

# Eco-Efficiency Planning

Sunshine Coast – Wide Bay Health Service District

Fraser Coast Health Service

Climate Change, Healthcare  
and Carbon Footprints

5 – 6<sup>th</sup> August 2010

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Fraser Coast Health Service



Queensland Government

Queensland Health

# HERVEY BAY HOSPITAL



# The Fraser Coast Health Service

- It is part of the Northern Cluster together with the Wide Bay Health Service
- The Fraser Coast Health Service is serviced by Maryborough Hospital and Hervey Bay Hospital and 4 smaller facilities including, 1- Aged Care Facility, 2- Community Health Centres, and 1- Oral Health Centre.

# ECO & ENVIROMENTAL - EFFICIENCY INITIATIVES

- ❖ Building Management System (BMS) upgrade
- ❖ Implementation of energy strategies
- ❖ On-going of Cost Avoidance
- ❖ Implementation of ongoing maintenance
- ❖ Water Conservation (Reduction)

# Building Management System (BMS) Upgrade

- Removal of obsolete BMS
- Installation of Web Based BMS
- Re-Commissioning of Air handling Units
- Cold Duct Temperature scheduling (AHU's)
- Install new industry standard Valve Actuators
- New Chiller Sequence and Chilled Water Control
- New Cooling Tower Sequence Control



# BMS Components

- Install NEW Stand Alone Direct Digital Controllers (173)
- Install industry standard actuators
- Install NEW temperature sensors
- Re-Use existing lan cabling



# BMS - Web Enabled (Connect to Internet (Standard ADSL))



# Operating Theatre's

## Install Proximity wall sensors

- Light Sensor.
- Humidity sensor.
- Temperature Sensor.
- Temperature Indication.
- Visual Temperature Indication.
- Visual Bar graph (distance from Set point).
- Non Touch Set Point adjustment (Proximity).

## Control Strategy

- Auto reset set point on Time Schedule.
- Night Set Back of Temperature Set Point.
- Manual Set Point adjustment 24hrs
- Auto Night Reset of Set Point after 2hrs.



# Air Handling Units

Accurate Cold Duct control

Online POP UP Information

Economy Cycle

Medical. (AHU A4)

Request Pos = 46.0 %  
Actual Pos = 45.6 %

11.5 °C = Calculated S/A

Req Pos = 100.0 %  
Actual Pos = 84.6 %

Req Pos = 97.0 %  
Actual Pos = 83.1 %

Req Pos = 100.0 %  
Actual Pos = 84.6 %

Req Pos = 90.0 %  
Actual Pos = 77.2 %

Req Pos = 73.0 %  
Actual Pos = 65.8 %

Req Pos = 89.0 %  
Actual Pos = 62.5 %

27.4 °C 29.6 %

156.2 Kpa

12.2

Setpoint = 25.0 Kpa

100.0 %  
**Running**  
Normal  
Request On

**NOT AVAILABLE**  
Request Off

**NOT AVAILABLE**  
Request Off

**AVAILABLE**  
Request Off

**AVAILABLE**  
Request Off

**NOT AVAILABLE**  
Request Off

**AVAILABLE**  
Request Off

OSA

EXH

0.0 %

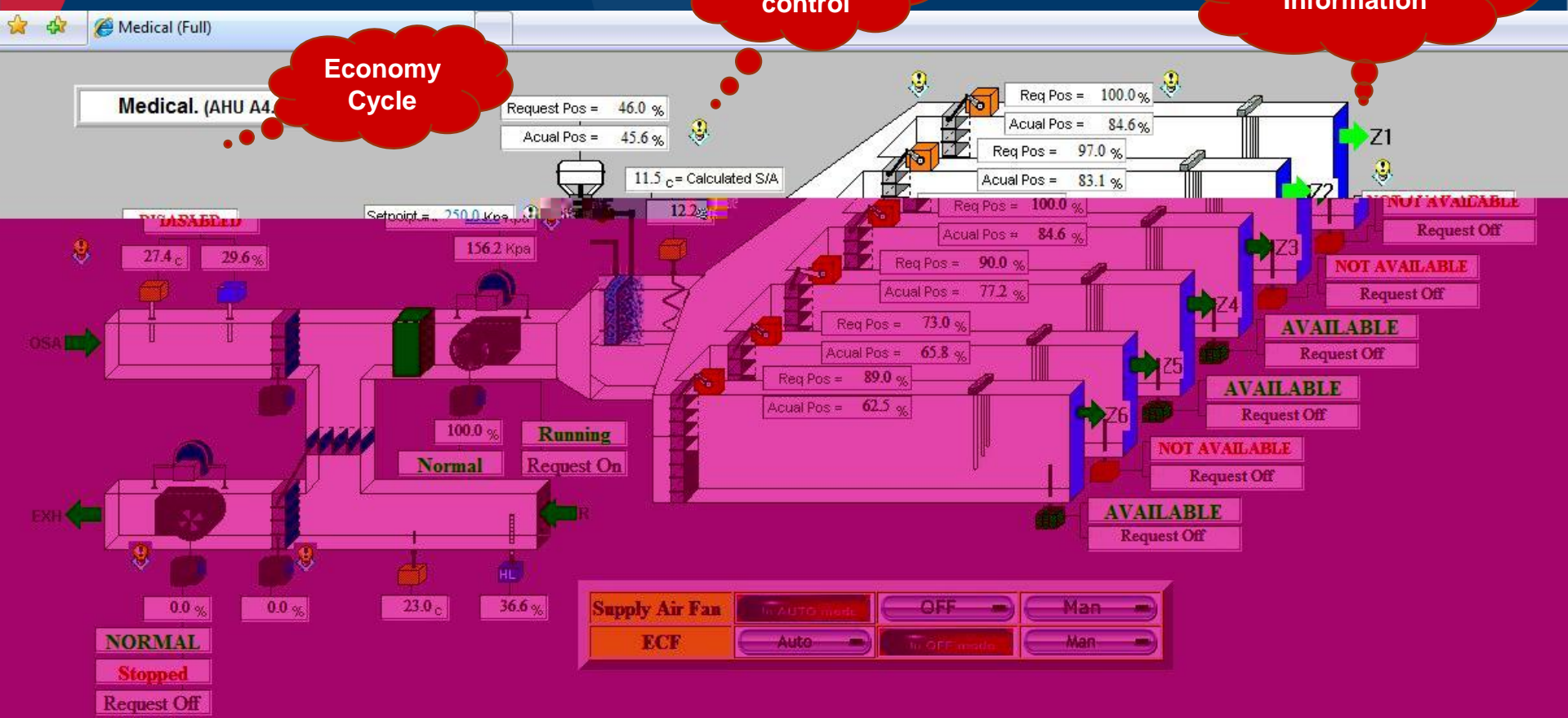
0.0 %

23.0 °C

36.6 %

**NORMAL**  
**Stopped**  
Request Off

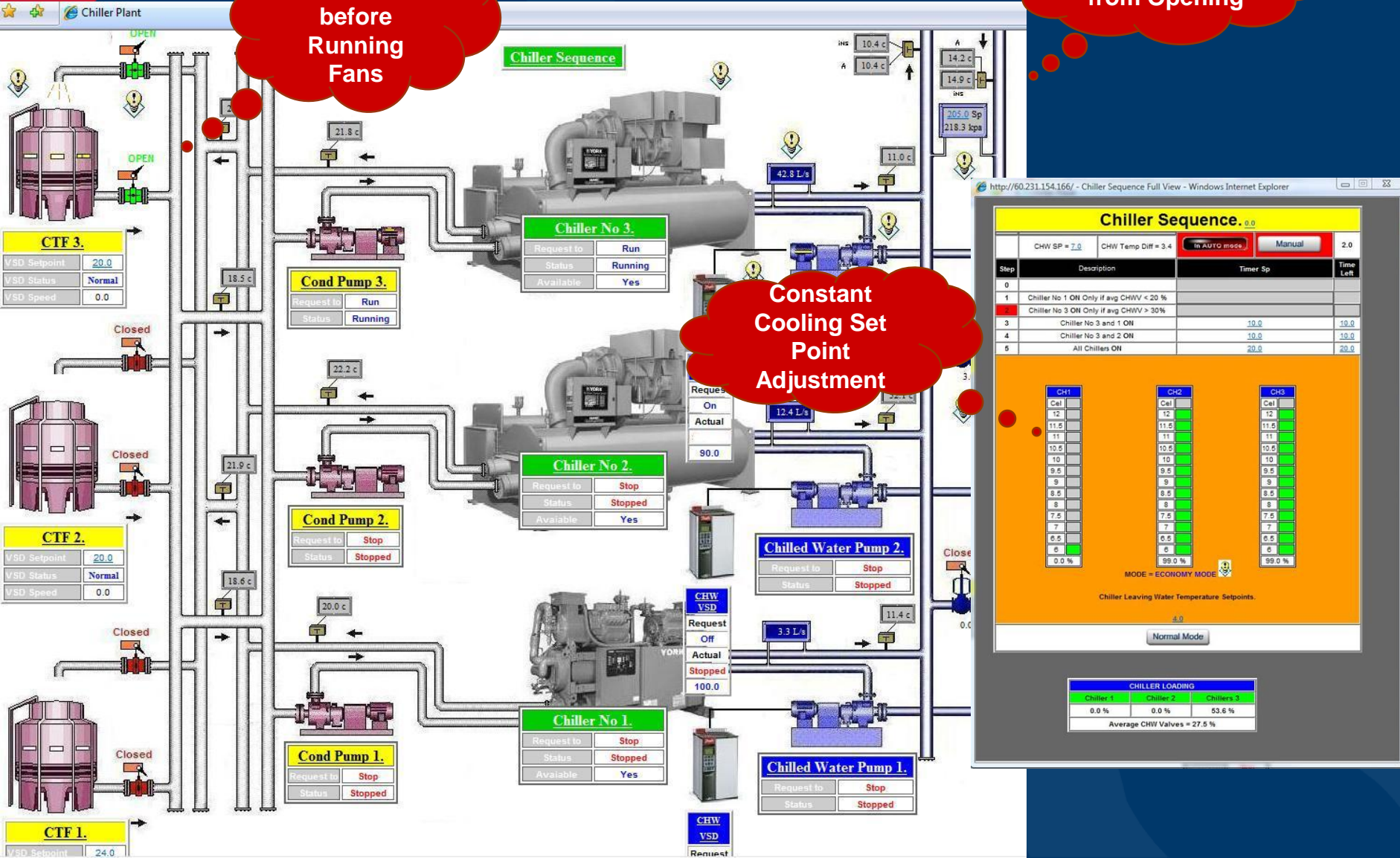
<b>Supply Air Fan</b>	In AUTO mode	OFF	Man
	ECF	Auto	In OFF mode



# Chiller Plant

Stage Towers before Running Fans

Minimize Bypass valves from Opening



Constant Cooling Set Point Adjustment

Chiller Sequence. 0.0

CHW SP = 7.0 CHW Temp Diff = 3.4 IN AUTO mode Manual 2.0

Step	Description	Timer Sp	Time Left
0			
1	Chiller No 1 ON Only if avg CHWV < 20 %		
2	Chiller No 3 ON Only if avg CHWV > 30%		
3	Chiller No 3 and 1 ON	10.0	10.0
4	Chiller No 3 and 2 ON	10.0	10.0
5	All Chillens ON	20.0	20.0

CH1		CH2		CH3	
Cell	Setpoint	Cell	Setpoint	Cell	Setpoint
12	12.0	12	12.0	12	12.0
11.5	11.5	11.5	11.5	11.5	11.5
11	11.0	11	11.0	11	11.0
10.5	10.5	10.5	10.5	10.5	10.5
10	10.0	10	10.0	10	10.0
9.5	9.5	9.5	9.5	9.5	9.5
9	9.0	9	9.0	9	9.0
8.5	8.5	8.5	8.5	8.5	8.5
8	8.0	8	8.0	8	8.0
7.5	7.5	7.5	7.5	7.5	7.5
7	7.0	7	7.0	7	7.0
6.5	6.5	6.5	6.5	6.5	6.5
6	6.0	6	6.0	6	6.0
0.0 %		99.0 %		99.0 %	

MODE = ECONOMY MODE

Chiller Leaving Water Temperature Setpoints: 4.0

Normal Mode

CHILLER LOADING		
Chiller 1	Chiller 2	Chillers 3
0.0 %	0.0 %	53.6 %
Average CHW Valves = 27.5 %		

# Trend Monitoring - Input

http://66.88.33.180/solidyne/datalog/applet.htm - Microsoft Internet Explorer

Data Logs Watch

Point	Description	Type	Interval	Size
n001i1	Input 1	Average	15	250
n001i1	Input 1	Instantaneous	15	100
n001o1	Output 1	Digital	15	100

### Add New Data Log

Points  
[n001i2in] Input 2

Log Interval (minutes)  
5

Maximum file size (Kb)  
250

Save Cancel

Add New Edit Selected Remove Selected

Solidyne Jan 17, 2003 11:03:36 AM

# Trend Monitoring - Results

Microsoft Internet Explorer window showing the Solidyne configuration page.

Address: <http://demo.solidyne.com/solidyne/>

Browser based control systems by **Solidyne**

### Solidyne Configuration

- DEMO
  - node 1
  - node 2

[Edit Schedules](#)

**Data Logs** | **Watch**

[n00111 av] Input 1	68	<input type="checkbox"/>
<EMPTY>		<input checked="" type="checkbox"/>
<EMPTY>		<input checked="" type="checkbox"/>

**Graphics** | **CSV Data**

Jan 17, 2003 11:45:54 AM

Applet Applet1 started

Local intranet

# Gas Consumption

- Gas was changed over from LPG to Natural Gas in 2008
- Upgraded to more efficient gas fired steam boilers
- Upgraded Kitchen equipment
- Reduction of Natural Gas to Solar Heating on the Hydro Therapy Pool (Maryborough)
- Gas usage has increased as a result of increased surgical activity in Theatres.

# EQUIPMENT

## Heat Pumps



Heat pumps



Heat pumps

- Heat pumps are configured to existing gas fired hot water system
  - Existing clarifiers are now used for bulk storage
  - Hot water reticulation is regulated by the heat pumps
- OUTCOME: Reduced gas usage**

# EQUIPMENT

## Boilers



Boiler

- Installation of more efficient steam boilers completed February 2008

**OUTCOME:** reduction of natural gas usage



Boiler control pad

# EQUIPMENT Sterilizers



Sterilizer 1 -  
front access



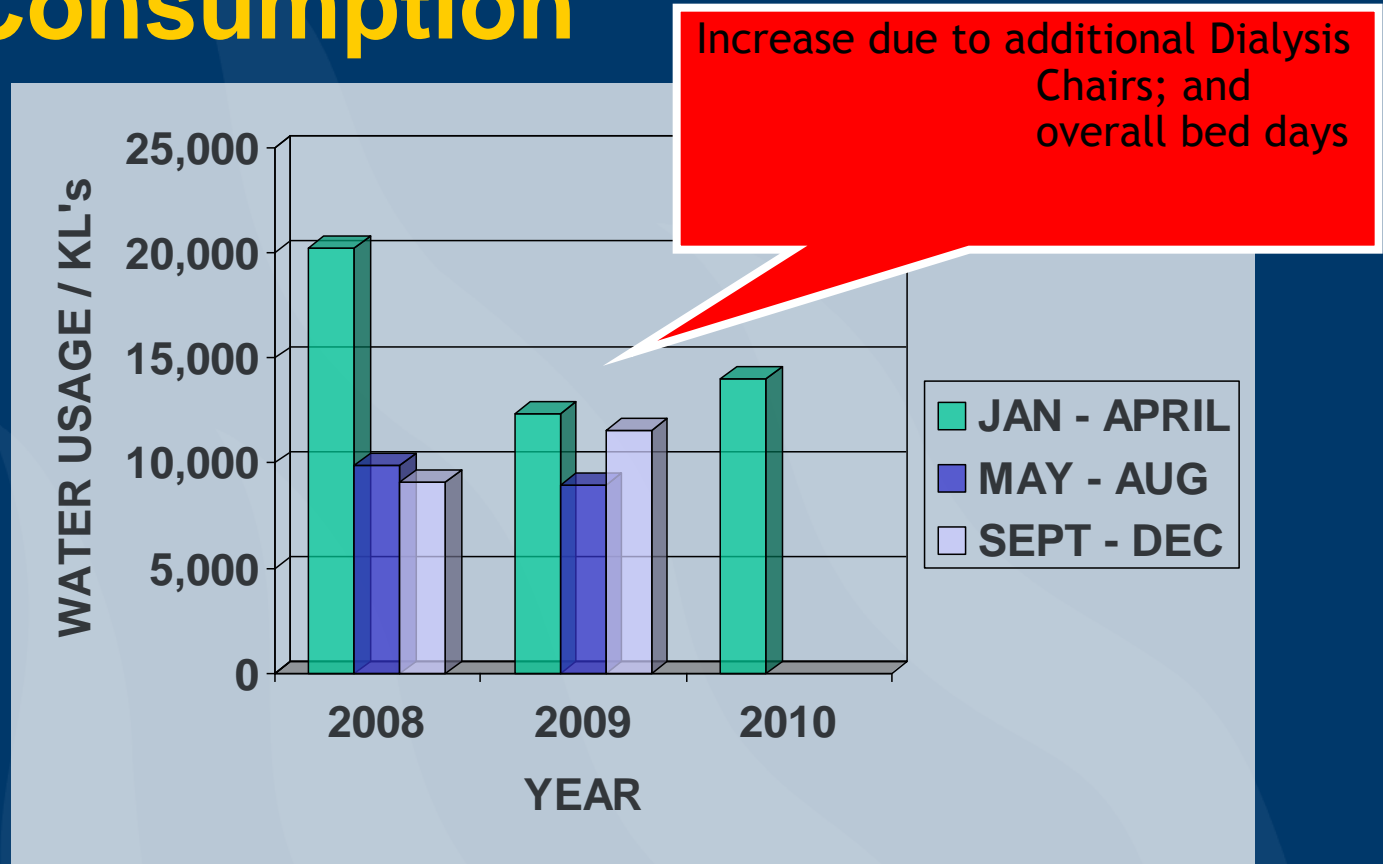
caption

13/06/2008

- Installed March 2008
- Access to front allows easier maintenance

**OUTCOME:** Added savings in all areas including water, power and steam.

# Water Consumption



**OUTCOME:** Without water saving strategies put in place, it is estimated that from January 2008 water consumption would have increased by 40% due to increased infrastructure

# EQUIPMENT Chillers



VSD Control Panel



LCD Control Panel

- Installation of the VSD (Variable Speed Drive) on a centrifugal chiller to control the capacity of the chiller in lieu of existing conventional capacity control
- The VSD modulates the speed of the chiller constantly to supply the required amount of cooling load

**OUTCOME:** Major reduction in electrical supply

# EQUIPMENT

## VSD Installation – Chilled Water Pumps

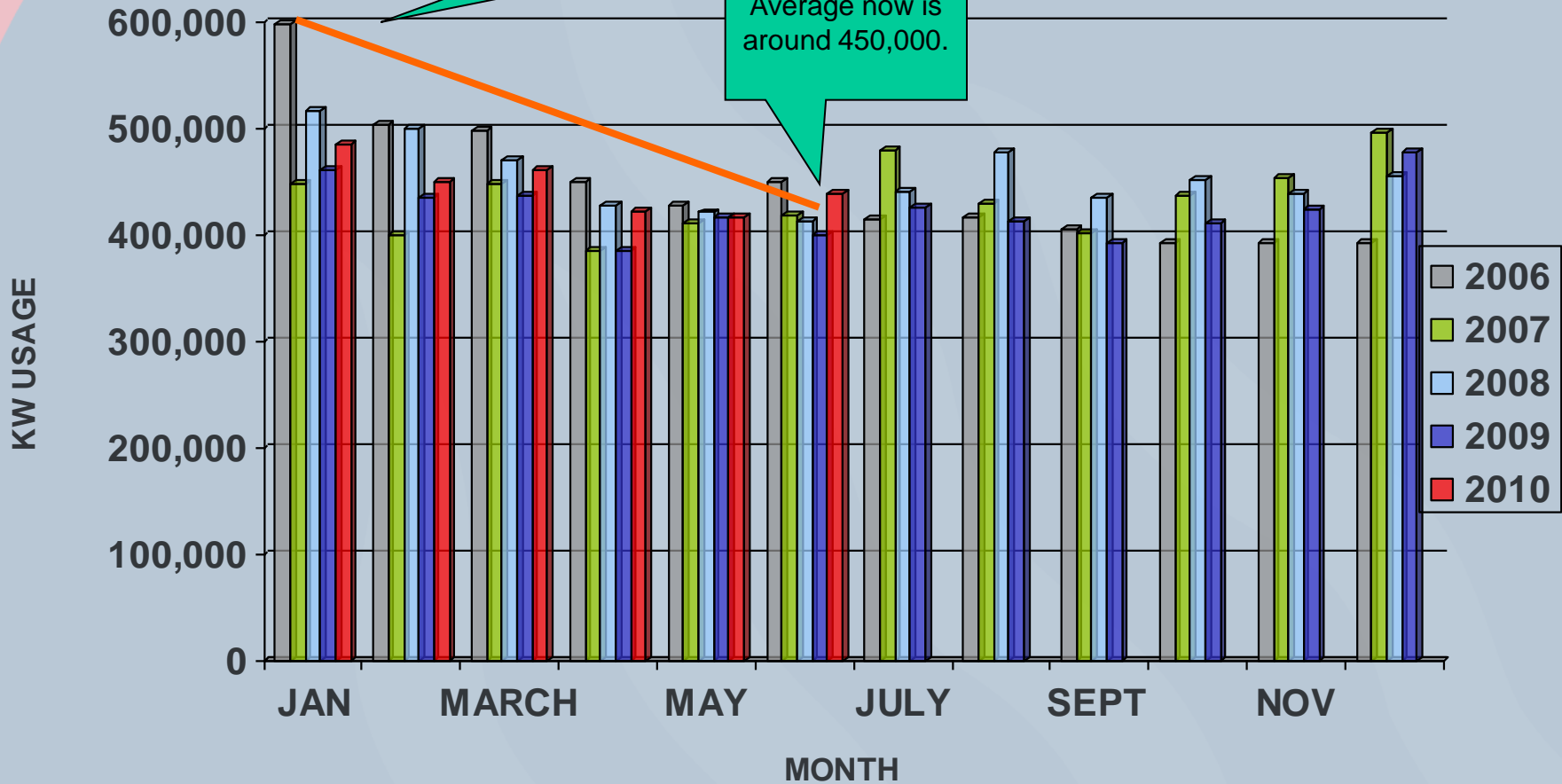


- Variable Speed Drives (VSD's) have been installed on all chilled water pumps to achieve energy savings when pumps are not required to run at 50hz

**OUTCOME:** Energy savings on power usage

# Energy

Annual Savings of approx 1.5 million KW Hours of run for the Hervey Bay Hospital



# Hervey Bay Project

- **Total Project Cost - \$986,370**

- **Total Project Savings:** (Validated to date)

- Annual CO2 savings = 1625 tonnes
      - (over 400 cars off the Queensland roads annually)
    - Annual electricity savings = 1,534,014 kWhs
    - Annual water = 23,400 KL
    - IRR = 20%
    - Loan payback period = 5 years



# Maryborough Project

- **Total Project Cost - \$956,505**

## **Total Projected Savings:**

- Annual CO2 savings = 1105 tonnes
  - (over 275 cars off the Queensland roads annually)
- Annual electricity savings = 1,104,878 kWhs
- Annual Gas Savings= 105 Gj
- Annual water = 1078 KL
- IRR = 16.47%
- Loan payback period = 7 years



# Next Phase Of Energy Reduction

- Introduction of 350kw of Solar Power to support the daylight hours of consumption for Power and Light. Anticipated completion January 2011
- Introduction of additional 450kva Generator System to complement the existing 900kva to allow approx (1) megawatt of surplus energy to be co-generated back to the supply authority grid, anticipated to commence in February/March 2011
- Energy reduction enhancements on Maryborough Hospital complete, ready for validation in November 2010

# Acknowledgments - Queensland Government (July 2010)

- Fraser Coast Health Service has been recognised for the Energy Reduction at the Hervey Bay Hospital and we have been awarded a \$2 million budget to install 350KW of PV Solar.

## \$4m solar farm makes Hervey Bay renewable capital

Hervey Bay is positioning itself to become the renewable energy capital of the Sunshine State with a \$4 million solar farm to power the hospital and a water treatment plant.

Premier Anna Bligh and Energy Minister Stephen Robertson visited Hervey Bay on Friday to announce funding for the state's first community solar farm which will produce 300-500 kilowatts of clean power from next year. Half the \$4 million funding will go towards developing the solar park on 20ha at the Fraser Coast Water Recycling Innovation Centre and Arboretum on Hebblewhite Road in Lawungan.

The other \$2 million will be used to install solar panels on the roof of the Hervey Bay Hospital with excess energy fed into the grid.

The solar park will consist of 1500 solar panels each measuring 1.5 metres by 1 metre, taking up two hectares.

A further eight hectares will be left vacant for future solar farm expansion. A 2009 election promise, the solar park was initially proposed for a bogoom, but was reworked into the

some of the best sunshine in the world," Premier Bligh said.

"Hervey Bay Hospital will not only treat people, but it will now provide energy for us."

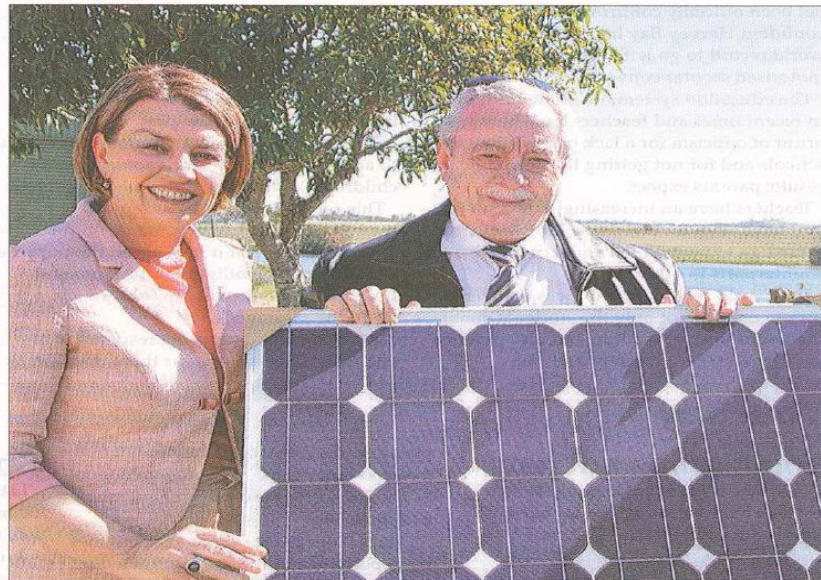
Energy Minister Stephen Robertson said if successful, the community solar farm could be replicated throughout the state.

"Energy savings provided by a 400kW solar installation have the potential to save 600 tonnes of carbon emissions every year, or the equivalent energy use of 70 households," Mr Robertson said.

"The solar power generated at health service facilities, including Hervey Bay Hospital and the Wide Bay community solar farm, will help Queensland create a virtual solar power station by doubling our solar energy generation over the next five years."

Fraser Coast Mayor Mick Kruger said council had already taken a greener approach to new buildings and had appointed an energy efficiency officer to oversee construction.

"We have solar panels on our library and art gallery and we will have them



Premier Anna Bligh flew into Hervey Bay on Friday to announce a \$4 million solar scheme as part of her 2009 election commitment. She is pictured with a solar panel

# Acknowledgments – World Health Organisation

Hervey Bay Hospital has been recognised by the W.H.O as a Health Facility demonstrating best practise in Energy Efficiency.

