

Development and Analysis of a Survey of Small and Medium-size Manufacturers of Electronic Parts, Components and Equipment

Needs Assessment—
Assistance Needed to Improve Environmental Performance of
Canadian SMEs in the Electronics Sector

Commission for Environmental Cooperation
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Un résumé est disponible en français

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Executive Summary

There are concerns that Canadian small- and medium-size enterprises (SMEs) are not sufficiently aware nor sufficiently able to respond to changes in parts, components and product design requirements being driven by the need of larger suppliers and original equipment manufacturers (OEMs) to comply with regulatory initiatives such as the European Restriction on Hazardous Substances (RoHS) Directive and China RoHS Directive. These directives are targeting the reduction or elimination of such material as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs). Lack of information or lack of awareness of the potential impact of such initiatives and the associated pollution prevention opportunities could hamper access to global markets.

This needs assessment was conducted by the Canadian Centre for Pollution Prevention (C2P2) in response to a request from North American Clean Electronics Pollution Prevention Partnership (CEP3). This report summarizes the work done by the C2P2 to develop and distribute a survey requesting information from small and medium-size manufacturers of electronic parts, components and equipment on the awareness of regulatory initiatives to reduce the use of toxic substances and assistance needed to improve environmental performance, and to compile and interpret survey results. Part of the analysis will be the foundation for designing a plan for assistance to these companies including dissemination of information and training materials, as well as appropriate tools to help the improvement of the electronics supply chain environmental performance in North America.

The following conclusions can be drawn from the findings of the survey:

The purpose of the survey was to gather information from small and medium-size manufacturers of electronics to assess the assistance needed to address the issue of toxic and hazardous constituents in electronic and electrical equipment. Key considerations in the development of an assistance program were to meet the spirit and intent of the CEP3 initiative.

- Information on effective pollution prevention measures and their benefits will help raise awareness. The information will need to be clear and concise, as small firms have little time to address non-essential issues.
- Continued involvement and support from associations from across Canada is essential.

Although the Canadian survey had a poor response rate, the findings largely correlate with those of the US survey. Combining the US and Canadian survey results led to a greater understanding of the needs of this sector.

Part of the analysis will provide the foundation for designing a plan for assistance for these companies, including dissemination of information and training materials, as well as appropriate tools to help the improvement of the electronics supply chain environmental performance in North America

1.0 Background

The North American Clean Electronics Pollution Prevention Partnership¹ (CEP3) is an initiative of Commission for Environmental Cooperation (CEC). CEP3 is a voluntary environmental leadership initiative among industry, government, and nongovernmental organizations committed to eliminating or significantly reducing the use of identified toxics and hazardous constituents in electronics manufactured or imported in the North American market. The purpose of CEP3 is to take a preventive approach to reducing the health and environmental risks associated with electronics production and consumption.

There are concerns that Canadian small and medium-size enterprises (SMEs) are not sufficiently aware nor sufficiently able to respond to changes in parts, components and product design requirements being driven by the need of larger suppliers and original equipment manufacturers (OEMs) to comply with regulatory initiatives such as the European Restriction on Hazardous Substances (RoHS) Directive and China RoHS Directive. These directives are targeting the reduction or elimination of such material as lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs). Lack of information or lack of awareness of the potential impact of such initiatives and the associated pollution prevention opportunities could hamper access to global markets.

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2.0 Survey Methodology

The purpose of the industry survey was to collect information on the training and technical assistance needs of small and medium-size manufacturers of electronics with regard to the challenges of:

- complying with international electronic environmental regulations;
- reducing the use of toxic substances during manufacturing and assembly; and
- improving overall company pollution prevention performance.

Survey Design

The survey and the methodology for its delivery were developed through consultations with staff of the US National Pollution Prevention Roundtable and with Duncan Bury and Susan Pecman of the Sustainable Consumption Division of Environment Canada's National Office of Pollution Prevention. Once designed, the survey was tested by Jay Illingworth of the Electronics Product Stewardship of Canada.

The survey comprises 20 questions and was designed to be completed online in 15 minutes by the respondent. The survey was posted at <http://www.surveymonkey.com/s.asp?u=383353010113> and is now available in Appendix I.

SurveyMonkey was used to create a professional online survey. The online tool was used to design the survey, deliver the survey via e-mail, collect responses and analyze results in real-time.

¹ The CEP3 has been developed in response to the three North American National Roundtables for Pollution Prevention (NAP3). The CEC is headquartered in Montreal and was established as part of the environmental side agreement to the North American Free Trade Agreement (NAFTA).

Delivery of Survey

On 22–23 December 2006, the survey was distributed by e-mail to 367 SMEs and a reminder notice was sent on 10 January 2007. The names of these contacts were obtained from the Scott's Directory² and entered in a database from 8 to 22 December 2006. Over 1200 companies with fewer than 500 employees were found in the Scott's Directory when searched by NAICS codes 33411, 33431, 33441. These codes correspond to the Clean Electronics Scoping Study (Kelleher 2006). Due to time and resource constraints, approximately 25 percent of these companies with e-mail addresses were entered into a MS Access database. Some of the companies appeared in multiple sectors, which explains why there were more listings than the 779 companies identified in the Kelleher report. The initial deadline for the survey was set for 19 January 2007; however due to the slower than expected response rate, the deadline was extended to 31 January 2007. Reminder e-mail notices were sent out mid-January noting the extended deadline.

Other activities to engage potential participants included contacting industry associations by e-mail (December 7 and 21) and asking for their help in obtaining membership lists and promoting the survey. A list of those associations can be found in Appendix II. Electronics Product Stewardship Canada, Canadian Association of Importers and Exporters and Technology Association of Canada indicated they would do what they could in promotion of the survey.

Due to privacy issue constraints, C2P2 was not able to access membership lists directly and had to rely on the goodwill of industry associations to promote the survey. Discussions were also held with the Chair of the Ottawa Manufacturers Network (OMN) Special Interest Group on Environmental Initiatives. The OMN had conducted four RoHS compliance workshops with members. The outcome of the workshops was that there are various states of readiness on RoHS compliance. The OMN is very supportive of continuing efforts to improve the environmental performance of SMEs in the electronics sector.

3.0 Target Audience and Response Rate

Target Audience and Industry Profile

The target audience for the survey comprised of those small and medium-size manufacturers of electronics that have facilities in Canada. In general, electronics manufacturing comprises of the following three types according to the North American Industry Classification System (NAICS):

- NAICS 33411: Computer and Peripheral Equipment
- NAICS 33431: Audio and Video Equipment
- NAICS 33441: Semiconductor and Other Electronic Components

As mentioned, a database was created with information on a total of 367 SMEs dispersed across the above electronics manufacturing categories. Table 1 below summarizes the distribution, with 33 percent in computer and peripheral equipment; 10 percent in audio and video equipment and 57 percent in semiconductor and other electronic components. The distribution within the sample is very consistent with the actual numbers of computer, IT and electronic manufacturing industries in Canada, which are 31.7 percent, 8.3 percent and 60 percent, respectively (Kelleher 2006).

Number of SMEs (Total: 367)	North American Industry Classification System codes		
	33411	33431	33441
	122	36	209

² Scott's Directory: <http://www.scottsinfo.com/scottshome/default.aspx>

The distribution of SMEs examined according to the number of employees was looked at across five categories as displayed in Table 2 below. Upon examination of the distribution, it is apparent that the majority of SMEs examined have either 1 to 10 employees (35 percent) or 11 to 50 employees (38 percent). Some 73 percent have fewer than 50 employees.

NAICS codes	Facility size (number of employees)				
	1–10	11–50	51–100	101–250	251–500
33411	59	42	15	5	1
33431	14	14	3	4	1
33441	56	85	29	31	8
Total:	129	141	47	40	10
percent of total SMEs examined	35	38	13	11	3

An analysis was also conducted on the distribution by province of the SMEs examined. As Table 3 shows, the majority of SMEs examined operate in Ontario (60 percent), followed by Quebec (24 percent) and British Columbia (7 percent).

Province	NAICS codes			Total	Percent
	33411	33431	33441		
BC	7	1	18	26	7.1
AB	3	2	11	16	4.4
SK	1	0	4	5	1.4
MB	2	1	3	6	1.6
ON	80	21	118	219	59.7
QC	27	11	49	87	23.7
NB	1	0	1	2	0.5
NS	1	0	5	6	1.6

Given that the majority of SMEs contacted are in Ontario, a further analysis by telephone area code was conducted to determine where in Ontario the SMEs are located. As shown in Table 4 below, the majority are located in areas codes 905 (45 percent) and 416 (25 percent); followed by 519 (13 percent) and 613 (13 percent). Therefore, some 70 percent of companies operate in the Greater Toronto area, followed by 13 percent in the Golden horseshoe. The Ottawa area, at 13 percent, has the least prominent concentration of SMEs in the electronics sector.

Telephone Area Code	33411	33431	33441	Total	Percent of Total in ON
905	36	11	52	99	45
519	14	1	14	29	13
416	15	7	33	55	25
807	1	0	0	1	1
705	2	2	2	6	3
613	12	0	17	29	13

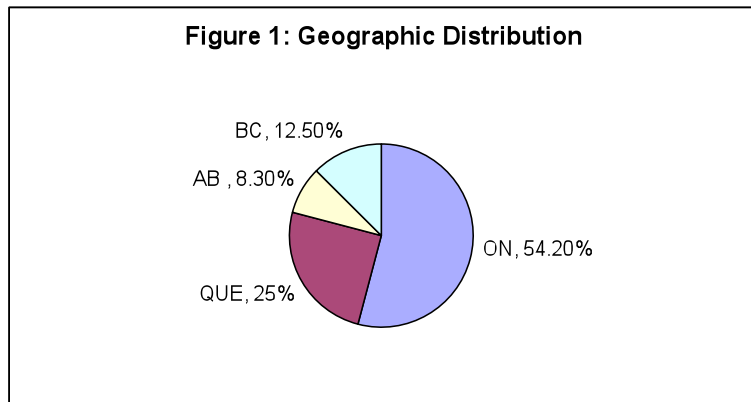
Response Rate

As of 31 January 2007, the closing date for the survey, a total of 25 respondents completed the survey for a response rate of 6.8 percent. Generally, response rates for online surveys can range between 2-30 percent. For a survey of this size, the response rate is respectable given that the survey was live for the time period immediately before and after the Christmas season.

Distribution and Composition of Survey Respondents

Survey respondents were asked to indicate the location of their company by province or territory, as well as the first three characters in their facility's postal code.

As illustrated in figure 1, the majority of companies responding to the survey were located in either Quebec or Ontario, although there were also respondents from Alberta and British Columbia. The majority of Ontario respondents were situated in the Greater Toronto area, followed by small pockets of companies in the Golden horseshoe and Ottawa area.



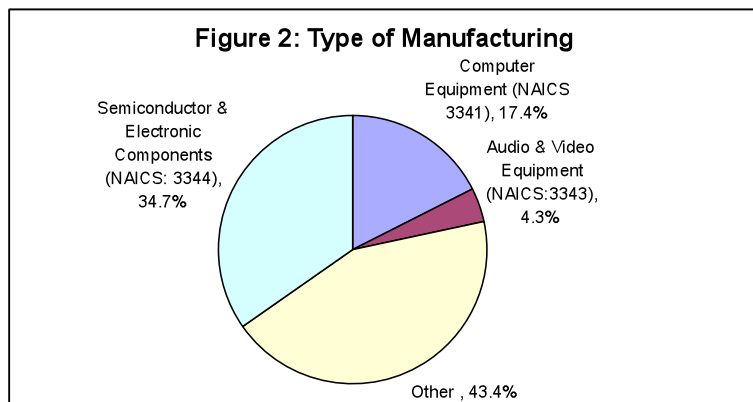
4.0 Summary of Survey Results

This section summarizes the results of the survey under the following subheadings:

- Characteristics of Survey Respondents
- Current Environmental Activities
- Awareness of Environmental Initiatives Aimed at the Electronics Sector
- Current Challenges in Improving Environmental Performance
- Information, Training and Technical Assistance Needs

4.1 Characteristics of Survey Respondents

The survey respondents were predominantly found in the semiconductor and electronic components sector (NAICS-3344). This result matches analysis of the sample as summarized in Table 1. Many respondents classified themselves as "Other." A review of the "Other" classification showed that many small companies appear to operate under more than one NAICS code (Figure 2).



Another interesting statistic derived from the survey was the geographic location of the markets for electronic industry companies. Approximately 32 percent of the companies participating in the survey indicated that Canada constituted 75 percent of their market. Another 32 percent of the companies noted that Canada accounted for 25 to 50 percent of their market. Finally, between 32 and 58 percent of the participating companies indicated that less than 25 percent of their products were destined for Canada, the United States, Mexico, Europe and other global markets.

Other significant highlights from the survey respondents:

- 45.8 percent have between 11 and 50 employees
- 87 percent have a quality management system
- 43.5 percent have an affiliation with an international industry association, while another 30.4 percent lack an affiliation with local, regional, national or international associations
- 45.8 percent are original equipment manufacturers, while another 33.3 percent consider themselves sub-assemblers.

4.2 Current Environmental Activities

The survey respondents had good systems in place to address potential environmental issues. Over 52 percent had an environmental health and safety manager and, as noted above, 87 percent had quality management systems.

Survey respondents were asked to provide insights on their pollution prevention initiatives. As expected, many had tackled the “low-hanging fruit” options of training, housekeeping and product substitution. Table 5 illustrates the types of pollution prevention activities in which the companies in the electronics sector are engaged.

Table 5 : Current Pollution Prevention Activities Conducted by Facilities Surveyed	Percent of Facilities Engaged In
Integrate environmental considerations into purchasing practices	45
Integrate environmental considerations into inventory management systems	45
Use good housekeeping practices to minimize wastes	55
Change production schedules to minimize equipment and feedstock changeovers	43
Segregate byproducts at source	33
Staff are trained in materials handling and pollution prevention	50

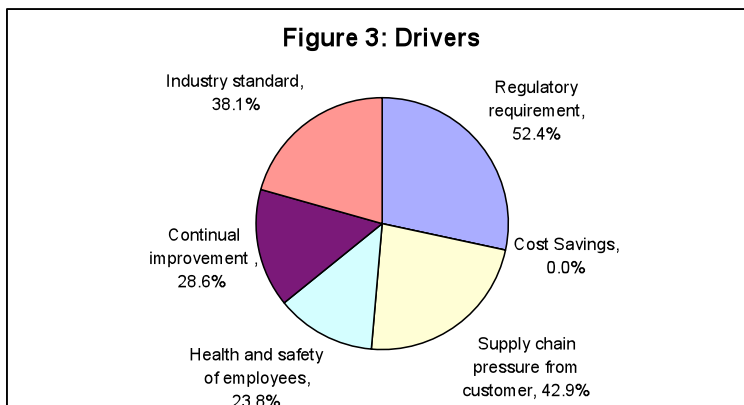
Replace polluting materials used in production with non-polluting or less polluting materials and feedstock	52
Introduce new technologies or approaches to existing operating systems, processes or practices to reduce pollutants generated and materials, energy or water wasted	45
Integrate environmental criteria into the usual design considerations of performance, cost, quality, etc.	32
Use methods to prevent pollution over the entire life cycle of the product	32

4.3 Awareness of Environmental Initiatives Aimed at the Electronics Sector

The survey participants indicated that they were familiar with the RoHS directive, with approximately 91 percent of the respondents either fully or partially engaged in carrying out actions to address it. Interestingly, however, respondents claimed to have little knowledge of North American environmental initiatives aimed at the electronics sector, including governmental green electronic purchasing specifications, provincial electronic product stewardship initiatives, or the US Electronic Product Stewardship Assessment tool.

As highlighted in the February 2007 progress report on this project, anecdotal feedback from the chair of the environmental compliance special interest group of the Ottawa Manufacturers Network (OMN) indicated that companies are in various stages of readiness in addressing environmental issue. He noted that more work is necessary for Canadian companies to address RoHS compliance and that they are potentially vulnerable to being a step behind their European counterparts. In today's global marketplace, customers are placing greater demand on their suppliers to meet global standards. If a supplier is reluctant to address an environmental issue, the customer is likely to seek a supplier that will.

The drivers for taking action on environmental issues are regulatory requirements followed by pressure from the supply chain and industry standards (Figure 3). Not one respondent cited cost saving measures as a driver, even though they were encouraged to select as many drivers as possible.



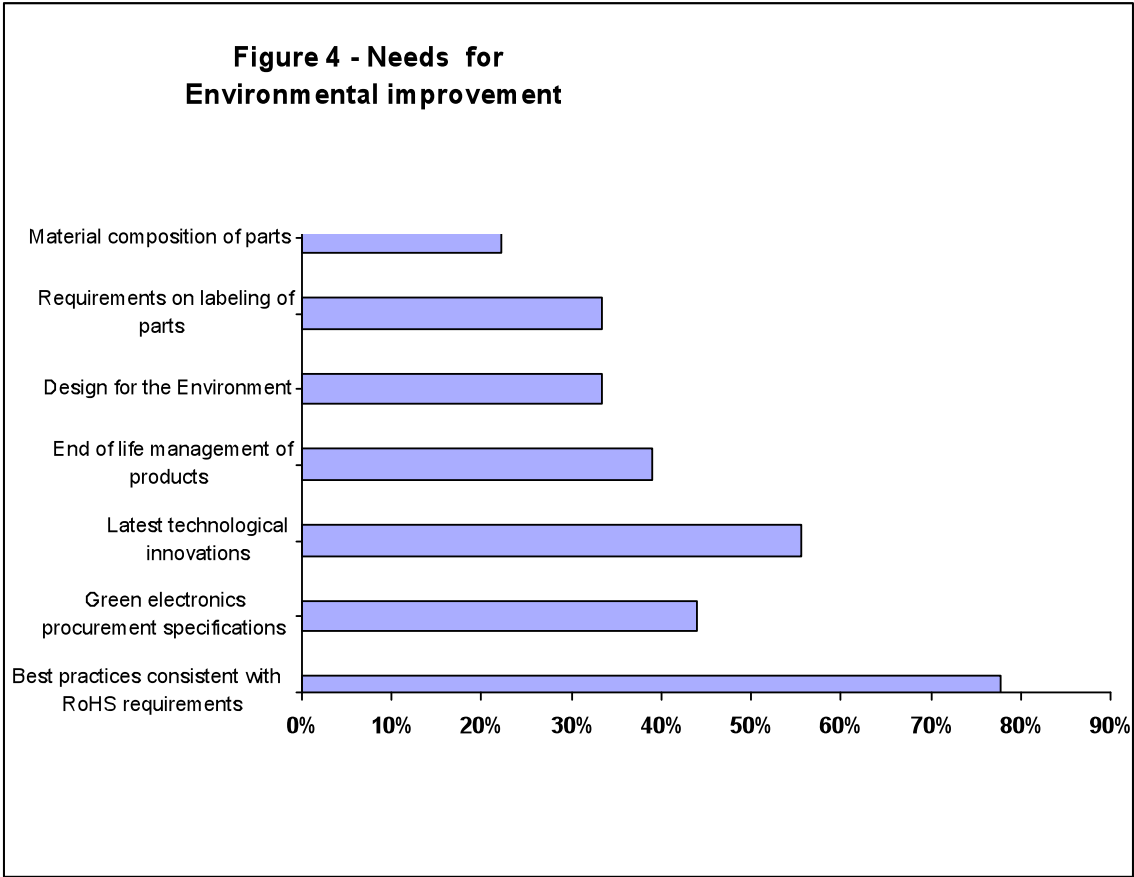
4.4 Current Challenges in Improving Environmental Performance

A list of twelve issues was provided to participants to gain a sense of what was hindering their respective companies from improving their environmental performance. The top four reasons are highlighted in Table 6.

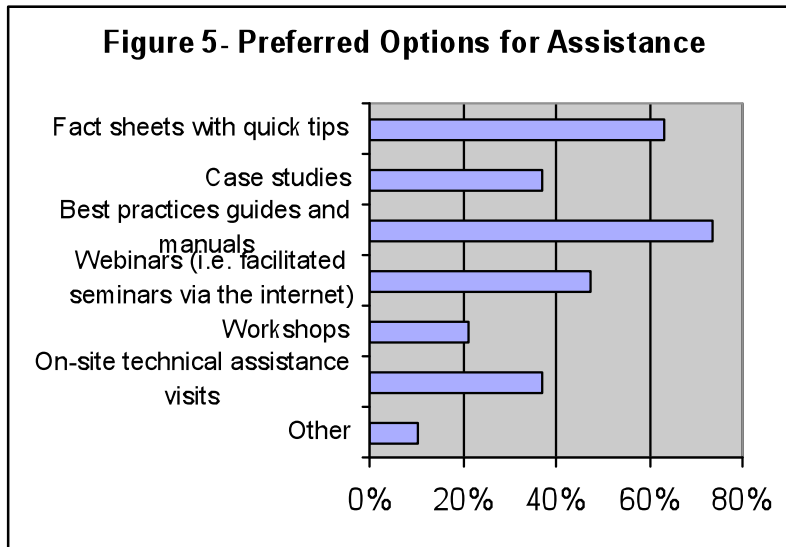
Issue	Response (percent)
Insufficient capital to undertake investments in new technologies	52.6
Time	47.8
Financial resources to undertake pollution prevention measures	36.8
Not enough information on new and emerging environmental performance requirements from markets and authorities	31.6
No in-house expertise	31.6

4.5 Information, Training and Technical Assistance Needs

The needs of SMEs in the electronics sector to improve environmental performance vary. As evidenced by Figure 4, access to best management practices consistent with RoHS requirements (78 percent), followed by latest technological innovations (56 percent) and green electronics procurement specifications (44 percent), were identified most often. Surprisingly, some of the harder tasks such as design for the environment, requirements on the labeling of parts and material composition of parts were not identified as immediate needs. Either facilities were handling those issues satisfactorily or these issues were being shelved for the time being.



Survey participants were asked in what format they would like to receive assistance in addressing environmental performance issues. The top three options, as noted in Figure 5, were best practices guides, fact sheets with quick tips, followed by facilitated seminars via the Internet (Webinars).



The top sources of information currently relied upon by the survey participants include suppliers (74 percent), industry and company websites (68 percent), trade publications, and customer feedback (58 percent)

Fourteen survey respondents were interested in follow-up information (more than 50 percent). Close to 93 percent of the respondents were interested in receiving further information on best practices, while 71 percent wanted the survey results. Some 29 percent were interested in being contacted for further details to learn more about participating in this initiative.

4.6 Comparison to US Survey Results

The survey of US SMEs in the electronics sector by the National Pollution Prevention Roundtable posed questions similar those of the Canadian survey. Not surprisingly, there were many similarities between the US and Canadian survey results. The common areas of greatest significance concerned the types of information of greatest interest to SMEs and the preferred options for receiving information and technical assistance.

The types of information of most interest to US SMEs are green electronic procurement specifications, material composition of parts, best management practices consistent with RoHS requirements, end-of-life management of electronics, and the latest technological innovations. The methods for receiving information in order of preference include webinars, case studies and fact sheets. These items are preferred over on-site technical assistance and workshops.

5.0 Lessons Learned and Recommendations

5.1 Lessons Learned

Despite the survey responses, the following lessons were garnered from developing, conducting and evaluating a survey of small and medium-size manufacturers of electronic parts, components and equipment.

- ***Small firms have little time to address non-essential issues.*** Due to the nature of their business, small firms spend the majority of their time responding to immediate operational issues. Hence it is less likely that such businesses had the time to fill out a survey.
- ***Deeper involvement of the associations in the survey.*** Although a number of the associations were contacted and made aware of the survey, the associations could have been engaged more actively involved in the process. Activities such as co-signing the initial survey, and promoting the survey internally through newsletters and on association websites may have helped increase the involvement. There is a need to develop partnerships with associations early on to facilitate more action in the future.
- ***Businesses appear to have acted on the simplest and easiest practices to implement pollution prevention measures.*** It is obvious and understandable that small businesses will act in such a manner. However, what needs to be decided is how to motivate these businesses to move forward and tackle more difficult and potentially more rewarding activities.
- ***Environmental stewardship is a competitive advantage in the electronics sector.*** From anecdotal discussions with key technical experts, it appears that many Canadian SMEs in the electronics sector may be lagging behind on addressing RoHS requirements. As a result, these companies are vulnerable to losing market share to European and Asian competitors who are RoHS-compliant.
- ***Flexibility is a key attribute of any environmental program targeted at SMEs.*** Many of the facilities within this sector have diverse needs and it appears many are starting from different levels. Therefore, the program features need to be broad enough to attract participants with differing levels of interest.
- ***Reliance on a broad number of stakeholders for direction on environmental issues.*** The electronics sector does not rely on any one particular player (i.e. supplier, trade magazine, customer) for guidance on environmental issues.
- ***Do not neglect the white goods manufacturers who were not the target of the survey.*** There may be opportunities to advance the awareness of this niche part of the sector. White box manufacturers within the computer industry refers mostly to personal computer component manufacturers and assemblers which produce no-name personal computers and servers.
- ***Cost savings was not a significant driver to seeking environmental improvements.*** In most pollution prevention projects, cost savings is one the top reasons for seeking environmental improvements. However, respondents in this survey did not pinpoint cost savings as an opportunity. In addition, a large number of companies included capital investment and financial resources to undertake P2 measures within the top barriers. There seems to be a strong sense among the sector that substituting for the RoHS targeted substances will be costly.

5.2 Recommendations

To build awareness and momentum for the project, the initial objectives for the project should be to create a set of early “wins” for the project. Specifically, in Canada, CEP3 should:

- Set up a series of RoHS-readiness workshops following the model pioneered by the Ottawa Manufacturers Network. The workshops should be delivered in the Greater Toronto Area, where a predominant number of the targeted businesses appear to be located. The workshops would also address other topics related to reducing the health and environmental risks associated with electronics production and use.
- Research, develop and distribute a number of best management practices which address compliance issues, pollution prevention opportunities and costs implications for addressing the RoHS directive and others.
- Document and distribute case studies of SMEs in North America that have successfully addressed the RoHS directive.
- Develop a short webinar that would address the key issues and generate additional awareness among SMEs.
- Explore partnering with major Original Equipment Manufacturers (OEM) to help drive improvement down the supply chain.
- Explore potential links to the CEC greening the supply chain project.
- Prepare and implement a communications plan that would engage all stakeholders in the electronics sector, including customers, suppliers, trade publications, academic websites/publications, local chambers of commerce, and industry associations.

6.0 Conclusions

The following conclusions can be drawn from the findings of the survey:

The purpose of the survey was to gather information from small and medium-size manufacturers of electronics to assess the assistance needed to address the issue of toxic and hazardous constituents in electronic and electrical equipment. Key considerations in the development of an assistance program to meet the spirit and intent of the CEP3 initiative.

Information on effective pollution prevention measures and their benefits will help raise awareness. The information will need to be clear and concise, as small firms have little time to address non-essential issues.

Continued involvement and support from associations from across Canada is essential.

Although the Canadian survey had a poor response rate, the findings largely correlate with those of the US survey. Combining the US and Canadian survey results led to a greater understanding of the needs of this sector.

Part of the analysis will provide the foundation for designing a plan for assistance for these companies, including dissemination of information and training materials, as well as appropriate tools to help the improvement of the electronics supply chain environmental performance in North America

References

Kelleher, M. (May 2006). Clean Electronics Scoping Study (unpublished paper prepared for the CEC Secretariat).

Appendix I—Survey

Capacity of Electronics Manufacturers to Improve Environmental Performance

Introduction to the Clean Electronics Pollution Prevention Partnership and Survey

The Canadian Centre for Pollution Prevention (C2P2), in partnership with the Clean Electronics Pollution Prevention Partnership is conducting this short survey to assess the information, training and technical assistance needs of small and medium-size manufacturers of electronics with regard to the challenges of:

- reducing the use of toxic substances during manufacturing and assembly;
- improving overall company pollution prevention performance; and
- complying with international electronic environmental regulations.

This survey will take approximately 15 minutes to complete. The results of the survey will be used to inform the development of an assistance program for small and medium-size manufacturers of electronics to improve their environmental performance specifically on the issue of toxic and hazardous constituents in electronic or electrical equipment. We would be pleased to share the results of the survey with you should you be interested.

Privacy Statement:

Any information you volunteered in response to this survey will be presented and published in aggregate only. Names of individuals and/or companies will remain confidential. The survey will only be used to gather information from small and medium-size manufacturers of electronics to assess the assistance needed to address the issue of toxic and hazardous constituents in electronic and electrical equipment. It will not be used for any other purposes and your personal information will not be shared with any other party. We may contact you by e-mail if you asked for more information on best practices; the survey results; or indicated that you are willing to participate in follow-up research.

Please take 15 minutes to complete the survey by January 19, 2007 by answering the following questions:

1. What type of electronics manufacturing does your company do? (Please check all that apply)

- Computer and Peripheral Equipment (NAICS: 3341)
- Audio and Video Equipment (NAICS:3343)
- Semiconductor and Other Electronic Components (NAICS: 3344)
- Other (please specify)

2. Where does your company reside within the electronics supply chain? (please check all that apply)

- First tier supplier of components
- Second tier supplier of components
- Subassembly
- Original equipment manufacturer
- Other (please specify)

3. How many people are employed at your company?

- 1-10
- 11-50
- 51-100
- 101-250
- 251-500
- over 500

4. What province or territory is your company primarily located in?

5. What are the first 3 digits of your facility's postal code?

6. What affiliations does your company currently maintain?

- Local Chamber of Commerce
- Regional industry association
- National industry association
- International industry association
- No affiliation with an association

7. Where does the market for your company's products exist geographically by percentage?

	0percent	under 25percent	25-50percent	50-75percent	over 75percent
Canada	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
USA	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mexico	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Europe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Does your company have a Health, Safety, and Environmental Manager?

- Yes

- No
- Don't know

9. Does your company have a:

- Quality management system
- Environmental management system
- Don't know
- No

**10. “Pollution Prevention is the use of processes, practices, materials, products or energy that avoid or minimize the creation of pollutants and wastes, at the source.”
(Canadian Council of Ministers of the Environment)**

Pollution prevention practices include:

- Purchasing techniques and inventory management**
- Operating efficiencies and training**
- Materials and feedstock substitution**
- Equipment modifications and process changes**
- Product design and reformulation**

As per the definition of pollution prevention above, does your facility take or has taken the following pollution prevention measures to improve its environmental performance?

Not considering it Planning to consider it Considering it currently Carrying out to some degree Carrying it out fully

Integration of environmental considerations

into purchasing practices									
Integration of environmental considerations into inventory management systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use good housekeeping practices to minimize wastes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Change production schedules to minimize equipment and feedstock changeovers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Segregate by-products at source	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Training staff in materials handling & pollution prevention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Replacing polluting materials used in production with non-polluting or less polluting materials and feedstock	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduced new	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

technologies or approaches to existing operating systems, processes or practices to reduce pollutants generated and materials, energy or water wasted

Integrate environmental criteria into the usual design considerations of performance, cost, quality etc.

Use methods to prevent pollution over the entire life cycle of the product

11. Does your company take any measures to reduce and/or eliminate the use of the following substances (please check all that apply):

Lead

Mercury

Polybrominated diphenyl ethers (PBDEs)

None of the above

Other (please specify)

12. If you checked any of the substances above, what was your driver for reducing or eliminating the use of the substance(s) (please check all that apply):

Regulatory requirement

Cost Savings

Supply chain pressure from customer

Health and safety of employees

Continual improvement

Industry standard

13. What is your company's level of awareness and/or response on the following initiatives?

	Not aware of this initiative	Aware of this initiative	Planning to address	Carrying out actions to address to some degree	Carrying out actions to address fully	N/A
Restriction on the use of certain Hazardous Substances (RoHS) Directive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Waste Electrical and Electronic Equipment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(WEEE)
Directive

California's
SB20/50

Government
green
electronics
procurement
specifications

U.S.
Electronic
Product
Environmental
Assessment
Tool
(EPEAT)

Canada's
Environmental
Choice –Eco-
logo
Certification
Criteria
Document 158
on notebooks
and desktop
computers
including
monitors

Provincial
electronics
products
stewardship
initiatives

14. Has your company ever had difficulties exporting products outside Canada due to environmental regulatory restrictions (i.e. RoHS)? If yes, can you please elaborate

15. What are issues have you faced that are hindering your company from improving its environmental performance (please check all that apply):

- Not enough information on what pollution prevention is and what it can do to help a company's environmental and quality performance
- Not enough information on new and emerging environmental performance requirements from markets and authorities
- Little upper management support
- Time
- No in-house expertise
- Insufficient training
- Inadequate documentation systems for record keeping
- Insufficient resources for monitoring, measurement, and compliance auditing
- Insufficient capital to undertake investments in new technologies
- Financial resources to undertake pollution prevention measures
- Core culture of company is non-supportive
- Other (please specify)

16. What would your company be interested in learning more about (please check all that apply):

- Best practices consistent with RoHS requirements
- Latest technological innovations
- Material composition of parts

- Design for the Environment
- End of life management of products
- Other (please specify)

17. What options for information, training and technical assistance would you prefer (please check all that apply):

- On-site technical assistance visits
- Workshops
- Webinars (i.e. facilitated seminars via the internet)
- Best practices guides and manuals
- Case studies
- Fact sheets with quick tips
- Other (please specify)

18. What sources of information do you currently rely upon to stay informed of issues that impact your business (please check all that apply)?

- Trade publications
- Industry and company websites
- Customers

- Local industry associations
- Academic websites and publications
- Other (please specify)

19. Contact information (optional):

Name:
Job title:
Telephone:
E-mail address:
Company name:

20. I am interested in:

- Receiving survey results
- Receiving further information on best practices for my industry
- Being contacted for further details to support this initiative
- Other (please specify)

Appendix II—Industry Associations

* Jay Illingworth

Electronics Product Stewardship Canada

* Melissa McCormack

Canadian Association of Importers and Exporters

* Doug Wright

Alberta Recycling Management Authority

* Bernard Courtois

Information Technology Association of Canada

* Nancy Coulas

Canadian Manufacturers & Exporters

* Milos Janick

Electro-Federation Canada

EEE Industry in Canada³

Table 3.5 lists some key statistics for the IT and high tech business in Canada.

Table 3.5: Canadian IT and High-Technology Industry Key Facts, 2003⁴

GDP (2001)	\$50 billion
Sector revenue (2001)	\$94 billion
Export	\$25.3 billion
IT spending	\$136 billion
Software and computer services market (2002)	\$20.3 billion
Hardware	3.3 million PCs sold
IT services market	\$22.5 billion
Employment	567,000 workers

The IT and high tech sectors in Canada focus on highly specialized communication products or software, which is not the focus of the CEP3 program. The ICT sector remains the largest private R&D investor in Canada, investing \$5.2 billion, or 50percent of all R&D investment in 2003. IBM is the largest R&D investor in Canada.

The IT and high-tech sectors are relatively small in Canada. Overall, about 10percent of Canadian manufacturing shipments originate in these industries. In 2003, Canada shipped \$13.7 billion worth of IT and high tech goods to the US, ranked 7th as a supplier of sector goods to the US.

Manufacturing in the computer, audio-visual and semi-conductor sectors is minimal in Canada. Table 3.6 shows that the manufacturing activity is distributed among a large number of very small companies, most of which are classified as SMEs. Access to these companies as part of the CEP3 program will be a challenge. Because there is not a large manufacturing base in Canada, these companies are only represented through the ElectroFederation of Canada, the Canadian Importers and Exporters Association and the Canadian Federation of Independent Business (CFIB).

**Table 3.6
Statistics for Computer, IT and Electronics Manufacturing Industries in Canada**

NAICS Code	Manufacturing Industry Description	Total Manufacturing Employees	Production Workers	Non-Production Workers	Number of Companies
34111	Computer and Peripheral Equipment	10,723	6,676	4,047	247
33431	Audio and Video Equip	1,483	958	525	65
33441	Semiconductor and Other Electronic Component	25,356	17,570	7,786	467

Discussions with ElectroFederation of Canada indicate a significant need to educate companies in this sector on RoHS and how it will impact on their business over time.

³ Taken from the unpublished Clean Electronics Scoping Study prepared by M. Kelleher for the CEC Secretariat in May 2006.

⁴ the North America IT and High Technology Sectors, A company and Industry Analysis, September, 2004, Mergent (<http://webreports.mergent.com>)