ITF Roundtable

Social Impact of Time and Space-Based Road Pricing

30 November – 1December 2017 Auckland

NZ context and
lessons from the literature

Enabling New
Zealanders
to flourish

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Acknowledgement:

- NZ Transport Outlook team for graphs and statistics
- MR Cagney for literature review materials and draft framework/principles

What do kiwis like?

We love

... to travel by car   Light vehicles account for 75% of total distance travelled p.a.

... cars   In 2013, 54.5% of households own two or more vehicles
        Australia = 50.3% (2011)   UK = 30% (2015)
        Less than 8% of households do not own any vehicles
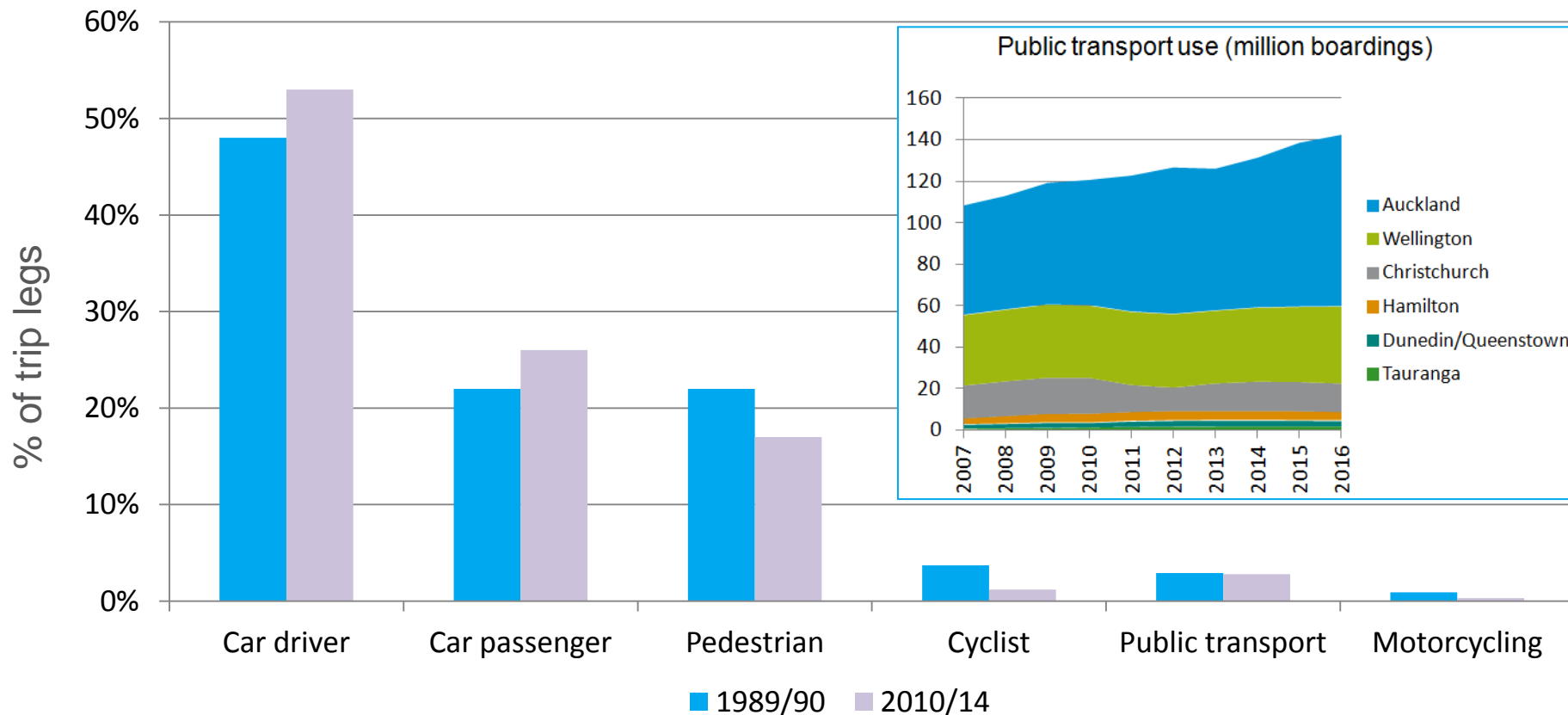   Australia = 8.4% (2011)   UK = 24% (2015)

... our old cars   Average age of the light vehicle fleet in 2016 was 14.3 years
        USA = 11.6 years   Canada = 9.3 years
        Australia = 10.1 years   Europe = 7.4 years

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Although PT use has increased, we are still using cars more

Public transport use (million boardings)

- Auckland
- Wellington
- Christchurch
- Hamilton
- Dunedin/Queenstown
- Tauranga

Y-axis: % of trip legs

Categories: Car driver, Car passenger, Pedestrian, Cyclist, Public transport, Motorcycling

Legend: 1989/90, 2010/14

Source: Ministry of Transport (New Zealand Household Travel Survey)

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National Land Transport Fund (NLTF) revenue

About $3.6 billion total revenue per year

Fuel excise duty (FED) (54%)

▶ 59.524 cents per litre on every litre of petrol

▶ Small amount of revenue from other fuels (LPG and CNG)
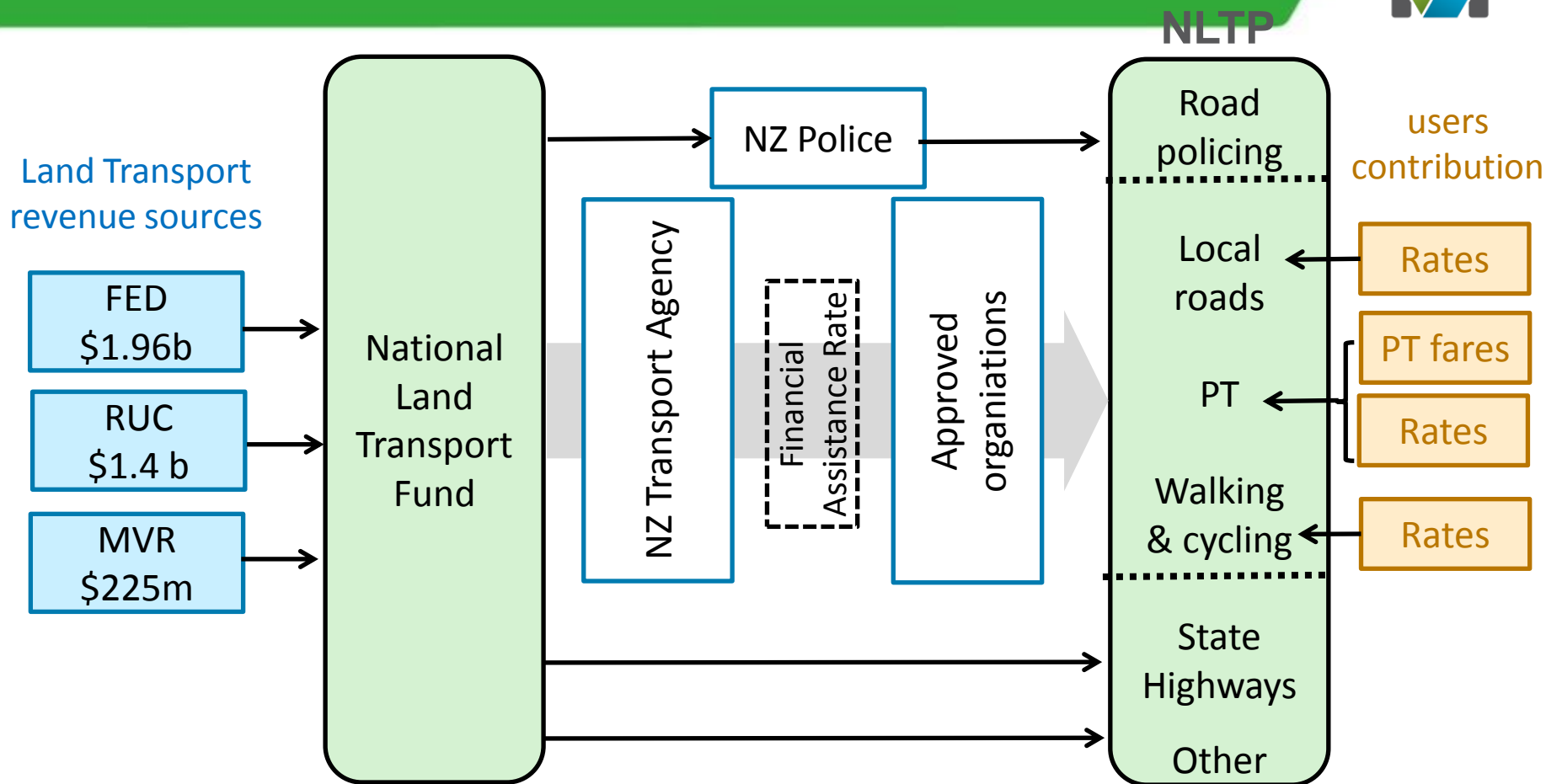
▶ $1.94 billion revenue per year

Road user charges (RUC) (distance-based) (40%)

▶ Per km charge for vehicles that use fuels that don't pay FED (diesel)

▶ Diesel car = $62 per 1,000km, 44 tonne truck = $641 per 1,000km

▶ $560 million from light vehicles, $880 million from heavy vehicles per year

Motor vehicle registration and licensing fees (6%)

▶ $43.50 from each licence goes to the NLTF (most of the rest to accident compensation)

▶ $225 million revenue per year

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NLTF and NLTP

NLTP

Land Transport revenue sources

FED $1.96b	
RUC $1.4 b	→ National Land Transport Fund
MVR $225m	

NZ Police

NZ Transport Agency

Financial Assistance Rate

Approved organiations

Road policing

users contribution

Local roads ← Rates

PT ← PT fares / Rates

Walking & cycling ← Rates

State Highways

Other

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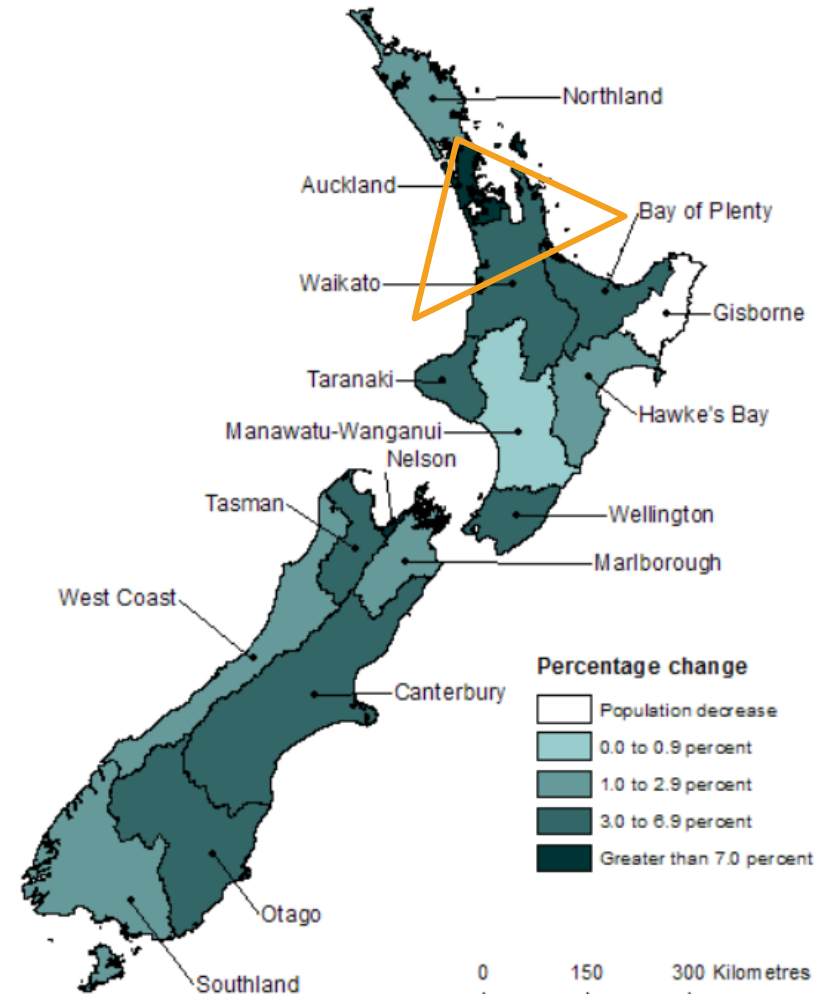TE MANATŪ WAKA

Auckland and National perspective

"Golden triangle" regions account for half of NZ's population

Auckland alone ~ 40%

With changing trends, we need to change our revenue mechanisms.

Source: *New Zealand Transport Outlook Future states*

Change in census usually resident population count
By regional council area
2006–2013 Censuses

Northland
Auckland
Bay of Plenty
Waikato
Gisborne
Taranaki
Hawke's Bay
Manawatu-Wanganui
Nelson
Tasman
Wellington
Marlborough
West Coast
Canterbury
Otago
Southland

Percentage change
- Population decrease
- 0.0 to 0.9 percent
- 1.0 to 2.9 percent
- 3.0 to 6.9 percent
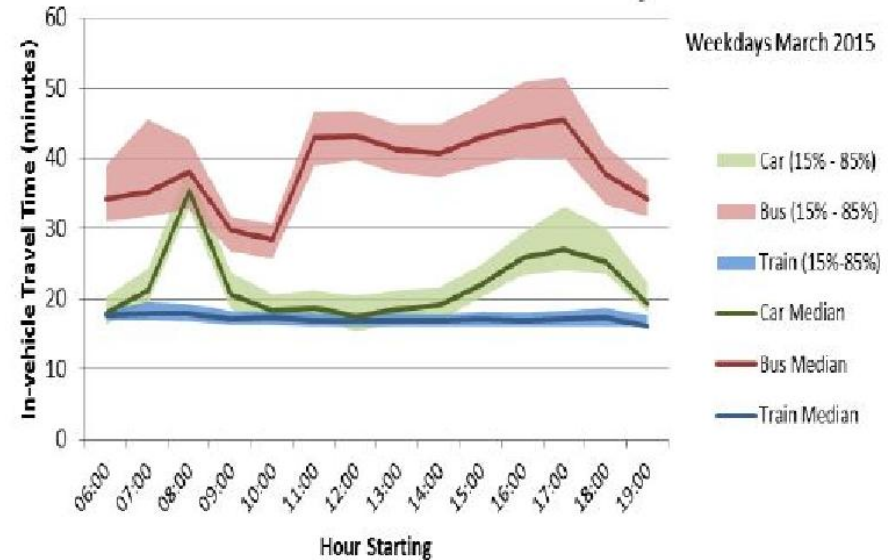- Greater than 7.0 percent

0   150   300 Kilometres

Source: Statistics New Zealand

Rapid Transit Lanes and performance
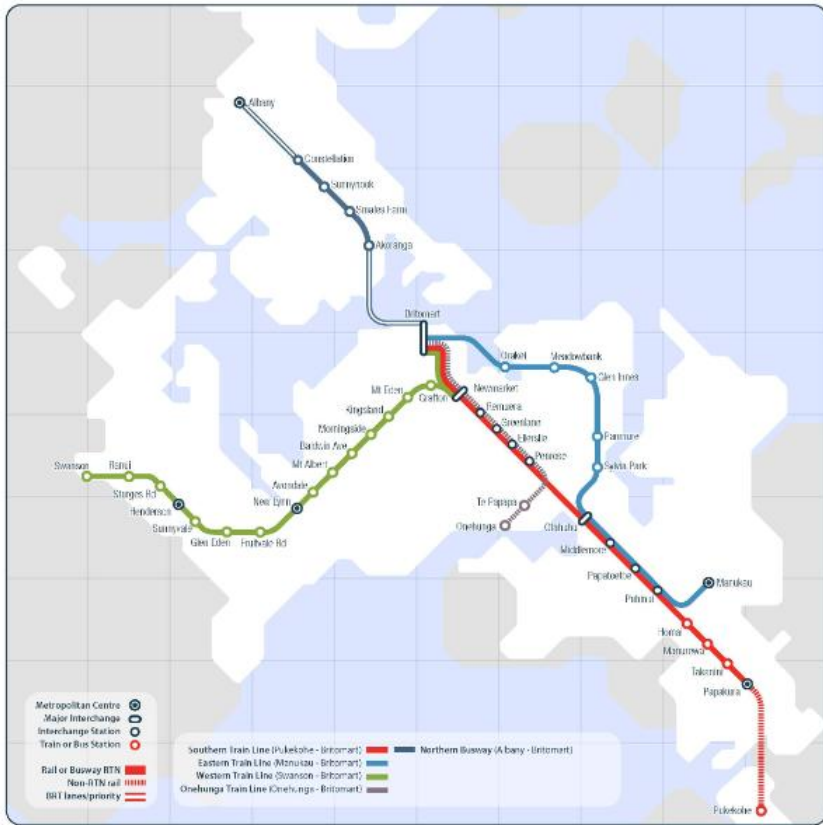

Albany to CBD - Travel Time by Mode
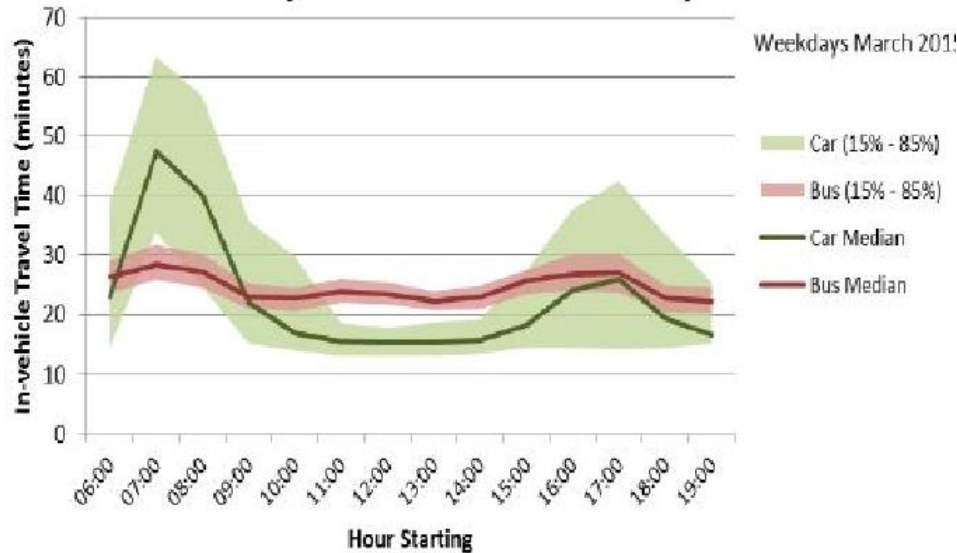
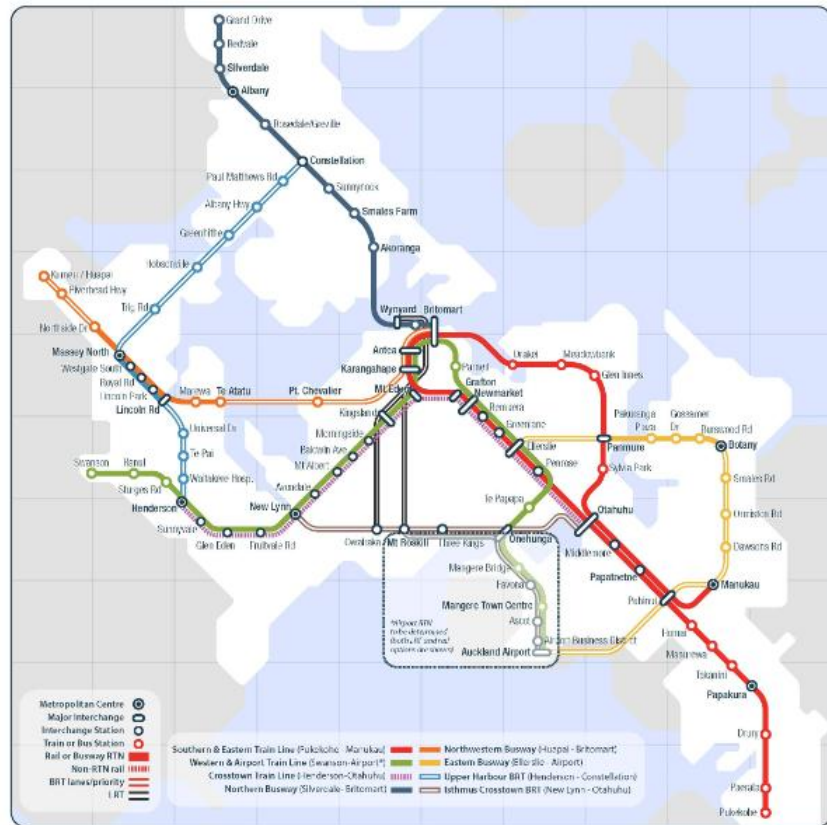Panmure to CBD - Travel Time by Mode

Roads suffer from wide variability while the Northern Busway and rail lines – which have accounted for most of the PT growth to the city over the last 15 years – have fairly reliable times

Source: Greater Auckland website

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Auckland's proposed Rapid Transit Network

current

2046

Source: Auckland Transport website

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Road pricing

Past and current investigations

- Auckland Road Pricing Evaluation Study (2006)
- Auckland Road Pricing Study (2008)
- Future Auckland Transport Funding (2014)
- Auckland Smarter Transport Pricing project (current)

One of the critical success factors

- Public acceptability (D'Artagnan Pacific, 2017)

    Key issues:
    - Perceived potential adverse impacts
    - Lack of / insufficient consideration of social / distributional impacts

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Modelling of social and distributional impacts

Approach	Example of study	Key features
Bottleneck congestion model	Arnott et al (1994)	Compares outcomes for user groups with different VOTs and costs of scheduled delay
Transport model (some with integrated land use)	AFFORD (Fridstrom et al , 2000) RFF (Safirova et al ,2006)	Disaggregated by zones to identify impacts across zones
Simulation model	Bonsall and Kelly (2005)	Ability to identify impacts on various at-risk groups
Microdata modelling	Bureau and Glachant (2008)	Model accounts for variations between individuals
Computable general equilibrium model	De Palma and Lindsey (2004)	Model accounts for multiple modes, routes and fiscal impacts for government
User preference modelling	Eliasson and Mattsson (2006)	Model accounts for differences in travel behaviour, preferences and mode choices

...and combinations of the above

Source: MR Cagney (research in progress) and other individual references cited

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Social impact assessment process

| What are the pricing and equity objectives? | **Who** will be better off and who will be worst off? | **Why** and **How** are they affected? | **What** are the impacts? | Can effects be mitigated? | How? When? Where? Who? | What are the actual impacts? |

Analyse context of the intervention → Identify stakeholders and perform stakeholder analysis → Identify factors affecting outcomes → Analyse data and assess priorities for mitigation → Consult stakeholders and develop mitigation plan → Implement mitigation plan → Evaluate and monitor outcomes

Assessment framework → Modelling tools

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What are the equity objectives?

Equity objectives:

• Market related – user/polluter pays (time of day and location are important)

• Income related – Horizontal (within income group) and **vertical** (between income groups)

• Territorial related – **Spatial distribution** of winners and losers

• Temporal related – **Time of day** and intergenerational

Key dimensions:

► Time of day   – peaks and off-peaks, every hour, half-hour or minutes

► Location   – inside/outside charging zones, meshblocks or area units

► Income   – household vs individual, household type adjusted, DepIndex etc

➔ modelling implications

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Who, why, how and what

WHO

Income groups	Ethnic groups	Other circumstances (eg disability)
Household types	Travel origin	Travel destination

WHY/HOW

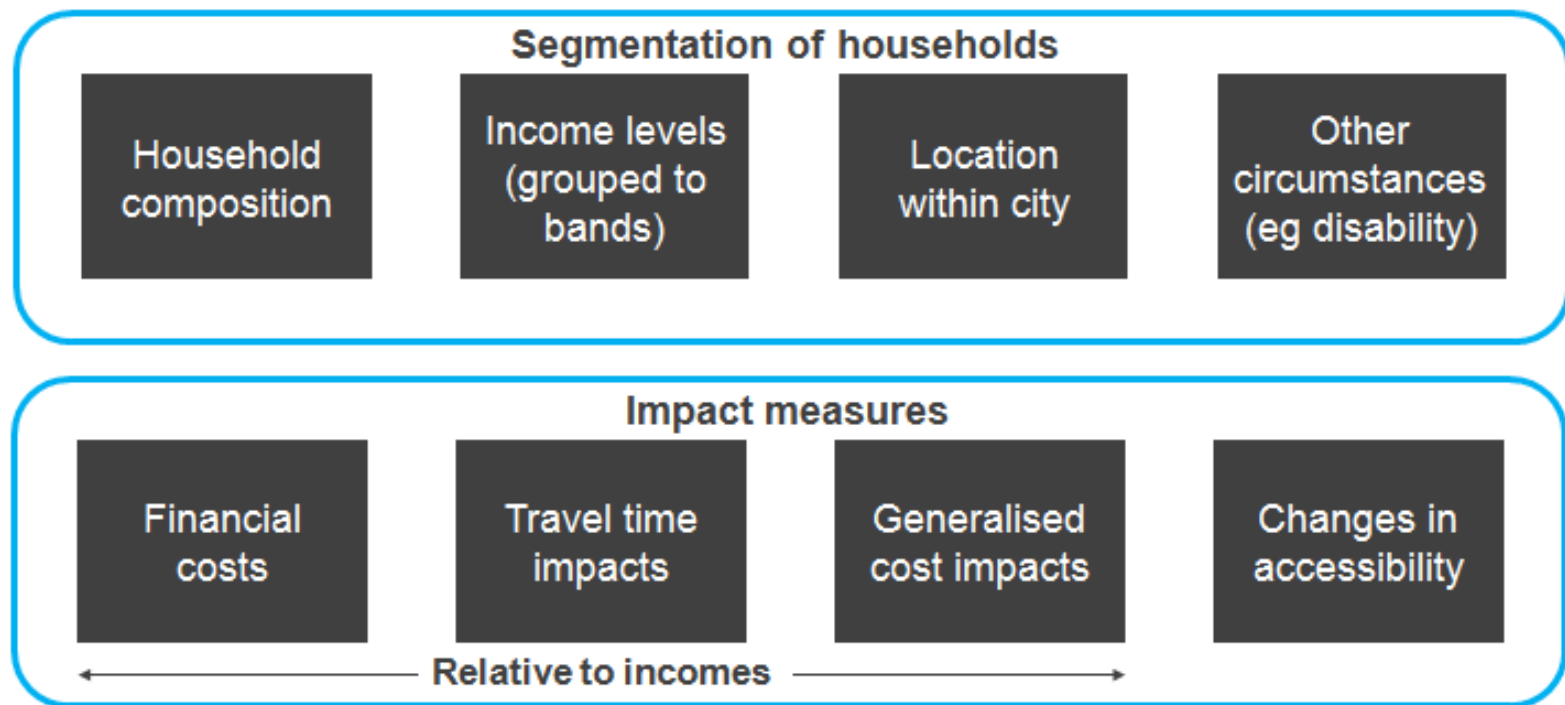|		
Ability to pay	Needs to avoid trips	Physical constraints (eg disability)
Ability to consolidate trips	Ability to switch time, modes or routes	Ability to switch locations

WHAT

- Travel time
- Financial costs
- External impacts
- Accessibility impacts

Proposed framework

Segmentation of households

- Household composition
- Income levels (grouped to bands)
- Location within city
- Other circumstances (eg disability)

Impact measures

- Financial costs
- Travel time impacts
- Generalised cost impacts
- Changes in accessibility

← Relative to incomes →

MRC

Questions for discussion

- Which equity objective(s) is/are the most relevant?

- What dimensions should the assessment framework covers?

- How best to identify those who are better off and those who are worst off?

- How do we best assess equity/distributional impacts?

  - How do we best accommodate data requirements?

  - What should be the right tools/models to use?

- How do we best communicate the above to decision-makers?

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