

Energy Efficient Office Buildings:

TRANSFORMING THE MID-TIER SECTOR



The Victorian Government is committed to new jobs, growth and leadership in climate change. Key to this leadership are plans to seize the opportunities for new technology and the jobs of the future as outlined in the New Energy Technologies Strategy, and to actively reduce emissions and adapt to the impacts of climate change.

In June 2015, the Victorian Government released its Energy Efficiency and Productivity Statement: Saving energy, growing jobs. The statement outlined the vision and priorities needed to deliver a productive, energy efficient economy for Victoria. Benefits outlined in the statement include increased employment opportunities, higher economic productivity, improved working conditions, improvements in health and wellbeing and cost savings for businesses and households.

So, how to deliver reductions in energy use and greenhouse gas emissions? One highly cost-effective method is via improvements in building performance. Investment in energy efficiency improvements in the built environment also results in new jobs, while supporting the innovative products and services that are helping transition our economy and community.

This report summarises the findings of Sustainability Victoria's Energy Efficient Office Buildings (EEOB) program, which was designed to assist owners of mid-tier commercial office buildings to reduce costs and environmental impacts via improved energy efficiency.

The mid-tier sector represents a significant opportunity for change, accounting for 80% of office buildings and 50% of floorspace. Change across the sector could deliver emissions reduction of 540,000 tonnes per year – the equivalent of taking 135,000 cars off the road.

The aim of this research is to demonstrate what's possible and engage the sector to invest in these changes and reap the economic and environmental benefits.

Hon Lily D'Ambrosio
Minister for Energy, Environment and Climate Change
Minister for Suburban Development

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Table of Contents

Executive summary	4
What is the mid-tier?	6
What is the opportunity?	7
Energy efficient office buildings program	8
Insights from the EEOB program	14
Moving forward	16
Key messages for property owners	17
Key messages for facility managers And service providers	19
Key messages for tenants	21



Executive summary

Sustainability Victoria's Energy Efficient Office Buildings program demonstrates that energy savings of up to 29% can be achieved across the mid-tier office buildings sector, via building tuning and cost-effective energy efficiency measures.

The building sector in Australia accounts for approximately 19% of total energy consumption and 23% of greenhouse gas (GHG) emissions¹. Recent modelling suggests that the building sector can potentially deliver a 23% reduction in emissions by 2030, with reductions of 55% estimated by 2050². The modelling assumes no further technological breakthroughs and suggests, therefore, that these reductions can be realised through viable cost-effective energy efficiency actions alone.

Should no further action be taken, modelling also suggests that the building sector could potentially consume almost half of Australia's carbon budget by 2050. The carbon budget is the maximum GHG emissions Australia can release to have a reasonable chance of limiting global warming to 2 degrees Celsius. Significant cuts to emissions across the built environment sector are therefore critical for Victoria and Australia to reach long-term targets of net zero GHG emissions by 2050. Urgent action is required now to transform this sector. The mid-tier building sector comprises a significant

portion of the built environment. The 'mid-tier' is defined (within the commercial building sector) as non A-grade, or non premium-grade buildings³. Typically constructed between 1960 and 2000, these buildings represent an era removed from current energy efficiency considerations. In Victoria, these buildings are represented by older, medium-sized office buildings in the Melbourne CBD and in suburban and regional centres.

Mid-tier buildings often contain outdated and inefficient technologies and the buildings are often operated well below potential. In addition, sector challenges relating to ownership structures, split incentives⁴ between owner and tenant and a lack of awareness around sustainability issues all affect sector engagement.

In Victoria, the mid-tier office building sector represents approximately 80% of all office buildings and emits more than 1.3 million tonnes of CO₂-e per year. Because of this, the sector represents a significant opportunity for sector-wide energy efficiency and carbon emissions reduction.

¹ Second Plank: Building a low carbon economy with energy efficiency buildings, Australian Sustainable Built Environment Council (ASBEC), 2008.

² Low Carbon, High Performance: How buildings can make a major contribution to Australia's emissions and productivity goals, Australian Sustainable Built Environment Council (ASBEC), 2016.

³ As per the Property Council of Australia grading matrix.

⁴ Split incentives are a barrier to the deployment of energy efficiency measures in buildings. Split incentives occur when those responsible for paying energy bills (the tenant) are not the same entity as those making the capital investment decisions (the landlord or building owner). In these circumstances, the landlord may not be inclined to make the necessary upgrades to building services when the benefits associated with the resulting energy savings accrue to the tenant.

Victoria hosts approximately six million square metres of mid-tier building stock across 2,700 buildings⁵. This equates to an estimated 400,000⁶ workers whose lives can be impacted by the comfort, wellbeing, health and productivity benefits associated with energy efficiency initiatives⁷.

Sustainability Victoria's Energy Efficient Office Buildings (EEOB) program demonstrates that the savings potential in mid-tier office buildings is significant, real and feasible.

The program provided assistance to 20 building owners to undertake three stages of work: a detailed opportunities analysis; building tuning implementation; and monitoring and verification. The selected buildings are reasonably representative of Victoria's mid-tier office stock. The buildings comprise the following:

- 8 buildings in the Melbourne CBD and ranging between 2,000 and 22,000m²
- 8 buildings in wider metropolitan Melbourne and ranging between 2,228 and 20,376m²
- 4 buildings in regional centres and ranging between 570 and 4,072m²

Across the program's 20 participating Victorian buildings⁸, average benefits included the following:

- 29% reduction in energy use
- A 1 star NABERS Energy rating improvement
- Less than 3-year payback on efficiency investment

Overall, the program is estimated to deliver the following:

- Over 4,000 tonnes CO₂ emissions reduction over a 12-month period
- Over \$1.1m in savings in energy bills per annum
- Over \$10m in co-investment from building owners
- Over 90 jobs, according to ABS job-generation factors in the construction industry

A comfort measurement trial of four buildings within the program showed that, following building tuning, a narrower range of temperatures and higher frequency of comfortable conditions (20 to 22 degrees Celsius) were experienced. The trial utilised a world-leading Victorian innovative technology, with the results of the comfort trial indicating significant potential for productivity, health and wellbeing improvements.

Other reported co-benefits of the EEOB program included the following:

- A reduced number of tenant complaints
- Faster rectification of temperature problems
- Reduced maintenance costs.

Research also indicates that better performing office buildings can increase asset value and rental returns and decrease tenant turn-over⁹.

As the sample of buildings in the EEOB program is representative of Victoria's mid-tier office building stock, extrapolation of the program's findings across the 2,700 mid-tier office buildings in Victoria suggests the following potential benefits:

- 540,000 tonnes CO₂-e emissions reduction
- \$150m savings in energy costs
- 12,000 jobs¹⁰

Published within this report are case studies for each EEOB project, as well as information and guidance for the key stakeholders and decision makers who are critical to the ongoing transformation of the mid-tier sector.

⁵ Figures exclude additional sub-class of buildings that are less than 500 square metres in net lettable area.

⁶ Assuming 1 employee per 15m².

⁷ The Next Wave: Retrofitting Victoria's office buildings, Davis Langdon, 2013.

⁸ At the time of publishing 12 months of monitoring data had been received from 3 buildings, 6 months from buildings and <6 months from 4 buildings.

⁹ The Property Council/IPD Australia, 2014, Green Property Index Headline Results & Selected Charts Period Ending December 2013

¹⁰ Based on Australian National Accounts: Input-Output Tables; Construction Industry Multipliers for \$1m of Output (direct jobs), Australian Bureau of Statistics

What is the mid-tier?

Location Profile

- CBD
- CBD fringes
- Suburban areas
- Regional cities

Ownership profile

- Property groups
- Government owned
- Corporate owned
- Foreign owned
- Private landlords, e.g. private investors, property syndicates, family-owned

Building management profile

- Sustainability not a key agenda
- Building upgrades triggered by equipment failure
- No long-term robust asset management plan
- Diverse sets of skills and background in facilities management

Building Profile

- Non A- or premium grade (as per PCA grading matrix)
- Older buildings with aging HVAC plant and lighting
- Less than 10,000 m²
- Mix of smaller offices
- Higher vacancy rates
- Less rent paid per square metre

Tenant profile

- SMEs
- Cost-focused
- Shorter leases



Why are we targeting it?



The building sector in Australia accounts for approximately 19% of total energy consumption, and 23% of overall GHG emissions.



The potential for energy savings from efficiency upgrades for commercial office buildings across Australia has been estimated at 5,142 GWh, or 3.8 million tonnes of CO₂-e, by 2020.



It is estimated that approximately 52 million square metres, out of 64 million square metres of commercial office space in Australia, can be classified as mid-tier.

CORE BENEFITS



POTENTIAL FOR 12,000 JOBS IF SECTOR INVESTS IN A 30% ENERGY PERFORMANCE IMPROVEMENT



CONTRIBUTES TO ECONOMIC GROWTH



IMPROVES OCCUPANT HEALTH AND WELL-BEING



INCREASES CAPITAL & LABOUR PRODUCTIVITY



SAVES MONEY AND INCREASES ASSET VALUE

Who are the key stakeholder groups?



LOCAL, STATE AND FEDERAL GOVERNMENT AGENCIES; INDUSTRY ASSOCIATIONS.



PROPERTY OWNERS



FACILITIES MANAGERS, ON-GROUND INTERMEDIARIES, E.G. CONTRACTORS



TENANTS

Energy efficient office Buildings program

Throughout the mid-tier building sector, significant opportunities exist for energy efficiency reform. However, certain historic barriers provide challenges. Unlike the premium and A-grade commercial building sector (where market demand for energy efficiency and new innovation is high and commercially viable), the mid-tier market is fragmented. Engagement with the market is therefore often difficult.

The EEOB program was developed to provide building owners and facilities managers with a simplified end-to-end service, as well as with trusted advice.

EEOB was a three year program designed to help commercial office building owners reduce costs and environmental impact via improved energy efficiency. Funding was made available, on a matched dollar-for-dollar basis, for eligible Victorian commercial office buildings to do the following:

- Undertake an opportunities analysis
- Take building services
- Measure and monitor cost savings and improvements

The program involved three key project stages:

1. Opportunities Analysis

The Opportunities Analysis (based on a Level 2 Energy Audit under AS3598:2000) was designed to provide building owners with a baseline for operational energy costs. Key opportunities considered at this stage of the project included:

- Operational practices and behaviors
- Building controls and automation tuning
- Retro-commissioning
- Capital asset improvements
- High level renewable and low emissions energy investments
- Building envelope improvements
- Metering and monitoring upgrades

2. Building Tuning

The building tuning stage aimed to ensure optimised and efficient operation of existing services and systems. Implementation items eligible for funding under this stage of the program included:

- HVAC controls tuning
- Lighting controls tuning
- Installation of metering/sub-metering to facilitate tuning and monitoring
- Other building services controls tuning (e.g. lifts)
- Retro-commissioning

3. Monitoring

Monitoring was required for a period of 12 months post completion of Stage 2. The monitoring phase was designed to provide feedback on the implemented energy efficiency initiatives and provided an opportunity for minor adjustments (i.e. further tuning changes) to be made if necessary.



Panel delivery model

All services to eligible buildings in the EEOB program were performed by a panel of approved Service Providers. The panel was established at the beginning of the EEOB program via a tender process. Sustainability Victoria required delivery partners to demonstrate experience and capability, specific to mid-tier commercial office buildings, as well as Quality Assurance certification (ISO 9001:2008 or similar).

Service Providers were required to provide a comprehensive end-to-end service offering, with a single contact point from Stage 1 through to the completion of Stage 3. Despite some complications, created by a mid-tier-specific delivery model never before used in the market, evidence indicates that this delivery model was critically important in assisting building owners to implement the different stages of the program.

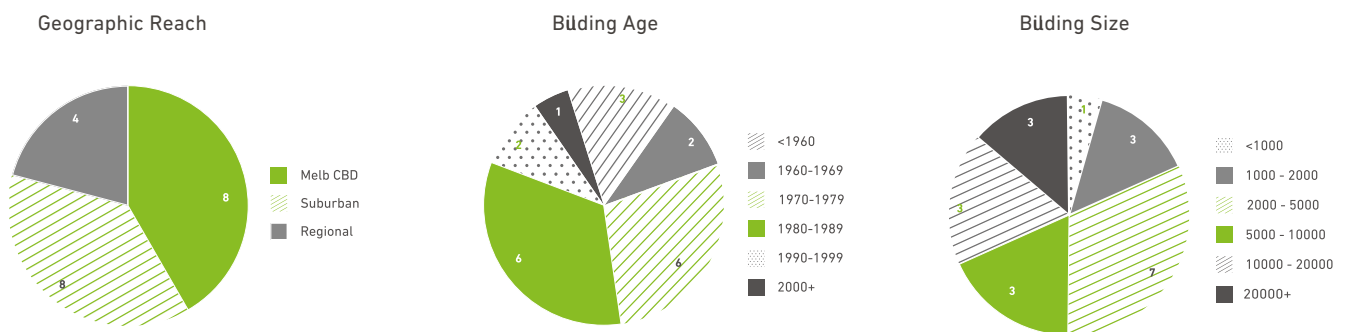
The generally reactive nature of building maintenance in the mid-tier means key decision makers considering a comprehensive energy upgrade are often unsure how to begin. The program's phased structure, alongside its panel of approved Service Providers, simplified the process for building owners. The program's use of a single, accountable contact, responsible for identifying opportunities, implementing upgrades, and monitoring results, worked to provide owners with assurance that their investment would yield positive returns.

Benefits seen by building owners:

- Ease of implementation
- Expertise from trusted sources
- Quality assurance
- Accessibility
- End-to-end service offerings
- Standard scope for the Opportunities Analysis
- Single-point accountability for improved customer service
- Continuity in monitoring and verification, which provides comfort that investment will result in realised savings.

Snapshot of participants

SV is working with 20 buildings through the EEOB program. This is the largest sample of mid-tier buildings in a program to date, and is broadly representative of Victorian mid-tier building stock in terms of size and location. The sample includes representation from the Melbourne CBD, Melbourne Metropolitan areas and regional centres. A full list of EEOB participants can be found in the table on the next page.



Typical improvements implemented through EEOB

While every building has its own history, layout and specific issues, a number of key energy saving opportunities emerged via the energy efficiency audits of participating buildings.

These opportunities included:

- Installing modern temperature sensors to ensure that heating and cooling is responsive to real ambient and indoor temperatures
- Fixing jammed dampers to enable fresh air to be brought into the building
- Clearing blocked coils and ducts to reduce the amount of energy needed to pump air through buildings
- Installing modern building management systems to optimise how plant and equipment work together, and to detect and rectify problems quickly
- Balancing air to measure air flow rates and recommissioning dampers and controls to distribute air flow more effectively
- Installing occupancy sensors to reduce unnecessary lighting in common areas
- Recommissioning timers to make sure equipment is only operating when necessary
- Installing variable speed drives for fans and pumps so that they can throttle in response to demand
- Installing sub-metering to give facility managers better visibility as to where energy is being used in buildings
- Installing carbon monoxide sensors in car parks, so that exhaust fans run only when a build-up of exhaust gases is present

ADDRESS	YEAR OF CONSTRUCTION	AREA (M ²)	% SAVINGS	NABERS IMPROVEMENT
454 Glenferrie Road, Kooyong, VIC 3144	1999	7,763	↓13%	2.0
277 Camberwell Road, Camberwell, VIC 3124	1980	2,429	↓55%	2.5
227 Princes Drive, Morwell, VIC 3840	1960	1,800	↓28%	1.0
990 Whitehorse Road Box Hill VIC 3128 ^{**}	1992	20,018	↓3%	N/A
810 Whitehorse Road Box Hill VIC 3128 ^{**}	1977	4,830	↓6%	N/A
69-71 Moorabool ST Geelong 3220	1981	1,202	↓22%	0.5
293 Swanston Street Melbourne VIC 3000	1937	2,000	↓21%	0.5
123 Lonsdale Street Melbourne VIC 3000	1972	5,846	↓60%	2.0
114 William Street Melbourne VIC 3000	1976	22,000	↓25%	1.0
53 Queen Street Melbourne VIC 3000	1958	4,430	↓31%	1.5
167 Queen St Melbourne 3000	1971	5,000	↓21%	1.0
235 Ryrie St Geelong 3220	1984	4,072	↓6%	1.5
70 Robertson St Kennington 3031	1990	2,228	↓11%	0.5
484 St Kilda Rd 3182	1982	20,376	↓22%	1.0
234-250 Collins St Melbourne 3000	1989	11,512	↓25%	0.5
60 Albert Rd South Melbourne 3000	1973	15,000	↓16%	N/A
222 High St Kew 3101 ^{**}	1970	2,552	↓6%	0.5
310 King Street Melbourne VIC 3000	1970(est)	6,000	↓62%	1.0
176-178 McCrae Street Bendigo 3550	1966	570	↓6%	N/A
99 King Street Melbourne VIC 3000	1988	11,090	↓42%	2.0

- NABERS Energy Ratings are self assessed and are projected from 6 months of monitoring.
- % savings and NABERS improvements may not correlate exactly due to a range of reasons including, but not limited to, changes in vacancy rate, addition of metered exclusions and a change from whole to base building ratings.
- Projected savings are conservative and based off a Level 2 audit and a 6 month monitoring period. Savings are likely to be greater when the complete 12 month monitoring period has concluded, which will include the summer savings.

^{*}Baseline NABERS data unavailable

^{**} Variances in vacancy

Results

At the time of publication, a mixture of projected results and actual measured results had been received for all buildings in the program. Final program results will be published after each building has been monitored for twelve months.

Preliminary results show significant annual savings in energy consumption across the participating sites.



↓29%

29% reduction in energy usage



↓4,000

Over 4,000 tonnes CO₂-e emissions reduction



↓\$1.1M

>\$1.1M savings on energy bills



1.0

Projected 1.0 star average NABERS improvement



↓3 yrs.

Less than 3 year simple payback

Comfort monitoring

As part of the EEOB program, a small sample of buildings participated in a trial of comfort monitoring technology with occupant surveys. The trial aimed to investigate the performance of HVAC systems in mid-tier buildings, and to determine links between energy efficiency improvements and people's comfort and wellbeing.

The comfort monitoring trial revealed that, prior to EEOB upgrades, wide temperature variations were present in all participating buildings, with some variations ranging from 18°C to 33°C across a single floor space. Research by the World Green Building Council¹⁴ suggests that such conditions would result in negative impacts on occupant health and wellbeing. This, in turn, would impact performance and productivity.

After building tuning, the same floor showed a narrower range of temperatures and a higher frequency of comfortable conditions (20–22°C). This indicates that significant potential exists for productivity, health and wellbeing improvements through building tuning.

To date, post-retrofit surveying has been conducted in one building. Results show strong improvements in satisfaction across all indoor environment parameters.

Table 1. Reduction in occupant dissatisfaction survey results, prior to and following building tuning.

PARAMETER	CHANGE
Dissatisfaction with temperature	↓35%
Dissatisfaction with air movement	↓17%
Dissatisfaction with humidity	↓14%
Dissatisfaction with air quality	↓19%
Number of Sick Leave days	↓24.3%

¹⁴ World Green Building Council, Health, Wellbeing & Productivity in Offices: The next chapter for green building, 2014



'On the ground': Participant feedback

Twelve key stakeholders involved with the EEOB program (a mix of buildings/ facilities managers, owners and property consultants) provided feedback through a formal interview process.

According to the feedback, stakeholders felt the program and upgrades made facilities management easier due to:

- Reductions in tenant complaints
- Improved comfort in office spaces, with better temperature and air distribution
- Fewer manual interventions required in the control process
- Reduction in energy billing costs
- Decreased response time in relation to detecting and locating problems
- Decreased maintenance costs, including fewer site visits from contractors to rectify problems
- Increased understanding of power usage and energy efficiency for both tenants and building workers
- Increased understanding of building system lifecycles via a basic asset register and plan

Participant feedback also highlighted the value of the end-to-end service requirement. Participants felt that the advice and network access offered from reliable contractors helped to minimise complexity and risk for building owners and managers. The EEOB program's provision of a panel of approved Service Providers, and end-to-end service offering, enabled building owners to seek quotes, select a provider and maintain a single contact point from initial audit through to the implementation, monitoring and verification. The program helped to overcome major barriers to the uptake of energy efficiency in the mid-tier by providing easy implementation strategies, and a trusted contractor responsible for measuring and verifying the success of the upgrades.

Insights from the EEOB program

Key learnings from the EEOB Program can be used to more effectively engage decision makers and address some of the persistent barriers discouraging energy efficiency in the mid-tier sector. Understanding the mid-tier market is crucial to driving energy efficiency in the sector, and the EEOB program has gathered significant data to help motivate change.

Cost a potential challenge to energy efficiency upgrades?

The mid-tier market often perceives cost (in relation to both access to finance and confidence in returns) as a barrier to energy efficiency.

The EEOB program demonstrates the value represented by energy efficiency improvements. Participants reported a range of co-benefits that could be included in the business case for energy efficiency upgrades. These included:

- Energy savings of an average 29%, returning a simple payback on outlay of less than 3 years
- Improved NABERS (National Australian Built Environment Ratings System) ratings
- Increased satisfaction from prospective tenants in relation to the building's appeal
- Decreased numbers of service call outs to rectify HVAC issues and decreased maintenance costs
- Decreased complaint response times (from three days to three hours)
- Improved comfort and productivity for workers

Building performance visibility issues

Many mid-tier buildings utilise original and out-dated equipment, such as thermostats, pneumatic controls and meters. When these controls provide unreliable data, the operation of major plant and equipment can be triggered unnecessarily.

Most EEOB participants installed modern building management systems and sub-meters as part of the program. The following benefits were observed:

- Improved detection of performance problems (prior to tenant complaint)
- Reduced travel and response times due to improved capacity to fix problems remotely
- Better long term building performance tracking and management
- Alarm notification of unnecessary plant operation

Benefits of 'proactive' building management

The reactive nature of much mid-tier building management means upgrades in the sector are often triggered by equipment failure, rather than energy efficiency or productivity performance issues. The reactive approach contributes to higher costs, more disruption and greater tenant dissatisfaction compared to an approach that is more proactive.

EEOB Service Providers provided a holistic analysis of the participating building's operating systems and prioritised areas where improvements could be made. By taking a robust, proactive approach to building auditing, implementation and monitoring, EEOB participants reported the following:

- Energy audit reports are a useful tool for understanding longer term asset management plans, as well as for troubleshooting current issues.
- Energy efficiency measures resolve many building issues, reduce tenant complaints and contribute to building management improvements.
- Improved monitoring and control systems reduce conflict and unnecessary operation of HVAC plant.
- Reduced pressure on buildings' HVAC plant lengthens the life of the asset.
- Ongoing monitoring contributes to the correct operation of building systems.

Effectiveness of routine maintenance processes

Mid-tier buildings characteristically have aged and potentially faulty plant and equipment that may operate inadequately, or not at all. While qualified engineers can detect many easily repairable defects on critical items such as dampers, sensors, timers and ducts, these are not always discovered via routine maintenance procedures.

The EEOB program highlighted the following:

- Faulty plant fixtures are usually the root cause of greater building performance issues. Repair and replacement of minor sensors and controllers can have a positive impact on efficiency and can improve the level of comfort for tenants.
- Level 2 energy audits, completed by a qualified engineer, can verify the correct operation of plant fixtures.

Mid-tier building owners and knowledge base

Mid-tier building owners are a diverse group; identification of and engagement with these owners can be difficult. Unlike the owners of premium and A-grade stock, owners of mid-tier buildings are rarely members of peak bodies or industry associations. This means there is no readily available forum for sharing information and knowledge.

In a market already crowded with energy efficiency products and services, mid-tier owners often do not know where to begin in order to scope and procure a holistic energy efficiency upgrade. Many building owners also do not know who to trust to provide this advice.

The program found the following:

- A strong end-to-end delivery model of energy efficiency improvements, including a period of monitoring and verification with assured savings, does not typically exist for owners and managers of small-medium sized office buildings in the mid-tier sector.
- It is critical to identify channels of engagement with owners; influencing trusted key decision makers, such as accountants, property managers and facility managers, can be important to gaining traction in this market.

Tenant-directed fit-outs and appliance use can exacerbate HVAC issues

Based on the energy efficiency audits carried out as a part of EEOB, decades of tenant-directed building modifications, combined with poor choices in appliance placement, have exacerbated many HVAC problems in the mid-tier building sector. The research also indicates that close communication and cooperation with the tenant can see these issues resolved, so that the building systems operate as intended.

Common problems and solutions include the following:

- Tenant fit-outs that restrict air flow and returns can be improved by helping tenants to understand that efficient space use and load can result in better HVAC optimisation. Qualified engineers can provide various solutions to suit each tenancy requirement while retaining office quality.
- The use of plug-in heaters and split systems that cause conflicts for centralised heating and cooling systems (resulting in complaints, overworked plants and reactive system adjustments) can be minimised by rectifying underlying building systems problems via building tuning.

Inefficient buildings / unhappy tenants

The program deployed wireless sensors across a number of buildings to monitor a range of indoor comfort measurements including temperature, humidity, radiant heat and air flow. Staff surveys measured the level of staff satisfaction with indoor temperatures.

Where upgrades were undertaken, monitoring showed an improvement in comfort and staff productivity.

Moving forward

Ongoing transformation of the mid-tier sector over time is reliant on information, engagement and influence. All these factors ultimately contribute to behavioural changes of key stakeholders. Behavioural Insights theory states that if you want to encourage a behaviour, make it Easy, Attractive, Social and Timely (EAST)¹⁵. Insights from the EEOB show that this is possible.

Make it easy:

See key messages for property owners on next page.

- Reduce the 'hassle factor' of taking up a service. Provide the mechanisms and systems to make it as easy as possible for owners to initiate an energy efficiency upgrade. This could include access to a panel of approved service providers and trusted experts; a standard scope of works for an audit and opportunities analysis and an end-to-end service model that is complete with built-in monitoring and verification processes and a single point of accountability.

Make it attractive:

See key messages for facility managers & service providers on p.19, 20

- Simplify messages. Ensure that costs, benefits and co-benefits are clear, with a strong business case tailored to specific audiences.

Make it social:

20 case studies at the back of the report.

- Show that others perform the desired behaviour. Case studies can demonstrate what is achievable, and that peers have already taken action.

Make it timely:

- Prompt people when they are likely to be most receptive. Triggers exist in the lifecycle of commercial buildings that provide timely opportunities to influence an energy efficiency upgrade. These could include:
 1. End of lease, when tenancies may become vacant for a period of time
 2. Equipment failure
 3. Equipment approaching end of life
 4. The need to disclose NABERS energy performance at point of sale or lease (Commercial Building Disclosure legislation)

In order to encourage reform in the mid-tier sector, ongoing engagement with key stakeholders is critical. As mid-tier owners are notoriously difficult to identify and engage, key to the success of any engagement strategy is the identification of trusted advisors and other intermediaries that may be able to influence or make decisions on behalf of mid-tier owners.

Stakeholder groups that have played important roles in the delivery of the EEOB program include property owners, facility managers, service providers, and tenants. We conclude this report by presenting key stakeholder group insights, outcomes and next steps, to enable individuals from these groups to access targeted, practical information to encourage and enable them to improve the energy efficiency of Victoria's mid-tier building stock.

This approach also enables policy makers to stand in the shoes of other stakeholder groups to understand their unique perspectives.

¹⁵ The Behavioural Insights Team, EAST: Four simple ways to apply behavioural insights, 2014

Key messages for Property owners

Property owners are key to unlocking the energy efficiency potential in the mid-tier sector. As the people responsible for leases and capital expenditure, it is important for property owners to be well versed in the main aspects of energy efficiency and to understand how energy efficiency affects tenant satisfaction and retention, asset value and rental returns.

Are these things stopping you?

- A perception that energy efficiency investments won't yield financial return
 - The cost of efficiency upgrades compared to other competing budget priorities such as aesthetic improvements or building code compliance
 - Lack of tenant demand or concerns regarding tenant disruption
 - A perception that efficiency upgrades only benefit tenants through reduced energy costs
 - A disincentive to invest in performance upgrades when asset replacement cycles extend beyond ownership cycles
 - Lack of access to capital
- Buildings with strong sustainability and energy credentials (such as high NABERS ratings), attract trustworthy, long term tenants (such as government representatives) who are driven by internal policies to seek energy efficient buildings.
 - Innovative financing mechanisms, such as Environmental Upgrade Agreements (EUAs), exist to tie loans for environmental upgrades to the property.

Did you know?

- The quarterly IPD Australian Green Property Index suggests evidence of higher basic rent and higher net operating income for high NABERS Energy-rated offices when compared to low NABERS Energy-rated offices¹⁶. These benefits exist in addition to lower operating costs, lower capital expenditure, lower vacancy rates, and longer Weighted Average Lease Expiry (WALE).
- Although capital upgrades are essential to energy efficiency, low-cost tuning and optimisation of existing plant and equipment can also make a significant contribution.
- Long term asset planning, that incorporates holistic energy performance, can contribute to significant operational savings over the lifetime of the system.

Where to next?

- Undertake an assessment of your building's energy performance to determine potential energy savings for you and your tenants.
- Develop a long term asset management plan which includes a whole-of-system energy productivity outlook on maintenance, repairs and replacement, to ensure you are getting the most for your dollar.
- Use lease expiry, equipment end-of-life, and changes to regulation and legislation as opportunities to revisit building energy productivity.
- Attract tenants by promoting energy efficient buildings through programs like NABERS.
- Ensure facility managers have access to building energy data as a way of driving and maintaining energy performance, and consider appointing a facility manager if you don't already have one.

¹⁶ <http://nabers.gov.au/AnnualReport/environmental-benefit.html>

SPOTLIGHT ON: 277 CAMBERWELL ROAD, CAMBERWELL



The new owner of this recently acquired multi-tenanted building planned a strategy to attract tenants into occupied floors.

The EEOB opportunities analysis identified that major components of the HVAC system were at end-of-life. While the owner opted to retain some of the existing HVAC components, energy efficiency measures were enacted to extend the life of system.

PROGRAM ACTIVITIES INCLUDED THE FOLLOWING:

- Upgrade of HVAC system from constant air volume to variable air volume (VAV), so as to reduce energy consumption by the system's fans
- Upgrade of old pneumatic controls to new digital controls
- Installation of sensors, controls and efficient lighting in common areas
- Installation of sub-meters on tenant power supply and essential services

OUTCOMES INCLUDED:

- Projected annual savings of 48,500kWh electricity and 93,000MJ gas
- A plan to work towards a 4-star NABERS self-assessment

NEXT STEPS:

- A 12 month monitoring and fine tuning phase
- A focus on refreshing the building with LED lighting upgrades, broader HVAC works in floor, vehicle stackers and floor plan changes

“Significant sustainability improvements can be made to buildings without major capital expenditure”

- Jack Russell, National Sustainability Manager, Airmaster, EEOB Participant

“NABERS was the whole driver for (energy efficiency) upgrades for the owners – it’s difficult to keep good tenants... so this was a deliberate positioning strategy to get better quality tenants”

- Craig, property consultant, EEOB Participant

Key messages for Facility managers And service providers

Facility managers and service providers work at the coalface of energy efficiency in buildings. These people work with technology, building owners, tenants and each other. As on-ground technical personnel, it is vital for facility managers to understand and drive building performance in terms of energy efficiency, both during general operation and during maintenance works.

Potential barriers to serious engagement with energy efficiency include time, budgets and administrative issues. Proactive asset management in the energy efficiency domain, combined with capacity and knowledge building, is instrumental in achieving performance goals in the mid-tier sector. Facility managers and engineering service providers need not only to understand building performance, but also advocate on energy efficiency to owners, contractors and other service providers.

Are these things stopping you?

- Owners lacking in motivation or technical knowledge in relation to energy efficiency
- Budget restrictions
- Limited time
- Difficulty in obtaining appropriate data
- Payback periods that extend beyond the duration of facility management contracts

Did you know?

- There is a demonstrated link between building timing, thermal performance and occupant comfort.
- Energy efficiency business cases are useful tools for communicating the potential benefits of retrofitting to owners.
- Troubleshooting is easier, cheaper and quicker to rectify with increased visibility of data and building management systems.
- Investment in preventative maintenance and systems, such as building management system (BMS) optimisation, can have significant impact without excessive cost.

Where to next?

- Consider investing in building energy data monitoring and analysis technologies to drive enhanced energy management in your buildings.
- Ensure auxiliary equipment, such as occupancy sensors, thermostats and other controls, is properly maintained and is providing correct data.
- Consider joining an industry association that can provide access to technical resources, training and a peer network for knowledge sharing and collaboration.
- Be aware that there are significant technical tools (such as 'Calculating Cool'¹⁹) and resources available to assist you in scoping and implementing energy efficiency projects.
- Development of an international standard for facilities management is currently underway, with support from the Facilities Management Association of Australia (FMA). Ensure that you are up to date with these developments.

¹⁹ Calculating Cool is a free tool which measures how efficient your building HVAC system is and identifies potential areas for improvement. For more information visit www.calculatingcool.com.au

Common building issues encountered

- The use of personal heating and cooling devices in an office space is often an indicator of, and contributor to, problems with the building's heating and cooling systems.
- Heating and cooling plant often run unnecessarily, or in conflict with each other.
- Modern sensor and control systems can detect when equipment is running unnecessarily.
- Sensors should be operational and responding to real conditions in the building, rather than faulty or absent data.

Facilities managers reported that their jobs were made easier following the upgrades, due to:

- A reduction in tenant complaints.
- A reduction in energy bills and maintenance costs, including fewer site visits from contractors to rectify problems.
- A reduction in manual interventions required in the control process and system.
- A reduction in response times in detecting and fixing problems.
- An increased understanding of ways to manage and improve energy performance across building systems.

SPOTLIGHT ON: 114 WILLIAM STREET, MELBOURNE



While the owner of this multi-tenanted property had invested in lighting upgrades and a new Building Management System, no significant changes had been made to the plant or control strategy since the building's construction.

The EEOB Opportunities Assessment identified that multiple tenant fit-outs over numerous years had created conflicts between the heating and cooling systems. In addition, opportunities for savings were identified through observations that the building had lighting in occupied rooms and that fans and pumps ran unnecessarily at constant full throttle speed.

PROGRAM ACTIVITIES INCLUDED THE FOLLOWING:

- Installation of lighting occupancy sensors
- Installation of carbon monoxide sensors in car park
- A full rebalancing of the fresh air system
- Introduction of a boiler 'lockout' to reduce hot water production during warmer weather

OUTCOMES INCLUDED THE FOLLOWING:

- Estimated cost savings of over \$96,000 per year.
- A potential NABERS improvement of 1.5 Stars (self-assessment)
- Projected annual savings of 525,000kWh electricity and 3,890,000MJ gas

“There has been a substantial drop in energy bills that has corresponded identically to predicted savings... (and we’ve) had quite a significant reduction in temperature complaints”

-Craig, property consultant, EEOB Participant

Key messages for tenants

As the ultimate rent-payers for commercial buildings, tenants have the potential to influence building-related decisions. Tenants also benefit from energy efficiency initiatives including reductions in energy bills and increased employee comfort and productivity.

Tenants should feel informed and empowered to raise energy efficiency issues with building managers and owners.

Are these things stopping you?

- Concern that rental increases will offset the cost of building upgrades
- A lack of data or understanding about the comparative efficiency performance of your building

Did you know?

- Energy efficiency initiatives can greatly reduce energy consumption, and therefore reduce energy bills and operating costs.
- The link between building tight, thermal performance and occupant comfort is demonstrated.
- Tenant retention is a primary consideration for building owners, meaning tenants have a degree of power in the relationship.

Where to next?

- Consider joining Cityswitch or searching for government energy efficiency or office building programs in your state or territory.
- If you are re-negotiating your lease in the near future, the inclusion of green lease clauses could help to improve comfort levels and significantly reduce your running costs. The lease negotiation stage is the time to negotiate energy efficiency improvements for your building.
- Advocate for energy efficiency initiatives in your building, citing the success of programs such as NABERS, Calculating Cool and EEOB as leverage.

Have a look around your office!

Ask yourself the following:

- Have staff brought in their own heaters and desk fans?
- Have managers installed split systems to try to fix temperature problems?
- Is your office manager constantly fielding temperature and comfort complaints from staff?
- A positive answer to any of these questions suggests the likelihood of an underlying problem with the central building HVAC systems. The presence of these issues may also indicate that energy efficiency initiatives and improved energy management could significantly contribute to cost savings and comfort improvements.
- Talk to your facility manager about what options might be available to identify the source of the problem and to improve energy management.

SPOTLIGHT ON: 222 HIGH STREET, KEW



The owner of this building had already attempted to reduce the building's environmental impacts through a carbon management plan, equipment improvements and lighting and solar upgrades. The owner joined the EEOB program to find additional ways to save electricity and plan for longer term future upgrades to improve office comfort and the building's NABERS Energy rating.

The occupants of the building participated in a comfort satisfaction study, which surveyed occupant comfort before and after the EEOB upgrades took place. Measurement sensor technology was also introduced to workspaces in the building so as to gather data on indoor environmental quality.

The sensor technology feedback and occupant survey found a demonstrated link between building performance improvements and comfort improvements for building occupants. The technology also proved a self-diagnostic tool for building occupants to confirm, map, and correct thermal issues with minimal business interruption. This approach could be applied in future programs for engaging the tenants working within uncomfortable, inefficient commercial office spaces.

OUTCOMES:

- Projected annual savings of 84,000kWh electricity and 151,000MJ gas
- Projected annual emissions reduction of 102,681 kgCO₂-e
- Reduction in occupant dissatisfaction for all measured indoor environment quality parameters
- Correlating improvements in physical measurements as determined by Hm technology
- Reduction in ventilation noise

Table 1. Reduction in occupant dissatisfaction survey results, prior to and following building tuning.

PARAMETER	CHANGE
Dissatisfaction with temperature	↓35%
Dissatisfaction with air movement	↓17%
Dissatisfaction with humidity	↓14%
Dissatisfaction with air quality	↓19%
Number of Sick Leave days	↓24.3%

“We wanted to improve the indoor work environment for our staff – we’ve had ongoing issues with our indoor temperature control. Since the works have been done, we’ve already seen a reduction in electricity and gas consumption and a 30-40 percent cost saving in the running of our HVAC system. A large part of that was through improving the efficiency of our air conditioning system. We’ve also seen an improvement in thermal comfort for our staff - monitoring has shown that temperature variations are operating in a much narrower range since the upgrades were completed.”

-Nikki Jordan, Sustainability Manager at Bank Australia



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

53 Queen St, Melbourne

System optimising for better building comfort

Overview

53 Queen Street is a partially owner occupied office building in the heart of Melbourne CBD. The building owners joined the EEOB program so that they could integrate holistic energy efficiency improvements that reduce operational costs and the environmental footprint of the organisation.

Program activities

The EEOB supported extensive tuning of the building's HVAC systems so that they could amplify the savings of a chiller upgrade that was urgently required. The building tuning included full re-commissioning of water and air flows through the HVAC system, which has improved air quality and temperature control throughout the building.

The building management system was also re-set to optimise energy efficiency and comfort. This included boiler staging adjustments, changes to chiller and boiler lockout temperatures, and optimising start and stop times for fan coil units.

Plans have also been prepared for future improvements to the building systems, including re-designing the domestic hot water system for replacement in the future.

SNAPSHOT

BUILDING DETAILS

- › 4,145 square metres over 13 floors.
- › Concrete construction with east facade
- › Air cooled chillers with fan coil units.

TENANT

Owner Occupied / Multi-tenanted

SERVICE PROVIDER

Energy Action

OUTCOMES

- › Based on a NABERS self-assessment the building aspires to a target of 4 Stars.
- › Projected annual savings of 124,709kWh electricity.

CHALLENGES

- › Some rectification and investigation work for HVAC plant due to changes that had been made throughout the life of the building.
- › Fine tuning the temperature controls triggered some temporary thermal comfort issues which were managed through tenant engagement.
- › Some metering challenges due to switchboard issues.

NEXT STEPS

- › The project will continue to fine tune the operation of the new systems and equipment.
- › The domestic hot water system works is scheduled to be the next major improvement project.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

60 Albert Rd, South Melbourne

Asset lifecycle replacement plan to boost building performance.

Overview

60 Albert Rd is a 1973 building located in the inner suburb of South Melbourne. Major components of the buildings plant were approaching end of life, making this an ideal opportunity to integrate energy efficiency to significantly advance the performance of the building.

Program activities

The building owner undertook major plant upgrades, including replacement of dampers and water pumps, and installation of variable speed drives. The EEOB opportunities assessment identified a number of additional short and long term improvements that could be staged alongside the replacement of major plant.

A high priority for the building was upgrading old pneumatic controls to digital controls. This enabled better control of the building services, and facilitates easier integration of future upgrades into the system. The EEOB also supported replacement of the building management system, tuning of air handling units, new flow rate sensors on boilers and reduced HVAC plant operation.

Carbon monoxide sensors were also installed to reduce carpark extraction fan demand, and a service meter was installed on the HVAC for greater visibility of HVAC demand.

SNAPSHOT

BUILDING DETAILS

- > 15,000 square metres over 19 floors.
- > Concrete standalone office.
- > Water cooled constant air volume HVAC

TENANT

Multi-tenanted

SERVICE PROVIDER

Allstaff

OUTCOMES

- > Based on a NABERS self-assessment the building is targeting a 1.5 star NABERS Energy improvement.
- > Projected annual savings of 48,526kWh electricity and 662,168MJ gas.

CHALLENGES

- > Moving controls from pneumatic to digital was a significant task requiring all systems to be transitioned.
- > Lack of documentation for existing systems.
- > Some older motors were not compatible with variable speed drives and required replacement.

NEXT STEPS

- > The building will fine tune operations for the 12 month monitoring period.
- > Opportunities that have not been implemented will continue to be prioritised and integrated into the strategic operation of the building.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“We’ve reduced demand on our HVAC system, stabilised our indoor temperatures, and we have happier tenants”

Andrew, Facility Manager



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

69 Moorabool St, Geelong

Energy Audit identifies quick wins

Overview

69 Moorabool St is a 1200 square metre office building situated in the regional city of Geelong. The building was constructed in the early 1980s and contains mixed uses and a number of upgrades and changes through its life.

Program activities

An opportunities assessment was conducted to identify quick improvements for the building to achieve energy efficient operation. The assessment identified several short payback initiatives, less than 3 years that would improve the self-assessed NABERS Energy rating from 2.5 to 3 stars. Key cost effective measures included:

- › Time clock adjustment:
0.3 year payback, 2600kWh saving
- › Widen dead band control:
2.5 year payback, 1566kWh saving
- › LED lighting replacement:
2.8 year payback, 1248kWh saving

SNAPSHOT

BUILDING DETAILS

- › 1,202 square metres over one floor
- › Concrete construction, detached building.

TENANT

Single tenant

SERVICE PROVIDER

Ecosave

OUTCOMES

- › Identified energy savings of 21,902kWh electricity.

CHALLENGES

- › The small scale of building changes the economic feasibility of energy efficiency improvements. Capital improvements at a smaller scale become much more affordable and effective at a smaller building scale.

NEXT STEPS

- › The building will prioritise and integrate the improvements.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

70 Robertson St, Flemington

Australian Wool Testing Authority (AWTA) finds simple but effective changes for big savings

Overview

Located in the inner fringe of Melbourne, 70 Robertson Street is an early 1990s building which has recently undertaken upgrades such as LED lighting, and is also intending to install solar PV in the future. The building had always been a reasonably comfortable space, and AWTA hadn't realised that significant additional savings could be until they undertook an EEOB opportunities assessment.

Program activities

The Opportunities Assessment found that significant savings could be made by matching heating and cooling system activity more closely with real demand. AWTA implemented a number of changes, including altering the settings on the building management system timeclock to reduce unnecessary plant operation.

The air distribution system was zoned so that heating and cooling could be shut down in unoccupied rooms. New manual switches were installed so that staff could turn off air conditioning when leaving a meeting room. Carbon monoxide sensors were installed on the carpark fans so that they only operated when exhaust ventilation was needed. In addition, major savings were achieved through reducing the number of cooling units operating in the server room.

SNAPSHOT

BUILDING DETAILS

- › 2,200 square metres over 2 floors.
- › A mix of concrete and steel frame construction.
- › Air cooled fan coil units.

TENANT

Owner occupied

SERVICE PROVIDER

Airmaster

OUTCOMES

- › Based on a NABERS self-assessment the building is tracking to achieve a half star improvement.
- › Projected annual savings of 38,658kWh electricity and 75,725MJ gas.

CHALLENGES

- › Further server room improvements, beyond switching off cooling units, are difficult to implement due to the need for continuous operation of servers and equipment.
- › Usage of spaces varies significantly between the office floor, making the task of optimising equipment operations slightly more challenging.

NEXT STEPS

- › The project will use the opportunities assessment as a guide to continue energy efficient operation and implement improvements at the relevant intervention points.
- › The building will continue to assist staff improve behavioural change.

Together, these changes proved to be low cost, but very effective measures that significantly contributed to improving the building energy performance.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“We’ve definitely achieved bill savings, and there’s also been a substantial increase in staff awareness about energy efficiency – they’re much more conscious of switching air conditioning off when leaving a meeting room”

Keith, Engineering Manager



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

99 King St, Melbourne

Asset lifecycle replacement boosts building performance.

Overview

99 King St is an 11,090 square metre office building in Melbourne. As part of the building life cycle, the replacement of major plant and equipment is a current focus for the building. The building participated in the EEOB program to go beyond 'like for like' replacement and take the building's energy efficiency performance to levels comparable with new commercial office buildings.

Program activities

The EEOB program provided the building with a range of energy efficiency measures to complement the chiller replacement, new variable speed drives and other major plant upgrades. The EEOB building tuning works complemented additional investments for installation of a new building automation system, new sub metering, economy cycle and optimisation of space heating.

The sub metering and building management system gives the facility managers far greater visibility of consumption across the various building services, and the ability to rectify issues remotely and immediately. The works are expected to raise the building NABERS rating from 2 stars to 4.5.

SNAPSHOT

BUILDING DETAILS

- › 11,090 square metres over 10 floors.
- › Brick and concrete construction.
- › Water cooled chillers with centralised AHU.

TENANT

Multi-tenanted

SERVICE PROVIDER

Napier and Blakeley / Allstaff

OUTCOMES

- › Based on a NABERS self-assessment the building is targeting 4.5 Star NABERS Energy.
- › Projected annual savings of 531,911kWh electricity and 729,106MJ gas.

CHALLENGES

- › The extent of upgrades was considerable and required careful planning to coordinate.
- › Replacing fan motors and ducting was a challenge due to spatial constraints.

NEXT STEPS

- › The immediate steps are to ensure the building is optimised for all seasons through a 12 month monitoring process.
- › The asset improvement plan will continue to be rolled out as per the improvement plan.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“We’ve seen a significant reduction in temperature complaints, and a substantial drop in energy bills”

Craig, Building Service Provider



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

114 William St, Melbourne

Melbourne high rise gets a performance boost.

Overview

114 William St, Melbourne is a 24 level glass and concrete building that was constructed in the 1970s. Although the building owner had already invested in lighting upgrades and a new Building Management System, no significant changes had been made to the plant or control strategy since the building was constructed.

Program activities

The EEOB Opportunities Assessment identified that tenant fitouts over the years had created heating and cooling issues in the building, and the heating and cooling systems were running at the same time. It also found that lights were running in unoccupied rooms, and fans and pumps running at constant full throttle speed regardless of demand.

Through participation in the program, the building owner invested in a range of upgrades to save over \$96,000 per year. These included lighting occupancy sensors, a boiler 'lockout' to reduce hot water production during warmer weather, carbon monoxide sensors in the carpark to reduce unnecessary fan use, and a full rebalancing of the fresh air system.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 22,000 square metres over 22 floors.
- › Concrete construction, detached building.
- › Water cooled variable air volume HVAC with terminal fans.

TENANT

Multi-tenanted

SERVICE PROVIDER

Programmed

OUTCOMES

- › Based on a NABERS self-assessment the building is currently tracking towards a NABERS improvement of 1.5 Stars.

- › Projected annual savings of 563,576kWh electricity and 3,230,260MJ gas.

CHALLENGES

- › Some compatibility issues with VSDs and older pumps.
- › The building was sold during the course of the project – however the new owner continued and supported the project.

NEXT STEPS

- › The project is already measuring some considerable energy savings.
- › After the project has completed the monitoring stage the building will continue working towards an aspirational target of 5 Star NABERS.

“Through the EEOB program, the building service providers are now working more collaboratively to fix problems, rather than working separately and creating more system inefficiencies. This is a new approach for the mid-tier office sector”

Darren Blake, Programmed



“Previously the heating and cooling systems were fighting each other. Now, we have much greater consistency in floor temperatures, and we can detect and rectify issues before they reach complaint level. Complaints have greatly reduced and there’s not much manual intervention now.”

Manoj, Facility Manager

ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

123 Lonsdale St, Melbourne

Restoring a small 1970s building in the heart of Melbourne’s CBD.

Overview

123 Lonsdale St is typical medium sized office building in the Melbourne CBD. Developed in the 1970s, the building is typical of the era with a prominent north façade and adjoining buildings to the east and west.

This building undertook tuning upgrades in addition to replacement of major heating and cooling plant. By tuning to ensure the building’s systems are operating as efficiently as possible, these initiatives contribute significantly towards the building owner’s goal of achieving a 4 Star NABERS Energy performance.

Program activities

The EEOB audit revealed a mixture of old and new technology in the building which is typical of old building assets. Among the opportunities, it was found that there were significant blockages in the air distribution system, and this was causing fans and motors to work extra hard to pump air through the building. In addition, the building was operating on a constant air volume system, which pumps air through the building at a constant speed regardless of occupancy and the need for ventilation.

The building owner implemented a number of upgrades to significantly reduce energy demand in the building. These included replacement of blocked hot water coils and liners in the air

SNAPSHOT

BUILDING DETAILS

- › 5,800 square metres over 11 floors.
- › Concrete construction with north façade – adjoining buildings on east and west.
- › Air cooled constant air volume HVAC (upgraded to variable air volume).

TENANT

Multi-tenanted

SERVICE PROVIDER

Allstaff / NDY

OUTCOMES

- › Based on a NABERS self-assessment the building aspires to a target of 4 Stars.
- › Projected annual savings of 569,011kWh electricity and 3,197,914MJ gas.

CHALLENGES

- › Air balancing a system that had been converted from constant air volume to variable air volume.
- › Completing the work while the building was occupied while minimising disruption.

NEXT STEPS

- › The project will continue to fine tune the HVAC system to optimise for seasonal variation.
- › The current unoccupied levels present an ideal opportunity for the building to be refreshed which includes works broader than the scope of the EEOB program. This includes: comprehensive LED lighting upgrades, broader HVAC works in floor, vehicle stackers and aesthetic and floor plan changes.

handling units, and refurbishment of existing fans, filters, dampers and alarms. They also purchased new variable speed drives for the pump motors to convert the HVAC system from constant airflow to a more efficient variable airflow system. This upgrade required substantial building tuning, such as air balancing works throughout the building,

installation of variable flow controls and sensors, and upgrading of the Building Management System.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

167 Queen St, Melbourne

Targeting a NABERS improvement for better returns

Overview

167 Queen St is a typical attached small office building in Melbourne CBD. The Strata ownership structure is similar to many buildings of this size and the involvement in the program demonstrates how energy efficiency and economic outcomes can be achieved regardless of the ownership structure.

Program activities

The building conducted an opportunities assessment that also integrated some aspects of major capital works improvements in the near term. These improvements, were prioritised and implemented through the program. Other opportunities were deferred to later capital improvements in order to optimise the staging and improvement costs.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 5,000 square metres over 11 floors.
- › Concrete attached building with east facade
- › Water cooled variable air volume HVAC

TENANT

Multi-tenanted

SERVICE PROVIDER

Allstaff

OUTCOMES

- › Based on a NABERS self-assessment the building is targeting a 1 star NABERS Energy improvement.

- › Projected annual savings of 78,605kWh electricity and 687,586MJ gas.

CHALLENGES

- › Lack of as-built documentation and equipment details.
- › Access into occupied areas/strata ownership

NEXT STEPS

- › The building will now use the information and revised documentation inform the strategic ownership of the asset and plan to synergise major capital works projects such as the boiler upgrade.



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

176 McCrae St, Bendigo

Small regional office renewed and refreshed

Overview

176 McCrae St is a small 570 square metre office located in the regional city of Bendigo. Built in 1966, the office is due to a refresh and the owners, Catholic Care Sandhurst, have participated in the EEOB program to find ways of integrating energy efficiency into their long term improvement strategy.

Program activities

The EEOB opportunities assessment identified a range of actions that are somewhat different to larger offices. Timer controls and lighting changes were identified and implemented as key opportunities. The decentralised HVAC also presented a significant opportunity to improve the operation of the building, so staff training in more efficient control of air conditioning units was also undertaken.

The abundance of roof space on the building also provided the opportunity for installation of a solar photovoltaic energy array for further cost savings.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 570 square metres over 2 floors.
- › Brick construction
- › Split air conditioning units.

TENANT

Owner Occupied

SERVICE PROVIDER

Programmed

OUTCOMES

- › Based on a NABERS self-assessment the building is targeting a 1 star NABERS Energy improvement.
- › Projected annual savings of 27,000kWh electricity.

CHALLENGES

- › HVAC is decentralised meaning focus needed to shift towards behavioural change.

NEXT STEPS

- › The building will undergo 12 month monitoring to evaluate the success of the upgrades.



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

222 High Street, Kew

Bank Australia ramping down their environmental footprint.

Overview

222 High St Kew is a 2,500 square metre office building that houses the headquarters of Bank Australia. With a business focus on creating a healthier planet, Bank Australia has already undertaken some improvements to reduce environmental impacts through a carbon management plan, improvements to equipment, lighting and solar upgrades.

Bank Australia joined the EEOB program to find additional ways to save electricity, as well as longer term future upgrades that will improve their NABERS rating and the comfort of their office space.

Program activities

The EEOB opportunities assessment identified a range of improvements that could be made to increase the building energy efficiency. Bank Australia invested in upgrading the HVAC controls and sensors and installed new dampers to improve the control and adjustability of the air conditioning system. The assessment also found a significant amount of leakage was occurring in the ductwork in the ceiling, and so were able to significantly save on air treatment and pumping by making some simple repairs to the ducts.

The building also implemented several other activities that contribute to the reduction of environmental footprint. They optimised their hot water reticulation

SNAPSHOT

BUILDING DETAILS

- › 2,500 square metres over 3 floors.
- › Concrete construction with newly refurbished north façade.
- › Air cooled cooling plant with dedicated AHU with economy cycle.

TENANT

Bank Australia

SERVICE PROVIDER

Energy Action

OUTCOMES

- › Targeted NABERS improvement of 1 star.
- › Projected annual savings of 19,521kWh electricity and 27,880MJ gas.

- › Thermal comfort improvement and reduction in ventilation noise

CHALLENGES

- › The stage 2 audit identified some items not initially budgeted for and these items were prioritised over other less significant items.
- › Sub metering required modification in order to reduce costs while maintaining the same level of information.

NEXT STEPS

- › The project will undergo a 12 month monitoring and fine tuning phase.
- › Bank Australia will use this project as an example for other sites.

system, and they installed new metering so that they could separately monitor electricity usage in retail and office spaces. The improvements yielded significant energy efficiency savings, while improving thermal comfort and reducing ventilation noise in the office space.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“Senior executives have mentioned how happy they are with indoor temperature improvements. There has also been a decrease in temperature complaints so that’s saved time and effort for our team.”

Erietta, Senior Officer



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

227 Princess Drive, Morwell

Regional building reaches beyond energy efficiency

Overview

227 Princess drive is located in the regional town of Morwell Victoria. The building owners have a strong corporate focus on sustainability policy and have invested in solar photovoltaic for the office building.

Program activities

This 1970s regional office building is smaller than comparable office buildings in the city, but the owner has already invested in a range of energy efficiency improvements in the past. The project identified that due to the smaller scale of the building, and the work energy efficiency work completed to date, investment into rooftop solar photovoltaic would be the next logical step in reducing the office's energy bills.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 1,800 square metres over 2 floors.
- › Brick construction, standalone office.
- › Split inverter units.

TENANT

Owner occupied

SERVICE PROVIDER

Airmaster

OUTCOMES

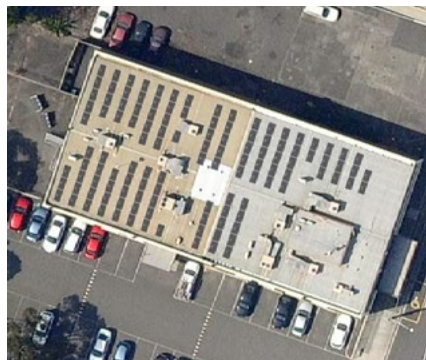
- › The building has evaluated options to install a 30kW solar photovoltaic array.
- › Projected electricity generation of 39,604kWh annually.

CHALLENGES

- › Existing low hanging fruit had already been implemented by the building owner.
- › Projecting future electricity prices can be sensitive to paybacks.

NEXT STEPS

- › The project will use the opportunities assessment to determine the most appropriate delivery model (capital or lease etc.)





ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

234-250 Collins St, Melbourne

Timely upgrade for merged buildings.

Overview

234-250 Collins St is a unique building originally consisting of two separate adjacent buildings. The buildings were later merged and in the current state are served by centralised services that provide for a mix of office and retail use. The building joined the EEOB program to identify and implement a range of building tuning actions that would maximise the energy efficiency impact of a major chiller replacement.

Program activities

The EEOB Opportunities Assessment identified significant improvements that the building could implement. This included improvements to the HVAC controls so that plant is running at the right time, and upgrade, re-wiring and installation of sensors on lights in stairwells, lift lobby and toilets.

The building owners also installed new meters on the building, and sub meters on tenancy lighting, HVAC services and each chiller. These new meters will enable the energy performance of the building to be measured and monitored.

SNAPSHOT

BUILDING DETAILS

- › 11,512 square metres over 10 floors.
- › Two adjoining buildings with shared services
- › Water cooled chillers serving multiple spaces.

TENANT

Multi-tenanted

SERVICE PROVIDER

Programmed

OUTCOMES

- › Based on a NABERS self-assessment the building is targeting a 2 star NABERS Energy improvement.
- › Projected annual savings of 284,000kWh electricity and 775,994MJ gas.

CHALLENGES

- › Integrating and project managing a range of works on site at the same time.
- › Fine tuning the building to operate efficiently for both retail and office uses using the same centralised plant.

NEXT STEPS

- › The building will continue to monitor and optimise the operation of the building services.
- › Facilities management will work with new tenants to further optimise energy efficiency.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“We expect these upgrades will improve our NABERS rating, which will help us to lease out vacant floors”

Joe, Facility Manager



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

235 Ryrie St, Geelong

Raising the bar for office building in Geelong.

Overview

235 Ryrie St is a 4,400 square metre office building in the central business district of Geelong. The building already has some tenants committed to energy efficiency through the CitySwitch program and as a result see efficient building performance as a valuable attribute. The building had already undergone some energy efficiency upgrades, mostly lighting, and through the program underwent a comprehensive approach to reposition their asset as an efficient and effective one.

Program activities

The opportunities assessment identified a number of upgrades that would increase the function of the building automation systems. As a result, the building owners invested in a range of improvements, including installation of a new building management system and new controllers on fans, dampers and the boiler. They also installed occupancy sensors in common areas, 26 new temperature sensors throughout the building, a sensor on the gas meter and carbon monoxide sensors in the downstairs carpark.

The HVAC was also recommissioned which included air balancing, and documentation was updated for all the systems that had been changed throughout the life of the building. Four new meters were then installed on power mains, mechanical

SNAPSHOT

BUILDING DETAILS

- > 4,000 square metres over 4 floors.
- > Concrete construction with views of Port Philip Bay
- > Two speed centralised AHU, air cooled.

TENANT

Multi-tenanted

SERVICE PROVIDER

Airmaster

OUTCOMES

- > Based on a NABERS self-assessment the building aspires to a target of 4.5 Stars.

CHALLENGES

- > Installation of metering without disruption to tenant energy
- > Some water and air balancing unable to be completed due to latent conditions found

NEXT STEPS

- > The project will fine tune the building automation and controls to optimise operation
- > The building will investigate window film options as the next major improvement opportunity.

Projected annual savings of 12,796kWh electricity and 235,808MJ gas.

services, common lighting and lifts. A regeneration unit was installed on the lift counterweight so that energy could be recovered from the movement of the lift.

The building also identified opportunities for improvement to be completed and investigated in the near future, such as window film treatments, and asset management documentation for future reference and planning.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“Complaints have reduced, and the new meters and sensors allow me to troubleshoot problems instantly from my laptop”

Rob, Facility Manager



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

277 Camberwell Road, Camberwell

Restoring an inner suburban office for new tenants.

Overview

This building contains 2,400 square metres of office space and is located in the heart of the inner Melbourne suburb of Camberwell. The owner acquired the building relatively recently, and had been focusing on refreshing the building to attract tenants into unoccupied floors.

The delivery of the energy efficiency project, the building owner and management team have gained a better understanding of their building asset, which will enable better building management for the building owner and future tenants alike.

Program activities

The EEOB opportunities assessment identified that major components of the heating, ventilation and cooling (HVAC) system were at end of life. While the owners opted to retain some of the existing HVAC components, they focused on energy efficiency measures to extend the life of system. They upgraded the HVAC system from constant air volume to variable air volume (VAV) to reduce energy consumption in the system's fans. The building's old pneumatic controls were also upgraded to new digital controls.

Sensors, controls and efficient lighting were installed in common areas, and sub-meters were installed on tenant power supply and essential services.

SNAPSHOT

BUILDING DETAILS

- › 2,400 square metres over 4 floors.
- › Concrete construction with views of Camberwell.
- › Air cooled constant air volume HVAC with heating hot water reheat (upgraded to variable air volume).

TENANT

Woodards

SERVICE PROVIDER

Programmed

OUTCOMES

- › Based on a NABERS self-assessment the building aspires to a target of 4 Stars.
- › Projected annual savings of 185,000kWh electricity and 14,000MJ gas.

CHALLENGES

- › The previous history of electrical work required some upgrade work to refresh
- › Existing mechanical plant was approaching end of life which required some planning to coordinate and ensure works were complimentary.

NEXT STEPS

- › The project will undergo a 12 month monitoring and fine tuning phase.
- › The current unoccupied levels present an ideal opportunity for the building to be refreshed which includes works broader than the scope of the EEOB program. This includes: comprehensive led lighting upgrades, broader HVAC works in floor, vehicle stackers and aesthetic and floor plan changes.

The building assessment also gave the owners greater clarity around the realistic aspiration of achieving 4 star NABERS. Although the program did not financial support all components of the upgrade, the opportunities assessment made a significantly compelling case for a number of upgrades to be carried out such as tenancy led lighting upgrades. As a result, the building is now able to plan a coordinated, long term approach to decision making and upgrades for better building performance.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“Participating has given me a greater awareness of the efficiency opportunities available in buildings like ours.”

John, building owner



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

293 Swanston St, Melbourne

Energy efficiency also delivers better comfort outcomes.

Overview

293 Swanston St is a building joined the EEOB program to address some air conditioning issues in the building. The building experienced some inconsistencies with the air conditioning as a result of several years of add-ons and adjustments.

Program activities

A level 2 audit was conducted to identify the building performance characteristics and understand how the systems interacted and was designed to function. Through this audit a number of key recommendations were made that could present opportunities to improve thermal comfort and energy efficiency.

The building engaged in thermal comfort monitoring technology to monitor the building. This provided verification of the air conditioning faults and thermal conditions. The building is has now continued to utilise the monitoring technology to address air conditioning issues as the improvements are gradually implemented.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 2,000 square metres over 4 floors.
- › Concrete attached building with east/west

TENANT

Multi-tenanted

SERVICE PROVIDER

Programmed / Hux

OUTCOMES

- › Based on a NABERS self-assessment the building is targeting a 0.5 star NABERS Energy improvement.
- › Projected annual savings of 26,000kWh electricity.

CHALLENGES

- › Building fabric is dated by modern standards and requires intrusive implementation.

NEXT STEPS

- › The building will continue utilise the sensor technology to resolve and improve air conditioning performance and efficiency.



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

310 King St, Melbourne

Targeting a NABERS improvement for better returns.

Overview

310 King St building joined the EEOB program to find ways to improve energy efficiency and tackle some simple short payback immediate improvements. The building had already undertaken lighting upgrades, but were keen to take a more comprehensive approach to energy performance management in the building.

Program activities

The EEOB opportunities assessment found some opportunities for instant savings, including seized external air dampers and leaking ductwork. Repair of the dampers and air distribution system resulted in a 50% reduction in air leakage, which represents significant savings in HVAC costs.

The building owner undertook major upgrades with a new boiler, fans and variable speed drive. In addition to these upgrades, the EEOB supported installation of a new building management system, plus various sensors and controllers, occupancy sensors and controls for lighting, and programming of economy cycles and purging into the BMS. In addition, the documentation was updated to reflect the current state of the building systems and control strategies.

SNAPSHOT

BUILDING DETAILS

- > 6,000 square metres over 10 floors.
- > Concrete attached building
- > Air cooled DX units.

TENANT

Multi-tenanted

SERVICE PROVIDER

Allstaff

OUTCOMES

- > Based on a NABERS self-assessment the building is targeting a 1 star NABERS Energy improvement.
- > Projected annual savings of 141,134kWh electricity and 1,126,983MJ gas.

CHALLENGES

- > Multiple tenants meant there were some challenges coordinating access.
- > Existing documentation was incomplete.

NEXT STEPS

- > The monitor their current performance with the implemented improvements.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

454 Glenferrie Road, Kooyong

Office retrofit for Vision Australia

Overview

454 Glenferrie Rd, Kooyong houses the head offices of Vision Australia. The building has had several additions, and extensions throughout its life and as a result has complicated operation and variable thermal comfort.

Program activities

Vision Australia committed to improving their building asset through the EEOB program and also participated in thermal comfort to understand their building performance.

The EEOB assessment identified several areas of improvement, specifically aged equipment that required replacement and recommended an overhaul of the control system. The comfort monitoring also supported the changes and highlighted the opportunity to realise co benefits of improved thermal comfort and air distribution within the offices.

With the audit information, a decision was made to comprehensively retrofit the building over a longer timeframe (outside of EEOB timeframes). The building is aspiring to a NABERS Energy performance of 4 Stars once the retrofit has been completed and commissioning completed.

SNAPSHOT

BUILDING DETAILS

- › 4,838 square metres over 2 floors
- › Concrete construction.
- › Various air conditioning systems (due to be completely overhauled).

TENANT

Vision Australia

SERVICE PROVIDER

GHD

OUTCOMES

- › Based on a NABERS self-assessment the building aspires to a target of 4 Stars.
- › Projected annual savings of 109,644kWh electricity and 1,056,842MJ gas.

CHALLENGES

- › Committing to a comprehensive retrofit required greater levels of approval.
- › Planning a retrofit without relocating staff will be a challenge.

NEXT STEPS

- › Vision Australia is currently engaging in a full building retrofit.
- › The building will investigate rooftop solar once the retrofit process is complete.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

“Participating in the EEOB program has given me a much greater knowledge and awareness of the efficiency opportunities available in buildings like ours.”

John, building owner



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

484 St Kilda Rd, St Kilda

Building tuning to amplify the returns of a major retrofit.

Overview

484 St Kilda Rd is located in the popular commercial strip just outside Melbourne CBD. The 17 storey building has historically enjoyed low vacancy rates, but the owners were keen to increase the building's appeal to tenants by improving its thermal performance and NABERS energy rating.

Prior to joining the EEOB program, the building owners were already planning major upgrades of the ageing mechanical plant. Through the structured approach of the program, they were able to find further efficiency opportunities, and ultimately achieve a 1.5 star improvement in its NABERS Energy rating.

Program activities

The building owners made a significant investment in the replacement of the building's three chillers and associated drives, pumps and sensors, as well as hot water variable speed drives and new air handling units. The EEOB program supported building tuning opportunities that complemented these equipment upgrades.

Complementary work included time schedule adjustments to all HVAC systems to reduce unnecessary plant operating hours. The EEOB program also supported the installation of controls and sensors in tenancy spaces,

SNAPSHOT

BUILDING DETAILS

- › 20,000 square metres over 17 floors.
- › Concrete construction on the main St Kilda Rd commercial precinct.
- › Water cooled variable air volume HVAC with terminal fans.

TENANT

Multi-tenanted

SERVICE PROVIDER

Allstaff / NDY

OUTCOMES

- › Based on a NABERS self-assessment the building aspires to a target of 4.5 Stars.
- › Projected annual savings of 466,443kWh electricity.

CHALLENGES

- › Coordinating the replacement of major plant in a single weekend to minimise tenant disruption.
- › Some issues with documentation of existing systems due to age of building.

NEXT STEPS

- › The project will continue to refine the optimisation of the new HVAC plant and control strategy.
- › The sub-metering system will be utilised to identify additional operational changes that can further improve efficiency.

and occupancy sensors in the carpark lighting systems, and new sub meters on mechanical services, lighting, lifts, essential services and chillers.

The new sub-metering and controls now provide much clearer insight into energy consumption in various parts of the building systems, enabling more consistent and effective management of plant operation and comfort.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

810 Whitehorse Rd, Box Hill

A carpark tune-up for easy energy savings

Overview

The owners of 810 Whitehorse Road decided to participate in the EEOB program to find ways to improve their building energy efficiency. Car park operations were identified as an opportunity that could demonstrate that energy efficiency could be cost effective and simple to implement.

Program activities

The building had three levels of carpark space, and the carpark exhaust fans operated all day without any throttling or controls. As part of this project, the building owners installed carbon monoxide sensors so that it could detect the car exhaust concentrations in the carpark space. The owners also installed controllers and variable speed drives so that the fan motors could be throttled in response to the need for ventilation in the carpark space. These simple changes eliminated the unnecessary use of the large fan motors, and resulted in significant energy savings.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- > 4,830 square metres over 3 floors (plus 3 levels of car park).
- > Concrete construction, detached building.

TENANT

Multi-tenanted

SERVICE PROVIDER

GHD

OUTCOMES

- > Projected annual savings of 32,110kWh electricity.

CHALLENGES

- > Coordinating works outside of carpark use hours

NEXT STEPS

- > The works demonstrate the cost effectiveness of simple improvements which will influence future investment decisions.



ENERGY EFFICIENT OFFICE BUILDINGS — PROJECT OVERVIEW

990 Whitehorse Rd, Box Hill

Office building upgrades for a fast growing precinct

Overview

Located in one of Melbourne's high growth suburbs, Box Hill, 990 Whitehorse road serves the growing needs of commercial office space for the area. With a major refurbishment and extension planned, the building seized the opportunity to review and refine its energy efficiency operations.

Program activities

This relatively new building was constructed in 1992, so major equipment upgrades were not a high priority for the building owner. However, there were opportunities to improve the efficiency of the existing equipment, including the installation of a building management system (BMS). Simple HVAC upgrades were undertaken to assist with monitoring and control of the building services, and included as new pressure sensors, controls and programming.

Variable speed drives were also added to the mechanical plant to further increase the efficiency of the existing motors. Lighting efficiency was also improved with the addition of sensors and reprogramming of timer clocks.

Further information

For more information contact
info on 03 8626 8700
email info@sustainability.vic.gov.au
or visit www.sustainability.vic.gov.au/eeob

SNAPSHOT

BUILDING DETAILS

- › 20,000 square metres over 6 floors.
- › Concrete construction, detached building.
- › Water cooled variable air volume HVAC.

TENANT

Building refurbishment after major tenant lease end.

SERVICE PROVIDER

GHD

OUTCOMES

- › Based on a NABERS self-assessment the building expects to achieve a half star NABERS improvement (the building is currently vacant).
- › Projected annual savings of 109,644kWh electricity and 1,056,842 MJ gas.

CHALLENGES

- › Coordinating a high volume of works completed on sight during the refurbishment and extension of parts of the building.
- › The BMS system requires some training to upskill the building managers.

NEXT STEPS

- › The building will seek to attract and work with tenants to prioritise energy efficiency.
- › Once the building is occupied, the facility manager will evaluate how it's performing and continue to optimise energy efficiency performance.



