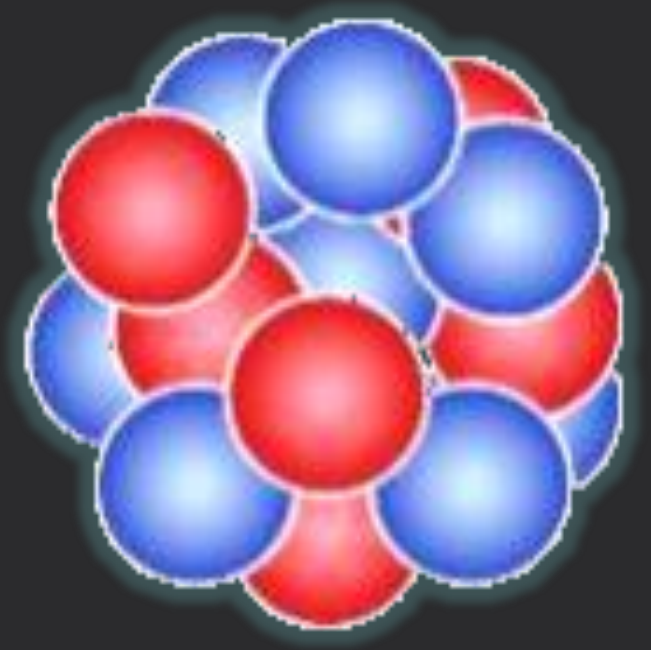
Light at the end of the tunnel … or impending crash?

How cities should plan for the future of the car

@1garsvert
jbarsoum@ca.ibm.com



^{14}C

5730

years

$10^{(-)}$

Kn

years


AED

Back up for a moment:

Why did we start densifying cities?


Shanghai, 1987


Shanghai, 2013
AURORA

3%

GDP cost of traffic in major urban areas
$23B for Los Angeles alone
$200B for UK + France + Germany + US

95%

Accidents caused
by human error

96%

Percentage of time
that cars are not in use

10

Parking spots per car
in major urban areas

1,300,000

Deaths per year
in car accidents

2,000,000,000

Cars on the road
in 2020, *up from*
1B in 2010

Transportation is polluting and unhealthy

- Switch to clean vehicles
- Switch to healthy vehicles

Too many vehicles, congestion

- Use existing transport space more effectively
- ehaviour: more people per vehicle, or fewer cars
- Add more space for transport

Car-centric transport is expensive

- Change fiscal incentives to facilitate alternative models
- Reduce need for car ownership

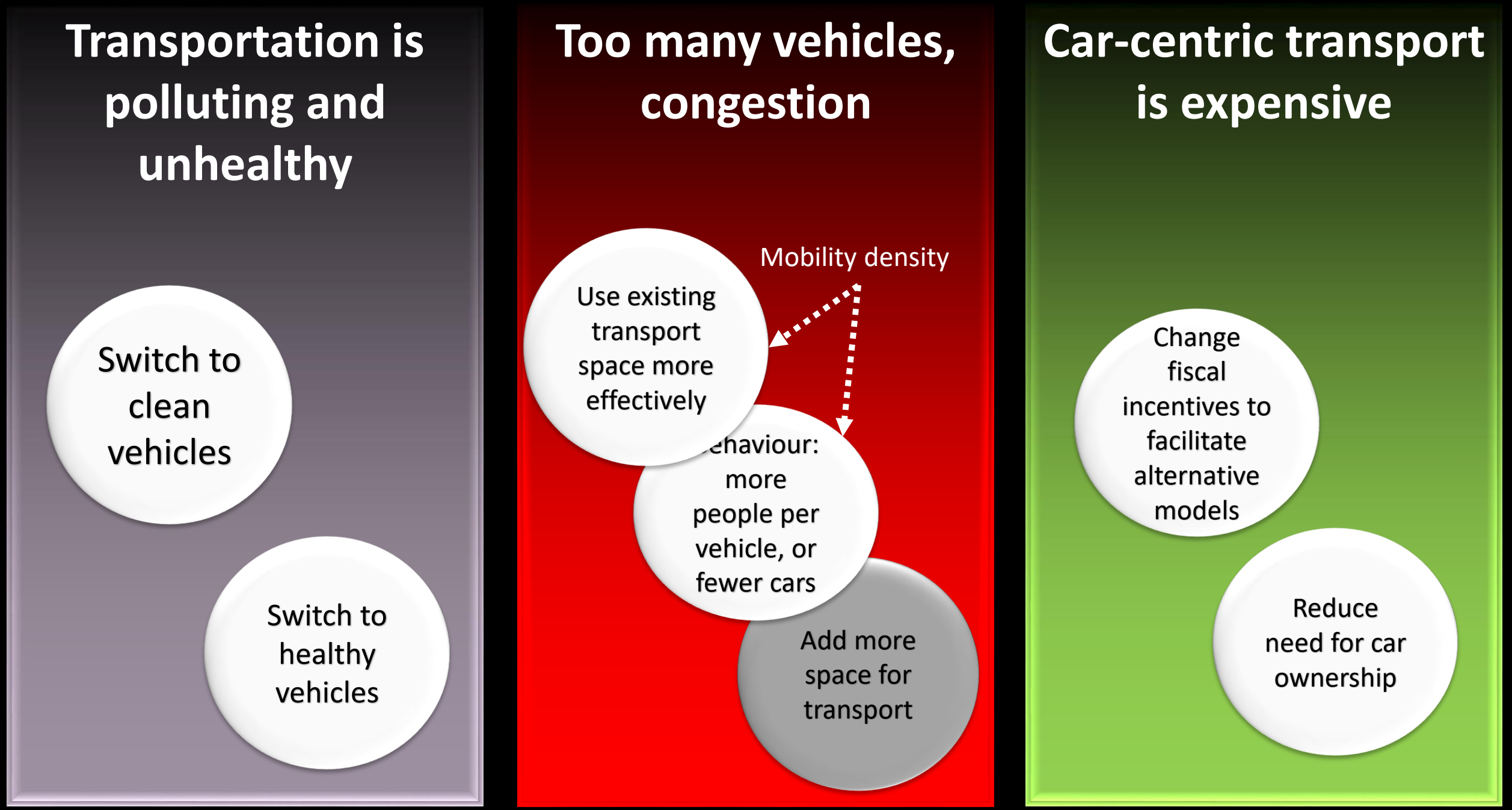

China


France


Brazil


Los Angeles

(Induced demand)


Transportation is polluting and unhealthy
Switch to clean vehicles
Switch to healthy vehicles
Too many vehicles, congestion
Mobility density
Use existing transport space more effectively
ehaviour: more people per vehicle, or fewer cars
Add more space for transport
Car-centric transport is expensive
Change fiscal incentives to facilitate alternative models
Reduce need for car ownership

Switching to clean and healthy vehicles


YC63 HRM

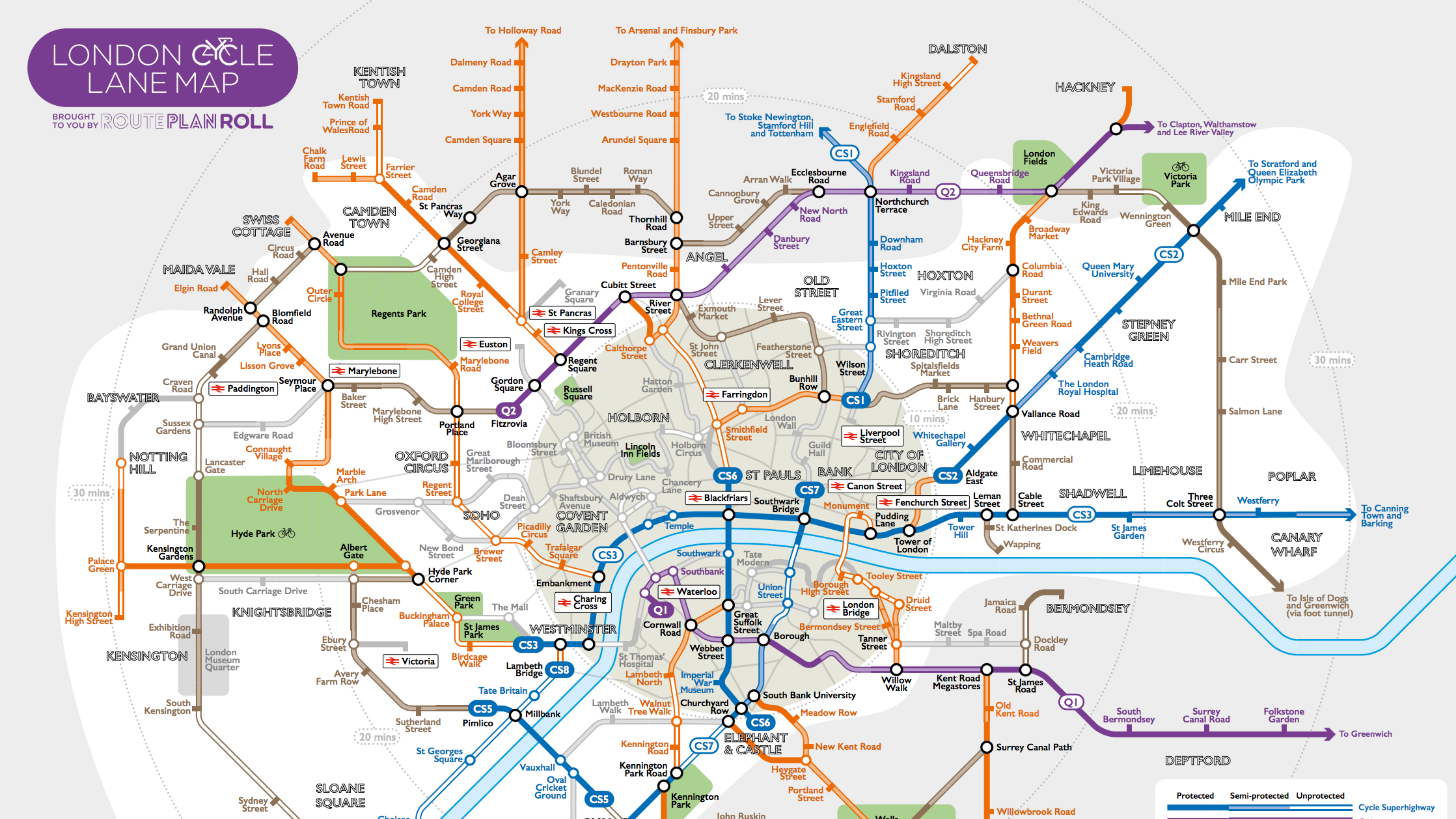

IN AE 101E


IONIQ

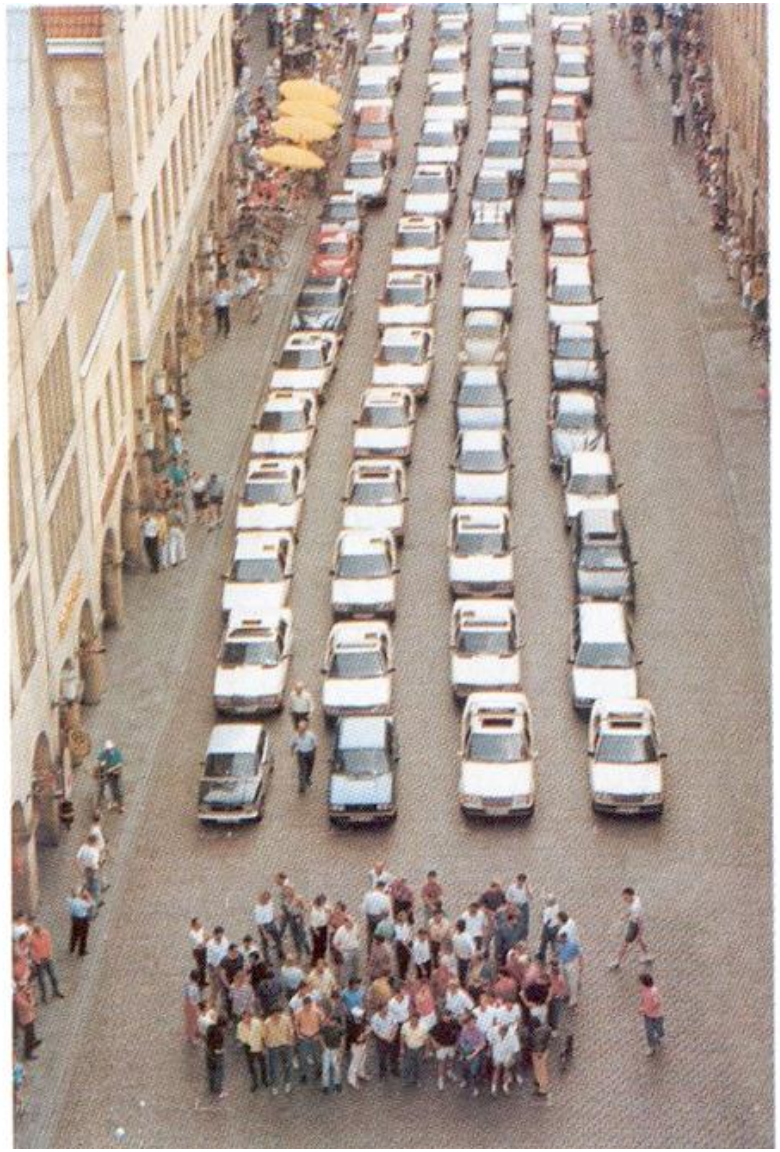
Before the electric car

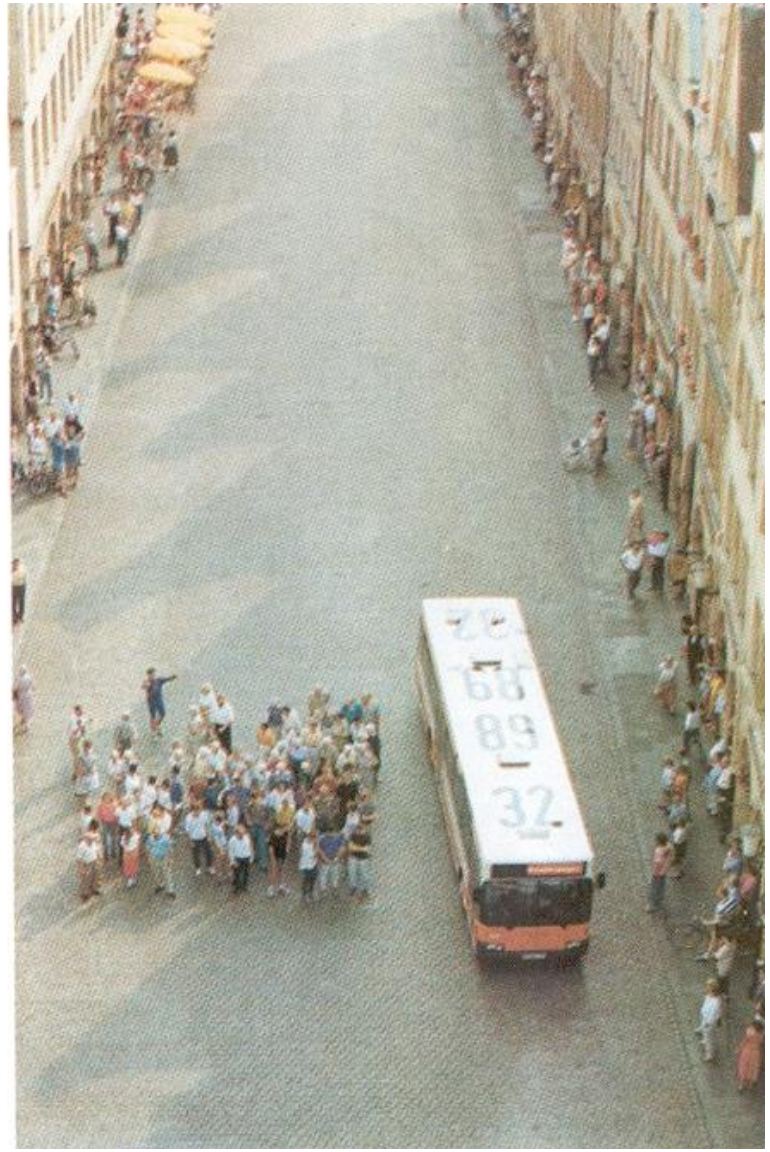
After the electric car

Homage à Copenhagenise…


LONDON CYCLE LANE MAP
BROUGHT TO YOU BY ROUTEPLANROLL
To Holloway Road
To Arsenal and Finsbury Park
Dalmeny Road
Camden Road
York Way
Camden Square
Drayton Park
MacKenzie Road
Westbourne Road
Arundel Square
KENTISH TOWN
Kentish Town Road
Prince of Wales Road
Chalk Farm Road
Lewis Street
Farrier Street
Camden Road
St Pancras Way
Agar Grove
Blundell Street
Roman Way
York Way
Caledonian Road
Thornhill Road
Barnsbury Street
ANGEL
Pentonville Road
Camley Street
CAMDEN TOWN
Georgiana Street
Camden High Street
Royal College Street
SWISS COTTAGE
Avenue Road
Circus Road
Hall Road
MAIDA VALE
Elgin Road
Outer Circle
Regents Park
Randolph Avenue
Blomfield Road
Grand Union Canal
Lyons Place
Lisson Grove
Craven Road
Paddington
Seymour Place
Marylebone
Baker Street
Marylebone High Street
Portland Place
Marylebone Road
Euston
St Pancras
Kings Cross
Granary Square
Cubitt Street
River Street
Calthorpe Street
Regent Square
Gordon Square
Q2
Fitzrovia
Russell Square
BAYSWATER
Sussex Gardens
Edgware Road
NOTTING HILL
Lancaster Gate
Connaught Village
Marble Arch
North Carriage Drive
Park Lane
OXFORD CIRCUS
Great Marlborough Street
Regent Street
Grosvenor
SOHO
Dean Street
New Bond Street
Brewer Street
Picadilly Circus
Shaftsbury Avenue
COVENT GARDEN
Trafalgar Square
Aldwych
Drury Lane
Bloomsbury Street
British Museum
Lincoln Inn Fields
HOLBORN
Hatton Garden
Holborn Circus
Chancery Lane
Temple
Embankment
Charing Cross
Hyde Park Corner
Hyde Park
Albert Gate
Kensington Gardens
The Serpentine
Palace Green
West Carriage Drive
South Carriage Drive
KNIGHTSBRIDGE
Chesham Place
Green Park
The Mall
Buckingham Palace
St James Park
WESTMINSTER
CS3
Birdcage Walk
Victoria
Ebury Street
Avery Farm Row
Lambeth Bridge
CS8
Tate Britain
CS5
Millbank
Pimlico
Sutherland Street
St Georges Square
Vauxhall
Oval Cricket Ground
Kensington High Street
Exhibition Road
London Museum Quarter
KENSINGTON
South Kensington
SLOANE SQUARE
Sydney Street
30 mins
20 mins
10 mins
Exmouth Market
St John Street
CLERKENWELL
Lever Street
Featherstone Street
OLD STREET
Farringdon
Smithfield Street
London Wall
Bunhill Row
Wilson Street
CS6
ST PAULS
Blackfriars
Southwark Bridge
BANK
CS7
Canon Street
Monument
Guild Hall
CITY OF LONDON
Liverpool Street
Whitechapel Gallery
Fenchurch Street
Pudding Lane
Tower of London
Southwark
Tate Modern
Southbank
Waterloo
Q1
Cornwall Road
Union Street
Great Suffolk Street
Borough High Street
Tooley Street
London Bridge
Druid Street
Bermondsey Street
Tanner Street
Borough
Webber Street
St Thomas' Hospital
Lambeth North
Imperial War Museum
Lambeth Walk
Walnut Tree Walk
Churchyard Row
South Bank University
Meadow Row
ELEPHANT & CASTLE
Kennington Road
Kennington Park Road
Kennington Park
New Kent Road
Heygate Street
Portland Street
John Ruskin
DALSTON
Kingsland High Street
Stamford Road
Englefield Road
To Stoke Newington, Stamford Hill and Tottenham
CS1
Arran Walk
Ecclesbourne Road
Cannonbury Grove
Upper Street
New North Road
Danbury Street
Kingsland Road
Northchurch Terrace
Downham Road
Hoxton Street
HOXTON
Pitfield Street
Virginia Road
Great Eastern Street
Rivington Street
Shoreditch High Street
SHOREDITCH
Spitalsfields Market
Brick Lane
Hanbury Street
HACKNEY
To Clapton, Walthamstow and Lee River Valley
London Fields
Queensbridge Road
Victoria Park Village
Victoria Park
King Edwards Road
Wennington Green
Broadway Market
Hackney City Farm
Columbia Road
Durant Street
Bethnal Green Road
Weavers Field
Queen Mary University
STEPNEY GREEN
Cambridge Heath Road
The London Royal Hospital
Vallance Road
WHITECHAPEL
Commercial Road
Aldgate East
CS2
Leman Street
Cable Street
SHADWELL
LIMEHOUSE
POPLAR
Three Colt Street
Westferry
To Canning Town and Barking
Westferry Circus
CANARY WHARF
Tower Hill
St Katherines Dock
Wapping
St James Garden
To Stratford and Queen Elizabeth Olympic Park
MILE END
Mile End Park
Carr Street
Salmon Lane
To Isle of Dogs and Greenwich (via foot tunnel)
Jamaica Road
BERMONDSEY
Maltby Street
Spa Road
Dockley Road
Willow Walk
Kent Road Megastores
St James Road
Old Kent Road
Surrey Canal Path
South Bermondsey
Surrey Canal Road
Folkstone Garden
To Greenwich
DEPTFORD
Willowbrook Road
Protected
Semi-protected
Unprotected
Cycle Superhighway

Sharing public space more efficiently





Houston, TX

Surface parking: 21.3%
Garage parking: 3.7%

Street area (including sidewalks): 39.7%

Total area for rights-of-way plus off-street parking: 64.7%

Park space: 2.6% (1.1% excluding Discovery Green)

A quick calculation using Montreal as an example

- Population 1.5M and 1M cars; 10 spots per car, so 10M parking spaces

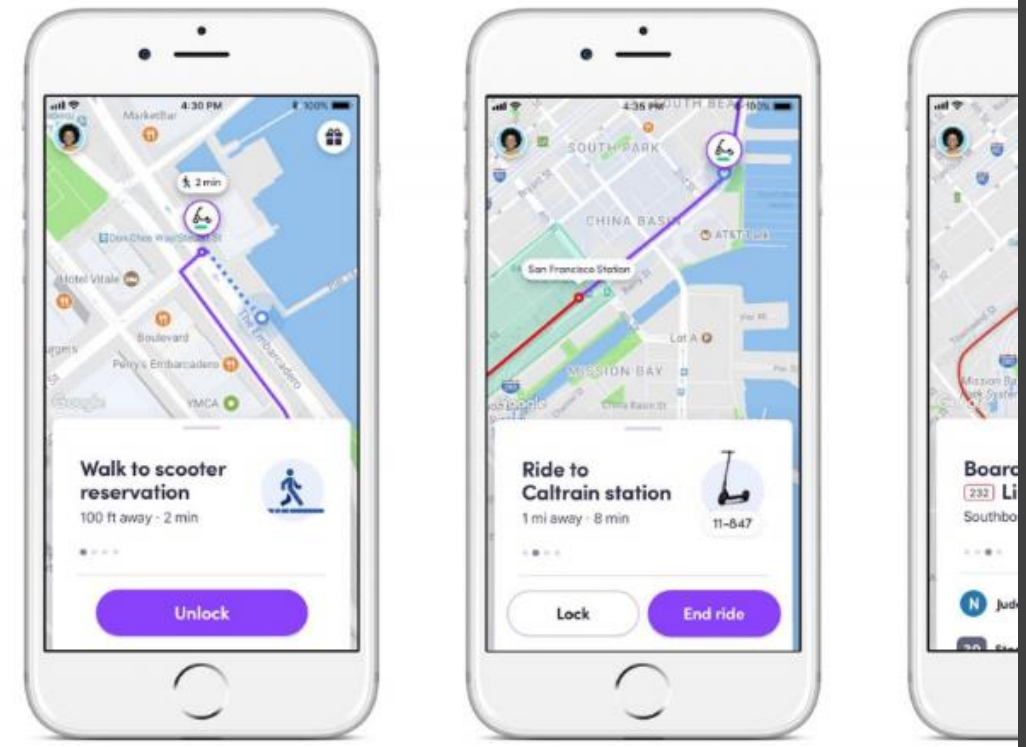
- If we could reallocate 5% of the space from cars
  - Increase the tax base by 16% (30% -> 35% of area)
- **+$560M/y (annual tax revenue ~$3.5B/y)**

- A tree's annual ecosystem benefit might range from $200 to $500
  - Assume you could plant one tree per parking spot
- **+$2B-$5B/y total economic benefit**


The struggle to claim public space has begun
Here, for parking spaces


But also on sidewalks

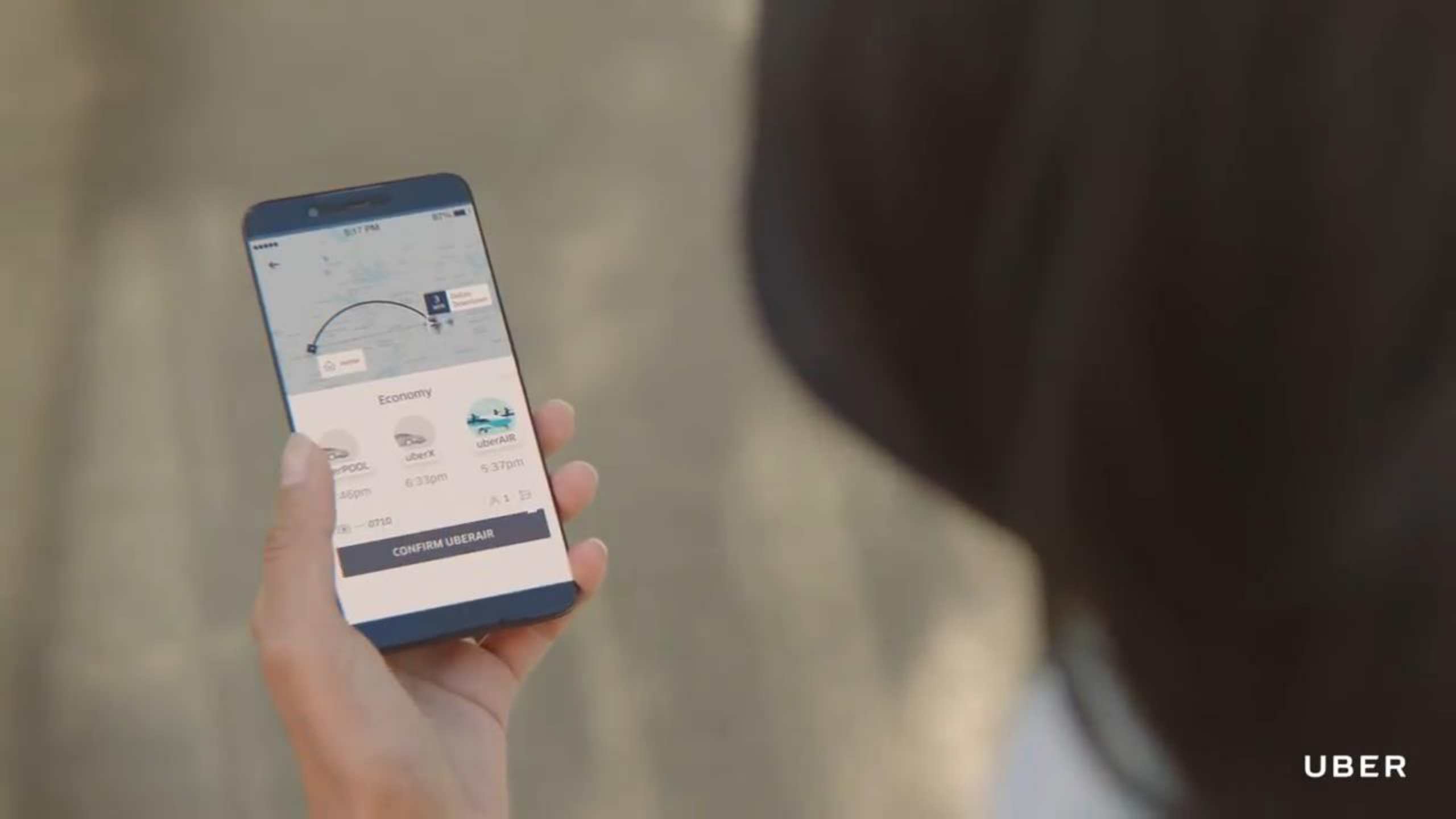

eScooter Share
DROP ZONE
City of LONG BEACH

"Uber Plans Shift to E-Bikes and Scooters for Short, Inner-City Rides"


CAR SHARE
ONLY
CAR SHARE
ONLY

But also in 3D


5:17 PM
87%
Economy
uberX
6:33pm
uberAIR
5:37pm
CONFIRM UBERAIR
UBER

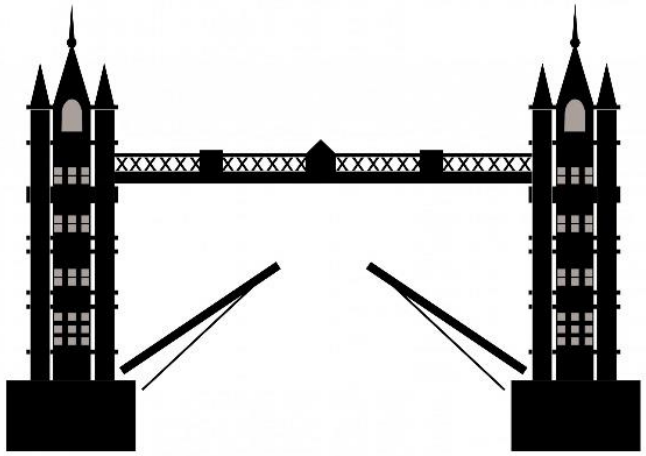

LAX TERMINAL 2

Western land claims

Homestead act (1882)

Changing behavior through fiscal incentives

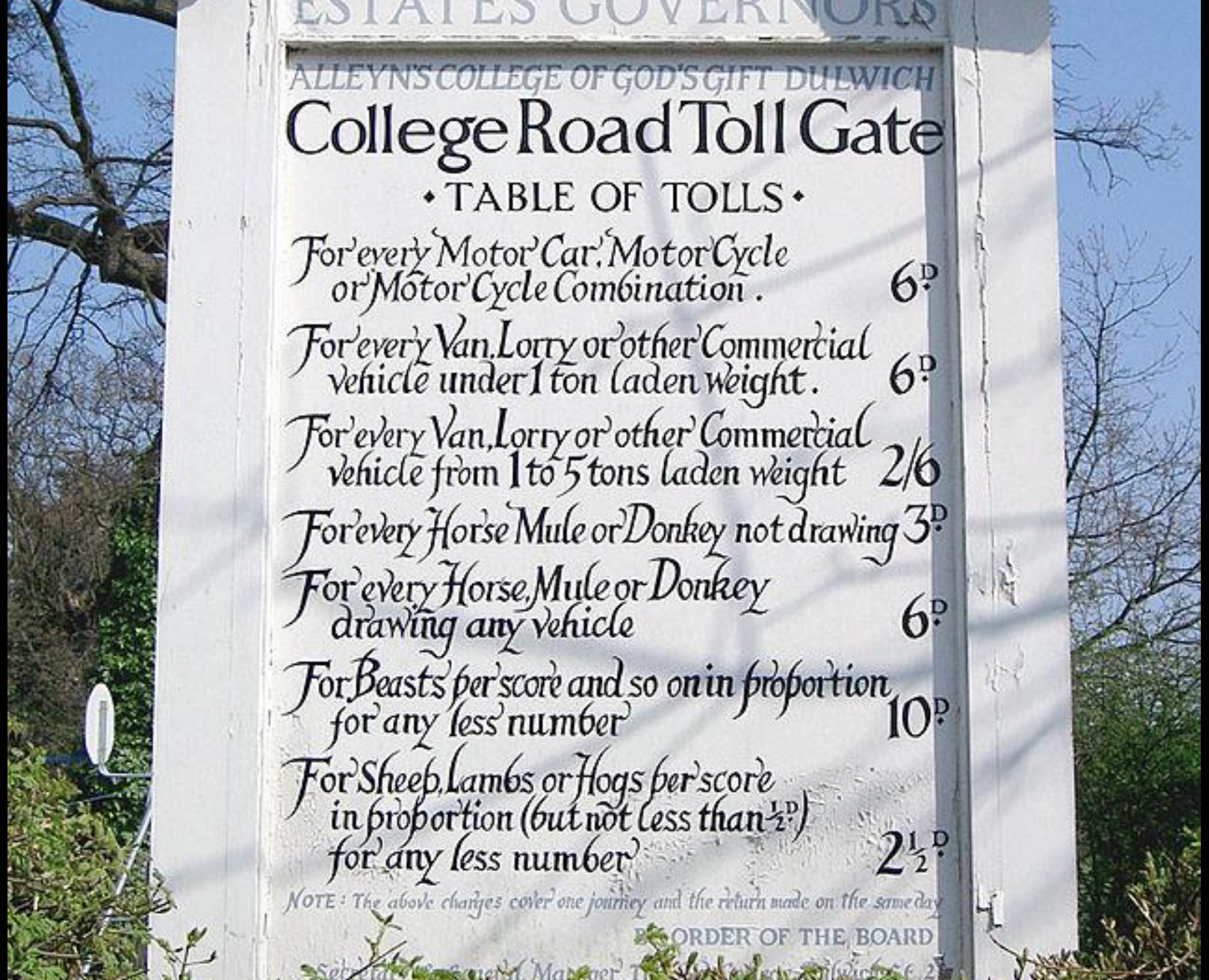
Modern tolling examples



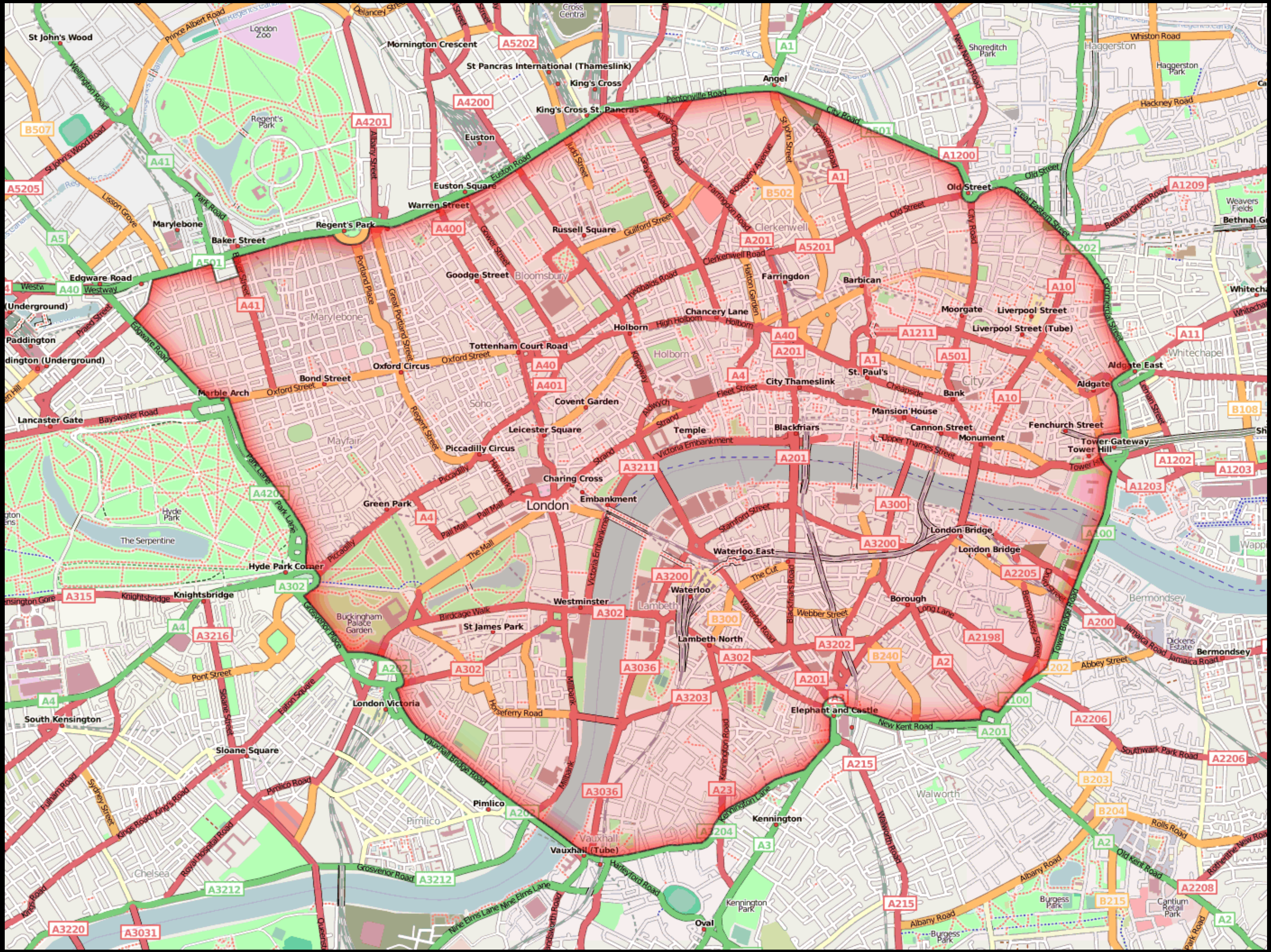
London (Congestion)

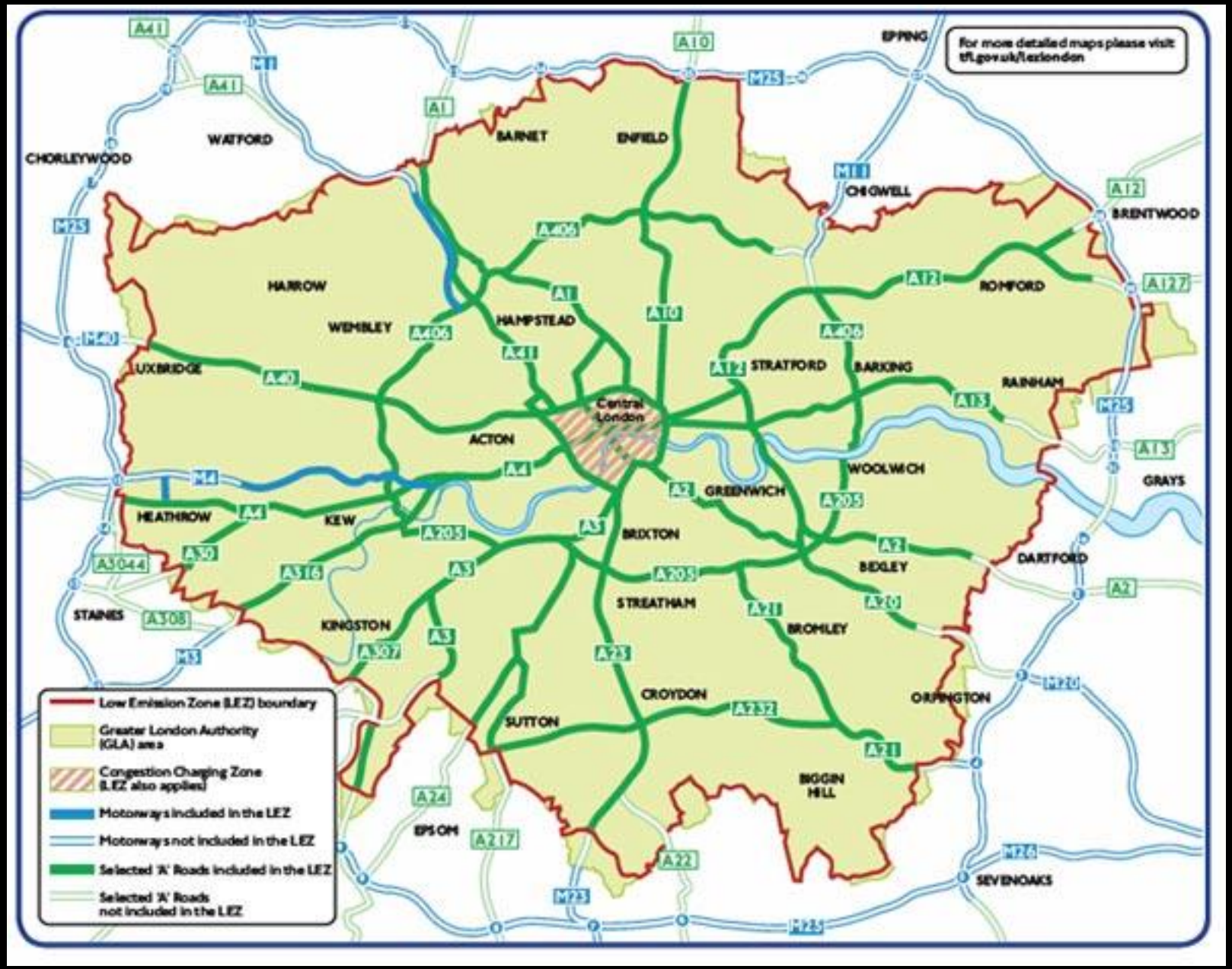
Stockholm (Cordon)

Eindhoven (mileage tolling)



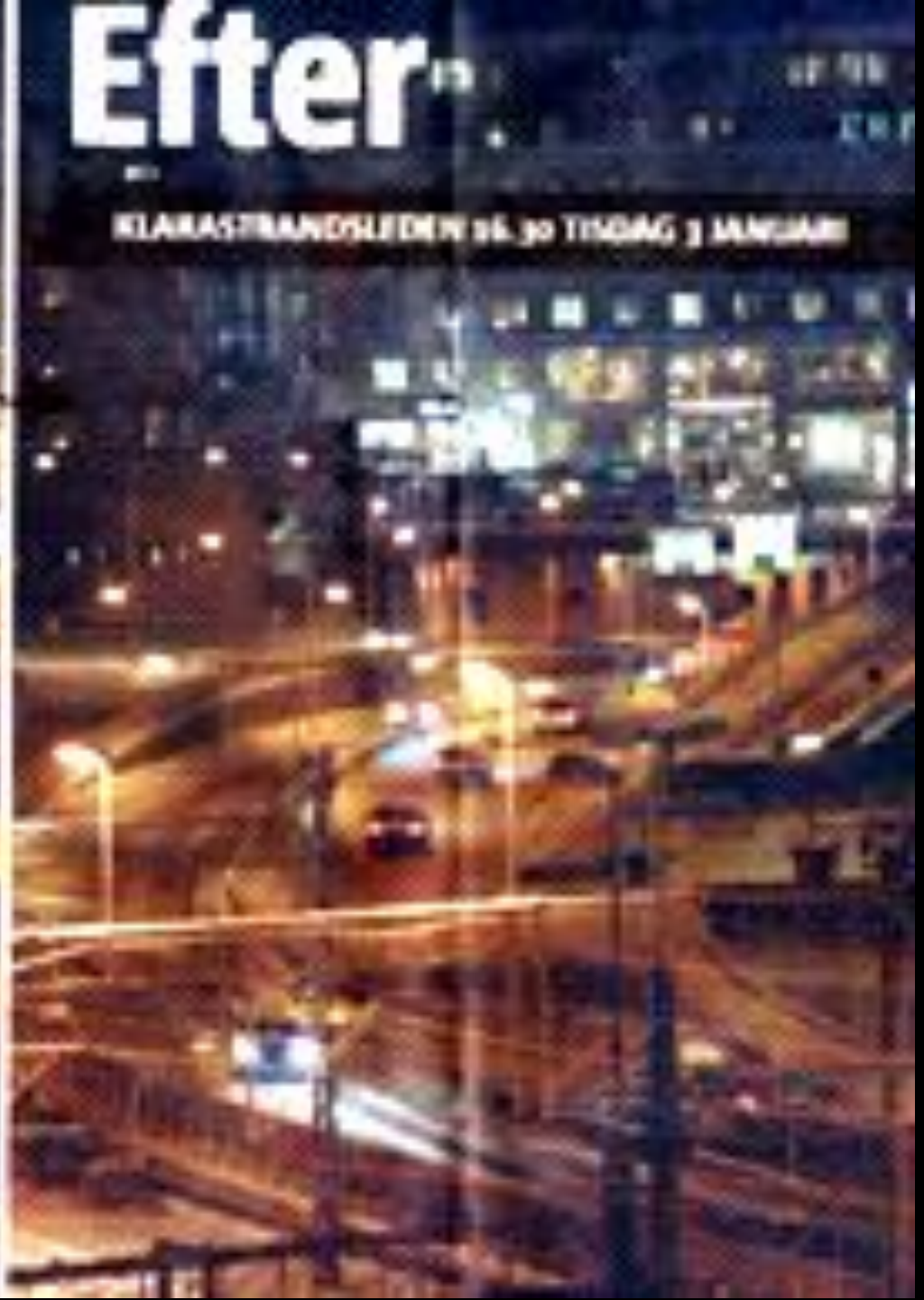

Transport for London
Congestion charging


London
Marylebone
Mayfair
Soho
Bloomsbury
Holborn
Clerkenwell
City
Whitechapel
Bermondsey
Walworth
Pimlico
Chelsea
Vauxhall
Lambeth
Regent's Park
Hyde Park
The Serpentine
Buckingham Palace Garden
Baker Street
Marble Arch
Oxford Circus
Piccadilly Circus
Leicester Square
Covent Garden
Charing Cross
Westminster
Waterloo
London Bridge
Tower Hill
Aldgate
Liverpool Street
Moorgate
Barbican
Farringdon
King's Cross
Euston
Angel
Old Street
Elephant and Castle
Kennington
Oval
London Victoria
Sloane Square
Knightsbridge
Hyde Park Corner
Paddington
Edgware Road
Bond Street
Green Park
St James Park
Blackfriars
Bank
Monument
Borough
Lambeth North
Pimlico
Vauxhall (Tube)

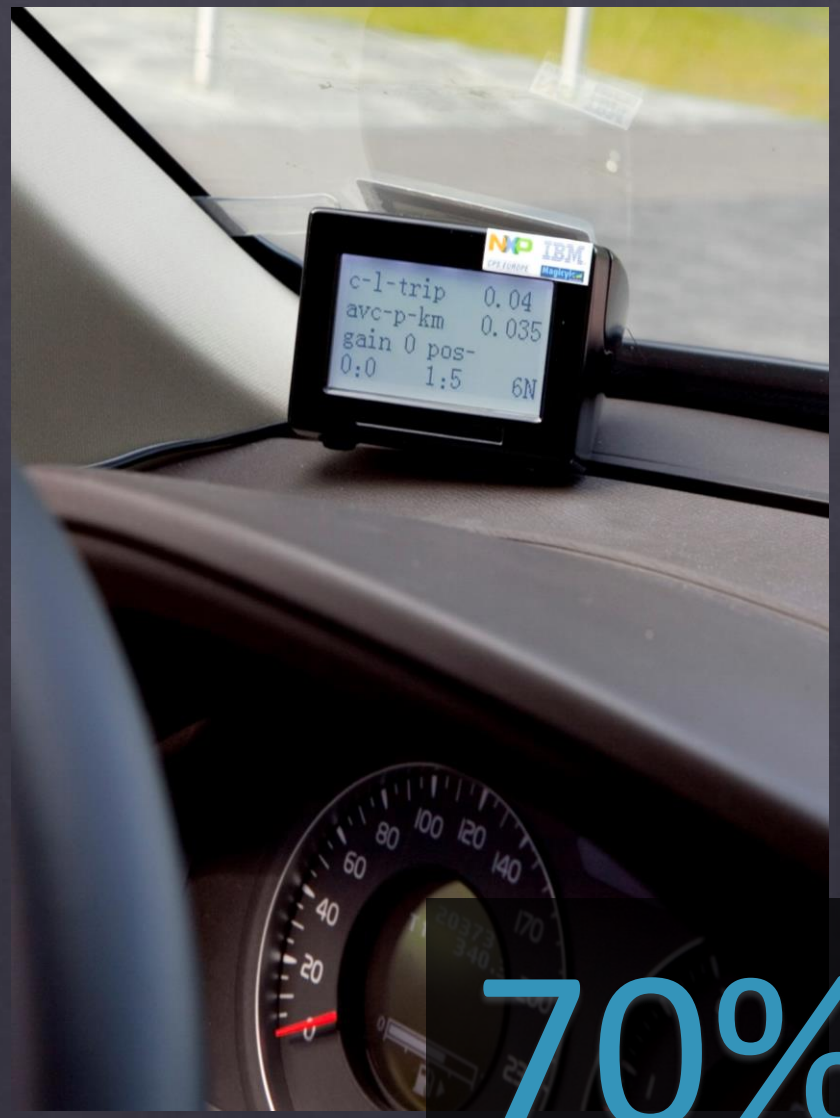

for more detailed maps please visit tfl.gov.uk/lezlondon
CHORLEYWOOD
WATFORD
BARNET
ENFIELD
EPPING
CHIGWELL
BRENTWOOD
HARROW
WEMBLEY
HAMPSTEAD
ROMFORD
UXBRIDGE
STRATFORD
BARKING
RAINHAM
Central London
ACTON
WOOLWICH
GRAYS
HEATHROW
KEW
GREENWICH
BRIXTON
DARTFORD
BEXLEY
STAINES
KINGSTON
STREATHAM
BROMLEY
CROYDON
ORPINGTON
SUTTON
BIGGIN HILL
EPSOM
SEVENOAKS
Low Emission Zone (LEZ) boundary
Greater London Authority (GLA) area
Congestion Charging Zone (LEZ also applies)
Motorways included in the LEZ
Motorways not included in the LEZ
Selected 'A' Roads included in the LEZ
Selected 'A' Roads not included in the LEZ


Betalstation
transportstyrelsen.se
E4 E20
HELSINGBORG
GÖTEBORG
E4 E20
SUNDSVALL
SOLNA
275 V


Före
KLARASTRANDSLEDEN kl. 20 MÅNDAG 2 JANUARI


Efter
KLARASTRANDSLEDEN kl. 20 TISDAG 3 JANUARI


20%
transportstyrelsen.se
Betalstation
E4 E20
HELSINGBORG
GÖTEBORG
E4 E20
SUNDSVALL
SOLNA
275 V



70%

Increasing mobility density through carsharing, carpooling and “taxi 2.0”

It used to be easy

Public transport

Taxi

Your own car

Now, not so much

And regulation is lagging

Public

Shared autonomous

Shared pool

Taxi

Shared public

Carshare

Private share

Private autonomous

Private

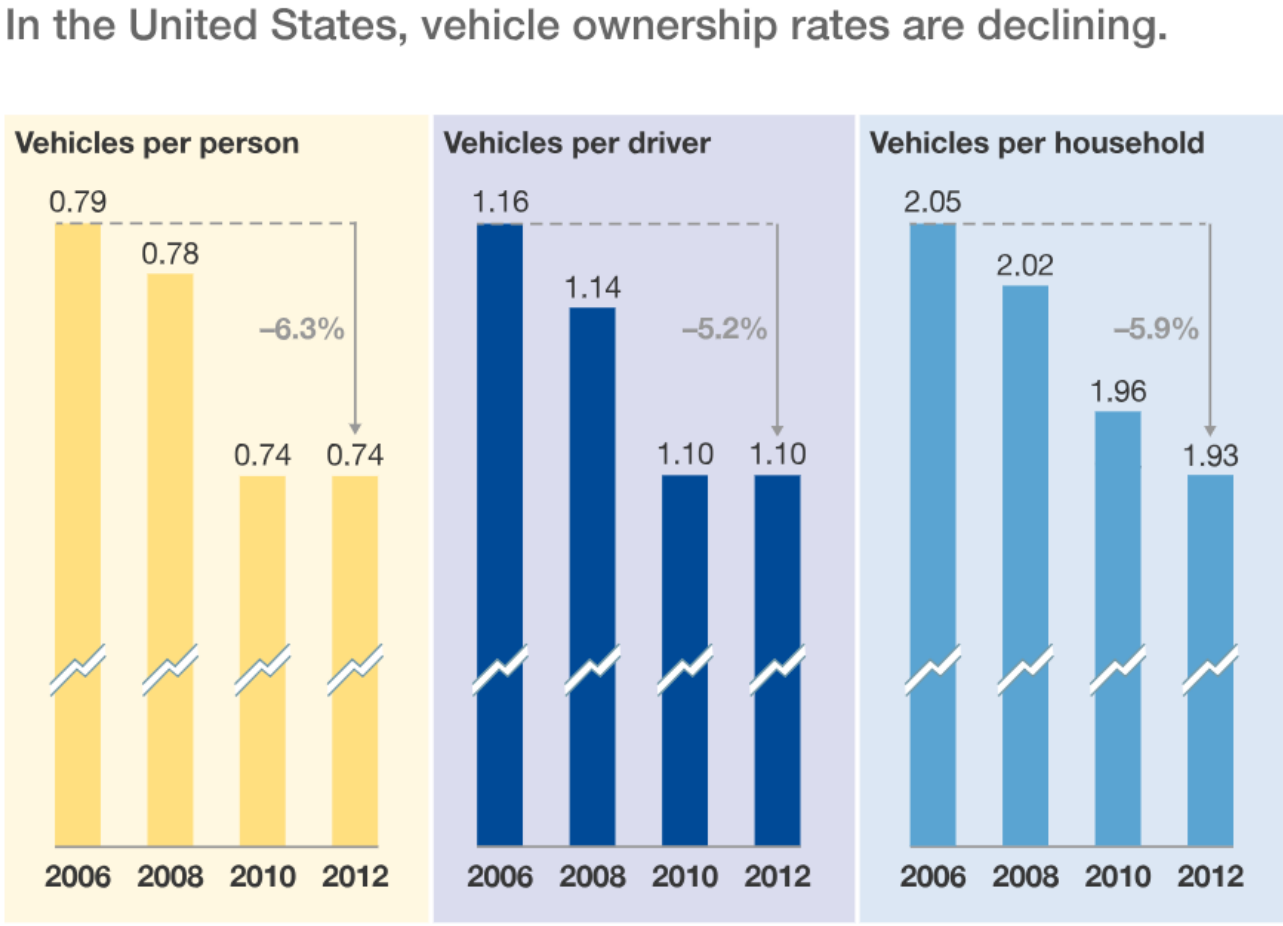
Uber-Lyft

uberPOOL

sharethebus

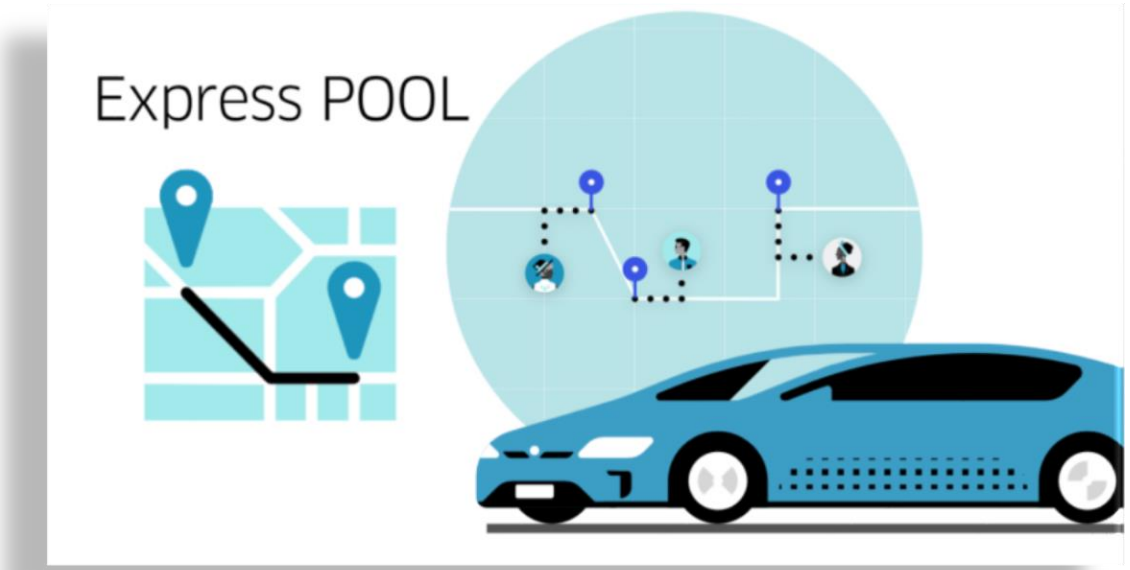
FLiXBUS

Can car sharing replace car ownership?

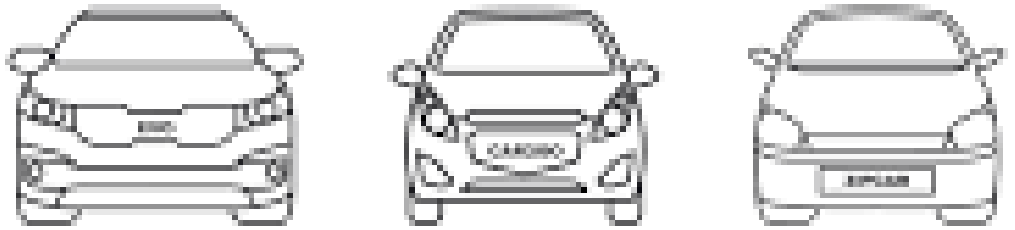


Is Taxi 2.0 evolving to City Bus 2.0?

How will car sharing impact public transport and modal share?



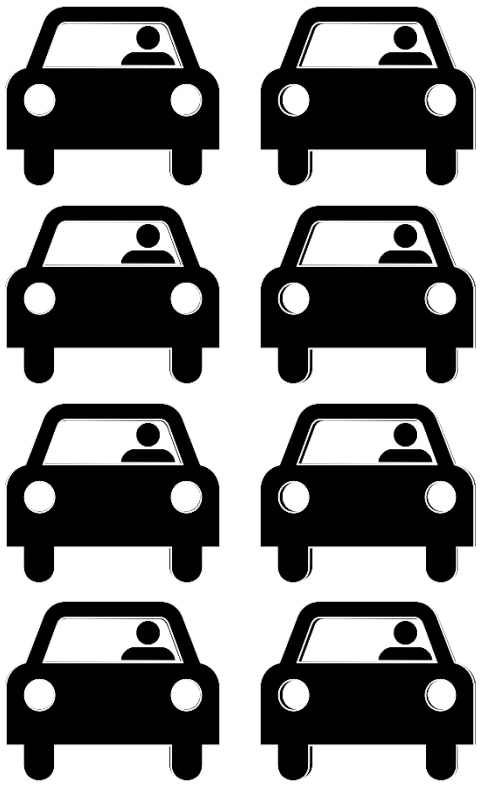
What is the impact on parking needs? What will we do with excess parking?

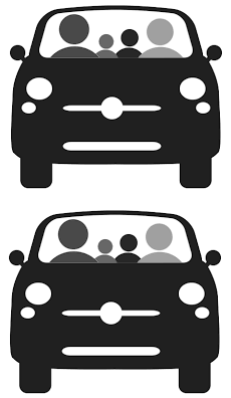


CARSHARE
PARKING ZONE

Autonomous vehicles


60





NOT!

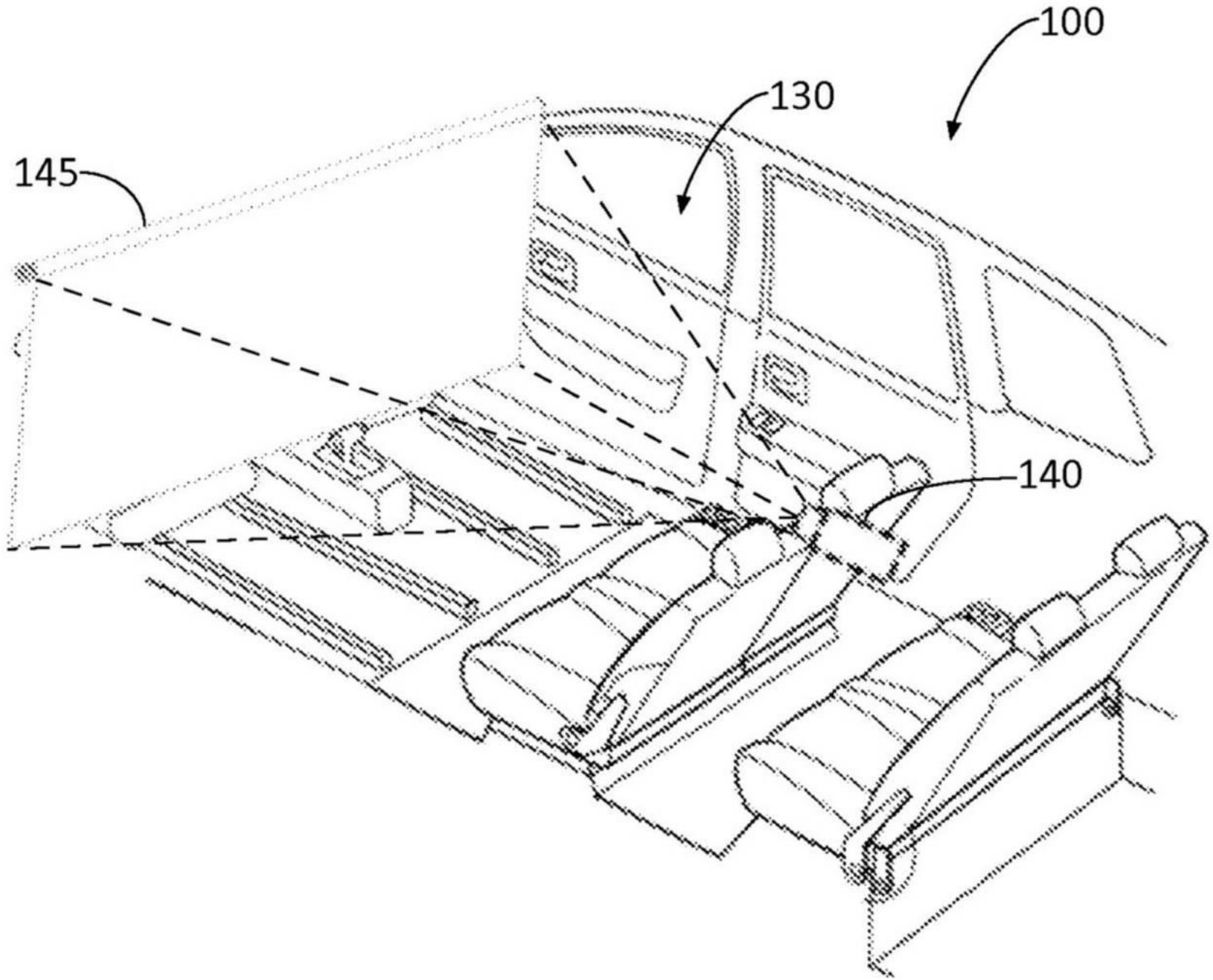
PROGRESS!


olli
olli
olli
2


WAYMO

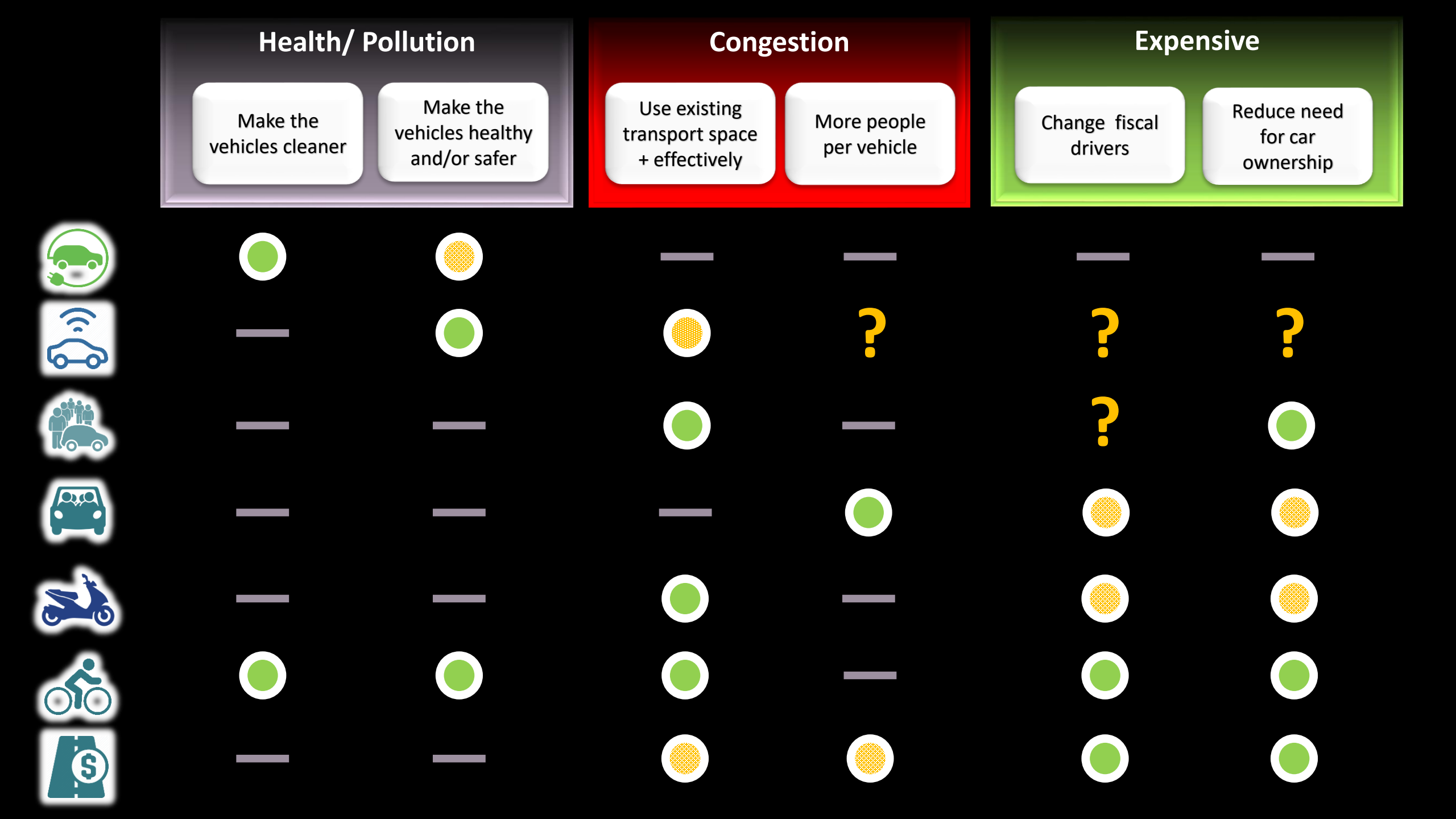

olli
olli


EASY MILE
EZ10
EASY MILE
EZ10
EZ10


100
130
145
140


My unwatched episodes
72°
70°

If all the vehicles were autonomous, electric and on-demand, would there be a difference between these services?

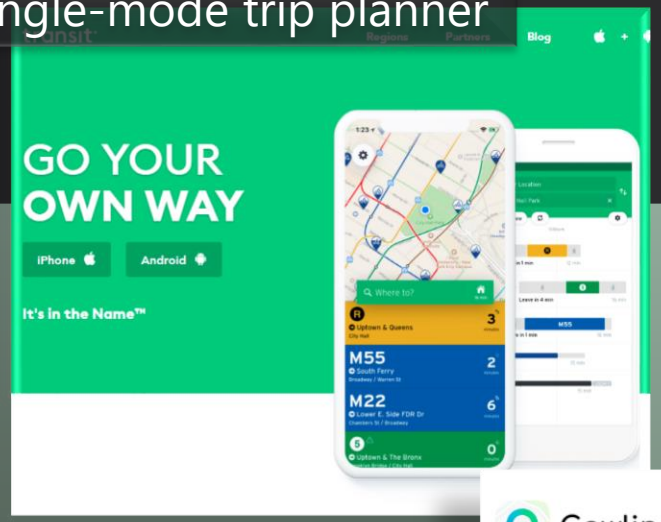

Health/ Pollution
Make the vehicles cleaner
Make the vehicles healthy and/or safer
Congestion
Use existing transport space + effectively
More people per vehicle
Expensive
Change fiscal drivers
Reduce need for car ownership
?
?
?
?

The industry that masters all of this will rule transportation

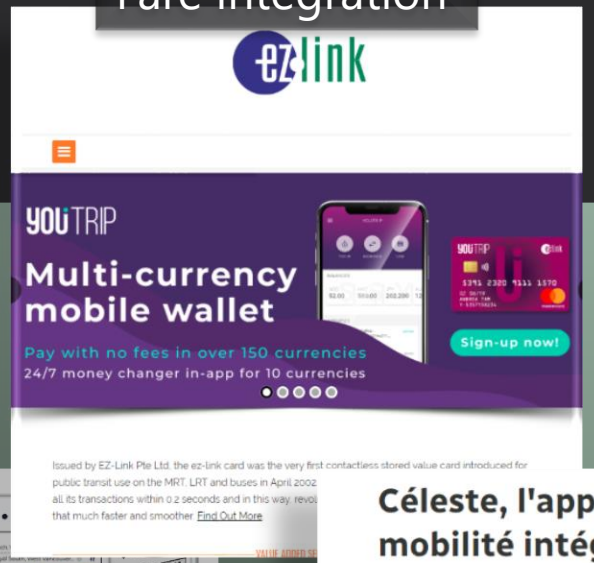
- Make the vehicles clean
- Switch to healthy vehicles
- Use existing transport space more effectively
- Transport more people per vehicle
- Add more space for transport
- Change fiscal incentives to facilitate alternative models
- Reduce need for car ownership

Helping people find their way, door to door:
From trip planning to Mobility as a Service (MaaS)

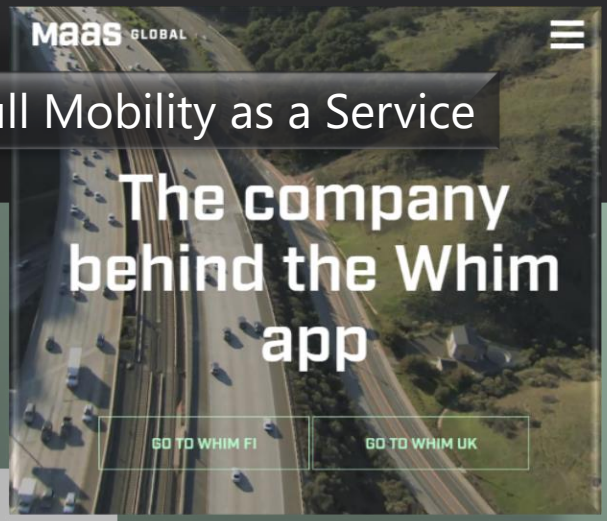
Single-mode trip planner



Fare integration



Full Mobility as a Service



Multimodal trip planner

Open systems & APIs

What should you watch for next?

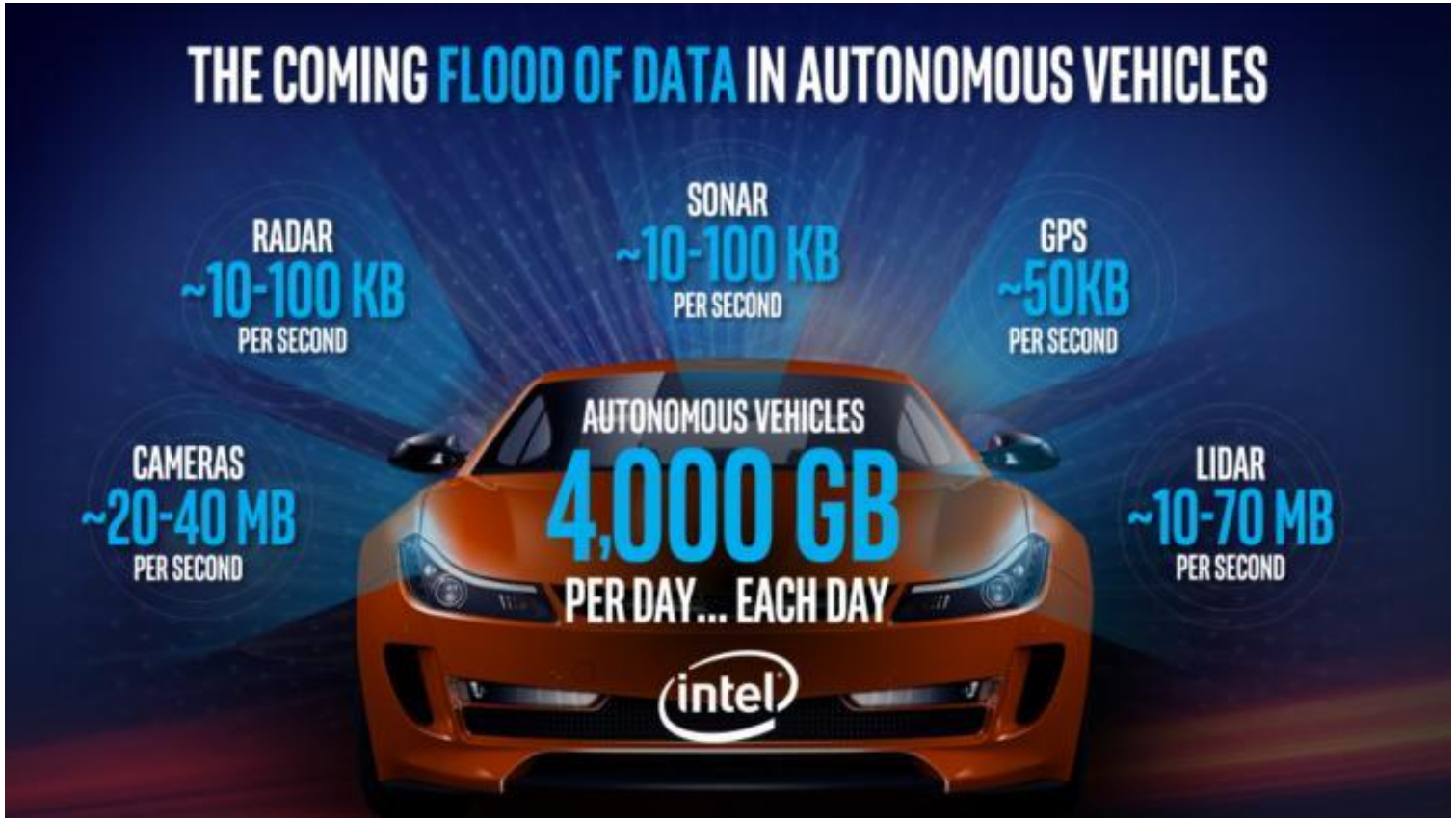
Use the regulatory and fiscal levers judiciously

Deal with societal concerns and objectives

Build a shared vision

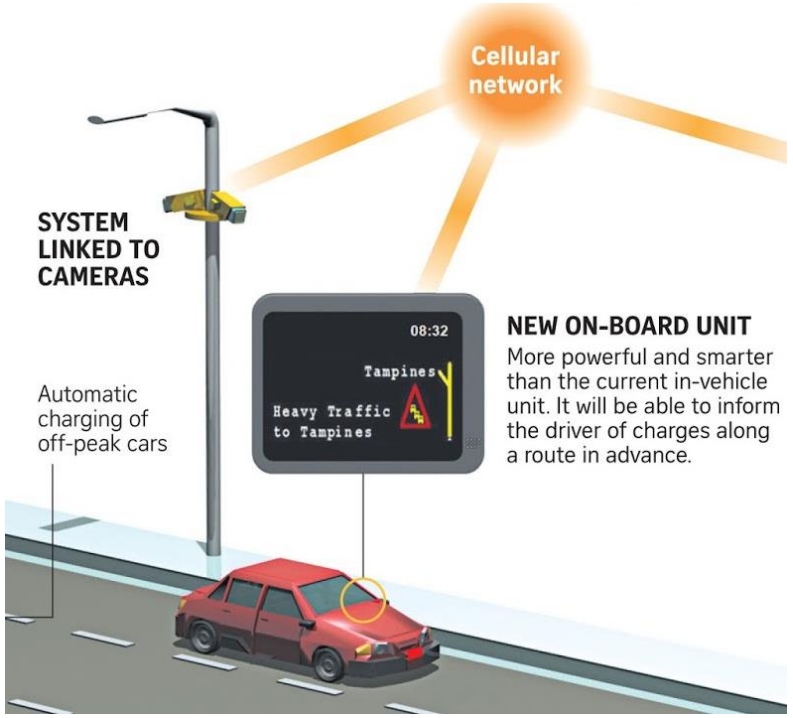
1. Judicious use of Regulatory Levers

Lever 1:
Data Sharing



Lever 2:
Fiscal changes

- Mileage tax for autonomous vehicles?
- Price parking appropriately



2. Deal with Societal Concerns and Objectives

Concern 1: Privacy

Concern 2:
Equity and accessibility

Concern 3: Usage costs

Driverless cars could cost 35 cents per mile for the Uber consumer

By Caitlin Huston
Published: Sept 19, 2016 11:42 a.m. ET

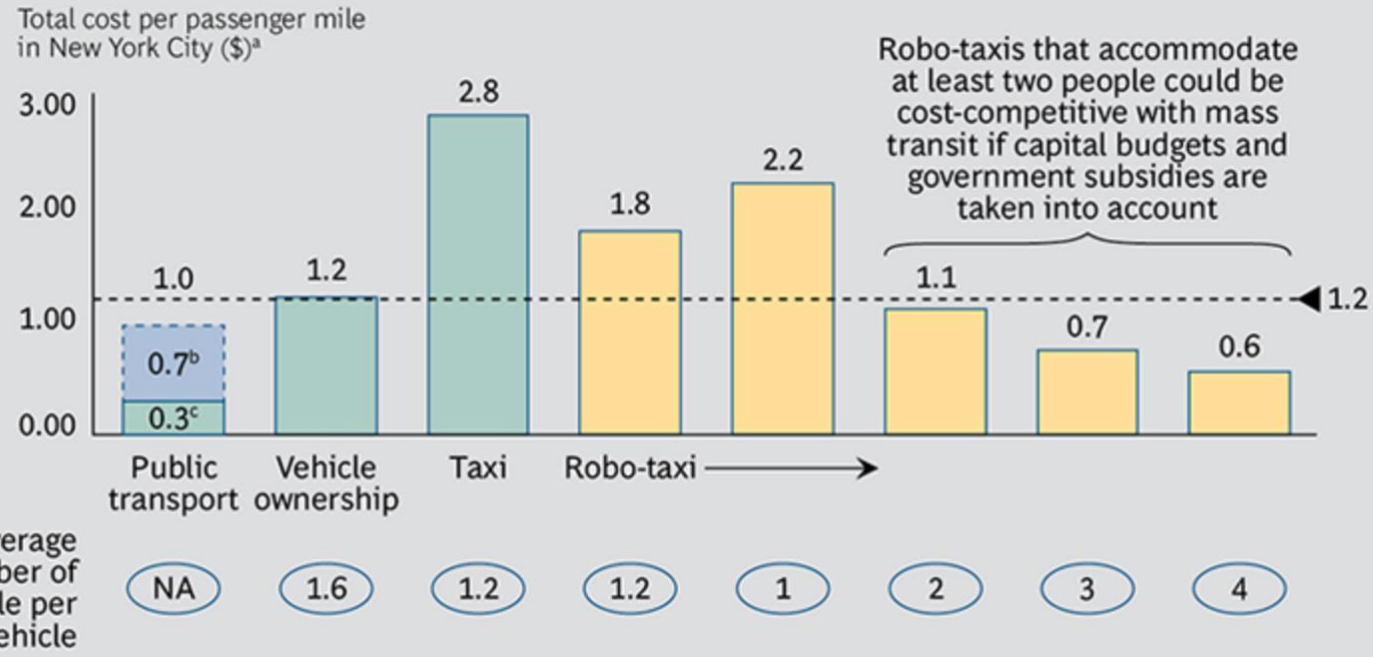
03.03.17 | FAST CITIES

Will Ride-Hail Be Free By 2021? The Startup Ad Platform Vugo Says Yes

The company is betting that passengers will soon travel in autonomous vehicles for free as long as they don't mind watching ads—including political ones.

Robo-Taxis Could Replace Traditional Taxis and Cars in Megacities

New York City case study



Sources: BCG analysis; U.S. Department of Transportation; NYC Metropolitan Transportation Authority; NYC Taxi & Limousine Commission; Kelley Blue Book.

[a]Does not consider the impact of convenience and shorter wait and commute times.

[b]Non-fare-based operating funds received from New York City transit; local, state, and federal sources; and other sources.

[c]Annual fare revenues per passenger mile traveled.

Concern 4:
Safety and security

Concern 5:
Improved Quality of life

Street redesign

3. Build a shared vision

Shared Vision Element 1: Economic development

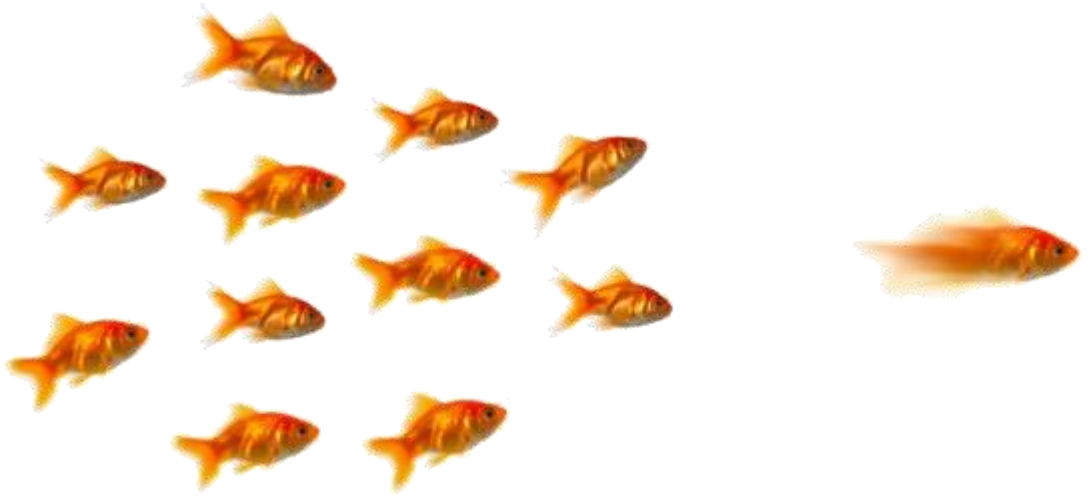
- Articulate economic gains
- Rethink fiscal environment

Shared Vision Element 2: Defining new careers

Shared Vision Element 3: Level-up education & training

Shared Vision Element 4: New Governance

- Unified governance
  - Helsinki, TFL
- Unified fiscal planning
  - California, Norway
- Autonomous cars require triple-helix collaboration and public sector experimentation
  - California, Singapore



Thank you!

@1garsvert
jbarsoum@ca.ibm.com