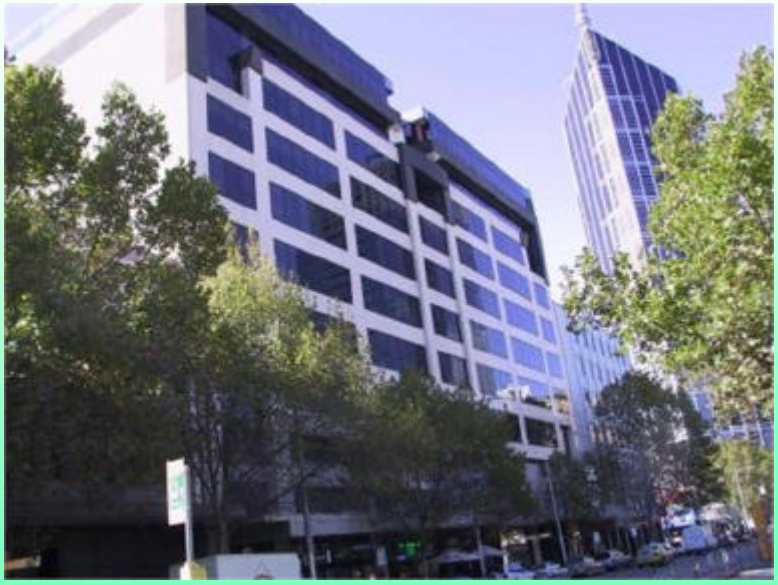


Building Retrofitting

440 Elizabeth Street, Melbourne

Presented by Ron Lazarovits

1200 Buildings Introduction to Retrofitting Seminar #2

16 May 2012

Energy Saving Through Retrofitting

Selecting a consultant is key to the success of a building retofi program.

The consultant of this project was Enman Pty Ltd, an energy management company operating for 23 years with proven record Kliger Wood, the building manager approached Enman directly to assist them in applying for the GBF.

Enman was contracted to conduct a technical and business study to come out with solution to reduce energy consumption and apply for GBF fund.
Since the technology is a cutting edge and very specialised technology Enman was engaged to implement the entire project at the project cost approved in the GBF application

Energy Saving Through Retrofitting

Solution for retrofit

Finding a solution that will work and meet expectations is very hard unless you are expert. We were dependent on our energy experts and went with their recommendation.

Energy Saving Through Retrofitting

Recommendation

The Initial brief came from Kliger Wood managing agents, to implement a BMS for the building.

Enman, the consultant, conducted a technical study to design a BMS with advance control to save energy:

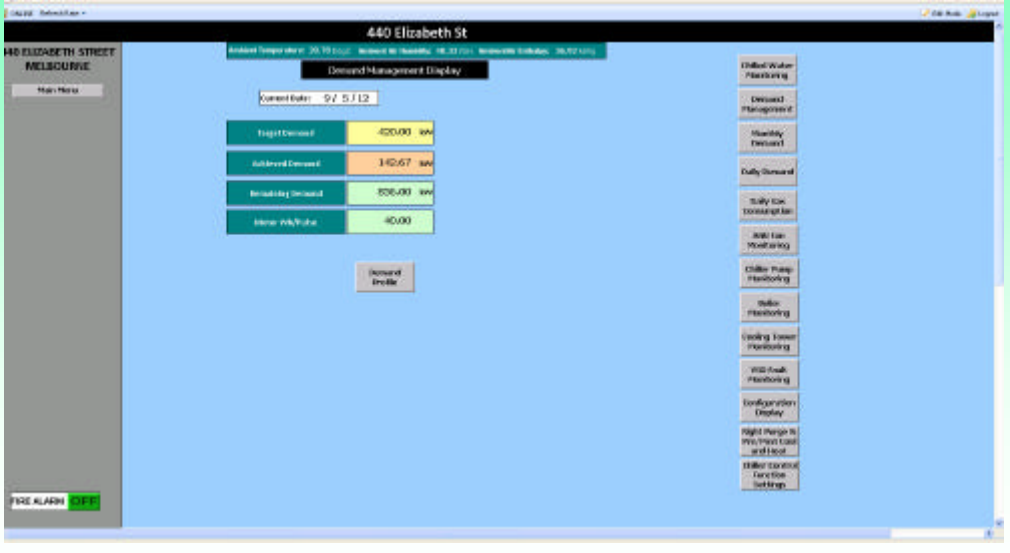
- Enthalpy based economy cycle (Takes humidity into account)
- Optimal start (season, difference in outside temp)
- Night purge (Use outside air after switch off to drop temp)
- Chiller optimal control
- Cooling tower optimal control
- Variable speed drive to fans. Lower the speed at low cooling load
- Variable speed drive for pumps. Lower speed at low Cooling/heating load
- Demand management and control with energy reporting and trending

Energy Saving Through Retrofitting

How easy it was to implement?

It was relatively simple to execute the project:

- Enman provided the turnkey project.
- There was no project variation cost in this project
- Energy performance is beyond our expectation.



Energy Saving Through Retrofitting

How it works

There was no BMS in the building. Control system was a hardwired analogue systems based on time clock.

The BMS is a computer based control system using telemetry data.

- It can provide complex and intelligent control, displays, trend reports, which are vital to the success of operating the building efficiently.
- Remote monitoring: Can monitor the building operation remotely through web and can change operating parameters remotely such as fan speed, room temperature.
- It provides energy consumption and trend of electricity demand. Assists with negotiations for energy purchase.
- Sizing information for future purchase of plant.
- Can deal with tenant complaints on a factual basis.

Energy Saving Through Retrofitting

Verification of energy saving

The verification is done by:

- Comparing energy bills. The comparison needs to be both monthly and yearly to pick up seasonal variations.
- NABERS star rating was the ultimate proof of the energy saving. The NABERS star rating of the building was 0 star and after one year of operation the rating improved to 3.5 star.

Energy Saving Through Retrofitting

Sustainability of performance

As this is energy saving through advance control and optimisation the saving will only continue if we keep the control system as per its original design and ensure that all settings are correct.

Some of the challenges we found

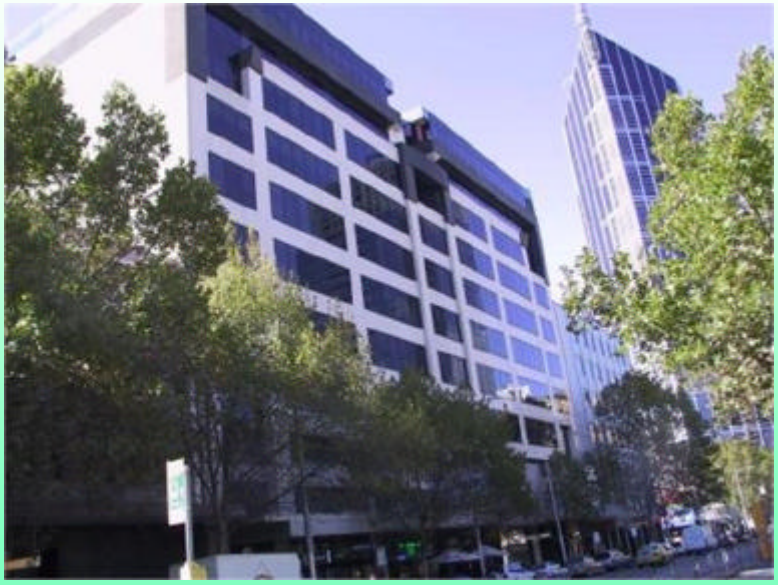
- The maintenance personnel reset parameters without understanding the system. Therefore training of operators is vitally important to sustain the savings.
- Since we do not have a dedicated facility manager we decided Enman, the original designer, would oversee the system and make necessary changes as required.

Energy Saving Through Retrofitting

What is next ?

As an investor we are looking at the future and considering how to raise the star rating economically.

- **Further study**:
  - Enman was engaged again to evaluate other possible energy saving opportunities which fall in line with our investment criteria.
- **Life cycle analysis:**
  - While we are interested in improving energy efficiency we are also looking at the life cycle of the equipment.
- **Economics:**
  - It is obvious that we can replace old system like chillers with new state of the art chillers. New energy efficient chillers use much less energy. We also looked at replacing the old boilers with energy efficient condensing type boilers which can again reduce our gas bill.
  - These replacement may not be economically attractive unless requires to be changed due to its old age.



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