

**GASNZ INDUSTRY FORUM 2017**

**Wairakei, 7-9 October, 2017**

# **The Role of Gas in a Low-Carbon Future**

**Prof Ralph Sims**

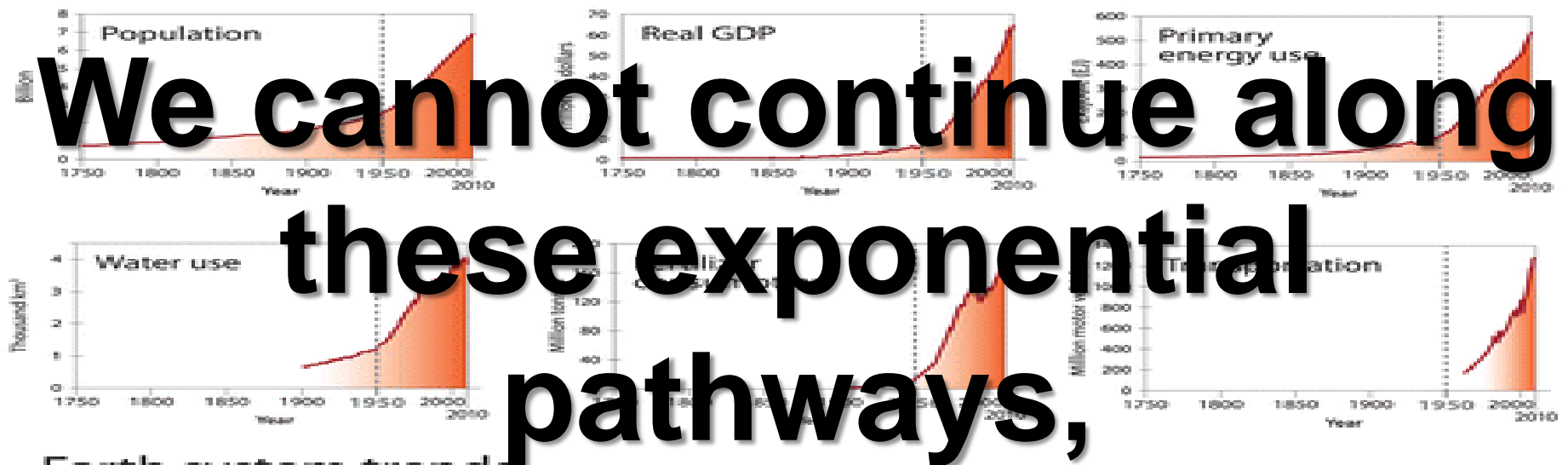
**Massey University**

**R.E.Sims@massey.ac.nz**

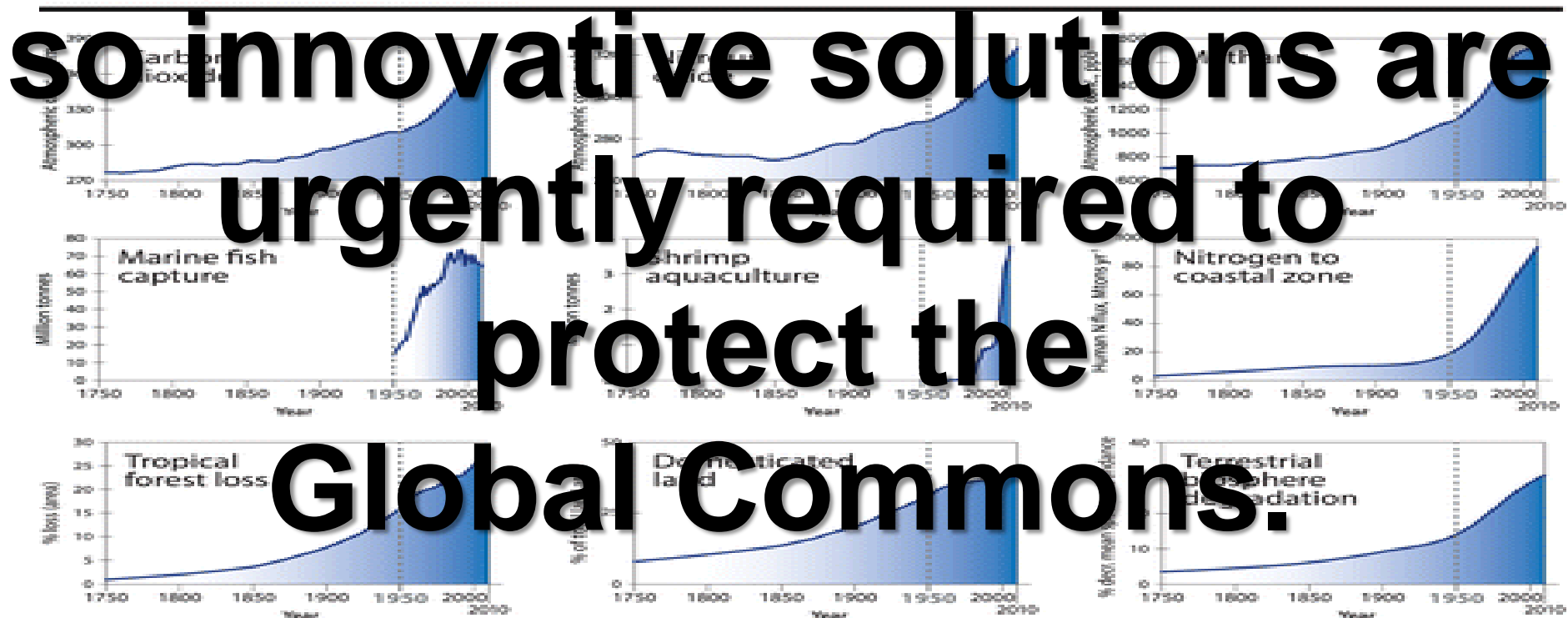
**Welcome to the  
Anthropocene age**

**as driven by the  
“Great Acceleration”**

## Socio-economic trends



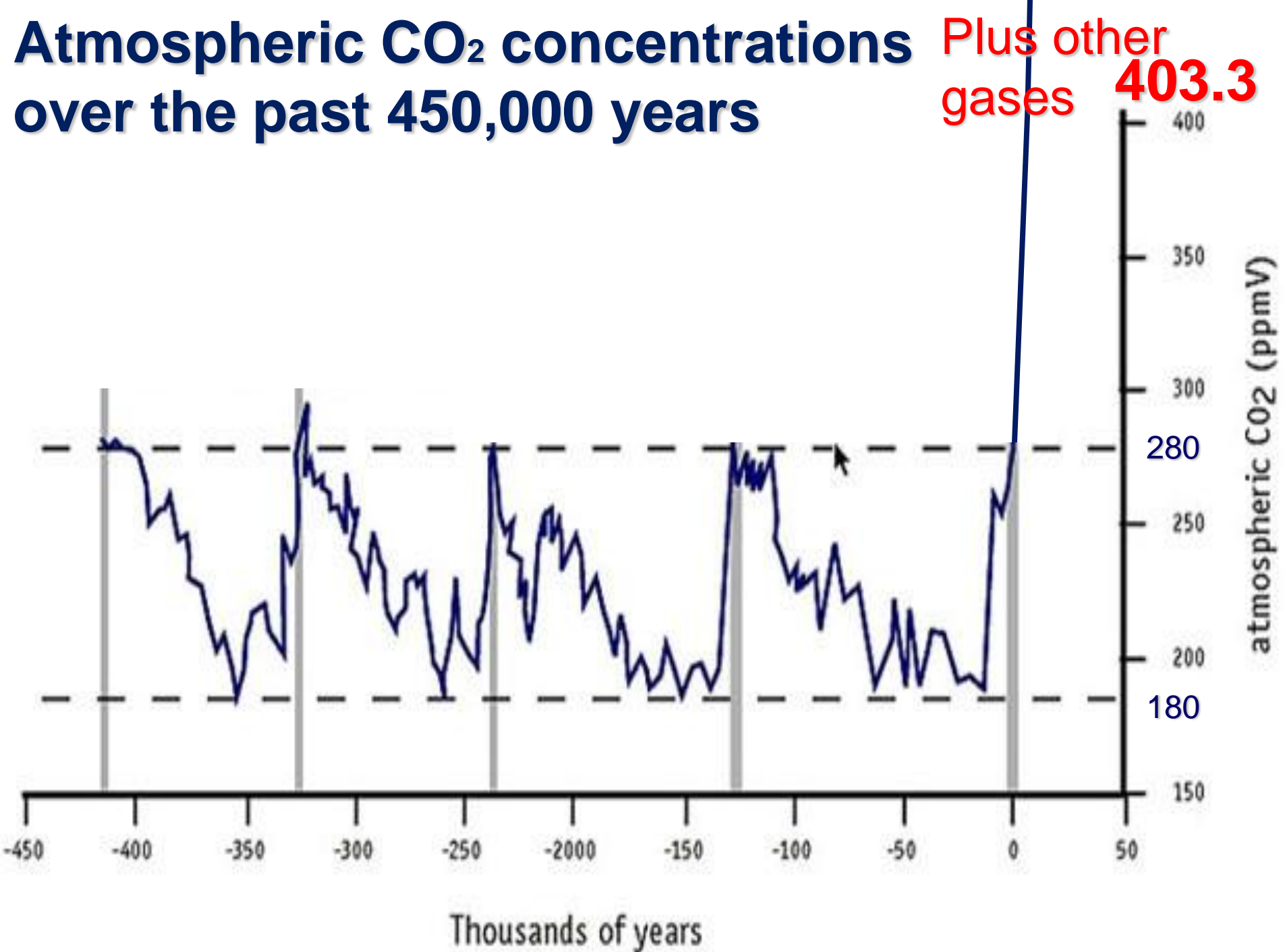
## Earth system trends



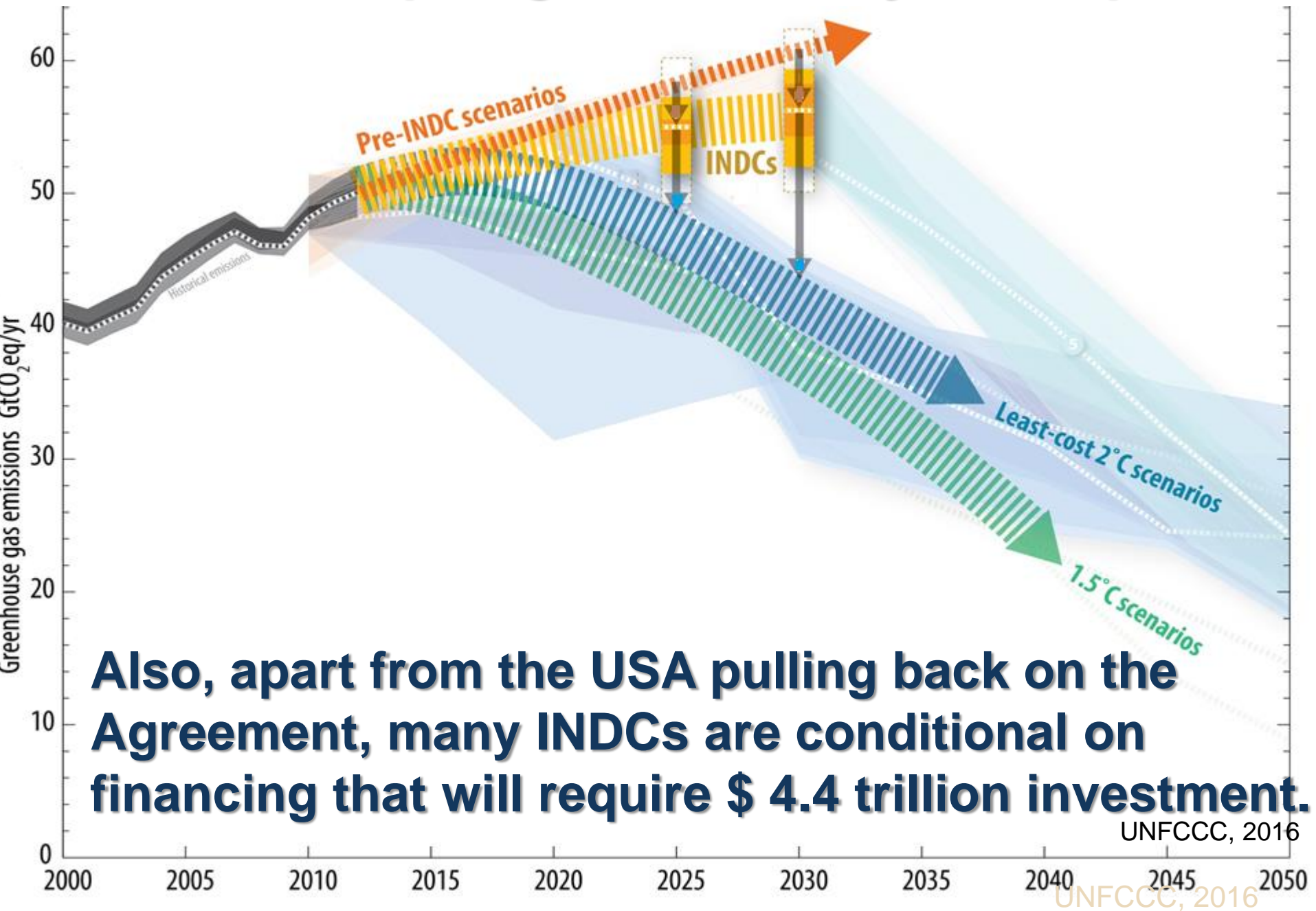


# Atmospheric CO<sub>2</sub> concentrations over the past 450,000 years

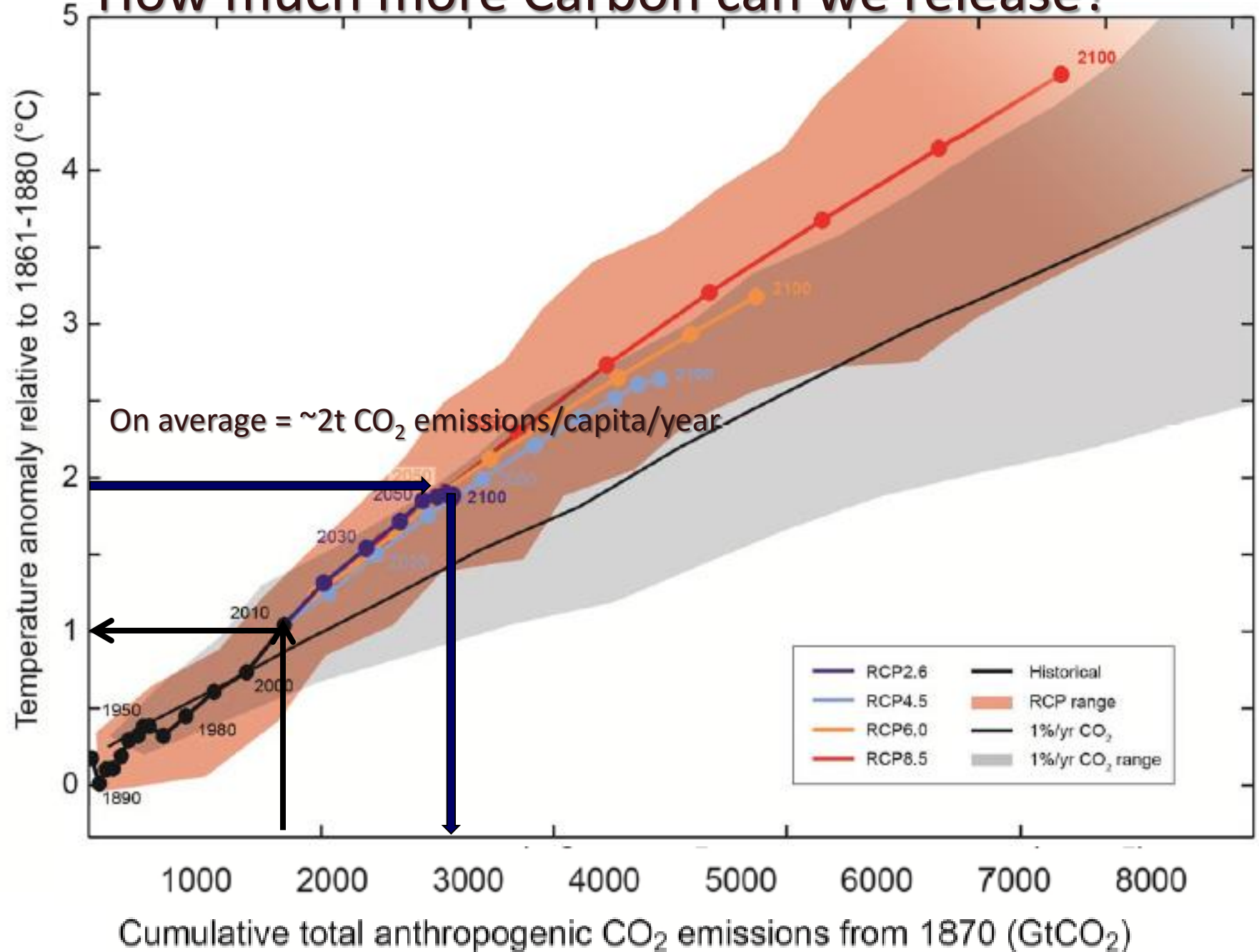
Plus other  
gases **403.3**



# The Paris pledges are totally inadequate



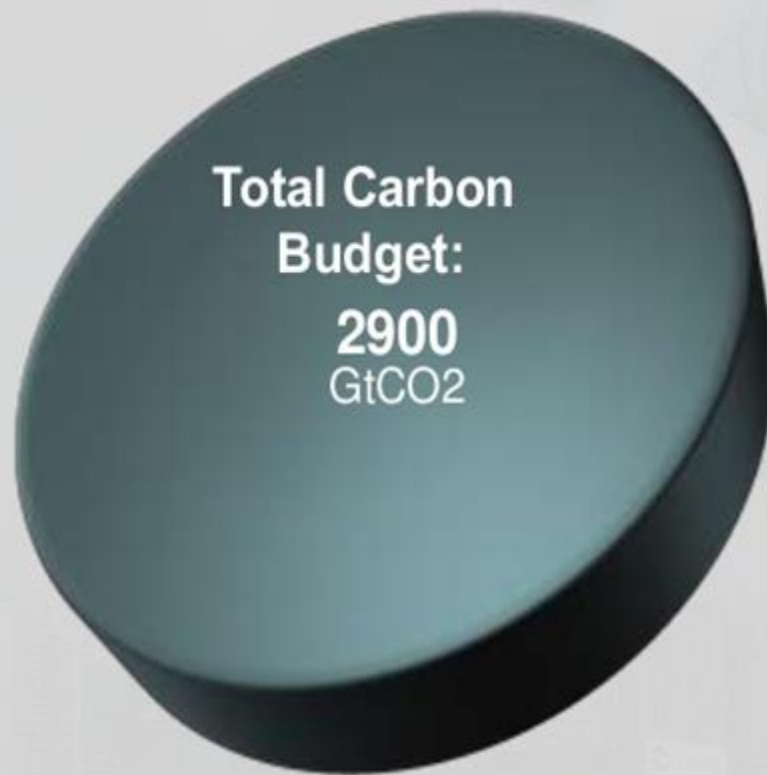
# How much more Carbon can we release?



# How much more Carbon can we release?

## The window for action is rapidly closing

65% of our carbon budget compatible with a 2° C goal is already used



AR5 WGI SPM

Since 2011 at ~50 Gt CO<sub>2</sub>/yr emissions means only ~700 Gt CO<sub>2</sub> to release

**So why do we  
continue to invest  
in exploring for  
more oil, coal and  
gas?**



**New Zealand is responsible for 0.22% of total GHGs but has one of the highest emissions per capita.**

**Paula Bennet, when Minister of Climate Change Issues, agreed to ratify the Paris Agreement.**

**Our NDC target is to reduce emissions by 11.2% below 1990 levels.**

**Currently we are 24% above 1990 levels (~80 Mt CO<sub>2</sub>) less removals by forests.**

**So now we have to do something domestically.**

**But what do we do?**



# Transition to a low-carbon economy for New Zealand

April 2016

the ROYAL  
SOCIETY of  
NEW ZEALAND  
TE APĀRANGI

<http://www.royalsociety.org.nz/expert-advice/papers/yr2016/mitigation-options-for-new-zealand/>

## Climate Change Mitigation Options for New Zealand

Latest report on climate change mitigation options



## Climate Change Implications for New Zealand

April 2016

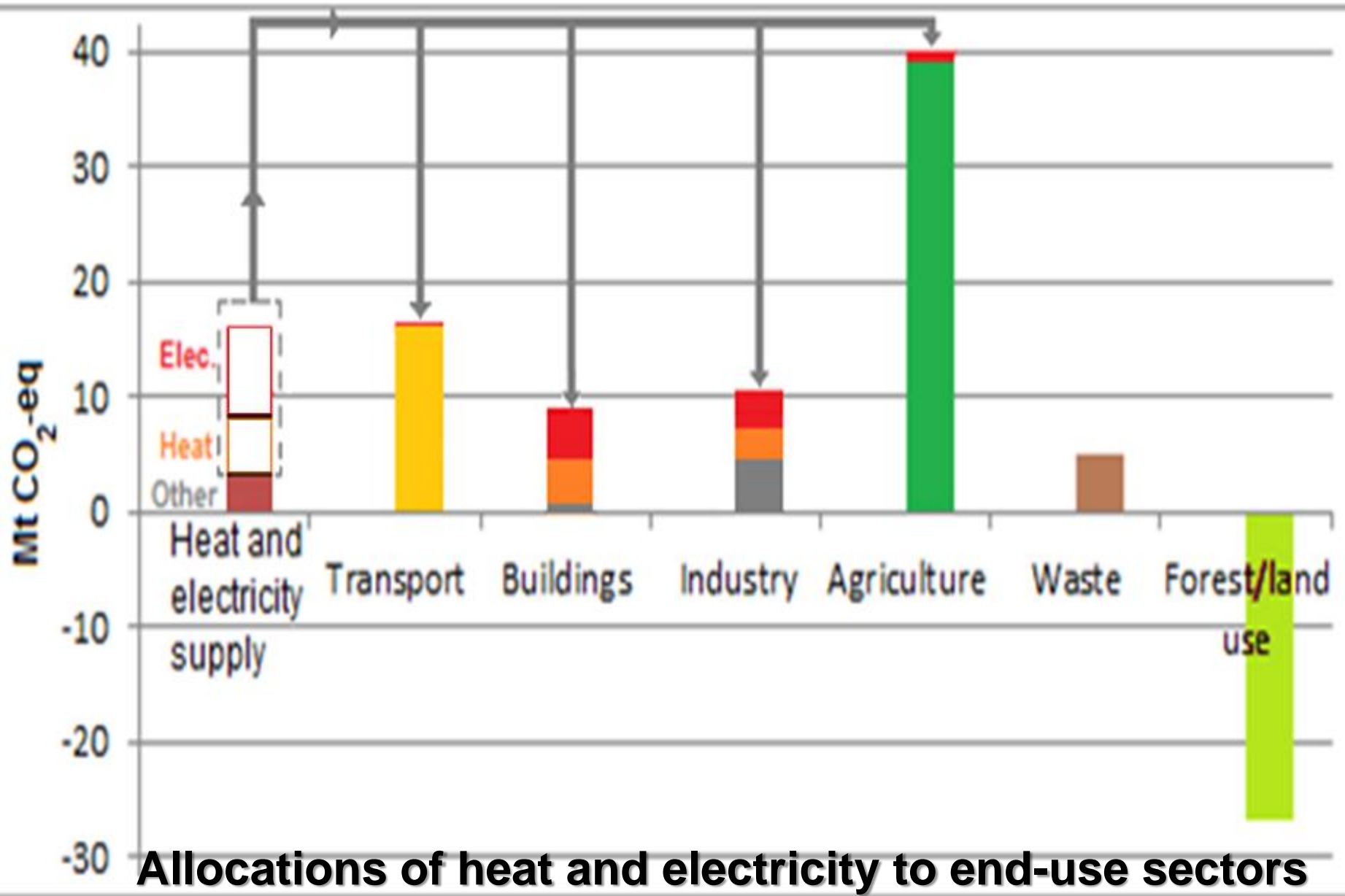
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## Climate Change Implications

Read latest expert advice report on implications of  
climate change for New Zealand



# New Zealand's current GHG emissions



(Royal Society 2016 "Transition to a low-carbon economy for NZ")

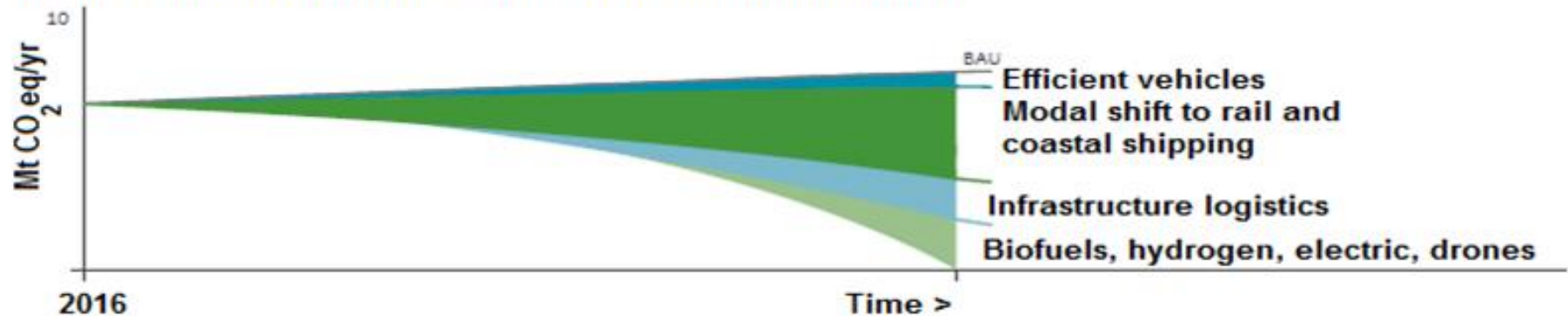
# Royal Society of New Zealand, 2016

## *“Transition to a Low-carbon economy for NZ”*

The report showed there are good opportunities to reach net zero GHG emissions for most sectors - but costs are uncertain and further analysis is needed.

### Freight transport as an example:

Freight transport (domestic excluding international shipping)



<https://royalsociety.org.nz/what-we-do/our-expert-advice/all-expert-advice-papers/climate-change-mitigation-options-for-new-zealand/climate-change-mitigation-resources/>





# Final Thoughts

UN Secretary General, Ban-Ki Moon at the signing of the Paris Climate Agreement:

*“This Covenant must amount to more than promises.*

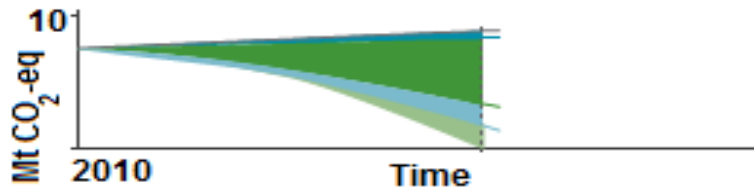
*It must find expression in actions we take today on behalf of this, and all future generations.”*

- Gas has reduced C emissions compared with coal but does not reduce to anywhere near enough.
- Energy efficiency can help.
- Hydrogen can be produced and use the gas distribution network: Example: City of Leeds, UK: Northern Gas Networks moving away from methane to a hydrogen grid was “technically possible and economically viable”. Conversion to start by 2026, with costs estimated £2bn.
- But how is the hydrogen to be produced?
- We are now too late for 1.5°C and maybe also 2°C so we will also have to learn to adapt to climate events.

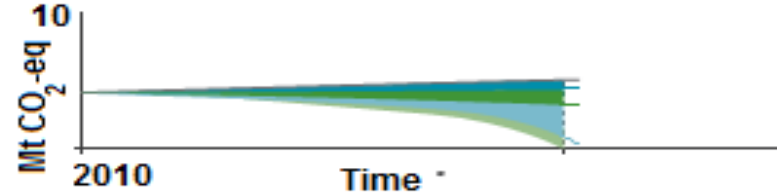


# The exception is Agriculture

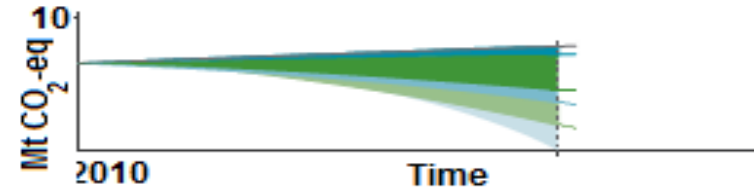
Electricity



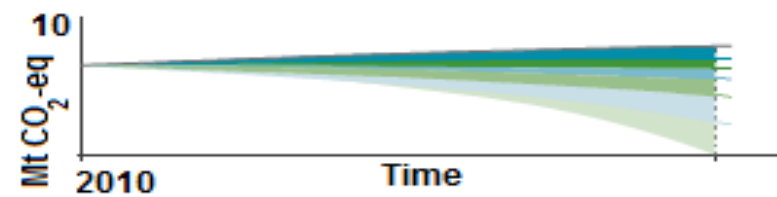
Commercial buildings



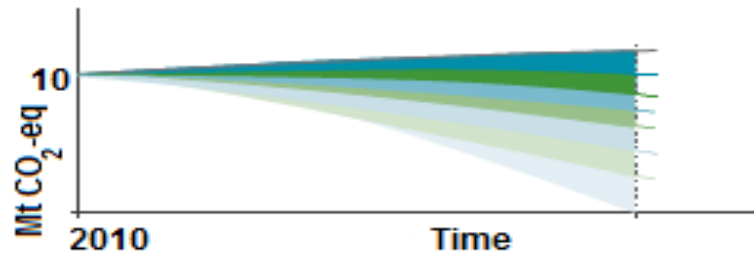
Heat



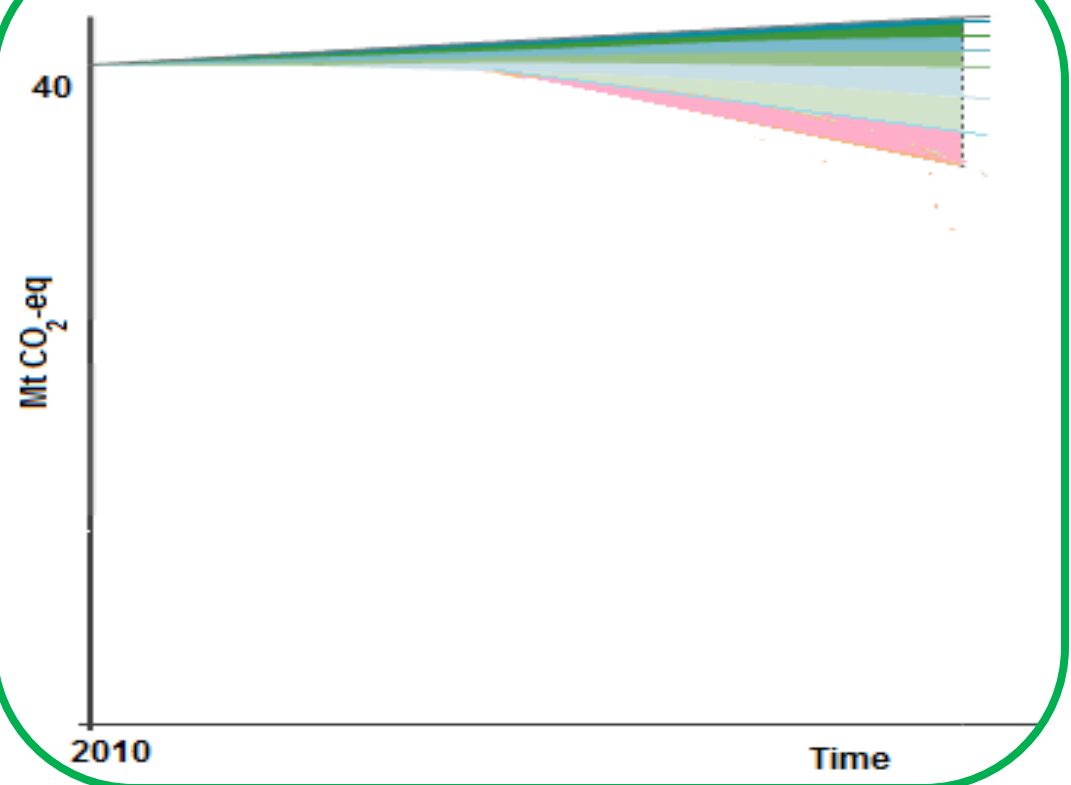
Residential buildings



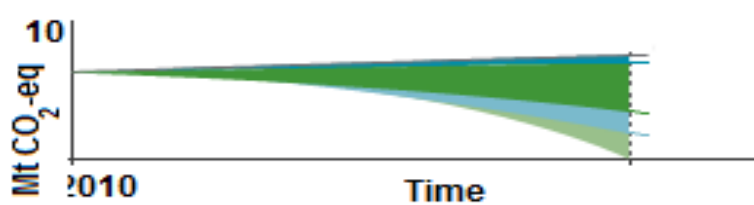
Passenger transport



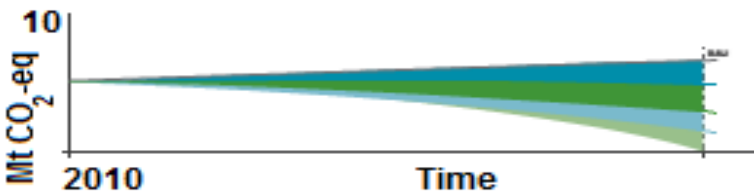
Agriculture



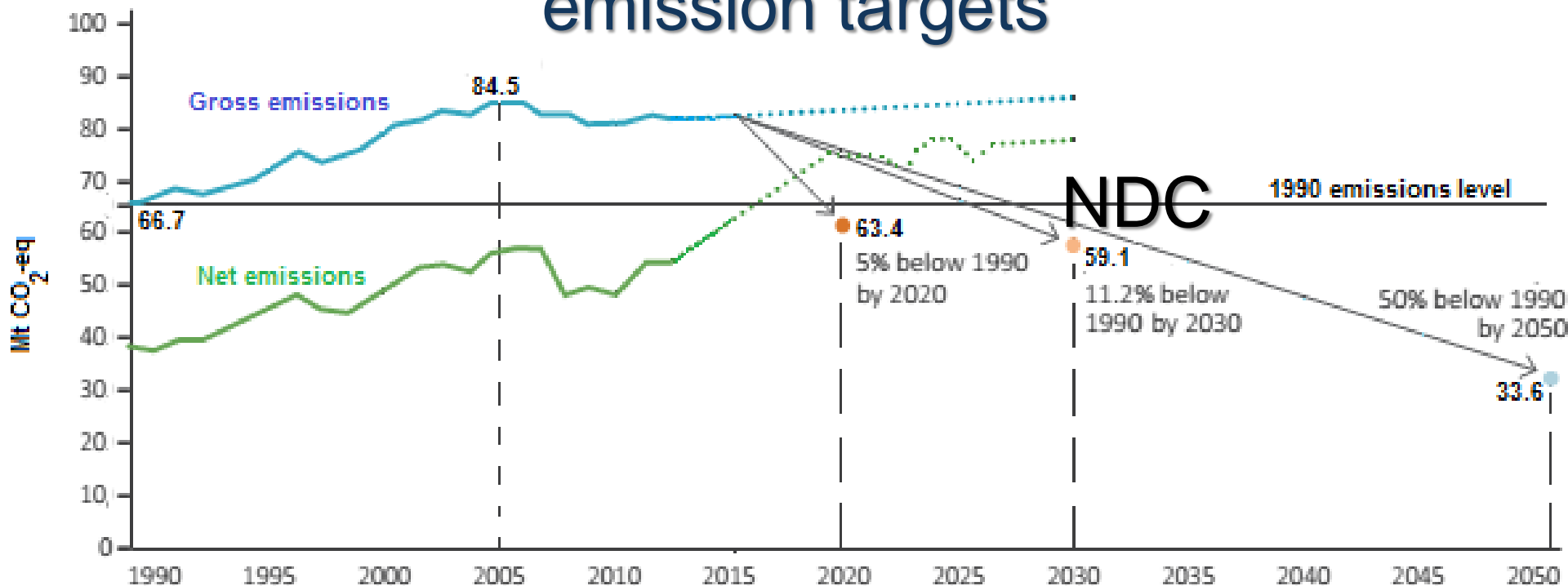
Freight transport



Industry



# New Zealand's national greenhouse gas emission targets



**Subject to international agreement, our NDC can be met by a combination of:**

- purchasing carbon credits off-shore;
- CO<sub>2</sub> removals by forest sinks;
- reducing domestic GHG emissions
  - including the transport sector.



# NZ GHG mitigation potential by source – cumulative emissions over 2021-2030 period.

