

Retail Panel Presentation

Day-Ahead and Real Time Market Activities



Disclaimer Statement

This presentation provides a general overview of the Texas Nodal Market Implementation and is not intended to be a substitute for the ERCOT Nodal Protocols (available at <http://nodal.ercot.com/protocols/index.html>), as amended from time to time. If any conflict exists between this presentation and the ERCOT Nodal Protocols, the ERCOT Nodal Protocols shall control in all respects.



Presentation Purpose

This presentation is intended to facilitate discussion about the use of the market tools and transactions described in the ERCOT training curriculum by Retail Electric Providers and their QSE.

This presentation assumes participants have completed the ERCOT Nodal 101, Basic Training course or have an equivalently gained understanding of the Nodal Protocols. ERCOT makes an extensive set of training courses available to Market Participants as described at <http://nodal.ercot.com/training/index.html>. ERCOT encourages Market Participant participation in these courses and has established Market Participant Readiness criteria for such participation.

Please feel free to stop me and ask questions as we proceed. I have planned a structured discussion followed by an unstructured Question and Answer period.

Nothing in this presentation should be construed as advice or recommended action by any Market Participant or Entity.

Discussion Topics

Topics covered in this presentation:

- I. Typical DAM Basic Transactions
- II. Risk Issues between the Day Ahead Market (DAM) and Real Time (RT) Operating Day
- III. Tools to Address Basis Risk in the DAM and RT
- IV. DAM Bid Submittals
- V. Reliability Unit Commitment Risk Mitigation

I. Typical DAM Basic Transactions

Typical DAM Basic Transactions That Will be Discussed Today

All DAM transaction submittals are from a QSE

- Depending on the transaction, there can be as many as 4 parties involved: a Resource Entity, the Resource Entity's QSE, the Buying Entity's QSE, and the Buying Entity.

Basic Transactions Include:

- **DAM Energy Bids**
 - Energy Bids express a willingness to buy a quantity of energy at or below a specified price. These bids are considered only in the DAM.
- **Point-to-Point Obligation Bids**
 - P-t-P Obligations are bought in the DAM and settled in Real Time. They are essentially a linked virtual energy sale at a point of injection and a matching energy buy at the point of withdrawal. Here "linked" means that the virtual energy sale and buy can only be struck simultaneously in the DAM.
- **QSE-to-QSE Energy Trades**
 - Energy Trades have no monetary value. The Trade Volume is treated as capacity in the DRUC and HRUC.
- **QSE-to-QSE Capacity Trades**
 - Capacity Trades have no monetary value. The Trade Volume is treated as capacity in the DRUC and HRUC.

II. Risk Issues between the Day Ahead Market (DAM) and Real Time (RT) Operating Day

Risk Issues between the DAM and RT Operating Day

- **Basis Risk**
 - Basis risk is the risk that the price difference between the exchange contract and the commodity being hedged (electric energy) will widen (or narrow) unexpectedly. In our case that the price difference between the sink LMP and source LMP will widen (or narrow).
 - A CRR financial instrument is a hedge that sets the limit of financial exposure to congestion cost or basis risk that the **CRR Owner** is willing to incur or accept between two specified Settlement Points (SP).
 - In ERCOT, there are two types of CRR financial instruments: an **Option CRR** and an **Obligation CRR**.
 - The **Option CRR** strike price per megawatt is the maximum of \$0.00 or the sink (withdrawal) SP Price – the source (injection) SP Price.
 - The **Obligation CRR** strike price per megawatt equals the sink (withdrawal) SP Price – the source (injection) SP Price, which can be either positive, in which case ERCOT pays the CRR Owner, or negative, in which case the CRR Owner pays ERCOT.
- **Basis Risk Differences Between DAM and RT**
 - In general, CRR financial instruments owned by all other CRR Owners will only be settled in the DAM.
 - Entities whose CRR instruments are settled in the DAM face a Basis Risk between DAM and Real Time congestion cost.
 - Risk is a function of many factors including: demand amount cleared in the DAM; the difference in the generation pattern between that cleared in the DAM and the actual generation pattern in Real Time; Force Outages of Transmission facilities or Generation Resources; other changes in the network model between DAM execution and Real Time etc.

Risk Issues between the Day Ahead Market and Real Time Operating Day

Differences in the settlement timeline for the DAM and its associated Operating Day results in risk due to the:

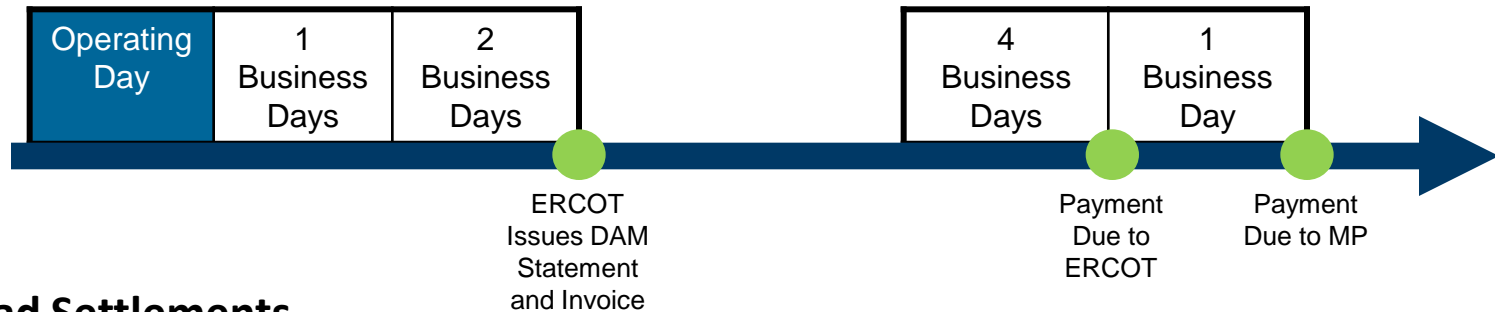
- **Cost of Money**

- Participation in the DAM accelerates the payments to ERCOT for energy bought in the DAM and consumed in RT because of the DAM settlement timeline with RT true-up following on the RT settlement timeline.
- On the other hand, participation in the DAM is voluntary; however, a decision to not participate in the DAM places the entire metered consumption at risk of facing the RT SP spot price if not covered by a bi-lateral trade.

- **Credit Impacts**

- These timelines also result in credit impacts on Market Participants resulting in part from the treatment of outstanding DAM and Real Time Invoices in ERCOT's credit exposure calculations for each counter party participating in the DAM and RT markets.

Day-Ahead Settlements



Day-Ahead Settlements

Executed on a separate timeline

Scope – DA Energy, A/S and most CRRs

Settlement Interval – one hour

Prices – Nodal prices (for energy) and MCPC for capacity

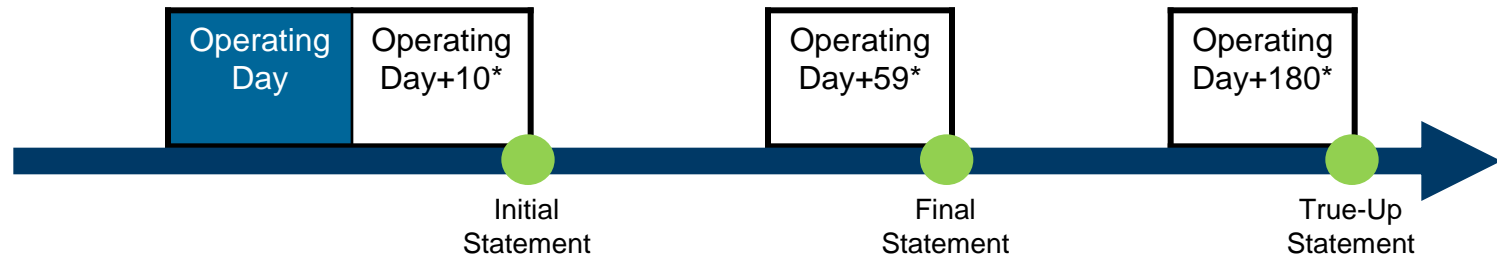
Statements & Invoices

Statement & Invoice published on same day (because meter data not required)

Payments due 4th business day from invoice

Paid 5th business day

Real-Time Settlements



Real-Time Settlements

- Same timeline as current Zonal market
- Scope – DRUC, Adjustment Period, and RT Operations
- Settlement Interval – one hour or 15 minutes
- Prices – nodal prices (for energy) and MCPC for capacity

Statements & Invoices

- Published separately
- Weekly invoices

Note: *Must fall on a business day (not a weekend)

III. Tools to Address Basis Risk in the DAM and RT

Tools to Address Basis Risk in the DAM and RT

Purchase of CRR Financial Instruments for DAM Basis Risk Mitigation

- Market Participants that satisfy the registration requirements to be an ERCOT CRR Account Holder can purchase CRRs in the Annual and Monthly CRR Auctions.
- Market Participants can sell/purchase CRRs in the bilateral market (which is an OTC market in ERCOT).
- Only ERCOT CRR Account Holders can register their CRR ownership and track change of ownership resulting from bilateral CRR sales and purchases in the CRR Account Holders database maintained by ERCOT.
- ERCOT will only settle CRR financial instruments with the CRR Account Holder registered as the owner of the CRR instrument.

Purchase of P-to-P Obligations in the DAM for RT Basis Risk Mitigation

- QSE's may bid to buy a P-to-P Obligation in the DAM. The P-to-P bid price represents the not-to-exceed premium the buyer of the instrument is willing to pay. The purchase premium is part of the DAM Invoice charges.
- DAM P-to-P Obligations are valued and settled only in that DAM's associated Operating Day and as such are part of the Real Time Invoice payments or charges.
- P-to-P Obligations can provide a basis hedge between the DAM and RT.

There are other more sophisticated transaction strategies that can be used by Market Participants to create basis or energy hedges in the DAM and RT Markets. Discussion of such strategies is beyond the scope of this discussion.

IV. DAM Bid Submittals

Bidding as a Price Taker

- A **DAM Energy Bid** represents the QSE's willingness to buy energy at or below a certain price and at a certain quantity (which may be fixed or variable) at a specified settlement point in the DAM.
- **DAM Energy Bids** may only be made and can only be struck in a DAM.
- By Protocol requirement and system implementation, a valid DAM Bid must include an up-to price. Essentially, each Energy Bidder is a price taker up to the bid price specified in the bid submittal.
- The implication is that the higher the bid price specified the more likely the DAM optimization engine will strike the offer.
- However, as described in the following the Bidder's ability to maximize its bid price is restrained by the Bidder's ability to meet the ERCOT credit requirement checks performed prior to DAM execution.

Day Ahead Market Credit Rules & Impacts

- The DAM Credit Requirement checks for a QSE are described in Nodal Protocol 4.4.10(6) and further described in the MMS – Day-Ahead Market and Supplemental Ancillary Service Market Requirements Specification, Section 3.4.1, CR1 – Credit Requirement².
- The pre-DAM credit requirement checks are preformed for each QSE. ERCOT systems assume that each transaction is struck in the DAM and calculates a running transaction-by-transaction impact on the QSE's credit exposure.
- A QSE Transaction that cause the QSE's credit exposure to exceed its posted credit limit in the DAM is rejected. This process continues until all transactions are evaluated.

IV. Reliability Unit Commitment Risk Mitigation

Reliability Unit Commitment Risk Mitigation

Nature of the Risk

- A QSE that **fails** to cover its obligation with capacity can be subject to a RUC Capacity Short Charge.
- Each time a RUC process is executed at ERCOT a snapshot of each QSE's net capacity is recorded for settlement purposes.
- The larger QSE RUC capacity shortfall (RUC or Real-Time) is used for capacity short calculations.

Tools to Address RUC Risks

Dam Energy
Purchases & Sales

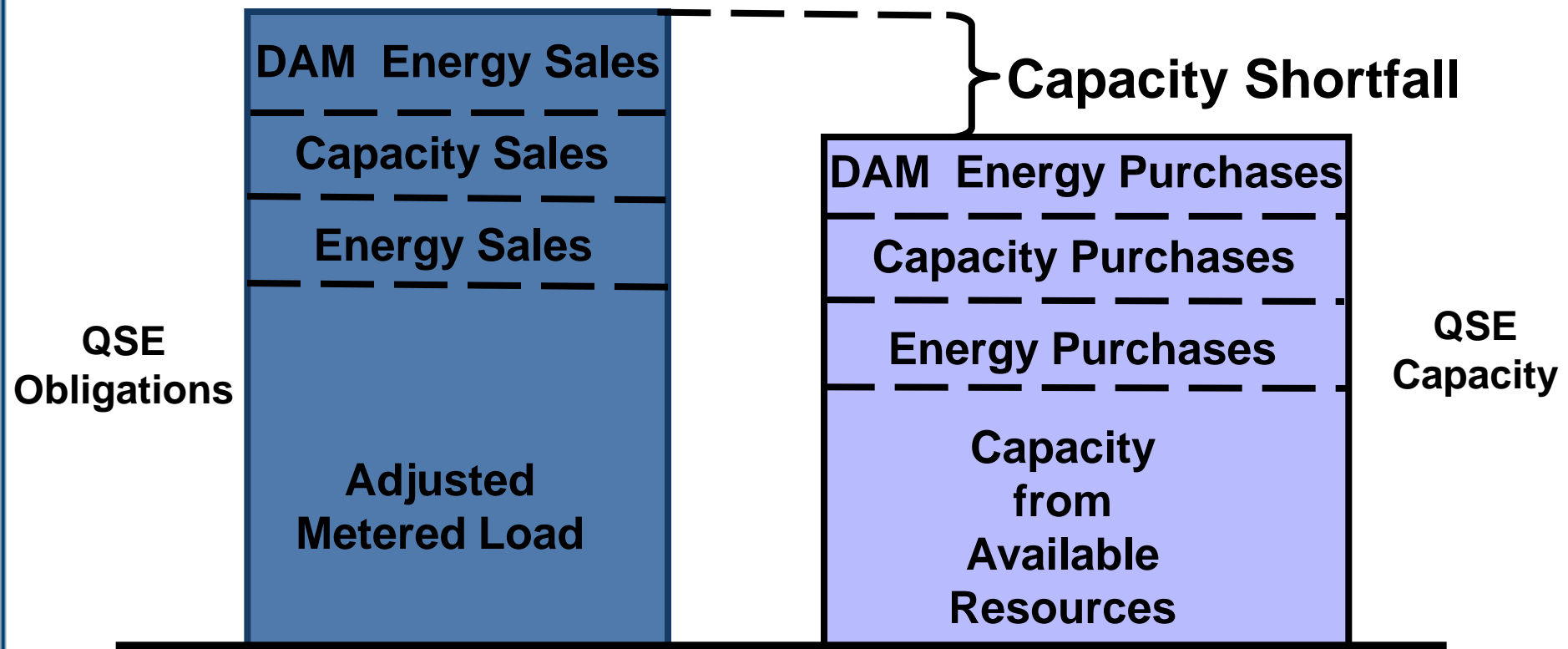
QSE-to-QSE Capacity
Trades

QSE-to-QSE Energy
Trades

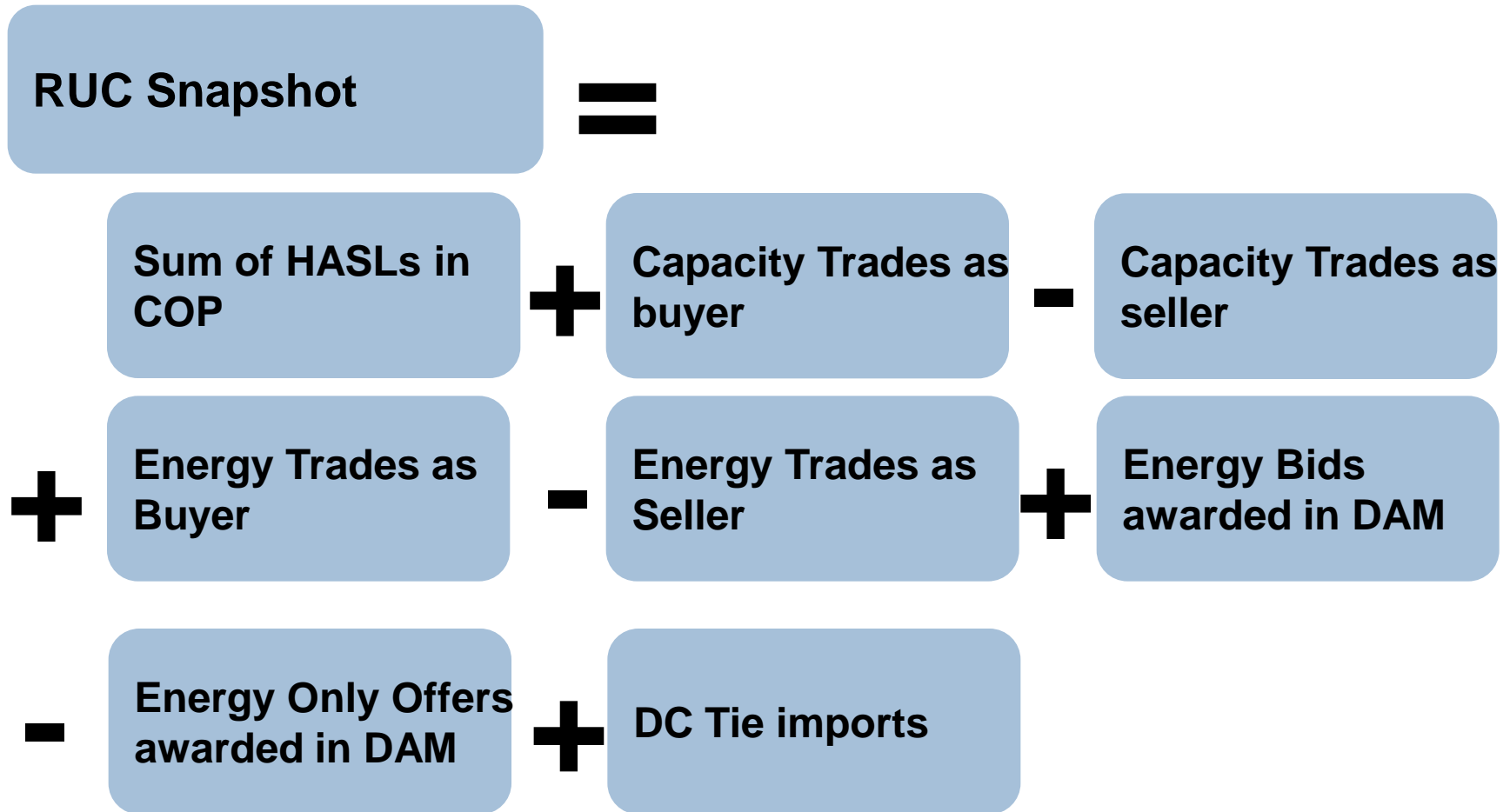
RUC Capacity Short Charge

RUC Capacity Short Charge

When a QSE does not provide enough capacity to meet its obligations, it may be assessed a Capacity Short Charge



Reliability Unit Commitment - Snapshot

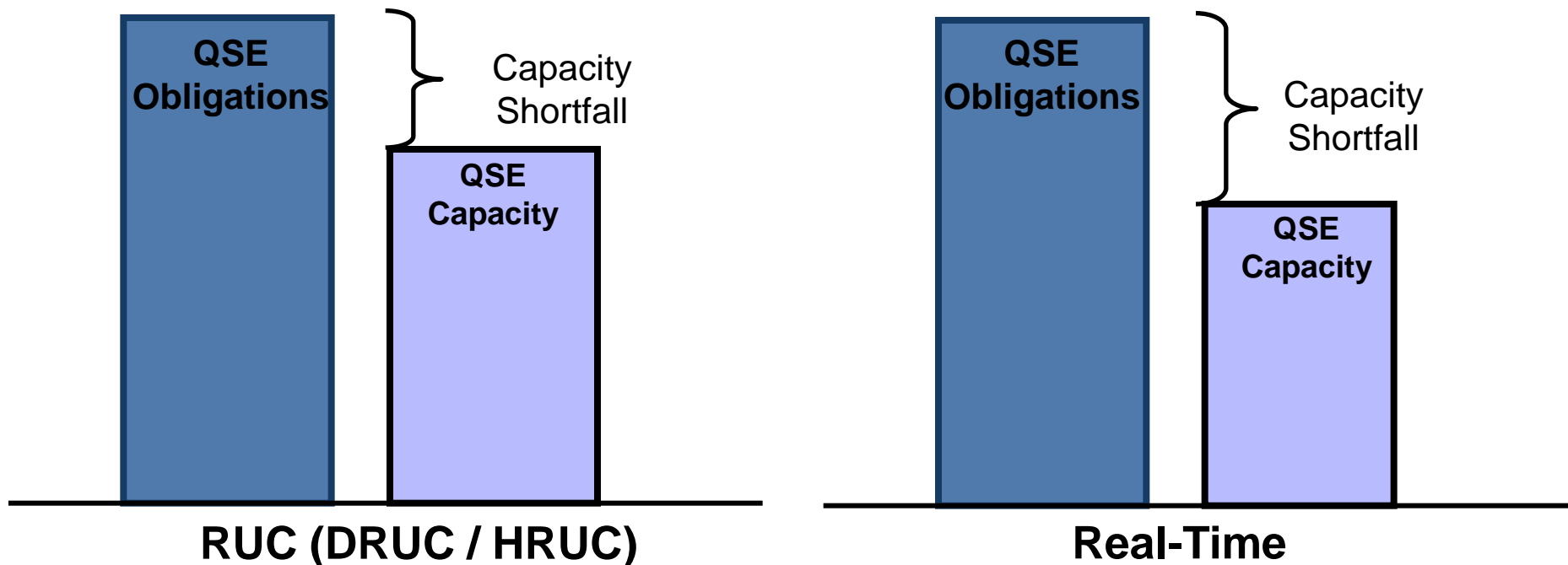


Note that all values/trades are as of the time of the RUC Snapshot

RUC Capacity Short Charge

RUC Capacity Short Charge

The larger QSE capacity shortfall (RUC or Real-Time) is used for capacity short calculations



References

1. MMS Explanation of Market Submission Items,
http://nodal.ercot.com/docs/pd/mms/odfr/emsi/mms_explanation_of_market_submission_items_v0_29.doc
2. MMS Project Requirements of Deliverables,
<http://nodal.ercot.com/docs/pd/mms/index.html#req>
3. MMS Project Other Deliverables,
<http://nodal.ercot.com/docs/pd/mms/index.html#oth>
4. Credit Exposure Study for DAM Bids & Offers,
http://nodal.ercot.com/docs/pd/mms/wp/wp-damcec/credit_exposure_study_for_dam_bids_and_offers.doc

Example Contract for Differences DAM SPP Contract Strike Price

A Contract for Differences Example

This example is intended to demonstrate how a contract for differences could work. Certain simplifying assumptions are made for ease of illustration.

This example does not include the effect of cost of credit required for the bilateral contract or for ERCOT. The example demonstrates how an energy hedge, a guaranteed energy price for the purchaser and seller, and a congestion hedge utilizing a PTP Option operates under various price scenarios.

Assume:					Contract Amt	Contract Strike Price	Contract Fin Obl						
					100	\$20	\$2,000						
Entities G and L Agree to Guarantee one another 100 MWs at \$20/MWh in a contract for differences, delivered to the Load Zone.													
Entity G buys a 100 Mw PTP Option strip in a Monthly CRR Auction for \$5.00/MW per hour.													
G's Marginal cost is \$15/MWH for all MWs generated.													
Case	GRT Dispatch	G's SPP	ERCOT → G	L's Contract Demand	L's LZSPP	L → ERCOT	L → G	G → L	L Net Position	Option Premium	Option Value to G	G Net Position	G Marginal Profit
No Congestion	100	\$15	\$1,500	100	\$15	\$1,500	500	0	-\$2,000	-\$500	\$0	\$1,500	\$0
No Congestion	100	\$20	\$2,000	100	\$20	\$2,000	0	0	-\$2,000	-\$500	\$0	\$1,500	\$0
No Congestion	100	\$30	\$3,000	100	\$30	\$3,000	0	1000	-\$2,000	-\$500	\$0	\$1,500	\$0
Congestion	100	\$15	\$1,500	100	\$20	\$2,000	0	0	-\$2,000	-\$500	\$500	\$1,500	\$0
Congestion	100	\$15	\$1,500	100	\$30	\$3,000	0	1000	-\$2,000	-\$500	\$1,500	\$1,500	\$0
Congestion	100	\$15	\$1,500	100	\$40	\$4,000	0	2000	-\$2,000	-\$500	\$2,500	\$1,500	\$0
Congestion	100	\$20	\$2,000	100	\$40	\$4,000	0	2000	-\$2,000	-\$500	\$2,000	\$1,500	\$0
Congestion	100	\$40	\$4,000	100	\$20	\$2,000	0	0	-\$2,000	-\$500	\$0	\$3,500	\$2,000
Congestion	100	\$50	\$5,000	100	\$30	\$3,000	0	1000	-\$2,000	-\$500	\$0	\$3,500	\$2,000
Conclusions:	The Load has achieved a \$2,000 hedge for 100 MW delivered to the LZ												
	The Generator has achieved a \$1,500 hedge for 100 MWs generated and delivered to the LZ												
	If the delivery hedge is reversed in ownership, add -\$500 to the Load position and +\$500 to the Generator position												

Retail Panel – Questions

Questions or comments?

