2017 EIANZ ANNUAL CONFERENCE
Tu Kaha: Stand tall
Fronting up with wicked solutions

Environment Institute of Australia and New Zealand Inc.

Sustainability through collaboration: A controlled cross-sector study of collaboration for sustainability in Australian Manufacturing

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ACKNOWLEDGEMENTS

The author acknowledges the support of the Cumberland Business Chamber in western Sydney for the provision of catering and venues for the workshop program.

This research formed part of a Masters of Sustainable Development at Macquarie University and did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

INTRODUCTION

Collaboration between government, business, NGOs, civil societies and scientists is widely acknowledged as being necessary for the attainment of the UN Sustainable Development goals. These 17 goals and 169 indicators, agreed by world leaders in 2015, aim to address the "wicked" challenge of decoupling economic growth from energy use, material use and greenhouse gas emissions.

One such multi-organization collaboration and co-ordination group re-imagined the Port of Los Angeles as a "shared cargo transhipment system". The University of Southern California used dialogue and learning workshops to encourage collaboration by a group named the Sustainable Enterprise Executive Roundtable (SEER). One outcome was a model for cargo routes that optimised shipping time, cost and carbon reduction. Despite the reputed success of this and similar initiatives, no empirical test as to the benefits of learning and collaboration of this nature yet exist. The research described in this paper was undertaken in 2016-17 in an attempt to fill this research gap as well as exploring the drivers and barriers to change in an Australian business context.

RESEARCH AIMS AND METHOD

It was hypothesised that a cross-sector collaboration group set up in a defined local industrial zone in Sydney would support the SEER findings by demonstrating a positive intention and greater sense of urgency to start a Green Business Initiative (GBI) in a collaboration Group A, that would be significantly stronger than a non-collaborative matched control Group B.

If, after the workshop learning sessions, the change in Group A was greater than Group B, there would be evidence to support the premise that the collaboration partnership had a positive effect. Group A was named the Cumberland Business Sustainability Partnership (Cumberland BSP). Refer to Appendix 2 Table 2 for the composition of both groups.

First the researcher tested whether Educational Workshops in Sustainable Consumption and Production stimulate action toward sustainability. 1
Second, the researcher compared the actions of Group A and B.

Third, the researcher applied insight into the barriers and challenges present in the Australian business context and identified the current drivers for change.
Appendix 1 Tables 2 – 5 summarise the research design; group composition by industry sector; workshop program, workshop activities in both groups and additional activities for Group A only.

The study used a measure of entrepreneurial intention created by Linan and Chen (2009), a questionnaire which integrated psychology and entrepreneurship literature. The survey was delivered in a 20-minute personal telephone interview, identical in the pre and post intervention stages.

RESULTS

The results of the statistical data analysis give a high degree of confidence that intervention of Learning Workshops in Sustainable Consumption and Production caused a positive shift in overall attitudes in both Groups A and B. This causal relationship is evident in the output of the mixed-design split-plot ANOVA – using SPSS which compared the two groups before and after the interventions. The output of this analysis is presented in Appendix 2 Figure 5.
In the final workshop (1.3) the people who were present rated the GBIs against a set of criteria as shown in Appendix 1 Table 6.

A major finding is that after the collaborative learning workshops conducted with Group A, its intention to start a GBI and show a stronger sense of urgency was not significantly greater than that of Group B. In fact, the qualitative results indicate the opposite to be true in this particular experiment with the sense of urgency and future intentions measured as stronger in Group B. Despite being a larger group comprising diverse sectors and having many more opportunities to collaborate, none of the ideas presented by Group A could be described as joint efforts between its members.

WHY DID COLLABORATION NOT TAKE PLACE IN GROUP A AS EXPECTED?

One reason for a reluctance to collaborate was commercial confidentiality. A member of Group A raised the issue that the presence of a direct competitor inhibited her ability to share experiences and contribute ideas to the discussions despite possessing a desire to do so.

Another limitation may have been that a number of participants felt that they did not possess the necessary authority to make decisions on behalf of their organisation. While discussions with others gave them valuable insight, as individuals they lacked the power to turn these ideas into action.

There was a large dropout rate from the first to the last workshop - 60% for Group B and 75% for Group A. Attendance at a workshop was viewed as an optional extra to the core business and less important than work priorities, personal or family life.

Barriers identified in this research and the top challenges preventing a company becoming more sustainable are shown in Appendix 2 Figures 3 and 4.

WHAT ARE THE STRONGEST FACTORS DRIVING CHANGE?

The vast majority of companies in both groups hold - and wish to retain - certification to the Environmental Management System standard ISO14001. This emerged as a key motivator for companies in Group A for conducting an environmental assessment of products and processes and for auditing suppliers. It was a reason given by both groups for their company's efforts in finding a new use for materials that were previously considered to be waste.
The next most significant motivating factor for changes in specific behaviours for Group A were related to cost savings. Nearly all businesses in this group mentioned the importance of adequate financial return as a justification for current waste and energy projects particularly the switch to LED lighting.
These and other motivations for change in specific behaviours are summarised in Appendix 2 Figures 1 and 2. The removal of financial barriers would no doubt enable a greater number of sustainability projects to take hold.

WHAT THIS TELLS US ABOUT COLLABORATION IN THE COMMERCIAL SECTOR

The top rated GBI in this study, the 1MW rooftop power station, which emerged from Group B, illustrates how in Australia, new business models and financial agreements such as Power Purchase Agreements (PPA) are facilitating the rapid uptake of solar power by industry. PPA requires collaboration between asset owners/managers, energy utilities, manufacturers lessees and investors. Each stakeholder must reap a financial reward if collaboration arrangements are to break through the financial barriers that are hindering the application of clean technology and other "wicked solutions".
A diagram of GBI–1 and why it was given full marks for being innovative and transformative is presented in Appendix 4.

The fact that the top rated GBI emerged from a different set of collaboration opens up an

avenue for further research. For example, one might explore whether asset owners, manufacturers and lessees can form collaboration partnerships that share, virtualise, optimise or exchange assets using Circular Economy concepts articulated by the Ellen MacArthur Foundation.

CONCLUSION

This research shows that cross -sector collaboration groups will not necessarily be more effective than the traditional approaches of individual companies working within a supply chain. To become viable in the commercial sector, green business initiatives cannot be perceived as a diversion from the company's core business. There must be a clear financial incentive to all parties involved with Government creating the policy settings to encourage private investment and to bring more parties to the table.

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APPENDIX 1: TABLES 1 – 6.

Table 1: Research Design

Group A (Test)	X 1	X 2	O 1
Group B (Control)		X 2	O 1

Where

O_1= pre and post test survey questionnaire

Intervention X_1 = creation of Cumberland BSP for collaboration (Group A)
Intervention X_2 = Learning Workshops

Table 2: Group composition by industry sector

ANZSIC CODE	Description	% of research participants	
		Group A	Group B
C	Manufacturing	54	80
I	Transport, postal and warehousing	8	20
D	Electricity, gas, water, waste service	22	-
J	Information, media and communications	8	-
O	Public administration and safety	8	-

Table 3: Workshop Program

Workshop Program		Duration (hours)	Timing	Test Group A	Control Group B
X2	Module 1.1 Learning Session Sustainable Consumption & Production Module 1.2 Learning Session Opportunities identification and assessment	4	Late Nov 2016	yes	yes
X1	Module 2.1 Cross-sector collaboration Shared Vision / Statement of Purpose Module 2.2 Cross sector collaboration Site visits in Western Sydney	4	Mid – late Jan 2017	yes	no
X2	Module 1.3 Learning Session Presentation of Project Plans	4	Late Mar 2017	yes	yes

Table 4: Workshop Activities – both Groups

Type of activity	Description	Conceptual	Relational	Action
Interaction with music	Speed networking		Yes	
Learning of theory	SDGs, systems thinking, circular economy, LCA, supported by videos	Yes		
Group activity	Re-envisaging the system	Yes	Yes	
Group activity	Reading inspirational case studies			
Group discussion / brainstorm	Identifying opportunities for improvement		Yes	Yes
Individual presentations with discussion	Presentation of GBIs			Yes
Presentation by CSIRO	ASPIRE – an internet waste matching program in association with Local Councils	Yes	Yes	
Webinar by experts in LCA (Group A only)	PIQET (Packaging impact quick evaluation tool)	Yes		

Table 5: Additional Workshop Activities – Group A only

Type of activity	Description	Conceptual	Relational	Action
Group discussion / brainstorm	Cumberland BSP Statement of Purpose		Yes	
Relationship building	Site visit to Visy rPLASTICS 100% plastic recycling factory	Yes	Yes	
Group discussion / brainstorm	Identifying opportunities for improvement – additional session		Yes	Yes
Additional meetings	Suggesting ways to work together on identified ideas		Yes	Yes

Table 6: GBIs presented and rating criteria used

GREEN BUSINESS INITIATIVES (GBI)	
RATING CRITERIA	MAXIMUM SCORE
Financial acceptability of ROI Size /	3
scale of potential benefit	2
Potential for transformative change Degree of	2
innovation or creative thinking Risk acceptability /	1
manageability	1
Potential for replication in other industrial locations	1
Overall Rating	10
RESULTS	
GBI-1: Group B: Peer rating = 10 Install 1MW solar PV power station on rooftop of new 30,000m^2 warehouse involving multi-sector partners	
GBI-2: Group B: Peer rating = 8.5 Install battery storage for output of co-generation plant to avoid peak power cost spikes	
GBI-3: Group A: Peer rating = 7.5 Create process for timber salvage, re-use and re-manufacture into new products	
GBI-4: Group A: Peer rating = 7 Undertake Zero waste and carbon neutral events for the Business Chamber	
GBI-5: Group A: Peer rating = 7 Install 500 KW solar PV on rooftop of own company's manufacturing plant	
GBI-6: Group B: Peer rating = 6.5 Replace 440W high intensity high bay lighting with 150W LED.	

Appendix 2: Figures 1 – 5

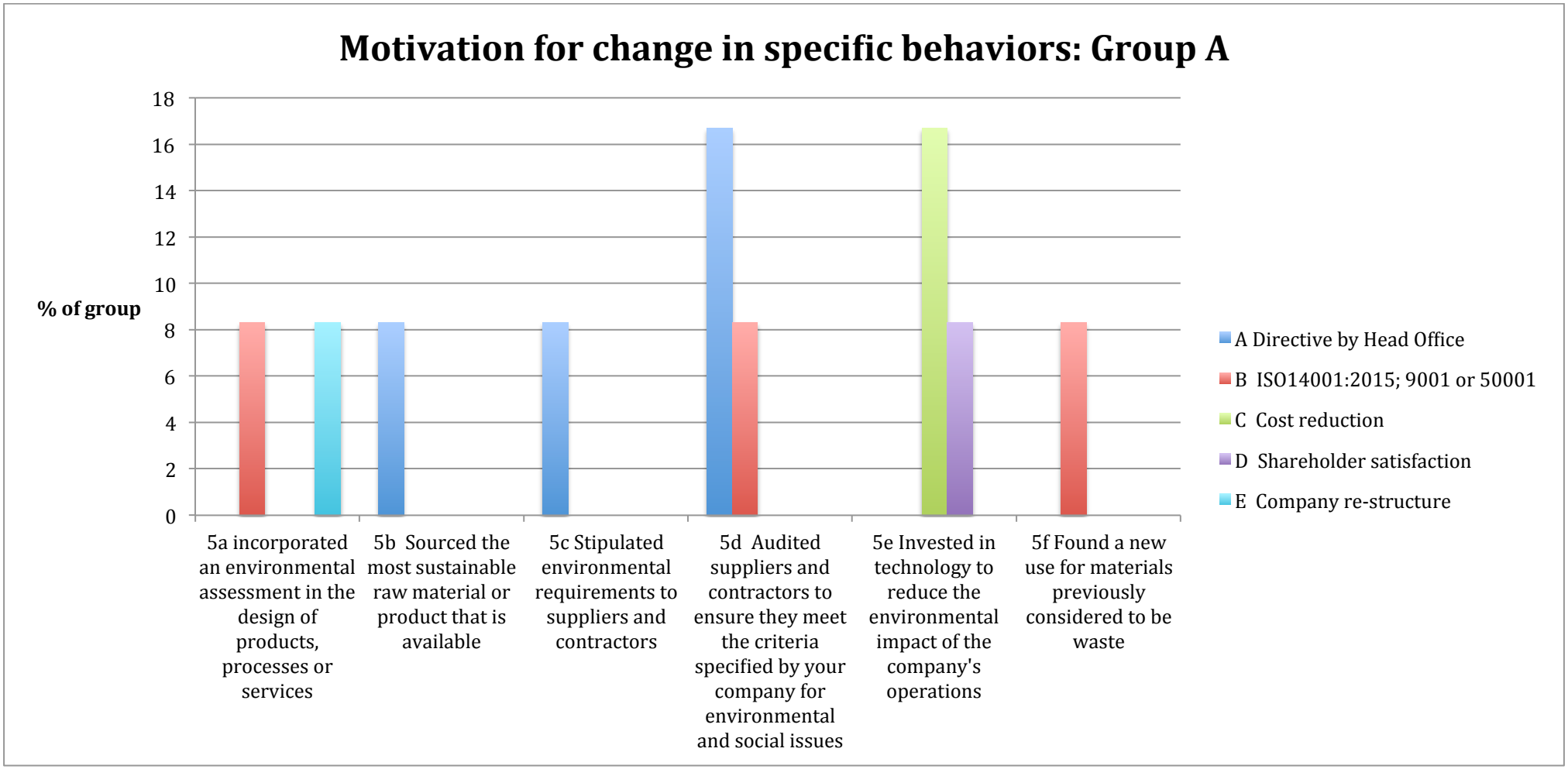


Figure 1: Motivation for change in specific behaviours described in Survey questions 5a) – 5f) by Group A

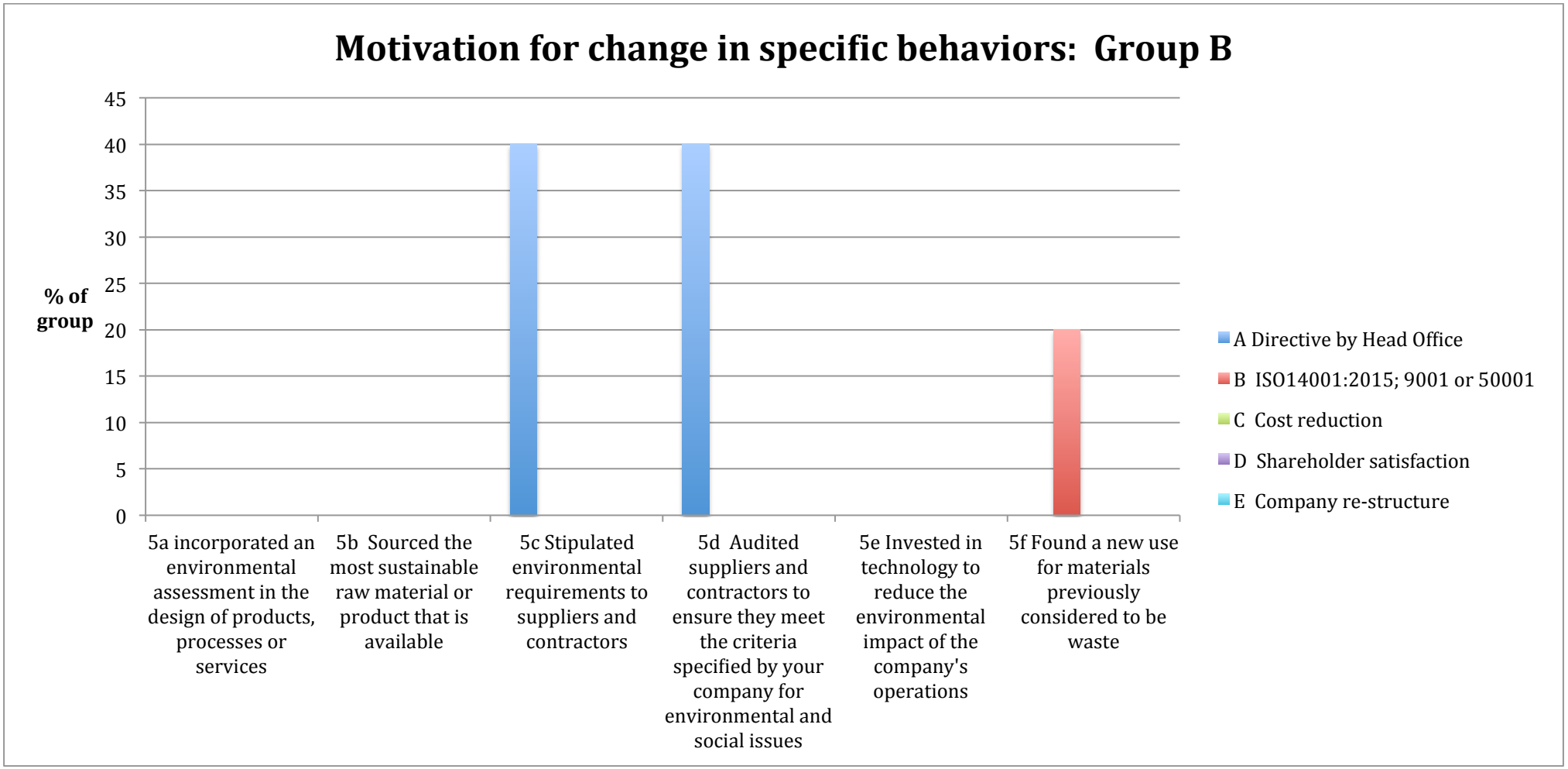


Figure 2: Motivation for change in specific behaviours described in Survey questions 5a) – 5f) by Group B

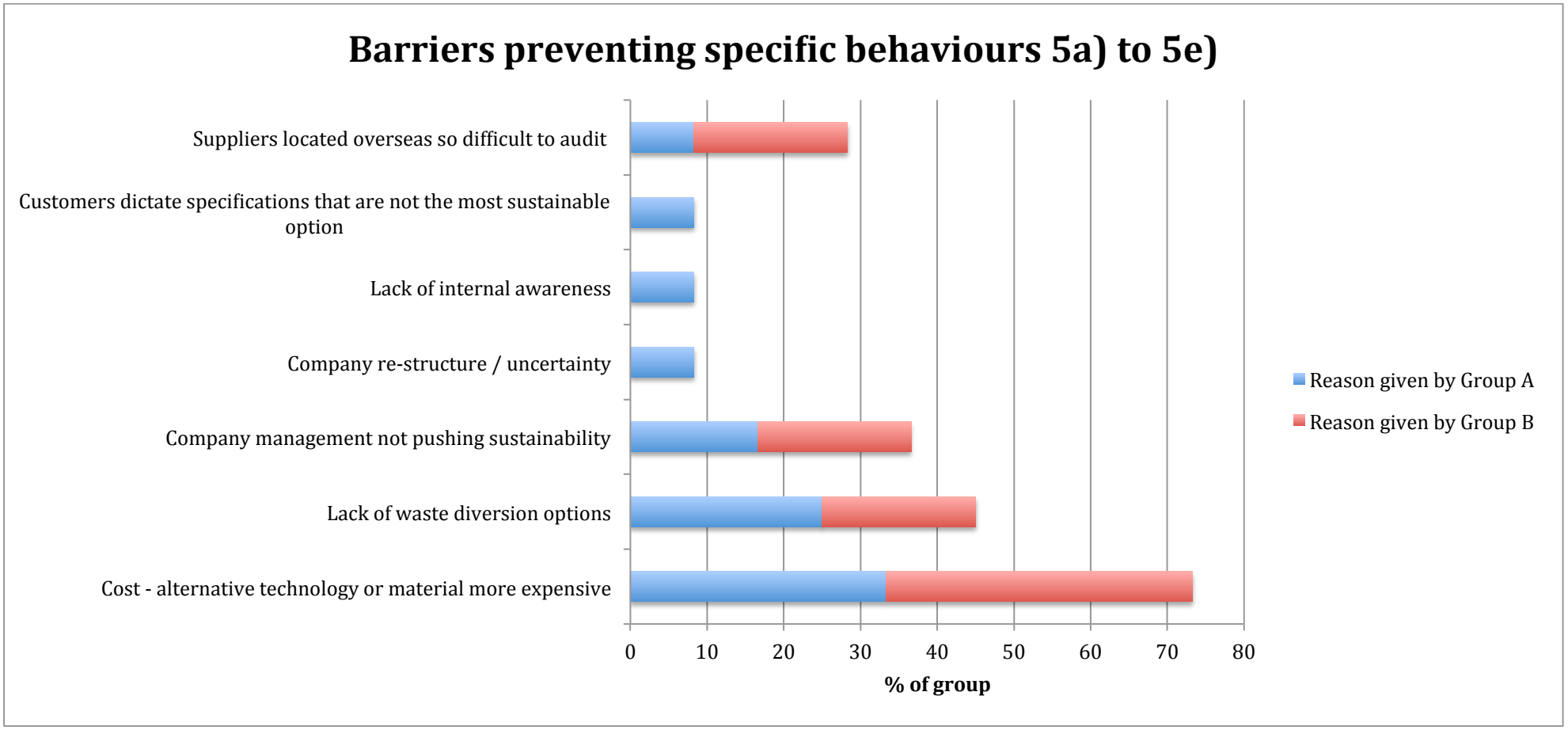


Figure 3: Barriers preventing specific behaviours described in Survey questions 5a) – 5f) by Group both groups

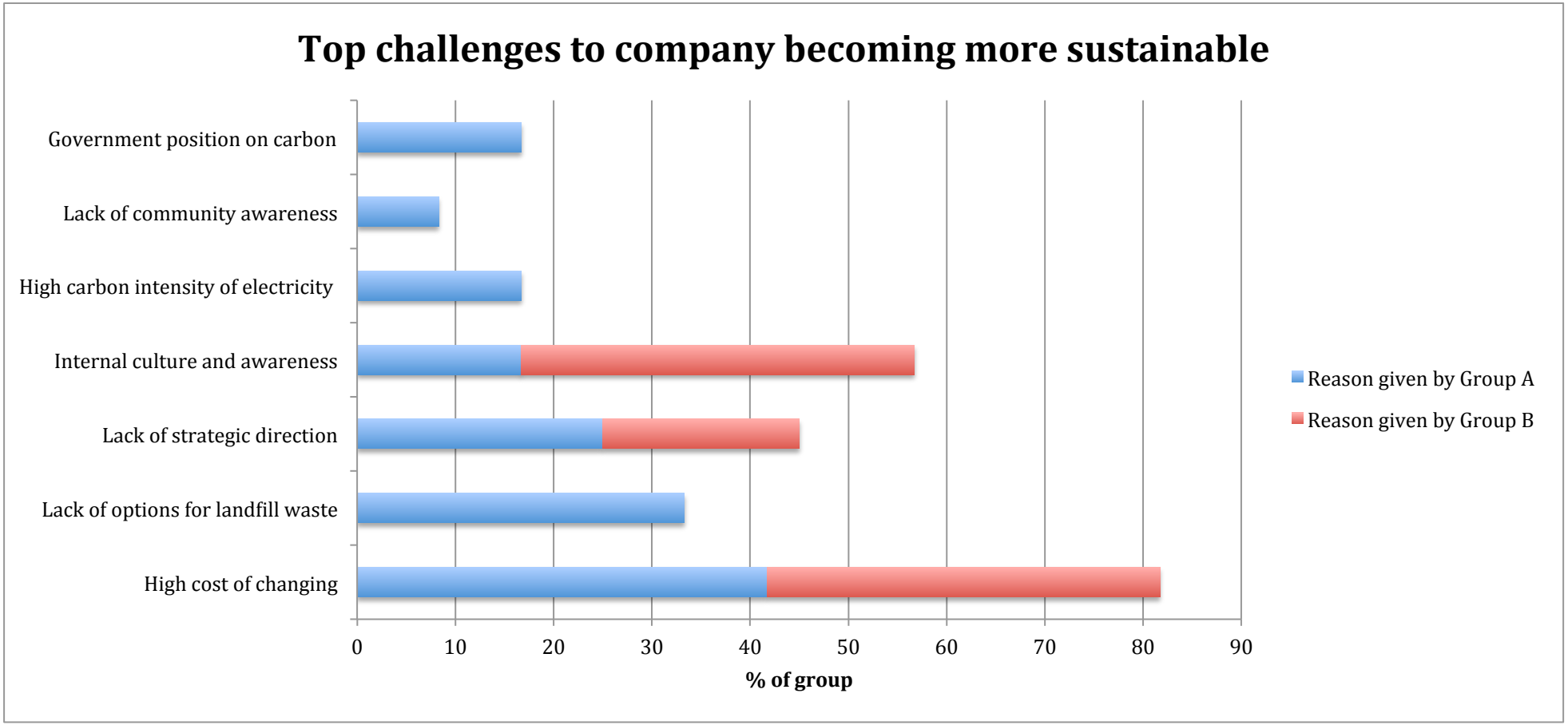


Figure 4: Top two challenges preventing company becoming more sustainable in both groups

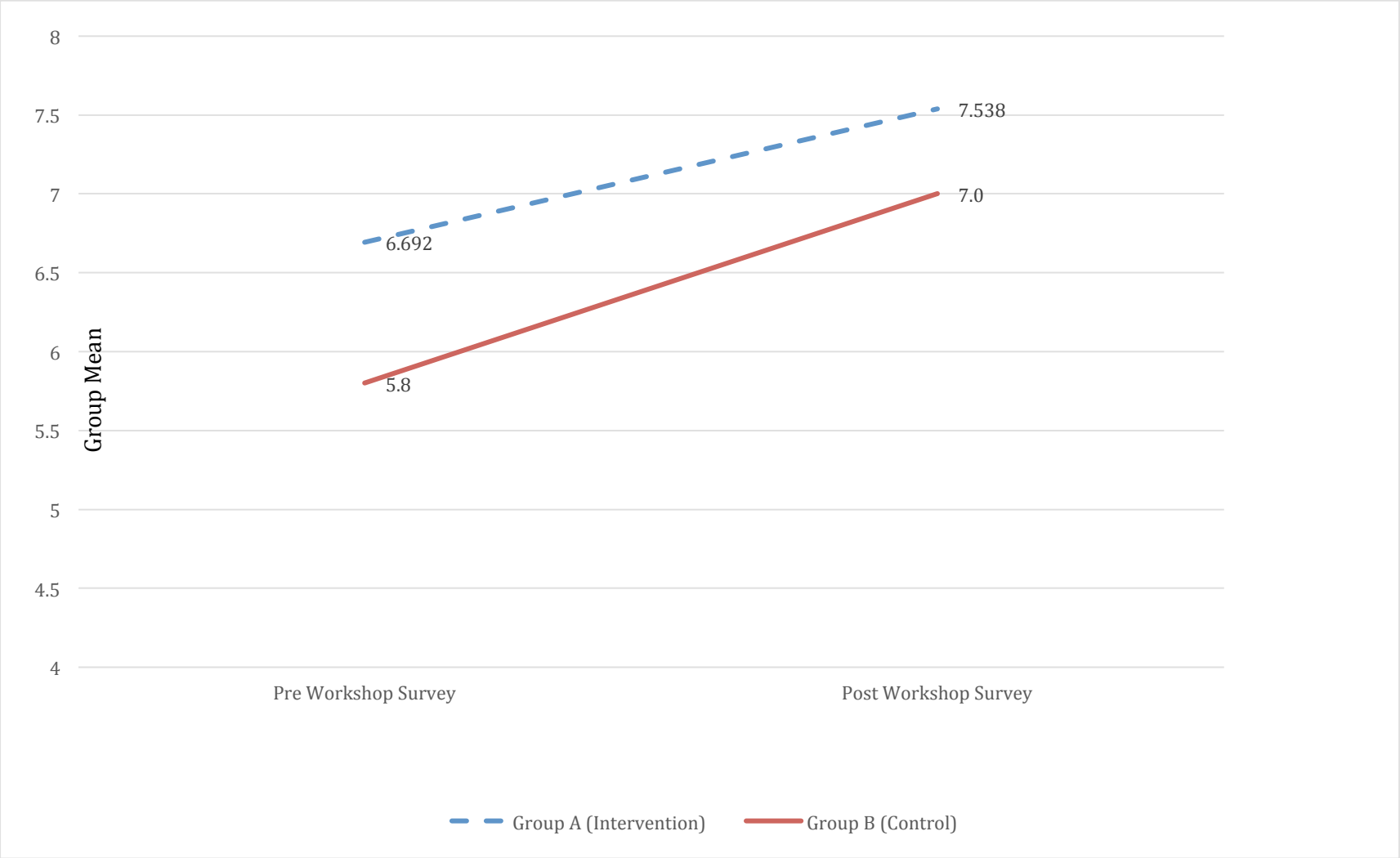
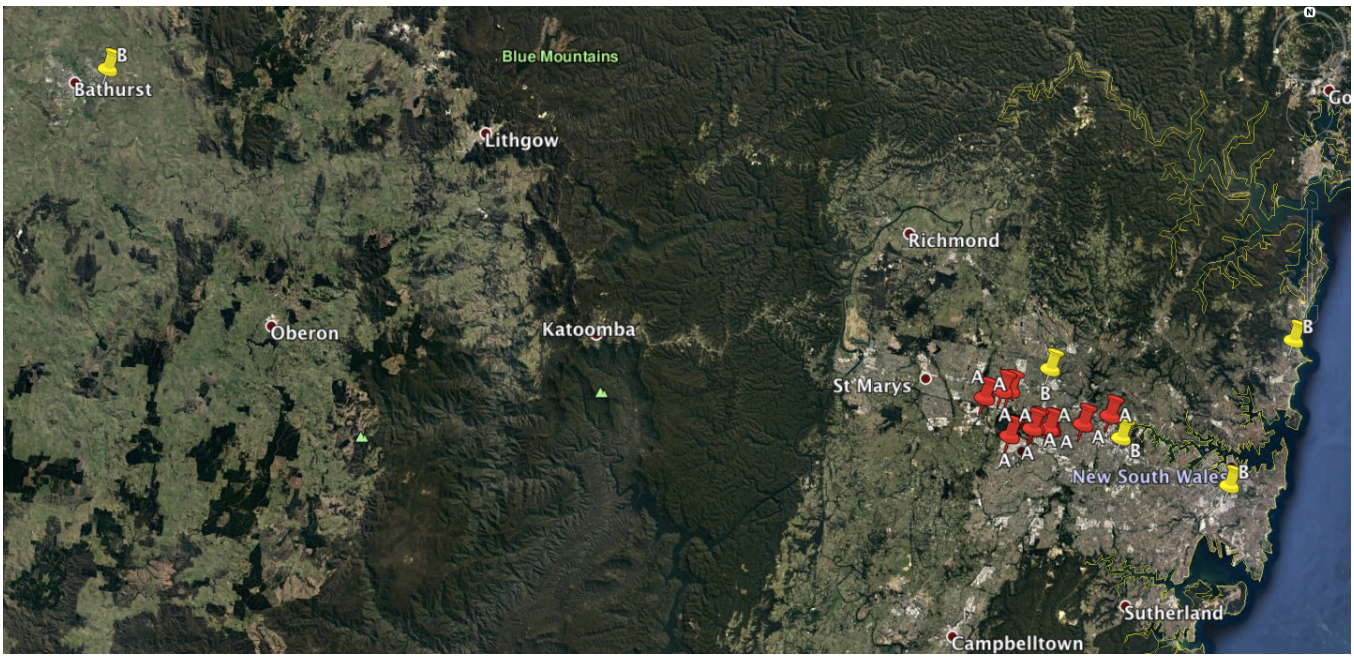


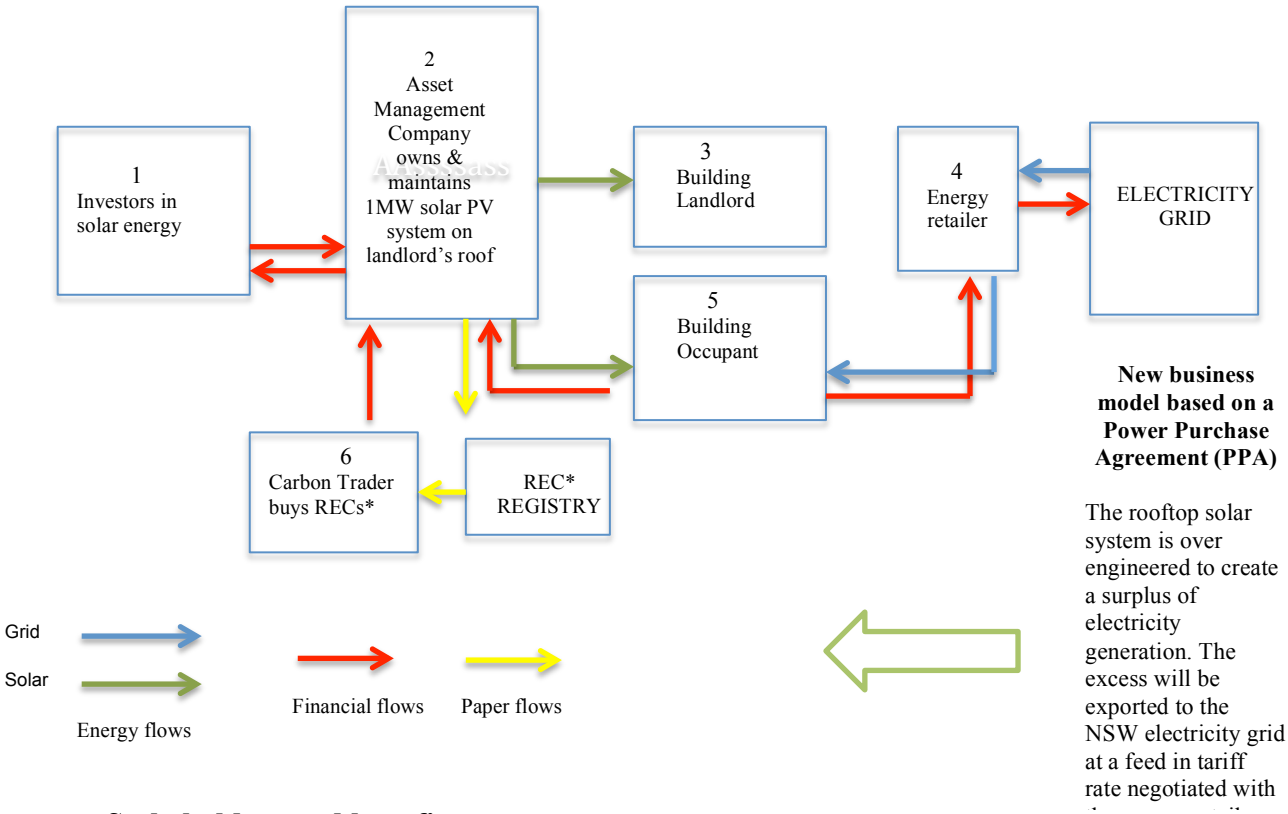
Figure 5: Comparison of means for pre and post survey change

Appendix 3: Location map – Group A and B

Group A – red pins Group B – yellow pins



Appendix 4: GBI – 1 1MW power station on 30,000m^2 warehouse roof



Stakeholders and benefits

1 Investors: return on investment.

2 Asset Management Co: stream of revenue & profit on sale of electricity & RECs

3 Landlord: enhanced corporate image

4 Energy retailer: able to meet company & regulatory targets for renewable energy

5 Lessee: no upfront cost of solar generation system, guaranteed electricity price, hedge against future rises over the 10 year contract & cheaper LGSs*

6 Carbon trader: profit on buying and selling RECs

Environmental benefits:

Minimise negative impacts associated with fossil fuel power generation

LGC large-scale renewable certificates created & held in the REC Registry until sold

REC Renewable energy certificate

*Australian Government Clean Energy Regulator


Research methods
Conclusion
Sustainability through collaboration
A controlled cross-sector study in Australian manufacturing
Results

SUSTAINABLE DEVELOPMENT

Sustainable development is a process for meeting human development goals while sustaining the ability of natural systems to continue to provide the natural resources and ecosystem services upon which the economy and society depend.

Sustainability through collaboration

A controlled cross-sector study in Australian manufacturing

MACQUARIE University

Suzanne Orme

Enviroease

Research methods

Results

Conclusion

What this says about cross-sector collaboration

Rationale for the study

Collaboration across sectors is widely regarded as necessary for attainment of the UN SDGs

We aimed to fill a research gap:
the lack of empirical evidence proving the effectiveness of multi-sector collaboration groups in stimulating innovation and creative thinking

We also aimed to:
Identify the drivers for change in the Australian business context in 2017

as well as the barriers and challenges to sustainable development that currently exist

Collaboration across sectors is widely regarded as necessary for attainment of the UN SDGs


TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
Make cities and human settlements inclusive, safe, resilient and sustainable
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

RESPONSIBLE CONSUMPTION & PRODUCTION: TARGETS – SDG 12

12.1
Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries

12.2
By 2030, achieve the sustainable management and efficient use of natural resources

12.3
By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

12.4
By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

12.5
By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

12.6
Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

12.7
Promote public procurement practices that are sustainable, in accordance with national policies and priorities

12.8
By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

12.a
Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production

12.b
Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products

12.c
Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

AFFORDABLE AND CLEAN ENERGY: TARGETS - SDG 7

7.1
By 2030, ensure universal access to affordable, reliable and modern energy services

7.2
By 2030, increase substantially the share of renewable energy in the global energy mix

7.3
By 2030, double the global rate of improvement in energy efficiency

7.a
By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

7.b
By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support


"Transformative change is necessary which opens the window for innovation, new ideas and new paradigms"
Johan Rockstrom
Johan Rockstrom

We aimed to fill a research gap:
the lack of empirical evidence proving the effectiveness of multi-sector collaboration groups in stimulating innovation and creative thinking

We also aimed to:
Identify the drivers for change in the Australian business context in 2017

as well as the barriers and challenges to sustainable development that currently exist

Research methods

Mixed method study
Attitudes and "eco-entrepreneurial intention" measured using pre and post workshop questionnaire delivered by phone interview to gain additional qualitative insights.....

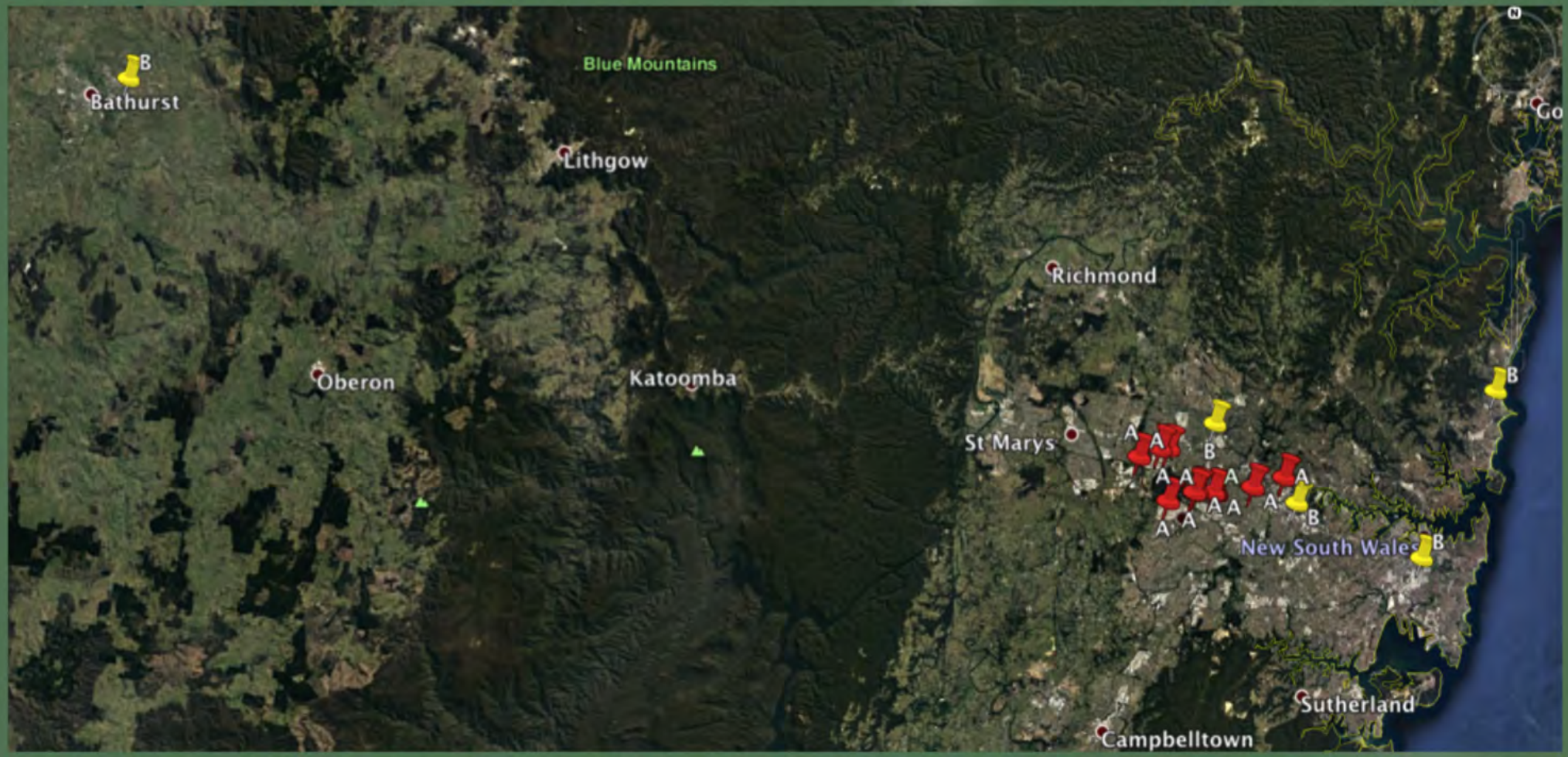
- Series of learning workshops in Sustainable Consumption and Production

- Replicated ideas from SEER, the Sustainable Enterprise Executive Roundtable facilitated by Hilary Bradbury-Huang of the University of Southern California

Location of research participants

- This group re-imagined the Port of Los Angeles as a shared cargo transhipment system with a model that optimised routes, shipping time, cost & carbon reduction

Location of research participants



roup re-imagined the Port of Los A

Sustainable Consumption & Production

MACQUARIE University

Objective

Re-think approaches to **sustainable value creation** in ways that are practical & feasible to implement

Learning sessions

Life cycle assessment

Circular economy

Principles, benefits, key concepts, latest tools & resources

Sustainable procurement

Lean

Sharing economy

Systems thinking

Innovation

Continual Improvement

What does participation involve?

- 2 x 15min telephone interviews
- 2 x half day workshops
  Venue: Alpha Hotel, 1 Peter Brock Drive, Eastern Creek

Get started

1 Choose an interview timeslot
2 Sign the Information & Consent Form
3 Attend on Thurs 2nd Feb and 23rd March

Outcomes

IMPROVED BUSINESS PERFORMANCE

- Gains in knowledge, insight & understanding
- New & enhanced business skills
- Mutually beneficial relationships
- Recognition & reward

Group activity

RE-IMAGINING THE SYSTEM

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE

1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
ReSOLVE levers: regenerate, virtualise, exchange

PRINCIPLE

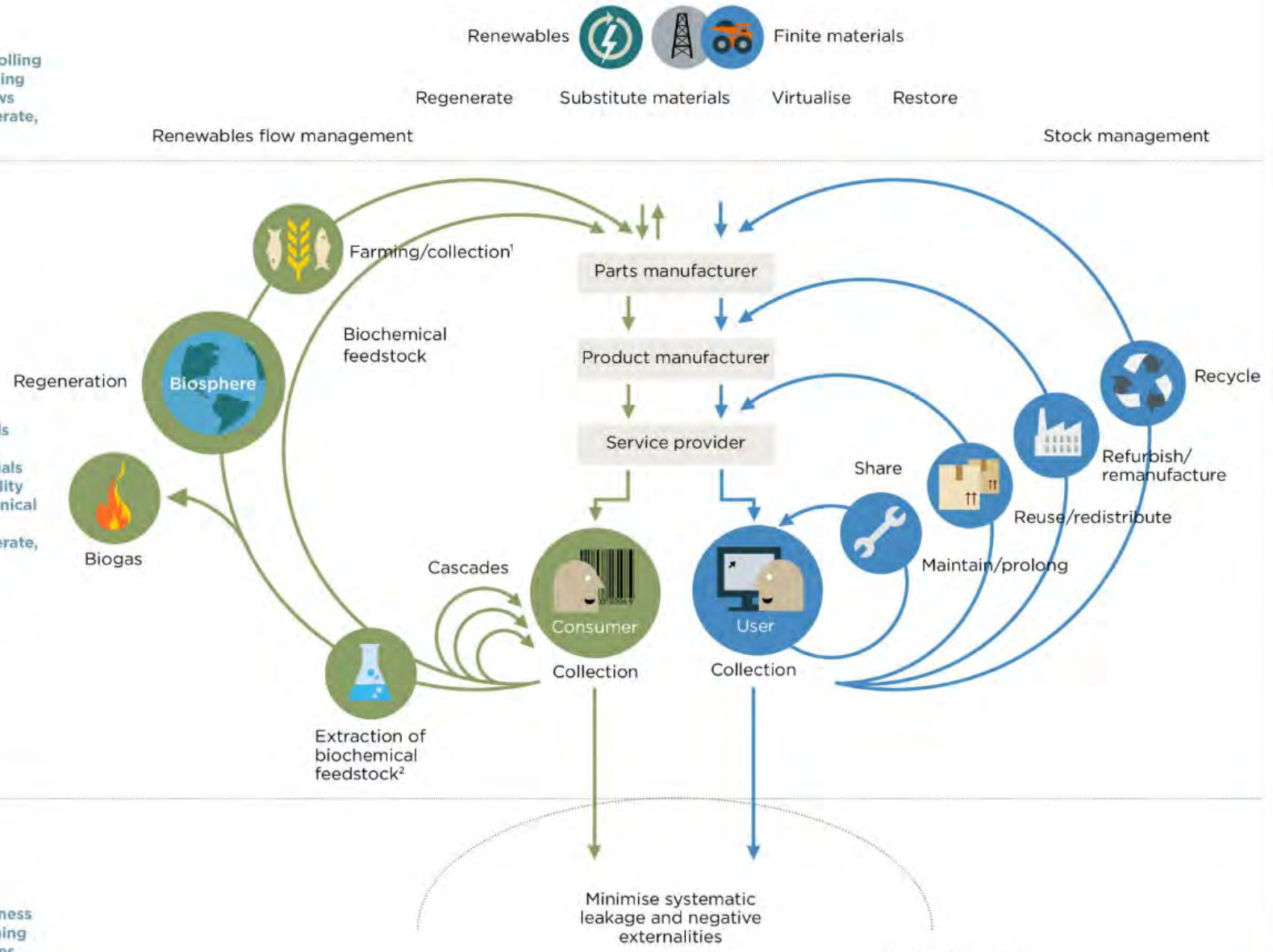
2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
ReSOLVE levers: regenerate, share, optimise, loop

PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities
All ReSOLVE levers



1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input

Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

Results

GREEN BUSINESS INITIATIVES (GBI)

RATING CRITERIA	MAXIMUM SCORE
Financial acceptability of ROI	3
Size / scale of potential benefit	2
Potential for transformative change	2
Degree of innovation or creative thinking	1
Risk acceptability / manageability	1
Potential for replication in other industrial locations	1
Overall Rating	10

RESULTS
GBI-1: Group B: Peer rating = 10 Install 1MW solar PV power station on rooftop of new 30,000m^2 warehouse involving multi-sector partners
GBI-2: Group B: Peer rating = 8.5 Install battery storage for output of co-generation plant to avoid peak power cost spikes
GBI-3: Group A: Peer rating = 7.5 Create process for timber salvage, re-use and re-manufacture into new products
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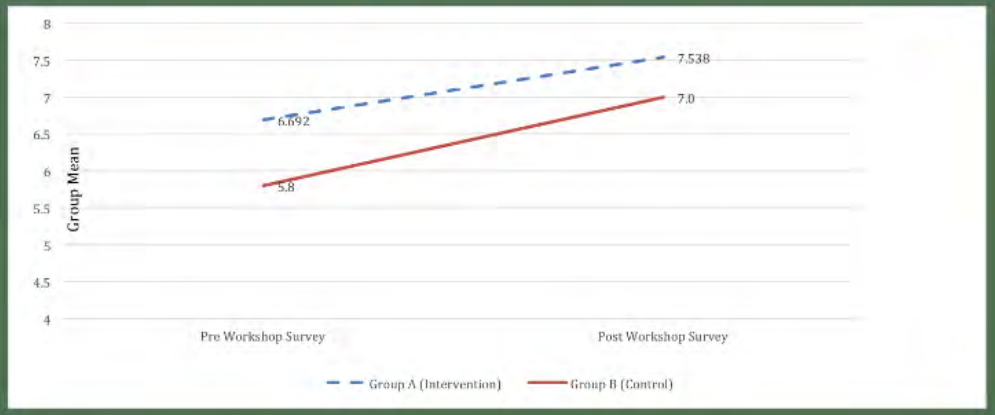
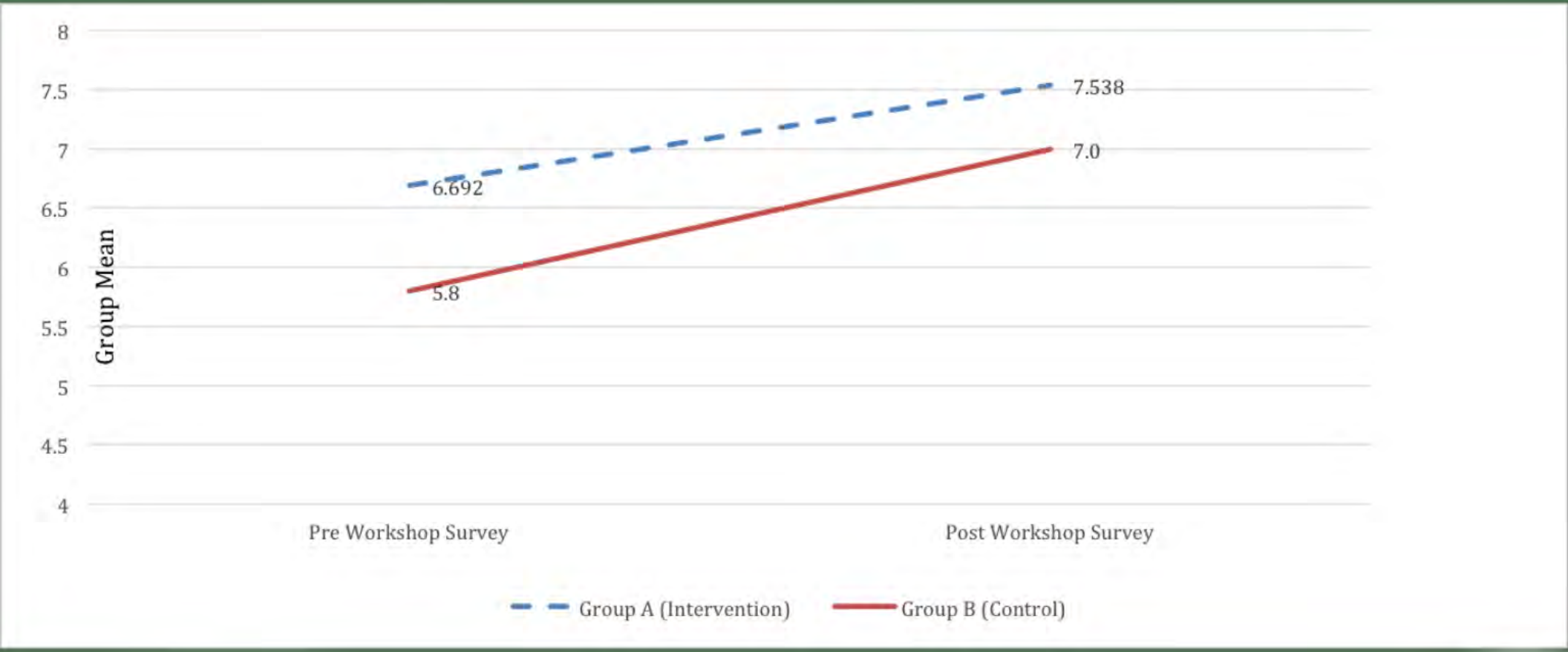
GBI-5: Group A: Peer rating = 7 Install 500 KW solar PV on rooftop of own company's manufacturing plant
GBI-6: Group B: Peer rating = 6.5 Replace 440W high intensity high bay lighting in Adelaide with 150W LED.

Positive shift in attitudes & intentions in both Group A and B

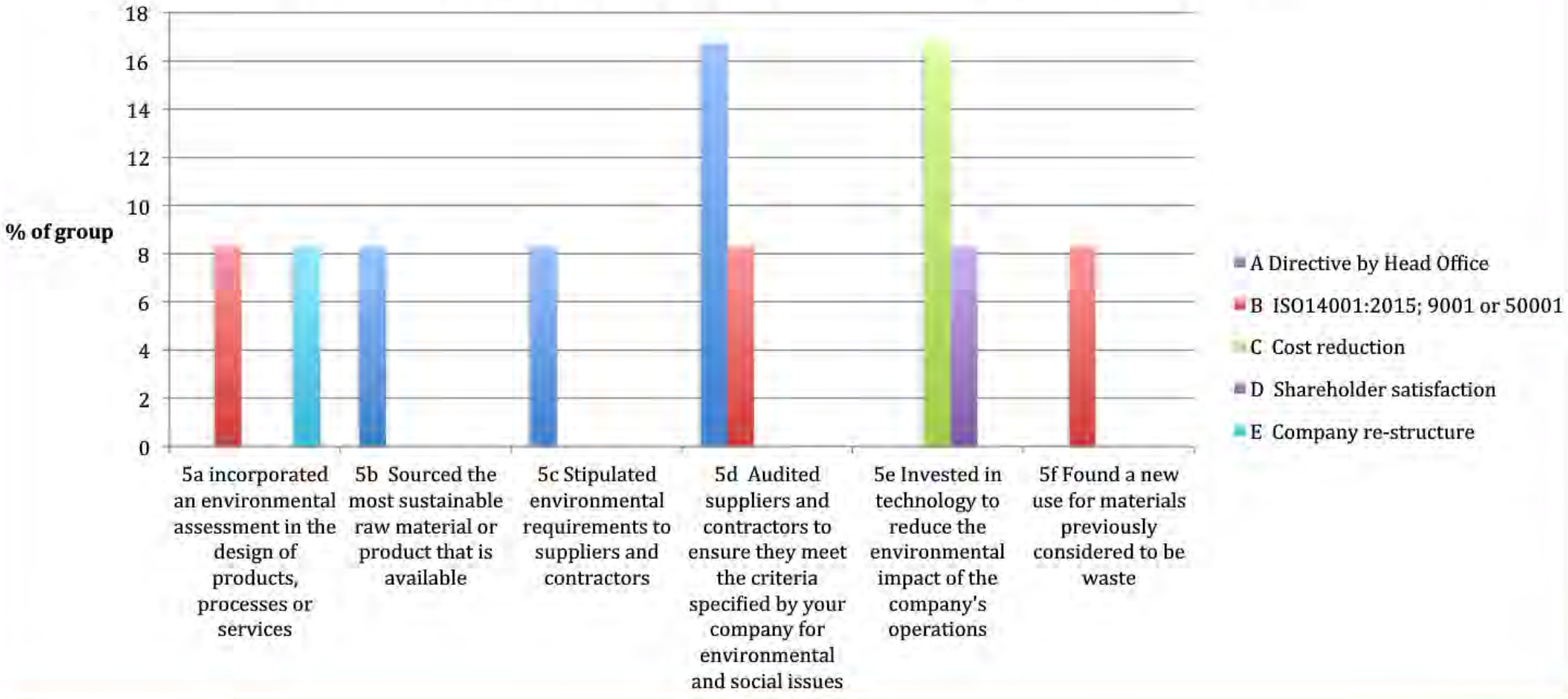


Group A and B

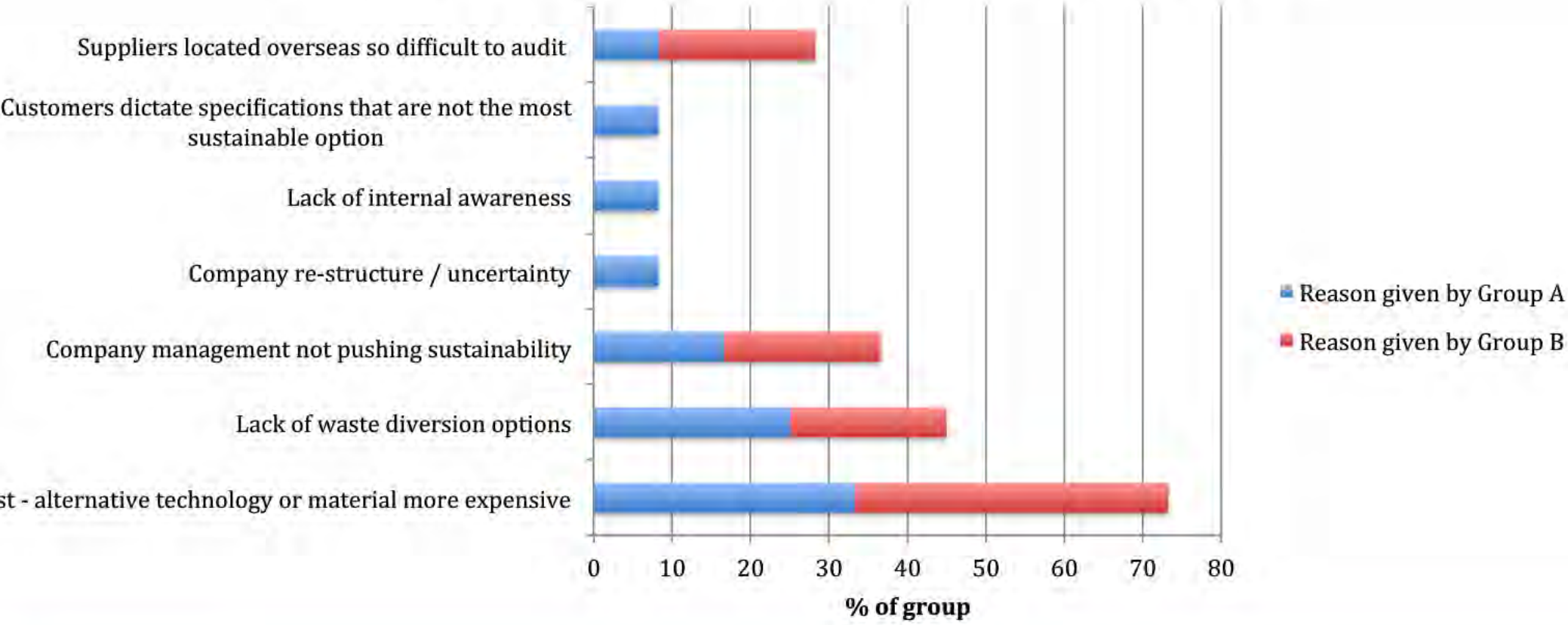

8
7.5
7
6.5
6
5.5
5
4.5
4
Group Mean
7.538
7.0
6.692
5.8
Pre Workshop Survey
Post Workshop Survey
Group A (Intervention)
Group B (Control)

Drivers for change, barriers & challenges

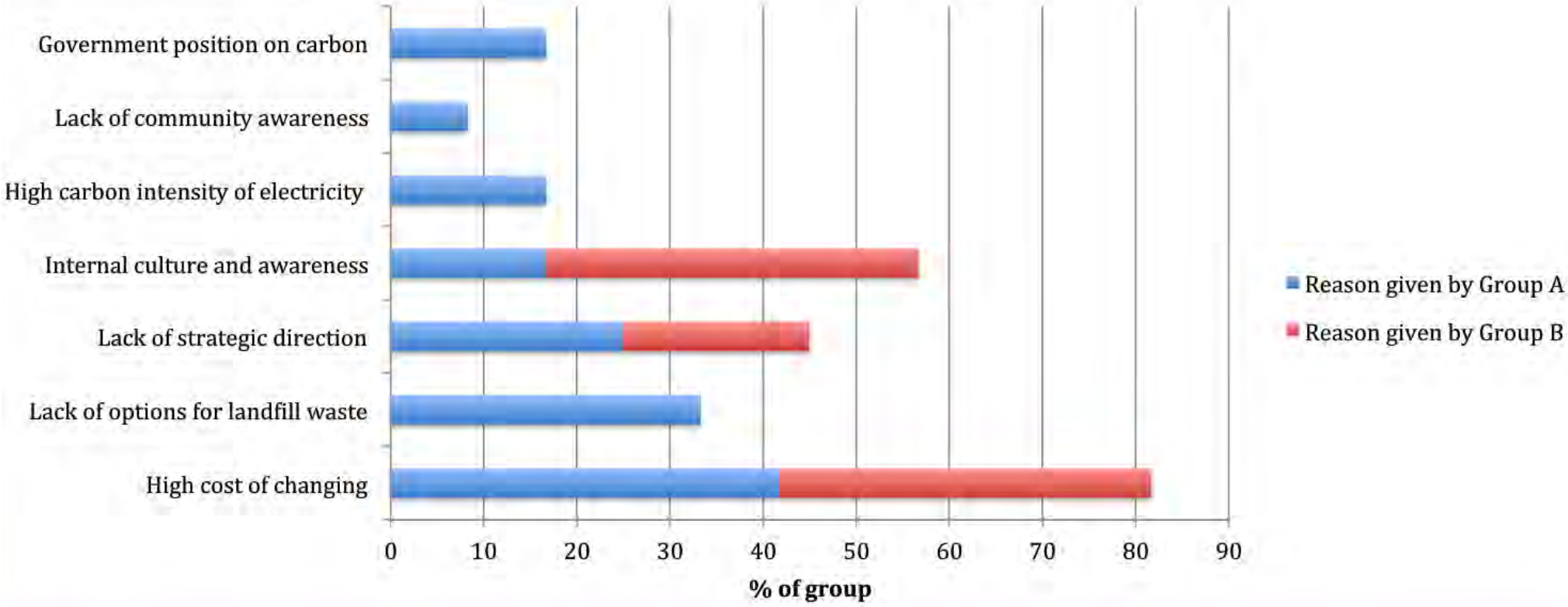
Motivation for change in specific behaviors: Group A



Barriers preventing specific behaviours 5a) to 5e)



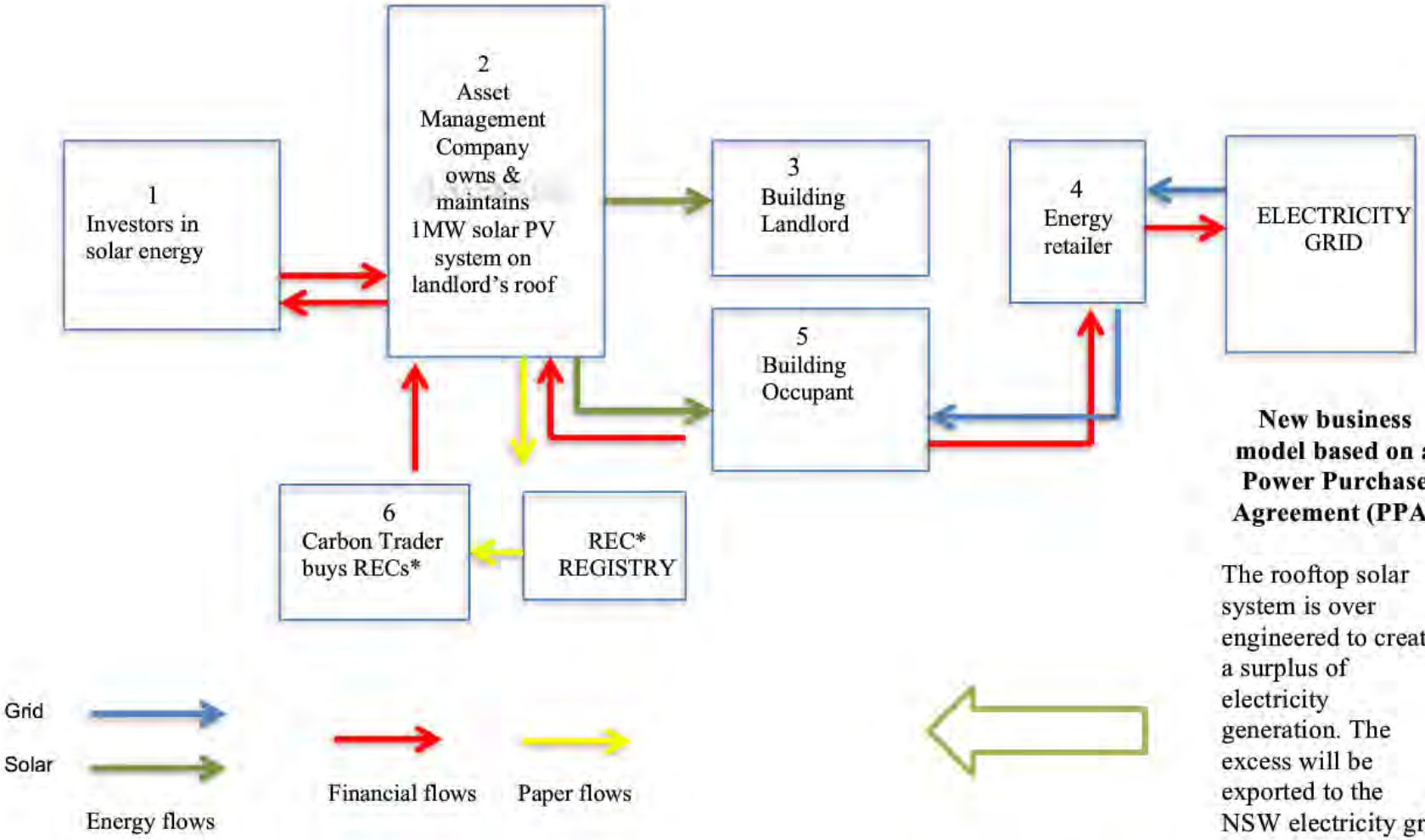
Top challenges to company becoming more sustainable



What this says about cross-sector collaboration


• The cross- sector collaboration Group A did not generate more ideas or exibit a greater sense of urgency to start a GBI than Group B
• The two top rated GBIs emerged from the non-collaborative control group B (the opposite of what was expected)

Appendix 4: GBI – 1 1MW power station on 30,000m^2 warehouse roof



New business model based on a Power Purchase Agreement (PPA)

The rooftop solar system is over engineered to create a surplus of electricity generation. The excess will be exported to the NSW electricity grid at a feed in tariff rate negotiated with

Stakeholders and benefits

1 Investors: return on investment.

2 Asset Management Co: stream of revenue & profit on sale of electricity & RECs

3 Landlord: enhanced corporate image

4 Energy retailer: able to meet company & regulatory targets for renewable energy

5 Lessee: no upfront cost of solar generation system, guaranteed electricity price, hedge against future rises over the 10 year contract & cheaper LGSs*

6 Carbon trader: profit on buying and selling RECs

Environmental benefits:

Minimise negative impacts associated with fossil fuel power generation

LGC large-scale renewable certificates created & held in the REC Registry until sold

REC Renewable energy certificate

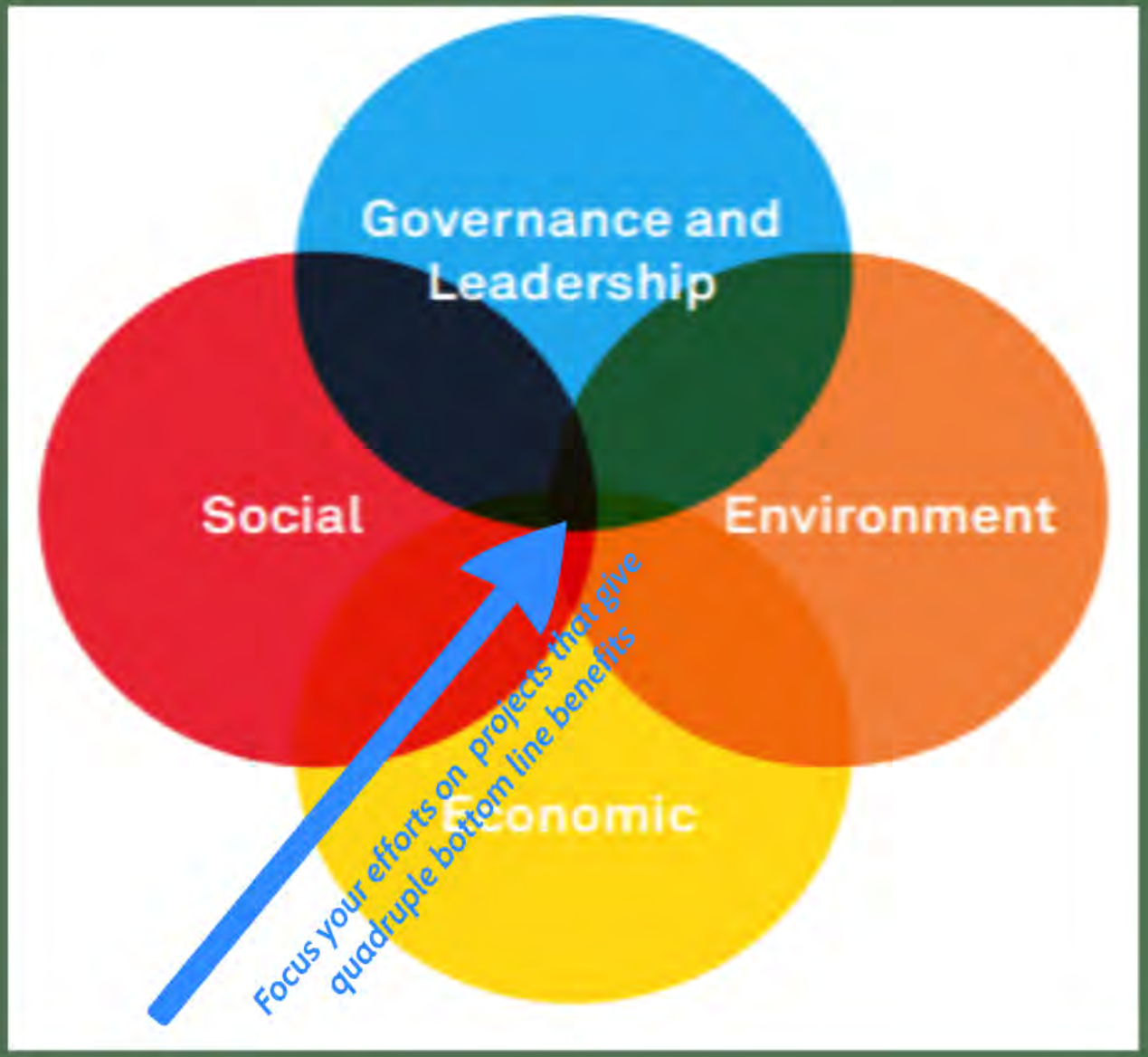
*Australian Government Clean Energy Regulator

Conclusion

- The sustainability workshop program resulted in a significant shift in attitudes and intentions to undertake a Green Business Initative (GBI) in two groups of business people
- Non- traditional collaboration partners and financial arrangements are driving change

- New business models may provide "wicked solutions" that accelerate progress towards the SDGs

- For these models to gain acceptance in the current business climate, project ideas must not be perceived as a diversion from the "core business"


Governance and Leadership
Social
Environment
Economic
Focus your efforts on projects that give quadruple bottom line benefits

Research methods

Results

Conclusion

What this says about cross-sector collaboration

Questions and discussion