Presidential Transition Series

What the Federal Government Can Do to Encourage Green Production

Nicole Darnall
Assistant Professor
Department of Environmental Science and Policy
George Mason University

IBM Center for
The Business of Government

2008

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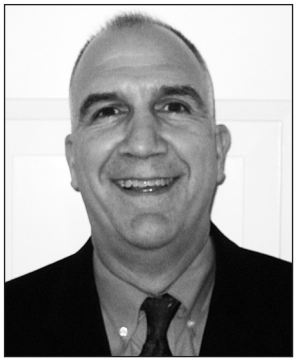
FOREWORD

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, "What the Federal Government Can Do to Encourage Green Production," by Nicole Darnall. This report identifies factors that discourage companies from using "green" production methods and offers advice to the next administration and Congress on how to address them.

Albert Morales

The green movement has reached a tipping point in recent years. Private industry now realizes that using green production techniques not only improves the environment but also can provide significant financial benefits by reducing waste, regulatory costs, and potential long-term liabilities.

While technology and markets will play a crucial role, government actions will be just as critical. This report identifies six factors that currently discourage industry from undertaking green production methods. Many of them could be ameliorated if the federal government provided greater leadership in creating expectations that consumers, investors, and industry include environmental considerations in their day-to-day decision making. Having open discussions on how different segments of society can take part in addressing environmental challenges can raise awareness, increase demand by consumers, and result in increased investments by investors and industry. Providing measurement tools for assessing progress can help as well. Existing measures, such as the EnergyStar program, have had significant, measurable effects, and new tools could as well.



James Y. Loving, Jr.

We hope that this report will provide useful insights for the new administration and the next Congress as the federal government develops an environmental agenda for the coming years.

Albert Morales
Managing Partner
IBM Center for The Business of Government
albert.morales@us.ibm.com

James Y. Loving, Jr.
Business Development Executive
for Energy, Environment and Sustainability
IBM Public Sector
loving@us.ibm.com

EXECUTIVE SUMMARY

In recent years numerous studies and media accounts have discussed how companies that are improving their environmental performance by undertaking green production are reporting significant financial benefits from doing so. While deriving financial benefits is good for business, the environmental benefits of these private actions also can be enjoyed by society. This win-win arrangement raises an important question for the new administration and the 111th Congress: If business opportunities exist from engaging in green production, why aren't all companies pursuing it?

This report identifies six obstacles that discourage most companies from undertaking green production:

- Insufficient federal leadership
- Poor understanding of environmental costs and benefits
- Weak internal coordination
- Organizational inertia
- Poor diffusion of green production best practices
- Consumer and investor inability to recognize and reward green companies

Unless these obstacles are resolved, the vast majority of companies will likely forgo developing a green production program. This report offers recommendations to the new administration and Congress to address these issues. The recommendations are categorized into three themes: strengthening federal leadership, expanding federal initiatives, and establishing a mandatory environmental product label policy.

Strengthening Federal Leadership

Recommendation 1: The new administration should create greater expectations that consumers, investors, and company managers consider the environment in their decision making. Specifically, the new administration should have open discussions about how different societal actors can take part in addressing global (and local) environmental problems. Additionally, it should raise environmental consciousness and influence individuals to actively seek environmentally friendly products and investments. Doing so can encourage companies to engage in green production and encourage speculators to invest in green technologies. Combined, these efforts can expand market opportunities for environmentally conscious businesses and improve the environment.

Recommendation 2: The new administration should frame the issue in a way that invites corporate-wide interest. The new administration and the 111th Congress must move beyond the win-lose rhetoric—protecting the environment and enhancing economic prosperity can lead to win-win outcomes. Green production is an opportunity for companies to reduce their liabilities and regulatory pressures, improve their internal efficiencies, enhance market opportunities, and add business value.

In reframing the issue, the new administration and the 111th Congress should:

- Convey a sense of urgency so that companies understand why undertaking green production *now* is in their best interest.

- Discuss how the local community can benefit from companies undertaking green production programs since most individuals connect more directly with local issues.
- Use business language to describe how undertaking green production can improve business value.

Expanding Federal Initiatives

Recommendation 3: The Environmental Protection Agency should develop online environmental accounting tools.
A significant impediment to companies implementing green production programs is knowledge of cost-saving opportunities. The U.S. Environmental Protection Agency (EPA) should develop online environmental accounting tools to help companies better understand the costs and benefits of green production. Doing so can help companies build a business case for going green.

Recommendation 4: The Environmental Protection Agency should promote the use of environmental audits to help companies diffuse green production practices throughout their organizations.
EPA should encourage companies to use environmental audits. These audits differ from typical "compliance audits," which focus on ensuring that a company complies with environmental regulations. Environmental audits systematically assess how well a company's management practices conform to green production goals and help diffuse green production practices throughout a business organization.

Recommendation 5: The Environmental Protection Agency should develop an approved "template" and encourage companies to use it in their voluntary environmental reporting.
EPA should develop a standardized environmental reporting template to increase the transparency of corporate environmental reporting and allow individuals to compare companies' environmental attributes. Comparability of companies' environmental attributes would be of particular interest to financial organizations and to nonprofit organizations that are seeking to identify more ecologically sustainable companies. Moreover, by asking companies to measure and report on specific metrics, companies would likely manage them to a greater degree. Companies that obtain external certification for their conformance to the template should be granted the privilege of using an EPA-developed logo for use in their marketing and promotions.

Recommendation 6: The Environmental Protection Agency should expand technical assistance offerings to encourage more companies to undertake green production programs.
Since many company managers mistakenly believe that developing green production programs is too costly, EPA should expand its technical assistance offerings to decrease the "risk" associated with developing a green production program. In particular, EPA should focus on providing technical assistance to companies with the largest environmental footprints to further reduce their environmental impacts.

Establishing a Mandatory Environmental Product Label Policy

Recommendation 7: The new administration and the 111th Congress should consider establishing a mandatory environmental product label policy.
Like nutrition labels on food, which have influenced consumers to assess the composition of the food, environmental labels would equip consumers with information to scrutinize the environmental footprints of the products they purchase.

Labels would also provide investors with credible information about a company's environmental focus and reduce opportunities for companies to make false product claims about their products' environmental attributes. Even if only a small portion of consumers used the environmental information in making their product purchases, a small portion is all that is needed to radically change companies' production decisions so that they become more environmentally friendly. Product labels should be *mandatory, multidimensional, comprehensive, standardized,* and *government developed* in order to be effective.

The success of an environmental product labeling policy rests on whether or not interested parties believe the information disclosed on the label is credible. If consumers and investors do not trust this information, the labeling program will do little to influence the demand for green products. Label

credibility can be ensured by using random testing and by levying swift penalties on companies that use environmental product labels to misrepresent their products' environmental impacts.

Conclusion

In sum, companies are investing significant resources in green production programs and benefiting financially by doing so. However, significant barriers prevent business from undertaking more widespread green production. This report offers specific recommendations to reduce these barriers.

The recommendations above are supported by examples from numerous companies in the pages that follow. These examples provide important context for the new administration and the 111th Congress to take stronger action to encourage green production throughout society.

What Is 'Green' Production?

In recent years we have been hearing a great deal about companies' so-called "green" production efforts. But what exactly is green production?

The Concept

A company's environmental efforts can be classified as either reactive or proactive. *Reactive* environmental efforts are the actions companies take in order to comply with environmental regulations. These actions are considered reactive because companies are required by law to implement them.

By contrast, *proactive* environmental activities are the efforts companies undertake that are not required by law and that reduce pollution. Green production is a type of proactive environmental activity.

It is a twofold concept that has both an internal and external focus:

- *Internally,* green production involves the improvement of a company's organizational efficiencies by minimizing waste in the production cycle. These efforts can increase profitability in that a company's output remains constant while its cost per unit output falls.
- *Externally,* green production involves addressing the increasing demand for green products and technologies. Such efforts include developing new product concepts that reduce consumer and business-to-business waste.

Types of Green Production Activities

Whether a company focuses its green production efforts internally or externally, its foundation rests on one of three types of activities:

- Pollution prevention
- Product stewardship
- Innovative green technologies[1]

Pollution Prevention

Pollution is the contamination of air, soil, or water by the discharge of harmful substances. Pollution prevention is the reduction or elimination of pollution at the source (source reduction) instead of at the end-of-the-pipe or stack. Pollution prevention occurs when raw materials, water, energy, and other resources are used more efficiently, when less harmful substances are substituted for hazardous ones, and when toxic substances are eliminated from the production process. Pollution prevention allows for the greatest and quickest improvements in environmental protection by avoiding the generation of waste and harmful emissions.[2]

For instance, by switching from solvent-based coatings to water-based coatings, a company can not only improve the environment but also eliminate having to meet environmental approvals. As a consequence, this modification can speed up the time that it takes to get a company's product to market. It also reduces the company's long-term liabilities related to hazardous waste disposal. In other instances, pollution prevention focuses on non-regulated environmental impacts such as energy use. 3M's energy conservation program is one example. Beginning in the year 2000, 3M challenged 150 company sites to reduce their energy consumption by 4 percent a year. The result for 3M has been a savings of more than $190 million.

Pollution prevention focuses on improving a company's *existing* products and processes. It does so by

engaging the company's *internal* stakeholders—its employees and managers—to reduce pollution at the source.

Product Stewardship

Like pollution prevention, product stewardship focuses on improving a company's *existing* products and processes. However, it extends the company's reach by looking beyond organizational boundaries to individuals and organizations that are involved in a product's life cycle. A product's life cycle is its design, development, distribution, use, and disposal or reuse. Companies that undertake product stewardship assess the environmental performance of their products from raw material access, through production processes, to product use and disposal of used products. For instance, in developing 3M's product stewardship program, its Valley, Nebraska, facility recognized an opportunity to reduce its supplier waste. By working with its supplier, shipments now incorporate reusable packaging. The modification reduced shipping waste at this single 3M facility by 8 tons in the first year (see "Product Stewardship at 3M" sidebar).

Product stewardship requires particular attention to product design and identifying ways in which existing products and processes can be redesigned to reduce waste. These modifications create opportunities for companies to differentiate their existing products from competing products in the market. More comprehensive product stewardship programs also require companies to have strong relationships with their suppliers, distributors, and customers so that they can reduce waste throughout the product's life—from cradle to grave.

Innovative Green Technology

Innovative green technology differs significantly from pollution prevention and product stewardship because it does not focus on improving the company's existing products and processes. Rather, innovative green technologies look toward *unseating* existing products and processes by making them obsolete.

Innovative green technologies disregard widely accepted industry routines and knowledge. Companies that pursue these efforts engage external stakeholders and build partnerships with nontraditional stakeholders such as environmental groups, consumer groups, and other companies to acquire new competencies, knowledge, and vision. A company's goal for undertaking green innovation is to reposition itself for tomorrow's business opportunities. Doing so requires significant experimentation and leadership.

Most companies that have robust innovative green technology programs already have invested in pollution prevention and product stewardship activities and, therefore, have a significant focus on the environment and improving internal efficiency. Further, these companies have strong relationships with their internal stakeholders and their supply chain.

However, companies that invest in innovative green technology also recognize that pollution prevention and product stewardship lead to continuous *incremental* improvements in existing products rather than *radical* changes in product development. By investing in innovative green technology, companies can reposition themselves in such a way that establishes their role as an industry leader, preempts competitors, and, in some instances, restructures

Product Stewardship at 3M

3M has one of the most established pollution prevention and product stewardship programs among U.S. manufacturing companies. In 2005, the program celebrated its 30th anniversary. Overall it has prevented more than 2.6 billion pounds of pollution. In the first year of its program, 3M estimates that it saved $1 billion.

One example of the types of product stewardship efforts 3M has undertaken is the redesign of the packaging of its Post-it® Flags. The new design reduced waste by doing away with the back card and plastic blister cover from the packaging. These changes eliminate 35 tons of solid waste annually.

The company also is working closely with its suppliers. Its Valley, Nebraska, facility worked with its supplier to change the component packaging to a system where both the containers and input packaging can be returned. This modification reduced shipping waste by approximately 8 tons in the project's first year.

their industry. For instance, by investing in hybrid locomotive technology, General Electric (GE) aspires to do for the locomotive transportation market what Toyota did for the automobile market. By establishing itself as an early market entrant in hybrid locomotive technology, GE hopes to preempt its competitors and establish itself as a market leader in this area (see "Green Innovation at General Electric" sidebar).

Benefits of Green Production

Companies can benefit from green production by:

- Reducing long-term liabilities
- Reducing regulatory costs
- Preempting regulation
- Reducing supply chain risk
- Improving internal efficiencies
- Enhancing market opportunities

Reducing Long-Term Liabilities

The first way in which companies can benefit from green production relates to reducing their long-term liabilities. A long-term environmental liability is a legal obligation to clean up contamination of air, soil, or water due to the intentional and unintentional discharge of harmful substances. Even though many environmental discharges are legal, in some instances they can accumulate to such a degree that the producer will be held responsible for their cleanup. In other instances, producers of pollution can be held responsible for cleaning up toxic waste sites regardless of how small their contribution. By utilizing green production, companies can reduce or eliminate pollution before it is produced. Doing so also can decrease a company's liability associated with its production process.

Reducing Regulatory Costs

Environmental policy regimes that are more heavy-handed have a negative relationship with companies' profitability.[3] Achieving regulatory compliance often requires that companies commit manpower and resources toward obtaining operating permits, treating waste, adopting specific pollution control technology, and monitoring and reporting on specific environmental activities. However, for companies that avoid creating pollution, many environmental regulations would no longer be relevant to them.

To the extent that companies can reduce their environmental impacts below that threshold and keep it there, they may no longer need to apply for costly operating permits or undergo expensive monitoring

Green Innovation at General Electric

General Electric (GE) began investing significantly in innovative green technologies in 2005 when it developed its Ecomagination program. The company was responding to customer interest in environmentally friendly products. Additionally, GE was acting on market projections suggesting demand for wind power, solar photovoltaics, and fuel cells would grow to $100 billion by 2015, and clean water technologies would reach $35 billion by 2007. By investing in innovative green technologies, GE hopes to preempt its competitors and establish itself as a market leader in green energy and lighting.

Examples of Ecomagination products include GE's LED (light emitting diode) traffic signal modules. After switching 77,000 traffic lights from standard incandescent lamps to GE LED traffic signal modules, the State of Kentucky projects saving $1.7 million annually from reduced energy costs and $1.5 million in reduced maintenance and life cycle costs. Additionally, GE has developed a hybrid locomotive that reduces carbon dioxide emissions over traditional locomotive designs and increases fuel savings.

With the development of its Ecomagination program, GE pledged to double its annual revenues from clean technology products from $10 billion in 2004 to $20 billion in 2010. Further, GE expects that more than half of its product revenue will come from Ecomagination-certified products by 2015. To be certified, GE requires that Ecomagination products or services significantly improve customers' operating and environmental performance or value proposition. In 2005, GE introduced and certified 17 Ecomagination products. One year later it certified 43 Ecomagination products, and another 17 were on track for certification in 2007.

Reducing Regulatory Costs at Leff-Marvins Cleaners, Inc.

When Leff-Marvins Cleaners, Inc., of Pittsburgh, Pennsylvania, replaced its old dry-cleaning equipment with new cold-water-chilled closed-loop systems that recycle perchloroethylene (PERC), it no longer had to apply for a state environmental permit. The reason? Leff-Marvins' new equipment eliminated most of its regulated emissions and reduced its use of PERC from 200 gallons per month to 40 gallons per month. Leff-Marvins realized a net savings of $1,400 per month and now has one less regulatory requirement.

and reporting of specific environmental activities. Additionally, these companies can reduce their risks associated with emissions violations or legal implications of non-compliance. In some instances, companies are able to accrue a net gain. (For one example, see the sidebar "Reducing Regulatory Costs at Leff-Marvins Cleaners, Inc.")

Preempting Regulation

Some companies are able to use their green production programs to get ahead of the regulatory curve to such a degree that they can preempt future legislation altogether. In these instances, companies avoid the risk of more stringent regulation because their pollution is so low that additional regulatory controls would have little effect on their operating procedures (see the sidebar "Preempting Regulation and Improving Internal Efficiencies at Cisco Systems").

Preempting Regulation and Improving Internal Efficiencies at Cisco Systems

In an effort to preempt regulation and improve its operating efficiencies, Cisco designed and built its San Jose, California, headquarters to exceed California's state Title 24 energy standards by 15 to 20 percent. At two of the headquarters sites, which include 4.9 million square feet of space in 25 buildings, the company conserves an average of 49.5 million kilowatt-hours per year. These efforts are expected to save about $4.5 million per year in operating costs. They also put Cisco ahead of the regulatory curve so that the company avoids the risk of more stringent future regulation affecting its operating procedures.

In other instances, companies that are ahead of the regulatory curve may use their position to push strategically for more stringent environmental regulations. Doing so could offer these companies a competitive advantage over dirtier competitors that would struggle to meet tighter regulatory requirements.[4]

Reducing Supply Chain Risk

Many companies are relying on their green production programs to more closely manage their supply chain relationships. Such actions help companies avoid inheriting environmental risks from less environmentally conscious suppliers.[5] The global automotive industry is an example of one sector that collectively is considering the environmental attributes of its suppliers to avoid unnecessary environmental risks. U.S. automakers are requiring that their suppliers assess and continually improve their environmental performance. By doing so, these companies are reducing the risk of inheriting environmental problems and minimizing potential long-term environmental liabilities associated with their product inputs.[6]

Improving Internal Efficiencies

Another way in which companies can benefit from green production relates to improving their internal efficiencies and reducing operating costs. When waste occurs, product inputs and natural resources are not consumed entirely in the production process. Waste of any sort therefore represents an inefficiency in the production process or a problem with product design. To the extent that production waste can be reduced, companies can benefit financially.

In other instances, inefficiencies relate to general operating procedures that affect the entire organization, rather than the production process itself. For instance, when Cisco Systems assessed its general operating procedures, it identified an energy-savings opportunity. While electrical costs are generally bundled into overhead, Cisco took the point of view that these costs could be managed actively. A simple programming modification allowed the company to power down its computer monitors after 10 minutes of activity. This modification alone saved the company more than $15 million.

Enhancing Market Opportunities

Green production also can enhance business innovation. Business innovation has changed significantly in recent years and its pace is increasing. Innovation spans virtually all organizational and locational boundaries, and involves stakeholders rarely considered in the past. These changes create significant opportunities for companies that improve their environmental performance by reducing their production and legal compliance costs and enter into innovative markets that value green production.

For instance, Walden Paddlers developed the first kayak made of 100 percent recycled materials (see the sidebar "Green Innovation at Walden Paddlers"). By capitalizing on a cheap supply of recycled plastic, the company made a product that was more durable than other kayaks on the market and at a price that was significantly less than its competitors.[7] Companies such as Walden demonstrate that producing green products can lead to market benefits. This is especially true since green products are becoming more popular in society. In the U.S., 15 percent of consumers routinely pay more for green products, and another 15 percent seek green products if they do not cost more.[8]

The change in consumer preference increasingly is affecting product and service markets.[9] Consumers have demonstrated a willingness to pay price premiums of $30 per night for hotel services with superior environmental performance,[10] spend 20 to 50 percent more for organically produced food products,[11] and pay $3,000 to $8,000 more for hybrid cars over comparable non-hybrid models.[12] Shifts in market demand also have affected intermediary markets where North American companies report that corporate buyers (especially those in Europe) are offering preferential purchasing if they demonstrate minimal harm to the natural environment. GE hopes to capitalize on changing market demand. The company pledged to double its annual revenues from clean technology products from $10 billion in 2004 to $20 billion in 2010. It expects that more than half of its product revenue will come from environmentally friendly certified products by 2015 (see the sidebar "Green Innovation at General Electric" on page 10).

Additionally, companies that undertake green production programs can benefit by enhancing their social legitimacy. Legitimacy refers to organizations' actions that are considered desirable or appropriate.[13] Socially legitimate companies benefit from improving their intangible value, such as by developing an eco-friendly reputation, improving relations with environmental regulators, and enhancing community standing. These companies also are better positioned to expand into new markets that target environmentally conscious customers and gain differentiation advantages in existing markets. Combined, these activities help ensure a company's long-term survival and competitiveness.

Green Innovation at Walden Paddlers

Growing market demand for inexpensive recreational kayaks and the abundant supply of inexpensive recyclable plastics presented an opportunity for Walden Paddlers. In 1995 the company produced the first kayak made of 100 percent recycled materials. Its product innovation was made possible by working closely with its suppliers. By insisting on using green production principles, the company was able to produce a kayak that was tougher and lighter than kayaks made by competitors using traditional methods. Walden Paddlers has since become a market leader in popularly priced kayaks.

Factors That Discourage Green Production

Economists often pose the question: "Why are there no $10 bills lying on the ground?" Their answer is that someone has already picked them up. This question can be asked of corporate decisions to undertake green production. The question implies that green production opportunities do not exist, because if they did, companies already would be exploiting them. However, the vast majority of companies are not doing so. Six obstacles discourage most companies from undertaking green production:

- Insufficient federal leadership
- Poor understanding of environmental costs and benefits
- Weak internal coordination
- Organizational inertia
- Poor diffusion of green production best practices
- Consumer and investor inability to recognize and reward green companies

Insufficient Federal Leadership

Many U.S. consumers believe that federal leadership related to environmental issues such as climate change and sustainability has not yet been demonstrated[14], and they are concerned about our environmental future.[15] Additionally, the results of a national household survey showed that more than one-third of U.S. consumers indicate they are prepared to adapt their lifestyles to tackle environmental concerns.[16] Social awareness and behavioral change among members of the public depends on the public's knowledge of targeted environmental problems.[17] In the absence of this information, consumers, investors, and company managers are less likely to know what actions they can take to improve our environmental future. Moreover, consumers and investors have difficulty identifying which products are more environmentally friendly than others, and what companies are striving to be green.

In addition, insufficient federal leadership about climate change and environmental sustainability can encourage large segments of society to believe that these issues can be resolved if U.S. companies simply adhere to existing environmental laws. However, a study by the Worldwatch Institute concludes that most ecological systems are in decline, even in locations where companies are adhering to environmental regulations.[18] As such, compliance with existing environmental regulations is only one part of achieving long-term environmental sustainability.

Poor Understanding of Environmental Costs and Benefits

Many company managers believe that protecting the environment constrains their financial opportunities,[19] which is why they pursue an environmental compliance approach rather than a green production strategy. However, these same managers generally have a poor understanding of their company's environmental costs. This lack of knowledge is due to the fact that traditional accounting systems advocate that environmental costs should be bundled into administrative costs (overhead).

As a consequence, company managers consider environmental costs to be fixed rather than a cost that can be managed actively. Yet most environmental costs can be managed proactively, and doing so helps companies operate more efficiently.

For instance, energy costs often are bundled into overhead despite the fact that energy-savings projects

are some of the easiest pollution prevention activities to implement and generally have a high return on investment. As an example, during 2006 3M reduced its energy use by 11 percent in a single year and saved $25.6 million. Other types of environmental costs that often are bundled into overhead relate to water usage, disposal of unused inputs, and regulatory compliance.

Even when a company's mid-level managers recognize the cost-saving benefits of green production, barriers may still exist because executive managers believe that preventing waste is expensive.[20] Such a view makes it difficult for mid-level managers to implement a green production program since executive support often is required prior to implementing organization-wide changes.[21]

Weak Internal Coordination

Other barriers relate to weak internal control. Many proactive environmental strategies require cross-functional coordination among organizational departments and work in multi-collaborative teams[22] involving engineers, production managers, purchasing officers, and other employees.[23] However, companies typically suffer from limited cross-functional cooperation. As such, information learned by one business department often is not shared with others.

Weak internal coordination also fuels misinformation about the costs and benefits of green production. For instance, employees frequently can identify improvements that can be made in day-to-day operations that would improve organizational efficiencies and benefit the environment. However, generally there is no procedural mechanism in place for these ideas to be considered and implemented, especially if the remedy spans multiple departments. The result is that organizations often fail to explore green production opportunities that might otherwise improve their profitability.[24]

Organizational Inertia

Organizational inertia further discourages green production because innovative environmental programs can disrupt current production systems.[25] For instance, retrofitting a company's lighting systems to make them more energy efficient may require that production lines be shut down for a period of time. These modifications also may require additional internal coordination and planning, as well as small capital investments. Combined, these factors may be viewed as unnecessary and disruptive, especially when existing processes are profitable.

Inertia further exists because there are uncertain payoffs associated with undertaking some green production projects. For other green production projects, the payoffs are certain, but the payout period is not. This risk, coupled with potentially disruptive operational changes that occur with some green production projects, causes many top-level managers to dismiss the benefits of taking action.

One way to deter organizational inertia is to rely on experience. However, most companies historically lack experience in green production.[26] In situations such as these, unless faced with a low-risk decision, companies generally forgo basic green production opportunities to improve operational efficiencies. They also dismiss opportunities to develop green products or technological innovations that can enhance new market prospects and lead to a competitive advantage.[27]

Poor Diffusion of Green Production Best Practices

In some instances, company executives may support the idea of undertaking green production, but diffusion does not occur. This issue is particularly problematic in larger companies with multiple divisions, subsidiaries, and facilities. Because companies with multiple strategic business units operate with some level of autonomy, divisions, subsidiaries, and facilities may choose to disregard corporate leadership because there are few consequences. In other instances, these business units may undertake a green production program as required, but only at a basic level rather than fully integrating it throughout their operations.

Consumer and Investor Inability to Recognize and Reward Green Companies

Most consumers and investors have difficulty distinguishing which products and companies are green because of the lack of information that is available to them. In consumers' minds, the environmental performance differences between companies are

indistinct in that each business appears to have the same objectives and procedures. The lack of information reduces market efficiency in that environmentally conscious consumers who wish to purchase green products and services have limited information to do so. In other instances, companies offer information about their green production practices, but consumers do not find the messages compelling, in part because they are overwhelmed by competing environmental claims.[28]

Consumers also question the validity of companies' self-proclaimed greenness. These same factors are affecting the investment community's ability to accurately identify environmentally friendly businesses. Within this setting, the challenge for the environmentally conscious company is to inform consumers and investors in a credible way about their otherwise unknown environmental activities and policies, thus reducing market information asymmetries (see the sidebar "What Are Information Asymmetries?").

These factors pose a substantial impediment to companies wishing to receive market recognition for their green production activities. They also suggest that unrealized financial benefits may exist for organizations which are able to distinguish themselves as being environmentally friendly.

In spite of the market limitations, a small number of investment options have developed for the green-minded investor (see the sidebar "Green Investment Funds, Indices, and Stocks"). However, concerns have been raised about the ability of these funds to accurately assess companies' environmental sustainability because of the limited information available about firms' environmental risks. Matthew Kieran is the founder and chief executive of Innovest, a consulting company with the mission of integrating sustainability and finance by identifying

What Are Information Asymmetries?

Information asymmetries occur when knowledge about a company and its environmental performance is unavailable to external parties. When information asymmetries are present, product prices—which are a function of production costs, efficiency, and product quality—are pooled within common markets. In these settings, prices are no longer accurate market signals and instead reflect average costs, efficiencies, and qualities of all enterprises operating within the common pool market.

Because consumers and investors cannot make rational buying decisions, market failures arise. For instance, when questions arise about a product's quality, consumers are less likely to buy it unless the manufacturer offers a product guarantee or warranty. Similarly, in the absence of accurate environmental information, consumers and investors are unable to draw distinctions among companies. Because there is no readily available means to determine which companies and products are cleaner than others, potential customers who wish to purchase products and individuals who wish to invest in green companies have difficulty doing so.

Green Investment Funds, Indices, and Stocks

By January 2008, there were more than 10,000 investment funds operating worldwide. The list below illustrates the relatively small number of U.S. options for the green-minded investor.

- Alternative Energy Speculator
- Calvert Large Cap Growth Fund
- Dow Jones Sustainability Index
- Green Century Funds
- Green Chip International
- Green Chip Stocks
- Guinness Atkinson Alternative Energy Fund
- New Alternatives Fund
- Portfolio 21
- PowerShares WilderHill Clean Energy Portfolio
- Sierra Club Funds
- Spectra Green Fund
- Winslow Green Growth

non-traditional sources of risk and value potential for investors. He notes, "It is increasingly critical that performance-driven investors move beyond simply pressing for greater company [self] disclosure.... It is time for investors to demand more sophisticated tools for assessing the environmental performance of companies." Until this occurs, investment in green firms will most likely not realize its full potential.

Recommendations for the New Administration and Congress

The previous section discusses the barriers to implementing green production programs. Do these barriers mean change is not possible? No. Change is possible. However, it will require reducing the obstacles that impede companies from developing green production programs.

This section offers recommendations to the new administration and the 111th Congress that can effectively address these barriers. The recommendations are grouped around three themes:

- Strengthening federal leadership
- Expanding federal initiatives
- Establishing a mandatory environmental product label policy

Strengthening Federal Leadership

The first area in which the new administration should focus its attention to encourage more widespread green production is strengthening the role of national leadership.

Recommendation 1: The new administration should create greater expectations that consumers, investors, and company managers consider the environment in their decision making.

Most U.S. consumers believe that there is reason for concern about our environmental future, but far fewer understand the ways in which they can address the problem.[29] Additionally, many companies want to "do the right thing" and undertake green production activities of some form. However, they suffer from inertia and a compelling reason to do so. The new administration should articulate the importance of considering the environment in daily decisions.

Having open discussions about how individuals can take part in addressing global (and local) environmental problems can raise consciousness. Strong leadership of this sort also can influence individuals to actively seek environmentally friendly products and investments, and encourage speculators to invest in new green technologies. Influencing consumer and investor preferences in this way will create a greater urgency for companies to increase the pace in which they develop their green production programs. Additionally, by increasing environmental expectations, companies may be more likely to consider expanding existing green production programs and reducing their environmental footprints to a greater degree.

Recommendation 2: The new administration should frame the issue in a way that invites corporate-wide interest.

When proposing that the regulated community should develop green production programs, the new administration needs to move beyond the win-lose rhetoric—protecting the environment and enhancing economic prosperity can lead to win-win outcomes. However, convincing businesses of this relationship may prove difficult since the rhetoric suggesting otherwise persists. The new administration should reframe the issue to increase the probability that companies will endorse and undertake green production by focusing the discussion on:

Opportunity. Green production should be presented as an opportunity for firms to reduce their liabilities and regulatory pressures, improve internal efficiencies, enhance market access, and add business value.

All of these factors help companies offset the cost of regulation and potentially can lead to a net gain. Moreover, companies that jump ahead of their competitors in undertaking green production can set the standards which other companies must follow.

Urgency. Without an immediate urgency, organizations generally do not make tough decisions. A key for the new administration is to convey to companies why undertaking green production *now* is in their best interest. One way to do this is to focus on how the environment is of increasing interest to society. More and more, communities, researchers, and nonprofit groups are coming to the conclusion that addressing our most urgent environmental problems requires more serious action. While some companies are working hard to address this issue, most firms are doing too little to address the problem. Additionally, as competitors increasingly adopt green production approaches, dirtier companies may suffer competitively because they will be less efficient, shoulder greater environmental liability, and forgo green market opportunities. Finally, as society comes to terms with our changing global climate, additional regulations may follow. The new administration should emphasize that companies that ignore these societal changes may be disadvantaged competitively.

Local impact. While global environmental issues have received significant attention, most individuals connect more directly with local issues. The new administration should emphasize to companies how the local community may benefit from firms undertaking green production programs. Examples include cleaner water, local land use, and cleaner air. Climate-change issues should be discussed in terms of local impacts and how companies can help address them. Doing so can lead to greater local approval and support within companies for their green production policies and approaches.

Business language. Discussions of the environment often lead to passionate and emotional statements about what individuals or businesses ought to do for society. While some of the statements may have merit, they often impart a sense of hopelessness, fear, or blame. Action is more likely to occur if the new administration frames its discussions using business language rather than emotion. It should make the case that undertaking green production is good business and can improve the value of the organization. Such a position will be made stronger if the new administration uses powerful, meaningful, and clear business metaphors—such as "green is good," "win-win opportunity," "greening the bottom line," and "doing well by doing good."[30]

Recommendations

For Strengthening Federal Leadership

1. The new administration should create greater expectations that consumers, investors, and company managers consider the environment in their decision making.
2. The new administration should frame the issue in a way that invites corporate-wide interest.

For Expanding Federal Initiatives

3. The Environmental Protection Agency should develop online environmental accounting tools.
4. The Environmental Protection Agency should promote the use of environmental audits to help companies diffuse green production practices throughout their organizations.
5. The Environmental Protection Agency should develop an approved "template" and encourage companies to use it in their voluntary environmental reporting.
6. The Environmental Protection Agency should expand technical assistance offerings to encourage more companies to undertake green production programs.

For Establishing a Mandatory Environmental Product Label Policy

7. The new administration and the 111th Congress should consider establishing a mandatory environmental product label policy.

Expanding Federal Initiatives

The second area that the new administration should address to encourage more widespread green production relates to expanding a number of federal initiatives. More specifically, the Environmental Protection Agency should promote environmental cost accounting tools, promote the use of environmental audits, develop an approved environmental reporting "template," and expand its technical assistance offerings.

Recommendation 3: The Environmental Protection Agency should develop online environmental accounting tools.

A significant impediment to companies implementing green production programs is knowledge of their benefit. This lack of knowledge suggests that EPA should more widely promote the use of different types of financial accounting systems that assess environmental concerns.

Environmental cost accounting (also known as total cost accounting) is a financial tool used to provide a more complete assessment of the true profitability of business investments and operations. Environmental cost accounting enhances decision making by improving the underlying cost information on which decisions are based. Relative to conventional cost accounting and project evaluation approaches, environmental cost accounting:

- Considers a wider range of direct and indirect costs and savings
- Uses longer time horizons that reflect the full economic or commercial life of the project
- Incorporates financial indicators that account for the time value of money
- Reveals hidden costs by relating them to the activities that cause them
- Considers uncertain or less quantifiable costs[31]

A key component to encouraging more widespread green production is for EPA to help companies relate environmental costs (which often are buried in overhead accounts) to product and service costs. A very small number of companies undertake environmental cost accounting because of the barriers noted earlier. However, companies that use environmental cost accounting can benefit significantly.

For instance, in understanding its waste disposal costs, a company might account for its disposal costs on a per product basis by evaluating its actual cost of waste disposal and relating this cost to the number of product outputs (e.g., widgets). However, it is also important to account for the less obvious costs such as staff time, loading time, manifest management, drums and supplies, storage space, records storage space, waste testing, regulatory audits, training, regulatory reviews, spill planning, and biennial reports. Once these costs are related to the number of products manufactured, the company can arrive at a more accurate estimate of its true product cost. Environmental accounting tools therefore provide a basis for evaluating opportunities that reduce costs not previously considered, and help business managers realize that most environmental costs can be managed directly rather than bundling them into overhead.

EPA should develop online assessment tools so that a company can input information about its costs associated with a particular waste stream. The company then should be prompted to identify more specific information related to that waste stream to help account for the hidden costs of pollution. Online assistance tools such as these provide readily accessible information to company managers to help build a case within their organization to implement green production activities. They also can improve business managers' understanding of their company's environmental costs, thereby reducing organizational inertia.

Recommendation 4: The Environmental Protection Agency should promote the use of environmental audits to help companies diffuse green production practices throughout their organizations.

EPA should more rigorously encourage companies to use internal environmental audits. These audits differ from typical "compliance audits," which focus on ensuring that a company complies with environmental regulations. While an internal environmental audit may address regulatory compliance issues, it is designed more broadly to encourage the organization-wide diffusion of green production practices by systematically documenting and evaluating how well a company's management practices conform to green production goals. An internal audit is implemented by the company's internal staff and members of the green team. By emphasizing objective review, internal environmental audits help companies achieve managerial commitment and control of their environmental practices and conformity to company policies.[32]

In instances where companies lack the internal expertise to undertake an internal environmental audit, EPA should encourage companies to use

external audits. External environmental audits involve hiring an outside independent assessor to examine the implementation of the company's green production practices. Similar to internal audits, external audits help companies achieve managerial commitment to implementing green production practices. Additionally, they encourage conformity to company policies, especially when the organization lacks the expertise to do the assessment in-house. External audits also have greater objectivity and independence[33] since an outside, independent assessor examines the organization's environmental practices, which can confer external legitimacy, especially with key stakeholders.[34]

At the corporate level, environmental audits of all sorts protect green production investments. They create routines and systems designed to improve the environment. Moreover, company audit results can be used as evaluation criteria in employees' annual performance assessments. Combined, these factors can help achieve a company's environmental goals and encourage the more widespread use of green production within the organization.

Recommendation 5: The Environmental Protection Agency should develop an approved "template" and encourage companies to use it in their voluntary environmental reporting. EPA should develop a standardized environmental reporting template that increases the transparency of corporate environmental reporting and allows individuals to compare companies' environmental attributes. At present, many companies that pledge their commitment to the environment already report externally on their progress.

By March 2008, approximately 1,150 U.S. companies had registered their environmental reports on CorporateRegister.com. Many other companies had produced environmental reports that were not registered. The fact that these reports are made public through central registries and company websites increases the transparency of companies' green production activities.

However, since company environmental reports differ from business to business, they lack comparability. Information contained in one report often is missing in another. Additionally, companies generally use dissimilar environmental metrics to measure their overall environmental footprints. In still other instances, businesses use different values to normalize their environmental data (e.g., number of employees, total sales, total revenue, total profit, production quantity). Because of the variability across environmental reports, comparing the relative "greenness" of one company to another is difficult at best.

While voluntary reporting guidelines exist through the Global Reporting Initiative (GRI), these guidelines are broadly constructed around sustainability concepts, of which environmental concerns are but one component. To date, approximately 1,000 companies follow the GRI guidelines. Of these companies, only a portion are U.S. based. Moreover, because of GRI's broader global focus, many smaller U.S.-based companies would not consider adhering to its guidelines. Yet, small and medium-sized enterprises account for approximately 90 percent of U.S. manufacturing companies.[35]

There is a clear need for greater comparability across the environmental reports. EPA should develop an "approved" template for companies to use in their voluntary environmental reporting. Comparability of companies' environmental attributes would be of interest to financial organizations that are seeking to identify companies which are more ecologically sustainable. Additionally, increased comparability would benefit nonprofit organizations and individuals who are attempting to draw distinctions among companies and their environmental efforts.

An ancillary benefit of an EPA-sponsored environmental reporting template relates to measurement. Companies manage what they measure. By asking companies to voluntarily measure and report on specific metrics, they are likely to manage these metrics to a greater degree.

Further, as additional companies advertise their green production efforts, there is a greater likelihood that external parties such as the media will examine and challenge company claims. Legitimate green production companies are in an excellent position to defend and promote their green brand. Having already undertaken an inventory of the company's baseline activities—and forming clear, concise timelines that demonstrate commitment—companies can support their positions with greater ease.

By taking the step of relying on an EPA-sponsored environmental reporting template, companies can increase the transparency of their green production programs, which improves their overall legitimacy and helps insulate them from claims of "greenwashing" and investigation by the U.S. Federal Trade Commission for deceptive advertising.

EPA's environmental reporting template should include environmental metrics for a core set of activities/pollutants that companies are asked to track and disclose (see the "Environmental Reporting Template" sidebar). The template also should ask companies to report information on their overall environmental performance as it relates to their product or service life cycle. Further, companies should be asked to include metrics that are normalized in several ways to allow for different types of comparisons. For instance, related to raw-materials use, a company's total raw materials could be reported by the weight of its product and unit value added. Companies also could evaluate their raw materials by considering the fraction recycled within the company and the fraction recycled by product users.

EPA should encourage companies that follow the approved environmental reporting template to certify their conformance. Certification would increase the legitimacy of a company's environmental report and enhance the external credibility of their green production efforts.[36] Certification should be carried out by an external consultant.

In return for their certification, EPA should offer companies the privilege of using a specialized logo in their marketing and promotions. The specialized logo would act as a type of eco-seal (see Appendix I), offering external verification of the company's adherence to the environmental reporting standards.[37] Since the eco-seal would be developed by EPA, rather than industry and environmental groups, it would have more credibility with consumers.[38]

Recommendation 6: The Environmental Protection Agency should expand technical assistance offerings to encourage more companies to undertake green production programs. Since many company managers mistakenly believe that going green is too costly, EPA should expand its technical assistance offerings to decrease the "risk" associated with developing a green production program. Technical assistance programs provide businesses with expertise on how to implement environmentally friendly practices. They challenge companies to optimize their use of resources, minimize non-product-related losses, and increase productivity. The Departments of Agriculture, Energy, and Transportation should also provide similar technical assistance to the industries they serve.

Environmental Reporting Template: Examples of Environmental Metric Categories

- Energy
- Electricity
- Gas
- Coal
- Fuel oil
- Steam
- Raw materials
- Water
- Land and biodiversity
- Emissions, effluents, and waste
- Greenhouse gases
- Acid rain
- Hydrocarbons
- Hazardous waste
- Toxic waste
- Hazardous waste
- Solid waste
- Water waste

Technical assistance can help motivate companies to undertake green production programs, thereby reducing organizational inertia. This is especially true for businesses that do not have foundational capabilities to implement a green production program on their own. More specifically, companies that lack a budget for environmental innovation, a dedicated environmental manager, or prior experience with quality management systems are likely to incur greater costs as a consequence of undertaking green production programs and therefore forgo adoption.[39] By relying on technical assistance, these companies can be encouraged to develop a green production program that benefits the environment and improves their internal efficiencies.

EPA already provides state environmental offices with grants that are designed to offer companies technical assistance. Many of these programs provide voluntary on-site pollution prevention audits, planning assistance, and training. However, most

existing technical assistance programs restrict the provision of services to smaller businesses, despite the fact that many organizational barriers preventing companies from adopting green production practices are likely to *increase* with the size of the enterprise. For instance, larger companies have greater problems related to inertia and coordination since they have a larger number of individuals and departments that must effectively communicate in order to undertake green production.

By expanding technical assistance to companies with the greatest environmental impacts, EPA can encourage companies that pose the greatest environmental risk to improve the environment to a greater degree. Encouraging these businesses to adopt green production programs also can have important secondary benefits, since these companies often have more extensive supply chains that can be influenced to reduce their environmental footprints as a consequence of their new green focus.

Establishing a Mandatory Environmental Product Label Policy

Recommendation 7: The new administration and the 111th Congress should consider establishing a mandatory environmental product label policy.

Consumers who wish to purchase environmentally friendly products lack sufficient information to do so. Poor information also makes it difficult for environmentally concerned investors to invest in green companies. At the same time, there is too little guidance regarding the appropriateness of companies' environmental assertions,[40] and existing information disclosure mechanisms are limited significantly in their ability to resolve information asymmetries in the marketplace (see Appendix I).

The new administration and the 111th Congress should advance environmental product labeling legislation to remedy these market problems. Environmental product labels convey information about a product's environmental attributes. A mandatory environmental product label would significantly improve the flow of information to consumers and investors. Unlike hazard or warning labels, which identify negative attributes, environmental label information is neutral. The label simply contains multidimensional summary facts that can be used by consumers in making their purchasing decisions.[41] Equipped with this information, consumers would have the choice to behave in an environmentally responsible way. Consumers that chose to purchase more environmentally friendly products would derive not only tangible benefits from the product, but also intangible benefits related to the "warm glow" of helping the environment.[42] At the same time, consumers who do not consider environmental attributes in their purchasing decisions may be persuaded to reassess their position in the future. Even if only a small portion of consumers uses the environmental information in making their product purchases, a small portion is all that is needed to radically change companies' production decisions so that they become more environmentally friendly.[43]

In addition to providing market participants with credible environmental information, environmental product labels also would reduce opportunities for companies to make false product claims about their green production focus.[44] In the 1990s, approximately half of the environmental advertising was considered misleading or deceptive.[45] The amount of deceptive environmental advertising is expected to be greater today given society's burgeoning interest in environmental issues and the proliferation of unverifiable environmental information. This concern has led the Federal Trade Commission (FTC) to fast-track review of its 1998 regulations on green marketing. The FTC sees the largely unregulated area of "green advertising" as a primary target for consumer deception.[46] Environmental product labels would reduce opportunities for companies to make these false product claims.[47]

Further, by virtue of having to report the information publicly, companies would be motivated to seek innovative ways to reduce the environmental footprint of their products. A similar situation occurred when companies had to report their toxic releases in EPA's toxic release inventory (TRI) database. Simply reporting their volumes of TRI chemicals and publicly releasing the information created incentives for companies to significantly reduce their toxic pollution.

When implementing the environmental labeling program, EPA should take care to protect the label's credibility. When consumers and investors trust that the labeling program accurately identifies products and businesses that are green, market opportunities

can arise for environmentally conscious companies. As a consequence, consumers increasingly will rely on environmental product labels in making their purchasing decisions, as will individuals in determining their investment decisions.

The hazard of establishing a weak environmental labeling program is that it will have little effect on the demand for green products. For instance, companies may report information about their environmental activities, but that information is not accurate or valid. If problems of this sort persist, they will diminish the legitimacy of the entire labeling program. As a consequence, consumers and investors will be less likely to use these labels in their purchasing and investment decisions. Additionally, companies that are truly green will derive fewer market benefits.

Establishing a weak environmental label may also cause consumers and investors to similarly question the validity of other government labeling efforts such as USDA (U.S. Department of Agriculture) Certified Organic, EPA Green Lights, and EPA WaterSense, which are intended to identify products having specific attributes that are environmentally friendly. Therefore, failure to protect a product-wide environmental labeling program can threaten the long-term credibility of all green production policies and programs and their ability to serve as market mechanisms for environmental protection.

EPA should ensure label credibility by using random testing and by levying swift penalties on companies that use environmental product labels to misrepresent their product's environmental impacts.

An expanded discussion of establishing a mandatory environmental product label policy is presented in Appendix II.

Conclusion

In sum, economic prosperity need not be at odds with the environment. Businesses are investing significant resources in green production programs and benefiting financially by doing so. However, six obstacles discourage most companies from undertaking green production: insufficient federal leadership, poor understanding of environmental costs and benefits, weak internal coordination, organizational inertia, poor diffusion of green production best practices, and consumer and investor inability to recognize and reward green companies.

Unless the above obstacles are resolved, markets for green products most likely will not realize their full potential. The coming transition to a new administration and Congress presents an opportunity to address these issues in the executive and legislative branches. This report offers specific recommendations to assist.

By strengthening federal leadership, expanding federal initiatives, and establishing a mandatory environmental product label policy, significant strides can be made toward encouraging more widespread use of green production within U.S. business, while at the same time improving the nation's natural environment.

Appendix I: Existing Mechanisms for Companies to Obtain Recognition for Their Green Production Efforts

Three mechanisms exist for companies to receive recognition for their green production efforts. Each has varying degrees of ability to resolve market information asymmetries for green products. These mechanisms include:

- Self-promotion
- Participation in voluntary environmental programs
- Eco-seal certification

Self-Promotion

Self-promotion involves a company's efforts to self-advertise, market, and brand its green production efforts. Companies that rely on self-promotion have the advantage of maintaining internal control over the messages about their green production programs. However, these messages suffer from external legitimacy problems. Companies that self-advertise their efforts in the absence of some form of external verification are perceived as less trustworthy because their messages are more readily manipulated to favor the company's position. As such, they may be effective at informing target markets only on a basic level.

One way to address this issue is to have an external auditor verify that the company's environmental assertions are true. In such instances, a company hires an external consulting firm to validate its marketing claims. However, for this type of certification to influence purchaser decisions, companies must undertake significant advertising efforts to promote their green production activities and certifications. As an example, GE's self-promotions of its Ecomagination program are expected to consume much of the company's $90 million corporate advertising budget.[48] While this value represents an extreme, it illustrates the extent to which some companies are investing to self-promote their green production efforts and develop a new green brand. It also illustrates that creating a new green brand can be costly and may explain why many companies fail to promote their green production efforts.

Voluntary Environmental Programs

A second way in which corporate managers can market their green production activities is by participating in a voluntary environmental program (VEP). VEPs consist of formalized programs, codes, agreements, or commitments that encourage organizations to voluntarily reduce their environmental impacts beyond the requirements established by environmental regulations.[49] More than 200 VEPs operate in the United States at a national or regional level, and many more are relevant at the state and local level.[50] (See the sidebar "Examples of Voluntary Environmental Programs.") VEPs typically are developed and sponsored by government, an industry association, or a nonprofit organization. Sponsors of VEPs determine the program's environmental goals and subsequently recruit companies to fulfill program commitments.

Like companies that self-promote their green production programs, companies that participate in VEPs can self-advertise their commitment to VEP goals by way of their corporate websites and promotional materials. However, a significant point of differentiation between VEPs' and companies' self-promotional efforts is that VEP administrators develop and promote their programs. Doing so helps establish a brand name for the program and for how its participants are benefiting the environment. VEPs therefore

offer additional information to the market that may attract interest from environmentally conscious consumers and investors. For these reasons, VEP participants may derive more market benefits than companies that rely on self-promotion alone.

Two types of VEPs are relevant to companies seeking to market their green production efforts: self-monitored and certified VEPs.[51] As the name suggests, participants in self-monitored VEPs determine their conformance to program goals by way of self-monitoring their environmental performance and reporting that performance to program sponsors.[52] Self-monitored VEPs generally emphasize conservation, energy efficiency, employee education, waste minimization, and recycling.

The second type of VEP relies on independent third-party auditing to ensure conformance to program goals. Certification indicates that a company has implemented systems to document its environmental impacts[53] and mechanisms for continually improving them over time.[54] Although less prevalent than self-monitored VEPs, certified VEPs have significant popularity because of their external monitoring and reporting features. By virtue of undergoing external certification, companies may be more compelled to improve their environmental performance to a greater degree than programs requiring self-monitoring alone.[55] As a consequence, these VEPs may confer additional external legitimacy about participants' environmental commitments.[56] Further, the certification process is more likely to formalize managerial commitment toward achieving environmental performance goals[57] and provide additional incentives for companies to improve their environmental performance to a greater degree than programs only requiring self-monitoring.[58]

Like participants in self-monitored VEPs, companies participating in certified VEPs can self-promote their proactive environmental activities. Because they undergo external certification, participants in these VEPs may garner additional external recognition[59] for their green production programs.

In spite of having greater credibility than companies' self-promotion efforts, VEPs have limitations. Generally, VEPs either are designed to reduce the environmental impact of a specific type of pollutant—such as solid waste—or multiple pollutants relevant to a particular industry. However, not all types of pollutants or industries have corresponding VEPs. As such, VEPs have a limited relevance to most companies. Additionally, questions have been raised about the ability of many VEPs to actually

Examples of Voluntary Environmental Programs

More than 200 Voluntary Environmental Programs, or VEPs, operate in the U.S. at a national or regional level, and many more are relevant at the state and local level. Examples include:

Self-Monitored VEPs

Coatings Care: Assists coatings industry professionals to protect worker and community health and the environment, as well as promote product safety. Participants implement best management practices and seek to enhance business value.

Metal Finishing Strategic Goals Program: Strives to continuously improve the environmental performance of metal finishing companies. Participants are encouraged to benchmark their environmental performance and costs and compare them with other companies operating in the same area.

National Environmental Performance Track: Recognizes facilities that have a sustained record of compliance and have implemented high-quality environmental management systems. Performance Track encourages facilities to continuously improve their environmental performance by working closely with their community and employees.

WasteWise: Encourages organizations to eliminate municipal solid waste and certain industrial wastes, benefiting their bottom line and the environment.

Certified Third Party VEPs

ISO 14001: ISO 14001 specifies the requirements to establish an environmental policy, determine environmental aspects and impacts of products/activities/services, plan environmental objectives and measurable targets, implement and operate programs to meet objectives and targets, check and correct problems, and undergo management review.

Responsible Care: Encourages chemical companies to work together to continuously improve their health, safety, and environmental performance, and to communicate with stakeholders about their products and processes. Previously a self-monitored VEP, Responsible Care now requires external certification.

achieve their program goals, in part because some have stronger goals (and demonstrated environmental improvements) than others, yet these programs are marketed similarly and viewed by external parties in the same way.

Because there is no readily available means to determine which VEPs are more legitimate than others, they are viewed in the same light, which diminishes the reputation of more robust VEPs.[60] Other VEPs suffer from poor monitoring and conformance requirements. As a consequence, participant companies may "free-ride" and obtain benefits without adhering to program requirements.[61] Free-riding diminishes the external legitimacy of VEPs.[62] Consumers and investors therefore are less likely to use VEPs as a means to identify environmental leaders.

Eco-Seals

A third way companies can receive market credit for their green production activities is to use eco-seals. An eco-seal is a logo indicating that a product has met a certain set of environmental and/or social standards or attributes. There are more than 80 eco-seals relevant to U.S. companies, 50 of which operate internationally.[63] (See the sidebar "Examples of Eco-Seals.") Eco-seals are rudimentary forms of environmental labels in that they also are product focused and generally provide information about the product's green attributes.[64]

Eco-seals, like VEPs, are developed and administered by an independent organization, such as the government, a nonprofit, or a consulting group, rather than the company itself. Companies elect to adhere to the eco-seal standards and receive certification for this conformance. Any company whose products qualify for the eco-seal and undergo certification is licensed to use the seal.

Another similarity with VEPs is that eco-seal developers market the logo. As such, eco-seals are recognized to a greater extent in the marketplace. Because they are developed and certified by an external party, eco-seals offer credible information about the product's environmental aspects, and can influence the demand for environmentally friendly products and services.

Examples of Eco-Seals

An eco-seal is a logo indicating that a product has met a certain set of environmental and/or social standards or attributes. There are more than 80 environmental labels relevant to U.S. companies, 50 of which operate internationally. These seals include:

Energy Star: Eco-seal promotes energy-efficient products and practices. Products in more than 50 categories are eligible for the Energy Star seal. They use less energy, save money, and help protect the environment.

Greenstar Certified: Certification promotes the production and use of cleaning products that maximize sustainability, protect the environment, and protect human health.

Rainforest Alliance Certified: Certification guarantees consumers that the products they are buying are the result of practices carried out according to a specific set of criteria balancing ecological, economic, and social considerations.

Sustainable Forestry Initiative: This seal provides customers and end users of wood and paper products an assurance that products are produced in accordance with their environmental expectations. SFI has a comprehensive approach to wood supply monitoring and provides this assurance with several options for chain of custody and on-product labels.

USDA Certified Organic: Reflects a set of national standards that food labeled "organic" must meet, whether it is grown in the U.S. or imported from other countries. Organic meat, poultry, eggs, and dairy products come from animals that are given no antibiotics or growth hormones. Organic food is produced without using most conventional pesticides; fertilizers made with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation.

Water Sense: Products bearing the WaterSense seal are generally 20 percent more water-efficient than similar products in the marketplace and must be independently tested before qualifying for the seal.

Eco-seals differ from VEPs in that eco-seals focus on *product* attributes. The eco-seal attests that product features meet specific standards since they are certified by an external third-party organization. Since a single label can be used on tens of thousands of products, it is more identifiable in

the marketplace and therefore has greater brand recognition.

By contrast, VEPs generally focus on *process* attributes. VEP participation indicates that a company is reducing pollution in its production process or continually improving aspects of its environmental management systems. Because of these distinctions, it is possible that a company could participate in a VEP but not qualify for an eco-seal. One example might be an appliance manufacturer that participates in WasteWise, an EPA-sponsored VEP that encourages solid waste reductions. Further, the company could have an environmental management system certified to ISO 14001, the international environmental management system standard.

By participating in these VEPs, the company may be continually reducing its production waste and improving internal efficiencies. However, this same company may not produce any products that qualify for the EPA Energy Star logo, because the products do not meet Energy Star's efficiency requirements.

Additionally, while the company's products might have other desirable environmental qualities, an eco-seal label may not exist to identify these features. As such, these features go unnoticed by consumers unless the company self-promotes them. However, as noted earlier, self-promotion of a company's green production efforts can be expensive and generally lack external legitimacy.

In other instances, a company may qualify for and use an eco-label, but that label creates as many market information problems as it resolves. For instance, a New Zealand grower that does not use pesticides and chemical fertilizers can obtain a USDA Certified Organic eco-seal and subsequently market its produce in the United States as being environmentally friendly. However, the eco-seal does not require that the same grower disclose information about the energy consumption and carbon emissions involved in shipping its produce from New Zealand to the United States. Doing so may illustrate that overall the produce is less environmentally friendly. Because of their limited focus on a small number of environmental attributes, eco-seals therefore are fundamentally constrained in their ability to resolve environmental information asymmetries.

Appendix II: Essential Elements for Creating a Mandatory Environmental Product Label Policy

The Five Components

An effective mandatory labeling policy should have five components. The policy needs to be:

- Mandatory
- Multidimensional
- Comprehensive
- Standardized
- Government developed

The new administration and the 111th Congress should make environmental product labeling *mandatory* in order for it to be effective. Since most companies do not regard disclosing environmental information as a positive selling feature, the information will be under-reported unless product labels are required.[65] Additionally, in the absence of a mandate, information provided will be reported inconsistently across companies, products, and key product attributes.[66] A voluntary product labeling program, therefore, would not be useful in providing consumers consistent information to inform their purchasing decisions.

The new administration and Congress also should make the information conveyed in an environmental label *multidimensional*. Unlike eco-seals, which convey information about a single environmental attribute, and for which a product either qualifies or not (see Appendix I), a multidimensional label provides detailed information about several product attributes and would be relevant to all consumer products. Multidimensional labels include rankings, percentages, or scores, and are more effective at conveying complex environmental information.[67]

Environmental Product Label at Timberland

Since 2006, Timberland's packaging has included a "nutrition label" detailing how and where each footwear product was manufactured and its impact on the environment. Timberland hopes that this kind of transparency in product packaging will become so commonplace that consumers will start to look for it—and demand it—in the products they purchase and the companies they do business with.

Our Footprint Notre Empreinte

Environmental Impact Impact sur l'environnement

Energy to Produce: (per pair)*	2kWh
Énergie utilisée (par paire)*	2kWh
Renewable energy (Timberland-owned facilities):	5%
L'énergie renouvelable (sites appartenant à Timberland) :	5%

Community Impact Impact sur la communauté

Hours served in our communities:	119,776
Nombre total d'heures données :	119,776
% of factories assessed against code of conduct:*	100%
% d'usines évaluées pour leur conformité au code de conduite :*	100%
Child labor:*	0%
Main-d'oeuvre enfantine :*	0%

Manufactured Fabriqué à

Shingtak, China Shingtak, Chine

* metrics based on global footwear production for 2005
* informations fondées sur production totale de chaussures en 2005

FOR MORE INFORMATION VISIT WWW.TIMBERLAND.COM/CSRREPORT
POUR PLUS D'INFORMATIONS : WWW.TIMBERLAND.COM/CSRREPORT

These labels parallel the information provided on nutrition labels. They would involve the disclosure of numerical information about multiple environmental impacts such as pounds of greenhouse gases, toxic air pollutants and hazardous waste, or a high/medium/low risk in a table of environmental scores.[68]

To be effective, the new administration and the 111th Congress should make environmental labels

comprehensive. Environmental product labels should provide consumers adequate information to make informed purchasing decisions. The hazard of providing insufficient information is that environmental labels would have little effect on—or misinform—consumers' purchasing decisions. For instance, Timberland's Footprint label indicates the amount of energy it uses to produce its pair of shoes in the box—two kilowatt-hours (in the sample label provided by the company; see the sidebar "Environmental Product Label at Timberland"). However, this label does not provide enough information. Consumers are left wondering whether a two kilowatt-hour is a little amount or a lot. Additionally, the renewable energy statistic reflects only the amount of energy used at Timberland-owned facilities, not at its factories, which Timberland does not own.[69]

The Certified Eco-Profile is an example of a more comprehensive environmental label. It was developed by an independent testing and certification organization, and includes multiple environmental impact values related to the product's life cycle. Further, the label offers a graphical depiction of the product's life cycle impact and a way in which consumers can determine whether this impact has a small or large effect on the environment (see "Certified Eco-Profile Label" sidebar on page 30). This type of environmental label is more likely to influence consumers' purchasing decisions in a meaningful way.

Additionally, the new administration and 111th Congress should require a specific product label format where companies do not have discretion over how the information is presented. *Standardized* formats provide the largest benefit to consumers[70] because they increase the number of products or attributes consumers consider in making their product choices and allow for more accurate choice decisions.[71] As demonstrated by the extensive variability of environmental reporting in environmental reports, unless required, it is unlikely that companies would find it privately beneficial to organize and display product information in a standardized format that would also help consumers.

Finally, EPA, in consultation with the Federal Trade Commission and other federal agencies, should develop and administer an environmental product label—that is, an environmental product label should be *government developed*. While an independent certifier also could do so, this approach would have less credibility. When asked, most U.S. consumers prefer that a federal agency administer and enforce an environmental labeling program, followed by environmental groups, independent certifiers, and, finally, industry groups.[77] Because the environmental information is impossible for most consumers to verify, the success of an environmental label uniquely hinges on companies being able to credibly communicate to the consumer information about their environmental activities.[78]

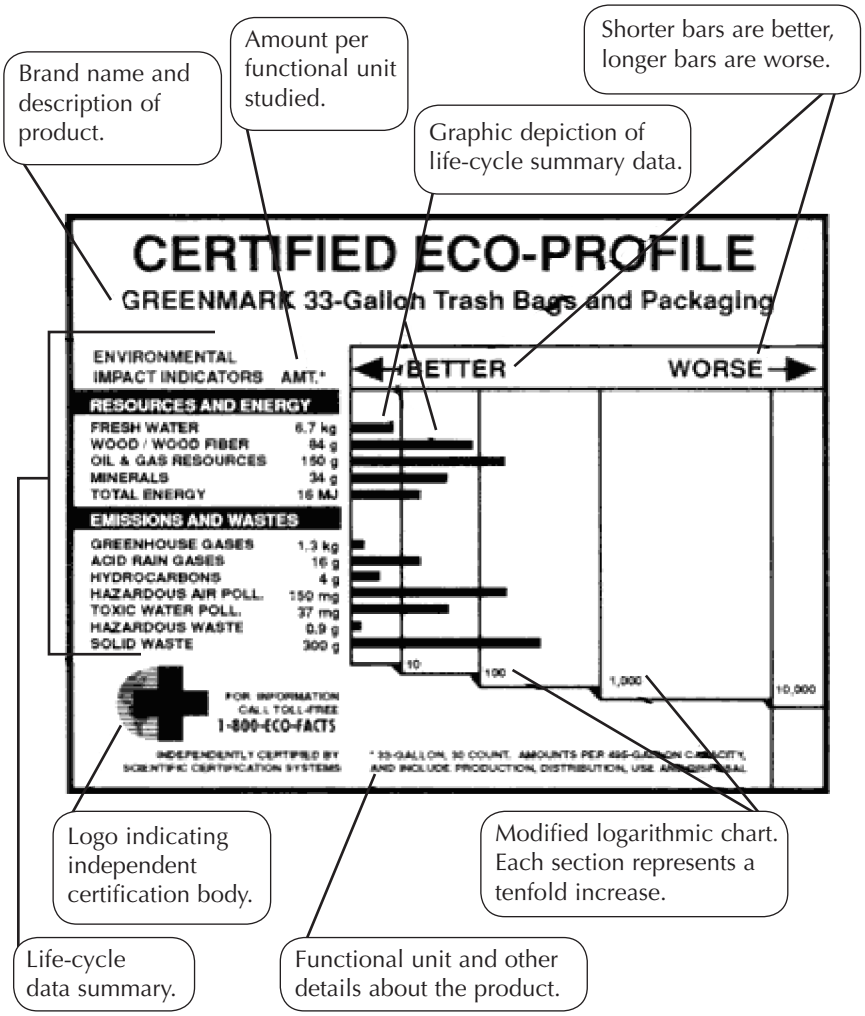
Arguments Against Implementing an Environmental Label Policy

One argument against the need to require product labels is that companies will offer the information on their own.[72] However, as noted in the preceding sections of this report, the number of companies that voluntarily provide environmental information is very small. Additionally, existing eco-seal programs cover only a limited number of product attributes (see Appendix I). Eco-seals generally apply to a small subset of products and environmental attributes rather than summarizing every product's environmental features. Further, consumers generally seek more detailed information about a product's environmental attributes than a seal alone.[73] Information asymmetries therefore persist regarding the environmental impacts of the vast majority of companies' products.

Another argument against the provision of environmental information through product labeling is that the policy would have little impact on consumer decision making. On the surface, this claim is supported by the relatively low number of environmentally friendly products in the market. It therefore would be easy to believe that consumers do not really care about and are not willing to pay more for environmentally friendly products. However, this argument is not necessarily true. Rather, the lack of credible environmental information related to consumer products is slowing the development of markets for green products.[74] The United States, in particular, has seen a substantial shift in its interest in green products. The missed opportunity is in how companies are unable to effectively connect with consumers in a believable way.[75] By providing this information in a product label, consumer and producer behavior can be altered significantly.[76]

Certified Eco-Profile Label

The Certified Eco-Profile label was developed by Scientific Certification Systems, Inc. (SCS), an independent testing and certification organization. The label was introduced for wood products to provide consumers with cradle-to-grave environmental information based on life-cycle assessments. It is similar to a nutritional label, providing a comprehensive summary of a product's environmental performance. Wood products evaluated under this program would be labeled for particular applications, such as use as structural building materials.



The Benefits for Business

There are at least two types of businesses that will benefit most from mandatory labels:

- The first type includes companies whose business concepts are fundamentally clean. These companies operate in less stringently regulated industries, but within highly competitive markets and with many competitors that are less environmentally friendly. A standardized environmental label would create an opportunity for these businesses to be recognized and valued appropriately for their green approach.
- The second type of company that would benefit is one that undertakes green production but operates in an industry that is under significant external scrutiny for its environmental impacts. While these companies are protecting the environment to a greater degree than their competitors, they endure the same level of external criticism as their industry peers because there is no way to distinguish them. Many of these companies *favor* policy makers taking a stronger

position on environmental protection. For instance, the Business Roundtable, an association of chief executives, has come forward with a policy statement on climate change. The group advocates pragmatic, proactive solutions to help sustain the economy while simultaneously decreasing greenhouse gas emissions (see the sidebar "Climate Change Position of the Business Roundtable").

Why is the Business Roundtable pushing for a policy solution? One reason is that its member companies are working to reduce their own greenhouse gas emissions, but their competitors are not. By pushing strategically for more stringent regulatory oversight, greener companies can derive a competitive advantage over dirtier competitors that may struggle to meet the new regulatory requirements.[79] While environmental labels would not impose significant environmental requirements outside of simply reporting information, they expose dirtier companies, which can put them at a competitive disadvantage. At the same time, environmental labels would insulate cleaner companies from the typical criticisms about their industry. This advantage is important because consumers do not shun high-emission industries in favor of brands from sectors that are "naturally green." In fact, consumers are ready to credit perceived leaders within these intrinsically higher-emission sectors where the potential for emissions reduction is greatest.[80] Environmental product labels are one way to help level the playing field. Companies that are clean will get credit for their green production efforts.

Climate Change Position of the Business Roundtable

On July 17, 2007, the Business Roundtable issued a policy statement on climate change. The group, which consists of CEOs of companies representing nearly a third of the total value of the U.S. stock market, agreed that:

- More companies should commit to making emission reductions a priority and report on their progress in achieving these reductions.
- An improved national registry for reporting emissions and documenting reductions would stimulate additional progress by industry.
- Government policies should encourage early action and investment to reduce emissions and improve energy efficiency.
- Increasing energy efficiency is a proven and cost-effective strategy for reducing emissions and should be a priority for business and government.
- The development and deployment of energy-efficient, low-GHG (greenhouse gas) technologies is vital to long-term emissions reductions.
- Research, development, and deployment investment in new low-GHG technologies must be increased in the public and private sectors to levels commensurate with the climate challenge.
- Investment in climate science must be continued at a high level so that we can better understand and predict the magnitude and timing of future warming.

The Costs

Improving the flow of environmental information to consumers does do not require companies to install expensive capital equipment and monitoring devices, only to report on activities that many already track. Environmental information disclosure policies can be less expensive to regulate compared to other types of environmental policies. They also are cheaper to monitor.[81]

In spite of these lower costs, many companies will suggest that environmental product labels are too burdensome. Industry specialists will provide extensive estimates supporting this case. For instance, during amendment hearings of the U.S. Clean Air Act of 1990, industry specialists offered evidence that the law would increase the price of coal to $1,500 per ton. However, in the first 10 years of the program the price per ton did not exceed $200. In responding to industry's overestimations of the burden changes in the law would impose, then–BP CEO Lord John Browne stated, "Every time there's a new piece of legislation, we say it's the end of our industry. [We have] an appalling track record in this regard."[82]

Does industry intentionally overestimate its compliance costs? Not necessarily. It is more likely that industry routinely *undervalues* its own capacity for innovation. In the wake of the U.S. Clean Air Act amendments, innovation expanded in ways never anticipated, in large part because the legislation

offered flexibility to companies in how they met the new requirements.[83]

One of the most attractive features of a mandatory environmental product label policy is that it encourages innovation, because unlike traditional environmental policies, labels do not specify how companies reduce their environmental impacts (or even that they do). Rather, the market disciplines companies to reduce their environmental footprint. Along the way, some companies will be able to use the environmental label as a branding advantage that invites the patronage of green-minded consumers.

Finally, some critics may argue that while companies may offset the cost of regulation by undertaking green production, additional regulation would decrease employment across the economy. These arguments are not necessarily valid, as illustrated by a recent United Nations report. The report shows that millions of "green jobs" are created in sectors from solar power to biofuels that slightly exceed layoffs elsewhere in the economy. Moreover, green jobs are not just for the middle classes—the so-called "green collar" jobs—but also for workers in construction, forestry and agriculture, engineering, and transportation. Union experts note that these findings may ease worries among workers that tougher environmental standards could mean an overall loss of jobs for many countries.[84] To the extent that the new administration and Congress begin to encourage more widespread green production activities, the number of green jobs may expand even further.

The Importance of Public Education

As EPA implements the environmental labeling program, it must develop an extensive education campaign. Such campaigns have proven useful in encouraging consumers to consider nutritional label information in making their purchasing decisions. Public education should focus on informing consumers as to the presence, goals, and utility of the environmental product label and its information. Doing so will increase the likelihood that consumers would usefully interpret information offered on the product label.

Endnotes

1. For additional information about these distinctions, see: Hart S. L. & Milstein M. B. 2003. Creating Sustainable Value. *Academy of Management Executive* 17(2), 56–69.

2. See National Pollution Prevention Roundtable. http://www.p2.org/about/nppr_p2.cfm, last accessed March 20, 2008.

3. See: Darnall N. 2008. Environmental regulations, green production offsets and organizations' financial performance. *Public Administration Review*, *in press*. Also see: Darnall N., Jolley G. J. & Ytterhus B. 2007. Understanding the relationship between a facility's environmental and financial performance. Johnstone N. (ed.) *Environmental Policy and Corporate Behaviour*. Northampton, MA: Edward Elgar Publishing, in association with Organisation for Economic Co-operation and Development (OECD), pp. 213–259.

4. Maxwell J. W., Lyon T. P. & Hackett S. C. 2000. Self-regulation and social welfare: The political economy of corporate environmentalism. *Journal of Law & Economics* 43(2), 583–618.

5. Klassen R. D. & Whybark D. C. 1999. The impact of environmental technologies on manufacturing performance. *Academy of Management Journal* 42, 599–615.

6. Darnall N., Jolley G. J. & Handfield R. 2008. Environmental management systems and green supply chain management: complements for sustainability? *Business Strategy and the Environment* 17(1), 30–45.

7. Larson A. L. 2000. Sustainable innovation through an entrepreneurship lens. *Business Strategy and the Environment* 9(5), 304–317.

8. Ginsberg J. M. & Bloom P. N. 2004. Choosing the right green marketing strategy. *Sloan Management Review* 46, 79–84.

9. D'Souza C. 2004. Ecolabel programmes: A stakeholder (consumer) perspective, *Corporate Communications* 9, 179–188.

10. Rivera J. 2002. Assessing a voluntary environmental initiative in the developing world: The Costa Rican certification for sustainable tourism *Policy Sciences* 35, 333–360.

11. Barkley A. 2005. Organic food growth: Producer profits and corporate farming. Chapter 9 in: *Corporate Agribusiness: Concepts and Cases*. Deepika, M. G. & Rajagopalan. S. (eds.). Hyderabad, India: The ICFAI University Press, pp. 145–163.

12. Walters P. 2005. Cities question the costs of hybrid cars. *Philadelphia Associated Press,* Dec. 9.

13. Suchman M. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review* 20, 571–610.

14. The Climate Group & Lippincott Mercer. 2008. *Unprecedented consumer action is met with new money-saving climate commitments*. http://www.theclimategroup.org/index.php/news_and_events/news_and_comment/together_celebrates_its_first_anniversary/, last accessed July 12, 2008.

15. Maibach E., Roser-Renouf C., Weber D. & Taylor M. 2008. *What are Americans Thinking and Doing about Global Warming? Results of a National Household Survey.* Washington, DC: Porter Novelli and Center of Excellence in Global Climate Change Communication Research, George Mason University, Fairfax, VA.

16. The Climate Group & Lippincott Mercer. 2008. *Consumers, Brands and Climate Change*. http://www.theclimategroup.org/assets/resources/Climate_Change_UK_07.pdf.

17. Thogersen, J. 2005. Consumer behaviour and the environment: which role for information? Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour.* Northampton, MA: Edward Elgar.

18. Worldwatch Institute. 2001. *State of the World 2001*. Washington DC: Worldwatch Institute.

19. For additional information about how regulations may harm company profitability see: Christiansen G. B. &

Haveman R. H. 1981. The contribution of environmental regulations to the slowdown in productivity growth, *Journal of Environmental Economics and Management* 8, 381–390. Conrad K. & Morrison C. J. 1989. The impact of pollution abatement investment on productivity change: An empirical comparison of the US, Germany and Canada, *Southern Economic Journal* 55, 684–698. Lave L. B. 1973. The economic costs of air pollution, *The Economics of Environmental Problems* 58, 19–35.

20. Dieleman H. & De Hoo S. 1993. Toward a tailor-made process of pollution prevention and cleaner production: Results and implications of the PRISMA project. Fischer K. & Schot J. (eds.) *Environmental Strategies for Industry*. Island Press: Washington, DC, pp. 245–275.

21. Cordano M. & Frieze I. H. 2000. Pollution reduction preferences of U.S. environmental managers: Applying Ajzen's theory of planned behavior. *Academy of Management Journal* 43, 627–641.

22. Hart S. 1995. A natural-resource-based view of the firm. *Academy of Management Review* 20(4), 986–1014.

23. Cordano M. & Frieze I. H. 2000. Pollution reduction preferences of U.S. environmental managers: Applying Ajzen's theory of planned behavior. *Academy of Management Journal* 43, 627–641.

24. Dieleman H. & De Hoo S. 1993. Toward a tailor-made process of pollution prevention and cleaner production: Results and implications of the PRISMA project. Fischer K. & Schot J. (eds.) *Environmental Strategies for Industry*. Island Press: Washington, DC, pp. 245–275.

25. Sharma S. 2000. Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy. *Academy of Management Journal* 43, 681–716.

26. Cordano M. & Frieze I. H. 2000. Pollution reduction preferences of U.S. environmental managers: Applying Ajzen's theory of planned behavior. *Academy of Management Journal* 43, 627–641.

27. Dieleman H. & De Hoo S. 1993. Toward a tailor-made process of pollution prevention and cleaner production: Results and implications of the PRISMA project. Fischer K. & Schot J. (eds.) *Environmental Strategies for Industry*. Island Press: Washington, DC, pp. 245–275.

28. The Climate Group & Lippincott Mercer. 2008. *Unprecedented consumer action is met with new money-saving climate commitments*. http://www.theclimategroup.org/index.php/news_and_events/news_and_comment/together_celebrates_its_first_anniversary/, last accessed July 12, 2008.

29. Maibach E., Roser-Renour C., Weber D. & Taylor M. 2008. *What are Americans Thinking and Doing about Global Warming? Results of a National Household Survey.* Washington, DC: Porter Novelli and Center of Excellence in Global Climate Change Communication Research, George Mason University, Fairfax, VA.

30. Andersson L. M. & Bateman T. S. 2000. Individual environmental initiative: Championing natural environmental issues in U.S. business organizations. *Academy of Management Journal* 43(4), 548–570.

31. Environment Canada. *Pollution Prevention Planning Handbook*. http://www.ec.gc.ca/NOPP/DOCS/P2P/hbook/En/, last accessed March 20, 2008.

32. International Chamber of Commerce. 1991. *An ICC guide to effective environmental auditing*. Paris: ICC Publishing.

33. Karapetrovic S. & Willborn W. 2001. Audit system: concepts and practices. *Total Quality Management* 12, 13–28.

34. Solomon A. 2000. Could corporate environmental reporting shadow financial reporting? *Accounting Forum* 24, 30–55.

35. United States Census. 2004. *Number of Firms, Number of Establishments, Employment, and Annual Payroll by Employment Size of the Enterprise for the United States, All Industries.* http://www.census.gov/csd/susb/susb04.htm, last accessed May 7, 2007.

36. Bastile G. & Skierka K. 2008. *Greenwashing: A Perfect Storm.* Bite Communications Group, http://www.bitepr.com/services/cleantech/Bite%20Cleantech%20POV%20Feb%202008.pdf, last accessed March 20, 2008.

37. In order to differentiate among the two forms of labeling, we refer to environmental logos as eco-seals and labels with more extensive environmental information as environmental labels.

38. Teisel M. F., Peavey S., O'Brien K. A. 2001. Environmental certification and labeling of forest products: will it lead to more environmentally benign forestry in Maine? *Maine Policy Review* 10(1), 72–78.

39. Darnall N. & Edwards Jr., D. 2006. Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. *Strategic Management Journal* 27(2), 301–320.

40. Bastile G. & Skierka K. 2008. *Greenwashing: A Perfect Storm*. Bite Communications Group, http://www.bitepr.com/services/cleantech/Bite%20Cleantech%20POV%20Feb%202008.pdf, last accessed March 20, 2008.

41. Krarup S. & Russell C. S. (eds.) 2005. *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

42. Krarup S. & Russell C. S. (eds.) 2005. *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

43. Moorman C. 1998. The market-level impacts of information: competitive responses and consumer dynamics. *Journal of Market Research* 34, 82–98.

44. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

45. Kangun N., Carlson L. & Grove S. J. 1991. Environmental advertising claims: a preliminary investigation. *Journal of Public Policy and Marketing* 10(2), 45–58.

46. Bastile G. & Skierka K. 2008. *Greenwashing: A Perfect Storm.* Bite Communications Group, http://www.bitepr.com/services/cleantech/Bite%20Cleantech%20POV%20Feb%202008.pdf, last accessed March 20, 2008.

47. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

48. Creamer M. 2005. GE sets aside big bucks to show off some green. *Advertising Age*, May 9. http://adage.com/.

49. Carmin J., Darnall N. & Mil-Homens J. 2003. Stakeholder involvement in the design of U.S. voluntary environmental programs: does sponsorship matter? *Policy Studies Journal* 31(4) 527–543.

50. Carmin J., Darnall N. & Mil-Homens J. 2003. Stakeholder involvement in the design of U.S. voluntary environmental programs: does sponsorship matter? *Policy Studies Journal* 31(4) 527–543.

51. Other types of voluntary environmental programs are information, assistance and awareness programs. These VEPs consist of programs that provide either technical assistance or education to ensure that participants are familiar with environmental regulations and emerging industry practices. Additionally, environmental pledge VEPs require participants to make an internal commitment to enhance their environmental performance as demonstrated through a goal or value statement, a signed agreement, or the creation of performance targets. Since neither type of VEP requires participants to demonstrate their environmental performance, they offer fewer benefits to participants in the way of external recognition and legitimacy. For additional information, see: Darnall N. & Carmin J. 2005. Greener and cleaner? The signaling accuracy of U.S. voluntary environmental programs. *Policy Sciences* 38(2–3), 71–90.

52. Darnall N. & Carmin J. 2005. Greener and cleaner? The signaling accuracy of U.S. voluntary environmental programs. *Policy Sciences* 38(2–3), 71–90; Darnall N. & Sides S. 2008. Assessing the performance of voluntary environmental programs: does certification matter? *Policy Studies Journal* 36(1), 95–117.

53. Bansal P. & Hunter T. 2003. Strategic explanations for the early adoption of ISO 14001, *Journal of Business Ethics* 46(3), 289–299.

54. Darnall N. 2006. Why firms mandate ISO 14001 certification. *Business & Society* 45(3): 354–381.

55. Potoski M. & Prakash A. 2005. Covenants with weak swords: ISO 14001 and facilities' environmental performance, *Journal of Policy Analysis and Management* 24(4):745.

56. Bansal P. & Hunter T. 2003. Strategic explanations for the early adoption of ISO 14001. *Journal of Business Ethics* 46(3): 289–299.

57. Rondinelli D. A. & Vastag G. 2000. Panacea, common sense, or just a label? The value of ISO 14001 environmental management systems. *European Management Journal* 18: 499–510.

58. Potoski M. & Prakash A. 2005. Covenants with weak swords: ISO 14001 and facilities' environmental performance. *Journal of Policy Analysis and Management* 24(4):745.

59. Bansal P. & Hunter T. 2003. Strategic explanations for the early adoption of ISO 14001. *Journal of Business Ethics* 46(3): 289–299.

60. Darnall N. & Carmin J. 2005. Cleaner and greener? The signaling accuracy of U.S. voluntary environmental programs. *Policy Sciences* 38, 71–90.

61. For additional information about free-riding in voluntary environmental programs, see: Darnall N. & Carmin J. 2005. Greener and cleaner? The signaling accuracy of U.S. voluntary environmental programs. *Policy Sciences* 38(2–3), 71–90; King A. & Lenox M. 2000. Industry self-regulation without sanctions: The chemical industry's responsible care program. *Academy of Management Journal* 43, 698–716; Rivera J. 2002. Assessing a voluntary environmental initiative in the developing world: The Costa Rican Certification for Sustainable Tourism. *Policy Sciences* 35, 333–360.

62. Darnall N. & Carmin J. 2005. Greener and cleaner? The signaling accuracy of U.S. voluntary environmental programs. *Policy Sciences* 38(2–3), 71–90.

63. See http://www.ecolabelling.org.

64. In order to differentiate between the two forms of labeling, we refer to environmental logos as eco-seals and labels with more extensive environmental information as environmental labels.

65. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

66. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

67. Teisel M. F., Peavey S., O'Brien K. A. 2001. Environmental certification and labeling of forest products: will it lead to more environmentally benign forestry in Maine? *Maine Policy Review* 10(1), 72–78.

68. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

69. Makower J. 2006. Timberland reveals its "nutritional" footprint. *GreenBiz.com*. January 28. http://makower.typepad.com/joel_makower/2006/01/timberland_reve.html, last accessed March 20, 2008.

70. Schkade D. A. & Kleinmuntz D. N. 1994. Information displays and choice processes: differential effects of organization, form, and sequence. *Organizational Behavior and Human Decision Processes* 57(3), 319–337.

71. See: Coupey E. 1994. Restructuring: constructive processing of information displays in consumer choice. *Journal of Consumer Research* 21(1), 83–99; Winneg K., Herrmann M. J., Levy A. S. & Roe B. 1998. *Label Testing: Results of Mall-intercept Study*. Consumer Information Disclosure Series, Regulatory Assistance Project, Gardiner, ME, April.

72. Krarup S. & Russell C. S. (eds.) 2005. *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

73. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

74. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

75. The Climate Group & Lippincott Mercer. 2008. *Unprecedented consumer action is met with new money-saving climate commitments*. http://www.theclimategroup.org/index.php/news_and_events/news_and_comment/together_celebrates_its_first_anniversary/, last accessed July 12, 2008.

76. For additional information, see Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

77. Teisel M. F., Peavey S., O'Brien K. A. 2001. Environmental certification and labeling of forest products: will it lead to more environmentally benign forestry in Maine? *Maine Policy Review* 10(1), 72–78.

78. Teisl M. F. & Roe B. 2005. Evaluating the factors that impact the effectiveness of eco-labelling programmes. Krarup S. & Russell C. S. (eds.) *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

79. Maxwell J. W., Lyon T. P. & Hackett S. C. 2000. Self-regulation and social welfare: The political economy of corporate environmentalism. *Journal of Law & Economics* 43(2), 583–618.

80. The Climate Group & Lippincott Mercer. 2008. *Unprecedented consumer action is met with new money-saving climate commitments*. http://www.theclimategroup.org/index.php/news_and_events/news_and_comment/together_celebrates_its_first_anniversary/, last accessed July 12, 2008.

81. Krarup S. & Russell C. S. (eds.) 2005. *Environment, Information and Consumer Behaviour*. Northampton, MA: Edward Elgar.

82. Schwartz N. D. 2004. Inside the head of BP. He doesn't like red meat. He thinks green. What is John Browne doing running the world's largest oil company? *Fortune*. July 26. http://money.cnn.com/magazines/fortune/fortune_archive/2004/07/26/377141/index.htm, last accessed March 20, 2008.

83. Davies J. C., Mazurek J., McCarthy K. & Darnall N. 1996. *Industry Incentives for Environmental Improvement: Evaluation of U.S. Federal Initiatives*. Washington DC: Resources for the Future, Center for Risk Management.

84. Doyle A. 2007. "Green jobs" to outweigh losses from climate change. *Reuters UK*, Dec. 6. http://uk.reuters.com/articlePrint?articleId=UKL0612674420071206, last accessed Mar. 20, 2008.

ABOUT THE AUTHOR

Nicole Darnall is Assistant Professor of Environmental Science and Policy and Assistant Professor of Public and International Affairs at George Mason University. She specializes in corporate sustainability, environmental policy innovation, and the role of external stakeholders in the environmental governance of corporations and government.

Dr. Darnall's research contributes to the understanding of management strategy and the policy sciences by advancing a more nuanced conception of firms' responses to the regulatory and social setting. She investigates the reasons why companies adopt sustainability strategies, whether companies that adopt these strategies improve the environment, and whether companies that improve the natural environmental also derive business value. Her research has appeared (or is forthcoming) in *Strategic Management Journal*, *Public Administration Review*, *Accounting, Organizations and Society*, *Journal of International Management*, *Policy Sciences*, *Policy Studies Journal*, *Business & Society*, *Business Strategy and the Environment*, *Asian Business & Management*, *Review of Policy Research*, *Environmental Quality Management*, and other journals.

Dr. Darnall's scholarship has received the Academy of Management, Organizations and Natural Environment Division's Emerging Scholar Award and Best Paper Award, the Decision Science Institute's Distinguished Paper Award, The *oikos* Foundation's Sustainability Case Writing Competition Award (honorable mention), and The Case Association's *Best First Case Award*. Additionally, her research has received funding from the National Science Foundation, the Organisation for Economic Co-operation and Development (in Paris), the U.S. Environmental Protection Agency, and George Mason University.

She previously served as Assistant Professor in the School of Public and International Affairs at North Carolina State University. Prior to Dr. Darnall's academic career, she was an economist for the U.S. Forest Service and a researcher at Resources for the Future.

She received her doctorate in public policy analysis from the University of North Carolina at Chapel Hill. She holds master's degrees in public policy and economics from Vanderbilt University and the University of Texas, respectively.

KEY CONTACT INFORMATION

To contact the author:

Nicole Darnall
Department of Environmental Science & Policy
George Mason University
4400 University Drive, MSN 5F2
3020 David King Hall
Fairfax, VA 22030-4400
(703) 993-3819
fax: (703) 993-1066

e-mail: ndarnall@gmu.edu
website: http://mason.gmu.edu/~ndarnall

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For additional information, contact:
Jonathan D. Breul
Executive Director
IBM Center for The Business of Government
1301 K Street, NW
Fourth Floor, West Tower
Washington, DC 20005
(202) 515-4504, fax: (202) 515-4375

e-mail: businessofgovernment@us.ibm.com
website: www.businessofgovernment.org