

# **CLINZI - Climate's Long-Term Impact on New Zealand Infrastructure**

The New Zealand Centre for Ecological Economics in conjunction with the University of Maryland (USA) conducts research into the interaction between climate change and variability, and people. One of our core projects is CLINZI.

New Zealand infrastructure owners and managers need to consider the impact of climate change on their assets. CLINZI offers a useful tool to assist in this process.

CLINZI aims to:

- ensure all strategic infrastructure systems and services in New Zealand are evaluated for their vulnerability to climate impacts.
- improve the ability of planners to make strategic decisions about infrastructure system investments in the context of climate change risk.

The CLINZI approach tries to be comprehensive in two ways. First, we take a broad perspective of infrastructure systems and services (ISS). That is, we consider not only the 'built' infrastructure like roads and electricity transmission lines, but also the 'soft' institutional infrastructure. Second, the CLINZI project does not consider individual infrastructures in isolation. Rather, we consider the interrelationships between infrastructure systems.

The CLINZI analysis is also pragmatic. It is organized within a risk management framework, and combines risk identification with quantitative modelling (where data is available) and evaluation of institutional policies and strategies. Our quantitative modelling relies on determining the past relationship between infrastructure system operation and climate. We then investigate how this relationship may change under various scenarios of climate change.

The risk analysis process is consistent with the ISO standard for risk analysis and management. In CLINZI, we initially focus on risk identification and risk analysis steps in the process.

The policy analysis process is essentially an audit of the policies and strategies of the infrastructure managing agencies. We review relevant asset management plans and framework documents and evaluate how effectively (if at all) climate change has been factored into these documents.

We have conducted two case studies already: Hamilton city and Wellington city. Our Hamilton study was a pilot study conducted with the support of the Waikato Engineering Lifelines Group. Our Wellington city case study is still underway with Wellington City Council contributing Wellington to this project. This study is more comprehensive than the Hamilton study and has reinforced several important findings:

- Following the Resource Management (Energy and Climate Change) Amendment Act 2004, the issue of climate change is clearly on the policy agenda.
- The issue of climate change is making it into high-level strategy documents.
- However, the translation of many of these strategies into action is lagging, although this is not always the case. Storm water management in Wellington, for example, is currently addressing sea-level changes.
- Managing climate change impacts on infrastructure within a risk management framework is essential because a) the processes is well defined and comprehensive b) the process is well understood by both policy and engineers
- Quantitative modeling for both Hamilton and Wellington suggests that over the medium-long term many infrastructure systems demonstrate greater responsiveness to population changes than to climate change. However, as the risk of extreme climate-event impacts increases, clearly a picture of infrastructure being immune from climate change impacts is imprudent. Future planning decisions must be sensitive to the risk of climate change. In the future, we hope to extend the CLINZI project to other areas of New Zealand.
- Area's where we have identified the greatest potential for climate change impacts include:
  - a) Sea level rise impacting on road, buildings and storm water
  - b) Traffic volumes
  - c) Electricity demand

d) Water quantity and quality (water treatment costs)

e) Potential socio-economic impacts (insurance costs)

- The lack of good time series data has been a limiting factor in these analyses.