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EXECUTIVE SUMMARY

Key Themes

- a. **Take advantage of new technologies.** Solar, wind, and batteries are critical to providing low cost power to the ERCOT system. Solar saved Texas ratepayers \$8B in the first 8 months of 2022. Batteries help firm renewables and increase flexibility and reliability of the ERCOT system. Market design should make the most of these new technologies.
- b. **Create and maintain stable business environment through regulatory certainty.** The Commission must avoid market designs that suddenly and dramatically alter the economics of existing generators. Such action would threaten investor confidence in Texas, increasing consumer costs by increasing investor risk. This includes assignment of significant new ancillary service costs to existing generators as well as any market structure that shifts significant energy market revenues to a capacity market.

Market Design Recommendations

- a. **Recommend against PCM as designed by E3.** To assume that real-world investment will occur as shown in E3's single-year, theoretical, equilibrium model is gambling with ERCOT reliability. PCM would result in cost increases to consumers without directly increasing reliability. It is not guaranteed to result in new dispatchable generation due to insufficient tenor to support new investment and a demand curve that can change every year. If sufficient new generation does not appear, it would result in higher consumer costs (additional PCM costs would not be offset by lower energy costs), windfall profits for a set of existing thermal generators, and lower reliability. Rather than catalyzing new investment, change and uncertainty could reduce investment. It would be difficult to design correctly and the novel nature makes it difficult to underwrite for project financing. It could potentially be revised to be workable but that would require significant stakeholder discussions lasting at least 12 months; in the meantime it is premature to definitively adopt it as a market structure. *(Response to notice questions #1, 2, 10)*
- b. **Recommend BRS.** BRS is the best, least cost, near-term measure for improving winter reliability. Unlike the PCM or other capacity market constructs, it is simple and guaranteed to result in additional generation and increased reliability. As a targeted, out-of market solution, it does not disrupt existing energy market operations. If the goal is incentivizing new dispatchable generation, designing the BRS to include 5+ year contracts to on-ramp new generation resources is a straightforward solution. The BRS can be implemented in the near term and serve as bridge to longer term market reforms. *(Response to notice question #8)*
- c. **Consider addition of DEC.** A DEC proposal could be considered in conjunction with the BRS to provide incentives for new dispatchable, fast-ramping generation that can be right-sized to address chronic short-duration volatility driven events and the steepening solar "duck-curve."

Process Recommendation: Recommend PUC adopt initial targeted BRS as outlined in its December 2021 Blueprint, and begin implementation in the near term. In parallel, analysis and stakeholder input regarding longer term market reforms should run for at least 12 months. This approach achieves near term reliability improvements while ensuring broader market changes are not made in a hasty fashion with questionable outcomes and unintended consequences. There is no urgent problem that merits taking shortcuts in designing smart longer term market reforms. It is prudent to allow the market to adjust to the new ECRS and other reforms prior to adopting major new market structures. *(Response to notice question #11)*

PROJECT NO. 54335; PROJECT NO. 52373

**REVIEW OF MARKET REFORM
ASSESSMENT PRODUCED BY
ENERGY AND ENVIRONMENTAL
ECONOMICS (E3)**

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**PUBLIC UTILITY COMMISSION
OF TEXAS**

**REVIEW OF WHOLESALE
ELECTRIC MARKET DESIGN**

COMMENTS OF

CLEARWAY ENERGY GROUP LLC

COMES NOW Clearway Energy Group LLC (“Clearway”) to file these comments regarding the Public Utility Commission of Texas (“Commission”) review of market reform produced by Energy and Environmental Economics (E3) (“E3 Report”) and accompanying staff memo filed in Project 52373, Review of Wholesale Market Design, and noticed for comment under Project 54335 on November 10, 2022.

INTRODUCTION

Clearway builds, owns, and operates wind, solar, and gas power plants, as well as stand-alone battery storage systems and storage paired with generation. We are one of the largest independent power producers in the U.S., with significant footprints in California, Texas, and 26 other states. In Texas we currently operate over 1.8 GW of wind and solar generation, representing over \$2 billion in capital investment in the state. We have over 3 GW of new wind, solar, and storage under development in Texas representing a multi-billion dollar commitment to the ERCOT market that is sensitive to the market reforms under consideration by the Commission.

In considering market design reforms, we encourage the Commission to:

1) Take advantage of the low cost power that solar and wind can provide, as well as the flexibility that new battery technologies can provide. In 2022, solar and wind are on track to save consumers an estimated \$11 billion by lowering wholesale energy prices¹. Batteries enhance the value of solar and wind to the grid by helping firm renewable generation and increasing reliability during times of peak system need. Advancing market reforms that do not take advantage of these features would be a missed opportunity to lower electricity rates for consumers and build a more forward-looking, resilient grid in Texas.

2) Prioritize regulatory certainty to restore and maintain a stable business environment for power producers in Texas. Any market structure that suddenly assigns significant new costs to existing generation that has been financed and constructed under a certain set of regulatory expectations would send a chilling signal to investors that Texas is risky. This will simply raise financing costs going forward, which will be passed through to consumers in the form of higher electricity costs. Similarly, a new market structure that dramatically shifts revenues out of the established energy market into a new capacity market mechanism such as the Performance Credit Mechanism (PCM) that only certain generators could access would undermine longstanding investments in ERCOT's energy market. Any such market design changes should be vetted through a much more robust and transparent stakeholder process than what has occurred to date in Project 52373 and this current 30-day comment round in Project 54335. This transparency and gradualism are crucial for restoring and maintaining investor confidence.

¹ The Impact of Renewables in ERCOT, published by IdeaSmiths LLC in October 2022. Available at: https://www.ideasmiths.net/wp-content/uploads/2022/10/IdeaSmiths_CFT_ERCOT_RE_FINAL.pdf

MARKET DESIGN RECOMMENDATIONS

A. Do not adopt a Performance Credit Mechanism framework without further analysis and consideration of alternatives. (*Response to Notice Questions #1, 2, 10*)

The PCM as proposed by E3 would result in significant cost increases for consumers without increasing reliability, at least in the near term. It is also questionable whether it would actually incentivize new dispatchable generation that would increase reliability in the longer term. The most predictable outcome from the PCM as proposed is that it would create windfall profits for a set of existing thermal generators and raise consumer electric rates in the initial years and likely beyond. E3 estimates the cost of the PCM (i.e. the value of PCM payments to generators) at \$5.67 billion per year². Given that it takes years to develop new dispatchable generation, unless the PCM launch were scheduled several years following adoption of the details of the PCM framework, the PCM payments in the first several years of the PCM would flow to existing generators, creating an entirely unnecessary windfall for those large corporations at ratepayer expense.

E3 posits that the cost of the PCM would be offset by a reduction in energy prices, such that consumer electricity rates would remain relatively stable. However, the purported reduction in energy prices relies on an assumption that generation developers will be able to underwrite an anticipated revenue stream from the PCM, such that it will actually result in new dispatchable generation that would offer lower cost energy into the energy market and suppress prices. Obviously, this energy price suppression cannot occur until the new generation is

² E3 Report, p.6

operational, thus again unless PCM launch were delayed several years post adoption of the detailed PCM rules, the energy price suppression would not occur in the initial years of the PCM. In those initial years, consumers would experience rate increases to cover the cost of the PCM, without experiencing a corresponding decrease in energy prices or an increase in reliability.

Beyond the initial years, the assumption of energy price suppression remains highly questionable given the novel nature of the PCM and characteristics that will make it difficult to underwrite PCM revenue. In particular, the fact that the PCM demand curve could change each year and the lack of a long-term contract (e.g. 5-10 years) will make it difficult for developers of new dispatchable generation to rely on an anticipated PCM revenue stream to finance new plants.

Clearway retained Energy GPS Consulting, a firm with extensive experience in energy system modeling and trading in the ERCOT market, to review both the E3 Report and the ICF Assessment of ERCOT Market Structural Changes (“ICF Report”) ³ filed in Project 52373 on October 26, 2022. Energy GPS offered the following observations:

The E3 analysis employs a standard, forward-looking, equilibrium-based production cost model. These models begin with the existing demand, generating resources, and transmission grid. Then, the model accounts for known additions and retirements. Finally, the model adds new generation and retires existing generation based on the *modeled* economics. This modeled economic outcome is based on a large stack of assumptions that may or may not play out in the real world. **The largest flaw in E3’s equilibrium model is the assumption that the modeled market design will result in investment in the asset mix they have modeled.** There are no guarantees that the market will deliver the equilibrium response they have modeled.

³ Assessment of ERCOT Market Structural Changes by ICF Resources, Inc., filed by the Texas Consumers Association in Project 52373 on October 26, 2022. Available at: https://interchange.puc.texas.gov/Documents/52373_380_1248378.PDF

While equilibrium-based modeling is standard in electricity markets, there is broad recognition that these models are deeply flawed; electricity markets are almost never in equilibrium. For example, it is difficult to model next month's electricity prices with any certainty, let alone many years in the future. Production cost models are not good at predicting future capacity prices. Let alone future capacity prices that will result from a market that does not exist. Most investment decisions are backed by models which incorporate uncertainty (known as stochastic) which the E3 model does not include. A modeled, single-year revenue that is sufficient to provide adequate returns does not mean that there are sufficient returns across the life of a project. ERCOT is the market that is least likely to be in equilibrium because of generation divestment on the wholesale side and complete retail access. Sophisticated users of equilibrium-based models try to understand the model's flaws and biases to interpret the results. **In this case, it appears E3 has assumed away the equilibrium-based production cost model flaws and shortcomings and framed the results as having both certainty and validity. That is a potentially dangerous stance.**

With respect to the generation investment decision, the E3 Report assumes equilibrium conditions persist for 2026, and presumably indefinitely, which will create net revenues for natural gas combustion turbines (CTs) of \$93.50 per kW-year. The study further assumes that the CT owners or investors will believe that those numbers are achievable for the long term. Energy GPS has reviewed many of E3's studies in CAISO and the Western United States. The Western United States has vertically integrated markets where regulators direct utility procurement to achieve new generation portfolios. In these markets, if E3's modeled results are not correct it doesn't necessarily impact the amount of new generation that is built because if regulators approve utility investment, then said investment will happen. If the modeled energy and capacity prices are wrong, that risk is borne by ratepayers rather than investors. The dynamic in Texas is different – there are no ratepayers who can take the long-term price risk associated with asset revenues. Instead, those risks are borne by investors. It is extremely doubtful that investors (without the ability to allocate costs to ratepayers) would have sufficient confidence from this E3 study to make major investments in new generation in ERCOT.

If investors don't react to this single-year, equilibrium model by bringing to life or keeping alive 5,000 MW of generation that E3 shows as retiring in its energy-only case, then all of the results that follow from this assumption are wrong. Further, if investors in assets that would be harmed by depressed energy prices resulting from a capacity market construct (be it

LSERO, FRM, or PCM) reduce their investments, and investors in assets that would benefit from a capacity market construct don't make the assumed level of "equilibrium" investments, the result could actually be *lower* reliability in the medium term.

ICF has a significant consulting practice that supports assets purchases and sales. ICF's work is very much grounded in the real-world of investment in electricity infrastructure. The ICF study properly identifies the challenges of its modeling and sensitivity to assumptions, and evaluates a number of years, making it a more thoughtful and realistic assessment of the ERCOT market proposals.

This critique of the E3 Report highlights the importance of further analysis and stakeholder process to refine a longer-term market design for the ERCOT market. It would be irresponsible and misguided for the Commission to make a binding decision to adopt the PCM or any other new capacity market construct based on this E3 Report.

There may be ways to adjust the PCM structure to make it a more workable framework but such concepts require significant stakeholder discussions that would take at least 12 months if run properly. In the meantime, it is premature to definitively adopt the PCM as a market structure. The Commission should instead follow through on its commitment to launch a Backstop Reliability Service to increase reliability in the near term, while continuing to evaluate longer term market design options with the benefit of more robust analysis and stakeholder input.

B. Implement a Backstop Reliability Service (*Response to Notice Question #8*).

A Backstop Reliability Service (BRS) is the least cost, most targeted near-term market design to increase winter reliability, and the Commission should adopt it. In contrast to much more complex and uncertain capacity market constructs such as the novel Performance Credit Mechanism, the BRS draws a simple direct line from goal (more dispatchable generation) to

outcome. A payment to generators that would otherwise retire provides the immediate needed reliability benefit. Ring-fencing the impact of those generators on energy and ancillary service prices maintains the status quo economics of the ERCOT energy market. Thus, a BRS will not threaten the economics of existing generators nor increase the risk profile of ERCOT's energy market in the eyes of investors. A BRS can serve as a bridge policy – it can be right-sized and can sunset when appropriate, within 5-10 years.

Given the time required to develop new dispatchable generation, the BRS in the initial years would be filled by generators that would otherwise retire. That said, the BRS can and should also be designed to incentivize new dispatchable generation. Attracting new generation will require a longer contract term than what existing older generators would need, likely a minimum 5-year term, as well as more careful consideration of how to properly return the new participating generators to the market after that initial 5-year term.

Unlike the capacity market constructs like PCM which require heroic assumptions about how the capital markets will respond to this novel new policy, the BRS provides a clear de-risked path to achieving the reliability results that are desired at a known cost. The ICF Report, which contains more realistic capacity market sensitivities than the E3 Report, finds the BRS to be the least cost approach for increasing reliability.

The Commission has already expressed the intent to proceed with development of a BRS in its December 2021 Market Design Blueprint⁴. We encourage the Commission to follow through with that commitment and begin design and implementation of a BRS in the near term.

C. Consider Dispatchable Energy Credit (DEC) mechanism as add-on to BRS

While BRS can mitigate low probability/high impact scenarios such as winter storms and act as a reliability reserve, a DEC-like proposal can address more day-to-day reliability needs resulting from net load variability by incenting new fast ramping generation. The eligibility criteria for DEC's could potentially be expanded from 5-minute to 10-minute startup requirements which would encourage participation of new gas generation technologies in addition to batteries and demand response.

We note that E3's analysis of the DEC did not properly reflect the DEC structure as proposed. ICF more accurately studied the DEC proposal and found it to be a significantly lower cost means of incentivizing new dispatchable generation versus a capacity market construct.

We encourage the Commission to maintain DEC as an option as it further considers market design reforms via a minimum 12 month stakeholder process informed by expert consultant analysis, with the goal of producing the most efficient and sustainable longer term market design reforms.

⁴ Approval of Blueprint for Wholesale Electric Market Design and Directives to ERCOT, issued by the Commission on January 13, 2022 under Project 52373. Available at: https://interchange.puc.texas.gov/Documents/52373_336_1180125.PDF

PROCESS RECOMMENDATIONS

(Response to Notice Question #11)

We recommend the Commission adopt an initial targeted BRS as outlined in its December 2021 Blueprint, and begin implementation in the near term. ERCOT has already developed a thoughtful list of design questions⁵ to which the Commission could direct stakeholders to respond as a means of kicking off the more detailed design and implementation process.

In parallel, the Commission should continue to analyze and take stakeholder input on other longer term market design mechanisms designed to incentivize new dispatchable generation. Such a stakeholder process should take a minimum of 12 months, include robust and transparent consultant analysis⁶ (more robust and transparent than the E3 Report process to date) and should result in a gradual phase-in of any reforms that are ultimately deemed necessary.

This approach represents a meaningful step to achieve near term reliability improvements while ensuring broader market changes are not made in a hasty fashion with questionable outcomes and unintended consequences. There is no urgent reliability problem that merits taking shortcuts in designing smart longer term market reforms. It is prudent to allow the market to adjust to the new ECRS and other changes underway including adjustments in

⁵ ERCOT memo regarding implementation of Backstop Reliability Service, filed February 9, 2022 under Project 52373. Available at: https://interchange.puc.texas.gov/Documents/52373_339_1186519.PDF

⁶ For example, consultant assumptions and models should be published with time allowed for other stakeholders to run their own analyses and respond. This is a best practice in other markets that allows for better comparison of apples to apples and assists regulators in reaching optimal outcomes.

ancillary procurements and a significant volume of new battery additions coming online prior to adopting any major new market structures.

We look forward to continuing to work in good faith with the Commission and stakeholders on these critical issues.

Respectfully submitted,

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