




# 50 Lonsdale Street Sustainability Victoria Air Conditioning Set-point Offset Trial

Property Owner: 

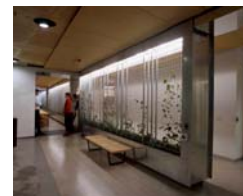
Engineer & Specialist  
Contractor: 

Sustainability Victoria  
Level 28, 50 Lonsdale St  
Melbourne VIC 3000  
sustainability.vic.gov.au



## SV's Fit-out

- > Located on the 28<sup>th</sup> level of the Urban Workshop
- > 1950m<sup>2</sup> NLA
- > 5 Star Green Star/ 5 Star NABERS ratings
- > ISO 14001 Certified Environmental Management System
- > Stretch targets for energy, materials and water consumption as well as transport and est. for sustainable procurement



sustainability.vic.gov.au



## **Sustainability Victoria**

### **Air Conditioning Set-point Offset trial**

- > In August 2009 Sustainability Victoria's tenancy was modified to accommodate an Air Conditioning set-point offset trial.
- > Trial sought to determine the savings achieved by installing set-point offset control strategies
- > Equipment was installed on a control floor with the same monitoring equipment
- > A control floor was chosen due to a similar amount of tenants and equipment located there.



## **Sustainability Victoria**

### **Air Conditioning Set-point Offset trial Drivers**

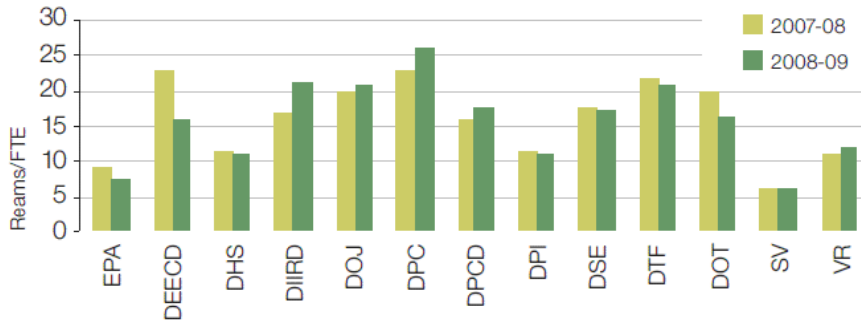
- > Pursuit of best practice in tenancy operations
- > Energy cost savings / Carbon emissions management
- > Replication value
- > Low cost no cost savings
- > Strong element of adaptation/behaviour change



## Drivers - best practice in tenancy operations

SV performs at the top amongst Whole of Victorian Government entities that report their EMS results

Figure 9. Reams of A4 equivalent paper used per full time equivalent employee

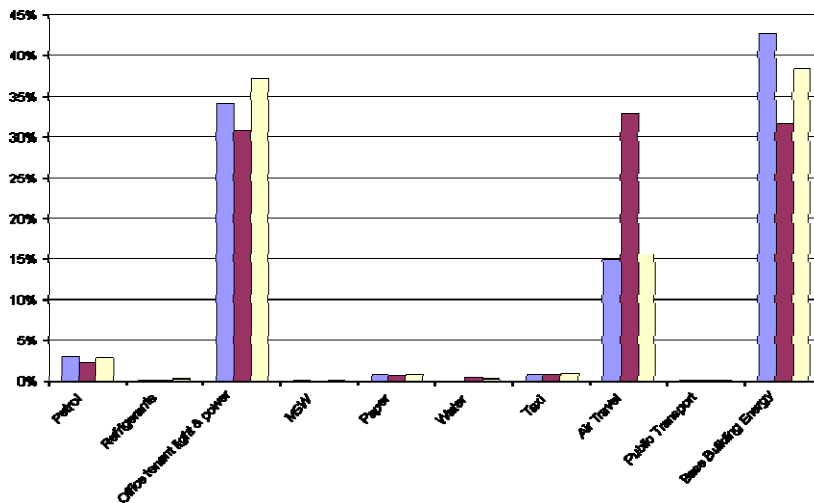


sustainability.vic.gov.au



## Drivers - Carbon emissions management

07/08 GHG Emissions 08/09 GHG Emissions 09/10 GHG Emissions



sustainability.vic.gov.au





## Instrumentation



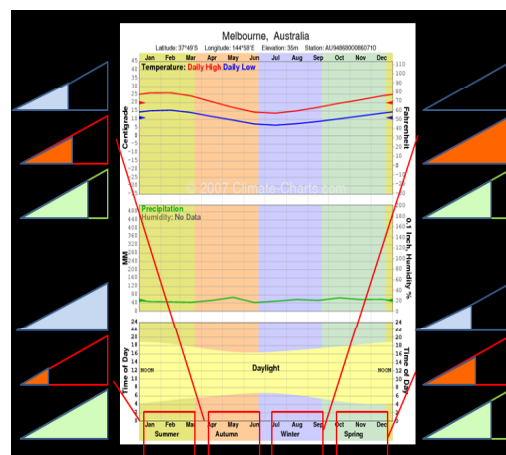
- > BACnet Control system for collecting data
- > Existing Pulse kWh meters to measure fan energy
- > 4-20mA temperature probes connected to the DDC system to measure return water temperatures



## Control Setup



- > Set-point initially raised or lowered between from -0.5 to 0.5 Degrees Celsius based on the month
- > January to March set-point offset increased to 1.5 Degrees Celsius

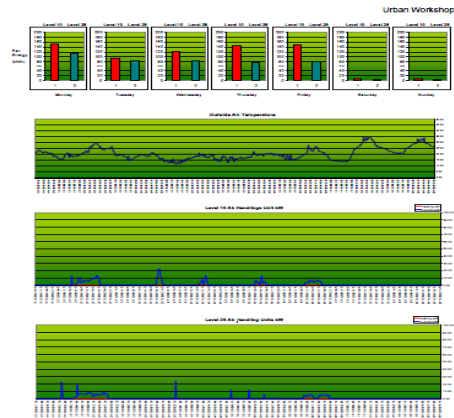


## Data Reporting



Data collected includes

- > Fan energy usage (kWh)
- > Heating hot water Energy usage (kWr)
- > Chilled Water Energy Usage (kWr)



## Sustainability Victoria Air Conditioning Set-point Offset trial Communications

Extensive communications strategy deployed prior to implementation of the trial which included:

- > All Staff presentation which included a Q&A
- > Follow up All Staff email on specific details
- > Email dropbox set up called 'Comfort'
- > Regular updates as to how the trial was progressing
- > Mid-point survey to gauge the impact on staff comfort



## Communications

### >> inside newS

Edition 39, August 2009

#### BEHAVIOUR CHANGE IN FULL SWING

The set-point trial had finally begun by 1 August after a few glitches due to the monitoring systems installation.

The temperature range and conditions will now be monitored more closely than ever by our resident project manager from AG Coombs, who is responsible for ensuring we stay within the agreed temperature ranges of 20-23°C in the winter and 23-26°C in the summer.

We've already had a huge win with respect to behaviour ch, ch, ch, ch, chaaaanges...

After sternly advising Kelly Wickham that she doesn't 'wear anything but heels and I don't do layers', Vanessa Lawry has rugged up for work to defend against the slight decrease in temperature. Now that's adapting.

Remember, email [Comfort](#) if you have any issues regarding the temperature in the office.



## Preliminary Survey Results

### SUSTAINABILITY VICTORIA: Testing best practice measures - Set point trial survey results

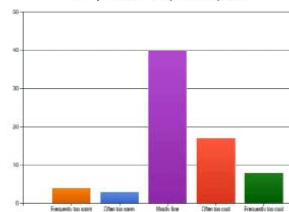
Sustainability Victoria, in conjunction with Knight Frank and ISPT, trialled an expanded set point temperature range at its level 28 location of the Urban Workshop, 50 Lonsdale Street, Melbourne. Commencing in August 2009 the trial will run one year to September 2010 with a two month period in the summer of 2010/11 to attribute savings observed during the trial period.

Staff who were working with Sustainability Victoria prior to the implementation were recently surveyed to ascertain comfort impacts due to the trial. The results were quite interesting and of the 110 staff surveyed just over 60% responded.

As a baseline:

- > 5.7% of staff found the office frequently too warm
- > 4.3% of staff found the office often too warm
- > 57.1% of staff found the office mostly fine
- > 24.3% of staff found the office often too cool
- > 11.4% of staff found the office frequently too cool

How did you find comfort levels prior to the set point trial?



The temperature range during the trial was expanded from the previous  $\pm 1.5^\circ\text{C}$  from a set point of  $21.5^\circ\text{C}$  to  $\pm 3^\circ\text{C}$ . The results are as follows:

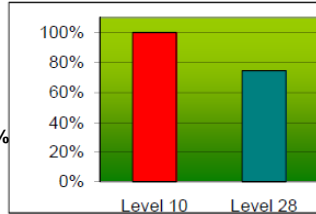
- Comfort levels during the winter months of the set point trial:
- > 0% of staff found the office frequently too warm
  - > 2.9% of staff found the office often too warm
  - > 70% of staff found the office mostly fine
  - > 21.4% of staff found the office often too cool
  - > 5.7% of staff found the office frequently too cool



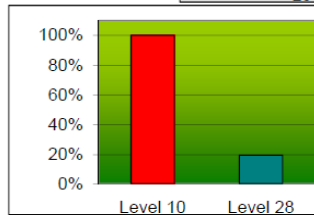
## Results

### Energy consumption baseline December 2009

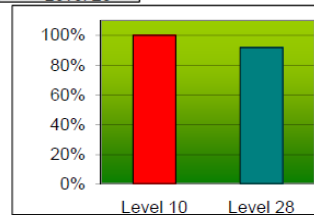
- Total estimated fan energy savings 13%
- Estimated chilled H<sub>2</sub>O energy savings 12%
- Total est. GHG savings = 4,642 kg CO<sub>2</sub>-e



Fan Energy  
2498 kWh vs  
1865 kWh



Heating Hot Water  
Energy  
80.4 MJ vs 15.8 MJ



Chilled Water  
Energy  
13430 vs 12325 kWh

sustainability.vic.gov.au

Sustainability  
victoria  
Victoria  
The First State

## Ongoing Communications

**Preliminary results from the expanded temperature set point trial - Message (HTML)**

From: Paul Wilburn  
To: Anika Poppy, Simon Clay  
CC:  
Subject: Preliminary results from the expanded temperature set point trial

Some exciting preliminary results from our expanded temperature set point trial where we're comparing base building chilled water and fan energy use against a control floor in level 10. Level 10 has a very similar population to ours (145+) and a relatively similar fit-out in that its open around the perimeter and somewhat enclosed near the building core area.

Given that we've doubled the range of acceptable limits on temperature for our floor from plus or minus 1.5 degrees to plus or minus 3 degrees we've pushed in upwards of 40% savings compared to level 10. The graph below represents a 36% savings from the December to early January and a savings of 8,356 kgCO<sub>2</sub>-e or 167,000 black balloons. That can't be right! This is also a savings of a \$100/month based on:

- If Level 10 used 3011 kWh of electrical energy in December, then we would have saved 3011 \* ((77-64)/100) = 391.43 kWh = which is about \$58 savings.
- If Level 10 used 13299 kWh of Chilled water energy in December (and the chillers have a COP of 4), then we would have saved 13299 / (70-61)/100/4 = 299.23 GJ which is about \$45 savings. This simple adjustment could save ISPT at the Urban Workshop in upwards of \$20,000/year!

The numbers within the brackets are percentages e.g. 77-64 and 70-61 and they account for the efficiencies we've achieved due to the ramping up of temperature over the period from November to January. In other words we went from 0.5 degrees in one month to 1.0 the following and finally to the 1.5 degrees at the peak of the trial.

ISPT is pretty keen to have this rolled out not only across this building but perhaps across its entire building stock. We'll get together a case study once the trial is over (Aug/Oct 2010) and we'll be given credit for showing the way! Thanks to Paul and co. for making this happen...

**Sustainability Victoria  
Setpoint Offset trial - Chilled water energy**

Chilled Water energy consumption from the 30th of November until the 10th of January 2010. Level 10 consumed 17302 kWh compared to 11112 kWh consumed by level 28.

ISPT  
SUPER PROPERTY

Sustainability  
victoria  
Victoria  
The First State



## Sustainability Victoria Air Conditioning Set-point Offset trial Next steps

- > Suspend for a period over summer to ascertain savings
- > Trial alternative scenarios
- > Work with ISPT to roll out through Urban Workshop
- > Disseminate to sector more broadly

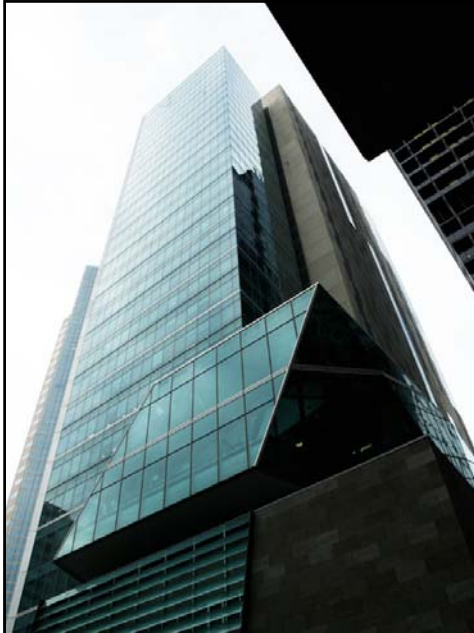


## Contact

- > [Kelly.wickham@sustainability.vic.gov.au](mailto:Kelly.wickham@sustainability.vic.gov.au)

## Search

- > [www.resourcesmart.vic.gov.au](http://www.resourcesmart.vic.gov.au)
- > [www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)



# 50 Lonsdale Street Sustainability Victoria Air Conditioning Set-point Offset Trial

Property Owner: 

Engineer & Specialist  
Contractor: 

Sustainability Victoria  
Level 28, 50 Lonsdale St  
Melbourne VIC 3000  
[sustainability.vic.gov.au](http://sustainability.vic.gov.au)

