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> Climate & Energy.

National Energy Emissions Audit
Electricity Update

May 2019

Providing a comprehensive, up-to-date indication of key electricity trends in Australia

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Key points

+ **Australia's national energy emissions are down 21% since 2008, due to growth of renewables and declining demand.**
  Emissions from Australia's electricity sector continue to decline. They are 21% below 2008 levels, even lower than the lowest emissions of the carbon price period. This reduction is due to the rise of renewable energy and three years of gradual reduction in total demand for electricity. The rise of renewables (Figure 6) is mostly due to the rise in solar and wind (Figure 13).

+ **Victoria is on track to meet its interim renewables target of 25% by 2020.**
  It is currently at 21%, up nearly 4% in 12 months.

+ **Wind generation has overtaken hydro generation for the first time.**
  A significant milestone was reached in April 2019; total annual wind generation was larger than total annual hydro generation for the first time.

+ **South Australia renewables leader, shares rooftop solar honours with Queensland.**
  South Australia is the leading state NEM region[1] for clean energy, at over 50% of total electricity generated. South Australia also has the highest proportion of rooftop solar 8.7% of total generation over 12 months. Queensland is the leader in solar households in absolute terms, with 3.1 TWh generated in the year to April 2019.

[1] The ACT is counted as part of the NSW NEM region, so is not included in this comparison.

Introduction

Welcome to the May 2019 issue of the *NEEA Electricity Update*, with data updated to the end of February 2019. The *Electricity Update* presents data on electricity demand, electricity supply, and electricity generation emissions in the National Electricity Market (NEM), plus electricity demand in the South West Interconnected System (SWIS). In this issue we focus particularly on how various states in eh NEM are progressing towards higher shares of renewable generation, and also take a state by state look at the contribution rooftop solar generation is making to total consumption of electrical energy..

ELECTRICITY UPDATE TO APRIL 2019

Demand for electricity

Figure 1

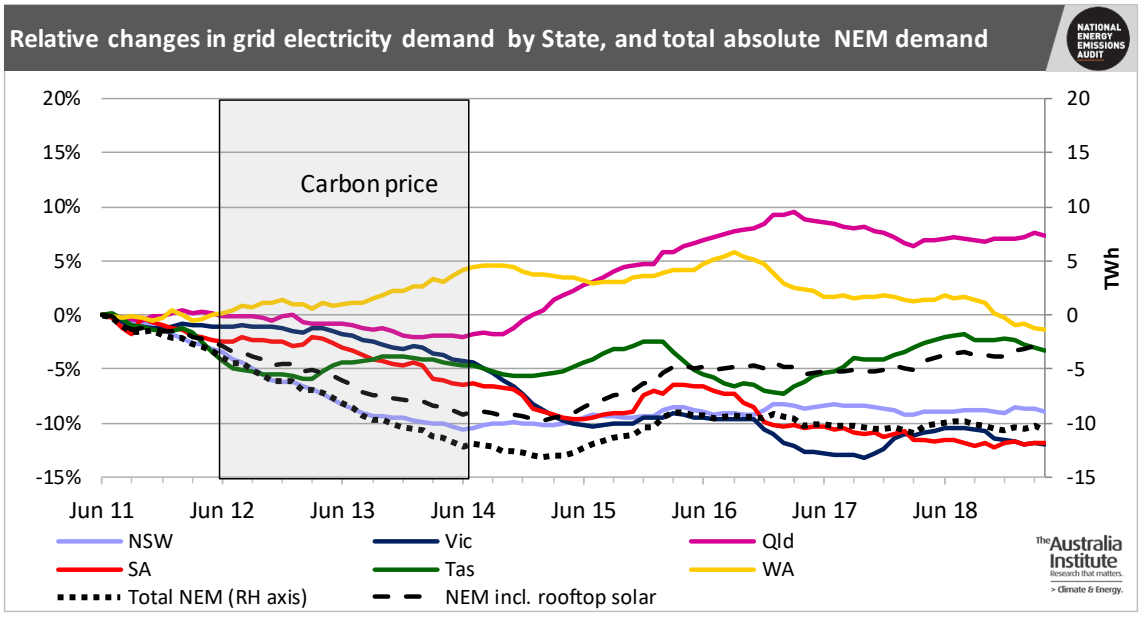


Figure 2

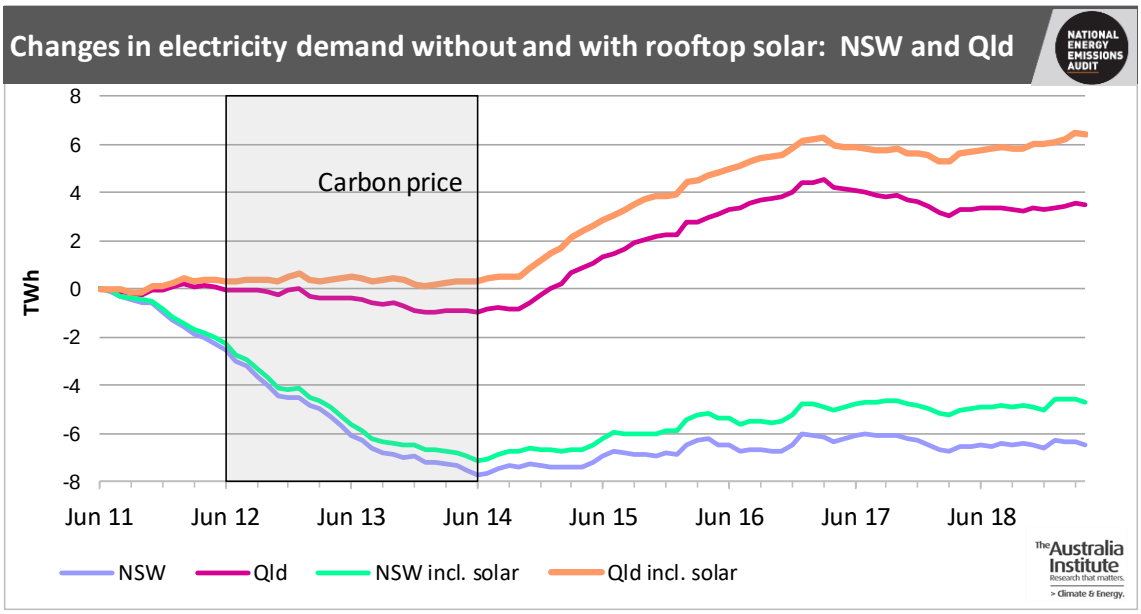
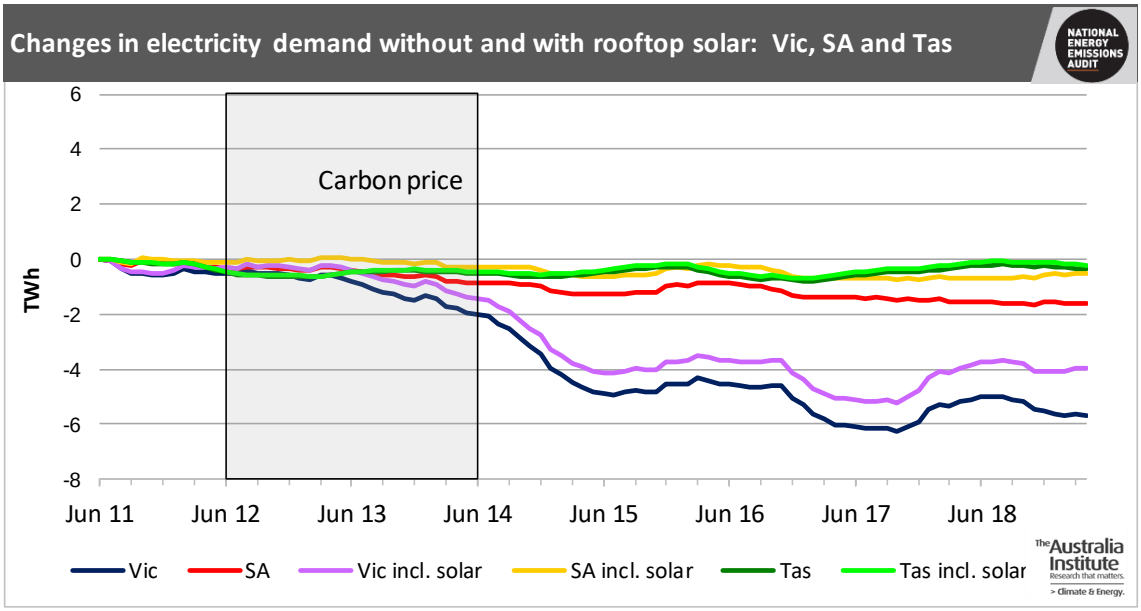


Figure 3



Generation and emissions

Figure 4

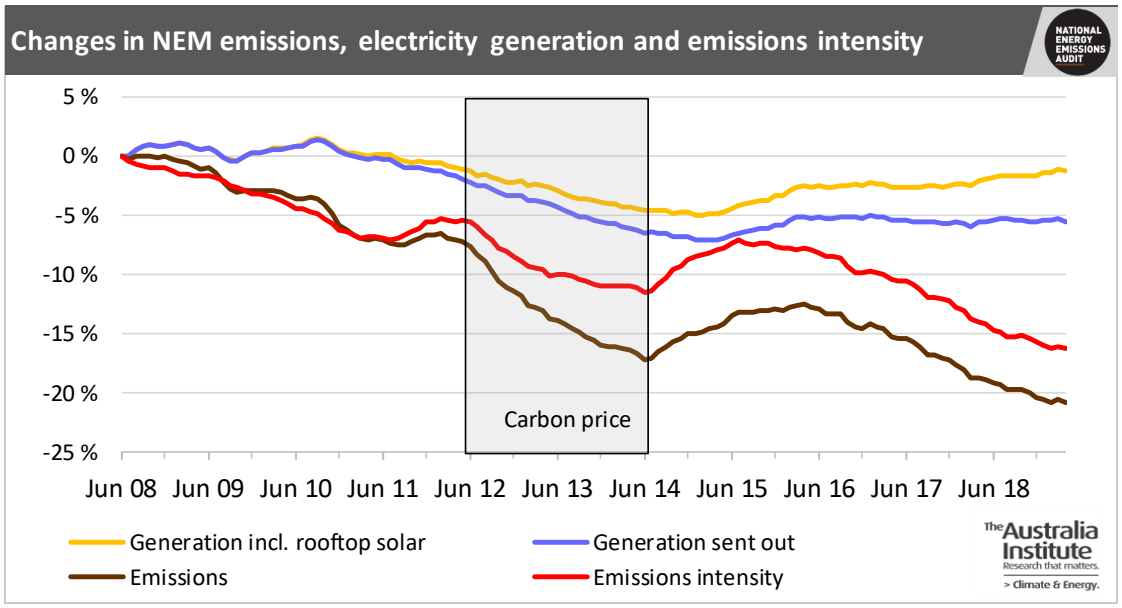
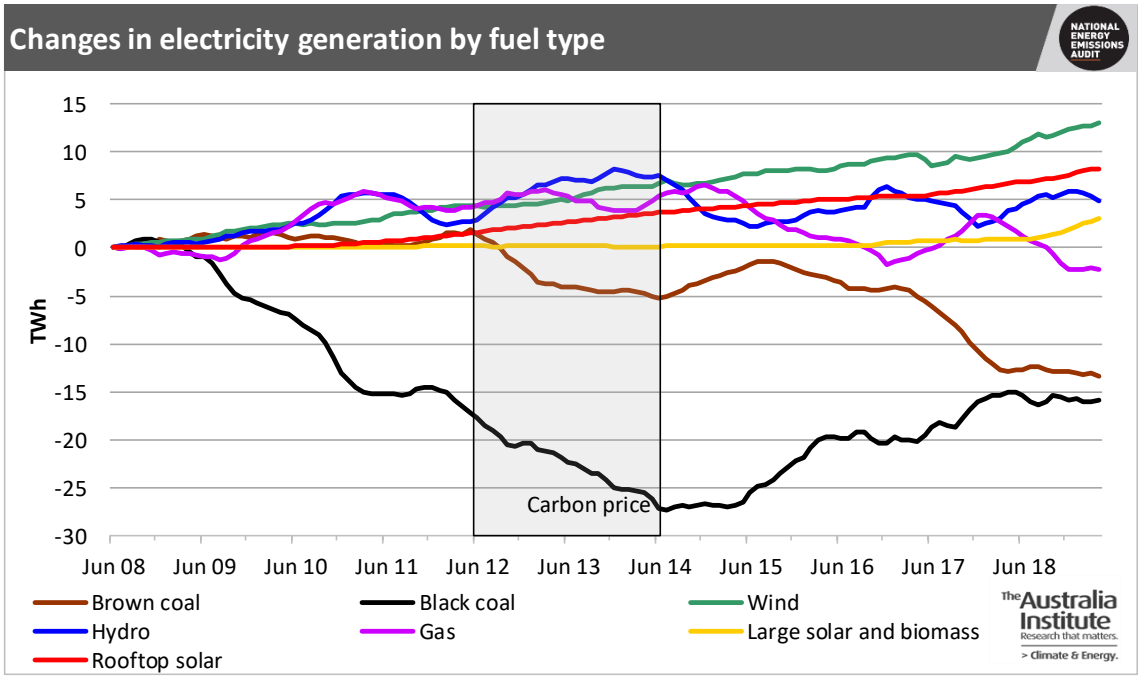
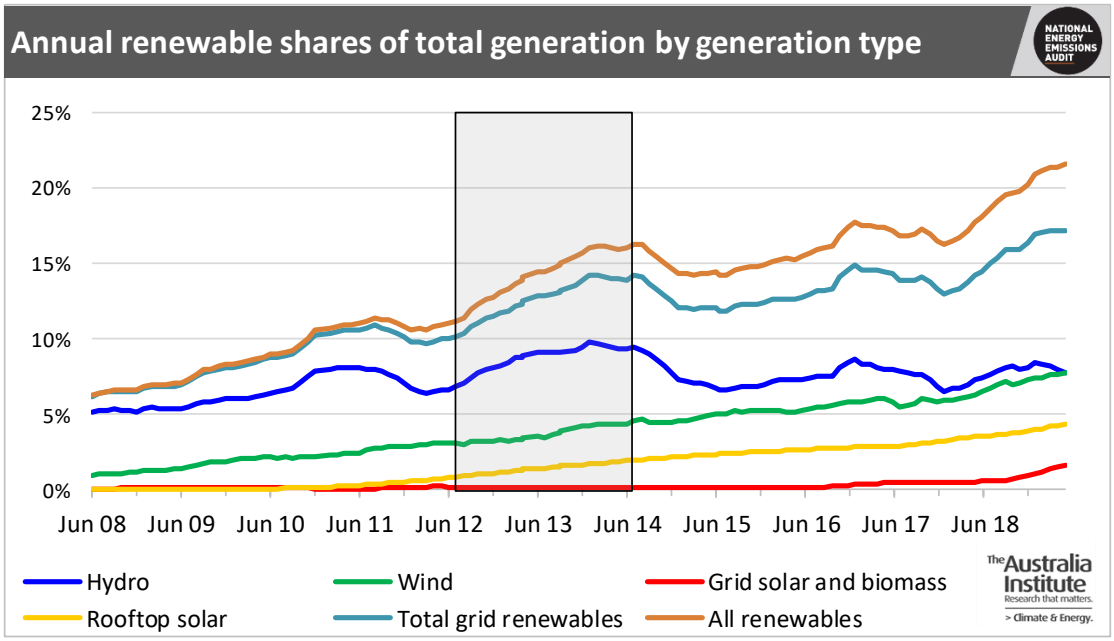


Figure 5



Growth in renewable generation in the NEM

Figure 6



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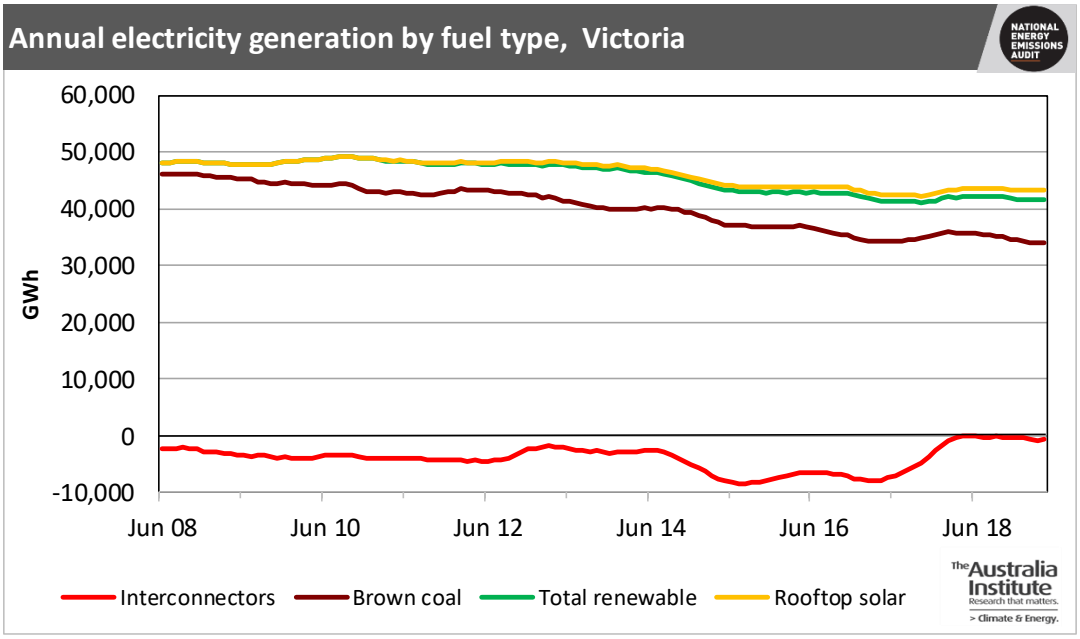


Figure 8

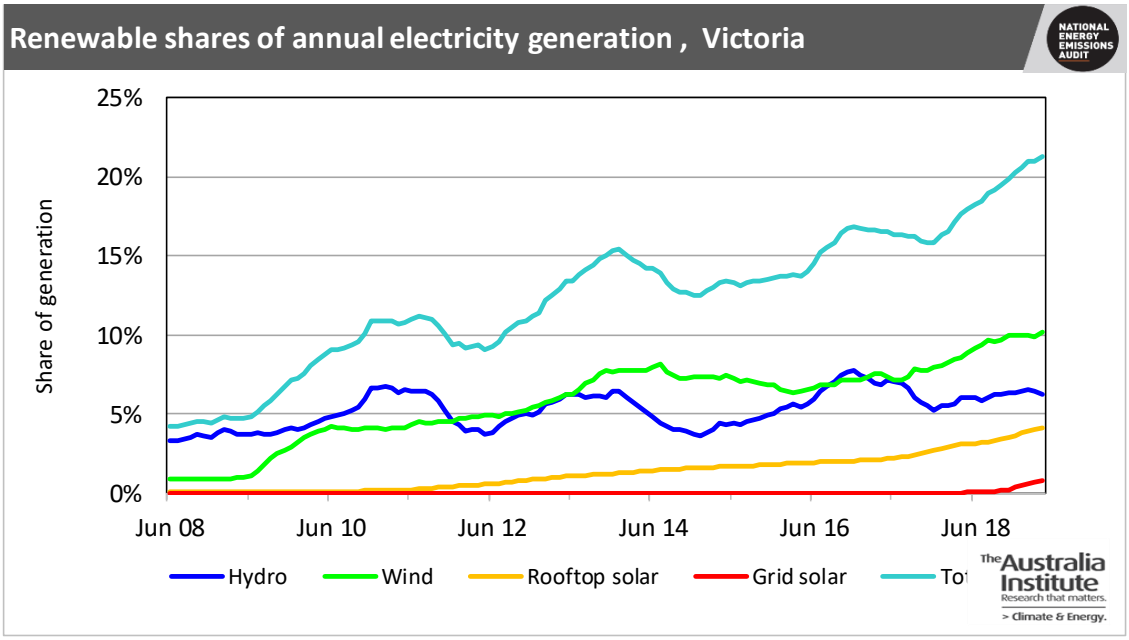
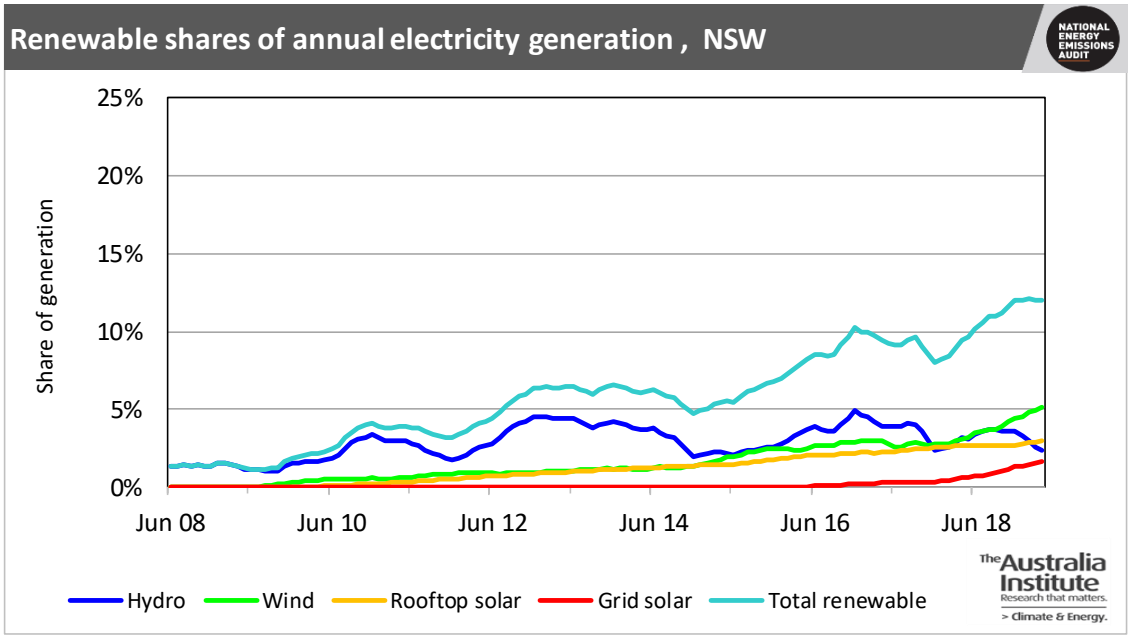


Figure 9



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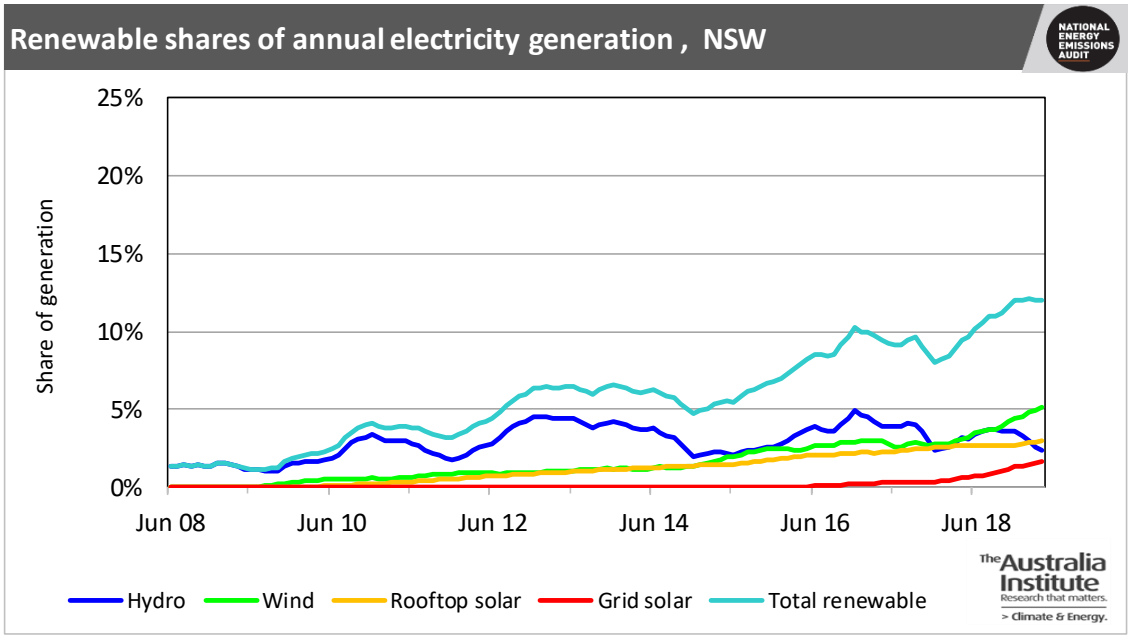

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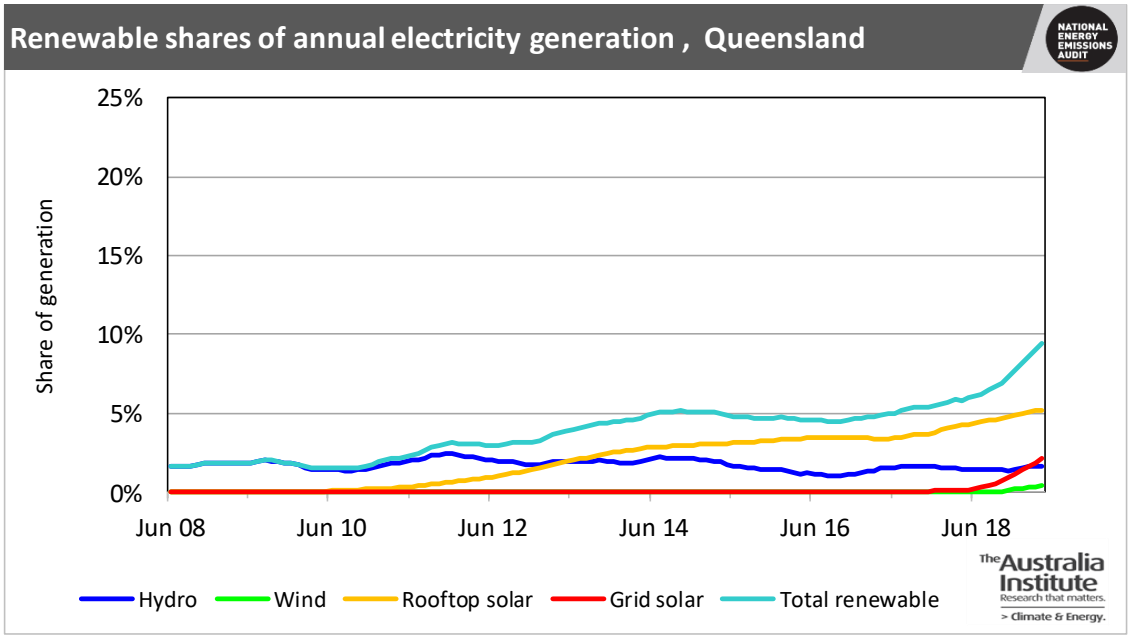

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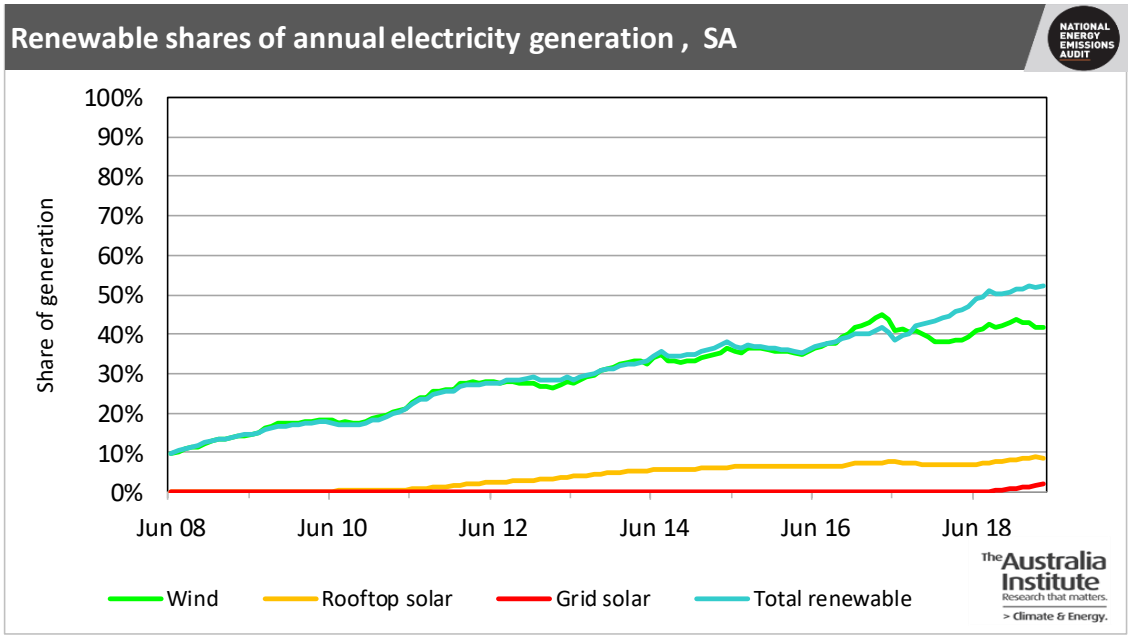


Figure 13

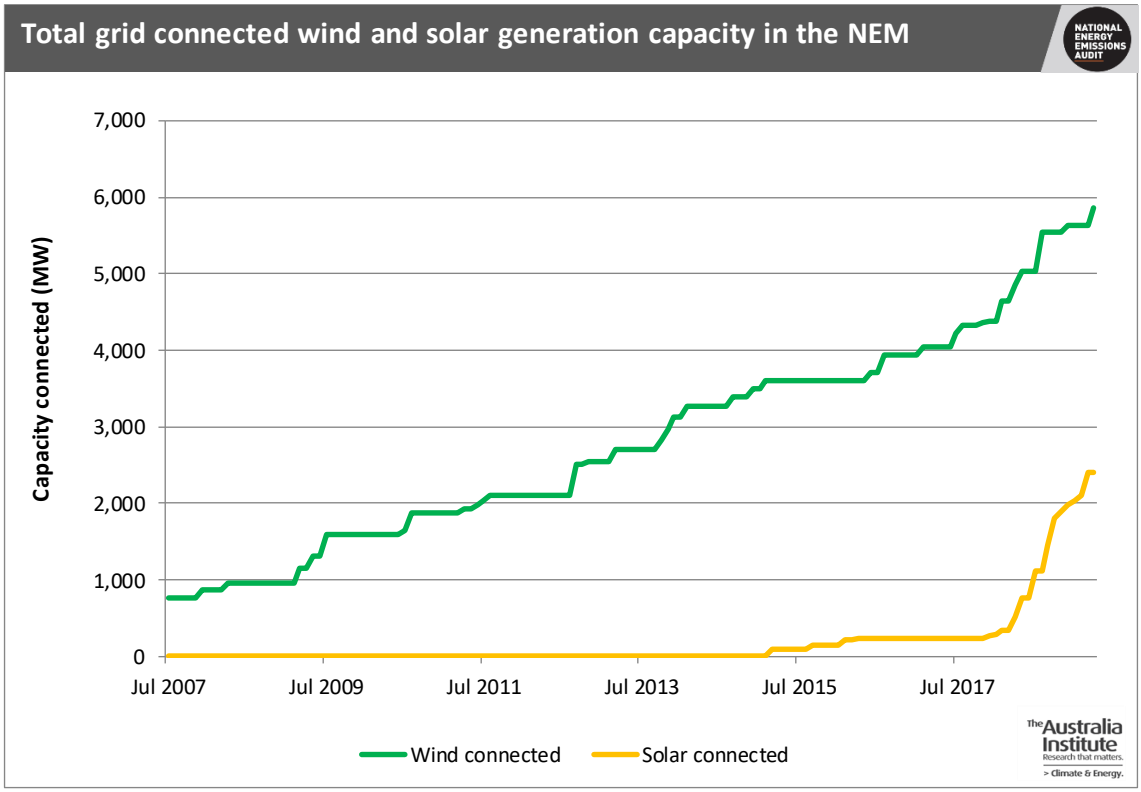
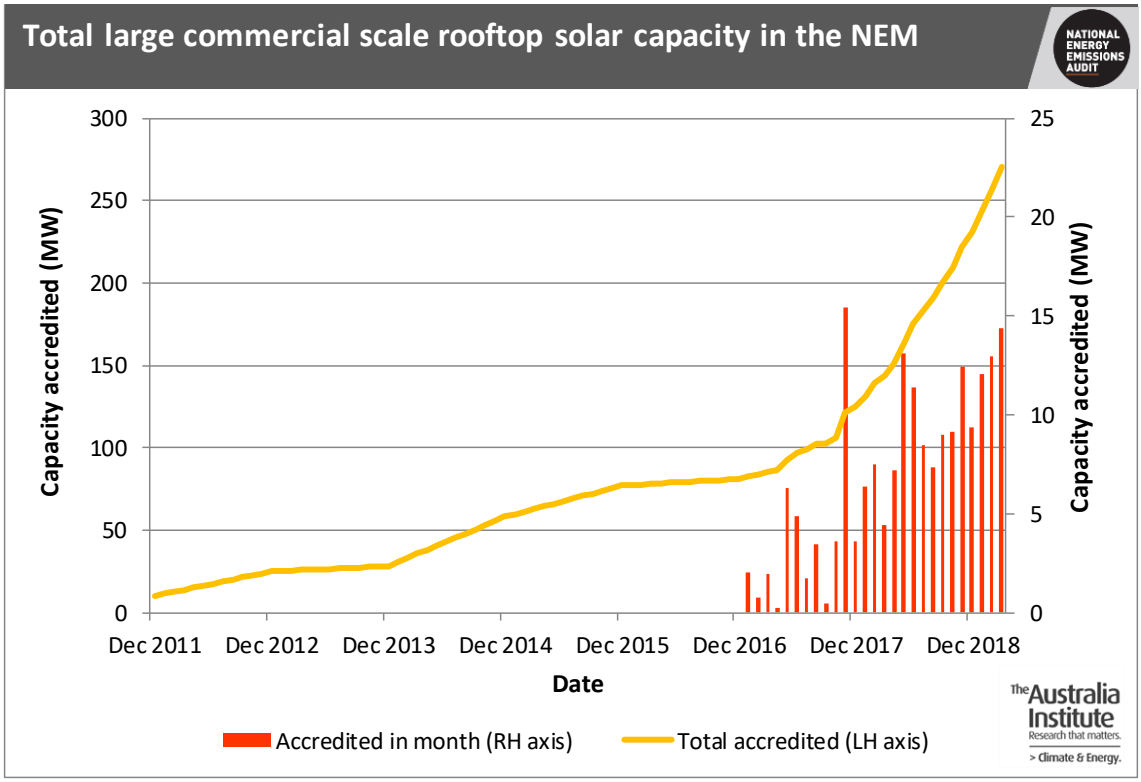


Figure 14



APPENDIX: NOTES ON METHODOLOGY

Data on annual consumption of electricity, and seasonal peak demand, are for each of the six states. All other data are for the states constituting the National Electricity Market (NEM) only, i.e. they exclude Western Australia. All data are reported as annual moving averages. This approach removes the impact of seasonal changes on the reported data. Annualised data reported in *NEEA Electricity Update* will show a month on month increase if the most recent monthly quantity is greater than the quantity in the corresponding month one year previously. Most data are presented in the form of time series graphs, starting in June 2011, i.e. with the year ending June 2011. Some graphs start in June 2008. These starting dates have been chosen to highlight important trends, while enhancing presentational clarity.

Defining the particular meaning of the various terms used to describe the operation of the electricity supply system will help in understanding the data discussed.

Demand, as defined for the purpose of system operation, includes all the electricity required to be supplied through the grid level dispatch process, operated by AEMO. This includes all the electricity delivered through the transmission grid to distribution network businesses, for subsequent delivery to consumers. It also includes energy losses in the transmission system and auxiliary loads, which are the quantities of electricity consumed by the power stations themselves, mostly in electric motors which power such equipment as pumps, fans, compressors and fuel conveyors. Auxiliary loads are very large: in 2011 they amounted to 6.3% of total electricity generated and currently about 5.6%. Most of this load is at coal fired power stations, where it can be as high as 10% of electricity generated at an old brown coal power station and 7% at a black coal fired power station. Auxiliary loads are much lower at gas fired power stations, and close to zero at hydro, wind and solar power stations. Both demand and generation, as shown in the *Electricity Update* graphs, are adjusted by subtracting estimates of auxiliary loads. Thus demand, as shown, is equal to electricity supplied to distribution networks (and a handful of very large users that are connected directly to the transmission grid) plus transmission losses.

Generation is similarly defined to include only electricity supplied by large generators connected to the transmission grid. It does not include electricity generated by rooftop PV installed by electricity consumers, irrespective of whether that electricity is used on-site ("behind the meter") by the consumer or exported into the local distribution network. From the perspective of the supply system as a whole, the effect of this generation, usually termed either "embedded" or "distributed" generation, is to reduce the demand for grid supplied electricity below the level it would reach without such distributed generation. That effect can be clearly seen in the regular total generation graph; the gap between the red line – electricity sent out to the grid from large grid connected power stations – and the yellow line – that

electricity plus estimated electricity generated by distributed solar systems – is the electricity supplied by those systems.