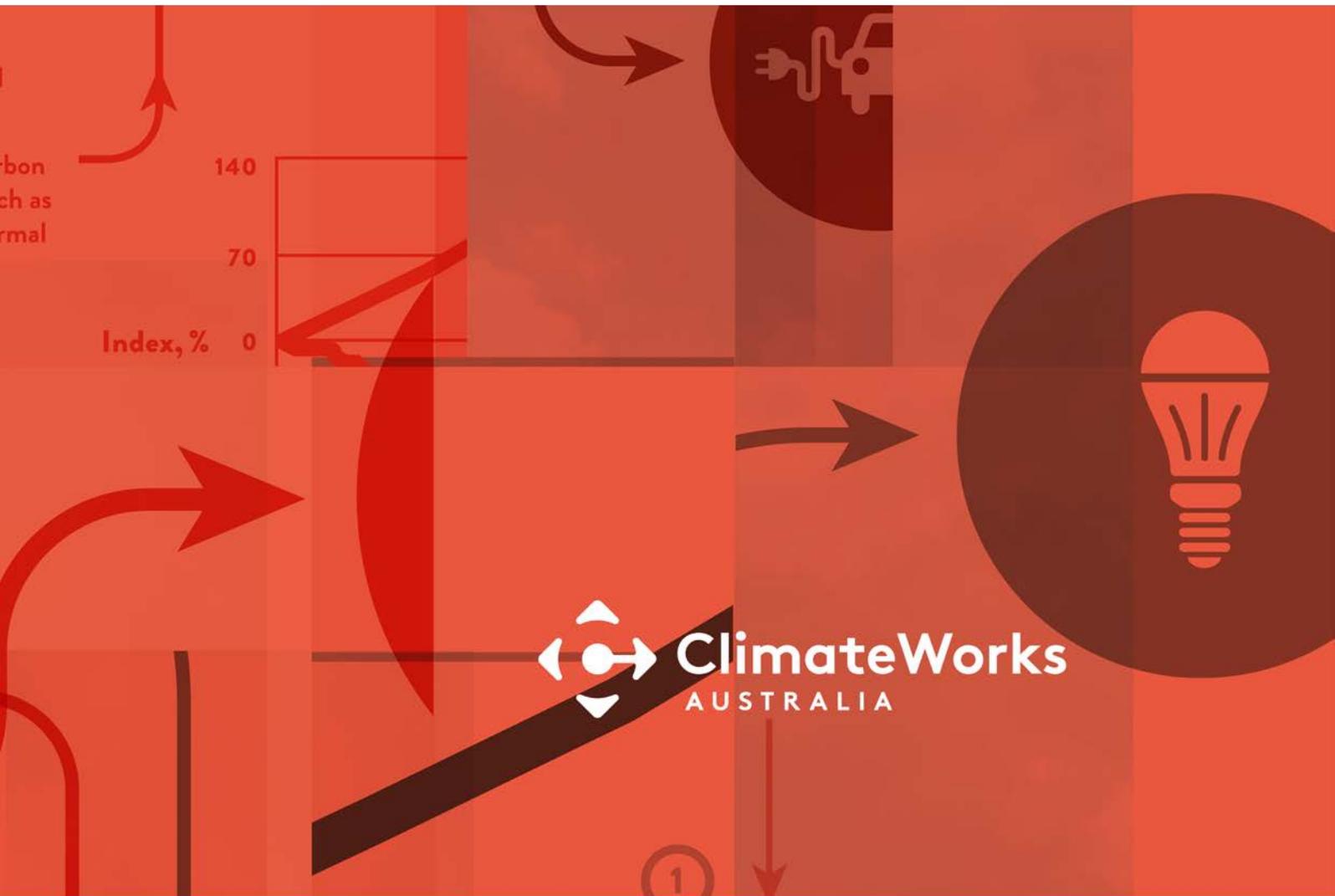


REPORT

# Solving the gas crisis

A big problem deserves a big solution

November 2017



 **ClimateWorks**  
AUSTRALIA

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# Solving the gas crisis

A big problem deserves a big solution –  
How energy efficiency and fuel shifting can help

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## Executive Summary

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Australia is facing a gas crisis due to a mismatch between domestic supply and demand in the east coast market, driven by rapid growth in the LNG export market and the absence of a comprehensive national energy policy. The resulting high energy prices and unfavourable contract conditions have wide-ranging impacts for the Australian economy, particularly for industries reliant on gas. Without any changes, gas prices could continue to rise, leading to negative impacts on industry profitability – potentially leading to closures and job losses.

This creates big risks for Australia.

Fortunately, there is a big solution: demand side improvements including energy efficiency and switching from gas to alternative low carbon energy sources. This has been largely overlooked in discussions on the gas crisis to date.

ClimateWorks' analysis has found that implementing energy efficiency measures and fuel shifting could reduce demand for gas by 321 PJ across the country in 2030 – a quarter of gas use otherwise expected. Reducing the amount of gas required for businesses and households would directly reduce bills and relieving pressure in the market could reduce energy costs for all gas users. Energy efficiency and fuel shifting can therefore help businesses and households save money on their energy bills and create productivity benefits across the Australian economy. This represents a potential win-win for both Australia's finances and emissions.

By 2030, Australia could:

- **Reduce gas demand** by 25 per cent
- **Relieve the expected east coast supply gap** by 45 to 70 per cent
- **Reduce emissions** by up to 16 MtCO<sub>2e</sub> or 12 per cent of our current emissions target
- **Achieve energy productivity improvements** accounting for up to 50 per cent of the target in the National Energy Productivity Plan.

However businesses and households face barriers to unlocking available opportunities, governments can provide support to overcome these barriers to help solve the gas crisis and reap multiple benefits.

The most important step is to build confidence in long term policy stability. This will ensure signals and incentives support appropriate long-term investment decisions.

Governments can also build upon a range of existing programs to reduce barriers and unlock opportunities. These include: the National Energy Productivity Plan (NEPP), the National Construction Code (NCC), Minimum Energy Performance Standards (MEPS) for equipment, the Emissions Reduction Fund (ERF), energy efficiency certificate schemes, as well as programs by the Clean Energy Finance Corporation and the Australian Renewable Energy Agency (ARENA).

Increased support and incentives for industry are of particular importance, given there is little national policy currently focused on energy efficiency and fuel shifting. Additional policy for industry is needed to:

- build capacity and incentives for best practice in energy management and procurement
- provide support to companies to help alleviate financial constraints (where this provides a wider public benefit)
- decrease risks related to companies being early adopters in Australia of emerging technologies and practices
- encourage business motivation, perhaps through mandatory requirements or targets.

The buildings sector offers numerous opportunities, with many providing energy savings for businesses and households. Opportunities for improved energy efficiency and fuel switching in buildings could be unlocked by:

- strengthening energy performance requirements and rating systems for buildings and equipment and introducing a long term trajectory to guide future updates.
- decreasing risks for companies who are early adopters in Australia of emerging technologies and practices
- providing financial incentives where market distortions are preventing the implementation of cost-effective opportunities
- improving energy data, information and education for homeowners, renters, commercial building owners and tenants.

Government interventions to support industry and the building sector to reduce gas demand can help get Australia onto a pathway to net zero emissions, create energy savings for businesses and households and improve energy security and productivity. Governments can unlock this win-win solution for businesses, households and the nation. The policy frameworks are in place, now is the time for governments to ensure the programs, and the measures to implement them, will make the most of the opportunities available.

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# 1. We need to talk about gas

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**Australia is facing a gas crisis due largely to a mismatch between domestic supply and demand in the east coast market, with rapid growth in the LNG export market, and the absence of a comprehensive national energy policy. This has wide-ranging impacts for the Australian economy through high energy prices, unfavourable contract conditions, and reduced competitiveness for industries reliant on gas.**

The energy debate in Australia has focused on the electricity and gas crisis in recent months. The Australian Competition and Consumer Commission's (ACCC) first interim gas report, Gas Inquiry 2017-20 Interim Report (ACCC 2017), forecasts a significant supply shortfall in the east coast gas market of up to 55 PJ in 2018, rising to 108 PJ under the higher range of domestic demand forecasts. Shortfalls in the market contribute to gas price increases, in turn increasing electricity prices, and are already imposing substantial impacts across the economy.

Large industrial and commercial users are particularly exposed to increases in wholesale energy prices, because the wholesale price is often a larger component of overall energy costs than network and retail costs. These users generally also prefer longer term gas contracts of 3-5 years or more. Longer term contracts are increasingly difficult to secure in a non-transparent market, and often burdened with unfavourable conditions, including take-or-pay provisions (AiG 2017). As a result, industrial gas users have been facing price demands in new contracts of \$10-\$16/GJ (ACCC 2017) or higher, in some cases three times more expensive than expiring contracts (Macdonald-Smith 2017). Recent spikes in wholesale electricity prices were influenced by gas prices, and with gas generators increasingly the marginal producers, gas price increases have had a marked impact on wholesale electricity prices (Saddler 2017).

These problems are largely attributed to the rapid growth of the Liquefied Natural Gas (LNG) export market over the last few years, which ties exports to large, long-term fixed international contracts. This has placed a huge strain on the supply of domestic gas in Australia, particularly with the commencement of Queensland LNG exports, which have tripled the demand for gas in eastern Australia (AEMO 2016). The mismatch in supply and demand of gas was compounded when actual yields from newly developed reserves were lower than expected (AER 2017). This, combined with exposure to international export prices, higher cost of production from the new gas fields and barriers to entry for new companies, has contributed to higher prices for Australian gas users.

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## 2. What happens if we continue along this path?

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**Under business-as-usual, high gas prices will persist (McKinsey 2017). This is expected to reduce industry profitability, which may force closures and job losses.**

Current discussions on the gas market tend to focus on shoring up the supply side of the equation, with the Australian Government recently introducing the Australian Domestic Gas Security Mechanism (ACCC 2017). If triggered, this mechanism would restrict LNG exports in an expected shortfall year and direct supplies to meet domestic demand. While such arrangements may partly alleviate the gas supply shortfall (Belot 2017), they represent short term solutions that are unlikely to solve the price issue. States such as Victoria and NSW are also being strongly encouraged to remove their restrictions on coal seam gas extraction, including the Federal government discussing reductions in GST payments (Durkin & Macdonald-Smith 2017).

In the long run, the strong link with export markets will mean that domestic gas prices will likely be determined or influenced by international LNG prices. Further, as new gas development is likely to be more expensive than existing or past projects because of the type of gas resource, it seems unlikely that additional supply would significantly lower gas prices. Analysis by McKinsey (2017) suggests that gas prices could range from a 'low case' of A\$7–8 per GJ to a 'high case' of A\$12 per GJ. The low case assumed price was driven by local production costs, new domestic supply and substantial demand reduction. The high case assumes prices are at parity with global markets and not all demand and supply opportunities are unlocked. In other words, the days of 10-15 year gas contracts at \$3 per GJ are gone.

Such high gas prices, compounded by the uncertainty of domestic supply, pose significant challenges for large gas-using industrial businesses. In the chemicals industry, gas is used as a feedstock for production (PACIA 2014), while other large industrial users rely on gas as an energy source for many processes, such as heating. Research conducted by ClimateWorks (2014) showed that more than 70 per cent of large Australian companies had energy costs above 10 per cent of their earnings<sup>1</sup> while nearly half of companies had energy costs above 25 per cent of earnings. And a doubling or tripling of gas costs will represent a material impact on company profitability, given that gas represents nearly 37 per cent of total energy use in industry (OCE 2016).

Continued high gas prices are particularly concerning for trade-exposed gas users who are less able to transfer an increase in energy costs onto consumers (Macdonald-Smith 2017), potentially leading to job cuts as businesses seek to maintain operational viability. One research report suggested that without affordable and reliable gas, one in five heavy manufacturers could close by 2019, with knock on effects across the economy (BIS Shrapnel report cited by AWU 2014). Under current gas prices Australia has lost its competitive advantage over other regions for manufacturing reliant on gas use, as the United States and the Middle East are expected to have cheaper gas prices for the foreseeable future.

Faced with these challenges, some industries may also consider switching back to coal as a fuel source, should the cost of using gas outweigh that of switching to and operating coal. From a national perspective, emissions intensive energy sources such as coal would jeopardise Australia's emissions reduction commitments as part of the Paris Agreement. Even if this shift were viable in the short term, this poses a risk for industries in the long run as costs associated with the higher emissions from using coal are likely to increase in a low carbon economy. And risks are increased because these high emissions and costs may be locked-in for a substantial number of years due to the expense of switching and lifespan of large equipment.

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<sup>1</sup> In this earlier analysis, we used earnings as reported earnings before interest, taxes, depreciation and amortisation (EBITDA).

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### 3. Is there a solution we can pursue now?

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**To avoid the problems identified above, an alternative solution is required. To date, much of the discussion has focused on bolstering gas supply. Instead, demand side improvements – namely energy efficiency measures and fuel shift from gas to electricity and low carbon energy sources – can reduce both the amount of gas needed to meet economic requirements and energy costs for all users.**

It is important to ensure that Australian industry invests in energy efficiency and switches from gas to alternative low carbon energy sources. This would reduce costs and build resilience during the transition to a low carbon economy, which is now inevitable. The added advantage of demand side actions is that they will not only alleviate supply pressures, they will also help energy users reduce their energy costs.

A number of options such as increasing gas supply or reverting to coal represent short-term solutions. However, these options pose a risk in the medium to long-term, especially given Australia's commitments to reduce emissions under the Paris Agreement.

#### What sort of potential does demand reductions offer?

**Energy efficiency and fuel shift could reduce demand for gas by 25 per cent in 2030, which could meet 45 to 70 per cent of the expected supply gap in 2030.**

With anticipated growth in Queensland LNG exports and relatively stable levels of domestic consumption compared to current levels, demand for gas from east Australia is projected to increase to 2030. As supply from existing gas fields declines, the mismatch between gas supply and demand in east Australia will likely continue to 2030, according to recent work by McKinsey (2017). This gap in gas supply in 2030 is estimated to be 465 PJ or 21 per cent of 2030 total east coast gas demand forecast (McKinsey 2017). AEMO's Gas Statement of Opportunities (AEMO 2017) also indicates there may be shortfalls in 2030.

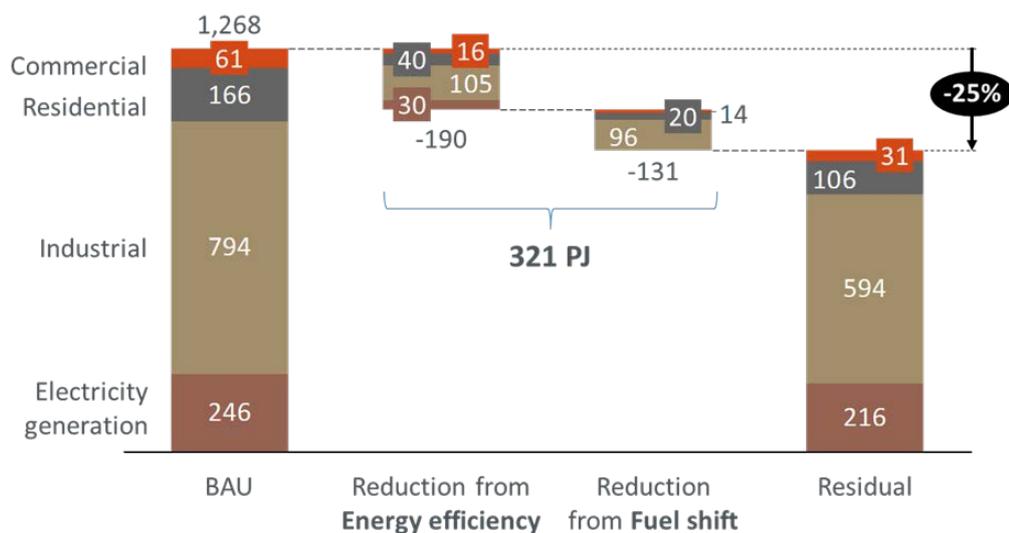
According to ClimateWorks analysis, some demand side improvements are expected under business as usual, leading to about 100 PJ reduction in gas consumption in 2030. But demand for gas can be further reduced through a combination of energy efficiency and shift from gas to other energy sources such as electricity and alternative fuels including bioenergy. Our analysis shows that these measures could quadruple the demand reduction – an additional reduction of 321 PJ, as shown in Figure 1.

The identified measures include opportunities that improve energy efficiency and those that shift fuel use from gas. Energy efficiency opportunities can reduce gas use both directly or through reduction in electricity use. This has an indirect effect on reducing demand for gas through reducing the need for gas powered electricity generation<sup>2</sup>. Examples of the opportunities that result in better energy efficiency include: more efficient boilers (and alternative fuelled boilers), capture and reuse of waste heat and steam in industrial processes, more efficient crushing and grinding in mining, variable speed drives on motors and conveyors, energy efficient equipment in homes and businesses, better insulation in buildings, highly efficient heating and cooling systems and more efficient lighting.

The potential energy savings of 321 PJ is equivalent to about 70 per cent of the expected supply gap in 2030 identified in the McKinsey report. This assumes that demand reduction across Australia could alleviate the shortfall in east Australia. Demand reduction only in east Australia accounts for 211 PJ – equivalent to about 45 per cent of the gap.

<sup>2</sup> The analysis considered the net reduction in electricity use accounting for decreases expected from energy efficiency measures as well as increases expected from electrification.

Figure 1: Opportunity to reduce gas demand in buildings, industry and electricity generation in 2030, PJ



Over half of the potential reduction in gas demand, or 190 PJ, could be delivered from energy efficiency opportunities that deliver net cost benefits. Most of this (105 PJ) is available through reduction of gas use in industry, such as process improvements or switching to using more efficient equipment or boilers at time of replacement, equivalent to 13 per cent reduction in energy use by 2030 (excluding gas used as a feedstock). Our research showed that through the Energy Efficiency Opportunities (EEO) program, companies identified gas savings equivalent to 15 per cent of their energy use in 2010-11. Of this only 40 per cent were expected to be implemented under business-as-usual. The highest savings identified in percentage terms were in food and beverage manufacturing, wood, pulp and paper manufacturing, petroleum manufacturing and chemicals. With significantly increased gas prices, it is likely that large numbers of new profitable opportunities will be available to industrial users.

A further 56 PJ demand reduction can come from residential and commercial buildings, through improvements to the building and to equipment that uses gas, especially for space and water heating. This is equivalent to 25 per cent per cent reduction in energy use, across residential and commercial buildings, in 2030.

The remaining opportunities from energy efficiency (30 PJ of reductions) are from improvements which reduce demand for electricity from buildings and industry, resulting in a 12 per cent net reduction in electricity use in 2030, which in turn reduces the need for gas-fired generation.

Another major opportunity to reduce demand for gas lies in fuel shifting. Shifting from gas to electricity or alternative low carbon energy sources has the potential to deliver 131 PJ of reduction in gas demand in 2030. This potential is largest in industry, particularly in heating processes that are currently fuelled by gas which can be shifted to alternative energy sources such as solar thermal, bioenergy or electrical equipment. This opportunity represents 96 PJ, equivalent to 12 per cent of gas use shifted towards alternative energy sources in industry. In residential and commercial buildings, heat pumps (including split system air-conditioners) that use electricity can be used instead of gas equipment for water and space heating. This opportunity totals 34 PJ in 2030, representing 15 per cent of gas use that can be shifted towards alternative energy sources.

ClimateWorks analysis (2016a) shows that electrical appliances are usually more efficient, requiring less energy input to create the same amount of output (e.g. heating). In the case of hot water systems, heat pumps can use four times less energy than gas equivalents, while split air-conditioning systems can use seven times less energy than gas space heaters. Where on-site low carbon energy sources (e.g. solar PV) are used instead of gas, this can also lead to additional productivity benefits in the form of reduced energy losses as a result of transmission and distribution.

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## 4. Reducing gas demand delivers additional benefits

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**Beyond reducing demand, energy efficiency and fuel switching also present cost-savings and productivity benefits for industry, while helping meet Australia's emissions targets and National Energy Productivity Plan (NEPP). This represents a potential win-win for financial and emissions considerations.**

### Cost savings

Many of the energy efficiency and fuel shift opportunities available to buildings and industry create cost savings. They reduce gas bills for consumers in two ways: reducing consumption of gas can have a direct impact on reducing gas bills, while alleviating the demand for gas could moderate gas prices across the east coast gas market by removing the additional price paid because supply scarcely meets demand. Moderating gas prices could in turn alleviate electricity prices in some instances, where gas generations set the price.

An example of the scale of benefits can be shown by the review of the Gas Efficiency Funding program that operated in NSW. Businesses were able to reduce gas consumption by 338 TJ per year, saving \$3.1 million in gas bills with an average payback of 3 years. The Program provided \$1.5 million government funding matched with \$7.5 million from participating businesses. These savings were achieved through gas monitoring and efficiency projects, as well as steam traps and equipment lagging (OEH 2017).

### Industry competitiveness

Reducing demand for gas can introduce major opportunities for improving the productivity and competitiveness of Australian industry. Our comparisons of domestic and global companies have found that leaders in energy efficiency consistently achieve large energy savings (between 1-2 per cent per year), much higher than the rest of their sectors. In Australia, we found that the top 20 per cent of companies achieve around four times more savings than the average company. The bottom 20 per cent achieve near-zero improvement.

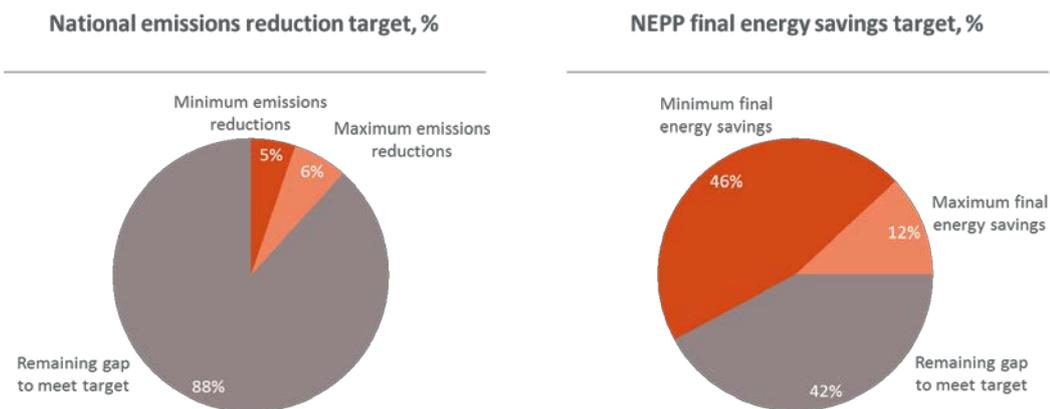
And low performing companies could increase their profit margins by 2 to 10 per cent each year after accounting for the capital costs of improvements, if they matched the efforts of leaders in their sector (Climateworks 2016b). This is particularly important for Australian companies, as the country is lagging behind other developed economies in terms of energy productivity<sup>3</sup>(IEA 2017), while energy prices are soaring. Capturing these currently untapped opportunities would assist the competitiveness of Australian companies against other economies such as the US and China.

<sup>3</sup> Australia lags behind other developed economies in terms of percentage improvement, particularly in recent years (2008-16)

## Emissions and energy productivity targets

Reducing gas use and incentivising fuel shift towards alternative energy sources could also make a significant contribution to national emissions reductions and energy productivity improvements as shown in Figure 2. Such measures could achieve 186 to 234 PJ of final energy savings, more than half of Australia’s national energy productivity target to 2030. They could also deliver 7 to 16 MtCO<sub>2</sub>e abatement, meeting up to 12 per cent of the abatement required to meet Australia’s current 2030 emissions reduction target<sup>4</sup>. A range of potential contributions are possible due to the various options for fuel shift – if all gas is replaced by grid electricity then it will not deliver any emissions reductions, given the expected emissions intensity of electricity by 2030. However, gas replaced by renewable electricity, solar thermal energy or bioenergy will deliver strong emissions reductions.

Figure 2: Potential contribution of demand reductions to emissions and productivity targets



<sup>4</sup> Based on ClimateWorks analysis of the emissions reduction that could be delivered by existing or committed policies and the gap between this and the emissions reduction required to meet Australia’s current 2030 emissions reduction target (26 per cent below 2005 levels)

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## 5. Government action is needed to support reduce demand

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Research by ClimateWorks Australia has shown that despite increased recognition of the merits of energy efficiency improvements and fuel shifting, a number of barriers constrain implementation. ClimateWorks' previous research includes two projects that considered energy efficiency opportunities and barriers to their implementation. The first looked at the industrial sector and included extensive engagement with industrial companies with large energy use (Climateworks 2013a). Recent conversations with similar companies confirmed that these barriers remain relevant today despite strong increases in energy prices. Given findings of the second project, which looked at the building sector (ASBEC 2016), it is clear that barriers are not limited to price or payback periods. The barriers are creating market failure, even where not predominantly price related. Government action can reduce barriers through a range of public policy measures and increase uptake of opportunities with multiple benefits to society. Without additional policies or initiatives, uptake of these opportunities will be limited.

ClimateWorks identified barriers to the uptake of opportunities in three broad categories:

- company capability – the ability or capacity of the organisation to identify and implement opportunities
- project attractiveness – the relative attractiveness of the project considering costs, benefits and risk
- company motivation – a company's interest in implementing a project beside consideration of the financial merits.

These categories are overlapping and interconnected and act as a high-level summary of a complex issue. The categories do not occur in isolation, and individual barriers interact with barriers in other categories. For example, non-pricing barriers are allocated under company motivation, but they interact strongly with a project's attractiveness. The relevant barriers for the industry and building sectors are discussed below in more detail, along with the policy frameworks and potential government interventions that could address them.

The most important step is to **give all energy users confidence in long term policy stability**. This will ensure signals and incentives facilitate appropriate long-term investments.

All businesses require confidence in policy direction – for both energy and emissions policies – to make long term investments. A favourable investment environment could be achieved through:

- Improved transparency of gas markets so that gas users have better information around current gas prices and therefore more robust forecasts of future gas prices. The Gas Market Reform Group established by COAG Energy Council and follow up work through the Australian Energy Market Commission is an important start.
- Bipartisan, long term emissions reduction target for Australia of net zero emissions by 2050. This is in line with the Climate Change Authority's recommended carbon budget and the Paris Agreement, and is consistent with net zero emissions goals by most states and territories.

## Unlocking opportunities in industry

**There are a range of price and non-price barriers that deter businesses from unlocking energy efficiency and fuel shift opportunities.**

ClimateWorks' previous research on industry energy efficiency found price was a major barrier to unlocking opportunities – with emphasis on the payback period for investment. However our analysis showed that even where an investment would have a short payback period there were still barriers that prevented implementation of energy efficiency and fuel shift opportunities. Barriers included:

- **Lack of access to appropriate capabilities**, including skills, information and expertise. Clearly if a company does not know of the benefits of particular opportunities and lacks the capability to implement them, uptake will be low. This may be because of an absence of internal capabilities or through not knowing how to access trusted and competent external sources.
- **Competition for or lack of access to internal capital**. Even if an opportunity has an attractive payback period, it will not be taken up if the business case for energy efficiency and/or fuel shift opportunities is less attractive than other potential investments.
- The **operational risks** associated with projects using relatively novel technologies (at least to Australia). Some opportunities may require forms of procurement or energy contracts that the company has not used before. This increases the perception of risk and uncertainty.
- Low priority given to improving energy productivity within a company will affect the likelihood it invests in energy efficiency or fuel switch opportunities. The fact that energy efficiency improvements are often not considered to be core business, and compete for attention with multiple other issues, can lead to a **lack of motivation** for businesses to take up opportunities.
- This low motivation may be made worse by a **lack of long term national energy policy** and poor visibility of future energy prices, leading to inertia in response to both market and policy uncertainty.

**Further government action is required to overcome these barriers and support industry to unlock the range of opportunities available. Governments can build upon existing policy frameworks to deliver the support that is needed through the NEPP, the ERF as well as policy at the state level and programs by the CEFC and the ARENA.**

Further policy and initiatives at the national level are required to supplement the small number of state-based programs to support energy efficiency and fuel shift in industry. There are national policy frameworks in place that could form the basis for reducing gas demand while bringing multiple benefits. However at present, the policies within these frameworks are not unlocking the substantial opportunities for energy efficiency or fuel shifting opportunities in industry. Additional policy for industry is needed to:

- build capacity and incentives for best practice in energy management and procurement
- provide support to companies to help alleviate financial constraints (where this provides a wider public benefit)
- decrease risks related to companies being early adopters in Australia of emerging technologies and practices
- encourage business motivation, perhaps through mandatory requirements or targets.

In order to encourage long lasting and continuous improvement, it is important to start by establishing a good knowledge base and systems for businesses. Of particular note is good understanding of energy use and energy savings opportunities, setting up energy data monitoring systems and developing the right energy management practices.

A number of states have programs to provide information and advice to energy practitioners – including the Energy Saver program in NSW, the Boosting Business Productivity program in Victoria, the Business Energy Savers Program in Queensland and the Tasmanian Energy Efficiency Loan Scheme. These include energy assessments or audits for businesses which can identify the most appropriate opportunities to reduce energy use but currently tend to have a greater focus on electricity.

The National Energy Productivity Plan (NEPP) also provides a framework well-suited to the introduction of additional policy to build capacity in industry. A number of measures in the plan could be strengthened and resourced to address the identified barriers.

For instance, ClimateWorks' analysis showed businesses with good practice energy management were 2-3 times more likely to implement cost-effective opportunities than their peers. This included regularly analysing energy data, incorporating energy management into policies and operational guides, and having oversight from senior managers.

Encouraging good practice in energy management could be supported through skills and information programs, certification programs or initiatives that support knowledge sharing. For example, governments at state or national level could incentivise energy monitoring and reporting and best practice energy management (such as ISO50001) or support selected businesses to implement such systems. Other initiatives such as increased benchmarking of energy productivity performance could also help businesses understand how they compare to their peers. The NEPP recognises the need for such interventions, but resourcing of these measures is currently limited.

Support to reduce financial constraints could be provided through a variety of programs including matched funding, loans or innovative financing to improve the attractiveness of energy efficiency and fuel shift projects. This in turn could facilitate access to further capital. Such incentives can have substantial benefits. As noted previously, through the NSW's Gas Efficiency Funding Program, \$1.5 million of government funding was matched with \$7.5 million from participating businesses, a 1:5 ratio.

The Emissions Reduction Fund (ERF) also has the potential to unlock opportunities to reduce gas demand by providing additional financial incentives. The ability to generate ERF credits for reducing emissions includes projects to reduce industrial energy use - through energy efficiency or fuel switching. However, although industry is technically eligible, businesses have submitted few projects, probably because the price of the ERF credits is not high enough to strongly incentivise relevant activities and transaction costs are high. As of early November 2017 there are 34 accredited ERF projects that address industrial energy efficiency out of nearly 700 – and about 2 per cent of the abatement purchased (CER 2017). Improving the financial attractiveness and accessibility of ERF credits could help increase this take up.

Some jurisdictions have programs in place that encourage energy efficiency through obligations on energy retailers to meet energy efficiency targets. These obligations lead to the creation of energy efficiency certifications which can provide additional financial incentives to project proponents. Programs include the Energy Savings Scheme (ESS) in NSW, the Victorian Energy Upgrades (VEU), South Australia's Retailer Energy Efficiency Scheme (REES) and the ACT's Energy Efficiency Improvement Scheme (EEIS). These programs support the implementation of relevant opportunities in industry, but their scale and scope is currently small. NSW's ESS was expanded recently to include large commercial and industrial opportunities - to replace the Gas Efficiency Funding grant scheme. Victoria and ACT's schemes cover multiple opportunities for residential and small businesses, but have few eligible projects for industry. Victoria has instead introduced a grant-based program – Gas Efficiency Grants. These energy efficiency schemes could be expanded to cover further industrial projects. Where the schemes include tradeable certificates, additional measures would also be required to increase demand in order to maintain the value of the certificates, such as increasing the ambition of the targets for energy efficiency.

At the federal level, agencies such as ARENA and CEFC could have a role in providing financial assistance to early stage technologies and processes. Their work could also help overcome risk-related barriers to their adoption through demonstration or pilot programs. These can communicate the benefits of new technologies or processes and address business' concerns around the risks associated with them. The technologies that can deliver significant reductions in gas use are often developed overseas and not readily available in Australia, particularly in the case of shifting from gas to alternative fuels. This can sometimes translate into a lack of access to appropriate expertise or into procurement challenges. In order to overcome this, businesses could be provided with assistance to import and trial new technologies, helping industries understand and overcome the risks associated with adopting these technologies. Information or demonstration programs could also assist businesses to understand procurement processes required for new feedstocks or energy sources.

In the past, some policies have created mandatory requirements for energy performance of large energy users including the EEO. The EEO was found to drive improved energy efficiency by reducing barriers to the uptake of energy efficiency opportunities (ACIL Tasman 2013). The Safeguard Mechanism – part of the ERF – could be amended to have a similar impact given it caps emissions of large energy users and creates obligations for new facilities. At present the baselines set under the Safeguard Mechanism do not change and therefore do not create incentives for improvement unless companies are experiencing a strong growth in production. The baselines could be amended to reduce over time. Declining emission baselines would be expected to incentivise energy efficiency and fuel switching for large emitters and energy users.

## Unlocking opportunities in buildings

### **A range of price and non-price barriers inhibit unlocking energy efficiency improvements and shifting to electrical appliances in buildings for households, businesses and developers.**

A wide range of opportunities can further improve energy efficiency in residential and commercial buildings that also often deliver net financial benefits. These include improvements to the building itself, more efficient appliances and equipment and improved building management. Also electric alternatives for gas-using appliances, especially space and water heating, are usually more efficient than existing appliances. However along with any additional capital cost of these opportunities, there are a variety of barriers to uptake of energy efficiency improvements and shifting to electrical appliances – as for industry. For the building sector, the opportunities for new buildings are often highly cost effective, the opportunities in existing buildings may be less marked. The barriers include:

- **Lack of capacity or capabilities** to identify and implement energy efficiency measures. This is most notable for existing buildings particularly amongst low income households and small businesses, but also for small scale developments – for example single buildings. Their ability to access information (especially appropriate energy data) and expertise may be limited or considered too time consuming with too much uncertainty of benefits. And because the relative price of technologies is changing rapidly it can be hard to keep up-to-date.
- **Attractiveness of opportunities** depends not only on whether the opportunity itself makes economic sense but also on the rate of return and certainty about future costs. And where businesses have long term deals below the market price (for example for large commercial building portfolio owners), the business will not recognise the full cost effectiveness of energy efficiency and fuel shifting opportunities.

- **Competition for or access to internal capital**, as for industry, may not be funded if the business case for energy efficiency and/or fuel shift opportunities is less attractive than other investments.
- **Supply chain issues** – to install or maintain new products will mean developing new supply chains. And the relevant technologies and methods are less developed within Australia than elsewhere in the world, with resulting restricted markets. This applies across the construction, renovation and maintenance industry, as well as for equipment and appliances. This tends to reduce motivation, and can make products more costly until they become widely deployed.
- Building owners and developers may **lack motivation** to install energy efficiency measures and shift fuel use due to split incentives, where building owners need to spend while tenants receive the benefits. The current rules of the electricity market also create restrictions on how developers can financially benefit from investments that are higher cost but profitable in the long term.

### Existing policies can be built upon to encourage building owners to shift towards greater uptake of energy efficiency opportunities and electrical alternatives to gas.

Building energy performance has improved substantially in new buildings due to increased energy efficiency, improvements across the building sector as a whole has been less marked (ClimateWorks 2014). Australia lags behind comparable countries. Existing policy frameworks have the ability to deliver better outcomes for the Australian economy through unlocking cost-effective opportunities. Opportunities for improved energy efficiency and fuel switching could be unlocked by:

- strengthening energy performance requirements in the National Construction Code and introducing a long term trajectory to guide future updates
- incentivising improvements to existing buildings through building rating systems and additional information for building tenants when they buy or lease
- strengthening Minimum Energy Performance Standards (MEPS) and mandatory labelling, and establishing a more streamlined and faster process for MEPS updates. This could include broadening the standards to consider electrification opportunities and comparisons across classes of equipment that provide the same service (for example all types of space heaters)
- decrease risks related to companies being early adopters in Australia of emerging technologies and practices
- providing financial incentives where market distortions are preventing the implementation of cost-effective opportunities – for instance installing energy efficiency measures in existing buildings that would otherwise be limited due to split incentives
- improving energy data, information and education for homeowners, renters, commercial building owners and tenants.

Due to the long-lived nature of buildings, making sure new buildings are as efficient as possible ensures long-term benefit. Standards can be highly effective in mandating minimum performance improvements because they address market failures such as split incentives and information asymmetry. Existing new building standards meant the required energy performance of new commercial offices was a third better than offices built ten years previously (ClimateWorks 2013b). The move towards 5-star homes delivered an average 7 per cent reduction in emissions for new homes (ASBEC 2016). Analysis by Pitt&Sherry indicate that tighter minimum energy performance standards for new buildings could be increased cost effectively by 68 per cent in commercial buildings by 2020, and by 16 per cent for residential (2012). Improvements to commercial building standards are expected to be agreed in 2018 and governments should introduce further improvements for residential buildings.

States and territories improving enforcement of compliance would be a useful complement to improve standards, in light of research showing that poor compliance with existing regulation is likely to be widespread (State of South Australia 2014).

Ongoing improvements for energy performance standards in new buildings should be set according to an ambitious long-term trajectory, in commercial and residential sectors. Setting forward policy well in advance encourages the sector to be innovative and implement best practice. A long-term trajectory could also guide future ambition of building rating systems, such as Green Star and NABERS which incentivise developers who go beyond the minimum standards. Ratings, and additional information at the point of sale or lease help owners and occupiers recognise the benefits of higher energy performance.

Improvements in building practices for new buildings will flow on to existing buildings, but further efforts are required to make the most of opportunities available. States and territories can encourage improvements for existing buildings through voluntary or mandatory information requirements, or other measures of energy performance.

Additional support for research, development and commercialisation could also be provided at the state or national level. This could include demonstration or pilot projects accompanied by information programs to reduce risks for early adopters of technologies new to Australia.

Improvements to buildings themselves could be supplemented with broader consideration of Minimum Energy Performance Standards (MEPS) to include electrification opportunities, as well as support programs to facilitate access to high efficiency appliances. Standards for appliances and equipment are be effective in overcoming low motivation or capability issues amongst consumers. The 2015 review of the Greenhouse and Energy Minimum Standards (GEMS) program indicates that Australian standards lag behind other countries and behind latest technological developments (DIS 2015). As of late 2017 work continues to implement revisions to these standards.

Financial incentives are also required, particularly amongst low income households or to accelerate the uptake of newer, more efficient technologies, such as electric induction cooktops. Ideally, these should be targeted at strategic upgrade opportunities in the building lifecycle, such as design, construction, installation or replacement of appliances and insulation. As identified above, a number of state programs, such as NSW ESS, Victoria's VEET and ACT's EEIS, are in place which provide financial incentives through white certificates for energy efficiency retrofits in residential and commercial buildings. Beyond these white certificate schemes, other incentive mechanisms that could further leverage existing drivers and elevate the priority of energy efficiency and fuel shifting opportunities amongst homeowners, renters, commercial building owners and tenants. These include energy retailer financed improvements, stamp duty concessions or green depreciation, green doors or planning incentives, rates and charges relief, and density bonuses (ASBEC 2016).

To overcome the complexities and opacity of energy consumption information for homeowners, renters, commercial building owners and tenants, improvements are needed in energy data, information and education. Improvements are required to facilitate better access to energy data for consumer and third party service providers. This could support education and awareness by increasing understanding of current energy consumption patterns, and identify areas for improvement.

## Government support can unlock this big solution

Government interventions to support industry and the building sector to reduce gas demand can help get Australia onto a pathway to net zero emissions, create energy savings for businesses and households and improve energy security and productivity. Energy efficiency and fuel shifting are a big solution that can create a win-win for businesses, households and the nation. The policy frameworks are in place, now is the time for governments to ensure the programs, and the measures to implement them, will make the most of the opportunities available.

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## About us

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### ClimateWorks Australia

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ClimateWorks Australia is an expert, independent adviser, acting as a bridge between research and action to enable new approaches and solutions that accelerate Australia's transition to net zero emissions by 2050. It was co-founded in 2009 by The Myer Foundation and Monash University and works within the Monash Sustainable Development Institute.

Since launch, ClimateWorks has made significant progress, engaging key decision makers from all tiers and sides of politics and business. Their collaborative, end-to-end approach to solutions that will deliver greatest impact is informed by a thorough understanding of the constraints of governments and the practical needs of business. This, combined with philanthropic funding and university ties, has earned the organisation an outstanding reputation as a genuine and impartial adviser.

In the pursuit of its mission, ClimateWorks looks for innovative opportunities to reduce emissions, analysing their potential then building an evidence-based case through a combination of robust analysis and research, and clear and targeted engagement. They support decision makers with tailored information and the tools they need, as well as work with key stakeholders to remove obstacles and help facilitate conditions that encourage and support Australia's transition to a prosperous, net zero emissions future.

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