

REPLACEMENT CAPACITY CONCEPT

(Package 8)

Purpose

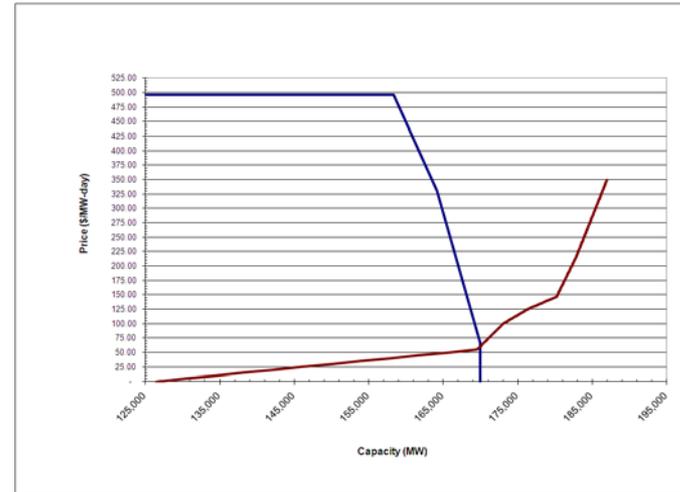
- 1) Shore up physical nature of RPM to ensure reliable operation of the PJM transmission system.
- 2) Provide for comparable and equitable treatment of all resource types (generation, demand response and energy efficiency)
- 3) Parallel model for DA and RT Energy costs and allocations.
- 4) Ensure proper price formation in BRA and incremental auctions.
- 5) Maximize overall market efficiency and minimize opportunities for market manipulation.
- 6) Optimize the reliability objective at the least cost.

Approach

- 1) Treat capacity auctions similar to energy market.
 - a) BRA Capacity = DA Energy
 - b) IA Capacity = Balancing Energy

- 2) PJM retains the commitment from the BRA in the IA.
 - In the energy market resources that clear in the DA market cannot change their price for RT dispatch, this minimizes opportunities for market manipulation and inefficient market outcomes. We would propose the same treatment of resources that clear the BRA.
 - In the energy market resources that fail to follow dispatch or deviate from their day ahead commitments are subject to deviation charges, we would propose the same treatment for resources that clear in a BRA.
 - In the energy market the most economic resources that clear in the day ahead market are required to provide energy in real time, and if they do not, they are subject to deviation charges. We would propose the same treatment for resources that clear in a BRA.

Step 1 – BRA Clears at \$60



Step 2 – PJM adjusts BRA Planning Parameters to determine sell back price.

Step 3 – Run Incremental Auction

Step 4 – Calculate Deviation Charges



Step 5– Calculate Deficiency Charges in the Delivery Year

Deviation Charges

- 1) Deviation charges only apply to resources that buy out uneconomically.
- 2) Uneconomic buy out only occurs when the cleared IA CP is greater than the original BRA sell offer.

Economic is defined as :

BRA Offer < BRA Clearing Price

IA Clearing Price < BRA Clearing Price

BRA Offer > IA Clearing Price

Allocation

All deviation charges collected by PJM will be allocated to load as a credit.

Why do we define economic this way?

A supplier who has a capacity cost of \$50 offers into the BRA at \$50, if the auction clears at \$100 the supplier is set to make \$50 in the delivery year. If later the IA then clears at \$25, and the supplier buys out of its commitment, then the supplier would be considered economic because it would now be set to make \$75 instead of \$50.

$$(BRA - COST) + (COST - IA CP)$$
$$(\$100 - \$50) + (\$50 - 25) = \$75$$

A supplier who has a capacity cost of \$50 offers into the BRA at \$50, if the auction clears at \$100 the supplier is set to make \$50 in the delivery year. If later the IA then clears at \$75, and the supplier buys out of its commitment, then the supplier would be considered uneconomic because it would now be set to make \$25 instead of \$50.

$$(BRA - COST) + (COST - IA CP)$$
$$(\$100 - \$50) + (\$50 - \$75) = \$25$$

Therefore anytime a seller accepts less profit in the delivery year than they had originally locked in at the time of the BRA, they would be considered uneconomic.

Why do we define economic this way?

Sunk Costs: New Generator Clears and begins construction, spending half of its cost at the time of the IA.

A supplier who has a capacity cost of \$50 offers into the BRA at \$50, if the auction clears at \$100 the supplier is set to make \$50 in the delivery year. If later the IA then clears at \$25, and the supplier buys out of its commitment, then the supplier would be considered economic because it would still be set to make \$50.

$$\begin{aligned} & \text{(BRA - COST) + (COST - SUNK COST - IA CP)} \\ & (\$100 - \$50) + (\$50 - \$25 - \$25) = \$50 \end{aligned}$$

A supplier who has a capacity cost of \$50 offers into the BRA at \$50, if the auction clears at \$100 the supplier is set to make \$50 in the delivery year. If later the IA then clears at \$75, and the supplier buys out of its commitment, then the supplier would be considered uneconomic because it would now be set to make \$0 instead of \$50.

$$\begin{aligned} & \text{(BRA - COST) + (COST - SUNK COST - IA CP)} \\ & (\$100 - \$50) + (\$50 - \$25 - \$75) = \$0 \end{aligned}$$

Sunk costs associated with new resources would only serve to lower the price at which buying out would be economic.

DEVIATION CHARGE EXAMPLES

DEVIATION CHARGES

Deviation charges equal costs of uneconomic buy outs plus PJM over-procurement divided by deviation MWs not to exceed the absolute value of $(\text{BRA CP} - \text{IA CP}) + (10\% \times \text{BRA CP})$.

Simplified Example 1

Gen A - 100 MW with an offer cap of \$50 offers at \$50. (Only Unit to Buy Out)

BRA CP = \$100

IA CP = \$75

Gen A Buys Out in IA.

Economic = No

BRA Offer (\$50)	<	BRA CP (\$100)		YES
IA CP (\$75)	<	BRA CP (\$100)		YES
BRA Offer (\$50)	>	IA CP (\$75)		NO
		ECONOMIC		NO

BRA Settlement = $100 \text{ MW} \times \$100 \times 365 \text{ Days} = \$3,650,000$

IA Settlement = $-100 \text{ MW} \times \$75 \times 365 \text{ Days} = -\$2,737,000$

Deviation Charge = $-100 \text{ MW} \times (\$100 - \$75) \times 365 \text{ Days} = -\$912,000$

P&L = $\$3,650,000 + (-\$2,737,000) + (-\$912,000) = \0

Simplified Example 2

Gen A - 100 MW with an offer cap of \$50 offers at \$50.

BRA CP = \$100

IA CP = \$40

Gen A Buys Out in IA.

Economic = Yes

BRA Offer (\$50)	<	BRA CP (\$100)		YES
IA CP (\$40)	<	BRA CP (\$100)		YES
BRA Offer (\$50)	>	IA CP (\$40)		YES
		ECONOMIC		YES

BRA Settlement = 100 MW X \$100 X 365 Days = \$3,650,000

IA Settlement = -100 MW X \$40 X 365 Days = -\$1,460,000

Deviation Charge = \$0

P&L = \$3,650,000 + (\$1,460,000) + \$0 = \$2,190,000

Simplified Example 3 – Two Units (Both Buy Out – one economic, one not)

Gen A - 100 MW with an offer cap of \$80 and offers at \$80.

BRA CP = \$100

IA CP = \$75

Gen A Buys Out in IA.

Economic = Yes

BRA Offer (\$80)	<	BRA CP (\$100)	YES
IA CP (\$75)	<	BRA CP (\$100)	YES
BRA Offer (\$80)	>	IA CP (\$75)	YES
		ECONOMIC	YES

Gen B - 100 MW with an offer cap of \$50 offers at \$50.

BRA CP = \$100

IA CP = \$75

Gen B Buys Out in IA.

Economic = No

BRA Offer (\$50)	<	BRA CP (\$100)	YES
IA CP (\$75)	<	BRA CP (\$100)	YES
BRA Offer (\$50)	>	IA CP (\$75)	NO
		ECONOMIC	NO

Gen A - BRA Settlement = 100 MW X \$100 X 365 Days = \$3,650,000

Gen A - IA Settlement = -100 MW X \$75 X 365 Days = -\$2,737,000

Gen A - Deviation Charge = Economic = Yes = \$0

P&L = \$3,650,000 + (\$2,737,000) + = \$912,000

Gen B- BRA Settlement = 100 MW X \$100 X 365 Days = \$3,650,000

Gen B - IA Settlement = -100 MW X \$75 X 365 Days = -\$2,737,000

Deviation Charge = -100 MW X ((\$100-\$75) + (10%*\$100)) X 365 Days = -\$1,277,500

P&L = \$3,650,000 + (\$2,737,000) + (1,277,500) = (\$364,500)

Rules

- 1) Resources that clear a BRA cannot change their price in the IA.
 - Buying out of obligation at a price higher than their cost/offer is a deviation.
- 2) Resources that do not clear a BRA can change their price in the IA and clear.
- 3) All Resources can buy out of commitments subject to deviation charges if buyout is uneconomic.
- 4) Deviation credits are allocated back to load.
- 5) Deviation Charges are equal to all costs that increase the FZCP (except for BRA under-procurement) divided by deviation MWs.

Benefits

- 1) PJM is not withholding capacity or exercising market power.
- 2) PJM sell back offer price is not arbitrary and establishes the true value of excess capacity.
- 3) Promotes an incentive to offer at cost in the BRA
- 4) Flexibility to buy out of commitments and sell in the IA is retained.
- 5) Proper price formation is promoted.
- 6) Load is not burdened with the cost of arbitrage for the sole purpose of profit without any enhancement to reliability and the value of the capacity procured in the BRA on behalf of load is maximized.