

Intertie Pricing Issues

Scott Harvey

Member California ISO MSC

MSC Meeting March 30, 2012

Topics

- Energy offset charge drivers
- Trigger values and energy offset charges
- Dual constraint pricing
- Hour-ahead market

Energy Offset Charge Drivers

The level of real-time energy offset charges due to RTD – HASP divergence depends on two factors:

- RTD – HASP price difference
- Level of net import purchases at the HASP price

There is a credit, not a charge, if the California ISO is a net buyer of imports in HASP.

Energy Offset Charge Drivers

Net import sales at the HASP price can arise from:

- Physical imports scheduled in the day-ahead market that do not flow in real-time;
- Physical exports that were not scheduled in the day-ahead market but flow in real-time.
- Virtual imports scheduled in the day-ahead market.

Energy Offset Charge Drivers

Variations in market conditions between those expected day-ahead and those prevailing in real-time would tend to produce a mix of net purchases and sales at the HASP price.

- HASP modeling assumptions that systematically understate the real-time price will tend to result in net sales at the HASP price.
- This should not consistently result in large net sales because reductions in supply in the HASP (reduced physical imports or increased physical exports) will raise HASP prices.
- There can however be large net sales in the HASP driven by physical or virtual imports scheduled in the day-ahead market and offset by virtual demand bids.

“Trigger Value” and Energy Offset Charges

Virtual Transactions at the ties will not create uplift under the California ISO’s proposed interim pricing design.

No congestion on ties in HASP

100 MW virtual import
supply →

IFM Schedule

← 100 MW Bid in
Load

Virtual Import Supply
←
100 MW purchase by mp
at RTD price

HASP – Real Time

Internal Generation
→
100 MW sale
at RTD price

No real-time short fall due to virtual supply

“Trigger Value” and Energy Offset Charges

Virtual Transactions at the ties will not create uplift under the California ISO’s proposed interim pricing design.



No real-time shortfall due to virtual supply.

“Trigger” Value and Energy Offsets Charges

Would the absence of uplift due to virtuals ensure that real-time imbalance energy offset charges remain low?

- No. As long as interchange transactions settle at HASP prices and internal load and generation settle at real-time prices, there is a potential for HASP / RTD price divergence to produce high levels of real-time energy offset charges.

Dual Constraint Pricing

What was the impact of the old pricing rule when there was congestion on the ties in the day-ahead market?

- Physical imports offered at prices below the clearing price in the day-ahead market do not clear!
- “Hedged” physical imports prevent other physical imports from clearing in day-ahead market, at no cost!
- Lots of congestion, no congestion rents, no price signal!

Dual Constraint Pricing

Two components to problem:

- Two constraints enforced on same line

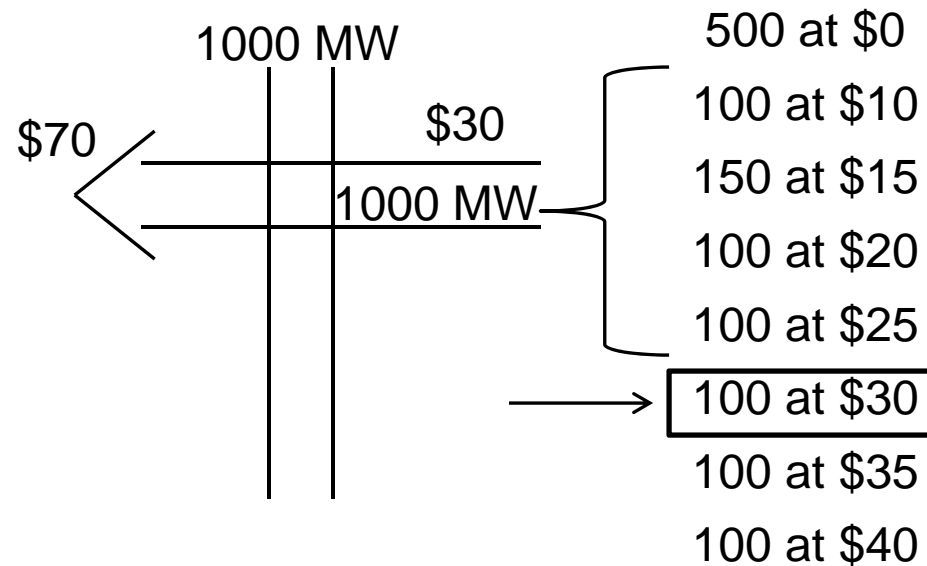
$$\text{Net physical} + \text{Net virtual} \leq \text{Limit} \quad [1]$$

$$\text{Net physical} \leq \text{Limit} \quad [2]$$

- One Price
 - Physical and virtual schedules priced based on shadow price of constraint [1]

Dual Constraint Pricing

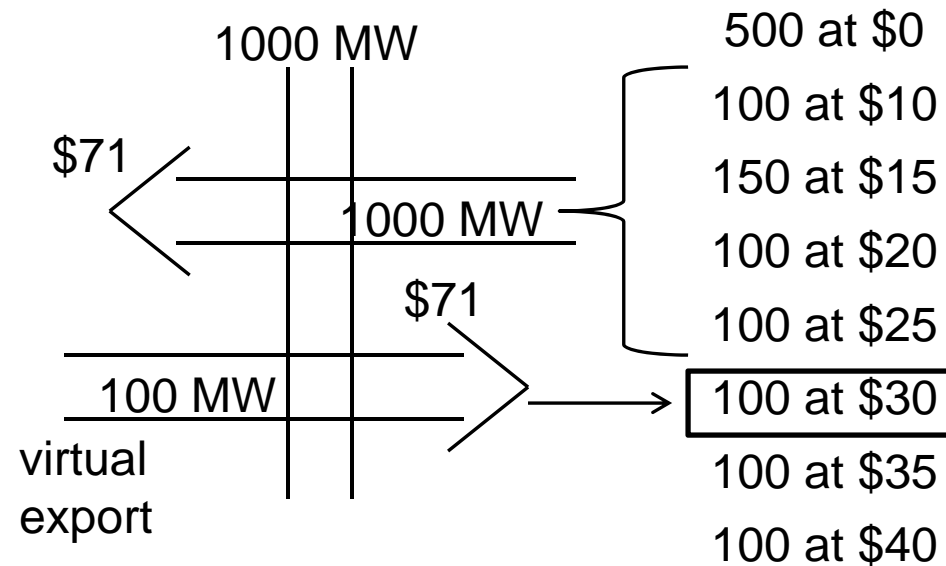
No Virtual Counterflow



50 MW offered at \$30 clears in the day-ahead market
Both constraints bind with same shadow price

Dual Constraint Pricing

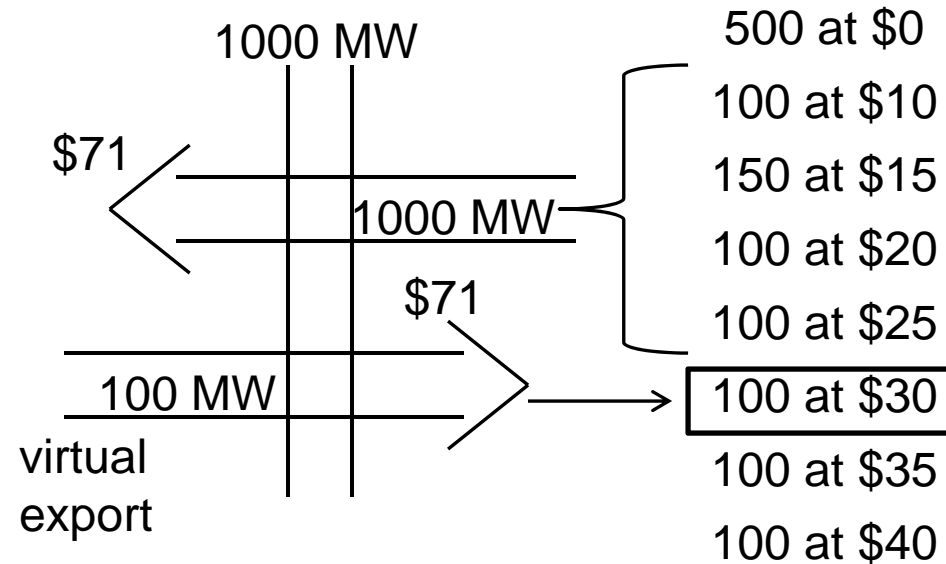
With Virtual Counterflow



Price of imports is \$71. Import offered at \$35 does not clear. Net supply on tie in IFM falls to 900 MW. IFM price rises to \$71, constraint [1] is not binding.

Dual Constraint Pricing

With Virtual Counterflow



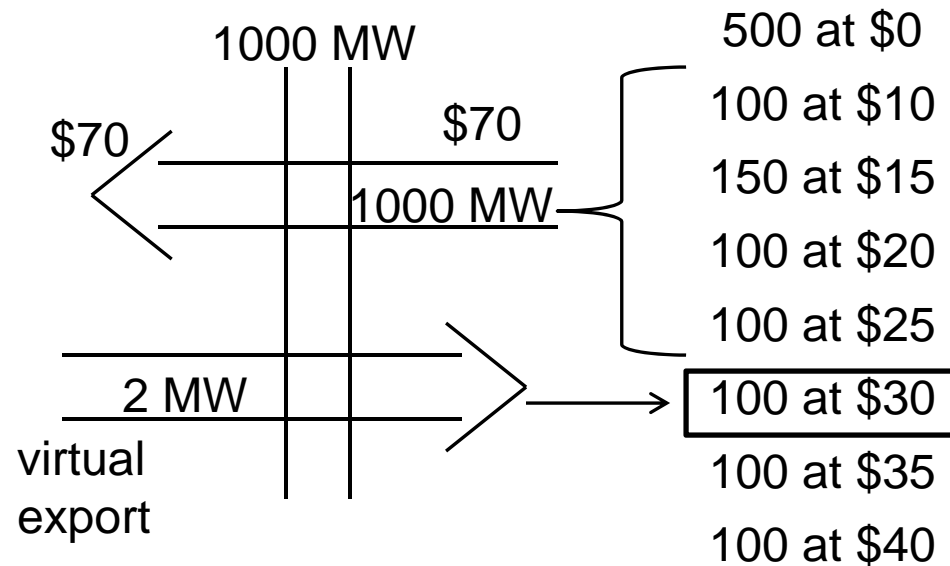
Private cost of “hedge” = 0

Social cost of “hedge” = \$41

By what standard is this efficient?

Dual Constraint Pricing

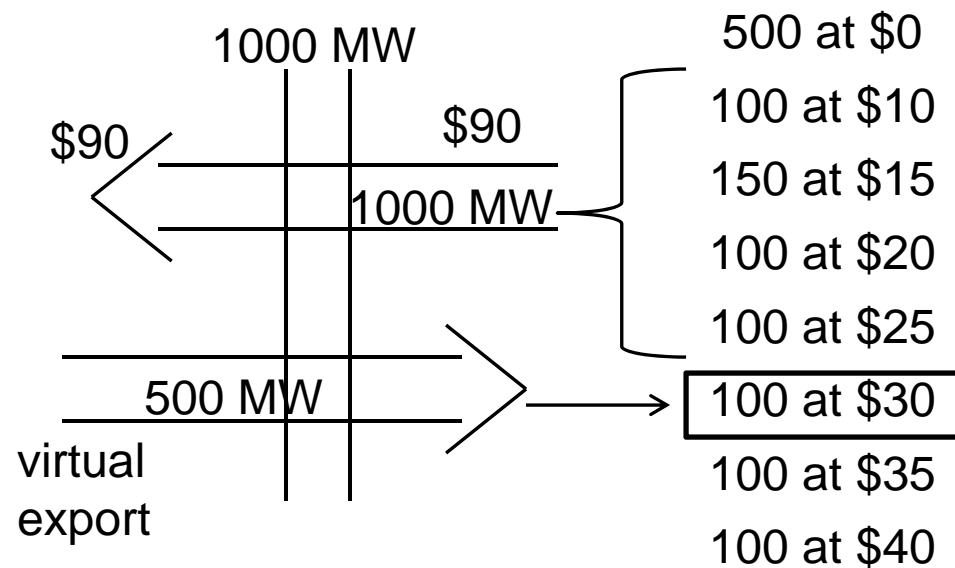
2 MW Virtual Counterflow



Price of imports is \$70. Import offered at \$35 does not clear. Constraint on physical imports is binding. Constraint on physicals + virtuals is not binding.

Dual Constraint Pricing

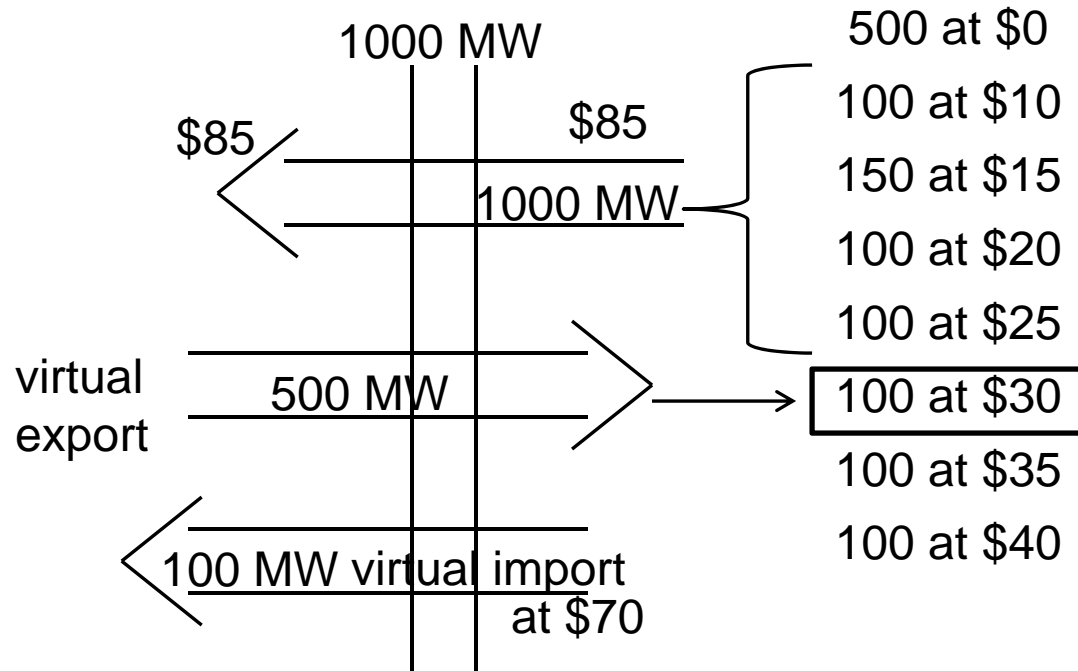
500 MW Virtual Counterflow



Large virtual export reduces supply on tie in IFM to 500 MW, price rises to \$90. Import offered at \$35 does not clear. Only constraint on physical interchange binds.

Dual Constraint Pricing

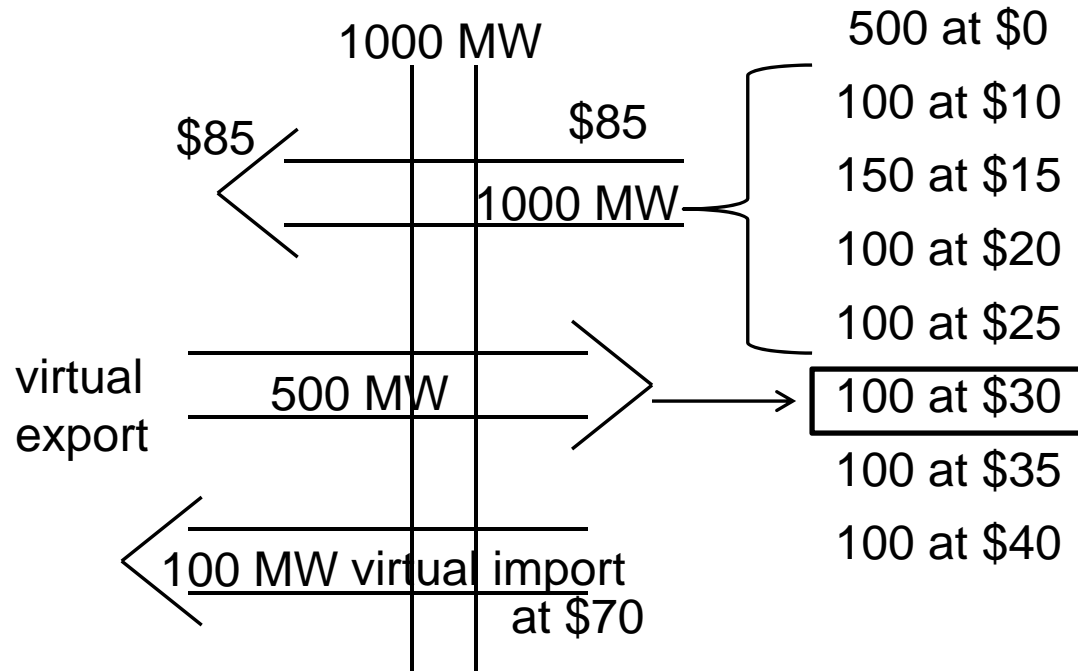
Large Virtual Counterflow and Virtual Import



Large virtual export, allows virtual import offered at \$70 to clear at \$85. Physical import offered at \$35 does not clear.

Dual Constraint Pricing

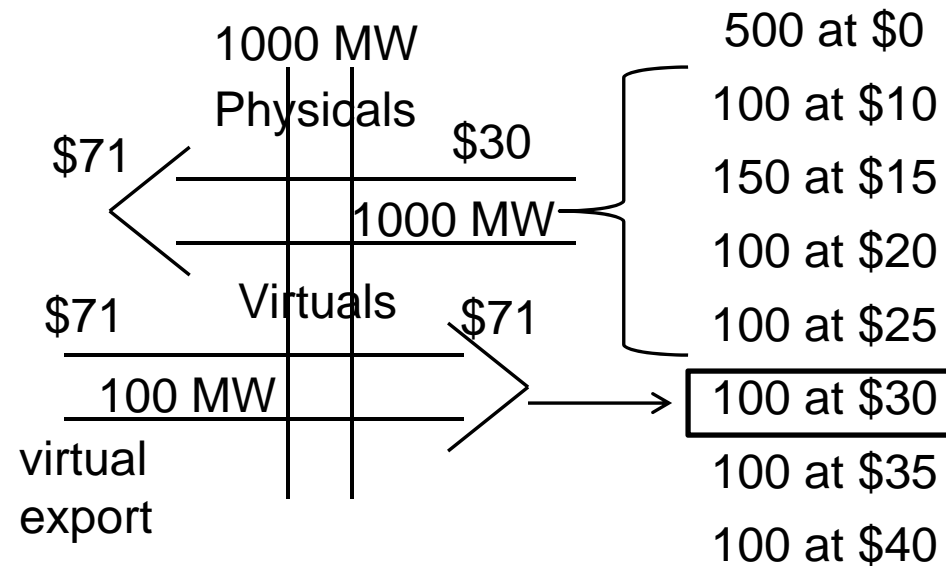
Large Virtual Counterflow and Virtual Import



If there are dual constraints that are enforced in the IFM, the California ISO needs to price them both.

Dual Constraint Pricing

With Virtual Counterflow and Option A Pricing



Private cost of “hedge” = \$41

Social cost of “hedge” = \$41

Hedge is efficiently priced

Full Hour Ahead Market

There is nothing wrong in principle with a full hour-ahead market, if there is enough volume to warrant the cost of settling the market.

- 90-95% of volume does not change from day-ahead to real-time.
- How much of the change between day-ahead and real-time would market participants want to settle hour-ahead?
 - Would the difference be identifiable?
 - Would there be efficiency benefits to market participants of settling hour-ahead?
- Are there loads and exports that want to settle schedule changes between day-ahead and real-time at HASP prices?