

Zero-emissions vehicles: challenges, opportunities and trends

RA presentation

March 2022



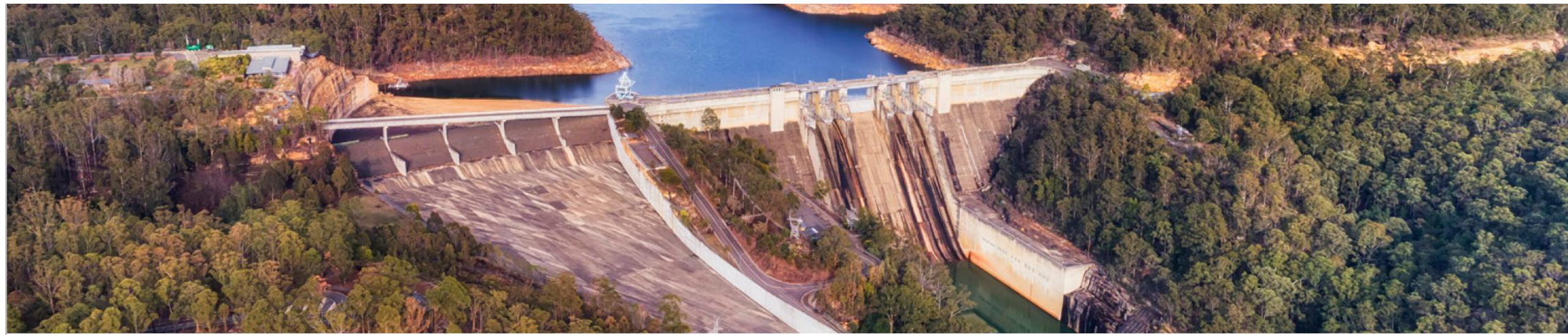
**Infrastructure
Australia**

Acknowledgement of country



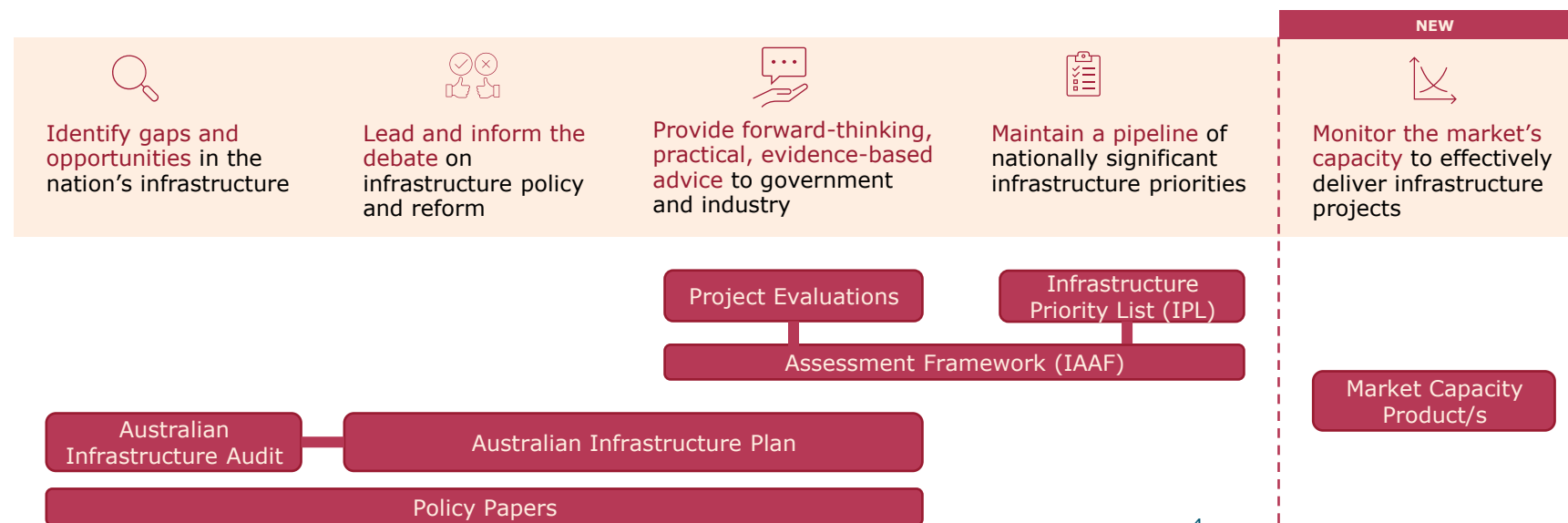
Who we are

Infrastructure Australia was established in 2008 to advise governments, industry and the community on the investments and reforms needed to deliver better infrastructure for all Australians.



About Infrastructure Australia

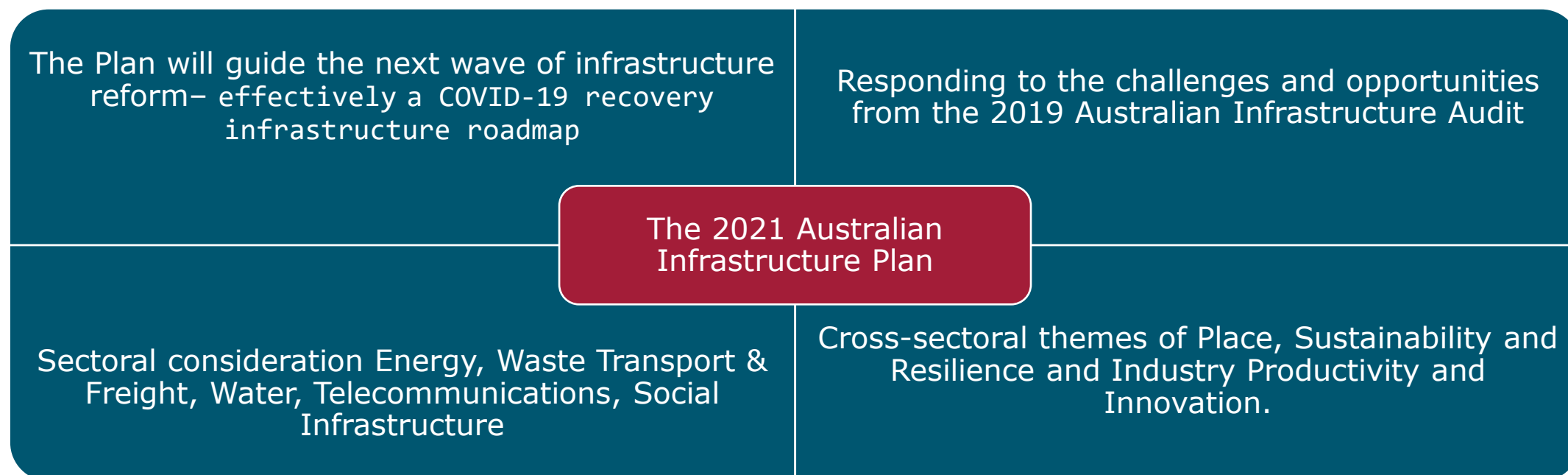
Core Activities



Overview of the 2021 Australian Infrastructure Plan

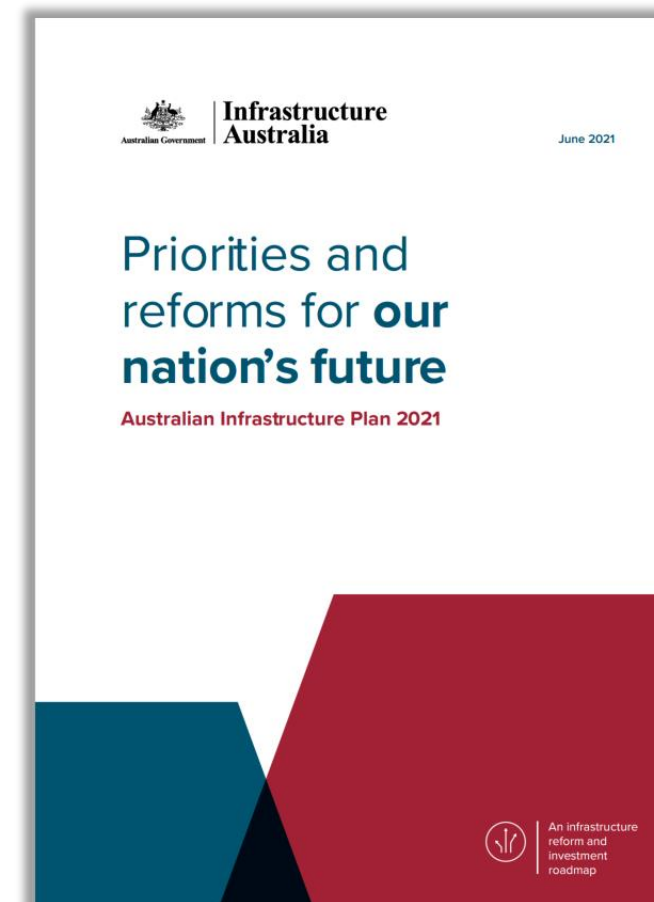
The Plan focuses on pragmatic reforms to **drive productivity** growth, maintain and enhance our **standard of living** and ensure our cities and regions remain world class.

There is a clear focus on how the **infrastructure sector can best support the national recovery** of the pandemic.



Chapters at a glance

- **Place-based outcomes for users** – Unlocking the potential of every place
- **Sustainability and Resilience** – Balancing infrastructure outcomes in an uncertain future
- **Industry Productivity and Innovation** – Facilitating a step change in industry productivity
- **Transport** – Delivering an integrated transport network
- **Energy** – Enabling an affordable transition to a net zero future
- **Water** – Prioritising safe and secure water
- **Digital and Telecommunications** – Ensuring equality in an era of accelerating digitisation
- **Social infrastructure** – Supporting economic prosperity and quality of life
- **Waste** – Accelerating Australia's transition to a circular economy



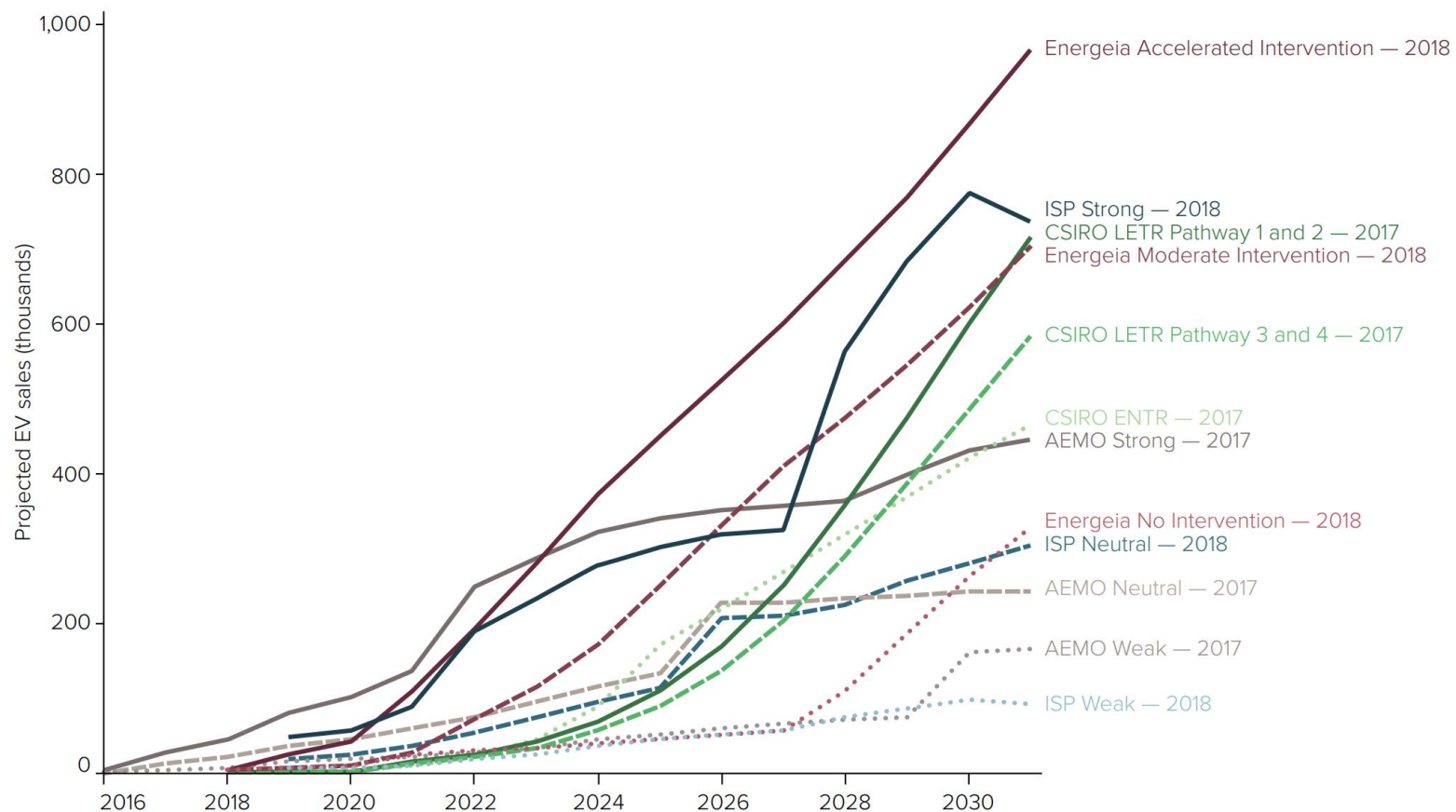
Key messages

- **Change and uncertainty** - We need to re-think Australia's infrastructure to deal with the current environment of change, uncertainty and risk
- **Moment in digitalisation** - We need to harness technology and innovation in infrastructure to drive new industries
- **Diverse geography** - We need to embrace the unique challenges and opportunities afforded by Australia's diverse geography
- **Minimum service levels** - Responding to the vastness of Australia while supporting quality of life for all Australians
- **Public value / balanced outcome** - We need to ensure our infrastructure industry is delivering value money
- **Customer empowerment through data** - We need to harness data to change the way infrastructure is delivered in Australia

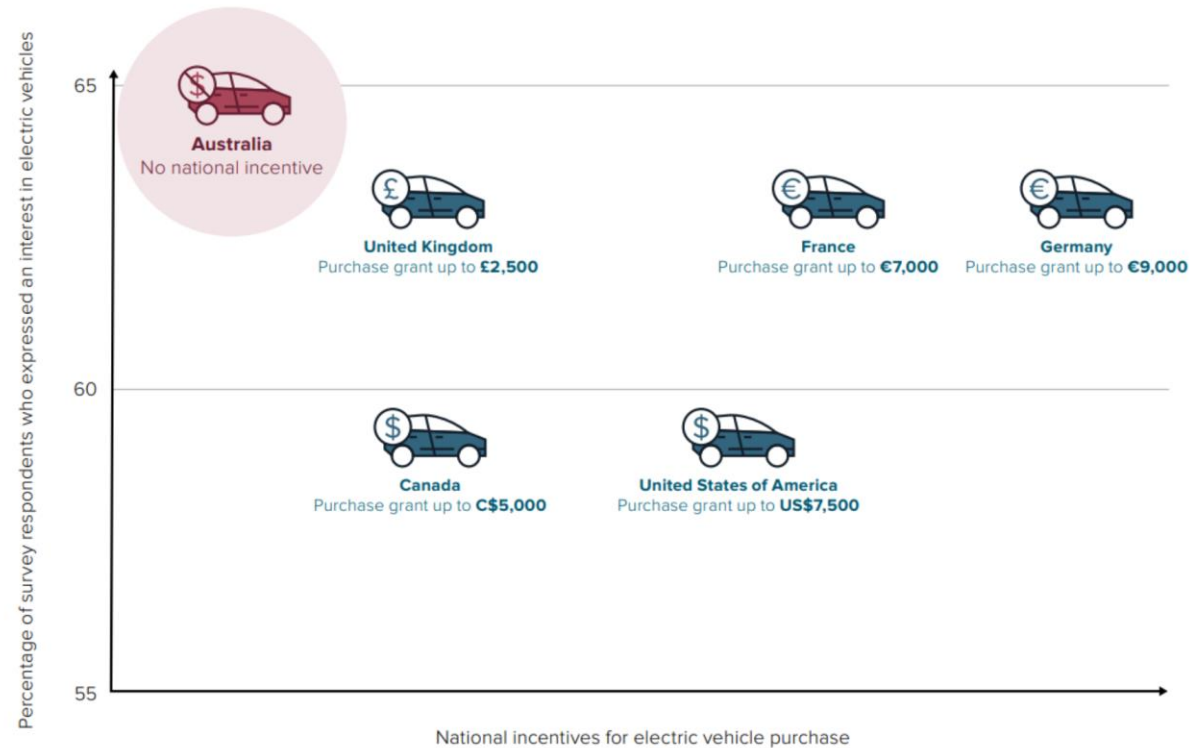


Trends, challenges and opportunities impacting ZEV uptake

Australian electric vehicle sales are becoming increasingly optimistic



Many Australians want to adopt clean and green motoring



Note: Incentives include electric and plug-in hybrid cars, and do not include state, provincial or other local financial programs, charger installation or old vehicle buy-back initiatives.

Source: Adapted from L.E.K. Consulting (2020)⁴²

We need to meet present needs without compromising future generations

Component of sustainability	Principle
Social	Infrastructure and policies should improve quality of life, access and wellbeing to create an inclusive and fair society.
Economic	Infrastructure and policies should grow productivity, the Australian economy and allow equitable access to economic and growth opportunities, while efficiently using financial resources.
Environmental	Infrastructure and policies should protect environmental outcomes by reducing pollution, balancing resource consumption, conserving natural ecosystems and resources, and supporting climate mitigation and adaptation.
Governance	Infrastructure and policies should build trust in governance and institutions through transparent, accountable and inclusive decision-making.

Source: Infrastructure Australia (2021)⁶³

Australian passenger vehicles have high carbon dioxide emissions

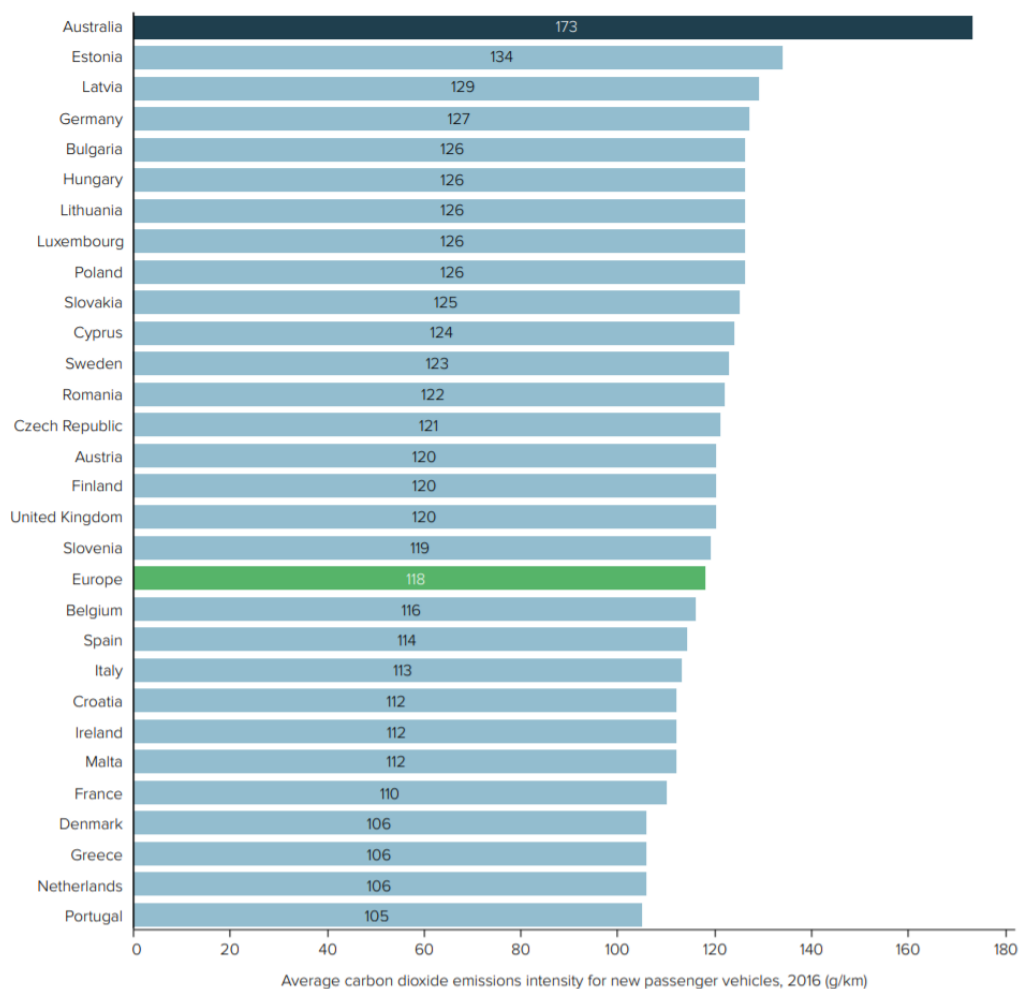
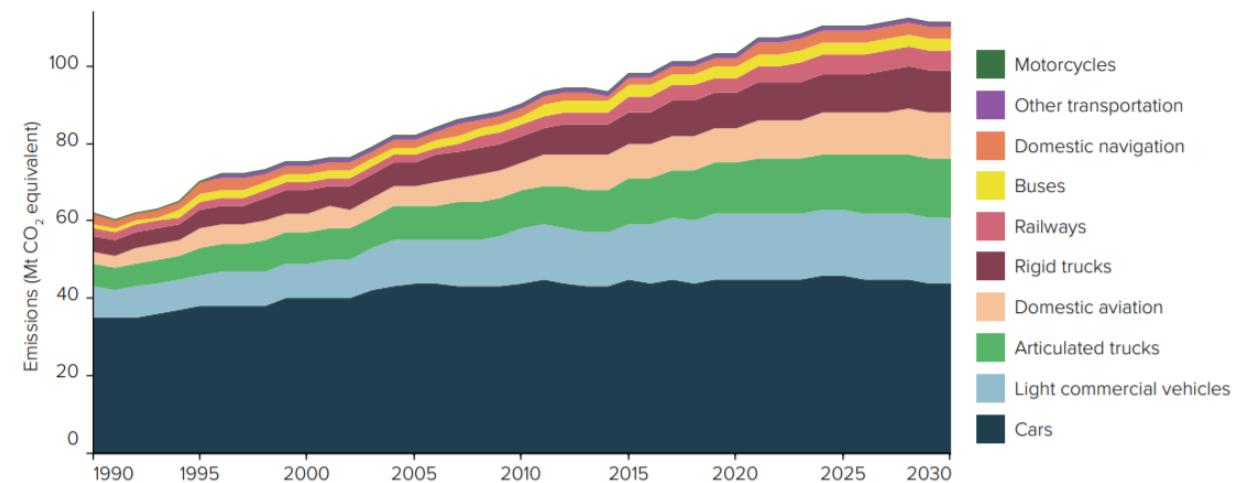


Figure 15: Cars' total emissions are far higher than other modes of passenger transport



Source: Department of the Environment of Energy (2017)¹⁸¹

Australia has to meet its net-zero commitments

Australia

Emissions: 530.8 Mt CO₂e

Emissions per capita: 21.4 t CO₂e

Targets: 26-28% below 2005 levels by 2030

Signed and ratified Paris Climate Agreement

Australian Capital Territory // 0.2%

Emissions: 1.3 Mt CO₂e

Emissions per capita: 3.1 t CO₂e

Targets: 40% below 1990 levels
by 2020 (legislated)

65-75% below 1990 levels by 2030

Net zero by 2045 (legislated)

South Australia //

4.2%

Emissions: 22.1 Mt CO₂e

Emissions per capita: 12.8 t CO₂e

Targets: 60% below 1990 levels by
2050 (legislated)

Net zero emissions by 2050

Queensland // 30.5%

Emissions: 161.5 Mt CO₂e

Emissions per capita: 32.5 t CO₂e

Targets: 30% below 2005 levels in 2030

Net zero emissions by 2050

Victoria // 21.1%

Emissions: 110.3 Mt CO₂e

Emissions per capita: 17.3 t CO₂e

Targets: 15-20% below 2005 levels by 2020

Net zero emissions by 2050 (legislated)

Western Australia //

16.4%

Emissions: 88.5 Mt CO₂e

Emissions per capita: 34.2 t CO₂e

Targets: Aspiration of net zero
emissions by 2050

New South Wales //

24.4%

Emissions: 131.5 Mt CO₂e

Emissions per capita: 16.6 t CO₂e

Targets: Net zero emissions by 2050

Tasmania // 0.2%

Emissions: 0.9 Mt

Emissions per capita: 1.7 t CO₂e

Targets: 60% below 1990 levels
by 2050 (legislated)

Net zero by 2050

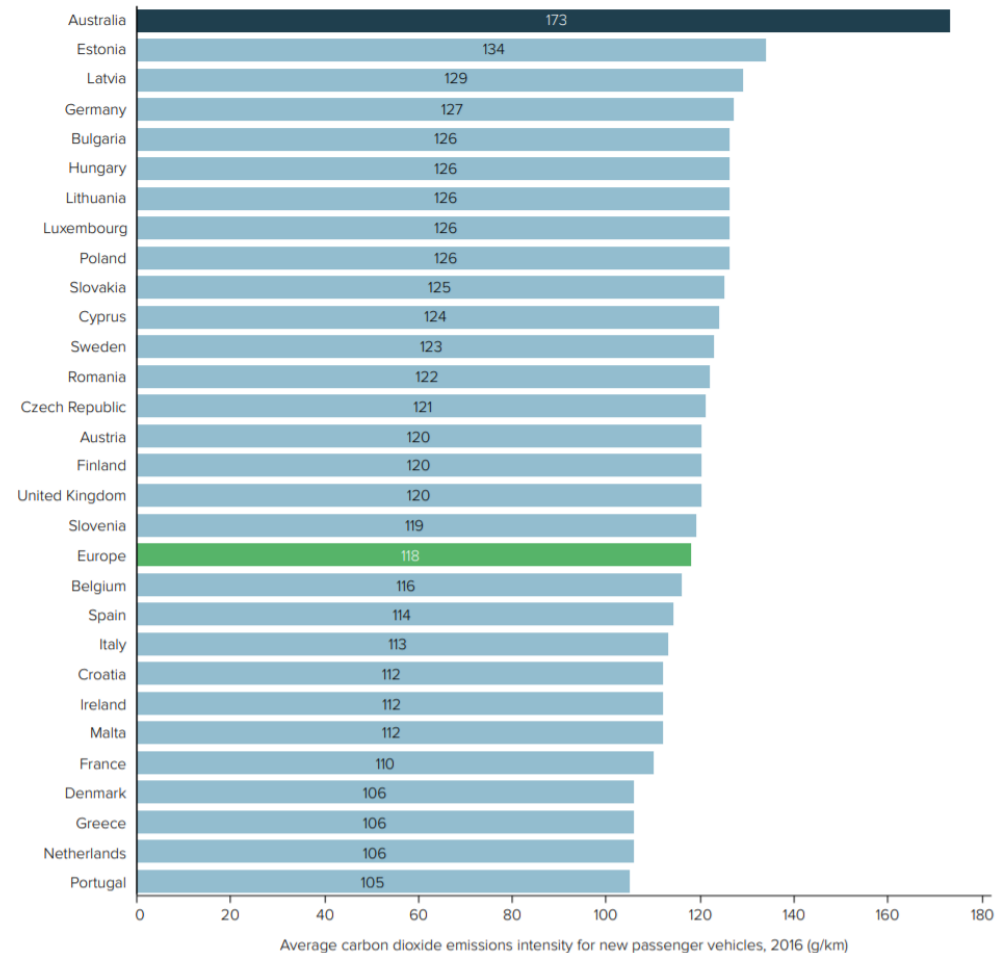
Northern Territory //

3.1%

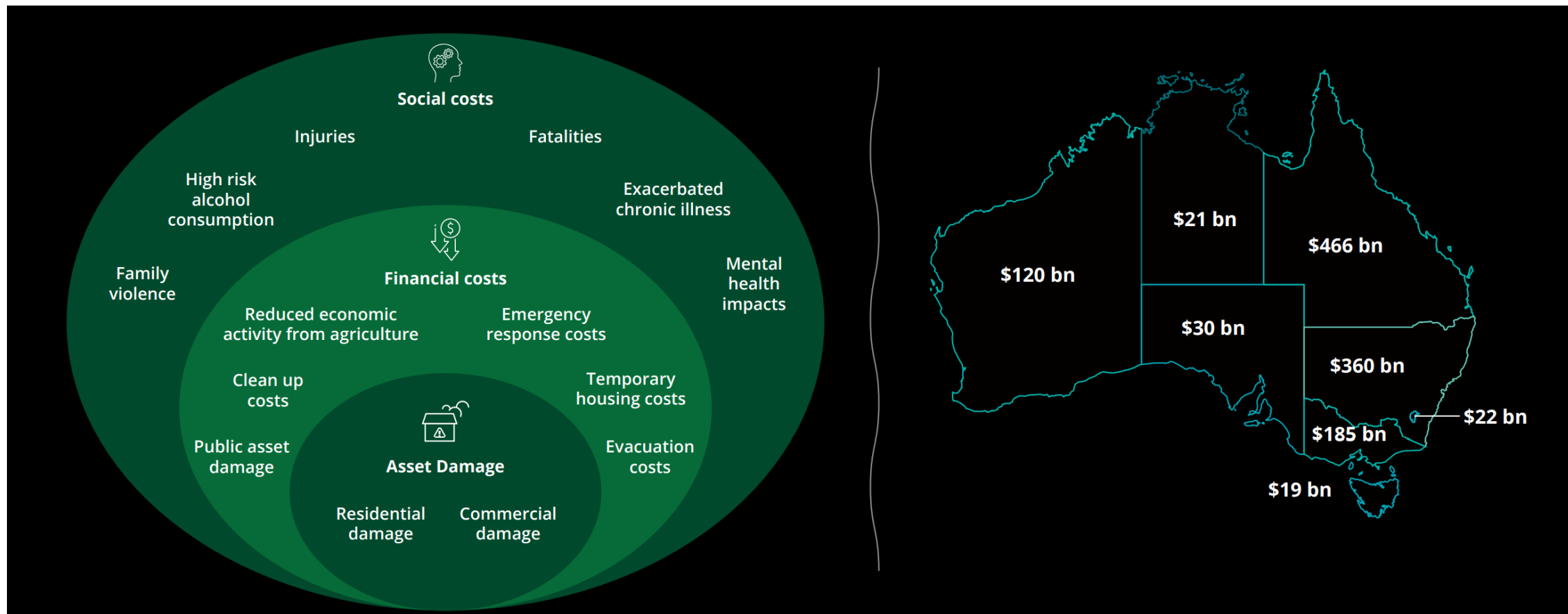
Emissions: 16.6 Mt CO₂e

Emissions per capita: 67.4 t CO₂e

Targets: Aspiration of net zero
emissions by 2050



Natural disaster costs are increasing in line with climate change



Trust is falling leading to challenging infrastructure delivery

- Trust in NGOs, business, government and media has fallen by almost 10% over 2021-22.
- Nearly 6 in 10 say their default tendency is to distrust something until they see evidence it is trustworthy
- Major cost and project delays result from community opposition to infrastructure projects, and community 'fatigue' with construction.
- 71% of Australia's population living in major cities will be impacted by projects in the forward-looking infrastructure pipeline.

Case Study: Melbourne Skyrail

Initially there was lots of apprehension from local communities over the proposed Melbourne Skyrail, with locals listing concerns over noise, property values, pollution, environmental damage, and maintenance expectations of the infrastructure. However, by addressing these issues in the design and maintenance of the Skyrail, such as through erecting noise barriers and fixing drainage issues around the parks. This has led to many residents seeing the new overpass as a net benefit to the community due to improvements in local traffic and greenspace.

Case Study: Eastern Creek Energy from Waste

In 2017 a large scale waste-to-energy plant in Western Sydney faced strong community opposition due to fears of health risks and pollution, which contributed to the project failing to receive planning approval. Ultimately a lack of community engagement by the developer to inform the public about the facility and its impacts on the environment and local region contributed to the failure of the proposal.

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Previous decade - estimated historical impact from community oppositions.³⁰

A patchwork of policy and incentives

- Private and public incentives are often unaligned
- All levels of Australian government have varied policy settings
- Government policy and standards lack coordination

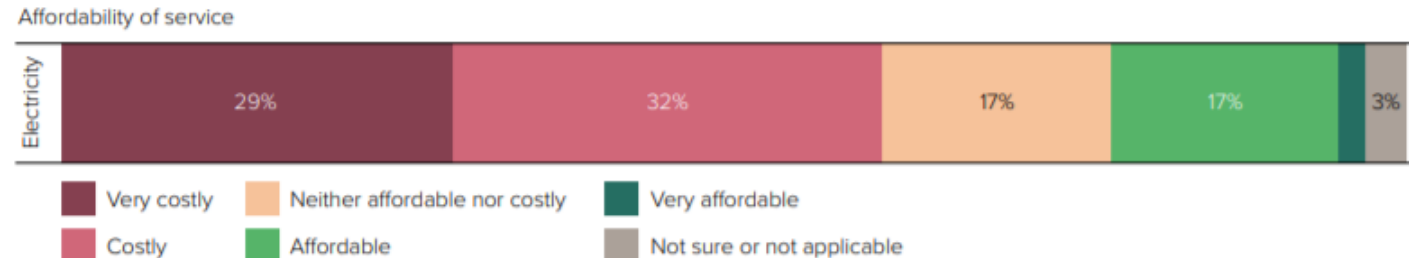
Policies	QLD	NSW	ACT	VIC	SA	TAS	WA	NT	FED
EV Sales/Uptake Target	0%	0%	0%	0%	0%	0%	0%	0%	0%
Investment in public EV charging networks	75%	50%	25%	25%	25%	75%	0%	0%	25%
EV Strategy	50%	50%	50%	25%	25%	0%	25%	25%	25%
EV purchase incentive/Home charging installation subsidy	0%	25%	0%	0%	0%	0%	0%	0%	0%
EV tax incentive	25%	25%	75%	25%	0%	0%	0%	25%	25%
Public awareness initiatives	25%	25%	0%	0%	25%	25%	0%	0%	0%
Govt Fleet EV Target	25%	25%	100%	0%	25%	0%	0%	0%	0%
Electric bus transition plan	0%	25%	75%	0%	0%	0%	0%	0%	N/A
EV readiness requirements for buildings	0%	25%	50%	0%	0%	0%	0%	0%	0%
EV industry development plan and incentives for EV industry	25%	0%	0%	25%	25%	0%	25%	0%	0%

Managing the convergence

The future energy system's aims and trajectory

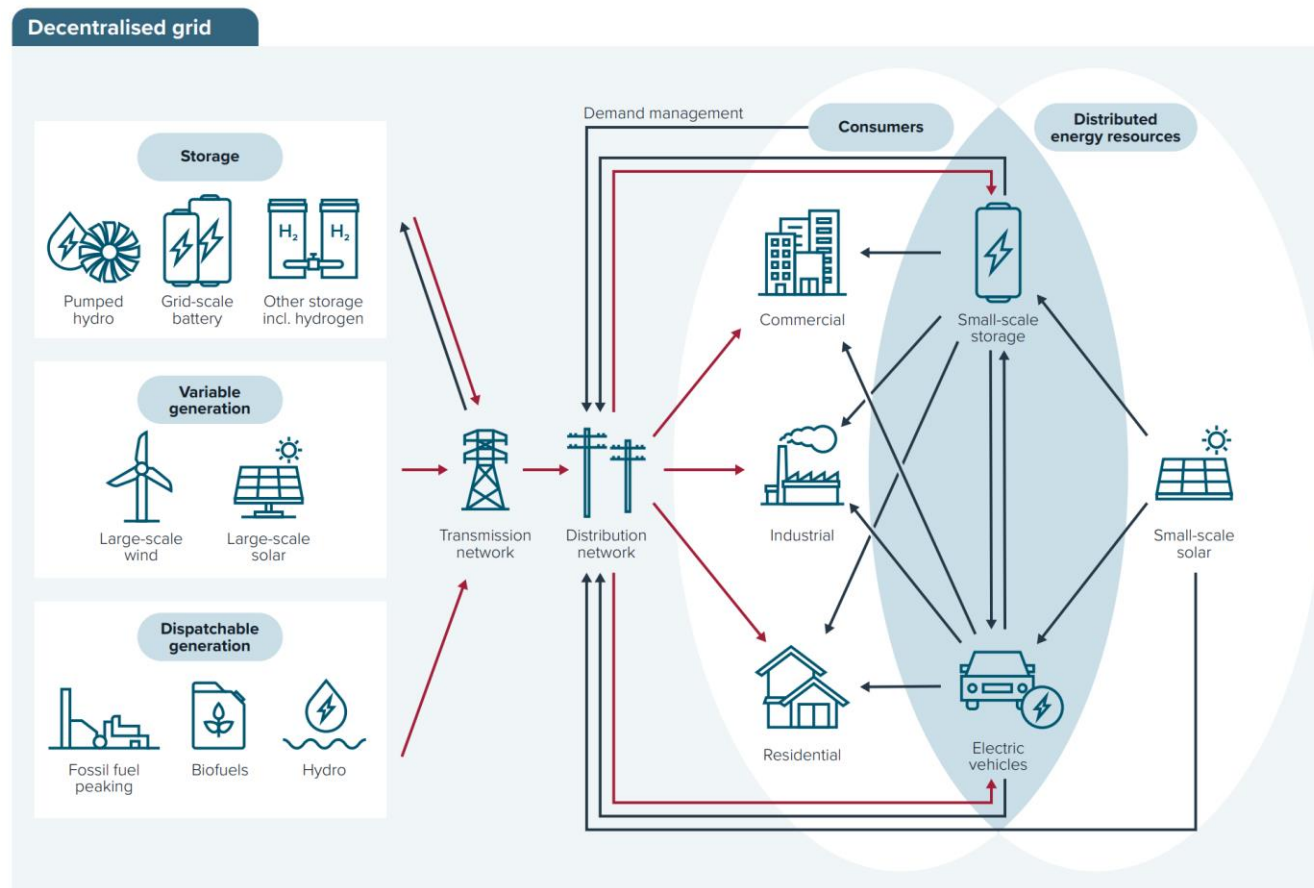
- Tackle affordability issues
- Keeping businesses competitive and support quality of life,
- Embrace cheaper, cleaner energy technologies
- Drive change through a smart grid
- Future-proof Australia's energy exports

Figure 3: Electricity is perceived as the least affordable form of infrastructure, with over 60% of consumers rating it as 'costly' or 'very costly'



Source: JWS Research (2018)⁶⁴

ZEVs have broad implications for the structure of the energy market

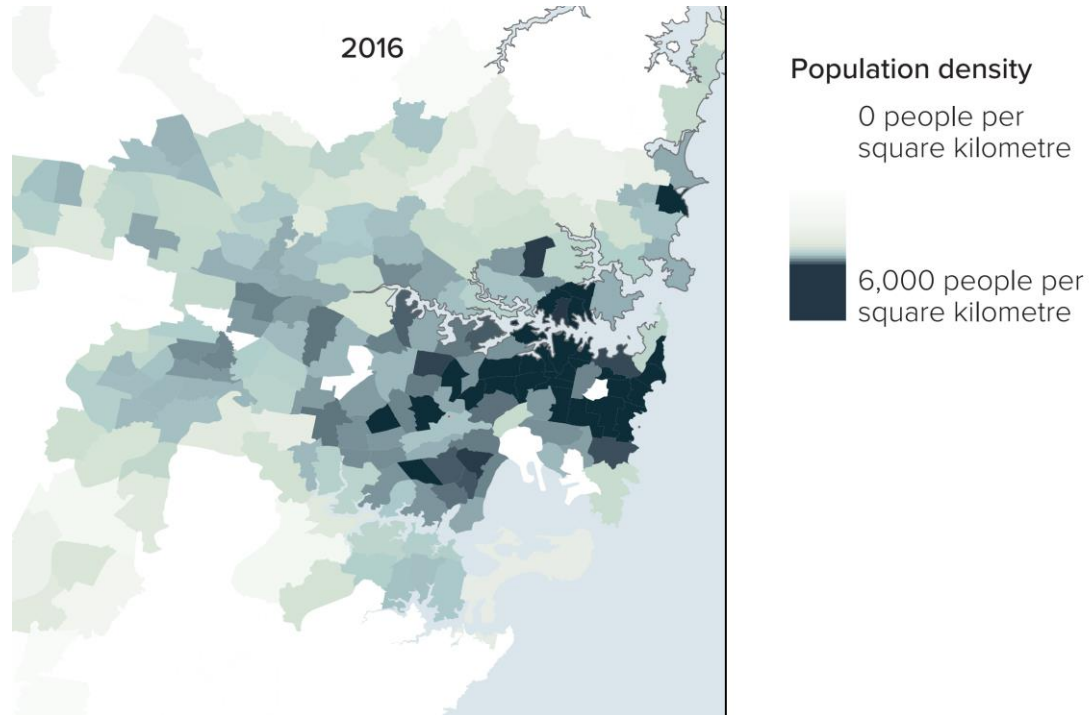


We need to build ZEVs into the fabric of urban development

- **Easily accessed charging facilities**
- **Updated building codes**
- **Two-way charging facilities**
- **Nationally consistent technical standards**
- **Bus depot facilities**



Without management, ZEVs could exacerbate inequality



Between 2008 and 2018

71.6%

of population growth occurred
in our fast-growing cities ¹⁴⁶

Recommendations

2.2 Recommendation

Meet Australia's present and future needs by establishing the quadruple bottom line as a goal for all infrastructure policy and investment.

Proposed sponsor: Department of Infrastructure, Transport, Regional Development and Communications

Supported by: State and territory environment departments

When this should impact:


0-5


5-10


10-15

15+


Where this should impact:











- 0-5

2.2.1 Achieve consistency and shared ownership through embedding the quadruple-bottom-line into infrastructure decision-making frameworks.

Proposed lead: Department of Infrastructure, Transport, Regional Development and Communications

Supported by: Infrastructure investment assurance and assessment agencies, state and territory treasuries and state and territory infrastructure bodies
- 0-5

Ensure consistent understanding by adopting the quadruple-bottom-line definition of sustainability.

Proposed lead: State and territory environment departments

Supported by: State and territory infrastructure delivery agencies, state and territory infrastructure bodies and state and territory treasuries
- 0-5

Meet Australia's commitments to net zero through long-term sector-specific plans that set interim emissions reduction targets and strategies that prioritise infrastructure investments and services.

Proposed lead: Department of Industry, Science, Energy and Resources

Supported by: State and territory environment departments, industry representative groups
- 0-5

Ensure consistent application of the quadruple-bottom-line at the strategic proposal development phase by embedding sustainability guidelines in investment frameworks and guidance materials. These should include considering sustainability when identifying problems, developing options and undertaking economic analysis.
- 0-5

Proposed lead: State and territory treasuries

Supported by: Infrastructure investment assurance and assessment agencies and state and territory infrastructure bodies
- 0-5

Facilitate national and cross-sectoral consistency by using quadruple-bottom-line guidelines to develop complementary, sector-specific sustainability principles and frameworks.

Proposed lead: Infrastructure Australia

Supported by: State and territory infrastructure bodies, infrastructure investment assurance and assessment agencies, state and territory treasuries and industry representative groups
- 0-5

Support common approaches to assessment, cross-sector collaboration, shared responsibility and best practice, and develop connections and networks, by forming a cross-jurisdictional sustainability group.

Proposed lead: Infrastructure Australia

Supported by: State and territory infrastructure bodies, infrastructure investment assurance and assessment agencies, state and territory infrastructure bodies, state and territory treasuries and industry representative groups
- 0-5

2.2.3 Deliver cost-effective emissions reduction and broad sustainability benefits consistent with the quadruple bottom line by managing zero emissions vehicle uptake and vehicle standards.

Proposed lead: Department of Industry, Science, Energy and Resources
- 0-5

Ensure the uptake of electric vehicles at the right scale and time to optimise quadruple-bottom-line benefits by delivering a national electric vehicle strategy through the expansion of the Future Fuels Strategy.

Proposed lead: Department of Industry, Science, Energy and Resources
- 0-5

Facilitate cost-effective emissions reductions by aligning vehicle emission standards with global best practice and requiring manufacturers to reduce emissions over vehicle portfolios.

Proposed lead: Department of Industry, Science, Energy and Resources
- 0-5

Ensure national consistency and coordination by aligning state and territory strategies and actions to the national strategy, including targets and timelines for transitioning all government fleet vehicles to electric vehicles whenever they are fit-for-purpose.

Proposed lead: State and territory finance departments

Supported by: Australia, state and territory government fleet managers, and state and territory transport departments

4.3 Recommendation

Free people from relying on driving for door-to-door mobility by ensuring urban transport services are managed as an integrated, inclusive, user-responsive and smart transport system.

Proposed sponsor: Department of Infrastructure, Transport, Regional Development and Communications

Supported by: State and territory transport departments, local governments

When this should impact:

0-5

5-10

10-15

15+

Where this should impact:











- 5-10

4.3.5 Ensure all road users can experience the benefits of world's best practice transport technologies by establishing a single national market for electric, connected and autonomous vehicles.

Proposed lead: National Transport Commission

Supported by: Department of Infrastructure, Transport, Regional Development and Communications, Department of Industry, Science, Energy and Resources, Department of Home Affairs, Australian Building Codes Board, Austroads, state and territory transport departments, local governments
- 0-5

To bring down purchase costs for bus and truck operators and speed up the rollout of new fleets, develop Australian Design Rules and common cross-jurisdictional technical specifications for zero-emission heavy vehicles that assist Australian manufacturers and importers in achieving economies of scale.

Proposed lead: Department of Infrastructure, Transport, Regional Development and Communications

Supported by: National Transport Commission
- 5-10

Ensure that fast-charging facilities for buses (and other zero-emission heavy vehicles) funded under the Future Fuels Strategy are subject to compliance with new cross-jurisdictional technical specifications.

Proposed lead: Australian Renewable Energy Agency
- 5-10

Enable the longer-term rollout of fleets of electric vehicles that can both return power to, and draw it from, the grid by ensuring the National Construction Code formalises requirements and specifications for providing and operating next-generation two-way charging facilities and associated signage in multi-residential, commercial, industrial and public buildings, including bus depots.

Proposed lead: Department of Industry, Science, Energy and Resources

Supported by: Australian Building Codes Board, Austroads
- 5-10

Facilitate the use of both privately owned and shared fleets of light electric vehicles and micromobility devices by ensuring standard and/or two-way charging facilities are installed at kerbside locations, and in public parking areas by the developers of off-street destinations such as shopping centres and long-term car parks.

Proposed lead: State and territory transport departments

Supported by: Local governments

- 5-10

Facilitate the uptake of new transport technologies by developing nationally uniform standards for the design and operation of road and digital assets used by Level 4 and 5 connected and autonomous vehicles. For all new road and major maintenance projects, immediately adopt and implement standards that offer 'no-regrets' benefits for existing and Level 3 vehicle operations, including line marking and digital speed zone standards.

Proposed lead: National Transport Commission

Supported by: Austroads, state and territory transport departments
- 5-10

Ensure the data-sharing framework and associated digital infrastructure for gathering and using connected and autonomous vehicle-generated data are designed to support the separate administration of a national distance-based road user charging regime. Also ensure they align with privacy and cyber security requirements.

Proposed lead: National Transport Commission

Supported by: Department of Home Affairs, state and territory transport departments

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