

Fact sheet: Energy efficiency

How Australia can decrease its energy costs using existing technologies



Implementing energy efficiency actions below \$32/tCO₂e could avoid in 2020 the equivalent of the generation in VIC or QLD today

In the Low Carbon Growth Plan for Australia (2010), ClimateWorks Australia identified 54 opportunities to reduce greenhouse gas emissions within Australia that enable to reach a 25% reduction on 2000 levels by 2020 at an average cost equivalent to \$185 per household per annum. The most cost effective of those opportunities relate to energy efficiency, which we define as ways to cut energy use without affecting industry mix and output, or people’s lifestyle.

Implementing all the energy efficiency opportunities below \$32/tCO₂e could lead to a 20% reduction in electricity generation in 2020, or 60TWh (Figure 1). This is equivalent to around 8000 MW of base-load generation capacity, or more than the generation from Victoria or Queensland in the year ending June 2009. Based on capital cost estimates for coal base-load power plants from the Low Carbon Growth Plan, this corresponds to avoided capital cost of around \$15 billion, more than the total investment needed to implement all commercial buildings retrofit opportunities.

Electricity generation in 2020, TWh

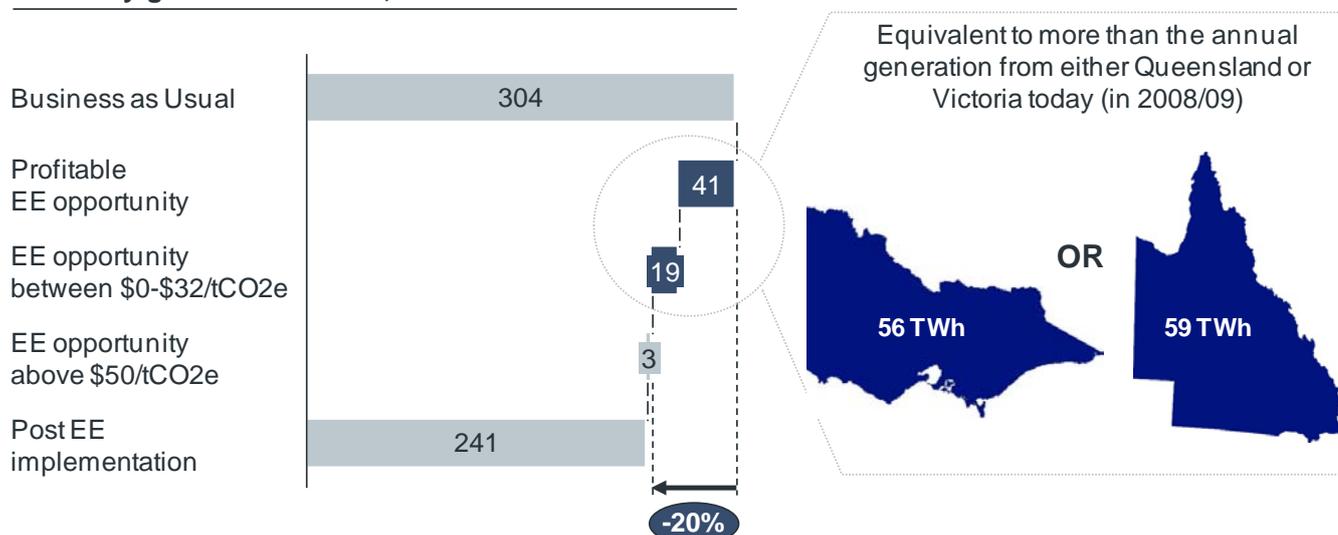


Figure 1 - Impact of implementing energy efficiency opportunities on electricity generation in 2020 (2010 estimates)

In addition, implementing energy efficiency opportunities could allow electricity generation in Australia to stabilise in this decade without any change in output or behaviour for households and businesses (Figure 2). This should enable a decrease in the expansion of the transmission and distribution network, especially if energy efficiency measures are targeted at decreasing peak demand. Given that recent electricity price increases have been mostly driven by increased network costs, this should in turn enable to slow the increase in electricity price expected for the coming years.

Electricity generation, TWh

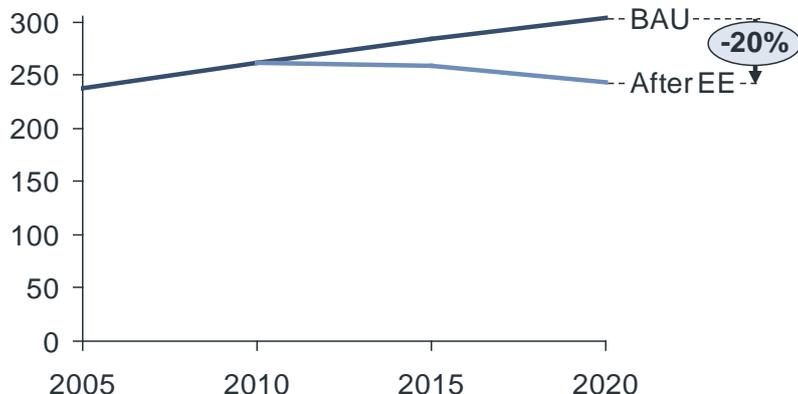


Figure 2 - Impact of implementation of energy efficiency opportunities below \$32/tCO_{2e} on Australian electricity generation

A third of this opportunity would be lost if action is delayed until 2015

As explained in the Low Carbon Growth Plan for Australia 2011 update report, most of the 54 emissions reduction opportunities will be affected by delays. For example, in the absence of the right incentives, new cars with lower fuel efficiency than required by the Low Carbon Growth Plan will be bought. Given that cars stay on the roads for 20 years on average, the potential emissions savings corresponding to upgrading those cars are lost for 2020. In these cases extra emissions are locked-in that cannot be caught up by 2020. The full explanation of ClimateWorks’ methodology to compute the impact of delay can be found in the 2011 update report available at www.climateworksaustralia.org.

In the last 12 months, this analysis shows that Australia has already lost 2.0 TWh of potential electricity savings. If Australia delays action further, this loss will increase exponentially. Figure 4 shows the results of ClimateWorks modelling in the case of a “do nothing” scenario, with a stable BAU over the next four years—where forecast 2020 emissions would not continue to rise, but nor would they fall. If action is delayed until 2015, the missed opportunity in reduced electricity demand corresponds to more than the generation from South or Western Australia in the year ending June 2009.

Electricity savings potential from energy efficiency, TWh

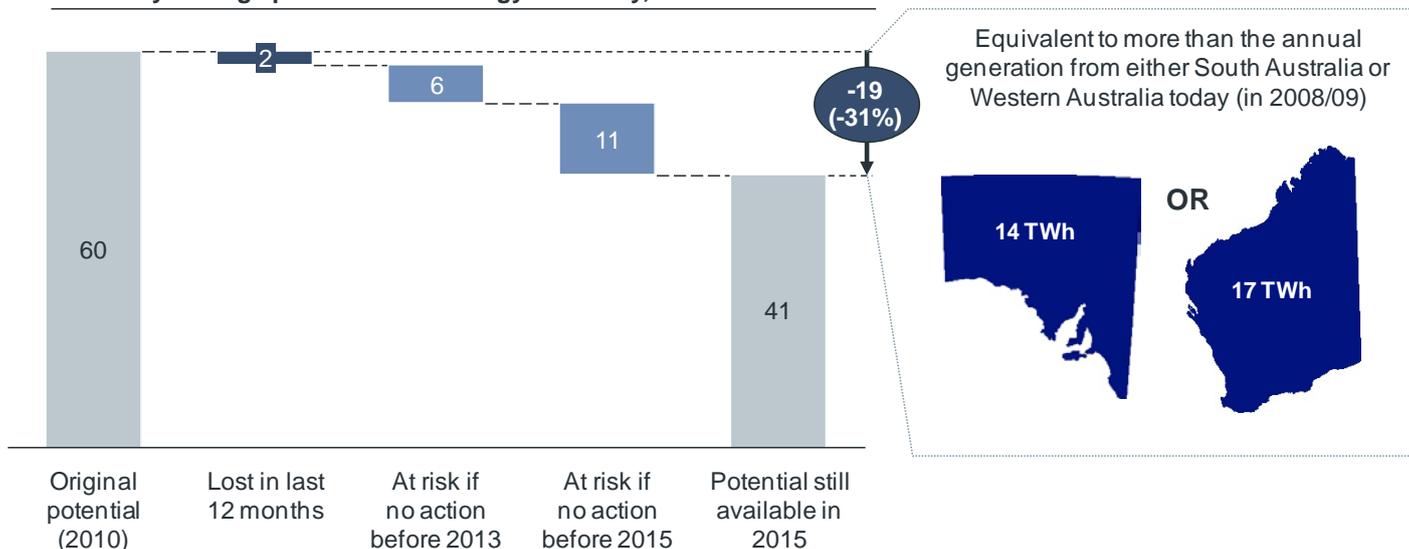


Figure 3 - Impact of delay to action on potential savings from energy efficiency opportunities below \$32/tCO_{2e}

Appendix – What is energy efficiency?

In the Low Carbon Growth Plan for Australia (2010), ClimateWorks Australia identified 28 opportunities to reduce greenhouse gas emissions within Australia through energy efficiency, adding up to 69MtCO₂e abatement potential.

All the energy efficiency opportunities were estimated assuming no reduction in lifestyle or economic activity, i.e.:

- Exclude changes in business mix (e.g. shifting mix of economy from manufacturing to service industries)
- Exclude changes in lifestyle (e.g. driving less)

2020 GHG emissions reduction investor cost curve in 2010

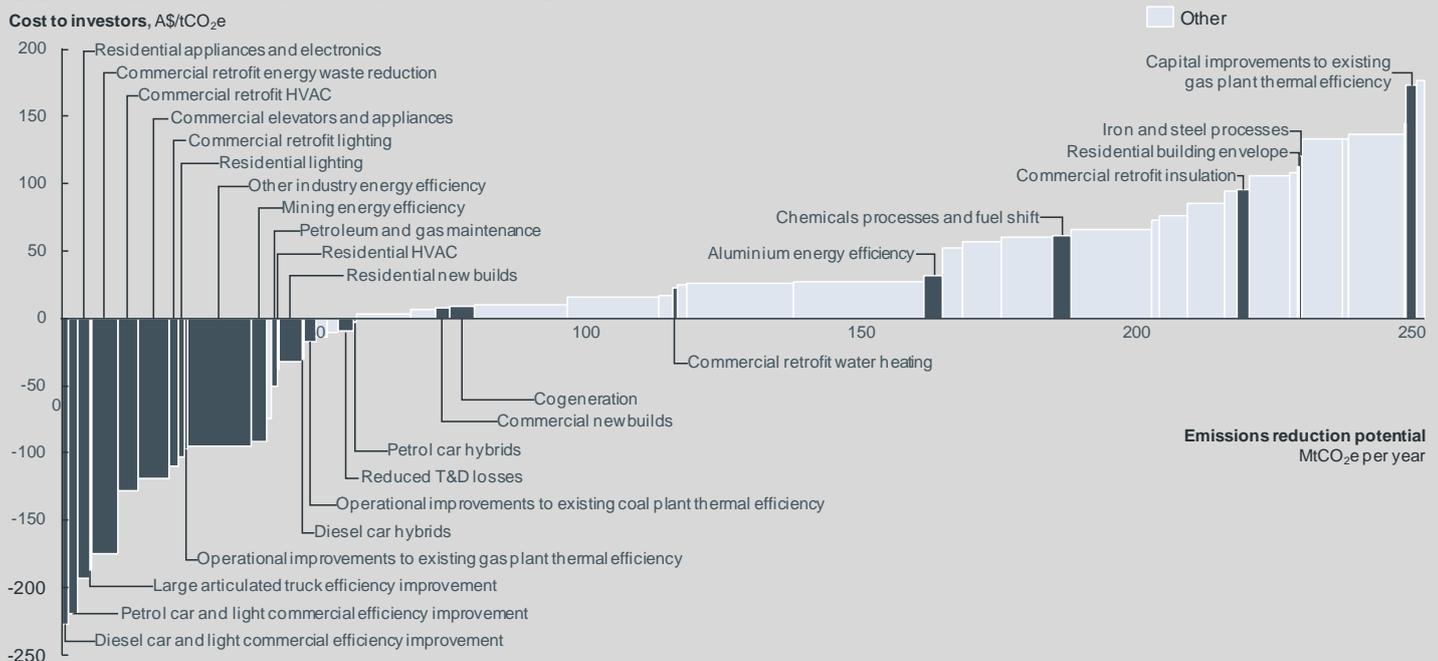


Figure 4 - Energy efficiency opportunities identified in the Low Carbon Growth Plan for Australia

Description of the energy efficiency opportunities

The energy efficiency opportunities span across four sectors:

➤ Commercial buildings

- **New builds.** Improved building design and orientation, improved insulation and air tightness; usage of better materials and more efficient HVAC and water heating systems.
- **Improved efficiency through technology.** Includes actions such as replacing inefficient light bulbs, improvement energy efficiency of all appliances and equipment, but also decreasing energy losses experienced with open refrigeration, insufficiently insulated ovens or water mains. Implementing or upgrading control systems for lighting and HVAC systems can also reduce fixed energy use, especially in subsectors such as offices or hotels.
- **Energy waste reduction.** The cheapest opportunity in existing buildings is in reducing energy waste, which includes actions such as reducing oversized and unnecessary equipment and better management of existing controls systems.

➤ Residential buildings

- **New builds.** Upgrading new homes to 7.2 stars in the HERS rating system (compared to 4 and 5 stars for NSW and other states in the current standards).
- **Small equipment upgrade.** Other major opportunities include the replacement of CFL light bulbs by LEDs and the increase of appliances and equipment efficiency above current levels.

➤ *Power sector*

- **Improved coal and gas power plant thermal efficiencies.** Better operational practices such as reducing coal moisture, reducing auxiliary power consumption at the plant, and reducing operator variability.
- **Reduced transmission and distribution losses.** Installing larger capacity conductors, installing more reactive power sources, upgrading to low loss transformers, raising distribution voltages, balancing loads, etc.

➤ *Industry*

- **Known technologies.** Major improvements typically include: improved control systems and processes, reduction of duplicated or oversized equipment, upgrade of motor systems, decrease of energy losses in boilers and steam distribution systems, waste heat recovery for pre-heating or other uses, and building utilities.
- **New technologies.** In aluminum smelting, the drained wetted cathode technology could help reduce significantly the consumption of electricity.
- **Cogeneration** (also called combined heat and power or CHP). Provides primary energy savings by creating heat and electricity from the same fuel source (particularly high potential in the Iron and Steel industry).

Economy-wide savings from energy efficiency opportunities

In addition to the electricity savings, the identified opportunities could cut 37 TWh of other fuel consumption, especially from petrol and diesel savings in the transport sector and from direct fuel combustion in the industry sector (see Figure 5). These savings add up to a potential of \$5 billion avoided annual energy costs for Australian households and businesses in 2020.

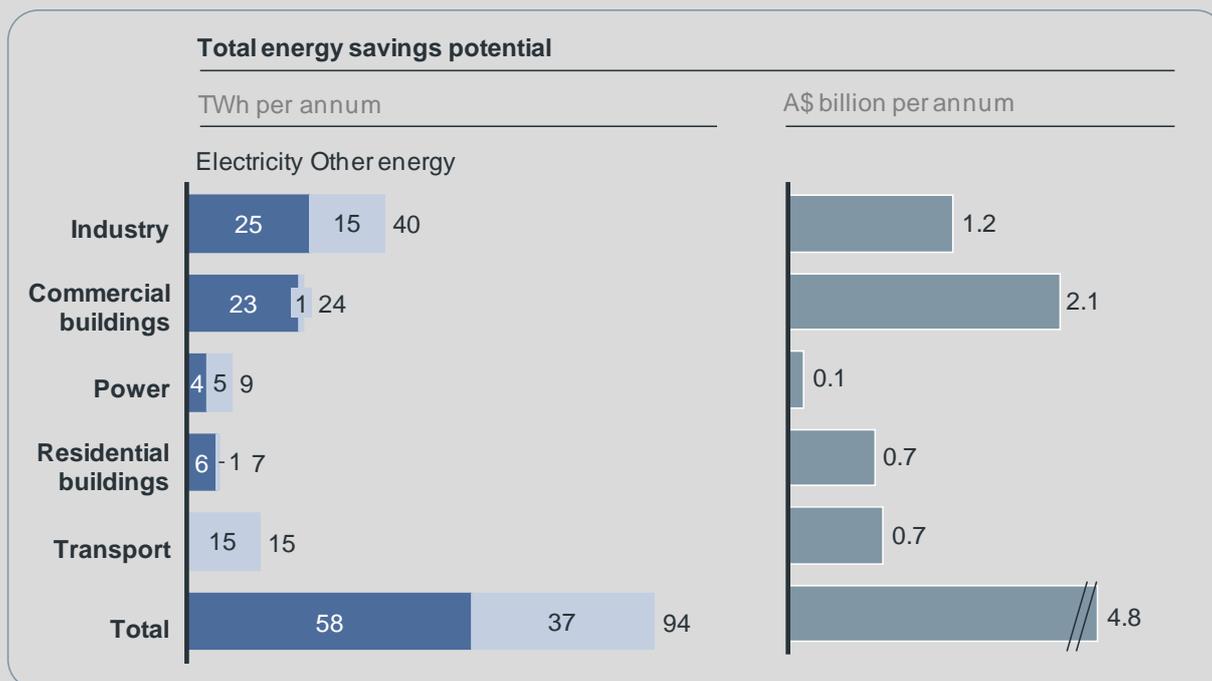


Figure 5 - Savings from energy efficiency opportunities below \$32/tCO₂e (2011 estimates, after one year delay)

Achieving these savings will be easier with access to good data – it will be important in any advancement of energy efficiency programs to also advance data sharing on energy consumption.

This fact sheet as well as the Low Carbon Growth Plan for Australia and its 2011 update can be accessed at www.climateworksaustralia.org

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