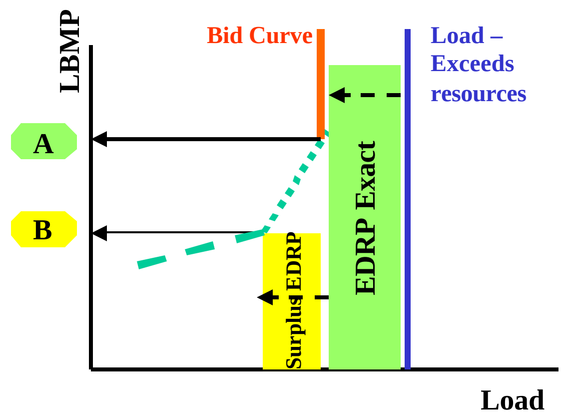
Impact of EDRP on RT LBMPs

Background

The EDRP program as currently configured makes no provision for dispatching anything less that the full available set of EDRP resources in a zone when any such resources are needed in that zone to restore reserves. Provisions for dispatching only part of the available EDRP resources in any zone of collective of zones were considered in the original design, but not implemented except in the case of diesel generators.[1] Given the substantial increase in the size of the program during 2002, nearly 1,300 MW are now registered, it is now much more likely than last year that situations may arise where some but not all of the available EDRP resources are needed to restore reserves.

The figure below depicts the consequences of calling more EDRP resources than are needed to resolve the reserve shortfall and to resume normal market operations and pricing. The Bid Curve represents the available resources at bid prices. The load depicted exceeds these available resources and therefore the demand curve does not intersect the bid curve. If EDRP resources were perfectly fungible and divisible, and dispatchers were able to determine exactly how many EDRP resources are required to restore market equilibrium, then they could call for just enough EDRP load to shift the load curve to the left until it just intersects the bid curve. At this point, the LBMP would be determined by the last unit on the bid curve available for dispatch. This LBMP is indicted in the figure at LBMP **A**. If instead all EDRP resources were called, some generation resources would need to be backed off. The LBMP would fall, as indicated in the figure by the lower LBMP **B**. Payments to generators for real time load would be reduced.



Simulation of Summer 2002 Impacts

To quantify this potential impact of overcalling EDRP resources, we have used the supply flexibility models developed for last year EDRP evaluation to trace the impact of the full dispatch of this year's EDRP resources under alternative assumptions about how many EDRP resources would be really needed to restore reserves to acceptable levels. There are several essential components for the analysis:

1. The supply flexibility models developed for three zones (Capital, NYC and LI) and two aggregate zones (Western and Hudson) as part of last year's PRL

[1] In 2001, the NYIS0 agreed to dispatch through EDRP no more than 150 MW of on-site diesel generation in nay hour. A round-robin dispatch system was devised to determine which participants with diesel generation would be dispatched at each event, if more than 150 MW were available. Since only about 70 MW of such generation subscribed the round robin dispatch was never used.

evaluation were used to establish LBMPs for the alternative scenarios regarding the need for EDRP resources.
2. To represent this year's EDRP dispatch, these alternative scenarios are evaluated for the supply and price conditions that characterized last year's EDRP events (three days, 17 hours state-wide, one additional day with six hours downstate).
3. We assumed that 1,400 MW of EDRP load would be available this summer. The distribution by zone was determined by the current registration. To reach the simulated 1400 MW, the current registration in each zone was increased by about 9% (currently there are about 1300 MW registered).
4. We assumed that curtailments by EDRP participants would average 60% of the registered level. Thus in our simulations, we assume that system wide about 840 MW of EDRP curtailments would have been realized during state-wide events and 277 MW during the additional downstate day. Last year, participants in EDRP delivered just over 60% of their registered load during the August events.
5. We assumed that dispatchers called all registered EDRP resources in the reserve deficient zones whenever any of those resources were needed to restore reserves.

To quantify the impact of dispatching EDRP on RT LBMPs, we simulated four cases:

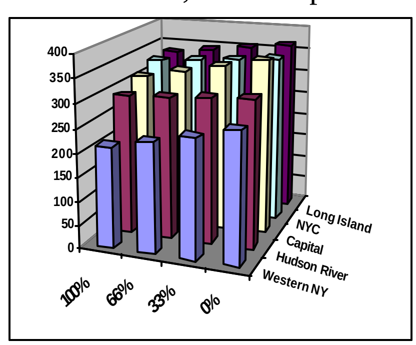
Case 1. No EDRP needed. This case is used to establish a reference LBMP from which the results of the other cases can be compared.

Case 2. 1/3 EDRP needed. Only 1/3 of the EDRP resources were needed to restore reserves, although all were dispatched.

Case 3, 2/3 EDRP needed. Only 2/3 of the EDRP resources dispatched were actually needed.

Case 4. All EDRP resources were needed.

For each case we derived the LBMPs consistent with the EDRP need and compared it to the LBMP that would have resulted because all of the EDRP resources were dispatched. We call this difference the LBMP shortfall that arises by calling EDRP resources in excess of what is actually needed to restore reserves. The RT Generator Payment Shortfall is the product of this difference in LBMP and the amount of load settled in real-time.[2] In Case 4, there would be no shortfalls of either kind. The cases, which represent ascending EDRP need situations, result in smaller shortfalls in LBMPs and payments.



Simulation Results

The results of the simulations are depicted in the adjacent figure and provided in detail in the table below. The price shortfalls and revenue adjustments increase in a non-linear fashion as the % of EDRP needed decreases. In Case 1 (which is used for reference purposes and is listed at the bottom of the table as 0% needed), 840 MW of EDRP curtailments are undertaken on the three event

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[2] For last summer in NYC, these revenue adjustments would have been paid to LSEs, since day-ahead Fixed bid loads were far in excess of actual RT loads, so LSE's liquidating their long position in settlement would have been the beneficiaries of these transfers.

days over 17 hours and an additional 277 MW is curtailed for six hours on a fourth day. However, in this case, we assume that none of the curtailment was needed in any of those hours. Therefore, the simulated price shown for each zone is the one that would obtain if none of the load reduction were called. In this case, the average LBMP shortfall would be calculated as the difference between the price in case 1 (0% needed) and the price in Case 4 (100% needed and listed first in the table). For example, this average price difference per MW is $ 54 = $368 - $314 for the Capital Zone. The corresponding total revenue shortfall to generators in the capital zone for all EDRP event hours would be about $380 thousand.

% EDRP Needed	Capital		NYC		Long Island		Western NY		Hudson River		TOTAL
	Price	Rev. Adj to Gens	Price	Rev. Adj to Gens	Price	Rev. Adj to Gens	Price	Rev. Adj to Gens	Price	Rev. Adj to Gens	Rev. Adj to Gens
100%	314	$0	330	$0	332	$0	212	$0	294	$0	**$0**
66%	332	$132,664	339	$59,978	343	$88,768	230	$213,119	299	$66,712	**$561,240**
33%	350	$252,870	346	$104,551	355	$180,579	250	$447,268	305	$134,757	**$1,120,023**
0%	368	$380,477	354	$149,385	366	$275,510	273	$705,723	311	$204,157	**$1,715,252**

The total revenue adjustment for generators state wide is estimated at $1.7 million (last column in the table). Alternatively, if only one third of the curtailments was in excess of what was needed (the 66% needed scenario), the revenue shortfall to generators state wide would be slightly over half a million dollars.

Although not shown in the table, payments to EDRP participants if all were called would be over $14 million. Further, it is important to note that if EDRP could be dispatched incrementally so that just the needed amount of load was curtailed and paid, program costs (uplift) would decrease, both because payments to curtailing customers would be decreased proportionately and there would be no need to consider revenue adjustments for generators. For example, the total cost of fully dispatching EDRP resources and paying adjustments to generators when only 2/3 of the EDRP resources were needed would cost $14.6 million ($14 million in EDRP payments and $0.6 million in revenue adjustments to generators). In contrast, if just 2/3 of the EDRP resources were dispatched, and assuming that this could be accomplished by some costless rationing scheme, then the total program cost would be about $9.3 million (2/3 of the EDPR cost and no revenue adjustments since price would properly reflect equilibrium market conditions).

Conclusions

The supply flexibility models developed as part of last year's EDRP program evaluation were used to simulate the consequences of over-dispatch of EDRP resources. Last year's EDRP events and this years EDRP resources provided the framework for the analysis. Four cases were simulated and the impacts in RT LBMPS and generator RT revenues were estimated. In each case, all 1,400 of available EDRP resources were assumed to be dispatched. The amount of those resources actually needed distinguishes the cases and results in RT price adjustments.

It is clear from this analysis that the minimum-cost solution to matching EDRP resources to situational needs is to invoke a means by which only the needed resources are curtailed and paid. This could be achieved by requiring participants to bid strike prices at which they wish to curtail, and by dispatching curtailments using the last-price rule that the NYISO uses in its energy and capacity auctions. This may be impractical for 2002 given the time required to establish and administer such a bidding system, and it may in the short run undermine the reputatio n of the program and its providers.

An alternative is to adopt a prorating system or some form of round-robin curtailment procedure. In the former, the ratio of the needed curtailments to the total EDRP resources becomes the prorating factor, which is announced along with the notice of a curtailment event. Participants will be paid for curtailments up to the level defined by their registered ERDP load times the prorating factor. A round-robin procedure would establish an initial ordering of participants, perhaps randomly by zone. At the first event, curtailment notices would go out to the number of individuals required to meet the EDRP curtailment need of the zone. If not all are called, then at the next event; curtailment notices would begin with the fist participants not previously called and to additional participants until the required curtailments are reached. This process would be repeated at each subsequent event.

Prorating can be an efficient and effective means of matching EDRP resources to circumstantial needs. But, participants may find the process confusing, and to implement it, the NYISO would have to develop a software system and tie it to the price notification system. Any round-robin scheme with be equally cumbersome to implement and not nearly as efficient as the bidding or prorating system. In addition, some participants might consider such arrangement improper since neither was revealed when the customers signed up, and they may insist on being allowed to alter their registration amount. All of these methods would encounter problems if customers' nominations of their load curtailment capabilities were biased in either direction, but this is especially troublesome in the case of prorating.

If EDRP resources cannot be made divisible for dispatch purposes, then some adjustment to generators selling in the RTM might be in order. This could be accomplished using the method demonstrated above. At each event, the needed EDRP resources would be determined (perhaps after the fact). Then, using the simulation model, the adjusted LMBP and revenue shortfalls could be calculated. The determined amounts could then be paid to the appropriate generators (or LSEs liquidating a long DAM position). Such an arrangement might pose problems for timely settlements. Alternatively, it might be possible to accomplish the same purpose through some hybrid pricing such as that now used for situations involving block-loaded peaker units that are needed only some of the hours during which they are loaded into dispatch.

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