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Evaluation of EPA's "colleges and universities sector program" at three universities in New York State

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Evaluation of EPA's "Colleges and Universities Sector Program" at Three Universities in New York State

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Abstract

The topic to be investigated in this thesis is the impact of the United States Environmental Protection Agency (U.S. EPA) Colleges and Universities Sector Program on three universities located in New York State. The parameters to be analyzed are the changes in the way environmental issues have been approached using tools and incentives provided by the EPA Colleges and Universities Sector Program, drivers that motivate the colleges to achieve environmental management through compliance with environmental laws and regulations, and obstacles that stand in the way of compliance. This research is based primarily on a survey conducted in three universities participating in this program.

The findings and conclusions yielded by this investigation concerning the impact of the EPA Program on the three universities indicate that colleges and universities are putting a great effort into compliance and are using the tools provided by the Program, such as participation in various voluntary programs, compliance guidance, Environmental Management Systems (EMS), and Best Management Practice (BMP) benchmarking information. This study has found that the three universities have started developing compliance programs, audit programs, and EMSs at their campuses. Finally, the universities studied have not participated in EPA programs for the innovation of environmental regulations that are applicable to colleges and universities as the program proposes.

Since the EPA launched the Colleges and Universities Sector Program, colleges and universities are expected to have increased their efforts to manage their impact on the environment in order to avoid the costs of penalties in case of non-compliance as a motivational force. However, colleges and universities are influenced to manage their environmental issues by additional drivers such as universities' own managerial strategies, leadership, environmental ethics, and stakeholders. On the other hand, obstacles that prevent colleges and universities from managing environmental issues originate from the low priority of the board and top management on environmental issues, lack of funding, and lack of adequate guidance from governmental institutions. According to the way that the EPA Colleges and Universities Sector Program has influenced environmental management at three colleges and universities, it can be expected that colleges and universities will continue putting their efforts mostly on compliance, participation in voluntary agreements, audit practices implementation, benchmarking of BMPs, and EMS implementation. EPA approaches to environmental management proposed in the Colleges and Universities Sector Program are implemented at a slow pace due to the limited availability of funds.

1.0 Introduction

The topic to be investigated in this thesis is the impact of the EPA Colleges and Universities Sector Based Program on three universities located in New York State. The Colleges and Universities Sector is part of the EPA Strategies Program which is a partnership designed by the EPA "to promote sector-wide environmental progress through regulatory innovation, the promotion of Environmental Management Systems (EMS), and the measurement of environmental performance and progress over time" (Basic Information par. 1). EPA defines sector-based programs as "an established mechanism to help many companies or other regulated entities achieve high environmental standards using flexible, voluntary approaches" (Basic Information par. 1). A number of tools, resources, information, case studies, and guidance for better management of environmental issues have been developed by the EPA and are available under the Colleges and Universities Sector Program, an overview is presented in Table 1. This study determined if these institutions are using tools and resources of the EPA Colleges and Universities Sector Program for EMS implementation, environmental performance measurement, audit practices, pollution prevention programs participation, and BMP benchmarking in order to evaluate how the mentioned program has helped the three institutions of higher education to improve managing their environmental issues.

Table 1. EPA's Colleges and Universities Sector Program [a]

Tools, Resources, Guides, and Reports	**Voluntary Environmental and Pollution Prevention Programs**
1. EMS workgroup tools, training resources, and support to promote the Development of EMS 2. Performance Measurement workgroup tools and support 3. Regulatory Innovation Workgroup 4. EPA Region 2 Resources	1. Project XL 2. Smart Grow 3. Waste Wise Program 4. National Environmental Performance Track Program 5. Green Power Partnership with Higher Education 6. Labs 21 7. Energy Star for Higher Education (Sector Programs) and Energy Star Building Partnership (Compliance Assistance Internet Sites for Colleges and Universities). 8. P2 and Mercury Elimination Programs.

Source: "Colleges and Universities". U. S. EPA. http://www.epa.gov/sectors/colleges/index.html. "Colleges & Universities". EPA Region 2. Compliance. http://www.epa.gov/#enforce, and "Compliance Assistance for Internal Sites". EPA Region 2. http://www.epa.gov/cgi-bin

[a] A list of resources, guides and information available through the Colleges and Universities Sector Program.

In order to determine the impact of the Universities and Colleges Sector Program on the three universities, relevant literature was investigated from the EPA web site, "Colleges and Universities Sector," as well as other publications from partner organizations and the three higher-education institutions' sources. Representatives of the

three institutions were asked to fill out a questionnaire designed by the researcher of this thesis to determine if this strategy has motivated changes in the way environmental management takes place on those campuses. The questionnaire contained questions related to the following:

- Changes in the administration influenced by the EPA Colleges and Universities Sector Program.
- The implementation of tools, resource, reports, guidelines applications and incentives used from the Program and environmental initiatives on each campus (specifically, participation in voluntary and pollution prevention programs, partnerships, benchmarking best-management practices, EMS use, audit practices, environmental performance evaluation, and participation in regulatory innovation).
- Most important environmental issues present at their institution.
- Driving forces for environmental management.
- Obstacles that impede management of environmental issues and social responsibility, the application of compliance incentives from audit disclosure, pollution prevention, and improved environmental performance.

The objective of this research is to determine and explain the impact of the Colleges and Universities Sector Program on the selected universities. To do this it was necessary to do the following:

- Investigate a range of concepts and tools related to colleges and universities environmental management efforts such as sustainability, EMS implementation,

drivers and barriers for EMS implementation, compliance, and environmental performance evaluation.

- Distribute a self-complete questionnaire to three colleges and universities, and interview representatives of the three colleges and universities' departments of Environmental Management, Health and Safety.
- Examine the questionnaire answers and compare them to the literature about colleges and universities' integration of sustainability in campus services and operations.
- Analyze the key outcomes from the answers of the questionnaire.
- Discuss to what degree the three universities are using the tools and resources provided by the Sector Program, and to what degree barriers impede the management of environmental issues in their organization.

It was necessary to determine if the EMS at each of these three universities has been or is in the process of being implemented as an effect of the EPA Colleges and Universities Sector Program, stakeholder's initiatives (students, staff, local communities, NGOs, GOs), or its own initiatives. It was pertinent to acknowledge the status of the EMS implementation at each of the three universities studied, if any, and activities related to performance measurement.

This research is an opportunity to gain knowledge, and to analyze factors that influence EMS implementation and better management of environmental issues through the integration of sustainability in higher-educational institution's management. The idea

of the research was suggested by a professor of the department of EHS because this investigation allows an examination of what would be valuable to evaluate regarding governmental voluntary programs, as well as universities' management of their impact on the environment. Students from the RIT MSc EHS Management Program from previous years have done theses related to EMSs at colleges and universities.

This topic is significant because it elucidates how the EPA Sector Strategies Program has helped the studied universities to achieve environmental improvement through the use of its environmental management tools. Currently the EPA is putting significant pressure on colleges and universities to comply; therefore, it is pertinent to visualize the trends in the improvement of colleges' and universities' environmental management as a result of EPA's Sector Strategies Program. One way to analyze the situation of the three colleges and universities studied was to assess if and to what degree the EPA's Colleges and Universities Program for universities and colleges has been applied in the way EPA planned, as well as determine what else those institutions can do to improve environmental management. In order to do this, it was pertinent to ask if the universities researched were using voluntary programs, tools, and incentives of the EPA Colleges and Universities Program and if these measures have helped to improve their environmental management. What is assessed in this thesis is adequate because campus operations are an area where the degree to which institutions of higher education are managing environmental issues can be measured. The resulting assessment provides a basis for anticipating to what degree the EPA Sector Strategy's objectives will be accomplished in the future.

1.1. Research Questions

1.1.1. Primary Research Question

1. What is the impact of EPA's Colleges and Universities Sector Strategy on the universities included in this study?

1.1.2. Secondary Research Questions

1. Did the EPA Colleges and Universities Sector Program influence the environmental management practices (departmental tasks, programs implemented, or partnerships with the EPA or related organisms in the three universities studied)?
2. What tools developed by the EPA Colleges and Universities Sector Program have been applied by the universities studied? Have the universities studied used information regarding EMS implementation, audit policy, performance indicators, and BMP benchmarking available through the EPA's Sector Strategy Program, the EPA Pollution Prevention Programs, or the Voluntary Standards mentioned in the EPA Sector Program?
3. What are the drivers and obstacles that operate in these three universities that hinder or help them manage their environmental issues and to what degree are they causally related to the EPA Colleges and Universities Programs?

1.2. Definitions of Terms

Sector Strategies Program: "an established mechanism to help many companies or other regulated entities to achieve high environmental standards using flexible and voluntary approaches" (Basic Information par.1).

Colleges and Universities Sector: one of the 12 sectors chosen by the EPA's National Center for Environmental Innovation (NCEI) at the U.S. EPA's Office of Policy, Economics and Innovations (OPEI), to be part of the Sector Strategies Program. The Colleges and Universities Sector Program was incorporated in the Sector Strategies Program in May, 2003 (Sector Strategies Program par. 4).

1.3. Acronyms

ACE: American Council on Education

APPA: Association of Higher Education Facilities Officers

BMS: Best Management Practices

CERES: Coalition for Environmental Performance

CSHEMA: Campus Safety, Health and Environmental Management Association

C2E2: Campus Consortium of Environmental Excellence

EHS: Environmental Health and Safety

EMS: Environmental Management System

EPE: Environmental Performance Evaluation

CEO: Chief Executive Officer

GRI: Global Reporting Guidelines

ICC: International Charter of Commerce Business Charter for Sustainable Development

ISO: The International Organization for Standardization's ISO 14001 series are guidelines to develop an EMS in an organization

NACUBO: National Association for Colleges and Business Officers

NCEI: EPA's National Center for Environmental Innovation

OPEI: EPA's Office of Policy, Economics and Innovations

SD: Standard Deviation

ULSF: University Leaders for a Sustainable Future

U.S. EPA: Environmental Protection Agency

2.0 Background

The EPA has developed and implemented a variety of useful initiatives and innovative programs designed to improve environmental performance in different sectors in production of the United States. One of those programs is the Colleges and Universities Sector Program, which encourages institutions of higher education to develop and implement an EMS in order to manage their environmental impact while complying with environmental laws and regulations, implementing audit practices, and measuring their environmental performance (An Overview par. 2). Another topic included in this investigation is the integration of sustainability in the way environmental issues are managed in order to achieve better environmental performance. Three universities have been selected in order to investigate whether or not they are currently applying the tools and resources recommended by the Colleges and Universities Sector Program, and to evaluate the impact of the Program on those universities. Today these tools, resources and guidance are being implemented: therefore, it is important to determine how this program through its guidance, tools, incentives, and resources has added value to these three higher-education institutions.

3.0. Literature Review

The EPA started a strategic program to help production sectors to work cooperatively with stakeholders to reduce pollution and ease the burden of regulation (Sector Strategies par. 1). The Sector Strategies Program is "an established mechanism to help companies or other regulated entities to achieve high environmental standards using flexible and voluntary approaches" (Basic Information par. 1). These voluntary initiatives are either private or public efforts to improve environmental performance beyond existing legal requirements (qtd. in Ten Brink 37). The EPA Sector Program offers a number of tools, resources and works collaboratively with 12 sectors to promote EMS use, to update applicable regulations, and to measure their environmental performance (Sector Program par. 1). Under the Colleges and Universities Sector Program, higher-education institutions can be part of Pollution Prevention programs. In these programs the EPA considers the possibility of influencing regulated organizations to commit to implement an EMS as a condition of relieving an organization from certain environmental regulatory burdens (Tibor and Feldman 9). As a result the EPA, under established conditions, could "reduce reporting, and inspection requirements and even reduce fines when an organization finds out that is not in compliance with regulations" (Tibor and Feldman 9). In combination with programs designed to approach specific sectors of production, some of the EPA Pollution Prevention programs provide programmatic umbrellas under the mentioned possibilities. Among those programs the following can be included: Project XL, Product Stewardship, the Common Sense Initiative, and the Environmental Leadership Project ELP (Tibor and Feldman 9).

3.1. Colleges and Universities Sector Program

The Colleges and Universities Sector, part of the EPA Sector Strategies Program, encourages colleges and universities to manage their environmental issues. Colleges and universities are required to meet the same environmental requirements as any other production sector (Enforcement Alert par. 1). The EPA's Sector Programs "promote environmental stewardship and EMS use; help expand regulatory flexibility from facility-specific pilots to sector-wide outcomes and builds partnerships that embrace innovations from trade associations, states, and communities" (Sector Programs par. 6). Other tasks performed by these programs are defining what kind of assistance is needed, and building partnerships that embrace innovations from trade associations, states, and communities (Basic Information par. 1). The EPA Colleges and Universities Sector Program tools for EMS implementation are benchmarking BMPs, measuring environmental results, and auditing practices. Some of the above mentioned tools coincide with quality systems practical tools, which are being benchmarked in the direction of environmental excellence, measuring environmental results, establishing cross-functional teams, improving employee involvement and morale, auditing practices implementation (Willig 6).

The EPA Sector Strategies Program is part of EPA's National Center for Environmental Innovation (NCEI) at EPA's Office of Policy, Economics and Innovations (OPEI), which assists EPA's programs and regions in adopting innovative approaches that support improved environmental performance (Colleges and Universities par. 4). Colleges and universities are one of the 12 sectors of industry, business, and services

included in the Sector-based Strategies Program (Sector Strategies Program, par. 1). The EPA and external partners such as trade associations, states, and communities have worked together to assess factors that are drivers or barriers for better environmental performance in this sector (Colleges and Universities par. 5). The association partners identified by the EPA Sector Strategy Program are:

- American Council on Education (ACE)
- Association of Higher Education Facilities Officers (APPA)
- Campus Consortium of Environmental Excellence (C2E2)
- Campus Safety, Health and Environmental Management Association (CSHEMA)
- Howard Hughes Medical Institute; and
- National Association for Colleges and Business Officers (NACUBO)

(Sector Strategy Program par. 3)

The EPA Colleges and University program assists colleges and universities to develop an EMS and improve their environmental performance and go beyond compliance with environmental regulations (An Overview par. 2). In July 1999, as part of its "EMS Action Plan for Promoting the Use of Environmental Progress", the EPA made a commitment to stakeholders to support EMS use in organizations to improve compliance, pollution prevention, and other measures of environmental performance (Colleges and Universities par. 2). Colleges and universities are encouraged to address environmental, health, and safety issues in a system that manages processes and procedures which include administrative resources, personnel, budget, and strategies to assure control of environmental quality on college and university campuses. To promote

the use of EMSs, partners design strategies to evaluate EMSs needs and capabilities in each sector, create the right EMS tools for each sector, and achieve widespread EMS adoption throughout each sector (Sector Strategies par. 3). The chair in the EPA Colleges and Universities EMS workgroup is the University of Missouri Rolla (Sector Strategy Program par. 6). Here are some colleges and universities that have begun EMS's on their campuses:

- Washington State University
- Michigan State University
- University of Texas MD Anderson Cancer Center (EH&S Management System)
- University of Missouri-Rolla
- University of Massachusetts-Lowell

(Sector Programs par. 8).

The EPA Strategies Program partners for performance measurement track the progress of each sector by selecting appropriate performance indicators, gathering information on trends, using existing data, and analyzing and reporting on environmental gains and burdens reduction (Sector Strategies par. 8). The performance measurement team is presided over by the University of Colorado-Boulder (Sector Strategy Program par. 8). The following are the colleges and universities that are interested in reporting environmental performance on their campuses:

- The University of Vermont's Environmental Report Card
- UNC Chapel Hill Campus Sustainability Report 2003
- University of Michigan's Ann Arbor Campus

- University of Florida Sustainability Indicators Report
- Pennsylvania State University Indicators Reports 2000
- The University of Central Florida
- Bowdoin College Environmental Impact Audit 2000
- Tufts University Green House Gas Emissions. Inventory for 1990-1998
- University of California Berkeley Sustainability Assessment

(Sector Programs par. 8).

To overcome the barriers to environmental improvement, partners locate creative solutions to environmental problems by analyzing factors that affect environmental performance in each sector, crafting options for innovative regulatory and policy change, and acting upon ideas that are most likely to solve significant problems (Sector Programs par. 19). The Regulatory Innovation Work Group is directed by the Iowa State University (Sector Programs par. 19). Finally, the partners that have position statements about regulatory innovation are the Campus Safety Health and Environmental Management Association and the Howard Hughes Medical Institute (Sector Programs par. 19).

3.2. Implementing Environmental Management Systems in Colleges and Universities

A number of higher education institutions' stakeholders advocate for the integration of sustainability in the environmental management of colleges and universities. Superior environmental performance has been defined by stakeholders as a condition for integration of sustainability in management systems (Balf and Ralph, par.

5). It has been recognized that the elements for superior environmental performance, regulatory compliance, campus greening, and educating for sustainability often exist in the form of underlying values, expertise of faculty, professional staff, within specific programs, policies, and procedures. According to researchers, every college and university has a system for managing its environmental compliance, which has an impact at some level (Balf and Ralph, par. 5). Advocates for sustainability also say that an EMS like the one described in the ISO 14001 series is an appropriate guide for colleges and universities to verify that all elements of an EMS are present (Balf and Ralph, par. 5). Consistent use of this management system form and function allows for more effective integration of systems within departments, between decentralized schools, or campus-wide (Balf and Ralph, par. 9).

For colleges and universities to implement an environmental management system, as in any business, it must be considered a system that has an underlying form that contains the essential elements of a "Plan, Do, Check, Act" loop, which creates a cycle of continual improvement (Balf and Ralph, par. 7). The essential elements of "Plan, Do, Check, Act" involve adding value, the allocation of resources, the identification, assessing, and prioritizing of opportunities, and the detection of strategies for leveraging resources (GEMI 6-7). Planning involves identifying department environmental impacts, needs and goals, and strategic opportunities for solving companies' challenges (GEMI 9). Doing what adds value involves building a business case for the application of an environmental program or initiative, which means getting support and approval from senior management and benchmarking other companies that have tried similar initiatives

(GEMI 21). The "checking" element requires the gathering of actual costs and benefit information, analyzing the value created by environmental activities, communicating the value of a project or initiative, and obtaining feedback from internal and external stakeholders (GEMI 39). While checking the value added of an environmental project or initiative, it is common to use financial tools such as AVA and ROI, among others, to determine its impact on the corporation by quantifying its costs and benefits (GEMI 50).

During the implementation of an EMS, colleges and universities should define an environmental policy and a way to implement it. According to the ISO 14001 standard, for example, the environmental policy should recognize all aspects of an organization's operation that may have an impact on the environment (Tibor and Feldman 31). The ISO 14001 series standards describes an EMS as "the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy" (Tibor and Feldman 31). The policy, together with the rules, procedures, authority, and communication networks, is part of the structure of the organization (Reitz 510). This structure is influenced by the company's mission and strategy, technology, environment, organizational performance, and behavior (Reitz 518, 524). The policy statement should incorporate the organization's vision, core values, and beliefs in seeking environmental excellence, as well as the guiding principles that focus on the actions of the organization. It should take into account the cultural and ethical position of the organization to its stakeholders. To conclude, the policy must include a "commitment to continual improvement, prevention of pollution, coordination

with other organizational policies, specific local or regional conditions, and compliance with relevant environmental regulations, laws and other criteria to which the organization subscribes" (Tibor and Feldman 46-47).

3.2.1. Applying Sustainability in Colleges' and Universities' Environmental Policies

According to the stakeholders of colleges and universities, sustainability is fundamental to environmental management (Shriberg 2). Sustainable development is a model suggested in a number of voluntary guidelines, studies (Shriberg 56), and reporting initiatives (Business Strategy for Sustainable Development 14). It is a guide because it orients an organization around the efforts of initiatives for sustainability that are more likely to have a long-term, strategic focus (Shriberg 8). In other words, sustainability integrates environmental, social and economic issues.

Since the policy statement should incorporate the organization's vision, core values, and beliefs in seeking environmental excellence, the concept of sustainability, as advocates for sustainability claim, should be closely examined as a guide. It has been said that sustainability is an orienting tool for managers because it is "a transcendent concept with the ability, even the responsibility, to become a cross-disciplinary, holistic paradigm" because it should consider environmental and social issues as an integrated approach (Shriberg 9). Other authors have also claimed that "the concept of sustainability should become a central organizing idea for higher education" (Uhl, Anderson, et al. 152). Maybe the most accurate definition of sustainable development is the one suggested by the World Commission on Environmental and Development qtd. in Uhl, Anderson et

al.: “to meet the needs of the present without compromising the ability of future generations to meet their own needs” (152).

Even though sustainability is a difficult concept to incorporate in environmental management, colleges and universities are influenced by sustainability. Sustainable development has become widely accepted in society at large, which supports sustainability as a response to ecological disasters and long term trends such as global warming. Also the philosophical reasons for supporting sustainability cannot be refuted because no one can reasonably oppose ensuring the future of the world (Shriberg 12). It has been said that despite pressures and the collective desire for a better environment, sustainable development decision makers in corporations have been able to satisfy constituents’ environmental concerns by committing symbolically and philosophically to sustainability without expediting political capital to actually enact change (Shriberg 12). In addition, a survey analysis about environmental sustainability and higher education reveals various models and indicators of environmental sustainability in institutions of higher education in the United States shows that higher education, for the most part, has not accepted the basic principles of environmental sustainability (Taylor par. 1). The problem of integrating sustainability with policies, goals, and objectives in management systems is that the concept of sustainable development is complex, and in attempting to strike a balance between ecology and economics, the concept is too broad to integrate into environmental management (Shriberg 15). To conclude, the integration of sustainability at colleges and universities is a difficult task to accomplish due to the complexity and the amplitude of this term.

Colleges and universities implementing an EMS should follow the same guidelines as any other business or industry considering sustainability and applying considerations to universities campuses. Guidelines for EMS implementation include sustainability as a guiding principle and explain that there is a process that corporations should follow in order to achieve sustainability. The ISO 14001 standard for EMS implementation, for example, only refers to sustainability as one of the definitions of the standard. The Organization for International Standardization recognizes that "environmentally sustainable companies" need to follow a "long and arduous path" to achieve sustainability in their activities and operations, and must:

- Systematically increase awareness of environmental impacts on ecosystems and natural resource consumption among workers at all levels of the firm.
- Adopt strategies that will lead to new products, processes and technologies with substantially reduced environmental impacts.
- Accept responsibility for the environmental impacts of products throughout their life cycles -- from extraction of the materials necessary for manufacture, to production, transport, use and disposal.
- Train workers to contribute to the environmental improvements, and measure and reward workers' contributions.
- Foster communication and dialogue with communities and outside stakeholders, especially those whose values may differ from the company manager

(Tibor and Feldman 503).

Other voluntary standards, principles and guidelines applicable to any business emphasize a more extensive use of sustainability in environmental management. For example, the ICC Business Charter for Sustainable Development lists 16 principles for environmental management to be used by companies as the basis of their sustainability programs (ICC):

- To recognise environmental management as among the highest corporate priorities and as a key determinant to sustainable development; to establish policies, programmes and practices for conducting operations in an environmentally sound manner.
- To integrate these policies, programmes and practices fully into each business as an essential element of management in all its functions.
- To continue to improve corporate policies, programmes and environmental performance, taking into account technical developments, scientific understanding, consumer needs and community expectations, with legal regulations as a starting point, and to apply the same environmental criteria internationally.
- To educate, train and motivate employees to conduct activities in an environmentally responsible manner.
- To assess environmental impacts before starting a new activity or project and before decommissioning a facility or leaving a site.
- To develop, design and operate facilities and conduct activities taking into consideration the efficient use of energy and materials, the sustainable use of

renewable resources, the minimization of adverse environmental impacts of waste generation, and the safe and responsible disposal of residual wastes.

- To conduct or support research on the environmental impact of products, processes, emissions, and wastes associated with the associated with the enterprise and on the means of minimizing such adverse impacts.
- To modify the manufacture, marketing or use of products or the conduct of activities with scientific and technical understanding, to prevent serious irreversible environmental degradation.
- To promote the adoption of these principles by contractors acting on behalf of the enterprise, encouraging and, where appropriate, requiring improvements in their practices to make them consistent with those of the enterprise; and to encourage the wider adoption of these principles by suppliers.
- To develop and maintain, where significant hazards exist, emergency preparedness plans in conjunction with emergency services, relevant authorities and the local community, recognizing potential transboundary impacts
- To contribute to the transfer of environmentally sound technology and management methods throughout the industrial and public sectors.
- To contribute to the development of public policy and to business, governmental and intergovernmental programmes and educational initiatives that will enhance environmental awareness and protection.
- To foster openness and dialogue with employees and the public, anticipating and responding to their concerns about the potential hazards and impact of operations,

products, wastes or services, including those of transboundary or global significance.

- To measure environmental performance; to conduct regular environmental audits and assessment of compliance with company requirements, legal requirements and these principles; and periodically to provide appropriate information to the board of directors, shareholders, employees, the authorities and the public.

(Tibor and Feldman 546).

Literature on the topic of sustainability in higher-education institutions explains how these institutions can integrate the concept of sustainability into their functioning. One of those sources, the Pennsylvania State University Sustainability Indicators Report (qtd. in Shriberg 52), provides a number of definitions of a sustainable campus college or university, for example:

> A university whose long term prospect for continuing to exist is good; specifically such a university behaves in ways that sustains the integrity and biodiversity of the local and planetary ecosystems upon all life depends (qtd. in Shriberg 52).
>
> A university whose core values include: respect for the biota and natural processes, mindfulness of place, living within planetary limits, accounting for full costs, and civic responsibility (qtd. in Shriberg 52).

"The Talloires Declaration", a document signed by a number of colleges and universities that have pledged to work under the principles of sustainability, presents "a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities" (Tallories Declaration par. 1). In the case of this research, it will be important to refer to some of

those areas where universities can incorporate sustainability and why; for example, "by offering services, colleges and universities have the opportunity to help local, national and international communities in ensuring a healthy ecological, social and economic future" (Shriberg 53). And through operations, "sustainable colleges and universities reflect the core values of sustainability through design by and for the environment (i.e. imitating the natural world) in all their operating systems" (Shriberg 53).

According to advocates for sustainability, another fundamental element of environmental management at colleges and universities is sustainability measuring (Shriberg 8). They maintain that the advantage of measuring sustainability is that effective sustainability policies, objectives, and programs can be developed as support for sustainability initiatives (Shriberg 8). However, the problem identified in measuring sustainability in higher education is lack of empirical data and assessment initiatives. Institutional assessment tools can help to alleviate the problem through benchmarking best practices and focusing campus efforts on continual improvement and the communication of progress among institutions (Shriberg 1). Among other assessment tools for measuring sustainability on college and university campuses, the EMS Self Assessment Tool is used and is also mentioned in the EPA Colleges and Universities Sector program (Colleges and Universities par. 12). These tools provide foundation for strategic planning, identifying issues and methods to set and achieve prioritized sustainability goals, and identifying the motivators for assessing performance (Shriberg 163).

3.2.2. Drivers of Integrating Sustainability into Environmental Management

After conducting a survey of U.S. colleges' and universities' sustainability efforts, Shriberg concluded that the drivers that promote sustainability at those institutions are top management commitment from university presidents, provosts, and deans; administrators, faculty and staff commitment; and student commitment (58-59). An important driver found in literature and identified as the base of an EMS is top management commitment. Related to this, the ISO 14001 standards state, that "top management must play an active role in the implementation process" by making clear the purpose of the EMS to its employees and fostering employee awareness and motivation while making certain that all employees are accountable for environmental performance (Tibor and Feldman 43). Top management often commits to environmental management and social responsibility influenced by all the stakeholders that might interact with the higher-educational institution after agreeing on a strategic position with its board staff to face environmental issues and social responsibility. Administrators, faculty, and staff members acquire resources and provide incentives for participation (Shriberg 58). This study determined that "students often provide the activism behind campus environmentalism, particularly on operational initiatives such as recycling and environmental auditing" (Shriberg 58). The tangible drivers that may influence environmental management are cost/savings financial benefits from the application of environmental programs, strategic market position, increased recruitment and avoidance of fines due to non-compliance are the factors that normally influence environmental management. Intangible drivers are concerns of staff, faculty and administrators,

students, donors, alumni, local communities, and the public, reputation, environmental ethics, benefits to workers happiness (Shriberg 60).

The stakeholders associated with colleges and universities are local communities, government, and the public and activist groups. A stakeholder is "any group of or individual able to affect, or affected by, the realization of an organization's goals" (qtd. in Bonnafous-Boucher and Pesqueux 40). Generally speaking, the term includes suppliers, clients, shareholders, employees, communities, political groups, political authorities (national and territorial) the media, etc. (qtd. in Bonnafous-Boucher and Pesqueux 40). Government pressure turns out to be one of the main drivers, as this research reveals in its examination of a program created by a regulatory agency that wants to promote a number of approaches to environmental excellence. Compliance influences mostly institutions of higher education that need to continue developing efforts to manage their environmental issues (Shriberg 1). Colleges and universities whose strategies are influenced by sustainability establish relationships with their stakeholders to manage their environmental issues by engaging cross-functional teams, achieving organizational management, establishing partnerships, collaborating with customers, and collaborating with stakeholder organizations (Shriberg 1).

3.2.3. Colleges' and Universities' Organizational Management

A review of the historical development of higher education management concludes that management in universities and colleges goes parallel with the field of organizational theory (Shriberg 23) and that higher-education institutions do not typically

change quickly or radically (Shriberg 2). This study indicates that until the 1960s college and university management focused on the ideal that managers had control over higher-educational outcomes and their organizations were expected to be effective in setting organizational directions and achieving goals. In this case the successful managers' attributes were seen to be rationality, efficiency, and control over predictable outcomes. During the later1960s and the1970s, old theories of absolute management control were questioned "as students claimed that colleges and universities were too rigid, complex, and impersonal" (Shriberg 24). According to Shriberg, "current theories about universities' administration assume that competing forces (such as trustees, administrators, government, faculty, alumni, and students) resolve problems through negotiation and political trade-offs where problems, opportunities, solutions and participants- are mixed in a 'garbage can'. The best predictors of what comes out of the garbage and gets accomplished are time and fortuitous circumstances, not national or political decision making" (Shriberg 24). According to Shriberg's review, the late 1970s and 1980s models focused on "outside" influences, including the importance of culture and reflected in organizational processes where choice of organizational direction is limited (Shriberg 25). The 1990s theories assume that different perspectives apply in different settings, focus on complexity, and are bounded by rationality (or a lack of it), thus highlighting diversity, symbols and culture, with multiple competing interests (Shriberg 25). Thus, it is evident that today's colleges' and universities' organizational management is influenced by exterior demands, and a number of interests shape the way universities are managed.

3.2.4. Decision Making in Colleges and Universities

According to Shriberg there are seven attributes, derived from the literature, that characterize decision-making processes in colleges and universities, which differ from those of other institutions and that affect the integration of sustainability: complex diffusion of power, less authority control than other institutions, horizontal organizational hierarchy, loosely coupling organizational systems, low accountability, complex mission, and diverse managerial culture (26). The complex diffusion of power in institutions of higher education is due to varying levels of responsibilities of the various governing bodies. Campus leaders apply less direct control and use policy statements, official proclamations, awards ceremonies, and other ways to influence the strategic direction of the institution without directly exercising power and authority (Shriberg 26). In colleges and universities the organizational hierarchy is horizontal, and taking into account that the structure (rules, procedures, policies, authority, and communication networks) in a horizontal organization regulates the actions and interactions of the members at the same levels, communication with top management should be efficient (510). However, communication is not fluent within this type of organization (Shriberg 26). In relation to having this type of horizontal organization, another study established that a college or university reporting to a Board of Governors having full-time responsibility for an EMS does more to ensure dedicated resources (time, money, and expertise) than a simple declaration of principles (Herremans Allwright par. 7). Colleges and universities have loosely coupling organizational systems because events affect the whole institution in different forms (Shriberg 27). There are generally low levels of accountability in these systems because there are such a small number of administrators compared to faculty and

staff personnel, and their goals and tasks are not always clear -- which leads to less administrative control of organizational direction (Shriberg 27). As for faculties, they are accountable to their institutions, discipline, academic profession, and national system which lead to decreased potential for coordination amongst all of the loosely coupled organizations on campus (Shriberg 27). Additionally, the mission of higher-education institutions goes far beyond the traditional three prongs of teaching, research, and service, and it occupies a central function (Shriberg 27). Mission is the very reason for the existence of an organization and the strategy is an overall policy that attempt to put the organization in a position to carry out its mission most advantageously (Reitz 519).

3.2.5. Environmental Management and Social Responsibility at Colleges and Universities

Stakeholders' concerns about the environmental, social, and economic impact of any public or private institution, company or corporation influence the way colleges and universities manage their impact on the environment. Corporate social responsibility with respect to institutions of higher education is influenced by other groups defined as stakeholders, who constitute a public demand that colleges and universities cannot ignore. As this thesis makes clear, governmental organizations -- especially the EPA -- play a major role in influencing what issues are addressed by these education institutions, and how. Shriberg proposes that in order to manage environmental issues, integrate sustainability, and meet their social responsibility, leadership can determine if changes in management to satisfy these demands can be applied effectively (36). Shriberg states that leaders can motivate the management of environmental issues and social responsibility

through “enlightened self-interest” (36). “Enlightened self-interest” refers to the stakeholders’ concerns about reputation and perceived ethics in an institution management (Shriberg 35). The motivators of these concerns are the demands and concerns of local communities, the potential gain in reputation that can benefit the corporation by helping it to attract resources, enhance its performance, and build competitive advantage. This is the power of the notion of environmental ethics. For example, as Post and Altman state, local communities are beginning to demand that corporations operate on ethical environmental principles that include respect for the local environment (qtd. in Shriberg 36); some corporations that have ignored such demands have had to face fiscal and even reputational costs (Shriberg 36). A positive external (in society) reputation translates into a positive internal corporate image, which can motivate stakeholders. The concepts of social responsibility, citizenship, and accountability have profoundly influenced the way corporations and institutions (as units of economy) function nowadays. Moreover, Shriberg determined that “firms are finding that as environmental values take hold at the deepest level of societal structures; it becomes necessary to include those values in their corporate culture or risk creating value systems that are dissonant with those of their employees” (Shriberg 38).

3.2.6. Obstacles to Integrating Sustainability in Environmental Management at Colleges and Universities

Managing environmental issues, integrating sustainability, and meeting social responsibility are not the priorities in institutions of higher education. Despite the pressures that colleges or universities might feel coming from their social and political

environment or internal sources (such as technology, personnel, and management) (Reitz 562), other factors tend to determine these institutions' actual managerial practices. Lack of funding, the attitudes of personnel, the quality of communication among departments, and the difficulty of changing past practices keep colleges and universities from pursuing sustainability as a priority (qtd. in Shirberg 43). Their conservative nature is a function of their slowness with respect to organizational change (Shriberg 43). A study of problems integrating sustainability in higher-education institutions identified lack of accountability and lack of incorporation of sustainability as part of a university's culture. For example, Stanwick and Stanwick explains that CEOs in corporations have little incentive to pursue social and environmental initiatives without the support of the board, and the board is not likely to support initiatives with short-term costs and long-term benefits (qtd. in Shriberg 43); they are adverse to risk. Therefore it has been said that environmental initiatives in colleges and universities have low priority as factors that affect decision making (Shriberg 43).

3.2.7. Leadership and Culture at Colleges and Universities

A study of sustainability on campuses, "Sustainability in U.S. Higher Education: Organizational Factors Influencing Campus Environmental Performance and Leadership Campus Environmental Performance and Leadership", predicts that transformational leaders are more effective than other types of leaders in integrating sustainability on campuses (Shriberg 136). People working under transformational leaders are motivated by being communicated about the importance and value of their designated outcomes (Miner 364). Consequently, having a transformational leader in managing environmental

issues is that his or her followers experience a greater sense of mindfulness and personal engagement in their work; they see it as more fulfilling, enjoyable, and important, which condition favors better environmental management (Miner 377).

The leader defines the culture of an organization, which is another element in leadership that defines how changes can be made. “Leadership is, simply, a type of influence exerted by an individual on a group” (Reitz 467). It is determined by the characteristics of subordinates, the task, the organizational context, superiors, peers, and leaders’ own characteristics (Reitz 477-479). Culture is important when changes should be made by top management to support sustainability in a college or university. “Changing procedures or adding a new lawyer or bureaucracy doesn’t work unless accompanied by cumulative change in the way business is perceived. The aim is to own environmental issues and the environmental aspects of their jobs” in this way, environmental issues become leveled with basic issues through the company (Tibor and Feldman 199).

3.3. Compliance Guidance

When the EPA’s Colleges and Universities Sector Program started, colleges and universities did not have a clear knowledge of their obligations with respect to environmental laws. One of the reasons was that historically EPA has not focused its resources on colleges and universities, and a number of colleges and universities did not have sophisticated environmental compliance programs as a result of their limited experience in being inspected (EPA’s Colleges and Universities Initiative par. 1). There

was a high rate of non-compliance at these facilities (EPA's Colleges and Universities Initiative par. 2); consequently in July 2000, the EPA announced that colleges and universities were "not receiving top marks for environmental compliance" after conducting inspections on campuses (Enforcement Alert par. 6). In addition, most of these institutions haven't implemented an EMS despite EPA inspections and programs because there are other factors such as their internal management, organizational structure, values, culture and stakeholders' pressure that determine the decision of an institution to manage its environmental impacts.

The Colleges and Universities Sector includes a wide variety of campuses across the country from small community colleges to large research universities (Enforcement Alert par. 3). Operations on college and universities campuses include diverse facilities such as research laboratories**,** art studios, utility generation and transmission plants, water distribution systems, and dormitories, as well as specialized facilities such as medical centers, agricultural centers, nuclear reactors, and high security biomedical laboratories (Enforcement Alert par. 4). During early inspections of campuses across the nation, EPA found compliance problems with a considerable number of regulations of the Resource Conservation Act (RCRA), the Spill Prevention Control and Measurements of Clean Water Act (CWA), Underground Storage Tank Management; and the Clean Air Act (CAA) (Enforcement Alert par. 5). Examples of noncompliance included improper handling and disposing of hazardous waste materials, boilers, and furnaces, as well as inadequate monitoring of underground storage tanks, deficient sewage treatment facilities, and improper asbestos and lead-based paint removal (Enforcement alert par. 6).

The first actions of the Colleges and Universities Sector Program in Region 2 (New York, New Jersey, and Puerto Rico) were to reach out to the academic community with workshops aimed at increasing the awareness of environmental regulations and encouraging the use of environmental management systems and pollution prevention programs (Enforcement Alert par. 3). EPA Region 2 also sent an "invitation" to sign up for the audit program to avoid enforcement actions if campuses were not in compliance. Enforcement actions could be avoided by colleges disclosing their non-compliance in an audit program under given conditions (Colleges and Universities par. 2). EPA especially targeted colleges and universities for inspections if their campuses were located in urban areas, near sensitive ecosystems, and if they had received EPA grants. As a result, institutes entered into comprehensive audit agreements when they were found to be violating of hazardous waste laws, contaminating soil and water, undergoing asbestos cleaning, etc. (EPA's Colleges and Universities par. 4). By 2001, the enforcement continued in all of the regions, but especially in Regions 1, 2, and 3 (Enforcement Alert par. 7-15).

The EPA encourages colleges and universities to evaluate and report on their environmental performance to the Agency under the Audit Policy. The Audit Policy was created in 1996 and revised in 1999 so that colleges and universities were able to take advantage of it before EPA conducted an inspection on each campus (60 FRL 6576-3). The Audit Policy consists of incentives for "self-evaluation and self-disclosure of violations of regulated entities compelling new incentives to discover, disclose, and

correct violations of environmental law" (An Overview par. 3). The Audit Policy applies to violations under all of the environmental laws that EPA administers; it is also referred to as the U.S. EPA's "Self-Disclosure Policy: Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations" (An Overview par. 3). The following are the conditions for entities to avail themselves of the Audit Policy: first to demonstrate that they have made systematic efforts to prevent, detect, or correct violations and to report them. If the entity doesn't possess an audit system, the incentives of the policy are reduced to 75% of the gravity-based penalty (An Overview par. 5). Other conditions of the Audit Policy are that the entities can't take advantage of it in order to delay investments to meet compliance, and environmental audit reports are necessary (An Overview par. 10). The violations found should be promptly corrected, and the audit policy doesn't cover criminal liabilities. The last requirement of EPA's Audit Policy is to make these self-assessments public and to make publicly available any agreement between entities and the agency (An Overview par. 3).

The condition for entities to qualify for the Audit Policy is for them to demonstrate a systematic discovery of the violation through an Environmental Audit or a Compliance Management System that reflects due diligence in preventing, detecting and correcting violations. If it's through a Management System, the regulated entity should prepare documentation and show training of employees. Another important fact to consider is that the Compliance Management System should be publicly available (An Overview par. 2).

Colleges and universities can conduct self-audits to discover violations or non-conformances to their Environmental Management Systems. To be eligible for the incentives, colleges and universities should describe the violations found in the audits in a "systematic discovery" and meet all nine Audit Policy conditions. Self-audits help colleges and universities to identify their problems and communicate how the institutions are addressing the violations (An Overview par. 1). As a result of this incentive to these education institutions, a number of colleges and universities have applied successfully for an Audit Policy agreement with the EPA and have begun engagement with the Colleges and Universities Sector program.

3.4. Environmental Performance Evaluation

Colleges and universities are encouraged to improve their environmental performance and track their environmental performance. The performance indicators chosen by the sector are energy efficiency, air emissions reduction, waste management and minimization, water conservation, and environmental management systems promotion (Environmental Performance Reporting par. 6). To get an idea of the indicators used in colleges and universities performance measurement, the Annual Report of the Sustainability Coalition (2001) assesses ten metrics: energy usage, water usage, materials usage, paper usage (volume or expense), recycled materials, leased products, CO2 emissions, waste disposal, fertilizer use, and land use (EPA Environmental Performance Reporting par. 1). The EPA reports other indicators also used in its best management practices by three distinct institutions of higher education (Yale University, the University of North Carolina, and the University of Vermont): energy consumption,

water management, materials reduction, paper reduction, recycled materials, land use minimization, leased products, transportation management, waste management (Colleges and Universities par. 17). These indicators concentrate on some of the areas that, according to a survey of colleges and universities, seem to be in need of being addressed, like energy management, dry waste, hazardous waste, water conservation, air quality, liquid waste, natural areas conservation, and water quality (Herremans and Allwright par. 11).

The EPA's Sector program collects environmental trend data for each of the 12 sectors of the Sector Strategies Program. In their report on all sectors, including colleges and universities, the EPA has collected four years of data on energy use. The Colleges and Universities Sector's performance measurement workgroup explores a way to measure sector-wide and economic progress using the performance indicators of ten registered institutions (Colleges and Universities par .12). The measurement group is using a self-tracking tool developed by the C2E2 to analyze trends in the data reported by colleges and universities to allow these institutions to track and benchmark their environmental indicators against aggregated data from other schools in similar size and type (EPA). Such a tool is proposed to analyze and collect data from campuses that voluntarily agree to measuring their environmental impact. It is called "C2E2 tool administrator" (Colleges and Universities Self Tracking Tool par. 1). Regarding reporting on environmental performance, the USFL and the GRI are discussing the development of a "Resource Document" to assist in the development of sustainability reporting guidelines for institutions of higher education (EPA Institutional Communication

Environmental Performance Reporting par. 17). Some campuses are actually reporting their environmental performances using ISO 14001 reporting guidelines and the Coalition for Environmentally Responsible Economies (CERES) which is working on designing guidelines for colleges and universities to report their environmental performance (EPA Institutional Communication Environmental Performance Reporting par. 17).

According to ISO 14001 standard series, colleges and universities may start measuring their own environmental performance even if they do not have an EMS in place (Tibor and Feldman 33). Here is a broad definition of environmental performance: (ISO 14001) the "measurable results of the environmental management system, related to the organization's control of its environmental aspect, based on its environmental policy, objectives and targets" (Tibor and Feldman 31). The evaluation performance (EPE) system, part of ISO 14001 standard guidelines (ISO 14031), does not mandate performance levels, but requires that senior management establish environmental performance goals and monitor progress toward these goals (Tibor and Feldman 31). The EPE performance evaluation system is a management tool that can provide reliable, objective, and verifiable information that can be used to focus on and improve an organization's environmental performance. EPE uses selected indicators to measure and communicate the organizations environmental performance (Tibor and Feldman 147). The Environmental Performance Indicators (EPIs) must be relevant to objectives that are quantified in specific units or environmental-performance metrics (Tibor and Feldman 149). Subsequently, the organization must establish targets and measure its performance compared to those targets and a base line (Tibor and Feldman 149). To do such a

comparison, the organization measuring its performance must aggregate performance metrics using weighting or scaling techniques, considering values of different stakeholders groups, the relative importance of environmental impacts and internal business priorities (Tibor and Feldman 156), and in general developing or choosing a scheme that fits the organization's specific needs.

3.5. Voluntary Agreements and Pollution-Prevention Programs

Available through the EPA to colleges and universities are voluntary environmental and pollution prevention programs such as Project XL, Labs 21, Energy Star for Higher Education, and the Green Power Partnership with Higher Education, the National Environmental Performance Track Program, and Waste Wise Program (Protecting Health and the Environment On and Off Campus par.12-14). Other cross-program activities related to colleges and universities that offered by the EPA in Region 2 are Project XL and Smart Grow. Pollution prevention programs have been perceived as being most effective along with the application of environmental strategies (Willing 10).

Voluntary environmental initiatives are private or pubic efforts to improve environmental performance beyond existing legal requirements (Ten Brink 38). Over the last decade voluntary initiatives have become an important element in the mix of public policies and corporate strategies for managing industrial impacts on the environment (Ten Brink 38). According to Paton there are four types of voluntary environmental initiatives: unilateral initiatives, private codes, voluntary challenges, and negotiated agreements (qtd. in Ten Brink 38). Unilateral initiatives are actions taken to improve

environmental performance within a single firm. Private codes include initiatives by industry associations, non-governmental organizations (NGOs), and standard organizations (qtd. in Ten Brick 38). Voluntary challenges are government-sponsored programs that encourage firms to improve environmental performance and receive public recognition for their efforts. Negotiated agreements involve contracts reached between government and industry (Ten Brink 38). The most distinctive element of North American experience has focused on voluntary challenges programs such as the U.S.'s 33/50 and Energy Star programs, which individual firms may choose to participate in or not at their own discretion (Ten Brick 39). At the same time, North American industries have created a wide variety of private codes, such as the chemical industry's Responsible Care program, and individual firms have engaged in a wide array of unilateral initiatives (Ten Brick 39). In Europe firms have participated mostly in private codes such as the ISO14000 series and the Global Reporting Initiative (GRI) (Ten Brick 39).

Pollution Prevention programs are available through the EPA. Prevention of pollution in the context of ISO 14001 is a broad concept and is defined in Clause 3.13 of ISO 14001 as the "use of processes, practices, materials or products that avoid, reduce or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution. This broad definition offers companies and nations around the world flexibility in interpreting the kinds of pollution prevention methods they can use to fulfill these requirements (Tibor and Feldman 42).

Project XL is a project in which a select group of entities tests alternative approaches to reduce costs of environmental management and achieve environmental performance beyond traditional command-and-control regulatory requirements (Tibor and Feldman 573). Project XL, which stands for "eXcellence and Leadership", is a national pilot program that provides a way to test innovative ways of achieving better and more cost-effective public health and environmental protection. Project XL offers flexibility in its regulations, policies, procedures and guidance in order to encourage companies, communities, and other regulatory systems to manage their environmental problems. Institutions are encouraged to become partners in this project by preparing a proposal that demonstrates:

- Achievement of superior environmental results
- Benefits to the project sponsor such as cost savings, paperwork reduction, or operational flexibility
- Stakeholder involvement and support
- Innovation and multi-media pollution prevention
- Transferability
- Technical and administrative feasibility
- Presence of adequate monitoring, reporting, accountability, and evaluation methods
- No shifting of the risk burden

(Project XL, par. 1).

Project XL has been criticized because far from yielding positive outcomes in terms of environmental regulatory reform, the project has presented barriers and constraints that impede government-business partnerships for environmental improvement. While this project was intended to test alternative strategies to manage environmental issues, companies encountered bureaucratic delays at EPA (Sexton et al. 64). Other problems cited by authors were the lack of EPA leadership, insufficient implementation guidance, deficient coordination among national and regional offices, and inadequate legal protection from citizen lawsuits and EPA enforcement. Other arguments against pollution prevention programs were that stakeholders didn't agree about giving companies regulatory flexibility even if they demonstrated superior environmental performance (Sexton et al. 64). Because of all the problems encountered while implementing projects like Project XL, analysts suggest working on environmental management improvement with the experience of implementing the Project XL in mind (Sexton et al. 64).

The Campus Consortium for Environmental Excellence (C2E2), one of the partners of the Colleges and Universities Sector Strategies Program, is exploring ways to develop management systems in higher-education institutions as they may apply to hazardous materials use in laboratories, sharing ideas and information about training resources, and participating in the development of Project XL in collaboration with EPA (Lab XL, par. 9).

Regarding Labs XL, the Labs 21 Program announced its "interest in using the EPA's Project XL Program to promote consideration of energy and water conservation measures in laboratory buildings" (Lab XL, par. 9) through the Lab XL Program. Labs21 is a voluntary program that encourages U.S. laboratories to design and develop sustainable, high performance and low-energy laboratories. In this program all public and private sector laboratories are invited to join the Labs21 Partnership Program.

To join the partnership, any U.S. laboratory is encouraged to design a Labs21 project in a new construction or a retrofit project that belongs to an organization where sustainable design practices are applied to provide basic facility information, and energy and water consumption data for each laboratory project to be included in the program. The laboratory must also set measurable energy and environmental performance goals. Labs21 has tools to help set goals for a project and to benchmark the energy and environmental performance of a facility. Additionally, Labs21 asks participants to share the results of their projects through presentations at Labs21 conferences and articles in organizational and trade publications, and other promotional outlets (Colleges and Universities par. 9). The Labs21 Partnership Program has been working with private and public sector laboratories since 2002 including universities, pharmaceutical companies, microelectronic firms, high schools, and federal agencies. These institutions have helped to demonstrate new strategies for achieving high-performance laboratories in their respective fields.

Other programs that are recommended through the Colleges and Universities Sector Program are the Energy Star for Higher Education, the Green Power Partnership

with Higher Education, and the National Environmental Performance Track Program. The Energy Star for Higher Education is a government-backed program focused on the efficient use of energy and protecting the environment. The Green Power Partnership with Higher Education encourages organizations to use green power as part of best-practice environmental management (Colleges and Universities par. 9). Finally, the National Environmental Performance Track Program encourages top environmental performance among private and public facilities in the United States. This program evaluates campus-wide environmental management systems (Colleges and Universities par. 9).

Another program available to Colleges and Universities through the EPA is Smart Growth, which is described as "a development that serves the economy, the community, and the environment" (About Smart Growth par. 2). This program can be applied to the colleges and universities sector by virtue of its context of sustainable development in communities because it changes the terms of the development debate away from the traditional growth/ no growth question to, "How and where should new development be accommodated?" (About Smart Growth par. 2). Smart Growth responds to attempts to achieve healthy communities, economic development and jobs, strong neighborhoods and transportation choices (About Smart Growth par. 2).

The Waste Wise Program offers standards to colleges and universities for solid waste reduction and access to specific resources to reduce the amount of waste produced and disposed of by each campus. This program encourages partners to design solid waste

reduction programs and provides technical assistance, information, and recognition to participating organizations. For example, EPA provides institutions with assistance to establish waste reduction goals and access to standardized goals and objectives for colleges and universities. The program also provides the option to transfer annual reporting forms and join the Waste Wise college competition to see which school can collect the most recyclables over a ten-week period. The advantages for colleges and universities enrolling in this program include the promotion of the college, guidance, planning, measurement, and improving the EPA's service on those university campuses (An Overview par. 1-2).

3.6. Three Universities Information

Table 2. Population of Students in the three Universities Studied

	University #1	University #2	University #3
Graduate Students	2267	5932	4005
Undergraduate Students	12933	13515	4696
Total	15200	19447	8701
Faculty Staff	3004	9400	17075
Total Number of Students and Faculty Staff	18204	28847	25776
Campus area	1300	745	534

Source: Researched universities demographics http://.com/college/facts/8328.html

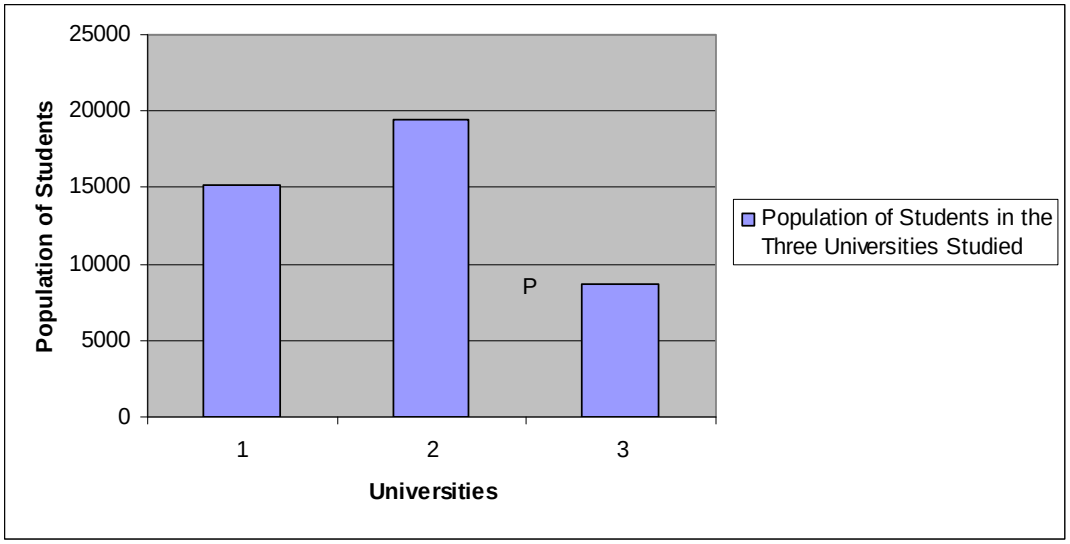

Figure 1. Population of Students in the three Universities Studied

Source: Researched universities demographics

All three universities used in this study have been classified as large, based on the information published in an article about universities' demographics, which classifies universities as small, large or medium according to their populations. University #1 enrolls a total of 15,200 students, 12,933 undergraduate and 2,267 graduate students. University #1 is located on 1,300 acres of campus. In this study this university will be considered a large university including the number of students. Meanwhile, University # 2 has a total of 19,478 students; 13,515 are undergraduate students, 5,884 graduate students. University # 2's campus encompasses 745 acres. Finally, University #3 has a total of 8,425 students, 4,005 of them are graduate students and 4,696 undergraduate students. University #3 has a 534-acre campus. In this study university #3 will be

considered a large size university taking into account the number of students and faculty staff compared with the other two universities of this research.

3.6.1. University #1

Brief description of Environmental Initiatives, Pollution Prevention Programs, and Environmental Management

The Environmental Health and Safety (EHS) Department of University #1 (being one among ten departments) belongs to the Department of Risk Management and Safety Services of the Division of Finance and Administration. The EHS Department "strives for a safe and healthy living, working & learning environment for all students, faculty, staff and visitors on campus, while minimizing its impact on the environment."

University #1's EHS Department is developing and implementing a campus-wide EMS. The EHS department is currently working on its Strategic Environmental Management Initiative EMS that began in 2001. The Strategic EMS Initiative is currently in its third year of development, with a goal of completing development and implementation of the EMS at the rate of two colleges or divisions per calendar year. According to University #1's description of its EMS, it is a framework for understanding the environmental, health, and safety footprint of campus, complying with applicable laws and regulations, and implementing proactive pollution prevention and safety strategies. "It is also a continuous cycle of planning, doing, reviewing and improving processes and actions associated with EH&S performance". University #1's EMS is built

upon the EH&S's commitments outlined in the University's Commitment to Environmental Sustainability, which emphasizes the following:

- Development and propagation of policies and practices that protect the natural environment and sustainable use of the environment, energy resources and materials.
- Conducting operations, when feasible, in a responsible manner while protecting human health and the environment.
- Proactive activities that prevent pollution prevention, compliance with environmental laws and regulations and environmental performance improvement.
- Proactive environmental management and integrating stewardship into academic programs.
- Developing opportunities that share and expand the environmental expertise of its faculty, staff and students (University #1 Web Site).

The department of EHS at University #1 works toward regulatory compliance in the areas of fire prevention and protection, environmental protection, and occupational health and safety, and it seeks continual improvement. Other activities at the EH&S Department involve a program for employees to learn about RCRA Hazardous Waste Training, Respiratory Protection, Bloodborne Pathogens, Chemical Inventory Training, and Health and Safety. Some of the activities that occur on campus are closely followed in order to guarantee that they are being performed while in compliance with the applicable environmental health and safety regulations. University #1's operations

include biology and chemistry research (especially in laboratories), chemical storage, wetland management, printing presses, facilities management, and plant and groundskeeping.

3.6.2. University #2

Brief description of Environmental Initiatives, Pollution Prevention Programs, and Environmental Management

The mission and vision of University #2's EHS Department is based on the promotion of a safe and healthy campus environment by coordinating the provisions of programs and services to reduce safety, health and environmental risks with the activities of the university community in a manner consistent with responsible fiscal and environmental stewardship. University #2's Office for Environmental Compliance is a member of the Campus Consortium for Environmental Excellence, EPA's partner in the Colleges and Universities Sector Program.

This institution's Program for Environmental Compliance is responsible for fulfilling the mission of the Office for Environmental Compliance. It has a team that recommends, develops and maintains programs for environmental assurance. The team reviews the compliance status of operations and reports to designated responsible deans and directors. The Program for Environmental Compliance is in charge of green programs and sustainability stewardship. The program's functions are to support the Petroleum Bulk Storage Program and to manage the following: the University Refrigerant Compliance Program, the Title V Clean Air Act Compliance Program, the

University Radiation Control Permit, the campus State Pollution Discharge Elimination System (SPDES) Program, the University Sanitary Sewer Pretreatment Program, the University Building Drain Program and the University programs for Wetland Protection.

The Office for Environmental Compliance of University #2 is also responsible for the Environmental Auditing for the Workplace and the Working Environment Initiative programs. Environmental Auditing of the Workplace is a project on which a report was issued in spring 1998 by the University's Center for the Environment and led by the Work and Environmental Initiative. This project was established in 1992 to examine the relationship between the workplace and the environment; it worked with the University's office for environmental compliance. Workplace eco-auditing is a participatory process for engaging employees at their worksites in looking for "beyond compliance" ways to improve environmental performance and it tries to engage students and diverse campus environments.

The goals of Universities #2's Work Environmental Initiative are:

- More efficient use of resources
- Increased use of recycling materials
- Product substitution to increase use of less toxic materials
- Lower hazardous waste disposal costs
- Lower solid waste disposal costs
- Lower electricity and other energy costs

- Continuous growth in participation by people and organizations at the University campus
- Increase in positive organizational activity on the environment

(University #2 Web Site).

The University #2's process for environmental audits in the workplace was undertaken in part as a process for implementing its "Statement of Sustainability", which was signed by students and the administration in October of 1997.

3.6.3. University #3

Brief description of Environmental Initiatives, Pollution Prevention Programs, and Environmental Management

University #3's EHS mission is based on its providing safety and advisory services to the university community by managing risk, assessing and evaluating the environment, advocating safe work practices, providing quality educational programs, and ensuring compliance with University and regulatory standards. The University's EH&S department consists of five interconnected units, which are the Fire Marshall's Office, the Industrial Hygiene Office, the Pest Control Office, the Radiation Safety Unit, and the Sanitarian's Office. There is also a Hazardous Waste Management Unit, an Institutional Biosafety Committee, an SMH Infection Control Program, and a Workers' Compensation Program.

The Fire Marshall's Office is responsible for all aspects of maximizing fire safety throughout the University. This includes inspections of buildings, testing of fire detection and protection equipment, conducting drills, providing educational programs, evaluating materials and establishing guidelines for fire safe materials, and reviewing plans for construction and renovation projects (Environmental Health and Safety) .

The Industrial Hygiene staff is responsible for evaluating the risks of physical, chemical, and biological agents in the workplace and for providing guidance to those who may be exposed in order to minimize EHS risks. The Industrial Hygiene Unit is also responsible for conducting training programs on health hazards of chemical and biological agents, investigating air quality/odor concerns, and responding to emergencies such as chemical spills. This department is also related to Safety Training for Facilities, including laboratories and off-site locations. The department also provides programs, policies, procedures, and other information for specific areas such as university research laboratory personnel, clinical laboratory personnel, and university facility personnel. For OSHA required safety training, all Environmental Health and Safety training for facilities staff is scheduled through area supervisors and facility managers. The EHS activities also include employee incident reporting, oxygen leaks, chemical inventories, and job-hazard assessments. EHS activities at University #3 also include general access to safety plans, programs, policies, procedures and other information.

The Pest Control staff is responsible for preventing or controlling any type of pest problem. The Integrated Pest Control Management Program’s goal is to limit the number

of pest-related problems and reduce pesticide use by providing proactive service, including the Sanitarian's services and educational programs.

The Radiation Safety Unit is responsible for all activities dealing with radioactive material and radiation producing equipment. The services provided include monitoring laboratories for safe use of radioisotopes, inspecting radiation-producing equipment, ordering radioactive materials for the University's community, and arranging for disposal of these materials.

The Sanitarian's Office staff is responsible for helping the University to achieve and maintain a healthful environment. Areas of program management include inspection of all food operations, training food services personnel, approving outside caterers hired to work inside the University, and investigation and follow up of any food-related health and safety complaints. Additionally, questions regarding water quality, poor housekeeping practices, or general sanitation should be directed to this office.

University #3 is a partner in EPA's Labs21 Program with a project for its research teaching facility. Under its Biomedical Engineering/Optics (BME/Optics) Initiative, the Department of Biomedical Engineering and the Institute of Optics will share a new research and teaching facility. The facility calls for approximately 92,000 gross square feet of teaching and research laboratory space, administrative and faculty office space, shared conference rooms, a 50- and a 100 seat lecture hall, an atrium lobby space, and an

area dedicated to Institute Ventures. The dedicated laboratory space will comprise approximately 26,000 net square feet.

By 1992, University #3 developed a coherent program to reduce energy consumption by more than half during the following five years, without noticeable increase even with the addition of two buildings, resulting in an annual avoidance of $1.5 million in electricity costs. The program allowed energy growth while avoiding increased electricity costs. By renovating lightning and control systems, University # 3 reduced electricity use by more than a third while improving occupant lighting and temperature levels. The institution also opted for energy cogeneration in order to produce much of their electricity requirements at very low costs. Through the program the University was able to include the academic and environmental community in the energy management process.

4.0. Methods and Materials

4.1. Research Aims

The aim of the survey is to determine the impact of the EPA Colleges and Universities Sector Program by examining if the Program objectives were accomplished and if tools, resources, guides, and reports developed by the EPA and the Coordinating Committee of the Program have been used by the universities surveyed, and what has been the effect on their management after having using them. The objectives of the EPA Sector Program are to promote the development of EMSs at colleges and universities, to encourage environmental performance measurement, and to work for the innovation of regulations pertaining to participating colleges and universities. The survey includes questions pertaining to the three objectives of the Program and the use of its tools for colleges and universities. Concepts and tools related to college's and universities' environmental-management efforts have also been incorporated; these include the following: sustainability, EMS implementation, benchmarking of best management practices, partnerships, voluntary agreements, participation in pollution-prevention programs, performance measurement, and audit practices.

The primary source of information for this thesis was a questionnaire survey designed for the three universities selected for this study, which was presented in a personal interview (Appendix 2 and Appendix 3). The second largest source of data for the study were the articles related to environmental issues that have appeared on the EPA website for the Colleges and Universities Sector Program and related organizations. These documents provided valuable insights into how decisions are made with regard to

environmental issues. This material is part of the body of EPA publications that can be accessed through the EPA's web site, the EPA Colleges and Universities Sector Program coordinating committee, the studied universities' websites, and other institutional web sites like the GRI and ISO, which were analyzed to provide insight into current initiatives, and strategies.

4.2. Population and Sample

Three universities located in New York State make up the total sample of this research; these institutions are part of a population of 4,000 colleges and universities located in the U.S. that are subject to EPA inspections (EPA 1). These universities were selected from a sampling frame of all members of the population of all the colleges and universities mentioned in the EPA Sector Strategies Performance Report 2004, where 15 million students in total are being educated and where the enrollment is expected to increase to more than 18 million by 2003 (EPA 1). The institutions of higher education studied are located in the EPA Region 2. This location was convenient for the researcher who also resides in the same location; contacting the representatives to be interviewed and collection of replies was not difficult. In these three universities a total of 73 employees work at the EHS Departments; 5 of them in University #1, 32 in University #2, and 35 in University #3. The population and sample are illustrated in Figure 2. The director of each university was interviewed with the questionnaire included in Appendix #2, and four members of each EHS Department were interviewed with the questionnaire in Appendix #3. Because of the intensive research required to collect data from each institution, the necessary attention to confidentiality, and the follow up required to obtain

the responses (the completed questionnaire) -- which was accomplished at a rate of 100%, it was determined that the three universities made up a sufficient sample. To determine the statistical significance or reliability in using a relatively small sample, all of the answers taken together had to succeed in determining whether or not the program had a high degree of participation. It was determined also if a high number of tools were used by the institutions, and if there was a considerable effect in overcoming the barriers that impede the management of environmental issues.

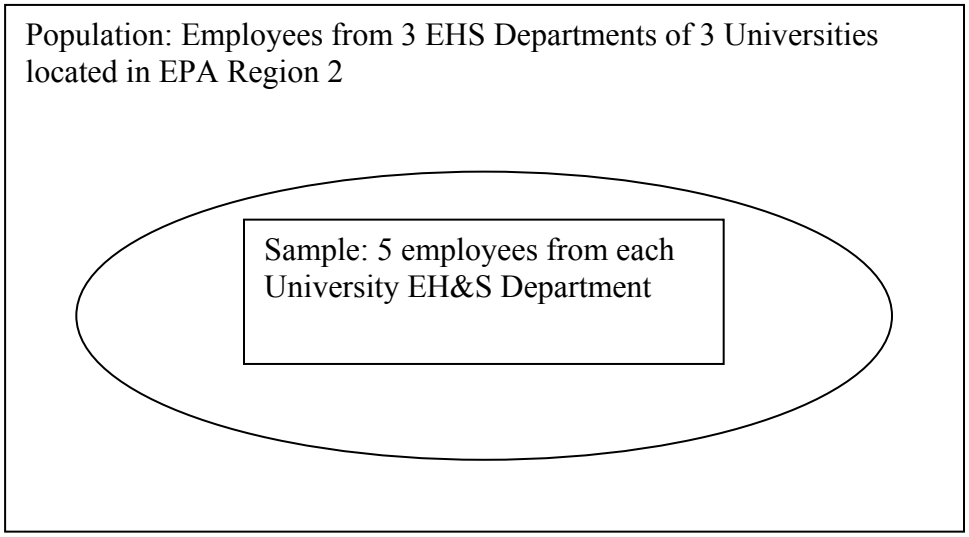

Figure 2. Population and Sample of the Research: three universities located in Region 2, New York State.

Table 3. Job titles of each member of the EHS Department of the three universities studied

University # 1 ***a* Environmental Health and Safety Department**	**University # 2** ***a* Environmental Health and Safety Department**	**University # 3** ***a* Environmental Health and Safety Department**
Environmental Health and Safety 1. Manager of Environmental Health and Safety	Administration 1. Director 2. Administrative Assistant 3. Administrative Assistant	Administration 1. Director 2. Administrator 3. Administrative assistant
Fire Safety 2. Environmental Health & Fire Safety Technician	Fire Protection and Emergency Services Section Associate Director (same as Director of EH&S Department) 4. Administrative Assistant 5. Administrator Emergency Services 6. Senior Emergency Services Specialist, Supervisor of Emergency Services Team 7. Emergency Services Team Member 8. Emergency Services Team Member 9. Emergency Services Team Member 10. Emergency Services Team Member 11. Emergency Services Team Member Emergency Preparedness and Events Management Emergency Planning 12. Coordinator Fire Protection Services 13. Senior Emergency Services Specialist Testing and Inspecting 14. Senior Fire Inspection Specialist 15. Fire Protection Specialist	Fire Safety Fire Marshal (same as Director) 4. Fire Safety Coordinator 5. Fire Safety Coordinator 6. Fire Safety Coordinator 7. Fire Safety Inspector 8. Administrative Assistant

	16. Fire Protection & Emergency Response Specialist 17. Fire Protection Specialist Extinguisher Detector Shop 18. Senior Fire Protection Specialist 19. Fire Protection Specialist 20. Fire Protection Specialist 21. Fire Protection Specialist 22. Fire Protection Specialist	
Health and Safety Fire Safety Radiation and Laser Safety 3. Senior Environmental Health Specialist 4. Occupational Safety Specialist 5. Environmental Health & Safety Compliance Specialist	Occupational Health and Safety Section 23. Associate Director of OHS Section and Industrial Hygienist 24. Administrative Assistant Industrial Hygienists: 25. Industrial Hygienist 26. Industrial Hygienists Asbestos Services 27. Senior Health and Safety Specialist 28. Asbestos Safety Specialist 29. Asbestos Safety Specialist Safety: 30. Senior Health and Safety Specialist 31. Senior Safety Specialist for Construction 32. Safety Specialist 33. Senior Safety Specialist Biosafety Section 34. Biological Safety Officer	Industrial Hygiene 9. Chemical Safety/ Laser Safety Officer 10. Environmental Health Specialist 11. Occupational Health Specialist 12. Safety Specialist 13. ECC Surveyor 14. Laboratory Safety Technician 15. Secretary 16. Biosafety Officer 17. Biosafety Technical Associate 18. IBC Administrative Assistant
		Pest Control Unit 19. Pest Control Manager 20. Pest Control Technician 21. Pest Control Technician 22. Secretary
		Radiation Safety 23. Radiation Safety Officer 24. Health Physicist 25. Health Physicist

		26. Technician 27. Technician 28. Technician 29. Program Administrator 30. Secretary
		Sanitation Unit Senior Sanitarian (same as Pest Control Manager) 31. Environmental Health Technician 32. Secretary
	Information Technology Services 35. IT Consultant	

Source: The Three Universities' Web Sites.

a List of Job Titles of the staff of the EHS Department at the three each universities studied.

Total of employees in each university EH&S Department:

University #1: 5

University #2: 32

University #3: 35

Total number of employees at all three universities: 72

Total surveyed: 15 interviews:

3 Directors

12 Employees (4 of each university)

The results should indicate whether or not the universities are managing their environmental issues using their own tools, and/or those made available by the EPA and its partners.

4.3. Data Analysis

Quantitative analysis was conducted through descriptive statistics, including means, variance, and standard deviation.

4.4. Sample Distribution

The frequencies of the variables are summarized as follows:

1. Sample in each section or unit of the EHS Department
2. Most important environmental issues

4.5. Collections of Replies

To obtain the completed questionnaire, it was necessary to contact each representative to explain the research and ask general questions regarding their work at the department. After the first contact was made and an approval of his or her participation was obtained, the questionnaire was sent to him or her to keep and fill out. The researcher picked up the questionnaire; however, in some cases the interviewee sent the filled-in questionnaire by e-mail, if that was more convenient. Additionally, an appointment was set to answer questions that the interviewee might have about the survey, and to pick up the completed questionnaire.

4.6. Questionnaire Design

The questionnaire included questions covering the following:

- The likelihood of implementing an EMS influenced by the EPA Colleges and Universities Sector Program and the implementation status of the EMS in those institutions
- Changes in the administration influenced by the EPA Colleges and Universities Sector Program
- The use of incentives, tools, resources, guides, and reports available for colleges and universities through the EPA Colleges and Universities Sector Program Participation in voluntary programs, Pollution Prevention programs, partnerships, benchmarking Best Management Practices, EMS use, audit practices, environmental performance evaluation
- Participation in regulatory innovation
- Driving forces for implementing an EMS at the university and the priority of the environment in universities
- Obstacles that impede the environmental management and social responsibility at each university studied

4.7. Main Survey

The interviews conducted at the three institutions of higher education were intended to get information on the application of the EPA's Colleges and Universities Sector Strategy Program and its impact on the way they currently manage environmental issues. In this evaluation a questionnaire was sent to obtain the mentioned information.

The method to collect data was intended to be only qualitative, aimed at obtaining information about the EHS departments' activities and programs, and opinions about the EPA Colleges and Universities Program at each university. The interviews were conducted on location at the universities with representatives of their EHS Departments who agreed to provide information. Additionally, information on the status of the Colleges and Universities Sector Strategy Program were requested from EPA contacts for this program. The key outcomes from the answers were identified. It was analyzed how the three colleges and universities implement environmental management practices. This means the verification of the use of the tools and programs offered by EPA through the Sector Strategy Program and the success of the universities examined in overcoming obstacles to managing environmental issues.

5.0 Results

Respondents from the survey perceive that the impact of the Colleges and Universities Sector Program on the three universities studied have caused positive changes in the way environmental issues are managed but they did not have measures in place to quantify the benefits (Table 4). They have participated in compliance and audit agreements with the EPA. Tools such as compliance guidance, participation in voluntary programs, guidelines for EMS implementation, and benchmarking BMP offered by the EPA through the Colleges and Universities Sector Program, have also influenced the way environmental aspects are managed.

Table 4. Perceived improvement, using the Colleges and Universities Sector Program tools

6.1. Perceived improvement	**Observations**	**Min**	**Max**	**Mean**	**SD**
University 1	5	2	5	3.55	0.92
University 2	3	3	5	3.4	20.25
University 3	1	5	5	5	0
Total	9	2	5	3.55	1.19

Source: Question 6. Appendix 4.

The drivers for environmental management are regulatory pressures (mean= 4.46), and environmental ethics (4.30). The major obstacle that needs to be addressed by the Colleges and Universities Sector Program in order to excellerate environmental performance is the tendency of institutional management to view environmental initiatives as long term investments rather than the avoidance of costs from

environmental non-compliance fines. The second major obstacle is lack of funding. Overall, the respondents think that the Colleges and Universities Sector Program has had a positive influence (Table 4).

5.1. Responses to the Primary Research Question

5.1.1. What is the impact of EPA's Colleges and Universities Sector Strategy on the universities included in this study?

The EPA Colleges and Universities Sector Program has have positively influenced the way colleges and universities manage their environmental issues. The activities that have had influence are: compliance, EMS tools use, voluntary programs participation, benchmarking BMP, performance evaluation, and participation in audit agreements with the EPA. According to the answers given on the survey questionnaire, an increasing effort to implement compliance programs has been a priority. Moreover, the EPA audit agreement for colleges and universities has been applied in the universities investigated. Tools related to EMS implementation and performance evaluation have also been used. Furthermore, the three universities studied did not report any participation in the process directed by the EPA for innovating environmental regulations affecting activities on university campuses. However, it is too early to reach a conclusion about the impact of the EPA Colleges and Universities Sector Program on the universities studied since some of the institutions studied are still implementing compliance programs, will continue implementing EMS's, and will continue to work on environmental audits and environmental performance.

5.2. Responses to the Secondary Research Questions

5.2.1. Did the EPA Colleges and Universities Sector Program influence the environmental management practices (departmental tasks, programs implemented, or partnerships with the EPA or related organisms in the three universities studied)?

Respondents perform mostly a combination of EHS roles together (frequency percentage= 14%), and specific activities such as biosafety (9%), fire safety (7%), health and safety (7%). The majority of respondents confirm that their responsibilities changed mostly to activities and tasks related to compliance assurance (Figure 5).

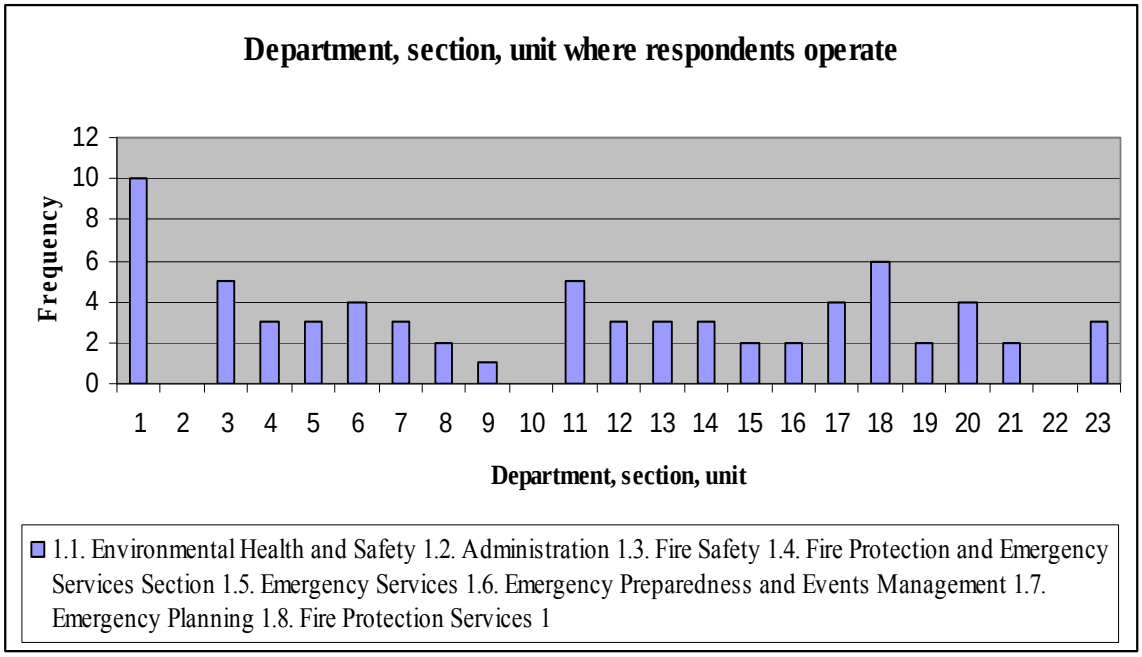

Figure 3. Departments, section, unit in which respondents operate

Source: Question 1. Appendix 4.

Compliance assurance (mean 3.8) and participation in voluntary agreements (mean 3.5) were the most frequent activities performed by respondents (Table 5).

Table 5. Activities performed by respondents at the three universities studied

2.1. Compliance assurance	**Observations**	**Min.**	**Max.**	**Mean**	**SD**
University 1	5	4	5	4.8	39.06
University 2	4	1	5	3.75	0.13
University 3	4	2	5	2.25	0.17
Total	**13**	**1**	**5**	**3.84**	**0.19**
2.2. EMS implementation					
University 1	5	3	5	4	1.56
University 2	4	1	5	3.5	0.13
University 3	4	1	5	1.5	2.11
Total	13	1	5	3.23	0.24
2.3. Environmental performance measurement					
University 1	5	2	5	3.2	1.08
University 2	4	1	5	3.5	0.19
University 3	4	1	5	2.25	0.12
Total	13	1	5	3.15	0.30
2.4. Benchmarking of BMS					
University 1	5	3	4	3.2	39.06
University 2	4	1	5	3	4
University 3	4	1	5	2.5	0.13
Total	13	1	5	3.23	0.40
2.5. Participation in voluntary agreements					
University 1	5	4	5	4.4	17.36
University 2	4	1	5	3.5	0.19
University 3	4	1	4	2	0.44
Total	**13**	**1**	**5**	**3.53**	**0.31**
2.6. Audit practices implementation					

University 1	5	4	5	4.4	17.36
University 2	4	1	5	1.66	0.12
University 3	4	1	5	2	0.35
Total	13	1	5	3.45	0.34
2.7. Participation in the innovation of environmental regulations					
University 1	5	1	4	3.2	0.54
University 2	4	1	4	3	0.44
University 3	4	1	5	1.5	0.35
Total	13	1	5	3	0.17

Source: Question 2. Appendix 4.

The most important environmental issues at their universities are hazardous waste management (mean= 4.67), liquid waste management (3.83), and solid waste management (3.83) (Figure 4).

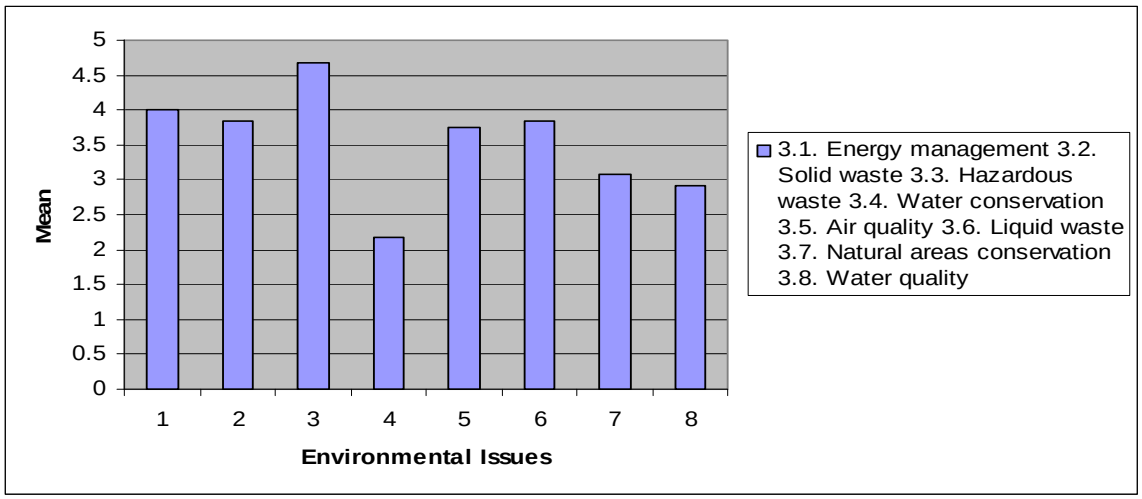

Figure 4. Environmental Issues

Source: Question 3. Appendix 4

The universities studied have worked to assure compliance by participating in audit agreements, benchmarking BMPs, and implementing EMSs. The changes perceived by the respondents in departmental responsibilities are caused by compliance and to participation in voluntary agreements with the EPA. According to the respondents, the universities studied implemented EMSs by virtue of their own strategies and previous efforts to comply with regulations, and by virtue of programs implemented to manage specific units in their EHS departments. One university participated in the Labs 21 EPA program and all three of them have applied for Audit Agreements with the EPA. Benchmarking BMPs has equally been a frequent practice of the three universities studied. According to the answers, the universities interviewed also do environmental reporting rather than environmental performance measurement, activity suggested in the Sector Program. Finally, with respect to actualization of regulations affecting colleges and universities, the respondents report no participation with the EPA or related organisms in the actualization of such regulations.

While the implementation of audit practices and EMSs as suggested in the Colleges and Universities Program might imply that in these institutions the departments of EHS requires a larger number of employees, the truth is that this can be also attributed to how the institution is growing. According to one respondent, the number of employees working in the department of EHS in the university where he/she works grows with the number of facilities incorporated.

In compliance assurance, EHS reporting take a great part of the time of the EHS employees. Respondents state that in the process of reporting, the universities go beyond compliance (SARA Tier II Reporting), and this is also true of training. The EHS Departments interviewed have implemented programs to assure compliance with environmental health and safety regulations. Additional activities such as participation in Emergency Planning Committees, benchmarking BMPs, and participation in Pollution Prevention program Labs 21 were also mentioned.

5.2.2. What tools developed by the EPA Colleges and Universities Sector Program have been applied by the universities studied? Have the universities studied used information regarding EMS implementation, audit policy, performance indicators, and best management practices available through the EPA's Sector Strategy or related EPA pollution prevention programs, or the voluntary standards mentioned in the Sector Program?

The most-used tools were those designed to improve environmental compliance and implement audit programs. The tools were effective in improving environmental management in activities related to performance evaluation, EMS implementation, and benchmarking best management practices. EMSs were not necessarily implemented or initiated in the investigated universities as a result of the EPA initiative to work on the Colleges and Universities Sector Program; there are other reasons for environmental programs implementation as strategic decisions of the institution and stakeholders like students and university staff. The status of the implementation of EMSs varies from having an in-place environmental policy, department missions, visions, environmental

management commitments, and top management commitment (according to the information available on the web site of each university studied). One respondent informs that each unit at the EHS department works independently under an EMS. Other respondents from have affirmed that implementing an EMS is possible even in decentralized units. One of the universities participates in Labs 21 Pollution Prevention Programs through its Department of Architecture. Moreover, these institutions have used information and guidelines provided by the EPA, along with information on BMPs and the Audit Policy. The universities studied report to the EPA on matters of waste water, title V air pollution permits, radiation safety, and hazardous waste management.

5.2.3. What are the drivers and obstacles that operate in these three universities that hinder or help them manage their environmental issues and to what degree are they causally related to the EPA Colleges and Universities Programs?

According to respondents, other drivers besides compliance (mean=4.46) with environmental regulations such as environmental ethics (4.3), and top management commitment (4.15) constitute environmental initiatives that influence environmental management at the three universities studied (Table 6).

Table 6. Drivers for Environmental Management at the three Universities Studied

4.1. Cost/savings financial benefits	**Observations**	**Min.**	**Max.**	**Mean**	**SD**
University 1	5	3	5	3.8	3.18
University 2	4	3	5	4	0.11
University 3	4	3	5	4	4
Total	13	1	5	3.92	3.52
4.2. Potential reputation gains					
University 1	5	2	5	4	0.69
University 2	4	2	4	3	0.01
University 3	4	4	4	4	0
Total	13	1	5	3.69	1.45
4.3. Strategic market position					
University 1	5	1	4	2.6	0.92
University 2	4	2	3	44	0.19
University 3	4	1	4	3	0.44
Total	13	1	5	2.61	0.98
4.4. Benefit to students/staff/faculty recruitment					
University 1	5	2	5	3.8	0.54
University 2	4	2	3	2.75	0.13
University 3	4	5	3	3.75	0.13
Total	13	1	5	3.46	0.37
4.5. Environmental ethics					
University 1	**5**	**3**	**5**	**4.6**	**2.44**
University 2	**4**	**3**	**5**	**4**	**0.003**
University 3	**4**	**3**	**5**	**4.25**	**2.11**
Total	**13**	**1**	**5**	**4.30**	**2.19**
4.6. Benefits to workers happiness					
University 1	5	2	4	3	6.25
University 2	4	3	3	0	0.02
University 3	4	1	4	3.25	0.35
Total	13	1	5	3.07	2.12
4.7. Top management commitment					
University 1	**5**	**3**	**4**	**4.4**	**0.48**
University 2	4	3	4	3.75	28.44
University 3	4	4	5	4.25	28.44
Total	**13**	**1**	**5**	**4.15**	**1.79**
4.8. Regulatory pressures					
University 1	**5**	**5**	**4**	**4.8**	**39.06**

University 2	**4**	**5**	**3**	**4.5**	**1.78**
University 3	**4**	**4**	**3**	**4**	**4**
Total	**13**	**1**	**5**	**4.46**	**3.23**
4.9. Faculty, administration and staff					
University 1	5	4	2	2.8	3.18
University 2	4	5	3	3.5	1.77
University 3	4	3	2	2.25	28.44
Total	13	1	5	2.84	1.79
4.10. Student's pressure					
University 1	5	4	3	2.8	3.18
University 2	4	3	2	3.75	28.44
University 3	4	4	3	2.75	0.70
Total	13	1	5	3.07	1.41
4.11. Donor's pressure					
University 1	5	4	2	2.8	3.18
University 2	4	4	3	3.25	0.008
University 3	4	2	1	1.5	16
Total	13	1	5	2.53	1.33
4.12. Alumni pressure					
University 1	5	3	2	2.6	17.36
University 2	4	5	3	3.5	1.77
University 3	4	2	1	1.5	16
Total	13	1	5	2.53	0.96
4.13. Concerns of local communities					
University 1	5	4	2	3.61	1.56
University 2	4	5	3	4.25	0.003
University 3	4	4	3	3.75	28.44
Total	13	1	5	3.61	2.05
4.14. Public opinion					
University 1	4	4	3	3.5	1.78
University 2	3	5	3	3.666667	0.004
University 3	3	4	2	3.5	16
Total	10	1	5	3.555556	0.08
4.15. Activist groups					
University 1	5	3	2	2.2	3.18
University 2	4	5	3	4.25	0.004
University 3	4	4	3	3.5	16
Total	13	1	5	3.230769	0.63

Source: Question 4. Appendix 4.

The obstacles encountered by these three universities to environmental management are lack of short term cost/benefits from environmental initiatives (mean=3.7), and lack of financial resources (3.6) (Table 6.).

Table 7. Obstacles that impede environmental management at the three universities studied

5.1. Lack of top management commitment					
University 1	5	1	4	2	0.39
University 2	4	1	4	2.25	0.70
University 3	4	1	3	1.75	2.11
Total	13	1	4	2	0.66
5.2. Lack of commitment of faculty/staff and administrators					
University 1	5	2	4	3	1.56
University 2	4	3	4	3.75	28.44
University 3	4	1	5	3	0.16
Total	13	1	5	3.23076923	0.63
5.3. Lack of commitment from students					
University 1	4	2	4	3	1
University 2	4	3	4	3.5	16
University 3	4	1	4	2	0.44
Total	12	1	4	2.83	0.58
5.4. Lack of personnel working on environmental issues					
University 1	5	2	5	3.6	0.92
University 2	4	2	4	3	1
University 3	4	1	5	2.75	0.20
Total	13	1	5	3.15	0.43
5.5. Lack of financial resources					
University 1	**5**	**2**	**4**	**3.61**	**2.44**
University 2	**4**	**3**	**4**	**3.5**	**16**
University 3	**4**	**2**	**5**	**3.75**	**0.35**
Total	**13**	**2**	**5**	**3.61**	**1.37**
5.6. Lack of short term cost/savings benefits					
University 1	**5**	**2**	**5**	**3.4**	**0.29**
University 2	**4**	**3**	**5**	**4.25**	**2.11**
University 3	**4**	**2**	**5**	**3.75**	**0.70**
Total	**13**	**2**	**5**	**3.76**	**0.50**
5.7. Lack of knowledge of environmental					

regulations and resources available					
University 1	5	2	5	2.84	0.39
University 2	4	2	3	2.5	16
University 3	4	5	2	3	0.44
Total	13	2	5	2.84	0.68
5.8. Lack of guidance from regulatory agencies					
University 1	5	1	4	2.23	0.92
University 2	4	1	3	2	4
University 3	4	1	4	2.25	0.70
Total	13	1	4	2.23	1.11
5.9. Lack of incentives from regulatory agencies					
University 1	5	1	2	1.8	39.06
University 2	4	2	3	2.5	16
University 3	4	1	4	2.25	0.70
Total	13	1	4	2.15	2.85
5.10. Higher priority of other incentives					
University 1	5	1	3	2.84	6.25
University 2	4	2	4	3.5	1.77
University 3	4	2	4	3.25	2.11
Total	13	1	5	2.84	0.90

Source: Question 5. Appendix 4.

6. Conclusions

The EPA Colleges and Universities Sector Program has added value and helped the studied universities to approach environmental management. Interviewees perceived benefits from the program but did not have measures to quantify the benefits. The interviewees have perceived that they have support from management; on the other hand, they also perceive lack of commitment from the top management for the application of environmental programs and initiatives. This could be explained with what Shriberg established about sustainability in colleges and universities, where top management has limited authority on the decisions about expending in the applications of environmental initiatives that those decisions are taken through the Board. The Board is not likely to expend resources in long term commitments like sustainability in campuses. The EPA Colleges and Universities Program influenced the universities studied primarily through compliance requirements. From the result it can be concluded that the universities studied are reporting due to compliance with environmental regulations, to take advantage of the incentives of the EPA Audit Policy and implementing EMSs.

There are external and internal factors influencing the way colleges and universities move toward environmental management. According to this research the drivers for environmental management are compliance, environmental ethics, and the potential gains that can attract resources and enhance environmental performance. The drivers identified are university's values and the need for compliance department at each university. What drives EHS management has to do with what influences the image of the university. Taking into account these major drivers in determining the impact of the

Colleges and Universities Sector Program, it is believed that the EPA influences environmental management at the three colleges and universities included in this research by applying regulatory pressures and offering tools and guidance to improve environmental management, while on the other side the university's own managerial strategies are the basic drivers of environmental management, which is influenced by its stakeholders.

The most important obstacle to environmental management is identified as a lack of funding, which can be influenced by lack of management commitment, priority of other initiatives in universities, and a lack of interest in investing in long-term environmental initiatives. Top management commitment is clearly related to the determination of funding for environmental management. Other obstacles like lack of funding, avoidance of non-compliance fees and funding from voluntary agreements are the only incentives that these institutions have to manage EHS issues. To alleviate the lack of incentives, universities look for additional funding for environmental management from private sources, the EPA, the Department of Labor, and local authorities. There are other obstacles, however. Some result from the lack of effectiveness of guidance and incentives from the EPA, and finally, another is a lack of commitment from internal stakeholders such as students, administrators and faculty staff.

Since literature on sustainability at colleges and universities agree that colleges and universities have some level of concern about environmental issues that translate into action, it is to be expected that these higher-education institutions with high

environmental ethics and responsible policies will accept EMS approaches and environmental initiatives. In general, colleges and universities recognize on their campuses environmental issues such as management of energy, solid waste, hazardous waste, liquid waste, water conservation, air quality, and water quality. However, the universities studied do not report on those identified issues by means of the CAA self-tracking tool, which is part of the EPA Colleges and Universities Program. In other researches about sustainability in colleges and universities, it has been found that environmental efforts on campuses excel in traditional operational environmental measures such as reducing waste, minimizing hazardous waste, and maximizing recycling, but only a smaller number of campuses address less traditional areas like "maximizing purchases of local and organic food" and "designating transportation policies" (Shriberg 152-153). Therefore, such efforts as the EPA Colleges and Universities Sector Program will influence environmental management and social responsibility at institutions of higher education, together with other factors brought to bear by the university management and stakeholders.

6.1. Future Research

This thesis has covered opinions of members of three universities located in New York State. It has covered the environmental initiatives so far applied. Since respondents of the research report not participation with the EPA in the innovation of environmental regulations at the moment, it would be advised for future research to review performance evaluation and the innovation of environmental regulations that affect colleges and universities.

Appendix 1. Cover Letter 1

DATE

NAME
TITLE
ADDRESS

Dear NAME:

The enclosed document is a questionnaire on the impact of the EPA Colleges and Universities Sector Program for the justification of the thesis that I'm developing. I'm requesting the participation of three Universities located in New York State. The reason why I'm collecting this information is to support the information that I have obtained so far on campus environmental management in response to the EPA Colleges and Universities Sector Program.

The questionnaire can be completed in 10-20 minutes; no specific quantitative information or interest in environmental issues is required. Strict confidentiality will be maintained for you and your institution. Your survey response will not be shared with anyone outside my thesis committee. The results will be reported without institutional and individual names (or other forms of identification). Your participation is voluntary and you may withdraw your survey at any time and omit any questions.

All participants will receive a confidential summary of results within two months, allowing you to have knowledge of this investigation and to increase your knowledge about how campuses are dealing with environmental issues in response to the EPA Colleges and Universities Sector Program.

Please return the enclosed questionnaire by DATE, I also would like to set up an appointment so I can come to your office to pick up the questionnaire and clarify any question you may have any about the survey. I would truly appreciate your participation and value your information in this research. If you have questions or comments please contact Magaly Montenegro. I look forward to receiving your questionnaire. Thank you very much.
Sincerely,

Magaly Montenegro Martinez
mem2131@rit.edu
(585) 319-1194
Environmental Health and Safety Management Msc. Program
College of Applied Sciences and Technology
Rochester Institute of Technology

Appendix 2 Cover Letter 2
DATE

NAME
TITLE
ADDRESS
Dear NAME:

Dear NAME:

I'm an international student from the Rochester Institute of Technology Msc. EHS Program. Currently I'm developing a questionnaire for a survey on the impact of EPA Colleges and Universities Sector Program as part of the thesis required in my program. I'm requesting the participation of three Universities located in New York State and I've chosen University NAME as part of my survey. I have obtained information from public access (websites and EPA publications). Attached you can find the questionnaire for the director of the department (Appendix 2) and for the members of the EHS Department (Appendix 3).

The questionnaire can be completed in 10-20 minutes; no specific quantitative information or interest in environmental issues is required. Strict confidentiality will be maintained for you and your institution. Your survey response will not be shared with anyone outside my thesis committee. The results will be reported without institutional and individual names (or other forms of identification). Your participation is voluntary and you may withdraw your survey at any time and omit any questions.

All participants will receive a confidential summary of results within two months (after the thesis submission to my committee), allowing you to have information of this investigation and to increase your knowledge about how campuses are dealing with environmental issues in response to the EPA Colleges and Universities Sector Program.

I would like to send you the questionnaire by e-mail or deliver it personally to your office. I'm also planning on collecting the questionnaires by DATE, and if possible, I also would like to set up an appointment so I can come to your office to pick up the questionnaire and clarify any question you may have any about the survey. I would truly appreciate your participation and value your information in this research. If you have questions or comments please contact Magaly Montenegro. I look forward to receiving your approval. Thank you very much.
Sincerely,

Magaly Montenegro Martinez
mem2131@rit.edu
(585) 319-1194
Environmental Health and Safety Management Msc. Program
College of Applied Sciences and Technology
Rochester Institute of Technology

Appendix 3. EPA Colleges and Universities Sector Program Questionnaire for Directors of the EHS Department

1. Please indicate the department in which you operate, section, unit (check all that applies).

1.1. □ Environmental Health and Safety Department:

- □ 1.1.1. Environmental Health and Safety
- □ 1.1.2. Administration
- □ 1.1.3. Fire Safety
- □ 1.1.4. Fire Protection and Emergency Services Section
- □ 1.1.5. Emergency Services
- □ 1.1.6. Emergency Preparedness and Events Management
- □ 1.1.7. Emergency Planning
- □ 1.1.8. Fire Protection Services
- □ 1.1.9. Testing and Inspecting
- □ 1.1.10. Extinguisher Detector Shop
- □ 1.1.11. Health and Safety
- □ 1.1.12. Fire Safety
- □ 1.1.13. Radiation and Laser Safety
- □ 1.1.14. Occupational Health and Safety Section
- □ 1.1.15. Industrial Hygiene
- □ 1.1.16. Asbestos Services
- □ 1.1.17. Safety
- □ 1.1.18. Biosafety Section
- □ 1.1.19. Pest Control Unit
- □ 1.1.20. Radiation Safety
- □ 1.1.21. Sanitation Unit
- □ 1.1.22. Information Technology
- □ 1.1.23. Other……..
  ……...

2. Have your responsibilities or the activities of your department, section, or unit changed in order to comply with specific activities of the EPA Colleges and Universities Sector Program?

	Disagree 1	2	Neutral 3	4	Agree 5	N/A
2.1. Compliance	□	□	□	□	□	□
2.2. EMS implementation	□	□	□	□	□	□
2.3. Environmental performance Measurement	□	□	□	□	□	□
2.4. Benchmarking of Best Management Practices	□	□	□	□	□	□
2.5. Participation in Voluntary Agreements	□	□	□	□	□	□
2.6. Audit Practices Implementation	□	□	□	□	□	□
2.7. Participation in the innovation of Environmental Regulations affecting Colleges and Universities	□	□	□	□	□	□

3. Has your institution implemented or is it planning to implement an EMS in response to the Colleges and Universities Sector Program incentives?
□ 3.1. Yes
□ 3.2. No
□ 3.3. Other (a number of environmental initiatives or programs, please name them)……..……
……

4. If your institution has an EMS in place or is implementing one, what is the status of the EMS? (Check all that apply)
□ 4.1. Policy
□ 4.2. Planning:
- □ 4.2.1. Environmental aspects
- □ 4.2.2. Legal and other requirements
- □ 4.2.3. Objectives and targets
- □ 4.2.4. Environmental management program(s)

□ 4.3. Implementation
- □ 4.3.1. Structure and responsibility
- □ 4.3.2. Training, awareness, and competence
- □ 4.3.3. Communication
- □ 4.3.4. EMS documentation
- □ 4.3.5. Document control
- □ 4.3.6. Operational control
- □ 4.3.7. Emergency preparedness and response

□ 4.4. Checking and corrective action
- □ 4.4.1. Monitoring and measurement
- □ 4.4.2. Nonconformance and corrective and prevention action
- □ 4.4.3. Records
- □ 4.4.4. Environmental management system audit

□ 4.5. Management review
- 4.5.1. Changes to policy, objectives and other elements of the EMS

□ 4.6. Other (i.e. EMS gap analysis please name it)……..
□ 4.7. No activities

5. Has your institution used any of the following standards, guidelines, or principles for environmental management? (Check all that apply)
□ 5.1. ISO 14001
□ 5.2. CERES
□ 5.3. GRI
□ 5.4. ICC Business Charter for Sustainable Development
□ 5.5. Other standards, guidelines, or principles (please name them)…….……
□ 5.6. No standards, guidelines, or principles are used

6. Has your institution used any of the following tools, training resources, and support developed by the EPA Colleges and Universities Sector Program EMS workgroup to promote the development of an EMS? (Check all that apply):
□ 6.1. Web-site for assistance in EMS planning and implementation
□ 6.2. Region 1 Implementation Guide
□ 6.3. C2E2 Self-Assessment Checklist
□ 6.4. Information of colleges and universities with an EMS in place
□ 6.5. Other tools (please name them)……
□ 6.6. No tools are used

7. Has your institution used the following tools developed by the EPA for performance measurement? (Check all that apply)
□ 7.1. Performance indicators, success stories, and other tools
□ 7.2. U.S.EPA EMS page
□ 7.3. C2e2 Colleges and Universities Self-Tracking Tool
□ 7.4. Sector Strategy Performance Report
□ 7.5. Case Studies on Environmental Performance reporting from the Best Management Practices Catalog
□ 7.6. Other tools (please name them)……
□ 7.7. No tools for performance measurement are used

8. What are the most important environmental issues present at your institution?

	Disagree 1	2	Neutral 3	4	Agree 5	N/A
□ 8.1. Energy management	□	□	□	□	□	□
□ 8.2. Solid waste	□	□	□	□	□	□
□ 8.3. Hazardous waste	□	□	□	□	□	□
□ 8.4. Water conservation	□	□	□	□	□	□
□ 8.5. Air quality	□	□	□	□	□	□
□ 8.6. Liquid waste	□	□	□	□	□	□
□ 8.7. Natural areas conservation	□	□	□	□	□	□
□ 8.8. Water quality	□	□	□	□	□	□

9. Has your institution set goals with respect to any of the following performance indicators mentioned in the EPA Performance Measurement Report? (Check all that apply)
□ 9.1. Energy efficiency
□ 9.2. Air emissions reduction
□ 9.3. Waste management and minimization
□ 9.4. Water conservation
□ 9.5. Materials reduction
□ 9.6. Paper use reduction
□ 9.7. Recycled materials use
□ 9.8. Land use reduction
□ 9.9. Leased products use
□ 9.10. Greenhouse effect reduction

□ 9.11. Transportation management
□ 9.12. Other (please name it)…….……
□ 9.13. No performance indicators used

10. Does your institution belong to the following association partners for Environmental Management at the EPA Sector Strategy Program? (Check all that apply)
□ 10.1. American Council on Education (ACE)
□ 10.2. Association of Higher Education Facilities Officers (APPA)
□ 10.3. Campus Consortium of Environmental Excellence (C2E2)
□ 10.4. Campus Safety, Health and Environmental Management Association (CSHEMA)
□ 10.5. Howard Hughes Medical Institute
□ 10.6. National Association for Colleges and Business Officers (NACUBO)
□ 10.7. Other (please name it)……..
□ 10.8. No partnerships

11. Does your institution participate in one of the following EPA Pollution Prevention and Voluntary Programs? (Check all that apply)
□ 11.1. Labs 21
□ 11.2. Performance Track
□ 11.3. Waste Wise
□ 11.4. Green Power Partnership with Higher Education
□ 11.5. Energy Star for Higher Education
□ 11.6. Smart Growth
□ 11.8. Other (please name it) ……...
□ 11.9. No participation

12. Is your institution part of EPA's activities for innovation of the following regulations applicable to colleges and universities? (Check all that apply)
□ 12.1. Business case to summarize and justify the need for laboratories in the academic community: RCRA/ Lab waste issues
□ 12.2. Regulatory reform of the Spill Prevention and Countermeasure Requirements
□ 12.3. Other (please name it)……
□ 12.4. No participation

13. Has your institution used any of the following tools and resources provided by the EPA Colleges and Universities Sector Program, Region 2? (Check all that apply)
□ 13.1. Audit policy information
□ 13.2. Information for EMS
□ 13.3. Design for the Environment program's EMS Tools
□ 13.4. Environmental Management Guide for Small Laboratories
□ 13.5. Managing your Hazardous Waste a Guide for Small Businesses
□ 13.6. Understanding the Hazardous Waste Rules: A Handbook for Small Business
□ 13.7. Environmental compliance audit protocols
□ 13.8. Hazardous and solid waste publications
□ 13.9. Other (please name it)…… ……
□ 13.10. None

14. Has your institution applied for an audit agreement with EPA Region 2?
□ 14.1.Yes
□ 14.2. No

15. What are the driving forces for environmental management and social responsibility in your institution?

	Disagree 1	2	Neutral 3	4	Agree 5	N/A
15.1. Cost/savings financial benefits	□	□	□	□	□	□
15.2. Potential reputation gains that can attract resources and enhance environmental performance	□	□	□	□	□	□
15.3. Strategic market position	□	□	□	□	□	□
15.4. Benefits to student, staff and/ or faculty staff recruitment	□	□	□	□	□	□
15.5. Environmental ethics	□	□	□	□	□	□
15.6. Benefit of workers happiness	□	□	□	□	□	□
15.7. Top management commitment	□	□	□	□	□	□
15.8. Regulatory pressures	□	□	□	□	□	□
15.9. Faculty, administrators and staff members' pressure	□	□	□	□	□	□
15.10. Student pressure	□	□	□	□	□	□
15.11. Donor pressure	□	□	□	□	□	□
15.12. Alumni pressure	□	□	□	□	□	□
15.13. Concerns of local communities	□	□	□	□	□	□
15.14. Public opinion						
15.15. Activist groups	□	□	□	□	□	□

16. What are the obstacles that impede environmental management and social responsibility at your institution?

	Disagree 1	2	Neutral 3	4	Agree 5	N/A
16.1. Lack of top management commitment	□	□	□	□	□	□
16.2. Lack of commitment from faculty/staff and administrators	□	□	□	□	□	□
16.3. Lack of commitment from students	□	□	□	□	□	□
16.4. Lack of personnel working on environmental issues	□	□	□	□	□	□
16.5. Lack of financial resources	□	□	□	□	□	□
16.6. Higher priority of other initiatives	□	□	□	□	□	□
16.7. Lack of interest in long-term investments from environmental initiatives	□	□	□	□	□	□
16.8. Lack of knowledge of environmental regulations and resources available	□	□	□	□	□	□
16.9. Lack of guidance from regulatory						

agencies	□	□	□	□	□	□
16.10. Lack of incentives from regulatory agencies	□	□	□	□	□	□

17. If your institution has taken part of any EPA project related to the Colleges and Universities Sector Program, do you see any improvement in the environmental performance using the EPA's tools?

Not at all	A little		Fairly	Very	Extremely	N/A
1	2		3	4	5	
□	□		□	□	□	□

18. Comments

……..……..……
……..…..…
……..……

Appendix 4. EPA Colleges and Universities Sector Program Questionnaire for members of the EHS Department

1. Please indicate the department; section and/or unit in which you operate (Check all that apply).

1.1. □ Environmental Health and Safety Department:

- □ 1.1.1. Environmental Health and Safety
- □ 1.1.2. Administration
- □ 1.1.3. Fire Safety
- □ 1.1.4. Fire Protection and Emergency Services Section
- □ 1.1.5. Emergency Services
- □ 1.1.6. Emergency Preparedness and Events Management
- □ 1.1.7. Emergency Planning
- □ 1.1.8. Fire Protection Services
- □ 1.1.9. Testing and Inspecting
- □ 1.1.10. Extinguisher Detector Shop
- □ 1.1.11. Health and Safety
- □ 1.1.12. Fire Safety
- □ 1.1.13. Radiation and Laser Safety
- □ 1.1.14. Occupational Health and Safety Section
- □ 1.1.15. Industrial Hygiene
- □ 1.1.16. Asbestos Services
- □ 1.1.17. Safety
- □ 1.1.18. Biosafety Section
- □ 1.1.19. Pest Control Unit
- □ 1.1.20. Radiation Safety
- □ 1.1.21. Sanitation Unit
- □ 1.1.22. Information Technology
- □ 1.1.23. Other……..
  ……...

2. Have your responsibilities or the activities of your department section or unit changed in order to comply with specific activities of the EPA Colleges and Universities Sector Program?

	Disagree 1	2	Neutral 3	4	Agree 5	N/A
2.1. Compliance	□	□	□	□	□	□
2.2. EMS implementation	□	□	□	□	□	□
2.3. Environmental performance measurement	□	□	□	□	□	□
2.4. Benchmarking of Best Management Practices	□	□	□	□	□	□
2.5. Participation in Voluntary Agreements	□	□	□	□	□	□
2.6. Audit Practices Implementation	□	□	□	□	□	□
2.7. Participation in the innovation of						

Environmental Regulations affecting Colleges and Universities	□	□	□	□	□	□

3. What are the most important environmental issues present at your institution?

	Disagree		Neutral		Agree	N/A
	1	2	3	4	5	
□ 3.1. Energy management	□	□	□	□	□	□
□ 3.2. Solid waste	□	□	□	□	□	□
□ 3.3. Hazardous waste	□	□	□	□	□	□
□ 3.4. Water conservation	□	□	□	□	□	□
□ 3.5. Air quality	□	□	□	□	□	□
□ 3.6. Liquid waste	□	□	□	□	□	□
□ 3.7. Natural areas conservation	□	□	□	□	□	□
□ 3.8. Water quality	□	□	□	□	□	□

4. What are the driving forces for environmental management and social responsibility in your institution?

	Disagree		Neutral		Agree	N/A
	1	2	3	4	5	
4.1. Cost/savings financial benefits	□	□	□	□	□	□
4.2. Potential reputation gains that can attract resources and enhance environmental performance	□	□	□	□	□	□
4.3. Strategic market position	□	□	□	□	□	□
4.4. Benefits to student, staff and/ or faculty staff recruitment	□	□	□	□	□	□
4.5. Environmental ethics	□	□	□	□	□	□
4.6. Benefit of workers happiness	□	□	□	□	□	□
4.7. Top management commitment	□	□	□	□	□	□
4.8. Regulatory pressures	□	□	□	□	□	□
4.9. Faculty, administrators and staff member's pressure	□	□	□	□	□	□
4.10. Student pressure	□	□	□	□	□	□
4.11. Donor pressure	□	□	□	□	□	□
4.12. Alumni pressure	□	□	□	□	□	□
4.13. Concerns of local communities	□	□	□	□	□	□
4.14. Public opinion						
4.15. Activist groups	□	□	□	□	□	□

5. What are the obstacles that impede environmental management and social responsibility at your institution?

	Disagree		Neutral		Agree	N/A
	1	2	3	4	5	
5.1. Lack of top management commitment	□	□	□	□	□	□
5.2. Lack of commitment from						

5.3. faculty/staff and administrators	□	□	□	□	□	□
5.3. Lack of commitment from students	□	□	□	□	□	□
5.4. Lack of personnel working on environmental issues	□	□	□	□	□	□
5.5. Lack of financial resources	□	□	□	□	□	□
5.6. Higher priority of other initiatives	□	□	□	□	□	□
5.7. Lack of interest in long term investments from environmental initiatives	□	□	□	□	□	□
5.8. Lack of knowledge of environmental regulations and resources available	□	□	□	□	□	□
5.9. Lack of guidance from regulatory agencies	□	□	□	□	□	□
5.10. Lack of incentives from regulatory agencies	□	□	□	□	□	□

6. If your institution has taken part in any EPA project related to the Colleges and Universities Sector Program, do you see any improvement in the environmental performance using the EPA's tools?

Not at all	A little		Fairly	Very	Extremely	N/A
1	2		3	4	5	
□	□		□	□	□	□

7. Comments

……..……..……
……..…..…
……..……..…
……

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