# Greening Our Hospitals: Water

health

Case study

# Central reclaim water pipeline

## Overview

Water efficiency is critically important to society but due to the low cost of water, water reduction projects often do not have a commercial payback. Greening Our Hospitals: Water provided funding for water efficiency measures based on a set of criteria that were not purely financial but instead included sustainability principles. The need to reduce water consumption is seen as increasingly important due to a seven-year drought and severe water shortages in some rural areas, and has been supported by governmental environmental policy requirements, including the department's sustainability policies.

Due to careful planning and implementation the Eastern Health – Box Hill Hospital project has been highly successful, exceeding initial savings forecasts by approximately double and achieving a very short simple payback of 1.5 years.

## Summary

This project set out to collect water from the sterilisers located on level four of the Main Block. Seal water from the liquid ring vacuum pumps and condenser cooling water is diverted to a collection tank located in the grounds behind the kiosk via a 100-millimetre, centrally located reclaim water pipeline. The water is then pumped up to toilet flusher tanks located on the level seven roof of the West Wing. Careful planning of the central reclaim water pipeline has enabled the hospital to reclaim additional water from the new dialysis unit reverse osmosis (RO) and the adiabatic coolers.

- Steriliser vacuum pump wastewater and condenser cooling water is diverted to a 13,000-litre tank on the ground floor. The first 30 metres of the 100-millimetre piping is high-density polyethylene to accommodate the high temperature of the discharge water when the steam ejector is working through the pump.
- The reclaimed water is then pumped up to the flusher tanks. This pump feeds a pressure system and is controlled by a two-level float switch. This ball valve allows for a dead band to maintain tank levels above 66 per cent.
- When the tank levels drop below 65 per cent capacity a motorised valve opens the town main to top up the flusher tanks to the default level. Two sets of interconnected flusher tanks are located on the roof of West Wing and service 80 per cent of toilets in the hospital.

Steriliser water reclaim tank

**Health service**
Eastern Health – Box Hill Hospital

**Total investment**
$55,000

**Date of completion**
May 2008

**Initial water saving estimate**
6,200 kL per annum

**Actual water saving**
11,365 kL per annum

**Annual cost saving**
$35,800

**Simple payback**
1.53 years

**Project design**
Eastern Health

**Water cost**
1.6533 $/kL in 2011
0.8819 $/kL in 2007

**Sewage disposal cost**
1.6697 $/kL in 2011
1.0277 $/kL in 2007

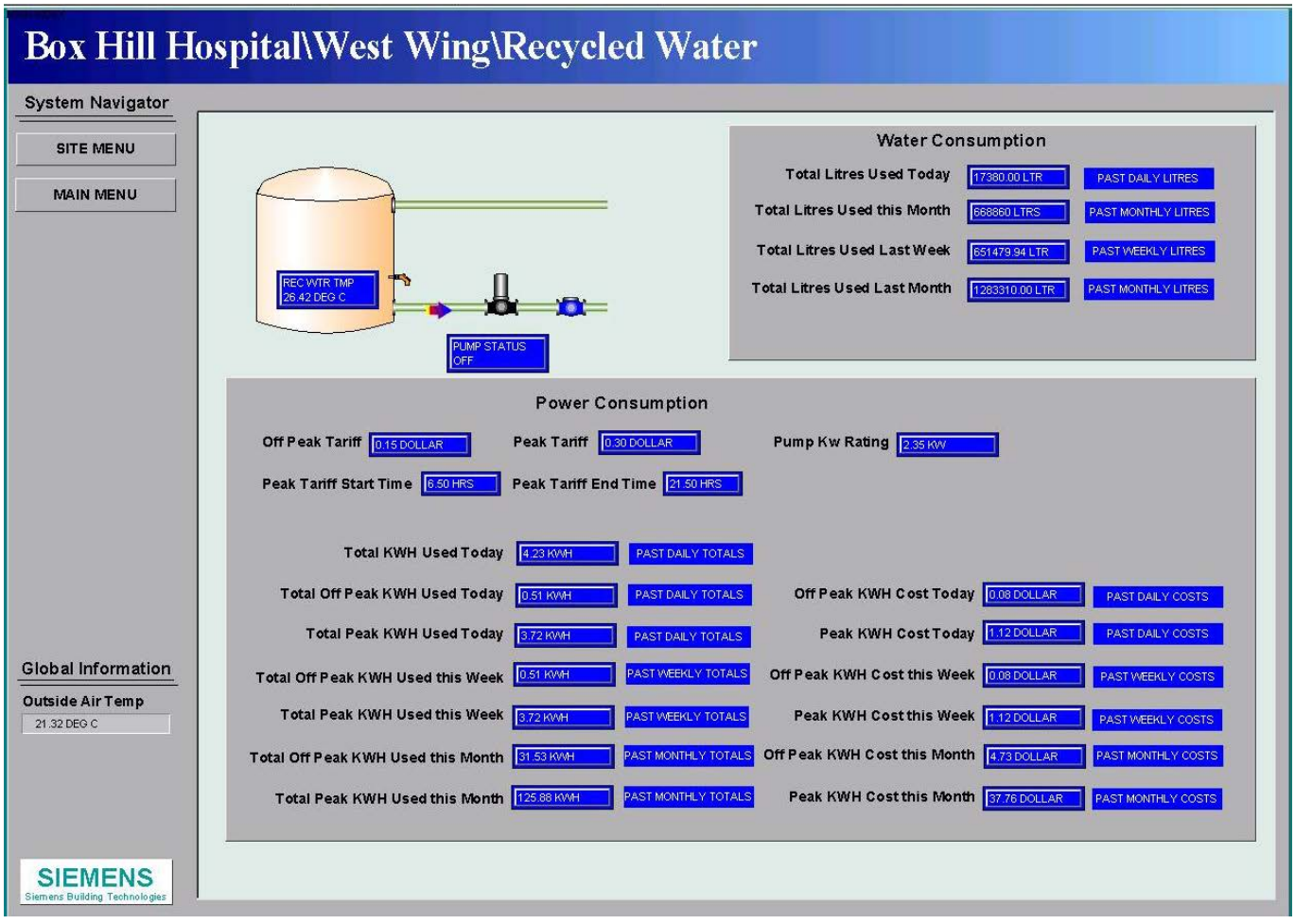
**Initial projected $/kL saved**
$8.87

Pulsing water meter connected to BAS

- The reclaim water piping runs centrally through the hospital, which has enabled easy connection to other systems.
- Two centrally monitored pulsing water meters were installed on the incoming water mains. These meters are connected to the building automation system which logs water consumption and alarms when consumption falls outside preset parameters.
- Reject water from the dialysis RO plant on level four is discharged into the central reclaim water pipeline.
- Bleed and spray water from four Muller 3C adiabatic coolers on the West Wing roof is discharged into the central reclaim water pipeline.
- Reject water from the pathology RO plant located in the West Wing level five is collected in a 350-litre tank then pumped directly to flusher tanks when full.

Since its inception Eastern Health has been working to reduce the amount of energy, water, waste and other resources that it consumes. New projects such as the new dialysis unit have specific funding to include sustainability initiatives. Other projects such as the adiabatic cooler and pathology RO reject water reclaim are funded from the maintenance budget. A number of these projects came out of the WaterMAP process, starting with the pilot project to collect and pump the pathology RO reject water up to the toilet flusher tanks. This project reclaimed 746 kilolitres per year, the year before the Greening Our Hospitals: Water project. The water collection system was further expanded in 2010 to collect RO condensate water from a newly installed dialysis unit on level two of the hospital (RO plant is located on level four). It is anticipated that this will provide another 5,000 kilolitres for toilet flushing. The main system has proven durable with almost 2.5 years of trouble-free operation. All system maintenance is documented in the site preventative maintenance program.

Screen shot of BAS water monitoring interface



## Key technical issues

Infection control was consulted throughout each separate project and their advice was central to what water was collected, such as the water from the vacuum pump and condenser and not the chamber drain. The three sterilisers operate up to 30 cycles per day so the cutover timing was critical. As with all works in critical areas, consultation with the users was vital to the success of the project. Some of the technical and installation issues to be overcome were:

- The pressure pump kept tripping out on overload because the ball valve oscillated slightly when it was filled, but this issue was solved by fitting a delay-start timer to the pump.
- Initially the town mains water backup was controlled in the tank using a complex ball-valve arrangement. This system proved unreliable and a float switch and motorised valve were retrofitted.
- A set of administrative procedures was created to run the system on town main water if the motorised valve failed.
- A monthly tank sanitisation program was implemented as the temperature in the collection tank was 26° C.
- Cutover of sterilisers to the collection pipe had to be coordinated and timed.
- The location of collection tank, pressure pump and pipe runs had to be planned.

### What worked well:

- fitting a motorised valve for the town main back up
- sub-metering on high water-use equipment
- remote water meter management
- connecting each component to the building automation system to monitor collected water temperature, calculate water and energy consumption and provide alarms when water consumption falls outside of the preset range.

### What did not work well:

- using a mechanical ball valve arrangement for flusher tank make-up
- not installing remote-monitored sub-meters.

## Health service profile

Eastern Health provides a comprehensive range of high-quality acute, sub-acute, palliative care, mental health, drug and alcohol, residential care and community health services to people and communities that are diverse in culture, age, socioeconomic status, population and healthcare needs.

Eastern Health delivers clinical services to more than 700,000 people through seven clinical programs from more than 25 different locations. Our services are located across 2,800 square kilometres in the east – the largest geographical catchment area of any metropolitan health service in Victoria.

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