

The uptake of life cycle approaches in the building industry in New Zealand, illustrated on the example of the gypsumboard industry

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- Background
- LCM case study
- Conclusions

Background

- Nearly a third of all electricity is used domestically – in heating, lighting, and running appliances
- Domestic energy consumption is about 13 % of the total energy consumption in New Zealand
- Waste from construction and demolition may represent up to 50% of all waste for disposal
- New Zealand houses have a well-earned reputation for being cold, damp, draughty and mould-ridden

- New sustainability priorities for the government
- Review of building code
- Greenbuild database
- Govt3 (green purchasing)
- New Zealand Green Building Council

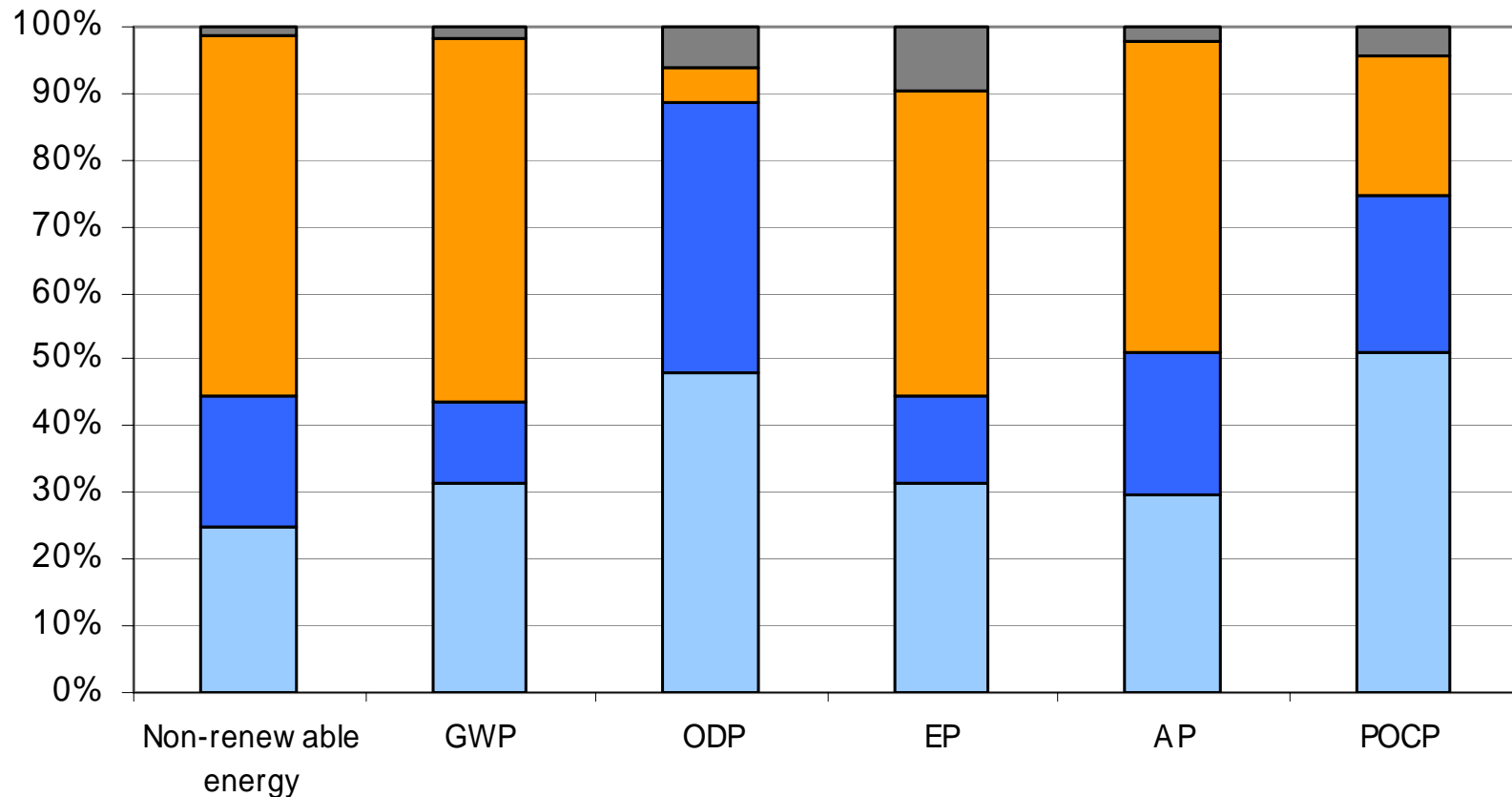
- “it is not energy use but the CO₂ emissions associated with the generation and use of energy that are unsustainable because of their contribution to climate change”.
- This would need to consider:
 - ▶ emissions used on a day-to-day basis to run the building
 - ▶ emissions that arise from the materials used to construct and maintain the building
 - ▶ emissions arising from the construction, maintenance and demolition of the building.

“We are considering CO₂ emissions rather than other greenhouse gas emissions because CO₂ is the most significant greenhouse gas associated with buildings.”

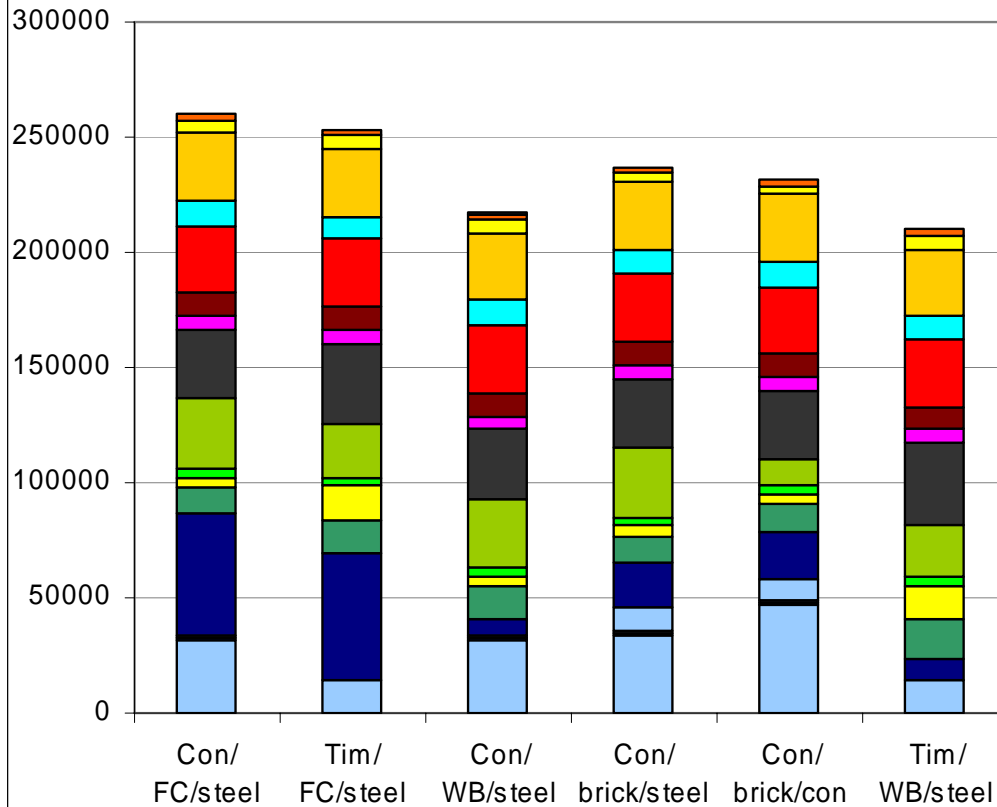
(Department of building and housing)

- Exemplar house study
- 3 bedroom home
- Different materials, locations, types of heating
- Results were used to communicate with stakeholders

Timber/WB/steel, Wellington electricity

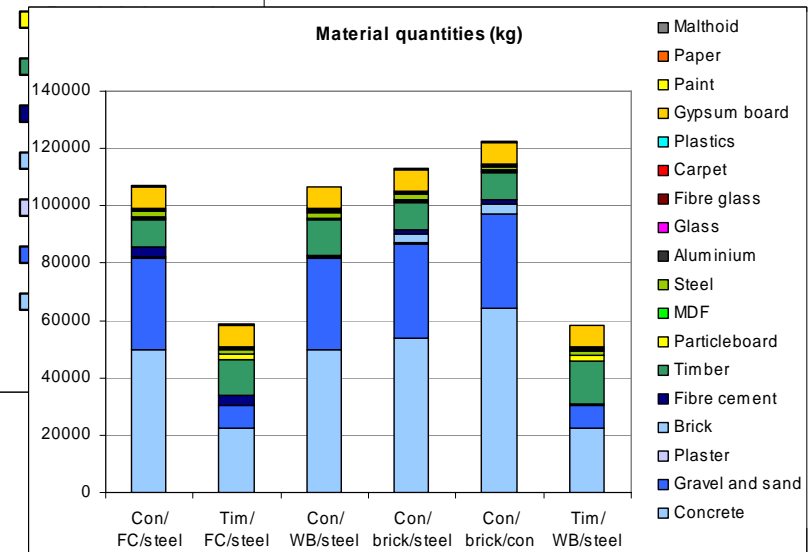


Non-renewable energy content of building materials (MJ)



- Malthoid
- Paper
- Paint
- Gypsum board
- Plastics
- Carpet
- Fibre glass
- Glass
- Aluminium
- Steel
- MDF

Material quantities (kg)

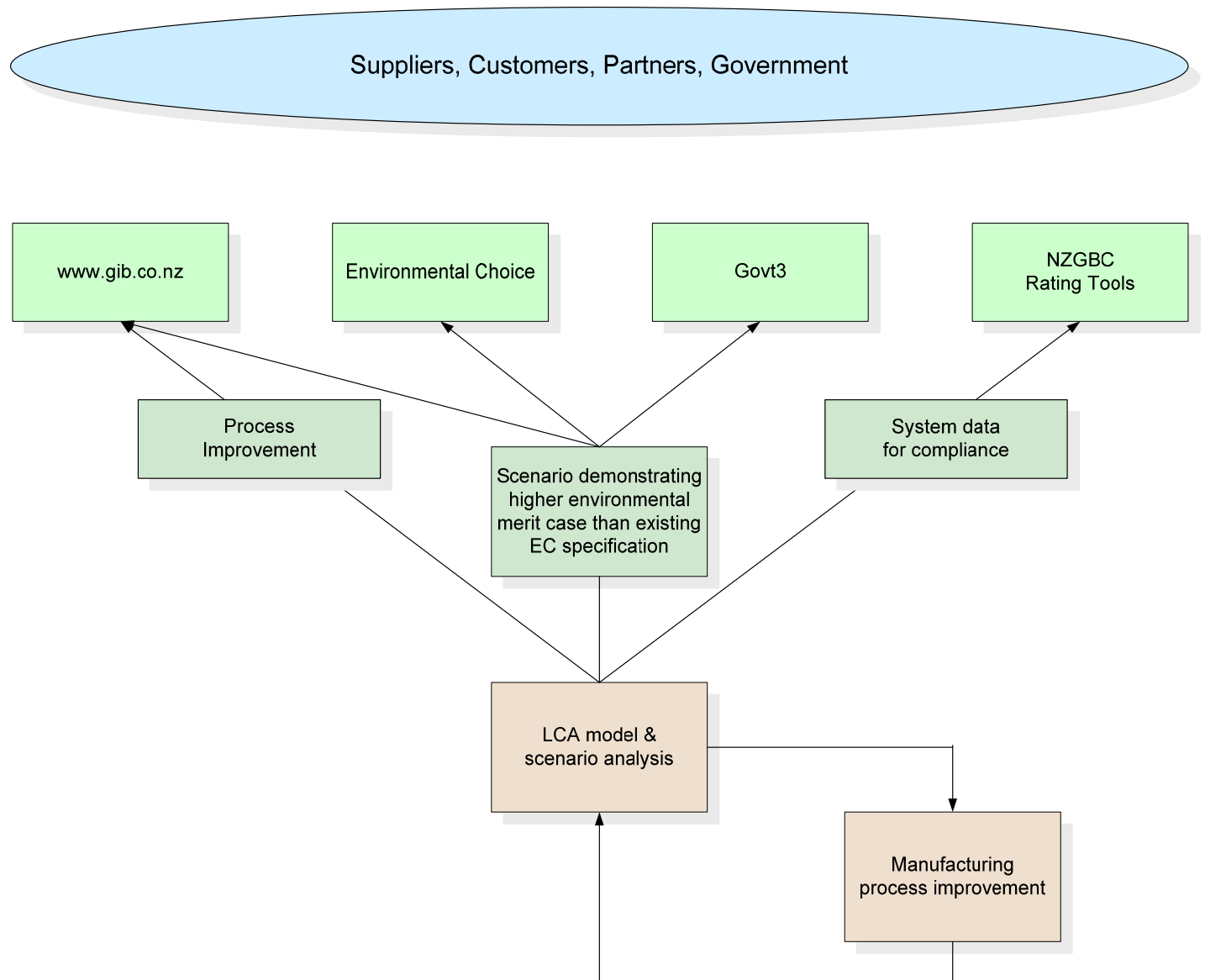


- Malthoid
- Paper
- Paint
- Gypsum board
- Plastics
- Carpet
- Fibre glass
- Glass
- Aluminium
- Steel
- MDF
- Particleboard
- Timber
- Fibre cement
- Brick
- Plaster
- Gravel and sand
- Concrete

LCM case study

- Gypsumboard manufacturer in NZ
- Early adopter of Life Cycle Assessment
- Full LCA of two production sites
 - ▶ Developed sustainability strategy
 - ▶ Developed communication strategy
 - ▶ Environmental Choice
 - ▶ Initiated industry wide LCA
 - ▶ Mentor for other companies

WWB: LCA Measurement & Communication Architecture



Presentation Layer
media, content

Middleware Layer
process, tools

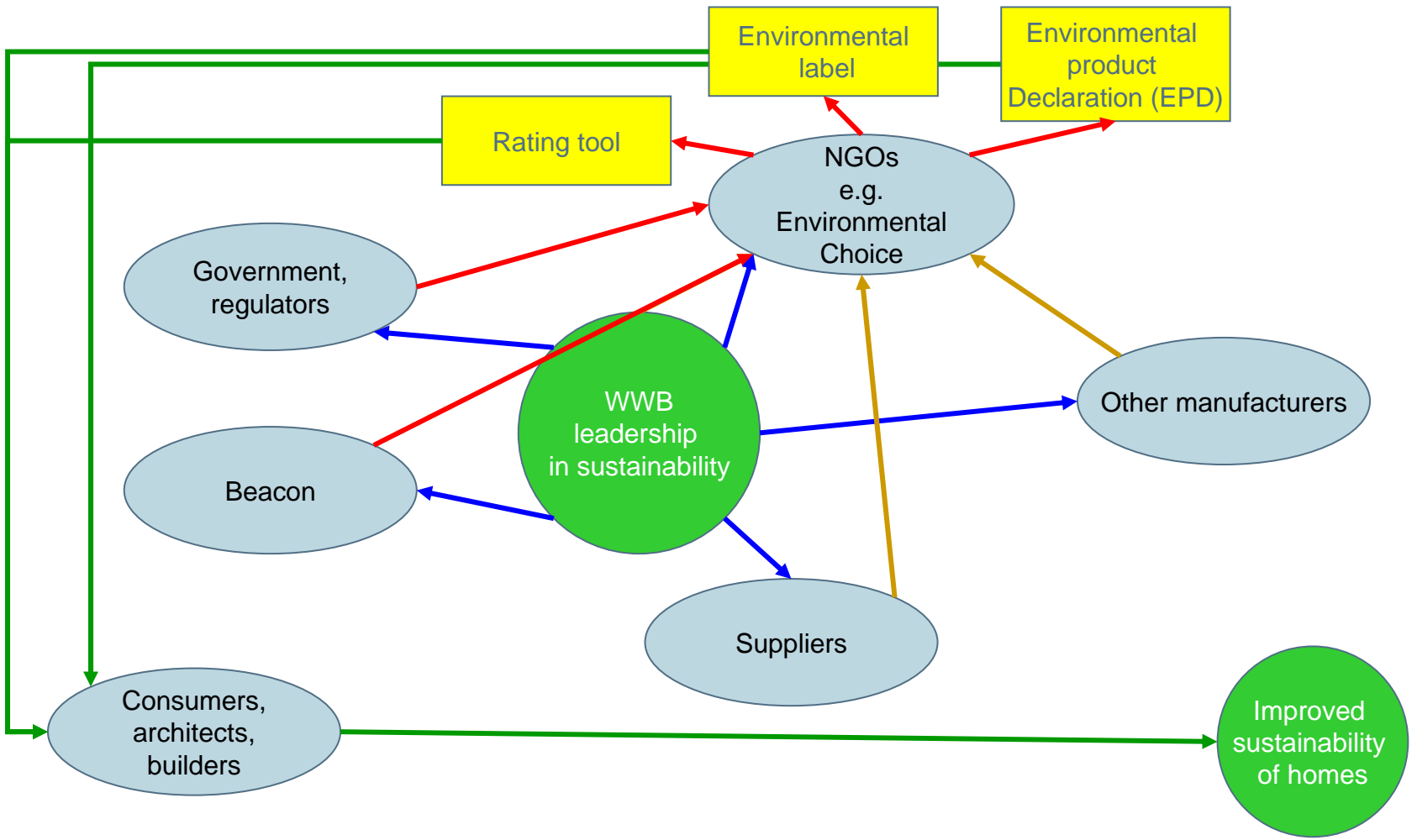
Data Layer

- Communication
- Action
- Data
- Result

Provision of data for rating tools, env. Lables, EPD

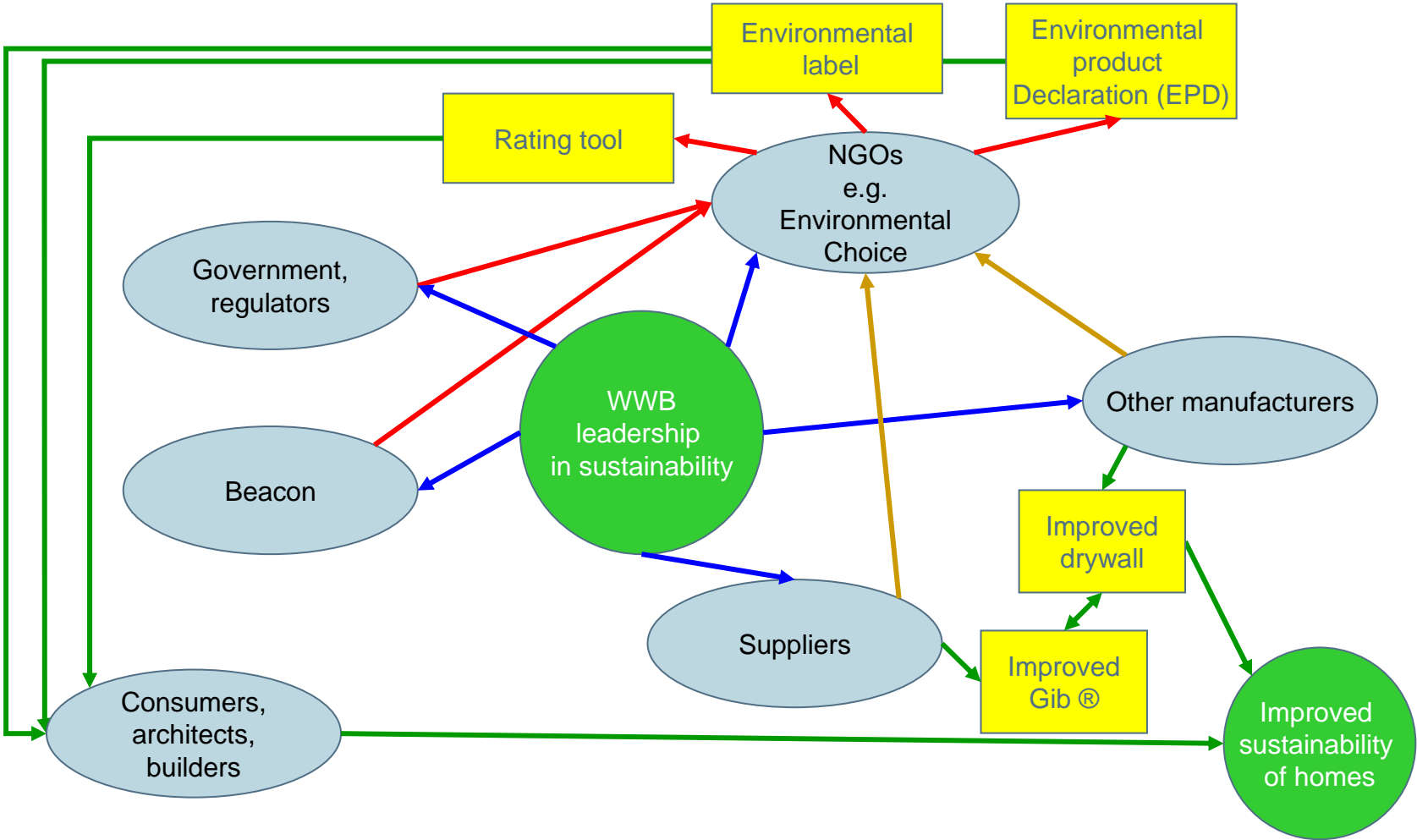
- by WWB
- other manufacturers
- suppliers of WWB

Use of information by consumers, architects, builders



- Communication
- Action
- Data
- Result

Overall process of establishing leadership in sustainability and improvement of homes through communication, provision of information



“

It provides an ideal framework to examine the supply chain system and then model improvements around environmental and economic outcomes.

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Guided by the robust quantitative framework of a full Life Cycle Assessment (LCA), Winstone Wallboards is committed to an active leadership role in changing the course of New Zealand's built environment.

Winstone Wallboards successfully applied LCA to the production and distribution of their GIB® plasterboard earlier this year and are now applying the knowledge to waste plasterboard disposal. “The LCA approach is holistic, transparent and repeatable”, says Kevin Golding, Manager Future for Winstone Wallboards Limited. “It provides an ideal framework to examine the supply chain system and then model improvements around environmental and economic outcomes. We have a good story to tell and LCA gives us reliable high quality data”.

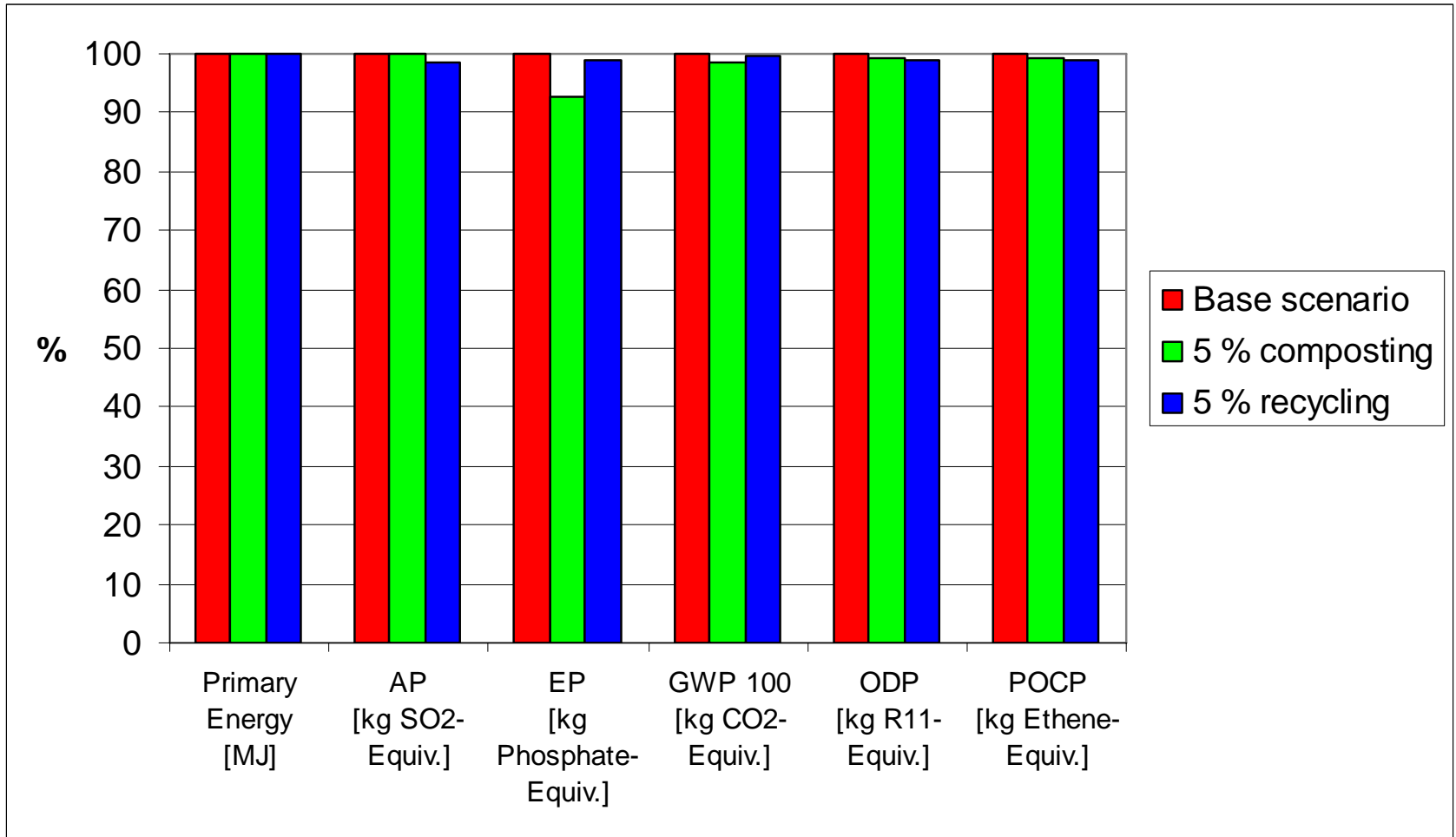
The company sees a direct link between improving sustainable performance and business performance. They regard LCA as a practical tool for targeting waste reduction as part of their vision of creating a better, safer, healthier and more secure life for all New Zealanders.

Every year 3.4 million tonnes of waste go to New Zealand's 90 landfills. According to a recent Landcare bulletin, this waste amounts to about 700 kg per person and is enough to fill olympic-sized swimming pools stacked 5 km high. An estimated 25,000-30,000 tonnes of waste annually are plasterboard.

Of the various solutions that Winstone Wallboards are considering, the most viable appears to be reuse of plasterboard in composting.

- Type 1 label
- Govt3 compliant

- Existing specification for plasterboard
- Requires 5 % recycled content
 - ▶ reduce waste going to landfill
 - ▶ resource efficiency



- Transport distances
- Composting as alternative scenario
- Replacement of soil enhancer (virgin gypsum)

- Specification was changed and offers now option of 5% of plasterboard waste going to composting

- Other plasterboard manufacturers in Australasia
- Average for plasterboard industry

- Position the association as the authoritative source for information relevant to the gypsum board industry ✓
- Communicate gypsum board environmental credentials ✓
- Be recognised as an environmentally responsible industry ✓
- Position gypsum board as the preferred interior lining, having superior environmental attributes to alternatives ●
- Provide the public with information on relevant environmental and sustainability measures, and correct any misinformation ✓
- Provide sustainability comparison for differing construction types focussing on whole-of-life building and measures ●
- Position sustainability with other build-ability and lifestyle parameters
- Communicate the association's views to the relevant Authorities ✓

- More plasterboard manufacturers will do detailed site specific studies
- Roofing manufactures discussed experiences with WWB and have started LCA journey

- Drivers for quantification of environmental performance
- Slow uptake of life cycle approaches
- Research results convinced industry to start LCM journey
- Snowball effect started by one company