



# **Solar roofs, networks and tariffs**

Some thoughts

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# Some questions we will ponder today

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## Part A

- 1. Have households that installed rooftop PV when subsidies were at their peak had a windfall gain ?
- 2. How much have households invested in rooftop PV ?
- 3. How much subsidy did households that have invested in rooftop PV receive, and where did that subsidy come from ?

## Part B

- 4. Are Australia's network services businesses serving the public interest ? If not, why not ?
- 5. Should households in Australia have higher fixed charges in their electricity bills ?

## Part C

- 6. Should households with PV have higher fixed charges in their electricity tariffs ?
- 7. Should households with PV be paying more to network service providers ?

# Introduction

## PV in Australia

- 12% of Australia's houses – 1.2 million homes
- Rapid expansion – 8,000 (2007) to 1.1 million (2013)

## Scope

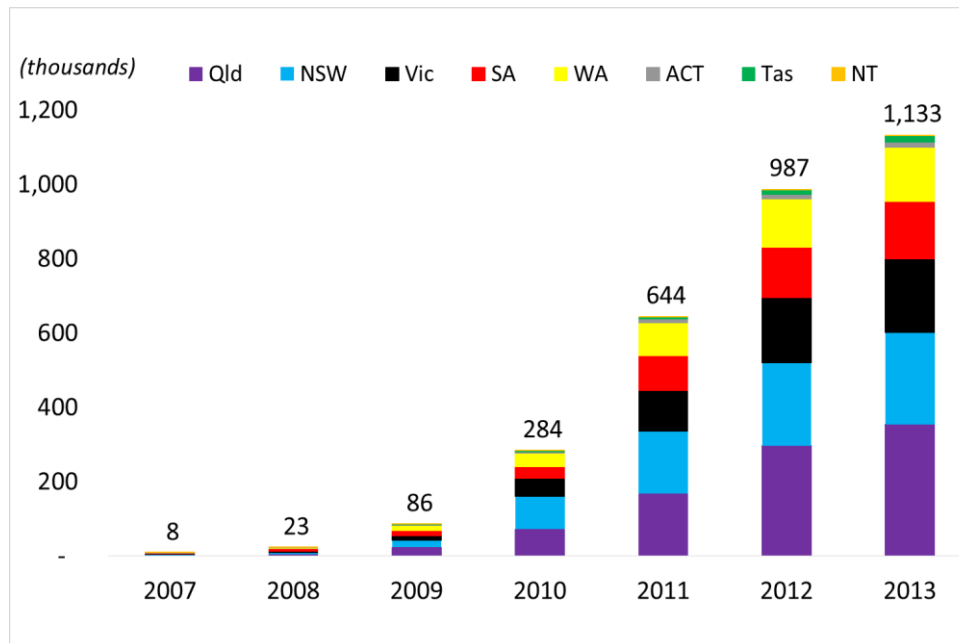
- Evaluation of costs of benefits of solar PV in Australia
- 900,000 installations during period 2010 to 2012

## System Size

- System size increased – 1.1kW (2009) to 3kW (2012)

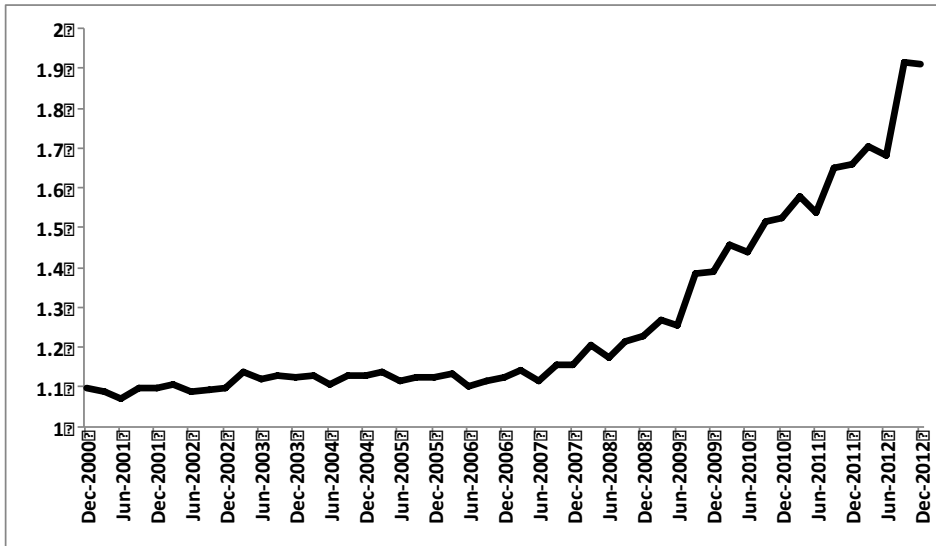
## Three factors

- Rising electricity prices
- Capital and production subsidies
- Declining PV system costs



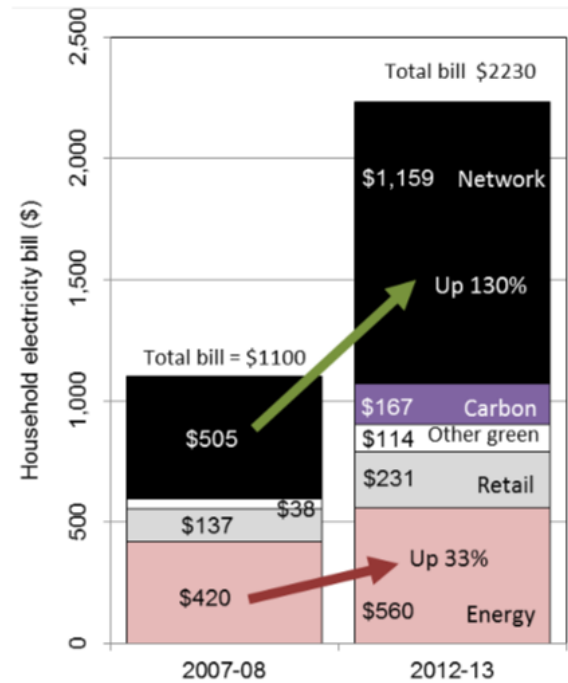
# Rising Electricity Prices

**Australian household electricity price index**  
Adjusted for changes in CPI



(ABS, 2013)

**New South Wales household electricity bill**  
2007-08 and 2012-13

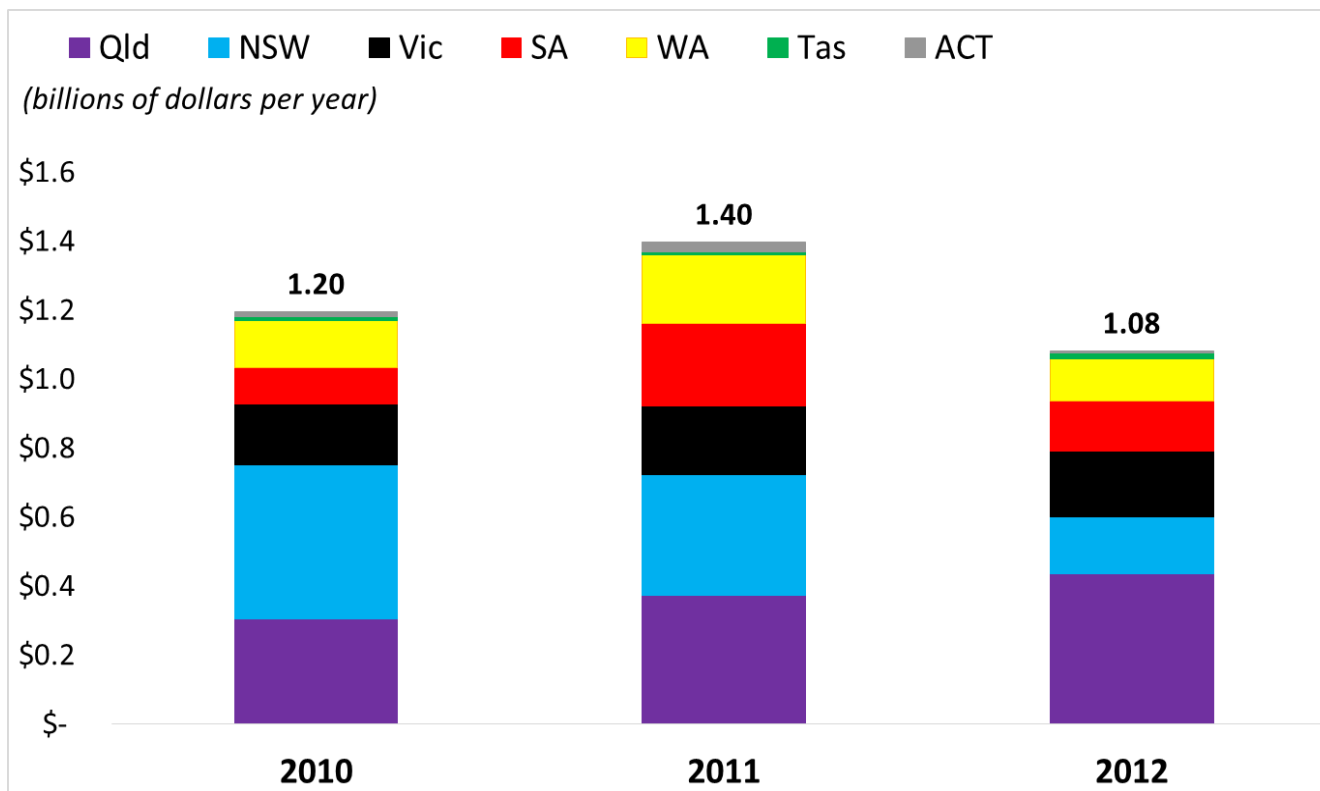


(Productivity Commission, 2013)

# RECs created through solar PVs

## Renewable energy certificates

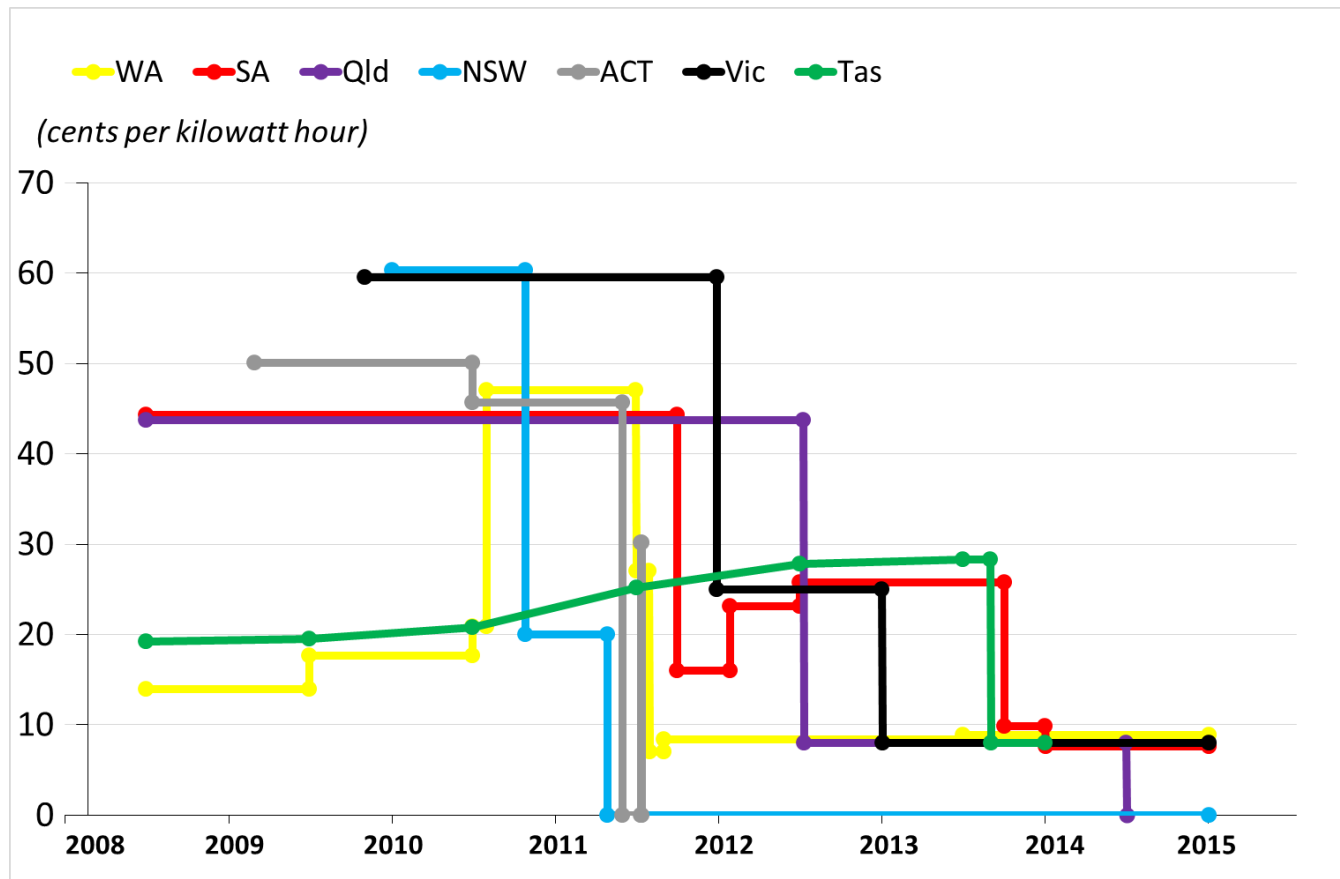
- 120+ million solar RECs created during 2010 to 2012
- Multiplier declines from 5 to 1 (for up to 1.5 kW systems)



# Production Subsidies

## Production subsidies

- A bumpy ride...
- Jurisdictional Feed In Tariffs (FiTs) – Net and/or Gross (NSW and ACT)
- Mandatory 'retailer payments' account for small step rises



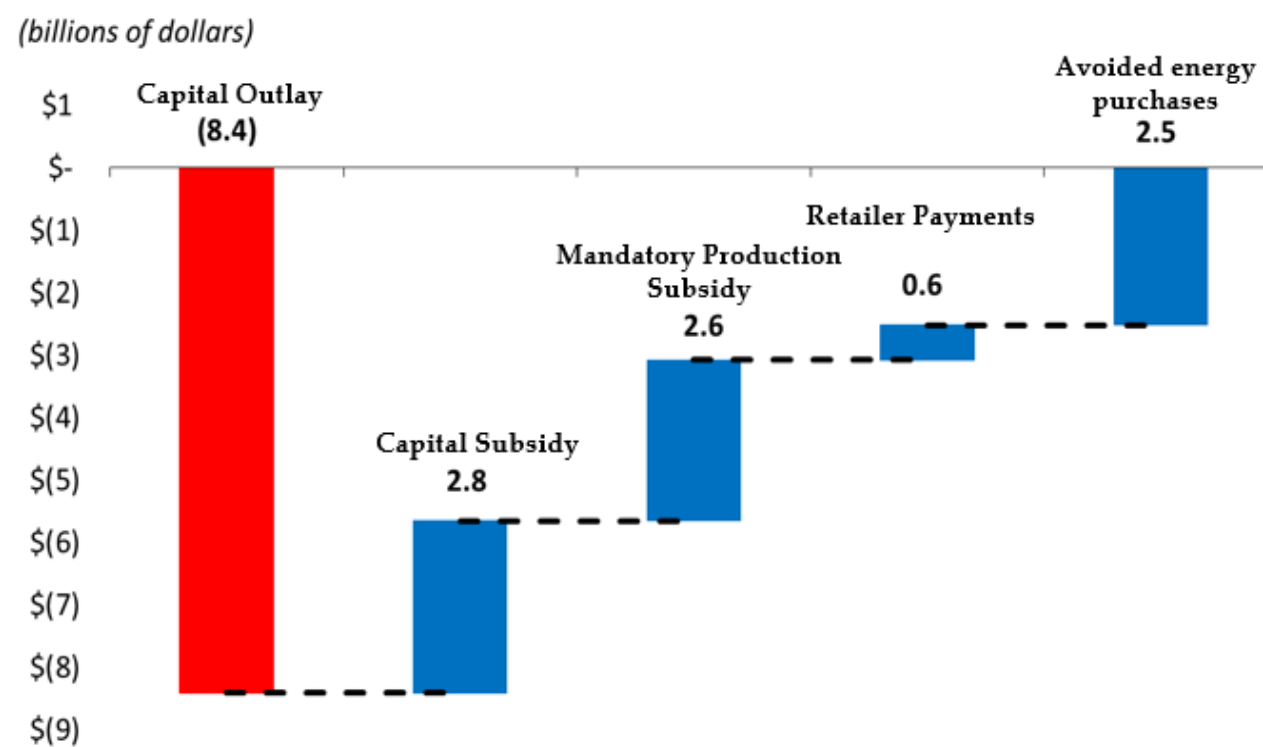
# Putting it all together

## Internal Rate of Return (IRR)

- 9.8% (the discount factor at which the NPV is zero)

## Location Dependent

- Varies by Jurisdiction – SA 11.5%...Tas 5.5%



# All cost and no benefit for energy users?

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## Findings

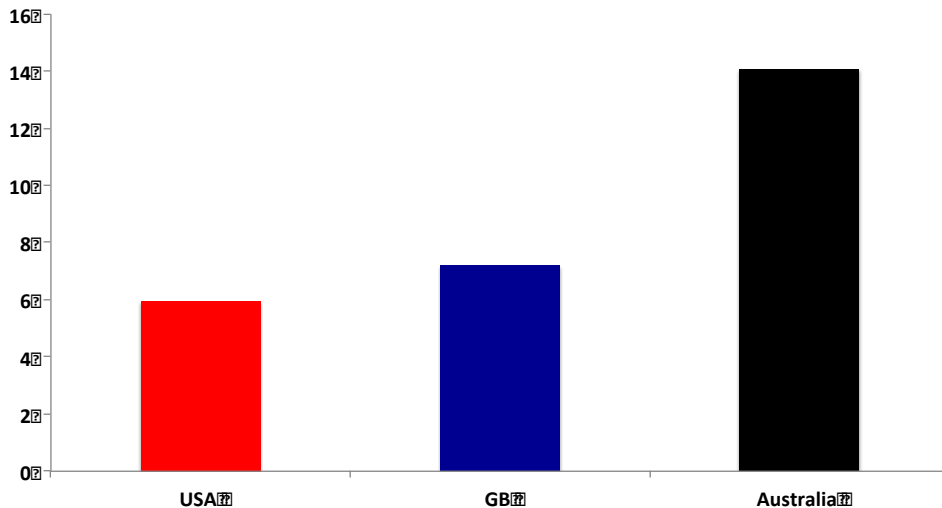
- Effective subsidy - \$108/MWh – over PV lifetime – paid by users
- PV production at time of peak demand – reduction in wholesale market price
- Reduction in overall and peak demand
- \$162 / MWh compares with nation-wide electricity price \$320 / MWh
- \$250m p.a. less to monopoly network service providers



### Network services charges for average usage households

(PPP-adjusted exchange rates)

Australian Cents per kWh



Regulated network charges in Australia now much higher than GB or U.S.

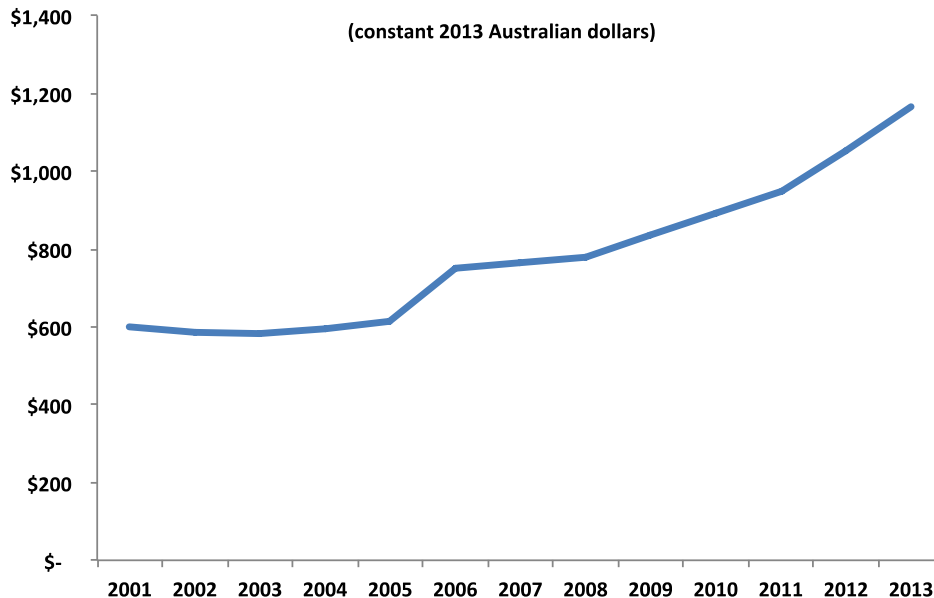
Source: US (EPRI), GB (Ofgem), Australia (gazetted network tariffs, average household consumption data, OECD PPP)

It never used to be this way: regulated revenue per connection doubled in constant currency between 2005 and 2013

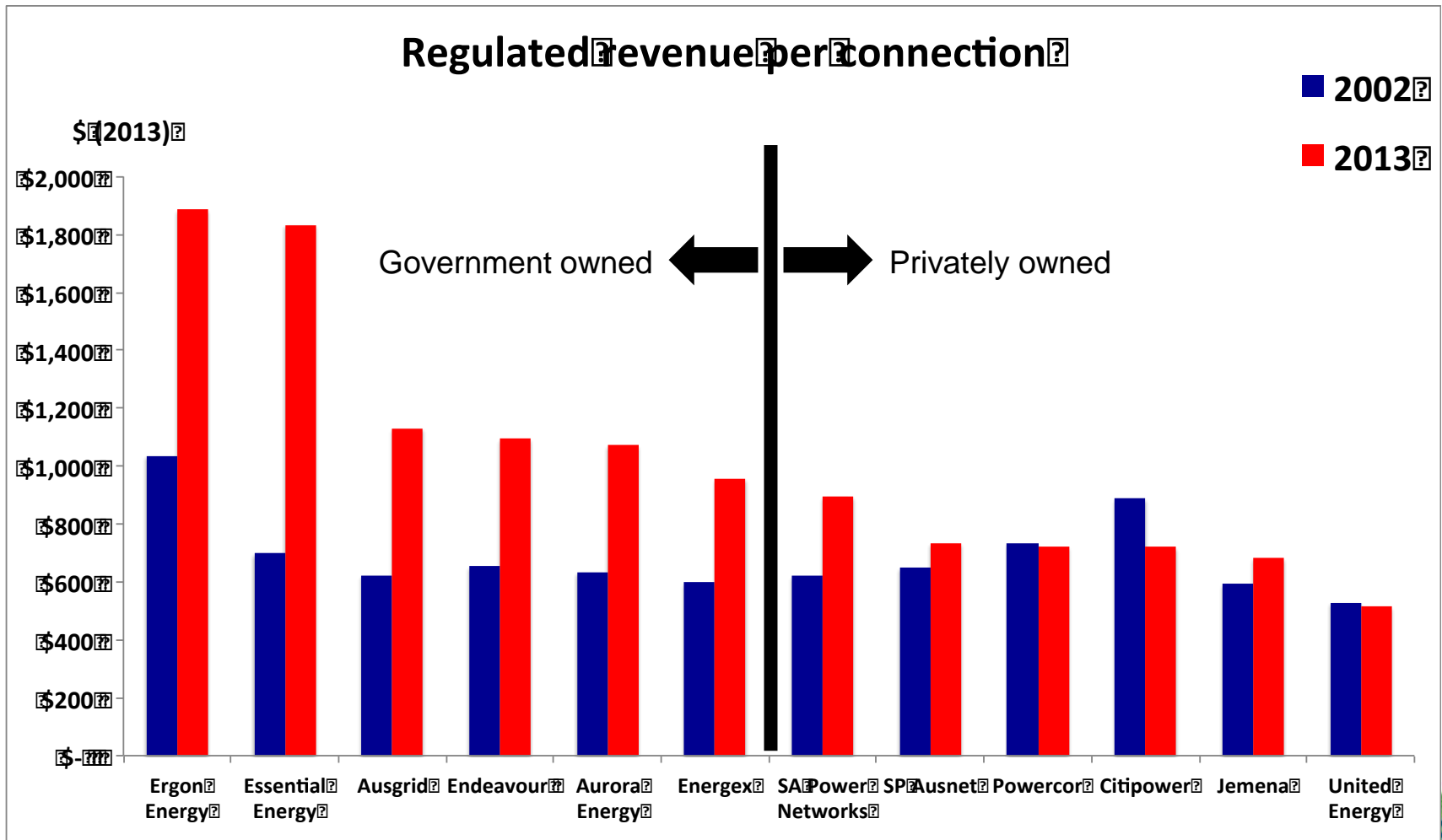
### Average regulated revenue of distributors per connection

(constant 2013 Australian dollars)

\$/connection

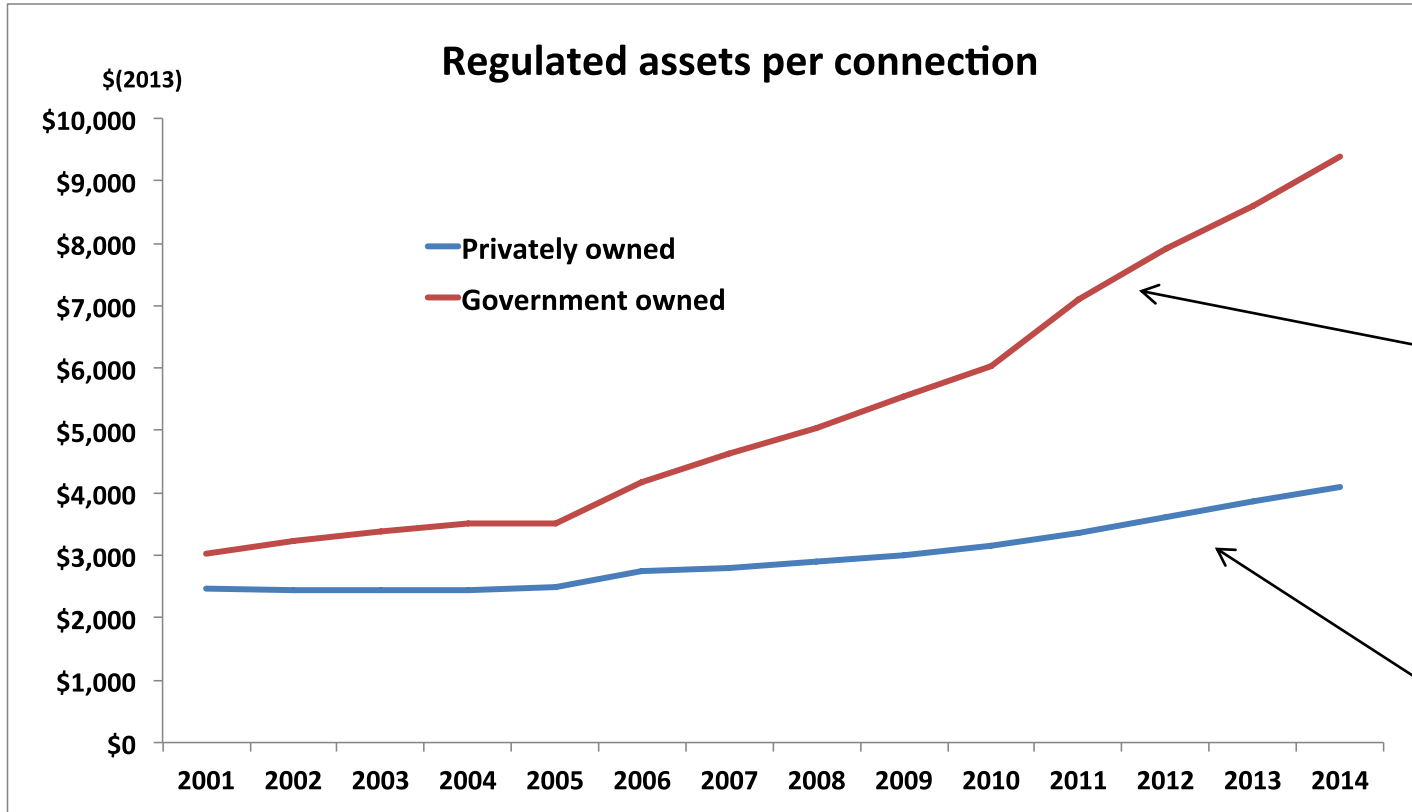


# And there is a government / private split



Source: regulatory decisions

Many factors, but higher regulated assets of government-owned networks is the main explanation ...

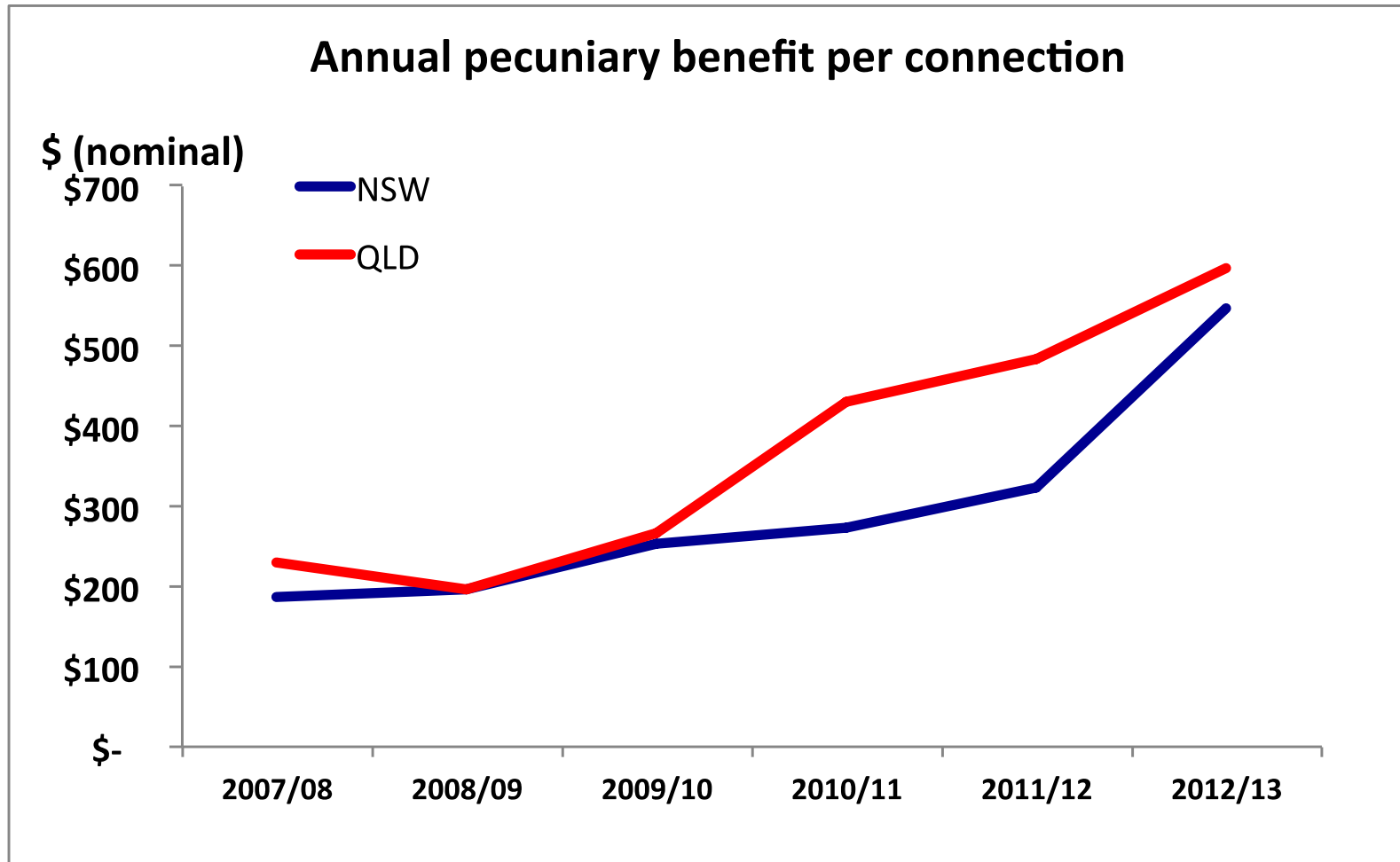


Source: regulatory decisions

Much higher capex + upward asset revaluation

Assets per connection in GB and private Australian distributors are comparable

... and larger asset base has translated into remarkable financial gains for the government owners

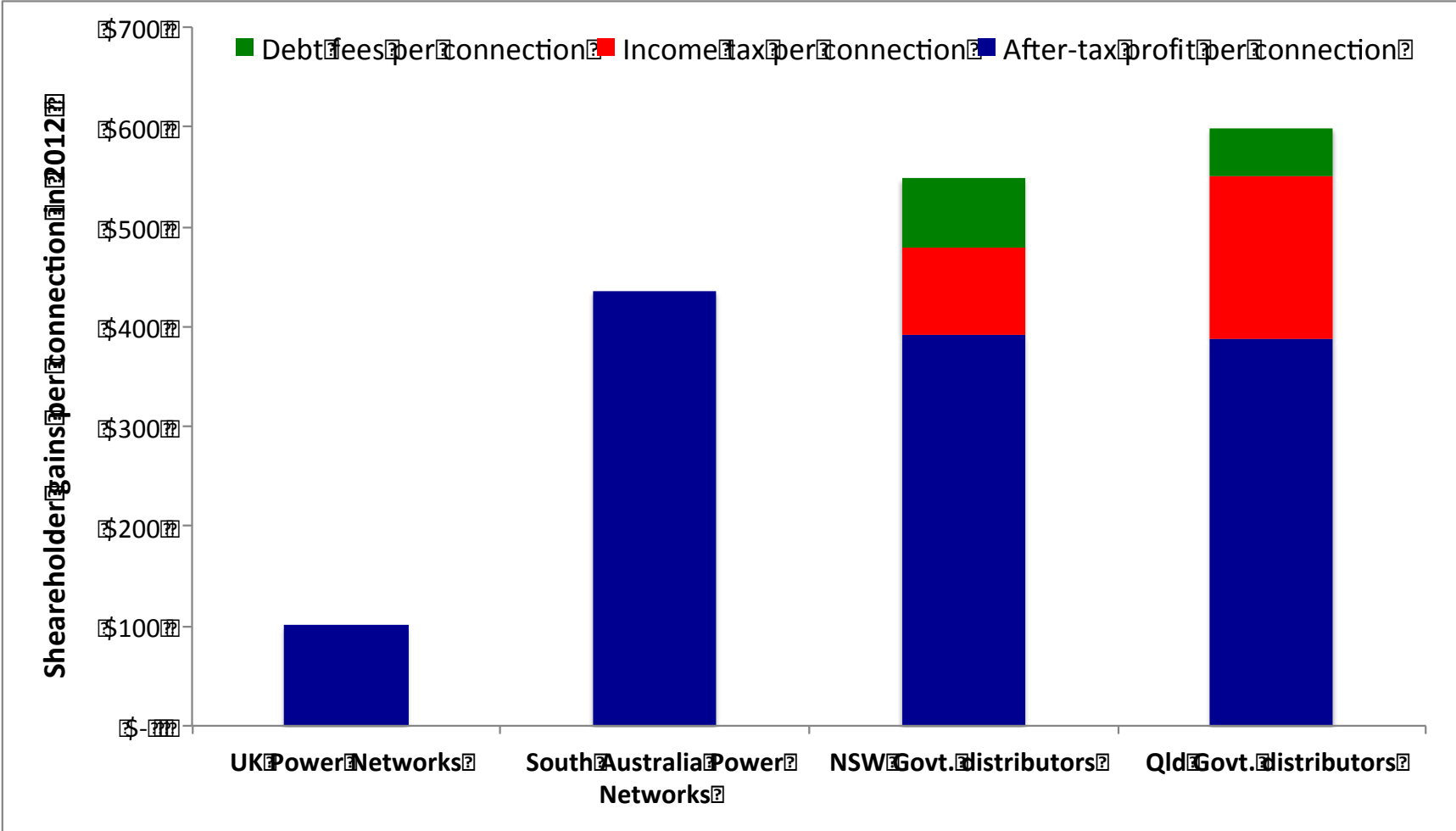


Source: Statutory accounts



Pecuniary benefit = Pre-tax attributable profits + income tax (which state government collects) + “guarantee” fees on the debt provided by state governments

# Shareholders in private distributors in Australia have also done well



## Operating conditions don't explain govt./private cost differences ...

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- No evidence of systematic or enduring quality of supply problems
- Peak and average demand contracting since 2009, and unremarkable growth before that.
- Asset age data of government-owned distributors does not support “catch-up” hypothesis.
- Rationale for introduction of RPI-X 15 years ago - low capital and labour productivity - does not support claims of historic “under-spending”

# So, why these outcomes ?

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## Factors common to government and private NSPs

- Quasi-judicial merits review arrangements combined with opportunity to cherry pick has undermined regulator
- Generous cost of capital compared to US and GB
- Consumers' willingness to pay largely ignored.

## Factors specific to government NSPs

- Incentives
- *De jure* but not *de facto* regulatory independence

## Incentives: RPI-X applied to government distributors has over-compensated capital expenditure

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- For govt. distributors allowed rate of return  $\gg$  cost of capital, so more money to be made (and more easily) by inflating expectations and then expanding the RAB rather than under-spending regulated expenditure allowances.
- State regulators approved large intra-period capex and opex increases when govt. distributors said they would spend above controls.
- Recent evidence that state govt. credit-rating worries are now providing “capital market” discipline to govt. distributors. But deep cuts needed to restore reasonable prices not on the radar, and little political or regulatory appetite to deal with stranded assets.



## Independent regulation in word, much less deed

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- Australian Energy Regulator (AER) created (2005) through federal-state bargain, along with Australian Energy Markets Commission (AEMC), a powerful advisor / rule maker answerable to the jurisdictions (states and territories).
- Seeming dilution of state government political control suggests greater regulatory independence. But:
  - AER implements regulation designed by AEMC (globally, a unique bifurcation).
  - Some key factors (e.g. network planning standards, inability to adjust WACC to account for income tax receipt by govt. distributors) determined by state governments.

AER is convenient whipping boy for state energy ministers but AER gave the govt. distributors most of what they asked for (which their govt. owners strongly supported).

# Summary: Ownership is 9/10<sup>ths</sup> of the law

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- RPI-X applied to govt. distributors has encouraged the discovery of wants, rather than efficiency.
- Those suggesting that it was wishful thinking to ignore ownership when applying RPI-X seem to be right.
- Cost and price outcomes by private distributors more encouraging but shareholders seem to have had more than their fair share of the spoils.
- Fresh thinking and willingness to consider major reforms needed.