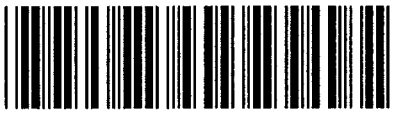
Control Number: 24770



Item Number: 186

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Public Utility Commission of Texas

Memorandum

TO: Chairman Rebecca Klein
Commissioner Brett A. Perlman
Commissioner Julie Caruthers Parsley

FROM: Parviz Adib, Market Oversight Division
David Hurlbut, Market Oversight Division
Julie Gauldin, Market Oversight Division

DATE: March 18, 2003

RE: Docket No. 24770, Report of the Electric Reliability Council of Texas (ERCOT) to the PUCT regarding Implementation of the ERCOT Protocols

Proposal to Apply a Modified Competitive Solution Method to Balancing Energy Service and Update on Applying the Competitive Solution Method to Ancillary Capacity Services

The Market Oversight Division (MOD) is continuing its investigation into the price spikes in Up Balancing Energy Service (UBES) and ancillary capacity services that occurred during the cold weather event of February 24-26, 2003. As MOD indicated in its report of March 3, 2003,[1] hockey-stick bidding on the part of one qualified scheduling entity (QSE) significantly contributed to the UBES price spikes, and that absent this behavior, the market clearing price for energy (MCPE) would have been $500 per MWh or less during the intervals in question rather than $990.

Regardless of whether the QSE in question violated any rule or protocol, MOD concludes that an important contributing factor to the high prices seen on February 24-26 was the balancing energy market structure that made it possible for a single hockey-stick bid to set the MCPE at $990. After further study of the market conditions leading to the recent UBES price spikes, MOD has concluded that a modified form of the Competitive Solution Method (CSM) proposed by Staff in Docket No. 24770[2] can be quickly implemented and would have

[1] *Analysis of Balancing Energy Price Spikes during the Extreme Weather Event of February 24-26*, Market Oversight Division Staff Report (March 3, 2003). This report was filed in Project No. 23100 on March 4, 2003 and Docket No. 24770 as an attachment to Keith Rogas's memo on March 17, 2003.
[2] *See* Docket No. 24770, Commission Staff's Initial Brief (January 25, 2002), pp. 15-24.

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mitigated these spikes to a level more in line with the increase in fuel costs that occurred during the cold weather event.

Similarly, MOD believes that its original recommendation to implement CSM should be considered as a remedy to address similar problems in ancillary capacity service markets.[3] With respect to the ancillary capacity service markets, MOD has provided ERCOT staff with protocol language that could implement CSM alongside simultaneous selection of ancillary services.[4] Simultaneous selection of ancillary services is currently being implemented by ERCOT.[5] ERCOT staff has told MOD that ERCOT will provide a high-level system impact assessment on CSM for the ancillary capacity service markets by early April.

Modified CSM for Balancing Energy Service

The features of CSM that complicate its application to the balancing energy service markets in fact never would have come into play during the February 24-25 BES price spikes.[6] Moreover, the conditions surrounding this price spike – in particular, ERCOT's procurement of all available UBES – will very likely characterize some future price spikes. If another extreme weather event were to increase system load beyond ERCOT forecasts, the amount of UBES required by ERCOT to balance the system and deal with local congestion could again exhaust the eligible bid stack. Hockey stick bidding is most likely to harm the market under such conditions: the last eligible megawatt is deployed, yet the bid price of that last megawatt is abnormally high due to strategic bidding rather than to changes in marginal costs.

MOD concludes that a simplified version of CSM could be implemented quickly, with little impact on ERCOT systems, as follows.

1. Test whether ERCOT deploys all eligible UBES or Down Balancing Energy Service bids from a particular zone.[7]
2. If so, flag the interval for mitigation and deploy the energy.
3. Calculate an out-of-merit (OOM) floor price, which would be the MCPE that would have resulted had ERCOT deployed 90% of the eligible bid stack.
4. Settle each deployed resource at the greater of the OOM floor price or its verifiable costs.

The simplified version would differ from full CSM in that it would only be triggered when ERCOT deploys *all* eligible balancing energy offers.[8] In addition, it would not require identifying pivotal bidders or calculating a Market Clearing Price (MCP) Limit, which are

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[3] *See* Docket No. 24770, Application of Competitive Solution Method to Data from ERCOT Ancillary Capacity Services (October 11, 2002).

[4] *See* Appendix. *See also* Order No. 17 and letter from Keith Rogas to Marc Burns dated and filed January 30, 2003.

[5] In Docket No. 23220, the Commission ordered ERCOT to use simultaneous selection of ancillary services. Docket No. 23220, *Petition of the Electric Reliability Council of Texas for Approval of the ERCOT Protocols*, Order on Rehearing (June 4, 2001), p. 7.

[6] In particular, determining who is a pivotal bidder becomes more complicated when zonal congestion results in separate balancing energy bid stacks for each congestion zone. Such determination is an integral part of calculating an MCP Limit.

[7] If there is no zonal congestion, the entire ERCOT area is treated as a single zone.

[8] Full CSM applies two competitive sufficiency tests, both of which fail when the entire bid stack is procured.

the two features of full CSM that complicate its application to the balancing energy markets.[9] Nor would it involve an extended market, which would be infeasible given the schedule for submitting balancing energy bids.

Replacing the MCPE with an OOM floor price would not change the amount of balancing energy procured, just the level at which it would be paid. The OOM floor would apply to a zone if and only if all that zone's available balancing energy offers were procured.

This procedure would be consistent with current ERCOT protocols that establish a wall between real-time system operators and bid information. That means ERCOT system operators would still be free to make real time decisions at any time without having to worry about the marginal cost of the last megawatt of balancing energy. This procedure would, however, automatically protect the market from harm in the event that operators needed every eligible megawatt from a zonal stack that happened to be affected by hockey stock bidding.

MOD has consulted with ERCOT staff, and they confirmed that verifying whether 100% of the eligible bid stack was deployed would be relatively easy, but that it may be more complicated to check for less than 100% deployment, especially if there is zonal congestion.[10] A Commission decision to implement a "100% deployment solution" soon would not preclude additional measures later that would address other relevant scenarios, however.

What MOD proposes here is not a perfect or comprehensive mitigation procedure, but it would be good enough to prevent price spikes whose characteristics match those seen on February 24 and 25 in UBES. Therefore, MOD recommends implementing this proposed simplified CSM for balancing energy service soon, and exploring further mitigation measures for balancing energy in Project No. 26376, Rulemaking on Wholesale Market Design Issues in the Electric Reliability Council of Texas.[11]

The following chart shows how modified CSM would have affected the MCPE for the interval ending at 6 p.m. on February 24, 2003, when the MCPE spiked to $990. Note that the OOM floor price still would have been $299, which is indicative of fuel costs on the spot market for natural gas at the Houston Ship Channel hub during the cold weather event.

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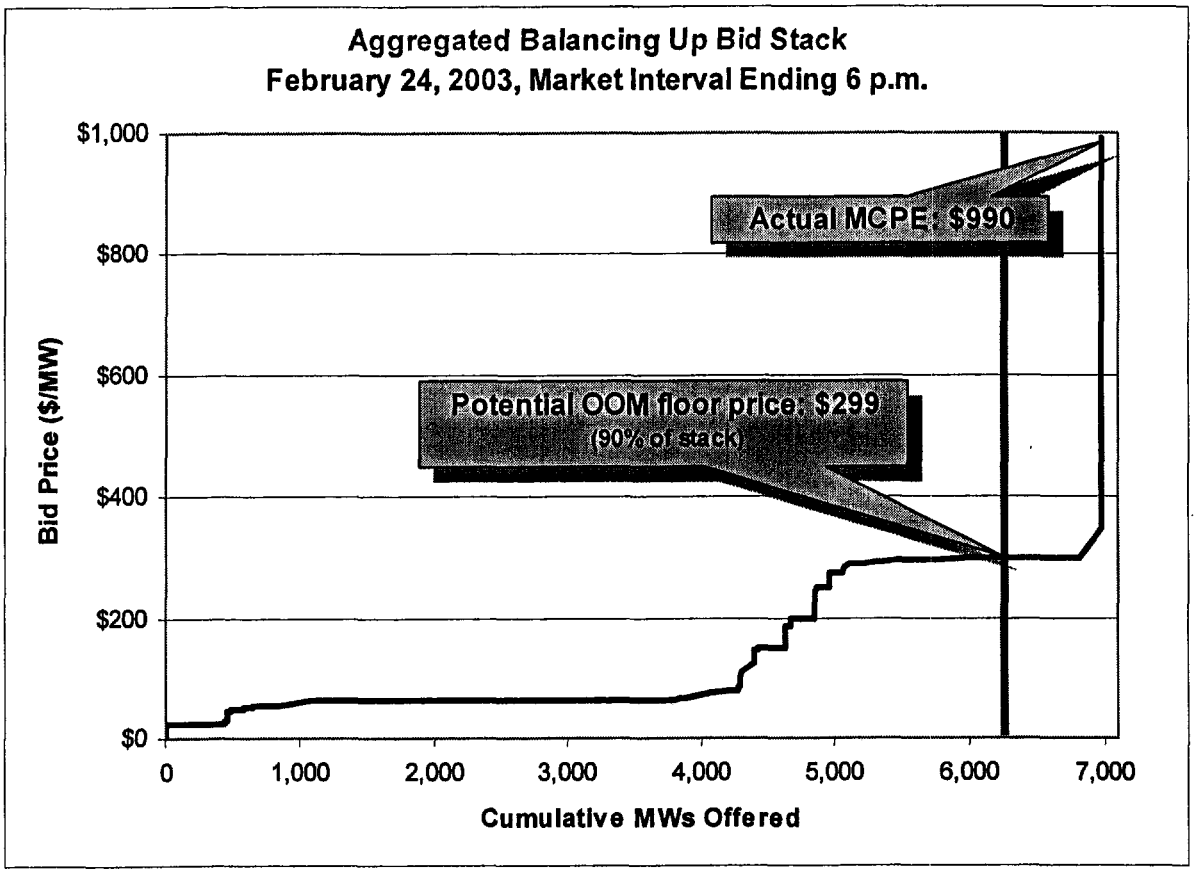
[9] A bidder is pivotal if removing all of its offers would leave the bid stack short of what ERCOT needs. All bidders are pivotal when the entire stack is procured, which makes the MCP Limit zero.

[10] In fact, ERCOT already flags intervals for which all eligible bids were deployed.

[11] Further mitigation measures for balancing energy are dependent upon the congestion management method adopted by the Commission in Project No. 26376. *See* Commission Staff' Response to Order No. 17 concerning Procedural Schedule (December 16, 2002), p. 2, last pargraph.


Aggregated Balancing Up Bid Stack
February 24, 2003, Market Interval Ending 6 p.m.
$1,000
$800
$600
$400
$200
$0
Bid Price ($/MW)
Actual MCPE: $990
Potential OOM floor price: $299
(90% of stack)
0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
Cumulative MWs Offered

Appendix:
Implementation of the Competitive Solution Method in ERCOT Ancillary Capacity Service Markets

Add to 2.1, Definitions

Ancillary Services Simultaneous Optimization Model
The optimization model used to simultaneously procure Regulation Up, Responsive Reserves, and Non-spinning reserves.

Composite Ancillary Services Bid Stack
All the bids received for Regulation Up, Responsive Reserves, and/or Non-spinning Reserves for the same time interval.

Pivotal Bidder

A bidder is considered pivotal if removing all of its offered quantities from the Bid Stack will result in a Bid Stack that is less than the total quantity to be obtained by ERCOT.

6 Ancillary Services

6.8 Compensation for Services Provided

6.8.1 Payments to Providers of Ancillary Services Procured in the Day-Ahead and Adjustment Periods

6.8.1.1 Payments for Ancillary Service Capacity

6.8.1.2 Automatic Mitigation – Competitive Solution Method

6.8.1.2.1 Competitive Sufficiency Test

(1) For each Settlement Interval in the Day-Ahead Market, ERCOT shall apply a Competitive Sufficiency Test to the Bid Stack for Regulation Down Service, and to the Composite Ancillary Services Bid Stack for Regulation Up, Responsive Reserves, and Non-spinning reserves.

(2) A Bid Stack shall fail the Competitive Sufficiency Test if either of the following conditions are true.

(a) The total capacity available is less than 115% of the total capacity to be obtained by ERCOT, or

(b) The MCPC is set by a Pivotal Bidder.

(3) In applying 6.8.1.2.1(2)(a), ERCOT shall employ the following methodology:

(a) For Regulation Down Service:

$$CA_{RDi} = \sum_{q} C_{RDiq}$$

and

$$\frac{CA_{RDi}}{CP_{RDi}} \geq 115\%$$

where:

i : interval being calculated

C_{RDiq} : the MW of capacity offered by QSE q for Regulation Down Service for interval i

CA_{RDi} : the total capacity available for Regulation Down Service for interval i

CP_{RDi} : the total Regulation Down Service to be procured by ERCOT for interval i.

(b) For the Composite Ancillary Services Bid Stack for Regulation Up, Responsive Reserves, and Non-spinning Reserves:

Let CP_{RUi} = the total Regulation Up Service capacity to be procured by ERCOT for interval i.

Set $CP_{RUi}^{revised} = 1.15 * CP_{RUi}$

Let CP_{RRi} = the total Responsive Reserve Service capacity to be procured by ERCOT for interval i.

Set $CP_{RRi}^{revised} = 1.15 * CP_{RRi}$

Let CP_{NSi} = the total Non-Spinning Reserve Service capacity to be procured by ERCOT for interval i.

Set $CP_{NSi}^{revised} = 1.15 * CP_{NSi}$

Then, run the Ancillary Services Simultaneous optimization model, substituting $CP_{RUi}^{revised}$ in place of CP_{RUi}, substituting $CP_{RRi}^{revised}$ in place of CP_{RRi}, substituting $CP_{NSi}^{revised}$ in place of CP_{NSi} and keeping all other inputs the same. If there is a feasible solution to the LP, then the Composite Ancillary Services Bid Stack passes the 115% test, otherwise it fails.

(4) In applying 6.8.1.2.1(2)(b), ERCOT shall employ the following methodology:

(a) For the Composite Ancillary Services Bid Stack for Regulation Up Service, Responsive Reserve Service, and Non-Spinning Reserve Service, a QSE *q* is pivotal if removing all of the QSE's bids from the Composite Ancillary Services Bid Stack and re-running the Ancillary Services Simultaneous optimization model results in an infeasible solution.

(b) For Regulation Down Service, a QSE *q* is pivotal if

$$CA_{RDi} - C_{RDiq} < CP_{RDi}$$

where

i: the interval being tested

q: the bidding QSE being tested

C_{RDiq}: bids by QSE *q* during interval *i* for Regulation Down Service

CA_{RDi} : the total capacity available for Regulation Down Service for interval i.

CP_{Di} : the total Regulation Down Service obtained by ERCOT for interval i.

6.8.1.2.2 Extended Market

(1) If a Bid Stack (either the Composite Ancillary Services Bid Stack or the Regulation Down bid stack) fails the Competitive Sufficiency Test, ERCOT shall post Indicative MCP(s) equal to the clearing price(s) which would result from the original Bid Stack. ERCOT shall also extend by one hour the Day-Ahead Market in the service or combination of services for the Settlement Interval that failed the test. During the Extended Market, QSEs may:

(a) increase their self-arrangement for the affected services,

(b) withdraw bids to the extent that the corresponding withdrawn quantities are to be used to serve an ancillary service requirement that has been converted during the Extended Market from ERCOT-obtained to self-arranged,

(c) offer additional quantities to ERCOT at a price of $0 (i.e., the QSEs will be price takers as to these quantities), and/or

(d) increase the services to which an existing bid applies (in the case of the Composite Ancillary Services Bid Stack), as long as the revised bid meets the restrictions in 4.4.11. If a change in an existing bid results in the bid not conforming to 4.4.11, then the original bid will be maintained by ERCOT.

(2) After the close of the Extended Market, ERCOT shall determine Extended-Market MCP(s), which shall apply to all quantities procured by ERCOT for the affected Settlement Interval. In the case of Regulation Up Service, Responsive Reserve Service, and Non-Spinning Reserve Service, an Extended-Market MCP for each of the three services shall be calculated by applying the Ancillary Services Simultaneous Optimization Model to the Extended-Market Composite Ancillary Services Bid Stack. The Extended-Market Bid Stack shall include all bids submitted for that Settlement Interval in the original Day-Ahead Market that have not been withdrawn under (1)(b), and those that have been submitted or changed under (1)(c) and (1)(d).

(3) At the end of the Extended Market, the Competitive Sufficiency Test shall be applied again. If the Extended-Market Bid Stack passes the Competitive Sufficiency Test, ERCOT shall use the Extended-Market MCPs to pay QSEs whose bids are accepted.

(4) If the Extended-Market Bid Stack fails the Competitive Sufficiency Test, then ERCOT shall calculate an MCP Limit for the failed Settlement Interval. A QSE whose bid is accepted shall be paid the Mitigated MCP, which shall be the lower of the MCP Limit or the Extended-Market MCP. ERCOT shall use all QSE bids accepted in the Extended Market up to the quantity to be obtained by ERCOT and to the extent that the bids are at or below the Mitigated MCP. If this competitive procurement is insufficient to meet the entire quantity to be obtained by ERCOT, ERCOT shall obtain the remaining quantity needed pursuant to subsection (6) below.

(5) If the Extended-Market Bid Stack fails the Competitive Sufficiency Test and an MCP Limit cannot be calculated, ERCOT shall obtain the entire quantity needed pursuant to subsection (6) below.

(6) To the extent described above, ERCOT shall OOM available Resources on a non-discriminatory basis, regardless of whether the Resources were bid into ERCOT-administered markets, to obtain needed quantities and shall pay the OOMed Resources the higher of their verifiable, incremental costs directly attributable to the services provided or the marginal prices corresponding to 90% of the quantities procured by ERCOT from the Bid Stacks. [Verifiable, incremental costs directly attributable to the services provided shall be determined according to a new Protocol provision or a modification of 6.8.2.2(4) and (5).]

6.8.1.2.3 MCP Limit

The method for calculating an MCP Limit for Regulation Down is as follows:

(1) Remove from the Extended-Market Bid Stack all bids from Pivotal Bidders to obtain a Non-Pivotal Bid Stack.

(2) The MCP Limit is 150% of the MCPC that would have resulted if ERCOT had procured the lowest-priced 95% of the Non-Pivotal Bid Stack.

The method for calculating MCP Limits for Regulation Up Service, Responsive Reserve Service, and Non-Spinning Reserve Service is as follows:

(1) Obtain a Non-Pivotal Bid Stack by removing from the Extended-Market Bid Stack all bids from Pivotal Bidders.

(2) Obtain a Revised Constraint Set for the Ancillary Services Simultaneous Optimization Model as follows:

(a) subtract any capacity accepted from Pivotal Bidders for Regulation Up from CP_{RUi} ,

(b) subtract any capacity accepted from Pivotal Bidders for Responsive Reserves from CP_{RRi} ,

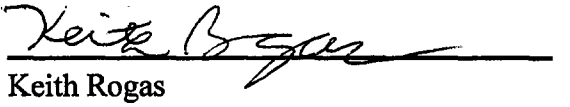
(c) subtract any capacity accepted from Pivotal Bidders for Non-spinning Reserves from CP_{NSi} , and

(d) reduce each of the resulting CP values by a further 5%.

(3) For each service, the MCP Limit is 150% of the MCPC that would have resulted if ERCOT had solved the Ancillary Services Simultaneous Optimization Model using the Revised Constraint Set and the Non-Pivotal Bid Stack.

CERTIFICATE OF SERVICE

I, Keith Rogas, certify that copies of this document will be served on all parties on March 18, 2003, by fax.



Keith Rogas