

Tuesday, November 08, 2011

Green buildings for health, wellbeing & productivity

Local case study – Nedbank green buildings

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Occupant wellbeing and effectiveness



Q. Why should GreenStar rating systems be interested in occupant wellbeing and effectiveness?

Ongoing costs related to occupants (particularly employees - for office rating tools) quickly exceed the costs of the building

Any savings in occupant costs or improvements in work performance quickly translate into financial arguments

Assessing occupant wellbeing and effectiveness is one measure of the effectiveness of your building (and can quickly become more important than savings in electricity, water, etc.)

Nedbank green buildings



Phase II building, Sandton
GreenStar Rating: ★★★★★
Obtained: Oct. 2009 (design),
Sept. 2010 (as built) 46 pts



Umhlanga Ridgeside
GreenStar Rating:
★★★★★
Obtained: Sept. 2010
(design) 55 pts



Menlyn Maine Falcon building,
Pretoria
GreenStar Rating: ★★★★★
Obtained: Sept. 2011 (design)
56 pts

Indicators of employee wellbeing and effectiveness



1. Productivity (effectiveness)

(a) direct measures (work performance, sales turnover, work quality, customer satisfaction)

(b) indirect measures (perceived productivity, manager ratings, job satisfaction, absenteeism, employee retention, operating costs, insurance/medical costs)

2. Human Resource Development (wellbeing)

(a) physical health (directly through physical fitness or indirectly through environmental conditions)

(b) psychological wellbeing

(c) perceptions of quality of physical environment



(d) employee turnover and absenteeism

3. Stakeholder relations (effectiveness)

improved public image, community outreach, social responsibility indices

Popular measures of Post Occupancy Evaluations



Measure	Positives 	Negatives 
Building User Survey (BUS), York, UK	Outputs and comparisons easy to read Database for benchmarking	Commercial product with costs to use Focuses on comfort and satisfaction with physical environment
Centre for the Built Environment (CBE), UC Berkeley, USA	Outputs and comparisons easy to read Database for benchmarking	Commercial product with costs to use Focuses on comfort and satisfaction with physical environment

Measures for Nedbank study



- All freely available online with independent validation
- Warwick-Edinburgh Mental Well-Being Scale (WEMBS): 14 items, good reliability, good criterion-related validity (Tennant *et al.*, 2007)
- Sick Building Syndrome scale: 15 items assessing physical well-being, 14 items assessing work environment (Hedge *et al.*, 1996)
- Job satisfaction: 1 item (Wanous *et al.*, 1997)
- Intention to stay in the organisation, 4 items (Carlopio, 1996)
- self-reported absenteeism: N days sick leave
- self-reported presenteeism: N days at work despite being ill because you felt you had to (Biron *et al.*, 2006)
- self-reported productivity: how well have they been working over the last month (0-100%)
- Company image: 4 items, self-developed, organisation's sustainability image

Designing an evaluation



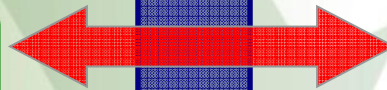
BUILDING IS OCCUPIED

**Classic POE on
green building**

Designing an evaluation



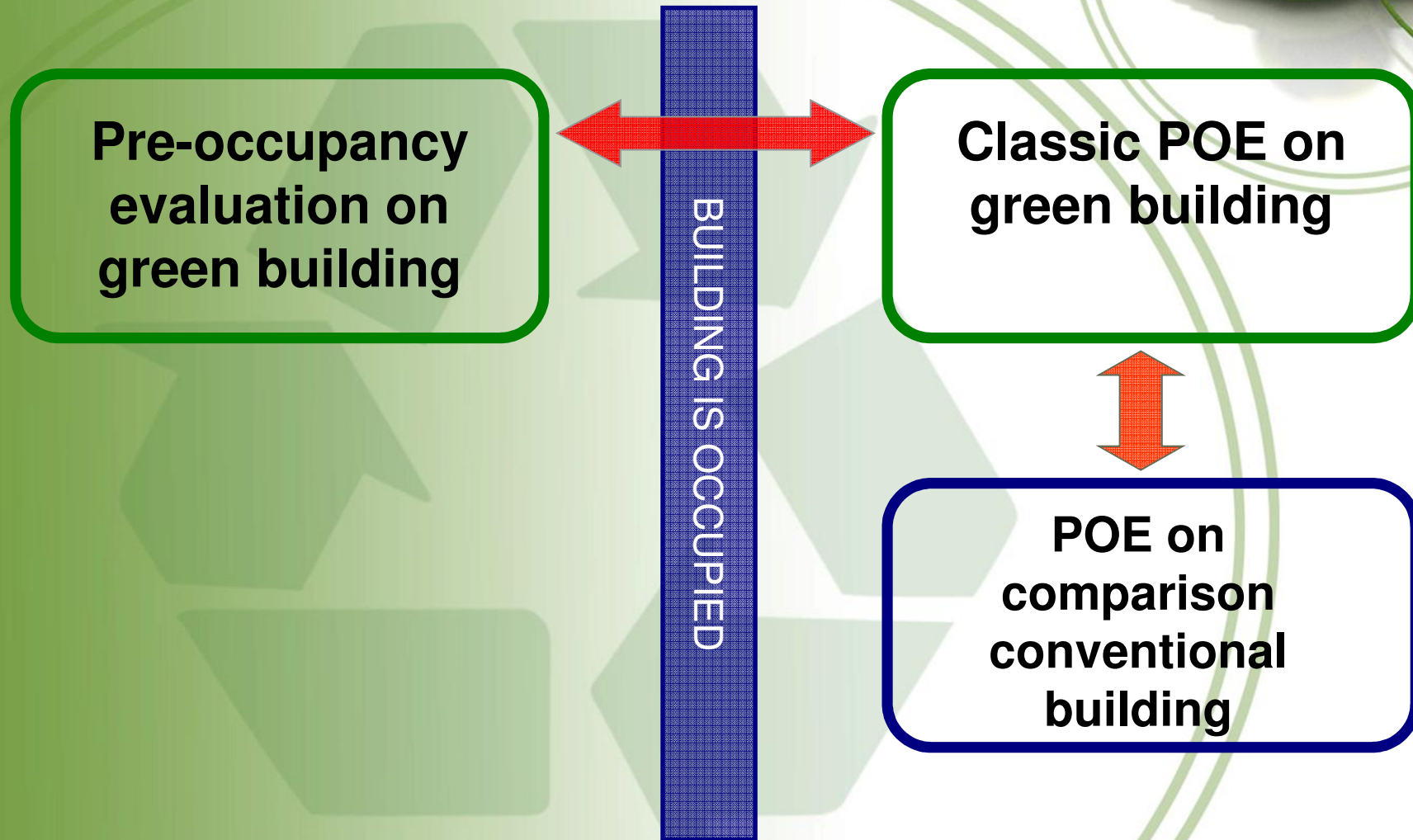
**Pre-occupancy
evaluation on
green building**



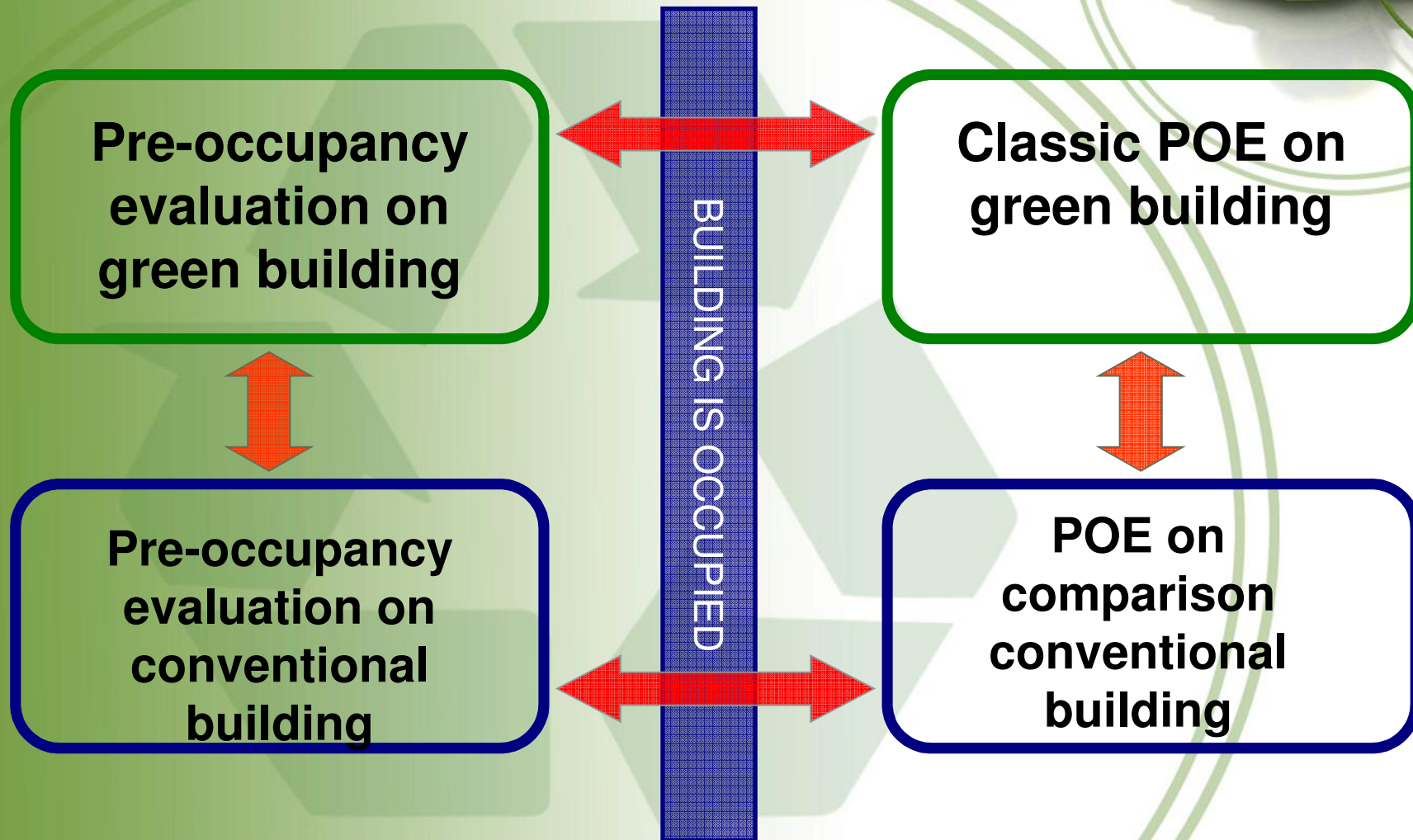
BUILDING IS OCCUPIED

**Classic POE on
green building**

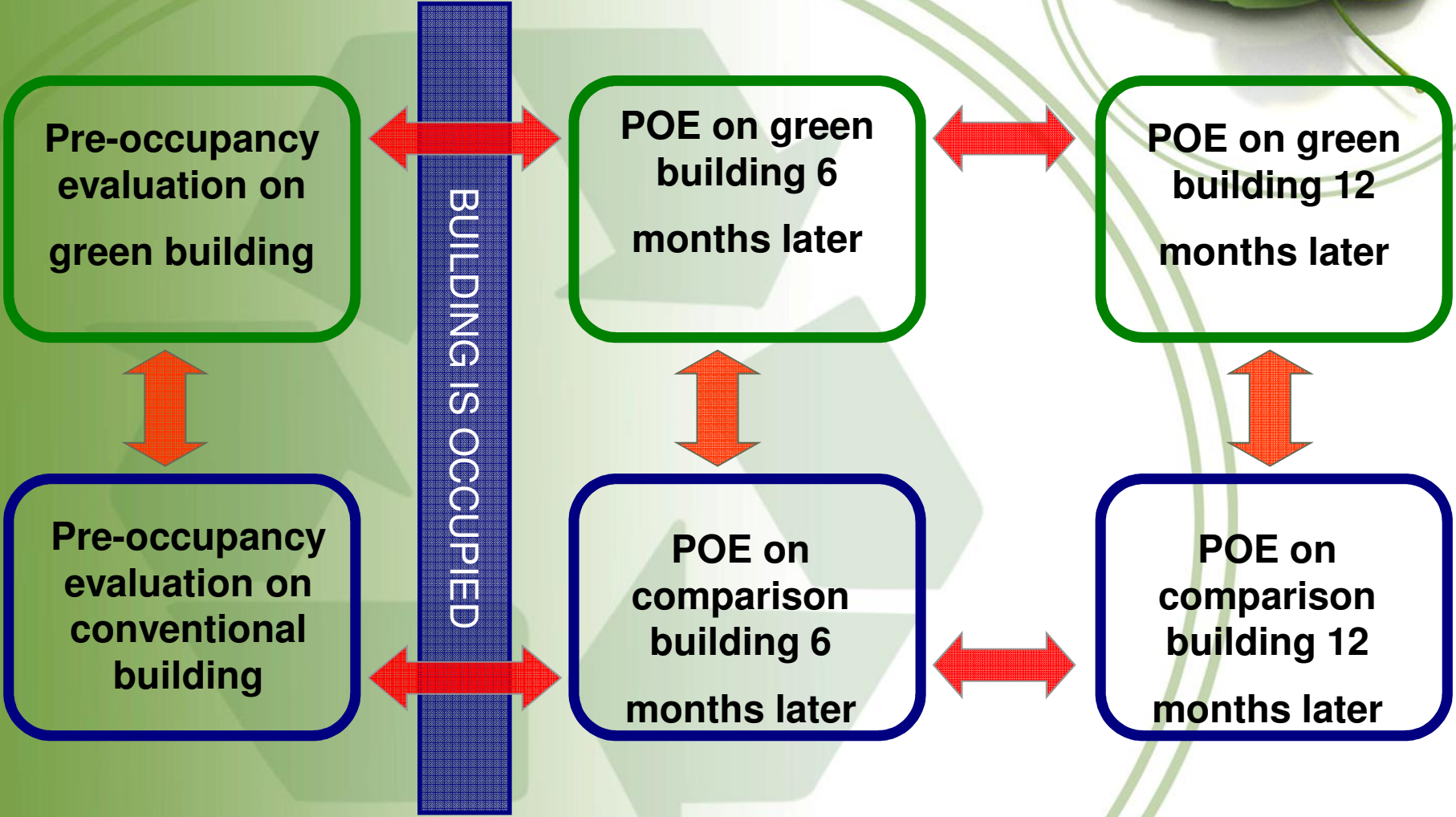
Designing an evaluation



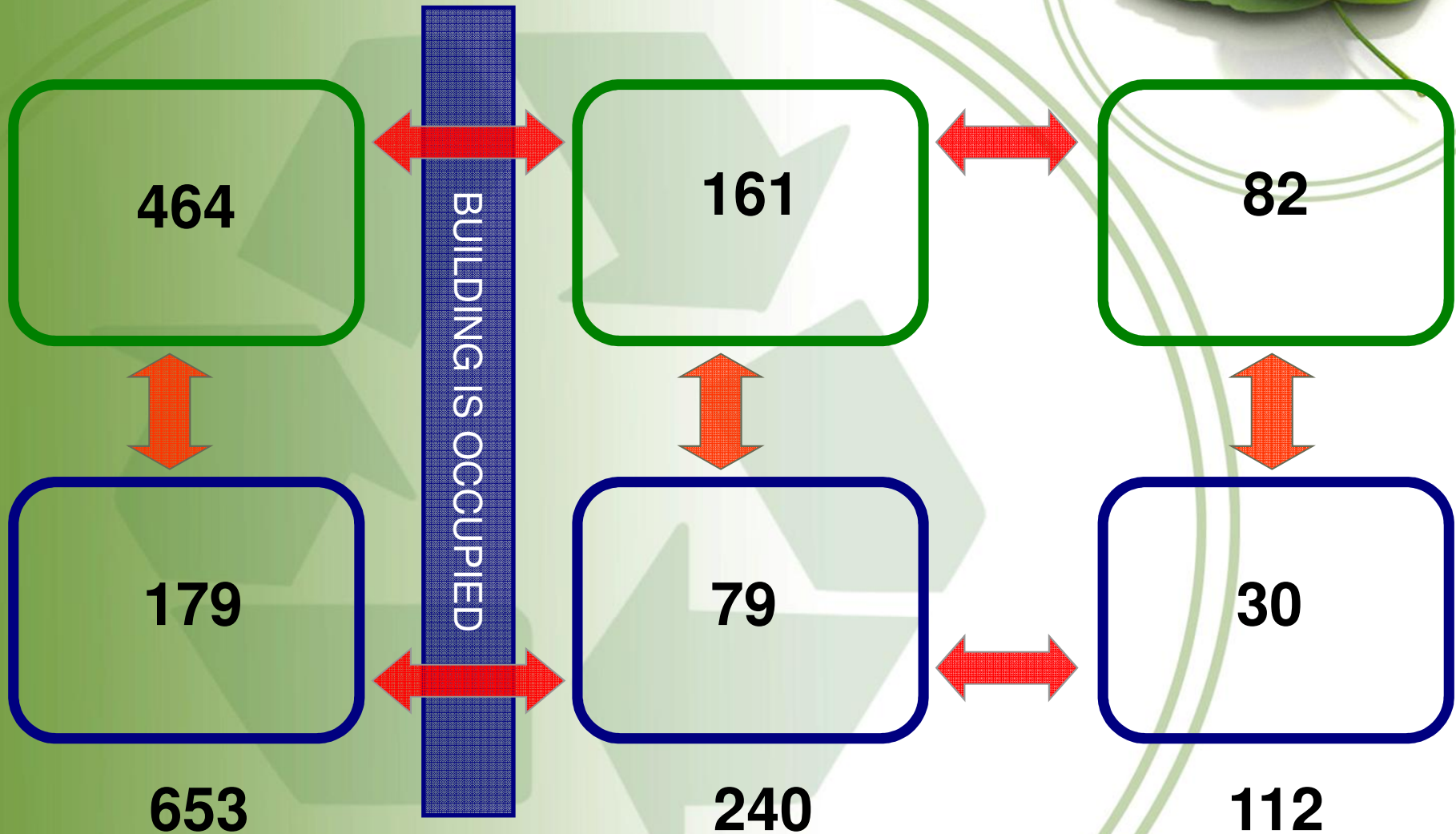
Designing an evaluation



Nedbank study design



Problems in sample drop-off



Results Nedbank Phase II



	T1 to T2	T1 to T3
Psychological wellbeing	➡	➡
Physical wellbeing	➡	➡
Job satisfaction	➡	➡
Propensity to stay	➡	➡
Absenteeism	➡	➡
Presenteeism	⬇	➡
Physical work environment	➡	➡
Company image	➡	➡
Perceived productivity	➡	➡

Other buildings: ➡
Green buildings: less dusty

Results Umhlanga Ridgeside



	T1 to T2
Psychological wellbeing	
Physical wellbeing	
Job satisfaction	
Propensity to stay	
Absenteeism	
Presenteeism	
Physical work environment	
Company image	
Perceived productivity	

Other buildings:

Green buildings: better ambient temp., less noisy, less dusty, better air movement and ventilation

Lessons learned



- Occupant wellbeing and effectiveness take time to have an impact (\pm 12 months or longer)
- Just making a building green doesn't automatically confer improved occupant wellbeing and effectiveness ("it is how you make it green" i.e. it's all about **design**)
- Issues of daylight, use of outside air, and aspects of personal control of environment important design components
- Future work: what aspects are psychologically restorative (e.g. outside views to natural settings, sense of personal control, connections with environment and other people)
- Improvements most likely where previous building was poor