

From Here To ... Ten Years of Life Cycle Management Research In New Zealand

Sarah McLaren

Figure 10. **Construction materials dominate total materials use in 2011 and 2060**

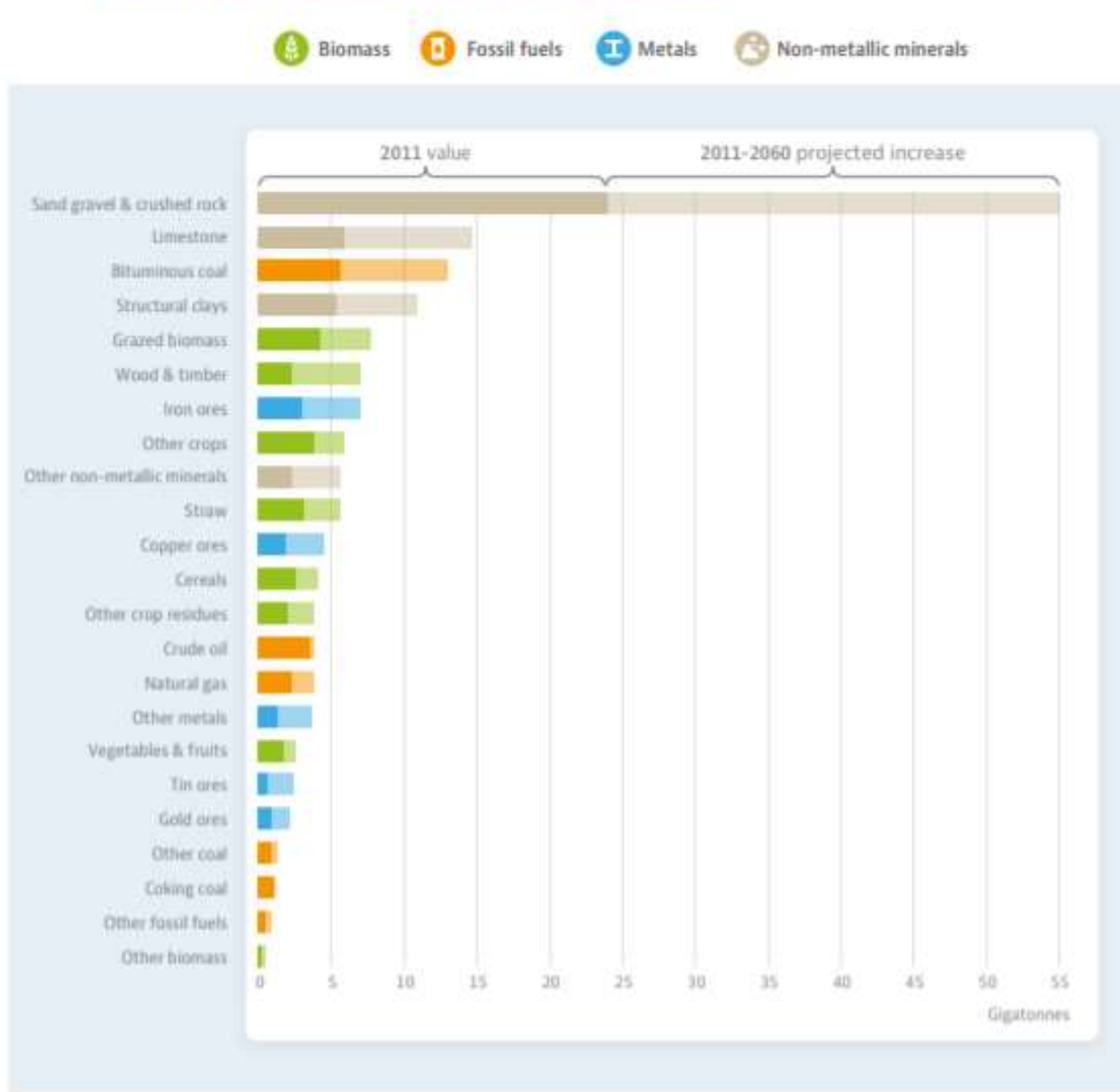
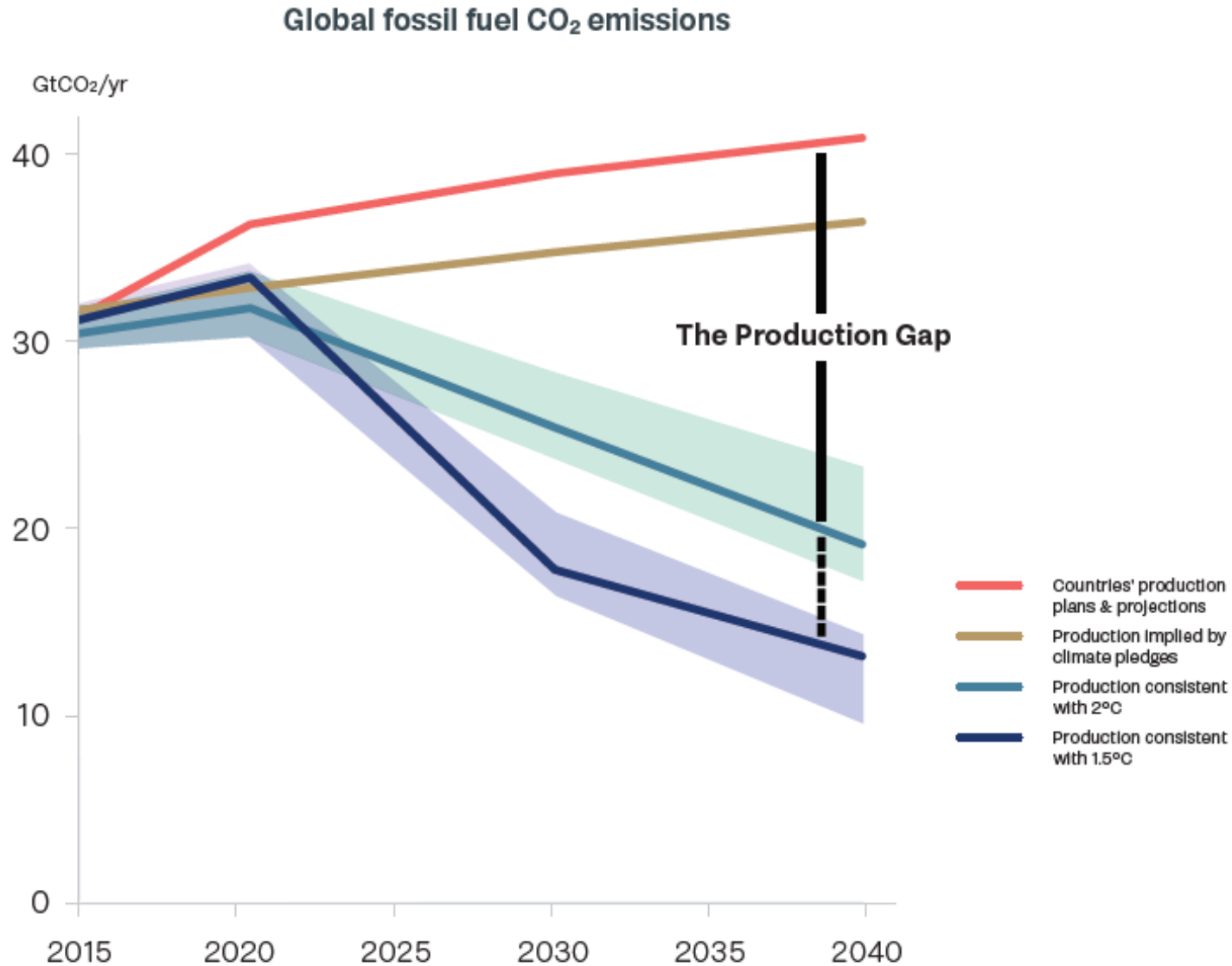


Figure ES.1

The fossil fuel production gap — the difference between national production plans and low-carbon pathways (1.5°C and 2°C), as expressed in fossil fuel carbon dioxide (CO₂) emissions — widens between 2015 and 2040.

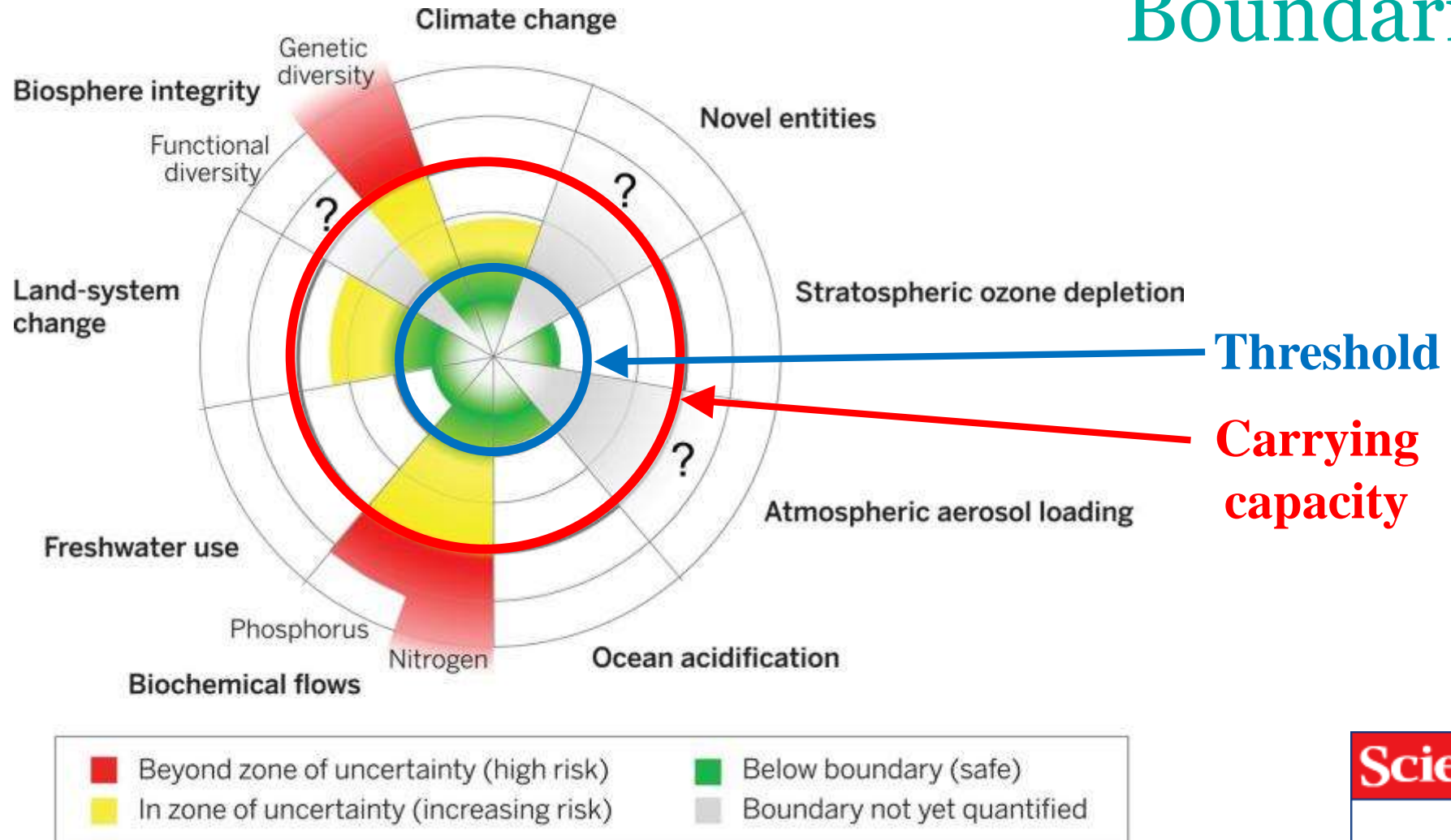


Source: SEI, IISD, ODI, Climate Analytics, CICERO, and UNEP. (2019). *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C*. Available at: <http://productiongap.org/>

Current status of the control variables for seven of the planetary boundaries.

The green zone is the safe operating space, the yellow represents the zone of uncertainty (increasing risk), and the red is a high-risk zone.

Planetary Boundaries



NZLCM Centre



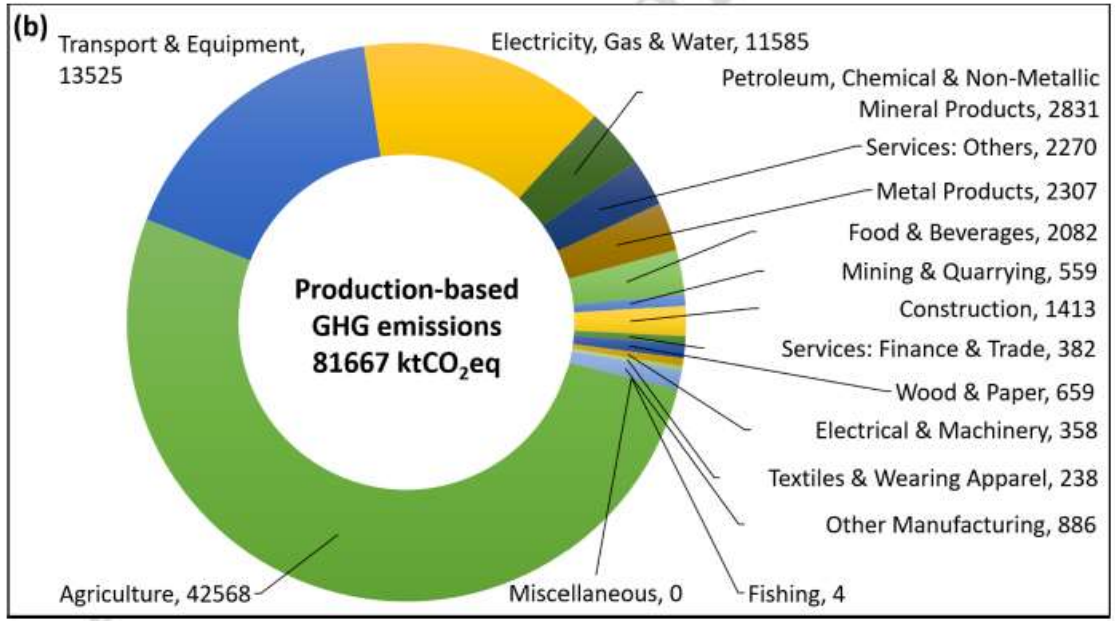
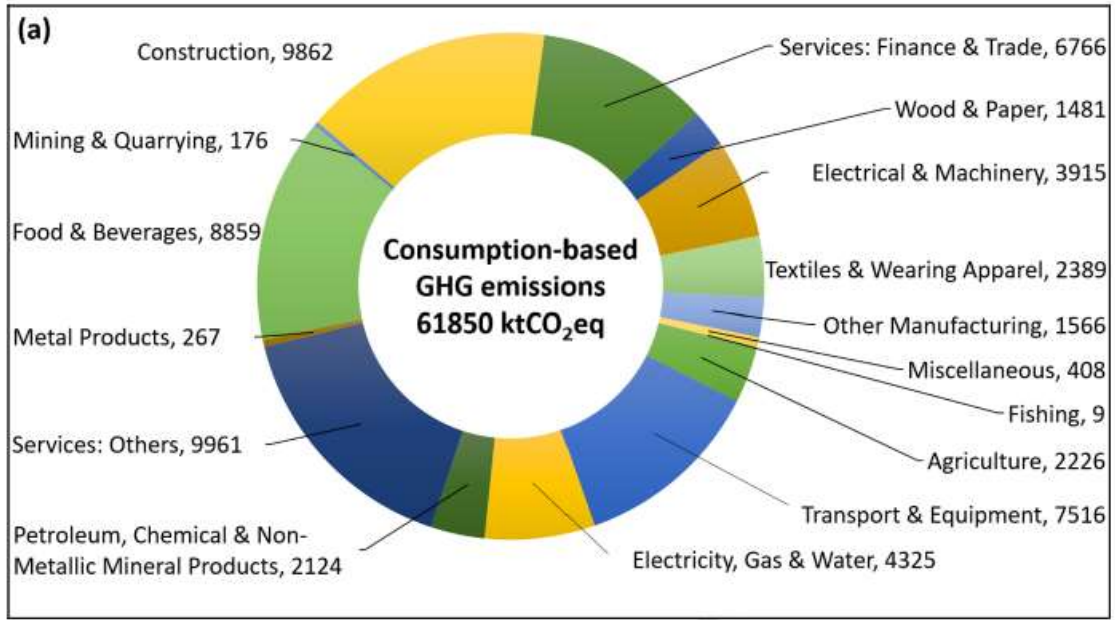
Partnership: AgResearch, Landcare Research, Massey University, Plant and Food, Scion

Mission: to build capability for Life Cycle Management (LCM) in New Zealand

Supported by a MAF/MPI grant for five years (2009-2014)

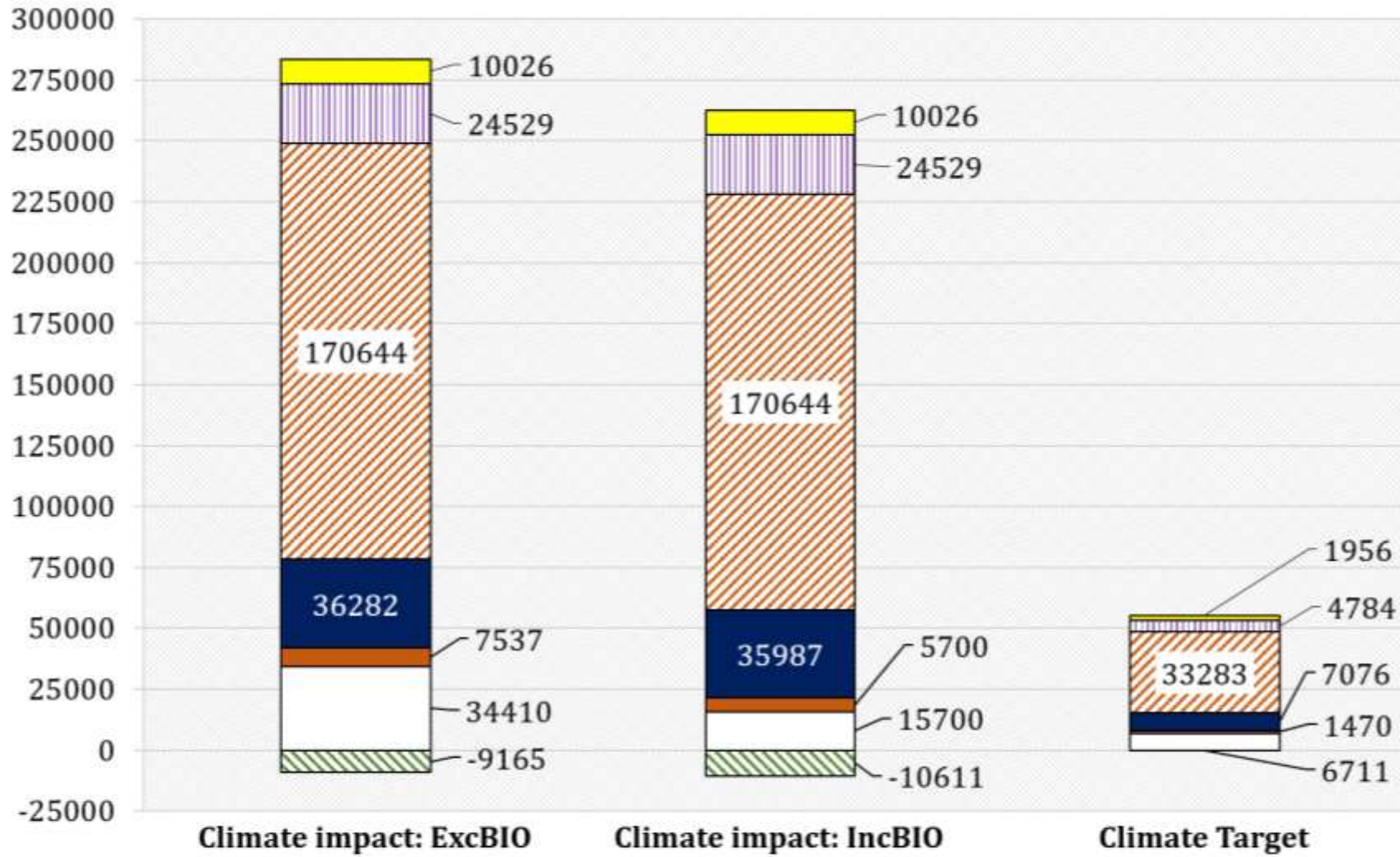
Fig.1 Contribution of the 16 key sectors to New Zealand's (a) consumption- and (b) production-based GHG emissions, respectively, for the year 2012. Consumption- and production-based GHG emissions calculations are available in Electronic Supplementary Material 1 and 2, respectively.

New Types of Modelling



Source: Chandrakumar, C., Malik, A., Ramilan, T., McLaren, S.J., & Lenzen, M. (2019). Understanding New Zealand's consumption-based greenhouse gas emissions: an application of multi-regional input-output analysis. *International Journal of Life Cycle Assessment*, published online. <https://doi.org/10.1007/s11367-019-01673-z>

Climate impact/targets of the New Zealand new-built detached house (kgCO₂eq)



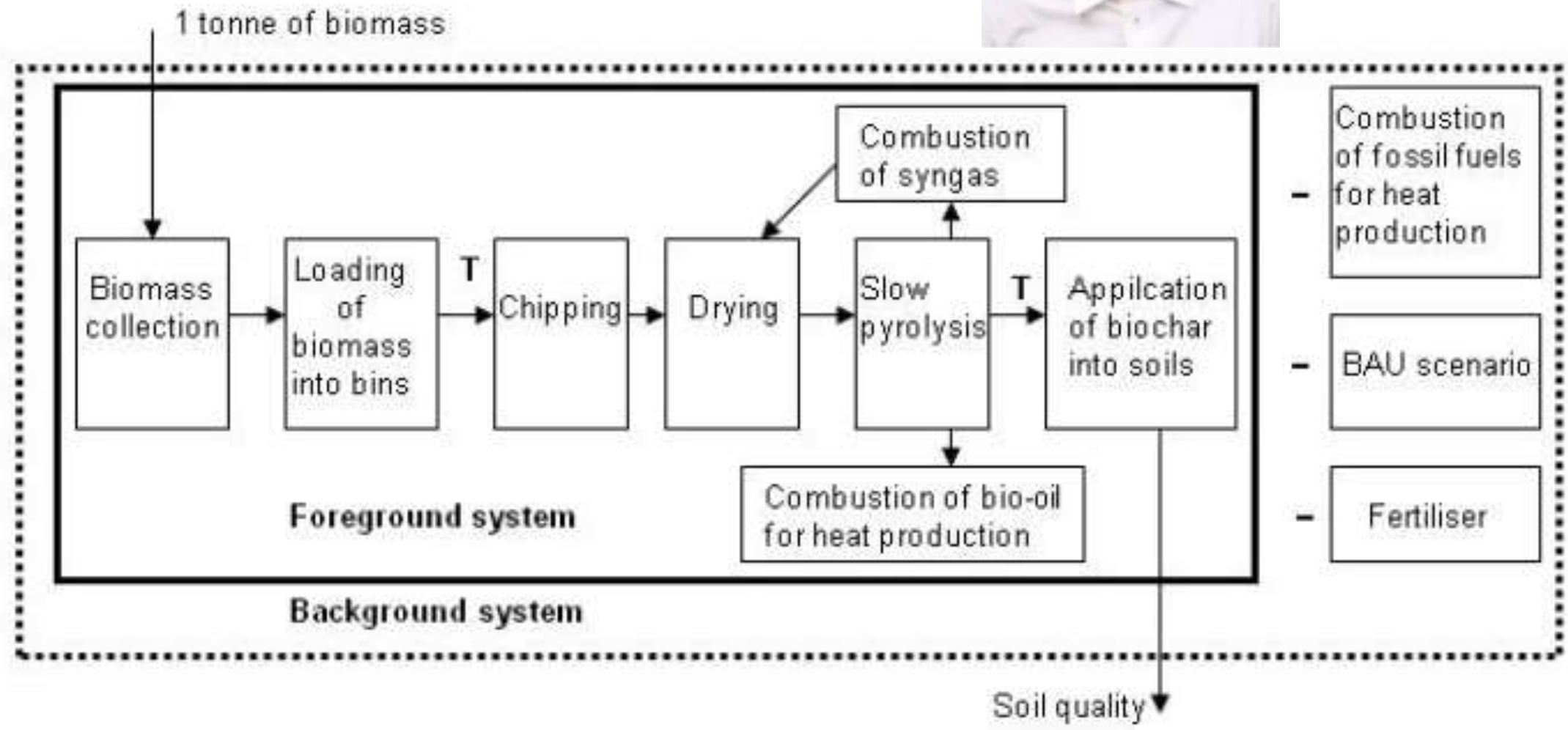
- A1-A3: Product stage
- B2: Maintenance & B4: Replacement
- ▨ B7: Operational water use
- ▩ D: Recycling potential

- A4-A5: Construction process stage
- ▨ B6: Operational energy use
- C1-C4: End-of-life stage



Source: Chandrakumar, C., McLaren, S.J., Dowdell, D., & Jaques, R. (forthcoming). A science-based approach to setting climate targets for buildings: the case of a New Zealand detached house Building and Environment. Accepted for publication in *Building and Environment*.

Source: Anaya de la Rosa, R. (2014). *LCA of Biochar Case Studies In New Zealand In Line with Carbon Markets*. PhD thesis. Palmerston North: Massey University.



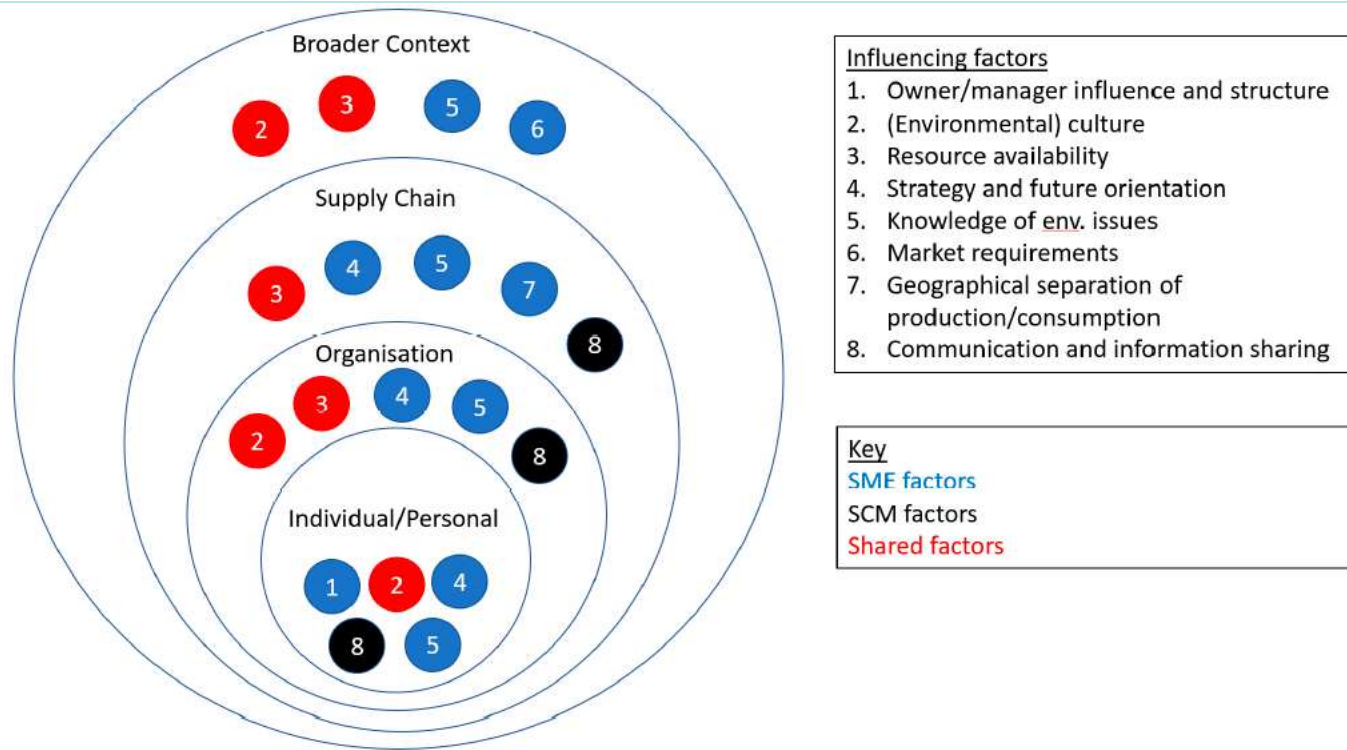
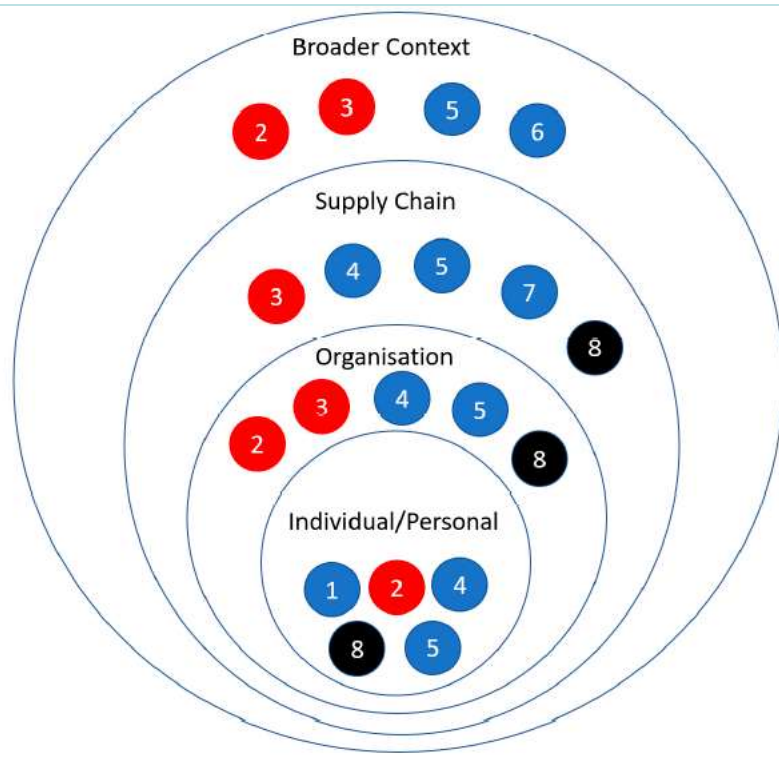


Figure 1. Enablers and barriers to successful life cycle management (LCM) uptake based on four views.



Mechanisms for Facilitating LCM



- Influencing factors
1. Owner/manager influence and structure
 2. (Environmental) culture
 3. Resource availability
 4. Strategy and future orientation
 5. Knowledge of env. issues
 6. Market requirements
 7. Geographical separation of production/consumption
 8. Communication and information sharing

- Key
- SME factors (blue)
 - SCM factors (red)
 - Shared factors (black)



Product Improvement
Optimising existing products and processes

Redesign and Functional Innovation
Creating new 'flagship' products that have environmental consideration at the forefront

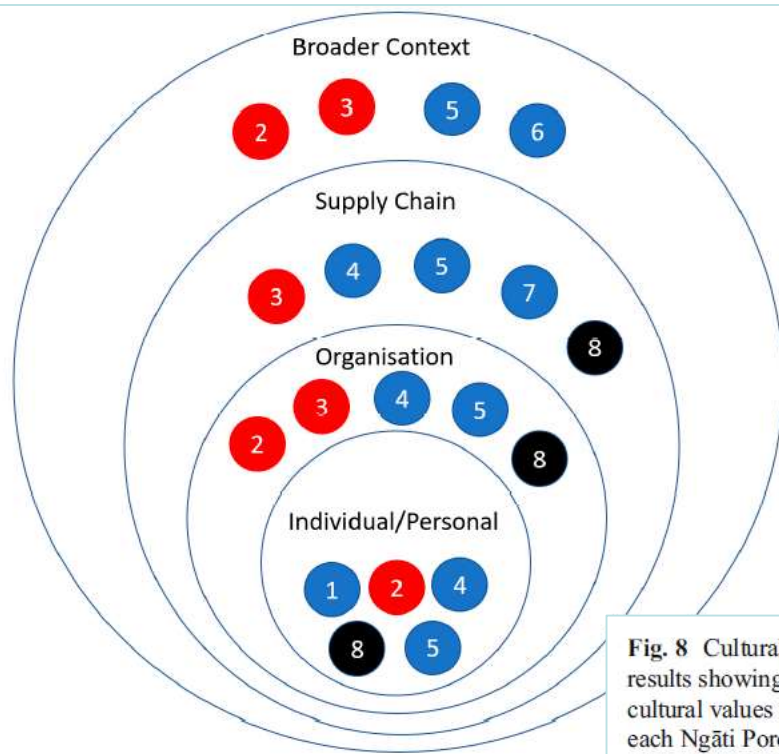
Business Model
Deliver and capture value through an alternative platform or as a service offering rather than a product

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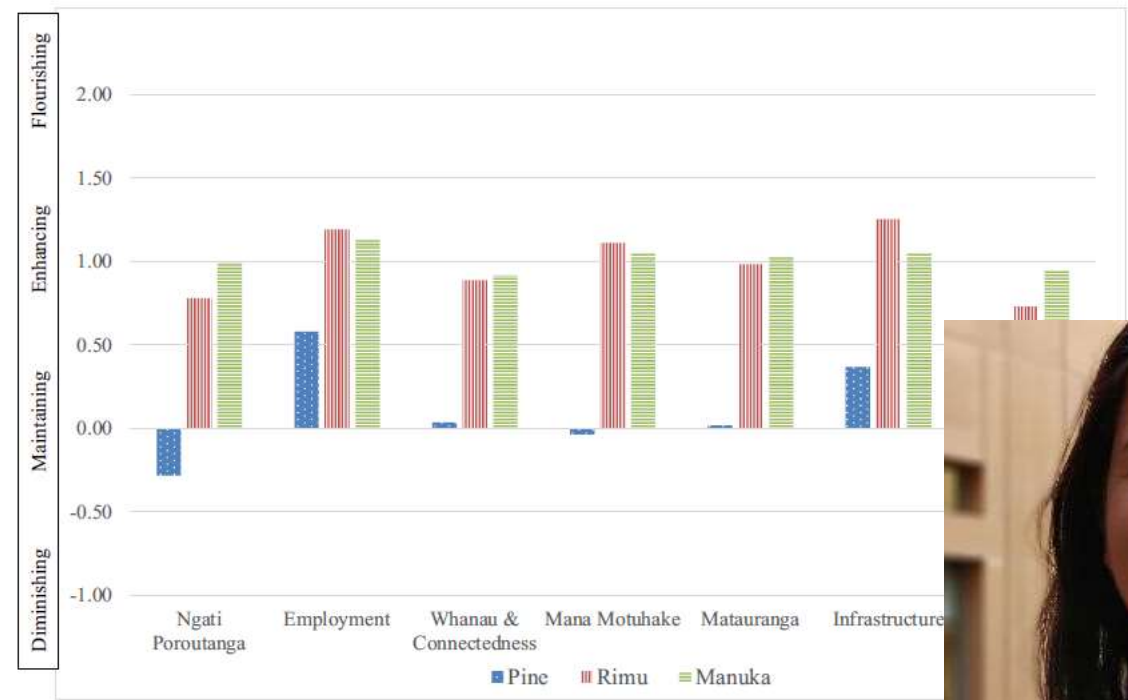


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Key

SME factors
 SCM factors
 Shared factors

Fig. 8 Cultural Indicator Matrix results showing the average cultural values associated with each Ngāti Porou aspiration as derived from the three forestry scenarios



Product Improvement
 Optimising existing products and processes

Redesign and Functional Innovation
 Creating new 'flagship' products that have environmental consideration at the forefront



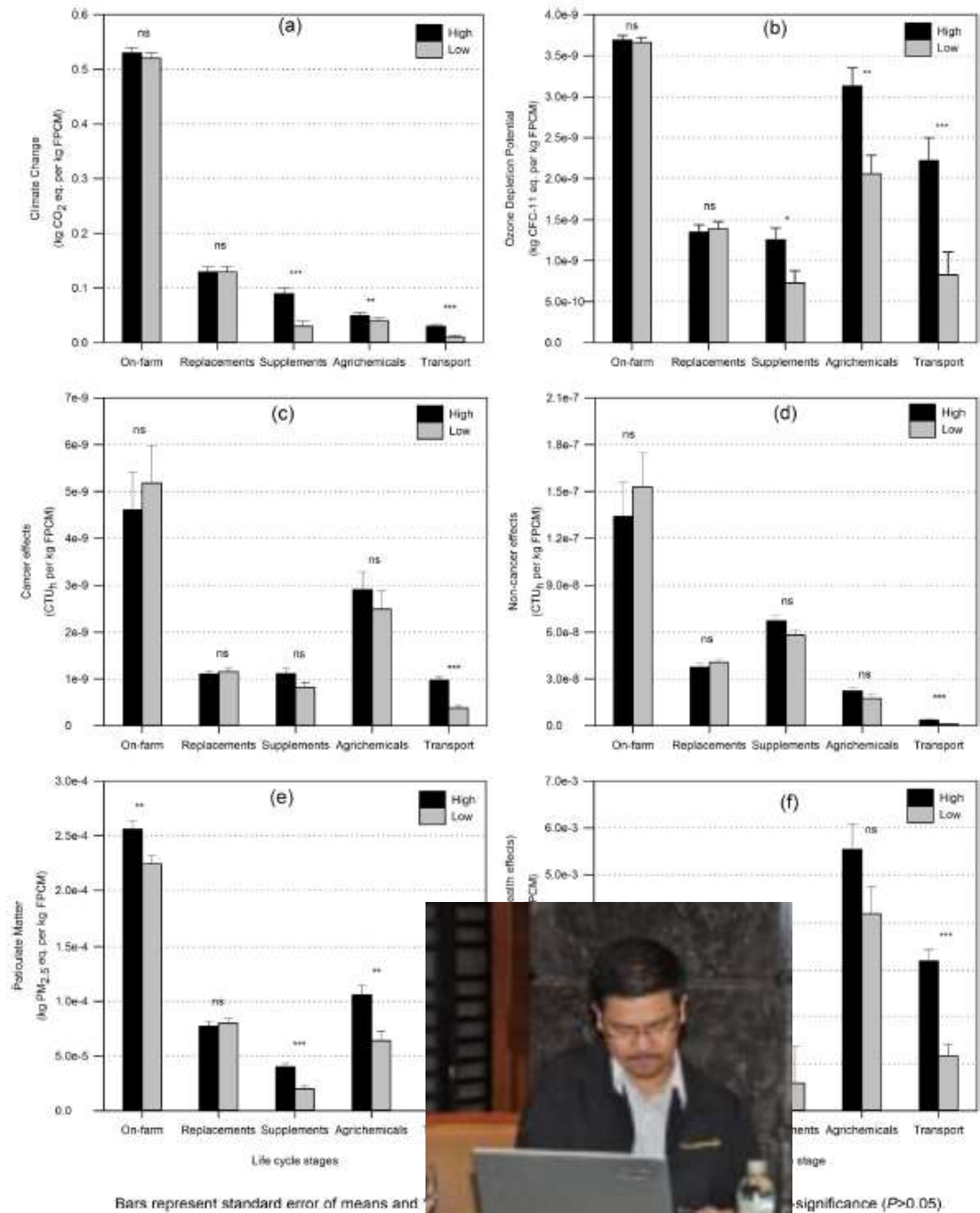
Business Model
 Deliver and capture value through an alternative form or as a service rather than a product

Mechanisms for Facilitating LCM



Figure 1. Enablers and barriers to successful LCM

Understanding Systems ...



Bars represent standard error of means and significance ($P > 0.05$)

Fig. 1. Effects on (a) Climate change, (b) Ozone Depletion Potential, (c) Cancer, (d) Non-cancer, (e) Particulate Matter, and (f) Health effects of low and high intensification levels and the contribution of different life cycle stages of production. Results of low and high intensification levels on (a) Climate change, (b) Ozone Depletion Potential, (c) Cancer, (d) Non-cancer, (e) Particulate Matter, and (f) Health effects of low and high intensification levels and the contribution of different life cycle stages of production.



Understanding Systems ...

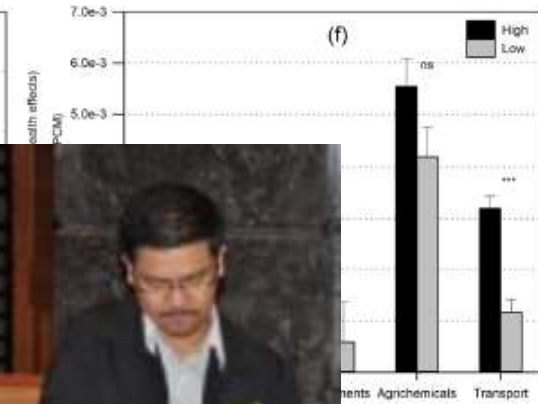
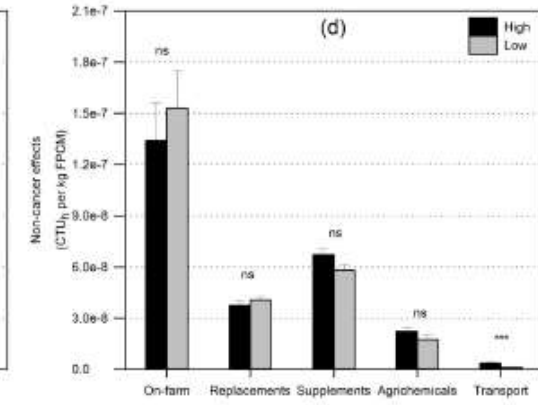
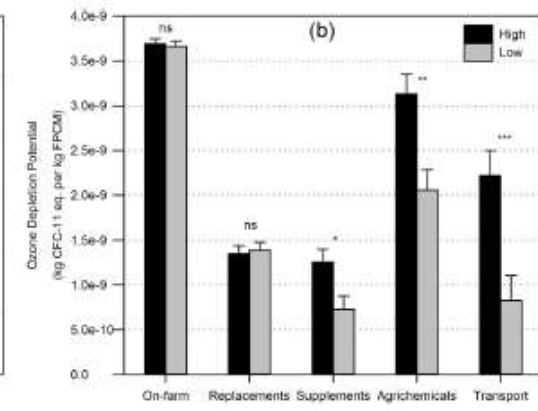
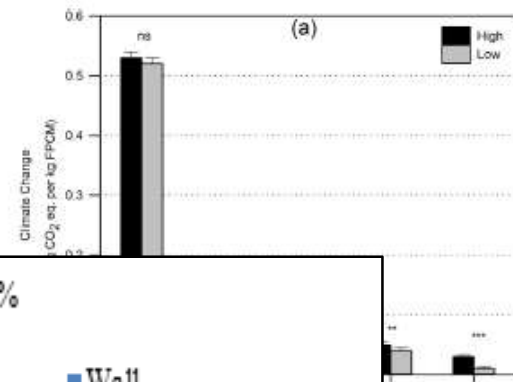
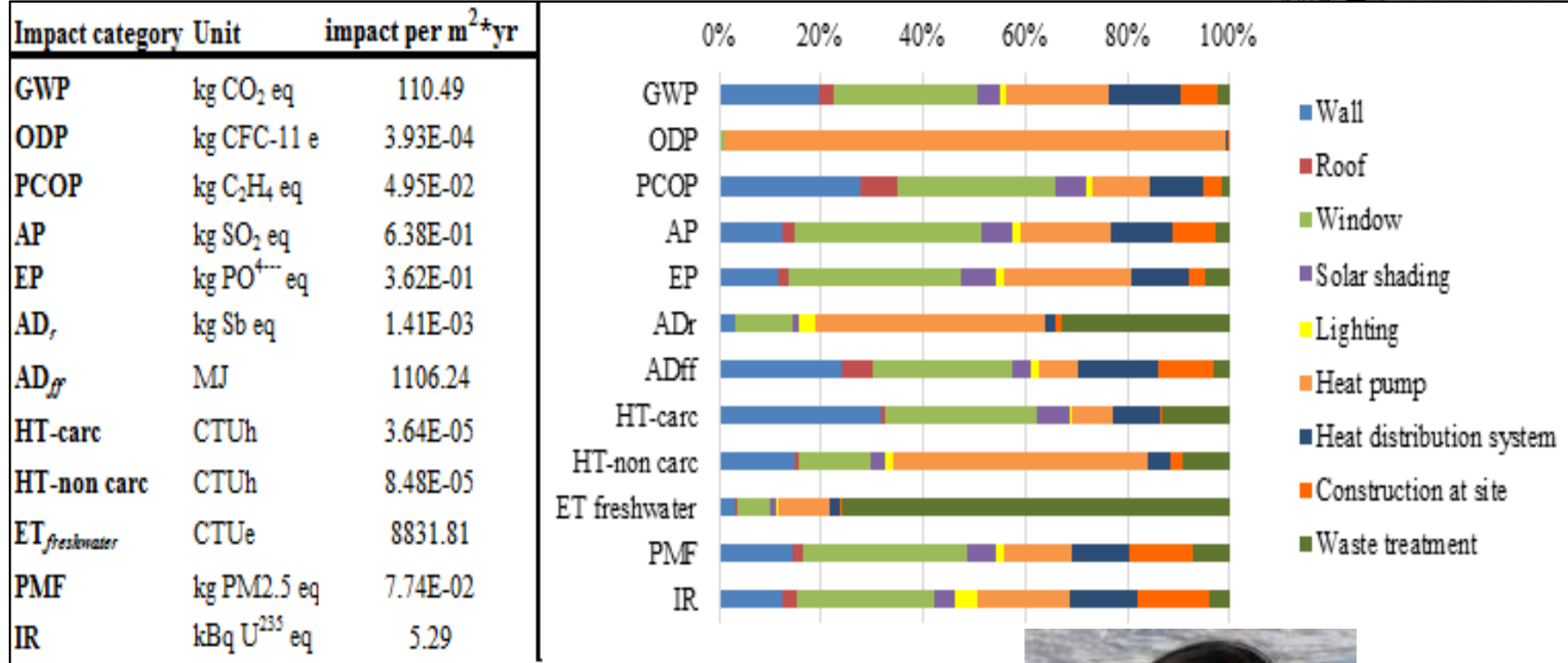


Figure 2 The impact assessment results for refurbished building (year 2010) and the contributions of the different refurbished components, construction and operation.



ns represent standard error of means and significance (P>0.05)

ing Radiation results of low and high

Understanding Systems ...

Impact category	Unit	impact per m ² *yr
GWP	kg CO ₂ eq	110.49
ODP	kg CFC-11 e	3.93E-04
PCOP		
AP		
EP		
AD _r		
AD _{ff}		
HT-carc		
HT-non carc		
ET _{freshwater}		
PMF		
IR		

0% 20% 40% 60% 80% 100%

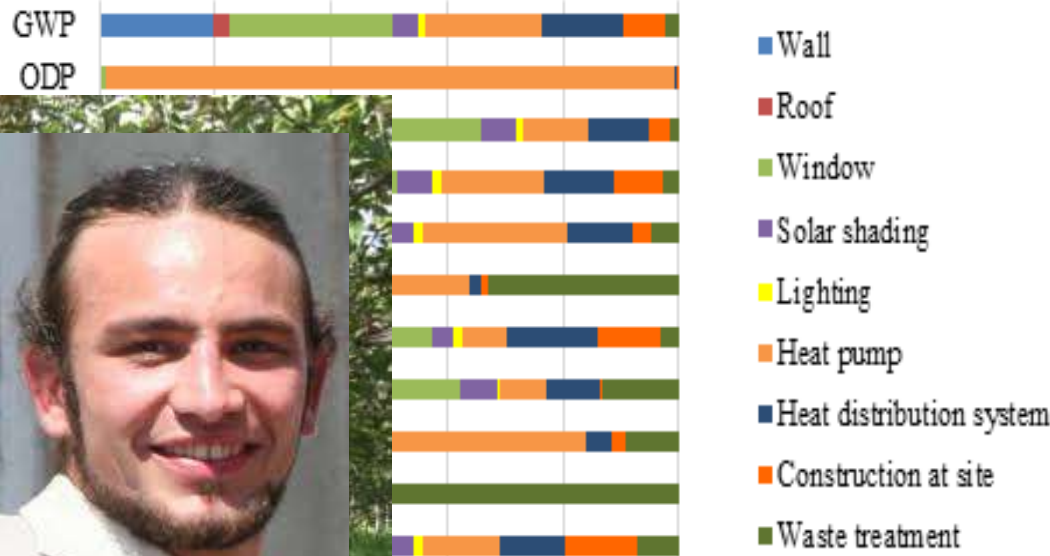
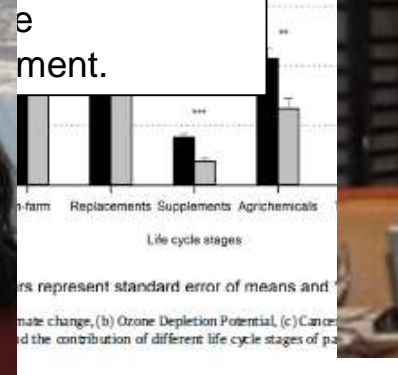
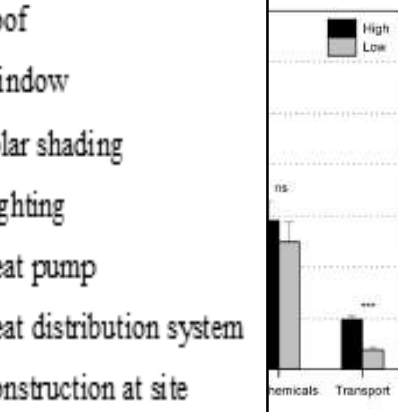
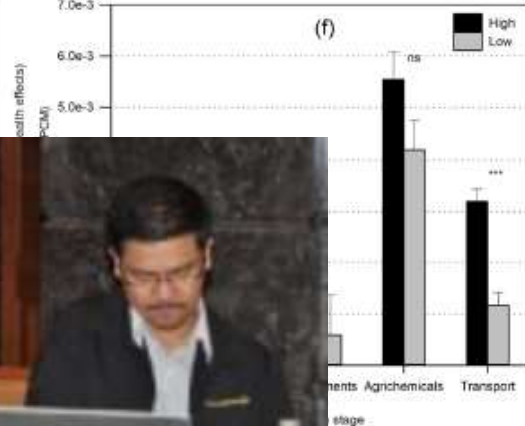
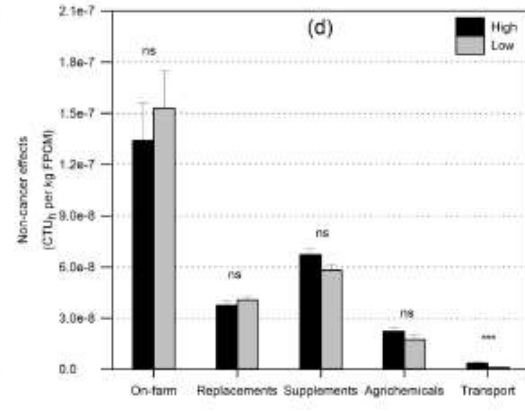
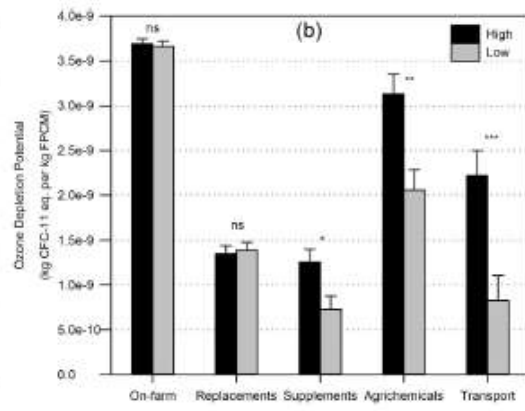
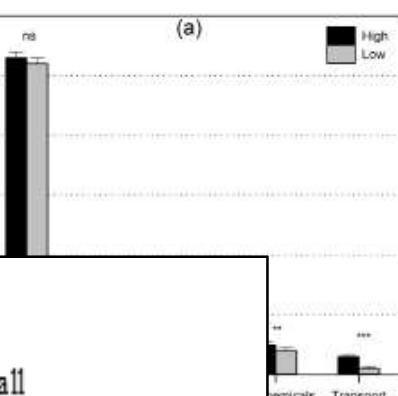


Figure 2 The contribution

year

on ac



ns represent standard error of means and ...
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NZLCM Centre: Five Strategic Imperatives



Capacity for LCM in NZ

Impact: use of LCM in NZ

Credibility: international recognition

Leading edge of research

Sustainable funding

Capacity - NZ LCM Centre Courses



Undergraduate:

- Bachelor of Engineering: Design With Constraints (3rd year)
- Bachelor of Science (Environmental Science): Environmental Issues (2nd year), Environmental Solutions (3rd year)

Postgraduate qualifications:

- Four courses on LCA/M plus research project for Master's (90 or 120 credits)
- Master's programmes in AgriScience, Environmental Management, Engineering Studies (endorsement in LCM)

Continuing Professional Development courses:

- Introduction To Life Cycle Assessment and Footprinting
- Undertaking an LCA Study



NEW ZEALAND
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MANAGEMENT CENTRE

Sustainable Business
An Initiative of BusinessNZ

future footprints: sustainability in the marketplace

There are challenges and opportunities
focus on 'green metrics' and
what doesn't.



water footprinting

**Principles, methods &
guidelines**

future footprints: sustainability in the marketplace

Forum participants will hear the views
and current actions in the sustainable
different perspectives on the issue



Alan
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Land Use In LCA

Principles, methods guidelines

One day workshop at

James Cook Hotel Grand Chancellor
147 The Terrace, Wellington

Thursday, 4th September 2014
9.15 am to 5.00 pm

This workshop coincides
with the NZ LCA Conference
on 2nd and 3rd September, 2014.

More information at www.lcaconference.org.nz

Registration and Fees:

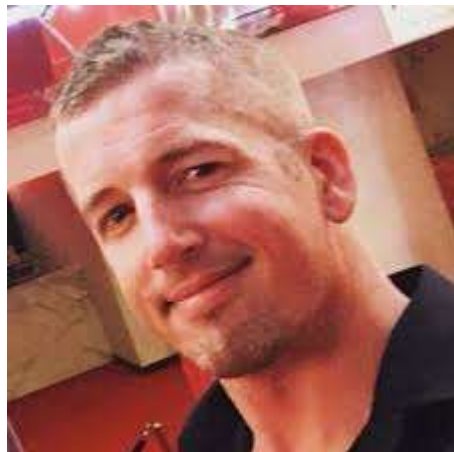
Participants can register and attend the
workshop as a part of the NZ LCA
Conference 2014 or as a specialised
stand-alone workshop. The fee is NZ\$
for attending the workshop.
For registration and
enquiries, contact info@lcaconference.org.nz

NEW ZEALAND
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MANAGEMENT CENTRE

Impact - Events



Credibility and Leading Edge - PhD Students



International Standards



International Review Group
(IRG)



Home » Events

Events

Talk on Redesigning Supply Chains for Absolute Sustainability

Room AHB1.40A, AgHort Block B, Massey University, Palmerston North; Time 12.30 pm

28 November 2019

Global supply chains are growing and becoming more complex as consumer demands are increasing. On the one hand, this supports the economic growth of different supply chain actors.

[Read more](#)

ALCAS Student Webinar Tomorrow

20 August 2019

ALCAS Student Webinar Tomorrow (21st August 2pm NZST)

This months ALCAS student webinar has a great line up.

EXPERT: Tim Grant, Lifecycles, LCA of regions - yes regions, as in regional areas.

[Read more](#)

Past events

[View past events](#)

LCANZ's 10th Anniversary Summit

Hatchbox, Auckland

27 November 2019

LCANZ is proud to announce that registrations are now open for the #rethinkLCA 1 day summit coming up in November.

[Read more](#)

Webinar: A Science based target approach for buildings

8 August 2019 to 9 August 2019

Summary: The use of Life Cycle Assessment (LCA) provides useful information to support eco-efficiency improvements and therefore, to reduce the climate impacts of building designs.

[Read more](#)

Talk on Plastics and Human Health

4 November 2019 to 7 November 2019

Kia ora koutou

Massey University's Political Ecology Research Centre is pleased to announce three events with visiting scholar, Dr John Peterson 'Pete' Myers, on the topic of Plastics and Human Health.

[Read more](#)

Events

4th ICGSI & 3rd LCA AGRIFOOD ASIA

EPD webinar with Fletcher Building, Allied Concrete and BRANZ

Hybrid LCA Webinar

ISIE Conference

▶ Past events



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238.700 Life Cycle Assessment (LCA) and Footprinting Principles (15 credits)

The concept of life cycle thinking and its application to support decision-making for product systems. The course will provide an overview of the principles and methodology for Life Cycle Assessment (LCA) according to the ISO 14040 and 14044 standards, and introduce related environmental footprinting approaches (carbon and water footprinting).

Note(s): Students are required to use their own computer to download a software programme and do some modeling.

Requirements

Note: You may enrol in a postgraduate course (that is a 700-, 800- or 900-level course) if you meet the prerequisites for that course and have been admitted to a qualification which lists the course in its schedule.

- Prerequisite(s): 10010x or 10110x

Offerings

Year	Semester	Mode	Location
2019	Semester One full semester	Distance	
2019	Semester One full semester	Block	Manawatu Campus
2020	Semester One full semester	Distance	
2020	Semester One full semester	Block	Manawatu Campus

Page authored by Director, Student Administration

Colleges

- Massey Business School
- College of Creative Arts

Teaching and learning

- Courses and qualifications
- Distance learning

Research

- Library
- Expertise search

Sustainable Funding

Summary: LCM Enablers

- LCM research for:
 - Understanding of environmental impacts along supply chains built on objective data
 - Understanding shaped by models that change perceptions
 - Enabling mechanisms that facilitate change
- Enablers for LCM research:
 - Data is fundamental
 - Collaboration
 - International engagement
 - Government investment to get initiatives off the ground

Change “on the ground” influenced in disparate ways; individual studies contribute to new ways of perceiving the world around us

References

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