

Capturing Savings in the Industrial Sector: NYSERDA's Approach to Industrial and Process Efficiency

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ABSTRACT

Across the country, energy efficiency programs are facing substantially increasing goals for MWh and Btu reductions. This holds true in New York and with increased goals come increased challenges for program administrators to achieve greater penetration in targeted sectors. One area of opportunity is the industrial sector, specifically with process and production efficiency enhancements. Enormous potential exists, but capturing programmatic savings is difficult as process projects can be complex, require considerable capital, have long approval and implementation cycles, and often involve internally guarded information. The New York State Energy Research & Development Authority (NYSERDA) has implemented an aggressive Focus on Industry and Process Outreach approach for the industrial sector (including data centers) in order to increase program participation in NYSERDA's targeted Industrial & Process Efficiency (IPE) program. The IPE program services existing and new facility projects and incentivizes improvements including O&M measures, productivity improvements (Lean, 6 Sigma), and manufacturing measures that result in reduced "energy per unit of production." The outreach effort is led by a team of contractors with specialized expertise that identify and deeply engage with stakeholders, trade allies, economic development entities, and customers to effectively identify opportunities, support project development, submit applications, and deliver guidance for the program. This approach results in long-term relationships, facilitates continuous efficiency improvements, and increases the programmatic savings captured. This paper will discuss all details of the IPE program (program construct, incentive levels, technical review, M&V) and will specifically present the multifaceted outreach approach that has effectively increased program participation.

Introduction

With the 2008 Energy Efficiency & Portfolio Standard (EEPS) legislation, New York established a program to reduce the state's electricity usage by 15% from forecast levels by the year 2015, with comparable goals in natural gas conservation. NYSERDA's Industrial & Process Efficiency (IPE) program, funded by the System Benefits Charge paid by utility ratepayers, is one of the fast-start efforts to reach these goals in the high potential industrial and data center sectors. Historically, industrials account for 11% of the state's energy usage and New York has the second largest concentration of data centers in the U.S. Energy consumption by data centers is forecasted to double in 3 – 5 years.¹

¹ NYSERDA

To capture the vast process and production efficiency opportunities in the industrial sector, NYSERDA developed the Energy Smart Focus on Industrial and Process Outreach (Focus) program with a team of specialized contractors who provide the industrial sector with technical expertise, audits and assessments, and assistance with financial incentives to help implement energy efficiency projects. NYSERDA divided the state into two regions and assigned the industrial outreach for the downstate region to Energy & Resource Solutions (ERS), the upstate region to Clough Harbour & Associates, LLP (CHA), and the data center outreach for the entire state to Willdan Energy Solutions (Willdan). The Outreach consultants (Focus contractors) assess the market, identify potential customers, reach out through multiple avenues to contact customers, conduct site visits and scoping audits, assist with measure identification and assessment, and application assistance. The contractors also provide technical assistance during implementation of recommended improvements and help industrial customers locate contractors and vendors. This paper presents IPE program in detail and discusses the multi-pronged approach that has resulted in significant participation and progress towards aggressive program goals.

Program Construct

The NYSERDA Industrial and Process Efficiency Program has significant goals and substantial funding to make inroads into the largely untapped industrial and process efficiency opportunities in New York State. The Focus on Outreach program is an innovative effort to aggressively target industrial customers and use technically proficient engineering consultants to assess and develop energy efficiency projects with these customers.

Goals and Funding

The IPE program goals of 840,000 MWh of electric savings and 1,682,265 MMBtus of gas savings by 2013 are almost four times the savings performance of the previous 10 years from NYSERDA's Existing Facilities program.² Along with these aggressive goals, \$108 million was committed in incentive funding for the program.

Incentives

NYSERDA's Existing Facilities program offers incentives for a variety of energy efficiency projects including pre-qualified measures and performance-based incentives. Pre-qualified incentives are provided for small energy projects and equipment replacement on a per unit basis for lighting, HVAC, chillers, motors, VFDs and small gas efficiency projects. The Outreach effort focuses on larger customers and cost-effective energy efficiency projects that deliver verifiable annual energy savings. Incentives are provided for both electric and gas savings according to the schedule provided in Table 1. Projects must meet the minimum incentive threshold of \$10,000 and are based on one year of savings. Performance-based incentives are offered to offset the project capital costs and are capped at the lesser of 50% of the project cost or \$5,000,000. The \$5,000,000 cost cap was designed to encourage major facility

² NYSERDA Buildings Portal data, 1998 – 2008

energy saving projects that previously were limited by lower program caps. For all NYSERDA programs, customers must contribute to the Systems Benefit Charge (SBC) on their utility bills in order to participate.

Incentives are provided for basic facility measures such as lighting, VFDs, chillers, etc. based on annual energy savings of the proposed versus existing equipment. For process efficiency measures, savings are calculated based on the “energy saved per unit of production” so a plant that is expanding capacity can still receive incentives if they are increasing production with more energy efficient equipment. This incentive structure encourages New York companies to consider expansion in positive business climates and approach expansion with energy efficiency in mind. The \$5M is an attractive financial incentive for companies in growth mode or to support retooling during down times.

Table 1 - NYSERDA Industrial and Process Efficiency Performance-Based Incentives*

Performance Based Incentives	Upstate	Downstate (ConEd territory)
Electric efficiency	\$0.12/kWh	\$0.16/kWh
Natural gas efficiency	\$15/MMBtu	\$20/MMBtu
Monitoring-based commissioning (operations & maintenance)	\$0.05/kWh	\$0.05/kWh
Maximum incentive per facility: \$5,000,000. Minimum incentive: \$10,000. Contribution to Systems Benefit Charge required for participation		

*The incentive rates shown above are based on annual energy savings. Incentives are determined by multiplying the annual energy savings by the rates shown.

NYSERDA also offers Monitoring-based Commissioning incentives to support the implementation of continuous commissioning programs and for operational and maintenance improvements supported by protocols and systems that promote persistent and measurable energy savings.

Technical Review

As part of the Outreach effort, the Focus contractors provide assistance with calculations and savings estimates for proposed efficiency measures. The contractor can prepare and submit the application for the customer if requested. Once the application is submitted, NYSERDA assigns an engineering consultant to perform Technical Review of the proposed measures. The Technical Reviewer verifies existing conditions and equipment, calculates a baseline energy usage using onsite information and measurements, and then estimates the energy usage for the proposed measure based on established engineering methods and vendor supplied information. Focus contractor assistance and technical reviewer analyses are funded by NYSERDA at no cost to the customer.

Measurement & Verification

Measurement and verification (M&V) is required for electric measures with kWh savings greater than 500,000 kWh (1,000,000 kWh for lighting measures) and for gas measures with savings greater than 10,000 MMBtu. The Technical Reviewer determines the appropriate measurement and verification requirements based on the type of measure and performs the

required data collection and analysis. NYSERDA pays 60% of the incentive upon measure installation and the remaining 40% at the end of the M&V period. The second payment is adjusted up or down depending on the results of the M&V.

Market Assessment

For the Outreach project, the Industrial sector was categorized into three segments by NYSERDA with defined titles of Tier 1, Tier 2, and Tier 3. As illustrated in Table 2, Tier 1 end users are those with electric demand in excess of 2 MW. Tier 2 is composed of users between 500 kW and 2 MW, and Tier 3 encompasses those facilities below 500 kW. At the start of the program, the only identified customers were NYSERDA’s list of 128 Tier 1 facilities, which had traditionally been supported by NYSERDA Key Account Managers.

Table 2 - Industrial Outreach Tier Structure

Tier Level	Annual kWh	Demand (kW)
1	15,000,000 and up	2000 and up
2	1,500,000 – 14,999,999	500 - 1999
3	1,499,999 and below	499 and below

The Tier 2 facilities in New York were not well defined, but NYSERDA mandated that the Focus contractors pursue these users directly as their energy usage represented a large savings potential. This tier of customers presented a unique challenge as thousands of them are present in New York, but limited information was available about their energy consumption. A major aspect of the Focus effort was to identify, locate, and qualify these mid-sized customers and move them to participate in NYSERDA’s programs. Tier 3 customers are not solicited proactively, but are supported on an “inquiry” basis.

Downstate

To create the target list of high potential Tier 2 accounts for the downstate region, ERS developed a methodology for identifying and prioritizing facilities and locations based on a cross-tabulation of Economic Census Data and the Manufacturing Energy Consumption Survey (MECS) published by the Energy Information Agency. Using the North American Industrial Classification System (NAICS) for sectors, we developed electrical and natural gas consumption estimates for every known industrial establishment in the region. This information was incorporated into the project’s online project management database tool, Salesforce, to facilitate highly targeted outreach to the most energy intensive customers.

Table 3 presents the results of the downstate market assessment and the total potential downstate savings. To achieve program goals, downstate penetrations would have to range from 50-100% depending on the Tier categorization which poses a considerable challenge. Direct outreach is targeted only at Tier 1 and 2 categories and thus the program will not capture a considerable percentage of the Tier 3 potential.

Table 3 – Downstate Market Assessment

Tier Level	Number of Facilities	Annual MWh Usage	Demand (kW)	Assumed Savings Potential	Total Potential MWh Savings
1	97	2,978,750	2000 and up	5%	148,938
2	1256	4,635,375	500 - 1999	10%	463,538
3	11651	2,447,826	499 and below	10%	244,782

Upstate

For the initial market assessment in the upstate region, CHA developed regional profiles of both large (Tier 1: 2MW+) energy consumers and consumers below that level (Tier 2: 0.5 – 2 MW) who also had significant potential for savings. Data for the profiles came from several sources including NYSERDA customer/key accounts, CHA customer/key accounts, Regional Technology Development Centers, the county-based Industrial Development Agency members of the New York State Economic Development Council (NYSEDC), manufacturing and technical association memberships (e.g., MACNY, AFE), Multiple Intervenors (MI), and public and semi-public information from NYS utilities and subscription databases.

From this profile and available sources of information, including NAICS, census data, size, and industry type, approximate energy consumption levels were assigned. Based on this information, prioritized lists of target firms were created, together with the individual contacts and approaches most likely to lead to successful outcomes.

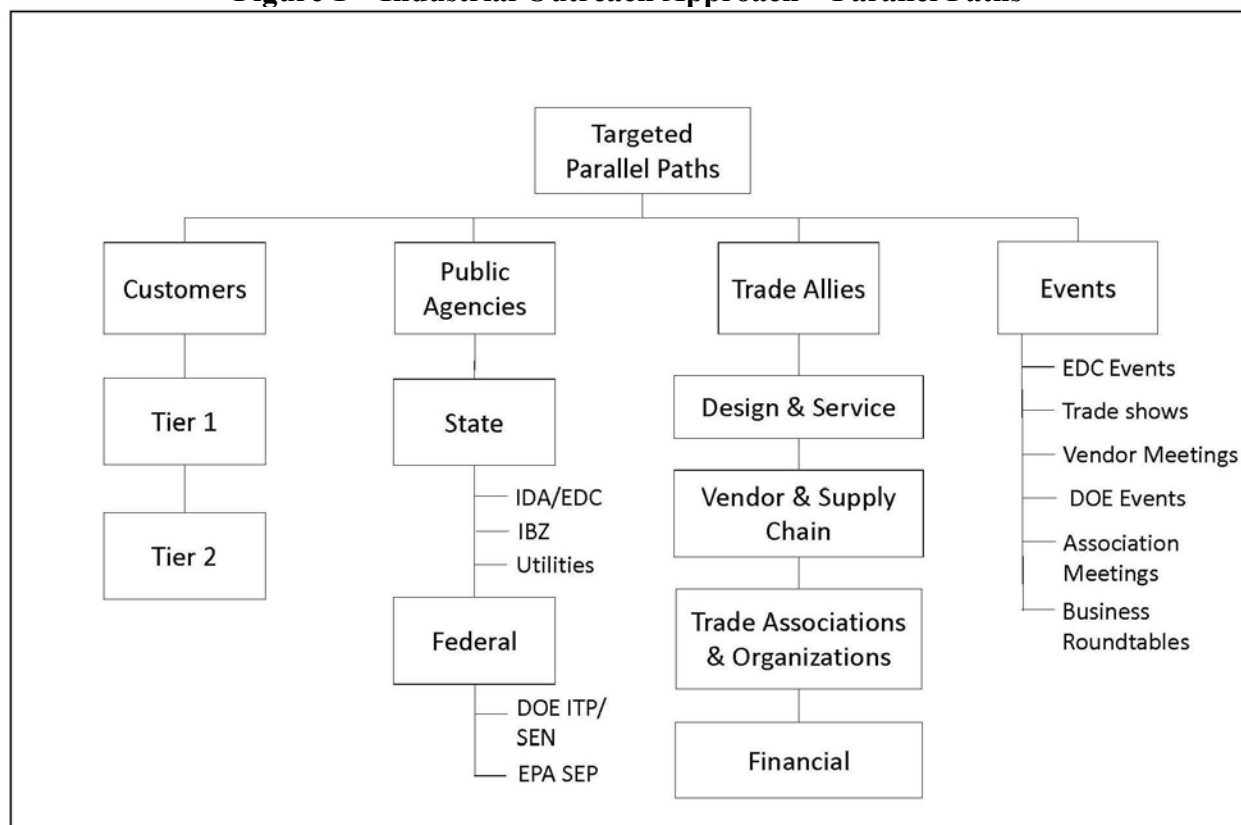
Approach

Working with the full suite of NYSERDA industrial energy efficiency programs to help realize the state’s goals, the Focus contractors engage the targeted Tier 1 and 2 customers using the following methods and strategies:

- Utilize experience with the industrial sector to address efficiency opportunities including industrial processes and data centers.
- Engage customers in the energy efficiency opportunities that are specific and unique to the industrial and data center processes in their sectors and facilities.
- Identify and engage the key decision-makers for each industrial customer early in the process including financial officers, production managers, facility managers, and data center managers.
- Approach the industrial customer with knowledge of and attention to linking energy usage to particular process improvements and the competitive advantages that greater operational efficiencies offer.
- Carefully relate discussions of energy usage to the particular industrial production and financial challenges of customer sectors and facilities.
- Act as an “account executive” for industrial customers willing to take action. Convey value to the customer and the ability to help them realize energy efficiency savings and provide access to the full array of available incentives (e.g., NYSERDA and others).

Figure 1 depicts the “targeted parallel path” approach that the Focus contractors follow to reach out to customers. We use direct outreach for existing NYSERDA key Tier 1 accounts and accounts with which the team has prior relationships. For the other target accounts, we pursue a collaborative approach with economic/industrial development organizations (IDA/EDCs), through federal programs such as DOE’s Save Energy Now (SEN) Leaders, Manufacturing Extension Partnerships (MEPs), trade allies including vendors, trade associations, and project development organizations, and through participation in a variety of industry-related events. The collaborative relationships in particular with IDA/EDCs and with vendors have provided numerous introductions and project opportunity leads with accounts that would have otherwise been difficult to penetrate.

Figure 1 – Industrial Outreach Approach – Parallel Paths



The following sections discuss specific approaches by each Focus contractor.

Industrial - Downstate

For the downstate industrial customers, ERS employs an outreach method that is multifaceted, targeted, and success-focused to ensure high-level customer participation. Our approach involves persistent but supportive marketing, high quality technical services, and knowledgeable representation of the portfolio of NYSERDA programs that serve the industrial facilities. Some of the key features of the proposed approach include:

- **Effective mix of customer interaction services** – Our outreach and interactions include basic marketing, NYSERDA program support, technical guidance, relationship development, and supportive “hand-holding.”
- **Support to customers from marketing through implementation** – All Focus contractors are developing long-term relationships with the customers, introducing all parties to the benefits of energy efficiency and the NYSERDA programs, identifying and developing measures, project development, and providing support through the implementation process. These relationships ensure that NYSERDA and the customer are continuously engaged in future rounds of potential energy saving projects.
- **Effective support for all applicable customer staff** – Outreach efforts focus on all levels from the customer’s facility management and engineering staff to identify and develop specific measures, to corporate executives, including financial officers, to better understand the cost-saving benefits and economic advantages of participation. These efforts help to motivate corporate mandates for energy efficiency project implementation.
- **Comprehensive leverage of market actors** – Our approach assumes that more projects will ultimately develop if the distributor/vendor, consultant, economic/industrial development, trade allies, and engineering communities all understand the benefits of the programs and effectively act as an extension of our outreach team, working with customers to get measures and projects developed and installed. We focus significant efforts to reach out to these players and provide education on NYSERDA’s programs.
- **Sub-sector customized approaches** – Approaches are adjusted to accommodate variations between the sub-sectors of the industrial market including unique regions, corporate personalities, characteristics, and organizational types found in the different sub-sectors. The ERS team incorporates a wide variety of creative, value-added features, leveraging our extensive New York relationships in the industrial sub-markets to achieve high levels of program participation.

Industrial – Upstate

Similar to the downstate outreach, CHA has a multi-faceted approach to outreach with the upstate customers.

- **Direct outreach** - Based on the targets developed during the initial market assessment, CHA working in conjunction with NYSERDA and partners (e.g., RTDCs, NYSEDC members, MI, MACNY) arranges meetings with key senior management decision-makers and their technical and operations staff. This process is focused on existing clients and contacts and leverages the trusted relationships existing with these target companies. The team presents NYSERDA’s Industrial Process Efficiency (IPE) programs and points out those aspects most likely to be relevant to the individual firm. MEP and NYSEDC managers are on hand to link potential energy saving opportunities to the wide array of supporting performance improvement and state/federal funding opportunities available through their organizations. These presentations focus on the prospect for financial returns and long-term profitability improvements as a result of these initiatives.

In addition, CHA assesses the company’s understanding of energy efficiency, awareness of relevant forms of waste, and motivation and capability to implement potential projects. This outreach includes review of information on capital investment

opportunities and requirements as well as the company's project approval process. The initial meeting sets the stage for establishing on-going relationships and communications in order to maintain awareness of the IPE programs and new project opportunities.

- **Group outreach** - For targeted firms below the 2 MW threshold, CHA working in conjunction with NYSERDA and partners arranges regional workshops at which the NYSERDA IPE programs and case studies are presented. Breakout sessions are held to further explore specific company opportunities during the workshop. From these interactions, to further develop opportunities for companies with planned initiatives, individual meetings as described above are arranged.

For smaller firms assistance is provided by responding to calls and inquiries, utilizing NYSERDA program materials, and other means relevant to assisting the customer with NYSERDA program participation.

- **Project development** - In addition to educating the companies on the available NYSERDA programs, the goal of individual meetings is to assess the desire, commitment, and capability of the organization to pursue significant process and energy improvement projects. For those companies that demonstrate this, assistance is provided in the form of technical support and guidance to be able to participate in NYSERDA's IPE implementation programs. This includes identifying potential process improvement and energy saving projects and identifying how energy efficiency fits into upcoming projects. Where project ideas need further technical assistance, referrals to NYSERDA technical assistance programs are made.

Data Centers

For data centers, Willdan identified three market challenges to achieving NYSERDA's goal: market confusion about NYSERDA, the inherent difficulty in gaining access to data centers, and the conflicting stakeholder priorities within data center organizations. The strategy concentrates on overcoming these challenges by educating the data center market on the value and virtues of NYSERDA and its programs by directly reaching out to the market and then driving participation in the program. Follow-up includes maintaining relationships with key influencers within the market to ensure satisfaction and repeat participation.

Willdan's approach to outreach and marketing to the data center industry leverages a suite of strategies ranging from direct sales and cold calling new prospects to targeted outreach attending and hosting industry events and workshops.

The events and workshops strategy includes activities such as participation in industry trade shows (e.g., DCD and the Uptime Symposium), presentations at various professional organizations meetings (such as 7X24 Exchange and ASHRAE), local stakeholder associations and organizations, and a variety of social networking tactics that reach a broad audience. For example, we identified key stakeholders in the data center space to work with and gain insight into their concerns about data center energy efficiency. We helped facilitate round table discussions at NYSERDA's Data Center Stakeholder meeting held at the Uptime Institute Symposium in May 2010.

Willdan's outreach strategy leverages vendor relationships to gain access to customers, using professional networks to access others, and through carefully planned cold calling, reach the plethora of other large data center customers that we cannot access through other channels. Additionally, we integrate an aggressive direct sales strategy in order to bring early adopters into

the program and help data center operators work through the project implementation process. They act as the internal “cheerleader” for the program, gathering the information we need to submit the application and, at times, advocating that the benefits of the program outweigh the time/resources needed to submit the application and work with the Technical Reviewers.

Willdan focuses on customer relationship strategies by maintaining constant and open communication channels with the customers. We proactively gather customer feedback and use it to implement refinements to the programs. We maintain these relationships by:

- Contacting the customer directly to discuss the status of their application/TR process
- Contacting the customer periodically to see if they have any new projects which should be considered for the program
- Attending industry events and meetings of professional organizations that they attend
- Keeping the customer informed of major events NYSERDA is involved in (e.g., DCD and Uptime, NYS Data Center Energy Efficiency Leadership Award)

A good experience with the program (application through Technical Review to receiving the incentive) is critical to having customers submit future applications; it also helps overcome some existing stereotypes that working with efficiency programs can be involved.

Project Implementation

All Focus contractors provide technical and NYSERDA program guidance to the customer for the duration of the customer’s project implementation. The contractors serve as a technical resource through project installation implementation. We support technical decision-making regarding equipment selection and qualification, engineering savings associated with equipment alternatives, and any necessary engineering guidance that provides confidence that the installed equipment will deliver the savings and perform as anticipated. Team members maintain on-going customer communication and on-going relationships to assure expectations are met and to maintain awareness of new opportunities.

Industrial and Process Sector Support

The Focus contractors provide support to increase energy efficiency and NYSERDA program participation within the industrial sector through several other methods, including:

- Developing and distributing outreach materials for specific industrial sectors and process improvement and energy saving initiatives (i.e., linking energy efficiency to lean manufacturing, compressed air energy efficiency improvements)
- Developing and providing training/education to specific industrial sectors and process improvement and energy saving initiatives
- Collaborating with key stakeholder groups, vendors, contractors, consultants, subject matter experts, and other organizations to educate on NYSERDA IPE programs, discuss customers who may be potential participants, and explore opportunities for systematic outreach to members/customers.

Challenges

There are numerous unique challenges and barriers to adoption of energy efficiency measures in New York State’s industrial facilities. Key barriers include:

- Current economic situation coupled with generally difficult times for New York manufacturers limit capital project expenditures.
- Industrial operations currently are very focused on production – not efficiency projects.
- Reduced staff resources limit project discovery and development of energy efficiency improvements.
- Industrial management and staff have a limited understanding of NYSERDA programs.
- Facilities lack industrial process-specific insights associated with energy efficiency, so they target typical facility opportunities such as lighting and HVAC instead.
- When industrial processes are addressed, it is often with a simplistic approach involving motors and drives.

The Focus on Outreach team addresses these challenging barriers through a multi-pronged approach that seeks to support these firms financially (with NYSERDA programs and other funding sources), educate process engineers on the significant benefits and energy savings inherent in process improvements, train and inform staff of the cost savings to be achieved through adoption of energy efficiency measures, provide necessary support to facilitate implementation, and reach out to senior management so they best understand approaches and rationale for prioritizing energy efficiency in their business and strategic plans.

Results to Date

The Outreach effort has significantly increased participation in NYSERDA efficiency programs with programmatic results far outpacing previous incentive programs. The savings results from electric efficiency measures since program inception in October, 2009, are provided in Table 5. Through April 2011, 338 electric applications have been submitted with committed electric savings of 417,715 MWh or 50% of the program goal. As shown in Table 6, 49% of the allocated electric incentive funds have been encumbered for these projects.

Table 5 – NYSERDA IPE Program Results - Savings (Oct. 2009 – April 2011)

Progress thru Apr. 2011	Program Status: Committed	
	Electric (kWh)	Gas (MMBtu)
Program goal	840,000,000	1,682,265
Committed	417,715,244	1,238,825
% of goal	50%	74%

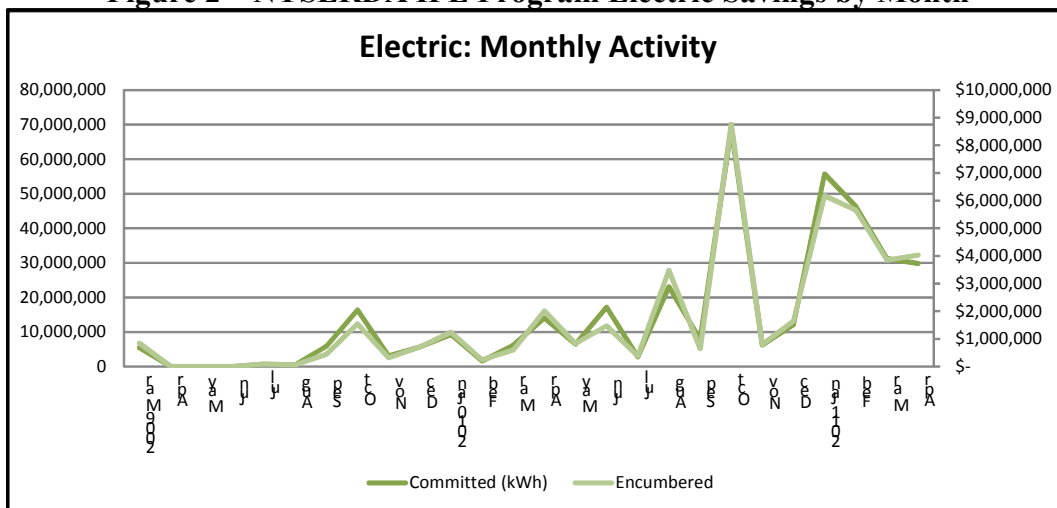
One hundred seventy three gas efficiency projects have been submitted since the gas program began in August, 2010, accounting for 1,238,825 MMBtu or 74% of the gas savings goal. Eighty-four percent of the gas incentive funding has been encumbered for these projects.

Table 6 – NYSERDA IPE Program Results - Funds (Oct. 2009 – April 2011)

Progress thru Apr 2011	Program Status: Encumbered	
	Electric	Gas
Program budget	\$92,843,186	\$14,659,656
Encumbered	\$45,616,118	\$12,340,856
% of budget	49%	84%

Figures 2 and 3 reflect the monthly activity for electric and gas measures since the start of each program. With the Focus contractors close involvement in project development and savings estimates, most applications are submitted to NYSERDA with well documented analysis and savings so NYSERDA is able to quickly encumber project funds as shown by the closely matching committed versus encumbered lines in the graphs.

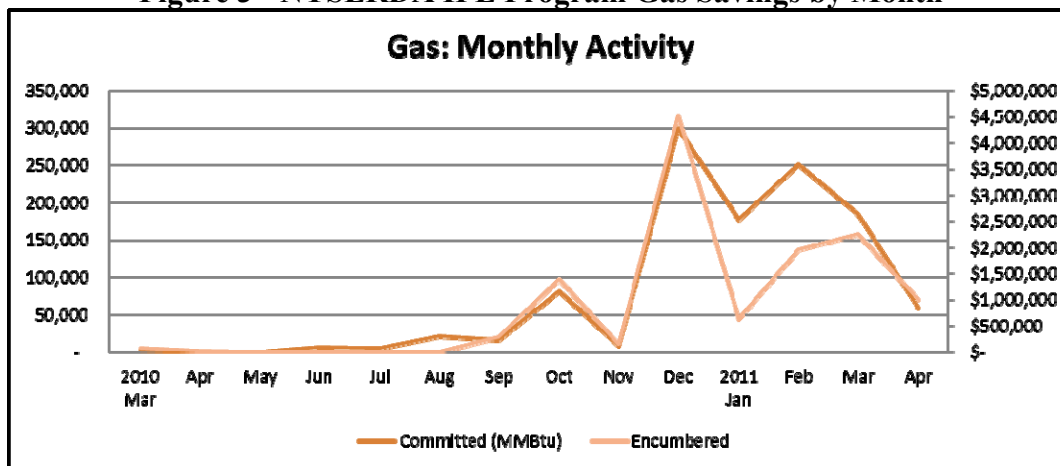
Figure 2 – NYSERDA IPE Program Electric Savings by Month



Electric program inception October, 2009

Source: NYSERDA IPE Program Performance – Apr. 2011

Figure 3 - NYSERDA IPE Program Gas Savings by Month



Gas program inception August, 2010

Source: NYSERDA IPE Program Performance – Apr. 2011

Table 7 reflects the average savings and incentives per project and Table 8 presents the total IPE program savings attributable to facilities measures, process measures, and data centers. As Table 8 indicates, facility measures such as HVAC, lighting, motors, etc. still represent over 50% of the programmatic savings to date; however, process measures account for 30% of the electric savings and 45% of the gas savings to date. As customer relationships are strengthened so that internally guarded process information is more readily shared, we believe that opportunities will increase to tap the high potential from process efficiency measures.

Table 7 – Electric and Gas Savings Measures by Project

ELECTRIC		GAS	
\$/kWh based on totals	\$0.11	\$/MMBtu based on totals	\$9.40
Avg kWh per project	1,300,042	Avg kWh per project	33,159
Median kWh project	350,506	Median MMBtu project	9,777
Avg Incentive per project	\$140,201	Avg Incentive per project	\$311,799

Table 8 – IPE Program Savings % by Measure Category

Category	kWh	MMBtu
Facility	55.7%	55.1%
Process	30.5%	44.9%
Data center	11.7%	0.0%

Summary

The Focus on Industrial and Process Efficiency program has resulted in substantial utilization of NYSERDA’s offerings and has created strong customer partnerships that should drive continuous attention and long-term efforts to further reduce energy usage. The multi-faceted approach to identifying, recruiting, and engaging industrial facilities has created awareness of NYSERDA’s programs throughout industry and with supporting organizations and provides a strong basis for ongoing participation in NYSERDA’s programs. To date some of the notable impacts of this program are:

- Significant increase in program applications and encumbered savings since initialization of Outreach efforts.
- Increased likelihood of achieving targeted program goals
- Deeper engagement with end-use customers and strong, long-term partnerships
- Greater market awareness of NYSERDA’s programs
- Deeper and closer relationships between NYSERDA and selected consultants which result in a greater level of technical and Outreach resources for the program

The variety of activities conducted to support customers through the entire cycle of project development and implementation drives continuous efficiency improvements and ensures that efficiency measures are accurately analyzed, effectively implemented and result in achieved program savings. This effort requires considerable collaboration with NYSERDA, industry market actors, stakeholders, vendors, event coordinators and at multiple levels of customer organizations – providing positive results to reach the program MWh reduction goals.