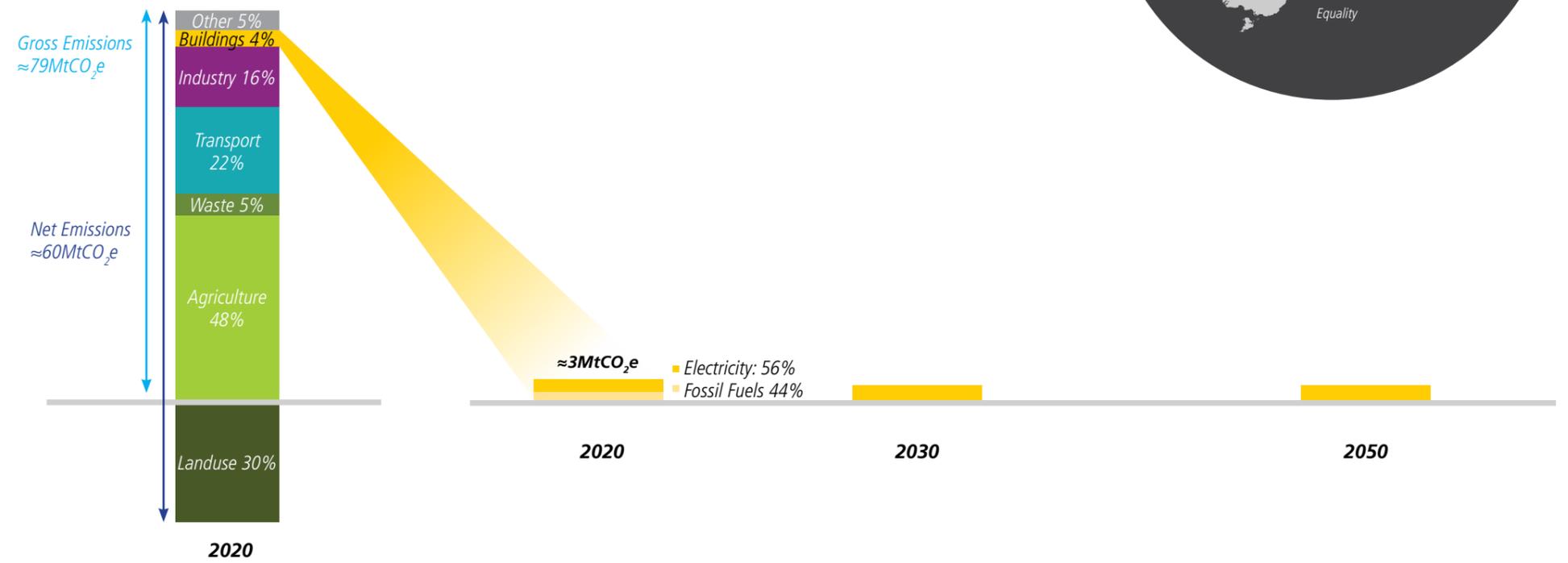


- THE CHALLENGE:**
- ▶ HIGH EMISSIONS
  - ▶ HEATING CLIMATE
  - ▶ UNEMPLOYMENT
  - ▶ HOUSING CRISIS
  - ▶ DECLINING BIODIVERSITY
  - ▶ LINEAR ECONOMY
  - ▶ ECONOMIC INSECURITY
  - ▶ POLLUTED WATERWAYS
  - ▶ DEGRADING SOIL

- TRANSITION: BUILDINGS**
- ▶ UPGRADE & REPURPOSE BUILDING STOCK
  - ▶ MORE EFFECTIVE BUILDING USE
  - ▶ MINIMISE ENERGY DEMAND
  - ▶ DECARBONISE CONSTRUCTION MATERIALS
  - ▶ EXIT FOSSIL FUELS



## Transition: Built Environment

### CHALLENGE STATEMENT

While good building design can have a positive influence on our health and wellbeing, the built environment also has impacts on our natural environment and climate. Only 4% (≈3.2MtCO<sub>2</sub>-e/yr) of emissions can be directly attributed to building energy consumption during operation. However, a significant proportion of the emissions associated with the manufacture of key building materials and transport can also be attributed to building construction. The built environment will also be impacted by the effects of global heating; including sea level rise, flooding, overheating, and severe weather events. The house price-to-income ratio of New Zealand homes is classified as “severely unaffordable” (although COVID-19 may effect a fall in house prices) and many New Zealander’s live in poor quality, damp homes that they cannot afford to heat. In addition to challenges faced, there are also potential opportunities to add value streams both within buildings and as an industry e.g. through leadership in sustainable design and intellectual property, increased productivity in construction and building use/ operations, and export opportunities.

### KEY OPPORTUNITIES

Beca buildings specialists have identified the following key opportunities for built environment transitions as priorities for economic recovery:

**Upgrade and repurpose existing building stock:** Upgrading and repurposing existing building stock is substantially less carbon intensive than building new, due to the carbon intensity of many building materials and associated construction process. Existing buildings can often be brought up to similar energy efficiency, health and wellbeing standards as top performing new builds for a fraction of the cost.

Increased remote working could lead to opportunities such as repurposing central offices to residential spaces, which would simultaneously increase housing availability and reduce GHG emissions from commuting. Investment in upgrading and repurposing existing buildings through Wave-3 would create quality jobs around New Zealand, improve the efficiency of existing assets and avoid impacts from new developments.

**Enabling more effective building use:** Many buildings are underutilised, with low or intermittent occupancy (e.g. infrequently used meeting rooms or school buildings that are empty during holidays), with low or no occupancy for many hours of the year. COVID-19 has highlighted the social and environmental benefits of remote working including greater flexibility for workers, reduced reliance on proximity to workplaces and reduced work travel and associated greenhouse gas emissions. Continued remote working could exacerbate underutilisation of spaces. A key opportunity for Wave-3 is investment in projects and programmes that increase the adaptability, effectiveness and efficiency of buildings, such as investment in smart building systems that can be used to extend hours of building use, focusing energy use only on occupied areas to optimise energy efficiency during extended periods of use.

**Minimise energy demand:** Building code standards, a capital cost focus and the lack of incentives to ensure high energy efficiency has helped lead to poor performance building stock in New Zealand. In commercial buildings, building tuning alone typically achieves 10 to 30% energy and emissions savings with very short financial payback periods.

Warm, efficient buildings reduce emissions and improve health and wellbeing. Energy efficiency measures that help to moderate electricity peaks (that occur during times of peak demand) will also lead to less reliance on fossil fuels for electricity generation.

**Decarbonise construction materials:** Sustainably sourced timber structures significantly reduce upfront emissions and compared to emissions from cement and steel and, act as a carbon sink / sequestering carbon into our built environment. Projects to accelerate this industry shift could result in significant emissions savings every yea. Expanding timber production for local use and exports would create more jobs and revenue, whilst increasing our total carbon sinks. Some concrete and steel cannot feasibly be replaced by timber. Investing in solutions to decarbonise these materials would also create high quality jobs and revenue streams.

**Exit fossil fuels:** The combustion of on-site fossil fuels for space heating, hot water and cooking contributes approximately one third of building emissions. Projects should focus on the replacement of such systems with low carbon systems such as heat-pumps and/or alternative energy sources (such as biomass) to significantly reduce emissions.