



CUNDALL

**55 St Andrews Place,
Treasury Reserve,
Melbourne**

April 2012

- Established for 35 years
- Multi-disciplinary consultancy
- 20 offices in 11 countries
- 400+ staff
- High level of repeat business
- Innovative design solutions
- Customer focused
- Award winning projects

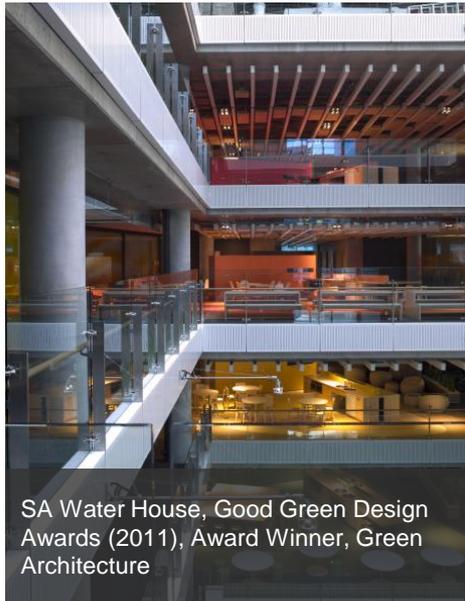


**INVESTORS
IN PEOPLE**



Awarding winning projects

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SA Water House, Good Green Design Awards (2011), Award Winner, Green Architecture



1 Bligh Street, CTBUH 2012, Best Tall Building Award, Asia & Australasia region



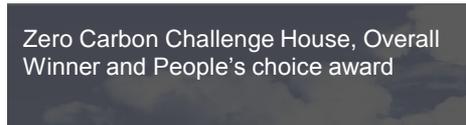
Triptych Tower Melbourne, Australia, National Innovation and Excellence Awards, 2012, The Village Building Award for Best Residential Development



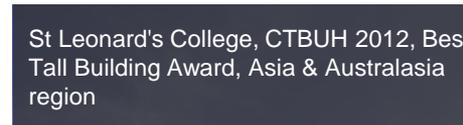
Royal Children's Hospital, International Design and Health Academy Awards (2012), Sustainable Design



Ravenswood School for Girls, AIA (2012), NSW Sulman Award for Public Architecture



Zero Carbon Challenge House, Overall Winner and People's choice award



St Leonard's College, CTBUH 2012, Best Tall Building Award, Asia & Australasia region

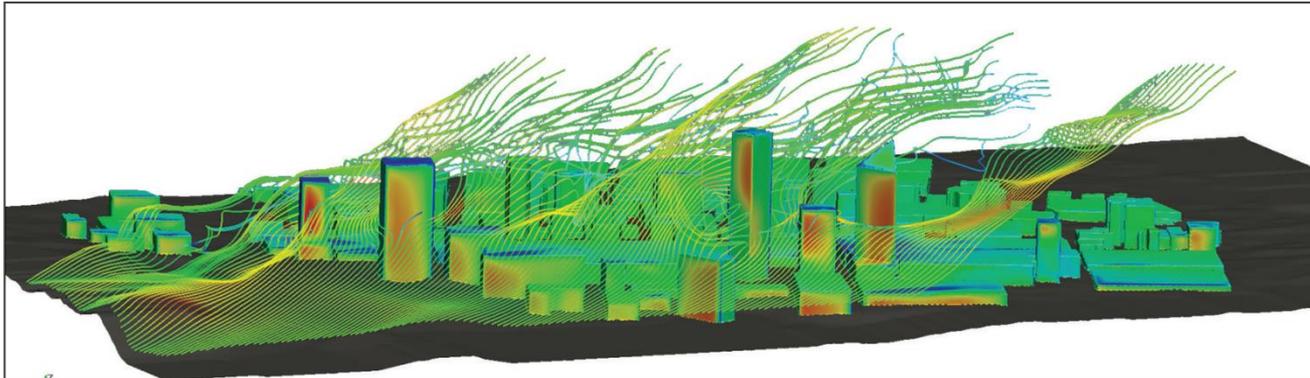


Rouse Hill Town Centre, Urban Land Institutes (ULI) Awards for Excellence (2010), Asia Pacific Competition

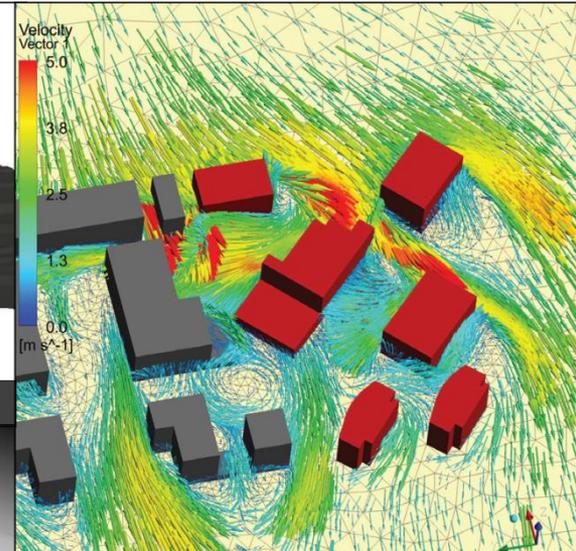


Modelling Capabilities

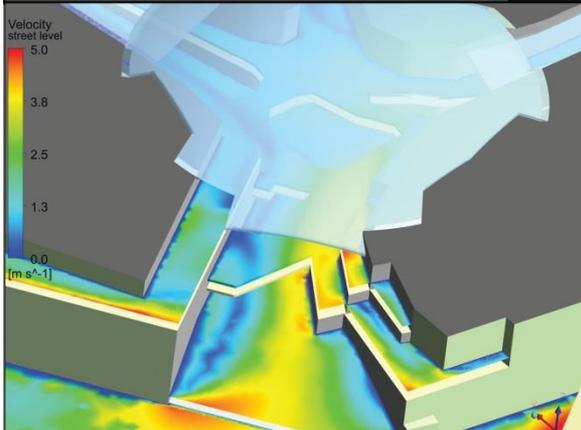
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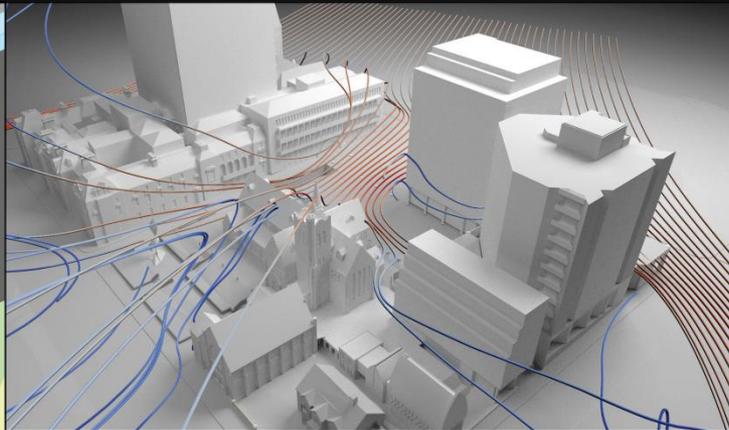
District scale urban comfort / wind analysis



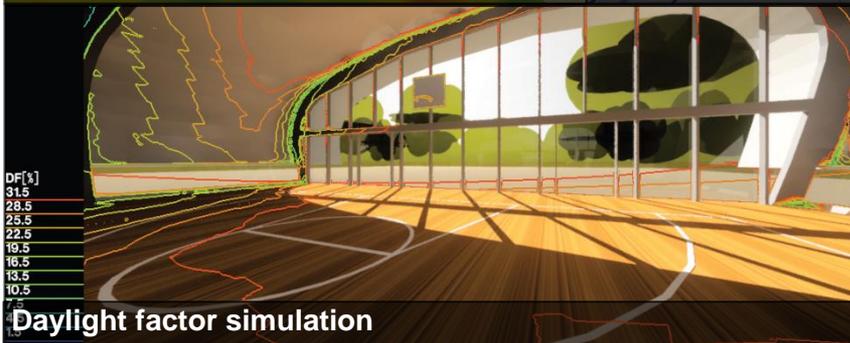
Site-level CFD study



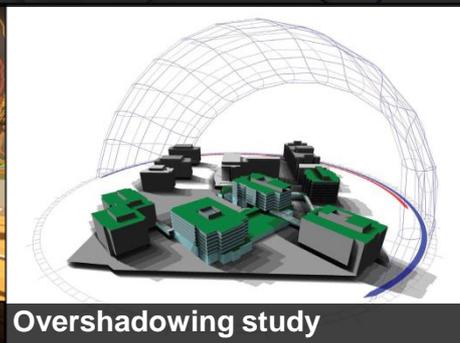
Semi-covered retail AVA study



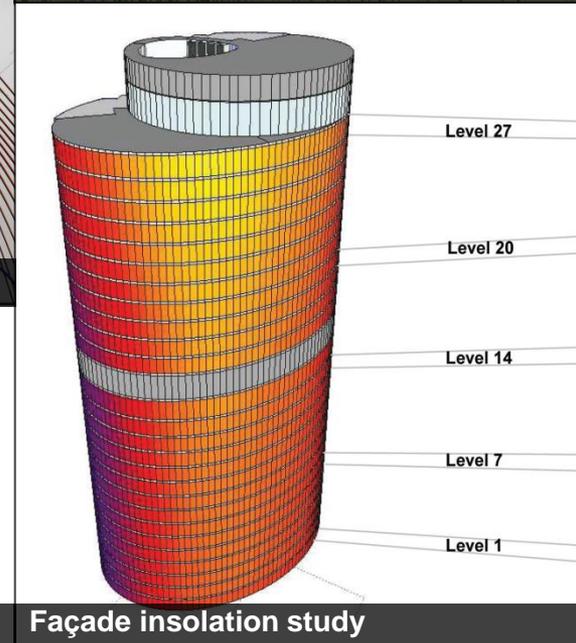
Block scale external comfort study



Daylight factor simulation



Overshadowing study



Façade insolation study

**55 St Andrews Place
Treasury Reserve
Melbourne**

History

- Architectural competition in 1962 to produce a building of “soaring wonderment”
- Winning (non-conforming) design proposed 3 pre-cast concrete panelled boxes buildings:
 - two infill building of similar scale to the Old Treasury Building and 2 Treasury Place (constructed in 1850s)
 - a taller building to be placed facing Macarthur Street
 - Height, scale and proportioned window openings to complement the classical forms
- The infill buildings were to ‘stand out like brown sparrows between two peacocks of Victorian architecture’

Sparrows between Two Peacocks!

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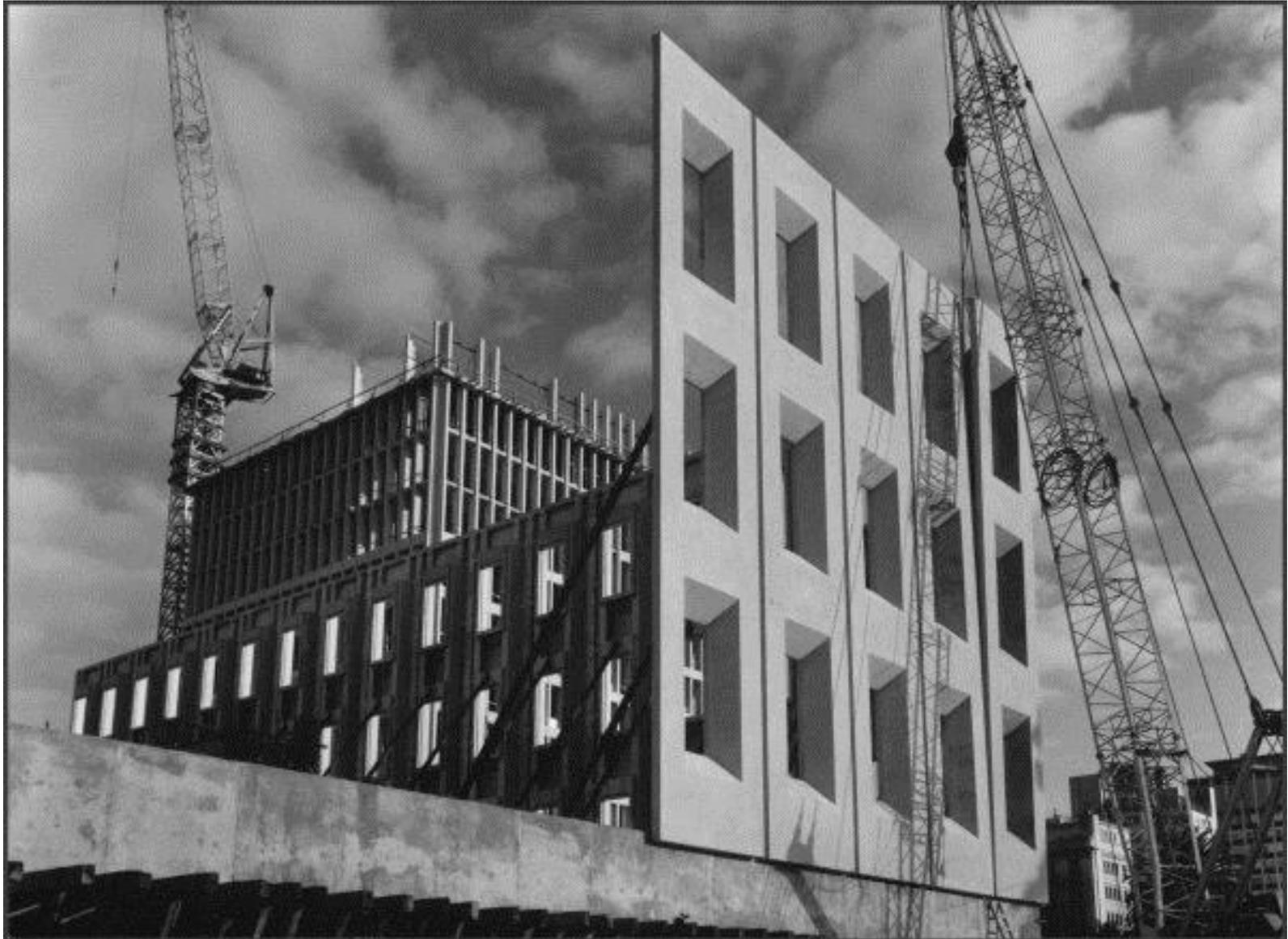
- 55 St Andrews Place
- 1 Treasury Place
- 1 Macarthur Street

Image © 2006 DigitalGlobe

© 2006 Google™

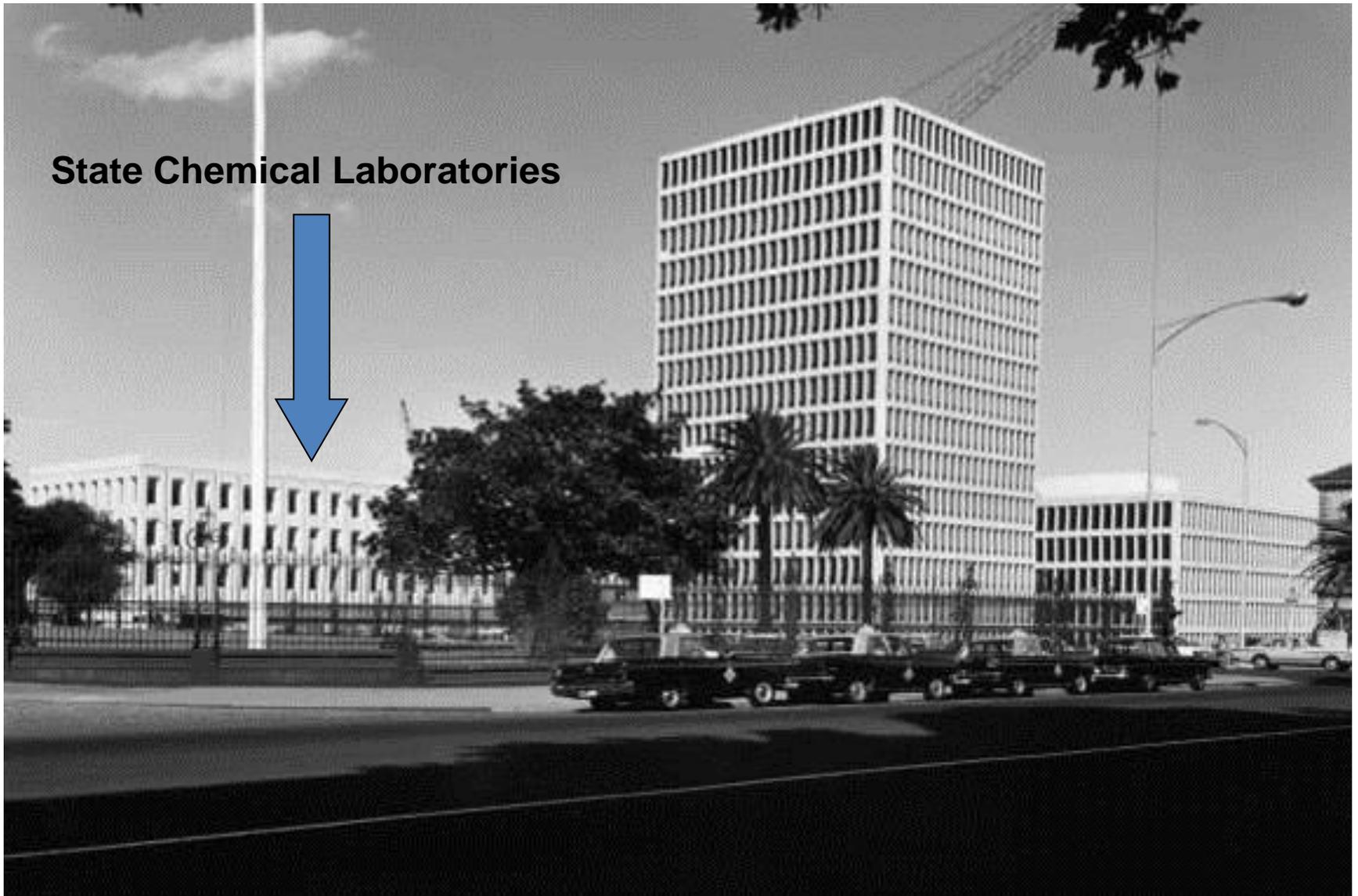
Under Construction (1967)

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Complete ~1968 (4 floors only)

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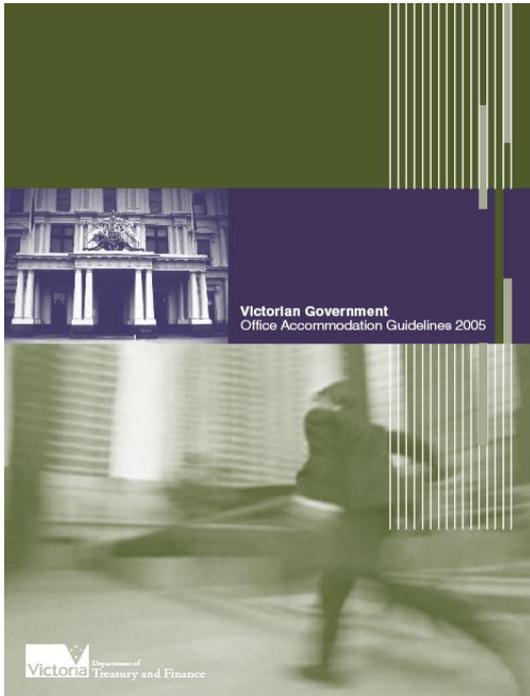
State Chemical Laboratories

Additional floor added in 1996

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Prevailing Government Office Standards



Quality

Set the scene for the New Workplace.

Social Economic Environmental

Describes the workplace as:

“a living organism, as a forum, as a functional unit.”

Looks for a method to improve productivity, specifies a “green” building along with value for money.

Environmental Performance

- Green Star - Office Design: 4-Star
- Green Star - Office Interiors: 4-Star
- NABERS Base Building: 4-Star (existing), 4.5-Star (new)
- NABERS Tenancy: 5-Star Cyclist Facilities

Existing Conditions

Existing Conditions

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Fabric Loads



Ground Floor



Level 4



Other issues

- Drafts
- Stuffy
- Control system problems
- System undersized after Level 4 added
- Level 4 – return air in ceiling void (roof poorly insulated)
- No metering of chilled water to AHU



Other problems & issues

- Poor lighting system and control
- WCs use a full flush
- Minimal AAA rated fixtures
- No external shading on levels 1 to 3 – heavily tinted glass gets hot causing local discomfort
- Fire Services need upgrading
- Carpet at end of life
- Improve access for all people



Greenhouse

- 1 Star NABERS Energy Rating

Comfort

- Poor IEQ
 - Daylight
 - Visual Comfort
 - Thermal Comfort
 - Air Quality



The Challenge

Environmental Performance

- Take from 1-Star to 4-Star NABERS Energy rating
- Fix other IEQ problems!

On-going Management

- Dedicated ESD consultant engaged
- Involve the Departments' environment manager (EMS)
- Increased productivity from improved working conditions
- Access for people with a range of disabilities
- Water efficiency
- Material selected to minimise waste and off-gassing
- Waste – kitchen design, recycling area & construction waste
- Data centre design and energy consumption considered

The Team

The Team

- Victorian Government Property Group (VGPG)
(Principal & Owners' and Tenants' representatives)
- VGPG engaged Cundall to develop an ESD Building Improvement Plan
- Cundall engaged services of:
 - H2o Architects
 - Medland Mitropoulos
(Fire, Electrical & Hydraulics)
 - W T Partnership (Quantity Surveying)
 - Stokes Perna (Building Surveyors)
- Involved Jones Lang LaSalle & AG Coombs from Day 1
 - they know the building!



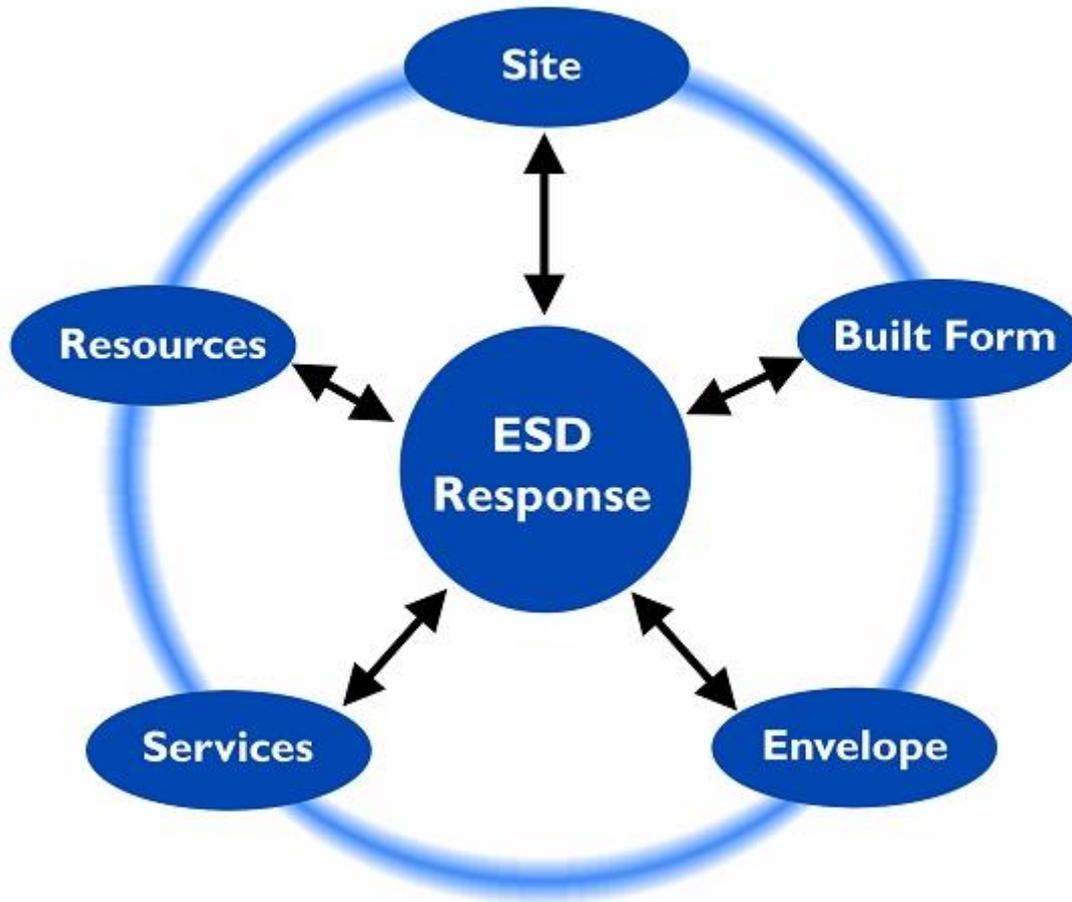
The Approach

Typical Approach

- Typical approach to existing buildings is to tackle services, internal materials and fittings



Our Approach

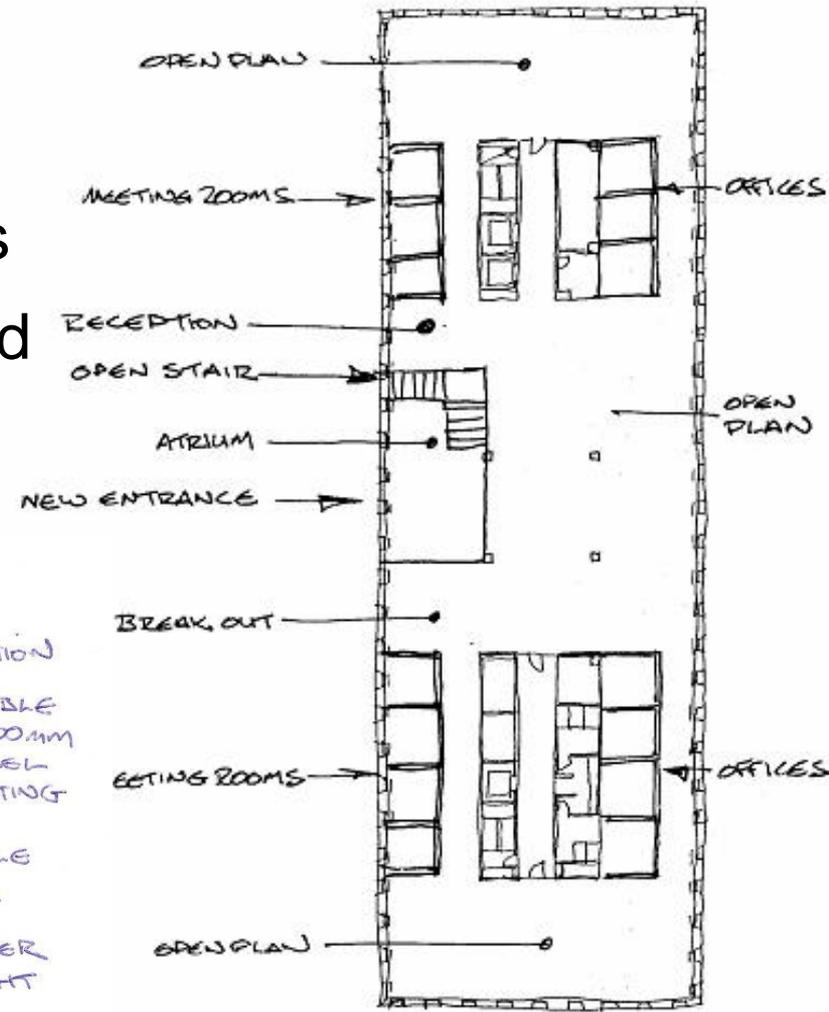
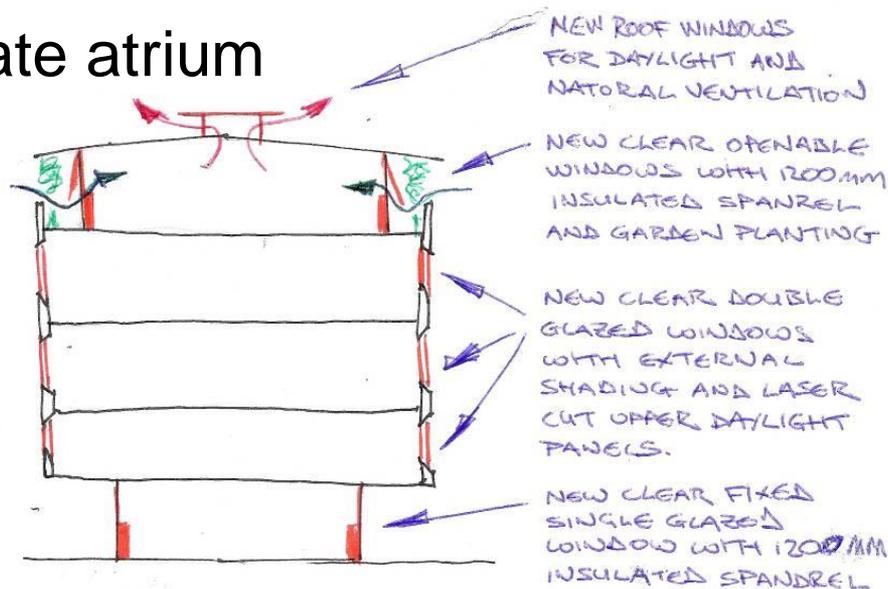


- Go back to the start and reconsider same issues as for a new building
- Philosophy:
 - Improve daylight
 - Improve comfort
 - Reduce fabric loads
 - Retain what we can

The Plan

Site, Form & Fabric

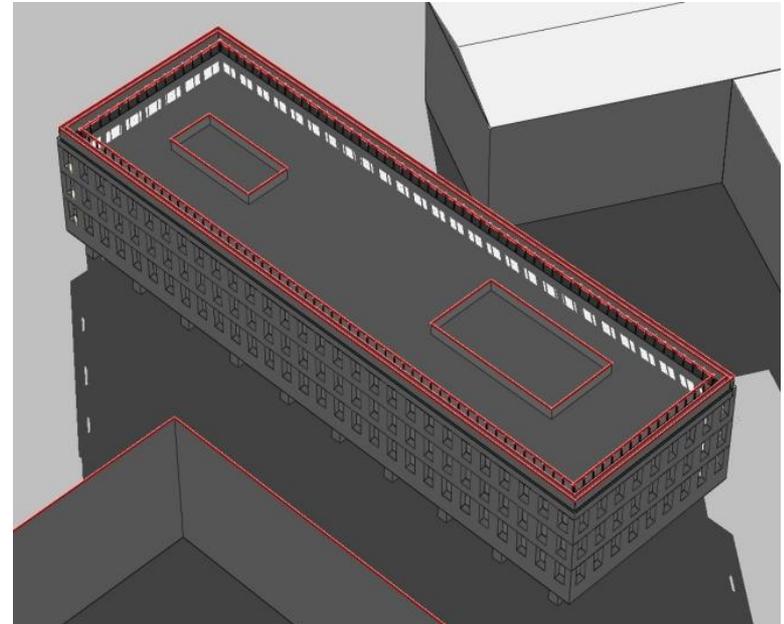
- Clear glazing & add shading
- Reduce extent of full height glass
- Add clerestory, roof insulation and openable windows to Level 4
- Relocate air intake
- Create atrium



IMPROVEMENT OPTION 3
PROPOSED PLAN 1:200
+ SECTION

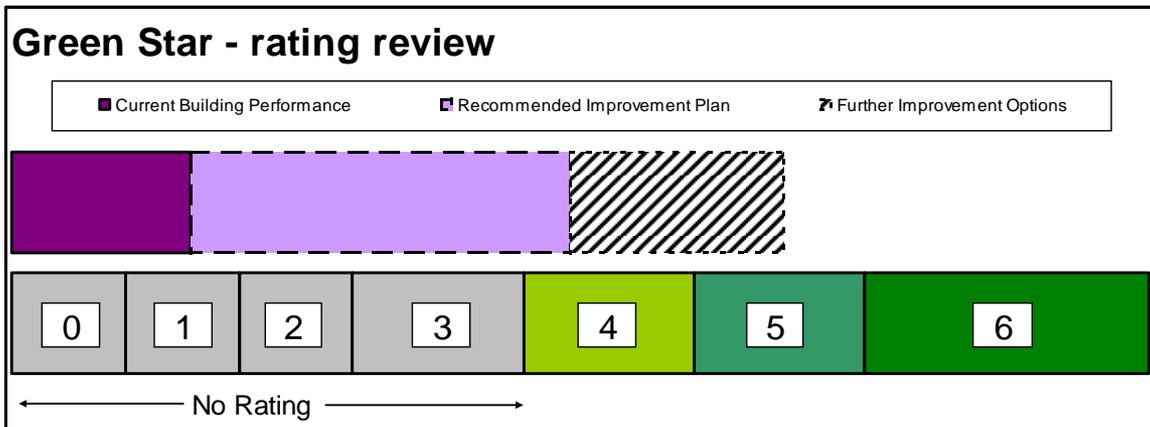
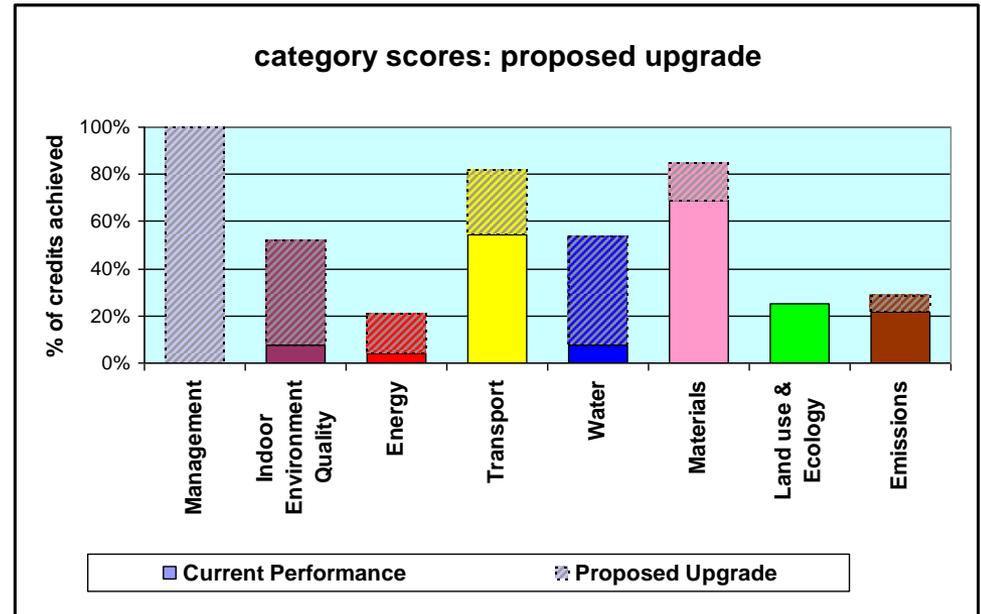
Engineering Services

- Swirl diffusers but keep HVAC
- Metering to CHW from central plant
- New lighting system
- Rainwater harvesting
- Upgrade Fire Indicator Panel
- New low VOC carpet and paint
- Cycling facilities
- New waste storage facility



Environmental Ratings

- 4 star Green Star
- 4.5 star NABERS
- Budget of \$4.3 million
- New tenant not known



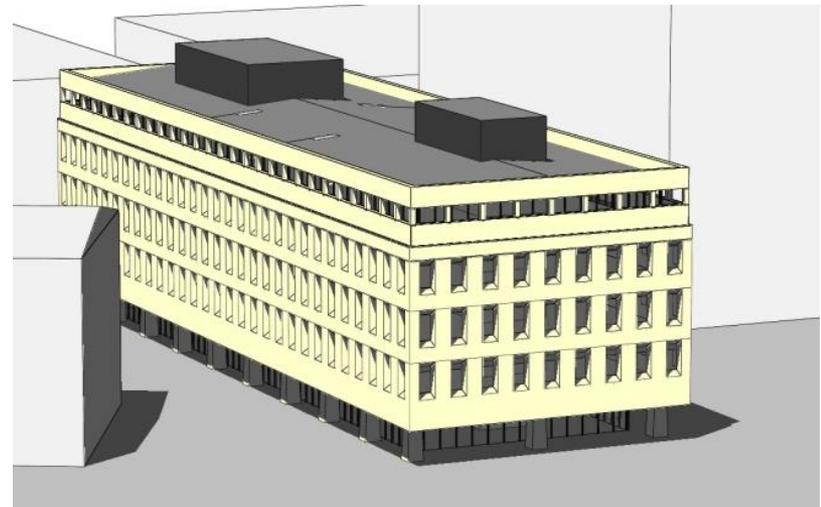
Implementation

Engagement

- Cundall Team engaged to implement ESD Improvement Plan
- Montlaur Project Managers engaged for Contract Administration
- Department of Parliamentary Services became Tenant
- Fitout integrated into base building design and documentation

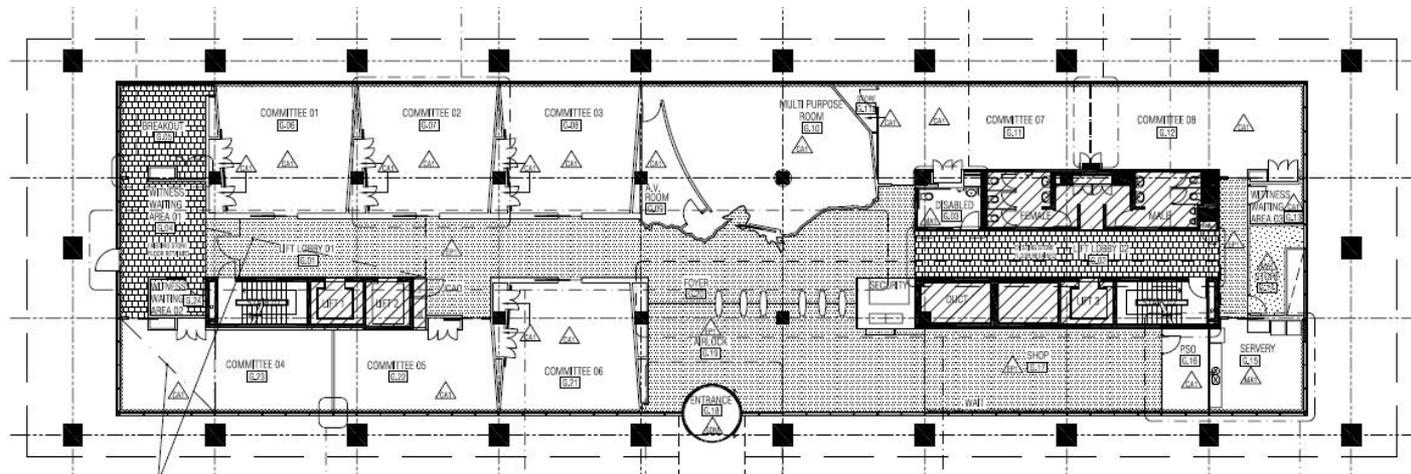
The Budget

- Total budget approx \$7 million
- 60:40 cost split between base and tenancy



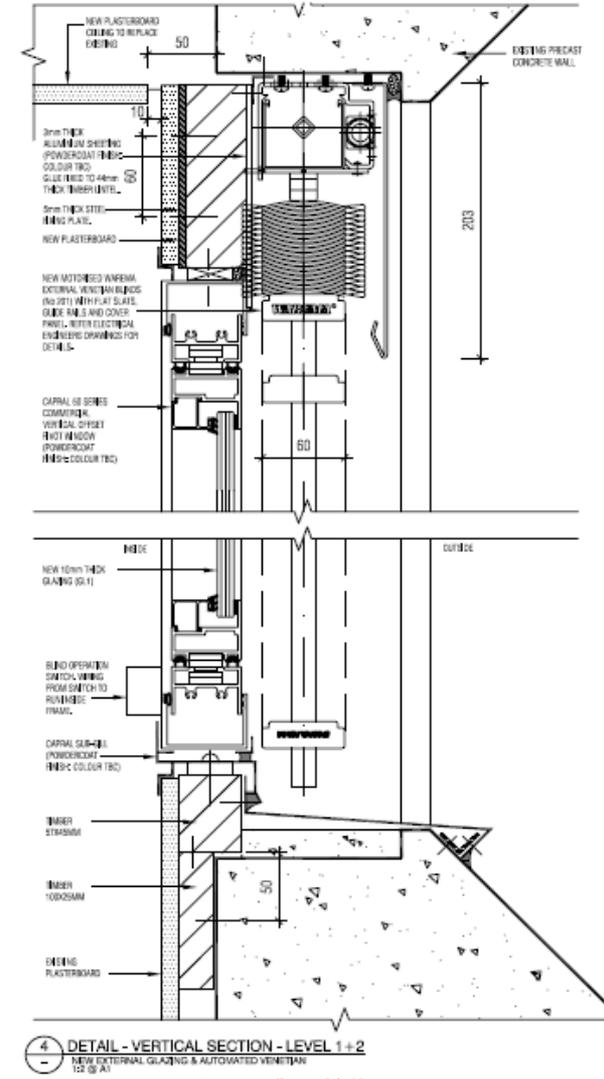
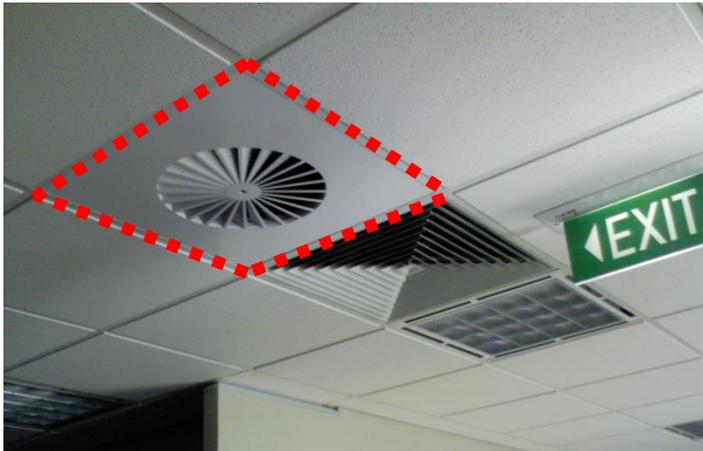
Design – Ground Floor

- New A/C system for committee rooms
- 100% outside air with heat recovery and indirect evaporative cooling
- FCU to each room
- High performance internal blinds



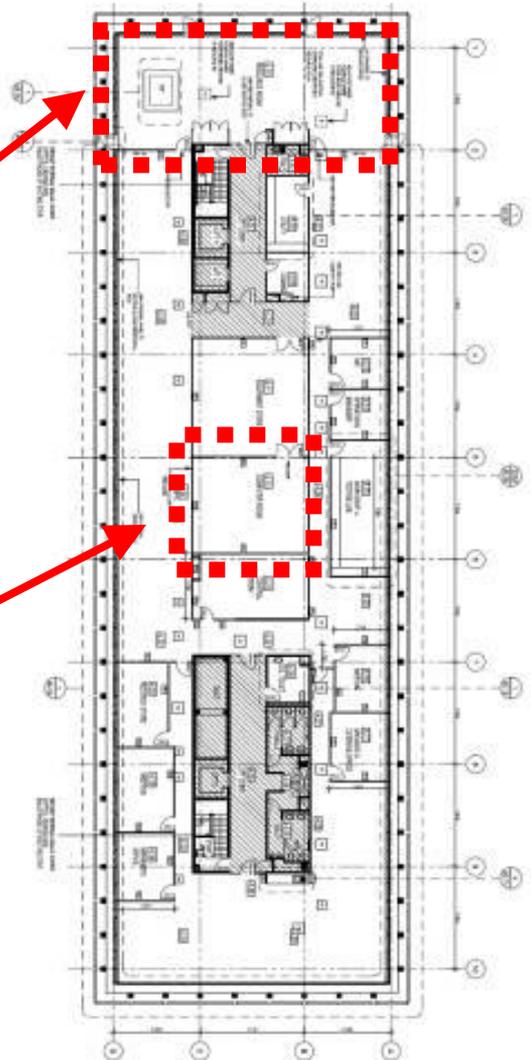
Design – Level 1 - 3

- External automated blinds and clear single glazing
- Swirl diffusers and recommission VAV boxes



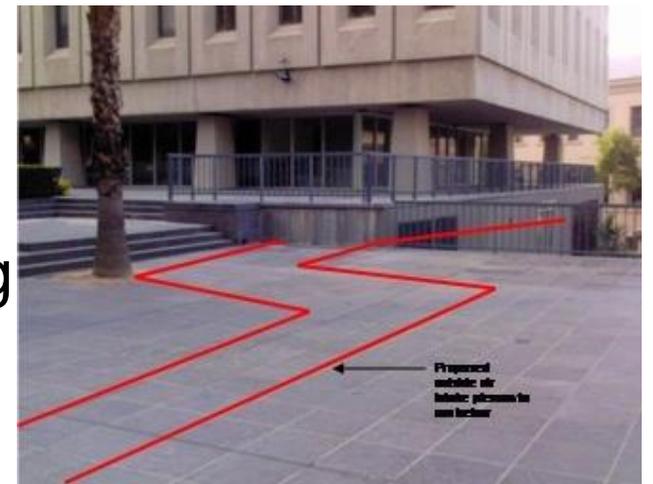
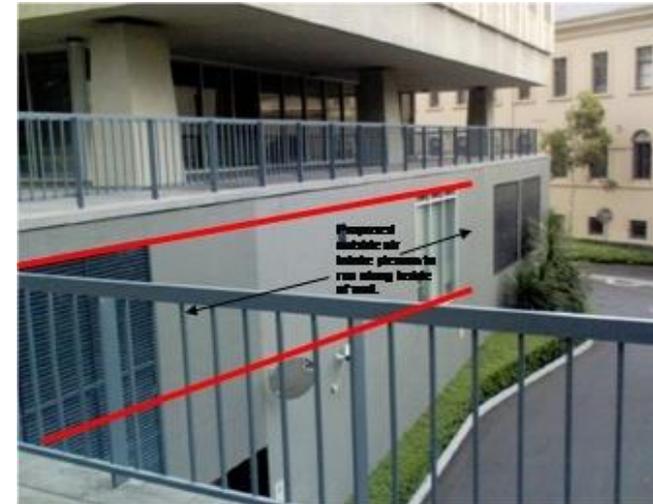
Design – Level 4

- 1200mm spandrel added to reduce fabric loads
- Mixed mode deleted – tenant didn't want it
- Non-conditioned resource room (wintergarden) added
- Skylights added
- HVAC & Lighting as per Levels 1-3
- Data Centre – natural ventilation?



Design – Central Services

- Relocated air intake
- Increase outside air by 50%
- Add tenant exhaust
- CO2 sensors
- New control strategy
- Commissioning Agent
- Duct cleaning
- CHW, energy & water metering
- Rainwater harvesting for toilet flushing & irrigation



Design – Lighting

- T5 ceiling lights to provide 160 lux
- Task lighting to desks & meeting rooms
- New lighting control system



Design – Internal & Fitout

- Low VOC carpet & paints
- Reuse 50% furniture & partitions
- Retain 80% of ceilings
- Waste storage added
- Cyclist facilities added
- Disabled toilets added to 2 floors
- Relocate building entry
- Use of internal & external planting



Delivery Process

- Integrated documentation
- ESD embedded in tender docs
- Conventional tender process

Delivery Process

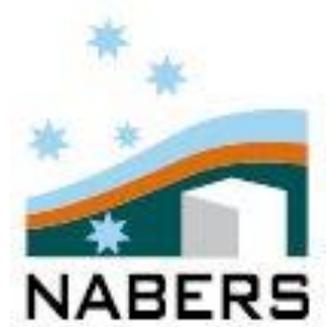
- Schiavello appointed
- Lowest tender
- Tender below pre-tender estimate
- ISO14001 accredited
- Good ESD experience



Outcomes

- 4.5 star NABERS Energy Base Building
- 5 star NABERS Energy Tenancy
- 4 star Green Star – Office As-Built rating
- 4 star Green Star – Office Interiors
- Over 40% reduction in greenhouse gas
- Cost saving of over \$100k per annum

4 star rating



Recognition

- UK Chartered Institute of Building Services Engineers (CIBSE) '*Sustainable Building Services Award*'



Before



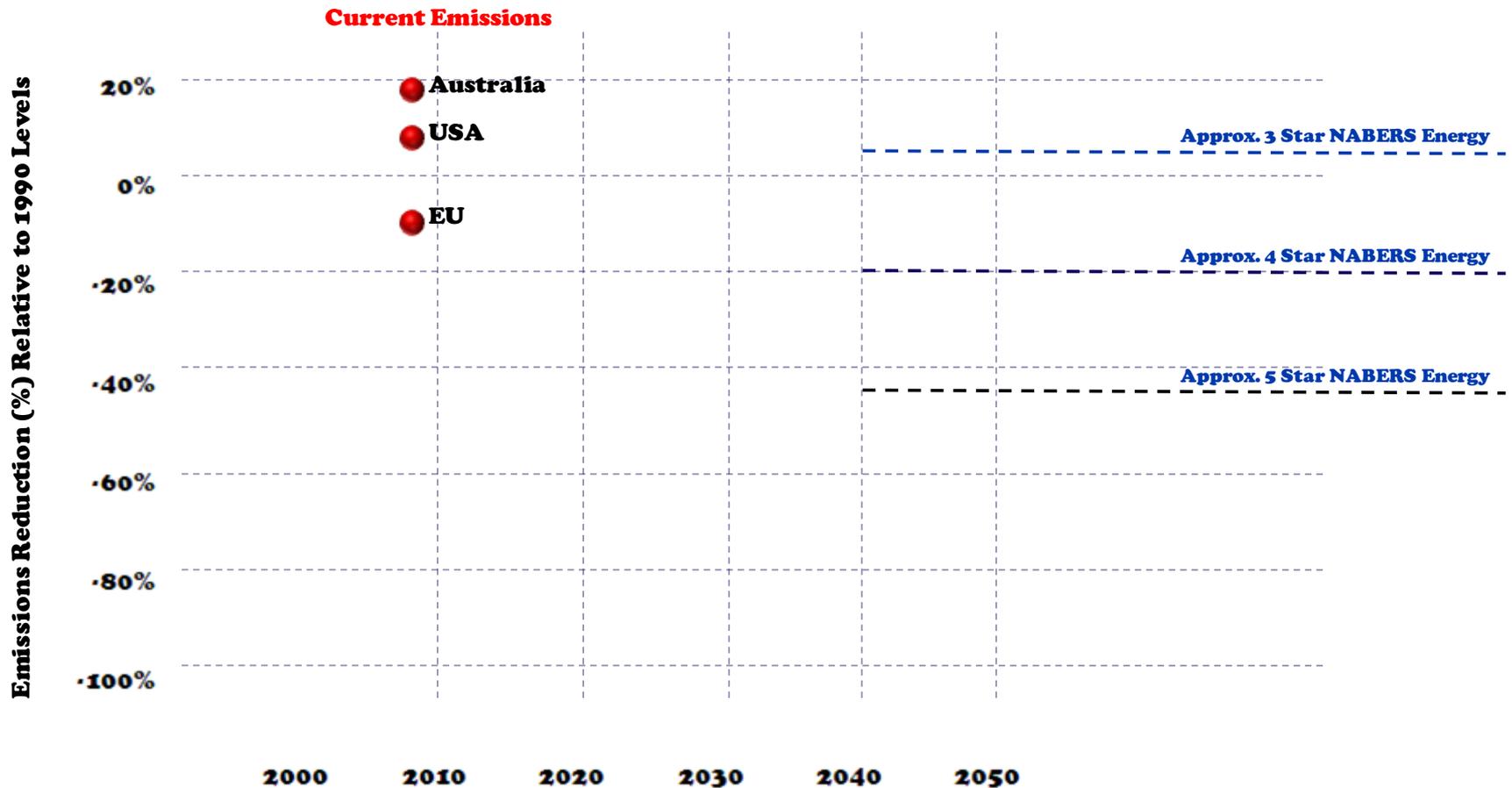
After



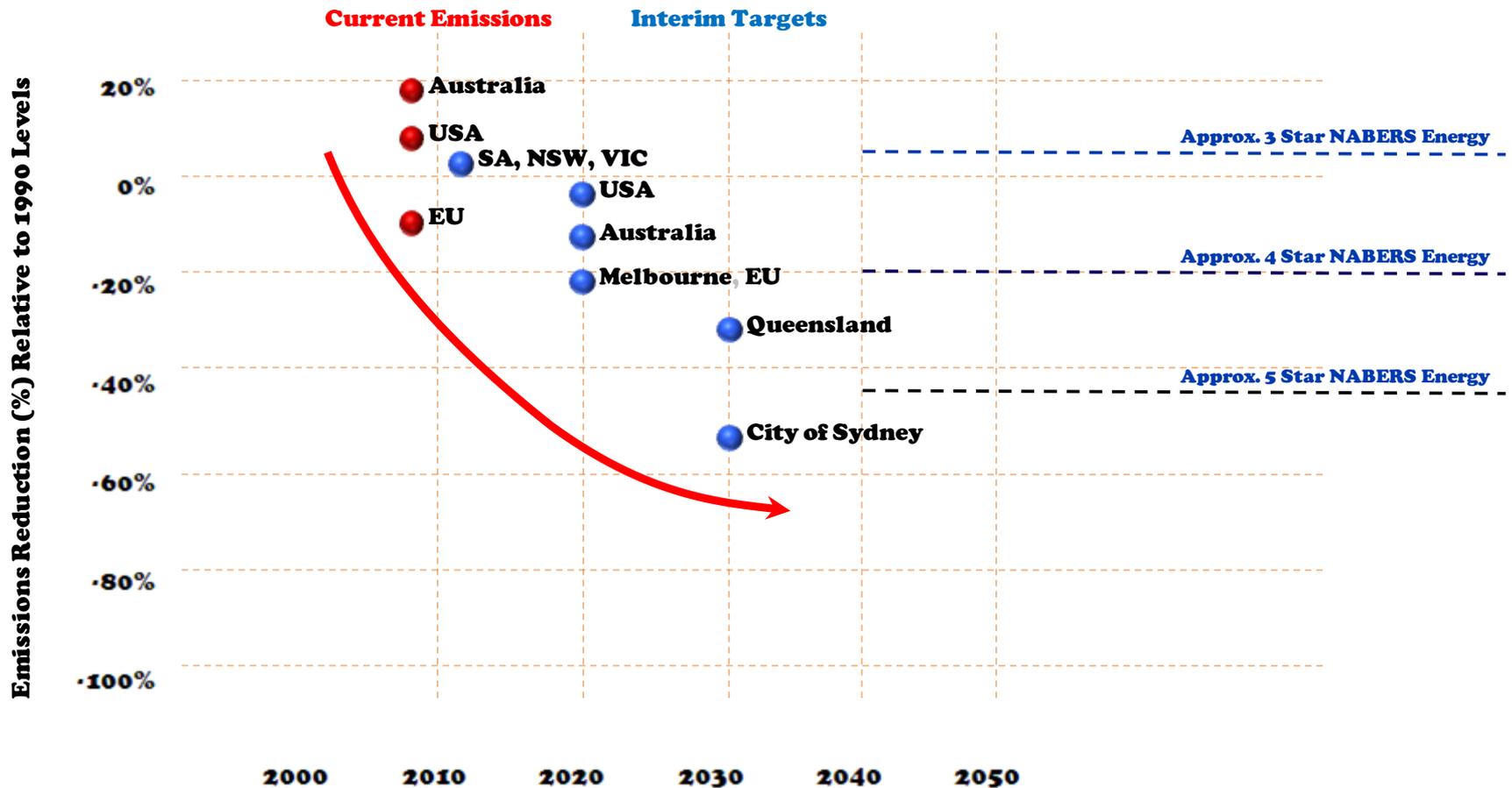
The Existing Building Challenge

Global Greenhouse Gas Emission Reduction Targets

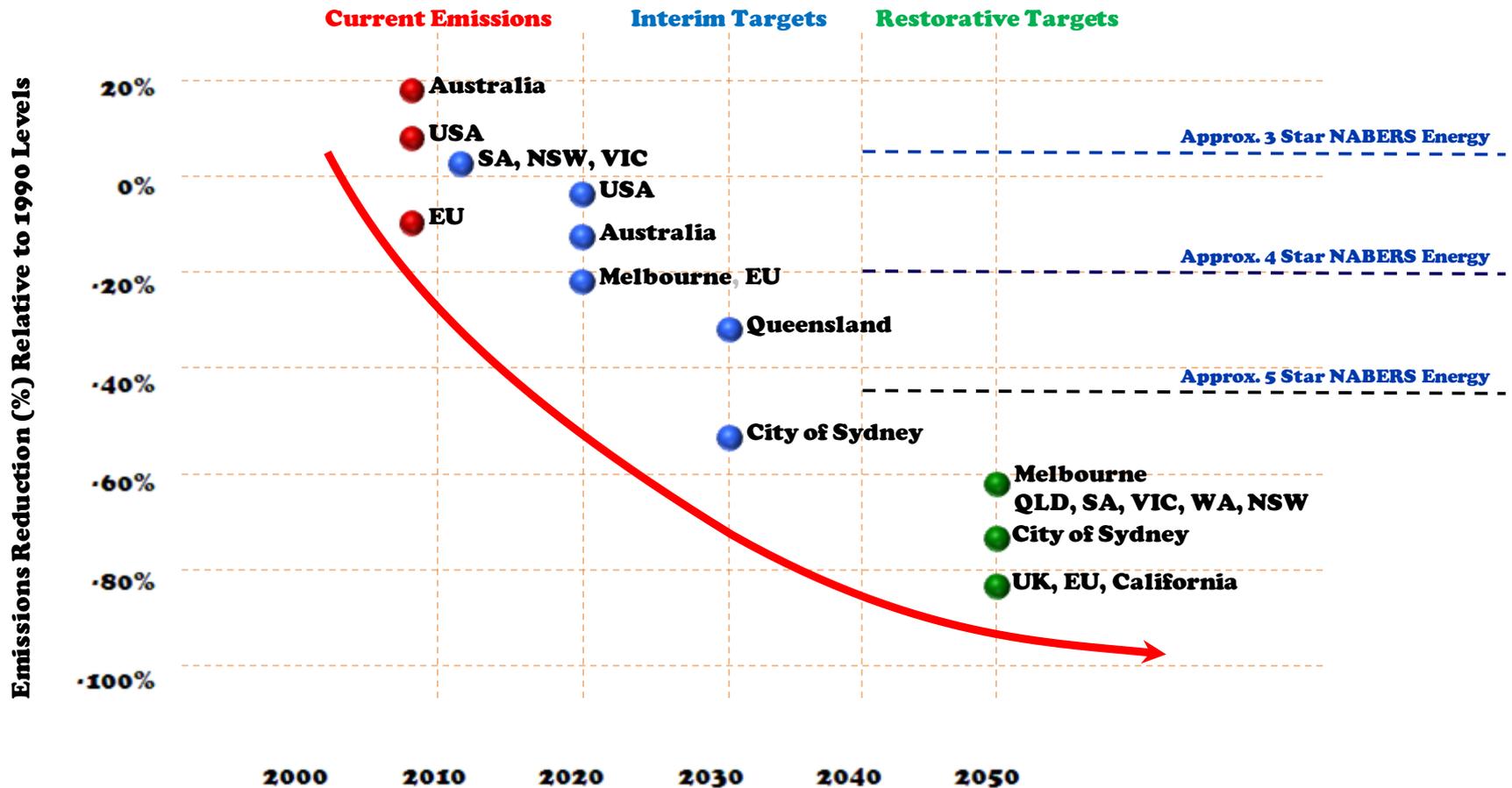
Global CO₂ Emissions Reductions Targets



Global CO2 Emissions Reductions Targets



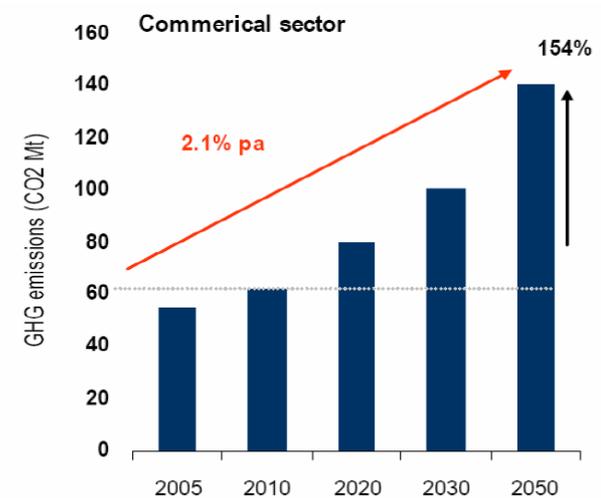
Global CO2 Emissions Reductions Targets



Commercial Building Impact Data

Greenhouse Gas Emissions

- Account for 10% of National GHG emissions
- Increase by 2.1%pa BAU scenario
- GHG increase by 87% from 1990 to 2006
- Australia has a legal obligation to reduce GHG emissions (Kyoto agreement)



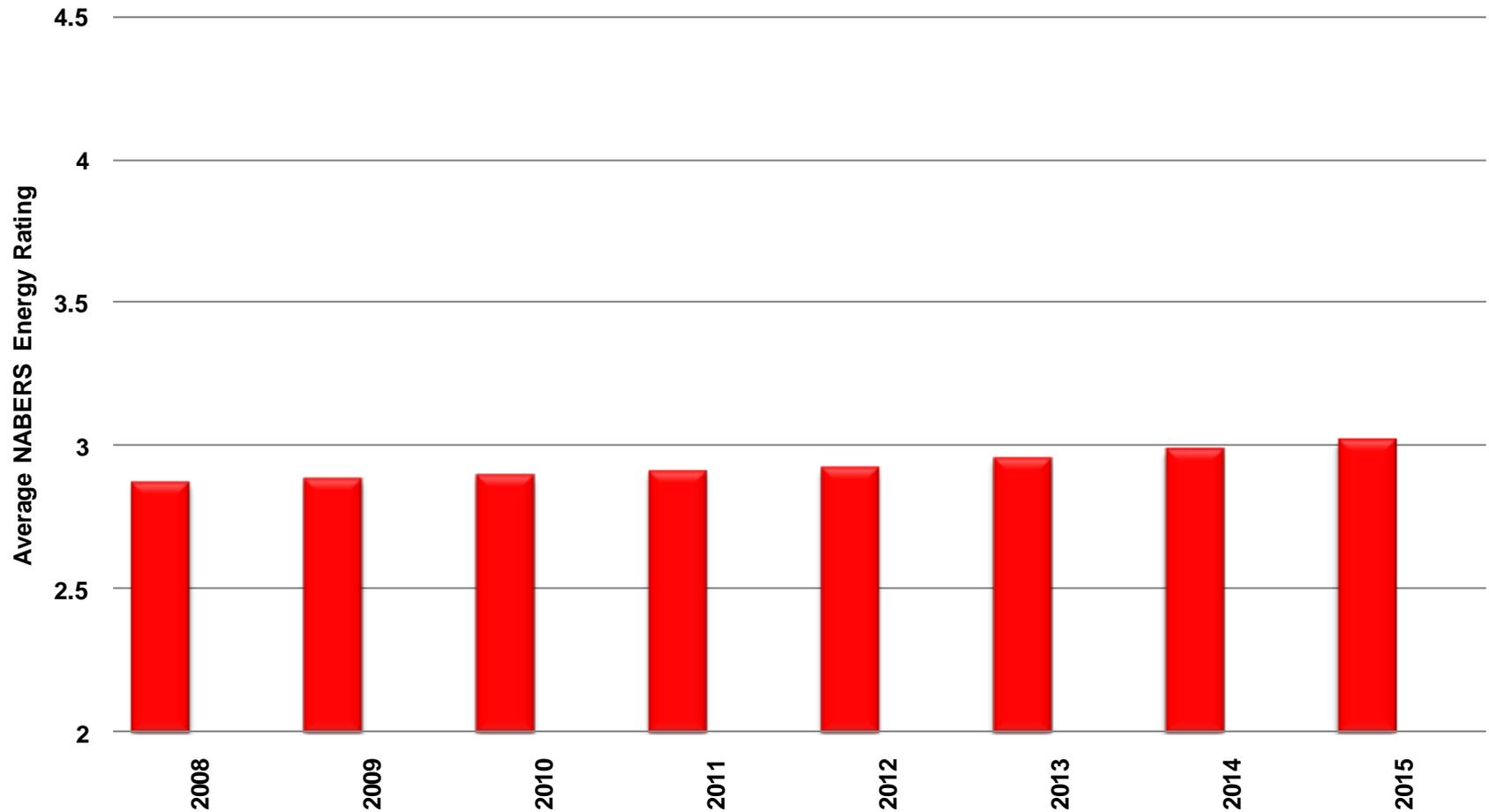
Projected Commercial Building Sector Emissions. Source: CIE (2008)

Built environment has the largest & most cost effective GHG abatement opportunity through energy efficiency

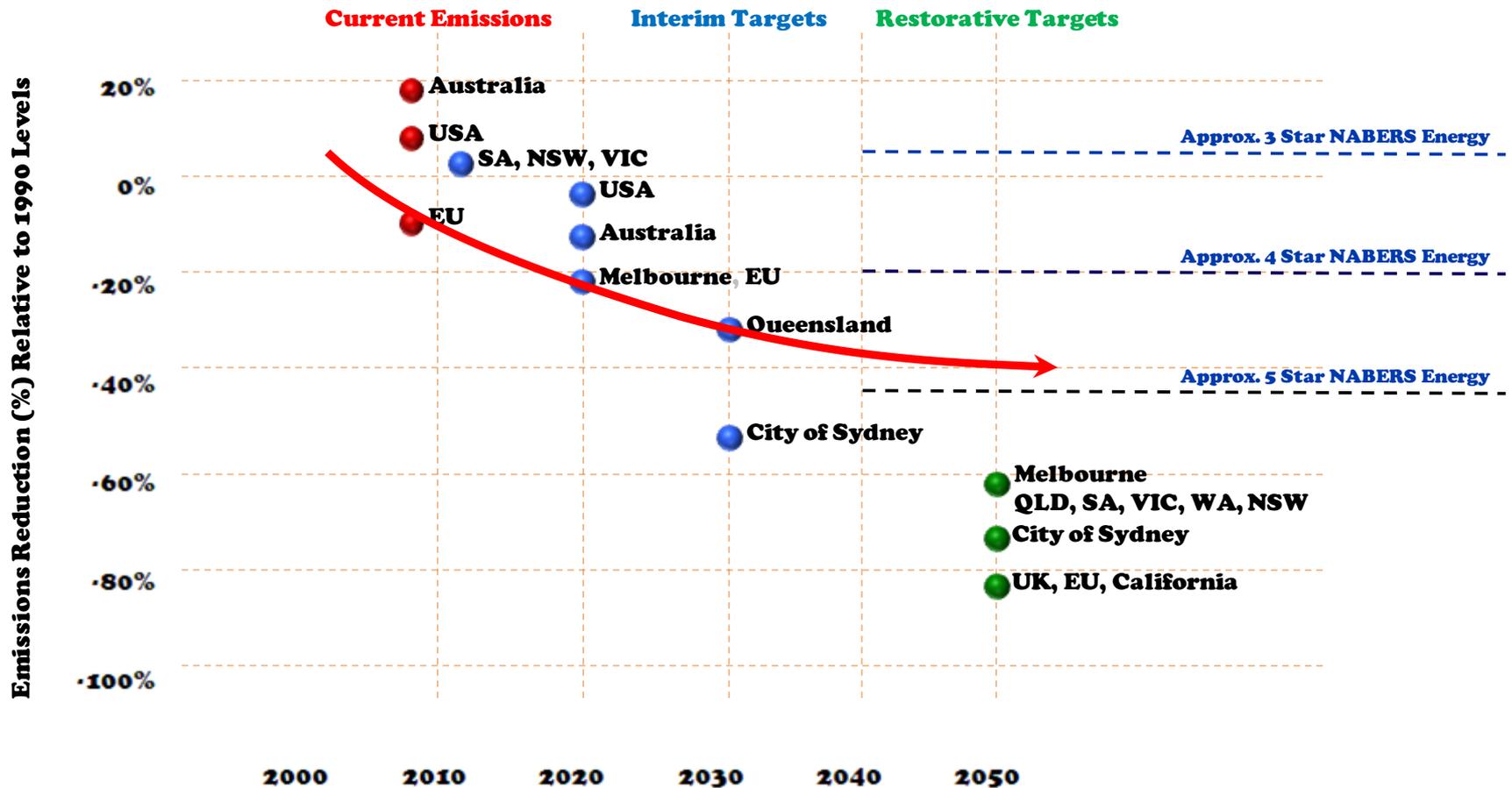
Government introducing mandatory energy efficiency schemes to overcome market failures and barriers

Why focus on existing buildings?

Impact of 3 New 5-Star Buildings per year

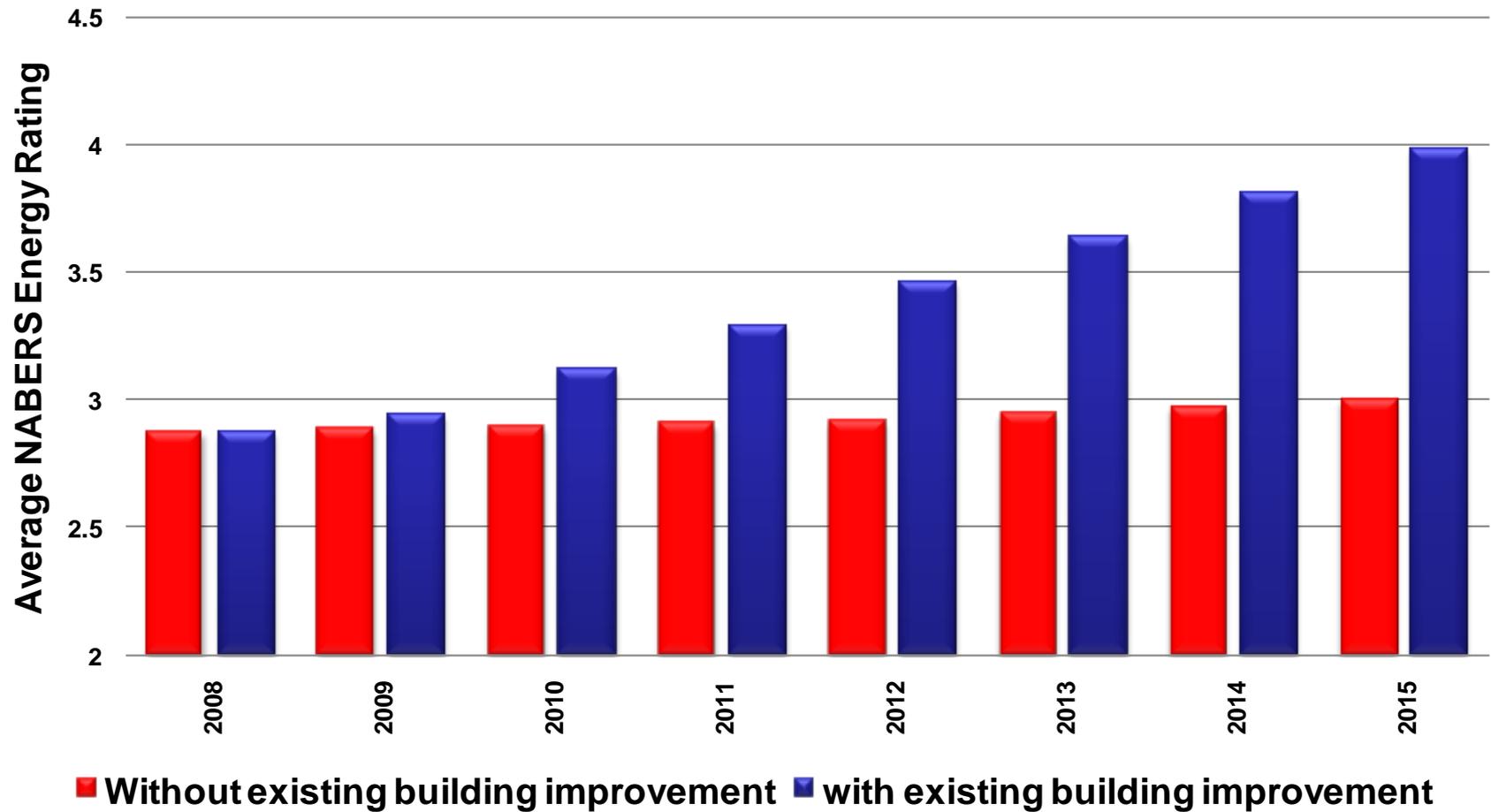


Global CO2 Emissions Reductions Targets

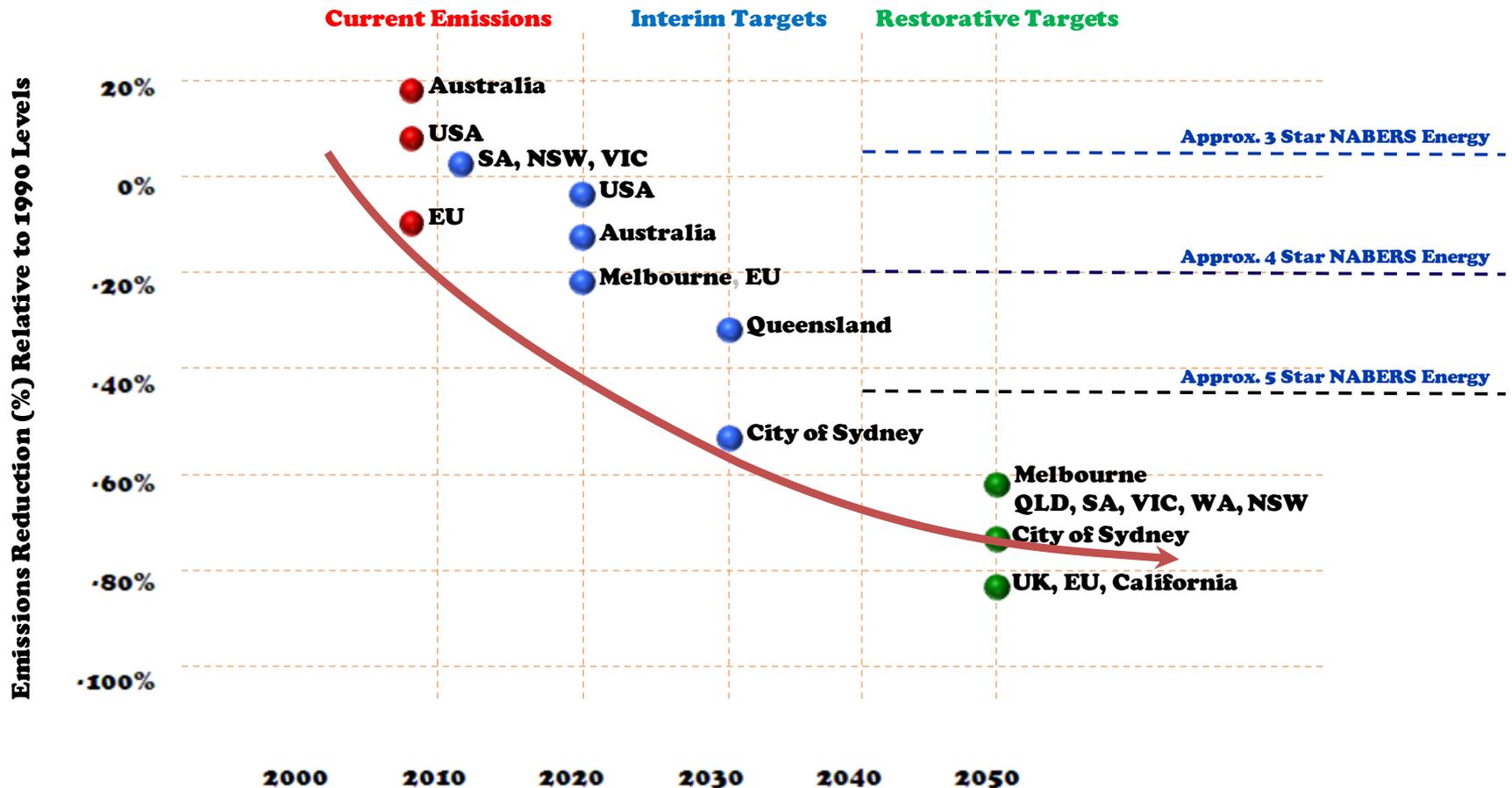


**What if the same
amount of money was used
to upgrade 20 buildings a year
in each city by 1.5 NABERS stars?**

Impact of Existing Buildings



Global CO2 Emissions Reductions Targets



Taking up the Challenge

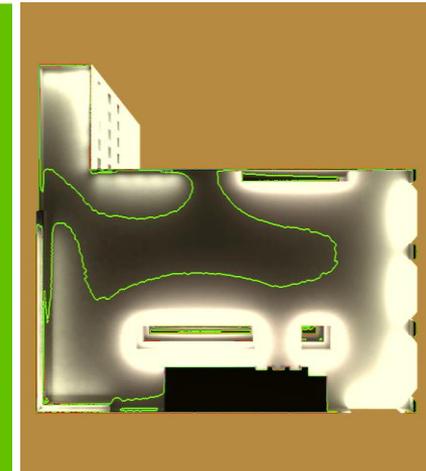
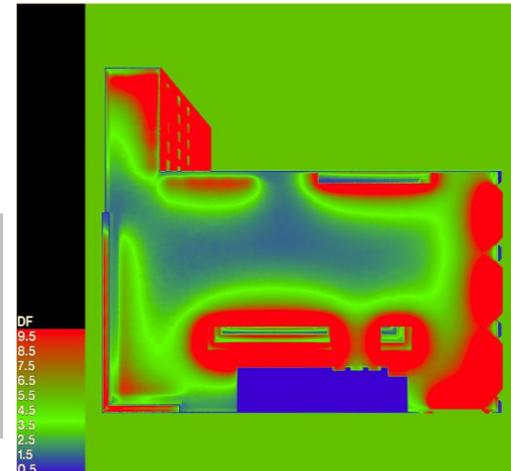
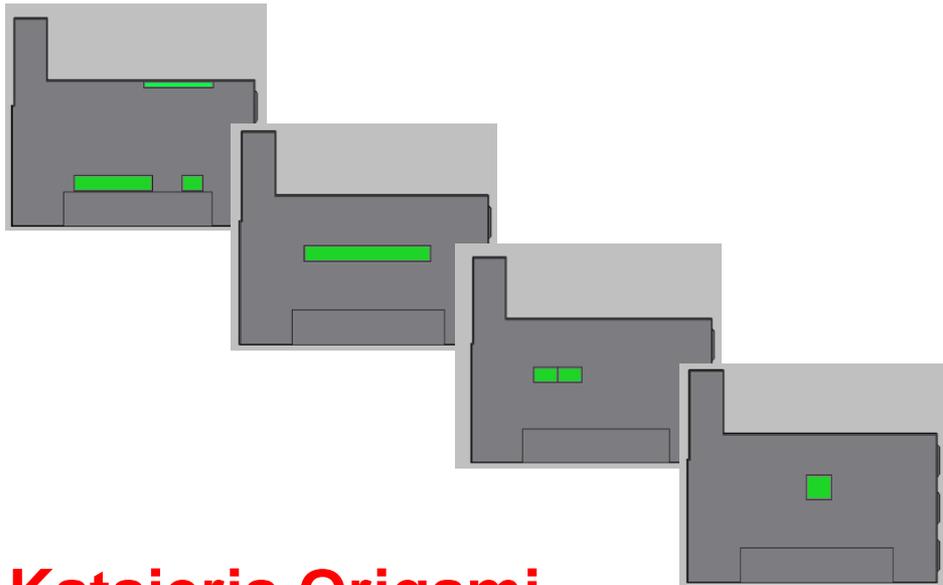
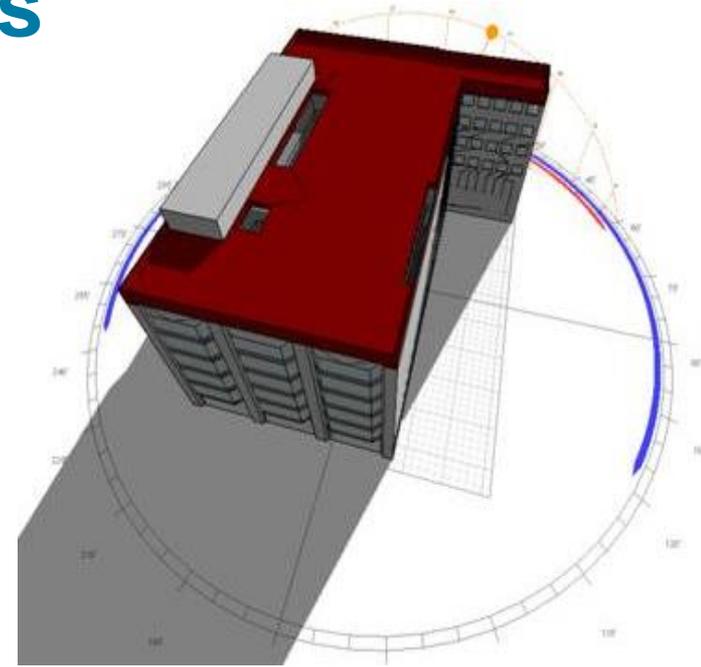
Existing Conditions

- Deep plan building offering limited daylight penetration & access to views
- Limited fenestration on longest two facades (i.e. north-west & south-east)
- Heavily tinted primary facade facing south-west
- Dated aesthetic needing re-vitalisation



Daylight Penetration Studies

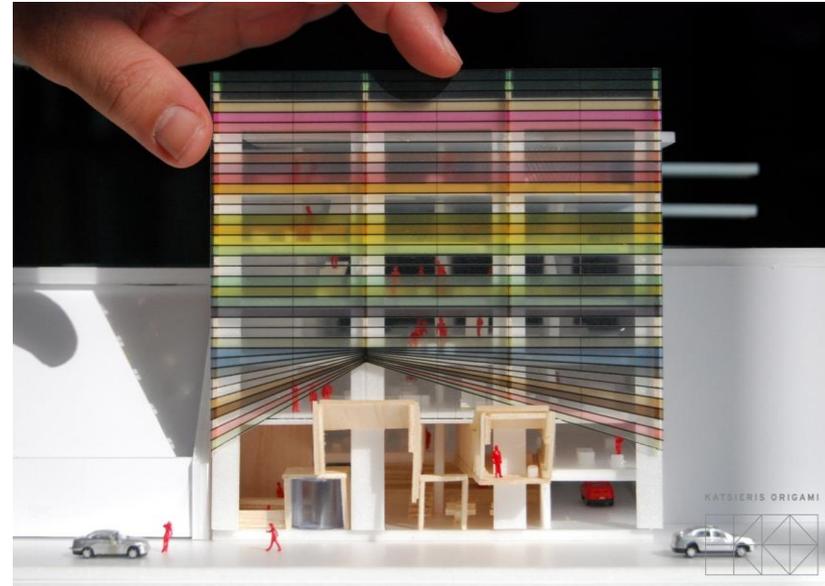
- Stepped Atrium
- Strip Atrium & Green Slot
- Full Length Vertical Atrium
- Central Atrium



Katsieris Origami

Redevelopment Response

- Improved occupant amenity
- Improved facade performance & appearance
- Greater penetration of daylight within heart of building
- Good access to views
- Reduced environmental impact



To Demolish or Not Demolish?

- Retain
 - Can significantly improve facade performance & appearance
 - Capture benefit of embodied energy
 - Higher overall environmental benefit
 - Cost less
- Demolish
 - Increase material / resource use
 - Net negative energy impact by losing embodied energy benefit
 - Can provide a high facade performance & slightly better NABERS rating

Possible?



Existing

**TOGETHER WE
CREATE CHANGE
IN THE WORLD**



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