

# **Sustainability and the built environment**

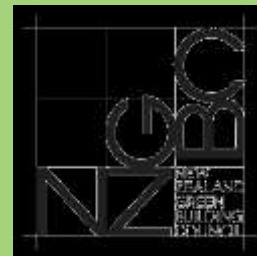
*27<sup>th</sup> July 2011*



# Introduction

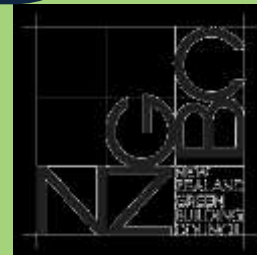
*Matthew Blaikie*

*Senior Technical Coordinator, NZGBC*



# Agenda

- *Sustainability concepts*
- *The built environment*
- *NZGBC role and tools*



# Sustainable Development

***“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”***

*The Brundtland Report - 1987*

The United Nations World  
Commission on Environment  
and Development (WCED)

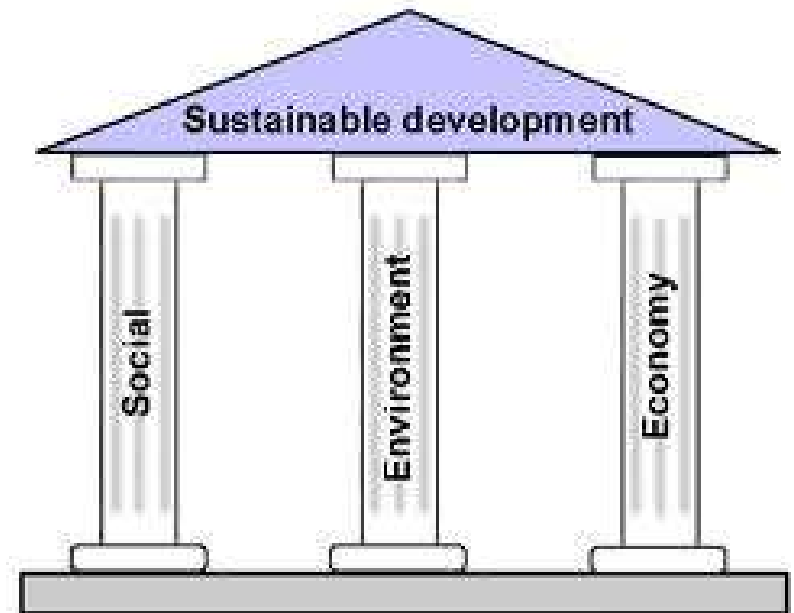


# 2005 World Summit

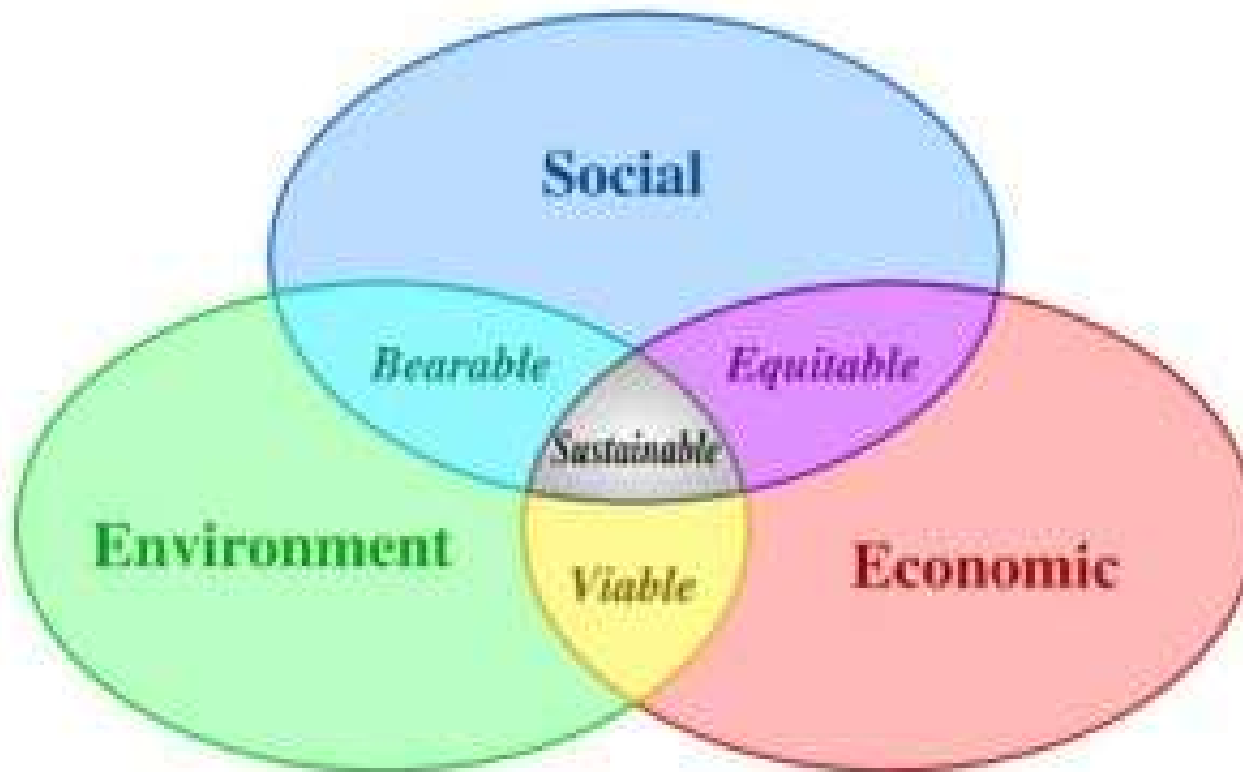
*Noted that sustainable development requires the reconciliation of environmental, social and economic demands - the "three pillars" of sustainability.*



Three legged stool  
concept



# Triple Bottom Line

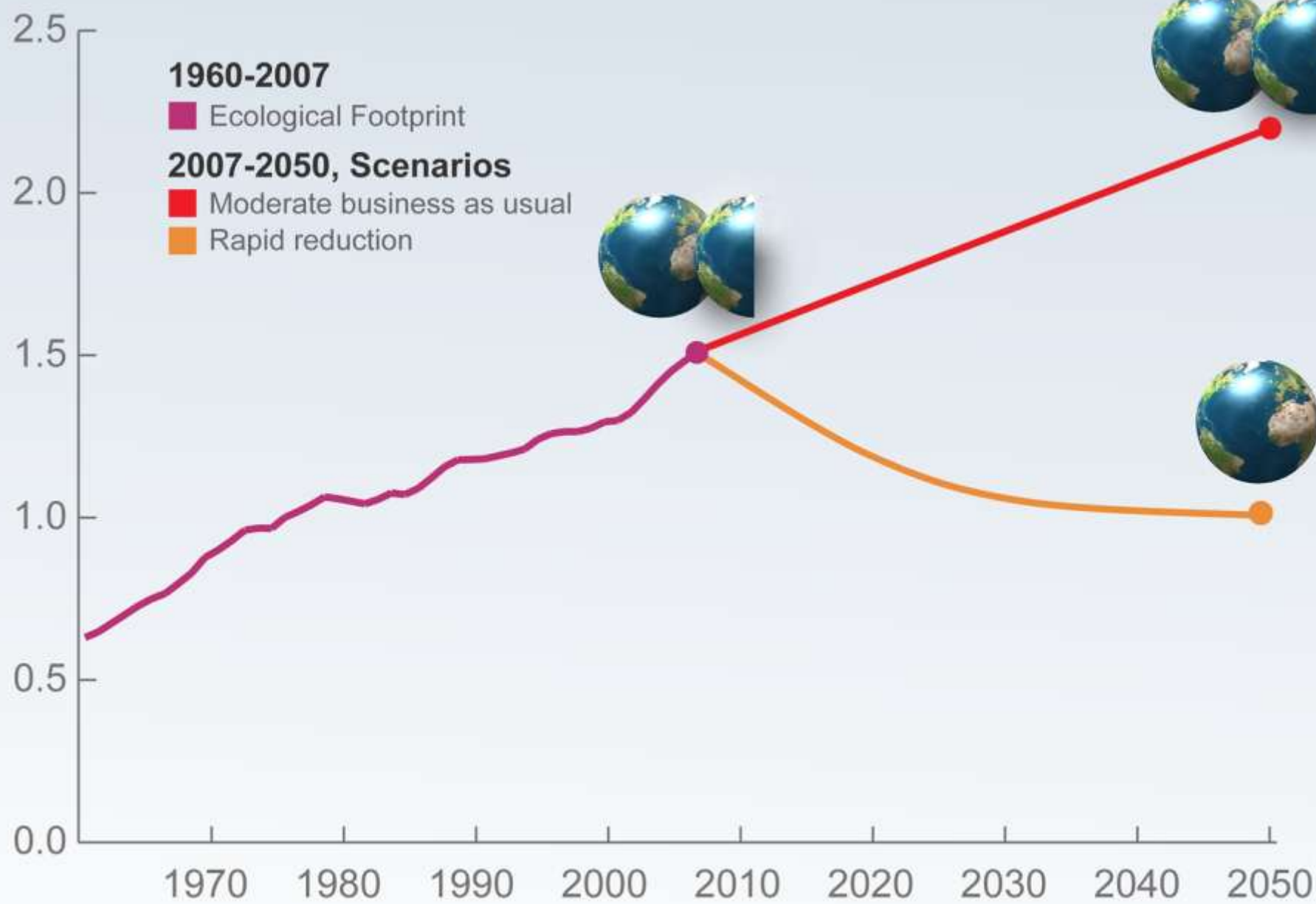


# Quantifiable limits

***“Sustainability is improving the quality of human life while living within the carrying capacity of supporting eco-systems”***

*Source: IUCN/UNEP/WWF - Caring for the Earth:  
A strategy for Sustainable Living (1991)*



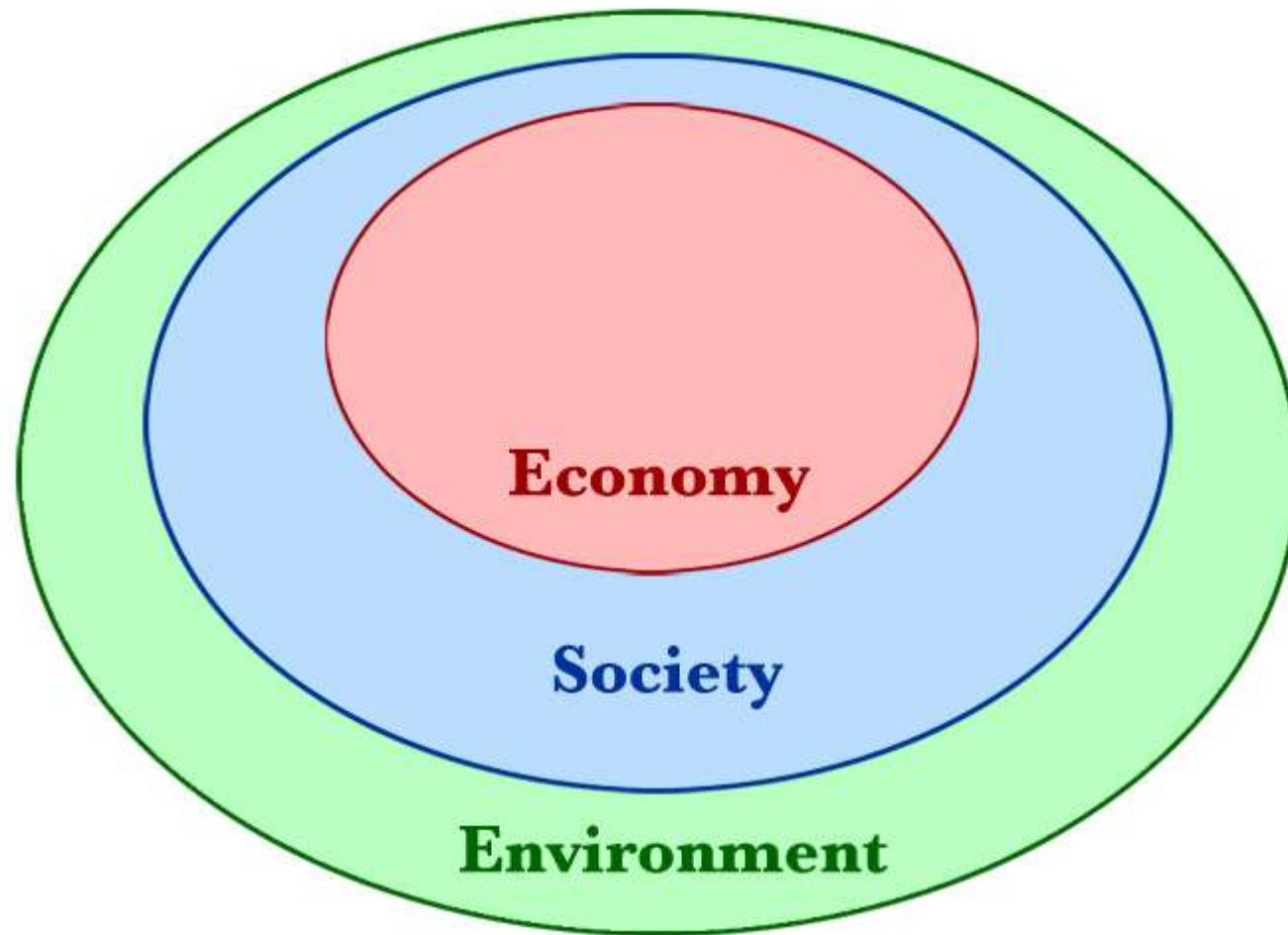


*y-axis: number of planet earths, x-axis: years*

Source: Global Footprint Network

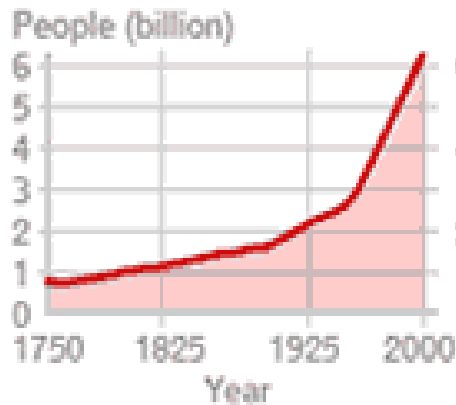


# Existing within the capacity of the environment

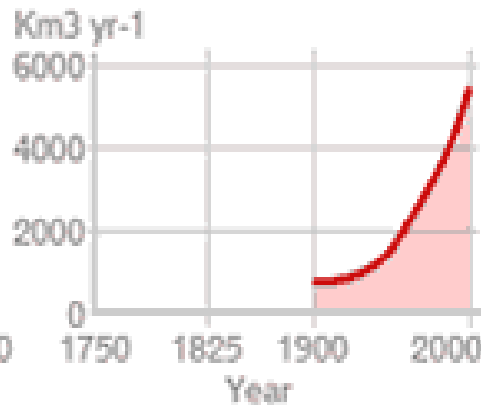


# Living within natural limits?

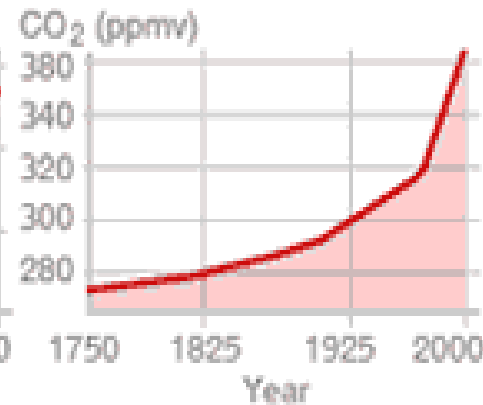
**POPULATION**



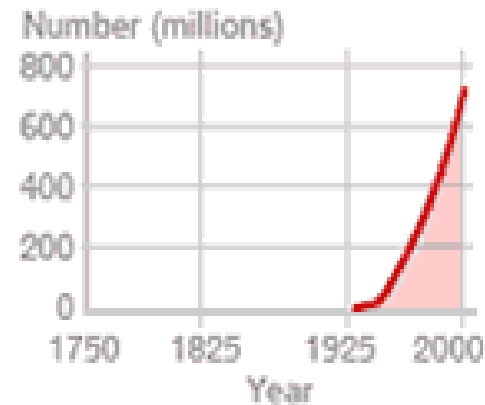
**WATER USE**



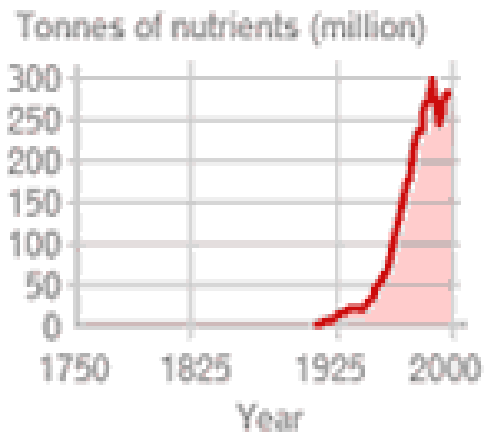
**CO<sub>2</sub> CONCENTRATION**



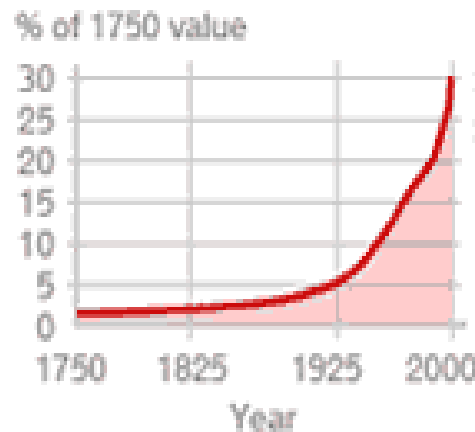
**NUMBER OF CARS**



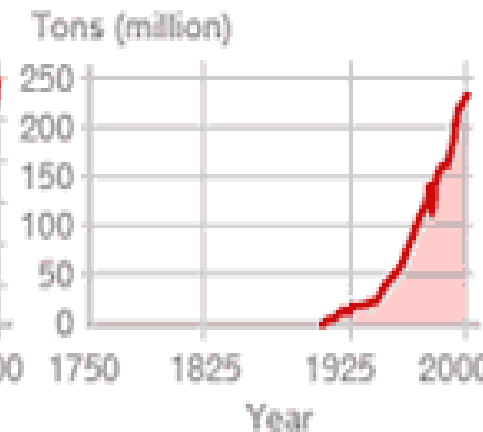
**FERTILISER CONSUMPTION**



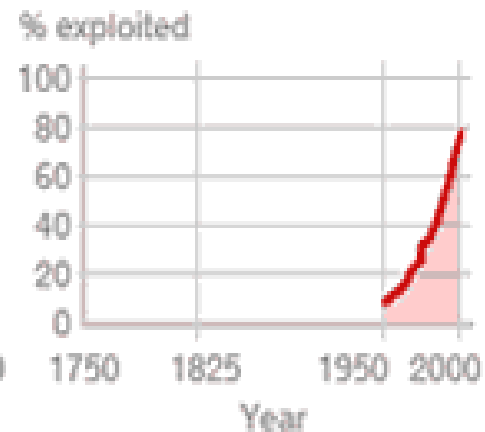
**LOSS OF RAINFOREST**



**PAPER CONSUMPTION**

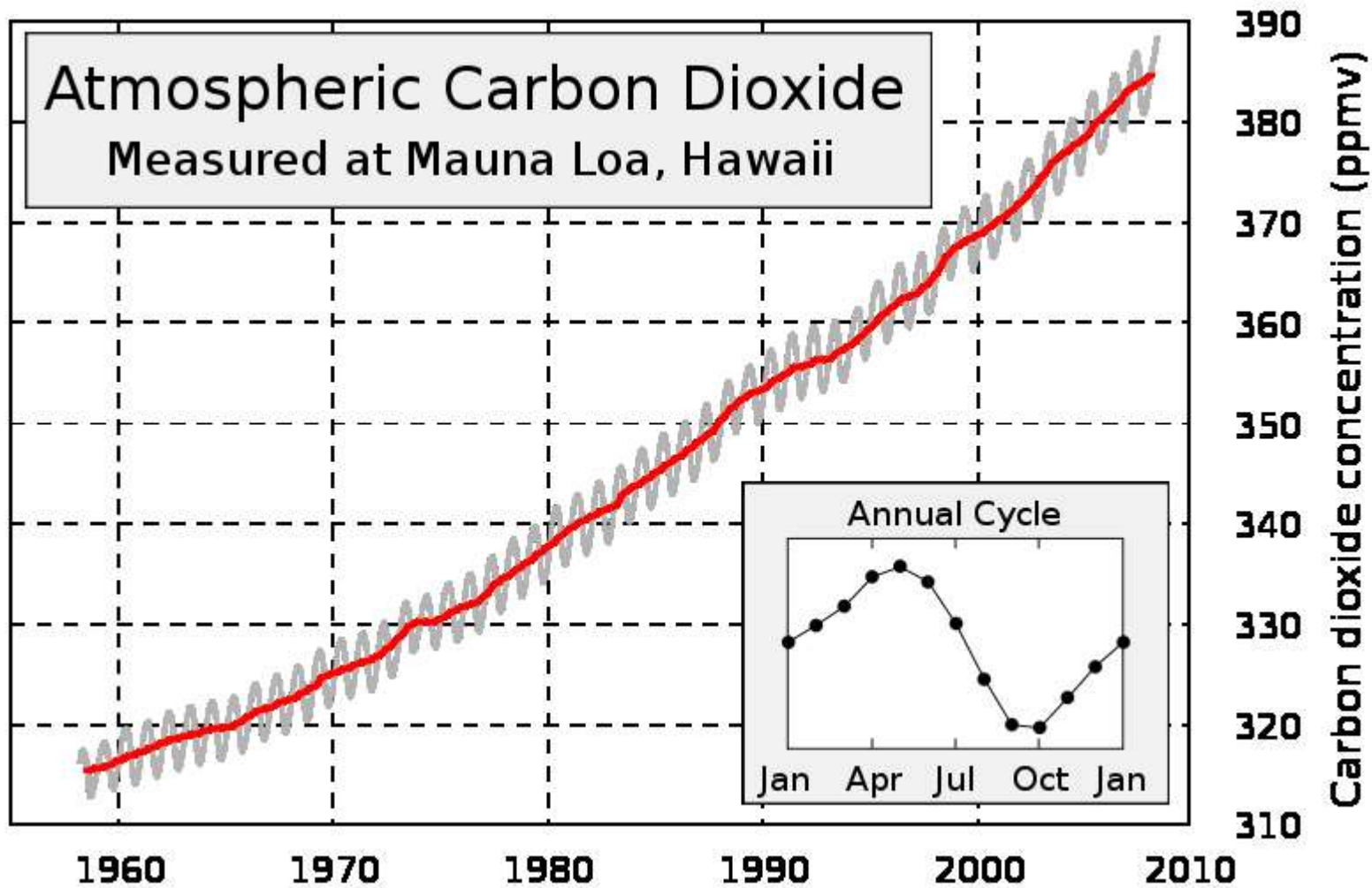


**FISHERIES FULLY EXPLOITED**



SOURCE: International Geosphere-Biosphere Programme (Steffen et al 2004)

# Increasing CO<sup>2</sup>



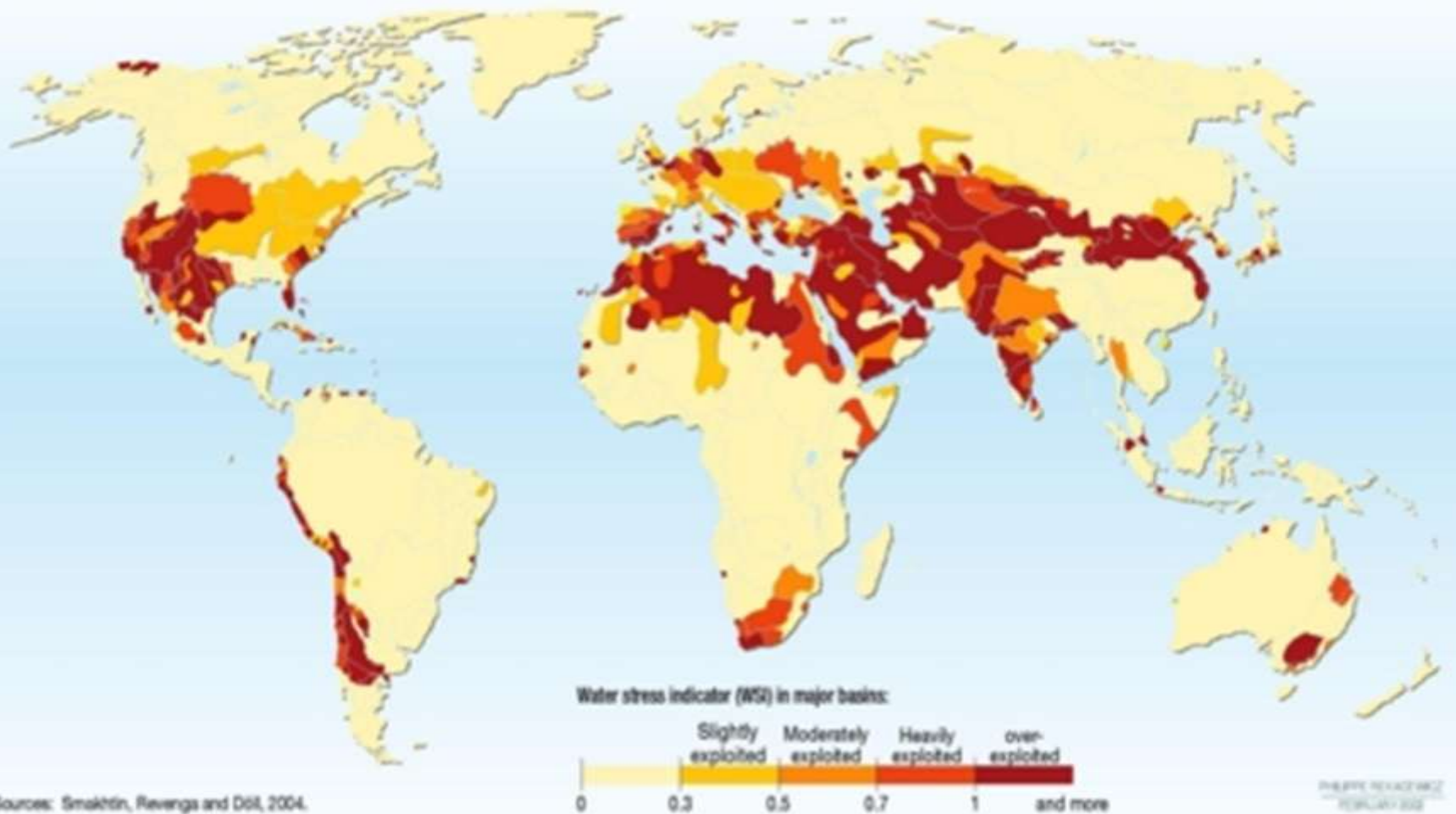
# Biodiversity loss

***“Biodiversity loss is moving ecological systems ever closer to a tipping point beyond which they will no longer be able to fulfil their vital functions.”***

*UN Secretary-General Ban Ki-moon,  
International Day for Biological Diversity  
22 May 2010.*

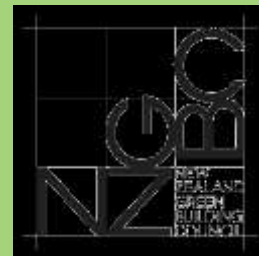


# Water scarcity



Sources: Smakhtin, Revenga and Doll, 2004.

# The built environment

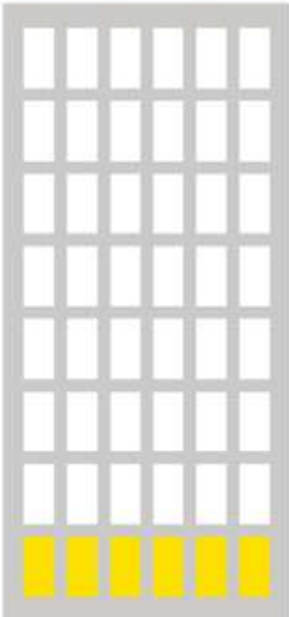


# WORLDWIDE, BUILDINGS ACCOUNT FOR:



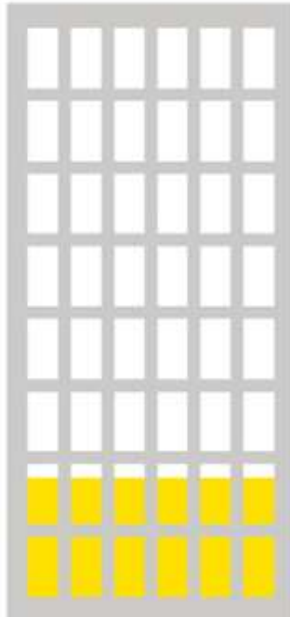
**17%**

of fresh water  
consumption



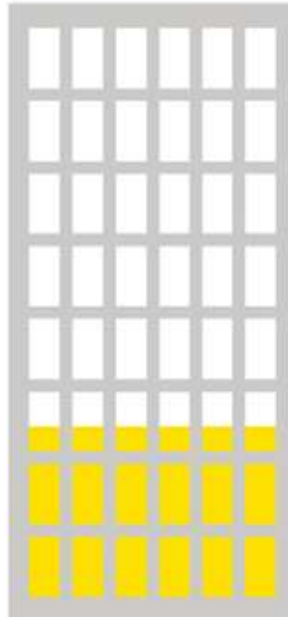
**25%**

of wood harvest



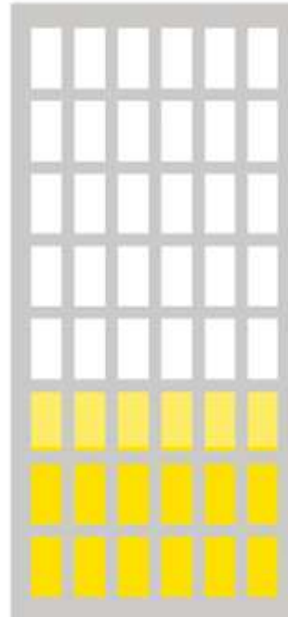
**33%**

of CO<sub>2</sub> emissions



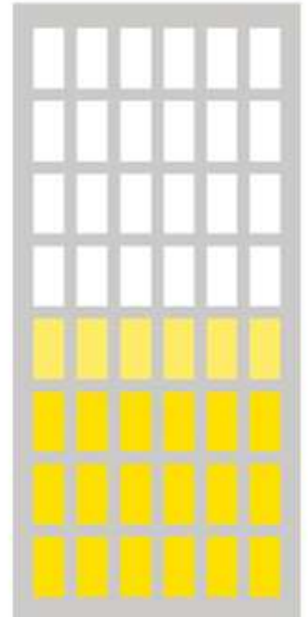
**30-40%**

of energy use



**40-50%**

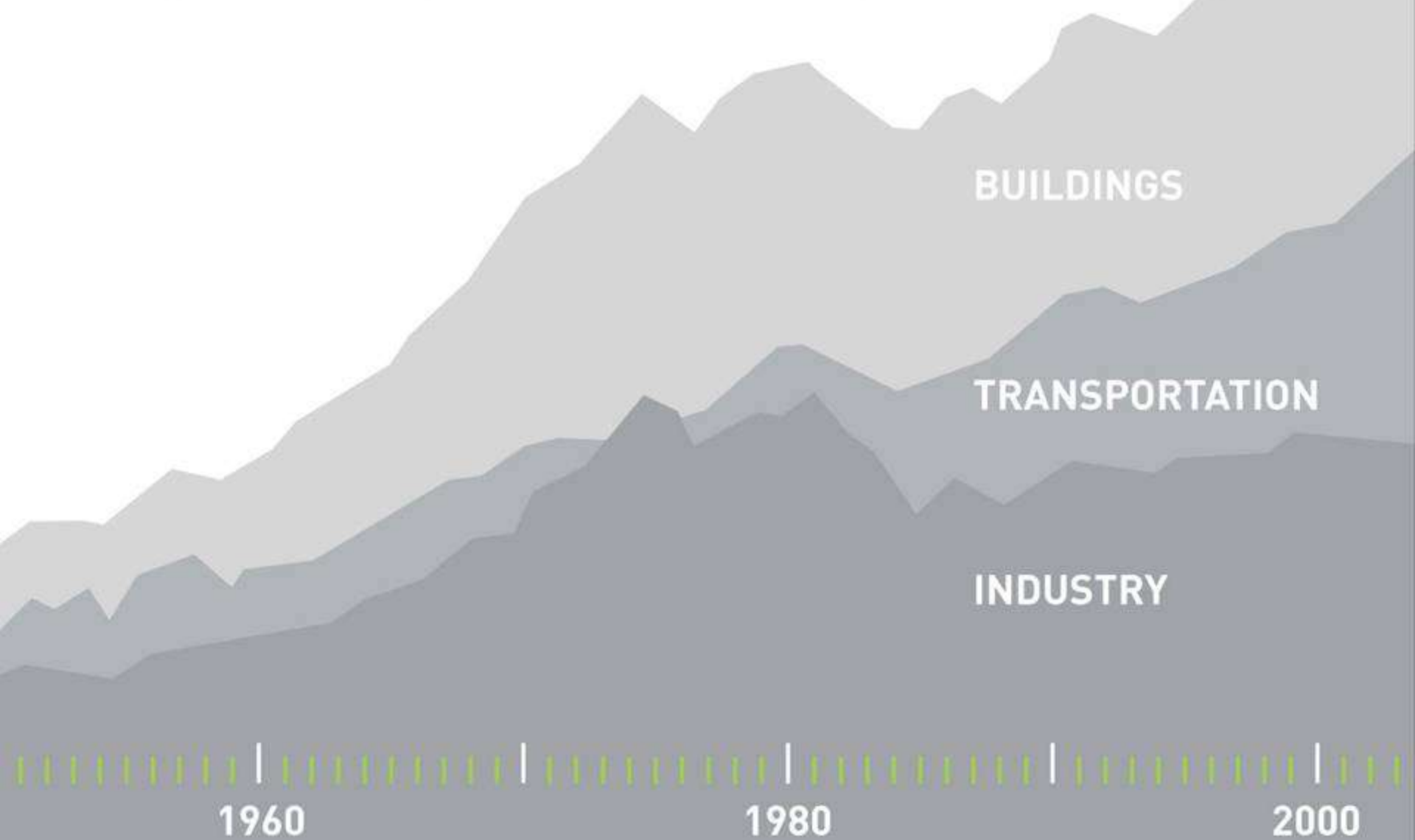
of raw materials  
used



## CO<sub>2</sub> EMISSIONS BY SECTOR:



Buildings are an important part of the solution to climate change.





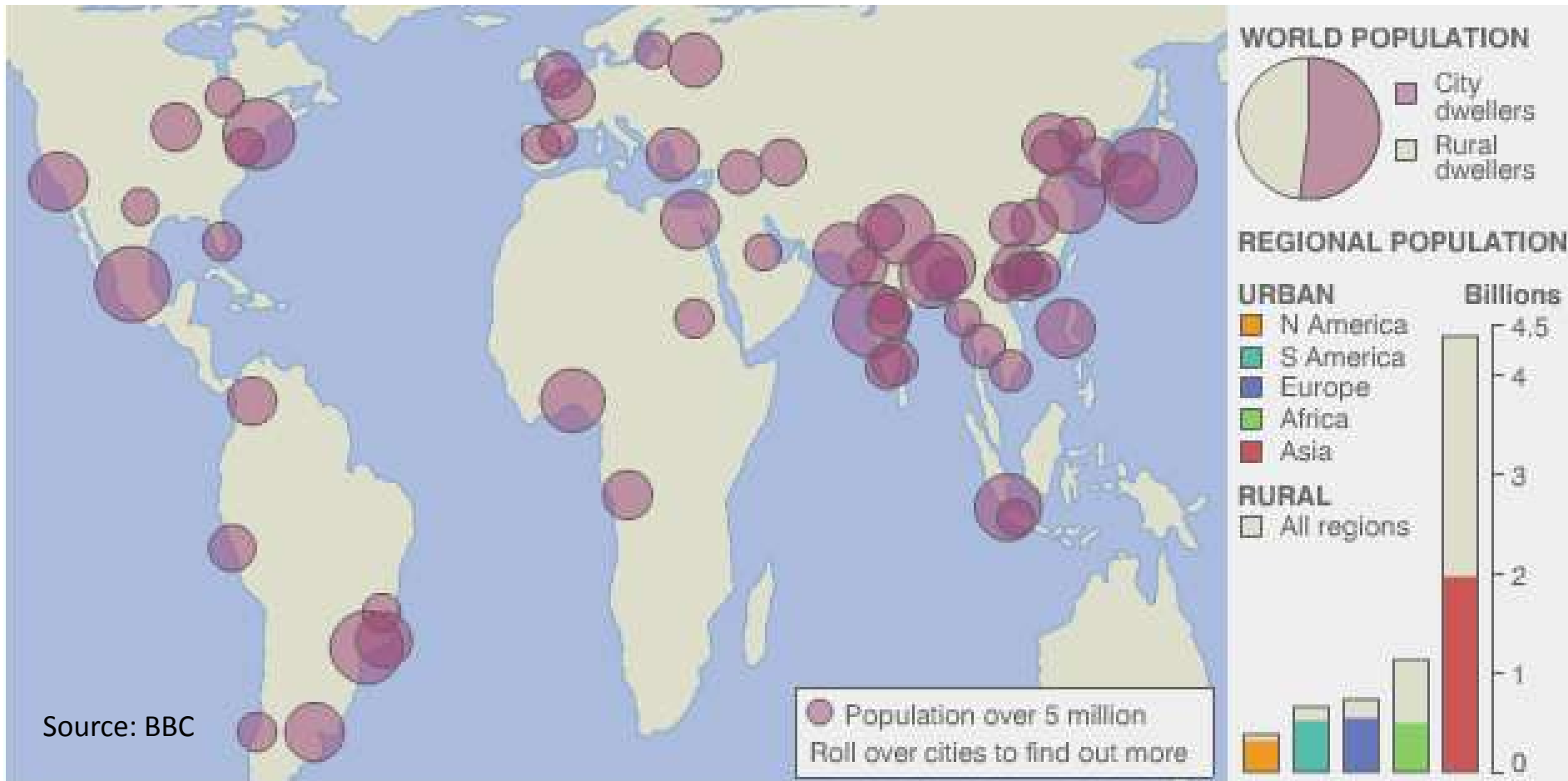
# Increasing urbanisation

1955



# Increasing urbanisation

2015



# Wellington context

- *Wellington City's population is expected to increase by over 20% over the next 20 years.*

Source: Toward 2040: Smart Green Wellington



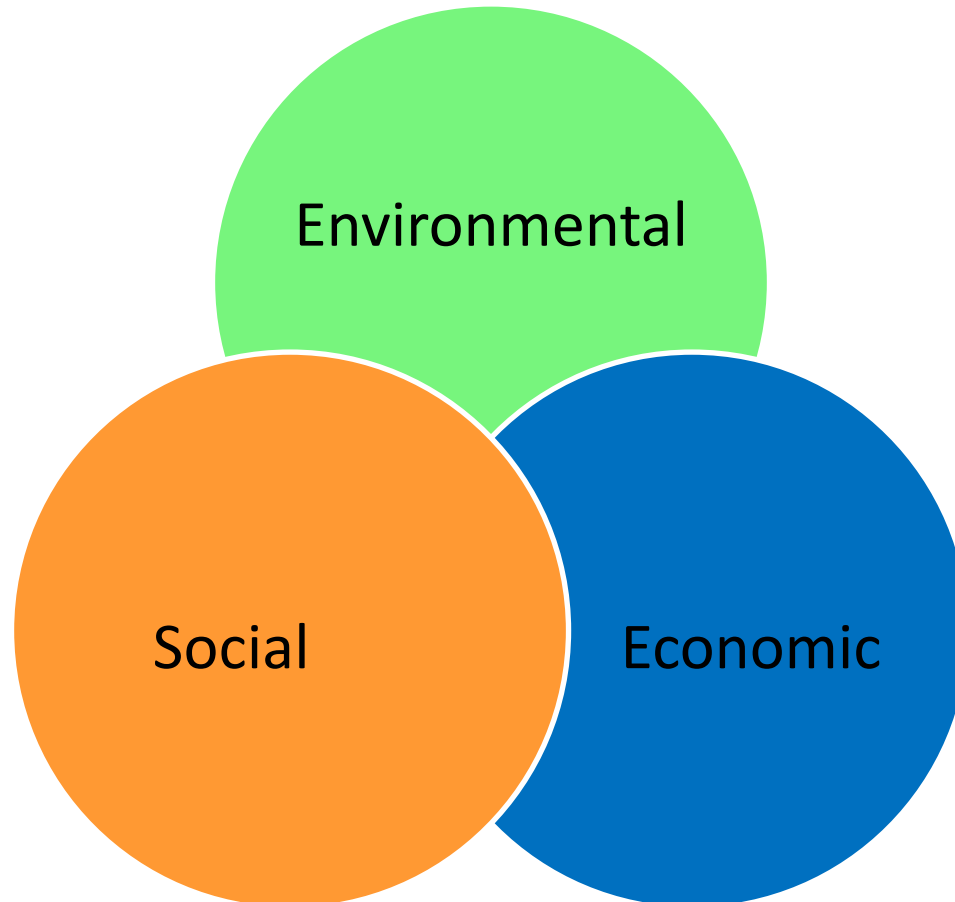
# Auckland context

- *Population set to reach 2.1 million by 2040.*
- *An estimated increase of 600,000 people.*
- *330,000 additional dwellings required...*

Source: Auckland Plan Discussion Document



# Primary drivers for green building



# Social

- *Healthier places to live and work*
- *Minimising internal pollution*
- *Improving comfort and satisfaction*
- *A positive impact on the local community*



# Economic drivers

- *Reduced operations costs*
- *Improved flexibility*
- *Reduced infrastructure demands*
- *Marketing opportunity*
- *Higher rental returns / reduced vacancy rates*
- *Future proofed assets*



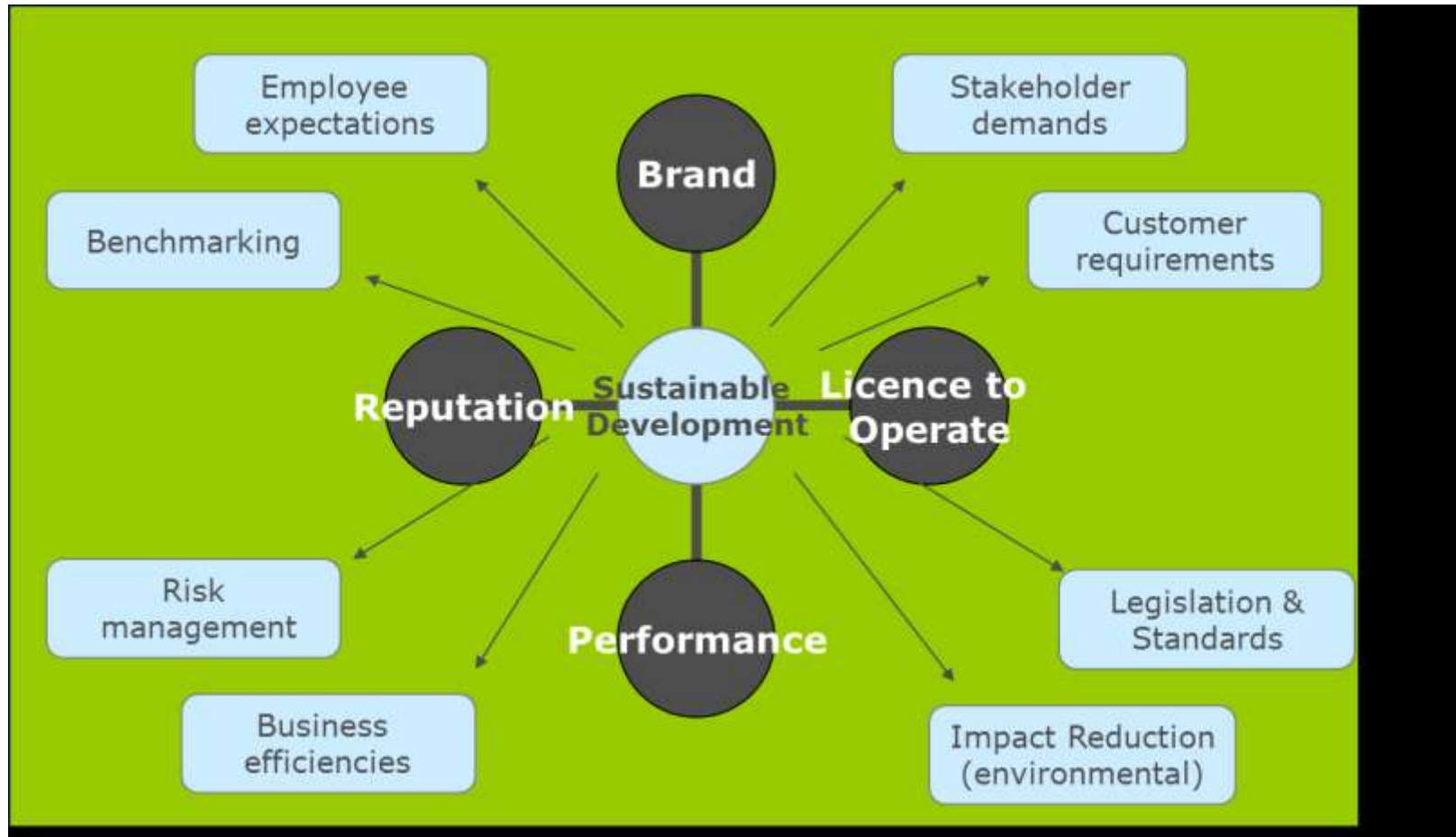
# Tenant drivers

- *Reduced total occupancy costs*
- *Improved staff satisfaction and productivity*
- *Reduction in churn costs*
- *Reduced absenteeism*
- *Increased staff attraction and retention*
- *Future proofing*
- *Demonstration of CSR*

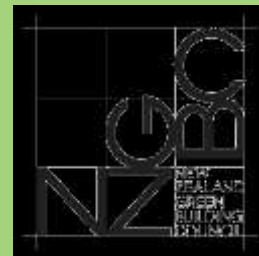




# Market drivers



# **New Zealand Green Building Council**



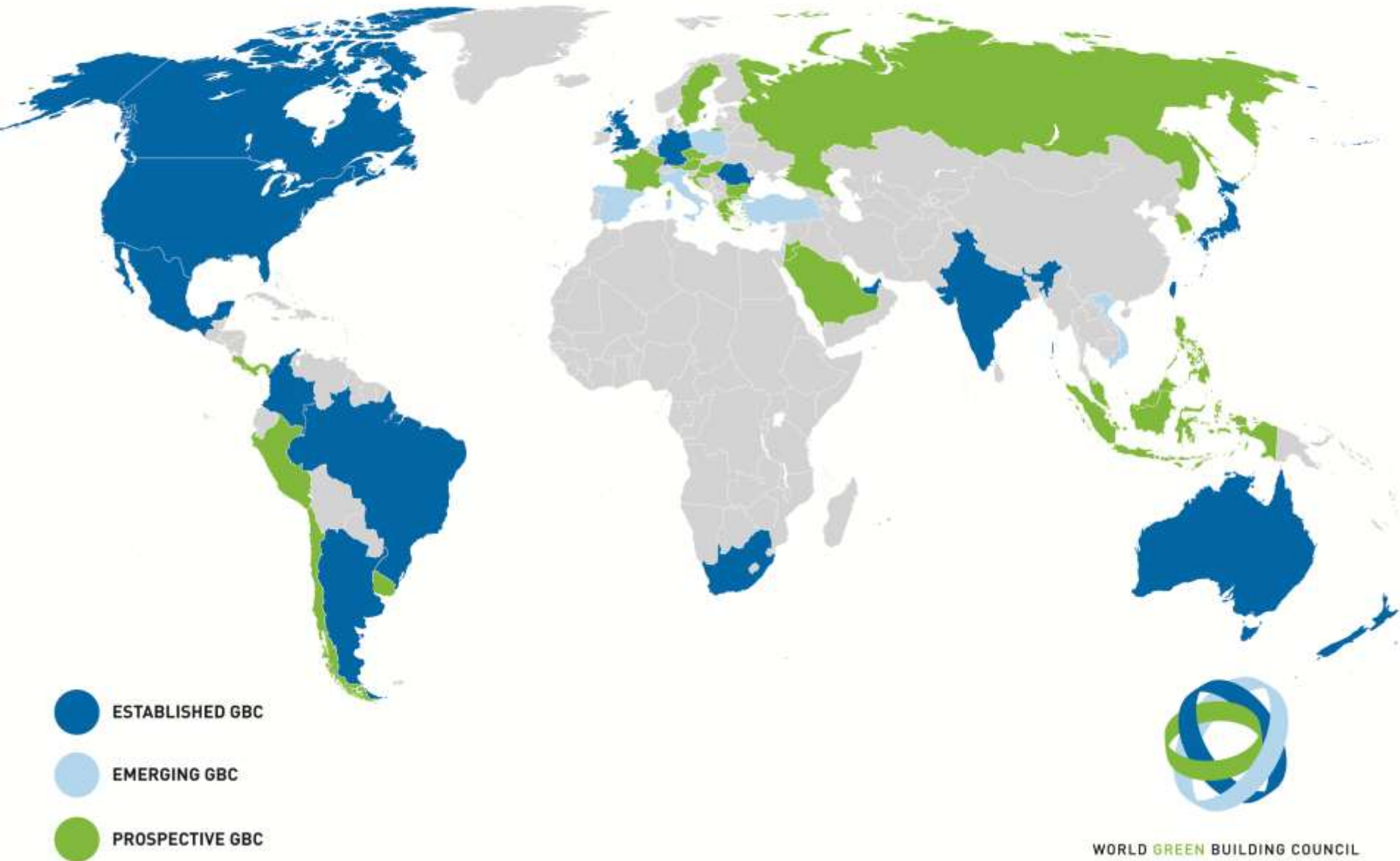
# **New Zealand Green Building Council**

**Vision:** *That New Zealanders work and live in healthy, efficient, productive and environmentally sustainable buildings, today and into the future.*

**Mission:** *To accelerate the development and adoption of market based green building practices.*



# GREEN BUILDING COUNCILS WORLDWIDE: 2010

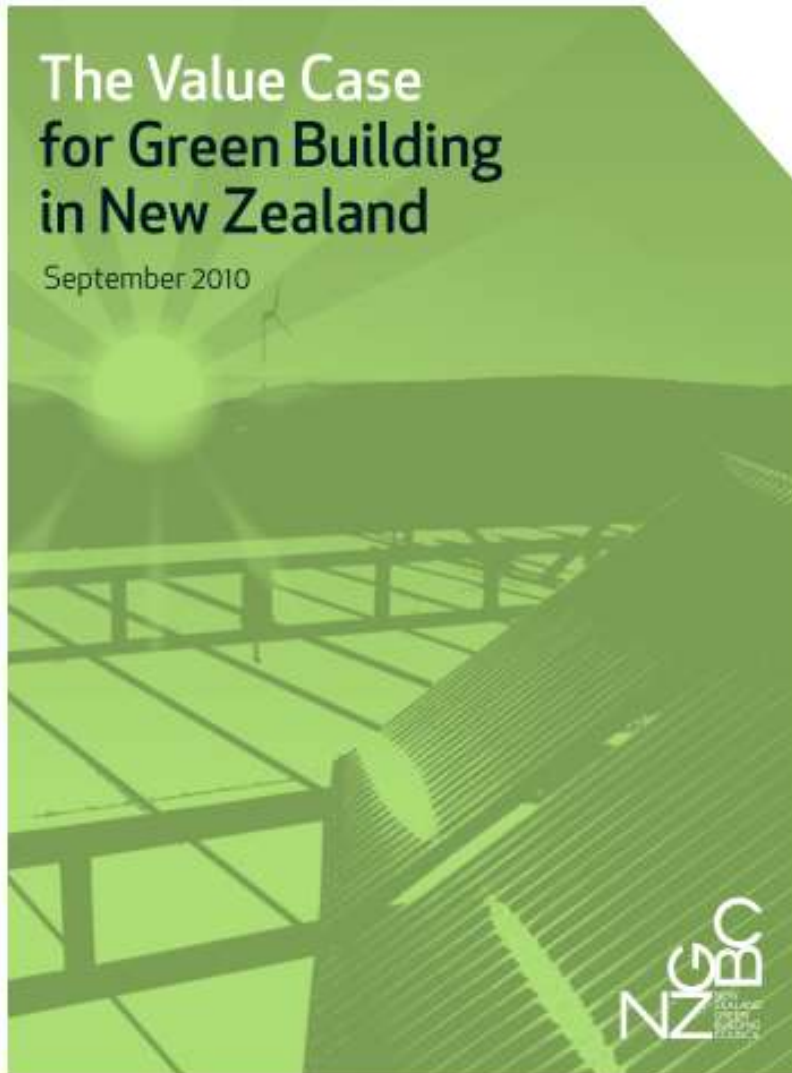


# Industry capacity

- *Over 2,000 industry professionals trained*
- *496 Green Star Accredited Professionals*



# Knowledge



# Green Star

*Green Star is a comprehensive, national, voluntary environmental rating scheme that **evaluates the environmental attributes and performance** of New Zealand's buildings using a suit of rating tool kits developed to be applicable to each building type and function*



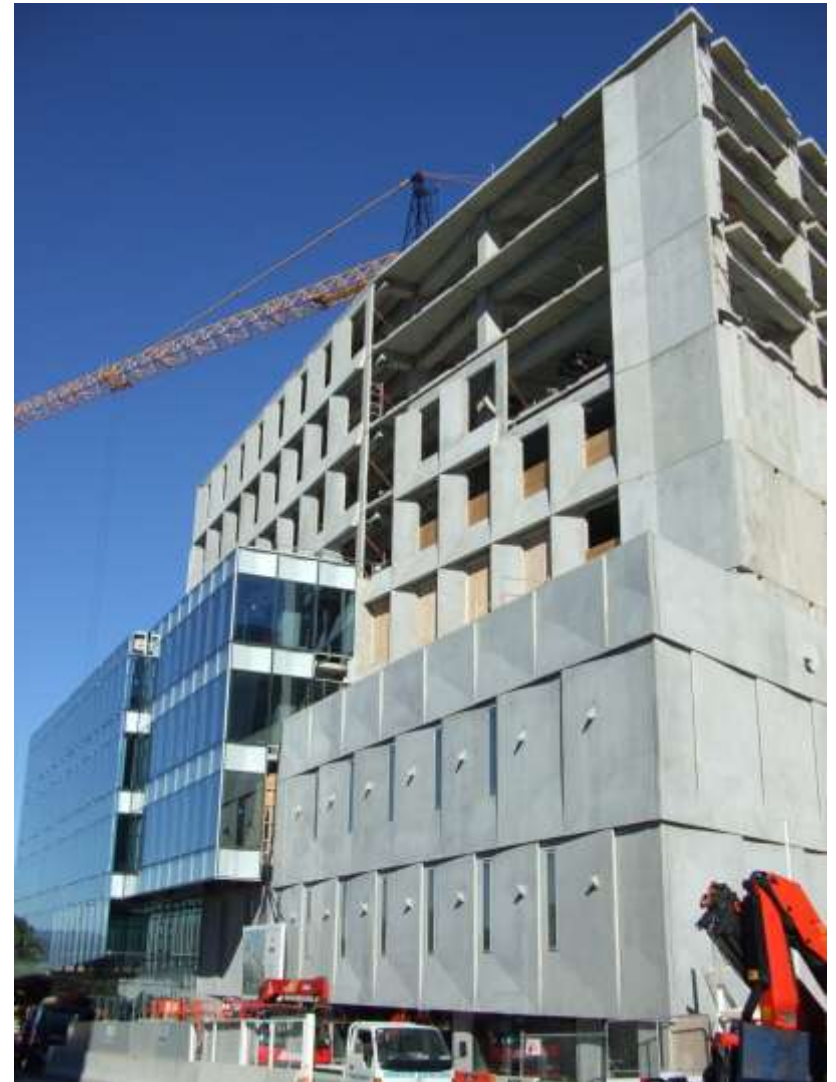
*A Green Star NZ Certification represents **commitment and leadership** to green building practices and environmental performance*



# Green Star



1. Innovation
  2. Indoor Environment Quality
  3. Energy
  4. Transport
  5. Water
  6. Materials
  7. Land Use and Ecology
  8. Emissions
- + *Innovation*



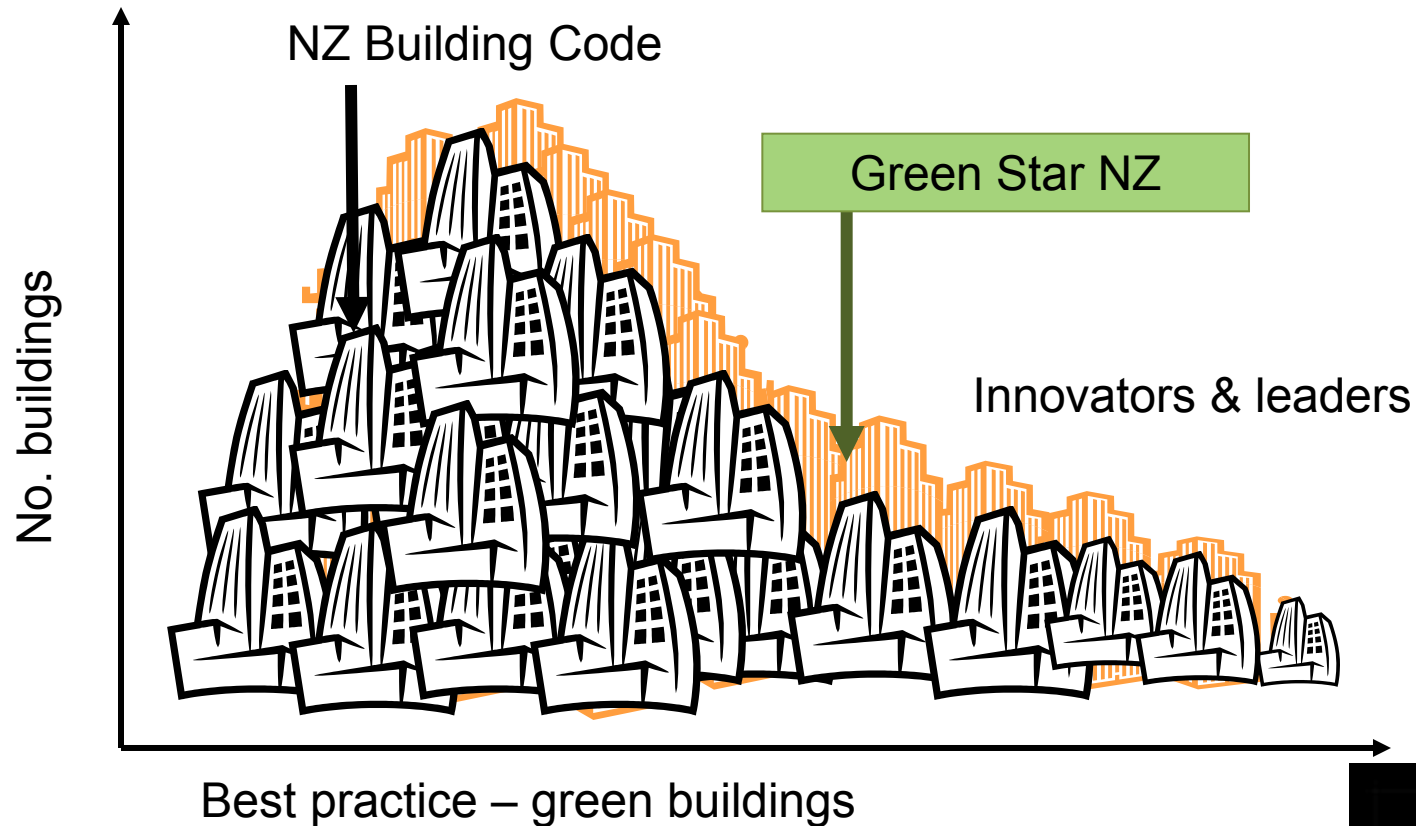


# Green Star ratings

Rating	Score	Represents	Office Design
★	10	Minimum Practice	<i>Not Rated</i>
★ ★	20	Average Practice	<i>Not Rated</i>
★ ★ ★	30	Good Practice	<i>Not Rated</i>
★ ★ ★ ★	45	<b>New Zealand Best Practice</b>	<b><i>Rated</i></b>
★ ★ ★ ★ ★	60	<b>New Zealand Excellence</b>	<b><i>Rated</i></b>
★ ★ ★ ★ ★ ★	75	<b>World Leadership</b>	<b><i>Rated</i></b>



# Rewarding best practice



# Rating each life-cycle phase



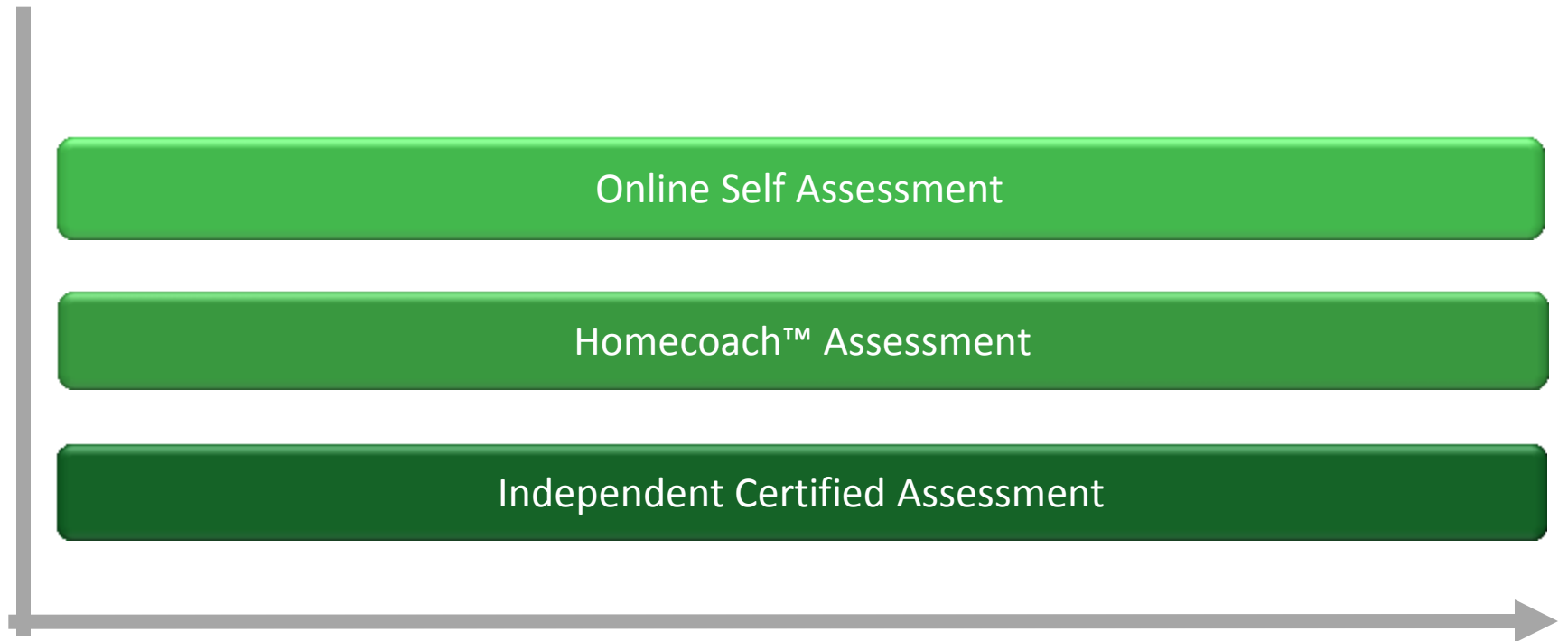
# Homestar



1. Energy, Health and Comfort
  2. Water
  3. Waste
  4. Home Management
  5. Materials
  6. Site
- + Innovation*  
*+ Resource Adjustment*  
*Factor*



## Assessment types



**1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10** 

# Home performance report

Self assessed

## Your Homestar rating

4 

## Analysis

Congratulations, on completing the Homestar™ rating.

The assessed house has not achieved a minimum performance level in the core issue of good moisture management (specifically extractors to bathroom and/or kitchen areas) and overall warmth and comfort (specifically the ability for the house to achieve healthy winter-time temperatures without using excessive energy). As a result, only a star rating of 4 has been achieved, even though the home's performance in other areas would otherwise result in the home obtaining a higher star rating. To gain a higher star rating address this core issue first, and then reassess the house once the changes have been made.

A small part of the rating tool rewards non-permanent fixtures of the home such as fridges, freezers, dishwashers, compost facilities etc. If these are removed (for instance when the house changes occupancy) this could affect the star rating of the house.



Your house has been identified as a type of 1990's house which often shows a great variability of housing styles and use of materials. Some insulation should exist in all houses built from 1978 onwards. However, it may be poorly installed, inadequate or in need of replacement. Aluminium windows in these houses are easier to retrofit with double glazing than wooden frames, although performance of the aluminium frames as well as flashings may require consideration of full window replacement. A relatively easy retrofit option for these houses is to improve space heating with heat pumps or solid fuel heating.



## Recommendation information

Use the recommendations in this report to prepare a plan for your whole house. This will guide you through the process of making your home cosy, warm, healthy, cheaper to run and with a higher rating. Some recommendations involve simple actions you can take at little or no cost. Others involve investments that will pay for themselves through lower running costs or other benefits like making your home more comfortable.

The recommendations are provided in order of priority for improving your overall health and comfort in the home, but you can re-prioritise based on the potential to improve your star rating, the operational cost savings, or whether the recommendation will be kinder on the environment – simply click on the headings to change the order.

# Recommendations

Reorder your priorities according to your preferences below

Recommendation	Material Costs ◆ Unsorted	Installation Costs ◆ Unsorted	Points Potential ◆ Unsorted	Health & Comfort ◆ Unsorted	Cost Savings ◆ Unsorted	Environment ◆ Unsorted
<b>Install double or secondary glazing to your main windows.</b> <b>HEALTH &amp; COMFORT » WINDOWS</b> Double glazing or secondary glazing helps to prevent heat loss from the house. If you are installing new windows, choose window frames that are good insulators (wood, PVC or thermally broken aluminium). Low-emissivity (low-E) glass also helps to reduce heat loss through windows.	\$\$\$\$\$	\$\$\$\$\$	▲▲▲▲	▲▲▲▲▲	▲▲▲▲	▲▲▲▲
<b>Install thick drapes and/or curtains over the rest of the house</b> <b>HEALTH &amp; COMFORT » WINDOWS</b> Use thick drapes or curtains with pelmets and close them at dusk to reduce the loss of heat through the windows in the home.	\$\$	\$\$	▲▲	▲▲▲	▲▲▲	▲▲▲
<b>Install more ceiling insulation.</b> <b>HEALTH &amp; COMFORT » CEILING</b> Ceiling insulation should be the number one priority in any household. Ideally, you should have at least 150 mm to 200 mm thick, continuous insulation in the ceiling or roofspace.	\$\$\$\$\$	\$\$\$\$\$	▲▲▲▲	▲▲▲▲▲	▲▲▲▲	▲▲▲▲
<b>Consider replacing downlights.</b> <b>HEALTH &amp; COMFORT » CEILING</b> Downlights reduce the effectiveness of your insulation by creating a gap in your ceiling and insulation. If you have a high concentration of downlights, upgrading to higher levels of insulation may not result in more comfortable indoor temperatures at all. Get your electrician to check what type your downlights are. to see whether it is best to	\$\$	\$\$	▲▲▲▲	▲▲▲▲	▲▲▲▲	▲▲▲▲

# Enabling a sustainable built environment

