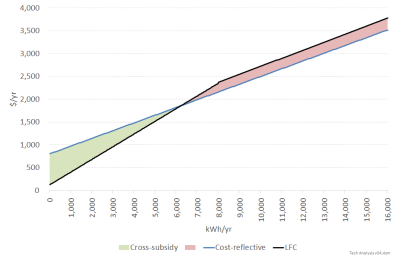
The low-fixed charge (LFC) regulations: History, impact, alternatives

Presentation to the Productivity Commission



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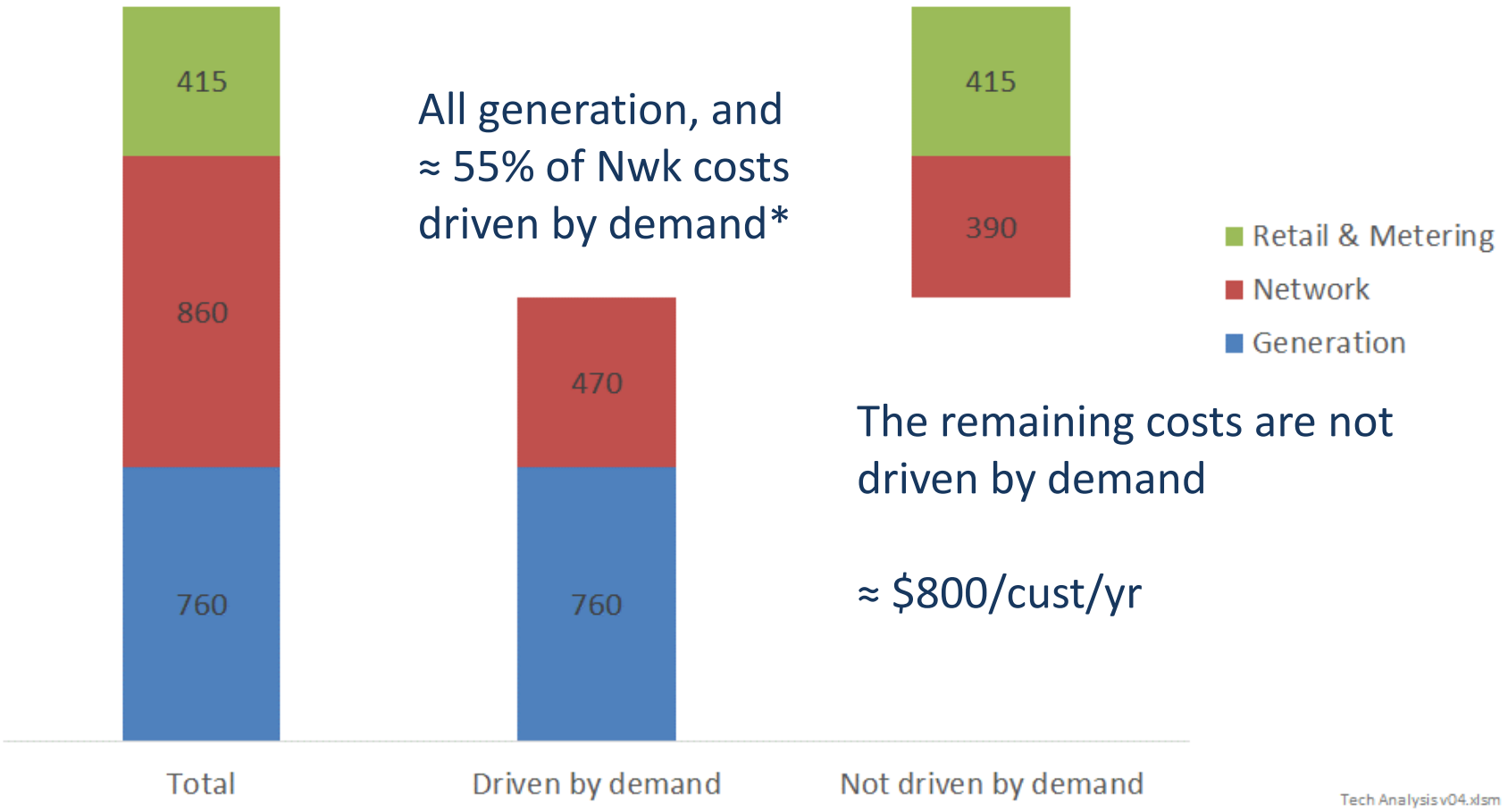
Contents

- History behind the low-fixed charge (LFC):
- How does it measure up to its policy objectives?
- What are the alternatives?

History behind the low-fixed charge (LFC)

- What is it?
- Why was it introduced?
- What objectives is it meant to achieve?

Let's start with the basics: the average residential bill



All generation, and
≈ 55% of Nwk costs
driven by demand*

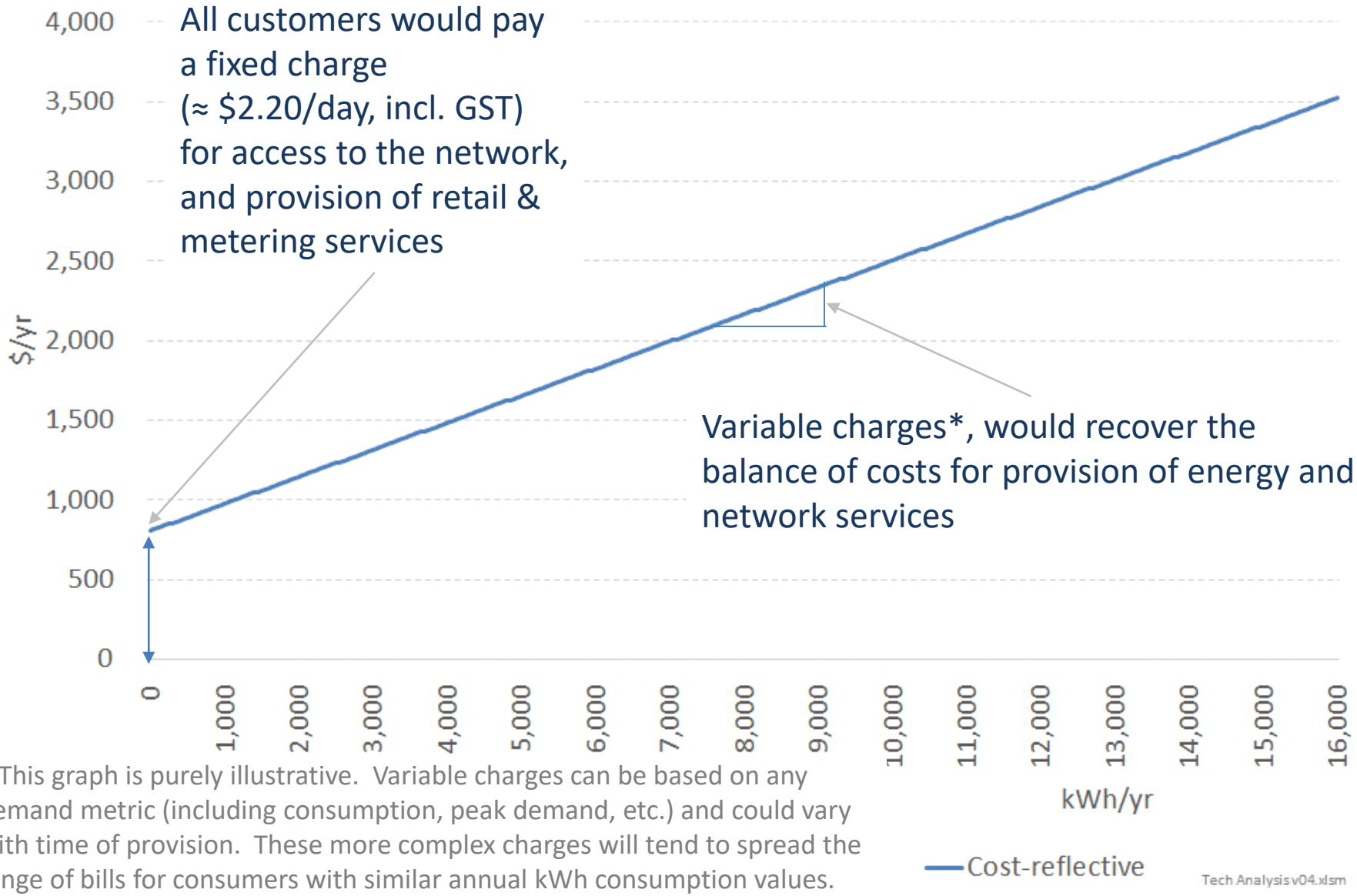
The remaining costs are not driven by demand

≈ $800/cust/yr

Note: All costs inclusive of GST. Source: Concept analysis of MBIE data

* Gen. costs driven by demand at all times. Nwk costs driven by peak demand over the long-term. 55% estimate based on Orion analysis. Will vary by network

Bills under a simple cost-reflective tariff would look something like this



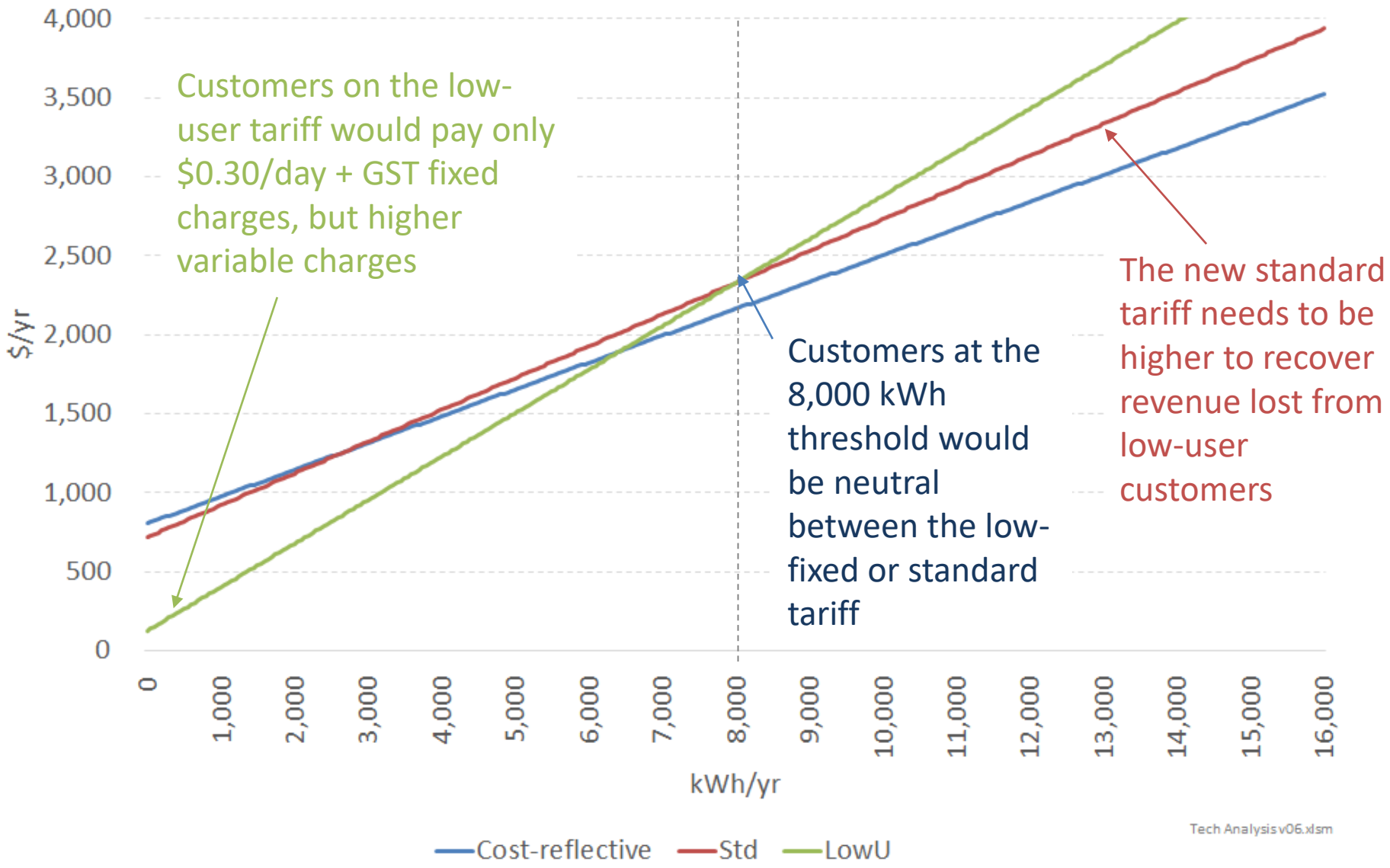
* This graph is purely illustrative. Variable charges can be based on any demand metric (including consumption, peak demand, etc.) and could vary with time of provision. These more complex charges will tend to spread the range of bills for consumers with similar annual kWh consumption values.

But we have the low-fixed charge regulations

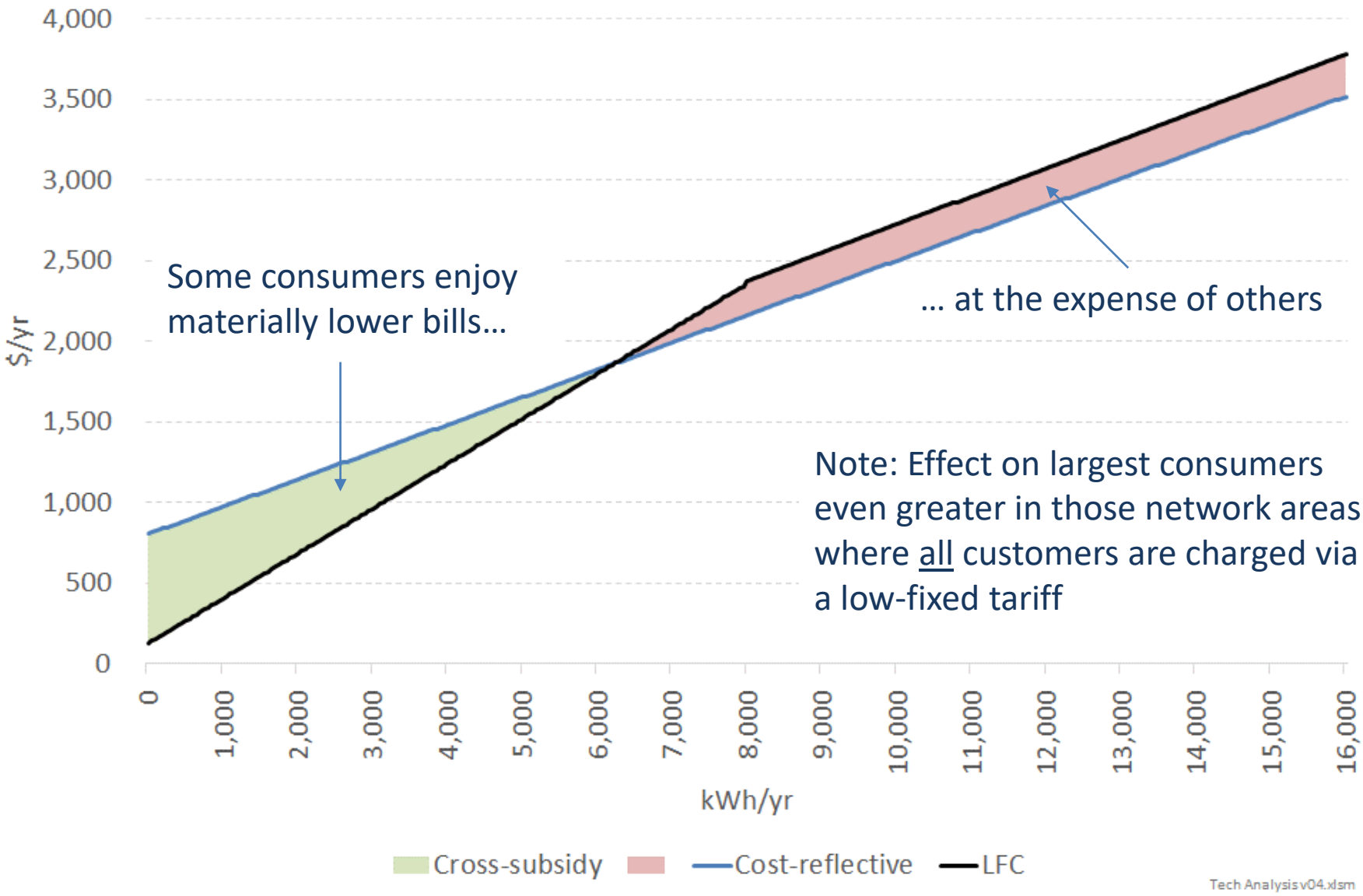
- Policy introduced in 2000 via a Government Policy Statement
  - Expected retailers to offer a tariff with a low-fixed charge which would amount to no more than 10% of the bill for the 'average' 8,000 kWh customer

- Regulations introduced in 2004 after government felt that industry was not delivering
  - Requires retailers and networks to each have low-fixed charge option of 15c/day (30 c/day overall), which would deliver the same bill as the standard tariff for an 8,000 kWh customer
    - 8,000 kWh threshold amended to 9,000 kWh for lower South Island in 2007

To comply with the low-fixed charge, tariffs need to look like this



This introduces cross-subsidies between customers



What was the policy intent? A variety of motivations…

December 2000

GOVERNMENT POLICY STATEMENT

FURTHER DEVELOPMENT OF NEW ZEALAND'S ELECTRICITY INDUSTRY

The Government expects all retailers to offer at least one tariff to consumers with a fixed charge of no more than 10 per cent of the bill of the average domestic consumer (i.e. consuming 8,000kWh per annum). This new tariff should incorporate the following design features:

Pete Hodgson

Electricity fixed charges: progress, but not enough

29 APRIL, 2001

Minister of Energy Pete Hodgson has welcomed moves by several major electricity companies to introduce lower fixed charges, but warned the industry it wants to avoid regulation.

Came against a background of rising electricity prices, and concerns that retail competition was not delivering sufficient benefits to consumers

Pete Hodgson

Hodgson to introduce targeted relief on electricity bills

Minister of Energy, Pete Hodgson, has confirmed that some aspects of power prices are to be regulated. The move follows recent calls for intervention on rising power prices from the Consumers' Institute and other bodies.

"I have been concerned about the impact of rising power prices on low income groups for some time and have decided to make the low fixed charge tariff compulsory," says Mr Hodgson. "Some companies had been playing games around offering such an option."

Work on this regulation pre-dates the latest round of power price rises.

"I instructed officials to draft regulation on this issue some months ago. It will compel all electricity retailers to offer a tariff, the fixed charges portion of which cannot exceed 30 cents per day excluding GST. This tariff is designed to make those consumers that use less than the average 8000 kwh of power a year better off. In particular, it is designed to help older New Zealanders on fixed incomes who are typically frugal users of power."

Lower power bills great news for older Kiwis

9 JULY, 2004

Older New Zealanders will be among the big winners of government plans to control electricity prices for some customers, Senior Citizens Minister Ruth Dyson said today.

What was the policy intent? A variety of motivations…

- Environmental
  - High variable charges promote energy efficiency

- Social
  - Poorer households tend to consume less → a low-fixed charge will lower the bill for such households
  - Pensioners were of particular concern

How well does the LFC meet its original (and other) policy objectives?

Environment: Is the LFC resulting in lower greenhouse emissions?

Social: Is the LFC resulting in benefits for low-income consumers?

Economic: Is the LFC helping deliver lower cost energy for New Zealand?

Some positive environmental effects in the past
However, potentially negative effects in the future

- Higher variable charges do incentivise *energy* efficiency
  - Although *economically* inefficiently so in many cases. (See later)

- However, now acting against technology which is arguably biggest opportunity to de-carbonise our economy …

Examined greenhouse impacts of uptake of new technologies

Solar, and batteries

EVs

Detailed market projections undertaken to examine emissions impact of technology uptake

- Concept's market models work out least-cost generation build and operation, now and into future, based on key drivers, e.g.:
  - Demand growth and shape
  - Fuel & CO2 prices
  - Generating technology costs

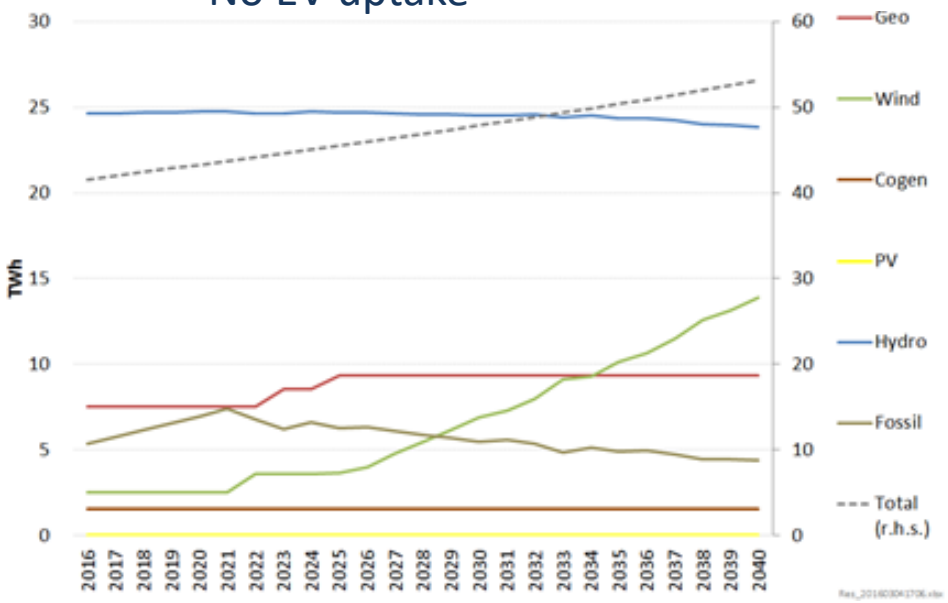
- Run two scenarios
  - one with new technology uptake (e.g. solar PV, EVs, or batteries), and
  - one without

- Impact of technology on grid generation build and operation – and hence emissions

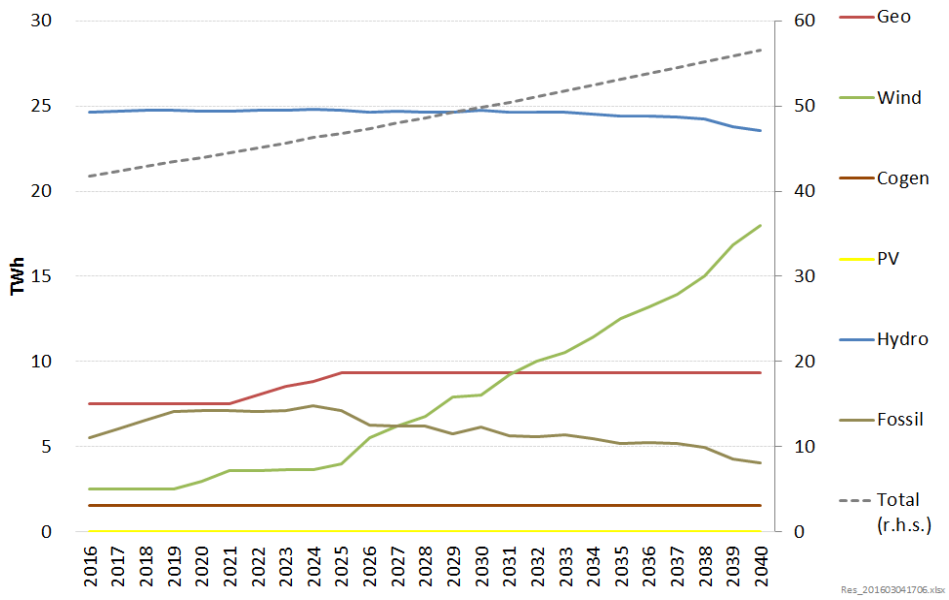
- Repeated over many different scenarios (e.g. fuel price, CO2 price, Tiwai in/out, etc.) to determine whether nature and scale of impact is consistent

Projected NZ generation with / without EVs for sample scenario

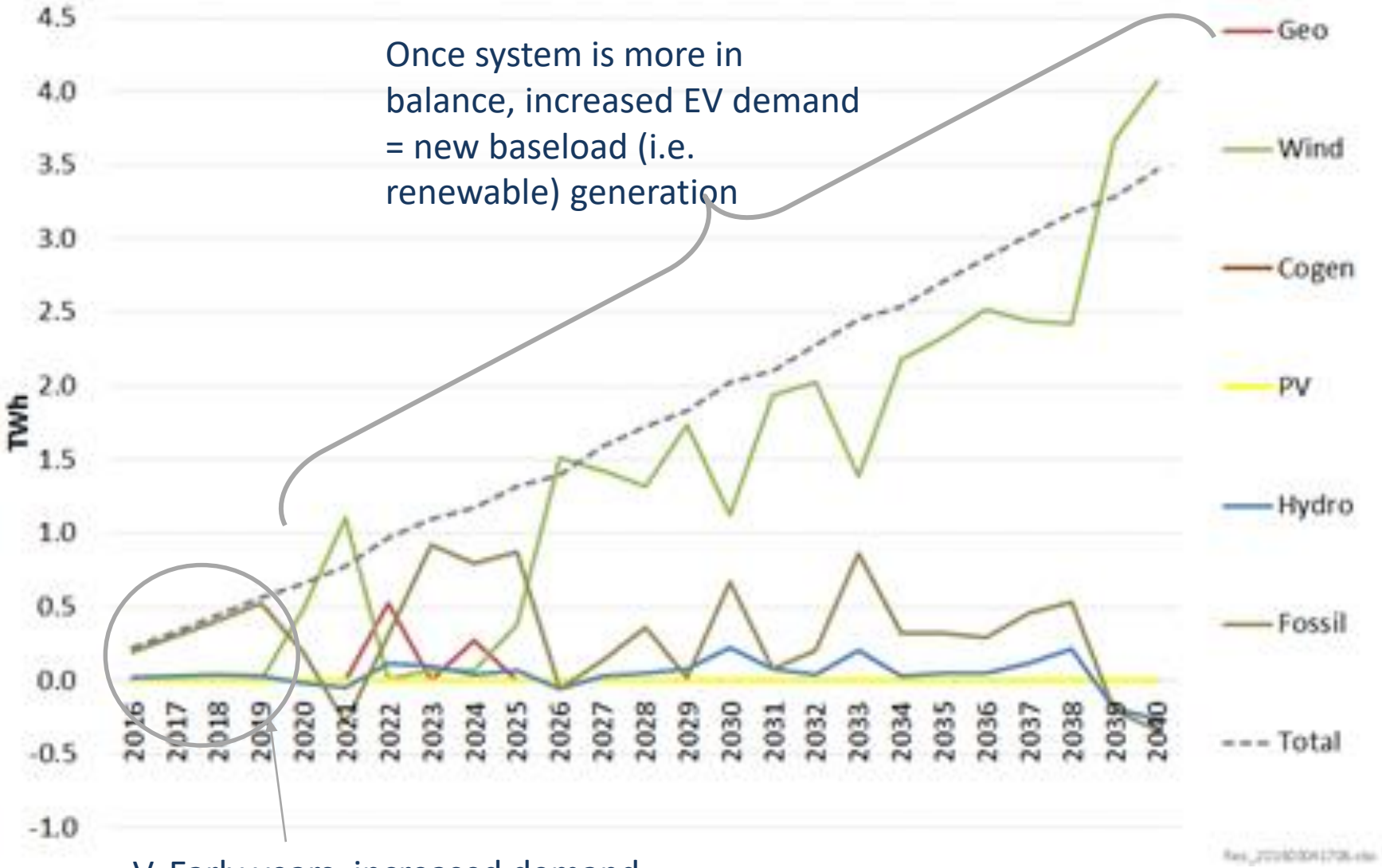
No EV uptake



High EV uptake

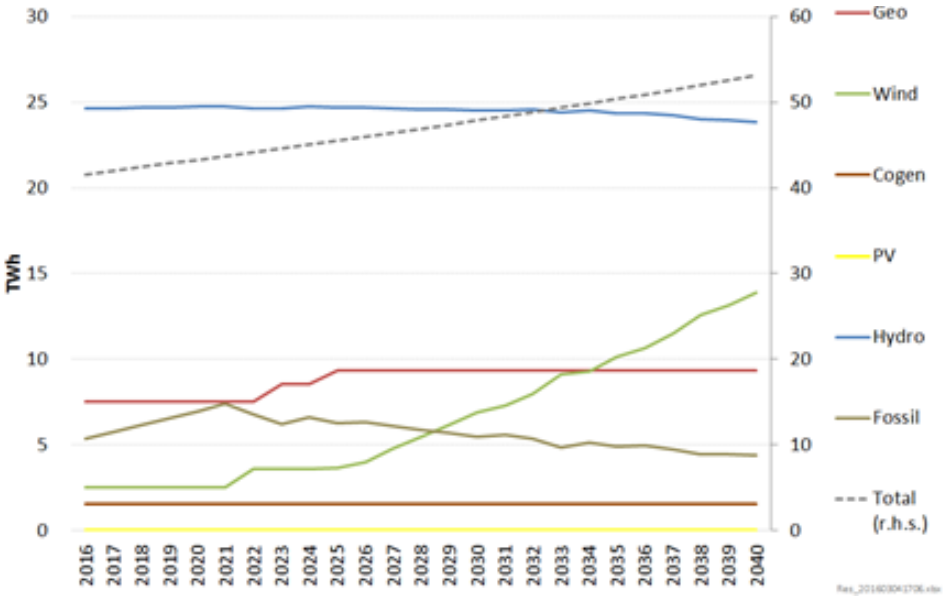


The majority of future EV demand would be met by increased wind generation

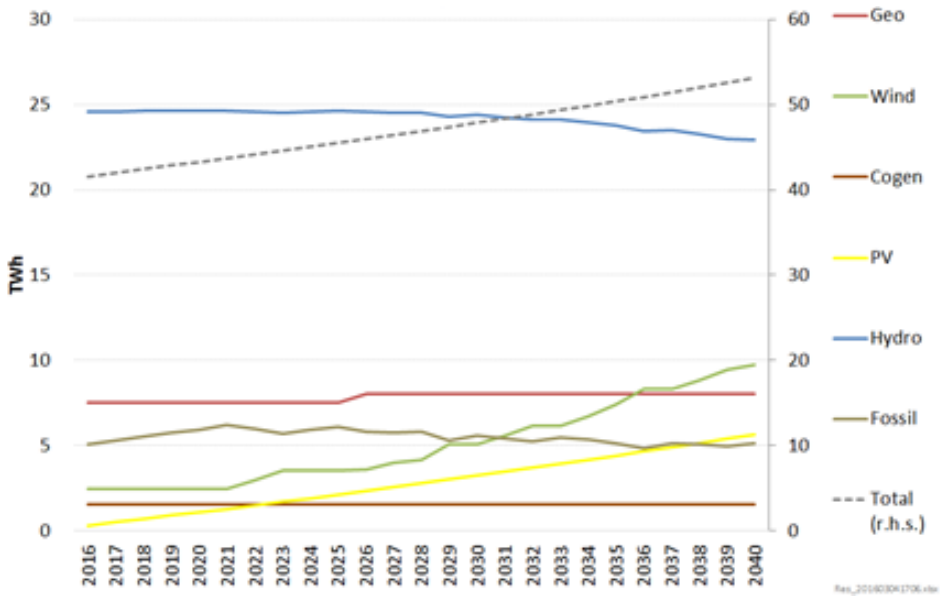


Also looked at impact of high solar PV uptake

No Solar PV



High Solar PV



Modelling indicates little environmental benefit of PV in NZ

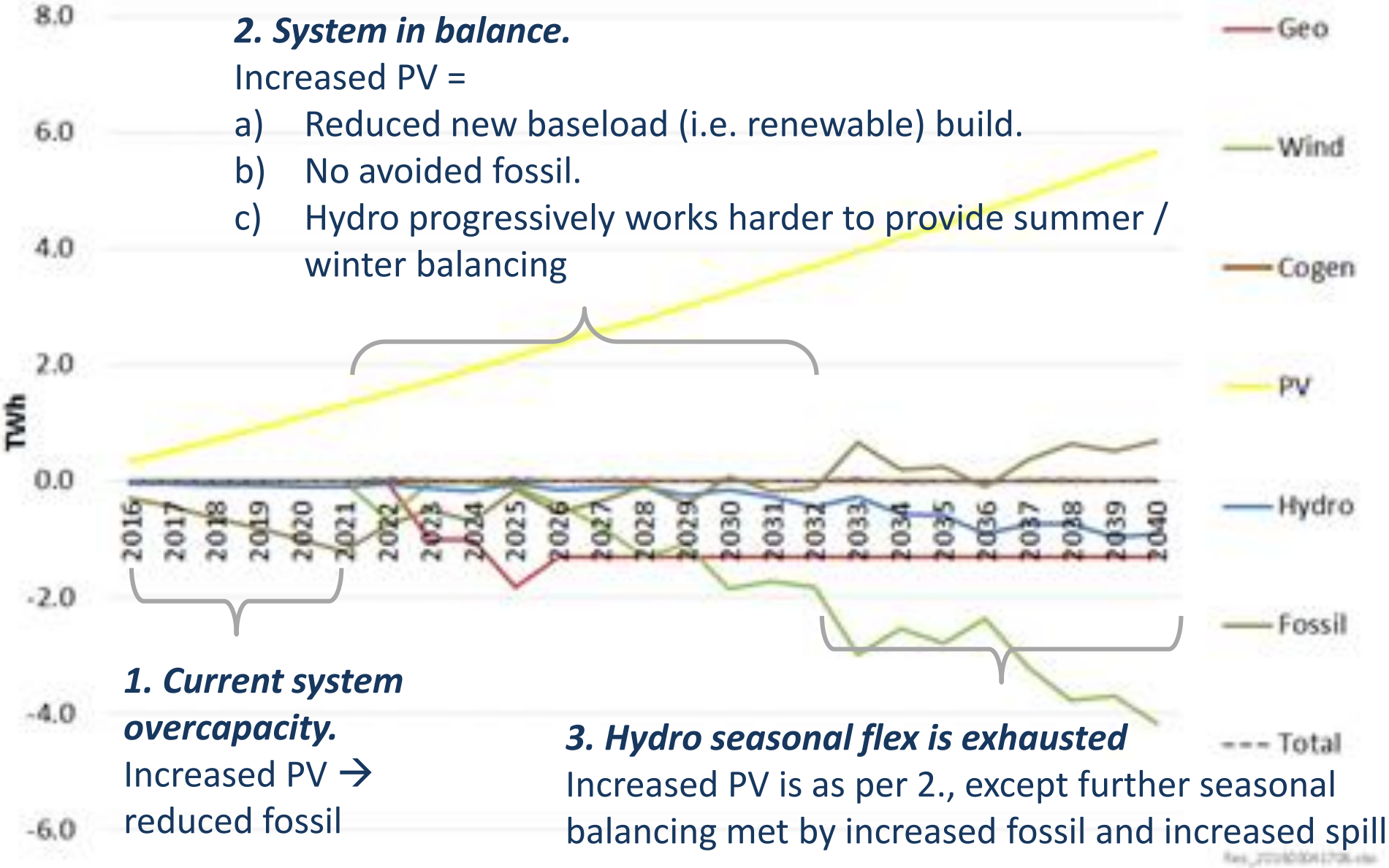
2. System in balance.

Increased PV =

a) Reduced new baseload (i.e. renewable) build.

b) No avoided fossil.

c) Hydro progressively works harder to provide summer / winter balancing



1. Current system overcapacity.

Increased PV → reduced fossil

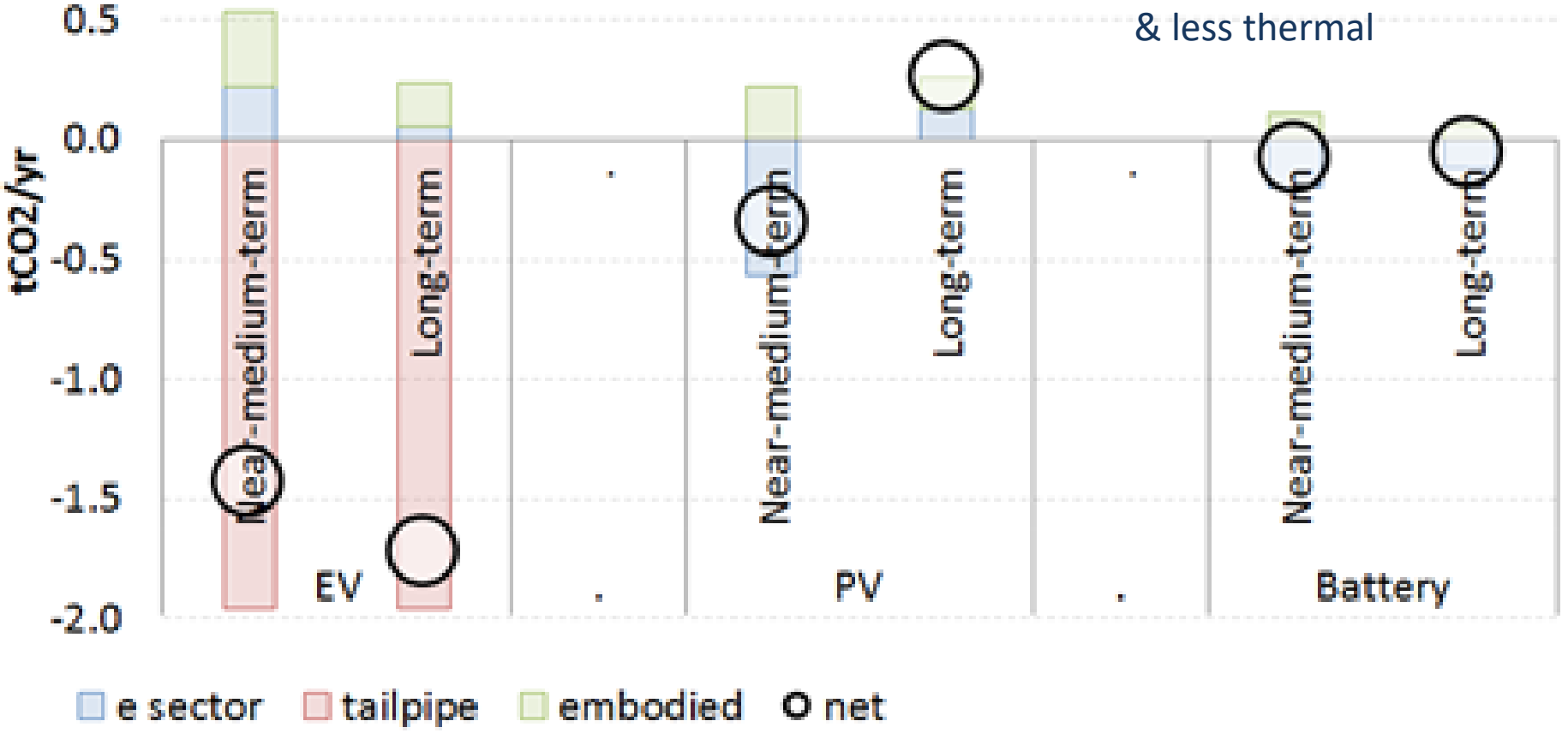
3. Hydro seasonal flex is exhausted

Increased PV is as per 2., except further seasonal balancing met by increased fossil and increased spill

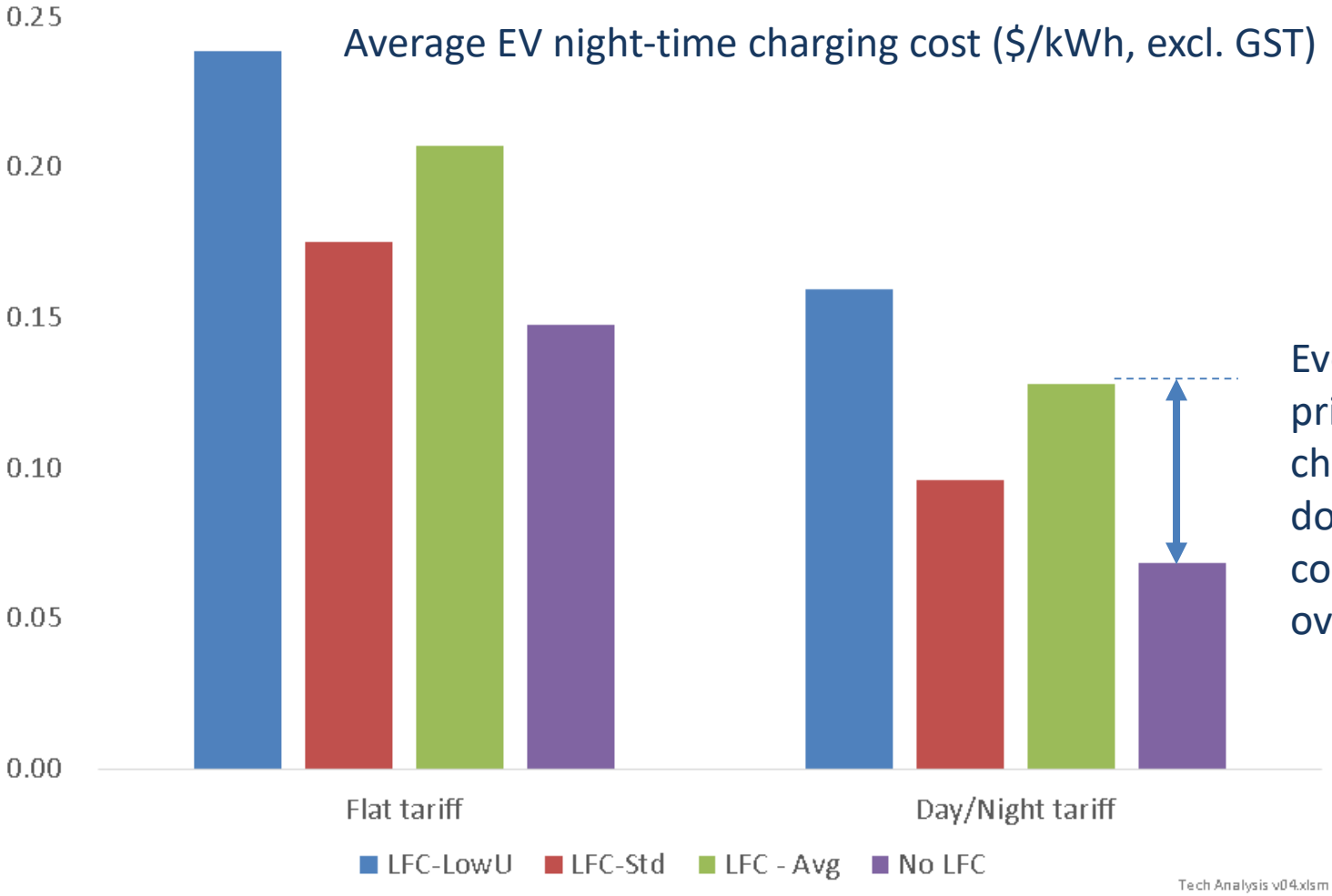
Considering all effects, EVs represent the biggest opportunity to de-carbonise our economy

- Analysis also considered avoided tailpipe emissions for EVs, and embodied emissions in manufacture of the technology

Flattening of demand curve → more renewables & less thermal



The low-fixed charge substantially increases the cost of charging EVs → their uptake will be supressed



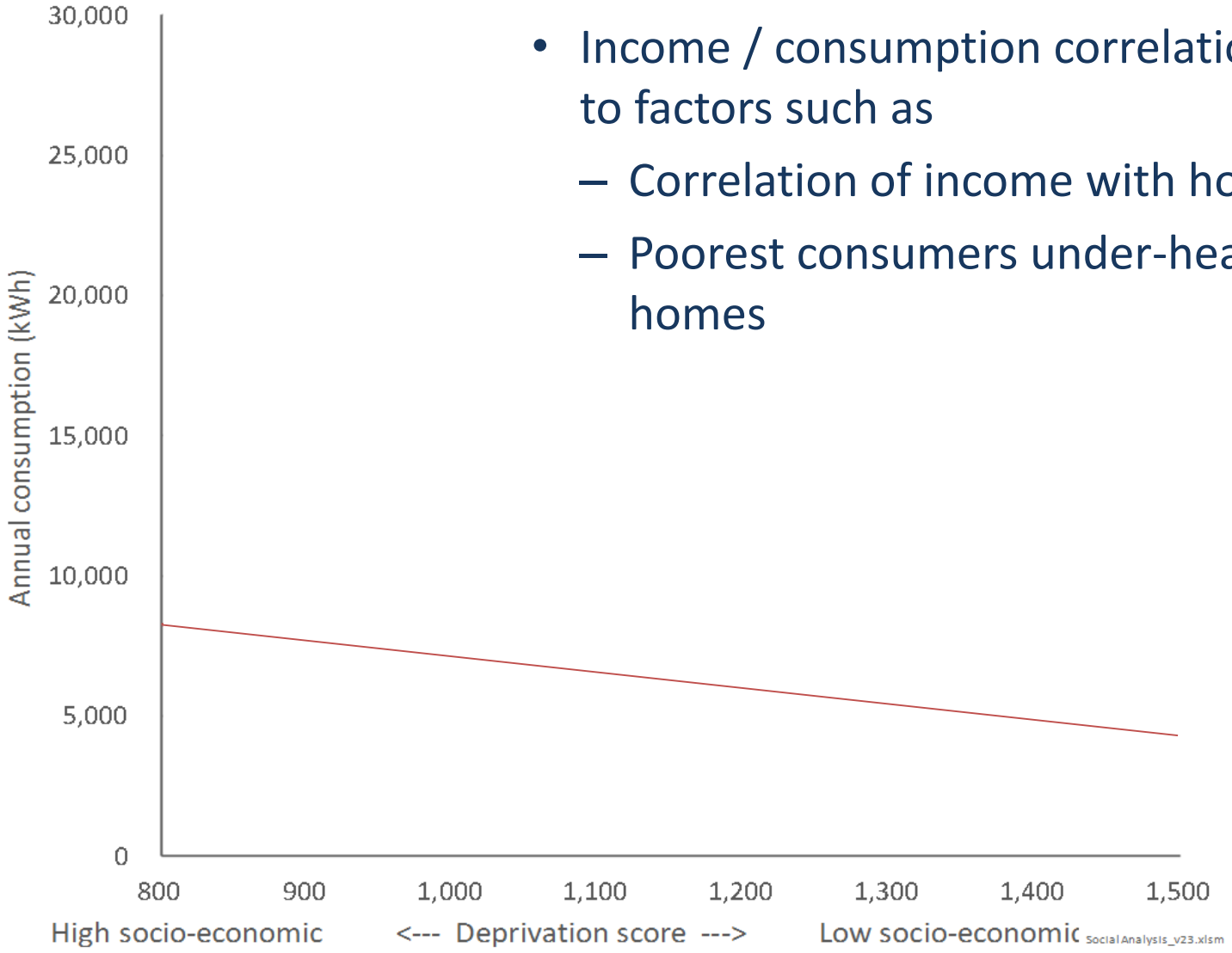
Even with day/night pricing, the low-fixed charge roughly doubles the running cost of an EV charged overnight

Note: Even with an EV, approx. 42% of consumers would qualify for Low User tariff

How does the performance of the LFC stack up against these (and other) policy objectives?

- Environment
  - Is the LFC resulting in lower greenhouse emissions?
- Social
  - Is the LFC resulting in benefits for low-income consumers?
- Economic
  - Is the LFC helping deliver lower cost energy for New Zealand?

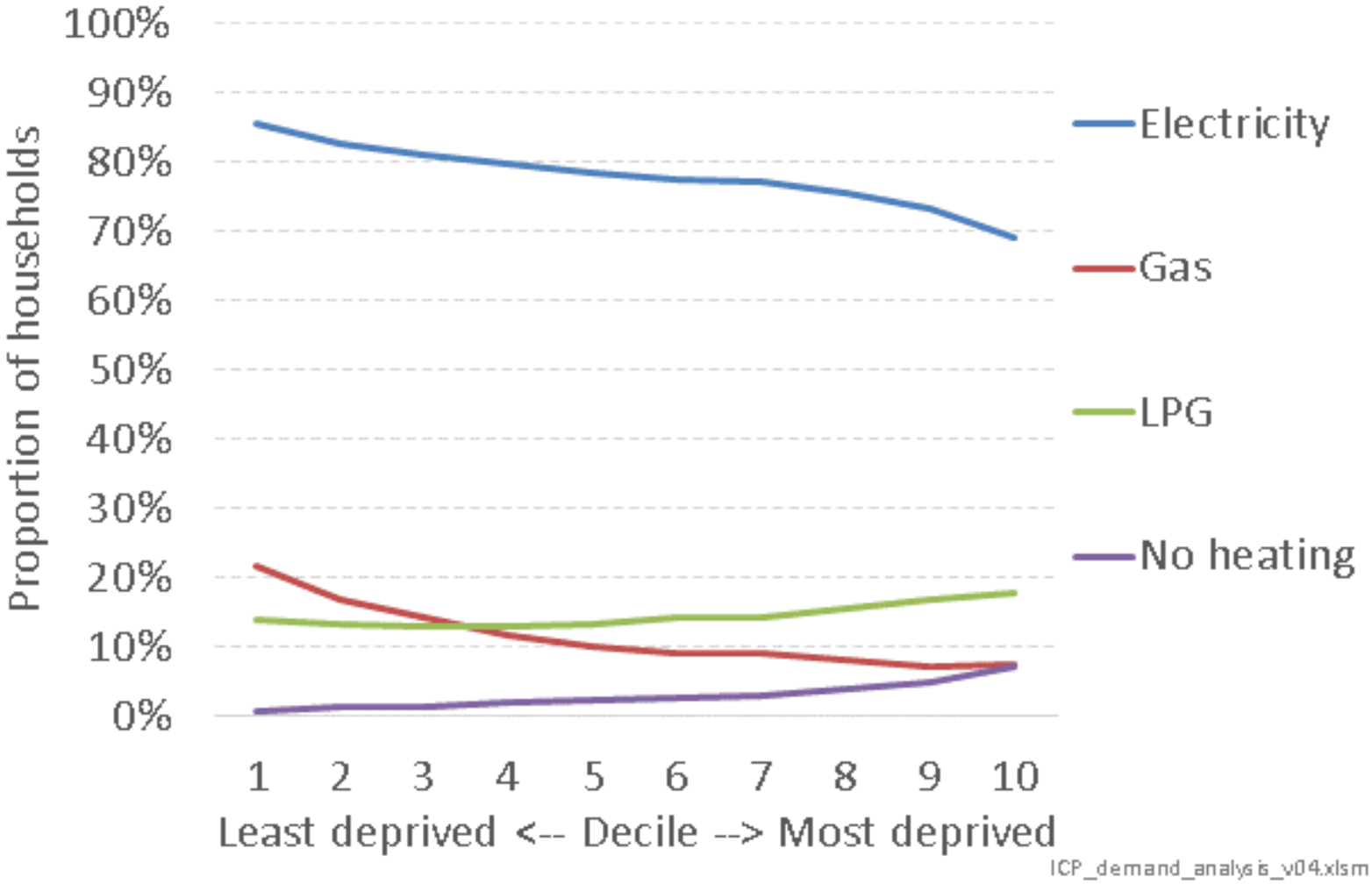
It is true, that in general, low-income consumers use less → LFC will have benefited such consumers



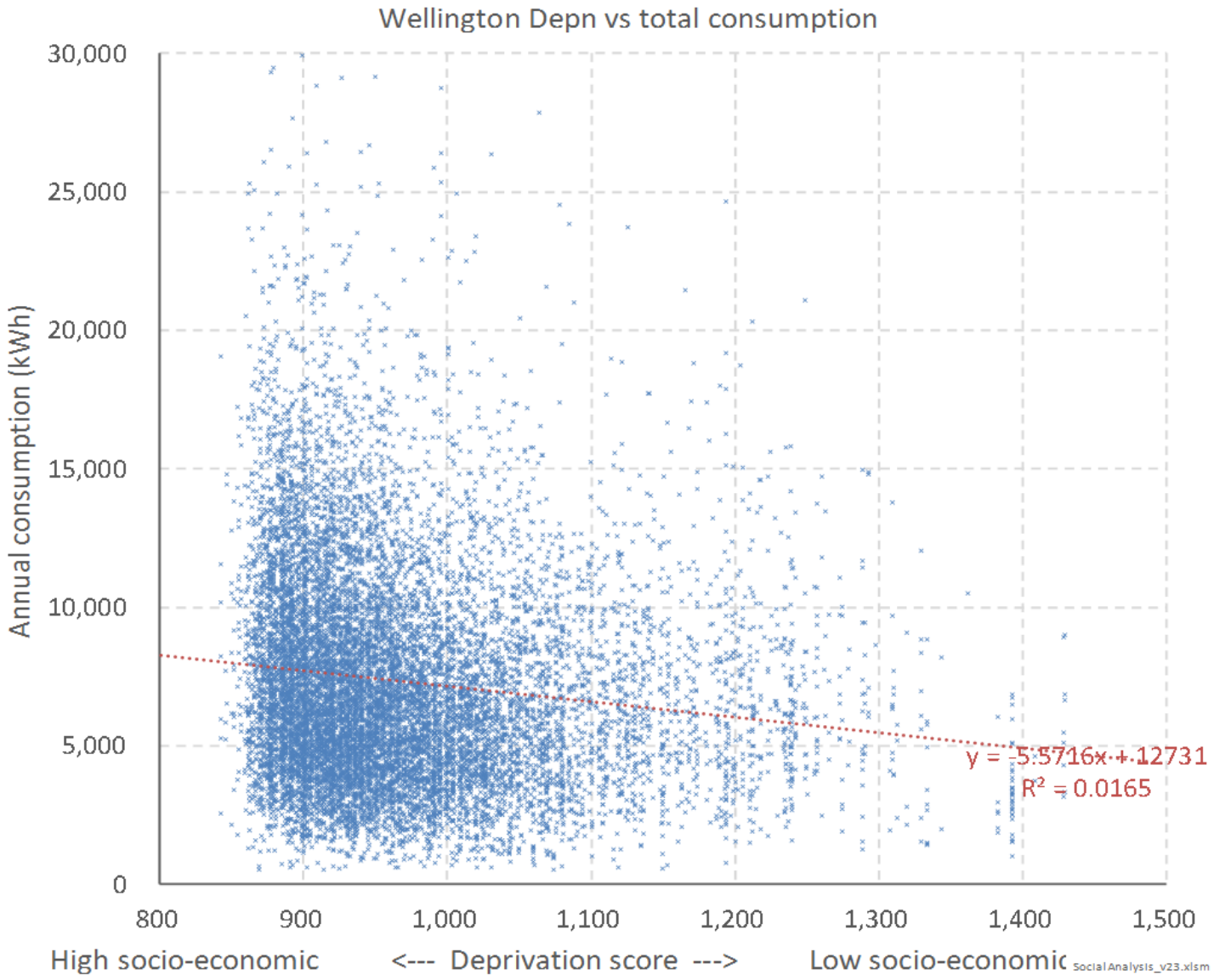
- Income / consumption correlation likely due to factors such as
  - Correlation of income with house size
  - Poorest consumers under-heating their homes

As an aside, the 2013 census provides insights into this aspect of fuel poverty

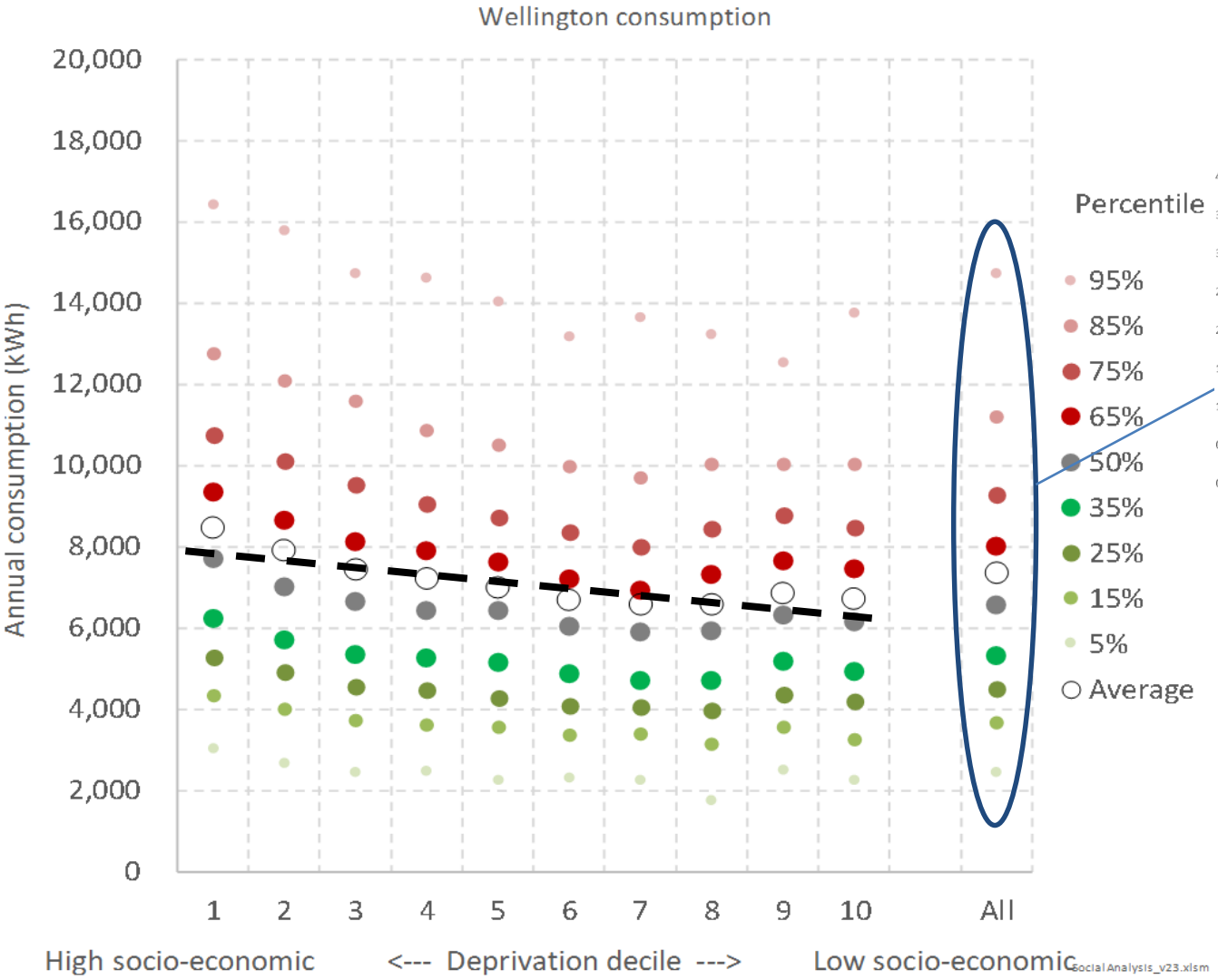
2013 Census reported proportion of households with different types of heating

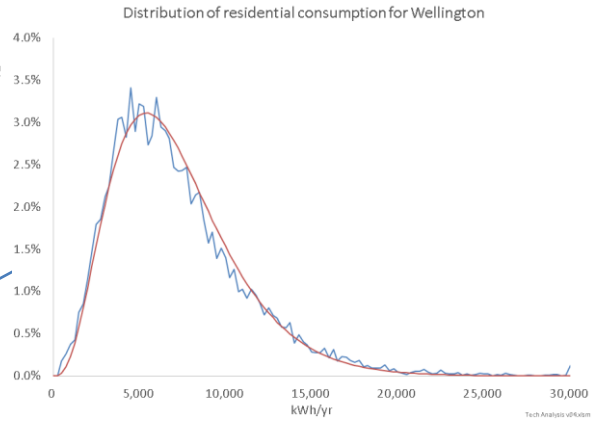


But there are many low-income households which are large consumers, and vice-versa



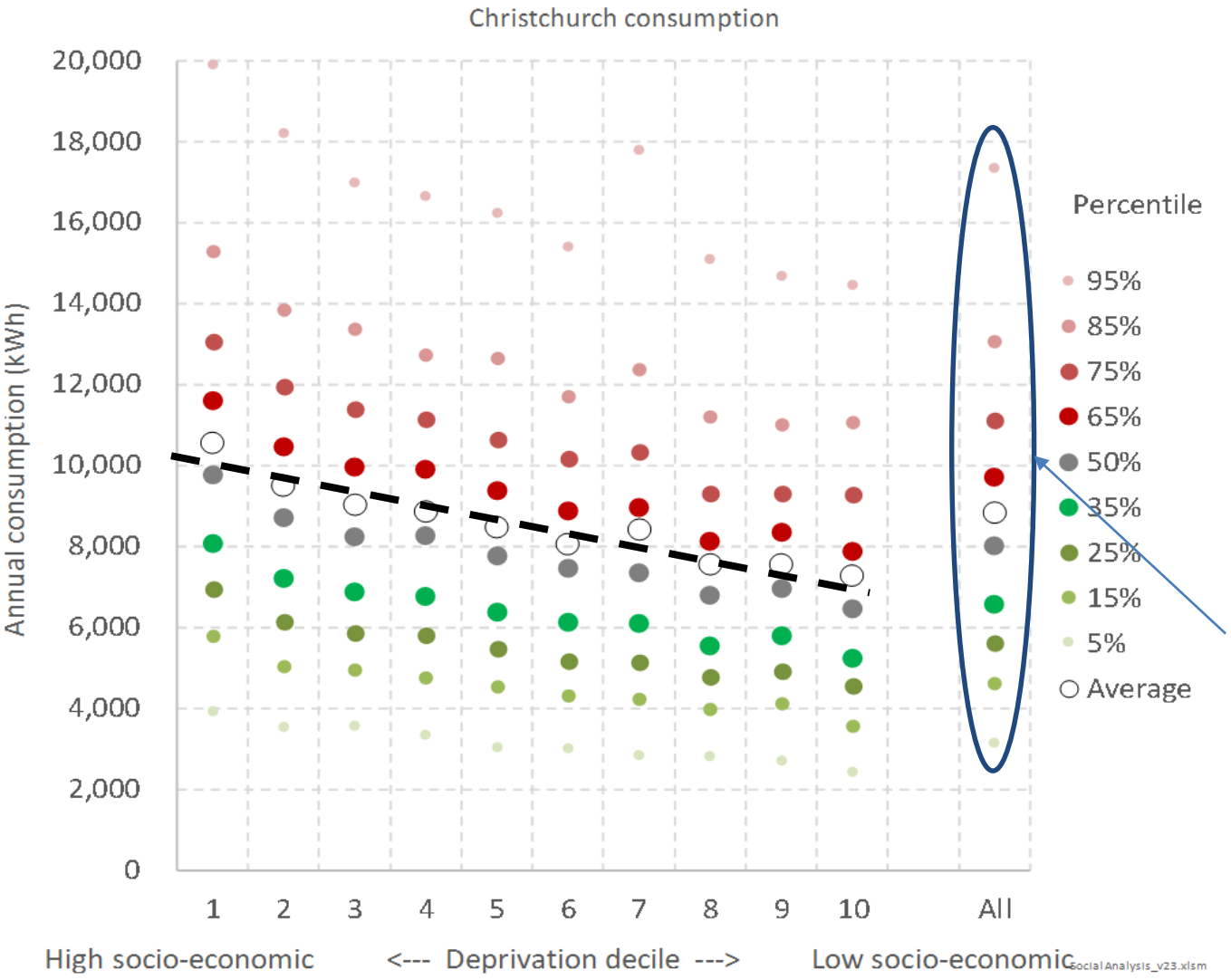
All income deciles have a similar spread of consumption between ‘large’ and ‘small’ consumers





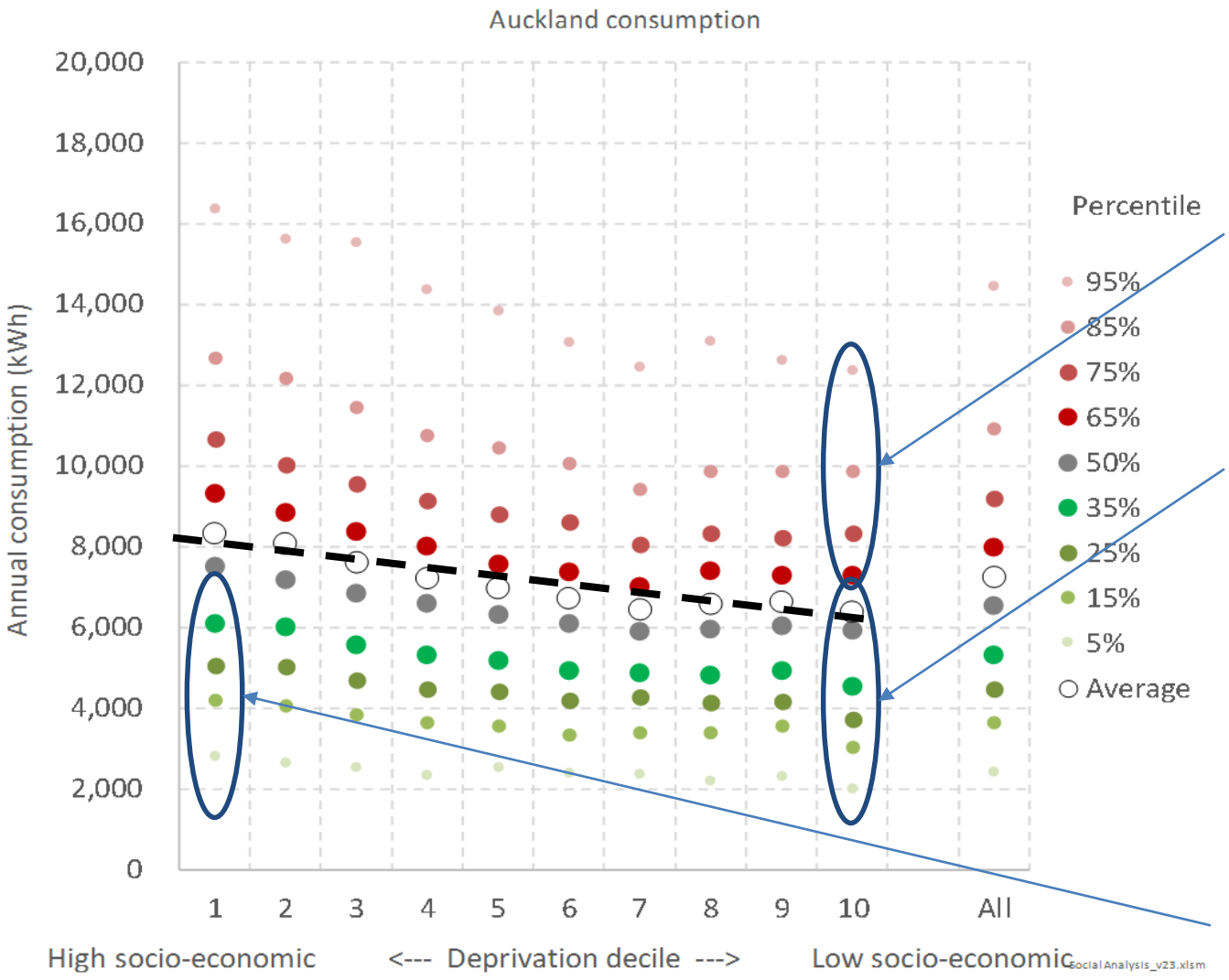
The distribution of consumption levels for each decile has the same general shape, but with different means

This relationship between consumption and income appears consistent across networks, with some more strong than others



The shape of the distribution of consumption levels is very similar across networks, but with different means

This pattern of consumption with income means the LFC is hurting some low-income consumers



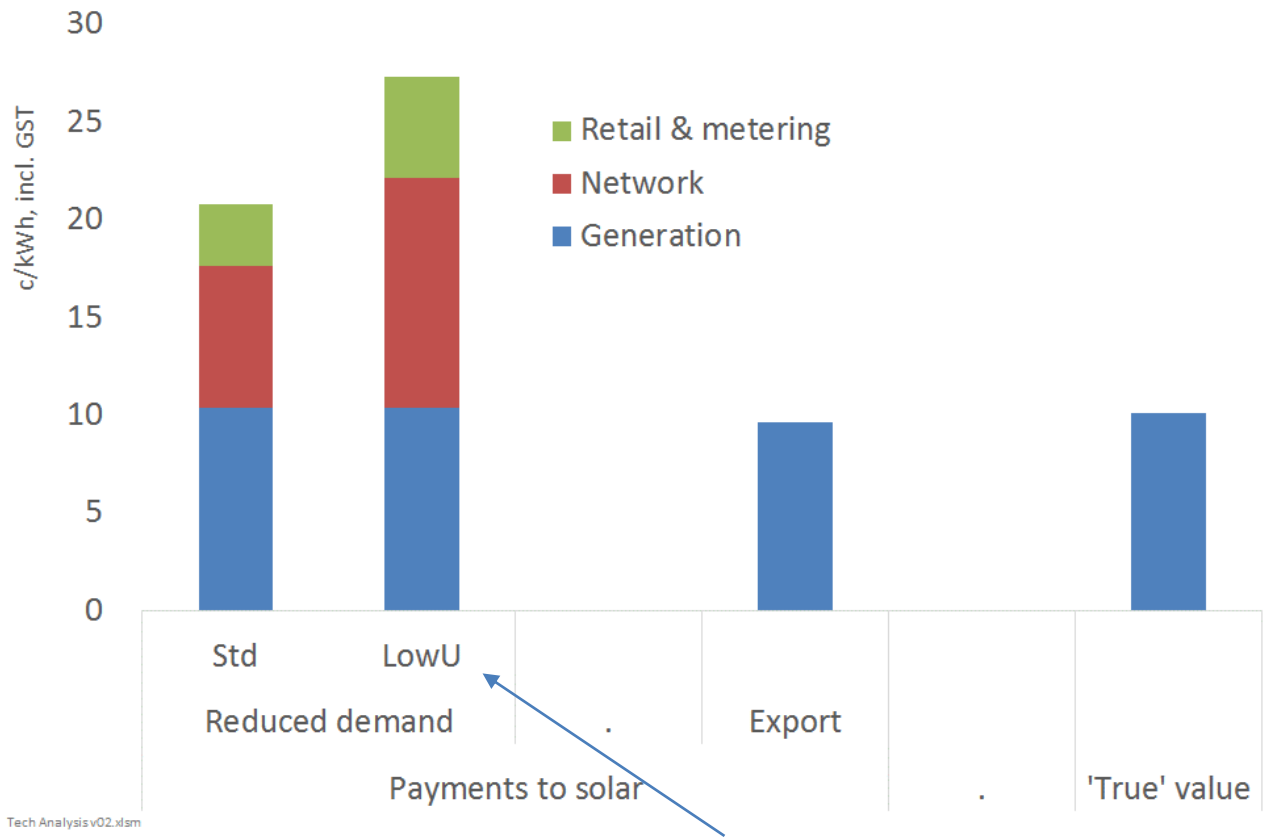
≈ 45% of low-decile consumers suffering higher bills (≈ $180/yr)

≈ 55% of low-decile consumers enjoying lower bills (≈ $220/yr)

Average impact across all lowest decile ≈ $35/yr bill reduction

Plus many of the wealthiest are enjoying cross subsidies! (≈ $200/yr)

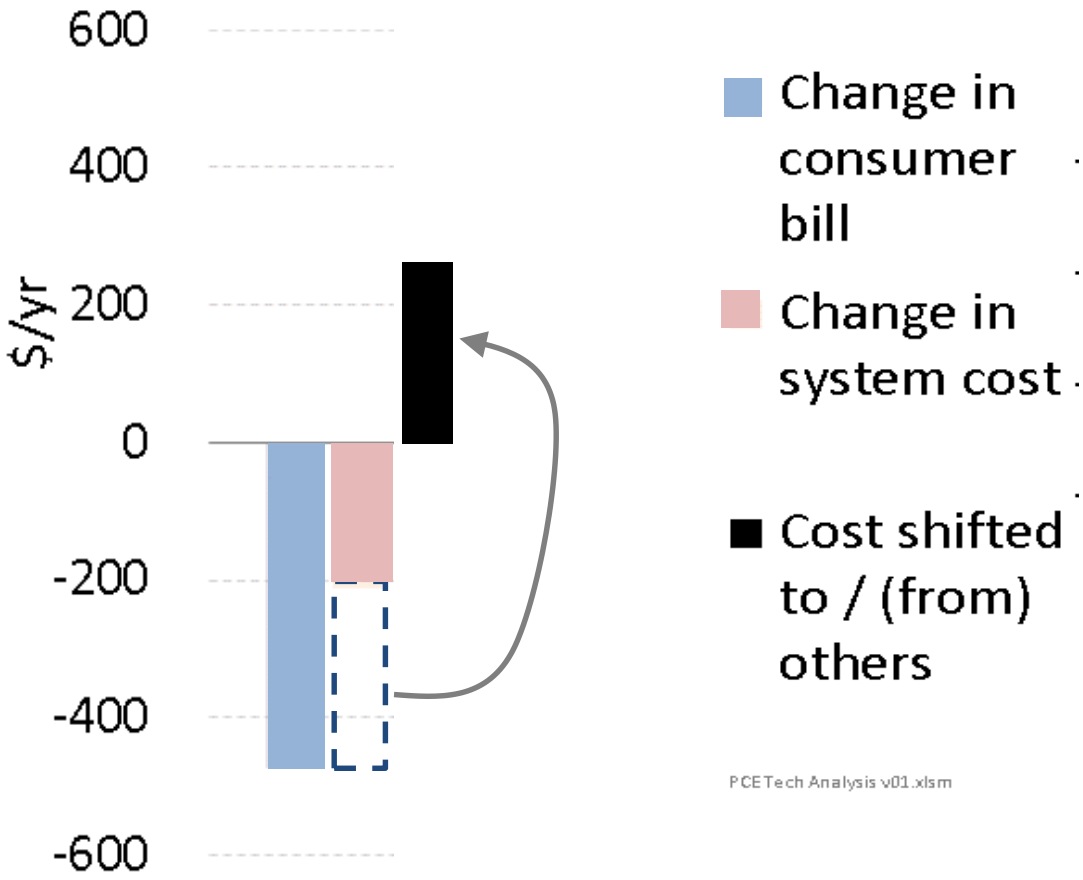
With the advent of solar PV, the low-fixed charge is now causing a new problem: exacerbating solar cost-shifting



- Solar paid as if it were reducing network and retail costs
- But such costs are not reduced.
  - (Indeed, solar may *increase* both network & retail CTS costs)

Returns for solar much greater on Low User tariff
(Noting that solar will turn most Std consumers into 'Low users')

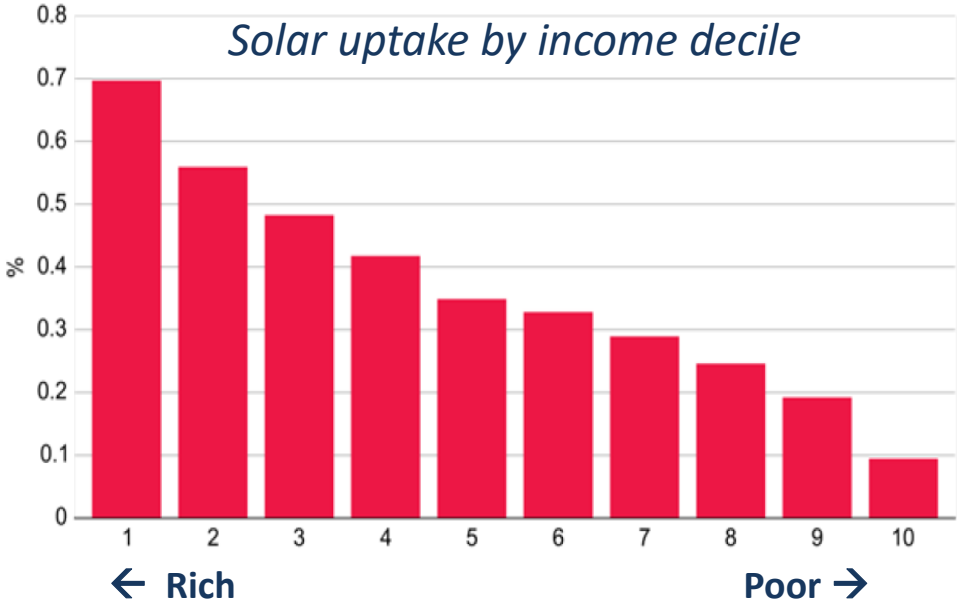
Solar + current tariffs → cost-shifting



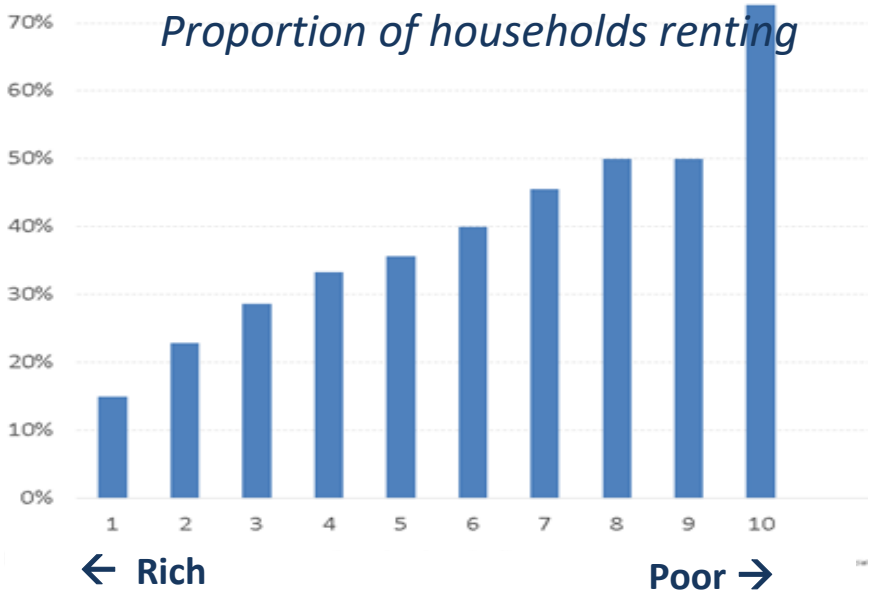
- Under-recovered network & retail costs will be 'shifted' onto other consumers through higher tariffs

Solar cost-shifting will particularly hurt the poor

The poorest are most likely to be solar 'have nots'.

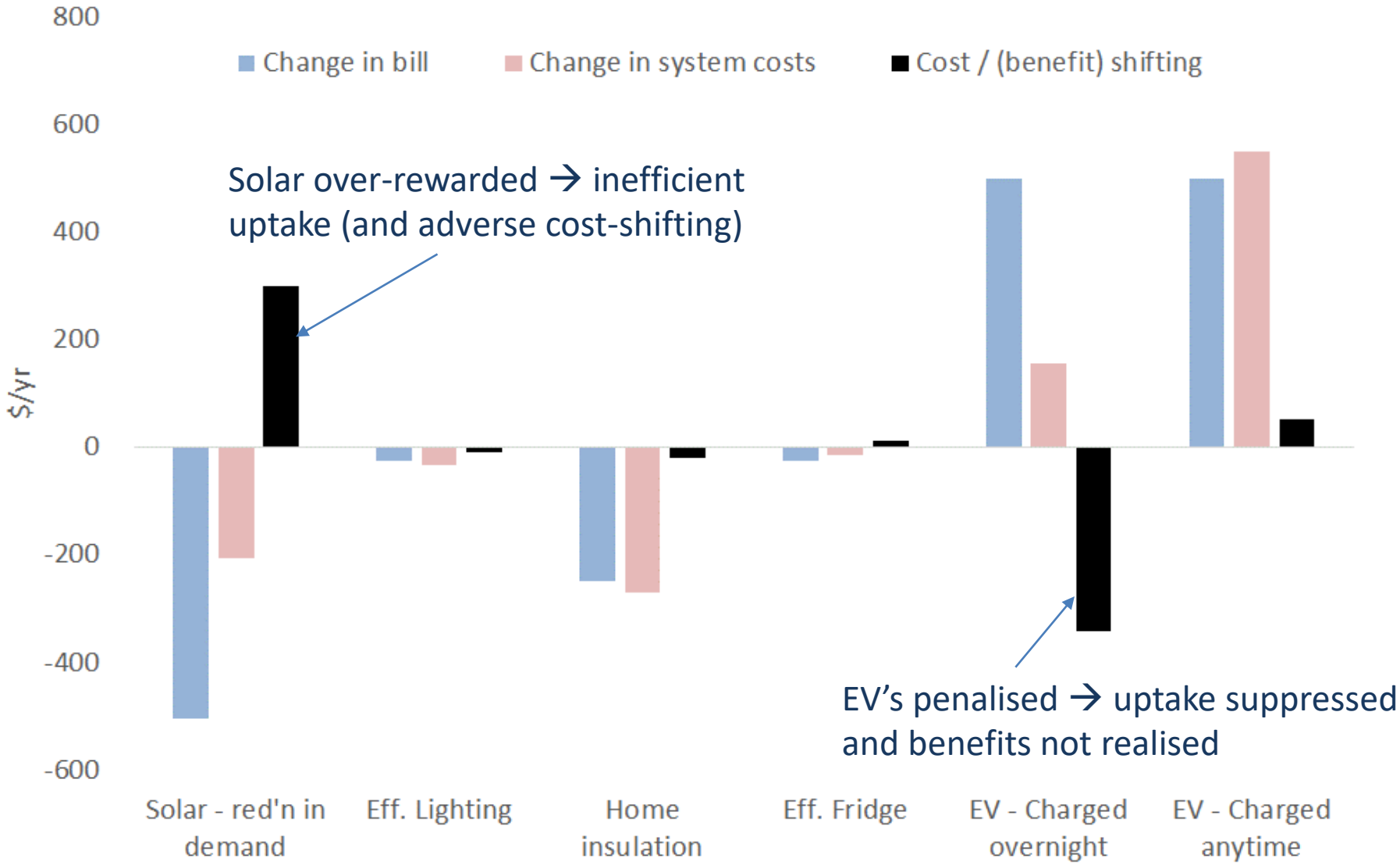


Due to: - Lack of income
- Not owning own home



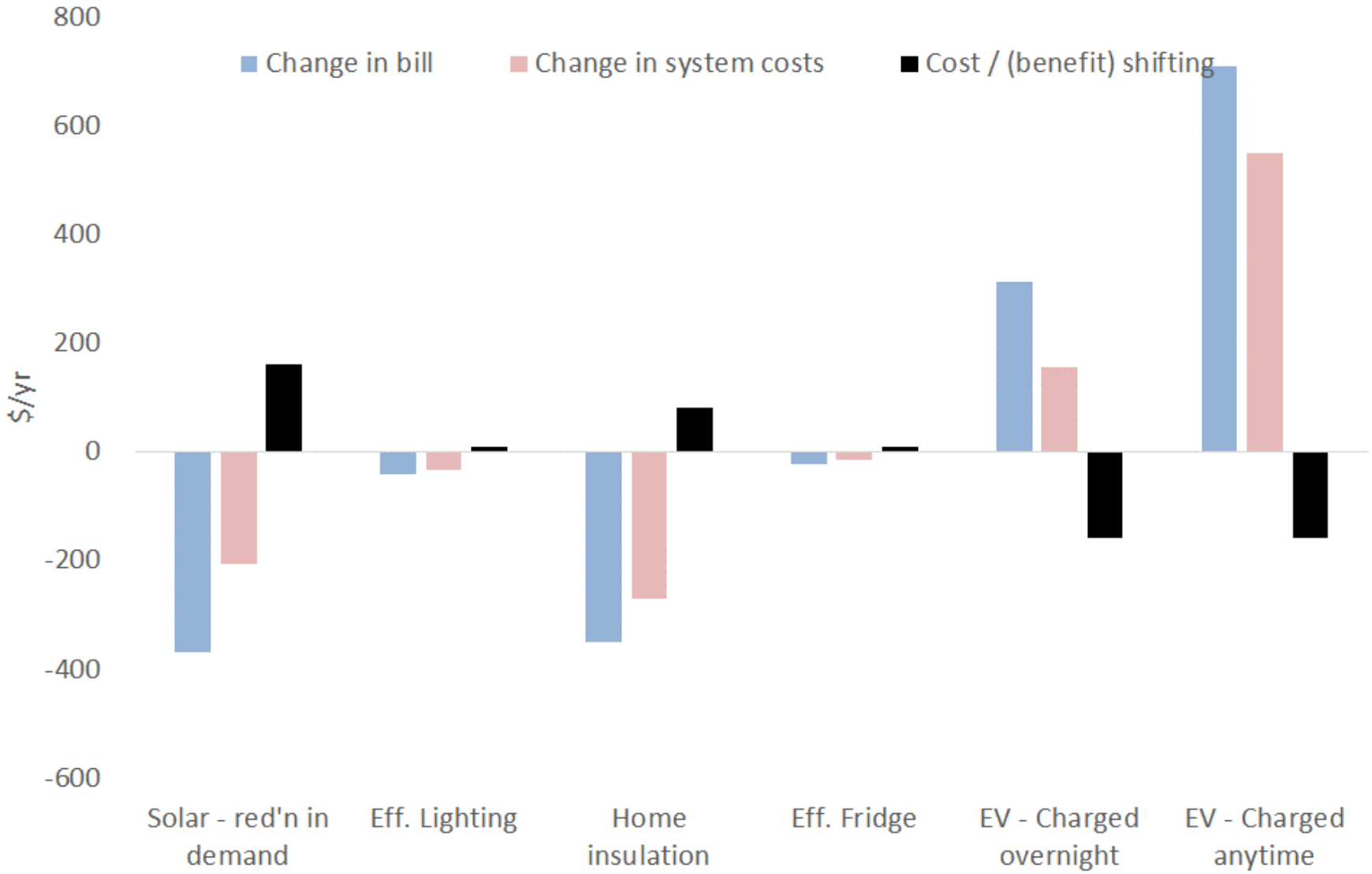
Uptake of solar by 50% of households
→ average $150/yr bill increase for poorest consumers

Solar and EVs stand-out for the cost / (benefit) shifting under current tariff structures



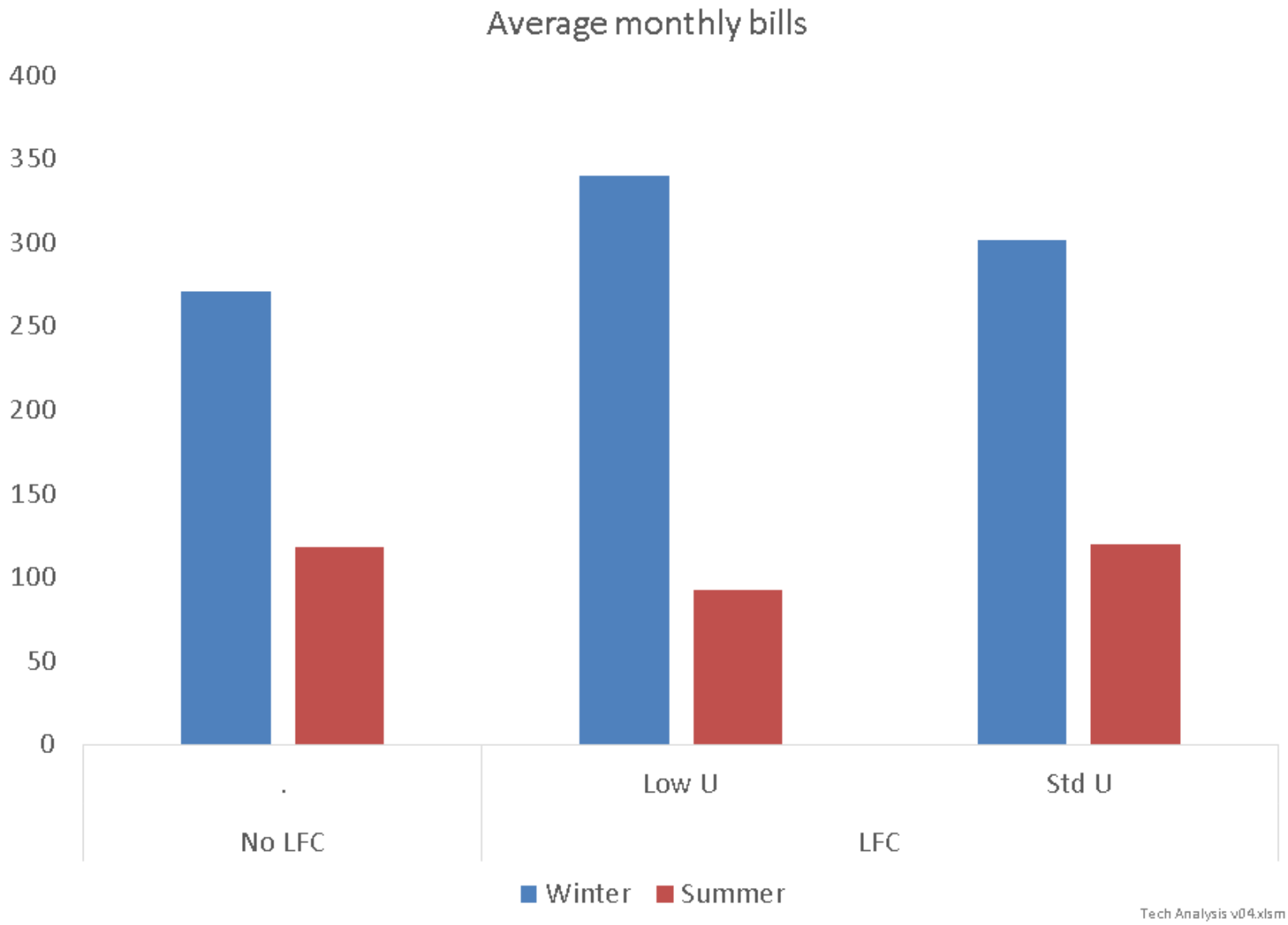
Tech Analysis v04.xlsm

Even if we move to fully time-cost-reflective tariffs, keeping the LFC will still distort price signals and result in cost-shifting



Tech Analysis v04.xlsm

Increased variablisation also exacerbates winter / summer bill differentials – challenging for some low-income consumers



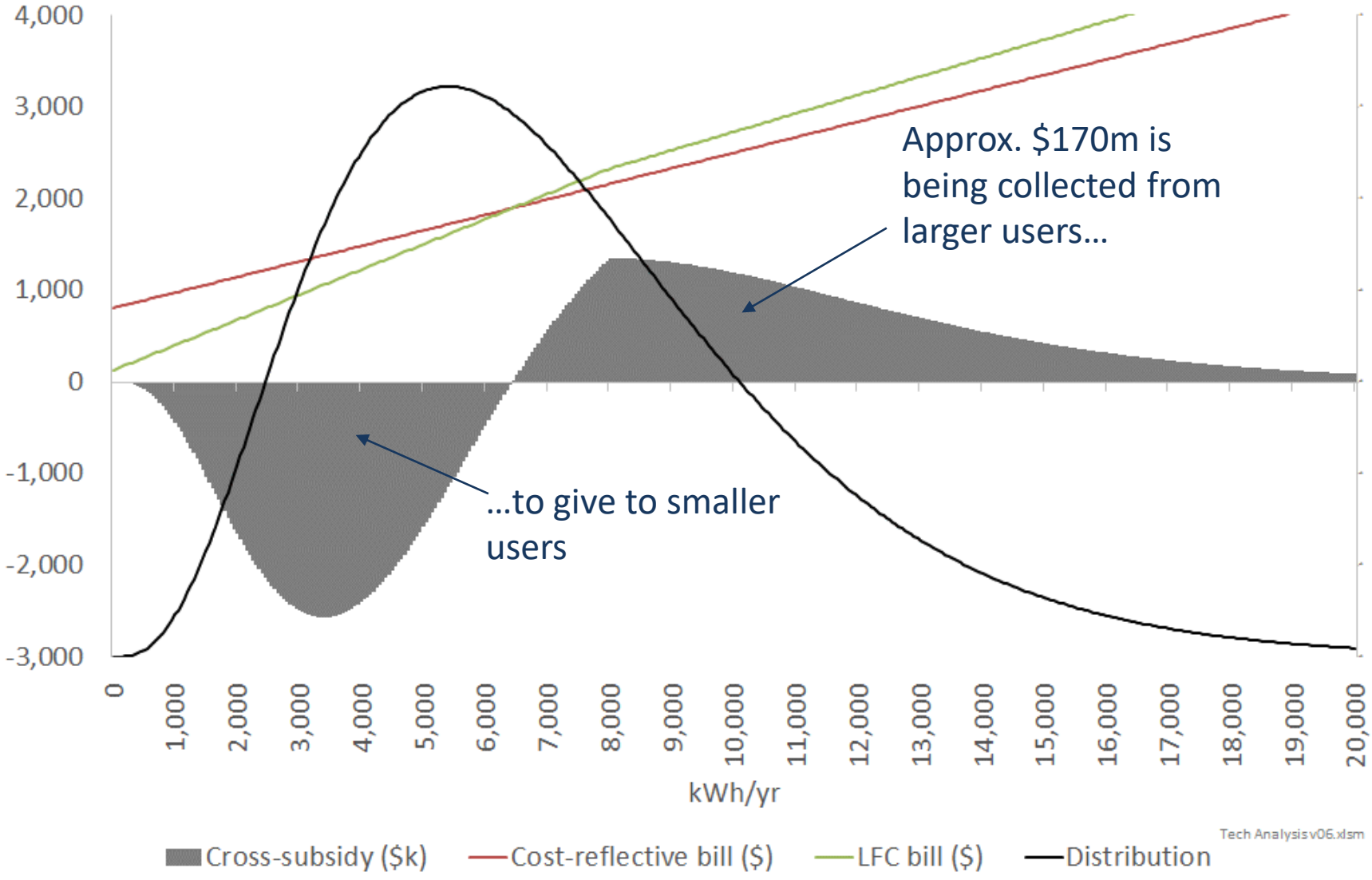
Social impacts of LFC – a re-cap

- Helps some low-income consumers, but harms others
- Accelerates solar cost-shifting – which will generally harm the lowest income consumers
- Increases winter / summer bill differentials – particularly challenging for low-income customers

Would the LFC pass muster if it were a general taxation-funded welfare measure?

- Thought experiment to see if a social-welfare measure with characteristics of the LFC would likely be approved

A lot of money is being shifted between consumers …



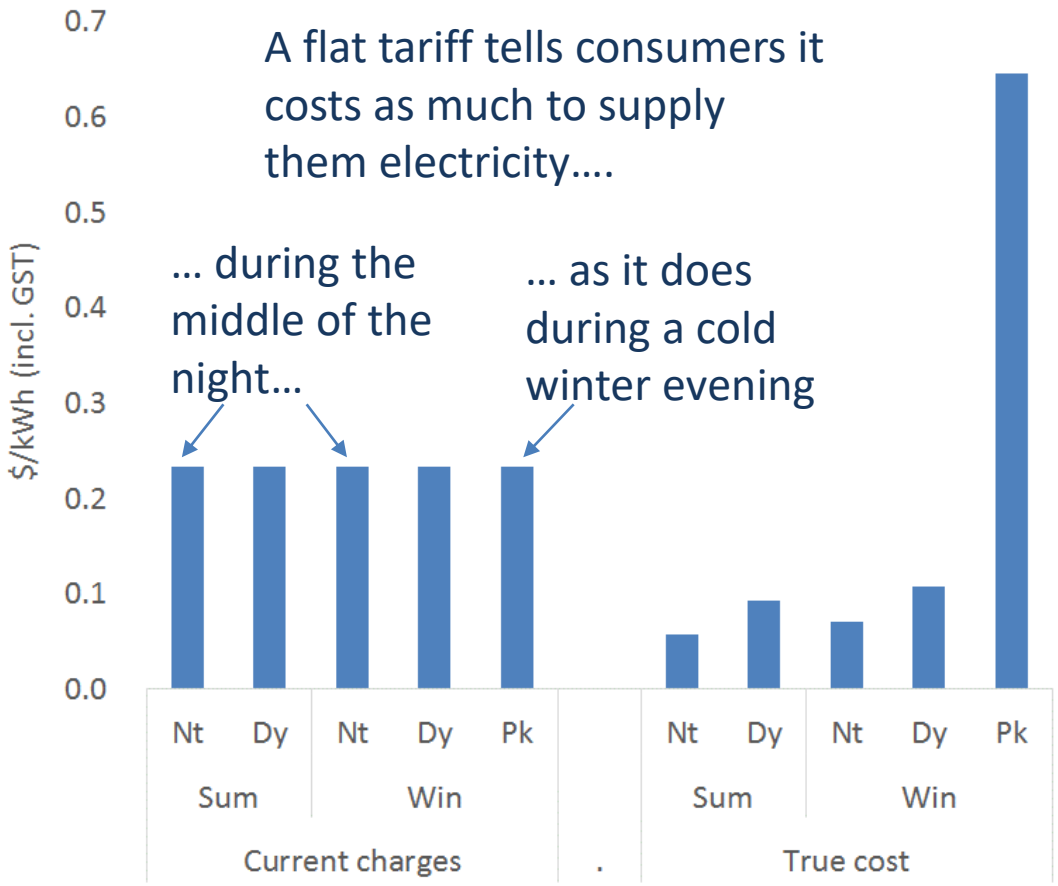
… yet the average benefit to the poorest is small – with some being worse off

- It is questionable whether a general taxation-funded social welfare measure would be approved which:
  - collected $180m from one set of taxpayers
  - to give an average annual benefit of $35 for the target low-income recipients
  - but materially harmed a significant proportion of this target group
    - Note: The UK Hills report on fuel poverty identified those consumers who were low income and above average consumption as those who were most likely to be in fuel poverty and in need of support.
    - This is precisely the group that is harmed by the low-fixed charge regulations

How does the performance of the LFC stack up against these (and other) policy objectives?

- Environment
  - Is the LFC resulting in lower greenhouse emissions?
- Social
  - Is the LFC resulting in benefits for low-income consumers?
- Economic
  - Is the LFC helping deliver lower cost energy for New Zealand?

Flat tariffs send consumers the wrong messages

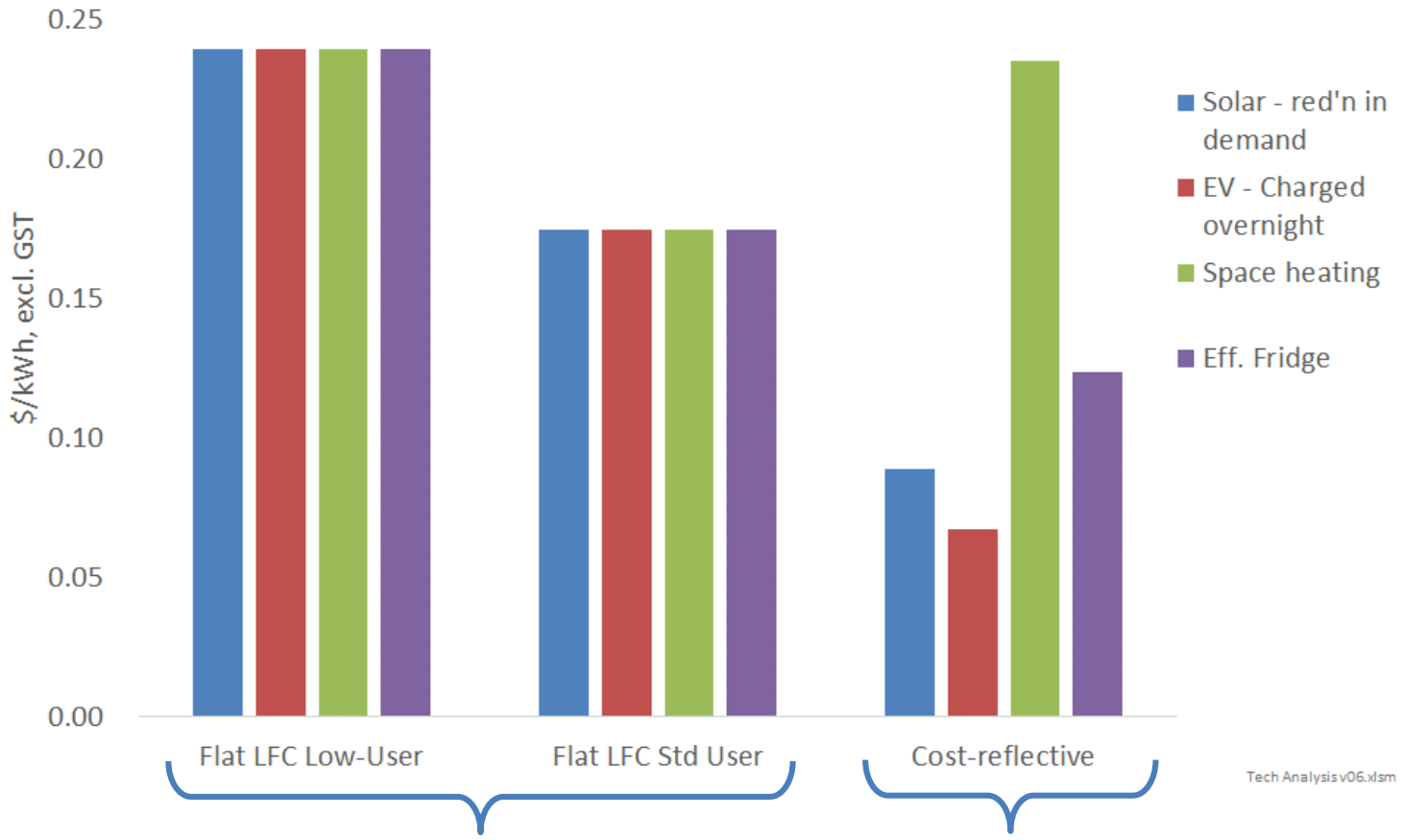


But the reality is very different

This matters, because consumers have to make energy choices

Flat tariffs + LFC → distorted signals for different technologies

Demand (or generation)-weighted average price seen by different consumer technologies



Demand profile

Day-only, more in Sum.

Night-only

Winter peak profile

Baseload

Current tariffs tell consumers that the value of investing in different technologies (e.g. generating solar, insulating your house, buying an efficient fridge) are the same…

… but a cost-reflective tariff would tell the true story

Distorted price signals → emissions consequences, because in the long-term, an increase in demand…

… at night times → increase in *baseload* demand (and gen)

More renewables (in NZ)

… in winter mornings & evenings → increase in *peak* demand (and gen)

More fossil (in every country)

Which means…

EVs and fridges are really green (in NZ)

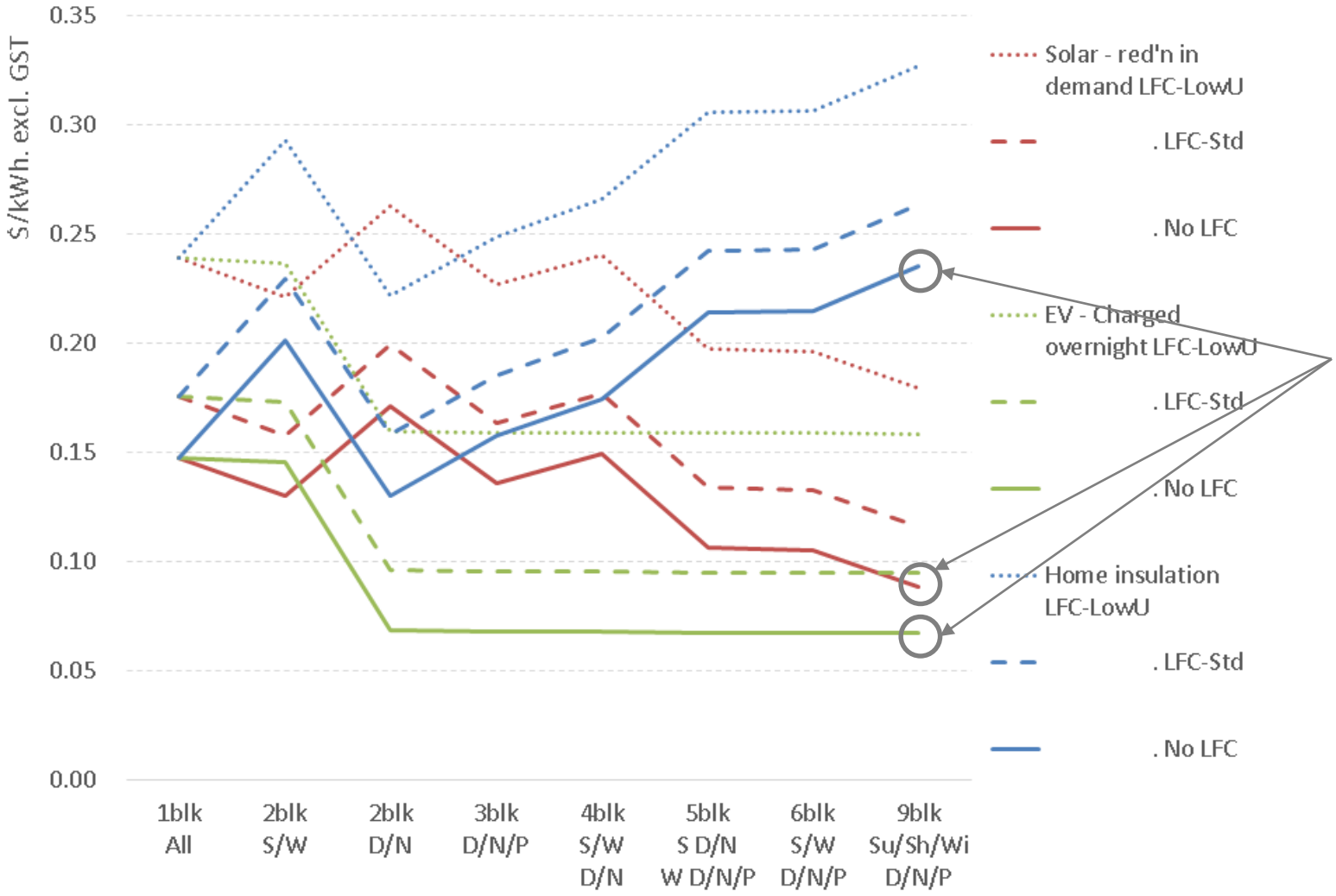
Electric heating and lighting is CO_2 intensive

Resistance heaters ≈2.5 x CO_2 of gas

Heat pumps ≈ 0.75 x CO_2 of gas

Even with time-of-use tariffs, the LFC will continue to distort the price signals for different consumer technologies

Demand (or generation)-weighted average price seen by different consumer technologies for different time-of-use (TOU) structures

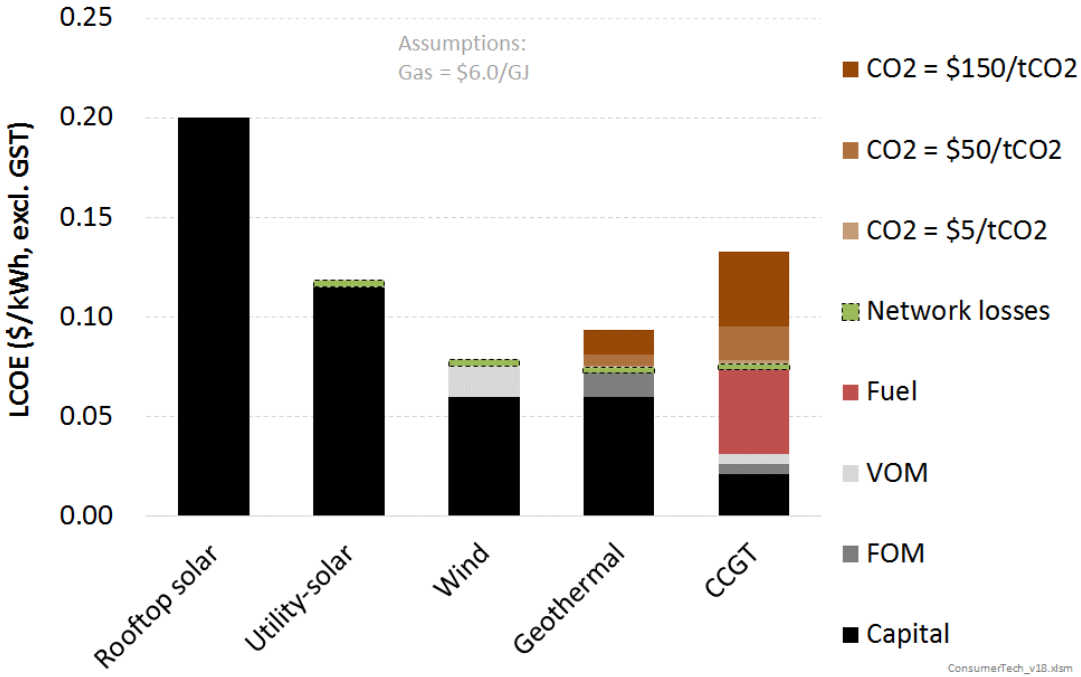


Close to 'true' cost of meeting such a demand profile

Distorted price signals will cost NZ

- Rooftop solar much more expensive than other generation, but flat tariffs + LFC encourage uptake
- Potential inefficient cost of $1.2-2.6 bn
- Move to time-cost-reflective tariffs but LFC remaining will still over-reward solar

- Suppressed-uptake of EVs could cost several hundred million



Note: None of these technologies avoid the need to build the grid

Flat pricing is also particularly harmful for incentivising low-carbon technologies

- Peaky load (e.g. space heating, lighting) predominantly met by infrequently-used fossil fuel generation

- Flat pricing reduces the benefit consumers should get from installing insulation or efficient lighting

Is there any way round the LFC regulations to deliver efficient network pricing?

- It may be possible to develop network charges with less variabilisation of fixed costs (e.g. peak demand, or booked capacity pricing) and which are LFC-compliant
- However:
  - Interpretation of such tariffs under regulations is not clear-cut
    - Networks may be unwilling to embrace such tariffs without explicit approval from government
      - Further, under a Revenue Cap, networks face little or no commercial pressure to remove the LFC → Some may be less willing to invest public / political capital in pushing an unpopular measure
  - Concerns raised about in ENA consultation as to whether such charging approaches will deliver best outcomes for consumers relative to alternatives
    - May add complexity (and cost) to network & retail billing
    - Complexity for consumers
    - May result in less efficient whole-of-supply chain pricing to consumers

Similarly, harder to have efficient charging for retail & metering with LFC

- Retail & metering costs not driven by consumption or connection capacity
- However, LFC regulations drive retailers to recover retail & metering costs via such measures for low-user customers

Plus the low-fixed charge is impacting on retail competition and costs

- The low-fixed charge increases the complexity of operating in the market
  - Tariff design and administration (including call-centre aspects)
  - Compliance effort around limitation to primary residential addresses
  - Potentially frustrating some innovative pricing approaches

- This increases cost-to-serve, and hinders competition
  - Hard to estimate the scale of impact in terms of higher consumer prices

How does the overall performance of the LFC stack up?

- Environment
  - Is the LFC resulting in lower greenhouse emissions?
    - Frustration of EV uptake likely to outweigh any energy efficiency incentives
- Social
  - Is the LFC resulting in benefits for low-income consumers?
    - Currently helps some, hurts others. Low overall benefit.
    - In long-term will accelerate solar cost-shifting that will harm most low-income consumers
    - Exacerbates winter / summer bill differentials – particularly difficult for low-income
- Economic
  - Is the LFC helping deliver lower cost energy for New Zealand?
    - Significant cost of inefficient technology decisions
    - Adds to retail cost-to-serve and hinders competition & innovation

What are the alternatives?

- Improve?
- Remove?
- (And replace?)

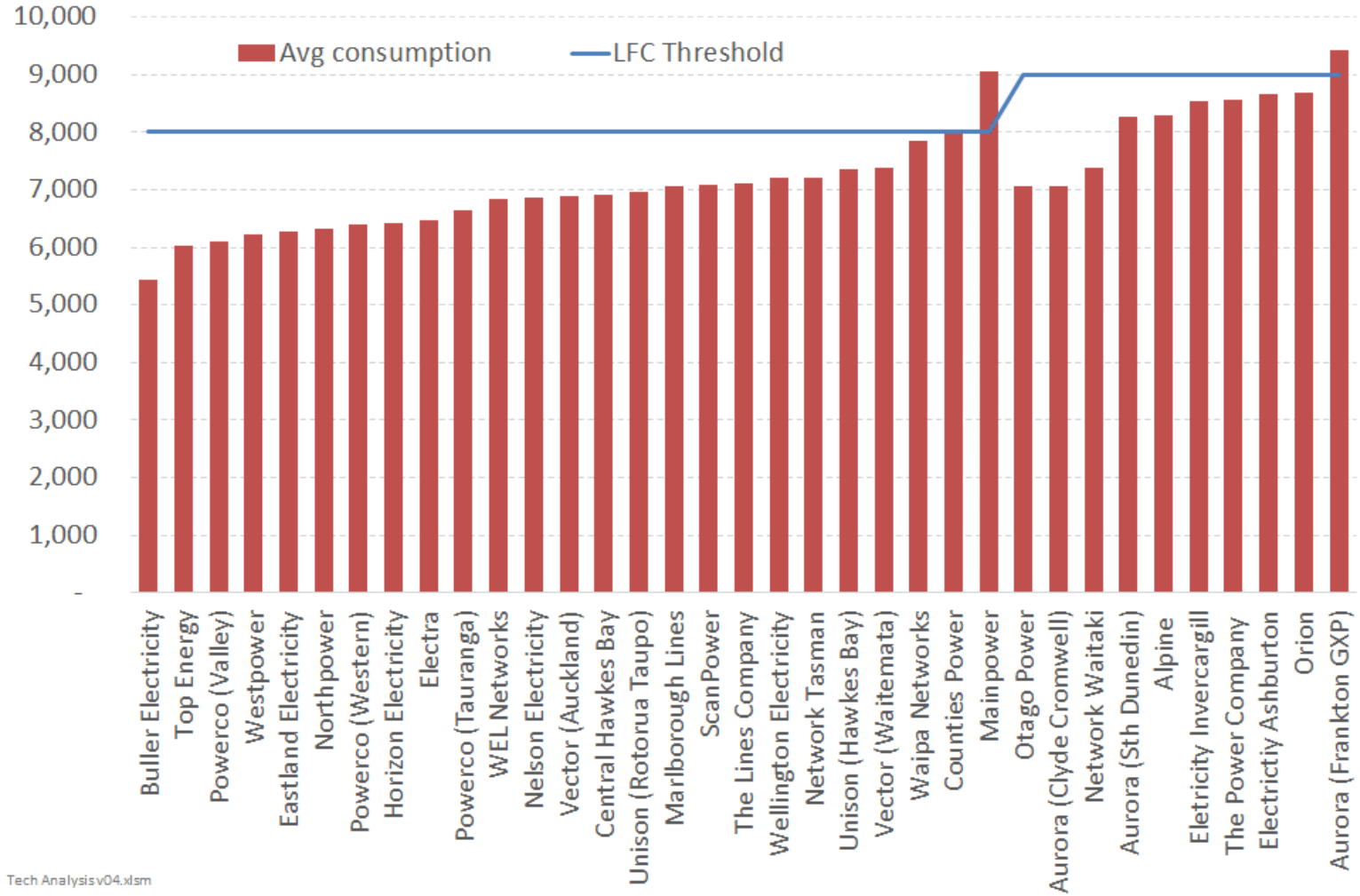
The Greens proposal to improve the LFC addresses a number of issues

- 8,000 kWh (9,000 kWh in the Lower South Island) does not represent the average user
  → Set the LFC threshold at a level equivalent to the 25th percentile of consumption

- 0.15 $/day has not been updated for inflation
  → Increase in line with CPI

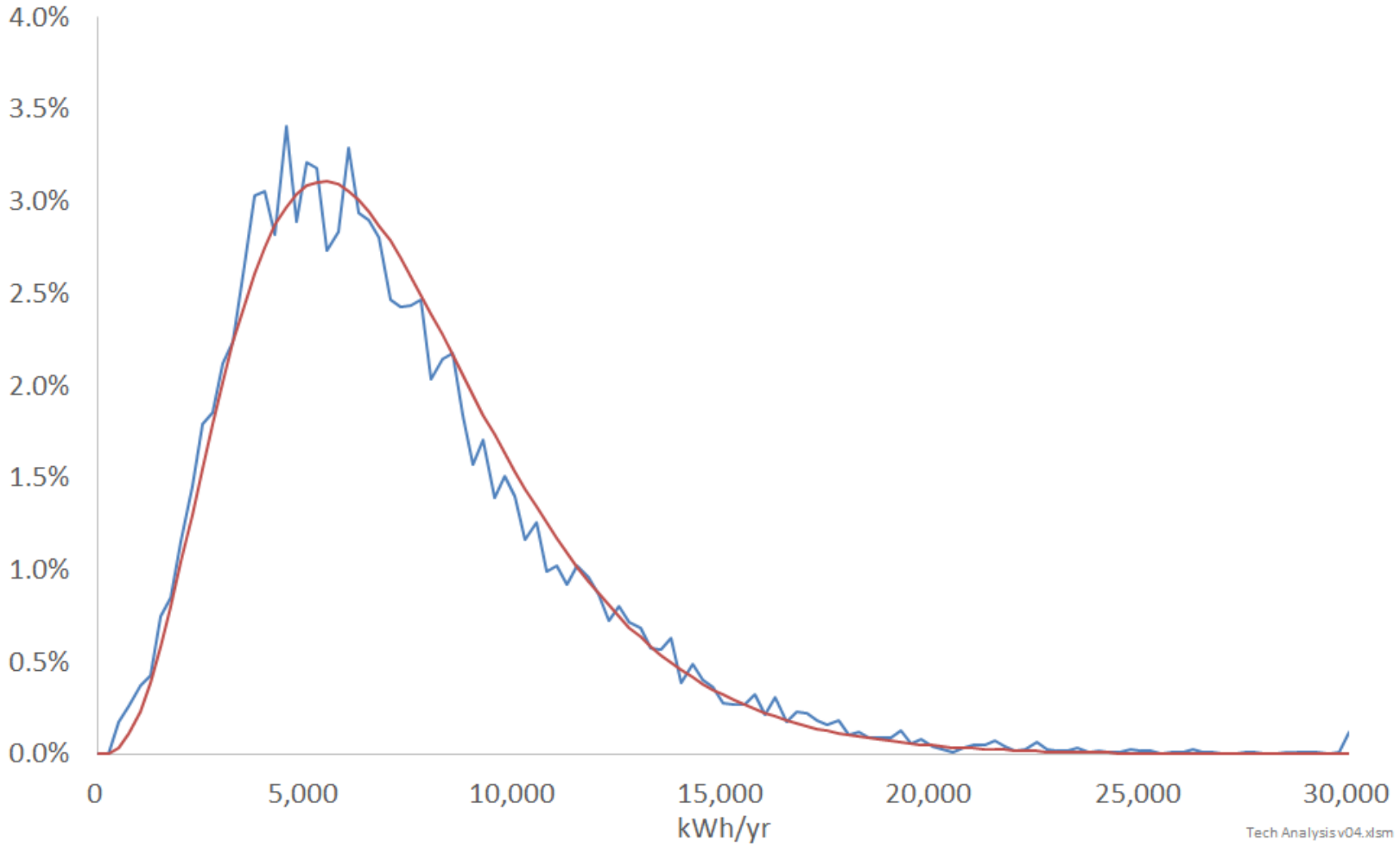
The average user consumes less than the LFC threshold

- Average residential consumption for YE Mar 16 was 7,265 kWh
- Even greater variation across networks

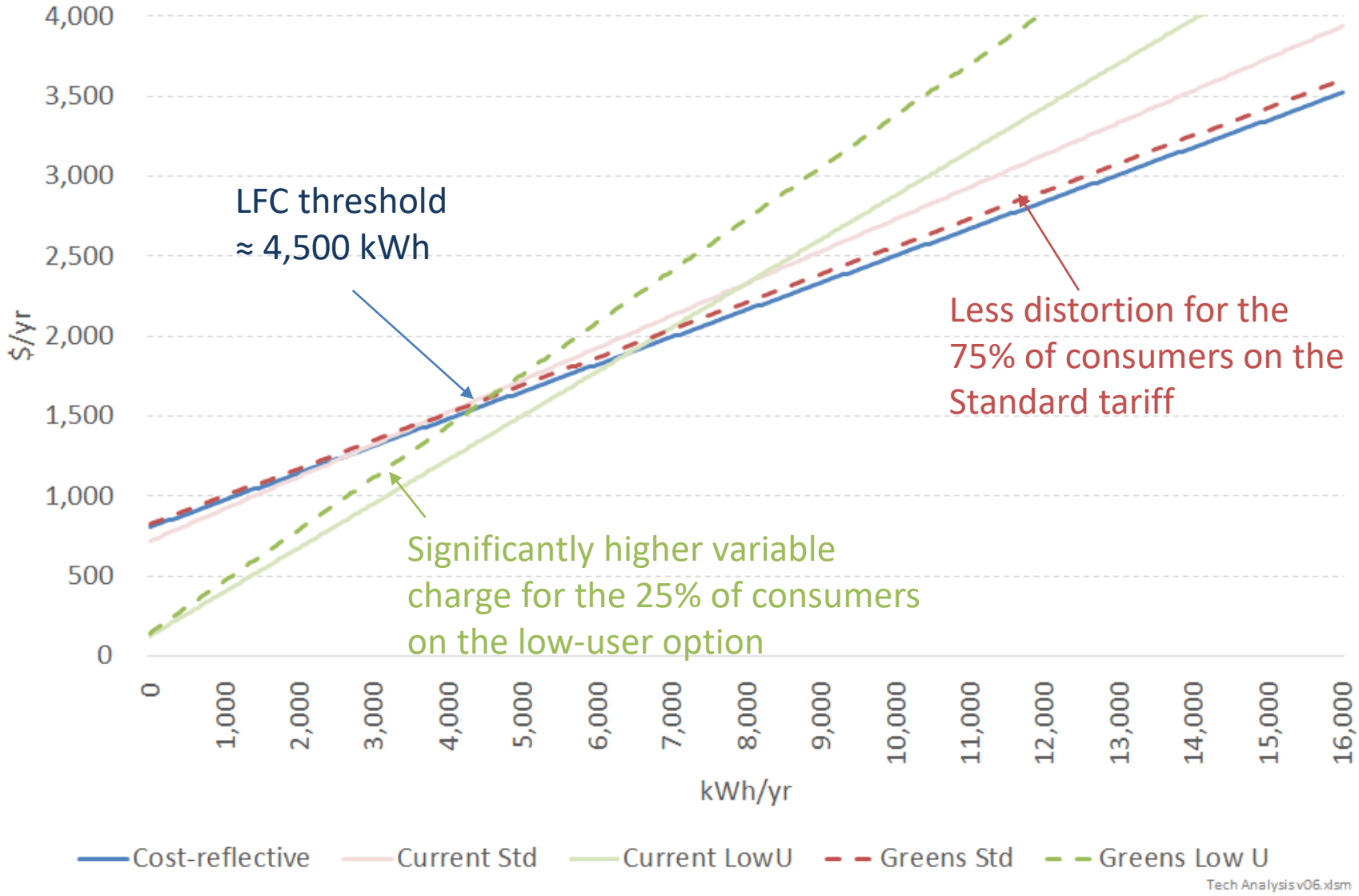


Plus the mean consumption is different to the median consumption

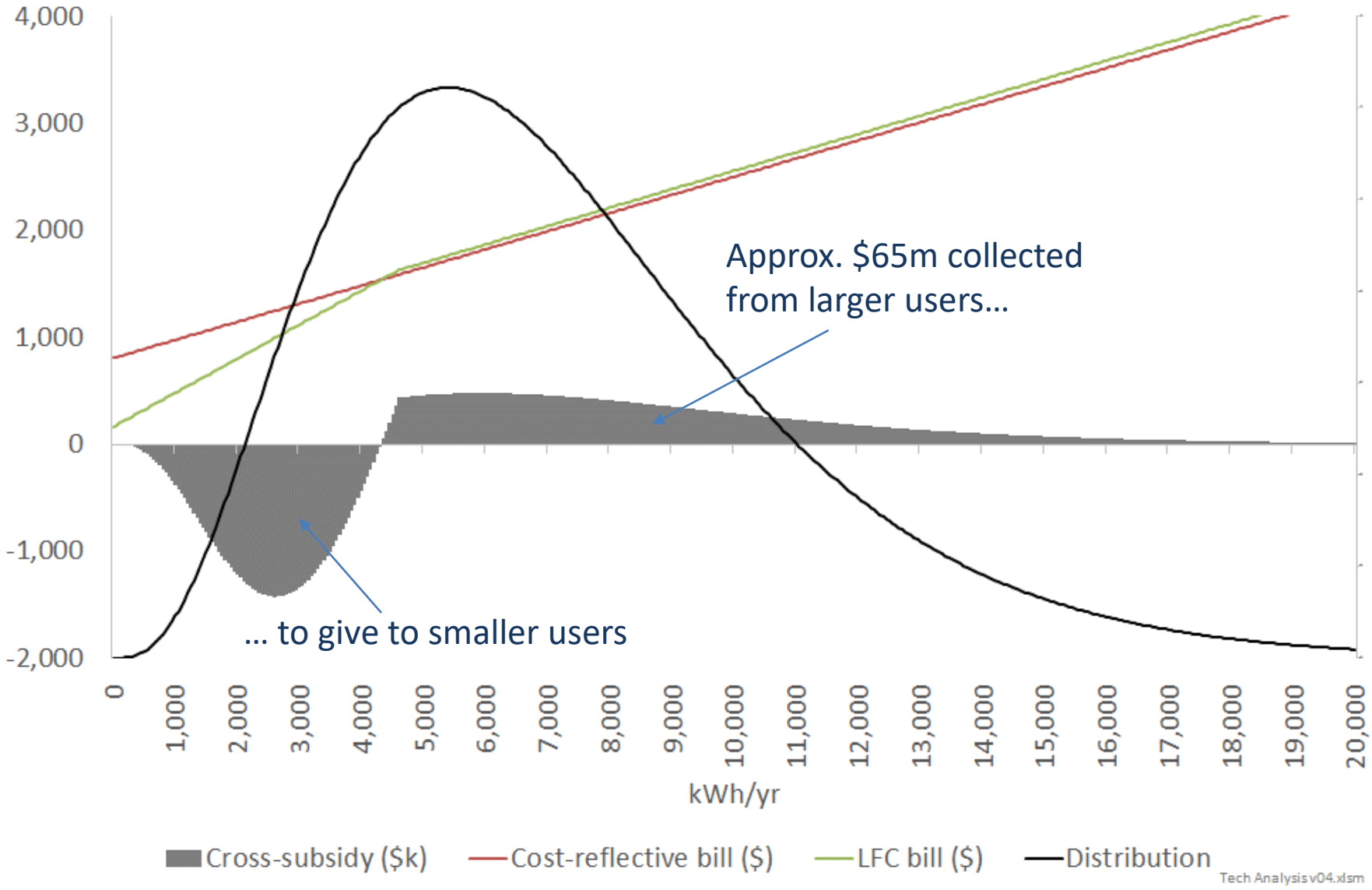
- Approx. 2/3 of consumers qualify for the LFC as currently specified
- Approx. 56% of consumers consume less than the average consumption



What would this amended tariff look like?



Cross-subsidies would be less, but still material



Shifting the pivot delivers mixed results

- A smaller number of consumers benefit
  - ≈ 27% of lowest decile consumers (i.e. 2.7% of total population) will enjoy an average $175/yr cross-subsidy
- But the corollary is that a larger number of consumers will be funding this cross-subsidy
  - ≈ 73% of lowest decile consumers will have average bills $51/yr higher than under cost-reflective tariffs
- Average benefit to lowest decile consumers is $10/yr lower bills

- Is it worth taxing one set of consumers $65m to give an average benefit to those in the lowest decile of $10/yr?

- Plus those on the low-user tariff will face even more distorted price signals, and higher summer / winter bill differentials
  - And the drag on retail competition will remain

If the LFC is removed, should something replace it?

- Better environmental outcomes are likely to emerge from removal of the LFC
  - Remove pricing dis-incentive for EVs
  - Possibly more likely that more time-cost-reflective tariffs (which better signal those technologies which save the most carbon) will occur with removal of the LFC,
    - Because variablisation effect of the LFC will make
      - peak prices sharper (and more scary!), and
      - exaggerate summer/winter bill differentials

- Similarly, removal of the LFC will deliver more economically efficient (and hence lower-cost) energy and transport services

- However, from a social perspective, removal without replacement is not so clear cut

What would be the social effect of removing the LFC?

- Removal will un-wind cross-subsidies
  - Good for those who were paying more (particularly good for those on low-income)
  - Bad for those who were benefiting (particularly bad for those on low-income)
- Phasing the removal would help ease this transition

- However, the underlying social policy rationale (however mis-targeted the LFC was at achieving this) remains:
  - Energy costs are difficult to manage for the lowest-income members of society. (Over the last 20 years, residential electricity prices have grown at roughly twice the rate of inflation – and only recently have started to fall)

- Better-targeted assistance to those in-need would address this social need, and help ease the pain of cross-subsidies being unwound

What might better-targeted assistance look like?

- Another measure which alters electricity prices (e.g. progressive pricing) is likely to result in similar problems to the LFC 

- Assistance targeted and delivered via social welfare mechanisms likely to deliver better outcomes 
  - Fuel subsidies, insulation grants, etc.

- Other 
  - Various measures overseas for delivering energy-assistance to target consumers (poor, elderly, etc.)
  - Varying degrees to which measures delivered using energy-market arrangements
  - Varying degrees of success…

Thank you

About Concept

- Concept is a specialist energy and economics consultancy that provides services to clients in New Zealand, Australia and the wider Asia-Pacific region.
- Concept provides advice on energy sector policy, business analysis, restructuring, market design, regulatory issues, energy modelling, market analysis, and technical issues.
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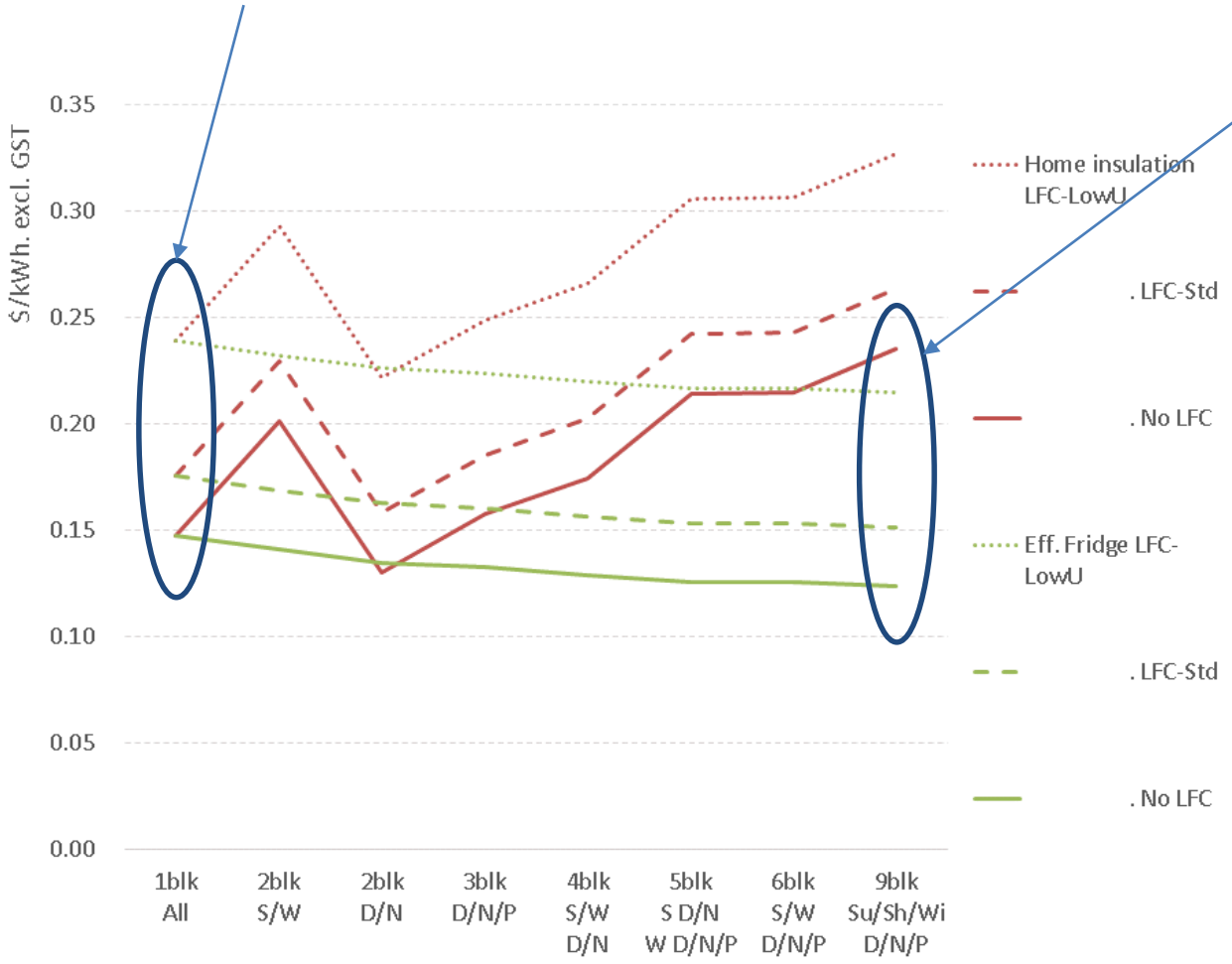
Back-up slides

[Material from past presentations which may be useful for facilitating discussion points, as required]

Saving space heating demand is worth a lot more than saving refrigeration demand. Current tariffs don't signal that

Current tariffs tell consumers that reducing refrigeration demand is as valuable as reducing heating load

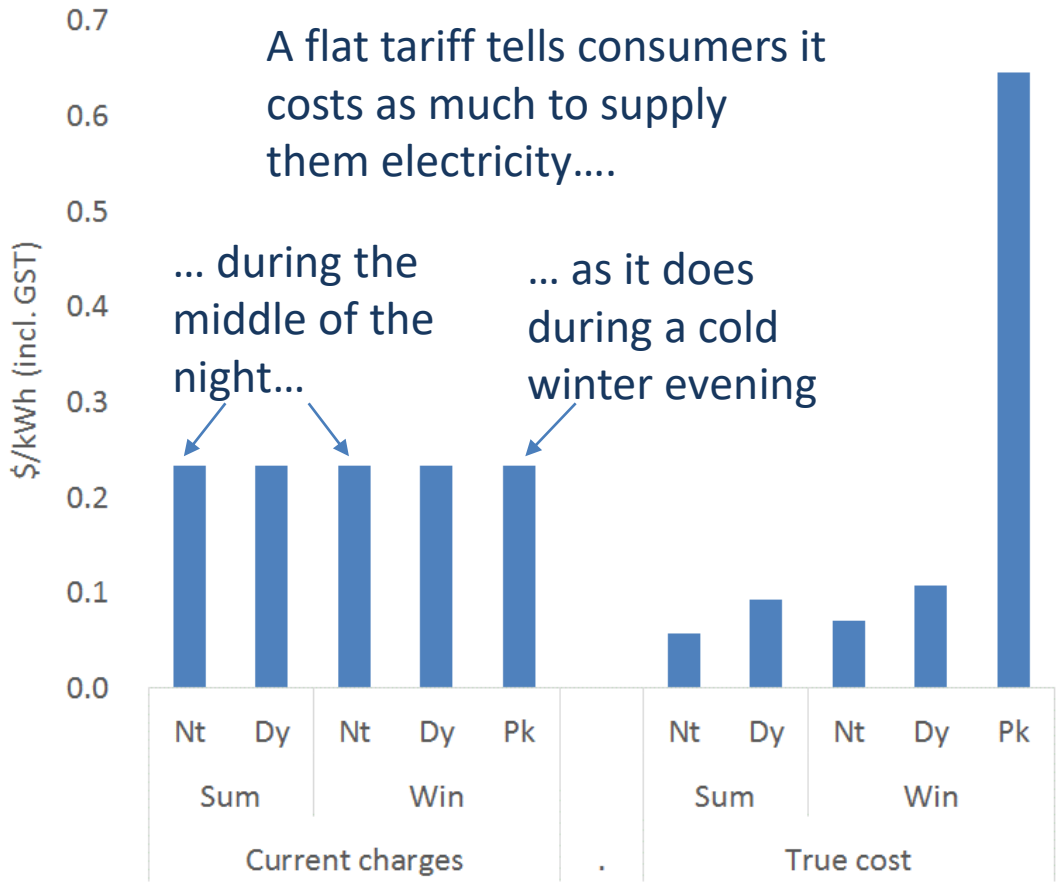


But because refrigeration is baseload, and space heating very peaky, the reality is very different

Refrigeration → renewable gen.
Space heating → fossil gen.

Plus space heating drives the need for a lot of infrequently-used (and hence costly) network and generation assets

Flat tariffs send consumers the wrong messages



But the reality is very different

This matters, because consumers have to make energy choices

Until recently, consumers' energy technology choices were limited

What type of heater?

Whether / how much to insulate your home?

Limited choices

→ Not too many opportunities to get it 'wrong'

→ Outcomes not too grossly inefficient or inequitable

Now, consumers' energy choices have exploded

New types of heating (and cooling)

New types of lighting

New types of 'smart' appliance

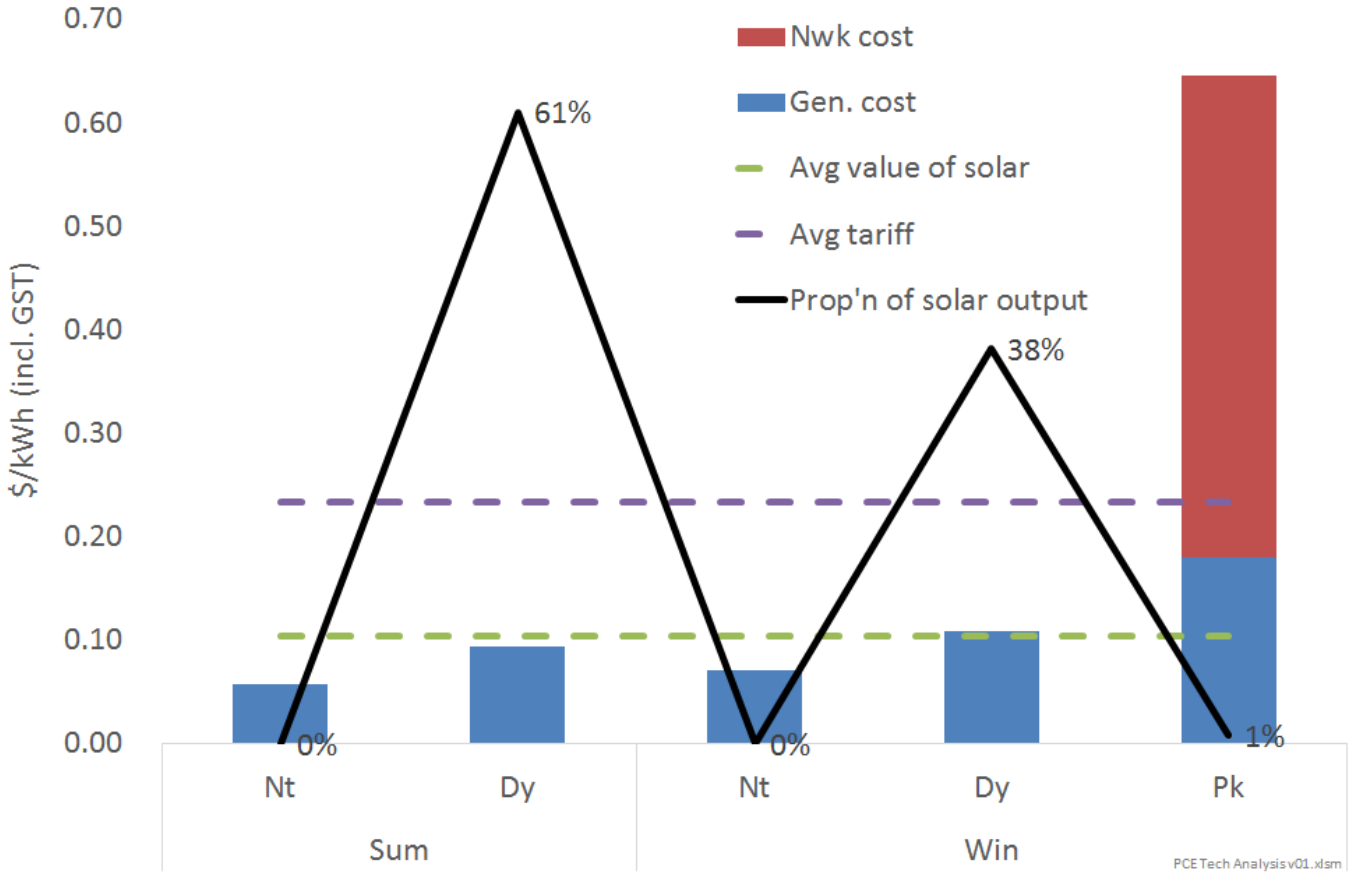
But are todays tariffs resulting in consumers making the wrong choices?

New types of vehicle

Consumers can even build their own power station…

… and operate their own storage facility

A flat tariff over-rewards solar for reducing consumer demand



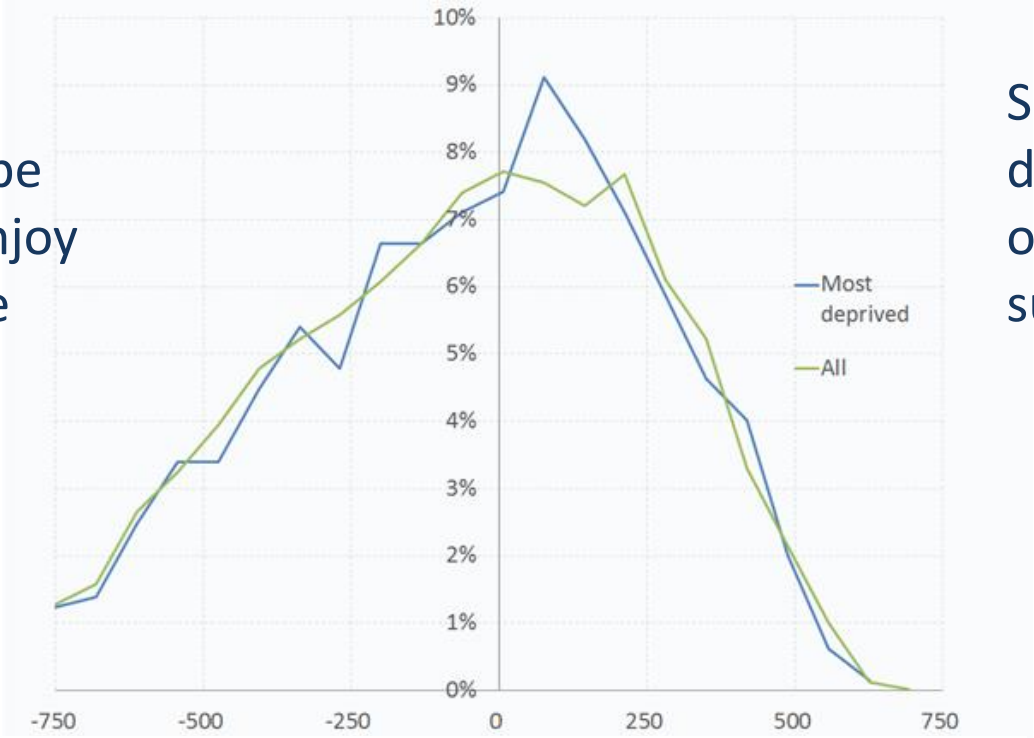
- Consumer benefit of solar is avoiding residential tariff when it is generating
- However, value to NZ, is a lot lower

Cost-reflective tariffs will be good for most customers, particularly low-income, in the long-term

- Approx. $120/yr lower bill in the long-term
- Poorest consumers will particularly benefit from not having costs shifted onto them
- Plus NZ will benefit from the economic and environmental gains
- But …

Not everyone will be a winner

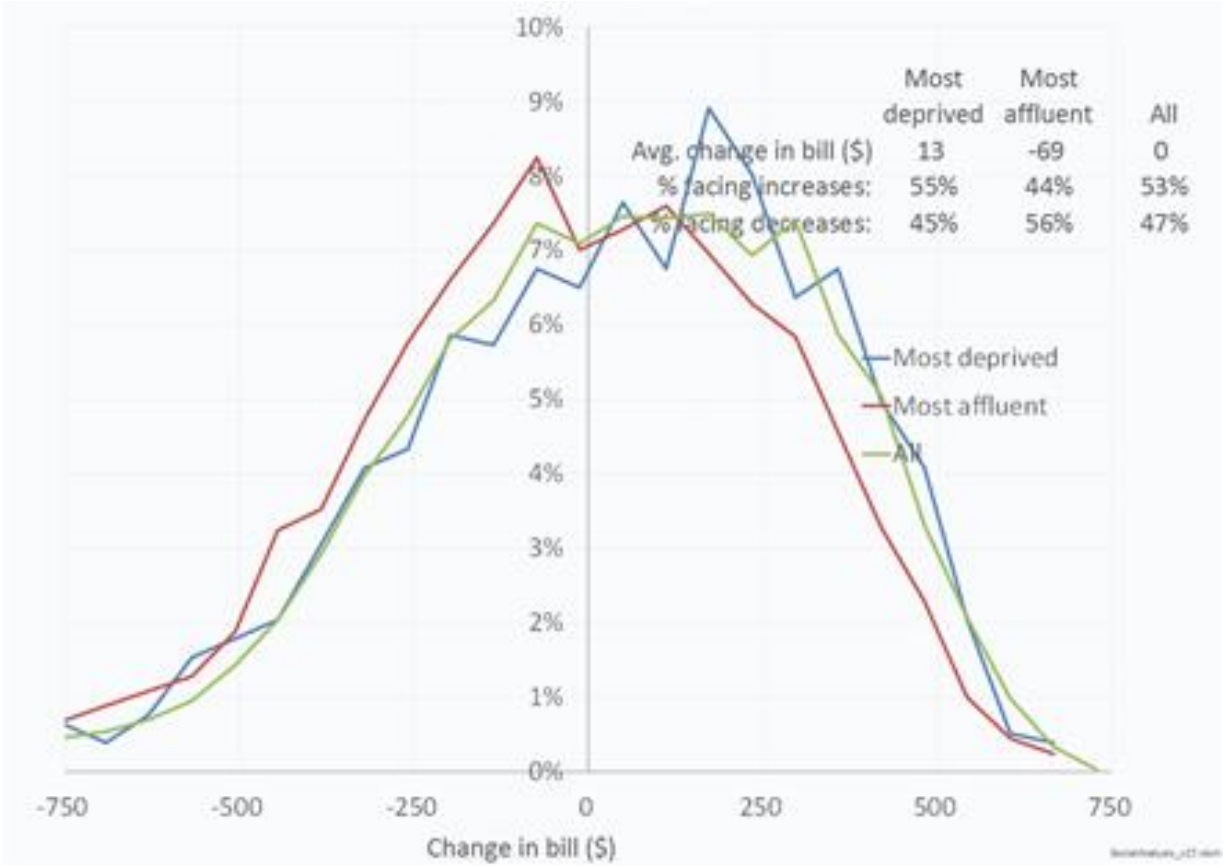
Although most consumers will be ‘winners’ and enjoy lower bills in the long-term…



Long-term difference in bill outcome ($)

Some will be ‘losers’ due to the unwinding of current cross-subsidies

A rapid move to cost-reflective tariffs would result in some significant initial bill impacts



- Unwinding of significant cross-subsidies between customers
- Even though the average bill impact will be zero

ELECTRICITY AUTHORITY
TE MANA HIKO

What are the regulatory / policy implications?

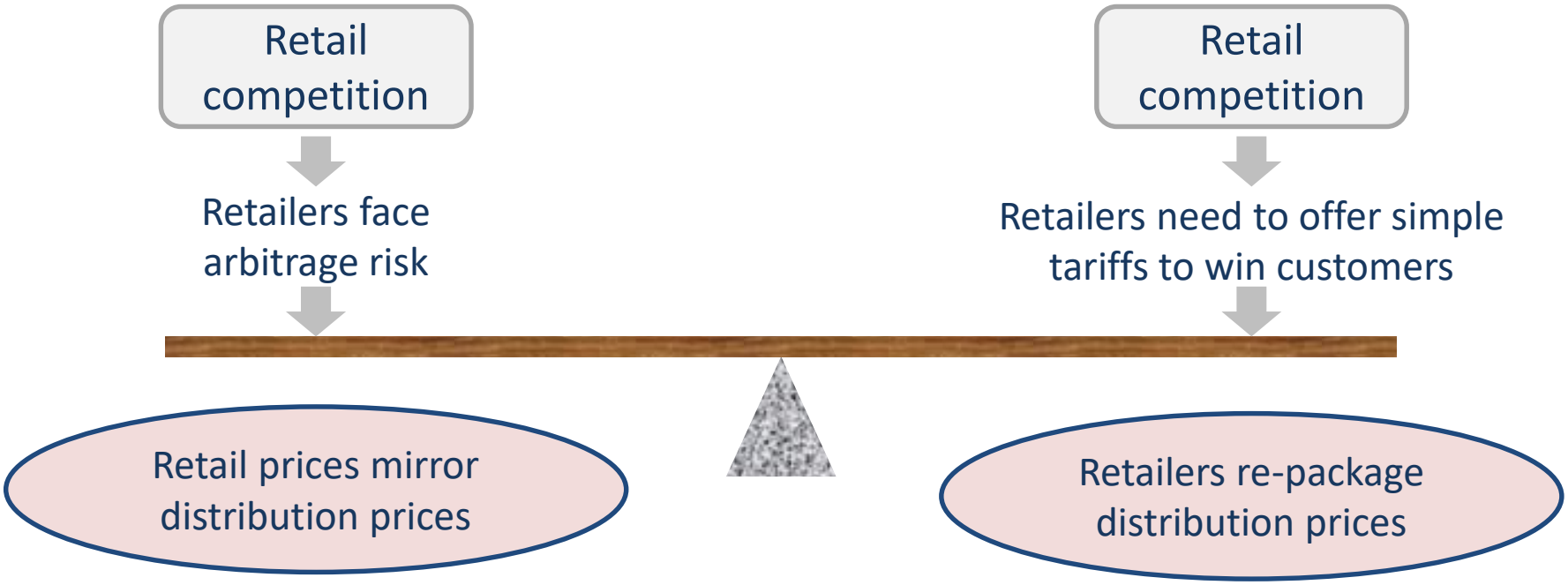
MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HIKINA WHAKATUTUKI

COMMERCE COMMISSION NEW ZEALAND

Is regulatory prescription required for cost-reflective network pricing?

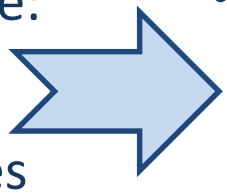
- Some networks think they are incentivised to implement efficient pricing
- Other stakeholders highlight potential barriers
  - Revenue cap *coupled with no real stranding risk* → no commercial incentive to re-structure tariffs
    - Concern in Australia about this effect
  - Some NZ networks selling consumer technology (PV) whose value proposition relies on current pricing structures
  - Different ownership could affect incentives

Will retailers pass through network price signals?



Will retailers offer cost-reflective 'energy' (gen + retail) charges?

- Customers don't like:
  - Complexity
  - High fixed charges



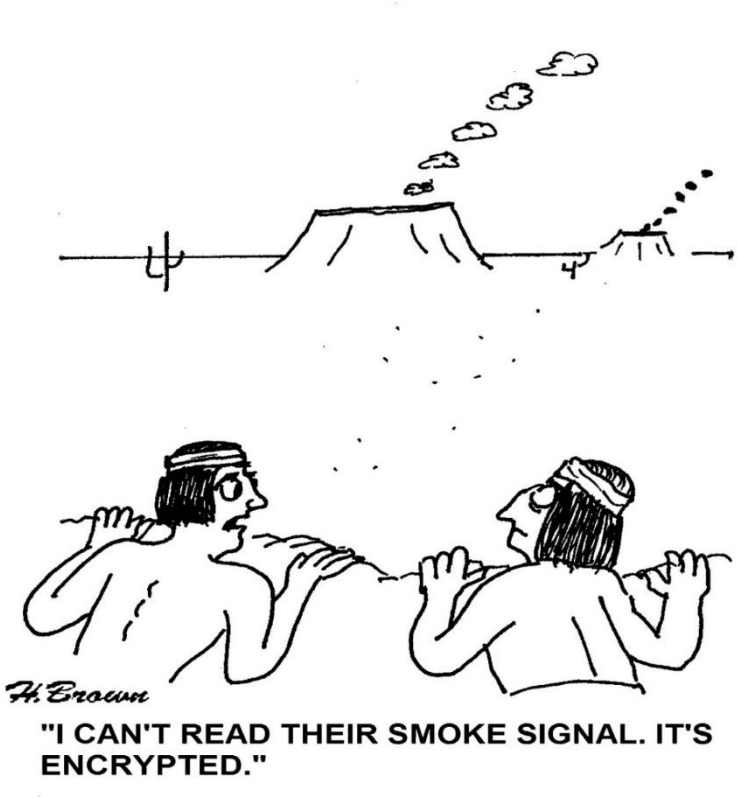
- Retailers offer
  - Flat tariffs for generation cost recovery
  - Variable tariffs for recovery of fixed retail costs

- Competition alone seems unlikely to force retailers to only offer cost-reflective tariffs
  - Requires customers to want to move to more complex tariffs
  - Adverse selection – e.g. choosing solar plus flat tariffs – may frustrate this

Some factors may help retailers move to cost-reflective tariffs

- Some network tariff structures (e.g. TOU) less likely to be re-packaged than others (e.g. peak-demand-based)
- TOU network structure may also make a TOU generation structure more likely
- Preventing advanced meter readings from being submitted to the wholesale market in aggregate form
- Getting rid of the low-fixed charge…

Getting price signals right is critically important. But challenging!



- Wrong prices to consumers →
  - Worse environmental, economic & social outcomes
- Transitioning to the 'right' prices won't be easy
  - Inevitably winners & losers
  - No strong commercial dynamic on suppliers to move to cost-reflective tariffs
- Need:
  - Appropriate regulatory incentives
  - Broader political & consumer buy-in

The key lesson from Australia, Hawaii, Germany, UK, ….

Get things right before it is too late!