

Reverse-cycle Air Conditioners: Australian Renewable Energy Giants

And maybe the cheapest way to heat
your home this winter!



Tim Forcey – University of Melbourne Energy Institute



MELBOURNE
ENERGY INSTITUTE

*Switching off gas -
An examination of
declining gas demand in
Eastern Australia*

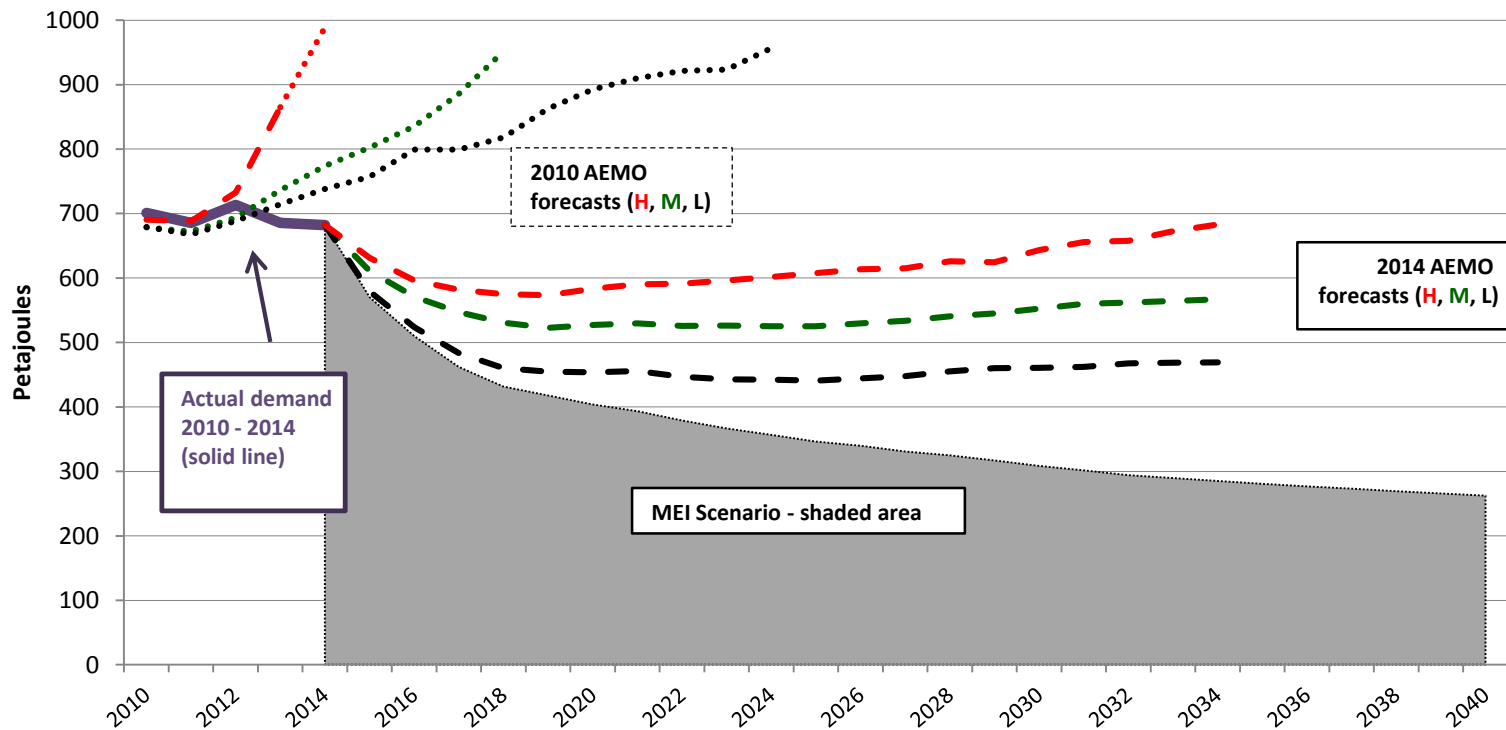
26 August 2015

Tim Forcey - Energy Advisor, Melbourne Energy Institute (MEI)

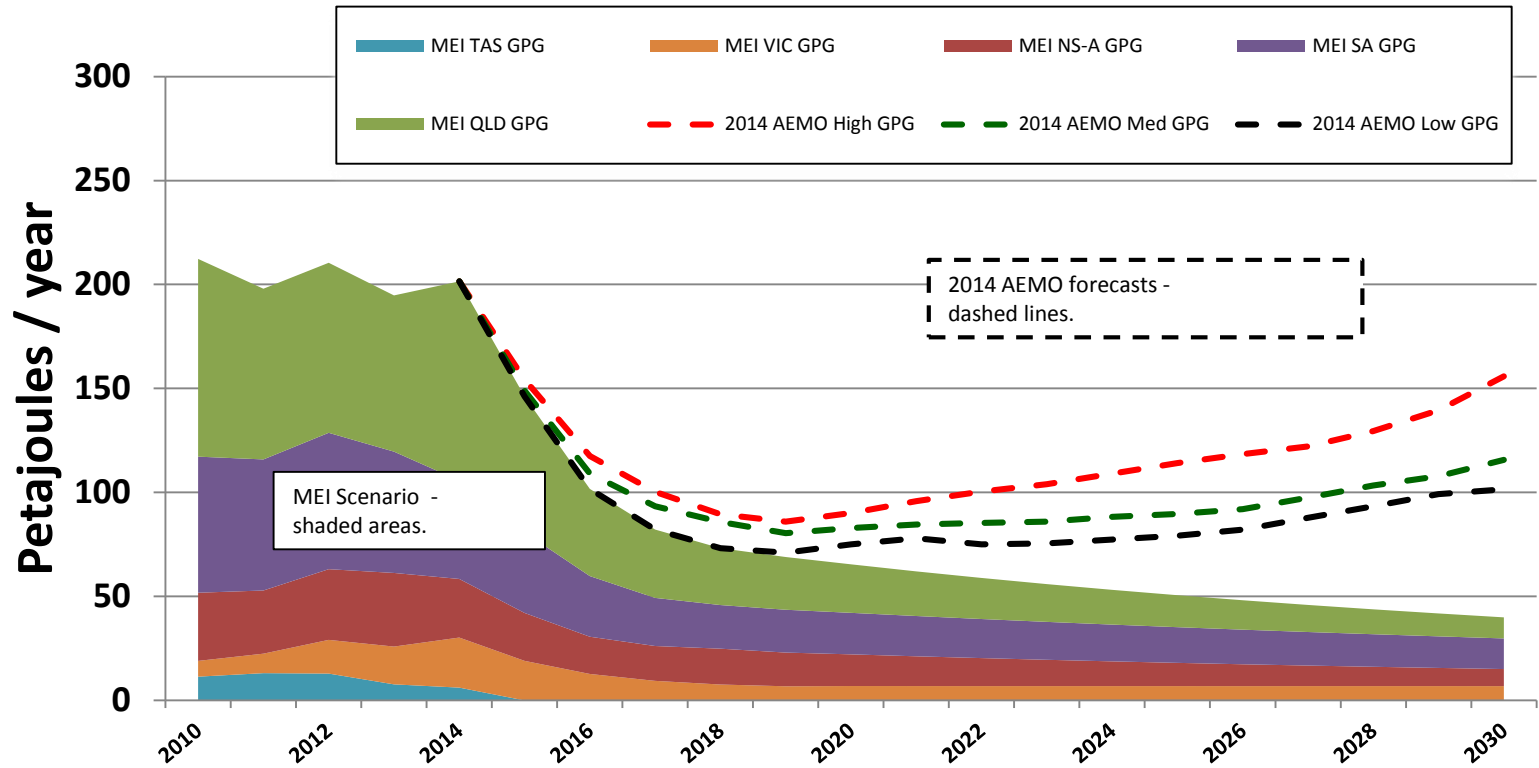


University of
Melbourne
Energy Institute
report

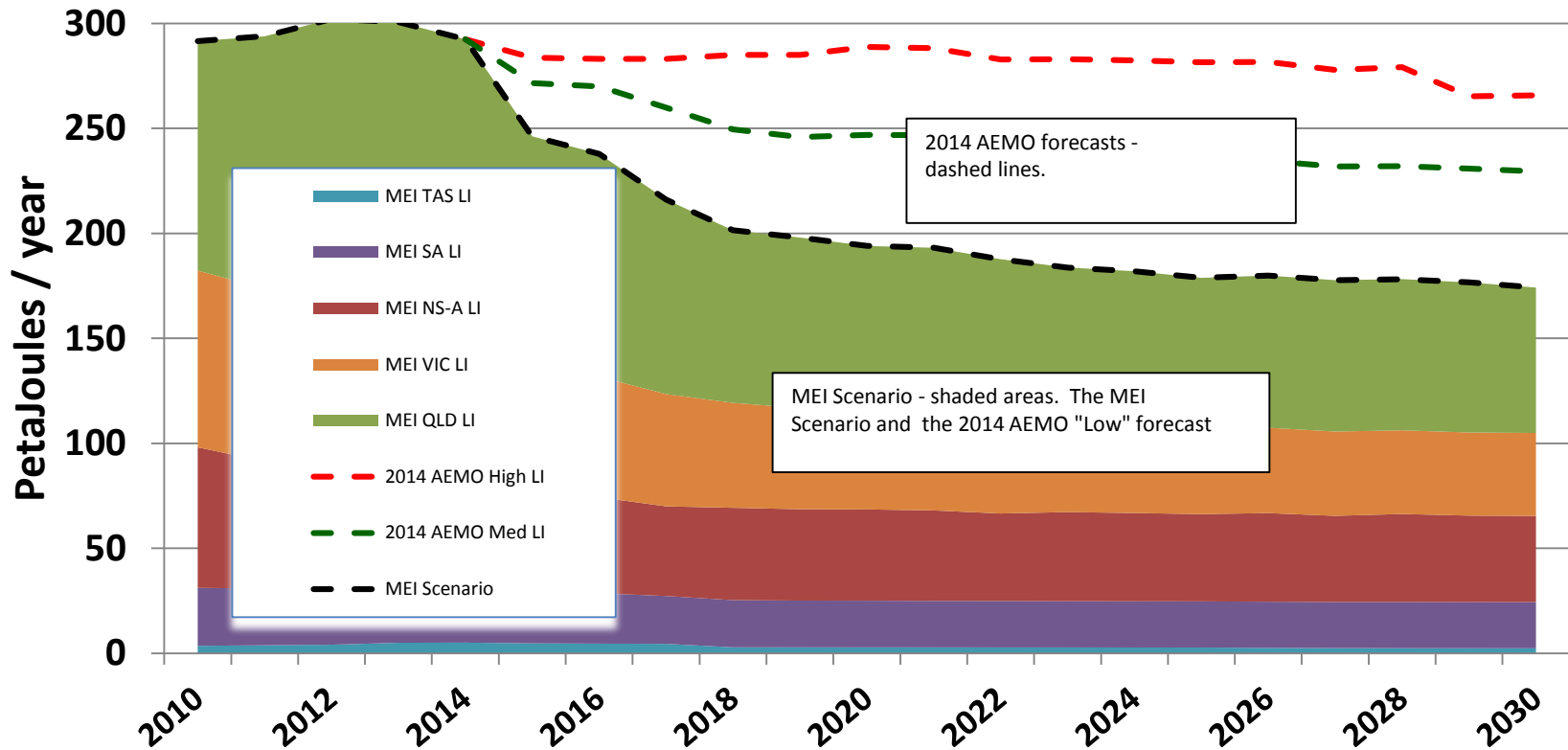
<http://www.energy.unimelb.edu.au/switching-gas---examination-declining-gas-demand-eastern-australia>



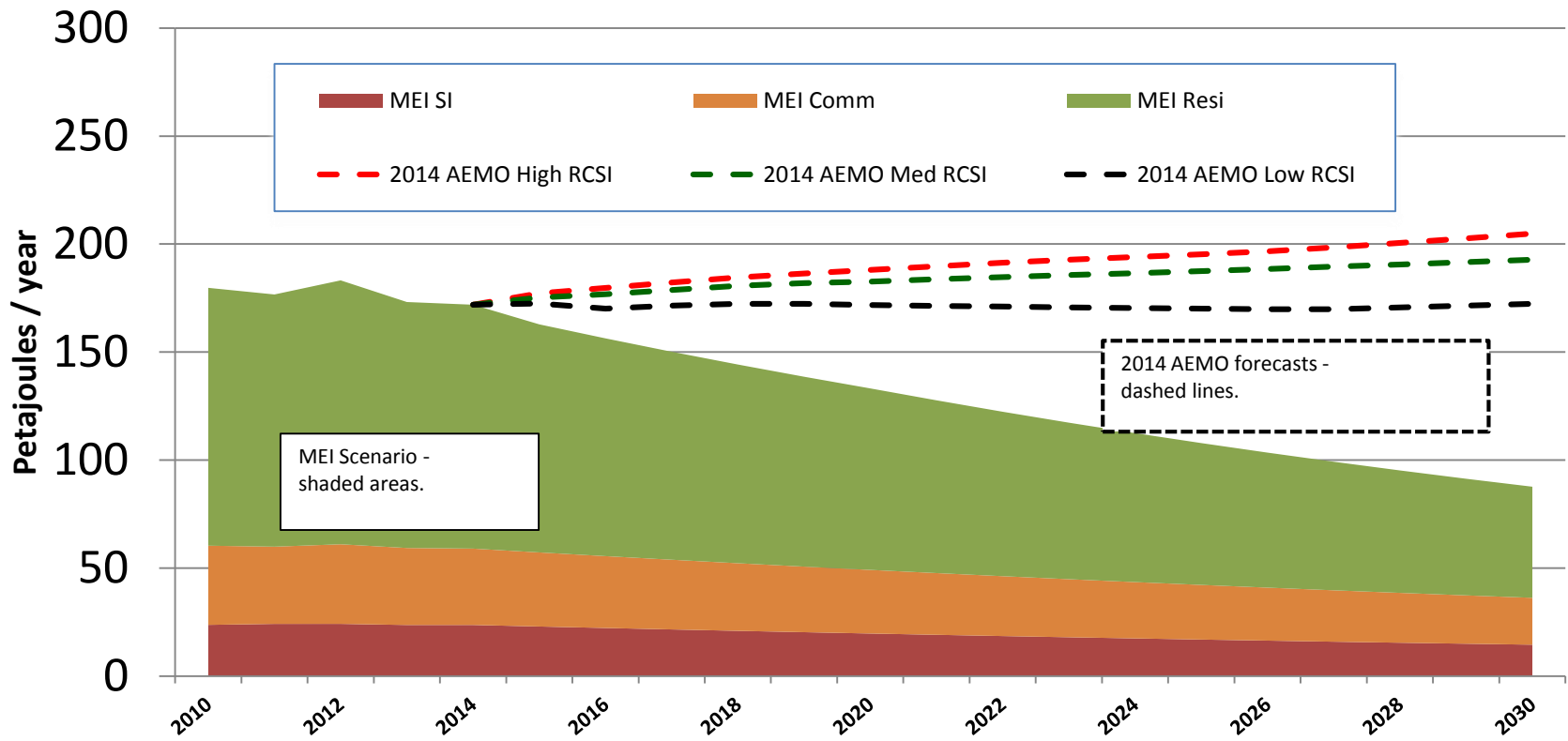
Actual gas demand and scenarios of future demand.



Gas used for electrical power generation, actual and forecasts.



Gas used in the Larger Industrial sector, actual and forecasts.



Gas used in the residential, commercial, and smaller-industrial (RCSI) sector.

You are here: Home » Victoria »

'Heat pump' tech could save Victorian homes up to \$658 a year on gas: report

August 26, 2015 - 6:51AM

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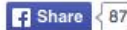


Tom Arup

Environment editor, The Age

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BREAKING NEWS A man's body has been found in the South Esk River in the town of Perth, northern T

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Reverse cycle air conditioners cheaper to run than gas heating, report finds

By consumer affairs reporter Josie Taylor
Updated 25 Aug 2015, 6:43pm

Consumers can save money by making the switch from gas heating to using reverse cycle air conditioners, a Melbourne University study has found.

RELATED STORY: Fact check: Does privatisation increase electricity bills?

RELATED STORY: 2014 was hottest year in modern history: NASA

MAR Melbourne 3000

2 September, 2015 10:23PM AEST

Gas demand peaks as Metgasco-NSW talks fail

By Joanne Shoebridge (ABC North Coast)

The future of the domestic gas industry is being called into question by a new report from Melbourne Energy Institute which forecasts that demand for gas could halve within a decade.

ABC News

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The World Today is a comprehensive current affairs program which backgrounds, analyses, interprets and encourages debate on events and issues of interest and importance to all Australians.

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From the archives

2011 Leuka is now being struck by the country's 28-year-long shift war, in which the 100,000 Tassie cattle may have been about. The report by Dr AJCY Alexander McLeod in 1983 looks at the beginnings of the shift war: the Leuka in 1983.

CLICK PLAY TO LISTEN

PREVIOUS THURSDAY MP3 PREVIOUS WEDNESDAY MP3

The full story...

Vic parliamentary committee to consider viability of onshore gas exploration

Tom Niggins reported this story on Wednesday, July 22, 2015 12:45:03

ELEANOR HALL: To Victoria now where farmers have funded tens of thousands of dollars for research - not into the effects of gas exploration, but into the economics of the industry.

Today the researchers have presented their findings to a state parliamentary committee considering the industry's future.



As seen on: news.com.au



Gas no longer the cheapest way to heat your home

Thursday 27 August 2015



Article by Rebecca Elley

While you may have assumed keeping your home warm through a gas heater was the most economic way, a new report by the Melbourne Energy Institute has found otherwise. The study showed that residents could potentially reduce their heating costs by 70% if they switched from using a gas heater to a reverse cycle air conditioner on heating mode.



FRIDAY SEPTEMBER 4, 2015 NOW: 11.7* MAX:

New report shows 'game changer' to bring down household gas prices

August 26, 2015

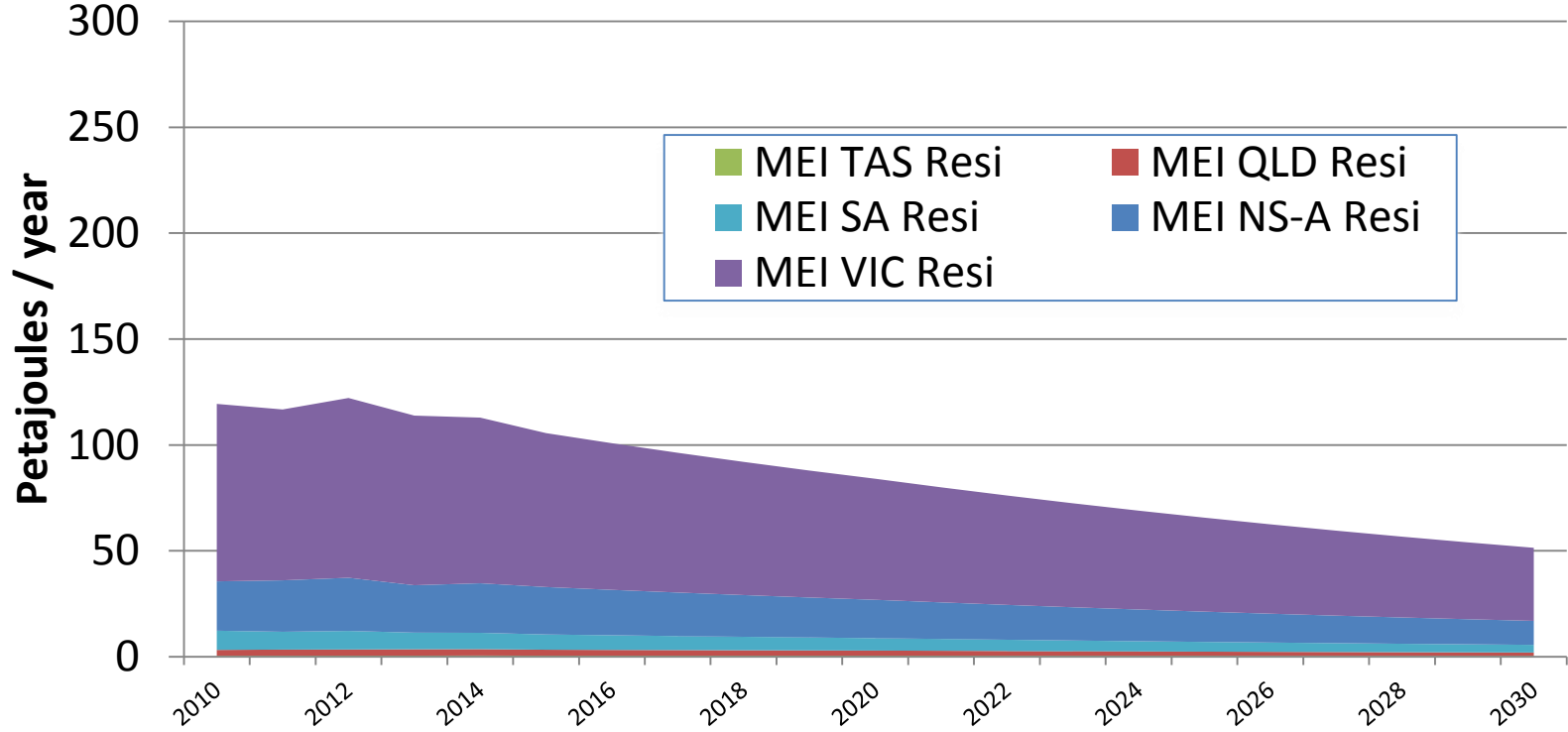
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A new report by the University of Melbourne has a surprise recommendation to save money on gas bills.

Energy advisor at the Melbourne Energy Institute Tim Forcey said using a reverse cycle air conditioner during winter could be a better alternative than gas heating.



Residential gas demand, actual and MEI Scenario.

Capital City		Melbourne	Sydney	Adelaide
Gas	\$/year	\$1,606	\$942	\$1,071
Electricity	\$/year	\$582	\$314	\$554
Savings with electricity	\$/year	\$1,024	\$628	\$517

Running costs for space-heating, water-heating, and cooking are less with electricity (Grattan Institute)



Location	Home Type	Gas space-heating costs (energy- only, excludes fixed supply charges)	RCAC space-heating costs (energy- only, excludes fixed supply charges)	Heating cost savings with RCAC	% savings with RCAC
		(\$/year)	(\$/year)	(\$/year)	(%)
Canberra, ACT	large	\$2,255	\$522	\$1,733	77%
Melbourne, VIC	large	\$1,049	\$391	\$658	63%
Orange, NSW	medium	\$1,370	\$949	\$421	31%
South NSW	small	\$599	\$415	\$184	31%
Adelaide, SA	small	\$180	\$124	\$56	31%

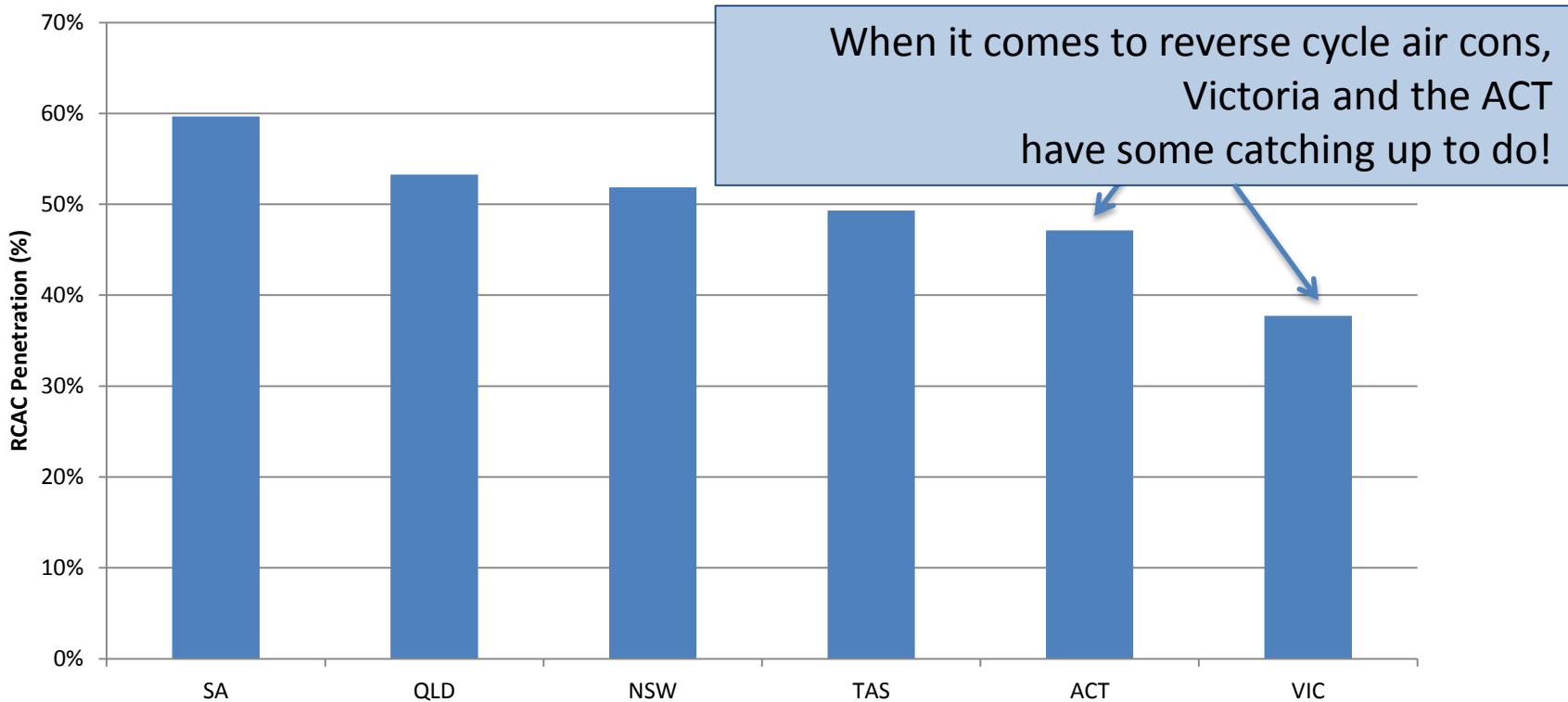
This table lists only five of the 156 region/zone and dwelling-type combinations examined by the ATA.



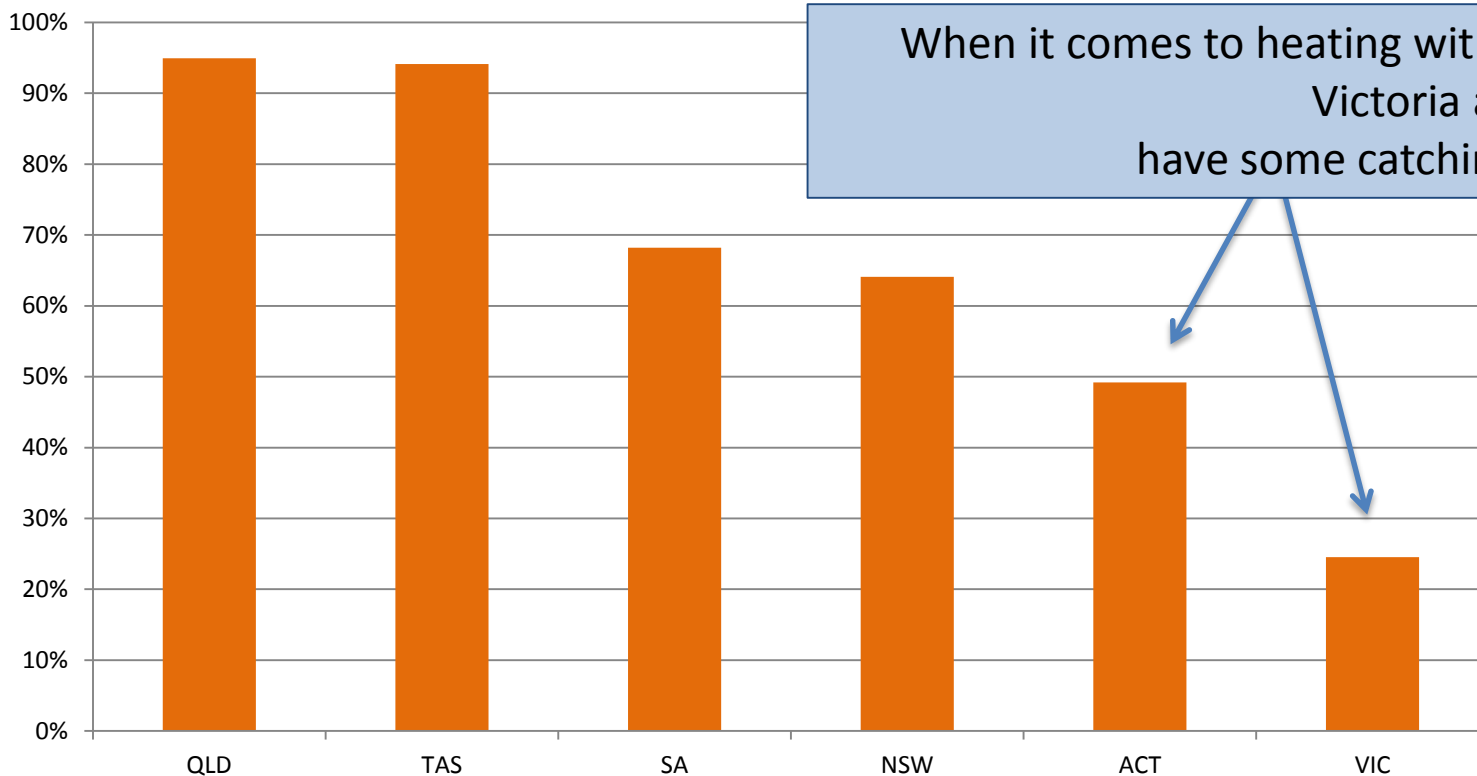
Are we still Cooking
with Gas?

Report for the Consumer Advocacy Panel



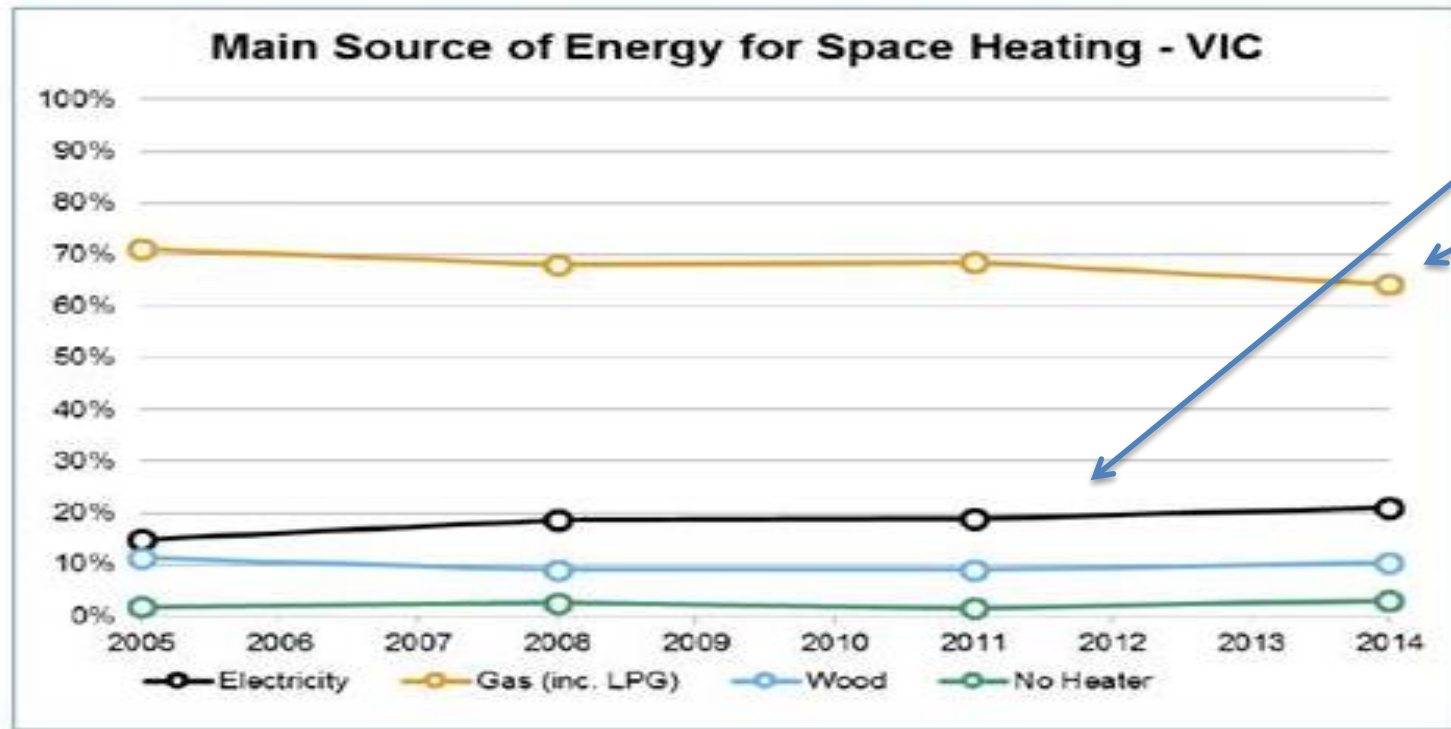


% of eastern-Australian homes with at least one reverse-cycle air conditioner.



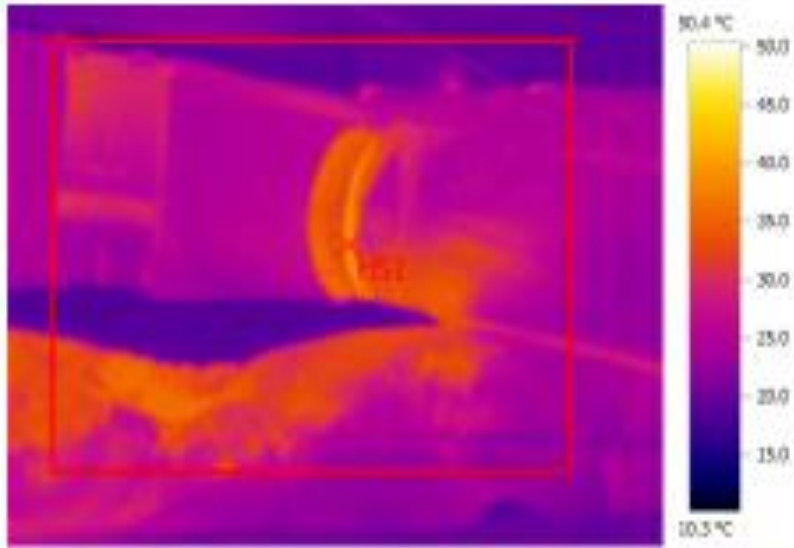
Of those homes using gas or electricity as main way of space-heating,
% that use electricity.

Figure 65: Main source of space heating for Victorian households

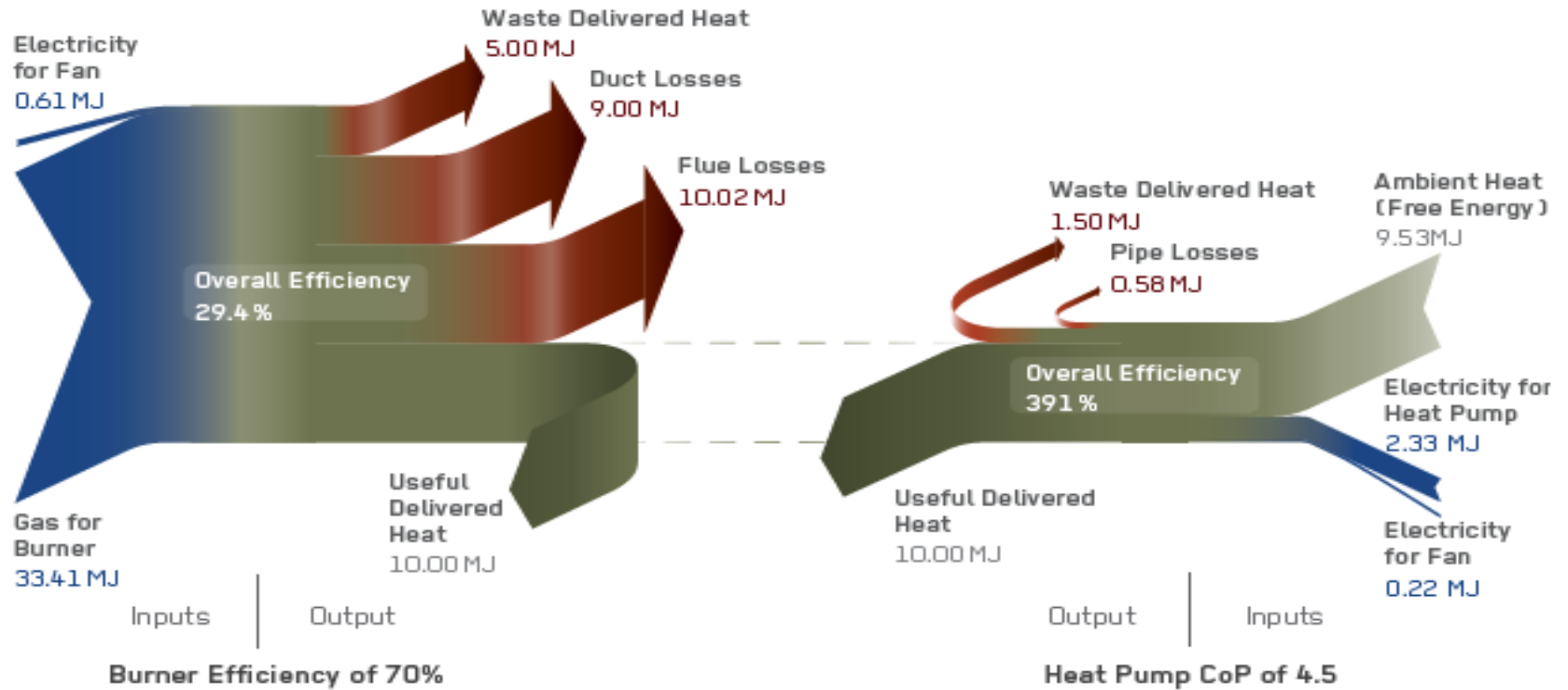


Electricity replacing gas as the main source of heating in Victorian homes. – Oakley Greenwood

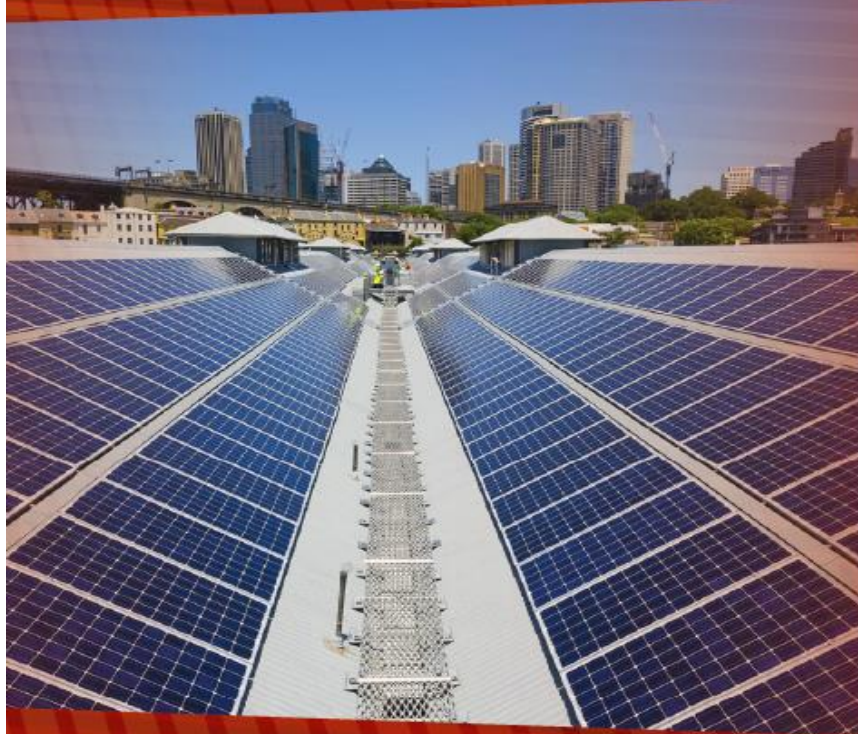
Source: Australian Bureau of Statistics (2014) 4602.0.55.001 Environmental Issues: Energy Use and Conservation, March 2014; Australian Bureau of Statistics (2011) 4602.0.55.001 Environmental Issues: Energy Use and Conservation, March 2011.



Thermal and visual images of **failed** ducted gas space heating.

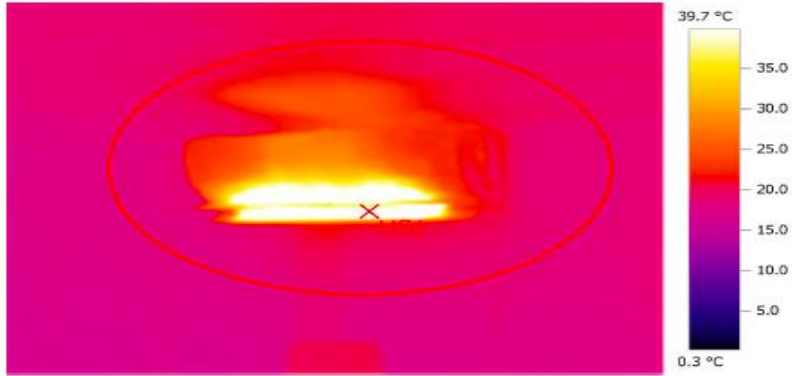


Comparing the performance of ducted gas space heating vs modern reverse cycle air con (heat pump).



Beyond Zero Emissions' zero carbon Buildings plan shows how to operate buildings without gas.

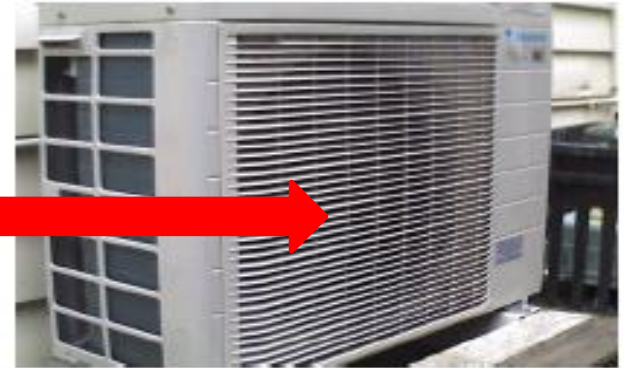
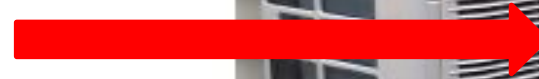
Reverse cycle air conditioner – in heating mode, producing temperatures of up to 50 deg C.



1 part of electricity produces
6 parts of space heating.



5 parts of renewable energy
go in here.



Case Study 5 – Tim Forcey, Melbourne, Victoria

“Home science experiment” detailed in
Renew Magazine, October 2015.

Top-of-the-line 7 star air conditioners
easily beat 20-year-old whole-house
ducted gas, especially when only part
of the house needs to be heated.

Heating costs across the entire winter
reduced to ~ 1/3rd of previous winters.
Savings in this well-insulated home =
\$300 to \$400/year.

<http://renew.org.au/current-issue/comfortably-ahead-a-tale-of-two-heaters>



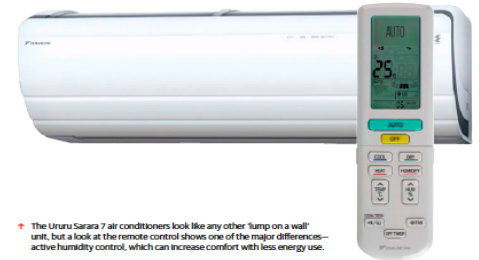
Comfortably ahead A tale of two heaters

Turn on your air conditioner—and knock hundreds of dollars off your heating bill. Tim Forcey describes the learnings (and savings) gained from his experiment with reverse-cycle electric heating.

OVER the last 20 years my wife and I have raised a family in our 100-year-old Melbourne bay-side weatherboard home. Last spring, following our third partial renovation, we installed two air conditioners in preparation for the hot summers to come—particularly so my wife and I could stay comfortable when working at home.

The two air conditioners we chose did just that, easily cooling our full ground-floor living space (128m² consisting of seven rooms and a hallway). Based on advice from Matthew Wright (founder of www.pure-electric.com.au), we opted for two top-of-the-line Ururu Sararas (UR7s) manufactured by Daikin: one small wall-mounted unit in our front bedroom (2.5kW rated for cooling) and one medium unit (3.5kW) in the lounge room.

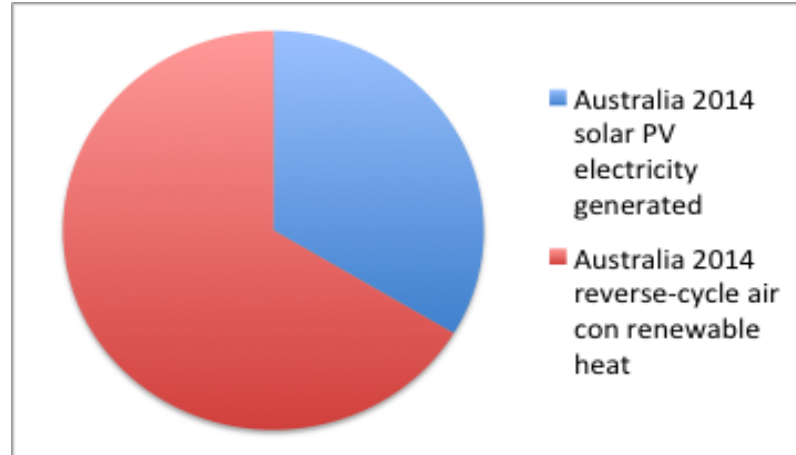
The total US7 rated cooling capacity of 6kW contrasts with a 14kW multi-headed



↑ The Ururu Sarara 7 air conditioners look like any other ‘lump on a wall’ unit, but a look at the remote control shows one of the major differences—active humidity control, which can increase comfort with less energy use.



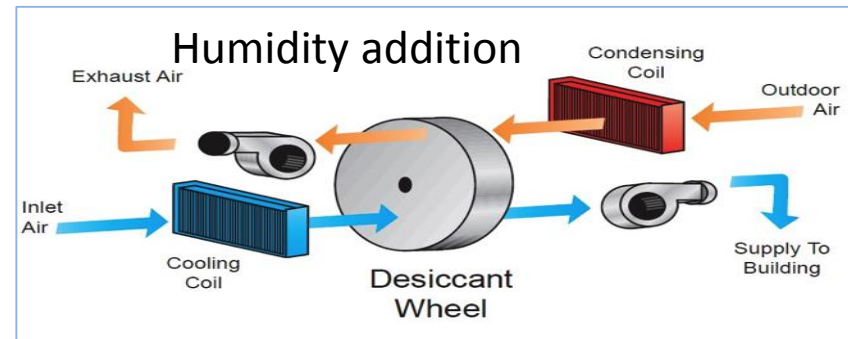
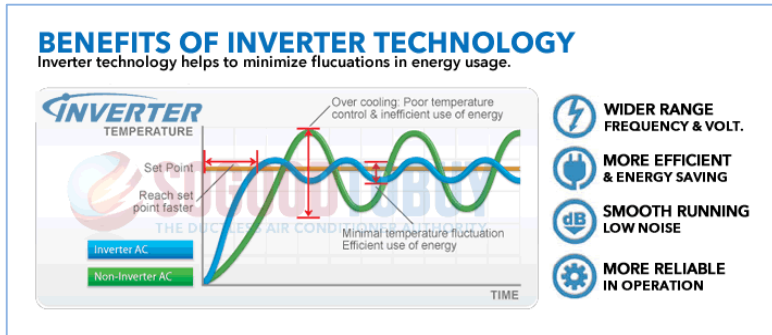
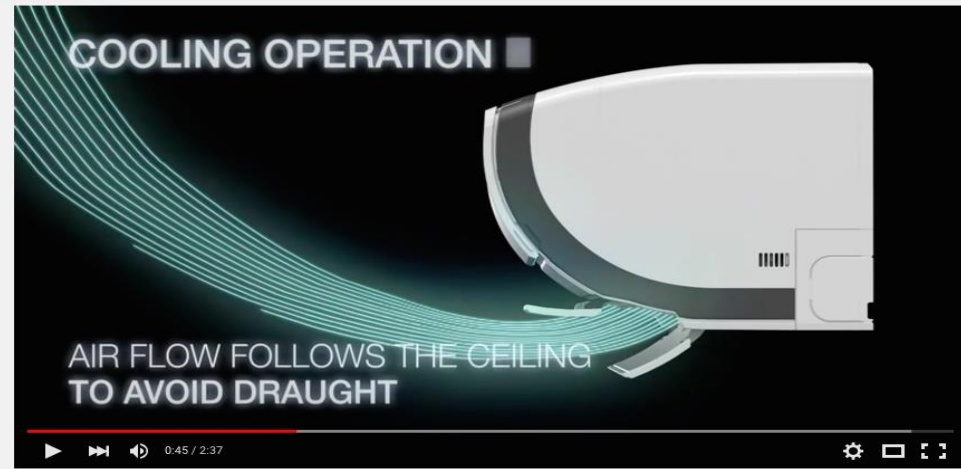
In Australia, **more** renewable energy is produced by reverse-cycle air conditioners, than by roof-top solar PV panels. Who knew?!



<http://www.energy.unimelb.edu.au/switching-gas---examination-declining-gas-demand-eastern-australia>

Heat pumps have been widely used in the USA, Europe, and Japan since the 1970's, with 58 million sold globally in 2013.

The efficiency of heat pumps continues to increase, as does the number of comfort and convenience features.



Heat pump hot water heater:
1 part of electricity produces
4.5 parts of hot water.



Induction cooktop:
More efficient than gas,
and just as controllable.



Your pot becomes the heating element.
Minimal energy wasted.

3.5 parts of renewable energy
go in here.



Get more out of your solar power system by using water as a battery

February 24, 2015 3.22pm AEDT



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Melbourne

Disclosure statement

Tim Forcey does not work for, consult, own shares in or receive funding from any company or organization that would benefit from this article, and has disclosed no relevant affiliations beyond the academic appointment above.

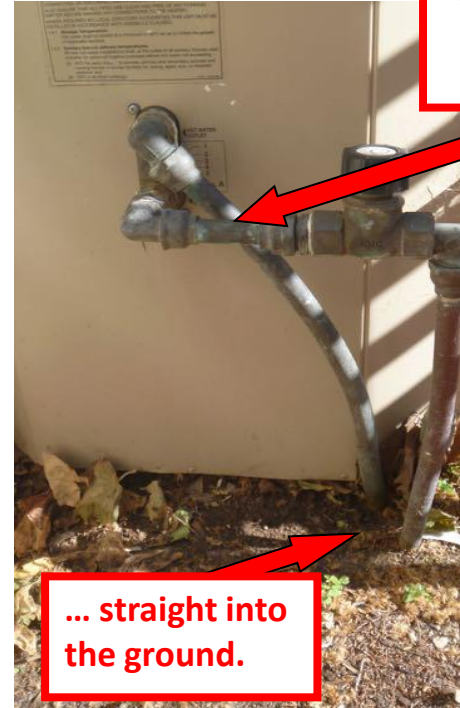
Partners



Uninsulated
attic (Victoria)

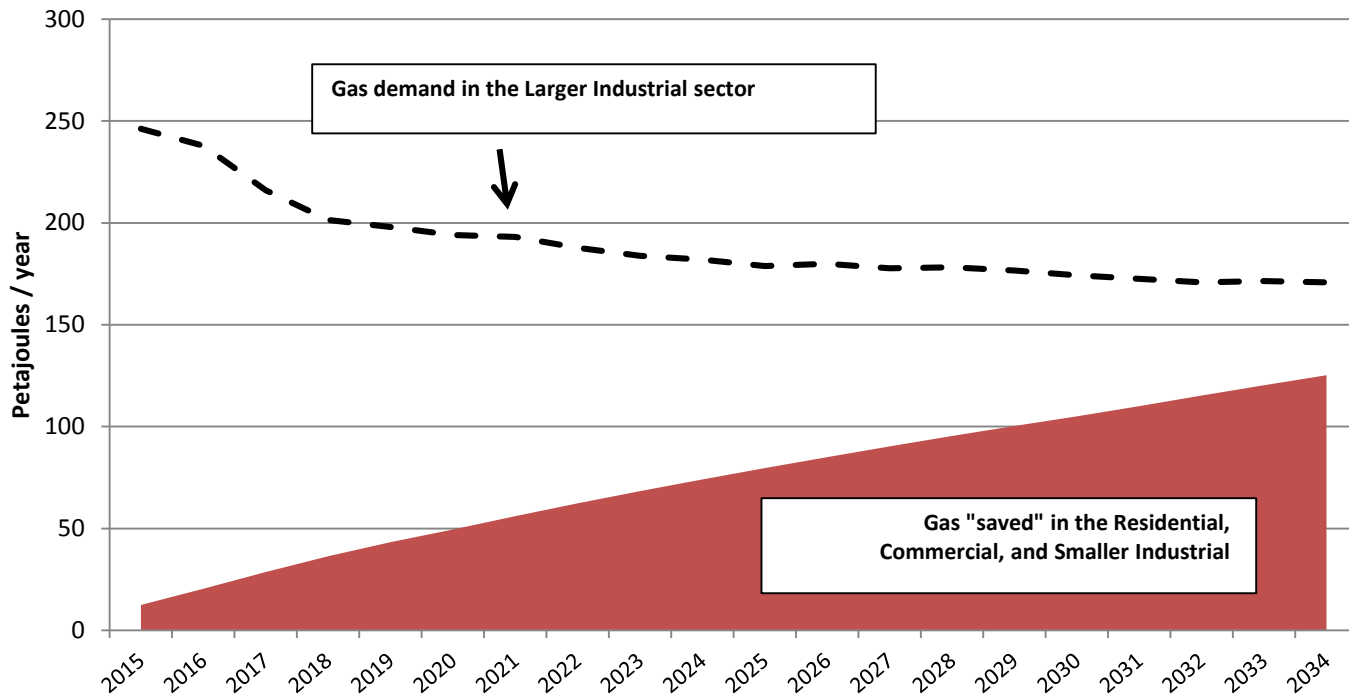


"HOT WATER
OUTLET" ...

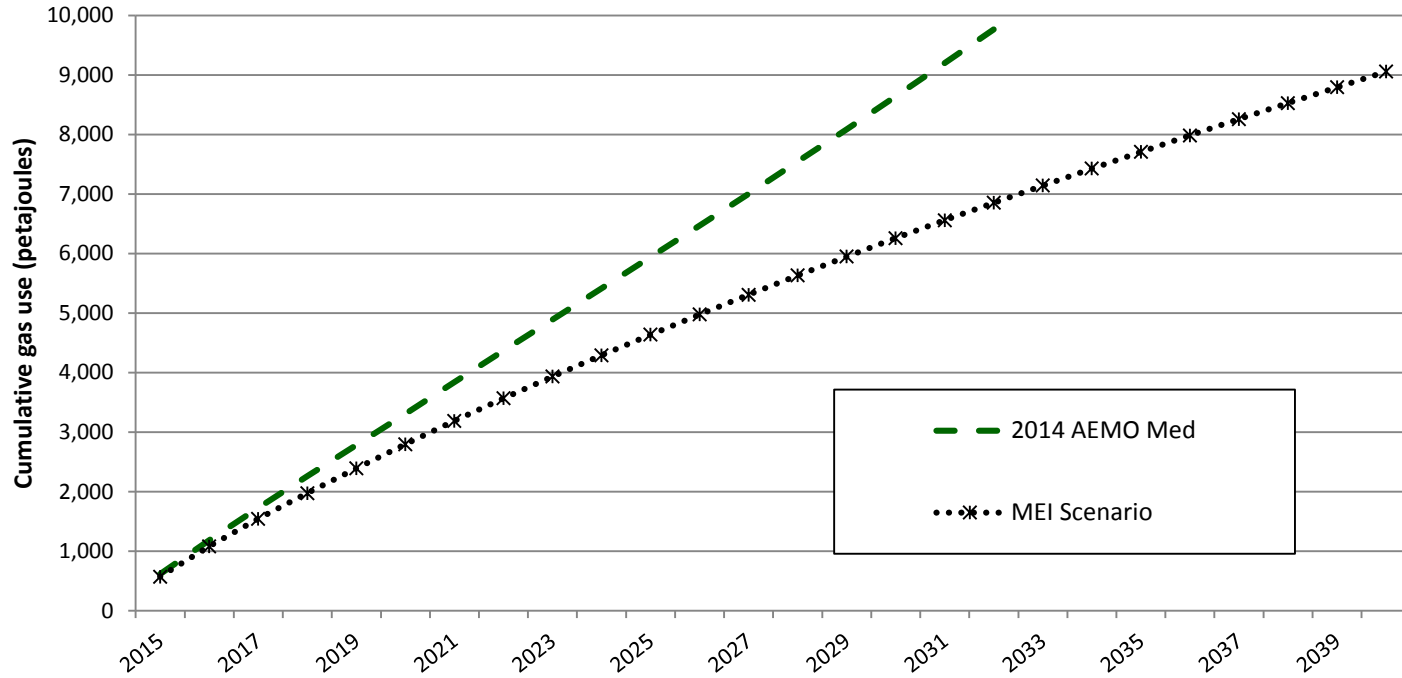


... straight into
the ground.

Energy efficiency opportunities in Victoria.



In 20 years' time, ~70% of the gas used in the Larger-Industrial sector can be sourced from gas "saved" in buildings.



Reducing gas demand stretches out developed gas reserves by > one decade.

Time for eastern Australia
to have an Integrated
Resource Plan (IRP)
considering both gas
supply *and* gas demand
options.

GAS

DEMAND

MANAGEMENT

DISCUSSION PAPER NO. 1

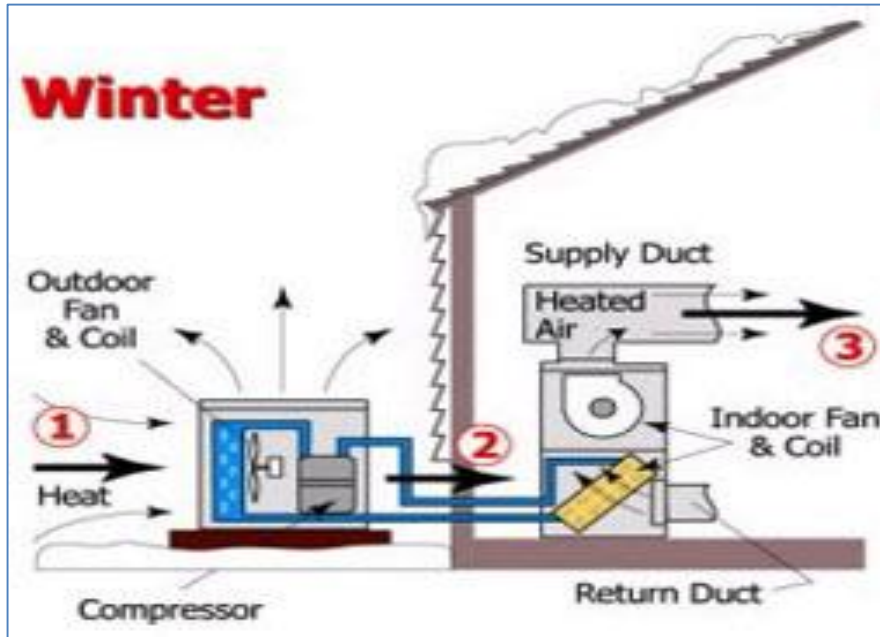
July 1990

Gas and Fuel Corporation of Victoria

ECONOMIC POLICY AND RESEARCH DEPARTMENT

Heat pump example: Winter Space-Heating

Reverse-cycle air con mode moves heat from a **cold place** (outside your house) to a **hot place** (your lounge).



Heat pumped from the air surrounding your house => to inside.