was a natural reaction considering that the technology immediately reduced energy loss by more than half and delivered an annual electric bill savings of 21%. Daikin suddenly found itself the leading seller of energy saving air conditioners, which until then had been competitors undercutting each other by 100 yen to gain an edge amid heated competition.

Two years after the commercial air conditioners hit the market, Daikin debuted as its main commercial series the Super Inverter 60, which uses 60% less electricity. With this achievement, Daikin brand products grabbed more than 40% share of the market. The technology was then installed in multi-split air conditioners for office buildings and the entire product spectrum. In 2003, reluctance DC technology was recognized by the National Commendation for Invention in Japan.

While Daikin room air conditioners now enjoy the top market share, the business was once rooted to third behind commercial air conditioning and fluorocarbons in terms of business priority for the company. Daikin once trailed far behind major Japanese electronics brands, with seventh or eighth place in sales rankings, and the company considered exiting the market. It was only this reluctance technology that saved it.

The business turnaround became an opportunity to gather the latest information from related industries. Semiconductor advances, performance improvements in microcontrollers and meodymagnets, along with enhanced production technologies for electrical steel plates and wiring were all leveraged to continually innovate new air conditioners with ever-higher energy saving. In 2011, the commercialization of the Eco Inverter product marked a new phase in the history of Daikin’s inverter development. The new design eliminated the electrolytic condenser and other parts, which also helped lower the cost. And yet the energy saving performance was even higher than that of the AC inverter. Ohyama dubbed the new machine the global low-cost inverter. The imperas for the new design had come in 2000. Osamu Takahashi, Professor at the Nagoa University of Technology, had urged Ohyama to collaborate on the development of a global standard inverter. Ohyama thought such an inverter would be a good match with Daikin’s DC motor. At the start of the project, Takahashi has envisioned a Japanese federation of companies to tackle the new technology. He then changed tack and decided to work exclusively with Daikin. The project suffered a setback when Takahashi passed away suddenly in 2003. Ohyama’s resolve only increased, determining to fulfill the professor’s last wishes by any means possible. A decade after the project started, Daikin commercialized a product for China. This newly developed air conditioner became symbolic of the second-stage collaborative development with China’s Gree Electric Appliances, with which Daikin formed an alliance in 2008. Today, Daikin and Gree Electric Appliances are manufacturing a million units of these air conditioners annually. The technology is still being advanced, however, in order to further expand sales of dedicated cooling inverters for the Asian market as well as inverter air conditioners for North America.

In Japan, inverters have solidified their reputation for high efficiency and superior energy saving performance. Today, all room air conditioners in Japan are equipped with inverters. The technology has also spread to lighting, hybrid cars, and many other fields. Globally, however, inverter air conditioners account for less than 50% of the total market share. While inverter market share is expected to rise, there are still issues to conquer, including the development of lower cost machines for low-income regions. Other issues include the scarcity of raw materials, differing electric power infrastructures in each locality, and establishing maintenance structures. To solve these issues, Ohyama and his members are focusing their R&D on low-cost inverters and inverter intelligence.

As Daikin expands its global presence, it will also continue to find new ways of advancing Japan’s technological strengths. “Anyone can solve one problem if they pursue only that,” notes Ohyama. “We’ve gotten this far by using one technology to solve two problems. We’ll keep challenging ourselves in this spirit,” he adds with the pride of an engineer who created the world’s best inverter. His words also reflect his passion for “cooperative creation” in solving multiple issues with one technology.

Differece Between Inverter and Non-inverter Type Air Conditioners

Air conditioners without inverters cool or heat a room to a set temperature, then turn OFF once the temperature is reached. They turn back ON again when the temperature rises above or falls below the set temperature, repeating this process during operation. As a result, room temperature fluctuates and energy is wasted.

Air conditioners with inverters cool or heat a room to a set temperature, then maintain this temperature by turning OFF and ON the compressor motor at a high speed.

Difference Between Inverter and Non-inverter Type Air Conditioners

- Lower energy consumption
- Higher temperature control
- Provides comfort
- Higher energy saving

Air conditions with inverters without inverters cool or heat a room to a set temperature, then turn OFF once the temperature is reached. They turn back ON again when the temperature rises above or falls below the set temperature, repeating this process during operation. As a result, room temperature fluctuates and energy is wasted.

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