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Received - 2021-12-10 11:33:34 AM
Control Number - 52373
ItemNumber - 298

PROJECT NO. 52373

REVIEW OF WHOLESALE ELECTRIC MARKET DESIGN	**§ §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

COMMENTS OF FTI-CL ENERGY

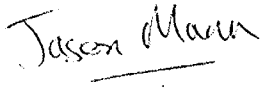
TO THE HONORABLE PUBLIC UTILITY COMMISSION OF TEXAS:

FTI-CL Energy appreciates the opportunity to provide the attached comments in the Commission's review of the Electric Reliability Council of Texas's ("ERCOT") wholesale electric market design. FTI-CL Energy files these comments following our December 1, 2021, memorandum and similarly in response to Commissioner McAdams' November 17, 2021, memorandum proposing the Commission establish a Dispatchable Portfolio Standard (DPS).

FTI-CL Energy was retained by Eolian, L.P. to comment on Commissioner McAdam's DPS proposal, and in particular, (i) the concept of substitute goods in energy markets; (ii) the reimbursement/penalty characteristics of the LSE Obligation and DEC proposals; and (iii) the extent to which the likely duration of the design phase of each proposal may impact on investment.

We appreciate the opportunity to provide the attached memorandum and look forward to working with the Commission and other stakeholders as it considers these complex issues.

Respectfully submitted,



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Memorandum

TO: **PUCT Commissioners**

FROM: **FTI-CL Energy**

DATE: **December 10, 2021**

RE: **Global energy market perspectives on the DEC proposal in ERCOT**

Introduction

In a memorandum dated December 1st, 2021[1], FTI-CL Energy commented on both the Full LSE Obligation proposal and DEC proposals, as well as their potential efficacy for meeting the evolving system needs in the ERCOT region. In the context of the evolving debate in the Review, we now comment further on: (i) the concept of substitute goods in energy markets; (ii) the reimbursement/penalty characteristics of the Full LSE Obligation and DEC proposals; and (iii) the extent to which the likely duration of the design phase of each proposal may impact on investment.

New DEC resources would not automatically displace existing resources on a 1:1 basis.

In our previous memorandum, we explained that targeted mechanisms can be advantageous to the extent they: (i) minimize regulatory intervention and are transitory in nature; (ii) avoid the risk of spending consumer money on the wrong kind of capacity; and (iii) still foster innovation.

We understand that a strong theme of current debate in the Review is whether the DEC proposal would cannibalize existing generation units, based on the premise that DEC-compliant resources would act as substitute goods for existing generation. We set out below two reasons why we consider this not to be the case.

i. The determination of substitute goods in energy markets must take into consideration the matching of resources to needs.

A targeted mechanism relies on the concept of unbundling different attributes responding to different needs. In power systems, resources provide a range of attributes. The terminology and exact definitions differ by system, but some examples are:

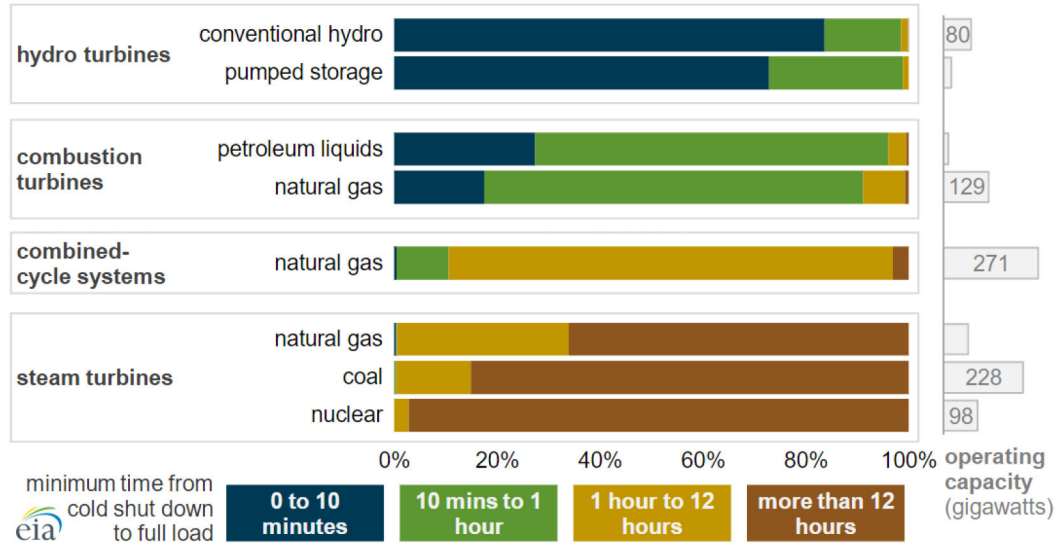
- Energy: actual MWh delivered to the system;
- Capacity: maximum potential MW production to the system;

[1] Unless specified otherwise, defined terms remain the same as per our December 1st, 2021 memorandum.

- Dispatchability: the ability to turn on or off the energy production from the resource;
- Ramping: the ability to provide flexibility to the system at short timescales by increasing or decreasing output rapidly;
- Reactive Power/VARs: voltage support that physically moves real power from generation sources to load;
- Frequency response (FR): the ability to provide flexibility to the system at extremely short timescales by increasing or decreasing output extremely rapidly; and
- Inertia: the store of kinetic energy in the rotating mass of machines and motors connected to the system, which aids overall system stability at very short timescales.

DEC-compliant generation, as well as existing generation, would each supply *capacity* to the power system. However, the concept of a perfect substitute refers to a good or service being equivalent in all respects to another. DEC-compliant resources would have a very different profile to most existing resources in ERCOT. In particular, DEC-compliant generation would provide fast ramping in timescales (<5 minutes or less) that most existing resources could not respond to, as illustrated by Figure 1, which shows typical start-up times for typical conventional resources in US power systems.

Figure 1: U.S. Electric Generating Capacity by Minimum Time from Cold Shut Down to Full Load (2019)



Source: U.S. Energy Information Administration, *Annual Electric Generator Inventory*

This means that DEC-compliant resources would have a very different *dispatch profile* to the vast majority of conventional dispatchable resources in ERCOT. DEC-compliant resources would likely be dispatched to meet relatively short duration events and would likely be complementary to slower-ramping resources. In practice, a typical example of this is where, at the immediate onset of a system stress event, DEC-compliant resources could meet the initial ramp in net load over a short timescale before other types of generation are able to start production.

An additional point is that DEC-compliant resources are in general likely to run for shorter durations in the energy markets than most other resources, due to (a) the technological constraints imposed by the primary objective of providing flexibility and (b) their participation in ancillary products that cannot be met by traditional resources. Therefore, the total bulk energy that DEC-compliant resources supply to the system would likely be relatively low. Recall that, absent a capacity market, *energy, not capacity,* is the primary attribute that resources are remunerated for.

In our previous memorandum we discussed that, given the identification of the current (and, more importantly, future) need for a specific type of capacity, a question has been raised about how to incentivize investment in such capacity. There appears to be a consensus in ERCOT that additional mechanisms are required to encourage such timely investment, with the central question of what type of mechanism is most appropriate. The DEC proposal would of course have some impact on the operation of (existing, and future) non-DEC compliant resources. However, given the lack of perfect substitutability described above, we consider it would not be appropriate to automatically assume that new DEC resources would automatically displace existing resources on a 1:1 basis.

ii. The type of, and growth in, system needs means that substitution is not as relevant, as more resources will be needed.

As discussed in our previous memorandum, we understand that significantly more flexible resources will soon be required in ERCOT. This, combined with the projected growth in electricity consumption more generally (as per Commissioner McAdams' Memorandum – "*we will need 15 GW of additional generation capacity in 10 years just to keep up with the growth - and that is assuming no retirements of existing generation resources*"), means there are ample capacity requirements to accommodate new DEC-compliant resources. In other words, a future optimal resource mix for ERCOT may include all existing resources, as well as new DEC-compliant and new non-DEC-compliant resources.

The market-driven incentives of DEC-like mechanisms are more efficient at encouraging resource performance than ex post penalty regimes needed for mechanisms like the Full LSE Obligation.

The DEC proposal and the Full LSE Obligation proposal operate differently with regard to how resources are paid/penalized within each mechanism. In the DEC proposal, DEC-compliant resources earn DECs (and are therefore paid under the mechanism) based on MWh *cleared* in various ancillary services and energy markets.[2] In the Full LSE Obligation proposal, resources are paid up front based on participation in the mechanism, independent of MWh of energy produced. In the case of non-availability, penalties are applied.

[2] Broadly speaking, clearing means the resource has confirmed availability to generate, and has submitted a cost bid that is below the market-clearing price. This usually means that the resource will actually generate electricity in the bidding period if the resource is cleared to provide energy. If the resource is cleared to provide ancillary services, the resource is available to the grid to dispatch to support reliability. In some circumstances, a resource that clears the market to provide energy may not be asked to generate by the system operator for technical or transmission constraint reasons (although it depends on the extent to which products and prices are locational in nature, which, all else equal, tends to increase the efficient functioning of markets).

The differences between the two proposals are significant. In the DEC proposal, resources within the mechanism have a strong and inherent market-driven incentive to perform, because no revenue is generated by resources that do not clear in the market. This means the resources need to be technically available to keep their operations efficient (e.g. to minimize their marginal costs of production) and to bid efficiently. Further, if a resource clears in the market and does not perform, it is subject to market-based penalties.

By contrast, in the Full LSE Obligation proposal, as with other decentralized and centralized capacity markets around the world, the incentives are not market-driven but instead administratively-driven in the form of penalties for non-delivery under defined reliability events. A penalty regime is *required*, simply because resources receive payments up front, which is not the case with the DEC proposal.

There are three main issues with a penalty regime:

i. The efficiency of the penalty regime hinges entirely on the ability of the administrator to define a reliability event. This may not provide efficient operational incentives as participants maximize availability based on the declarations of expected reliability events rather than the actual situations of system stress.

ii. Related to the above, with the growth in intermittent resources, reliability events are becoming increasingly more difficult to define and predict. Therefore the penalty regime becomes increasingly inefficient at providing operational incentives, contrary to a market-price driven system which will in principle reflect actual system needs.

iii. The penalties levied for non-delivery (during a defined reliability event) are extremely difficult to calibrate. In part this is due to the asymmetric nature of penalties and the resultant moral hazard that can potentially be generated.

    To take two examples:

    i. resources may *expect* that, in a severe stress event, penalties may be waived if there is mass non-performance. The mere expectation in this case would disincentivize the desired behavior, irrespective of whether the expectation is correct.

    ii. for various reasons, investors in resources may not *expect* to actually be exposed to any very large penalties that may be levied (e.g. due to expectations of bailouts, or limited liability protections in corporate structures).

In France for instance where there is a decentralised obligation on LSEs, the system operator determines peak period days in D-1 according to expectations of peak demand during the year. This has led to uncertainties for market participants, and even to mistaken outputs. Another lesson from the French experience with decentralised obligations was also that the ex-post monitoring of resources actual availability was unreliable and failed to correctly assess the level of service provided by all remunerated capacities.[3]

[3] Réseau Transport Electricité (2021), Retour d'expérience sur le mécanisme de capacité français: Section 6.4 and Section 7.

A simpler model, such as the DEC, reduces the risk of prolonged stagnation of investment.

The ultimate effect on investment from the Full LSE Obligation proposal or the DEC proposal is to some extent an empirical question and would be driven by the nuanced design choices made. As we previously stated, we believe that implementation of the DEC proposal, coupled with other targeted proposals that the PUCT is considering, would greatly benefit ERCOT's system, more so than the Full LSE Obligation proposal.

However, we additionally note that, anecdotally, the existence of debate on significant energy market reforms tends to result in a pause or significant reduction in new investment origination. This is because many investors choose to await finalization of the reforms and the resulting effect on price formation before committing to new projects.

The above is true for any mechanism, but a relatively simple mechanism such as the DEC proposal, which is modeled on the existing REC mechanism, could be implemented much more rapidly and with less implementation risk than the Full LSE Obligation proposal.[4] The PUCT should be aware that capacity mechanisms of any description typically require 3-5 years of development work in addition to ongoing refinement and monitoring.

This means that, aside from the other merits discussed above, the DEC proposal is likely to reduce the risks of prolonged stagnation of investment.

Concluding comments.

Given the identification of the need for a specific type of capacity, and consensus in ERCOT that additional mechanisms are required to encourage timely investment in this capacity, the DEC proposal could benefit the ERCOT region as a 'targeted' mechanism designed to meet system needs.

One important aspect of the targeted nature of the mechanism is that it is not the case that new DEC-compliant resources would automatically displace existing resources on a 1:1 basis. By contrast, DEC-compliant resources would likely be dispatched to meet relatively short duration events and would likely be complementary to slower-ramping resources, from a dispatch efficiency viewpoint.

Further, as a market-driven mechanism, it would not suffer from some of the difficulties associated with the effectiveness (or otherwise) of an administratively-driven penalty regime that have been seen and debated in many capacity markets constructs.

[4] In France, it took over three years to implement a capacity mechanism, and in the UK, it took five years. To illustrate the latter – in the UK, the Government was considering a capacity mechanism throughout 2009 and 2010, leading to a formal consultation in late 2010, and the first capacity auction was held in December 2014. See *The development of the Capacity Market for electricity in Great Britain*, Matthew Lockwood, 2017.