

The future of road funding – through the looking glass



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Current drivers of change

Shifting patterns of vehicle usage

- MaaS
- Sharing economy
- Mass transit systems
- Hub and spoke

Technology

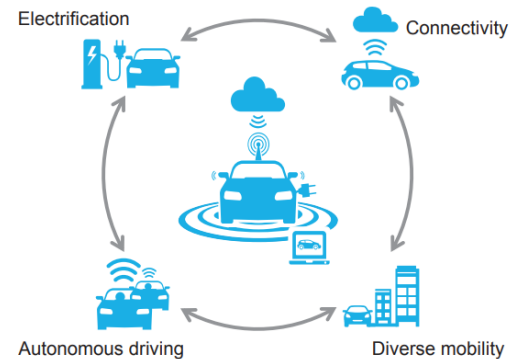
- Vehicle efficiencies
- Electric vehicles, batteries and charging technology
- AI and autonomous vehicles
- Connected vehicles (e.g. e-buses)

Other influences

- Housing availability and affordability
- Changing demographics
- Decline in fossil fuel use as sources of vehicle energy – hydrogen, renewables etc

Global megatrends trigger trends in the automotive industry that have the potential to radically change the mobility industry

4 disruptive technology-driven trends ...



... radically changing the mobility industry

Shifting markets and revenue pools

Changes in mobility behavior

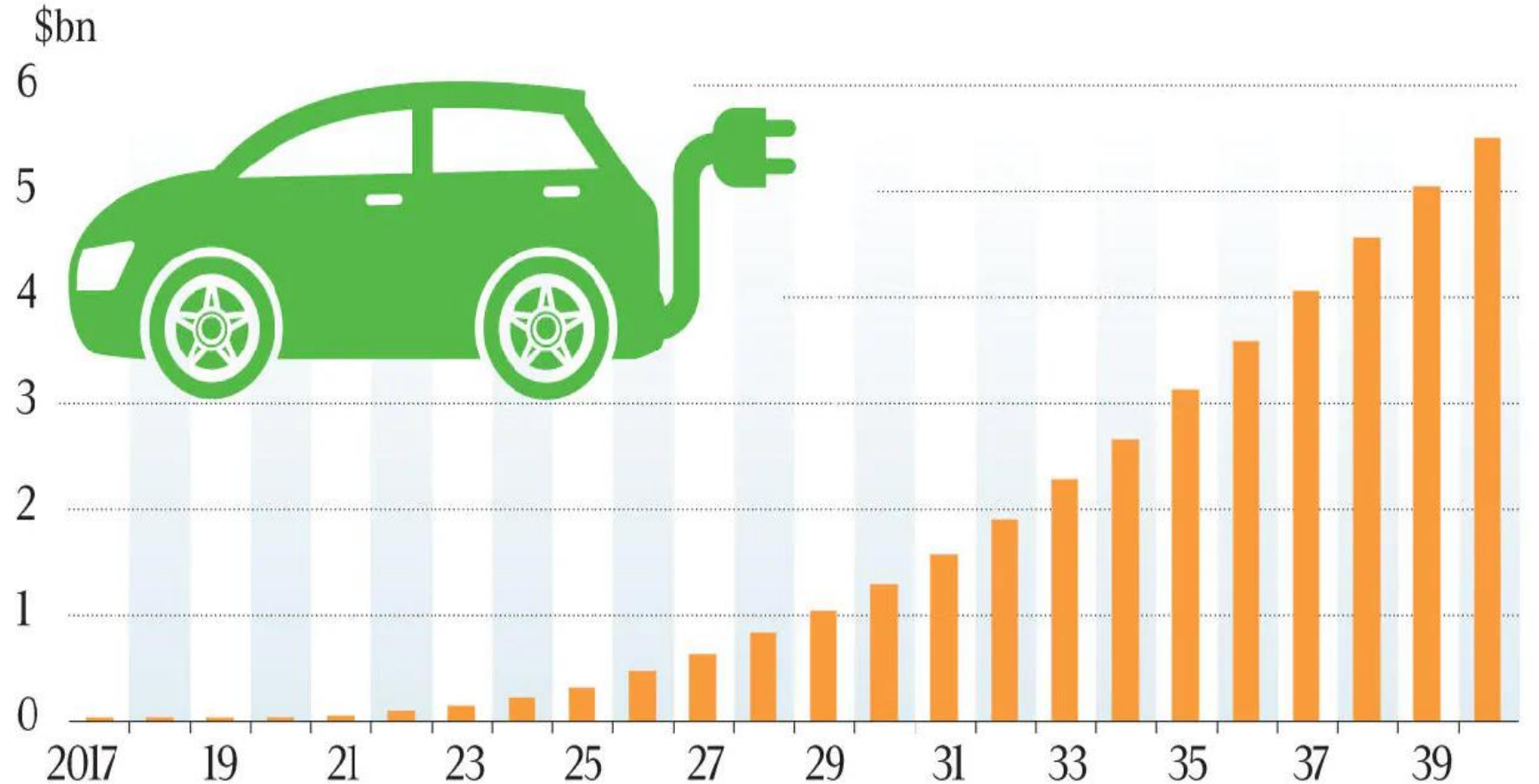
Diffusion of advanced technology

New competition and cooperation

SOURCE: McKinsey

Out with the old....

LOST FUEL EXCISE REVENUE FROM THE SHIFT TO ELECTRIC CARS



Source: BloombergNEF

Out with the old....

- Vehicles registrations and licences
- Fuel excise
 - Bloomberg New Energy Finance 2018 study - >\$1b hit by 2030 and >\$5b hit by 2040
- Direct and indirect taxes (e.g. Council rates, GST and stamp duties on vehicle purchases and insurances)
- Subscription services offered to motorist (e.g. NRMA, insurers and car manufacturers)

What's being promoted globally?

- User/consumption charges (without or without capacity charges)
- Tolls (e.g. toll roads, corridor charging, time of day, hot lanes, heavy vehicle etc.)
- Congestion charges
- Netflix-style subscriptions (e.g. WHIM in Helsinki)

Where do we go?

Need to understand the short-term and long-term objectives:

- Moderating motorists behaviour
- Sustainability of road network (capex and opex)
- Safety
- Productivity
- Environmental footprint
- 'Fairer' use system (social equity)
- Connectivity (people, places, work, services)
- Consumerism

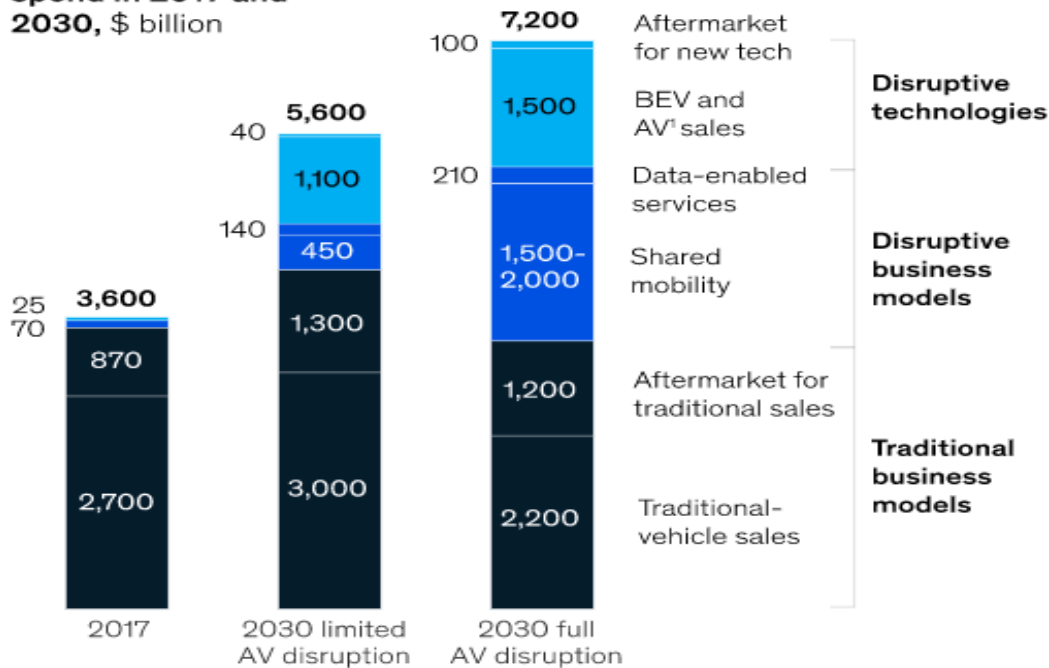
Where do we go – infrastructure v services?

- Current options are 'infrastructure' focused
 - Easier to determine and impose
 - e.g. EV users charged rate per km
 - Harder to accept by all users if considered a new 'tax'
 - Often overlooks 'first mile', 'last mile' and car parking (e.g. current issue with 'dockless' micro-vehicles)

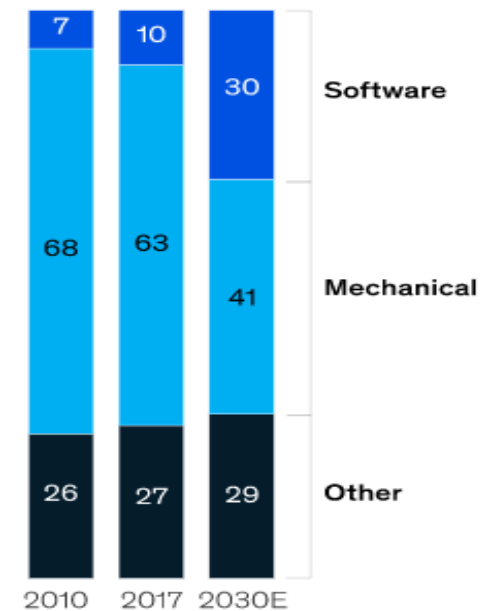
- Should the focus be on 'products and services' side?
 - Various products and services being offered
 - Products and services target different users at different times
 - Pricing on an outcomes basis – easier to accept by users
 - Government return through direct taxes (e.g. GST) and new revenue models

Electric and autonomous vehicles will unlock new potential as revenues fragment from traditional streams and software content increases.

Mobility-revenue scenario, based on spend in 2017 and 2030, \$ billion



Average vehicle-component content, % by value



Note: Figures may not sum to 100%, because of rounding.
¹Battery electric vehicle and automated vehicle.

What are the products and services?

- Mobility services (e.g. robo-taxis, multi-modal subscriptions) – a new consumer experience
- Data – the newest asset class
 - Spectrum, communication and storage services
 - Capitalising on data
 - IoT
 - ‘vehicle to everything’ (V2X) communications
- ‘Recharging economies’
 - Ultra-fast charging network (e.g. Qld Government and WA Government)
 - Wireless charging roads (e.g. UK) and wireless charging docks (e.g. Norway)
- Public transport services (e.g. advertising) – reduce public transport charges
- Insurance and health services (e.g. safety and security improvements)
- Property services
 - Connected ‘smart’ homes, industrial hubs and cities
 - Increase in value of properties – ‘value capture’

Mobility as a Service

ILLUSTRATIVE

Car data could enable in-car advertising, allowing for decision making or purchasing online while driving

! Point of purchase decision 🛒 Point of actual purchase

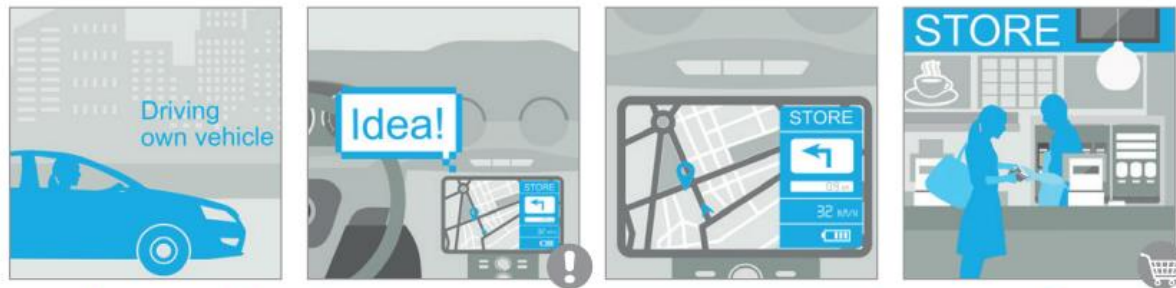
Today

Car as vehicle to **carry the customer** to a shop after the decision to purchase has been made



Tomorrow

Car as touchpoint to **recommend to the customer** where/ what to buy



Car as service to be provided to **support the customer** in either buying onboard, reaching the store or enjoying the brand experience



SOURCE: McKinsey

Can this be achieved by 2030?

Challenges

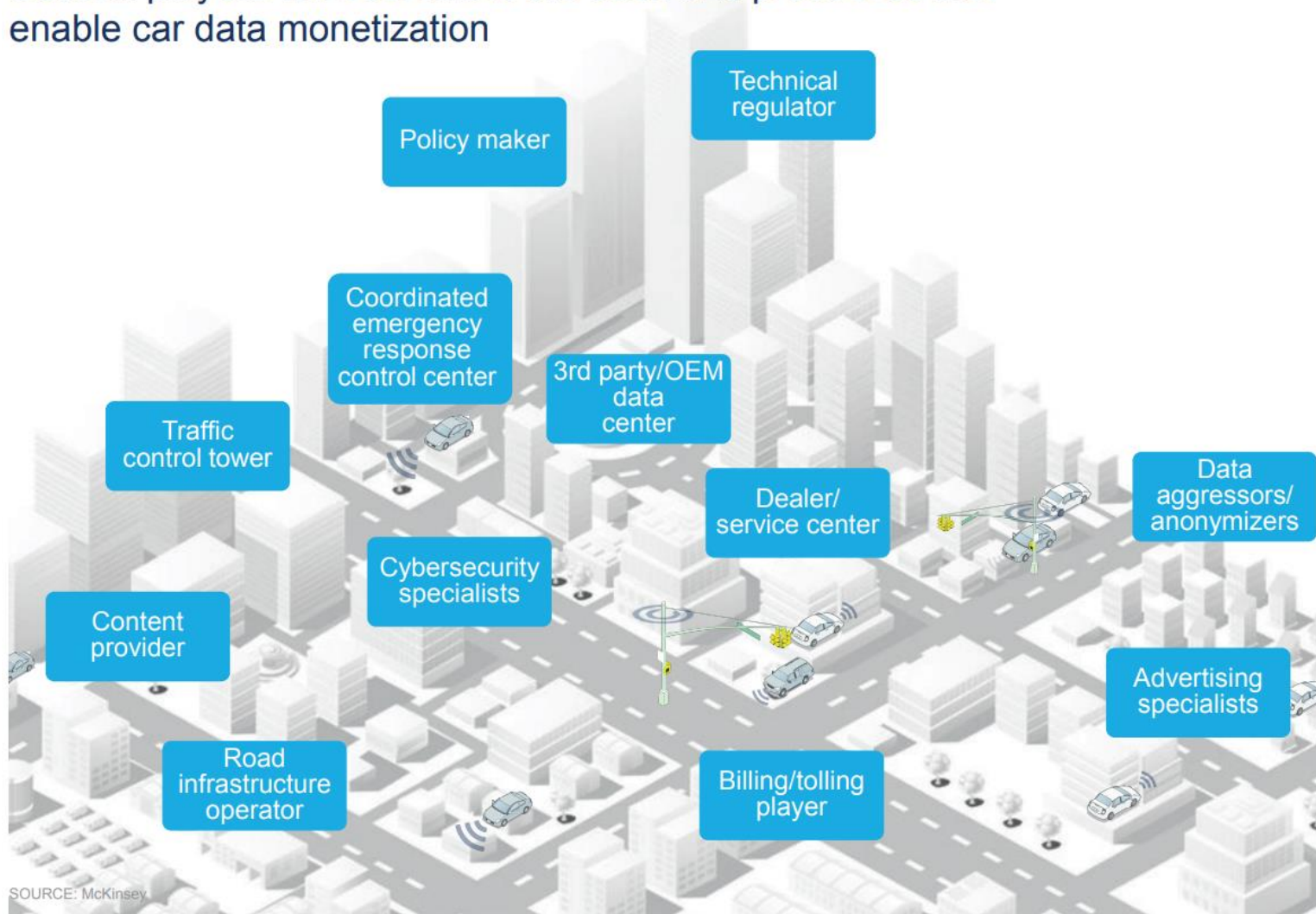
- Politics and government policy – for example:
 - Federal Labor – 50% EVs by 2030
 - Large scale battery manufacturing strategy
 - National hydrogen strategy
 - Planning laws and policy
 - Energy efficiency policy framework
- Road networks – different ownership and expanse
- Rate of technology change and adoption v regulatory reform
 - Impact of EU and other international standards
 - Community push e.g. Fossil-Fuel-Free Street Declaration
- Australian demographics and stakeholders
- Data: privacy and security (including cyber-risk)

*How wonderful that we
have met with a paradox.
Now we have some hope of
making progress*
(Niels Bohr)

Stakeholder matrix

Several players will coordinate the back-end processes that enable car data monetization

NOT EXHAUSTIVE



SOURCE: McKinsey

Prediction is very difficult, especially about the future
(Niels Bohr)

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