

Australia's greenhouse gas emissions are on the rise. Electricity emissions, which make up about a third of the total, rose [2.7% in the year to March 2016](#).

Australia's emissions reached their peak in 2008-2009. Since then total emissions have barely changed, but the proportion of emissions from electricity fell, largely due to falling demand and less electricity produced by coal. But over the last year demand grew by 2.5%, nearly all of this supplied by coal.

In 2015 I wrote about [concerns that Australia's electricity demand and emissions would start increasing again](#). This has now come true. So what's driving the trend?

Why did demand fall?

To understand this trend we need to look at data from Australia's National Electricity Market (NEM), which accounts for just under 90% of total Australian electricity generation. While the NEM doesn't include Western Australia or the Northern Territory, it has much better publicly available data.

The chart below shows electricity generation from June 2009 to March 2016.

The most important things to note are that, until February 2015, overall generation fell and the amount of electricity supplied by coal also fell. These two trends are closely related.

In June 2009, coal was supplying 84% of electricity, while 7% came from renewables (mainly hydro and wind) and 9% from gas.

Because renewables have near-zero short-run marginal costs (because they don't have to pay for fuel) they will nearly always be able to outcompete coal and gas. This will be particularly so when demand for electricity falls.

Since June 2009 coal has been squeezed out by falling demand and a growing supply of renewables and gas. Until February 2015, total demand fell 8%, gas supply rose 43%, renewable supply grew 55% and coal supply fell 18%.

A dangerous trend

Since February 2015, however, these trends have reversed, which is very bad news for Australia's emissions. Demand grew 2.5% and, combined with falling electricity supply from gas and renewables, coal picked up the slack, driving emissions 2.7% higher.

Gas generation is being forced out of the market, as [wholesale prices throughout eastern Australia have risen](#) to levels set by the [three new liquefied natural gas \(LNG\) plants in Queensland](#).

[Renewable generation, mainly hydro, increased briefly thanks to the carbon price](#), further squeezing out coal, but [this is of course now gone](#).

Growth in other renewable generation (mainly wind) has stalled because of the near-total freeze in new investment under the [reduced large-scale Renewable Energy Target](#) (LRET) precipitated by the Abbott government.

Why is demand increasing?

To understand why demand is increasing we can look at the three major consumer groups – industry, business and households – as you can see in the figure below.

After growing until 2012, industry demand fell sharply because of closures of several major establishments, most notably aluminium smelters in New South Wales and Victoria.

Since 2015 very rapid growth has occurred in Queensland, driven by the coal seam gas

industry. Extraction of coal seam gas requires the use of enormous numbers of pumps, compressors and related equipment, to first extract the gas from underground and then to compress it for pipeline transport to the LNG plants at Gladstone.

Initially, the industry used gas engines to power this equipment, but then realised that electric motor drive would cost less. The government-owned Queensland electricity transmission business, Powerlink Queensland, is making major investments (paid for by the gas producers) in new transmission lines and substations to meet this new demand.

By the end of 2017-18, [electricity demand could increase by 20% in Queensland and by 5% for Australia overall](#) . All of this demand, at least initially, will be supplied by coal-fired power stations, increasing Australia's total emissions by about 8 million tonnes, or roughly 1.5%.

As a side note, the LNG plants in Queensland will not themselves use electricity from the grid, but will use about [120 petajoules of gas each by 2017-18](#) , adding another 6 million tonnes to national greenhouse gas emissions.

Household and business demand

[Household demand fell since 2010](#) due to [energy standards on appliances](#) , increasing electricity prices and a one-off behavioural response due to unprecedented political attention to electricity costs thanks to climate policy.

Now electricity prices have stabilised or are falling and attract much less attention. Moreover, fewer appliance energy standards are being introduced, slowing the decrease in demand.

The result is that average electricity consumption per household, which fell by 17% between 2010 and 2014, has stabilised. In the absence of stronger energy efficiency policies and programs, residential electricity consumption can be expected to grow in line with population.

Business is the largest of the three consumer groups. Electricity demand fell slightly between

2010 and 2014. This is because electricity intensity, the amount of electricity needed to produce economic value, fell 3% each year; that is, slightly faster than the economy grew.

It now appears, however, that in the past year the fall in electricity intensity has almost ceased, so that total consumption has increased in line with economic growth.

A challenge for energy and climate policy

In December 2015 the federal and state governments announced the [National Energy Productivity Plan](#) to increase energy productivity 40% by 2030. This is part of the plan to meet [Australia's 2030 climate target](#).

[Energy productivity](#) is the economic value produced per unit of energy. The 40% goal is equivalent to a reduction of just under 30% in the energy intensity of the economy.

In the case of electricity, had the trend of the period 2010 to 2014 continued, this would have been achieved quite easily. It now appears to be a much more challenging goal, requiring the urgent introduction of a range of new energy efficiency policies and programs.

CORRECTION: The lead image has been corrected. It previously incorrectly showed aluminium works at Gladstone, Queensland.

Hugh Saddler is a member of the Board of the Climate Institute. He is also a part-time employee of pitt&sherry, a company which, among many other activities, provides consultancy services relating to energy efficiency policy.

Read more <http://theconversation.com/australias-carbon-emissions-and-electricity-demand-are-growing-heres-why-57649>