

Early value cases for sustainable office buildings



David Fullbrook
e Cubed Building Workshop
www.e3bw.co.nz

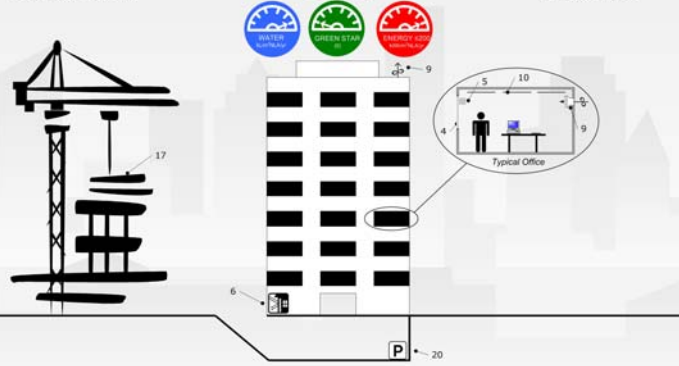
Brief for study from MfE

- Provide short sharp value cases for a MfE Cabinet Paper recommending appropriate Green Star NZ for new leased government buildings
- Develop 4,5 and 5+ star models. 5+ to include a 10% renewable component. Used Green Star NZ pilot
- Use real cost data wherever possible (2006)
- Include both hard and soft cost considerations
- Use a conservative and justifiable method of assessing cost benefits in accordance with existing Treasury guidelines
- Review findings with industry stakeholders

Value Case Development

- What started out as a simple focused study proved controversial with industry stakeholders mainly due to property economics
- However the negative feedback improved the study considerably.
Particular thanks to NZGBC, Georgia Myers and Peter Dow

FIGURE 3 – Standard Non-Rated Office DESIGN



- 1. No Transport Measures
- 2. Intelligent Controls
- 3. Sleep Room with Little Daylight
- 4. Performance Single Glazing
- 5. Blinds
- 6. Code Insulation
- 7. Tensile Exhaust Riser
- 8. Fan Coil System
- 9. Minimum Code Outdoor Air Rates
- 10. TS Lighting with Bulk Switching
- 11. Large Control Zones
- 14. Standard Fittings
- 15. Standard Paints
- 16. Standard Ceiling Tiles
- 17. Standard Trimmer
- 18. Breakroom Carpet
- 19. Integrated Fibout
- 20. Small Car Parking

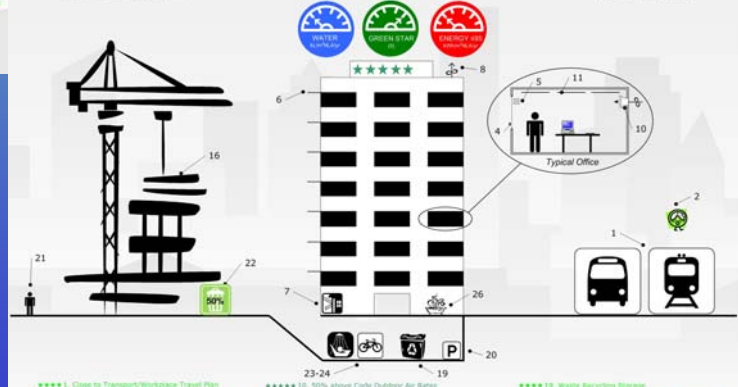
Developing the value case models

FIGURE 4 – 5 Star Office DESIGN



- 1. Close to Transport/Workplace Travel Plan
- 2. SMS with Energy & Water Metering
- 3. David Plan Form
- 4. High Performance Double Glazing
- 5. Blinds
- 6. Best Practice Sunshades
- 7. Better Insulation
- 8. Tensile Exhaust Riser
- 9. Low Flow VAV or Chilled Beam HVAC System
- 10. 50% above Code Outdoor Air Rates
- 11. TS Lighting with Dimming
- 12. Small Control Zones
- 13. AAAA Fittings & Waterless Urinals
- 14. Water Based Paints
- 15. Recycled Ceiling Tiles
- 16. Sustainable Trimmer
- 17. Recycled Face & Back Carpet Tiles
- 18. Integrated Fibout
- 19. Waste Recycling Storage
- 20. Small Car Parking
- 21. Environmental & Commissioning Management
- 22. Waste Room/roomless
- 23. Showers
- 24. Bike Parks
- 25. Roof Water Recycling (70%)
- 26. Solar Water Heating (30%)

FIGURE 5 – 5 Star Office DESIGN

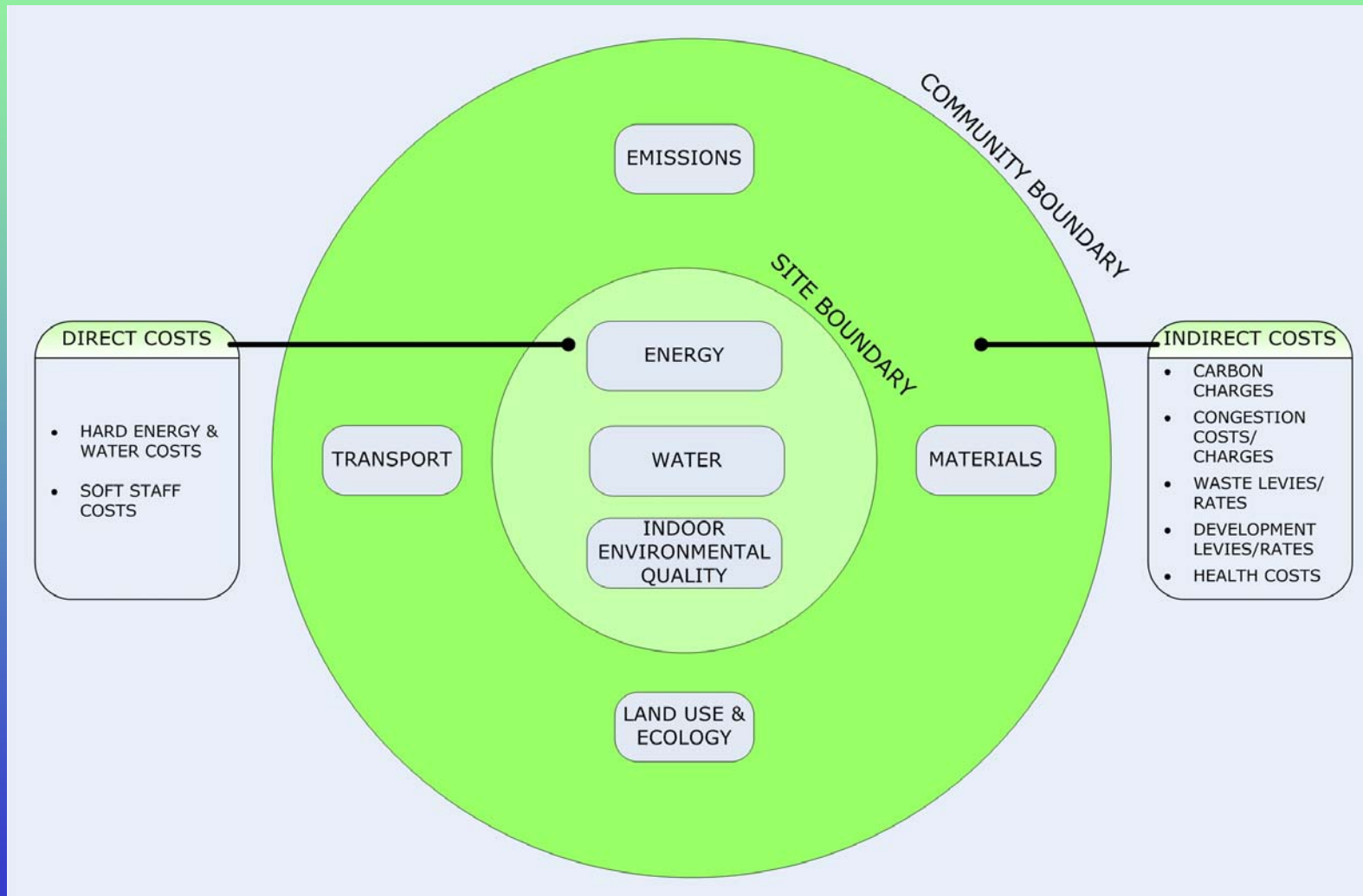


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Looking at the apportionment of value to the Green Star tool

GREEN STAR NZ OFFICE DESIGN V1 - PRINCIPAL VALUE ALLOCATION					
Category	Title	Credit No.	Shared Community Value	Building Owner Value	Tenant Value
Management	Green Star Accredited Professional	Man-1	Reduced greenhouse gas emissions, waste and environmental impacts	•	
	Commissioning - Clauses	Man-2		•	•
	Commissioning - Building Tuning	Man-3		•	•
	Commissioning - Commissioning Agent	Man-4		•	•
	Building Users' Guide	Man-5			•
	Environmental Management	Man-6		•	
	Waste Management	Man-7		•	
Indoor Environment Quality	Base Ventilation Rates	IEQ-1	Health and productivity benefits	•	•
	Ventilation Rates	IEQ-2			•
	Air Change Effectiveness	IEQ-3			•
	Carbon Dioxide Monitoring and Control	IEQ-4			•
	Daylight	IEQ-5			•
	Daylight Glare Control	IEQ-6			•
	High Frequency Ballasts	IEQ-7			•
	Electric Lighting Levels	IEQ-8			•
	External Views	IEQ-9			•
	Thermal Comfort	IEQ-10			•
	Individual Comfort Control	IEQ-11			•
	Internal Noise Levels	IEQ-12			•
	Volatile Organic Compounds	IEQ-13			•
	Formaldehyde Minimisation	IEQ-14			•
	Tenant Exhaust Riser	IEQ-15			•
Energy	Energy	Ene-1	Reduced greenhouse gas emissions and infrastructure demands	•	•
	CO ₂ Emissions	Ene-2		•	•
	Electrical Sub-Metering	Ene-3		•	•
	Tenancy Sub-Metering	Ene-4		•	•
	Office Lighting Power Density	Ene-5			•
	Office Lighting Zoning	Ene-6			•
	Peak Energy Demand Reduction	Ene-7		•	•
Transport	Provision of Car Parking	Tra-1	Reduced congestion, pollution and greenhouse gas emissions. Health and productivity benefits	•	
	Small Parking Spaces	Tra-2		•	
	Cyclist and Foot Commuter Facilities	Tra-3			•
	Commuting Public Transport	Tra-4		•	•
Water	Occupant Amenity Potable Water Efficiency	Wat-1	Reduced water and waste water treatment and infrastructure demands	•	•
	Water Meters	Wat-2		•	•
	Landscape Irrigation Water Efficiency	Wat-3		•	•
	Cooling Tower Water Consumption	Wat-4		•	•
Materials	Recyclables Storage	Mat-1	Cleaner production processes, reduced pollution, resource use reduction, waste and greenhouse gas emissions	•	
	Re-use of Façade	Mat-2		•	
	Reuse of Structure	Mat-3		•	
	Shell and Core or Integrated Fitout	Mat-4		•	
	Recycled Content of Concrete	Mat-5		•	
	Recycled Content of Steel	Mat-6		•	
	PVC Minimisation	Mat-7		•	
	Sustainable Timber	Mat-8		•	
	Carpet	Mat-9		•	
	Paint	Mat-10		•	
	Thermal Insulation	Mat-11		•	
	Non-Carpet Floor Coverings	Mat-12		•	
Land Use & Ecology	Ecological Value of Site	Eco-1	Reduced urban sprawl, protection of ecological value and biodiversity	•	
	Re-Use of Land	Eco-2		•	
	Reclaimed Contaminated Land	Eco-3		•	
	Change of Ecological Value	Eco-4		•	
	Topsoil and Fill Removal from Site	Eco-5		•	
Emissions	Refrigerant ODP	Emi-1	Reduced greenhouse gas emissions, ozone depletion, watercourse pollution, infrastructure demands, light pollution and health benefits	•	
	Refrigerant GWP	Emi-2		•	
	Refrigerant Recovery	Emi-3		•	
	Watercourse Pollution	Emi-4		•	
	Reduced Flow to Sewer	Emi-5		•	
	Light Pollution	Emi-6		•	
	Cooling Towers	Emi-7		•	

Distinguishing between Direct and Indirect Costs



Green Building Benefits

- Operating Costs
 - Space/Facilities Costs
 - Staff Costs
 - Branding
 - Indirect Costs
- Hard cost savings
- 
- 
- Soft cost savings
 - Beyond The site Boundary

Value Case from Building Owners Perspective

Averaged Capital Cost Investment

4 star prime building

6.5%

5 star landmark building

6.3%

Averaged Payback

**4 star prime building
8.6yrs**

4.1 to

**5 star landmark building
8.8yrs**

2.9 to

Averaged 20 year NPV

**4 star prime building
capital**

**1.5 x initial
investment**

**5 star landmark building
capital**

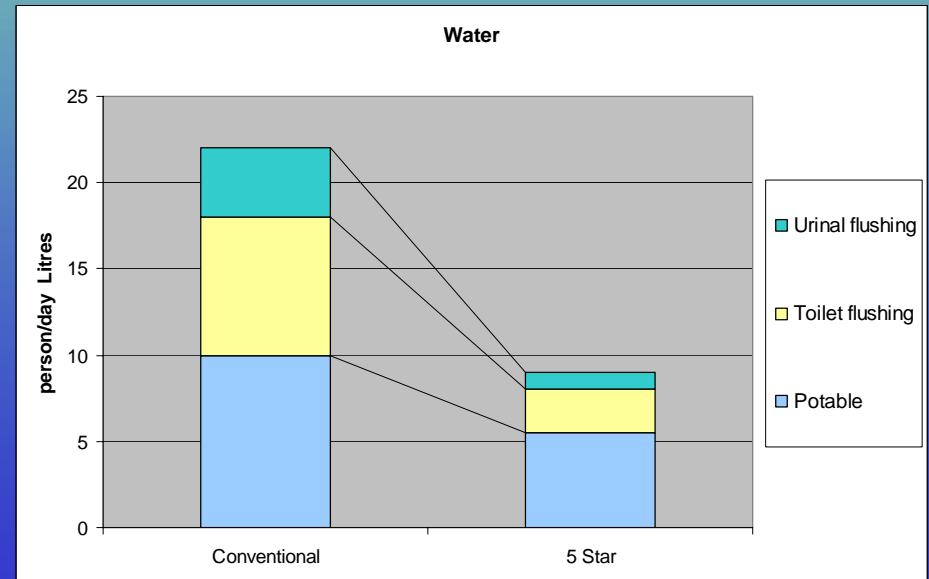
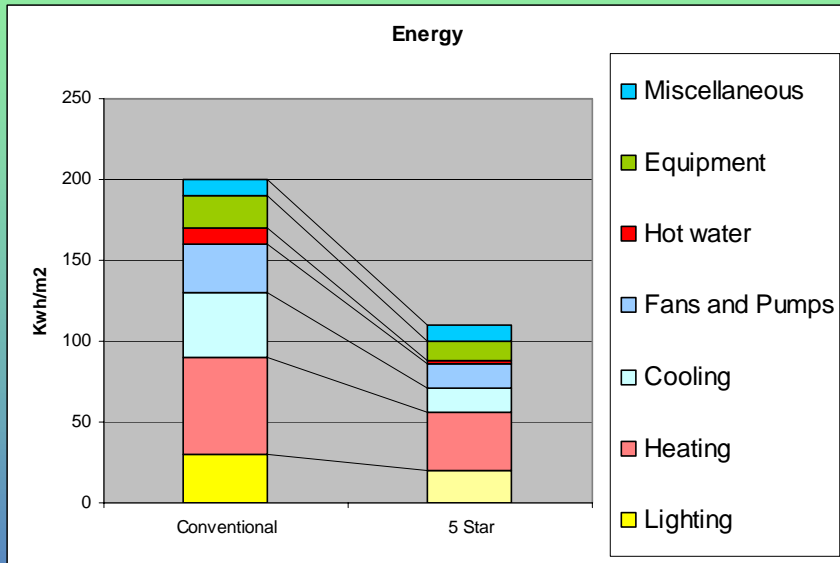
**2.5 x initial
investment**

Building Owner/ Developer Benefits

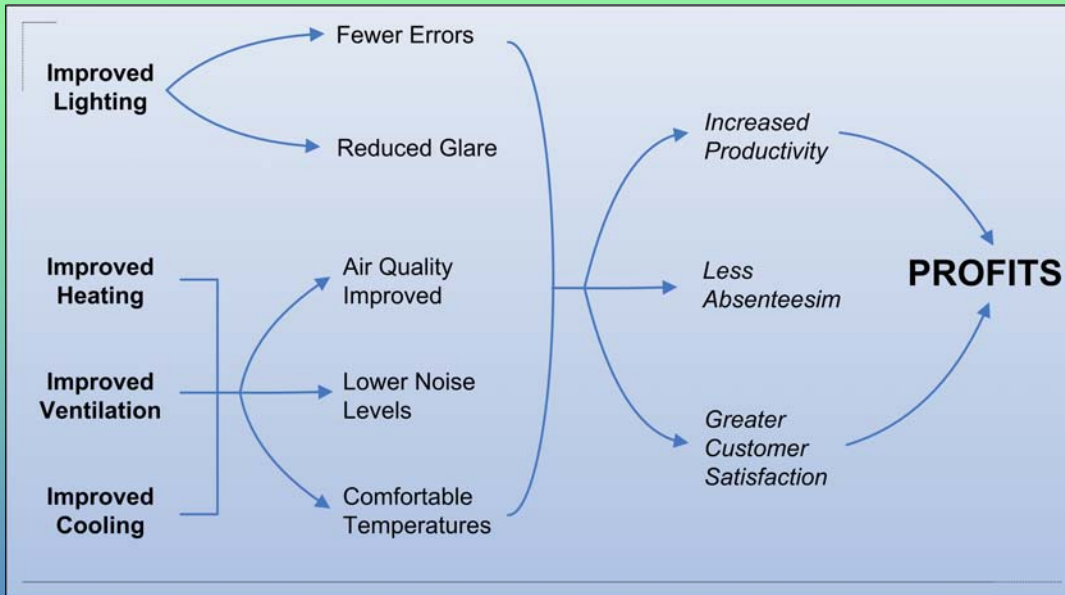
- Marketing advantage due to point of difference
- A faster lease up period
- Higher tenant retention rates due to increased tenant satisfaction
- Higher building value upon appraisal and sale
- Greater future-proofing of asset base

Value Case from Tenant Perspective

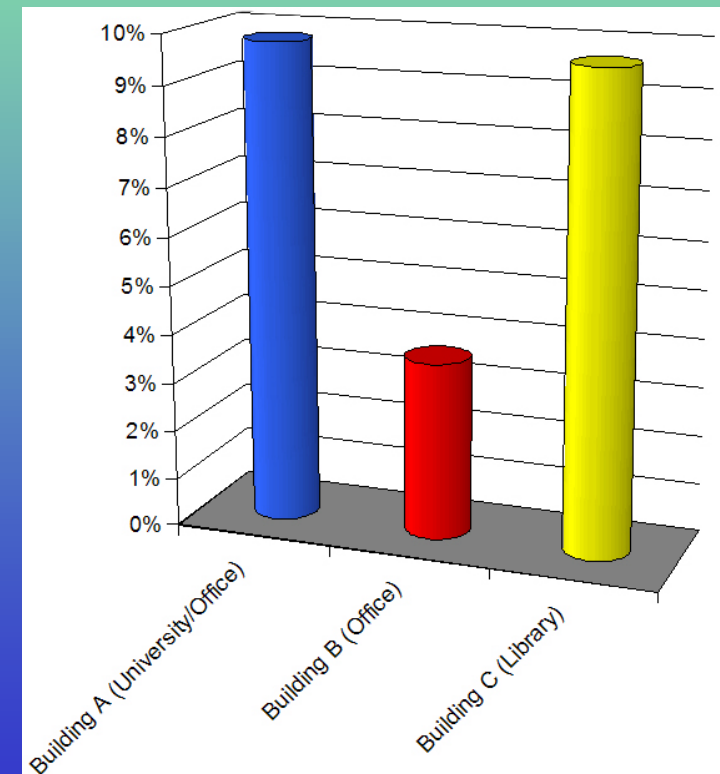
Hard Operating Cost Benefits



Soft Costs - Productivity Benefits

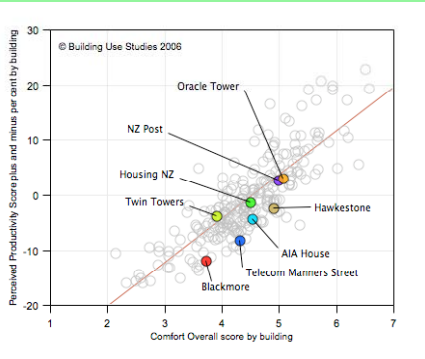


Workplace effectiveness can have a +/- 5 to 15% effect on productivity



Soft Benefits Analysis

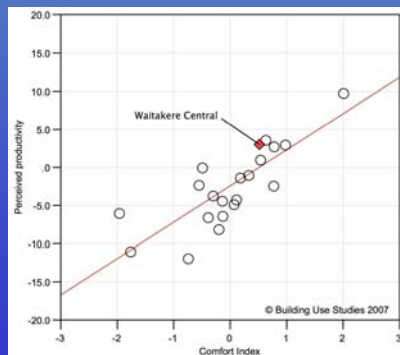
Pre



Design

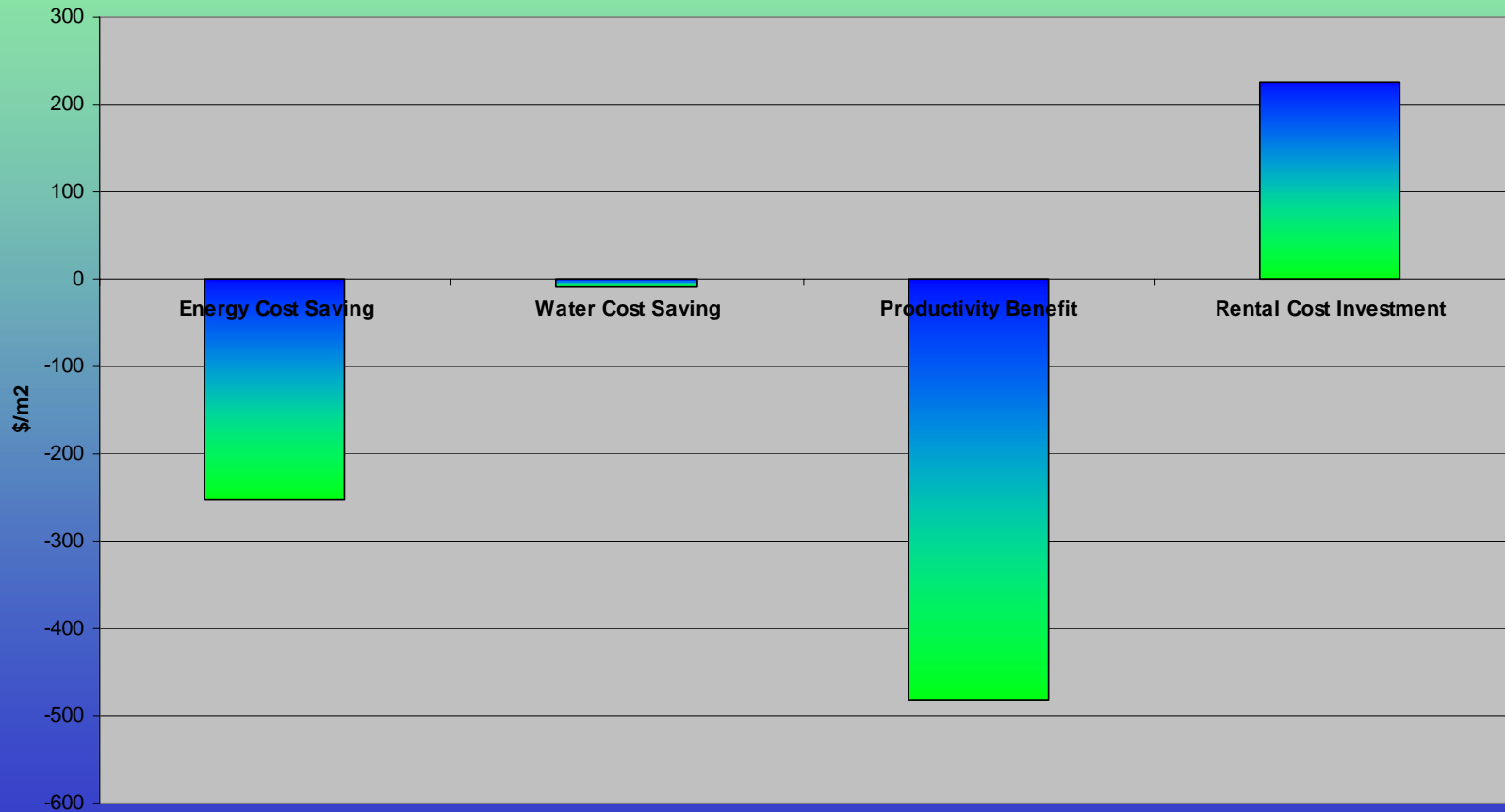
- IEQ Design Analysis Tool developed by e3BW as a research project over the last 3 years
- Combines modelling and attributes analysis
- Has 80 attributes compared to Green Stars 15. Attributes being continuously refined and the tool is being calibrated using real POEs
- Used as a rating tool between pre and post occupancy evaluations at the design stage
- IEQ analysis and productivity assessment is applied to approximately 10 % of the averaged salary cost which represents non-productive element of salary

Post



Offices 20 Year Present Values of Costs and Benefits

20 Year Present Values



Averaged Rental Cost Investments

4 star prime building
3.3%

5 star landmark building
3.9%

As a percentage of net rental

Averaged Total Occupancy Cost Savings

4 star prime building
5.5%

5 star landmark building
9.0%

As a percentage of net rental

Tenant Benefits

- Reduced total occupancy costs. (rental, operating costs including energy, water and maintenance and staff costs)
- Improved staff satisfaction due to improvements in workplace environment, connectivity, amenity and workplace identity
- Reduction in churn costs due to increased building flexibility and open plan configuration
- Increased occupancy density compared to existing premises due to greater open plan configuration and floor plate efficiency
- Alignment with tenant sustainability goals

Tenant Benefits

- A 40-52.5% reduction in energy use and costs and a 52-57% reduction in water use and costs.
- A soft cost/productivity benefit of 0.5-0.8% % of the average salary cost.

Workplace Expression and Branding

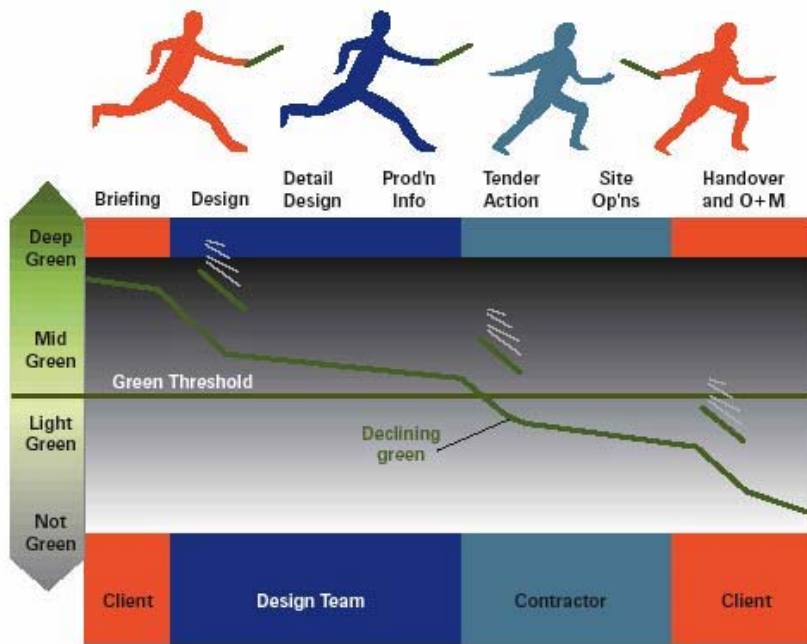
- Impossible to quantify
- However a 2003 survey by the Management Today magazine found 94% of respondents regarded their place of work as a symbol of whether they were valued by their employer
- Post occupancy evaluations have carried out by e3BW green buildings suggest a high level of user satisfaction and an identifiable 'forgiveness factor'

Value Case from Community Perspective

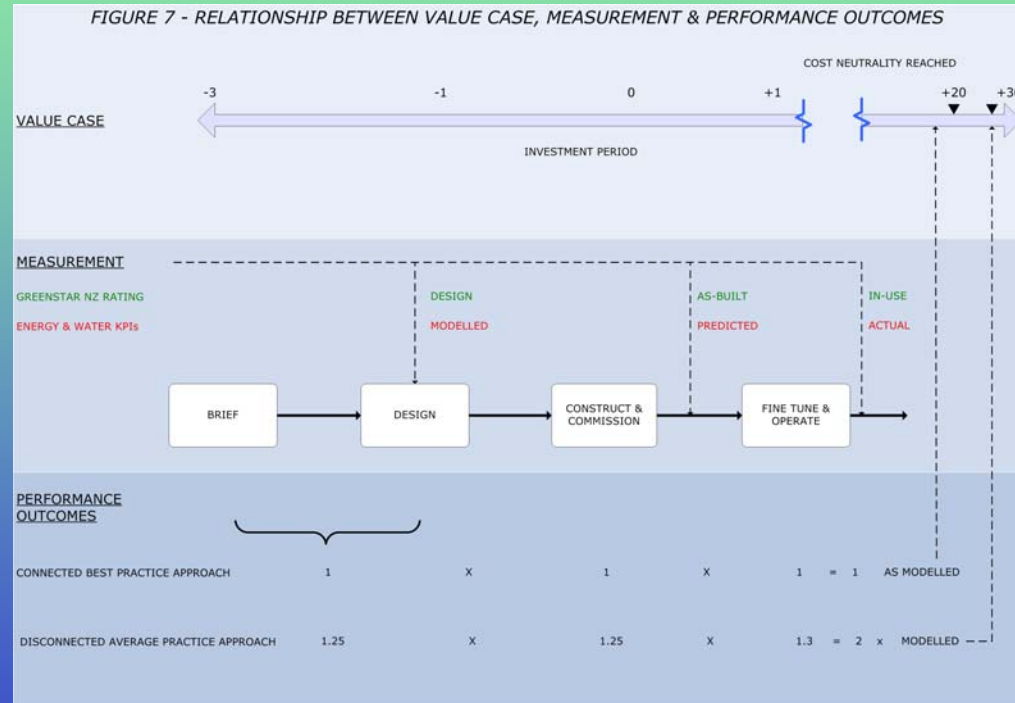
Indirect Environmental Costs

- For every dollar spent on a building there are 20c to 1 dollar of indirect cost beyond the site boundary
- Stern report - Potential 5 – 20% of global GDP lost each year due to costs and risks of climate change
- Global costs of natural disasters aggravated by climate change could double to 150 billion euros per year in ten years. Insurance cost equivalent to a world trade centre attack every year. (Source Swiss Re.)
- The draught induced electricity shortage of 1992 caused a drop in GDP of 1.5%. (Source NIWA).The 1997-Canterbury draught cost the New Zealand economy \$618m or 0.9% GDP. (Source Greenpeace)
- In New Zealand the flooding and storms of 2004 cost over \$400m. (Source Greenpeace)
- Current Treasury estimate of NZ Kyoto liability \$567m and rising.
- Waste due to NZ construction - \$80m per annum
- Environmental impacts of road \$1.4b in 1996

Maintaining value – a connected process



...Once dropped its is difficult to pick up again and regain lost ground



Building Owner and Tenant Partnering



- There's inevitably a vacuum at handover
- Form Building Management Committee
- Implement operational environmental management plan
- User and FM guidance is important
- Manage outcomes together

Commercial terms and green leases

- A semi gross lease with a 'green lease schedule probably represents the best value for tenants
- Should require agreed green star rating and associated performance targets are met and total occupancy costs are not exceeded
- Needs to include a simple mechanism/formula for adjustment of targets for climatic effects and use of the building
- First year may not be representative, so there needs to be some flexibility.
- Needs some tolerance and a progressive implementation period
- Needs to be fair to both parties or will be regarded as a penalty by the building owner.

Raising the bar



Evidence from the US suggests the average cost investment for green buildings is 2%, down from 5 to-15% just a few years earlier as the market stabilizes and the bar is raised

2007 Property Council Awards Announcement



- Announcement that all new Government leased office accommodation to be NZGBC rated to 4/5 Star standard.
- Central government uses approximately 0.9million m² of space
- Green office buildings feature significantly in the awards