

White Paper

# Think... Electric Vehicles

Inspire a better world  
through influence  
and design



**ADP**  
Consulting : Engineering

**ADP acknowledge Aboriginal & Torres Strait Islander peoples as the Traditional Custodians of the lands on which we live, gather and work. We pay our respect to the Elders past and present, and offer that respect to the First Peoples of every Nation and Country within our circle of influence.**

Artwork: Created by [Timothy Buckley](#), a proud Mununjali Man, 'Thrive' is inspired by the many environments where we find life; all of which thrive through balance and diversity. In the same way as diversity does, communication creates positivity and growth for everyone.



# Think... Electric Vehicles

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As demand for electric vehicles takes off, shopping centres can be the power stations of the future.

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Climate change targets, the cost of petrol and carbon offsets, clean engine standards and government incentives, rating schemes and consumer preferences have all converged to drive demand for EVs.

As Australia's policy and regulation get up to speed, an enormous challenge has emerged: rolling out charging infrastructure across the nation's wide brown land.

Australia has some of the world's most sustainable shopping centres. In fact, more than 1.3 million Australians visit a [Green Star-rated shopping centre each day](#), and millions of square metres of retail space is assessed each year for its NABERS Energy performance.

As shopping centre owners roll out renewable energy and electrify their operations, they are poised to become power stations of the future.

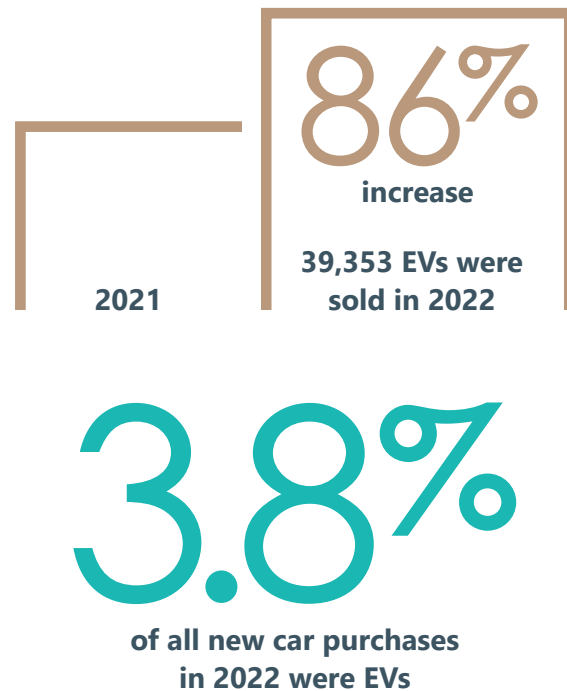
How can electric vehicles become a new revenue stream? And how can you think differently about EVs to make the most of the opportunities ahead on the road to net zero?

ADP is assisting several shopping centre owners to establish EV charging stations through their existing electrical infrastructure – and we have some interesting insights to share. So, how can other shopping centre owners prepare?



# Think... Facts

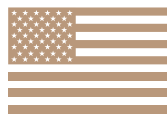
The [Australian Electric Vehicle Council](#) has crunched the numbers, and there are now 83,000-plus EVs on Australia's roads.



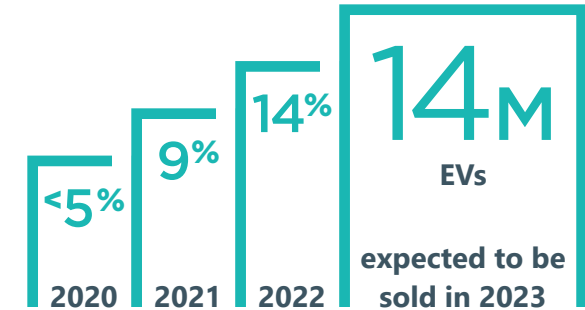
**China** is the world's EV frontrunner. More than half of the electric cars on roads worldwide are in China, and the country accounts for around 60% of global electric car sales.



In **Europe**, the second largest market, electric car sales increased by more 15% in 2022. One in every five cars sold was electric.



Electric car sales in the **United States** – the third largest market – increased 55% in 2022, reaching a sales share of 8%.



A 35% year-on-year increase

10M+

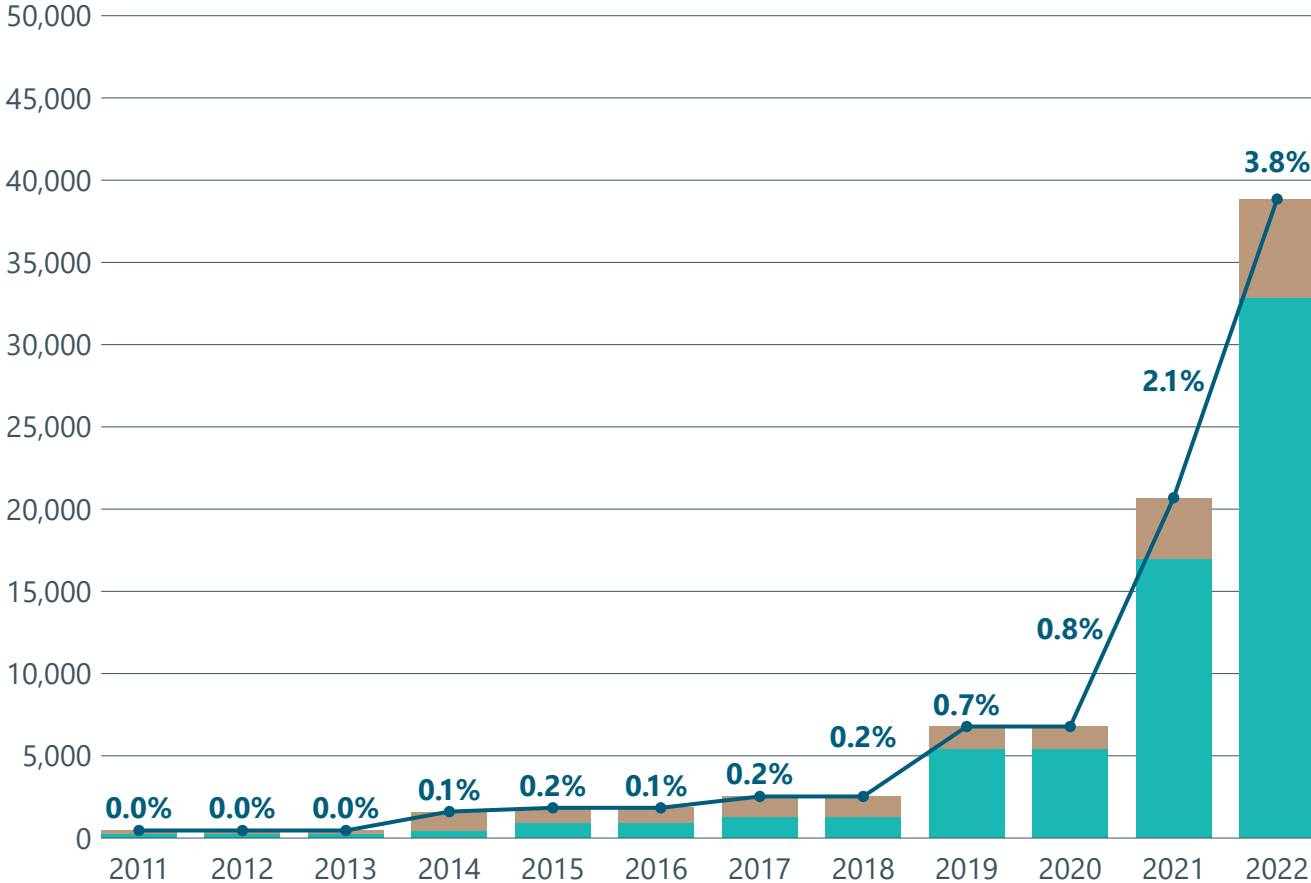
EVs were sold globally in 2022

Source: [International Energy Agency Global EV Outlook 2023](#)

# Think... The big picture

## New EVs purchased in Australia: 2011-2022

- BEV: Battery electric vehicles
- PHEV: Plug-in hybrid electric vehicles
- Market share



Source: [Electric Vehicle Council Australia](#), 2023

# Think... Leadership

Convenient and accessible charging facilities can reinforce a shopping centre's position as a destination and community hub, increasing dwell time and enhancing the customer experience.

Shopping centre owners can also capitalise on the growing EV market by becoming one-stop-shops for EV customers.

Importantly, EVs reinforce a shopping centre's sustainability credentials and net zero ambitions.

Australia's shopping centre leaders are moving at speed and scale. Here are just three signs of the times...

## **Vicinity Centres**

Around 66% of Australia's population live within 30 minutes of a Vicinity shopping centre. Chadstone Shopping Centre, for example, attracts more than 20 million visitors each year.

In a partnership with French energy company Engie and REA, [Vicinity has installed EV fast-charging stations](#) in carparks across 60-plus assets.

## **AMP Capital**

The rollout of the [Evie charging stations in 2022](#) at 16 of AMP Capital's centres in New South Wales, Queensland and Western Australia provides a pay-per-use charge option of 40 cents per kWh for time-poor visitors to the centres.

## **Lendlease**

Around [80 EV charging stations](#) – up to 22kW – have been installed at 16 commercial and office precincts, including Barangaroo and Darling Square precincts in Sydney and Melbourne Quarter in Victoria.

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Australians typically visit their local shopping centre twice a week for a 30 minutes grocery shop. Shopping centres generally have large electrical substations and good access to electrical infrastructure that can support large amounts of charging. They can also provide a pleasant experience while customers wait for their cars to charge.

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# Think... Policy and regulation

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State and territory governments have also introduced a range of incentives and investments – from rebates to reduced stamp duty to fast-charger rollouts – to propel the EV market.

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## **National Electric Vehicle Strategy**

In April 2023, the Australian Government released the first [National Electric Vehicle Strategy](#). At the centre of this strategy is a new commitment to introduce Australia's first vehicle Fuel Efficiency Standard, alongside initiatives to support battery recycling, infrastructure planning, apartment building design and rolling out world-leading training for emergency services workers.

State and territory governments have also introduced a range of incentives and investments – from rebates to reduced stamp duty to fast-charger rollouts – to propel the EV market.

## **National Construction Code**

Overlaying these voluntary frameworks is the National Construction Code, which sets minimum standards for the safety, health, amenity, accessibility and sustainability of certain buildings.

The Code is produced and maintained by the Australian Building Codes Board, on behalf of the Australian Government and each state and territory government and is updated every three years.

The next iteration, which comes into full effect in October 2023, adds requirements for electric vehicle charging equipment, alongside solar panels and battery systems. New electrical distribution boards dedicated to electrical vehicle charging are now required in accordance with [Section J9 of the Code](#).

# Think... Economics

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Let's compare the economics of EV installation. Just say a shopping centre installs EV chargers in 5% of its 10,000 car parks...

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**500**  
car parks  
with 20kW chargers

**500**  
x 20kWh x 0.15c/KWh  
cost is **\$1,500**

**50%**  
utilisation equals  
**\$6,000 a year**

**\$2.16M**  
annual energy cost

**\$2M**  
annual profit

# Think... Detail

Australia will need a hierarchy of EV charging infrastructure:

**1. Home charging** is likely to account for around 80% of EV recharging activity

**2. Public charging** with medium speed recharging in shopping centres and workplaces

**3. Service stations** with ultra-fast charging for interstate and recreational travel, consumers in high density dwellings.

AC and DC chargers are two different types of EV charging systems. AC, or alternating current, EV chargers work by converting the AC power from the grid into the DC (direct current) power that is stored in the EV's battery. These chargers are typically slower and less expensive than DC chargers and are commonly used for overnight or workplace charging.

DC (direct current) EV chargers bypass the conversion process and supply the EV's battery directly with high voltage DC power. This makes them more expensive than AC chargers, but they are also faster – charging an EV battery in as little as 30 minutes. DC chargers are commonly used for public fast charging stations located along highways or in other areas where drivers need to quickly top up their battery.

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Electric cars could increase demand on Australia's power grid during the evening peak by at least 30% unless households adopt smart charging, [according ARENA](#).

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# Think... Green

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Buildings generate around a quarter of Australia's emissions, while transport is responsible for 18.7% of Australia's national inventory.

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While the National Construction Code sets minimum standards, the Green Building Council of Australia's (GBCA's) Green Star and the National Australian Built Environment Rating System (NABERS) are voluntary rating systems that recognise best practice and reward leadership.

## **Green Star**

From 2023, a 5 Star Green Star rating – equivalent to Australian excellence – must meet the GBCA's Climate Positive criteria. A building must be fossil fuel free, powered by renewables and built with materials that are low in upfront carbon emissions. From 2026, all buildings seeking a 4 Star Green Star rating, representing 'Best Practice', must meet these requirements.

EV charging points must accommodate at least 5% of all car parking spaces; connections for car sharing parking spaces must also be accommodated. Electrical infrastructure and a load management plan must be prepared to allow for future installation of EV charging to 25% of all car parking spaces. A dedicated, safe, unobstructed route from the electrical supply point must allow for future provision of electrical cabling without the need for substantial builders' work.

## **NABERS**

NABERS does not directly reward EVs, but because the energy associated with EV charge points does not form part of the minimum energy coverage and is not required to be included, they do not have a negative impact on a NABERS Energy rating. Emissions associated with moving vehicles are not included in the scope of ratings.

# Think... Design

Range anxiety is a real concern now, but as battery technology advances and charging infrastructure expands the range capabilities of EVs will improve.

What it will mean, though, is a very different way of thinking about distances – and a very different way of thinking about the design of shopping centres.

Here's just some of the questions that asset owners are asking as they consider how EVs will reshape the future...

- Will we invest in fast-charging DC infrastructure or slower but cheaper AC? How will that change the design of our assets?
- Do we need more car park exits or just better exit distribution?
- How much water will we need for sprinklers and hydrants? Will that require more drainage? Or more containment?

- Will our open deck car parks need sprinklers, like in the United States, [where the National Fire Protection Association](#) now requires that all parking garages – including open parking structures – have sprinkler systems?
- How will we manage smoke extraction?
- Will we need more mechanical systems? Or will the ones we have just work harder?
- How will the EVs operate and how will the design of car parks prioritise the customer experience? Will customers turn up and plug in? Is there a booking system? How will our system work with apps and loyalty programs?

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# Think... Safety

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Like any energy storage system, EVs carry a potential fire risk; however, that risk is low compared to traditional gasoline-powered vehicles.

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Rank and fuel type	Fires per 100,000 sales	Total fires
Hybrid	3,474.5	16,051
Gas	1,5259.9	199,533
Electric	25.1	52

While the occurrence of fire is low, when it does happen the consequences can be catastrophic. The combination of chemicals in an EV battery is extremely volatile and difficult to extinguish. Several EV fires have destroyed garages and neighbouring vehicles. EV fires can be unpredictable and reignite days after being extinguished.

Market research company IDTechEx has found that a third of EV fires occur when the vehicle is stationary, parked and not charging. In these incidents, thermal runaway is likely to be the cause.

Thermal runaway is when the temperature of a system, such as an EV battery, rapidly increases due to a self-reinforcing chain reaction. Once a cell enters thermal runaway, it releases flammable gases and generates an intense amount of heat. This elevated temperature can force neighbouring cells into thermal runaway, leading to a cascading effect and potentially a fire or explosion.

Source: [AutoinsuranceEZ](#), 2022

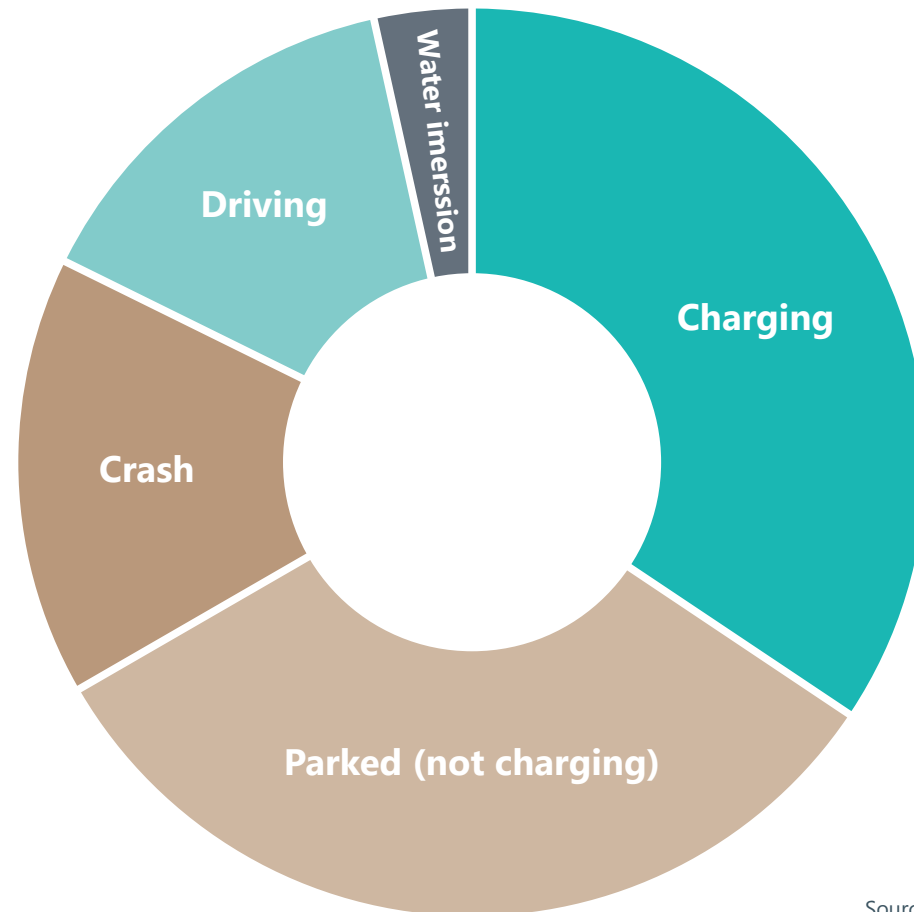


# Think... Safety

Thermal runaway can start with poor temperature control, a manufacturing flaw, excessive charging or an accident. EV manufacturers are looking to minimise the risk through insulation and fire protection materials and effective temperature control systems.

Shopping centre owners can mitigate the risk by establishing EV charger technology in areas that reduce fire risk – such as open deck or other outdoor spaces – and that may be less impacted by future changes to standards.

**Cause of EV fires from 96 fire incidents**



Source: [IDTechEx](#), 2022



# Think... Opportunities

As the EV market gains momentum, commercial real estate will become a central hub for charging stations.

Yet the complexities of EV charging infrastructure are not easy to untangle. Shopping centre owners may be keen to secure a competitive advantage but don't know where to start. Here's some key areas to think about:

**1. Start with your strategy:** It may be tempting to see turnkey solutions as an easy fix. But every shopping centre is unique, with varying sizes and shapes of parking facilities, tenant mixes and charging requirements. Failure to develop a long-term, bespoke strategy could lead to greater expense, lower quality implementation and fewer revenue opportunities in the future.

**2. Prioritise the customer experience:** Carefully consider how EV charging could enhance your customer's shopping experience. How will the EV chargers work with customer engagement programs, like your shopping centre app or loyalty program? How will you entice the customer to charge at the centre? Will there be rewards, like spend and save? Place your customer at the centre of your decisions.

**3. Select your site:** Determine the EV charging locations. Whether they are outdoors or inside will impact the reticulation, containment and accessibility.

**4. Specify the right chargers:** Weigh up the pros and cons of AC, DC and bidirectional charging, and then select from the growing list of local and international manufacturers. If you're not sure where to start, ADP can help.

**5. Investigate existing electrical infrastructure:** Understand how the EV charging system will interface with the existing power distribution. This takes a detailed investigation of everything from as-built drawings to on-the-ground inspections.

**6. Secure your revenue stream:** There are many ways to bill EV users for using EV charging stations; the most common payment methods are via an RFID card or credit card. Again, ADP can help.

**7. Coordinate fire protection:** A coordinated approach to mechanical, electrical and fire protection will ensure you get the best bang for your buck.

**8. Make a move:** Don't take a "wait and see" approach – because your competitors certainly aren't. Starting small, with a scalable strategy and expert partners, can help you to test approaches and iron out problems.

# Think... Collaboration

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**Think** is a thought leadership series developed by ADP to ask and answer some of the big questions confronting Australia's property and construction industry.

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## About ADP

ADP Consulting is one of Australia's largest, 100% Australian-owned, sustainability-led engineering consultancies.

We are on a quest to inspire a better world through influence and design. We work with industry-leading partners who care just as much as we do about innovation, design excellence and, importantly, our impact on the planet.

Always thinking, we push the boundaries in engineering and design to find the best solutions to the most complex projects.

## Our experts

For more information about our electrical and fire engineering services, please contact:



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