

Climate change: scientific, economic & policy context

Ralph Chapman

Victoria University of Wellington

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**UOW Public Health Summer School:
‘Building for Zero Carbon by 2050’**



Approach in this talk

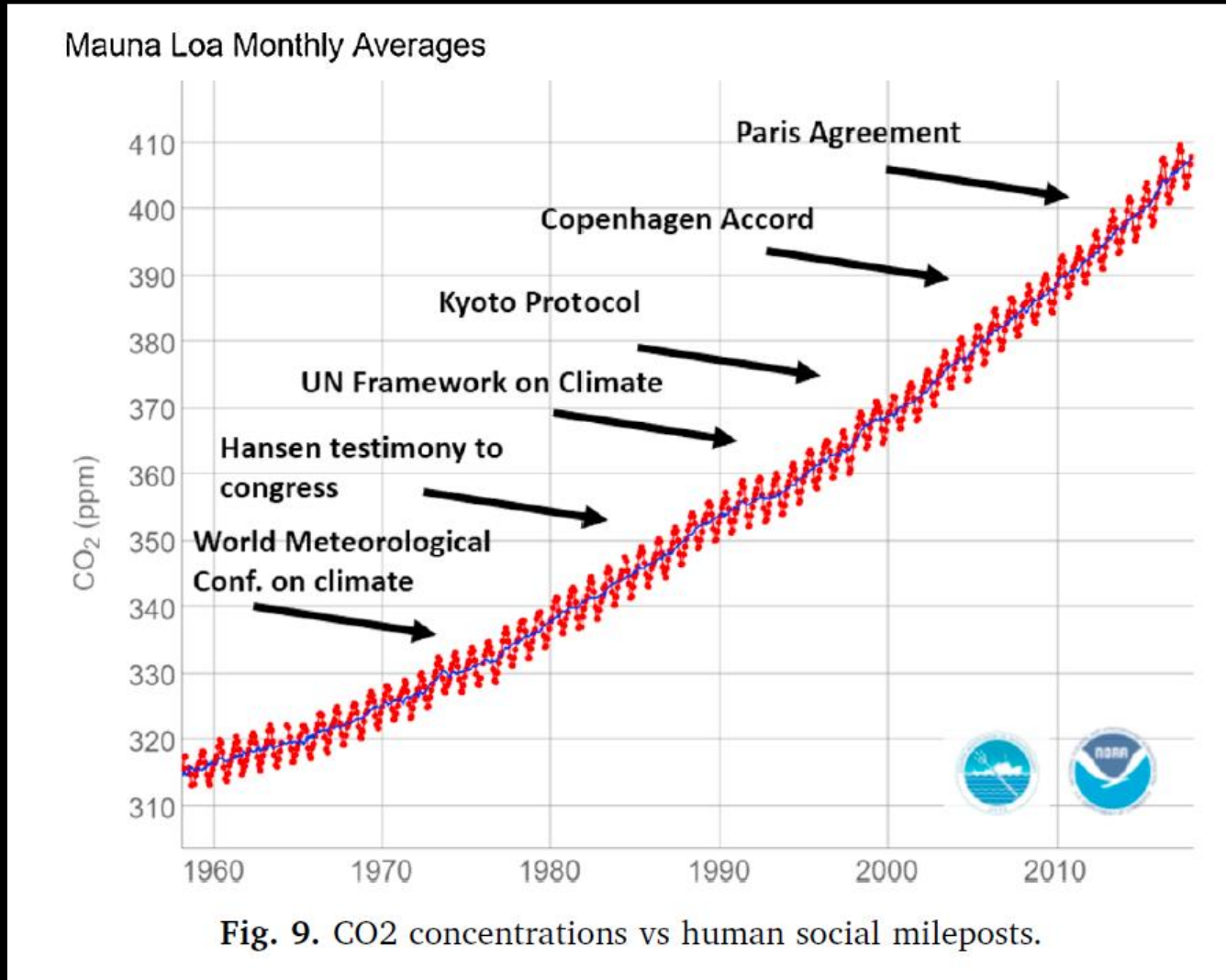


- Intro: **framing insights**: the role of cities; wellbeing
- Urban economy context: **how cities can help in the zero carbon transition**
- NZ policy context:
 - Actions the govt is **currently taking** to make our urban environment zero carbon
 - Some things that **still need to be done**



1 Scientific context

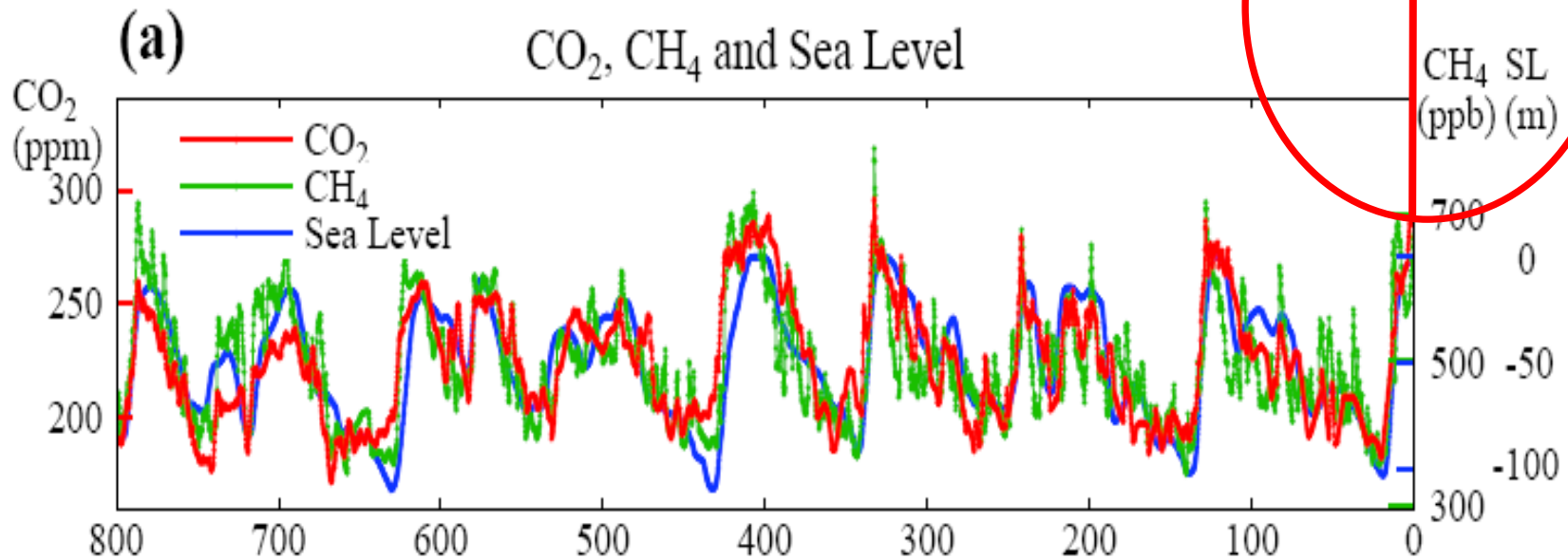
Climate change: not the only sustainability issue but the biggest by far



The 800-ky carbon trend ...

an unprecedented experiment with the atmosphere

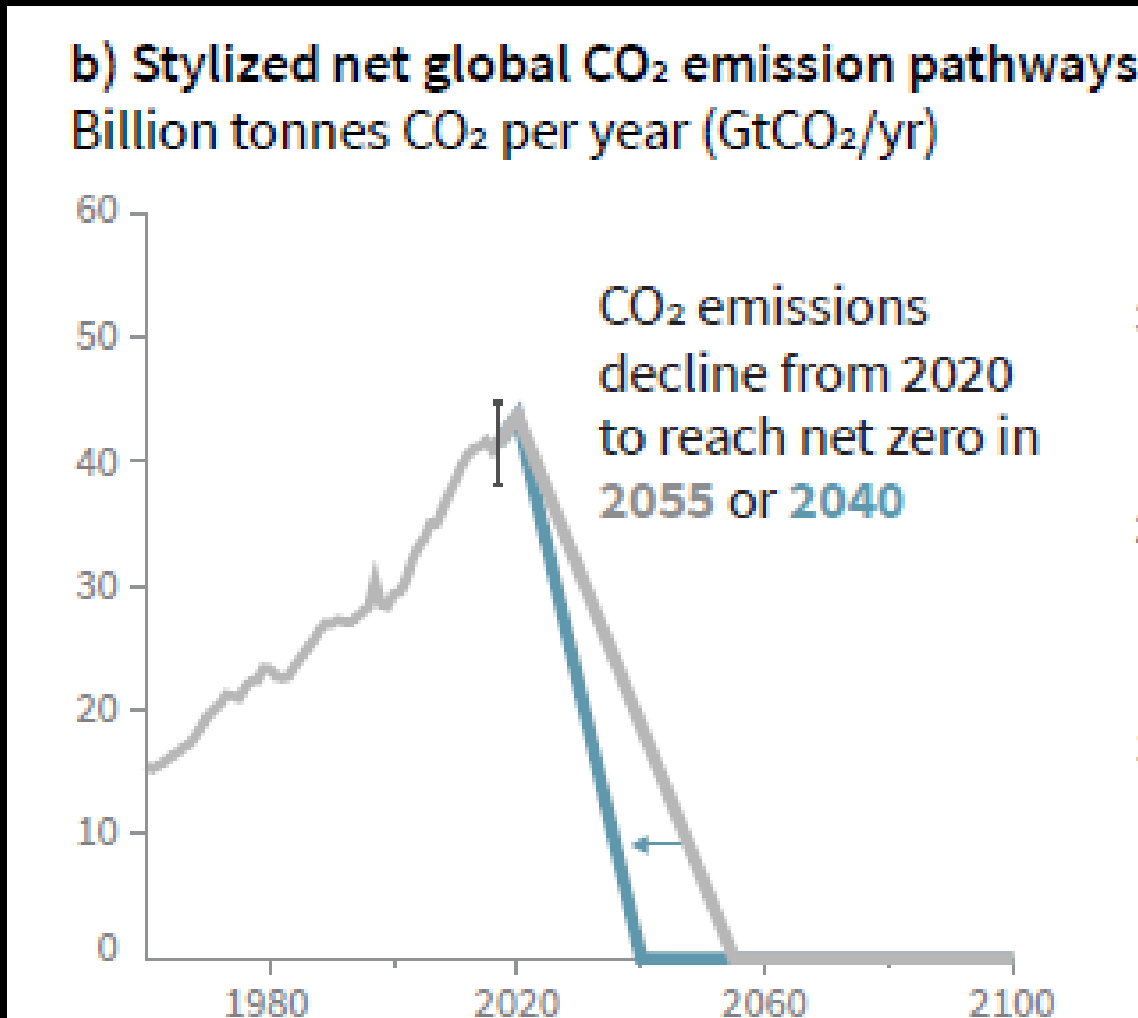
Now 415



Source: Hansen et al (08)

IPCC (2018) report:

The zero-carbon transition is a race against time



We must halve emissions by 2030 for a reasonable chance of limiting warming to around 1.5°C....

Slower cuts → 2°C or more

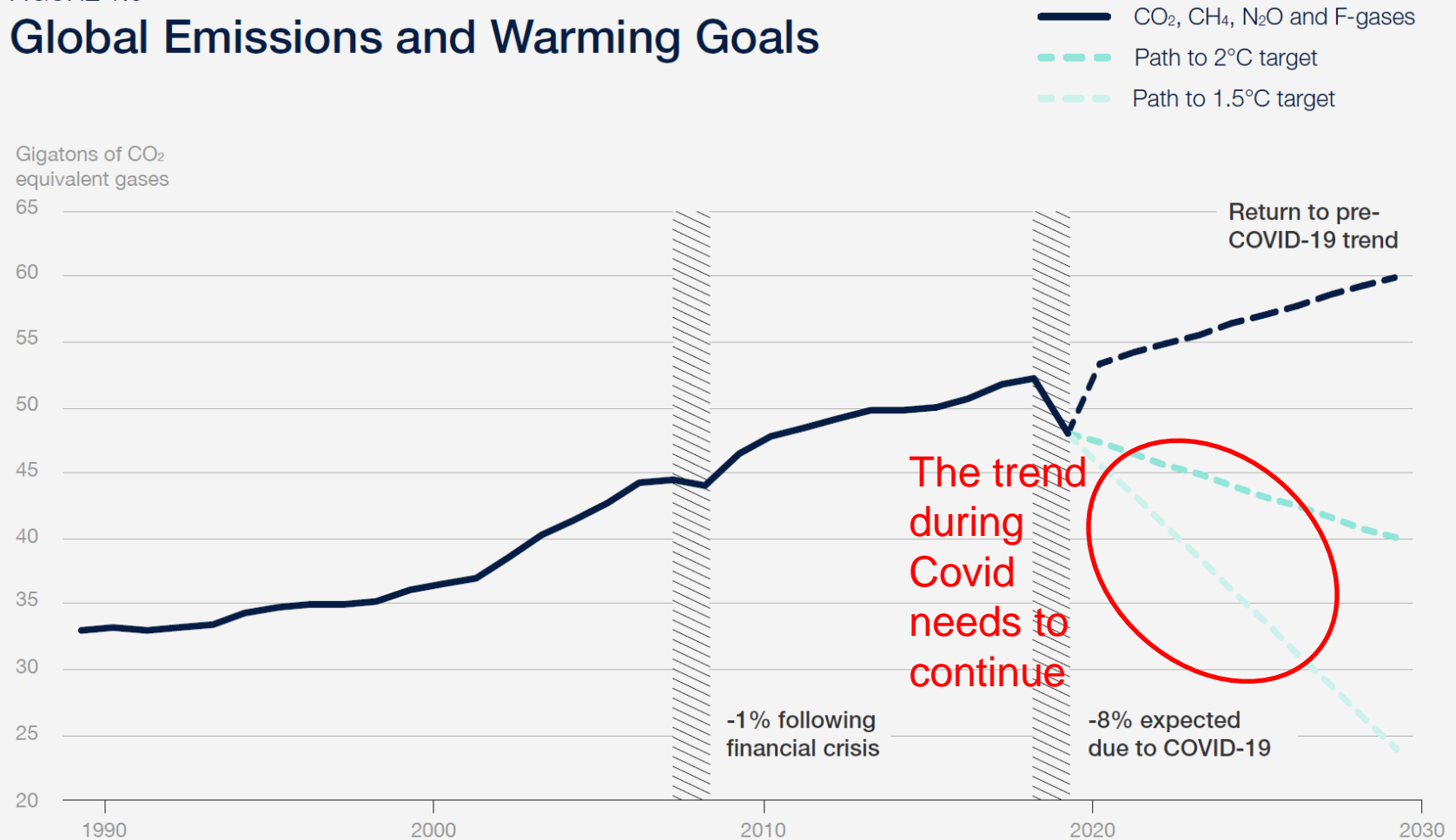
Mitigation urgency & the policy context

- Many tipping points between 1.5°C & 2°C
- VUW's Antarctic Research Centre: 1.5C → ~9m SLR, as ice shelves & glaciers melt, not that slowly!
- High risk catastrophic impacts above 2°C (eg SLR > 20m?): civilisation significantly threatened
- Globally, prob of >2°C still high, but odds improving (Climate Action Tracker: 2.1°C optimistically)
- NZ govt so far pointed closer to 2C rather than 1.5C?

Post-Covid, where are GHGs heading?

FIGURE 1.3

Global Emissions and Warming Goals



Why 'not worrying' turns out to be dangerously cavalier

Xu et al (2020) Future of the human climate niche

- With global **heating of 3°C** , extreme heat is projected within 50 yrs to **envelop 1.2 billion people** in India, >400 million in Nigeria and >100 million in each of Pakistan, Indonesia and Sudan.
- In short, likely insufferable heat for well over a billion people **within our children's lifetimes**



Sanjay Kanojia/AFP via Getty Images

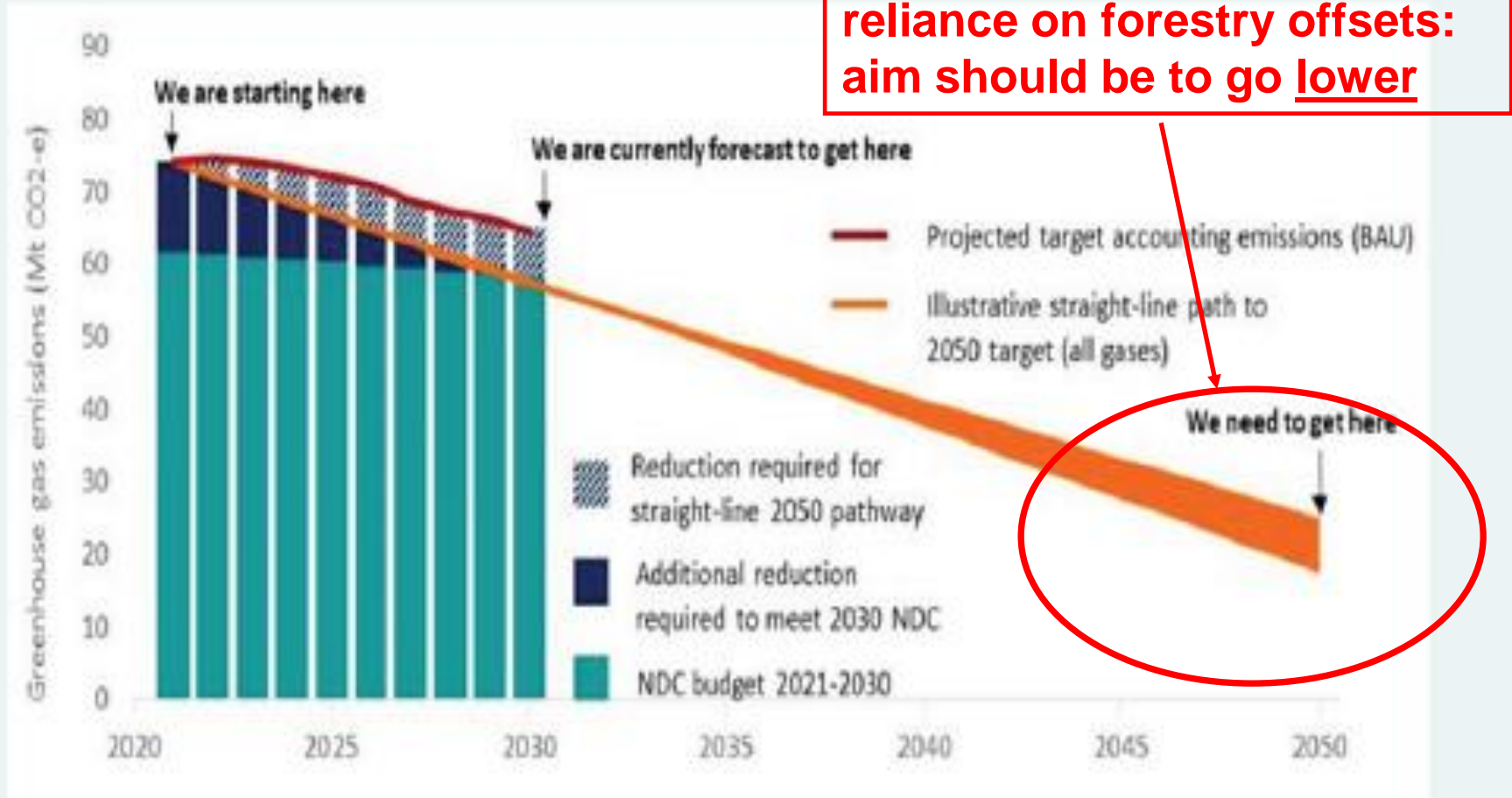
Mitigation urgency & the policy context

We know:

- To not aim **well below 2°C** is ethically indefensible
- Can expect more nasty climate '**surprises**'
- Achieving 1.5C will require cutting CO₂ ~**6 - 7%** **each yr**
- It is **a 'climate emergency'** (a slow one)
- NZ should be acting **ethically**, not simply aiming for the global average (net zero by 2050)

MBIE's BIM on climate change (Nov)

Challenges



Comment on CCC's framing

- **Agree that** 'Aotearoa has a responsibility as a developed country to take a leading role in reducing GHGs'*
- **Agree that** 'Aotearoa must do more than the global average in terms of reducing emissions'*
- To me, this means **we have to do more than meet the net zero by 2050 target.**

*(p.175, First report)

Waterview connection
project wins “Concrete
Award” 2019



2 Urban economy context

Cities can play a major role

- Cities are **major part** of carbon emissions problem, but problem is systemic
 - Cities ~ 45% of GHGs; ~76% of total CO₂
 - Transport > 1/3 of urban GHGs
- Type of **urban form matters** more than city/rural
 - emissions/person of NYC < Oklahoma City
 - Barcelona < Atlanta
 - Wgtn < Auckland



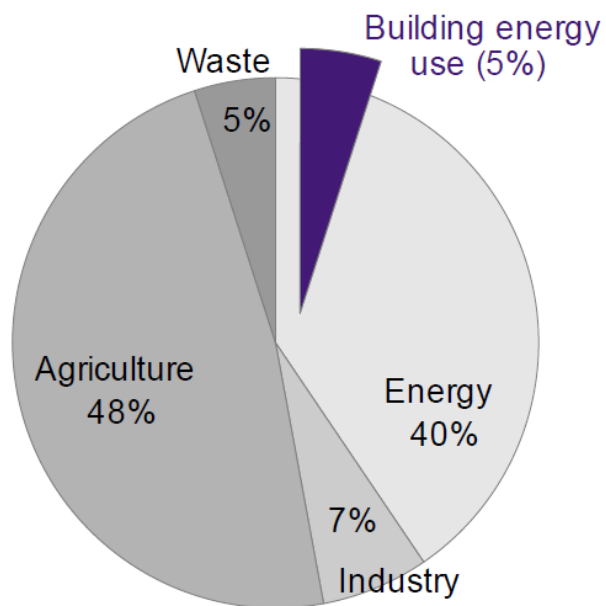
New York Times

The role of cities (NZ)

- Urban emissions cover housing, other bldgs, transport, etc.
 - Buildings are 5% of direct GHGs (incl electricity)
 - 20% of consumption based emissions (incl. trade)
 - Road transport: 19% of GHGs -- up 102%, 1990-2018
 - fastest growth of any big sector; hardest nut to crack
 - 44% on a consumption basis (incl trade)
- Overall, urban CO₂ emissions constitute a huge vulnerability for NZ
- Mitigation has to be a central goal of urban policy

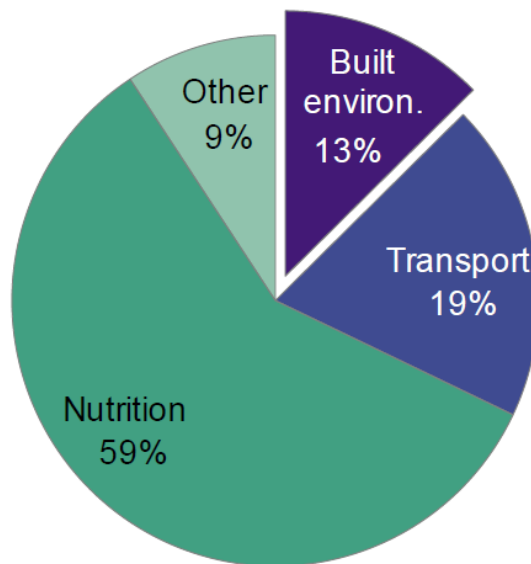
Comparing production & consumption based emissions

(a) Production-oriented view



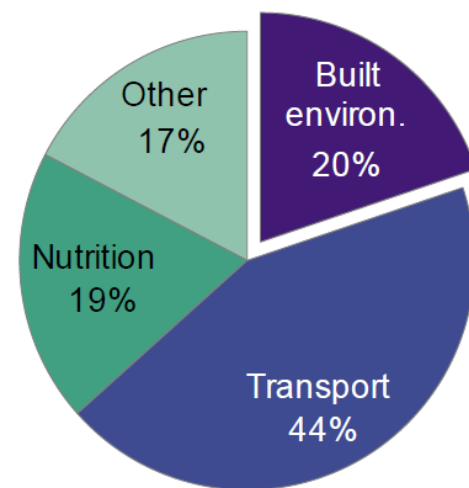
80,000 kt CO₂e
NZ's total footprint

(b) Life cycle perspective
(excluding international trade)



17 t CO₂e
per person

(c) Consumption-oriented view
(including international trade)



60,000 kt CO₂e
NZ's total footprint

13 t CO₂e
per person

Figure 1: A breakdown of New Zealand's carbon footprint in 2015 from (a) a production perspective, (b) a life cycle perspective, and (c) a life cycle consumption perspective

Thinkstep Aus 2018

Why is contribution of cities critical?

- As well as being big energy users, cities are **innovative**, and sometimes nimble (Glaeser, 2011)
 - Agglomeration → ideas proliferate and develop rapidly in cities: so can help solve problems
- **Downside**: cities tend to **lock in a pattern** of energy-, building- & transport-related emissions
 - Urban **land use expanding** at 2x rate of urban popn growth; low density → high emissions



What could hold cities back?

- Cities are **complex** systems
 - City governance is **complex** and **multi-level**
 - Need to work **across** sectoral and political **boundaries** (NZPC, 2020)
- Conflicting pressures – growth; **nature** of change (e.g. resistance to intensification) (MfE, 2020: NPS)
- Some previous policies damaging (MfE, 2020)
 - e.g. much land use **regulation can impede intensification**

How can we facilitate urban transitions?



Leverage points -- ‘places... where a small change can lead to a large shift in behavior’ (Meadows, 2009)

- Infrastructure **renewal opportunities**, to improve building carbon efficiency – e.g. NYC building CO₂ down 40% by 2030
- **Trendsetters** / frontrunners can drive qualitative shift in investment (Loorbach & Rotmans, 2010); e.g. **Bahnstadt, Heidelberg**
- Greater leverage from **policy packages** (e.g. complementary measures encouraging walking, cycling together with PT)



Rintoul St housing, Newtown, Wgtn: WCC

3 A-NZ policy context

Urban development

Reforms to RMA (Parker)

Three-fold plan:

- i. new Natural and Built Env't Act (NBA)
- ii. Strategic Planning Act (SPA) on top of that
- iii. Managed Retreat and CC Adaptation Act

- Important for new overall **framework for urban development**

- But a 10-year transition process (Randerson)

NPS-UD now in effect since August 2020

- Generally helps mitigation, e.g. **Objective 8**, and **Policy 1**: NZ's urban environments: 'support reductions in GHGs; and are resilient to the current and future effects of climate change.'
- District plan rules in "city centre zones" in Tier 1 cities will have to "realise as much development capacity as possible" and "maximise the benefits of intensification".
- But climate refs don't use the language of emergency, and objective 2 (affordability) gets more prominence

Integrating cities and transport

OECD now strong on urban land use
and its importance for transport:

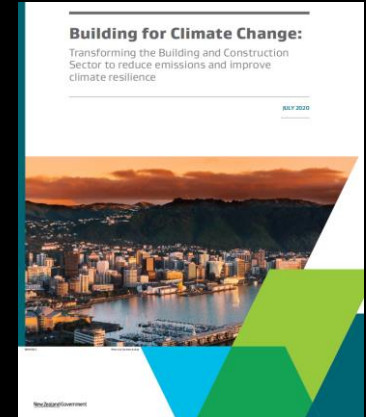
- ‘Policies that promote a more compact urban form are fundamental in the long-run success of urban transport decarbonisation strategies ‘
- OECD, May 2020, [Decarbonising urban mobility.., the Case of Auckland...](#); p.18

Building and housing: MBIE's BIM

Building and Construction	Moving to a low emissions economy will rely on energy efficient buildings and construction practices.	<ul style="list-style-type: none">• New Zealand Energy Efficiency Conservation Strategy• Building Act• Trans-Tasman energy efficient equipment - product standards programme• Waste Minimisation Act• Urban Growth Agenda• National Policy Statement on Urban Development Capacity
Housing	Building housing that is energy efficient, dry and warm can reduce the cost of electricity to households and is a key action for reducing energy hardship.	<ul style="list-style-type: none">• Warmer Kiwi homes programme• Kiwibuild• Supporting renewable energy projects in public and māori housing

Source:
MBIE (Nov20) BIM on Energy & Resources

‘Building for Climate Change’ -MBIE consultation doc



- ‘Our vision is that by 2050, NZ’s buildings are using **as little energy and water as possible**’
- Change has to be driven with clarity, determination and urgency

The end goals for MBIE are simple:

- › reduce greenhouse gas emissions, and
- › improve New Zealand’s resilience to climate change.

We need to
sharpen up
these goals!

Important policy actions in MBIE domain

- Don't want another generation of unsustainable, C-intensive buildings
- Bldg Act needs to make it very easy to regulate for sustainable building
- Regulatory ambiguity needs to go
- Bldg Act must be ambitious

Other relevant MBIE activities

- MBIE leads Building and Construction sector strategies
- MBIE likely to lead the 'Built Environment' domain workstream of the NAP
- Looking forward to seeing ambitious proposals!

4 Conclusion

- No time to lose on carbon emissions reduction to **avoid collapse** of our current form of civilisation
- Unprecedented scale of change
- **Halve** emissions **each decade** till 2050. Reduce $\sim 7\%$ /yr
- Cities have major responsibility and major role
- Many aspects of urban systems need rapid **transformation**



Rintoul St housing, Newtown, Wgtn: WCC

Conclusion (2)

Strong arguments for policy makers to:



- Understand **systemic nature** of cities
- include **co-benefits** in assessing policy measures
- focus on **well-being** not growth
- Increase **ambition** of policy on **buildings**
- Increase **overall ambition** on urban carbon reductions

Keep the **long climate change emergency** uppermost in formation of urban and transport policy

Thanks

