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CME Australia

Energy, carbon, finance: The business of markets

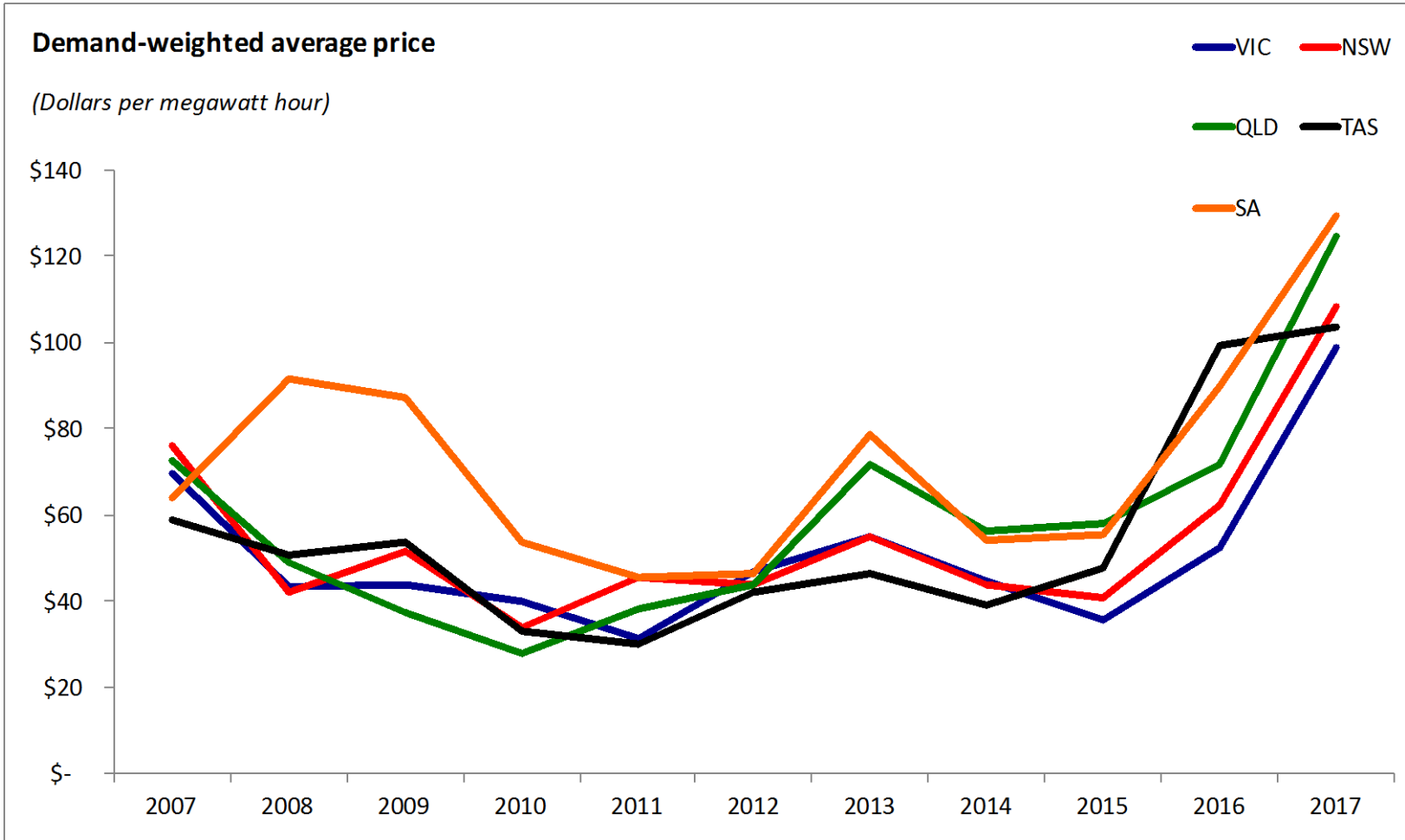
Sydney, Tuesday 17 October 2017



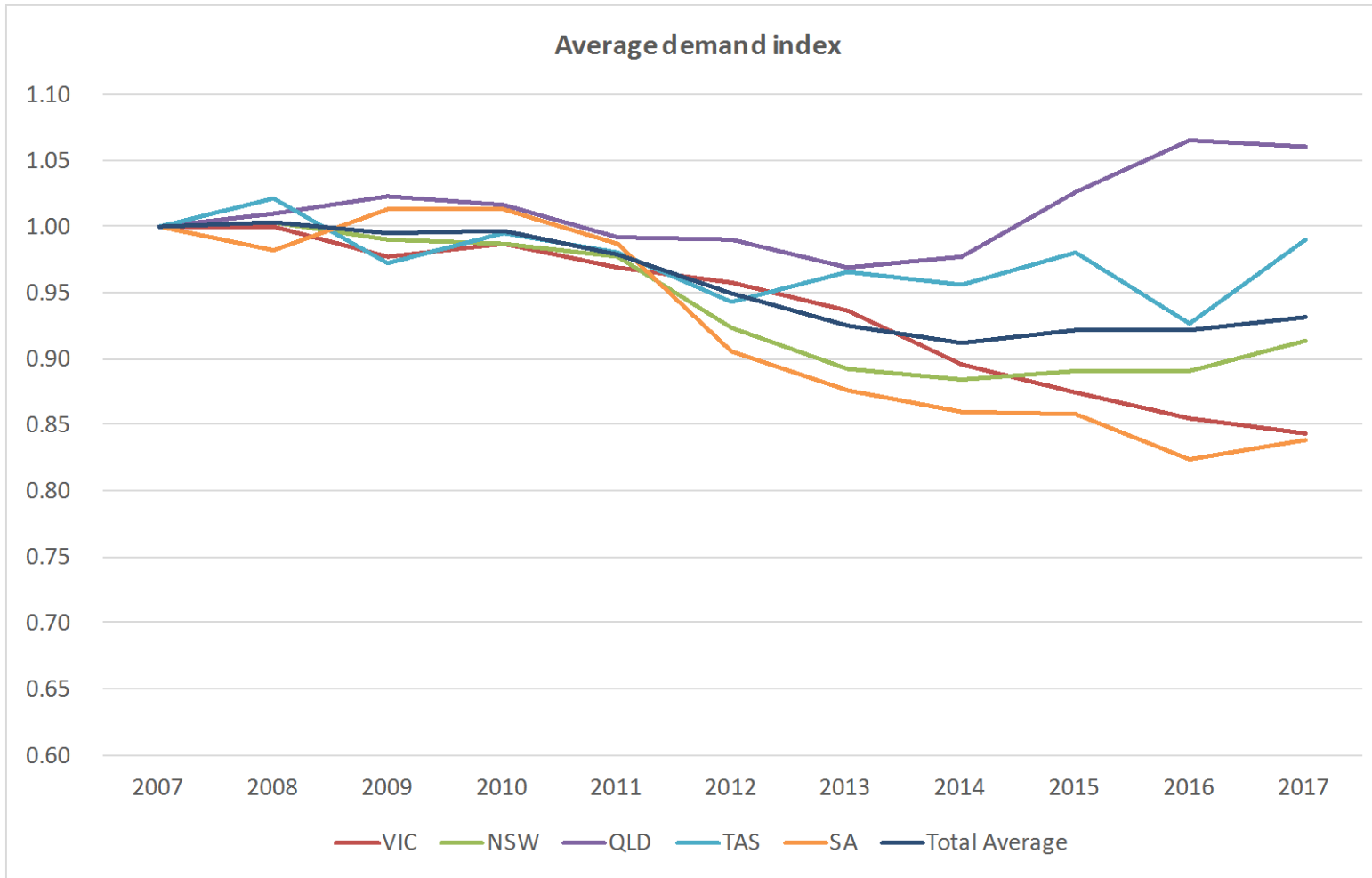
-
- Wholesale
 - Networks
 - Retail
 - Distributed energy

Wholesale

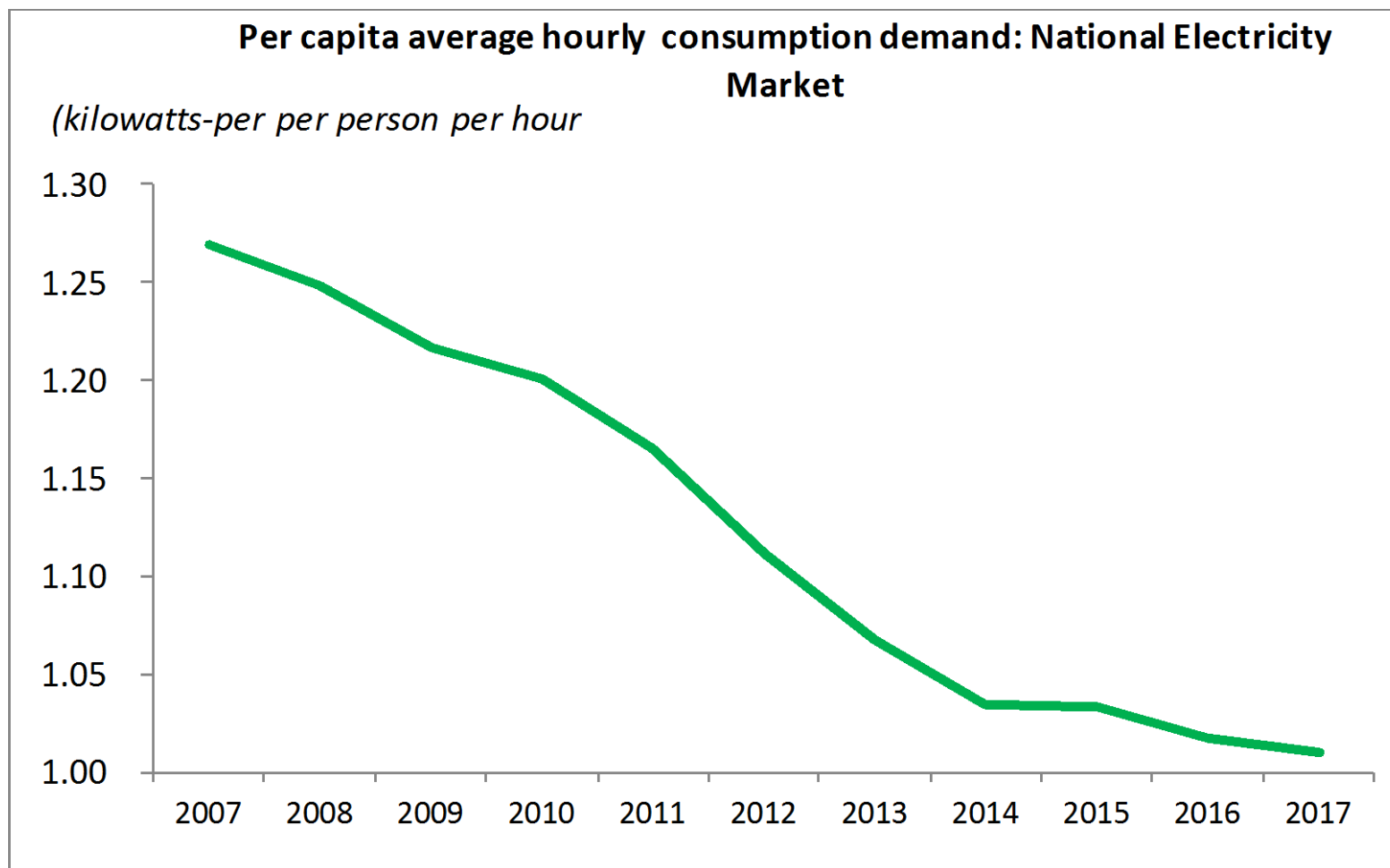
Average spot prices (\$/MWh): highly variable, now at record highs



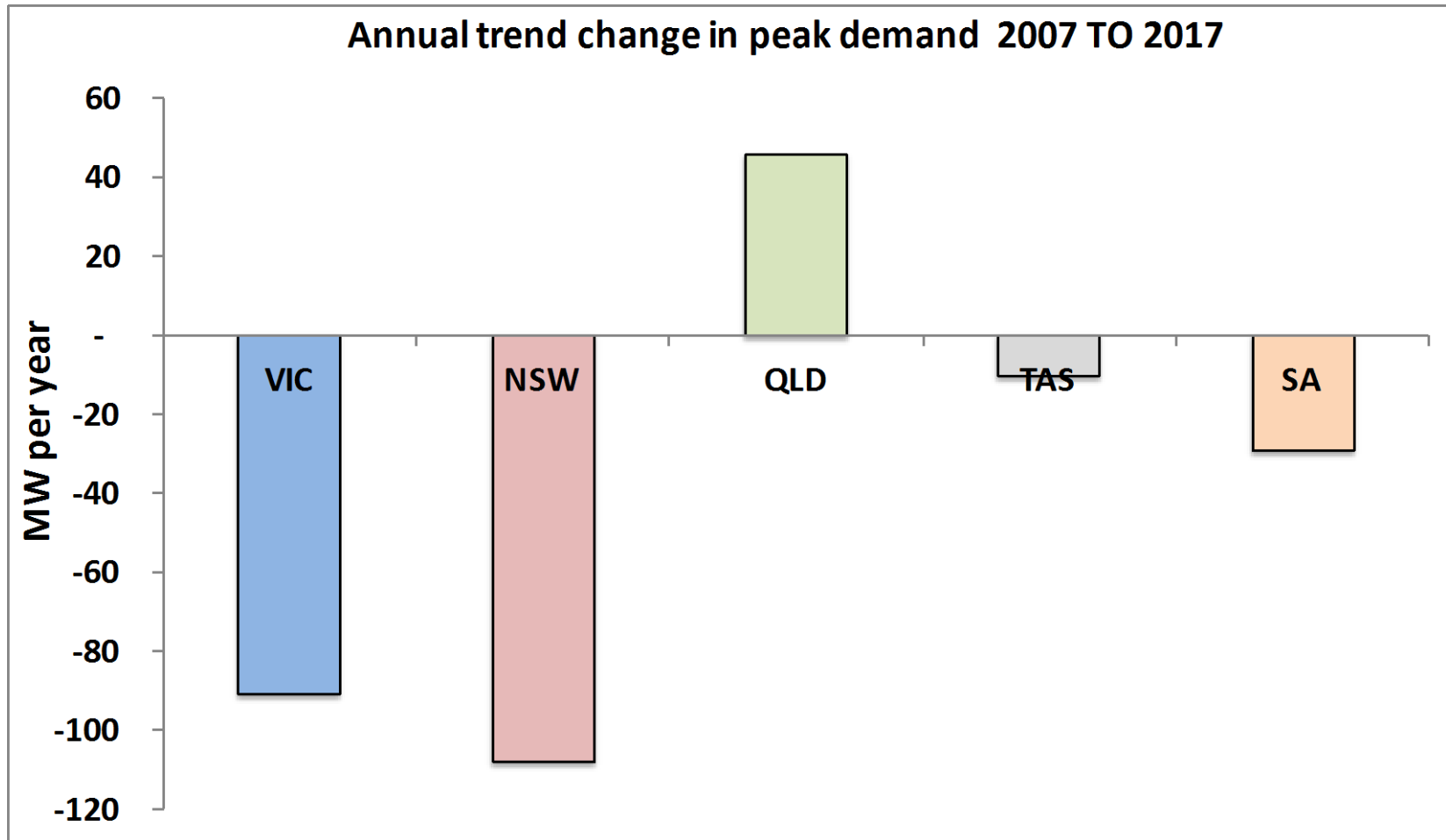
Grid demand index: declining mostly



Average per capita demand (kW/person/hour): large declines



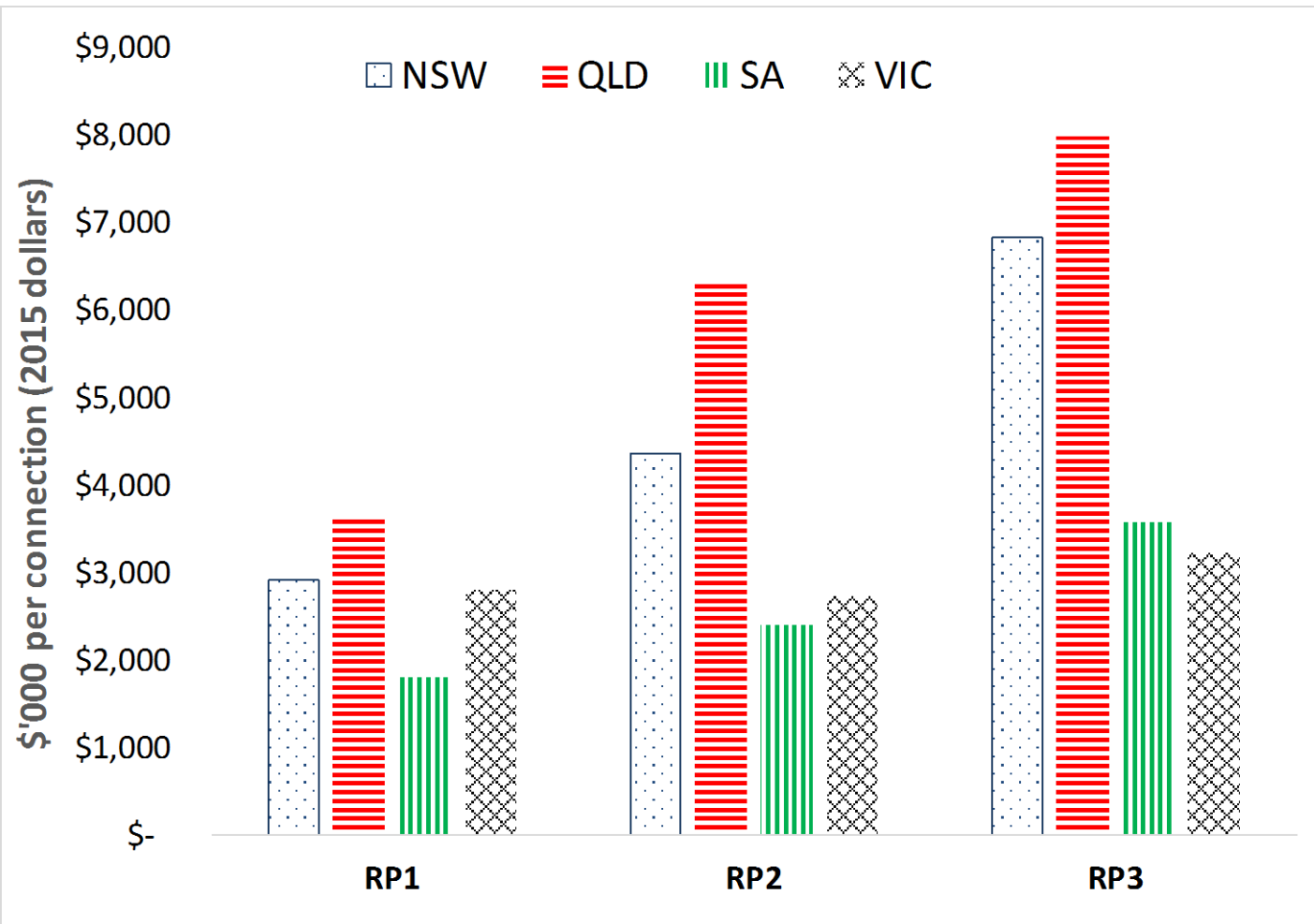
Trend changes in peak demand 2007 to 2017: generally declining



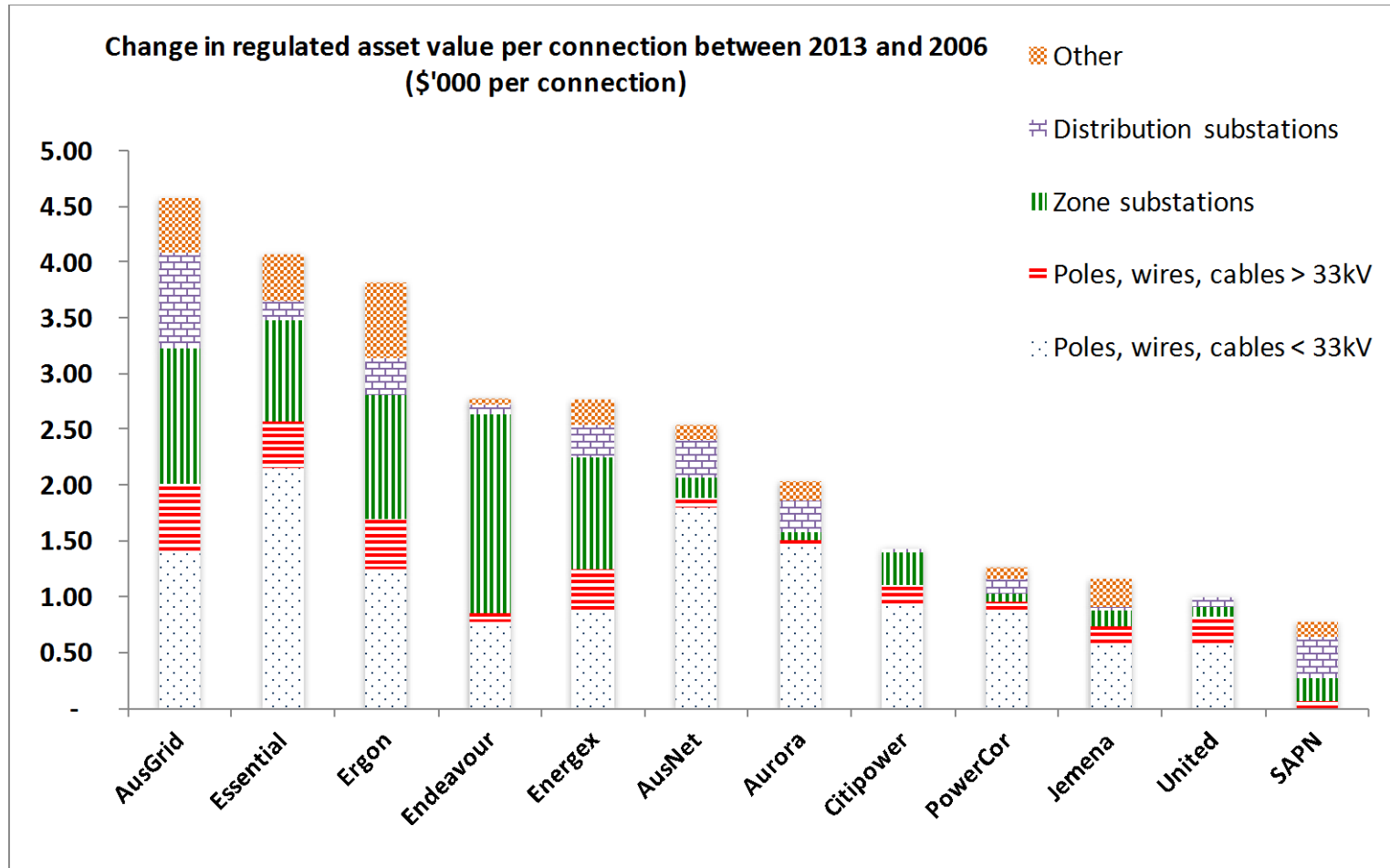
Networks



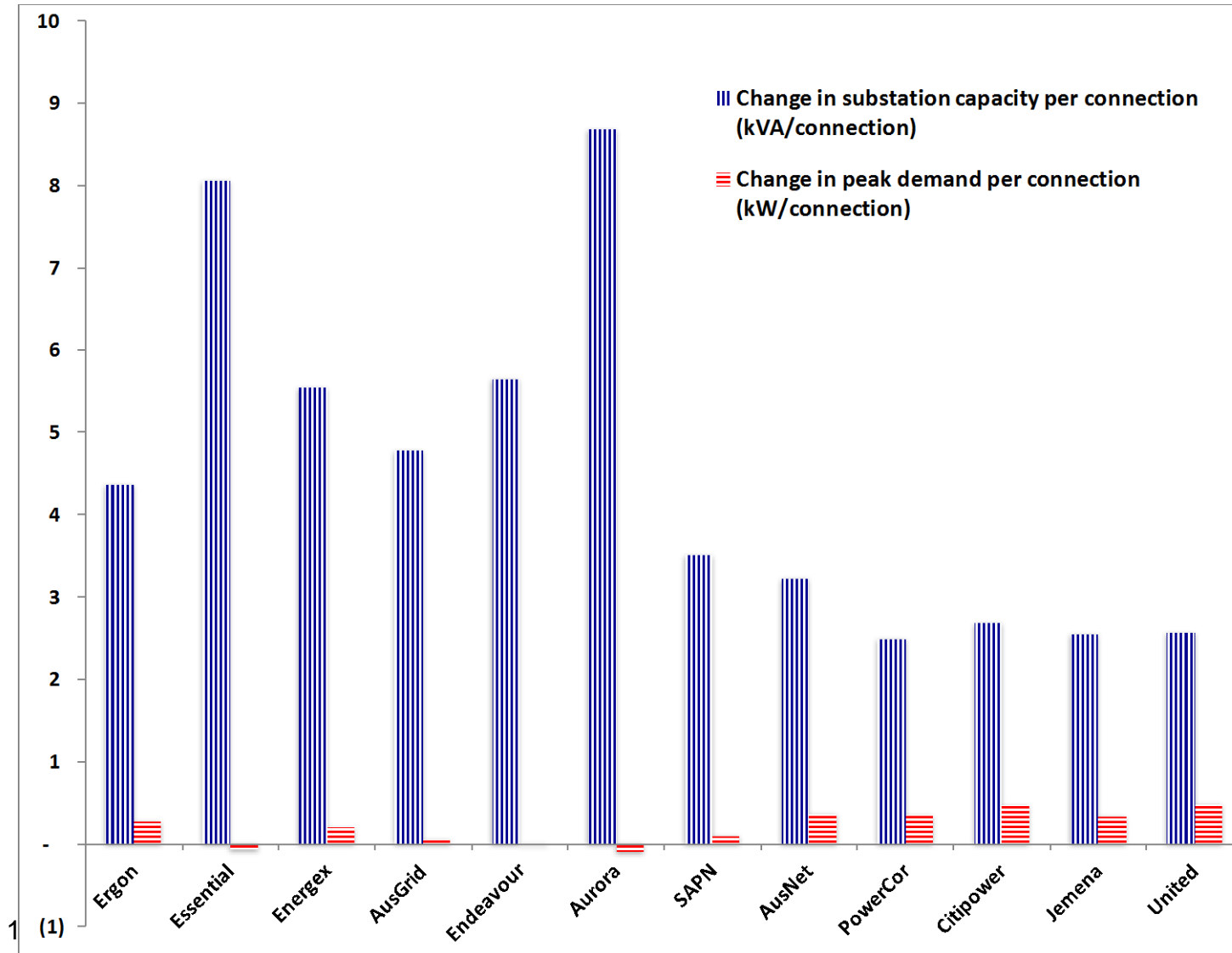
Total expenditure allowances in three regulatory periods: govt v private disparity



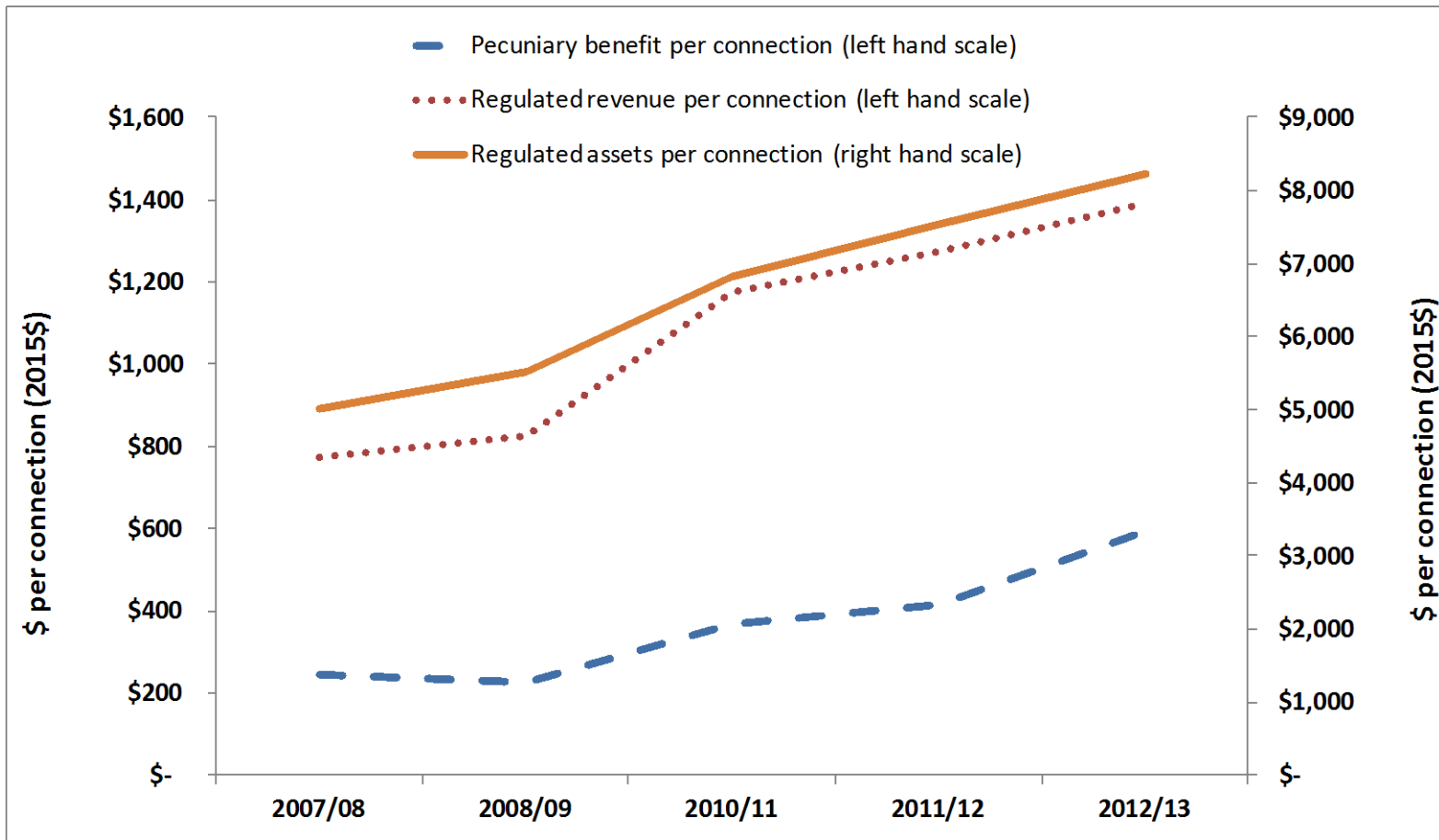
Change in asset value by asset type: mostly substations where govt owned



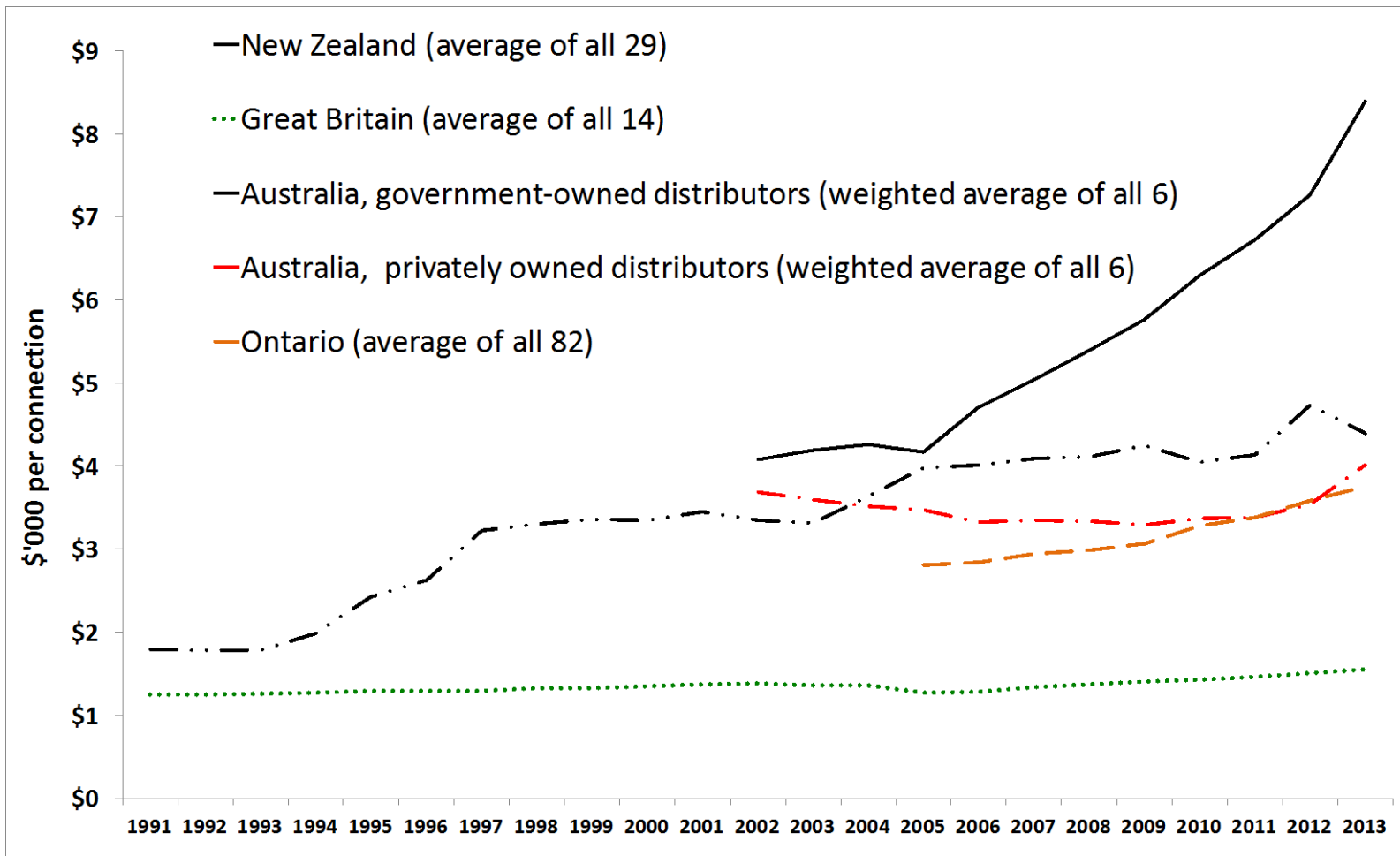
Change in substation capacity and peak demand per connection from 2006 to 2013: supply far exceeds demand, particularly where govt. owned



Pecuniary benefit, regulated assets per connection and regulated revenue per connection for government distributors: profits proportion to RAB



Regulated asset value per connection (\$'000 per connection) for electricity distributors in New Zealand, Great Britain, Australia and Ontario (2015 Australia dollars, PPP exchange rates)

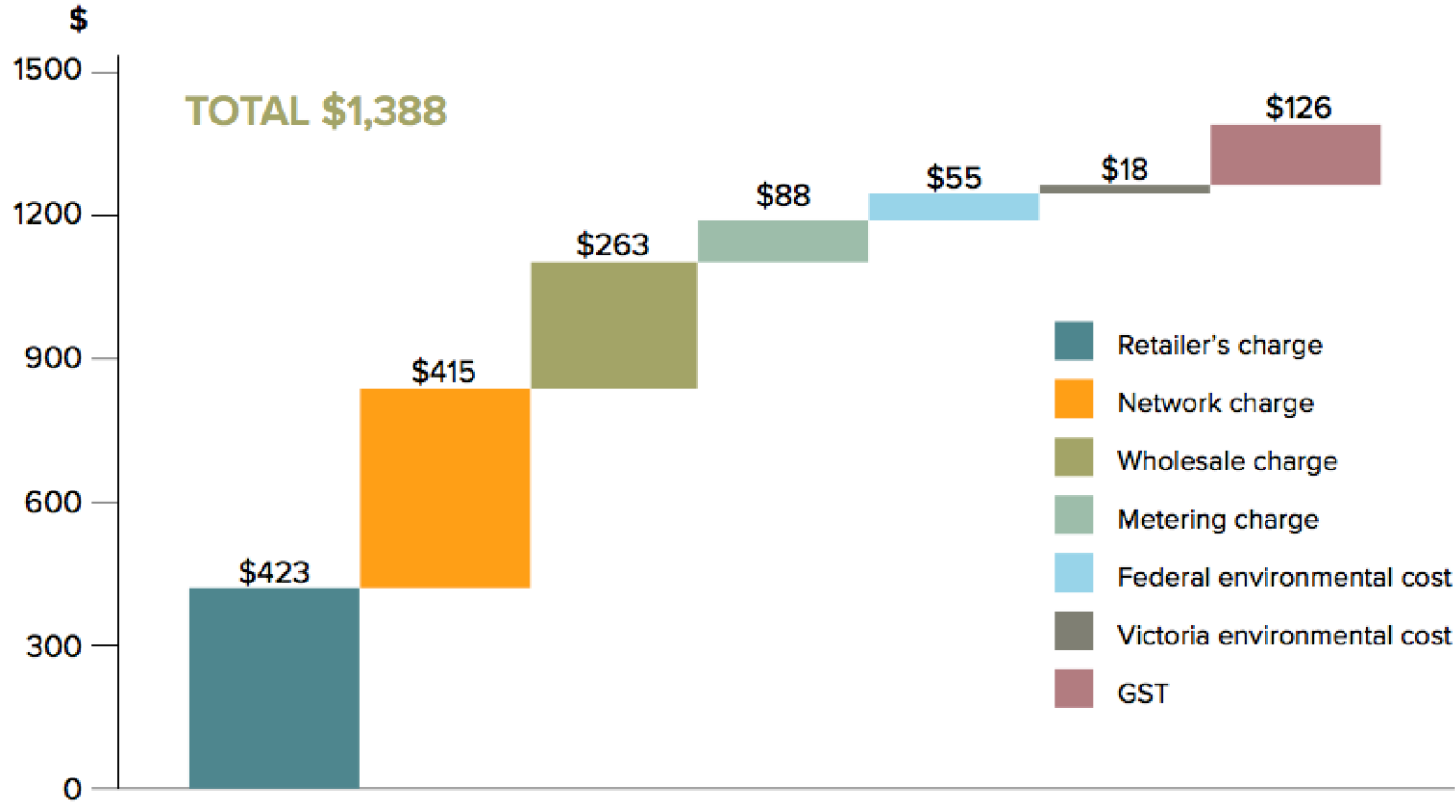




Retail

Bill break-down residential – VIC: retail dominates

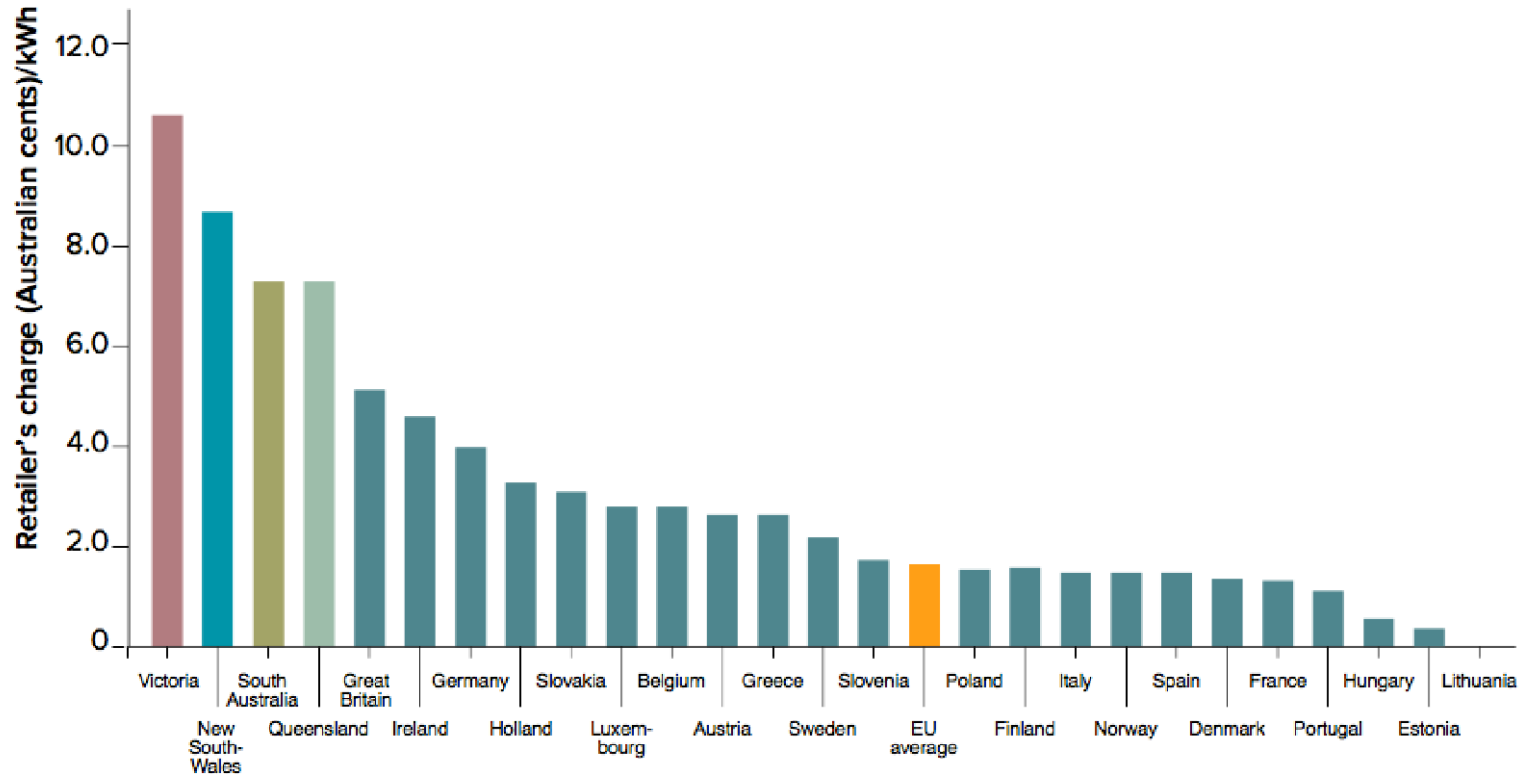
Figure 19 Residential bill disaggregation based on average bill from sample (4 MWh)



Source: Based on CME electricity analysis, Figure 30, p. 63

International comparison of retailers' charge: Australian's retailer charges much higher than in Europe

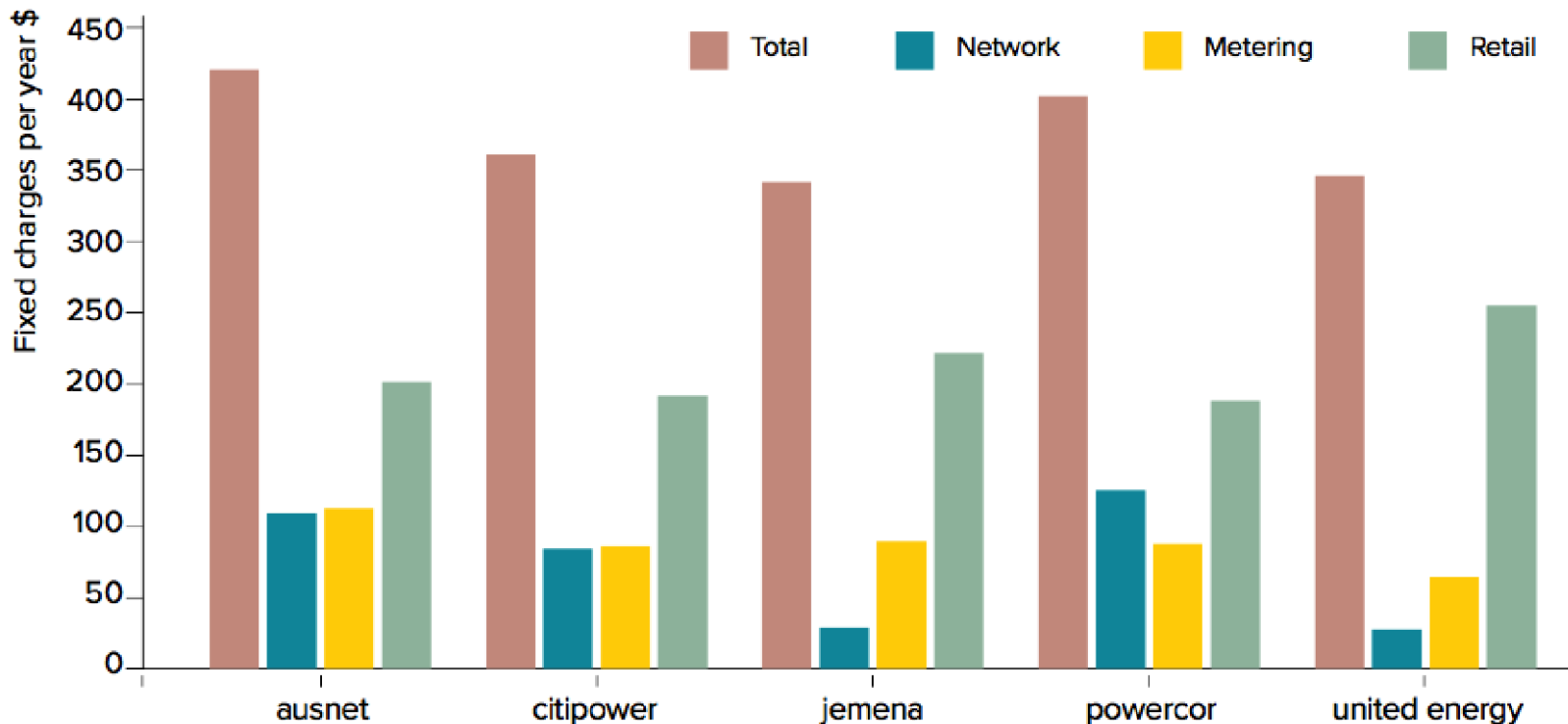
Figure 20 Interstate cross country comparison of retailer charges for their retail services, to residential customers (cents per kWh)



Source: Based on CME electricity analysis, Figure 35, p. 68

Break-down of fixed charges: retailer fixed charges disproportionately high

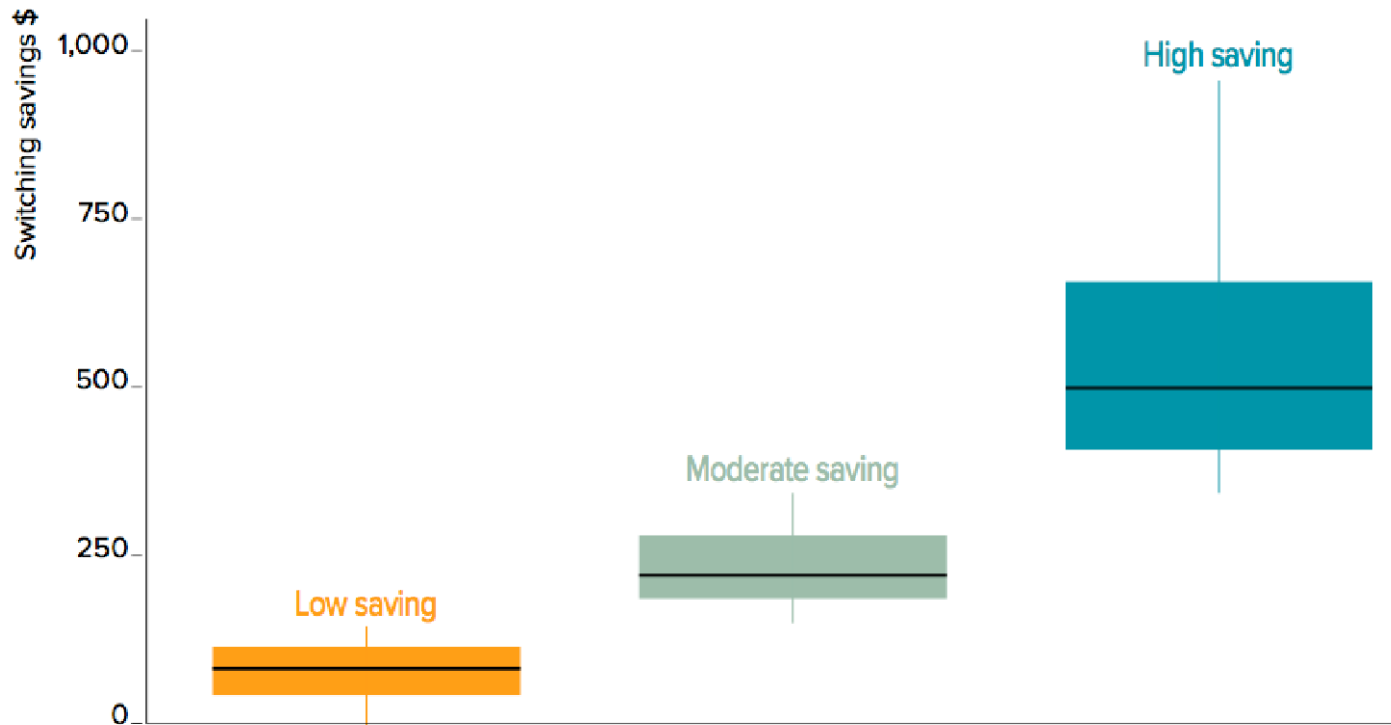
Figure 22 Annual fixed retail, fixed network and metering charges, bill data



Source: Based on CME electricity analysis, Figure 23, p. 50

Saving from switching: lots of money on the table. Why?

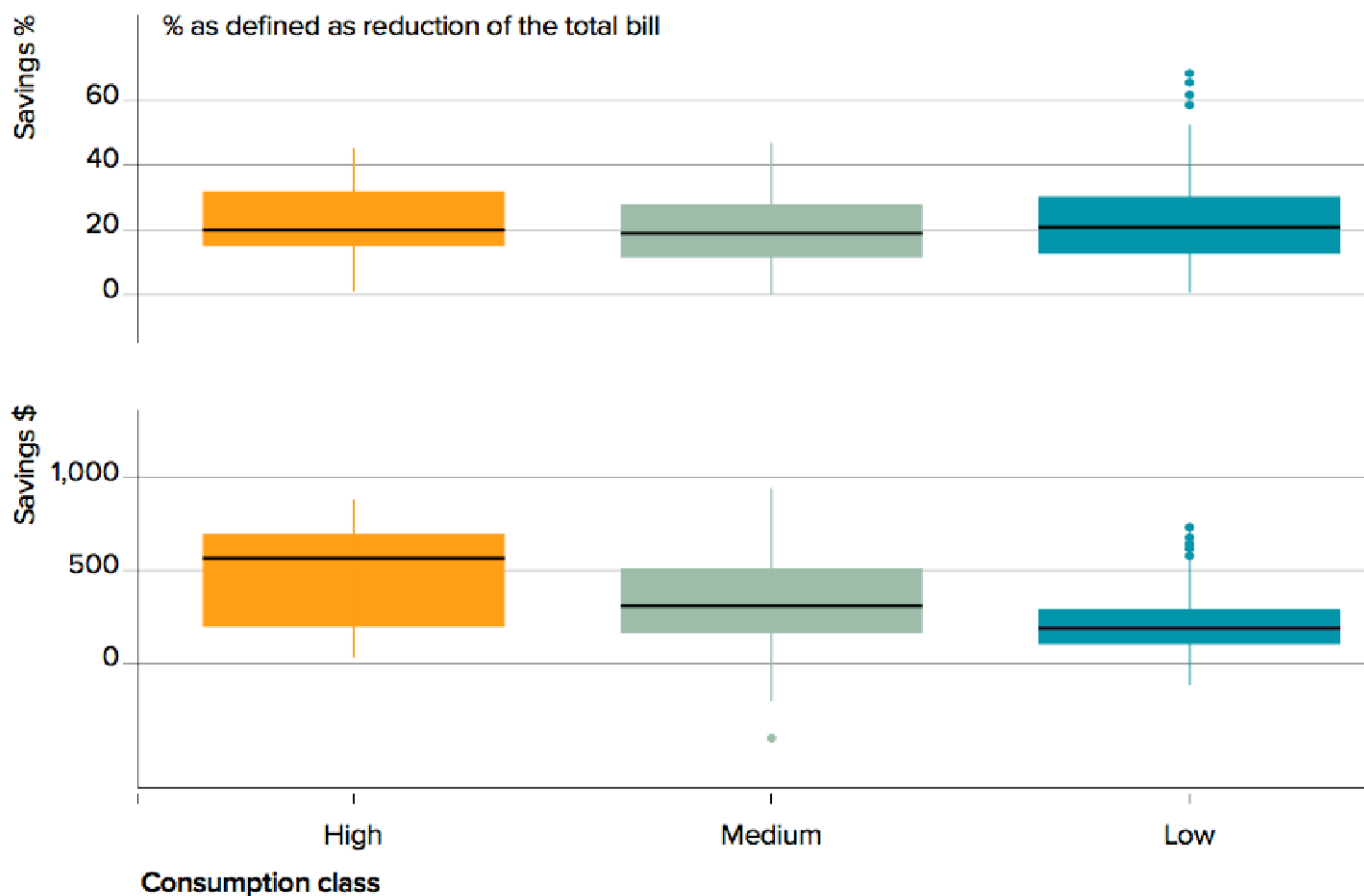
Figure 24 Savings that could be achieved if consumers switched electricity offers



Source: Based on CME electricity analysis, Figure 42, p. 77

Saving from switching as percentage of bill: ditto

Figure 23 Distribution of savings by level of consumption



Source: Based on CME electricity analysis, Figure 41, p. 76

Distributed energy

Behind-the-Meter (BtM) PV v Grid for households: PV installation now at record high can be no surprise

	cents per kWh*			
	VIC	NSW	SA	QLD
Lowest grid variable price	15	17	34	20
Typical grid variable price	27	29	41	27
Highest grid variable price	45	44	55	34
Average solar price	6.3	6.0	5.5	5.5

BtM PV 2.5 - 7x cheaper than grid variable price in VIC

BtM PV 6 - 10x cheaper than grid variable price in SA

- Installed price of PV dropped ~80% over last 7 years. Nationally 1/5 detached/semi-detached households now with PV (1/3 in SA and QLD).
- PV clearly much cheaper than grid, but PV typically only displaces ~ 30% of grid consumption for typical house. Surplus PV production exported to the grid, currently receives around 10 cents per kWh (~doubled in last year).
- Rooftop PV pays for itself in almost all cases with north or west facing roof. Rapid growth also in commercial sector
- Monthly installation rate at all-time high in August 2017 (100 MW, costing ~ \$150m).

Behind-the-meter battery economics for households: rapidly getting there for small customers

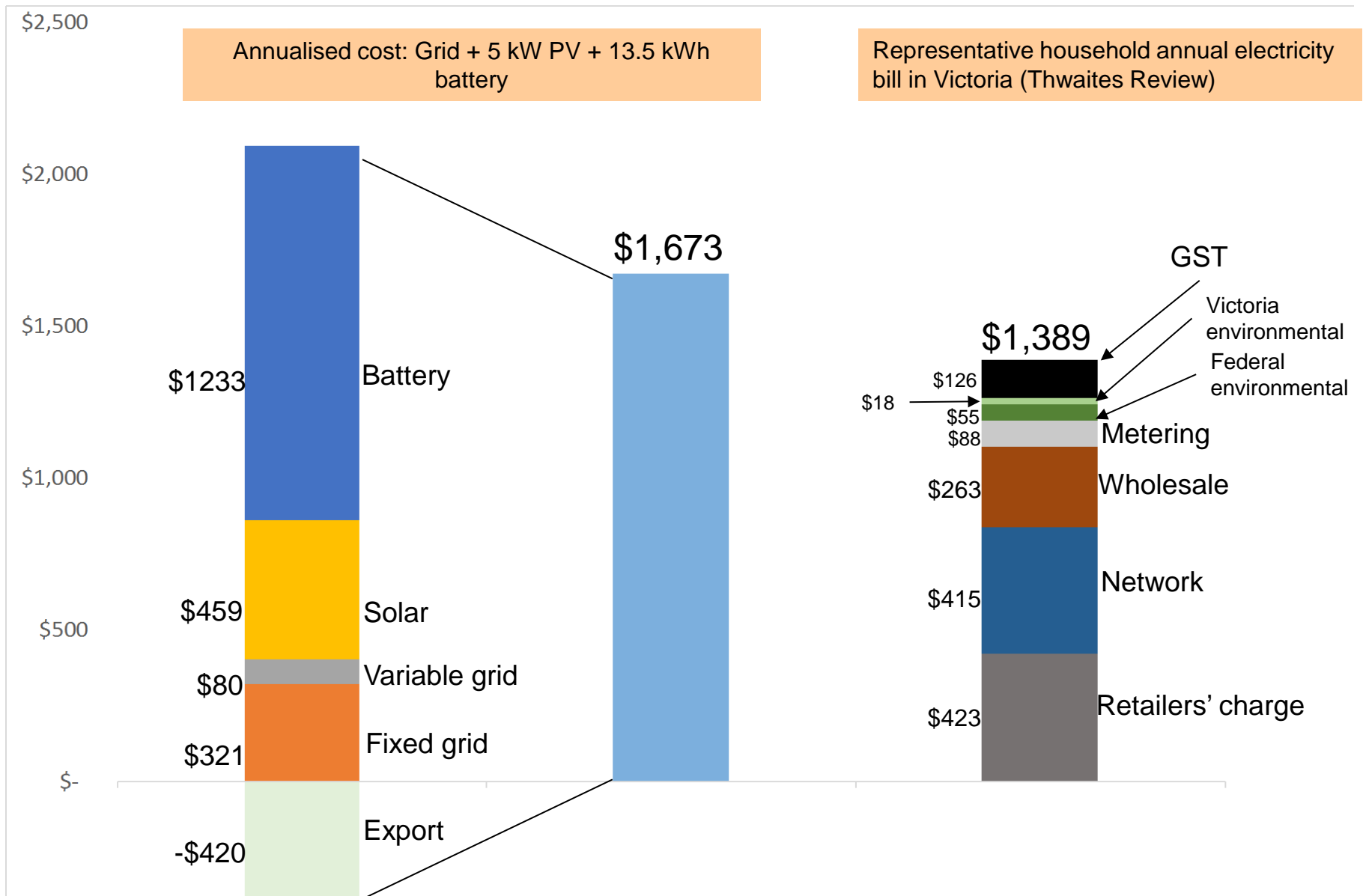
	cents per kWh				
	VIC	NSW	SA	QLD	
Grid-only arbitrage (median peak minus off-peak prices)	17	24	40	18	The benefit
Solar/grid arbitrage (lowest grid price minus avg. solar)	8	11	28	14	
Solar/grid arbitrage (median grid price minus avg. solar)	21	23	35	21	
Solar/grid arbitrage (highest grid price minus avg. solar)	39	38	50	28	

	Cents per kWh stored and reproduced per day	
Tesla PW2**	28	The cost
Bloomberg capex estimate	25	

* Grid prices from MarkIntell on 13 September 2017

** \$11k annualised at 2% (real) over 10 years, zero residual, 90% round-trip efficiency

- For households in SA, benefits from grid-only arbitrage or grid/PV arbitrage comfortably exceed costs. Elsewhere, benefits exceed costs for expensive retail offers.
- PV + Battery allows grid-independence for 70-100% of consumption. Optimal battery/PV sizing for households depend on many factors.



Grid+PV+Battery dearer than grid-only for representative household in Victoria, but the gap is narrowing

Policy issues arising

- Distributed energy technology development, and price/quality failure in the shared system driving decentralisation. Continued decentralised technology development certain but resolution of price failures in shared system remains unclear.
- Governments concerned about electricity prices should focus on ensuring households and businesses can take advantage of BtM PV, and increasingly also batteries.
- Grid still valuable as back-up/decentralised trading/ diversify risk. Continued decline in dependency on shared grid is certain. Incentives for grid by-pass are very strong in some places.
- Network asset values, particularly of government-owned distributors reflect historic write-ups, indexation at CPI and gold-plating. Asset write-down to bring regulatory values to economic value essential to ensure those dependent on the grid do not disproportionately bear burden of past policy failure & to avoid wasteful grid by-pass.
- For government distributors this is fiscal and political. For private distributors, legitimate concerns about political appropriation arise.



Annual Dinner

Dr Philip Lowe
Governor

Reserve Bank of Australia

*Recent Developments in the Australian
and Global Economy*

Tuesday 21 November, Four Seasons Sydney

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