

The Impact of Energy Efficiency Technical Assistance

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ABSTRACT

The New York State Energy Research and Development Authority (NYSERDA) offers cost-shared technical assistance to the commercial, industrial, institutional and governmental sectors. Studies funded through this program can evaluate: energy efficiency improvements, process and productivity improvements, energy operational procedures, commissioning, rate analysis, load shapes, and aggregation opportunities.

In this paper, we present the results of three surveys, sub-sampling customers who received technical assistance studies through the program between 1992 and 2000. These surveys indicate that 66% of the 216 customers surveyed implemented a portion of the Energy Conservation/Energy Efficiency Measure (ECM) recommendations. In addition, every dollar spent through NYSEERDA's technical assistance program leverages \$18 of investment by customers on energy efficiency improvements and customers realize \$5 in annual energy savings.

Environmental emissions benefits were also evaluated. Results show that for every dollar spent by NYSEERDA on technical assistance, 0.01, 0.2, and 71 pounds of SO_x, NO_x and CO₂ emissions respectively, were eliminated. Benefits by sector and fuel type are also presented.

Introduction/Methods

NYSERDA's primary goal in cost-sharing technical assistance studies is to increase productivity and economic competitiveness of New York State by identifying and encouraging implementation of cost-effective ECMs. These studies are undertaken through two separate programs, FlexTech and the Technical Assistance Program.

Through the FlexTech Program, NYSEERDA contracts with highly qualified consulting firms to provide a variety of technical assistance services, which are custom-tailored to meet customer needs. The Technical Assistance Program allows Customers to choose their own service provider. Both programs contribute up to 50% of study costs.

In an effort to accurately evaluate the cost effectiveness of NYSEERDA's technical assistance programs, including both FlexTech and the Technical Assistance Program, a telephone survey of customers was developed. Initially customers with study completion dates 18 to 24 months prior to the survey are selected. It is NYSEERDA's experience that this allows the customer an appropriate amount of time to evaluate the recommendation; make a determination on what action to take and implement chosen recommendations, if any. Further, this window of time is sufficient to provide a viable sample size

The following is a description of the survey process. From completed study files, project specific information was pre-filled into a survey-form. Over a period of about two

weeks, a customer was called a maximum of two times. Customers that did not respond to two phone messages were deemed unresponsive and eliminated from the survey sample. Customers who were reached were asked a series of customized questions regarding study results such as the implementation and financing of ECMs, and customer satisfaction. A database was established to record, tabulate and report on the findings of the completed surveys. Weekly meetings of the survey team were held during the course of the survey period to fine tune the survey process, ensure quality control and review survey metrics.

Results

A total of 216 customers that received studies through the FlexTech and Technical Assistance Programs between 1992 and 2000 were surveyed. Of the 216 customers, 144 (66%) implemented recommendations. These recommendations incorporated improvements to a variety of systems that included: lighting, HVAC, controls, building envelope, domestic hot water, industrial improvements, generation and various custom measures. The 144 customers can be divided in to three general sectors: Institutional, Industrial and Other. The results presented in Table 1 show a breakout of the implemented projects by sector.

**Table 1. Energy Efficiency Recommendations Implemented by Sector
1992-2000**

Sector	Number of Customers	Energy Savings (mmBTU/year)	Monetary Savings (\$)	Capital Spent (\$)	Overall Payback (Years)
<i>Industrial</i>	47	850,000	5,000,000	12,700,000	2.5
<i>Institutional</i>	71	260,000	2,800,000	14,300,000	5.1
<i>Other</i>	26	170,000	2,000,000	7,300,000	3.7
TOTALS	144	1,300,000	9,800,000	34,000,000	3.5

The institutional sector, which included: K-12 schools, colleges, local and state government accounted for 49% of the total number customers surveyed who implemented recommendations. The industrial sector included a vast array of manufacturing and agricultural businesses and accounted for 33%. The remaining customers, accounting for 18%, included retail businesses, multi-family buildings and commercial business ranging from restaurants to an indoor golf facility.

As shown in Table 1, recommended ECMs implemented in the industrial sector had an overall payback of 2.5 years, compared to 5.1 years for the institutional sector. This illustrates that, for this sample set, institutional customers are willing to accept ECMs with longer paybacks. Among the many potential reasons for this difference are: institutional customers are generally more stable and less market driven than the industrial customers and industrial energy efficiency projects compete with investments in production capacity for capital funding.

Table 2 presents a summary of the impact of NYSERDA's technical assistance programs from 1992-2000 broken out by survey period. Of the 216 customers surveyed, 66% implemented ECM recommendations. This rate has not varied significantly between

1992 and 2000 illustrated by a 5% (range: 64%-69%). The dollars leveraged and the dollars saved per dollar spent by NYSERDA varied over time somewhat more than the percentage of firms implementing recommendations (see Table 2). There are many potential factors influencing variability in the survey results, both internal and external to the survey. One internal issue may be that the sample size of the implemented projects in each individual survey period (67, 34 and 53 respectively) was relatively small. However, there are many external factors that influence the survey results over time such as: changing energy costs, variations in the state's economy, and the availability of capital incentive funds during the different periods when the projects were being implemented.

As a whole NYSERDA's technical assistance programs achieved an excellent rate of return on investment for New York State. Over the last eight years, every dollar spent by technical assistance leveraged an \$18 investment by customers on energy efficiency improvements.¹ These investments in turn stimulate the state's economy. Every dollar spent by technical assistance leveraged \$5 of energy savings by customers. These energy savings improve the economic viability of New York's businesses and institutions and reduces New York's dependency on energy imports.

Table 2. Eight-Year Implementation Metrics

	1992-1994 Survey	1996-1998 Survey	1999-2000 Survey		Summary 1992-2000
Projects Implemented to Number Surveyed	67 of 101	34 of 53	43 of 62		144 of 216
% Implementation	66%	64%	69%		66%
\$ Leveraged/\$ TA	17	14	23		18
\$ Saved/\$ TA	5	4	7		5
lbs NO _x /\$ TA	0.1	0.1	0.1		0.1
lbs SO ₂ /\$ TA	0.2	0.2	0.1		0.2
lbs CO ₂ /\$ TA	67	74	71		71

In addition, emission reductions were tracked for these implemented projects for 1992-2000. Every \$1 spent by Technical Assistance provided reductions of the following: .01 lbs NO_x, 0.2 lbs SO_x, and 71 lbs CO₂ (EPA 1995).

NYSERDA also tracked the energy savings and related environmental benefits associated with the implemented measures by fuel type. Table 3 shows the impact that the implemented recommendations from studies completed between 1992 and 2000 have on Energy, Economics and Emissions. A significant reduction is demonstrated for NO_x, SO_x, and CO₂ based on the implementation that these 144 surveyed customers have undertaken. The annual electricity savings of 51,000 MWh has the potential to power approximately 8,500 homes for a year while the 54,000 tons of CO₂ reductions is the equivalent of removing 10,800 automobiles from the road annually (Michael 2003).

¹ NYSERDA's technical assistance expenditure referred to in this paper is NYSERDA's share of all co-funded studies, both implemented and non-implemented, but does not include NYSERDA's administrative costs.

Table 3. Annual Energy, Economic and Emissions Impacts for Implemented Measures representing the survey period between 1992-2000

Fuel Type	Energy Savings (MWh, mmBTU)	NO _x Reductions (tons)	SO _x Reductions (tons)	CO ₂ Reductions (tons)
<i>Electric</i>	51,000 MWh	33	77	22,000
<i>Natural Gas</i>	540,000 mmBTU	27	0	32,000
TOTALS	N/A	60 tons	77 tons	54,000 tons

Conclusion

NYSERDA cost-shares technical assistance studies to increase productivity and economic competitiveness of New York State by identifying and encouraging implementation of cost-effective ECMs. In an effort to improve its services, NYSERDA performs periodic evaluations of its technical assistance programs. The results of these evaluations show that technical assistance achieves an excellent rate of return on investment for New York State.

Over the past eight years, the impact of NYSERDA's technical assistance investment has been relatively constant. In aggregate, every dollar spent by technical assistance leverages an \$18 investment by customers on energy efficiency improvements. These investments in turn stimulate the state's economy. Every dollar spent by technical assistance leverages \$5 of energy savings by customers. These energy savings improve the economic viability of New York's businesses and institutions and reduces New York's dependency on energy imports.

NYSERDA currently spends approximately \$5 Million per year on technical assistance studies. Based on the results of this evaluation, NYSERDA's annual technical assistance investment of \$5 Million has the potential to result in \$90 million in energy-related capital improvements and \$25 million per year in energy savings. In addition, emission reductions of 250 tons of NO_x, 500 tons of SO_x and 180,000 tons of CO₂ are expected annually.

References

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