

Lessons Learned from NMPC's Subscription Service Program for Large Industrial Customers

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Niagara Mohawk Power Corporation's (NMPC's) Subscription Service Program, now in its third year, offers large commercial and industrial (C&I) customers a choice: continue their eligibility to participate in NMPC's demand-side management (DSM) programs and pay "DSM surcharges" in their rates or participate in the Subscription Service Program to opt out of NMPC's DSM programs and hence avoid paying the "DSM surcharges". The Subscription Service Program is an attempt to respond to large C&I customers' concerns about the rate impacts of utility-sponsored DSM programs and to competitive pressures facing utilities.

NMPC selected Research Triangle Institute (RTI) to perform an impact evaluation of the Subscription Service Program. RTI is also conducting a study for NMPC and New York State Energy Research and Development (NYSERDA) to estimate the technical, economic, and market potential of energy savings for the customers who participated in the Subscription Service Program. In this paper we present the interim results and findings from these studies and lessons learned from NMPC's 3-year experience in the Subscription Service Program.

Background of the Program

NMPC initiated the Subscription Service Program as a 3-year pilot program in 1993. The program was offered to all large C&I customers on time-differentiated electric rates. These customers had to decide whether to participate in NMPC's Subscription Service Program by April 15, 1993. Each customer's decision was retroactive to January 1, 1993, and is effective through December 31, 1995. Customers who did not participate in the Subscription Service Program and remain eligible for DSM programs are referred to as Option A customers; customers who chose to participate in the program and opt out of the DSM programs are referred to as Option B customers.

Option B customers do not have to pay NMPC's DSM Investment Recovery Adjustment Mechanism (DIRAM) charges, the portion of NMPC's DSM program costs currently associated with DSM financial incentives. But they are still required to pay DSM information program and administrative costs and net lost revenues related to NMPC's DSM programs as part of their base rates.

Option B customers were required to conduct energy audits within 6 months of their decision to participate and provide them to NMPC. Energy audits had to follow NMPC's audit specifications and provide a priority list of electric energy conservation measures (ECMs) and estimates of their energy savings potential. Option B customers must report their progress in implementing energy audit recommendations to NMPC at the end of each calendar year.

Option B customers are ineligible to receive any rebates offered by NMPC's DSM programs. They were also required to repay all the rebates they received through NMPC's DSM programs since September 1, 1992. However, customers who chose Option B had the flexibility to move back to Option A at any time during the subscription period, provided they give 15 days notice and pay the accrued DIRAM charges.

As of early fall 1993, a total of 291 large general services customers had been offered the opportunity to participate in the Subscription Service Program. Of these, 42 percent, or 121 customers, chose Option B; 58 percent, or 170 customers, chose Option A to remain eligible for DSM rebate programs. Since then four Option B customers were dropped from the program because of a change in their rate class or inactive status of their NMPC accounts. Currently the program has 117 active participants.

All Option B customers submitted energy audits, as required by the Subscription Service Program. An NMPC contractor conducted a preliminary review of the audits to verify their conformity with NMPC's audit specifications prepared specifically for the Subscription Service Program participants. Most of the audits were returned to customers for clarification and minor corrections and subsequently resubmitted.

In addition to the energy audit data provided by Option B customers, all Option B and a sample of Option A customers provided NMPC with a wealth of energy-usage information from the energy audits and their responses to an Industrial Market End-Use Survey (IMEUS). Audit data and their responses to IMEUS provided information on electricity uses, practices, and conservation opportunities for the following electric end uses: lighting, motors and drives, heating and air conditioning, air compression, and process uses.

The results of our study reported in this paper are based on the energy audit and IMEUS data for these 117 Option B customers and IMEUS data for 41 Option A customers. In addition to these data, RTI used several other data sources. Table 1 summarizes the data sources.

Table 1. Data Sources for Impact Evaluation

Data Source	Data Size	Data Collection Period
Energy audits	117 Option B	1992 — 1993
IMEUS	41 Option A 117 Option B	1993
RTI Option B site visits	28 Option B	1994
NMPC Option B survey	61 Option B	1995
RTI Option A telephone survey	40 Option A	1995
HBRS Option A telephone survey	69 Option A	1995
RTI on-site survey (EPRI/NMPC tailored collaboration)	34 Option A 65 Option B	1993

Characteristics of Participants and Nonparticipants

The primary difference between Option A and Option B customers is the concentration of large industrial facilities. Most of the Option B customers (81 percent) are large industrial customers while 60 percent of the Option A customers are manufacturing facilities. The remaining Option A customers have nonmanufacturing facilities such as government offices, colleges, hospitals, and retail stores. Table 2 presents a breakdown of Option A and B customers by business type.

Table 2. Breakdown of Option A and Option B Customers by Business Type

Business Type	Option A	Option B
Chemical, Rubber, and Plastics	14%	15%
Food and Kindred Products	5%	15%
Paper and Allied Products	10%	15%
Primary and Fabricated Metal Products	10%	17%
Machinery and Electronic/Electric Equipment	11%	9%
Other Manufacturing	11%	10%
Education	10%	2%
Health	6%	4%
Government	3%	0%
Other Commercial	20%	13%
Total	100%	100%

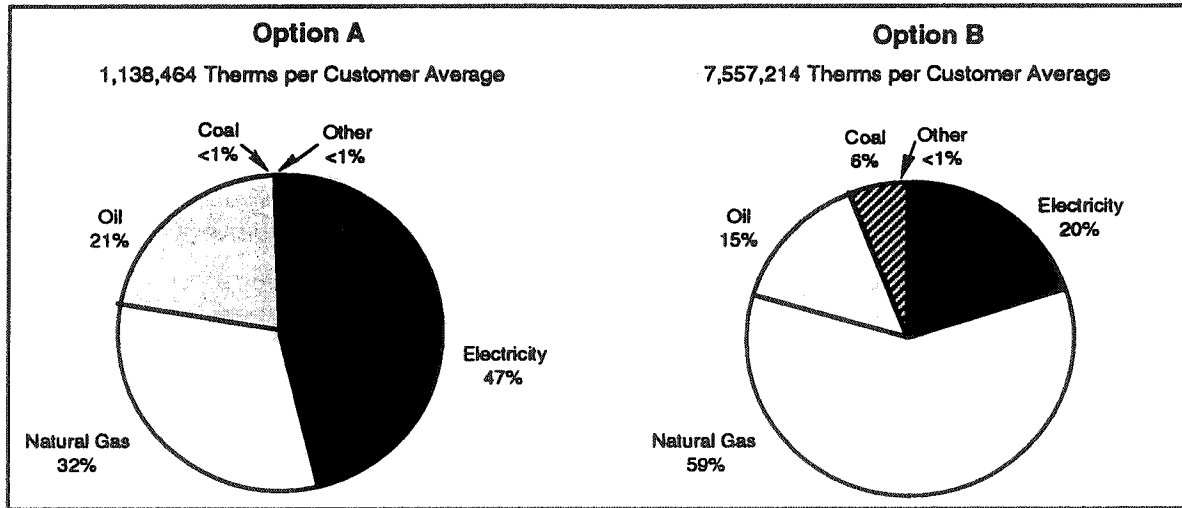
Most Option B customers are corporations whereas almost half of Option A customers are federal/state/local governments.

Option B customers are larger than Option A customers on average. The annual average use of electricity by Option B customers is 52 GWh as compared with 29 GWh for Option A customers (not including one Option A customer who is extremely large, having an annual electricity use of almost 2,000 GWh).

Less than 20 percent of program participants are “small” customers (annual energy consumption less than 10 GWh), whereas almost half of program nonparticipants are “small” customers. Approximately 25 percent of Option B customers are “large” (annual energy consumption greater than 50 GWh) while 11 percent of Option A customers are “large.” Approximately a quarter of Option B customers and a similar fraction of Option A customers purchase some of their electricity from New York Power Authority.

Figure 1 shows the breakdown of energy use by fuel type. Electricity as an energy source is less important for Option B customers than for Option A customers on average: 20 percent of Option B customers’ energy use comes from electricity, compared to 47 percent for Option A customers.

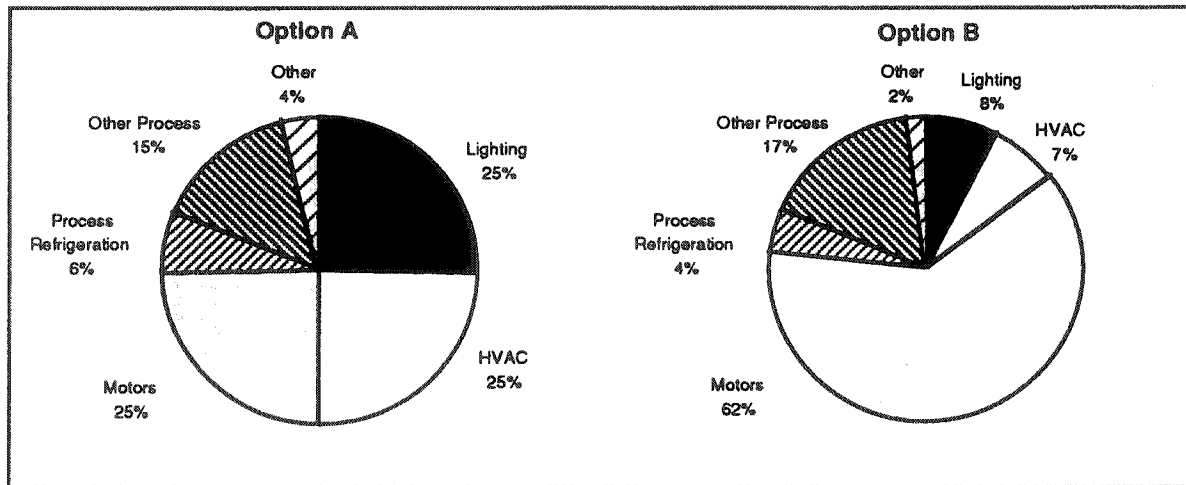
Figure 1. Breakdown of Energy Use by Fuel Type



Source: IMEUS data (data are available for 95 percent of Option A customers and 84 percent of Option B customers).

Figure 2 shows electricity usage by end use for Option A and B customers. Option B customers use electricity mostly for motors, 62 percent of total electricity usage, while the shares of electricity use for HVAC and lighting are small, 7 percent and 8 percent, respectively. Option A customers' electricity use is split almost evenly among motors, HVAC, lighting, and other uses combined.

Figure 2. Breakdown of Energy Use by End Use



Reasons for Participating or Not Participating

To participate in the program, customers must repay any DSM rebates they received from NMPC since September 1992. This requirement may have influenced some customers against participation. Approximately one-half of Option A customers received DSM rebates during the period, and some of these customers may have chosen not to participate in the program because of the rebate repayment requirement. Still many customers participated in the program despite this requirement. Approximately one-third of Option B customers received DSM rebates during the same period, and these customers may have found it more advantageous to repay the rebates and avoid the DSM surcharges.

One would anticipate that customers with definite plans to install ECMs that are eligible for NMPC's rebates would be less likely to choose Option B than those who have no plans. However, many customers with "rebate-eligible" ECMs chose Option B. Although Option A customers are more likely to have plans for rebate-eligible ECMs than Option B customers (75 percent vs 50 percent), a large number of Option B customers had plans for "rebate-eligible" ECMs.

Option B customers are more likely to install "rebate-ineligible" ECMs than Option A customers. Approximately 20 percent of Option B customers had plans for only "rebate-ineligible" ECMs while 5 percent of Option A customers had such plans. Although NMPC's DSM programs were designed to cover a broad spectrum of ECMs, including custom measures programs covering process equipment and electrotechnologies, most NMPC rebates are prescriptive, covering only conventional ECM technologies such as lighting, motors, drives, and HVAC measures. Thus, some customers with large process loads may have felt that NMPC's DSM programs are not designed to meet their ECM needs.

During an RTI survey, many Option B customers indicated that they opted out of the DSM programs because utilities' DSM programs tend to cross-subsidize certain customer classes at the expense of others, e.g., industrial customers tend to cross-subsidize commercial customers. These customers felt that DIRAM charges were unfair because of the subsidy effect. Many Option B customers thought that DIRAM charges were too high and they would not see future opportunities to receive large enough benefits to justify the charges.

Some customers opted out of the DSM programs because they believe utilities' DSM programs are not very cost-effective. They argued that DSM program administration costs were too high compared with rebates paid to the customers. They believed that they could implement ECMs more cost-effectively by themselves rather than under the utilities' DSM programs. During a survey conducted by RTI, approximately 70 percent of Option B customers indicated that their plans for implementing ECMs would not change as a result of choosing Option B. This survey was conducted while customers were preparing their audit reports so this survey result does not reflect the effects of audits on their implementation plans.

Many Option A customers did not participate in the program because of the costs for energy audits, and many Option A customers received NMPC rebates since September 1992. For these customers, repaying NMPC rebates and costs for energy audits was too burdensome, so they decided to choose Option A. Some of the Option A customers were even unaware of the DIRAM charges they had been paying in their rates until they were offered the Subscription Service Program.

Approximately three-quarters of Option A customers had plans for ECMs that were eligible for NMPC rebate payments. These customers chose Option A probably because they foresaw

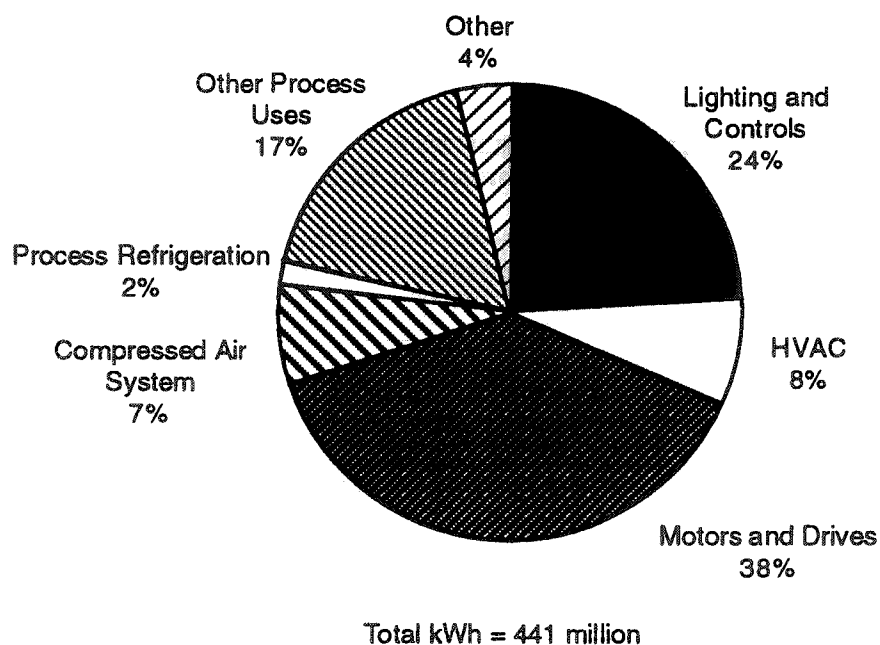
opportunities to recover a part of, or more than, DIRAM charges through rebates and technical assistance from NMPC.

ECM Potential Savings for Participants

In the energy audits, a total of 957 ECMs (not including cogeneration and fuel switching measures) were identified as technically feasible options, and their energy savings potential and costs were estimated.

Total potential savings from these ECMs, referred to as the technical potential in this paper, amount to 441 GWh, or 7.2 percent of total GWh use of Option B customers (6,101 GWh per year). Almost 40 percent of these potential savings are from ECMs related to motors and drives, including motors and drives of process equipment. Lighting ECMs account for approximately one-quarter of the technical potential, and HVAC and air-compression ECMs account for 15 percent. These three categories of ECMs combined account for slightly more than three-quarters of the technical potential. Process ECMs account for only 19 percent. Figure 3 shows the breakdown of technical potential by measure type.

Figure 3. Breakdown of Technical Potential by Measure Type



Potential GWh savings are highest in three sectors: the primary and fabricated metals sector, chemical/rubber/plastic sector, and paper and allied product sector. These three sectors combined account for 55 percent of the technical potential. Table 3 shows the breakdown of the technical potential by business type.

Table 3. Breakdown of Technical Potential by Business Type

Business Type	Potential GWh Savings	Percentage of Annual GWh Use
Chemical/Rubber/Plastic	83.8	4.4
Food and Kindred Plastic	48.5	9.1
Paper and Allied Products	66.2	6.3
Primary and Fabricated Metals	92.6	8.7
Stone/Glass/Clay Manufacture	30.9	6.2
Electronic and Electrical Equipment	22.1	15.6
Electric/Gas/Sanitary	35.3	23.4
Social Services/Commercial Properties	13.2	7.5
Other	48.5	9.3
Total	441	7.2

ECMs Implemented by Program Participants

According to a survey NMPC conducted for 61 Option B customers in early 1995, these customers have completed or partially completed 133 ECMs, or 28 percent of the 477 ECMs listed in their audits. If the 57 Option B customers who did not respond to NMPC's survey were assumed to have completed ECMs at the same rate as those surveyed, approximately 270 ECMs would have been completed or partially completed by all Option B customers. This represents 57 GWh of annual energy savings, or 13 percent of the technical potential, or 0.9 percent of total annual GWh usage by Option B customers. Figure 4 illustrates the breakdown of annual energy savings by measure type. Energy savings from motors/drives ECMs are estimated to be the highest, accounting for 25 percent of total energy savings from all completed ECMs (called "accomplished" energy savings in this paper). Energy savings from lighting ECMs are almost as high as energy savings from motors/drives ECMs. Combined together, motors/drives and lighting ECMs account for almost one-half of accomplished energy savings.

Table 4 shows the breakdown of accomplished energy savings by business type. Three sectors completed very high percentages of their technical potential: the food and kindred product sector (19 percent), the stone/glass/clay sector (17 percent), and electric/gas/sanitary sector (16 percent). In particular, the electric/gas/sanitary sector saved 4 percent of its total annual electricity use by implementing ECMs recommended in the energy audits.

Figure 4. Breakdown of Energy Savings from Completed ECMs by Measure Type

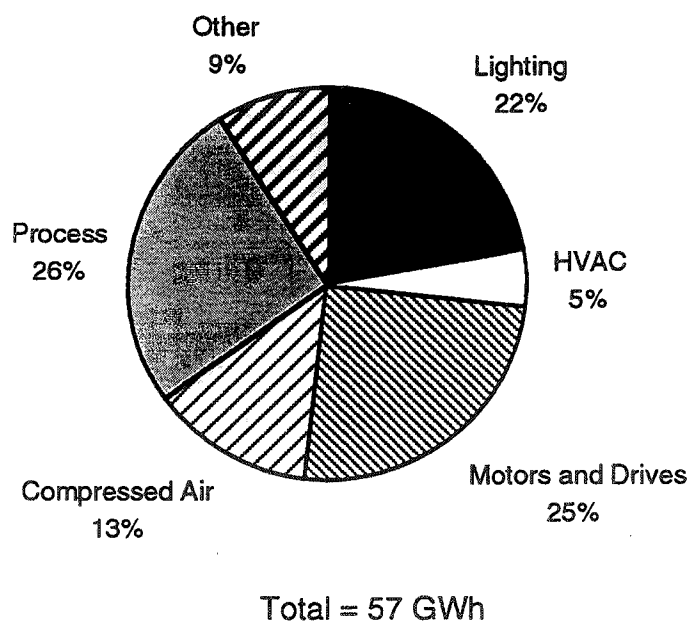


Table 4. Breakdown of Accomplished Energy Savings by Business Type

Business Type	Accomplished GWh Savings	Percentage of Technical Potential	Percentage of Total GWh Use
Chemical/Rubber/Plastic	10.4	12.4	0.5
Food and Kindred Plastic	9.4	19.4	1.8
Paper and Allied Products	7.1	10.7	0.7
Primary and Fabricated Metals	9.5	10.3	0.9
Stone/Glass/Clay Manufacture	5.3	17.2	1.1
Electronic and Electrical Equipment	2.4	10.9	1.7
Electric/Gas/Sanitary	5.7	16.2	3.8
Social Services/Commercial Properties	1.5	11.3	0.9
Other	5.3	10.9	1.0
Total	56.6	12.8	0.9

Almost one-half of the accomplished energy savings are from ECMs with paybacks shorter than 2 years. Most of the completed ECMs have payback periods shorter than 5 years, accounting for slightly more than 80 percent of accomplished energy savings.

Market Barriers to Implementing ECMs

According to customers' implementation plans for ECMs, which Option B customers compiled within several months after they submitted the energy audits to NMPC, Option B customers indicated that they would not implement 65 percent of the 957 ECMs listed in their energy audits. The highest nonimplementation rate is among HVAC measures. Almost 90 percent of all ECMs related to HVAC were unlikely to be implemented by Option B customers. Approximately 60 percent of lighting measures in the audits will not be implemented. Motors/drives ECM projects are least likely to be shelved. Option B customers indicated they would not implement 55 percent of all motors/drives ECMs listed in the audits. Figure 5 shows the fraction of ECMs by measure type that would not be implemented according to the implementation plan the customers formulated soon after they saw the audit results.

Figure 5. ECMs Not to be Implemented

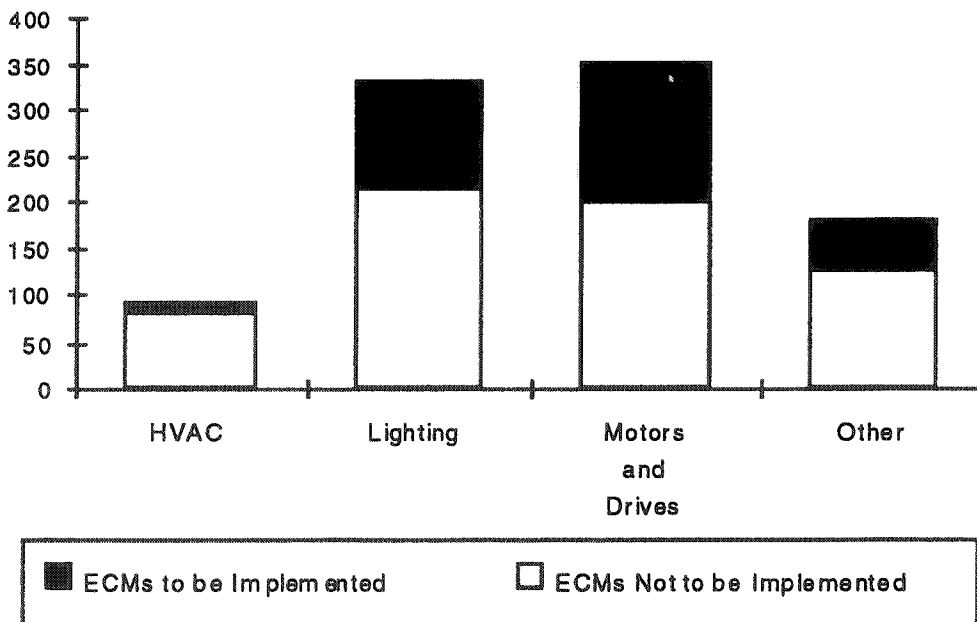


Table 5 summarizes the reasons cited by Option B customers for not implementing ECMs listed in the energy audits. The most frequently cited reason is either poor payback or an unavailability of capital. More than half of the ECMs will not be implemented because of economic reasons. With NMPC's rebate programs, customers may find some of these ECMs economically attractive. Other ECMs were not implemented because they were technically infeasible (12 percent), business future is uncertain (11 percent), alternative actions were taken (6 percent), or other reasons (15 percent).

Table 5. Reasons for Not Implementing ECMs

Reason	Percentage of ECMs Customers Do Not Plan to Implement
Poor Payback	31
Unavailability of Capital	25
Potential Problems in Technical Compatibility/Not Technically Feasible	12
Uncertain Business Future	11
Alternative Action Taken	6
Low Priority, as Needed Basis	5
Unavailability of Manpower	3
Combinations of Above	7

Note: The information on reasons for not implementing is available for 156 ECMs from the survey conducted by NMPC. The percentage is based on these ECMs.

Lessons Learned for Administering the Program

Several lessons have been learned in the initial phase of this pioneering program. Three areas are defined, and aspects within those three areas are further identified. Administrative issues that came to light can best be categorized as relating to the audit process, administration and communication, and reporting and tracking.

Both the audit requirements and the audit review process could be improved. First, delivery of the audit requirements and specifications was incomplete. Information and training sessions were offered to the customers, but attendance by the actual energy auditor was not assured. Recommendations to address this problem in future offerings include providing potential program participants with a sample audit that does have acceptable levels of detail, identifying common problems in prior audits, and providing some training sessions for the auditors. Regarding the audit review process, timeliness and consistency are issues that should be addressed. Timeliness is an issue for both returns of completed audits from the customers and for the turnaround of audits by the Company's reviewers, while consistency applies both to the personnel involved in the program and to the quality of the audit review process. At Niagara Mohawk, it seemed at times that too many people were involved in the process. The customers, the audit reviewers, and the Company staff could all benefit if the responsibilities were clearly identified and the personnel involved were prepared for their tasks and given the resources to do their tasks. Consistency is also needed in evaluating the audits.

General administrative and communication issues are similar to those mentioned above. Timing of the program's phases needs to be clearly planned and followed. The tasks and roles of the personnel involved in the program should be clear. During periods of high turnover (as Niagara Mohawk experienced), management of individual customer's accounts and logistical support at the corporate level both become inconsistent. A consistent program message is needed, and the program design should be flexible and responsive to turnover of account managers, recognizing both the training needed to effectively promote and manage the program and the relative priority of the program within the account managers' full set of responsibilities. Furthermore, a stable

presence is needed at the corporate level. As the program runs through different phases and/or as personnel change, it is very important to have someone at the corporate level whose job is devoted to overseeing the administrative and communication functions. Finally, the program needs some oversight from upper management. Without a “champion” to ensure that priorities and resources are properly allocated, an endeavor of this scale is likely to suffer.

The third area of concern is tracking actions taken by customers. In Niagara Mohawk’s case, the Subscription Service Program is not an alternative to DSM but an alternative vehicle for delivering DSM. Tracking the customers’ actions and developing reliable estimates of their energy-efficiency gains is a fundamental part of the program. The ability to do so requires a proactive presence by the account managers, responsible and reasonable evaluation planning, and a contract agreement with the customers that ensures they will provide timely and accurate data.