

Comments of Southern California Edison: Virtual Bidding Design Parameters July 28, 2006

Per the request of the CAISO, please find SCE's comments related to the design criteria for Virtual/Convergence Bidding. SCE appreciates the opportunity to provide comments on this important topic.

Summary of SCE's Position

On June 13, 2006 the CAISO held a joint stakeholder/Governing Board Tutorial session related to Virtual Bidding (VB). During that meeting, SCE's Gary Stern gave a presentation which, in part, outlined SCE position on VB as follows:

- VB should not be implemented in California until MRTU has demonstrated proper function for a period
- Appropriate oversight must be in place to prevent market manipulation when VB will be implemented
- A potential significant asymmetry would exist absent rules from the CPUC for VB use by IOUs

In addition to these high-level positions, SCE provides additional comments on detailed design elements below. Implied in these comments is that MRTU is approved as filed. That is, the VB system must not be designed in isolation, but rather it can only be designed in the unique context of the actual MRTU market approved by the FERC. Since the FERC has not yet approved MRTU, finalizing a VB design at this time is clearly premature. Thus the comments below should be considered preliminary and SCE may wish to modify positions in response to changes to the current MRTU design.

The comments below follow the presentation outline and numbering per Alan Isemonger's presentation of on July 19th 2006.

Item 1: Explicit vs. Implicit

Explicit VB should be flagged on submission, should only occur in the Day-ahead market, and should be limited to energy only.

Item 2: Deterrence of Implicit Virtual Bidding

Implicit VB should be discouraged and instead explicit VB should be utilized. SCE notes that the CAISO already has tariff language prohibiting the submission of false information and other tools to address abuses of implicit VB. Moreover, the CAISO should not attempt to deter implicit VB by providing subsidies or other cost avoiding

incentives to parties that utilize explicit VB. (Please see items 6, 9A &10 for additional details on VB cost allocation.)

Item 3: Spatial Granularity (Nodal, zonal, load-pockets)

Consistent with arguments made in favor of VB, and in light of the existing rules and restrictions in MRTU, SCE believes **VB submission should only be allowed at the LAP levels**. By limiting VB to the LAPs, the same level at which CAISO load bids, the CAISO will have a better chance of achieving its desired market benefits. Primarily, limiting submission to the LAPs will concentrate VB liquidity, increase competition among virtual bidders, and as a result achieve greater market efficiency and price convergence between the Day-ahead and Real-time markets. In addition, as compared to nodal VB, limiting VB submission to the LAP level greatly simplifies market monitoring activities and eliminates a host of gaming concerns. Further, LAP level VB should reduce development, implementation and participation costs and integrate relatively smoothly into the current MRTU design.

Liquidity should be a primary and dominant consideration for the CAISO. Liquidity enhances market efficiency, helps address potential market manipulation, reduces trading risk, reduces bid-ask spreads, improves risk management and facilitates market confidence in the durability of the traded product. Of any single design element, concentrating liquidity of virtual transaction holds the greatest potential to produce real benefits to California, and the best way to increase liquidity is to limit VB to the LAPs. Put simply, limiting the number of VB trading locations concentrates liquidity to those locations.

Virtual bidders will have limits on their transactions, likely through explicit position limits, and certainly through implicit restrictions related to credit requirements, and internal trading and risk restrictions. Finally, virtual traders will simply have limitations on their internal trading resources. Limiting trades to the LAPs allows virtual bidders to focus these limited resources on participation at the LAPs. This in turn will increase liquidity to the price points most relative, indicative and meaningful to California, that is the LAPs.

In contrast, it is incredulous to argue that allowing Virtual Bidding at a nodal level will provide California with deep and liquid markets at all 3000+ internal CAISO nodes. Rather, because of limitations on trading, adding additional nodes for VB will simply harm liquidity at the important LAP locations.

In addition, LAP level bidding is consistent with the MRTU market design and bidding philosophy. Note that MRTU was designed to only allow load to bid at LAPs. Similarly limiting VB to the LAPs allows virtual load and physical load to participate on an even footing. Moreover, the CAISO should be able to integrate “negative virtual demand” bids (equivalent to virtual supply) by simply treating negative demand as a reduction to LAP level load.

In summary, restricting VB to the LAPs is consistent with the MRTU market design and allows the greatest chance for the benefits of VB to be realized while limiting the potential risks of VB. LAP bidding promotes the greatest amount of liquidity, and associated benefits of liquidity, at the LAPs. LAP-only bidding also facilitates effective market monitoring and greatly limits the potential for abuses. As a result, California and the CAISO should have a strong preference for LAP level bidding only.

Virtual bids should not be allowed on the interties

Virtual bids can block access to physical transmission import and export capacity, and given the crucial role imports play to California, this simply should not be allowed. In addition, VB at the inter-ties could create fictional “counterflows” that could result in the IFM accepting schedules for physical flows which exceed transmission limits. That is, the virtual bids could create *infeasible schedules*, one of the primary flaws in the current market that MRTU attempts to remedy. Neither RUC nor the IFM is designed to replace “virtual counterflows” with the physical counterflows that would be needed in order to maintain feasibility. One of the primary drivers behind the redesign of the market has been and continues to be the elimination of infeasible schedules. Any VB rules that reintroduce infeasible scheduling would directly undermine this fundamental MRTU objective. In short, allowing VB on the interties creates a reliability issue and must not be allowed.

Moreover, interties clear at an hourly price in the HASP, not the real-time price, and thus intertie VB would complicate VB implementation without providing a clear concomitant benefit. Finally, SCE has particular concerns over virtual bidding at the ties because of the proposed bifurcated treatment of transmission in MRTU. That is, under MRTU the CAISO “reserves” ETC capacity on the interties and provides ETC holders with a “perfect” hedge against congestions. Allowing VB on the interties in combination with ETCs presents additional market manipulation concerns.

Virtual bids should not be allowed at generation nodes

Although SCE agrees that using VB to hedge against real-time outages may be a legitimate use of VB, it is not necessary to have nodal virtual bidding to perform this hedging. Generation can still obtain this hedge, although perhaps not as precisely, by submitting virtual demand at a LAP¹. In fact, if there is a high correlation between a generator’s node and a LAP price, a practically equivalent hedge can be obtained simply

¹ For example, in October 6, 2004 comments related to the creation of Trading Hubs, Sempra Energy Resources observed “In theory, under virtual bidding, the generator could use a virtual demand bid to hedge this [real-time outage] risk. Ideally, the generator would make its virtual demand bid at its injection node, so that the increase in the cost of covering its real-time supply obligation would be exactly offset by the increase in the value of the virtual demand bid. Assuming that virtual bidding will not be allowed at individual injection nodes, however, the next best alternative would be a hub price that is averaged or weighted across a collection of injection nodes.” Based on MRTU rules, specifically the physical treatment of LAPs and the purely financial treatment of Trading Hubs, allowing VB at the LAPs appears consistent with Sempra’s proposed “next best” alternative. Sempra’s comments can be found at <http://www.caiso.com/docs/2004/10/07/200410071653275049.pdf>

through bidding at the LAP level. Moreover, prohibiting financial bids at the nodal level is consistent with the overall MRTU design and is consistent with MRTU's Local Market Power Mitigation.

The CAISO faced a similar issue related to Physical Scheduling Coordinator trades as part of a settlement process to address "seller's choice" contract issues. Prior to allowing a Physical Scheduling Coordinator trade, MRTU requires physical validation that a physical generator has been committed in the IFM or HASP. Allowing financial virtual bids at the generation nodal level appears inconsistent with the intent of the seller-choice contract settlement and with the validation rules associated with Physical SC Trades.

Virtual bids should not be allowed at individual load nodes

Allowing VB at individual load nodes is inconsistent with the MRTU design. As noted previously, in MRTU load is only allowed to bid at the LAPs, and in fact is prohibited from bidding on a nodal level. Further, load is distributed with set LDFs, and allowing nodal VB would effectively undermine the use of LDFs. Finally, settlement for load is at the LAP level, and introducing nodal VB would require entirely new settlement rules and systems.

Moreover, allowing VB at nodes creates a host of market manipulation concerns without providing any quantifiable benefits². For example, VB at specific nodes can exploit "knife edge" solutions within the IFM optimization. SCE notes that the CAISO has already raised the issue of possible inappropriate optimization output as a result of knife edge solutions. Because of the serious nature of such results, the CAISO appropriately included additional provisions in its tariff (such as the ability to require RA units to provide energy rather than A/S, the ability to rerate transmission to emergency levels, and to change LDFs within tolerance bands) to address spurious optimization results. SCE notes that nodal Virtual Bids have the potential to force spurious optimization outcomes beyond those which can be remedied by the current tools available to the CAISO.

In short, nodal VB creates a host of market manipulation concerns, asymmetries and complexities for CAISO systems. In return, there is no quantifiable benefit. VB at individual load nodes should not be allowed.

Virtual bids should not be allowed at Trading Hubs

Under MRTU, Trading Hubs are weighted aggregations of prices. They are a purely financial construct calculated after-the-fact. Sales and purchases (SC Trades) at Hubs are not considered in the optimization and have no impact on pricing. If allowed, Virtual Bids at a Trading Hub would have to be "distributed" using some yet-to-be defined distribution mechanism. Again, this would undermine the MRTU market design which relies on LDFs for load and physical injections for generation. Since under MRTU neither physical load nor physical generation can bid at the Trading Hubs, allowing VB at the Trading Hubs is inconsistent with the MRTU design and should not be allowed.

² For an additional discussion on manipulation concerns, see "Virtual Bidding: Considerations Related to Potential Market Manipulation, DRAFT", 9/30/02, [Http://www.caiso.com/docs/2002/10/01/2002100109314814914.pdf](http://www.caiso.com/docs/2002/10/01/2002100109314814914.pdf)

Item 4: Load Distribution Factors (LDFs)

As noted in item 3, the CAISO should only allow VB at the LAP levels. Thus in the Day-ahead market, the CAISO should distribute the virtual load using the exact same LDFs used to allocate physical load. For negative virtual load bids (virtual supply) the CAISO should *reduce* load using the same LDFs used for physical load.

In real-time, the virtual bids should be reversed using the exact same LDFs used to distribute physical load in real-time for settlement purposes.

SCE has concerns about the CAISO introducing “new” LDFs beyond those used to settle physical load. Creating a new “settlement price” may increase incentives for implicit virtual bidding and encourage participants to attempt to arbitrage Virtual Settlements against Physical Settlements. Such gaming creates neither price convergence nor market efficiency; rather it simply exploits flaws in the CAISO’s settlement systems and should be avoided. Using a single set of LDFs prevents this issue from arising in the first instance.

Item 5: Market Power Mitigation

As a preliminary matter, the CAISO must recognize it has an affirmative obligation to monitor its markets for abuse. Prior to implementing any market feature, market participants must have a reasonable level of assurance that the CASIO is in fact capable of monitoring and detecting abuses, and that the CAISO has sufficient recourse to stop and remedy abuses it detects. As a result, the CAISO must design a monitoring program commensurate with their VB design and provide sufficient detail of this monitoring plan such that market participants can reasonably expect the CAISO to carry through with its monitoring obligations. To date, the CAISO has provided scant detail on how they intend to monitor Virtual Bidding behavior.

Furthermore, one of the main justifications in the CAISO’s White Paper on VB was the argument that explicit VB will reduce the incentive for implicit VB (a set of behaviors that is in violation of the rules, harmful to the market, and potentially difficult to monitor and police). If appropriate VB rules are not put in place, and manipulative behavior with VB is introduced, then the very justification for VB will have been undermined.

The CAISO can only implement a design it is capable of effectively monitoring

Effective market power mitigation and more precisely market monitoring and anti-gaming safeguards are a necessary precondition for the implementation of VB. The CAISO must monitor their markets and the behavior of market participants irrespective of the VB design ultimately implemented. The exact tools the CAISO will require depend on VB implementation details. Structural rules, such as only allowing VB at the LAPs and the immediate release of VB information, provide significant safeguards to the market and will help facilitate effective CAISO monitoring.

In their MRTU reply comments, the CAISO adopted language related to their monitoring obligations. Section 39.2.1, item (4) requires the CAISO to monitor for "Bidding practices that distort prices, dispatch, or uplift charges away from those expected in a competitive market." The CAISO has an obligation to implement this portion of the tariff and to monitor and detect any VB practices which violate this standard. Thus, accompanying any VB design proposal, the CAISO has an obligation to its stakeholders, as well as to the FERC, to propose a monitoring program capable policing their VB system for abuses.

VB is not a substitute for proper market implementation

There should be no confusion - Virtual Bidding is not intended to, and should not be designed as a tool to "fix" CAISO modeling errors or to mitigate local market power. If the CAISO's model has errors, the errors should be corrected by the CAISO. Put simply, the CAISO model should be accurate, and it would be irresponsible to rely on "the market" to correct something for which the CAISO is the sole custodian and has sole responsibility of maintaining. The "I" in CAISO stands for "Independent", and as the guardian of the model, they should be a neutral arbitrator to ensure their model produces just and reasonable results for both buyers and sellers.

Moreover, VB is not a tool to remedy "local market power". Again, the CAISO's market design should explicitly address local market power and prevent the exercise thereof. The filed MRTU tariff properly has explicit local market power mitigation (LMPM) measures. Again, LMPM should be handled through the CAISO via explicit tariff provisions. It is improper and unreasonable for the CAISO to expect Virtual Bidding to allow "the market" to resolve local market power issues.

Specific market concerns

SCE's does not base its concerns over the need for effective monitoring on phantom fears or shadowed speculations, far from it. Our concerns originate from first hand experience as to the potential damage that can result from market abuse. After the energy crisis of 2000-2001, SCE participated in a host of investigations as member of the California Parties, a group which included the CPUC, the California Attorney General, the Energy Oversight Board, Pacific Gas and Electric, and the State Water Project (CERS). Building off of analysis performed internally by the CAISO³, our investigations documented evidence of massive market manipulation and tariff abuses during the crisis. Many of these abuses exploited design flaws, or if you will, modeling errors in the previous market design. For reference and illustration, SCE includes below portions of a

³ For example, "Analysis of Trading and Scheduling Strategies Described in Enron Memos", California ISO Department of Market Analysis, October 4, 2002 located at <http://www.aiso.com/docs/2003/01/06/2003010617125814460.pdf>; Direct Testimony for Dr. Eric Hildebrandt Docket No. EL03-180-000 located at <http://www.aiso.com/docs/2004/01/20/200401201825085949.pdf>; "Empirical Evidence of Strategic Bidding in CA ISO Real Time Market", Dr. Anjali Sheffrin, July 17, 2001, located at <http://www.aiso.com/docs/2001/07/21/2001072118472011880.pdf>.

California Parties' filing (the "Calendar") made to the FERC. The Calendar quantifies the number of abuses we identified *in each hour* during the summer of 2000.⁴

The Calendar track occurrences of the following forms of market manipulation:

- "Fat Boy" – A form of ad hoc virtual bidding which relied on submitting false load to the CAISO in order to sell day-ahead power into the real-time market. The scheme effectively withheld power from the day-ahead market, increasing day-ahead prices and creating panic real-time buying by the CAISO.
- "Get Shorty" - A form of ad hoc virtual bidding which relied on submitting false generation to the CAISO in order to buy power into the real-time market.
- "Ricochet" – Also a form of ad hoc virtual bidding on the interties which relied on the submission of false information and in some cases a misrepresentation of the ability to provide A/S. Day-ahead power was exported or "parked" to fictitious load, and then resold at inflated prices to the CAISO as both energy, A/S and Replacement Reserves.
- "Death Star" – A form of congestion manipulation which often relied on the submission of false information and transmission outside of the CAISO. Fictitious counterflows were scheduled in order to collect congestion payments.
- "Cut Schedules" – Fictitious schedules were submitted to the CAISO in order to receive counter-flow congestion payments. After the payment was realized, the schedules were cut.
- Various economic and physical withholding schemes.

SCE notes, that although many of these games have come to be known as "Enron strategies", our investigations, as well as investigations by the CAISO revealed that a host of other participants engaged in these strategies, many of whom are still active CAISO market participants⁵.

In the graphics below, each small colored box in the Calendar represents a specific trade-hour. The small number within each box tallies the violations discovered in that hour. The small boxes are also color coded such that darker colors represent increased violations. For example, the first hour of the Calendar is May 1, 2000, HE1. The number in this small orange box is "12", meaning we found 12 violations in that hour. HE16 on May 22, 2000 is the first purple box, and here we found 32 violations.

⁴ Reply to Answers to Motion for Institution of Consolidated Proceeding to Address Remedy and Damage Issues and for Common Protective Order of the California Parties under EL00-95 ET AL., Attachment A, May 27, 2003.

⁵ Reference the California Parties "EL0095Attachment B.PDF" at http://elibrary.ferc.gov/idmws/File_list.asp?document_id=4106382 for additional details.

Summary Calendar of Trading Behavior: May 1-Oct 1, 2000 - All Parties

(Number of identified screen violations - each cell represents one hour)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday																																									
	1-May-00		2-May-00		3-May-00		4-May-00		5-May-00		6-May-00		7-May-00																																			
HE 1 - HE6	12	11	13	12	12	12	14	13	17	14	15	15	15	13	15	15	15	10	12	12	13	12	12	10	10	11	10	11	12	11	11	13	13	12	16	10	12	12	13	12	11							
HE 7 - HE12	12	15	15	15	16	16	18	20	21	21	20	21	16	18	19	19	18	16	16	17	20	18	17	17	13	16	12	17	16	11	16	16	16	15	14	16	18	18	18	16	14	17	14	14	13	13	15	15
HE 13 - HE18	17	17	16	17	16	17	21	22	22	20	20	17	16	17	20	18	17	17	16	17	20	18	17	17	13	16	12	17	16	11	17	18	18	19	17	16	15	16	15	16	17	15	13	16	12	17	16	11
HE 19 - HE24	18	19	19	18	14	13	18	19	20	22	17	14	13	19	19	18	13	18	13	16	15	16	12	12	17	17	16	17	14	12	14	15	17	16	13	16	14	15	17	16	13	16	13	16	15	16	12	12
	8-May-00		9-May-00		10-May-00		11-May-00		12-May-00		13-May-00		14-May-00																																			
HE 1 - HE6	11	13	12	12	13	13	13	10	10	12	15	15	11	12	12	9	13	14	14	15	14	13	14	16	15	16	15	15	14	13	11	11	14	11	15	16	14	12	14	11	13	11						
HE 7 - HE12	15	16	18	21	18	19	18	16	17	19	19	17	16	17	18	18	20	20	15	13	15	14	14	16	15	17	18	18	19	17	16	16	16	18	16	13	15	15	13	13	15	14						
HE 13 - HE18	18	17	17	17	15	16	19	18	17	19	20	17	19	18	18	20	19	18	17	16	16	15	16	13	15	14	17	16	16	15	17	15	15	15	16	16	16	16	16	16	18	17						
HE 19 - HE24	17	19	17	17	14	14	19	21	18	19	14	14	17	16	17	19	13	13	14	15	17	15	13	13	18	14	18	17	16	14	15	16	13	13	11	13	16	14	16	15	12	13						
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HE 7 - HE12	13	12	14	17	17	16	15	15	14	15	15	16	14	13	12	12	12	15	15	19	16	12	15	13	15	15	16	18	18	17	18	14	12	14	14	14	14	13	12	18	17							
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HE 19 - HE24	17	15	13	14	14	14	15	13	14	14	13	12	14	16	16	14	16	15	16	17	17	16	14	13	20	17	19	18	14	14	20	17	19	18	14	13	20	19	18	17	16	17						
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HE 1 - HE6	16	19	18	18	19	19	18	20	21	22	20	18	19	22	23	22	22	22	21	21	23	22	23	23	18	22	23	24	22	20	17	18	22	23	22	19	20	23	21	22	22	23						
HE 7 - HE12	19	16	18	23	25	23	22	19	24	25	23	24	17	18	18	22	22	25	18	20	19	21	20	21	19	17	19	15	19	17	18	18	16	17	20	22	23	18	21	21	18	20						
HE 13 - HE18	23	23	25	32	27	25	26	24	23	24	24	25	24	25	27	28	28	28	19	19	19	21	22	19	19	18	18	21	17	21	23	24	23	22	22	25	22	21	20	20	20	21						
HE 19 - HE24	23	24	22	21	18	17	25	22	24	21	15	13	26	27	24	20	20	18	18	20	21	19	19	18	22	19	21	19	19	18	23	24	23	22	20	18	21	20	20	19	18	20						
	29-May-00		30-May-00		31-May-00		1-Jun-00		2-Jun-00		3-Jun-00		4-Jun-00																																			
HE 1 - HE6	16	16	16	16	15	15	20	20	21	19	20	19	18	17	15	21	21	22	19	20	18	19	18	17	19	24	25	25	25	23	19	18	21	21	22	22	20	20	20	20	20	18						
HE 7 - HE12	15	13	14	18	19	19	14	16	17	18	20	21	22	20	19	21	23	22	21	20	20	22	24	25	24	19	20	22	25	24	22	22	19	17	18	19	16	18	17	15	15	16						
HE 13 - HE18	21	20	21	20	20	22	24	22	23	23	25	20	21	24	26	25	20	24	23	24	26	23	26	26	23	25	24	24	25	26	19	20	20	20	25	23	17	18	16	18	17	18						
HE 19 - HE24	20	18	18	19	19	19	22	18	17	20	13	16	24	18	21	18	17	16	23	24	24	22	18	19	26	23	25	24	19	19	20	18	17	17	16	18	17	17	19	18	19	21						
	5-Jun-00		6-Jun-00		7-Jun-00		8-Jun-00		9-Jun-00		10-Jun-00		11-Jun-00																																			
HE 1 - HE6	26	24	25	25	23	22	16	18	23	23	22	22	24	26	25	25	23	24	23	24	24	23	24	24	21	22	22	22	22	23	15	17	18	18	20	18	20	21	21	19	21	18						
HE 7 - HE12	25	21	19	21	21	22	19	16	18	17	19	19	23	18	16	17	16	17	24	24	22	23	18	18	23	16	22	22	18	19	16	17	19	20	23	23	19	19	17	20	19	21						
HE 13 - HE18	22	22	22	23	22	23	22	18	16	17	18	18	21	19	20	20	20	17	19	20	19	18	18	17	18	21	24	22	21	21	13	25	25	22	22	23	22	23	24	21	22	22						
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HE 7 - HE12	25	28	22	25	21	21	23	26	28	30	33	30	29	27	27	30	31	31	24	22	22	25	26	28	24	22	22	23	20	23	19	20	22	23	20	21	16	15	17	16	14	16						
HE 13 - HE18	18	20	23	23	23	24	30	32	38	35	35	34	32	33	32	33	34	32	20	20	20	31	30	30	24	22	22	22	23	14	18	21	22	22	25	26	15	18	18	18	18	17						
HE 19 - HE24	22	21	18	20	20	20	36	31	30	29	20	21	35	29	28	27	21	22	28	24	26	23	19	22	26	25	24	21	20	22	22	23	24	23	18	19	17	17	17	18	15	14						
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HE 7 - HE12	20	21	18	18	17	18	19	18	21	21	22	23	21	20	23	24	26	27	23	23	22	24	26	23	20	20	21	20	18	19	23	22	25	21	24	23	20	21	21	22	20	18						
HE 13 - HE18	17	19	20	25	22	24	20	23	25	27	28	26	27	26	27	26	23	20	25	26	25	26	24	23	24	24	24	25	25	23	21	27	27	26	25	27	18	19	19	18	18	18						
HE 19 - HE24	21	23	22	22	15	16	23	22	22	24	15	15	29	25	23	24	18	18	25	24	26	24	19	19	21	22	23	23	17	18	25	28	26	24	22	19	17	18	18	17	20	20						

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	26-Jun-00	27-Jun-00	28-Jun-00	29-Jun-00	30-Jun-00	1-Jul-00	2-Jul-00
HE 1 - HE6	20 22 19 21 21 22	19 20 18 21 23 23	20 22 21 22 23 23	23 24 22 23 23 24	19 23 23 22 23 22	18 19 20 21 21 18	19 19 21 19 21 19
HE 7 - HE12	23 23 24 25 15 25	15 22 23 23 25 26	26 23 23 26 23 25	20 23 21 22 23 22	20 18 24 16 27 23	21 22 22 24 22 22	19 21 19 20 20 22
HE 13 - HE18	26 30 29 30 27 28	29 30 30 29 30 30	27 30 31 31 29 29	22 23 28 29 28 25	20 24 30 28 27 25	22 20 22 20 21 21	20 25 23 21 21 22
HE 19 - HE24	24 28 26 24 18 19	29 30 28 25 17 20	23 21 26 27 21 21	22 23 21 22 19 21	23 23 23 21 18 20	22 20 20 20 18 17	22 21 22 23 18 20
	3-Jul-00	4-Jul-00	5-Jul-00	6-Jul-00	7-Jul-00	8-Jul-00	9-Jul-00
HE 1 - HE6	17 20 21 18 18 18	14 18 18 18 17 18	15 13 13 12 13 13	16 18 14 15 14 16	19 18 19 19 17 17	20 19 19 18 18 19	15 16 15 16 18 17
HE 7 - HE12	16 17 19 18 16 18	17 19 21 18 19 21	14 16 16 19 20 21	19 19 21 22 23 22	18 17 17 19 16 19	20 19 17 17 16 20	16 17 16 16 19 17
HE 13 - HE18	19 21 21 19 17 16	21 20 17 20 20 19	22 19 17 18 19 18	23 20 20 21 22 19	17 18 19 18 17 17	19 21 22 20 22 19	16 18 18 19 19 18
HE 19 - HE24	15 16 16 17 15 15	22 18 17 17 20 22	18 20 18 17 15 14	17 20 21 20 17 16	17 19 18 17 18 17	19 19 17 20 22 20	19 18 20 20 18 21
	10-Jul-00	11-Jul-00	12-Jul-00	13-Jul-00	14-Jul-00	15-Jul-00	16-Jul-00
HE 1 - HE6	18 17 15 15 17 15	17 19 18 17 16 19	20 19 18 19 17 18	17 17 17 17 17 17	19 18 18 19 17 21	17 17 19 19 19 19	15 16 15 18 18 21
HE 7 - HE12	23 30 22 22 23 21	18 21 21 19 22 23	22 22 24 22 21 21	23 22 22 24 24 26	24 23 20 22 21 22	21 25 26 21 21 20	19 19 19 18 26 26
HE 13 - HE18	20 18 22 21 26 27	21 20 19 19 21 23	22 23 24 23 22 24	21 18 22 23 23 24	21 20 22 21 20 21	21 21 23 24 22 23	20 18 20 19 21 17
HE 19 - HE24	24 23 21 24 19 18	23 26 23 22 22 20	24 24 23 22 20 20	24 24 25 21 22 19	21 22 25 23 19 20	22 22 18 19 18 14	15 16 17 19 17 15
	17-Jul-00	18-Jul-00	19-Jul-00	20-Jul-00	21-Jul-00	22-Jul-00	23-Jul-00
HE 1 - HE6	18 19 20 17 17 19	22 24 23 21 22 23	23 24 25 24 22 23	21 22 23 22 24 16	21 21 21 22 22 26	23 24 23 25 22 26	17 22 22 21 23 24
HE 7 - HE12	20 20 21 11 22 21	23 27 26 29 25 29	30 31 29 29 25 22	27 26 28 28 30 29	28 24 25 27 25 27	27 27 31 26 28 24	20 19 22 25 25 26
HE 13 - HE18	23 22 20 20 21 21	27 26 29 28 29 31	25 25 29 23 28 28	27 26 24 25 27 27	26 25 30 27 26 24	23 25 23 27 24 24	25 23 21 23 22 21
HE 19 - HE24	24 19 19 21 23 21	28 28 27 29 25 23	26 22 21 22 24 23	24 25 27 26 24 22	23 25 23 24 21 23	24 25 24 24 23 22	23 23 23 25 24 22
	24-Jul-00	25-Jul-00	26-Jul-00	27-Jul-00	28-Jul-00	29-Jul-00	30-Jul-00
HE 1 - HE6	20 22 23 23 24 24	24 27 23 24 22 24	22 20 20 19 20 22	21 20 21 21 21 23	19 21 19 18 19 21	24 24 18 20 21 21	23 23 22 23 23 21
HE 7 - HE12	24 24 23 23 24 24	27 26 22 22 23 27	25 24 26 23 25 29	24 26 28 26 26 28	25 25 22 21 24 26	22 28 26 25 26 27	24 23 24 22 27 26
HE 13 - HE18	24 23 24 23 24 23	24 25 27 26 25 28	26 29 27 29 30 28	31 28 32 32 30 31	28 28 27 29 30 28	27 29 26 26 26 25	26 24 27 29 26 26
HE 19 - HE24	23 21 21 22 24 24	24 24 24 22 22 23	27 27 24 22 20 21	27 26 22 26 23 21	25 24 22 24 19 18	26 23 28 26 24 22	23 24 27 27 17 20
	31-Jul-00	1-Aug-00	2-Aug-00	3-Aug-00	4-Aug-00	5-Aug-00	6-Aug-00
HE 1 - HE6	22 21 22 21 22 23	25 26 27 26 27 26	26 25 26 26 28 27	28 25 25 26 26 26	23 24 23 23 24 24	24 22 22 22 23 22	24 25 25 26 24 24
HE 7 - HE12	25 29 25 27 27 27	29 30 31 32 32 35	26 25 27 28 25 32	27 29 30 31 31 31	28 29 25 28 30 32	23 22 20 24 26 26	22 22 24 24 25 27
HE 13 - HE18	27 29 28 29 28 29	29 29 26 27 29 29	34 34 33 33 34 31	28 31 31 29 31 33	32 31 30 29 32 31	29 27 26 26 28 27	24 25 25 25 25 26
HE 19 - HE24	27 24 24 25 25 22	29 31 31 28 27 24	30 27 27 25 25 24	30 27 26 26 28 27	33 31 27 26 24 25	28 26 24 25 22 23	25 25 24 21 22 25
	7-Aug-00	8-Aug-00	9-Aug-00	10-Aug-00	11-Aug-00	12-Aug-00	13-Aug-00
HE 1 - HE6	23 23 23 23 25 24	20 24 24 23 23 24	22 24 26 23 25 25	25 28 29 28 28 28	27 24 24 25 26 26	24 25 25 25 26 24	22 25 24 20 21 22
HE 7 - HE12	23 25 23 25 25 24	24 26 25 28 30 28	24 25 24 27 27 28	26 28 31 31 30 28	27 25 23 26 29 34	21 26 23 24 24 28	25 23 27 26 26 24
HE 13 - HE18	23 25 26 28 29 28	28 32 31 33 32 32	30 33 35 31 28 28	29 33 37 33 33 34	30 37 35 35 37 38	29 28 24 27 27 27	23 23 23 24 25 24
HE 19 - HE24	25 26 26 22 22 22	30 26 27 29 27 23	30 26 26 25 20 22	29 26 28 30 25 24	37 31 30 27 27 23	24 24 26 23 22 24	24 29 28 26 23 25
	14-Aug-00	15-Aug-00	16-Aug-00	17-Aug-00	18-Aug-00	19-Aug-00	20-Aug-00
HE 1 - HE6	25 22 24 25 24 23	25 24 24 25 25 27	27 26 25 24 26 24	23 23 22 22 22 25	23 24 24 24 25 26	20 20 19 22 20 20	22 21 23 23 22 21
HE 7 - HE12	28 29 28 26 29 26	26 27 27 25 24 27	26 27 25 29 32 31	23 27 26 32 33 31	23 22 21 28 30 31	21 19 22 24 21 25	24 27 23 24 26 24
HE 13 - HE18	35 33 33 33 35 34	29 28 30 31 32 30	34 33 34 34 35 32	31 32 33 34 33 33	32 29 27 28 29 28	25 27 29 30 29 25	23 24 25 23 23 25
HE 19 - HE24	29 27 27 29 26 25	28 24 26 30 30 28	28 29 27 26 24 24	28 31 31 28 21 22	26 26 26 22 19 21	24 22 19 19 19 20	23 23 22 21 21 19

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	21-Aug-00	22-Aug-00	23-Aug-00	24-Aug-00	25-Aug-00	26-Aug-00	27-Aug-00
HE 1 - HE6	26 23 26 23 24 23	23 24 25 23 24 24	22 21 21 20 21 20	24 25 24 23 24 24	23 23 23 25 25 23	20 20 19 19 20 20	20 19 21 21 23 23
HE 7 - HE12	23 26 22 25 27 25	24 23 25 23 23 26	21 24 24 26 26 25	21 27 21 28 26 27	22 26 27 24 27 29	21 23 22 26 21 23	24 23 21 24 23 21
HE 13 - HE18	28 28 29 31 29 28	24 30 31 29 29 27	28 25 26 27 26 25	27 26 31 27 24 25	19 30 30 28 29 30	24 25 27 25 27 26	22 20 22 24 21 23
HE 19 - HE24	25 27 25 24 21 24	26 26 28 23 22 24	23 24 27 25 21 24	26 23 21 21 21 21	30 27 28 22 20 20	25 29 26 21 21 22	25 23 19 22 22 24
	28-Aug-00	29-Aug-00	30-Aug-00	31-Aug-00	1-Sep-00	2-Sep-00	3-Sep-00
HE 1 - HE6	22 22 22 21 21 20	23 26 26 26 28 28	21 19 21 21 22 25	28 25 23 21 24 24	21 22 20 19 22 19	21 21 22 20 21 20	20 19 19 20 20 19
HE 7 - HE12	23 22 22 24 21 21	25 27 26 24 29 29	24 19 18 17 20 21	25 24 22 23 23 21	19 20 17 18 18 20	19 22 22 19 18 19	19 23 24 27 25 24
HE 13 - HE18	22 23 27 26 25 25	29 26 25 24 25 23	19 16 17 17 17 19	21 20 20 20 20 20	19 22 20 17 18 18	20 19 16 18 18 18	23 25 25 22 21 20
HE 19 - HE24	21 24 22 20 24 21	23 23 26 25 23 22	22 21 21 24 24 26	21 25 24 22 23 26	22 20 20 17 19 18	19 20 18 19 19 20	19 19 17 19 19 18
	4-Sep-00	5-Sep-00	6-Sep-00	7-Sep-00	8-Sep-00	9-Sep-00	10-Sep-00
HE 1 - HE6	21 20 19 18 18 18	22 21 21 22 21 20	25 23 25 23 25 25	21 24 24 23 24 25	19 20 19 21 21 19	21 22 22 22 22 22	22 22 23 23 23 24
HE 7 - HE12	19 19 21 26 25 24	19 21 21 19 19 18	27 20 17 22 17 21	22 18 16 19 18 21	19 21 19 20 19 20	20 19 18 18 19 17	26 23 24 22 22 20
HE 13 - HE18	21 20 24 21 23 24	21 19 18 17 16 17	22 18 20 19 20 21	20 16 19 19 17 18	18 18 17 17 18 19	16 15 16 15 15	20 17 20 20 22 20
HE 19 - HE24	23 25 22 20 21 21	15 16 16 19 21 20	20 17 18 18 22 23	17 17 16 17 21 18	17 19 21 18 19 18	17 18 17 19 22 21	21 21 20 22 25 23
	11-Sep-00	12-Sep-00	13-Sep-00	14-Sep-00	15-Sep-00	16-Sep-00	17-Sep-00
HE 1 - HE6	26 24 25 24 24 20	23 23 23 23 23 23	21 22 22 22 21 20	25 25 22 24 24 24	23 21 24 21 23 21	21 24 21 23 23 24	24 22 25 23 24 24
HE 7 - HE12	22 22 19 20 20 20	26 28 27 24 23 25	25 26 22 22 25 24	23 23 25 27 28 27	26 26 25 23 21 22	26 30 26 25 23 21	25 24 23 23 23 26
HE 13 - HE18	21 22 23 24 23 24	19 18 22 22 21 20	25 26 28 25 28 24	27 31 31 28 29 30	22 23 24 24 24 20	20 21 21 21 20 20	23 22 25 26 26 26
HE 19 - HE24	22 19 20 22 21 22	22 18 18 20 22 22	23 21 25 24 21 23	26 23 26 23 24 24	21 20 20 21 21 22	20 22 22 25 22 21	25 25 24 24 21 22
	18-Sep-00	19-Sep-00	20-Sep-00	21-Sep-00	22-Sep-00	23-Sep-00	24-Sep-00
HE 1 - HE6	21 20 23 22 22 22	24 24 24 25 27 25	28 27 27 28 26 28	26 27 27 26 27 26	23 24 27 26 25 25	24 24 23 23 24 23	23 23 22 22 24 23
HE 7 - HE12	24 22 23 24 23 27	28 28 28 26 26 28	26 24 26 27 29 24	24 23 27 29 23 21	21 25 22 24 26 22	21 24 24 25 28 28	25 25 24 25 22 25
HE 13 - HE18	23 24 27 24 26 26	33 32 35 32 31 31	26 28 29 31 30 24	23 25 25 25 22 21	22 24 24 23 22 23	28 26 27 29 24 21	23 26 27 29 23 24
HE 19 - HE24	21 21 19 22 19 19	31 33 32 29 26 26	31 26 25 26 30 28	23 25 24 21 25 27	25 22 24 25 25 26	20 18 23 23 24 26	25 27 27 23 25 26
	25-Sep-00	26-Sep-00	27-Sep-00	28-Sep-00	29-Sep-00	30-Sep-00	1-Oct-00
HE 1 - HE6	26 24 25 26 26 26	21 23 22 22 22 22	22 24 22 25 25 25	23 23 23 23 26 24	21 20 22 21 21 19	20 20 21 18 21 21	20 20 21 18 21 21
HE 7 - HE12	24 25 24 22 22 21	22 24 21 23 23 23	23 24 23 24 21 27	22 23 23 23 24 24	20 21 21 23 20 21	24 26 23 25 28 21	24 26 23 25 28 21
HE 13 - HE18	17 21 24 20 22 22	19 20 26 24 20 22	23 24 22 22 24 23	20 20 18 18 18 18	23 22 21 17 15 19	19 21 22 22 21 25	19 21 22 22 21 25
HE 19 - HE24	20 23 23 22 26 24	21 20 22 25 24 28	18 19 21 22 25 23	17 20 17 18 23 21	17 19 18 18 22 24	22 20 21 19 24 22	22 20 21 19 24 22

Source: Detailed Daily Summaries of Market Behavior Number of Identified Screen Violations: 1-10

Notes: For each entity listed in the Detailed Daily Summaries, the Summary Calendar counts the following as one screen violation: 11-15

- ** Every violation of the Ricochet screen. 16-24
- ** Every violation of the Fatboy screen. 25 +
- ** Every violation of the Get Shorty screen.
- ** A violation of the Deathstar and/or Cut Schedules screens.
- ** A violation of the Day-Ahead and/or Hour-Ahead High Reserve Bid screens.
- ** A violation of the High Real-Time Energy and/or Withholding screens.
- ** A Suspected False Outage.
- ** A Reserve Shutdown during an ISO Emergency Hour.

As the Calendar illustrates, abuses of the tariff, and of law, were not isolated instances; rather they occurred with rampant frequency. During many days in July, August and September 2000, we found *dozens of violations*, performed by a host of market participants, *in virtually every hour*.

Not only did the FERC find that many of these types of activities violated the CAISO tariff, several criminal charges were brought against traders for the use of these, and for additional manipulative strategies. For example, Count One of the Grand Jury Indictment of former Enron trader John Forney is 18 U.S.C. § 371 - Conspiracy to Commit Wire Fraud. In delineating the “means and methods of conspiracy and fraudulent scheme”, the

indictment not only lists Death Star, Get Shorty, and Ricochet, but additional schemes as well. Particularly relevant to VB, the indictment describes an additional strategy not capture on the Calendar: Load Shift. Load Shift is yet another ad hoc virtual bidding strategy and is described in the indictment as follows:

“Enron owned Firm Transmission Rights to Path 26, a major transmission line between Northern and Southern California, which gave Enron the right to collect revenues for use of Path 26 by other energy companies only if the line was congested. FORNEY and others submitted and caused to be submitted false and fraudulent schedules, bids and information, in which they misstated their load for the express purpose of creating the illusion of congestion across Path 26 in order to collect revenue based on Enron’s Firm Transmission Rights. This was known within Enron as the Load Shift trading scheme.”⁶

On August 5, 2004, following the guilty pleas of two additional colleagues, Mr. Forney plead guilty to conspiracy to commit wire fraud for the purpose of manipulation California’s energy markets.

At the same time the FERC furthered investigations of California electricity market manipulation, the Commodities Futures Trading Commission was busy investigating abuses of false price reporting to natural gas publications. The false reporting was intended to manipulate published gas index prices. The most apparent reason for manipulating gas indices is to increase the value of other holdings that are valued based on the index. That is, by manipulating the price of the index, other holdings (such as gas contracts valued against the index) would increase in value.

For example, according to a CFTC press release dated September 20, 2005 related to charges brought against the former head of gas trading at AEP:

“The complaint charges that between November 2000 and September 2002, Foley directed those he supervised to submit false reports of natural gas trading, including false prices and volumes, to index reporting firms that compile energy price surveys or indexes (indexes), such as Platts. According to the complaint, price and volume information is used by Platts and others in calculating indexes of natural gas prices for various hubs throughout the United States. The complaint alleges that Foley knowingly directed the delivery of false information to firms such as Platts in *an attempt to skew those indexes for his and his company’s financial benefit...*(italics added)

According to the complaint, Foley’s conduct constitutes an attempted manipulation under the Commodity Exchange Act, which, if successful, could have affected prices of NYMEX natural gas futures and options contracts.”⁷

⁶ United States of America v. John M. Forney, No.: CR 03-0178 MJJ, pages 7 – 8.

⁷ <http://www.cftc.gov/opa/enf05/opa5114-05.htm>

Ultimately, the CFTC reached settlements related to gas price reporting and price manipulation *with over a dozen parties* and assessed penalties of approximately \$300 million. Once again, a host of parties which paid fines to the CFTC continue on as active participants within the California markets.⁸

Both the electricity and gas manipulation events are particularly relevant to the discussion of the VB design. First, California has already been the victim of massive abuse and manipulation in both the electricity, and gas markets. In weighing concerns over market manipulation, there is no credible justification to downplay concerns or to simply argue “it can’t happen here”. History shows it can and it has. Second, the CAISO is undertaking the design of a VB market feature that can be used to produce outcomes which parallel many of the Enron and false reporting strategies:

- Many Enron strategies used fictitious information to exploit model and design flaws to profit from fictional flows and dispatch – Virtual Bidding is a financial bid that can be used to exploit model and design flaws to profit from fictional flows and dispatch.
- Some Enron strategies leveraged fictitious bids to increase the value of other derivative-like holdings – Virtual Bids are a financial bid that can be leveraged to increase the value of other derivative holdings.
- Parties used fictitious information to manipulate gas indices to increase the value of products which cleared against the indices – Virtual Bids allow parties to submit financial bids to influence the value of power indices.

More specifically, other markets have already experienced problems related to VB. For example, a November 30, 2004 letter from then FERC Commissioner Pat Wood to Senator Dianne Feinstein discusses, in part, abuses of Virtual Bidding in both PJM and ISO-NE.

“The first case involves allegations that a market participant in PJM submitted virtual bids or offers at a specific location to cause congestion so that it could profit from Financial Transmission Rights (FTRs) that the market participant held at that location. As a result, PJM modified its tariff to disallow profiting from FTRs, if the FTR holder contributed to congestion by using virtual bidding at the associated location.”

“Another example involved the use of virtual bidding to increase rather than reduce the spread between day-ahead and real-time prices. This came up in ISO-NE, where the tariff give the market monitor authority under such circumstances to prohibit a market participant from engaging in virtual bidding at that location or to restrict the quantities it can trade. There, the market monitor relied on the

⁸ Parties to CFTC settlements include AEP, Aquilla, Calpine, CMS Energy, Coral, Duke, Dynegy, El Paso, Encana, Enron, Enseroc, Koch, Mirant, Oneok, Wes Gas, Williams, Xcel.

tariff to suspend a market participant's ability to engage in virtual trades at a particular location.”⁹

In summary, all of this experience argues for implementing a VB system that limits opportunities for future manipulation, and a system that the CAISO is capable of monitor effectively. Stakeholders have a right to demand assurance that like abuses will not be allowed again. California has very real and recent observations of 1) parties exploiting the CAISO market design and modeling errors and 2) parties manipulating prices with the intent of increasing the value of products which settled against the now manipulated prices (i.e. derivatives valued against the index). The CAISO must be cognizant and responsive to this recent background of rampant market manipulation as it proposes any new market design feature. As a result, the CAISO must be vigilant and must design a Virtual Bidding system which provides stakeholders with assurance that Virtual Bidding cannot be use to 1) exploit market design flaws and modeling errors, or 2) manipulate prices in order to profit from derivatives-like instruments (e.g. CRRs) which clear against CAISO prices.

SCE's suggestions for monitoring

Below are specific suggestions for the CAISO's monitoring process.

- The CAISO requires tariff authority to limit, suspend or revoke a participant's right to utilize virtual bids. The CAISO should develop this language for review with stakeholders and file it with the FERC as part of their VB design package.
- The CAISO requires tools to perform specific “Virtual Bid-in/Virtual Bid-out” analysis. To prevent Virtual Bids from being used to exploit modeling errors or “knife edge” optimization solutions, the CAISO should provide guidance on what is and what is not acceptable Virtual Bidding behavior. The CAISO should consider prospective rules to disqualify or reject virtual bids that exploit their optimization. Again, the CAISO has an obligation in MRTU to monitor "Bidding practices that distort prices, dispatch, or uplift charges away from those expected in a competitive market."
- The CAISO should monitor the price impact, congestion impact, and unit commitment/RUC impact of specific virtual bids. For example, the CAISO must be able to answer a question like “how did the virtual bids of SC-A impact the price and dispatch of generation controlled by SC-A?”
- The CAISO should monitor the “profitability” of Virtual Bidding transactions, monitoring both highly profitable and high or sustained

⁹ SCE notes that in this second example, parties used Virtual Bids to cause price *divergence* rather than convergence. Among other observations, this demonstrates that “Virtual Bidding” is a more accurate nomenclature than “Convergence Bidding”.

losses. Bids that remain highly profitable may indicate exploitation of some modeling error or, depending on the VB design, some flaw in the VB bidding rules. Transactions that have high or sustained losses may indicate the bidder is “leveraging” the price, congestion, or dispatch impact of its virtual bids to profit from a derivative-like instrument. For example, a participant may be willing to lose \$1,000 per day on their VB energy because they make \$5,000 in CRR payments.

- Depending on the VB design, especially if bids are allowed in region more granular than the LAP, the CAISO needs explicit VB rules for participants that hold CRRs. Based on the ultimate VB design, the CAISO should propose VB/CRR rules with stakeholders.
- SCE believes that a market design that limits opportunities for manipulation is essential in order for the CAISO to fulfill its obligation to police its markets. Thus, SCE’s proposals to only allow VB at the LAPs can be viewed as an element of the CAISO’s monitoring plan. Moreover, LAP-only bidding concentrates liquidity and thus hinders the ability of any single participant to manipulate market prices or to distort prices away from competitive outcomes. Further, limiting bidding to the large LAPs should effectively address concerns that even small amounts of virtual bids strategically placed at sensitive locations (from an optimization solution perspective) could “distort prices, dispatch, or uplift charges away from those expected in a competitive market.”

Item 6 and 9A : Pricing and Unit Commitment/Unit Commitment Cost Allocation

There are two major principles that should guide cost allocation: 1) cost causation and 2) limiting perverse incentives/limiting incentives for implicit virtual bidding.

From both a cost causation and incentive perspective, VB should be treated as closely as possible to physical bids. From the IFM’s pricing and commitment perspective, virtual bids are treated the same as physical bids, and thus the virtual bids should bear a like amount of uplift costs.

Both the Day-ahead and Real-time settlements should mimic physical settlements. For Real-time, both the physical and virtual transactions need to include all of the processes related to LAP price averaging, incorporating the hourly costs of HASP power, the price “adders/subtractors” in real-time, and finally the ex-post LDF corrections made after the CAISO receives meter data. In addition, certain virtual bids will need to pay a like portion of RUC costs and the day-ahead and real-time bid guarantees (start-up, minimum load, energy bid guarantees, etc.).

Below is a detailed break-down of the cost that should be attributed to virtual bids:

Market	Day-Ahead Bid Type	Charges/Payment
Day-ahead	Virtual Supply	Paid Day-ahead price (LAP price per SCE)
Day-ahead	Virtual Supply	Charged RUC uplifts
Day-ahead	Virtual Demand	Charged Day-ahead price (LAP price per SCE)
Day-ahead	Virtual Demand	Charged IFM commitment costs (start-up, minimum load, bid cost guarantee)
Real-time	Virtual Supply	Charged total Real-time price (same final price charged to load served out of the Real-time market including the “adder”, HASP adjustments, and price adjustments based on final meter data) Real-time commitment costs (start-up, minimum load, bid cost guarantee) Tier 2 Ancillary Service costs Real-time Ancillary Service costs
Real-time	Virtual Demand	Paid total Real-time price (same final price paid to load that “provides” energy to the Real-time market [i.e. consumes less than its final schedule] including the “subtractor” and any price adjustment based on final meter data)

Item 7: Bid Price-Quantity Pairs

At a minimum, VB should be subject to the same bid caps and floors applied to bid-in physical generation and load. In the MRTU design, this implies that virtual bids cannot price-take but rather have to submit valued bids within the bid cap ranges.

Further, self-schedules should have priority over virtual bids, especially if the design allows VB at the inter-ties. (Please see also Item 10, *Interaction with the CAISO proposal to preserve RA resources*)

Item 8A: Collateral Requirements

Collateral must be sufficient to protect the market from VB payment defaults. Further, collateral should be commensurate with position limits allowed for trading.

The CAISO indicates that the FERC has provided significant guidance on this issue for other ISOs. Assuming this guidance is sufficient to allow the CAISO to develop a draft proposal, SCE will provide additional comments based on a specific CAISO proposal.

Item 8B: Proxy Clearing Price

See comments for Item 8A.

Item 9A: Unit Commitment Cost Allocation

See comments for Item 6.

Item 9B: A/S Cost Allocation

In MRTU the CAISO attempts to purchase 100% of its *forecast* A/S needs in the Day-ahead market. However, A/S cost are allocated in two tiers, the first tier based on actual load net of self-provision, and the second tier if the CAISO has additional remaining A/S costs.

SCE notes that since A/S are bought based on the CAISO's forecast, virtual bids should not generally impact the quantity of A/S procured, but virtual bids will likely impact the *cost* of procuring these services. This happens because virtual supply can displace the commitment of physical generation in the IFM, but A/S can only be procured from physical resources. Further, tier 2 charges result if the CAISO effectively over procures A/S. Thus tier 2 looks more like a grid uplift charge than a true A/S charge.

In addition, the CAISO may have to procure additional A/S in Real-time to maintain reserves during operations. Just like physical demand, virtual supply creates a real-time energy demand, and, if the CAISO is forced to buy A/S in real-time because it requires capacity for energy that otherwise would have provides A/S, the virtual supply should be allocated real-time A/S costs in a manner consistent with physical demand. SCE requests clarification from the CAISO on precisely how real-time A/S purchase costs are allocated to load and whether or not these costs are captured in the tier 2 charges.

Because virtual bids can impact A/S costs, and because tier 2 looks like a simple uplift, it is appropriate to charge Virtual Supply tier 2 A/S costs. It also appears virtual supply should be charged real-time A/S costs to the extent these costs are not captured in the tier 2 charge. Because the CAISO primarily procures A/S based on its forecast, tier 1 A/S costs should not be charged to virtual bidders.

Item 10: Other Design Elements

SCE has several other design elements which must be addressed.

Information release

Virtual bids can have significant impact day-ahead prices, unit commitment, and congestion flows. This has the potential to negatively impact the market. The primary defense against "harmful" virtual bids is to "undo" the bid with an equal and opposite virtual bid. In order to do this, participants require information on how virtual bids are being used in the market.

Given the purely financial nature of virtual bids and the potential need for impacted participants to respond with counteracting virtual bids, information concerning VB bidding should be released immediately, that is with as little lag as possible. Preferably, the CAISO should release VB information shortly after the close of the day-ahead market. Further, participant specific VB information should be released. Consistent with the release of other bidding data, the identity of the virtual bidder should be coded, but the code should remain constant through time so that the market can track the behavior of a VB participant through time.

The immediate release of virtual bidding data improves market efficiency, serves as a deterrent for manipulative uses of VB, and facilitates monitoring VB throughout the market.

Recovery of development and on-going administrative costs

A virtual bidding system will have costs for implementation and costs for ongoing administration and monitoring. The development cost and the ongoing administrative cost for VB should be born by participants that actually submit virtual bids. Participants that do not utilize VB should not be required to pay for or subsidize the development or ongoing administrative costs. SCE envisions an explicit per MWh transaction fee for virtual bidding. If the fee is based only on VB that clears the market, an additional flat administrative fee for VB participants may be necessary.

SCE requests that the CAISO provide estimates of development and administrative cost (including costs related to collateral enforcement and market monitoring) so that a rate structure for VB trading can be developed.

Interaction with local market power mitigation

Any VB design must not undermine MRTU's Local Market Power Mitigation (LMPM) system. At a minimum, the "final" VB design must be reviewed after the FERC approves LMPM.

Interaction with the CAISO proposal to preserve RA resources

In its reply comments to the FERC, the CAISO acknowledged a concern raised by both SCE and PG&E that the current market design did not ensure the power from RA units could be dedicated to serve California load during critical periods. In their May 16, 2006 reply comments the CAISO stated the following:

"In reconsidering this matter, however, in the course of preparing this Reply the CAISO has concluded that the inability of sufficiently-resourced LSEs to ensure they can fully utilize their resource adequacy resources in the IFM during times of supply shortage is too important to defer for resolution to Release 2. The CAISO therefore proposes to implement the preferred solution described above, which consists of two elements. First, in the IFM self-scheduled CAISO Demand will have higher scheduling priority than self scheduled exports that are not otherwise being supported by a corresponding amount Energy scheduled from non-RA generation resources. Second, the CAISO will work to develop a manual procedure to enable exports, in both the IFM and the HASP, to self schedule energy for exports that are served by generation from non-RA capacity (IFM), or by non-RA/non-RUC capacity (HASP). Such Self-Schedules would have the same scheduling priority as self-scheduled internal Demand in the IFM, and as the CAISO demand forecast in the HASP. The CAISO believes that a manual procedure will be the only way to implement this feature in Release 1, but will still include this item in the Release 2 agenda to develop an integrated software solution."

Any VB implementation must be cognizant of this proposed solution and must not undermine the CAISO's effort to preserve RA resources during critical periods.

Interaction with Physical Scheduling Coordinator Trades

As noted above, the CAISO implemented a careful scheme for Physical Scheduling Coordinator Trades to address, among other items, the delivery and settlement of seller's choice contracts. Any VB design must not undermine the settlement systems or design goals of the Physical SC Trade system.

Interaction with existing load settlements

As noted above, the MRTU design, as a matter of policy, has restricted Day-ahead load bids within the CAISO to the LAPs¹⁰. In addition, Real-time settlements have been designed to settle at the LAP level. Any VB design must recognize these bidding restrictions placed on physical load and must not undermine Real-time settlements or the policy objectives related to LAP level bidding.

Position limits

The MSC has advocated position limits for virtual bidders. SCE believes limits are prudent and should be included as part of the design.

Conclusion

The comprehensive design of a virtual bidding system remains a non-trivial matter. SCE appreciates the CAISO's efforts to discuss issues with stakeholders and to solicit our feedback. Based on the complexities and sheer number of issues, it is not at all apparent the CAISO will be in a position to present their Board with a fully developed virtual bidding proposal "before the end of the summer".

In determining VB design elements, the CAISO must remain cognizant of its obligation to effectively monitor its market against abuses. This is particularly important in light of rampant market abuse already experienced in California. Further the CAISO must have tools and tariff authority to remedy abuses once detected. A VB design, as supported by SCE, that only allows trades at the LAPs greatly simplifies both the VB design process and monitoring functions. At the same time this design provides sufficient functionality to capture the vast majority of the purported benefits of VB.

Finally, the CAISO must commit to review, and if necessary, revise their VB proposal after the FERC provides definitive rulings on the MRTU design.

SCE thanks the CAISO for the opportunity to provide comments and will continue to work with interested parties in the development of a virtual bidding system.

¹⁰ Additional rules apply to Metered Subsystems.