Six steps to decarbonise the six cities region

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Committee for Sydney

Image source: iStock

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The six cities of the Sandstone Megaregion have an opportunity to lead Australia to the post-carbon future.

The Greater Cities Commission's discussion paper provides a six-cities-sized opportunity to show how government can lead by example and create the conditions for accelerated market action.

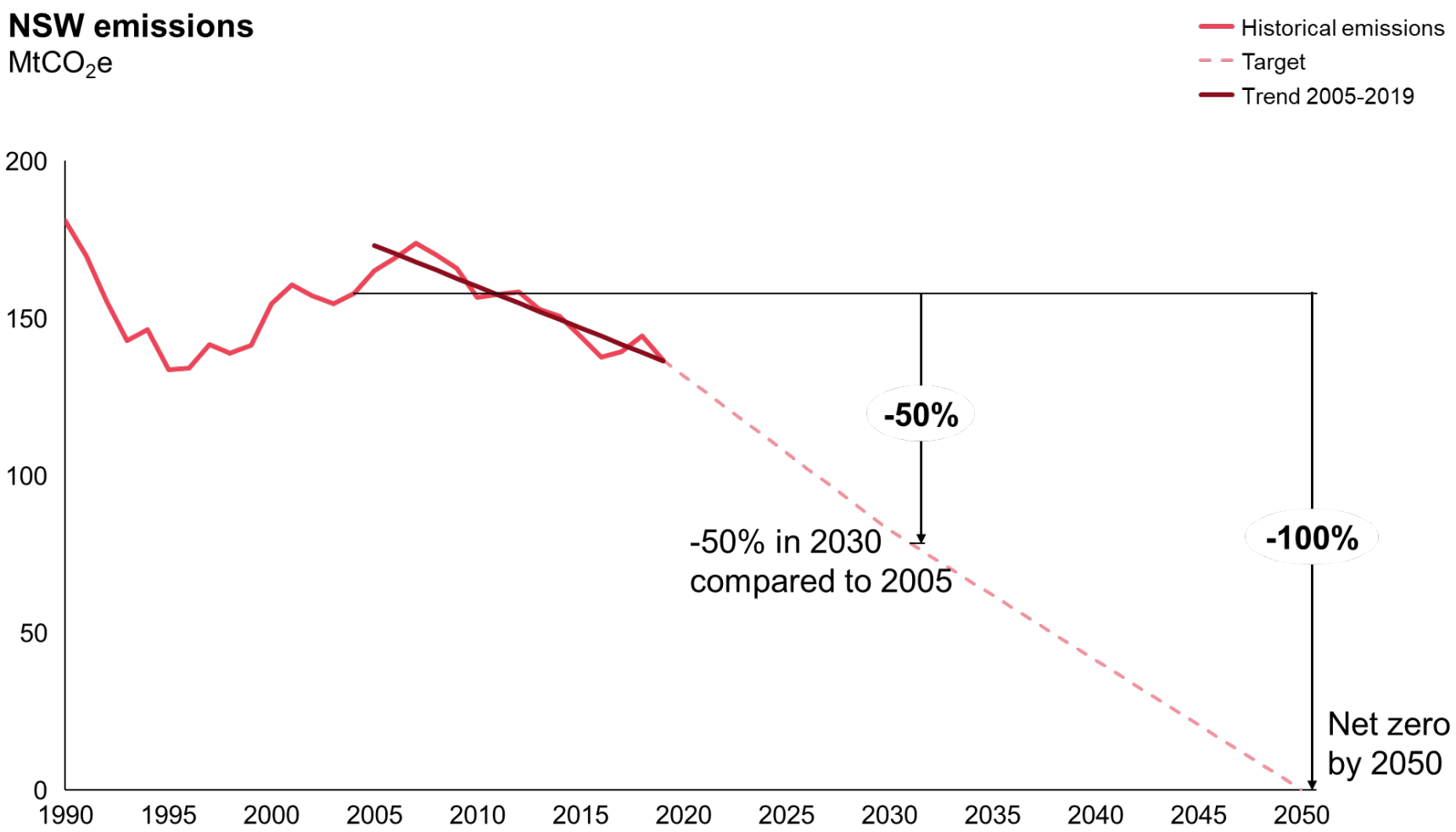
But we think the Greater Cities Commission can do even more, including at the sub-region, precinct and building scales.

We propose six big steps to decarbonise the Sandstone Megaregion:

1. **Government to lead by example:** Leverage transport and building sectors to show the way on buses, vehicle fleets, public housing, schools and office buildings
2. **Decarbonise road transport:** Use the built environment to drive a faster transition to EVs by increasing the availability of charging infrastructure across the city
3. **Limit transport emissions growth:** Set a 2030 modal shift target of 40% for all trips taken by walking, cycling, micromobility and public transport
4. **Electrify homes and commercial buildings:** Accelerate the shift away from gas, and towards the electrification of homes and commercial buildings
5. **Set storage targets:** Determine sub-regional battery and other storage targets to multiply the benefits of growing rooftop solar on homes and warehouses
6. **Turn waste into opportunity:** Go beyond innovation precincts to drive the co-location of industries benefiting from a more circular economy.

Image source: Unsplash

Chart 1: NSW needs to accelerate its emission reductions to meet its 2030 and 2050 targets



Note: Historical emissions are all inventoried GHG emissions in NSW, including land use, land use change, and forestry. NSW target trajectory taken to be linear.
Source: NSW Government, Department of Industry, Australian Greenhouse Gases Information System

Our research[1] shows despite NSW's climate policies leading the nation, Greater Sydney is not on track to do its fair share in meeting the state's 2030 or 2050 net zero targets.

Transport (36%) and buildings (31%) are the biggest emitting end use categories today, with residential buildings, and passenger cars and light trucks, the biggest contributors in each category.

Emissions reduction, therefore, relies on millions of individual purchases, not just large capital investments, and those consumer decisions will need to be guided towards greener choices.

This means small business and the general public, as well as larger corporates, are critical to the net zero journey, and in a time of rising energy bills, government and industry may well need to provide incentives, subsidies and/or cost of living support to consumers.

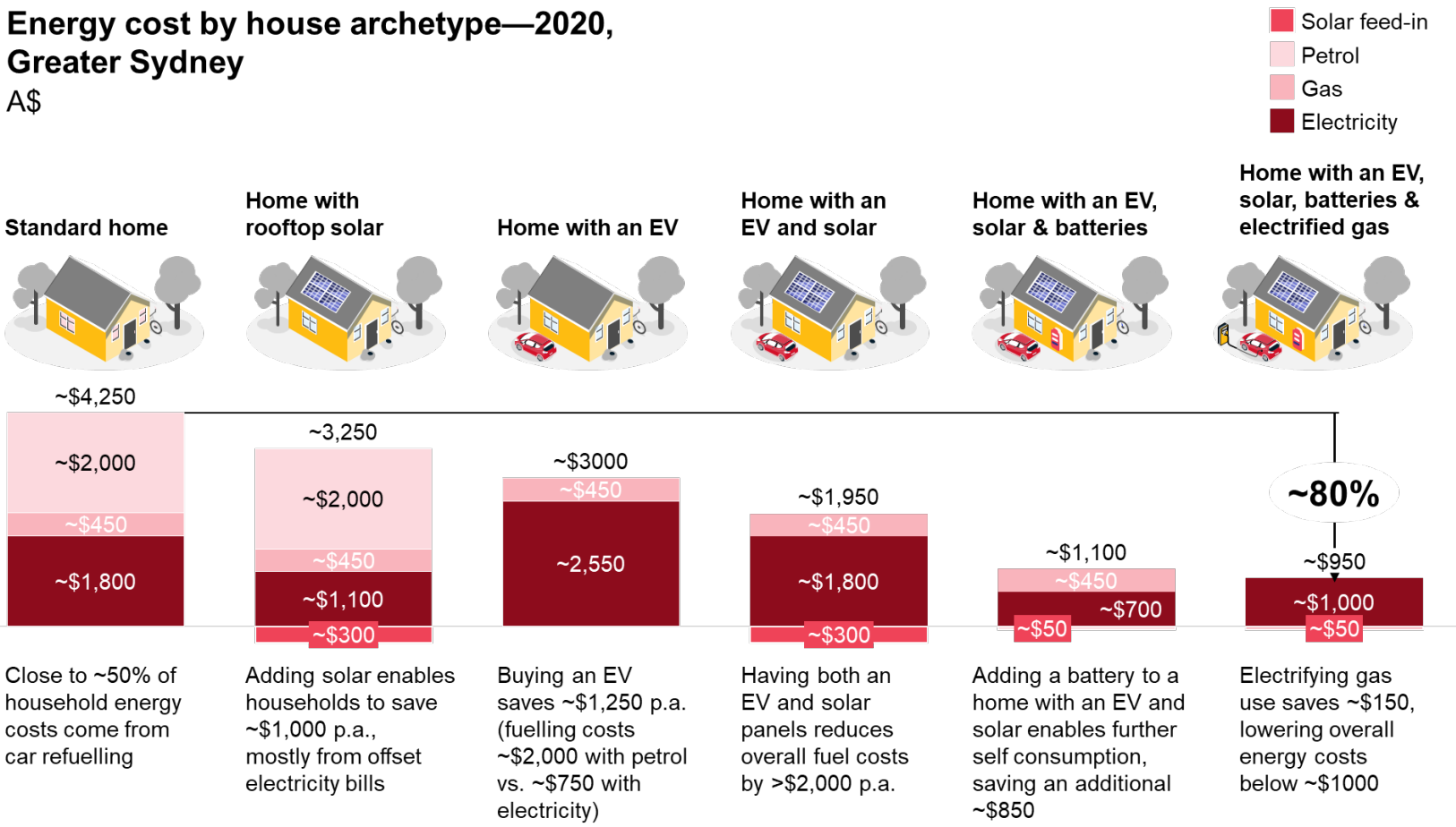
In time, households could save 80% of their household energy bills through decarbonising buildings and transport, but in the short term there needs to be a laser focus on managing the rising burden of energy bills.

Taken together, this means the Greater Cities Commission needs to be even more ambitious than set out in the discussion paper – and take the community with them – in making the megaregion, whatever it's called, known globally for what we do next on net zero.

1. https://sydney.org.au/wp-content/uploads/2022/08/Committee-for-Sydney-Decarbonising-Sydney-August-2022.pdf

Image source: Endeavour Energy

Chart 2: Decarbonisation technologies could reduce consumer energy costs by ~80% to <$1,000, from ~$4,250 today



Source: McKinsey Sustainability Insights, McKinsey Power Solutions, NSW household load curve 2021

1. Government to lead by example

Government buildings

Government should lead the way by electrifying all its own buildings, replacing all gas use with electricity in hospitals, schools, public housing and public commercial buildings.

Installing solar panels across these public assets would mean a significant reduction in energy costs for users of those assets.

Government fleets

Government should set an end date to convert all state and local government fleets to electric vehicles, using bulk purchasing to reduce the upfront capital costs.

This will reduce the operational costs to government, particularly while fuel costs are at historical highs, and expand the secondhand car market for electric vehicles after three to four years of use.

Trains and buses

While emissions from our trains are fully offset via Purchase Power Agreements, our buses are just at the start and not expected to be fully electric until 2035.

As the discussion paper notes, this needs to be accelerated.

Many bus depots will also have the potential to generate rooftop solar and store this energy to reduce potential impacts on the grid.

Image source: Unsplash

2. Decarbonise road transport

Government should use the built environment to drive a faster transition to EVs by increasing the availability of charging infrastructure across the city

Transport is our biggest emissions challenge. Passenger vehicles have the potential to abate 68% of Sydney's transport emissions before 2030. Fuel efficiency and light trucks will make up a further 21%.

As households replace their vehicles, the shift to electric vehicles will have major benefits for household costs of living, particularly in parts of the city where car-dependent commutes, and therefore energy budgets, are highest.

The GCC can use the built environment to drive a faster transition to EVs by increasing the availability of charging infrastructure across the city. Aside from upfront cost, the major impediment to accelerating EV uptake is access to charging infrastructure.

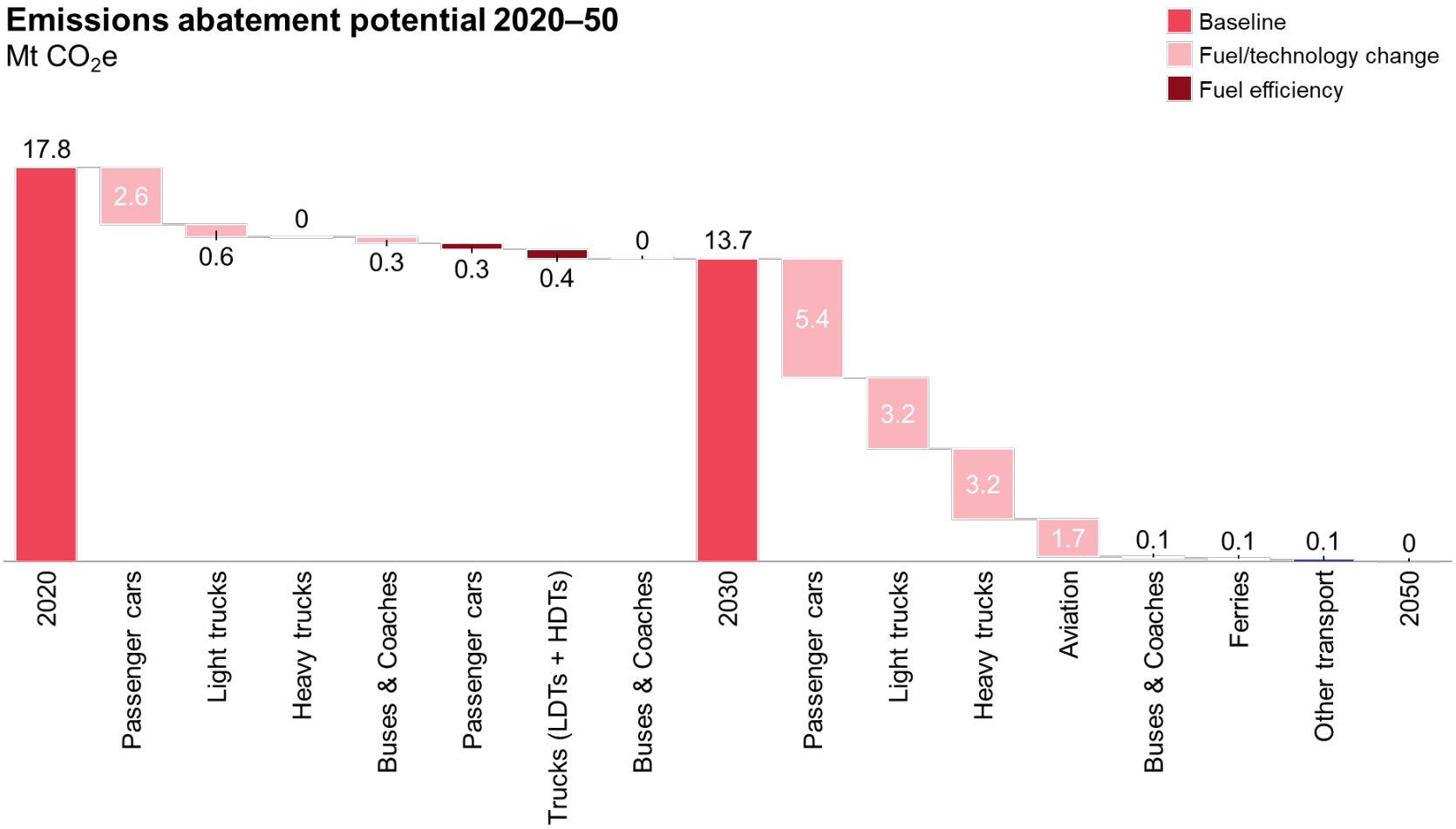
Upfront costs will come down as more secondhand vehicles reach the market (from commercial and public fleets), and federal fuel emissions standards encourage more overseas car makers to send more supply to Australia.

To enable acceleration from the demand side, the GCC should focus on expanding charging infrastructure – requiring charging in new and existing buildings, commuter and retail destinations, and in public areas such as kerbs.

An integrated network of public EV charging stations will be crucial to overcoming 'range anxiety' for EV adopters.

Image source: Freepik

Chart 3: Passenger cars lead emission reduction before 2030, trucks decarbonise faster after 2030



Source: NSW emissions from 2019 AGEIS UNFCC emissions report, adapted to Greater Sydney; McKinsey Sustainability Insights

3. Limit transport emissions growth

Government should set a 2030 modal target for 40% of all trips to be walking, cycling, micromobility and public transport, rising from 30% today.

This means 40% of all trips in Sydney are by active transport, micromobility and public transport by 2030, and assumes a shift to (increasingly electric) ride-hailing and taxis.

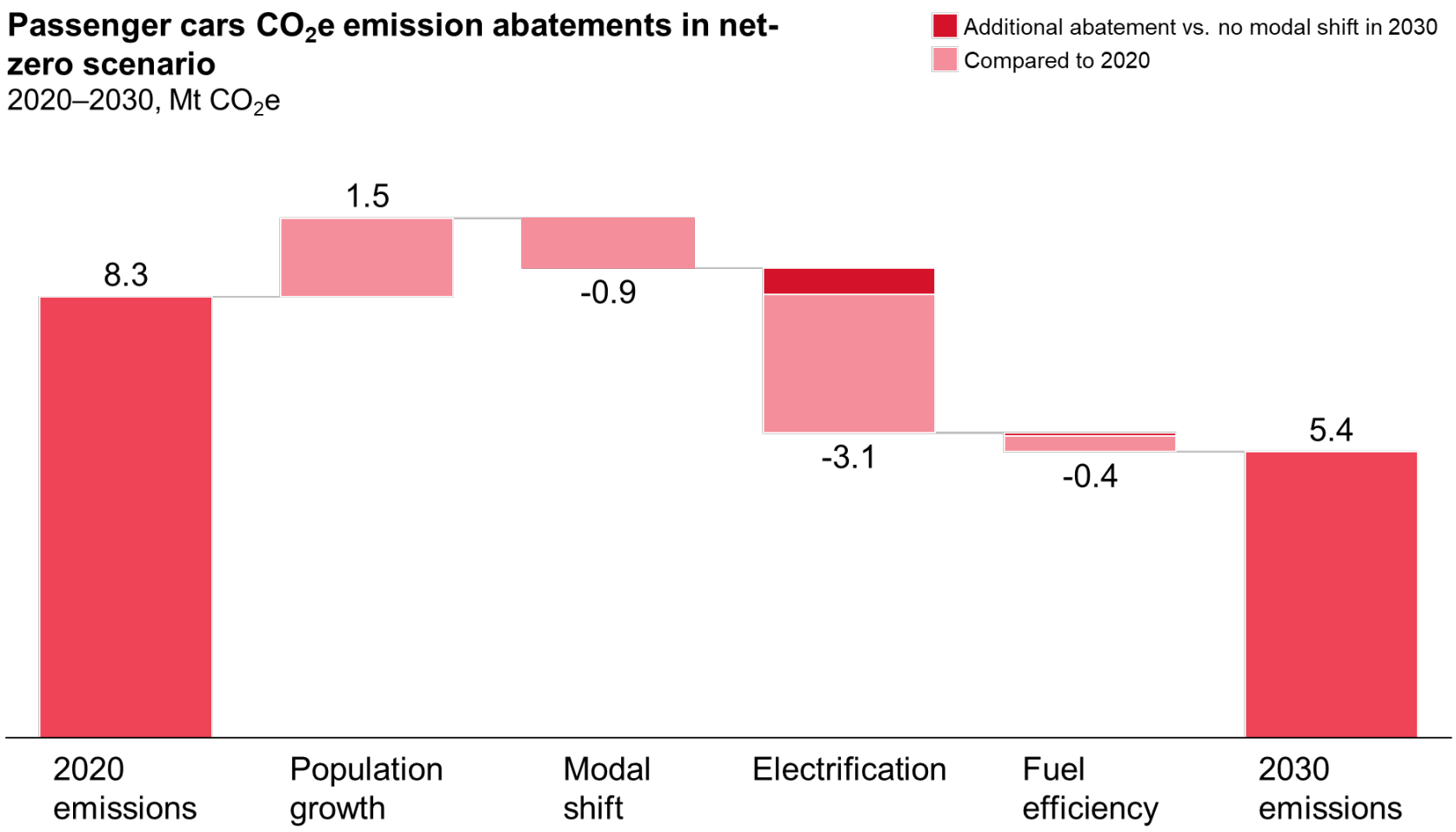
Our analysis shows that while ambitious, a shift of this scale to alternate forms of transport, and associated reduction in vehicle travel, would only act to offset additional emissions generated by population growth.

Our modelling indicates that even in the most ambitious integrated land use and transport plans, we can only ensure active transport keeps emissions static rather than rising with population growth.

We therefore recommend the GCC enacts land use and policy settings to make this 40% modal shift target achievable (the Committee's Rethinking Station Precincts[2] report explains how).

2. https://sydney.org.au/wp-content/uploads/2022/05/Committee-for-Sydney-Rethinking-Station-Precincts-May-2022.pdf

Chart 4: Passenger emissions would fall from modal shift, adoption of EVs and fuel efficiency



Source: McKinsey Centre for Future Mobility Insights

4. Electrify homes and commercial buildings

Government should accelerate the shift away from gas, and towards the electrification of homes and commercial buildings.

By 2030, power generation emissions are projected to fall by 60%, and by 2039 (or earlier) all NSW coal power generation is planned to close, removing almost all NSW power sector emissions.

However, cleaning the grid will do some but not all the heavy lifting on decarbonisation.

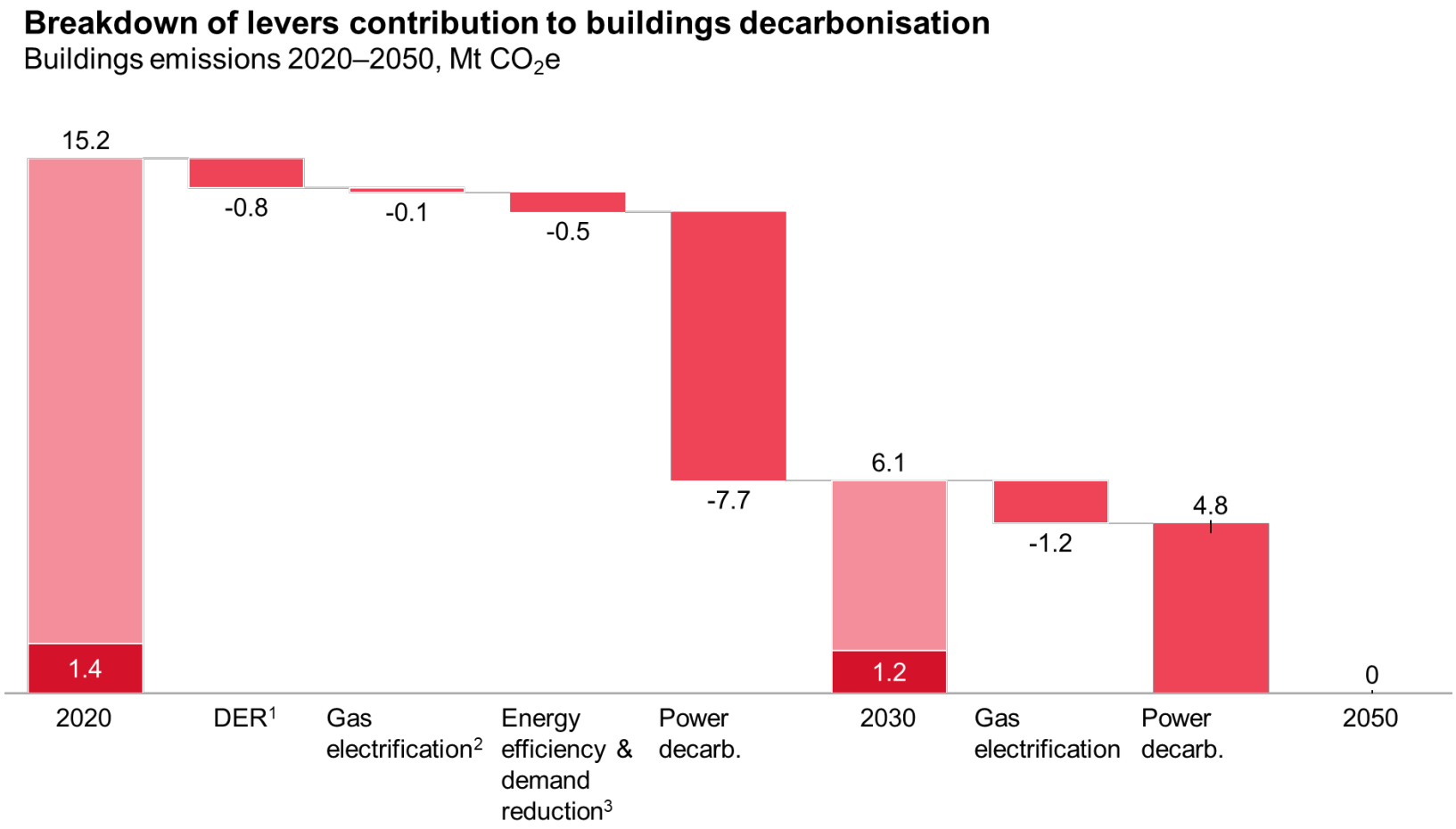
We need to electrify space heating, water heating and cooking in new and existing buildings, as old appliances reach their end of life, and require disclosure of energy performance ratings for residential sales and rental transactions.

Phasing out gas connections in new commercial buildings, and residential homes and apartments, will reduce emissions and energy costs as more cheap renewables enter the grid.

Electrification will also enable consumers to benefit from the growing adoption of rooftop solar across the six cities, requiring action to expand access to renters and apartments dwellers, as well as expanding the solar for low-income housing program.

Image source: City of Canterbury Bankstown

Chart 5: Gas-to-electricity and distributed energy resources are needed to reduce building emissions



1. DER = distributed energy resources. Key actions include installation of solar PV and battery storage.
2. Includes transition of water heating, space heating, cooking, and other appliances to electricity from gas or LPG
3. Includes continued improvement of energy efficiency across the appliance fleet, improved insulation of buildings, and measure to reduce demand energy demand in buildings (e.g., reducing standby time, reducing heating temperatures)

Note: numbers do not add exactly due to rounding

5. Set battery storage targets

Government should set battery storage targets to extend the benefits of expanding residential and commercial rooftop solar to the community and the grid.

In addition to residential rooftop solar growth, the capacity of rooftop solar on commercial buildings has risen by ~43% per year in the last five years, and strong growth is likely to continue. Rooftop solar is ideal for commercial buildings with plenty of roof space relative to floorspace – shopping centres, carparks, warehouses, industrial sheds, manufacturing plants and other low-rise commercial buildings.

However, without battery storage to soak up the excess solar generated during the day, businesses (and residents) risk their rooftop solar being 'turned off' during the day, as the volume of solar generated exceeds what the grid infrastructure can handle. This will also reduce commercial returns and slow down payback periods for residents and businesses.

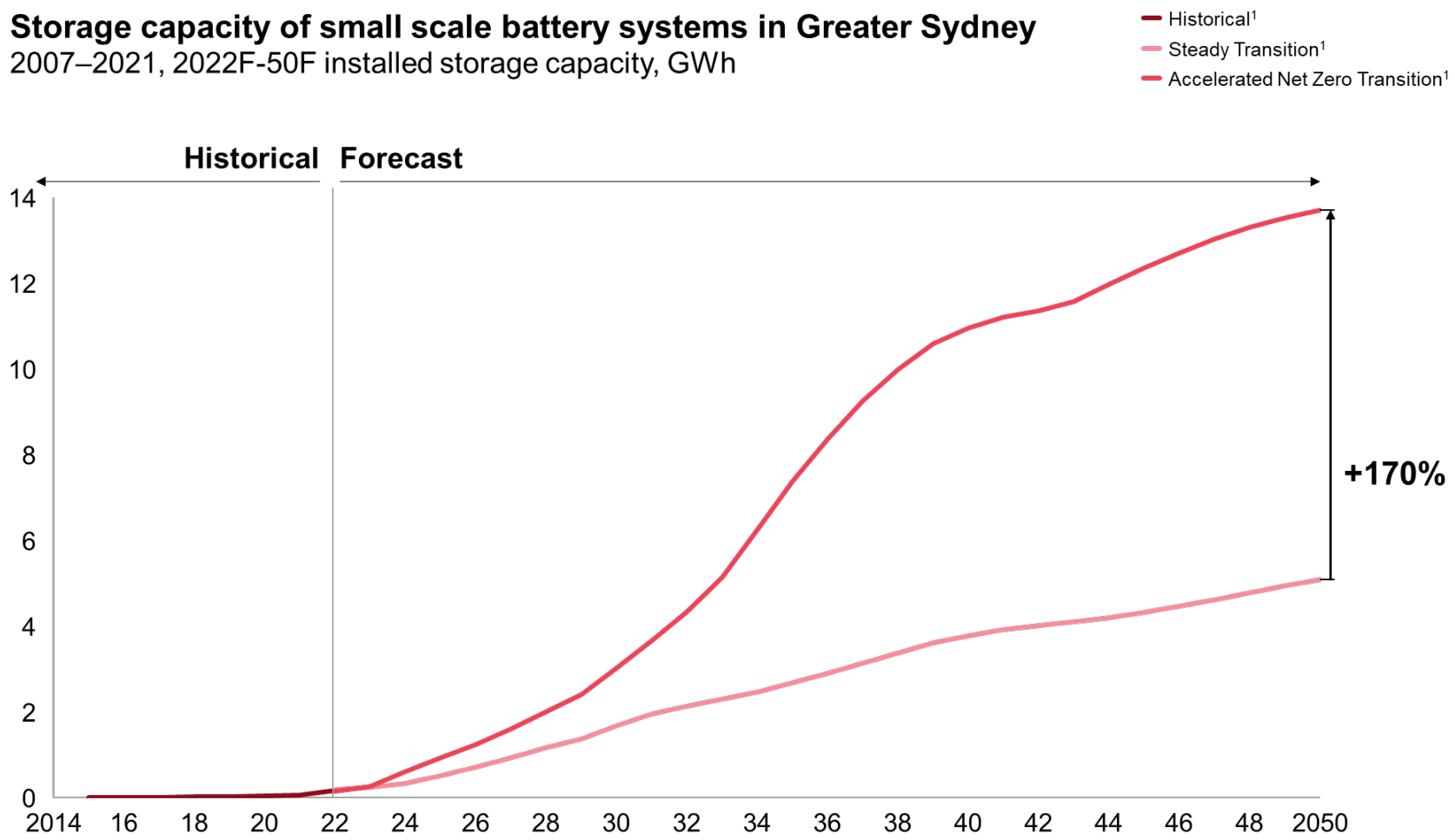
Community (or neighbourhood) batteries solve this problem, charging up during the day, and discharging during peak demand periods in the early evening. Locating batteries in areas that have (or will have) a high adoption of rooftop solar can assist with grid stability, and help maintain a more stable return to rooftop solar producers.

The more of Sydney's electricity demand that can be met by distributed energy resources, the less additional electricity needs to be brought in from large scale energy generators.

The GCC should therefore determine sub-regional battery and other storage targets (including vehicle-to-grid as it comes online) to multiply the benefits of growing rooftop solar on homes and warehouses across the six cities.

Image source: Ausgrid

Chart 6: Battery installations would have to ramp up to 17% every year to reach 40% of dwellings by 2050



1. 2014-2021 historical installs from Clean Energy Regulatory and forecast storage capacity from AEMO ISP 2021 Steady Progress (for Steady Transition) and Step Change (for Accelerated Net Zero) scenarios. Assumes regional allocation as per AEMO scenarios, and average system size of 13.5kWh in 2021, growing by 1% p.a.

Source: AEMO ISP 2021 Assumptions, Clean Energy Regulator

6. Turn waste into opportunity

Waste makes up only 7% of Greater Sydney's carbon emissions, but within this waste lives an extraordinary and largely untapped opportunity.

The concept of a circular economy refers to a system where resources are redeployed and reused, and waste flows are turned into inputs for further production. Economic modelling[3] suggests a circular built environment could generate $648 billion in direct economic benefits over 20 years and save 3.6 million tonnes of CO_2 per year in Australia by 2040.

The Committee applauds the GCC's commitment to embed circular economy design into six innovation districts, target net zero waste in those innovation districts, and target at least one circular economy hub in each of the six cities.

Partnerships between universities, government and industry are already showing the potential to reuse waste to create economic benefits.

But the scale of the opportunity means even more ambition is required.

We think the GCC should create the planning and investment incentives to drive the co-location of industries benefiting from a more circular economy, and support the creation of a market for connecting circular supply chains.

3. https://www.pwc.com.au/assurance/esg/building-a-more-circular-australia.pdf

Next Steps

The Greater Cities Commission has made a very good start with its discussion paper, and it needs to go further, faster, and in partnership with government, business and households.

A renewed focus on equity in the journey to net zero will be critical and should guide new investment for the longer term.

We believe that the Greater Cities Commission has the mandate to accelerate decarbonisation across the six cities region, and establish our reputation as a global leader over the next 20 years.

Image source: Pexels

Resilience Program Partners

We would like to thank our Resilience Program Partners for supporting the Committee for Sydney's work to drive solutions to our most pressing resilience challenges.

Our Resilience Program Partners are leaders in their respective fields, embracing the transition to a decarbonised future, and adapting to a changing climate.

Innovation Fund Partners

We would like to thank our Innovation Fund Partners for their support of Committee for Sydney's research.

Our Innovation Fund Partners are future focused, and outcome driven.

They are leaders of change. Their combined investment underpins our annual research program and together with our members, enables us to grow our impact and output - striving to create a better Sydney that offers unparalleled opportunity and quality of life for everyone.

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