INFRASTRUCTURE VICTORIA

Electric Vehicles: are networks ready?

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WHO WE ARE
AND WHAT WE DO

30-year infrastructure strategy

Research

Independent advice to government
(automated and zero emissions vehicles)

OUR VALUES

Independence Influence Partnership Openness Innovation People

context of the study

The Victorian Government asked Infrastructure Victoria to provide advice on what infrastructure might be required:

- to enable operation of highly automated vehicles (AVs)
- in response to the ownership and market models that may emerge from the availability of highly automated vehicles
- for zero emission vehicles (ZEVs) as a high proportion of the Victorian fleet.

timeline

OCTOBER 2017 — REQUEST FOR ADVICE

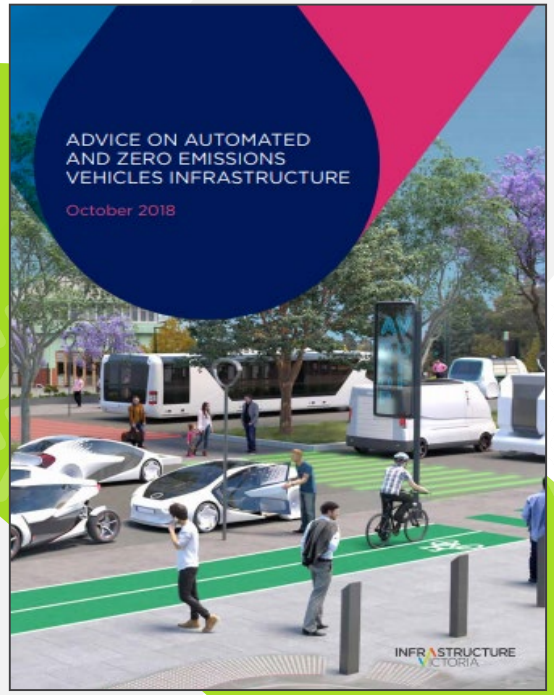
CONSULTATION

APRIL 2018 — SCENARIOS REPORT

AUGUST 2018 — EVIDENCE BASE

CONSULTATION

OCTOBER 2018 — FINAL REPORT



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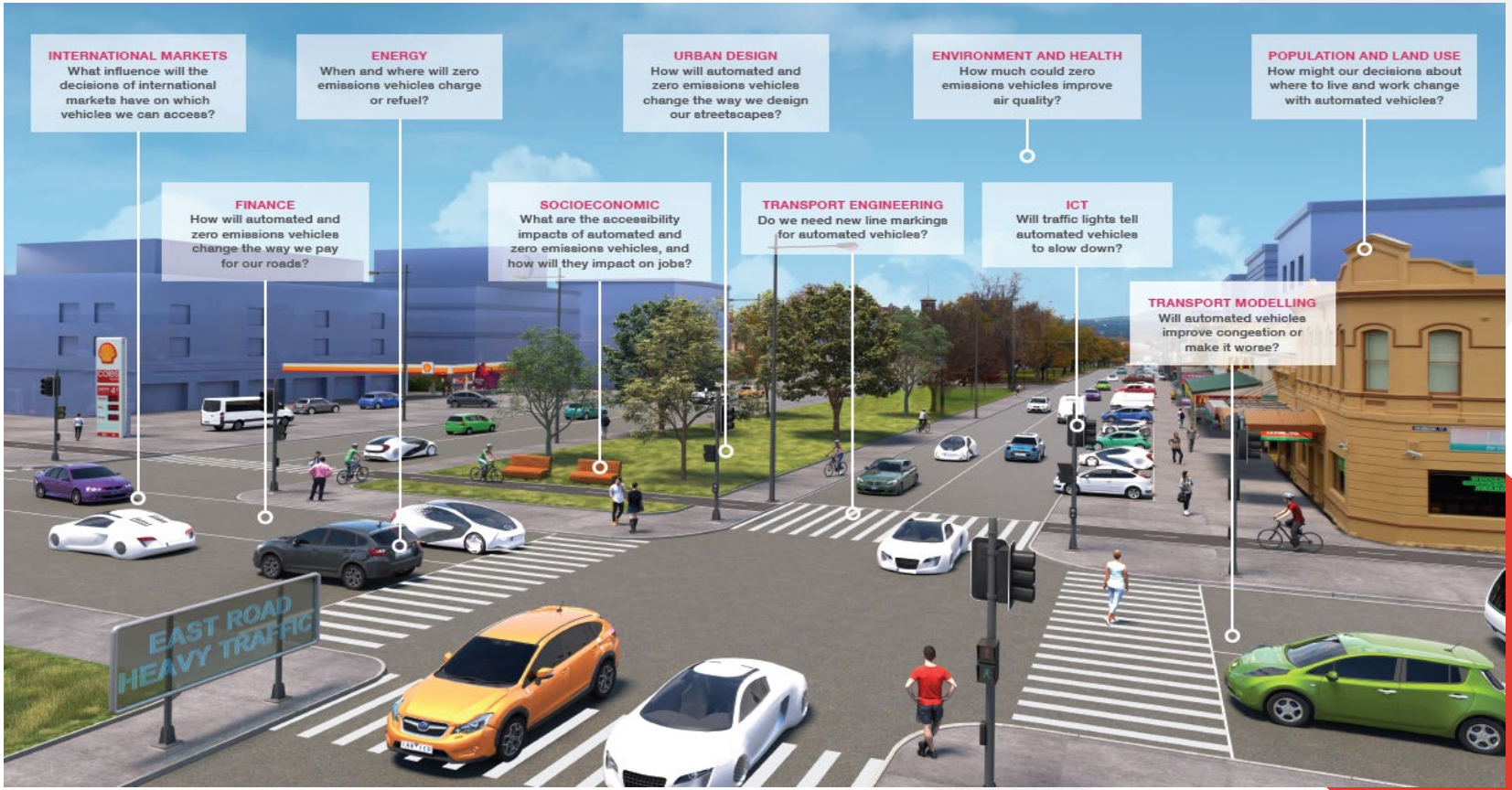
scenarios

Scenario	Year	Driving mode	Power source	Ownership/ market model
1. Electric Avenue	2046			
2. Private Drive	2046			
3. Fleet Street	2046			
4. Hydrogen Highway	2046			
5. Slow Lane	2046			
6. High Speed	2031			
7. Dead End	2046			

evidence base



key benefits

$14.9 billion increase in Gross State Product in 2046

UP TO **91%** of congestion reduced

25% of greenhouse gas emissions reduced

UP TO **$735 million** worth of health benefits

UP TO **94%** of road accidents reduced

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investment required

UP TO

$1.7 billion to upgrade mobile networks

APPROXIMATELY

$250 million

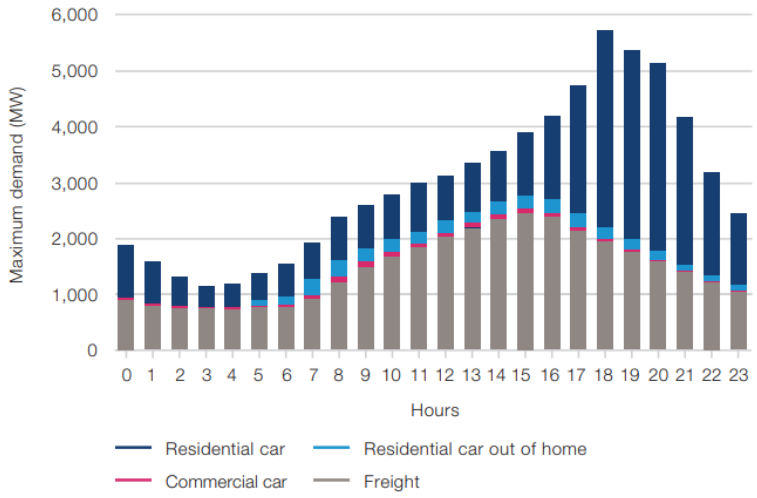
for improved line markings on roads

AT LEAST

$2.2 billion for energy network upgrades

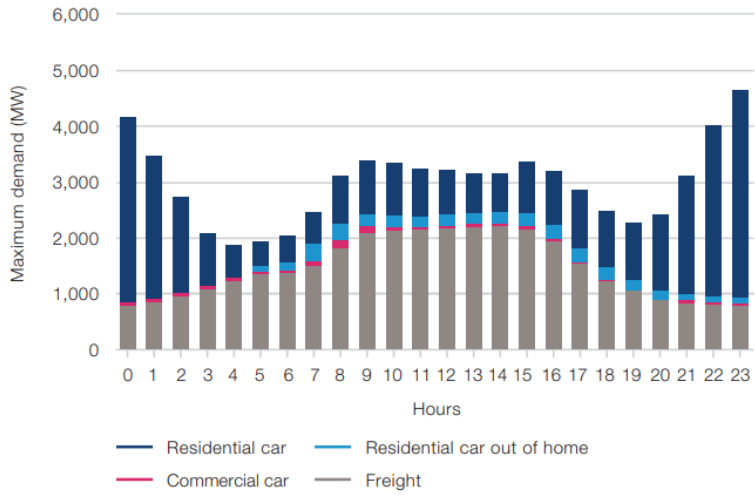
findings - energy

Electric Avenue – non-incentivised load profile



Source: KPMG energy modelling

Electric Avenue – incentivised load profile

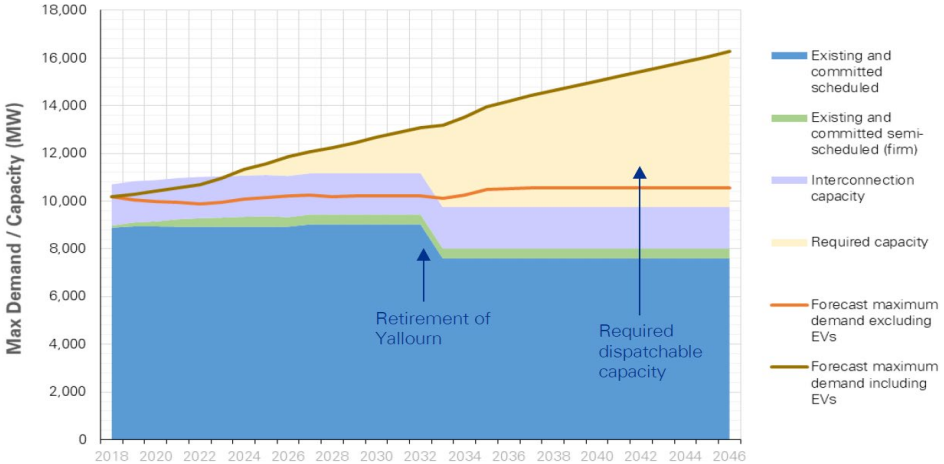


Source: KPMG energy modelling

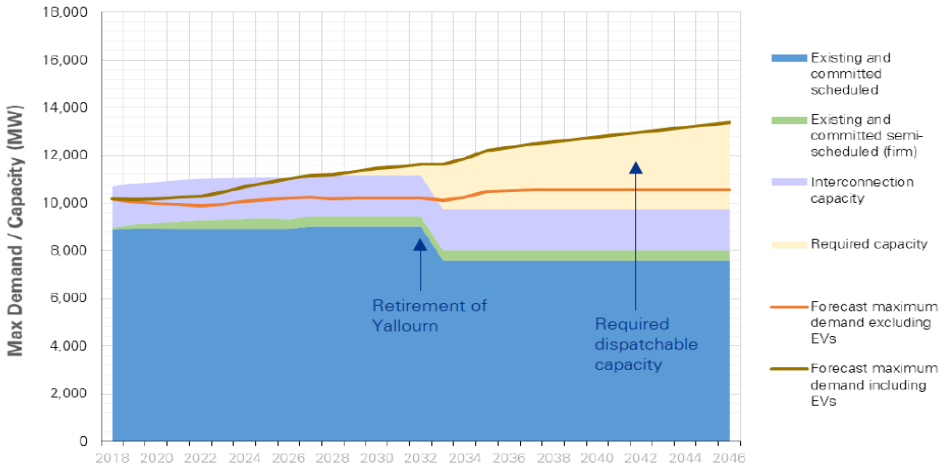
energy modelling

Electric avenue generation requirements

Non-incentivised



Incentivised



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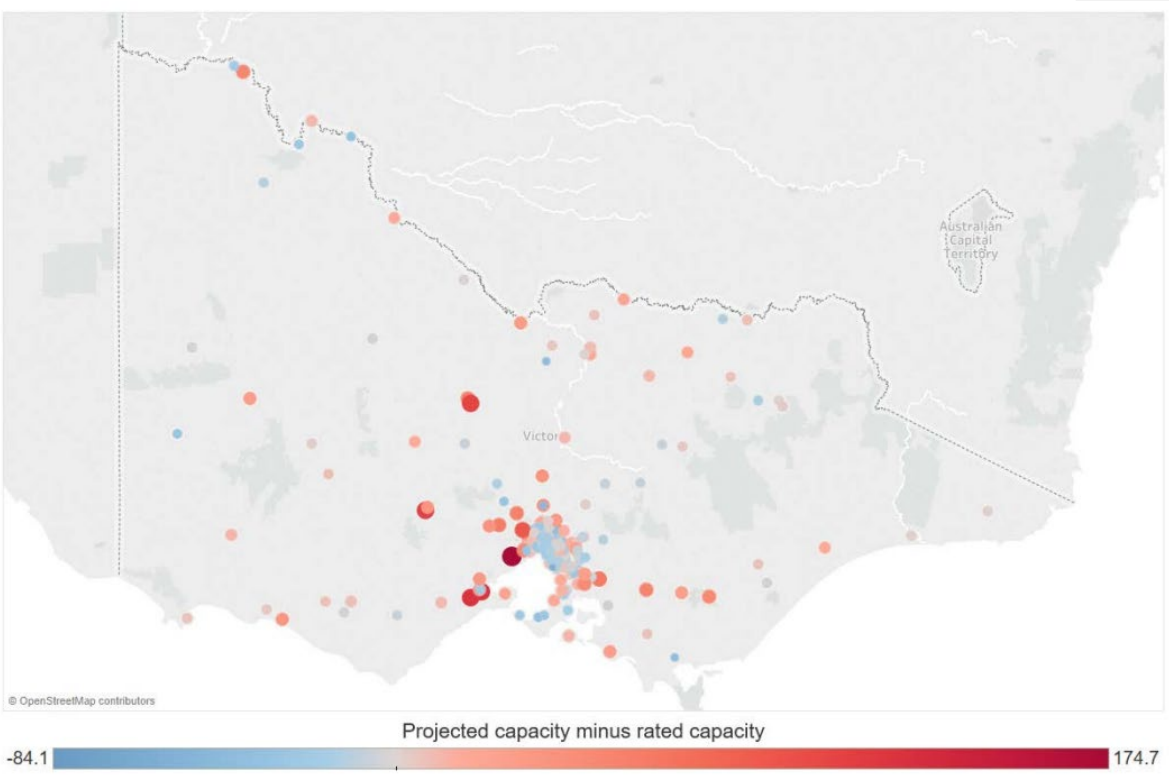
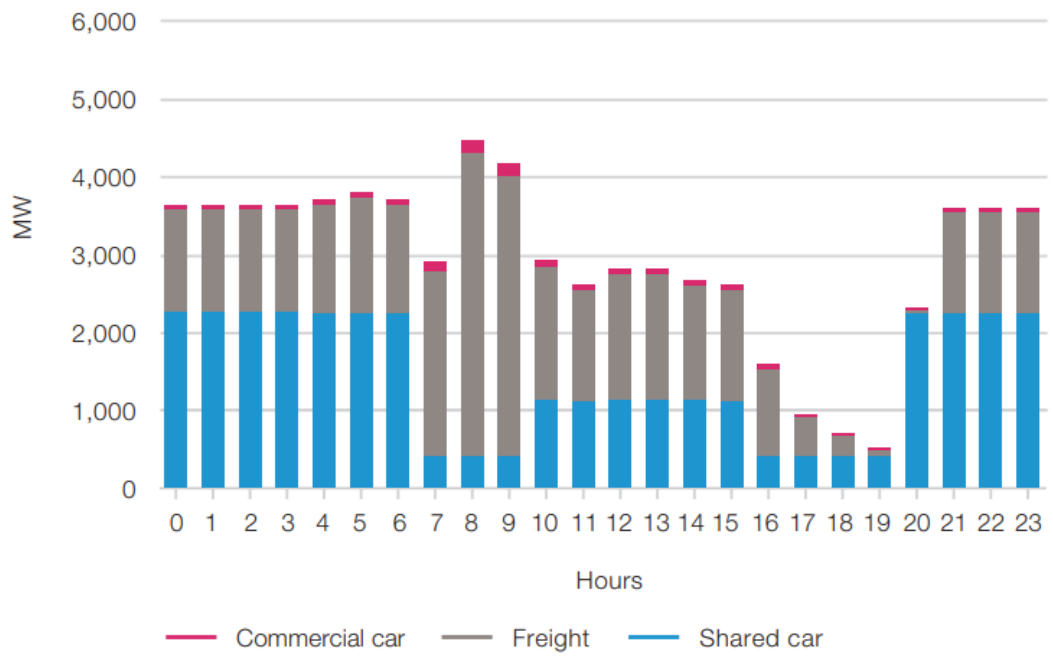
energy modelling

Zone substation performance – Electric Avenue, non-incentivised



findings - energy

Fleet Street: vehicle charging profile



Source: KPMG energy modelling

energy modelling

- In all scenarios, automated and zero emissions vehicles are likely to lead to increased consumption and maximum demand.
- The need for dispatchable capacity to meet peak demand varies substantially between scenarios.
- The impact on distribution network will very depending on the type of charging taking place.

energy modelling

- Incentives around time of use could reduce the network investment required by up to $2.5 billion.

- Depending on scenario and use of incentives, the number of zone substations in need of upgrade ranges from 40 to 120, out of a total of just over 225 in Victoria.

- The average cost to charge a privately-owned electric vehicle in 2046 is forecast to be around $1,700 annually (in Electric Avenue and Private Drive) based on the current price of 28.6 cents per kWh. For a fleet owner, it is closer to $10,000 annually.

Advice:

17 RECOMMENDATIONS

> *Infrastructure Victoria has called on the Victorian Government to clear the way for the roll out of driverless and zero emissions vehicles to reap unprecedented benefits for the economy, community and environment.*

Recommendations cover:

- Transport
- ICT infrastructure and data
- Energy
- Planning
- Waste
- Monitoring and coordination

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› energy recommendations

Transition to zero emissions
Establish a supportive environment for the Victorian fleet to transition to zero emissions technologies.

Do now:
- Design standards for public EV charging infrastructure
- Principles for smart charging and payment systems

Do when ZEV numbers increase significantly:
- Only allocate public land to charging where it meets FCAI standards
- Evaluate effectiveness of ZEV subsidies
- Only invest in public chargers where there is a market failure
- Monitor developments of inductive charging trials
- Assess whether to allow freight ZEVs to travel where currently restricted
- Analyses costs/benefits of ZEV zones for freight

› energy recommendations

Plan for energy changes
Enable the energy sector to respond to the emergence of zero emissions vehicles.

Do now:
- Advocate for stricter Australian vehicle emissions targets and enable further investment in transmission networks for renewables
- Ensure the regulatory frameworks for network investment allow sufficient investment to facilitate ZEV uptake

Do when ZEV numbers increase significantly:
- Monitor ZEV uptake and consider a register of where ZEVs charge
- Further research on local distribution networks to minimise barriers to ZEV uptake
- Engage with fleet operators on the optimum location for and charging patterns of large depots

› energy recommendations

Encourage demand management
Allow for incentives or other mechanisms to shift energy demand from peak periods.

Do now:

› Review state settings to allow demand-variable rates and demand management strategies

Do when ZEV numbers increase significantly:

› Ensure vehicle charging can be controlled to occur outside peak demand times
› Establish flexibility in the energy system to allow new approaches to managing the impacts of ZEV charging
› Investigate allowing distributors to control generation, demand response and storage technologies to improve efficiency

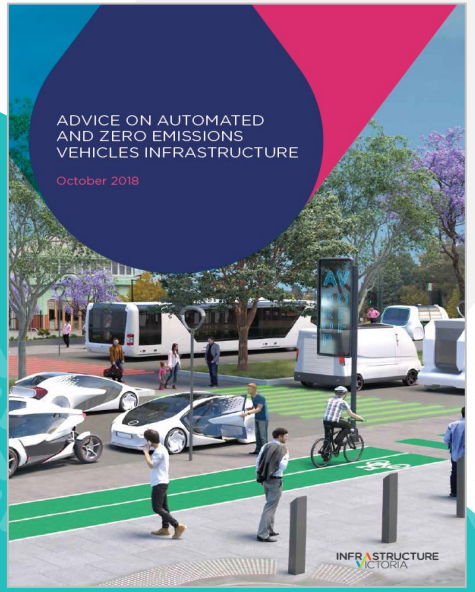
more information

- ***Advice on automated and zero emissions vehicles infrastructure***: contains all 17 recommendations, decision pathways, triggers and the evidence base

- A short animated video explaining our advice is available on our website.

- A suite of before/after images that reimagine Victorian streets and neighbourhoods with automated and zero emissions vehicles are also online (released in August).

- View and download:
www.infrastructurevictoria.com.au/AVadvice



Keep in touch

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