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Energy Supply by Major Sources, Annual 1978–1981

Total Energy	Annual Total 1978	1979	1980	1981	Percentage Change from Prior Year 1979	1980	1981
			(quadrillion Btu)				
Domestic Production	61.59	63.24	63.14	63.67	2.7	-0.2	0.8
Net Imports	16.85	16.07	14.84	14.69	-4.6	-7.7	-1.0
Stock Withdrawals	0.36	-0.54	-0.04	-0.22	—	—	—
Total Available	78.80	78.78	77.94	78.13	-0.1	-1.0	0.2
Petroleum	38.02	36.71	35.28	34.75	-3.4	-3.9	-1.5
Natural Gas	20.30	20.13	20.84	20.39	-0.8	3.5	-2.2
Coal	14.61	15.29	15.61	16.56	4.7	2.1	6.2
Other	6.04	5.82	6.08	6.54	-3.6	4.5	7.6
			(million tons)				
Coal							
Consumption	644	678	699	740	5.3	3.1	5.9
Electric Utility	481	529	551	592	10.0	4.2	7.4
Non-Utility	163	149	148	148	-8.6	-0.7	0.0
			(trillion cubic feet)				
Natural Gas Consumption	19.87	19.71	20.59	20.13	-0.8	4.5	-2.2
		(billion kilowatt-hours)					
Nuclear Generation	276	255	273	315	-7.6	7.1	15.4
Hydro Generation	280	280	287	287	0	2.5	0
			(million barrels per day)				
Petroleum							
Crude Oil Production	8.70	8.51	8.55	8.38	-2.2	0.5	-2.0
Other Liquids Supply	2.10	2.19	2.11	2.09	4.3	-3.7	-0.9
Total Domestic	10.80	10.70	10.66	10.47	-0.9	-0.4	-1.8
Net Imports	7.84	7.74	7.03	6.94	-1.3	-9.2	-1.3
Stock Withdrawals	0.26	-0.10	-0.10	-0.03	—	—	—
Total Available Product Supplied	18.90	18.34	17.58	17.38	-3.0	-4.1	-1.1
Motor Gasoline	7.41	7.03	6.68	6.61	-5.1	-5.0	-1.0
Distillate Fuel Oil	3.43	3.30	3.19	3.23	-3.8	-3.3	1.3
Residual Fuel Oil	3.02	2.79	2.54	2.31	-7.6	-9.0	-9.1
Other	4.99	5.28	5.17	5.23	5.8	-2.1	1.2

Note: Historical data in this table may differ from comparable data in Volume 2 due to rounding error in cumulating from monthly data or to alternative methods of handling data on stocks, converting to Btu, or other similar computational factors.

Source: Department of Energy

At the Electricity Resource Bazaar: Lessons from Case Studies of Integrated Bidding in New York

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This article evaluates the integrated bidding programs of two utilities in New York state: Niagara Mohawk and Consolidated Edison. Both programs involve DSM as well as supply resources. In terms of ratepayer benefits, bid prices for winning projects compare favorably to each utility's alternative supply options and to prices obtained by other utilities. In terms of project viability, both utilities experienced problems that could undermine the confidence of private developers in bidding processes. In terms of fairness, controversial items were NMPC's handling of its own plant refurbishment project and of DSM bids made by energy service companies and Con Edison's threshold and eligibility requirements for DSM bidders. To avoid these and other pitfalls, utilities and regulators are encouraged to offer separate solicitations for supply and demand-side resources and to consider a "preferred resources" approach to resource acquisition.

Cet article évalue les programmes intégrés de soumission dans deux entreprises de service public en énergie de l'État de New-York, Niagara Mohawk et Consolidated Edison. En termes d'avantages pour le contribuable, les prix d'achat pratiqués dans le cadre des projets qui remportent la soumission soutiennent favorablement la comparaison avec ceux d'options alternatives d'offre de chacune de ces entreprises ainsi qu'avec les prix obtenus par d'autres entreprises de service public. En termes de viabilité de projet, les deux entreprises ont éprouvé des problèmes qui pourraient miner la confiance dans le système d'appel d'offre au sein de l'entreprise privée. En termes d'équité, ont prêté à controverse la façon dont Niagara Mohawk a agi dans le cadre de son projet de remise en état de ses propres installations et dont elle a traité les offres de gestion axée sur la demande des compagnies de service en énergie, ainsi que les seuils et les exigences en matière d'admissibilité imposés par Consolidated Edison aux soumissionnaires pratiquant la gestion axée sur la demande. Les entreprises de service au public et les autorités règlementaires sont encouragées à émettre des appels d'offre séparés pour ce qui concerne les ressources en gestion axée sur l'offre et sur la demande et à considérer une approche dite de "ressources préférentielles" pour la planification et l'acquisition des ressources, de façon à éviter quelques-uns des pièges rencontrés ici ou là.

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1. Introduction

Competitive resource bidding has emerge[d as] the dominant process by which American ele[ctric] utilities are acquiring new resources to mee[t fu]ture needs. In the short term, bidding is see[n by] many public utility commissions (PUCs) [as a] useful way for utilities to choose among th[ird-] party suppliers of electricity resources and as a valuable yardstick against which to judge utility performance. Integrated solicitations, where supply-side and demand-side resources are bid and evaluated on a comparative basis, are seen as a way to simultaneously promote the goals of integrated resource planning (IRP), spur further implementation of demand-side management (DSM), and achieve the economic efficiency advantages of competition. However, competitive bidding programs pose formidable policy, design, and management challenges for utilities and their regulators. Chief among these challenges are resolving potential conflict of interest problems when utilities are loath to relinquish their traditional role of electricity supplier. Since bidding concerns itself with marginal resource decisions, it does not constitute a radical restructuring of the electricity industry. Yet, in the long run, these marginal decisions ultimately raise questions about the future market share of the vertically-integrated utility in the generation segment of their business and its role on the customer side of the meter. As utilities and PUCs proceed with integrated solicitations, they may confront questions such as how potentially attractive resource options like life extension or repowering projects should be treated and what the relationship should be between utility-sponsored DSM programs and DSM bidding.

This article summarizes an assessment of two bidding programs implemented in New York. The New York Public Service Commission (NYPSC) ordered the state's seven investor-owned electric utilities to develop competitive bidding programs that were applicable to both supply and DSM resource options (NYPSC, 1988b). Because integrated bidding is a relatively new phenomenon, New York regulators sought to systematically review the experience of two utilities' bidding experiments in their state. This paper evaluates the bidding programs of Niagara Mohawk (NMPC) and Consolidated Edison (Con Edison) against several indicators of "success" and discusses several policy options for structuring more effective competitive procurement processes for DSM resources and for situations in which the utility wants to participate as a seller.

2. Regulatory Context and Bid Program Designs and Outcomes

The state regulatory environment has, to a great extent, shaped bidding programs in the US, and the state of New York is no exception. In response to forecasted needs for additional capacity by the early to mid 1990s, the NYPSC directed utilities, in a two-year series of decisions, which started in 1988, to implement bidding programs, file long-range DSM and integrated resource plans, offer full-scale, system-wide DSM programs to various customer classes, and suggest ratemaking mechanisms that would overcome financial barriers to promoting energy efficiency options.

The NYPSC consciously chose to implement bidding quickly in the spirit of experimenting with this alternate form of resource acquisition. The NYPSC provided general guidelines on bidding, but it was left to the utilities to sort out and ultimately reconcile the consequences of these DSM policy initiatives with bidding guidelines that required inclusion of demand-side providers. The NYPSC did, however, anticipate the potential for conflict among these initiatives contained in the following statement.

> We are proceeding to require these new statewide DSM programs recognizing that there may be a conflict between this initiative and our simultaneous steps to acquire new service capacity by means of all source bidding systems. While the all source bidding systems include provisions for acquiring DSM resources, we recognized at the outset that we do not yet know the extent to which bidding systems can effectively deliver DSM services. Accordingly, we intend to proceed with plans for utilities to design and administer the delivery of DSM services. We will observe the interplay of the two approaches and change our approach if lessons of experience indicate change makes sense (NYPSC, 1988a).

The development process of bidding in New York occurred in two phases. In the first phase, a working group comprised of representatives of utilities, regulatory agencies, independent power producers (IPPs), and consumer groups deliberated on bidding policy and implementation issues (primarily related to the selection of generation resources), culminating in the NYPSC's decision on bidding guidelines and policies (NYPSC, 1988b). In the second phase, utilities filed draft bidding guidelines and requests for proposals (RFPs) in compliance with the NYPSC's decision. Interested parties were then allowed to file comments on the initial utility bidding proposals. Where compromise could not be reached among the parties on contested issues, the Commission made its own determination. In the end, the design of the bidding programs of Niagara Mohawk and Consolidated Edison bore the marks of strong regulatory involvement.

Table 1 summarizes the structure and outcome of Niagara Mohawk's and Consolidated Edison's solicitations. Consolidated Edison issued its RFP in February 1990, calling for 200 MW of supply or DSM capacity (Consolidated Edison Company, 1990). Con Edison employed an objective scoring system to rank bids on the basis of price and non-price factors. Under the price fac-

Table 1: Structure and Outcome of Solicitations of Two New York Utilities

	Consolidated Edison	Niagara Mohawk
Type of Solicitation	Integrated	Integrated
Bid Evaluation	Objective scoring system	2-staged: objective scoring system in 1st stage; subjective evaluation of short-listed projects in 2nd stage.
Host Utility Allowed to Bid?	No	Yes
Customers Allowed to Bid?	Yes	Yes
Resource Block	200 MW	350 MW
RFP Issued	Feb 1990	Nov 1989
Competition Winners Announced	Jan 1991	July 1990
Supply Bids Offered	35 (2976 MW)	75 (7115 MW)
DSM Bids Offered	5 (12 MW)	33 (165 MW)
Supply Bids Chosen	5 (204 MW)	2 (405 MW)
DSM Bids Chosen	4 (11 MW)	7 (36 MW)
Executed Contracts (as of Dec. 1993)	5 (180 MW)	4 (20 MW)

tor, project bid prices were adjusted according to differences in expected energy output, proposed contract term, plant availability, and transmission and distribution cost impacts in order to facilitate comparisons in terms of overall expected cost. The production cost aspects of the price scoring were not transparent to the bidder. Non-price factors included the project's ability to diversity the utility's fuel mix, project viability and level of risk (e.g., the probability of successful development and operation throughout the term of the contract), compatibility with the utility's operational requirements, and the project's environmental characteristics. The non-price factors were monetized and added to the price factor in order to calculate an overall adjusted price in $ per kW. This ranking criteria was the sole factor used to select among projects in the Con Edison auction. On January 1991, the utility chose five out of 35 supply bids and four out of five DSM bids to enter into contract negotiations.

Niagara Mohawk issued its integrated bidding RFP for 350 MW in November 1989 (Niagara Mohawk Power Corporation (NMPC), 1989). NMPC relied on a two-stage bid evaluation process. In the first phase, an independent third-party scored and ranked bids using an objective, transparent point scoring system incorporating various factors (i.e., price, economic risk, success, longevity, performance, and environmental). In the second phase, the utility conducted a more detailed analysis of a short list of projects emerging from the first phase. In this phase, NMPC evaluated DSM projects using additional criteria (e.g., comparison with the cost of utility-sponsored DSM programs targeted at similar market segments) and evaluated bids individually and in combination, exercising significant discretion in choosing the best combination of projects. In this solicitation, NMPC was allowed to bid its own projects. Out of this process, the utility selected two of 75 supply bids and seven of 33 DSM bids. One of the chosen supply bids was Niagara Mohawk's own project.

3. Measuring Success

Despite the widespread belief in the virtues of competition, the success of competitive bidding is not necessarily guaranteed. Competitive resource acquisition programs can encounter problems at various stages: failure to bid, difficulty in designing a system for choosing the best projects fairly, an inability of utilities and private parties to negotiate contracts successfully, failures or substantial delays in project development, or an inability to maintain firm capacity or demand reductions over the contract lifetime.

Given these challenges, and because few detailed case studies of utility bidding programs have been conducted, the following framework is offered for assessing the outcomes of competitive bidding:

(1) Market response;
(2) Project viability - the proportion of projects (and capacity) that successfully develop and come on-line;
(3) Economic benefits of ratepayers compared to alternatives, and;
(4) Processes that are administratively tractable, workable, and perceived to be fair.

The first three indicators focus on quantifiable impacts of bidding programs, essentially tracking the project development process, while the fourth indicator is more subjective and process oriented. In this section, we discuss methodological issues associated with these indicators and use them to compare the results of the Con Edison and NMPC bidding programs relative to those of other utilities.

3.1 How Many Bidders?

Assessing the market response by private producers and DSM providers to a utility's solicitation is often viewed as the "front page" test of a utility's bidding program. If the terms of the RFP are so unfavourable that bidders do not bother to bid, then the solicitation cannot be judged efficient or plausible in any meaningful sense. The typical figures of merit for this indicator are total capacity offered by private producers relative to the requested amount and the number of bids received. Table 2 summarizes market response from utilities that have included both supply and DSM resources in bidding solicitations. Private producers have typically proposed projects that represent 3-20 times the capacity put out to bid by utilities. On the demand-side, the energy service company (ESCO) industry is relatively immature compared to the private power industry and individual bids tend to be quite small (< 5 MW). Thus, in analyzing market response by DSM providers, it is also useful to examine participant response as measured by the number of bids, rather than focusing only on demand reduction quantities.

The market response by private power producers to the Niagara Mohawk and Con Edison bidding programs was substantial, and closely parallels national trends. On the demand-side, the initial market response by ESCOs and customers was particularly noteworthy in Niagara Mohawk's bidding program: 33 bids representing 163 MW. Compared to other utilities, the market response by DSM providers to Con Edison's bidding program (i.e., four bids for 12 MWs) can only be characterized as poor. Our analysis concluded that the threshold and eligibility requirements established by Con Edison discouraged many prospective DSM bidders.

There are several reasons why even this simple indicator should be interpreted with caution. First, there are significant accounting differences among utilities in reporting offers made by private producers. For example, some utilities allow developers to submit more than one bid per supply-side site. Niagara Mohawk received 75 supply-side bids offering 7115 MW of capacity. However 26 projects were multiple bids at the same site (which varied principally by contract term), which meant that there were only 49 unique supply projects representing about 4700 MW. On the supply-side, it is probably more meaningful to report the cumulative capacity represented by projects at unique sites.

Second, the DSM resource is limited by market factors (e.g., customer base, characteristics of existing equipment, etc.). It can be "mined" either by utility-sponsored DSM programs or by energy service companies via bidding or performance contracting programs. Thus, the scope and comprehensiveness of a utility's existing DSM programs plays a key role in defining remaining market opportunities for ESCOs.

Third, a quantitative assessment of capacity offered relative to resource block need provides little information regarding the quality of bids. Threshold and eligibility requirements vary significantly among utilities and it appears that bidder participation is correlated to some extent with the stringency of these requirements. Some utilities that defined minimal threshold requirements have reported that many of their bids were not serious offers and were quickly elimi-

Table 2: Market Response in Small vs. Large Bidding Programs

Utility	RFP Issued	Resource Block Size[1]	Supply Resource No. of Bids	Supply Resource MWs	DSM Resource No. of Bids	DSM Resource MW
Con Ed	2/90	200	35	2976	4	11.9
Niagara Mohawk	11/89	350	75	7115	32	162
Small Program (≤ 100 MW)						
Central Main Power (CMP) #1	12/87	100	45	666	13	36
Puget Power	6/89	100	34	1251	8	28
Rochester Gas & Electric (RG&E)	9/90	50/20	3	59	19	67
Central Hudson	11/90	50/20	15	680	7	40
Pacific Power & Light	10/91	50	30	1288	19	91
Washington Water Power		30	10	280	5	15
Large Program (〉100 MW)						
Orange & Rockland Utilities (ORU)	6/89	200	25	1395	12	29
LILCO	11/89	150/15	21	1765	14	23
CMP #2	5/89	150-300	41	2338	9	30
Jersey Central Power & Light (JCP&L)	8/89	270	11	712	8	56
Public Service Electric & Gas (PSE&G)	8/89	200	8	654	8	53
PSI Energy	12/88	550	12	1800	9	78
NYSEG	7/90	100/30	11	595	31	98
Northern California Power Authority (NCPA)	7/91	200	58	9866	12	139

1/ Some utilities established separate supply & DSM resource block size targets (shown by supply goal/DSM goal).

nated during the utility's initial bid evaluation.

3.2 *Demonstrated Project Viability?*

Because competitive bidding is a relatively new phenomenon, a key indicator of success is the extent to which projects with signed contracts ultimately come on-line and develop successfully. There are two over-arching issues that complicate any analysis of project viability. First, there is the so-called "winners curse" phenomenon. The utility buyer is obligated to look for the best deal for ratepayers, however there is always the possibility that the sellers' project is unrealistic, and therefore not truly viable. The utility's bid evaluation and selection process must distinguish between bids that are too good to be true and projects that are truly innovative. Second, there is a potential problem if the utility's underlying strategic motives are at odds with the stated objectives of the solicitation. In a situation in which the utility's role is defined as the "supplier of last resort" and the utility would like to build a favoured generation option, then the perception may exist among some parties that the utility would prefer for winning bids to fail.

Several approaches have been used by utilities to manage risks associated with project viability. For example, some utilities explicitly factor the expectation that a certain fraction of projects will fail to develop and thus sign contracts for a quantity of capacity that exceeds their resource requirements (Ellis, 1989). Various policy options have been proposed to make the utility financially indifferent to the "buy vs. build" choice. Private power industry representatives have suggested that utility shareholders should have the opportunity to earn some type of financial incentive based on the utility's success in acquiring low-cost purchased power (Morse & Meal, 1993).

According to a recent study, 2842 MW or about 13% of the projects with signed contracts awarded through bidding processes at US utilities have been cancelled and/or failed to develop (Robertson, 1992). Interestingly, the decision to cancel was initiated by developers for over 1060 MW, while utilities cancelled contracts representing over 1100 MWs. Because the vast majority of capacity has been won by supply-side bidders and because these projects tend to be significantly larger than DSM bids, failures of individual supply-side projects are particularly important. The principal reasons for cancelled projects include environmental permitting problems, public opposition, local zoning problems and loss of steam host. These failure rates should be viewed as providing preliminary evidence because only about 24% of projects with contracts awarded through bidding have come on-line. Most projects are either still under construction, under development, or have not yet signed contracts.

We make the following observations with respect to project viability issues that emerged from the Con Edison and Niagara Mohawk bidding programs.

- For a variety of reasons, the amount of capacity and number of projects that will successfully develop from Niagara Mohawk's bidding program will be significantly less than the utility's resource need as indicated in the RFP. Niagara Mohawk has dropped its own project and paid a project termination fee of $25 million to the other supply project sponsor. Together these represent 405 MWs out of 441 MWs originally chosen. According to the utility, the primary reason for cancellation was that the projects were no longer cost-effective given the utility's most recent estimates of long-run avoided costs, which are substantially lower than those in effect at the time the RFP was issued (and when projects were evaluated).
- The situation is less clear for the Con Edison bidding program because the bulk of supply-side projects are under development. Substantial financial difficulties were initially experienced by York Research, the developer of four winning bids representing 186 MW out of a total award group of 215 MW. With the reorganization of these projects and York's formation of a partnership with Mission Energy, staff at Con Edison believe that the prospects are good that these projects will ultimately develop. However, their prospects remain uncertain. Contract negotiations have not been completed for two of the projects, representing about 34 MW. The process has taken far longer than anticipated and has been extended by mutual agreement between Con Edison and the project developers.[1]
- Looking at the status of winning DSM bidders at Con Edison and Niagara Mohawk, it appears that the six signed contracts will ultimately yield about 28 MW of demand reductions as compared to 46 MW of savings comprising the Final Award Groups for each utility. There was some attrition among winning DSM bidders during contract negotiations. These DSM projects were sidetracked in the initial stages of the development process (i.e., contract negotiations); similar patterns have been observed at other utilities.
- The status of winning projects at these two utilities can be summarized as follows. At Con Edison, about 80% of the capacity of winning projects is under development and 16% is in the pre-contract phase because of delays. At Niagara Mohawk, the utility has cancelled about 95% of the capacity of winning projects. It appears that the failure of winning bidding projects to develop successfully will have only a minimal impact on system reliability, and economic losses to the utility appear to be minor. The economic recession and increased utility DSM activity have reduced load growth while, at the same time, a glut of private power projects from the pre-bidding era are coming on-line. Thus, NMPC's sharply re-

1/ Con Edison's willingness to extend contract negotiations is influenced by the fact that they perceive no pressing need for new capacity.

duced need for new resources makes comparisons with other US utilities more problematic because the underlying economic incentives to pursue these purchases are muted. Although the bidding programs in New York were regarded by regulators as a pilot for gaining experience with competitive resource acquisition, high failure rates among winning bids are not a particularly desirable outcome. Perceptions of the integrity of the bidding process can be adversely affected and questions may be raised regarding the utility's underlying motives.

3.3 Benefits to Ratepayers?

Ultimately, the merits of competitive bidding will be judged on whether the process yields projects that offer economic benefits to ratepayers compared to the relevant alternatives. At present, several factors make this issue difficult to analyze: (1) data limitations, (2) disagreements over the appropriate yardstick to use in assessing economic benefits to ratepayers, (3) analytic complexities involved in valuing and pricing various contract terms and provisions and (4) changing market conditions.

First, in order to analyze economic benefits to ratepayers from competitive bidding, it is essential that the products of the process (i.e., contracts) be publicly available. However, some commissions (e.g., Texas) and utilities (e.g., Niagara Mohawk) regard all or some of the provisions of private power contracts as confidential. Moreover, some cost components for DSM projects (e.g., customer cost contributions) are not typically included in the contract between the utility and winning bidder. In some cases, customer costs are verified by the utility during project implementation. This information along with utility administrative costs are necessary to calculate the societal cost-effectiveness of DSM projects.

Second, in evaluating the economic benefits of supply-side projects to ratepayers, a utility's avoided supply costs provide a convenient and relatively well-established metric. However, on the demand-side, the value of a DSM bid depends to some extent on what it is replacing. The DSM bid could be compared to the utility's avoided supply-side costs, but the utility might also believe that it is important to evaluate the cost of the DSM bid relative to "comparable" planned or existing utility DSM programs. Significant disagreements exist regarding the appropriate metric to use in evaluating the value of DSM bids, and this issue figured quite prominently in Niagara Mohawk's bid evaluation process (Hamilton & Flaim, 1992). We would argue that the costs of a "comparable" utility DSM program, adjusted for additional risks and services provided by an ESCO, provides a lower bound for comparing the economic benefits to ratepayers of DSM projects, while the utility's avoided supply costs (including environmental externalities) provides an upper bound.

Third, contract terms and provisions are often quite complex, particularly those relating to the pricing and performance of supply-side projects. This makes it difficult to reduce contract features to standardized formats that allow various projects to be analyzed on a comparable basis. For instance, contracts that provide for dispatchability are more valuable than must run projects, all else being equal; measuring the value difference can be complex (Kahn, Marnay, & Berman, 1992).

Fourth, the time period between formulation of a utility RFP, bid submission, evaluation and contract negotiation can be long and market conditions may change significantly. For example, long-run avoided costs (LRACs) of Con Edison and NMPC, which reflected future capacity needs and projected fuel prices, fell markedly over the period of their solicitations. This resulted in a significant erosion of expected benefits from bid proposals.

Several analysts have conducted scoping studies that include small samples of contracts signed under competitive bidding, which attempt to estimate the benefits compared to contracts that were signed under the PURPA standard offer regime or the utility's avoided supply costs. Kahn (1992b) provides anecdotal evidence that show declining prices for projects developed in a bidding regime compared to similar earlier ones that were developed under standard offers. Lieberman (1992) provides statistical evidence from four states substantiating the same conclusion. On the demand-side, Goldman and Kito (1994) collected information on the costs of ten utility DSM bidding programs based on signed contracts, evaluation reports, and interviews with program managers. All DSM bidding programs cost less than the utility's supply-side alternatives at the time of the RFP. However, several programs appear to be only marginally cost-effective from a total resource cost perspective, given the uncertainties in customer and administrative costs and future avoided costs.

Table 3 summarizes information on the costs of nine individual DSM and supply-side bidding projects that have signed contracts with Niagara Mohawk and Con Edison. In the following sections, we also compare these results with the costs of the bidding programs of other US utilities.

- Levelized bid prices for the three Con Edison supply-side projects average 6.8 ¢/kWh (expressed in 1992$) and are about 39% lower than the utility's avoided supply cost. For comparison, bid prices (normalized at an 85% capacity factor) ranged between 5.4-8.2¢ (kWh) for nine supply projects that were winning bids at other utilities (Kahn, Milne, & Kito, 1993). At first glance, the winning supply-side bids at Con Edison offered a more substantial discount from avoided supply costs compared to experience at other utilities (whose bid prices are 10-20% lower than avoided supply costs). However, as mentioned previously, Con Edison's estimates of its LRACs decreased significantly during this period compared to those that appeared in the RFP (which were approved in 1989). Thus, changes in market conditions make it much more difficult to estimate the competitive benefit of these projects.
- Levelized total resource costs[2] for DSM bidders in Con Edison and Niagara Mohawk bidding programs average 5.6 and 5.4 ¢/kWh respectively, which are at the low end of the 5.4 to 8 ¢/kWh range observed in the bidding programs of other utilities (Goldman & Kito, 1994). However, it is difficult to draw definitive conclusions on the costs of DSM bidding programs because of confounding factors and differences in the quality of cost data. Utility payments to winning bidders are determined by a number of factors including: (1) the allowed ceiling price for DSM bids, (2) the relative cost and mix of DSM options, (3) comprehensiveness of energy services being provided by bidders, and (4) degree to which performance risks and marketing and measurement costs are borne exclusively by ESCOs. For example, Con Edison established ceiling prices for individual DSM measures paid by the utility. For the mix of measures offered by winning bidders, the ceiling prices were about 5 ¢/kWh, which was much lower than the utility's avoided supply costs. In this situation, it is not particularly meaningful to compare DSM bid prices as a percentage of avoided supply costs among the two utilities. Prices of winning DSM bids averaged 77% of Con Edison's ceiling price. In contrast, prices of winning DSM bids averaged 39% of NMPC's ceiling price (which was also the utility's avoided supply cost). Thus, it does appear that NMPC, which received over 30 DSM bids, was able to select projects with lower bid prices (on the basis of percentage of ceiling price) compared to Con Edison, whose DSM bid choices were quite limited. Furthermore, while the DSM bids chosen by the two utilities are comparable on a total resource cost basis, NMPC's performance was superior because their projects targeted higher value market segments.
- A much more detailed and disaggregated analysis would be required to compare the costs of DSM bids to "comparable" utility DSM programs. This type of comparison would provide a lower bound benchmark estimate to use in valuing economic benefits to ratepayers. In some cases, this type of analysis could be problematic. For example, two of NMPC's four winning DSM bids were directed at residential customers, proposing measures (e.g., second refrigerator pick-up) and targeting sec-

2/ Total resource costs include levelized bid prices, estimated customer cost contribution, and utility program administration costs (including measurement and evaluation costs). Bid prices are lower because they exclude the latter two cost components.

Table 3: Cost-Effectiveness of NMPC and Con Edison Bids with Signed Contracts

Bid	MW	Bid Price (¢/kWh)	Estimated Customer Contribution (¢/kWh)	Program Admin Cost (¢/kWh)	Levelized TRC Costs (¢/kWh)	Bid Prices as % of Ceiling Price	Bid Price as % of 1989 LRACs
Con Ed DSM	7.4	4.2	1.0	0.3	5.6	77%	32%
Con Ed Supply	170	6.8	NP	NA	6.8	NA	61%
NMPC DSM	20	3.8	1.4	0.3	5.4	39%	39%

NA = Information not available
NP = Not applicable

tors (i.e., multifamily) that were not part of the utility's current DSM program offerings. Although Con Edison offered similar lighting and motor measures in its commercial rebate program, the two ESCOs are bearing additional performance risk in their contracts. Thus, in comparing the economic benefits to ratepayers of the two program delivery approaches, one must account for differences in risk allocation and assign some monetary value to the risk bearing.

3.4 *Tractable and Perceived to be Fair?*

This last indicator encompasses several process-related issues and is clearly the most subjective. In one sense, reliance on competitive procurement involves a trade-off between the expected economic gains from competition with the costs of managing the potential conflicts associated with this type of process. It is unlikely that utilities will receive many kudos for managing competitive processes in part because a significant market response means that there will be many losing bidders almost by definition. About the best outcome one can expect on process-related issues is that most parties view the utility's bidding process (including the design and implementation of the RFP) to be reasonable and that the utility's evaluation and selection process is perceived as "fair." A poor market response or failure to bid may indicate that a utility's bidding program was not administratively tractable. Some evidence on this subject is available from several utilities that have conducted process evaluations of the DSM portion of their bidding programs (Environmental and Energy Services Co. (ERCE), 1990; Peters, McRae, & Seiden, 1992).[3]

In assessing "fairness," we consider several dimensions, while recognizing that these issues are obviously subjective and open to varying interpretation. First, are there systematic biases in the utility's bidding RFP, particularly its bid evaluation and scoring system, that would favor certain types of resources or providers? Second, are there serious problems in the way that the utility implemented the provisions of the bidding RFP which significantly disadvantaged certain types of resources or providers? In reviewing Con Edison's bidding program, we focused on the utility's RFP, especially its threshold requirements and bid evaluation system, in part because the utility relied exclusively on an objective scoring system. In contrast, NMPC's two-phase bid evaluation process necessarily involved more judgment on the part of utility management. Thus, our analysis focused on the decision criteria and resource choices of NMPC in implementing their bidding scheme because the process was much less transparent.

The design of the Con Edison bidding system discouraged many third-party DSM providers from even participating, based on our surveys of prospective and actual bidders. Con Edison is the only utility to require ESCOs to have signed letters of intent from all potential customers at the time of bid submittal. Moreover, after a contract was signed with the utility, a winning

3/ Formal evaluations that are publicly available are rare for supply-side procurements.

ESCO was not allowed to substitute a project if one of the customers with a letter of intent withdrew. Con Edison insisted that these threshold requirements were necessary to minimize potential project viability problems among third-party DSM providers. Many potential DSM bidders viewed these threshold requirements as onerous and unreasonable; 14 of 23 survey respondents cited them as a principal reason for their decision not to participate in the program.

In contrast, while Niagara Mohawk's bidding RFP elicited an impressive market response from DSM bidders, many DSM bidders were upset by and quite critical of the company's decision criteria used in the second phase of its bid evaluation process (Goldman & Busch, 1993). Based on their overall score in the first phase, virtually all DSM bids were included in NMPC's Initial Award Group and many DSM bidders assumed that they would succeed in the second phase because their bid prices were lower than supply-side projects. However, as part of its detailed evaluation of remaining bids in the second phase, NMPC compared the costs of DSM bids with the costs of utility-sponsored DSM programs from the utility's perspective (i.e., Utility Cost Test). In some cases (e.g., bids for commercial lighting), the utility rejected bids if it concluded that it could deliver the same DSM resources at a lower cost than the bid prices. DSM bidders complained that the utility's RFP and bidding guidelines did not adequately explain bid evaluation criteria to be used in the second phase and that they were not told that their bids would compete with NMPC's other DSM programs. Moreover, bidders complained that the "expected" cost of utility-sponsored programs was not a fair comparison to the "price" of DSM bids, because their prices and quantities were guaranteed whereas the company's costs were estimates not subject to such guarantees. NMPC also rejected all but the least cost ESCO bid in a particular customer or end-use category. The effect of this decision was most pronounced in the heterogenous commercial/industrial sector (C/I) where NMPC received a number of attractive bids from ESCOs that offered comprehensive services and multiple measures to customers but selected only one bid.

Bid evaluation and selection processes are further complicated when utility subsidiaries participate directly as a seller in the parent utility's own auction. A few PUCs (e.g., New Jersey) have deemed the potential threat posed by anticompetitive practices to be so great as to exclude a host utility from participating as a seller in its own bidding program. Other PUCs, like New York, have allowed the utility to propose its preferred resource options but have imposed additional requirements and procedural safeguards (e.g., sealed bids, use of independent third party to rank bids) plus the threat of financial sanctions if unfair or abusive practices are discovered.

In New York, Con Edison did not participate as a seller, while Niagara Mohawk proposed two life extension projects, one of which was selected. NMPC utilized a two-stage bid evaluation process that featured an independent contractor (hired by NMPC) who ranked bids based on an objective self-scoring system in the first phase. NMPC then analyzed the subset of bids passing the first phase screening in more detail in a second stage using modeling and analysis methods established by the utility. NMPC's use of a third-party evaluator in the first phase was not sufficient protection against the appearance of self-dealing. This is particularly true in light of the utility's limited exploration of alternatives in the second phase subjective bid evaluation and concerns about asymmetric and more lenient treatment of refurbishment projects compared to new projects in the first phase environmental scoring (Goldman, Busch, Kahn, Stoft, & Cohen, 1992). The chosen utility plant refurbishment project illustrates the generic issue of the treatment of utility repowering and life extension options in competitive bidding: the difficulty of comparing refurbishments of existing resources with new projects. These issues will probably arise elsewhere in the future. Utility subsidiaries can be expected to play an even more prominent role in competitive bidding programs with the passage of the Energy Policy Act of 1992 and the creation of a new class of independent power producers (i.e., Exempt Wholesale Generators).

4. Lessons for Utilities and Regulators: Balancing Regulation with Competition

4.1 Role of the Regulator in Utility Bidding Programs

PUCs in the US have generally embraced the concept of competitive resource bidding perhaps without fully appreciating the difficulties and intricacies that managing such processes would entail. Regulation and competition do not necessarily mix easily and it is the challenge of the regulator to maintain some equilibrium between them. The potential for self-dealing by the utility poses one of the most significant threats to competitive bidding. In cases where the utility has no interest in bidding or building its own projects, then there is no potential for conflict of interest and the necessity for significant regulatory intervention in the bidding process is weaker. In cases where the utility is antagonistic towards bidding or is keen on remaining a player in the power generation business, then the case for more significant regulatory involvement is more compelling. With such a self-interest at stake, it would be naive to entrust the utility with sole responsibility for defining the rules of the competition. The problem is that regulators are not well situated to define the rules by themselves either. Details of the solicitation matter and the effect of those details on outcomes can be unpredictable (see (Goldman, Busch, Kahn, Baldick, & Milne, 1993; Goldman, et al., 1992).

A spectrum of regulatory involvement in utility bidding programs exists: from a *laissez-faire* approach in which the utility is allowed full discretion in designing and carrying out the solicitation to an interventionist approach in which regulators manage the details of the solicitation. Faced with the challenges described above, state regulators have chosen various approaches that span this spectrum. For example, Virginia and Indiana PUCs have more or less followed the laissez-faire approach. The Wisconsin PUC, in a pilot bidding program of Wisconsin Electric Power's, took the interventionist approach in which regulators assumed the role of bid evaluator, excluding the utility from that function. New York took an intermediate position to these other states by setting policy goals and guidelines for bidding and overseeing auction designs proposed by utilities in response to the guidelines.

4.2 Preferred Resource Approach Could Address Market Power Asymmetries

In cases where the utility wants to remain a player in supplying new resources for its service territory, the regulator faces a trade-off between some form of market share allocation or taking the risk of self-dealing by the utility in the bid evaluation process. One regulatory approach to allocating market share among the players in competitive bidding is the "preferred resource" approach. Integrated resource planning involves the proliferation of alternatives and stakeholders seeking market share. To facilitate the entry of new participants such as QFs, IPPs and ESCOs, the regulator may create a set of rules that will de facto reduce the incremental market share of the regulated firm to zero. Sensing such a threat, the regulated firm then has an incentive to manipulate the implementation of "all-sources" bidding in its own favor. In the extreme, this incentive becomes abusive self-dealing; even in less extreme cases the appearance of self-dealing may be created. We would argue that strategic concerns cannot be eliminated from the planning process, but rather that they must be managed with some sense of the trade-off posed by different market share allocation outcomes (Kahn, 1992a). If the vertically integrated regulated firm were truly felt to be obsolete, then these problems could be controlled by simply barring all further utility investment or participation in all-source bidding. We feel that such a view is unwarranted because there are important co-ordination economies of vertical integration (Baldick & Kahn, 1993; Kahn & Stoft, 1994).

The "preferred resource" approach is one option for overcoming strategic behavior of utilities in the midst of competitive resource procurement. With this approach, given the utility's market power and potential for conflict of interest, the PUC makes an initial determination of resource and supplier mix issues as part of their review of a utility's IRP plan. The effort to determine market share in advance would allow participation of the utility and their resources on a priority basis, reserving the competitive process for residual needs. This would ensure ratepayers benefit from the use of valuable utility resources and could mitigate conflicts of interest when utilities choose DSM bids while simultaneously conducting their own DSM programs. Several decisions in Florida embody this approach implicitly, if not explicitly (Florida Public Service Commission (FPSC), 1990; Florida Public Service Commission (FPSC), 1992).

A key underlying rationale for the "preferred" resource approach is that the utility has some unique opportunity for low cost generation capacity additions such as through life extension or repowering of existing generation resources that would otherwise be retired from service. Of course, life extension and repowering opportunities need not necessarily be developed under traditional utility ownership. An alternative approach to realizing economic value from the aging powerplant asset base would be divestiture to third parties.[4] Taylor and Kahn (1991) suggest that some kind of profit sharing arrangement between ratepayers and shareholders would facilitate the development of a market for divested assets. Absent a profit sharing arrangement, divestiture becomes involved in difficult legal questions concerning which party is the actual residual owner of these assets. Even if profit sharing is agreed to as a policy option, there remains a question of how to allocate shares. The "preferred resource" approach is, in fact, an implicit benefit sharing arrangement. Ratepayers get the benefit of the lower cost generation resource (compared to alternatives), while utility shareholders get the earnings associated with the additional investment. It is difficult to translate this implicit sharing arrangement into an explicit formula. Thus, the "preferred resource" approach bypasses some of the thornier issues raised by third-party development of the life-extension/repowering resource. While this approach may not be the most efficient solution, it avoids some of the more obvious conflicts of interest raised by "all-sources" bidding.

Figure 1 contrasts the "preferred resources" approach to planning and bidding with the integrated planning and auction approach used by these two New York electric utilities. In the latter approach, the utility defines the total resource need through an IRP process; this need can be filled either by independent power producers, ESCOs, or utility-sponsored generation projects, with utility-sponsored DSM effectively operating as a set-aside through the DSM planning process mandated in New York. In contrast, the "preferred resources" approach produces, as one outcome of the IRP plan review process, an initial determination of the DSM and supply-side quantity targets. Among supply-side resource options, the utility's IRP plan would define "preferred resources" that are to be developed by the utility, such as plant life-extension and repowering projects. On the demand-side, the utility would offer a combination of its own programs and ESCO-delivered programs. Residual need would be filled through competitive resource acquisition by some combination of QFs, IPPs, power purchases, and ESCO-provided DSM. Finally, as the provider of last resort, utility new construction would serve as the backstop under traditional rate-of-return treatment.

This administrative approach is admittedly "second-best," but it would then allow the competitive bidding processes among independent power producers to function more efficiently and fairly. Such a process would certainly be contentious, and would require a judicious balancing of competing objectives. Implementation would require an active role for the PUC so that no external participants dominate the process. There are clearly risks to allocating market share through a preferred resources approach. The main one is that the administrative process becomes excessive, and indistinguishable from micro-management by the regulator. Barring such unfortunate outcomes, these more structured and targeted competitive processes would

4/ A market for divested assets would be strongly dependent on the buyers' views of the likely power prices for refurbished facilities. A utility upon which divestiture was forced, might try to bias downward the perception of such prices. Therefore, an incentive scheme may be needed to make a market in divested assets work properly.

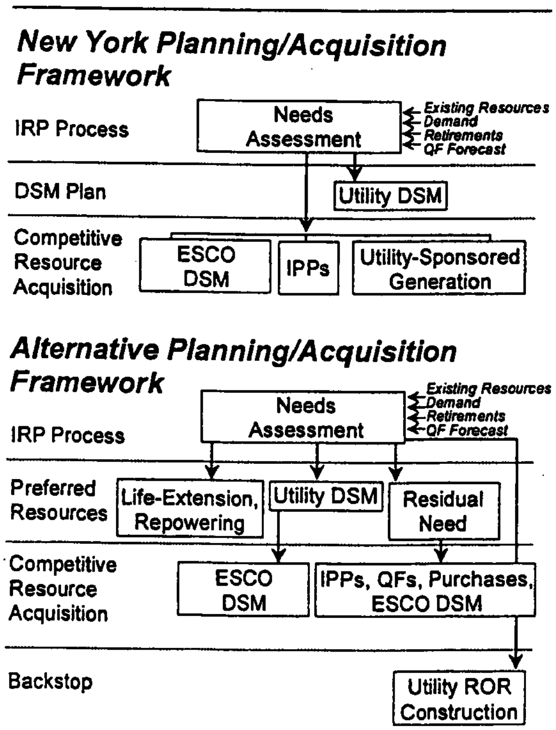

Figure 1: Alternative Models for the Relationship Between Planning and Competition

provide useful feedback and information on the costs, risks, and reliability of various resource options to the utility and its regulators. This would preserve the "yardstick" function of competition in a regulated industry, as well as a potential "second-sourcing" capability in the event of poor utility performance.

4.3 Optimal DSM Procurement May Require a Different Approach

SEPARATE SOLICITATIONS FOR SUPPLY AND DSM

There are several key differences between DSM and supply resources in terms of market structure, inherent characteristics, and level of development which are germane to bidding. First, the market for energy efficiency is ultimately a retail market, while the competition for private power contracts is a wholesale market. Second, on the supply-side, there is a well-developed infrastructure of private power developers, whereas the energy services industry is relatively immature (although growing rapidly). Third, provision of "saved energy" typically involves a complex relationship among customers, the ESCO, and utility, while supply-side power providers have a more straight-forward relationship with the utility only. Fourth, the output of demand-side resources can never be measured with the same degree of certainty as supply-side resources.

These differences between supply-side and DSM resources argue for procurement processes that are specifically tailored to evaluate the attributes and distinctive features of each resource. In practice, this can be accomplished most easily by designing separate procurement processes for DSM and supply-side resources with distinctive scoring systems.

CONSIDER PARTNERSHIPS OVER ARMS-LENGTH RELATIONSHIPS

Utilities have traditionally contracted out some elements of their DSM programs by soliciting bids to private sector firms using conventional competitive procurement processes. As currently structured, most DSM bidding programs stretch the boundaries of third-party involvement from procuring "energy services" to provision of "saved energy" through long-term contracts. In deciding how to structure demand-side procurement processes, the role(s) of ESCOs need to be more clearly linked to policy goals, which are then reflected in program design. Policy and program objectives often mentioned by proponents of DSM bidding (and sometimes embraced by regulators) include:

- experiment with alternative delivery mechanisms compared to conventional utility-run DSM;
- promote the development of an "infant" energy services industry;
- encourage performance-based DSM programs in which DSM savings are guaranteed and maintained over the long-term;
- provide a competitive benchmark to help assess utility DSM performance in terms of program cost, cost-effectiveness, and development of DSM market potential.

"Replacement" or "partnership" bidding represent alternative conceptual approaches, which help link policy choices regarding the role of ESCOs to the four overall program objectives listed previously. For example, in an "all-sources" integrated supply and demand solicitation, the underlying premise is that independent power producers, resources offered by other utilities, and DSM bidders compete to displace some or all of a planned utility supply-side project. Similarly, in a demand-side only "replacement" bid, DSM bidders are given an opportunity to compete against and possibly replace a planned utility DSM program or set of programs. In this approach, a primary objective is to have ESCOs provide a "price check" on the utility's estimated or actual DSM program costs.

In contrast, in a DSM "partnership" bidding approach, there is an explicit recognition that utility and ESCO activities are complementary and that a high degree of coordination is required between the two entities during program implementation. Utilities and ESCOs agree to work cooperatively to develop the DSM resource and the ESCO, in effect, acts as an agent of the utility in its DSM programs. In this approach, the principal aspect of competition is among ESCOs during the selection phase. The utility is particularly interested in proposals that augment or enhance its existing DSM activities, including provision of saved energy or comprehensive delivery of energy services under performance contracting arrangements. Partnership bidding programs are more likely to emphasize qualifications, experience, performance guarantees for savings, customer relations, comprehensiveness and value of services rather than heavy emphasis on bid price (i.e., the first and third objectives).

In most situations, we believe that partnership bidding types of programs are the preferred approach for procuring DSM resources given the difficulties of structuring effective competitions among ESCOs and utilities and the relative immaturity of the ESCO industry. It is still unclear if the most effective way to utilize ESCO capabilities is to have them offer "saved energy," or bid costs for specified services with selection based primarily on qualifications and price. Much more experimentation is needed to determine the appropriate level of ESCO involvement and which types of program designs are best to make use of their capabilities. Initial experience with DSM bidding suggests that the utility will continue to play the key role in developing certain types of DSM programs where the utility is uniquely positioned (e.g., direct load control or informational programs). However, the viability of ESCO/utility partnership arrangements also hinges on the utility's ability to satisfactorily resolve potentially thorny "market share" conflicts at the planning and/or implementation stages. State regulators have significant responsibilities in this area, and, at a minimum, must ensure that utility management does not have a financial incentive to pursue utility-sponsored DSM programs at the expense of third-party delivered DSM programs. Ultimately, roles for ESCOs will be shaped by the utility's strategic vision of their longer-term objectives, the capabilities of utilities to effectively deliver DSM resources, and regulatory preferences regarding the utility's role and degree of involvement on the customer side of the meter.

5. Conclusion

In terms of our four indicators of "success," the results from these two pilot bidding programs in New York must be viewed as mixed. Bid prices for winning projects compare favorably to each utility's alternative supply options as well as to prices obtained by other utilities in their competitive bidding solicitations. Overall, these bidding programs are likely to produce economic benefits to ratepayers, particularly if the projects under development for Con Edison ultimately come to fruition. However, in terms of project viability, the amount of capacity that successfully develops will be significantly less than Niagara Mohawk's resource need as originally solicited. In the long run, although Niagara Mohawk's cancellation decisions were appropriate given altered expectations in their need for new resources, high failure rates are undesirable because they undermine confidence in bidding among private developers. In terms of fairness, Con Edison's threshold and eligibility requirements for DSM bidders and Niagara Mohawk's handling of its life extension/refurbishment project and ESCO bids in the commercial/industrial sector were particularly controversial. NMPC's decision to select only one ESCO that offered multiple measures in the C/I sector was unfortunate, given the company's lack of experience in designing and implementing "comprehensive" programs directed at C/I customers. Ultimately, the NYPSC has to share some responsibility for confusion on this issue because it provided insufficient policy guidance to the utilities who were left to grapple with potential conflicts between PSC-mandated core programs and DSM bidders' proposals.

Competitive mechanisms for electricity resource procurement pose new problems for regulators. Several broad themes emerge from these case studies of two bidding programs in New York. First, the details of the RFP, bid evaluation and contracting processes matter. They determine the ultimate success of the program in producing benefits to ratepayers. Second, an important reason that regulators have to pay attention to the details is that market share conflicts pose significant problems on both the supply and demand-side. Third, supply-side and demand-side markets differ so markedly that integrated supply and DSM procurements may be more trouble than they are worth. Separate RFPs or procurement processes for supply- and DSM resources are administratively more simple and increase the chances that utility ratepayers will truly benefit from competitive processes, particularly for demand-side resources.

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