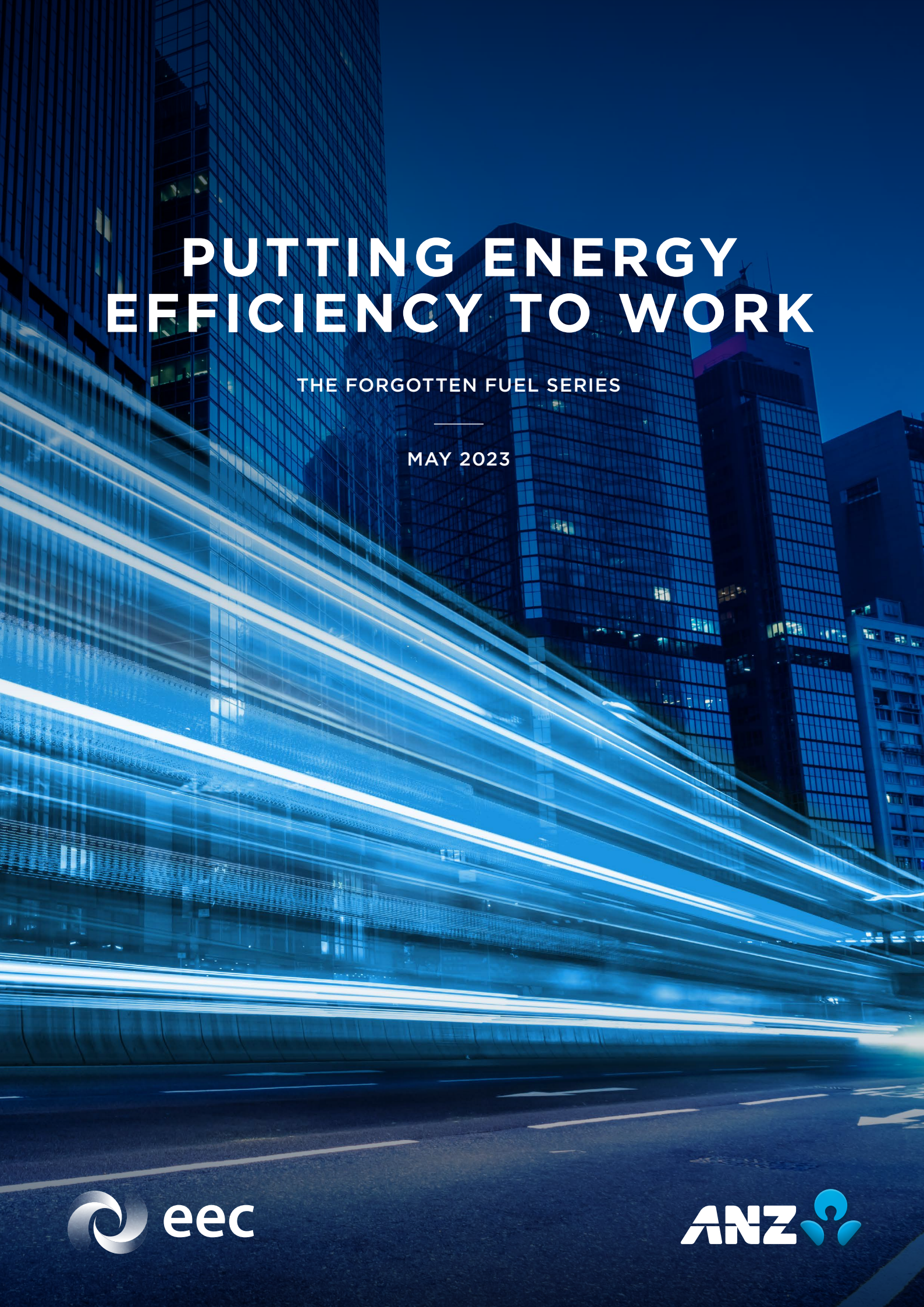


PUTTING ENERGY EFFICIENCY TO WORK

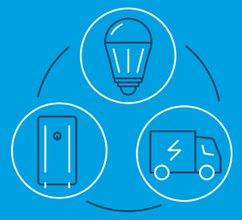
THE FORGOTTEN FUEL SERIES

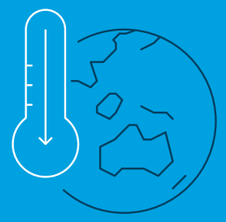
MAY 2023

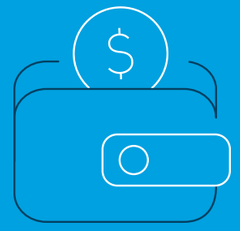
eec

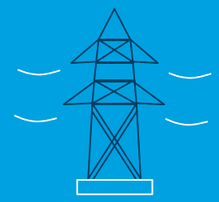
ANZ

CONTENTS









IT'S TIME TO MAKE

ENERGY EFFICIENCY

A PRIORITY

In households and businesses across Australia, climate change and energy costs are important topics of conversation.

Foreword by Mark Whelan and Luke Menzel.

Around the country, Australians are looking for opportunities to cut their energy bills and reduce their environmental footprint. To achieve these goals, a lot of the focus has naturally been on the country's energy supply. Supported by household and business uptake, substantial amounts of renewable energy such as wind and solar have been introduced into our electricity system.

At the same time, global and local factors have increased the volatility of energy prices, raising the cost of doing business and the cost of living.

Fortunately, it turns out the best tools we have to improve energy affordability and cut emissions are also some of the most cost effective – and they are available now, to us all.[1]

ENERGY EFFICIENCY AND ENERGY MANAGEMENT

Energy efficiency means getting more out of every unit of energy we use. Think modern LED bulbs delivering the same – or better – performance as old-fashioned incandescent lights while using 75 per cent less electricity;[2] or the insulation in your roof and walls keeping your house warm in winter and cool in summer with less reliance on the heater or air conditioner.

Energy management describes smart decision-making around energy use. For example, undertaking an energy audit to build the business case for equipment upgrades – like replacing an old boiler with an electric heat pump powered by renewable energy – can save businesses tens of thousands of dollars on their energy bills.

These are not new concepts. Around the world, forward thinking governments are treating energy efficiency as a core strategy to meet their energy and emissions reductions targets. In 2016, energy ministers from the Group of Seven countries – the United States, the United Kingdom, France, Germany, Italy, Japan and Canada – backed energy efficiency's role as the 'first fuel' for decarbonising their economies, enhancing their energy security and fostering economic growth.[3]

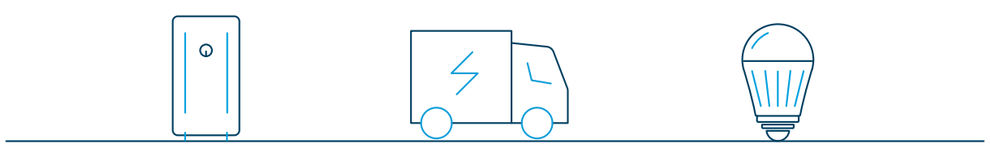
It takes a moment to get your head around the idea of treating a concept like 'efficiency' as a fuel to power our lives. But when you consider that *using* and *managing* energy is just as critical to reducing bills and emissions as *generating* electricity and *supplying* gas, it begins to make sense.

Energy efficiency improvements not only reduce overall energy demand, they can create downward pressure on energy prices and emissions, generating employment and lowering bills for consumers.[4]

[1] International Energy Agency (IEA) 2022, Energy Efficiency 2022.
[2] Australian Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, Lighting.
[3] G7 Energy Ministers 2016, Kitakyushu Energy Ministerial Meeting: Kitakyushu Initiative on Energy Security for Global Growth Joint Statement.
[4] IEA 2022, Energy Efficiency 2022.

In terms of getting to net zero, it might seem as if electrification, insulation and being smarter about how and when we use energy couldn't have the same impact as solar panels and wind farms. But it turns out the size of the prize is the same: the International Renewable Energy Agency estimates that energy efficiency will deliver a full quarter of the entire world's emissions reductions to 2050.[5] That's the same proportion that is expected to come from renewable energy.[6] Electrification is anticipated to deliver a further 20 per cent.[7]

NEW RESEARCH COMMISSIONED BY ANZ AND THE EEC CONFIRMS THESE INTERNATIONAL FIGURES HOLD HERE IN AUSTRALIA. THEY SHOW ENERGY EFFICIENCY AND ELECTRIFICATION CAN DELIVER 14 PER CENT AND 26 PER CENT OF AUSTRALIA'S EMISSIONS REDUCTIONS, RESPECTIVELY, AT LOW COST.[8]



[5] International Renewable Energy Agency (IRENA) 2022, World Energy Transition Outlook 2022.
[6] Ibid.
[7] Ibid.
[8] Northmore Gordon 2023, Energy efficiency scenario modelling.

Despite the massive potential for energy efficiency and energy management to reduce emissions while saving money, it's often been overlooked here in Australia. While other nations have declared energy efficiency the 'first fuel', here at home it is often the 'forgotten fuel' of our economy's net zero transformation.

Out of the 25 largest energy using countries, Australia ranks 22nd for policy and practice in industrial energy efficiency, hampering the productivity and competitiveness of our businesses.[9]

MARK WHELAN

Group Executive, Institutional ANZ

LUKE MENZEL

Chief Executive Officer, EEC

And whilst our houses are our shelter and places of refuge, there is an incredible opportunity to lift the energy efficiency standards of many of Australia's 10 million homes, which will improve health, comfort and financial wellbeing.

The $1.6 billion Energy Savings Package in the 2023-2024 Australian Budget will help ensure energy efficiency is no longer forgotten by everyday Australian businesses and households.

But as this report attests, there is much more we could all do. Rolling out energy efficiency as quickly as possible will help Australia reach its net zero goal at the least cost for households, businesses and governments.

The *Forgotten Fuel* series of reports is the result of a longstanding collaboration between ANZ and the EEC. The three reports explore the ways in which businesses and households can benefit from using energy efficiency as a tool to supercharge emissions reduction, save money, and improve health and wellbeing.

[9] American Council for an Energy-Efficient Economy (ACEEE) 2022, International Energy Efficiency Scorecard.

SUPERCHARGING EMISSIONS

REDUCTION

For both businesses and households, energy efficiency and energy management are essential to ambitious emissions reduction efforts.

In 2021 Australia set itself the urgent task of achieving net zero emissions by 2050. To avoid the worst impacts of climate change and preserve a liveable planet, global temperature increase needs to be limited to 1.5°C above pre-industrial levels.[10] To do this, worldwide emissions need to be reduced by 45 per cent by 2030 and reach net zero by 2050.[11]

Limiting the effects of climate change means not just achieving net zero emissions, but also limiting the total amount of emissions we create. Every tonne of carbon we *don't* emit helps keep temperature increase down.

Energy efficiency is key to this, as it helps us reduce emissions *quickly*. Switch out a high-power light bulb for an LED globe and you've reduced emissions today – quicker even than installing solar panels on a roof.

What does net zero actually mean?

Net zero emissions means balancing the greenhouse gas emissions created and released into the atmosphere with the emissions removed from the atmosphere.

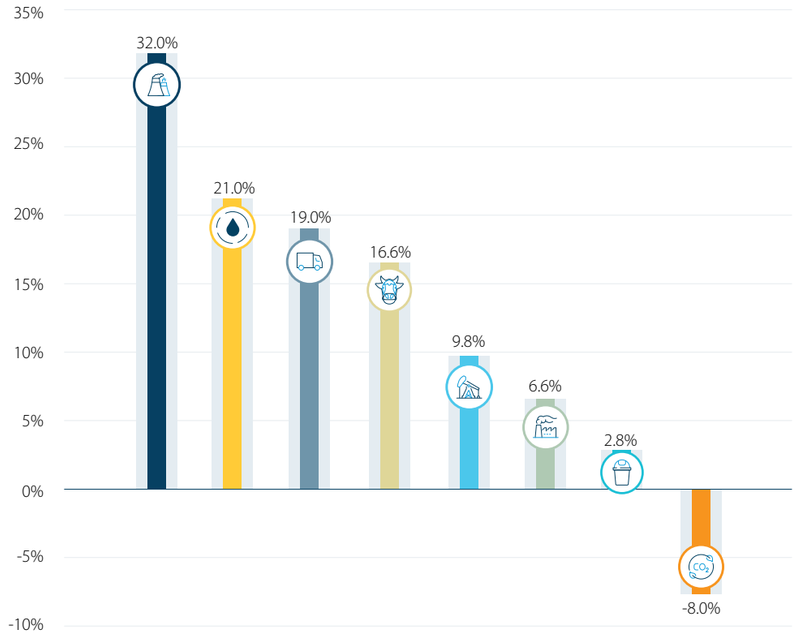
A 'net zero economy' is achieved when the sum total of activities results in no increase in emissions added to the atmosphere. Achieving this by 2050 – and almost halving emissions by 2030 – is integral to achieving the Paris Agreement's goal of limiting global warming to 1.5ºC.

The energy we use in our homes, businesses and vehicles is responsible for around 80 per cent of Australia's emissions,[12] and while our energy systems are changing fast, they continue to be dominated by fossil fuels.

This means any effort to use energy more efficiently – using less to provide the same service – not only saves money, it reduces emissions at the same time.

[10] United Nations n.d., For a livable climate: Net-zero commitments must be backed by credible action.
[11] Ibid.
[12] DCCEEW 2022, Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2022.

AROUND 80 PER CENT OF AUSTRALIA'S EMISSIONS COME FROM ENERGY



- Electricity
- Transport fuels
- Fugitive emissions
- Waste
- Stationary energy, exclusing electricity
- Agriculture
- Industrial processes & product use
- Carbon removal from LULUCF

- Fugitive emissions means emissions that occur during the production, processing, transport, storage, transmission and distribution of fossil fuels
- LULUCF means land use, land-use change, and forestry, and includes activities like reforestation
- Stationary energy, excluding electricity means fuels used for heat and industrial processes

Source: DCCEEW 2022, Quarterly Update Of Australia's National Greenhouse Gas Inventory: September 2022.

Not all of Australia's emissions can be lowered easily. Some – like those from producing steel and cement – will take many years. Energy efficiency will still reduce emissions from those businesses, helping them comply with the requirements of the reformed Safeguard Mechanism to start decreasing their emissions each year as we head towards net zero by 2050.[13]

Around the world, energy efficiency is already hard at work reducing emissions. Between 2000 and 2017, energy efficiency was responsible for reducing global emissions by 12 per cent,[14] while the global economy grew by 65 per cent at the same time.[15]

Many countries – and some Australian jurisdictions – have energy efficiency programs for household appliances – think of the incentives to replace incandescent light globes with modern LEDs available in some states. Where these long-running programs exist, they've been shown to help reduce energy usage by more than half – and up to 84 per cent for big energy-intensive appliances such as air conditioners[16] – creating fewer emissions and reducing costs while maintaining our quality of life.

[13] DCCEEW n.d., Safeguard Mechanism.
[14] IEA 2019, 'Emissions savings', Multiple benefits of energy efficiency: from "hidden fuel" to "first fuel".
[15] World Bank 2023, GDP (constant 2015 US$).
[16] IEA 2021, Energy Efficiency 2021.

AS IMPORTANT AS RENEWABLES

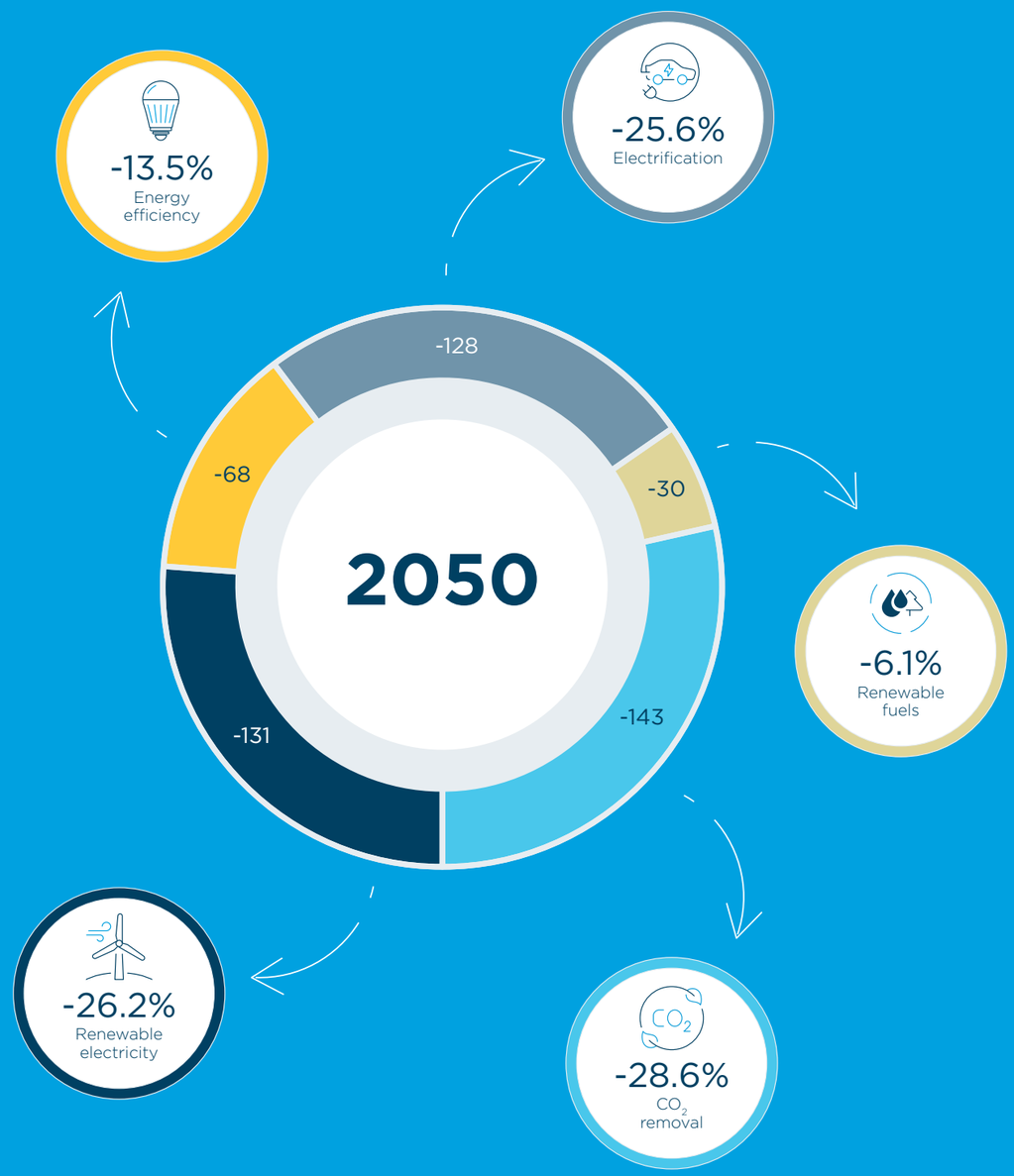
To achieve net zero by 2050, experts predict energy efficiency and electrification will be responsible for 25 per cent and 20 per cent, respectively, of all emissions reduction worldwide.[17]

In Australia, new research commissioned by ANZ and the EEC suggests energy efficiency will deliver 19 per cent of the emissions reduction we need by 2030 – and 14 per cent by 2050.[18] Energy efficiency can deliver us a larger part of our 2030 target because we can get started on it quickly, accelerating the energy transition and limiting emissions immediately.

Looking out to 2050, combined with electrification, which takes advantage of more efficient electric appliances, we can achieve 39 per cent of the emissions reduction we need – a larger share of emissions reduction than renewable electricity.[19]

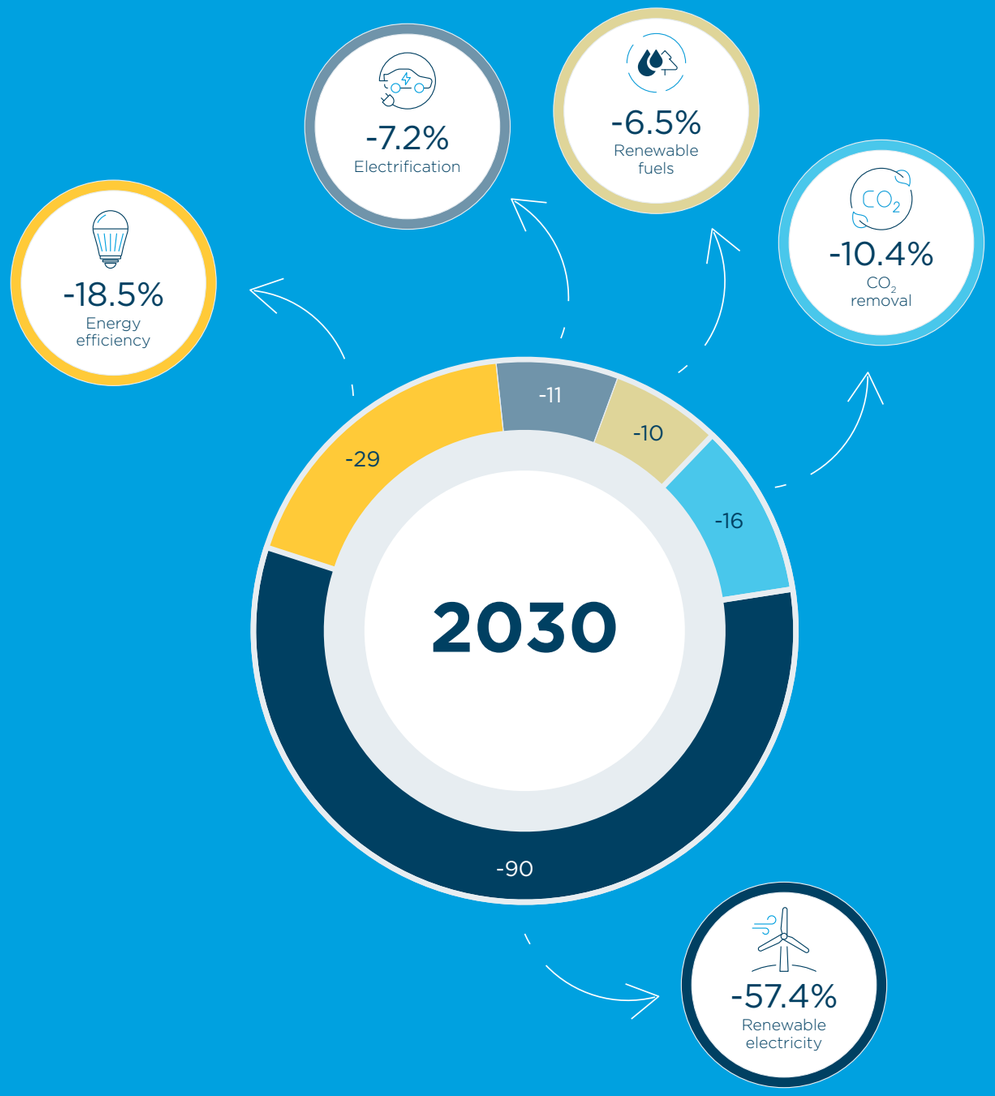
[17] IRENA 2022, World Energy Transition Outlook 2022.
[18] Northmore Gordon 2023, Energy efficiency scenario modelling.
[19] Ibid.

AUSTRALIA'S EMISSIONS REDUCTIONS (Mt CO_2-e) TO 2050 IN A LOW-COST SCENARIO



Source: Northmore Gordon 2023, Energy efficiency scenario modelling.

AUSTRALIA'S EMISSIONS REDUCTIONS (Mt CO_2-e) TO 2030 IN A LOW-COST SCENARIO



Source: Northmore Gordon 2023, Energy efficiency scenario modelling.

To achieve Australia's target of reducing emissions by 43 per cent by 2030, we'll need to reduce our emissions by 157 million tonnes. We will also need to reduce our emissions by a further 343 million tonnes – or around 500 million tonnes in total – to get to net zero by 2050. In order to achieve those goals, we must use a range of technologies, including renewable electricity, energy efficiency and electrification, as well as renewable fuels like green hydrogen and biofuels, and carbon removals through reforestation and other efforts.

AMBITIOUS EFFORT ON ENERGY EFFICIENCY IS THE LEAST-COST WAY TO TRANSFORM OUR ECONOMY TO NET ZERO EMISSIONS.

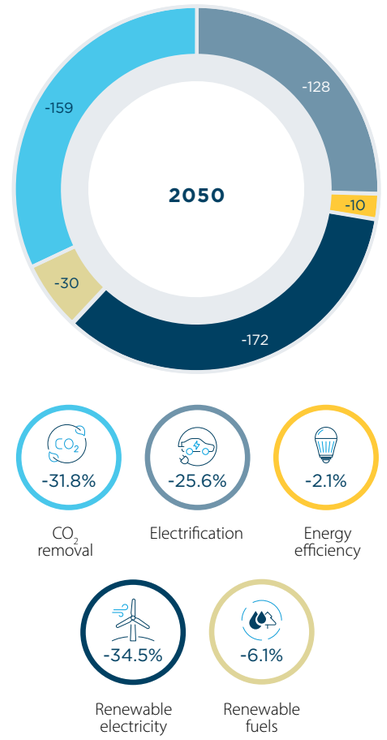
Right now, we're not on the necessary path. With current policies and business-as-usual conditions, energy efficiency and electrification will make up a relatively small part of our emissions reduction. With business-as-usual, energy efficiency will deliver only two per cent of emissions reduction in 2050, and renewable electricity and carbon removals will have to do much more of the work.

Energy efficiency scenario modelling

ANZ and the EEC commissioned Northmore Gordon, a leading provider of energy and carbon advisory services across Australasia, to undertake research into the role of energy efficiency and electrification in decarbonising Australia.

The modelled scenarios all support a net zero economy by 2050, with the business-as-usual scenario based on what Australia is currently doing, i.e. current policies and programs. The low-cost enhanced energy efficiency scenario is based on ambitious but demonstrated and available energy efficiency improvements.

AUSTRALIA'S EMISSIONS REDUCTIONS (Mt CO_2-e) TO 2050 IN A BUSINESS-AS-USUAL SCENARIO



Source: Northmore Gordon 2023, Energy efficiency scenario modelling.

THE MORE ENERGY EFFICIENCY WE GET DONE NOW, THE LESS NEW ENERGY INFRASTRUCTURE WE NEED TO BUILD.

What is electrification?

Electrification involves replacing technologies that use fossil fuels with technologies that use electricity instead. Importantly, electric appliances and equipment not only enable the use of renewable electricity, but are more efficient than gas appliances, equipment and vehicles.

Common examples for households include induction cooktops, reverse cycle air conditioners, heat pump hot water systems and electric vehicles.

Common examples for businesses include electrifying low and medium temperature heat in commercial buildings and food and beverage manufacturing from gas to electric heat pumps or switching to electric powered irrigation systems and tractors for farmers.

USING ENERGY MORE EFFICIENTLY ENABLES THE ESSENTIAL TRANSITION TO RENEWABLES TO MOVE FASTER AND CHEAPER – HELPING REDUCE THE IMPACTS OF CLIMATE CHANGE ON ALL OF US.

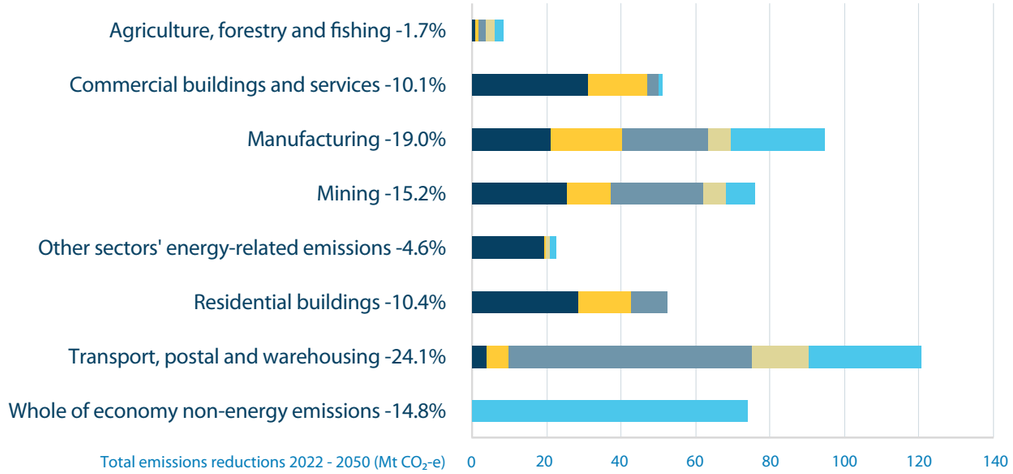
Because it's quicker and less costly to reduce energy-related emissions through energy efficiency than it is to build and transition to new low-emissions energy supply, the more we can optimise existing renewable energy sources, the less we need to build new ones.

Electrification is an important part of this: not only can electric appliances and industrial equipment use renewable electricity, they are typically more efficient than kit powered by fossil fuels. An electric car is usually around three to four times more efficient than a comparable petrol car.[20] And a heat pump – like a reverse cycle air conditioner or heat pump water heater system – can provide three to four times as much heat energy as it takes to run.[21] This means the emissions savings are realised from both energy efficiency and renewable energy usage.

Reducing emissions through energy efficiency can be done right across the economy – from households and small businesses to big industry and transport. The graph on page 13 shows how major sectors of the economy can use energy efficiency, electrification and renewables to reduce their emissions.

[20] IEA 2019, Global EV Outlook 2019.
[21] EEC and A2EP 2023, Harnessing heat pumps for net zero: the role of heat pumps in saving energy and cutting emissions, p. 15.

AUSTRALIA'S EMISSIONS REDUCTIONS (Mt CO_2-e) BY SECTOR TO 2050 IN A LOW-COST SCENARIO



Source: Northmore Gordon 2023, Energy efficiency scenario modelling.

Note: 'Whole of economy non-energy emissions' means all of the non-energy related emissions in Australia, including indirect energy emissions like fugitive emissions. This also includes emissions from agriculture, industrial processes and product use, and waste.

Across the economy, there are big opportunities for energy efficiency and electrification. In mining and manufacturing, businesses can reduce almost half of their emissions through energy efficiency and electrification. Decarbonising our homes will also involve using these methods to reduce emissions by 46 per cent, and then harnessing renewable electricity for net zero-ready housing.[22]

We still don't have the technology to reduce all our emissions to zero. Some things, like producing cement and steel, create some emissions that we can't get rid of with existing cost-effective technology. To deal with these hard-to-abate – or hard-to-remove – emissions, we'll need to use carbon or CO_2 – removals.

RAMPING UP AMBITION ON ENERGY EFFICIENCY AND ELECTRIFICATION WILL BE A VERY COST-EFFECTIVE WAY TO ACHIEVE NET ZERO IN AUSTRALIA.[23]

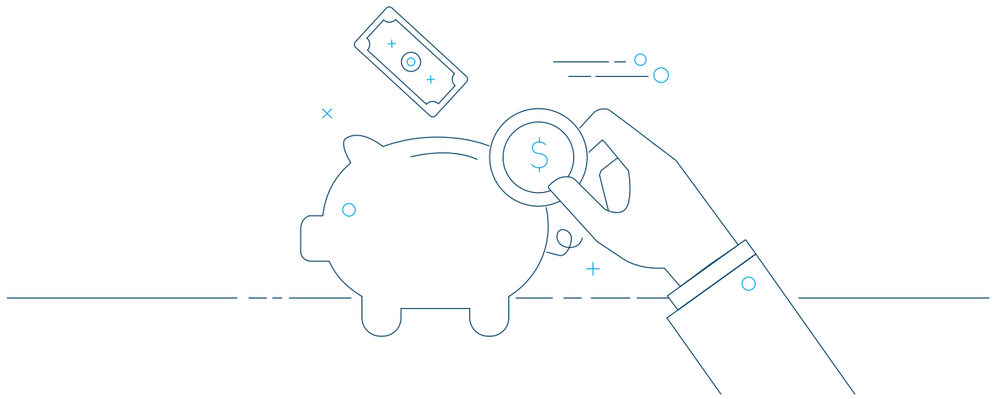
Using energy efficiency and electrification to reduce emissions is available now and almost always cost-effective,[24] giving us a better chance of achieving our emissions reduction targets as quickly as possible, whilst also saving money.

[22] Northmore Gordon 2023, Energy efficiency scenario modelling.
[23] Ibid.
[24] Ibid.

ENERGY EFFICIENCY SAVES US

MONEY

Energy efficiency lowers household and business energy bills, increases business competitiveness and productivity, and even fights inflation.



SAVINGS AT HOME

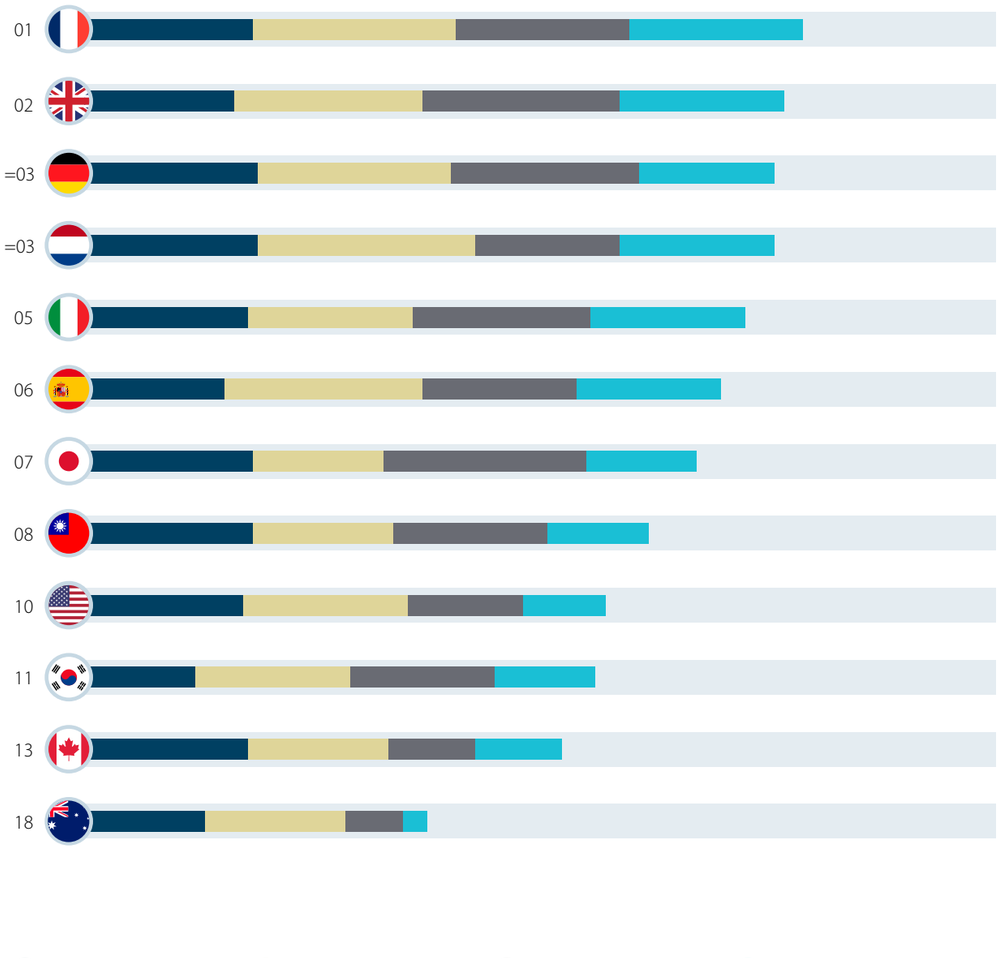
Australia's energy bills have seen a lot of fluctuation in recent years,[25] and many Australians experience bill stress.

Australia is ranked worst in the developed world for energy efficiency[26] so powering our appliances and making sure our homes aren't too cold or hot takes much more energy than it should.

THIS WASTED ENERGY COMES WITH A BIG PRICE TAG.

[25] Australian Energy Regulator (AER) 2022, Wholesale energy prices have come off record highs but remained elevated at year end.
[26] ACEEE 2022, International Energy Efficiency Scorecard.

AUSTRALIA RANKS LAST IN THE DEVELOPED WORLD FOR ENERGY EFFICIENCY POLICY & PRACTICE



The American Council for an Energy Efficient Economy (ACEEE) ranks the energy efficiency policy and performance of the 25 top energy-consuming countries in the world. Australia ranks worst for advanced economies within that group.

Countries are scored against their national efforts, buildings, industry and transport policy and performance, with Australia doing well for national efforts and buildings, but poorly for industry and transportation.

Source: ACEEE 2022, International Energy Efficiency Scorecard.

There are a range of ways to increase the energy efficiency of a home, which means it can be hard to estimate just how much a household can save through energy upgrades and retrofits. Nevertheless, modelling by the Australian Council of Social Service and the Brotherhood of St Laurence found a one-off capital investment of around $2,000 for apartments and $5,000 for houses can result in average savings ranging from $290 per year for apartments to more than $1,000 each year in houses.[27] This means energy efficiency upgrades often pay for themselves within a few years, creating savings for homeowners well into the future.

Star power

The Nationwide House Energy Rating Scheme (NatHERs) star ratings are a guide to the thermal performance – heating and cooling needs – of a home's construction.[28]

Star ratings are from one to 10 and based on information about the home's design, construction materials and the climate of its location. Australia is transitioning from a six to seven-star minimum for new builds under the National Construction Code.

Whilst NatHERS star ratings enhance the energy efficiency of new homes, until recently Australia has not had an equivalent program for existing homes.

Addressing this, in April 2023 the Australian Government announced its intention to pilot a new RapidRate tool that will estimate an energy star rating for existing homes, supporting households with lowering energy bills.[29]

Home energy assessments are also available to understand existing homes' energy performance, and are subsidised under some state and territory government programs.

SAVINGS FOR AUSTRALIA'S WORST PERFORMING HOMES ARE EVEN BIGGER.

Modelling has shown that upgrading an average one-star Melbourne home to four stars could save a household at least $2,275 each year.[30] These upgrades have been found to save more than three times as much energy as upgrading a home that already has a four-star rating and improving it to seven stars – which is the current minimum standard for new homes. In other words, the biggest energy and cost savings opportunities exist in the least efficient homes.

The types of upgrades required to take a home from one up to four stars are relatively cost effective, and generally include basic draught proofing, installing insulation, and replacing inefficient appliances with modern, flexible electric ones.

Staying cool and keeping warm

Heating and cooling accounts for 20 per cent to 50 per cent of energy used in Australian homes, depending on the climate zone. The good news is there are some simple things we can do to maximise energy savings and reduce cooling and heating loads.

For example, reverse cycle air conditioning provides heat as well as cooling. It's also 300 - 600 per cent efficient, which means it can take one unit of electrical energy and turn it into between three to six times as much heating or cooling energy. Under mild conditions, some products can achieve efficiencies of over 1,000 per cent.

DCCEEW 2023, Heating and cooling.

[27] Australian Council of Social Service (ACOSS) and Brotherhood of St Laurence 2019, Affordable, clean energy for people on low incomes.
[28] DCCEEW 2022, Home energy star ratings.
[29] Husic, E & McAllister, A 2023, Joint media release: New home energy efficiency ratings powered by artificial intelligence.
[30] EEC 2022, Energy Efficiency Council response to the National Energy Performance Strategy discussion paper, pp. 52-53.

SAVINGS, COMPETITIVENESS AND PRODUCTIVITY IN BUSINESS

The high cost of energy and its negative impact on business has been widely reported, with some Australian businesses closing, moving offshore or delaying plans for expansion.

Energy efficiency offers individual businesses an opportunity to save money on bills and reduce operating expenditure (OpEx). Needless to say, energy efficiency and smart energy management in businesses takes a different approach to household upgrades. For businesses, energy management can include custom and off the shelf systems and equipment upgrades. It can also involve expert help to implement energy management systems (EnMS) that support businesses with setting up management processes to continually improve their energy performance and lower costs year-on-year.

Reducing OpEx is as much about strategy as it is about budget, which is why implementation of a robust EnMS should be at the heart of any business improvement strategy in organisations where energy spend is a significant draw on OpEx. Investing in energy efficiency and energy management is also a risk management strategy, as the reduced OpEx helps to shield businesses from uncertain and volatile energy prices.

Catching up with businesses worldwide

In 2022, global investment in energy efficiency exceeded AUD$800 billion.[31] If Australia can capture even a small share of this investment, it could represent billions of dollars a year for our economy.

There are approximately 333 million businesses classed as MSME (micro, small and medium-sized enterprises) throughout the world, contributing from nine to 29 per cent of energy demand.[32]

A recent survey in Europe found more than half of small and medium enterprises (SMEs) are planning to implement new measures to improve energy efficiency in the immediate future, and 61 per cent are already putting them in place to save energy.[33]

The Australian research organisation Climateworks Centre has found savings generated from investment in energy productivity can create increases in annual profits of two to 10 per cent.[34] A recent report by the Climate Group had similar results, finding an average seven per cent improvement in energy productivity for businesses that have implemented EnMS.[35]

Businesses with large energy bills can make substantial savings. For example, businesses upgrading or replacing inefficient equipment in the Victorian Energy Upgrades (VEU) program have been found to save up to $74,000 a year on energy costs.[36] Similar savings are reported by the NSW Energy Savings Scheme and other state government energy efficiency subsidy programs.

But energy efficiency is just one part of the solution. A proactive approach to leveraging data, calibrating investment in *all forms of energy upgrades,* and optimising energy procurement, should be at the heart of leading businesses' approach to cutting costs and reducing emissions. For businesses looking to improve on their environmental, social and governance (ESG) performance, taking action to reduce energy and emissions in their own operations is key.

[31] IEA 2022, Energy Efficiency 2022, p. 33.
[32] Ibid, p. 38.
[33] European Commission 2022, SMEs, resource efficiency and green markets, p. 4.
[34] Climateworks Centre 2016, Energy Productivity for Companies.
[35] Climate Group 2023, Climate critical: The energy efficiency imperative.
[36] Victorian Department of Energy, Environment and Climate Action 2023, Victorian Energy Upgrades for businesses.

SMART ENERGY MANAGEMENT IS ESSENTIAL TO EFFECTIVE NET ZERO STRATEGIES WITHIN AN ESG FRAMEWORK

What is ESG?
Environmental, social and governance (ESG) is the movement, or framework, for businesses to operate in an environmentally and socially responsible and transparent manner.[37]

[37] Standards Australia n.d., Environmental, Social and Governance (ESG).

FIGHTING INFLATION

According to the International Energy Agency, we are currently experiencing the first energy crisis with truly global impacts.[38] Prices for oil and natural gas have reached levels never seen before.

The crisis has stoked inflationary pressures and created a looming risk of recession, with the heaviest burden falling on poorer households, where a larger share of income is spent on energy and food.[39]

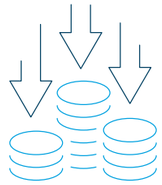
What is inflation?
According to the Reserve Bank of Australia, inflation is an increase in the level of prices of the goods and services that households buy.[40]

Inflation is measured as the rate of change of those prices. Over the twelve months to the March 2023 quarter, the Consumer Price Index (which measures household inflation) rose by seven per cent across Australia.[41]

Energy price inflation varies across countries depending on the fuel mix, the level of energy efficiency and the structure of the economy, as well as government polices such as fuel taxation and energy bill support strategies.[42]

Investing in energy efficiency is anti-inflationary as it lowers spending on energy. But making these investments in an environment of high inflation and substantial cost of living pressures is not easy.

The upfront costs associated with energy efficiency upgrades can be low, but can also be quite substantial. Nevertheless, governments around the world are pursuing support programs for energy efficiency because of the value that it brings to their economies, and the households and businesses within them.



For example, in 2022, the United States Government passed the Inflation Reduction Act, which includes hundreds of billions of dollars in new spending and tax breaks to fight inflation by boosting economic competitiveness, innovation, and industrial productivity.[43]

While the Inflation Reduction Act has commanded headlines for historic investment in renewable energy and climate efforts, often less publicised is its support for household and SME energy efficiency.

A KEY PART OF THE INFLATION REDUCTION ACT IS ENERGY EFFICIENCY FOR HOMES AND BUSINESSES.

Lowering energy costs is a recognised measure to fight inflation, and the US Inflation Reduction Act intends to do this by supporting energy-saving property improvements, including energy efficient windows, insulation, heat pump hot water systems, reverse cycle air conditioners and rooftop solar, as well as energy audits for homes and businesses.

This investment is intended to support households and businesses to save money on their energy bills and shield themselves from further volatile energy prices.[44]

[38] IEA 2022, World Energy Outlook 2022.
[39] Ibid.
[40] Reserve Bank of Australia n.d., Inflation and its measurement.
[41] Australian Bureau of Statistics 2023, Consumer Price Index, Australia: March Quarter 2023.
[42] IEA 2022, Energy Efficiency 2022.
[43] McKinsey & Company 2022, The Inflation Reduction Act: Here's what's in it.
[44] US Department of the Treasury 2022, Fact Sheet: Four Ways the Inflation Reduction Act's Tax Incentives Will Support Building an Equitable Clean Energy Economy.

IMPROVING THE ENERGY EFFICIENCY OF HOMES BENEFITS BOTH THE PHYSICAL AND MENTAL HEALTH OF THE PEOPLE LIVING IN THEM.

ENERGY EFFICIENCY IMPROVES OUR HEALTH

Even modest energy efficiency upgrades improve our health, happiness and wellbeing.

Australians spend 90 per cent of our time indoors.[45] While this statistic might be surprising, what's even more surprising is just how much better our buildings could perform when it comes to creating healthy living environments with comfortable air temperatures, humidity, noise levels and air quality.[46]

In 2005, Australia's first minimum energy efficiency standard for new homes was introduced, with the National Construction Code setting the standard for new builds at a five-star minimum. This standard has since been increased, and we are moving to a seven-star standard for houses and apartments across the country. But while the homes of the future will be comfortable and efficient, our existing homes and buildings are a long way off the pace. In fact, industry and consumer groups agree that more than eight million of Australia's 10 million homes are inefficient, largely because they were built before we had mandatory minimum energy efficiency requirements.[47] These homes tend to be poorly insulated and draughty, and many have ventilation and damp issues.

This is especially worrying given people living in homes that are damp, cold or mouldy are at greater risk of respiratory illness, infections, and asthma.[48]

Improving the efficiency of these homes doesn't just reduce costs and lower emissions: it improves the physical and mental health of the people living in them.

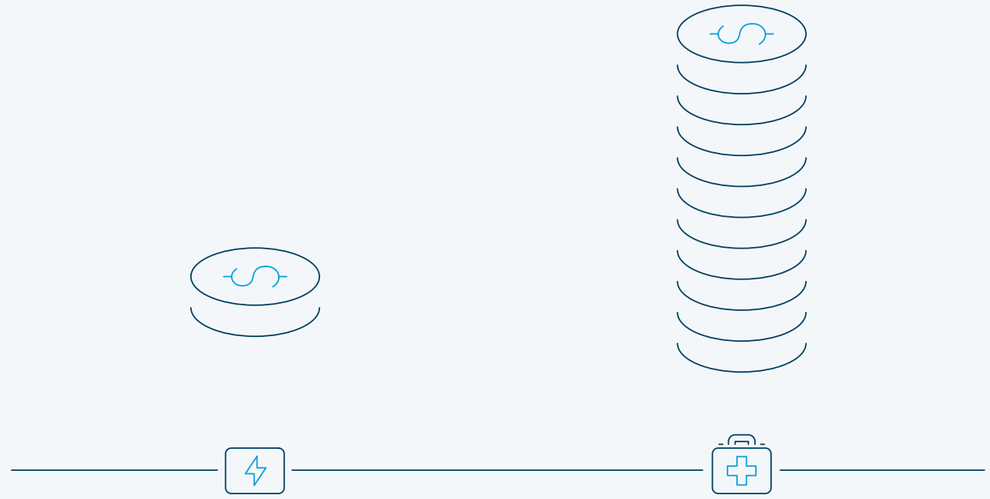
A growing number of studies show that through the reduction of thermal discomfort and anxiety related to fuel poverty or bill strain, energy efficient homes promote improved mental and social health outcomes. This is especially relevant to economically and socially vulnerable Australians, who experience energy poverty disproportionately.[49]

One study of the Victorian government's Healthy Homes Program found that among elderly participants, even modest energy efficiency upgrades – those costing less than $3,000 – were associated with benefits that included reduced breathlessness and improved quality of life, particularly in mental health and social care.[50]

These benefits spread beyond individuals, with the study finding the upgrades led to healthcare savings of almost $900 per person over the winter period. In fact, in this program, for every $1 saved in energy, more than $10 was saved in healthcare.[51]

[45] DCCEEW n.d., Indoor air.
[46] IEA 2019, 'Health and wellbeing', Multiple benefits of energy efficiency: from "hidden fuel" to "first fuel".
[47] Affiliated Insulation Industry Coalition (AIIC) and EEC 2022, Media Release: Industry-led roadmap provides a path to safely deliver healthier, better insulated homes and reduced energy costs.
[48] Waters, A 2001, Do housing conditions impact on health inequalities between Australia's rich and poor?, Australian Housing and Urban Research Institute (AHURI).
[49] Brotherhood of St Laurence n.d., Affordable, clean energy.
[50] Sustainability Victoria 2022, The Victorian Healthy Homes Program Research findings.
[51] Ibid.

FOR EVERY $1 SAVED IN ENERGY COSTS, MORE THAN $10 CAN BE SAVED IN HEALTHCARE COSTS



Source: Sustainability Victoria 2022, The Victorian Healthy Homes Program Research Findings.

In New Zealand, a government program aimed at improving efficiency through better insulating homes found benefits including:

- Hospitalisation and pharmaceutical cost savings;
- Reduced medical visits;
- Reduced days off school or work; and
- Reductions in caregiver costs.[52]

Echoing the findings of both the Australian and New Zealand programs, studies of insulation retrofits in social housing in the United Kingdom found that tenants reported improved social and emotional benefits, including feeling more comfortable at home, improved mental health, social interaction, and family relations.[53]

Needless to say, the benefits don't begin and end at home. A Singaporean study found that people working in energy efficient buildings are less likely to suffer from fatigue, headaches and skin irritations.[54] Bright, cool fluorescent lighting also increases the risk of eye diseases,[55] meaning that installing dimmable, warm LEDs can also improve comfort by reducing eye strain.

A number of Australian and international studies have found close association between energy efficiency improvements in offices and worker productivity from fewer sick days, reduced stress and improved employee morale.[56] For example, a review of Australia's Commercial Building Disclosure (CBD) program found retrofits resulting from the first years of the program delivered at least $168 million in improved occupant productivity, more than double the value of the energy savings![57]

[52] Grimes et al. 2012, Cost Benefit Analysis of the Warm Up New Zealand: Heat Smart Programme, New Zealand Ministry of Economic Development.
[53] Gilbertson et al. 2006, 'Home is where the hearth is: Grant recipients' views of England's Home Energy Efficiency Scheme (Warm Front)', Social Science & Medicine vol. 4 issue 4, pp. 946-956.
[54] IEA 2019, 'Health and wellbeing', Multiple benefits of energy efficiency: from "hidden fuel" to "first fuel".
[55] Walls, HL et al. 2011, 'Eye disease resulting from increased use of fluorescent lighting as a climate change mitigation strategy', American Journal of Public Health vol. 101, issue 12.
[56] ACIL Allan 2016, Commercial Building Disclosure Program Review – Final Report.
[57] Ibid.

WE CAN BEGIN TO REIMAGINE HOW
TO MAKE THE BEST USE OF AUSTRALIA'S
ENERGY RESOURCES.

ENERGY

EFFICIENCY

ENABLES AFFORDABLE AND RELIABLE

ENERGY SYSTEMS

The energy system of the future must be affordable and reliable. Enter energy management.

In the space of 30 years, Australia is seeking to rebuild its entire energy system. If we embrace energy efficiency and energy management, we will lower the costs of this rebuild and make ourselves more resilient to future global energy shocks.

Right now, a huge amount of investment goes into making sure there's enough energy supply to meet periods of 'peak demand' – severe heatwaves or cold snaps when thousands of households are running energy-intensive appliances like air conditioners and heaters at the same time.

But as modern appliances and better performing buildings require less energy to keep us comfortable, we can help to transform the energy grid by reducing the amount of energy needed, even in those periods of peak demand.

As efficient buildings and industrial energy management practices reduce the amount of energy our networks need to supply, the size – and cost – of the entire system can be lowered, and we can begin to reimagine how to make the best use of Australia's energy resources.

Partly, this will be necessary because fossil-based energy sources tend to be more 'dispatchable' than renewable energy, meaning that power output is often set to meet demand.

As the lowest cost renewable sources of energy like solar and wind are more variable, energy efficiency and energy management will be an important factor in helping smooth the transition to a decarbonised energy system, as well as managing its long-term performance. Working with energy storage solutions such as pumped hydro and batteries to help ensure there is always enough supply to meet demand is integral to supporting a variable renewable electricity grid. But energy storage can't solve the problem on its own. Matching investments in storage with investments in energy efficiency and demand flexibility is essential to operating our future energy system, as it reduces the need for supply from renewables and storage, and the associated network infrastructure.

Doing more with less

Over the past 20 years, countries that are part of the International Energy Agency have made a sustained effort to implement energy efficiency measures across the buildings, industry and transport sectors. The gains have been significant.

While the economies of the group grew by 40 per cent in real terms during this time, the amount of energy demand has remained the same. This means pressure to grow the size of supply – or generation – in our energy systems has been largely offset through efficiency-related measures. This has saved billions of dollars of investment in generation and network upgrades.

IEA 2022, Energy Efficiency 2022.

Rolling out energy efficiency as soon as possible will also help ensure the reliability of the grid, as old fossil fuel generators are progressively turned off and new renewables come online. To put this into context, our homes are a particularly important piece of the puzzle. At home, most of our energy use – running our appliances, hot water systems and heaters – happens early in the morning and at night: times when there's minimal low-cost solar power in the system.

As Australian homes become more energy efficient and improve their thermal performance – through measures such as insulation, double-glazing and draft-proofing – they can make better use of smart electric appliances, including pre-heating and -cooling buildings to make the most of low-cost solar generation during the day.

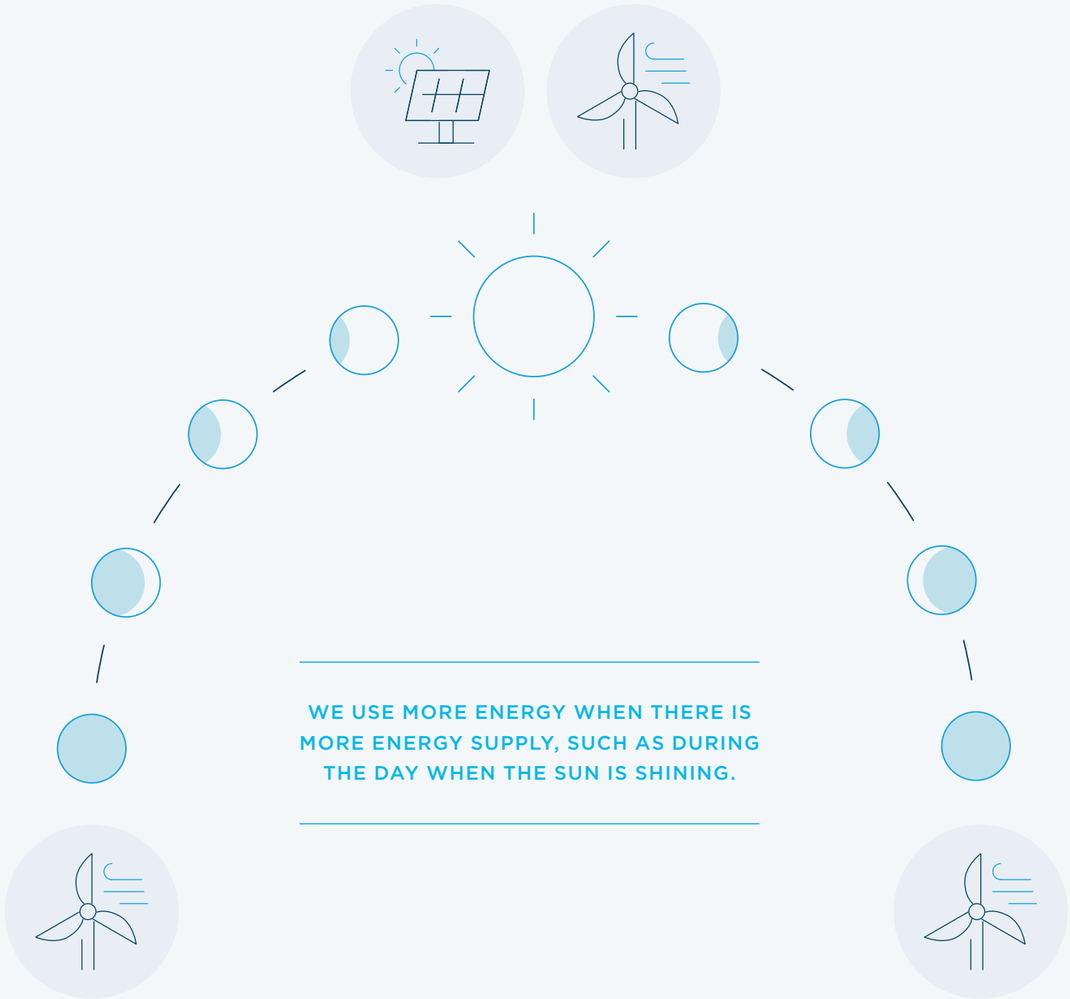
Smart appliances include heating and cooling systems and whitegoods such as washing machines that can switch on and off depending on when energy is cheapest. These appliances can help to reduce demand during critical periods.

Smart electric vehicle chargers can do the same by altering charging times to access different prices – for example, based on how much surplus solar energy is being produced if there is a solar PV system installed. Through more efficient homes and smarter appliances, we can reduce the amount we need to spend on electricity network infrastructure, helping to keep costs down for everyone. Managing demand in this way is especially critical in this decade, when energy storage is still relatively expensive.[58]

The challenges associated with transforming and strengthening our energy system are big, but not impossible. Through the coordinated efforts of communities, industry, governments and finance providers, we can overcome these issues and create exciting opportunities to ensure that as we cut emissions to transform the energy sector to net zero, we keep costs down and ensure reliable supply for everyone.

[58] EEC 2023, Clean Energy, Clean Demand.

AN IDEAL ENERGY SYSTEM MATCHES SUPPLY WITH DEMAND



WE USE MORE ENERGY WHEN THERE IS MORE ENERGY SUPPLY, SUCH AS DURING THE DAY WHEN THE SUN IS SHINING.

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ABOUT ANZ

ANZ provides banking and financial products and services to over 8.5 million retail and business customers, and operates across more than 30 markets.

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ABOUT EEC

EEC is the peak body for Australia's energy management sector. A not-for-profit membership association, EEC works to:

- Drive world-leading policy on efficiency, electrification and demand flexibility;
- Ensure we have the skilled workforce to deliver Australia's energy transition; and
- Support businesses and households to rapidly decarbonise.

Learn more at eec.org.au.

DISCLAIMER

WHERE TO GO FOR HELP?

For businesses
There is an enormous amount of information on energy in the public domain, yet it can be hard for businesses to extract what matters for them.

Navigating a dynamic energy landscape: a briefing for Australian businesses is designed to cut through the noise and help businesses confidently navigate Australia's dynamic energy landscape. The sector spotlights, tax incentives guide and other resources that accompany the briefing exist to support this aim.

For households
Your Home is an Australian guide to designing, building or renovating homes to ensure they are energy efficient, comfortable, affordable and adaptable for the future. It's packed full of resources and is designed 'for everyone.'

For everyone
For those looking to find reputable energy and net zero products and services, browsing the EEC's member list is a great place to start.

You can also find certified professionals and tradespeople by browsing the EEC Professional Certifications website.

What's next?
Putting energy efficiency to work is the first report in ANZ and the EEC's Forgotten Fuel series. The second and third reports will have a deeper focus on the benefits of and opportunities for energy efficiency in businesses and households.

For more information:

- From ANZ: email newthinking@anz.com or contact your ANZ Relationship Manager; and
- From EEC: email info@eec.org.au.

This report is current as at May 2023 and the details in it are subject to change.

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