

SOL. eqpt. - temperature @ 1.5m
From 1/8/2000 to 1/8/2000
Aug-1 1952 Day C

ANTARCTIC CLIMATE & ECOSYSTEMS CRC

PREPARING FOR WHITE SWANS:
Climate Change and Opportunities for the Economy

Dr Jim Salinger
Prof Caroline Saunders
Rod Oram

ANTARCTIC CLIMATE & ECOSYSTEMS CRC

Wellington / November 1st 2011 www.acecrc.org.au

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**CLIMATE CHANGE:
THE SCIENCE AND ITS IMPACTS**

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BLACK SWAN

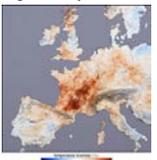


- The event is a surprise
- The event has a major impact

WHITE SWAN



- Navajo tradition the Great White Swan can call up the Four Winds
- The Great Spirit will use white swans to work its will
- A symbol of transformation

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CO2 and Temperature

- Joseph Fourier – 1820s

CO₂ doubling best estimate 3°C (2.0 - 4.5°C)
This century

CO₂ concentration now 38% above pre-industrial
Half that increase in last 30 years

Most of the CO₂ there for centuries to come
Oceans & ice sheets take centuries to adjust

- Noted that fossil carbon building up in atmosphere

CO2 and Temperature



- Joseph Fourier – 1820s
 - Speculated that the atmosphere keeps the Earth warm



- John Tyndall, Irish earth scientist, 1860s
 - Found the key greenhouse gases
 - Block heat from escaping to space

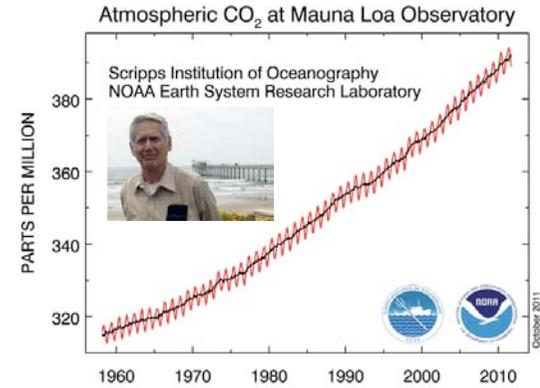


- Svante Arrhenius, Swedish chemist, ~1900
 - Doubling CO₂ would raise temperatures 5°C



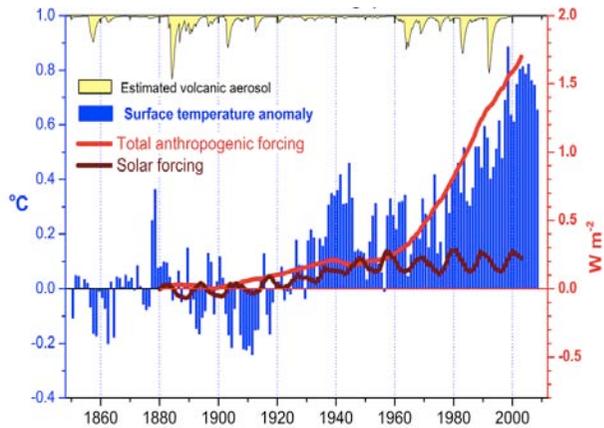
- Athol Rafter, DSIR scientist, 1950s
 - Noted that fossil carbon building up in atmosphere

Increases in greenhouse gases

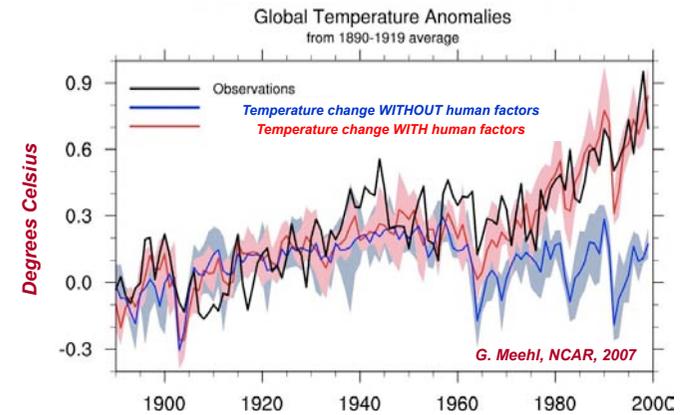


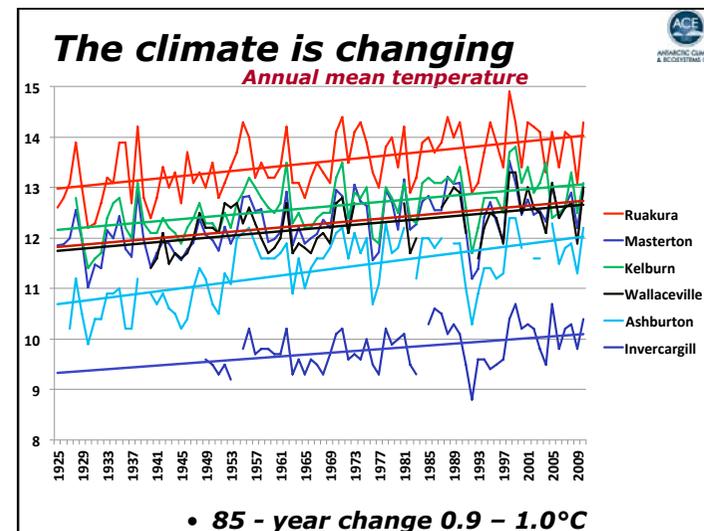
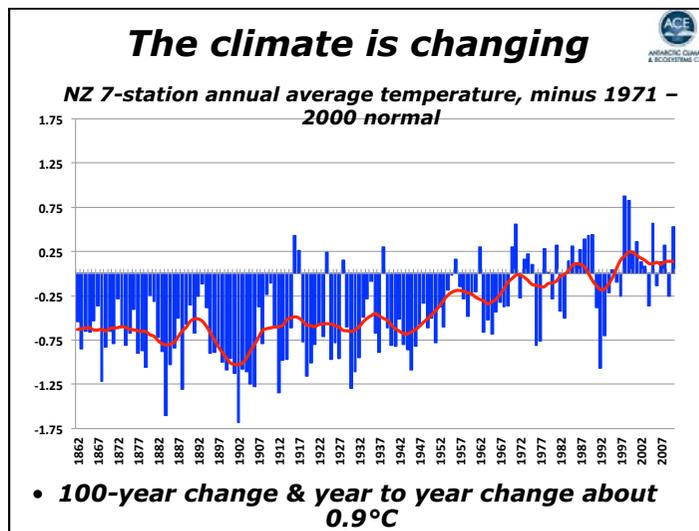
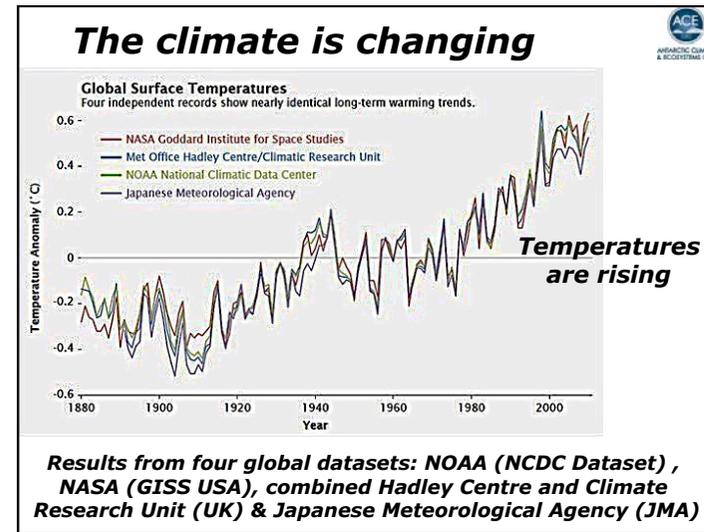
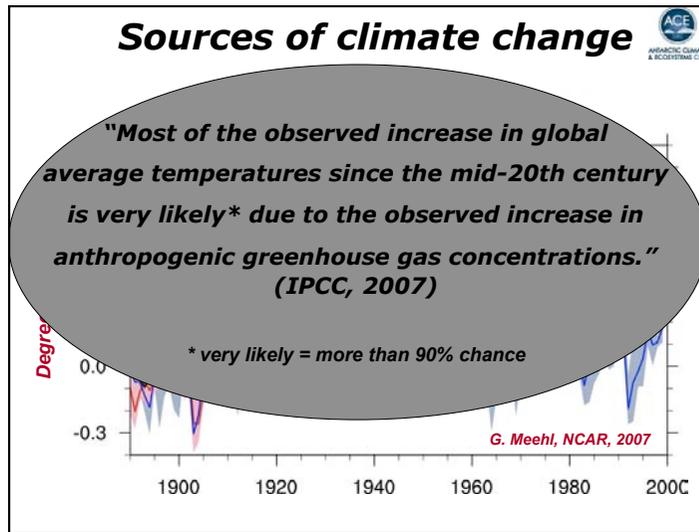
New Zealand Climate Change Research Institute
Te Pūkaki Hurihanga Taiao

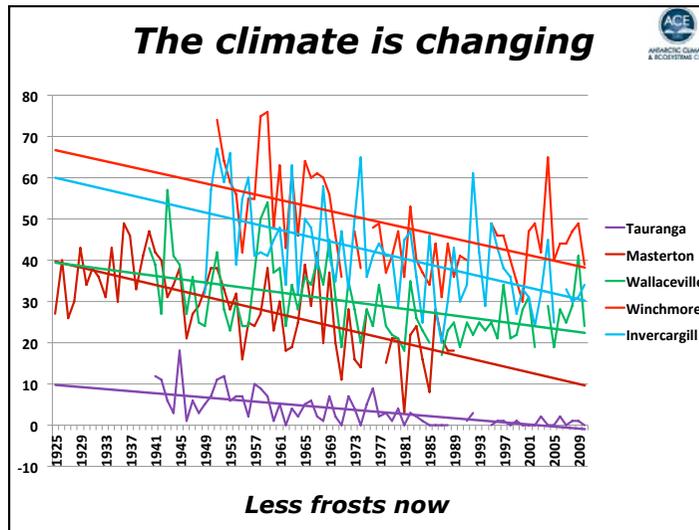
Sources of climate change



Sources of climate change







Extremes are increasing

- Europe August 2003
- Wide area temperature anomaly of about 3°C
- Was more than 7°C warmer than usual in some places
- About 30,000 premature deaths
- Unprecedented drop in crop yields
- This is now twice as likely as it was 50 years ago due to global warming

Extremes are increasing

- 2010 Pakistan record breaking floods began in late July 2010, resulting from heavy monsoon rains in Pakistan and affected the Indus River basin
- Drought and widespread fires in Russia at the same time as near-record flooding across much of China is raising the question of correlations between extreme events
- Extremes like this have been expected to become more frequent, for some time
- But climate scientists are now concerned about likely connections between them

Extremes are increasing

Global warming 'influencing weather extremes'

By Isaac Davison 5:30 AM
Friday Jul 15, 2011

Human-influenced global warming has played a role in the severe weather events in New Zealand and abroad over the past year, says a visiting climate expert, Christchurch-born climate scientist Kevin Trenberth, now employed by the US National Centre for Atmospheric Research.

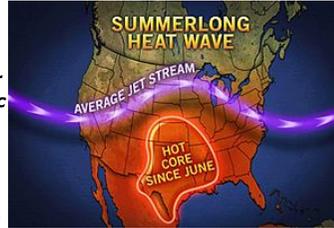
Weather-related disasters in the past year range from a heatwave in Russia to flooding in Pakistan, China, India, and Queensland and drought in Brazil. New Zealand also broke temperature and rainfall records and experienced a deadly tornado in Auckland. After the deadly US spring storms, Dr Trenberth said: **"When natural variability is compounded by human influences on climate this is what we get. Records are not just broken, they are smashed."**

Extremes are increasing

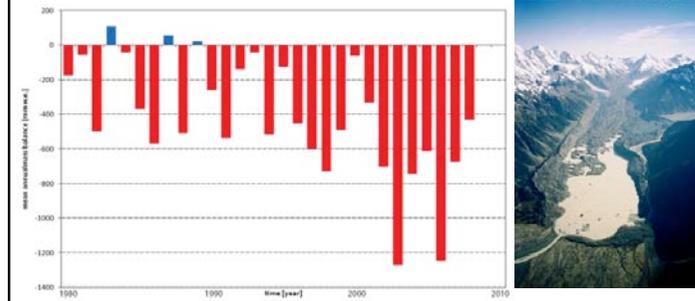
• The blistering heat experienced by USA during August, as well as the June through August months, marks the second warmest summer on record (NOAA's National Climatic Data Center).

• The average U.S. temperature in August was 24.3°C, 1.7° above the long-term (1901-2000) average, while the summertime temperature was 23.6°C, which is 1.3° above average.

• Texas, Oklahoma, New Mexico and Louisiana had their warmest summers on record. Average summer temperatures in Texas and Oklahoma, at 30.4°C, exceeding the previous seasonal statewide average temperature record for any state.

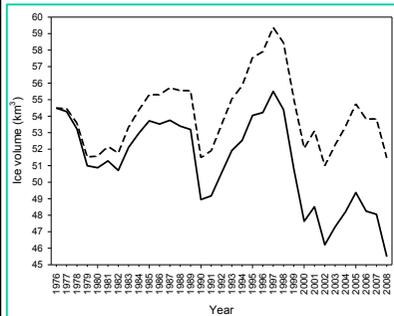


Glaciers are shrinking



Glaciers are shrinking world wide

Alpine Response

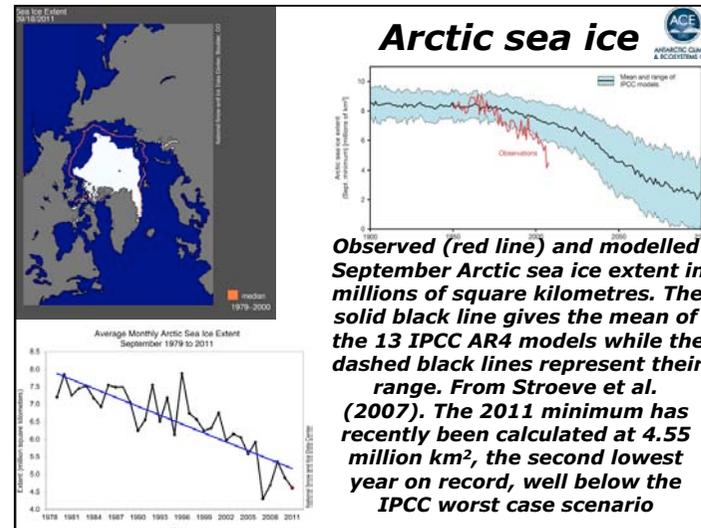


Total volume change of alpine ice (solid line)
As much as 12 percent of the volume of Swiss alpine glaciers was lost over the period from 1999 to 2008

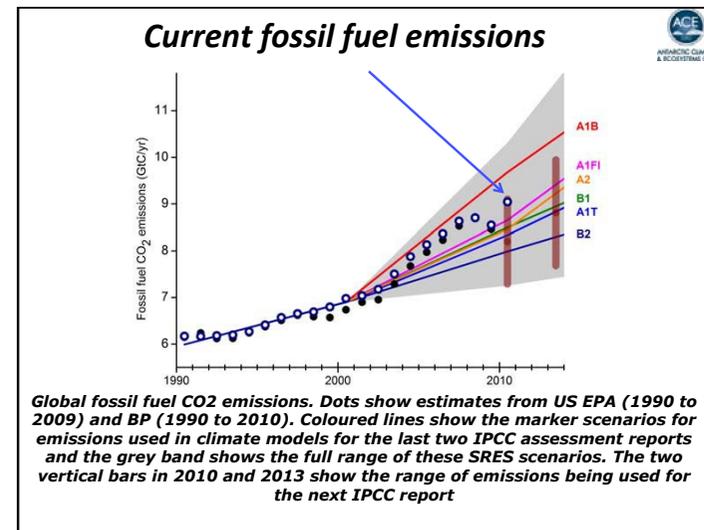
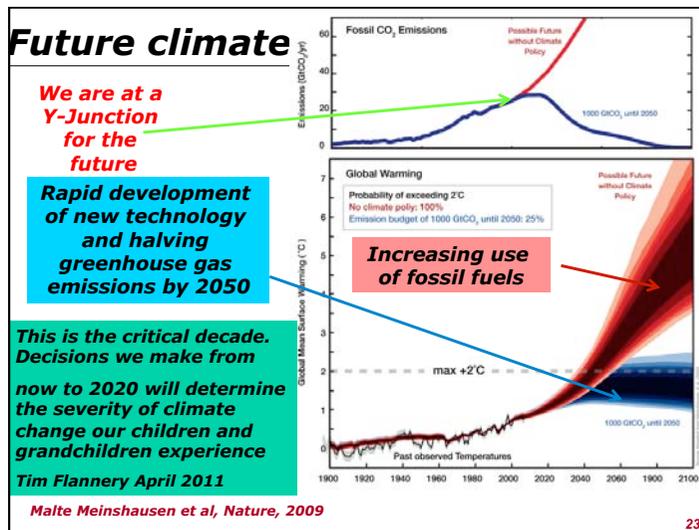
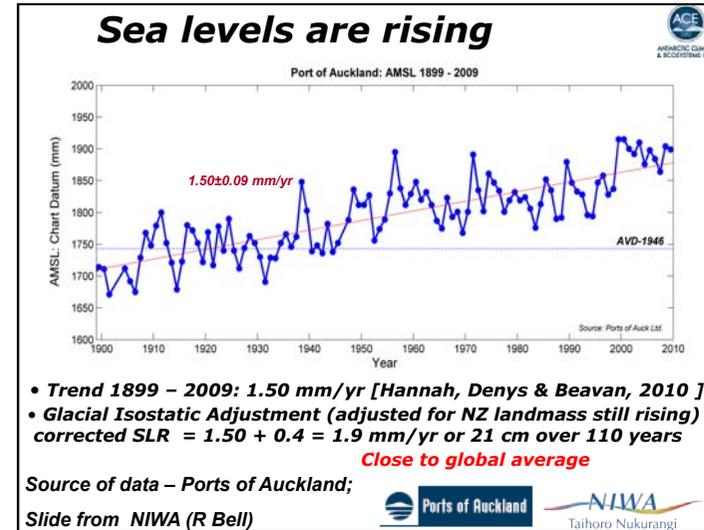
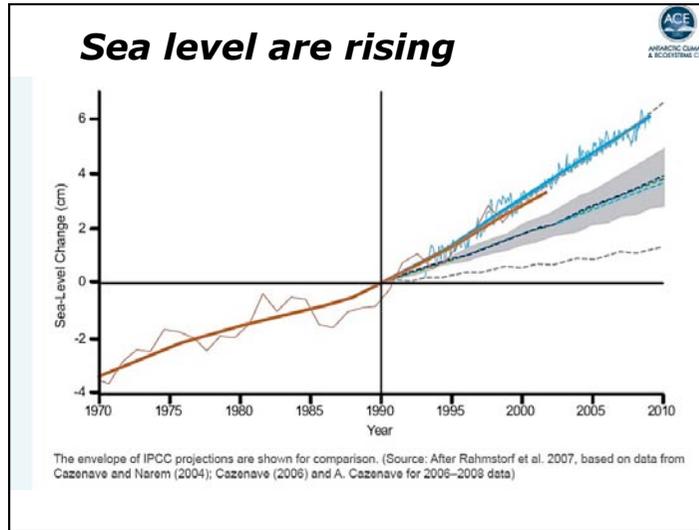
- Southern Alps ice volume has decreased 16% from 55 to 45 km³ 1976 - 2008

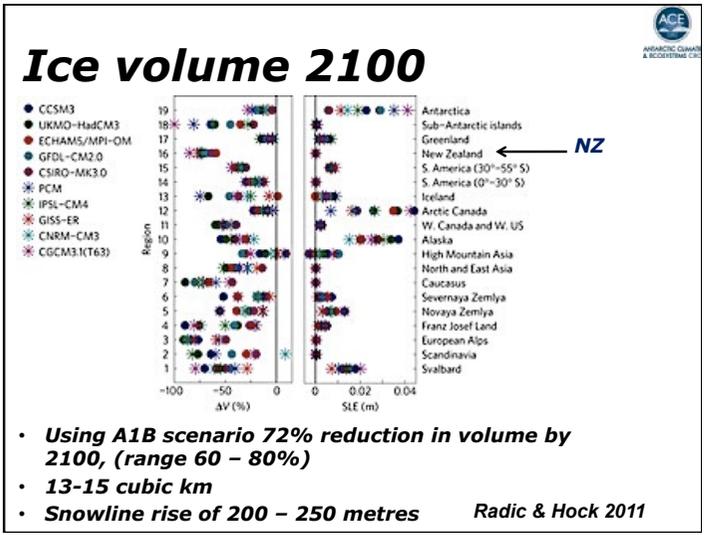
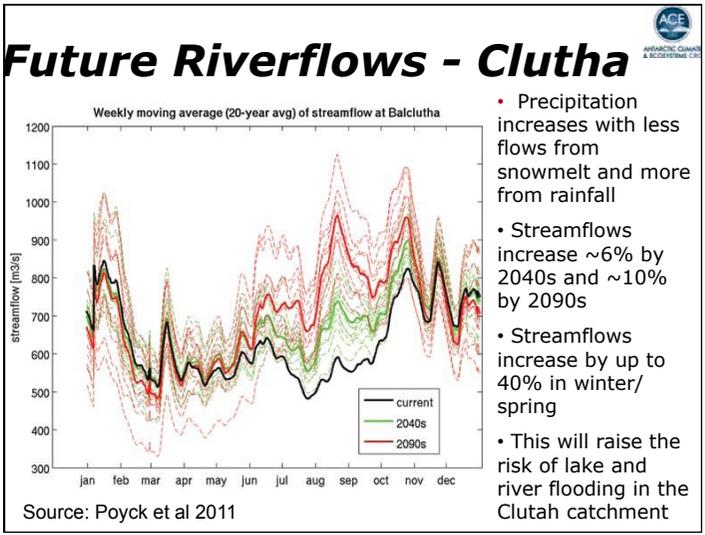
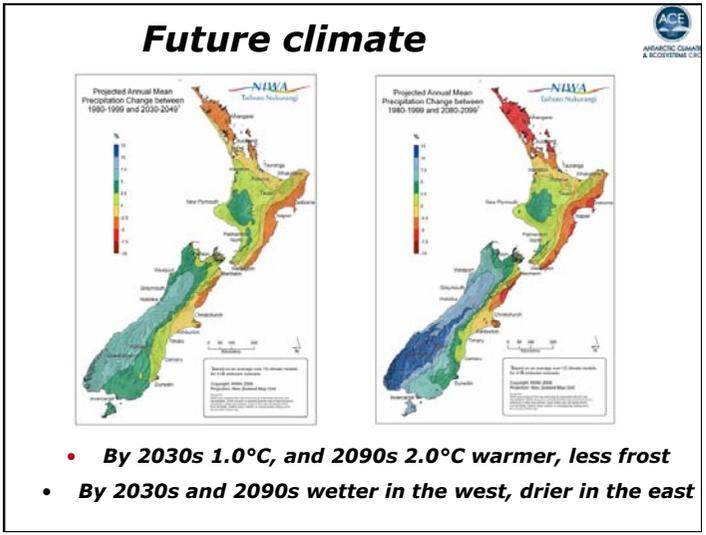
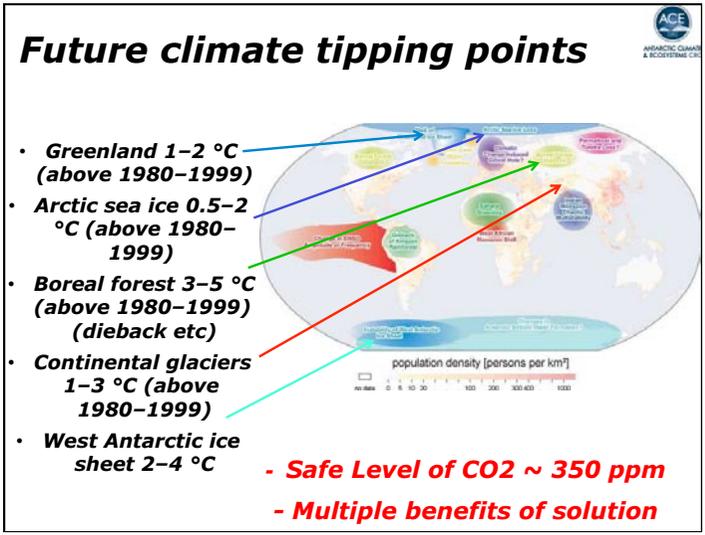


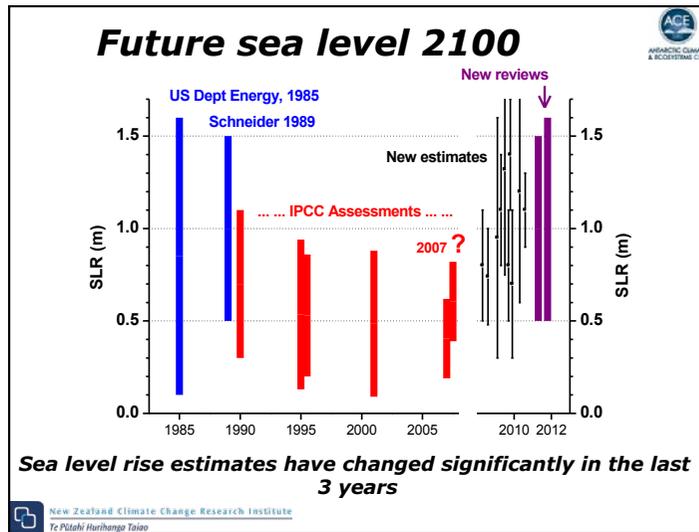
Arctic sea ice



Observed (red line) and modelled September Arctic sea ice extent in millions of square kilometres. The solid black line gives the mean of the 13 IPCC AR4 models while the dashed black lines represent their range. From Stroeve et al. (2007). The 2011 minimum has recently been calculated at 4.55 million km², the second lowest year on record, well below the IPCC worst case scenario







Future Projections

- Reflections on scholarly reticence

My own experience and observations of related phenomena suggest that the source of bias is scholarly reticence. It is not optimism that is unscholarly, but being too far away from the mainstream. That could potentially cut either way on climate change. However, in circumstances in which the mainstream has been moving steadily towards more certain views that human-induced climate change is substantial and potentially damaging, and towards expectations of more severe damage, not being too far away from the mainstream has been associated with understatement of the risks.

Professor Ross Gurnaut, March 2011

- Erring on the Side of Least Drama (ESLD)

The problem, of course, is that some phenomena in nature are dramatic. If the drama arises primarily from social, political, or economic impacts; it is crucial that they be reported accurately, and not discounted. Scientists are committed to separating emotion from judgment. In attempting to avoid drama, the scientific community may be biasing its own work—a bias that prevents the full recognition of dramatic natural phenomena that may, in fact, be occurring.

Professor Naomi Oreskes, August 2011

Summary

- More greenhouse gases warm the climate
- Carbon dioxide 38% higher than pre 1750 & rapidly rising
- Temperatures and sea levels are rising, extremes increasing
- Less frosts are occurring, glaciers and sea ice shrinking
- At a critical point in carbon emissions for the future
- Temperatures and sea level will rise significant this century and beyond
- Impacts will occur, and mitigation options available for agriculture eventually

Source: Dan Wasserman, Tribune Media Services, Inc.

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MARKET ISSUES FROM CLIMATE CHANGE, CARBON FOOTPRINTING, LIFECYCLE ANALYSIS AND FOOD

Professor Caroline Saunders
AERU
Lincoln University



Enough Food? - World Food Supply

- Currently enough food for 12bill with pop of 7bill predicted to rise to 11bill
- With climate change food supply predicted to increase
- Policies in major countries currently restrict supply, eg: US conservation land 37.6 m ha of which between 4 and 11 million could be used



However.. Enough food but..

- The distribution of food is a huge issue
- Need to empower rural producers
- New production with climate change need
 - infrastructure
 - property rights
 - knowledge of different crops including pests and disease in new areas



So enough food???

But... Does this account for...

- Water shortages – 2/3 world predicted to experience water stress
- Oil- the availability of cheap supplies
- Inputs such as fertiliser and pesticides
- Less land with predicted loss of 12 mill ha
- Loss of ecosystems and their services
- Changing diets



Future market conditions

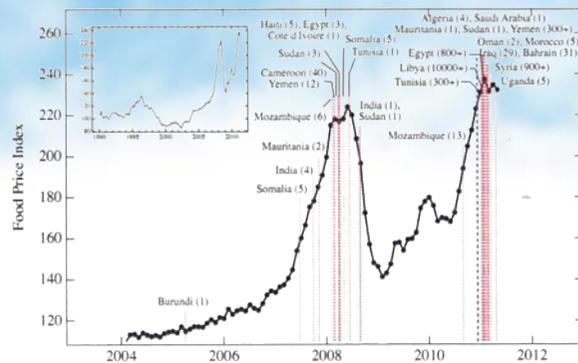
- In theory enough food but distribution even more an issue
- The important factor in world markets including food and oil is the fluctuations and uncertainty
- The fluctuations are factors which lead to imperative for change

Imperative to change

- Frequency of oil crises: Political factors, exploration in ecologically vulnerable areas.
- Climate change: Floods, droughts, shift in production.
- Food crisis
- **Financial crisis**
- Commodity speculation
- Fluctuations in prices
- Hit the vulnerable, lead to political crisis.



Relationship between food price spikes and protests in selected countries



Source: New England Complex Systems Institute

Adverse weather events were a major factor contributing to crop price increases

Index: January 2002 = 100*



Notes: LDC=Least developed country, HRW=Hard red winter wheat. * = Four-crop price index: Monthly wheat, rice, corn, and soybean prices, weighted by global trade shares. Source: USDA, Economic Research Service using International Monetary Fund, International Financial Statistics.

Need to act...

- Market a tool acts with our permission
- Markets do not deal with equity and can get stuck in disequilibrium situations
- Need to develop infrastructure and invest in human, human-made, social, cultural and natural capital
- EG; Green skills, resource saving technology

Market failure and disequilibrium

- Markets fail to take account of externalities or through imperfectly allocated property rights
- Markets can get into a disequilibrium whereby certain behaviours are reinforced and no incentive for new ones exist
- Green growth.. To facilitate uptake of green technology in Australia firms needed to be aware of what existed but also have staff who understood these technologies

Growth???

- Need to redefine growth... No evidence (once basic needs met) that welfare/happiness related to income...
- Growth should be in welfare/happiness/wellbeing not \$\$\$\$
- Need to assess what is important to us as communities and what that means.. More leisure time, better environmental quality

What we can do....

- Change attitude that growth is financial it is much more; social; cultural; environmental
- Multi disciplinary work which enables science to be put in social context and communicated
- Input into strategies for the future (LTCCP)
- Develop community resilience and social capital

“to stay the same we have to change”

So for NZ agriculture

- We cant feed the world (2% dairy)
- But need to maintain high value for products based on sustainability and help other countries with our technology
- But... to access high value markets need to assess attributes of product
- This includes being aware of market requirements and policy
- Assurance schemes can lead to win win situation for NZ

NZ Brand

- NZ does brand itself as Clean and Green
- Generally surveys overseas show positive reaction to NZ brand (100% pure; Zespri)
- Need to maintain this to access high value premium markets
- Price not important for consumers in these markets but attributes of products are such as how it is produced
- Retailers are vying with each other to develop schemes to attract this type of consumer

Market schemes

-  • Leaf Marque – UK, Germany, France, Italy, Sweden and Luxembourg
-  • Natures choice – Tesco
-  • Eco– Plan A – M & S
-  • Good Steward Chain – Walmart
-  • Assured Food Standard – Red tractor label
-  • GLOBAL G.A.P.– 93,000 producers 100 countries

Sustainability & Market Access Issues

- ***Carbon Footprinting***
- ***Local food and seasonal consumption***
- ***Lower meat and dairy consumption***
- ***Ethical food - fair trade and organic!***
- ***Biodiversity and wildlife***
- ***Water quality and quantity***
- ***Ageing Population***
- ***Food waste***

Cutting carbon footprints!

- Modelled producer assuming unrealistic cuts in inputs of 50% and 15% increases in yield – affected **footprint by -4%**
- However modelling consumers making half trips to supermarket and dropping waste from 11% to 9 % **reduces footprint by 14%**
- More emissions in trip to pick up air freighted vegetables than the air freight
- Hence most impact is made by changes at top of supply chain – by consumers

Local Food and Seasonal Consumption

- **Growing demand for local food – zero kms**
- **UK and US government promoting local food and food miles!** (sausages from supermarket would have to travel 227,727 miles to have same footprint as those from local shop)
- **Growth in local farmers markets, box schemes ect**
- **Seasonal consumption also may not be better for the environment**
- **Also consider wider sustainability implications**

Waitrose -

- Waitrose will be the first supermarket to stock their own 100% British dairy products, and customers will be able to trace its provenance from farm to fridge.
- This is great news for the cows and the British farmers and the environment. The cows are being raised in the lap of luxury. They are living in light airy barns, with clean beds of straw or a specially designed comfy mattress; nutritional advisors to ensure a healthy diet and pedicures--their hooves are regularly trimmed.

Lower Meat and Dairy Consumption Low Carbon Diets

- Demand for reduction in meat and dairy consumption (livestock 18% of worlds total)
- 'meat free Monday' Paul McCartney
- Ghent – meat free one day a week
- WWF meat should be labelled 1-3 times a week max
- NHS – reducing meat and dairy in diets

Lower meat and dairy consumption Low carbon diets

- Demand for reduction in meat and dairy consumption (livestock 18% of worlds total)
- Research shows that dairy based diet not much different from vegan diet for emissions (6%)
- Meat based diet more emissions (23% more)
- Further research into alterative sources of supply for meat and its by products

Emerging markets

- *Considerable growth especially for livestock products (but much met by their own increase in production)*
- *One billion middle class in Asia, Latin America and central and eastern Europe*
- *Main change from small retailers to supermarkets and global procurement*
- *Eg China from no supermarkets in 1990 to 60,000*
- *Growth from western chains (Tesco Walmart) and these likely to require same standards of procurement for their other markets*

Other countries being subsidies to met sustainability requirements

- EU Single Farm Payment – subsidises farmers to comply with environmental criteria and will include carbon footprinting (75bill euros)
- EU also pays extra for farmers for agri-environmental schemes to – (22 bill euros)
- EU pays to help comply with market schemes (92 million ecu)
- US – increase in conservation area (115 million acres)
- Increase in payments for working land conservation (US\$3.4 billion)

Conclusion

- Opportunities for NZ to lever win-win scenarios for growth from marketing products to high value markets on sustainability criteria
- No such thing as poor markets but poor marketing

• Rod Oram's presentation •
Wellington, November 1st, 2011

Reinventing Paradise

Responding to climate change:
Economic opportunities

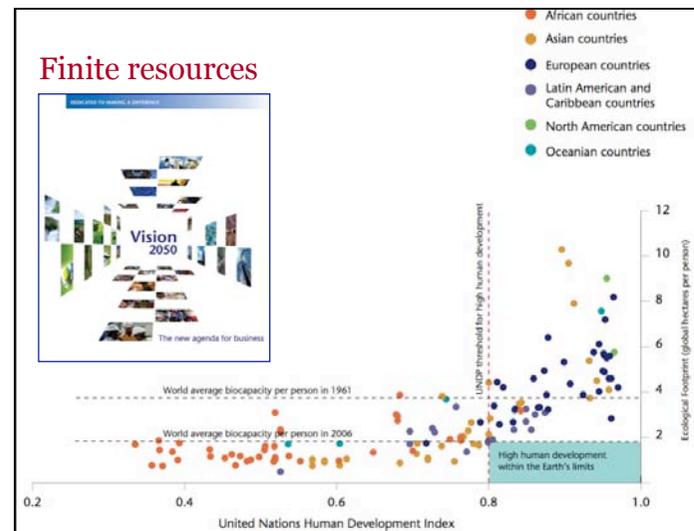
© 2011, Rod Oram / Email. oram@clear.net.nz / Phone. +64 21 444 839

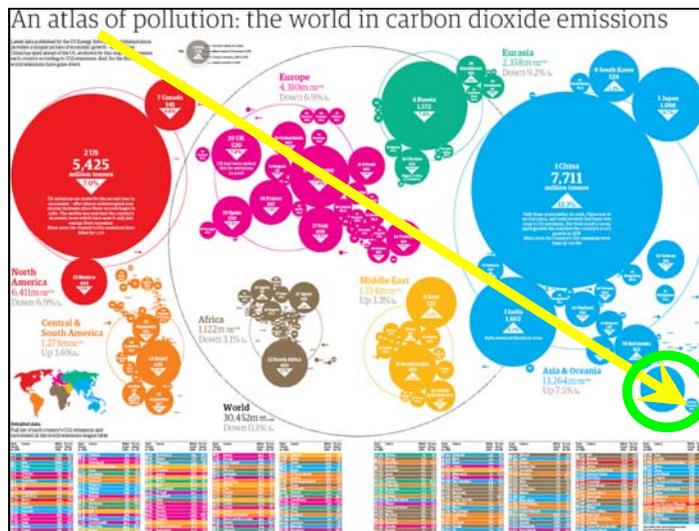
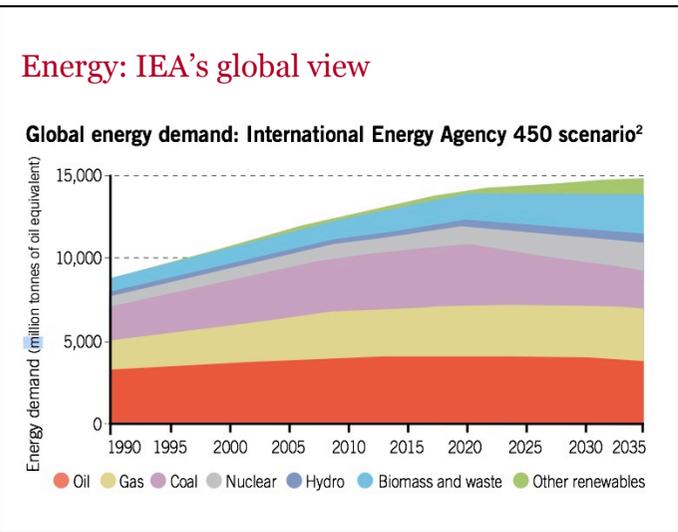
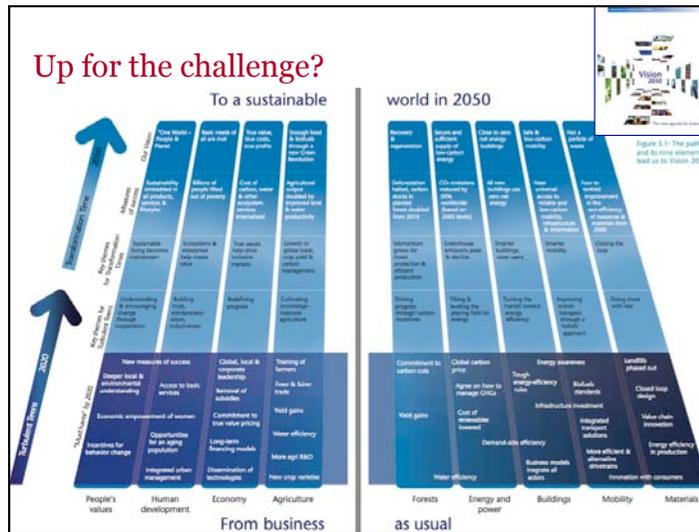
Agenda

- What's up?
- Why us?
- Our response
- Our advantage

The great challenge

- People, planet
- Vision 2050
- A very challenging roadmap for ecological, societal and economic development
 - World Business Council for Sustainable Development

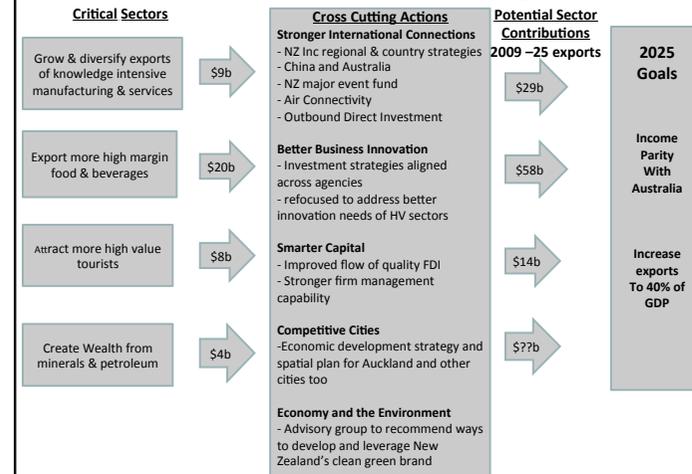


- ### Agenda
- What's up?
 - **Why us?**
 - Our response
 - Our advantage

Why New Zealand?

- Our environment matters:
 - Of all OECD countries, we're the most dependent on our natural environment for earning our living
 - Environmental integrity and brand are vital to earning that living
- Our resources are thin:
 - We are a very, very small, thinly resourced, open economy
 - ...we have few people, limited capital
 - We have to innovate fast and efficiently, in business and government
 - E.g. world's first independent Central Bank; fiscal responsibility act
- We think and act globally to create opportunities...e.g.:
 - World Trade Organisation; sponsoring China's admission; first FTA
 - WTO agricultural negotiations
 - UN in general...
 - ...UNFCCC in particular, e.g. on agriculture and forestry
 - ...Kyoto chairman is Adrian Macey, a NZ diplomat

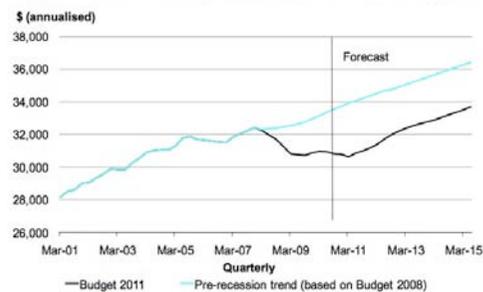
Government's Economic Growth Agenda



Slowth

- Growth no faster after recession than before recession
 - ...need 2x faster to deliver economic and social benefits we need

Figure 1.11 – Real production GDP per capita

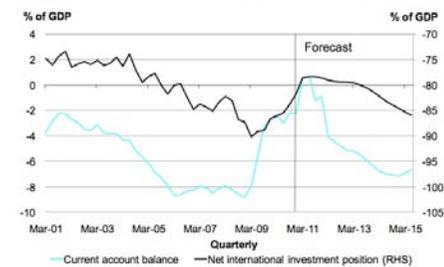


Sources: Statistics New Zealand, The Treasury

Current account and net int'l liabilities

Our net international liabilities heading back to 85% of GDP, one of the highest rates in OECD...
 ...same level as before the recession or 2008 election

Figure 1.13 – Current account and net IIP

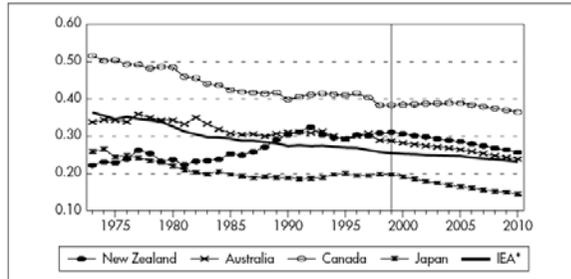


Sources: Statistics New Zealand, The Treasury

Our high energy intensity

- We rely on abundant cheap energy...to produce low value goods

Energy Intensity in New Zealand and in Other Selected IEA Countries, 1973-2010
(Toe per thousand US\$ at 1990 prices and purchasing power parities)

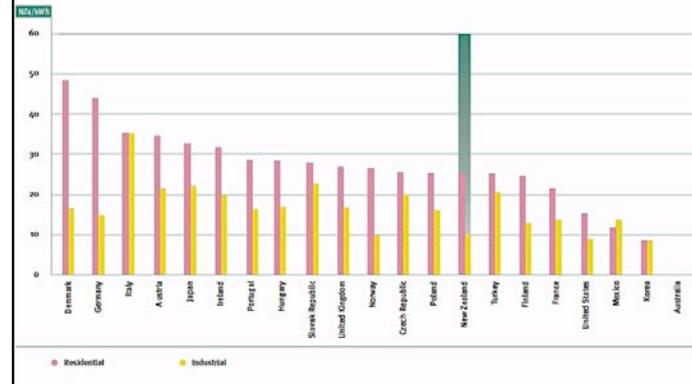


* excluding Norway from 2000 onwards.

Sources: *Energy Balances of OECD Countries*, IEA/OECD Paris, 2000; *National Accounts of OECD Countries*, OECD Paris, 2000; and country submissions.

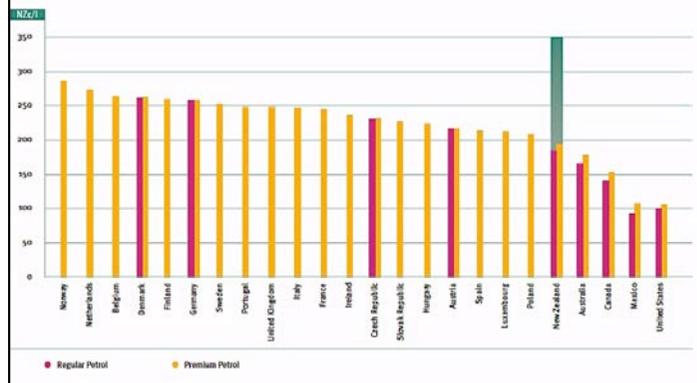
Cheap electricity

Figure J.1a: International Residential Electricity Prices for the September Quarter 2010



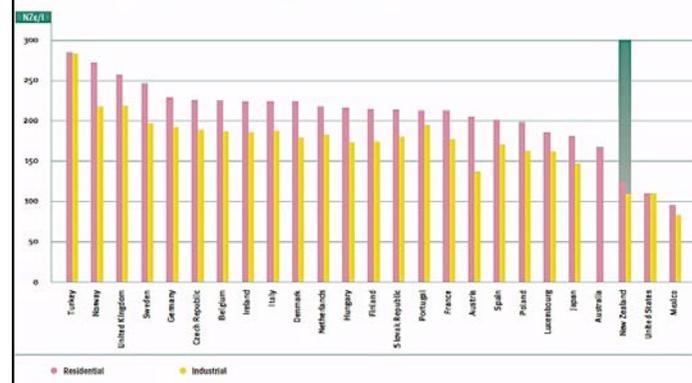
Cheap petrol

Figure J.1c: International Petrol Prices for the September Quarter 2010



Cheap diesel

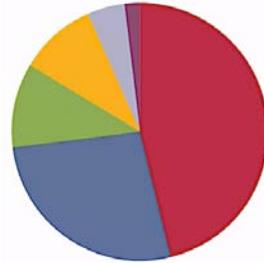
Figure J.1d: International Diesel Prices for the September Quarter 2010



Energy sources in 2010

- We're very dependent on oil
- Oil is only going to get more expensive
- Finding more of ours won't reduce the price to users...we'll still pay world price

Figure A.3a: Total Consumer Energy by Fuel for 2010



- Oil 46.0%
- Electricity 27.0%
- Other Renewables 10.3%
- Gas 10.2%
- Coal 4.8%
- Geothermal Direct Use 1.8%

Notes to Figure A.3a: "Other Renewables" in this instance refers to bioenergy and solar thermal.

Agenda

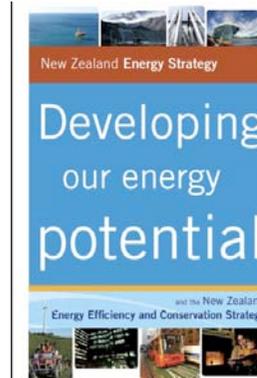
- What's up?
- Why us?
- **Our response**
- Our advantage

Role of NZ government – overseas

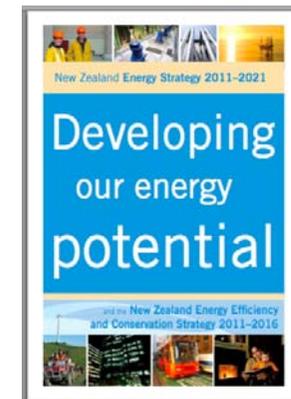
- **Global Research Alliance on Agricultural Greenhouse Gases**
- Proposed by NZ government at Copenhagen in 2009...to:
 - Reduce emissions; increase food production
 - Help developing countries to join global climate change frameworks
- Alliance now has 36 countries + 3 observers including the EU
 - = 70% of global agricultural GHGs; agriculture = 15% of total GHGs
- Three main workgroups:
 - Livestock, led by NZ and Netherlands, 483 projects identified to-date
 - Croplands, led by US, 429 projects to-date
 - Paddy Rice, led by Japan, 60 projects to-date
 - Secretariat: NZ
- Successful Ministerial Summit in June
- What in means to NZ:
 - Bedrock science for us; our biggest international science collaboration
 - Government has committed NZ\$45m over four years 2010-13

NZ's Energy Strategy

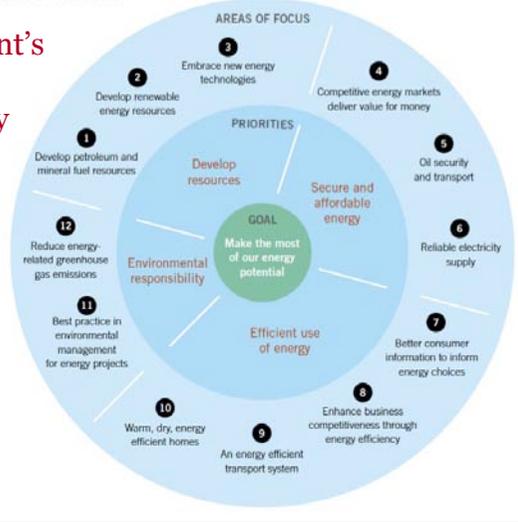
• The un-strategy



• The strategy



Government's energy un-strategy



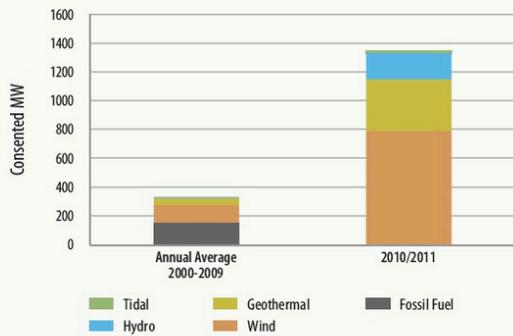
The government's energy strategy

AREAS OF FOCUS	PRIORITIES	GOAL
Develop renewable energy resources Develop petroleum and mineral fuel resources Embrace new energy technologies	Diverse resource development	Make the most of our energy potential
Best practice in environmental management for energy projects Reduce energy-related greenhouse gas emissions	Environmental responsibility	
Warm, dry, energy efficient homes An energy efficient transport system Enhance business competitiveness through energy efficiency Better consumer information to inform energy choices	Efficient use of energy	
Competitive energy markets Reliable electricity supply Oil security and transport	Secure and affordable energy	

Big increase in renewable electricity capacity

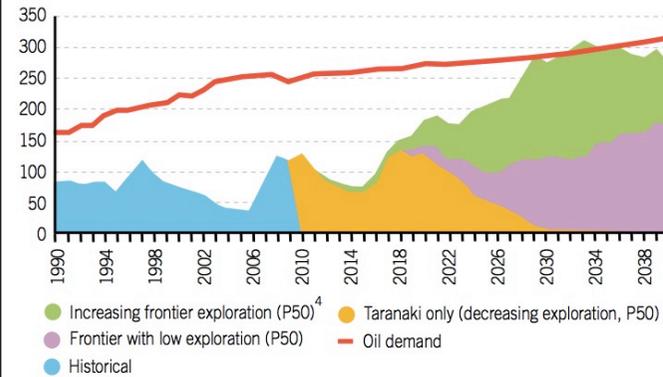
Consented new generation by type

FIGURE 2



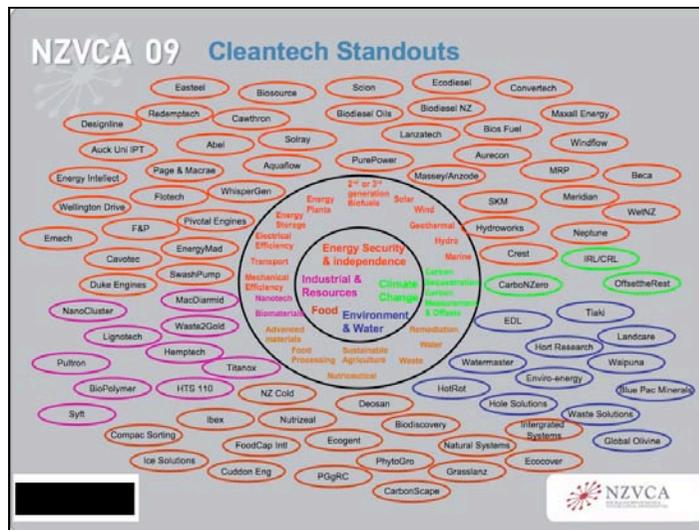
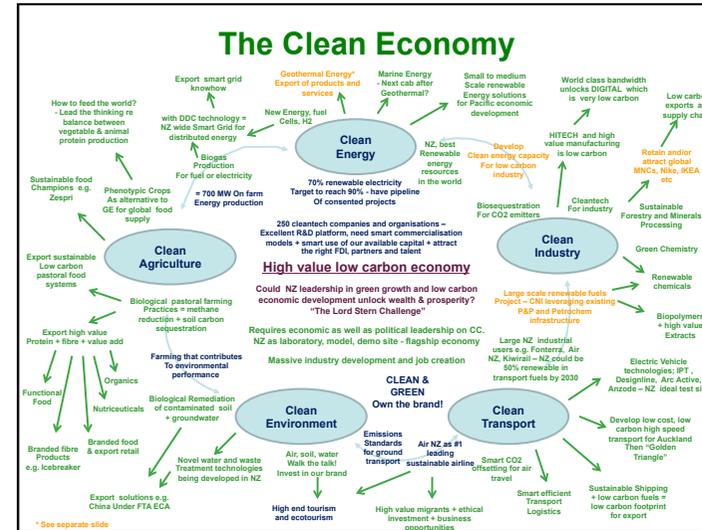
Government's view on NZ oil and gas

Oil production and demand (petajoules)



Business engagement

- After years of scepticism, engagement is growing
- Some leaders emerging, e.g.
 - Fonterra in the dairy sector
 - Air New Zealand
 - Zespri in kiwifruit
 - Mighty River, Meridian and Contact in renewable electricity
 - NZ Post in transport
- Investment in renewable electricity accelerating
- Some fuel switching e.g. from coal to wood chips in industrial plants
- But generally speaking, if companies aren't directly engaged in the ETS as "points-of-obligation", then many tend to ignore even basics such as energy and fuel efficiency audits, improvements
- Clean tech activity still very modest
 - ...tho some outstanding individual companies and investors



LanzaTech...clean tech leader

- Signed commercialisation agreements at the Expo with:
 - Chinese Academy of Sciences
 - Baosteel; next pilot plant in China
- Makes biofuel from industrial waste gases
 - Turns greenhouse gas liability into profit
 - World pioneer of the science
- Auckland-based; NZ Steel pilot plant
- Big venture capital backing
 - Latest round US\$18m
 - NZ: Stephen Tindall
 - US: Vinod Khosla
 - China: Qiming Ventures

LanzaTech

helping industry complete the cycle

welcome

LanzaTech has developed a proprietary platform for producing low-carbon liquid biofuel in any industrialized geography, at a much larger scale than is currently being envisioned elsewhere.

Specifically, we have developed a full production process that can be retrofitted to industrial facilities which use the carbon intensive component of waste flue gases as a feedstock.

20 Billion Gallons of Renewable Fuel Production

Industrial flue gases are an inherently low cost, high volume, point source resource, produced in most industrialized regions. LanzaTech's mission is to enable industries that produce high volumes of carbon monoxide containing flue gases to become the lowest cost, highest volume producers of liquid biofuel.

The LanzaTech Pilot Plant

BAOSTEEL

NEW ZEALAND STEEL

Urban New Zealand

- As a nation, we largely define ourselves by our rural and wild parts
 - ...and we believe rural business underpins the national economy
- Yet, we're one of the most urbanised populations in the world
 - ...87% of us live in towns and cities
 - ...most people earn livings far removed from the rural economy
- Our urban places are in trouble...
 - ...their built environments are increasingly unsustainable
 - ...their economies anemic, inward looking
 - Christchurch pre-earthquake had a lot of marginal businesses, buildings
 - Auckland mainly serves only its own population
 - Wellington's tourism & events strategy earns little; public sector shrinking
 - Dunedin is slipping away
 - ...and every smaller town has its own story to tell, positives & negatives
- **Challenge:**
- **Reinvent, reinvigorate our urban communities and economies**

Christchurch

- Draft centre city plan
- Excellent...
- ...input
- ...conception
- ...themes
- ...transformation
- Lots more to do, though, on the economy

Green City
A greener more attractive city, supported by a wider and upgraded Iron River/Dakara corridor, a greener Cathedral Square, new street trees throughout the Central City, 500 new Green Star rated buildings, rain gardens, surface stormwater treatment and a new network of neighbourhood parks.

Stronger built identity
A low-rise city with safe, sustainable buildings that look good and function well, supported by urban design controls, new regulation and incentives, strengthened heritage buildings with adaptive reuse, new lanes and courtyards and precincts of distinct activities and character.

Compact CBD
A more compact Central Business District (CBD) supported by business incentives, new regulation, well-designed streetscapes, a redeveloped Convention Centre, new regional and central government offices, ultra fast broadband and free Wi-Fi, short-term free car parking in Council-controlled car parking buildings and bus routes around the edges of the CBD.

Live, work, play and learn
Making the Central City a great place to live, work, play and learn, supported by high-quality inner city housing options and demonstration projects, residential incentives, improved access to a wide range of schools, new metropolitan sporting facilities, a new Central Library, new public art and a performing arts venue and playgrounds.

Accessible city
A city easy to get to and around, supported by excellent walking and cycling paths, high-quality public transport, short term free parking, a network of green two-way streets, and an efficient and attractive ring road for traffic around Moorhouse, Fitzgerald, Bealey, Harper and Deans avenues.

TOWARD 2040

SMART GREEN WELLINGTON

GLOBAL TRENDS FACING WELLINGTON

- Big cities get the most attention
- Harnessing new technologies
- Responding to climate change and resource scarcity
- Populations older and more diverse

ECO CITY
Our city will take an environmental leadership role as the Capital of Green and Grow the 21st Century.

CONNECTED CITY
Our newly advanced urban will link to networks across physical, virtual and social transactions.

PEOPLE CENTRED CITY
Our city will be healthy, vibrant, affordable and resilient, with a strong sense of identity and place...

DYNAMIC CENTRAL CITY
The central city will be a place of mobility, innovation and investment, affording the lifestyle of a much larger city.

THE CAPITAL CITY IS ALREADY A CREATIVE, HIGHLY SKILLED, CONNECTED POPULATION WITH OUTSTANDING ECOLOGICAL ASSETS. THESE ARE OUR STRENGTHS.

Auckland's plan

- Current long-term growth rate 2.1%:
= GRP of \$85bn in 2031, of which exports \$17bn
- Target long-term growth rate 5+%:
= GRP of \$190bn in 2031 (2+x)...of which exports \$60bn (3+x)
- Eco-city
 - "Greening growth"
 - ...among many measures cut GHG emissions "significantly"

AN INTERNATIONALLY COMPETITIVE AND PROSPEROUS ECONOMY FOR ALL AUCKLANDERS THROUGH A STEP CHANGE IN EXPORTS AND INTERNATIONALISATION

VISION

STRATEGIC DIRECTION

1. A BUSINESS FRIENDLY AND WELL-FUNCTIONING CITY
2. AN INNOVATION HUB OF THE ASIA-PACIFIC REGION
3. INTERNATIONALLY CONNECTED AND EXPORT DRIVEN
4. INVESTING IN PEOPLE TO GROW SKILLS AND LOCAL WORKFORCE
5. A VIBRANT, CREATIVE WORLD CITY

SCALE

- An average annual increase of regional exports greater than 6%
- An average annual real GDP increase greater than 5%
- An average annual productivity growth greater than 2%

THESE PERFORMANCE GOALS, WHEN ACHIEVED, WOULD RESULT IN THE AUCKLAND ECONOMY IMPROVING 20 PLACES IN 20 YEARS AGAINST OTHER OECD CITIES

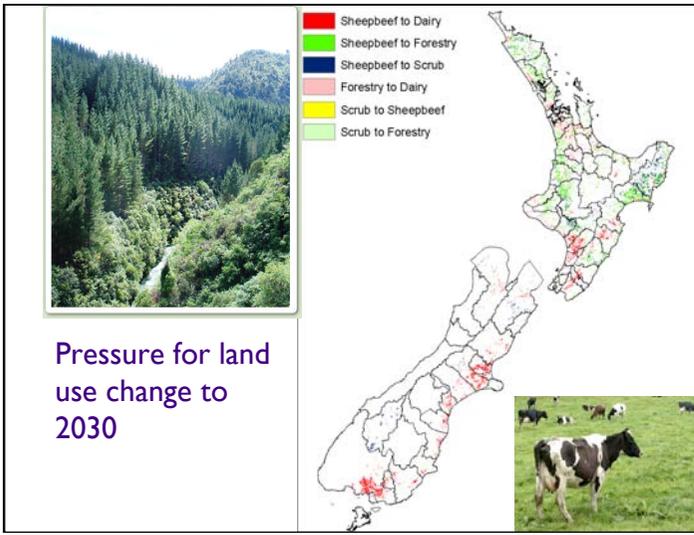
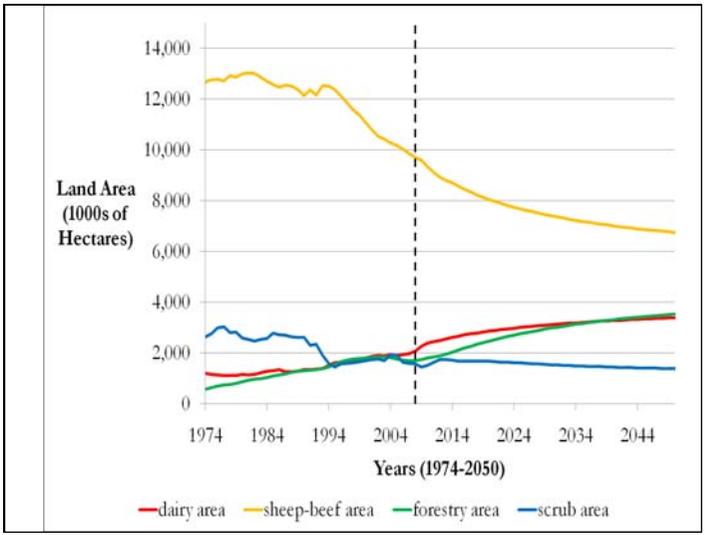
ACTIONS NEEDED TO SUPPORT THESE STRATEGIC DIRECTIONS

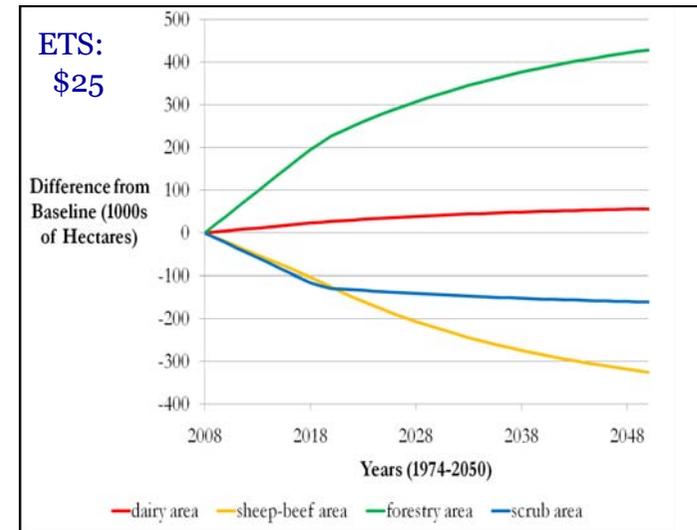
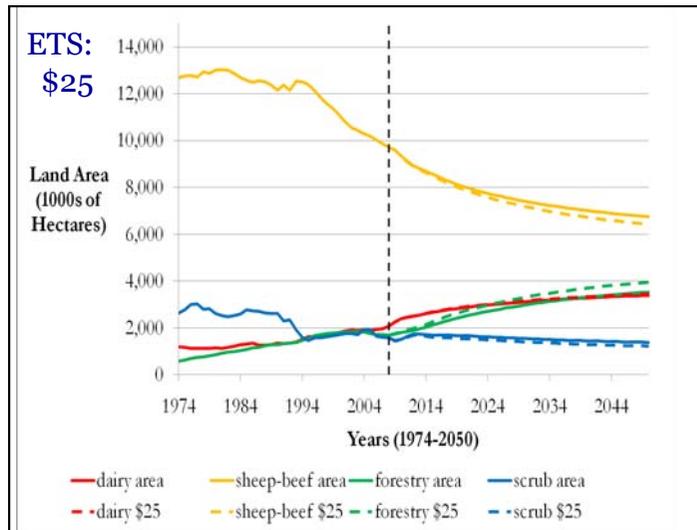
- Support the development of strong links between business, research institutions, business and organisations
- Invest in industry-led infrastructure that supports innovation and the emergence of Auckland's innovation system
- Build up the innovation capability of business
 - Ensure Auckland is globally connected and engaged
- Auckland Council will lead and build an international reputation for Auckland being open and business friendly
 - Ensure Auckland has well-functioning economic infrastructure
 - Ensure Auckland's businesses have access to the resources they need to be productive
- Auckland Council will continue to invest in research, innovation and training (including skills and education sectors)
- Increase Auckland's workforce participation and productivity growth
- Promote Māori culture to create a unique value proposition
- Ensure Auckland is nationally and internationally recognised as being innovative, major and smart (especially in the creative sector)
- Promote Pacific and migrant cultures to create a unique value, talent and investment proposition

CRISP OUTPUTS STRATEGIES

- CREATING A SUSTAINABLE ECO ECONOMY
- FACILITATING AN IWI/HAORI ECONOMIC POWERHOUSE
- DEVELOPING AND ENHANCING AN INNOVATIVE RURAL AND MARITIME ECONOMY
- SUPPORTING A DIVERSE ETHNIC ECONOMY

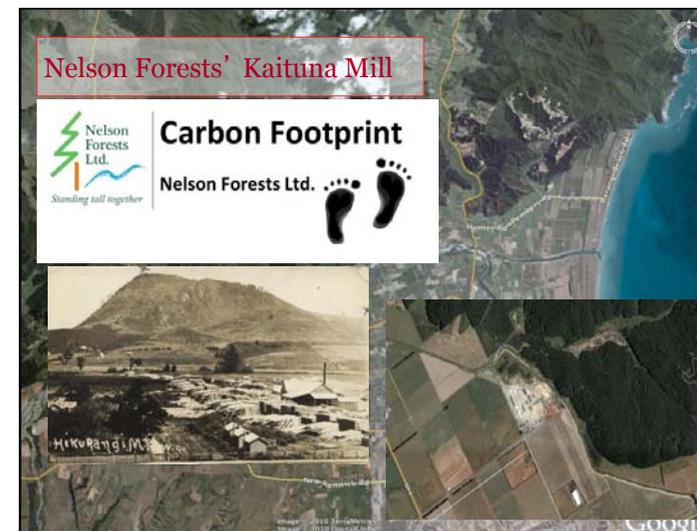
Cities	<i>vs.</i>	Government
<ul style="list-style-type: none"> • What our cities want • Compact form • Public transport • Quality urban design • Wide choices in housing • Power to decide, act • Enough investment • New economy • Sustainability • Local democracy 		<ul style="list-style-type: none"> • What we will get • Urban sprawl • Roads • Urban guidelines • Narrow choice in housing • Strong central control • Limited investment • Old economy • Economy-Environment "balance" • Central intervention





Forestry engagement

- Forest owners suffered great turmoil because of policy indecision, shifts by last government
 - Impact included virtually no new planting; heavy deforestation
- Much more policy stability now
 - Impact includes big pick up in planting
 - Notably, some sales of Kyoto forest credits to overseas buyers
- But big issues still to be resolved, e.g:
 - For small forest owners, decision whether to opt in or out of the ETS is a big one
 - Uncertain future for permanent forest sinks
 - ...likewise, international negotiations on forestry rules
- New Zealand remains very dependent on its Kyoto forests for minimising its Kyoto obligations
- This is a short-term strategy; doesn't solve long term emissions, mitigation & adaptation; policy and action still inadequate on those issues





Zespri

- April 2009: Published its carbon life cycle analysis:
 - Orchard operations make up 17% of total emissions for EU exports
 - Packhouse & coolstore processes account for 11% of total emissions
 - Shipping accounts for 41% of total emissions
 - Repacking and retailer emissions amount to 9% of total emissions
 - Consumer consumption & disposal comprises 22% of total emissions
- Bottom line: resource efficiency builds a more profitable, resilient business
- E.G. Kite-assisted ships save 22% of their fuel bills on average



Zespri

- Established brand
- Built marketing
- Innovated – gold
- Innovated – orchards
- Innovated – intellectual property
- Clever, 12-month supply chain
- Result?
- 40% - 100% premium in EU
- ...and lots more science yet

From exporter to global leader...

...decommoditising a commodity



The road to sustainable dairy farming

- The International Dairy Federation began locking on to climate change issues a few years ago
 - Leaders within it include Fonterra, exporter of 90% of NZ's milk... and David Homer, an IDF board member and UK dairy farmer
- The IDF's 2010 World Dairy Summit was in Auckland last November
 - 2,250 delegates from 30 countries
 - Sustainable dairy farming was one of the conference streams
 - ...attended by 250 farmers and scientists
 - ...upbeat assessment of science, environment & business opportunities
 - Some of the delegates responses follow...



Is human activity contributing to global climate change?



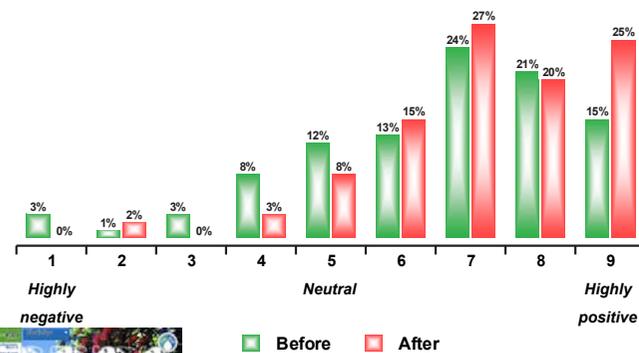
Is dairy farming contributing to global climate change?



From what you've heard today, is dairy farming part of the climate change solution?



How do you rate sustainability as a driver in your farming business?



Will you...



Farming engagement

- Dairy exports are NZ's largest source of foreign exchange (about 25%)
- Dairy farming is NZ's largest industrial GHG emitter (about 40%)
- Dairy sector is NZ's largest export conundrum
 - Can it grow volume and value strongly?
 - Can it do so in environmentally responsible ways?
 - Can it compete against low-cost farmers overseas?
- Sheep & beef farmers have the same issues
- Federated Farmers was the fiercest ETS critic
 - Focuses only on cost and competition...not on opportunities
 - Sceptical about climate change, worries about economic impact
- Strong countervailing voices e.g. Fonterra
- Government is taking reasonably firm line with FedFarmers
 - ...pushing the benefits of the ETS, science, int'l engagement

Our opportunity

- 1 litre of milk = 940 gm of CO₂ equivalent
 - (According to the lifecycle analysis of milk by Fonterra, processor of 90% of NZ's milk, and a world leader in the global dairy trade)

16,000,000,000 litres = 15,040,000,000 kg of CO₂ eq

- 15.04m tonnes of CO₂ eq per year is not a waste product, or a liability

**Helping animals digest their feed better
so they produce fewer emissions, more energy
would help close the nutrient cycle**

**This a brilliant business opportunity...
healthier cows and soil...**

= more food, better environment, bigger profits

NZ Agricultural Greenhouse Gas Research Centre

- New ways of working
- ...on science; on collaboration, NZ and globally
- ...on engaging with farmers

Pastoral Greenhouse Gas Research Consortium

- Since 2002, 50/50 government and industry
- \$30m investment in science so far

- NZ Agricultural Greenhouse Gas Research Centre
- Opened March 2010; \$48.5m funding next 10 years
- Four main workstreams...\$15.6m committed 2010-14
- Mitigate methane; mitigate nitrous oxide; increase soil carbon; deliver farming solutions



ETS and farming

- Animals should be activated in the ETS in 2015, government's latest review of ETS recommends
- Substantial help and safeguards for farmers:
 - 2-for-1 deal on carbon price
 - Allocation of free credits equal to 95% of animal emissions for first 2 years
 - Allocations reduce to 90% over following 3 years...
 - ...and by 1.3% a year thereafter
- Multiple safeguards for all sectors, including:
 - Free allocations reduced only in line with emission reduction opportunities
 - ...to ensure exporters remain competitive
- Regular reviews of ETS to ensure competitiveness maintained and system works efficiently



Farming gets best deal of all exporters

- Panel's recommendations give farmers the lowest cost carbon of any sector

Types of participants	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture ETS participants receiving agricultural allocation	\$0	\$0	\$0	\$1.3	\$1.4	\$2.0	\$2.7	\$3.5
Highly emissions-intensive, trade-exposed ETS participants receiving industrial allocation	\$1.3	\$1.8	\$2.5	\$3.3	\$3.5	\$3.8	\$4.0	\$4.3
Moderately emissions-intensive, trade-exposed ETS participants receiving industrial allocation	\$5.0	\$6.9	\$8.7	\$10.8	\$11.0	\$11.3	\$11.5	\$11.8
Other ETS participants receiving no allocation	\$12.5	\$16.8	\$20.8	\$25.0	\$25.0	\$25.0	\$25.0	\$25.0

Table 10.3: Summary of impacts on farmers (assuming a \$25 carbon price)

	Status quo	Panel's recommendations
Average dairy farmer's expenditure on energy and obligations		
2013	\$6,700 pa	\$4,400 pa
2015	\$9,900 pa	\$8,300 pa
2016	\$10,200 pa	\$8,400 pa
2017	\$10,500 pa	\$9,200 pa
2018	\$10,800 pa	\$10,100 pa
2019	\$11,200 pa	\$11,200 pa
Average sheep and beef farmer's expenditure on energy and obligations		
2013	\$2,400 pa	\$1,600 pa
2015	\$5,500 pa	\$3,900 pa
2016	\$5,800 pa	\$4,100 pa
2017	\$6,100 pa	\$4,800 pa
2018	\$6,400 pa	\$5,700 pa
2019	\$6,700 pa	\$6,700 pa

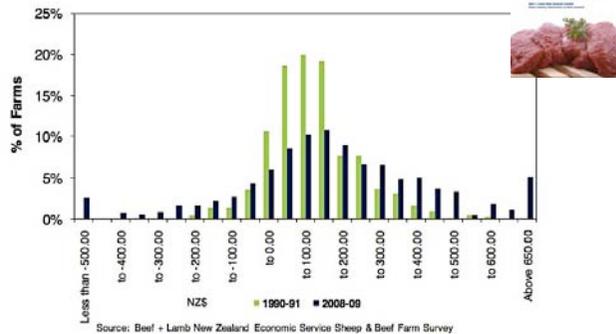
Costs in context

- Sheep and beef:
 - MAF model farm accounts 2010-11:
 - ETS cost 2015: \$1,600
 - ETS = 0.7% of working costs; 1.1% of pre-tax profits
 - ETS cost 2019: \$6,700
- Dairy:
 - MAF model farm accounts 2010-11:
 - Revenues: \$1.15m
 - Farm working costs: \$576,403
 - ETS cost 2015: \$8,300
 - ETS = 1.4% of working costs; 2.4% of pre-tax profits
 - ETS cost 2019: \$11,200

Sheep & beef profitability

- Can the ETS improve farm profitability?
- Yes...through efficiencies on farm and premiums in market

re 24: A changing sector profile in farm profit per hectare



Fonterra's strategy

- 4.4m milking cows; 19% of agricultural GHGs; 25% of exports
- **Progress:**
 - 13.9% cut in energy emissions per tonne of product over last 8 years
 - Its plants began using ETS discipline in 2006
 - 8.5% cut in agricultural emissions per litre over past 8 years
- **Goals:**
 - 10% cut in ag emissions per unit of production by 2013 is NZ dairy goal
 - 30% cut by 2030 possible Fonterra believes...
 - "There is no debating the opportunity. We have a head start on some of our competitors." See Andrew Ferrier at www.climateandbusiness.com
- **Strategy:**
 - Pricing ag emissions would cost average farm \$22,000 a year
 - So, don't activate ag emissions in the ETS
 - If they were, production would fall here...rise in higher emission country
 - **But it's argument is deeply flawed**

What's really at stake

- *Fonterra: ETS will cost average farm \$22,000 a year*
- **Fact:** - No it won't; the industry will get free carbon credits to nullify impact
 - Cost will be \$8,300 in 2015 for the average farm
- *Fonterra: ETS will cut production here*
- **Fact:** - No it won't; more land will go into dairying
 - Dairying will become more intensive, so more emissions efficient
- *Fonterra: What happens in NZ is significant to global industry*
- **Fact:** - World dairy output grows each year by more than entire NZ output
- *Fonterra: We don't need the discipline of ETS...we'll do this anyway*
- **Fact:** - The ETS and gov't oversight will keep dairy industry focused
 - These new disciplines drive new analysis, insights, science & tools
- **Fonterra must lead...**it can drive these emissions & productivity gains better than any other global producer
 - It buys one-third of its milk overseas
 - Its ramping up farming overseas

Agenda

- What's up?
- Why us?
- Our response
- **Our advantage**

Our advantage

- In a world where one product, one country looks ever-more like others...
- ...we stand out for our innovative, practical, leading approaches to issues
- An example:
- Our pavilion at the Shanghai World Expo last year was very distinctive
 - ...and in many lists of Top 10 "must see" pavilions
- Expo's theme: "Better City, Better Life"
 - China investing in new technology, materials, energy sources so many more people can enjoy higher living standards
 - Our pavilion featured NZ's very distinctive urban lifestyle
- In these sorts of ways, we're starting to reap the same rewards from responding constructively to climate change



