Issues Relating to the Proposed Price Responsive Load Emergency Demand Response Voluntary Program (EDR)

Proposal General Description

The Emergency Demand Response Voluntary Program (EDR) as proposed within the Price Responsive Load Working Group would be generally patterned after a similar PJM program. It would be implemented such that during an emergency declared by the NYISO, loads would be paid for actual use reduction (either through actual load curtailment or transfer of some or all load to supplemental on-site generation) within one hour after notification. The proposed payment is the *higher of* $500/Mwh or LBMP (as per PJM). The reduction would be strictly voluntary. Also, some have proposed that End Use customers could be aggregated by any LSE (not limited to their own) and/or non-LSEs.

This proposal raises several issues and concerns... (1) Should EDR costs be allocated on a zonal or a state-wide basis? (2) How should "actual use reduction" be determined? (3) How can Non-LSEs (or LSEs other than the one serving the EDR End User) participate in EDR? (4) What information needs to be made publicly available?

Issue 1: Should EDR costs be allocated on a zonal or a state-wide basis?

Generally speaking, cost allocations should be designed with fairness and market efficiency (i.e., sending the correct price signals) in mind. If all loads precipitate the need for a service approximately equally and benefit from the service approximately equally, then it is fair to allocate the cost to all loads on a uniform basis. If, however, some loads are expected to provoke the need for a service more and/or benefit from the service more, then it is proper (from both a fairness and market efficiency perspective) to charge those loads proportionately more.

With respect to prompting the need for EDR and benefiting from EDR, let's consider two zones...

Table 1
Relative Value of EDR for Two Zones

	Condition	Zone X	Zone Y
1	Supply vs. Load	Supply level is **High** relative to its Load	Supply level is **Low** relative to its Load
2	Transmission Import Capability vs. Load	Import Capability is **High** relative to its Load	Import Capability is **High** relative to its Load
3	Load Growth	Load Growth relatively **Low**	Load Growth relatively **High**
4	Reliability in terms of LOLP* (i.e., projected energy deficiencies)	Relatively **Lower** (due to Lines 1 and 2) and **Stable** (due to Line 3)	Relatively **Higher** (due to Lines 1 and 2) and **Worsening** (due to Line 3)
5	Tendency to trigger EDR	Proportionately **Less Likely** for this Zone to trigger need for EDR (due to Line 4)	Proportionately **More Likely** for this Zone to trigger need for EDR (due to Line 4)
6	Value of EDR to this Zone	Proportionately **Less Valuable** for this Zone (due to Lines 4 and 5)	Proportionately **More Valuable** for this Zone (due to Lines 4 and 5)

Note:

*LOLP = Loss of Load Probability = a computation of how often load is expected to exceed available supply on a regional basis, thereby not being fully served. Service interruptions to load due to local transmission and distribution system problems (e.g. resulting from storms, equipment damage, etc.) are also "reliability" problems, but are generally not included in LOLP computations.

** As an aside, loads participating in EDR that are located in Zone X are proportionately less likely to be activated than comparable loads located in Zone Y (due to Lines 1, 2, 3, and 4).

Based upon levels of supply and import capabilities, different Zones have different levels of reliability (Loss of Load Probability = LOLP); thereby affecting the tendency to trigger EDR, and in turn, affecting the relative value of EDR to that Zone. If differences in LOLP exist among Zones, how should the costs of EDR be allocated? Clearly a higher reliability Zone (such as Zone X) should bear a portion of the cost because, it will presumably still have an LOLP greater than zero (albeit lower than Zone Y's LOLP). However, is it fair - and will it promote market efficiency - if Zone X is charged the same uniform rate for EDR as Zone Y?

Consider the comparison of the two following EDR cost allocation methods for Zones X and Y from the above example...

Table 2
EDR Cost Allocation Options

	Option 1 **Load Ratio Share** **Uniform State-Wide Rate**	**Option 2** **Proportional Based Upon** **Each Zone's Computed LOLP**
Zone X Allocated Cost of EDR	$30,000 x (5000/10000) = $15,000 = **$3/MWh**	$30,000 x 20% = $6,000 = **$1.20/MWh**
Zone Y Allocated Cost of EDR	$30,000 x (5000/10000) = $15,000 = **$3/MWh**	$30,000 x 80% = $24,000 = **$4.80/MWh**
Fairness	Less fair allocation since Zone Y with a higher LOLP (therefore lower reliability, and a greater probability it will trigger an EDR) pays the same EDR rate as Zone X with a lower LOLP	Fairer allocation since Zone Y with higher LOLP pays proportionately higher EDR rate than Zone X which has a lower LOLP
Market Efficiency for Load Growth	EDR cost allocation sends less correct price signal that discourages load growth more than it should in Zone X (which has higher reliability and therefore more capability to serve load growth), and discourages load growth less than it should in Zone Y	EDR cost allocation sends more correct price signal because it discourages load growth less in the higher reliability Zone X and discourages it more in the lower reliability Zone Y
Market Efficiency for Additional ICAP	EDR price signal does not provide a higher incentive for additional ICAP in a Zone that has lower reliability	EDR price signal encourages additional ICAP more in a Zone that has lower reliability thereby providing an economic incentive to improve overall reliability more
Market Efficiency for Transmission Expansions	EDR price signal does not provide a higher incentive for a transmission expansion to a Zone that has lower reliability	EDR price signal encourages additional transmission import capacity more to a Zone that has lower reliability thereby providing an economic incentive to improve overall reliability more

Assumptions:

Zone X computed LOLP = 20% of Total LOLP for both Zone X and Zone Y.
Zone Y computed LOLP = 80% of Total LOLP for both Zone X and Zone Y.

60 MW EDR is invoked for one hour due to an energy deficiency.
EDR payment @$500/MWh for one hour = (60 MW x $500/MWh) = $30,000.
The resulting Real-Time Actual Loads are 5,000 MW in Zone X and 5,000 MW in Zone Y.

As illustrated in Table 2 above, in the interest of fairness and to foster market efficiency, we propose that the EDR cost allocation method for loads within each Zone be made proportional to that Zone's computed LOLP, rather than using a uniform state-wide rate. Computing the LOLP is relatively straightforward, and this measure is already used to determine ICAP requirements. This method could be further simplified by combining the computation for adjacent Zones that have strong ties (i.e., low anticipated inter-Zonal congestion) between each other.

The "LOLP Proportional" method for EDR cost allocation would send more appropriate price signals to help improve reliability by encouraging additional supply capacity, transmission expansions, and load responses to price in the proper locations. Thus, each Zone would be charged for EDR based upon its relative risk. Otherwise, if loads in higher reliability areas are forced to pay on an equal basis for emergency load reductions precipitated more by lower reliability areas; it wrongly discourages load growth in locations that can handle more load growth, and subsidizes load growth in locations that are less able to handle the growth. In short, price signals should be encouraging reliability improvements ***where*** reliability needs to be improved.

Issue 2: How should "actual use reduction" be determined?

Various proposals have been set forth on how "actual use reduction" for payment of EDR should be determined? Without going into the relative merits of those specific proposals, we recommend the following guidelines in the determination of "actual use reduction" to help prevent potential gaming problems (e.g., intentionally pre-loading, thereby being capable of a larger cut).

1) Actual use reduction for EDR participants should be based on an hour or hours *previous* to their notification to implement EDR, and not based on any hours(s) after the notification but before activation.

2) EDR participants may be notified Day-Ahead on *advisory* basis *without* a Forward Contract; and then *officially* notified and activated on a Real-Time basis. As above, if the advisory notification is made in the Day-Ahead, payment for EDR should be based on use during the hour in question *previous* to the Day-Ahead notification.

Issue 3: How can Non-LSEs (or LSEs other than the one serving the EDR End User) participate in EDR?

Allowing participation in EDR by non-LSEs and/or LSEs other than the one serving an EDR End-User may offer more flexibility and increased competition, but it also raises two concerns: (1) economic fairness, and (2) administrative complexity.

With respect to economic fairness, an LSE obligated to procure supply for an End User (but not involved with EDR for that load) needs to be protected from the risk (i.e., losses that may result from disparities between Day-Ahead and Real-Time prices) of not serving that load when that End User voluntarily reduces consumption due to EDR. If an LSE has a higher than average level of EDR End-Users aggregated by others, and it is not "held whole" through a revenue neutrality mechanism, it will bear a disproportionately high level of the costs associated with EDR.

With regard to administrative implementation, EDR End-Users would be responsible for having interval metering. Also however, allowing a non-LSE load or other LSE aggregator to participate in EDR would: (1) require creation of "pseudo-LSEs" within "host LSEs"; and (2) add yet another layer of complexity to NYISO and "host LSE" billing reconciliation. While these are not insurmountable problems, they will require adequate administrative lead-time to properly address.

Issue 4: What information needs to be made publicly available?

The Market can better improve reliability when it has access to as much information as possible. To this end, the proposed new data postings on the NYISO web-site (as approved in Motion #7 by BIC at its 9/22/2000 meeting) will provide a great deal more system information to help the Market anticipate and respond to system emergencies, including EDR. It will also help gauge the market efficiency of the specific EDR rules to provide guidelines for future improvements in the program. In this regard, we propose that the following information be added to Real-Time postings that specifically pertain to EDR:

1) The location and magnitude of the problem in terms of Energy shortages and Operating Reserve shortages.
2) The general cause or causes for the EDR in terms of heavy loads, generators forced out, transmission outages, etc.
3) Anticipated and actually invoked EDRs in terms of estimated MW amounts by Zone, start times, and expected durations.