



Transitioning towards zero emission buses – thoughts insights and challenges

A perspective from around Australia and New Zealand

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A black and white photograph of the Sydney Opera House, featuring its iconic sail-like roofs. The image is taken from a low angle, looking up at the building. A bright light source, likely the sun, is positioned behind the central roof, creating a strong lens flare that streaks across the sky and illuminates the building's surfaces. The foreground shows the curved, tiered steps of the opera house's plaza.

Arup in Australasia

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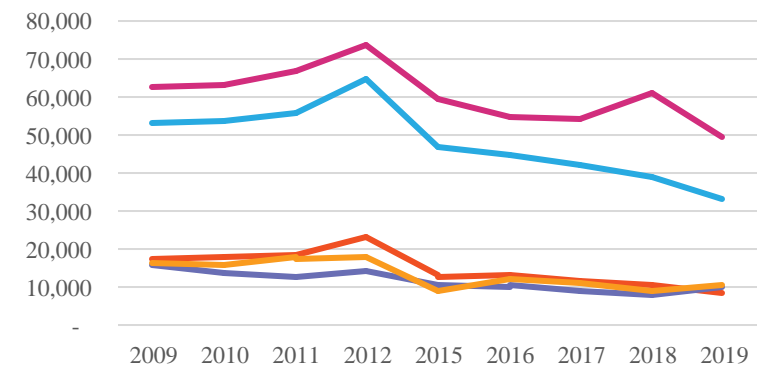
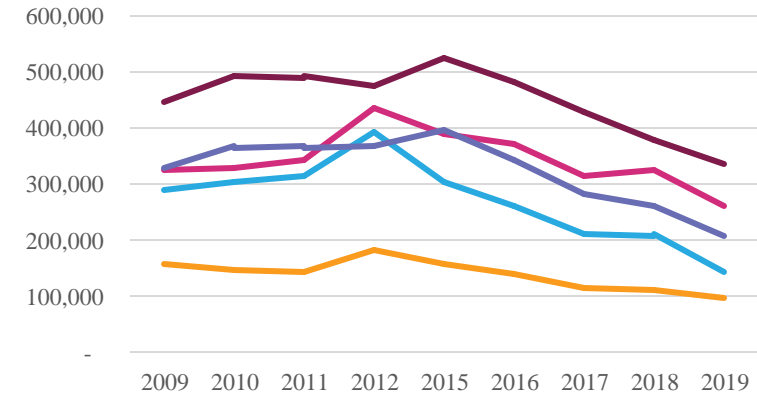
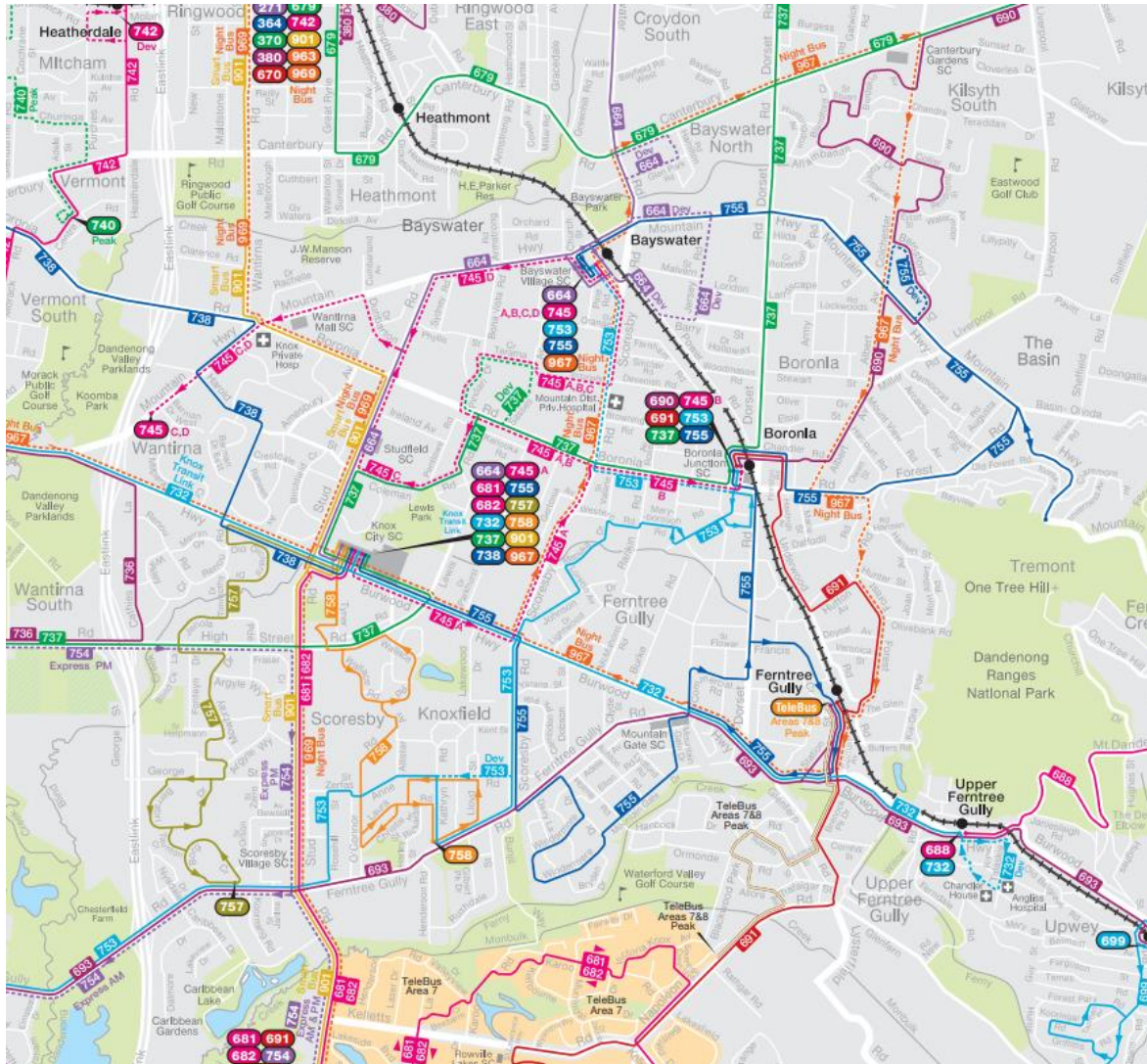


Shared
Personalised
Automated
Connected
Energy/electric

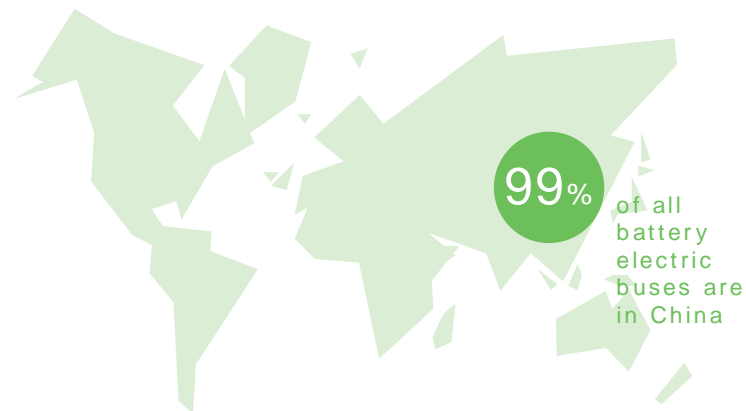
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Bus patronage in Melbourne....

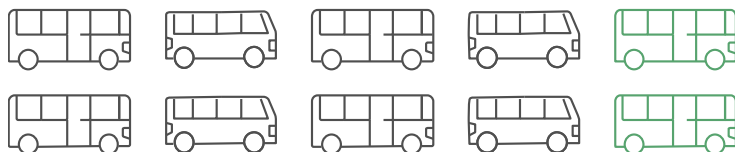


17% electric buses globally in 2020



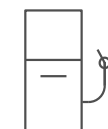
AUSTRALIA

100,473 buses operating in public and private sectors



80% of them are diesel buses

6700 litres annual average fuel usage for diesel bus



Europe

electric buses growing exponentially as older fleets are retired

3000

battery electric buses in operation



<100

hydrogen powered buses

70+ years

electrically powered buses have operated in Wellington

Targeted goals

By 2025

Auckland Transport to procure only ZEBs

By 2023

100+

electric buses in Wellington and New Zealand

By 2040

100%

electric buses fleet for Auckland Transport



Morning

After charging overnight begins am shift with

370kw/h

and drives 175km during the first shift

Afternoon

Arrives back at lunchtime with

45% battery

and charges for 60mins

Evening

Starts pm shift and drives

175km

and arrives back at depot with 35% battery life



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Snapshot

Australia

- NSW goal 8,000 buses by 2030, 50 new electric buses in 2021.
- ACT ban on diesel bus purchases, and 90 new electric buses currently.
- Qld all buses purchased by 2030 will be zero emissions. Several trials announced for 2021.
- SA has promised the transition of its entire public transport fleet
- Vic has committed \$20 million for a three-year trial of electric buses.

New Zealand

- Wellington 108 by early 2023, (22% of its total fleet). Bids from any bus companies running diesel vehicles won't be considered after 2027.
- Auckland Transport 50 buses in operation, no new diesel bus will be purchased from 2025, with goal to make the entire fleet zero emissions by 2030.



Key talking points



Outcomes and Opportunities



Policy and Planning



Transition and Technology



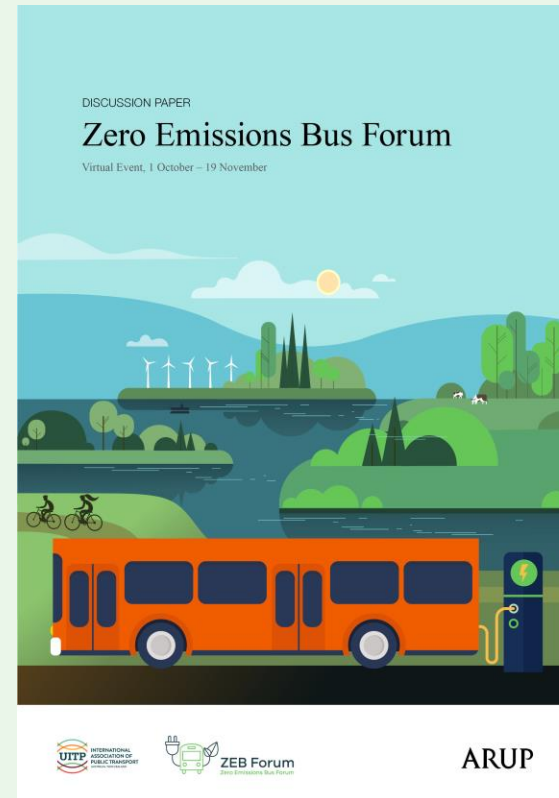
Ownership and Operations



Nation Building Exercise?



Systems thinking approach



Credits

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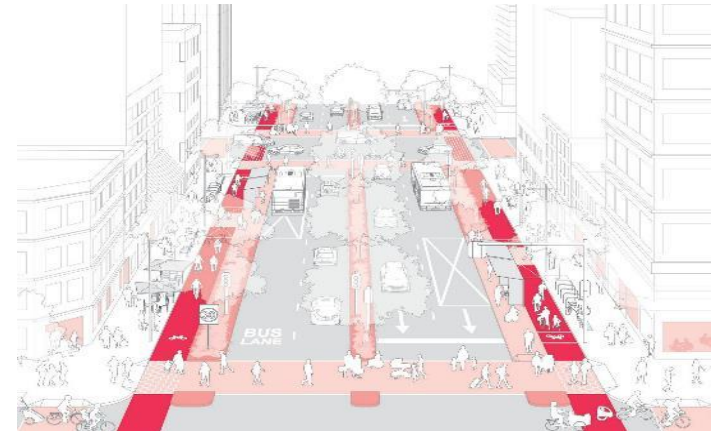
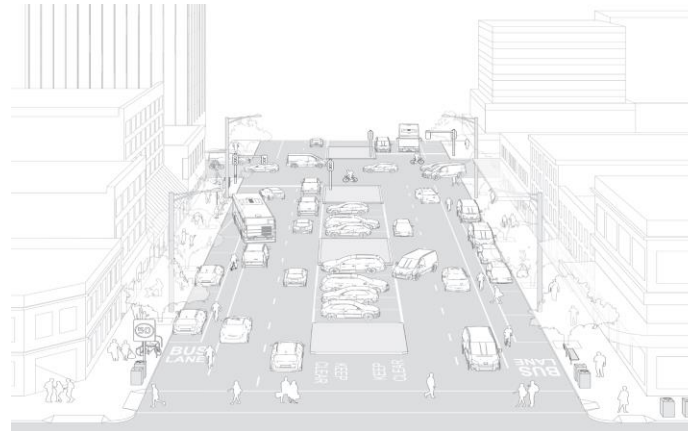
Energy Resilience and Security

A new product/service offering

Social licence to operate

Maintenance and operations

Re-imaging our roads and streets



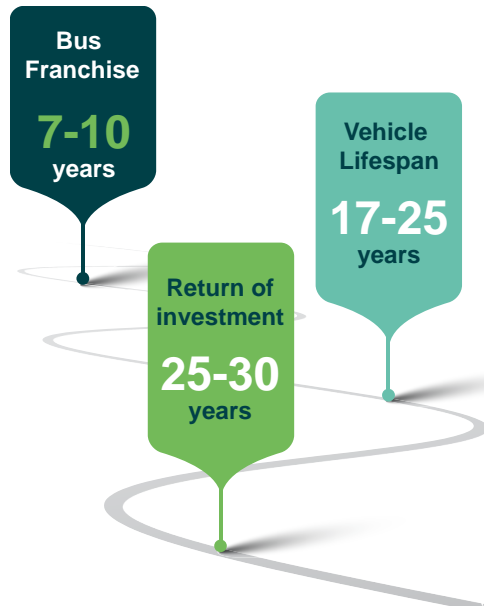
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Policy and Planning



Remaining agile



Accounting for time horizons



Coordination and certainty



Growing our champions

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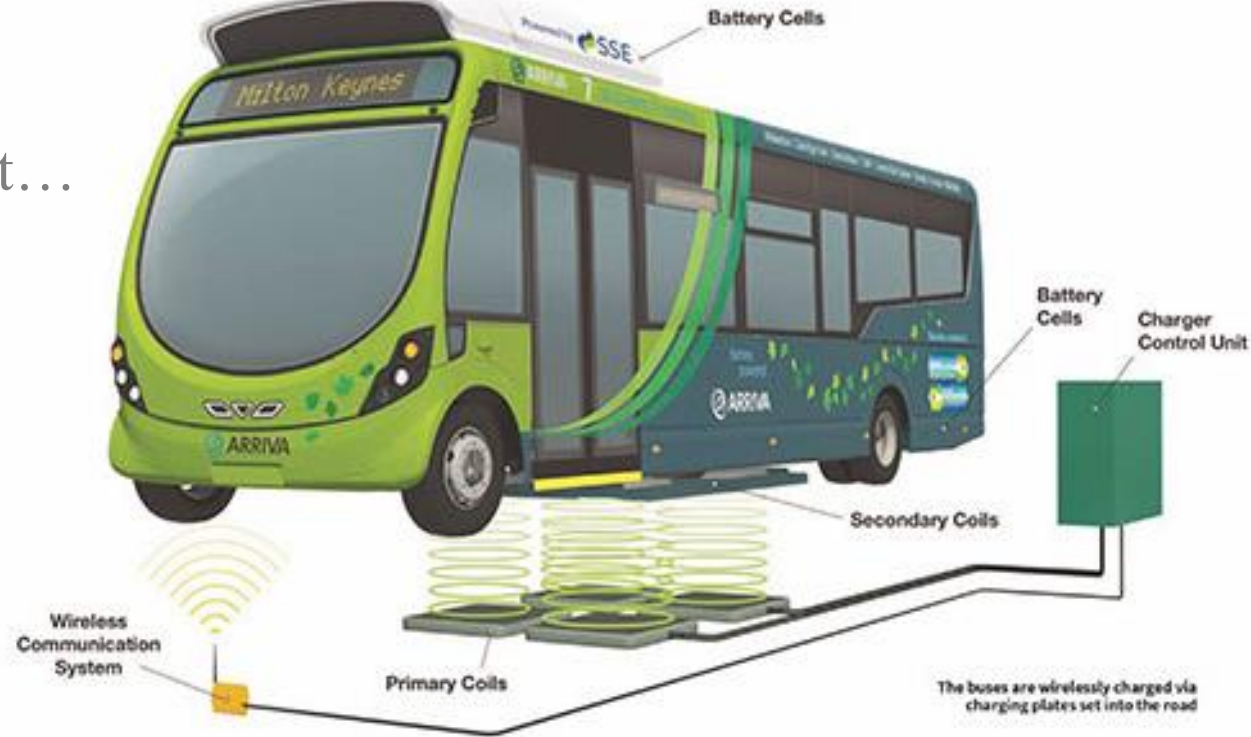
Transition and Technology

Buses are the easy bit...

Charging options

Hydrogen

Trials to Transition



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Ownership and Operations

Fleet as a Service?

Maintain a competitive market

Driving vehicle affordability

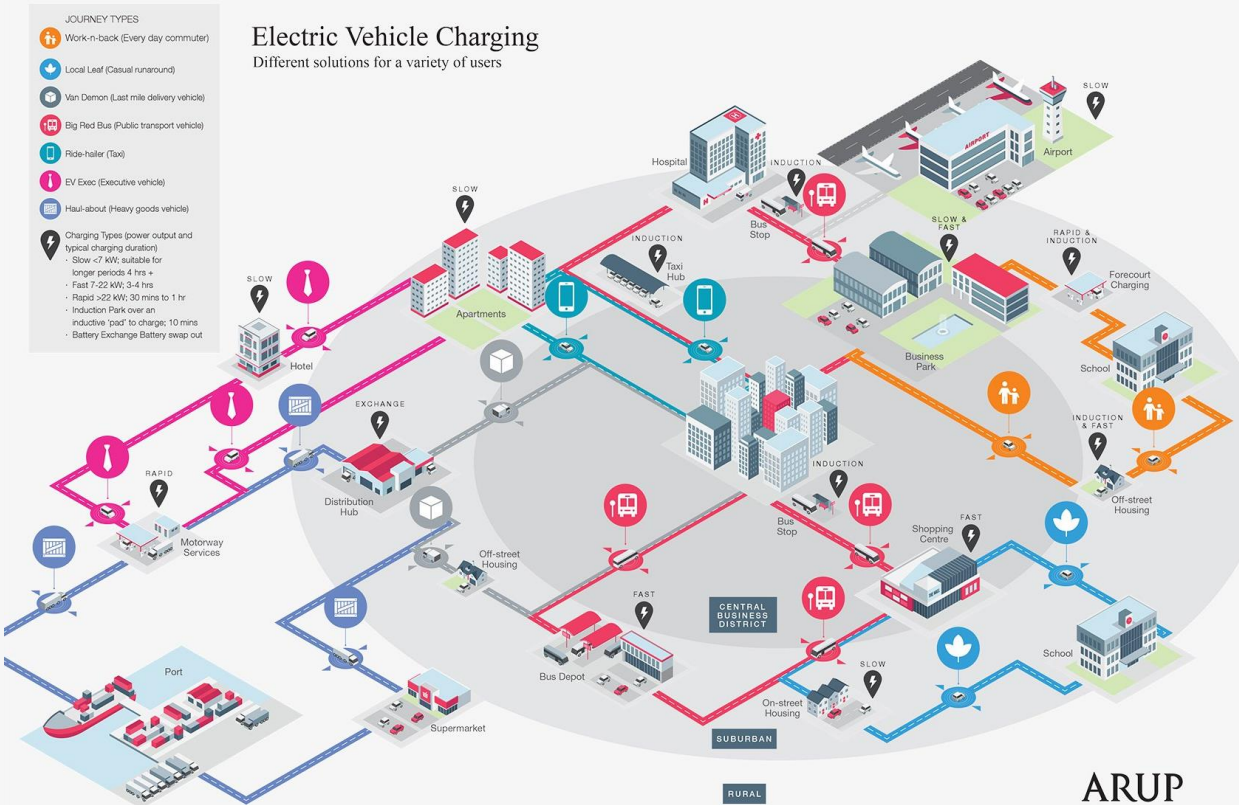
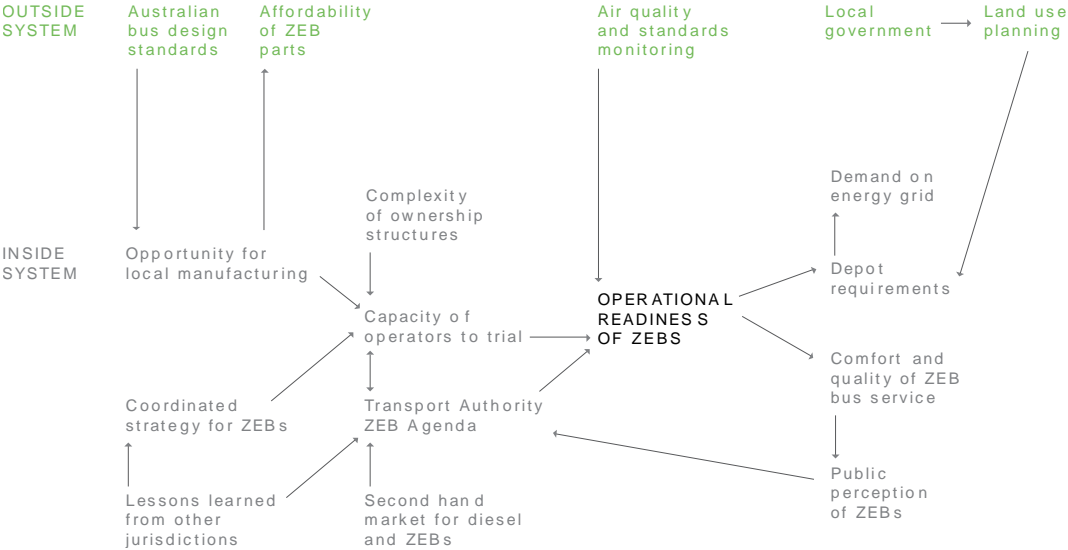


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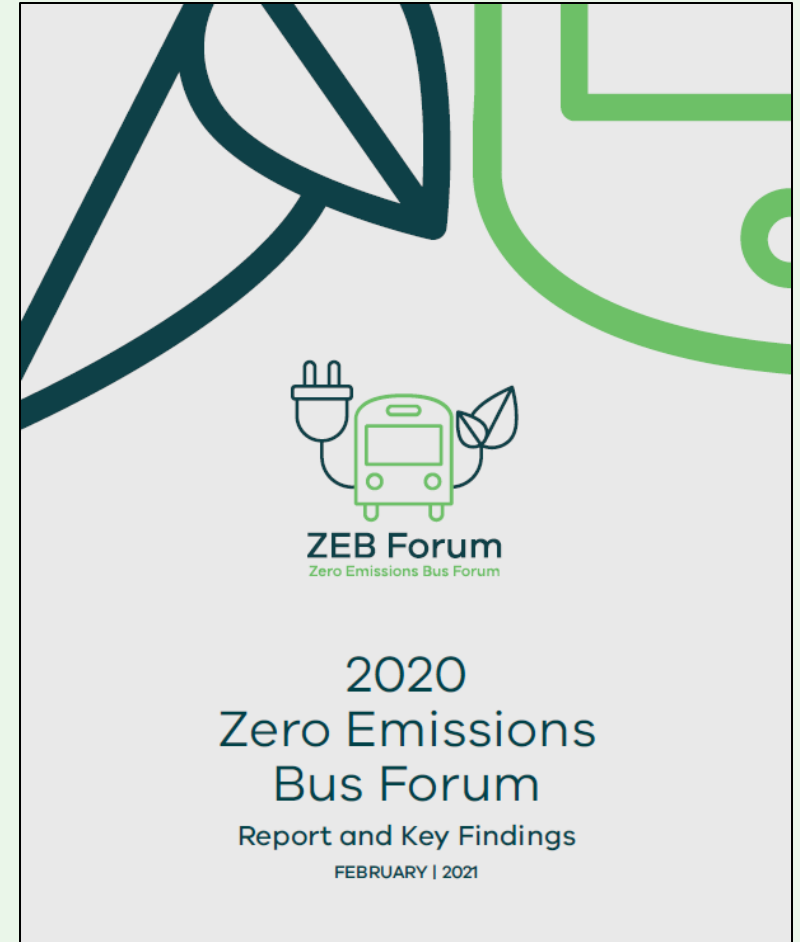
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System thinking



Pathways to transition

- Make clear long-term commitment(s) to ZEBs, and set in motion short term actions
- Think through regulatory frameworks for technical and safety standards
- Realise the benefits of coordination and cohesion across all stakeholders and jurisdictions
- Better educate stakeholders about the benefits and transition towards ZEBs
- Reduce uncertainty around technology, financing, infrastructure and operations



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