



# **New York State Professional Wet Cleaning Program**

## **New York State Dry Cleaner Survey**

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# New York State Pollution Prevention Institute (NYSP2I)

## Executive Summary

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This document summarizes the results of a survey of dry cleaning establishments in New York State (NYS) conducted by the New York State Pollution Prevention Institute (NYSP2I) in July and August 2010. The purpose of the survey is to identify barriers to conversion to professional wet cleaning (PWC) by assessing industry attitudes and concerns, along with any gaps associated with PWC technology. The results will be used to develop wet cleaning outreach and educational materials targeted for NYS garment cleaners.

In total, approximately 2,100 dry cleaning establishments were mailed the survey and 110 completed surveys were returned, resulting in a return rate of 5.4%. The geographic location of survey respondents correlates well with the geographic distribution of cleaners throughout the state.

The survey is divided into four areas: business information, operational information, technology, and professional wet cleaning. Highlights of the results from each area include:

### Business Information

- There is a correlation between the type of building and the location of the dry cleaner in the State
  - 96% of the co-located residential cleaners are downstate
  - 83% of cleaners located upstate are located in standalone buildings
  - 39% of downstate cleaners are co-located in commercial buildings, 33% are co-located in residential buildings, and 24% are located in standalone buildings
- More than half of respondents have facilities 2,000 square feet or smaller in size
- On average, each dry cleaning establishment has 6 fulltime and 2.3 part-time employees

### Operational Information

- On average, a dry cleaner's business is composed of 61% dry cleaning, 10.7% PWC, and 27.3% laundering and more than half clean 1,000 pounds or less per week
- Many cleaners use more than one cleaning solution in their operations: 56% use one cleaning solvent, 41% use PWC in combination with one or more other solvents, and the remaining 3% use a combination of solvents not including PWC.
- 67% of respondents plan to purchase new dry cleaning equipment in the next 10 years, 17% plan to purchase in 11 to 20 years, and 15% indicate they never plan to purchase new cleaning equipment

### Technology

- 86% of respondents identify themselves as "very knowledgeable" about perc and 53% identify themselves as "very knowledgeable" about PWC
- 66% of respondents are interested in using PWC, 50% are interested in using perc, and slightly less than 50% are interested in using hydrocarbon
- 18% of respondents indicate their customers request PWC, 12% request hydrocarbon, and 11% request perc

### Professional Wet Cleaning

- 57% of respondents agree that most cleaners do not know a lot about PWC
- 6% of respondents indicate that PWC equipment is difficult to learn and operate and 42% agree that special training is needed to operate PWC equipment
- About two thirds of respondents believe there are limitations to PWC: 71% think that PWC cannot clean all garment types, 67% say it is difficult to finish wet cleaned garments, and 65% say other solvents do a better job at cleaning some garments



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## Definitions

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*Drop shop or storefront:* a physical location where customers drop off and pick up garments only and garments are shipped to another location for cleaning, drop shops are typically used in urban areas where one dry cleaning plant serves multiple drop shops

*Dry cleaning:* a process that uses solvents other than water to clean garments labeled “dry clean only”

*Laundering or washing:* a process which uses standard washing and drying machines to clean nondelicate garments that normally would not be dry cleaned, such as cotton, slacks, and dress shirts

*Professional wet cleaning:* a process that uses sophisticated equipment to clean clothes in water that would normally be dry cleaned

*Upstate:* for purposes of this study, the location of dry cleaners is based on their zip code in the NYSEFC database; upstate is defined as NYS counties located north of Westchester and Rockland counties.

*Downstate:* for purposes of this study, the location of dry cleaners is based on their zip code in the NYSEFC database; downstate is defined as the five boroughs of NYC, Long Island (Nassau & Suffolk counties), and Westchester and Rockland counties.

### Dry Cleaning Solvents<sup>1,2</sup>

*Perchloroethylene (perc):* traditional dry cleaning solvent; also used in other industry sectors including degreasing operations, paints and coatings, and industrial and consumer products

*Glycol ether (Rynex, Solvair):* biodegradable volatile organic solvent with low volatility and a high flash point

*Liquid carbon dioxide:* gaseous carbon dioxide is pressurized and liquefied; there is no net increase in greenhouse gas emissions as carbon dioxide is obtained from large industrial combustion sources

*Siloxane D5 (GreenEarth, decamethylcyclopentasiloxane, or volatile methyl siloxane):* silicone based solvent; non flammable; potential health effects are somewhat controversial, see US EPA *Siloxane D<sub>5</sub> in Drycleaning Applications* fact sheet at <http://www.epa.gov/dfe/pubs/garment/d5fs3.pdf>

*Hydrocarbon (DF-2000, Ecosolv):* volatile organic compounds (VOC) which contribute to the formation of ozone which is linked to ill-health effects including respiratory irritation, asthma, and premature death, flammable

*Mineral spirits or Stoddard solvent:* highly flammable organic solvent typically used in painting

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<sup>1</sup> Solvent descriptions adapted from California Air Resources Board, Alternative Solvents Used for Dry Cleaning Operations, Dry Cleaning Notice 2009-2, November 2009, [http://www.arb.ca.gov/toxics/dryclean/notice2009\\_2.pdf](http://www.arb.ca.gov/toxics/dryclean/notice2009_2.pdf)

<sup>2</sup> For more information on the potential health effects of dry cleaning solvents, see California Environmental Protection Agency Air Resources Board, Dry Cleaning Alternative Solvents: Health and Environmental Impacts, Fact Sheet, March 2008, [http://www.arb.ca.gov/toxics/dryclean/AlternativeSolvs\\_E.pdf](http://www.arb.ca.gov/toxics/dryclean/AlternativeSolvs_E.pdf)



# New York State Pollution Prevention Institute (NYSP2I)

## 1. Background

The New York State Department of Environmental Conservation (NYSDEC) requested that the New York State Pollution Prevention Institute (NYSP2I) address the use of perchloroethylene (perc) use in dry cleaning with an ultimate goal of reducing the amount of perc used by dry cleaners in the State by converting them to more environmentally friendly alternative technologies. NYSP2I has been working alongside NYSDEC in conducting research regarding the current state of perc use in the NYS garment cleaning industry as well as exploring alternatives to perc.

### History of Dry Cleaning in New York State

Perc has been the solvent of choice of the garment cleaning industry for many years. It is relatively inexpensive, requires minimal control over the cleaning process, and can be used to clean all types of garments. Perc is classified by the International Agency for Research on Cancer as “Group 2A: Probably carcinogenic to humans” and is also a suspected developmental, gastrointestinal, kidney, reproductive, respiratory, and skin or sense organ toxicant<sup>3</sup>. Perc is a central nervous system depressant that can enter the body through respiratory or dermal exposure.<sup>4</sup> Perc also presents a hazard to the environment as it is persistent in water and soil and very persistent in sediment and air<sup>5</sup>. Once perc is released into the environment, it does not easily or quickly break down into less toxic constituents.

The health and environmental impacts of perc use are of particular concern in New York State, since New York has the second highest number of garment cleaning facilities in the country<sup>6</sup>, many of which are located on the bottom floor of high rise apartment buildings or as part of a strip mall. As such, the health effects are experienced not only by dry cleaning workers, but also by inhabitants of apartments located above dry cleaners as well as businesses located adjacent to them<sup>7,8</sup>. The New York State Department of Health (NYSDOH) outlines the potential health effects which may result from both long and short term exposure to perc in the air<sup>9</sup>. According to the NYSDOH, apartment residents living near dry cleaning shops are exposed to low levels of perc which may lead to reduced scores on tests of visual perception, reaction time, and attention. Furthermore, long term exposure to higher levels, such as those experienced by dry cleaning workers, can affect the liver, brain, and kidneys.

The New York City Department of Environmental Protection (NYCDEP) has promulgated regulations<sup>10</sup> and permitting requirements for New York City dry cleaners above and beyond those required by the NYSDEC. These amendments prohibit new perc dry cleaning machines from operating in residential buildings after July 13, 2006 and require perc dry cleaning machines that were installed in residential buildings before December 21, 2005 to eliminate the use of perc by December 21, 2020. Those cleaners who installed perc dry cleaning machines in residential buildings from December 21, 2005 through July

<sup>3</sup> Scorecard Chemical Profile, [http://www.scorecard.org/chemical-profiles/summary.tcl?edf\\_substance\\_id=+127-18-4](http://www.scorecard.org/chemical-profiles/summary.tcl?edf_substance_id=+127-18-4), accessed March 26, 2009

<sup>4</sup> Center for Disease Control, National Institute for Health & Safety, HC 19: Control of Exposure to Perchloroethylene in Commercial Drycleaning (Ventilation), Dec, 23 1997, <http://www.cdc.gov/niosh/hc19.html>

<sup>5</sup> PBT Profiler, <http://www.pbtprofiler.net/>.

<sup>6</sup> According to the 2007 US Economic Census, NAICS 8123202 “Dry Cleaning Plants”, there are 20,465 dry cleaning plants in the US. California has the highest number of plants (2,824) and New York is second, with 1,960 plants.

<sup>7</sup> Ma et.al., Association between Residential Proximity to PERC Dry Cleaning Establishments and Kidney Cancer in New York City, Journal of Environmental and Public Health, 2009, doi:10.1155/2009/183920.

<sup>8</sup> Schreiber et. al., Apartment Residents’ and Day Care Workers’ Exposures to Tetrachloroethylene and Deficits in Visual Contrast Sensitivity, Environmental Health Perspectives, 2002, 110:7.

<sup>9</sup> NYSDOH, Fact Sheet: Tetrachloroethylene (perc) in Indoor and Outdoor Air, May 2003, [http://www.health.state.ny.us/environmental/chemicals/tetrachloroethene/docs/fs\\_perc.pdf](http://www.health.state.ny.us/environmental/chemicals/tetrachloroethene/docs/fs_perc.pdf).

<sup>10</sup> Chapter 12 of Title 15 of the Rules of the City of New York, Governing and restricting the use of perchloroethylene at dry cleaning facilities in the City of New York, [http://www.nyc.gov/html/dep/pdf/final\\_perc\\_rule.pdf](http://www.nyc.gov/html/dep/pdf/final_perc_rule.pdf)



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13, 2006 were required to eliminate the use of perc by July 13, 2009. While these regulations are only applicable to the boroughs of New York City, the US Environmental Protection Agency<sup>11</sup> and NYSDEC<sup>12</sup> regulations are becoming more stringent with time, working to reduce the amount of perc released to the environment as a result of dry cleaning operations.

According to the NYS Environmental Facilities Corporation (EFC) database<sup>13</sup> as of October 2009, there are 2,091 dry cleaners in New York State. Of these, 1,717 use perc and 374 use an alternative to perc (e.g. hydrocarbon, GreenEarth, wet cleaning). The California Air Resources Board estimates a dry cleaner establishment consumes an average of 80 gallons of perc per year<sup>14</sup> and the average perc machine loses about 4 fluid ounces (0.42lbs) of perc to the atmosphere every day<sup>15</sup>. The operation of 1,717 perc based dry cleaners equates to the use of 137,360 gallons of perc each year, and 721 pounds of perc per day (131.6 tons perc per year) emitted to the atmosphere in New York State alone.

### Dry Cleaning Alternatives to Perc

Based on NYSP2I and NYSDEC's research, when considering environmental, human health, economic aspects and cleaning ability, professional wet cleaning is the garment cleaning technology of choice. Professional wet cleaning is a garment cleaning method that uses water, rather than a chemical, as the cleaning solvent. Sophisticated computer controlled washers, dryers, and finishing equipment are used with water based, biodegradable detergents and sizers. When compared to perc and other alternative solvents, professional wet cleaning not only has minimal negative environmental or human health effects, it also has the lowest installed system cost, the smallest electricity usage per load, and the lowest operating cost over the first five years of ownership (see Table 1 below). In terms of garment cleaning ability, professional wet cleaning has been shown to produce whiter whites, is easier to remove water based stains, and performs better than perc for some items<sup>16</sup> such as heavily soiled garments<sup>17</sup>.

Given the benefits, the decision to switch from perc to wet cleaning may appear obvious; however, throughout the State less than one percent of garment cleaners are fully dedicated to professional wet cleaning.<sup>18</sup> NYSP2I has received inquiries from NYS dry cleaners for information regarding professional wet cleaning and assistance with converting their operations. As consumers and cleaners become more aware of potential health effects of perc exposure and regulations for operators become more stringent, the desire to move away from perc exists, but cleaners need technical and economic assistance to implement the change to professional wet cleaning. Furthermore, lack of education and understanding of wet cleaning technology throughout the garment cleaning industry in other states has led to the development of education, outreach, and demonstration programs.

<sup>11</sup> Rule and Implementation Information for Perchloroethylene Dry Cleaning Facilities, <http://www.epa.gov/ttnatw01/dryperc/dryclpg.html>

<sup>12</sup> 6NYCRR Part 232 Perchloroethylene Dry Cleaning Facilities, <http://www.dec.ny.gov/chemical/8567.html>.

<sup>13</sup> The database is compiled primarily using National Emissions Standards for Hazardous Air Pollutants (NESHAP) reporting data. Cleaners using selected alternative solvents, including wet cleaning, are not required to report their usage and therefore may not be included in the database.

<sup>14</sup> State of California Air Resources Board, "California Dry Cleaning Industry Technical Report," February 2006

<sup>15</sup> Dry Cleaning & Laundry Institute, A DLI Whitepaper: Key Information on Industry Solvents, July 2007

<sup>16</sup> US EPA Design for the Environment, Case Study: Wetcleaning Systems for Garment Care, <http://www.epa.gov/dfe/pubs/garment/wsgc/wetclean.htm>

<sup>17</sup> California Dry Cleaning Industry Technical Assessment Report, State of California Air Resources Board, February 2006

<sup>18</sup> NYS EFC Garment Cleaner database, updated October 2009



# New York State Pollution Prevention Institute (NYSP2I)

**Table 1. Summary of environmental, human health & economic attributes of garment cleaning solvents<sup>a</sup>**

Garment Cleaning Solvent (chemical abstract service number)	Persistence in the Environment <sup>b</sup> and Potential Human Health Impacts <sup>c</sup>	Average Installed System Cost <sup>d</sup>	Avg. Natural Gas Usage per Month (therms) <sup>e</sup>	Avg. Electricity Usage per load (kWh) <sup>e</sup>	Avg. Cost for first 5 years of Typical Size Dry Cleaning Facility <sup>e</sup>
Perchloroethylene 127-18-4	persistent in water; persistent in soil; very persistent in sediment; persistent in air; unknown aquatic toxicity; affects central nervous system; irritates eyes, skin, respiratory tract	\$52,000	531	6.2	\$27,376
Hydrocarbon multiple, see below	affects central nervous system; irritates eyes, skin, respiratory tract	\$59,000	243	6.2	not applicable
DF-2000 Fluid 64742-48-9	very persistent in soil and sediment	not available	not available	not available	\$27,911
Pure Dry not available	not available	not available	not available	not available	\$28,535
Eco Solv 68551-17-7	persistent in sediment; bioaccumulative; very toxic to the aquatic environment	not available	not available	not available	\$27,872
Shell Sol 140 HT 111-84-2	persistent in sediment; very toxic to the aquatic environment	not available	not available	not available	\$27,755
Stoddard Solvent 8052-41-3	not available	not available	not available	not available	\$28,308
GreenEarth 69430-24-6	persistent in soil; very persistent in sediment; persistent in air; toxic to the aquatic environment; mild eye irritation	\$61,000	297	6.2	\$32,718
Liquid Carbon Dioxide 124-38-9	not persistent in the environment; irritates skin, eyes; frostbite	\$140,000	156	9.3 – 9.7	\$58,881
Professional Wet Cleaning 7732-18-5	not persistent or toxic to the aquatic environment; no potential human health impacts	\$47,000	388	3.2 washer 5.8 dryer	\$20,926

<sup>a</sup> Note: Information in this table does not include the potential human health or environmental effects due to detergents, sizers, or other additives to the cleaning cycle. Additives may present additional environmental or human health hazards.

<sup>b</sup> PBT profiler, <http://www.pbtprofiler.net/>, accessed 2/2/10.

<sup>c</sup> Manufacturer's material safety data sheet

<sup>d</sup> Alternatives to Perchloroethylene Use in Drycleaning, City of Los Angeles Environmental Business and Neighborhood Services Division.

<sup>e</sup> California Dry Cleaning Industry Technical Assessment Report, State of California Air Resources Board, February 2006.



# New York State Pollution Prevention Institute (NYSP2I)

## Other US Professional Wet Cleaning Programs

NYSP2I has benchmarked current wet cleaning programs in California<sup>19</sup>, Massachusetts<sup>20</sup>, and New Jersey<sup>21</sup>. Programs in these states are in various stages of development, but all have seen success with their conversion and demonstration programs. NYSP2I is also involved with a garment cleaning work group consisting of concerned environmental and pollution prevention organizations representing multiple stakeholders and has built relationships with key players in this effort including NEWMOA<sup>22</sup>, TURI<sup>23</sup>, New Jersey, and the UCLA Sustainable Technology & Policy Program<sup>24</sup>.

Building on current state wet cleaning program models and incorporating best practices and lessons learned from experienced program managers and industry experts, NYSP2I has developed a comprehensive program, the *New York State Professional Wet Cleaning Program*, to address perc related environmental and health concerns in New York State.

## New York State Professional Wet Cleaning Program

NYSP2I's *Professional Wet Cleaning Program* has three parts: 1) Development of NYS wet cleaning educational materials 2) Encouraging wet cleaning as an alternative to perc through conversions, and 3) Demonstration of wet cleaning throughout the NYS garment cleaning industry, as shown in Table 2.

Table 2: NYSP2I Wet Cleaning Program

Phase	Tasks
Part 1: Development of NYS wet cleaning educational materials	<ol style="list-style-type: none"> <li>1. NYS Dry Cleaners Database verification and update</li> <li>2. Barriers to wet cleaning conversion survey</li> <li>3. Develop NYS specific outreach materials</li> </ol>
Part 2: Encouraging Wet Cleaning as an Alternative to Perc through Conversions	<ol style="list-style-type: none"> <li>1. Convert perc cleaners to wet cleaning</li> <li>2. Dry cleaner conversion case studies</li> </ol>
Part 3: Demonstration of wet cleaning throughout the NYS garment cleaning industry	<ol style="list-style-type: none"> <li>1. Wet cleaning demonstrations</li> <li>2. Continued Outreach &amp; Education</li> <li>3. Provide technical assistance</li> </ol>

The program was initiated in spring 2010 with *Part 1: Development of NYS wet cleaning educational materials*. EPA funding has been received to assist with Parts 2 and 3, which began in fall 2010. Part 1 of the program is described below. This report focuses on Part 1 – Task 2 of the project.

### Task 1: NYS Dry Cleaners Database Verification & Update

The first step in the wet cleaning program is to verify the current New York State dry cleaner database. The New York State Environmental Facilities Corporation (NYSEFC) provided their database of NYS dry cleaners to NYSP2I in October 2009. The database information is populated by NYSEFC with dry cleaner responses to a “NESHAP for Perchloroethylene Drycleaning Facilities Notice of Compliance Status” form. This form must be completed by all perc dry cleaners in NYS and returned to NYSEFC. The database contains limited information on garment cleaners which use alternative solvents, as they are not

<sup>19</sup> The State program can be access via California Environmental Protection Agency, Air Resources Board, Non-Toxic Dry Cleaning Incentive Program (AB998), <http://www.arb.ca.gov/toxics/dryclean/ab998.htm>. San Francisco has their own equipment rebate program and can be accessed via San Francisco Department of Environment and Bay Area Air Quality Management District, [http://www.sfenvironment.org/our\\_programs/interests.html?ssi=2&ti=3&ii=27](http://www.sfenvironment.org/our_programs/interests.html?ssi=2&ti=3&ii=27)

<sup>20</sup> The Toxics Use Reduction Institute runs the Massachusetts wet cleaning matching grant program at [http://www.turi.org/community/wet\\_cleaning](http://www.turi.org/community/wet_cleaning)

<sup>21</sup> The New Jersey Small Business Development Center runs the wet cleaning program at <http://njsbdc.com/njwetcleaning/>

<sup>22</sup> Northeast Waste Management Officials' Association, <http://www.newmoa.org/>

<sup>23</sup> Massachusetts' Toxics Use Reduction Institute, <http://www.turi.org/>

<sup>24</sup> University of California, Los Angeles; <http://www.stpp.ucla.edu/>





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required to complete the form. Cleaners who voluntarily submitted the NESHAP form are also included in the database, as are cleaners identified by NYSEFC's Small Business Environmental Assistance Program. A permit or registration is not required in NYS for wet cleaners.

The database was scrubbed for repeat entries by NYSP2I staff. Additional cleaners who may use alternatives and are not included in the database were identified via internet searches and word of mouth. While site visits are optimal to validate cleaning solvent usage, they are time consuming and costly. Therefore, those additional cleaners were telephoned by NYSP2I staff to validate their cleaning solvent. The database was updated as appropriate.

## **Task 2: Barriers to Wet Cleaning Conversion Survey**

Past and current dry cleaning industry research has focused on the technical viability of professional wet cleaning, specifically its ability to clean garments using less energy and water than perc dry cleaning. Much of this research has been done in California using California dry cleaners as case studies. While the results of California's studies show dry cleaners can successfully convert from perc to PWC, it is unknown how those results translate to dry cleaners located in the northeast US. The climate of an area dictates the type of garments that will be cleaned and previous research has shown that certain garment types may be more difficult to clean with PWC than perc. The climates of the northeast and west coast are very different, and it is expected that more coats and heavier garments will be cleaned in the northeast than the west coast. It is unknown what effect, if any, this will have on the viability of PWC on the northeast.

Furthermore, it is unknown if a relationship exists between the geographic location of a dry cleaner and its adoption of PWC or other perc alternatives. NYSP2I is interested in any potential differences in attitudes, knowledge, and adoption of PWC when comparing dry cleaners located downstate – specifically the five boroughs of New York City – and upstate New York.

In order to understand the current state of dry cleaning in New York, including any potential differences between cleaners operating downstate and upstate or rural versus urban areas, a dry cleaner survey was developed. The survey specifically focused on the use and attitude towards alternative cleaning solvents among NYS dry cleaners. The results of the survey will be used to develop effective outreach and education materials centered on PWC to expand the use and knowledge of PWC by NYS dry cleaners.

## **Task 3: Develop NYS Specific Materials**

Based on the results of this survey, targeted outreach and education materials will be developed for NYS dry cleaners. Materials include comparison of alternative technologies, explanation of the wet cleaning process, wet cleaning step-by-step implementation guide (including identification of equipment manufacturers, funding sources, estimated cost, & time required, directory of cleaners in NYS that use alternatives, and list of potential vendors for cleaning equipment), and compilation of existing case studies of NYS cleaners that have successfully converted to wet cleaning from perc. All materials and links to pertinent educational resources including regulations, environmental and human health information, and research bodies will be posted on the NYSP2I website.



## 2. Survey Development

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### Survey Design

It was necessary for NYSP2I to reach out to a number of dry cleaners throughout New York State to understand the dry cleaning industry in NYS. Conversations with current cleaners and site visits to operational wet cleaners, perc cleaners, and hydrocarbon cleaners provided invaluable insight to the industry. The attitude towards and adoption of PWC varied with each cleaner we talked to. It became clear that in order to successfully implement a conversion program, the dry cleaning industry in New York must be well understood. Understanding the industry will allow NYSP2I to develop materials applicable to the industry and reach out to them using appropriate methods. The dry cleaner survey was developed to facilitate understanding the current dry cleaning industry in NYS.

A number of resources were used to assist with the design and provide direction of the qualitative and quantitative surveys. Feedback from other successful state dry cleaning and wet cleaning conversion programs were critical in ensuring essential information was not left out of the survey. Discussions with industry experts such as NYSDEC inspectors, NYSEFC staff, dry cleaning equipment distributors, and dry cleaning associations further built upon our knowledge base. Previous research and wet cleaning conversion case studies performed by other organizations were referenced. NYSP2I spoke with both advocates and opponents of PWC to ensure the survey was not skewed and both sides were represented.

### Qualitative Survey

To develop a meaningful written survey, a telephone survey was developed by NYSP2I. Dry cleaners were mapped to their RTDC<sup>25</sup> region using the zip code provided in the database. Four cleaners from each RTDC were randomly selected to participate in the telephone survey, with the expectation that two out of the four will participate in the survey.

The telephone survey was developed as a series of open ended questions to facilitate the development of a quantitative survey. An outline of the survey is displayed in Table 3. The survey was intended to be conversational between the owner/manager of the dry cleaning shop and NYSP2I staff. This allowed NYSP2I to ask follow up questions and ensure the answer was accurately understood and represented. Because the survey was conversational, the questions varied slightly from respondent to respondent and in some cases, not all questions were asked.

In all, 107 cleaners were called and nine participated in the survey. Dry cleaners located upstate and downstate were equally represented in the survey in order to reduce the risk of bias if the attitudes and practices vary between the regions of the state.

The results of the telephone survey provided insight from dry cleaners with various backgrounds and different experiences with PWC. Many had heard of PWC but did not know much about the process. A few had adopted PWC at their shop and were eager to share their experiences with us. The telephone survey allowed NYSP2I to develop a more robust and meaningful written survey. Many cleaners indicated on the phone that they plan to retire in the next five to ten years and close their business. This

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<sup>25</sup> NYS is geographically divided into ten, independent, not-for-profit Regional Technology Development Centers, <http://www.nystar.state.ny.us/rtdcs.htm>. The NYSP2I is a partnership between Rochester Institute of Technology, University at Buffalo, Clarkson University, Rensselaer Polytechnic Institute, and the RTDCs.



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is valuable information that may have been left out of the quantitative survey had the telephone survey not been conducted.

**Table 3. Qualitative survey outline**

On a scale of 1 to 10, how knowledgeable are you about dry cleaning in general?  
Is there anything in particular you would like to learn about?  
What percent of your business is washing?  
What percent of your business is dry cleaning? What solvent do you currently use? Have you tried any other alternatives? Tell me about your experience with them.  
What percent of your business is wet cleaning?  
What equipment do you use to wet clean?  
What garment types do you wet clean?  
On a scale of 1 to 10, how knowledgeable are you about professional wet cleaning as an alternative to cleaning with perc?  
On a scale of 1 to 10, how interested are you in learning more about wet cleaning?  
What areas would you like to learn more about?  
What is the benefit of using perc instead of wet cleaning?  
What is the benefit of using wet cleaning instead of perc?  
Have you ever considered switching to wet cleaning?  
Do you foresee yourself ever becoming a 100% wet cleaning operation?  
What are the barriers to dry cleaners adopting wet cleaning?  
When do you anticipate purchasing new cleaning equipment?

## Quantitative Survey

The results of the telephone qualitative survey were used to develop a written quantitative survey. The goal of the survey is to identify barriers to conversion to PWC by assessing industry attitudes and concerns, along with any gaps associated with PWC technology. The results will be used to develop wet cleaning outreach and educational materials targeted for NYS garment cleaners

The survey was mailed to all dry cleaners in the database, with a postage-paid return envelope. Of the 2,117 surveys distributed, 79 were returned to NYSP2I as undeliverable with no forwarding address, and 110 surveys were completed and returned to NYSP2I, a response rate of 5.4%.

The survey is divided into four distinct areas, with a series of questions for each:

1. Business Information: type of business, number of employees, square footage, and source of dry cleaning information
2. Operational Information: current solvent(s) used for cleaning, amount of garments cleaned, and percent of business that is laundering and dry cleaning
3. Technology: how knowledgeable and how interested cleaners are in using various cleaning solvents
4. Professional Wet Cleaning: perceived characteristics and potential benefits

The following section includes results of the quantitative survey. The survey is found in the Appendix.

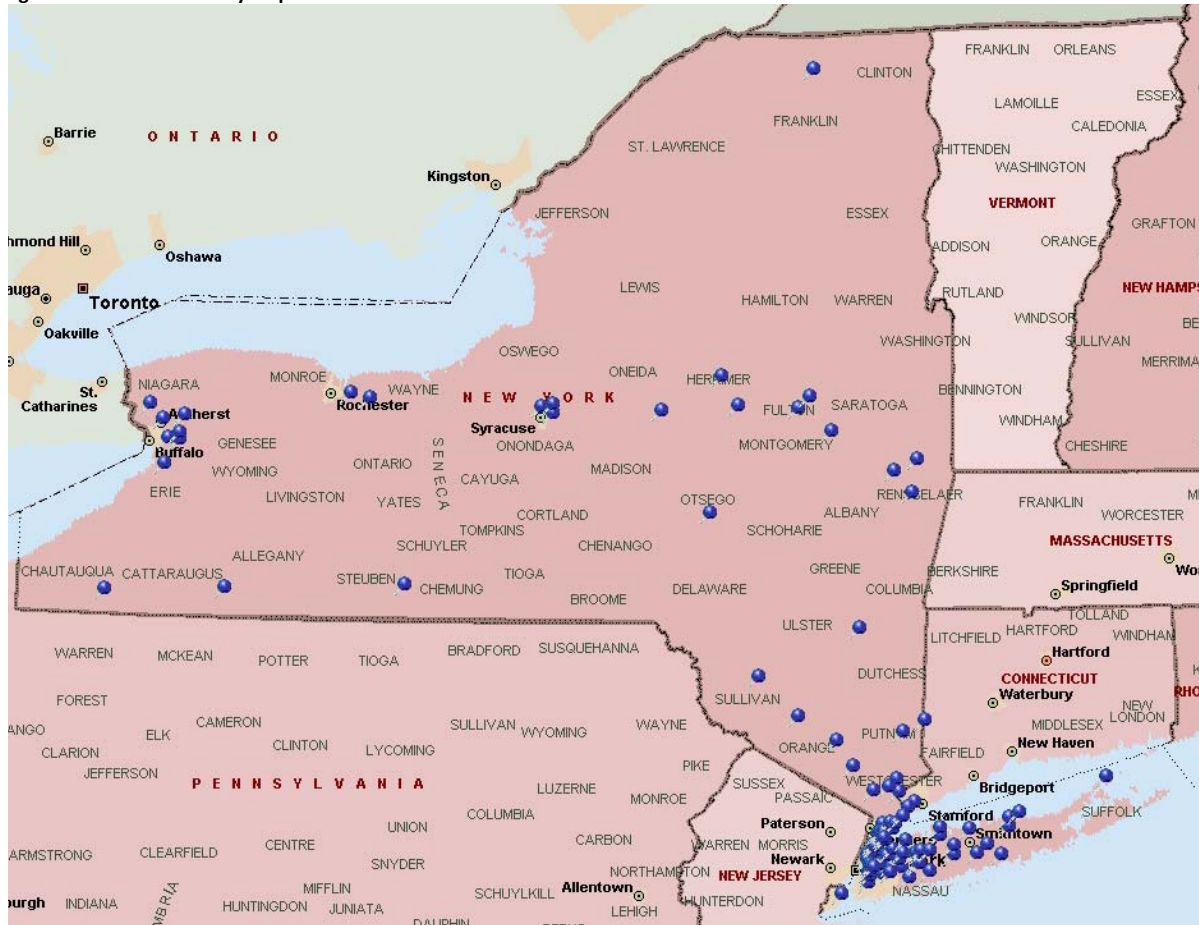
## 3. Quantitative Survey Results

### Business Information Survey Results

#### Location of Survey Respondents

The location of survey respondents is representative of the distribution of dry cleaners throughout the State. Of the approximately 2,100 cleaners in NYS, approximately 72% are located downstate<sup>26</sup>.

Figure 1. Location of survey respondents



#### Business Type

Only 2% of all respondents identify themselves as chain operations, 98% are independent, and no respondents identify themselves as part of a franchise.

#### Cleaner Type

When given the choice of “drop shop or storefront” or “cleaning is performed onsite”, 1 respondent indicated it is a drop shop only, 2 respondents did not respond, and the remaining 97% indicate that cleaning is performed onsite at their location.

<sup>26</sup> Location of dry cleaners is based on their zip code in the NYSEFC database. Downstate is defined as the five boroughs of NYC, Long Island (Nassau & Suffolk counties), and Westchester and Rockland counties. Upstate includes all other counties north of Rockland and Westchester.



# New York State Pollution Prevention Institute (NYSP2I)

## Years at Current Location

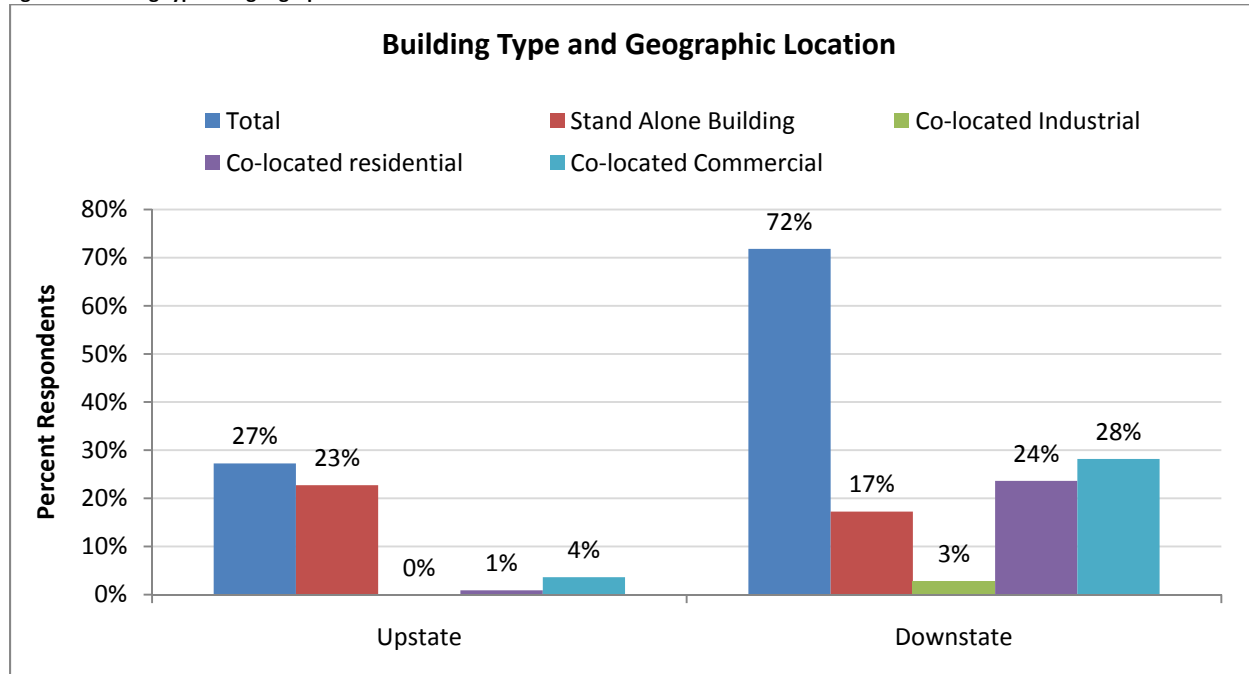
More than half (55%) the respondents have been in business at their current location for 20 years or less, with about 20% at their current location for less than 5 years. There is no correlation between the number of years in business and the solvent(s) used for cleaning; a cleaner in business for less than five years is just as likely to use professional wet cleaning as one that has been in business for more than 50 years.

## Building Type

The type of building where the cleaner is located was distributed somewhat equally with 39% in *standalone buildings*, 33% in *co-located commercial buildings* (such as a strip mall), and 25% *co-located in residential buildings* (such as the first floor of an apartment building). The remaining 3% are co-located in an *industrial building*.

To understand the geographic differences, the type of building was considered with the geographic location of the cleaner. Almost all *co-located residential cleaners* are located downstate, with only one located upstate in Buffalo. Similarly, the majority of *co-located commercial cleaners* are also located downstate, with 16 located in New York City and 13 located on Long Island. In contrast, 83% of all upstate cleaners are located in a standalone building; downstate 24% are in standalone buildings. In contrast, 89% of upstate cleaners are located in standalone buildings.

Figure 2. Building type and geographic location



## Facility Size

The majority of respondents (51%) have facilities 2,000 square feet or smaller, with 40% of all respondents having a facility between 1,001 and 2,000 square feet. The size of the facility can be an indicator of the number of dry cleaning machines, the mass of garments cleaned per day, and the number of employees.

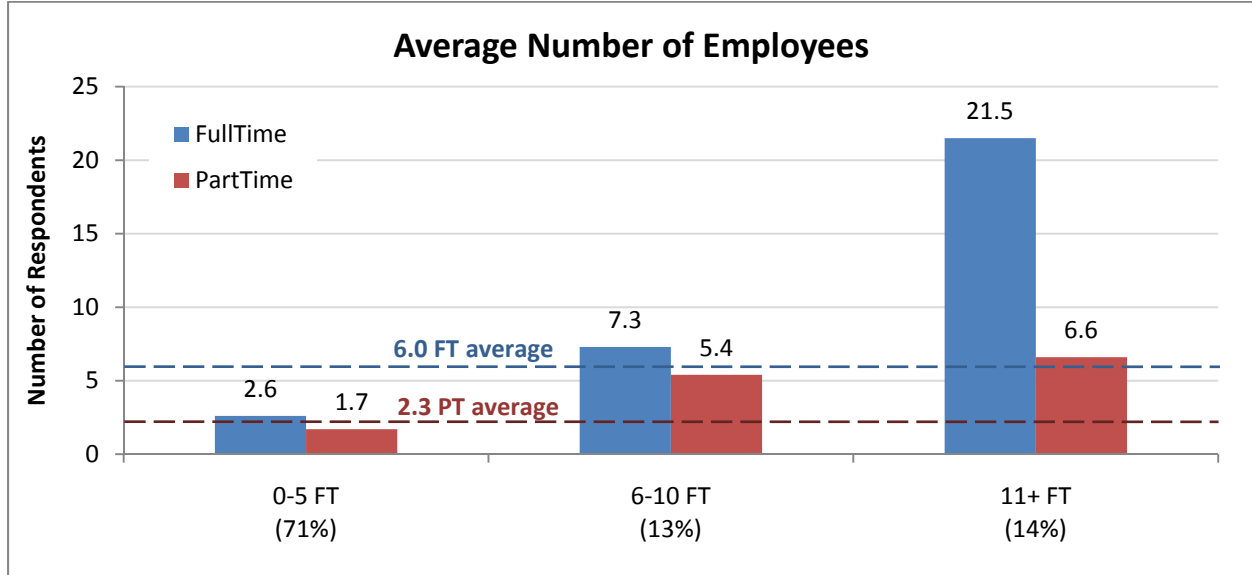


# New York State Pollution Prevention Institute (NYSP2I)

## Number of Employees at Current Location

Cleaners were asked to provide the number of fulltime and part-time employees at their establishment. On average, a dry cleaning shop has 6 fulltime employees and 2.3 part-time employees, with more than 70% of all shops having less than 5 fulltime employees.

Figure 3. Average number of employees



## Trade Association Membership

Cleaners were asked to indicate their trade association membership. Two thirds of respondents indicate they are a member of the National Cleaners Association, the leading national dry cleaning industry trade association. Four "other" responses were written in and include: America's Best Cleaner, USITT/NYSBGA, Green Cleaners Council, and IICRC.

Figure 4. Trade association membership





# New York State Pollution Prevention Institute (NYSP2I)

## Sources of Dry Cleaning Information

Cleaners were asked to identify the best sources of dry cleaning information. Many dry cleaners selected multiple sources and the majority of cleaners (75%) indicated that *dry cleaning magazines and printed newsletters* are the best sources of information. In contrast, the NYSDEC, EPA, and NYSEFC are favored by 16%, 12%, and 8% of respondents, respectively.

Figure 5. Sources of dry cleaning information

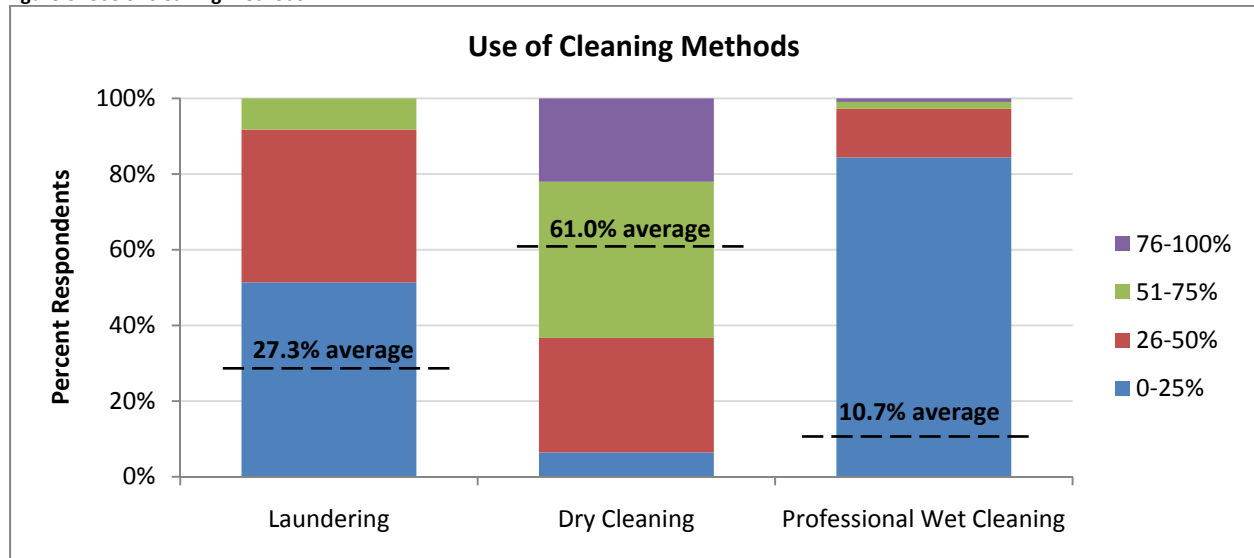
Source of Information	Number of Respondents
Dry Cleaning Magazines and Printed Newsletters	83
Dry Cleaning Trade Associations	75
Other Dry Cleaners	49
Dry Cleaning Equipment Suppliers	44
Detergent suppliers	35
Solvent Suppliers	24
The Internet	20
New York State Department of Environmental Conservation (NYSDEC)	18
Environmental Protection Agency (EPA)	13
New York State Environmental Facilities Corporation (NYSEFC)	9
Others were written in and include: studying myself (read books & search web); association w/ other cleaners in formal groups; supply sales people; supply sales persons; NCA; all suppliers; MSDS info; own experience and friends; and Management Association	9

## Operational Information Survey Results

### Type of Cleaning Performed

Cleaners were asked to indicate the percentage of their business that is laundering, dry cleaning, and professional wet cleaning. Approximately 86% of all respondents indicate zero to 25% of their business is PWC, with 58% (64 cleaners) stating they do not do any PWC. The remaining 14% of all respondents indicate 25-85% of their business is PWC. Zero respondents indicate 100% of their business is PWC. Dry cleaning makes up an average of 61% of a dry cleaners business. The remaining 39% consists of laundering and professional wet cleaning.

Figure 6. Use of cleaning methods



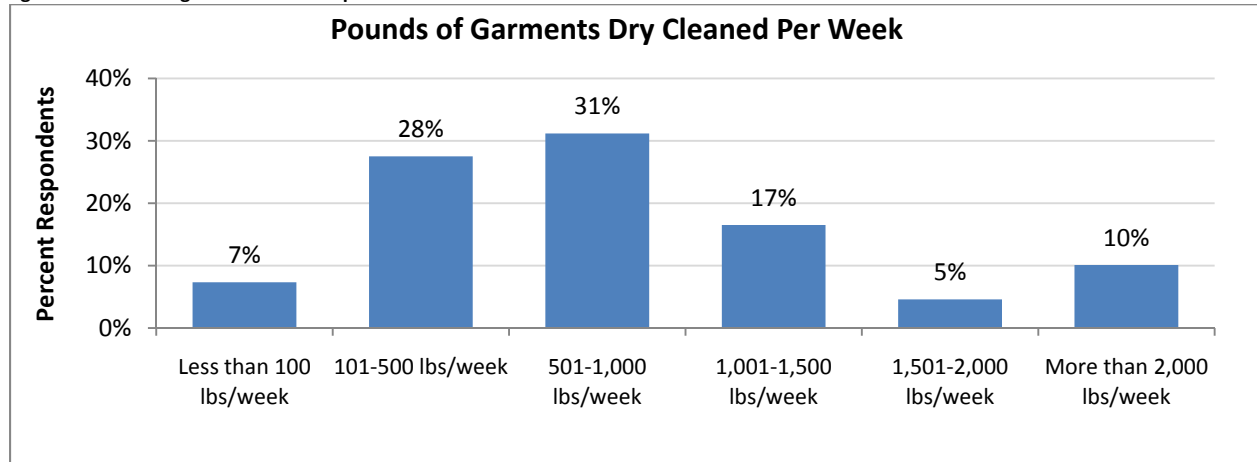


# New York State Pollution Prevention Institute (NYSP2I)

## Garments Dry Cleaned Per Week

More than half of the respondents indicate they dry clean less than 1,000 pounds of garments per week. Understanding the volume of garments cleaned is significant because cleaning 1,000 pounds per week using perc requires 920 pounds (68 gallons) of perc,<sup>27</sup> emits 410 pounds of perc to the atmosphere,<sup>28</sup> results in the disposal of 1,664 pounds of hazardous waste,<sup>29</sup> and releases 191 gallons of perc contaminated wastewater<sup>30</sup> each year.

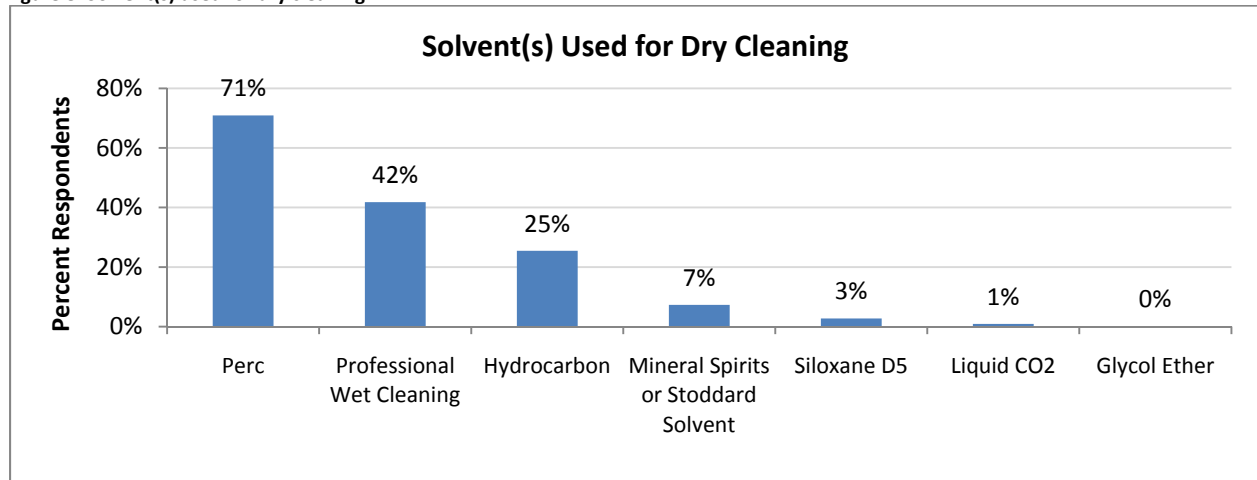
Figure 7. Pounds of garments cleaned per week



## Solvents Used for Dry Cleaning

About 70% of all respondents indicate they use perc in their dry cleaning process. Forty-two percent of all respondents indicate they do professional wet cleaning at their facility. The chart below indicates the percent of respondents which use each solvent. The total is more than 100% as an establishment may use more than one solvent.

Figure 8. Solvent(s) used for dry cleaning



<sup>27</sup> Average secondary machine cleans 52,000 lbs garments per year and consumes 68 gal of perc (California Air Resources Board, "California Dry Cleaning Industry Technical Assessment Report," February 2006, see Table IV-17. Facility Survey Summary for Emission Analysis).

<sup>28</sup> Secondary perc machine emits an average of 410 lbs perc per year, normalized to 52,000 lbs garments cleaned per year (California Air Resources Board, "California Dry Cleaning Industry Technical Assessment Report," February 2006, see Table IV-18. Emissions Comparison).

<sup>29</sup> International Fabricare Institute estimates 3.2 lb of perc per 100 lb clothes cleaned is lost in hazardous wastes from filters and distillation residues (CEPA, 1991)

<sup>30</sup> Secondary perc machine produces an average of 191 gallons separator wastewater, normalized to 52,000 pounds of garments cleaned per year (California Air Resources Board, "California Dry Cleaning Industry Technical Assessment Report," February 2006.)





# New York State Pollution Prevention Institute (NYSP2I)

Figure 9 below illustrates different cleaning solvent combinations in use at the dry cleaning establishments. Slightly less than half of responding cleaners (44%) use more than one solvent for dry cleaning (not including laundering operations). While 40% of all respondents only use perc, 42% indicate they use PWC in combination with at least one other cleaning solvent.

Figure 9. Solvent combinations used at dry cleaning establishments

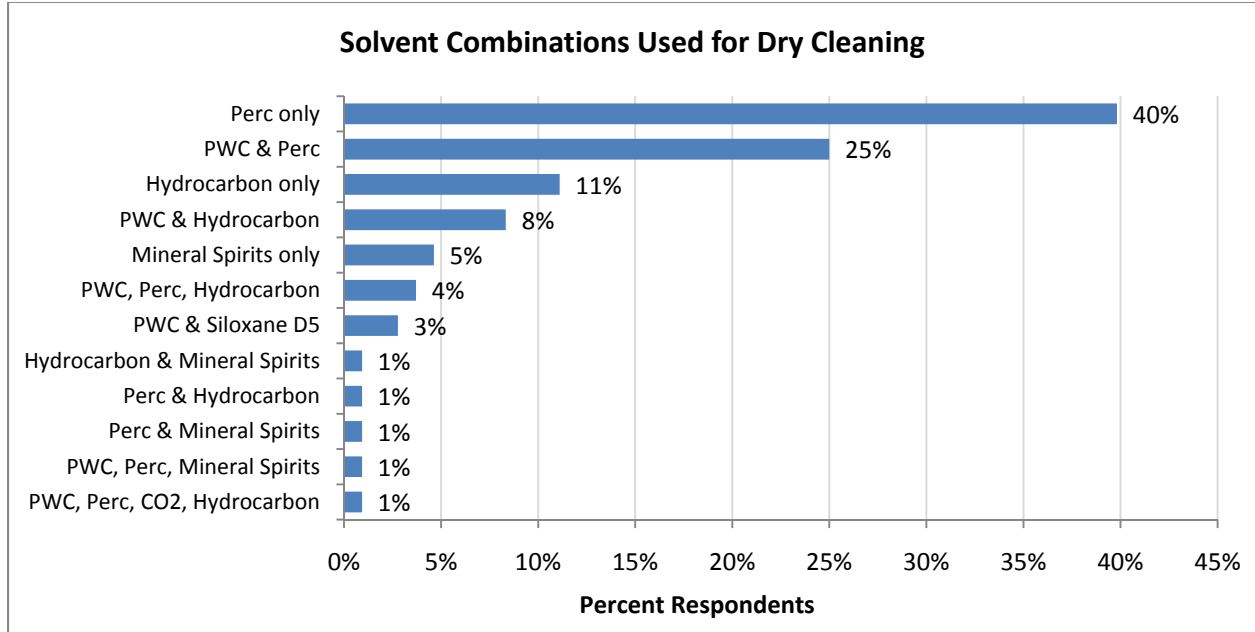
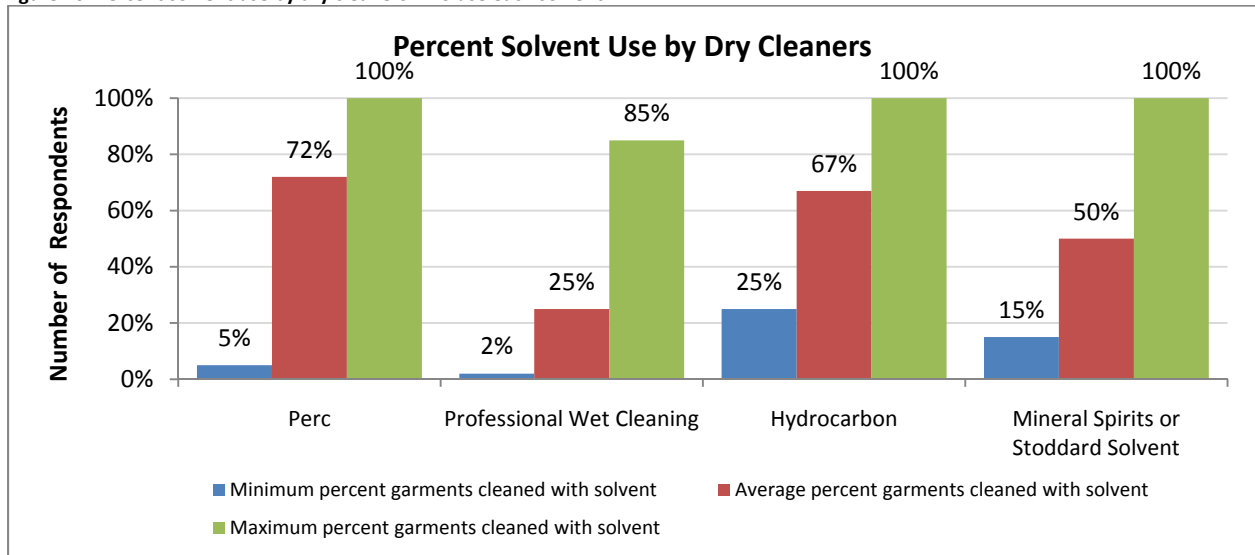


Figure 10 below illustrates the minimum, average, and maximum percent of a dry cleaner's business due to cleaning solvents they use. For example, of the respondents which use perc in their dry cleaning operations, on average, perc cleaning makes up 72% of their business, with perc making up 5% of the business of one cleaner and 100% of the business of another cleaner. In contrast, PWC makes up an average of 25% of the business of PWC users and the maximum PWC usage of a cleaner is 85%. (Because only two cleaners indicated they currently use Siloxane D5 for cleaning and no cleaners use Glycol Ether, they have been excluded from the Figure.)

Figure 10. Percent solvent use by dry cleaners who use each solvent



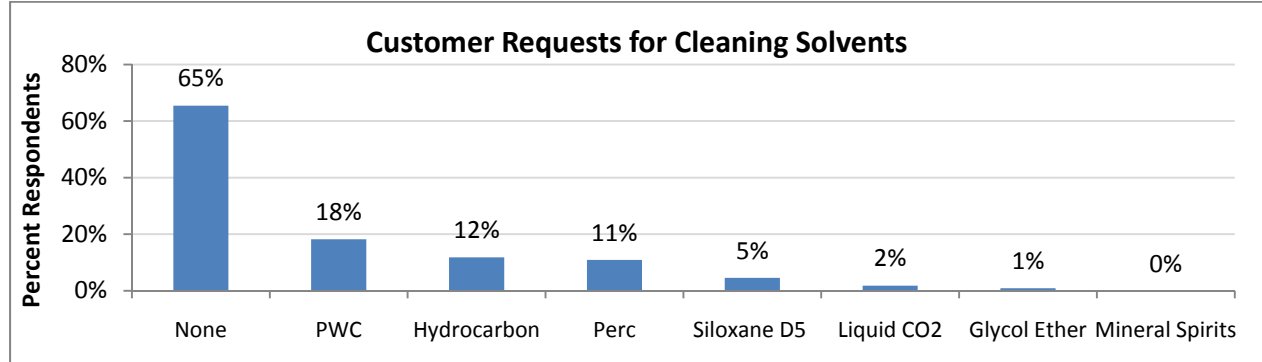


# New York State Pollution Prevention Institute (NYSP2I)

## Customer Requests for Cleaning Solvents

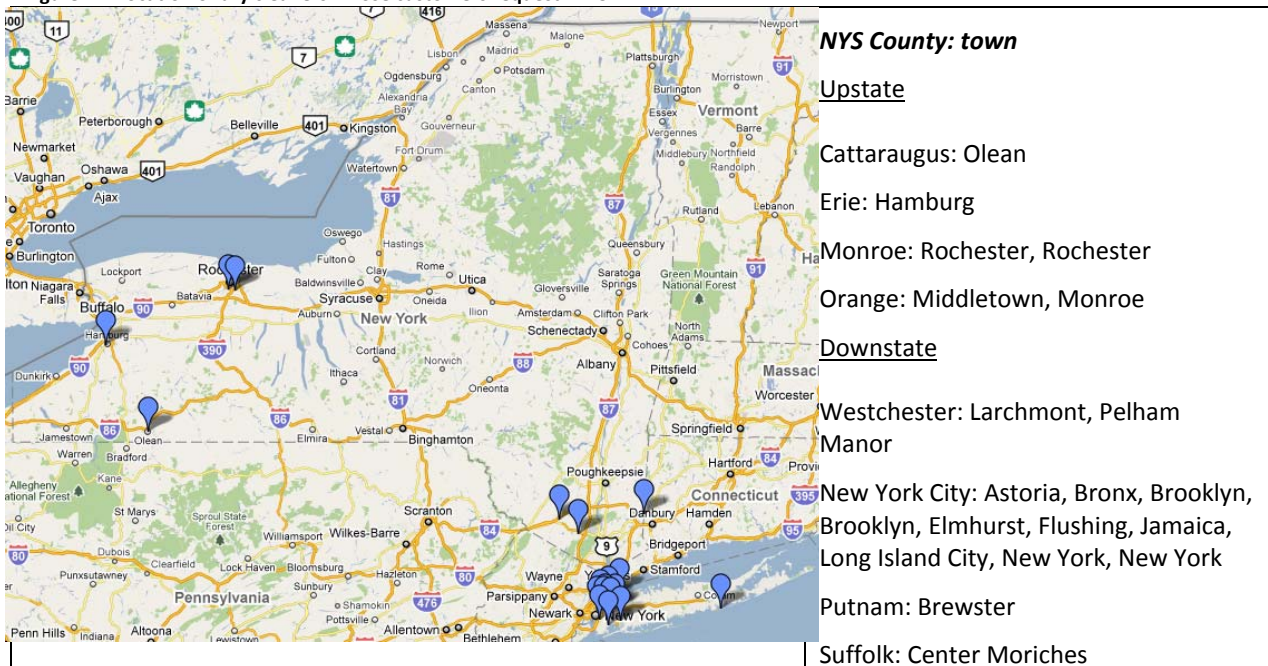
The majority of cleaners indicate that their customers do not request specific solvents be used to clean their garments. About 18% of respondents (20 cleaners) indicate that their customers are requesting their garments be cleaned using PWC, while 11% indicate customers request perc.

Figure 11. Customer requests for cleaning solvents



The location of dry cleaners whose customers request PWC are listed and mapped below. Similar to the location of all dry cleaners in NYS, 50% of those whose customers request wet cleaning are located downstate.

Figure 12. Location of dry cleaners whose customers request PWC



## Timeframe for New Equipment Purchase

More than two thirds (67%) of respondents indicate they plan to purchase new dry cleaning equipment in the next ten years, with approximately one half of this group planning to purchase equipment within the next five years. Fifteen percent of respondents (or 17 respondents) indicate they never plan to purchase new equipment.

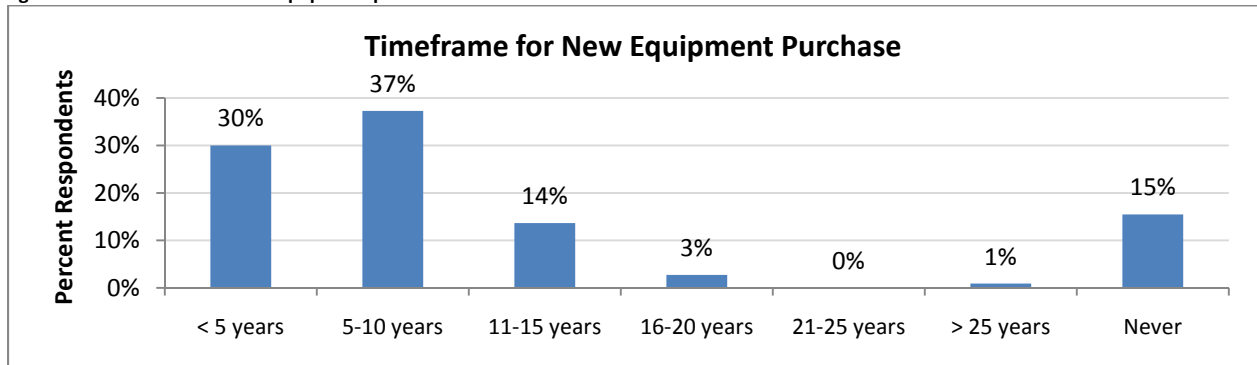
Cleaners who indicated they “never” plan to purchase equipment were asked to write-in a reason. Nine cleaners indicated they plan to sell the business or retire, six indicate their equipment is in good working



# New York State Pollution Prevention Institute (NYSP2I)

condition and doesn't need to be replaced, and two indicate that purchasing new equipment is too expensive.

Figure 13. Timeframe for new equipment purchase



## Technology Survey Results

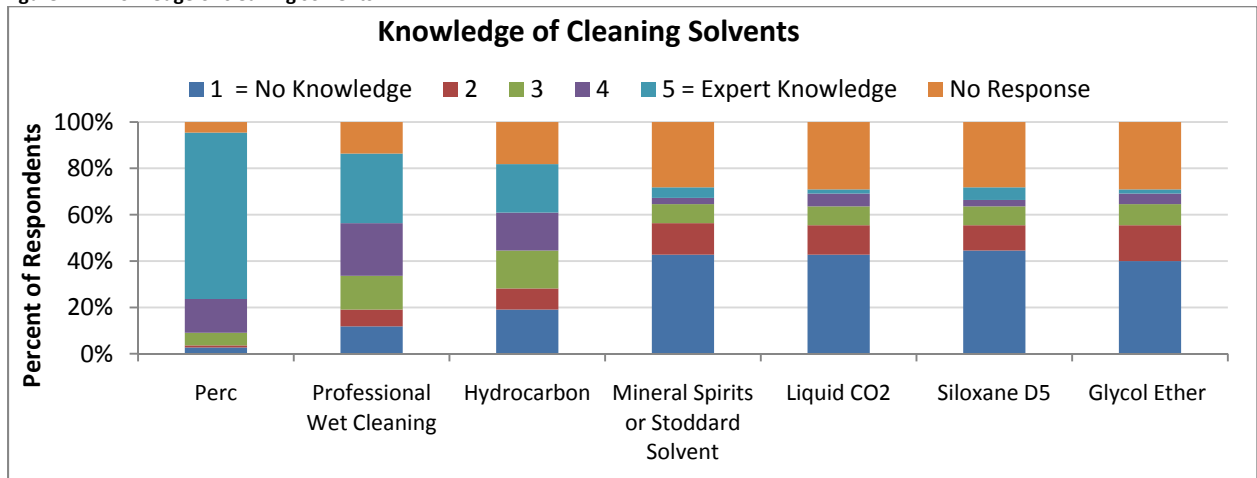
### Knowledge of Cleaning Solvents

Approximately 86% of respondents identify themselves as “very knowledgeable” (4 or 5, with 5 representing “expert knowledge”) about perc, with 72% having expert knowledge. In addition, about 76% of respondents indicate they currently use perc. It is not surprising that more respondents indicate high knowledge of perc than those who currently use perc, as many cleaners have previously converted from perc to another solvent.

In contrast, about 53% of respondents identify themselves as “very knowledgeable” (4 or 5, with 5 representing “expert knowledge”) about PWC, with 30% having “expert knowledge.” Only 42% of respondents indicate they currently use PWC. Therefore, more respondents consider themselves very knowledgeable about wet cleaning than those who are actually utilizing wet cleaning.

About 40% have no knowledge about mineral spirits, liquid CO2, siloxane D5, and glycol ether. This is consistent with the survey data which shows that 7% of respondents use mineral spirits, 1% use liquid CO2, 3% use siloxane D5, and zero use glycol ether.

Figure 14. Knowledge of cleaning solvents



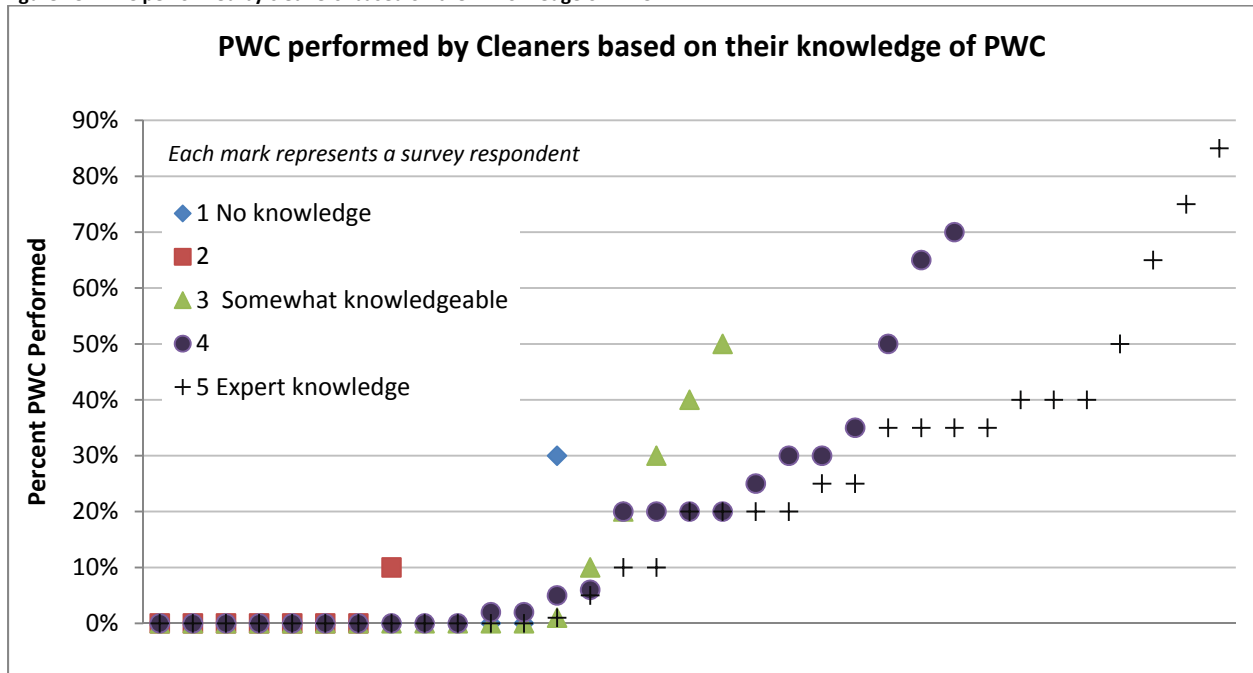


# New York State Pollution Prevention Institute (NYSP2I)

Of the 58 cleaners who identify themselves as “very knowledgeable” about PWC, 36 cleaners indicate they utilize professional wet cleaning. Of these 36 cleaners, on average, PWC makes up about 31% of their business. PWC makes up about 27% of the business of any cleaner who performs PWC onsite, regardless of their knowledge of PWC. Furthermore, as the level of knowledge of PWC increases from 3 to 4 to 5 (on a scale of 1 to 5, with 5 being “expert knowledge”), the average percent of PWC at each dry cleaner increases from 21% to 24% and 33%, respectively.

Figure 15 below illustrates the percentage of PWC performed by cleaners based on their knowledge level of PWC. Cleaners who identify themselves as “very knowledgeable” about PWC are more likely to utilize PWC at their shop and PWC makes up a larger portion of their business than cleaners who do not identify themselves as knowledgeable about PWC.

Figure 15. PWC performed by cleaners based on their knowledge of PWC



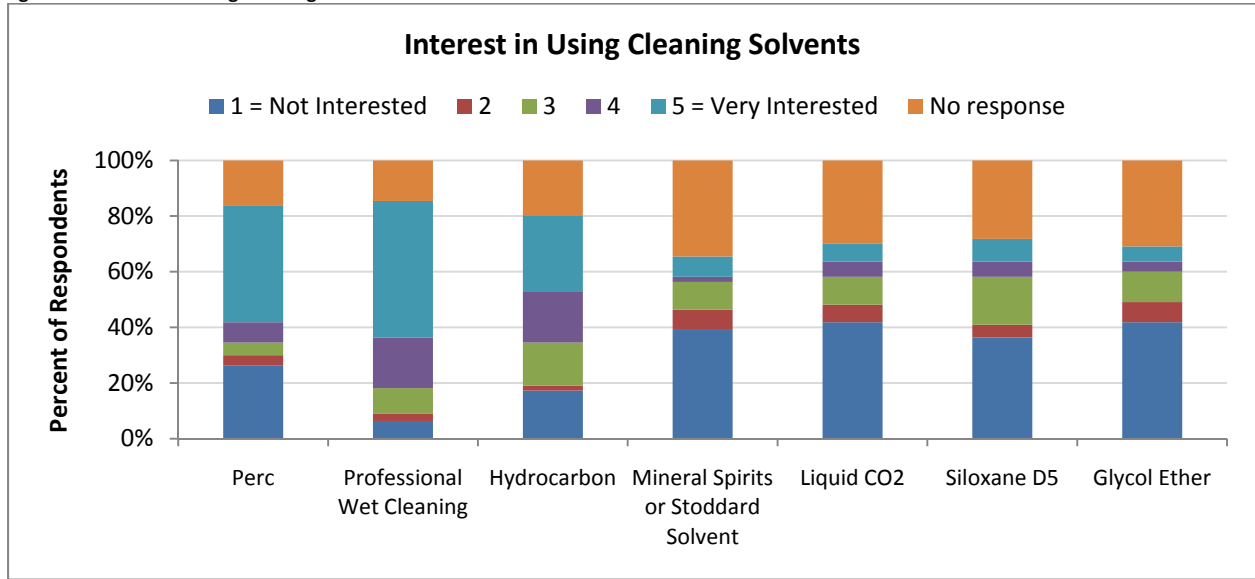


# New York State Pollution Prevention Institute (NYSP2I)

## Interest in using Cleaning Solvents

About 67% of all respondents are interested in using PWC in their cleaning operations and about half of the respondents are interested in using perc for their dry cleaning operation. Slightly less than half are also interested in using hydrocarbons. Generally, respondents are not interested in using mineral spirits, liquid CO<sub>2</sub>, siloxane D5, or glycol ether.

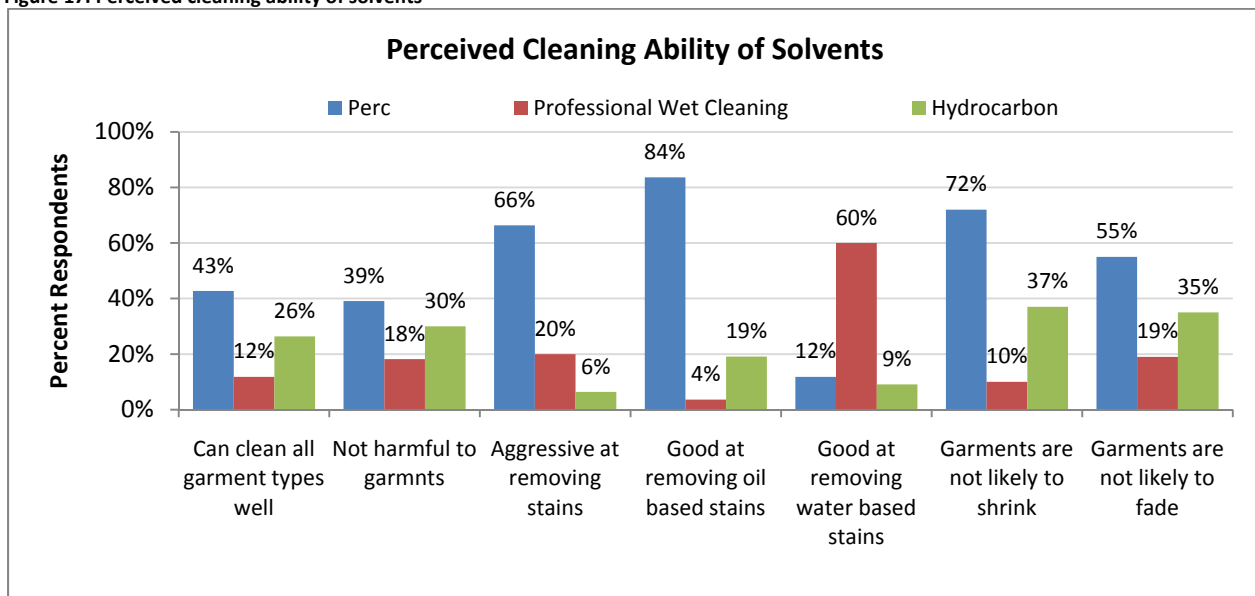
Figure 16. Interest in using cleaning solvents



## Ability to Clean Garments

Survey respondents were asked to indicate how well the solvents work at cleaning garments. Most respondents believe perc can clean all garment types well, followed by hydrocarbon and PWC. Similarly, most respondents believe perc is not harmful to garments, followed by hydrocarbon and PWC. Not surprisingly, more respondents believe PWC is good at removing water based stains than any other alternative, as water based stains are more easily dissolved in water.

Figure 17. Perceived cleaning ability of solvents





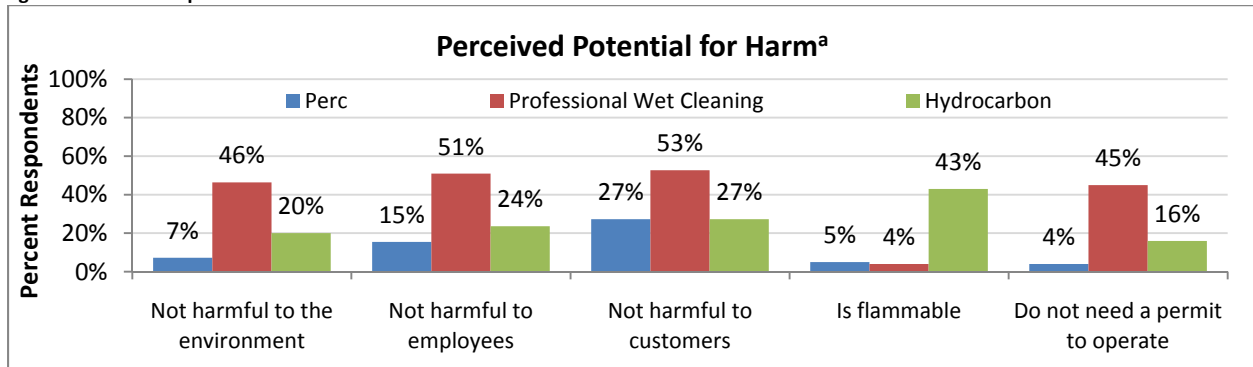
# New York State Pollution Prevention Institute (NYSP2I)

## Potential for Harm

Cleaners were asked to indicate whether or not they believe cleaning solvents are harmful to the environment, employees, and customers. Forty-six percent of respondents indicate that PWC is not harmful to the environment, 20% indicate hydrocarbon is not harmful and 7% indicate perc is not harmful. Similar trends are seen in potential harm to employees and customers. More than half of the respondents indicate PWC is not harmful to employees or customers, about one quarter of respondents indicate hydrocarbon is not harmful to either group, 15% indicate perc is not harmful to employees and 27% indicate perc is not harmful to customers.

Less than half correctly identified that hydrocarbons are flammable and that a permit is not required to operate a PWC system.

Figure 18. Perceived potential for harm



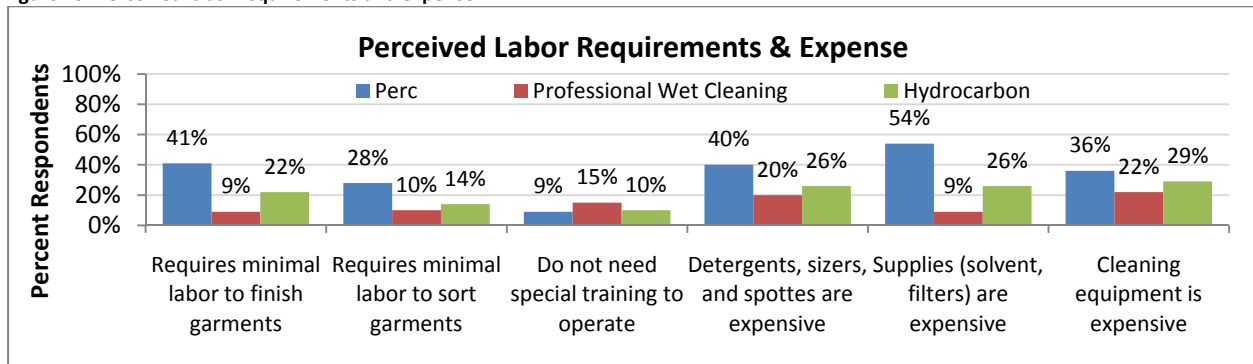
<sup>a</sup>Data for mineral spirits or Stoddard solvent, liquid carbon dioxide, siloxane D5, and glycol ether is excluded from the graph as 10% respondents use them and the majority of respondents indicate they are not knowledgeable about the solvents.

## Labor and Expense

Respondents believe that PWC requires more labor to both finish and sort garments than perc or hydrocarbons. Surprisingly, more respondents believe that PWC does not require special training to operate equipment than perc or hydrocarbon. Anecdotal conversations with PWC and perc dry cleaners, equipment manufacturers, and industry associations have indicated that PWC cleaning equipment is more specialized than perc, and therefore requires additional training for workers to operate it effectively. Furthermore, wet cleaning equipment distributors highly recommend employee training, suggesting it is more complicated to operate than perc cleaning equipment.

Respondents believe detergents, supplies, and cleaning equipment for PWC cleaning is less expensive than hydrocarbon and perc. This finding is contradictory to conversations NYSP2I staff had with PWC and perc cleaners who indicate PWC detergent is more expensive than the perc counterpart.

Figure 19. Perceived labor requirements and expense



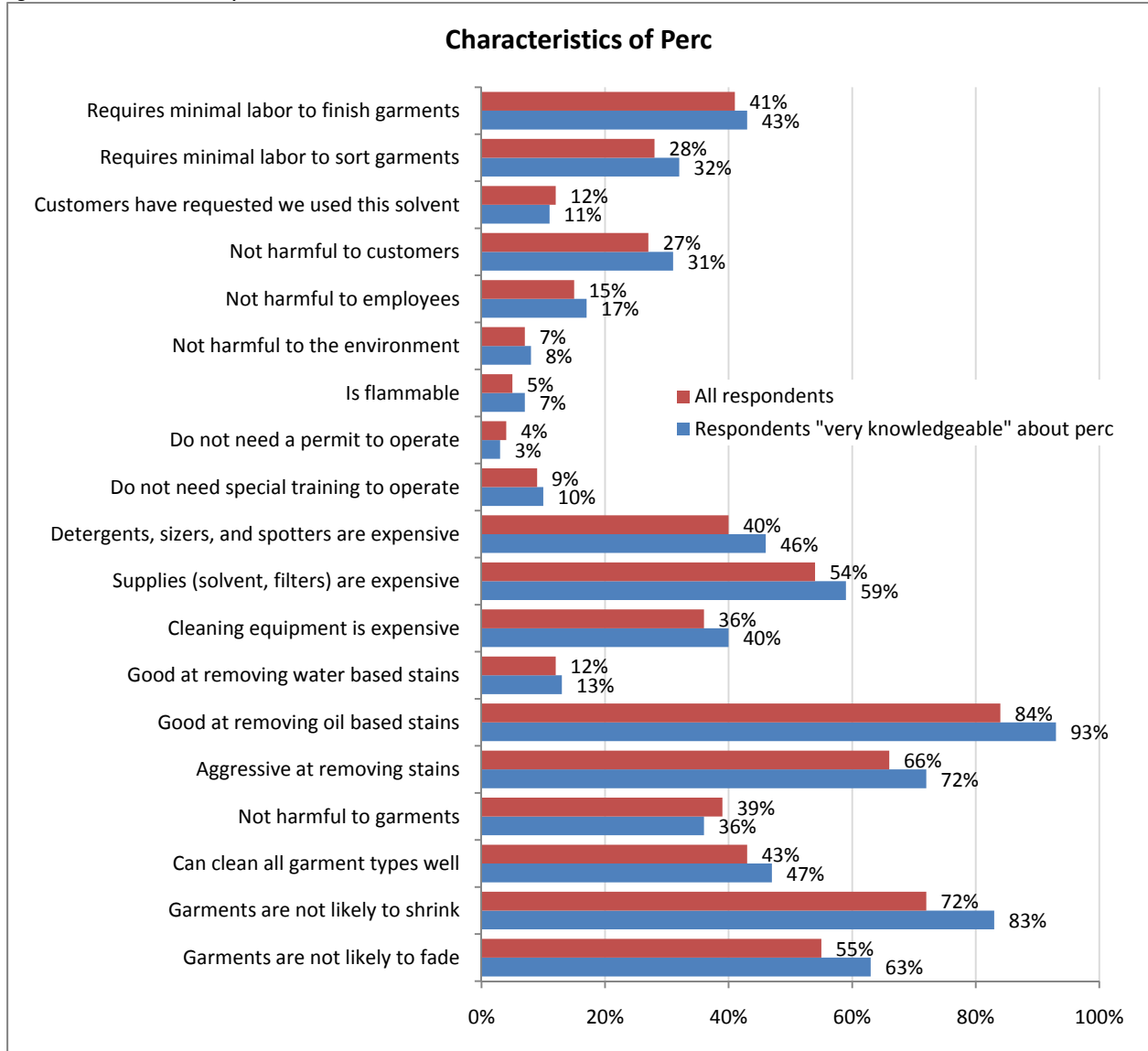


# New York State Pollution Prevention Institute (NYSP2I)

## Knowledge and Characteristics of Perc

As mentioned previously, eighty six percent of all respondents indicated they are “very knowledgeable” (4 or 5 out of 5) about perc. Survey data was sorted to compare the characteristics of perc identified by those “very knowledgeable about perc” to the characteristics identified by all survey respondents. Figure 20 below indicates the percent of respondents which indicate the characteristic applies to perc. Those who report they are very knowledgeable about perc are more likely to believe that it is not harmful to customers or employees; supplies, detergents, and equipment are expensive; and that perc is a good cleaner that’s also gentle on garments.

Figure 20. Characteristics of perc



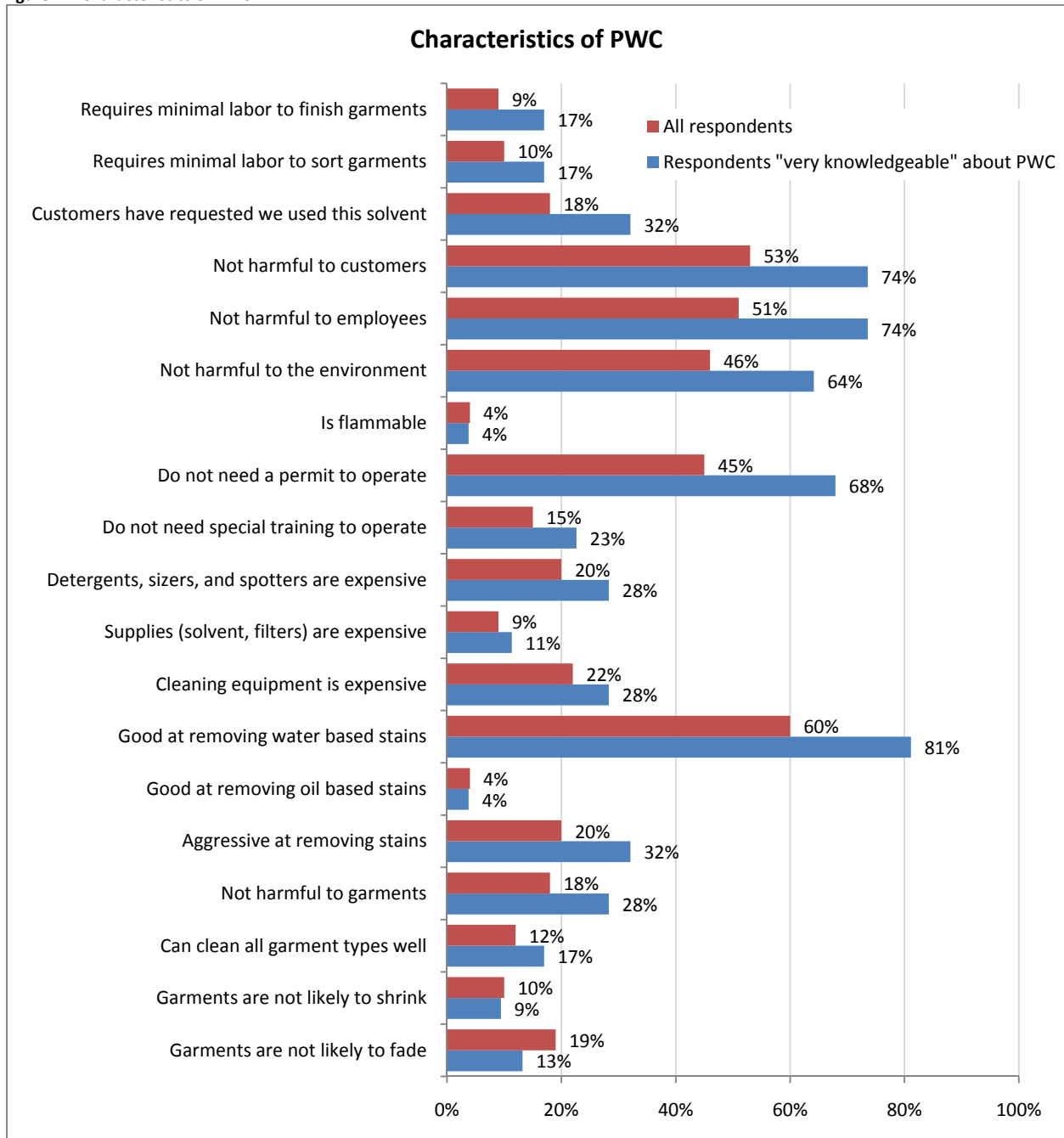


# New York State Pollution Prevention Institute (NYSP2I)

## Knowledge and Characteristics of Professional Wet Cleaning

Fifty three percent of all respondents indicate they are “very knowledgeable” (4 or 5 out of 5) about PWC. Figure 21 below compares the characteristics which cleaners who report they are very knowledgeable about PWC identify with PWC to those characteristics of PWC identified by all respondents. Respondents “very knowledgeable” about PWC are more likely to believe PWC is not harmful to customers, employees, or the environment and a permit is not required to operate a PWC system. “Very knowledgeable” respondents are also more likely to identify PWC as good at removing water based stains. Cleaners reporting they are very knowledgeable about PWC also indicate their customers have requested the solvent.

Figure 21. Characteristics of PWC







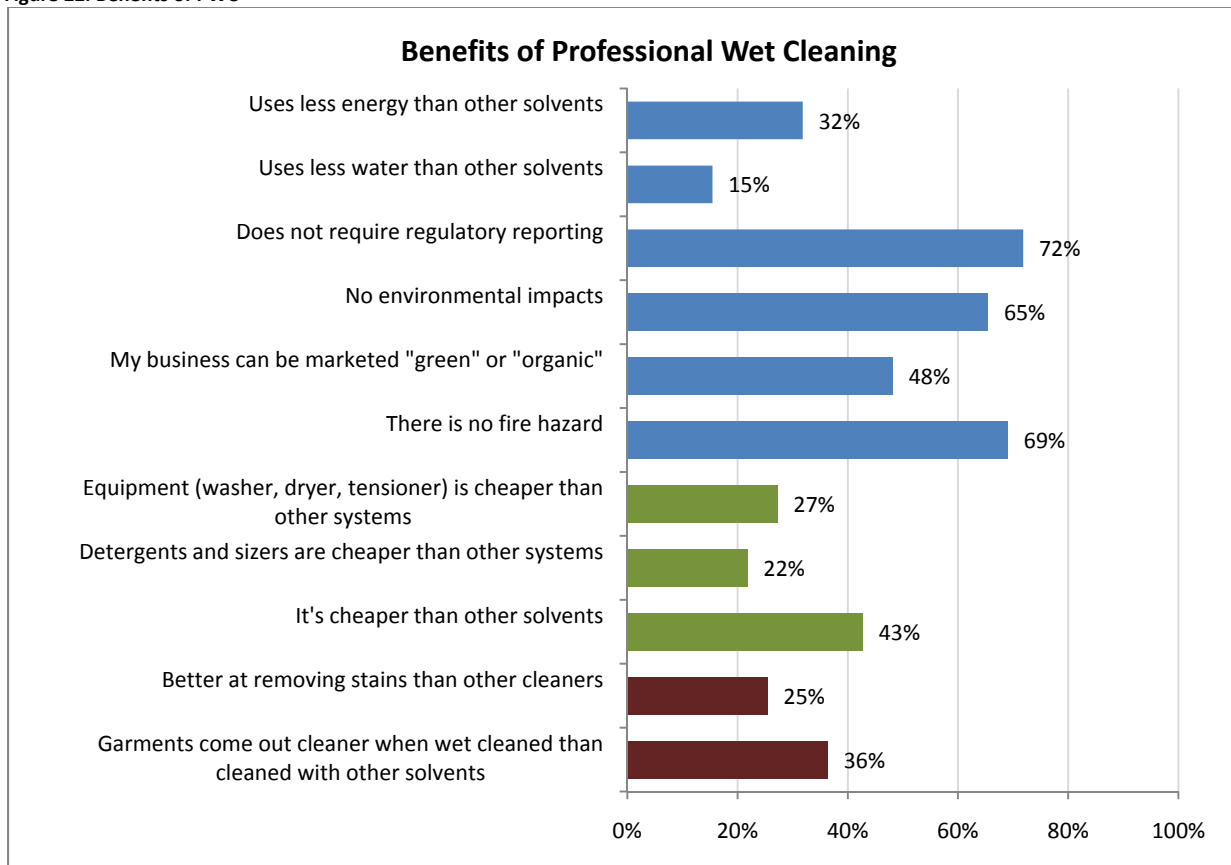
## Professional Wet Cleaning Survey Results

### Benefits of Wet Cleaning

In addition to the characteristics of wet cleaning in the early sections of this report, survey respondents were asked to identify benefits of PWC. Responses are in Figure 22 below. Benefits are grouped into energy and environment (blue), cost (green), and cleaning ability (red) to more easily evaluate data.

For the most part, dry cleaners understand the environmental benefits of PWC; operating PWC does not require regulatory reporting, the environmental impacts are minimal compared to other technologies, and there is no fire hazard. Studies in other states have shown that PWC can use less energy and water than other solvents.

Figure 22. Benefits of PWC



### Characteristics of Wet Cleaning

More than half of all respondents believe that most dry cleaners do not know a lot about PWC. In contrast, 53% of all respondents indicate they are "very knowledgeable" about PWC.

Forty two percent of respondents believe employees need special training to operate PWC equipment and 94% believe equipment is not difficult to learn and operate. Therefore, ensuring PWC operators get appropriate training is crucial to a successful PWC operation.

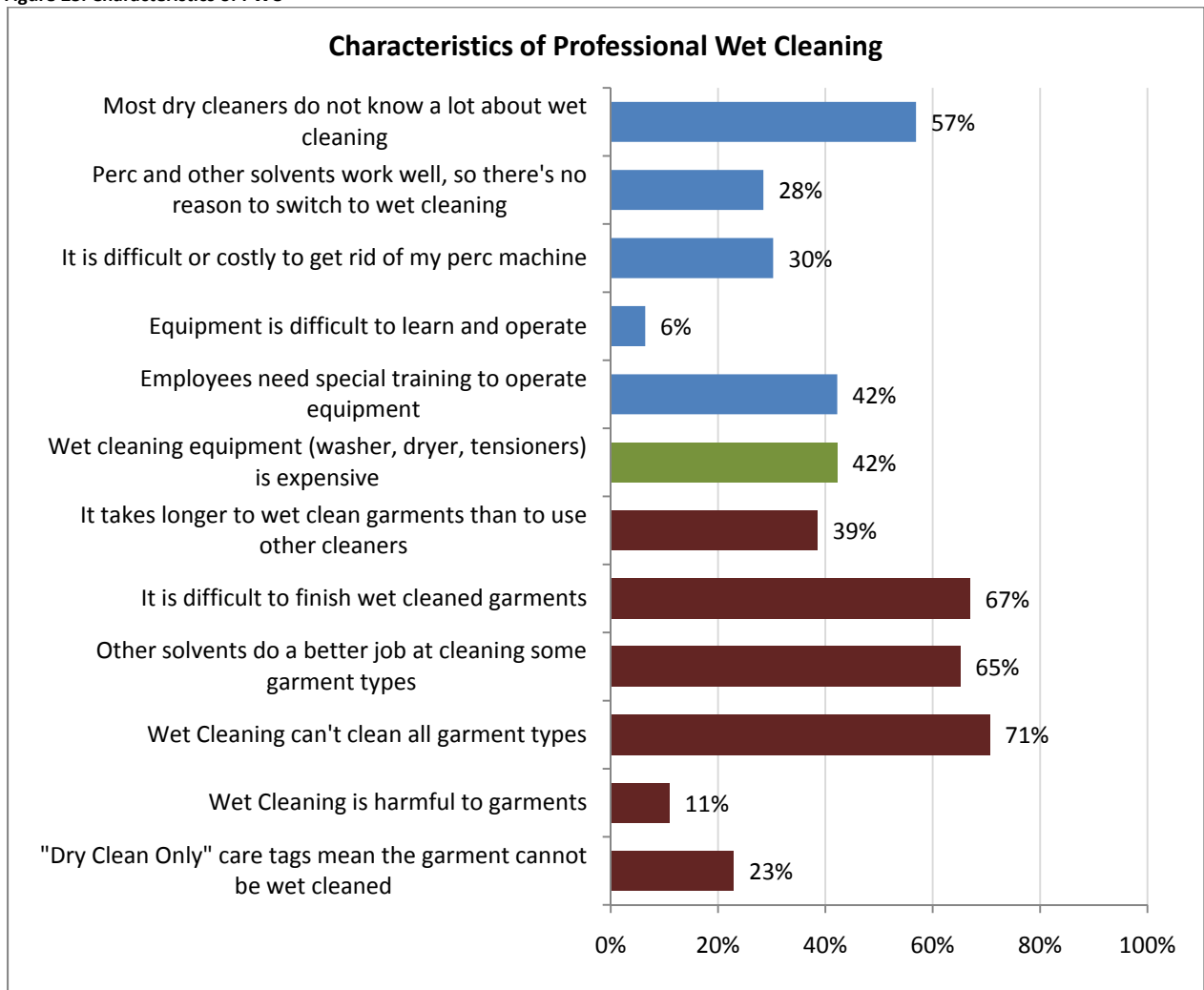
About one quarter of respondents believe other solvents perform well and there isn't a reason to switch to wet cleaning and about two thirds believe other solvents do a better job at cleaning some garment



# New York State Pollution Prevention Institute (NYSP2I)

types. In addition, 71% believe wet cleaning can't clean all garment types and 67% believe it's difficult to finish wet cleaned garments.

Figure 23. Characteristics of PWC



Where the environmental benefits on the previous page are known, it appears the adoption of PWC has remained slow due to the perceived cleaning ability of PWC. Furthermore, almost one quarter of all respondents believe that if a garment is marked with a "Dry Clean Only" care tag, then it cannot be wet cleaned.



## 4. Conclusions

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Although the environmental benefits of professional wet cleaning appear to be well known throughout the State, educating dry cleaners about the ability to clean garments well without harming the garments is critical in order to ensure the adoption of professional wet cleaning technology. More than half of all survey respondents are interested in using professional wet cleaning and about 20% of all respondents have customers requesting the use of professional wet cleaning. Providing opportunities for dry cleaners to observe wet cleaning in action, talk with other cleaners who use wet cleaning, and learn from each other will allow cleaners to see first-hand, the results and requirements of a operating a wet cleaning system. This approach has been shown by other state programs to increase adoption of the technology.

Survey results show that the adoption of PWC has remained slow due to the perceived cleaning ability of PWC. Almost one quarter of all respondents believe that if a garment is marked with a “Dry Clean Only” care tag, then it cannot be wet cleaned. Educating dry cleaners about the garment benefits as well as environmental and cost benefits will further increase the adoption rate by dry cleaners.



## Appendix: Qualitative Survey

### Dry Cleaning in New York State

Rochester Institute of Technology (RIT) is conducting a research project to understand the current state of the dry cleaning industry in New York. Your responses to this survey will assist in developing programs to help NYS dry cleaners stay in business and remain competitive. Please complete this survey and return it in the enclosed postage paid envelope by July 25. Survey results will be kept confidential. We appreciate your participation and thank you in advance for supporting the study.

Your name \_\_\_\_\_ Job Title \_\_\_\_\_

Business name \_\_\_\_\_ Telephone number \_\_\_\_\_

Business address \_\_\_\_\_

Do you have access to email?  Yes  No If yes, please provide your email address below

\_\_\_\_\_

### BUSINESS INFORMATION

1. How long have you been in business at this location? \_\_\_\_\_

2. Business type (check one)  Independent  Franchise  Chain operation

3. Cleaner type (check one)  Drop shop or store front (customers drop off and pick up garments only, cleaning is done by another cleaner)  
 Cleaning is performed on site at this location

4. Building type (check one)

- Stand alone building
- Co-located commercial building (strip mall)
- Co-located residential building
- Co-located industrial building (industrial park)

5. What is the size of your facility? \_\_\_\_\_ square feet

6. How many employees work at this location? \_\_\_\_\_ Full time \_\_\_\_\_ Part time

7. What trade associations are you a member of? (check all that apply)

- NCA (National Cleaners Association)
- DLI (Drycleaning & Laundry Institute)
- NEFA (North East Fabricare Association)
- KDLA (Korean Dry Cleaners Association)
- IFI (International Fabricare Institute)
- Other (write in): \_\_\_\_\_

8. In your opinion, what are the best sources of dry cleaning information? (check all that apply)

- dry cleaning trade associations
- detergent suppliers
- the internet
- solvent suppliers
- other dry cleaners
- dry cleaning equipment suppliers
- dry cleaning magazines and printed newsletters
- NYS Department of Environmental Conservation
- NY Environmental Facilities Corporation
- Environmental Protection Agency (EPA)
- others (write in): \_\_\_\_\_



## Dry Cleaning in New York State

### OPERATIONAL INFORMATION

9. What percentage of your business is laundering/washing, dry cleaning, and wet cleaning? Please estimate each. The total must equal 100%.

- \_\_\_\_\_ % Laundering/washing (using standard washing and drying machines to clean nondelicate garments that normally would not be dry cleaned, such as cotton, slacks, and shirts)
- \_\_\_\_\_ % Dry cleaning (using solvents other than water to clean garments labeled "dry clean only")
- \_\_\_\_\_ % Professional wet cleaning (using sophisticated equipment to clean clothes in water that would normally be dry cleaned)

10. Not including laundering/washing service, how many pounds of clothes do you dry clean? (check one)

- Less than 100 pounds per week                       1001 – 1500 pounds per week
- 101 – 500 pounds per week                               1501 – 2000 pounds per week
- 501 – 1000 pounds per week                               More than 2000 pounds per week

11. What percentage of clothes do you currently clean with these solvents? (total must equal 100%)

- \_\_\_\_\_ % Perchloroethylene (perc)
- \_\_\_\_\_ % Glycol ether (Rynex, Solvair)
- \_\_\_\_\_ % Liquid carbon dioxide (CO<sub>2</sub>)
- \_\_\_\_\_ % Siloxane D5 (GreenEarth)
- \_\_\_\_\_ % Hydrocarbon (DF-2000, Ecosolv)
- \_\_\_\_\_ % Mineral spirits or Stoddard solvent
- \_\_\_\_\_ % Professional wet cleaning
- \_\_\_\_\_ % Other (write in): \_\_\_\_\_

12. When do you anticipate purchasing new dry cleaning equipment or replacing current equipment?

- Less than 5 years from now                               Between 16 and 20 years from now
- Between 5 and 10 years from now                               Between 21 and 25 years from now
- Between 11 and 15 years from now                               More than 25 years from now
- Never. I do not plan to replace my dry cleaning system. Why? \_\_\_\_\_

### TECHNOLOGY

13. On a scale of 1 to 5 with 1 representing "no knowledge" to 5 representing "expert knowledge" please indicate your knowledge of the following cleaning solvents. Circle your response.

	No knowledge		Somewhat knowledgeable		Expert knowledge
Perchloroethylene (perc)	1	2	3	4	5
Glycol ether (Rynex, Solvair)	1	2	3	4	5
Liquid carbon dioxide (CO <sub>2</sub> )	1	2	3	4	5
Siloxane D5 (GreenEarth)	1	2	3	4	5
Hydrocarbon (DF-2000, Ecosolv)	1	2	3	4	5
Mineral spirits or Stoddard solvent	1	2	3	4	5
Professional wet cleaning	1	2	3	4	5



# New York State Pollution Prevention Institute (NYSP2I)

## Dry Cleaning in New York State

14. On a scale of 1 to 5, with 1 representing "not interested" and 5 representing "very interested" please indicate your interest in using the following solvents for dry cleaning. Circle your response.

	<i>Not interested</i>		<i>Somewhat interested</i>		<i>Very interested</i>
Perchloroethylene (perc)	1	2	3	4	5
Glycol ether (Rynex, Solvair)	1	2	3	4	5
Liquid carbon dioxide (CO <sub>2</sub> )	1	2	3	4	5
Siloxane D5 (GreenEarth)	1	2	3	4	5
Hydrocarbon (DF-2000, Ecosolv)	1	2	3	4	5
Mineral spirits or Stoddard solvent	1	2	3	4	5
Professional wet cleaning	1	2	3	4	5

15. Check the characteristics that apply to each cleaning solvent.

	Perchloroethylene (perc)	Glycol ether (Rynex, Solvair)	Liquid carbon dioxide (CO <sub>2</sub> )	Siloxane D5 (GreenEarth)	Hydrocarbon (DF-2000)	Mineral spirits or Stoddard solvent	Professional wet cleaning
Garments are not likely to fade	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garments are not likely to shrink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can clean all garment types well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not harmful to garments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Aggressive at removing stains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good at removing oil based stains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Good at removing water based stains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleaning equipment (washer, dryer, finishing equipment) is expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supplies (solvent, filters) are expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Detergents, sizers, and spotters are expensive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do not need special training to operate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do not need a permit to operate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is flammable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not harmful to the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not harmful to employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not harmful to customers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Customers have requested we use this solvent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Requires minimal labor to sort garments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Requires minimal labor to finish garments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



## Dry Cleaning in New York State

### PROFESSIONAL WET CLEANING

16. In your opinion, what are characteristics of professional wet cleaning? Check all that apply.

- Most dry cleaners do not know a lot about wet cleaning
- "Dry Clean Only" care tags mean the garment cannot be wet cleaned
- Wet cleaning is harmful to garments
- Wet cleaning can't clean all garment types
- Other solvents do a better job at cleaning some garment types
- It is difficult to finish wet cleaned garments
- It takes longer to wet clean garments than to use other cleaners
- Wet cleaning equipment (washer, dryer, tensioners) is expensive
- Employees need special training to operate equipment
- Equipment is difficult to learn and operate
- It is difficult or costly to get rid of my perc machine
- Perc and other solvents work well, so there's no reason to switch to wet cleaning

17. In your opinion, what are the benefits of using professional wet cleaning? Check all that apply.

- Uses less energy than other solvents
- Uses less water than other solvents
- Does not require regulatory reporting
- Equipment (washer, dryer, tensioners) is cheaper than other systems
- Detergents and sizers are cheaper than other systems
- No environmental impacts
- My business can be marketed "green" or "organic"
- Better at removing stains than other cleaners
- It's cheaper than other solvents
- Garments come out cleaner when wet cleaned than cleaned with other solvents
- There is no fire hazard

18. Any other information you would like to share with us? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



The New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology (RIT) can assist in converting dry cleaners from using perc to 100% professional wet cleaning. If you are a dry cleaner located in New York State and would like more information on this program, please contact Kate Winnebeck, Dry Cleaning Program Manager at 585-475-5390 or email [kmhasp@rit.edu](mailto:kmhasp@rit.edu).

Grant funding may be available for this initiative.

The New York State Pollution Prevention Institute at Rochester Institute of Technology (RIT) is looking for current 100% professional wet cleaners who are willing to hold a demonstration at their shop. Please contact Kate Winnebeck for more information.

To learn more, please visit the NYSP2I website at [http://www.nysp2i.rit.edu/wet\\_cleaning.html](http://www.nysp2i.rit.edu/wet_cleaning.html).