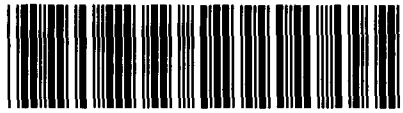

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PROJECT NO. 48539

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REVIEW OF THE INCLUSION OF MARGINAL LOSSES IN SECURTY-CONSTRAINED ECONOMIC DISPATCH

PUBLIC UTILITIES COMMISSION OF TEXAS

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PUBLIC UTILITY COMMISSION FILING CLERK

COMMENTS SUBMITTED BY TENASKA

Tenaska welcomes the opportunity to address the Commission on the important issue of marginal losses and their potential inclusion in SCED and Locational Marginal Prices (LMPs). We address the Commission's questions below.

According to ERCOT's study of the impact of marginal losses, including them in SCED could increase production costs rather than decrease costs. We wish to draw the Commission's attention to this point, and we expand on it below.

1. *What are the benefits of implementing the use of marginal transmission losses rather than average transmission losses in the Electric Reliability Council of Texas' (ERCOT's) Security-Constrained Economic Dispatch (SCED) over the long term?*

The benefits are that, in some cases, overall system efficiency improves. Incorporating the effect of marginal losses into LMP's will typically incent more generation to take place closer to load in the short-run. Purely as a matter of physics, this will lower total losses. Thus the inclusion of marginal losses is usually assumed to improve system efficiency. For example, the independent market monitor (IMM), in its 2016 State of the Market Report, wrote, "Recognizing marginal losses will allow the real-time market to produce more from a higher-cost generator located electrically closer to the load, thus resulting in fewer losses. Optimizing this trade-off in the real-time dispatch lowers the overall costs of satisfying the system's needs."[1] For this reason, the IMM and others have advocated for the inclusion of marginal losses as "best-practice" in LMP formation.

However, ERCOT's *Study of the System Benefits of Including Marginal Losses in Security-Constrained Economic Dispatch* contradicted this important claim.[2] ERCOT found that including marginal losses may lower production costs, but in the High Gas Price Case production costs rose by approximately $1 million compared to the case with average losses. The average gas price in the High Gas Price Case was $3.96/MMBtu, only $0.41/MMBtu higher than the Base Case.[3]

In the Base Case, production costs fell by $11.4 million. A $0.41/MMBtu rise in gas prices swung production cost savings from more than $11 million to a nearly $1 million loss. While Tenaska is not able to say with certainty what would happen if gas prices rose to a level higher than what was assumed in

[1] Potomac Economics, *2016 State of the Market Report for the ERCOT Electricity Markets*, xxvii, https://www.potomaceconomics.com/wp-content/uploads/2017/06/2016-ERCOT-State-of-the-Market-Report.pdf

[2] The ERCOT study assessed marginal losses as they would be implemented in ERCOT. The study results do not, of course, contradict principles related to how marginal losses would affect an idealized system in the abstract.

[3] Gas prices at major Texas hubs last averaged over $4/MMBtu as recently as 2014.

the High Gas Price Case, it seems reasonable to think that there is the potential for a significantly higher delta between average and marginal loss cases.[4]

ERCOT has offered theories about why efficiency declined in the High Gas Price Case, noting that ERCOT dispatch does not optimize around plant start costs. But the result itself of an efficiency loss calls into question the *raison d'être* of the push to include marginal losses in LMPs. While we (and ERCOT) are aware that models are sometimes wrong, if this result is indeed reliable, we recommend that the Commission end this Project and instruct ERCOT to continue using average losses in SCED.

In addition, marginal losses are expected to increase the incentive for future generation to be built relatively closer to load. For reasons mentioned above, some stakeholders view this outcome as a benefit – that is, generation taking place close to load lowers transmission line losses, thereby allowing load to be served at lower total cost. However, given the negative externalities associated with generating power near load centers (which also tend to be population centers), it is not clear that a typical Texas energy consumer would view this outcome positively.

2. *Are the benefits identified in response to Question 1 sufficient to justify the near term costs to the market as a whole? Please consider individual stakeholder implementation costs as well as the costs to ERCOT identified in its study.*

Tenaska does not anticipate significant individual implementation costs.

The costs to the market as a whole are likely to be more long-term than short-term in nature. While the efficiency gains are modest, on the order of $10 million per year, the transfer effects are likely to be large, with load benefitting greatly and generators losing hundreds of millions of dollars per year. (However, see our answer to Question 13.) This is enough to have an impact on generation planning for the foreseeable future, both with respect to new development and retirement decisions.

Tenaska does not take a position here on whether including marginal losses directly contradicts legislative directives or Commission precedent, but it seems to contradict the intent of "postage stamp" transmission and similar legislative efforts to spread the benefits (and costs) of generation across the State.

3. *What are the effects on retail customers and the retail market from the implementation of marginal transmission losses?*

This question, and retail issues generally, fall outside Tenaska's area of expertise.

4. *The ERCOT study of using marginal transmission losses instead of average transmission losses in SCED simulated one year. How would cumulative, multi-year impacts of using marginal transmission losses be different, if at all?*

Tenaska has not performed or commissioned a multi-year study, but straightforward reasoning suggests that generators would be incentivized to site new generation closer to load.

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[4] For reference, in the Low Gas Price Case ($1/MMBtu lower gas prices vs. Base Case), production costs fell by a total of $13.4 million.

5. *What costs would be incurred by market participants if marginal losses were implemented in the ERCOT market? Please provide an estimate of the costs that would be incurred by your company or companies or customers represented by your organization. Please describe the elements of those costs.*

Tenaska would incur negligible direct costs if marginal losses were implemented. Indirect costs, in the form of lost energy margins, would likely accrue to some (though not all) of Tenaska's plants.

6. *How would a decision to use marginal transmission losses affect your company's market systems?*

The effects on market systems would be negligible.

7. *How would a decision to use marginal transmission losses affect your company's internal operations?*

The effects on internal operations would be negligible.

8. *What are the effects on reliability on the ERCOT grid of using marginal transmission losses instead of average transmission losses in SCED?*

Given the potential for significantly lower generator revenues, on the margin it would appear that implementing marginal losses would lead to a lower equilibrium reserve margin and reduced reliability. (However, see our answer to Question 13.)

9. *What effects, if any, would marginal transmission losses have on grid hardening and resilience?*

One can easily envision two countervailing effects on long-term resilience. On the one hand, generation sited closer to load might increase resilience to certain adverse conditions by reducing the total miles traveled over the transmission system.

On the other hand, the geographic dispersion of generation that is enabled by average transmission losses could increase resilience under other conditions.

In either case, we expect the effects to be minimal.

10. *What effects would the use of marginal transmission losses in SCED have on grid reliability in regions of the ERCOT grid where non-synchronous generation is more prevalent?*

The effects would likely be minimal.

11. *How would a decision to implement marginal transmission losses affect investment in new generation resources in ERCOT over the next five years, the next 10 years, and in the years beyond 10 years?*

Over all of these times frames, implementing marginal losses would both (a) incentivize new resources to be located closer to load centers and (b) reduce overall incentives to invest in new generation resources. (On (b), however, see our answer to Question 13.)

12. *How would the implementation of marginal transmission losses affect the composition of the generation fleet in ERCOT?*

Tenaska has no comment.

13. *Assuming the Commission decided to go forward with implementation of marginal transmission losses, what are the key issues related to determining the appropriate treatment and allocation of the marginal transmission loss surplus revenues?*

Tenaska askes the Commission to consider two issues.

First, as demonstrated in the ERCOT study, the implementation of marginal losses would reduce generator revenue by hundreds of millions of dollars annually. This is essentially because the costs imposed on generators under a marginal loss regime are greater than the actual system costs caused by the generators. Contrary to the practice of the FERC-regulated ISOs, which award the over-collected charges to load, ERCOT should return the over-collected charges to the affected stakeholders.

Second, distributing over-collected charges on any marginal basis would introduce a distortion into the market. For example, if the money were distributed to loads on the basis of load-ratio shares, then the actual price paid by load for the marginal MW of consumption would be less than the putative (efficient) price. This distortion might be small enough for the Commission to decide it is safe to ignore, such that the Commission decides to allocate the money on the basis of load-ratio shares or generation ratio-shares.

However, the Commission should also consider allocation methods that will not distort price signals. One possible non-distortionary method would be to allocate to generation on the basis of capacity share.

14. *Does the ERCOT analysis of the benefits of including marginal transmission losses in SCED accurately measure such benefits? Are potential costs to the market or to market participants adequately accounted for?*

While Tenaska acknowledges certain modeling imperfections in ERCOT's analysis, we do not think these issues are sufficient to have materially affected, let alone sufficient to invalidate, the model's main results.[5] We believe the benefits have been measured fairly accurately.

Potential costs are underestimated in two ways important ways. First, generators have reasonably believed that average loss pricing is consistent with the State's policy objectives related to generation

[5] Note that the Brattle report, "Impacts of Marginal Loss Implementation in ERCOT," Oct 11, 2017, estimated similar production cost savings and reductions in generator revenues similar to the ERCOT analysis. See, for example, p 3. http://files.brattle.com/files/5595_impact_of_marginal_loss_implementation_in_ercot.pdf

siting and transmission. While policy reversals are sometimes necessary, the added uncertainty brought about by such changes is a real cost, albeit one that is difficult to quantify.

Second, if the Commission chooses to follow the convention of other ISOs and distribute the marginal loss surplus revenues to load, then the equilibrium reserve margin will be lower than it would be with average losses. Whether this lower reserve margin is worth the cost is separate issue, but it is a cost regardless, and one that is not considered in the ERCOT analysis.

15. *What ERCOT operational changes would need to be made that are not considered in ERCOT's studies?*

Tenaska has no comment.

16. *Would the use of marginal transmission losses in SCED change the ERCOT transmission planning process and transmission build-out?*

Transmission build-out would, on the margin, be reduced over time as generation sited closer to load. But it is not obvious that including marginal losses in SCED would have any impact on the transmission planning process.

17. *Assuming that the implementation of marginal transmission losses results in the location of generation closer to load, what advantages and disadvantages would there be during an emergency event or a market restart to having generation located closer to load?*

Tenaska does not anticipate major advantages or disadvantages relative to the status quo.

18. *What effects, if any, would the implementation of marginal transmission losses have on the Congestion Revenue Rights (CRR) market?*

Tenaska has no comment.

19. *How should the Commission direct ERCOT to implement marginal transmission losses in a way that mitigates any deleterious effects on the CRR market?*

Tenaska has no comment.

20. *Does your assessment of the incorporation of marginal transmission losses change based on the timeline of implementation?*

One reason Tenaska opposes the inclusion of marginal losses is their inclusion would mark a significant change from the policy regime that has held in ERCOT for many years. Tenaska does not support the change regardless of the implementation timeline, but an extended timeline (many years, say) would be preferable to a shorter timeline.

21. *What are the effects of implementing both Real Time Co-optimization (RTC) and marginal transmission losses on reliability and price formation?*

These are distinct issues, as the Commission has recognized by making separate projects. However, the reliability impact of RTC would also be negative due to reduced generator revenues.

22. *Are there any synergies that may result from contemporaneous adoption of both RTC and marginal transmission losses?*

Tenaska is not aware of any such synergies.

23. *What are the effects on retail customers and the retail market from the implementation of both RTC and marginal transmission losses?*

Tenaska has no comment.

Respectfully submitted,

TENASKA

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