

Case Study - Commercial Building Upgrade

221 London Circuit, ACT

Background

221 London Cct is an iconic 8,500m² commercial office building in Canberra's CBD, managed by Molonglo Group & Knight Frank.



221 London Circuit, Canberra ACT

The building was originally constructed in 1969 and has been renovated and upgraded multiple times over its history. As a result, the building has a complex mix of HVAC systems (including VAVs, on floor FCUs and PAC units).

In 2015, Energy Action were engaged by the Molonglo Group to help lift the site's NABERS base-building energy performance from 3.5 stars, up to a target of 4.5 stars.

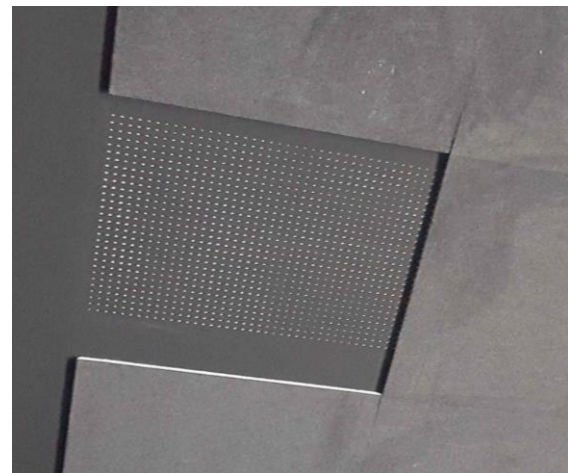
Opportunity

Before Energy Action commenced upgrade works the building was performing at 3.5 stars NABERS energy.

A comprehensive building tuning program was undertaken to lift the HVAC efficiency, the scope of works included:

- Chiller staging optimisation
- Improved condenser water temperature controls
- Air handler pressure reset and supply air temperature control strategies
- Ductwork modifications to improve air balance
- Return and exhaust air plenum pressure controls
- Increased FCU and PAC unit dead bands
- Installation of tenant condenser water isolation valves

Excessive air leakage on the upper level was a major cause of inefficiency. In winter the heating system was unable to achieve thermal comfort due to heat losses through unsealed gaps in the façade (particularly the ceiling).



New acoustic ceiling panels were installed over the perforated ceiling to improve air-tightness without compromising acoustics

Energy Action oversaw the implementation of air leakage tests to identify the source of these leaks and seal as many gaps as possible. In addition to large gas savings, the thermal comfort was significantly improved.



Air leakage test equipment during setup

Energy Action installed a 54kW PV system on the roof of the building, offsetting 16% of grid-supplied electricity and providing a 0.29 star improvement to the building's NABERS energy performance.



The PV system maximised the available roof space whilst maintaining service access

Further gas savings were realised through a domestic hot water system upgrade. The previous system was extremely inefficient as the solar hot water collectors were boosted by the central heating plant, meaning the heating plant operated year-round to service a small domestic hot water load.

Small instantaneous hot water boosters were installed to de-couple the heating plant from the domestic hot water system.

To round out the project, high efficiency condensing boilers were installed to replace the site's aging atmospheric boilers.



Two new 550kW condensing boilers

Outcome

Through the input of all the major parties, namely Molonglo Group, Knight Frank, Energy Action, Control & Electric, CCS Group and Air Leakage Measurement Australia, 221 London Cct has seen significant results in energy savings and NABERS improvement.

ENERGY SAVINGS

12 months since the upgrades were completed, the site has achieved an electricity saving of 231,000kWh/year and a gas saving of 624,000MJ/year.

In particular, supplementary condenser water system energy was reduced by 25%, domestic hot water energy decreased by 45% and the heating hot water system achieved an annual reduction of 40%.

Annual energy costs have been reduced by \$41,600, and a further \$23,500/year in other indirect costs have been avoided through the upgrades.

NABERS IMPROVEMENT & EMISSIONS
REDUCTION

The building achieve a certified 4.5 star NABERS base building energy rating in January 2018.

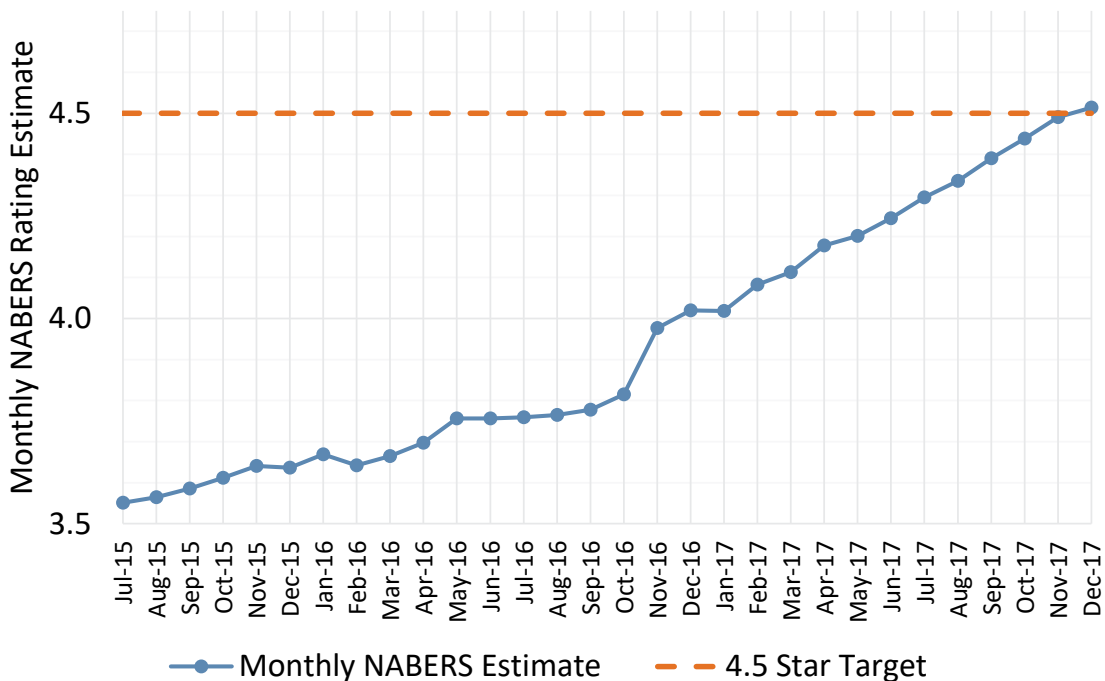
- ✓ 36% electricity saving
- ✓ 33% natural gas saving
- ✓ 35% emissions reduction
- ✓ 3.5 to 4.5 stars NABERS Improvement

Caoimhin Ardren, Director Projects & Advisory Services, Energy Action said:

“Energy efficiency of existing buildings is not sexy, nor is there a silver bullet. You need diligent effort and intimate knowledge of an asset to be able to exploit every available savings opportunity. Energy Action has shown just what is possible on 221 London Circuit, leaving no stone unturned.”

Andrew Cox, Development Manager at Molonglo Group said:

“Molonglo Group owns and holds all of its commercial assets. It is part of our philosophy to ensure that we always improve the environmental sustainability and energy efficiency credentials of each building we own. 221 London is a great example of this. We have taken an existing landmark Canberra property and improved its efficiency by upgrading key components of the building’s infrastructure and equipment in order to reposition the building for the next 40 years.”



The upgrade works and building tuning has improved the NABERS energy rating from 3.5 stars to 4.5 stars