Healthy Buildings

Creating better building and people efficiency

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The Economic Benefits of Green Buildings

The main reasons why companies are pursuing sustainability strategies are:

1. **Reduced Energy Costs**

2. **Increased Employee Health and Productivity**

Green Building Benefits

- Why non-residential building TENANTS choose green…

1 Green Buildings mean **HAPPIER EMPLOYEES AND OCCUPANTS**

2 Green Buildings reap **PUBLIC RELATIONS AND COMMUNITY BENEFITS**

3 Green Buildings can have **LOWER OPERATING COSTS**

4 Green Buildings provide **IMMEDIATE AND MEASURABLE RESULTS**

5 Green Buildings **SAVE ENERGY**

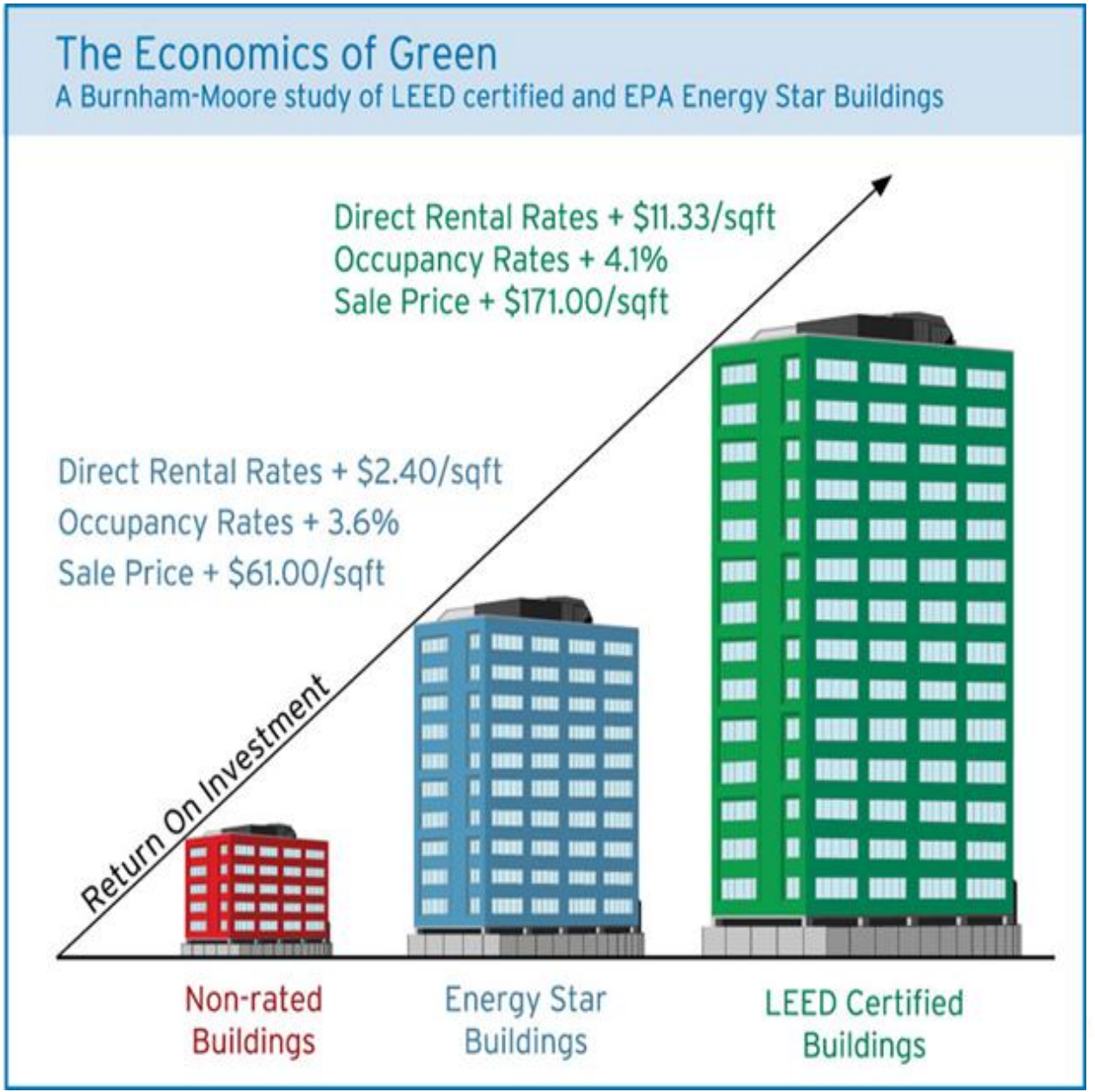
The Economic Benefits of Green Buildings

The Cost and Return on Investment

A recent study of LEED & Energy Star buildings conducted by the Burnham-Moores Center for Real Estate at San Diego University and The CoStar Group found significant advantages to using these strategies. The study shows an increase in rental & occupancy rates and sale price compared to Non-rated buildings.

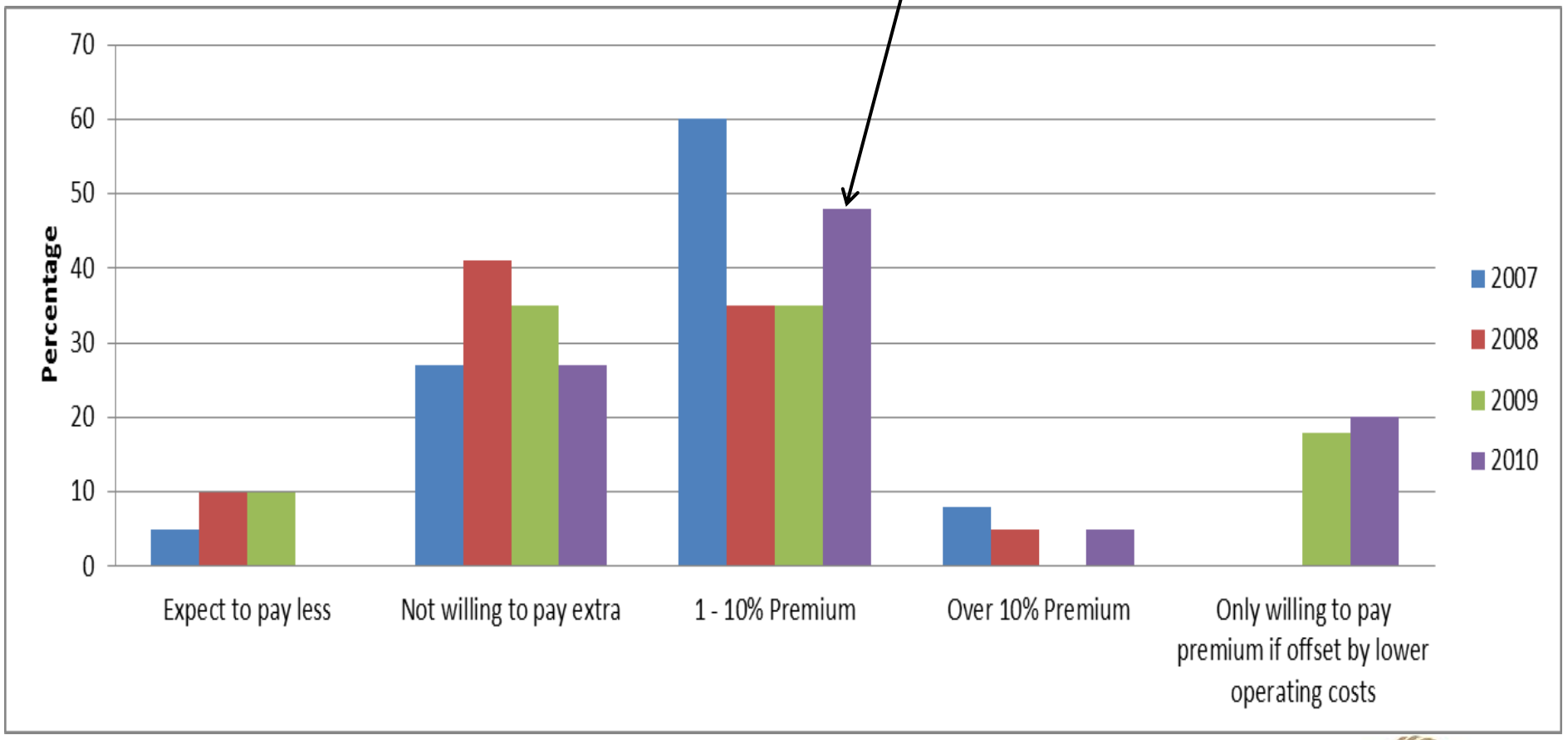
In another study the GSA* estimated construction cost for achieving LEED certification to be between a 0.4% savings to a 2.1% premium in new courthouse construction and office building modernization projects.

*GSA LEED Cost Study, October, 2004



The Economic Benefits of Green Buildings

In 2010 48% of respondents are willing to pay up to a 10% premium in rent for sustainable space



From: CoreNet & Jones Lang LaSalle 2010 'Global Corporate Occupier Survey Findings'

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The Economic Benefits of Efficient Buildings

The Australian Financial Review
www.afr.com • Tuesday 1 March 2011

Green buildings return more

Nick Lenaghan

Office towers with environmental ratings deliver better returns for their owners, both in capital growth and rental yield.

The inaugural Property Council of Australia/IPD Green Property Investment index tracks returns over the past two years delivered by commercial property. Buildings with a Green Star "office design" or "office as built" rating have performed better than non-rated assets over the two years to December, 2010.

Office properties with a NABERS energy rating of at least 4 stars delivered significantly higher returns than buildings with a rating of 3.5 stars or below, the survey found.

"The value-add is two fold. For landlords, if you improve your building the likelihood is you get a better market outcome," IPD regional managing director Anthony De Francesco said. "And for investors, there's evidence now to suggest why they should actually support this [rating of buildings]". Additionally, capitalisation rates were lower for rated assets as opposed to non-rated assets over the two-year period.

The survey results are the first since the onset of new mandatory disclosure which requires owners who sell or lease commercial office space of 2000 square metres or more to disclose its energy rating. Speaking at the Green Cities conference in Melbourne, Mr De Francesco said the survey found rated buildings suffered less on the downside when overall returns dropped for commercial real estate.

While the index found outperformance in each Green star rating category, the strongest returns were booked in 4 star rated assets.

"It could mean the pass-through benefits [for 4 star assets] comes through far more immediately than it would in the 5 and 6 star [property]," he said. Mr De Francesco added that there was a high correlation between better quality buildings and whether or not they were rated.

The Green Property Investment Index covers $36 billion in office assets held by the major real estate investment trusts and unlisted wholesale funds.

ENERGY ENHANCEMENT

Buyers and tenants can now search Australia's leading non-residential property web site, realcommercial.com.au, for listings by energy rating.

The REA Group yesterday relaunched the realcommercial site, using the same new platform as realestate.com.au.

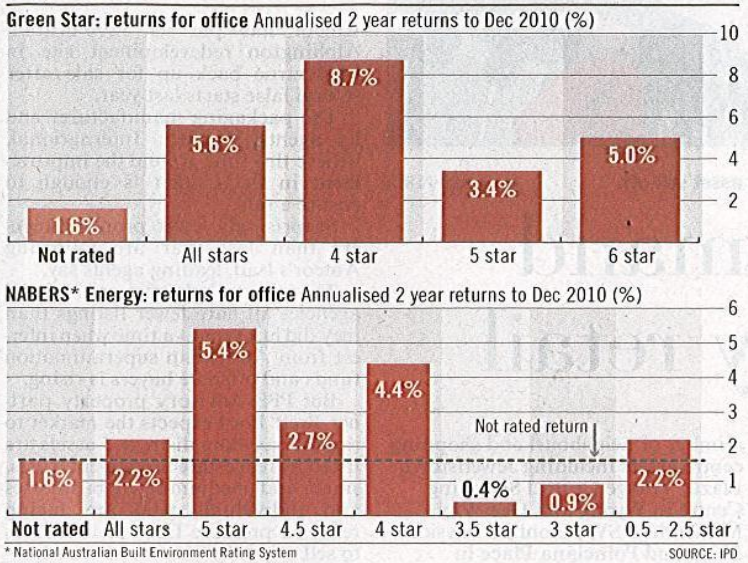
"The advanced refinement tools mean commercial property seekers can now drill down to specifics such as potential rental yields, length of tenure and even NABERs energy rating," said REA Group chief executive Greg Ellis.

The website was bought from agents, including CB Richard Ellis, Colliers International and Jones Lang LaSalle, over four years ago.

Mr Ellis said the agreement struck with the three at the time had been extended and enhanced.

Robert Harley

Paying off



The Economic Benefits of Efficient Buildings

- **The link between green building practices and employee productivity has long been recognised**.
- While the expected savings in energy costs are significant in its own right, for most businesses energy costs are generally much lower than overall labour costs.
  - Systems which provide a saving or reduced cost would deliver productivity benefits in the order of several times the benefit to energy costs.
    - Local thermal control: 3.5-3.7 per cent productivity gain (Loftness et al. 2003);
    - Indoor Air – Quality: 6 – 9 per cent productivity gain (Wyon 2004)

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Proven Links between Green Buildings and Organisational Performance

Financial Outcomes

- Reduced resource utilisation
- Reduced operating/maintenance costs
- Reduced Risks/avoided costs
- Increase overall productivity
- Increased resale value of property
- Reduced absenteeism

Business Process Outcomes

- Process innovation
- Increased work process efficiency

Stakeholder Relations

- Improved public image
- Increased ability to sell to pro-environmental customers
- Community outreach and education
- Improved ability to work with community stakeholders

Human Resource Development

- Improved quality of work life
- Improved personal productivity
- Imporved well being
- Reduced turnover and increased ability to attract high quality workers

The Economic Benefits of Efficient Buildings

- **Study of two Retrofit projects in Melbourne**

1. Retrofit 500 Collins St Melbourne 2005 - 2006

- Author: Sustainability Victoria and the Kador Group

2. City of Melbourne CH2 Building

- Author: Sustainability Victoria

- Showed up to 10% productivity increase after 12 months
  - Based on;
    - 44% reduction in the monthly average cost of sick leave
    - 9% improvement in the average typing speed of secretaries and a significant improvement in overall accuracy
    - Between 7% - 20% reduction in headaches.
  - Studies revealed improvements in other health indicators such as the
    - Reduction in colds and flu, sore eyes, fatigue and poor concentration.

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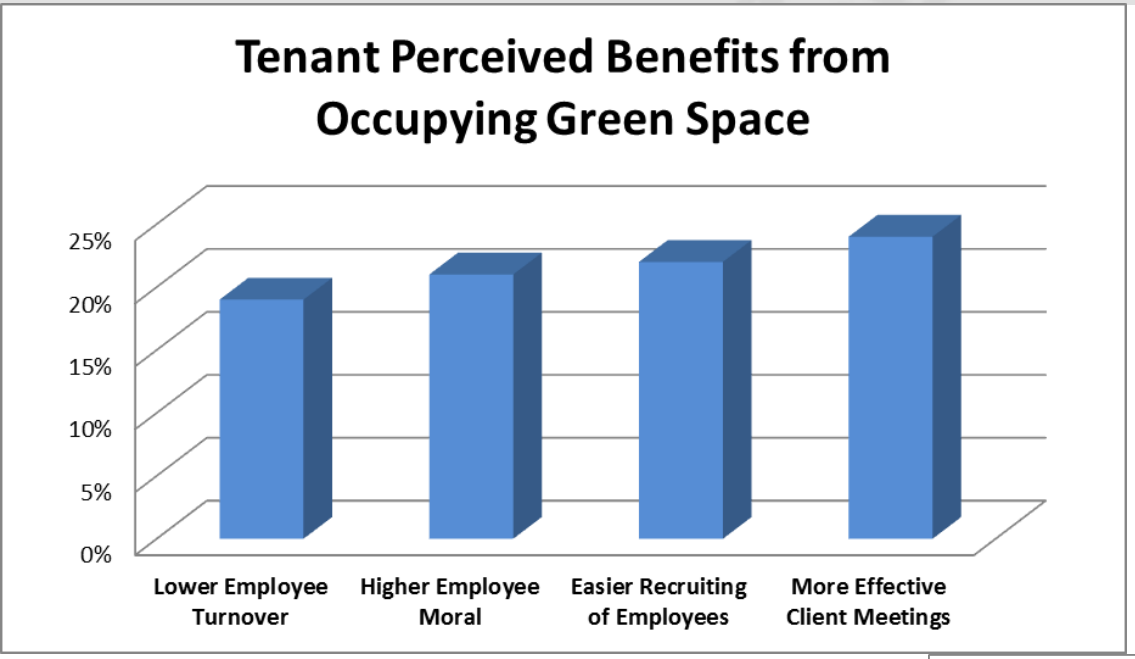
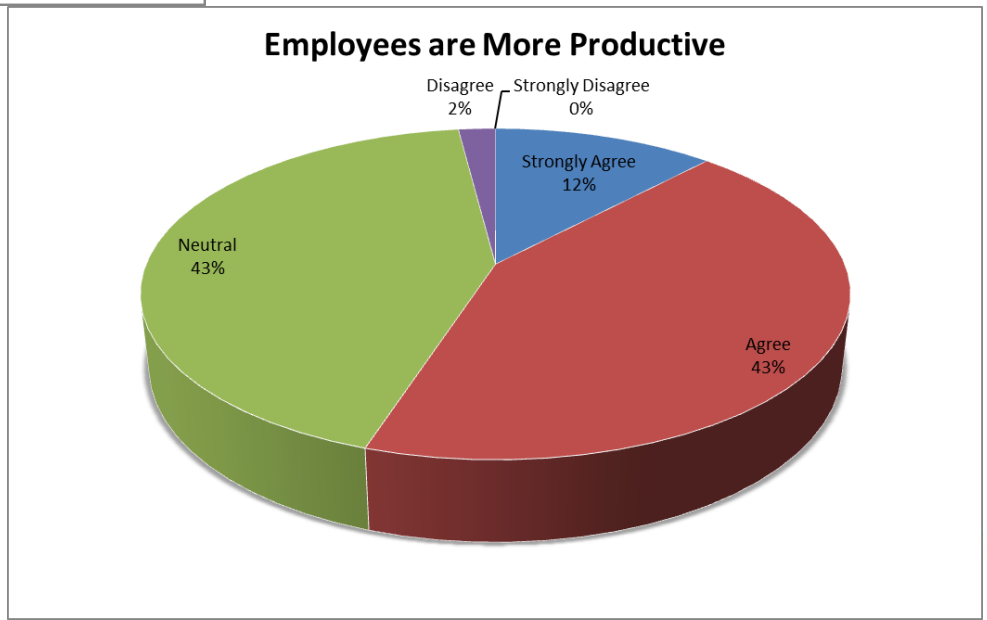
The Economic Benefits of Green Buildings





*** Source: CBRE and USD Survey Data 2009**

3 Key Elements

- Air Quality

  -Minimisation of airborne pathogens affecting occupant health

- Thermal Comfort

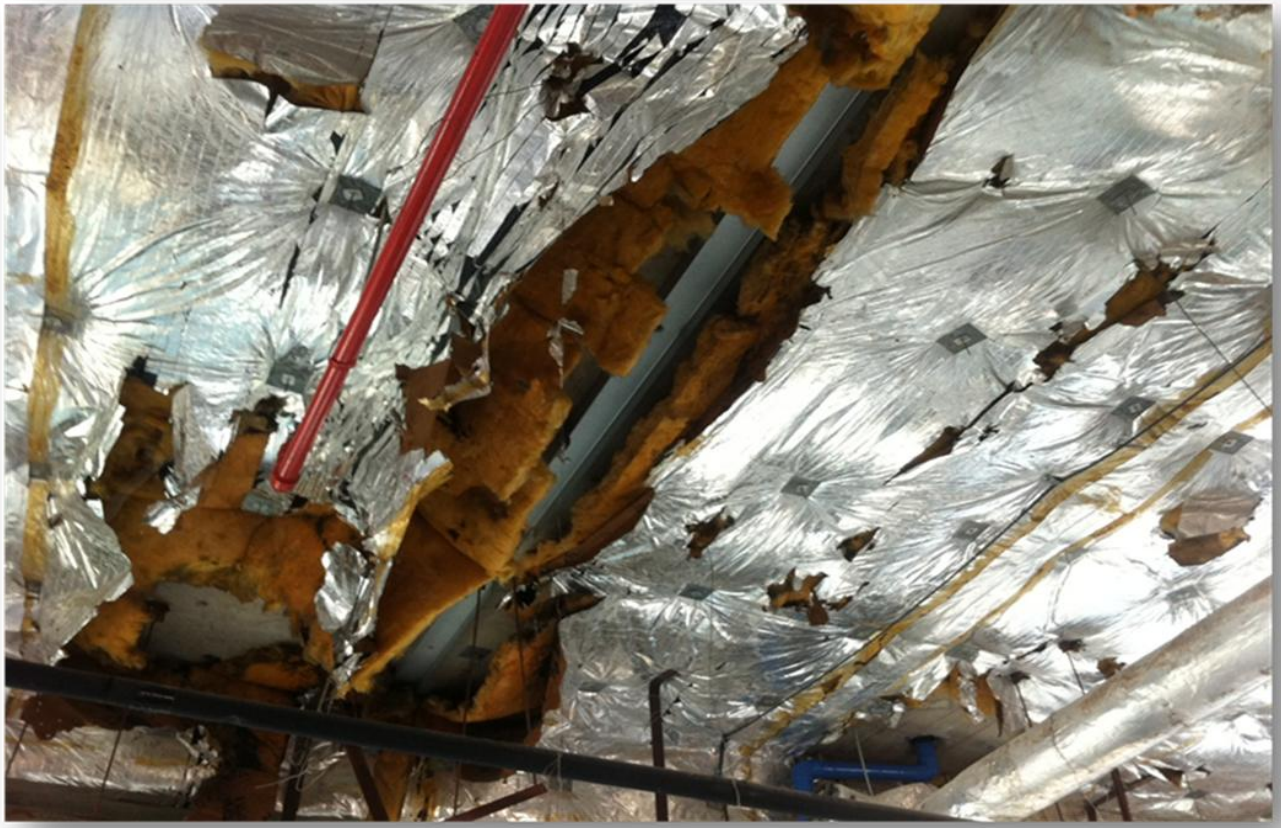
  - Isolation from varying extremes of temperature and climate outside the building

- Lighting

  - Natural and/or access to outdoor lighting/views

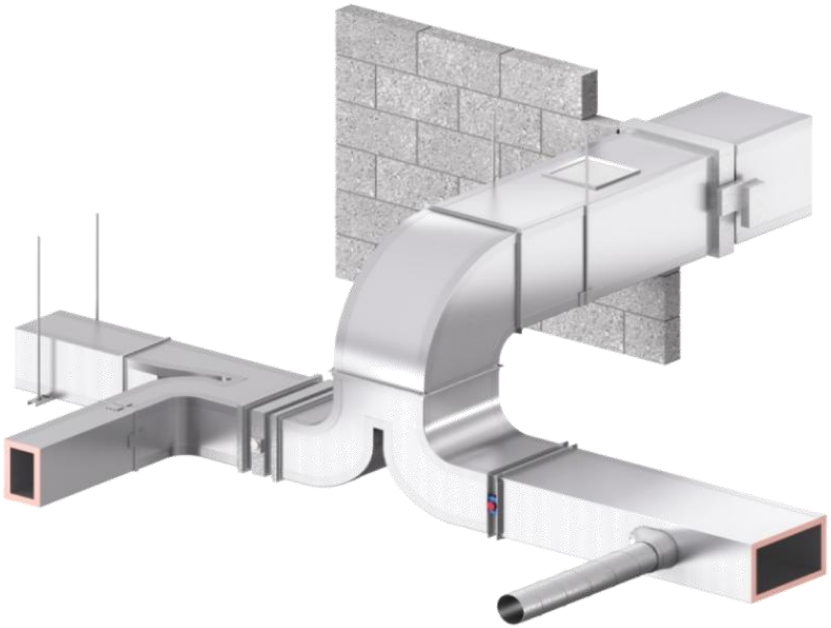
Air Quality

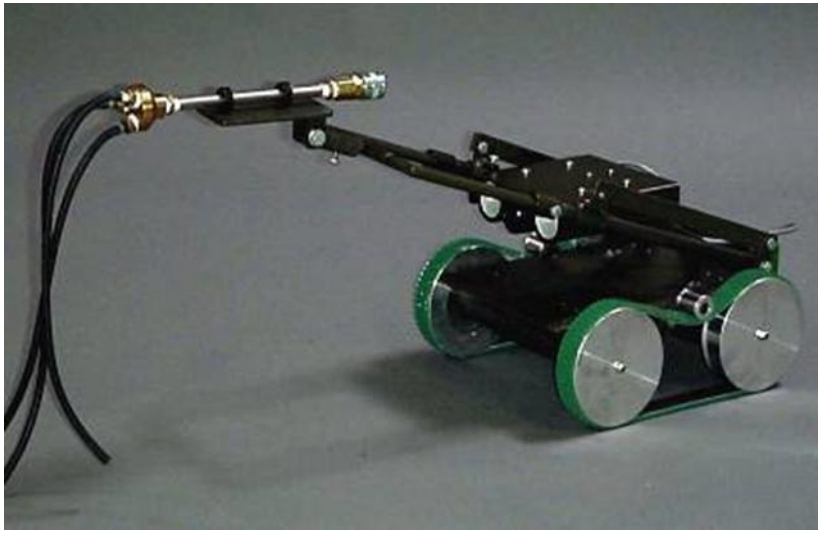
- Factors effecting Air Quality
  - External Air Pollutants
  - Chemical (off gassing of VOC’s)
  - Airborne Pathogens caused by mould
  - Temperature control



Air Quality

Air Quality





Air Quality

Air Quality

Condensation

- **Condensation is a result of 3 factors**
  - Vapour Pressure, temperature and relative humidity
- Vapour Pressure
  - The driving force that moves water vapour through a surface
  - The higher the temperature and humidity the higher the vapour pressure.
    - Vapour moves from a high pressure to a low pressure
- Relative Humidity
  - The ratio of how much water vapour is present in air at a given temperature
- How are temperature, relative humidity and condensation related?
  - Water vapour is present in all air at varying amounts depending on the temperature.
  - Warmer air has a greater capacity to hold water vapour than cooler air.
    - Condensation is caused when air containing a substantial amount of water vapour is cooled below a temperature known as the “dew point”

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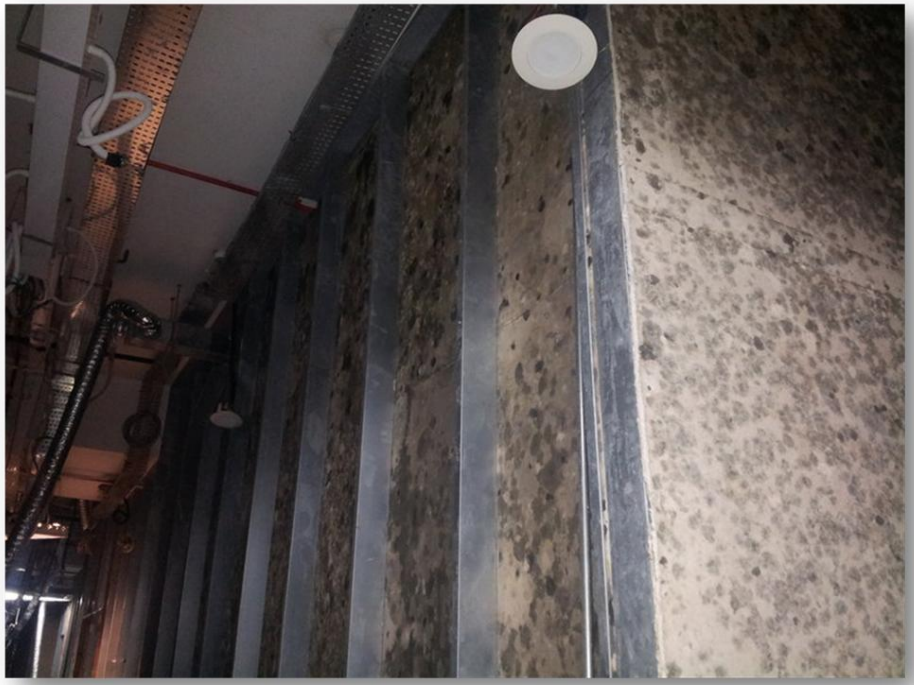
Consequences of Condensation

- Condensation is a direct cause in the presence and growth of mould in buildings
    - Black mould is generally visible on window frames and wall surfaces
    - Building furnishings (wall coverings, carpets, furniture) provide ideal amplification sites for microbial growth.
        - This microbial growth – fungi, bacteria and dust mites can produce odours, allergens and toxins



Types of Condensation

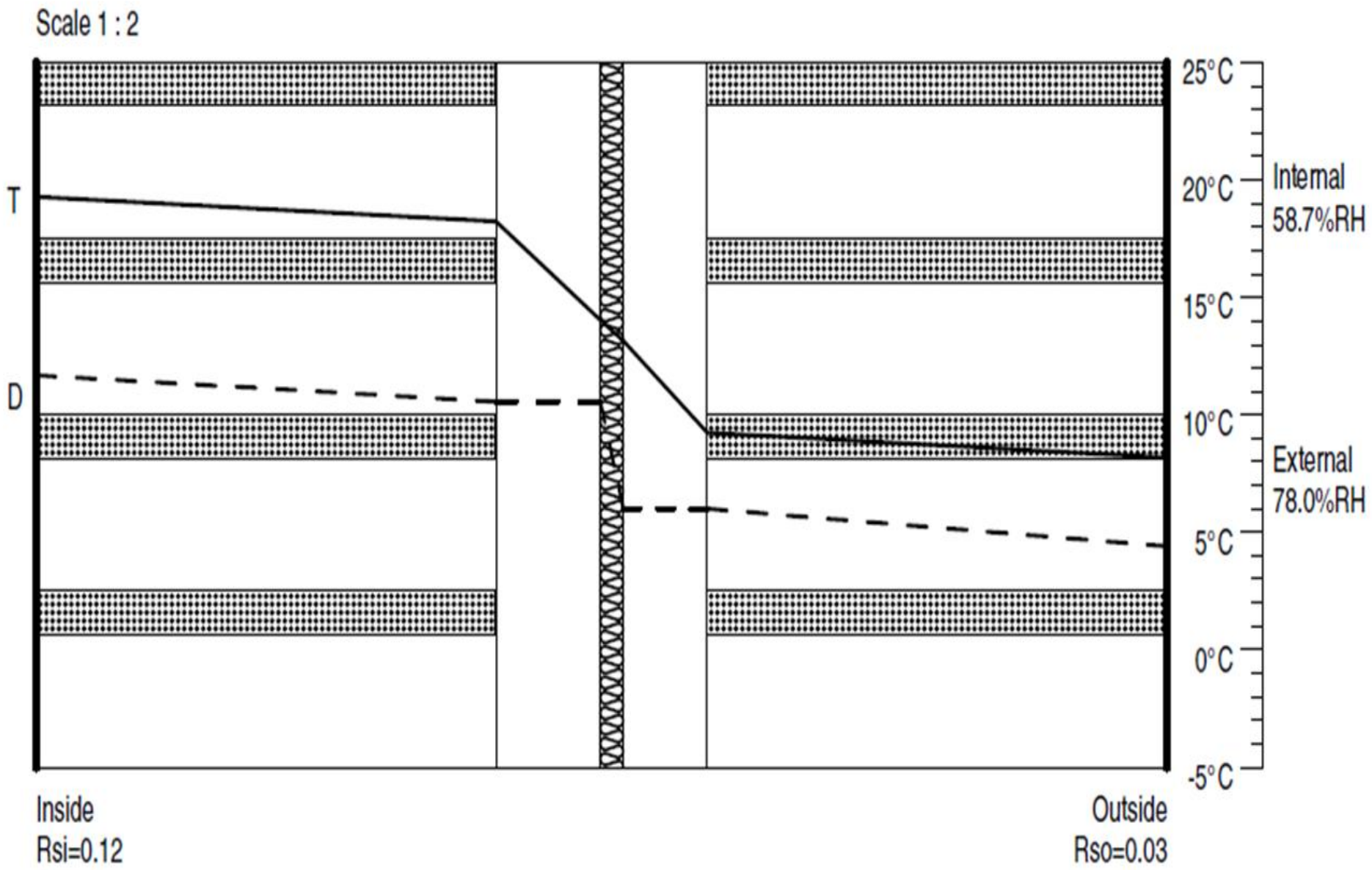
- Surface Condensation
  - Where water vapour condenses on a cold building element such as a window pane, wall or metal roof that has a surface temperature below the dew point.

- Interstitial Condensation
  - Condensation occurring inside the building element.
  - If the temperature gradient through the element is such that at a point the temperature falls below the dew point the water vapour will condense within the element.

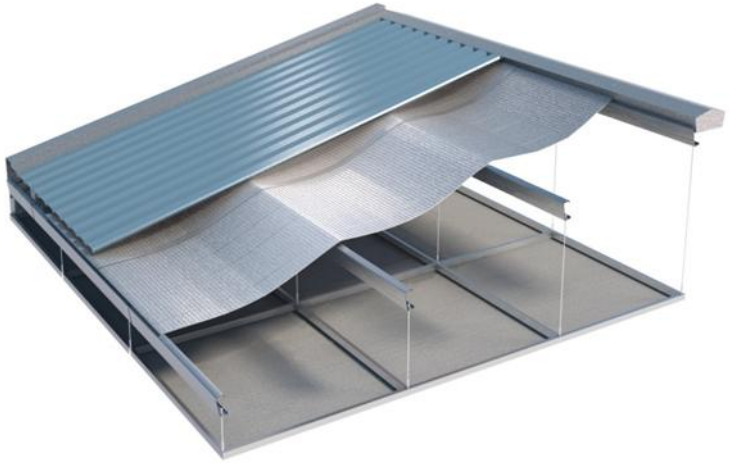
Condensation Control

- Ventilation
- Efficient Insulation/Vapour Barrier

Measuring Condensation Control

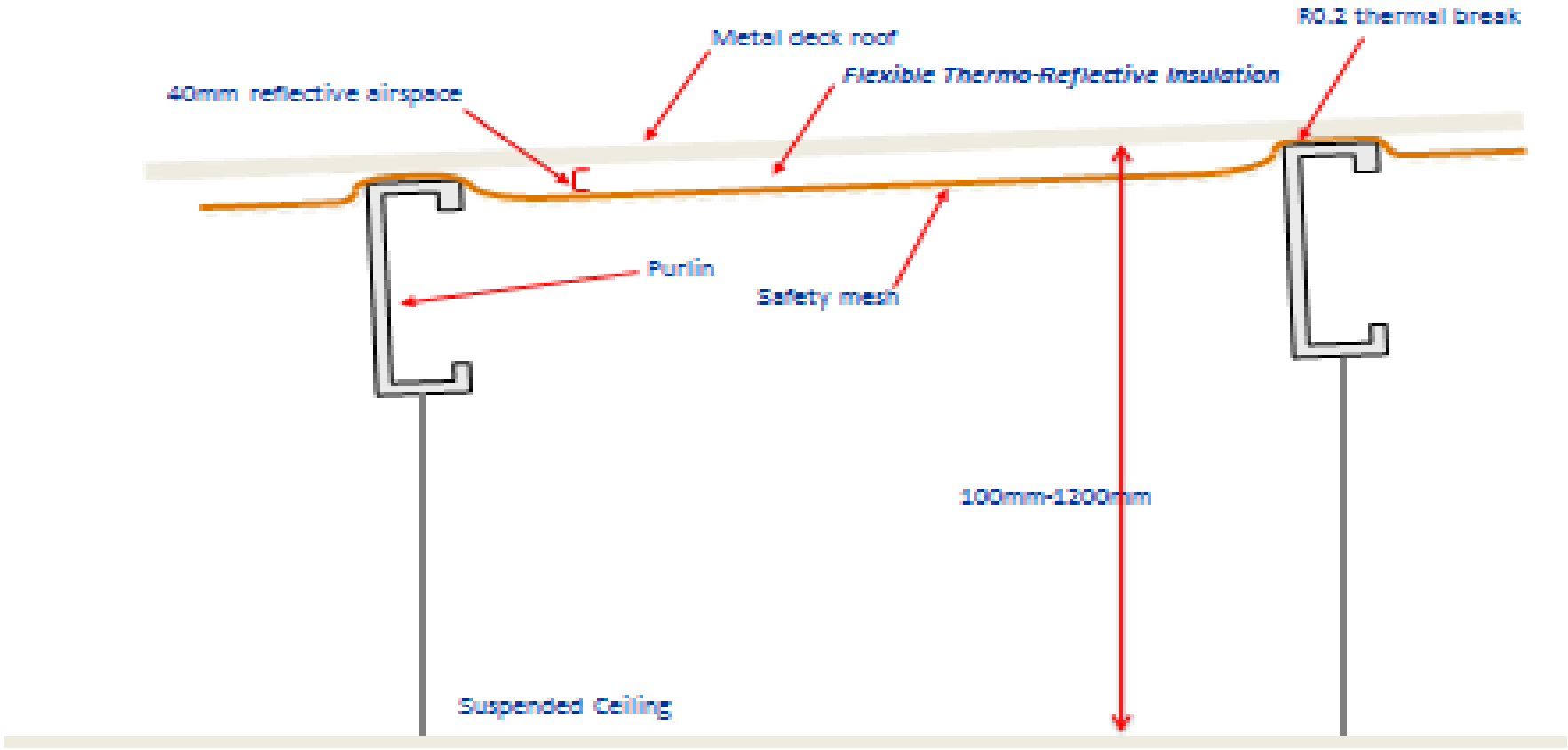


Condensation & Thermal Control



Condensation & Thermal Control

Commercial Roof Installation Detail



Condensation & Thermal Control

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Thank You

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