

Climate change and human health

Disruption, risk and opportunity

Alistair Woodward

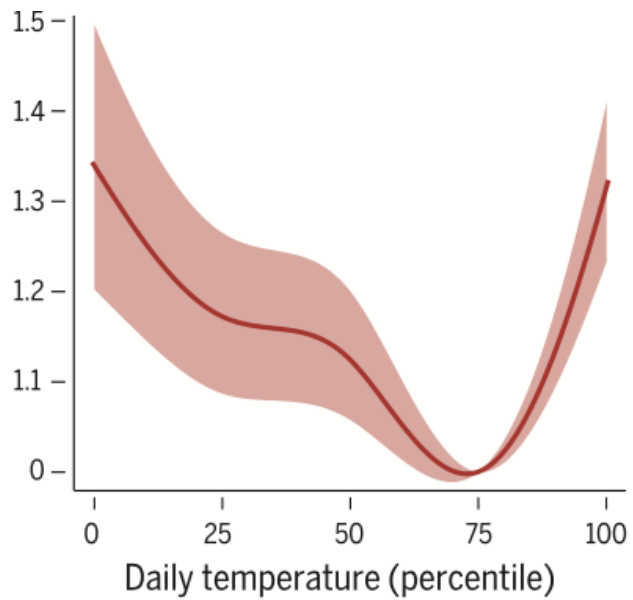
Epidemiology and Biostatistics

University of Auckland

Social and economic impacts of climate

Carleton & Hsiang

Science 2016;353:1112



Maize yields

Agricultural income

Math test scores

Gross Domestic Product

Total factor productivity

Household migration

Profanity in social media



Jan Wright
NZ Parliamentary
Commissioner for the
Environment

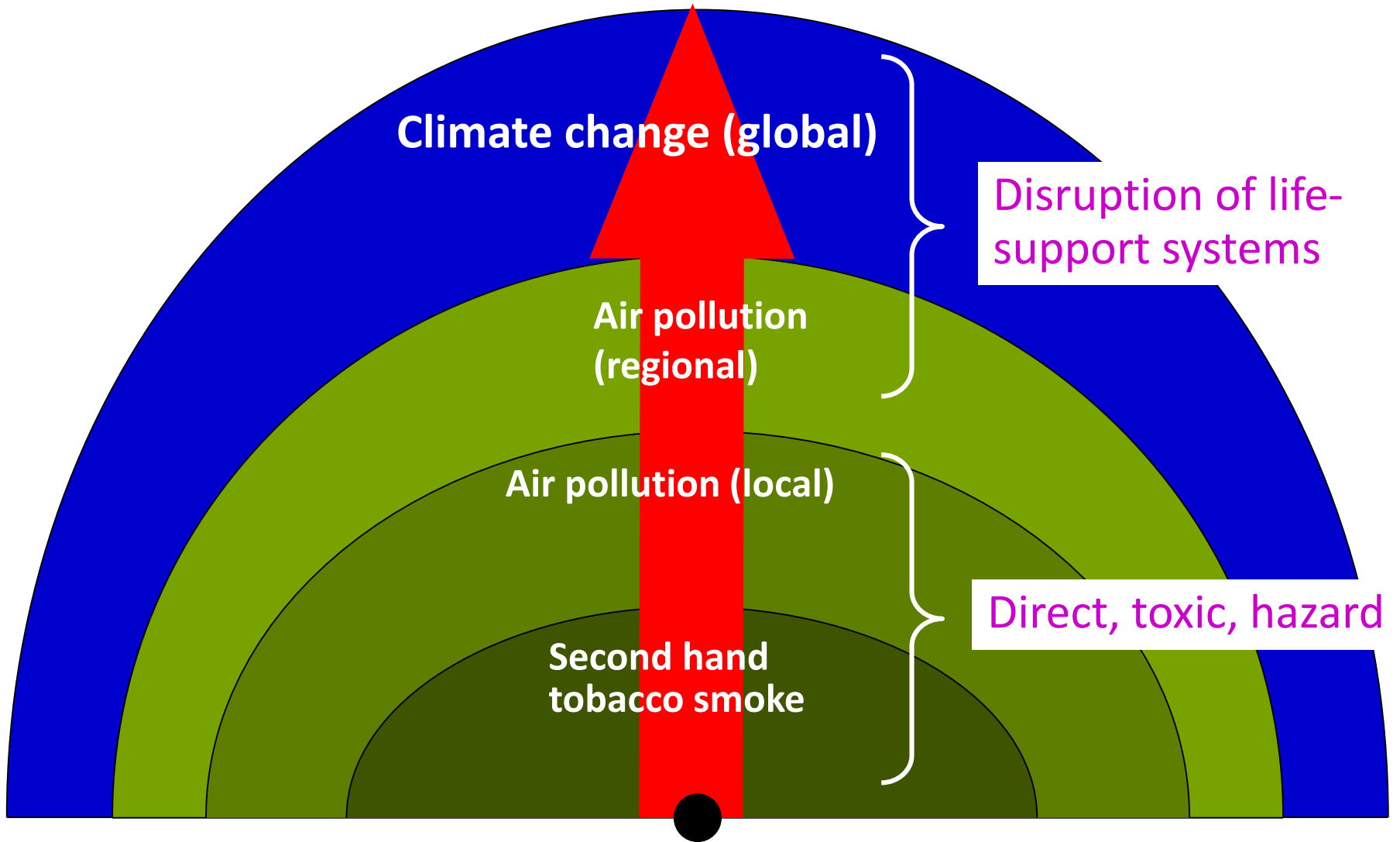
Which disruptive threats are most dangerous?

Those that are large-scale and fast-moving

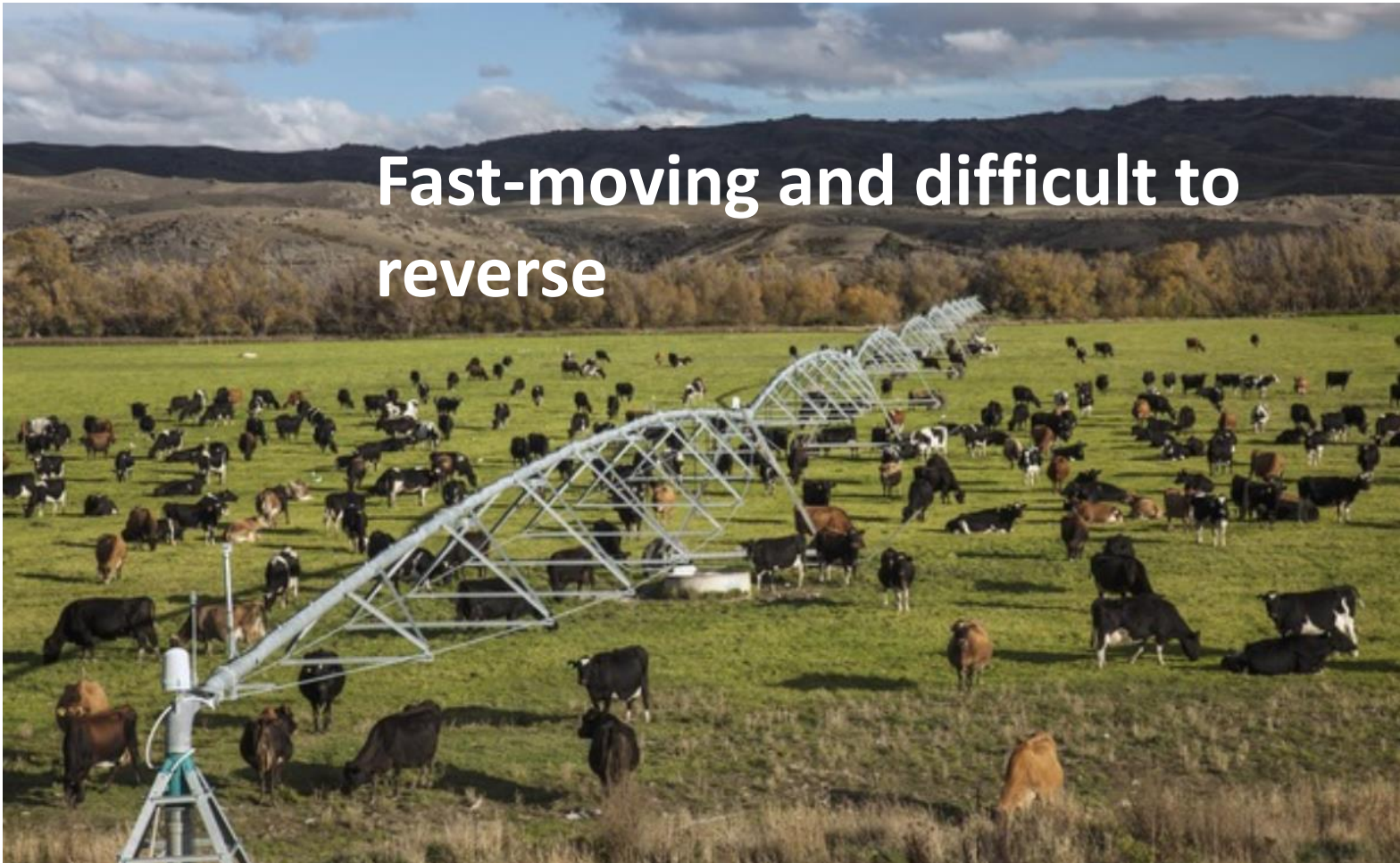
Those that are irreversible
Where there is a prospect of tipping-points

Salmon Lecture 2014

Large scale

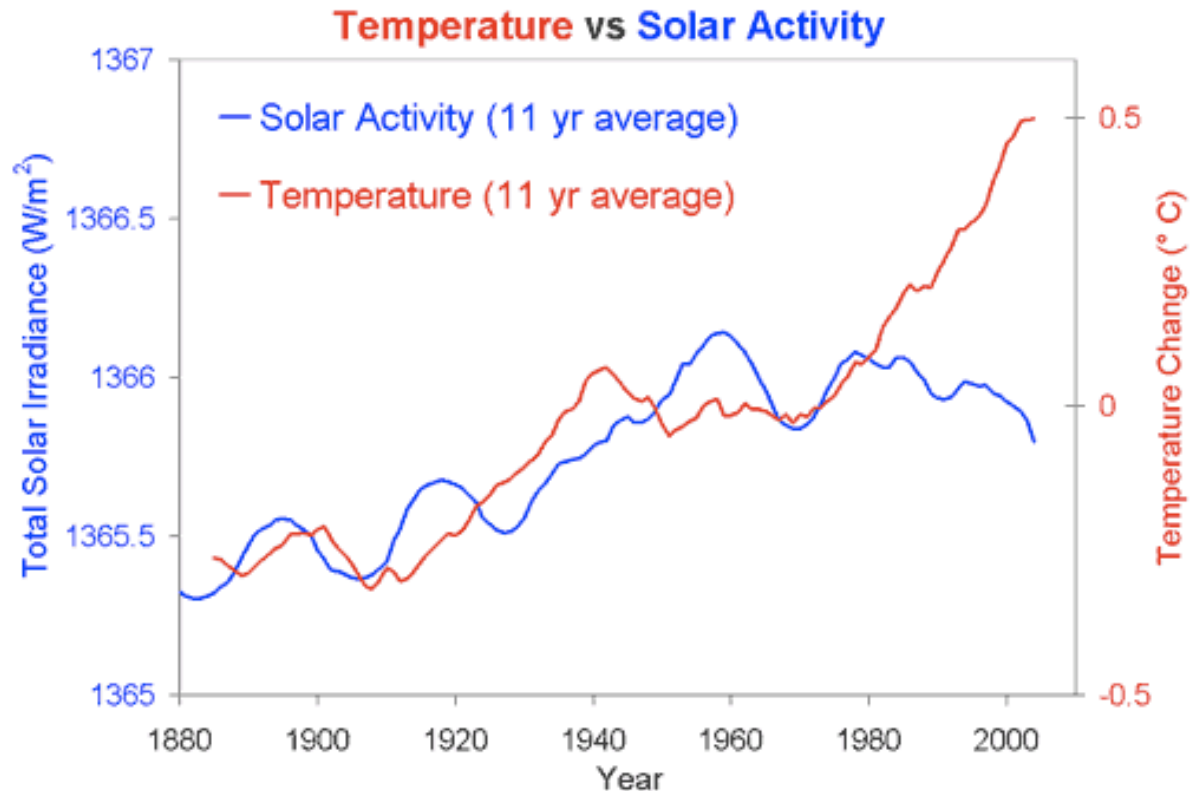


Fast-moving and difficult to reverse



Most rapid increase in levels of greenhouse gases in more than 400,000 years

Fast-moving and difficult to reverse

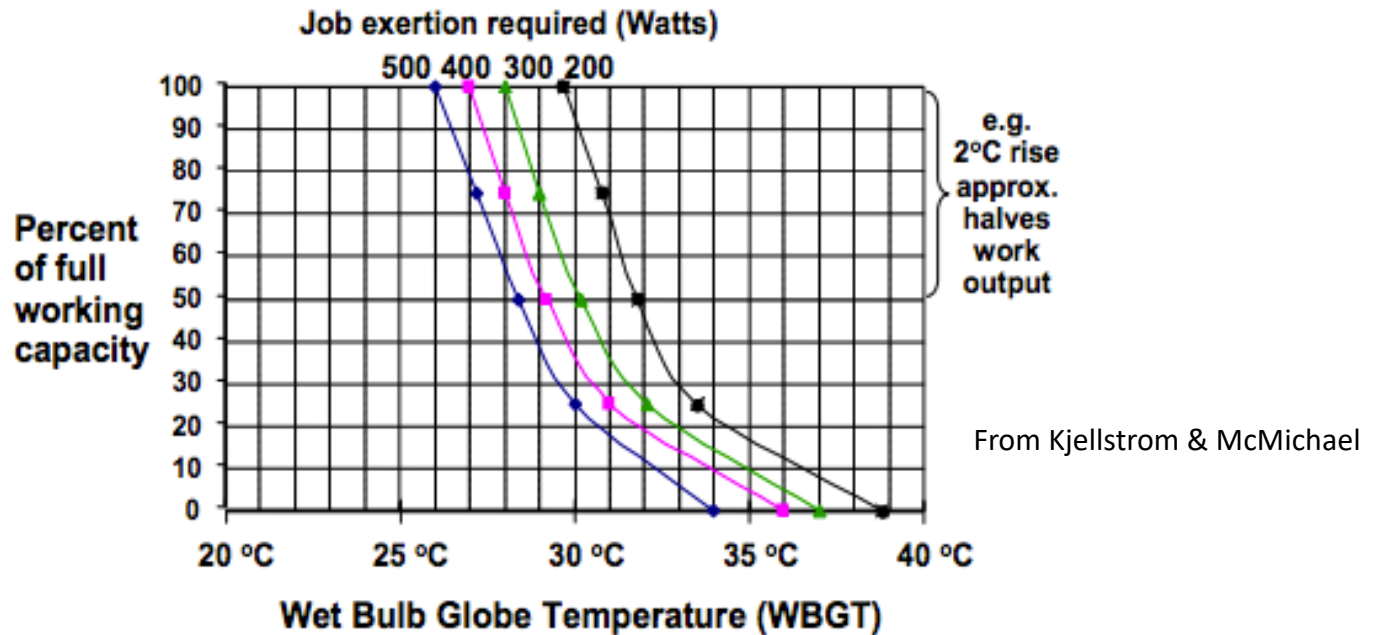


0.2 degrees / decade rise in global temperature is 170x faster than any average rate of increase in the last 7,000 years

Tipping points



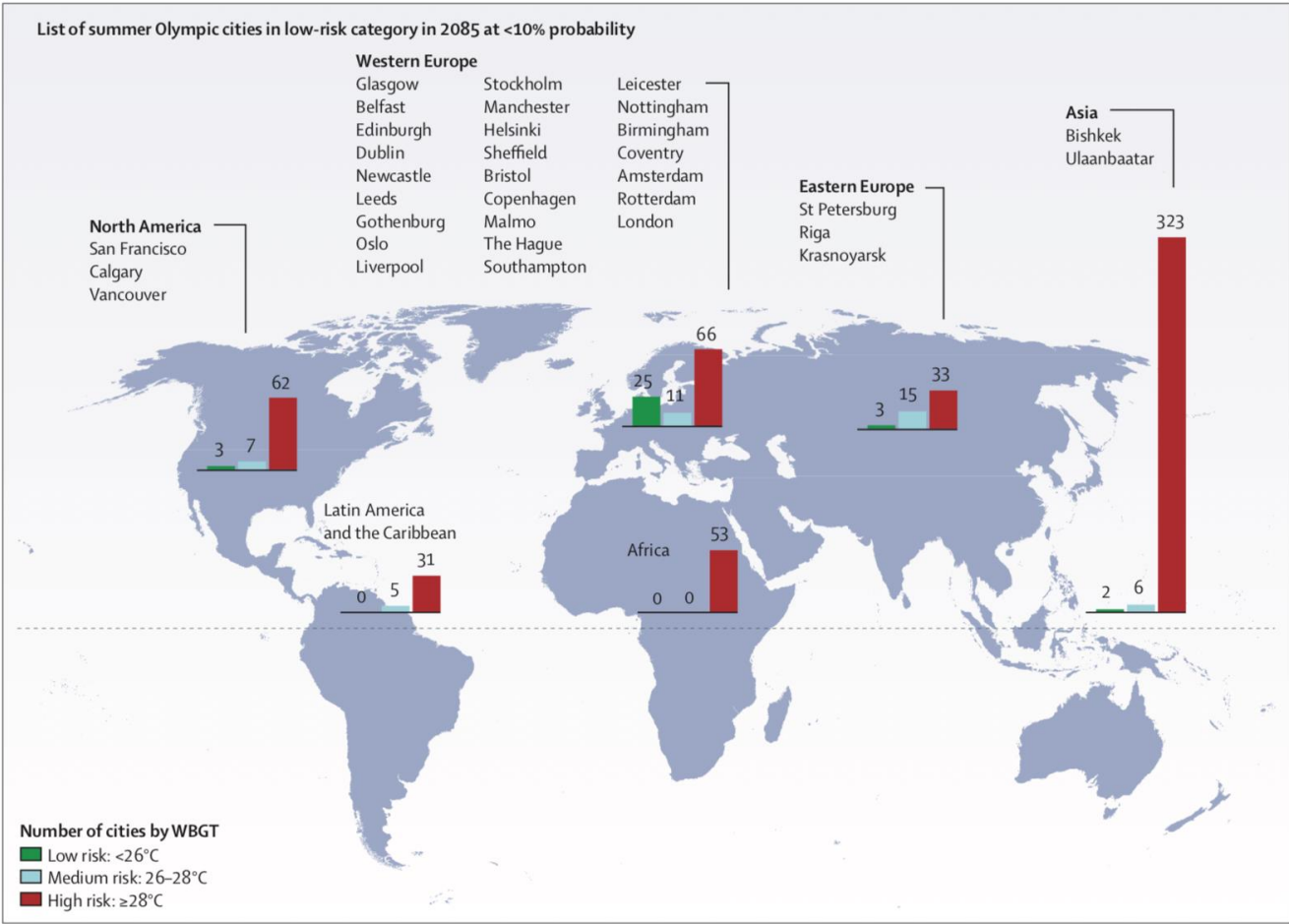
The relation between heat and work – a function of ideal human physiology and a pointer to fundamental temperature thresholds



Based on ISO Standard for Heat Stress in the Workplace (1989)

Wet Bulb Globe Temperature – a measure of heat stress that is sensitive to air temperature, radiant temperature, humidity and wind velocity

Where will the last Summer Olympics be held?



Smith et al 2016

Belfast or Glasgow



How climate and climate change affect health

- Direct effects
- Impacts mediated by natural systems
- The results of social disruption
- Transition risks



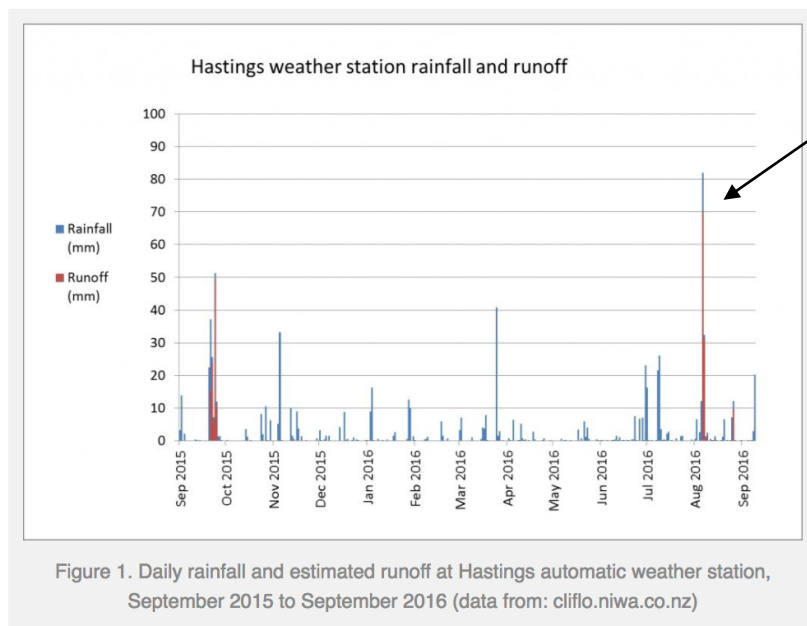
Low emissions scenario

SLR	Auckland
0cm	Every 100 years
10cm	Every 35 years
20cm	Every 12 years
30cm	Every 4 years
40cm	Every 2 years
50cm	Every 6 months
60cm	Every 2 months
70cm	Every month
80cm	Every week
90cm	Twice a week
100cm	Every day

Frequency of present 1 in 100 year coastal flooding increases in Auckland by almost an order of magnitude every 20 cm Sea Level Rise

High emissions scenario

New Zealand's largest outbreak of water-borne disease preceded by heaviest daily rainfall in more than 10 years



Havelock North – more than 5000 people ill due to *Campylobacter* in the town water supply

4 fold increase in extreme precipitation projected in most parts of NZ by 2050

<https://blogs.otago.ac.nz/pubhealthexpert/2016/09/26/note-to-the-havelock-north-inquiry-think-big/>

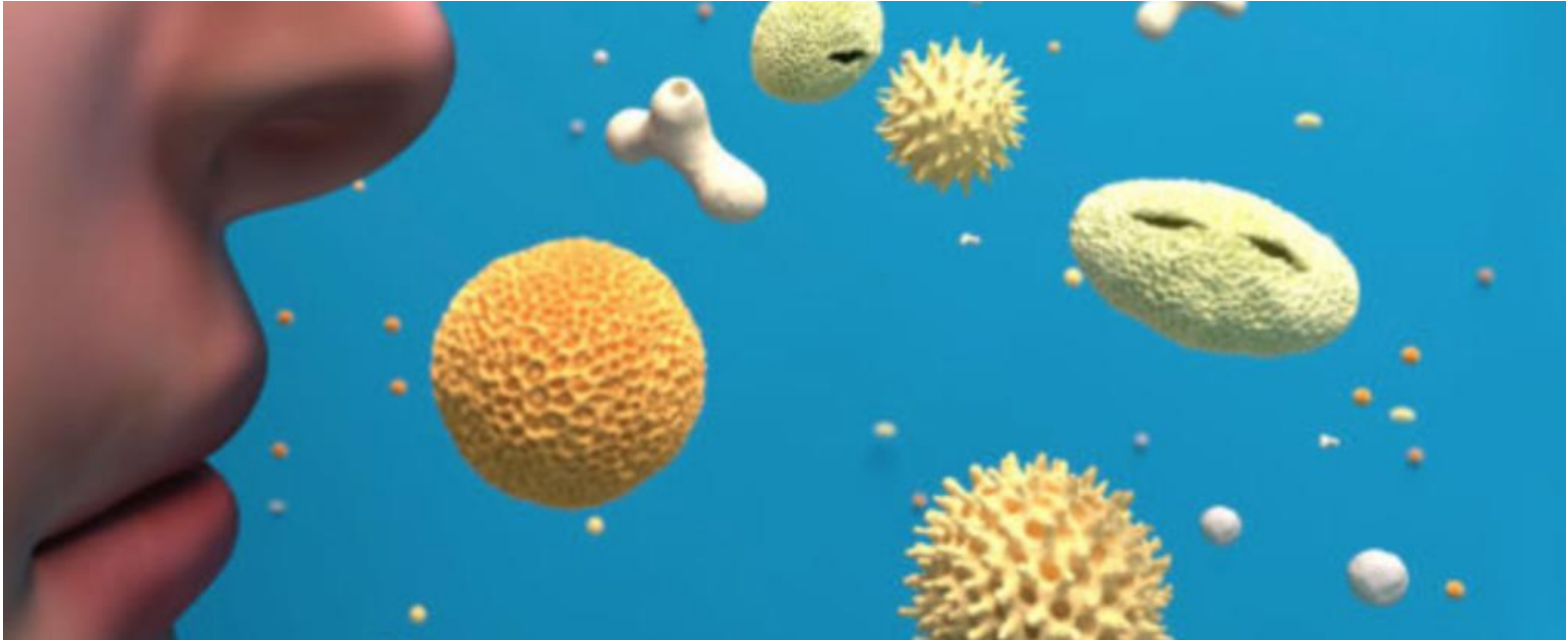
Which city is finding it more difficult to control dengue?



<https://www.startupbootcamp.org/events/fintech-hong-kong-pitch-day-2440/>



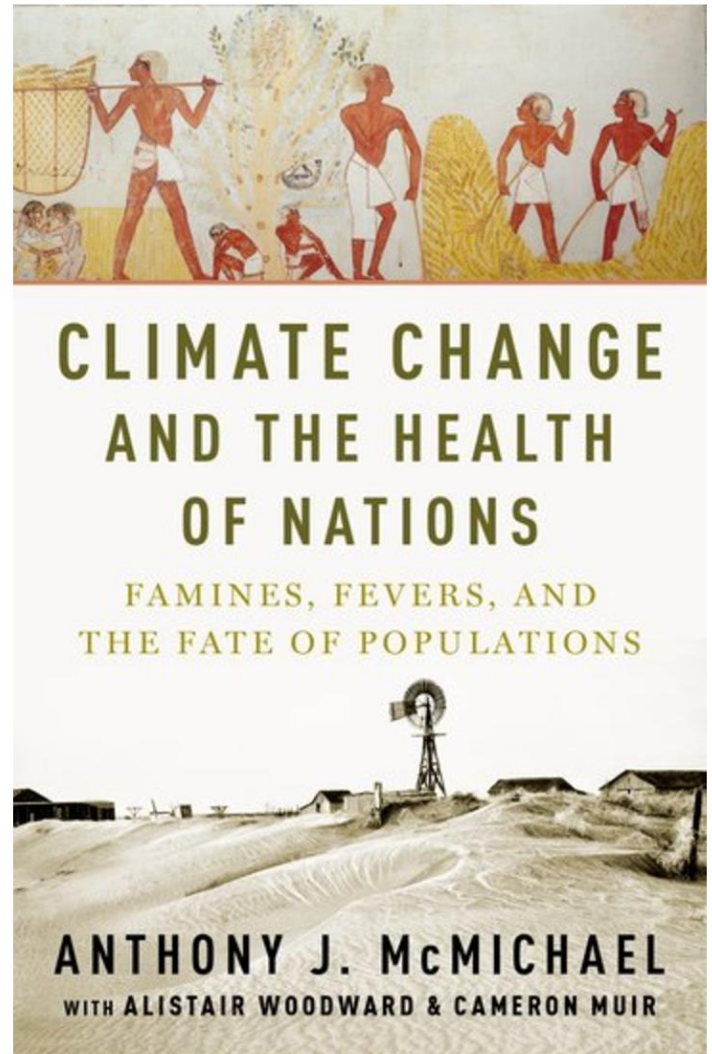
<https://vinepair.com/wp-content/uploads/2016/01/singapore-header.jpg>



CO₂ enrichment, longer growing seasons, increased allergic potential – projected 8 fold increase in birch pollens in New Zealand by 2100

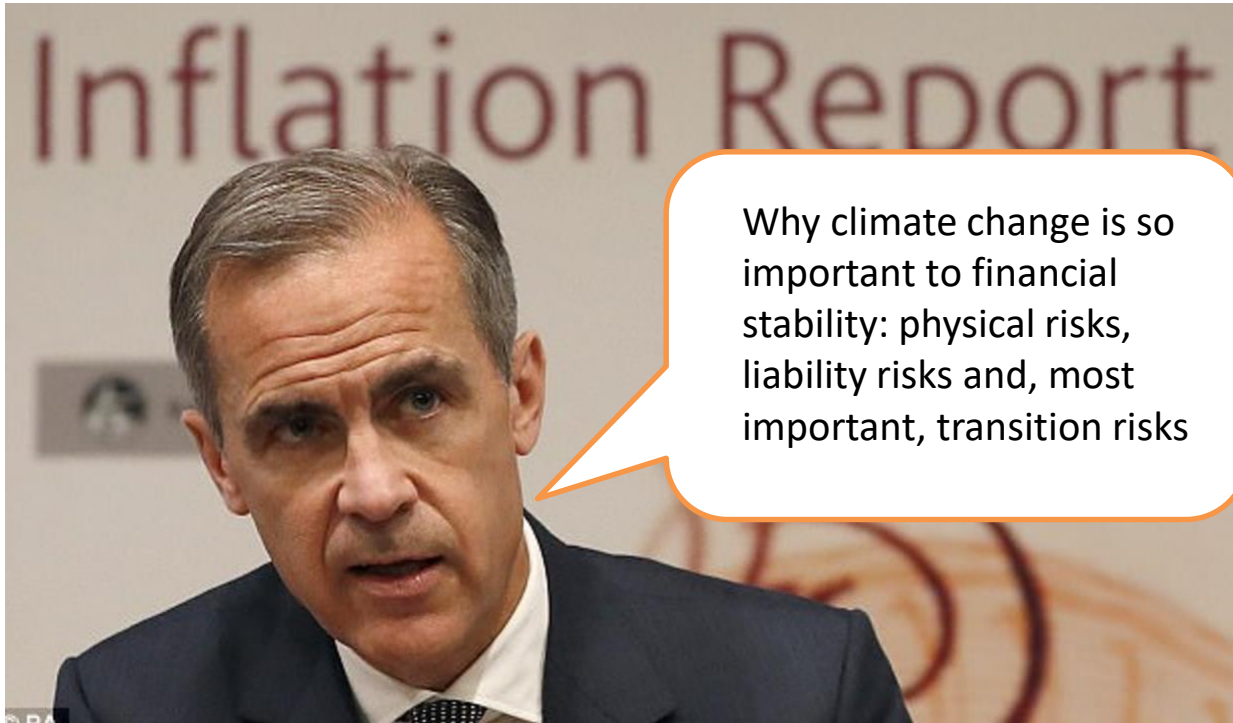
RSNZ 2017

“The past 10,000 years should have taught us two things: when climate changes, people move, and when states can’t feed their people, they fall”



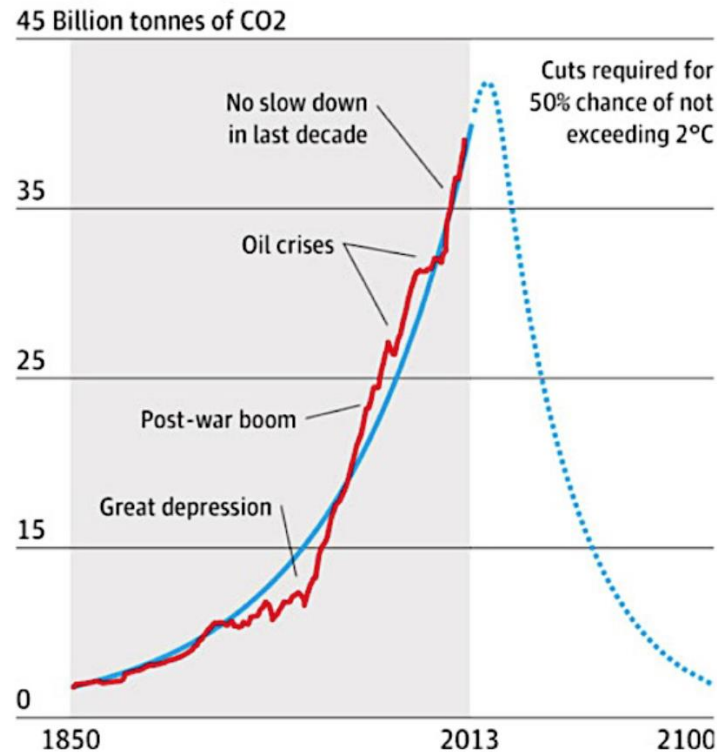


From The Guardian and IPCC AR3



Mark Carney, Governor of the Bank of England

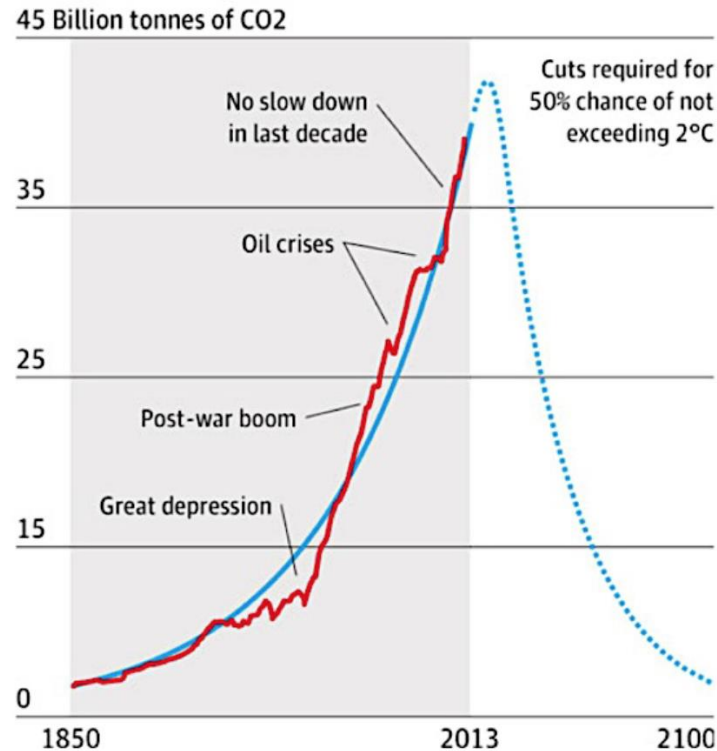
An effective response to climate change will require radical changes



\$200 a ton of Carbon would impose a cost on the UK National Health Service equivalent to about 20% of its total spend on medicines

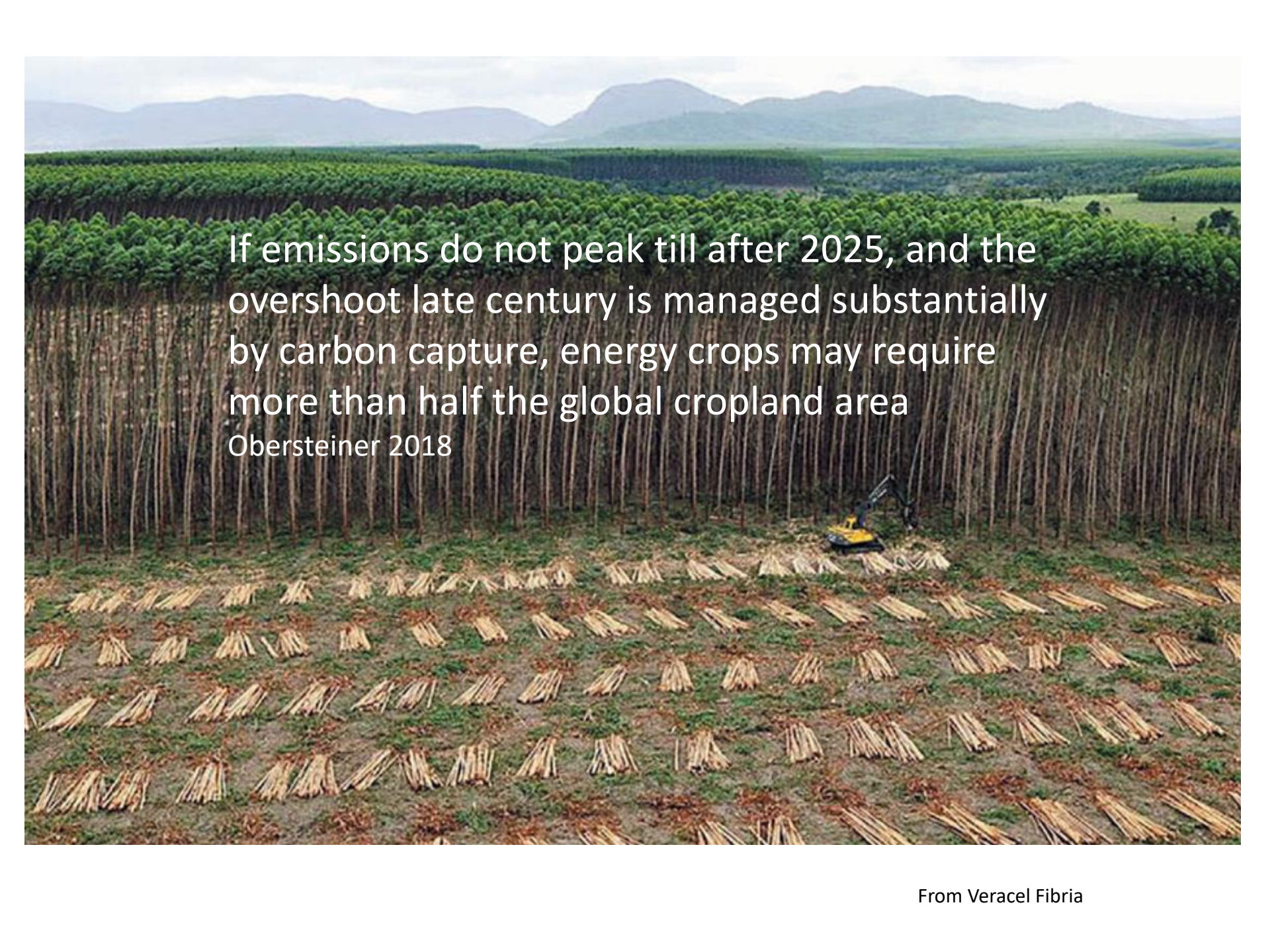
<http://www.theguardian.com/environment/2013/apr/17/why-cant-we-give-up-fossil-fuels>

An effective response to climate change will require radical changes



If the emissions peak is delayed, the Paris target will not be achieved without extreme deployment of negative emission technologies late this century.

<http://www.theguardian.com/environment/2013/apr/17/why-cant-we-give-up-fossil-fuels>

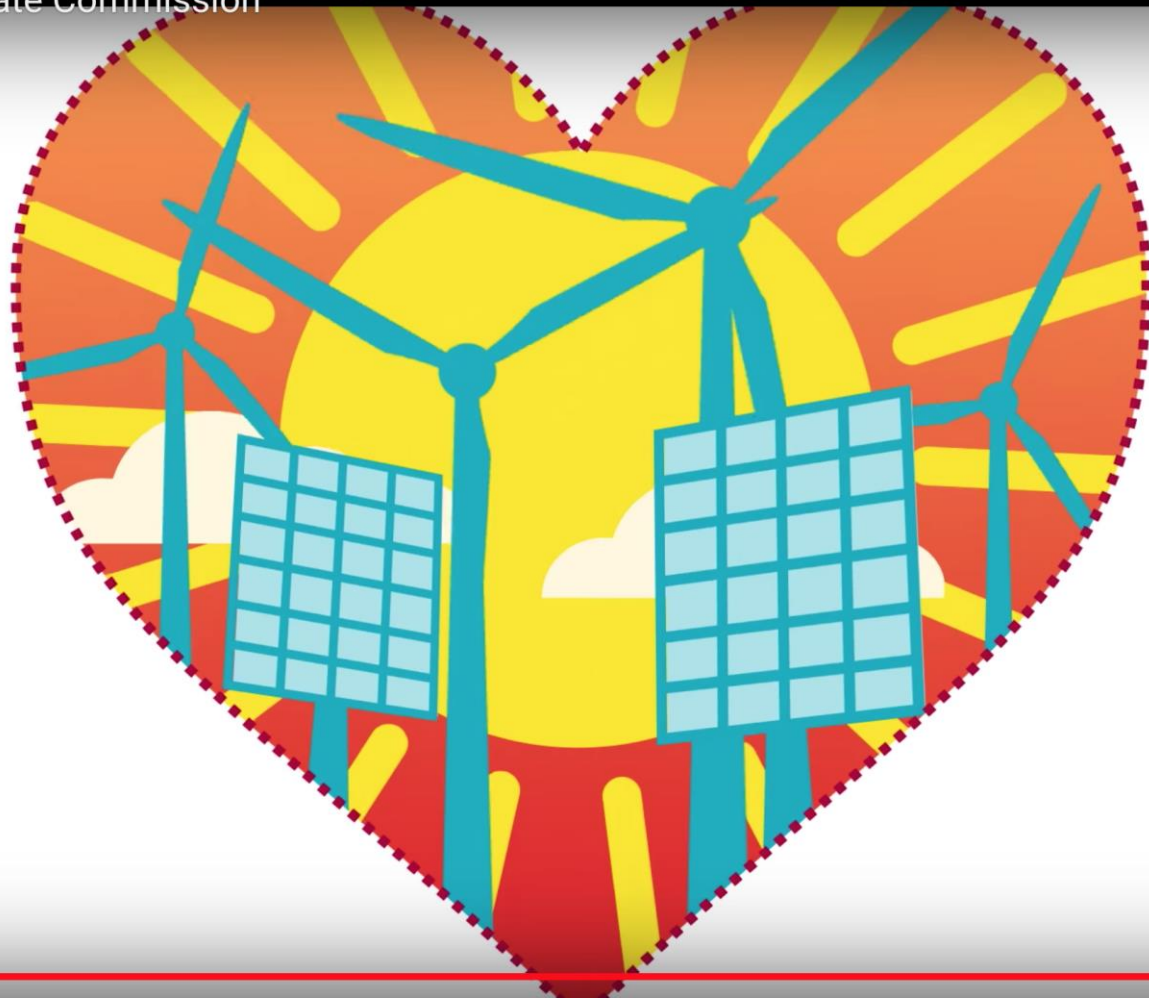
An aerial photograph of a vast eucalyptus plantation. The trees are arranged in neat, parallel rows that stretch across the landscape. In the foreground, a yellow excavator is positioned among the trees, and numerous bundles of harvested eucalyptus logs are laid out on the ground. The background features a range of green mountains under a cloudy sky.

If emissions do not peak till after 2025, and the overshoot late century is managed substantially by carbon capture, energy crops may require more than half the global cropland area
Obersteiner 2018



The central finding from the Commission's work is that tackling climate change could be the greatest global health **opportunity** of the 21st century.

The Lancet Climate Commission



MORE VIDEOS



Community trials of insulation and clean heating – higher temperatures, lower disease rates, lower power consumption

Howden-Chapman et al, 2007

Multiple satisfier?

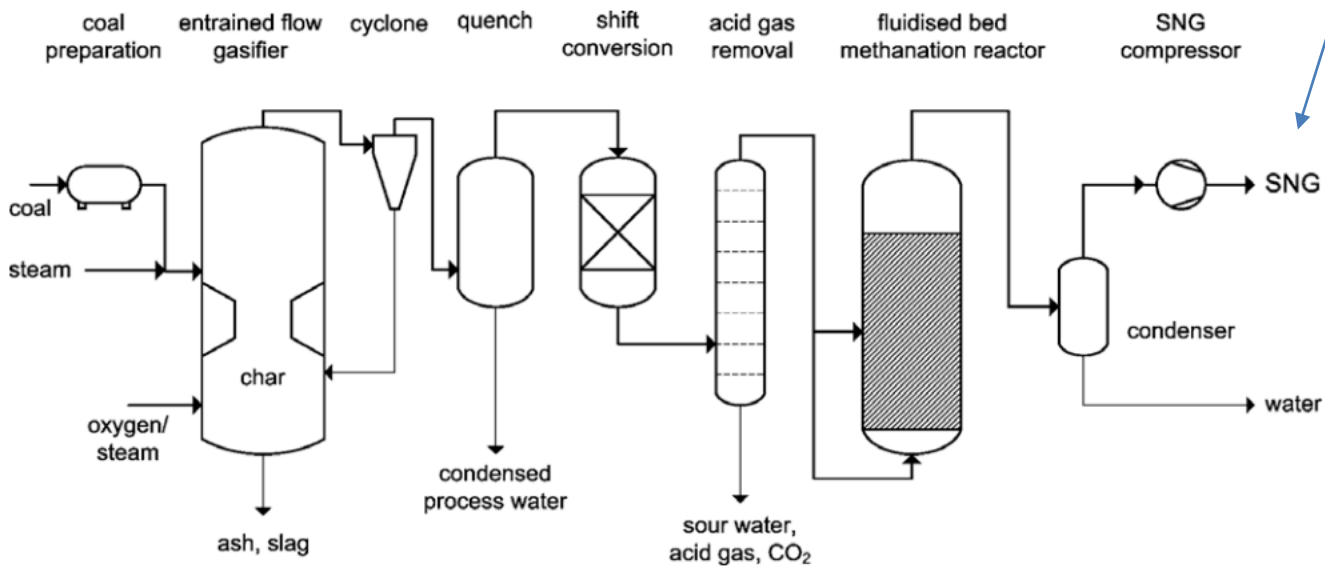


Health, mobility, efficiency,
emission reduction

A caution

- Climate agenda and health agenda may align, but they may not
- Co-benefits may spur climate action, or not
- Frequently the focus is on incremental change: this may not be enough

Fewer deaths from local air pollution



Coal-based synthetic natural gas

But more CO₂ emitted per kWh

Electric cars may be an energy solution; they are not a transport solution; and the health gains are slight



Really?

The healthy option!

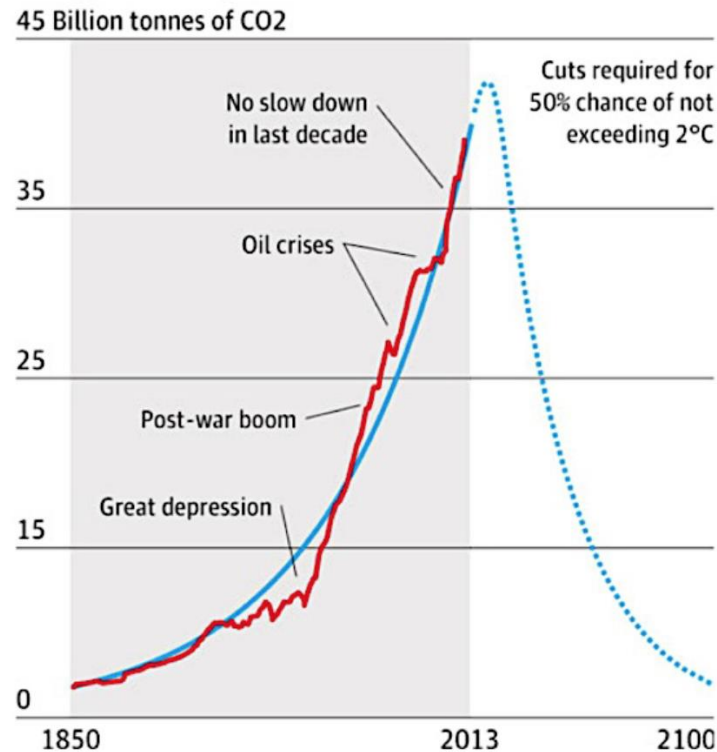
What about electric buses, trucks and bicycles?

Co-benefits may spur climate action, but they may not



“Southern Ward residents had the cycleway forced on them. I talk about it being done with the delicacy of the Soviet occupation of Berlin after 1940”
Nicola Young. Local resident

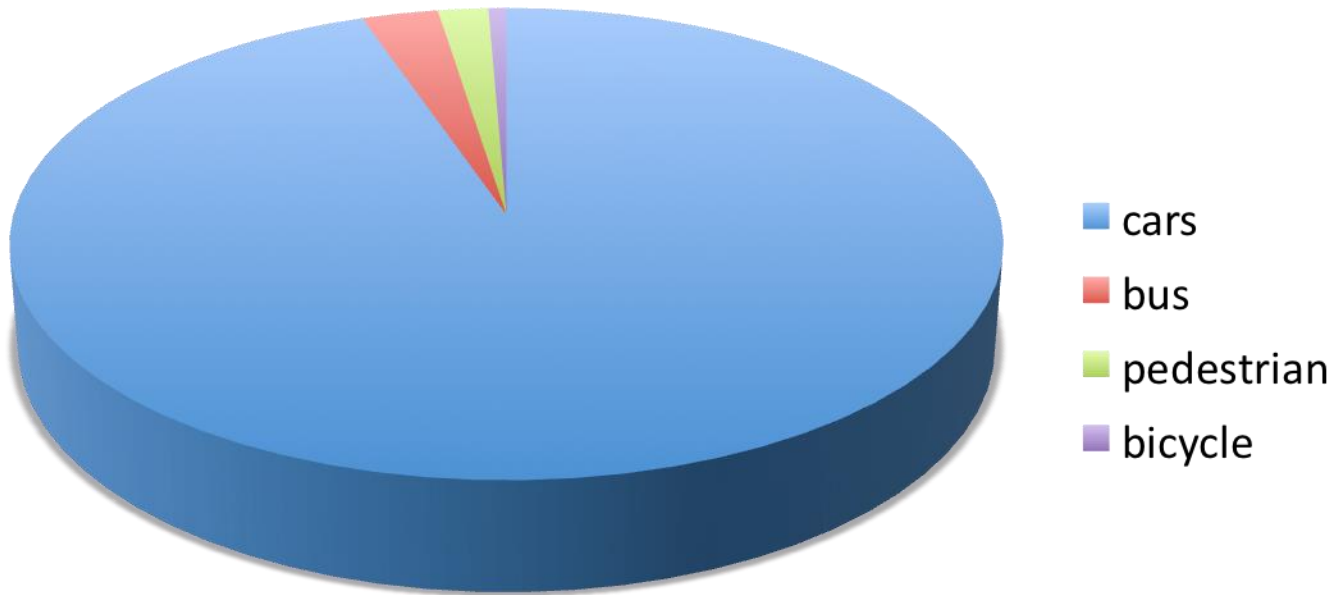
An effective response to climate change will require **radical** changes



<http://www.theguardian.com/environment/2013/apr/17/why-cant-we-give-up-fossil-fuels>

kilometres

A ten-fold increase in bicycle mode share would cut road transport greenhouse emissions by about 3%



How New Zealanders travel – distance, by mode, for road transport 2008-2009.

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Conclusions

- Lessons from the history of environmental health
- Importance of
 - Central direction
 - Local agency
 - Accountability
- Prospects

Nations Unies
Conférence sur les Changements Climatiques 2
COP21/CMP11
Paris, France



First-ever consensus
Model of
environmental
diplomacy
Solid science basis

But

Non-binding
Insufficient



McKinsey Center
for Business
and Environment

C4O
CITIES

Focused acceleration:

A strategic approach to climate
action in cities to 2030

NOVEMBER 2017

OraTaiao : New Zealand Climate & Health Council

Healthy Climate, Healthy People

We are health professionals calling for urgent and fair climate action - with real health gains now and for our future



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