How the two sided market fails to benefit consumers

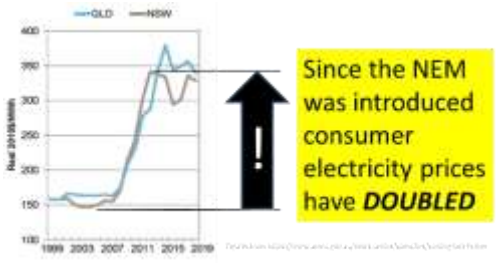
Dr Martin Gill

The creation of Australia's competitive energy market has not benefitted consumers. Apparently having learnt nothing from previous mistakes the Energy Security Board intends to apply the same failed economic theories to predict *this time* they *will* lower consumer energy costs. The proposal should be viewed as deeply concerning.

Introduction

The Energy Security Board (ESB) intends to make Australia's already far too complex National Energy Market (NEM) even more complex by creating a two-sided market. This two-sided market allows consumers to sell demand response. The ESB uses a simple economic model to predict consumer benefits.

Australia's NEM was also designed by economists. They applied textbook economic theory promising deregulation would increase competition. Their textbook suggested "competition would lower prices". So the NEM was deregulated and the benefit of this competition was clear, consumer electricity prices ***doubled***.



The doubling of prices occurred even though the NEM is highly competitive (as measured by the number of participants). Guaranteed generous returns on (inflated) regulatory asset bases make our distribution businesses attractive, the mandated competitive rollout of smart meters has doubled smart meter prices and Australian energy retailers rank among the most profitable in the world. But …

Market competition has *not* benefitted consumers

Ignoring all the previous failures the ESB intends to create a complex two-sided market hoping even more competition will benefit consumers.

Note to the ESB: Australia has always had a two-sided market. It did not avoid the doubling of energy prices. Regulating the two-sided market will not miraculously lower consumer electricity prices.

Summary of Submission

History shows when Australian regulators create "competitive" markets there is one inevitable outcome, consumers pay more.

The ESB's Market Design Initiative intends to create a new Two-Sided market [Ref 1]. Here analysis is used to show the creation of the market will not deliver the savings the ESB suggests.

It is relevant to note consumers can already access two-way services. Specifically the ability to sell solar and battery power back to the grid and to receive bonuses for choosing not to use electricity at particular times. This is occurring without the cost, complexity or risk of creating a new two-sided market. The ESB is encouraged *not* to create yet another "market" just to create competition.

Economics 101: "Price Elasticity"

The ESB's economic justification for their two-sided market relies on Price Elasticity. Price Elasticity assumes consumers will change the amount they purchase in response to price signals. The problem is consumers cannot choose not to purchase electricity, because it is an essential commodity. As deregulation of the NEM has proved, increasing electricity prices simply forces more consumers into energy poverty.

From the consumers' perspective the ESB proposal intends to reduce demand through the application of higher electricity prices. The ESB is reminded electricity is an essential service so making electricity even more unaffordable is socially unacceptable.

Enlightened economists note standard economic models should not be applied to markets trading essential commodities. This explains why the introduction of competition has failed to benefit consumers.

The ESB consultation paper explains the financial benefits of creating a two sided energy market using

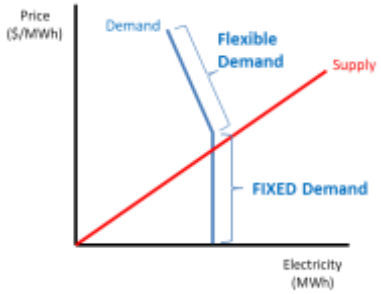
the textbook theory of "price elasticity". Their Figure 30 shows:

The figure on the right hand side shows the theoretical relationship between price and demand. The ESB asserts the introduction of a two-sided market can reduce demand, thereby lowering prices.

The doubling of electricity prices in the NEM should highlight the dangers of using inappropriate economic models to predict benefits. The following sections discuss significant issues with the ESB's textbook model and why it does not show their two-sided market will benefit consumers.

Changing the Demand Curve

The figure on the hand side of the ESB's Figure 30 suggests Demand is fixed. The one on the right hand side then shows if the ESB makes electricity more expensive it could lower demand. The truth lies between the two figures.



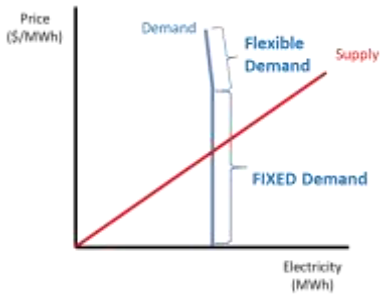
The above figure shows some demand cannot be shifted (refrigeration, etc) while with suitable price signals some appliances can provide flexible demand. Suitable appliances have been identified by the Council of Australian Governments (COAG) who have mandated these appliance support a unique demand response interface.

A review of the COAG mandate undertaken by the Department of the Prime Minister [Ref 2] finds the COAG decision did not follow best practice regulation. Among their concerns was the claimed benefits were overstated.

The following table shows claimed demand response benefits against measured benefits (justification for the measured values is provided in Appendix A).

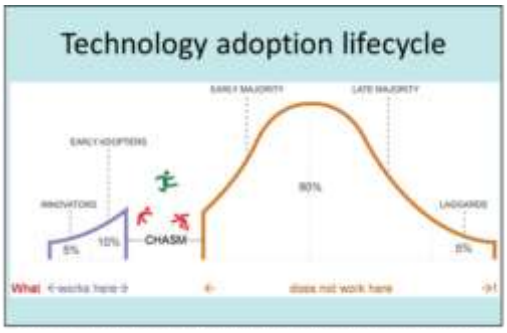
Appliance	Claimed Demand Reduction	Measured Demand Reduction
Air Conditioner	750W	50W
Hot Water Heater	3600W	300W
Pool Pump	1000W	200W

Testing shows the demand reductions are significantly less than claimed. This has two implications. Firstly the fixed portion of the demand curve is longer than initially shown and secondly the amount of demand reduction is significantly less than suggested. A revised figure is shown below.



Supporters of the demand response market refer to trials indicating consumers are willing to adapt their energy use. The ESB should be aware the results of these trials cannot be used to predict future benefits. The problem is the trials attract "early adopters" whose involvement produces far greater demand benefits than achieved by mass deployments.

One visualisation of the issue is The Technology Adoption Lifecycle as suggested by Kevin Chadwick of the Australian National University.



From Kevin Chadwick Australian National University

Kevin predicts "What Works for early adopters" does "Not Work for the majority". An example is provided by early smart meter trials which showed early adopters used the technology to lower their energy costs by 15%. Mass smart meter rollouts have failed to deliver any significant consumer savings or energy reductions.

Cost of Supply

The cost to supply electricity looks *NOTHING* like the figure the ESB's has presented. The cost of supply can be inferred from the typical generator bid stack:

The figure shows for the vast majority of demand values the introduction of a two-sided market has virtually no effect on the price of supply.

Advocates for the two sided market focus on the expensive generator bids shown on the right hand end. To assess potential benefits it is necessary to determine how often these expensive bids actually apply. Analysis of the wholesale price (in Victoria) is shown below:

This analysis reveals high pool prices apply less than 0.2% of the time. The conclusion is the promised economic benefits only apply for a miniscule amount of time. Any savings are minor.

The Price Elasticity also assumes the level of demand affects the cost of supply. This assumption is invalid in the NEM due to the associated energy futures market. By purchasing energy futures retailers can lock in lower prices, thereby avoiding high pool prices. Hence the energy futures market disconnects demand from cost. Put simply the assumed supply curve does not apply.

Calculating payments

A key assumption for any market is delivered goods can be measured. The measurements ensure payments reflect benefits. In the ESB's two-sided market payments must be based on *estimates* of unused electricity. The integrity of the entire market is therefore based on the accuracy of these *estimates*.

The Department of the Prime Minister commented on this problem referring to the AEMO/ARENA baselining study [Ref 3]. The AEMO study revealed major problems when attempting to *estimate* appliance electricity use. Issues arise for:

- Highly weather-sensitive loads (e.g. air-conditioners, pool pumps, hot water heaters)
- Loads influenced by rooftop PV generation (issue caused by unmeasured solar self-consumption)
- Loads that vary from day to day (e.g. domestic use especially around school holidays)
- Highly intermittent loads

Hence a major issue for the ESB's two-sided market is the inability to measure unused electricity or even show acceptably accurate *estimates*.

Paying for benefits which are not delivered leads directly to higher electricity prices

Note: the AEMC's mandated "smart" meters currently being installed across Australia do not make the measurements required to support the two-sided market. For example PV systems are net metered so do not measure either solar generation or solar self-consumption.

Australia's National Measurement Act requires all payments be based on measurements, something the two-sided market cannot achieve.

The ESB's two sided market risks breaching Australia's National Measurement Act

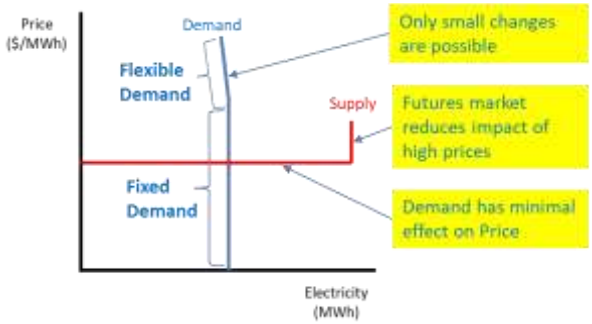
The ESB should ensure market participants detail exactly how they intend to *estimate* and *reward* consumer participation in their two-sided market. The documentation will simplify subsequent legal action by the ACCC against those making false claims.

Summarising Price Elasticity arguments

The ESB's two-sided market assumes the demand curve can be meaningfully shifted. The ESB should review whether this is achievable given the amount of fixed load and typically (grossly) exaggerated benefits of expensive demand response technologies. It is also noted the results obtained from current demand response trials are not scalable to a mass rollout.

The ESB's two-sided market assumes the cost of supply is related to demand. This appears to be overstated with minimal changes for 99.8% of the time. The futures market is then used to protect retailers from high prices for the remaining 0.2% of the time.

Updating the ESB's economics textbook Price Elasticity curves to include the above shows a different result:



The figure shows Price Elasticity does not support the creation of a complex two-sided market.

Benefits exist without the two-sided market

A number of retailers are already rewarding consumers for reducing electricity demand at specified times. Other retailers are offering consumers permanent access to wholesale prices. These initiatives are occurring without the complexity or additional costs of introducing a two-sided market.

On the technology front Virtual Power Plant trials are rewarding consumers for allowing their onsite batteries to be controlled. Payments for participation largely duplicate existing arrangements for the 2.5 million households with solar systems. Hence this does not require a two-sided market.

On the future technology front controlled charging of Plug-in Electric Vehicles simply duplicates control of off-peak hot water heating. Off peak hot water heating has delivered consumer benefits for more than 60 years without the need for a two-way market.

If the ESB was to perform a proper Cost Benefit Assessment (CBA) studying the introduction of a two-sided market then the above consumer savings cannot be included as benefits. The reason is the analysis can only include additional benefits, enabled by the two-sided market (of which there are none). Given the significant costs associated with the two-sided market a proper CBA is highly unlikely to show societal benefits.

Historical precedence

History provides consumers with the right to question the benefits of introducing competition to Australia's Energy Market. While the AEMC may claim their deregulation has created strong competition this has failed to benefit consumers. Instead the AEMC economic reforms have doubled consumer electricity prices. This is a spectacularly bad result for consumers and the Australian economy as businesses are driven overseas to find affordable energy (with the loss of jobs and lowering Australia's Gross Domestic Product).

Having failed to deliver cost savings the AEMC then promised the introduction of competition to the provision of mandated smart meters would "deliver services valued by consumers at a price they are willing to pay". The introduction of competition has doubled the price of smart meters:

Regulated Smart Meter Price	$880
AEMC Smart Meter Price	$1570

The above figures compare the published price of the Victorian regulated smart meter rollout to the market valuation of a competitive smart metering business. It is acknowledged the meter prices can't be directly compared because the more expensive AEMC "smart" meters provide significantly less societal benefits than Victorian meters (Refer Appendix B for more details).

The ESB is probably assuming the COAG decision to mandate a demand response interface will enable their two-sided market. The ESB is encouraged to review increasing evidence showing the mandated interface is both expensive and difficult to use while delivering only minor benefits (discussed in Appendix C).

History also shows after Australian regulators create these new competitive markets they then leave naïve consumers to the mercy of predatory marketing

tactics. The ESB is reminded of the early days of retail contestability where retailers used huge discounts on inflated prices to mislead consumers. Many consumers were left worse off after selecting what they thought was a better deal. Consumer exploitation will also occur in any new two-sided market.

Put simply Australia's energy markets should be taken as a case study in how deregulation of an essential service fails to benefit consumers. The two sided market appears to be yet another example providing minimal additional benefits while inflicting higher costs and complexity on consumers.

Conclusion

The economic arguments the ESB claim supports the introduction of a two-sided market do not stand-up. Figures from the actual market reveal benefits will be significantly less than suggested.

The failure to present a Cost Benefit Assessment is considered an acknowledgement the two-sided market does not deliver societal benefits. The reason being virtually all the benefits are already available. The two-sided market therefore can only deliver minor additional benefits, while incurring significant costs. Hence there appears no justification for the creation of a complex and costly market.

The ESB does not address consumer risks arising from the introduction of a new and complicated energy market. Without significant expenditure on consumer education (which our regulators have never bothered to do before) many consumers will be lured into schemes promising exaggerated benefits. These consumers will then be left worse off.

Finally the two sided market relies on estimated benefits. Trials show these estimates are inaccurate compromising the integrity of the entire market. Basing payments on these estimates may even breach Australia's National Measurement Act. Unless the ESB can rectify this major defect the proposal should not proceed.

Citation

Please accurately attribute all quotes and references to this submission including the title "How the two sided market fails to benefit consumers" It would be appreciated if references included the author's website drmartingill.com.au.

Comments or Questions?

The author is happy to receive comments or questions about this submission. He can be contacted at martin@drmartingill.com.au

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Appendix A – Measured Demand Response Benefits

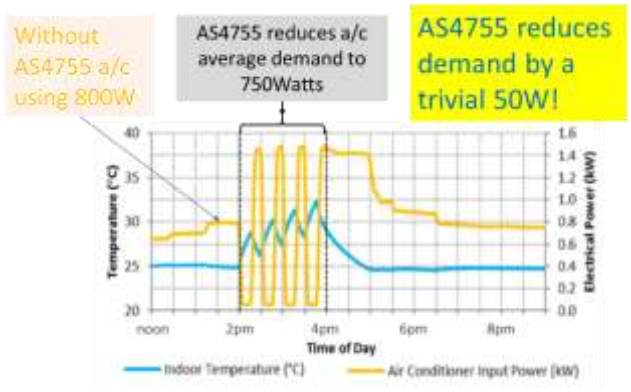
This appendix reviews claimed appliance demand response benefits to those measured in actual trials.

Hot Water Heaters

Demand response systems have been used to control domestic electric hot water heaters for more than 60 years. The average hot water heater uses 3600Watts. Turning the heater off does not produce a saving of 3600Watts because most heaters have already reached temperature and been turned off by the thermostat. Ausgrid measurements [Ref 4] found the average demand of uncontrolled hot water heaters is only 274Watts (as measured between 5pm and 9pm). Demand response programs should only claim 274W, or around 7% of the typically claimed benefit.

Air-conditioners

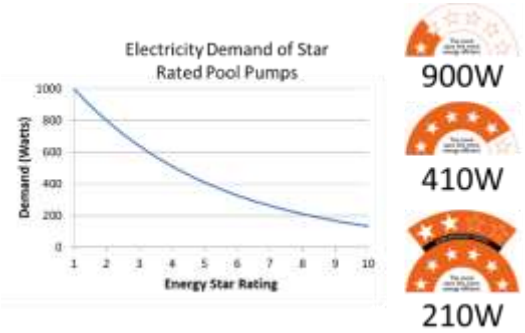
CSIRO laboratory testing of a modern 1500W air-conditioner supporting the COAG demand response interface was presented in Ref 5. The testing verified the interface successfully reduced demand to 750Watts. Unfortunately this is not the demand saving.



The testing shows in identical conditions, but without using the interface, the air-conditioner would have been using 800Watts. The testing confirms the effectiveness of the Government mandated Minimum Energy Performance Standards (MEPS) which over the past decade have reduced energy use of air-conditioners by 50%. The result is rather than reducing demand by the claimed 750Watts the saving is only 50Watts or 6% of the claimed benefit.

Pool Pumps

Over 10% of Australian households have a pool or spa pump (so around 1 million pumps are in daily use). Historically these pumps used 1000Watts. Turning off modern pool pumps no longer saves 1000Watts. The Government has included pool pumps in the energy efficiency programs. Ref 6 shows the demand of various star rated pool pump:



The figure shows a pool pumps using 1000Watts are now likely to only require 200Watts. The measured saving is therefore around 20% of the claimed value.

Appendix B – Contestable Meter Prices

The Victorian distributor lead smart meter rollout cost $2.2 billion for 2.5million smart meters. This equates to $880 a meter.

After the AEMC introduced competitive meter provision Australia's largest retailers set up dedicated metering businesses. They subsequently sold these businesses with published figures providing insights into the value placed on installed meters. For example Origin sold its 170,000 smart meters for $267million, equating to $1570 a meter.

The comparison suggests despite contestability the AEMC's (so called) smart meters are more expensive than distributor provided smart meters. Reasons the two figures can't be directly compared include 2013 v 2018 pricing and the Victorian meters support significantly more services and provide greater societal benefits than the AEMC meters are capable of supporting.

Appendix C – COAG demand response mandate

The Council of Australian Governments (COAG) has mandated a uniquely Australian demand response interface be fitted to a range of priority appliances.

The Dept of the Prime Minister's review of the COAG demand response mandate raises more issues for the two-sided market. It found the financial analysis prepared for COAG underestimated costs.

The financial justification used by COAG assumed the cost of the mandated interface over the lifetime of the appliance is $450. Manufacturer responses indicated the actual cost to add the interface is

significantly higher. The assumed cost also excluded all consumer payments. Taking the actual cost to enable and use the interface as $900 raises a question "Is it better to spend $900 on an interface intended to be used very occasionally or should it be used to improve the energy efficiency of appliances providing benefits over the entire life of the appliance?" The answer is obvious, from both an economic and environmental viewpoint encouraging more energy efficient appliances produces far better societal outcomes.

This raises another interesting dilemma. Consumers who retain old inefficient appliances stand to gain more from the two-sided market than those who upgrade their appliances to energy efficient models. Does the ESB really intend to encourage the installation of less efficient appliances?

More analysis of costs to use the interface were presented in a submission to the AER's Demand Management Incentive Scheme [Ref 7]. Like most the AER assumed "demand management solutions are less expensive", hence the financial analysis started with their assumptions:

	Network Solution	Demand Management
	$1,000,000	$200,000
Lifetime	50+ years	15 years
Certainty	100%	25%
Benefit/$ spent	100%	10%

Theoretical Saving $800,000

These figures are not comparable

The analysis then notes the two solutions cannot be directly compared. Specifically the network solution lasts more than 50 years, but the demand response solution must be replaced every 15 years. Once the figures are adjusted to account for several differences the results are very different.

	Network Solution	Demand Management
	$1,000,000	$27,000,000
Lifetime	50+ years	50 years
Certainty	100%	100%
Benefit/$ spent	100%	100%

PRACTICALLY

2600% more expensive (not including incentive payments)

The above analysis highlights mass deployment of demand response systems are expensive. These costs have not been included in the ESB's economic justification for a two-sided market. If these costs were included it would significantly reduce any potential benefits.

There is yet another problem with the COAG mandate. Testing shows the mandated interface is almost impossible to use as reported in AGL/ARENA trials [Ref 8]:

"The performance of the system was also poor, with considerable variability noted in how different air conditioner makes and models respond to [demand response] DR commands and uncertainty about the level of DR that can be achieved without impacting customer comfort" ... "the air conditioning program was discontinued after two DR events due to the unpredictable performance of the air conditioners and the inconvenience being experienced by some participants."

The conclusion is the ESB should assume the COAG interface is both expensive and difficult to use. Testing confirms the interface delivers minimal demand response benefits. The COAG mandate does not support the ESB's two-sided market.

About Dr Martin Gill

Dr Martin Gill is an independent consultant specialising in the provision of consumer advice. This advice is based on a deep understanding of the Australian energy industry and strong analytical skills. As a consultant he has prepared advice for consumer advocates, government regulators, electricity distributors, electricity retailers, asset operators and equipment vendors.

Dr Gill is a metering expert. During the National Smart Metering Program he facilitated the development of a specification for Australian smart meters. Innovative metering products developed by his teams have been externally recognised with the Green Globe Award, NSW Government's Premier's Award and Best New Product by the Australian Electrical and Electronics Manufacturers Association.

He currently represents the interests of consumers on a range of Standards Australia working groups including metering, renewable power systems, battery storage and demand management.