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الملتقى السعودي للكهرباء
Saudi Electricity Forum
طاقة مستدامة لرؤية شاملة
Sastainable energy for Comprehensive Vision

Saudi Electricity Forum

Under the Patronage of His Excellency

Khalid Bin Abdul Aziz Al-Faleh

Minister of Energy, Industry and Mineral Resources

10 -12 October 2017

Riyadh – Al Faisaliah Hotel

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International experiences for Electricity Sector privatization

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Fifth Session : Developments in Privatization of the Electricity Sector in Saudi Arabia

Saudi Electricity Forum
Riyadh, Saudi Arabia

10-12 October 2017

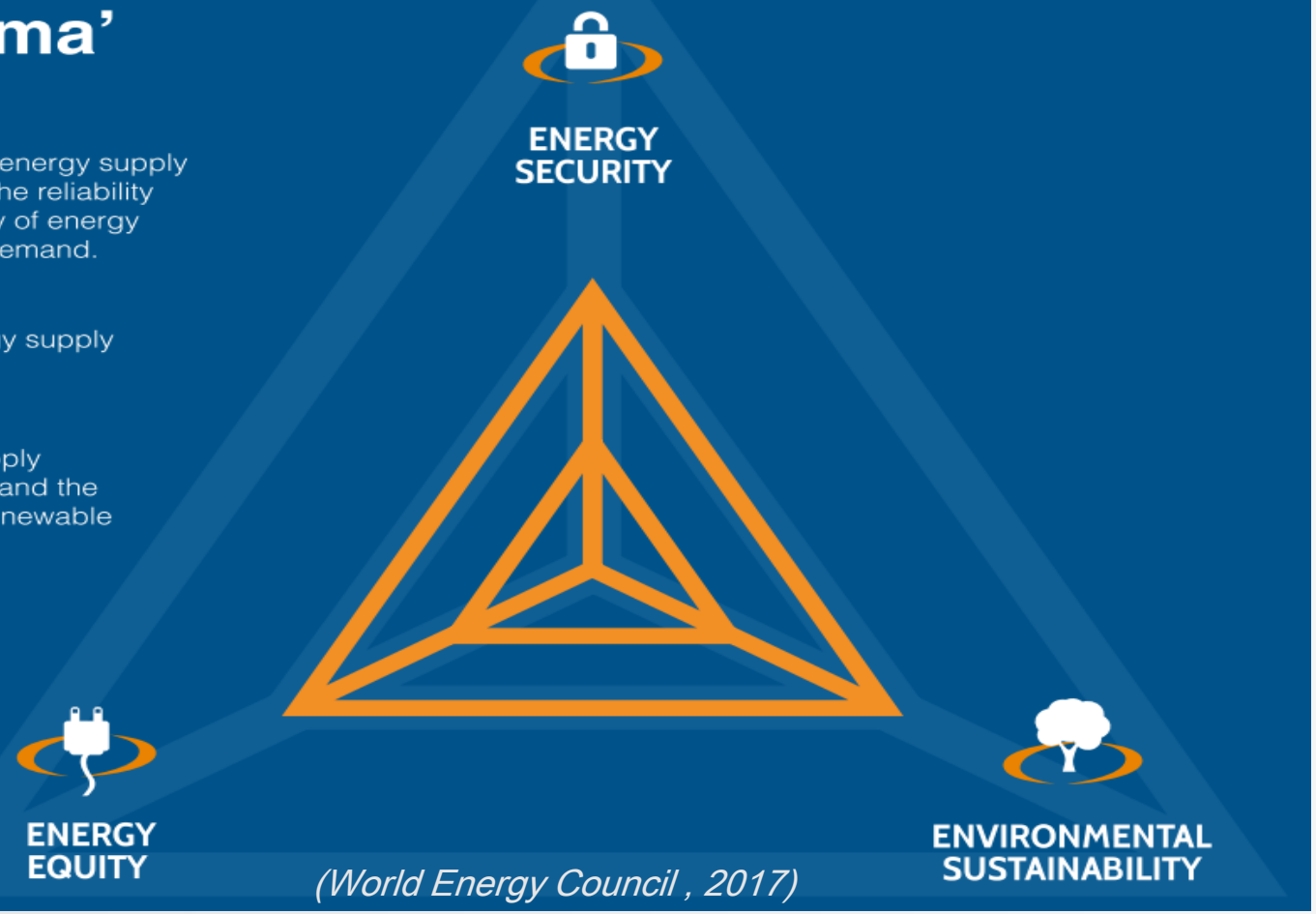
An agreed destination – however, all or none both possible given varied contexts, and choices

Balancing the 'Energy Trilemma'

Energy Security
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.

Energy Equity
Accessibility and affordability of energy supply across the population.

Environmental Sustainability
Encompasses the achievement of supply and demand-side energy efficiencies and the development of energy supply from renewable and other low-carbon sources.



(World Energy Council , 2017)

Privatization and the (traditional) electricity sector reform process

- Obliging electricity enterprises to operate according to commercial principles
- Restructuring of the electric power supply chain to enable the introduction of competition
- Development of economic regulation of the power market that is applied transparently by an agency that operates autonomously
- Privatization of the unbundled electricity generators and distributors under dispersed ownership
- Development of competition in the generation and supply segments by development of power exchanges
- Focusing government's role on policy formation and execution

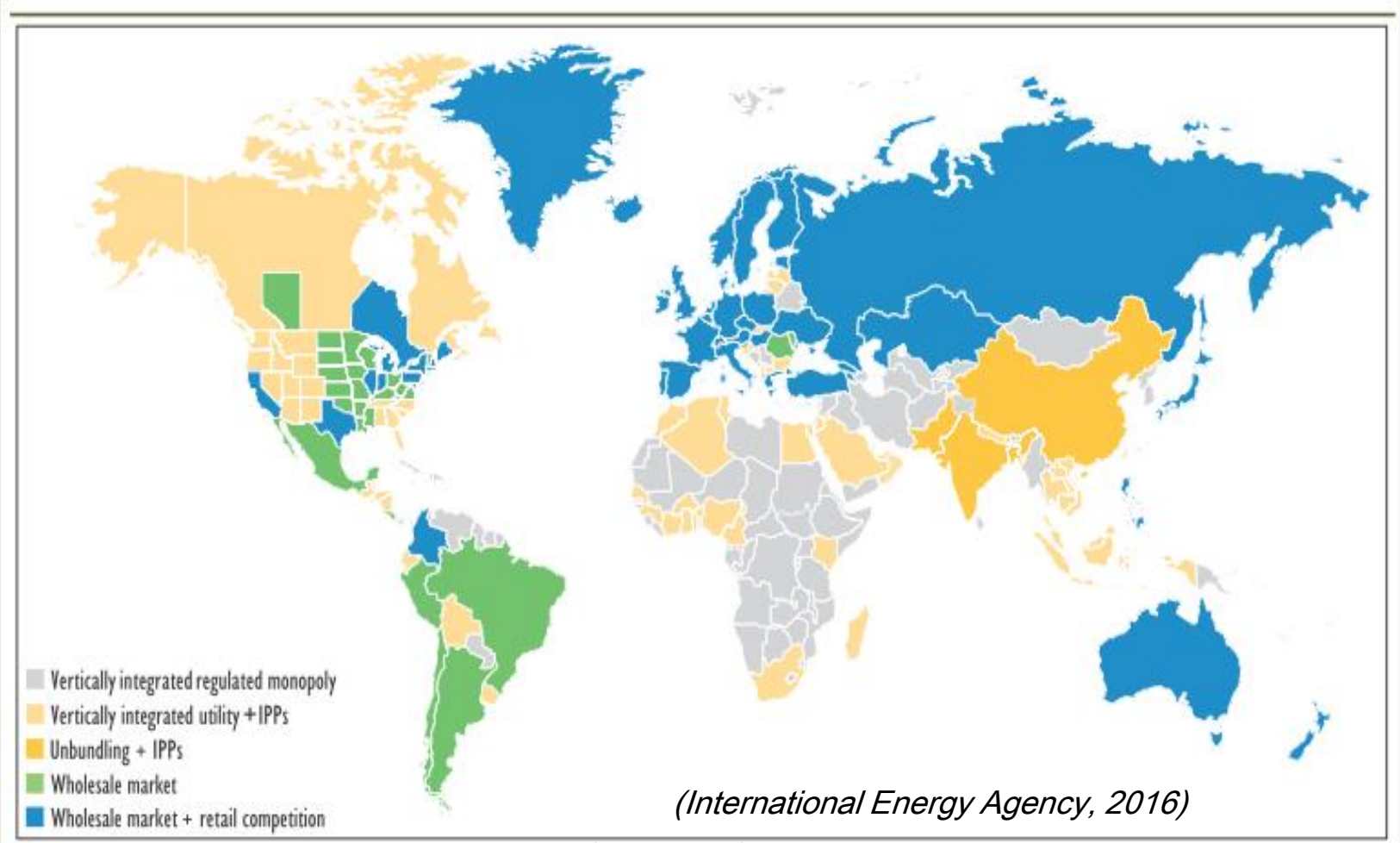
(World Bank, 2006)

In practice, not an inevitable progression,

privatization seen across all industry arrangements and both competitive and non-competitive (network) sectors

Function	Key Economic Characteristics	Implications
Generation	• Limited scale economies at plant level • Co-ordination economies at system level • Complementarity with transmission	Potentially competitive
Transmission	• Network externalities • In general not a natural monopoly • Large sunk costs	• Investment incentives need special attention • One grid but possibly several owners
Distribution	• Often a natural monopoly • Large sunk costs	No competition
System Operation	• Monopoly (due to technical constraints)	No competition
End user Supply	• Limited scale economies • No special features	Potentially competitive
Related Services: • **Power Exchanges** • **Financial Contracts** • **Construction and maintenance of assets**	No special features	Potentially competitive

(International Energy Agency, 2001)

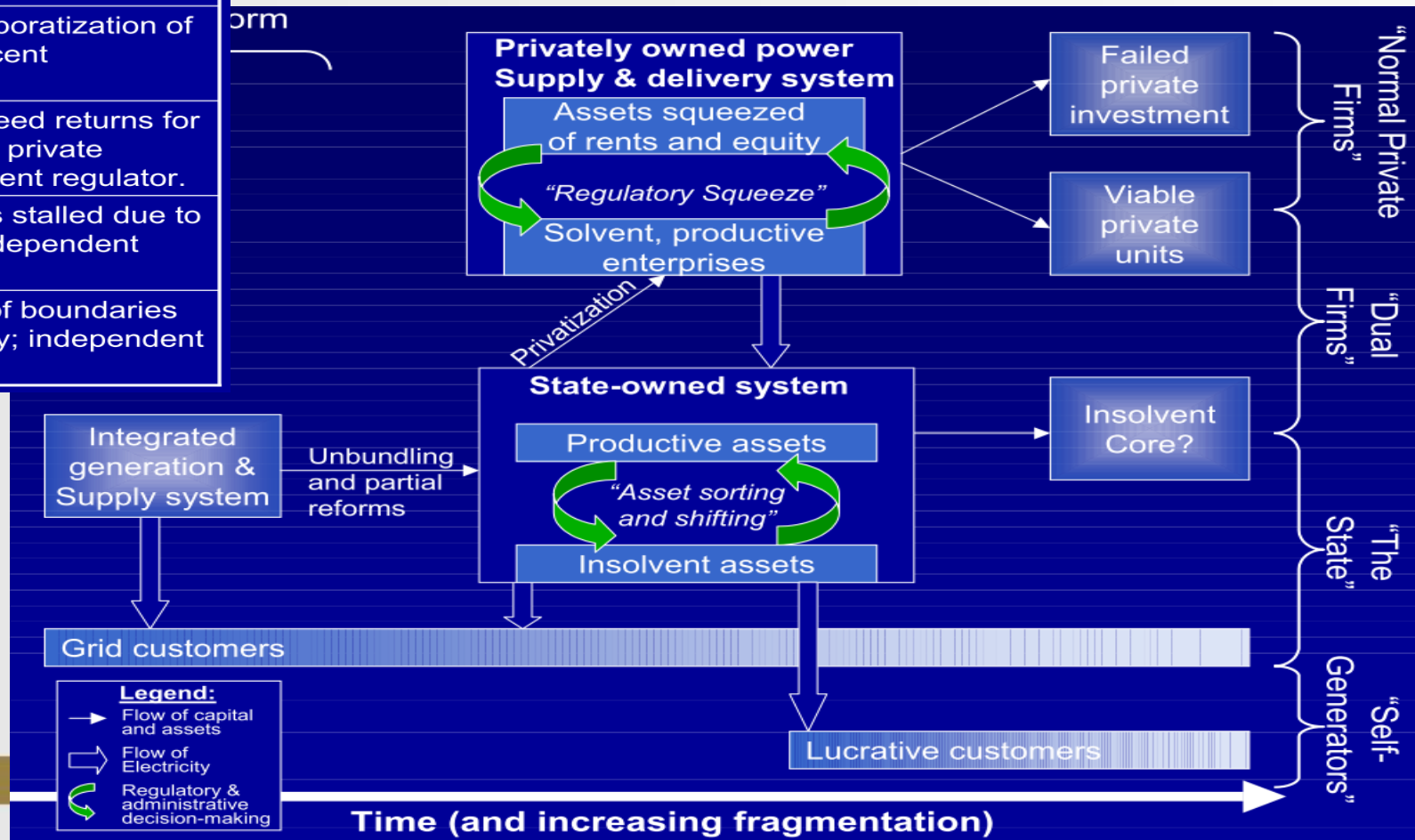


(International Energy Agency, 2016)

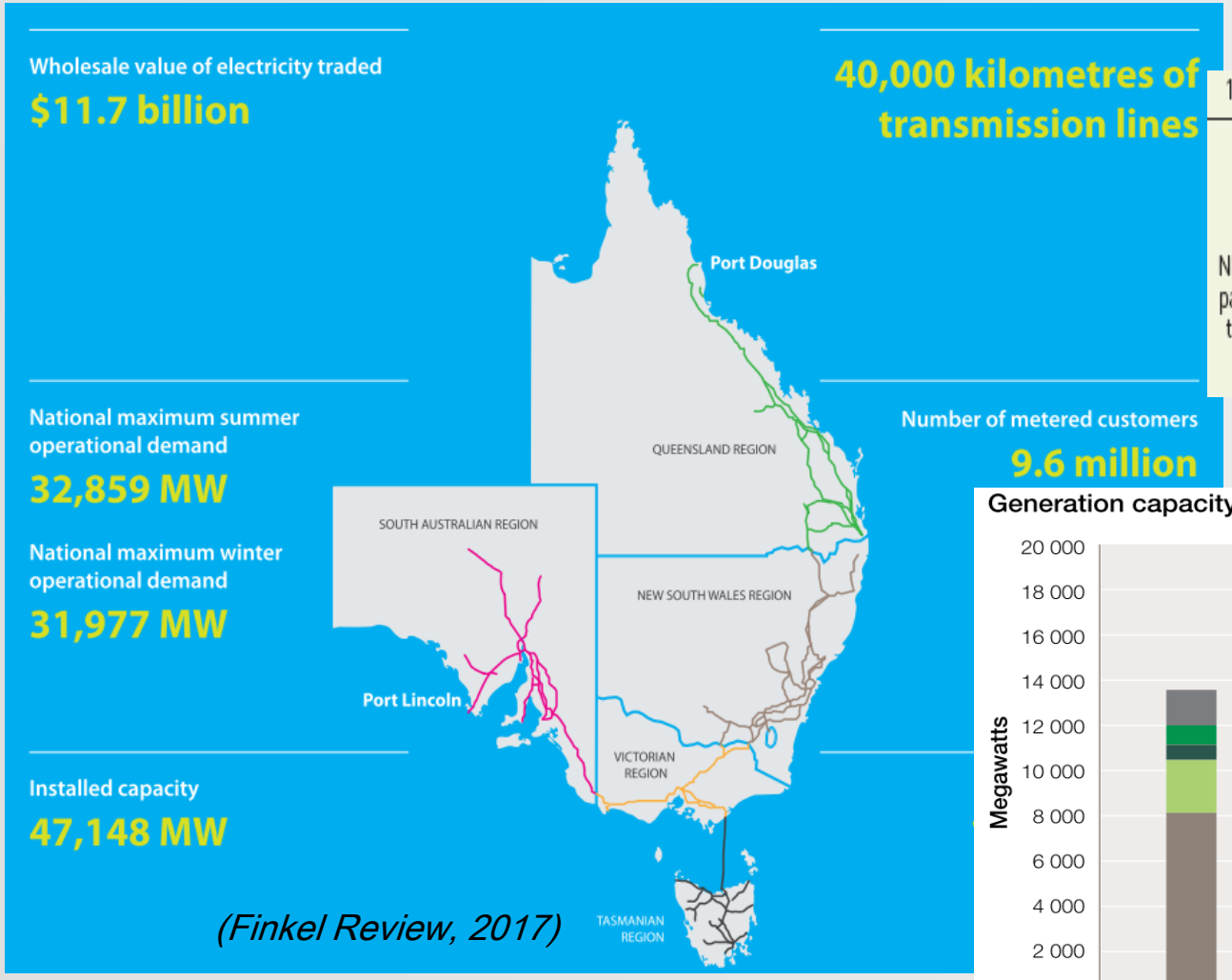
Some early electricity reform experience suggesting possible stable intermediate industry structures

Country	Strategy
Brazil	Privatization of distribution and generation companies to raise money; allowance for IPPs; creation of hydro system operator; independent regulator
China	Reform at the margins (IPPs) and corporatization of state enterprises to raise money; nascent independent regulator
India	Reform at margins (IPPs and guaranteed returns for national power corporation) then seek private management of distribution; independent regulator.
Mexico	Reform at the margins (IPPs); reforms stalled due to political and constitutional barriers; independent regulator
South Africa	Aggressive electrification; redrawing of boundaries for distributors; corporatization of utility; independent regulator; IPPs expected

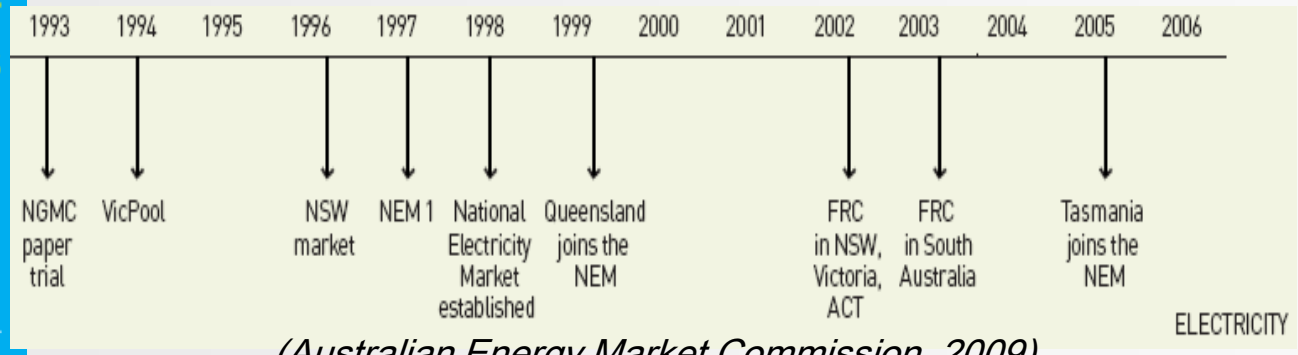
(Victor and Heller, The political economy of power sector reform, 2007)



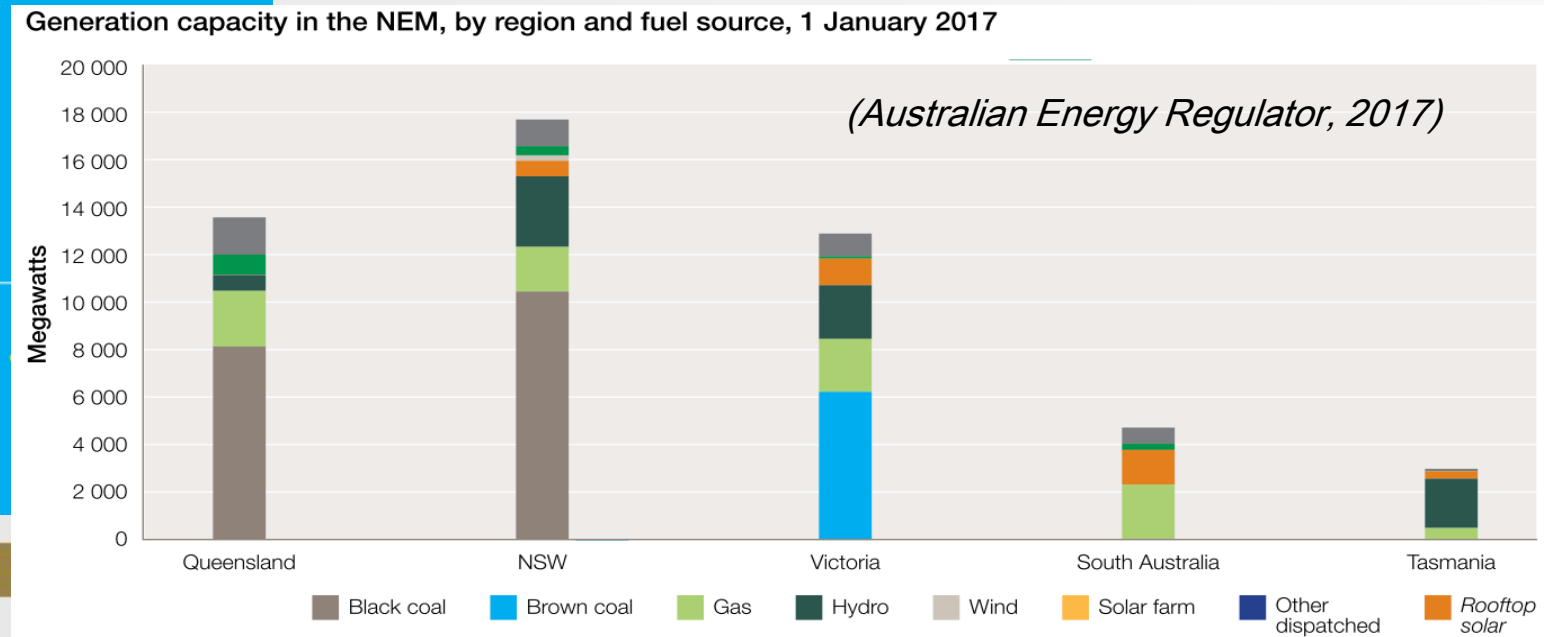
The Australian National Electricity Market, over two decades of restructuring and privatization



(Finkel Review, 2017)



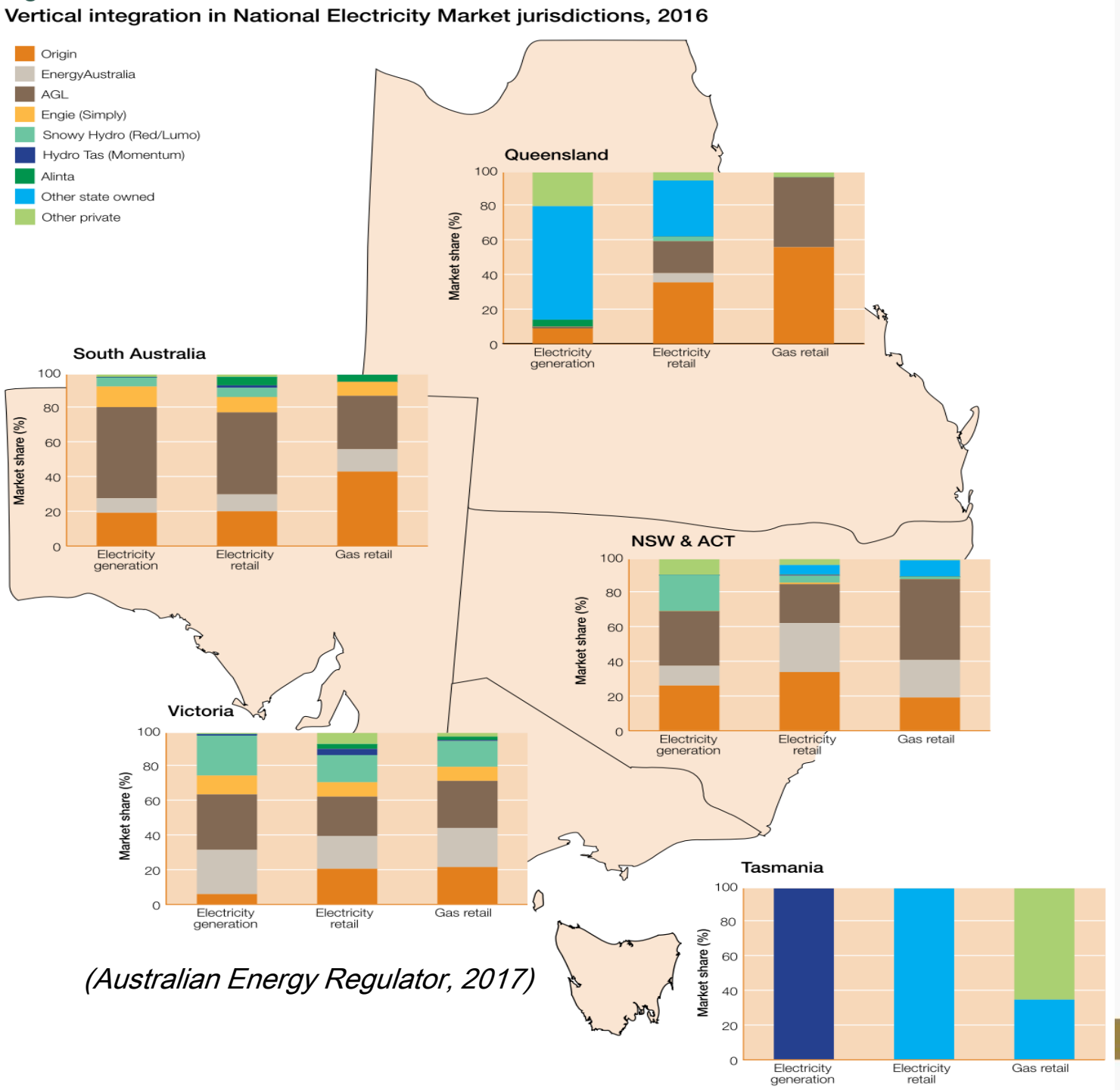
(Australian Energy Market Commission, 2009)



(Australian Energy Regulator, 2017)

Competitive Generation and Retail ownership

- Predominant private ownership of both generation and retail
- A mix of local and international firms, and foreign government vehicles
- A mix of State and Federal Government participation



(Australian Energy Regulator, 2017)

Regulated Network ownership

- Predominantly private ownership
- Both outright sales and 99 year leases
- Also one mixed govt/private partnership

Table 3.1 Electricity transmission networks regulated by the AER

NETWORK	LOCATION	LINE LENGTH (CIRCUIT KM)	ELECTRICITY TRANSMITTED (GWH) 2015–16	MAXIMUM DEMAND (MW) 2015–16[1]	ASSET BASE ($ MILLION)[2]	OWNER
NEM REGION NETWORKS						
Powerlink	Qld–NSW	14 756	52 872	11 616	6 571	Queensland Government
TransGrid	NSW	13 039	72 200	18 000	6 082	Hastings 20%; Spark Infastructure 15%; other private equity 65%
AusNet Services	Vic	6 559	na	na	2 880	Listed company (Singapore Power 31.1%, State Grid Corporation 19.9 %)
ElectraNet	SA	5 524	14 248	3 198	2 102	State Grid Corporation 46.6%; YTL Power Investments Limited 33.5%; Hastings 19.9%
TasNetworks	Tas	3 564	11 655	2 456	1 378	Tasmanian Government
NEM TOTALS		43 441	150 975		19 014	

Table 3.2 Electricity distribution networks regulated by the AER

NETWORK	CUSTOMER NUMBERS	LINE LENGTH (CIRCUIT KM)	ELECTRICITY TRANSMITTED (GWH) 2015–16[1]	MAXIMUM DEMAND (MW) 2015–16[2]	ASSET BASE ($ MILLION)[3]	OWNER
QUEENSLAND						
Energex	1 421 522	53 202	21 138	5 181	11 545	Qld Government
Ergon Energy	739 354	152 255	13 747	3 230	10 210	Qld Government
NEW SOUTH WALES AND ACT						
AusGrid	1 688 282	41 453	25 618	5 475	14 676	New South Wales Government 49.6%; IFM Investors 25.2%; AustralianSuper 25.2%
Endeavour Energy	968 355	36 468	16 645	4 272	5 979	NSW Government
Essential Energy	879 065	191 945	12 313	2 392	7 380	NSW Government
ActewAGL	184 962	5 312	2 876	672	907	Icon Water (ACT Government) 50%; Jemena (State Grid Corporation of China 60%, Singapore Power 40%) 50%
VICTORIA						
Powercor Australia	777 161	74 452	10 713	2 299	3 296	Cheung Kong Infrastructure/ Power Assets Holdings 51%; Spark Infrastructure 49%
AusNet Services	706 424	44 349	7 686	1 815	3 459	Listed company (Singapore Power 31.1%, State Grid Corporation 19.9 %)
United Energy	664 549	12 873	7 604	1 894	2 051	Cheung Kong Infrastructure 66%; SGSP Australia (State Grid Corporation 60%, Singapore Power International 40%) 34%
CitiPower	327 907	4 505	5 944	1 287	1 755	Cheung Kong Infrastructure/ Power Assets Holdings 51%; Spark Infrastructure 49%
Jemena	321 417	6 252	4 212	924	1 191	SGSP Australia (State Grid Corporation 60%, Singapore Power International 40%)
SOUTH AUSTRALIA						
SA Power Networks	858 647	88 808	10 355	2 894	3 863	Cheung Kong Infrastructure/ Power Assets Holdings 51%; Spark Infrastructure 49%
TASMANIA						
TasNetworks	285 325	22 681	4 243	232	1 615	Tasmanian Government

(Australian Energy Regulator, 2017)

A two decade process with more to come…

- Recently, Transgrid (2015)
  - NSW Transmission Network
  - 99 year lease for A$16b
  - Buyer consortia – Hastings Fund Management, Canadian Pension Fund, Abu Dhabi and Kuwait Investment Authorities, Spark Infrastructure
  - *Price 1.6X Regulated Asset Base*

Table 1. Privatisation of Australian electricity companies, 1992–2014.

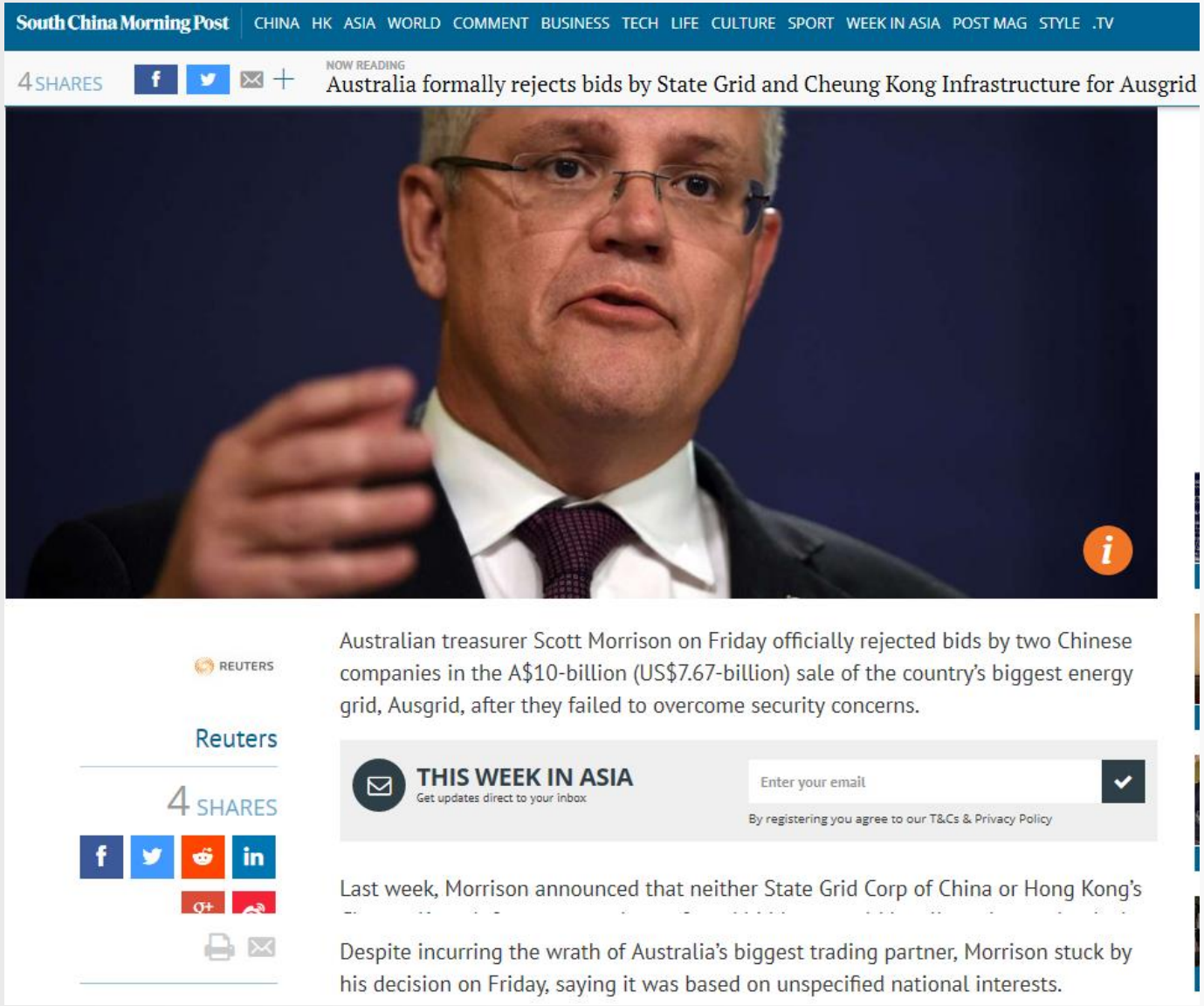
Company	Year	Function	State government	Gross proceeds (million AUD)
Loy Yang B (51%)	1992	Generation	Victoria	544
Gladstone Power	1994	Generation	Queensland	750
Collinsville	1995	Generation	Queensland	130
United Energy	1995	Distribution/retail	Victoria	1,553
Solaris Power	1995	Distribution/retail	Victoria	950
Eastern Energy	1995	Distribution/retail	Victoria	2080
PowerCor Australia	1995	Distribution/retail	Victoria	2150
Citipower	1995	Distribution/retail	Victoria	1575
Yallourn Energy	1996	Generation	Victoria	2428
Hazelwood Power/Energy Brix	1996	Generation	Victoria	2400
Loy Yang B (49%)	1997	Generation	Victoria	1150
Loy Yang A	1997	Generation	Victoria	4746
PowerNet Victoria	1997	Transmission	Victoria	2555
Southern Hydro	1997	Generation	Victoria	391
Ecogen Energy	1999	Generation	Victoria	361
ETSA Utilities	1999	Distribution	South Australia	3250
ETSA Power	2000	Retail	South Australia	175
Optima Energy	2000	Generation	South Australia	315
Synergen	2000	Generation	South Australia	39
Flinders Power	2000	Generation	South Australia	465
ElectraNet SA	2000	Transmission	South Australia	938
Terra Gas Trader	2000	Generation	South Australia	35
Sun Retail	2006	Retail	Queensland	1202
Powerdirect	2007	Retail	Queensland	1203
EnergyAustralia	2010	Retail	NSW	1486
Integral Energy	2010	Retail	NSW	1000
Country Energy	2010	Retail	NSW	1300
Delta West	2013	Generation	NSW	160
Eraring Energy	2013	Generation	NSW	50
Macquarie Generation	2014	Generation	NSW	1505
TOTAL				**36,886**

Source: Chester (2007), NSW Auditor-General (2011, 2013).

(Chester, 2015)

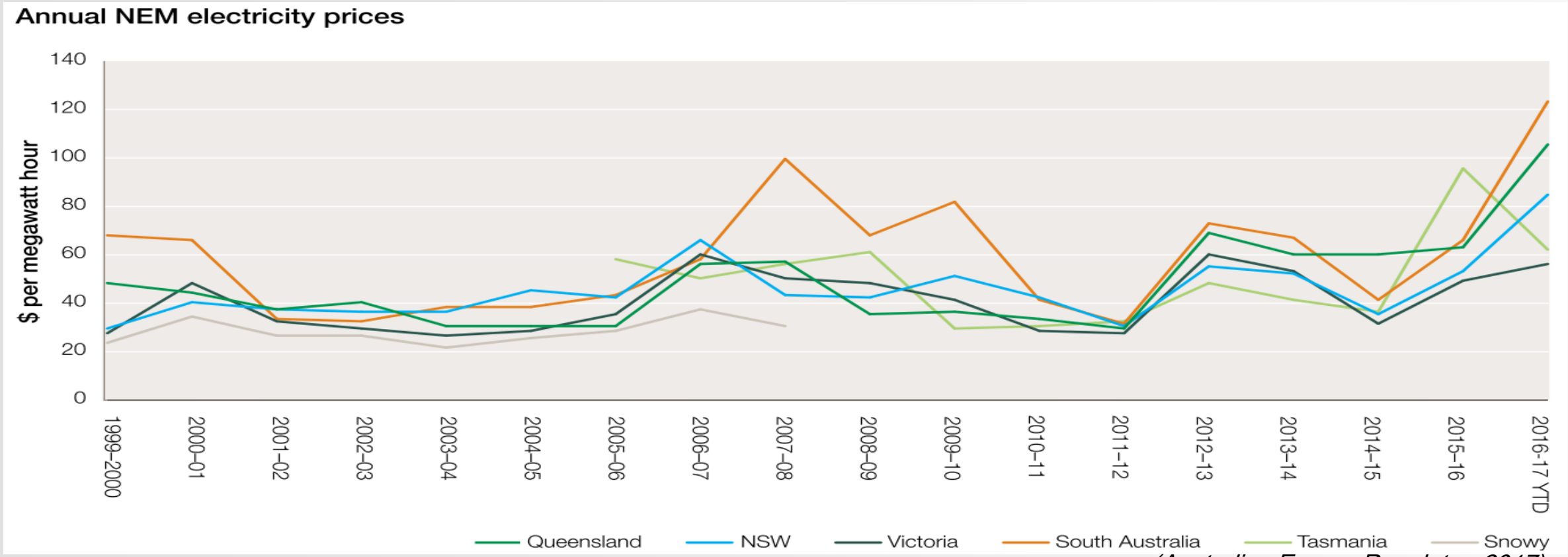
..and even more recently

- Ausgrid
  - NSW Distribution Network serving Sydney region – Australia's largest network business
  - 50.4% on 99 year lease for A$10.2b
  - Buyers IFM and Australian Super (Australian owned)
  - *Price 1.4X regulated asset base*
  - *Essential Energy serving rural and regional NSW to be retained in full public ownership*



Wholesale market performance

- Prices an outcomes of many factors including generation mix, structure
- *Evidence of the exercise of market power at times in regions with both predominantly private and government owned generation*

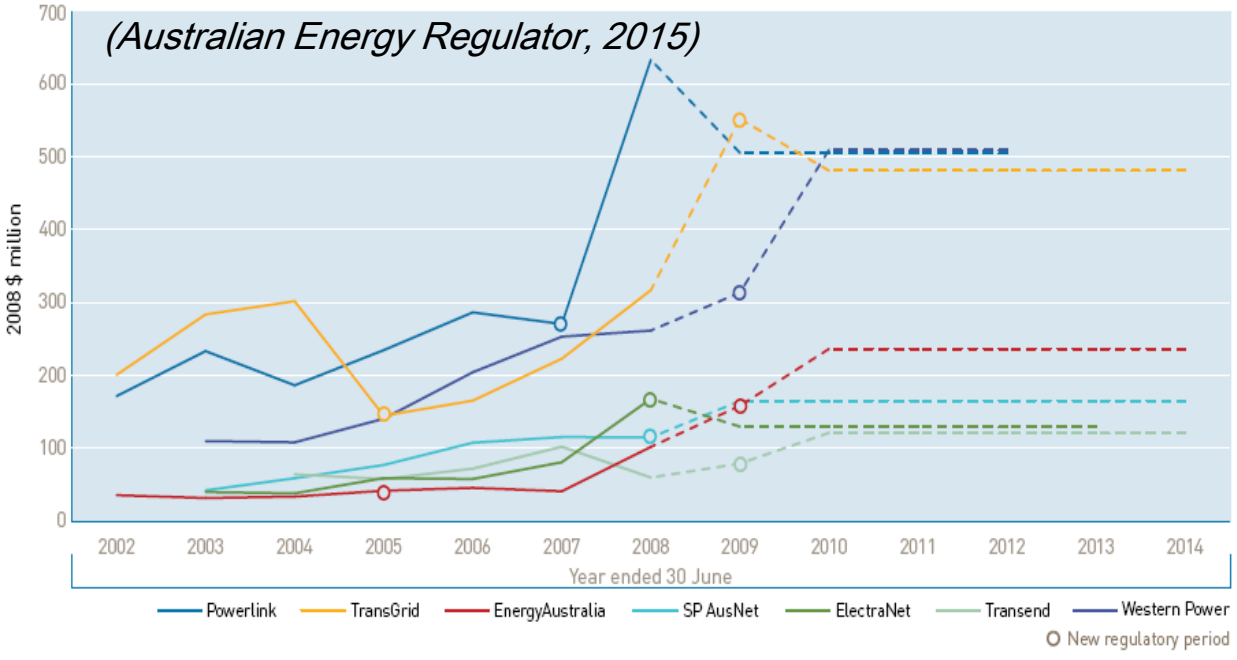


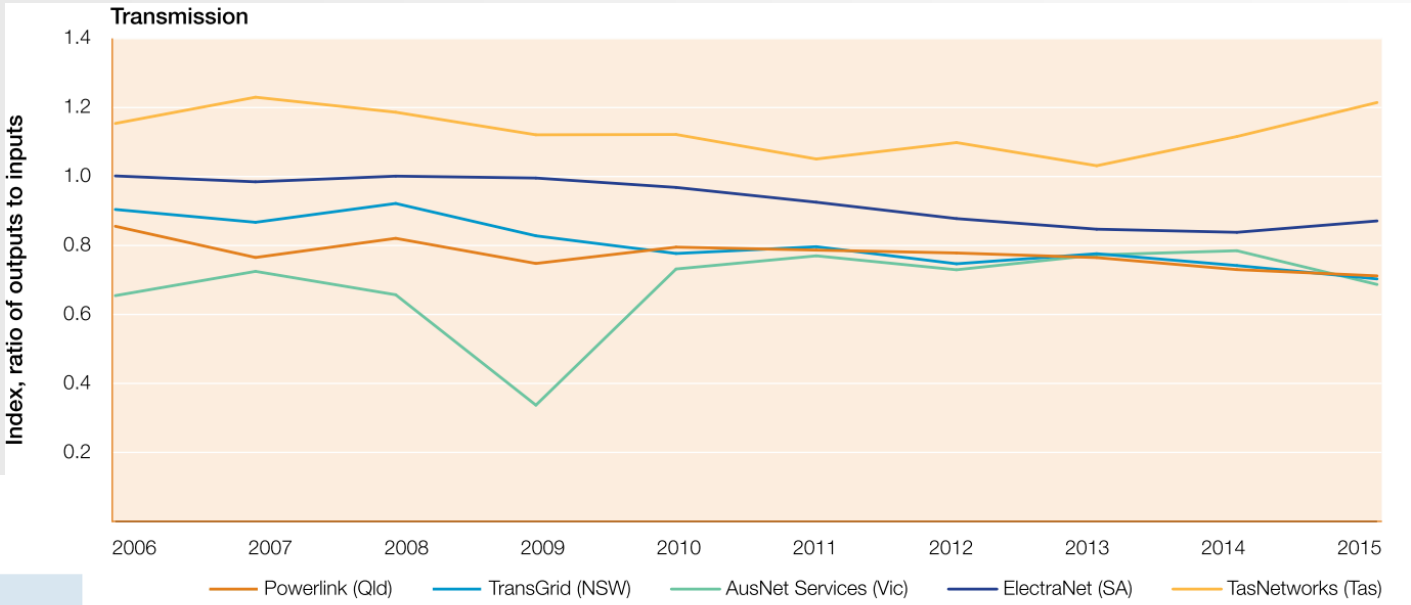
(Australian Energy Regulator, 2017)

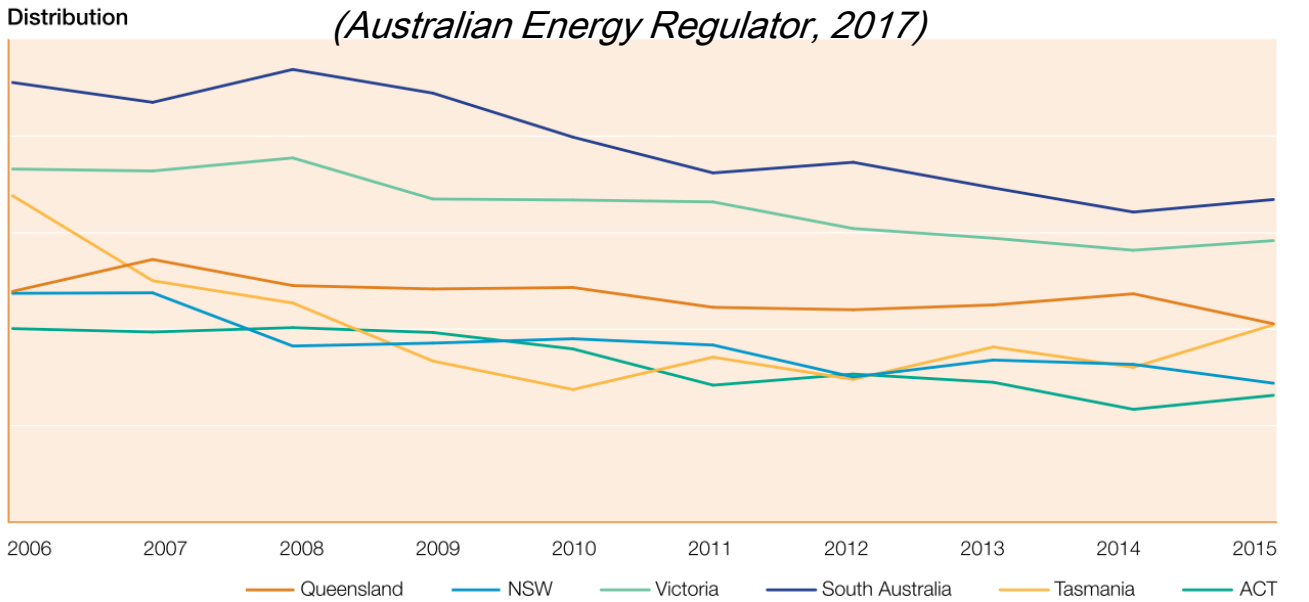
NEM network business performance

- Comparisons made challenging by different service areas and previous investment cycles
- Still, a marked increase in investment in some State owned networks vs privately owned
- AER productivity estimates suggest better private Dx performance, less clear on Tx

Figure 5.6
Electricity transmission investment by network

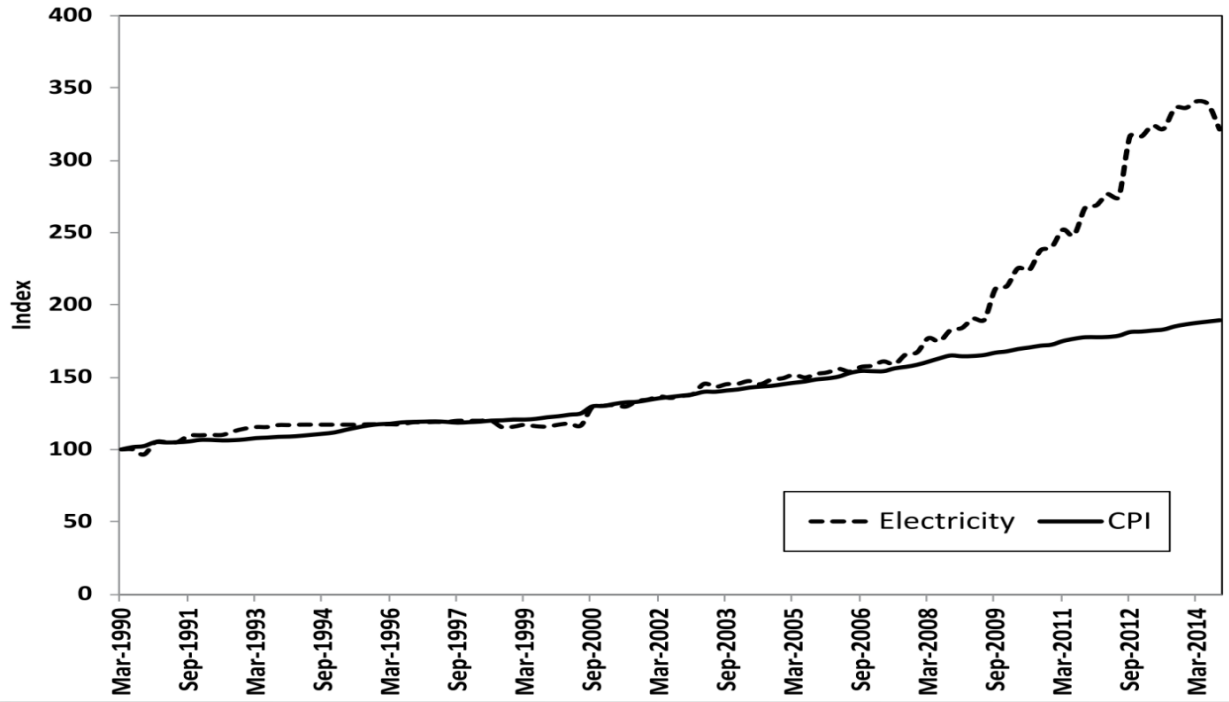


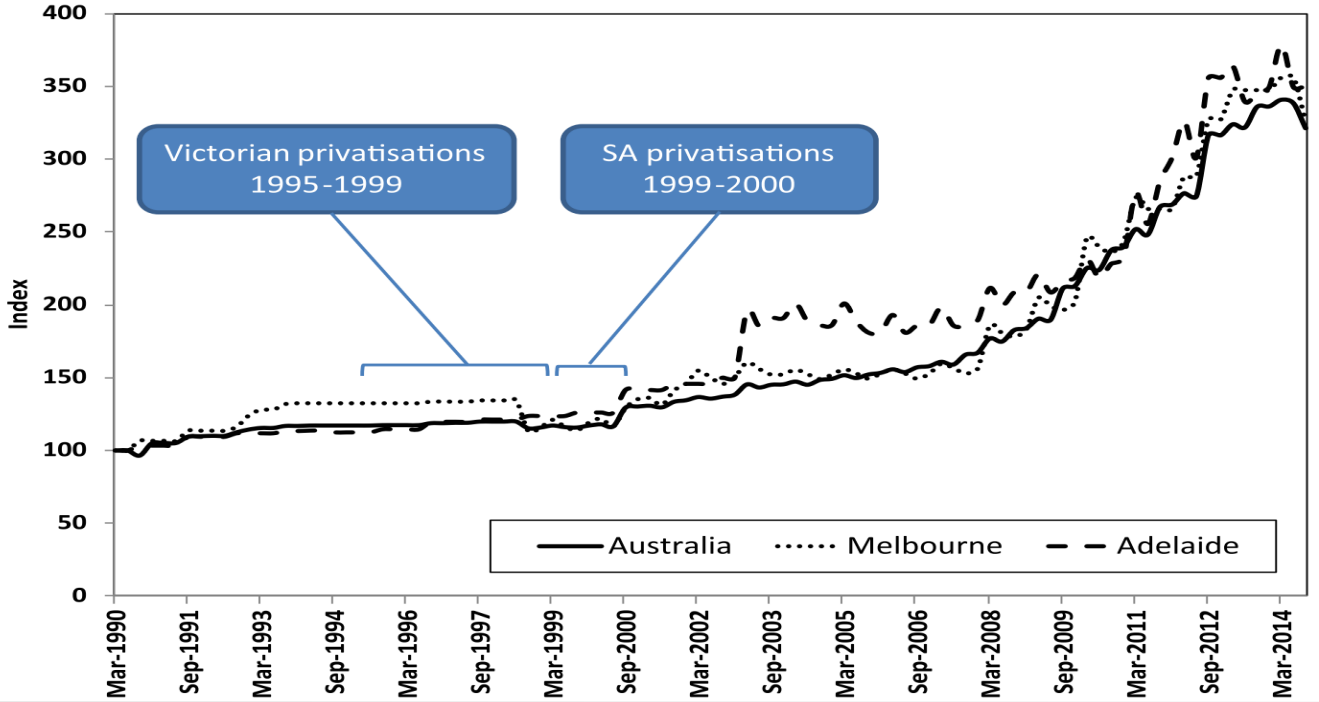




Retail (small customer) prices

- Very high retail price rises for a range of reasons including network expenditure
- *No clear evidence that regions with high levels of private retailer participation are performing better or worse for end-users than those with more government ownership*





(The Australia Institute, 2017)

Security challenges appear to be increasing

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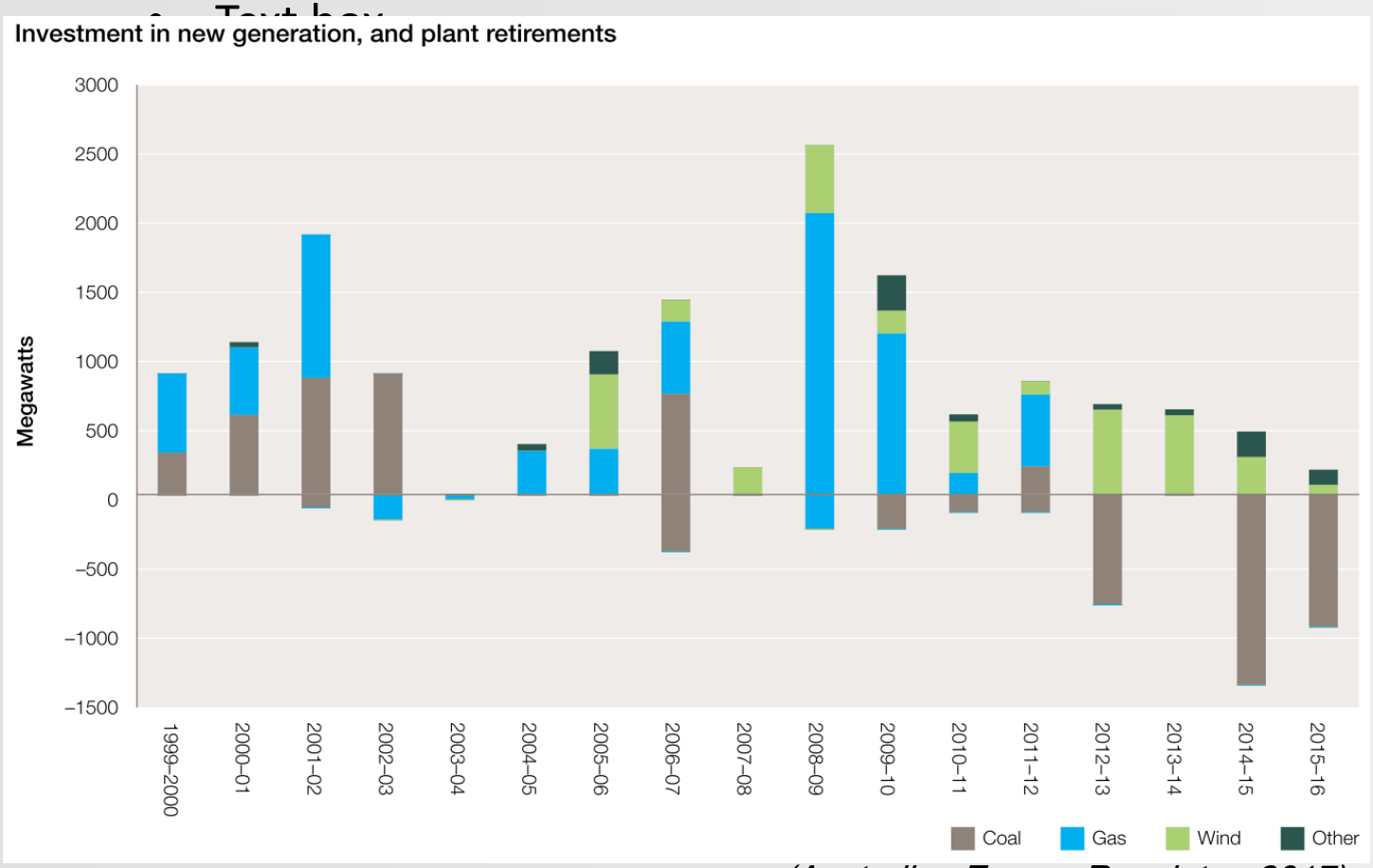
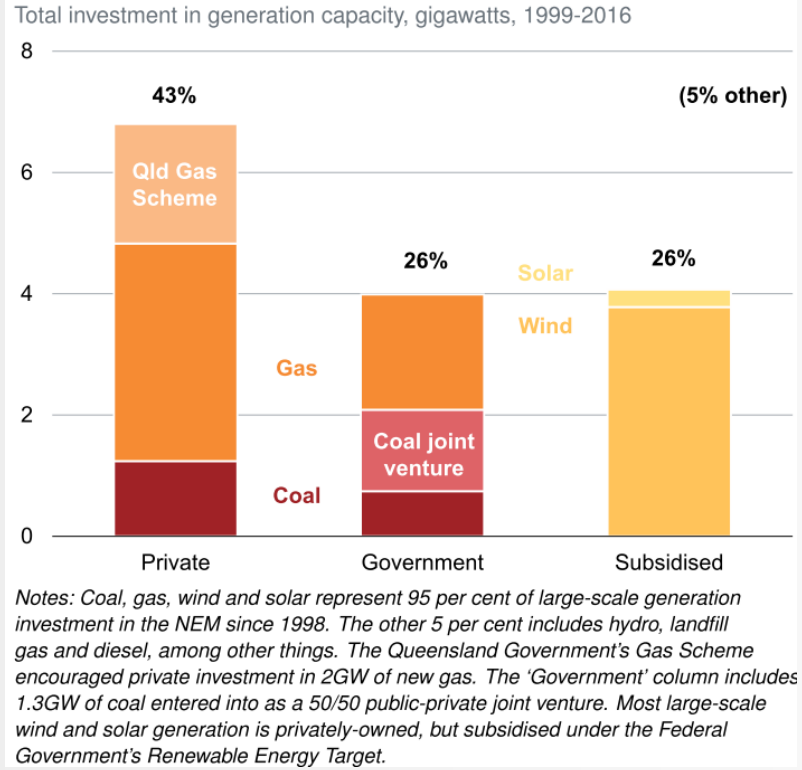
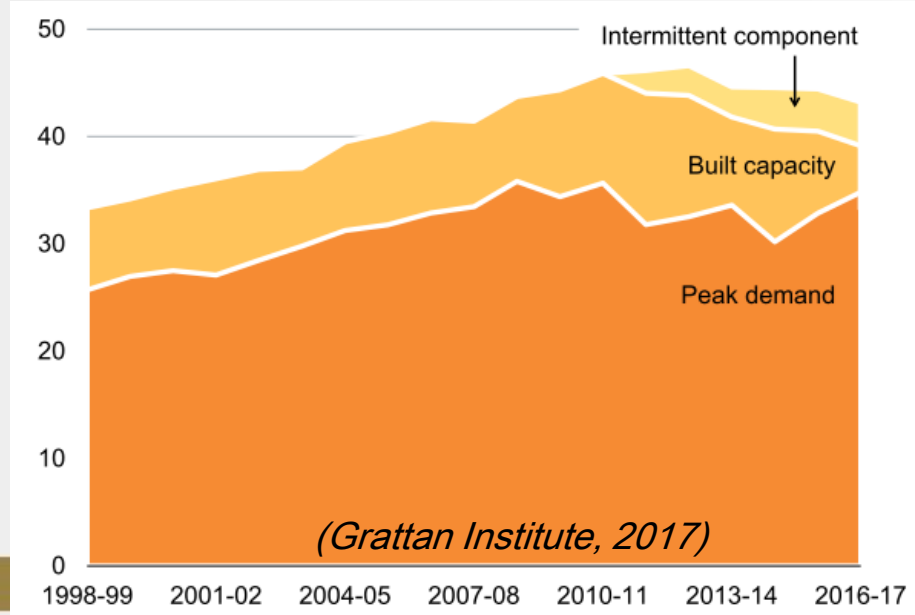


(Australian Energy Regulator, 2017)

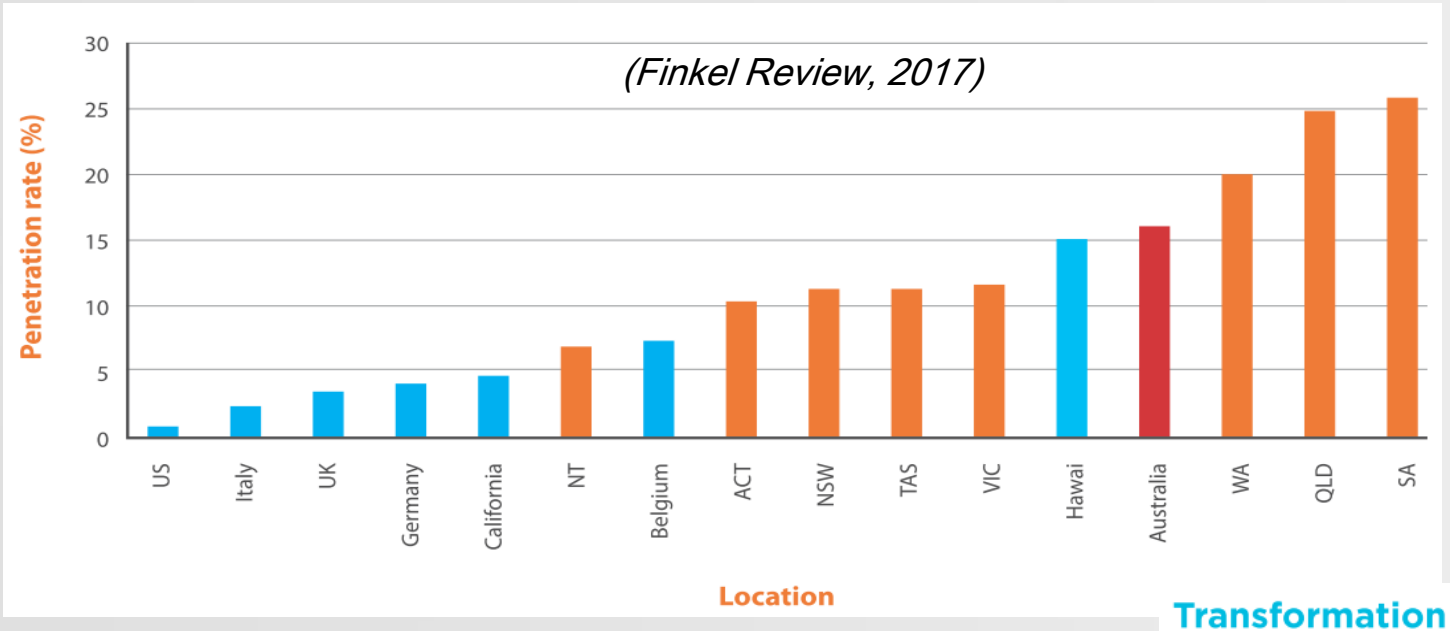


Notes: Coal, gas, wind and solar represent 95 per cent of large-scale generation investment in the NEM since 1998. The other 5 per cent includes hydro, landfill gas and diesel, among other things. The Queensland Government's Gas Scheme encouraged private investment in 2GW of new gas. The 'Government' column includes 1.3GW of coal entered into as a 50/50 public-private joint venture. Most large-scale wind and solar generation is privately-owned, but subsidised under the Federal Government's Renewable Energy Target.



(Grattan Institute, 2017)

The future – how distributed, hence invariably privatised?



- Australia has the highest household PV penetration in the world

- .. and pausible scenarios of distributed energy contributing up to 50% of total electricity generation

Transformation on an unprecedented scale

The electricity system supporting Australia's modern economy and lifestyle is experiencing change on an unprecedented scale. The transformation is driven by customers as they embrace new technologies, take control of their energy use and support action on climate change. By 2050, it is estimated that customers or their agents - not utilities - will determine how over $200 billion in system expenditure is spent and millions of customer owned generators will supply 30-50% of Australia's electricity needs.