>45%
energy savings with Danfoss-NOVENCO EC+ concept

ENGINEERING TOMORROW

Case story | EC+ concept with VLT® HVAC Drive FC 102

Retrofitting today's buildings for a **Zero Energy future**

The situation

A landmark in Singapore's Keppel Bay waterfront area, the 18-storey Keppel Bay Tower is a true testament to Keppel's commitment to sustainability and unrivaled energy efficiency.

Following a retrofit project implementing the Danfoss EC+ concept for optimal system efficiency – featuring Danfoss AC drives, NOVENCO axial fans, and high efficiency motors – Keppel Bay Tower achieved energy savings of more than 45% in AHU operation, which contributed to making it Singapore's first BCA Green Mark Platinum Zero Energy commercial building.

Discover how Keppel Bay Tower reduced AHU power consumption by more than 45% with the Danfoss VLT® HVAC Drive FC 102 and the high efficiency EC+ concept.

The challenge

In 2018, Keppel Land leveraged a grant from the Building and Construction Authority of Singapore Government (BCA) under the Green Buildings Innovation Cluster (GBIC) Programme to implement and test new energy-efficient technologies at Keppel Bay Tower to reduce the building's energy consumption.

Having already achieved the BCA Green Mark Platinum status, the aim of the GBIC initiative was to reduce consumption by a further 20%.

Danfoss, along with long-term partner NOVENCO, proposed retrofitting an existing centrifugal fan in one of the building's air handling units (AHU) with the high efficiency EC+ concept engineered to boost efficiency of HVAC systems in both new-build AHUs and existing systems.

The solution

The Danfoss-NOVENCO EC+ concept utilizes the high efficiency of each individual component as well as their intelligent interaction for a seamless solution delivering optimum system efficiency.

Axial fans utilize both static and dynamic pressures, which means the ZerAx® fan is more efficient, consumes less energy, lowers carbon emissions and operating costs – plus, reduces sound levels.

Variable speed drives enable energy efficient application control. And as a HVAC-dedicated drive with built-in intelligence, known for high reliability, low total cost of ownership (TCO), and many application functions, Danfoss VLT® HVAC Drive FC 102 was the perfect match for Keppel Bay Tower.

The retrofit took less than 10 hours.

The outcome

The EC+ AHU retrofit delivered energy savings of more than 45% for Keppel Bay Tower and played a substantial part in the 22.3% reduction in its annual energy consumption registered in early 2020 – exceeding its initial target of 20%.

As a result, Keppel Bay Tower was certified by the BCA as the first Green Mark Platinum Zero Energy commercial building in Singapore. And its new high-efficiency air distribution system based on the EC+ concept was one of the key contributors to this achievement.

Today, Keppel Bay Tower utilizes Danfoss-NOVENCO EC+ in all their AHUs and Keppel Land is considering similar retrofits across several other buildings.

"The Danfoss-NOVENCO EC+ solution replaced traditional fan systems in the Keppel Bay Tower AHUs, integrating Danfoss AC drives to permanent magnet motors (IE5) with great ease. Independently validated energy savings were over 45%."

Deepinder Chani, Director Commercial Buildings at Danfoss Drives

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