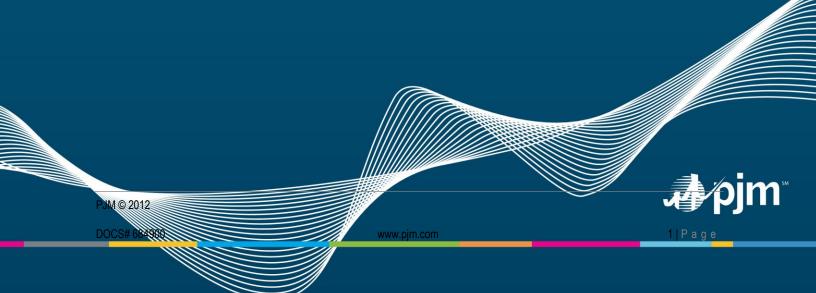# Evaluation of Cost Based Offer Floors

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Overview

In November, CDS developed manual language for solid waste or biomass units. This manual language included the following statement, "… cost offers for units that fire solid waste, biomass, or landfill gas shall not be less than zero." [i]

This paper will review the instances in which having a $0 floor on cost offers could affect a resource with a negative cost. Two examples will be addressed:

(1) In the energy market, a unit is mitigated to the lower of its cost or price offer, so a floor on the cost based offer has no real effect.

(2) In the calculation of lost opportunity cost, an arbitrary floor at $0 may keep a generator from recouping the lost opportunity cost.

This paper will not explore what would classify as a real negative cost.[ii]

Scenario 1: Energy Market: Market Power Mitigation

"In the cases where a generation owner is found to possess local market power according to the TPS test, if that owner's generator must be committed to resolve the constraint, then the generator is dispatched on the lower of its cost-based or market-based offer." [iii][iv][v]

For cases in which the price schedule is negative and the cost offer has a floor set at zero:

1. If the unit fails the TPS test and is found to have local market power ➜ the unit will be placed on the lower schedule, which is the price schedule.
2. If the unit passes the TPS test and is found to not have local market power ➜ the unit will be kept on the price schedule.

In both these cases, ***market power mitigation does not change the schedule that the unit is operating on because the price schedule is less than the cost schedule, so the cost offer floor adds no value for market power mitigation***.

Scenario 2: Opportunity Cost in the Energy Market

A unit operating in the energy market can accrue lost opportunity costs credits for many different reasons, such as:

- Reactive Services[vi]
- Hydro-electric Lost Opportunity Cost[vii]
- Scheduled in the day ahead and not called on in real time[viii]
- CT or CC pool scheduled or self scheduled then directed by PJM to reduce output[ix]
- Wind Lost Opportunity Cost (pending)

When the unit falls into one of the categories above, the following applies:

[The unit] shall be compensated for lost opportunity cost by receiving a credit hourly in an amount equal to
$$\{(LMPDMW - AG) \times (URTLMP - UB)\}$$

Where:

- LMPDMW equals the level of output for the unit determined according to the point on the scheduled offer curve on which the unit was operating corresponding to the hourly integrated real time LMP;

- AG equals the actual hourly integrated output of the unit;

- URTLMP equals the real time LMP at the unit's bus;

- UB equals the unit offer for that unit for which output is reduced or suspended determined according to the real time scheduled offer curve on which the unit was operating, ***unless such schedule was a price-based schedule and the offer associated with that price-based schedule is less than the cost-based offer for the unit,*** in which case the offer for the unit will be determined based on the cost-based schedule; and where URTLMP - UB shall not be negative. (Emphasis added)

For a unit receiving opportunity cost with a negative price schedule and a $0 cost schedule, the cost schedule would be used, since the price schedule is less than the cost based offer.

Example:

Take a unit with a real negative cost of -$10 ^{x} for every MWh; so the unit is paid to take the fuel. In this case the unit will make money until LMP falls below -$10.
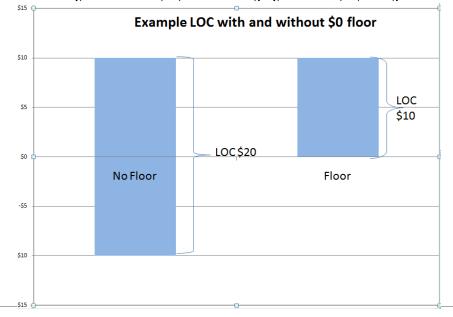
In the un-restricted, no floor case:

Price is -$10, Cost is -$10, LMP is $10: The unit receives $20

$$\{(LMPDMW - AG) \times (URTLMP - UB)\} = \{(1MW - 0MW) \times (\$10 - -\$10)\} = \$20$$

In the restricted, floor case:

Price is -$10, Cost is $0, LMP is $10: The unit receives $10

$$\{(LMPDMW - AG) \times (URTLMP - UB)\} = \{(1MW - 0MW) \times (\$10 - 0)\} = \$10$$

Example LOC with and without $0 floor

No Floor — LOC $20

Floor — LOC $10

In the restricted floor case, the unit is not being made whole to the true lost opportunity cost. ***When the unit's cost offer is set to 0, it misses the opportunity to earn an additional $10***. In the no cost offer floor case, the unit would have earned $10 in the energy market and had a negative cost of $10 for a total of $20. An arbitrary floor of zero could cause some units to leave money on the table when they offer a negative price offer and have a real negative cost offer.

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[i] http://pjm.com/~/media/committees-groups/subcommittees/cds/20111114/20111114-item-06a-post-meeting-m15-unit-types-not-addressed-by-manual-15-redline.ashx

[ii] A real negative cost would need to be determined by CDS. Currently, Renewable Energy Credits (RECs) received after a MWh has been generated are NOT considered a cost.

[iii] For a quick overview see PJM Manual 11 at 30-31. For more detail, see Operating Agreement, Section 6.4.1 (e)-(f)

[v] http://pjm.com/documents/~/media/documents/reports/a-review-of-generator-costs-and-compensation.ashx

[vi] PJM Operating Agreement p. 282

[vii] PJM Operating Agreement p. 269

[viii] PJM Open Access Transmission Tariff p. 1574

[ix] PJM Operating Agreement p. 269

[x] A real negative cost would need to be determined by CDS; currently RECs received after an MWh is generated is NOT considered a cost.