

Is electricity demand growth returning in Australia?

Discussion paper

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Summary

In late 2010, after over a century of almost uninterrupted growth, demand for electricity in Australia began to fall. Two previous papers, published in 2013 and 2015, examined possible reasons why demand was falling in the National Electricity Market (NEM), which accounts for nearly 90% of Australian electricity consumption. However, no sooner had the second paper been published than data began to suggest that electricity demand was growing again.

This short paper compiles data on electricity demand in the NEM up to the end of April 2016 and confirms that, as at that date, demand by both residential and general business consumers has been growing steadily since late 2014. On the basis of the preliminary data available, if these new trends continue, residential electricity demand will grow from now on in line with population growth, while general business demand will grow in line with economic activity.

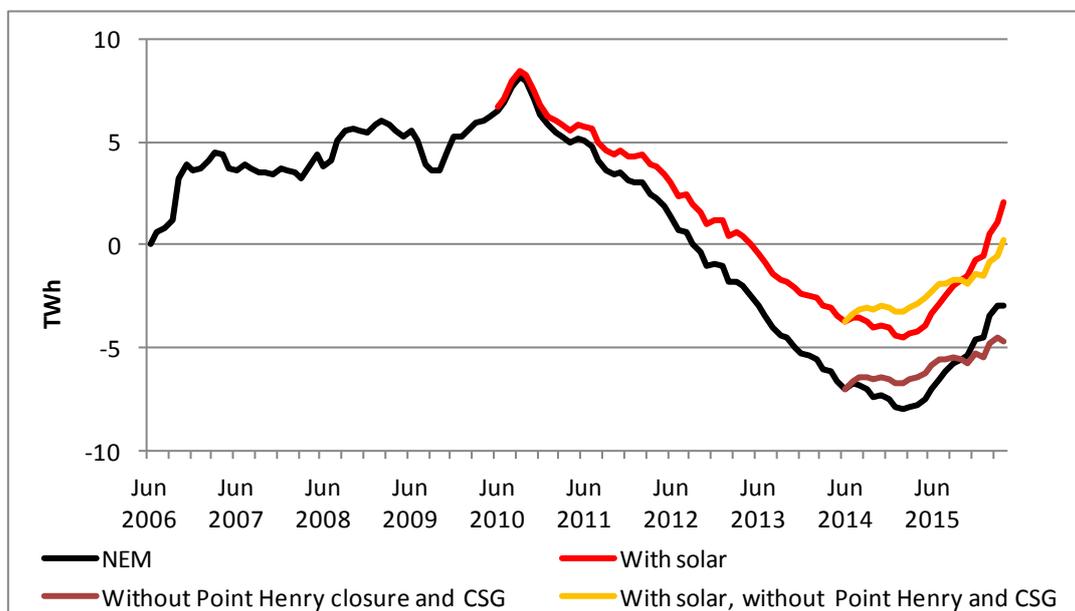
The paper explains that this fundamental underlying trend has been somewhat masked by changes in demand by a handful of very large electricity users, which caused a more rapid fall in total demand during the latter months of 2014, followed by a faster increase in total demand since then. At this stage it is difficult to pinpoint reasons for the abrupt change in overall demand trends; the paper speculates about possible reasons, including absence of political leadership on climate change and loss of momentum in energy efficiency policy.

Electricity demand growth

Just when falling electricity demand was becoming an accepted fact in Australia, it is over. There is now enough data to say unequivocally that demand is on the way up again. The following graphs provide different perspectives on supply and demand for electricity in the National Electricity Market (NEM) which accounts for nearly 90% of the country's total electricity consumption.

Understanding the key underlying trends is made difficult because of the masking effect of discrete changes in consumption by a few very large individual consumers. Two such changes have occurred in the past two years. First, the Point Henry aluminium smelter in Victoria closed in July 2014, removing about 3 TWh of annual demand. It was therefore not until July 2015 that the full impact of the closure was seen in moving annual NEM Electricity consumption figures. Second, in late October 2014 the switch to electric motor drive for pumps, compressors and other equipment began in the Queensland coal seam gasfields. This is a gradual process which is projected by the Australian Energy Market Operator (AEMO) to add about 8 TWh of annual consumption by the end of 2017¹.

Figure 1: Changes in total annual electricity sent out in the NEM, relative to the total for the year to June 2006



Source: Australian Energy Market Operator data, accessed through NEM-Review

Figure 1 shows monthly changes in electricity consumption, measured as moving annual total energy sent out from transmission connected generators, i.e. consumption as seen by the NEM, relative to the total in the year to June 2006 (the first full year for which complete data

are available). It also shows the additional consumption provided by rooftop solar and the underlying trend in NEM consumption, adjusted to remove the effect of the Point Henry closure (using very precise data from AEMO) and the new coal seam gasfield demand (using approximate estimates only).

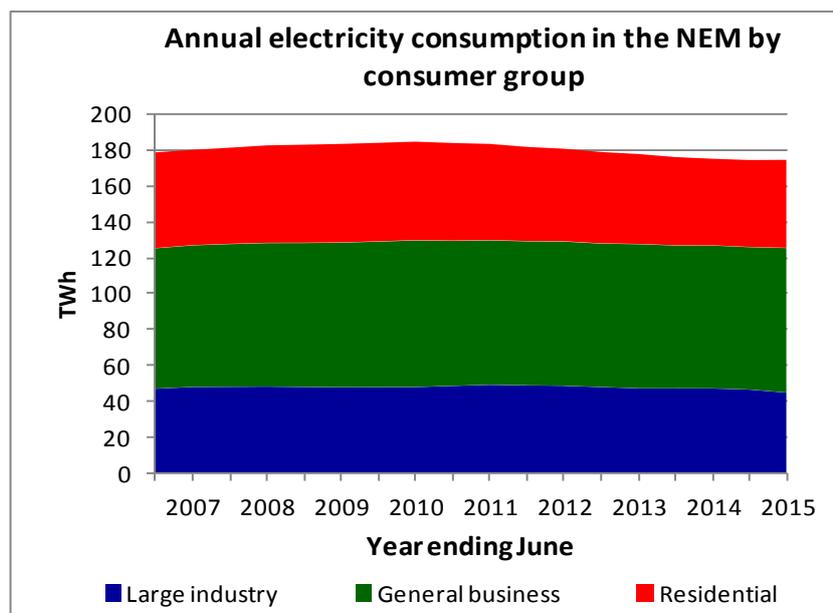
Two points are very clear. Firstly, underlying consumption has been rising slowly but steadily for nearly two years. In 2014 the NEM generators sent out around 7 TWh (3.7%) less than they did in 2006, and 15 TWh less than the peak reached in 2010. In the latest figure, electricity demand/sent out had grown back to less than 3 TWh below 2006 levels. If account is taken of the growing quantities of electricity supplied by rooftop solar, total electricity consumption is now higher than it was in 2006.

Secondly, the rise started in July 2014. These two observations are examined in turn.

More detailed analysis of trends uses annual data from network businesses, reported to the Australian Energy Regulator (AER) in each business' mandatory annual performance report (termed Regulatory Information Notices or RIN reports), and published by the AERⁱⁱ.

Total demand can be separated into three major groups of consumers by combining the data from network operators on the quantities of electricity they supply to residential and business consumers with historic data published by AEMO with its annual National Electricity forecasting Reports (NEFR). Large industry is defined as all consumers with average loads greater than 10 MW. General business is all remaining non-residential consumers. Figure 2 shows the quantities of electricity consumed by each of the three groups over the years since 2006. Figure 3 shows, in detail, the absolute changes in these quantities.

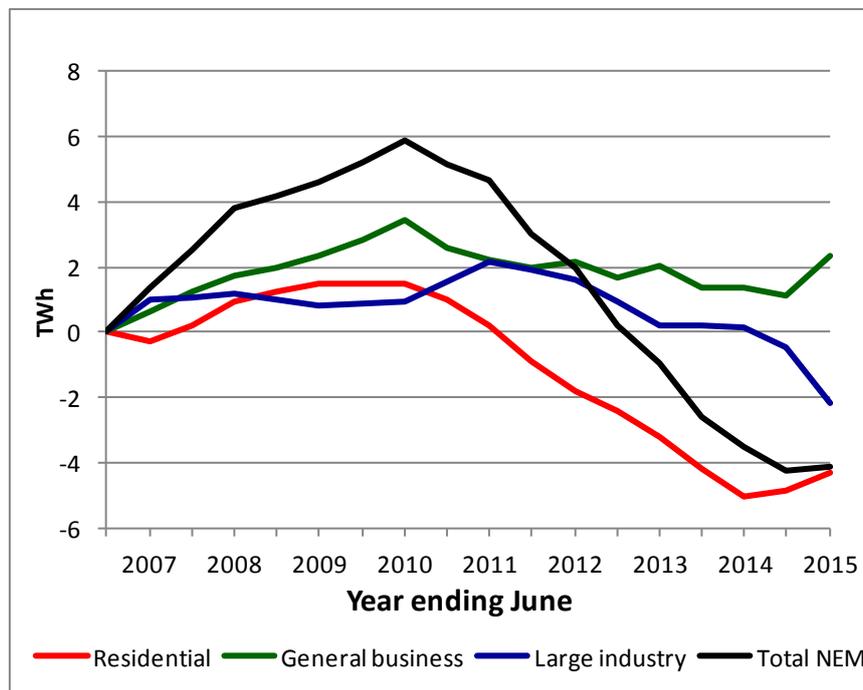
Figure 2: Annual electricity consumption in the NEM by major consumer group



Source: Calculated from AER RIN and AEMO NEFR data

Total consumption by all three groups fell prior to 2014, with residential consumption falling fastest. Major decreases and increases in consumption by large industry are mainly related to the closure and opening respectively of major industrial establishments, and that is certainly the case with these data. Apart from the previously mentioned Point Henry smelter closure and the coal seam gasfield electrification, the data include the effect during 2012-13 of the earlier closure of the Kurri Kurri aluminium smelter in NSW, offset for most of the period by increasing consumption by other large users, such as coal mines. Note that these smelters account for well over half of total consumption by large industry.

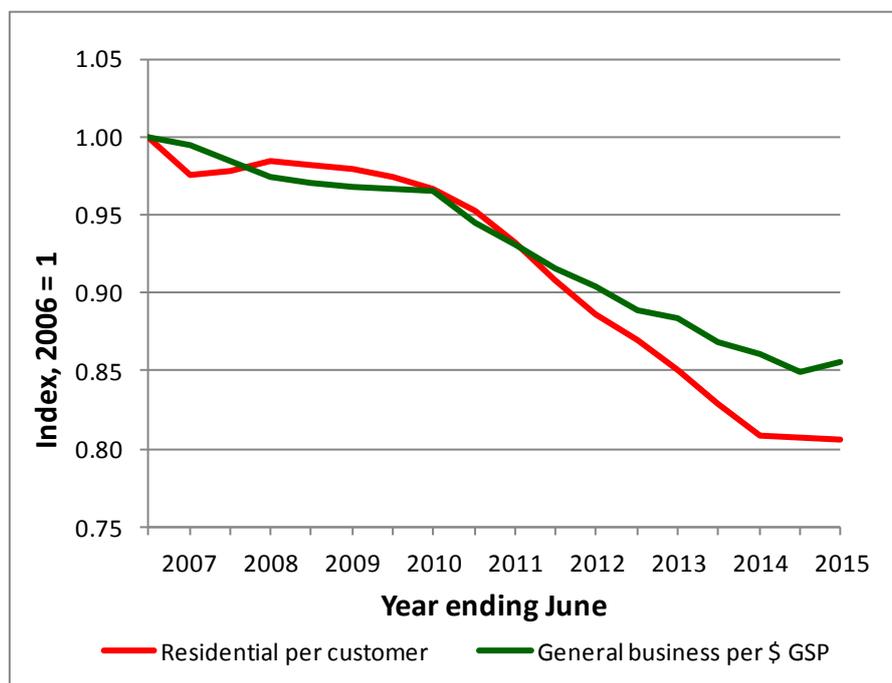
Figure 3: Absolute changes in annual electricity consumption in the NEM since December 2006 by major consumer group



Source: Calculated from AER RIN and AEMO NEFR data

However, it is the increase in demand from general business and residential consumers, together accounting for nearly three quarters of total demand, which is more significant from a long term perspective. As Figure 4 shows, declining total demand prior to 2014 was driven by large falls in electricity use intensity, measured as demand per capita for residential consumption, and demand per dollar of real Gross State Product for general business consumption.

Figure 4: Index of changes in annual electricity consumption in the NEM since December 2006 by major consumer group



Source: Calculated from AER RIN and AEMO NEFR data, combined with ABS data on population and Gross State Product

It is most significant that intensity appears to have stopped falling. In other words, individual consumers have stopped reducing their electricity consumption, as they were over the preceding four or so years. If this continues, total residential demand will grow in line with population growth, while business demand will grow at the same rate as the economy.

Figure 1 showed that, when adjustments are made for the effects of the large industry changes, that this is just what is happening (the small consumption fall in April 2016 is mostly attributable to short term consumption cutbacks in Tasmania in response to the electricity supply crisis caused by the failure of the Basslink cable). Ignoring this Tasmanian effect, adjusted NEM electricity consumption has increased at a rate equivalent to 1.0% per year since January 2015. (If the CSG demand growth is included the annual growth rate over this period is 2.3%.) State by state analysis of the data in Figure 1 confirms that similar trends can be seen in all five NEM regions (states). Why?

One contributory factor has been a slow-down in the growth of savings from appliance and equipment energy efficiency programs. Part of this is a consequence of the fact that most of the “big” opportunities for appliance standards were realised earlier in the life of the program, and further tightening of performance standards delivers diminishing returns in absolute terms. However, there has also been a slow-down in the introduction of new regulations over the past three years, which has contributed to slowing growth in electricity savings. Poor enforcement of building efficiency regulations has also contributedⁱⁱⁱ.

More importantly, however, it cannot be a coincidence that demand growth returned only after the abolition of the carbon price, to the accompaniment of much political fanfare. Contrary to what conventional economic theory would suggest, the impact on electricity prices of removing the carbon price does not seem, by itself, to have had much effect on electricity demand. Using the inflation adjusted household electricity component of the ABS Consumer Price Index reveals that carbon price removal was accompanied by modest but immediate reductions in electricity prices in three states: NSW, Victoria and Tasmania. In the two other NEM states, however, other factors meant that prices were unchanged in SA, according to the ABS data, while in Queensland consumer electricity prices actually increased after the carbon price removal because of other decisions by regulatory authorities.

The demand response differed widely between the five states. In NSW the increase began immediately. But demand also increased immediately in Queensland, at about the same rate as in NSW, even though prices were increasing, not decreasing. In Victoria, and also in Tasmania, demand increases did not start until the early months of 2015, by which time prices were also increasing again. Finally, in SA, as in NSW, demand followed a conventional economic path, not changing significantly until prices began to fall, which did not happen until April 2015, after which demand increased quite fast.

Previous analysis of the period when demand was falling strongly suggested that consuming behaviour, including consumer responses to higher electricity prices, is strongly influenced by the general level across society of awareness of and support for decisive action to address climate change^{iv}. The political rhetoric surrounding carbon price abolition sent a strong message that addressing climate change was not an important issue, or one with which consumers should overly concern themselves. This message was accompanied from mid 2014 on by the complete disappearance of energy efficiency as a public policy issue and even, in some quarters, advocacy for increased energy consumption. Opinion polls confirmed that the majority of respondents did not consider dealing with climate change to be a high priority for governments. In such an environment, it is hardly surprising that many electricity consumers appear to have lost interest in taking further steps to use electricity more efficiently. Overall, lack of political leadership, or leadership in the wrong direction, especially when political leaders are telling the public that electricity has got cheaper, even if it has not, is a more convincing explanation of increasing electricity demand than simple economic models of direct consumer responses to changing prices.

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ⁱⁱⁱ https://www.sa.gov.au/_data/assets/pdf_file/0004/135544/NEEBP-final-report-November-2014.pdf

^{iv} Saddler, H. 2015. *Power down II The continuing decline in Australia's electricity demand*.

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