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Te Puna Taiao
an environmental impact model for land transport

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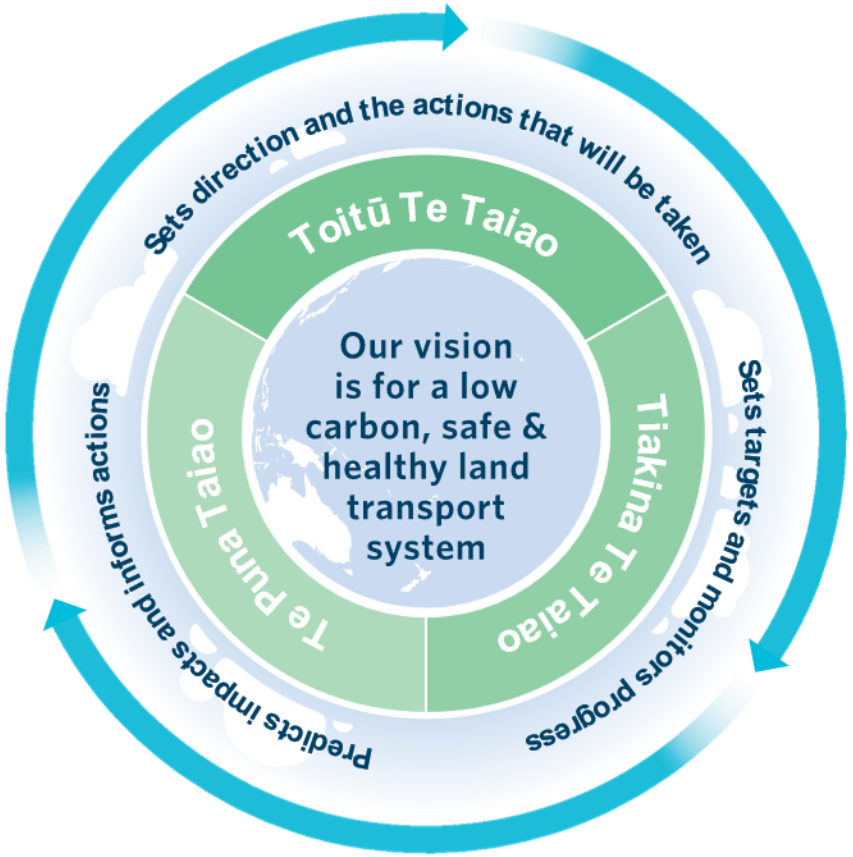
Te Puna Taiao, an environmental impact model for land transport

This project involves development of a macro-level, integrated environmental outcomes modelling tool for Waka Kotahi. It will support our commitment outlined in Toitū Te Taiao to deliver a low-carbon, safe and healthy land transport system.

Te Puna Taiao will assess the likely impact of operational policy, programmes, projects and activities, while recognising and encouraging synergies. It can weigh conflicting interests in order to minimise perverse outcomes and support value for money decision-making.

Tiakina Te Taiao is our plan to monitor and evaluate progress.



Combining models, skills and perspectives in integrating ideas

- Clearly and reliably predicts environmental impacts from a variety of combinations of interventions nationally and regionally
- Robustly analyses trends and models baseline and projections, thus illustrating benefits
- Enables Waka Kotahi and partners to identify the interventions needed to achieve budgets and targets set under the Zero Carbon Act
- Provides assurance that Waka Kotahi's decisions and activities are optimised within given constraints
- Integrates with existing Waka Kotahi tools as well as other relevant national and local government tools
- Establishes a knowledge repository of evidence-based research around land transport's environmental impacts
- Provides Waka Kotahi with options in developing a balanced portfolio of environmental primary and secondary interventions supported by best available evidence.

- The land transport system is complex
- Models vary in technique and results from poor to good
- From informed opinion scenarios to harmonic analysis of systems
- Proposed is an integrated assessment based on quality research in combining modelling approaches and outputs.

Pathway to the proof of concept

Integrated
- The project team brings together a range of subject matter experts
- A combined integrated model choice approach.

Research catalogue and directory
- Developing a directory of current thinking and evidence covering interventions, activities and modelling approaches
- Undertaking a literature review into findings of projects and programmes from grey literature.

Data
- We hear a lot about big data but less on the value of the data that we are collecting
- Identifying the limitations of available data and preparing for modelling.

Limitations
- Models have a use and a purpose in describing and helping us understand complex systems given we cannot observe the future.

Project team

Multidisciplinary approach
- Environment
- Behaviour
- Economics
- Transport systems
- Statistics

and project planning.

Current phase of modelling, module_1

Objective of Module_1

"To inform Waka Kotahi how Arataki levers will enable an effective combination of interventions at what levels in order to significantly reduce Greenhouse Gas (GHG) emissions from the urban land transport system."

Module_2 Inter-regional GHG emissions from land transport
Module_3 Rural communities/towns GHG emissions from land transport.

Te Puna Taiao is being built around a modular approach aligned to the **Avoid-Shift-Improve** framework utilising Arataki levers.

Interventions being treated through their dose response relationship in combination and sequencing.

The first set of modules involve an assessment of GHG reduction given Waka Kotahi ability.

Baseline GHG projection

In support of this will be the baseline modelling, predicting to 2050 incorporating the EV-uptake modelling and further modelling of change over time of any intervention or combination of interventions.

Project VKT … predict EV-uptake … model emissions … in order to calculate GHG emissions

Utilising existing models

- EV-uptake model
- Vehicle fleet emissions model VFEM

These then feed in to the

- Vehicle emissions prediction model VEPM
- Vehicle emissions mapping tool VEMT

This work will also inform the Ministry's transport emission action plan TEAP

Modelling workstream

Baseline

Modular packages

Integrated assessment

A combination of model types

- Econometric models
- Statistical models
- Geospatial models
- Transport system models
- Modelled scenarios

Interventions fall into two distinct groups

Direct: those specifically targeting Toitū Te Taiao outcomes, for example aspects of Keeping Cities Moving

Indirect: interventions whose primary purpose or raison d'être is, for example, road safety, but which also bring measurable benefits to emissions reduction or public health. For example, speed management.

Match an intervention suite to Arataki levers and Waka Kotahi influence

- Policy & regulatory settings
- Spatial & place-based planning
- Network design, management & optimisation
- Investment in infrastructure & services
- Economic tools - pricing & incentives
- Education, engagement & awareness.

A matrix form will likely be required to identify and quantify benefits and trade-offs across interventions and land transport activities.

Combinations require understanding the relationships, the dependency of any set of interventions, their union, dependency or dominance.

Urban form packages: grouping Waka Kotahi led interventions

Mode shift and urban form
- PT infrastructure investment
- Active mode infrastructure investment
- Integrated ticketing
- Invest in low emission public transport vehicles.

Optimisation
- Speed management
- Road space reallocation to low emission vehicles, PT and high occupancy vehicles
- Road space reallocation to active modes.

Create demand for sustainable transport
- Targeted promotion campaigns
- Travel planning: shifting people's enduring behaviour through education
- Promote and influence EV charging network.

Model selection workstream

Proof of concept intervention selection across three packages and the selection of suitable modelling approaches.

Question to be addressed:

"How to value an intervention based on what Waka Kotahi can affect, what scale is that benefit, the operational complexity of implementation and a measure of the time it will take to implement?".

Urban form packages: grouping interventions Waka Kotahi supports

Light vehicle reforms

- Vehicle and fuel efficiency standards to improve the safety and emissions performance of light vehicles entering New Zealand
- Fiscal incentives to support increased uptake of safe and clean vehicles.

Transport pricing

- Pricing package to reduce private vehicle travel demand, optimise freight demand
- That supports a revised revenue model for land transport.

Urban development

- Urban growth requirements to ensure new development and densification supports low carbon, safe and healthy travel.

Research workstream

Effectiveness, dose and response

Co-benefits and dependencies

Waka Kotahi led interventions will benefit from, and to varying extents depend upon, partnering interventions to maximise the benefit of our activities.

Continued focus on development post proof of concept module_1,2,3 …

- **Delivers** on the intent / purpose
- **Embed** in appropriate business processes
- **Owned**, maintained and supported by Waka Kotahi

- **Collaborative** project continues to bringing together a range of subject matter experts
- **Promotes** continued improvement of decision making processes
- **Continued** evidence base review
- **Adapt**, adopt and reflect new interventions.

Continuous improvement

An open transparent tool and robust developing catalogue of evidence.

Developing additional modules to further understand relationships between different environmental harms and impacts of the land transport system on people, place and planet.

Thank you

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