Philips Lumileds Singapore Plant

The manufacturing facility won a Green Mark Platinum Award, under the Existing Buildings category, at BCA AWARDS 2015.

The Philips Lumileds Singapore Plant is located in Yishun Avenue 7.

Founded in 1999, Philips Lumileds Lighting Company is a leading manufacturer of high-power LEDs and a pioneer in the use of solid-state lighting solutions for everyday purposes including automotive lighting, computer displays, LCD televisions, signage and signalling and general lighting.

The company's patented LUXEON power light sources combine the brightness of conventional lighting with the small footprint, long life and other advantages of LEDs.

In November 2007, Philips Lumileds officially opened its new production facility in Singapore. The LUXEON high power LED plant, its first outside of Silicon Valley, extended Philips Lighting's LED leadership while accelerating the growth of the solid state lighting industry.

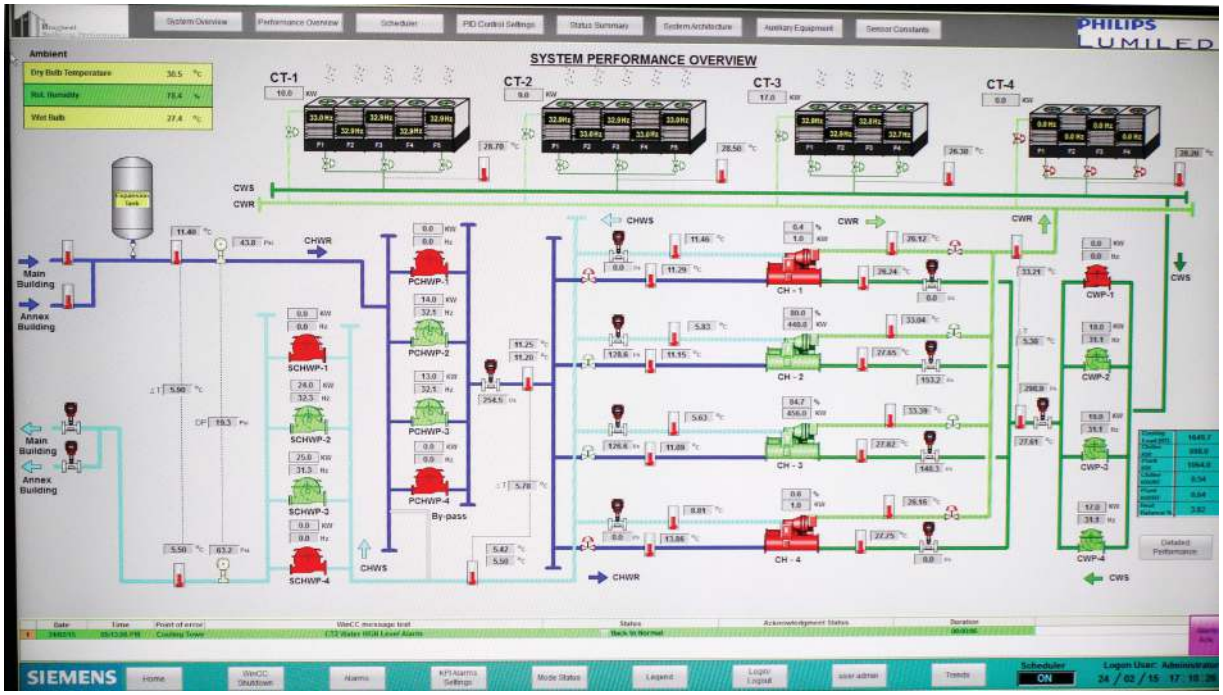
Located at Yishun Avenue 7, the Philips Lumileds Singapore plant, which operates round-the-clock, comprises two blocks - the Main Building and the Annex Building. The facility has a total Gross Floor Area of 41,716 m^2 and an open car park area of 1,732 m^2.

Initiatives in four key areas contributed to Philips Lumileds Singapore becoming the first manufacturing plant in the country to receive the Green Mark Platinum Award.

- The central chiller plant underwent optimisation to achieve an average plant efficiency of 0.64 kW/RT.
- LED lights were installed throughout the building, improving the lighting power budget, in accordance with the Singapore Standards Code of Practice.
- Extensive water recycling efforts have led to significant water savings and the achievement of PUB's Water Efficient Building (Gold) certification.
- Sustainable operations and management are strongly encouraged, through recycling efforts as well as through the implementation of educational and awareness programmes involving employees, contractors and vendors.

CHILLER PLANT OPTIMISATION

To improve overall operational efficiency, the obvious option for Philips Lumileds Singapore was to replace its 14-year-old chiller plant at significant expense. Instead, Philips Lumileds Singapore decided to collaborate with Barghest Building Performance (BBP), a Singapore-based energy efficiency service company in the intelligent building space, which focuses on extracting the best performance from existing central chiller plants. BBP uses data analytics, cloud-based optimisation and deep Heating, Ventilating and Air-Conditioning (HVAC)



The chiller plant management system enables the required cooling to be delivered in an energy-efficient manner.

By optimising its 14-year-old chiller plant, Philips Lumileds Singapore was able to achieve energy-efficient operations.

domain expertise to deliver energy savings for its clients.

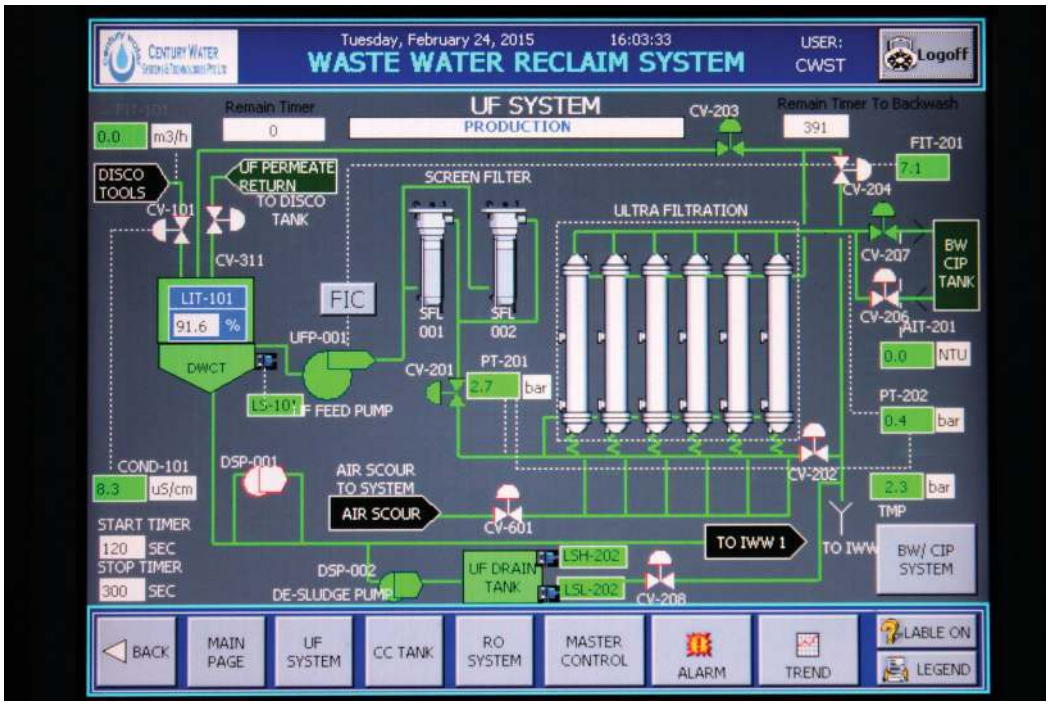
BBP provided an alternative to Philips Lumileds Singapore, that is, optimising the current chiller plant, to deliver the required cooling in an energy-efficient manner.

The optimisation solution provided by BBP includes the connection of variable speed drives to the chilled water and condenser water pumps as well as to the cooling towers.

Further, in line with the BCA Green Mark requirements for effective measurement and verification, dedicated digital power meters have been connected to all major

Instrumentation panels enable the remote monitoring and control of the air-conditioning system.

Installation of next-gen LED lighting improved the lighting power budget.



The waste water reclamation system helps to reduce the consumption of potable water.

equipment like chillers, cooling towers and pumps. Every chiller is connected to a magnetic, full bored flow meter and high accuracy temperature sensors on both the chilled water and condenser water sections. The heat balance is determined at every chiller and header level.

BBP also connected each site to a cloud-based central system, enabling Philips Lumileds Singapore to have access to remote monitoring, auto reporting and other features to improve day-to-day operations.

As a result of all these efforts, Philips Lumileds Singapore achieved a 27% improvement in the chiller plant's efficiency, without needing to replace major equipment or disrupt operations at the plant. With sustained savings of 30% of initial energy consumption, Philips Lumileds Singapore was able to realise a reduction of S$ 700,000 in annual energy costs.

Performance Contracting

In order to ensure sustained savings over time, Philips Lumileds Singapore has entered into a long-term performance contract with BBP, under which, BBP will be paid only upon measurable performance improvements at the Philips Lumileds Singapore plant. The efficiency improvements will be verified on a monthly basis by an independent third party, DNV GL, through the DNV GL, Clean Technology Centre in Singapore.

For its next project, BBP plans to evaluate and optimise the plant and office air handling unit system, in order to reduce energy consumption.

INSTALLATION OF LED LIGHTING

Being in the LED business, lighting optimisation was an obvious area of interest for Philips Lumileds Singapore. The company thus took steps to replace light fixtures, chiefly by installing a newly launched generation of next-gen LED lighting. The improvement in lighting power budget, compared to the code, is expected to reach 40%.

ACHIEVING WATER EFFICIENCY

Philips Lumileds is also focusing on water efficiency. It has installed a water recycling plant that has a capacity of 300,000 m^3/year, to capture condensate water from the air handling units (AHUs), production waste water as well as water rejected by the reverse osmosis system. The requirement for potable water is significantly reduced, due to the utilisation of recycled water and NEWater.

Smart meters capture the daily water consumption and link it to the building management system (BMS) and also to PUB, for monitoring purposes.

SUSTAINABLE OPERATIONS AND MANAGEMENT

Besides encouraging recycling efforts among employees, Philips Lumileds Singapore conducts awareness programmes for employees, suppliers and contractors, to promote environmental sustainability including energy and water conservation.

FUTURE EFFORTS

Although the Green Mark Platinum Award is a milestone for the Philips Lumileds Singapore plant, the site team is continuing its efforts to improve operations and reduce environmental impact. The Philips Lumileds Singapore team is continuing its programme, started three years ago, to reduce energy intensity and water usage as well as increase environmental awareness among all stakeholders.

(With effect from 1 April 2015, Philips Lumileds Singapore Pte Ltd has changed its name to Lumileds Singapore Pte Ltd).

Equipment required for ensuring process water quality include filters (image above) and reverse osmosis high pressure pumps (image below).

The company encourages recycling efforts.