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Demand Flow Chiller Plant Optimisation Robina Hospital Case Study

Robina Hospital Chiller Plant Optimisation

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Robina Hospital Chiller Plant Optimisation Facility Overview

Robina Hospital is the 6th largest hospital in Queensland with 364-beds and a suite of inpatient and outpatient services.

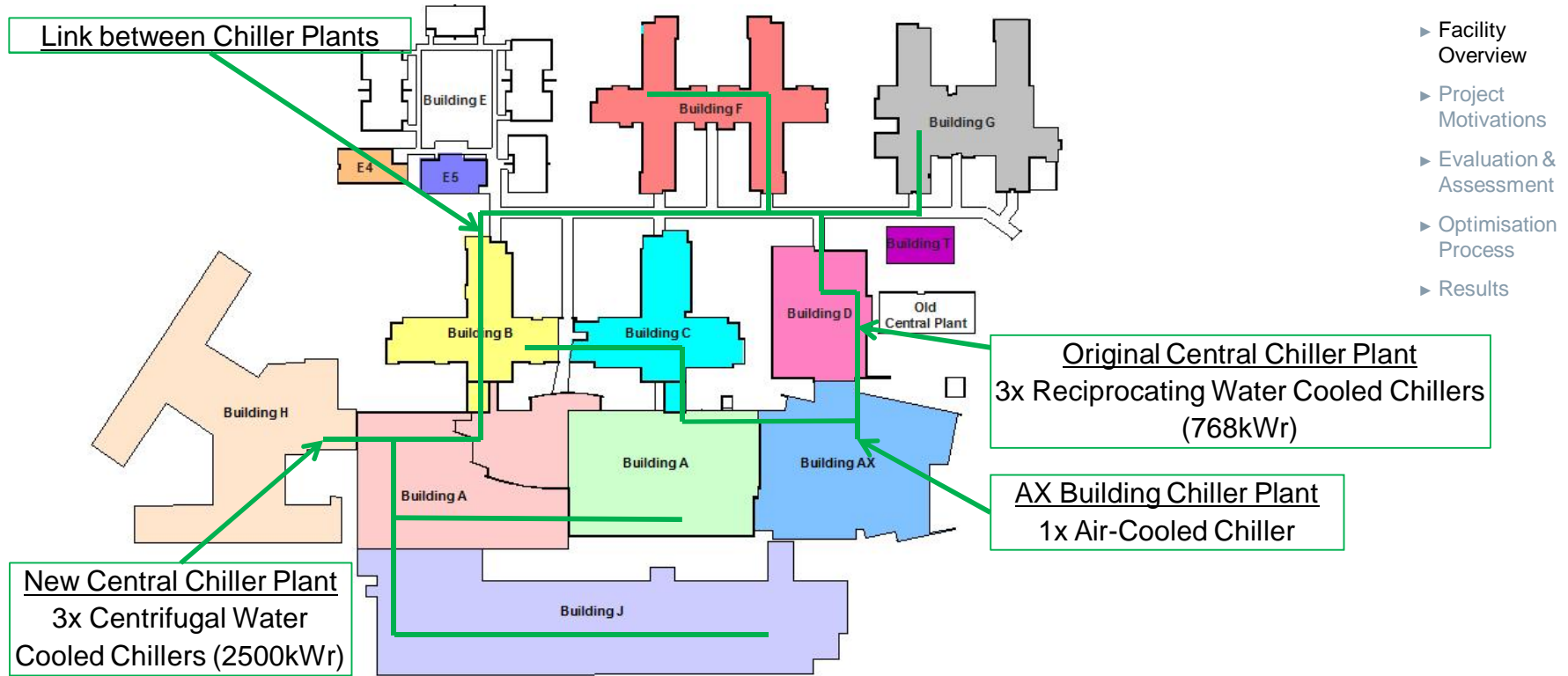
The facility has undergone constant expansion over the past 15 years:

- 2000 – Constructed as a private hospital offering some public services
- 2002 – Acquired by QLD Government
- 2007 – Stage 1 expansion adding 25 beds
- 2012 – Stage 2 & 3 expansions doubling number of beds

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Facility Overview



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Robina Hospital Chiller Plant Optimisation

Project Motivations

1. Simplification of Chilled Water System Operation
2. Improve facility energy efficiency
3. Reduce maintenance requirements of 3x Chiller Plants
4. Improve Humidification Control of Operating Theatres

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Robina Hospital Chiller Plant Optimisation Evaluation and Assessment – Chilled Water Sub-Systems

The five major energy consuming sub-systems of the Chilled Water network are:

1. Chillers
2. Chilled Water Pumps
3. Condenser Water Pumps
4. Cooling Tower Fans
5. Air Handling Units

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Demand Flow optimises the performance of all energy consuming sub-systems holistically.

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Optimisation Process

- 3 month project implementation period (July – September)
 - Installation of:
 - Variable Speed Drives for Condenser Water Pumps
 - Cooling Tower Isolation Valves
 - High accuracy differential pressure and temperature sensors
 - Commissioning of:
 - Demand Flow control algorithm
 - 12 months system fine tuning
- Continuous supply of chilled water critical for operating theatres and MRI

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Optimisation Process – Demand Flow™ Commissioning



Chillers

Optimised pressure and temperature setpoints.

Increased operating times at chiller 'sweet-spot'.



Pumps

Variable speed control of all chilled water and condenser water pumps.

Removes system bypasses to reduce excessive pumping energy.



Cooling Towers

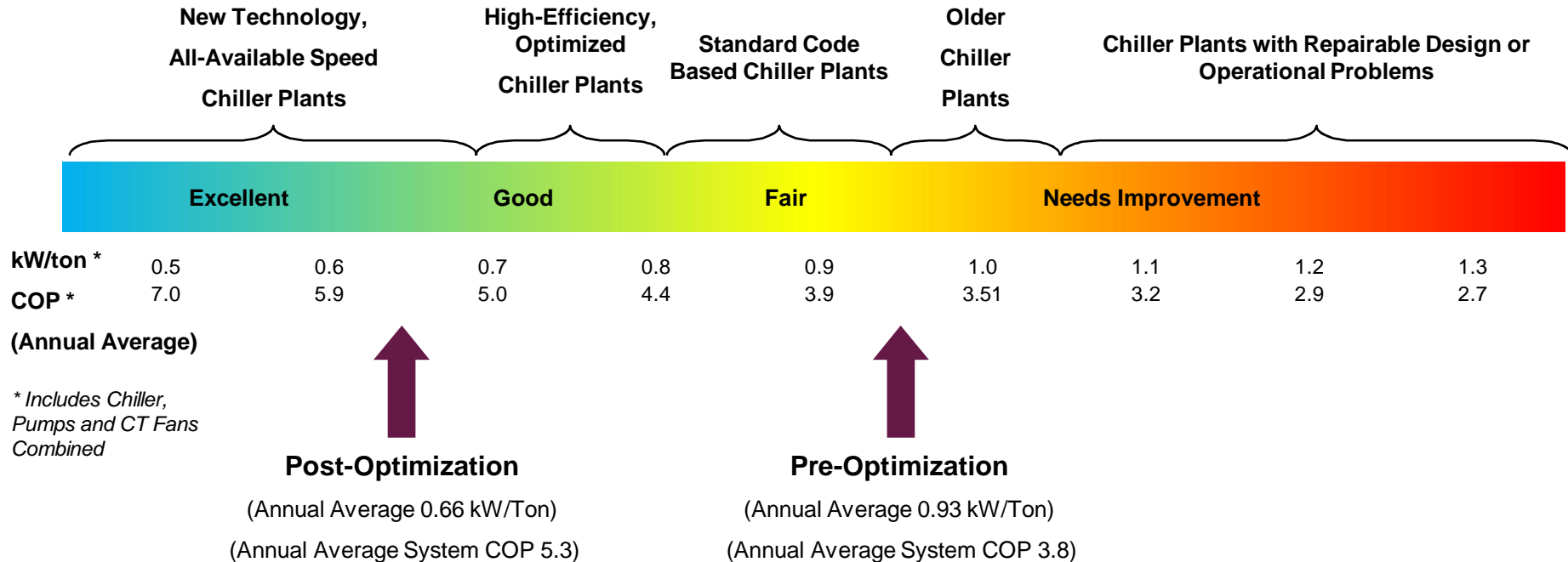
Optimised cooling tower flow, variable speed fan control and staging.

Robina Hospital Chiller Plant Optimisation Results – Facility Improvements

- Improved humidification control of operating theatres
- Increase in deliverable plant capacity
- Effective management of chiller lift
- Eliminates refrigerant flow issues at low load conditions
- Consolidation of Chilled Water Plants



Robina Hospital Chiller Plant Optimisation Results – System Efficiency Improvement



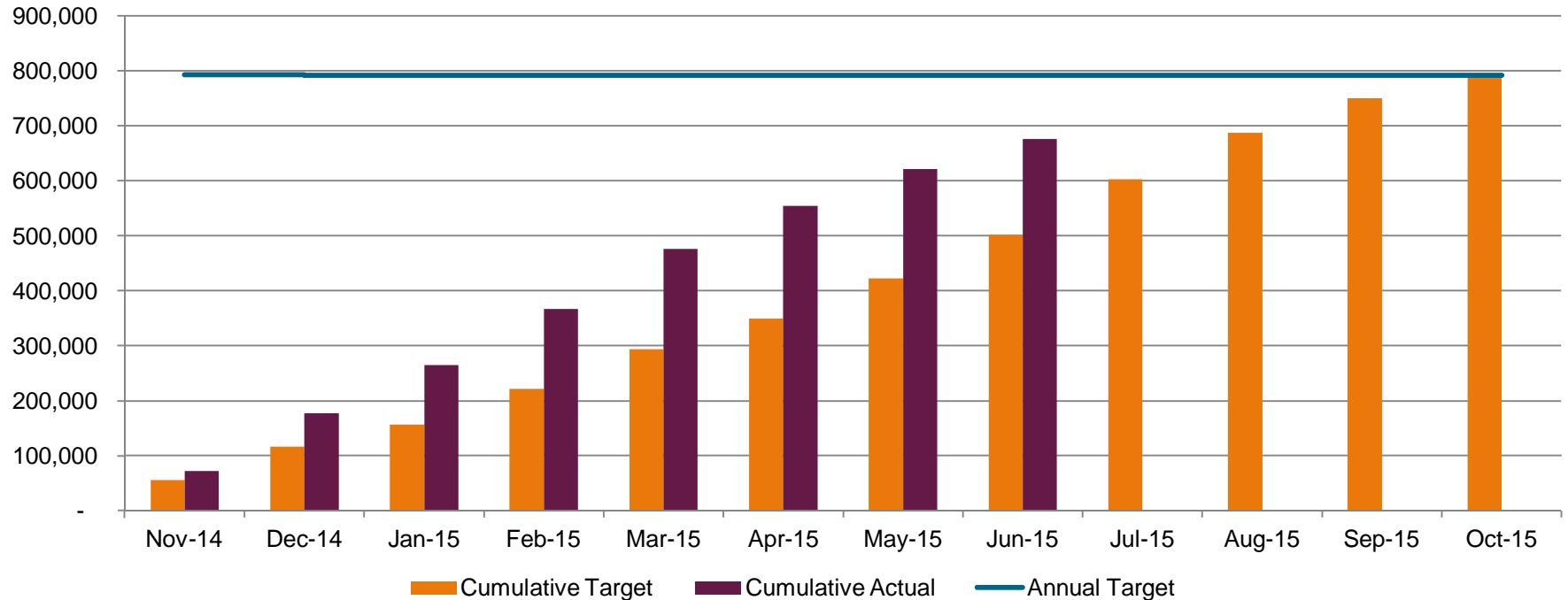
Source: "All Variable Speed Chiller Plants", ASHRAE Journal, September 2001

Robina Hospital Chiller Plant Optimisation Results – First 8 Months of Savings

- **26%** Saving in Chiller Plant Consumption
- **676,216 kWh** saved (85% of annual target)
- Reduction of **554 Tonnes** of CO₂ emissions
- Anticipated payback of 2.5 – 3 years ahead of a 3.3 year guarantee



Cumulative Target vs. Actual Savings (kWh)



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Contact page



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Any Questions?