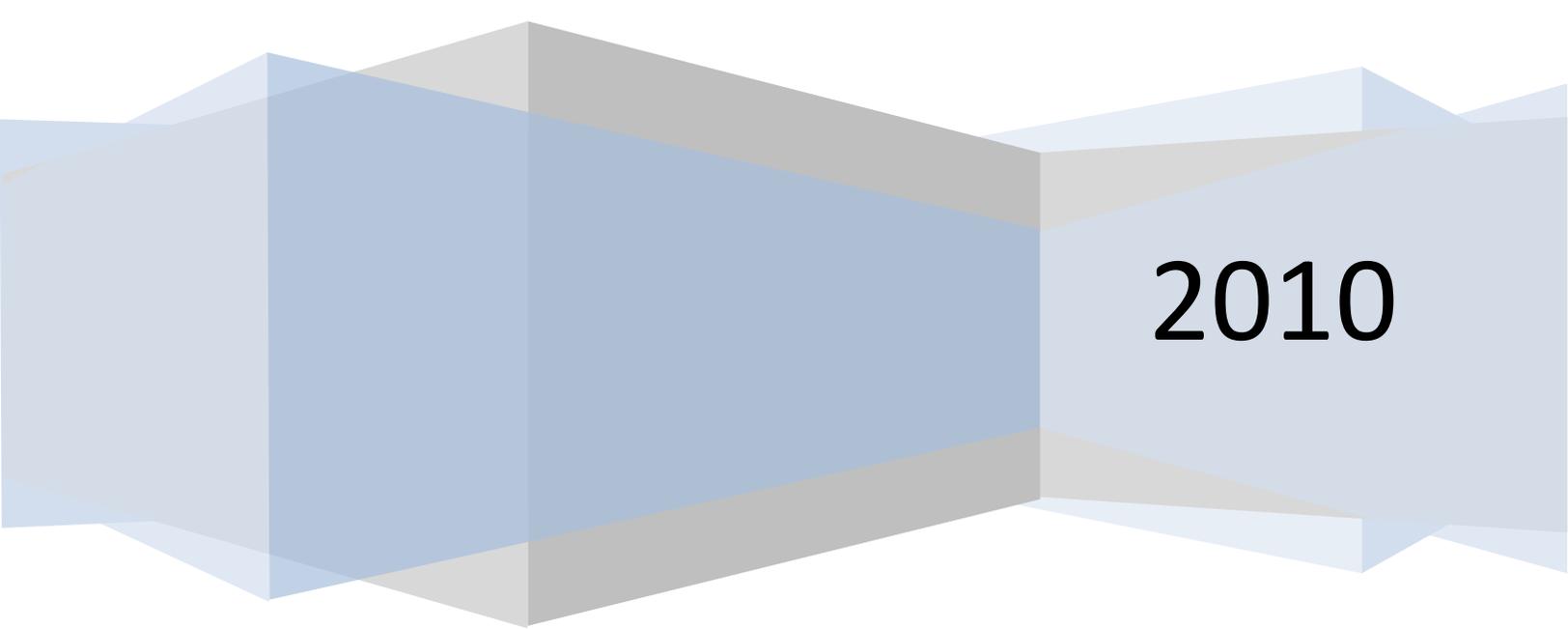


# New York State Printing Industry Report

Positioning Industry for the Future: Energy,  
Environment, Sustainability

Rochester Institute of Technology



2010

## Acknowledgements

The primary authors of this report are Mark Coleman, Senior Program Manager, Center for Integrated Manufacturing Studies (CIMS) and Rajiv Ramchandra, Staff Engineer, New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology (RIT). Questions, comments and feedback on this report can be directed to either Mark Coleman or Rajiv Ramchandra:

Mark C. Coleman  
*co-Manager, RIT Clean Energy Incubator (CEI)*  
*and Senior Program Manager (CIMS)*  
 Center for Integrated Manufacturing Studies  
 (CIMS)  
 Rochester Institute of Technology (RIT)  
 111 Lomb Memorial Drive, Building 78, Room  
 1005  
 Rochester, New York 14623-5608  
 T: 1 585-475-4473  
 F: 1 585-475-5250  
 E: [mccasp@rit.edu](mailto:mccasp@rit.edu)  
[www.sustainability.rit.edu](http://www.sustainability.rit.edu)

Rajiv Ramchandra  
*Staff Engineer*  
 New York State Pollution Prevention Institute  
 Rochester Institute of Technology  
 Louise Slaughter Building #78, Suite 2000  
 111 Lomb Memorial Drive  
 Rochester, NY 14623-5608  
 Phone: 585-475-4146  
 Fax: 585-475-6610  
 E-mail: [Rajiv.Ramchandra@rit.edu](mailto:Rajiv.Ramchandra@rit.edu)  
 Website: <http://www.nysp2i.rit.edu>

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- RadTech-The UV & EB Technology Association

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We especially thank the New York State printing industry contributors to this report who took time out of their daily business to fill-out surveys, participate in telephone “sensing interviews”, and provide additional data, information and support to the development of this report. The purpose of this study was to obtain understanding on the drivers that affect the energy, environmental and economic impact of printing establishments in New York State, with the goal of helping to identify options for enabling ongoing innovation and competitiveness within the industry.

We believe this report provides useful data, information, findings and recommendations for positioning the industry for the future, including key considerations on energy, environment and sustainability.

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## I. Executive Summary

The commercial printing industry is, like many industries, in the midst of change that will impact small-medium-and-large printers.

The Center for Integrated Manufacturing Studies (CIMS) at Rochester Institute of Technology (RIT) in collaboration with the New York State Energy Research and Development Authority (NYSERDA), RadTech-The UV & EB Technology Association, and the New York State Pollution Prevention Institute (NYSP2I) set out to understand the state of the New York State commercial printing industry and to what extent industry has faced or is currently facing challenges associated with energy, environment and sustainability.

A four month research effort was conducted to identify, assess, understand and reveal the macro influences on the ability of New York commercial printers to remain competitive, or to enhance their ability to competitive in a global economy. The findings of this research effort are not entirely novel, as many industrial sectors are struggling during the down economy on numerous, sometimes shared, challenges and barriers to growth. Still, the findings of this research do further validate the work of other studies that have concluded similar findings.

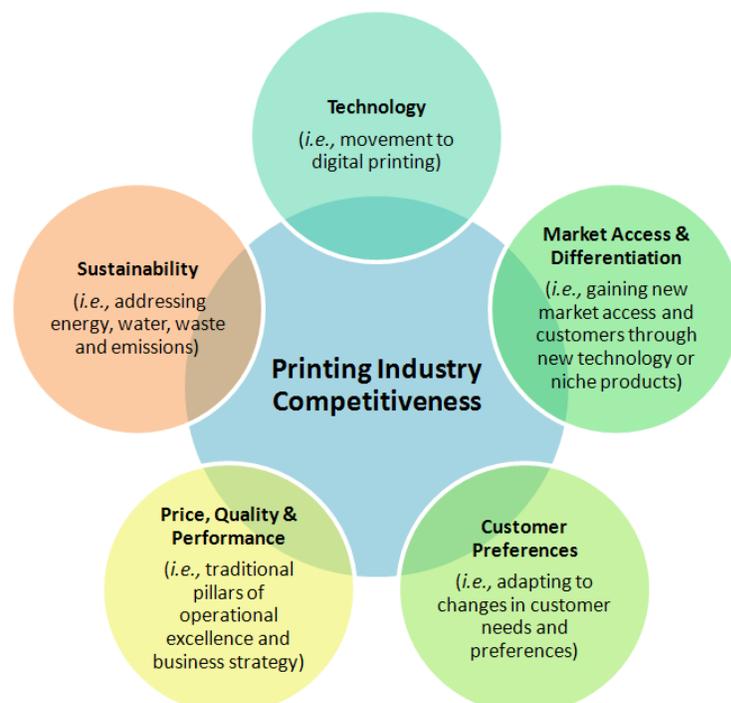
The research conducted by RIT sought to balance the acquisition of data and information through quantitative and qualitative research methods to achieve its core goals including:

- To assess and understand energy use among New York's commercial printers
- To assess and understand waste, recycling, pollution prevention and environmental management among New York's commercial printers
- To understand and potentially forecast how commercial printers will adopt and use printing technologies into the near future (next five years)
- To broadly understand the business, technology, regulatory and market challenges, opportunities, risks and threats that affect New York's commercial printing industry
- To understand the role of sustainability on industry competitiveness, growth and opportunity

As shown in the figure below there were five major influences that are now impacting the state of national and state commercial printing industry competitiveness:

1. **Technology** – the New York commercial printing industry is generally moving toward more digital printing technologies and applications. The majority of industry will make new equipment investments within the next five years.
2. **Price, Quality and Performance** – commercial printers continue to compete on these traditional pillars of operational excellence and business strategy.
3. **Market Access and Differentiation** – commercial printers seek to gain new market access and differentiate themselves from competition through the use of new technologies (like digital), but also by reducing operating costs (margin improvement) or enhancing the quality and performance of their products and services. Some companies are beginning to look at opportunities to differentiate themselves based upon their sustainability performance.
4. **Customer Preferences** – commercial printers are adapting to shifts in customer needs and preferences including quicker print runs, lower costs, and in some cases requests for lower environmental footprint products and services.
5. **Sustainability** – commercial printers are very aware of their environmental footprint and the concept of sustainability. Some printers have begun to make explicit policies toward sustainability, defining what it means to their enterprise and their customers. Others struggle with the concept of sustainability and do not yet feel it is a major driver of their day-to-day business and customer needs.

### Influences on National & State Printing Industry Competitiveness



This report summarizes many nuanced and interesting findings that each tie back to these five influences on the state of national and state printing industry competitiveness. Based upon the findings of this research, looking forward, the authors of this report believe the commercial printing industry in New York, and domestically, will see the five influences cited above having greater impact on the long-term health and competitiveness of the industry.

Projected shifts in technology and customer preferences will impact how commercial printers do business. Their ability to respond to shifting customer needs and requirements will, in part, dictate their ability to access new markets and differentiate themselves from competition. Maintaining high quality products and services in a speedy manner may challenge industry as new printing technologies and applications are tested and deployed for commercial use. Still, these technologies pose great potential to address sustainability goals from a natural resource use (energy, water, materials) and pollution prevention and waste minimization perspective.

The influences on the commercial printing presented above industry are not new. Nevertheless, the value and priority consumers, governments and companies place on these influences is changing, (*i.e.*, sustainability is gaining greater prominence among consumers and governments), thereby requiring industry to realign its business strategy with options for growth and profitability (competitiveness) in the context of new technology, process improvements and access to capital, human and technical resources.

The remainder of this report presents data and information in support of these claims. In addition, we issue a recommendations section that presents options of industry and other stakeholders to consider in attempts to enable New York's commercial printing industry to remain one of the most vibrant, efficient, competitive and sustainable in the country.

## II. Background and Purpose of the Study

The goal of this study was to obtain an understanding of the drivers that affect the energy, environmental and economic impact of printing establishments in New York State, and as an extension, the nation.

This study provides an overview of the New York State Printing industry including key metrics that serve to characterize the size and impact of the industry on energy, environment and economy:

- Number of printing establishments
- Number of employees
- Sales
- Energy use
- Environmental impacts related to waste, water and chemical use

This study unveils that there are at least five primary drivers that can change the energy, environmental and economic impact of individual printing establishments and the industry as a whole:

- Diversification
- Consolidation
- Technology Selection
- Operational Excellence
- Customer Volumes
- Regulatory Environment

In the early stages of this study, it was acknowledged by the authors that in order to garner useful information and make rational interpretations of the data (both surveyed and researched) it was imperative to develop a clear understanding of the printing industry before developing the survey and conducting related research.

With this bottom-up approach, the study set out to lay a strong foundation with the intention of achieving end results that would not only provide specific information on current practices and trends within the printing industry, but also serve as a benchmark of comparison for companies, government, trade groups, and public benefit organizations.

This study was conducted with financial and data support from the New York State Energy Research and Development Authority (NYSERDA), RadTech and the Center for Integrated Manufacturing Studies (CIMS), and New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology. A summary of these sponsors follows below.

### **About New York State Pollution Prevention Institute (NYSP2I)**

The New York State Pollution Prevention Institute (NYSP2I) is a statewide research and technology transfer center funded by the New York State

Department of Environmental Conservation. RIT and its partner universities, Rensselaer Polytechnic Institute, Clarkson University, and the University of Buffalo, along with the state's ten regional technology development centers (RTDC) together comprise the NYSP2I.

The vision for the NYSP2I is to foster the transformation and development of sustainable businesses and organizations in New York State in a collaborative program committed to making the State a leader in environmental stewardship.

The mission of the P2I is to provide a state-wide, comprehensive and integrated program of research, technology development and diffusion, outreach, training, and education aimed at making New York State more sustainable for workers, the public, the environment, and the economy.

NYSP2I's goal is to provide full geographic coverage of P2 programs and services across the state. This will be achieved through a number of mechanisms including strategic partnerships with the RTDCs, other technical assistance providers in the public and private sectors, universities and non-profit organizations. Additional information on NYSP2I can be found at, <http://www.nysp2i.rit.edu/>.

#### **About the Center for Integrated Manufacturing Studies (CIMS)**

The Center for Integrated Manufacturing Studies (CIMS) at Rochester Institute of Technology was established in 1992 with a mission to increase the competitiveness of manufacturers through applied technology and training.

CIMS represents a dynamic collaboration of in-house technical experts, as well as academic, industry and government resources. Located on the campus of Rochester Institute of Technology, our unique, world-class facility houses research centers, industrial programs, and an all-encompassing training program.

CIMS provides technology and workforce development solutions that strengthen our clients' ability to compete in the global marketplace.

CIMS' major programs include:

- Center for Excellence in Lean Enterprise
- Imaging Products Laboratory
- Manufacturing Technologies Program
- National Center for Remanufacturing and Resource Recovery
- Occupational Safety and Ergonomics Excellence Program
- Sustainable Systems Research Center
- Systems Modernization and Sustainment Center

CIMS' 170,000 square-foot facilities, which house \$45 million of contemporary equipment, on the campus of RIT support solution developments in technology bays, specialized applied technology laboratories and a state-of-the-art training

center. Over the last two years, CIMS has interacted with some 1,000 companies, completed over 1,100 industrial projects, and conducted more than 600 training courses for over 12,000 participants from around the world. Additional information on CIMS can be found at, <http://www.cims.rit.edu/>.

#### **About RadTech International**

RadTech International North America, a non-profit organization, is the association for the advancement of ultraviolet and electron beam (UV & EB) technology. RadTech serves as an industry forum, addressing the educational needs of the users and suppliers of UV and EB equipment and materials. Our members also represent end user companies in several industries including: Adhesives, Composite Applications, Converting/Packaging, Decorative Applications, Dental Restorations, Electronics/Electrical, Flooring, Graphic Arts (inks, high-gloss varnishes), Opto Electronics, Metals, Photoresists, Plastics, Rapid Prototype Parts Manufacture, Release Coatings, Steel Pipe, Tubing, and Wood Finishes. Additional information on RadTech can be found at, <http://www.radtech.org/>.

#### **About New York State Energy Research and Development Authority (NYSERDA)**

New York State Energy Research and Development Authority (NYSERDA) is a public benefit corporation created in 1975 under Article 8, Title 9 of the State Public Authorities Law through the reconstitution of the New York State Atomic and Space Development Authority. NYSEDA's earliest efforts focused solely on research and development with the goal of reducing the State's petroleum consumption. Today, NYSEDA's aim is to help New York meet its energy goals: reducing energy consumption, promoting the use of renewable energy sources, and protecting the environment.

Currently, NYSEDA is primarily funded by state rate payers through the System Benefits Charge (SBC), which was established on May 20, 1996, and was specified funding from July 1, 1998 to June 30, 2001. These SBC funds were allocated toward energy-efficiency programs, research and development initiatives, low-income energy programs, and environmental disclosure activities. Part of this funding went into the creation of New York Energy SmartSM, which helps to maintain momentum for the State's efforts to develop competitive markets for energy efficiency; demand management; outreach and education services; research, development, and demonstration; low-income services; and to provide direct economic and environmental benefits to New Yorkers. The SBC was extended through June 30, 2006, and most recently until June 30, 2011.

NYSERDA strives to facilitate change through the widespread development and use of innovative technologies to improve the State's energy, economic, and environmental wellbeing. In fulfilling its mission, NYSEDA's workforce reflects its public service orientation, placing a premium on objective analysis and collaboration, as well as reaching out to solicit multiple perspectives and share information. NYSEDA is committed to public service, striving to be a model of

efficiency and effectiveness, while remaining flexible and responsive to its customers' needs. NYSERDA's programs and services provide a vehicle for the State to work collaboratively with businesses, academia, industry, the federal government, environmental community, public interest groups, and energy market participants. Through these collaborations, NYSERDA seeks to develop a diversified energy supply portfolio, improve market mechanisms, and facilitate the introduction and adoption of advanced technologies that will help New Yorkers plan for and respond to uncertainties in the energy markets.

NYSERDA is governed by a board consisting of 13 members, including the Commissioner of the Department of Transportation, the Commissioner of the Department of Environmental Conservation, the Chair of the Public Service Commission, and the Chair of the Power Authority of the State of New York, who serve ex officio. The remaining nine members are appointed by the Governor of the State of New York with the advice and consent of the Senate and include, as required by statute, an engineer or research scientist, an economist, an environmentalist, a consumer advocate, an officer of a gas utility, an officer of an electric utility, and three at-large members. For more information, contact the Communications unit, NYSERDA, 17 Columbia Circle, Albany, New York 12203-6399; 1-866-NYSERDA or (518) 862-1090. Additional information on NYSERDA can be found at, <http://www.nysesda.org/>.

### III. Background on the NYS Printing Industry

A recent study conducted by Frank Romano and David Broudy ‘An Investigation Into Printing Industry Demographics – 2009’<sup>1</sup> was the logical starting point to understand the demographic nature of the printing industry in New York State. The goal of the study, which surveyed over 1,000 firms in the six New England states and New York combined, was to discuss definitions for the U.S. printing industry and the “print universe”.

The study shows that according to the NAICS (323) data presented by County Business Patterns based on the 2007 U.S. Economic Census, there are an estimated 423 corporations, 1,356 individual proprietorships and 92 partnerships, totaling 1,871 firms in the printing industry in New York State. The New York State printing industry is ~6% - 7% of the U.S. printing industry. Table 1 (below) uses the 2009 and forecast 2015 U.S. data and estimates the make-up of the New York State printing industry.

Category	U.S. – 2009	U.S. – 2015	NY – 2009 (6.5% of U.S.)	NY - 2015 (6.5% of U.S.)
<b>Commercial Printing</b>				
General Commercial	12100	11800	787	767
Quick Printing	5900	4000	384	260
Newspaper Printing	4300	3000	280	195
Book Printing	281	245	18	16
Financial, Legal Printing	102	98	7	6
Screen Printing	3999	2000	260	130
Digital Printing	3190	3000	207	195
<i>Subtotal</i>	29872	24143	1942	1569
<b>Form, Label &amp; Tag Printing</b>				
Business Forms Printing	469	300	30	20
Label, Wrapper Printing	640	510	42	33
Tag, Ticket, Tape Printing	105	95	7	6
<i>Subtotal</i>	1214	905	79	59
<b>Other Printing</b>				
Greeting Card	29	20	2	1
Specialty	790	980	51	64

<sup>1</sup> Romano, F., Broudy, D. (2009). An Investigation Into Printing Industry Demographics – 2009. *School of Print Media: Rochester Institute of Technology*.

Printing				
Packaging	1340	1310	87	85
Printing				
<i>Subtotal</i>	2159	2310	140	150
<b>PRINTING FIRMS - TOTAL</b>	33245	27358	2161	1778
<b>Trade Services</b>				
Prepress				
Services	1200	500	78	33
Trade Binding	1000	1000	65	65
Other Finishing				
Services	2200	2000	143	130
<i>Subtotal</i>	4400	3500	286	228
<b>PRINTING INDUSTRY - TOTAL</b>	37645	30858	2447	2006
<b>Other Services</b>				
Direct Mail				
Services	3477	3200	226	208
Graphics/Photo				
Services	8000	9000	520	585
Copy Shops	5800	4000	377	260
In-plant				
Services	5100	5000	332	325
<i>Subtotal</i>	22377	21200	1455	1378
<b>PRINT UNIVERSE - TOTAL</b>	60022	52058	3901	3384

Table 1: The U.S. and NY Print Universe

General Commercial constitutes the largest portion of the industry in New York and while the entire industry is forecast to shrink by ~19% by 2015, the sharpest decline (50%) is expected in Screen Printing.

### Market and Regulatory Issues and Drivers

There are a number of market and regulatory issues and drivers influencing the New York State (and domestic) printing industry. The following issues and drivers are summarized to provide additional context to the state of the industry.

#### Market Issues and Drivers

Issues:

1. *Computer use* - This is not immediate because the current generations are not completely comfortable reading consistently off of computer screens, but future generations may be.

2. *Postal rates* - A 10% increase in postal charges resulted in a 5% decrease in printed mail being shipped
3. *Desktop printing* - Even though high costs limit the amount of high-volume printing that can be done by at-home desktop printers; this directly affects the printing industry.
4. *Off-shoring* - The biggest competitor for the US printing industry is the non-US printing industry. The US trade surplus in the printing industry declined 38% from 2003 to 2004.
5. *Pollution Prevention* - The emphasis on being more environmentally conscious and sustainable tightens the regulations on the printing industry in terms of toxic releases during the manufacture of supplies (paper, ink, etc.)
6. *General attitude* - With more emphasis on being friendly to the environment (Issue 5), more clients are willing to sacrifice printed copies and spend more time and money learning how to use electronic copies.

#### Drivers:

1. *Economic drivers* - By decreasing the value of the American dollar, more overseas sales will be made because it will be less expensive for foreign businesses to purchase and ship from the United States.
2. *Increased leisure time* - Because of concern over sleep-deprived lifestyle between 1970 and 1990, the American lifestyle has been adjusted to include more leisure time during the day. This, when combined with advances in technology (microwave oven proliferation, automatic vacuum cleaners, etc.) leaves more time for leisure, including reading printed entities.

#### Regulatory Issues and Drivers

1. *Waste disposal regulations are getting stricter*
  - a. Definition of hazardous waste and what needs to be treated as hazardous is ever-changing as more chemicals are identified as possible or proven carcinogens
  - b. Prices of depositing waste is going up as space in landfills and other disposal facilities is becoming more limited
  - c. Emphasis on environmental awareness and recycling drives both A and B
2. *Reduction of VOCs in printing industry has many benefits*
  - a. Helps to reduce the risk of "Sick Building Syndrome" (SBS)

- b. Unfortunately, replacing VOCs can be costly to printing companies, as replacement chemicals can fall short of the reliability of the chemicals containing VOCs
    - i. This leads to more printing defects as reliability falls, which leads to more waste being produced
- 3. *Regulations only apply to industry*
  - a. For example, residents can use whatever they want in terms of in-home printing because it is their residence
    - i. This means that industry has to take extra time to make sure they are within standards, while household printing requires no such effort, so the cost stays the same or increases less

## IV. Research Methodology and Limitations

This study relied on a complement of primary and secondary data collection. The following methods were used for collecting data and information to support this study:

- Printing Industry Survey - Primary data collection and research was collected using a 29 question survey instrument targeted to owners and operators of New York State printing establishment.
- Sensing Interview Process – Primary data was also collected using a “sensing interview” process. This process basically made use of phone interviews as a way to collect additional insights from printing industry owners and operators on what they felt were challenges, opportunities, emerging issues, or threats to the ongoing competitiveness of their industry.
- Internet and Database Research – Secondary data and information was collected using Internet and Database Research on specific printing industry technologies, practices, trends, and companies. This data and information is used throughout this report and referenced accordingly.

### Data Collection Methodology and Time Frame

Over the course of twelve weeks, RIT administered a written survey instrument to 155 printing industry owners and operators (survey population). The survey population of owners and operators was selected from a complement of industry contacts selected from the Printing Industry Association of New York State (PIANYS) and RadTech International.

Table 2 below outlines the primary data collection methods, time frame for administering the methods, and outcomes (number of respondents) for the specific methods. RIT began with a target population of 155 printing industry owners and operators for the survey instrument (see Appendix D for the list of NYS printers that were targeted for the survey). In addition RIT selected, at random, a target of 20 companies to approach for more in-depth phone “Sensing Interviews”. As shown, RIT was able to yield a 10% response rate on the written survey and a 35% response rate on the Sensing Interview process.

RIT administered the written survey through the use of e-mail correspondence and direct phone calls. RIT made three attempts to reach the entire survey population:

- The first outreach phase included an e-mail to the owner and operator of the printing establishment with a description of the survey, its purpose and a request for their participation. The e-mail had as an attachment the electronic survey of 29 questions. The RIT team then followed up with a phone call to the owner/operator alerting them to the survey and request



*Over the course of 12 weeks, RIT administered a written survey to 155 printing industry owners and operators. RIT achieved a 10% participation rate in the survey.*

for their participation. In some instances phone messages were provided. In other instances RIT staff spoke directly with a representative of the company. Approximately three weeks were provided for this first outreach phase to be conducted.

- The second outreach attempt mirrored the first phase. The goal of the second phase was to send out e-mail reminders and make phone calls in attempts to increase the number of survey responses.
- The third phase mirrored the first and second phase. Still, phone calls were the primary mode of communication to printing industry owners/operators as an attempt to increase survey participation.

**Table 2. Primary Data Collection Duration & Responses**

<b>Data Collection Method</b>	<b>Data Collection Duration</b>	<b>Total Population</b>	<b>Responses/Participants</b>	<b>Responses as Percentage (%)</b>
<b>Survey (29 questions)</b>	Fielded for 12 weeks between March and May 2010	155	15	10%
<b>Sensing Interviews (1 hour in-depth phone interviews)</b>	Conducted between March and May 2010	20	7	35%

#### **Limitations of the Study**

While a 10% response rate to a survey is reasonable, the key limiting factor to this study is number of participants.

Within the 10% response rate, not every survey respondent answered every question, leaving gaps in the collection of data for some questions. While this is a limiting factor, the sensing interview process of this study helped further substantiate the quantitative data collected through the survey instrument. In addition, the sensing interview process served to collect “voice-of-the-customer” information, knowledge, and perspective that added additional dimension to this study.

## V. Findings from Survey Participants

### Business Context

- Greater than 65% of respondents use Offset Lithography as their core printing process/technology, by total annual revenue.
- The survey respondents represented a diverse cross section of the New York State Printing industry. For example,
  - 31% of the respondents characterized themselves as “General Commercial Printers”,
  - 23% of respondents characterized themselves as “Form, Label, Tag Print”,
  - 19% of respondents characterized themselves as “Packaging Printers”, and
  - 27% characterized themselves as something “Other”.

### Economic & Employment Impact

- In total, respondents represented more than **\$231 million in revenues** in 2009.
  - The revenue per employee for respondents ranges from \$56,000 to greater than \$240,000 with the average revenue per employee calculating as \$163,000.
- Respondents employ more than **1,200 people** in New York State.
- Respondents manage operations in more than **828,000 square feet** of facilities.

### Natural Resource Use, Impacts & Costs (Energy, Water & Climate)

- Respondents use more than **22.7 million kWhs of electricity** annually.
  - In total, respondents spend more than \$2.2 million on electricity annually.
  - The average annual electricity cost per respondent is \$227,000 per year.
  - On average, respondents use 22.87 kWhs of electricity per square foot of their facility (representing an average electricity cost of \$2.29 per square foot).
  - On average, electricity costs represent less than 1-2% of printing establishment’s total revenue.



*Respondents represented more than \$231 million in revenue; 1,200 employees and occupy close to one million square feet of building space in New York State*



*Total electricity and gas costs represent, on average, 1-2% of total revenue for respondents. Based upon sensing interview results, total energy costs can range 5-7% of total operating costs for commercial printers.*

- The respondents total electricity use equates to the following greenhouse gas (GHG) emissions:
  - 18.7 million pounds of CO<sub>2</sub>
  - 40,400 pounds of SO<sub>2</sub>
  - 18,300 pounds of NO<sub>x</sub>
- Respondents use more than **241,000 therms of gas** annually
  - In total, respondents spend more than \$297,000 per year annually on gas.
  - The average annual gas cost per respondent is \$59,000 per year.
  - On average, respondents use 0.32 therms of gas per square foot of their facility (representing an average gas cost of \$0.40 per square foot).
  - On average, gas costs represent less than 1% of printing establishments' revenues.
- Respondents used more than 21,500 gallons of chemicals in their operations in 2009. The majority of chemical use was for "press" printing processes.
- The majority of waste<sup>2</sup> (more than 95% by volume) generated by respondents was in solid waste (primarily paper and cardboard). Respondents generated more than 10.5 million pounds of solid waste in 2009. Other waste generation included:
  - 372,000 pounds of wastewater discharge
  - 12,100 pounds of hazardous waste
  - 3,500 gallons of hazardous waste
  - 650 pounds of air emissions
- Respondents use more than **4.4 million gallons of water** for their operations annually.
  - On average respondents use 5.76 gallons of water per square foot of their facility.
- Total electric and gas costs represent, on average, 1-2% of total revenue per printing establishment.

<sup>2</sup> The waste generation data is a function of those that reported data. Not all respondents reported waste data.



*59% of respondents report that they plan to purchase new Digital Printing Technologies in the next five years.*

### Printing Technology & Operational Practices

- 15% of respondents reported that they now used solvent-based inks in their printing processes.
- 59% of respondents report that they plan to purchase new **Digital Printing** Technologies (ink jet/toner) in the next five years. Of those, 46% of respondents' state that they plan to purchase a Digital Printing Technology (ink jet or toner based) in the next 1-2 years and 23% state they will purchase in 3-5 years.
- 48% of respondents report that they plan to purchase new **Offset (heatset/ conventional/UV/EB/LED) Printing** Technology in the next five years. Of those, 23% report a desire to purchase in the next 1-2 years and 15% plan to purchase in 3-5 years.
- 40% of respondents report that they plan to purchase new **Flexography Printing** Technology (water/solvent/UV/EB) in the next five years. Of those, 31% state that they intend to purchase in the next 1-2 years and 8% plan to purchase in 3-5 years.
- 40% of respondents report that they plan to purchase new **Screen Printing** Technology in the next five years. Of those, 31% plan to purchase in the next 1-2 years and 8% intend to purchase in 3-5 years.
- 8% of respondents plan to purchase new **Gravure** Printing Technology in the next 3-5 years.
- 46% of respondents indicated that they use **UV curing** in their printing process.
  - 46% of respondents noted that they use more energy-efficient LED bulbs versus UV lamps in their UV processes.
  - The majority of respondents (92%) did not respond to the question on whether EB technology is used in their processes.
- When asked if UV or EB technologies would be considered for future use, 38% of respondents indicated they would not adopt UV and 46% indicated they would not adopt EB technology. The remainder of participants did not respond to the question.
- Less than 7% of respondents indicated that they use thermal oxidizers in their printing process. No respondents indicated whether the use of thermal oxidizers resulted in lower VOCs.
- When asked about the brand of printing equipment currently in use, 21 brand names were identified; however a vast majority cited Heidelberg.



*64% of respondents state that their customers are interested in “sustainability” and that customers have influenced their business practices as it pertains to sustainable practices.*

- The age of Heidelberg equipment in use ranged from less than one year to more than 60 years old.
  - The average age of Heidelberg brand equipment in operation by respondents is 18.1 years old.
- The average age of all printing equipment for all respondents is 12.8 years old.

#### **Sustainable Practices, Recycling & Materials Management**

- 100% of respondents stated that their company has an existing **Recycling Policy**.
  - In aggregate, respondents recycle more than **10.2 million pounds of material** annually.
- 64% of respondents state that their customers are interested in “sustainability” and the same respondents note that customers have influenced their business practices as it pertains to sustainable practices. In fact,
  - 38% of respondents have an existing/active corporate **Sustainability Policy** in place.
  - 31% of respondents have an existing/active corporate **Environmental Policy** in place.
  - 23% of respondents have an existing/active corporate **Energy Policy** in place.
- Respondents are considering implementing, or have already implemented a variety of sustainability measures:
  - 62% are considering or have implemented waste reduction programs
  - 54% are considering or have implemented “ink and coating selection” into their printing operation
  - 54% are considering or have implemented “lean manufacturing techniques”
  - 46% are considering or have implemented “VOC reduction” technologies/processes
  - 31% are considering or have implemented “alternate substrate selection” into their printing operation
  - 23% are considering or have implemented the “use of bio-based or renewable raw materials”



*69% of respondents report that their company has a corporate manager, director or VP of EHS overseeing their environmental policy and operational practices.*

- 15% are considering or have “hired outside consultants” to help with sustainability measure implementation
- 38% of respondents currently belong to a **voluntary trade association** that has an emphasis on sustainability
- Printing companies have and continue to put staff and operational resources toward sustainability, environmental, health and safety practices. For example,
  - 23% of respondents report that their company has a **corporate manager, director or VP of Sustainability** overseeing their sustainability policy and strategy
  - 69% of respondents report that their company has a **corporate manager, director or VP of environmental, health and safety (EHS)** overseeing their environmental policy and operational requirements
- The **top sustainability and environmental concerns/issues** companies currently face include:
  - Reducing/recycling materials including wooden pallets
  - Indoor air quality
  - Enhancing the recyclability of label/liner materials and adhesives
  - Maintaining a profitable business while meeting or exceeding sustainability goals is a core concern of many companies
  - There is a lack of recycling options for pressure-sensitive adhesives (PSA)

## VI. Survey Data Findings and Analysis

### Overview

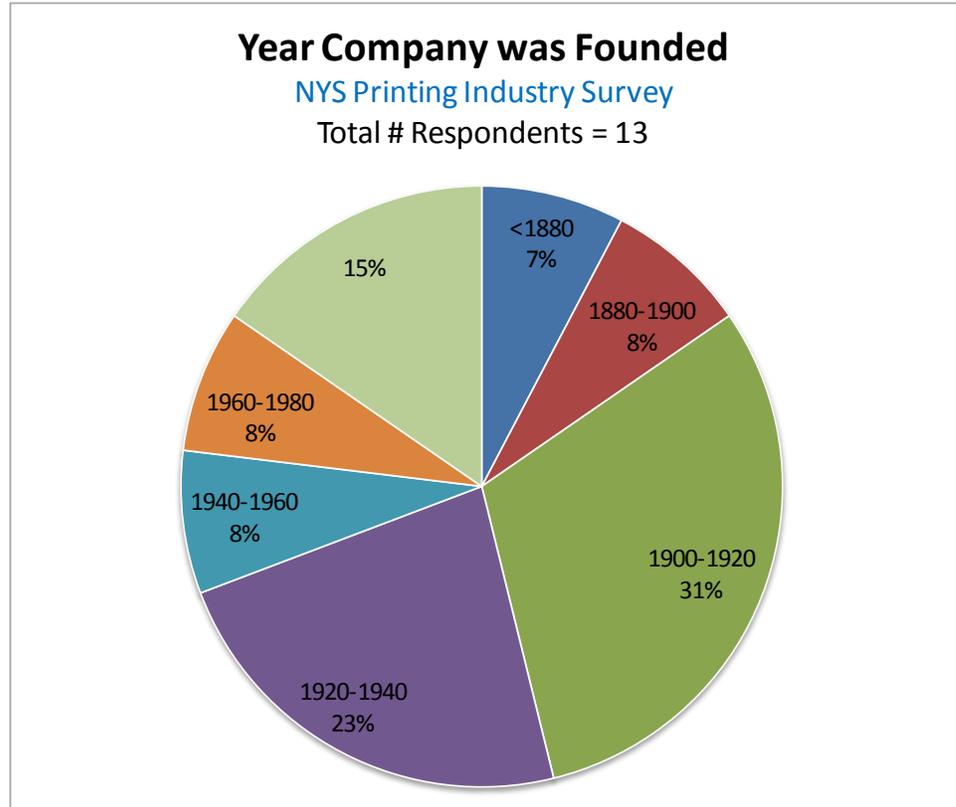
This section summarizes, analyzes and reports out on the data and information received from the printing survey administered by RIT. The survey questions attempted to understand current business practices and context; the current use of energy, water and other natural resources; the existing use and planned future use of printing technologies; and the perception, policies and practices companies have regarding sustainability. This section reports out the findings of the surveys in aggregate form as outlined below:

- **Business Context**
  - Questions focused on business data and metrics such as:
    - Year the company was founded
    - Core business segments of printing industry served
    - Total number of employees
    - Annual revenue
    - Annual revenue by printing process/technology
    - Size of the printing facility
  
- **Impacts of the Printing Industry on Natural Resources**
  - Annual Electricity Use
  - Annual Gas Use
  - Annual Water Use
  
- **Operations and Technology**
  - Brand and age of printing equipment
  - Planned purchase of new printing technologies and time horizon for purchase
  - Use of UV and EB technologies in the printing process
  - Use of thermal oxidizers in the printing process
  
- **Sustainability Perceptions, Policies and Practices**
  - Have customers requested sustainability
  - Have customers influenced sustainability decisions/practices
  - Involvement in voluntary trade-associations focused on sustainability
  - Use of solvent-based inks in the printing process
  - Range of sustainability measures considered or implemented at companies

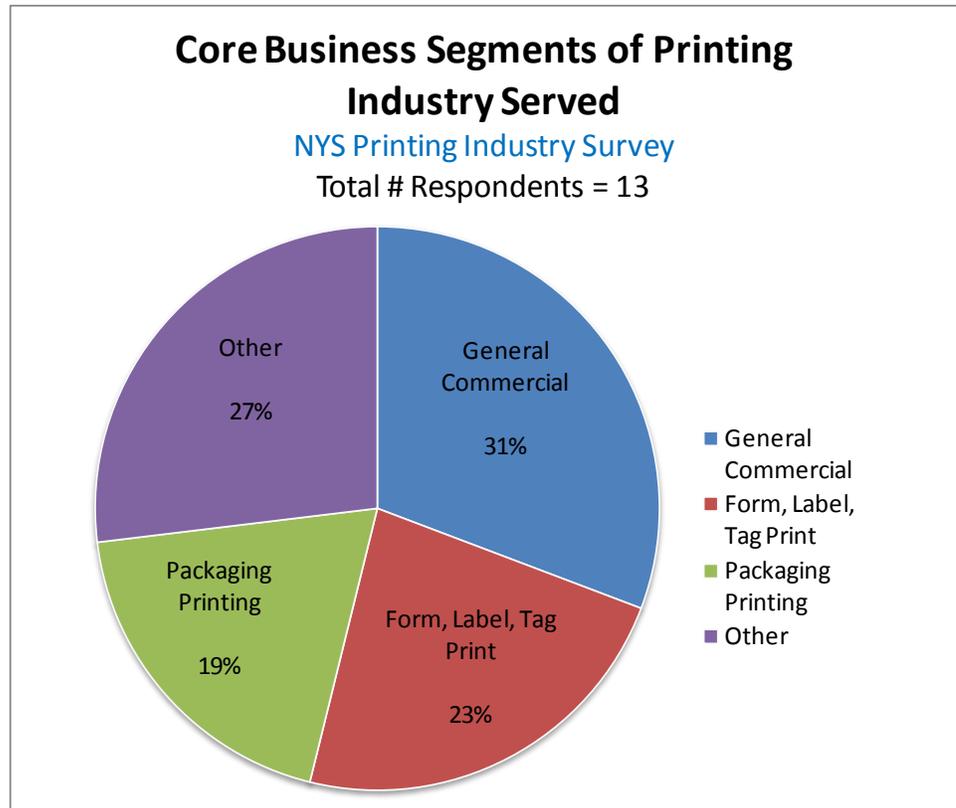


## Business Context

*54% of respondents companies have been in business for more than 70 years (founded prior to 1940).*



*Survey respondents represented a broad and balanced cross section of the printing industry.*

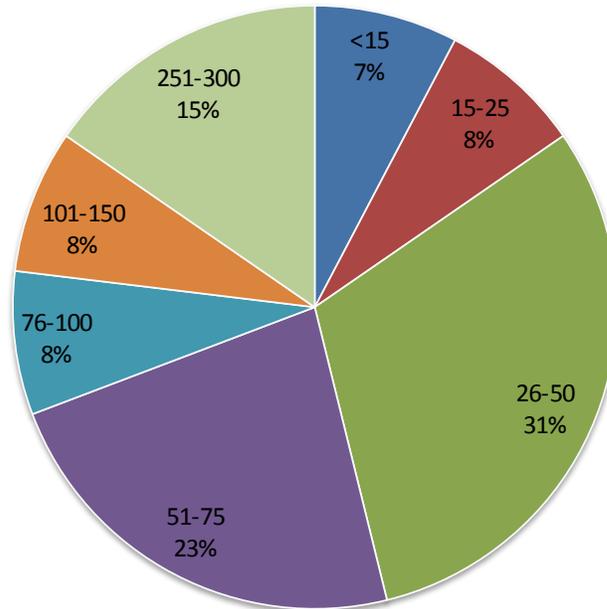


*The majority, 54% of respondents, employed between 26 and 75 employees. 15% of the respondents employ more than 250 people.*

### Total Number of Employees

NYS Printing Industry Survey

Total # Respondents = 13

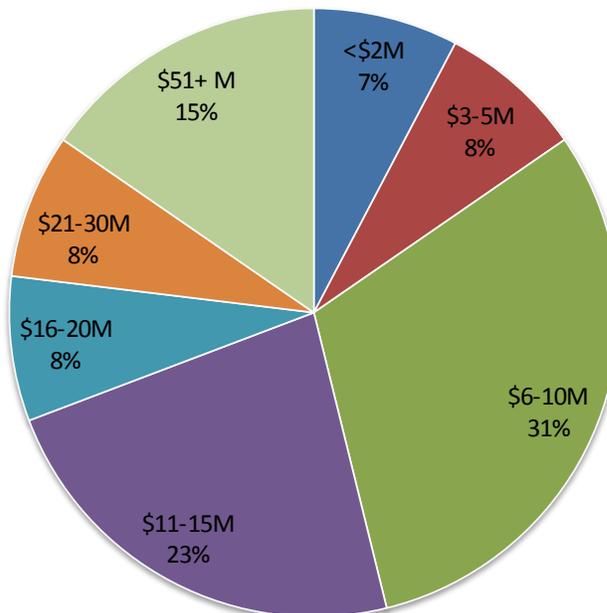


*The majority, 54% of respondents, reported total annual revenues between \$6 and \$15 million. 15% of respondents reported annual revenues greater than \$51 million.*

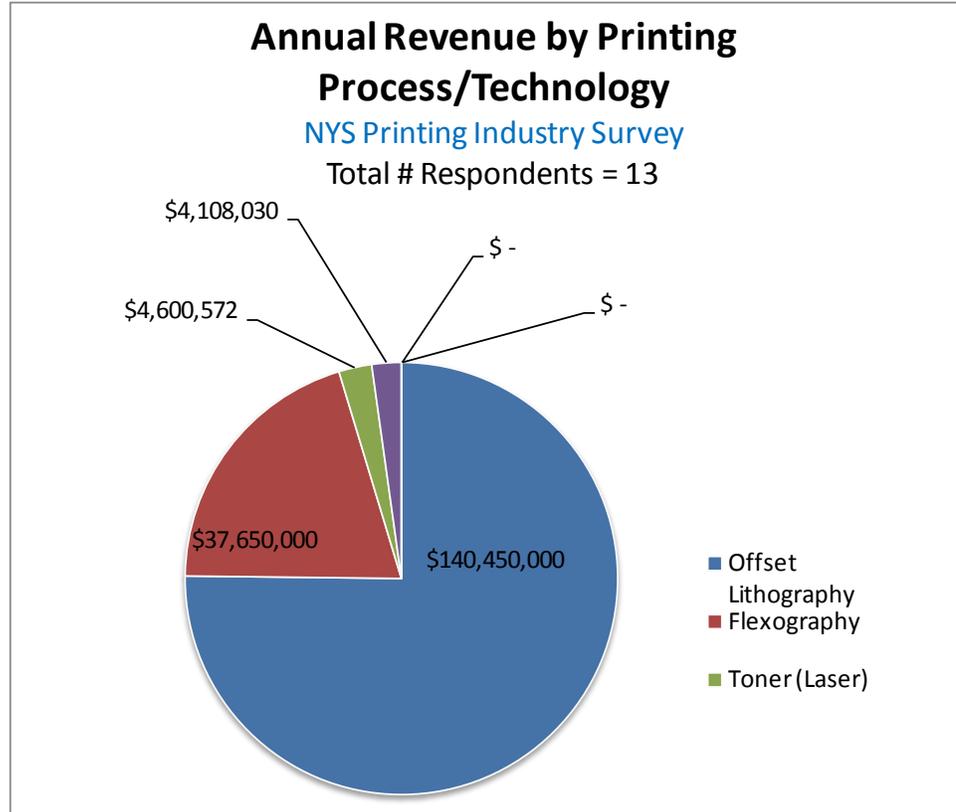
### Annual Revenue

NYS Printing Industry Survey

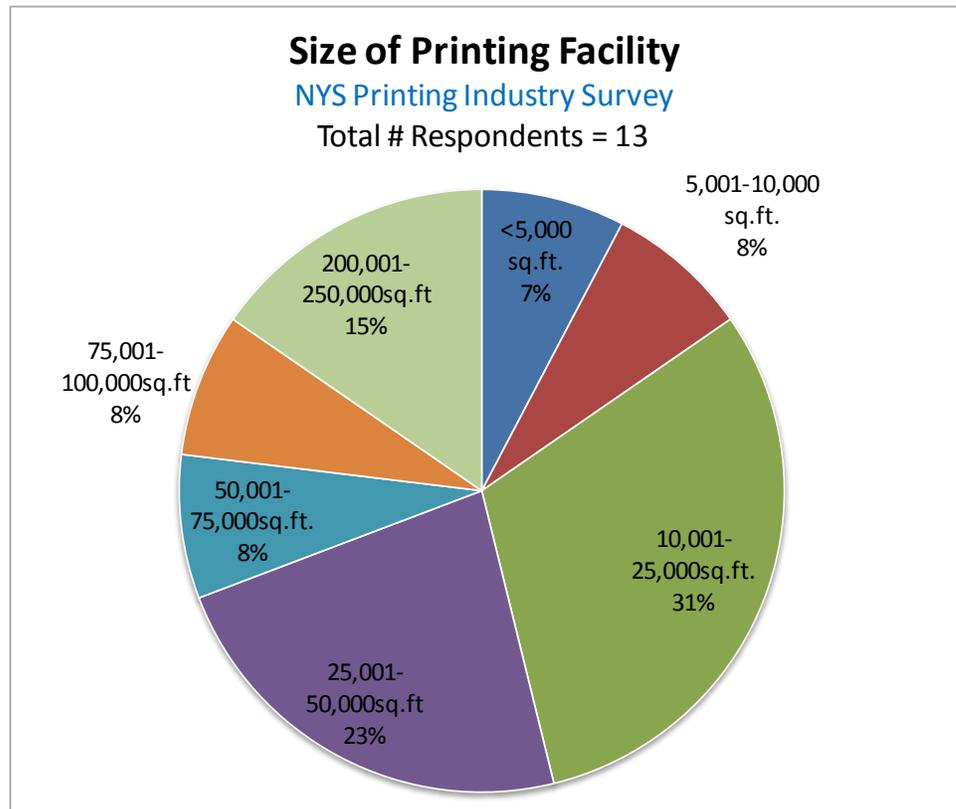
Total # Respondents = 13



*More than 65% of respondents use Offset Lithography as their core printing technology and revenue earner.*

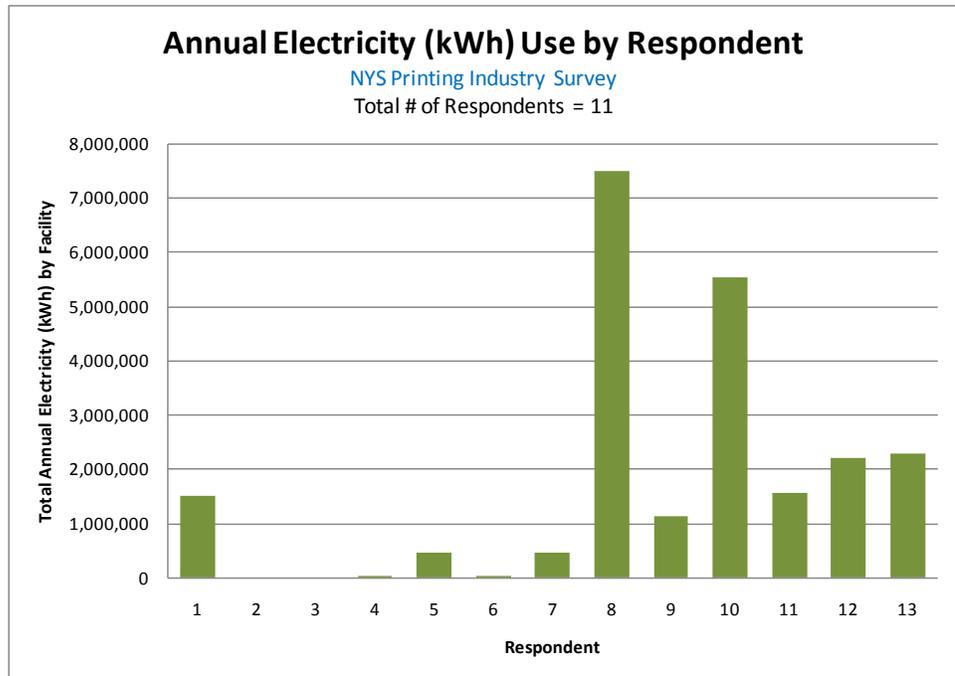
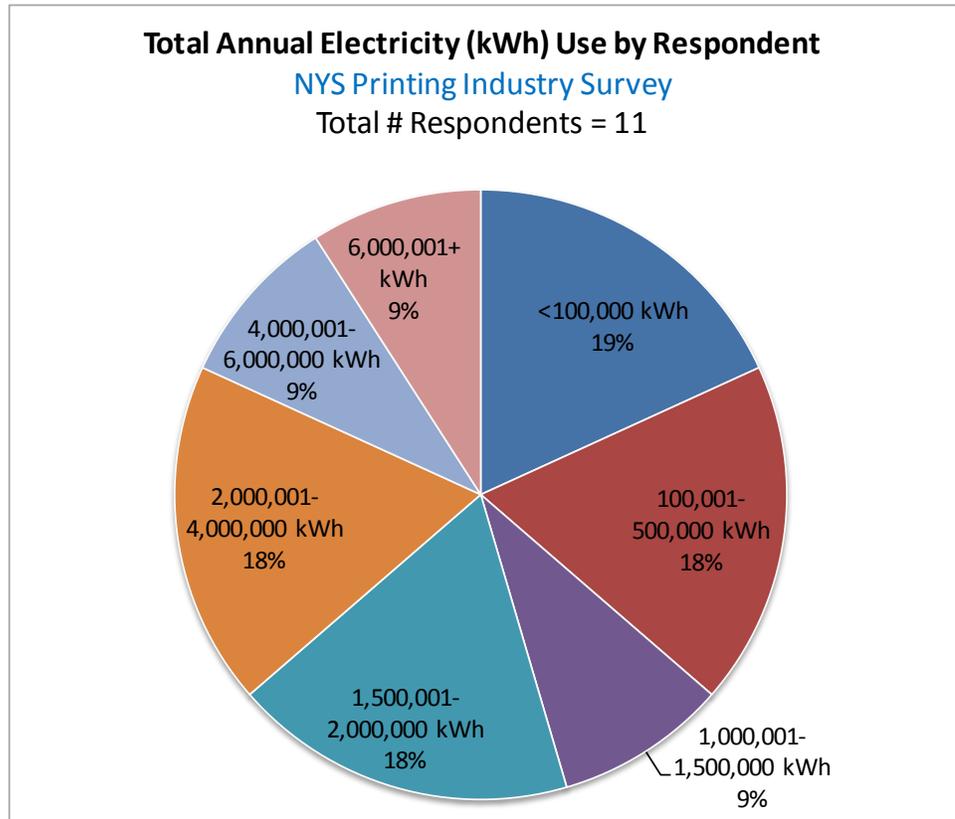


*The majority, 31% of respondents, occupy between 10,000 to 25,000 square feet of building space. 15% of the respondents occupy greater than 200,000 square feet of building space.*

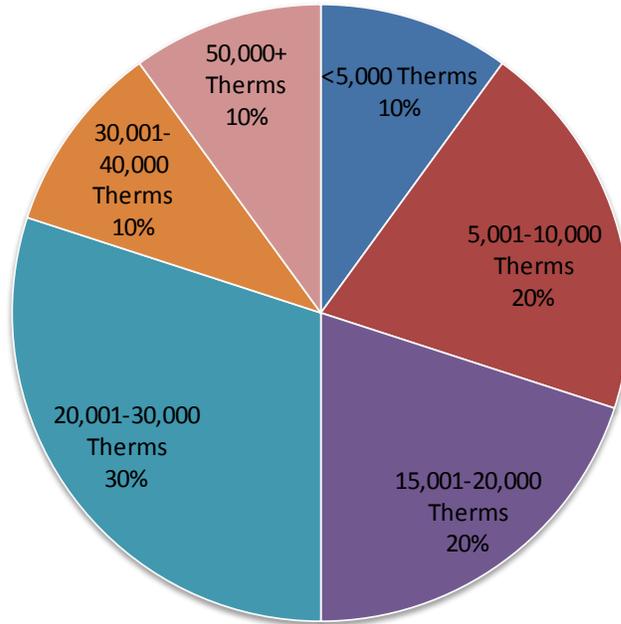


## Impacts of the Printing Industry on Natural Resources

*Respondents' annual electricity use was diverse. Nevertheless, more than 36% of the companies surveyed use more than two million kWh of electricity per year.*

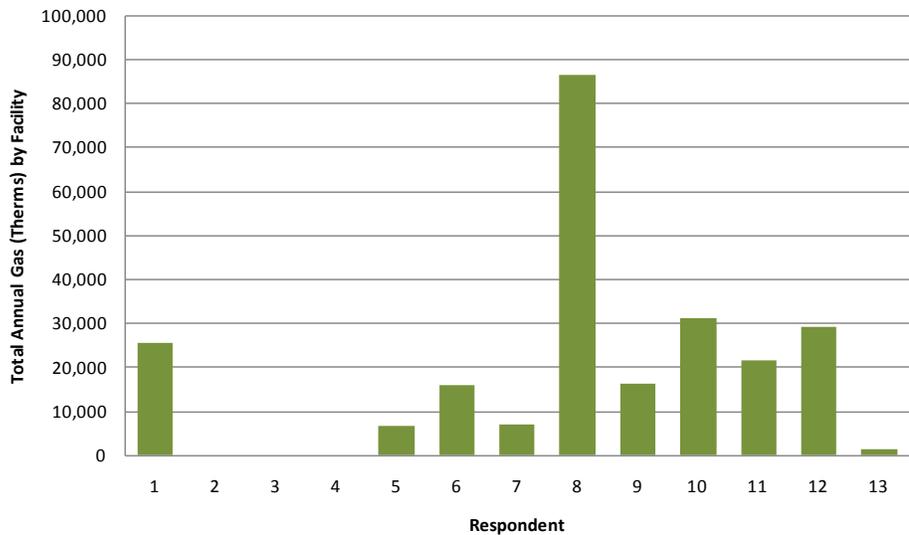


**Total Annual Gas (Therm) Use by Respondent**  
 NYS Printing Industry Survey  
 Total # Respondents = 10

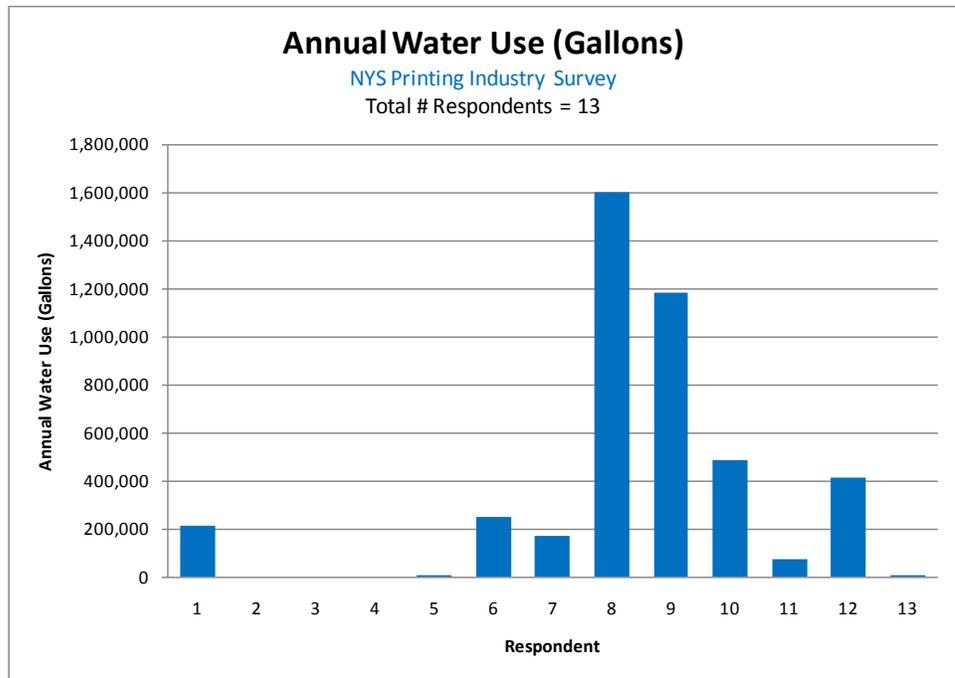
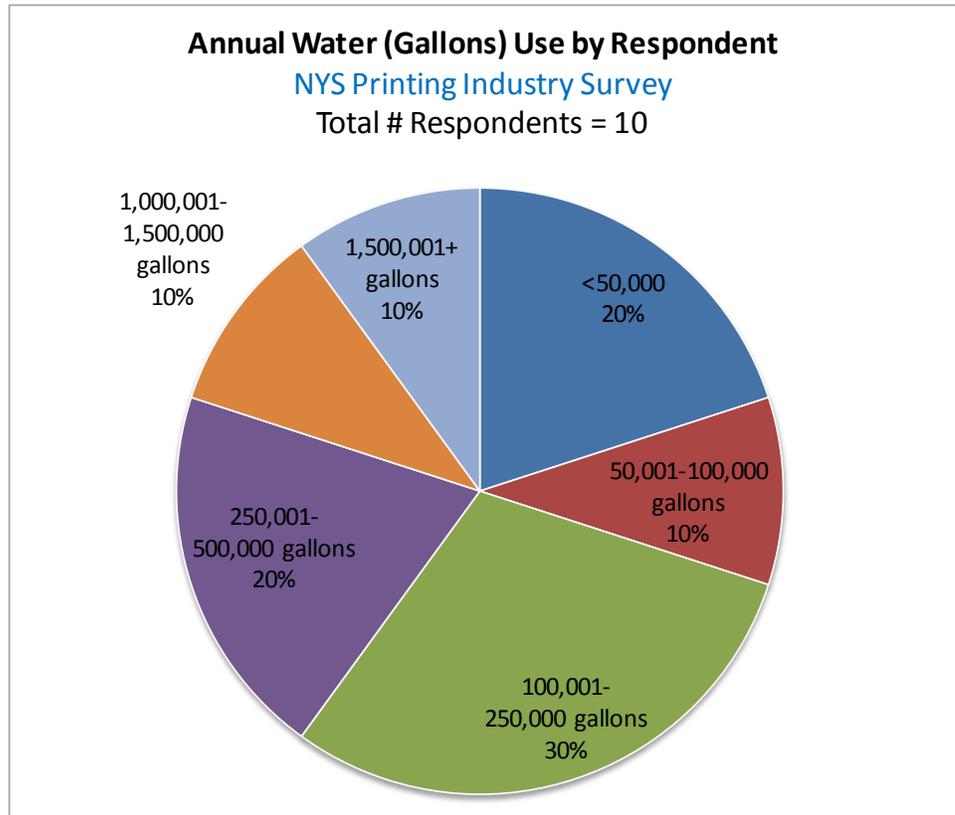


*Respondents' annual gas use was diverse. Nevertheless, more than 50% of the companies surveyed use more than 20,000 therms of gas per year.*

**Annual Gas (Therm) Use by Respondent**  
 NYS Printing Industry Survey  
 Total # of Respondents = 10

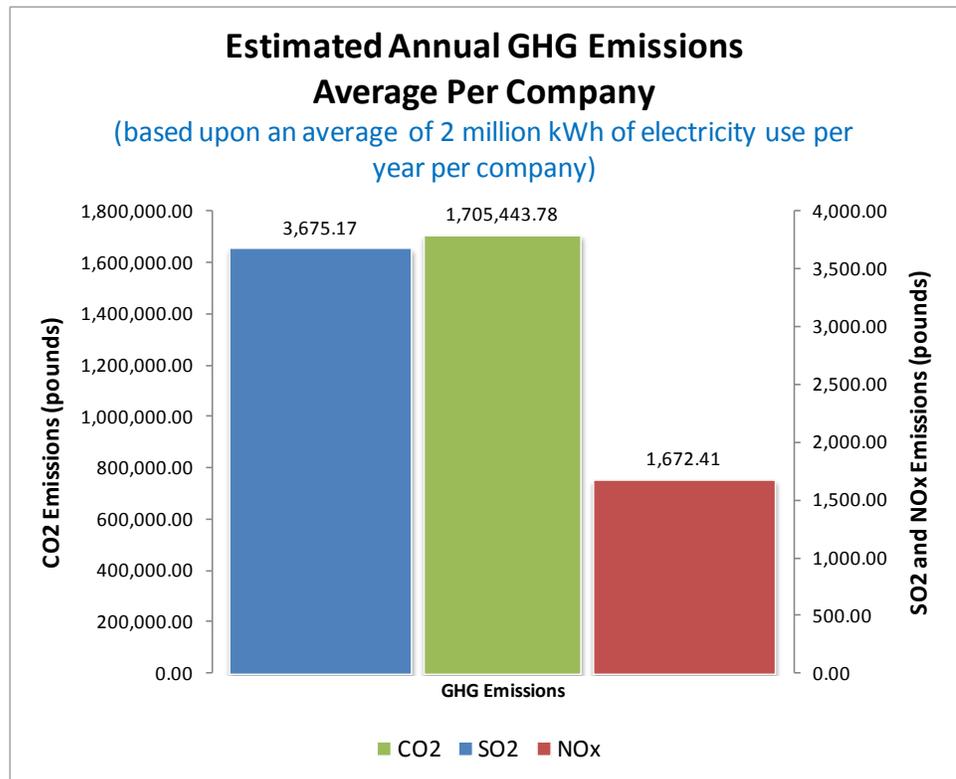
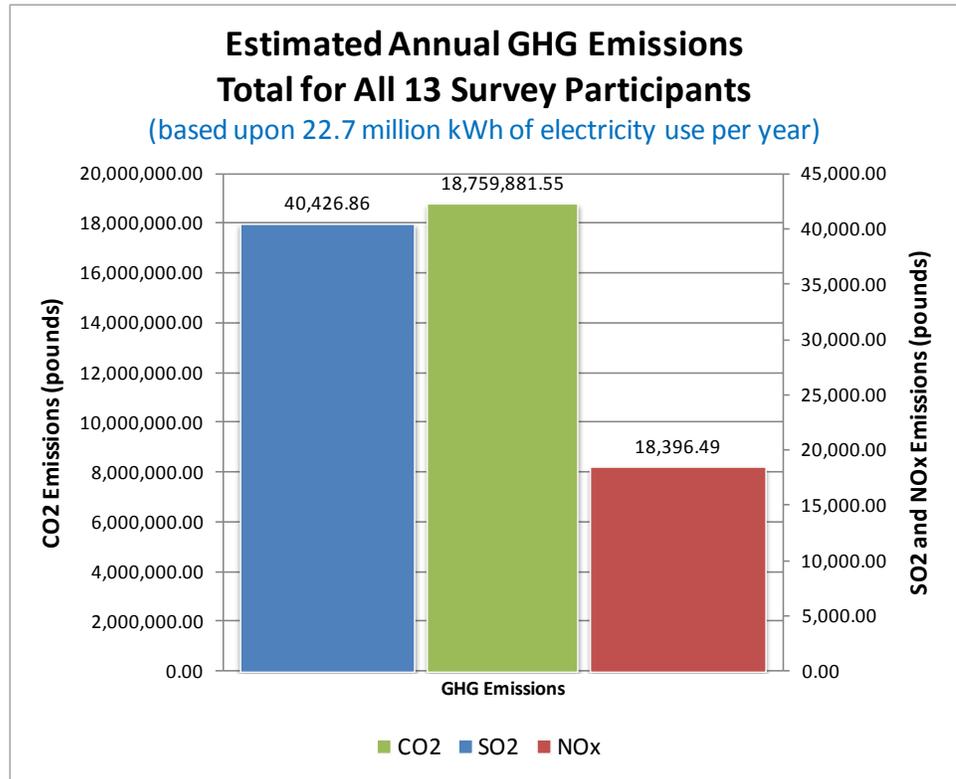


*Respondents' annual water use was diverse. Nevertheless, more than 40% of the companies surveyed use more than 250,000 gallons of water per year.*

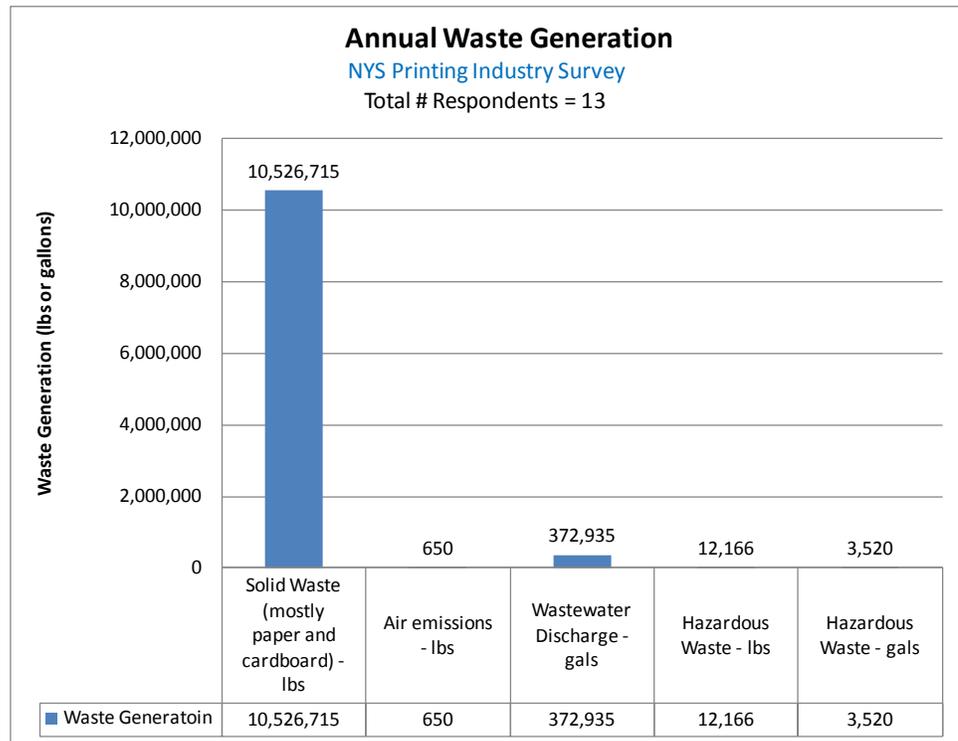


*Respondents' total annual electricity use contributes to 18.7 million pounds of CO2, 40,400 pounds of SO2, and 18,300 pounds of NOx emissions per year.*

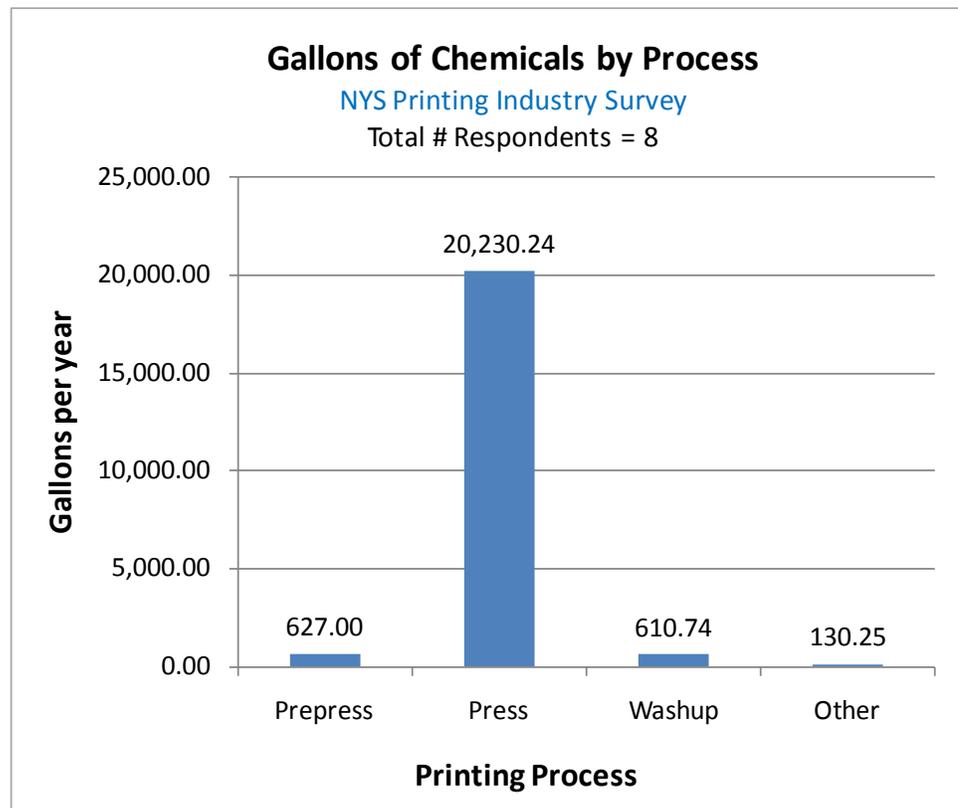
*On average, each company emits 1.7 million pounds of CO2 to the atmosphere annually.*



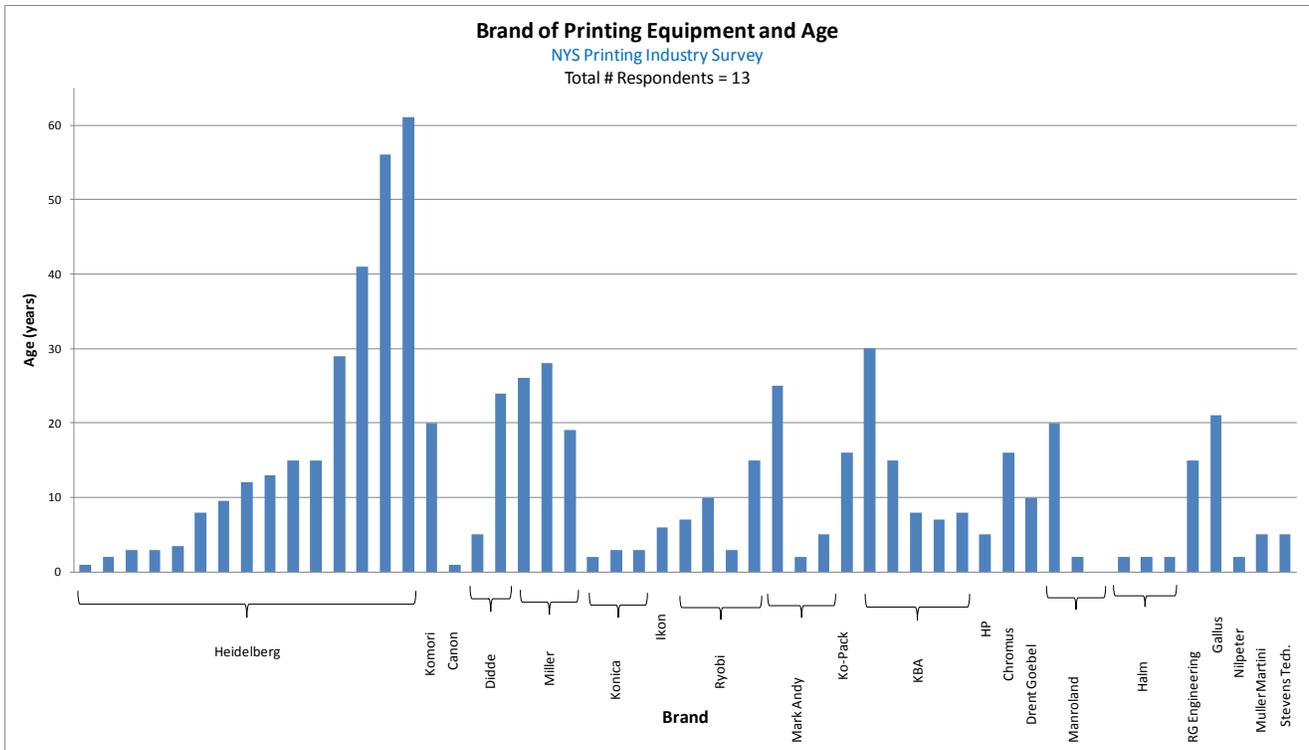
*Greater than 95% of respondents' annual waste generation is from solid waste (primarily paper and cardboard). In total respondents disposed of more than 10.5 million pounds of solid waste in 2009.*



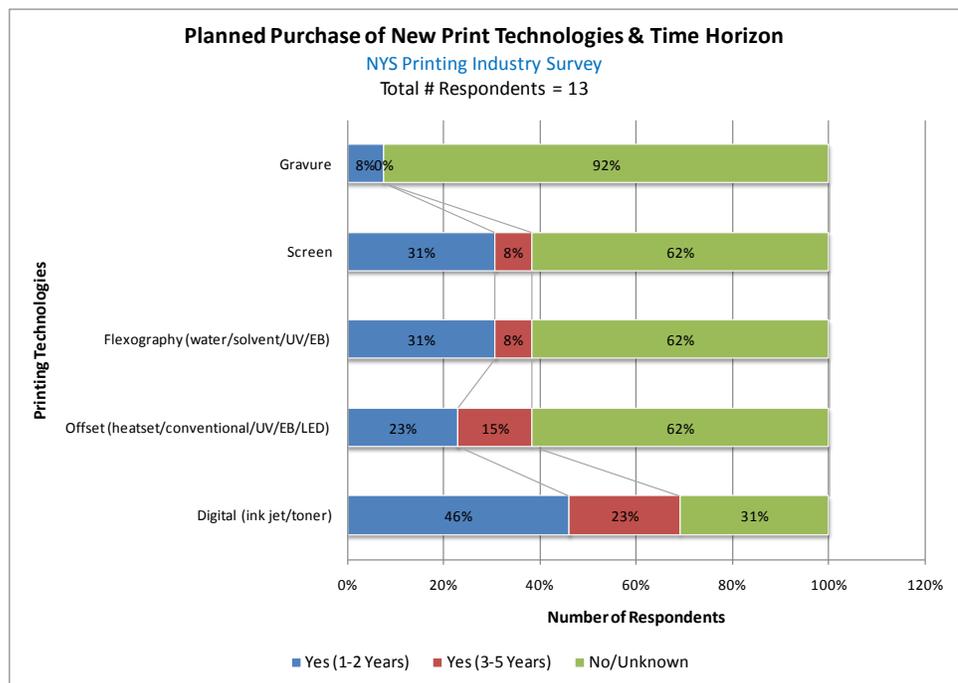
*More than 93% of the chemicals used by respondents were used in Press operations versus pre-press, washup, or other processes requiring chemical use. In total, respondents used more than 21,500 gallons of chemicals for their printing operations in 2009.*



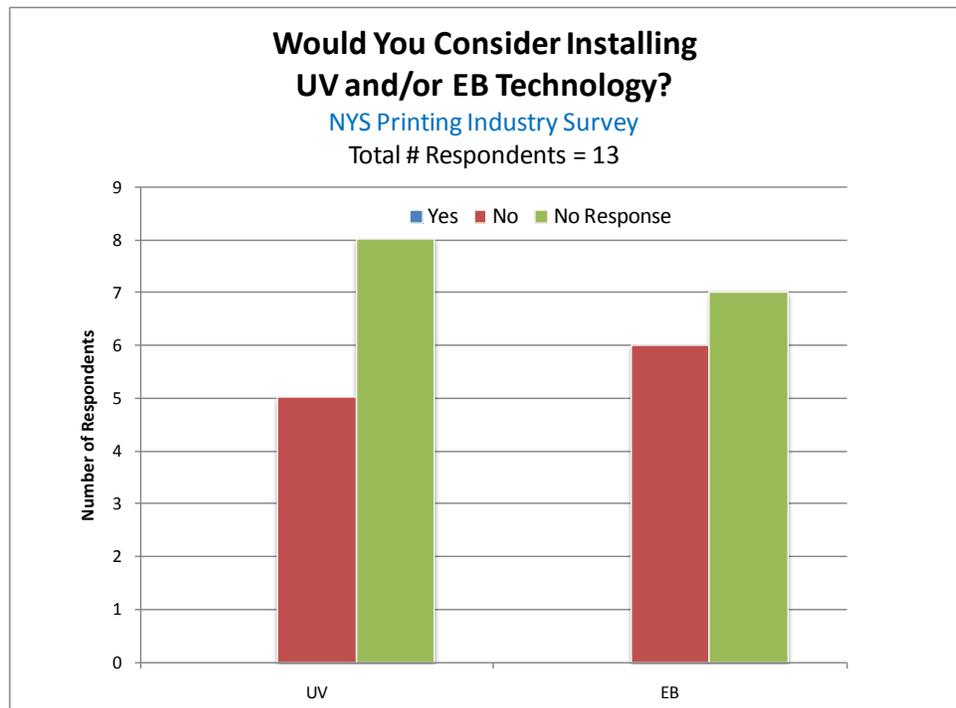
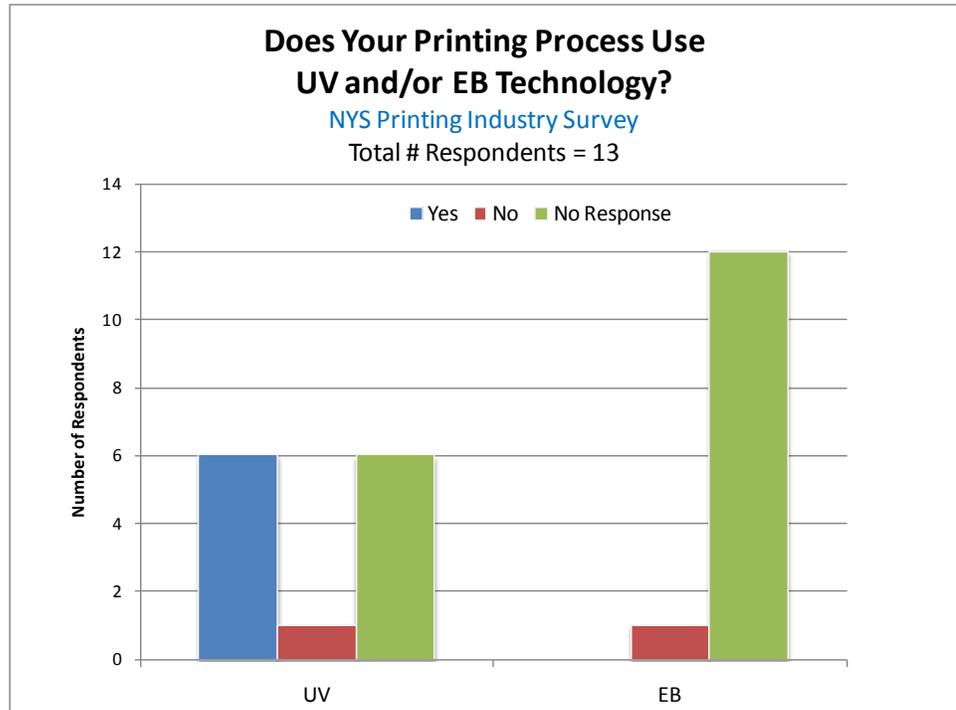
# Operations and Technology



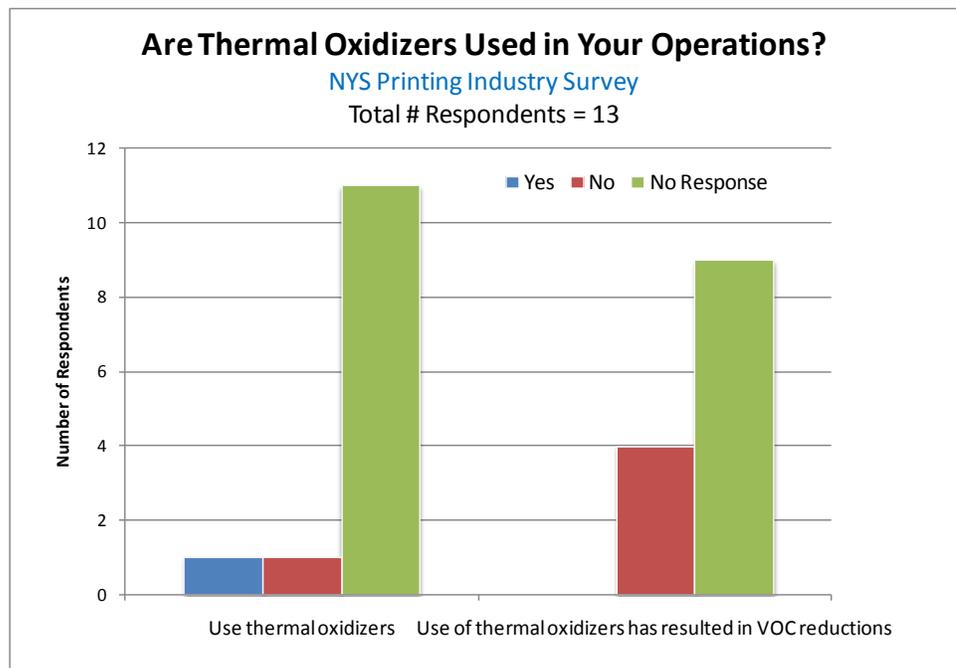
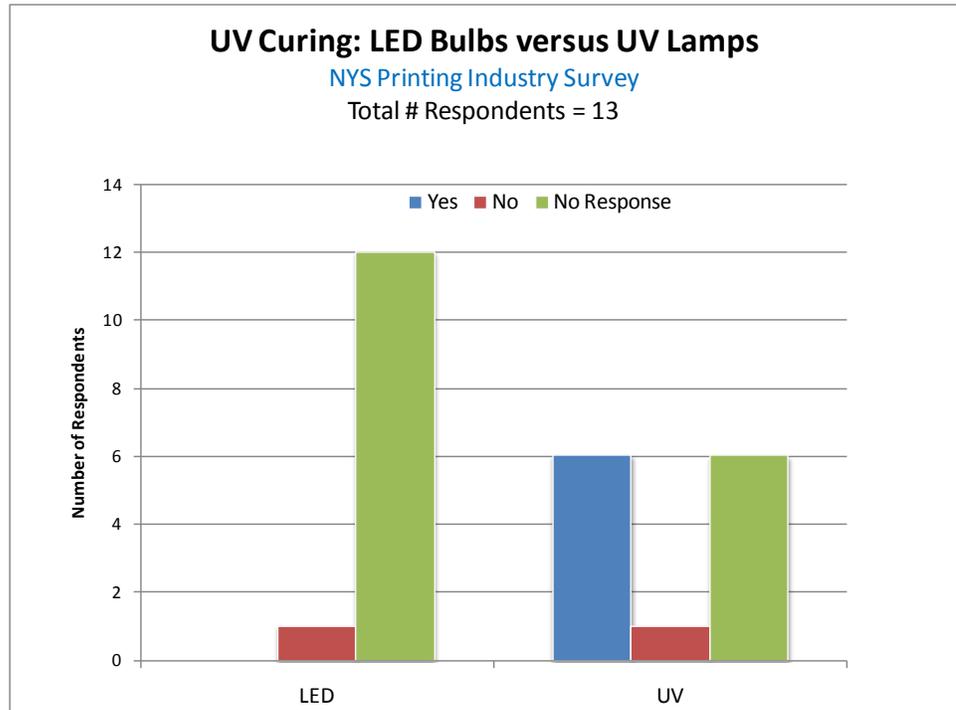
*46% of respondents plan to purchase new digital printing technology within the next 1-2 years. 59% plan to purchase new digital equipment within five years signifying a shift toward more digital printing in New York State.*



*46% of respondents currently use UV technology in their printing process.*



*46% of respondents currently use UV lamps in their UV curing process.*

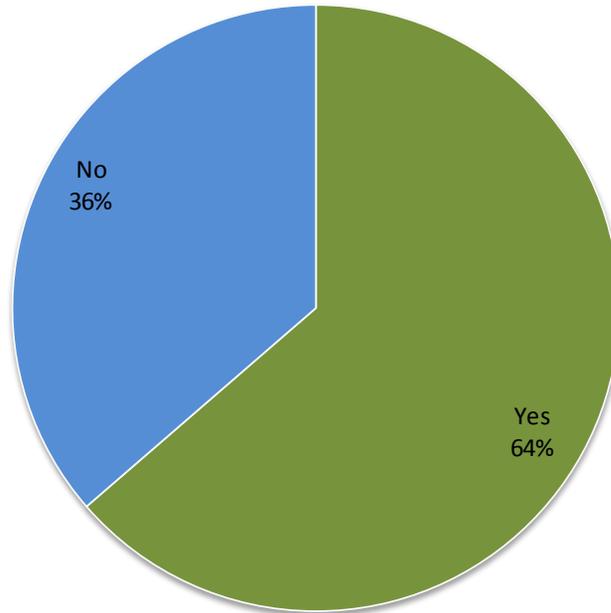


## Sustainability Perceptions, Policies and Practices

### Are Your Customers Interested in Sustainability?

NYS Printing Industry Survey

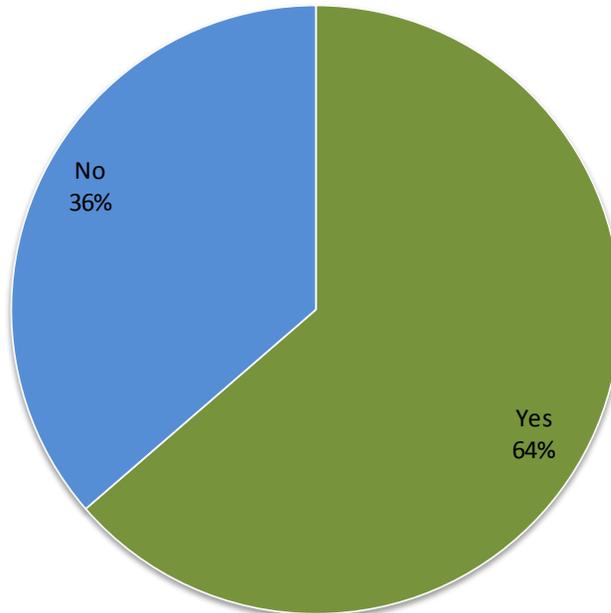
Total # Respondents = 11



### Has Customer Interest in Sustainability Influenced Your Business Decisions?

NYS Printing Industry Survey

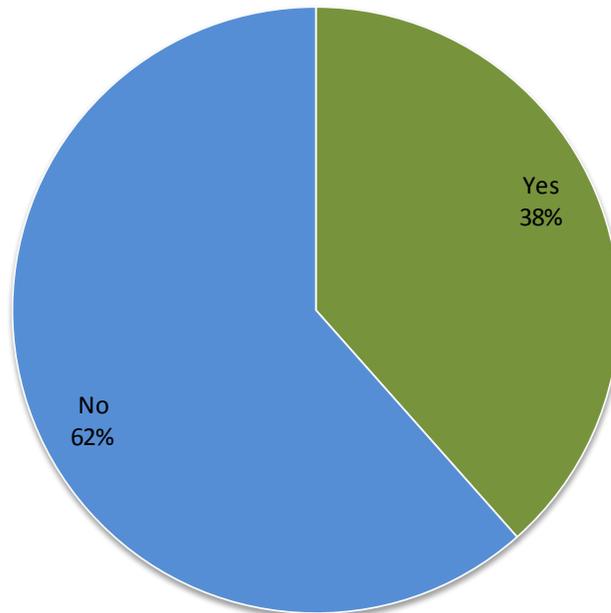
Total # Respondents = 11



**Has your Company Joined a Voluntary Trade Organization with an Emphasis on Sustainability?**

NYS Printing Industry Survey

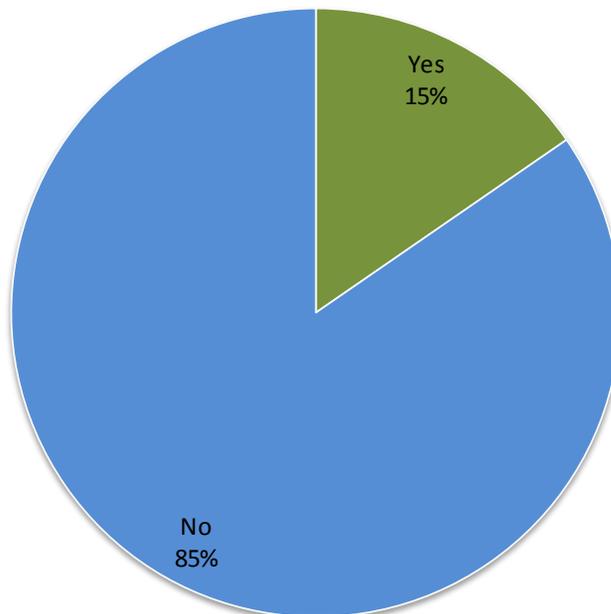
Total # Respondents = 13

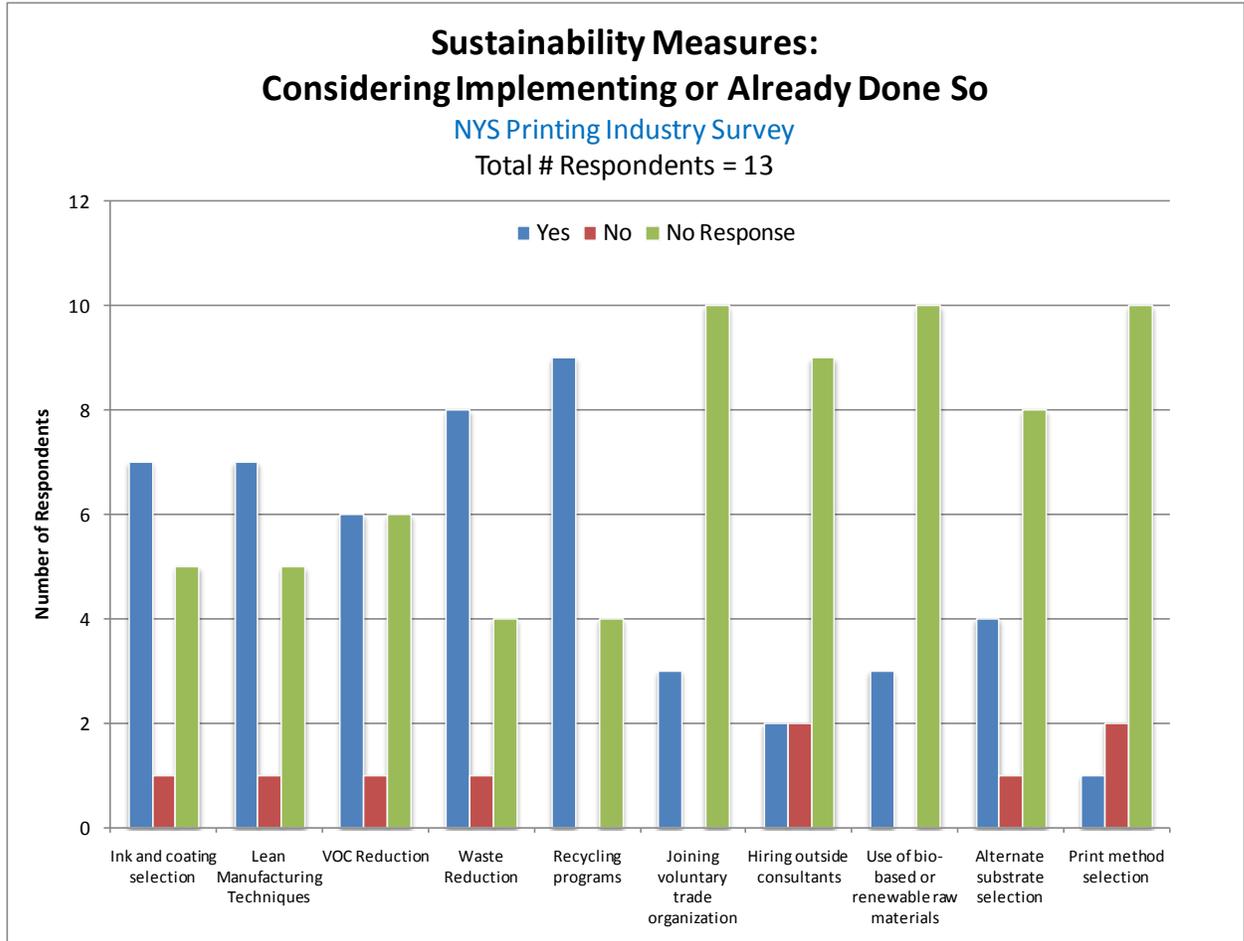


**Does Your Printing Process Use Solvent-Based Inks?**

NYS Printing Industry Survey

Total # Respondents = 13





## VII. Sensing Interview Summary

### Introduction

Between March 2010 and June 2010 the Rochester Institute of Technology (RIT) fielded a quantitative survey to 155 New York State printing establishments. As part of its research methodology and data collection activities, RIT also conducted “sensing interviews” with representatives (owners/operators) of six New York State printing companies. The purpose of the sensing interview process was to gather additional “voice of the customer (VOC)” information that could help qualify what was disclosed through the quantitative surveys as well as provide additional insight and knowledge on the major business, technology, policy and sustainability drivers (challenges/opportunities/risks/threats) to the printing industry.

Sensing interviews were scheduled and conducted over the phone. To guide the sensing interview, RIT prepared a “Sensing Interview Questionnaire” and used it to help initiate discussion during the phone interviews. The Sensing Interview Questionnaire is included in Appendix C. The Sensing Interview Questionnaire and phone interviews covered the following key topics/categories:

- Printing Industry Present and Future
- Energy Use, Management and Efficiency
- Technology Adoption, Forecasting, Challenges and Opportunities
- Waste Management and Pollution Prevention
- Areas of Opportunity/Direct Assistance

This section summarizes the key strategic issues facing the New York State printing industry as uncovered through the RIT sensing interview process.

The following companies participated in the Sensing Interview process:

Company	Region	# Employees
1. Courier Printing Corp.	Deposit, NY	30
2. Flower City Printing, Inc.	Rochester, NY	282
3. Fort Orange Press, Inc.	Albany, NY	34
4. Gooding Co., Inc.	Lockport, NY	29
5. Graphic Controls LLC	Buffalo, NY	250
6. Hammer Lithograph Corp.	Rochester, NY	231
7. Monroe Litho, Inc.	Rochester, NY	78

The companies represented the Western, Finger Lakes, Central, Southern Tier, and Capital regions of New York State (upstate region). The company sizes ranged from less than 30 employees to greater than 280. The findings of the sensing interviews are provided below. To protect the participants individual responses, the findings are reported in an aggregate form. Information is shared where a majority of participants reported similar information.





## Sensing Interview Findings

### Printing Industry Present and Future

The printing industry is undergoing major economic transformation. The challenge for many companies right now is how to remain competitive amid shifting customer preferences, volatile or increasing commodity prices and smaller margins on products (the printing bidding process has become very aggressive/competitive – lowering some prices) and services due to competition. More than 5,200 companies closed in 2008-09 (NAPL/PIA).

The six sensing interviews uncovered many noteworthy business/market and policy/regulatory influences on the state of the printing industry. Discussions also focused on some of the general industry trends that are shaping the use, adaptation and adoption of printing technologies and associated printing consumables. Key insights included:

- Customer preferences, the economy and new technologies are shaping how industry is doing business. For example, the Internet has caused a decline in the volume of business for many printers in the past decade. The Internet has enabled customers to reduce the need for paper-based marketing and materials. In addition, greater visibility and focus on the environmental impact of printing and paper consumption (and recycling) has shifted some customers to reduce paper-based printing and work more with Internet based marketing.
- As with all industries, the workforce of the printing industry is aging. This concerns some printing establishments from the perspective of acquiring new talent and expertise as well as knowledge transfer of printing processes, application and know-how to maintain printing processes at their facilities.
- The printing industry is very “people and relationship” based for many companies. There has been some saturation in the market resulting in lower volume for some printers. The mantra “location, location, location” continues to be an important competitive advantage for some printing establishments.
- Customers of printers are requesting more options with regard to environmental/green products and services such as greener paper (higher recycled content) and greater awareness of green inks (*i.e.*, soy based inks).
- While customers are somewhat familiar with environmental certification organizations and labels such as the Forest Stewardship Council (FSC), printers do not yet see customers explicitly asking printers whether they have that certification on their products. Smaller

customers/orders may be less likely to see the marketing leverage associated with the FSC logo.

- Printers noted that their customers would like to see companies that provide Forest Stewardship Council (FSC) certified paper/products and other “green/sustainable” certifications, but as long as they don’t have to pay more. For some small printers, and given recent economic conditions, the cost of FSC certification may be a barrier.
- Consolidation of companies continues to evolve in the printing industry. The consolidation is being motivated by (1) independent companies folding/going under due to the economy; (2) larger companies acquiring the assets of smaller niche companies and (3) a general discontinuation of operations as many family-based printers simply go out of business with nobody to hand the reigns to.
- Printers have acknowledged that there is now (and will be in the future) more regulation on environmental issues and smaller companies may face greater pressure/barriers in adopting sustainable policies and practices.
- Printers struggle with many high costs of doing business; principal among them is health insurance. While there is significant interest in environmental/sustainable initiatives, economics/costs continue to be the primary driver in business decisions.

#### Energy Use, Management and Efficiency

- Most printers expressed that energy costs were marginal compared to other business costs (typically 2-to-5 percent of total operational costs) and therefore although energy is important, it is not necessarily the most important cost driver to printers’ bottom-line profitability.
- Printers are, however, constantly looking to improve their utility rates and lower their energy consumption/footprint.
- Some companies have looked at off-setting printing processes toward non-peak hours (shifting time-of-day and use) to save money on electricity.
- Companies referenced the New York Power Authority (NYPA) “Power for Jobs” program and how it had been a very good incentive for helping them remain competitive on energy costs compared to other states. One company referenced the NYPA “Power for Jobs” program as having reduced their energy cost by 20% in the past; however the program was ended on May 15 2010. (<http://www.nypa.gov/edpab/index.htm>)

- The majority of companies have either implemented or evaluated the use of energy audits, lighting upgrades/retrofits, and energy metering as opportunities for assessing or taking direct action to manage or reduce energy use and costs. Many companies have worked with NYSERDA's programs (energy auditing, lighting, other) in the past, and have found them useful to their needs.

#### Technology Adoption, Forecasting, Challenges and Opportunities

- The printing equipment for many printers is aging. The latest improvements/advances in printing technology have resulted in faster processing times, lowered make ready and trim requirements, thus contributing toward sustainability. Many printers are evaluating whether to spend the money today, or wait a few months or years before making large capital investments on new equipment. Most companies do not have cash surpluses to buy new machines or modernize their facilities. The capital markets remain very constrained and slow to lend capital due to the continuing financial downturn.
- Digital printing is becoming more popular and printers generally see a shift happening to include more digital printing as a flex-solution or to fulfill the needs of customers with just-in-time one-time special orders.
- Companies are looking at "variable print" through digital printing as a way to differentiate their business, access and open new markets and provide service to customers.
- Most companies are concerned with and watching how quickly digital printing will have an impact on its business.

#### Waste Management and Pollution Prevention

- Volatile Organic Compound (VOC) emissions, hazardous waste generation, paper waste, and the use and disposal of chemicals are each key waste management concerns of printers. Preventative measures/source reduction is recognized as a critical contributor toward environmental/sustainable initiatives.

#### Areas of Opportunity/Direct Assistance

- Printers have expressed a need for more education, training and technology transfer to help them remain competitive and stay abreast of new technology, lean practices, energy efficiency and management practices, codes and regulations, and general business practices.
- Printers have expressed a need to understand best practices in air handling and filtration to help address volatile organic compounds (VOCs) inside printing establishments. Printers have noted that there is interest for localized air handling as well as facility-wide systems and

understanding the benefits, trade-offs, costs and energy impacts of such systems.

- Printers have expressed a need for understanding better (more efficient and effective) facility design that is flexible, yet helps enhance productivity and optimization of resources including energy and people and space.
- Printers have expressed a need for many financial instruments, incentives or programs that can enable them to do business more competitively, particularly in comparison to some of the business costs in other states. Printers expressed interest in programs to help with (1) energy costs (i.e., the NYPA “Power-for-Jobs” program or printing-industry specific NYSERDA funding; (2) investment tax-credits; (3) programs that enable the financing of capital equipment or facilities at lower rates; and (4) programs that can help printers pay upfront capital costs of new equipment or efforts to modernize their facilities. It should be noted that most printers recognized there are many local/regional/state programs in place that do help with these needs. Printers were thankful for the programs that do exist – but the general feedback was that more targeted, industry-specific programming could help them better manage business costs and remain competitive.
- Companies expressed that many customers are looking for “more sustainable, lower environmental footprint” product and service. Companies believe there is an opportunity to differentiate their business and compete on price, performance, quality and how sustainable their products and operations are. For example, food packaging printers noted that their customers are looking for labels that use less material, less ink and create less waste. Other printers noted that they are looking into the use of biodegradable papers and inks for some of their customers’ needs. Printers believe they can do more by way of sustainable/green products, operations and services; however they are limited by knowledge/information, capital/investment, people/resources and standards/specifications.



## VIII. Discussion

This survey and report helped reveal and further validate the emerging prominence of digital printing technology among New York State printing establishments. While some printers view digital printing as a niche application, enabling them to add new capabilities to customers or fulfill specialized orders, others view the technology as a fundamental shift that will have broader and more consequential impacts on the industry at large. Close to 60% of the respondents of the RIT survey stated that they intend to purchase new digital technologies within the next five years. There are numerous potential impacts of technological shifts within the printing industry. The use of electricity, for example, may increase or even decrease depending upon the rate of adoption and use of digital technologies. This is a trend that will be important to monitor in years to come.

The printing industry, like many industries, is experiencing changes in customer preferences, technologies and business models. The “information age” advent of the Internet, for example, has had vast and dramatic impact on the printing industry as some customers have opted for less direct mailer and more targeted web-based marketing and communications. The evolution of sustainability from a business context has been happening for some time. Most industrial sectors are now addressing business sustainability in one form or another.

For example, the automotive industry is advancing options for more fuel-efficient automobiles and now offering a portfolio of alternatives to consumers ranging from low-emission to hybrid-electric, electric, fuel-cell, ethanol, and biodiesel vehicles. The electric utility industry is offering greater choice on energy suppliers and supplies, including more options for renewable (solar, wind, hydro) power options. The consumer goods and electronics industries are offering lower energy appliances like ENERGY STAR® rated room air conditioners, refrigerators, microwaves, ovens, televisions, and computers.

In September 2009 the Boston Consulting Group (BCG), in partnership with MIT Sloan Management Review, issued a report<sup>3</sup>, “*The Business of Sustainability: Imperatives, Advantages, and Actions*”, which summarized the perspectives of more than 1,500 corporate executives and managers regarding sustainability. The BCG survey cut across all industrial sectors and included companies such as Yahoo, Coca-Cola, Royal Dutch Shell, Whole Foods Market, DuPont, Nike, Rio Tinto, Interface, GE, and others. The findings were very interesting:

- 92% of the BCG respondents said their company was addressing sustainability in some way
- 68% of business leaders with sustainability expertise cited improved financial returns as a benefit from their organization’s investments in sustainability initiatives, compared with only 32% of novices

<sup>3</sup> Source: BCG, <http://www.bcg.com/documents/file29480.pdf>.

- 60% of respondents stated their company was building awareness of its sustainability agenda

The BCG study reports on many interesting and useful data points such as those identified above. It also summarizes many of the challenges industry faces in defining sustainability and creating policies, procedures and practices to carry out sustainability goals. Thus industry, broadly, is struggling with how best to approach sustainability from a business and competitiveness context.

This survey unveiled very interesting findings regarding how New York printers are approaching sustainability. For example:

- 64% of respondents state that their customers are interested in “sustainability” and the same respondents note that customers have influenced their business practices as they pertain to sustainable practices. In fact,
  - 38% of respondents have an existing/active corporate **Sustainability Policy** in place
  - 31% of respondents have an existing/active corporate **Environmental Policy** in place
  - 23% of respondents have an existing/active corporate **Energy Policy** in place
- Respondents are considering implementing, or have already implemented a variety of sustainability measures:
  - 62% are considering or have implemented waste reduction programs
  - 54% are considering or have implemented “ink and coating selection” into their printing operation
  - 54% are considering or have implemented “lean manufacturing techniques”
  - 46% are considering or have implemented “VOC reduction” technologies/processes
  - 31% are considering or have implemented “alternate substrate selection” into their printing operation
  - 23% are considering or have implemented the “use of bio-based or renewable raw materials”
  - 15% are considering or have “hired outside consultants” to help with sustainability measure implementation
- Currently, 38% of respondents belong to a **voluntary trade association** that has an emphasis on sustainability.
- Printing companies have and continue to put staff and operational resources toward sustainability, environmental, health and safety practices. For example;

- 23% of respondents report that their company has a **corporate manager, director or VP of Sustainability** overseeing their sustainability policy and strategy
- 69% of respondents report that their company has a **corporate manager, director or VP of environmental, health and safety (EHS)** overseeing their environmental policy and operational requirements
- The **top sustainability and environmental concerns/issues** companies currently face include:
  - Reducing/recycling materials including wooden pallets
  - Indoor air quality
  - Enhancing the recyclability of label/liner materials and adhesives
  - Maintaining a profitable business while meeting or exceeding sustainability goals is a core concern of many companies
  - There is a lack of recycling options for pressure-sensitive adhesives (PSA)

These summary points reflect that sustainability is very much on the minds of New York State printers. The case study that follows examines how one company, Monroe Litho of Rochester, NY has begun to differentiate its products, operations and reputation on the basis of more sustainable production methods. Monroe Litho is a best-in-class example of a New York State company making considerable progress in defining what sustainability means to it and creating a corporate culture and strategy for identifying and implementing actionable initiatives to achieve the goals of the company.



## IX. Case Example

### Best Practices in the Printing Industry

#### Monroe Litho: Sustainability

*“We’ve worked incredibly hard over the past several years to redefine the way we run our business. We’ve reworked virtually every area of our operations to ensure that our printing processes are as environmentally friendly as possible.”*

Chris Page, CEO Monroe Litho

#### Corporate Background<sup>4</sup>

Founded in 1945 and headquartered in Rochester, NY Monroe Litho, Inc. has provided high-quality printing, production, and fulfillment to companies in the Rochester area and throughout the country.

Today the company employs more than 70 people and occupies 55,000 square feet of facility space. The company is a national leader in environmentally sustainable printing. In fact, Monroe Litho is one the first commercial printers in the U.S. to go with 100 percent wind-generated power – 100 percent of its electricity comes from clean, renewable, wind-generated sources. It has also won many national quality awards and holds several certifications – including Forest Stewardship Council (FSC) certification. In 2004, the company became the seventh graphic communications company in the country to be certified by the Forest Stewardship Council (FSC).

#### Corporate Sustainability Policy and Performance

Under the leadership of CEO Chris Page and Stephen Whittaker, Vice President, Quality Management & Sustainability Initiatives, the company has developed an internal corporate sustainability policy and operating committee.

<sup>4</sup> Information for this case study was made available from the Monroe Litho web-site, [www.monroelitho.com](http://www.monroelitho.com) and from conversations with Stephen Whittaker, VP Quality Management & Sustainability Initiatives.

The internal leadership and commitment to organizational structure and policies created by Monroe Litho has enabled it to develop environmental and sustainability goals and pursue specific internal initiatives to achieve these goals in a structured and cost-effective manner. In 2009 Monroe Litho reported on more than 50 milestones rooted in their internal sustainability initiatives. A sample of those accomplishments includes:

- Converting an old parking lot into 8,400 square feet of green space
- Offsetting 100% of electricity use with Wind Power
- Maintaining its Forest Stewardship Council and Sustainable Forestry Initiative Certifications, as well as its federal OSHA/New York

Specific energy, environmental and material/waste management impacts of the company include:

- Electricity consumption was reduced by 15%
- 570 tons of FSC paper processed
- VOC emissions were reduced by 11.5% [normalized]
- There has been only one accident in 569,000 hours worked over four years
- 13,000 pounds of non-conforming wooden skids recycled
- 4000 pounds of cardboard/corrugation recycled
- 7700 pounds of plastic strapping/wrapping materials recycled
- 475 pounds of CD jewel cases recycled
- 200 pounds of CDs recycled
- 375 pounds of fluorescent light bulbs recycled
- 12,000 pounds of aluminum printing plates recycled
- 2700 pounds of IT related equipment recycled
- 650 pounds of consumer batteries recycled
- 21 cell phones recycled
- 2100 pounds of metal ink cans recycled
- 17,000 pounds of scrap steel recycled
- 52 offset blankets recycled for other uses
- Water consumption was reduced by 16.9%
- Landfill dumpster activity reduced from five trips in 2008 to two trips in 2009
- There have been over 1,250,000 pounds of paper recycled/recovered

In addition to the impressive sustainability metrics achieved by Monroe Litho through its internal sustainability initiatives, policies and practices, the company maintains several strategic alliances and partnerships with external organizations that provide validity and credibility to its sustainability endeavors. Examples include:

US Environmental Protection Agency's Green Power Partnership

Purchasing wind power qualified Monroe Litho for the U.S. Environmental Protection Agency's Green Power Partnership. This partnership works with organizations to buy green power as a means to reduce the environmental

impacts associated with purchased electricity use. “Green power” is defined as electricity generated from environmentally preferable renewable resources, such as solar, wind, geothermal, biogas, biomass, and low-impact hydro. These resources generate electricity with zero anthropogenic (caused by humans) carbon dioxide emissions and offer a superior environmental profile to conventional power generation. In addition, buying green power helps support the development of new renewable energy capacity nationwide.

#### Forest Stewardship Council Membership

Monroe Litho was the seventh commercial printer in the U.S. to commit to the FSC – today, there are more than 1,500 members. The FSC is an international, not-for-profit organization dedicated to finding solutions to the problems created by poor forestry practices—and to rewarding good forest management. Its trademark provides international recognition to organizations that support the growth of responsible forest management. Only operations that have been independently verified for FSC chain-of-custody certification can label their products with the FSC logo. (Chain-of-custody is the path taken by raw materials from the forest to the consumer, including all successive stages of processing, transformation, manufacturing, and distribution).

#### Green Press Initiative

Monroe Litho is a member and participant in this national book

### *Monroe Litho, Inc. – Company Honorariums and Achievements*

#### **New York State Department of Environmental Conservation**

February 26, 2010

“New York Environmental Leader” Designation  
*First and only commercial printer in NY State*

#### **American Printer 2009 Environmental Excellence Award, Silver Recipient**

Category of 26-99 employees

September 11, 2009 Chicago, IL **Graph Expo ‘09**

#### **Sustainable Green Printing Partnership**

Audited November 12-13, 2008

The first commercial **SGP Certified Printer** in the US [outside of the beta test group]

December 8, 2008

Certification ID Number 1208-1228513052

#### **Sustainable Forestry Initiative**

SFI Chain of Custody Certified, NSF-ISR Ltd.

Certificate Number NSF-SFICOC C0001301

October 20, 2008; June 1 2009 Recertification Audit with renewal

#### **One of “Americas Safest Workplaces” 2008 [September, 2008]**

Recognized by Occupational Hazards Magazine [now EHS Magazine] and its judging Panel as one of the eighteen safest companies in the US for calendar 2007 [September 22, 2008 Anaheim, California Award Ceremony]

#### **United States Environmental Protection Agency “Green Suppliers Network”**

Official letter recognizing Monroe Litho as a member of the “Green Suppliers Network”

[A partnership between the US Environmental Protection Agency and the Manufacturing Extension Partnership Program of the National Institute of Standards and Technology] June 20, 2008

#### **Green Press Initiative**

Member and participant of this national book publishing organization as supporting the “Book Industry’s Treatise on Responsible Paper”, which includes addressing global warming through the use of recycled fiber and renewable energy, protecting endangered and highest value forests and supporting best practices in forest management. July 22, 2008

#### **Environmental Protection Agency Green Power Partner**

Certificate of Partnership

August 7, 2006

#### **Wind Power to Generate 100% of Electricity**

June 5, 2006

Certification that 100% of Monroe Litho’s electricity will come from wind power [Third graphic communications company nationwide]

publishing organization, supporting the “Book Industry’s Treatise on Responsible Paper.” This treatise includes addressing global warming through the use of recycled fiber and renewable energy, protecting endangered and highest value forests, and supporting best practices in forest management.

#### Sustainable Forestry Initiative

Monroe Litho is one of only five printers in New York State to hold both FSC and SFI certification. The company’s SFI certification indicates that it is using the best sustainable forest management practices in its daily operations—and that as a result, it protects air, water, soil, and wildlife as well as ensure that no wood comes from endangered forests. The SFI’s premise is that responsible environmental behavior and sound business decisions can co-exist. It is one of the world’s leading forest certification programs. SFI-certified companies practice sustainable forestry on all the lands they manage. They influence millions of additional acres through the training of loggers, foresters, and family forest landowners in best management practices and landowner outreach programs.

#### Sustainable Green Printing Partnership

Monroe Litho was the fifth commercial printer in the U.S. (and the first in the northeast) to be verified to the national standard of the SGP Partnership. This group encourages and promotes participation in the worldwide movement to reduce environmental impact and increase social responsibility in the print and graphic communications industry through sustainable green printing practices. The SGP recognizes these sustainable business practices as guiding principles to ensure continued viability and growth:

- Employ, wherever and whenever possible, materials derived from renewable resources or with low environmental impact, maximizing recycling and recovery efforts with efficient use of renewable energy
- Encourage the adoption of changes within the supply chain by strongly recommending the use of raw materials that do not threaten or harm future generations
- Educate the customer and ultimate consumer regarding the benefits of a restorative economy

#### Renewable Energy Procurement

Monroe Litho has partnered with Renewable Choice Energy to support the development of wind power projects and to take responsibility for their environmental impact. Monroe Litho has offset the conventional electricity use of its offices and manufacturing facilities by purchasing renewable energy credits (RECs). RECs are produced by wind farms, biomass facilities and other renewable energy projects. They provide companies and consumers a way to invest in renewable energy development and offset electricity use with energy from wind and other renewable energy projects without on-site installation. By purchasing RECs, the company is guaranteed that the electricity it uses is replaced on the national power grid with electricity generated from renewable energy sources.

*Monroe Litho's RECs Are Certified*

The renewable energy credits Monroe Litho purchases from Renewable Choice are certified by Green-e Energy®, the nation's leading independent certification and auditing program for renewable energy. The Green-e Energy program was established by the non-profit Center for Resource Solutions to provide an objective standard for qualifying and tracking renewable energy credits.

**Sustainability Can Be a Differentiator in the Marketplace**

Monroe Litho's sustainability partnerships and internal initiatives are diverse, but each focuses on specific corporate and business goals that enable the company to differentiate itself from competition, maintain existing business, and open the door to new relationships and business growth. As the printing industry morphs and changes due to swift changes in the economy and customer preferences, companies such as Monroe Litho are preparing their operations, products and people to adapt to this change. Monroe Litho's Vice President for Quality Management & Sustainability Initiatives, Stephen Whittaker, noted that the company's ability to bundle and leverage its sustainability initiatives has enabled it to achieve a corporate wide positive return-on-investment.

Additional information on Monroe Litho's sustainability initiatives can be found by accessing its website at <http://www.monroelitho.com/>.

## X. Recommendations



Based upon the quantitative and qualitative data and information that was gathered in the development of this report, the following recommendations are issued for the New York State Printing Industry Ecosystem (printers, universities, funding agencies, applied technology and research organizations, and other stakeholders):

### Technology/Operational Recommendations

- Address Indoor Air Quality – Printers in New York have a need to better assess, understand, and indentify options for reducing volatile organic compounds (VOCs) in their operations. There is need and opportunity to evaluate both process (reduction/elimination of VOCs at equipment level) and system (reduction/elimination of VOCs at facility level) solutions. There is a variety of options to achieve this recommendation including technology assessment/validation, pollution prevention processes/technologies, and facility design and layout opportunities.
- Monitor the Digital Movement and Impact on Industry Energy Consumption – There is a need to further assess, in greater detail, the potential short-mid-and-long term impact of technology shifts, such as the migration toward digital printing applications, on the energy footprint of New York State printers. The transition to digital printing may place greater printing industry demand for electricity. If so, the printing industry may require more information and options for reducing electric demand or enabling energy efficiency at its facilities to help reduce costs and lower electric use.
- Address Aging Equipment in the Context of Energy and Sustainability – This study unveiled that the average age of printing equipment in New York State is approximately 12.8 years old. Nevertheless, the majority of printers use Heidelberg branded equipment whose average age is 18 years old. Some printers have legacy equipment that is more than 60 years of age. It would be useful to better assess and understand the relationship between the age of printing equipment and energy use. Should energy use be significantly greater for older printing equipment it is recommended that industry and government identify options for creating win-win programs to help the printing industry migrate toward lower energy consumptive equipment that can also enable them to add capability or remain more competitive, while reducing energy footprint as an industry.

### Business Climate and Context Recommendations

- Assess Options for Incentivizing Industry to Reduce Energy Demand, Enhance Sustainability and Competitiveness – Many of the industry participants of this survey reported that they intend to buy new capital equipment in the next one-to-five years. This is a positive sign from

industry that it intends to make investments in itself to remain competitive, efficient and in-touch with customer needs and requirements. There are opportunities, however, to enable industry to finance capital improvements in facilities, processes, and equipment selection that can lead to energy demand reductions, greater productivity and less waste. Further information is needed, but it is recommended that industry stakeholders collaborate on how best to align financial resources with the printing industry to enable long-term competitiveness and sustainability.

### Industry-Wide Recommendations

- Centralized Knowledge Creation & Transfer – The topic of sustainability is gaining ground and advancing as a business concept throughout many industrial sectors. The New York State Printing Industry can benefit from a centralized knowledge resource that can serve as a point-of-contact and clearinghouse of data, information, analysis, resources, and knowledge networks and resources that can enable the industry to assess information on best practices in printing technologies, processes, and supply chain (paper, consumables, substrates, etc.) that address energy, environmental and sustainability issues. There are numerous organizations that already serve the New York State printing industry that can, with additional support, provide this value-added resource.
- Technology Test-Beds and Technology Transfer – The printing industry is undergoing a fundamental shift to digital printing technologies. Still, there remain numerous additional printing applications and processes that will have an impact on the future of the industry. There are new materials and substrates, new bio-based inks, UV, and EB technologies and a wide-variety of supplies that can have a positive impact on the industry for cost reductions, productivity and quality enhancement, energy reduction, waste, and water reduction<sup>5</sup>. New York’s Printing Industry would benefit from independent testing and validation of many of these technologies so that the risk of adopting any of these technologies into its operations can be minimized. Colleges, universities and applied research organizations can serve a unique role in fostering innovation and independently testing and validating technology for the printing industry. Moreover, these organizations can directly or

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<sup>5</sup> For additional useful reference and information on UV and EB technologies see:

- “An Introduction to Ultraviolet Light (UV) and Electron Beam (EB) Curable Coating Technology” by *George Pasternack, Ph.D.*, available at: <http://www.hgexperts.com/article.asp?id=5003>.
- “An Innovative Way to Print: Ultra Violet and Electron Beam Curing” by Emily Clark, Rochester Institute of Technology, Rochester, New York, January 2009, available at: <http://www.iopp.org/files/public/RochesterInstituteEmilyClark.pdf>

indirectly work with technology transfer organizations that can disseminate knowledge and technology throughout the printing industry of the state, so that all printers have access to the state-of-the-art.

- Sustainable Technologies and Processes – There currently is not enough data and information available to help printers assess technology from the perspective of sustainable production. Printers place high value on cost and performance (specifically, equipment speed and quality). Metrics such as these, when aligned with print technologies that use less energy and have a smaller environmental footprint, will enable printers to make more informed decisions on capital equipment upgrades in the context of sustainability. Thus, there is a need to assess the productivity, energy, environmental and economic impacts of new technologies. For example, as some printers within the industry transition toward digital technology, there is a need to evaluate the printing technology in the context of the aforementioned categories. In addition, data and information on the entire life cycle (including manufacture and end-of-life scenario) of existing and new print technologies will be useful to assess and compare to provide industry with information that can support capital purchasing decisions against sustainability criteria. It is recommended that industry, government, and research institutions collaborate to define the sustainability metrics, performance requirements, and test methods for assessing life cycle and specific use phase impacts of existing and new print technologies.

## XI. Appendices

### Appendix A: Glossary of Terms & Printing Organizations

#### **FSC – Forest Stewardship Council**

Forest Stewardship Council (FSC) is a non-profit organization devoted to encouraging the responsible management of the world's forests. FSC sets high standards that ensure forestry is practiced in an environmentally responsible, socially beneficial, and economically viable way.

Landowners and companies that sell timber or forest products seek certification as a way to verify to consumers that they have practiced forestry consistent with FSC standards. Independent certification organizations are accredited by FSC to carry out assessments of forest management to determine if standards have been met. These certifiers also verify that companies claiming to sell FSC certified products have tracked their supply back to FSC certified sources. This chain of custody certification assures that consumers can trust the FSC label.

Trusted environmental organizations including Greenpeace, National Wildlife Federation, The Nature Conservancy, Sierra Club, and World Wildlife Fund all support and encourage FSC certification. Consumers wishing to support healthy forests and communities should look and ask for the FSC label when purchasing wood or paper products.

FSC-US, based in Minneapolis, MN, is the U.S. "chapter" of FSC International, based in Bonn Germany. Additional information on FSC can be found at: [www.fsc.org](http://www.fsc.org).

#### **NAPL – National Association for Printing Leadership**

NAPL was founded in 1933 in the midst of the Great Depression as the National Association of Photo-Lithographers, setting out on a mission that continues to this day: to help its members stay on the leading edge of innovation and profitably grow their business. Over the years, the Association has evolved along with the graphic communications industry it serves.

By the early 1970s, the letterpress industry, once a competitor to photolithographers, had become heavily engaged in the lithographic field. For decades, our members had been lithographers, who were not known as printers. However, with letterpress printers joining our ranks in ever-growing numbers, in 1971, we changed our name to the National Association of Printers and Lithographers.

Later, in the 1980s and 1990s, as letterpress faded and the industry saw the explosion of computers and the arrival of digital technology, the printer's craft became an ever-more complex business demanding more advanced management skills. NAPL turned its focus to building and supporting industry

leaders and, in 1999, the Association again changed its name, this time to the National Association for Printing Leadership.

Today we are best known simply as NAPL, an acronym that has a heritage of nearly 75 years of service to companies in the printing and graphic communications industry. As the trade association for excellence in graphic communications management, NAPL counts among its members many of the industry's most progressive companies. Additional information on NAPL can be found at: <http://www.napl.org/>.

#### **PIANY – Printing Industries Alliance of New York**

Printing Industries Alliance, serving Graphic Communications Firms in New York State, Northern New Jersey and Northwestern Pennsylvania, is committed to promoting the value of graphic communications and increasing the profitability of member firms. Additional information on PIA can be found at: <http://www.printnys.org/1>.

#### **PIA – Printing Industries of America**

Printing Industries of America is the world's largest graphic arts trade association representing an industry with approximately one million employees. It serves the interests of more than 10,000 member companies. Printing Industries of America, along with its affiliates, delivers products and services that enhance the growth, efficiency, and profitability of its members and the industry through advocacy, education, research, and technical information.

Born out of the consolidation of PIA and GATF, Printing Industries of America has a long and impressive history. We are dedicated to the advancement of the graphic communications industry worldwide. Printing Industries proudly hosts two specialty Centers of Excellence—the Center for Technology & Research (formerly GATF) and the Center for Digital Printing Excellence. Both serve our members and the industry with in-depth, quality research, reports, products, services, and more. Additional information on PIA can be found at: <http://www.printing.org/>.

#### **SGP – Sustainable Green Printing Partnership**

*The mission of the Sustainable Green Printing Partnership is to encourage and promote participation in the worldwide movement to reduce environmental impact and increase social responsibility of the print and graphic communications industry through sustainable green printing practices.*

The printing industry is an important part of the world's manufacturing community. Print plays a vital role in communication, education, and daily existence. The printing industry has historically understood its effect on the natural world and accepts responsibility to continue efforts to reduce its overall environmental impact.

The SGP Partnership recognizes the following sustainable business practices as guiding principles to ensure continued viability and growth:

- Employ, wherever and whenever possible, materials derived from renewable resources or with low environmental impact, maximizing recycling and recovery efforts with efficient use of renewable energy.
- Encourage the adoption of changes within the supply chain by strongly recommending the use of raw materials that do not threaten or harm future generations.
- Educate the customer and ultimate consumer regarding the benefits of a restorative economy.

Printers can be listed as a certified SGP Printer by meeting a set of criteria to establish performance standards. The list of certified SGP Printers is available to the print buying community so that they can easily identify and contact “green” printers within their area. Additional information on SGP can be found at: <https://www.sgppartnership.org/>.

#### **SFI – Sustainable Forestry Initiative**

The Sustainable Forestry Initiative® (SFI®) label is a sign you are buying wood and paper products from a responsible source, backed by a rigorous, third-party certification audit. Voluntary third-party forest certification began in the 1990s in response to market concerns about forest management and illegal logging, primarily in developing countries.

The SFI program was launched in 1994 as one of the U.S. forest sector’s contributions to the vision of sustainable development established by the 1992 United Nations Conference on Environment and Development. Its original principles and implementation guidelines began in 1995, and it evolved as the first SFI national standard backed by third-party audits in 1998.

Today, SFI Inc. is an independent, non-profit organization responsible for maintaining, overseeing and improving a sustainable forestry certification program that is internationally recognized and is the largest single forest standard in the world.

The SFI 2010-2014 Standard is based on principles and measures that promote sustainable forest management and consider all forest values. It includes unique fiber sourcing requirements to promote responsible forest management on all forest lands in North America.

SFI certification also extends to the market. When they see the SFI label on a product, consumers can be confident they are buying wood or paper from responsible sources – whether it is reams of paper, packaging, or two-by-fours. Additional information on SFI can be found at: <http://www.sfiprogram.org/>.

**RadTech – RadTech International North America**

RadTech International North America, a non-profit organization, is the association for the advancement of ultraviolet and electron beam (UV & EB) technology. RadTech serves as an industry forum, addressing the educational needs of the users and suppliers of UV and EB equipment and materials. Our members also represent end user companies in several industries including: Adhesives, Composite Applications, Converting/Packaging, Decorative Applications, Dental Restorations, Electronics/Electrical, Flooring, Graphic Arts (inks, high-gloss varnishes), Opto Electronics, Metals, Photoresists, Plastics, Rapid Prototype Parts Manufacture, Release Coatings, Steel Pipe, Tubing, and Wood Finishes. Additional information on RadTech can be found at: <http://www.radtech.org/>.

## Appendix B: New York State Printing Industry Survey

### New York State Printing Industry Survey

# March 2010

Rochester Institute of Technology (RIT), in collaboration with New York State Pollution Prevention Institute (NYSP2I), New York State Energy Research and Development Authority (NYSERDA), and RadTech International seek your help in “Competitively Positioning the New York State Printing Industry for the Future”.

**Positioning Industry for  
the Future: Energy,  
Environment and  
Sustainability**

## Purpose & Method:

RIT is surveying a sample of the New York State printing establishments with the goal of understanding how issues related to climate, energy, environment and sustainability are having an immediate and longer-term impact on industry competitiveness.

RIT intends to collect data on the state of the NYS printing industry including existing technology and operational practices, an understanding of market and regulatory drivers, and perspective on the barriers and challenges printers are experiencing today, and project into the future.

RIT plans to use a two phased approach to collect useful data and insights. First, RIT will administer a concise survey tool (below) that will collect general business data and operational practice information. The survey is short in length and will enable quantitative analysis on the state of the industry. RIT will then conduct a sensing interview process, asking printing establishments for a 30 to 40 minute telephone or on-site interview to further discuss ongoing trends, emerging issues and opportunities as it relates to business competitiveness, opportunities for growth, technology readiness and sustainability.

***Please scan completed surveys and return to Rajiv Ramchandra at rxrasp@rit.edu or Mark Coleman at mccasp@rit.edu or fax at 585-475-6610.***

## Outcomes & Confidentiality:

The data, information and insights generated from this confidential process will help contribute toward a final report that will serve to inform businesses within and related to the printing industry, trade associations, funding agencies and other stakeholders on how the printing industry can position itself for growth and sustainability. All data and information gathered from this process will be kept strictly confidential and will not be attributed to any one company. Only trends and aggregated results will be presented in public reporting.

We thank you in advance for supporting this study.

## GENERAL BUSINESS CONTEXT QUESTIONS

## Question 1

Total Number of Employees (specify at facility, establishment or organization)	<i># of Employees</i>

## Question 2

When was your company founded?	<i>Year of Origin</i>

## Question 3

What is your annual revenue/sales? (provide a range if needed)	<i>\$ Annual Sales</i>

## Question 4

Number of Printing Facilities	<i># of Facilities</i>

## Question 5

Square Footage of Printing Facilities	<i>Facility Sq. Ft.</i>
	Facility 1
	Facility 2

## Question 6

Please identify all of the types of printing processes and technologies used at your facilities and revenue generated annually using each technology	<i>Printing Technologies</i>	<i>Revenue per year (\$)</i>
	Offset	
	Lithography	
	Flexography	
	Toner (Laser)	
	Inkjet	
	Screen	
Gravure		

## Question 7

Identify the core business segment(s) of the printing industry you serve (multiple segments may apply)	<i>Industry Segment</i>	<i>Check those that apply</i>
	General Commercial	
	Form, Label, Tag Print	
	Packaging Printing	
	Other (please define)	

## OPERATIONAL QUESTIONS: PROCESS INPUTS AND COSTS

### Question 8

Please provide the total annual energy consumption data for your printing facility (more than one facility may apply)	<i>Energy</i>	<i>Electricity (kWh/year)</i>	<i>Gas (Therms/year)</i>
	Facility 1		
	Facility 2		
	Total		

### Question 9

Please provide the energy rate paid for your printing facility (more than one facility may apply)	<i>Energy</i>	<i>Electricity (\$/kWh)</i>	<i>Gas (\$/therm)</i>
	Facility 1		
	Facility 2		
	Total		

### Question 10

Please provide the total annual water consumption data and rate paid for your printing facility (more than one facility may apply)		<i>Water Usage (Gallons/year)</i>	<i>Cost (\$/1000 gallons)</i>
	Facility 1		
	Facility 2		
	Total		

### Question 11

Please provide information on any hazardous or toxic chemicals used in your manufacturing process.	<i>Chemical Name</i>	<i>Quantity used (Pounds/year)</i>	<i>Purchase cost (\$/pound)</i>	<i>Which process uses it?</i>

## OPERATIONAL QUESTIONS: WASTE MANAGEMENT AND POLLUTION PREVENTION

### Question 12

Does your company have a manager/director/VP of environment, health and safety?	<i>Check (✓) if Applicable</i>	
	YES	NO
If Yes, who fulfils the role?		

### Question 13

Does your company have a manager/director/VP of sustainability?	<i>Check (✓) if Applicable</i>	
	YES	NO
If Yes, who fulfils the role?		

**Question 14**

<b>Does your company have an energy, environmental and/or sustainability policy?</b>	<i>Check (✓) if Applicable</i>					
	Energy Policy		Environmental Policy		Sustainability Policy	
	YES	NO	YES	NO	YES	NO

**Question 15**

<b>How is “waste” measured in your company (please identify any metrics, i.e., scrap paper, which materials are recycled, tipping fees, other)? Use multiple lines if a specific waste is disposed &amp; recycled.</b>						
	Description	Source/ Process	Check (✓) if quantities are tracked	Check (✓) if recycled	Quantity/year (specify unit i.e. lbs/gallons,etc.)	Annual disposal/ recycling cost
Solid Waste						
Air Emissions						
Wastewater discharge						
Hazardous Wastes						

**Question 16**

<b>Does your company have a recycling policy?</b>	<i>Check (✓) if Applicable</i>	
	YES	NO
<b>If YES, how much material is recycled by your company on an annual basis?</b>	<i>Amount of Material Recycled</i>	
	Pounds (LBS)	% of Total Material Used

**Question 17**

What is the core environmental issue or concern your company is currently faced with?

**Question 18**

<b>Please identify which areas your company is considering implementing, sustainability measures for, or have already done so.</b>	<i>Check (✓) if Applicable</i>	
	Ink and coating selection	
	Lean manufacturing techniques	
	VOC reduction	
	Waste reduction	
	Recycling programs	
	Joining voluntary trade organization	
	Hiring outside consultants	
	Use of bio-based or renewable raw materials	
	Alternate substrate selection	
	Print method selection	
	Other (Please Identify)	

**TECHNOLOGY AND PROCESS SPECIFIC QUESTIONS****Question 19**

<b>Does your printing process use UV and/or EB technology?</b>	<i>Check (✓) if Applicable</i>	
	<i>UV</i>	<i>EB</i>

**Question 20**

<b>If your printing process does not use UV and/or EB technology, would you consider installing it in your process?</b>	<i>Yes/No</i>	
	<i>UV</i>	<i>EB</i>

**Question 21**

Does your printing process use thermal oxidizers to decompose hazardous gases at high temperatures?	<i>Check (✓) if Applicable</i>	

**Question 22**

If thermal oxidation is used in your process, has it resulted in VOC reductions?	<i>Check (✓) if Applicable</i>	
	<i>YES</i>	<i>NO</i>
If YES, have VOC reductions been quantified?		

**Question 23**

If your process uses UV curing, are LED bulbs used in the process or UV lamps?	<i>Check (✓) if Applicable</i>	
	<i>LED Bulbs</i>	<i>UV Lamps</i>

**Question 24**

Does your printing process use solvent based inks?	<i>Check (✓) if Applicable</i>	
	<i>YES</i>	<i>NO</i>

**Question 25**

What is the brand/model of your printing press(es); and age of your printing press(es)?	<i>Brand/Model</i>	<i>Age</i>

**Question 26**

Please identify which print technologies (and time horizon for purchase) are being considered for future capital investments at your company.	<i>Printing Technologies</i>		<i>Time Horizon for Investment</i>		
			1-2 Years	3-5 Years	5-10 Years
	Digital (ink jet/toner)				
	Flexography (water/solvent/UV/EB)				
	Offset (heatset/conventional/UV/EB/LED)				
	Screen				
Gravure					

## BUSINESS SUSTAINABILITY SPECIFIC QUESTIONS

### Question 27

Are your customers interested in Sustainability?	<i>Check (✓) if Applicable</i>	
	YES	NO

### Question 28

Has their interest influenced current business decisions?	<i>Check (✓) if Applicable</i>	
	YES	NO

### Question 29

Has your organization joined a voluntary trade organization with an emphasis on sustainability such as the SGP?	<i>Check (✓) if Applicable</i>	
	YES	NO

## Appendix C: Sensing Interview Guide

### Printing Industry Present and Future

- What do you see as the **major business, regulatory or other influences** that you see impacting the state of the printing industry over the next 2-to-5 years?
- Do you see issues related to **climate change, energy price volatility, or materials supplies** having a significant impact on your company and industry in the next 2-to-5 years? If so, in what ways?
- In what ways is your industry changing? How is this having an impact on your company with regard to customers, operational practices, choice of printing technology, or suppliers?
- What role is diversification and consolidation having on your company and the printing industry? Is your company needing to diversify its customers and products/services? Is the need to diversify or consolidate also impacting your printing processes and technology choices?
- Are there additional concerns or opportunities that the printing industry need to address?

### Energy

- Has your energy use been increasing or decreasing over the past five years?
- Have your energy costs been increasing or decreasing over the past five years?
- Has energy use increased or decreased due to growth in business, adoption of new technology or other market factors?
- What are the energy related barriers or challenges to your company and the printing industry? *i.e.*, energy price volatility; energy management; managing energy supplies; deploying energy efficiency measures; reducing energy consumption; etc.

### Technology

- Have you adopted any new printing technologies or energy management technologies that have significantly increased or decreased your energy use and costs?
- Do you deploy ultraviolet (UV) or electron beam (EB) technology in your printing process?
  - What has your experience with UV and/or EB technology been (favorable, unfavorable)?

- Has UV and/or EB resulted in energy savings?
- Has UV and/or EB resulted in operational efficiency or productivity enhancements?
- Has UV and/or EB resulted in less or more waste or environmental impacts?
- Does your company use thermal oxidizers in its printing process?
  - If so, how have the oxidizers performed in reducing VOC emissions?
  - Are VOC emissions quantified?
  - Do oxidizers result in more/less energy used?
  - Do oxidizers result in greater/less expense to the company?
- What role do you feel technology will play in the future of the printing industry and specific to your company?
  - Are there barriers to adopting new printing technologies?
  - Do printing technologies exist that can make your operation more productive, less costly and less energy intensive? What are they? What inhibits you from adopting these technologies?

#### **Operations: Sustainability, Waste Management and Pollution Prevention**

- How does your company measure waste?
- Do you use internal metrics to account for waste produced, diverted, recycled?
- Does your company have an internal environmental, waste management and/or recycling policy?
- Is there a person who manages waste at your company?
- What are the barriers or challenges to reducing waste in the printing industry, from your company perspective?
- Is the “safety of chemicals” an issue for your business?
- Are your customers interested in Sustainability?
  - Has their interest influenced current business decisions?
- Is your organization taking steps in anticipation of future opportunities related to corporate sustainability?
  - *I.e.*, Has your organization considered hiring consultants?

- *I.e.*, Has your organization joined a voluntary trade organization with an emphasis on sustainability such as the SGP? If so which one?
- Does your company use or plan to implement lean manufacturing techniques into your operation? Explain.
- Is your facility operating under VOC or HAP cap?
  - Is a cap in VOC or HAP emissions preventing future expansion or growth of business?

## Appendix D: Participant Outreach List

The list below identifies the sample of 155 New York State Printers that comprised the outreach list for the RIT NYS Printing Industry Survey.

1	Action Envelope	Lindenhurst, NY
2	Adirondack Pennysaver	Plattsburgh, NY
3	Agrecolor	Mineola, NY
4	Albion-Holley Pennysaver	Albion, NY
5	Alchar Printing Group	Troy, NY
6	Aldine, Inc.	New York, NY
7	Aldine, Inc.	New York, NY
8	All Color Business Specialties, Ltd.	Farmingdale, NY
9	Allen-Bailey Tag & Label	Caledonia, NY
10	AlphaGraphics	Buffalo, NY
11	Alpina Digital	New York, NY
12	American Institute of Physics	Melville, NY
13	Ansel Printing & Packaging	Amherst, NY
14	Apple Converting	Norwich, NY
15	Ashton-Potter (USA) Ltd.	Williamsville, NY
16	Avalon Copy Centers	Syracuse, NY
17	Avon Reproductions, Inc.	Hauppauge, NY
18	BCO Industries of WNY, Inc.	Tonawanda, NY
19	Benchmark Printing, Inc.	Schenectady, NY
20	Bennett Printing Corporation	Brooklyn, NY
21	Boncraft Printing Group	Orchard Park, NY
22	Brigar X-Press Solutions, Inc.	Albany, NY
23	Bristol ID Technologies	Lima, NY
24	Brodock Press, Inc.	Utica, NY
25	Buffalo Newspress Inc.	Buffalo, NY
26	Buffalo Printing Co.	Kenmore, NY
27	Caboodle Printing, Inc.	Tonawanda, NY
28	Canfield & Tack, Inc.	Rochester, NY
29	Capitol Press Printers	Albany, NY
30	Cathedral Corporation	Rome, NY
31	Cayuga Press, Inc.	Cortland, NY
32	Cedar Graphics	Ronkonkoma, NY
33	Chase Press Yorktown	Yorktown Heights, NY
34	Chenango Union Printing Inc.	Norwich, NY
35	Cohber Press, Inc.	Rochester, NY
36	Col-Pal Press, Inc.	Oceanside, NY
37	Color-Tech Photo Labs, Inc.	Amherst, NY
38	ColorCentric Corporation	Rochester, NY
39	Concentrix Corporation	Pittsford, NY
40	Courier Printing Corp.	Deposit, NY
41	Curcio Printing	Vestal, NY
42	Delft Printing Inc.	Lancaster, NY
43	Dellas Graphics	Syracuse, NY

44	Digital Page	Albany, NY
45	Downtown Graphics & Printing	Buffalo, NY
46	DPI Secuprint, Inc.	Rochester, NY
47	Dupli Envelope & Graphics Corp	Syracuse, NY
48	Eagle Envelope Company, Inc.	Trumansburg, NY
49	Eagle Graphics, Inc.	Rochester, NY
50	Eastwood Litho, Inc.	Syracuse, NY
51	EPI Printing & Finishing	Rochester, NY
52	Evenhouse Printing	Hamburg, NY
53	Evergreen Corp. of CNY	Syracuse, NY
54	Excelsus Solutions, LLC	Rochester, NY
55	Falconer Printing & Design Inc.	Falconer, NY
56	Flower City Printing, Inc.	Rochester, NY
57	Fort Orange Press, Inc.	Albany, NY
58	Gateway Printing & Graphics	Hamburg, NY
59	GF Labels	Queensbury, NY
60	Gintzler Graphics, Inc.	Williamsville, NY
61	Gooding Co. Inc.	Lockport, NY
62	Graphic Controls LLC.	Buffalo, NY
63	Graphic Technology Long Island	Long Island City, NY
64	Great Eastern Color Lithographic	Poughkeepsie, NY
65	Grover Cleveland Press, Inc.	Amherst, NY
65	Grover Cleveland Press, Inc.	Rensselaer, NY
67	Hammer Lithograph Corporation	Rochester, NY
68	Hansen QP	Syracuse, NY
69	Highroad Press LLC	New York, NY
70	Hodgins Engraving	Batavia, NY
71	Hudson Printing Company	Long Island City, NY
72	Idesco Corporation	New York, NY
73	Immediate Mailing Services	Liverpool, NY
74	Integrated Color Solutions	New York, NY
75	Interlect, Inc.	Deer Park, NY
76	Jack W. Hunt & Associates, Inc.	Buffalo, NY
77	Jacobs Press, Inc.	Auburn, NY
78	Keller Bros. and Miller, Inc.	Buffalo, NY
79	KinaneCo Printing Systems	Syracuse, NY
80	Label World	Rochester, NY
81	Leader All Surface Printing	Buffalo, NY
82	LMN Printing Co., Inc.	Valley Stream, NY
83	Lodner Printing	Bronx, NY
84	Matrix Printing Solutions Inc.	Sanborn, NY
85	Mercury Print Productions, Inc	Rochester, NY
86	Merlin Printing, Inc.	Amityville, NY
87	Merrill Press, Inc.	Kenmore, NY
88	Metro Community News	Cheektowaga, NY
89	MIB Industries, Inc.	Ridgewood, NY
90	Microera Printers, Inc.	Rochester, NY
91	Modern Press	Albany, NY

92	Monarch Graphics, Inc.	Central Islip, NY
93	Monroe Litho, Inc.	Rochester, NY
94	Mr. Digital Printing	Farmingdale, NY
95	MTM Printing Company, Inc.	College Point, NY
96	NetPublications, Inc.	Poughkeepsie, NY
97	New York City Transit	New York, NY
98	New York Label & Box	Islandia, NY
99	Northern Graphics	Baldwinsville, NY
100	Northport Printing	West Babylon, NY
101	Nova Graphics, Inc.	New York, NY
102	Official Offset Corporation	Amityville, NY
103	One Industry Corporation	New York, NY
104	Oser Press, Inc.	Rochester, NY
105	P. J. Green, Inc.	Utica, NY
106	Panther Graphics, Inc.	Rochester, NY
107	Parkside Press	Buffalo, NY
108	Partners' Press	Kenmore, NY
109	PBR Graphics, Inc.	Albany, NY
110	Penny Lane Printing Inc.	Avon, NY
111	Photo File, Inc.	Mount Kisco, NY
112	Pine Barrens Printing	Westhampton Beach, NY
113	Pioneer Printers, Inc.	North Tonawanda, NY
114	Playbill, Inc.	New York, NY
115	Pliant Corporation	Macedon, NY
116	Precise Corporate Printing, Inc.	Brooklyn, NY
117	Prestone Printing Company	Long Island City, NY
118	Printcraft Complete Communications	Oceanside, NY
119	Printed Image of Erie County	Buffalo, NY
120	Printing Methods Inc.	Rochester, NY
121	Printing Spectrum	East Setauket, NY
122	Pro Printers	Hudson, NY
123	Quality Circle Products, Inc.	Montrose, NY
124	Quartier Printing	East Syracuse, NY
125	Queen City Imaging	Buffalo, NY
126	Register Graphics, Inc.	Randolph, NY
127	Reliable Press II, Inc.	Brooklyn, NY
128	RIT - Print & Postal HUB	Rochester, NY
129	The Royal Press	Staten Island, NY
130	Rye Printing, Inc.	Rye, NY
131	Sentinel Printing	Hempstead, NY
132	Snyder Printer	Troy, NY
133	The Standard Group	East Elmhurst, NY
134	Star Quality Printing	Hauppauge, NY
135	Starkey & Henricks	New York, NY
136	Stellar Printing, Inc.	Long Island City, NY
137	Sterling Sommer, Inc.	Tonawanda, NY
138	Sterling-Pierce Co., Inc.	East Rockaway, NY
139	Syracuse Label Company, Inc.	Liverpool, NY

140	The Mines Press, Inc.	Cortlandt Manor, NY
141	The Peters Print	Cohoes, NY
142	The Riverside Group	Rochester, NY
143	TLF Graphics	Rochester, NY
144	Tobay Printing Co., Inc.	Copiague, NY
145	Tucker Printers	Henrietta, NY
146	Ulrich Mail Advertising	Buffalo, NY
147	United Graphics, Inc.	Buffalo, NY
148	Upstate Printing, Inc.	Syracuse, NY
149	Velocity Print Solutions	Scotia, NY
150	Vanguard Printing LLC	Ithaca, NY
151	Whitney Printing Corp.	Buffalo, NY
152	William Charles Printing	Plainville, NY
153	Willow Graphics, Inc.	Copiague, NY
154	X-L Envelope & Printing, Inc.	Buffalo, NY
155	Zenger Group	Buffalo, NY