Proxy Bus Pricing Mechanisms and the CAISO's Proposed Pricing System for Integrated Balancing Area Authorities

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May 21, 2008
California ISO Board of Governor Meeting

LECG

TOPICS

- What are proxy buses and what is their purpose?
- Proxy bus evolution in PJM – problems with multiple proxy buses.
- Lessons.
- CAISO Pricing Proposal for Integrated Balancing Area Authorities.

WHAT ARE PROXY BUSES?

Proxy buses are used to define the locations at which a system operator assumes that an adjacent balancing area will increase or decrease generation to support changes in scheduled net interchange.

- Except in the case of controllable lines (DC or phase angle regulator controlled), proxy buses do not represent the point of interconnection between adjacent balancing areas.
- Proxy buses are not used for contract path scheduling purposes and do not play any role in inter-control area transaction check-out.

WHAT ARE PROXY BUSES?

The purpose of modeling changes in scheduled net interchange with an adjacent balancing area as sourcing or sinking at a proxy bus is to approximate the combined effect on congestion *within the modeling balancing area* (i.e., the change in the flows on binding transmission constraints secured by the modeling balancing area) of all changes in generation in the adjacent balancing area that would occur in response to a change in scheduled net interchange between the modeling balancing area and the adjacent balancing area.

- Proxy buses are not used to model or price congestion on constraints secured by another balancing area authority.

WHAT ARE PROXY BUSES?

Proxy buses can be defined as the weighted average of several locations or as single nodes.

- Imports scheduled from a proxy bus are modeled as sourced at the nodes composing the proxy bus.
- The locations used to define the proxy buses are external to the modeling control area and do not correspond to the points of interconnection.

EVOLUTION OF PJM PROXY BUSES

Higher proxy bus prices for interchange scheduled at a particular proxy bus are intended to reflect the more favorable impact of increases in generation at that location on transmission constraints within the modeling control area.

- The payment of such a premium benefits consumers if it incents the scheduling of additional imports having a favorable effect on internal transmission constraints.
- If there are multiple proxy buses on an interface, however, such a premium will cause market participants to schedule imports to be delivered to the higher priced proxy bus regardless of the actual location of the generation dispatched up to support the imports.
- This has been a recurrent problem for PJM whose experience is instructive.

EVOLUTION OF PJM PROXY BUSES

The proxy buses PJM uses to price scheduled interchange with external control areas have evolved in four ways since 1998.

- Addition and elimination of proxy buses as PJM has expanded.
- Consolidation of proxy buses.
- Introduction of conditional proxy buses.
- Introduction of a proxy bus for a new controllable line (Neptune).

EVOLUTION OF PJM PROXY BUSES

PJM has consolidated external proxy buses on several occasions.

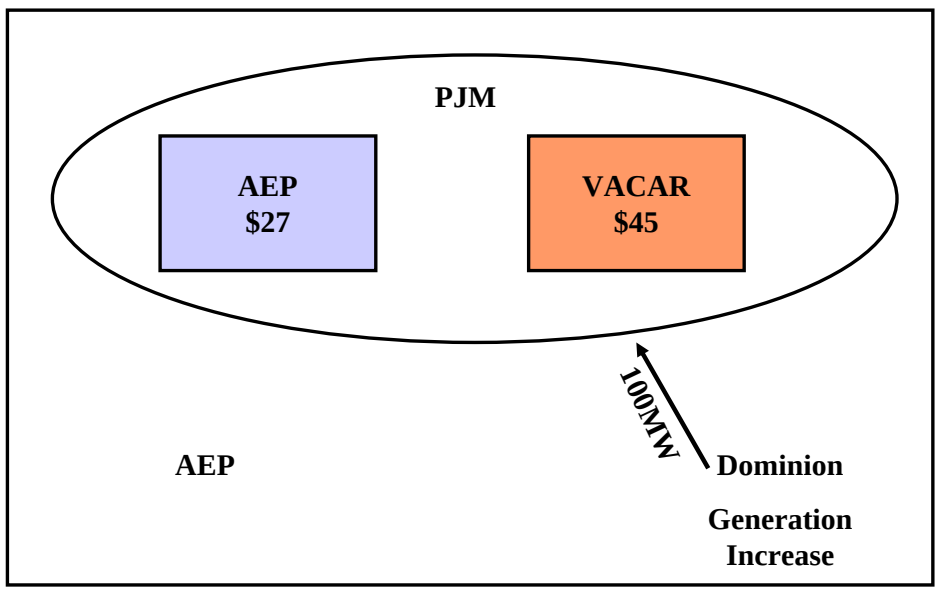
- New York east and west consolidated April 1, 2001.
- AEP and VACAR proxy buses consolidated March 1, 2003.
- Southeastern (Duke, etc.) and Southwestern (TVA, etc.) proxy buses consolidated October 1, 2006.

All of these consolidations addressed situations in which market participants were using their scheduling practices to sell power at inflated prices.

EVOLUTION OF PJM PROXY BUSES

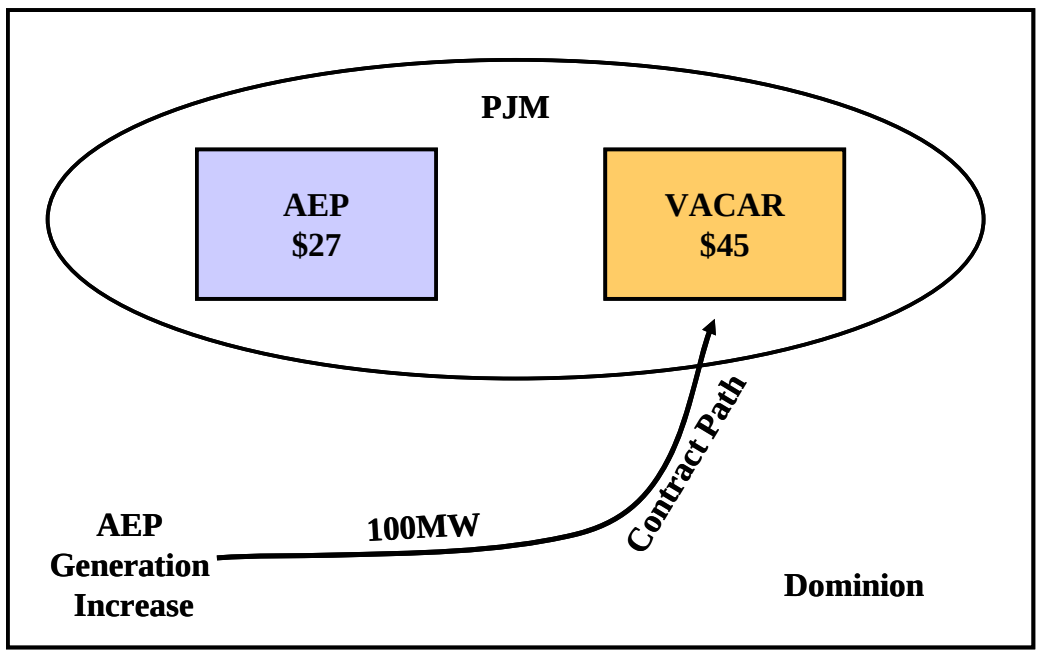
After APS joined PJM on April 1, 2002, PJM used separate proxy buses to model and price inter-change with AEP and VACAR (Dominion).

- Imports scheduled to sink in PJM from the VACAR proxy bus generally would be paid a higher price than imports from AEP because of the more favorable impact of generation in VACAR on internal PJM constraints.



EVOLUTION OF PJM PROXY BUSES

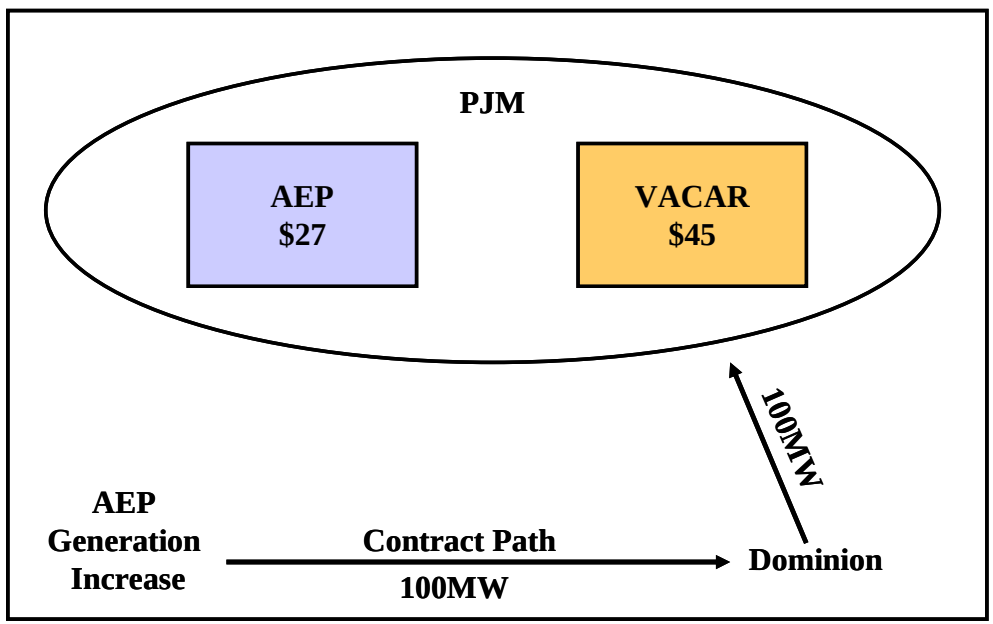
PJM observed over time that the actual change in flows on its system associated with an increase in imports from VACAR was often not consistent with a VACAR generation source and determined from a review of etags that many transactions scheduled at the VACAR proxy bus were actually sourced in ECAR.



EVOLUTION OF PJM PROXY BUSES

Effective July 19, 2002, PJM began applying the AEP proxy bus price to transactions scheduled to sink at the VACAR proxy bus but having an etag indicating an ECAR source.

- This rule could be and was circumvented, however, by unbundling the transaction, so the AEP and VACAR proxy buses were combined into a single bus on March 1, 2003.



EVOLUTION OF PJM PROXY BUSES

PJM continued to separately check out transactions with AEP and Dominion; however, transactions were paid the same price regardless of which control area the transaction was sourced from.

EVOLUTION OF PJM PROXY BUSES

Following the integration of AEP, Dayton and Dominion into PJM and the formation of the MISO, PJM had separate southeast (Duke, Carolina Power & Light) and southwest (TVA, LG&E, East Kentucky) proxy buses.

- During 2006, PJM observed an increasing disparity between contract path schedules (imports from southeast, exports to southwest) and the actual power flows on the PJM system.
- Once again, PJM market participants were scheduling transactions along a contract path outside PJM to sink at the highest price proxy bus.
- The southwest and southeast proxy buses were combined on October 1, 2006 and separate proxy buses established for exports and imports.

EVOLUTION OF PJM PROXY BUSES

In early 2007 PJM, Duke, Progress Energy Carolinas, and the North Carolina Municipal Power Agency implemented Interfacing Pricing Arrangements under which Duke, Progress, and the North Carolina Municipal Power Agency can buy and sell power to PJM at prices calculated for generator nodes on their system (rather than the South IMP or South EXP proxy bus prices).

- The Duke, Progress, and the North Carolina Municipal Power Agency specific prices will generally not be applicable if these entities are purchasing power outside their control area.
- Progress, Duke, and the North Carolina Municipal Power Agency agreed to provide confidential and auditable data to PJM as part of the agreement.

EVOLUTION OF PJM PROXY BUSES

These special agreements enable PJM to pay a higher price for imports supported by an increase in VACAR generation, while avoiding the uplift costs that would be borne by PJM consumers if PJM were to pay this price for imports supported by generation increases outside VACAR.

- All of these conditional proxy buses are defined as the average of several generator nodes within the external balancing area.

LESSONS

PJM and New York's experience shows that:

- Actual powerflows on internal constraints associated with import and export transactions can differ from those calculated based on contract path schedules.
- Given a choice, market participants will describe their imports as sinking at the highest priced proxy bus for a given balancing area.
- Market participants will create contract path schedules to sink their imports at the highest priced proxy bus price among alternative balancing areas.
- Any initial set of proxy buses and proxy bus definitions will likely need to evolve over time.

CAISO

The CAISO's proposed proxy bus design for integrated balancing area authorities draws upon PJM's experience.

- The CAISO design establishes a single default proxy bus price that will be used to settle imports, avoiding providing incentives for inefficient scheduling practices by market participants.
- Conversely, the CAISO design establishes a single default proxy bus price that will be used to settle exports.
- The CAISO design also provides for higher payments for schedules that are verified to be supported by generation having a favorable impact on internal CAISO transmission constraints.

CAISO

It is desirable for an electric system operator to be able to pay a premium for imports having favorable impacts on internal transmission constraints.

- It is not desirable for an electric system operator to pay a premium for imported power whether or not the power has such a favorable effect on internal transmission constraints.
- The crux of the CAISO proposal is that the CAISO will only pay a premium for imported power if the seller provides information enabling the CAISO to verify that the premium is warranted.
- The CAISO approach achieves the benefits of being able to purchase imports that reduce congestion without burdening CAISO power consumers with uplift costs from inflated payments for imported power or selling exported power for less than the cost of the generation needed to support those exports.