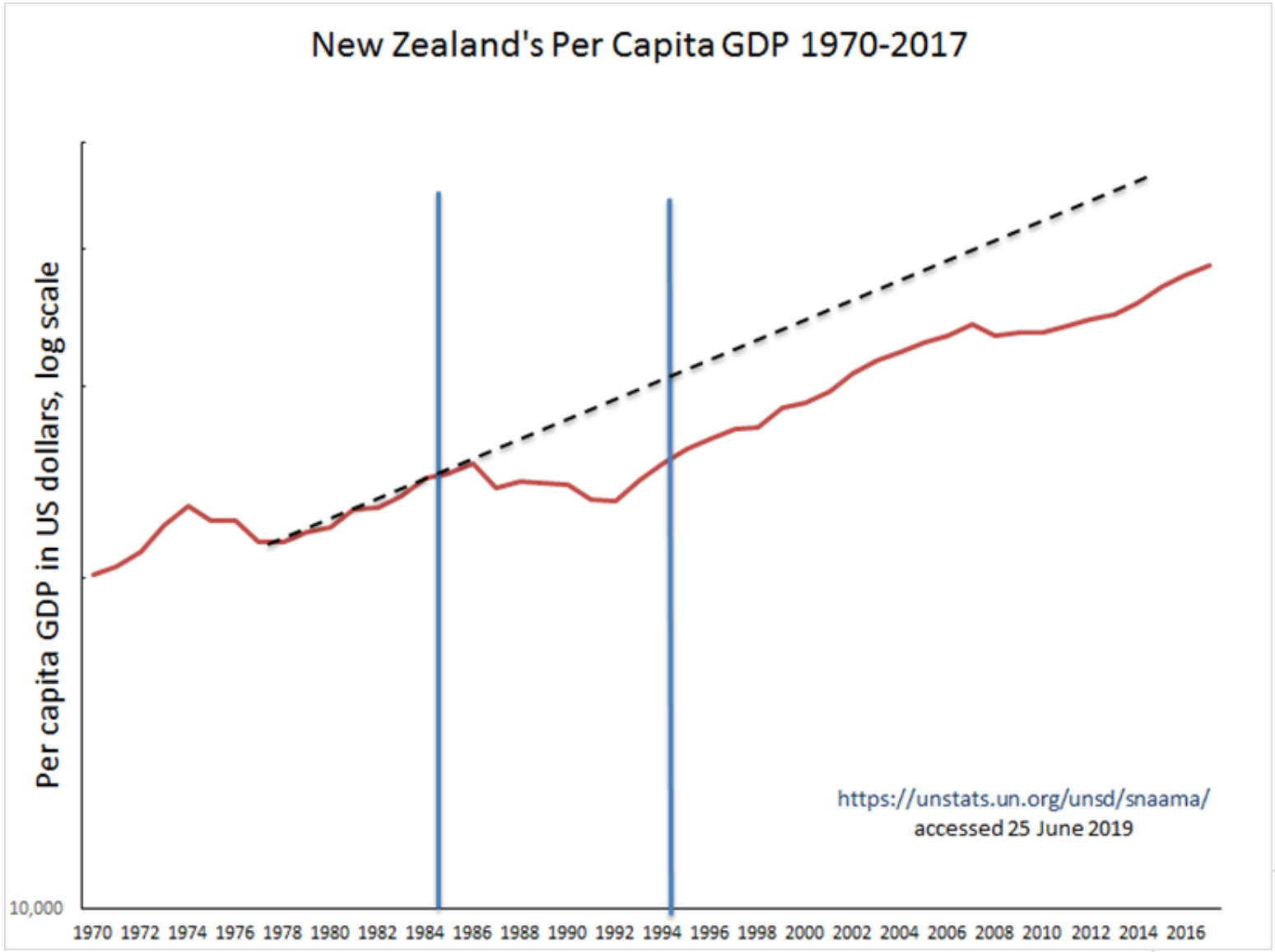
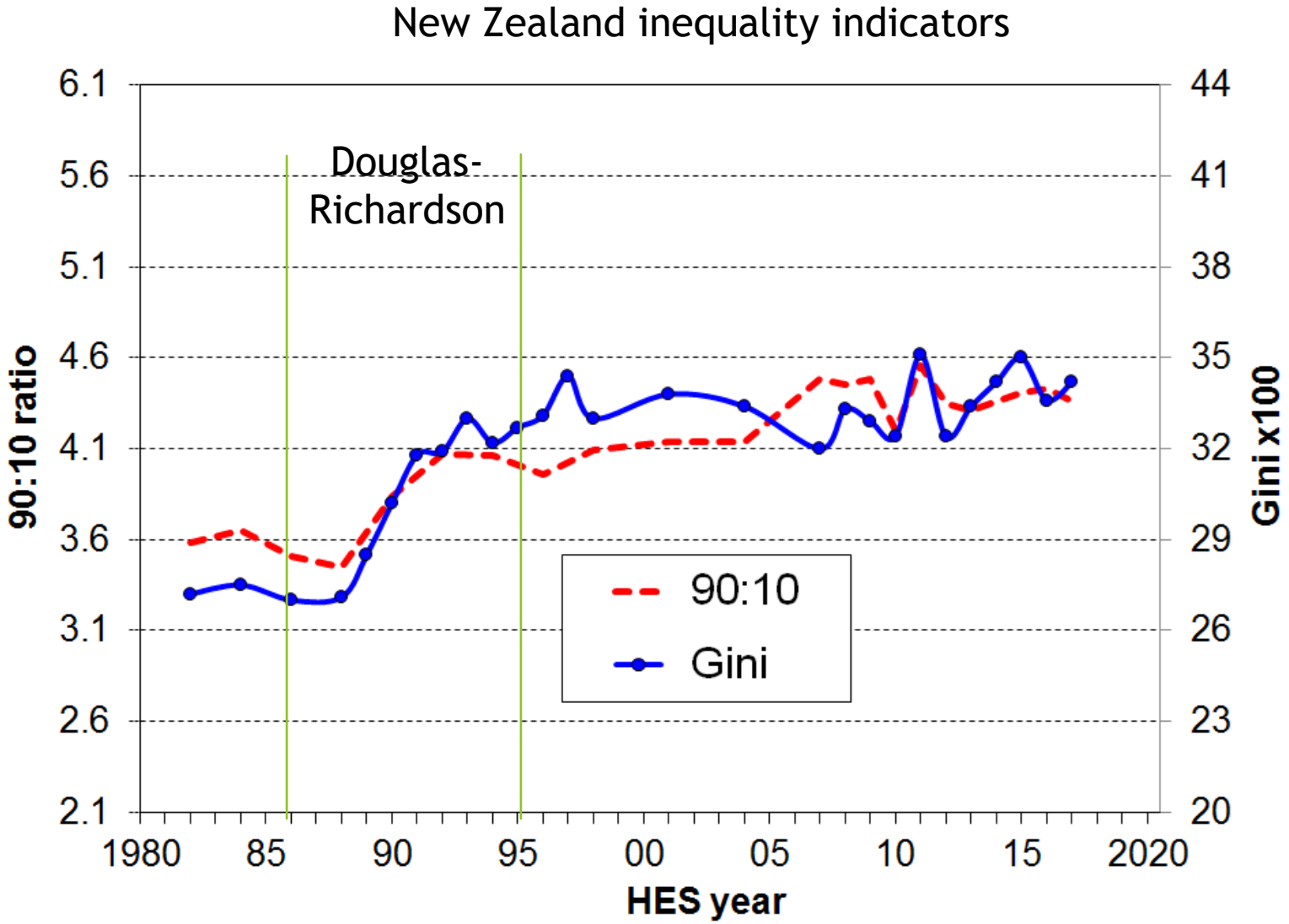
What's wrong with the New Zealand electricity market?

Geoff Bertram

19 August 2020

Lest we forget, the period 1984-94 has left a permanent mark on New Zealand's economy and society:





Brian Perry, *Household incomes in New Zealand: Trends in indicators of inequality and hardship, 1982 to 2017*, Wellington: MSD, October 2018, p.90.

The big promise of reform

- Back in the 1980s the proposition was that corporatizing, reorganising, and where possible privatising electricity, would bring gains for consumers because
  - Commercial, profit-driven management would (1) raise efficiency and (2) cut costs
  - Competition (or appropriate regulation) would (3) force efficiency and productivity gains to be passed through to prices
  - Consumers would therefore enjoy better service and lower prices, while profits could rise under an SOE or private model – sharing the gains from more productive use of resources

The outcome 1986-2018

- Productivity is down 30% over three decades
- Prices for residential consumers have doubled in real terms
- Prices for industry are up just a couple of percent
- Prices for commercial users are down by a quarter
- Gross profits are up 80%

My interpretation of these outcomes

High profits have come not from efficiency gains but from price-gouging residential consumers, under cover of entrenched market power, while the countervailing power of big business has protected industrial and commercial users.

In other words, the big promises were hollow.

Outline from here

1. Quick history
2. Some macro numbers: productivity, prices, and profits
3. Where can excess profits arise under the current industry structure?
4. Some modelling of profits in generation
5. Conclusion: policy options?

Before 1984

- An “essential service” collectively provided
- Priced as cheaply as possible to households: wellbeing the goal
- Run by civil engineers committed to optimal planned outcomes
- Integrated monopoly with non-profit objectives

Since 1984

- A commodity allegedly like any other supplied by corporates
- Priced to recover the full cost of the marginal generator plus the monopoly price for each lines-network operator plus a fat margin for dominant retailers
- Run by corporate managers and financial engineers maximising profit and “shareholder value”
- Multiple players in a complicated institutional landscape of some [allegedly] “competitive” and some [allegedly] “regulated” markets

1987 Corporatisation => profit-driven SOE (ECNZ)

1988 Transpower grid separated from generation stations (finally divested 1994)

1989 Taskforce recommends privatisation, “light handed regulation”

1994 Local electricity supply authorities expropriated, corporatised, and stripped of their retail franchise monopolies

1996 Wholesale “energy-only” spot market set up, Contact Energy spun off from ECNZ

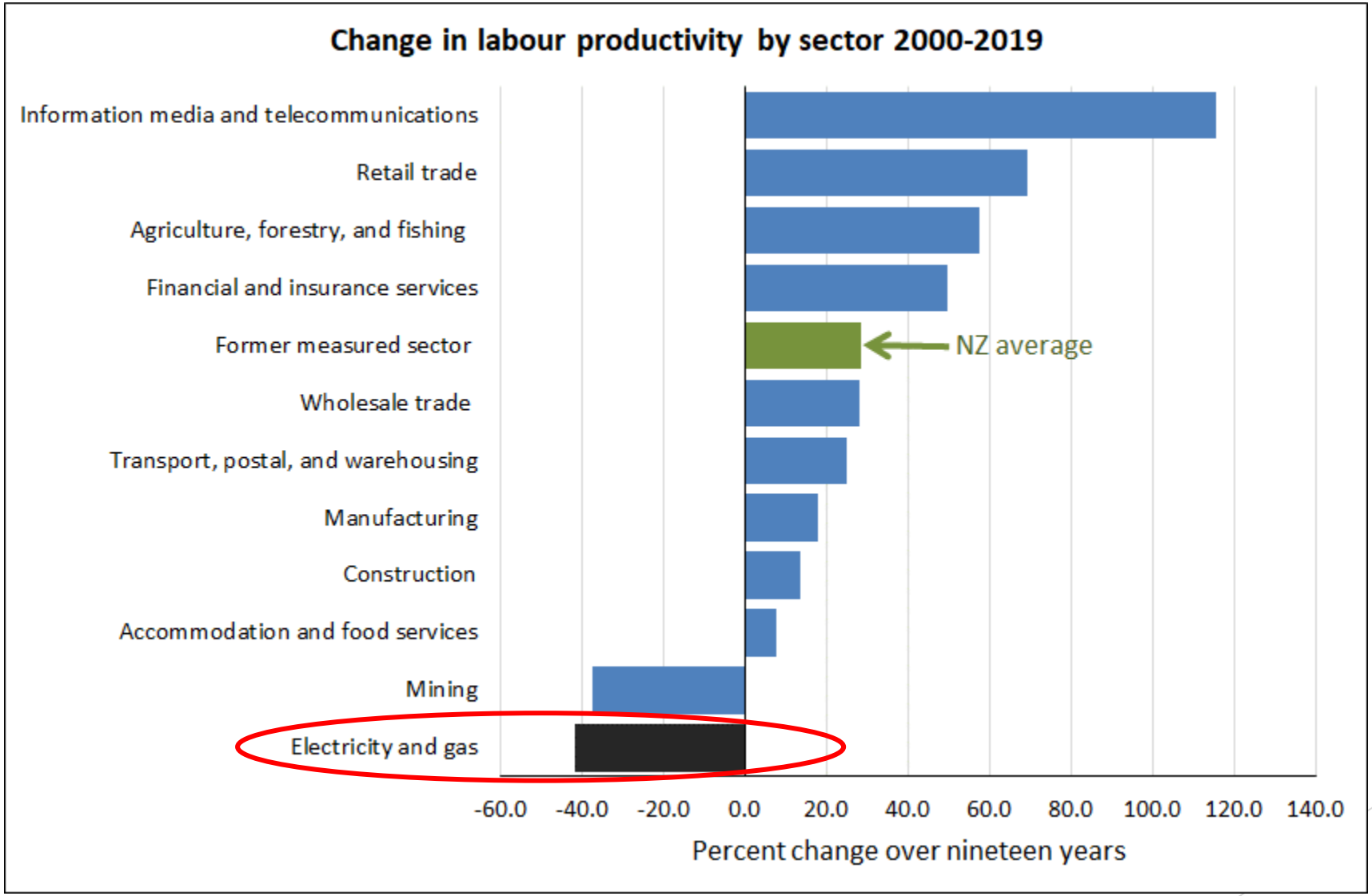
1999 ECNZ broken up => SOEs Meridian, Genesis, Mighty River and private Trustpower and Todd

1999 Local lines/energy split enforced and generators allowed to buy up retail businesses

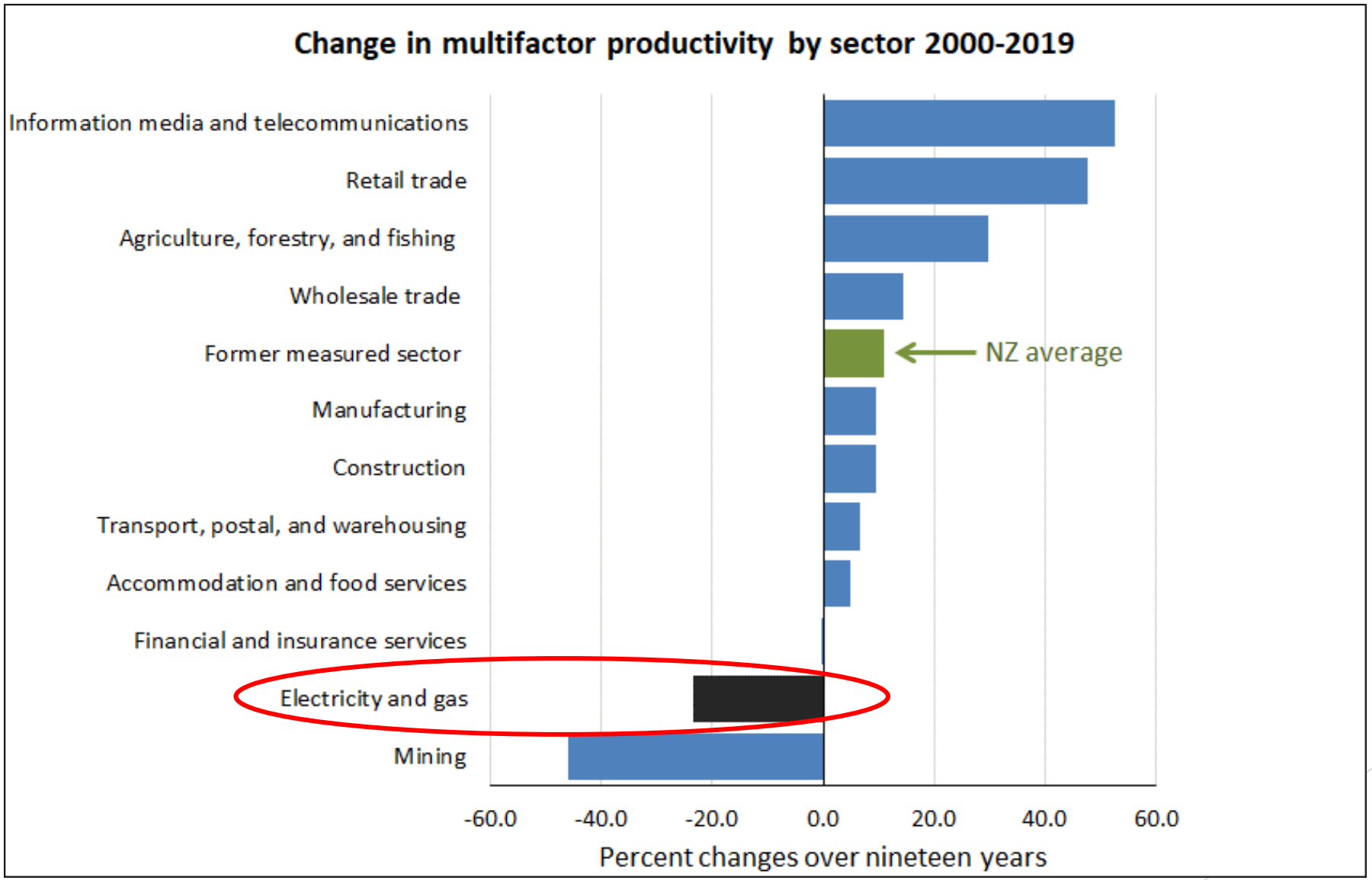
2008 Commerce Commission begins “regulating” lines companies

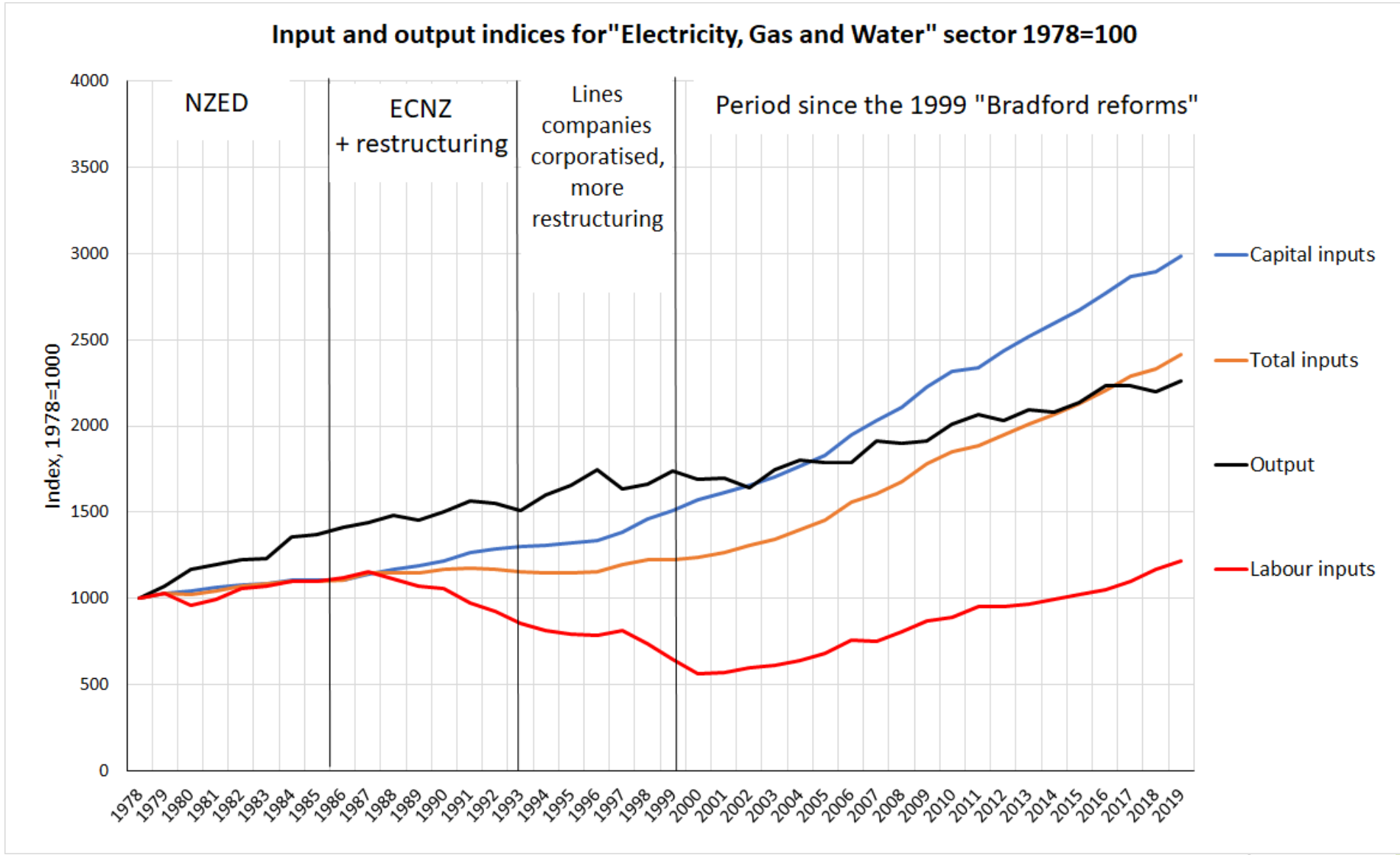
2013-14 Part-privatisation of the SOE gentailers

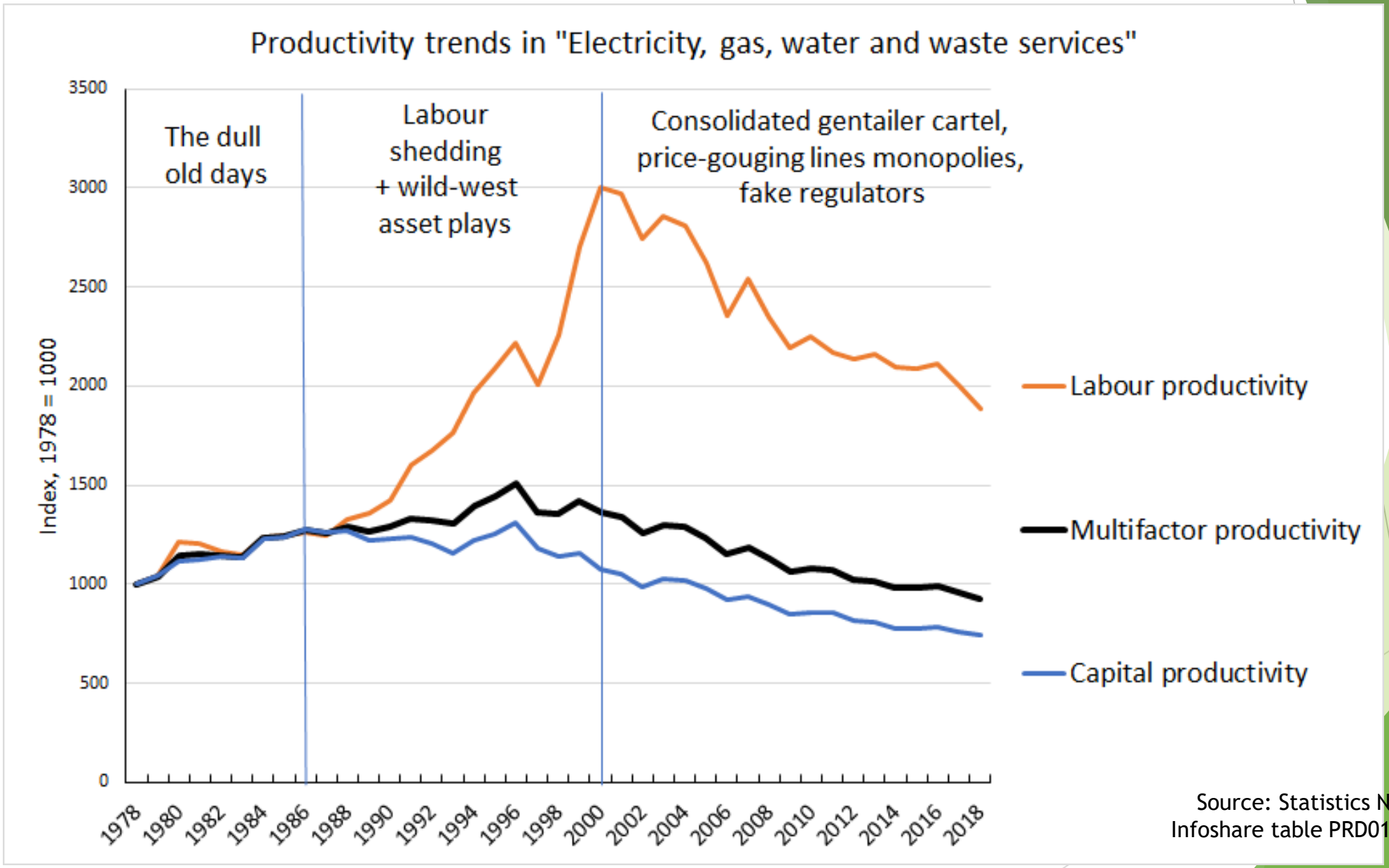
Raise efficiency?



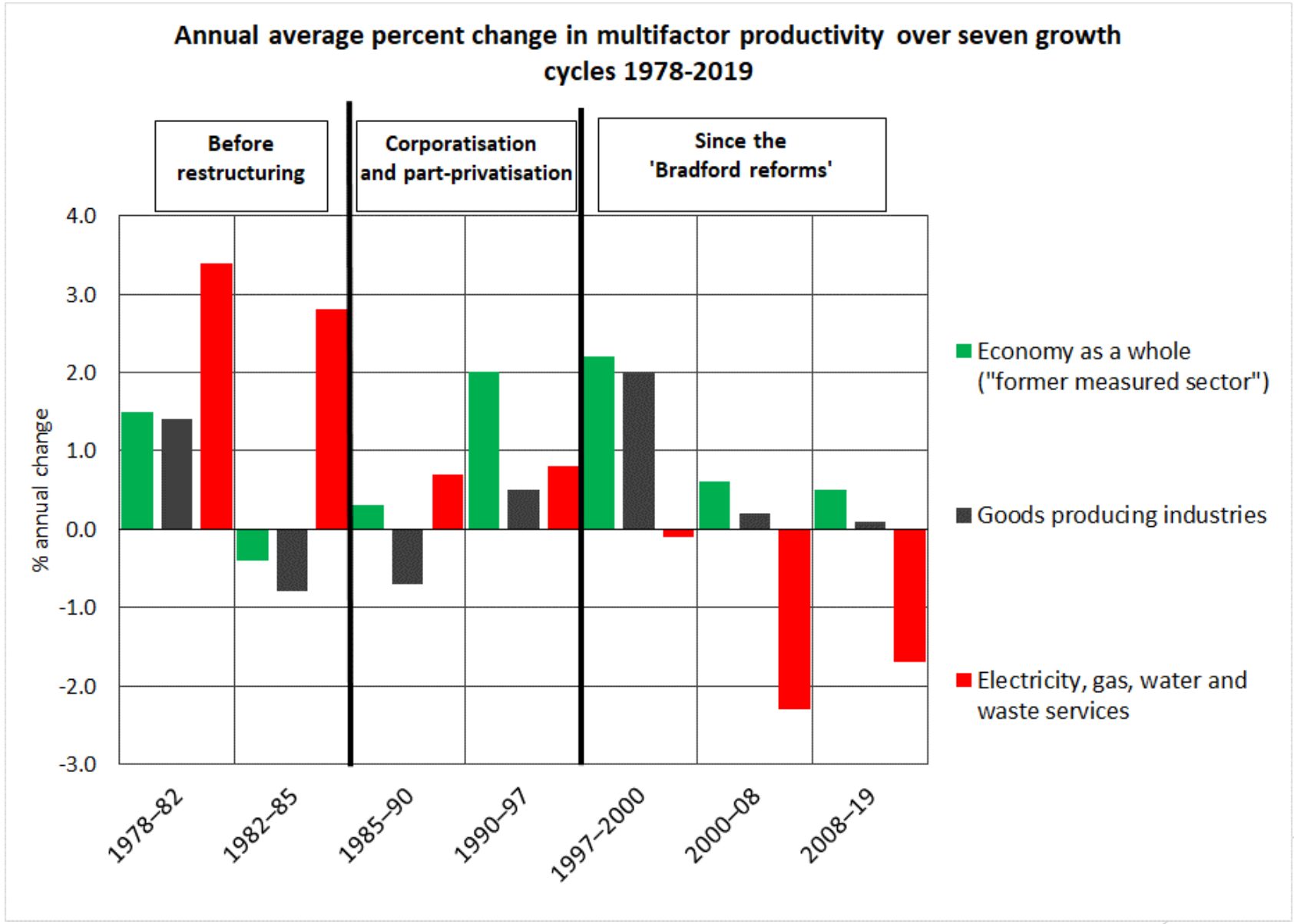
Raise efficiency?




Input and output indices for"Electricity, Gas and Water" sector 1978=100
NZED
ECNZ + restructuring
Lines companies corporatised, more restructuring
Period since the 1999 "Bradford reforms"
Index, 1978=1000
4000
3500
3000
2500
2000
1500
1000
500
0
1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Capital inputs
Total inputs
Output
Labour inputs



Source: Statistics NZ
Infoshare table PRD014AA


Annual average percent change in multifactor productivity over seven growth cycles 1978-2019
Before restructuring
Corporatisation and part-privatisation
Since the 'Bradford reforms'
% annual change
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
1978–82
1982–85
1985–90
1990–97
1997–2000
2000–08
2008–19
Economy as a whole ("former measured sector")
Goods producing industries
Electricity, gas, water and waste services

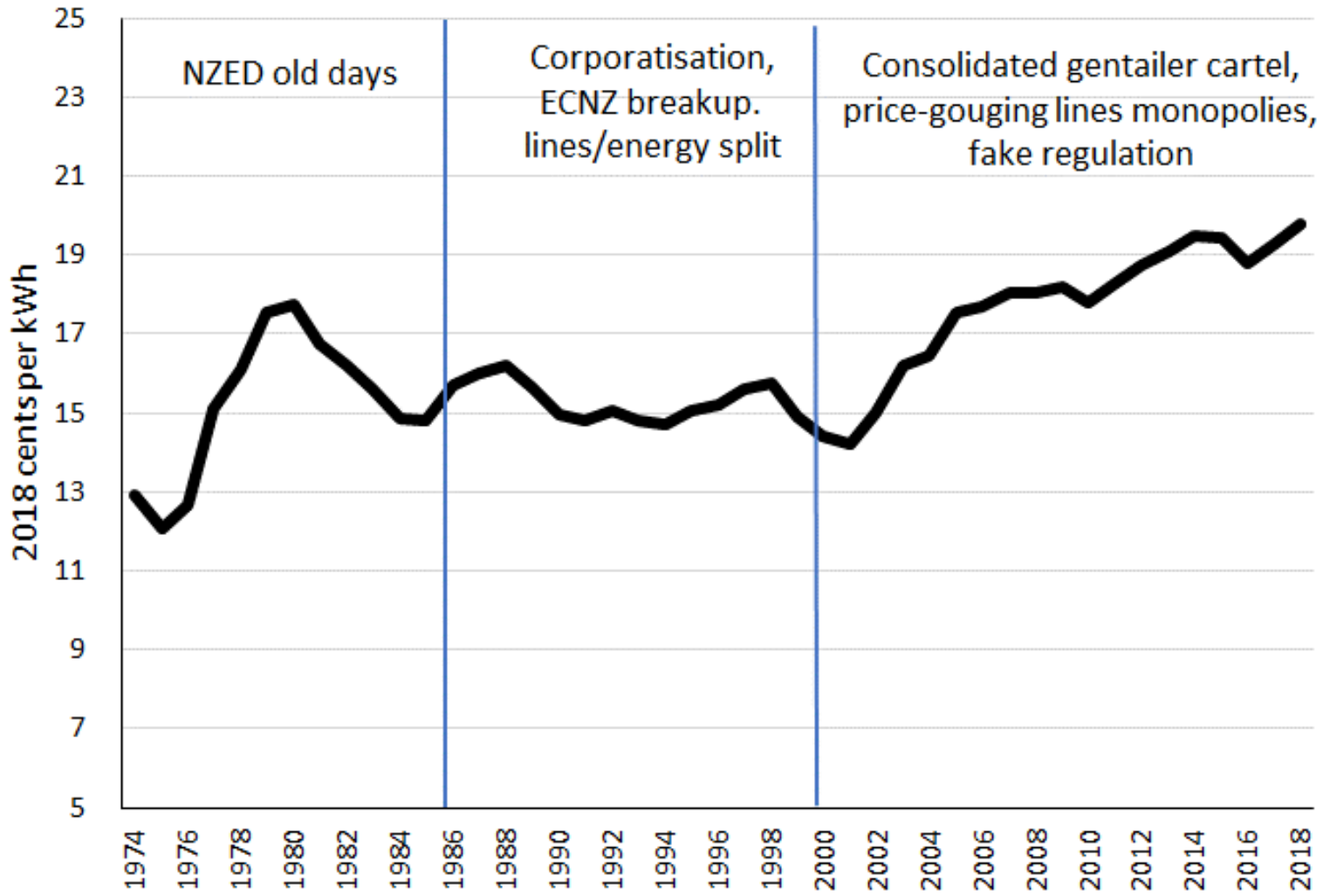
Bottom line: over the past two decades this sector has been loaded up with labour and capital engaged in unproductive activities

- Pursuit of profit combined with complicated “competition” games and financial engineering has meant that increasing amounts of labour and capital have been allocated to high-paid sales, marketing, financial management and administrative work that adds nothing to the volume or quality of the electricity reaching consumers

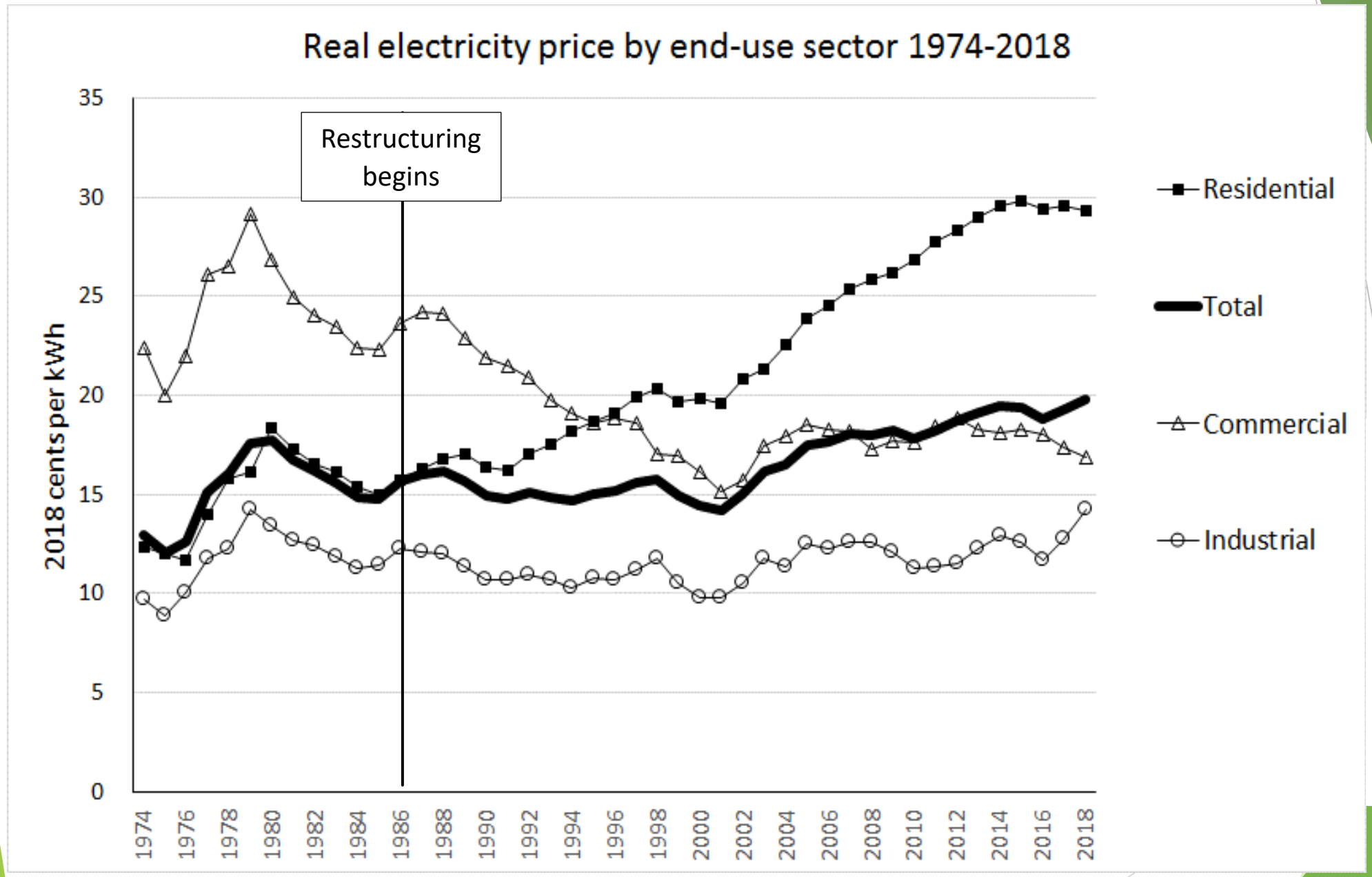
- Corporatisation and privatisation have culminated in a gigantic exercise in rent-seeking waste

Turn now to price

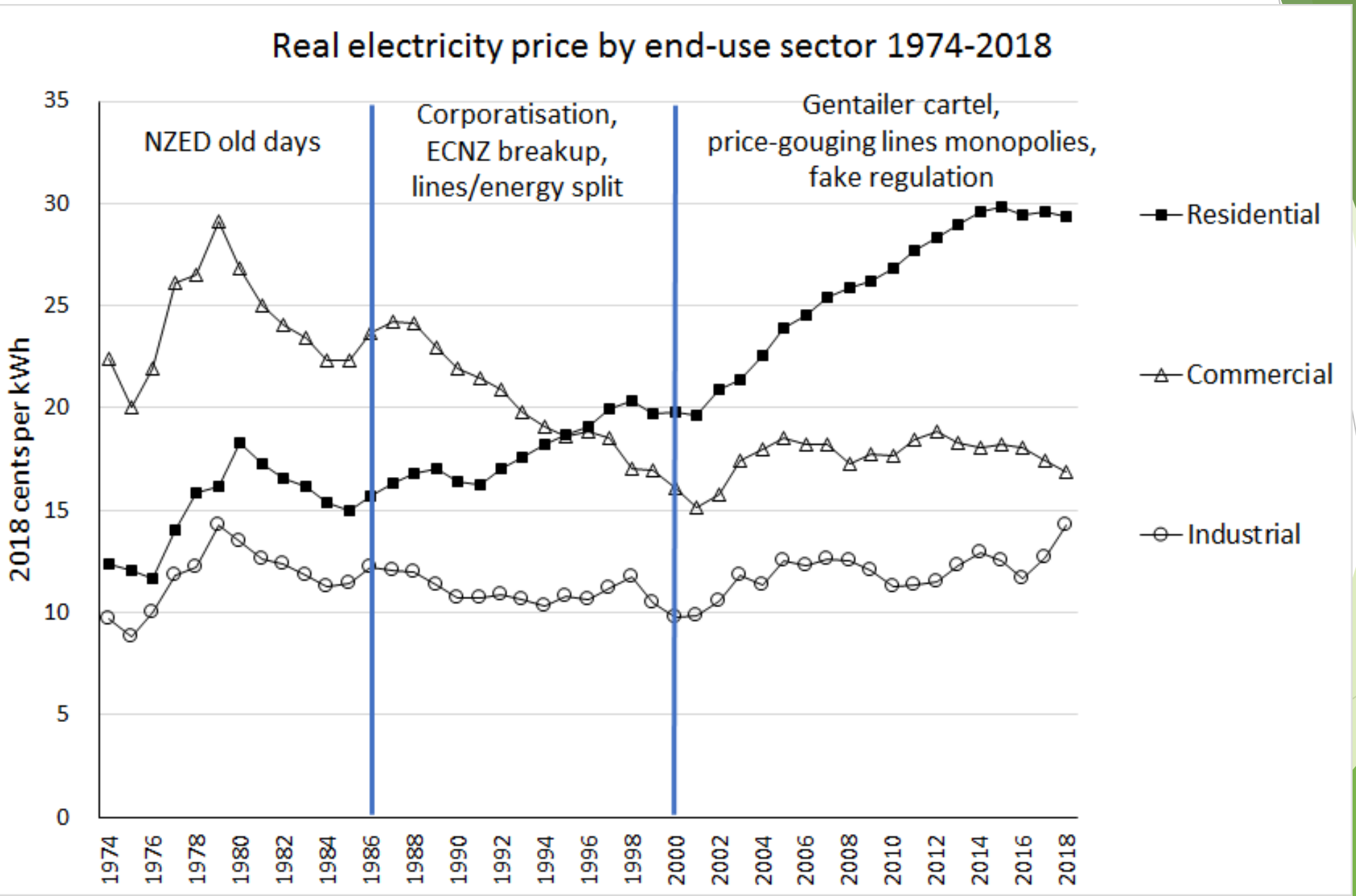
- First the average across all users
- Then the specific changes by sector



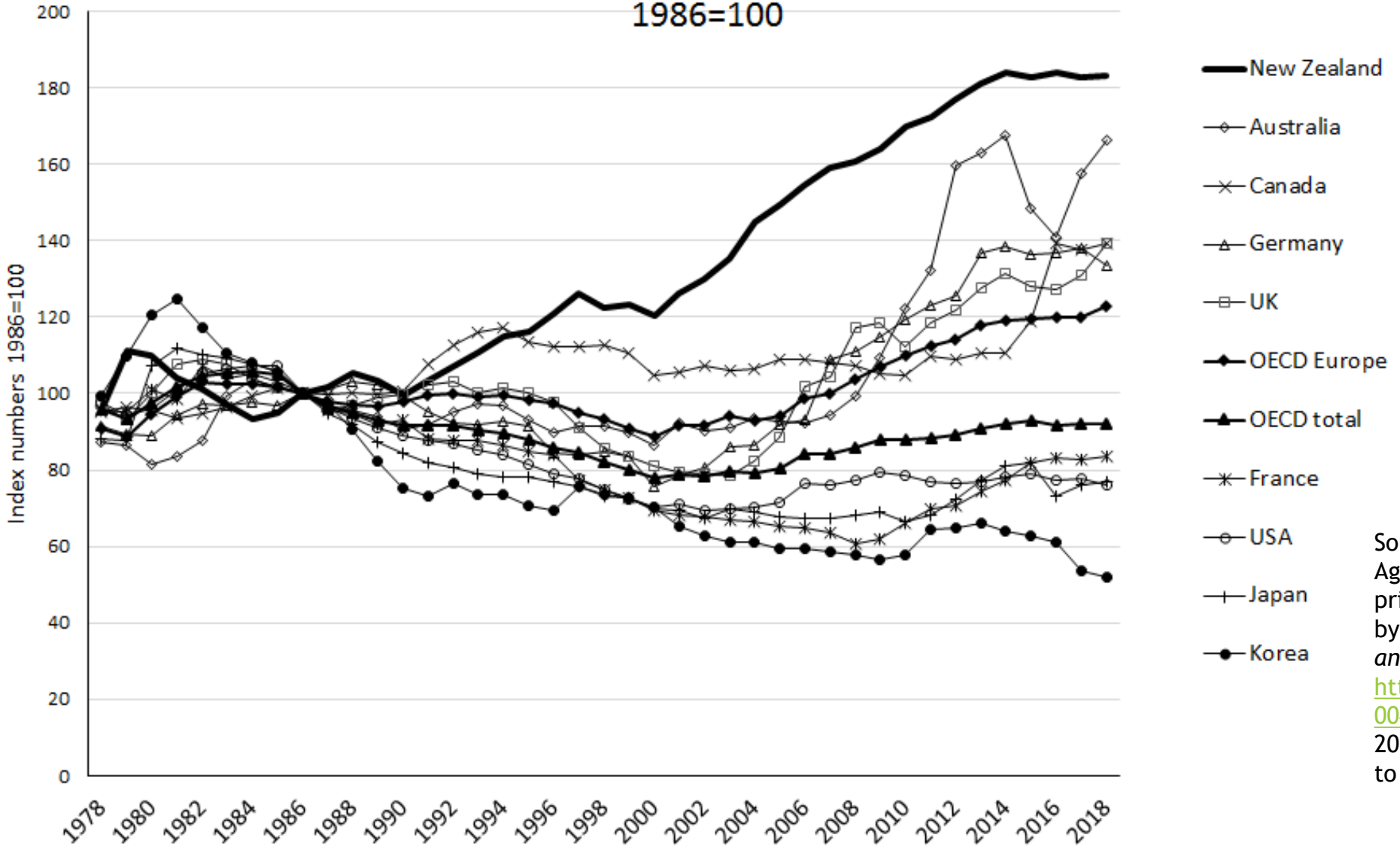
Calculated from MBIE 'Data tables for electricity" and "energy price tables" at https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics/ and https://www.mbie.govt.nz/assets/Data-Files/Energy/energy-quarterly-statistics/q1-march-2019/f0208a8a33/Prices.xlsx accessed June 2019.



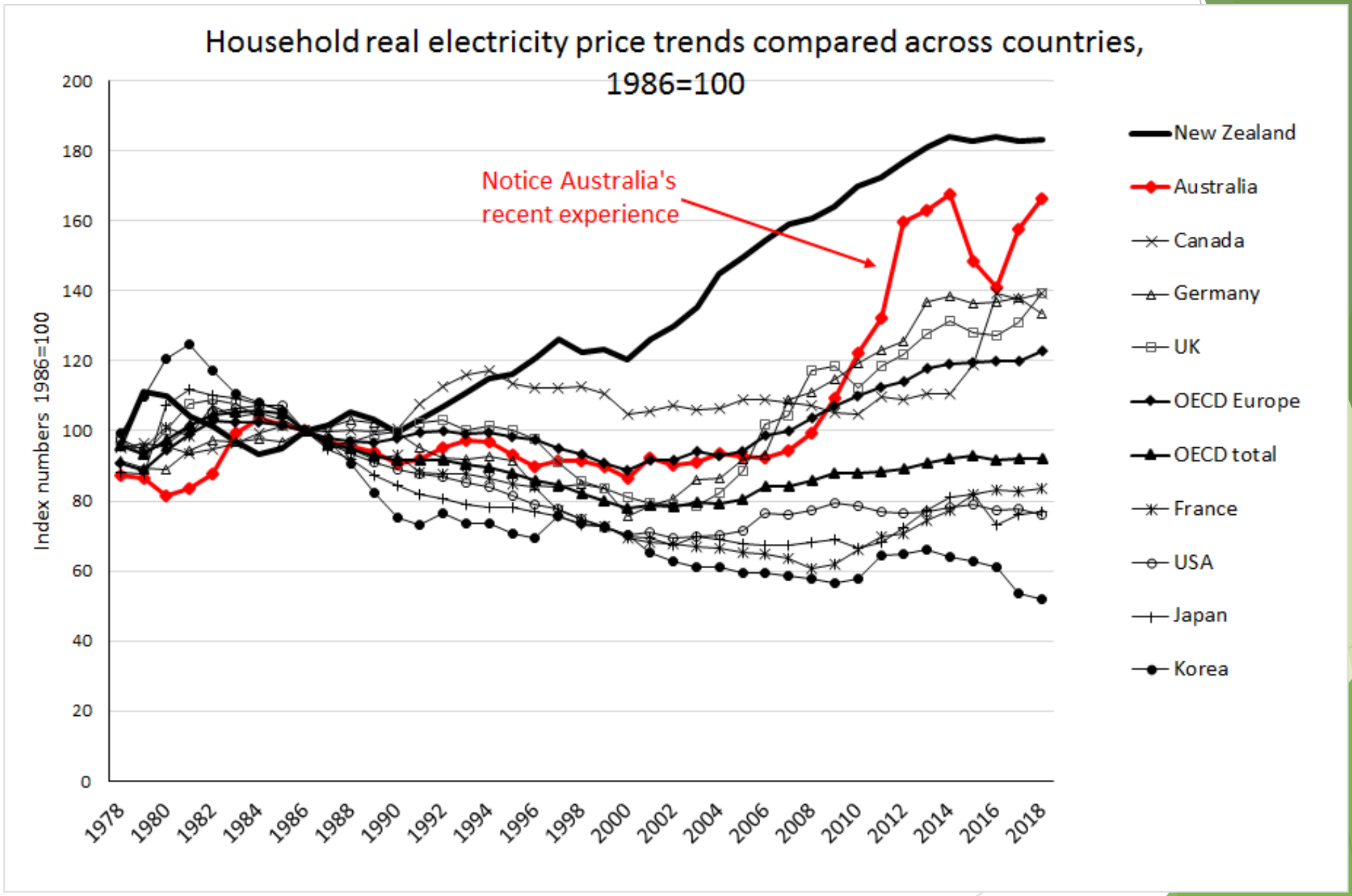
Source: MBIE data from https://www.mbie.govt.nz/assets/Data-Files/Energy/energy-quarterly-statistics/a0285022ed/prices-statistics.xlsx downloaded 20 May 2019, deflated to 2018 values using CPI for residential and PPI Inputs for commercial and industrial.


Real electricity price by end-use sector 1974-2018
NZED old days
Corporatisation, ECNZ breakup, lines/energy split
Gentailer cartel, price-gouging lines monopolies, fake regulation
2018 cents per kWh
35
30
25
20
15
10
5
0
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Residential
Commercial
Industrial

and comparing with other OECD countries



Source: International Energy Agency (2019), "End-use prices: Indices of energy prices by sector", *IEA Energy Prices and Taxes Statistics* (database) https://doi.org/10.1787/data-00444-en (accessed on 20 May 2019). Series rebased by author to 1986=100.


Household real electricity price trends compared across countries, 1986=100
Index numbers 1986=100
Notice Australia's recent experience
New Zealand
Australia
Canada
Germany
UK
OECD Europe
OECD total
France
USA
Japan
Korea
200
180
160
140
120
100
80
60
40
20
0
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018

Moving on from index numbers, compare different countries' residential prices

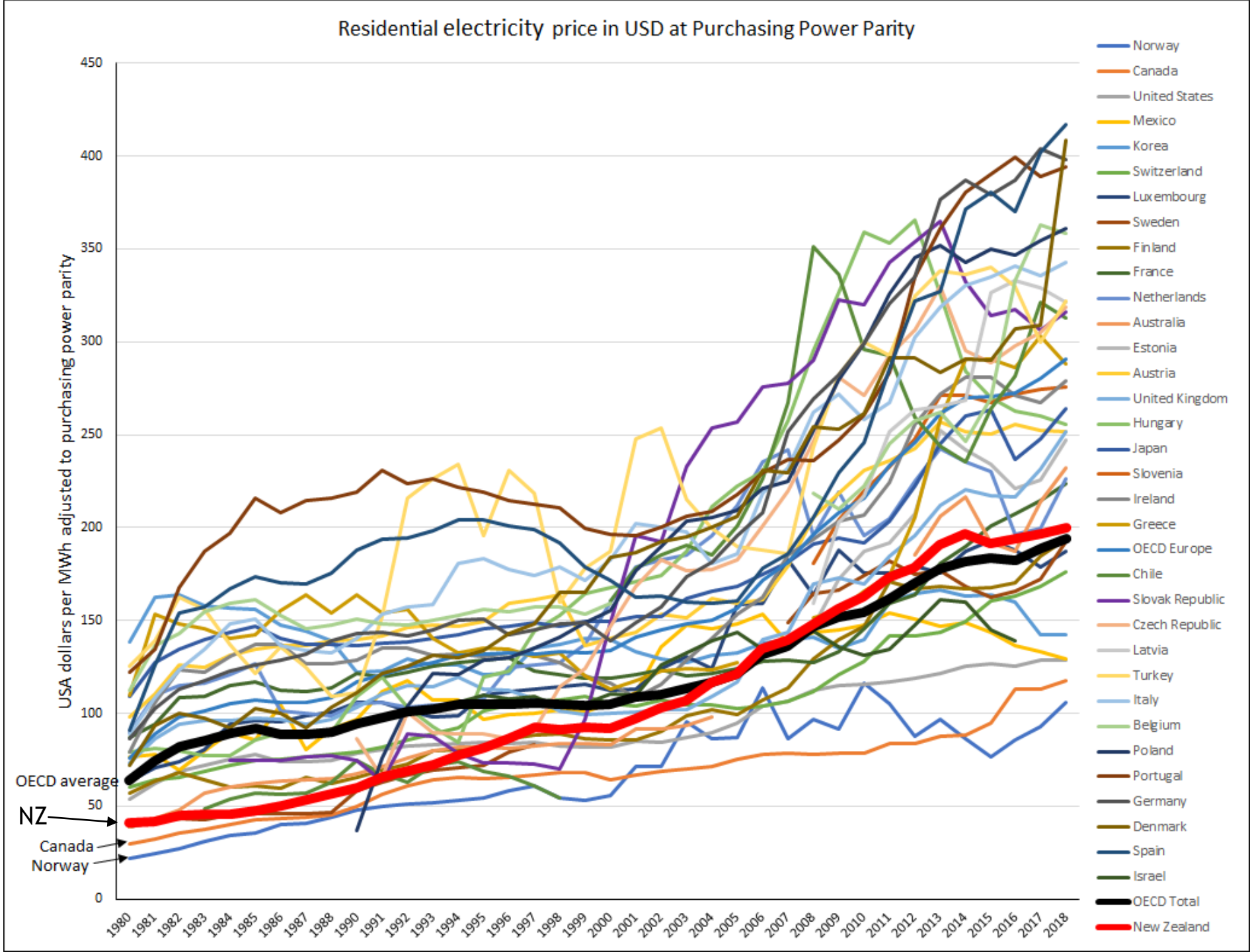
OECD data show residential prices in US dollars per MWh at purchasing power parity

This is of interest because industry spokespeople and MBIE talk proudly about "11th lowest residential prices in the OECD".

New Zealand used to be the third lowest, at 64% of the OECD average price.

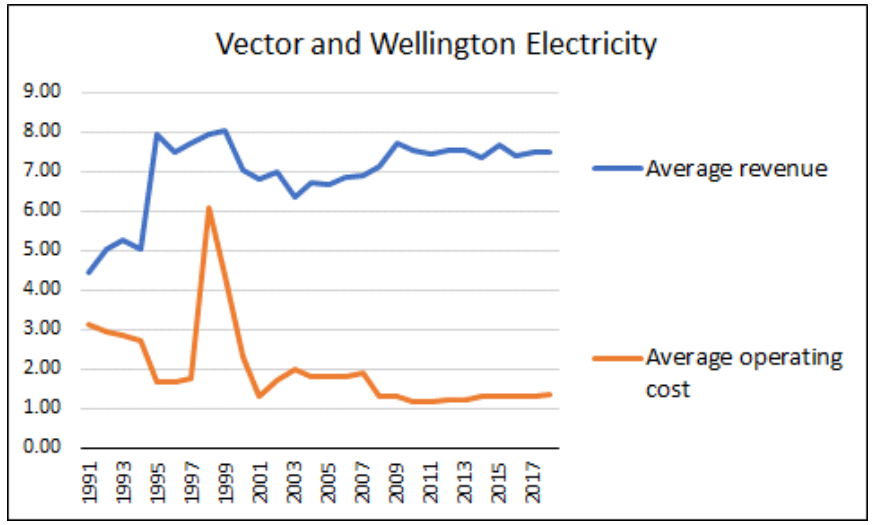
In 2018 NZ was eleventh lowest, at 103% of the OECD average.

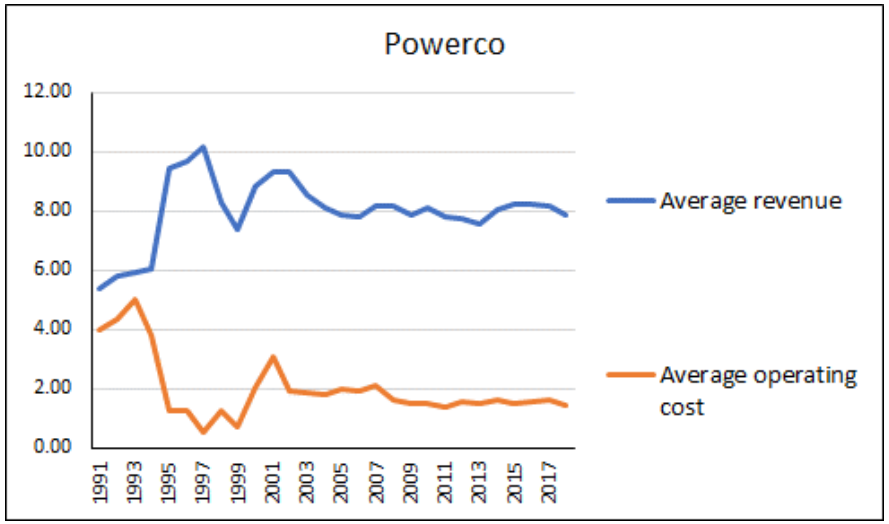
Source: International Energy Agency database accessed 3 October 2019.

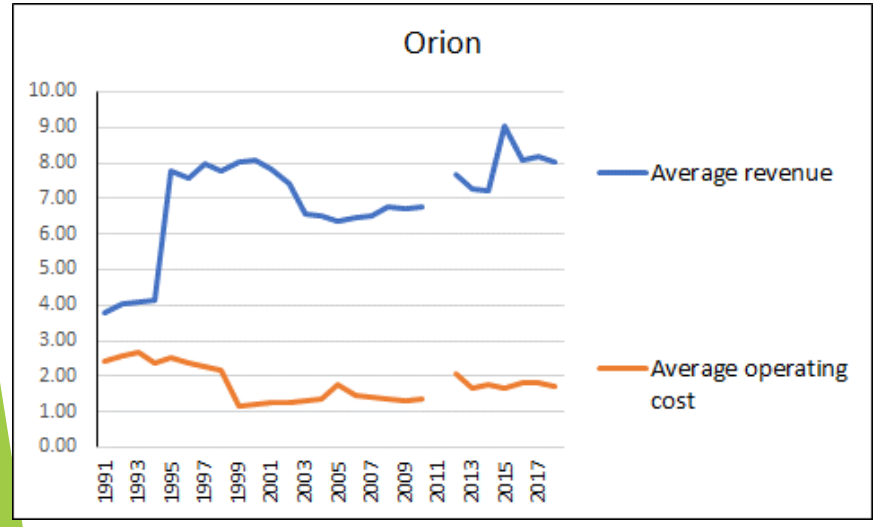


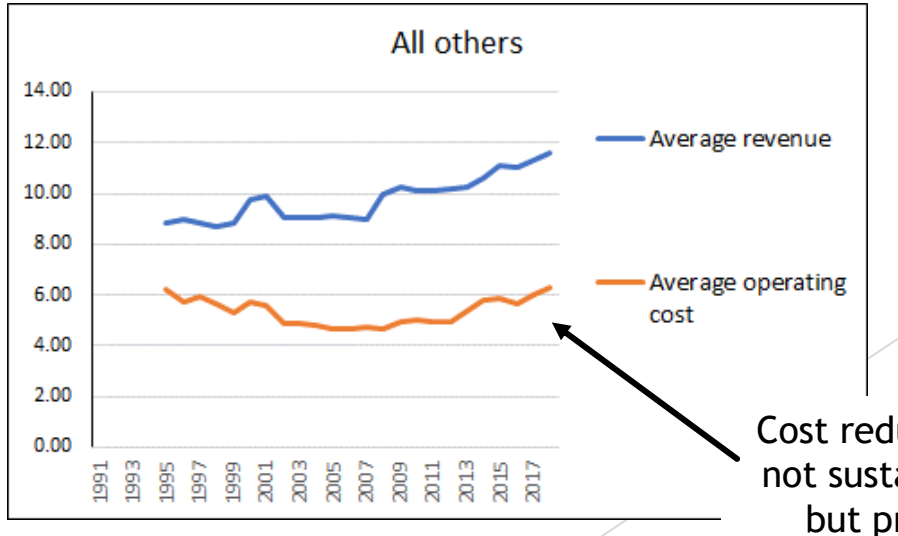
Cut costs and pass the gains through to prices?

Lines networks, real values in 2018 cents per kWh



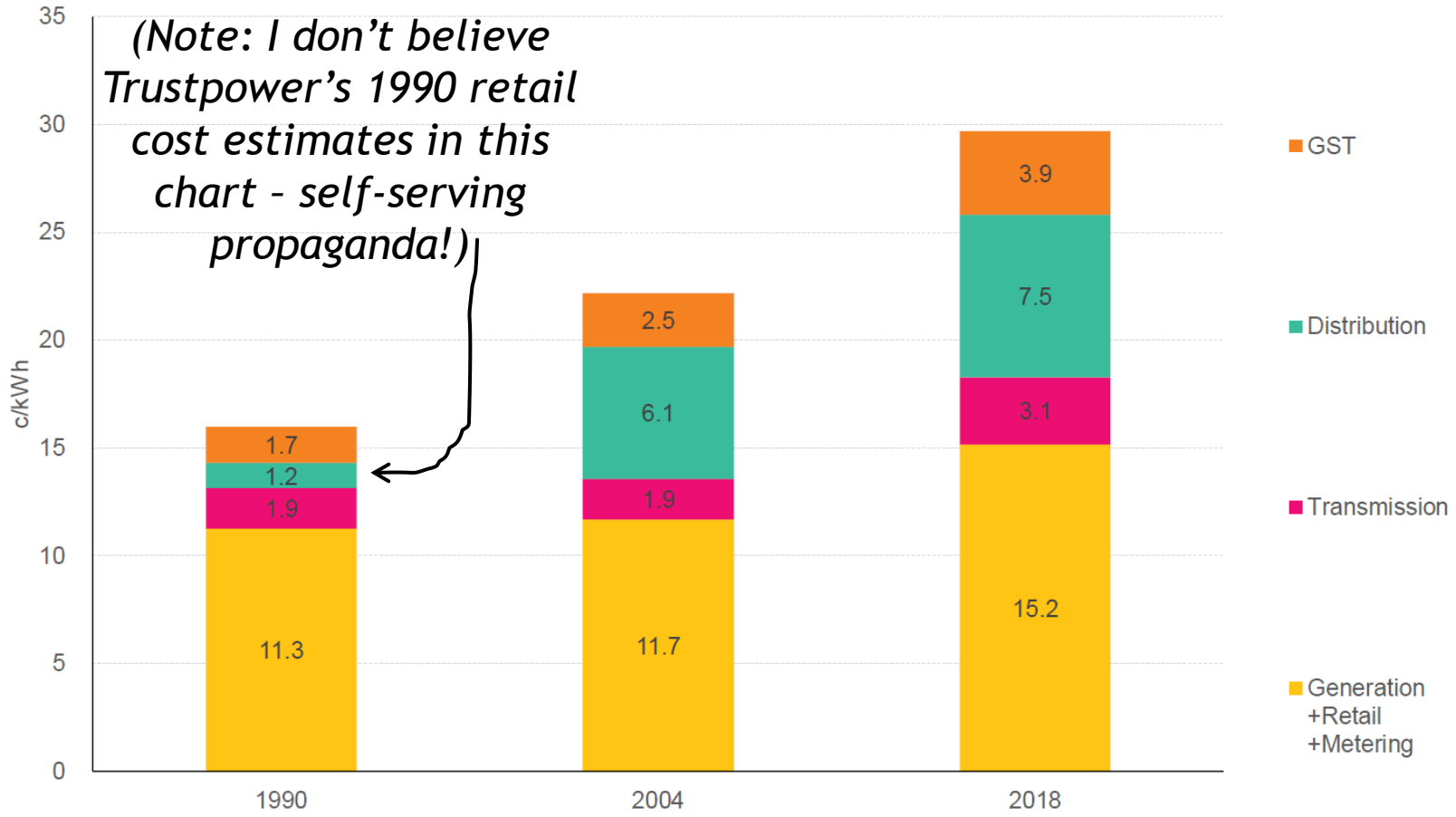






Cost reductions not sustained - but profit margins stayed

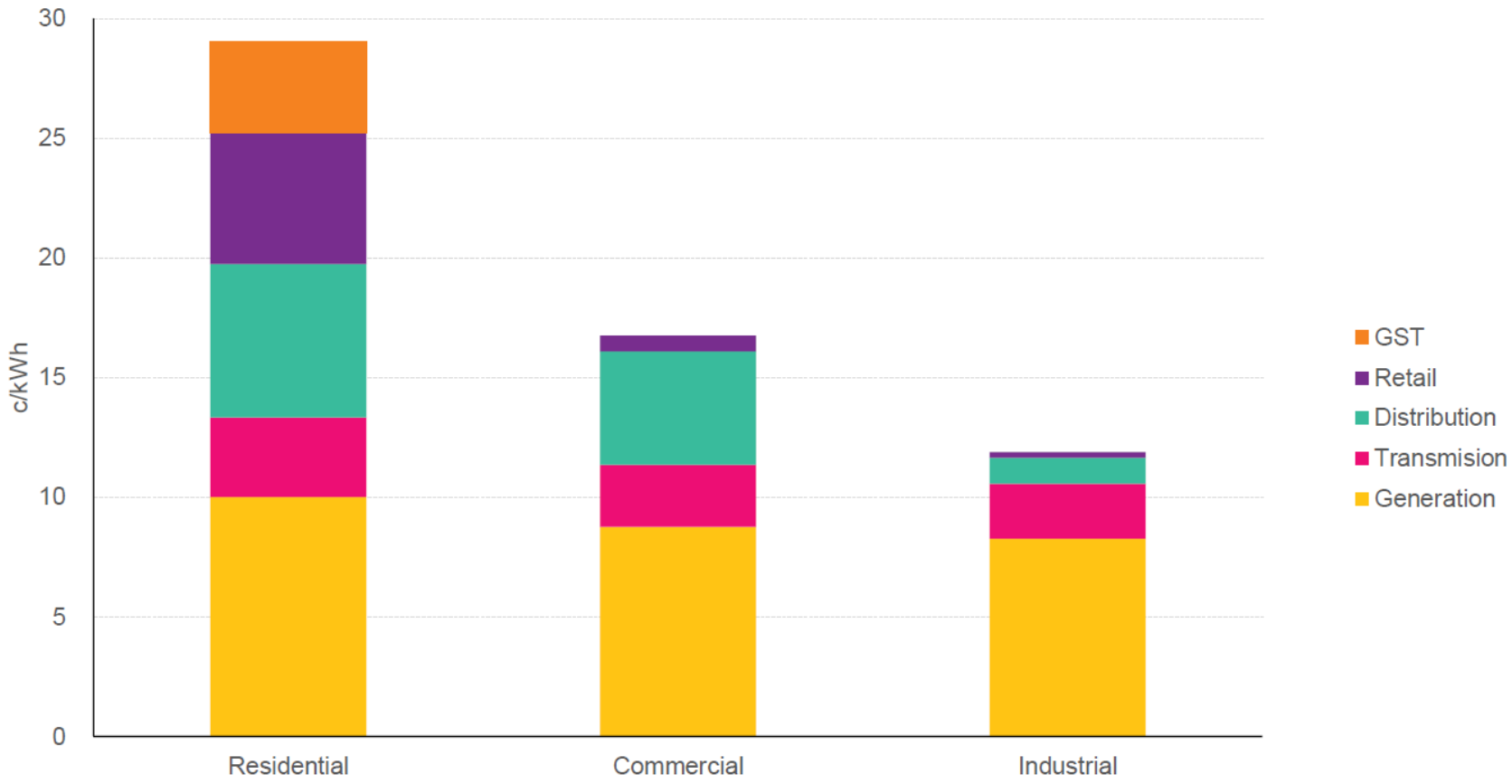
Figure 6: Changes in composition of residential prices



Sources: Trustpower analysis 1990–2004 and Ministry of Business, Innovation and Employment data 1990–2018. Prices are adjusted for inflation and expressed in 2018 dollars. They do not include possible rebates or dividends by distributors or retailers.

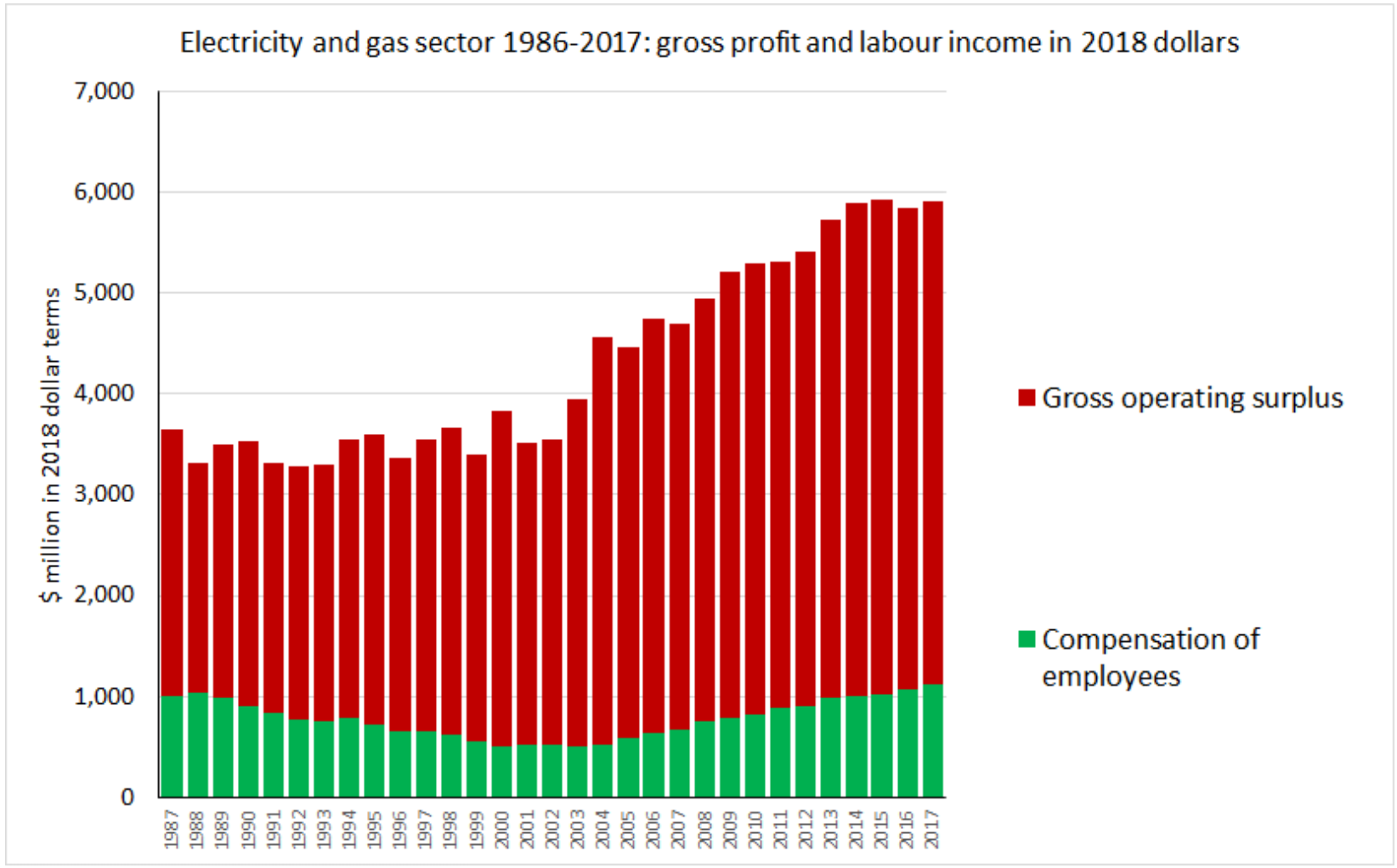
Source: Electricity Price Review/Hikohiko te Uira, *First Report* August 2018 p.20.

Figure 8: Estimated breakdown of charges by consumer type



Electricity Price Review/Hikohiko te Uira, *First Report* August 2018 p.23.

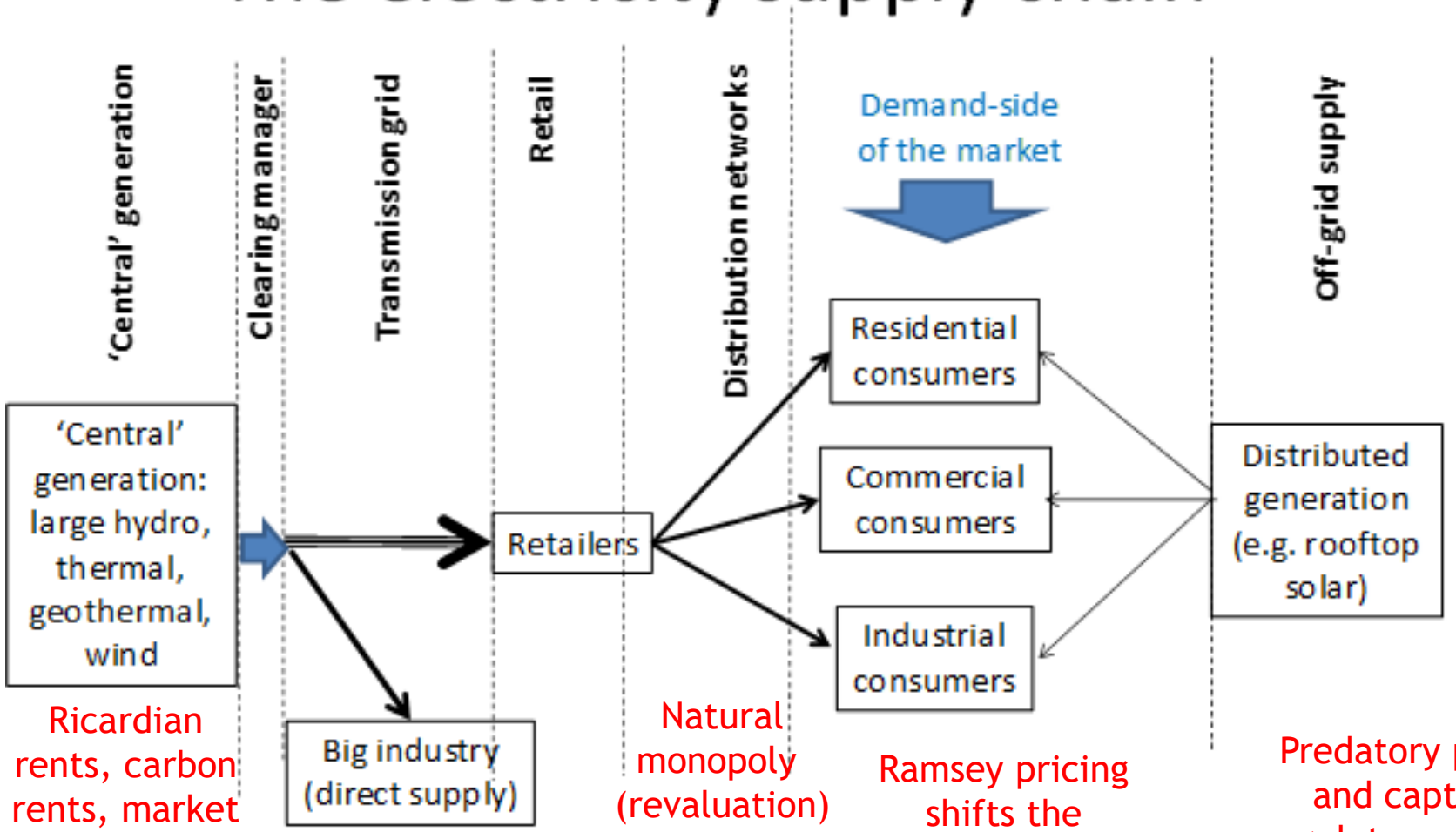
Finally, profits



Source: Statistics NZ https://www.stats.govt.nz/assets/Uploads/National-accounts-industry-production-and-investment/National-accounts-industry-production-and-investment-Year-ended-March-2017/Download-data/national-accounts-industry-production-investment-year-ended-march-2017.xlsx downloaded 20 May 2019.

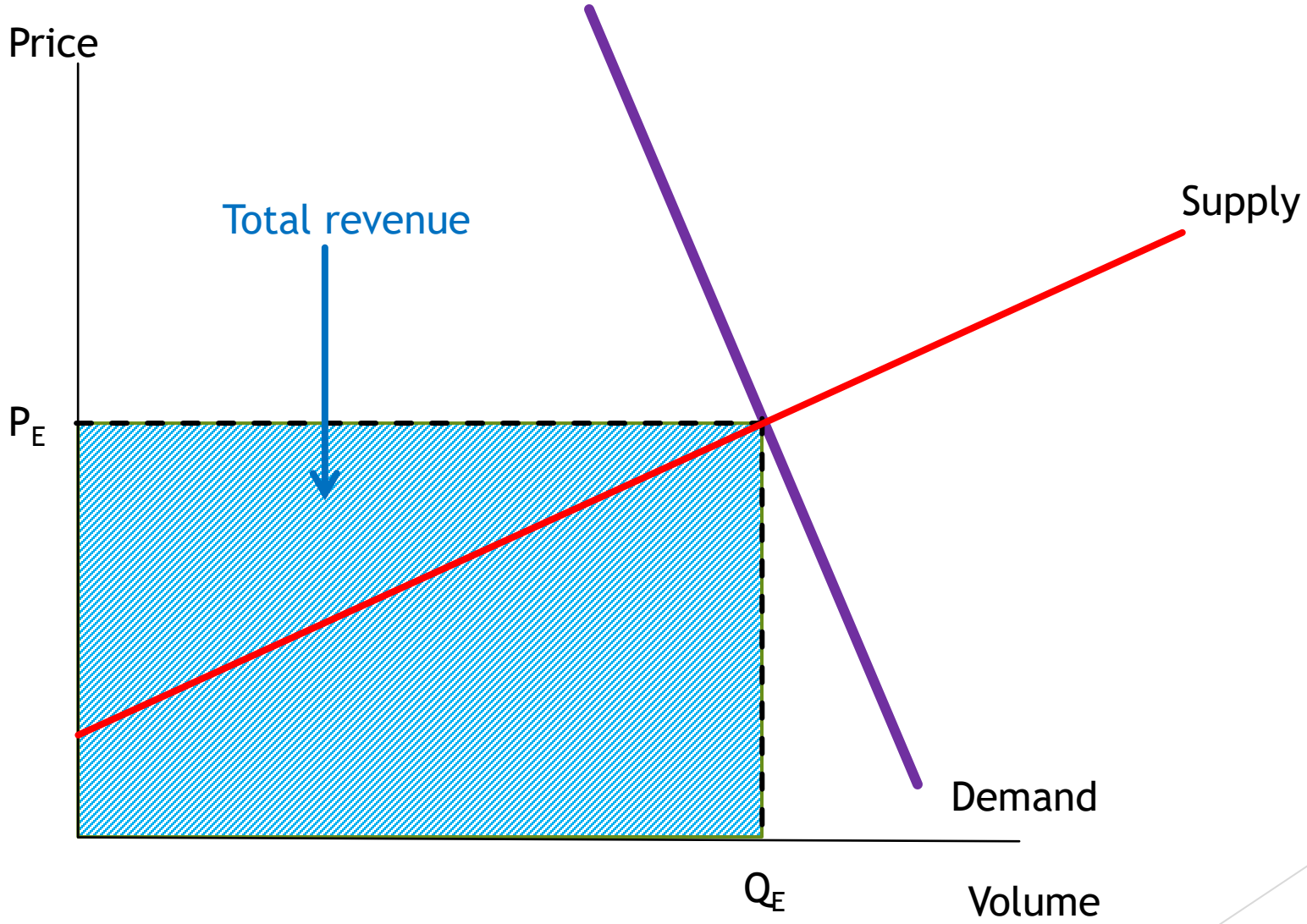
Where can market power be a problem?

The electricity supply chain

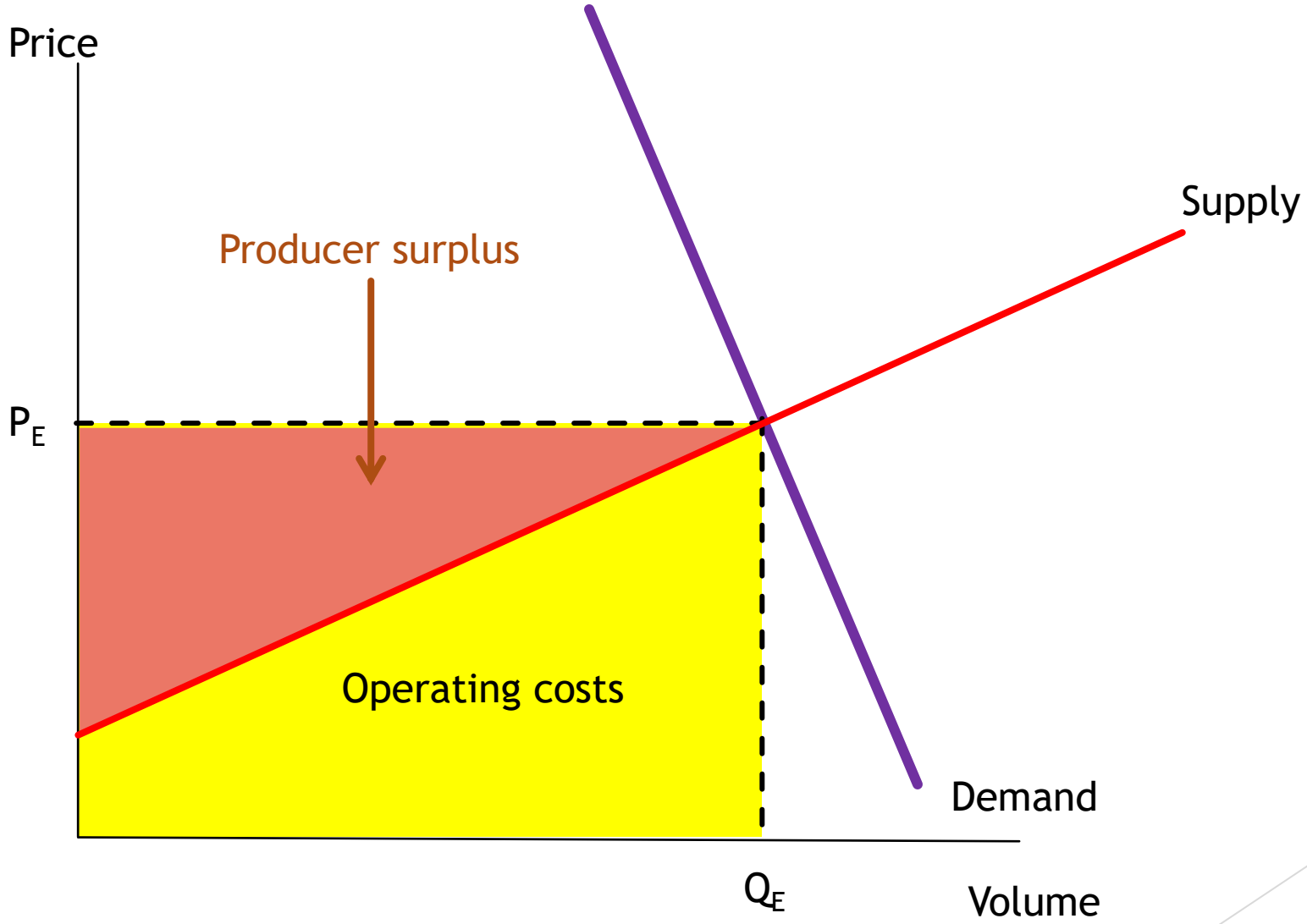


Wholesale market design

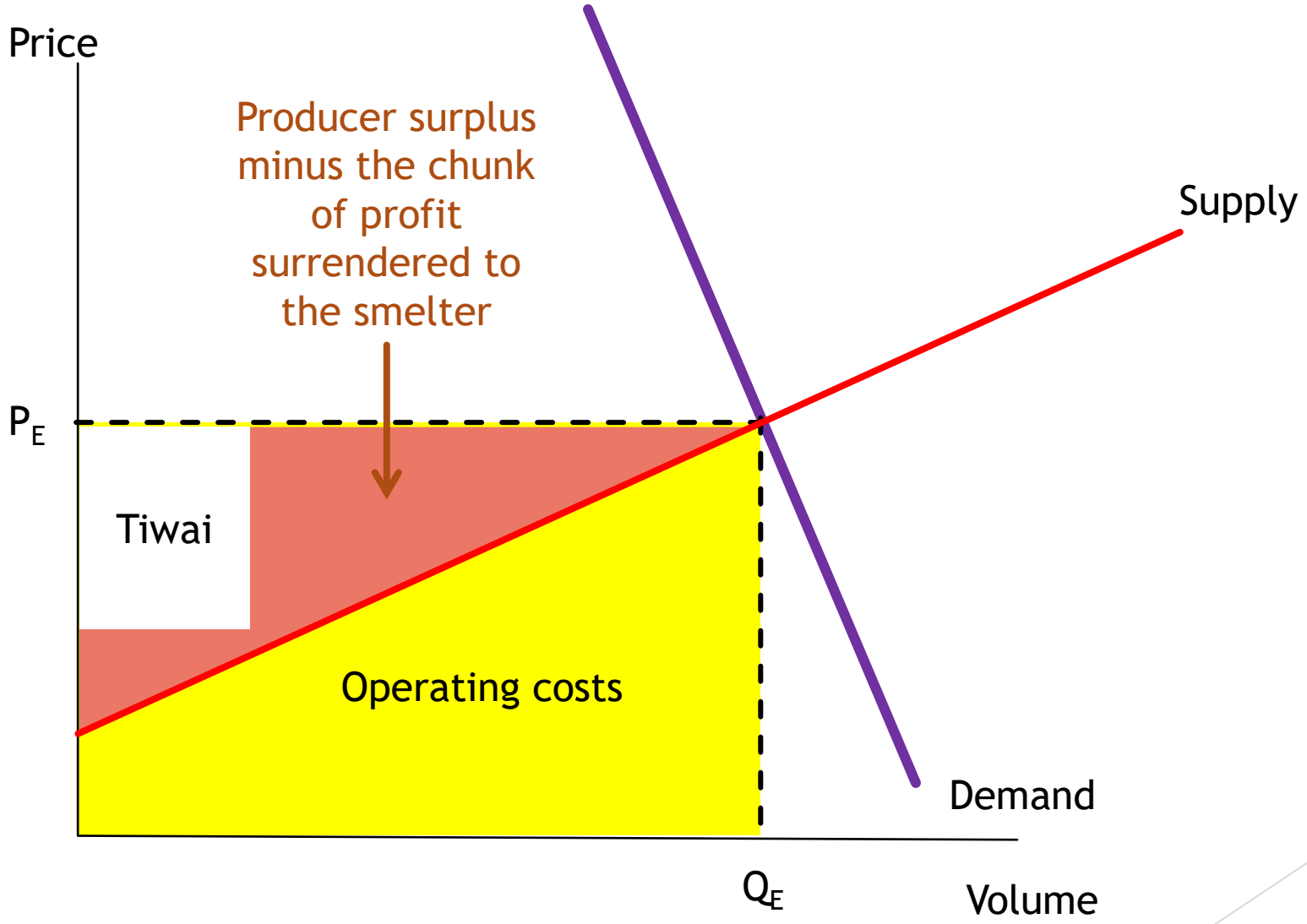
Supply and demand in an unregulated market



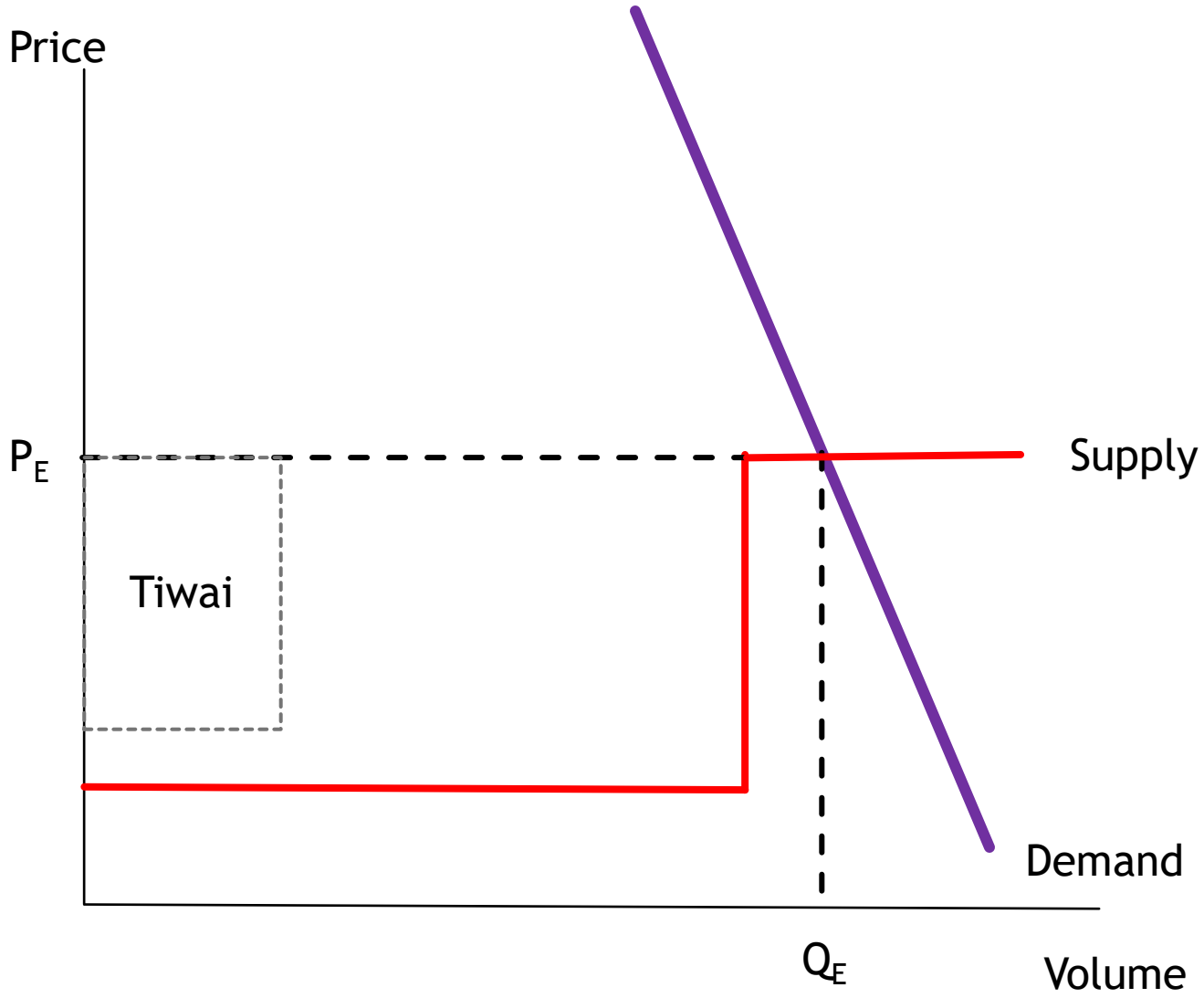
Revenue has two components



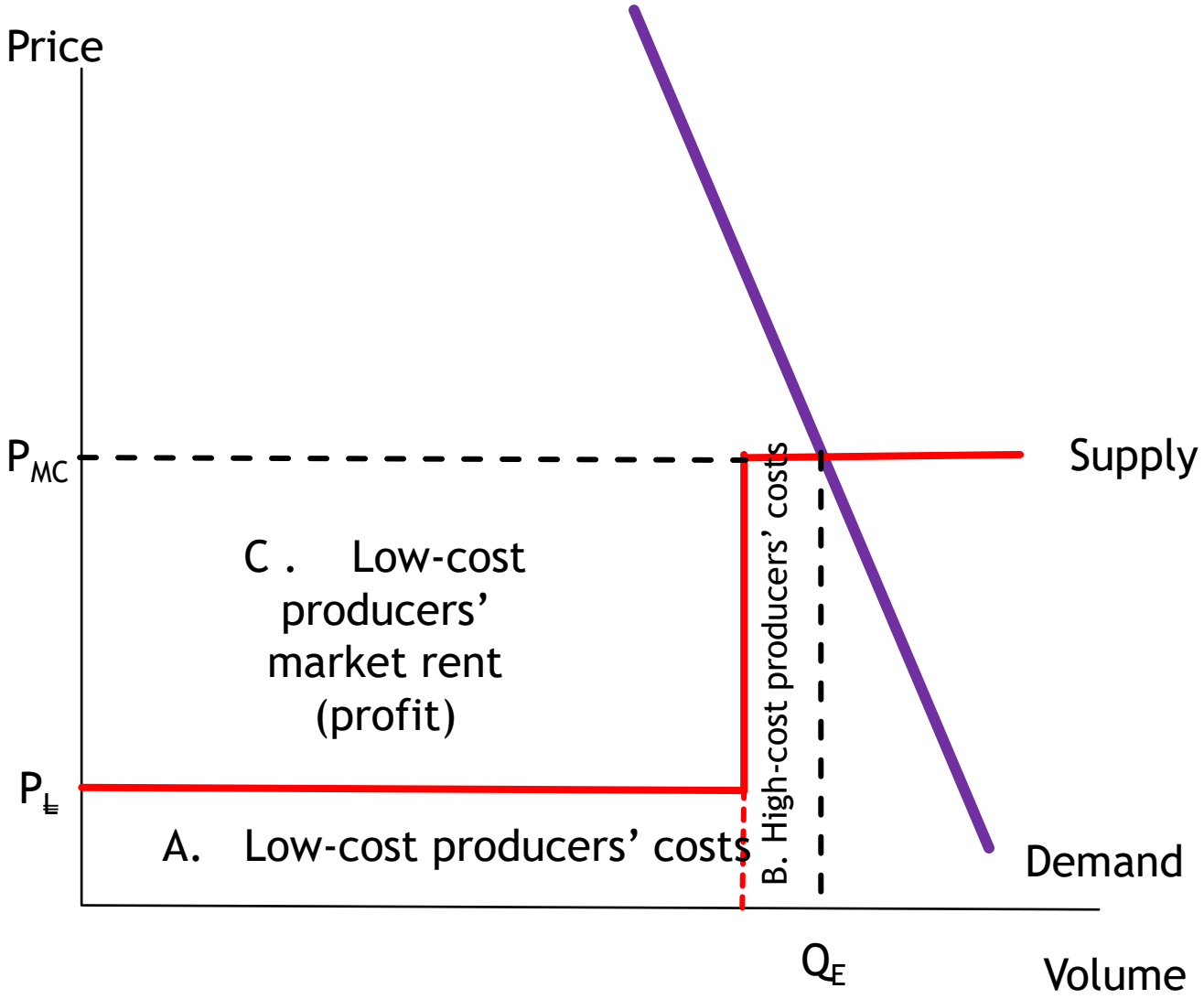
The Tiwai Point smelter can take 14% of the electricity at a cheap contract price while leaving the supply/demand balance unchanged



Actually the NZ wholesale electricity market looks more like this



So here's the supply/demand diagram for an increasing-cost industry with low-cost and high-cost producers:



- The total cost of supplying quantity Q_E is (A + B)
- The total revenue from selling this quantity at the marginal-cost price P_{MC} is (A + B + C)
- Area C is pure rent collected by the owners of the low cost plant
- So which is the "true cost" - (A+B) or (A+B+C)?

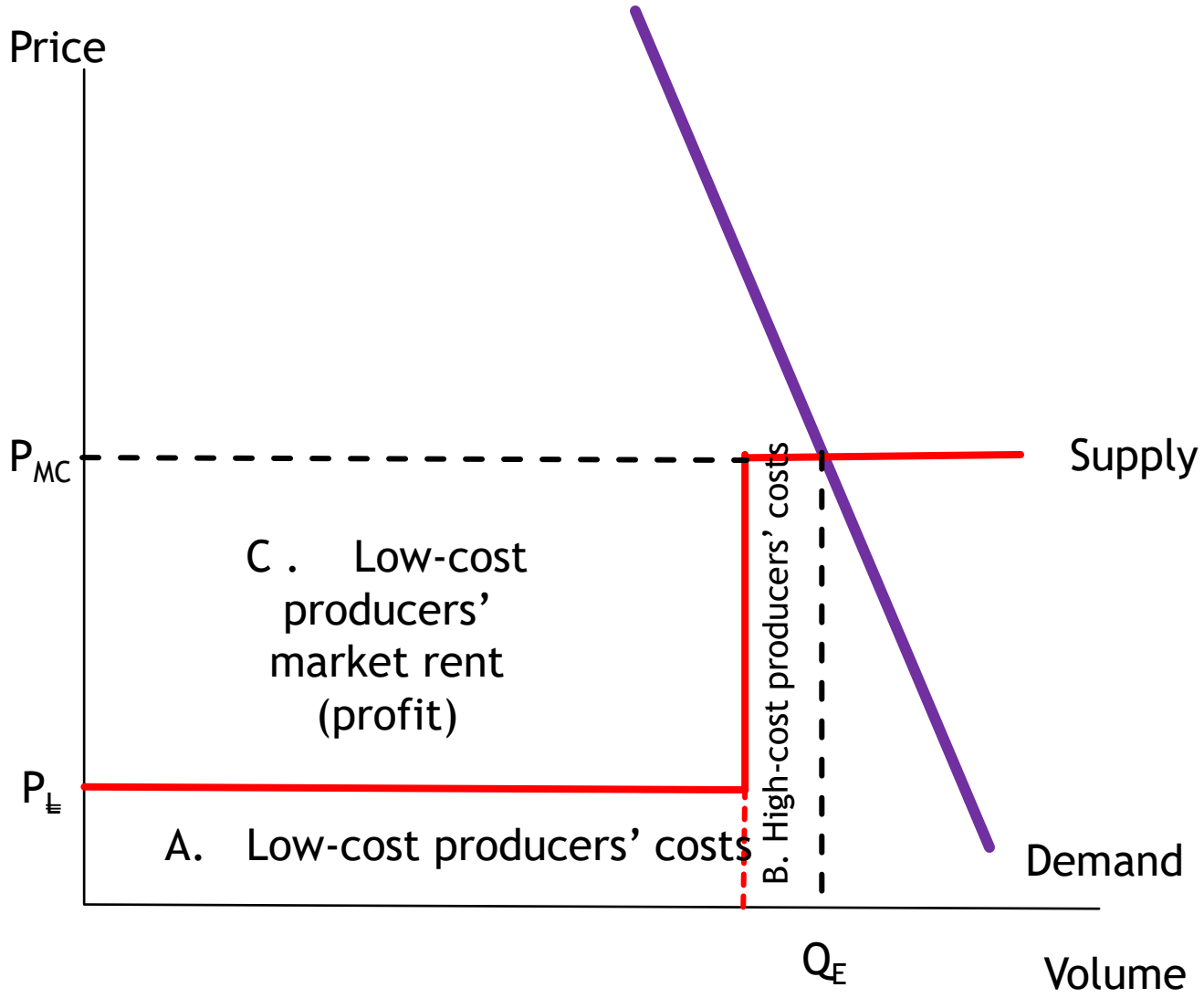
Marginal-cost pricing (Treasury)

Less happy consumers

Average-cost pricing (NZED)

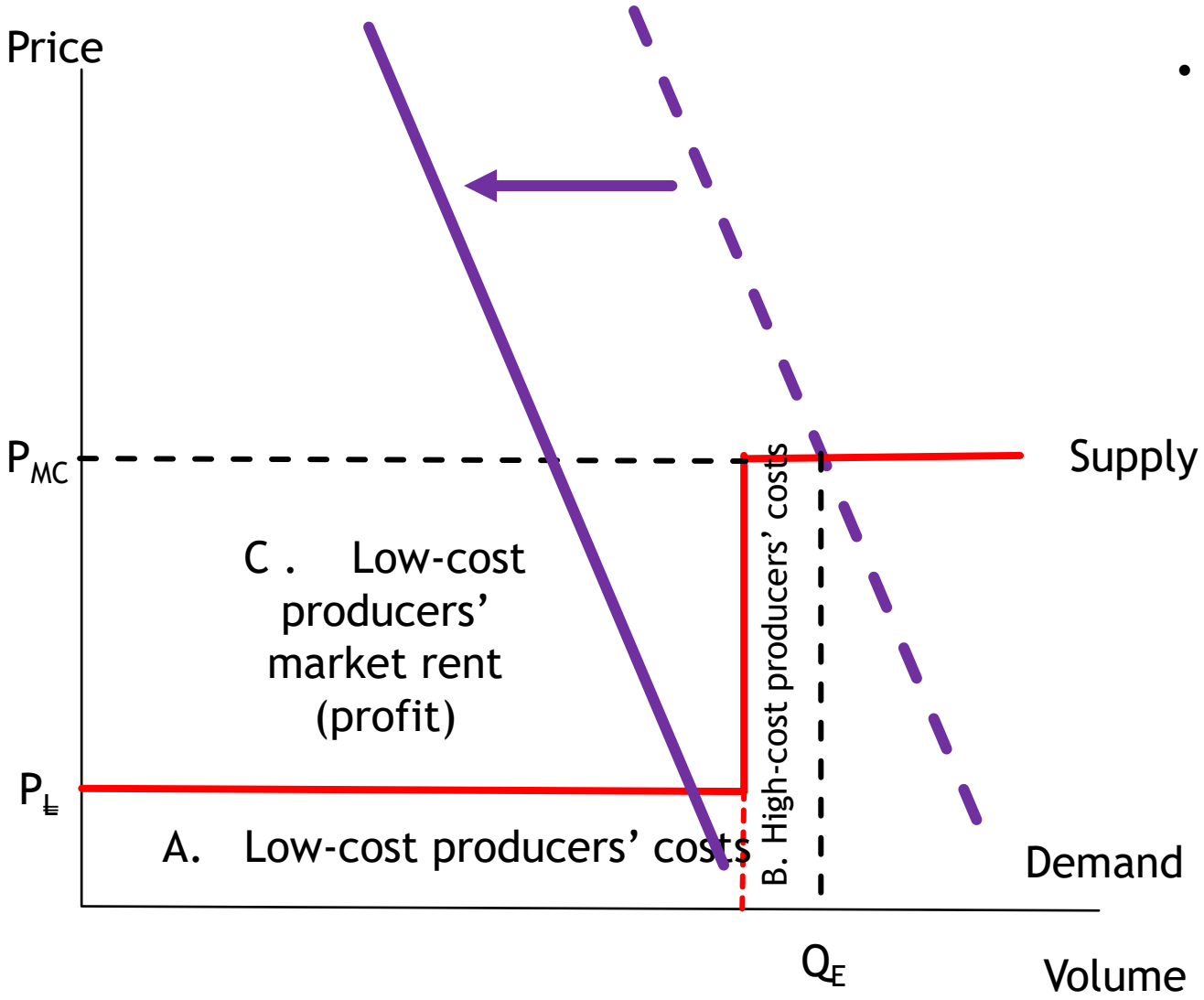
Happier consumers

Supply/demand diagram for an increasing-cost industry with low-cost and high-cost producers:



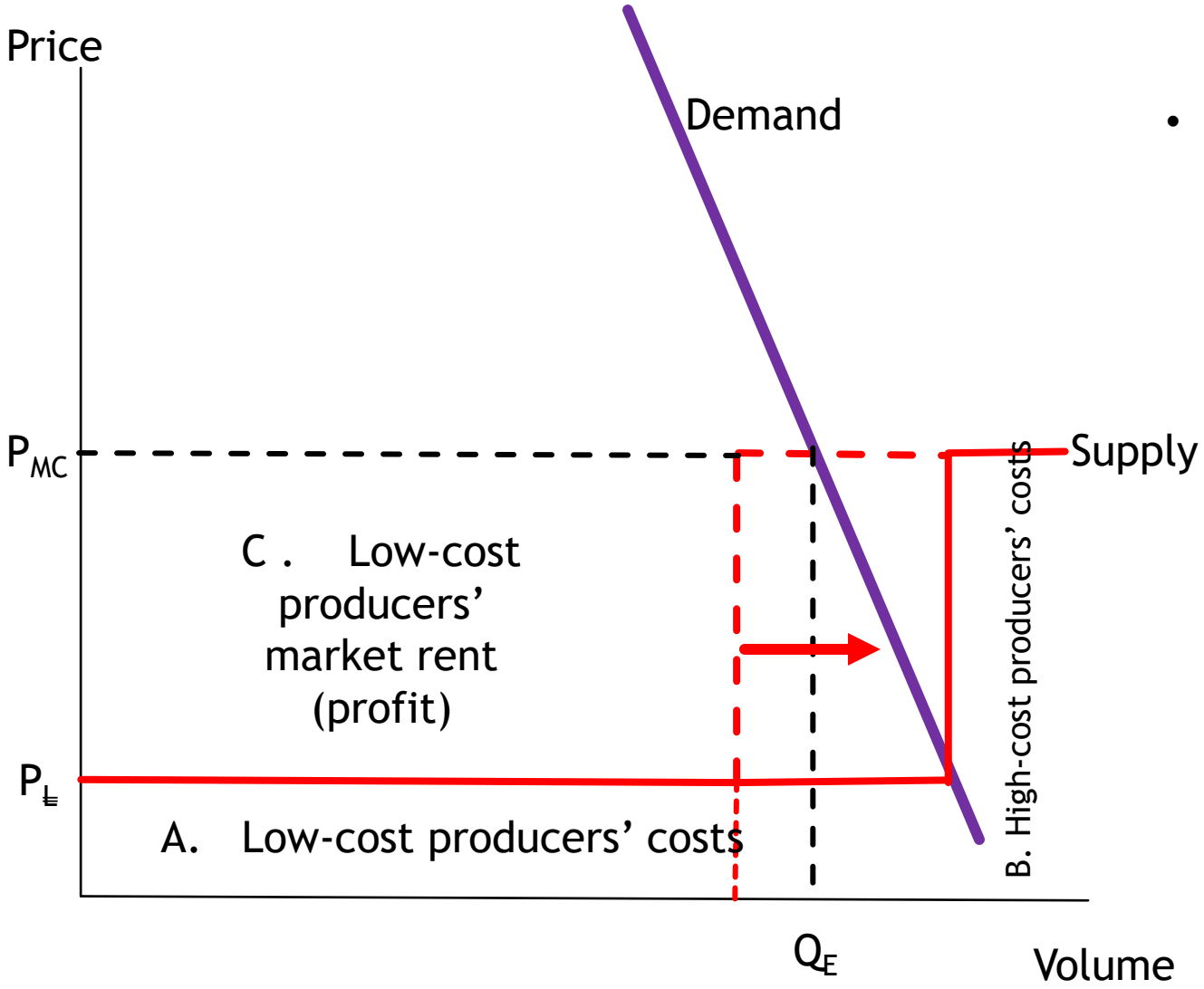
- Those big profits C rely entirely on having high-cost supply at the margin

Vulnerability of price and rents to a demand shift (in an energy-only market):



- Those big profits C rely entirely on having high-cost supply at the margin
- Shift the demand curve left (e.g. close the Tiwai Point smelter) and the price drops radically to P_L – and so do profits

Equal vulnerability of rent to entry of new low-operating cost renewables:

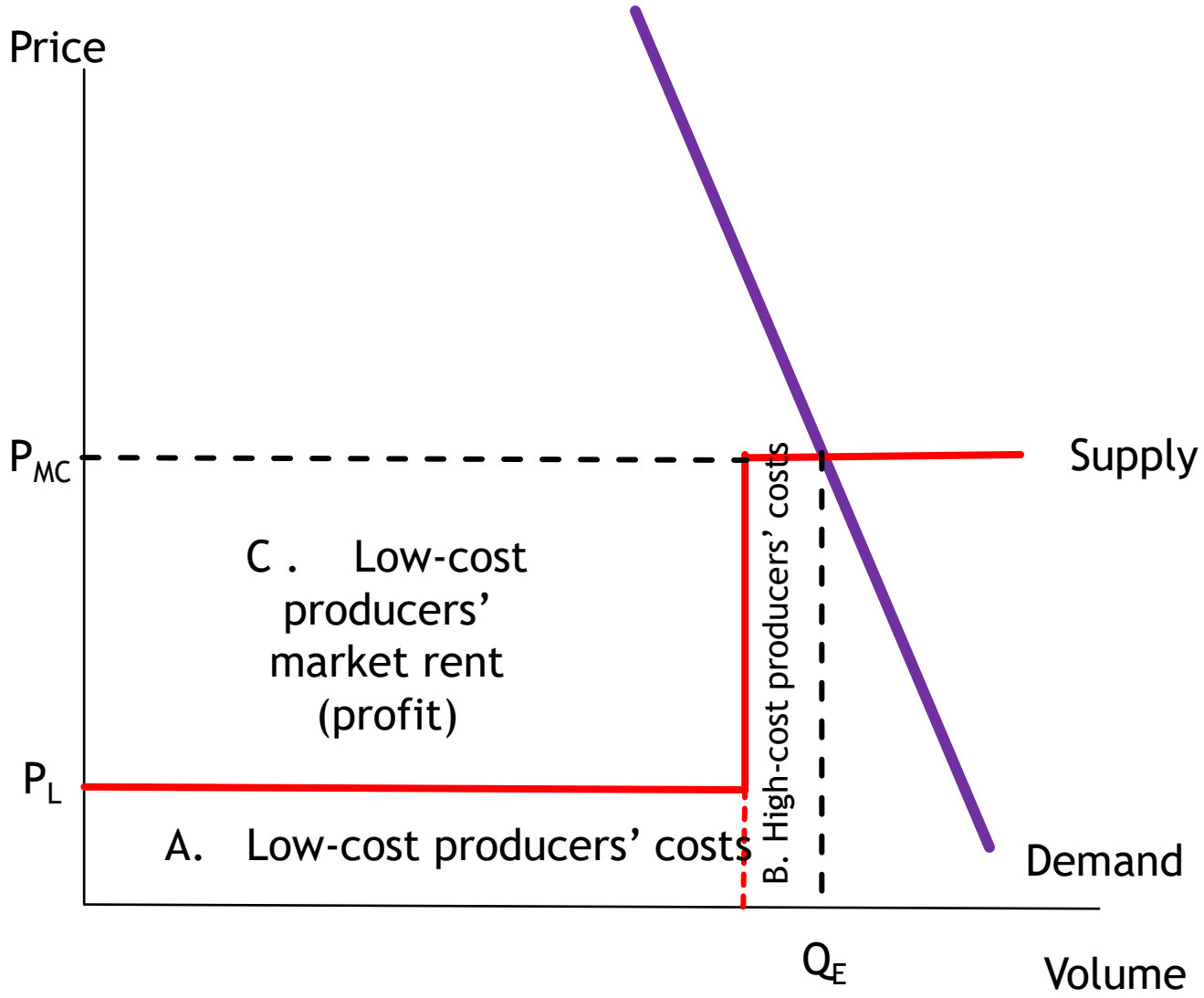


- Add more low-cost supply, pushing the high-cost suppliers out (off the margin) and the price drops radically – and so do profits
- Core strategy for Contact, Meridian, Mercury and Genesis is:

Keep demand up (keep the Tiwai Point smelter open!)

Keep supply constrained (don't build too many windfarms, and block rooftop solar if possible

Now, another wrinkle: carbon rents



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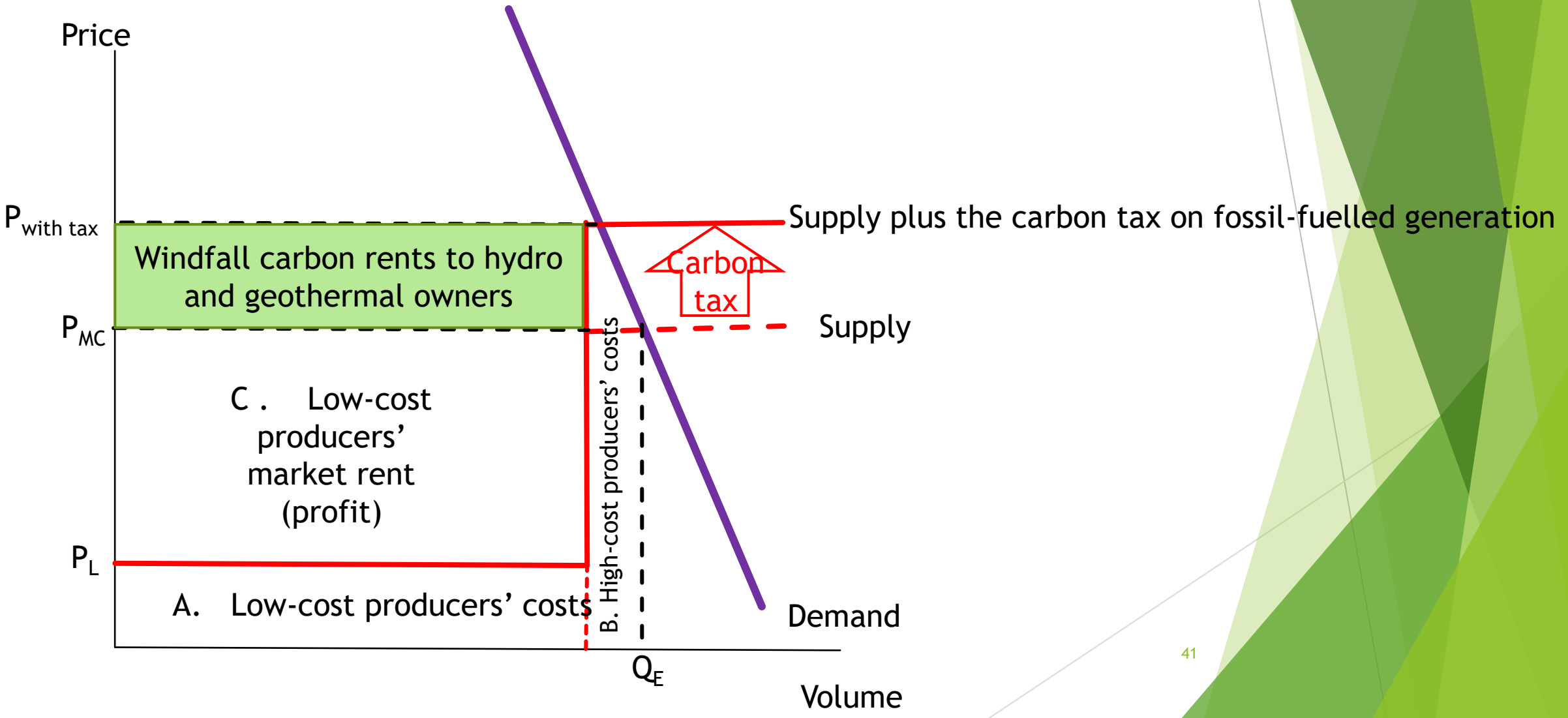
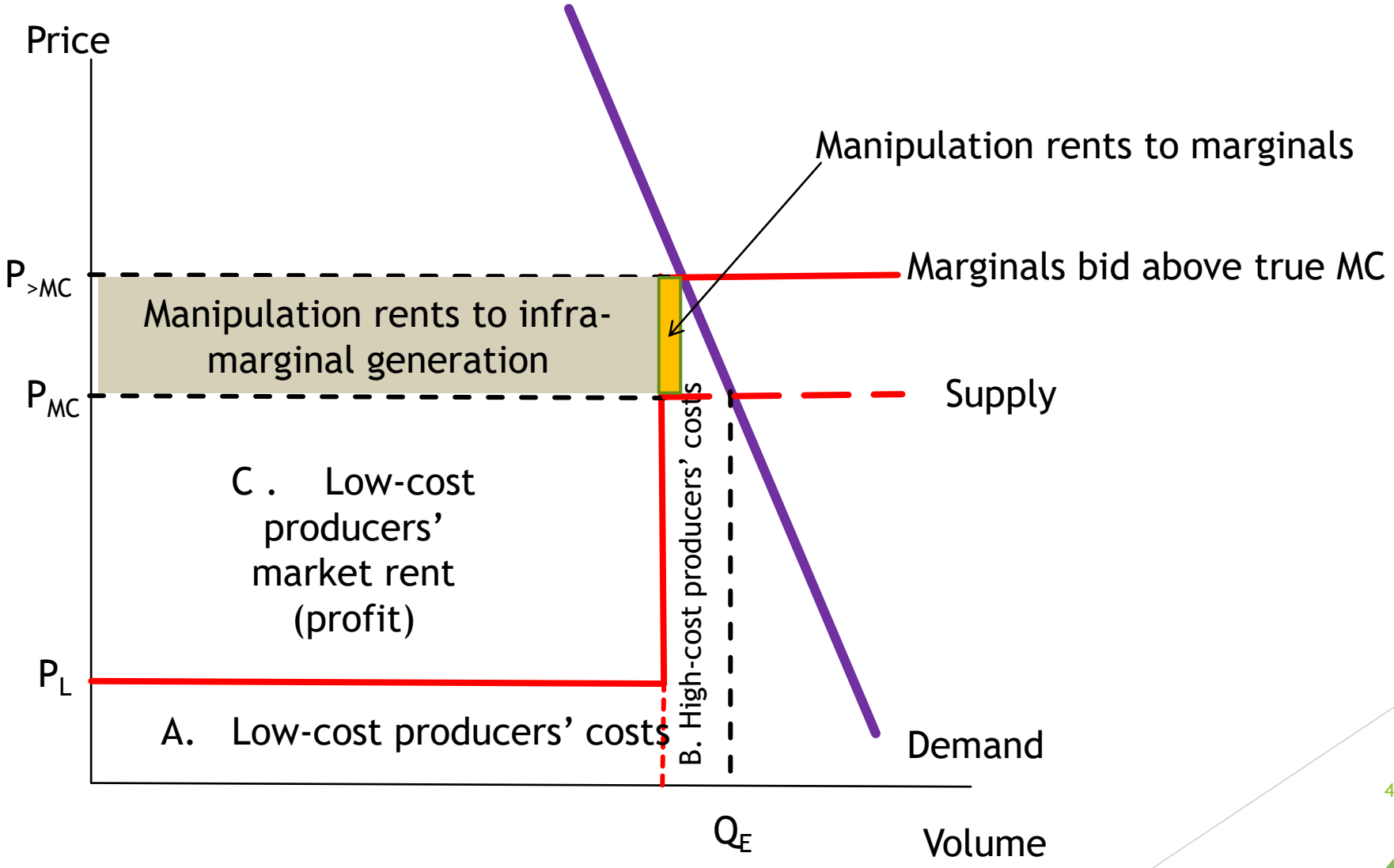
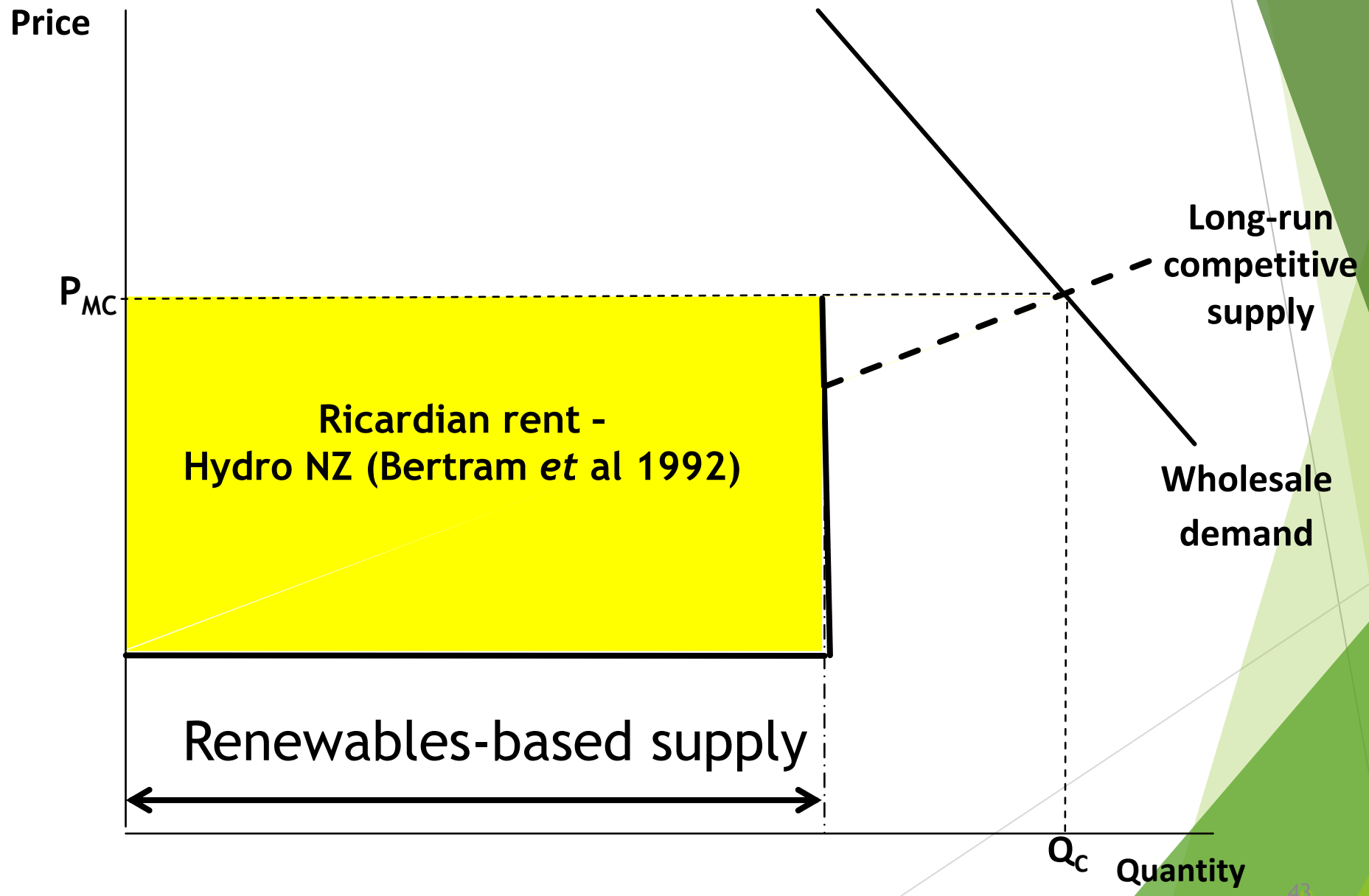


Now, market manipulation (Wolak, Poletti). At certain times of scarcity, the marginals bid above their actual marginal cost:



Summing up the three categories of generation rents:



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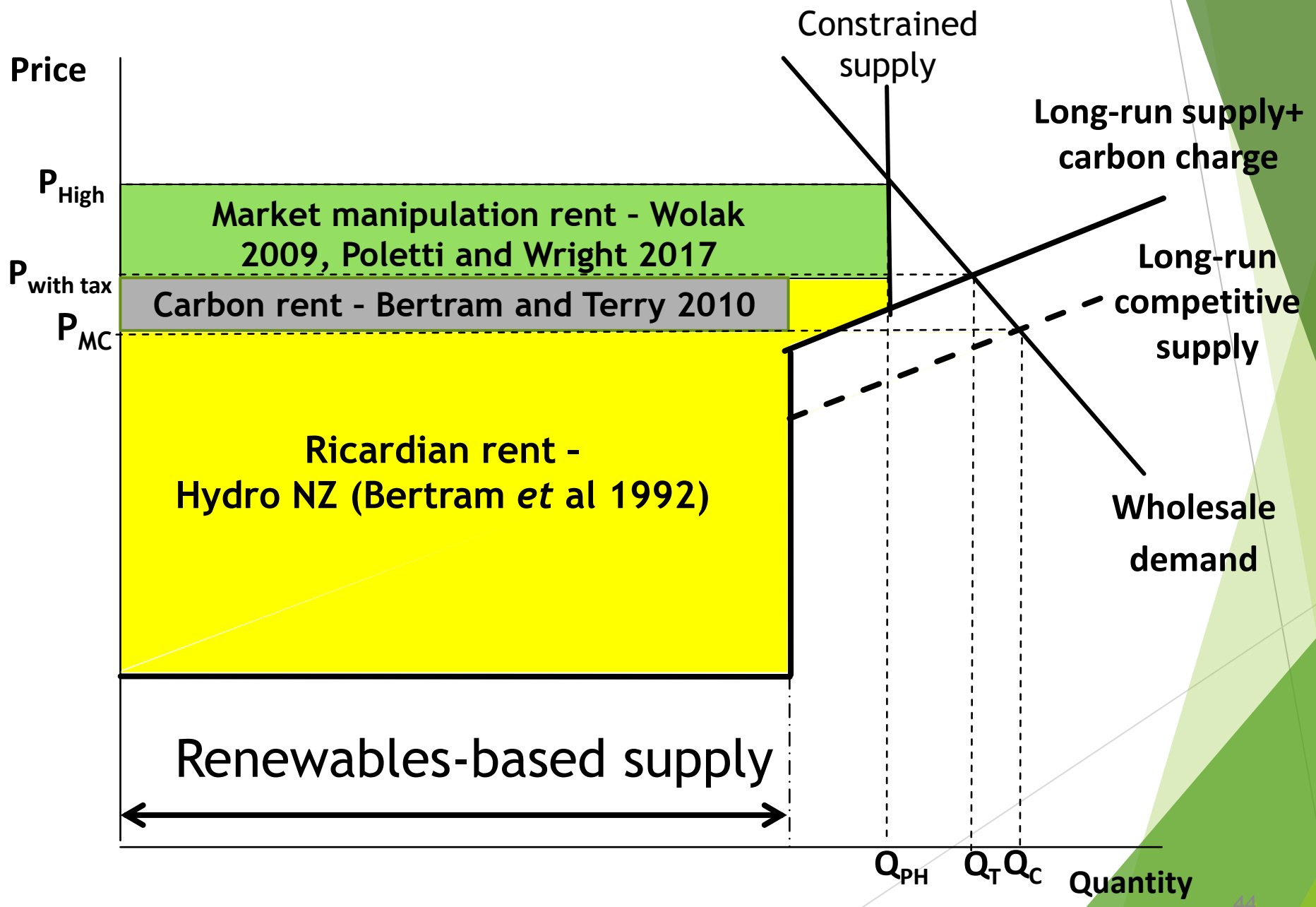
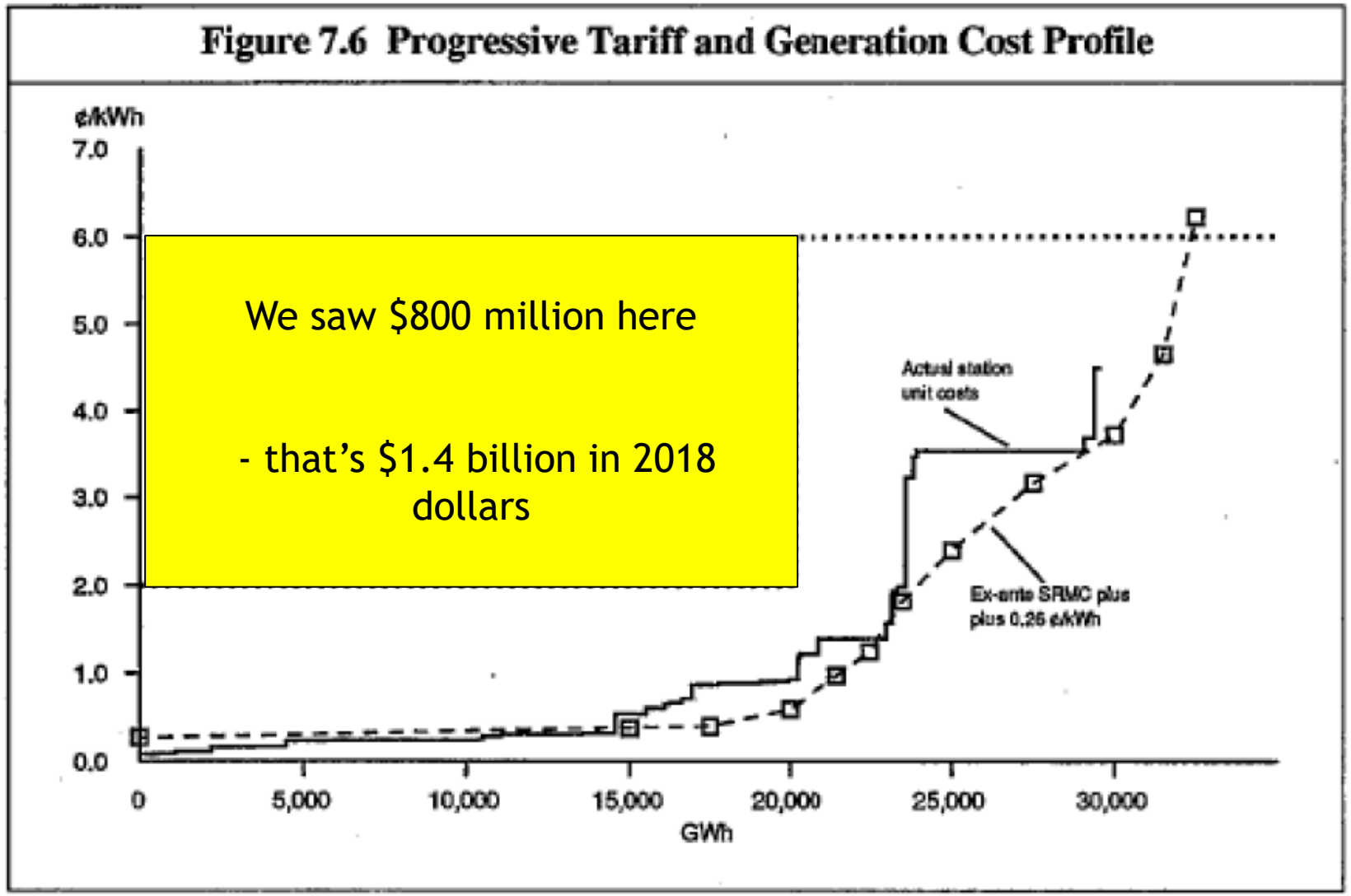
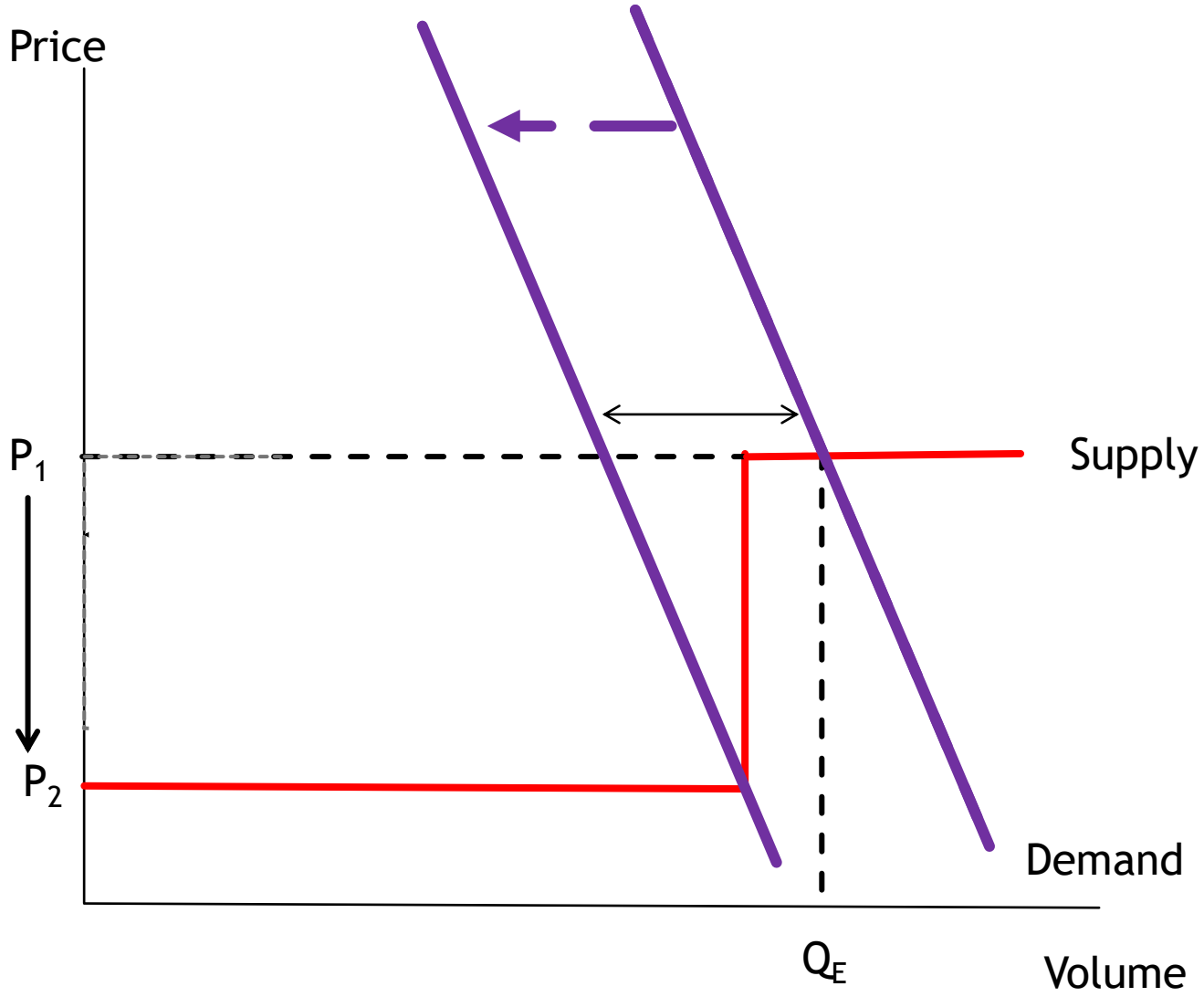


Casting our minds back twenty-seven years….

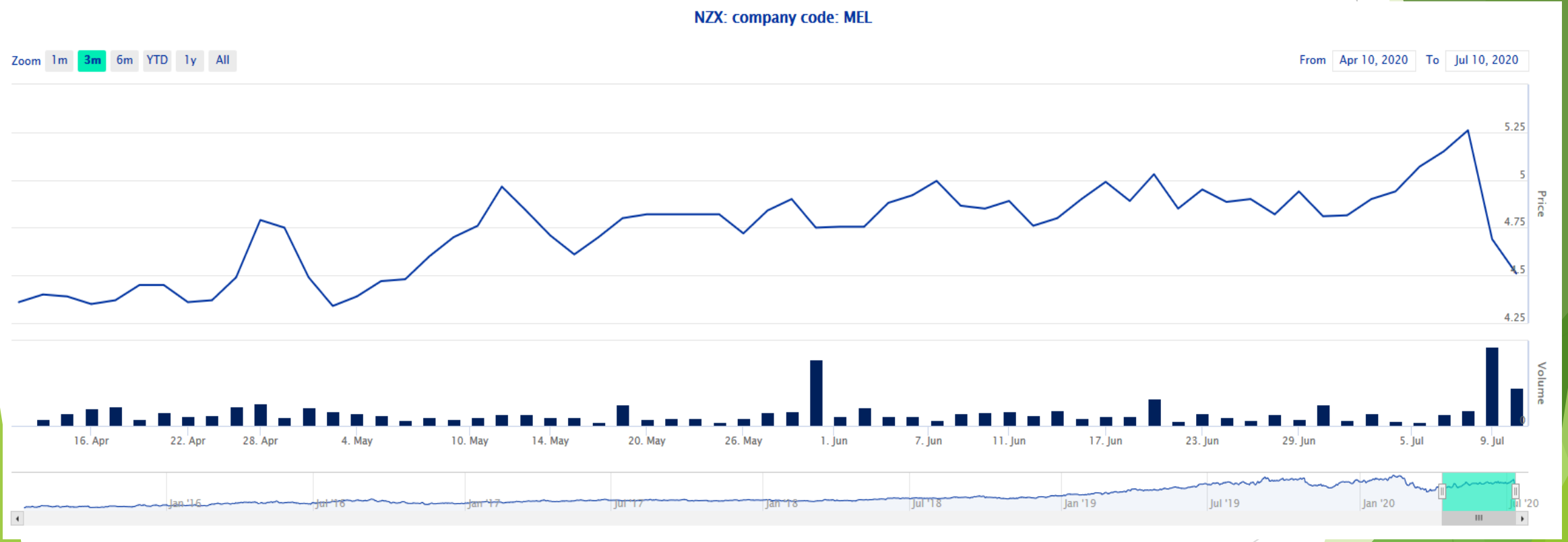


Source: Geoff Bertram, Ian Dempster, Stephen Gale and Simon Terry, *Hydro New Zealand: Providing for Progressive Pricing of Electricity*, 1992, p.51.

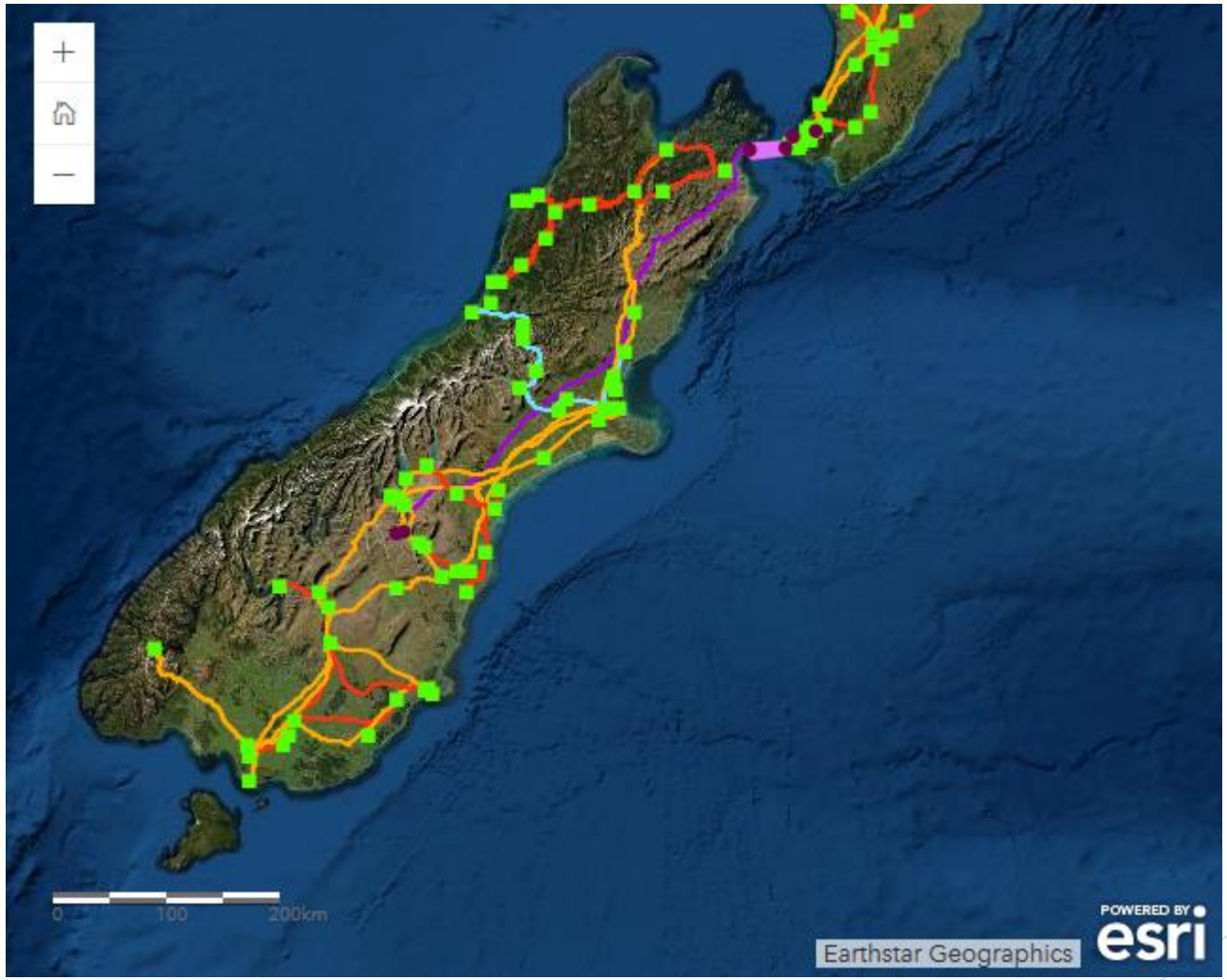
Suppose the smelter closes? If no constraints, the price would drop sharply, eliminating much of the Ricardian rent



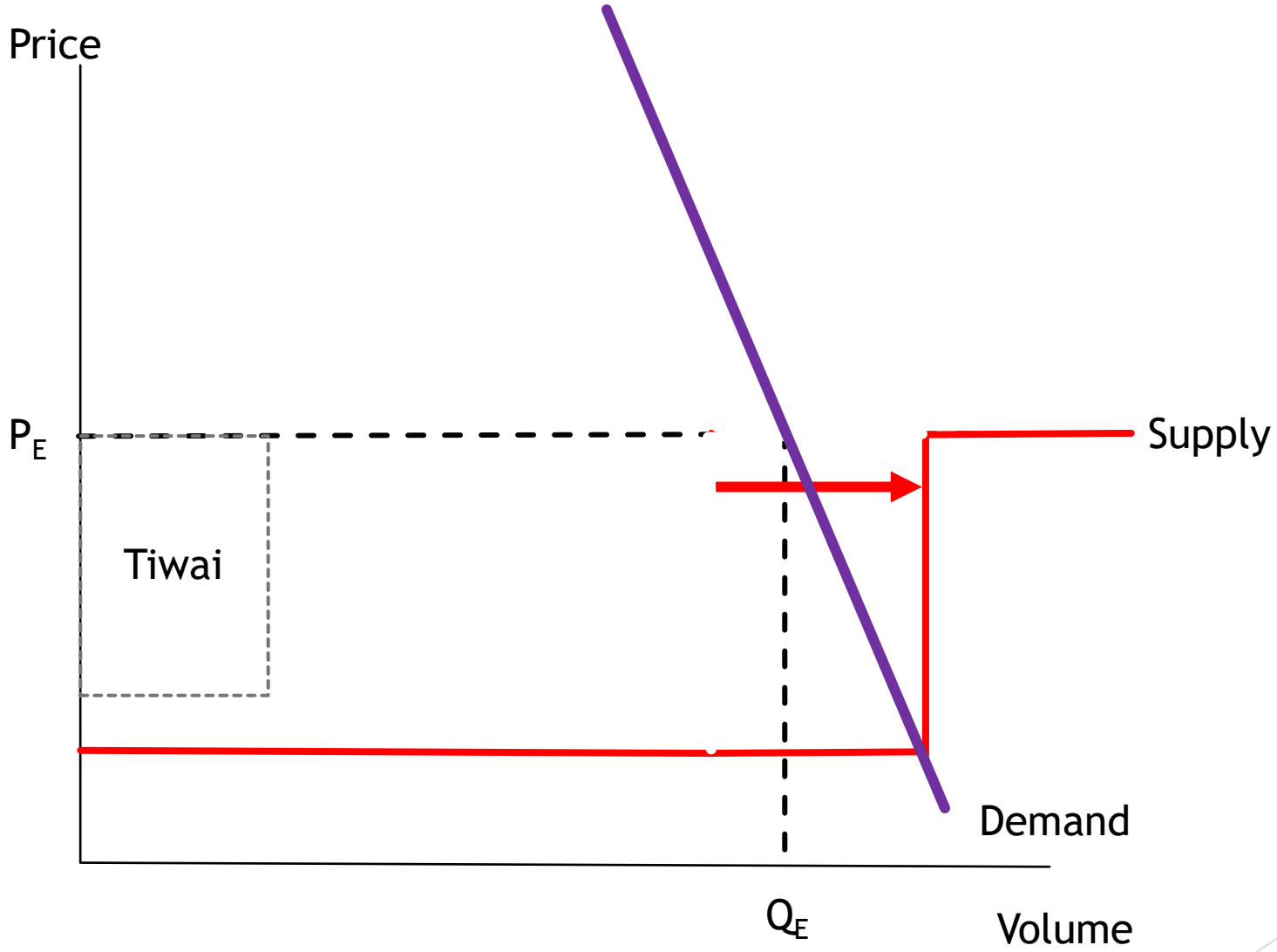
Meridian's share price dropped 14% when smelter closure was announced on 9 July



But there is a constraint…



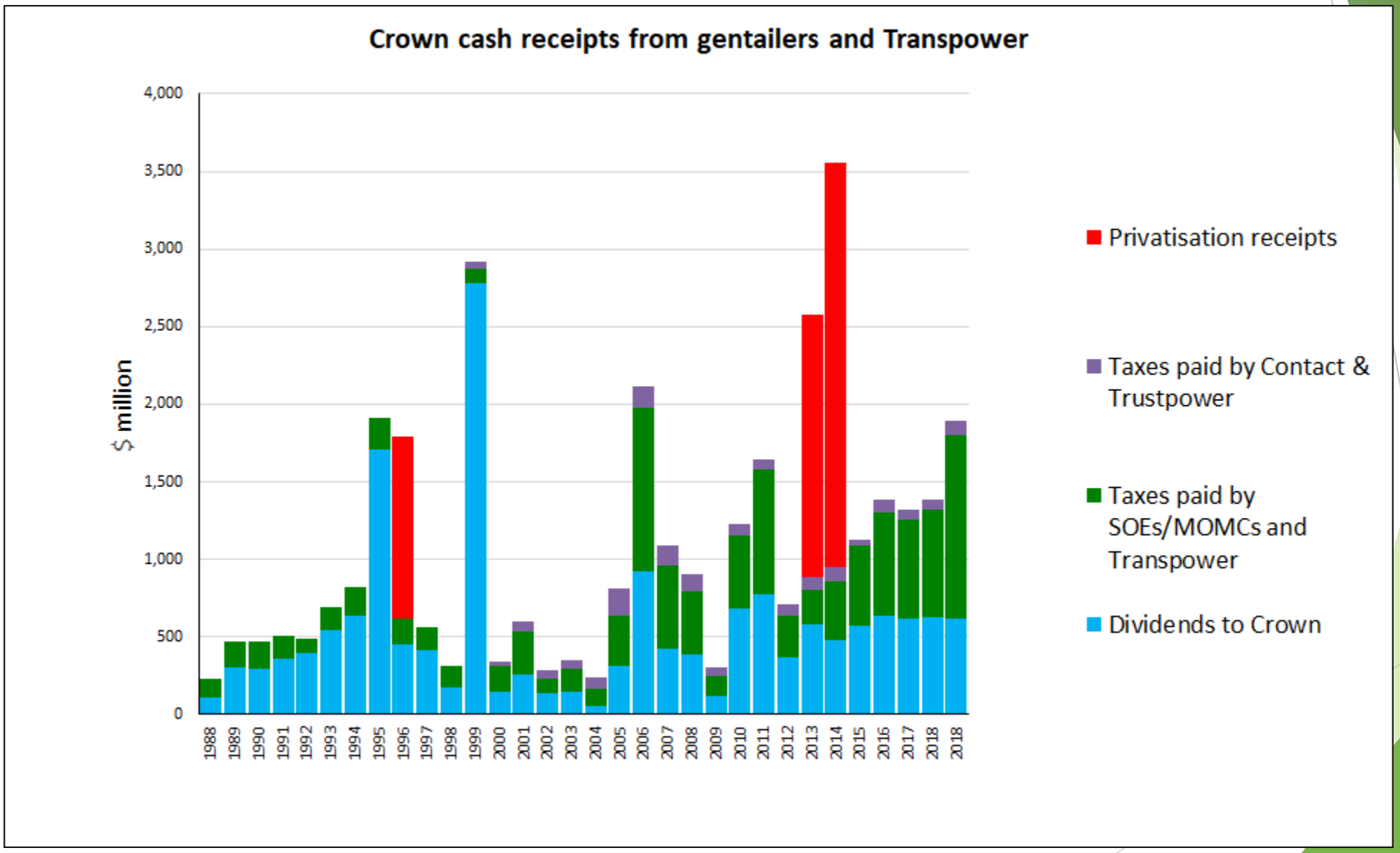
What else could hurt the cartel's profits? Rooftop solar and independent distributed renewables…



There are two key problems preventing a well-being-focused policy response

1. The industry structure is firmly entrenched by legislation passed by our Parliament over the three decades:
   - Commerce Act 1986
   - SOE Act 1986
   - Energy Companies Act 1992
   - Energy Industry Reform Act 1998
   - Commerce Amendment Act 2008
   - Electricity Act 2010

2. The Government's fiscal surplus depends heavily on a continued flow of profits and taxes from the industry


Crown cash receipts from gentailers and Transpower
$ million
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2018
Privatisation receipts
Taxes paid by Contact & Trustpower
Taxes paid by SOEs/MOMCs and Transpower
Dividends to Crown

Summary

- Multifactor productivity has gone down 30% (and capital productivity down 42%) since 1986
- Residential prices have gone up 90% since 1986 (while industrial prices hardly changed, and commercial prices fell 25%)
- Operating surplus has gone up 81% in real dollars since 1986 (compared with a 12% real increase in labour income)
- Redistribution of wealth from residential consumers to electricity asset owners and commercial users has been massive => increasing inequality and poverty (both child poverty and energy poverty in general)
- Residential consumers have gone from having no choice in a low-priced market to having lots of so-called “choice” [but no voice] in a high-priced market

What is to be done? Part 1

- Reclaim electricity as an essential service and a "commanding height" of the economy, to be controlled by the people for the people and given a central role in driving the economy to zero carbon
- Scrap the profit-driven market model, re-nationalise the big assets, re-integrate the generation and transmission sectors under efficient planning, return local networks to local control and take the shackles off their ability to build and operate distributed generation, drop the charade of "what's my number" retail "competition"
- Establish a mechanism to install reserve generating capacity on the market margin without requiring all prices to rise to long-run marginal cost. E.g. contract for reserve capacity as such, or build (or buy up) reserve capacity owned by the state to backstop predominantly low-priced renewable supply
- Instantly get rid of the perverse flow-through from carbon price to renewable price and rents
- At retail level, rebalance prices so that household prices come back down from their current heights, as
    1. rents and excess profits are stripped out of the supply chain;
    2. industrial and commercial users pick up a bigger share of whatever supply-cost burden remains

    ⇒ Either regulate household prices down, or have a state-owned retailer competing with the other retailers and providing a low-priced option, or go back to community-owned local not-for-profit retailers alongside independents, all with access to bulk contracted supplies of cheap hydro
- Make net metering mandatory to allow small independent suppliers of distributed renewable electricity such as rooftop solar a share of the market and a role as disruptor of incumbents' market power
- But can you un-scramble an egg?

What is to be done? Part 2

- Break up the gentailers by forcing divestment of their retail operations
- Abolish the lines/energy split at distribution level to allow local community-focused energy operations to emerge with secure access to distribution networks and retail customers
- Augment or abolish the limits on local lines operators' investment in generation
- Amend the ETS to allow renewables to bring down the electricity price
- Massively overhaul the Commerce Commission's approach to lines company regulation by switching it from a floor price to a ceiling price, and with a ruthlessly sinking ceiling
- Amend Part 4 of the Commerce Act to prescribe elimination, not just token "limitation", of excess profits
- Give the Electricity Authority explicit instructions to genuinely advance the interests of consumers and make sure it gets cracking
- Install a single buyer or similar mechanism in the wholesale market and compel generators to offer arms-length hedge contracts
- Open the way for local electricity pooling (e.g. rooftop solar with battery backup on a community scale) with a workable boundary interface with grid supply including net metering
- ….. and plenty more…….