon' goal: to see its emissions hit their peak and then start to fall in 2030, and for the nation to achieve carbon neutrality by 2060.

Hitting these targets will require a substantial investment

▲ **De-carbonizing the built environment, which accounts for 51% of China's total emissions, is essential for reaching the country's 'dual carbon' goal.**

in innovation, particularly in emerging technologies such as electric vehicles (EVs) and smart buildings. Already a world leader in solar power, China is now leveraging its manufacturing expertise for rapid decarbonization.

Among the companies leading the charge to net zero is Midea Group, the world's largest manufacturer of electrical appliances, based in Shunde, Guangdong. The company has rapidly responded to the nation's environmental targets and launched new divisions — focusing on electric cars and smart buildings — with sustainability in mind.

NEXT WAVE OF EVS

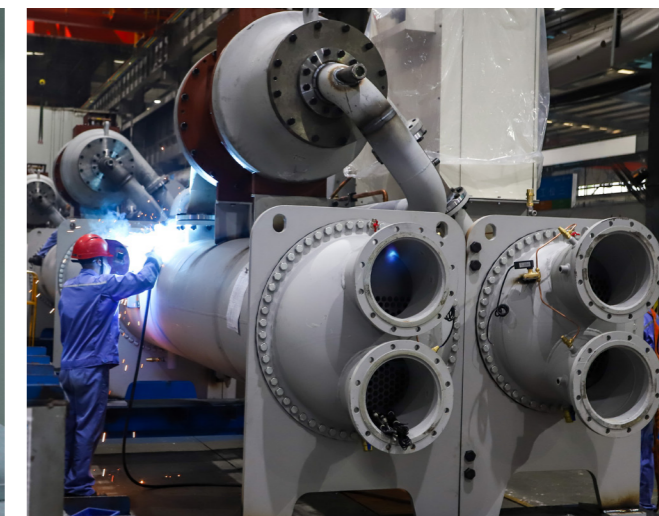
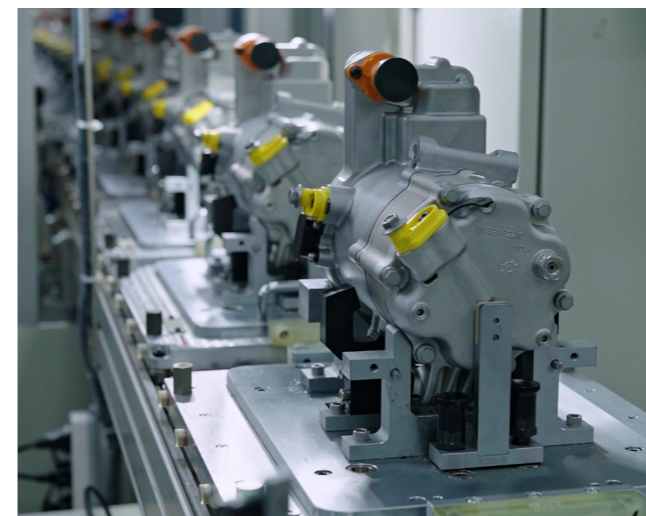
Rather than producing EVs, Midea is leveraging its expertise in heat management to produce critical components to support the industry. "EVs are one of the crucial strategic directions for Midea's future," says Guoyong Yang, the company's senior research engineer, noting that the field of EV manufacturing is relatively crowded, with just a handful of domestic suppliers of core components.

Compared to combustion engine cars, electric cars require more complex thermal management due to the additional components that must be kept cool, such as the battery,

electric motor, and EV controller that regulates the flow of power and operation of the motor.

These requirements present three major challenges, Yang explains: low efficiency due to the difficulty of effectively harnessing and recovering heat; the problem of coordinating multiple components; and extra bulk that increases weight and cost.

Meeting these obstacles demanded multiple innovations. Firstly, the team developed an electric compressor capable of reaching 12,000 rotations per minute (rpm). This high speed enables the compressor to heat and cool efficiently, with just



▲ (Left) The electric vehicle compressor assembly line at Midea, one of the world's largest manufacturers of home appliances. (Right) Midea is manufacturing water-cooled central air-conditioning systems for smart buildings.

40cc of power, it can achieve a cooling capacity of 14kW, surpassing the industry standard of 10kW for 45cc.

When combined with a triangular-cycle technology that distributes heat across a wide range of temperatures, the compressor is able to handle higher motor and electronic control heat, making it suitable for high-voltage charging and low-temperature heating. Finally, the team was able to shave off 1kg of weight by using high-strength aluminium alloy and simulations that allowed for more accurate predictions and optimized the design of complex systems.

Not only has the product achieved better cooling and heating, says Yang, "it has also achieved ultra-fast charging while enhancing the driving comfort for users."

SMART MEANS GREEN

EVs are essential to decarbonization. CO₂ emissions from the transportation sector account for more than 10% of China's total. But building-related emissions are an even bigger contributor, generating 5.08 billion tonnes of CO₂ in 2020, and accounting for 51% of China's total emissions.

More than half of a building's emissions come from heating, ventilation and air conditioning (HVAC) — along with lighting — says Zuozhong Wang, Head of the Digital Business Architecture Center at Midea Building Technologies.

Smart buildings that optimize energy consumption and integrate renewable energy are of huge importance to reducing China's emissions, a nation where urban sprawl and resultant construction have exploded in recent decades.

At Beijing's Daxing International Airport, Midea's customized, energy-efficient HVAC solutions include two ground-source heat pump units and five flue gas heat recovery pump units. According to Wang, these solutions make full use of shallow geothermal energy, flue gas waste heat and sewage waste heat, to achieve highly efficient heating during winter and cooling during summer. This saves as much as 17.36 million cubic metres of natural gas a year and reduces annual carbon emissions by more than 18,000 tonnes.

"The Beijing Daxing project is currently the largest multi-energy heat pump project in China," explains Wang. "By combining the social benefits

of environmental protection with the economic benefits of reduced energy cost, we are redefining how airports can be powered with green energy."

SMART TECH

Powering these energy savings requires a complete set of digital technologies and platforms, from the user interface to the underlying infrastructure, providing a comprehensive digital solution. Midea's solution is the iBUILDING platform, which enables top-level design, implementation, operation and maintenance as well as upgrading services. Using both cloud computing and edge technology, iBUILDING covers five key areas: insights, algorithms, business operations, data and technology.

"In addition, iBUILDING is an open platform that supports application development, with visual data analytic tools to meet the needs of data scientists and engineers," says Wang. "It also supports real-time computing, business insight analysis, machine learning and other scenarios. Data sharing and rich interfaces also allow third parties to collaborate, creating a vibrant smart building digital ecosystem."

Midea is an active user of its own smart building technology. At the Midea Industrial Park West for example, the company's LIFE low-carbon solutions are being used across a building's entire life cycle, from construction to operations.

Firstly, Midea's HVAC and intelligent elevators are integrated at the design phase, while building automation, smart lighting and intelligent operation and control are used to improve efficiency. The buildings are also designed to be run on green energy, with solar panels and high-efficiency energy storage. Users enjoy a smart and secure office with Midea's flexible configurations and intelligent access control.

By innovating on energy efficiency, renewable energy integration and advocating for sustainable practices, companies like Midea can play a vital role in helping China transition to a low-carbon economy and help the world in the process. ■



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