



THE SINGAPORE ENGINEER

COVER STORY:

MECHANICAL & ELECTRICAL ENGINEERING

Upgrading a 40-year old landmark and making it energy-efficient



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Upgrading a 40-year old landmark and making it energy-efficient

In 2013, the Management Corporation Strata Title (MCST) at Orchard Towers embarked on a journey to install an advanced air-conditioning system and to achieve BCA Green Mark certification.

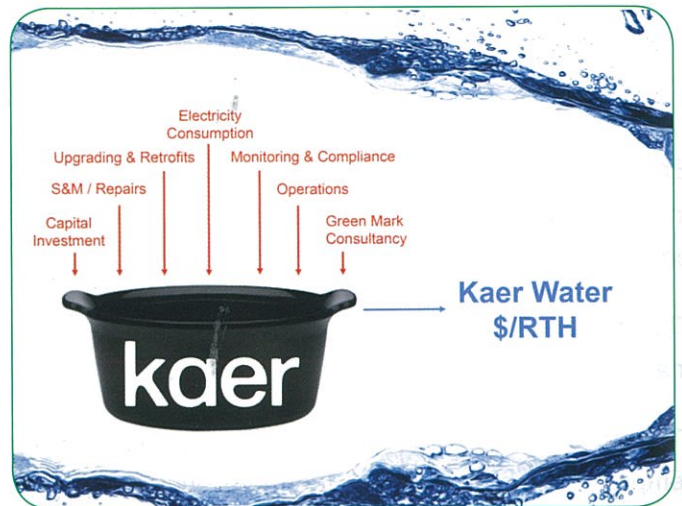
Orchard Towers is a 40-year-old mixed development located at the corner of Claymore Road and Orchard Road. It consists of a 25-storey office building (the front block) and a 25-storey residential / commercial building (the rear block), both served by a 19-year-old air-conditioning system.

When the MCST at Orchard Towers undertook the programme to upgrade the development and obtain Green Mark certification, it evaluated the numerous options available before deciding to outsource the air-conditioning requirements to Kaer, a leading builder and operator of high-performance air-conditioning systems in Singapore.

Phase 1: outsourcing the chiller plant

In September 2013, the MCST awarded Kaer the chiller plant contract (Kaer Water). Under this model, the company took over ownership of the existing chiller plant and, in 60 days, assumed the responsibility for operating the plant to deliver chilled water to the building's air-conditioning system. All costs associated with

the chiller plant are covered by Kaer (eg electricity consumption, service & maintenance, repairs/overhauls, operations) and the MCST simply purchases chilled water from Kaer at a fixed rate (S\$/RTH) and pays an amount that depends on the consumption.



The Kaer Water model



The Orchard Towers chiller plant in 2013

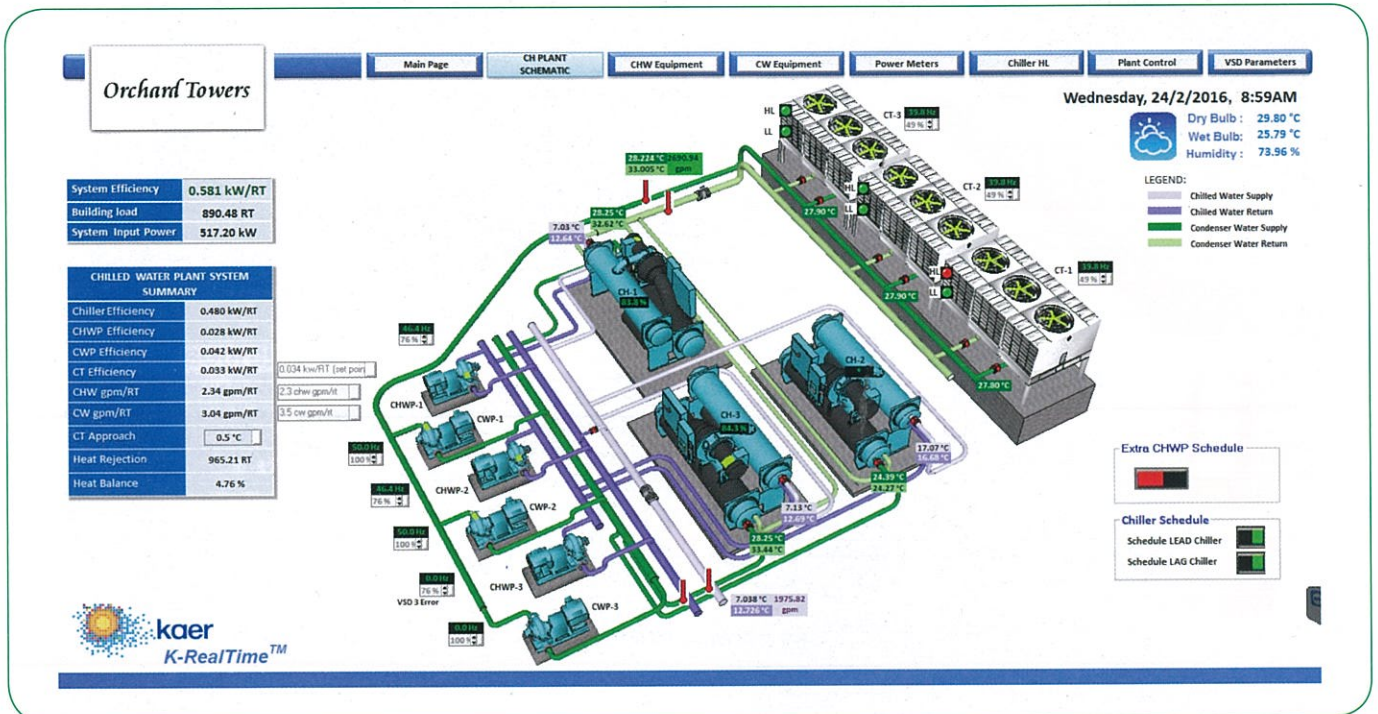


The Kaer Water plant at Orchard Towers, after the upgrading

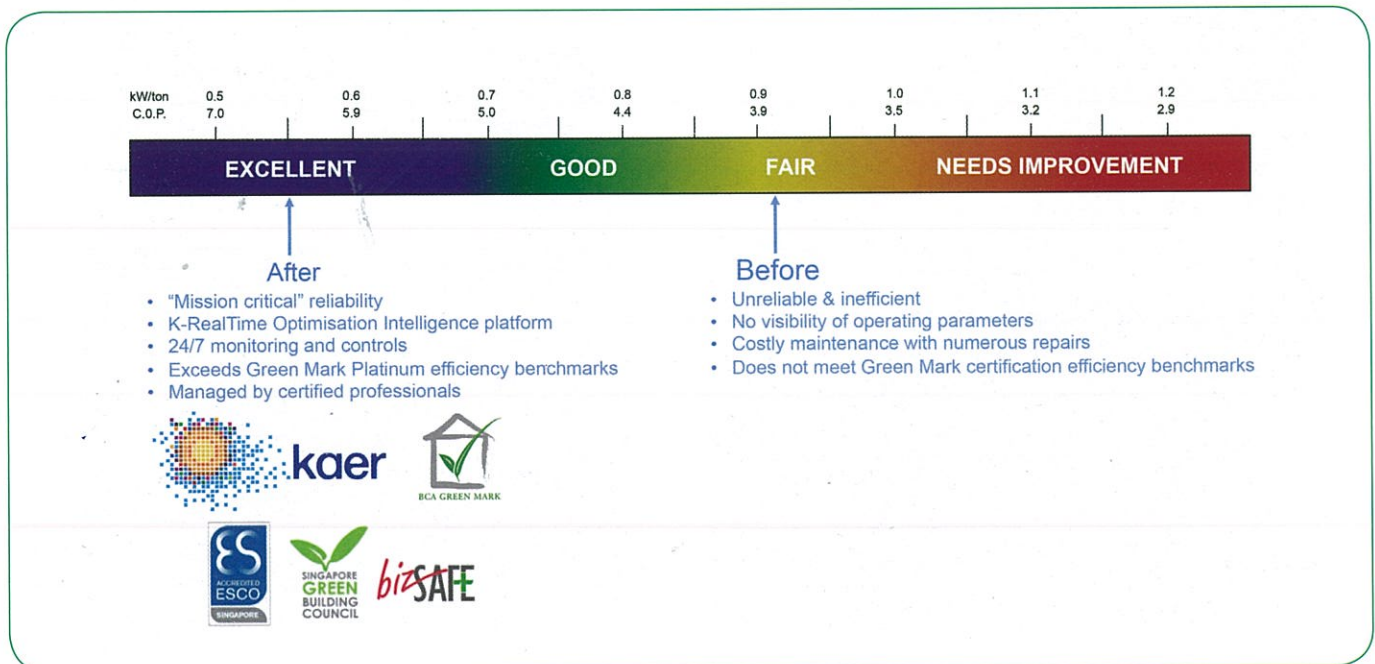
Due to the deteriorating condition and high energy consumption of the existing chiller plant, Kaer undertook a six-month upgrading programme to completely replace the system which consisted of the chiller plant equipment, pipework and electrical panels. The upgrading process was carried out with no disruption to the operations of the building. All investments were covered by Kaer, as part of the Kaer Water model, and no capital outlay was required from the MCST.



The K-RealTime Broadcast Centre monitors, controls and optimises over 40 air-conditioning systems in Singapore, Malaysia and Indonesia.



The K-RealTime Monitoring and Verification system with optimisation intelligence at Orchard Towers.



Summary of the Kaer Water results

The new Kaer Water plant operates at a 'mission critical' level and includes the following features:

- Brand new chillers, cooling towers and pumps
- Innovative pipe design to improve space planning and energy efficiency
- An energy efficiency profile that is better than Green Mark Platinum benchmarks
- The K-RealTime M&V system with optimisation intelligence
- Monitoring and controlling by Kaer via the K-Real-Time Broadcast Centre (KBC)
- Remote monitoring, 24 hours a day, through laptops, smartphones and tablets
- Smart SMS Alert system
- Capturing and archiving of all data, for trending analysis and BCA Green Mark submissions
- Inclusion of OSE (Operating System Efficiency) reports and BCA site verification data and reports, as and when required

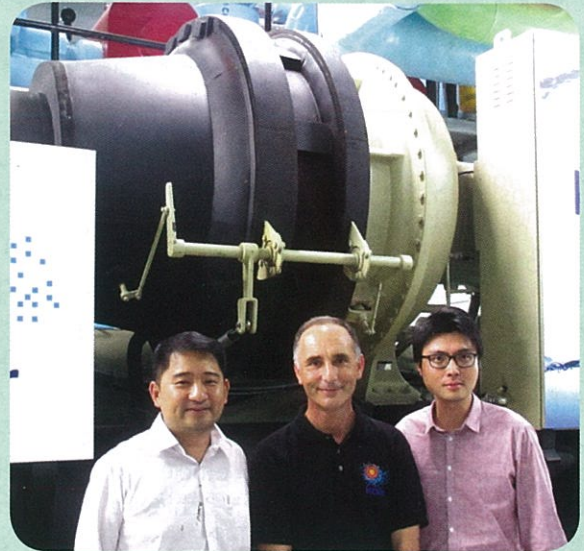
Phase 2: Green Mark certification

Orchard Towers received the Green Mark certification in February 2016, based on its investment in several key green features, including the following:

- An energy-efficient chiller plant (provided through Kaer Water)
- A permanent energy monitoring system (provided through Kaer Water)
- A naturally ventilated carpark
- Variable voltage variable frequency drives for escalators
- Water-efficient fittings
- The use of NEWater for the cooling towers
- Monitoring of the monthly water consumption
- Good indoor air quality
- Installation of LED lighting and motion sensors for lighting control

Phase 3: outsourcing the air-side system

With Kaer Water and the Green Mark certification in place, the MCST at Orchard Towers took the next step to upgrade the entire air-side system serving the building. This was achieved by upgrading the existing Kaer Water contract to a Kaer Air contract. Kaer now has full ownership over the entire air-conditioning system and is responsible for all costs associated with both the chiller plant and the air-side equipment. The company is currently implementing an upgrading project to re-design and replace all of the air handling units (AHUs) in Orchard Towers, to optimise the temperature and humidity conditions for the benefit of the tenants.



From left, Mr Stevenson Goh, Consultant/Building Manager, Orchard Towers; Mr Antonio Muci, Senior Manager, Kaer Pte Ltd; and Mr Robin Ng, Chairman, Orchard Towers Management Council.

"Through our partnership with Kaer, we believe Orchard Towers is now benefitting from the most reliable and efficient air-conditioning system in Singapore. Orchard Towers did not need to invest into the upgrading as it was all covered under the Kaer Water and Kaer Air programmes, which has allowed us to divert our attention and focus on other teething issues, including capital investments in the upgrading of our building to achieve Green Mark certification. We can now safely focus our attention on all other upgrading projects to improve Orchard Towers and need not worry about the operations and efficiency of our air-conditioning system as it is now completely outsourced to Kaer" - Mr Stevenson Goh, Building Manager/Consultant, Orchard Towers.

PROJECT CREDITS

Building Owner

MCST 664 (Orchard Towers)

Building Manager/Consultant

Mr Stevenson Goh

Contractor & Green Mark Consultant

Kaer Pte Ltd

All images by Kaer. More information on Kaer Water and Kaer Air may be obtained from www.kaerwater.com.