

## Climate change and energy security – our risks and responsibilities

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### Some quotes

- “If you are not energy independent, you are not independent” (CEO of an Italian energy company in a BBC World Service item)
- “The impact of climate change is a tremendous risk to the security and well-being of our countries” (Nancy Pelosi)
- “Climate change is crap” (Tony Abbott)
- “Men argue. Nature acts.” (Voltaire)

- Human activities have increased atmospheric CO<sub>2</sub> from its pre-industrial level of approx. 280ppm to 398ppm (0.04%). It has increased at 2.1ppm per year over last decade.
- Global mean temperature is about 0.8°C above pre-industrial levels. Climate change caused by burning fossil fuels has potentially huge impacts on human societies and the natural world. The impacts have already started to emerge.
- The global community has committed to holding warming below 2°C to prevent “dangerous” climate change. Present trends could result in a 2°C warming in 30 years and 4°C by 2100. This approaches the difference between temperatures today and during the last ice age.

- Road transport produces 41% of NZ’s energy sector GHG emissions. Its emissions are 70% above 1990 levels.
- Our transport system depends on diesel and petrol from imported crude refined at Marsden Point or directly imported. About half our imported crude oil is from the Middle East.
- The movement of freight and our economy is heavily reliant on the availability of diesel.

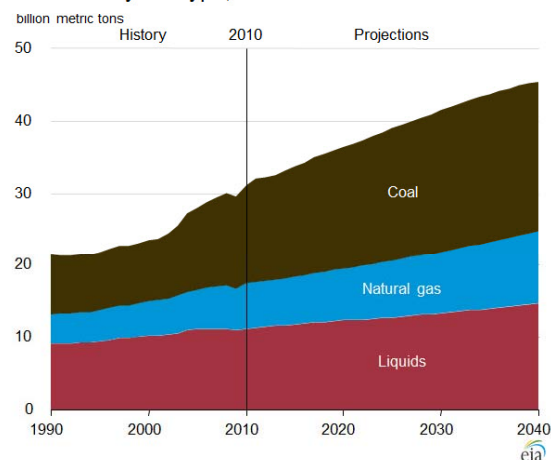
## Current Situation

- Increased global reliance on fossil fuels is increasing global CO<sub>2</sub> emissions. The costs of inaction will have a large impact on future generations if not enough is done.
- The world needs to reduce its GHG emissions by 5% a year over 38 years to keep to the 2° maximum threshold (source: National Research Council Report “Abrupt Impacts of Climate Change: Anticipating Surprises”, 3 December 2013)
- There is a lack of political will to tackle climate change risks, **BUT as an environmentally responsible nation we should take leadership and not hide behind the inaction of others.**

## CO<sub>2</sub> emission trends & forecast

Source: US Energy Information Association International Energy Outlook 2013  
(2012 CO<sub>2</sub> emissions = 34.5 billion tonnes, a 1.1% increase over 2011)

Figure 10. World energy-related carbon dioxide emissions by fuel type, 1990-2040

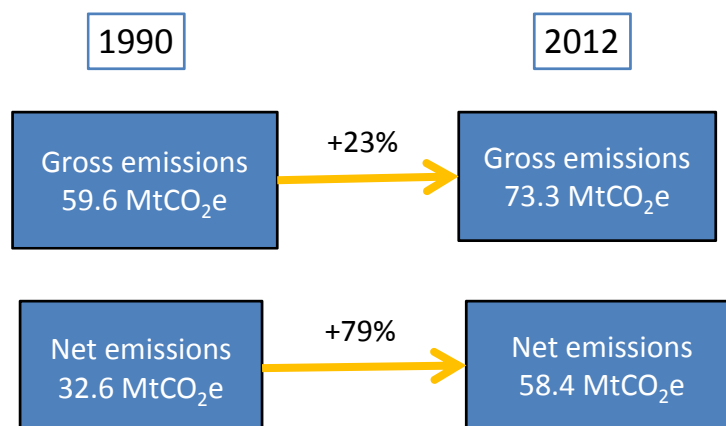


## A Global CO<sub>2</sub> Emissions Projection: 2010-2050

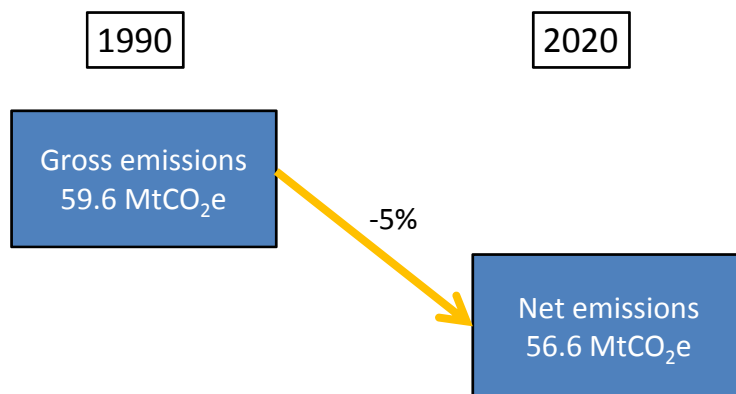
	<b>Growth Rate 2010-2050 (% per year)</b>
Real Gross Domestic Product per Person (GDP/Person)	<b>2.1%</b>
Carbon Intensity of Output (CO <sub>2</sub> /GDP)	<b>-1.6%</b>
World Population	<b>0.9%</b>
<b>Total CO<sub>2</sub> Emissions</b>	<b>1.3%</b>

Source data: The Climate Casino, William Nordhaus, 2013

## NZ's GHG emissions 1990 and 2012

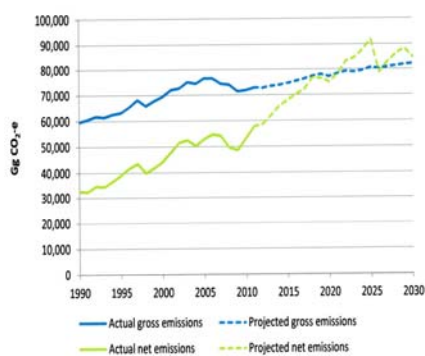


NZ has a new interim 2020 GHG reduction target of 5% with no policy changes. How could this be achieved?



**BUT** – from NZ's December 2013 Report under UN Framework Convention on Climate Change and the Kyoto Protocol

#### Updated Emissions Projection



#### Implications

Revised 2020 target

- - 5%  
(56.6 MtCO<sub>2</sub>-e)

Updated 2020 projection

- + 26%  
(75.0 MtCO<sub>2</sub>-e net emissions)  
(77.2 MtCO<sub>2</sub>-e gross = +29%)

## NZ Energy Strategy 2011 & Energy Efficiency and Conservation Strategy 2011

- NZES horizon reduced to 10 years. EECS now only 5 years.
- Travel Demand Management no longer referred to in NZES.
- Energy security mentioned. Response? More oil exploration.
- 2007 EECS targets on reducing GHG emissions, use of electric vehicles, reduction in single occupancy vehicle travel removed and not replaced.

## 2011 GPS on land transport funding

- Focus on short term economic growth and value for money. Emphasis on RoNS plus road safety improvements
- Refers to reliable, cost effective public transport and investing in walking/cycling to contribute to economic growth
- No reference to managing travel demand or specific actions to reduce GHG emissions
- In my view a continuation of 20<sup>th</sup> century thinking, ignoring or downplaying longer term issues and risks.

### Pricing Carbon – an essential step

- A carbon tax is required as markets do not put a price on the external damages from CO<sub>2</sub> emissions.
- Would need to be introduced by international agreement with trade sanctions to prevent countries from free riding.
- William Nordhaus proposes a carbon price of US\$25 per ton of CO<sub>2</sub> in 2015 rising sharply after that. Average increase in the annual cost of driving a car in US would be \$116.9 in 2015.

### Travel Demand Management

- Place much more emphasis on changing travel behaviour to reduce amount of travel by single occupant vehicles
- A congestion charge set to influence travel behaviour rather than maximise revenue is potentially a powerful travel demand management measure.
- A congestion charge should initially be introduced in Auckland then later Wellington and Christchurch with net revenues used to fund transport improvements.

## Alternative transport fuels

- Natural gas (a GHG). Becoming much more widely available internationally. Exploration potential in NZ is good.
- Ethanol and/or 'drop-in' biodiesel from wood chips and fast growing grasses grown on marginal land. Financial viability improving. NZ could part-fund a pilot plant or plants.
- Increase NZ's already high proportion of electricity from renewable sources.

## Public transport

- Reduce reliance on diesel buses to improve energy security, and reduce noise and emissions. Options:
  - Electric buses, potentially battery electric buses charged wirelessly at stops or interchanges.
  - Converting buses to CNG. CNG-powered buses are used in Brisbane, Sydney and Singapore.
  - Replacing buses with light rail vehicles or electrified heavy rail.



## Strategic land use and transport planning

- Set long term objectives supported by short term actions.
- Introduce and stick to targets for reducing vehicle kilometres travelled (VKT) per person, then total VKT
- Facilitate higher density, mixed use development supported by quality public transport and walking/cycling infrastructure
- Target congestion reduction measures to improving key freight routes and isolating buses from congestion.

## Other measures

- Increase funding for public transport, walking and cycling
- Do more to encourage car pooling and car share clubs
- Educate drivers in fuel efficient driving techniques
- Time and link traffic signals to minimise fuel consumption
- Include increased rainfall intensities and sea level rise (0.5-1m over this century) in transport infrastructure decision making
- Educate and influence decision makers and general public.

## Final word

- NZ should take steps to improve its transport energy security by reducing dependence on imported crude and liquid fuels. This must go well beyond hoping for significant crude oil and/or gas discoveries.
- Climate change is a major threat to the well-being of future generations and the world's biodiversity. The IPENZ Transportation Group is urged to give high priority to identifying and supporting effective action to reduce our transport system's carbon emissions.