



Accelerating EV uptake

Policies to realise
Australia's electric
vehicle potential

POLICY
REPORT

AUGUST
2022

ACKNOWLEDGMENT OF COUNTRY

We acknowledge and pay respect to the Traditional Custodians and Elders – past and present – of the lands and waters of the people of the Kulin nation on which the Climateworks Centre office is located, and all of the Elders of lands across which Climateworks operates nationally. We acknowledge that sovereignty was never ceded and that this was and always will be Aboriginal Land. [More information.](#)



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ABOUT US

Climateworks Centre bridges research and action, to achieve the system-level transitions required to reach net zero emissions across Australia, Southeast Asia and the Pacific. We act as trusted advisers, influencing decision-makers with the power to reduce emissions at scale. Co-founded by The Myer Foundation and Monash University in 2009, Climateworks is an independent non-profit working within the Monash Sustainable Development Institute.

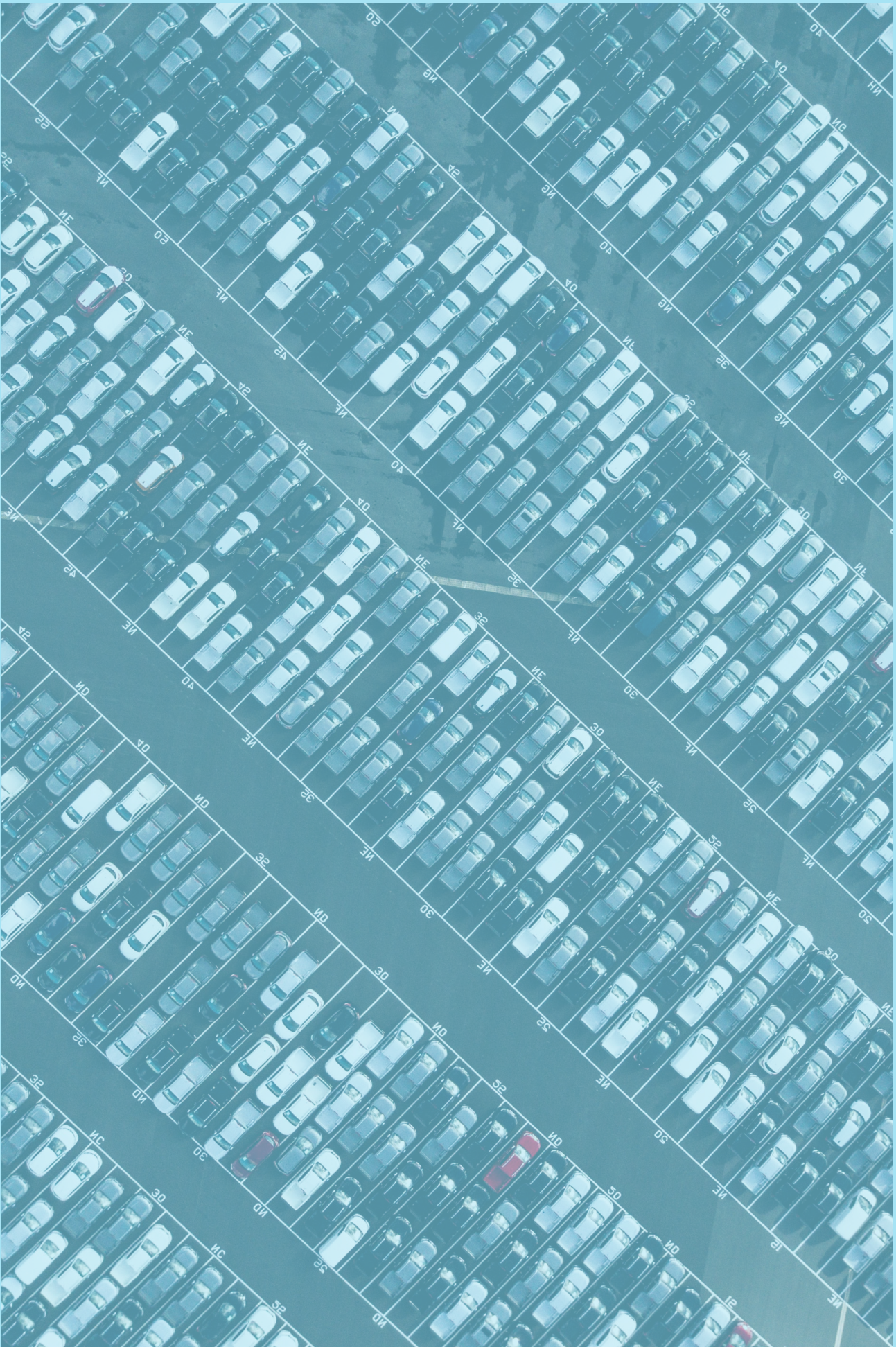
This report is part of the Climateworks transport program. Learn more about our work [here](#).

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Executive summary

The global shift to electric vehicles (EVs) is well underway, but Australia's EV uptake lags behind this trend.¹ In 2021, just 2% of cars sold in Australia were EVs (Electric Vehicle Council [EVC] 2022), despite half of all Australians seeing their next car purchase as an EV (EVC and carsales.com 2021). The major barrier to uptake is low EV supply to Australia.

Without addressing supply, consumer demand cannot be met and EV uptake will be severely limited. There are also significant savings to be gained by increasing supply.

The first step to unlock supply is setting fuel efficiency standards. These standards need to be competitive in the global EV market where EVs are prioritised for markets with strong standards. Climateworks Centre suggests setting this in the order of 95g CO₂/km by 2024, and reducing to 0g CO₂/km by 2035.

While addressing supply is a crucial starting point, a comprehensive policy package is needed to ensure a fast and smooth transition for individuals and businesses. Coordinated and sustained policy support will help the EV market transition through its emergent stages into a well-established marketplace.

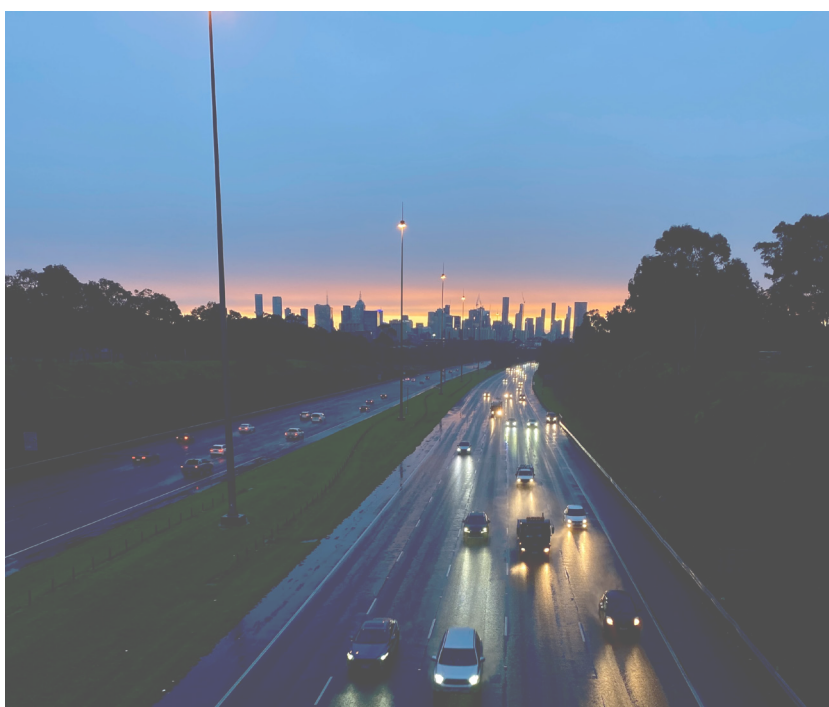
By getting the right policies in place, Australia can lift its ambition further, resulting in additional savings. Climateworks analysis shows that under a modelled decarbonisation scenario aligned with limiting global temperature rise to 1.5°C, EVs make up 76% of new vehicle sales by 2030 (ClimateWorks Australia 2020a, 2020b). The analysis presented in this report shows that raising national ambition to 76% will unlock \$20 billion in vehicle running cost savings and 24 mega tonnes of carbon equivalent (MtCO₂e) emissions savings, compared to Australia's current projected uptake. Globally, there is momentum for EVs to make up 100% of new cars sold by 2035. This would allow 15 years for internal combustion engine (ICE) vehicles to transition out of the fleet in time to reach net zero emission in 2050. These goals, and their positive effects, are within reach with the right policies in place.

¹ This report refers to electric vehicles (EVs), as light passenger vehicles that are battery electric vehicles. While a future zero-emissions transport system may also include fuel cell vehicles and other technology, at this point in time battery electric vehicles are the most mature, known and cost-effective technology. Some sources in this report also include data on hybrid electric vehicles; however, these are not zero emissions vehicles and therefore should not be considered in the long term. Additional work is also needed to address emissions from other areas of road transport such as trucks.

The three steps to accelerate EV uptake in Australia are:

- 1. Unlock supply, which is currently the main barrier to EV uptake in Australia and critical to meet uptake targets. The best tool to address this is setting federal fuel efficiency standards. Climateworks suggests setting this in the order of 95g CO₂/km by 2024, with a trajectory of reducing to 0g CO₂/km by 2035, and regular reviews to ensure it is set at the right rate to increase supply and at the pace with global trends.**
- 2. Implement a comprehensive policy package that increases supply, sets strong uptake targets, stimulates demand and plans ahead for a smooth transition for individuals, businesses and fleets while maintaining a fair and efficient transport system throughout.**
- 3. Set ambitious EV sales targets to provide certainty for the market and gain additional savings. Raising Australia's ambition to 76% of new vehicles by 2030 and 100% by 2035, will benefit consumers and the climate.**

This report sets out steps to accelerate and support Australia's EV transition, starting by addressing supply. Section one of the report outlines how Australia is tracking against EV uptake globally and against existing targets. Section two focuses on the critical component of supply and policies to increase the number of EVs coming into Australia. Finally, section three sets out how supply policies fit within a broader EV policy package designed to set up a smooth transition to a zero-emissions future.



EV adoption in Australia has been slow but can be accelerated

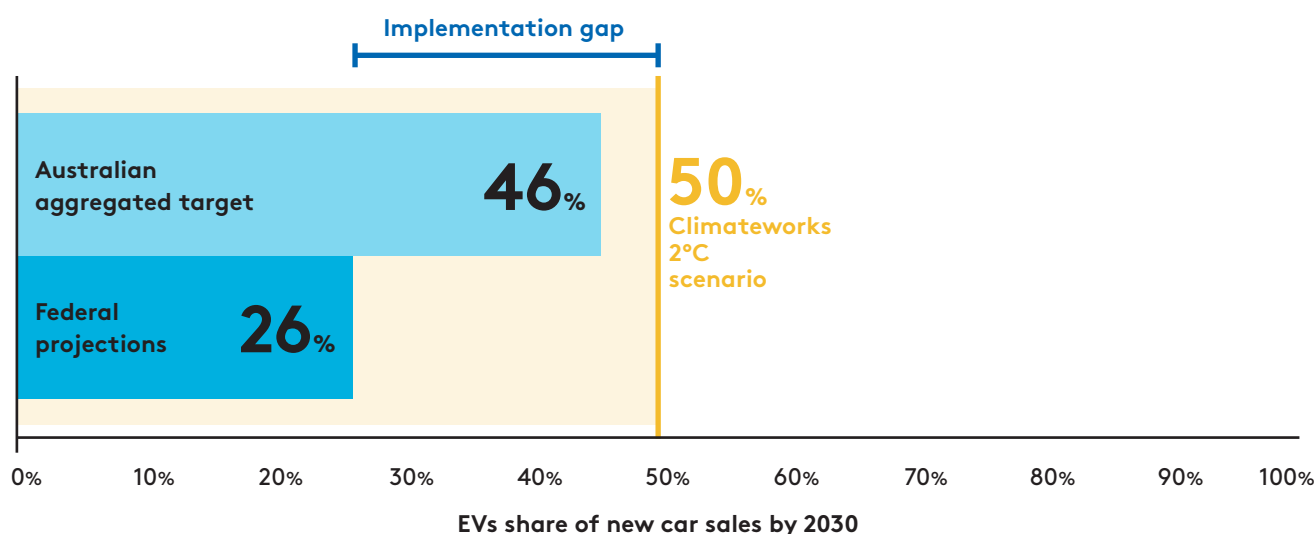
Australia lags behind global EV uptake. EV uptake is tracking at an average 10% globally and as high as 72% in Norway (International Energy Agency [IEA] 2022a). Meanwhile in Australia, new EV sales are growing, but slowly: they increased from 0.8% of new cars in 2020 to 2% in 2022 (EVC 2022).

Current trajectory misses out on cost savings and emission cuts

Due to this slow growth, Australia is not on track to meet existing, aggregated state and territory targets, which would be equivalent to 46% EV share of new car sales by 2030.² By comparison, Climateworks' modelling of a decarbonisation scenario aligned with limiting global temperature rise to 2°C included EVs making up 50% of new car sales in 2030. Figure 1 below shows the implementation gap between actual uptake, existing aggregated state and territory targets and the level of uptake modelled in Climateworks' 2°C-aligned scenarios.

Federal Government sales projections show that EVs will make up just 26% of the total sales in 2030 (Department of Industry, Science, Energy and Resources [DISER] 2020). This figure is based on the most recently published government projection, including the policy settings and assumptions at the time. Since 2020, new state-based policies and federal government changes mean that new EV policies have been announced. These focus mostly on charging infrastructure, financial incentives and government fleet transition. While it is expected this will affect future projections, the impact these policies will have on uptake remains unclear in an environment of constrained supply.

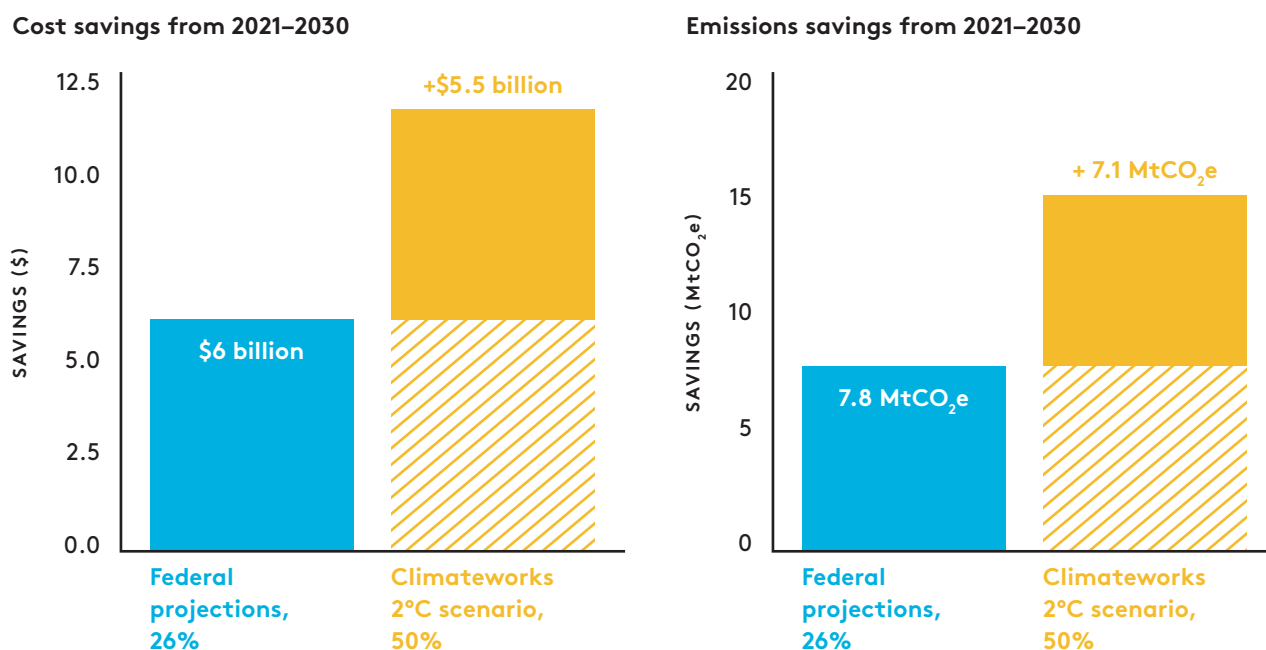
FIGURE 1: Current EV uptake projections



² New South Wales, Victoria and Queensland have targets of 50% of new light vehicle sales to be zero emissions by 2030, aligned to Climateworks' analysis for a 2°C pathway. The Australian Capital Territory has set a target of 80-90% by 2030. These official commitments cover 80% of the national EV market, and are equivalent to Australia committing to achieve 46% of new car sales by 2030. Other states and territories are seeking to make EVs the dominant vehicle type by 2030, without yet setting formal targets. For those without targets, the national projected EV uptake of 26% by 2030 has been used as the default target.

If Australia can close the implementation gap to reach 50% of new car sales being EVs by 2030, there will be 1.1 million more EVs on the road compared with reaching 26%. Given EVs' low running costs, by 2030 there is an opportunity to save as much as \$5.5 billion on cumulative vehicle operating expenses for households and businesses (see Figure 2). Finally, closing the gap would also mean that Australia avoids an additional 7.1 MtCO₂e, as shown in Figure 2.

FIGURE 2: Benefits of achieving 50% EV share of new car sales



More ambitious EV targets can support Australia's international climate commitments

Australia committed to the Paris Agreement goals of keeping a global temperature rise this century well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase even further to 1.5°C (see Box 1). In October 2021, Australia committed to achieving net zero emissions by 2050, in line with global efforts to meet the Paris Agreement. Additionally, Australia signed the 2021 Glasgow Breakthrough on Road Transport, which states that zero-emissions vehicles are 'the new normal,' and need to be 'accessible, affordable, and sustainable in all regions by 2030–35' (UK Presidency 2021). Setting and realising higher EV adoption targets, aligned to a 1.5°C pathway, will not only help meet these commitments and avoid the worst impact of climate change, but also ensure Australia is realising the full benefits of the EV transition.

BOX 1:**What do we mean by '1.5°C alignment' and why is it so important?**

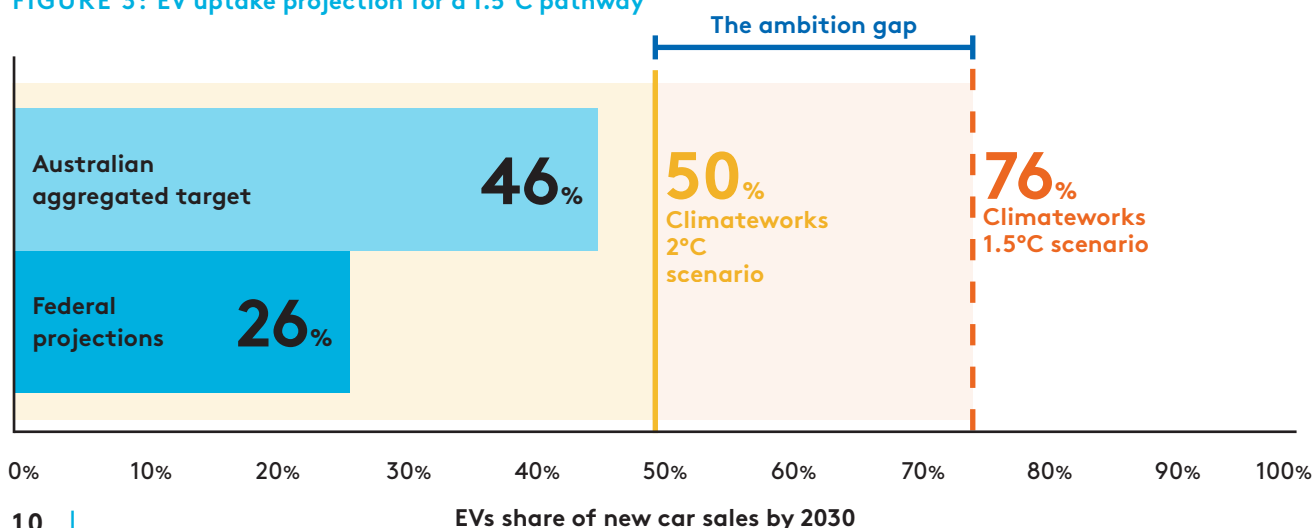
In 2015, the global Paris Agreement set the goal of limiting the increase in global average temperatures to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Since then, scientific evidence has demonstrated how each incremental increase in temperature will bring significant and damaging climate change impacts. The IPCC Special Report on Global Warming of 1.5°C (2018) laid out the stark differences between a 2°C and a 1.5°C world. These findings led global leaders to commit to efforts that limit global temperature rise to 1.5°C rather than 2°C, affirmed in the Glasgow Pact (2021).

As one of many examples, if global temperatures rise to 2°C rather than 1.5°C, the planet will see an additional 10cm of sea level rise, the near-disappearance of many coral reefs and an additional 420 million people exposed to frequent heat waves. With potentially twice as many droughts, communities and ecosystems would have far less time to recover.

Global pathways to avoiding the worst impacts of climate change by limiting global temperature rise to 1.5°C remain possible. However, we have a limited window of time to get on track. For decision-makers, this means aligning targets and policies to a 1.5°C pathway as early as possible. For transport in particular, this means rapidly rolling out known zero-carbon solutions through the 2020s to mitigate an expected increase in demand. Transport emissions should peak by 2030, and from there, rapidly fall to zero for road passenger transport by 2035. This is possible with the right policies in place.

Aligning to a 1.5°C pathway will enable even greater cost and emissions savings

While existing state and territory EV targets, in aggregate, nearly align to a 2°C pathway, significant benefits can be gained if Australia's ambition rises to a 1.5°C-aligned pathway. A comparison of EV uptake pathways and levels of ambition is set out in Figure 3. If Australia is to contribute to global efforts to avoid the worst impacts of climate change, Climateworks recommends bridging the current ambition gap and aiming for 76% of new vehicles by 2030 and 100% by 2035. 76% of new vehicles by 2030 is consistent with the scenarios modelled in Climateworks' *Decarbonisation Futures* (2020b). This is consistent with global recommendations to end sales of ICE vehicles by 2035 for the world to meet net zero emissions by 2050 (IEA 2022).

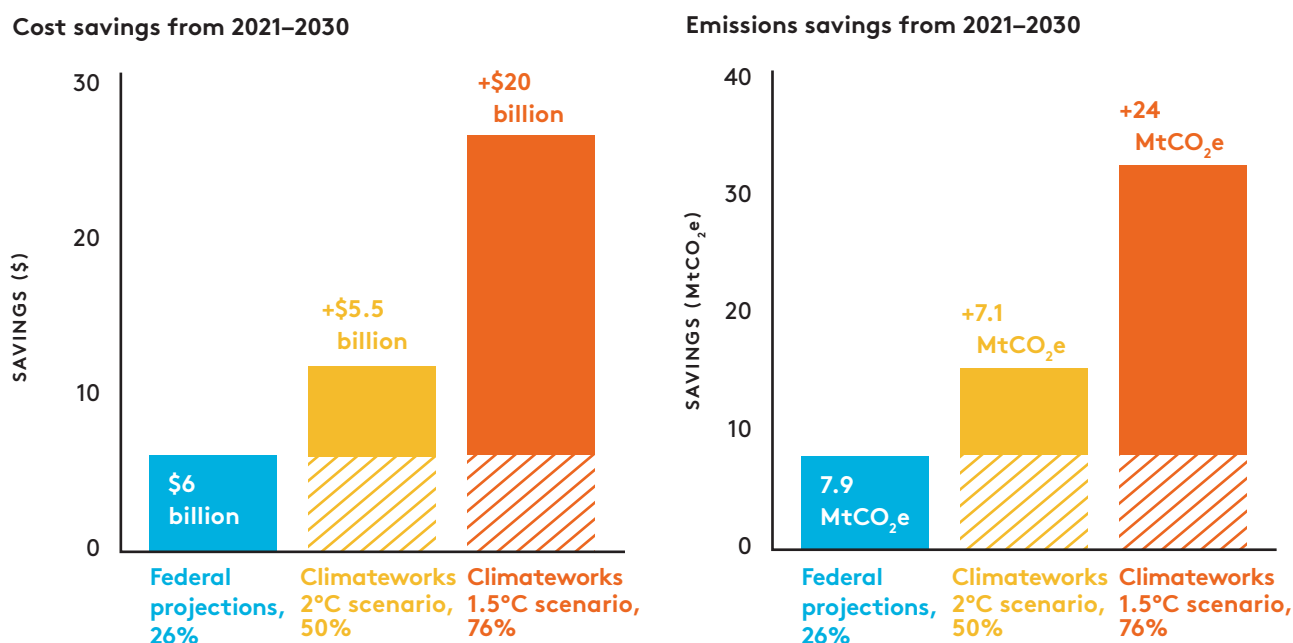
FIGURE 3: EV uptake projection for a 1.5°C pathway

A growing number of governments around the globe have set 100% EV uptake targets or total ICE vehicle phase-out schemes. As of June 2021, 17 jurisdictions around the world have made such commitments (Wappelhorst 2021). As a result, the vehicle industry is shifting to match this ambition; at least eight global manufacturers have committed to transition to 100% EV production by 2040, including affordable options such as Nissan by the early 2030s and Volvo by 2030 (EVC 2022).

Aligning to the 1.5°C pathway will also ensure Australians reap maximum benefits from the EV transition. It will reduce expenses for consumers and businesses through lower vehicle operating costs and save a significant volume of emissions. As Figure 4 shows, by 2030, achieving 76% EV share of new car sales would save nearly 24 MtCO₂e from being emitted into the atmosphere. Moreover, Australians would save \$20 billion on petrol and maintenance costs.

For each new ICE vehicle sold (which could have been an EV) the average Australian will emit an extra 16 kilo tonnes of carbon and spend an extra \$19,500 on vehicle running costs³ over the life of the vehicle.

Figure 4: Benefits of achieving 76% EV share of new car sales



In 2021, EV sales were more than 285,000 vehicles short of the trajectory needed to meet 76% of total car sales by 2030. If this trend continues to 2030, Australia could be almost 3 million vehicles away from meeting this sales ambition.

Australia can learn from its own history of effectively establishing new technology markets. Australian household solar panel uptake was underpinned by clear policy support including standards and financial

³ Based on the total running costs of fuel and maintenance over the 15-year lifespan of a vehicle: EV cost is \$26,360 and ICEV cost is \$45,948.

incentives such as feed-in tariff and certificate schemes. As the market was established, government support phased out to allow it to operate independently (Grattan Institute 2015). Achieving existing EV targets, and even lifting Australia's ambition to a higher target, is possible with the right national policies in place. This needs to start with unlocking supply by implementing fuel efficiency standards.

If 76% of new vehicle sales are EVs by 2030,
Australian consumers would save \$20 billion
and avoid 24 MtCO₂e.

Key points and recommendations

- + Australia is currently lagging behind global EV uptake.
- + Australia could take the opportunity to save \$5.5 billion and 7.1 MtCO₂e in emissions if EVs make up 50% of new vehicle sales by 2030.
- + Australia can take action by raising the ambition from the current trajectory to a 76% EV share of new car sales by 2030 and 100% by 2035.
- + Reaching a 76% EV share of new car sales can unlock \$20 billion savings for consumers and avoid 24 MtCO₂e emissions by 2030.



Start by unlocking supply to meet uptake targets

Growing consumer appetite for EVs is not yet being met by adequate supply or model choice in Australia.

While new EV sales are growing—from 0.8% of new cars in 2020 to 2% in 2021—consumer demand is far outstripping supply. In 2022, Hyundai's release of new EVs sold out in under seven minutes (The Driven 2022). Supply is limited in terms of volume as well as the range of models available. As of 2022, there are 24 different electric vehicle models available in Australia supplied by 17 different manufacturers. This is compared to over 130 EV model options in the UK (IEA 2022a). This is in part because the overall Australian vehicle market is small, remote and requires right-hand drive vehicles, making it less attractive to car manufacturers. Australia also lacks incentives to encourage manufacturers to increase supply of EVs. Given there are incentives in other markets such as New Zealand, the European Union and the United States, these jurisdictions remain a higher priority for vehicle manufacturers.

Manufacturers prioritise EV supply to countries where there are strong standards

Comprehensive policies and standards will incentivise, and even require, manufacturers to send more EVs to the Australian market. Australia's current lack of policy and regulations to provide market certainty and incentives for manufacturers means that consumers cannot currently access many electrified options. Some manufacturers have said they are unable to prioritise EVs for the Australian market due to the lack of standards and, instead, send their EVs to countries with strong standards they need to meet, such as the EU. The former Managing Director of Volkswagen Group Australia Michael Bartsch commented that, despite Australian demand for electric Volkswagens, 'So long as [...] there's no legislative environment that makes it imperative to bring the vehicles to Australia, the prioritisation will always be to sell those cars in Europe or America or China' (ABC 2021).

Fuel efficiency standards are therefore critical to unlock supply of EVs in Australia. Most other global vehicle markets have regulated such standards already (IEA 2022a).⁴ Designed correctly, they will incentivise manufacturers to bring more EVs to Australia. Based on Climateworks policy research, the best tool to increase EV supply in Australia is fuel efficiency standards.

Fuel efficiency standards are the most effective way to increase supply

Some markets have had increasingly stringent fuel efficiency standards for many years, and regions such as the European Union are now seeing a sharp increase in EV uptake. Others, like New Zealand, are in the process of introducing them. Mandatory fuel efficiency standards, also called fleet-wide light vehicle CO₂ standards,⁵ set an emissions cap across a manufacturer's new vehicle fleet—this is expressed as the average grams of CO₂ per km. The lower the CO₂ emissions per km in the standard, the more electric vehicles manufacturers will need to supply to meet the standard. Penalties can then be applied to manufacturers for each gram of CO₂ emitted above the fleet cap, as in the European Union and New Zealand.

⁴ The majority of the global vehicle market is regulated in some way by vehicle air pollution and efficiency standards.

⁵ Tackling light vehicle emissions can be addressed in a few ways. This report focuses on fleet-wide CO₂ standards, which will be referred to as fuel efficiency standards. These standards have variably been called CO₂ emission standards, light vehicle CO₂ emission standards, fleet-wide emissions standard, average emissions ceiling or efficiency standard. Additionally, this report does not cover mechanisms that focus on the individual vehicle design also called 'vehicle emissions standards', which regulate pollutants such as nitrogen oxides (NOx) and sulphur oxides (SOx).

Standards create a financial incentive to supply EVs to markets to avoid penalties. Under some schemes, if manufacturers reduce emissions below the standard, they can sell emissions credits to other manufacturers. Schemes like this exist in the United States and European Union. This approach assists manufacturers that are slower to adapt. However, standards need to be carefully designed to ensure all manufacturers can meet them through real fleet emissions reductions without overly relying on credits.

Table 1 below shows the standards in place around the world, indicating a trend towards standards in the order of 95–115g CO₂/km by 2025 and noting some challenges in comparing across jurisdictions.⁶

TABLE 1: Comparison of selected fuel efficiency standards in other jurisdictions

Scheme	The Clean Car Import Standard (New Zealand Government 2021)	'Fit for 55' package–CO ₂ emission standards for new cars and vans (European Union 2022)	GHG emission standard for passenger cars (United States EPA 2021)
EV uptake	% of sales, 2021: 4.4% (from 2.8% in 2020 and 2019) # models: 28 # vehicles: 6,700	% of sales, 2021: 17% (from 10% in 2020; 3.2% in 2019) # models: 184 # vehicles: 1.2 million	% of sales, 2021: 4.6% (from 2.2% in 2020 and 2.1% in 2019) # models: 70 # vehicles: 466,000
Current average CO₂ emissions	171g CO ₂ /km (2020)	96g CO ₂ /km (2020) ⁷	197.6g CO ₂ /km (2019) ⁸
Standard	113g CO ₂ /km (2025)	95g CO ₂ /km (2020–2024) Further targets to be set for 2025 and 2030 0g CO ₂ /km by 2035	108g CO ₂ /km (2025) ⁹ Targets are lowered 5% each year to 2026
Other features	Mechanisms for manufacturers to pool credits (enabling high emissions manufacturers to buy credits from low emissions manufacturers), and penalising manufacturers if they fail to meet the required targets.	Mechanisms for manufacturers to pool credits (enabling high emissions manufacturers to buy credits from low emissions manufacturers), and penalising manufacturers if they fail to meet the required targets.	Mechanisms for manufacturers to pool credits (enabling high emissions manufacturers to buy credits from low emissions manufacturers).

Sources: Cheung 2022; IEA 2022a; IEA 2022b; Motor Industry Association 2021

⁶ Note: there is inconsistency globally in the calculation of standards making comparison difficult. Most jurisdictions are moving towards Worldwide Harmonized Light Vehicles Test Procedure (WLTP) and it is recommended that Australia adopts this to ease comparison and compliance. Current FCAI voluntary target uses New European Driving Cycle (NEDC) emissions rates which are less reflective of real-world conditions compared to the WLTP tailpipe emissions rates used in the EU, NZ, Japan and other markets. US targets use Corporate Average Fuel Economy (CAFE) testing. See Yang and Bandivadekar (2021).

⁷ Includes flexible compliance mechanisms, such as super-credits and phase-in provisions. Without flexible compliance mechanisms: 108g CO₂/km (Tietge, Mock, Díaz and Dornoff 2021).

⁸ IEA 2021a, note the United States uses CAFE testing.

⁹ Converted from the US CAFE test cycle to the WLTP test cycle for consistency in comparison.

Australia is one of the only OECD countries without fuel efficiency standards and is falling behind international best practice (IEA 2021c). As such, there is currently no benefit or penalty that would incentivise manufacturers to supply more EVs to Australia. The result of a lack of standards is that Australia has amongst the highest emitting vehicle stocks in the world. In 2020, the average efficiency of new light vehicles sold in Australia was 180.5g CO₂/km (National Transport Commission [NTC] 2020).¹⁰ In comparison, New Zealand's average efficiency was 171g CO₂/km and the European Union's was 96g CO₂/km (see Table 1). With fuel efficiency standards, each vehicle manufacturer would be required to meet increasingly strict standards across the mix of vehicles they offer in the Australian market. This would provide Australians with greater vehicle choice, including more EVs as well as more fuel-efficient ICE vehicles. Setting standards encourages manufacturers to supply EVs while still allowing for vehicle choice and giving manufacturers the flexibility to transition.

In Australia, manufacturers have proposed a voluntary standard of 100g CO₂/km by 2030, along with annual emissions reductions targets between 2020 and 2030 of 4% per annum (passenger cars and light SUVs) and 3% per annum (heavy SUVs and light commercial vehicles) (Federal Chamber of Automotive Industries [FCAI] 2020).¹¹ In the first year of reporting, the majority of manufacturers failed to meet this emissions reduction target (FCAI 2021), indicating that voluntary standards do not have sufficient regulatory power. Furthermore, given the EU has set a target for manufacturers of 95g CO₂/km for 2020–2024 and enforces penalties. If Australia sets a significantly weaker standard than this or without penalty, it would not provide sufficient incentive for manufacturers to supply EV volume to Australia.

Without competitive standards, Australia will remain a destination for higher-emitting vehicles, leaving consumers with limited choice and higher running costs over the lifespan of their vehicles.

Additionally, recent petrol price increases have impacted Australia, and the international market remains uncertain. The most polluting, least fuel-efficient cars in the market are often the cheapest. Often, these are purchased by low-income buyers that can least afford higher running costs and petrol price shocks, in addition to overall rising living costs.

Globally, EV purchase prices continue to fall (Transport and Environment [T&E] 2021), but without standards to increase supply, many Australians who could benefit from these vehicles' low operating costs will miss out. When implemented, fuel efficiency standards will ultimately create financial savings for vehicle owners, improve energy security, and provide health and economic benefits for Australia alongside reducing emissions (Climate Change Authority 2014).

Numerous reports have called for standards to be introduced in Australia over the last five years, summarised in Table 2 below. These calls support standards in the order of 95–105g CO₂/km between 2024–2027, complemented with a target to fall to 0g CO₂/km by 2030–35. Building on Climateworks' previous analysis supported by these reports, we recommend fuel efficiency standards in the order of 95g CO₂/km by 2024, falling to 0g CO₂/km by 2035 to maximise the benefits of the EV transition for Australia. Further modelling, evidence and engagement is required to ensure these standards are at a level to shift the market, achieve Australia's net zero goals and provide industry with adequate time to meet the standard.

Implementation of legislated standards would set Australia on a pathway to reach net zero emissions. Once a standard is set, regular reviews (e.g. every 2 years) should be conducted to ensure this standard is having a positive impact on EV supply and keeping pace with global shifts.

To unlock EV supply, Australia needs to set fuel efficiency standards. Climateworks suggests setting this in the order of 95g CO₂/km by 2024, and reducing to 0g CO₂/km by 2035.

¹⁰ Data from 2019 is used due to methodology changes. Emissions data provided by industry since then includes the use of super credits, which changes the emissions data. Additionally, this change in methodology reduces the ability to compare previous years.

¹¹ Note this uses NEDC emissions rates compared to the WLTP, which is used in analysis.

TABLE 2: Review of design and impact of Australian fuel efficiency standards

RECOMMENDATION	SOURCE	STATED IMPACT	
		EMISSIONS REDUCTION	COST SAVINGS
95g CO ₂ /km by 2024	ClimateWorks Australia (2014, 2017)	<ul style="list-style-type: none"> + 4 MtCO₂e emissions reduction in 2020, and 8.7 MtCO₂e emissions reduction in 2024 + Equivalent to taking 2.2 million cars off the road 	<ul style="list-style-type: none"> + Fuel cost savings of \$7.9 billion per year in 2024 + Average consumer fuel savings of \$852 in 2024
100g CO ₂ /km by 2027 and fall to 0g CO ₂ /km by 2035	Grattan Institute's Car Plan (2021)	<ul style="list-style-type: none"> + 517 MtCO₂e emissions reduction between 2021-2035 	<ul style="list-style-type: none"> + Reduced running costs save consumer \$900 in first five years and \$2,000 over the life of the vehicle
105g CO ₂ /km target by 2025	Ministerial Forum on Vehicle Emissions (2016)	<ul style="list-style-type: none"> + 65 MtCO₂e emissions reduction to 2030 and 231 MtCO₂e emissions reduction to 2040 	<ul style="list-style-type: none"> + Fuel savings of \$27.5 billion by 2040 + Average consumer fuel savings of \$519 in 2025 + Net benefit of \$13.9 billion by 2040
	Climate Change Authority (2014)	<ul style="list-style-type: none"> + 59 MtCO₂e emissions reduction to 2030 + Equal to annual emissions of all light vehicles in 2014 	<ul style="list-style-type: none"> + Fuel savings of \$830 in vehicles first year and \$8,500 over the life of the vehicle
	Transport and Environment Research (Smit 2019)	N/A	<ul style="list-style-type: none"> + Cumulative fuel cost savings of \$1.3 billion between 2016-2019
<105g CO ₂ /km before 2025	Framework for an Australian Clean Transport Strategy (iMove CRC 2022)	<ul style="list-style-type: none"> + Australia's vehicles emit 20%, 45% and 50% more grams of CO₂ per km than the U.S., the EU and Japan respectively 	N/A
'in line with major markets around the world'	Electric Vehicle Council (2022b)	<i>Refers to Ministerial Forum on Vehicle Emissions (2016) figures</i>	<i>Refers to Ministerial Forum on Vehicle Emissions (2016) figures</i>
'in line with major car markets and fall to 0g CO ₂ /km by 2030/35'	The Australia Institute (2022)	<ul style="list-style-type: none"> + 9 MtCO₂e emissions reduction between 2016-2021 	<ul style="list-style-type: none"> + Cumulative fuel cost savings of \$5.9 billion between 2016-2021

The secondhand EV market can fill gaps in the short term and support a fair transition in the long run

SECOND-HAND IMPORTS

Putting in place fuel efficiency standards is a straight-forward and efficient solution to stimulate supply. There are other, complementary policies that can work alongside standards to stimulate second-hand EV supply and provide more affordable options to all households.

In a context of high demand, low EV supply and high up-front prices, boosting second-hand EVs imports can help bring more low-cost options to Australia.

Under Australia's current import policy framework, all second-hand vehicles, including EVs, face import restrictions. This includes a requirement that any vehicle model being considered for import has not been available for sale in Australia recently, as well as a series of technical compliance checks. Facilitating access to 'grey' or 'parallel' imports¹² was recommended previously by the Productivity Commission (2014), the ACCC (2014) and the Harper Review (Treasury 2015). Some organisations have emerged to bulk-buy second-hand EVs and sell them in the Australian market such as Goodcar, J-Spec and Kilowatt.¹³ Easing import restrictions can help accelerate this emerging, second-hand market.

Those designing supportive conditions for parallel EV imports to Australia can take inspiration from New Zealand where parallel imports have flowed into the domestic market since the 1980s. While there are differences to the New Zealand market, Australia could investigate a priority process for increasing parallel EV imports by streamlining regulatory and compliance steps. Revisiting import restrictions on parallel imports could help address EV supply issues and bring more affordable EVs to the Australian market.

FLEET TARGETS

Fleet procurement can be a powerful lever to boost EV uptake in Australia and inject supply into the second-hand market. Encouraging all fleets – both from government and the corporate sector – to set ambitious EV targets has the potential to flood the second-hand market with EVs at a more accessible price-point for most Australian drivers (EVC 2021). But policies are needed to support fleet shifts. For example, proposed changes to the Fringe Benefit Tax would substantially reduce the cost of business fleet vehicles.

The Federal Government replaces each of its 10,000 vehicles roughly every five years (Foley 2021), sending older vehicles to the used car market. A Federal Government commitment to 75% of new fleet purchases and leases being 'low-emissions vehicles' would amount to 1,500 vehicles a year from 2022 to 2025 (ALP 2022). These 'low-emissions vehicles' could then enter the second-hand market by 2027.

Additionally, business fleets made up 50% of annual new vehicle sales in 2020 and serve as an important source to the second-hand market (NTC 2020). If corporations set fleet targets, it would signal the creation of a major market for EVs in Australia with positive knock-on effects for the second-hand market. Ambitious fleet targets such as the 100% EV fleet target set by the EV100 initiative (EV100 2022)¹⁴ will not only signal a major market shift but also normalise the use of EVs. The shift to EV fleets also presents opportunities for employee and community education, overcoming misconceptions and demonstrating the significant benefits of electric vehicles. Later in their lifecycle, these fleet vehicles would contribute to a successful second-hand market making EVs more accessible and affordable to more Australians.

¹² Buying a car directly from a foreign seller without passing through an established automaker or dealership.

¹³ See more: <https://www.goodcar.co/about-us>; <https://www.j-spec.com.au/info/Who-is-JSpec.php>; <https://kilowattcars.com.au/>.

¹⁴ EV100 commits companies to switch their fleets to electric vehicles, and/or install EV charging for staff and/or customers by 2030.

Manufacturer sales targets can provide certainty and attract supply

While fuel efficiency standards provide an efficient and flexible approach to stimulate supply, setting manufacturers sales targets can complement standards and provide certainty that the future of vehicles is zero emissions. Setting clear national sales targets, as outlined earlier, for the EV transition will provide industry and consumers with certainty. This can be supported by setting specific sales targets for manufacturers to increase EV supply, as per policies in California and China (Rokadiya & Yang 2019).

British Columbia has legislated EV sales targets for manufacturers to deliver more EV models and vehicles (British Columbia 2021). This legislation includes penalties for failing to provide vehicles to the market as well as a credits system. Manufacturers can negotiate agreements with the province to gain credits for actions that reduce vehicle emissions or increase EV sales or use. Australia could apply this credits system here for manufacturers who provide priority access to government vehicle procurement, fleet subsidies, workforce training and development, or investment in charging infrastructure. Sales targets provide an alternative in the absence of national fuel efficiency standards; however, standards are the more efficient tool to drive supply to all states and territories.

Tackling supply issues, through the approaches recommended in this report, is a priority for a successful EV transition. As more EVs enter the Australian market, they will need to be met with continuous consumer demand and appropriate infrastructure. Supply is one focus area of a broader policy package that is outlined in this report to position Australia for a successful transition. Drawing from successful EV policies around the globe, the following section outlines such a policy package, designed to close both the implementation gap to existing targets and the ambition gap to reach 76% EV sales.

Key points and recommendations

- + Bringing more EVs into Australia is the most urgent priority. Setting fuel efficiency standards is the most effective way to increase supply.
- + Climateworks recommends legislating a fuel efficiency standard. Previous work suggests setting this in the order of 95g CO₂/km by 2024,

with a trajectory of reducing to 0g CO₂/km by 2035, and regular reviews (e.g. every 2 years) to amend in line with global trends. Further modelling, evidence and engagement will be required to ensure the standard is high enough to reach targets while providing industry with adequate time to adapt.



Comprehensive policy support will enable a successful EV transition in Australia

The shift from ICE vehicles to EVs is a major market transformation that requires consistent support. Countries with significant EV uptake have comprehensive policy packages that simultaneously address supply and demand and make the transition an easy one for all drivers.

Supporting the transition through multiple approaches can make EVs the logical choice for people in the market for a new car. EVs now make up over 70% of new vehicle sales in Norway and around 10% in the UK – and these countries have applied standards and financial incentives for a number of years. Financial incentives to purchase EVs and vehicle regulations have been in place in the European Union, Japan, China and the United States for years – and these steps are now producing the desired results.

While Australia's EV policy has picked up in recent years, there are gaps and differences between jurisdictions. The country is not yet planning comprehensively for high EV uptake.

State and territory governments have, however, set initial EV uptake targets and have begun setting policy and action plans to deliver on these. Policy announcements focus on financial incentives, charging infrastructure and awareness campaigns. These help stimulate demand for EVs, but tools to address national supply issues are limited at this level. The Australian Capital Territory was the first Australian jurisdiction to establish EV incentives and is now seeing the highest uptake in the country at 5% of new vehicle sales (EVC 2022). The majority of Australian states and territories now offer upfront incentives for EVs, while a number also waive stamp duty for EVs. New South Wales has invested \$171 million in charging infrastructure, more than all other states and territories combined. The Federal Government has focused on charging infrastructure and consumer awareness, but it has not yet set a clear national pathway for EV transition. Local governments are also playing their part, targeting fleet change, investment in charging infrastructure, and community education.

These efforts have started the transition, but gaps in the overall policy mix are being felt on the ground by Australians who struggle to purchase EVs in a market where so few vehicles and models are available.

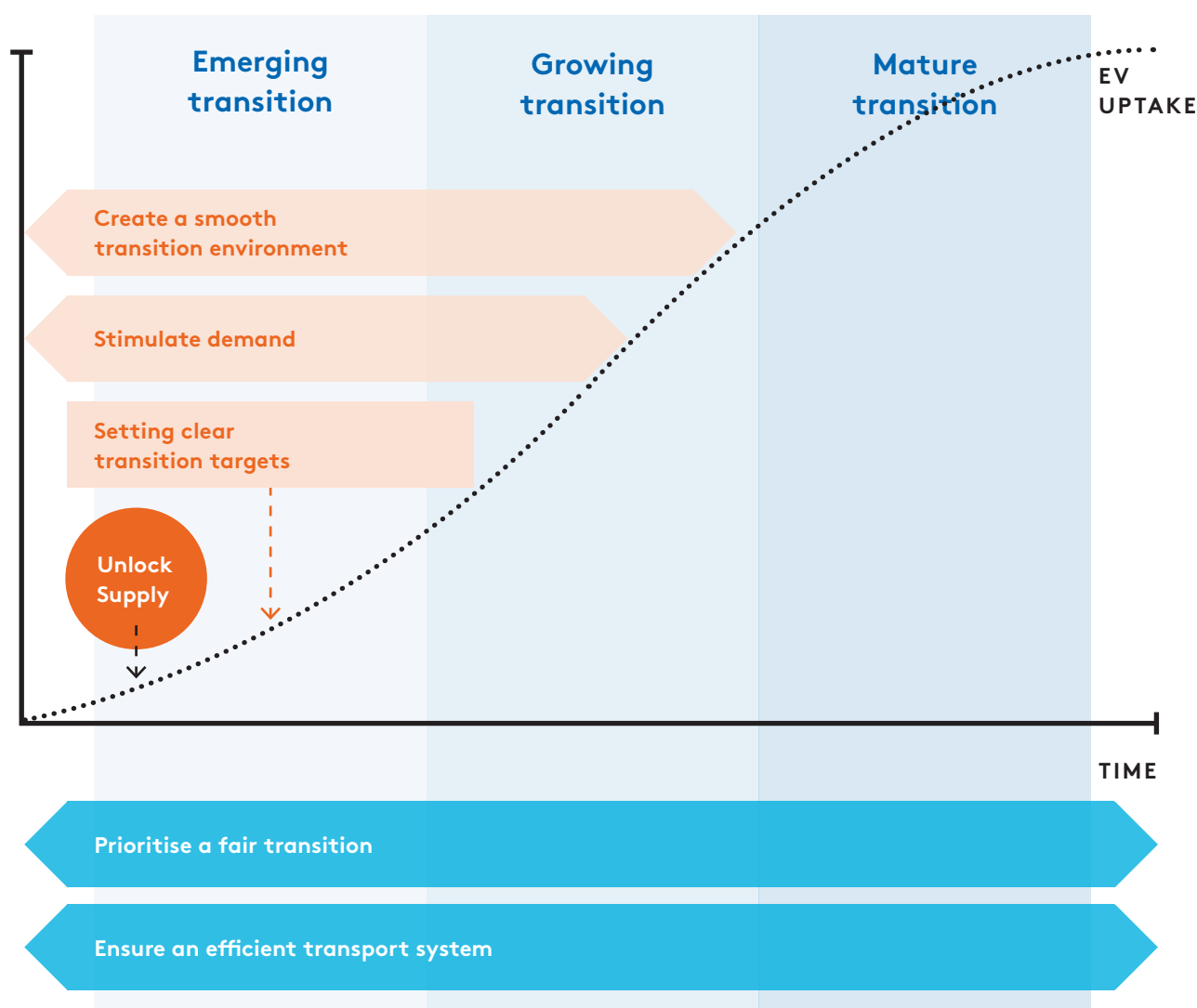
A mix of policies can support the EV market through all stages of the transition

A successful and accelerated EV transition requires a comprehensive and ambitious policy package that will address several challenges in a timely way. This package starts with focus areas already identified in this report: tackling supply and providing clear, ambitious targets. Including these areas, Climateworks' research identifies a total of six focus areas needed in the policy package to support the EV transition:

1. Increase the supply of EVs to the Australian market
2. Set EV uptake targets to provide certainty for consumers and the market
3. Stimulate demand for EVs
4. Create a smooth transition environment for EV users, industry and the grid
5. Prioritise a fair EV transition, ensuring there are options for everyone who needs a vehicle
6. Ensure EV transition results in an efficient transport system.

While these focus areas each play a critical role in the larger policy package, it must be noted that they would be insufficient if delivered in isolation. In particular, without addressing supply, other interventions will fail to deliver their full impact.

FIGURE 5: EV transition policy package



STIMULATE DEMAND FOR EVS

While urgent intervention is needed to unlock supply of EVs to the Australian market, efforts to stimulate demand need to continue, particularly while EV upfront costs remain higher than ICE vehicles. Until price parity is reached later this decade,¹⁵ financial support to reduce the price difference can help make EVs attractive to consumers. Once price parity occurs, financial support targeted to low-income households can help complete the transition. Financial support could include reducing and removing structural costs such as taxes and duties where possible. It may also include sustainable financial incentives that fund EV subsidies while also reducing ICE vehicle demand, such as New Zealand's Feebate Scheme. Or, finally, support could include scrappage or trade-in programs to remove ICE vehicles from the fleet.

CREATE A SMOOTH TRANSITION ENVIRONMENT

As demand for EVs grows, it will be important to have supportive elements ready to enable a smooth transition. These involve adequate charging infrastructure, including making new buildings EV-ready, as well as an electricity grid that can handle, and even benefit from, a higher number of charging vehicles. Other support measures include working with industries to prepare mechanics, insurers and manufacturers.

PRIORITISE A FAIR EV TRANSITION

As the transition to EVs accelerates, it risks leaving some drivers behind. Ensuring Australia reaches net zero emissions means that everyone needs to be able to participate and governments have a critical role to play in supporting this. Low-income households are already disproportionately car-dependent and more exposed to fuel price changes (Dodson and Sipe 2008). If there is not active support in the transition to EVs, these households could be left to pay increasingly more for inefficient fossil-fuelled vehicles. For renters and households without access to home charging, there is a crucial role for retrofitting programs, planning schemes and building code updates to support EV readiness. Targeted financial incentives for EV uptake also need to be maintained longer for low income households, particularly until more affordable, second-hand supply enters the market.

ENSURE AN EFFICIENT TRANSPORT SYSTEM

The EV transition needs to deliver an efficient transport system—both in terms of emissions and moving people around. EVs, like all private vehicles, remain a relatively inefficient way to transport people. They are both space and resource intensive, and contribute to congestion, sprawl and higher embodied emissions (Iveson 2021). Due to low running costs, EVs will be cheap to run once purchase prices reduce. However, this could encourage more car travel and further congestion. Addressing these risks and achieving a lower emissions- and space-efficient transport system requires more than just increased EV uptake. Mode shift to public and active transport, car share and other forms of shared mobility, will have an important role to play. These modes are particularly important in urban areas where most Australians live, as they can move more people using less space than EVs alone. Similarly, mechanisms like road pricing, urban planning and remote work can help reduce the need for and length of car trips. In particular, road pricing needs careful design to ensure it achieves these multiple benefits. Revenue raised can underpin the shift to lowest emissions transport options (Badstuber 2018).

Table 3 summarises the policy package recommended to achieve each of these outcomes and accompanying policy priorities. While this report focuses on targets and supply policies, interventions and planning are needed now on all areas of this policy package. Climateworks will release further reports detailing interventions in the other areas of the policy package.

¹⁵ BloombergNEF (Cheung 2022), IEA (2022) and T&E (2021) expect global price parity around 2027.

TABLE 3: Climateworks EV policy package

EV uptake policy focus areas

	Why is this important?	Key policy levers	Policy priority
1. Increase the supply of EVs to the Australian market	Australia is only getting a trickle of EVs as global manufacturers send supply to markets with strong policy settings and incentives Growing demand in Australia far outstrips supply	<ul style="list-style-type: none"> + Fuel efficiency standards influence manufacturers vehicle offerings + Government and business fleet targets + Facilitate second-hand imports 	National implementation of fleet-wide fuel efficiency standards to incentivise manufacturers to supply EVs to the Australian market
2. Set EV uptake targets to motivate manufacturers	Consumers, businesses and government need a clear pathway to provide certainty for decision making and maximise the benefits of the EV transition	Set targets to guide transition: <ul style="list-style-type: none"> + Aim for 1.5°C-aligned targets + Set interim targets + Set 100% uptake date 	National, state and territory governments raise EV sales ambition to 76% by 2030
3. Stimulate demand for EVs	To establish the new EV market and meet targets, mechanisms are needed to shift consumer preference from ICE vehicles to EVs	<ul style="list-style-type: none"> + Reduce or remove financial barriers such as stamp duty and taxes + Support government and business fleets EV procurement + Financial incentives that are sustainable and reduce ICE vehicle demand 	National, state and territory governments reduce barriers and implement incentives, providing consistency across jurisdictions to give market and consumer certainty
4. Create a smooth transition environment for EV users, industry and the grid	As demand scales up, a supporting environment can enable create a smooth transition, through charging infrastructure, building and planning requirements and retrofits, grid capacity and industry readiness	<ul style="list-style-type: none"> + Set charging guidelines + Invest in charging + Public education and awareness campaigns + Manage electricity grid capacity + Support industry transition, including mechanics + Update the building code 	National, state and territory guidance to ensure charging locations are convenient for users and efficient for the grid and transport network


 CONT.

Cross-cutting focus areas

	Why is this important?	Key policy levers	Policy priority
5. Prioritise a fair EV transition ensuring there are options for everyone	Ensure all Australians who need to drive can transition to cleaner, cheaper, more efficient vehicles	<ul style="list-style-type: none">+ Targeted financial incentives for low income households+ Stimulate second hand vehicle supply and demand+ ICE vehicle scrappage or trade-in programs+ Charging infrastructure retrofits for rentals and apartments	National, state and territory interventions to support second-hand market growth, ensuring all Australians are part of the transition
6. Ensure the EV transition results in an efficient transport system	Complement EV uptake with measures to reduce overall travel and shift to more sustainable modes	<ul style="list-style-type: none">+ Road pricing+ Investment in mode shift+ Support car share and shared mobility	National, state and territory governments actively manage demand for travel and additional vehicles, to maximise emissions reduction and efficiency of the transport network

Coordination will improve manufacturer and consumer confidence in the EV market

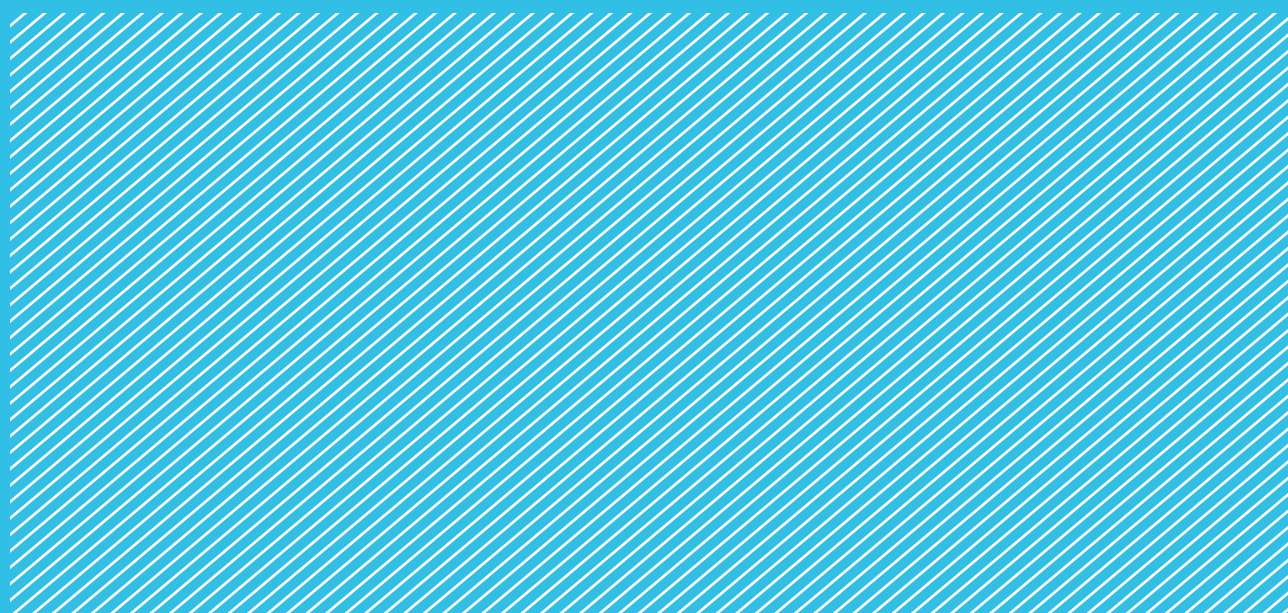
Australia needs to accelerate action on all six policy areas set out above to send a strong signal to manufacturers and consumers. This primarily requires the efforts of federal, state and territory governments, but there is also an important role for local government. A coordinated approach to policy development will support a stable and growing market and help prevent perverse outcomes across borders. This includes the risk that consumers purchase or register vehicles in places where they can access higher subsidies or avoid costs, which will make state and territory action more difficult. The recent Federal Government commitment to a national EV strategy has come at a critical point. This strategy can support consistency, boost EV buyer and manufacturer confidence in the stability of Australia's EV market, and highlight opportunities for market growth.

Key points and recommendations

- + Australia can draw from a wealth of global experience to create an effective policy package.
- + Climateworks recommends implementing a policy package that increases supply, delivers on targets, stimulates demand and plans ahead for a smooth transition
- for individuals, businesses and fleets, while maintaining a fair and efficient transport system.
- + A coordinated approach from all levels of government will make the Australian market more attractive for manufacturers and consumers.

The solutions to get Australia on track are available now. EV uptake can be supported with known policies, which have been implemented elsewhere and successfully enabled higher uptake. Australia can learn from these experiences and catch up by implementing the right policy package now. This means ensuring supply issues are addressed immediately, and designing appropriate policies across all six areas outlined in this report, to create a smooth transition to an EV future, and ensure Australia is well placed to achieve targets in line with limiting global temperature rise to 1.5°C.





Summary of key recommendations

The tools are ready for implementation now.
Climateworks recommends:

+ **Urgently tackling supply issues by implementing a fuel efficiency standard.** Climateworks suggests setting this in the order of 95g CO₂/km by 2024, with a trajectory of reducing to 0g CO₂/km by 2035, and regular reviews to amend in line with global trends.

+ **Implementing a comprehensive and ambitious policy package to realise consumer and climate savings.** This means implementing policies that increase supply, set clear targets, stimulate demand, enable a smooth and equitable transition, and guarantee an efficient transport network.

+ **Raising Australia's EV sales ambition to 76% of new vehicles by 2030, to realise \$20 billion in vehicle running cost savings and 24 MtCO₂e in emissions savings.**

Appendix: Technical methodology

In producing the analysis for this report, we have drawn on a number of sources. The data sources and assumptions for each figure are set out below. Data to track Australia's EV transition and its emissions is still being refined in some areas.

Below is a list of assumptions used in calculations for Figure 1: The current EV uptake projection

The figure uses the federal projections of 26% at 2030 (DISER 2020).

The Australian aggregated target was calculated using a weighted proportion of market share from VFACTS (2022). The following states have official public targets which were used: VIC (Victorian Government 2021), NSW (NSW Government 2021), QLD (Queensland Government 2022) and the ACT (ACT Government 2022). For states with no official public targets, the federal projection of 26% was used (DISER 2020).

To calculate the 50% EV sales share, data was used from modelling performed by CSIRO's Aus-TIMES model for *Decarbonisation Futures* (ClimateWorks Australia 2020a, 2020b).

Below is a list of assumptions used in calculations for Figure 2: Benefits of achieving 50% EV share of new car sales

Calculations for Figure 2 and 4 to estimate the cost and emissions savings, are based primarily on the EVC cost calculator assumptions (EVC n.d.) in Table 4.

TABLE 4: EVC cost calculator assumptions (EVC n.d.)

ASSUMPTIONS	VALUES
Annual kilometers (ABS 2020)	12100 (km)
Solar charging	No
Weekday kilometer average (ABS 2020)	31.78 (km)
Weekend kilometer average (ABS 2020)	31.78 (km)
Additional annual vehicle kilometres (road trip)	500 km
Day to day driving in urban	50%
Private parking and charging space	Yes
Free work charger	No
Car at home weekdays 8am-6pm	50%
Car at home weekends 8am-6pm	50%
Home electricity usage	7200 kWh per year
Public chargepoint cost	0.45(\$/kWh)
Electricity peak charges	0.288(\$/kWh)
Electricity off-peak charges	0.288(\$/kWh)
Electricity daily charges	0.93 (\$/day)
Percentage green power	0%
Postcode	3000
Total years of ownership	15 years (for cost calculation) 1 year (for emissions calculation)

Additionally, weighted average values of cost and emission were taken from the range of values provided by the EVC cost calculator based on SUV, sedan and hatchback body types. Weighting of percentage of market share of each body type was extracted from data from NTC (2020).

The number of new EV vehicles sales was calculated using the percentage of total light-duty passenger vehicle fleet projections from 2°C scenario (ClimateWorks Australia 2020a, 2020b).

Emissions were calculated with assumptions from the emission intensity based on the current energy grid for 1-year ownership. The EVC Cost Calculator green power was kept at 0% (EVC n.d.). Emissions were calculated with an assumption of 24% renewables based on the current energy grid (Taylor 2021). Future projections of grid emissions intensity was then calculated using the Aus-TIMES model to project the emission intensity of an EV from 2021–2030 (ClimateWorks Australia 2020b).

The cost and emissions savings were calculated annually and cumulatively from 2021–2030 by using the following equations:

$$Cost = \sum_{y=1}^N (\rho * \sum_1^y \omega_y)$$

Where:

y = Year

N = Total number of years till 2030

ρ = Cost benefit of single EV replacing ICEV according to cost calculator per year

ω_y = Number of EV sales in the year y

$$Emissions = \sum_{y=1}^N (\gamma * \tau_y * \omega_y)$$

Where:

y = Year

N = Total number of years till 2030

γ = Emission saving of single EV replacing ICEV in tonnes CO₂ per year

τ_y = Scale factor of electricity grid intensity for year y

ω_y = Number of EV sales in the year y

**Below is a list of assumptions used in calculations for Figure 3:
EV uptake projection for a 1.5°C pathway**

Similar assumptions are considered as described for Figure 1 with the addition of Climateworks 1.5°C scenario from ClimateWorks Australia (2020a, 2020b).

**Below is a list of assumptions used in calculations for Figure 4:
Benefits of achieving 76% EV share of new car sales**

Similar assumptions are considered as described for Figure 2 with the addition of Climateworks 1.5°C scenario from ClimateWorks Australia (2020a, 2020b). Table 4 contains the list of assumptions used in calculations for Figure 4.

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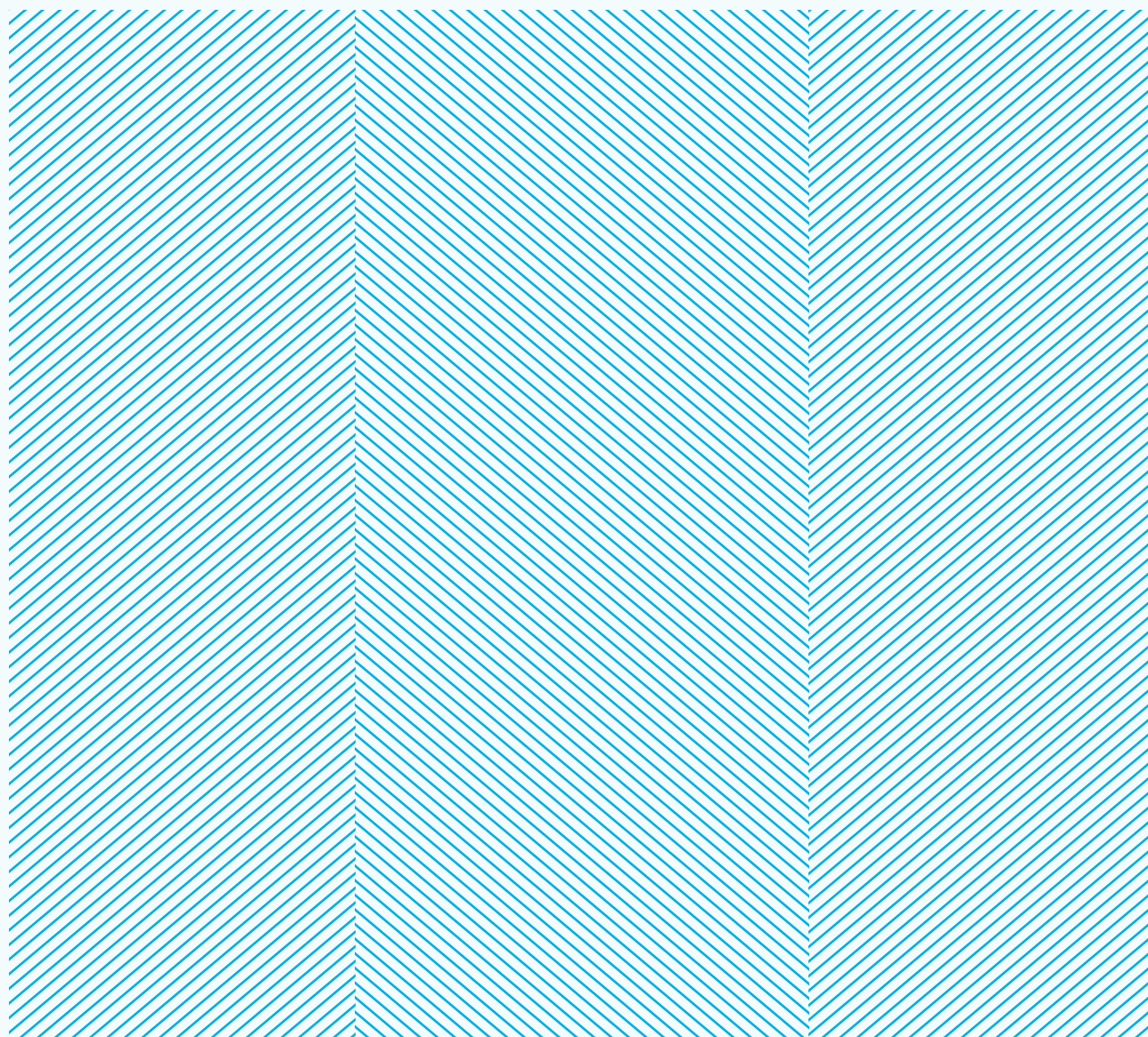
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