

# **Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector**

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## **ABSTRACT**

The New York State Energy Research and Development Authority (NYSERDA) and the United States Department of Energy (US DOE) share a common goal of reducing energy usage and carbon dioxide emissions within the industrial sector. In an effort to meet these goals and to characterize the existing industrial marketplace, an Industrial Partnership Network (Network<sup>1</sup>) was formed. As a member of the Network, Antares Group Inc. (ANTARES) completed the “Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector” study to identify the six manufacturing industry subsectors in New York State with the greatest electric energy intensity and the greatest carbon footprint based on their overall energy consumption. Companies within these subsectors having the potential to be large energy consumers were identified and company target lists for Network outreach efforts were created. The culmination of the project was a comprehensive report, updated annually in 2010, 2011 and 2012, that provides sector specific information from which to develop tools for focused Network outreach and engagement of industrial customers to participate in NYSEDA’s Industrial and Process Efficiency (IPE) and FlexTech Programs. Using the results of this benchmarking and market characterization study, NYSEDA and other Network members continue to focus on providing outreach assistance to the companies in these specific industrial market segments to maximize energy efficiency within their facilities, achieve energy and carbon dioxide (CO<sub>2</sub>) emission reductions, and help stimulate economic growth in New York State.

## **Introduction**

The “Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector” report was the first step in the Network’s effort to reduce energy consumption and CO<sub>2</sub> emissions. The study provides an estimated level of electrical energy usage and the associated carbon footprint from both electricity and thermal energy resources for each of the industrial subsectors within New York (NY) State. It also provides an estimation of each subsector’s energy intensity and identifies the key large energy consumers within each subsector for potential recruitment into NYSEDA’s energy efficiency programs.

The “Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector” report was supported through a grant award from the US DOE Advanced Manufacturing Office’s Save Energy Now (SEN) program—formerly the Industrial Technologies Program (ITP). The grant was administered by NYSEDA for the entire length of the project that spanned from November 2009 – October 2012 (three fiscal years). The

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<sup>1</sup> The Network consists of Antares Group Inc. (ANTARES), Couch White as Multiple Intervenors (MI), Manufacturing Association of Central New York (MACNY), New York State Energy Research and Development Authority (NYSEDA), State University of New York—Environmental Science and Forestry (SUNY ESF), and the Syracuse Center of Excellence in Environmental and Energy Systems (CoE).

“Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector” report was initially issued in July 2010 during the first year of the grant, and then revised and reissued during the second and third years of the grant to reflect updated source information and demonstrate each subsector’s changing energy consumptions over time.

The US DOE SEN grant offered an opportunity to employ an innovative project recruiting strategy to increase the effectiveness and success of existing NYSERDA energy efficiency programs and serve as a recruitment model nationwide. The grant project involved benchmarking and market characterization, targeted marketing and outreach of NY manufacturers into existing NYSERDA energy efficiency programs, and creation of tools to enhance recruitment. A goal of 84,000 MWh in electric energy reduction by 2015 was created for the Network’s effort through targeted recruitment leveraging Network industrial membership base. Specific NYSERDA programs for the targeted recruitment effort by the Network are:

- **Industrial and Process Efficiency Program** offers performance-based incentives to manufacturers and data centers that implement cost-effective electric and gas efficiency and process improvements. Incentives are calculated based on a reduction in energy usage per unit of production or workload, and may include projects that increase productivity and capacity, enhance reliability, and/or increase uptime.
- **FlexTech Program** provides objective and customized information to help customers make informed energy decisions. Program participants receive a cost-shared analysis targeting their particular energy and business needs, including technical evaluations, process improvement analysis, energy master plans, retro-commissioning, and development of peak load curtailment plans (PLCPs) as well as combined heat & power (CHP) projects.

Each issuance of the “Benchmarking Electricity Consumption and Carbon Dioxide Emissions from New York State’s Industrial Sector” report starts with a discussion on the methodology used to benchmark the electric energy consumption and CO<sub>2</sub> emissions for each industrial subsector. Based on this data, a market characterization is presented that narrows down a master list of all of the manufacturing companies in NY to create two smaller target lists of large manufacturing companies that are estimated to consume the most energy in NY. These lists—one for NY State as a whole and another for companies located in the central region of NY—are to be used by the Network for targeted recruitment into NYSERDA’s energy efficiency programs.

The official grant period concluded in November 2012. The Network’s activity resulted in increased participation in energy efficiency programs, reduced energy consumption and CO<sub>2</sub> emissions by the industrial sector per unit output, and an increased ability for the industrial sector to maintain its competitiveness by reducing overhead costs. During the three-year period of the grant 113 industrial projects were submitted to NYSERDA’s IPE and FlexTech Programs through Network outreach efforts, and combined savings of 165,880 MWh of electricity and 388,000 MMBtu of natural gas have been identified. Industrial projects are ongoing and in various stages of completion. Electric savings far exceeded the initial goal of 84,000 MWh, with additional natural gas savings also achieved. NYSERDA continues to work with industrial customers towards project completion and implementation, as well as engagement on future energy efficiency and productivity improvement projects.

## **Benchmarking Energy Consumption and Carbon Emissions**

Data for industrial energy consumption and CO<sub>2</sub> emissions were calculated and recorded using the first three digits of the six-digit North American Industrial Classification System (NAICS) code. Both the electric energy consumption and CO<sub>2</sub> emissions were estimated using data from the United States Census Bureau's "2010 Annual Survey of Manufactures," US DOE Energy Information Administration (EIA)'s "2006 Manufacturing Energy Consumption Survey (MECS)," and NYSERDA's "Patterns and Trends: 2010."

### **Estimating Electricity Consumption**

The manufacturing industry within NY used approximately 13,480 GWh of electricity in 2010, according to NYSERDA's annual report "Patterns and Trends: 2010." To deduce how that energy was distributed throughout the 21 different industrial subsectors, a benchmarking process was used based on a series of key economic factors. These economic factors were chosen to be representative of the overall economic impact of the industries within NY. The steps used by ANTARES were as follows:

1. Gather key economic factor data for all 21 industrial subsectors for NY from the Annual Survey of Manufactures. The economic factors used were "number of paid employees," "value added" and "total value of shipments."
2. Gather overall energy intensity data for each economic factor for all subsectors from Table 6.1 in 2006 MECS. This data was presented in terms of "energy consumption per economic factor."
3. Calculate the total energy used by each subsector by multiplying each economic factor by its energy intensity. The results of this were three total energy consumption values for each subsector.
4. Using energy consumption data for the Northeast Census Region in Table 7.6 in 2006 MECS, estimate the portion of each subsector's overall energy intensity that is attributed to electricity consumption only. Knowing the estimated division of purchased energy source (by fuel type), ANTARES was able to estimate the percentage of that energy that was from electricity purchases, as it changes between industries. ANTARES assumed that the division between fuel types in each subsector was the same in NY as it was in the entire Northeast Census region.
5. Multiply each subsector's previously calculated total energy consumption values (three per subsector) by the percentage that was determined to be electricity consumption only.
6. Normalize the electric energy consumption for the 21 subsectors based on the electricity consumption in "Patterns and Trends: 2010" and average the results.

### **Estimating Energy-Related Carbon Dioxide Emissions**

The manufacturing industry within NY generated approximately 17.1 million tons of CO<sub>2eq</sub> from on-site fossil fuel combustion in 2010 according to NYSERDA's annual report "Patterns and Trends: 2010." This is an increase from 15 million tons in 2009. In addition to fossil fuel combustion, each industrial sector in NY also purchases electricity, which also has CO<sub>2</sub> emissions associated with each unit of electricity consumed. This section will look at the

CO<sub>2</sub> emissions for both direct fossil fuel combustion and electricity consumption. To deduce how the CO<sub>2</sub> emissions are distributed throughout the 21 different industrial subsectors, a benchmarking process was performed using publicly available data in 2006 MECS and CO<sub>2</sub> emission rates for fossil fuels. This was done because each subsector consumes a different split of fuel types and each fuel type has a different CO<sub>2</sub> emission factor. The steps used by ANTARES were as follows:

1. Estimate the total purchased energy use for each subsector. This includes both electricity and fossil fuels consumption.
2. Using energy consumption data for the Northeast Census Region in Table 7.6 in 2006 MECS, estimate the energy consumed by fuel type (coal, oil, natural gas, electricity etc.) for all industrial subsectors.<sup>2</sup>
3. Using CO<sub>2</sub> emission rates for fossil fuels and electricity from the US Environmental Protection Agency (EPA), estimate the CO<sub>2</sub> emissions for all 21 industrial subsectors for NY. To simplify the calculation for the CO<sub>2</sub> associated with electricity purchases across the 21 subsectors, ANTARES created a total weighted average for CO<sub>2</sub> emissions from electricity consumption in NY based upon the number of employees for each of the three EPA Emissions & Generation Resource Integrated Database (eGrid) regions within NY.
4. Normalize the CO<sub>2</sub> intensity for the 21 subsectors based on the total CO<sub>2</sub> emissions listed in “Patterns and Trends: 2010” and average the results.

### Selecting the Top Industrial Sectors

A comparison of the top electricity-consuming sectors and the top CO<sub>2</sub>-producing sectors showed that four out of the top 6 sectors were the same for each list. These four sectors were automatically selected to be in the top six industrial sectors overall: Chemicals (325), Paper (322), Food (311), and Fabricated Metal Products (332).

The fifth and sixth top industrial sectors were not as easy to determine. The combined ranking of each sector that had not already made the top list was calculated by adding the respective rankings on each list and then dividing that value by 2. The two industries with the lowest combined ranking were selected as the fifth and sixth top industrial sectors. For example, Plastics and Rubber Products ranked #2 for electricity consumption, and ranked #8 for CO<sub>2</sub> emissions. Therefore its combined ranking would be  $(2 + 8)/2 = 5$ . Using this metric, Plastics and Rubber Products (326) and the Nonmetallic Mineral Products (327) were selected as the fifth and sixth top industrial sectors because their combined rankings were determined to be 5 and 4.5 respectively.

The top six industries for electricity consumption are not the same as the top six CO<sub>2</sub>-intensive industries for a few different reasons. First, the production of electricity in NY is generally less CO<sub>2</sub>-intensive than the burning of fossil fuels because there is significant renewable electricity generation in NY such as hydroelectric and large-scale wind farms. Second, not all industries use the same breakdown of energy for their product manufacturing. For example, some industries such as Computer and Electronic Products (334) are significantly more

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<sup>2</sup> Some purchased energy source information was not reported by the EIA due to relative high standard errors (more than 50% RSE). This data was estimated based on reasonable assumptions, such as that woody biomass was the “other” fuel type for 321 (Wood Products), 322 (Paper), 323 (Printing), and 337 (Furniture). Other purchased energy data that was omitted by the EIA because it was deemed to be negligibly small was approximated to be zero.

electricity intensive due to heavy use of electric drives and process cooling, whereas other industries that require a lot of process heat to melt and form raw materials—such as Nonmetallic Mineral Products and Primary Metal Products (331)— obtain a higher percentage of their overall energy consumption from fossil fuels.

**Table 1. Comparison of Industrial Sectors’ Electricity and CO<sub>2</sub> Rankings (partial list)**

Rank	Electricity			CO <sub>2</sub>		
	NAICS-based code	Code Description	Est. Electricity Consumption (GWh)	NAICS-based code	Code Description	CO <sub>2</sub> Emissions (million tons)
1	325	Chemicals	2,338	325	Chemicals	4.398
2	326	Plastics and Rubber Products	1,235	327	Nonmetallic Mineral Product	3.809
3	322	Paper	1,220	331	Primary Metal	2.932
4	311	Food	1,152	322	Paper	2.752
5	334	Computer and Electronic Products	918	311	Food	1.449
6	332	Fabricated Metal Products	915	332	Fabricated Metal Product	1.090
7	327	Nonmetallic Mineral Products	911	324	Petroleum and Coal Products	1.067
8	331	Primary Metals	877	326	Plastics and Rubber Products	0.962

## NY Industrial Market Characterization

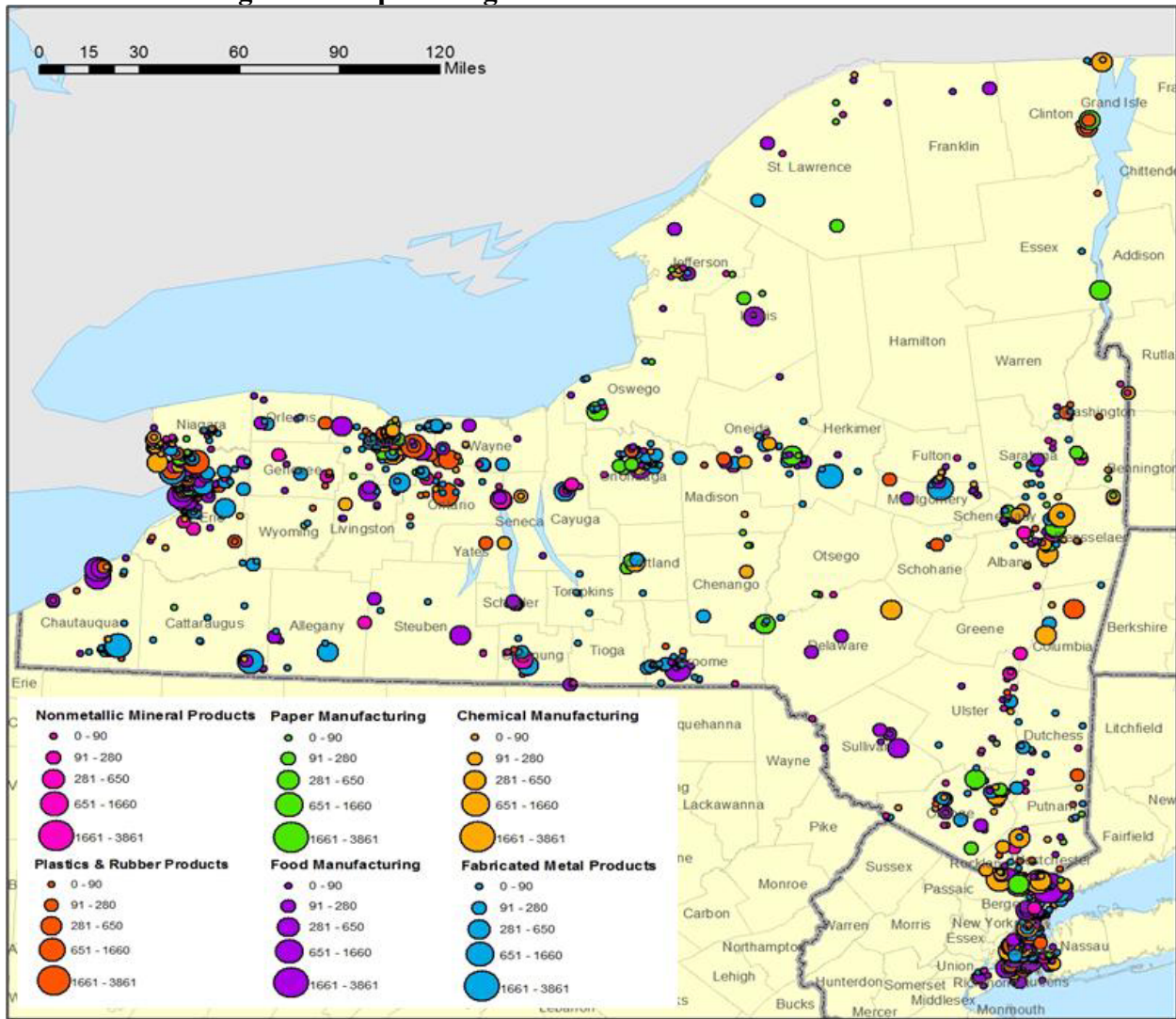
After benchmarking the NY industrial energy consumption and carbon emissions, the next task was to identify the top energy consumers within each industrial subsector. In particular, ANTARES was interested in finding the largest companies within these subsectors for targeted recruitment into NYSERDA’s programs using connections within the Network. Data for compiling these target lists of companies was obtained from the Hoover database<sup>3</sup> of New York Manufacturers. The compiled data was reviewed for companies whose primary purpose was manufacturing (NAICS numbers within the range of 311-339). If a company’s NAICS number did not fall within this range then it was eliminated from the pool. Only companies that had 20 or more employees were evaluated, and multiple facility locations for the same company were treated as separate line items.

The Hoover’s database distinguishes all locations as either “single location,” “branch,” or “headquarters”. In the previous version of this report, ANTARES eliminated company locations that were listed as “headquarters”. In this update, further screening was performed to identify locations that were solely corporate headquarters, where no manufacturing activities are performed. Of the 1,004 headquarters locations, 249 were determined to be corporate headquarters only. This screening was done using a combination of satellite imagery, company websites, and phone calls to specific company locations as needed.

<sup>3</sup> The database provided the following key information about each company: name, location, function (branch, headquarters, single location), sales, number of employees, and contact information.

Companies were then screened according to payment into the Systems Benefit Charge (SBC) charge, as contribution is requisite for participation in NYSERDA’s energy efficiency programs. Companies that are located on Long Island (Nassau and Suffolk counties) are Long Island Power Authority (LIPA) customers and do not pay the SBC charge on their electricity consumption. As a result, companies located in Nassau and Suffolk counties were eliminated during the screening process. Other companies located throughout NY that do not pay the SBC charge due to their involvement with something such as an electric cooperative were also screened out on a case-by-case basis using input from Network partners and NYSERDA Industrial Outreach Contractors (contracted by NYSERDA to provide targeted outreach and customized assistance to industrial customers).

**Figure 1. Map of Target Manufacturers in New York State**



**Target List for NY**

After eliminating the non-manufacturing and non-SBC charge eligible companies and facility locations in NY, the remaining companies were grouped together according to their

three-digit NAICS numbers. The companies that were in the top six energy consuming industrial subsectors were placed on a potential target list and were further sorted according to the “Number of Employees” at that particular site. This was done because the number of employees was the only energy intensity factor that was available for each company within the Hoover database<sup>4</sup>. Each company’s number of employees was multiplied by the energy intensity factor for each employee, depending on which industry the employee worked in, to obtain the total energy usage by that one company. This was then multiplied by the percent of the total energy that the company used that was just electricity. Certain industries use more electricity than others, and this calculation helped take this into consideration. For each of the 6 targeted subsectors, a top 10 target list was developed, resulting in a collective top 60 target list. All of the companies on the target lists for NY were checked to verify that they actually conduct manufacturing operations at that particular facility. The companies identified in the NY target list are all either nationally-recognized companies, or manufacture components for other well-known companies, and are major employers within their region. Altogether the companies on the NY target list consume an estimated 2,197 GWh on an annual basis.

Target lists were distributed to Network partners, NYSERDA Industrial Outreach Contractors, and NYSERDA project managers who serve as key account holders for large industrial NY manufacturers after the issuance of each report. This allowed for collective outreach efforts to be focused on the largest industrial subsectors and the largest companies within those subsectors. Of the total 113 projects recruited through the grant, 51 were submitted by companies on target lists. Remaining projects came from Network membership base and existing key account relationships. Over 300 meetings, conferences, and presentations were conducted directly through the grant project with target list and Network membership base companies. Grant project efforts were the focus of direct mailings that also highlighted NYSERDA energy efficiency programs. ANTARES created tools to enhance Network outreach efforts such as “Improving Industrial Efficiency Factsheets” of target process and machinery by subsector, case studies from successful projects, and identification of national process consultant expertise. Factsheets and case studies were distributed at outreach meetings and conferences, and select sheets appear on NYSERDA’s website. Webinars were held with the process consultants regarding NYSERDA energy efficiency programs. Using the target lists and tools developed by ANTARES, existing relationships of Network partners, and NYSERDA program outreach methods the Network was able to achieve 197% of the targeted electricity savings goal.

### **Target List for Central NY**

Many of the Network members work extensively within the Central New York (CNY) region, specifically MACNY, CoE, and SUNY ESF. As a result, ANTARES prepared an additional target list that only included companies that were located within CNY, using the same methodology that was used to create the NY target lists. The geographic limits of CNY correspond to the membership territory of MACNY, which represents approximately 350 businesses and 55,000 workers in a twenty-four county region as shown in Figure 2. Again, all of

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<sup>4</sup> The companies were not sorted according to the economic indicator “Value of Shipments” (or in the Hoover data, “Sales Amount”) because the dollar amounts listed for each company were usually figures for the company as a whole, not for the particular branch in NY that was of interest to the study. Because this data was inconsistent from company to company, employee numbers were the most reliable indication of a larger manufacturing operation.

the companies that are on the target list for CNY were checked to verify that they actually conduct manufacturing operations at that particular facility. The companies that were identified in the CNY target list include some very prominent nationally-recognized companies that are major employers to the region. Altogether, the 60 companies identified consume an estimated 1,070 GWh of electricity on an annual basis. Of the 113 total projects recruited through the grant, 82 were located in CNY. Of those 82 projects, 41 were with companies that were identified on the CNY target list.

**Figure 2. Counties in CNY Region**



## Changes between Annual Reports

As it was mentioned previously, the US DOE grant that funded the study spanned a period of three years. The benchmarking and market characterization study was initially issued during the first year of the grant, and was then revised and reissued during the second and third years of the study to reflect updated source information and demonstrate each subsector’s changing energy consumptions over time. This section summarizes the changes that have occurred between the first, second, and third editions of the benchmarking and market characterization reports. Specifically, it details the changes that occurred between the different editions of source data, such as the Annual Survey of Manufactures, Patterns and Trends reports, and MECS survey. A brief review is also given on the change in number of employees according to the Hoover’s database, and the resulting changes to the CO<sub>2</sub> emissions rate for electricity production.

According to the Annual Survey of Manufactures data, the manufacturing sector as a whole experienced reductions in the number of employees, value of shipments, and total value



added from the first edition of the report (2006 Annual Survey of Manufactures) to the third edition of the report (2010 Annual Survey of Manufactures) by an average change of -12.7%. However, small gains in the manufacturing sectors' value of shipments and total value added were achieved between the second (2009 Annual Survey of Manufactures) and third editions of the report, which indicates that even though the number of employees may have dropped overall, each employee's productivity had increased over time<sup>5</sup>. It should be noted that these small gains do not override the overall trend of decreasing economic indicators for the manufacturing sector.

The changes in available MECS data, which gave the energy consumption per employee, per dollar of value added, and per dollar of value of shipments, experienced significant changes from the first report (2002 MECS) to the second and third reports (both of which used 2006 MECS). During that time, the energy metrics per employee, per dollar of value added, and per value of shipments had total percent changes of +19.2%, -4.4%, and -16.0% respectively. This gives an average total percent change of -0.4% because the increase in energy consumption per employee nearly balanced out the decreases in energy consumption per dollar of value added and per value of shipments.

Overall, the economic indicators<sup>6</sup> and energy consumptions per economic indicator showed a decrease from the first to the third editions, of the report, even though small gains were made for select economic indicators of certain industrial subsectors between the second and third editions of the report. Since the product of the economic indicator and the energy consumption per economic indicator were used to indicate how much energy a particular subsector consumes, it is not surprising that overall, many manufacturing subsectors saw a decrease in overall energy consumption. In fact, over the entire length of the project, seventeen manufacturing subsectors showed a decrease in their overall energy consumption, while the remaining four subsectors showed an increase in their overall energy consumption. It should be noted that despite this overall decreasing energy consumption trend, some gains in energy consumption were made by the industrial subsectors from the second to the third editions of the report, although it was not enough to upset the overall trend.

The changing energy consumed by the manufacturing subsectors in the recent years is supported by the data contained in the Patterns and Trends reports from 2007 through 2010, which is shown in Table 2. The data indicates that the industrial sector has experienced an overall decrease in energy consumption for several different types of energy, as well as the industrial sector's net energy consumption. There is also a slight increase in energy consumption by the industrial sector from 2009 to 2010, which is consistent with the Annual Survey of Manufactures data presented above.

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<sup>5</sup> It is also possible that inflation contributed to the increase seen in "value added" and "total value" during this time period.

<sup>6</sup> The Annual Survey of Manufactures reports these in "dollars of value added", "value of shipments", and "total number of employees."

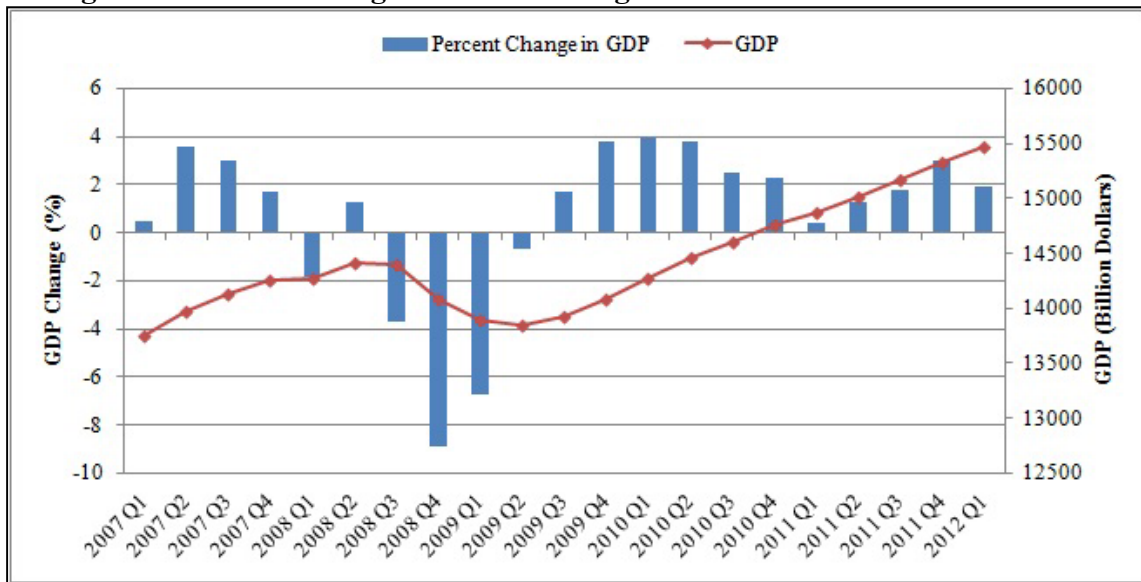
**Table 2. Summary of Changes in Industrial Energy – Patterns and Trends (2007 – 2010)**

Type of Energy Consumption	2007	2008*	2009	2010	% Change from 2007 to 2010
Petroleum (million barrels)	7	6	4	4	-40%
Natural Gas (billion cubic feet)	80	83	73	76	-5%
Electricity (GWh)	20,213	14,685	13,417	13,480	-33%
Net Consumption (Tbtu)	238	215	180	188	-21%

\*Provided for reference only; 2008 Patterns and Trends data was not used in the analysis of any of the Benchmarking reports.

It is possible that the change in the industrial sector’s energy consumption over time was also a reflection of the economic recession that began in 2008 and the subsequently began to improvement at the end of 2010, which can be seen by looking at Figure 3 below. The negative gross domestic product (GDP) growth rate corresponds with the reduction in overall energy consumption in the Patterns and Trends reports up until the third quarter of 2009 when the growth rate for the US GDP switched from negative to positive. A positive GDP growth rate indicates an improving economy and as a result, may require more energy input to support the economic growth that was identified within the 2009 and 2010 Patterns and Trends reports.

**Figure 3. Percent Change From Preceding Period in Gross Domestic Product**



The CO<sub>2</sub> emissions produced as a result of electricity generation in various parts of NY were also updated with current data. Based on the most recent eGrid data available (2009), the CO<sub>2</sub> emissions produced per MWh of electricity generated decreased with each subsequent report. The decrease in CO<sub>2</sub> emissions produced per MWh of electricity generated is explained by an increase of power plants using wind, water, biomass, and natural gas as their primary fuel source (addition of 19 power plants from 2007 to 2009), as well as a decrease in the number of plants using coal (reduction by 6 power plants from 2007 to 2009), and other fossil fuels as their primary energy source. Changes in the number of employees working within each of the three geographic eGrid regions in NY affected CO<sub>2</sub> emissions as well, although to a lesser extent. The overall effect was a significant decrease in the weighted CO<sub>2</sub> emission rate for NY.

As a result of the factors mentioned above, the top six manufacturing subsectors identified through the study changed from the first to the second edition of the report, but remained the same from the second to the third edition although their respective rankings did change significantly (Table 3). The differences in rankings were caused by changes in the three economic indicators that were mentioned previously, as well as the CO<sub>2</sub> emissions rates.

**Table 3. Top Six Manufacturing Subsectors (Electricity and CO<sub>2</sub> Intensity)**

2010 Benchmarking		2011 Benchmarking Report		2012 Benchmarking Report	
NAICS Code	Industrial Subsector	NAICS Code	Industrial Subsector	NAICS Code	Industrial Subsector
325	Chemical Manufacturing	325	Chemical Manufacturing	325	Chemical Manufacturing
334	Computer & Electronic Product Manufacturing	322	Paper Manufacturing	322	Paper Manufacturing
332	Fabricated Metal Product Manufacturing	327	Nonmetallic Mineral Product Manufacturing	311	Food Manufacturing
311	Food Manufacturing	311	Food Manufacturing	327	Nonmetallic Mineral Product Manufacturing
333	Machinery Manufacturing	332	Fabricated Metals Product Manufacturing	326	Plastics and Rubber Products Manufacturing
322	Paper Manufacturing	326	Plastics and Rubber Manufacturing	332	Fabricated Metal Products Manufacturing

## Conclusions

The industrial sectors that were identified to be the most energy intensive at the end of the three-year study period were: Chemical Manufacturing (325), Paper Manufacturing (322), Food Manufacturing (311), Nonmetallic Mineral Product Manufacturing (327), Plastics and Rubber Product Manufacturing (326), and Fabricated Metal Product Manufacturing (332). These top six industries were the same ones that were identified in the second edition of the benchmarking report, although the order and ranking of the subsectors had changed slightly. Two subsectors that had been present in the first edition of the report that had been eliminated during the second edition of the report included Computer & Electronic Product Manufacturing (334) and Machinery Manufacturing (333). The rearrangements in target industries and their respective rankings were primarily caused by changes in the economic indicators, which influenced industry electricity consumption, as well as changes in CO<sub>2</sub> emissions from electricity production, which influenced the CO<sub>2</sub> footprint of each industry. Target lists were developed by subsector and geographic region for focused Network outreach.

The DOE SEN grant provided an opportunity for Network partners, NYSERDA key account managers, and NYSERDA Industrial Focus Contractors to coalesce and use tools developed by ANTARES to focus outreach efforts on the most energy intensive industrial subsectors and the largest companies within those subsectors. Of the 113 total projects recruited through the grant, 51 were submitted by companies on the target lists while the remaining 62 projects were identified through Network membership base and existing key account relationships. Also, 82 of 113 total projects were located in the CNY region. Results of the 113 industrial projects submitted through Network outreach indicate a combined identified savings of 165,880 MWh of electricity and 388,000 MMBtu of natural gas, more than doubling the stated project goal. NYSERDA continues to work with industrial customers towards project completion and implementation, as well as engagement on future energy efficiency and productivity

improvement projects. Further recruitment into NYSERDA energy efficiency programs would benefit companies through reduced energy consumption and associated energy costs, help to improve the local economy through increased productivity, and ultimately help NYSERDA reach its goal of reducing energy consumption and CO<sub>2</sub> emissions all across New York State.

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