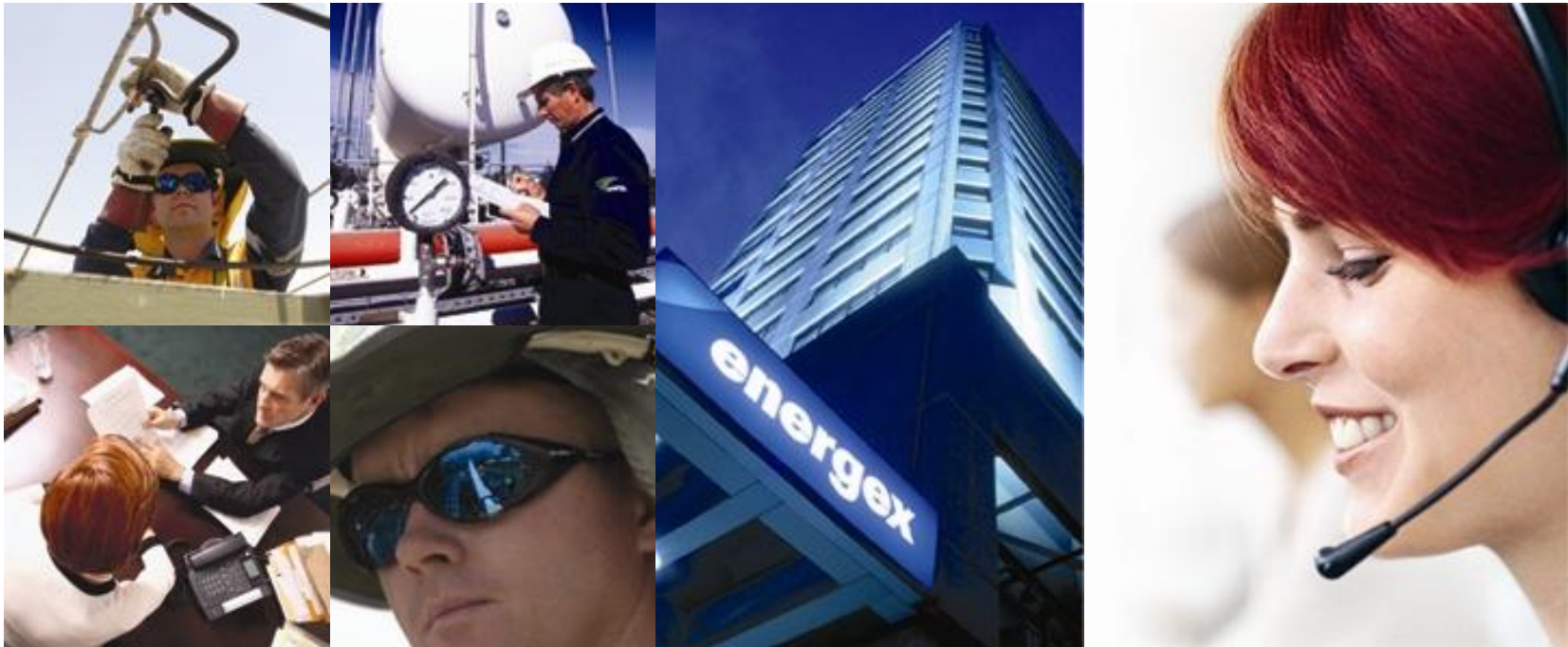


# Presentation to Institute of Hospital Engineering Australia

## “Relieving the Energy Usage Pain”



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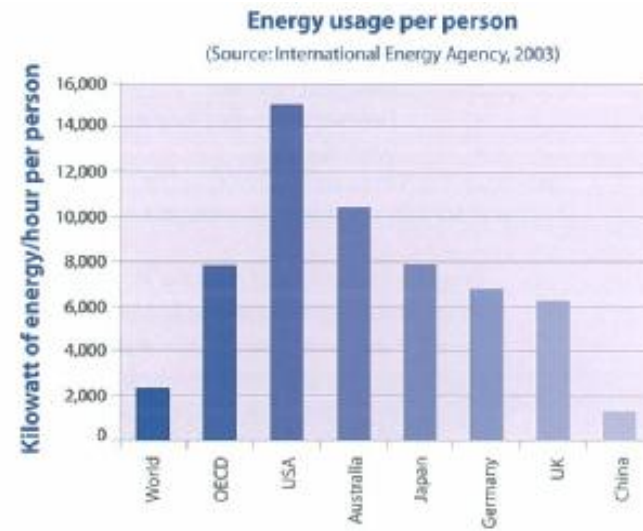
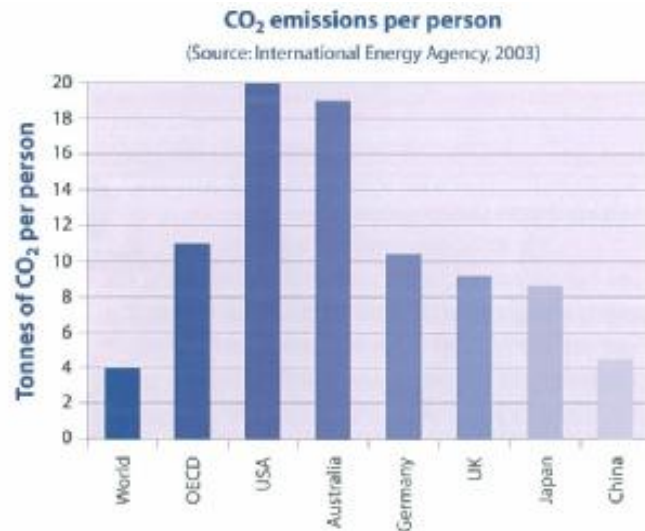
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# Truisms

- Australia is one of the World's largest energy users per capita.



- Energy prices are on the increase

# What is Energy Efficiency?



**The surgical removal of excess energy usage without affecting the site's daily operations.**

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# Why undertake Energy Efficiency Projects?



**Projects can achieve real energy savings of approx 30% or more with little effort on your part.**

**They won't compromise your site.**

# What is an Energy Efficiency Project?

## 1. Initial Proposal - (not just an audit)

A walk through evaluation of the site together with desktop modelling and benchmarking.

A business case containing CAP-EX, SAVINGS, PAYBACK PERIOD, IRR, NPV, CO2 REDUCTION.

## 2. Detailed Facility Study

An engineering grade audit that confirms the initial findings in the proposal and gives the energy savings guaranteed by ENERGEX.

It also contains the equipment list detailing their location in the site.

# What is an Energy Efficiency Project?

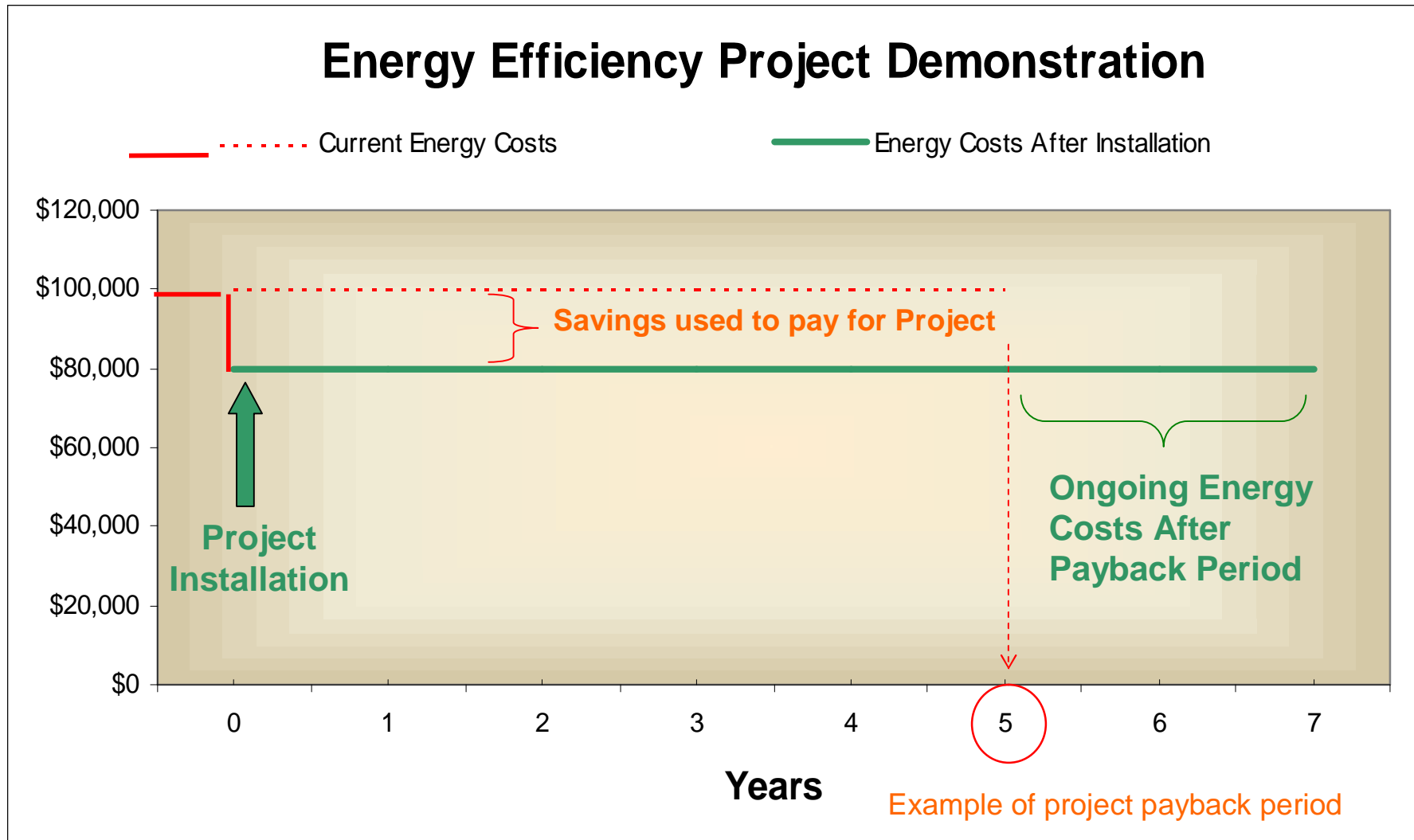
## 3. Installation and Commissioning

All equipment installed as per Detailed Facility Study and commissioned to ensure staff amenity.

## 4. Monitoring and Verification

Monitoring and verification of energy savings using the agreed methodology to prove the savings have been achieved.

# Making your energy savings work for you!



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# What has worked well!

## Energy Efficient Lighting

- Fixed dimming controls
- Occupancy detection
  - PIR, ultrasonic, microwave
- Daylight controls
- New efficient luminaries

### **Benefits**

- Up to 50% savings on lighting bills
- Lights match occupancy
- Fully automated





# Efficient Air-Conditioning Systems

- New technology chillers
- Variable speed drives
- De-humidifiers
- Variable air volume boxes
- Optimum start / stop controls

## Benefits

- Significant reduction in energy use
- Extends life of equipment
- Supply matches requirements



# Large scale Solar Water Heating

- Parabolic concentrators track the sun
- Produces hot water for the plant at 100 deg.
- Replaces or compliments boilers

## Benefits

- Minimal maintenance
- Cleaned by rain or sprinkler system
- Free energy
- Possibly qualify for renewable energy certificates



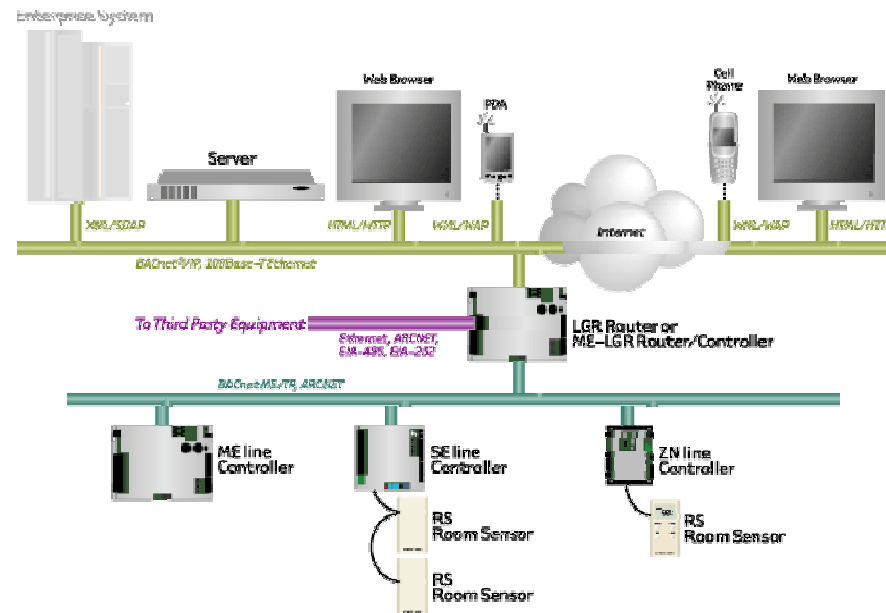
# Water Conservation Measures

- Flow restrictors
- Volume controls in cisterns
- Rainwater harvesting for reuse
- Reverse osmosis reject water capture
- Fire test water capture
- Capture of cooling tower blowdown



# Building Management System

Upgrade, re-configure and re-programme the BMS to optimise the control of more functions within the Hospital



# Domestic Hot Water

**Replace old electric and  
LPG hot water systems  
with efficient hot water  
heat pumps**



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# Other Potential Strategies

## Gas fired Tri-generation

- The simultaneous production of electricity, heating and cooling
- One process, one energy source

### *Benefits*

- Reduction in CO2 emissions
- Protection against blackout
- Possibly qualify for gas energy certificates





# Gas fired air-conditioning

- Natural gas to produce air-conditioning

## *Benefits*

- Reduction in CO2 emissions
- Protection against blackout
- Possibly qualify for gas energy certificates





# Cooling Tower Blowdown Capture

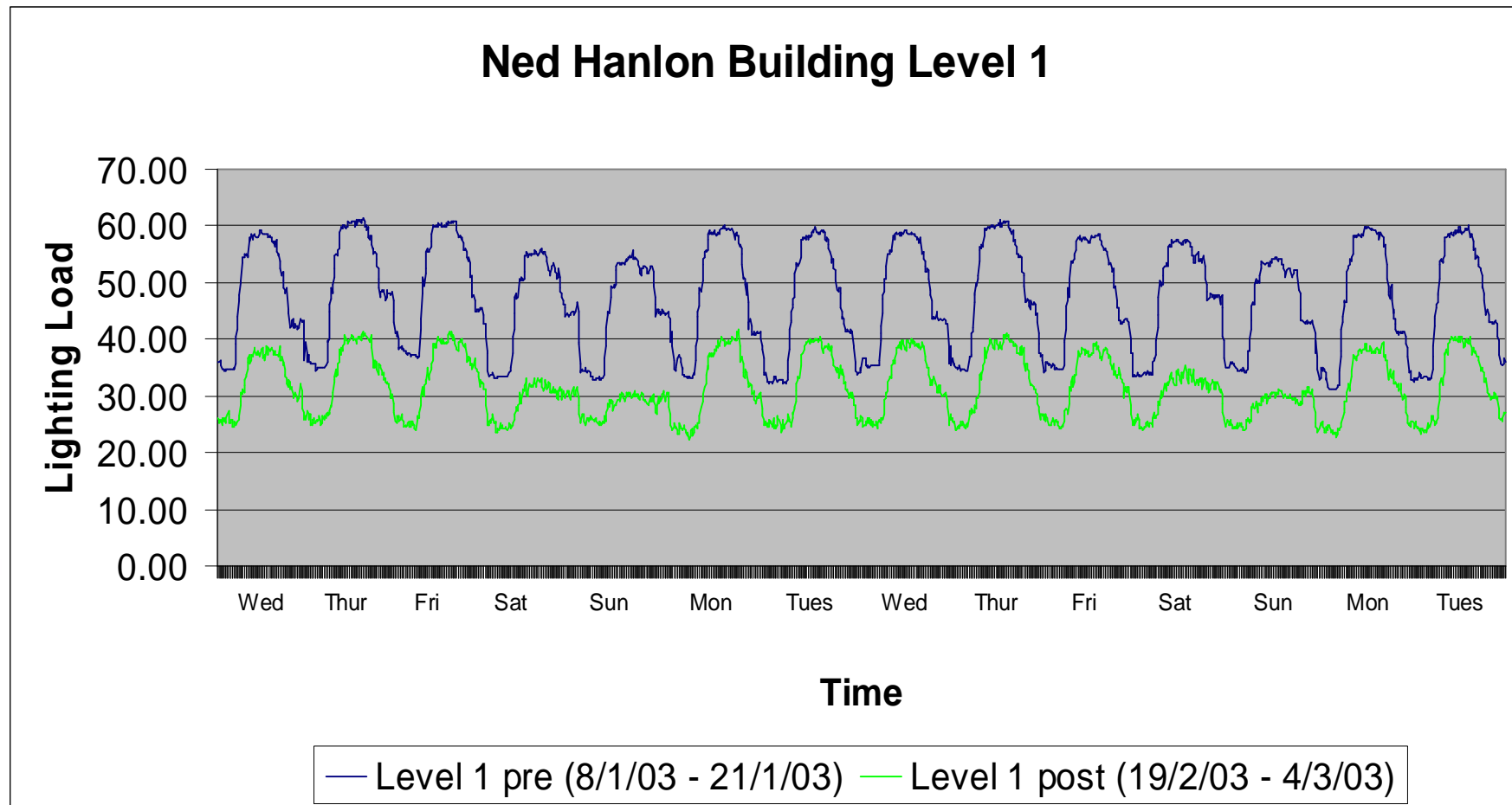
- Capture blowdown water
- Continuous self clean filter
- Reverse osmosis unit
- Combined with harvested rainwater
- Reuse in cooling towers



## Case Study – RBWH Ned Hanlon Building

– Interior Lighting Consumption p.a.	4,199,100 kWh
– Capital Cost (exclude GST)	\$434,600 + GST
– Energy Reduction p.a.	1,062,570 kWh
– CO2 Greenhouse Gas Reduction	1105 tonnes p.a.
– Total Cost Savings p.a.	\$107,370 + GST
– Simple Payback Period	4.0 years
– Internal Rate of Return	27.6 %
– Net Present Value	\$808,730

# Case Study - Monitoring & Verification



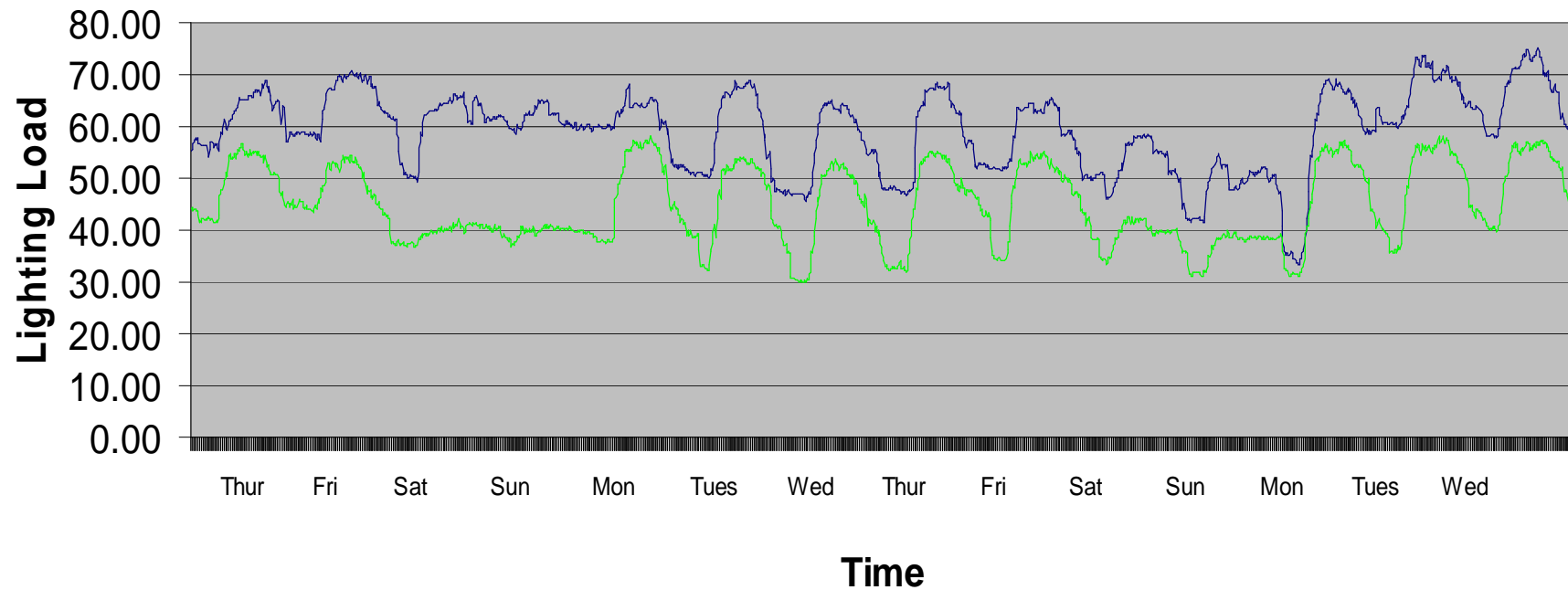
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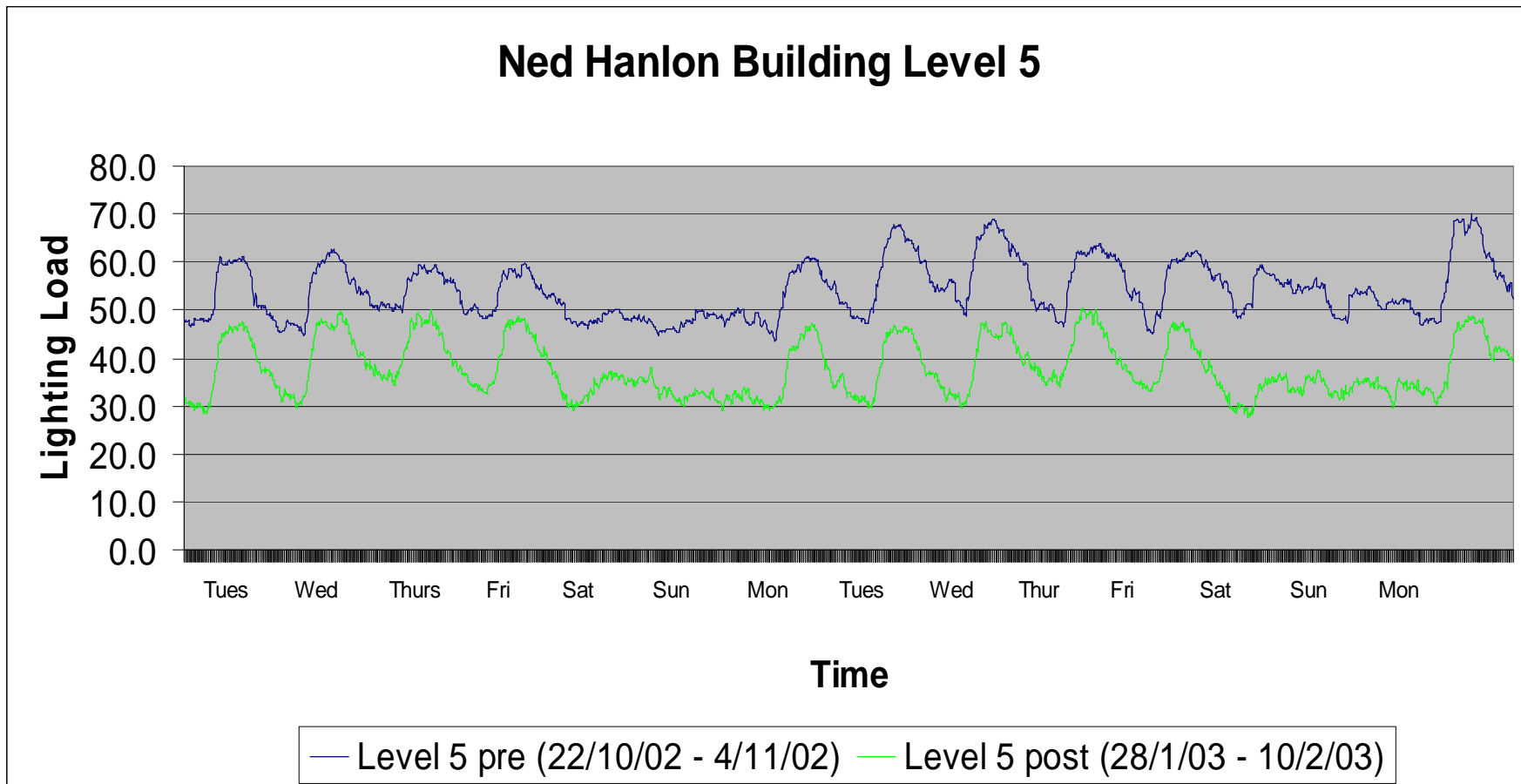
# Case Study - Monitoring & Verification

## Ned Hanlon Building Level 4



— Level 4 pre (21/11/02 - 4/12/02) — Level 4 post (13/2/03 - 26/2/03)

# Case Study - Monitoring & Verification



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# Case study - Monitoring & Verification

Area	Pre-installation kWh Lighting Consumption	Post-installation kWh Lighting Consumption	kWh Saved	CO2 Greenhouse gas reduction PA tonnes
Level 1	415,428	274,846	140,582	146.2
Level 4	584,220	431,106	153,114	159.2
Level 5	474,838	330,694	144,144	149.9
<b>Total</b>	<b>1,474,486 kWh</b>	<b>1,036,646 kWh</b>	<b>437,840 kWh</b>	<b>455.3 tonnes</b>

Area	Predicted kWh energy savings	Monitored kWh energy saved	Difference kWh	Difference %
Level 1	132,916	140,582	7,666	5.7 %
Level 4	148,558	153,114	4,556	3.1 %
Level 5	136,200	144,144	7,944	5.8 %
<b>Total</b>	<b>417,674 kWh</b>	<b>437,840 kWh</b>	<b>20,166 kWh</b>	<b>4.8 %</b>

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# Lessons Learnt

- **Needs to be a team approach**
- **Communication**
  - Continuous
  - Include all players
  - Timely
  - Changes to site
- **Be prepared for changes**
- **Co-ordination of contractors can be a challenge**







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