Attachment C – Seller's Choice Contracts under Nodal Virtual Bidding

Under MRTU, the settlement of bilateral energy transactions depends not only on the bilateral contract price, but on the actual CAISO Market Settlement. Specifically, the seller receives the bilateral contract price, plus the CAISO market settlement for the scheduled energy, and then the CAISO Inter-SC Trade (IST) settlement is subtracted back out to fix this double-settlement. Note that the Inter-SC Trade settlement is based on the LMP at the delivery location specified in the bilateral contract. In the case of no congestion, this adjustment brings the net settlement position back to the original bilateral contract price. If there is congestion, this will be reflected in the price differences between the source and sink nodes, which will create a differential in the CAISO market settlement. How that congestion cost will be allocated between the Buyer and Seller is determined by the chosen location of the Inter-SC Trade. The Buyer's net CAISO settlement position will be equal to the Sink LMP less the LMP at the delivery location specified in the IST, and the Seller's net CAISO settlement position will be equal to the Source LMP less the LMP at the delivery location specified in the IST.

For reference, following table shows the settlement of an Inter-SC trade, of which Seller's Choice is one type, in a situation in which there is no congestion.

Table C1: Inter-SC Trade without congestion

		Buyer	Seller
1	Bilateral Contract Settlement	-$60	$60
2	CAISO Primary Market Settlement	-$40	$40
3	CAISO Inter-SC Trade Settlement	$40	-$40
4	Net CAISO Settlement (2+3)	$0	$0
5	Net Position Including Bilateral (1+2+3)	-$60	$60

From the table above, it is evident that when there is no congestion there is no price impact to either party. Under MRTU, Inter-SC Trades at individual generator nodes require physical validation to verify that there is a transmission feasible generation schedule supporting the trade at the same location.

A potential concern with Seller's Choice contracts under nodal virtual bidding is that, using virtual bids, one could influence the feasibility of a generation schedule.[1] A Seller's Choice Contract does not specify a unique generation source, but rather leaves that determination up to the seller subject to the physical validation procedures for Inter-SC Trades as noted above. By virtue of the seller's bid clearing the IFM, the schedule is deemed feasible. Recall, though, that virtual bids also clear with physical bids in the IFM. The virtual bids impact congestion, and in so doing, can make a schedule that wouldn't be feasible without them appear feasible.

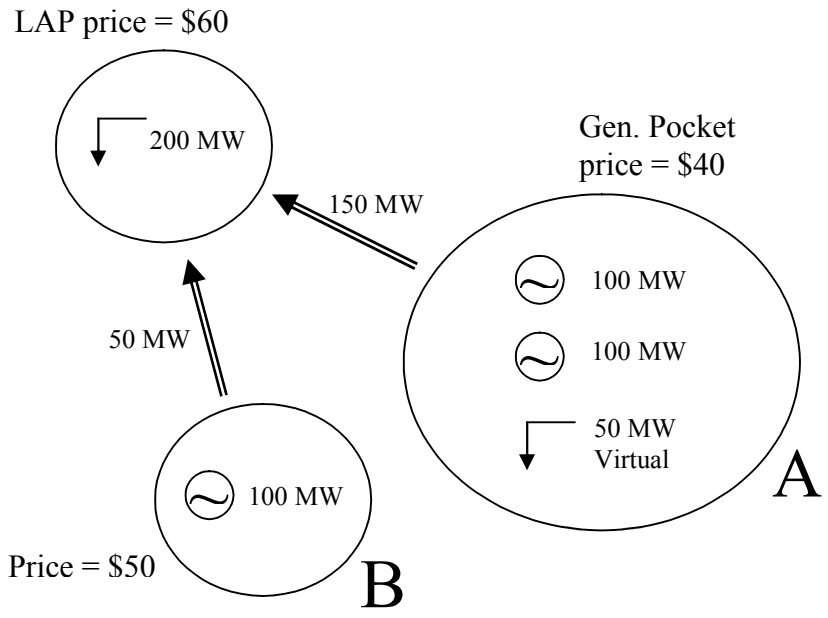
The situation described by the example below is one in which the Seller can supply power from Node A which has a lower marginal cost of production. Given that there is a transmission limit of

[1] For additional information and an example, see Jeffrey Nelson's presentation for SCE, posted at the following link: http://www.caiso.com/1c36/1c3676815e210.pdf

150 MW between Node A and the contracted sink, the generation owner can fulfill a 200 MW contract by providing 150 MW from the low-cost generation at Node A, and 50 MW generated at Node B where the marginal cost of production is higher. By submitting a virtual demand bid for 50 MW at Node A, however, there would no longer appear to be any transmission congestion and the generator would thus be able to schedule its entire contracted generation from Node A.

In the Day Ahead market, then, the contract has been fulfilled with the seller receiving $70/MW. The buyer, in turn, pays the contract price of $70/MW plus the additional $20/MW in congestion costs.

Figure C1: Seller's Choice Contract Example with Congestion, MC-differentiated units, and Virtual Demand Bidding by the Seller



In Real Time, the seller's virtual demand bid is settled at the unchanged nodal price, so this is a financial wash. Additionally, the 50MW of scheduled generation that cannot be delivered as a result of the transmission constraint is bought back by the generator at the difference between the Real Time and Day Ahead prices.[2] Again, as the LMP did not change, this is a financial wash for the seller. This strategy enabled the seller to undermine the physical validation procedures for Inter-SC Trades and deliver more energy at Node A than is physically feasible.

[2] This example assumes the DA and RT prices are the same. In practice, the need to reduce generation in RT may result in a lower RT price, which would cause a financial loss on the virtual transaction. To the extent the loss from the virtual transaction is significant, the incentive to use virtual bidding in this manner is diminished.

Given an active virtual bidding market, the Buyer may pick up on this practice by its counter party, and submit a virtual supply bid at Node A for 50 MW. This would render the transmission constraint binding in the IFM and consequently, in order to fulfill its contractual obligation (in this simple example) the seller would have to schedule only 150 MW at Node A, and the remaining 50 MW at Node B. Of course, the Seller could counter with a virtual demand bid of 100 MW, which could clear against the 200 MW of physical supply and 50 MW of virtual supply submitted by the Buyer and again, the Buyer would need to increase its virtual supply bid by 50 MW. In the end, since the Buyer can effectively undue any attempt by the Seller to undermine the IST physical validation procedure, the Seller may simply choose to refrain from this type of virtual bidding strategy.

For illustrative purposes, the table below provides details on all of the above mentioned scenarios, and gives both the buyer's and seller's net position after the close of the DA and RT markets.

Table C4: Seller's Choice Examples, with and without Virtual Bidding

Congestion, No Virtual Bidding

	Seller		Buyer	
	Price and Quantity	**Total**	**Price and Quantity**	**Total**
Contract (200 MW @ $70/MW)	200 MW x $70	$14,000	-(200 MW x $70)	-$14,000
Integrated Forward Market	(150 MW x $40) + (50 MW x $50)	$8,500	-(200 MW x $60)	-$12,000
Inter-SC Trade	-(150 MW x $40) - (50 MW x $50)	-$8,500	(150 MW x $40) + (50 MW x $50)	$8,500
Real Time	0	$0	0	$0
Net CAISO Settlement	IFM + IST + RT	$0	IFM + IST + RT	-$3,500
Generation Production	-(150 MW x $40) - (50 MW x $50)	-$8,500	0	$0
Net Settlement		$5,500		-$17,500

Congestion, Virtual Bidding by Seller

	Seller		Buyer	
	Price and Quantity	**Total**	**Price and Quantity**	**Total**
Contract (200 MW @ $70/MW)	200 MW x $70	$14,000	-(200 MW x $70)	-$14,000
Integrated Forward Market	(200 MW x $40) - (50 MW x $40)	$6,000	-(200 MW x $60)	-$12,000
Inter-SC Trade	-(200 MW x $40)	-$8,000	200 MW x $40	$8,000
Real Time	(50 MW x $40) - (50 MW x $40)	$0	0	$0
Net CAISO Settlement	IFM + IST + RT	-$2,000	IFM + IST + RT	-$4,000
Generation Production	-(150 MW x $40)	-$6,000	0	$0
Net Settlement		$6,000		-$18,000

Congestion, Virtual Bidding by Seller and Buyer

	Seller		Buyer	
	Price and Quantity	**Total**	**Price and Quantity**	**Total**
Contract (200 MW @ $70/MW)	200 MW x $70	$14,000	-(200 MW x $70)	-$14,000
Integrated Forward Market	(150 MW x $40) + (50 MW x $50) - (50 MW x $40)	$6,500	-(200 MW x $60) + (50 MW x $40)	-$10,000
Inter-SC Trade	-(150 MW x $40) - (50 MW x $50)	-$8,500	(150 MW x $40) + (50 MW x $50)	$8,500
Real Time	50 MW x $40	$2,000	-(50 MW x $40)	-$2,000
Net CAISO Settlement	IFM + IST + RT	$0	IFM + IST + RT	-$3,500
Generation Production	-(150 MW x $40) - (50 MW x $50)	-$8,500	0	$0
Net Settlement		$5,500		-$17,500