



Landcare Research
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**THE UNIVERSITY
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BUSINESS SCHOOL

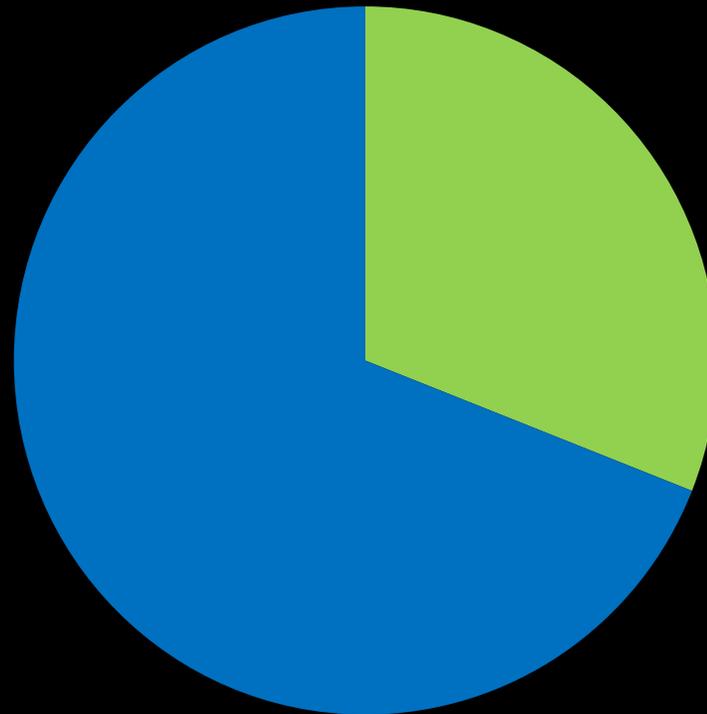


Green Building Business Plans: Will the market strike back and demand performance?

Jeremy Gabe
"The Future of Buildings"
NZSSES Forum, March 2011

Global Market Interest in Green Building

Firms in the global \$4.7 trillion construction market (pre-GFC)



'Largely to Fully Dedicated '
to Green Building

Source: McGraw-Hill Construction (2008)

Economic Motivations for Green Building

Inherently profitable for the owner; often easily monetised

INTRINSIC VALUE

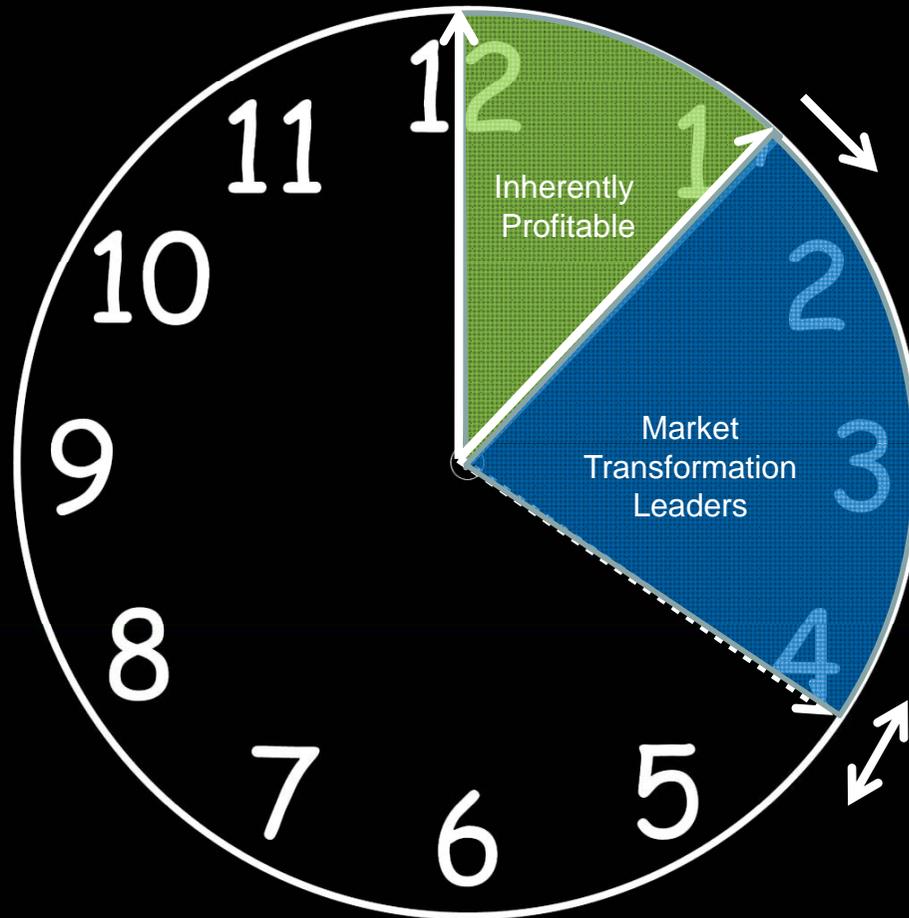
- **Reduced Costs**
- **Increased Revenue**
- **Reduced Risk**
- **Delayed Future Investment**

Credible market signal is the sole source of value

MARKET SIGNALLING VALUE

- **Qualification for Tax Credits**
- **Strategic Market Differentiation**
- **Perceived Legitimacy**
- **Delayed Regulatory Pressure**

The (Supply) Clock: Market Transformation in Action



- Polluter Pays Policies
- Increased Resource Scarcity

Research Question

How can accelerated market transformation begun by Green Building Councils be sustained (and perhaps grow)?

Objective: Examine risks to demand growth, particularly confidence in certification

- How does energy consumption variability affect the accuracy of LEED market signals?
- Model hypothetical changes to total credits obtained after adjusting for observed trends in measured energy savings (relative to potential savings).
- $N =$ First 450 LEED-certified buildings

Operational Energy Consumption in LEED Building Certification

% Cost Reduction (new/existing building)	15/5	20/10	25/15	30/20	35/25	40/30	45/35	50/40	55/45	60/50	>65/55
LEED credits	1	2	3	4	5	6	7	8	9	10	11

**11 LEED POINTS BASED ON SIMULATED ENERGY COST REDUCTIONS
(relative to regulatory-compliance baseline)**

REGULATED ENERGY
(space conditioning, hot water, lighting)

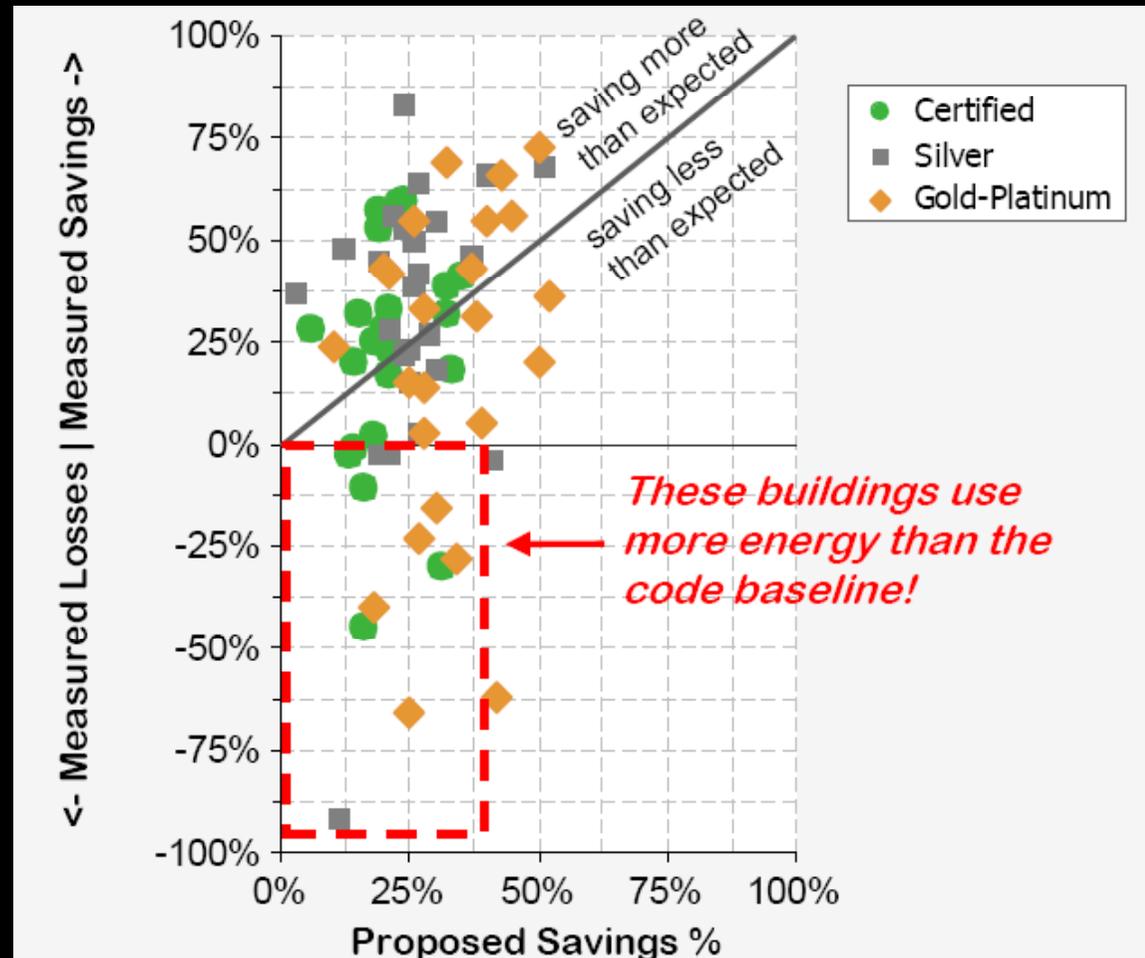
UNREGULATED ENERGY
(plug loads)

**Conventionally assumed (in the USA) as
25% of total building energy consumption**

Operational Energy Consumption in Certified Buildings: Intent (Potential) vs. Outcomes

ON AVERAGE,
MODELLED =
MEASURED; BUT
SINGLE BUILDING
SCALE SHOWS
LARGE VARIANCE

UNREGULATED
ENERGY
ASSUMPTION MAY
OVERSTATE
TOTAL ENERGY
SAVINGS IN-USE



Source: Turner and Frankel (2008)

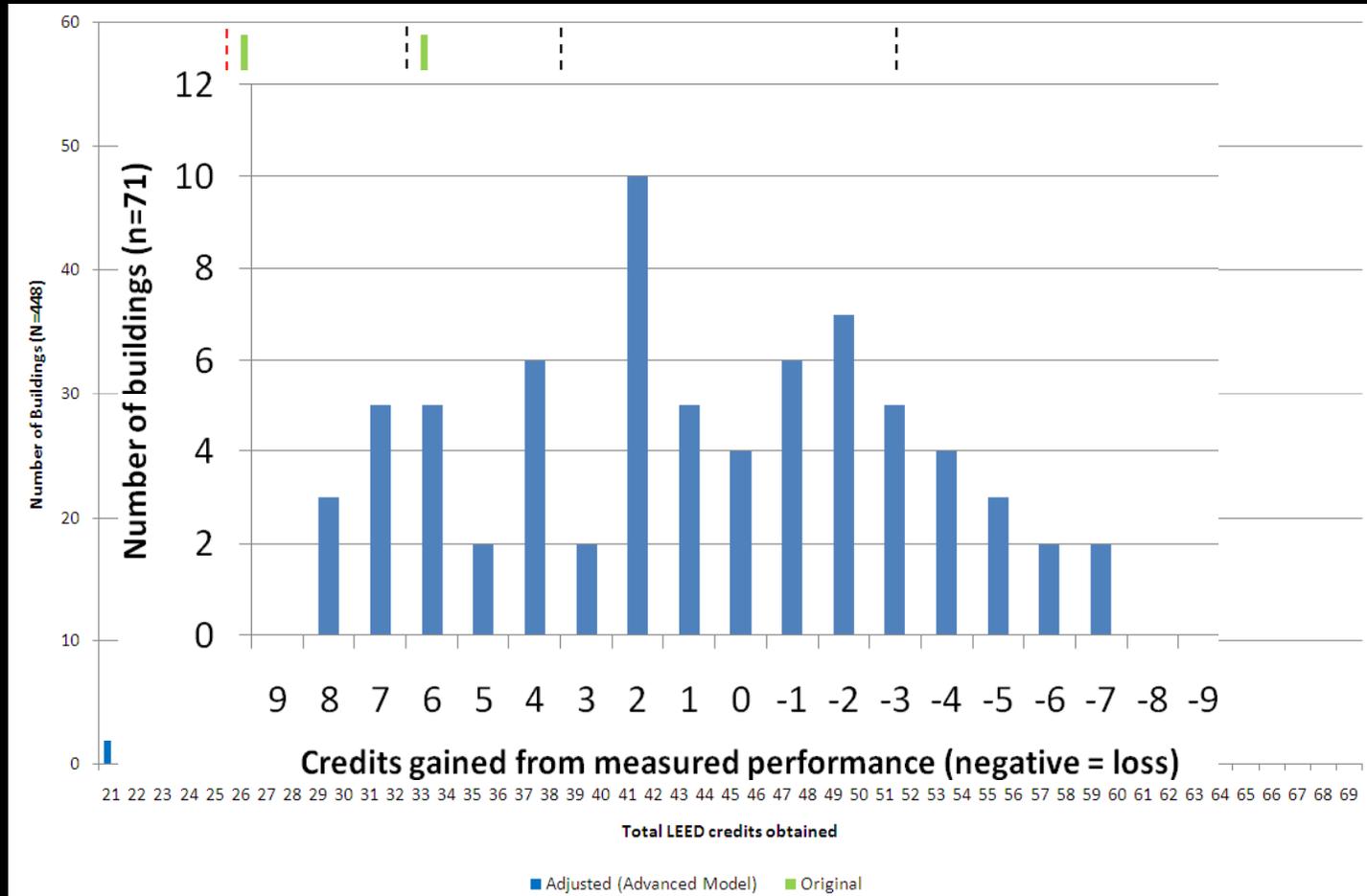
'Advanced' Model

ASSUMES
AMPLITUDE AND
DISTRIBUTION OF
OBSERVED
ENERGY
CONSUMPTION
VARIABILITY IS
REPRESENTATIVE
OF DATASET

94 BUILDINGS ARE
DEMOTED

46 BUILDINGS ARE
PROMOTED

IN TOTAL, 32% OF
BUILDINGS ARE
MISREPRESENTED
TO THE MARKET



'Simple' Model

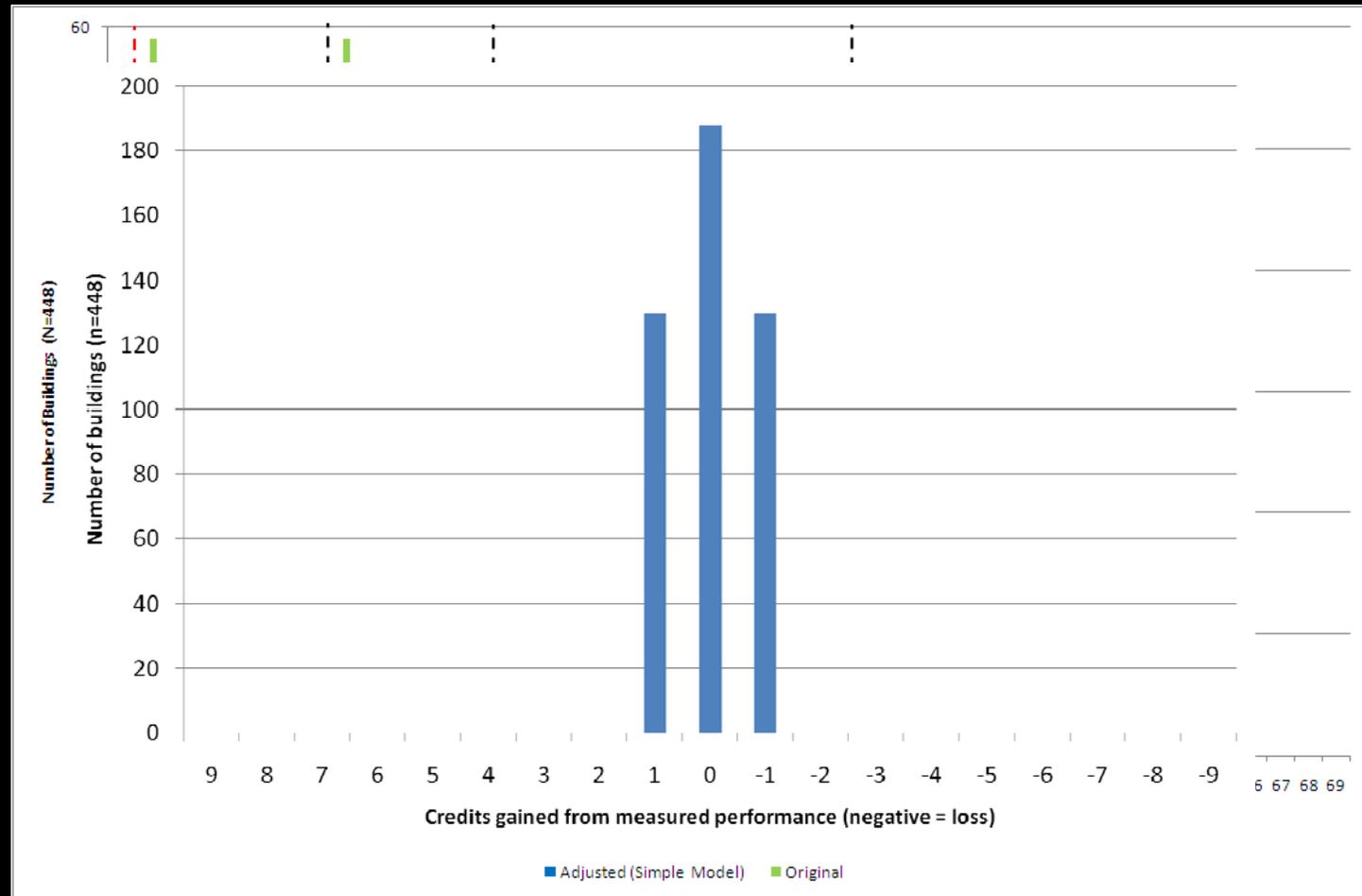
ACKNOWLEDGES
LIMITATIONS IN
TURNER AND
FRANKEL
COMPARISONS;
ASSUMES ENERGY
MODELLING
IMPROVES

**NORMAL
DISTRIBUTION OF
VARIABILITY
RETAINED, BUT
AMPLITUDE
LIMITED TO ONE
CREDIT
GAIN/LOSS**

61 BUILDINGS ARE
DEMOTED

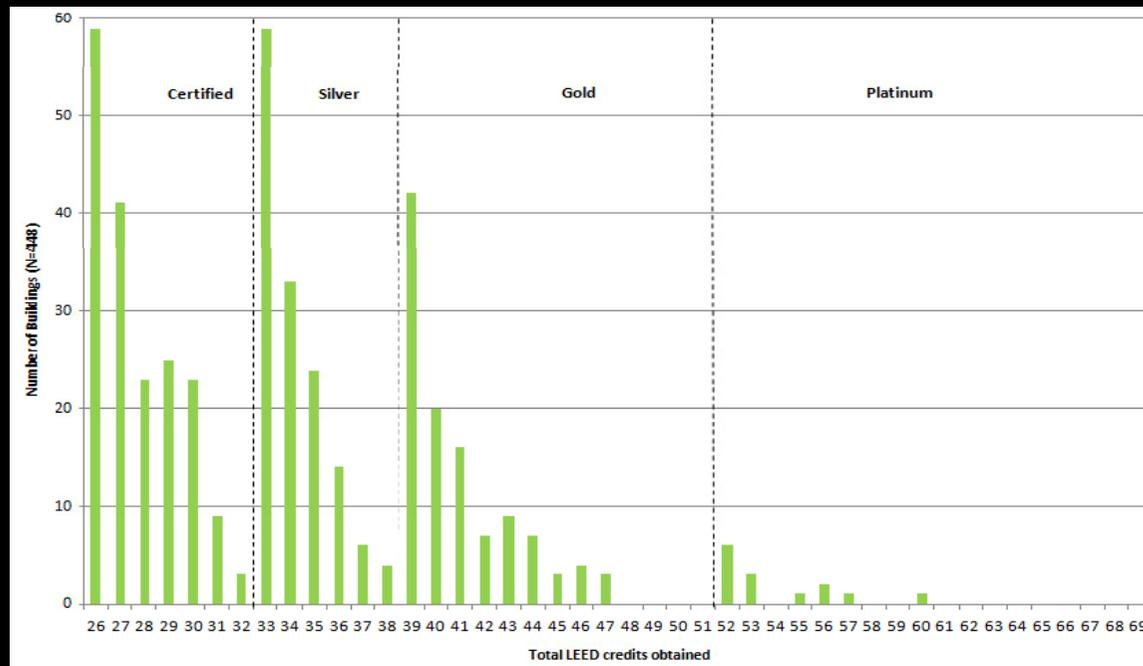
3 BUILDINGS ARE
PROMOTED

IN TOTAL, 15% OF
BUILDINGS ARE
MISREPRESENTED
TO THE MARKET



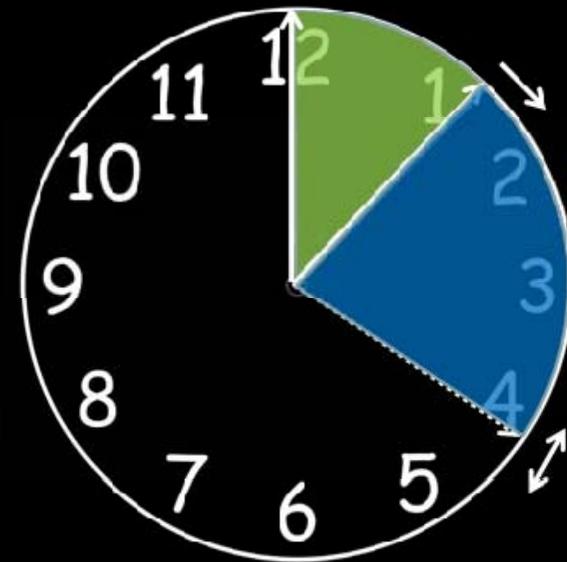
Conclusions

1. Perceived precision of green building certification thresholds disguises uncertainty in predicting resource consumption
2. Market participants leave little room for error; popularity of market signalling value in current framework creates risk



Conflict of Interest between LEED (Green Star) building owners and tenants seeking intrinsic benefits

- Owners prefer limited information disclosure & minimum responsibilities for performance
- Barrier to green lease terms
- Possibility of unrealised mutual benefits when tenants are willing to pay for improved performance



"DEMAND" CLOCK

The Future of Rating Tools: Performance Assessment

- Not measuring performance could risk market signal value
 - Current, not well informed, market: “innocent until guilty [of poor performance]”
 - Mature market aware of variability: “guilty until innocent”
- More room for continuous improvement than decline
 - Median building in Advanced Model = Gains 1 credit
 - Incentive for energy efficiency during minor retrofit projects
- Regulatory shift to performance disclosure
 - Australian Commercial Building Disclosure