Submission on the AER's Draft Decision on TasNetworks 2019-2024 Regulatory Proposal

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Attention: Mr Chris Pattas

This submission is made as an concerned individual. It has not been reviewed or endorsed by any person or group.

Contents

Tariff Pricing Principles are part of the Rules.

The Network Tariff Pricing Principles are the set of economic properties that a tariff must possess in order to comply with National Electricity Rules 6.18.5(e) through (g). The AER has the flexibility to interpret these principles in any manner, provided that its interpretations lead to decisions which are consistent with, and give effect to, **all** Rules and applicable jurisdictional schemes[1].

Currently, the AER is not enforcing Rule 6.18.5(g)(3), which requires tariffs to "**minimise** distortions to price signals for efficient usage" of the distribution network. Demand Tariffs contain highly distorted price signals for efficient usage, and because of these distortions Demand Tariffs promote less efficient responses than equivalently structured Time of Use tariffs. It does not require data to show this to be true. We can observe that the peak price signals contained in Time of Use tariffs directly and accurately display the information an electricity consumer needs in order to estimate the cost of switching on a load during peak times. The value of shifting a load from peak to off-peak times is likewise simple to calculate and happens to be a constant, so one calculation can be re-used until rates change. There are no artificial barriers to earning rewards under Time of Use tariffs, no uncertainty about whether rewards are achievable, and the relationship between behaviour and bill size is relatively easy for consumers to understand. On the other hand, Demand tariffs contain price signals which drive consumers to "flatten peak loads", which includes rewarding consumers for shifting loads from one peak time to another peak time. This reward is not at all cost-reflective, as there is zero expected long-run network peak infrastructure savings caused by having consumers respond in this manner.

Once peak load flattening has been accomplished by Demand Tariff customers, potentially at great expense but with no network benefits, any remaining efficiency budget can go toward load shifting from peak to off-peak times. The reward for efficient peak to off peak load shifting is notably more difficult to earn on a Demand Tariff than on a Time of Use tariff, because it also requires maintaining a flat load profile and converting the lower kWh into "shaving" maximum Demand. The difficulty and cost will cause customers to shift less load out of peak times or simply give up trying entirely.

Demand Tariffs are not cost reflective.

Rule 6.18.5(g)(3) also notes that tariffs which we call "fully cost reflective", that is, tariffs satisfying the pricing principles given in Clause (f), will contain price signals for efficient usage of the network. There is no room for interpretation by the AER here, because anything less than perfection will cause distortions to the price signal. Note the contrapositive: If a tariff contains an inefficient price signal, it has been shown to violate Clause (f).

Only Dynamic Tariffs could possibly be fully cost-reflective, as smoothing is required for static tariffs, which is distorting to price signals. Being a dynamic tariff is only one step toward cost reflectivity, and the theoretical "fully cost reflective" tariff defined in Clause (f) may not be well-defined even in the long term. The AER can, however, still quantify and compare the perfect price signals contained in a cost reflective tariff and contrast with the imperfect signals contained in each proposed network tariff.

[1] NER cl. 6.18.5(j)

If the AER is seriously claiming that Demand Tariffs satisfy Clause (f) and therefore contain perfect price signals, please demonstrate how Clause (g) can be applied consistently to compare tariffs despite the reference price signal being unstable and inefficient. The fact that other tariffs can outperform Demand Tariffs should immediately rule out the possibility of ever calling Demand Tariffs cost reflective under Clause (f).

The AER's tariff comparison using regression analysis contains errors.

In "Box A" of the *AER's Draft Decision on TasNetworks Tariff Structure Statement* (located on page "18-79" of Attachment 18 to the *AER's decision on Tasnetworks 2019-2024 Regulatory Proposal*), the reader is provided with vague details of a statistical analysis of NSW consumer load data. The analysis was performed in-house by the AER, and is the basis for the AER's curiously worded inference:

> *"Based on our analysis of data provided by NSW distributors, we consider that there is no clear cost reflective advantage of adopting demand tariffs over time of use tariffs"*[2]

I do not doubt that this statement is true, however I call this wording curious because it does not actually state that Demand Tariffs performed as well as Time of Use tariffs. The AER's conclusion appears to be the result of a one-sided test of the null hypothesis that "Demand Tariffs and Time of Use tariffs perform equally well" against the one-sided alternative that demand tariffs are superior to Time of Use tariffs. I believe that a two-sided alternative would be more appropriate, since theory cannot rule out the possibility that Time of Use tariffs outperform Demand Tariffs. The question "Is there a clear cost reflective advantage of adopting time of use tariffs over demand tariffs?" has not been answered by the above quote.

I am pleased with the AER's methodology of using the top 40 network hours as a proxy for total peak impact. This appears to be a reasonable proxy, consistent with the AER's beliefs. I hope that the AER will apply this methodology consistently in future studies whenever it can be considered reasonable. Consistency across regulatory decisions is simplifying and can facilitate better quantification and comparison of DNSP performance against benchmarks. Note that the AER's y-variable is not only a proxy for each customer's impact on network costs, but also a proxy for the theoretically perfect cost reflective tariff which would contain price signals for efficient usage of the network. If it were somehow possible to predict when those network peaks would occur, it could be possible to implement a tariff as cost-reflective as this one. Until then, we must settle for tariffs which minimise distortions to that perfect price signal.

[2] AER. *Draft Determination on TasNetworks 2019-2024 Tariff Structure Statement.* Page "18-78"

Another issue with Box A is that the AER's interpretation of R^2 is not valid. As the AER would know, R^2 measures only goodness of fit, or how "cost-representative" a tariff is. Many tariffs will have strong R^2 but only one will minimise the distortions to efficient price signals.

Speeding fines in work zones: an analogy explaining how to properly compare tariffs for cost reflectivity and efficiency of price signals.

The following illustrative analogy is designed to show that tariffs can perfectly assign costs to customers retrospectively (regression $R^2 = 1$), yet some tariffs still fail to contain price signals for efficient use of the network. Numbers used in this example were chosen for simplicity, and are not meant to be realistic.

Suppose that a road works zone has updated its speeding fine structure to be more "cost reflective". Three charging structures will be tested and compared, analogous to a Demand Tariff, a Time of Use Tariff and a Dynamic Critical Peak tariff.

For simplicity, not realism, suppose that the work zone is 1km long, and drivers are restricted to two choices of speed for each 0.1km of work zone they pass through: either drive at 25km/h with no penalty, or go 40km/h and receive a fine for every 0.1km (so drivers can collect up to 10 fines by the end of the 1km.)

At any point in time, active roadworks are taking place on just one 0.1km segment of the zone. The other 90% has no work occurring.

Calculating LRMC of these decisions:

- Driving at the speed limit of 25km/h is the baseline comparison case, so the LRMC of this choice is set to zero. These drivers do not receive a fine, so we have perfect alignment between costs and charges for this case.
- Drive at the dangerous speed of 40km/h. The LRMC of this choice has been estimated to be $1,500 per 0.1km of speeding past *active* roadworks, but $0 for speeding through all other parts of the work zone.

Since there is active work taking place for 0.1km, it follows that the total charge for speeding through the entire work zone should equal $1,500. If there were 0.2km of active works, the cost reflective fine would be $3,000 for speeding the entire 1km.

Tariff 1, Traditional fines (work like Time of Use tariffs): Each segment of the work zone charges $150 for speeding over the 0.1km. The actual location of active roadworks is random from the perspective of the drivers, so each choice to speed adds a 10% chance of speeding past roadworks.

Tariff 2, Demand fines: A driver is fined the full $1500 for speeding over any segment, however once the fine is paid, no further fines accrue for that journey.

Tariff 3, Dynamic fines: The most cost reflective fine possible is this dynamic tariff, equivalent to the Cost Allocation Method. This tariff charges $1500 for driving through the segment containing active roadworks, but does not give fines in the other 9 segments.

For the population of drivers whose speed will not change for any reason (they either go 25 the entire way or go 40 the entire way):

- The three tariffs are equivalent. They collect the same revenue from consumers ($0 or $1,500 per driver, based on speed), and generate the same response to price signals (0% reduction in speeding), and therefore total cost of accidents is equal across tariffs.

For drivers with the ability to change speed, but without the ability to see which segment contains the active roadworks:

- It is dangerous to speed through any segment, since there is a 10% chance that the decision will cause $1,500 of expected damage (a long-run average). The total revenue collected from these drivers should equal the expected marginal cost of each decision to speed. The expected cost of speeding is $150 per 0.1km, given that the driver does not know where the peak is (and does not find out until the end).
- The Traditional tariff charges $150 per 0.1km of speeding, regardless of location of the active roadworks. This matches the LRMC calculation, so this tariff collects the correct amount of total revenue, and each customer pays based on LRMC of $150 per decision to speed through a random interval. The traditional tariff appears to be a perfect-fit from the perspective of these customers with limited ability to respond to price signals.
- The Demand Tariff collects $1,500 from drivers who speed through any part of the work zone, even just one segment, regardless of whether they went through the active roadworks segment. The $1,500 charge is too large to reflect the costs of speeding through only parts of the work zone. Observe that once a driver has sped through a segment, the decision to speed through remaining segments can be made at zero cost to the driver. This is an example of a price signal for inefficient usage, driving increased speeding rates and therefore more accidents. Similarly, "Consume more for best value" is not a price signal for efficient usage of the network, and the demand stimulation drives up long run network costs.
- The Dynamic tariff continues to perform well. It is cost-reflective in the sense that it drives efficient responses and recoups the correct amount of revenue in total. However, customers who cannot determine the location of active roadworks cannot fully utilise the cost-reflectivity of this tariff. For that reason, these customers face unpredictability and increased variability in total charges compared to if they were on the Traditional tariff.
- There may be a case to apply a customer impact principle here and declare that the traditional tariff is more suitable than the dynamic tariff for these customers. Since both tariffs perform similarly but the dynamic tariff has slightly more volatility, there is reason to objectively call the Traditional tariff superior for thesecustomers.

For drivers with the ability to change speed and also to see which segment contains the active roadworks:

- It is not dangerous to speed through the 9 out of 10 zones which do not contain roadworks.
- It is costly to speed through the active roadworks ($1,500 per 0.1km)
- Traditional tariffs do not meet the needs of these savvy consumers. The $150 per 0.1km charge is far below the cost of speeding through the active roadworks segment, so this tariff is not cost reflective for these customers
- Demand Tariffs continue to stimulate inefficient behaviour with "all you can eat buffet" pricing. Deciding to speed through a segment which does not have active roadworks has no long-run cost for these drivers, yet they are charged $1,500 for the first occurrence. These customers are highly restricted in their choice, and are unable to use their abilities to maximise efficiency. There is zero marginal cost for speeding through the actual work zone if you speed through any other segment. This brings up a disturbing decision for these customers! Drivers which pay the $1500 should obviously go 40km/h outside the active work zone, but slowing down regardless of the lack of personal incentive would still be the right thing to do. These savvy customers know the prices and costs of their actions, and at least some of them will make the "moral" choice not to follow the price signal and cause $1500 in expected damages in order to save a few seconds by going 15km/h faster for 0.1km.
- Dynamic Tariffs produce the best combination of maximising the speed of the trip and minimising the risk of accidents. Drivers that can see active roadworks can safely travel at 40km/h for all segments except the one containing the active roadworks. By slowing to 25 through that segment, they avoid $1500 in charges and expected damages at a cost of a few seconds.

In conclusion of this example:

- All of these tariffs would have strong R^2 in a regression like the one in Box A, despite having a wide range of cost reflectiveness. It is therefore shown that R^2 is a statistic that is not strongly related to cost reflectivity. Average impact of customers on various tariffs would be a potential way to measure and compare cost reflectivity..
- Data which does not include the behavioural changes caused by price signals cannot be used to measure or compare cost reflectivity of tariffs.
- Customers whose demand was stimulated by the Demand Tariff ended up paying more total costs than if they were offered an efficient tariff.

Consumers need cost-reflective tariffs, not Demand Tariffs

I find it unconscionable for the AER to promote making Demand Tariffs opt-out, or even mandatory for small customers. That will cause a great deal of confusion in customers as it overcharges them monthly for momentary demand spikes, potentially without ever giving customers a chance to understand and respond to the price signal. The signal "just give up trying" is strong in confusing Demand Tariffs, possibly because it is aligned with the signal to "consume more for best value".

Consumers having the ability to respond to price signals require tariffs that allow use of that technology in efficient ways. This is called "empowering" consumers, which Demand Tariffs fail to do.

If a customer on a Demand Tariff adds, on average, more kVA to network peaks than they would under a Time of Use tariff, it doesn't matter if Demand charges recoup the extra costs to improve correlation, the Demand Tariff is still demand-stimulating, inefficient, and invalid for that customer by Rule 6.18.5(g)(3). DNSPs are not to offer smoothed or demand-stimulating network tariffs because the price structure will bias pricing and offerings from competitive retail plans as it distorts fledgling markets for consumer efficiency goods and services. Retailers under sufficient competition already engage in demand-stimulation, offering a suite of tariffs ranging from cost-reflective to smooth and predictable. Only a cost-reflective network charge will lead to efficient pricing of retail plans.

Exercise for the AER in customer empathy and basic tariff assessment:

a) List all factors which are required for a household energy user on a Time of Use Tariff to **calculate the marginal cost of running a 1kW load for the next 30 minutes.** Assume that peak pricing will be in effect for the entire 30 minutes. Write the equation or algorithm if possible.
b) Repeat part a) for Demand Tariffs.
c) Some of the factors which affect the calculation for Demand Tariffs are not prices. Circle any non-price factors that you identified that you would call "cost-reflective".
d) Which of the non-price factors are easy to observe, calculate or estimate? What barriers might customers face when attempting to compile necessary inputs?

My answers are on the next page.

Answers:

a) ToU Tariff

Factors:

- Peak kWh price

Cost to run a 1kW load for 30 minutes = peak kWh price * 0.5. Easy.

b) Demand tariff (assuming 30 minute interval, monthly reset):

Price Factors:

- Demand price ($/kVA/mo).
- Consumption price.

Non-price Factors:

- Maximum demand for the month so far.
- Maximum demand for the remainder of the month (using your Crystal Ball?)
- Any other loads currently on or coming on within 30 minutes.
- Peculiarly, number of minutes past the half-hour.

Cost ($) = hard to write as an equation. If there are no Demand charges to worry about, then the Demand Tariff is literally offering an off-peak marginal price for usage during peak times (a clear distortion to price signals for efficient usage). When Demand charges do apply, cost is difficult or impossible to calculate. Note that the charged Demand for running a load from xx:00 to xx:30 can be double the charged Demand for running the same load from xx:15 to xx:45, due entirely to the arbitrary decision to have demand periods reset on the half-hour.

c) None of these factors change effective marginal prices in any way that I would call cost-reflective, so I have not circled any of them. The last three actually raise more serious issues, such as privacy concerns amongst roommates sharing an electricity meter and the creation of cycles as more savvy customers learn to game the tariff.
d) It is not possible to calculate the Demand charge without knowing the future. It is not possible to calculate the Demand charge without full information about current loads. This would require collection of real-time and near-future data on other people in the house who may have a reasonable expectation of privacy and may not appreciate the argument that your intrusion is necessary for the sake of efficiency, when common sense says otherwise.

Nothing is preventing the AER from performing its duties

The Energy Security Board and AEMC agree that the regulatory framework is currently sufficient for the AER (in particular) to perform its role in upholding the NEO:

> *In 2018 the AEMC concluded that incentive regulation remains the appropriate fundamental principle for the economic regulation of electricity networks and that the current framework provides sufficient flexibility to support the evolving role of network service providers in the electricity sector's transformation.*[3]

I have a great deal of faith in the NEM framework, and I agree with the AEMC and ESB that the AER has sufficient flexibility to perform its duties now and in any feasible near-term scenario. My concern is about the AER's accountability when it fails to apply a Rule, or when an interpretation gives rise to an inconsistent system, making it possible to "prove" fallacies, and thus abuse customers. What can stop the AER from approving demand-stimulating Demand Tariffs, if the AER is determined to call them "efficient"? Judicial review?

NewReg will undermine transparency and consumer engagement

Consumers awakening to the problems with Demand Tariffs will be especially frustrated to discover that Energy Consumers Australia (ECA) has been quietly complicit in this conspiracy. Energy Networks Australia will be joining ECA and the AER to form NEWREG, with the goal of settling more regulatory matters prior to drafting initial regulatory proposals. Making backroom agreements prior to presenting proposals to the public will not result in efficient outcomes for consumers, unless all parties can unwind agreements easily when the public points out mistakes and rule violations. The public's role is not simply to provide opinions, but also to enlighten regulators about issues that they may not have anticipated. Choosing to ignore customers reporting many diverse problems with Demand Tariffs for the reason "it has already been decided" is pure abuse of power.

Please feel free to contact me on [redacted] if I can provide any clarification on these critical issues.

Best regards,

John Herbst

[redacted]

[3] Energy Security Board. *The Health of the National Electricity Market, 2018. p61.*