

Managing the electric bike and scooter revolution

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Palmerston North 30 July – 1 August 2018

Presentation outline

1. Background
2. Why regulate, types of e-bikes
3. Safety and speed
4. Regulatory approaches
5. Next steps

Background

SAFER JOURNEYS FOR PEOPLE WHO CYCLE

CYCLING SAFETY PANEL FINAL REPORT
AND RECOMMENDATIONS

DECEMBER 2014



“Investigate the adoption of the EU pedelec standard, and an age limit”

AS 15194:2016



Cycles—Electrically power assisted cycles—EPAC Bicycles (also known as pedelecs) (EN 15194:2009, MOD)

AS 15194:2016, Cycles—Electrically power assisted cycles—EPAC Bicycles (also known as pedelecs) (EN 15194:2009, MOD), is a modified adoption of EN 15194:2009, Cycles—Electrically power assisted cycles—EPAC Bicycles, and is reproduced with the permission of CEN, Avenue Marnix 17, B-1000 Brussels, Belgium. All exploitation rights of the European Standards in question are reserved worldwide to CEN and its Members. No reproduction may be undertaken without express permission in writing by CEN through Standards Australia Ltd.

STANDARDS
Australia

MAKING CYCLING SAFER AND MORE ATTRACTIVE

The NZ Transport Agency's cycling safety action plan



Acknowledges that legislation is dated E-bike and other LPV problem better defined

NZ TRANSPORT
AGENCY
www.nzta.govt.nz

Safer Journeys

New Zealand Government

Regulations and safety for electric bicycles and other low-powered vehicles
July 2017

J Lieswyn, M Fowler, G Koorey, A Wilke (ViaStrada Limited)
S Crimp

NZ Transport Agency research report 621
Contracted research organisation – ViaStrada Limited

2014

2016

2017

A note to the audience

This presentation is based on research report *RR 621 Regulations and safety for electric vehicles and other low-powered vehicles*.

While the NZ Transport Agency provided investment, the research was undertaken independently, and the resulting findings should **not be regarded as being the opinion, responsibility or policy** of the Transport Agency or indeed of any NZ Government agency.

The Transport Agency is established under the Land Transport Management Act 2003. The objective of the Transport Agency is to undertake its functions in a way that contributes to an efficient, effective and safe land transport system in the public interest. The Transport Agency funds innovative and relevant research that contributes to this objective.

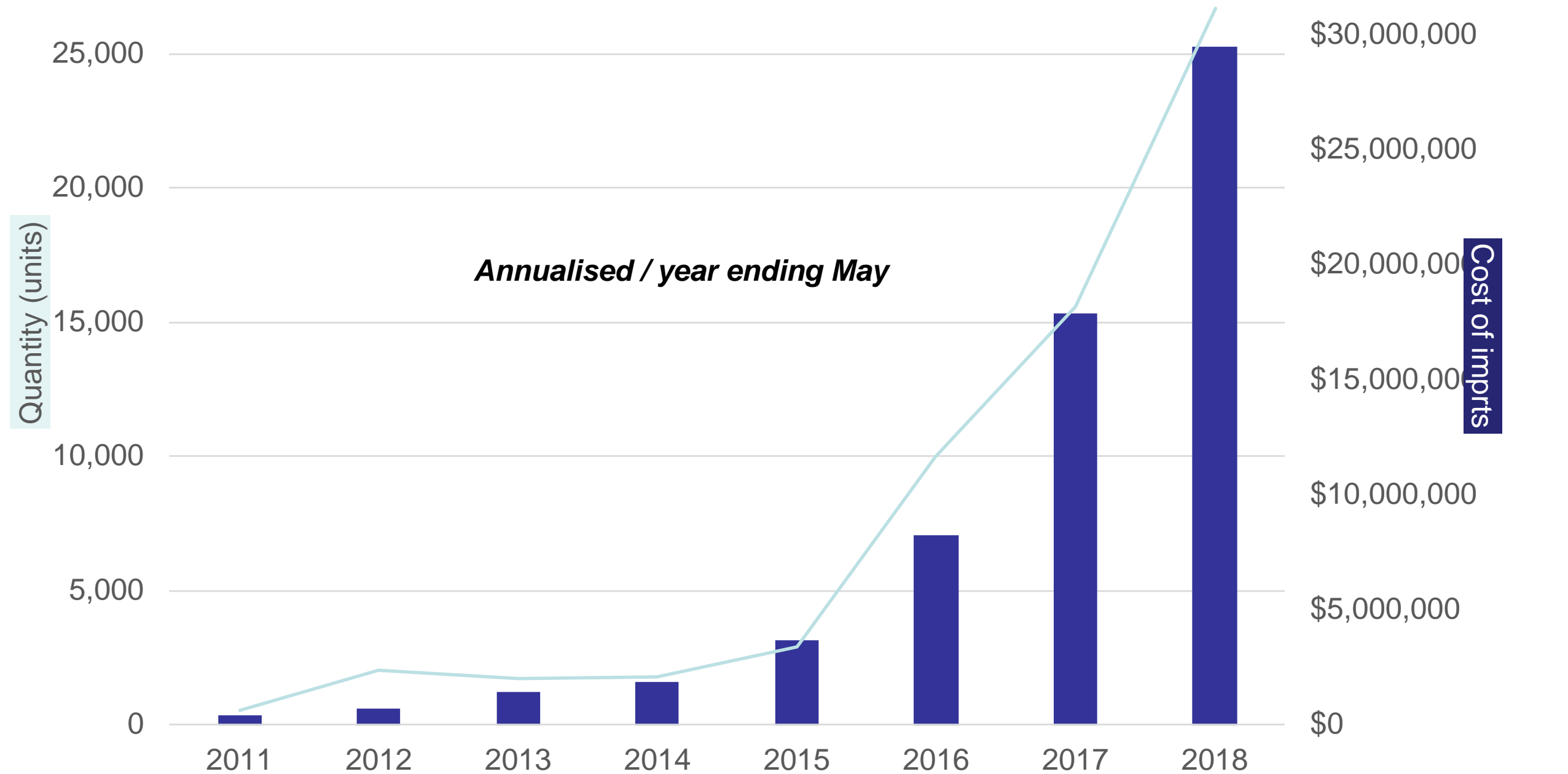
People using this research should apply and rely on their own skill and judgement and, if necessary, they should seek appropriate legal or other expertise regarding its use.

Research motivation

- Innovation outrunning legislation



Estimated imports of e-bikes





WHY REGULATE | TYPES OF E-BIKES

Why: clarify existing rules



« Back to search results

Land Transport (Road User) Rule 2004

wheeled recreational device—

- a) means a vehicle that is a wheeled conveyance (other than a cycle that has a wheel diameter exceeding 355 mm) and that is propelled by human power or gravity; and
- b) includes a conveyance to which are attached 1 or more auxiliary propulsion motors that have a combined maximum power output not exceeding 300 W



The following are examples of vehicles that meet the definition of motor vehicle but have difficulties meeting the safety standards and other requirements. This means they cannot be operated on the road.

- Motorised skate boards, scooters, and roller skates
- Segways and similar
- Powered Self Balancing Unicycles
- Cycles fitted with petrol motors
- Low powered scooters/mopeds
- Cycles designed primarily to be propelled by an engine not the muscular energy of the rider

Why: conform to, support industry

- 300W rated motor doesn't exist

The screenshot shows the BAFANG website interface. At the top, the BAFANG logo is in an orange pill shape. To the right are a home icon and 'ENQUIRY/0'. Below is a navigation bar with 'DRIVE SYSTEMS', 'COMPONENTS', 'COMPANY', 'SERVICE', 'NEWS', and 'D'. A yellow breadcrumb trail reads 'Home > Components > Motor'. The main content area has a 'FILTER' section with three dropdown menus: 'POSITION' (set to 'all'), 'RATED POWER (W)' (open, showing 'all', 220, 250, 350, 500, 750, 1000), and 'RATED VOLTAGE (DCV)' (set to 'all'). A red arrow points to the 250W option in the power dropdown. Below the filters is a 'FRONT MOTO' section with a bicycle icon.

Safe system approach – vehicles



ABC News Philadelphia

Safe system approach - vehicles



Safe system approach – facility design



LTA, Singapore

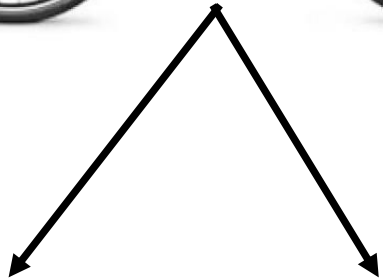
Safe system approach - users



E-bike types in NZ (per current regulations)

“Power-assisted pedal cycle”

designed primarily to be propelled by the muscular energy of the rider



Pedelec

Throttle
'twist & go'

“Power-assisted pedal cycle”

Utility bike. Ambiguous term. Not ergonomic to pedal – is it an SSEB?



“Power-assisted pedal cycle”

Trail bike with a throttle



“Pedal-assisted power cycle”

term in case law only. Scooter-style electric bike (SSEB). Max 20-25 km/h. Looks like a motor scooter.



“Power-assisted pedal cycle”

Cargo trike



A white bicycle is shown in a side profile, facing right. The bicycle has a white frame, black handlebars, a black seat, and black wheels with disc brakes. A yellow banner is overlaid across the middle of the image, containing the text "SAFETY AND SPEED".

SAFETY AND SPEED

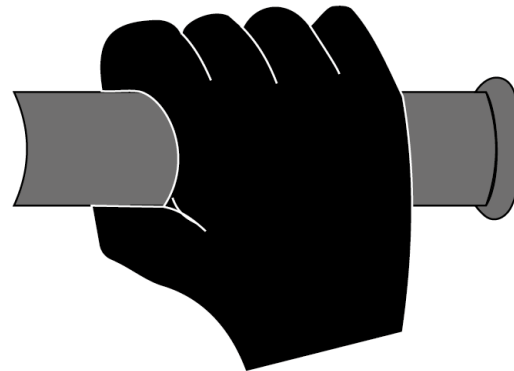
Throttles

PROS

- Confidence for impaired or less fit
- Easier hill starts
- No take-off lag

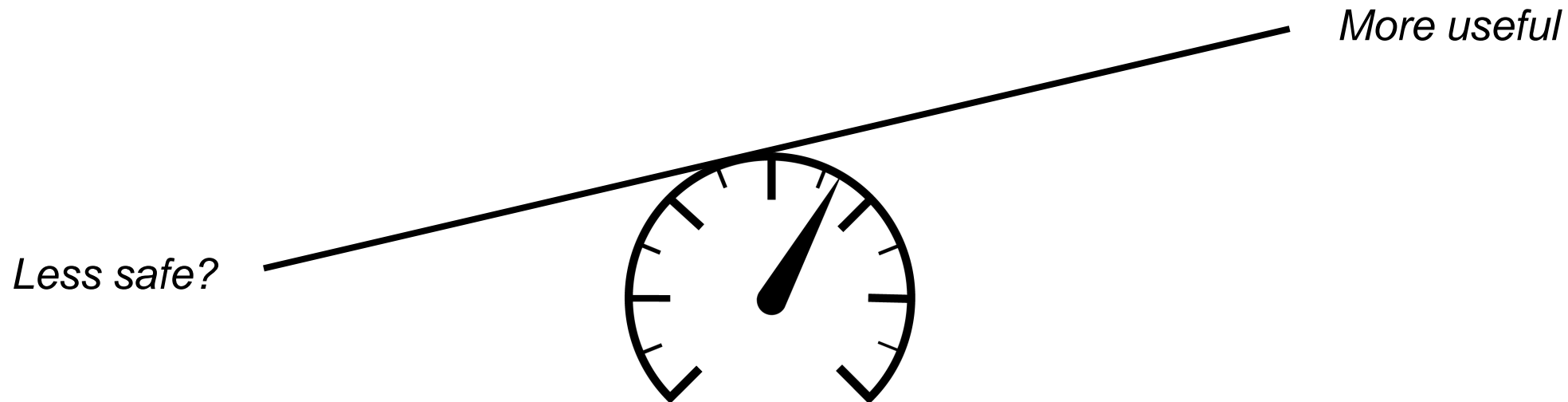
CONS

- Reduced health benefit
- Reduced range
- Take-off surprise
- More controls / confusion
- Less 'natural' feeling



Speed is most common safety concern

- E-bikes, compared with ordinary bikes:
 - Heavier
 - Can accelerate faster
 - Higher average speed
 - Can take drivers by surprise
 - Greater momentum on collision
 - Requires greater cognitive ability
 - Helps users to avoid conflict, take the lane
 - Throttles can help impaired users

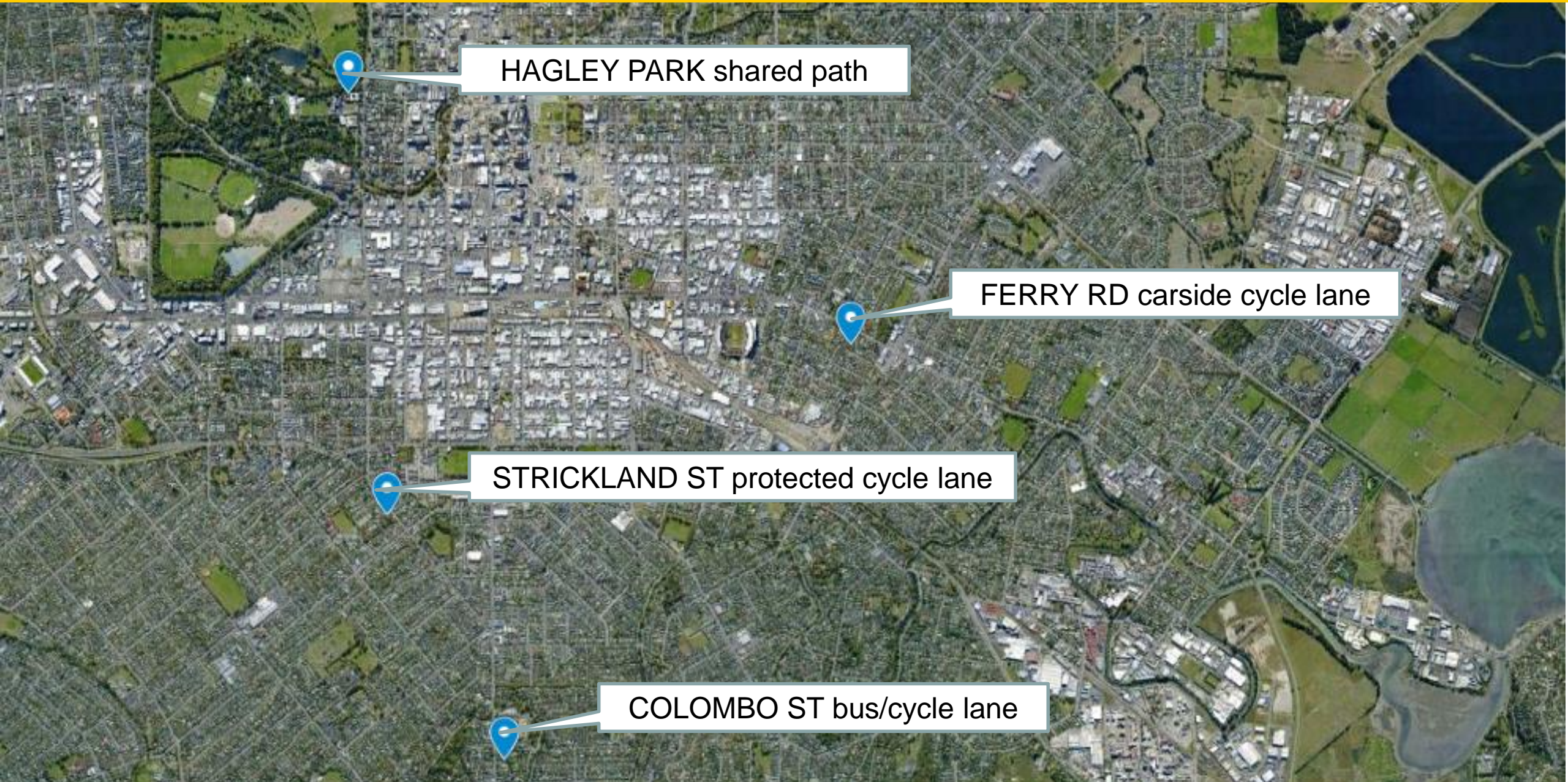


Methods

- Pro Laser III radar gun
 - Speed accuracy +/-1 km/h for subject targets
 - Range 1800m, accuracy 0.15m
 - Acquisition time 0.3s
 - Beam width 1m @ 300m
- Free speed observations – separate reading if:
 - Lateral ± 1 m, considered apparent steering inputs
 - Longitudinal ± 3 bike lengths, considered apparent deceleration
- E-bikes identification
 - Initial judgement aided by presence of steady headlight
 - Confirmed by visual scan for motor



Christchurch sites



HAGLEY PARK shared path

FERRY RD carside cycle lane

STRICKLAND ST protected cycle lane

COLOMBO ST bus/cycle lane

Strickland Street cycleway - 2017



Strickland Street cycleway



Results by gender (2018)

Type	Female		Male		Diff.	All riders		Precision at 95% CI
	Avg.	Obs.	Avg.	Obs.	Avg.	Avg.	Obs.	
E-bike	27.4	9	28.0	17	0.6	27.8	26	1.8 km/h
Unassisted	20.8	174	24.0	387	3.2	23.0	561	0.4 km/h
Female % (e-bike)		35%						
Female % (unassisted)		31%						
E-bike diff.						4.8		

1. Women are a larger proportion of e-bike (35%) than unassisted riders (31%)
2. The difference in average speed between genders **may** be less for e-bikes than for unassisted riders
3. E-bike riders travel **about** 5 km/h faster (29.6 km/h) than unassisted riders (24.4 km/h)

Results by facility type

Type	Bus / bike lane		Cycle lane carside		Shared path		Protected	
<i>Location</i>	Average	Obs.	Average	Obs.	Average	Obs.	Average	Obs.
E-bike								
<i>Colombo</i>	27.3	4						
<i>Ferry</i>			29.0	1				
<i>Hagley</i>					28.5	14		
<i>Strickland</i>							26.6	7
Unassisted								
<i>Colombo</i>	24.9	135						
<i>Ferry</i>			23.0	50				
<i>Hagley</i>					21.6	222		
<i>Strickland</i>							23.3	154
Total	24.9	139	23.1	51	22.0	236		
E-bike diff.	2.4		6.0		6.9		3.3	
2017 diff	0.4		7.9		5.0		n/a	n/a

Summary of Christchurch speed study

- E-bikes went from 2.6% to 4.4% of total bikes counted from 2017 to 2018
- Speed difference holding around 5 km/h
 - Higher difference on shared path than on protected cycleway
- Higher proportion of women on e-bikes than unassisted bikes
- More mid-drives and cargo bikes
- Need larger sample and more cities

	Autumn 2017	Winter 2018
e-bikes	15	26
unpowered	557	561
% e-bikes	2.6%	4.4%
Female % (e-bike)	38%	35%
Female % (all bikes)	25%	31%
E-bike vs. unpowered diff.	5.3	4.8



REGULATORY APPROACHES

Regulation in EU

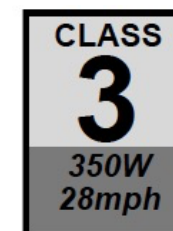
- Effective 01 January 2017

	Category	Description	Power	Motor cut-out	Type approval
AS 15194	Pedelec	Motor only functions on condition the cyclist pedals.	≤ 250 W	≤ 25 km/h	Not applicable
	Powered cycle	Designed to pedal; auxilliary motor with primary aim to aid pedalling. May have a throttle. Can include vehicles with 2, 3 or 4 wheels.	≤ 1000 W	≤ 25 km/h	L1e-A
	Moped	Includes SSEBs, electric mopeds and S-Pedelecs.	≤ 4000 W	≤ 45 km/h	L1e-B

Regulation in USA

Class	Description	Throttle	Power	Motor cut-out	Age
Class 1	Low-speed pedal -assisted electric bicycle	No	Max 750W	Max 20 mph (32 km/h)	n/a
Class 2	Low-speed throttle -assisted electric bicycle	Yes			
Class 3	Speed pedal-assisted electric bicycle Helmet, speedometer, prohibited on shared paths or protected cycleways unless authorised locally	No		<= 45 km/h	>= 16

- Tampering with speed control prohibited
- Registration, license, insurance not required
- Permanent label
- Mopeds, SSEBs separately regulated



Mobility scooter geometric requirements

A practical interpretation of NZS 4121:2001 with respect to mobility scooters

March 2018

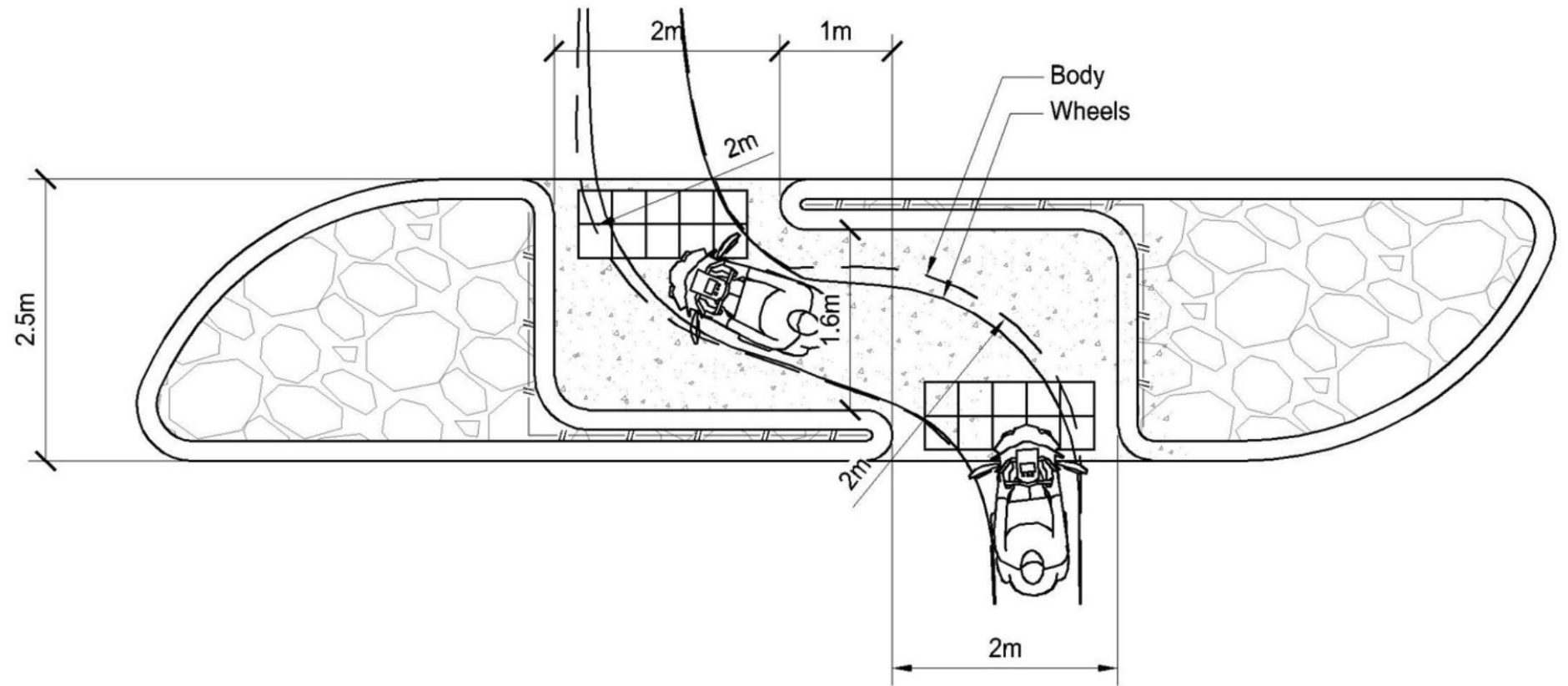


Figure 3 turning path through median refuge with chicane



SITUATION TODAY AND NEXT STEPS

Situation today

Sale >300W
not illegal

Use of
>300W on
road is
illegal

Industry
competitive
concerns



E-scooters and mobility as a service

- Self-balancing variants easy to ride slowly
- Faster than most other modes for short trips
- Can carry on the bus or into an elevator
- Scooter sharing on the horizon?

CITYLAB

DESIGN / TRANSPORTATION / ENVIRONMENT / EQUITY / LIFE 



Prepare now for the tiny vehicle takeover. // Kathy Willens/AP

Why Little Vehicles Will Conquer the City

BENJAMIN SCHNEIDER JUN 21, 2018



ELECTRIC BIKE
ELECTRIC SCOOTER
RENTAL & SALE



ELECTRIC BIKE RENTAL

ALL DAY \$75
HALF DAY \$45

BOOK US ONLINE
BOOK US
PHONE US

Facebook icon
Instagram icon

ELECTRIC SCOOTER RENTAL

ELECTRIC SCOOTER RENTAL

4 HOURS \$35

ELECTRIC SKATEBOARDS

HOVER BOARDS

ELECTRIC SCOOTER SALES

itag

Christchurch
TRAM
- CITY TOUR -

Combo Tickets

Tram & ...	\$48	\$12
Tram & ...	\$48	\$12
Tram & ...	\$40	\$12

Use of electronic scooters to be considered as more hit the pavement - 'they can do a lot of damage'



'They can do a lot of damage' – use of electronic scooters to be co...

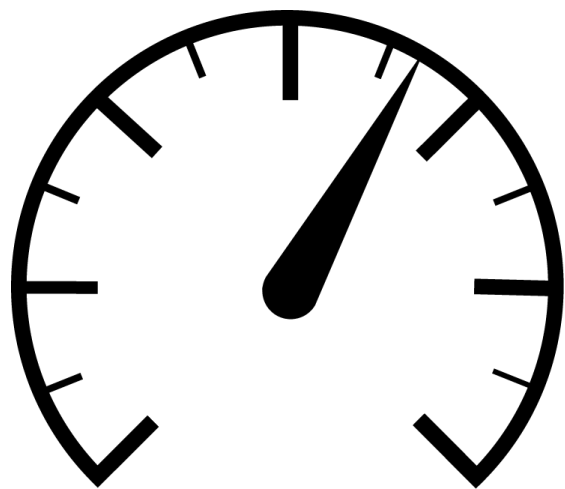
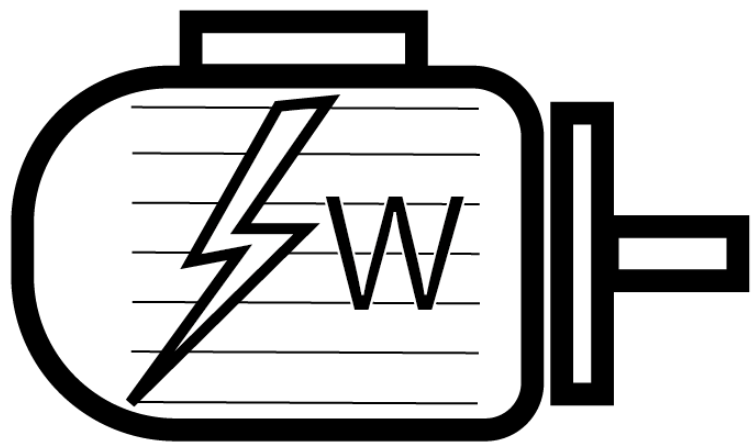
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Ongoing concerns about shared paths



Where narrow paths cannot be avoided; aim for separation and better LOS as budget and priorities allow





Thank you

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