Sustainable Logistics: Challenges and Opportunities of Greening the Procurement Process

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Abstract

This paper presents some of the challenges and opportunities faced by many organizations worldwide in trying to embark in the purchasing of products and services that are less harmful to local and global environments. Many of these private and public businesses are working to improve the environmental performance of their operations and products and green procurement has been a logical extension of this work. The paper presents how green procurement can be used as a means towards improving their products and operations from the environmental perspective to reduce risk, total cost of ownership and improve supply chain performance. Examples of green initiatives from Greece are presented together with references to success stories from the private sector. Reference is made to the total life cycle cost, and the non-cost criteria in decision making, trends in green procurement and opportunities for further research, all leading to the never ending question of whether Green Procurement is the right decision or not at this point in time for particular private and public sector businesses.

Keywords: sustainable logistics, challenges and opportunities, green procurement, improving products and operations from environmental perspective to reduce risk, total cost of ownership and improve supply chain performance. Greece.

1. Introduction

Many organizations worldwide are making an effort to purchase products and services that are less harmful to local and global environments. Both public and private sector organizations are implementing purchasing practices that include environmental (and social) considerations—green procurement. These activities are part of a broader movement toward more sustainable forms of production and consumption. Internationally, government procurement markets in 1997 accounted for 5–18% of GDP within OECD member countries (OECD, 2002). Governments are realizing the benefits of green procurement practices such

as cost savings from reduced energy consumption, resource use, and material management. They also reap more qualitative benefits such as improved image and achieving policy/program objectives.

Leading private sector organizations have also demonstrated significant movement towards greening procurement practices (Laios, 2008). Many private firms are working to improve the environmental performance of their operations and products (Laios, 1999) and green procurement has been a logical extension of this work. Private sector organizations have in the last two decades adopted green procurement practices for specific products (e.g., recycled-content office paper, renewable energy, paints, cleaners, etc.), but are also looking at the materials, substances and chemicals they purchase that go into the products and services they provide. This supply chain approach looks beyond the company's "gates" in an ongoing effort to reduce costs and risk. Leading companies are using life-cycle assessment and material tracking tools to identify materials, substances and chemicals in their products that pose significant environmental, health and safety risks and re-design their products to reduce or eliminate such materials (Lacroix, 2008A), (Lacroix, 2006B). In the private sector green procurement is seen as a means towards improving their products and operations from environmental perspective to reduce risk, total cost of ownership and improve supply chain performance (Lim, 2006).

Despite differences in emphasis, green procurement activities in both the public and private sectors take four main approaches:

- Procuring eco-labeled products or services
- In-house product/service evaluations
- Third-party product/service evaluations
- Supply chain initiatives

These approaches are often initiated within administrative, procurement, environmental or operational departments of private firms. Green procurement activities often rely on established product standards, labels and certifications that declare the environmental attributes or performance of the product. Driven by bottom-line performance, leading private sector firms see green procurement as a logical part of effective purchasing and supply chain management practices. Private companies often use in-house and third-party evaluations to make informed green procurement decisions. Private businesses however are reluctant to establish green procurement activities unless there are clearly demonstrated business benefits for themselves and/or their customers.

2. Definitions of Terms

"Green Procurement" (formerly known as Affirmative Procurement) is the purchase of environmentally preferable products and services in accordance with one or more of the established "green" procurement preference programs (Lacroix, 2010),. Green procurement is the purchasing of products or services which have a lower impact on the environment over their whole life cycle than the standard equivalent. It involves the integration of environmental issues into purchasing decisions based on price, performance and quality. This means that products or services that consume fewer natural resources should be given preference over competing products or services exerting a greater environmental impact. To prevent waste and pollution, these programs require considering environmental impacts, along with price, performance, and other traditional factors, when making purchasing decisions. The Typical Green Procurement program elements are (Lacroix, 2010):

- Recycled content products
- Energy Efficient products and energy efficient standby power devices
- Alternative fuel vehicles, alternative fuels, and fuel efficient vehicles
- Bio-based products
- Non-ozone depleting substances
- Alternative fuels and fuel efficient vehicles
- Environmental Protection Priority Chemicals

Purchasers are also encouraged to follow Environmentally Preferable Purchasing (EPP) guidelines as part of any Green Procurement Program (see Figure 1 – "How Mature is the Green supply chain" which illustrates some of the Green aspect of procurement.)

«Life Cycle Impact». Environmental impacts should be considered cumulatively over the entire life cycle of a product or service to avoid shifting adverse environmental effects from one stage of the life cycle to another. This approach is urged by both the United Nations Environment Programme and the European Union. It involves considering the impacts of extraction of raw materials, distribution, operation and disposal.

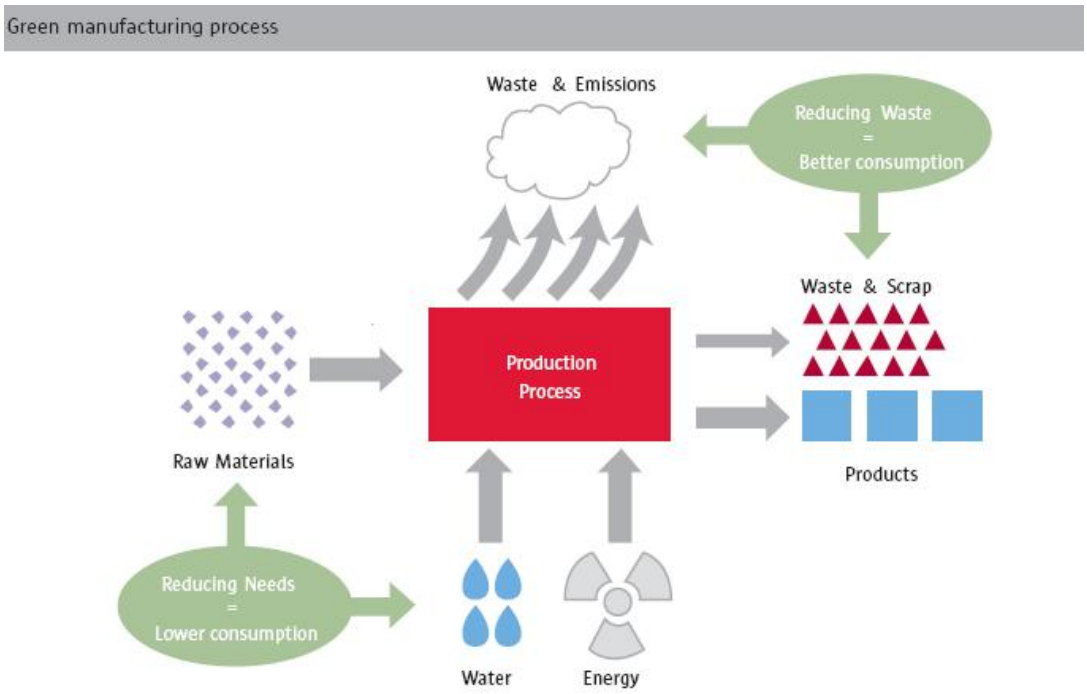

Figure 1. Green manufacturing process

Source: Supply chain Monitor, 2008 (How Mature, 2008).

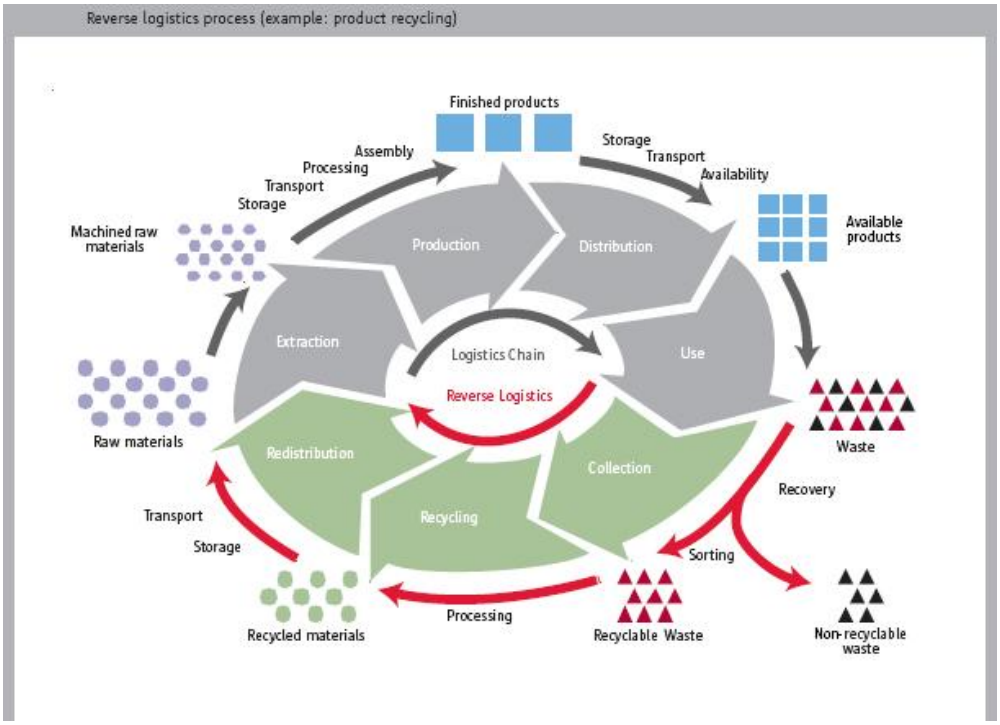

Figure 2. Reverse logistics process (example: product recycling)

Source: Supply chain Monitor, 2008 (How Mature, 2008).

This module summarizes the most important sources of environmental information relating to the procurement of goods and services. The information carried in the Green Procurement module will be particularly useful for:

- Small and Medium-sized Enterprises who wish to enhance their prospects of tendering success by satisfying environmental standards required in contracts
- Purchasers who want to learn how to appropriately 'green' their tenders

«Green Public Procurement in Europe». A study undertaken by the Commission in 2003 on the 'State of Play of Green Public Procurement in the European Union' revealed the wide variation in achievement in this area within Europe (Lacroix, 2010),. Denmark showed an impressive amount of commitment to green public procurement with 40% of administrations that include environmental criteria for more than 50% of their purchases. Similarly in Sweden 50% of administrations include environmental criteria for more than 50% of their purchases. Germany rated third with 30% and the UK at 23% still beat the average of 19%. It is clear that other countries in the European Union could learn from the example of Denmark and Sweden.

3. Pros and Cons of Green Procurement

3.1 Pros of Green Procurement

Japanese and European leading companies that decide to go along with green procurement activities are experiencing tangible benefits. Strategic sourcing can create value through increased overall cost efficiency, enhanced reputation and market share, and reduced environmental risks and liabilities. **Economic benefits** are achieved when reducing supplier-generated wastes and surpluses, when decreasing handling expenses and risks associated with waste disposal and from supplier's savings from improved efficiencies which may be passed along to buyers in the form of reduced prices. **Competitive advantage** is achieved through innovation. This occurs when efficient production is enhanced through suppliers' use of cleaner technologies, process innovation, and waste reduction. This is especially true when suppliers and customers work together to find new ideas. **Improved public image** is achieved when the greening of one's suppliers can contribute to a company's overall reputation among customers, investors, employees, and other stakeholders. **Tangible benefits** that are typically achieved by companies comprise, Cost avoidance due to lower waste management fees, lower hazardous material management fees, less time and costs for reporting; Savings from conserving energy, water, fuel and other resources (Khiewnavawongsa, 2008),(Lacroix, 2008B),(Lacroix, 2006B),(Lacroix, 2005); Easier compliance with environmental regulations; Demonstration of due diligence; Reduced risk of accidents, reduced liability and lower health

and safety costs; (Hill, 1993), (Isaak, 1998) Support of environmental/sustainability strategy and vision (Lacroix, 2007),(Lacroix, 2006A)]; Improved image, brand and goodwill; Improved employee and community health through cleaner air and water, less demand for landfill and less demand for resources (Lacroix, 2008B),(Lacroix, 2006A); and Increased shareholder value. While there are a number of other quantifiable measurable benefits which can be achieved from implementing green procurement, cost savings and risk reduction are perhaps the most universal across all types of industries and organizations. Qualitative benefits such as improved image, brand or ability to meet policy commitments is another key benefit and is of note in a business and public sector climate that is increasingly influenced by the public, nongovernmental organizations and employees that are well informed and educated around the environmental and social issues related to products and services. How both public and private sector organizations measure these benefits varies. They often quantify direct costs savings, environmental benefits, money spent or estimate hidden or indirect savings.

Success Stories from the Private Sector

General Motors of Canada works with suppliers and dealers to establish pollution-prevention practices that reduce environmental impacts and operational costs. By purchasing 6,650 reusable crates and pallets to deliver plastic parts to dealers, the company has eliminated the need for roughly 266,000 cardboard crates per year. The City of Santa Monica, Calif., enlisted city custodians to evaluate the effectiveness of less-toxic or nontoxic cleaning products. Bids from product vendors must now include environmental and health specifications as well as performance and cost criteria. When Chicago-based utility Commonwealth Edison factored life-cycle costs into its purchasing in the early 1990s, the company discovered that one of its largest hazardous-waste streams was the roughly 60,000 gallons of spent solvents it generated each year. ComEd established successful processes to reduce existing solvent inventories and screen solvents being considered for purchase. Leading private sector organizations have demonstrated significant movement towards greening procurement practices. As one of many examples, Home Depot (with a procurement volume of US$40 billion globally each year) has programs to procure and sell environmentally preferable products (Vershuren, 2002). Many private firms are working to improve the environmental performance of their operations and products and green procurement has been a logical extension of this work. Similar to public buyers, private sector organizations have in the last two decades adopted green procurement practices for specific

products (e.g., recycled-content office paper, renewable energy, paints, cleaners, etc.), with a few others have developed green procurement policies that cover a wider range of products, services and environmental issues. As the business benefits of these efforts become better known, green procurement is continuing to grow in the private sector. For manufacturing and process-oriented firms, such as DaimlerChrysler, green procurement practices look at the materials, substances and chemicals in the products and services they provide. Subsequently, this approach looks beyond the company's "gates" to include the materials, substances and chemicals its suppliers use. In ongoing efforts to reduce costs, leading companies use life-cycle assessment and material tracking tools to identify materials, substances and chemicals in their products that pose significant environmental, health and safety risks and re-design their products to reduce or eliminate such materials. Often, the risk of using a material of concern is associated with quantifiable costs to the company (e.g., NPRI reporting costs), its suppliers (e.g., special handling and transport costs), the user (e.g., costs for protective equipment and training) or end-of-life processor (e.g., hazardous waste disposal costs) (Rowlege, 1999). Leading companies have been able to capitalize on reducing these risks to reduce costs and achieve business benefits. In addition, private sector companies face increasing public scrutiny. Information on the original source of products (such as coffee and fish) and services has become increasingly available to NGOs, consumers and voters. A more educated supply chain is also serving to drive the elimination of specific substances or materials within products (e.g., mercury from lamp switches in automobiles, brominated flame retardants from electronic equipment, lead from paint, etc.). Another factor, specifically driving product-oriented companies to look at their procurement of components, materials, substances and chemicals, is the changing regulatory landscape. New voluntary agreements and formal regulations increasingly focus on "extended producer responsibility," where manufacturers may be held responsible for the products they sell when those products reach the end of their useful life. This expanded notion of responsibility is also expanding the concept of product liability and risk (European Directives on automobiles, 2008). Given potential cost savings, increasing scrutiny from the public and extended producer (or product) responsibility, leading private sector connect green procurement to financial performance. Informed purchasing decisions that consider the environmental attributes of products and services procured can benefit business by reducing risk, liability and costs and improving operational efficiency, product quality, product performance and supply chain management. To further this, the CEC is working to clarify the connections among risk reductions, cost reductions and reduced financial risks. The intent is to enable financial institutions to

calculate the full value of companies with environmental programs and initiatives when assembling their lending portfolios. Specifically, the CEC project focuses on two areas to understand the interrelation between finance and environment: 1) How environmental information affects financial markets; and 2) What are the investment opportunities in the environmental "sector."

Case Study: Wall-Mart, USA

In October 2005, in an auditorium filled to capacity, Wal-Mart President and CEO Lee Scott made the company's first speech to be broadcast to 1.6 million employees in all 6,000-plus stores worldwide—and shared with its 60,000-plus suppliers. Scott announced that Wal-Mart was launching a sweeping business sustainability strategy to dramatically reduce the company's impact on the global environment and thus become "the most competitive and innovative company in the world." He argued that "being a good steward of the environment and being profitable are not mutually exclusive. They are one and the same." He set the three ambitious goals: To be supplied 100 percent by renewable energy; to create zero waste; and to sell products that sustain Wal-Mart's resources and the environment. In little over two years, Wal-Mart's progress toward those goals and the array of innovative practices that Wal-Mart is implementing to "green" its supply chain have brought these amazing results (Plambeck, 2007): **Buying diesel-electric and refrigerated trucks** with a power unit that could keep cargo cold without the engine running, the logistics network achieved roughly a 25 percent improvement in fuel efficiency, saving nearly $75 million in fuel costs and eliminating an estimated 400,000 tons of CO2 pollution in one year alone. **The packaging network implemented a Web-based scorecard** that would evaluate each product's packaging against nine sustainability metrics, including cube utilization, recycled content, CO2 per ton of production, and recovery value. The scorecard was developed with input from the 200-plus members of the packaging network, including nonprofits, the U.S. Environmental Protection Agency, Wal-Mart's direct suppliers, packaging suppliers, and other stakeholders. Wal-Mart's more than 60,000 suppliers were asked to use the scorecard throughout calendar 2007 to see how their packaging innovations, environmental standards, energy efficiencies, and use of materials rated relative to their peers. Beginning in 2008, Wal-Mart formally planned to use the system to "measure and recognize its entire supply chain based upon each company's ability to use less packaging, utilize more effective materials in packaging, and source these materials more efficiently relative to other suppliers." The scorecard is an important enabler for Wal-Mart to achieve its public goal of reducing the packaging used by all of its suppliers

by 5 percent between 2008 and 2013. If achieved, this five-year program is expected to generate $3.4 billion in savings. In the first month, 2,268 vendors have logged onto the packaging scorecard site and 117 products have been entered into the system. **Making a five-year verbal commitment** to buy only organically grown cotton from farmers, and to buy alternate crops those farmers need to grow between cotton harvests. Last year, the company became the world's largest buyer of organic cotton. Promising by 2011 to only carry **seafood certified wild by the Marine Stewardship Council**, a group dedicated to preventing the depletion of ocean life from overfishing. **Buying (and selling) 12 weeks' worth of Restrictions on Hazardous Substances** (RoHS)-compliant computers from Toshiba.

3.2 Cons of Green Procurement

Green-procurement initiatives typically don't come easily. **Getting buy-in from suppliers often takes a concerted and persistent effort.** Environmental managers may also encounter initial resistance to change from within their own company's procurement department. **Some environmentally preferable products aren't as readily available**, and may not meet performance specifications, or may not be cost-competitive. However, these products often outperform their less-green counterparts through improved efficiencies or favorable life-cycle costs. The better known challenges which exist for private sector organizations in implementing and stimulating green procurement programs include: **Estimating hidden costs and potential savings**. Total cost of ownership and life-cycle costing tools provide a means towards estimating potential benefits (e.g., reporting, material handling, and disposal), however, purchasing departments are often ill equipped to conduct such calculations. These calculations often require an in-depth knowledge of the products being procured and how they are used and disposed of. They often also include **Mis-informed advocacy groups.** One important challenge to green procurement as a whole is that well-intentioned environmental groups may not understand the full picture and will send conflicting messages. This can lead to frustration on the part of procurers and undermine the effort. There appears to be a need to facilitate communication among environmental groups to ensure that their advocacy efforts send a consistent message to procurement officers (i.e., education on what is an environmentally preferable car, paper, etc.) (Case, 2002). In some cases the culprit is the **Lack of clear definitions.** Many procurement professionals and their organizations are still unaware, uncertain or struggling to define the term "environmentally preferable." This becomes particularly difficult when organizations need to balance multiple environmental attributes in their decision-making. In practice larger organizations are challenged with the

Integration into management systems. Decentralized organizations require consistent management systems to ensure consistent application of environmental initiatives. Many green procurement activities in the public sector have been bottom-up, initiated by small groups or individuals. Integrating green procurement activities within a quality or environmental management system can help ensure objectives, targets and measurement procedures are established throughout an organization. Many mid-sized companies face a challenge in **Educating marketing and sales professionals.** For companies who are selling and marketing green products, educating sales people about the environmental attributes of a product or services is a challenge. This is especially important in industries with high employee turnover. Stimulating customer demand for environmentally preferable products is key, but if employees are not actively communicating this information, much opportunity to raise consumer awareness is lost. Companies with a global vision also experience **Potential barriers to trade.** Globalization and international trade issues pose potential barriers to establishing procurement programs for both governments and private firms. Eco-labels have in the past, and likely in the future, will be discussed as a "barrier to trade" issue. There have been instances where eco-labeling has been designed to support certain products within specific markets (e.g., the overwhelming demand by consumers in the UK for labeling of GMO foods). As a result, labeling organizations tend to use clear, science based, environmental criteria when establishing their programs. For instance, the Municipality of Kolding, Denmark, cannot request that products have an ecolabel (such as the Nordic Swan or the EU flower) when designing calls for tenders with environmental criteria. This is because such requests would not comply with the World Trade Organization's Government Procurement Agreement and European Union legislation on free market and equal opportunities. Instead, municipalities can specify environmental requirements similar or identical to those required by an ecolabel. It is important to note a recent report by the CEC group on "Green Procurement in Trade Policy" which concludes that agreements such as the Uruguay Round Agreements, the North American Free Trade Agreement (NAFTA) and the Free Trade Area of the Americas (FTAA) do not pose serious barriers to green procurement in North America (Early, 2003). The Lifecycle mindset is new to some procurement professionals and requires **changing the first cost mindset**. A key challenge identified by many public and private sector organizations is changing behavior with the purchasing departments. In many instances, procurement is based on established supplier relationships, personal or brand preferences. First cost as the prime decision factor in purchasing. Many public sector organizations do not have purchasing practices that factor in total cost of

ownership, or full life-cycle costs of the organization. Providing information and tools that will change these behaviors to favor environmentally preferable products will be key to overcoming the status quo. Last but not least, **Insufficient and incomparable environmental information** makes sourcing difficult for procurement professionals**.** There is often not enough environmental information available on certain products (e.g., Interface requires information on embodied energy of supplied materials, which most suppliers do not have). Making this information available in a manner that is relevant to procurement officers, procurement specifications and their decision-making processes is a further challenge. For instance, the Bank of America had to work hard to convince a standards-setting committee for the financial industry to accept recycled paper for checks and other encoded banking documents (PPRC, 1999).

3.3 Green Initiatives in Greece

Several good initiatives have been noticed in Greece starting with the Municipality of Athens recycling kiosks and Paper Bag initiative (see Figures 3 & 4 below) to a web site on green procurement from 2006 see Figure 3 below.

Figure 3 & 4. A recycling kiosk in Athens (2004) & Paper Bag initiative (2008)
Source: Municipality of Athens 2004 (Mun. Athens, 2010).

Noteworthy is the excellent book by Ioannis Zisis on Green Entrepreneurship in Greek (Zisis, 2003) which covers many of the green initiatives in Greece including the role of the NGO SOLON. Mention is made to the various community support frameworks of the EU as well as to green initiatives of Greek ministries with focus on the Ministry of the Environment, Planning and Public Works. A worthwhile and quite current book of reference to consult for green entrepreneurship initiatives in Greece.

Figure 5. www.greenprocurement.gr (2008)

Source: (Greek green procurement web site,2008).

4. Guidelines to implement a Green Procurement Program

In most companies, greening the supply chain requires a comprehensive understanding of one's supplier relationships: which suppliers most affect environmental (Lacroix, 2007),(Lacroix, 2006B), health, and safety costs, risks, and reputation; which represent the greatest leverage points for efficiency and cost improvements; how to communicate effectively with suppliers on EH&S issues; and what are meaningful and verifiable means of tracking and measuring supplier environmental performance.

Following are ten tips for implementing an effective green-procurement program:

1) Research company procurement policies. Find out if and to what extent your company's procurement policies give price preference to environmentally preferable products.
2) Define your terms. Many people don't have a specific understanding of common phrases such as "environmentally preferable purchasing."
3) Screen suppliers and subcontractors. Survey them on specific EH&S practices and use a point scale to judge their responses. Encourage or require suppliers to implement environmental management systems. Provide suppliers with "blacklists" of undesirable chemicals or other materials.
4) Collaborate on an action plan. Involve suppliers early and often in product, process, and strategic decisions that impact them. Add suppliers to planning teams to implement design for environment initiatives. Within your own company, seek to collaborate at multiple levels, involving the technical personnel that plan and manage day-to-day operations.

5) Choose green products. Purchase raw materials that contain fewer toxic ingredients, are recyclable, or utilize recycled materials.
6) Test new products in small quantities. Evaluate results before expanding purchasing department- or company-wide.
7) Buy in larger quantities. Buyers' cooperatives enable smaller buyers to aggregate purchasing power, providing them with more leverage to persuade suppliers to undertake EH&S initiatives.
8) Have clear, written ground rules and expectations. Laying out guidelines in advance will make for smoother supplier audits, periodic reviews, and other performance assessments. Plan for face-to-face performance reviews with your suppliers on a periodic basis -- perhaps quarterly or twice a year.
9) Expect slow, incremental change. Put your procurement plan through an initial testing phase to pinpoint and solve potential problems. Assume that it will take time for programs to roll out company-wide.
10) Communicate the benefits. Resistance to change is common. Sharing the positive environmental impacts of purchasing policies with suppliers and procurement managers can help green-procurement programs maintain momentum.

5. Conclusion

Green procurement may or may not be the way of the future for a particular business or public sector company. The success stories cited in this paper and other sources illustrate the specific benefits and opportunities of green procurement in the private sector. A range of resources and organizations exist to assist both the public and private sector in adopting green procurement practices. Green procurement practices often vary and depend on the service, product, resource, material, substance or commodity being purchased. Integrating environmental, health and safety aspects of products/services into the procurement process (and weighting them accordingly), alongside the traditional criteria of cost, quality, safety and technical performance continues to be the major challenge with both public and private sector organizations. While several challenges remain, they continue to be identified and addressed. Importantly, international trade agreements will not pose serious barriers to green procurement (Early, 2003). In the private sector, the potential to reduce the frequency/severity of accidents, reduce liability and material handling and disposal costs are important benefits to communicate. The interviews and success stories indicated that organizations tend to use four key ways of measuring the results and benefits of green

procurement programs: measuring direct cost savings; estimating environmental benefits; reporting money spent; estimating hidden costs and potential savings. Tracking and measuring of green procurement activities and benefits is an area for further emphasis within the private sector.

There are several areas that need further attention in the coming years to continue fostering green procurement: **Continuing education and awareness on the business case**, success stories and best practices for green procurement, including networking between practitioners, and between private and public sector organizations. **Promoting, adopting and expanding existing product/service standards** and procurement criteria among government procurement practitioners. **Further international cooperation** to share standards and procurement criteria between labeling and standards organizations. This would help to promote mutual recognition and equivalency of labels and standards. **Explore and focus education and discussion** on how to "green" procurement activities can be integrated into existing environmental and quality management systems by private and public sector organizations. **Providing simple tracking and measurement techniques to quantify and help communicate the benefits** of green procurement activities. There is a need for measuring and reporting that enables products and services to be compared and enables private and institutional investors, as well as the banks and insurance agencies, to use the information.

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