Sustainable Energy NOW

Superpower:
Australia's Low-Carbon Opportunity

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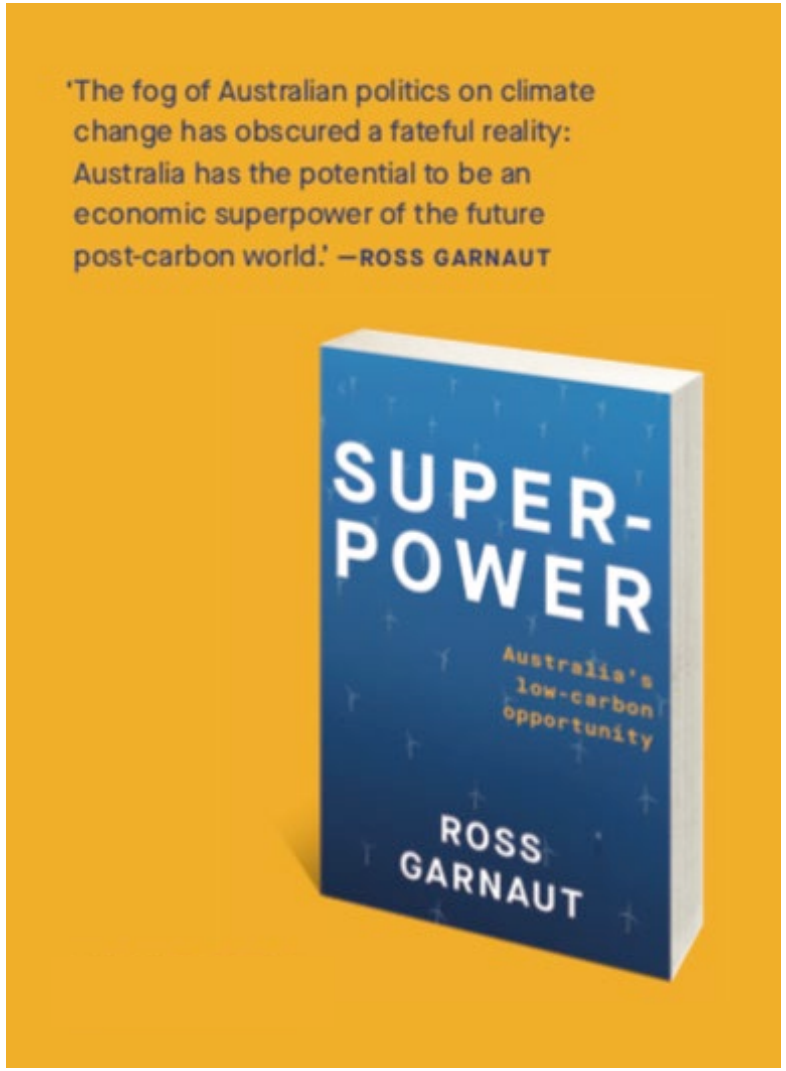
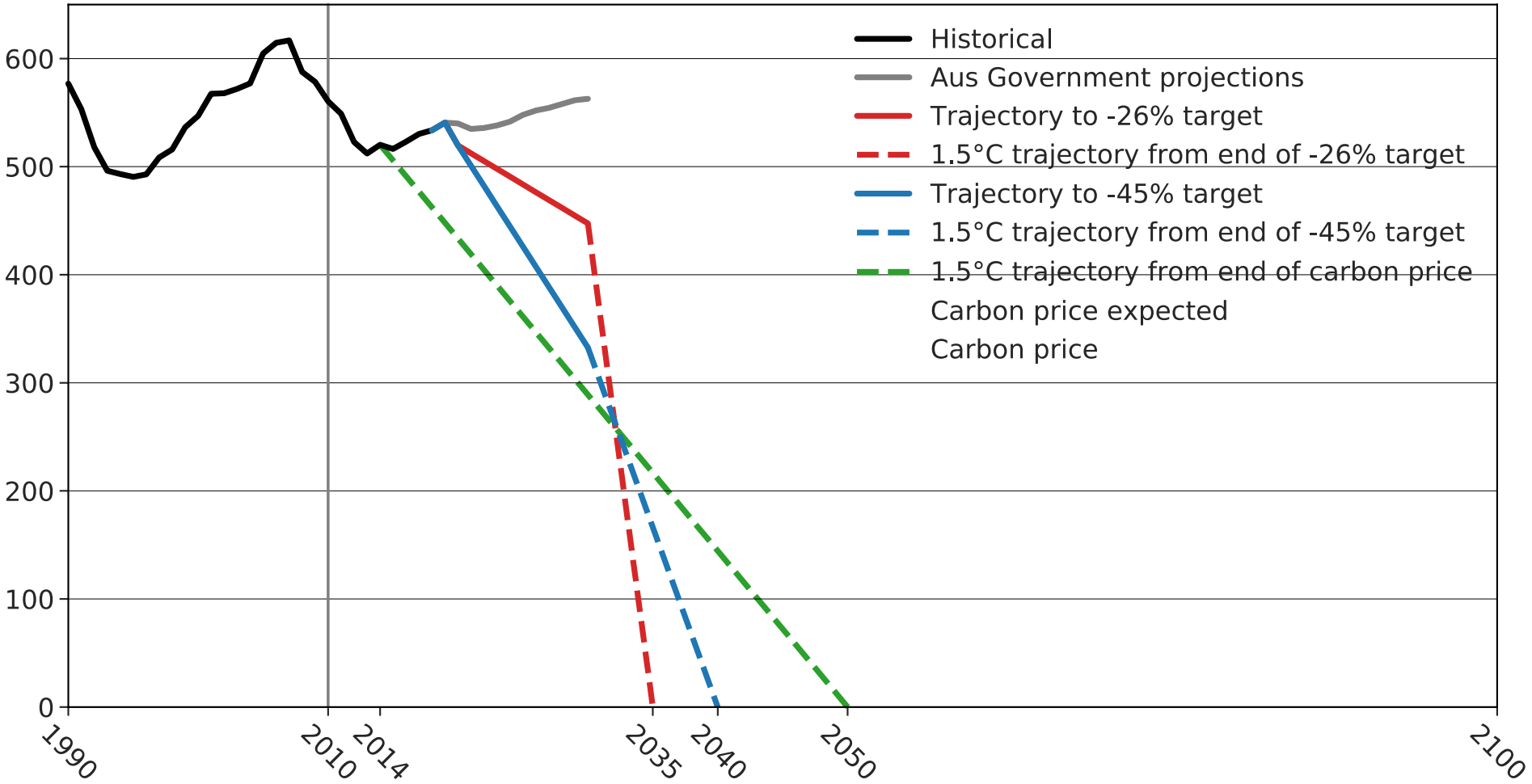
Superpower: Australia's Low-Carbon Opportunity

Charts used in this afternoon's presentation are from a series of lectures that I presented at The University of Melbourne, called *Climate & Energy Transition in Australia* and are also published in my book titled *Superpower: Australia's low carbon opportunity*



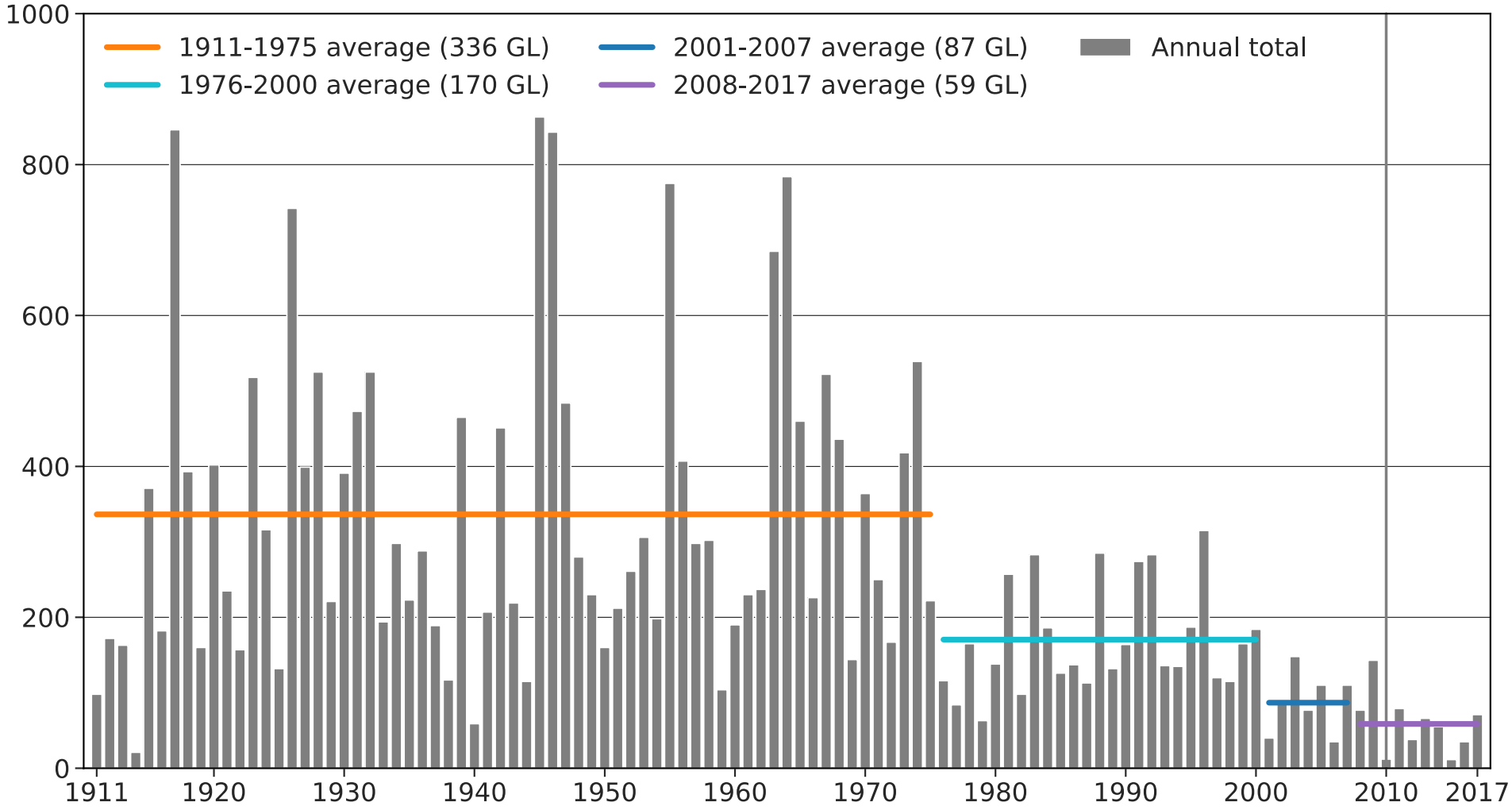
Murray Cod on the Darling

Chart 1 Australian Emissions: actual & paths to Paris (1.5 degrees) within budget approach *Mt Co2 eq p.a.*



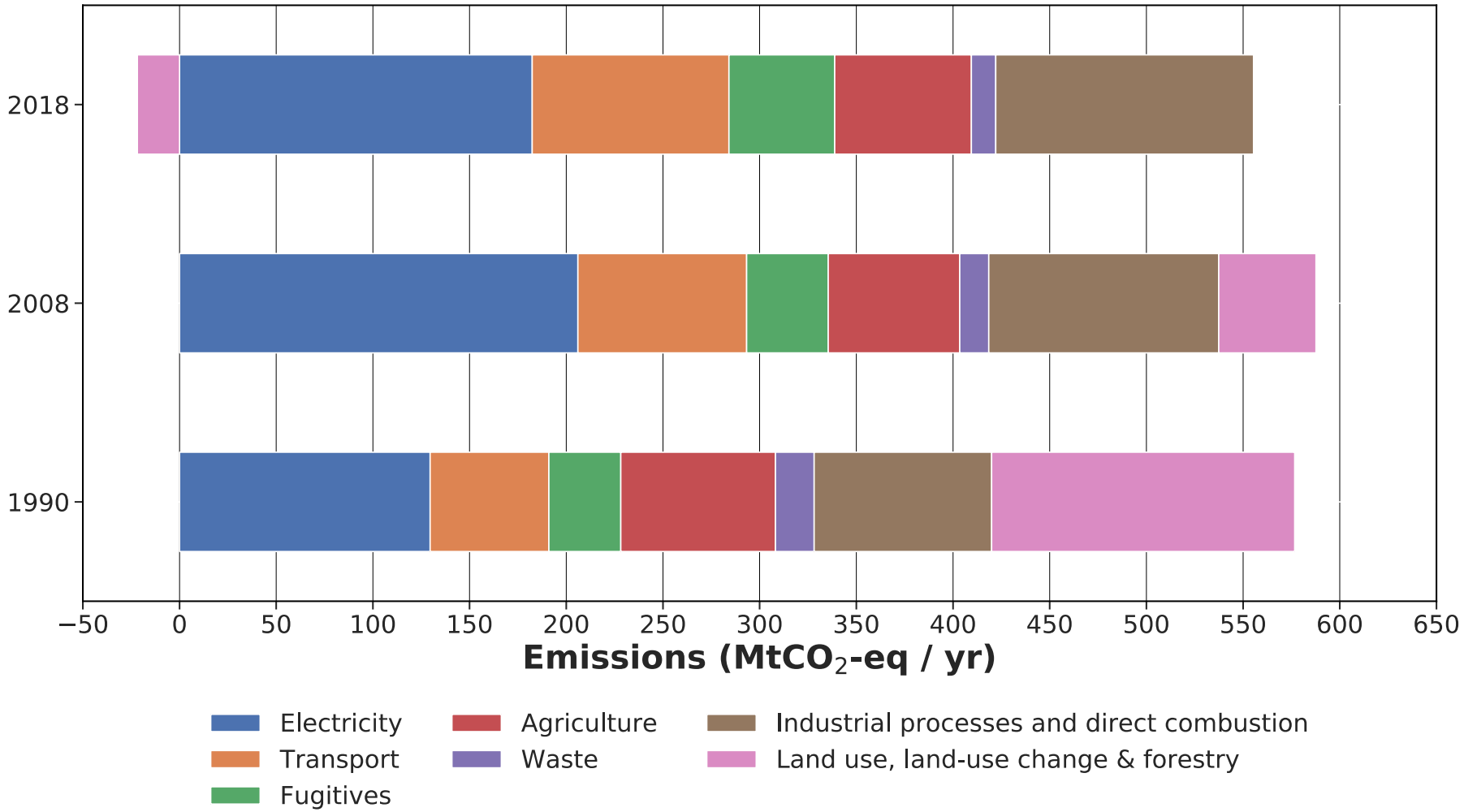
Note: Australia's share of carbon budget calculated with modified contraction and convergence approach, see Garnaut 2008 and CCA 2014.
Source: Department of the Environment and Energy, accessed 29 March 2019.

Chart 2 Annual stream inflow to Perth Dams



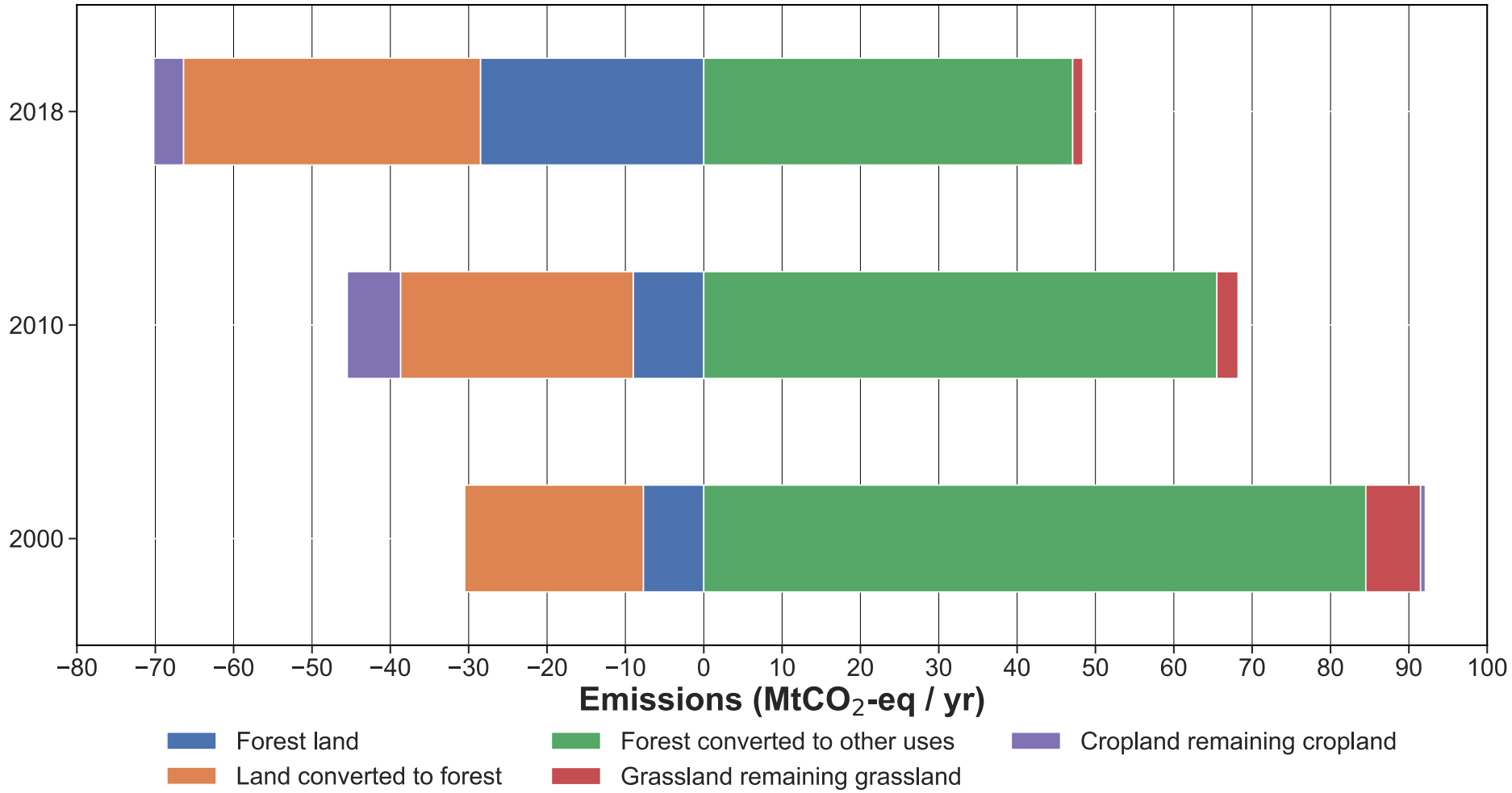
Note: Values exclude Stirling and Samson dams.
Source: Western Australia Water Corporation, accessed 29 March 2019.

Chart 3 Australian Emissions by Sector



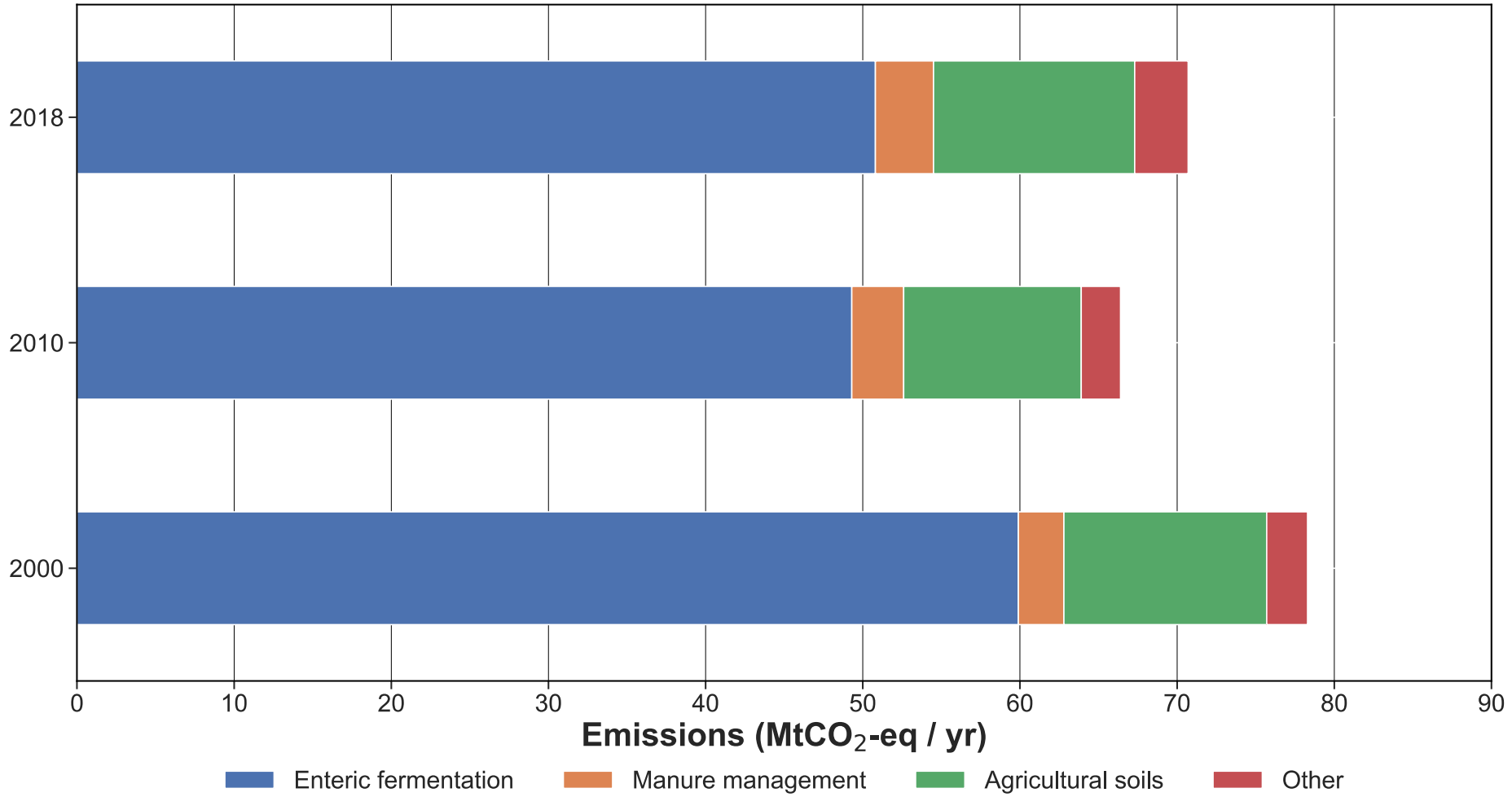
Source: Department of the Environment and Energy, accessed 29 March 2019.

Chart 4 Land sector emissions 2000, 2010, 2018



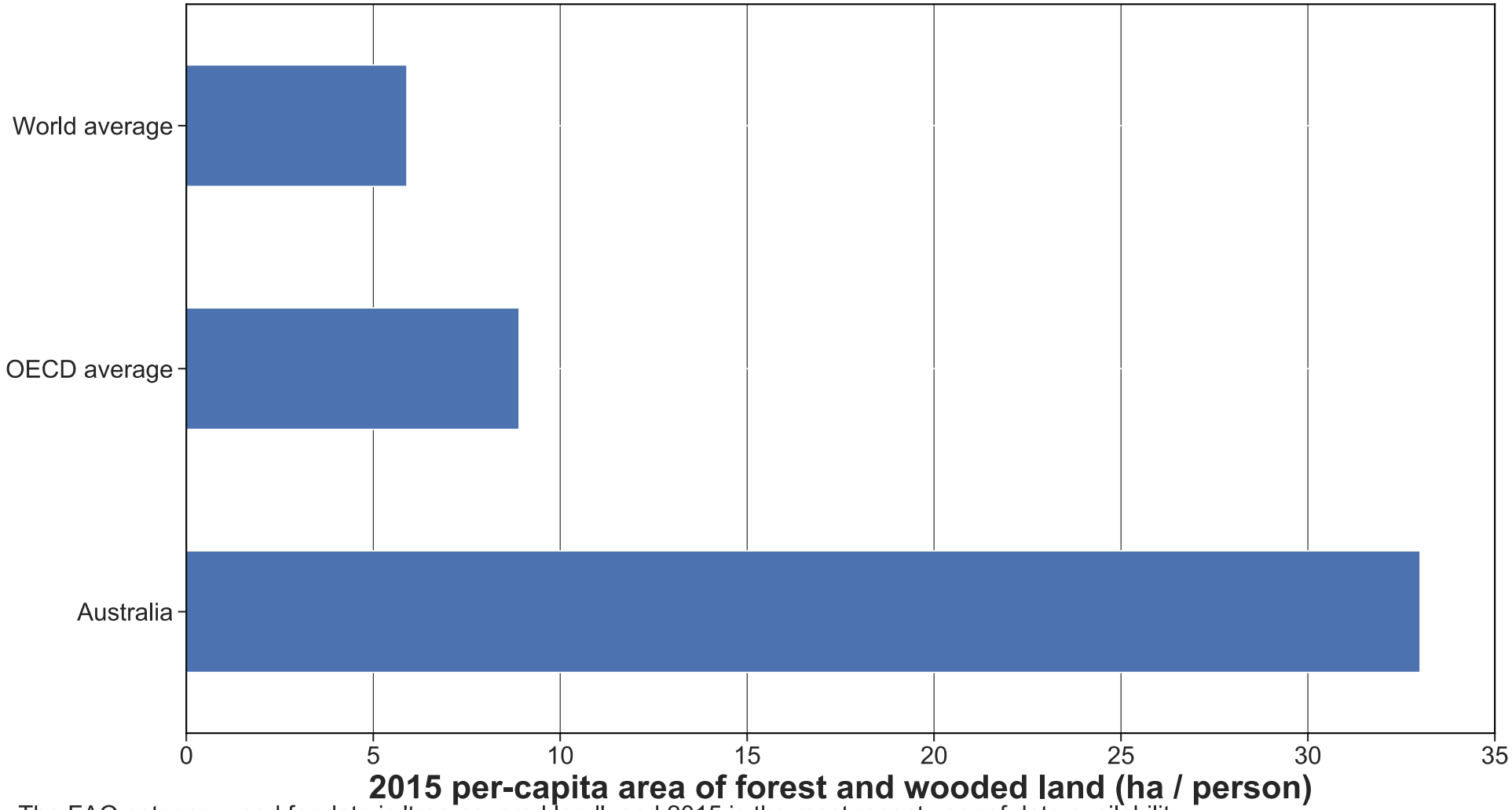
Note: Grassland remaining grassland includes Wetlands and Settlements.
Source: Department of the Environment and Energy, accessed 5 May 2019

Chart 5 Agriculture sector emissions 2000, 2010, 2018



Note: Other includes rice cultivation, burning of agricultual residues and savannahs and liming and urea application.
Source: Department of the Environment and Energy, accessed 5 May 2019

Chart 6 Per-capita area of forest and wooded land, 2015



Note: The FAO category used for data is 'tree-covered land', and 2015 is the most recent year of data availability.
Source: FAO 2015, accessed 5 May 2018.

Chart 7 Australian renewable power supply 2002-18

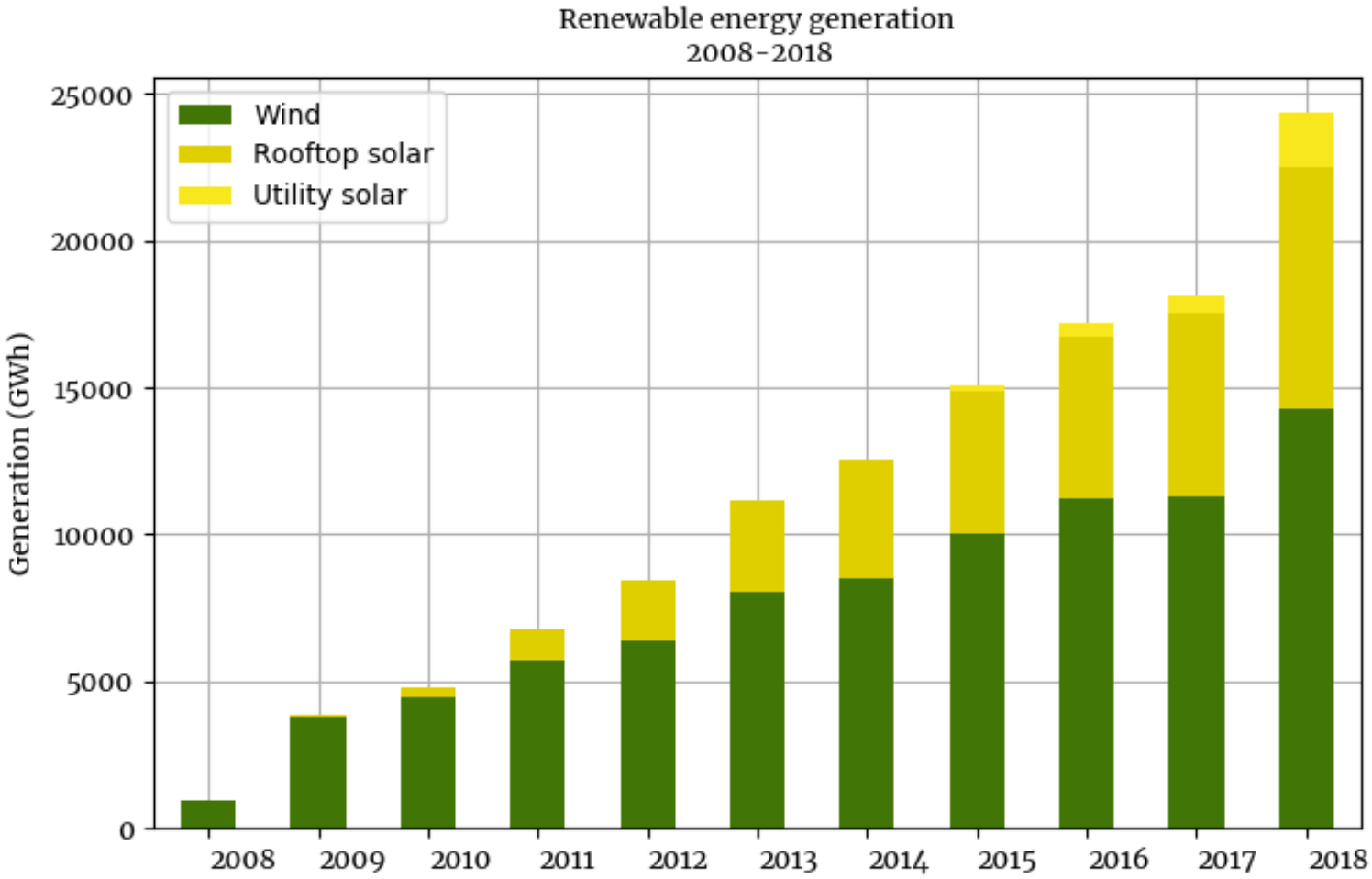


Chart 8 Total costs of solar PV Per MWh (real $A2019) as perceived in 2011

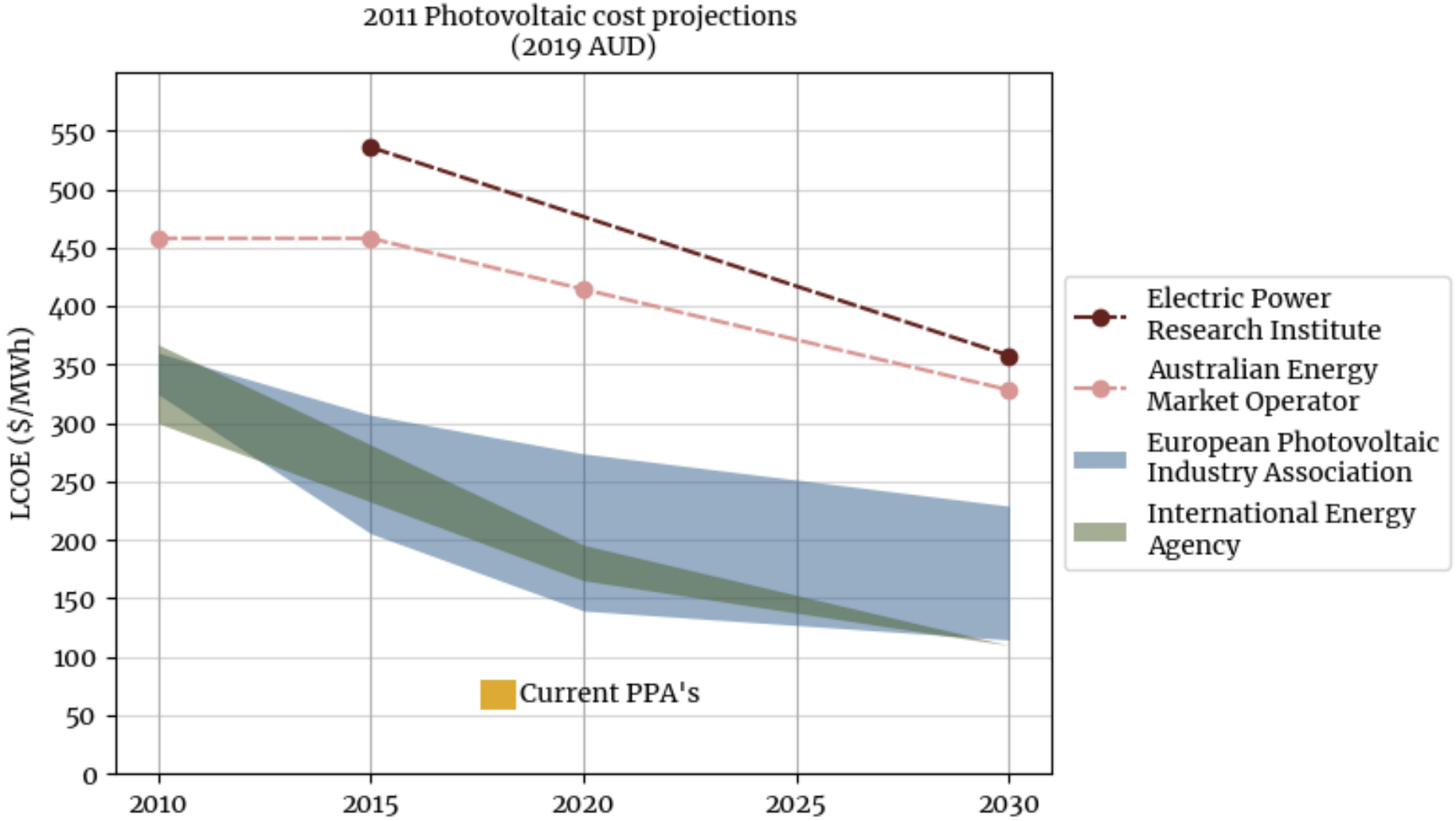


Chart 9 Total costs of wind per MWh (real $A2019) as perceived in 2011.

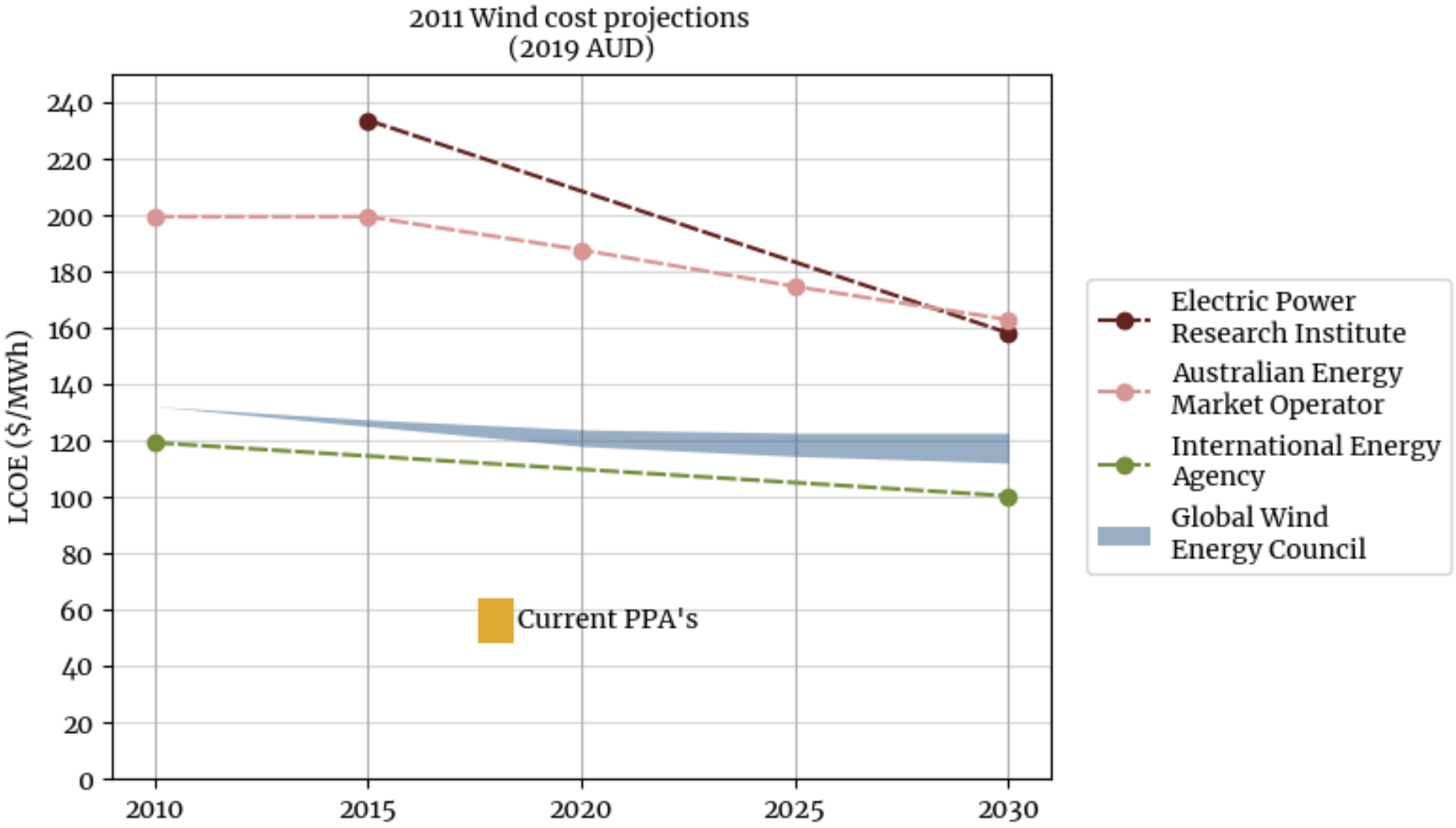


Chart 10 AEMO's persistent overestimation of future capital costs of solar PV

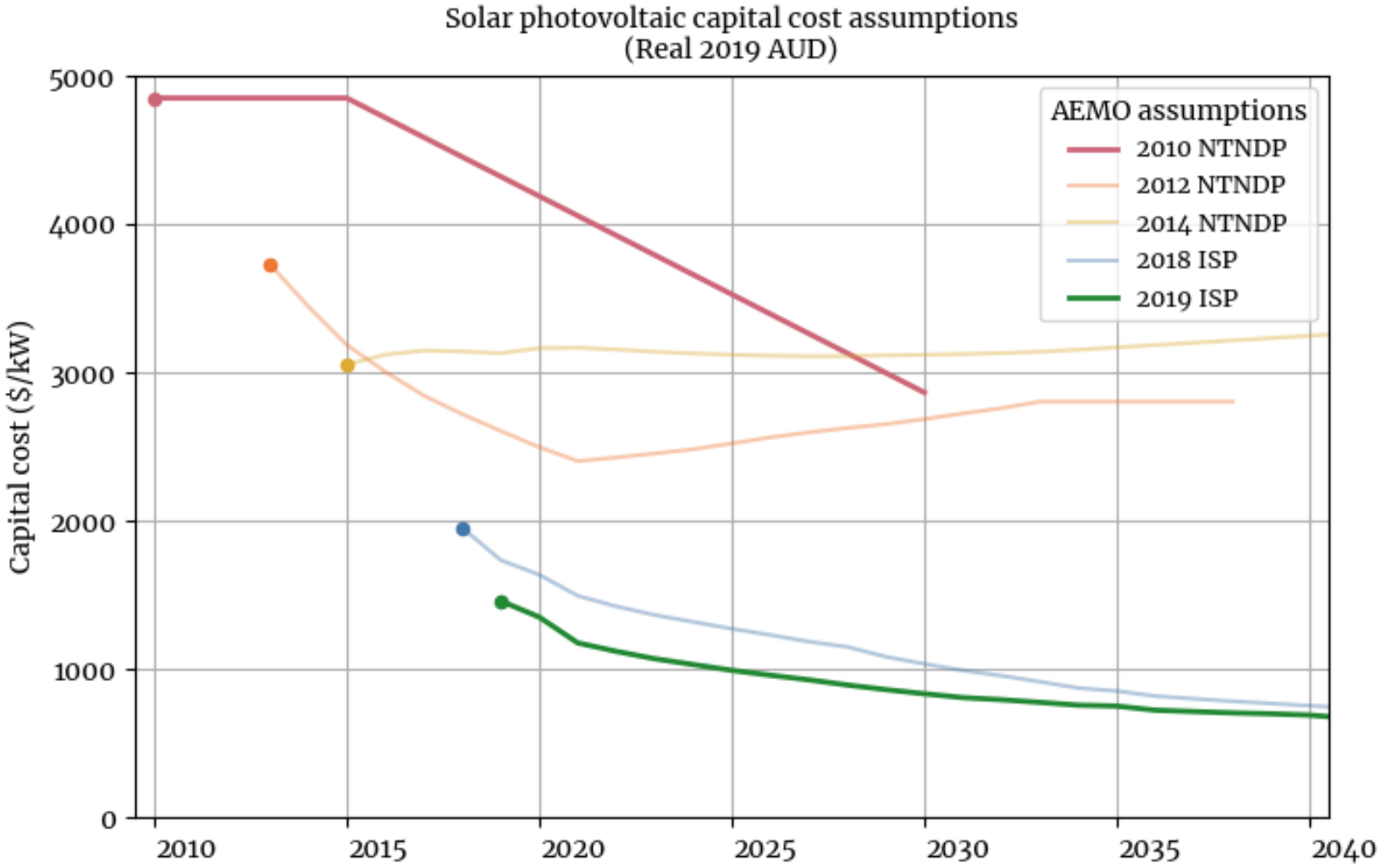


Chart 11 AEMO's persistent overestimation of future capital costs of wind

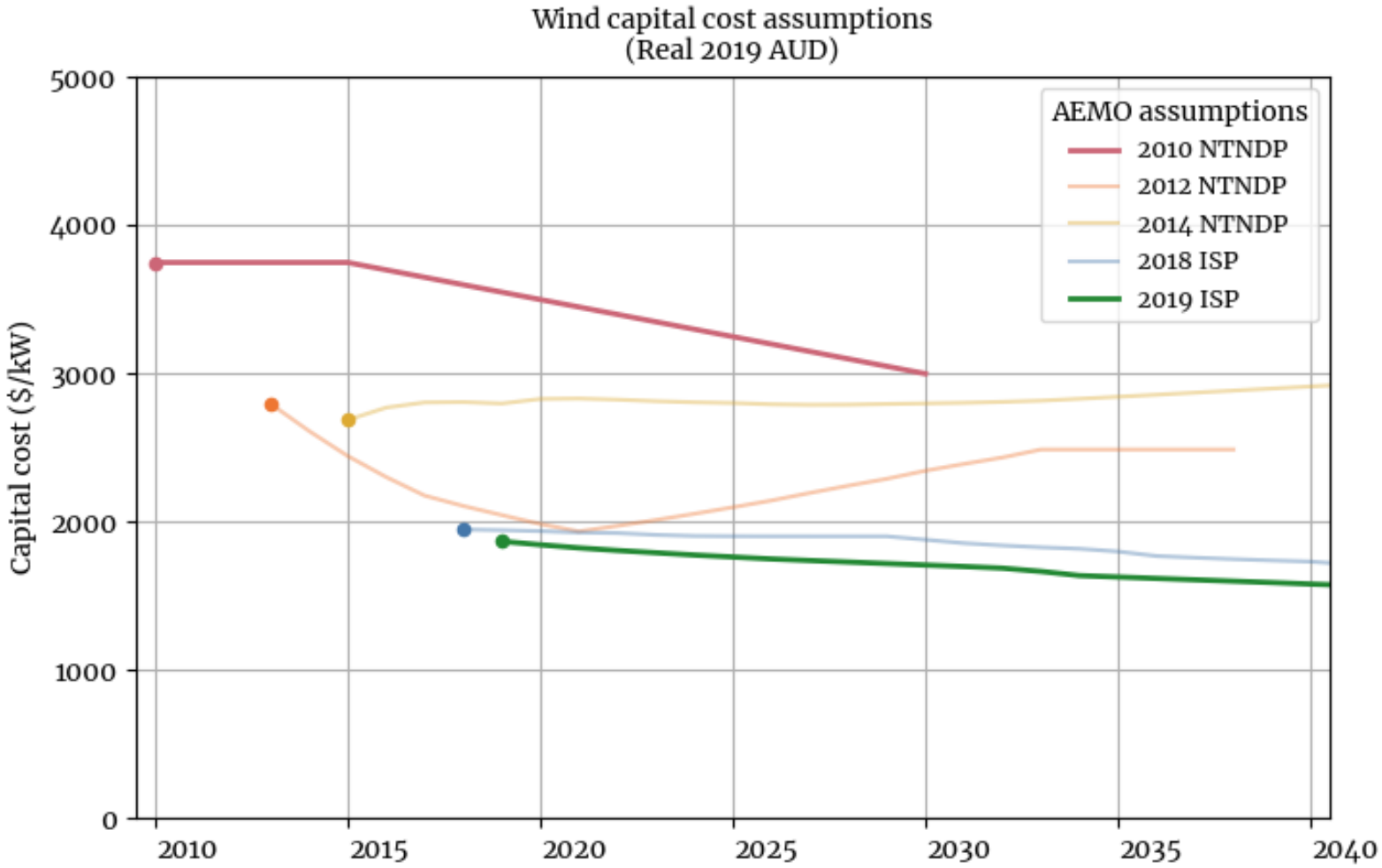
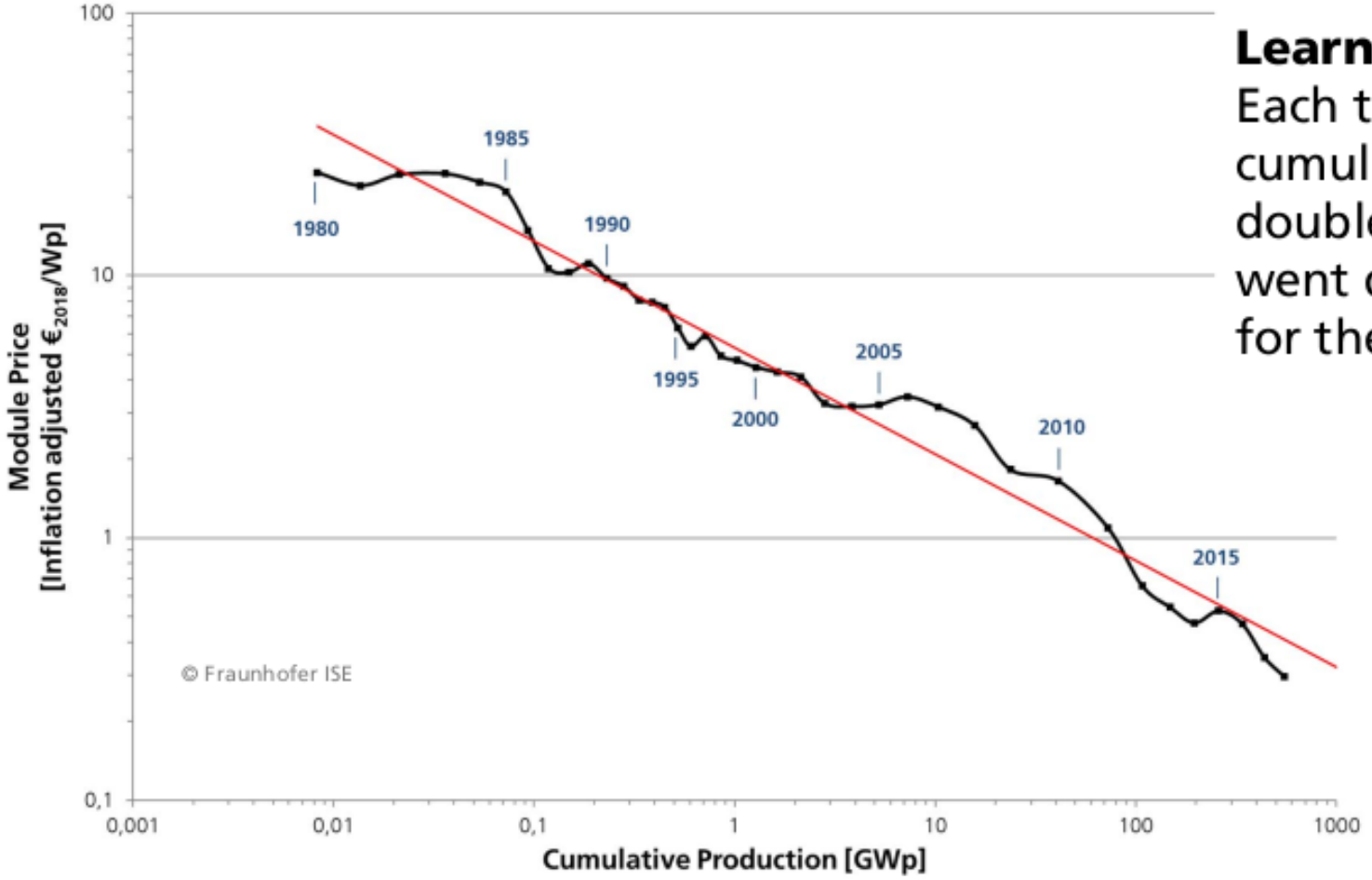


Chart 12 The learning curve for solar PV



Learning Rate:
Each time the cumulative production doubled, the price went down by 24 % for the last 38 years.

Chart 13 Locus of growing global solar PV installations

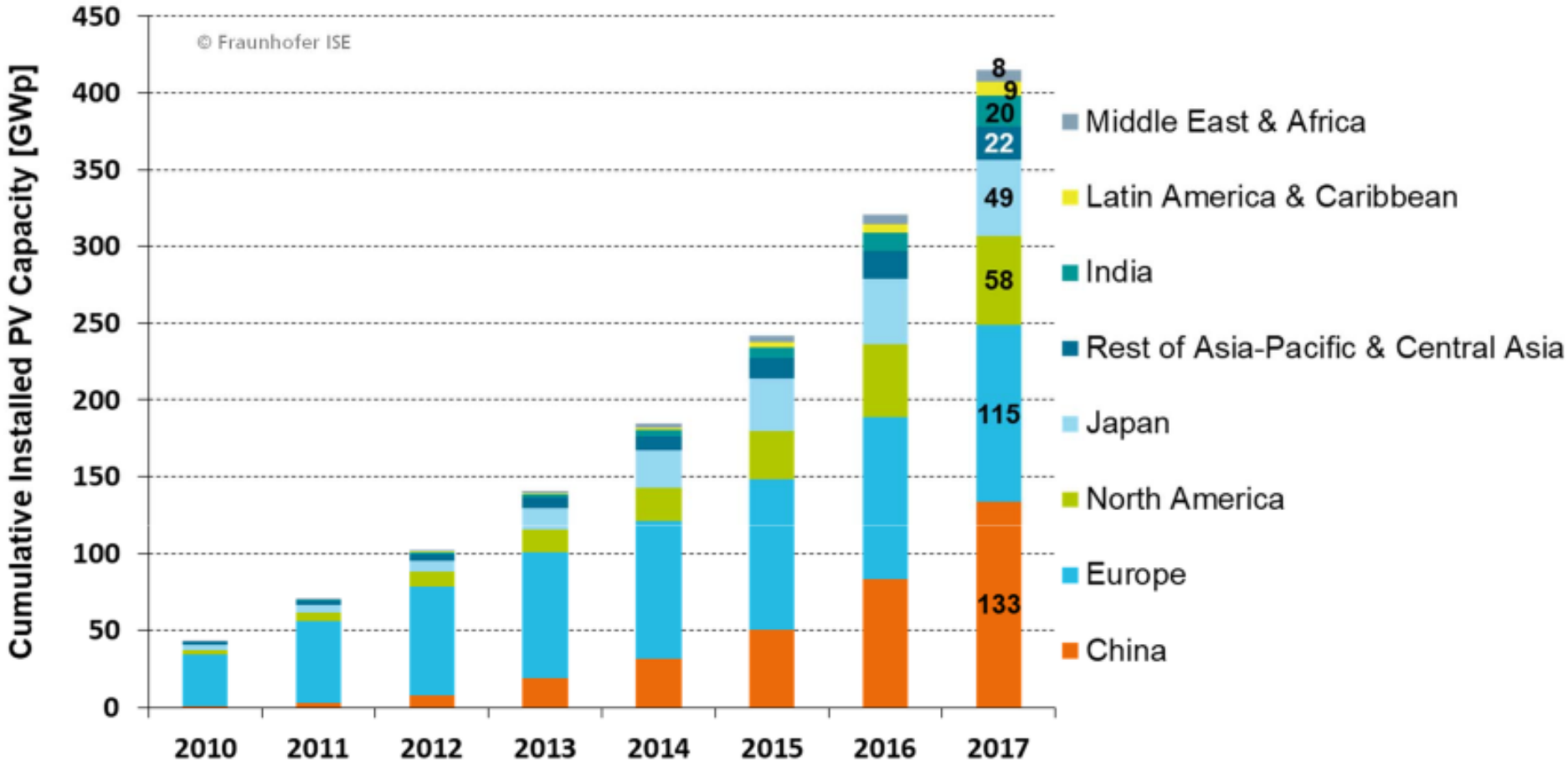


Chart 14 Locus of growing global solar PV production

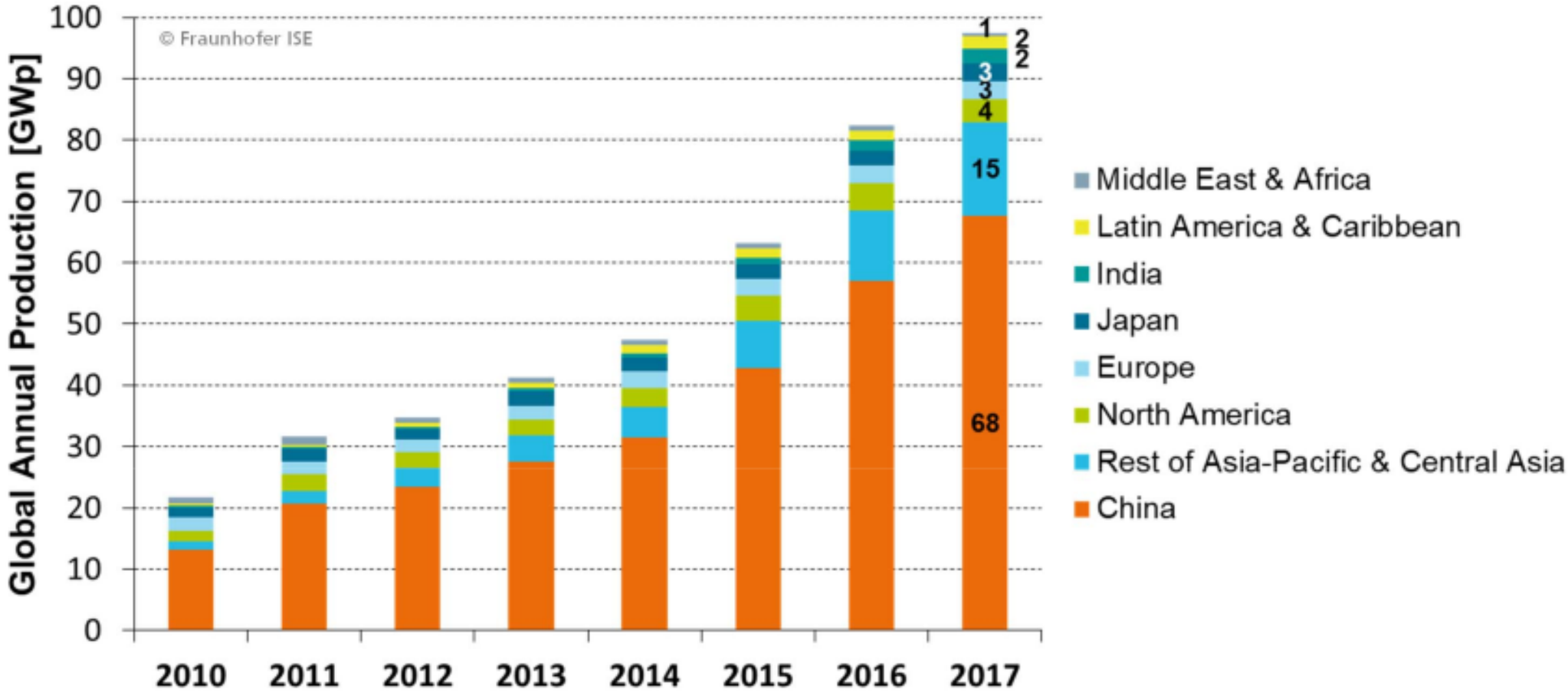


Chart 15 Total costs of Solar PV versus cost of coal fuel alone

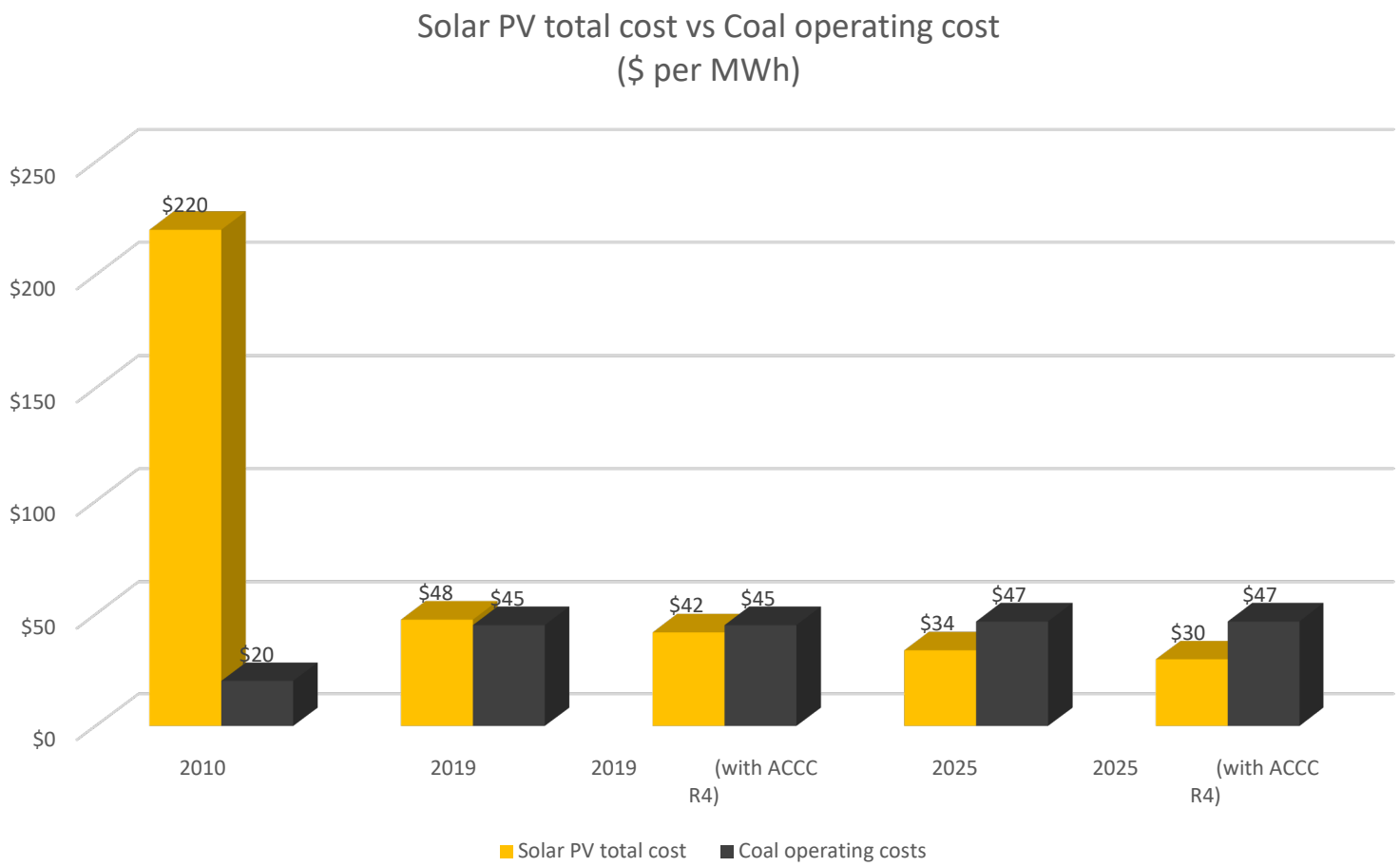
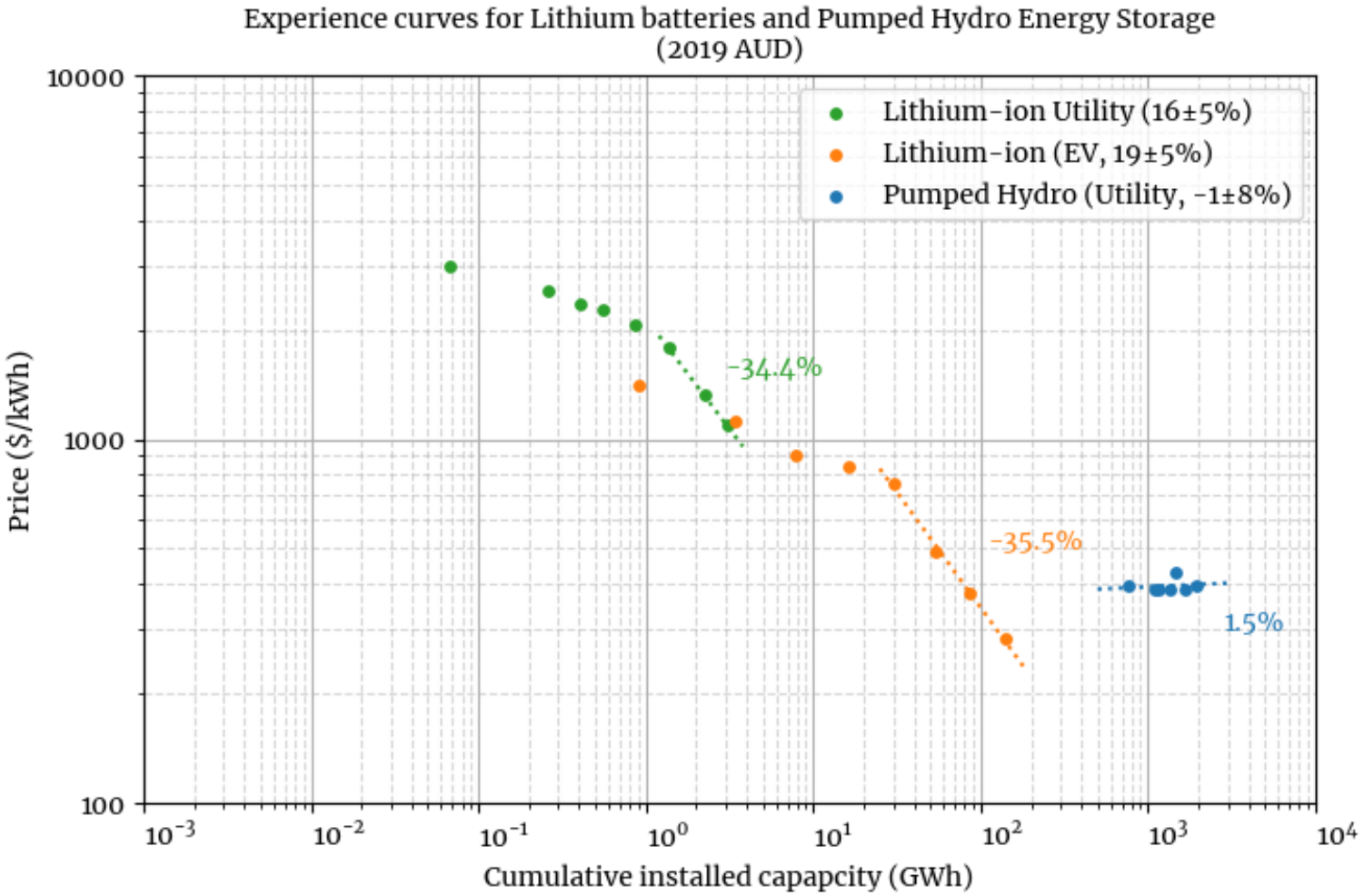


Chart 16 Costs of grid scale storage, 1990 to 2019



Source: Update 2018 - The future cost of electrical energy storage based on experience rates. Original paper: O. Schmidt, A. Hawkes, A. Gambhir & I. Staffell. *The future cost of electrical energy storage based on experience rates*. **Nat. Energy 2, 17110** (2017). Link to the original paper with original dataset: http://dx.doi.org/10.1038/nenergy.2017.110

The opportunity

Sources of Australia's industrial strength in the future low carbon world economy:

1. Low cost renewable energy

2. Low cost production of biomass for chemical industries

3. Efficient adding of value to agricultural, mineral and biomass products using low cost energy

4. Opportunities for negative emissions, e.g. in increased carbon soils, pastures and woodlands.

WA special advantages

WA special advantages:

1. World class solar and wind resources

2. Immense potential for carbon sequestration in the landscape

3. The world's main source of iron oxide and aluminum oxide for reduction to metal

4. Advanced expertise and skills in resources and energy project development

Tree of Knowledge, Barcaldine

Ross Garnaut: Professor of Economics, The University of Melbourne

Thank you