Transforming our transport system: Thinking big in the 21st century

Caroline Shaw

Department of Public Health

University of Otago Wellington

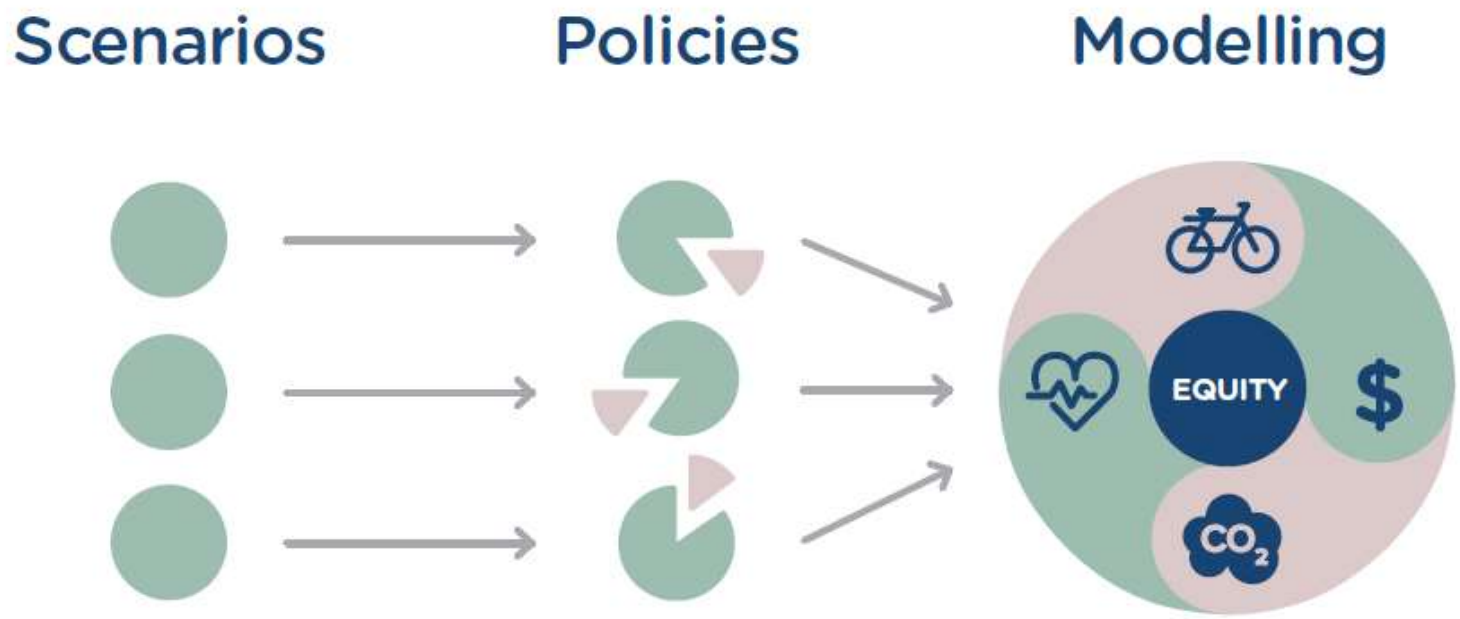
Project aims

1. Determine a range of plausible decarbonisation scenarios for the NZ transport sector

2. Tailor existing simulation model to examining decarbonisation scenarios

3. Estimate the impact of the different scenarios

Seeking the transport sweet spot: health, equity and zero carbon



What is scenario?

- The IPCC defines scenarios as: “coherent, internally consistent depictions of pathways to possible futures based on assumptions about economic, ecologic, social, political, and technologic development” or “alternative visions of how the future might unfold”

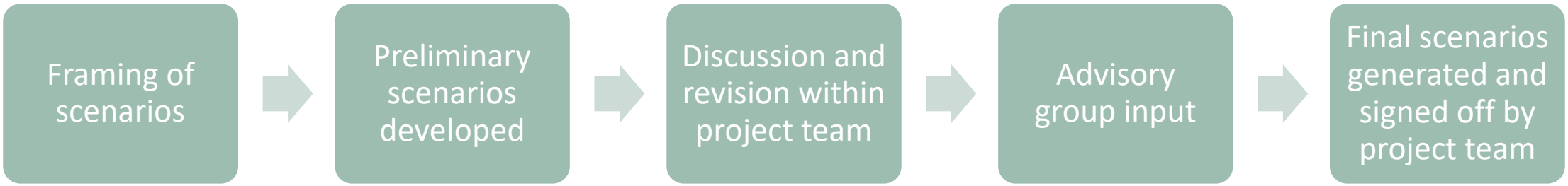
- Bridging the imagination gap between now and what needs to happen and between science and policy
- Provides a window into the current system values and assumptions
- Can generate social licence to act
- Provides practical tools for decision makers
- Help with strategic planning, risk management, communications, policy setting

How do you come up with a scenario?

- Visioning exercises
  - eg Tuominen et al 2014, Tight et al 2011
- Take something that exists already
  - eg policy goals/targets
- Researchers make something up
  - Probably the most common

Tight et al, 2011

Process – non-tikanga scenarios



Framing

- Scope and context of scenarios (i.e. what is included and excluded, the perspective taken on specific issues)
- Time frames of the scenarios and any associated outcomes
- Spatial scales
- Purpose of the scenarios

Information for each scenario

Part A: Detailed description of scenarios

- Description of mobility of people and goods
- Description of the infrastructure and requirements to support this type of mobility
- Qualitative description of intended impacts on
  - transport parameters (vehicle ownership levels, mode, trips numbers, distances, speed etc) and
  - health parameters in model (injury, physical activity, noise and air pollution)
- Main policy measures required to implement (high level)

Part B: Qualitative assessment of impact of scenario on:

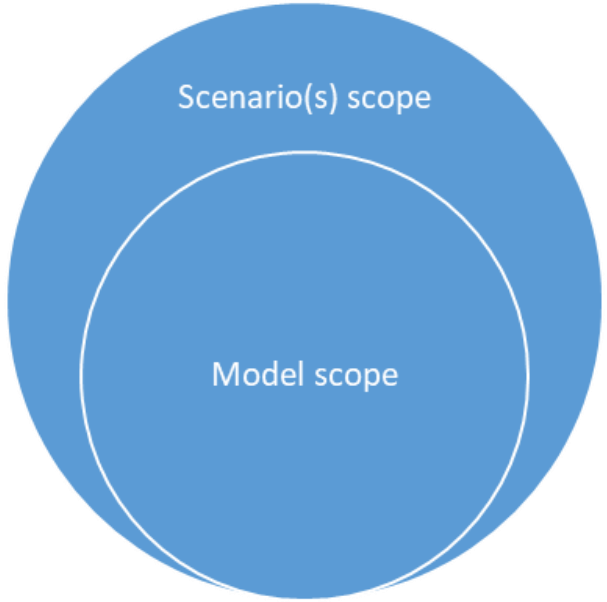
- All the transport-health domains (access, injury, physical activity, contamination, air pollution, community severance etc)
- Principles/values of the tikanga scenario- recognising that all scenarios should be thinking about Māori values
- Future capitals – part of the Treasury wellbeing framework

Framing

- Explicit about the values and assumptions underpinning of each scenario
- Purpose of this model is to quantify which scenario would reduce transport GHGe the most (compared to each other and the reference) and quantify the equity and health impacts of each scenario (again compared to each other and the reference)
- Domestic/national focus
- Timeline 2050 (policy) 2070 (health impacts)
- Technology that is currently in use or plausible without significant R & D (i.e. no flying cars or CCS)
- Deliberately diverse scenarios
- Not worried about political considerations of the policies
  - Although almost all have been implemented elsewhere
- Life cycle emissions where possible

Scenarios

- Reference: 2018
- Climate Change Commission scenario
- Healthy transport system
- Tikanga scenario- goal of the transport system is to support the aspirations and values of Māori



Climate Change Commission scenario-excerpts

Description (mobility of people)	**Values/underpinning assumptions**	**What does the inner city look like?**	**Trip numbers**	**General policy description**
People travel in individually owned electric powered cars. PT use is slightly higher to the reference scenario. Walking and cycling are similar to reference scenario. Intercity travel is by electric cars and planes.	Automobility. Assumption of individuals as rational actors in transport decisions; transport as an individual good; market based solutions; permissive of system inequity; predict and provide model of transport policy mostly retained; technical solutions to environmental issues.	Largely similar to present day. Charging infrastructure for electric vehicles visible on streets, in car parks etc. The need for car charging infrastructure has re-energised developers to include car parks in new apartment blocks in the inner city.	Similar to present day? CCC assumed a 7% decrease in household distance traveled by 2030 from some working from home and changes in urban land form. But evidence suggests EV drivers replace active trips with EV trips and people with umet transport need currently may drive more.	'Push and pull' policies to promote EV uptake and decrease ICE vehicle use. Strong economic policies needed but behavioural policies targeted towards promoting EVs to address specific concerns (e.g. range anxiety) and any groups reluctant to buy them.

Healthy transport system scenario- excerpts

Description (mobility of people)	**Mobility of goods**	**What do rural areas look like?**	**Impact on transport parameters: vehicle fleet**	**Infrastructure to support scenario**
People mostly travel by walking and cycling (regular bikes and ebikes) in cities. Public transport use has increased significantly, but is not as high as cycling and walking. Cars (electric) are predominately used for longer trips but the speeds of cars are lower than current. Intercity travel is predominately by cars, buses and trains.	Concerted efforts to remove freight from the road (because of health risks from injury, noise and pollution and because large trucks in urban areas makes people less likely to walk and cycle) have resulted in a large increase in the use of rail and coastal shipping. The remainder of freight is shipped by hydrogen powered trucks on roads. Urban areas have restricted access to large trucks to only small windows of time and location. Most urban deliveries are via small low speed electric vehicles or ebikes or collected from neighbourhood depots.	Rural areas largely look the same, however there are more bus routes, and the slower road speeds have allowed more people to use ebikes if they live within a 7-10km distance of a town.	Low levels of car ownership compared to reference. Cars are a mix of individually owned and car sharing schemes (land use changes mean fewer car parks). The car fleet is fully electric. To offset the safety issues associated with increased weight of electric cars; the average size of car has decreased.	There have been large scale programmes to a) allocate space in cities to public transport, walking and cycling infrastructure, b) deliver specific PT infrastructure (e.g. buses, light rail etc) investment and c) discourage car use. There is a network of charging infrastructure for electric cars across the country and to some extent in cities (although less than the Climate Change Commission scenario). Investment in rail and high quality intercity buses.

Current work

- Scenarios are being populated with policies to achieve them
- Collating evidence of the impact of the policies on model parameters
- Model update and expansion eg noise exposure and transport costings

- Modelling
- Translating the scenarios into something that is understandable- eg 3D images, descriptions of what places will look like (eg inner city areas, suburban areas) and descriptions of day to day lives of people and families

Thinking big is not necessarily doing big

20th century

21st century

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