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# Western Australia's Transition to a Competitive Capacity Auction

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PREPARED FOR



PREPARED BY


Kathleen Spees

Samuel A. Newell

Colin A. McIntyre

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## Executive Summary

The Western Australia Public Utilities Office (PUO) outlined its proposal for reforming the Reserve Capacity Mechanism (RCM) into a competitive auction-based mechanism that meets reliability objectives at lower cost. However, the PUO was concerned that if it instituted the auction immediately, a sudden large drop in capacity payments could impair suppliers and threaten the sustainability of the electricity market. The PUO therefore proposed a transitional mechanism intended to balance the competing objectives of reducing excess capacity and customer costs, while mitigating price impacts on suppliers.

A key element of the PUO's transition proposal is that it would discriminate against demand response (DR), paying a much lower price for it than for generation, to incentivize some DR to exit. Generation would be paid according to an RCM payment curve that declines somewhat more steeply than today's curve. The curve would remain static until the reserve margin tightens to 5–6%. If and when that occurs, the final auction design would be triggered, with a much steeper demand curve for capacity, and with DR and generation competing on a level playing field.

The PUO's proposed transition mechanism will meet or exceed the reliability objectives, and it will partly meet the objective of reducing customer costs at least compared to the status quo. However, we believe the proposed transition mechanism will largely fail to meet its goals of reducing costs and eliminating economically inefficient resources, and that these inefficiencies will persist for well over a decade before shifting to the more efficient competitive auction design. This is due to the proposed resource discrimination and other related problems:

- Discriminating between generation and demand response will distort investment and exit decisions away from least-cost, economically-efficient outcomes. Generators will have incentives to reinvest in their capacity even when it is unneeded and less cost-effective than demand response.
- The proposed static pricing schedule will maintain uneconomically high prices for a protracted period that may last more than a decade before the auction is triggered.
- The proposed outcomes-based trigger for moving to an auction (with lower prices) further distorts generators' incentives to uneconomically maintain and invest in their capacity in order to delay triggering an auction.

In this paper, we propose an alternative transition mechanism designed to balance the PUO's competing objectives of reducing customer costs and mitigating supplier impacts, while correcting the concerns we have identified. This proposal would treat all generation and demand response resources on a level playing field, move to an auction format as quickly as possible, and mitigate price shocks with a phased introduction of a demand curve. The initial demand curve would be relatively flat but would become steeper each year according to a pre-determined schedule. The curve would match the final proposed PUO curve after a known period, possibly five or ten years.

The result of our proposal would be to introduce an initial price shock that is similar to that under the PUO proposal, then gradually decrease prices as the demand curve becomes steeper, and move to the final auction design over the course of a pre-specified number of years. This alternative approach would limit the time of the transition period and provide a more concrete timeline for achieving the final design, while mitigating price shocks along the way. And it would eliminate the inefficiencies associated with resource discrimination.

## I. Background on the PUO Transition Mechanism Proposal

The Western Australia Public Utilities Office (PUO) outlined its proposal for reforming the Reserve Capacity Mechanism (RCM) into a competitive auction-based mechanism that meets reliability objectives at lower cost. The proposed auction design is generally consistent with best practices from successful capacity markets in the U.S. The auction would determine a clearing price and quantity based on the intersection of an administratively-determined demand curve and a supply curve made up of offers from all types of qualified suppliers competing against each other on cost. The demand curve would be constructed to procure just enough capacity to meet reliability objectives, without being so steep as to produce excessively volatile prices or invite the exercise of market power. Because the proposed curve for the final auction will be much steeper than the current RCM payment function, prices would decline more rapidly with excess capacity. At a high reserve margin, the price would be much lower than it is under the current RCM, so capacity would exit and avoid the present situation with high prices under excess supply conditions.

However, the PUO was concerned that if it instituted the auction immediately, the large and sudden price drop would be “financially disruptive for participants and create risks for the sustainability of the market as a whole.”<sup>1</sup> The PUO noted a risk of “flow on effects to the energy market...from a widespread impairment of generation assets.”<sup>2</sup> Hence they proposed a transition mechanism to ease that shock, while reducing customer cost, discouraging new entrants, and encouraging the exit of inefficient resources.<sup>3</sup>

The PUO’s proposed transition mechanism administratively sets the capacity price using a curve proposed by the Independent Market Operator (IMO) with a slope of -5 instead of the more gradual curve in effect today.<sup>4</sup> The PUO suggested using a single slope throughout the transition in lieu of a progressively steepening slope year to year.<sup>5</sup>

A key element of the PUO’s proposed transition mechanism is that it would discriminate against demand response, paying a much lower price for it than for generation to incentivize some DR to exit. The PUO’s rationale for this discrimination appears to be that it wants to reduce the excess capacity of both generation and demand response, but that a lower price is needed to cause demand response to exit due to its fundamentally different cost structure:

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<sup>1</sup> See PUO (2015), p.13.

<sup>2</sup> *Ibid.*

<sup>3</sup> See PUO (2015), p. 45.

<sup>4</sup> The proposed curve is defined as  $\text{Price} = \text{Price Cap} * ((1 - (\text{Surplus \%} + 3\%)) * \text{slope})^{-1}$ . A more negative slope parameter would correspond to steeper payment curves. The current formula sets  $\text{Price} = \text{Price Cap} * (\text{Surplus \%})^{-1}$ . An illustration of both curves is provided in Figure 3 in a later section. See IMO (2013), p. 32.

<sup>5</sup> See PUO (2015), p. 46.

The reforms to the capacity price formula during the transition period will result in the price paid for capacity being discounted more heavily when there is excess capacity than is currently the case. This adjustment will result in a lower capacity price and reduce incentives for generation capacity to be maintained in the market or new generation capacity to enter the market.

A lower capacity price will not have the same effect on incentives for demand side management capacity, as it has fundamentally different cost drivers to other forms of capacity.<sup>6</sup>

The PUO explains that demand response's cost structure reflects minimal capital costs and high dispatch costs that exceed the energy price cap. DR would incur high opportunity costs when dispatched, but the likelihood of being dispatched is low under excess supply conditions, so demand response will stay in the market until the capacity revenue is at levels far below what the proposed transition mechanism would produce.

## II. Assessment of the Proposed Transition Mechanism

The PUO's proposed transition mechanism will meet or exceed the reliability objectives, and it will partly meet the objective of reducing customer costs at least compared to the status quo. However, we believe the proposed transition mechanism will largely fail to meet its goals of reducing costs and eliminating economically inefficient resources, and that these inefficiencies will persist for well over a decade before shifting to the more efficient competitive auction design. This is due to the proposed resource discrimination and other related problems:

- Discriminating between generation and demand response will distort investment and exit decisions away from least-cost, economically-efficient outcomes. Generators will have incentives to reinvest in their capacity even when it is unneeded and less cost-effective than demand response.
- The proposed static pricing schedule will maintain uneconomically high prices for a protracted period that may last more than a decade before the auction is triggered.
- The proposed outcomes-based trigger for moving to an auction (with lower prices) further distorts generators' incentives to uneconomically maintain and invest in their capacity in order to delay triggering an auction.

These effects are likely to extend economic inefficiencies and high prices for many years, without providing price stability or predictability to the market.

### A. RESOURCE DISCRIMINATION WILL REDUCE ECONOMIC EFFICIENCY

The PUO's proposal recognizes that the current excess of capacity is costly and provides little marginal value, so some resources must be let go. Ideally, the resources that stay should be

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<sup>6</sup> See PUO (2015), p. 47.

the most competitive, and those that go should be the costliest. Indeed, one of the PUO's goals is "encouraging mothballing/retirement of inefficient capacity" in the transition.<sup>7</sup> But this is not what the proposed transition mechanism would do. The proposal instead targets demand response, but without having demonstrated that all demand response is less economic than all generation, other than referencing its higher dispatch costs. But dispatch costs are only one component of a resource's total costs. It would similarly miss the whole story if one were to focus on aging generators and note that they would likely have the highest capital reinvestment costs and so determine that the oldest generators should be targeted for price discrimination.

The missing pieces of this story are:

- First, capacity is a different product from energy. It is a megawatt of supply that has committed to be available so the system operator can avoid involuntary load shedding due to total supply being inadequate to meet demand. The ability of any resource to provide such a product should be established on technical grounds that are indifferent to the underlying asset's dispatch costs (those differences are fully recognized in the energy market). Resource qualification *should* however account for the true availability of each resource to help avoid load shedding. In the case of demand response, qualification requirements should include accurate measurement and verification standards as well as a measure of performance during reliability events (or surprise test events if there are no realized reliability events).
- And second, the most economically efficient resources to keep online to meet the capacity requirements are those with the lowest *net* costs, and that are willing to accept the lowest capacity payment.<sup>8</sup> The resources needing the highest capacity payment are the costliest and so should be the first to exit.

In many cases, existing generators will have lower net going forward costs than demand response and would be willing to accept very low capacity prices before retiring or mothballing. This is because existing generators' capital costs are largely sunk, and they

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<sup>7</sup> See PUO (2015), p. 45.

<sup>8</sup> A capacity supplier's net costs are given by the going-forward fixed operating and maintenance (FOM) and capital costs minus net energy revenues. "Net energy revenues" are the revenues earned in the energy market minus any fuel and other variable costs, thus fully reflecting each resource's value related to its dispatch costs. Net revenues from the energy market help cover a portion of a resource's fixed costs. This is particularly true for baseload generation that accrues substantial net revenues from the energy market. This is why the more capital-intensive baseload units need not earn a higher capacity payment than less capital-intensive combustion turbine units. Both baseload and peaking capacity will recover their capital costs in an efficient market, but baseload will earn proportionally more out of the energy market and less from capacity. Similarly, demand response will earn nothing from the energy market if it is not dispatched, or even face net costs from dispatch given the low energy price cap in Western Australia. If all resources are paid the same energy price for dispatch and the same capacity price for availability, then competitive forces will incentivize the lowest-cost combination of these resources to meet both energy and capacity needs.



would earn sufficient margins out of the energy market to stay online even without earning any capacity revenues. However, other existing generators would have very high net going forward costs, for example if they faced a major retrofit or plant reinvestment to continue operating. Overall, there will be a diversity of high-cost and low-cost resources amongst both demand response and generation. We have seen this in PJM, where demand response resources have out-competed many existing generators.<sup>9</sup>

The PUO's proposed mechanism is not set up to discover the relative economics of generation and demand response resources because it discriminates between them. With generation receiving a much higher price, high-cost generators may stay online while low-cost demand response exits. The high price paid to generation will shield it from the pressure to retire even when uncompetitive and uneconomic. This will create incentives for generators to undertake high-cost retrofits to uneconomically prolong the life of the unit even under current overbuilt conditions. Generators may even find it profitable to invest in uneconomic capacity uprates to their existing plants. Such capital expenditures would be economically wasteful and run counter to the goals of the energy market review.

The best way to identify the lowest-cost resources is through a competitive auction with a level playing field for all qualified resources, rather than administratively selecting winners and losers.<sup>10</sup> Every resource will offer to sell capacity at the minimum price they would need to recover their costs. Those with the highest offers would not clear. The result is to minimize total costs across the resource base, and minimize the customer costs associated with meeting a particular capacity requirement. The PUO recognizes the value of using a competitive auction: "When the auction arrangements commence, demand side management capacity will be subjected to the correct signals to compete on a level playing field with other capacity providers."<sup>11</sup> But a level playing field would be just as valuable during a transition, when it will be equally important to allow competitive forces to push the most uneconomic resources out of the market.

It is true that under the PUO's proposed transition mechanism, demand response would be compensated at uneconomically high prices if it were included in the payment scheme. But the same is true for generation. The medium-high prices contemplated in the transition mechanism are lower than under the current RCM, but still far above the economic value of capacity, far above the long-term proposed demand curve level, and far above the price levels that are likely needed to encourage substantial exit (of both generation and demand response) from the market. These concerns suggest that an even steeper demand curve should be implemented more quickly to reduce the magnitude of overcompensation across the board.

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<sup>9</sup> See Pfeifenberger *et al.* (2011), p. 17.

<sup>10</sup> By "level playing field" we mean equal competitive treatment across all resources that provide the same or nearly the same capacity value, being available to balance supply and demand and thus prevent involuntary load-shedding during peak conditions when supply can become inadequate. Differences in resources' availability and reliability can be accounted for through appropriate adjustments to their capacity ratings.

<sup>11</sup> See PUO (2015), p. 14.

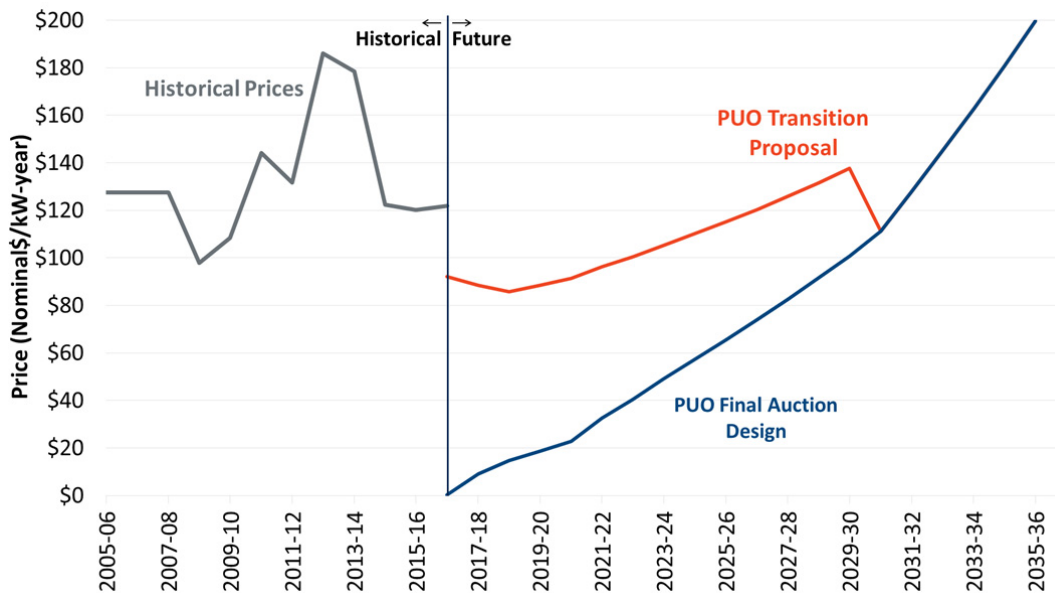
## **B. THE TRANSITION'S STATIC PAYMENT FUNCTION WILL MAINTAIN MEDIUM-HIGH PRICES FOR AN EXTENDED PERIOD FOLLOWED BY A SECOND SHOCK WHEN AUCTIONS ARE TRIGGERED**

Consistent with the PUO's transition objectives, the proposed mechanism would prevent prices from plummeting as quickly as they would if the ultimate auction design were implemented right away. However, it will likely not provide a smooth price path toward a competitive auction. Prices would drop when the “-5” curve is first introduced, even though we expect some capacity to exit at that time due to the lower, but still relatively high prices. Thereafter, prices would turn around and begin increasing over time as the supply excess slowly erodes with load growth and possibly some exit. This would result in a potentially long period of a decade or more during which the RCM curve remains static and produces prices well above the eventual auction demand curve. Over that period, the rising prices would provide incentives in the wrong direction regarding the PUO's goal to trim excess capacity; the prospect of rising prices would reduce generation exit both initially and thereafter. But once the reserve margin reaches the approximate 6% target the auction would be triggered. Prices would then drop again because: (1) the proposed auction demand curve is so much lower than the proposed transition price curve, and (2) supply from demand response that would be excluded throughout the transition could suddenly be re-introduced upon triggering competitive auctions.

To illustrate, we provide an example in Figure 1: we assume 25% (265 MW) of excess capacity exits upon the first price drop. Then no further capacity exits as prices rise along the static transition pricing curve with load growing by 0.75% per year. Prices are determined by the curve as follows: the price in the first year (2017/18) drops by 28%. Then prices rise by 3.8%/yr over the following 12 years until an auction is triggered in 2030/31 and prices drop by 20%. In other words, this scenario illustrates how uneconomically high prices could perpetuate for more than a decade. It is also possible that the transition period could last far longer than that, particularly if net load growth becomes very low due to rooftop photovoltaic installations or energy efficiency.

**Figure 1**  
**Reserve Capacity Clearing Prices**

Assuming 25% of the Current Excess Exits in the First Year and No Other Supply Changes Occur



**Sources and Notes:**

- Historical prices from AEMO (2016).
- MRCP projections from AEMO through 2018/19, growing at inflation thereafter.
- 2016/17 Capacity from IMO (2014) and assumed to decrease from 5618 MW to 5353 MW once transition is implemented, then held constant thereafter.
- Excess quantity calculated using 50% PoE forecasts from IMO (2015).
- Load projected to grow at 0.74% per year after 2024/25 capacity year, per average growth rate from IMO (2015).
- Projected prices do not account for any supplier responses other than those stated.

In this simplified scenario, the transition simply breaks the price shock into two price shocks with a number of years in between. And the in-between period maintains elevated prices and supports maintenance and reinvestment in excess capacity for 10–15 years.

It would be possible to mitigate the magnitude of the second shock by revising the shape of the final demand curve as well as the final trigger point. However, the size of the second shock could not be reduced substantially without introducing other drawbacks. This is because the primary options to reduce the size of the second shock would be to:

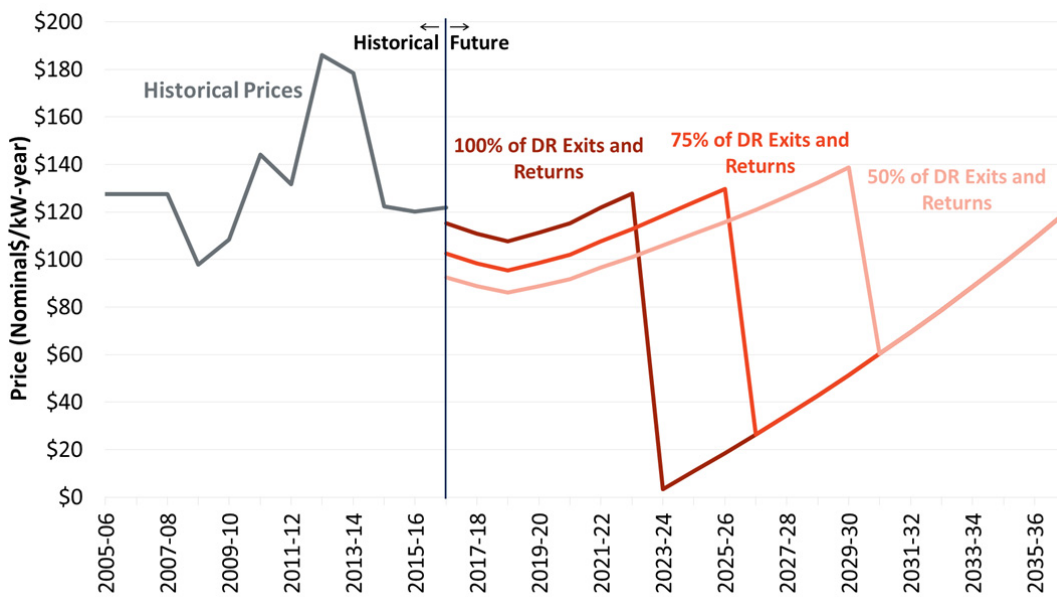
- Reduce the percent excess at which capacity auctions would be triggered, thus further extending the duration of the transition,
- Implement a curve with a substantially right-shifted zero crossing point or higher price point (thus resulting in higher prices even after the transition, as illustrated in Figure 3 below), or
- Make the transition curve steeper or steeper over time (both of which we believe would better meet the overarching design goals, as we discuss further in the subsequent section).

Resource discrimination against demand response will exacerbate some of the effects described above, particularly if the consequence of discriminating against demand response is to cause a substantial exit of demand response when the transition mechanism starts,

followed by a return of those same resources once the final auction is triggered. Their return would depress prices once the auction is triggered.

The price trajectory that could be expected under the most extreme scenario where some fraction of demand response exits then suddenly returns is shown in the following figure. For example in the most extreme case with 100% of demand response exiting and then returning, the result would be a small initial shock with minimal price reduction over the transition, a relatively short transition period, and a precipitous price drop upon triggering the final auction. The overall price trajectory is similar but with a larger initial shock, longer transition period, and smaller final shock if a smaller 75% or 50% proportion of demand response were assumed to exit and then return. These simplified cases are not intended to be predictive, but rather to illustrate the point that categorically excluding then re-including demand response in this way is likely to exacerbate the magnitude of the second shock and thus the implications to the market, counter to the transition mechanism design goals.

**Figure 2**  
**Reserve Capacity Clearing Prices**  
 Assuming All DR Exits in the First Year and Immediately Re-enters Once the Auction is Triggered



**Sources and Notes:**

- Historical prices from AEMO (2016).
- MRCP projections from AEMO through 2018/19, growing at inflation thereafter.
- 2016/17 Capacity from IMO (2014) and assumed to decrease from 5618 MW to the stated level once transition is implemented, then increase back to 5618MW once the auction begins.
- Excess quantity calculated using 50% PoE forecasts from IMO (2015).
- Load projected to grow at 0.74% per year after 2024/25 capacity year, per average growth rate from IMO (2015).
- Projected prices do not account for any supplier responses other than those stated.

While the real world will undoubtedly differ from our very simplified assumptions in these scenarios, it is likely that the proposed transition will look something like this. In Section III, we describe an alternative proposal that would provide a smoother and less protracted transition to auctions using the ultimate demand curve.

### C. THE PROPOSED OUTCOMES-BASED TRIGGER FOR IMPLEMENTING THE AUCTION FURTHER DISTORTS GENERATORS' INCENTIVES

The PUO proposes to maintain the static transitional payment schedule until excess capacity dwindles to 5–6%.<sup>12</sup> This approach may initially seem to be a reasonable way to limit the second price drop, but it would have the unintended effect of distorting generators' incentives. Generators with large net portfolios would realize that retiring a resource today would accelerate the implementation of an auction.<sup>13</sup> All the remaining resources in its portfolio would then receive a lower price, since the auction demand curve is so much lower than the transition price curve (*e.g.*, prices drop by 20% in the first example above, and even more precipitously in the second more extreme case). This prospect would introduce large incentives to portfolio owners to maintain existing generation capacity. Portfolio owners may be willing to keep an uneconomic unit operating for many years, even if operating that unit at a financial loss the entire time. By postponing that retirement, the portfolio supplier would avoid triggering the auction and keep earning uneconomically high profits on its other units. Very large portfolio owners could even decide to invest in new capacity if needed to support excess capacity above 5–6% and maintain transition pricing.

This effect would compound the economic inefficiencies described above from resource discrimination and a static transition payment function. The “transition” could theoretically last indefinitely, with high prices being paid to support uneconomic investments in excess capacity. Absent another re-design of the transition mechanism, the efficient auction mechanism proposed as the final design could remain an elusive target that is never adopted.

### III. Suggestions for a More Economically Efficient and Smoother Glide Path to Auctions

The PUO's proposed transition mechanism is intended to balance two competing objectives of reducing customer costs from RCM payments as quickly as possible, while mitigating the magnitude of the price shock affecting suppliers. However, the proposal as it stands would introduce economic inefficiencies and other concerns.

In this section, we describe an alternative proposed transition mechanism designed to meet those same objectives while correcting some of the concerns we have identified. We propose a transition mechanism that would treat all generation and demand response resources on a level playing field, move to an auction format as quickly as is practical, and mitigate price

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<sup>12</sup> We assume a 6% trigger throughout our analyses, a 5% trigger would prolong the transition period.

<sup>13</sup> The incentive we describe applies to any entity that has a large net generation supply portfolio, “net” meaning the net position of generation less any demand-side position serving loads. An entity with fully balanced generation and load positions will have no incentive to inflate or suppress capacity prices. An entity with more generation than load wishes capacity prices to be higher; an entity with more load than generation wishes prices to be lower.

shocks by steepening the demand curve over time according to a pre-determined schedule. The result of our proposal would be to introduce an initial price shock that is similar to that under the PUO proposal, gradually decrease prices as the demand curve becomes steeper, and move to the final auction design over the course of a pre-specified number of years. Compared to the PUO's initial proposal, the alternative approach would limit the time of the transition period, eliminate the second price shock, provide a more concrete timeline for achieving the final design, and eliminate the inefficiencies associated with resource discrimination.

## A. ALTERNATIVE TRANSITION MECHANISM PROPOSAL

To address the concerns we have identified with the transition mechanism proposal, we propose an alternative approach, along with a few variations designed to reduce the economic distortions, maintain a level playing field between demand response and generation, and provide a glide path for moving to the final design on a concrete timetable. The primary elements of this approach would include:

- **A Level Playing Field for All Resource Types.** To achieve the most economically efficient resource retirement, retrofit, and reinvestment decisions, we propose to treat all resources on a level playing field with the same capacity prices paid to all resource types including demand response and generation.
- **Introducing Auctions as Soon as Possible.** We propose moving to an auction format as soon as is practically feasible, perhaps after one or two years. This would maximize competition among different resource types, thus ensuring that the costliest resources exit the market first and that the lowest-cost resources are retained. Early auction introduction would allow for steeper demand curves to be implemented sooner.<sup>14</sup> Earlier introduction of auctions will also provide an opportunity to refine the auction structure while supply is plentiful and prices will presumably remain relatively lower. Until auctions are implemented, the payment mechanism would work like the current mechanism, but according to a payment curve equivalent to the demand curves described below.
- **Flat Initial Demand Curve Similar to the PUO Proposal.** The initial demand curve would be relatively flat to mitigate the size of the initial shock, for example it could have the same shape as the final demand curve proposal, but with a right-stretched

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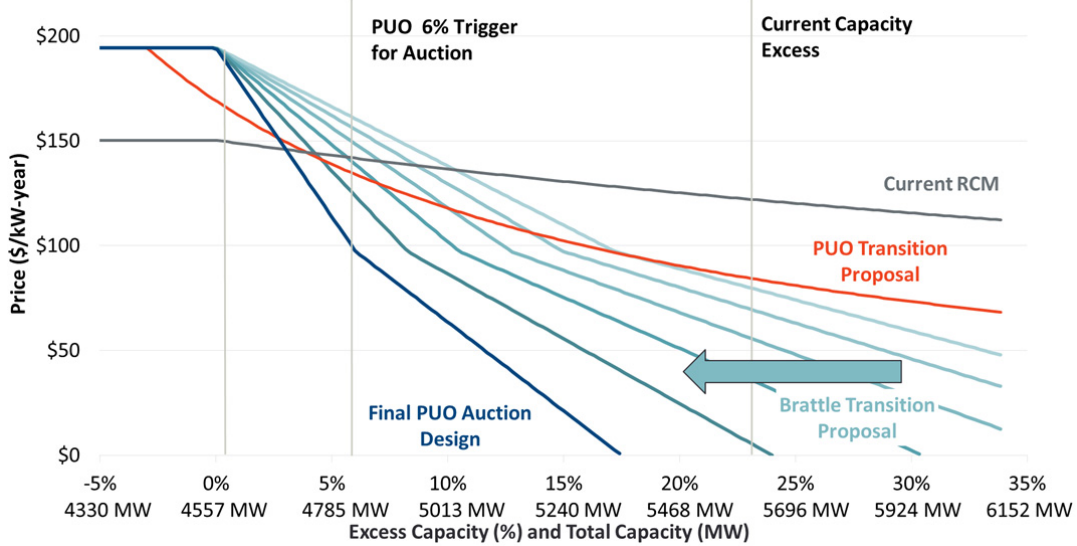
<sup>14</sup> Conducting an auction with a very flat demand curve would yield very similar results to an administrative mechanism, however as the curve becomes steeper it becomes more important to use an auction rather than administrative payments. This is because with a very steep demand curve there is a greater uncertainty in what the auction-clearing or administrative payment price will be as small changes in system quantity can cause larger changes in price. Thus, an administrative payment system with a steep demand curve would introduce large risks for suppliers that have to commit to selling capacity before they know the price. An auction solves this problem by allowing sellers to specify their offer price, reflecting the minimum payment they are willing to accept.

zero crossing point to make it flatter and have an expected price shock similar to the proposed transitional curve with a -5 slope.

- **Steepening Demand Curves over Time.** The curve would then become steeper each year according to a pre-determined schedule until it equals the final demand curve after perhaps five or ten years. After the initial shock, this would result in gradually lower prices over time to levels reflective of the final auction design. A shorter transition period would allow for greater price reductions, lower customer costs, and fewer incentives for uneconomic supply-side (re-)investments. But the shorter period would come at the expense of a more rapid decline in supplier revenues and thus financial harm to those generators compared to the status quo. Selecting an appropriate transition period would need to balance these competing interests.
- **A Fixed Timetable for Achieving the Final Design.** We propose that this transition to the final demand curve would be pursued according to a fixed, pre-determined schedule. A fixed timeline will eliminate the incentive for generators to maintain excess capacity to delay the final auction. It would reduce regulatory uncertainties and allow suppliers to offer their capacity based on more reliable long-term expectations of future prices and market design.

Figure 3 illustrates how this proposal could be implemented with progressively steeper demand curves over a pre-specified five-year transition period until it equals the final PUO demand curve proposal. While the exact form of the final demand curve is yet to be specified, the interim demand curve proposal could adopt some reasonable approximation (as we have done in this illustration), or could start with the proposed transition curve with a slope of -5.

**Figure 3  
Proposed Demand Curves**



*Sources and Notes:*

The dark blue curve is a rough approximation of the PUO’s proposed curve with a 17.5% zero crossing point (in line with the PUO’s 15-20% proposal) and a cap set at 110% of the 2016/17 MRCP. The convex shape is based on PJM’s 2018/19 Base Residual Auction (BRA) curve, see PJM (2015) and PUO (2015).

Brattle’s five transition curves are proportional to the same BRA curve and start with a zero crossing point of 50% and step linearly into a crossing at 17.5% five years later, with the starting point established such that the initial price shock would be similar to that realized under the PUO’s transition proposal.

**B. ILLUSTRATIVE PRICE TRAJECTORY**

In Figure 4 we show the same illustrative price trajectory from the PUO transition proposal discussed in Section II.B above, but now comparing an alternative price trajectory if following the Brattle five- or ten-year transition proposal. We reiterate that this illustrative price trajectory is simplified in that it does not account for any supplier response other than assuming that 25% of the current excess would exit in the first year of the transition (with no other changes thereafter). This version of the PUO price trajectory does not consider the additional “shock” effect that could result from excluding then re-including demand response.

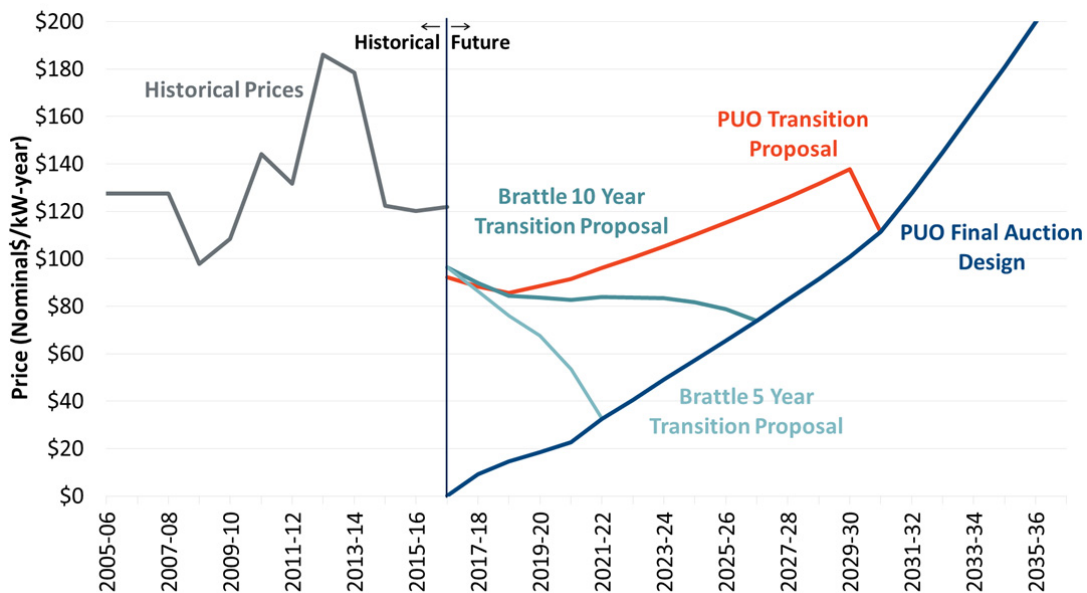
The alternative auction-based approach that we propose would also have an initial shock that could be sized to be similar to the PUO proposal. Prices would then decline for several years as the demand curve becomes steeper, but then begin rising again as the capacity excess diminishes toward long-run equilibrium levels. Lower prices and customer costs could be achieved in the intermediate years if a shorter five-year transition period were selected, benefiting customers by reducing costs further and faster. These same price reductions would be a greater financial harm to generators and demand response providers compared to the status quo and the PUO’s proposal. These low prices and the associated financial harm under the five-year version should be distinguished from low prices that occur as the result of a “shock,” which we would characterize as a sudden or unanticipated change. Lower prices under the five-year transition period would be financially harmful to suppliers, but not a “shock” in that the duration of the transition proposal would be established in advance and not changed arbitrarily.



On the other hand, a longer duration transition period could be selected, with a ten-year transition resulting in relatively flat and more stable prices for the duration of the transition. Selecting the transition period will necessarily require balancing the interests of customers (who would benefit from lower prices under a shorter transition), versus suppliers (who would benefit from higher prices under a longer transition).

In either case, this alternative transition proposal would reach the final auction design after a pre-specified number of years, and would avoid the second price shock at auction implementation that would occur under the PUO proposal.

**Figure 4**  
**Reserve Capacity Clearing Prices**  
 Assuming 25% of the Current Excess Exits in the First Year and No Other Supply Changes Occur



*Sources and Notes:*

Historical price data from AEMO (2016), 2016-17 supply data are from IMO (2014).

All price trajectories assume that 25% of the current excess exits the market in the first year of the transition, with no other supply changes thereafter. Excess quantity calculated using 50% PoE forecasts from IMO (2015). Load projected to grow at 0.74% per year after 2024/25 capacity year, per average growth rate from IMO (2015).

**C. COMPARISON OF TRANSITION PROPOSALS**

We believe that our proposed mechanism will better meet the PUO’s stated design goals for the transition mechanism, as summarized in Table 1. Our alternative proposal would be less likely to encourage uneconomic (re-)investments in generation, result in lower customer costs, and depending on the transition duration could be designed to achieve a greater level of price stability over time. It levels the playing field in a way that will enable the most cost-effective resources to supply capacity, thus ensuring that the highest-cost resources exit the market first. Our proposal does not avoid the fundamental tradeoff between customer costs and suppliers’ revenues however, but does allow for a reasonable balance to be made through the selection of the transition period.

**Table 1**  
**Comparison of Transition Proposals against the PUO's Design Goals**

Goal <sup>15</sup>	PUO's Initial Proposal	Alternative Proposal
<b>Reduce cost of excess capacity to consumers</b>	<ul style="list-style-type: none"> <li>Capacity prices would initially drop below current levels, but then begin increasing each year thereafter</li> <li>Prices would remain substantially above economically efficient levels for a protracted period</li> </ul>	<ul style="list-style-type: none"> <li>Lower capacity prices throughout the transition and a shorter transition period</li> <li>Prices could be substantially lower with a shorter transition period</li> </ul>
<b>Gradual price movement to minimise price shocks</b>	<ul style="list-style-type: none"> <li>Two sharp downward price shocks will bookend a period of price increases (the second shock could be mitigating by adjusting the trigger, but that would prolong the transition period)</li> <li>Timing of second shock will not be pre-determined</li> </ul>	<ul style="list-style-type: none"> <li>An initial price shock similar to the PUO transition, with steady or declining prices over time</li> <li>Approximate changes to price can be anticipated by the market based on the pre-determined schedule of steepening demand curves</li> <li>Shorter transition period will have steeper yearly price declines (but still somewhat predictable if the schedule is pre-determined)</li> </ul>
<b>Discouraging new entry</b>	<ul style="list-style-type: none"> <li>Medium-high capacity prices may attract more investment, including through uprates and possibly even new generation (though less likely)</li> </ul>	<ul style="list-style-type: none"> <li>Lower prices would be less likely to attract incremental investment compared to the PUO proposal</li> <li>But a longer transition proposal would still maintain moderate prices at which uprates could still be inefficiently incentivized</li> </ul>
<b>Encouraging mothball/retirement of inefficient capacity</b>	<ul style="list-style-type: none"> <li>Medium-high prices may encourage reinvestment in aging units rather than retirement or mothballing</li> <li>Trigger proposal may further encourage reinvestment in uneconomic resources in order to postpone the shift to auction</li> </ul>	<ul style="list-style-type: none"> <li>Level playing field among resources incents the most competitive resources to stay and the most costly to leave</li> <li>Lower prices would be less likely to incentivize uneconomic re-investments (particularly with shorter transition periods)</li> </ul>

<sup>15</sup> See PUO (2015), p. 45.

## List of Acronyms

AEMO	Australian Energy Market Operator
BRA	Base Residual Auction
DR	Demand Response
IMO	Independent Market Operator
kW	kilowatt
MRCP	Maximum Reserve Capacity Price
MW	Megawatt
PJM	PJM Interconnection
PoE	Probability of Exceedance
PUO	Public Utilities Office
RCM	Reserve Capacity Mechanism

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