Avoiding the Unmanageable

Getting to a low emission future

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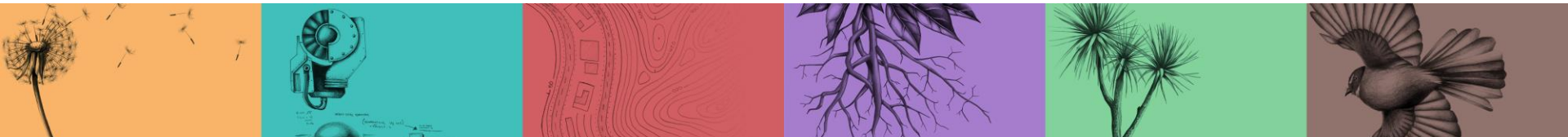
Wellington U3A, 9 September, 2016



Outline

What is climate change and what do we need to do?

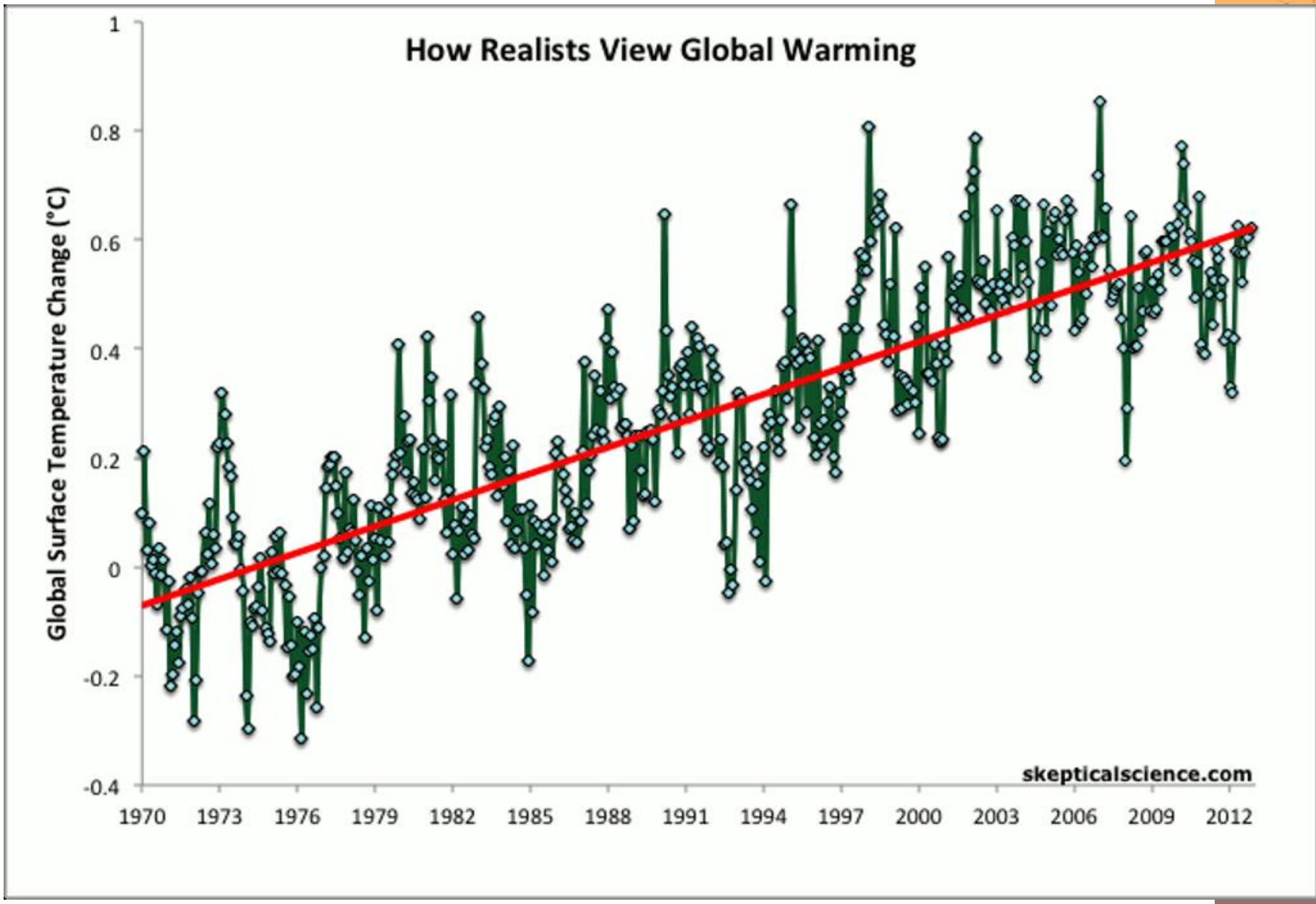
How did we get there from here?

Thoughts from a low emission future dialogue

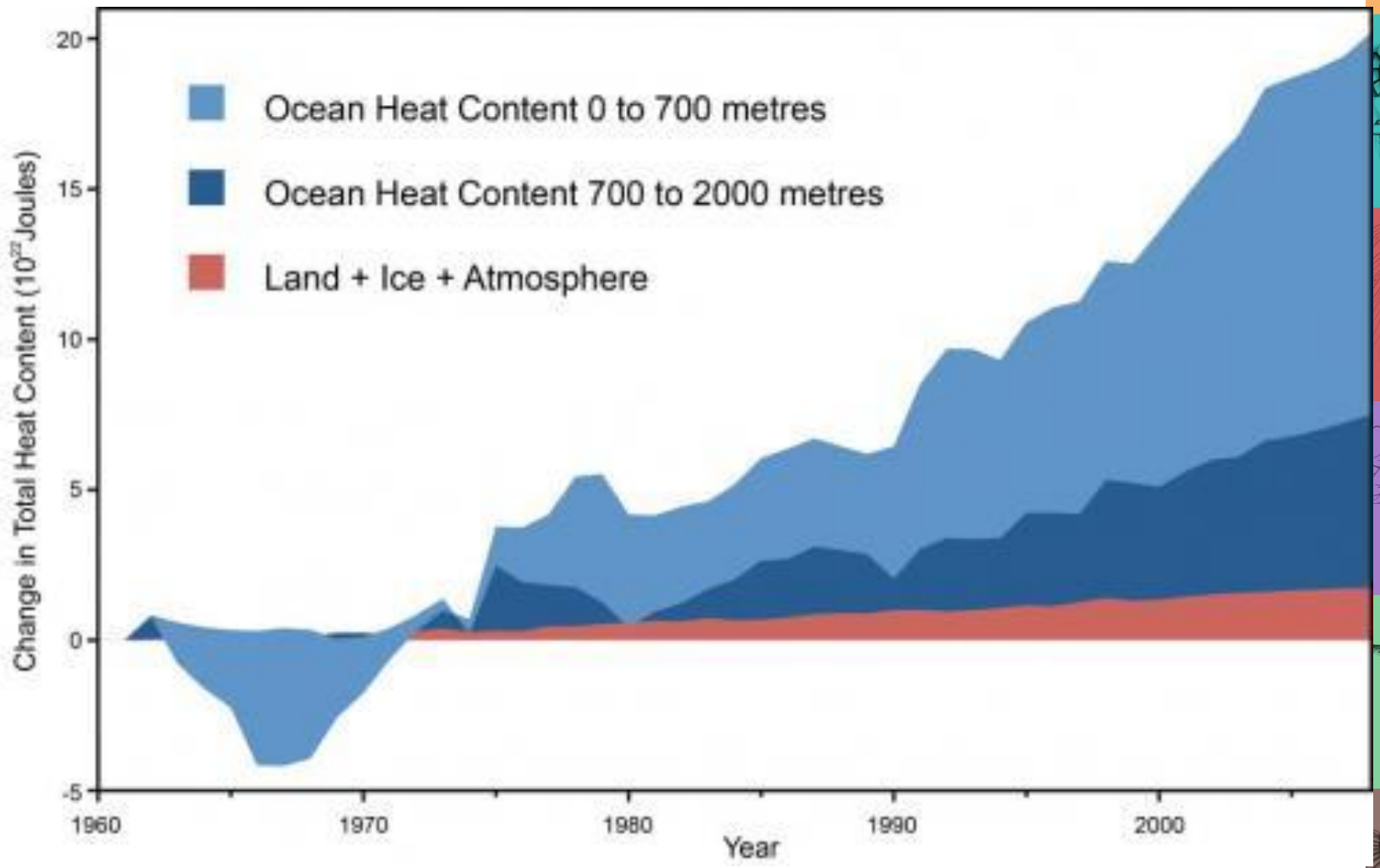
Emissions pricing and ETS

What can you do?

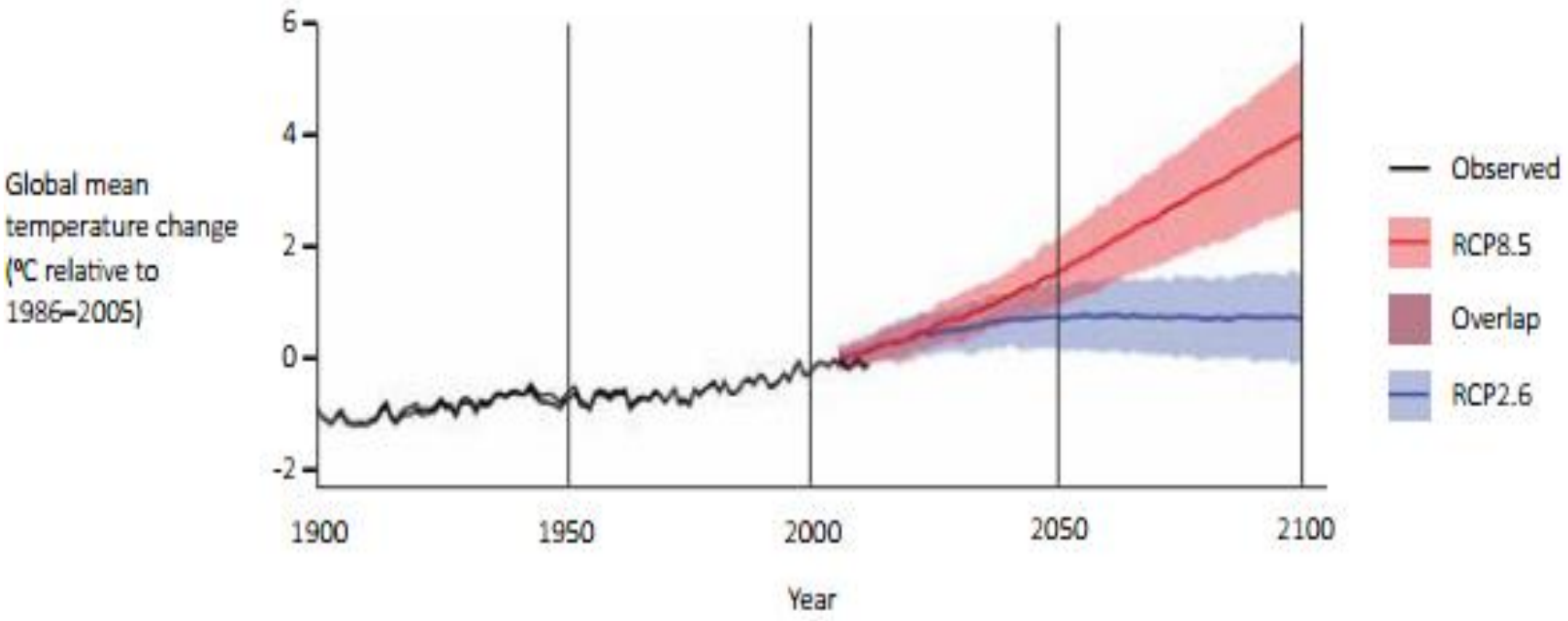
Global temperatures are rising



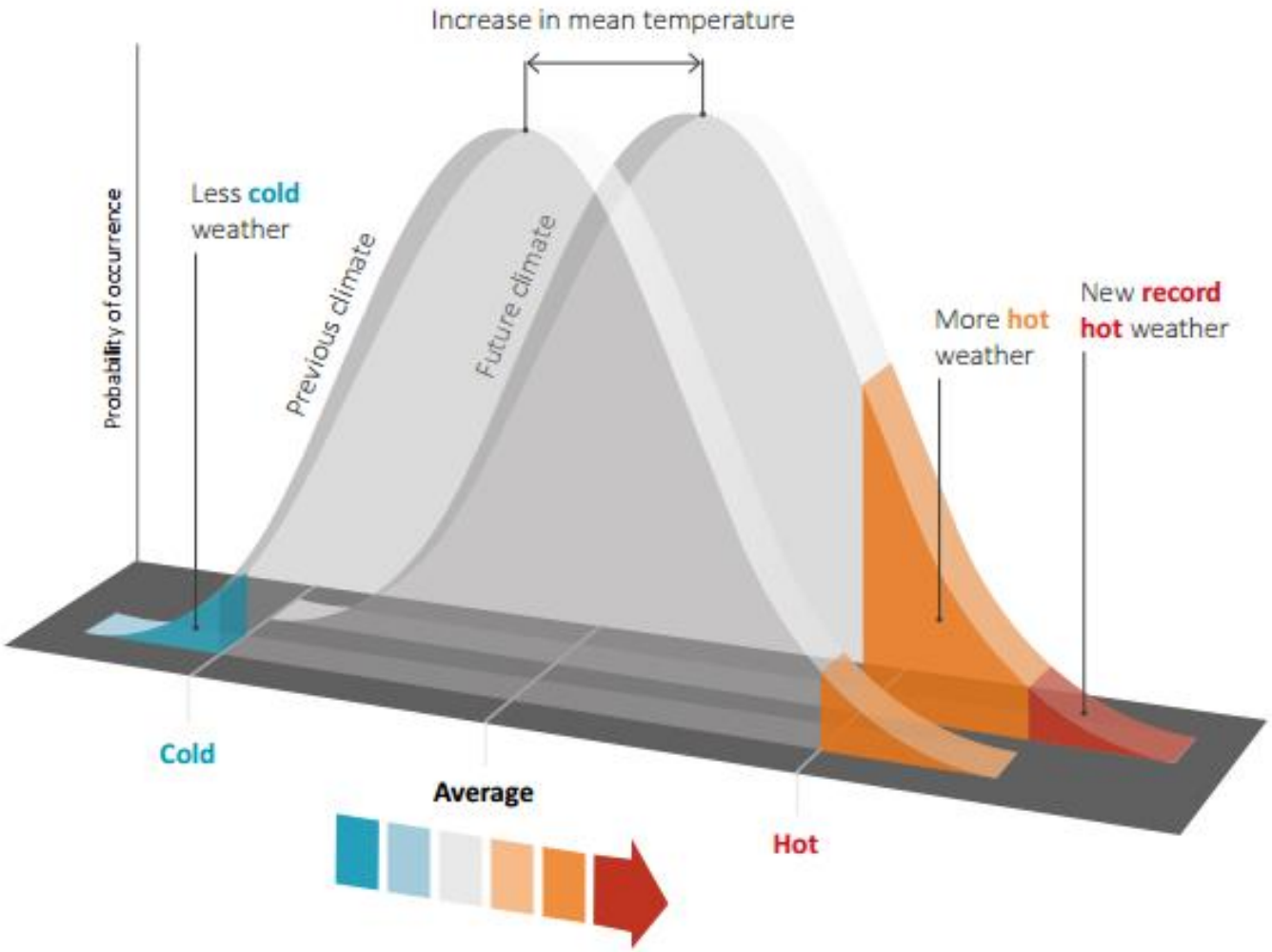
Oceans are warming



Climate is projected to change more

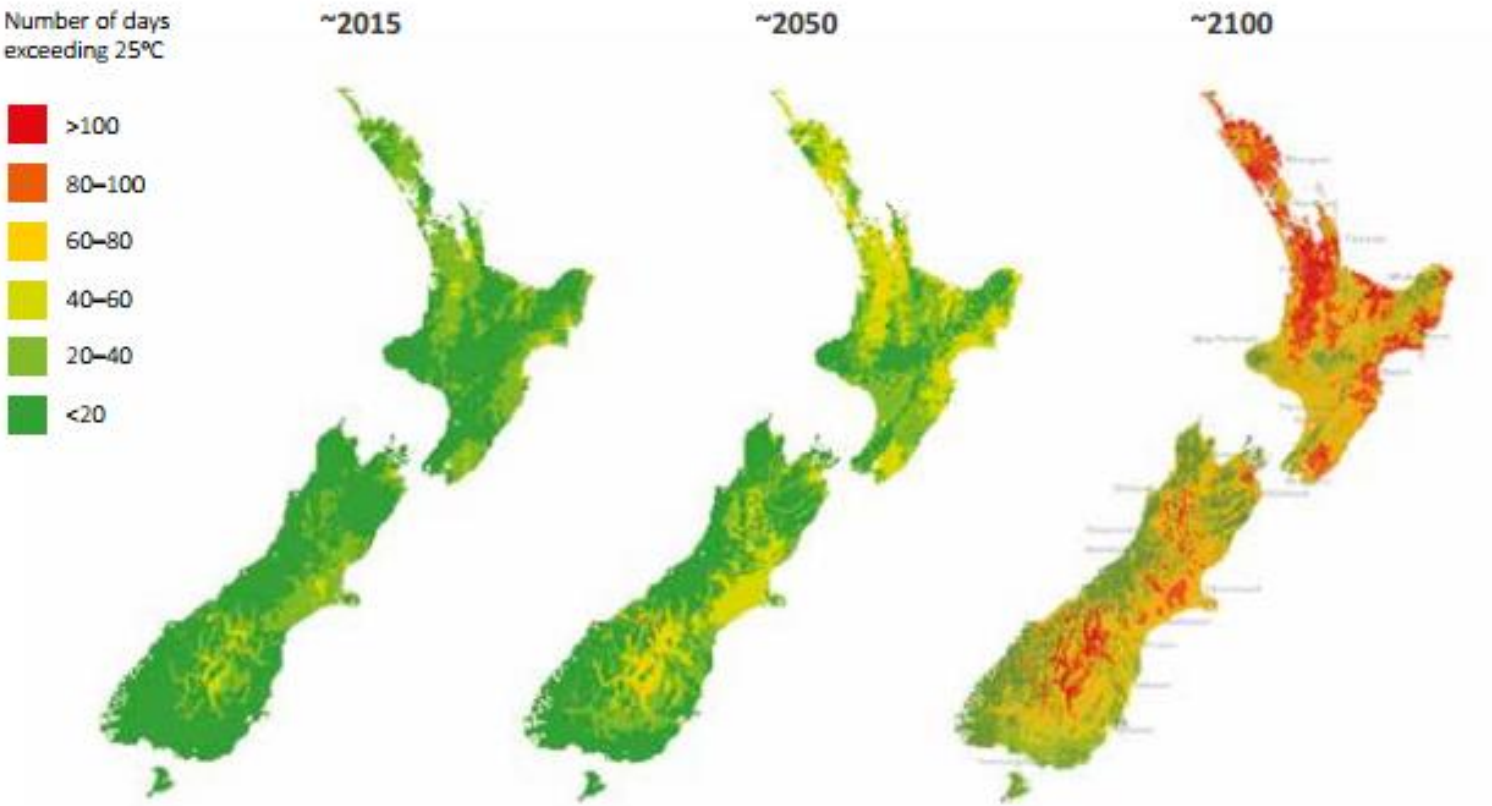


Temperature extremes changes with a shift in the mean



Not someone else's problem

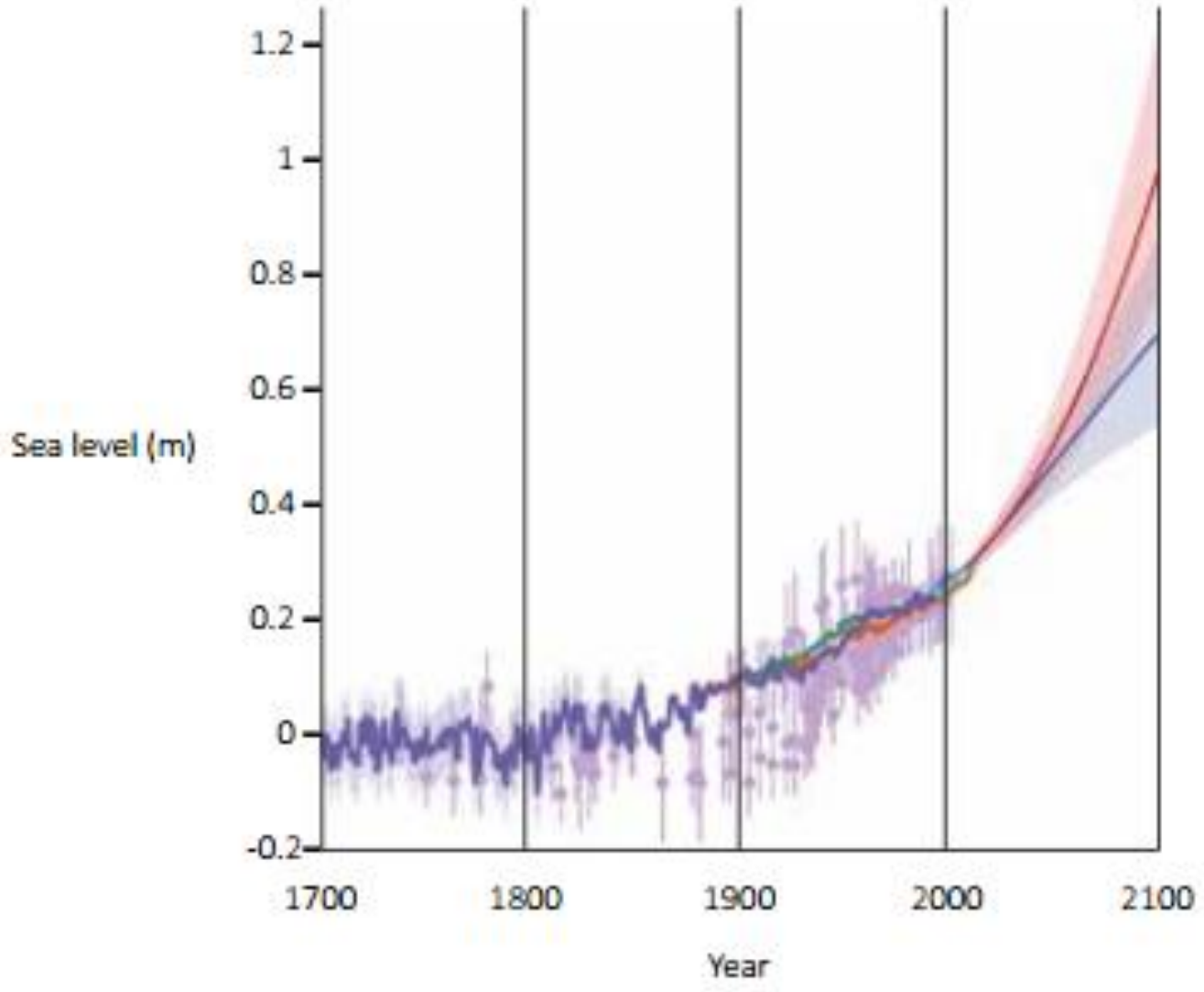
Figure 8: Estimated number of days with maximum temperatures exceeding 25°C, for the current climate (~2015), mid-21st century (~2050) and late 21st century (~2100), under the high carbon scenario (RCP8.5).



Source: Bodeker Scientific[33].

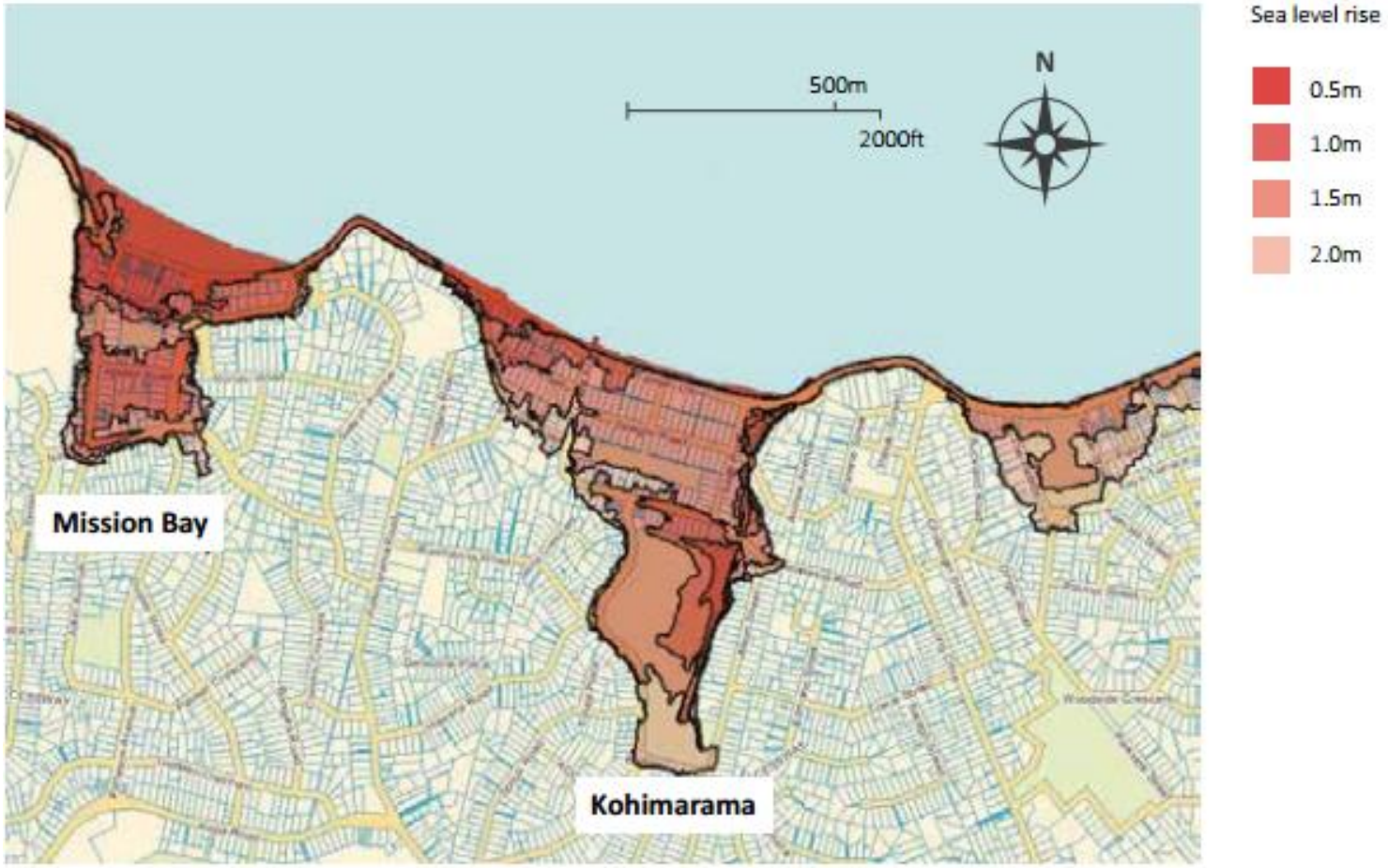
Sea levels are rising

(Blue) low-carbon world scenario 'RCP2.6'; (Red) high carbon world scenario 'RCP8.5'.



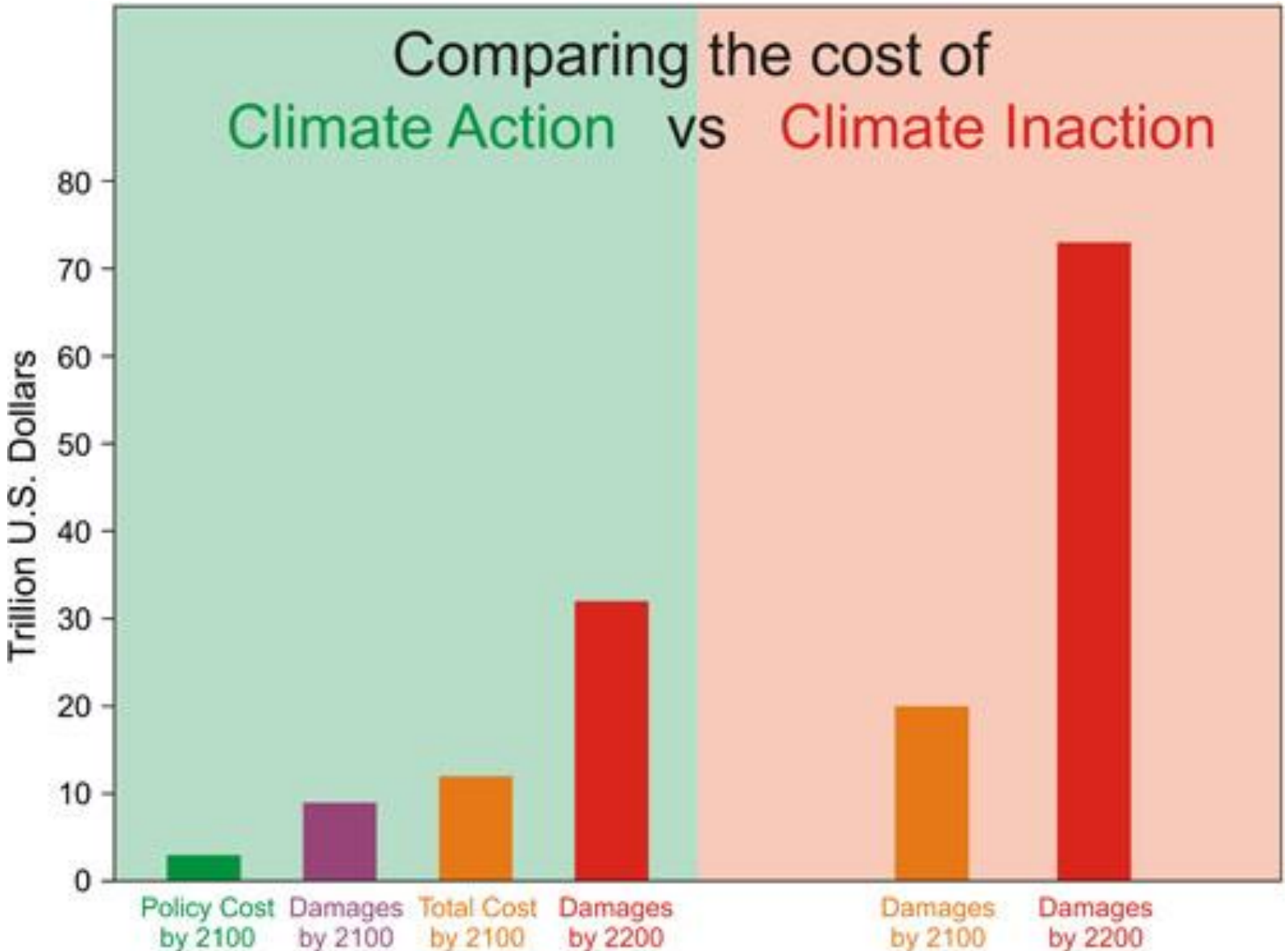
Sea level rise

Figure 9: Inundation extent in a highly populated Auckland area for a 1-in-100 extreme sea level event, for different amounts of sea level rise.



Source: Reisinger et al. 2015[47].

It's worth acting to reduce emissions



Free-riding and cooperation

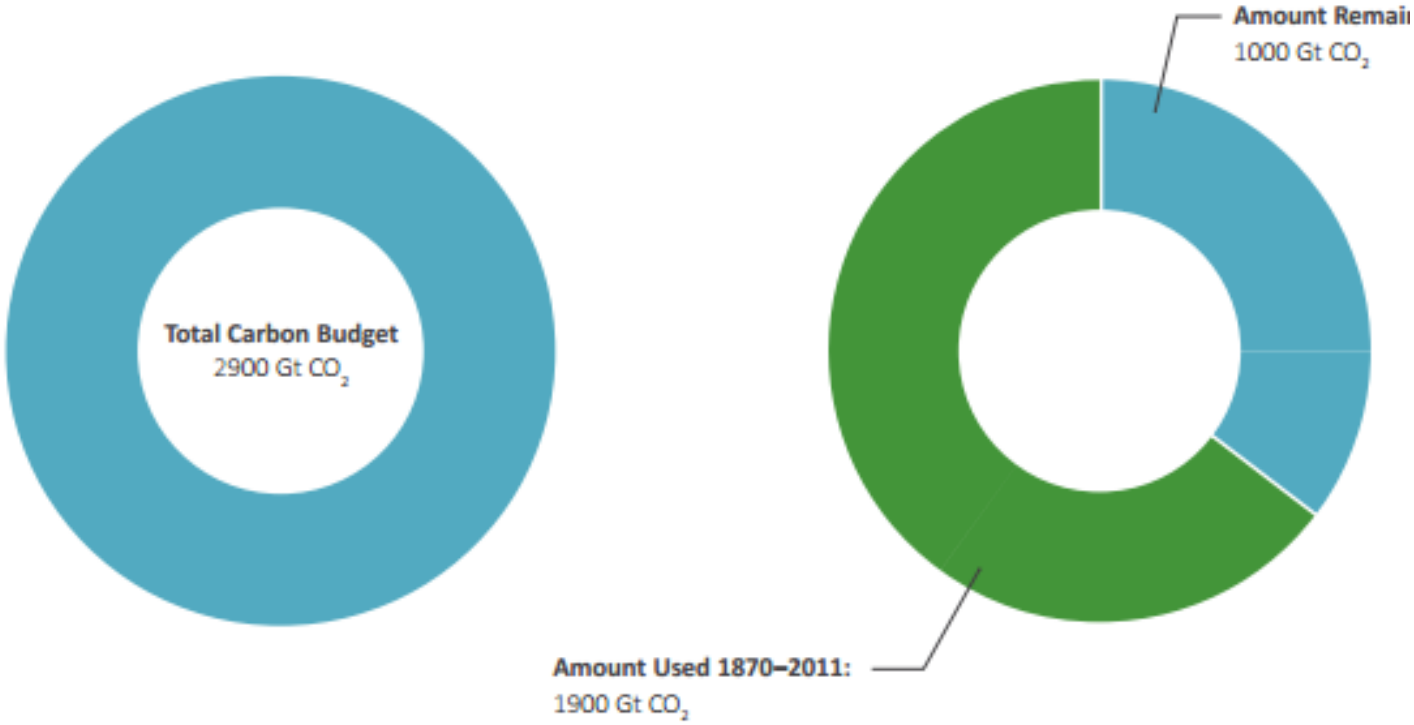
Climate stability is a global public good

The ability of the atmosphere to absorb emissions without damage is a global commons

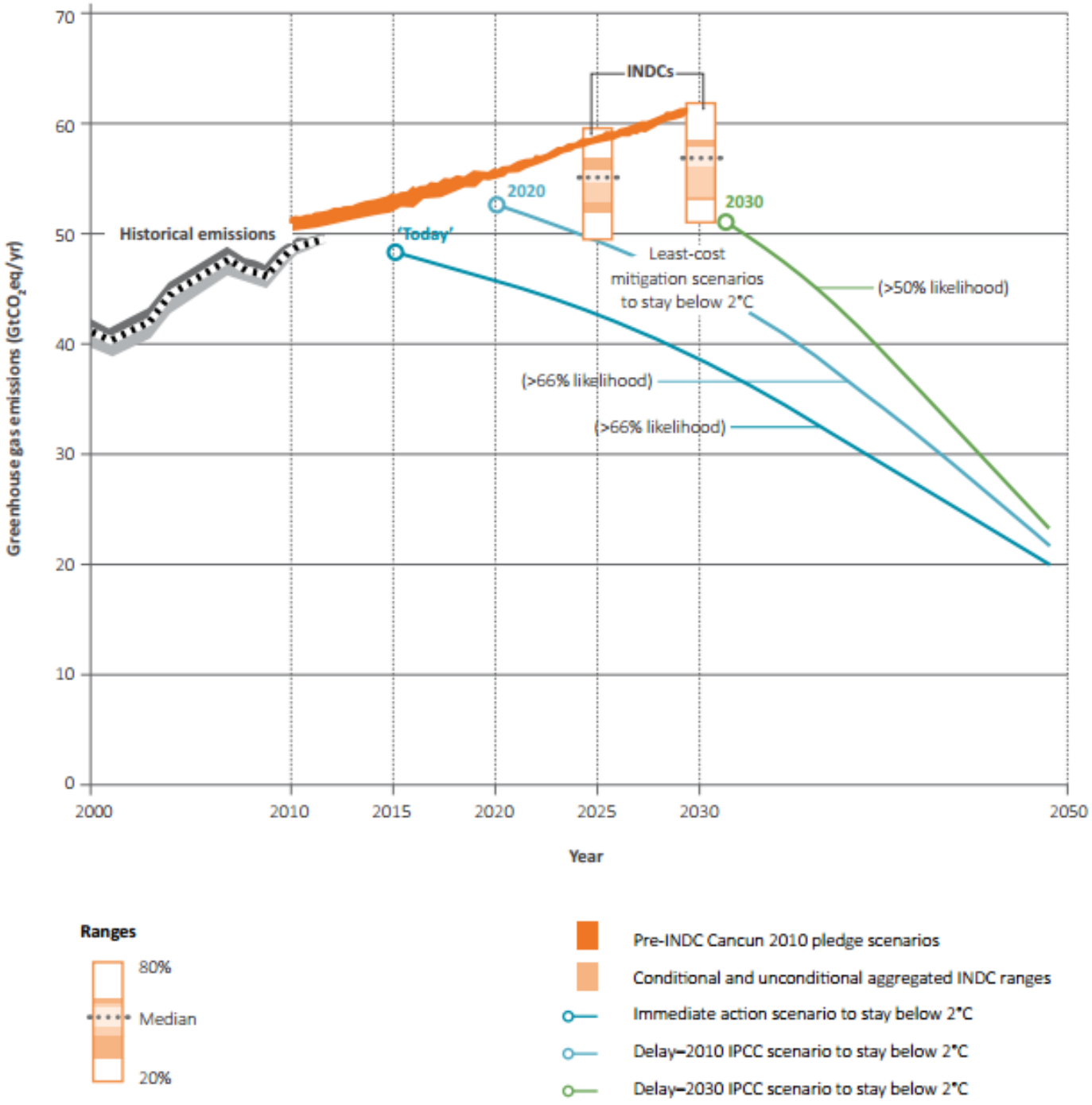
Globally there is no doubt that the ‘optimal’ level of climate mitigation is positive – and almost certainly much higher than what we have currently commited to.

We have to stop emitting

Figure 2.1 Around 1,900 Gt CO_2 of the total budget of 2,900 Gt CO_2 of anthropogenic CO_2 emissions that can be emitted into the atmosphere in order to keep below the agreed 2°C temperature rise target, has already been released.

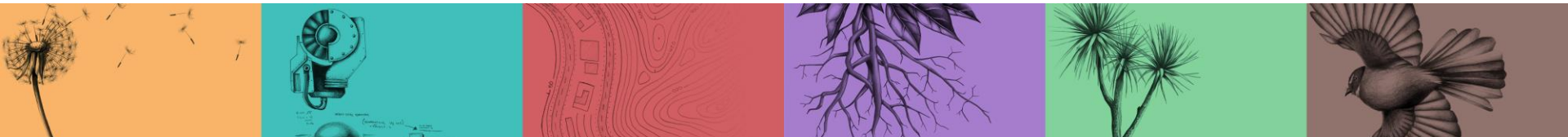


Source: IPCC (2013).


INDCs
2020
2030
Historical emissions
'Today'
Least-cost
mitigation scenarios
to stay below 2°C
(>50% likelihood)
(>66% likelihood)
(>66% likelihood)
Greenhouse gas emissions (GtCO2eq/yr)
Year
70
60
50
40
30
20
10
0
2000
2010
2015
2020
2025
2030
2050
Ranges
80%
Median
20%
Pre-INDC Cancun 2010 pledge scenarios
Conditional and unconditional aggregated INDC ranges
Immediate action scenario to stay below 2°C
Delay–2010 IPCC scenario to stay below 2°C
Delay–2030 IPCC scenario to stay below 2°C

How did we get there from here?

Key ingredients for an effective, efficient and just path to low emissions



Where is ‘there’?

Limit temperature rises to below 2^{o}C

The world transitions to a zero-net-emission economy by the end of this century

New Zealand (and Australia) transition even faster…

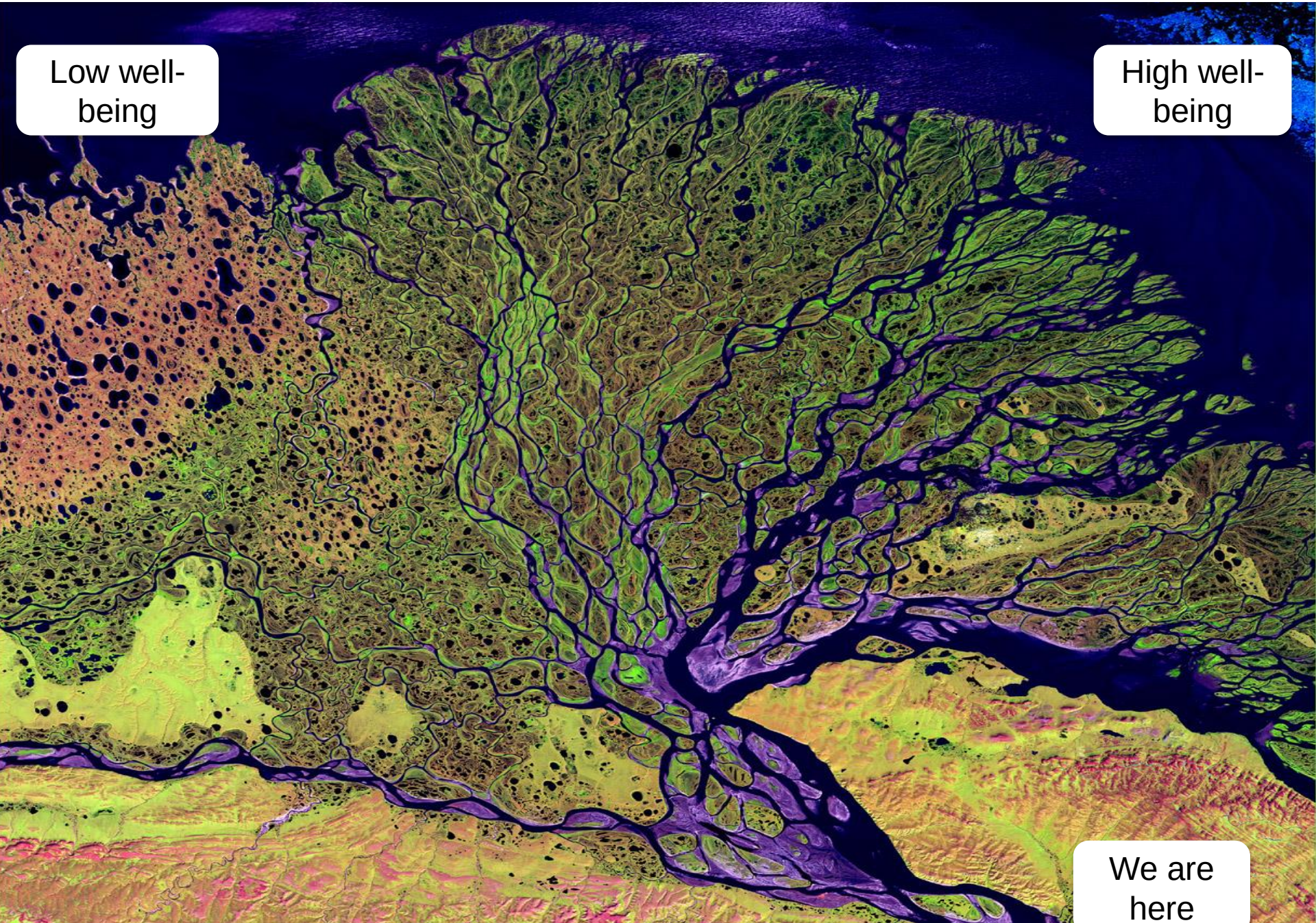
and help other countries along the way.

Net-Zero Emissions Future Vision

Change is continuous

- Alternative is not status-quo.
- We need to bring in the new – and usher out the old.

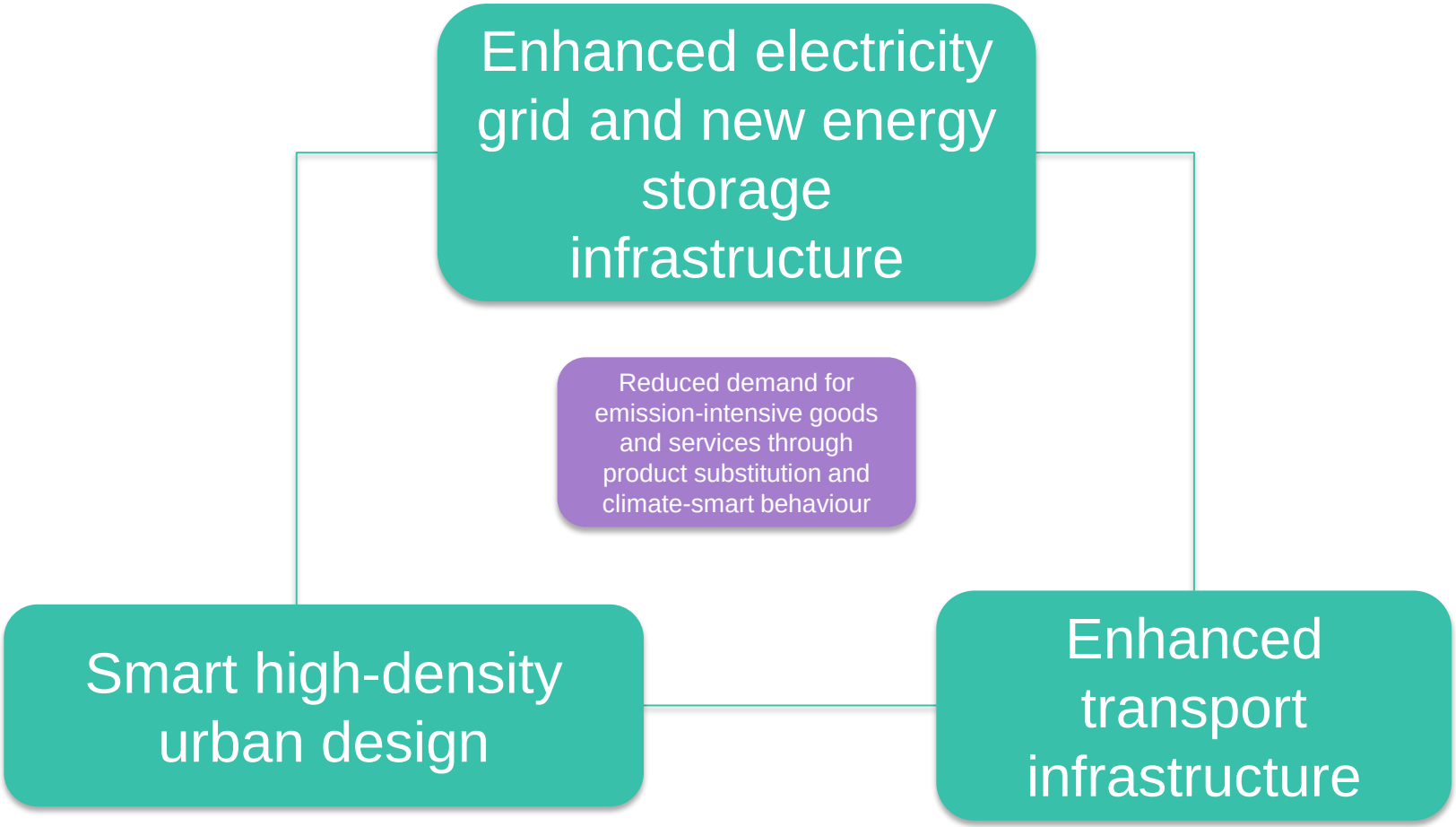
Net-Zero-Emissions Future



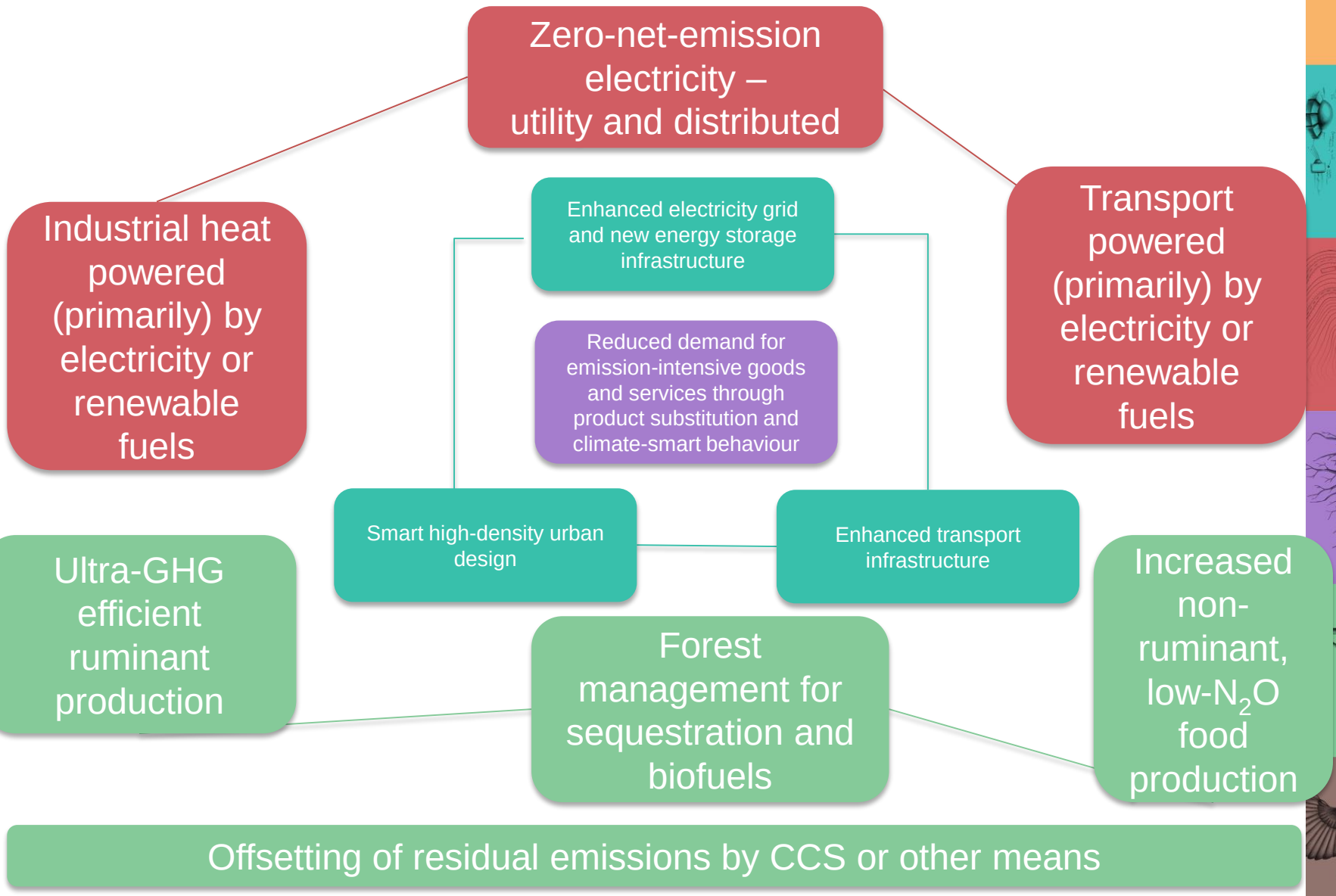
Driving a Net-Zero Emissions Future Consumption

Reduced demand for emission-intensive goods and services through product substitution and climate-smart behaviour

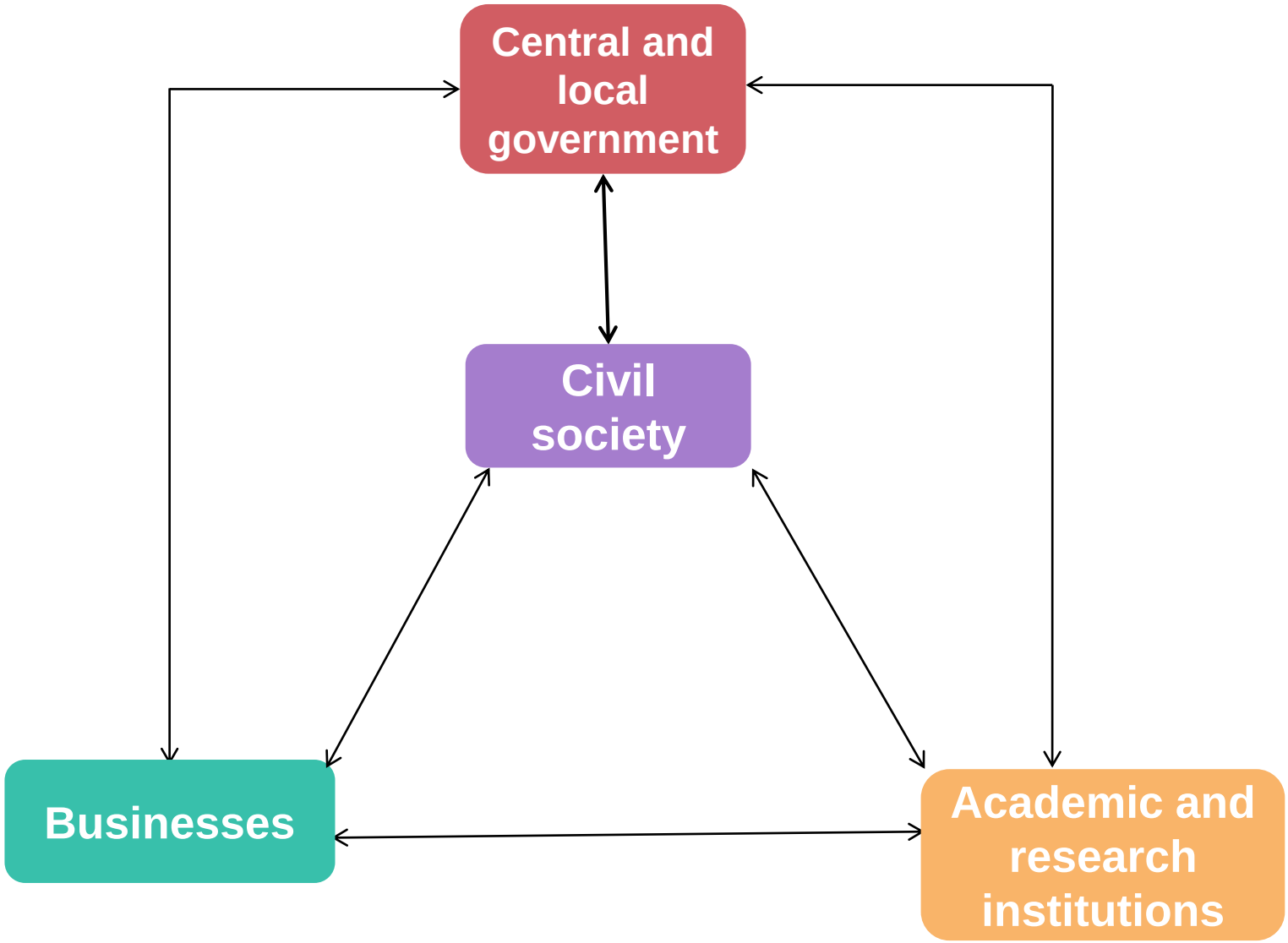
Driving a Net-Zero Emissions Future Infrastructure



Technology


Zero-net-emission electricity – utility and distributed
Industrial heat powered (primarily) by electricity or renewable fuels
Transport powered (primarily) by electricity or renewable fuels
Enhanced electricity grid and new energy storage infrastructure
Reduced demand for emission-intensive goods and services through product substitution and climate-smart behaviour
Smart high-density urban design
Enhanced transport infrastructure
Ultra-GHG efficient ruminant production
Forest management for sequestration and biofuels
Increased non-ruminant, low-N_2O food production
Offsetting of residual emissions by CCS or other means

Who Will Make Change Happen?



Is agriculture different?

Gases

Nitrous oxide

- long-lived but cannot get to zero

Methane

- Short-run climate benefits from reductions now
- For peak temperature – need to start serious reductions by 2050

Food security

Focus on low emissions per unit of nutrition

- Low emissions for each food type
- Move toward low emissions food

Long-run vision:

NZ operates a highly efficient, ultra-low-emission food production system

a combination of…..

1. NZ operates an ultra-GHG-efficient livestock sector.
2. NZ produces zero-methane, low-N_2O nutrition.
3. NZ reduces food waste across the chain of food production and consumption.
4. NZers have low emission diets.

What needs to happen to get there?

2. NZ produces zero-methane, low-N_2O nutrition

- Farms optimise use of nitrogenous fertiliser
- A ‘nutrition’ metric is agreed
- Profitable non-ruminant land-use options have been found, tested and established
- Pricing mechanism rewards low emission nutrition (producing and eating)

What actions can we take now and who can take them?

2. NZ produces zero-methane, low-N_2O nutrition

- A 'nutrition' metric is agreed
  - MPI funds research to define and test alternative metrics

    Federated Farmers leads a diverse stakeholder dialogue group to agree a metric

    MFAT get international community to accept the metric

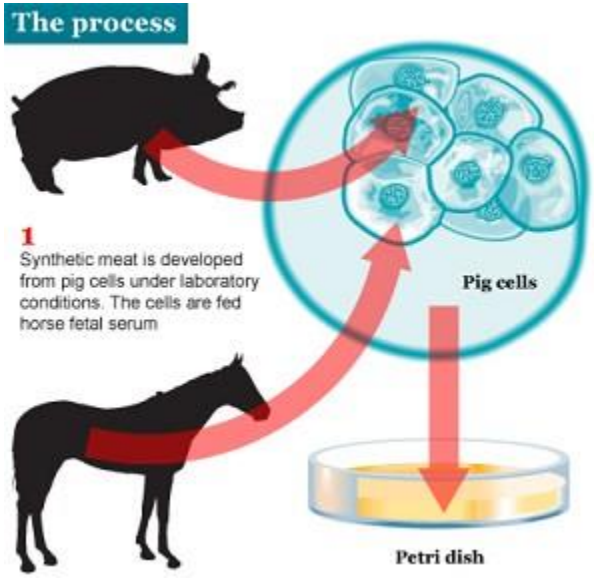
What actions can we take now and who can take them?

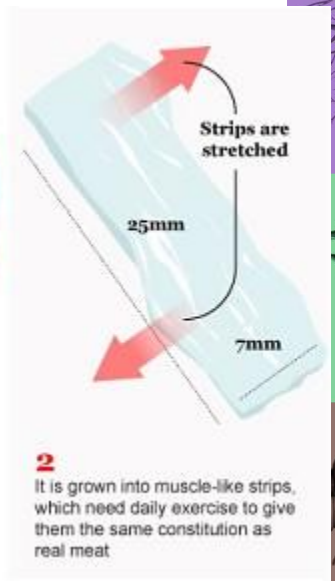
NZ produces zero-methane, low-N_2O nutrition

- Profitable non-ruminant land-use options have been found, tested and established
  - MPI funds more research on non-ruminant production including field/market trials
  - Business schools do supply chain analysis for new products
  - MBIE supports creation of new cooperative industry bodies
  - Farmers and entrepreneurs work together to create integrated production, processing and marketing chains
  - Ag ITOs train young people to work in new industries
  - Consumer groups promote new products

Future food?


Quorn
MEAT FREE. SOY FREE
FILLETS
No Artificial Colours or Preservatives
High in Fibre
High in Protein


The process
1
Synthetic meat is developed from pig cells under laboratory conditions. The cells are fed horse fetal serum
Pig cells
Petri dish


Strips are stretched
25mm
7mm
2
It is grown into muscle-like strips, which need daily exercise to give them the same constitution as real meat

Why emissions pricing?

The options for mitigation are many and varied

Understanding the climate implications of any action is really hard

Only private actors really know what can be done and what costs are

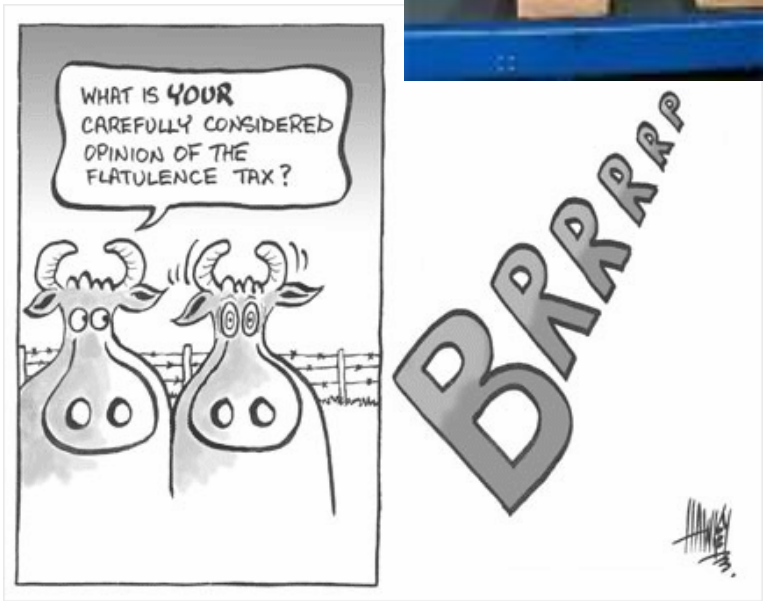
Price based instruments can:

- facilitate action by the willing by reducing financial barriers
- provide an incentive to the reluctant to act – or get them to fund other action
- provide accurate signals of the actual GHG cost of different activities

A little history

Before the ETS NZ had tried:

- Carbon tax
- Negotiated Greenhouse Gas agreements
- Projects to Reduce Emissions



and many other smaller programmes

- Biofuels targets
- Insulation programme
- Energy efficiency programmes
- Building standards…

Basic cap and trade

1. Define cap
2. Allocate (sell or give) ‘units’ that sum to cap
3. Allow trade in units
4. Monitor and enforce

If, for each point of obligation (monitored point)

$$\text{emissions} \leq \text{units}$$

then, cap is achieved.
If emissions would have been higher than the cap, someone must have mitigated.
Price rises until the cap is met.

The New Zealand ETS

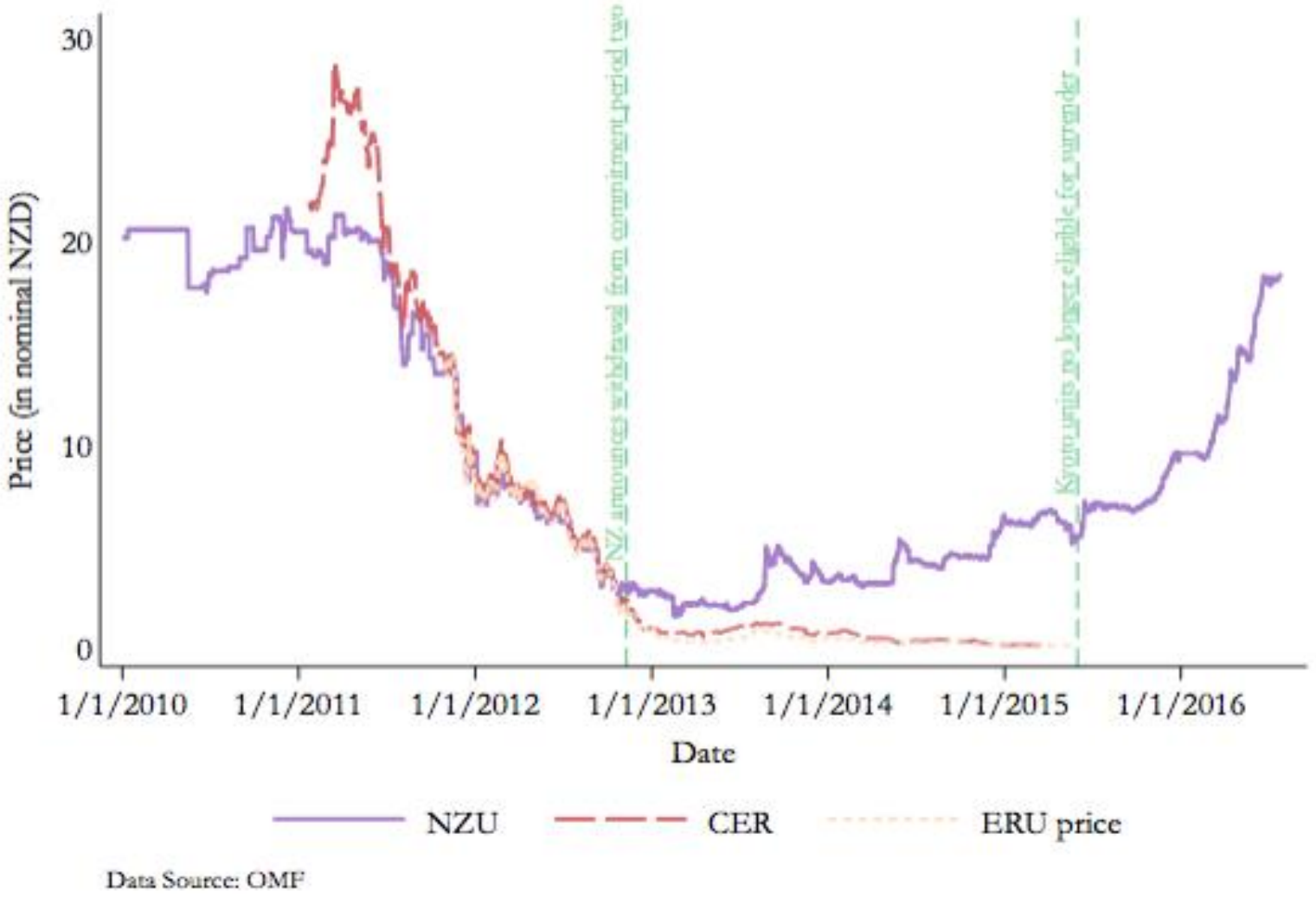
Compliance system has been operating since:

- 2008 forestry
- 2010 liquid fuels, stationary energy and process emissions
- agriculture?

Simple system with high credibility of monitoring

Ability to buy units from overseas has been critical

Emissions prices in NZ

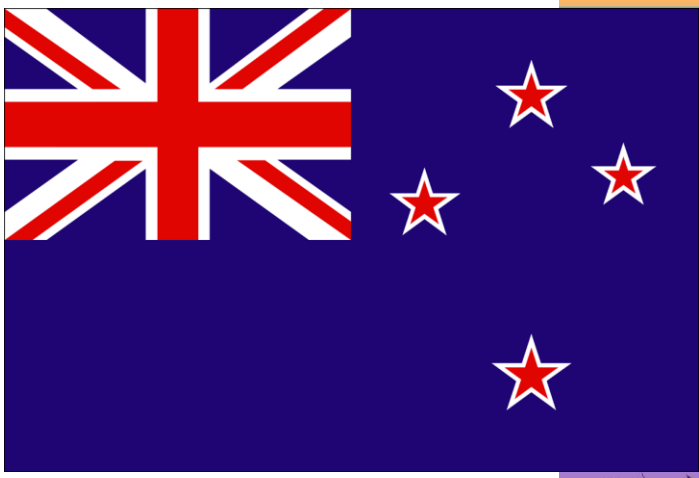


Data Source: OMF

Kyoto is over: Paris is a new world

New Zealand's system is strong in some ways:

- Comprehensive
- Simple
- Focused allocation strategy



Key Challenges

- Recovering from linkage to unreliable international market
- Large 'bank' – 4X annual emissions
- Supply is not defined
- Need to be able to fund international mitigation
- Low policy / investment stability
  - Lack of confidence
  - Weak political signals
- Create strong set of complementary measures

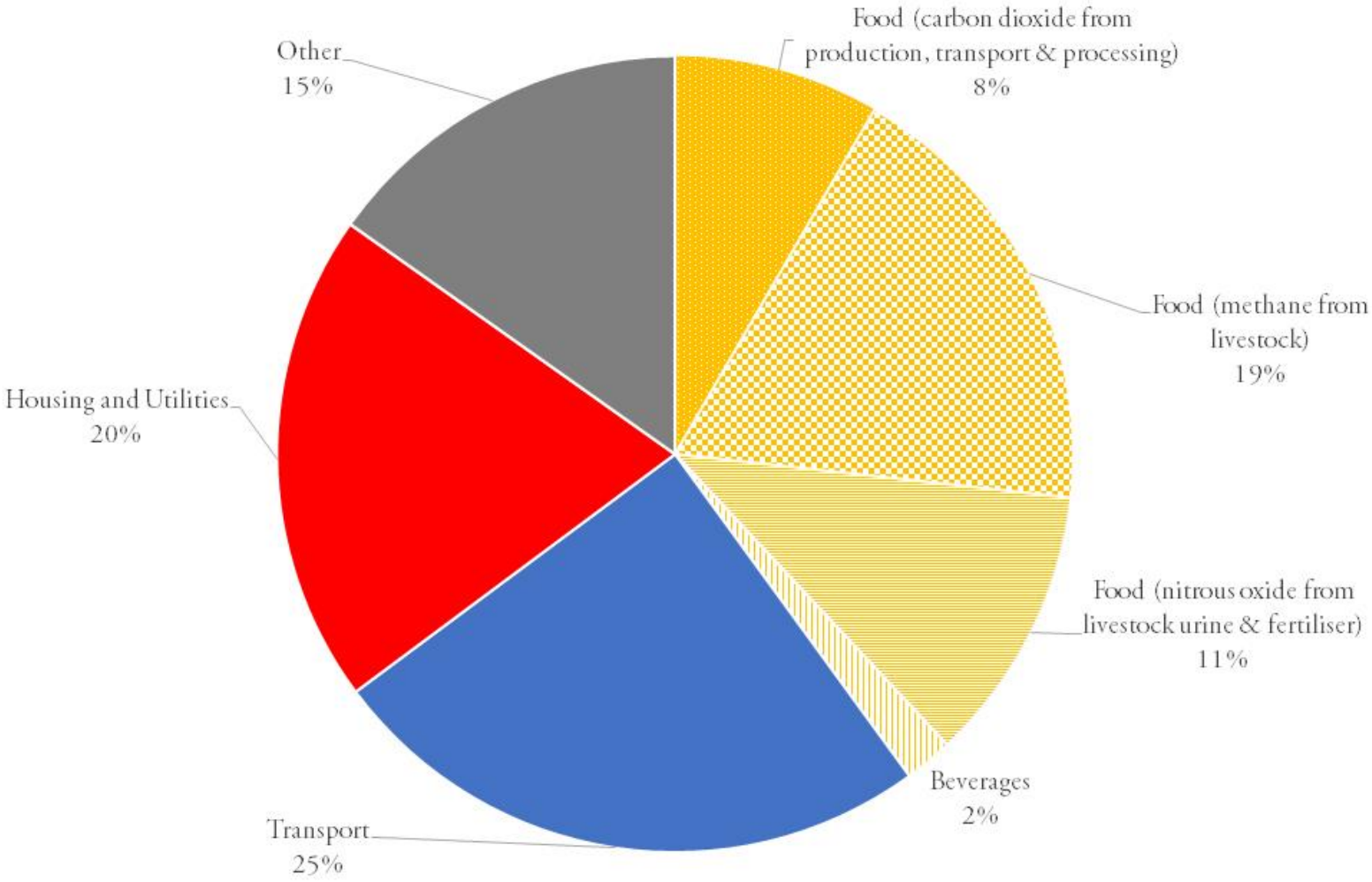

Can we help Colombia transition to low emissions – and help the peace process along the way?

Major sources of household emissions

Statistics NZ disclaimer

Access to the data used in this presentation was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented are the work of the authors, not Statistics New Zealand.

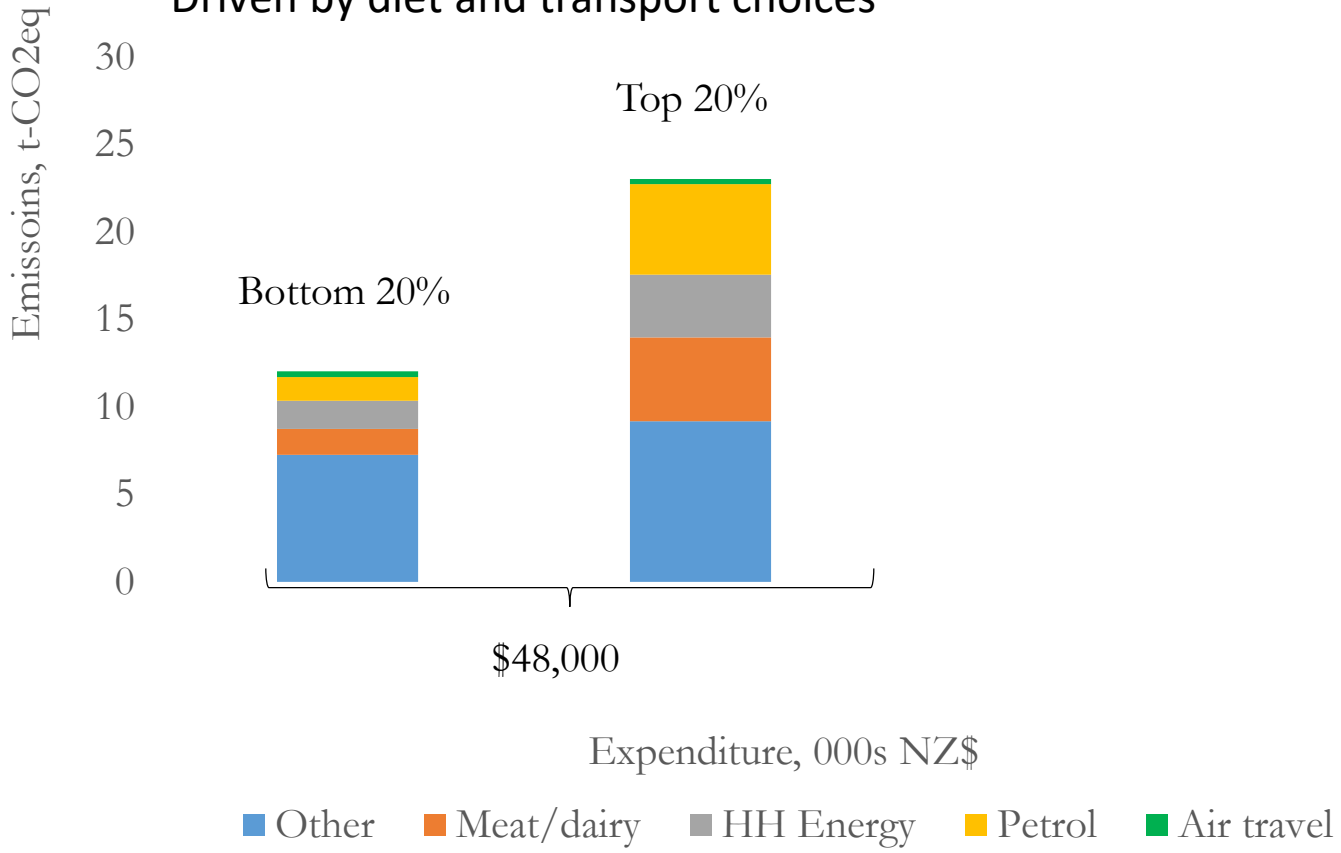
Composition of average per-capita emissions, 2012



What we buy also has an impact…

Top 20% of emitting households at each level of expenditure have emissions 80-90% higher than bottom 20% of households

Driven by diet and transport choices



www.motu.org.nz

http://low-emission-future.blogspot.co.nz/

http://insights.nzherald.co.nz/article/climate-action-tool