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| Date | 3/13/23 |
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| Market Segment | Independent Power Producer |

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| Comments |

**Please provide an Executive Summary and comments on each option below:**

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| Executive Summary |
| The fundamental premise of PCM is that generators are paid for performance during the highest risk hours of the year. The goals of PCM can be achieved with minimal system and market impacts by using the currently existing market mechanisms, in particular, the ORDC. For investor certainty, this can and should be done now, using the approach described below. While this could be a bridge mechanism, it could also be the path forward to implement the final PCM mechanism with a shorter implementation time and for a lower implementation cost.  One challenge with the implementation of the PCM is the high uncertainty of the Performance Credit (PC) quantities and the administratively-set PC clearing prices, which are dependent on random outcomes in the highest risk hours – as the graph in page 106 of the E3 report clearly shows. This level of uncertainty would make any investor nervous, thereby increasing the cost of capital. Another challenge is that current market bilateral contracting does not take into account PCs, which would be a new capacity product that would be charged to loads. Load Serving Entities currently have bilateral contracts that fully hedge their load obligations, prior to PCM implementation. Utilizing existing market mechanisms to implement PCM will allow LSEs to continue to hedge using existing bilateral agreements. In addition, given the risks of uncertainly in the specific highest risk hours in any year and market power issues, the forward PC auction is likely to clear near the cap. Credit impacts of such a change are also significant.  All these challenges can be overcome and a more certain return on dispatchable resource investment can be achieved by using the current ORDC mechanism with ex-ante and (optionally) ex-post adjustments as described below. This approach achieves the Commission’s goals for PCM utilizing existing ERCOT market tools, thereby reducing the cost and time for implementation.  The proposed ORDC Performance Credit Mechanism does the following:   * Sets a reliability standard based on Expected Unserved Energy (EUE). * Sets a target Peaker Net Margin (PNM) as percentage of Net Cost of New Entry (Net CONE) based on a demand curve of Percentage of Net CONE as a function of EUE. * Ensures that, on an annual basis, target PNM is met through targeted increases of the ORDC adders for the forecasted highest reliability-risk hours (“Performance Credit Prices” or “PCPs”) (essentially the same as the PC clearing prices under the PCM).   + Market Participants would know before the DAM that an “Hour of Highest Reliability Risk” will be occurring in the following Operating Day and that the ORDC will be adjusted for that hour(s).   + Option 1: If this over- or under-collects target PNM, a true-up (ex-post PCP adjustment) will occur at the end of the resource adequacy period (whether seasonal or annual).   + Option 2: If this over- or under-collects target PNM, the target PNM for the following resource adequacy period will be appropriately adjusted (i.e., no ex-post adjustment of PCP).   We have set forth the details of the proposed ORDC Performance Credit Mechanism under Option 1, below.  Additional Market Changes  In addition to our comments on the Options, we also believe there are certain enhancements to the current market design that should be made now as part of the bridging solutions. Regardless of whether the Legislature ultimately moves forward with PCM, the following market design changes need to be implemented to improve the current design:   1. Change the penalty function on Non-Spin in the RUC engine so that RUC properly accounts for the fact that online Non-Spin capacity is always available to SCED and offline Non-Spin can be deployed prior to RUC commitment. This would significantly reduce the amount of RUC commitments. 2. Correct the total disconnect between the ORDC curve and the demand curve for various Ancillary Service (AS) products. Currently DAM procures all AS at any cost whereas ORDC implies no value to most of at least the Non-Spin procured. This disconnect implies that there is no market price signal to commit the required capacity that ERCOT deems necessary for their current conservatively reliable operations. The ORDC needs to be modified to address this inconsistency by reflecting the value of AS in the ORDC curve. Under Real-Time Co-optimization (RTC) with the same AS Demand Curves being used in DAM and SCED, the outcome of the current ORDC (which is an aggregation of ASDCs) would be non-procurement of Non-Spin and possible reduced procurement of other AS products. This ORDC modification may go a long way in minimizing any “missing money” issues. 3. 4CP TCOS allocation sends a particularly inappropriate price signal going forward when such 4CP intervals may occur when the market generation capacity far exceed load. CRR Auction Revenue Distribution (CARD) is also sending inappropriate price signals during non-summer months. Both should be allocated based on 12 Net Peak Load basis. This is likely a longer term change. 4. Change FFSS to a cost-based mandatory service for all thermal resources that can provide it at the reasonable cost and greatly expand FFSS to meet winter needs. This is described in detail in prior comments submitted by HEN to the PUCT. 5. Modify RMR criteria to include extending RMR contracts to retiring resources essential to maintain the specified reliability (EUE) requirement.   With the changes above, the amount required to cover the difference between Net CONE and PNM are likely to be significantly reduced, which will help modify the Net CONE recovery amount of the manual PCM. |
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| Option 1: Implement a Basic settlement component of PCM manually |
| HEN proposes an ORDC Performance Credit Mechanism, as detailed below. While this could be a bridging option, this proposal accomplishes the goals of the PCM at a lower and faster implementation cost and timeline.  ORDC Performance Credit Mechanism   1. Establish the Reliability Standard 2. Use a reliability measure such as Expected Unserved Energy (EUE) that is more meaningful than the current flawed LOLE measure. The key flaw with the LOLE is that the LOLE is the same whether 1 MW of load is shed for 1 hour in a day or 20,000 MW of load is shed for that whole day – obviously these two events are not even close in their impact on the system and on lives. 3. The EUE measure (or whatever reliability standard is selected) needs to account for correlated common mode failure when one event causes multiple systems to fail, such as the outage of many natural gas resources and wind resources during a severe winter storm. With the addition of massive amounts of new solar and battery storage facilities, prolonged load shed during the summer is unlikely except possibly during an extreme drought accompanied with extreme heat. Even though an extreme winter storm may be a one-in-ten-year event (with climate change, it may be a more frequent event), it is the greatest risk and contributor to EUE if common mode failure is taken into account. Thus, if during a severe winter storm 10,000 MW of load is shed (roughly based on latest winter SARA taking into account Phase 1 market design improvements) for 72 hours, EUE would be 0.1x10,000x72 = 72,000 MWh. Given the amount of critical load, regulators may be more comfortable with TDSPs’ ability to rotate 5,000 MW of load shed amongst non-critical load so that no load is out for more than about 7 hours in this 72-hour period. Then, the Target EUE would be about 36,000 MWh. This Target EUE would be used to establish the Performance Credit Prices, as described in Subsection B, below. 4. HEN notes that the Loss of Load Probability (LOLP) used in determining the ORDC must also take into account common mode failure. To ensure that low probability but very high impact events are accounted for in LOLP, importance sampling techniques can be used. This is particularly important for winter months. Due to the seasonal and Time of Use (TOU) nature of LOLP, it may be more appropriate to use ORDCs that are seasonal and possibly even TOU, although this may be a longer term change than the timeline required for Phase 2 Bridge Options. 5. Establish the Performance Credit Prices   Once the reliability standard is selected, then the Performance Credit Prices (“PCP”) can be determined. LIKE PCM, the production of PCs is based on availability during the Hours of Highest Reliability Risk and costs are allocated based on Load-Ratio Share during those hours. This is done using existing Settlement systems by increasing ORDC adders by the PCP during those hours. For purposes of this explanation, we assume that EUE is chosen as the reliability measure and that, currently, the ERCOT system does not meet that measure. To determine the PCP, a demand curve is established based upon the cost of new resources needed to achieve the reliability standard. This requires establishing the target Peaker Net Margin (“PNM”). The target PNM should be set at a specified percentage (such as 95%) of the Net Cost of New Entry (“Net CONE”). The reason for setting the PNM below Net CONE is that there are likely to be annual PNMs that far exceed Net CONE every 5-10 years. Also, resources may have additional revenue sources, such as Ancillary Services (AS) or forward sales at a premium, that are not accounted for in PNM. Once the methodology for calculating Net CONE and PNM are established, the following steps would be followed:   1. Establish the resource adequacy period. For purposes of this explanation, we are using an annual resource adequacy period, but a shorter period, such as a seasonal period, could also be used. HEN proposes starting each Resource Adequacy Year (RAY) (or a seasonal period) in December of the prior calendar year because winter storms are likely to have a large impact on PNM if they occur. 2. Forecast PNM for the next RAY (or other resource adequacy period). ERCOT would forecast the PNM for the next RAY and estimate the difference between 95% Net CONE and this forecasted PNM. 3. Establish the demand curve. Using EUE as the reliability standard, the demand curve would start at 95% of Net CONE and continue until the EUE target is met (i.e., 36,000 MWh using the calculation set forth above) and then decrease to 0% of Net CONE when EUE is 0 MWh (which economically should not be achieved). The Percentage of Net CONE Guarantee would be determined each year based on the value corresponding to the EUE determined by ERCOT for that year, as shown in the demand curve below. ERCOT would establish the Percentage of Net CONE Guarantee each year for the following year.      1. Forecast the Hours of Highest Reliability Risk. As part of the implementation of this proposal, a defined number of Hours of Highest Reliability Risk would be established, and during those Hours, the PCP would be added to the ORDC as an adder. (For our example with an annual resource adequacy period, we are using 30 hours.) ERCOT would be responsible for forecasting the Hours of Highest Reliability Risk for the resource adequacy period. This would be done through an ERCOT-issued market notice at approximately 6 am of the day ahead of the Operating Day on days when ERCOT forecasts that one or more Hours of Highest Reliability Risk will occur. The Hours of Highest Reliability Risk can be determined by lowest Physical Responsive Capability (PRC) adjusted for ERCOT out-of-market action (multiplied by LOLP once seasonal and TOU LOLP is implemented). However, if ERCOT believes that calculating the expected PRC would be too difficult or uncertain, Peak Net Load could be used instead to determine the hours of highest reliability risk. (Peak Net Load would be defined as the anticipated load remaining net of forecasted wind and solar generation.) 2. Establish the Performance Credit Prices (PCPs). ERCOT would increase the ORDC adders for the Hours of Highest Reliability Risk that are forecasted by ERCOT for an operating day. This increase in the ORDC adders is the PCP. The amount of the PCP is calculated such that the increase in ORDC over the total Hours of Highest Reliability Risk during the resource adequacy period would be estimated to recover the difference between 95% Net CONE and unchanged PNM, subject to the SWCAP in each hour. In the event of a severe winter storm, no adjustments might be needed for the rest of the compliance period after the event. That is the reason for starting RAY in December. In general, ERCOT should err on the side of over-recovering PNM since that would imply ERCOT owing those QSEs that were short (typically loads) and having receivables from those QSE that were long (typically generators) during those times – which is a good position for ERCOT to be in from a credit perspective. 3. Settlement using the PCP. ERCOT would post the unaltered Settlement Point Prices (SPPs) and the PCPs in ORDC. ICE could continue to settle using unaltered SPPs and not deal in PCPs. ERCOT would settle the market using the unaltered SPP+PCP (the sum of which is treated as SPP for settlement purposes). Thus, all available capacity eligible for PCs are paid the PCP in either energy settlement or AS Imbalance Payment and all Loads are charged the PCP based on Load Ratio Share either in energy settlement or AS Imbalance related charge. The PCPs could be trued up at the end of the compliance period (see options below), but the DAM is final and any premium reflected in DAM clearing prices in anticipation of PCPs would not be altered. This is exactly the same as what would happen with PCM based on QSEs’ forecast of the 30 riskiest hours. If ERCOT appropriately settles the Parties, there would be no change in the current credit calculations since ORDC is already part of the settlement process in prices and AS imbalance payments/charges. 4. True-Up Options. We have considered two options to address the situation where the total PCPs paid during the compliance period either under-recover or over-recover 95% of Net CONE.   Option 1: At the end of the compliance period, ERCOT would perform a “price correction” resettlement to adjust the PCPs ERCOT set throughout the compliance period so that (i) PNM is exactly equal to 95% Net CONE and (ii) the PCPs were only applied to the actual Hours of Highest Reliability Risk during the compliance period. We anticipate that these would be relatively minor ex-post adjustments, compared to settling all of the PCPs ex-post.  Option 2: There is no ex-post price correction. Instead, any variance between the PNM and 95% Net CONE would be accounted for in the following compliance period.  The net effect of this approach is that ERCOT would be paying a “performance credit” in the highest risk hours for those QSEs that are long energy and capacity and ERCOT is charging those QSEs that are short energy and capacity while not impacting any hedged positions in the market. To give market participants time to modify their hedged positions and because unhedged positions and resource outages pose a greater risk with this change, the change should be phased in, say 70% of Net CONE in first year, 80% of Net CONE the second year, and then 95% of Net CONE on the third year onward assuming that the EUE target is not reached in that timeframe. |

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| Option 2: Procure Additional Ancillary Services |
| Procuring additional AS not only provides dispatchable resources additional revenues through the provision of the increased AS quantity but also increases energy price related revenues. Both ECRS and Non-Spin are ancillary services that address the need for operational flexibility and reserves and would not require additional modifications or implementation. ECRS is a two-hour duration product that is designed to address operational issues that result in periods of high Peak Net Load, such as solar ramping or unexpected outages. Non-Spin is a four-hour duration product that has been used successfully by ERCOT since Winter Storm Uri to procure reserves. HEN proposes that ERCOT establish a quantity of ECRS and Non-Spin that would (i) address operational and reserve requirements and (ii) send a market signal that additional dispatchable generation is required in ERCOT. This should be accomplished by a public announcement by ERCOT of the quantities of ECRS and Non-Spin that it will procure for the next three to five years. |

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| Option 3: Enhance the Operating Reserve Demand Curve (ORDC) |
| HEN’s first recommendation is to adopt the ORDC Performance Credit Mechanism explained under Option 1, above. In addition, we believe there are two additional changes that should be made to the ORDC, regardless of whether our ORDC Performance Credit Mechanism is adopted.   1. Correct the disconnect between the ORDC curve and the demand curve for various AS products. Currently DAM procures all AS at any cost whereas ORDC implies no value to most of at least the Non-Spin procured. This disconnect implies that there is no market price signal to commit the required capacity that ERCOT deems necessary for their current conservatively reliable operations. The ORDC needs to be modified to address this inconsistency by reflecting the value of AS in the ORDC curve. Under RTC with the same AS Demand Curves being used in DAM and SCED, the outcome of the current ORDC (which is an aggregation of ASDCs) would be non-procurement of Non-Spin and possible reduced procurement of other AS products. This ORDC modification may go a long way in minimizing any “missing money” issues. 2. LOLP used in determining the ORDC must also take into account common mode failure. In order to ensure that such low probability but very high impact events are accounted for in LOLP. Importance sampling techniques can be used to accomplish this. This is particularly important for winter months. Due to the seasonal and TOU nature of LOLP, it may be more appropriate to use ORDCs that are seasonal or even TOU. This may be a longer term change than the timeline required for Phase 2 Bridge Options. |

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| Option 4: Backstop Reserve Service (BRS) |
| BRS should be used to prevent retirement of existing resources until new generation has been built. BRS to prevent resource retirements can be implemented at a lower cost by modifying RMR criteria to include extending RMR contracts to retiring resources essential to maintain the specified reliability requirement. |

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| Option 5: Contracts for Capacity |
| Contracts for capacity can be implemented simply by modifying RMR criteria to include extending RMR contracts to retiring resources essential to maintain the specified reliability requirement. |

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| Option 6: Publish Indicative PCM Values |
| Under the recommendation for Option 1, ERCOT can determine and post the increase in ORDC adders for the 30 riskiest hours of each year over the past 10 years. |

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| Conclusion/Additional Comments |
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