TE MANATŪ WAKA
MINISTRY OF TRANSPORT

Domestic Transport Costs and Charges

Information session – Other topics

Car parking, walking & cycling, taxi & ride-hailing, micro-mobility and road crashes

30 August 2022

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Results included in this file may be subject to revision as the project team finalise the estimates for the DTCC Final Report.

Car parking

Stuart Donovan - Veitch Lister Consulting

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Questions and Challenges: Parking

Three questions:

1. Economic costs: What are the total economic (“resource”) costs of parking in New Zealand?
2. Financial charges: How do charges for parking vary by location, trip type, and time of day?
3. Incidence of charges: How is the burden of charges split between different parties?

Four challenges:

1. Data: Lack of consistent and comprehensive data on parking supply, costs, and charges.
2. Incentives: Public and private providers face different incentives → variation in costs and charges.
3. Unobserved factors: Charges vary due to factors that are difficult for researchers to observe.
4. Planning policies: Affect parking supply → user charges may not indicate economic costs.

Our Approach: Economic costs of parking

Step 1: Unit costs (A).

Estimate parking unit costs as a function of capital, land, and O&M inputs.

Variation in input quantities and/or prices means the unit costs vary by *parking typologies* (e.g. on and off-street) and *geographic locations.*

Step 2: Parking supply (B).

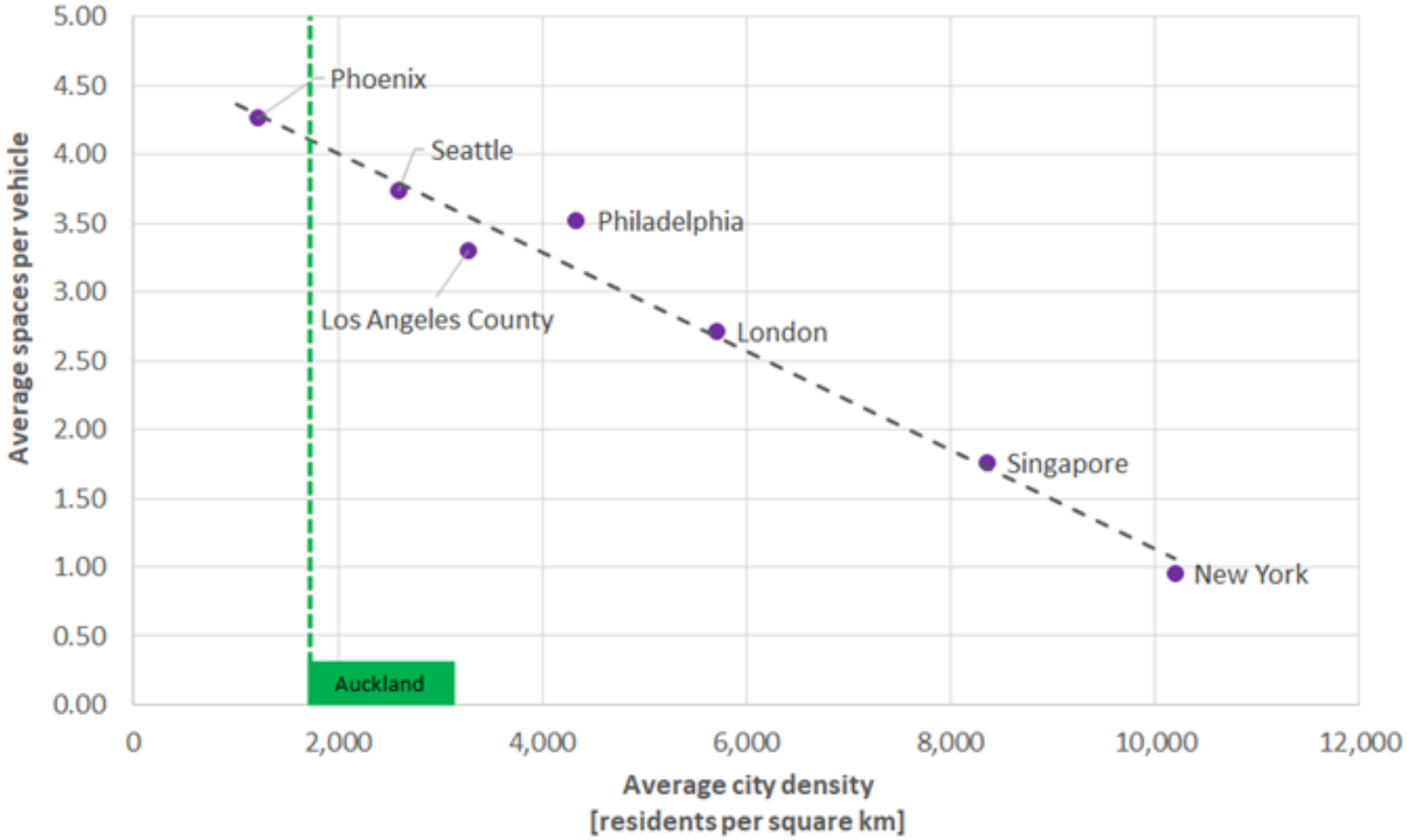
Estimate parking supply as a function of:

(1) the number of registered vehicles with

(2) the average number of parking spaces per vehicle for the urban and rural areas in each region.

Economic cost of parking = A x B

Parking supply: Estimating average spaces per vehicle



DRAFT RESULTS

Our Main Results: Parking

Economic costs: $14.7 billion p.a. This equates to approximately:

- $3,739 p.a. per light vehicle
- $3.90 per vehicle trip
- $0.32 per person-km.

These averages obscure considerable regional variation. E.g. in Auckland, the cost is ~$6,653 per vehicle.

- ~60% land
- ~25% O&M
- ~15% capital costs

Financial charges:

- Parking fees paid on
  - ~1% of all trips
  - ~6% of commutes
  - ~85% of fees are paid by the vehicle occupants
- Where fees are paid on commute trips, the costs are passed onto employers one-third of the time
- Due to “bundling”, e.g. into rents and goods / services, the size of parking subsidies is unknown

Limitations, Further Work, and Updates: Parking

Limitations.

- Parking supply rely on international estimates
- Estimate average (not marginal costs), although to may align
- Analysis of parking charges and their incidence limited by data
- HTS extended to collect data on the level of parking charges that are paid

Further work.

- Undertake surveys of parking supply in several New Zealand cities / towns (students?)
- Extend the parking supply model to include other factors that are relevant to policy
- Monitor parking supplied with new developments post NPS-UD → indicates regulatory “subsidy”

Suggested timeline for updates: Circa 2025 would enable estimates to be updated with data from the 2022 census, additional HTS waves, and land value data from Councils.

Walking and Cycling

Stuart Donovan - Veitch Lister Consulting

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Questions and Challenges: Walking and Cycling

Two questions:

1. Economic costs: What are the total economic (“resource”) costs of walking and cycling in New Zealand?
2. Financial charges: What are the user costs of cycling, for both conventional bikes and e-bikes?

Three challenges:

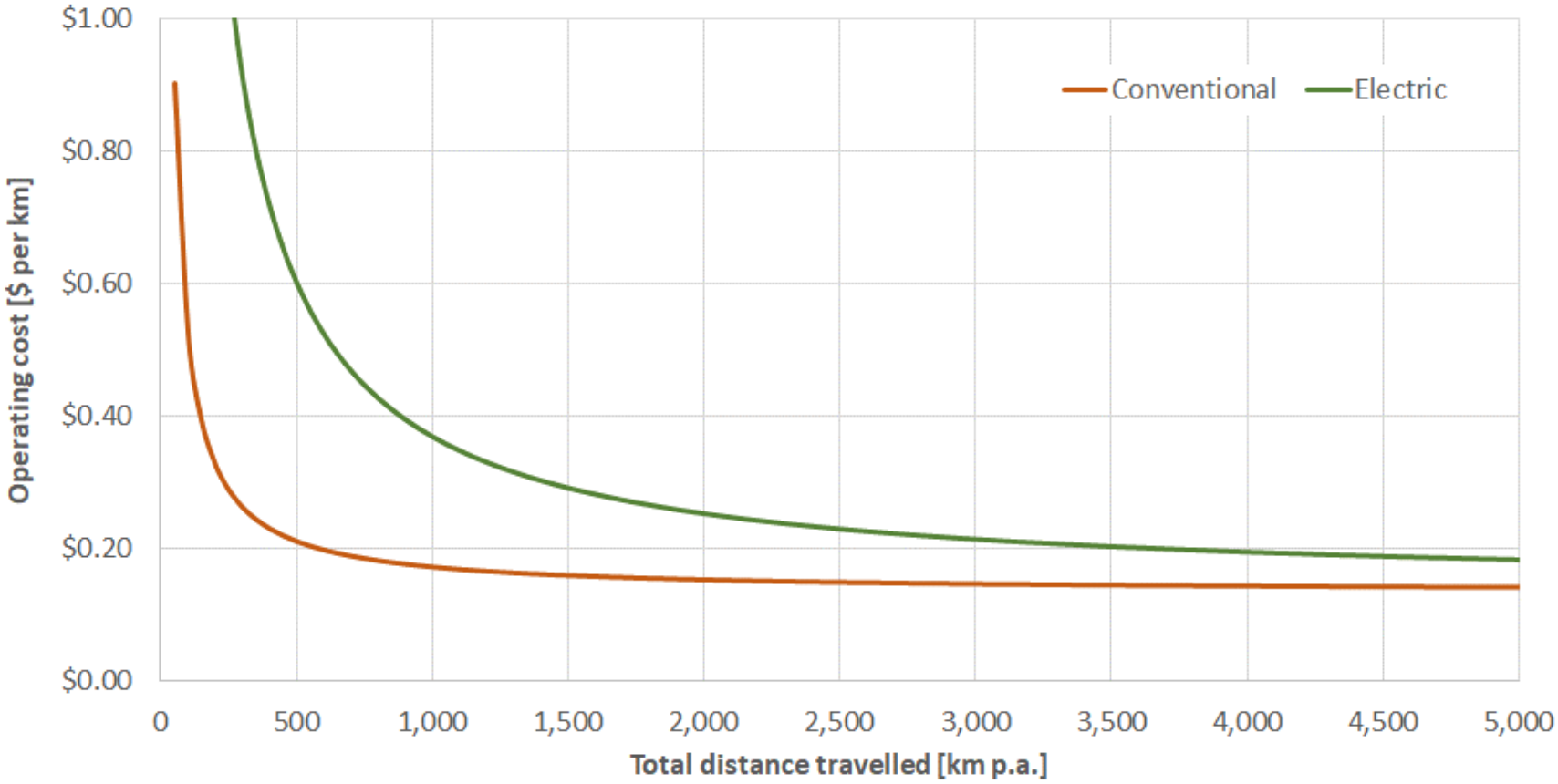
1. Data: Lack of data on walking and cycling, both the supply of infrastructure and demand.
2. Backwards looking: Does not capture recent (rapid) growth in cycling, especially in Auckland.
3. Heterogeneity: Financial charges of cycling will vary widely with the assumptions on capital costs and levels of use.

Our Approach: Economic costs of walking and cycling

Cost component	Valuation methodology
Land costs (A). The estimated cost of land within the road corridor used to accommodate walking and cycling infrastructure.	• Assess the land area of walking and cycling infrastructure as a function of the length and width of the respective networks • Multiply the land area of each network by land prices (per square metre) in urban and rural parts of New Zealand.
Capital costs (B). The estimated cost of constructing and maintaining walking and cycling infrastructure in the road corridor.	• Multiply the estimated length of the walking and cycling networks by rough order estimates (ROCs) per kilometre. • Annualise ROCs assuming a cost of capital (4% p.a.) and depreciation of 2% p.a. and 4% p.a. for walking and cycling, respectively.
Operating costs (C). The cost of purchasing and operating bicycles.	• Purchase costs derived from SNZ HES (NB: Broadly aligns with SNZ data on quantities / costs of imported bicycles and e-bikes). • Maintenance costs estimated from detailed case study, where we include additional costs for electricity and maintenance for e-bikes.

Economic cost of walking and cycling = A + B + C

Cycling: Estimating operating costs



DRAFT RESULTS

Our Main Results: Walking and Cycling

Economic costs:

- ~$1.5b p.a. (NB: This falls to ~$400m p.a. in "low land value scenario")
- ~$0.60 and ~$1.00 per trip for walking and cycling, respectively
- ~$0.60 and $0.35 per km for walking and cycling, respectively.

Location	Footpaths	Cycle paths	Total
Urban	$1,289.59	$151.41	$1,441.00
Rural	$43.00	$11.99	$54.99
Total	$1,332.59	$163.41	**$1,495.99**

Financial charges:

- Estimate the average conventional / e-bike travels 206 / 613 km p.a.
- Implies average operating costs of $0.32 and $0.51 per km, respectively
- SRMC (i.e. excluding purchase costs) estimated to be $0.13 per km.
- **Caveat:** Likely to be considerable heterogeneity in the financial charges incurred by individual users.

Limitations, Further Work, and Updates: Walking and Cycling

Limitations.

- Lack of detailed information on the physical extent of walking and cycling infrastructure
- HTS data is backwards looking and will miss recent rapid growth in cycling, e.g. in Auckland.

Further work.

- Gather more comprehensive and consistent data spatial data, possibly combining OSM and road asset data
- Clarify the average value of land within the road corridor, especially for local roads

Suggested timeline for updates: Circa 2025 would enable estimates to be updated with data from the 2022 census, additional HTS waves, and land value data from Councils. Also provides an opportunity to clarify the value of land associated with the local road network.

Taxis and “ride-hailing”

Authors: Veitch Lister Consulting in conjunction with Oliver Bruce

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Questions and Challenges: Taxis and Ride-hailing

Questions: What are the economic ("resource") costs of taxis and ride-hailing services in New Zealand?

Terminology:

- "Taxi" refers to services operated by a company and that can be hailed on the street or dispatched by an operator.
- "Ride-hailing" refers to services that link riders and drivers using a technology platform, e.g. smartphone apps.

Three challenges:

1. Industrial structure: Market share is estimated to be 50:50, although this is not yet stable
2. Regulatory reforms: Have continued to evolve over time, which may affect costs
3. Commercial activities: Which complicates the availability of and access to information.

Our Approach: Economic costs of taxis and ride-hailing

Adapts the private car operating cost model developed in the DTCC study, with some changes …

Cost component	Description
Variable operating costs	Compared to the private car fleet, we assume taxi and ride-hailing services use newer vehicles that have lower variable operating costs, e.g. petrol, oil, tyres, repairs, and maintenance.
Fixed operating costs	Additional costs associated with commercial use, such as fitout, insurance, driver licencing (Passenger Endorsements), logbooks, insurance, ACC payments, annual vehicle licensing/registration and WoF/CoF.
Fixed ownership costs ("capital charges")	The use of newer vehicles, along with a higher depreciation rate to account for commercial use (which leads to increased mileage and wear and tear), results in higher capital charges.
Labour / contracting costs	Payments to contractor-drivers, allowing for utilisation, dynamic (surge) pricing due to demand, and cleaning time. These components are assumed to yield an average per-hour rate around the level of the minimum wage.
Platform and licensing charges	Representing the costs charged by companies to provide and/or license the platforms, including technology, marketing, and profit margins.
Additional consumer charges	Such as airport charges (for both services) and electronic transactions (for taxi users).

DRAFT RESULTS

Taxis and Ride-hailing: Composition of the vehicle fleet

Vehicle fleet market share	Engine Size Capacity		
	SMALL (0-1500cc)	COMPACT (1501-2000cc)	MEDIUM (2001-3500cc)
Taxi	10%	20%	70%
Ride-hailing	25%	55%	10%
Average upfront purchase costs (incl fitout)	$15,500	$21,500	$49,500
Expected residual value after 5 years	$6,229	$8,640	$19,893

Notes: We assume a commercial cost of capital at 5% with an average vehicle life of 5 years based on information supplied by industry participants. The higher cost of capital and shorter economic life reflects the commercial nature of activities and subsequent wear and tear on vehicles. We assume depreciation at 20% p.a., which is higher than the rate for private vehicles used in the PC-OC model. Costs have been developed for three types of vehicles used in the taxi and ride-hailing industries, from which we calculate a weighted averaged WACC average.

DRAFT RESULTS

Our Main Results: Car vs Ride-hailing vs Taxis

Cost components		Car	RH	Taxi
1) Variable operating costs	*Resource*	$0.26	$0.28	$0.28
	Duty	$0.11	$0.09	$0.11
2) Fixed operating costs	*Resource*	$0.08	$0.08	$0.04
	Duty	$0.01	$0.01	$0.00
3) Fixed Ownership Charges		$0.24	$0.11	$0.10
4) Labour/Contracting Costs			$1.34	$2.19
5) Platform and Licensing Costs			$0.42	$0.30
6) Additional Consumer Charges			$0.28	$0.20
Cost	*per in-service veh-km*	*$0.70*	*$2.60*	*$3.23*
	per pass-km (inc GST)	*$0.44*	*$1.92*	*$2.38*
	per pass-trip (inc GST)	*$2.86*	*$12.24*	*$15.20*

Limitations, Further Work, and Updates: Walking and Cycling

Limitations.

- Analysis will not account for recent changes in demand and technology (e.g. EVs).
- Use occupancy data for private vehicles, which may be an under-estimate for taxis and ride-hailing.

Suggested timeline for updates: Circa 2025 would enable estimates to be updated with data from the 2022 census and additional HTS waves. We expect assumptions on the composition of the vehicle fleet will need to be revised to account for uptake of electric vehicles.

Micro-mobility

Authors: Veitch Lister Consulting in conjunction with Oliver Bruce

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Questions and Challenges: Micro-mobility

Question: What are the per kilometre and per trip costs of using shared scooter services in New Zealand?

Key definition: Scooters are defined as a “Powered Transport Device” under the NZTA Accessible Streets Definition. These are powered by 300W motors, which typically allow average operational speeds of 7.5-10kmh, which are provided via dockless shared schemes in urban zones and accessed by a smartphone app.

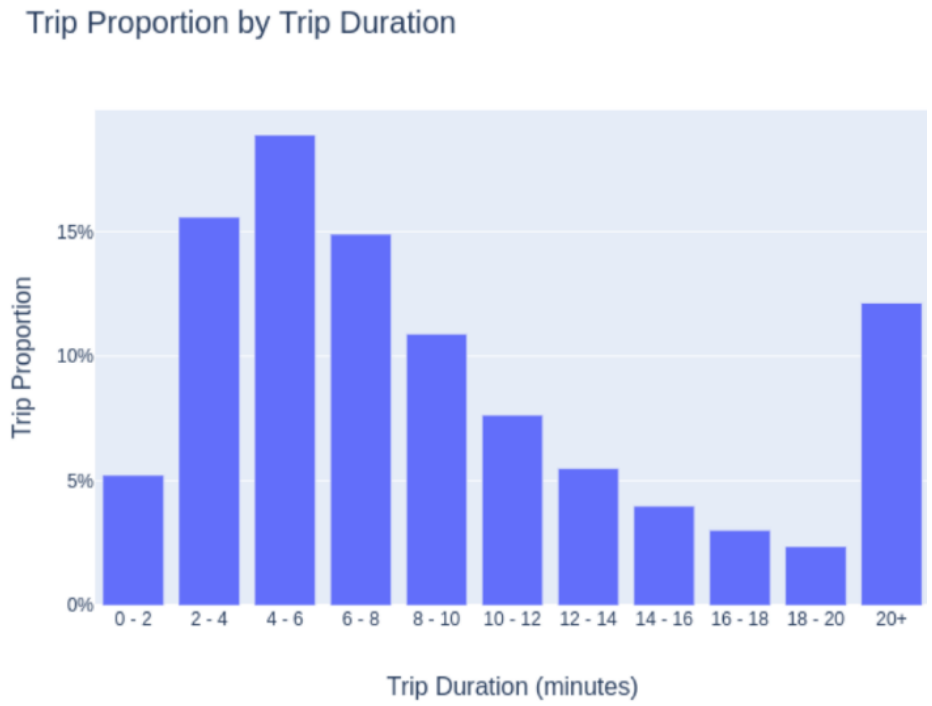
Four challenges:

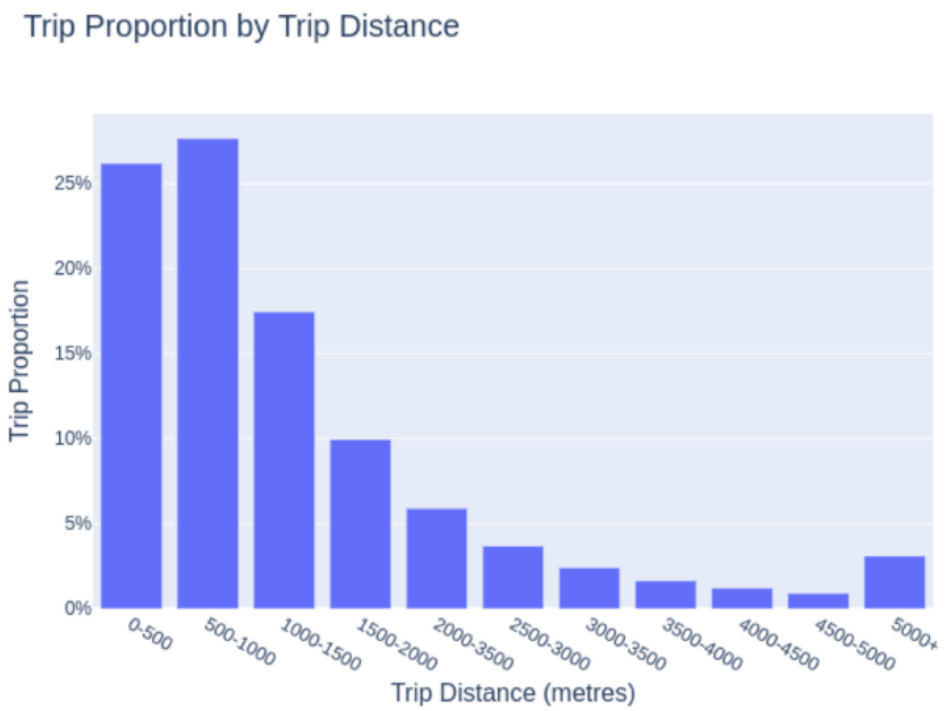
1. Industrial structure: Rapid growth in uptake
2. Regulatory approaches: Differ around the country
3. Technological change: Scooters and apps are evolving rapidly
4. Commercial activities: Much of the data is commercially sensitive

Our Approach: Economic costs of micromobility

Cost component	Description
Fixed capital expenditure	Fixed capital costs related to purchasing vehicles/parts and preparing them for deployment, with allowances for caps, vehicle churn, and repairability.
Variable operational expenditure	Variable costs of operating shared scooter services, such as distributing and recharging vehicles; checking and repairing vehicles; and new user promotions and marketing activities.
Fixed operating costs	Fixed operational costs required to run the business, including employees, general brand marketing, government relations and fees, legal expenses, insurance, technical development, vehicle, office and warehousing expenses
Taxes and profits	Costs associated with taxes, repayment of debt and a return to investors.

Micromobility: Data on trip duration and distance





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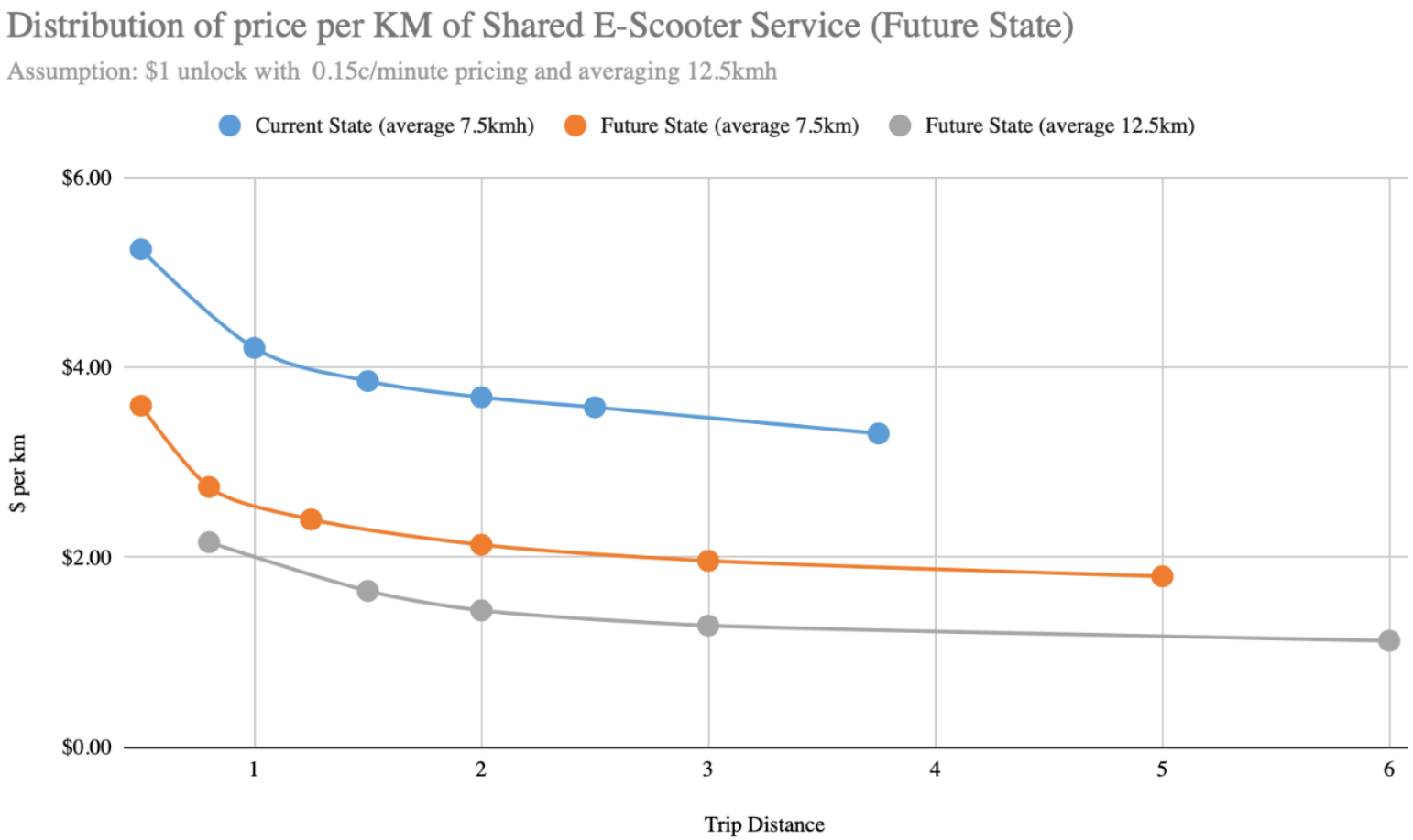
Our Main Results: Micromobility

Line Item	% of total cost	$ per km
1) Fixed Capital Expenditure	20.10%	$0.76
2) Variable Operational Expenditure	43.64%	$1.65
3) Fixed Operating Expenses	19.80%	$0.75
4a) Taxes	5.40%	$0.21
4b) Profit / Repayment of shareholders	11.00%	$0.42
TOTAL COST	100%	$3.79

Micromobility: Possible future cost curves



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Questions?