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to life*



Two Major Trends impacting the design of CBD buildings:-

Actual Sustainability Performance and Healthy and WELL Rated Buildings

Moving from the Green Building Promise to “show me the money” and “Could going to work make you healthier”

iCities World Class CBD Conference

24th October 2016

Jeff Robinson Sustainable Buildings Leader

Two Major Trends impacting Green Buildings In Australia

Performance



Health & Wellness



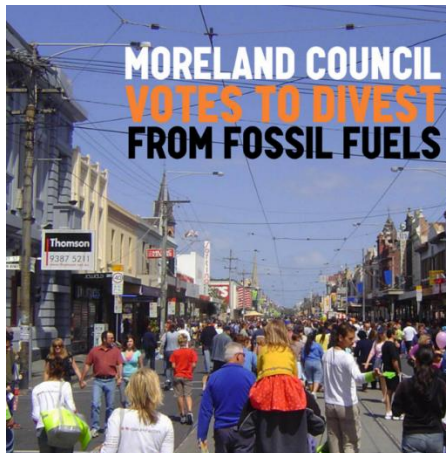
Health, Wellbeing &
Productivity in Offices
The next chapter for green building

JLL Lend Lease SKANSKA



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A Move Towards Socially Responsible Organisations



patagonia®

DON'T BUY
THIS JACKET



COMMON THREADS INITIATIVE
Together we can reduce our environmental footprint.

TAKE THE PLEDGE

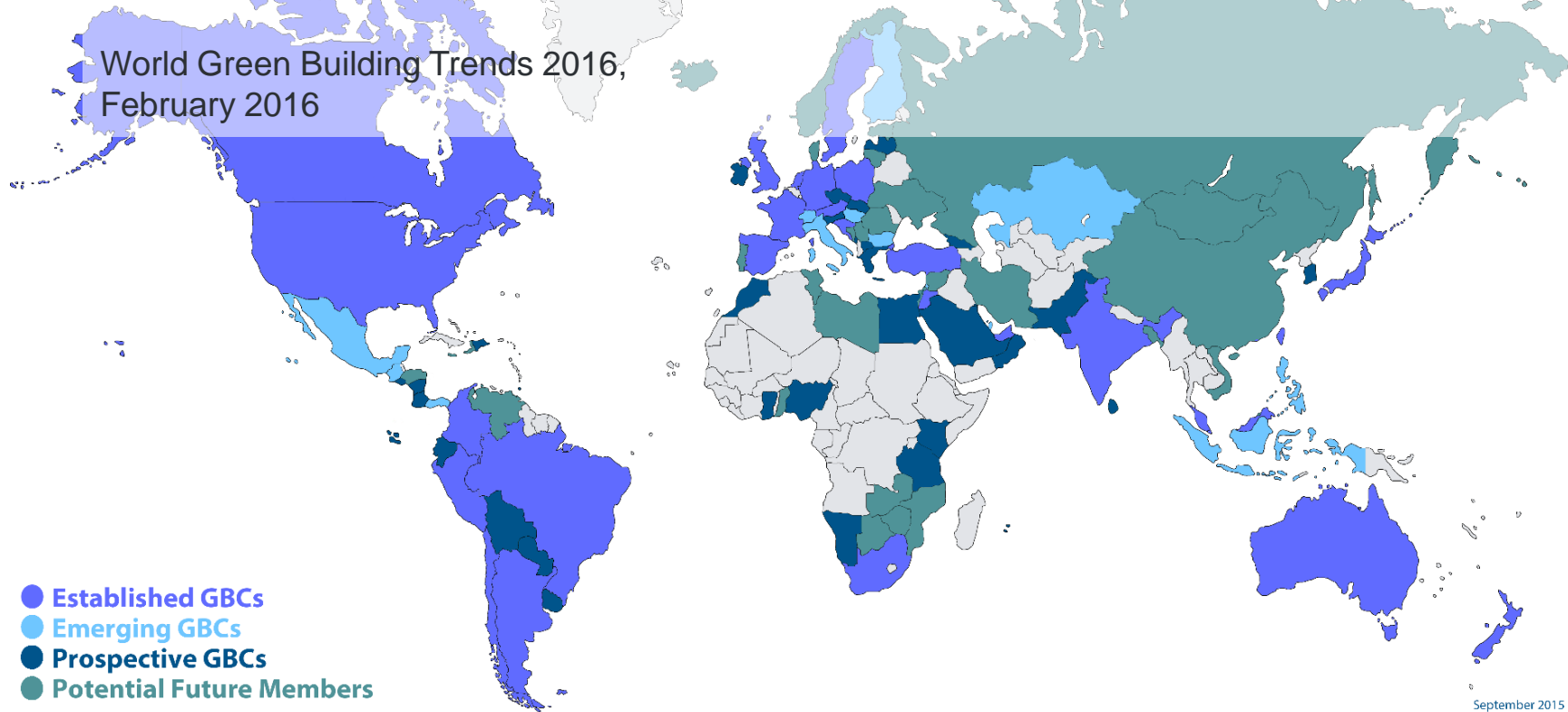
This
Changes
Everything
by mirvac



IMPACT
INVESTMENT
GROUP.+

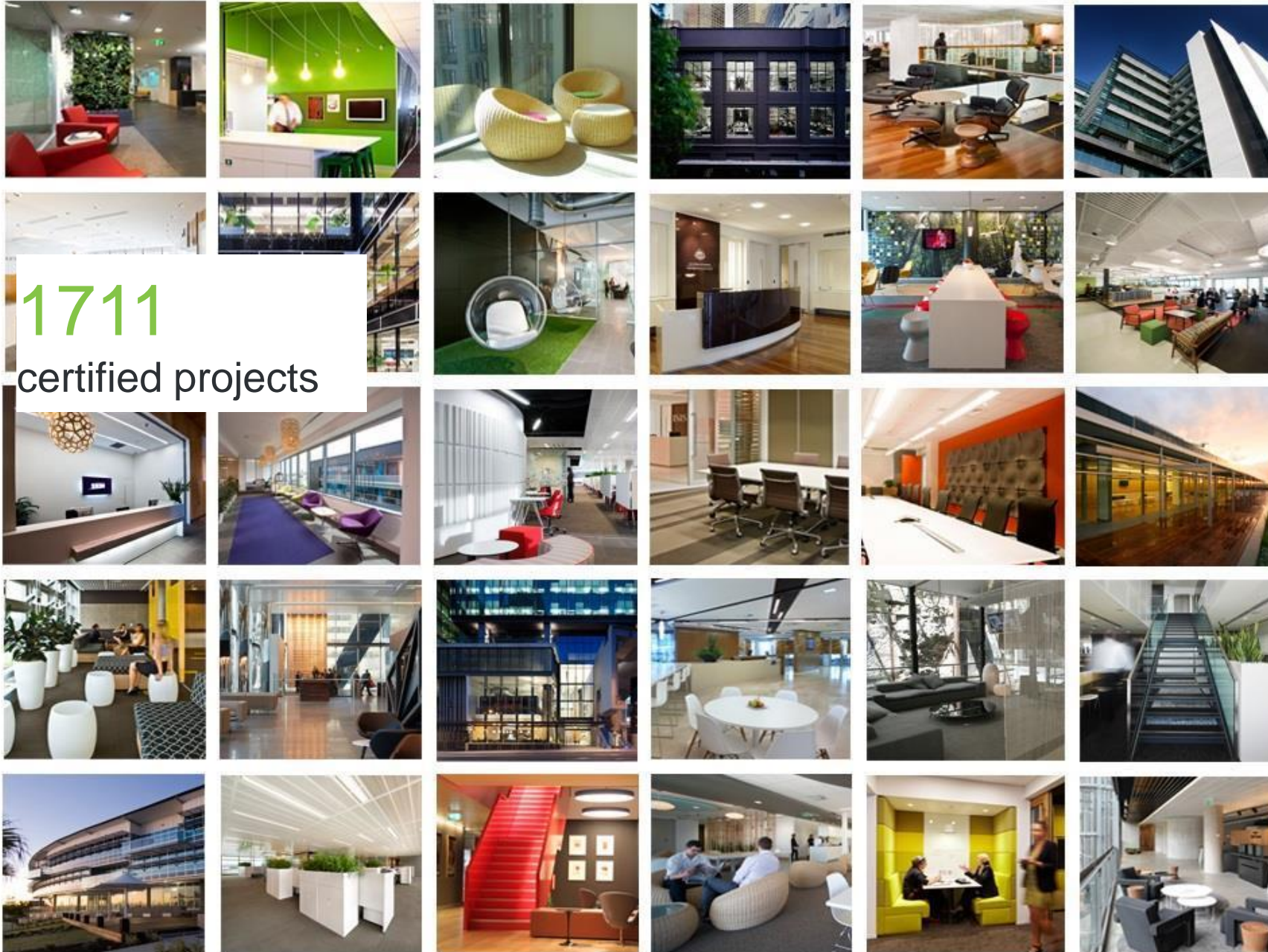
aurecon

“Green building continues to double every three years.”

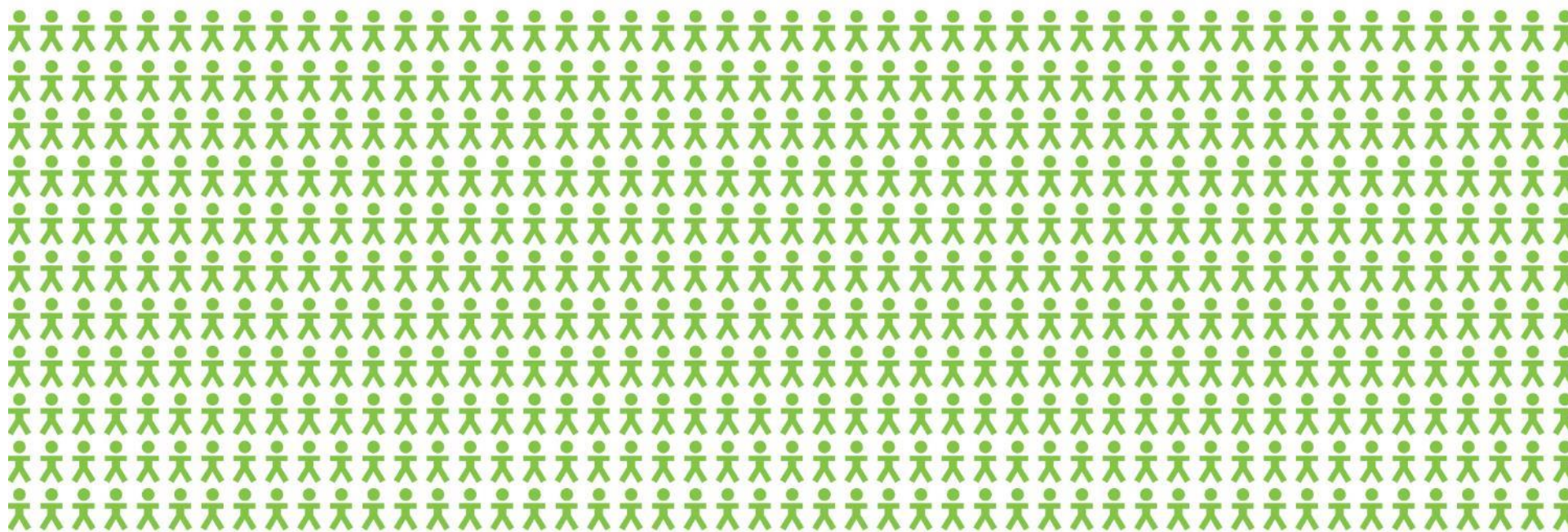


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1711
certified projects



600,000 people work in Green Star-rated offices



30%
of Australia's
CBD Office
space is
Green Star
certified.



Sustainability is now embedded in the DNA of the Australian,
property market

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For Lease

A Fresh Business Outlook

Colliers INTERNATIONAL

m²
1,250m² - 7,500m²
available areas


Large, efficient
floors of 2,500m²


New end-of-trip
facilities


Fully refurbished
floors with LED
lighting


Prominent
building signage


4.5-Star NABERS
Energy rating

colliers.com.au/13359

Edward Knowles
0400 680 526

Tony Landrigan
0411 423 758

700

THE AUSTRALIAN BUREAU OF METEOROLOGY BUILDING

National Australian Built Environmental Rating System (NABERS)

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- 6 star scale widely accepted performance-based rating system for existing buildings
- NABERS rates a building on the basis of its measured operational impacts on the environment
- NABERS rates the Energy, Water, Waste and Indoor Air Quality

OFFICES	SHOPPING CENTRES	HOTELS	HOMES	DATA CENTRES
Energy	Energy	Energy	Energy	Energy
Water	Water	Water	Water	
Waste				
Indoor Environment				

Commercial buildings over 2000m² must declare their NABERS Rating

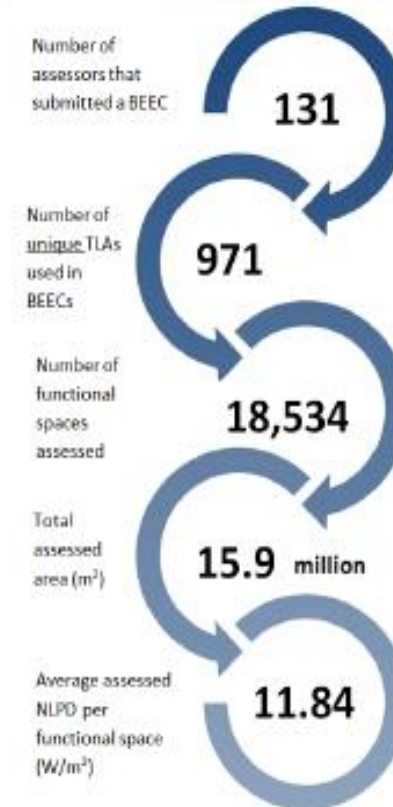
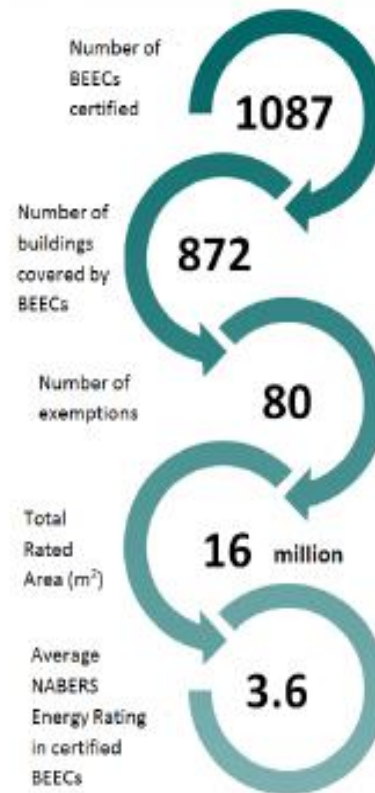


Stats of the 2014/15 Financial Year

An ACIL Allen Consulting review concluded the program has delivered \$44 million in benefits over the last four years by assisting to improve the energy efficiency of Australia's large office building

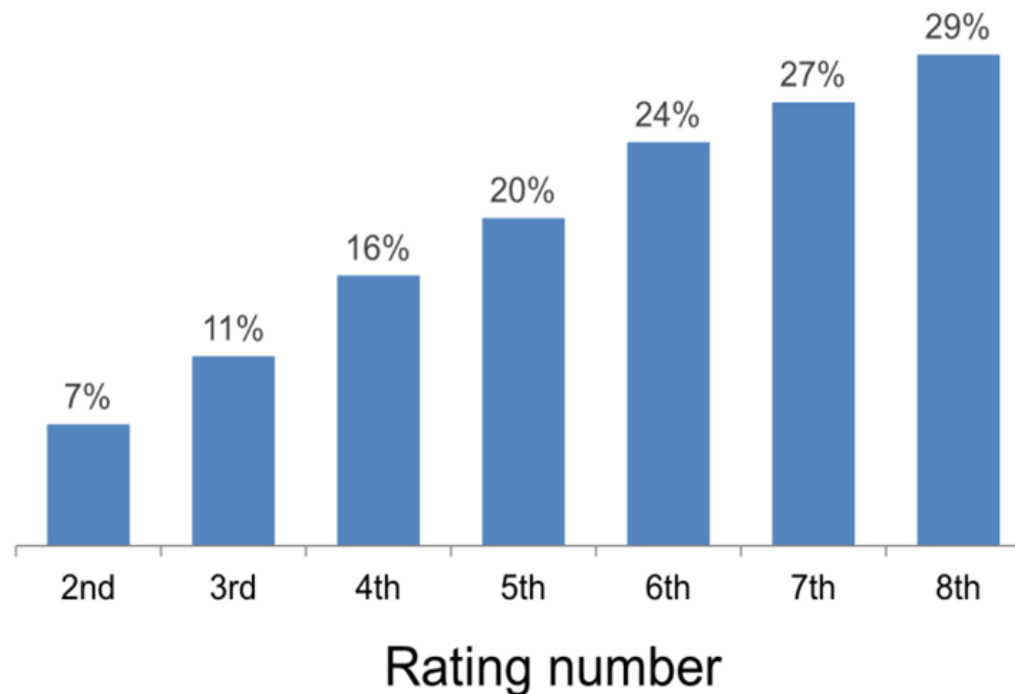


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www.cbd.gov.au

The more you Rate the Better you Get



- NABERS ratings have driven great results in building efficiency
- Efficiencies rising to 30% over the baseline

Average Improvement in NABERS Energy
Ratings after multiple ratings

Case Study – TAC Geelong

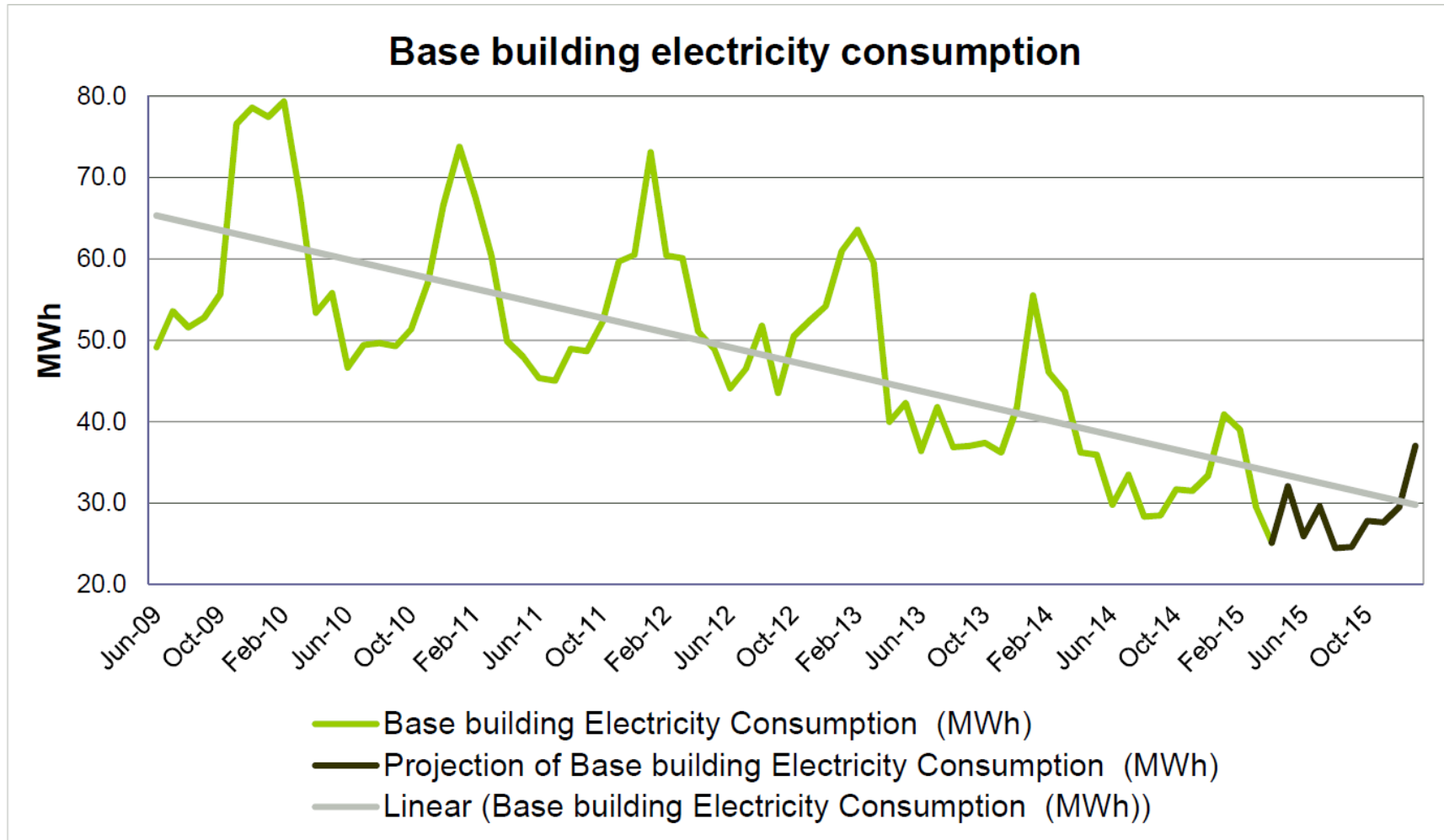
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- 7 Stories, 14,000m2 NLA
- New Building Ratings
 - 5 Star Green Star
 - 4.5 Star NABERS Energy
- On-going building tuning transformed a new energy efficient Australian office building by reducing its base building energy consumption by 50% over six years

TAC - The Benefits of On-Going Tuning

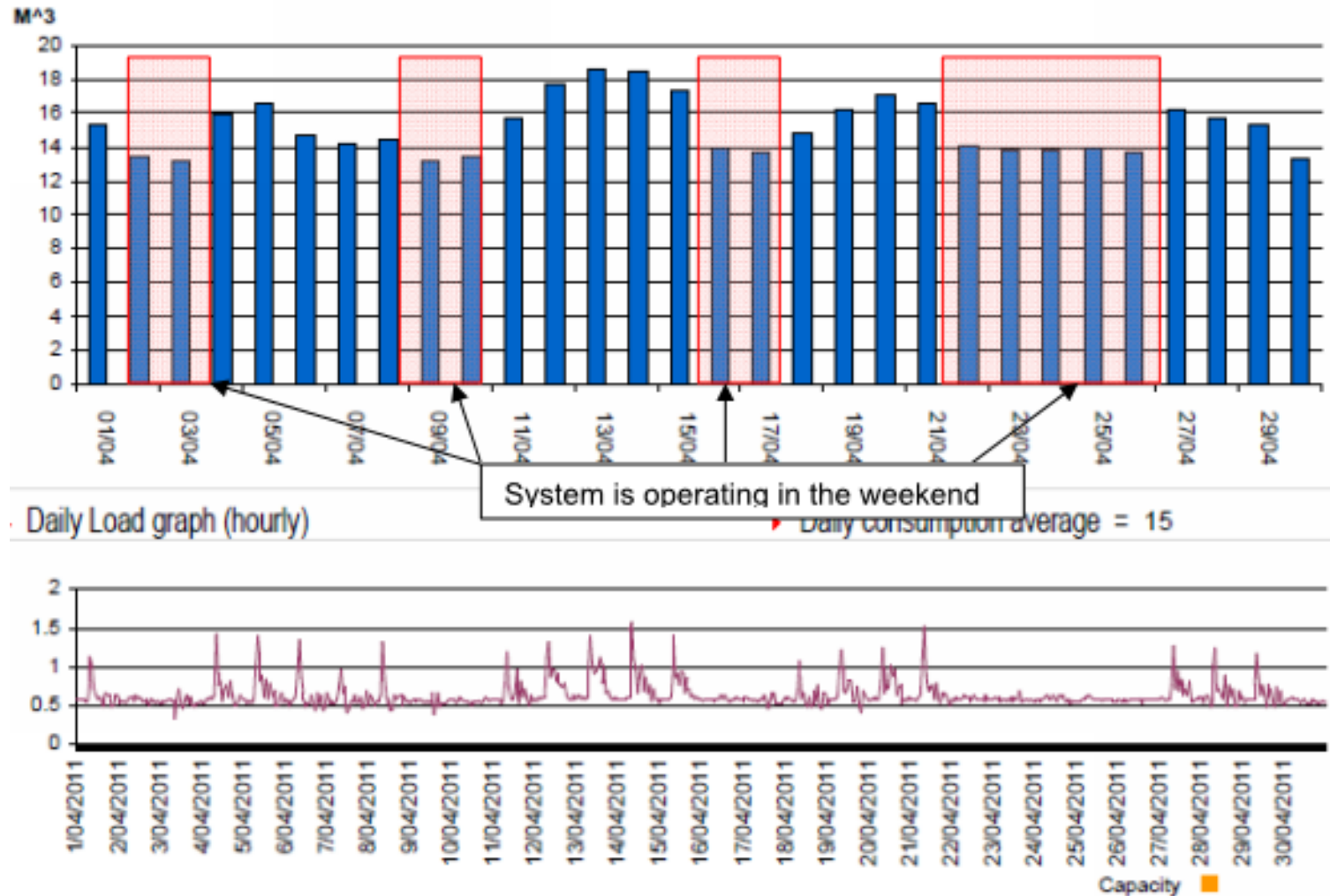
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Now Certified at 5 Stars NABERS Energy – Tracking 5.5 Stars

TAC – Drilling Into the Details

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TAC - The Energy Efficiency Journey

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Date	Description of energy saving initiative
Jan 2009 Ongoing	TAC implemented a recycling program for Batteries, Mobile phones and accessories, Light tubes, Computer and redundant equipment, Furniture and Toner cartridges.
Nov 2009	TAC car park lighting set at 50% on Business Hours balance controlled by sensors.
Jun 2010	External blinds confirmed as operating as per design.
Jul 2010	Daylight Harvesting Control confirmed as operating to design.
Jul 2010 Ongoing	TAC purchase 25% Green Power.
2010 Ongoing	TAC purchase Office consumables with recycled content including pens, pencils, post its, highlighters and copy paper.
2010 Ongoing	TAC purchase Green Kitchen products.
May 2011	After hours air conditioning buttons disabled – Fans only operate
Jul 2011	Façade air ingress rectification works completed
2011 Ongoing	TAC adjusted run times on all Billi Units
2011 Ongoing	TAC instructed paper supplier to remove all boxes from site following each delivery.
Jun 2012	7.00pm Plant shut down times reduced Mon-Thurs 6.30pm and Fri 6.00pm – Schneider observed a 3% decrease on Base supply.
Jun 2012	Retail car park lighting – 11 x 36 watt fittings replaced by 24 watt LED fittings
Jun 2012 Ongoing	Foyer lighting switched off manually on days of high/bright external lighting – RV and SM manually
Jun 2012	TAC arranged for 33 car park exits to be replaced by LED fittings
Mar/Jul 2012	TAC replaced all car park (non- emergency) and lift lighting for LED fittings
Jul 2012	Outside air sensor recalibrated – reading 0.7 degrees high
Aug 2012 Ongoing	TAC programmed Level 0 and 2 on/off lighting schedule – saving 13 kw per day
Aug 2012 Ongoing	TAC programmed tenancy lighting – half lights on at 7.00am and balance on 7.45am – Early starting lights off at 6.00pm and balance 7.00pm – Light off pulses every 2 hours on weekends and after hours
Aug 2012 Ongoing	Air conditioning off time adjusted on various days – Coming up to Public Holidays
Ongoing	Tenancy Meeting room lights off after 1 hour CTI to confirm
Aug 2012 Ongoing	Level 0 air conditioning schedule reduced to 7.30am – 5.00pm
Aug 2012 Ongoing	Escalator skirt panel lighting turned off – Neon 1152 watts constant 24/7 – 43% power reduction
Aug 2012 Ongoing	Escalators off after hours Mon-Fri off 9pm and on 4.30am – Off weekends – Barricades in place (Hume Security)
Dec 2012	51 Level 7 plant room lights replaced with LED – 4 replaced Management Office
Mar 2013	Recalibrated all car park sensors – 1 x sensor faulty and replaced
Mar 2013	BWTP Decommissioned – Exhaust fan isolated July 2013 – 1KW constant
Apr 2013	Meeting room supplementary unit run times reduced from 2 hours to 1 hour
May 2013	Night purge strategy implemented – Operates if internal temp >24 and external temp <22 degrees between 3 and 4am.
Jun 2013	External catenary light globes replaced – 15 x 70watt for 35watt – Saving 2,290kwh annually.

Date	Description of energy saving initiative
Jun 2013	Car park ventilation impulse fans – Once sensor levels reached below acceptable levels the fans ran on for 15 minutes – This was reduced to 5 and then 1 minute
Jun 2013	Solar power system installed – Base building 20KW – Tenancy 40KW
2013 Ongoing	Skin system ventilation implemented – Perimeter zone air off if not needed
Aug 2013	External lighting in Corio Street – Replaced 7 x 70watt fittings with 20 watt LED
Oct 2013	Foyer lighting in Airlocks – Replaced 12 x 36watt fittings with 20watt LED
Oct 2013	Chiller 1 repaired and re gassed
Oct 2013	10 hour weekly reduction Café external lighting
Oct 2013	Tenancy air conditioning set point relaxed from 22.5 to 23.0 degrees
Oct 2013	Loading dock lighting – Switch replaced with Infrascan motion sensor
Nov 2013	Chiller 2 repaired and re gassed
Nov 2013	Replaced faulty HHW non return and isolation valve
Dec 2013 Ongoing	TAC purchase certified Fair Trade coffee and tea
Feb 2014	DHW pump run times adjusted to run 7 days 6.00am – 10 .pm
May 2014 Ongoing	Controls Alterations works to be completed by Entire and Schneider in May 2014
May 2014	Annual clean and maintenance of solar panels completed
May 2014	Hot water service filter changed. It should decrease pump pressure and decrease associated energy consumption
May 2014	26 – 2 x 18 watt foyer lights replaced with 26 x 20 watt LED fittings
May 2014	6 – 2 x 36 watt stairwell emergency lights replaced by 6 x 8 watt Chamaeleon light fittings
May 2014	Plant off times programmed Monday – Thursday 6.00pm and Friday 5.30pm
20/2/2014	Lift motor room temperature adjusted from 21 to 23 degrees
13/06/2014	12 x 2 x 18 watt level 2 foyer lights replaced with LED 20 watt fittings
13/06/2014	6 x 2 x 18 watt car park foyer lights replaced with LED 20 watt fittings
27/06/2014	Schneider reset boilers stage two down set point from 60 to 55 degrees this should reduce run time of 2nd pump and boiler (boiler internal set point 60 or 62 degrees)
09/07/2014-28/07/2014	Project to replace 35 existing 80watt emergency light fittings in stairwells with 8watt Chamaeleon fittings completed as follows: 09 July – 7 14 July – 4 15 July – 7 16 July – 7 17 July – 7 18 July – 2 and 28 July – 1
22/08/2014	Otis installed a lift light strategy on the 2 car park lifts. After 10 minutes of not receiving a call the lift lights and fan will turn off until the lift receives a call. Lights were originally operating 24/7 at 36W plus one fan per lift
21/10/2014	Air lockout would be increased from 16 to 18.0 degrees as a trial for a month and then increased to 20.0 degrees

Date	Description of energy saving initiative
28/10/2014	Lift light strategy on goods lift and lift 5, after 5 minutes of no lift calls the lift lights and fan will turn off until the lift receives a call 24/7 Goods Lift - 72 watts plus fan Lift 5 - 36 watts plus fan
20/11/2014	Increased the outside air lockout set point from 18.0 to 20.0 degrees for all AHUs
10/12/2014	Converted 2 x level 2 foyer compact fluorescent to LED – Saving 32 watts per fitting
22/01/2015	Converted 3 x level 2 foyer compact fluorescent to LED – Saving 32 watts per fitting
28/01/2015	6 – 2 x 36 watt stairwell emergency lights replaced with 6 x 8 watt Chamaeleon lights – Savings 432 watts constant 24/7
27/02/2015	Conversion of 4 compact fluorescent 52 watt light fittings in the level 2 foyer (base building) to 20 watt LED fittings saving 128 watts per hour over 12 hours per day
18/03/2015	Lift 3 and 4 Light/Fan timers fitted. 100 watts approx. Off Sat/Sun 24/7 = 2,496 hours pa – M,T,W,T,F off 12 hours 3,120 hours pa Total 5,616 hours pa – Completed all lifts
20/03/2015	Conversion of level 2 lighting to LED. Convert / retrofit 4 existing fluorescent can down lights 52 watts and convert to 20 watt LED – 128 watts x 3,120 hours pa – All completed
24/03/2015	Diesel tank storage exhaust B2 altered to light switch control. 1 x SA and 1 x RA fans – 240 watts run 24/7 Mon – Fri – Run 120 hours per week or 6,240 hours pa – Meter M02 -
25/03/2015	Replace high bay foyer lighting with LED. Remove 8 x 150 watt surface mounted can lights and install 8 x 36 watt LED CR1500 fittings – Saving 984 watts constant 7.00am – 7.00 pm Mon – Fri or 984 watts over 3,120 hours pa
26/03/2015	Reduce schedule of operation for cleaner's room exhaust fan. EF 1.2 to run 6.30am – 7.00pm Mon – Fri saving approximately 1106.30 kwh pa
22/04/2015	Loading dock fan EF 1.5. Remove schedule 7.00am – 7.00pm Monday – Friday to operate via existing sensor – 1,000 watts on low speed – 60 hours per week x 52 weeks = 3,120 hours per annum.
24/04/2015	Domestic hot water scheduled adjusted to run from 6.00am – 10.00pm 24/7 to 6.00am – 9.00pm Monday to Friday and off on weekends.

Increasing the performance of 100 things by 1%!

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The Growing Importance of GRESB



700+

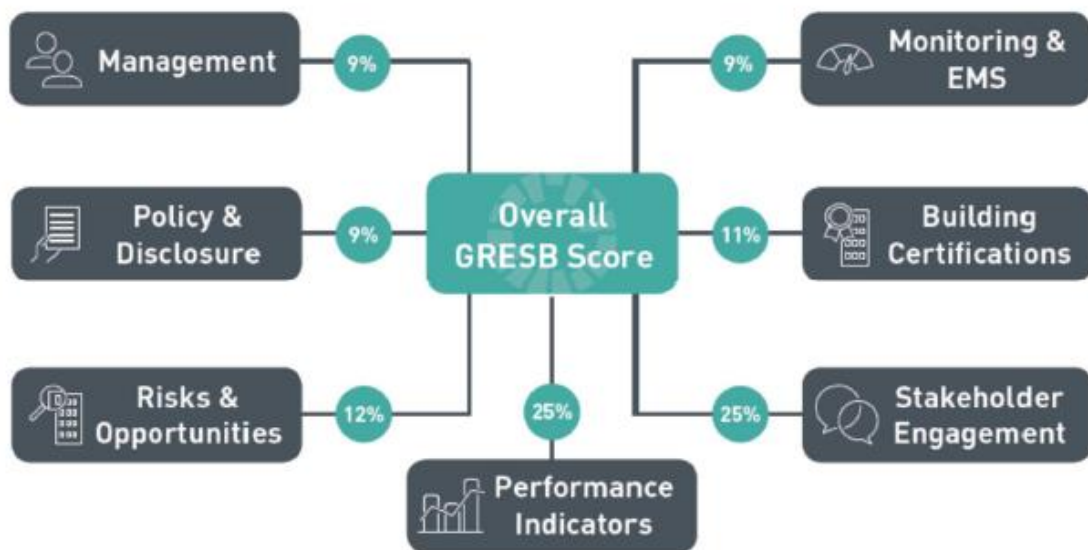
Global
participants



Increasing
transparency



Company
and investor benefits



- GRESB is an industry-driven organization committed to assessing the ESG performance of real assets globally, including real estate portfolios and infrastructure assets.

GRESB Investor and Bank Members



\$7.6 trillion
Institutional capital represented by 58 GRESB Investor Members

About GRESB
GRESB is an industry-driven organization committed to assessing the environmental, social and governance (ESG) performance of real assets globally, including real estate portfolios (public, private and direct), real estate debt portfolios and infrastructure. More than 200 members, including 58 pension funds and their fiduciaries, use GRESB data in their investment management and engagement process, with a clear goal to optimize the risk/return profile of their investments. For more information, visit www.gresb.com.

The performance of a Green Building impacts on its Value

- We have moved beyond the 'the Green promise' to having to
- demonstrate actual performance
-

GRESB is Huge with \$2.3 Trillion in Real Estate so Follow the Money

By *Stuart Kaplow* on December 27, 2015

POSTED IN [ENVIRONMENTAL](#), [GREEN BUILDING](#), [LEED](#), [SUSTAINABILITY](#)



GRESB at Greenbuild 2015

Representing a huge share of the market capitalization of real estate across the globe, this year, 707 real estate companies and funds, with over 61,000 properties, having an aggregate value of \$2.3 Trillion reported their environmental, social and governance information to Global Real Estate Sustainability Benchmark (GRESB).



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- “a higher sustainability ranking of REITs in the annual GRESB Survey correlates to superior financial performance.”



2016 GRESB Results For Australia/New Zealand



“Unbroken streak of global leadership” for Australia’s sustainable property market

- **Australia’s property market remains the world’s most sustainable,**
- as the 2016 GRESB report reveals an **“unbroken streak of global leadership”**.
- In 2016 GRESB, the leading data provider for environmental, social and governance (ESG) performance of real assets, assessed a record 759 real estate companies and funds, representing more than 66,000 assets and AUD \$3.7 trillion in gross asset value.
- GRESB found that the **Australia/New Zealand region extended its leadership, despite increasing competition from other markets around the world.**
- The average GRESB score of companies and funds in Australia/NZ improved from 70 in 2015 to 74 in 2016. In comparison, the global average was 60.
- According to Ruben Langbroek, GRESB’s Head of Asia Pacific, **Australia’s leadership reflects a long-term commitment to sustainability and a “pervasive spirit of collaboration and knowledge sharing”**.
- “Australia’s property industry also regards **superior sustainability as a proxy for quality**,” Mr Langbroek says.
- The data also reveals that companies reporting to GRESB for seven consecutive years outperformed their peers in environmental, social and governance (ESG) by an average of 12 points.

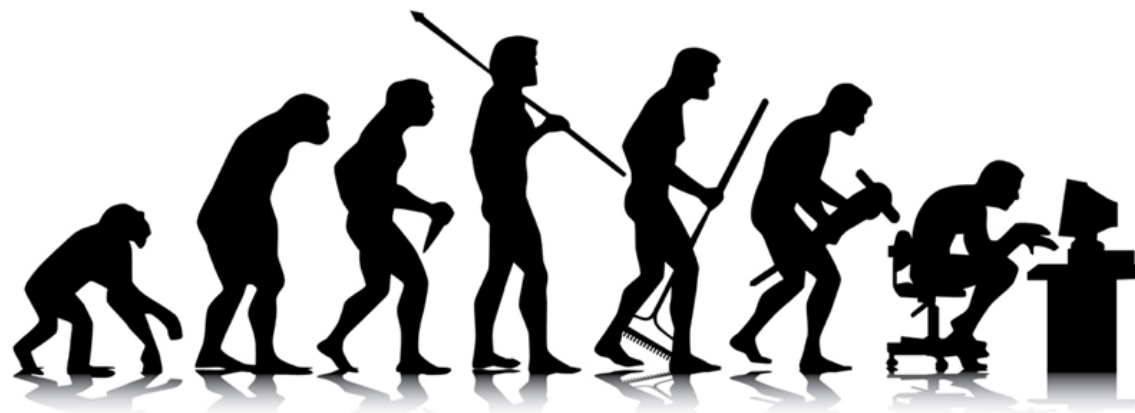
Many of us are living unhealthy lives

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heart disease
high blood pressure
OBESITY
cancer stroke diabetes



Our environment is changing how we live.



Physical inactivity is the **4th leading** risk factor for mortality.

People are increasingly seeking healthier life styles

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HEALTH

You can't buy it.



Those who lack it
would give all their
wealth to possess it.





Health, Wellbeing & Productivity in Offices

The next chapter for green building

Health, Well-being and Productivity in Offices

The next Chapter Green Buildings

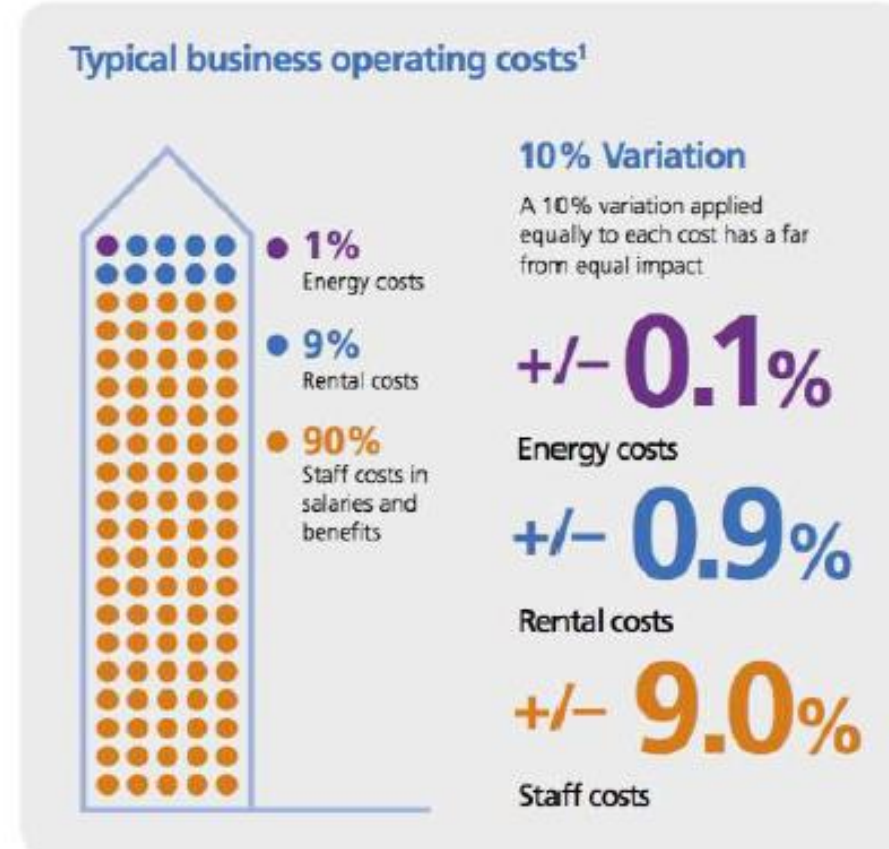


There is a new focus on Health and Wellbeing in Buildings

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- **Why is it Important?**

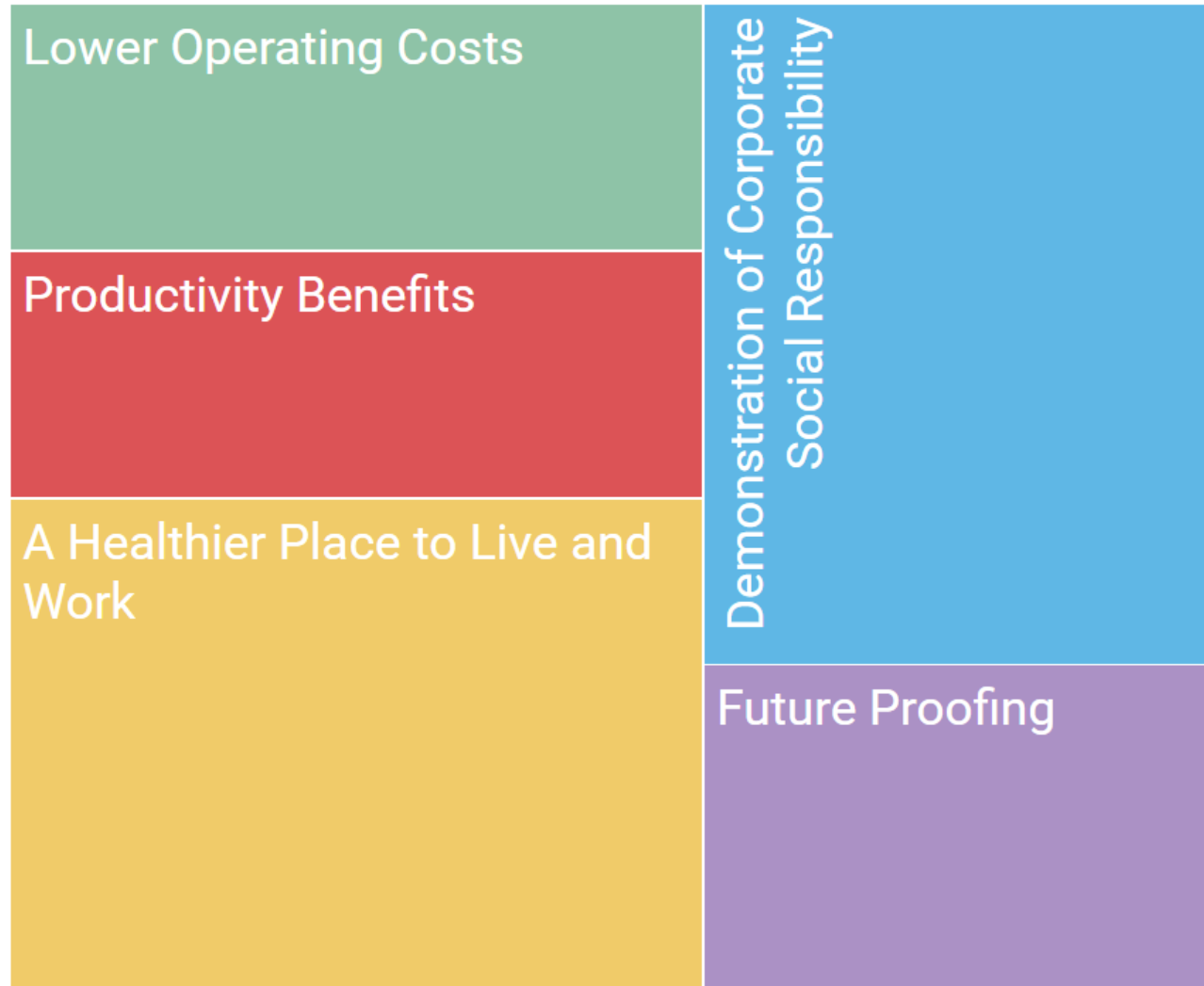
- We spend 90% of our time indoors
- Our environment
 - Influences our habits and choices;
 - Regulates our sleeping and waking cycles; and
 - Influences our health through the quality of our surroundings.
- Massive costs associated with staff both in sourcing and retaining people



Source: Health, Wellbeing & Productivity in Offices, World Green Building Council

Sustainability & Wellness – Why?

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PRESS RELEASE

Overview

- Corporate Information
- Executive Committee
- Senior Leadership Board
- Local Office Leadership

Media Centre

Our Offices

- Case Studies
- Achievements
- Client Tools
- Bull or Bear

Wellness the new focus for Australian office landlords

Sydney, 23 July 2015 – Wellness is the new focus for the office, retail, industrial and residential

This was one of the messages from today's breakfast panel presentation, CBRE's

In the breakfast panel presentation, CBRE's adapting to a changing business environment focus on wellness.

CBRE's global headquarters in Los Angeles factors such as access to daylight, circadian

Macquarie is pursuing similar WELL ratings Amanda Steele, said was part of a broader location, location" to having one on "amenit

"Clever landlords are scrambling to get ready

Ms Cranston agreed and said wellness was

"It's changed the discussion from bricks & m

"IT and finance, which are the growth sector workplaces have to be the platform for a col

Fellow panelist, Emil Joubert, CBRE's Natic regard to accommodating wellness, was the

"There are massive opportunities ahead for Joubert said.



Sections Jobs Business Property Sectors Politics Design & Tech Habitat eBooks

Who will be first with a WELL Building certificate in Oz?



Healthy buildings includes nutrition advice, healthy food and veggie gardens

Tina Perinotto | 8 May 2015

UPDATED 8 MAY 2015: According to CBRE associate director Tor sweeping the commercial property world is wellness for employees nutrition advice, lessons in healthy cooking, a thriving veggie garden

In Australia there's a race to be the first to be accredited with a cer Building Institute. Vying to create similar healthy workplaces with v not yet registered) are Medibank at its 720 Bourke Street building i Melbourne , and another owner in Brisbane looking seriously at the

WELL building standard set to storm the property world



480 Queen Street in Brisbane will be pursuing a WELL rating

Tina Perinotto | 4 February 2016

The WELL Building Standard looks set to shake up the top end of the property industry as much as Green Star did when it burst onto the scene in 2002.

What is the WELL Building Standard?

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- The WELL Building Standard is an evidence-based system for measuring, certifying and monitoring the performance of building features to impart a positive impact on human health.
- WELL is the product of over seven years of research and development in conjunction with the Mayo Clinic, the Cleveland Clinic and leading architects, scientists and wellness thought leaders.



DELOS Founder Paul Scialla



The WELL Building Standard is administered by the International WELL Building Institute™ (IWBI™), a public benefit corporation whose mission is to improve human health and well-being through the built environment. IWBI was launched by Delos in 2013.



WELL is like a **NUTRITION LABEL** for your building, providing transparency on the quality of our built environment.



WELL Building Standard

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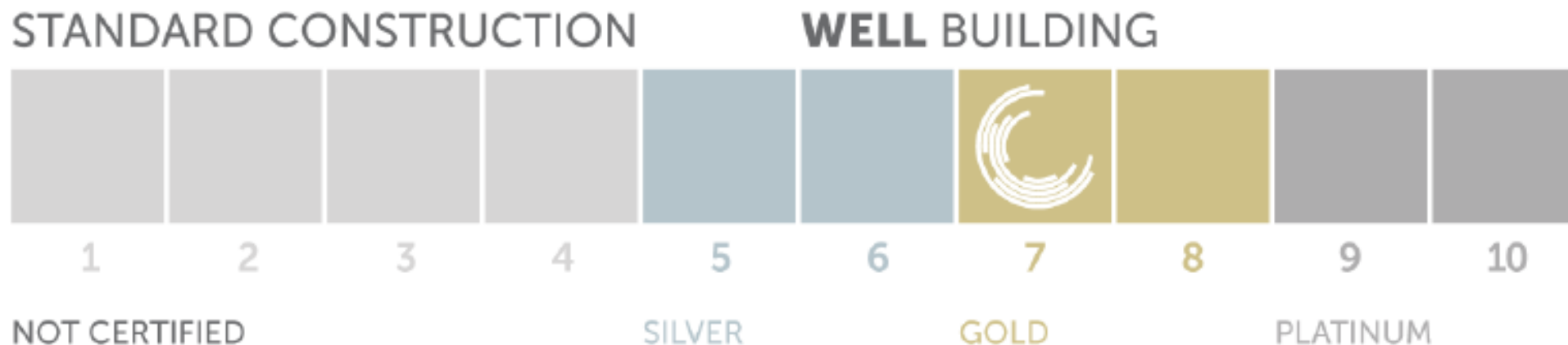
- Key Facts about WELL
 - System for measuring, certifying and monitoring health and wellbeing impacts of buildings based on scientific research
 - **Designed to complement other rating systems** such as Green Star & LEED
 - Has **105 performance metrics**, design strategies and procedures
 - **Requires on-site assessment & independent testing**
 - **Ongoing recertification**



WELL Certification Process



Ratings



■ Typologies for Offices



New and Existing Buildings



New and Existing Interiors



Core and Shell

Pilots

- Retail
- Multi Family Residential
- Education
- Restaurants
- Commercial Kitchen
- Communities

Construction
(Commissioning,
Testing, Air Quality
etc.)



**Operations & Maintenance
Initiatives**
(Inspections, cleaning,
pesticides etc.)

Design Initiatives
(HVAC, Lighting,
Biophilia, Daylight etc.)

Policies
(Leave, access to healthy
food, gyms etc.)

Seven Concepts



What Really Matters – The Building Occupants

Muscular System



Cardiovascular System



Digestive System



Endocrine System



Immune System



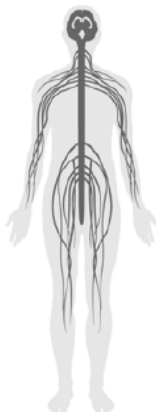
Integumentary System



Reproductive System



Nervous System



Respiratory System



Skeletal System



Urinary System



Body Systems Applied to WELL Features

This provides a simple way to express the built environment's complex impact on the Human body

What happens to your body when you sit for a prolonged period of time?

Calorie burning drops to less than
1 per minute.¹

Cardiovascular, endocrine, digestive, reproductive, respiratory, muscular, skeletal and nervous systems are
negatively affected.²

Prolonged sitting disturbs
mood, energy levels and productivity.³

¹Standing based of ce ork sho s encouraging signs of attenuating ost randial glycaemic e cursion. Buckley, J, et al. 2, s.l.: Occupational and Environmental Medicine, February 2014, Vol. 71, pp. 109-11. <http://www.ncbi.nlm.nih.gov/pubmed/24297826>. 10.1136/ oemed-2013-101823.

² IWB Fitness Wellography, Elements of Fitness: Physical Inactivity

³ Reducing Occupational Sitting Time and Improving Worker Health: The Take-a-Stand Project, 2011. Pronk, N, et al. s.l. : Preventing Chronic Disease, 2012, Vol. 9. http://www.cdc.gov/pcd/issues/2012/11_0323.htm. 110323.



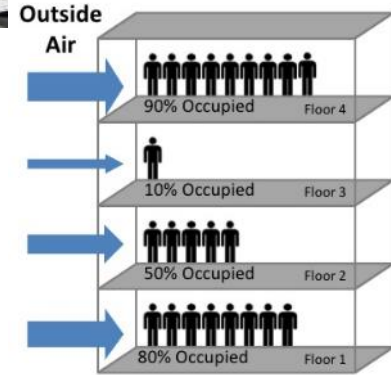
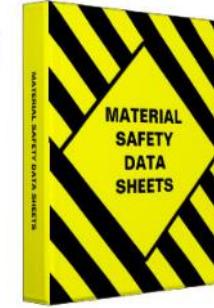
Air

PRE-CONDITIONS

- **AIR QUALITY STANDARDS**
(i.e. formaldehydes, VOCs, particulate matter, inorganic gases and radon)
- **SMOKING BAN**
- **VENTILATION EFFECTIVENESS**
(i.e. ASHRAE 62.1, demand controlled ventilation & system balancing)
- **VOC REDUCTION**
(i.e. paints, sealants, flooring, insulation, furniture and furnishings)
- **AIR FILTRATION**
(i.e. future carbon filters, filter efficiency MERV 13+ & filter maintenance)
- **MICROBE AND MOLD CONTROL**
(i.e. UV lamps on coils & mould inspections)
- **CONSTRUCTION POLLUTION MANAGEMENT**
(i.e. duct protection, filter replacement & VOC absorption management)
- **HEALTHY ENTRANCE**
(i.e. permanent entry walk off features and air seals)
- **FUNDAMENTAL MATERIAL SAFETY**
(i.e. asbestos, lead, PCBs and mercury)



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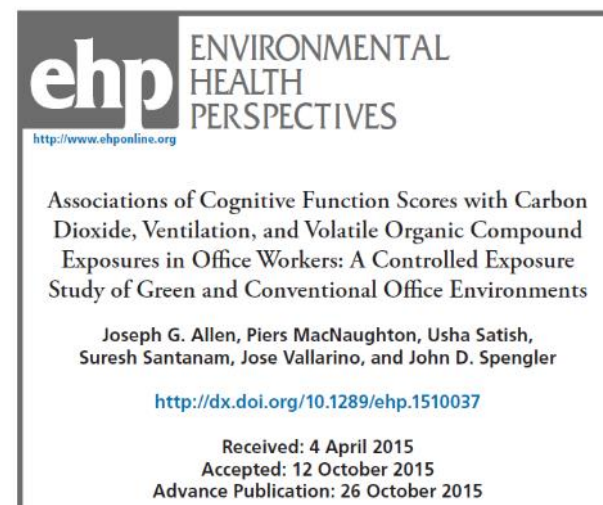
Green Buildings Improve Cognitive Performance

Exposure to lower levels of VOCs and CO₂ in green buildings improves

- Crisis Response
- Strategy and
- Information Usage

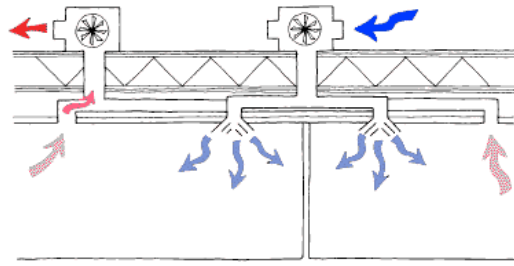


Cognitive performance scores averaged 101 percent higher in green buildings

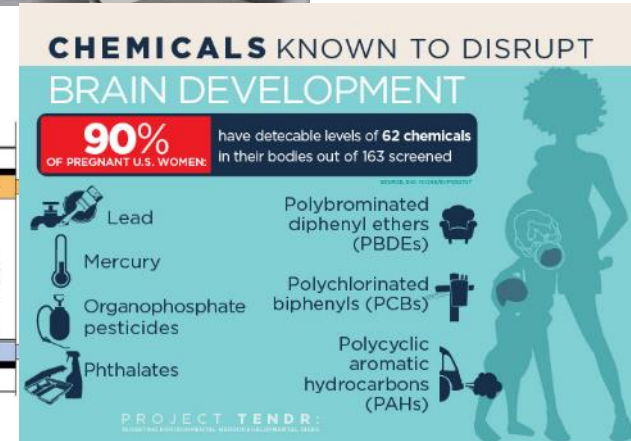
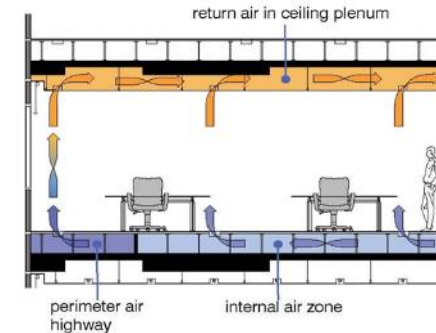


Air OPTIMISATIONS

- **AIR FLUSH**
- **AIR INFILTRATION MANAGEMENT**
- **INCREASED VENTILATION**
(i.e. increased outdoor air supply)
- **DIRECT SOURCE VENTILATION**
(i.e. isolation and exhaust of photocopying, kitchen and vehicle pollutants)
- **AIR QUALITY MONITORING AND FEEDBACK**
(i.e. air monitoring and display of environmental information)
- **OPERABLE WINDOWS**
(i.e. occupant control and outdoor air measurement & triggers)
- **DISPLACEMENT VENTILATION**
- **TOXIC MATERIAL REDUCTION**
(i.e. limiting perfluorinated compounds, flame retardant, phthalate (plasticizers), urea-formaldehyde)
- **ENHANCED MATERIAL SAFETY**



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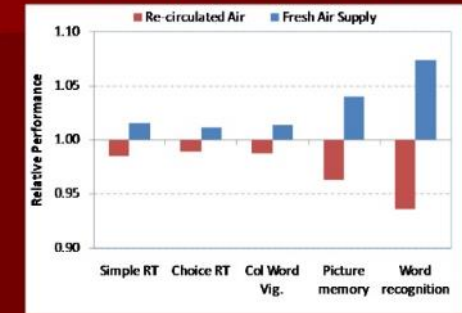


Beware
photocopier
hazard



**Material
Safety
Data
Sheets**

Performance with Fresh and Recirculated Air



Water

PRE-CONDITIONS

- **WATER QUALITY**

sediment

microorganisms

inorganic contaminants

organic contaminants

agricultural contaminants

additives

OPTIMISATIONS

- **PERIODIC WATER QUALITY TESTING**

(i.e. quarterly testing for contaminants)

- **WATER TREATMENT**

organic chemicals

sediments

microbes

legionella

- **DRINKING WATER PROMOTION**

(i.e. access to drinking water and water taste)



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Clean water every time



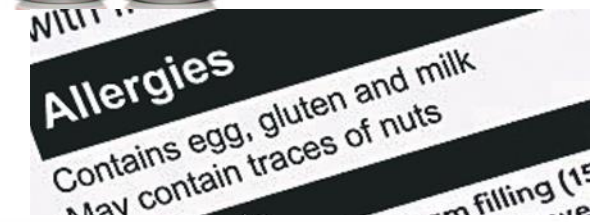
Nourishment

PRE-CONDITIONS

- **FRUITS AND VEGETABLES**
(i.e. supply, variety and promotion of fruits & vegies)
- **PROCESSED FOODS**
(i.e. refined ingredient restrictions & trans fat ban)
- **FOOD LABELLING**
(i.e. allergies, artificial ingredients, total calories, macro / micro nutrient content & total sugar content)
- **CONTAMINATION**
(i.e. cold storage, hand washing)
- **FOOD ADVERTISING**
(i.e. encourage whole and natural foods and discourage sugar & fat)



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per 30g cereal:					
16 SERVINGS	ENERGY 460kJ 110kcal 6%	FAT 0.7g LOW 2%	SATURATES 0.1g LOW 1%	SUGARS 5.1g HIGH 6%	SALT 0.2g MED 4%
% of an adult's reference intake. Typical values per 100g: Energy 1530kJ/360kcal					



Nourishment

OPTIMISATIONS

- **SAFE FOOD PREPARATION MATERIALS**
(i.e. cutting surfaces and storage capacity)
- **SERVING SIZES**
(i.e. meal sizes and dinnerware sizes)
- **SPECIAL DIETS**
(i.e. food alternatives)
- **FOOD PRODUCTION**
(i.e. sustainable & humane agriculture, gardening space)
- **MINDFUL EATING**
(i.e. eating areas to accommodate 20% of employees)



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Light

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PRE-CONDITIONS

- **VISUAL LIGHTING DESIGN**

(i.e. lighting levels, zoned lighting systems and brightness contrasts between task surfaces and the surrounding area)

- **CIRCADIAN LIGHTING DESIGN**

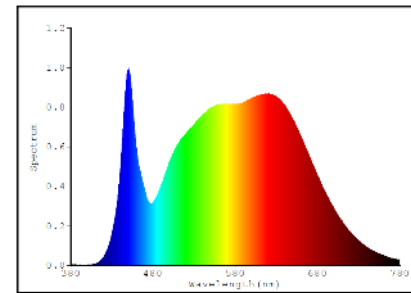
(i.e. melanopic light intensity)

- **ELECTRIC LIGHT GLARE CONTROL**

(i.e. shielding bare lamps and minimising glare)

- **SOLAR GLARE CONTROL**

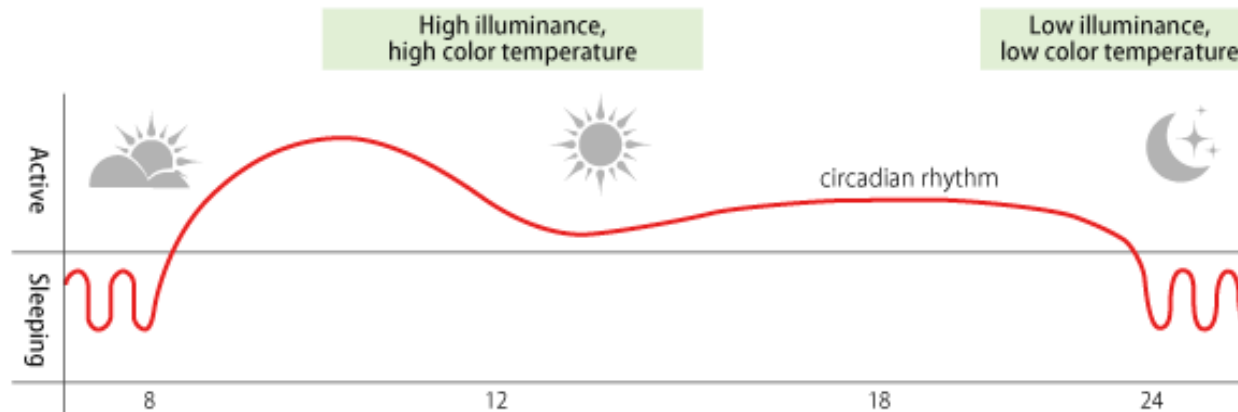
(i.e. minimising glare through internal and external shading)



Circadian lighting

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- Research has proven that the colour of light affects the functioning of the human body



- Design and install artificial lighting with consideration of the effects on the circadian rhythm of workers in a commercial office environment. Benefits include **maximising the productivity** of workers and improving general health.
- Research and studies undertaken have shown that exposure to blue coloured light can improve alertness and the general state of mind i.e. mood.

Research on productivity benefits of access to natural light

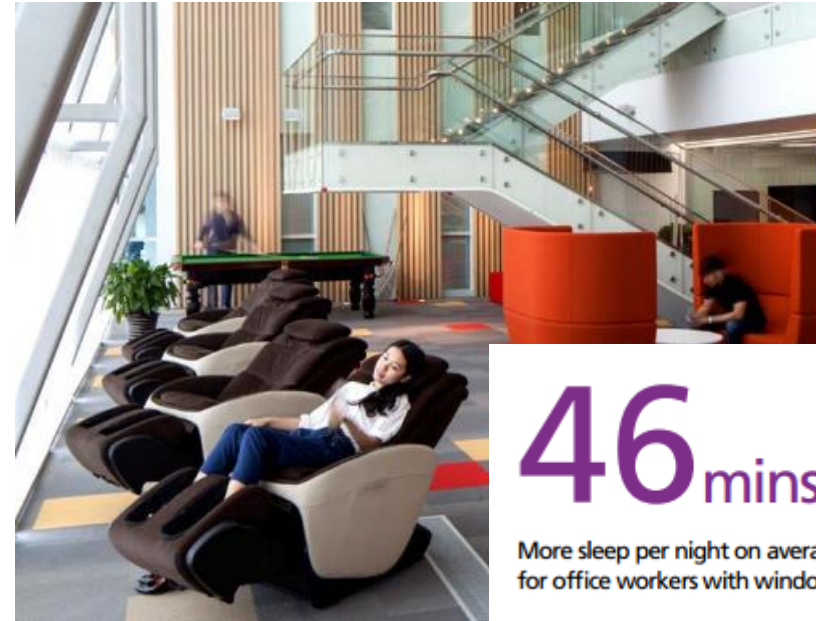
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Natural Light In Your Office Improves Productivity, Sleep And Health, Study Finds

The Huffington Post UK

Posted: 11/08/2014 10:41 BST | Updated: 14/08/2014 12:59 BST

- A new study from North-western Medicine and the University of Illinois at Urbana-Champaign reports that office workers with more light exposure at the office had longer sleep duration, better sleep quality, more physical activity and better quality of life compared to office workers with less light exposure in the workplace.
- **Employees with windows in the workplace received 173% more white light exposure during work hours and slept an average of 46 minutes more per night** than employees who did not have the natural light exposure in the workplace. There also was a trend for workers in offices with windows to have more physical activity than those without windows.
- **Workers without windows reported poorer scores than their counterparts on quality of life measures related to physical problems and vitality, as well as poorer outcomes on measures of overall sleep quality and sleep disturbances.**
- The study was reported in the Journal of Clinical Sleep Medicine in June 2014



46 mins

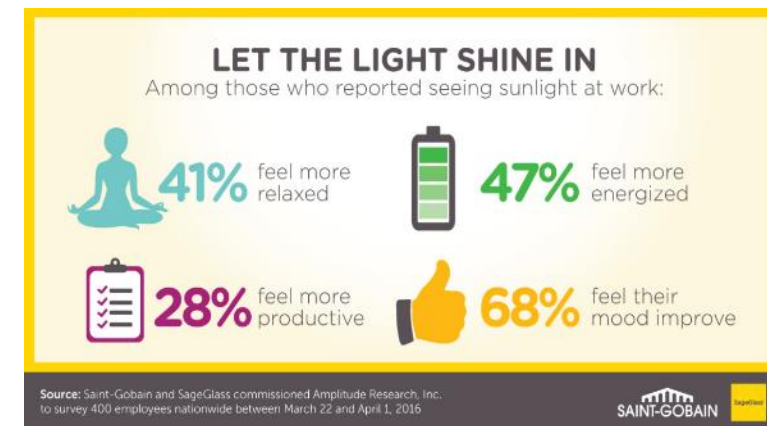
More sleep per night on average
for office workers with windows.



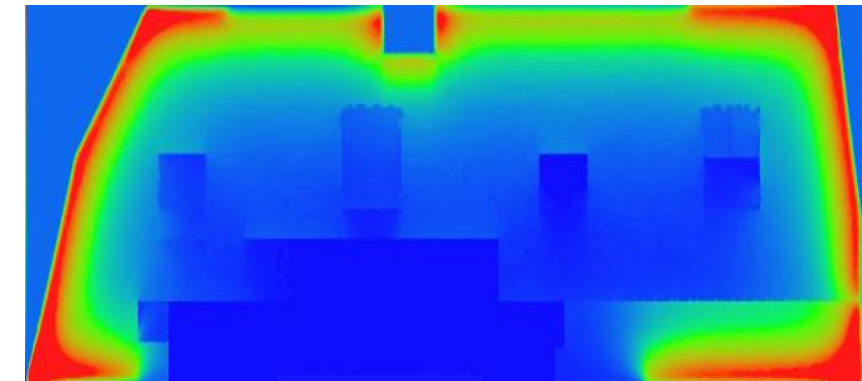
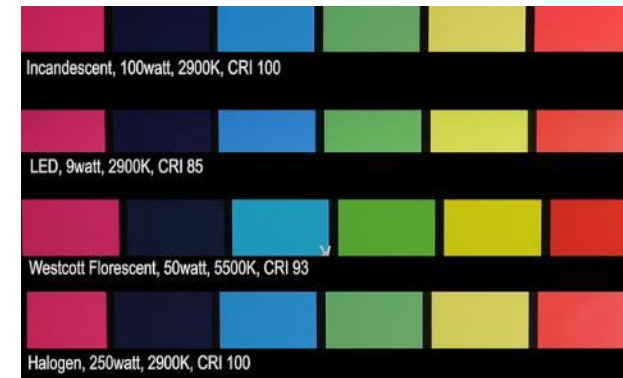
Light

OPTIMISATIONS

- **LOW-GLARE WORKSTATION DESIGN**
(i.e. glare avoidance)
- **COLOR QUALITY**
(i.e. colour rendering index)
- **SURFACE DESIGN**
(i.e. working and learning area surface reflectivity)
- **AUTOMATED SHADING AND DIMMING CONTROLS**
(i.e. automated sunlight control and responsive light control)
- **RIGHT TO LIGHT**
(i.e. distance to façade and views to the exterior)
- **DAYLIGHT MODELING**
(i.e. daylighting across the floor plate and sunlight exposure)
- **DAYLIGHTING FENESTRATION**
(i.e. window-wall ratio, window visual light transmittance & window transmittance in accordance with circadian lighting design)



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46 mins

More sleep per night on average
for office workers with windows.

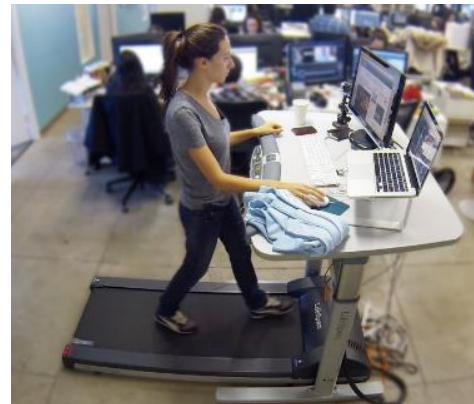
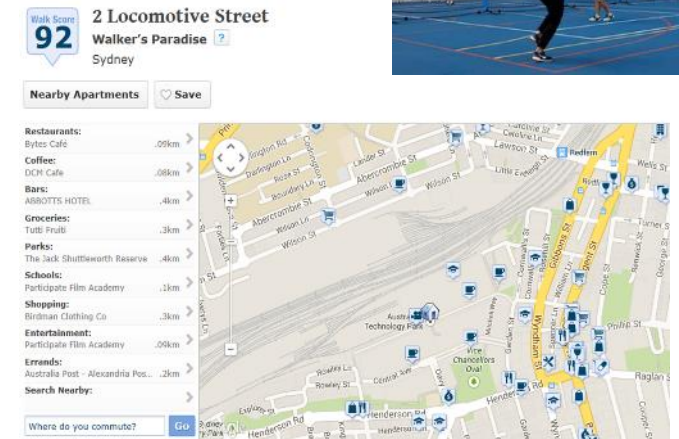
Fitness

PRE-CONDITIONS

- **INTERIOR FITNESS CIRCULATION**
(i.e. stair accessibility, stairs promotion & facilitative aesthetics)
- **ACTIVITY INCENTIVE PROGRAMS**
(i.e. subsidised gym membership)

OPTIMISATIONS

- **STRUCTURED FITNESS OPPORTUNITIES**
(i.e. providing fitness classes)
- **EXTERIOR ACTIVE DESIGN**
(i.e. pedestrian amenities, pedestrian promotion & Walk Score)
- **PHYSICAL ACTIVITY SPACES**
(i.e. external exercise spaces)
- **ACTIVE TRANSPORTATION SUPPORT**
(i.e. end of trip facilities)
- **FITNESS EQUIPMENT**
(i.e. cardio & strength exercise equipment)
- **ACTIVE FURNISHINGS**
(i.e. sit-stand desks, treadmill desks)

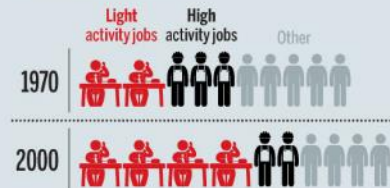


Is Sitting the new Smoking?

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The world we sit in

As a society we spend more time sitting than we perhaps ever have, a fact revealed by a comparison of labour-market trends in 1970 and 2000



INCREASED RISK OF DEATH

"PEOPLE WHO SIT FOR MOST OF THE DAY ARE **54% MORE LIKELY TO DIE OF HEART ATTACKS.**"

- Pennington Biomedical Research Center

"THE MORE PEOPLE SIT, THE SHORTER THEIR AVERAGE LIFE SPAN."

- American Cancer Society

"**18% MORE LIKELY TO DIE FROM DIABETES, HEART DISEASE AND OBESITY.**"

- American Journal Of Epidemiology

"**94% OF WOMEN AND 48% OF MEN WHO SAT MORE WERE LIKELY TO DIE EARLY COMPARED WITH THOSE WHO SAT LESS AND WERE ACTIVE.**"

- American Cancer Society

"**40% HIGHER RISK OF EARLY DEATH FOR WOMEN AND 20% HIGHER RISK FOR MEN.**"

- New York Times

"**SITTING 6 HOURS PER DAY MAKES YOU UP TO 40% MORE LIKELY TO DIE WITHIN 15 YEARS THAN SOMEONE WHO SITS LESS THAN 3 HOURS.**"

- MedicalBillingandCoding.org



9 Ways Excessive Sitting Can Harm You.

HEAD

Sitting for long periods of time can cause blood clots to form which can travel to the brain causing a stroke.

LUNGS

You are twice as likely to develop a pulmonary embolism, or blood clot, if you sit most of your day.

ARMS

The reduction of physical activity leads to hypertension or high blood pressure.

STOMACH

Excessive sitting contributes to obesity & colon cancer. Enzymes in the blood vessels of muscles responsible for burning fat shut down leading to the disruption of the body's method of metabolizing fuels.

FEET

Numbness in the feet can be caused by poor circulation. It can also cause nerve damage or pressure on nerves when you sit for long periods.

NECK

Fluid retained in the legs during the day moves to the neck at night & contributes to sleep apnea. Neck muscles are stressed leading to pain.

HEART

People who live a sedentary lifestyle are up to twice as likely to die or develop diabetes and heart disease than those who move frequently.

LEGS

Fluid collects in the legs during sitting. Standing & walking helps pump it through your body.

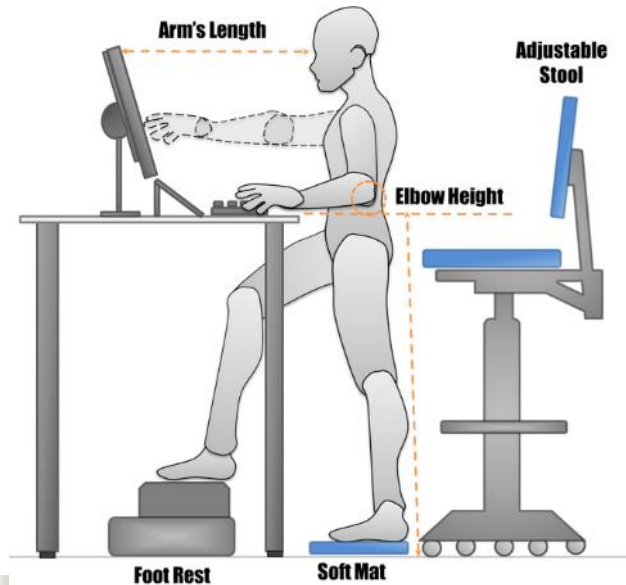
BACK

Sitting for long periods of time place a high amount on the spine. Over time, sitting can result in compression of the spinal disks. Because muscles are tight from pressure, sudden movements can lead to injury.



Sit to stand for a healthier workplace

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Take-a-Stand Project

Reported results from highly active, fit, normal weight, apparently healthy, mostly female employees with relatively sedentary work tasks using WorkFit sit-to-stand workstations:

“ I was able to focus on my work better, ”
My hand and shoulder pain went away.
I was able to do more exercising and moving
while standing and on the phone.

You can achieve these
incredible results when
standing one additional
hour a day, in four
15-minute increments.

HOW TO STAND:

Stand every time the
phone rings, and stay
standing throughout the
duration of the call.

Stand up during
meetings, towards the
back or side of the room.

Stand whenever you're
drinking a cup of coffee,
or eating your lunch
or snack.

Stand every hour on
the half-hour. Set your
Outlook calendar to
remind you.

When a challenging
or frustrating situation
arises, stand to clear
your head and gain a
new perspective.



“ I think I increased physical activity in other areas of my life ”
once I started using the WorkFit.
My posture improved. My neck, shoulder and lower back
tension went away.
This has made me look at my total activity level in other areas
of my life. I have now joined a gym.

A Partnership Project

aurecon

Comfort

PRE-CONDITIONS

- **ACCESSIBLE DESIGN STANDARDS**

(i.e. DDA compliance)

- **ERGONOMICS**

(i.e. screen, desk & seat flexibility)

- **EXTERIOR NOISE INTRUSION**

(i.e. noise intrusion)

- **INTERNALLY GENERATED NOISE**

(i.e. acoustic planning and mechanical equipment sound levels)

- **THERMAL COMFORT**

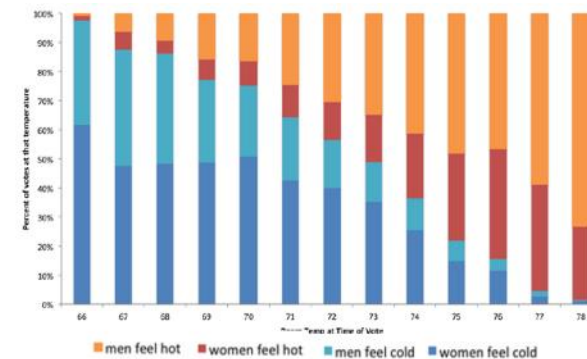
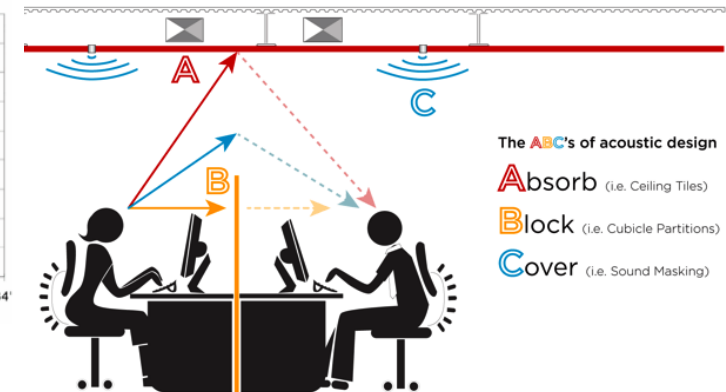
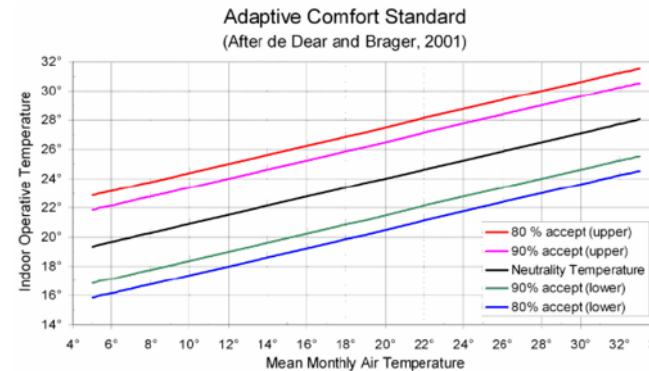
(ASHRAE comfort standards)



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UNIVERSAL DESIGN:

Making Design Accessible To Everyone In Society.



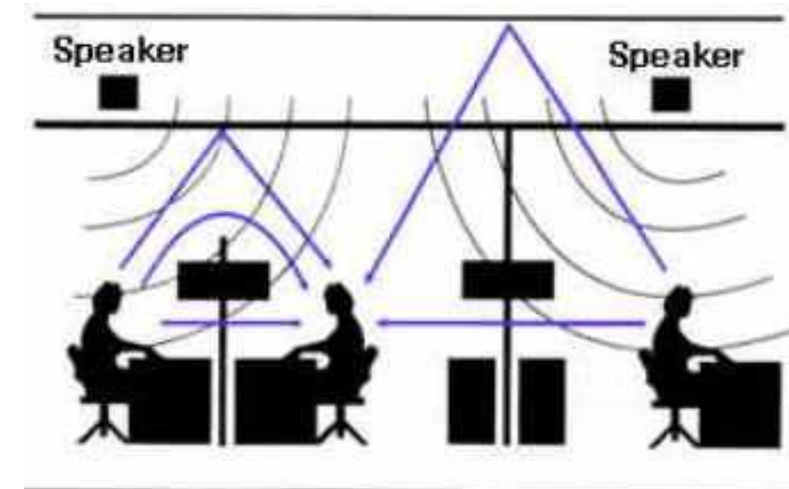
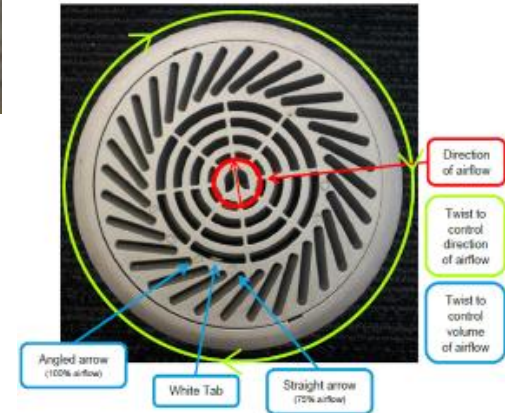
Comfort

OPTIMISATIONS

- **OLFACTORY COMFORT**
(i.e. providing separation from smells)
- **REVERBERATION TIME**
- **SOUND MASKING**
- **SOUND REDUCING SURFACES**
- **SOUND BARRIERS**
- **INDIVIDUAL THERMAL CONTROL**
(i.e. free address and personal thermal comfort devices)
- **RADIANT THERMAL COMFORT**
(i.e. radiant heating & cooling)



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Mind

PRE-CONDITIONS

- **HEALTH AND WELLNESS AWARENESS**
(i.e. building guides and wellness library)
- **INTEGRATIVE DESIGN**
(i.e. collaborative design process)
- **POST-OCCUPANCY SURVEYS**
- **BEAUTY AND DESIGN**
(i.e. human delight, celebration & public art)
- **BIOPHILIA**
(i.e. nature & pattern incorporation and nature interaction)



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Indoor Environmental Quality Building Name



Mind

OPTIMISATIONS

- **ADAPTABLE SPACES**
- **HEALTHY SLEEP POLICY**
- **BUSINESS TRAVEL**
(i.e. restriction on red-eye flights)
- **BUILDING HEALTH POLICY**
(i.e. health benefits)
- **WORKPLACE FAMILY SUPPORT**
(i.e. parental leave and child care)
- **SELF-MONITORING**
(i.e. sensors and wearables)
- **STRESS AND ADDICTION TREATMENT**
- **ALTRUISM**
(i.e. charitable activities and contributions)
- **MATERIAL TRANSPARENCY**
- **ORGANIZATIONAL TRANSPARENCY**
- **BEAUTY AND DESIGN**
- **BIOPHILIA**
(i.e. landscaping, planting & water feature)



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Daily views of nature are necessary for health and happiness

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Greener cities the key to happier, healthier, stress-free lives

January 26, 2016

Alana Schetzer

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An artist's impression of Melbourne covered in rooftop gardens and roadway parks. Photo: Anton Malishev

People are biologically wired to need to be close to nature, with more green open spaces and roof gardens needed to support their wellbeing, a new study says.

A lack of access to greenery could play a role in stress and overall poor health, with experts calling on architects and urban planners to provide more green, open spaces in built-up areas.

Curtin University professor Peter Newman, author of the paper *Biophilic Architecture: Rationale and Outcomes*, said including vegetation as part of building design has been absent in many cities and needs to be given more prominence.

How a Quick Glimpse of Nature Can Make You More Productive

Green roofs are great for the environment. Turns out they're great for tired workers, too.

ERIC JAFFE | [@e_jaffe](#) | May 5, 2015 | 3 Comments

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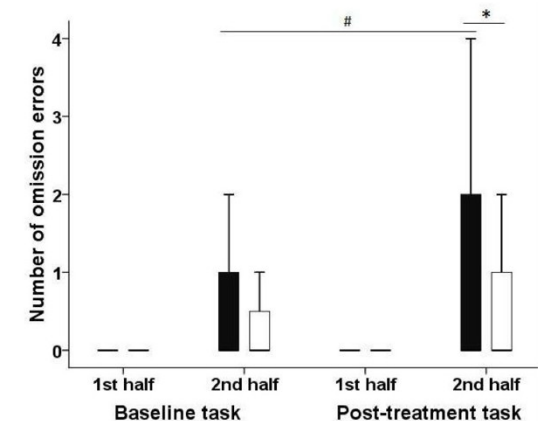


The benefits of a Micro break with views of nature

Test of 150 people given a repetitive task with a micro break with and without views of nature

“Our results have particular implications for the workplace where sustained attention is vital for performance. They provide a preliminary indication that micro-break views of a green roof could help employees top-up their attention resources as they become depleted in the workplace.”

(Lee et al., 2015, Journal of Environmental Psychology)



Bringing the nature to your building



Melbourne office buildings provide spaces for workers to relax, socialise and experience nature

WELL Commissioning

○ Timing

All design documents submitted for review
Minimum 50% occupancy
At least 1 month after OC issued

○ Accredited WELL Assessor (AWA)

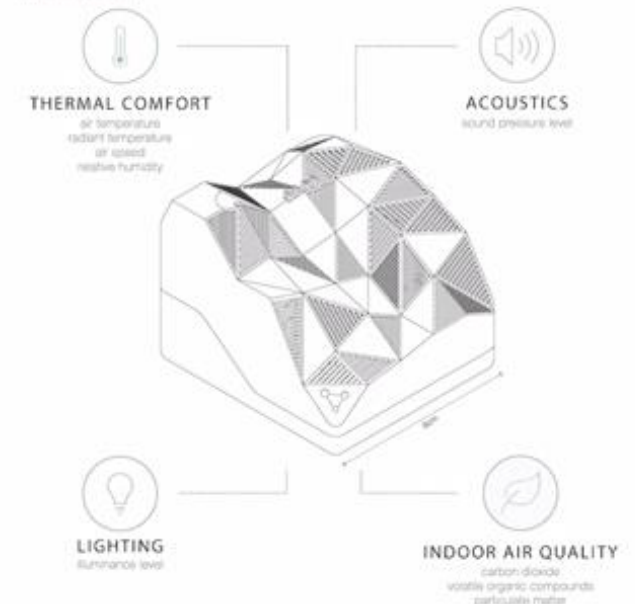
○ Performance Testing

Air Quality (i.e. organic & inorganic gases and particulates)
Water Quality (i.e. dissolved chemicals and suspended solids)
Light Attributes (i.e. colour temperature, intensity and spectral power distribution)
Thermal Considerations (i.e. ambient / radiant temperature, air speed and humidity)
Acoustic Elements (i.e. decibel levels and reverberation)



SAMBA Monitoring Station By IEQ Analytics

Prof. Richard de Dear & Thomas Parkinson
The University of Sydney



Which Companies are getting their Buildings WELL Certified ?

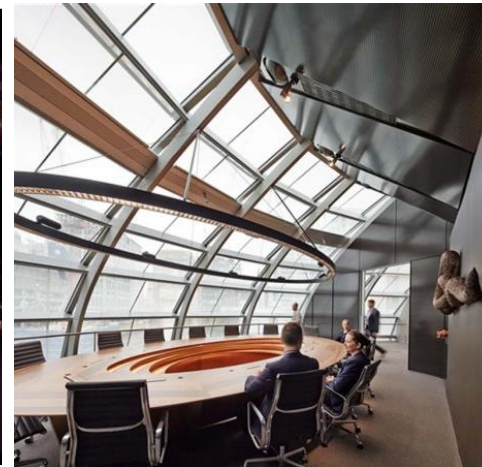
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- Over 260 projects registered or certified = 3.2m m² globally
- TD23, TD Bank Group, Toronto – WELL Gold
- Phipps Center for Sustainable Landscapes, Pittsburgh – WELL Platinum
- Haworth – Shanghai Headquarters – WELL Certified
- CBRE Headquarters, LA, USA
- Shangri-La Construction Headquarters LA, USA
- Macquarie Bank – 50 Martin Place & One Shelley Street
- Dexu – 100 Mount St Sydney & 480 Queen St Brisbane

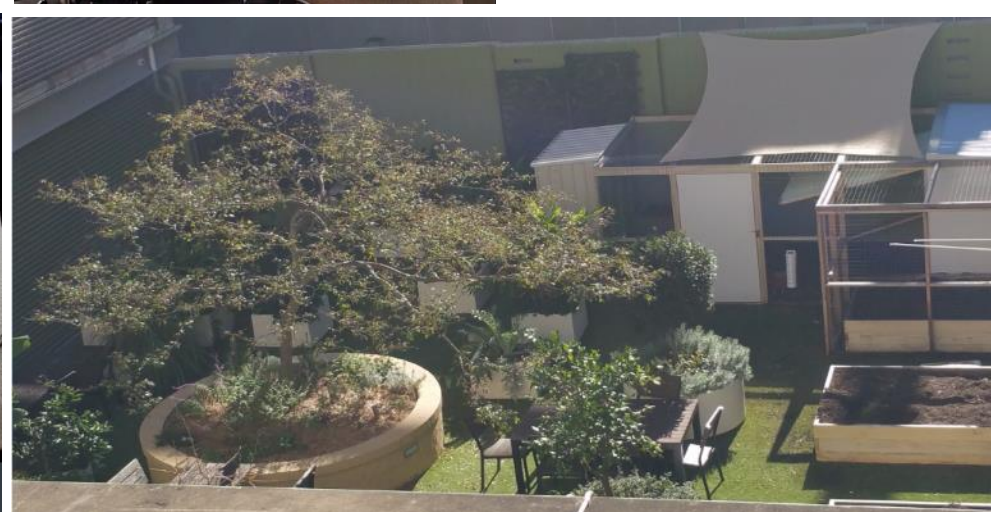


50 Martin Place applying for a WELL Rating

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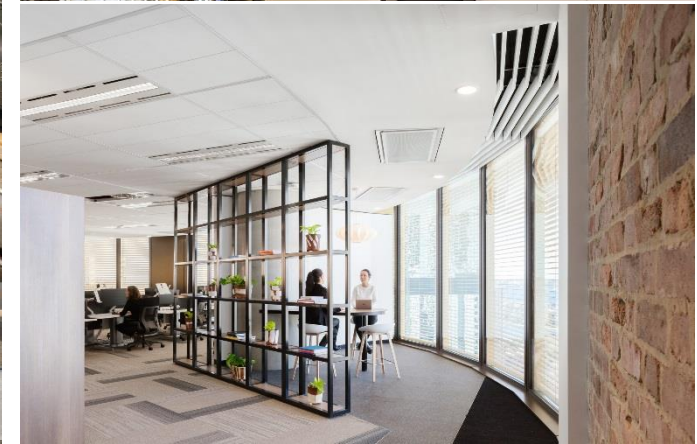
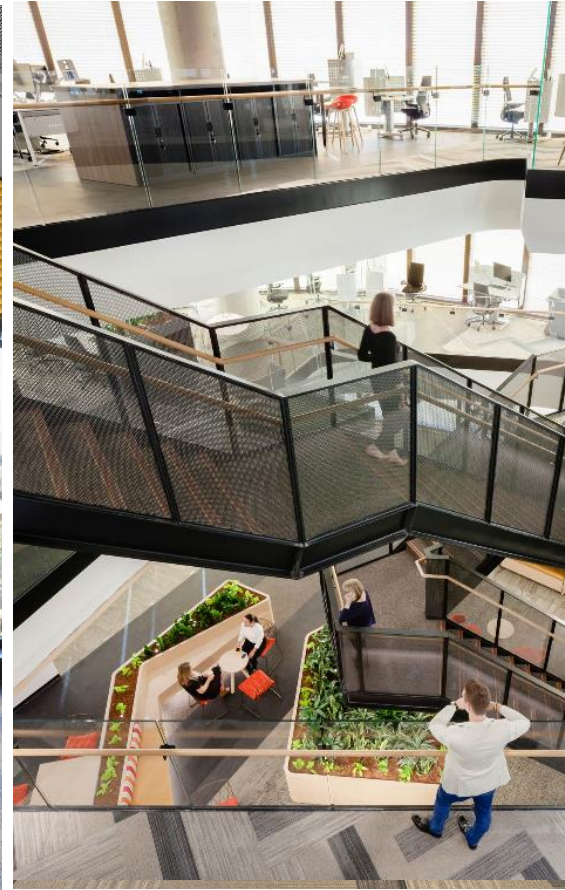
Beekeepers Doug Purdie, right, and Vicky Brown from The Urban Beehive with hives they manage on the roof of Macquarie Group's 19 Elizabeth St building. Ben Rushton



- Largest Heritage
- 6 Green Star Rating
- New glass dome
- Roof garden
- Urban Bee hive
- Chickens rescued from battery farm



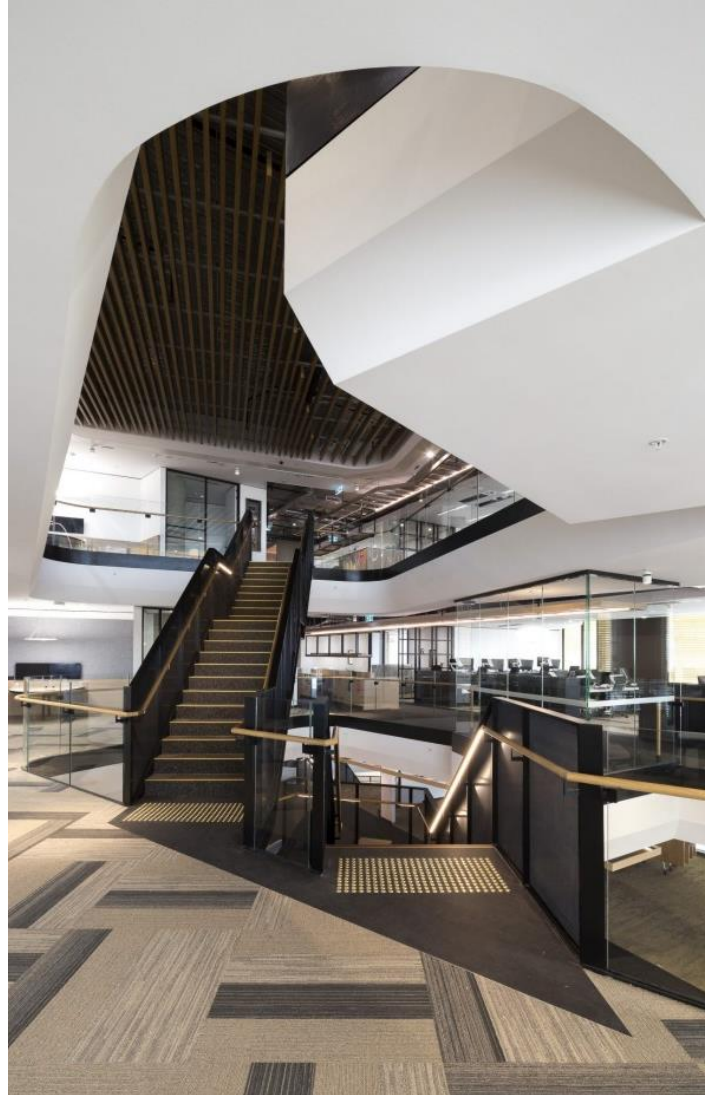
Mirvac's New Offices at 200 George Street Targeting a WELL rating



5 star NABERS +
6 Star Green Star + Targeting
WELL

Mirvac's New Offices at 200 George Street Targeting a WELL rating

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480 Queen St, Brisbane by Dexus

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- DEXUS has registered 480 Queen Street Brisbane (which it's buying from Grocon) for a WELL rating
- This means that premium tenants signed for the building will now be able to line up for their own WELL tenancy rating: BHP, PWC, Herbert Smith Freehills; Allens; HWL Ebsworth.



420 Queen Street, Brisbane, by Dexu

Perusing a WELL building rating

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A selection of the 20 Australian Buildings seeking WELL Certification

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420 Queen St Brisbane by Dexu



200 George St Sydney By Mirvac



Lend Lease Barangaroo South



20 Brougham Street, Geelong
by Grocon



1 Malop Street, Geelong
Quintessential Equity



Aesop – Northumberland
Collingwood By Grocon

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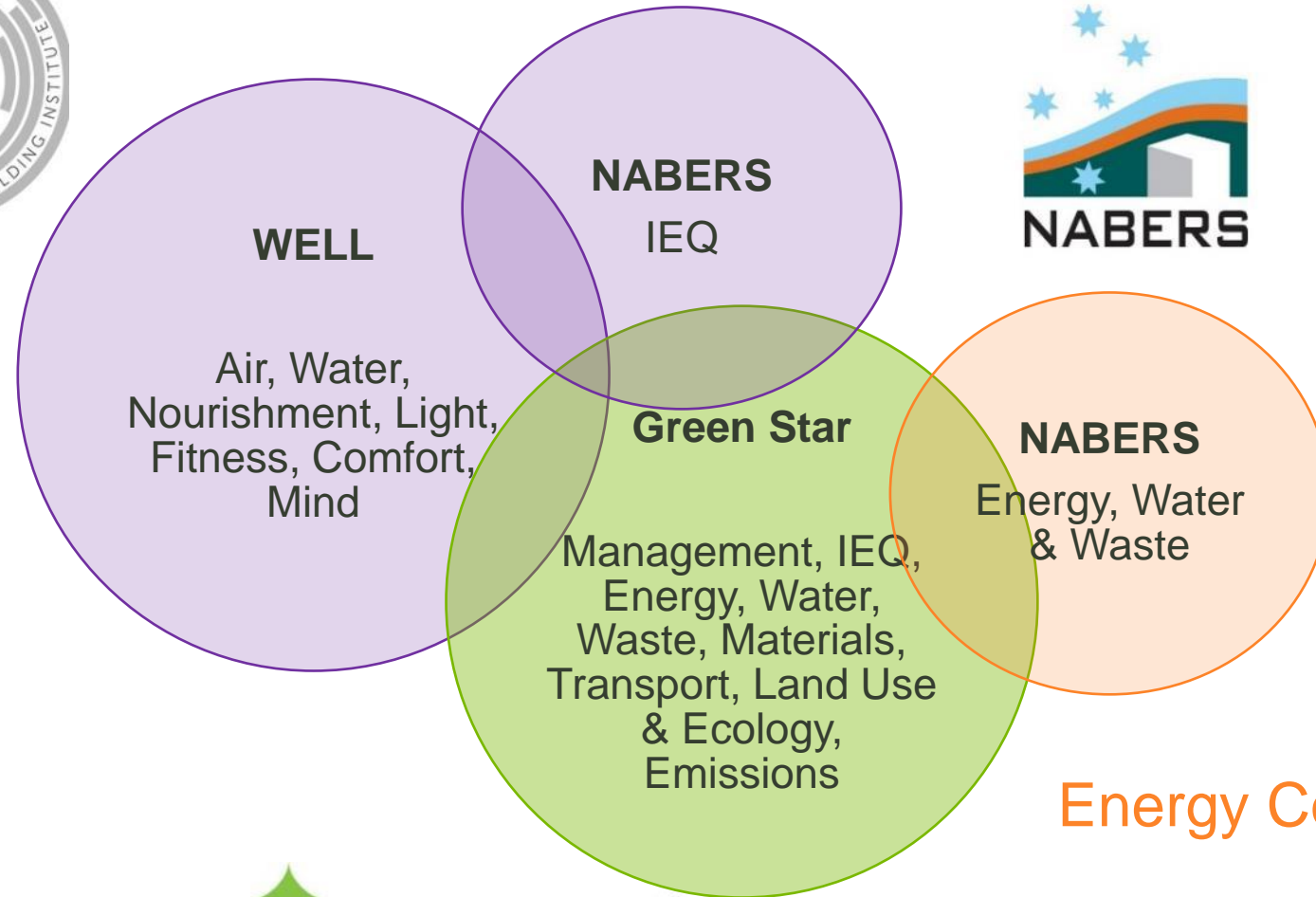


WELL GREEN

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Staff Costs: 90%



Energy Costs: 1%



Green Star & WELL

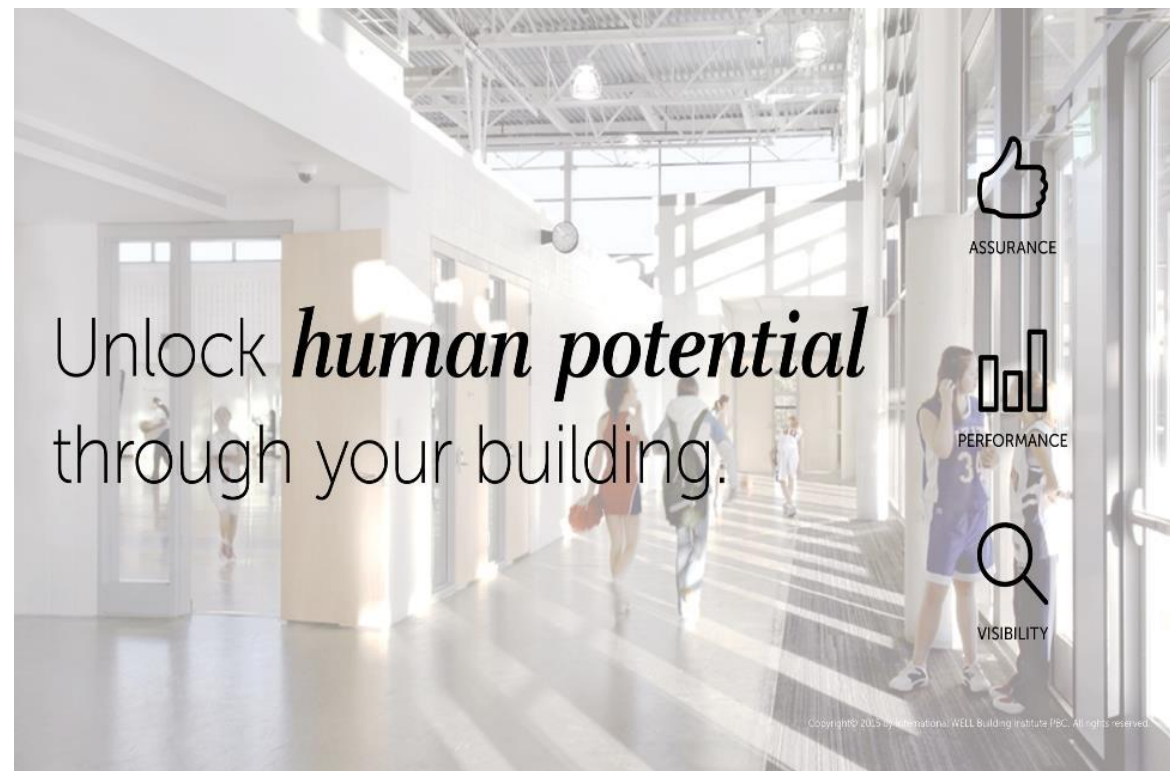
About 25% of Credits are common

- **Acoustics** → Exterior noise intrusion and Mechanical Equipment Sound Levels)
- **Daylighting** → Daylighting across the floor plate
- **Views** → Distance to façade and views to the exterior
- **Glare** → Glare minimisation from lighting and direct sun
- **Thermal Comfort** → ASHRAE Comfort Standards
- **Ventilation & Air Quality** → Ventilation effectiveness, construction pollution management, increased ventilation, direct source ventilation
- **Lighting Systems** → Lighting levels, zoned lighting systems, CRI, low glare,
- **End of Trip Facilities** → Bike Parks, Showers & Lockers
- **Construction Practices** → Commissioning, Airtightness Testing, Duct Protection
- **Materials** → VOCs in paints, sealants, adhesives and flooring and ban in use of hazardous materials

The GBCA and IWBI are partnering to deliver Green, Healthy Buildings in Austr

Conclusions

- Green building performance influences building's value
- Health, Well Being and Productivity is the Next Chapter in Green Buildings
- The WELL Building Standard is creating great interest because of its focus on creating healthy and productive workplaces for building occupants
- Designed to complement other rating systems such as Green Star
- The on-site assessment & independent testing ensures that workplaces remain healthy
- We need to adapt our buildings to provide conditions that are closer to our natural Habitat
- In a WELL certified building Going to Work can make you healthier
- In the fight for talent, having a certified WELL rated building will be an attractor



Thank you
For further information contact

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