OUR CHANGING CLIMATE: Is New Zealand Keeping Pace?

This year,* Public Sector *will examine several 'wicked' problems that central and local government, research providers, non-governmental organisations, and communities are working to address. In this issue we look at climate change, which might just be the biggest of all wicked problems with its complexities, interdependencies and uncertainty. SHELLY BISWELL looks at how New Zealand is working to meet its international obligations to reduce greenhouse gas emissions, and how it is creating low-carbon, climate-smart communities.

In December 2015, at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 21) in Paris, an agreement was reached to limit the rise in global temperatures to less than 2°C, with the aim of reducing the temperature goal of 1.5°C above pre-industrial levels. Dubbed the "Paris Moment" by many, New Zealand was one of 195 countries to commit to the accord.

Secretary-General Ban Ki-moon (second left), UNFCCC's Christiana Figueres (left), French Foreign Minister Laurent Fabius and President of the UN Climate Change Conference in Paris (COP 21), and President François Hollande of France (right), celebrate historic adoption of Paris Agreement. UN Photo/Mark Garten.

New Zealand Climate Change Ambassador Jo Tyndall discussed why the COP 21 was so successful at an Institute for Governance and Policy Studies panel discussion in February.

"There were a number of reasons why the 'stars aligned' in 2015. The solid science behind the Intergovernmental Panel on Climate Change's Fifth Assessment Report (AR5) kicked things off. Even more importantly, political momentum grew in the 18 months leading to the Paris meeting. And I couldn't emphasise enough the role of skilled diplomacy on the part of the host country France, both in the lead-up to and during COP 21."

As UN Secretary General Ban Ki-moon describes the agreement, "We have entered a new era of global cooperation on one of the most complex issues ever to confront humanity."

GLOBAL COMMITMENTS

Amongst developed nations, New Zealand has a unique emissions profile. That's in part because we have a higher than average proportion of emissions from the agriculture sector (48.4% of total emissions in 2013). We have made progress in reducing emissions per unit product by approximately 1% per year, but New Zealand's overall emissions related to agriculture have significantly increased since 1990 levels because of the growth of the sector.

Our other sector that has remained high is the energy sector (39.1% of total emissions in 2013). New Zealand has continued to show a persistent reliance on fossil fuels. Although strategies, such as the New Zealand Energy Strategy 2011/21 and the New Zealand Energy Efficiency and Conservation Strategy 2011/16, have been developed to reduce emissions, there is still much work to be done. For example, as noted in *New Zealand's second biennial report under the United Nations Framework Convention on Climate Change (2015)*, "The vehicle recycling rate is slower in New Zealand than many other countries, and fuel efficiency improvements take longer to have an effect in New Zealand relative to other developed countries".

AGRICULTURE SCIENCE

As Dr Harry Clark, Director of the government-funded New Zealand Agricultural Greenhouse Gas Research Centre, explains, New Zealand has invested in a number of ways to mitigate greenhouse gas emissions at both the domestic and international level.

"We have a unique greenhouse gas emissions profile, but as a country we also have a unique – very New Zealand – approach to finding a solution, which includes government, industry and research providers working in partnership," he says.

"This approach has allowed us to coordinate research and build a coherent, results-focused work programme. We've been able to do this, in part, because we're a small country, but also because we are all interested in achieving the same outcomes."

At the international level, New Zealand has played a key role in establishing the Global Research Alliance on Agricultural Greenhouse Gases, and hosting the Secretariat. As part of our commitment to the GRA, in December 2015 the Government pledged an additional $20 million in support to the programme to 2020.

NZAGRC's nitrous oxide programme field experiment involving 18 different plant cultivars confirms that plant genotype can influence emissions.

Due, in part, to our atypical greenhouse gas emissions profile, to meet our international obligations New Zealand has banked on international emissions trading. In fact, in our provisional intended nationally determined contribution (INDC) published in July 2015 it was spelled out that our INDC would remain provisional "pending confirmation of the approaches to be taken in accounting for the land sector, and confirmation of access to carbon markets".

For the medium to longer term, our dependency on carbon markets may make it increasingly difficult to meet our international obligations. As Dr Adrian Macey from the IGPS and former climate change ambassador explains in his informative article on COP 21 in the February 2016 issue of *Policy Quarterly*, "Even with unrestricted access to markets, there is a further risk to New Zealand over the longer term. The Paris Agreement requires that each new INDC be a progression over the previous one. But because international carbon units are not permanent reductions, to the extent that markets are used in New Zealand emissions, each time there is a new target New Zealand will begin with a liability from the previous period(s). This means effectively purchasing more units to get back to square one, until such time as real domestic reductions take place."

A recently published evaluation of the New Zealand Emissions Trading Scheme (NZ ETS) by the Ministry for the Environment (2016) found that the scheme has supported the Government in meeting its international obligations under the Kyoto Protocol. At the same time, the evaluation notes that the NZ ETS appears to have contributed "but only minimally, to changes in behaviour and decisions that have reduced net emissions below business-as-usual levels".

Specifically, the evaluation found "no sector other than forestry made emissions reductions over Kyoto Protocol Commitment Period One (2008–12) that were directly caused by NZ ETS obligations".

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In 2015, the Government began a review of the NZ ETS. Changes made to the NZ ETS following the review may support a reduction in emissions in some sectors, but it may not be wide enough to bring about the far-reaching changes required, for example, the full inclusion of agriculture in the NZ ETS is not within the scope of the review.

Milford Beach, King Tide event on 31 September 2015. Photo: Ben Sheeran, Auckland King Tides Initiative.

That means to make transformational changes will require using additional levers. Central government has a crucial role to play in this, in both bold mitigation strategy and policy development. Industry too has a significant role to play and a commercial imperative to do so. Business leaders appear to be aware of this. As a Business NZ (Major Companies Group) and Sustainable Business Council survey found in November 2015, over half of respondents said "climate was a material issue that warranted a business response".

And while much of local government's work is centred on adapting to climate change, it has an important role to play in developing low-carbon communities, as demonstrated in the *Low Carbon Auckland Plan* and elements of the *Greater Wellington Regional Council Climate Change Strategy*.

ADAPTING TO CHANGE

New Zealand uses a risk-based approach when it comes to preparing for and adapting to the effects of climate change. This approach is spelled out in much of our key legislation and guidance, such as how natural hazards are managed through the Civil Defence Emergency Management Act 2002. While one of the key pieces of legislation for adapting to the consequences of climate change, the Resource Management Act 1991 (RMA), does not explicitly include risk assessment, as part of the recent Resource Legislation Amendment Bill, the Government is proposing to include "management of significant risks from natural hazards".

To assist local government in assessing risk, in June 2015 Local Government New Zealand (LGNZ) and the Government announced an establishment board to investigate options for a local government risk management agency. Working with both local and central government, the board has been asked to identify risk management services that would assist councils and locally owned infrastructure operators. Government officials and local authorities are watching to see what the outcome of this process will be, which may have major implications in how local authorities prepare for and address climate change.

As our knowledge and understanding of certain natural hazards associated with climate change, such as sea-level rise, have grown we are beginning to develop more nuanced approaches to assessing risks. At the 2015 Australasian Coasts and Ports Conference in Auckland, for example, engineers, scientists and planners discussed how changes in coastal hazard lines are used in determining the risks associated with sea-level rise.

Resource management consultant Robin Britton says robust, ongoing public engagement is crucial: "Our national policy directs us to avoid an increase in the risk from coastal hazards, for example, and encourage changes in land use, such as relocating homes or infrastructure, to achieve this. But adaptation approaches through planning or consenting processes are often met with great resistance from property owners, communities and councils."

This challenge is often exacerbated by the difficulty of communicating hazard information and associated risks based on the long timeframes involved.

Dr Rob Bell, Programme Leader for Hazards and Risk at NIWA, has given this issue some thought in terms of adapting to sea-level rise and says there is a need for a "graduated approach". As he said in a recent interview for the New Zealand Coastal Society's *Adapting to the Consequences of Climate Change: Engaging with Communities*, "For a timeframe of 40 to 50 years, most of the effort and

Bucklands Beach, King Tide event on 30 October 2015. Photo: Ben Sheeran, Auckland King Tides Initiative

engagement on getting robust planning controls and non-statutory approaches in place should be focused on the residents who are most likely to be impacted… Then property owners likely to be affected in the longer timeframe (50 to 100+ years) can be put on a 'watching brief' with more flexible planning controls, so they can get the medium-term use out of their assets in the meantime."

The caveat to this approach, Bell says, is that there still needs to be an overarching, long-term adaptation strategy developed for the wider area based on a range of local trigger points (for example, thresholds for sea-level rise, erosion or number of coastal flooding events) with regular monitoring and review to "moderate any further intensification".

ENGAGING WITH COMMUNITIES

Over the past several years a number of local authorities have developed innovative ways to engage with communities about climate change.

Auckland Council's Coastal Management Services Team Manager Paul Klinac says that's because, "it's not enough to show up to a community meeting and put up maps with lines on them to illustrate how sea-level rise might affect an area, for example.

"That style tends to result in community push-back with respect to the process that has been followed, with questions about why the community hasn't been involved or consulted with from the beginning, and ultimately brings into question how decisions are being made."

Instead, local authorities are opting for community engagement that includes transparent processes and several points for decision-making. In addition, initiatives like King Tides Auckland, that encourages people from around the Auckland region to photograph the highest tides (king tides) that occur each year to build a visual record of the effects of sea-level rise, are gaining traction as a way to keep people involved in an ongoing conversation about climate change.

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Another example is an online tool that Waikato Regional Council recently made available that helps people to better understand the potential impacts of projected sea-level rise in Waikato's coastal areas. The aim of the Coastal Inundation Tool is to allow the public to interactively visualise what the coastal fringe may look like with various water level scenarios.

Rick Liefting, Senior Regional Hazards Advisor at WRC says, "We want communities to better understand the implications of projected sea-level rise and what better way than for them to see for themselves. We hope that the tool will spark the discussion on the possible implications and start more constructive dialogue on planning for the future."

An important dimension that needs to be considered in public engagement is Te Ao Māori. As researchers Darren King (NIWA) and Charlotte Severne (formerly of NIWA) and Guy Penny (Housing New Zealand Corporation) wrote in *The climate change matrix facing Māori society* (2010), while Māori are experienced in dealing with climate variability, new strategies may be needed to adjust to climate change. "Māori will do this in different ways, from defining their own aspirations, collaborating and driving new research and strategies, drawing on customary values and knowledge, and participating in discussion and active solutions at all levels from the marae and kura, to regional and national business and political forums."

RESEARCH AND SCIENCE

A key component in mitigating and adapting to climate change is science provision. New Zealand has some of the foremost scientists in the world working on climate change

issues. In addition to climate science, much of that work is being done in the area of agriculture (see box out), and there's also much work being done in the areas of biodiversity, oceanography, biosecurity, natural hazards and energy. Several of the 11 National Science Challenges include some aspect of climate change in their research work programme. The aim of the Deep South NSC, for example, is to enable New Zealanders to adapt, manage risk, and thrive in a changing climate.

According to Professor David Frame, an internationally renowned climate researcher at Victoria University of Wellington and Director of the NIWA-hosted NSC, part of the NSC's work will be to develop an Earth System Model to better predict how the climate will change.

"Research from the Deep South NSC is expected to help New Zealanders to better address challenges and opportunities associated with climate change," he says.

In addition, the Crown research institutes and other research providers undertake a number of mitigation and adaptation projects, and through collaborative efforts like the New Zealand Climate Change Centre, facilitate our understanding of climate change and its impacts and implications.

VUW's New Zealand Climate Change Research Institute, for example, is focused on the connection between climate change science, policy development and decision-making. One project the institute is working on is in collaboration with Deltares, a Netherlands-based applied research institute. Deltares developed a simulation game – the Sustainable Delta Game – for policy-makers to experience making decisions under uncertain and changing conditions. The game helps test the effects of policy options and to develop an adaptive plan using the dynamic adaptive policy planning (DAPP) approach. Using the DAPP approach enables decisions to be made that can be flexible, whatever the future climate. Deltares and CCRI, working with Greater Wellington Regional Council, Wellington City Council, Tasman District Council and Ministry for the Environment, have created two new versions of the game for New Zealand decision settings – a New Zealand river version and a New Zealand coastal version.

Dr Judy Lawrence, CCRI's project leader for the game, says the game and the DAPP approach has already been used to assess policy options for flood management in the CBD section of the Hutt River taking increased frequency and magnitude changes of river flows over 100 years into account.

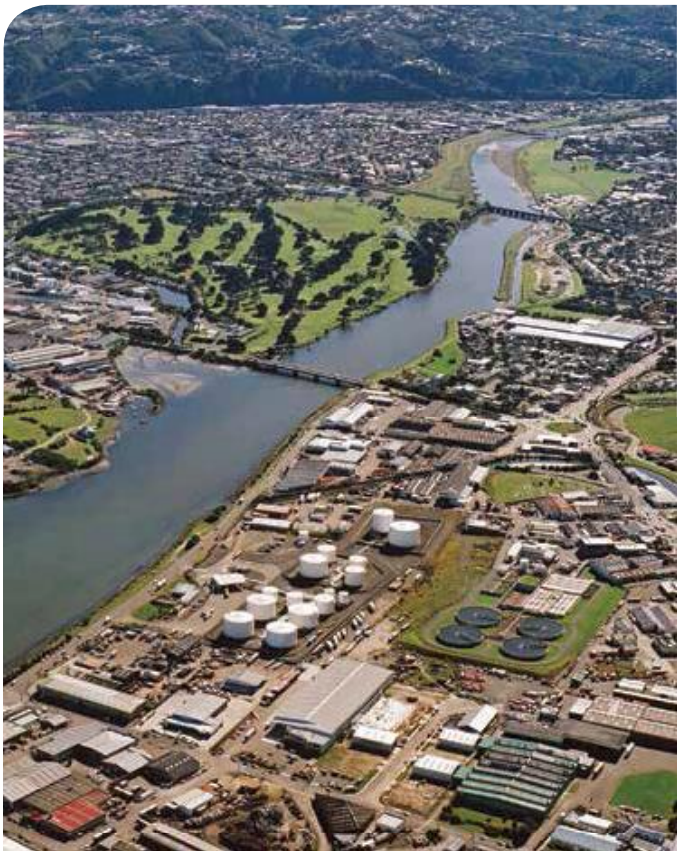
"We've trialled the game with the Ministry for the Environment and the partner local authorities," she says. "We're now planning a wider roll-out of the game this year with local government for application by decision-makers, including as part of public engagement on specific planning issues."

PUTTING IT ALL TOGETHER

To find solutions to move to a low-carbon society and adapt to the consequences of climate change will require a transformation in both how we plan for the future and how we operate today. While our international obligations help set the benchmark for what we need to achieve, to put our intentions into action we need to bring the discussion closer to home. What are our obligations to current and future New Zealanders? New Zealand's biological heritage? Our Pacific neighbours who are on the frontline of dealing with the effects of climate change?

It's a shift in thinking that is already occurring in many quarters. For example, Te Arawa Federation of Māori Authorities hosted the *Climate Change 2016 Conference: Sustainable economic growth that does not cost the earth!* in March. The no-nonsense quote on the conference's marketing materials could be seen as a clarion call for all New Zealanders: "Get your head around climate change, what it is going to mean for New Zealand and your business! 'Don't be a frog in the hot pot.'"

If COP 21 is to be remembered as the 'Paris Moment' for its global cooperation and multilateralism, it means that COP 22, which is scheduled to be held in November, 2016 in Morocco, could become each country's moment of truth.



The Hutt River is subject to a Floodplain Management Plan, an extensive programme of flood protection works to upgrade the flood security for the communities, taking into account climate change.

GOOD NEIGHBOURS – SMALL PACIFIC NATIONS

For many of New Zealand's Pacific neighbours, the effects of climate change are too difficult to ignore – rising sea level, extreme weather events and a rapidly changing marine environment due to warming temperatures and acidification.

During the COP 21 in Paris, Prime Minister John Key announced that over the next four years New Zealand would commit $200 million for climate-related support, with the bulk of that going to help Pacific nations. That follows on from the $65 million already provided to Pacific countries over the past three years to help them move to reliable and clean energy.