Investment mistakes in retrospect & stranded assets under uncertainty

Prof. Paul Simshauser AM

Griffith UNIVERSITY
Queensland, Australia

Introduction

- Why this matters: struck by advocacy, and consequences of missing policies vis-à-vis write-downs
- During the 20th Century, strong demand growth + falling technology costs + economies of scale led to falling real electricity tariffs.
- 20th Century over-Investment / stalled demand (e.g. recession) would produce rising tariffs; however, overcapacity could be *'sweated out';* growth in final demand would eventually resolve the matter.
- More recently, growth in final demand has been slowing. The role of productivity now vital.
- With slowing demand, what happens following material *investment mistakes in retrospect*, or, declining network load arising from disruptive competition? i.e. in either case – excess capacity
- Reverse differential between cost & demand growth produces unstable results:
  - Regulatory mechanics: with excess capacity, unit prices raised to meet Revenue constraints
  - Raises the *possibility* of damaging price spirals
  - Such scenarios may reach the boundaries of existing regulatory framework

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Economic Regulation & Tariff Stability

- Nature of the problem: in competitive markets, excess capacity (regardless of cause) leads to falling prices and falling profits. Consumers benefit, shareholders incur losses.
  - If structural in nature, assets of the firm will be written down (Directors duties, AASB).
- In regulated markets, lost revenues in one year can be recovered through higher tariffs in future years. If structural, consumer welfare adversely affected, shareholders kept whole.
  - Overcapacity in regulated markets, therefore, produces a strikingly different result
- This is where the regulatory framework may reach its boundaries; the political economy of an enduring episode of tariff increases is unlikely to be acceptable, and this means utility shareholders have an exposure. See Kind (2013).
- In such a scenario, some component of the RAB faces a stranding risk. Note: indivisibility of networks means physical assets may not be stranded per se. It is the tariff that is at risk of being stranded.

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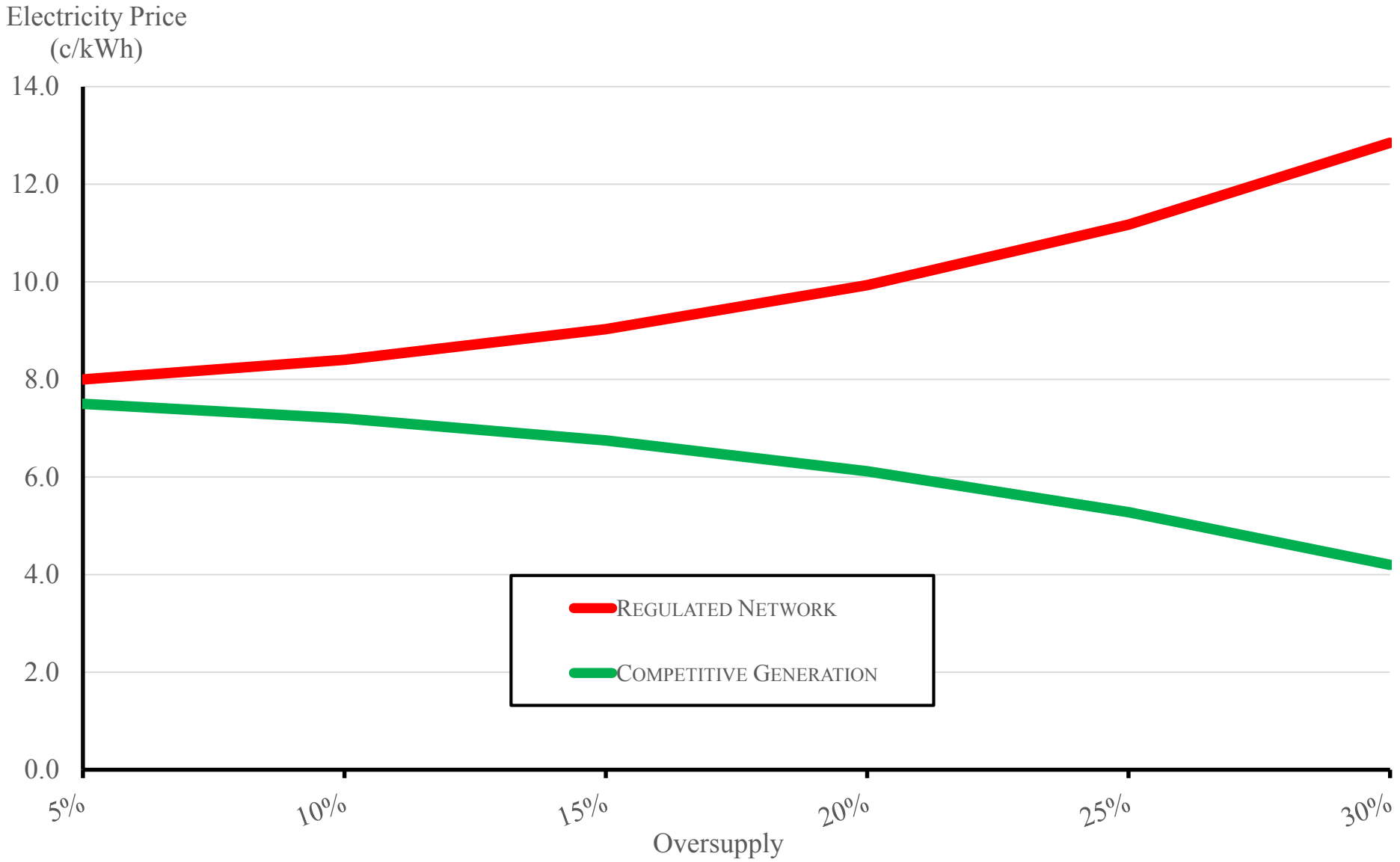
Over-capacity in regulated vs competitive markets: *strikingly different*



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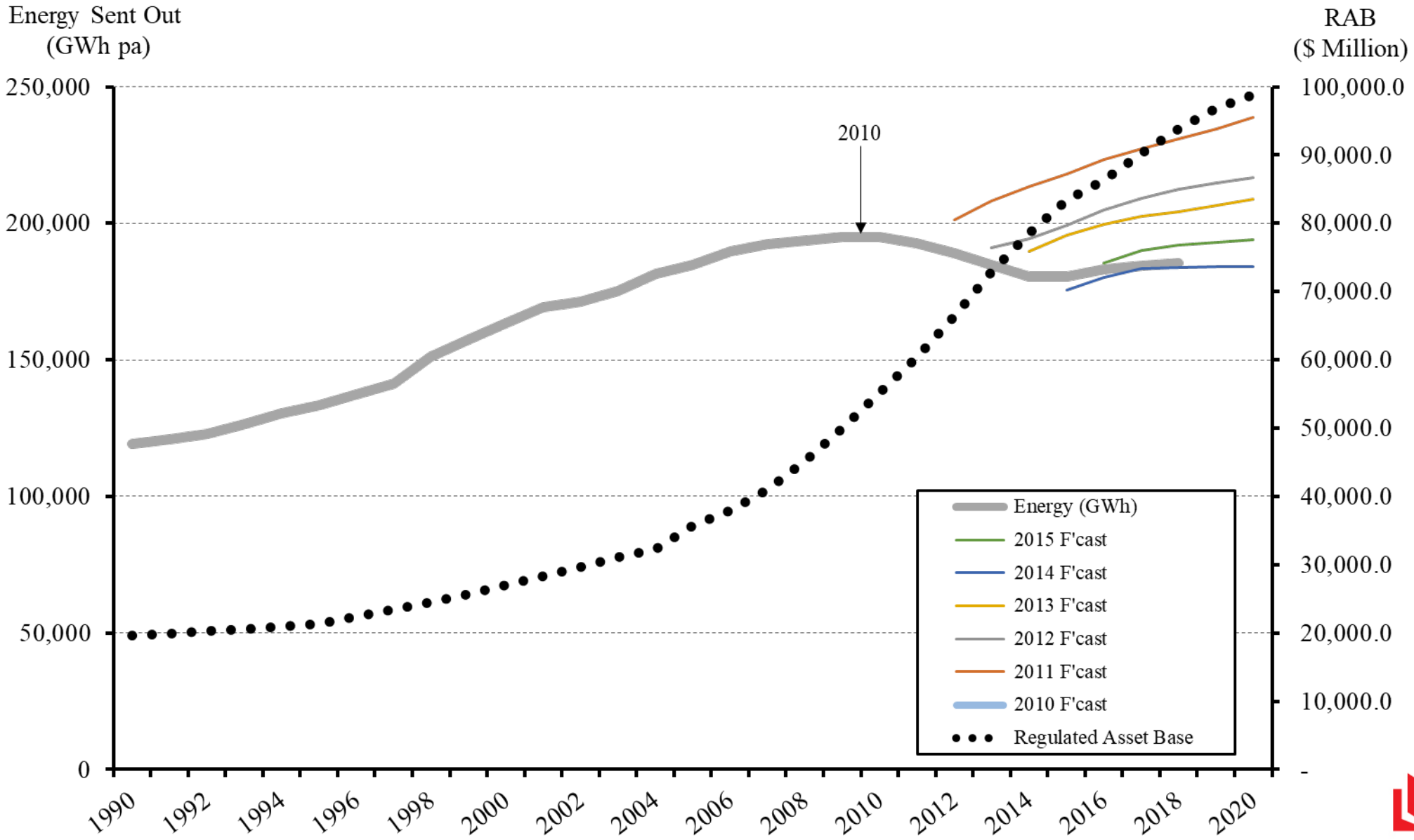
Pre-emptive options

- The answer to changing technology & demand patterns associated with a regulated network can't always be: "asset write-offs"
- Costs and consequences are material, and need to be thought through carefully
- In spite of changing demand patterns, the evidence is continual growth in network connections.
- Remote / geographically sparse examples aside, it is hard to imagine a collection of stand-alone systems outperforming the gains from market exchange arising from networks
- Pre-emptive options of network tariff reform, economic depreciation, and differential costs of capital require initial focus.
- An asset stranding policy needs to be analysed during peace time, not in the middle of a crisis…

NEM Final Energy Demand vs NEM Combined Network RAB



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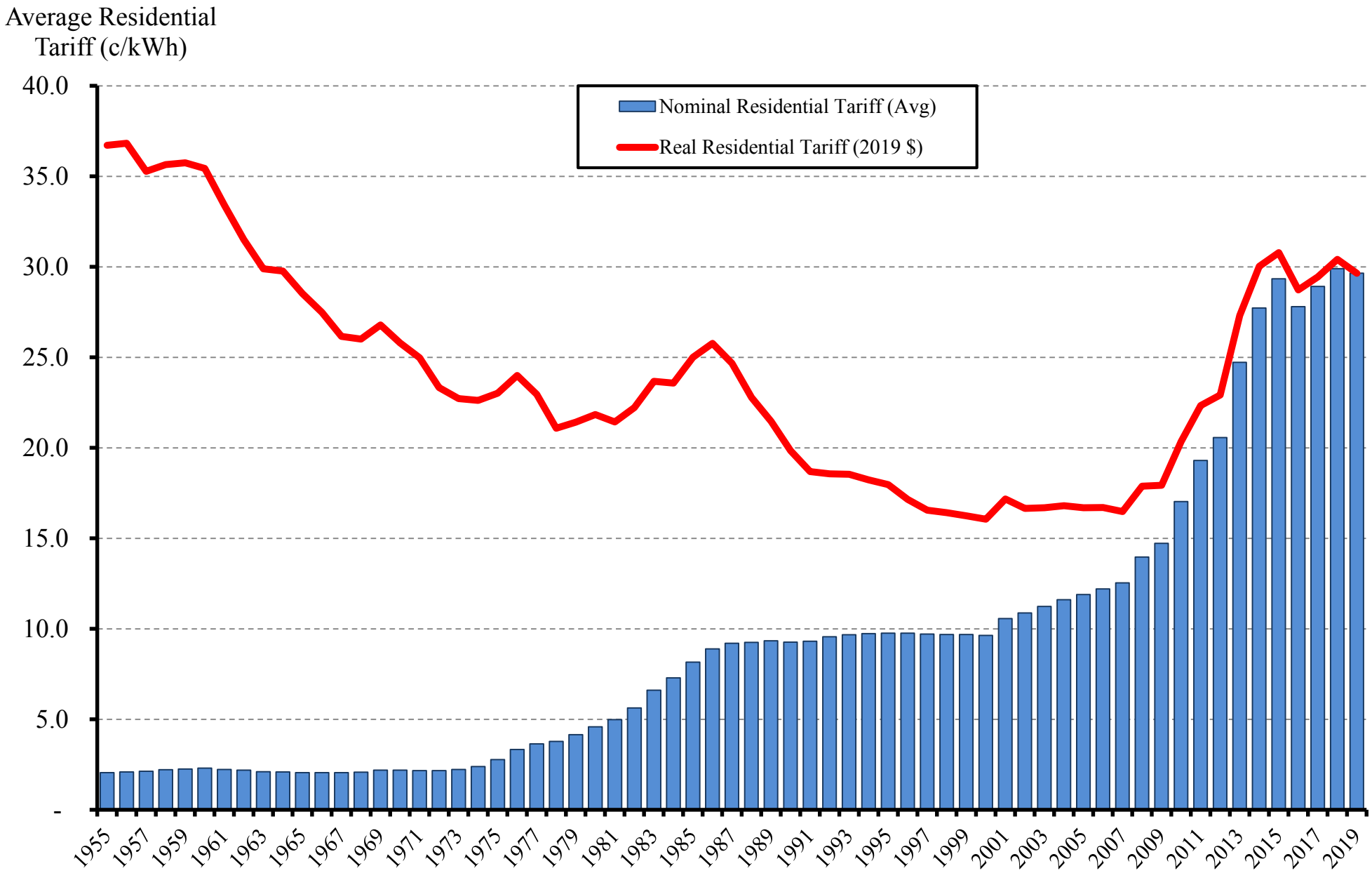
Queensland residential tariff: 1955-2019



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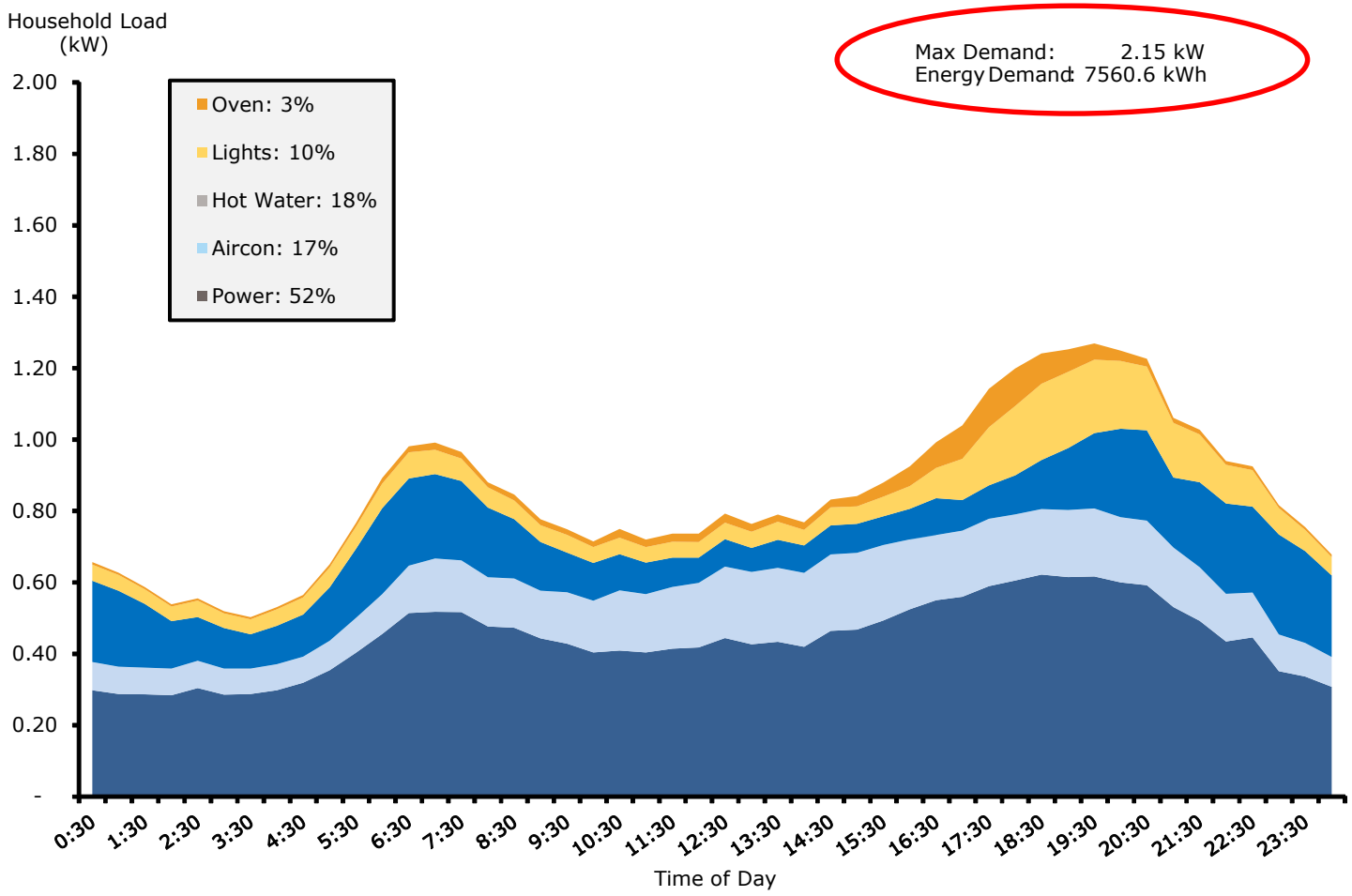
Drilling down: Annual average Southeast Qld household load (switchboard circuit level)



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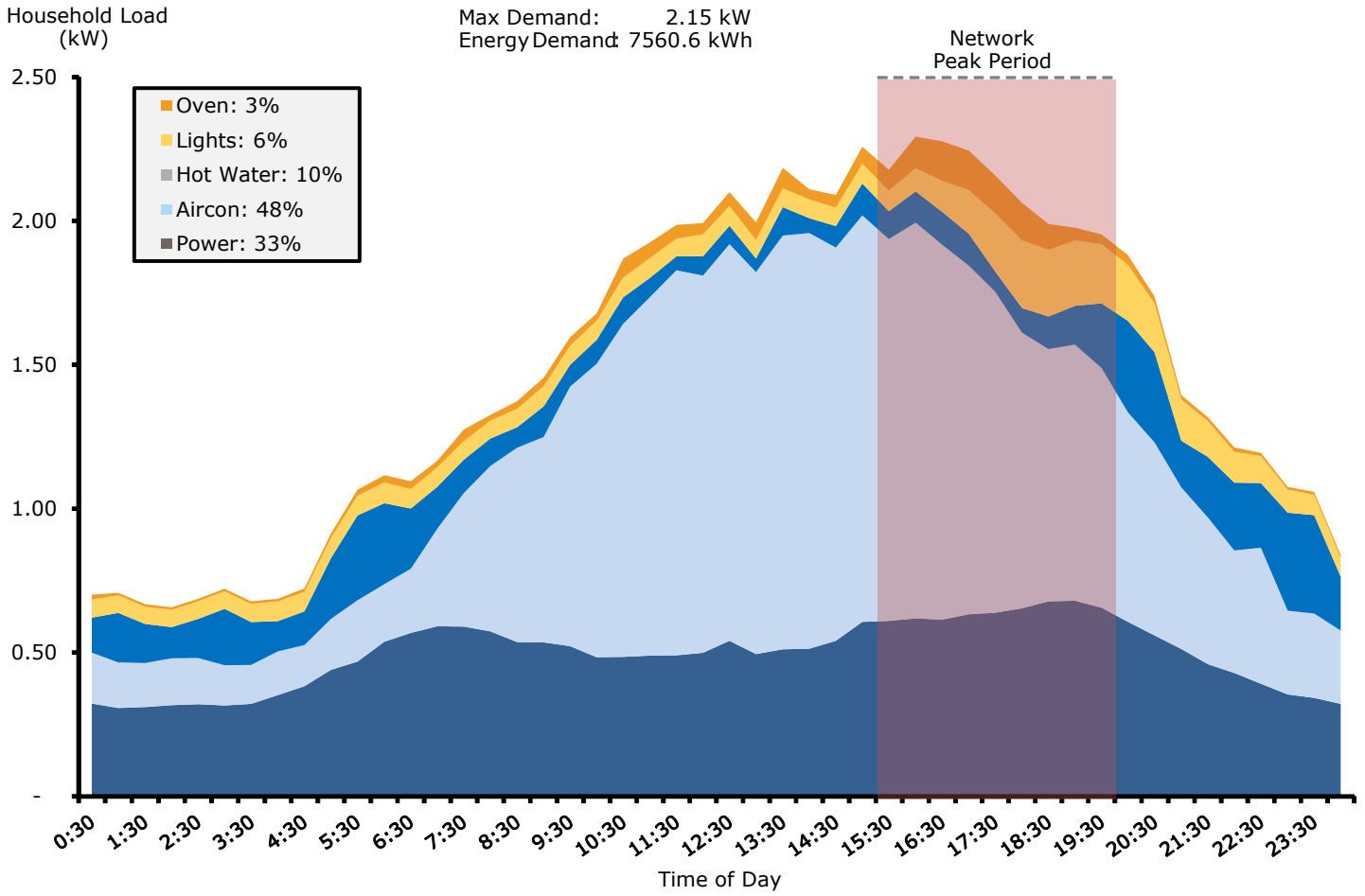
The same Southeast Qld households – Critical Event Summer Days (switchboard circuit level)



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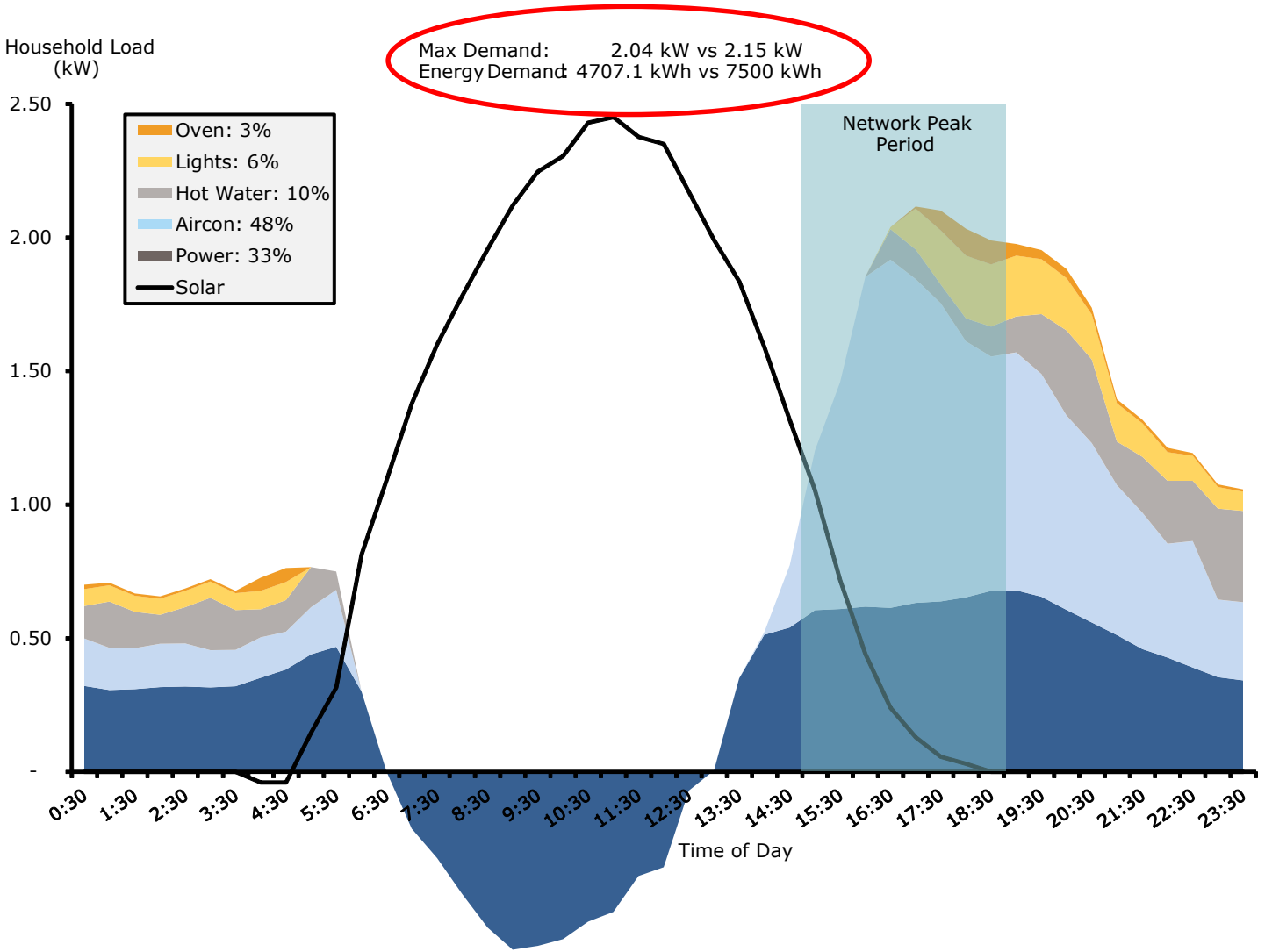
The same Southeast Qld households + Solar – Critical Event Days (switchboard circuit level)



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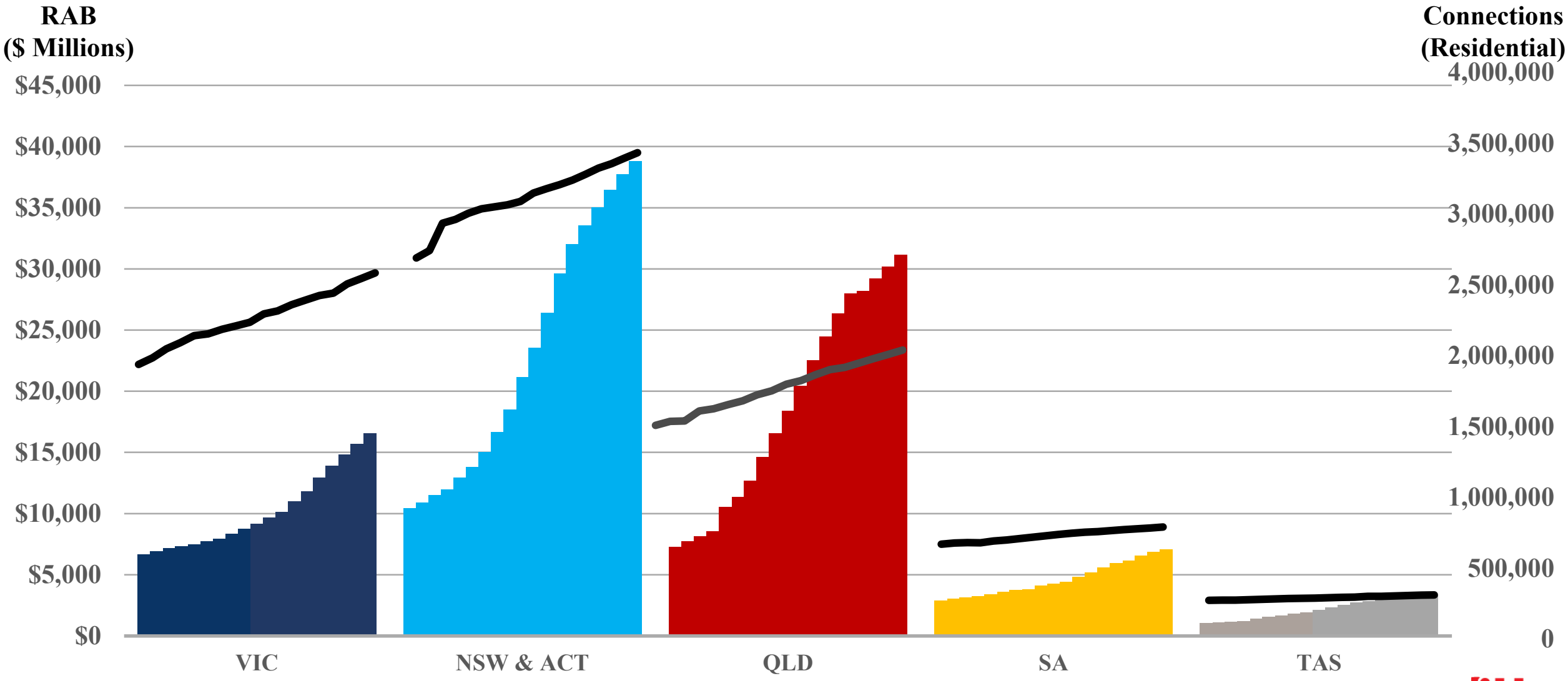
NEM Combined RAB vs Residential Connections Growth: 2001-2018



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Asset Stranding: arguments for *full recovery*

- The great regulatory economics treaties of Bonbright (1961) and Kahn (1970, 1971) are silent on how to deal with networks in decline. FERC Order 888 sparked a vast literature, from 1995
- Two lines of reasoning : *efficiency* and *equity / fairness*
- Theory of dynamic consistency: if legitimate and prudently approved investments are stranded by regulatory *fiat*, capital markets will interpret policy as opportunistic
  - e.g. Crawford (2014) shows asset write-off produces higher WACC, which exceeds benefits of any write-off (i.e. zero recovery scenario)
- Regulated rates of return do not explicitly incorporate stranding risk
- Regulatory Compact: first appears in court transcripts c.1983 ('Regulatory Bargain' can be traced back to 19th Century case law re: railroads): *Stranding approved assets presents an inescapable issue of procedural fairness*
- Regulators have precluded pricing above regulated set-points

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Asset Stranding: arguments for *partial recovery*

- The same two lines of reasoning(!) *efficiency* and *equity*
- While unfair to strand approved assets, equally unfair to recover misguided investments from captive consumers
- Disruptive competition doesn't impose costs, it exposes inefficient assets and above market tariffs
- A strict normative economic and legal analysis of the *Regulatory Compact* produces an objective view:
  - Consumers never agreed to the Compact
  - Anything not explicitly defined is therefore immediately contentious
  - The Compact is used to argue for all the upside, and none of the downside, inherent in long-dated contracts (e.g. MAC clauses, price re-openers etc)
  - In (ambiguous) long term contract disputes, courts allocate responsibility to the party best able to adapt.
  - With disruptive competition or investment mistakes in retrospect, it's hard to argue this is the consumer
- *Prudent Investment* Test and *Used and Useful* Test. Regulatory approval at commitment is not sufficient: Regulators have neither the skill or resources to judge technology and demand patterns – and cannot possibly match the vast expertise of network utilities.

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Asset Stranding: arguments for *partial recovery*

- Economic Regulation exists to protect consumers from market power, not to protect utilities from competition or investment mistakes in retrospect
- Principle well established via the San Fran *Market Streetcar* case (1945). Streetcar incurring economic losses at 5c tariff, so sought increased tariff to 7c. Death spiral followed. Regulator then cut the tariff to 6c, court proceedings followed:
  - Regulation and the fair return principle applies when the utility has monopoly power, not when it is besieged by disruptive competition that it is failing to navigate… utilities cannot simply look to their regulators to undo the impact of fundamental changes in the market… (see Market Street Ry Co vs Railroad Comm'n. 1945, and Graffy & Kihm, 2014).
- Moral hazard: there is a supply curve of stranded assets, the bigger the reward (i.e. Full Recovery), the more utilities will find.
- Investor expectations: prior to FERC Order 888, Equity Capital Markets priced in 77% recovery, not Full Recovery (see especially D'Souza & Jacob, 2001).

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Principles of Asset Stranding

- A network in decline and non-negative cost growth, will by definition produce a price spiral. In such circumstances:
  - There is no serious argument in favour of Zero recovery. It is *not* credible policy.
  - But the Regulatory Compact is an incomplete agreement and doesn't justify full recovery.
  - Stranding is a case-by-case proposition, and needs to be managed thoughtfully, and independently valued.
  - The recovery mechanisms selected are important. There are many options.
  - Mechanisms selected are a policy choice, not analytical determinations.
  - Recovery from consumers should be flexible, non-bypassable, and time-limited.

Applied Example

Scenario Setup.

- Distribution Network
- RAB of $10bn, 60% gearing.
- BBB rated utility, WACC of ~6%
- Government-wrapped bonds ~2.25%.
- Annual Regulated Revenue Requirement c.$1.35bn.
- 1.5m household connections
- 6800 kWh load per existing household (4500kWh for new connections)
- Solar take-up rate, 2.7% pa
- Network load in decline, but, connections growth of 1.6% per annum
- Own-Price Elasticity -0.1
- EV scenario: 3% growth pa in future periods

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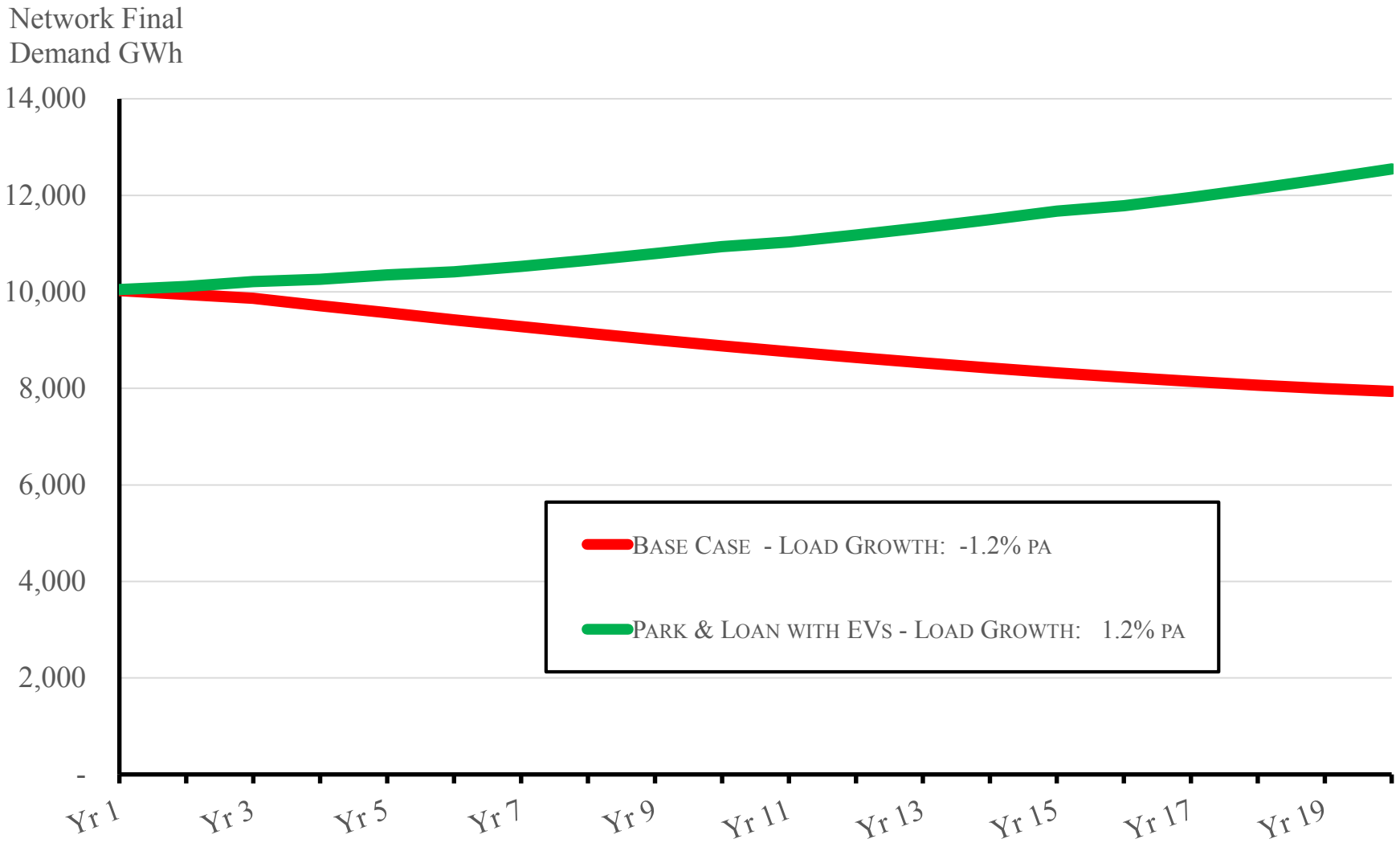
Final Energy Demand: Uncertain



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Stranding under uncertainty: Park & Loan

- Given over-capacity and uncertain future demand, the policy prescription works as follows:
  - Step 1: Identify economic tariff level (ie. 3c/kWh lower), and corresponding RAB
  - Step 2: "Park". Annexe $3.9b of RAB into a 'Stranding' account
  - Step 3. Reduce Network Tariff, re-aligned to the lower RAB, to reduce inefficient bypass
  - Step 4. "Loan". Issues $2.4b of govt-wrapped bonds, backed by network customers
  - Step 5. Add Hypothecated Tax to the (now lower) Network Tariff
  - Step 6. Wrapped-bond sales proceeds used to eliminate Parked RAB debt.
    - Equity of $1.5b is 'suspended' (*as distinct from written off*)
  - Step 7. At each 5-Year Regulatory Determination, re-test Parked RAB levels based on customer connections growth, load growth, or both.
  - Step 8. Un-park the component of RAB matched to connections (or load) growth and Return to Service
  - Step 9. Utility raises new Debt for un-parked RAB, network tariff raised to underpin, Debt proceeds used to buy component of govt-wrapped bonds on issue

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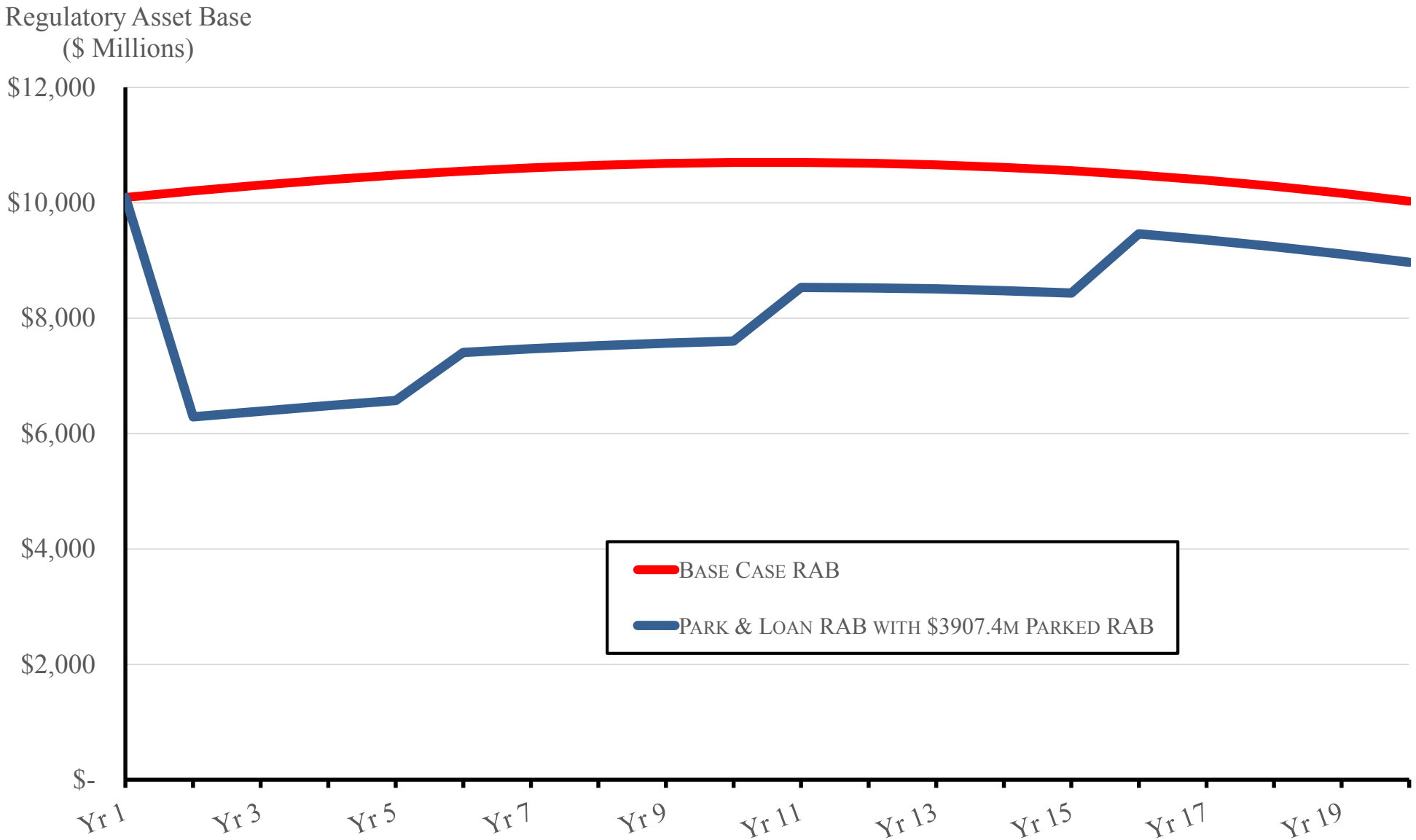
Park, Loan, Un-park and Return to Service



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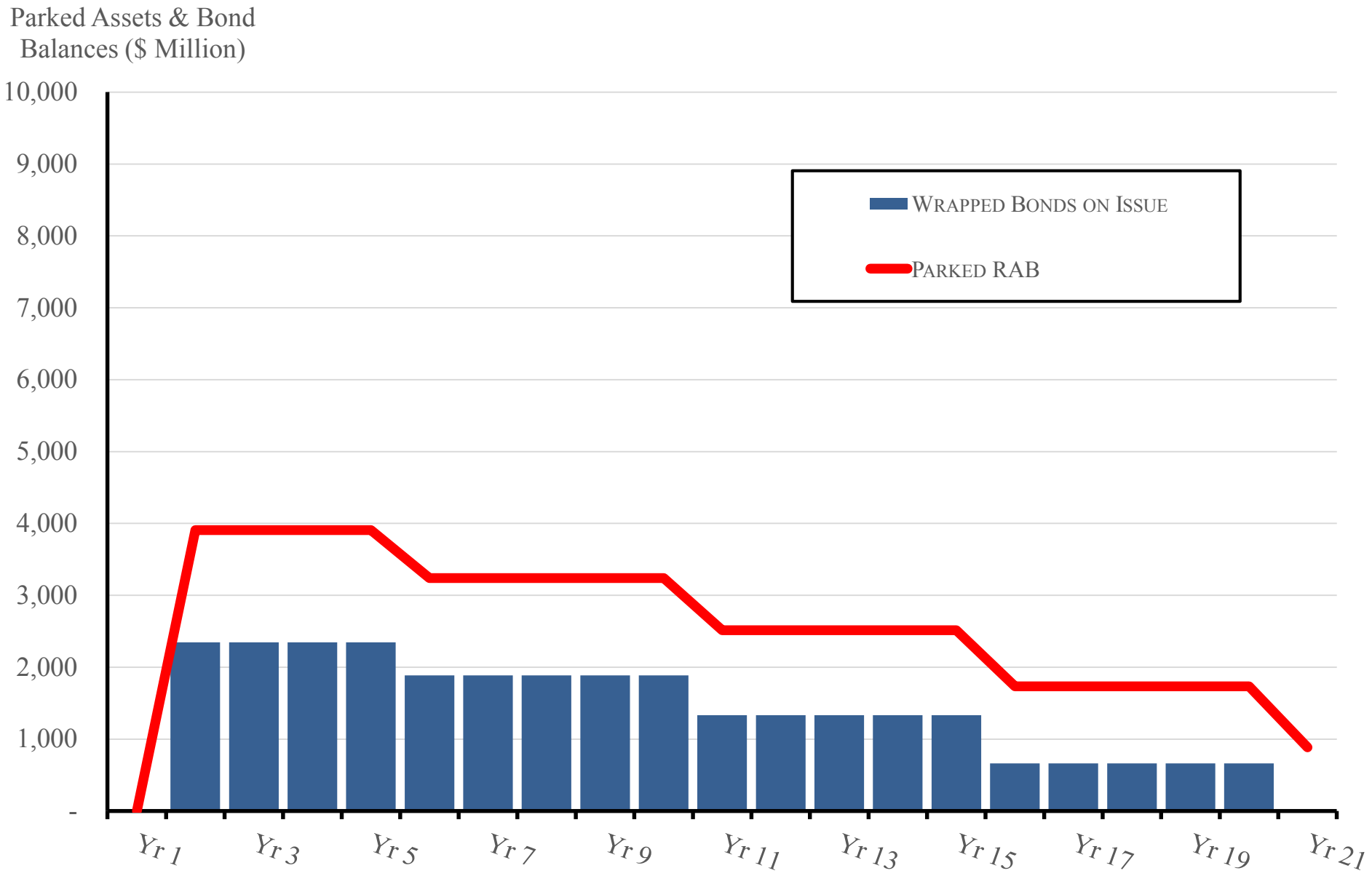
Parked RAB Balance & Wrapped Bond Balance



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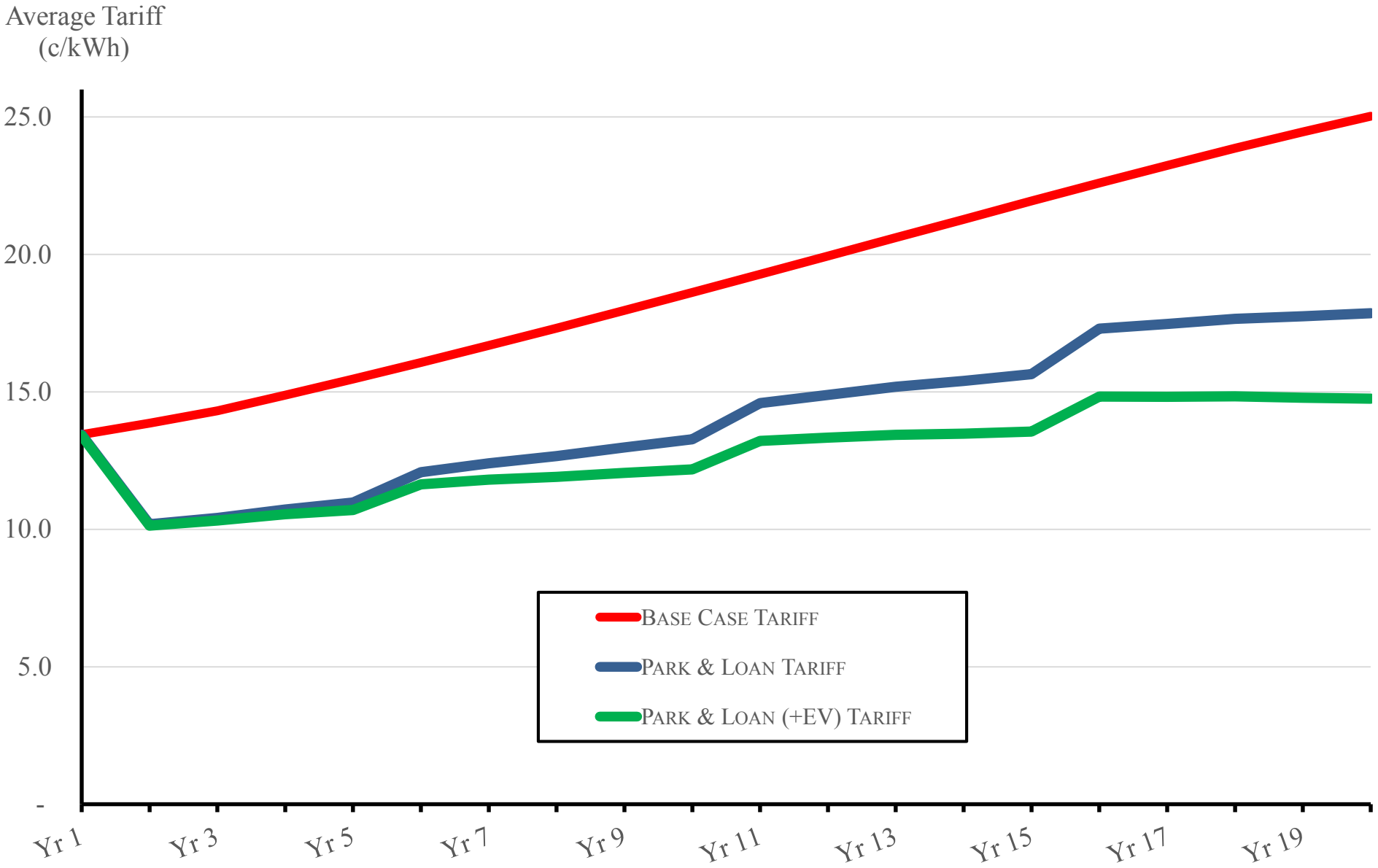
Network Tariff: Base Case vs Park & Loan



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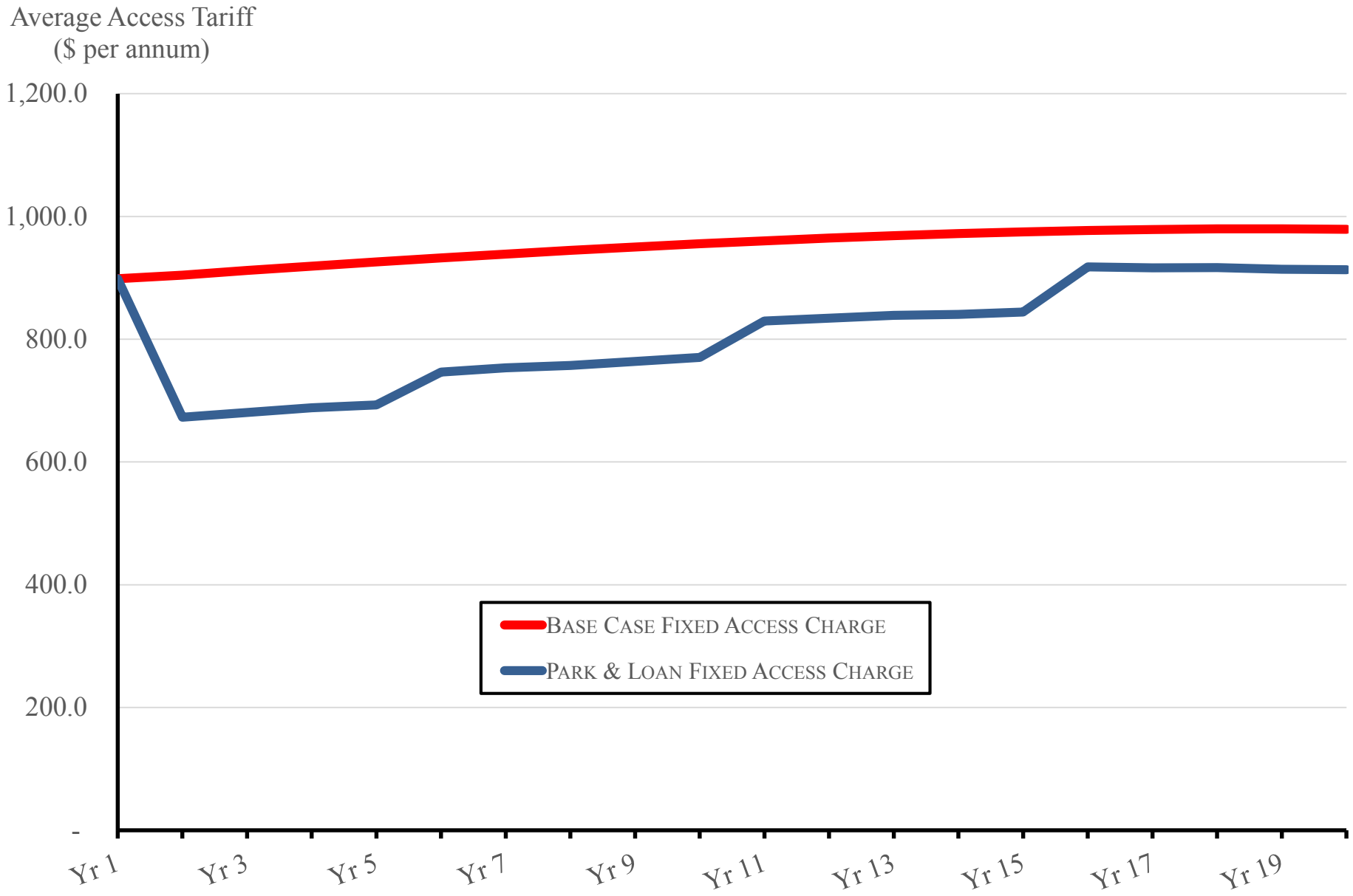
Network Access Tariff: Base Case vs Park & Loan



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Policy implications

- In a world of distributed energy resources, networks become more important, not less
  - In aggregate, self-supply cannot be expected to outperform gains from market exchange given a sunk network
  - However, an inefficient tariff will produce over-investment in network bypass and this reduces total welfare
  - Inefficient bypass amplifies tariff instability, and may distort gains from exchange
- Starting point, pre-emptive tariff design, depreciation methods etc.
- Asset Stranding policy is not for the feint hearted, and cannot be designed in the middle of a crisis. It needs to be thoughtfully designed - well ahead of its intended or required use.

Policy implications

- *Zero recovery* of stranded assets is not credible policy, but neither is *full recovery*.
  - In a mature debate, 100% recovery of certain stranded assets will be justified (e.g. where networks were *compelled* to invest, to meet service standards)
- The clauses of the so-called Regulatory Compact are matters for speculation.
- Apart from specific circumstances, network assets don't get stranded, tariffs face stranding risk.
- Any Asset Stranding policy needs clear objectives:
  - In my research: efficient network tariff subject to investment-grade *credit metrics* constraint (i.e. stability of electricity services is vital to the long run interests of consumers).
- Park & Loan provides an interesting possibility; park RAB, issue govt-wrapped bonds, un-park RAB in future regulatory determinations in line with connections growth
- The treatment of parked equity was not dealt with, nor was tariff structure. Both are important
- As an *absolute general conclusion*, this work shows how an Asset Stranding policy *can* be done. It has not necessarily shown how it *should* be done.

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