

# High expectations for the Climate Commission: Will Government's action plan push us fast enough?

To Engineers for Social Responsibility  
AGM & Workshop, March 15 2018.

## Contributions from the Wise Response Soc (WR):

Alan Mark. Introduction: NZ's climate change programme.

Dugald MacTavish: Meeting the GHG target: The Stabilisation Wedge.

Bob Lloyd: The Transport sector.

Janet Stephenson: The Industrial sector; the Energy Sector.

Hugh Campbell: The Land Use sector.

Nathan Surendran: The Waste sector.

Lisa Ellis: Ethical and social aspects

*WR Mission Statement: "As demand for growth exceeds earth's physical limits causing unprecedented risks, what knowledge do we need to secure NZ's future well-being."*

Sir Alan Mark

Introduction: NZ's Climate Change Programme

# The Zero Carbon Bill\*

New target for Net Zero GHG Emissions by 2050.  
Committed to a just and effective transition by 2050.

Early 2018: Cabinet will establish an Interim Climate Change Committee (one year).

Mid 2018: Climate Change Committee will:

Progress key issues (agriculture & Renewable Energy) for climate change policy;  
Engage with key stakeholders; advise Government.

[Cabinet minute: The 100 day plan for climate change.](#)

Zero Carbon Act: April, 2019: ?Bipartisan support!

With Independent Climate Change Commission to advise and monitor Government, and report.

\* Details from MfE: “NZ’s climate change programme.” 21/2/18.

# The Productivity Commission, 2017:

Maximise opportunities and minimise costs and risks of:

Transitioning to a lower emissions economy beyond 2030.

Reports back July 2018.

Findings will inform the Transition Hub's work on Economy by June '19:

Reducing domestic GHG emissions, and moving to a lower emissions future,

**While continuing to grow the economy.**

# NZ Emissions Trading Scheme

Key tool for reducing emissions and meeting targets.

Reflects Government's decisions to meet GHG targets.

To be revised.

## How ETS fits with the Zero Carbon Bill:

Implementing Govt's in-principle decisions of July 2017.

Advising on forestry accounting and operational improvements;

Future phase-outs of free allocation, operational and technical matters;

Consult stakeholders in developing ETS implementation;

Consult the public on Government's final policy decisions: late 2018.

## Forestry

**Climate Change Forestry Reference Group** to help officials test evidence, analysis and policy options to increase C sequestration from forestry.

## Agriculture

Nitrous Oxide and methane = about half NZ's GHG emissions.

Continued research investment:

**The Biological Emissions Reference Group (BERG)** 2016 to Sector stakeholders collaborate with Govt. Reports mid 2018.

**Dairy Action for Climate Change**, June 2017. DairyNZ, Fonterra, MfE, MPI: Improve environmental footprint.

**NZ Agricultural Greenhouse Gas Research Centre:** International efforts to reduce emissions through the: **Global Research Alliance on Agricultural Greenhouse Gases.**

Ongoing collaboration with the agricultural sector through the: **Pastoral Greenhouse Gas Research Consortium.**

# International emission reductions

Provided for under Art. 6 of the Paris Agreement.

NZ in discussions with several countries and various fora including:  
Asia Pacific Carbon Markets Roundtable, and as a Technical Partner to the World Bank's Partnership for Market Readiness.

## International Carbon Markets Project, 2016.

Explore options for:

High integrity International emission reduction units.

Important aspect is **ensuring the environmental integrity** of any use of these markets towards goals of the Paris Agreement.

Ministerial Declaration on Carbon Markets – NZ leads a group of countries **developing standards and guidelines for environmental integrity** in international carbon markets.

# Adaptation

Climate already changing; past emissions have locked in further change.

NZ's adaptation largely driven by world's ability to meet Paris Agreement goals of reducing emissions

Local governments have responsibilities under the RMA.

MfE provides information to local government.

See [Guidance for local government on preparing for climate change](#)

**Climate Change Adaptation Technical Working Group. 2016.**

Provides advice on adaptation to climate change impacts while **sustainably growing the economy**. Final report, March 2018.

See [Climate change adaptation technical working group](#)

See [Stocktake report](#) Dec. 2017.

**Also: Tax Working Group: Chair Sir Michael Cullen; TOR:**

“Role the taxation system can play in delivering positive environmental and ecological outcomes, especially over the longer term.” Includes achieving net zero carbon emissions by 2050. Reports Sept, 2018.

Thank You



# Dugald MacTavish

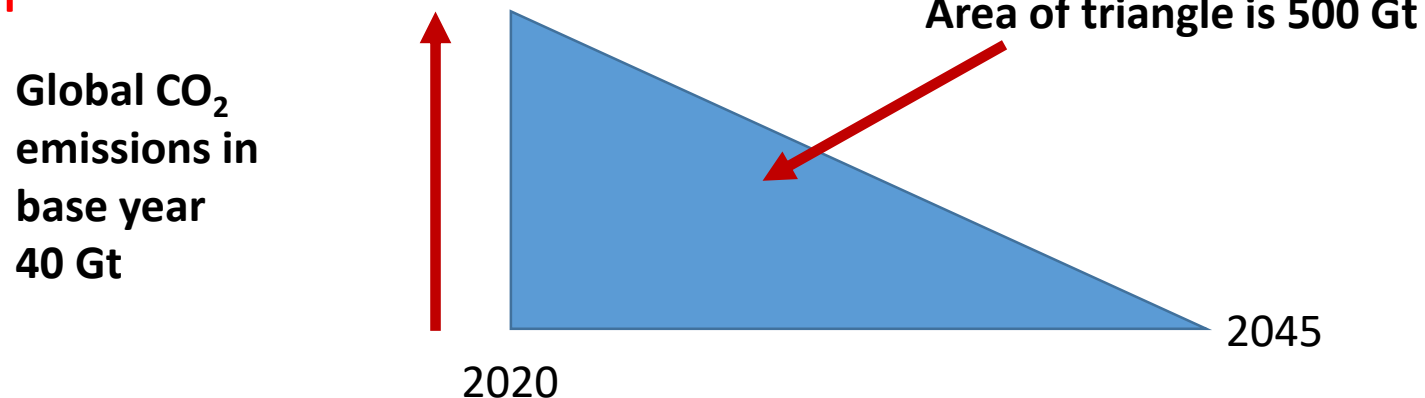
Framing the Challenge: The Stabilization Wedge

# How much more carbon can we safely emit globally? (no CCS)

IPCC AR5 2014 gives around 900 Gt CO<sub>2</sub> (inc. FOLU) to stay below 2 degrees with 66% probability, using start date of 2010

From 2010 until 2020 the world emissions will be close to 400 Gt, Annual emissions including FOLU in 2020 will be around 40 Gt so that half height x time = area means that time = 500/20 or 25 years

**i.e. implies zero emissions in 2045**



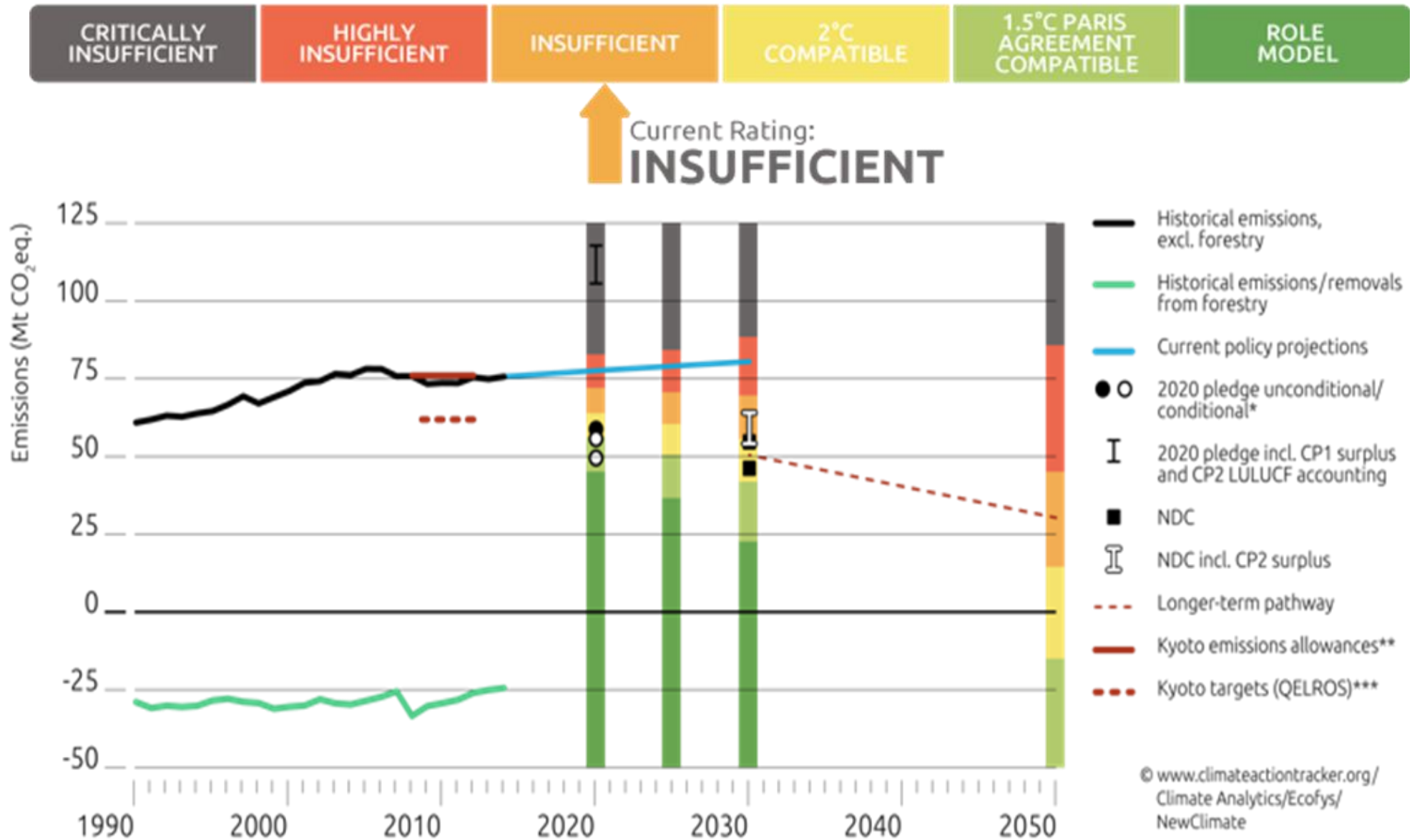
# How much can NZ emit on a per capita basis?

- NZ population 4.5 million cf world 7.5 billion
- % NZ =  $4.5/7500 = 0.06\%$
- Thus NZ allocation post 2020 is  $0.0006 * 500 \text{ Gt} = 300 \text{ Mt}$
- NZ current emissions of CO<sub>2</sub> only, are around 37Mt per annum
- Note this does not include embodied energy of imports as per IPCC rules or methane from agriculture and waste.
- Thus NZ can emit at current rates for around 8 years post 2020, less if embodied energy of NZ imports is included.
- **le zero emissions by 2028 - This is the equitable emission level for NZ CO<sub>2</sub> only**

# IPCC Rules

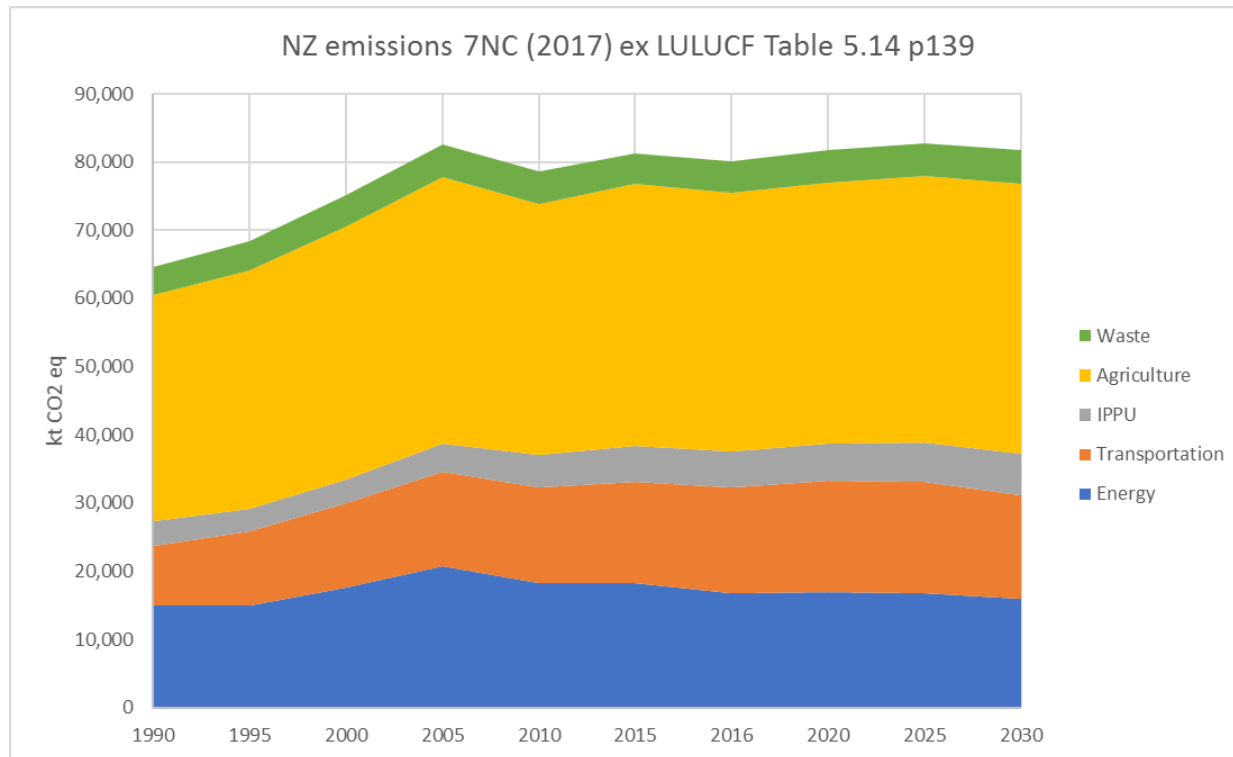
- But the IPCC does not work out the allocation on a per capita basis.
- The allocation is voluntary via the Paris agreement - Nationally Determined Contributions or NDCs.
- New Zealand's current IPCC agreed target via the (2015) NZ NDC is to reduce greenhouse gas emissions by 30 per cent below 2005 levels by 2030.
- This target will not keep us below 2 degrees.
- In 2018 the New Zealand Government has announced an improved aim to reduce our emissions to net zero by 2050. Can this be done and how?

# NZ progress assessed by “Carbon Action Tracker”

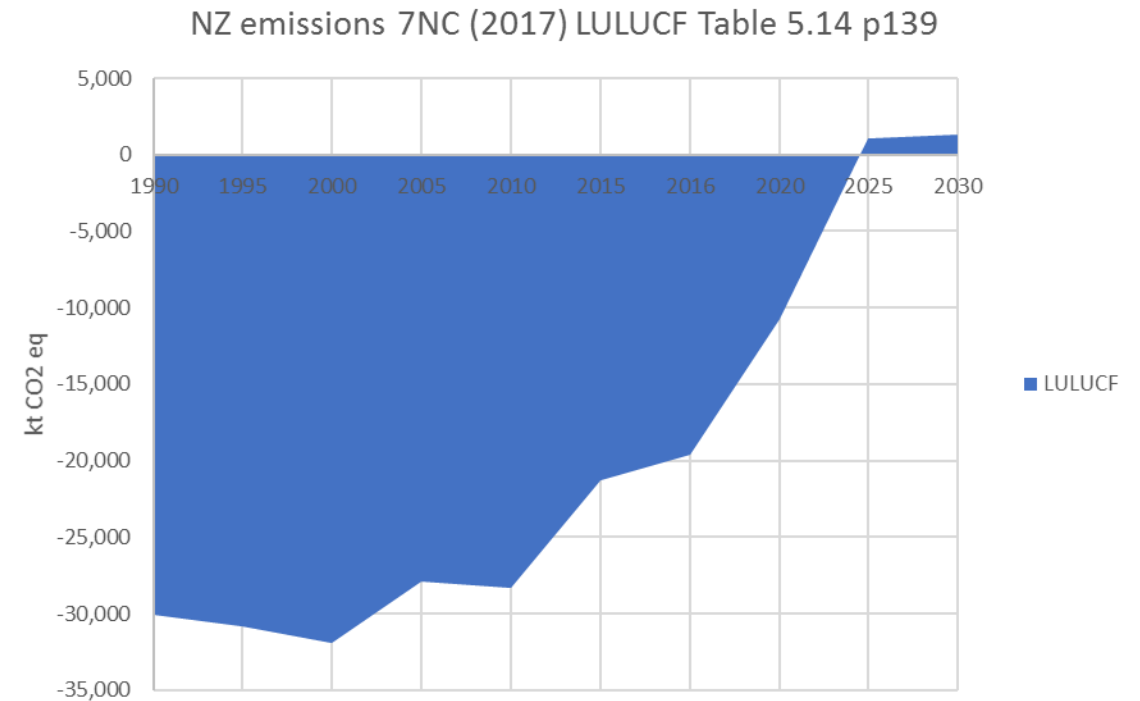


# NZ emissions progress from 7<sup>th</sup> National Communication 2017 to the UNFCCC (CO<sub>2</sub>eq)

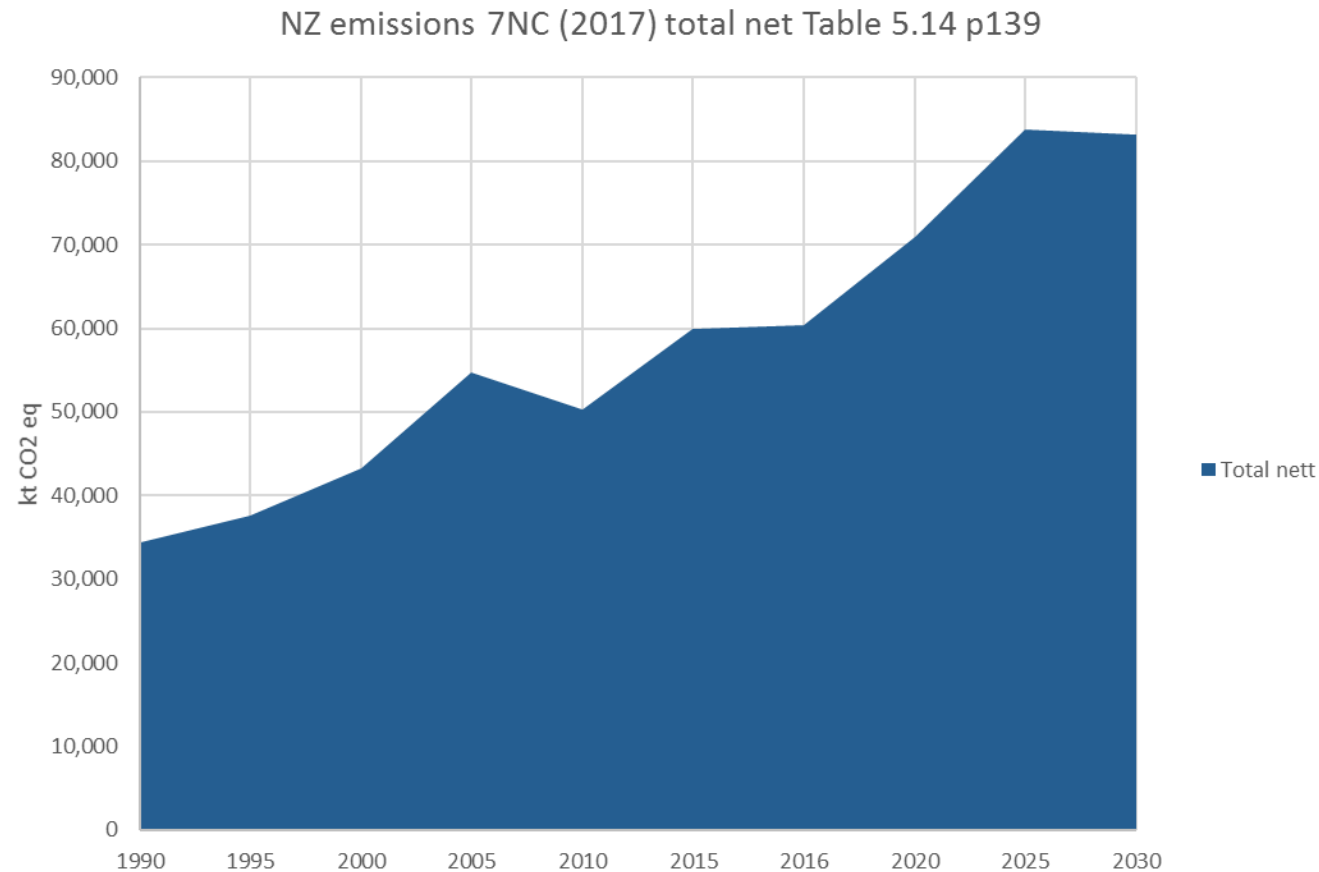
Positive



Negative

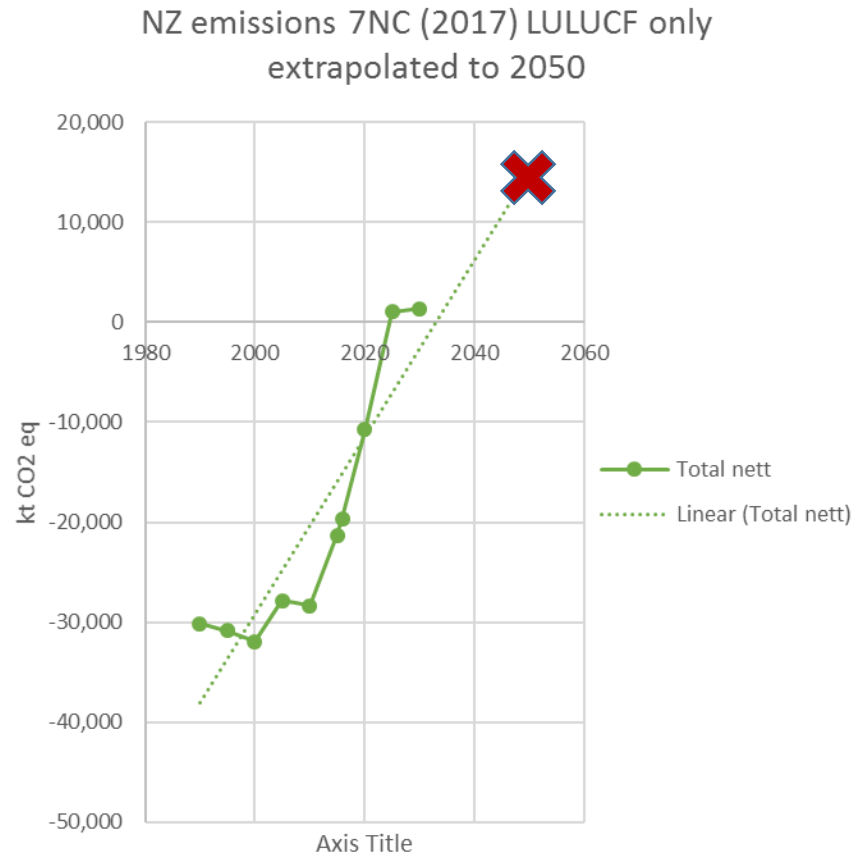


# Net emissions (Positive minus Negative CO<sub>2</sub>eq )



I.e. Result of the combination of the two previous graphs

# Forestry is the wild card (LULUCF)



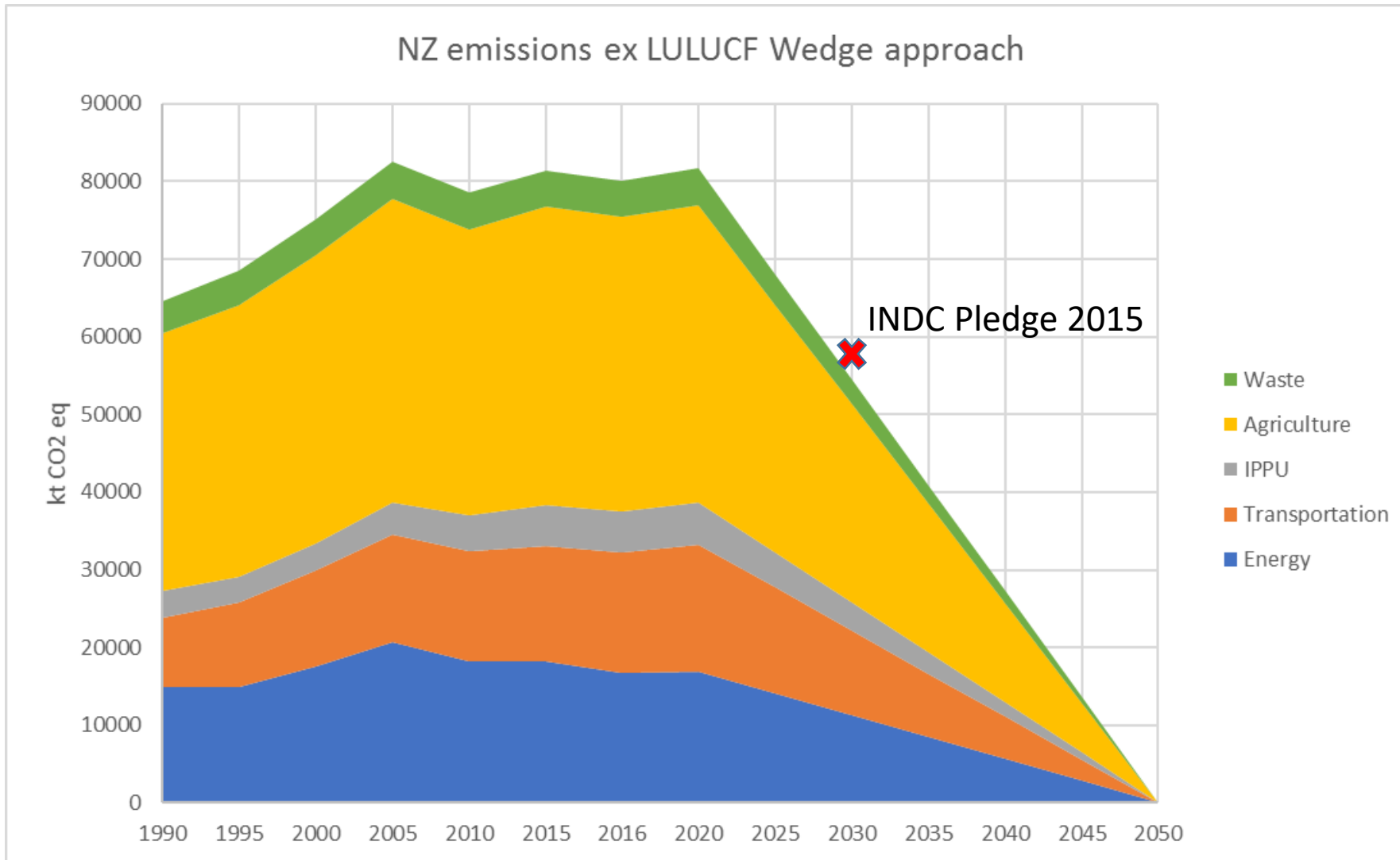
Current data extrapolated to 2050 gives forestry at 15 Mt CO<sub>2</sub> emissions (positive) annually

Obviously this cannot occur for NZ to have net zero by 2050 so a massive reforestation program needs to take place

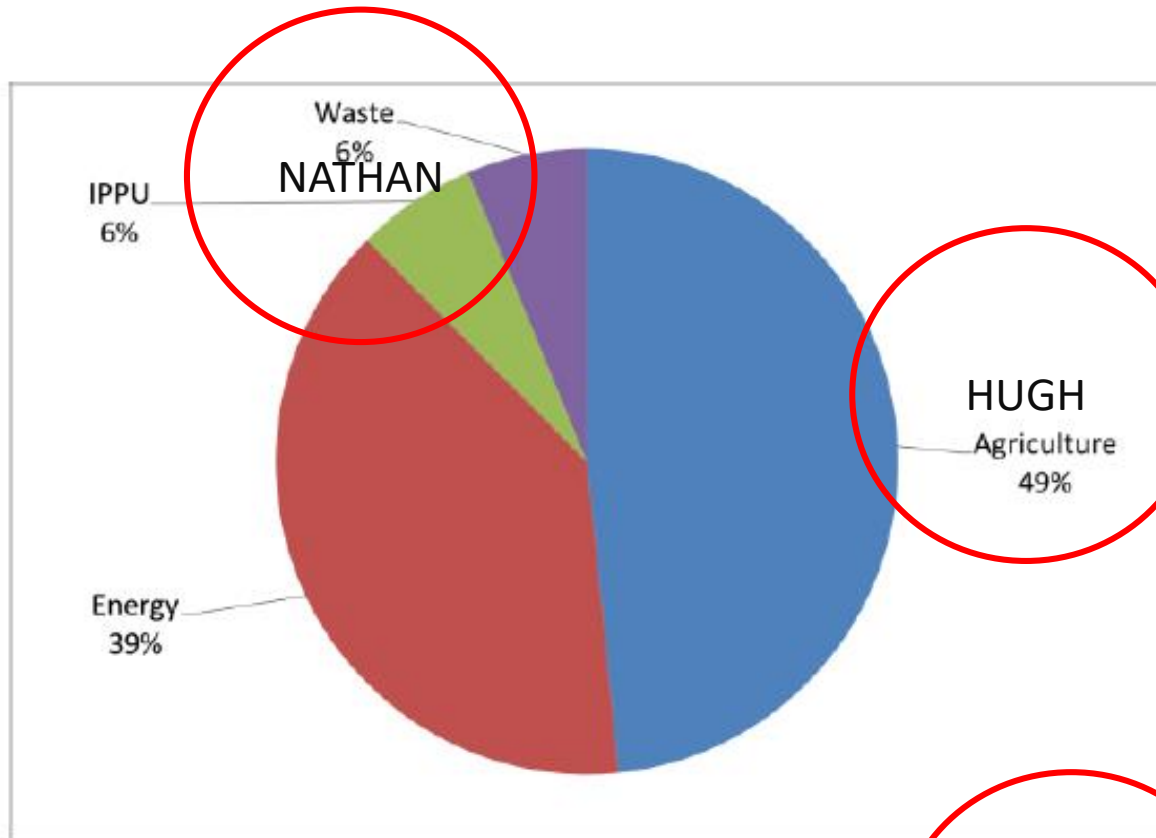
But this only delays the problem if the forests are eventually logged and used in any way that permits their decay and the release of carbon to the atmosphere



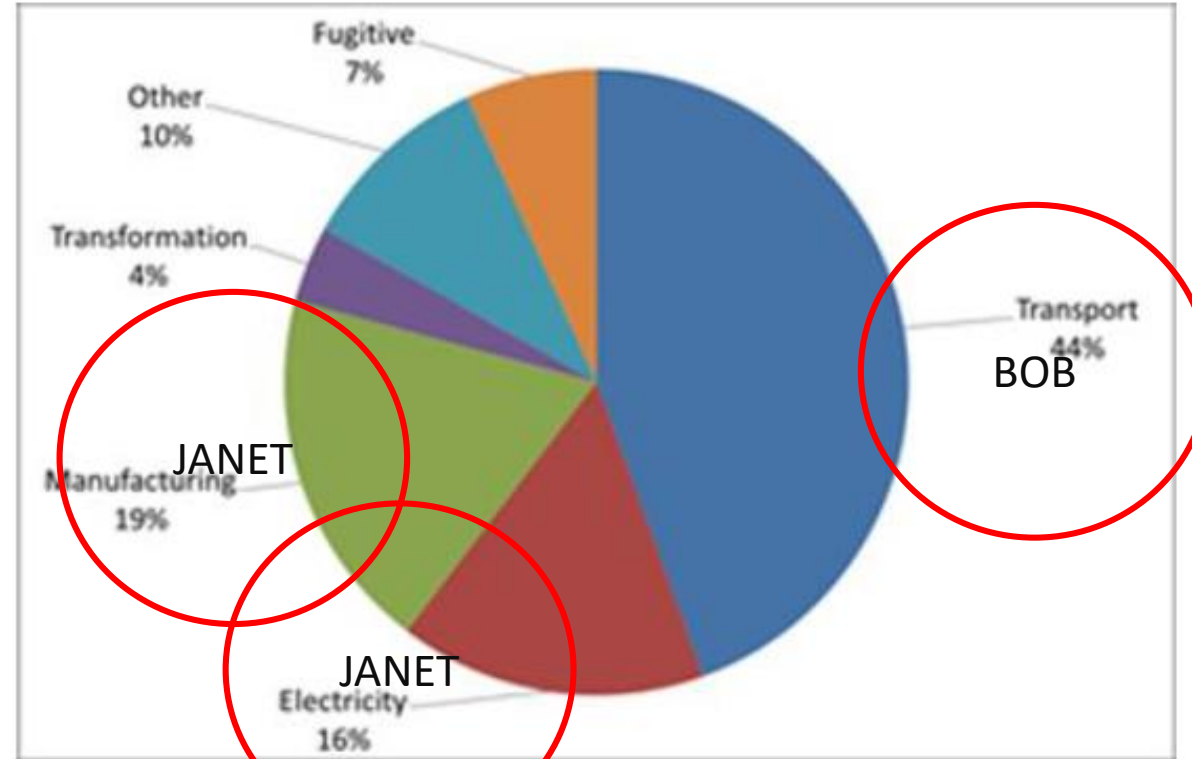
# NZ emissions from 7th Nat. Comm. With Wedge to give zero in 2050



# How might we get there? – speakers/subjects



NZ's GHG emissions by sector



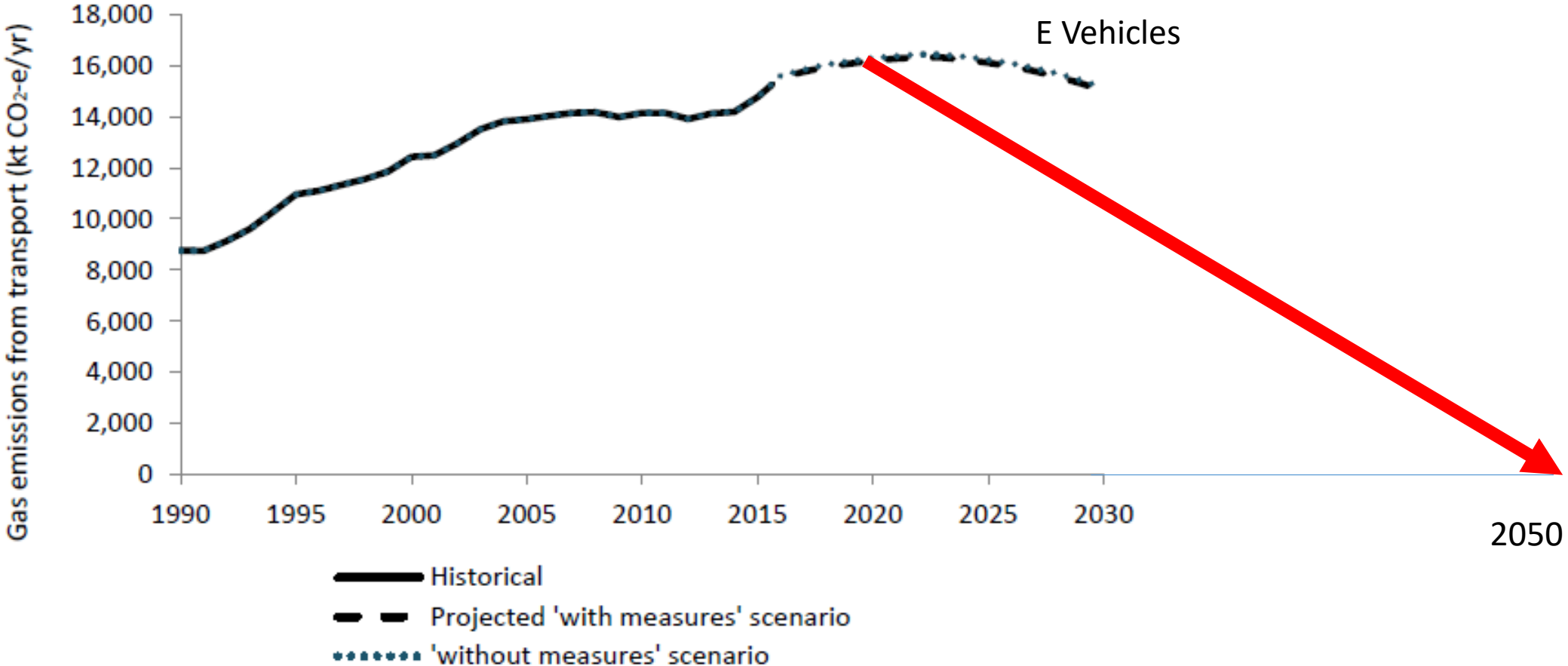
Breakdown of energy sector emissions

Lisa  
Ethical and  
Social

Bob Lloyd

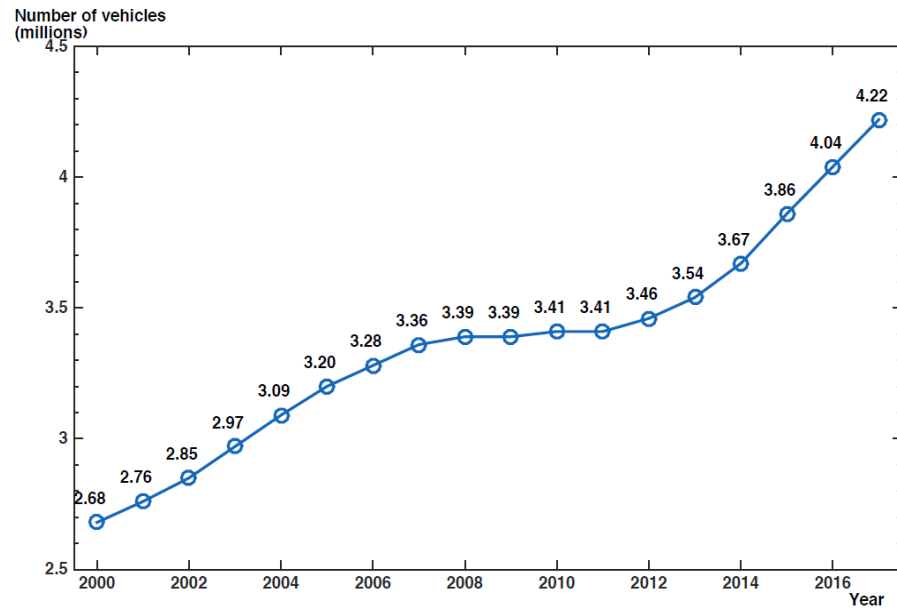
Transport

**Figure 5.16: Estimated historical transport emissions, 1990–2015, and projected ‘with measures’ and ‘without measures’ scenarios, 2016–30 (kt CO<sub>2</sub>-e)**

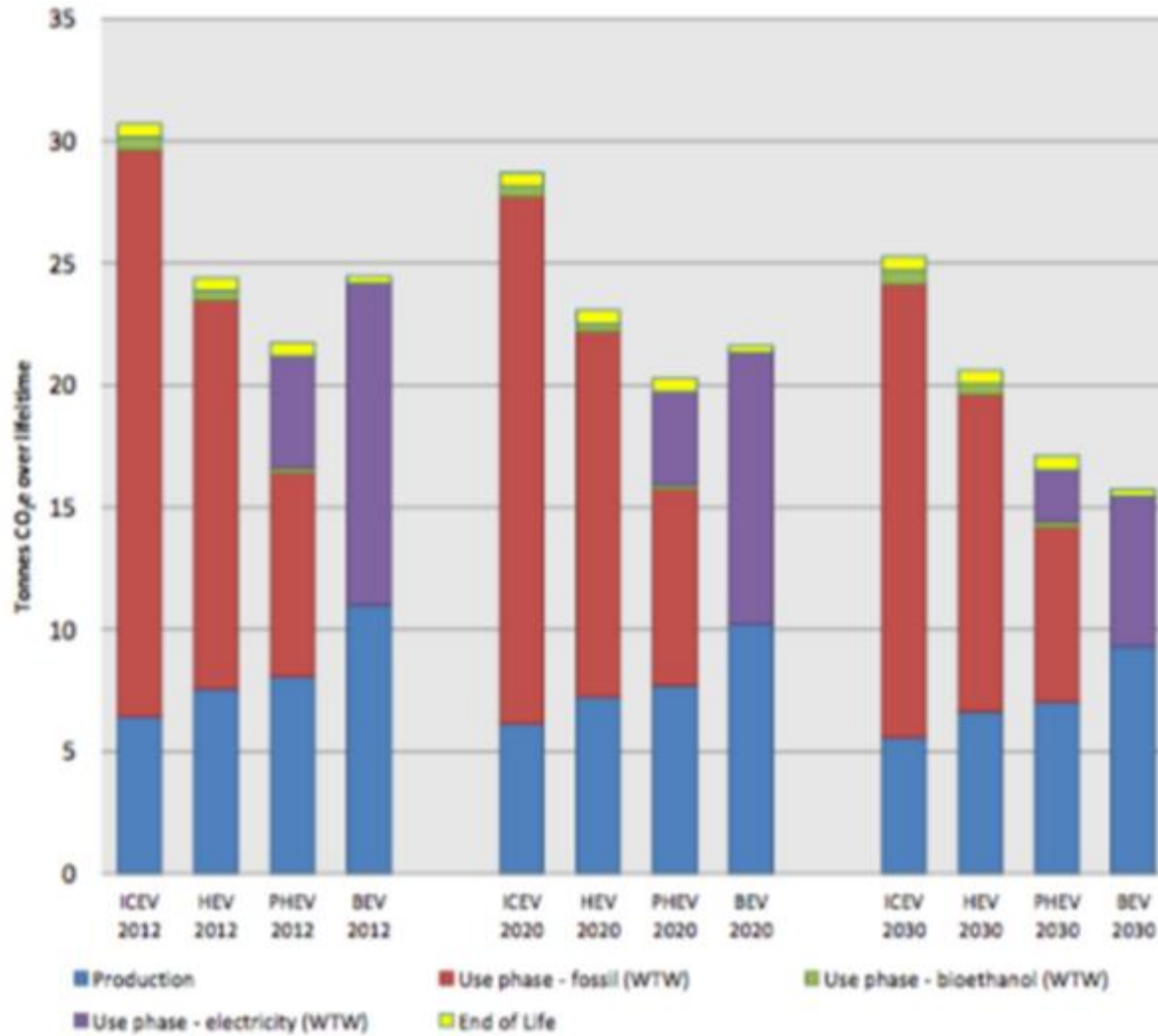


# Electric vehicles From 7<sup>th</sup> Nat. Comm.

- Electric vehicle uptake is estimated to reduce greenhouse gas emissions in 2030 by between 739 kt CO<sub>2</sub>-e (slow-uptake scenario) and 2056 kt CO<sub>2</sub>-e (fast-uptake scenario), with a reduction of 1772 kt CO<sub>2</sub>-e under a base case scenario

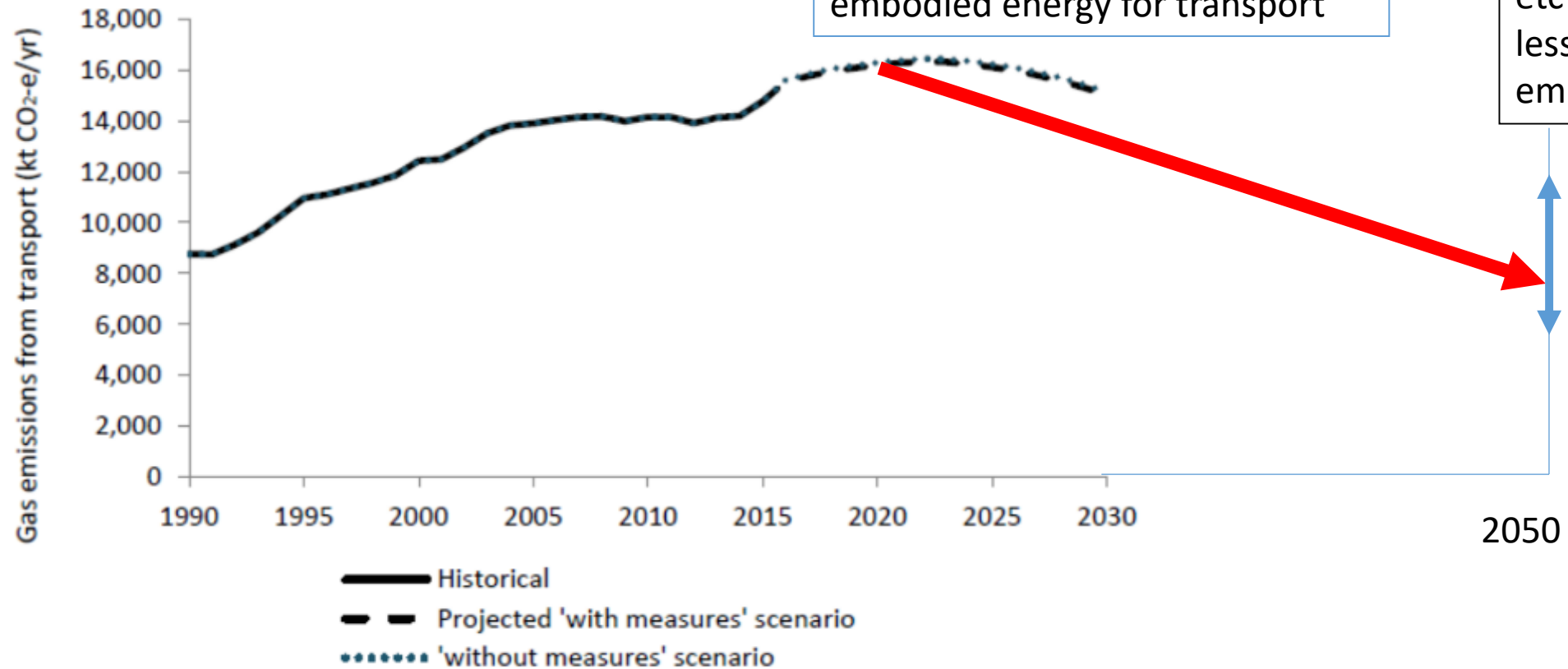


BUT embodied CO2 for a BEV between 7 (Japan)  
10 (UK) and 15 tonnes (China) - lifetime carbon  
cost



6 million BEV vehicles in 2050 at 1 tonnes CO<sub>2</sub> per year gives 6,000 kt CO<sub>2</sub> (10 tonnes/10 years)

Figure 5.16: Estimated historical transport emissions, 1990–2015, and projected 'with measures' and 'without measures' scenarios, 2016–30 (kt CO<sub>2</sub>-e)

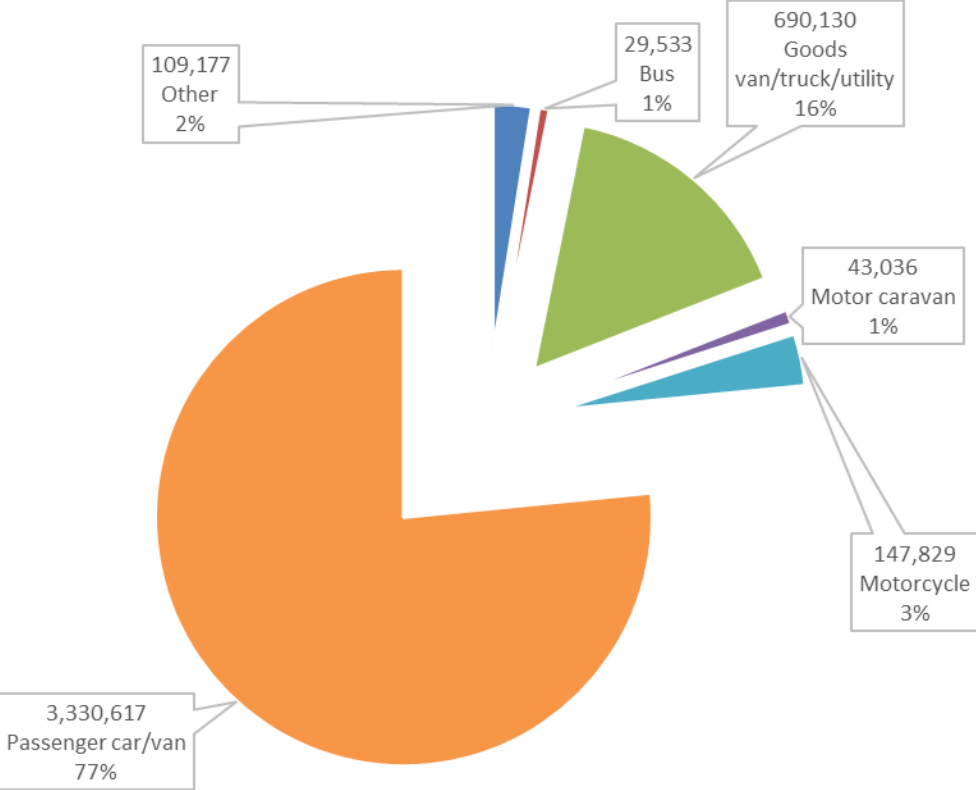


Note the 7<sup>th</sup> NC does not include embodied energy for transport

Add maintenance CO<sub>2</sub> for cars and roads, bridges etc plus heavy vehicles less improvements in embodied carbon

# Land transport in NZ 2018

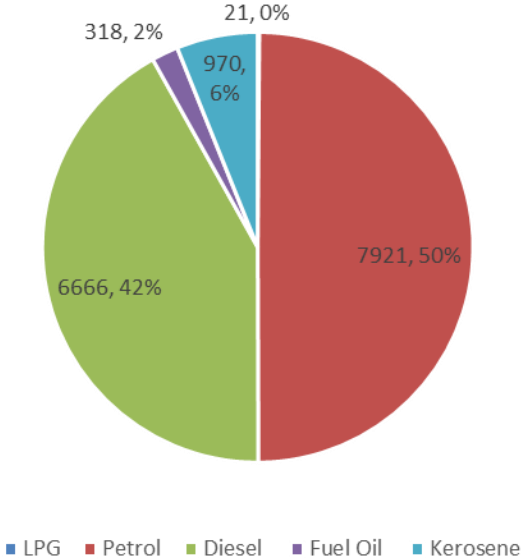
Number of vehicles



Other: includes, tractors, heavy machinery registered for road use, motorised agricultural machines, mopeds, ATVs and special purpose vehicles. Not included are heavy machinery that are not road registered.

Total 4.35 million road vehicles

NZ Total Transport fuel breakdown in 1000 tonnes CO2 2015





Lets go for ZERO: Not what we think we can get down to and without gaming the system by excluding embodied carbon and carbon trading.

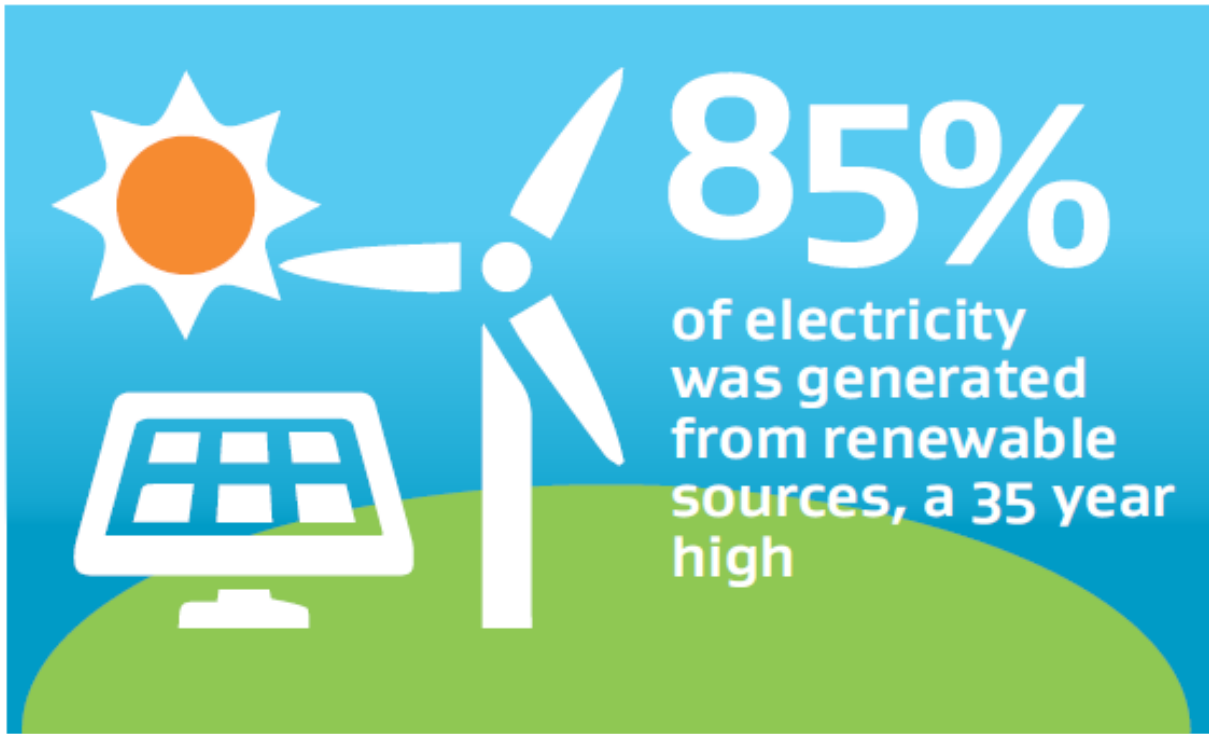
- A personal vehicle ownership approach is not going to get to zero real emissions
- Present studies eg the NZ BEC “Kayak and Waka” tell us what we can do using the existing economic model and its not a lot.
- Zero emissions by 2050 will only give us a 66% chance of staying below 2 degrees
- Present indications are that the climate change effects are outrunning models
- If we really want to stop runaway climate change we should have aimed for 1 degree or 350 ppm CO<sub>2</sub>
- Hey but we are already at 1 degree !!!
- Maybe we should go for zero carbon emissions by 2030

# Viable transport options for zero carbon

- Private transport is out No more personally owned cars!!!
- Limited long life electric cars for, health, emergencies, share rides/taxis (probably) with no driver)
- Electric trains with a long life
- Electric buses - also with a long life
- Cycling
- Walking
- Telecommuting
- Very limited air travel exceptions health and emergencies
- Limited shipping (but no more cars to ship) no oil tankers, LNG and coal

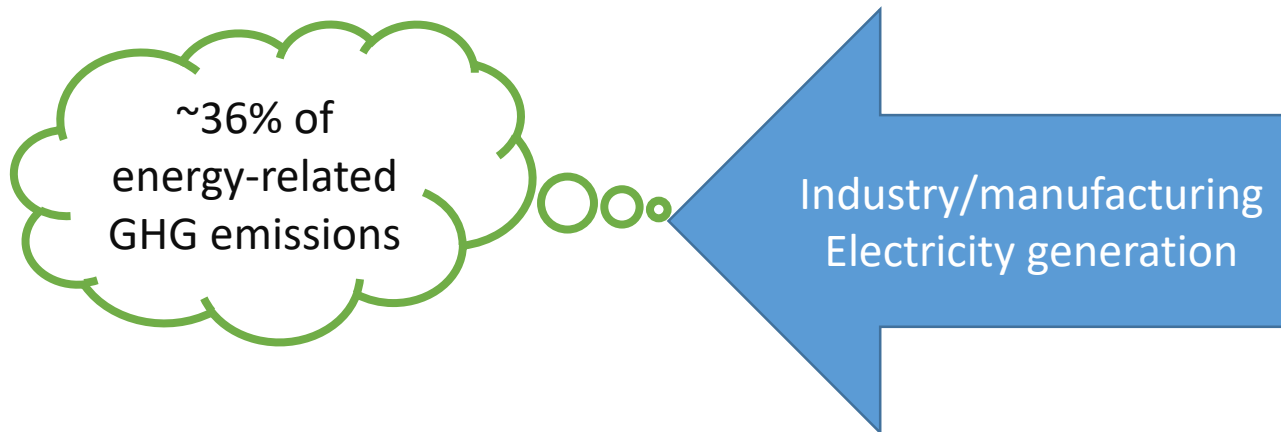
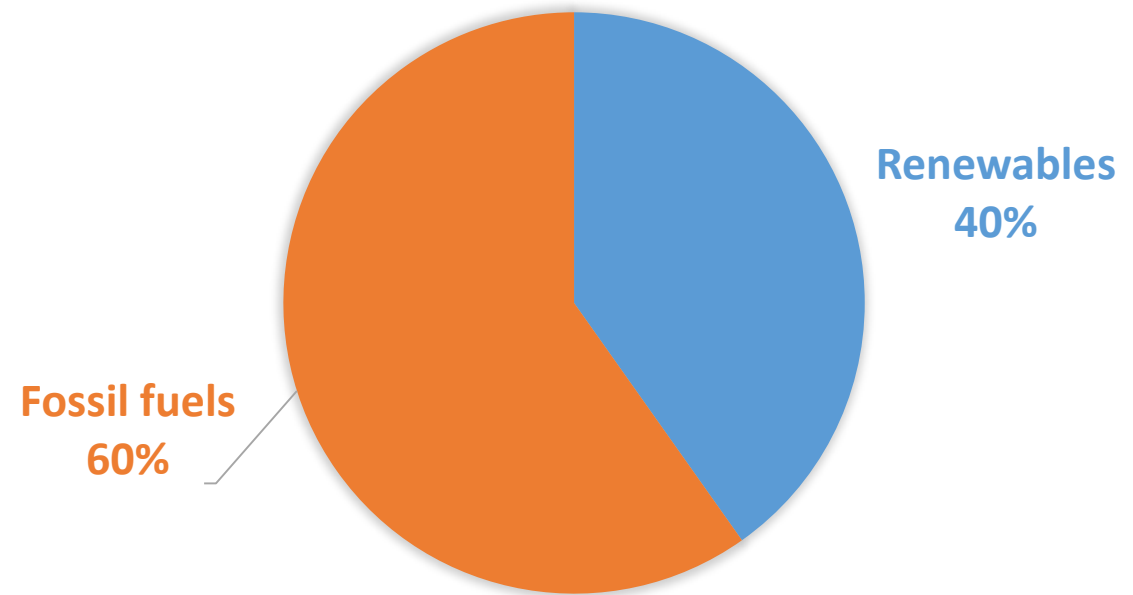
Janet Stephenson

Energy and Industry



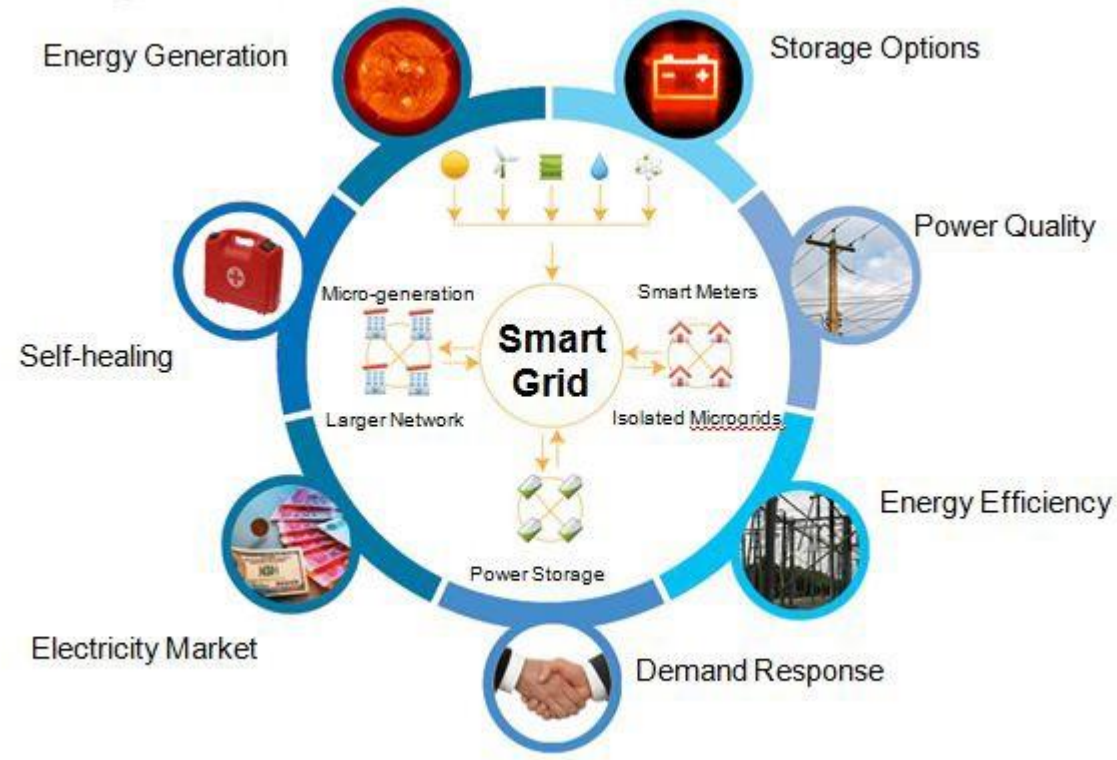
But ...

### TOTAL NZ ENERGY USE



Energy in NZ 2017

# Electricity sector is changing fast

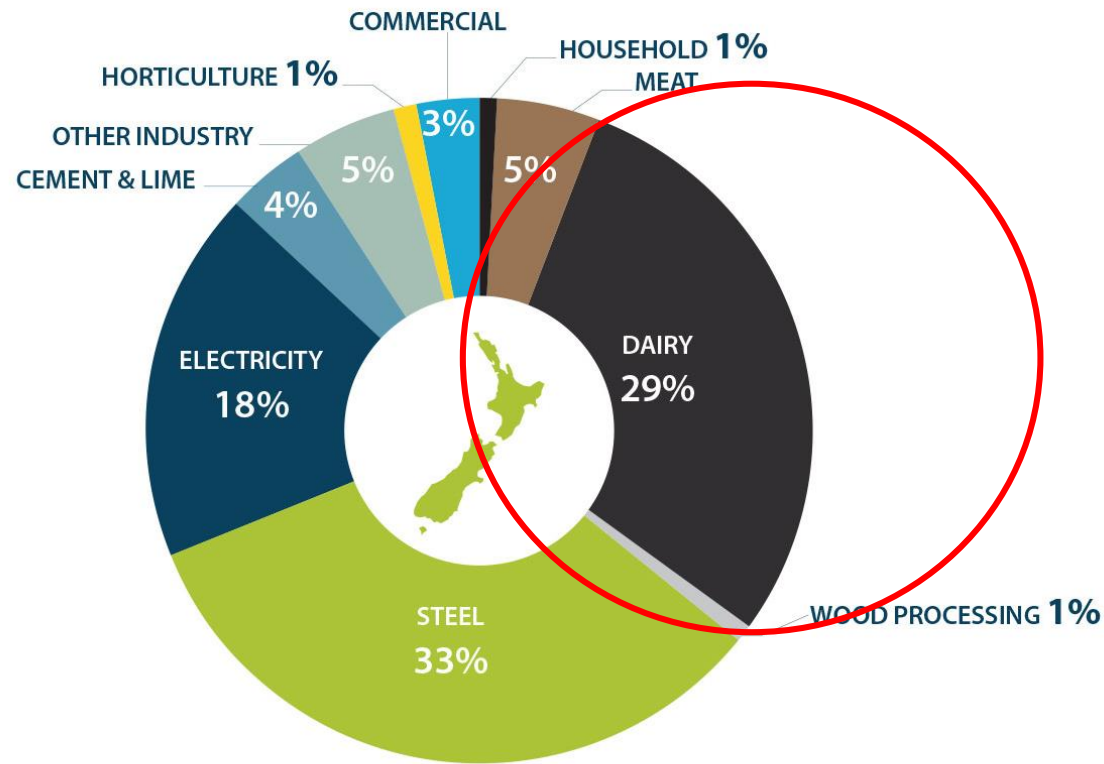


**BUT needs to solve flexibility challenge**

# Transforming industrial GHG emissions

## How New Zealand uses coal

In 2015 **2.7 million tonnes** of coal were used in New Zealand  
- the vast majority of it in different industry sectors.

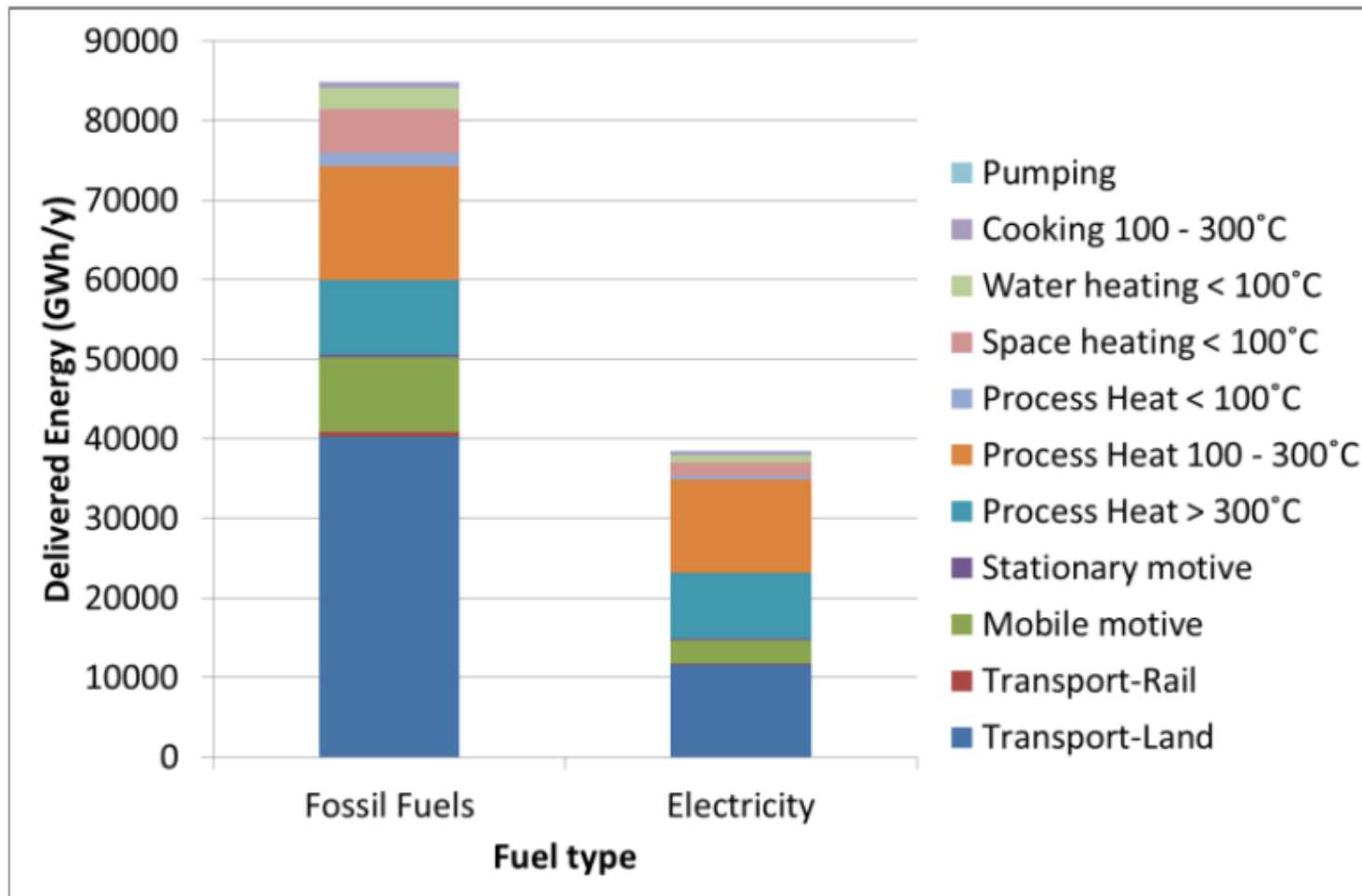


## Displacing coal and natural gas in industrial processes:

- Energy efficiency
- Bioenergy
- Geothermal
- Solar thermal
- Electro-thermal

**BUT needs R&D, policy certainty, financial signals, commitment.**

# What if we replaced all feasible fossil fuel use with electrical technologies/processes?



Requires new generation equivalent to NZ's 2014 electricity production – ie doubling of generation. **This is possible!**

GHG emission reduction would be ~85% of NZ's 2015 NDC

Immediate actions – EVs, heat pumps for low-grade process, space and water heating.

Medium term - medium and high-grade process heat

**BUT needs R&D, policy certainty, financial signals, commitment**

Delivered fossil-fuel and electrical energy for the short-medium term scenario

# Biofuels potential



If 30% of liquid fuels were made from plants grown on non-arable land:



Would reduce GHGs by 5m tonnes/yr, equivalent to taking ½ cars off the road

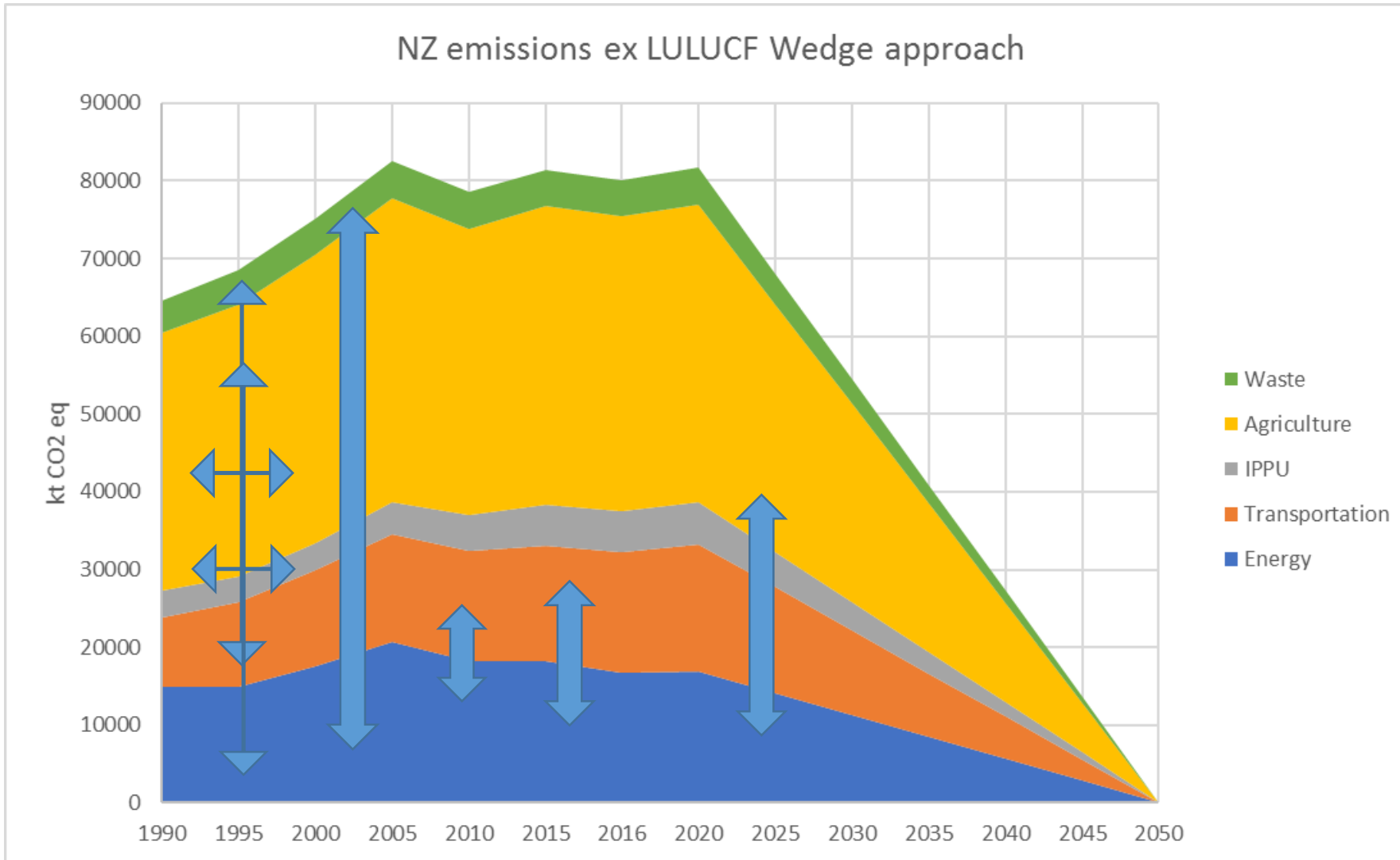


A forest the size of Taranaki region would achieve 2.3 billion litres of liquid fuels – more than enough to meet all South Island's needs.

**BUT needs R&D, policy certainty, financial signals, commitment**



# Solutions cross boundaries of current sectors



Renewable solutions apply to uses in many sectors (e.g. transport, industry)

Waste becoming an energy source

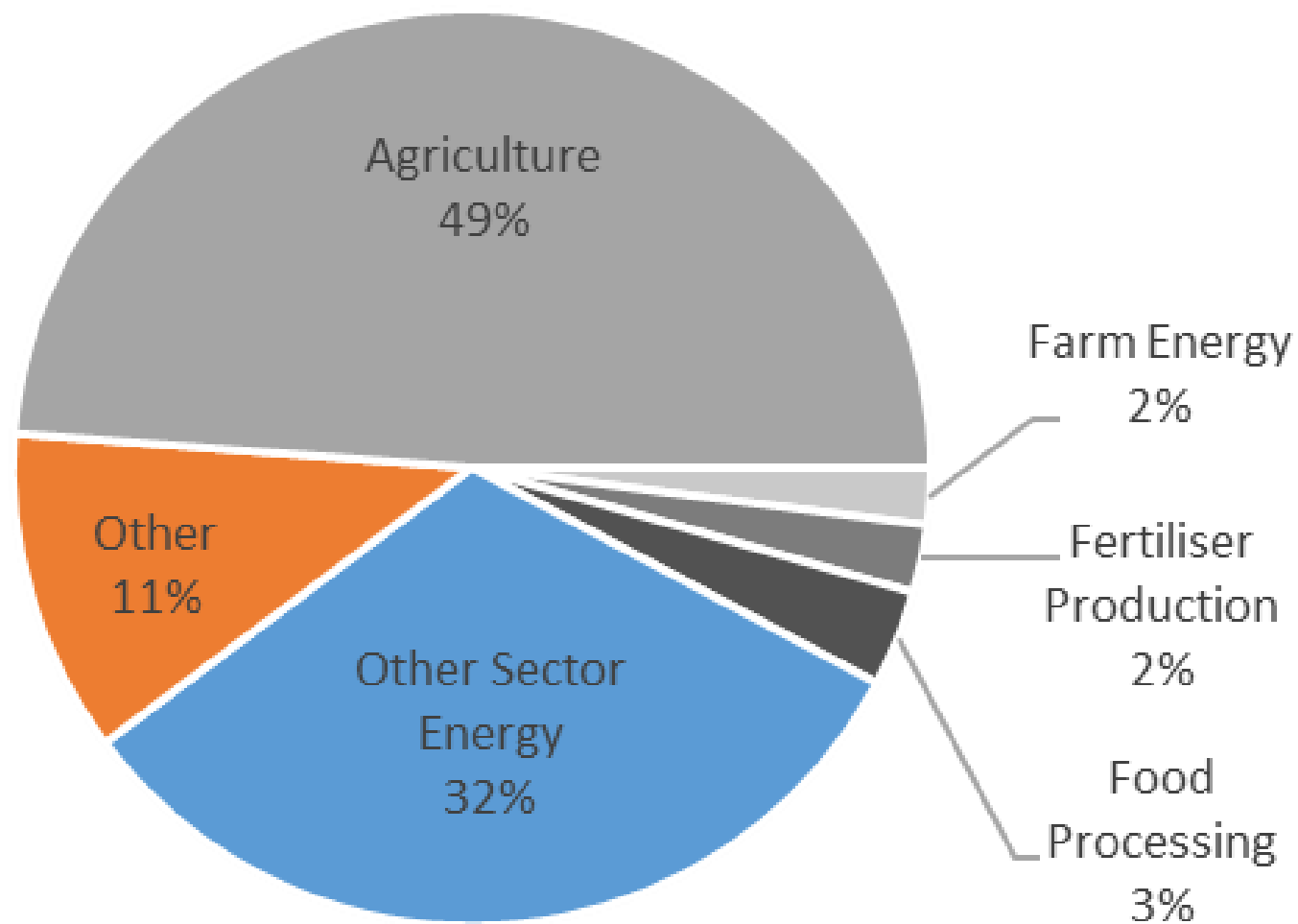
Merging of transport and electricity systems

Merging of consumers and producers of electricity - prosumers

Merging of agriculture and energy/GHG solutions

**BUT need to work beyond business-as-usual mind-sets**

## E.g. Agri-food sector GHG emissions



# Hugh Campbell

Agriculture / Land use

# The Wedge Diagram....

- Agriculture is our biggest area of concern.
- Highly politically empowered sector.
- Situated within the mysterious absence of historical conflict over land-use. NZ has not historically had a 'contested countryside' since the end of the 19<sup>th</sup> Century.
- Only recent emergence of direct critique of farming practices – with an increasing visibility of urban concerns.
- Emergence of discourse of 'Social License to Farm'.
- But this is a very new political space – operating on top of huge historical precedents and policy structures that are working against significant changes to farming.

# Five Key Problems:

- Farming systems changes won't deliver enough
- Plants vs animals
- Planning law
- Tax regimes
- Fetishisation of Free Trade

# Farming Systems....

- Progressive dairy farmers report that even with the most sophisticated management and new scientific inputs, they will only get half way towards their N and GHG targets.
- We need less dairy farms.
- There are two types of farmers: cutting down or planting trees.
- This is reflected in the low level of viticulture and horticulture – despite \$\$ returns being good.
- Agro-forestry – an idea that needs subsidization.

# Political choices....

- Voluntarism works very well for 20-25% of primary producers, moderately for around 50%, and poorly for the last 25%. Eventually you need compulsion.
- Planning law translates badly into regional plans when it comes to limiting styles of farming (the MacKenzie Basin is a crucial test case).
- The tax regime favours 'preserving equity' in land values. Significant tax reform is needed to shift incentives around land-use.
- Subsidisation is a dirty word, but it is Europe's primary mechanism for environmental change on farmed landscapes.
- Free Trade is a fetish that will add economic growth in low single digits. It crowds out policy discussion of everything else.

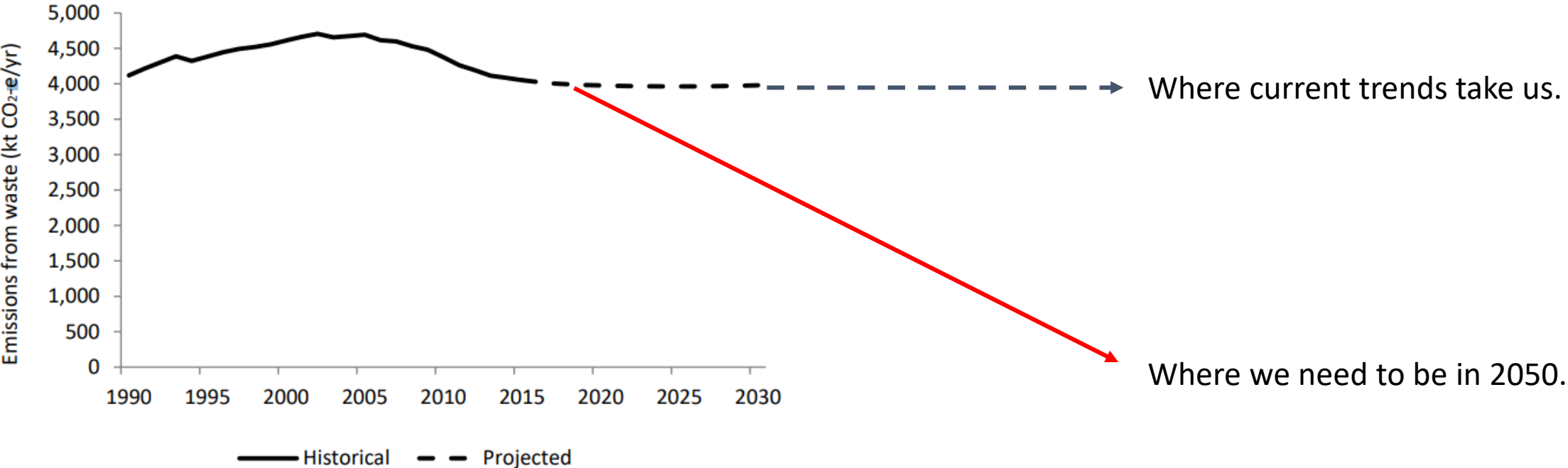
Nathan Surendran

Waste



# What's the current situation?

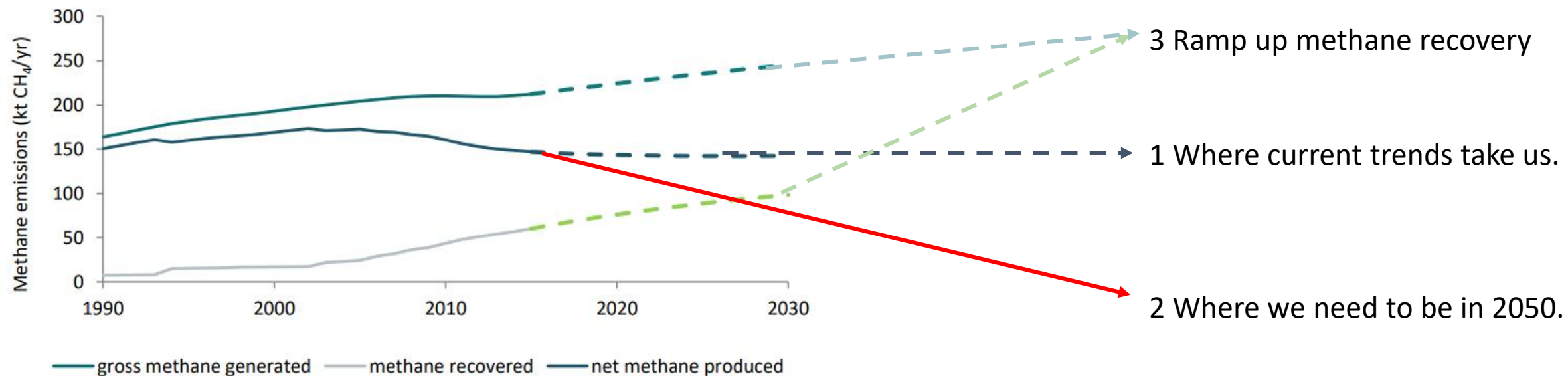
Figure 5.112: Historical and projected gas emissions from waste, 1990–2030



Note: kt CO<sub>2</sub>-e = kilotonnes of carbon dioxide equivalent.

# Simplistically, what can be done?

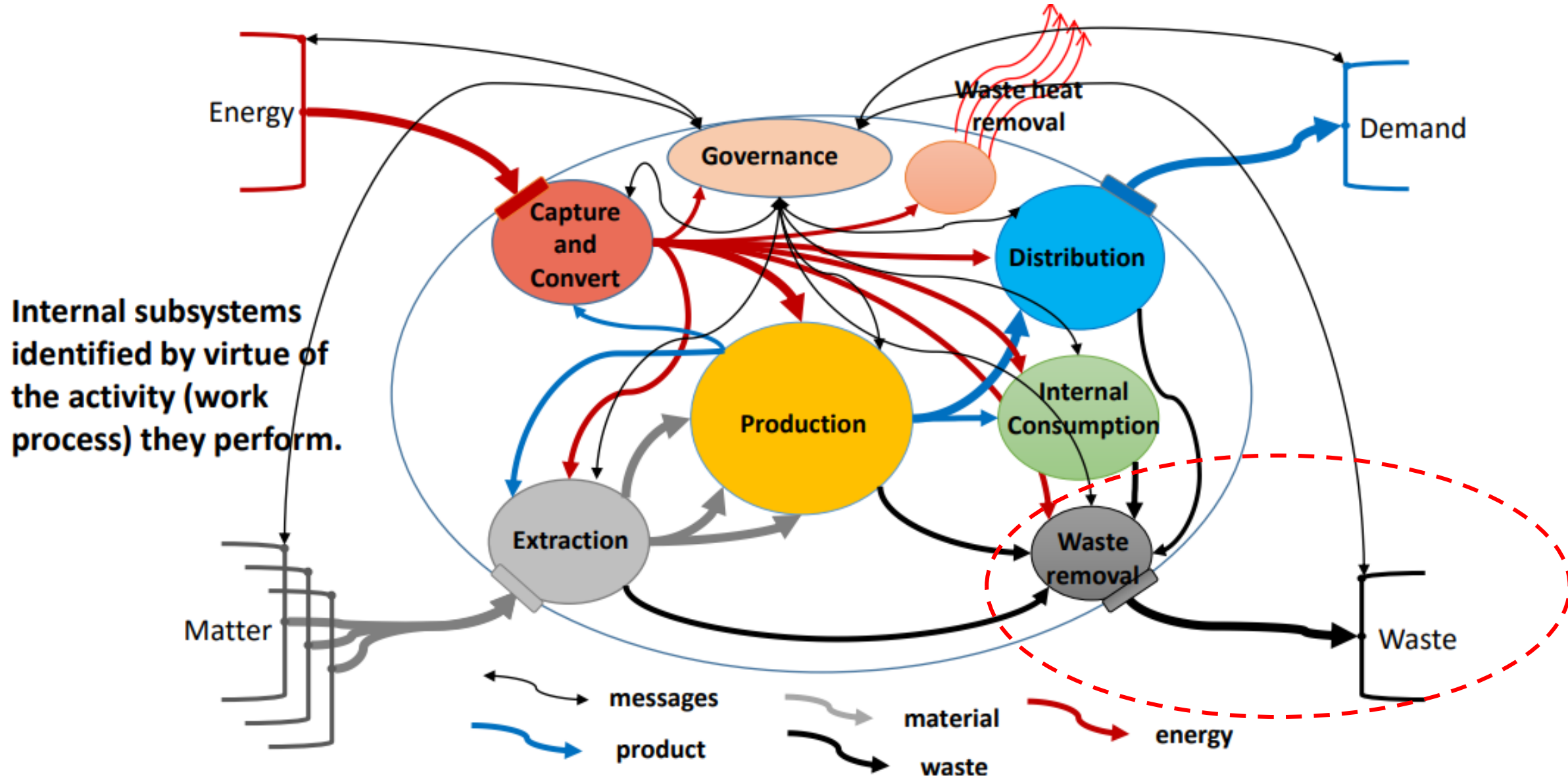
Figure 5.12: Gross methane generated from landfills, methane recovered from landfills and net methane emissions produced based on historical emissions, 1990–2015, and projected emissions, 2016–30



Note: kt CH<sub>4</sub> = kilotonnes of methane.

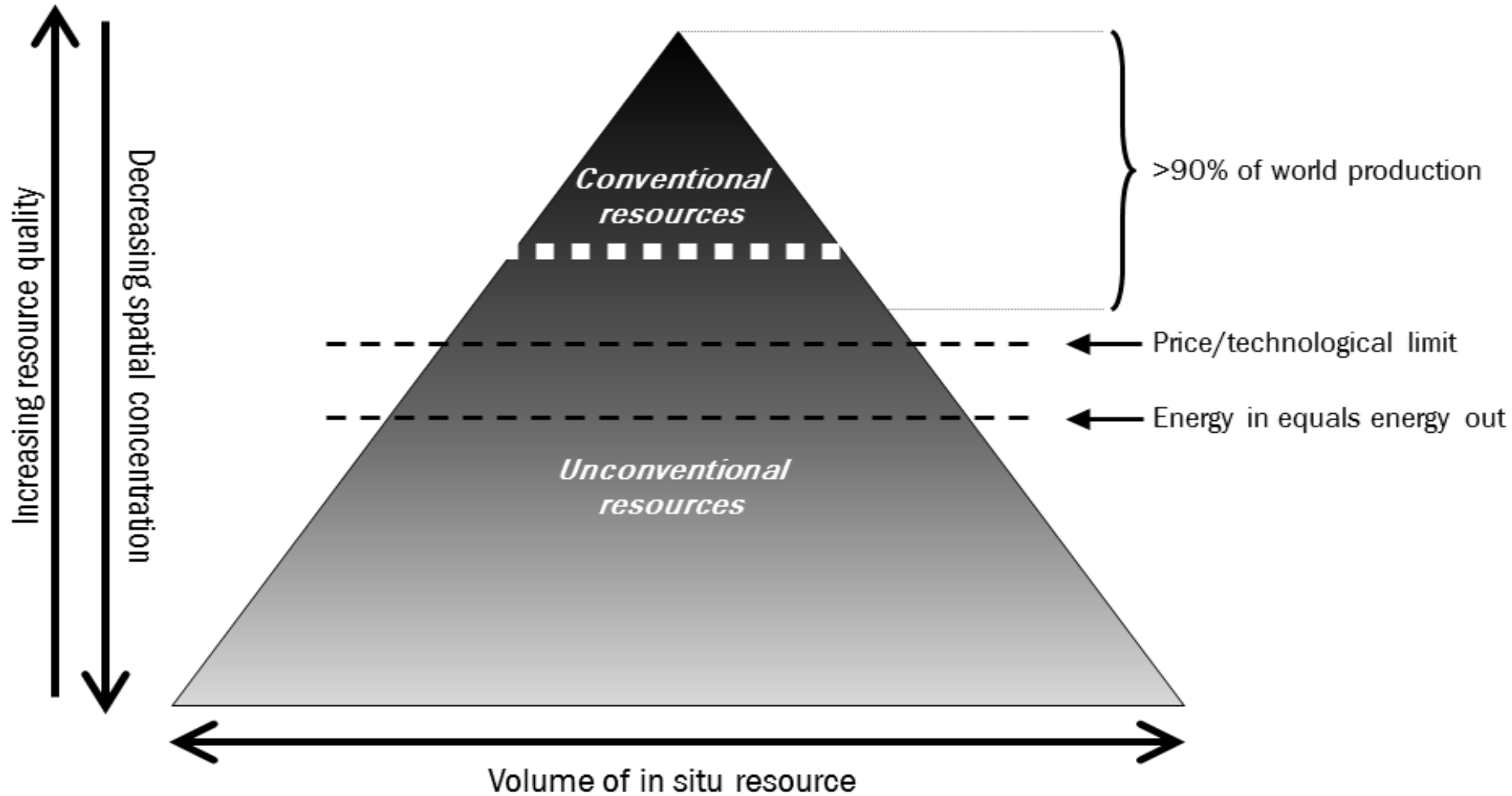
# The Economy as a system

<http://bit.ly/2peab6E>



# But... Resource Depletion

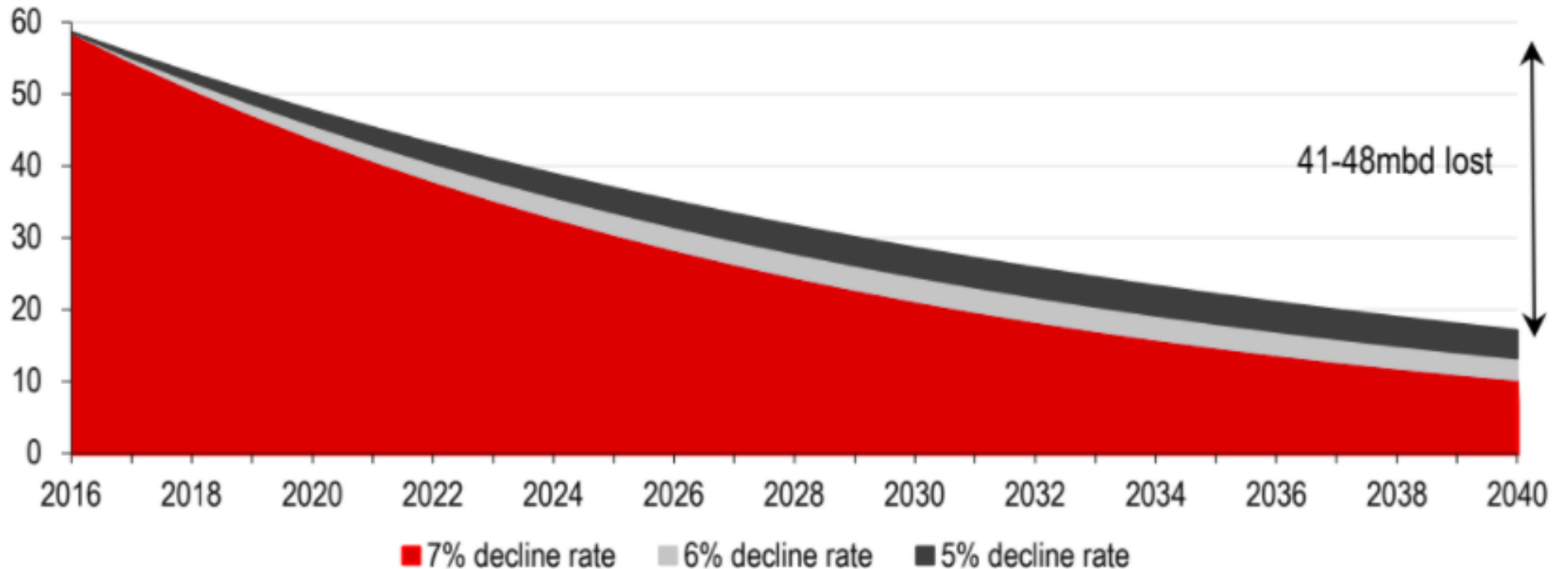
<http://bit.ly/1iqIAJa>



# Resource Depletion - another compelling reason to act quickly and decisively

<http://bit.ly/2uF57N4>

## Post-peak production (benign definition) – sensitivity to 5-7% decline rate to 2040



Source: HSBC estimates

We do not / will not have the option to continue with GDP growth (increased throughput), and at the same time cut emissions associated with waste.

1. Relatively modest improvements in waste emissions are still possible through increased resource efficiency, applying existing techniques such as methane recovery uniformly, etc.
1. Beyond that, either we reduce emissions associated with waste, by reducing overall resource and energy throughput, or we do not.

Resource depletion is a very compelling reason to act decisively.

Lisa Ellis

Ethical and social aspects

# Ethics: Doing what is right for New Zealand

- **The status quo in CC policy is unethical.**
  - We are taking far more than our fair share of the world's carbon budget.
  - This is an *intragenerational* wrong.
  - Our inaction means that we are shifting the burden onto our children and grandchildren, even more so since later action will be costlier for the same or worse results.
  - This is an *intergenerational* wrong.
- **But it is entirely within our power to switch to an ethical CC policy.**



Ethical CC policy will require prompt & sustained action from government & **society**.

- No ethically significant social transformation has happened without the work of both society and government, people and leadership.
- Societal action including the work of the Climate Consensus Coalition Aotearoa and many others has brought us to this point.
- The Zero Carbon Act and related CC policies are a great first step.
- But without sustained action from civil society to hold government accountable and to increase CC policy ambition, they will fail.

So, will the government's action plan push us fast enough?

- It is a great start, and could represent a significant improvement over the status quo.
- But much more needs to be done, both from society and from government.