# Climate Change for Planners

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## Introduction

Arguably one of the greatest challenges facing planners in the 21st century is the task to address the multi-level effects of continuing climate change. I say 'continuing' because climate is a pattern of climatic conditions (wind, rainfall, sunshine and temperature) that vary from year to year, and that what is defined as climate is never stable but merely a trend. The current trend being experienced locally and globally is for rising average annual temperatures with consequential impacts on rain and snowfall, wind, and extreme weather events across the globe.

## Understanding climate science

Planners need to understand the basic mechanism behind global climate change trends and the differential impacts in their region. The global greenhouse gas effect comes from the increased rate of greenhouse gases emissions (CO2, methane, ozone, CFCs) and water vapour to the atmosphere, and in the case of carbon dioxide, also absorbed by the oceans. There is an extremely strong correlation between the levels of carbon dioxide in the atmosphere and the rise in average global temperatures. There appears to be little correlation at present between sunspot activity, solar irradiance and global warming. This is the alternative explanation put forward by climate science skeptics for global warming.

Arguments put forward by climate scientists from the expert groups of the IPCC (International Panel on Climate Change) suggest that global warming in the 20th century is largely human induced. They claim this because of two important findings.

- The rapidity and direction of the change beyond any possible additional effects from natural "forcings"(from solar irradiance and/or volcanic eruptions)
- The ratio of carbon dioxide to oxygen in the atmosphere has also rapidly changed in the oil era due to combustion.

The IPCC 2007 assessment report (Dorfmann 2008; pp17) summarises the many climate science research findings thus:

> Most of the observed increases in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (man-made) GHG (greenhouse gases) concentration. … The observed widespread warming of the atmosphere and ocean, together with ice mass loss support the conclusion that it is *extremely unlikely* that global climate change of the past 50 years can be explained without external forcing (i.e. actions that drive the system from outside) and *very likely* that it **is not due to known natural causes alone** (emphasis added).

These combustion products of fossil fuel use (coal, gas, oil) are characteristic of our increasing intensive and industrialised way of life. There has also been widespread and ongoing deforestation in the tropic zones removing stored carbon since 1950.

The impacts of global warming are not uniform over the globe – they appear to be stronger in the polar regions and so far in the northern hemisphere. Symptoms of global warming are: periodic droughts as well as patterns of increased rainfall; stronger winds due to the pressure differential between high and low air pressure cells; warmer oceans thus increasing evaporation and consequent precipitation over adjacent coastal areas; and, the reduced ability of deep ocean water to store dissolved carbon dioxide. In the Polar Regions, global warming has resulted in ice cap and shelf thinning, larger ice-free areas in the Arctic Ocean and the breakaway of very large ice shelves – such as the Larsen B ice-shelf in 2006 –in the Antarctic Peninsula area (Exford 2006). Sea level rise appears to be moderate so far (3mm

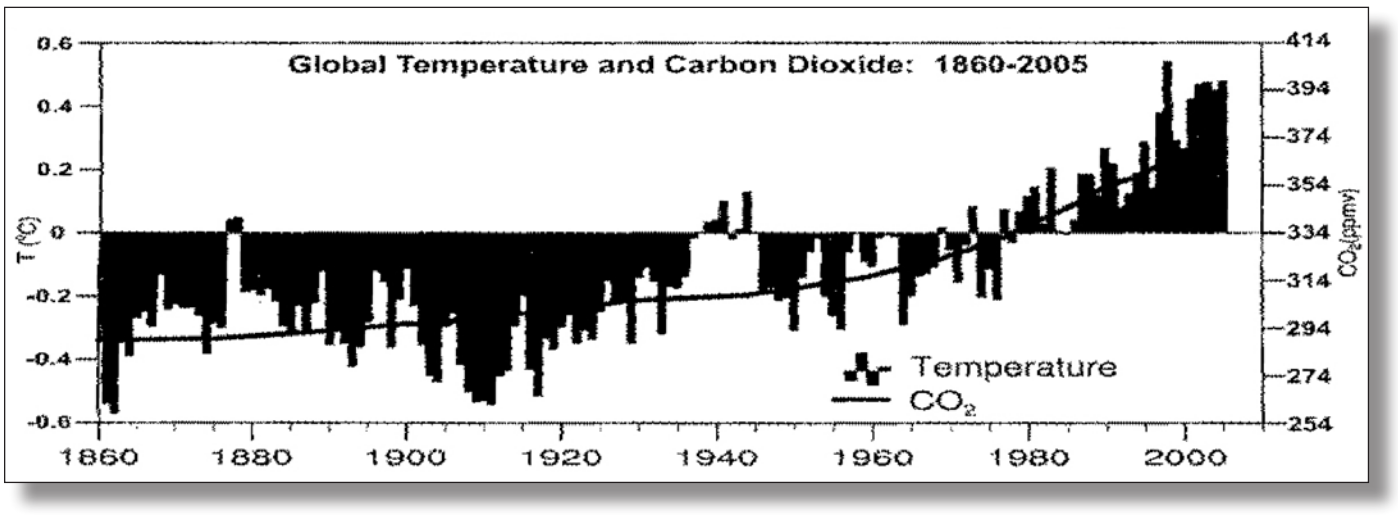


*Figure 1. Global Temperature and Carbon Dioxide: 1850-2005. Source: Karl and Trenberth, 2003*

per year) but is predicted to rise from between 1.5 to 3 metres over current levels in many coastal areas in the next 100 years.

In temperate climates like New Zealand, global warming effects will be mainly shown as increased rainfall in the north and west, and periodic drought in the east. The *IPCC Fourth Assessment Report* states it is virtually certain that New Zealand's climate "will be warmer (99% probability), with noticeable changes in extreme weather events" (Dorfman 2008; pp169). The DTR (diurnial temperature range or day/night differential) may well decrease as well as the total numbers of frost days. Monthly temperature means will also increase and many plant species may react by earlier flowering. Plant and insect pests may increase as conditions become more to their liking. Other plants that have adapted to narrow temperature or moisture regimes may become stressed or disappear. Extreme storm events (floods, tornados, high winds) may also become more frequent. Areas with coastal erosion such as North Canterbury may be at increased risk of storm surges and coastal inundation.

## Planning for these potential effects

It has been suggested that planning for the range of expected effects of climate change should move from a case by case assessment of each effect and its amelioration, and more towards an overall risk reduction strategy. This would encompass:

- Awareness raising
- Education of various sectors (government, non-government, business and community)
- Resilience planning and civil disaster preparedness
- Mitigation through carbon storage strategies where necessary
- Tackling the drivers of greenhouse gas emissions, especially transport
- Collaborative partnerships, and political will
- Climate justice issues

Planners will be at the forefront of all of these initiatives and will need to work closely with climate scientists, water and biodiversity scientists, transport agencies, and health providers to name but a few. Tangata whenua, community organisations and the public also should be involved in local and regional planning strategies at the scoping, planning consultation and strategic plan implementation phases.

## Use of Planning Instruments

Planners have a range of planning instruments available to them. Unfortunately there is not any central government guidance in the form of a National Policy Statement on Climate Change, nor any overall standards as to greenhouse emission targets for regions. There is a national greenhouse gas target set as a legally binding agreement under the Kyoto Protocol that requires a reduction to 1990 levels but this has never been met and is unlikely to be met under the proposed Emissions Trading Scheme (ETS).

There is a policy guidance document issued by the Ministry for the Environment (July 2008) *Preparing for Climate Change: a guide for local government* that relates to the new matters inserted into Part II – a new s7(i) – of the principal Resource Management Act 1991, by the Resource Management (Energy and Climate Change) Amendment Act 2004. The three new matters in this Amendment require that particular regard be given to:

(ba) - The efficiency of the end use of energy;
(i) - The effects of climate change; and
(j) - The benefits to be derived from the use and devel opment of renewable energy.

This can be achieved by requiring these matters be taken into account in decision-making on individual resource consent matters and on matters such as designations for infrastructure development. Climate change effects can also be considered proactively in Territorial Authorities' policies and plans as they come up for review. Under the hierarchy of planning instruments, Regional Policy Statements (RPS) and Regional Plans should address the effects of climate change and measures to avoid, remedy or mitigate those effects. The suite of Regional Plans that should consider and incorporate these long-term effects include:

- Water Resource Plans dealing with the availability of water and its many values and uses
- Coastal Management Plans – especially development in the coastal management zone
- Land Management Plans – dealing with the potential of soil erosion, land slips as well as strategies to address the effects of land activities on scarce water resources
- Biodiversity Plans and Strategies
- Bio-security Plans dealing with the continuing threats from invasive weeds and pests from warmer climates
- Regional Transport Management Plans – especially those relating to the adaptation of infrastructure to disruption, and reorientation to more sustainable transport modes
- Regional Waste Management Strategies – dealing with issues such as production and use of landfill gases, and transport and disposal of waste

Many local authorities have also chosen to assess climate change effects on their region or district and outline a set of actions that can be taken, outside of the regulatory environment. The Christchurch City Council's recently adopted Climate Smart Strategy is one such strategy that focuses on meeting three interlinked goals (CCC 2010).

These are:

**Goal 1:** Understanding the effects of climate change
**Goal 2:** Providing leadership in addressing climate change
**Goal 3:** Understanding and responding to the opportunities and challenges presented by climate change in ways that promote social, cultural, environmental and economic well-being and resilience

It is significant that this well analysed strategy was compiled by an interdisciplinary working party comprised of both Council staff and community members, and will be incorporated into the relevant Long Term Council Community Plans (LTCCP) over the next 15 years. This illustrates that actions to meet expected climate change impacts will need to be addressed under the Resource Management Act 1991 for land and resource development issues, and the Local Government Act 2002 for issues relating to long term community outcomes and wellbeing.

## Best Practice

A number of Councils have led the way in considering climate change effects and potential actions that they can take. These include:

Kapiti District Council – identified climate change as a significant issue for its district in 2004 and commissioned an update report after the 2007 IPCC Fourth Assessment Report. It identified significant potential effects on coastal development, and increases in stormwater infrastructure costs and for methods to assist the community to adapt by reductions in greenhouse gas emissions.

Greater Wellington Regional Council – joined 'Cities for Climate Change' in 2007; promulgated traffic demand management plans to reduce transport related emissions, coordinated community planting days, invested in flood protection and promoted wind farms.

Bay of Plenty Regional Council – identified significant economic effects on farming and horticulture; identified coastal inundation as a significant effect on coastal development, promoted dune restoration and called for a collaborative effort for proactive change management, as opposed to crisis management.

Other councils have fallen behind – possibly because of a lack of expertise or a lack of specific knowledge on how climate change may affect their region. For example, the West Coast Regional Council's opinion is that:

> Although there is little it can do to reduce global emissions of greenhouse gases, the Regional Council is obliged to support the directions of central government. These include reducing greenhouse gas emissions from the West Coast by performance standards on relevant resource consents. If the evidence for possible sea level rise becomes conclusive, methods of limiting development in areas vulnerable to coastal hazards will be implemented through regional rules. [*West Coast Regional Policy Statement 2000*, reviewed in March 2005.]

In their recent LTCCP released in 2009, climate change is addressed in the following manner:

> The Ministry for the Environment's report: *Preparing for Climate Change: A guide for local government in New Zealand* (2008) predicts that changes in temperature and rainfall, along with other climate changes, are likely to lead to positive and negative impacts across the country over the next 30-80 years. It is uncertain exactly what climate change will mean for the West Coast. Scientific modelling suggests that it could potentially mean, amongst other things, more severe and frequent rainfall events, floods, and landslides. There is considerable uncertainty about the actual effects of climate change over the life of this ten year LTCCP. The effects are likely to be over a longer time frame. At this stage we consider there is insufficient justification to allocate large amounts of funds to climate change adaptation or mitigation projects in this LTCCP. Council will take a watching brief on climate change information and any trends and impacts that are identified. We will also take a flexible approach if any assessment of climate change effects shows that action needs to be taken in response to changes over time. Section 7 of the Resource Management Act 1991 requires local authorities to have particular regard to the effects of climate change. This will be considered, along with other matters, in policy and plan development and review, when planning, or preparing mitigation for flood hazards and also when processing resource consents. Council has the view that coastline changes due to climate change are a national issue rather than a region by region issue as the sea level rise occurs uniformly across all of NZ.
>
> The question of what trigger level causes us to begin to address adaptation to sea level rise is an issue that should properly be addressed by the Government in a National Guideline document (WCRC 2009; pp23).

This attitude suggests that the West Coast Regional Council is unlikely to prepare adequately for issues such as natural hazards and civil defence, or to take a precautionary outlook in identifying a range of actions that it can take over the short to medium term to mitigate or avoid climate change impacts on the West Coast.

This range of Council responses suggest that each Council needs to identify the significant issues together with its communities and tangata whenua, (who now have special responsibilities under the proposed seabed and foreshore agreement), to plan for and meet the multi-dimensional challenges of climate change impacts.

## Climate Change Justice

An emerging issue for climate change planners is that of environmental justice. It is the developed world's compounding use of fossil fuels plus the deforestation of tropical forests that has brought about the consequent rises in greenhouse gas concentrations. A number of small island nations, such as Tuvalu and Kiribati are beginning to face the prospect of becoming environmental refugees from their overcrowded and inundated lands as sea levels rise and storm surges destroy their crops and

fresh water resources. Their plea to the countries attending the recent Copenhagen Conference on Climate Change 2009 was outlined in the earlier 2008 Niue Declaration. They asked for "resolute and concerted international effort, stressing the need for urgent action by the world's major greenhouse gas emitting countries to set targets and make commitments to significantly reduce their emissions, and to support the most vulnerable countries to adapt to and address the impacts of climate change". New Zealand has a special responsibility through historical, political and cultural ties to many island nations in the South Pacific. Planners have also played a part in New Zealand's aid and development efforts in the South Pacific, in helping to increase the capacity of island nations to react to extreme climate events (see photo).

Climate equity principles as global partners should require that all of us, including planners as interested and involved professionals, take measures to reduce our carbon footprints, both individually and as organisations.

Future generations also require us to be proactive about our present development decisions, as they will continue to be affected by the impacts of climate change long into the future from the lag effects of ocean warming. And although some RMA planning commentators such as Owen McShane (Dom Post 17 March 2005) have downplayed the need to take into account future generations claiming "they can take care of themselves"; equity and possibly some form of future global liability law may make it advisable that planners exercise caution in continuing to promote carbon rich development lifestyles. Planners can certainly play a central role in recommending and planning for reductions in carbon footprints within their organisations, and in reducing their own carbon transport miles.

## Conclusion

Climate Change will be one of the biggest challenges for planners and decision-makers in their communities in future. It will need to be factored into a range of planning instruments as well as signalling significant changes to organisational behaviour. In addition, planners as change agents, have a vital role in informing and educating themselves and communities, and in encouraging community-based responses to reducing greenhouse gas emissions at a household and community level. They can also assist in improving community resilience to severe climatic changes, advocating for greater community capacity to change wasteful carbon habits, and in adapting to potential resource reductions such as in water and fossil fuel availability.

*NZ Defence Force photo post-tsunami in Samoa 1 Oct 2009. Source, www.scoop.co.nz*

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## References


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## Further reading:


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