



**South Carolina Environment & Business
Roundtable**

***Environmental Strategies for
Industrial Development***

July 2005

TITLE:	<i>Environmental Strategies for Industrial Development</i>
DATE:	July 2005
AUTHOR:	Christopher Russell, C.E.M., Director of Industry Sector, Alliance to Save Energy
CONTACT:	Alliance to Save Energy 1200 18 th Street, N.W. Washington, DC 20036 (202) 857-0666 crussell@ase.org
ABSTRACT:	This report presents recommendations for boosting manufacturing competitiveness through waste minimization and cost-effective compliance with environmental regulations. Business, government, and academic leaders primarily from South Carolina gathered at the one-day <i>Environment & Business Roundtable</i> hosted by Clemson University to generate this vision. Recommendations from that Roundtable are in response to the Department of Commerce's January 2004 report entitled <i>Manufacturing in America</i> , which recognizes energy costs and regulatory burdens imposed on industry as two of several key impediments to U.S. competitiveness in a global economy. Leading recommendations from the Roundtable are to (1) enhance industry's awareness and practice of waste minimization, (2) implement simplified, less costly methods for administering regulatory obligations, and (3) evolve the role of regulatory agencies into technical assistance sources for industry. Taken together, these recommendations form a strategy for economic development. The recommendations offered in this report are an outline of proposed solutions not just for South Carolina, but for any state or region. This report concludes with a call to action that proposes a demonstration project to be conducted in South Carolina.



The Alliance to Save Energy is a bipartisan, nonprofit coalition of business, government, environmental, and consumer leaders committed to promoting energy efficiency worldwide to achieve a healthier economy, a cleaner environment, and energy security. The Alliance was founded in 1977 by Sens. Charles Percy (R-Ill.) and Hubert Humphrey (D-Minn.). The current chair is Sen. Byron Dorgan (D-N.D.) and Co-Chair James H. DeGraffenreidt, Jr. Congressional Vice-Chairs include Sens. Susan Collins (R-Maine), Jeff Bingaman (D-N.M.), James Jeffords (I-Vt.), Reps. Ed Markey (D-Mass.), Zach Wamp (R-Tenn.) and Ralph Hall (R-Texas). The board includes leading voices on energy from business, the environmental community, and academia. Over ninety companies and organizations currently support the Alliance through our Associates Program. The Alliance has a long history of initiating efforts to advance energy efficiency through strategic partnerships with government, business and public interest organizations.

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ACKNOWLEDGEMENTS

This project was funded by the Alliance to Save Energy, with in-kind support from Clemson University's South Carolina Institute for Energy Studies (SCIES), who partnered with the Alliance to develop and host the Roundtable on the Clemson campus.

Clemson University
**Dr. Lawrence Golan, Special Assistant to the Vice President for Research
and Economic Development and Director**
Dave Stubblefield, ESL Program Manager
Glenda Black, Assistant to the Director
Kim Davenport, Information Resource Consultant

The following individuals volunteered their time and expertise to the South Carolina Environment & Business Roundtable. The Alliance and Clemson's South Carolina Institute for Energy Studies gratefully acknowledge:

ROUNDTABLE PARTICIPANTS

Ryan Adolphson,	University of Georgia
Rick Baldauf,	South Carolina State Energy Office
Van Cato,	U.S. Senator Lindsay Graham's Office
David Godfrey,	U.S. Department of Energy, Southeast Region
Dr. Lawrence Golan,	Clemson University/SCIES
Tom Hudkins,	South Carolina State Energy Office
Skip Johnson,	Retired from Voridian (Eastman Chemical)
Tommy Knight,	Retired from Voridian
John Owings,	Greenville County Planning Commission
Gordon McNeal Smith IV,	Mitsubishi Polyester Film
Christine Steagall,	South Carolina Department of Health & Envir. Control

OTHER CONTRIBUTORS

Phyllis Copeland,	S.C. Department of Health & Environmental Control
Hanneke Counts,	Voridian
Preston Howard,	Manufacturers & Chemistry Council of North Carolina
Ed Meyers,	Southface Energy Institute
Kate Offringa,	Alliance to Save Energy
Karen Owens,	South Carolina Dept. of Commerce Business Recycling
Mitch Perkins,	South Carolina State Energy Office
Derrick Pierce,	Greenville & Spartanburg Chambers of Commerce
Lynn Preston,	Tandus/C&A Floorcoverings
Charles Rampey,	South Carolina Manufacturing Extension Partnership
Ethan Ware,	McNair Law Firm

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EXECUTIVE SUMMARY

This report describes an industrial economic development vision that is both environmentally positive and pro-business. The South Carolina Environment & Business Roundtable was convened for a one-day discussion of these issues on October 15, 2004. Leaders from government, business, academia, and trade associations discussed practical approaches to handling industry's process wastes and related regulatory compliance issues. The Roundtable's recommendations amount to an economic development strategy.

The Alliance to Save Energy believes that industry can improve its business performance through better management of its energy, water, and raw material consumption. This report outlines the Roundtable's suggestions for fostering greater industrial resource management capabilities. Roundtable members believe that industry's ability to comply with environmental regulations will improve directly with increased resource management competencies. The Roundtable's vision is to help government and industry to find less costly ways to administer the monitoring and reporting duties required by regulatory compliance. The report concludes with a call-to-action for implementing a demonstration project in South Carolina.

The Roundtable offers a strategy for economic development that (1) enhances industry's awareness and practice of waste minimization, (2) implements simplified, less costly methods for administering regulatory duties, and (3) evolves the regulatory enforcement role of government to include valuable technical assistance for industry. Central to this vision is voluntary industry participation in benchmarking of common air, water, and waste management functions. Focusing on every-day plant utilities largely avoids the issue of sharing proprietary information among competitors. Overall stewardship of these resources is extremely practical to manufacturers seeking ways to trim costs, boost revenues, and reduce the risk of environmental non-compliance. Given this focus, resource management should become a strategic industrial interest.

Promotion of the Roundtable's vision has value for a wide variety of stakeholders, including manufacturers, their service and supply allies, regulatory agencies, energy and water distribution utilities, and taxpayers.

Waste minimization requires the development of valuable human skills. Even as some production facilities are moved overseas, American resource management skills developed today will remain to benefit the emerging industries of tomorrow. A state or region that implements an industrial support infrastructure of this nature should be better able to retain, attract, and expand industrial activity that is fundamental to its economy.

Corporate leaders who have already set examples for waste minimization are the best proponents for this concept. Their endorsement will be crucial in reaching peers that harbor doubts or misperceptions. Promotion of case studies and related technical support will also help.

The South Carolina Business & Environment Roundtable's participants are prepared to advise the conduct of a pilot project to demonstrate this vision. It should be easily replicated in other states.

I. INTRODUCTION

Manufacturing in America. In January 2004, in response to persistent concerns about U.S. job losses, plant closures, and lackluster capital investment in the manufacturing sector, the U.S. Department of Commerce issued a report entitled *Manufacturing in America*.¹ The report was based on information collected during 2003 from manufacturers and trade associations located across the country. Participants offered their perspectives on U.S. manufacturers' competitiveness in the global marketplace. The Commerce Department's report summarized industry's common concerns.

Two industry concerns that were articulated in the Commerce report were (1) *access to affordable, reliable energy supplies* and (2) *the burden of industrial regulations and reporting requirements*. These concepts are related—any manufacturer that reduces energy waste also reduces combustion emissions. By extension, this reduces the company's exposure to the risk of regulatory non-compliance.

South Carolina Environment & Business Roundtable. *Manufacturing in America* was better at articulating problems than at offering solutions. In an effort to link industrial competitiveness with energy supply, waste mitigation, and environmental reporting, the Alliance to Save Energy partnered with Clemson University to convene the South Carolina Environment & Business Roundtable on October 15, 2004. While the participants were mostly representatives of South Carolina businesses, trade associations, government agencies, and universities, their recommendations could be applied anywhere in the U.S. The Roundtable's response to the *Manufacturing in America* report is a vision that would:

- promote improved business performance through better management of energy, water, and process waste;
- simplify the mechanisms for achieving regulatory compliance;
- enhance regional networks of environmental assistance available to industry, thus providing the know-how for boosting business performance through minimized process waste and improved regulatory compliance; and
- position the environmental assistance network as a tool for retaining and attracting industry—thus contributing to economic development.

Central to this vision is industry's voluntary, collaborative management of energy, water, and waste impacts. Control of these activities is extremely practical to manufacturers seeking ways to trim costs, boost revenues, and offset operating risk. Resource management can be a foundation for U.S. industrial competitiveness.

The Roundtable's vision is remarkable for encouraging government-business collaboration in place of the contention that is often fostered by this subject. None of this involves eliminating, reducing, or otherwise compromising existing statutes that regulate industrial impacts on air, water, and soil quality.

¹ See http://www.commerce.gov/opa/press/Secretary_Evans/2004_Releases/Manufacturing%20Report/DOC_MFG_Report_Complete.pdf to download a copy of the *Manufacturing in America* report.

WHAT IS THE ALLIANCE TO SAVE ENERGY'S INTEREST IN ENVIRONMENTAL REGULATION?

A functional reason for the Alliance's interest in environmental regulation is the connection between fuel combustion and air emissions. The reduction of fuel consumption has a proportional impact on emissions output.

Another reason is the Alliance's need to raise the visibility of the energy efficiency agenda. Few corporate leaders perceive energy efficiency to be a business opportunity. Energy is often considered a non-core issue that corporate leaders delegate to the "appropriate" staff. Corporate attention is reserved for more strategic concerns. Regulatory compliance—which is functionally related to waste minimization—is often a higher level concern. So are "infrastructure costs," which are the costs of operating in a given location. Taken together, waste management, regulatory compliance, and infrastructure costs have a major impact on the potential for regional economic development. This compound agenda is more likely to get high-level corporate and government attention.

The Alliance convened the South Carolina Environment & Business Roundtable to bring energy, emissions, water, and materials management into one model "waste minimization" discussion. The Roundtable developed a pro-business, environmental compliance vision expressly for engaging industry's higher-level decision-makers in the context of economic development.

II. SUMMARY OF MANUFACTURING CONCERNS

Environmental regulation involves time, expertise, and a large volume of data. Federal and state statutes describe the maximum allowable volume of critical contaminants in facilities' air, water, and solid waste by-products. Regulatory authorities typically issue permits that allow facilities to establish or expand any activities that produce known contaminants. In addition, the authorities maintain a communications protocol for ensuring compliance. Reporting and inspection activities are designed to monitor emissions output. Regulatory calendars may include both planned and "surprise" inspections to sample a facility's discharges. Most industrial facilities employ an environmental, health, and safety (EHS) staff to orchestrate regulatory obligations.²

Industrial infrastructure costs, such as land, utilities, fees, licenses, and compliance reporting can vary significantly depending on where facilities are located. These costs can impinge upon a manufacturer's competitive position. All too frequently in recent years, manufacturers have

² For more on federal regulations pertaining to air, water, and solid waste management:

Air Emissions

- Air Pollution Control Technologies: www.epa.gov/ebtpages/airairpollutioncontrol.html
- Air Pollution Compliance & Regulations: www.epa.gov/ebtpages/airairpollutionlegalaspects.html

Water

- Wastewater Management: www.epa.gov/owm/
- Water Pollution Compliance & Regulations: www.epa.gov/ebtpages/watwaterpollutionlegalaspects.html

Solid Waste

- Waste Treatment: www.epa.gov/ebtpages/wastwastetreatment.html
- Waste Management Compliance & Regulations: www.epa.gov/ebtpages/wastwastelegalaspects.html

sought relief from such costs through relocation, often outside the United States. The South Carolina Roundtable participants summarized these challenges as follows:

- **Energy costs.** A variety of forces impact both the magnitude and volatility of industrial energy expenditures. Energy, which for a long time was plentiful and easily consumed, is now purchased in new and complex deregulated markets. Energy shortages, supply bottlenecks, and related price distortions pose extreme difficulties in some regions, especially for small and medium-sized manufacturers.
- **Increased labor and management costs.** Environmental compliance requires labor hours to keep abreast of rules and changes, sort out any inconsistencies in those regulations, secure and tabulate the large volume of data that is required, and prepare reports for multiple agencies. Most manufacturers employ an environmental, health, and safety staff to handle these obligations.
- **Complexity inherent in the duplication and overlap of multi-state and federal reporting requirements.** Regulatory interpretation, reporting, and enforcement procedures tend to vary among jurisdictions. Manufacturers with multi-state operations must establish separate compliance mechanisms to satisfy the regulatory demands of each state.
- **Biased investment decisions caused by disparities among state regulations.** Corporations with multi-state operations will frequently allocate production to areas with weaker regulatory conditions. At worst, this leads to plant closures, with a ripple-effect impacting related suppliers and services, which also feature interstate operations. This spiraling destruction of regional business alliances works against all jurisdictions.

The *Manufacturing in America* report fails to describe industry's potential to build value through better management of energy, water, and material resources. Many manufacturers consider utility expenses to be uncontrollable, fixed costs of doing business. With recent energy price increases, manufacturers primarily seek expense relief by securing the lowest-priced fuels available. This "price-only" strategy ignores the costs savings derived from using efficient technologies, procedures, and behavior to reduce the volume of fuel consumed. Many manufacturers lack staff time and expertise to do more than produce products and push them out the door—there are few if any resources devoted to waste mitigation. Unfortunately, industry's energy, water, and material waste patterns tend to coincide.

BARRIERS TO WASTE MINIMIZATION: MISPERCEPTIONS AND LACK OF AWARENESS

Semantics may be the largest hurdle to waste minimization. When popular awareness of energy and environmental issues became evident in the 1970s, conservation and regulation were the order of the day. Environmental advocates' message to industry was to "stop doing what you are doing, and start doing what we want you to do." This did little to foster a positive relationship between environmentalists and industry. Add to this the media's growing awareness of energy issues, which became seamlessly intermingled with the emerging environmental protection agenda. To every-day folks in industry, a "pro-environment" message was commensurate with being "anti-business."

Today, forward-thinking companies implement waste minimization practices. While there is some public relations value in doing so, profit remains the ultimate motive (and yardstick) for undertaking waste elimination. Corporations benefiting from business-smart waste management include C&A Floorcoverings, which contributed comments to the South Carolina Environment and Business Roundtable. C&A is one of several corporations whose experience in starting up and sustaining corporate energy management programs is documented in a case study series developed by the Alliance to Save Energy. Download these cases from <http://www.ase.org/section/topic/industry/corporate/cemcases/>.

Many manufacturers waste energy because they have limited knowledge of their facilities' energy consumption patterns. Many industrial facilities still have only one utility meter to measure consumption for their entire plant. Traditional accounting practices treat plant-wide energy as an overhead cost, which is then allocated across sections according to their numbers of workers or square feet of space. Today's advanced energy and water metering technologies can monitor actual consumption by substations within a facility, so that section managers can better understand and control their utility costs.

Reliable, plentiful energy has long been taken for granted as a key feature of U.S. economic infrastructure. But today, that advantage is at risk in many regions of the country. Since the 1980s, the progressive deregulation of gas and electric utilities has permitted more large energy consumers to shop for fuel and power. However, deregulation also dismantles the mechanisms for planning investment in utility infrastructure. These investment decisions are increasingly left to the free market. As a result, utility assets in some regions of the country are increasingly compromised by age and capacity limitations due to under-investment. The results include episodic energy supply shortages and price spikes. While a company's ability to control the availability and cost of energy may be limited, its ability to plan for and manage potential effects is much greater.³

III. ENVIRONMENTAL SUSTAINABILITY: EMERGING MARKETS AND OPPORTUNITIES

Public interest in protecting the quality of the air, water, and land is paralleled by emerging markets for environmentally-friendly or healthy products and services.⁴ Growing numbers of

³ Bennett, Charles J., and Wells, Richard P., "Planning for Energy-Based Business Risks." *Executive Action*, December 2002.

⁴ One interesting example is volume of organic food sales in the U.S., which has grown at least 20 percent per year since 1990. Source: USDA Economic Research Service, *Recent Growth Patterns in the U.S. Organic Foods Market*. Agriculture Information Bulletin Number 777.

American consumers demand great products, at an affordable price and with minimal impact on their local environment. These sentiments suggest that U.S. environmental standards are unlikely to disappear.

Environmental strategies for economic development will allow U.S. manufacturers to (1) meet growing demand for goods that are environmentally safe to produce and consume; (2) become cost-competitive through production processes that waste less energy, water, and material; and (3) relieve stress on energy and water distribution systems through regional adoption of improved waste management principles.

AIR AND WATER EMISSIONS CREDIT TRADING: NEW OPPORTUNITIES

The growth of environmental regulation is creating new revenue opportunities in addition to compliance challenges. In brief, credit trading allows companies to generate revenue as a result of their reduction of air or water pollutants below permitted levels. This revenue is in addition to savings in fuel and water consumption.

Industries are slowly implementing credit trading capabilities. Awareness, tax complexities, and technical knowledge are hurdles that have yet to be fully overcome. State regulatory authorities can become information clearinghouses for companies that seek opportunities to generate and sell emissions credits. Alternatively, states may wish to pre-qualify consultants to serve in the same capacity.

For more information on credit trading:

- Air Emissions Trading: www.epa.gov/eftpages/airairquemotionstrading.html
- Water Quality Trading: www.epa.gov/OWOW/watershed/trading.htm

While much is reported about the loss of manufacturing jobs to other countries, workers in those nations are increasingly suffering from the environmental affects of their own industries.⁵ Foreign labor is often cheaper, but U.S. environmental quality is far superior, as are our communications, transport, and most other advanced infrastructure systems. Low-cost overseas labor markets will compete favorably with the U.S. for hosting low skill, low-value product manufacturing. But for manufacturing that is dependent on advanced infrastructure (as opposed to cheap labor), infrastructure cost control in the U.S. could make the difference in a manufacturer's future decision to stay or leave.

Manufacturers are increasingly responsive to the changing environmental landscape. In 2001, almost half of the 250 largest global companies published "corporate responsibility" reports, up from 35 percent in 1998.⁶ Increasingly, "customers, shareholders, and capital markets will reward companies who treat their environmental mitigation costs and responsibilities as investments."⁷ The practice of "environmental friendliness" is not limited to producers of consumer products. Increasingly, product fabricators seek inputs from suppliers that demonstrate similar resource stewardship principles. One example is home designers' increasing interest in using renewable materials. Shaw Industries, a \$5 billion, Georgia-based manufacturer of carpet and flooring products, is responding by developing product lines manufactured from

⁵ "Asia's Great Hunt for Oil," *Business Week*, November 15, 2004.

⁶ Weisul, Kimberly, "What is Corporate Responsibility?" *Business Week*, August 28, 2002.

⁷ Letwin, S.J.J., Enbridge Gas Distribution. "Energy and Enbridge's Bottom Line." PowerPoint presentation from Canada's *Energy 2003* symposium, March 26, 2003.

renewable materials.⁸

Case Study: Shaw Industries

Shaw Industries, a floor products manufacturer headquartered in Georgia, started an energy consumption management program in mid 2004. They have a corporate team of six individuals that provide energy procurement, bill reconciliation, energy audit and technical support for 53 facilities. The fully loaded cost for one or two of that staff is paid for by the bill reconciliation activities alone. All the energy benchmarking and technical assistance they provide to their plants pays for itself many times over through energy savings. During each month over the latter half of 2004, they found on average about \$1 million in annual savings opportunities. By the end of February 2005, projects representing about \$100,000 worth of annual energy savings were implemented, with projects worth another \$2 million of annual savings soon to follow.

SOURCE: The Alliance to Save Energy

The Alliance to Save Energy has documented the accomplishments of 3M, DuPont, Kimberly-Clark, and other leading U.S. manufacturers in adapting to a changing business environment.⁹ These corporations embrace waste minimization as a business-smart strategy for reducing costs, making new revenue, and offsetting environmental risks. Waste minimization allows many manufacturers to boost the productive capacity of their existing assets.

The competitiveness of U.S. industry can be linked to the reduction of waste, pollution, and society's desire for a sustainable environment. Today's forward-thinking corporations improve their business performance through better stewardship of resources. This strategy allows companies to enter new markets, improve the income performance of existing processes, or both. It is imperative that people working in today's industries learn waste minimization principles. American corporations may shift some manufacturing activities overseas, but their former employees will remain. So will bottlenecks in utility distribution infrastructure. The expertise that U.S. workers obtain today will reduce the hurdles to growing tomorrow's homeland industries.

BUSINESS IMPACTS OF WASTE MINIMIZATION: THE EXAMPLE OF FUEL EFFICIENCY

Heat utilization is the real value proposition behind fuel efficiency. Fuel becomes *heat* which modifies and refines raw materials into finished products. For manufacturers, *fuel efficiency* is realized through operational practices that also provide *control over thermal resources*. With control comes reliability of operations. With reliability comes the ability to fill orders faster and at less cost. Faster order turn-around means filling more orders, which brings in more revenue. In contrast to the concept of sacrifice, fuel efficiency is an indispensable component of any effort to improve productivity.

The productivity of purchased energy has positive benefits for all consumers served by a gas or power utility. Reduced industrial energy demand allows more consumers to be served by a fixed supply infrastructure.

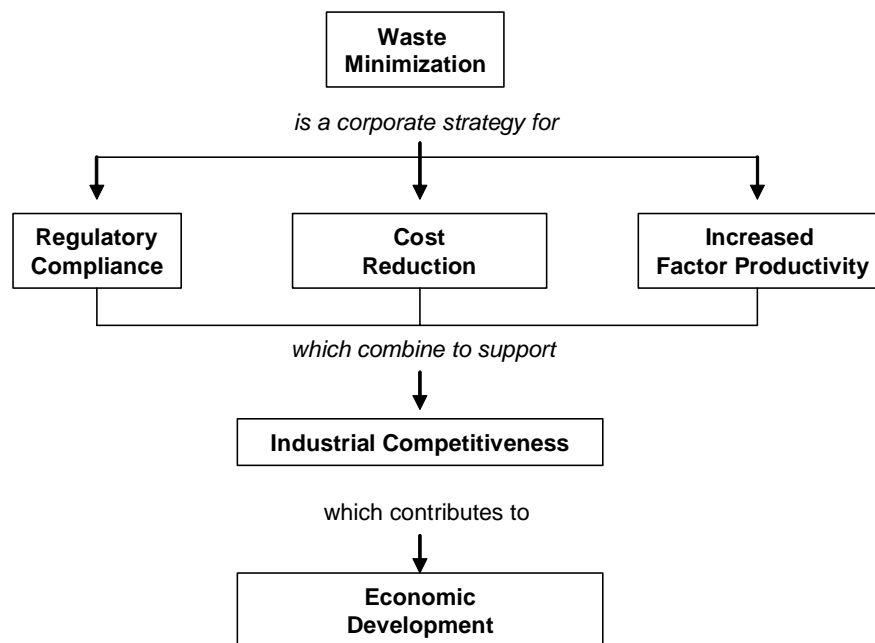
⁸ www.ase.org/section/topic/industry/corporate/pathfinding

⁹ *ibid.*

IV. FOSTERING ENVIRONMENTAL STRATEGIES FOR ECONOMIC DEVELOPMENT

In most states, economic development and the desire to retain and attract employers is a top priority. Infrastructure costs, including the cost of environmental reporting and compliance, are a key consideration in business location. States that work with industry to cost-effectively minimize process wastes while achieving statutory levels of environmental compliance will be better prepared to attract and retain manufacturing business and jobs. Industrial waste minimization, environmental compliance, and cost control can be combined to form an economic development strategy, as shown in Figure 1:

Figure 1: The Path from Waste Minimization to Economic Development



Environmental strategies can respond to a variety of business concerns. Every business typically has a critical “hot button” issue, in the form of a durable threat or opportunity. Business leaders tend to rally their employees around such key issues. Issues like competition or new market development may be imposed from outside the firm. Alternatively, agendas may be dominated by internal issues such as expense control or the need to generate free cash flow for reinvestment. Waste minimization contributes to these and many other business goals. See Appendix A, *Business Outcomes for Environmental Strategies*.

The role of corporate leadership. The majority of companies that successfully control costs through waste minimization do so as the result of corporate leadership. Waste minimization is a process, not a project. It cannot be achieved solely by plant engineers and government inspectors. Implementation of environmental strategies for industry will require people (both in government and industry) to cooperate beyond the confines of their traditional job descriptions and “turf” limitations. Successful waste management programs establish internal goals, accountabilities and performance metrics. Corporate leadership is crucial for coordinating a facility’s engineering, finance, process, and maintenance people to achieve meaningful

improvements.

Case Study: Toyota

In Toyota's view, environmental stewardship is not only the practice of a good corporate citizen, it is good for business. To that end, the Environmental Action Plan implemented by Toyota Motor Manufacturing North America demands that the company achieve the highest level of environmental performance in the auto industry.

Recognizing the environmental impacts beyond its own facilities, Toyota encourages and supports its parts and materials suppliers' efforts to protect the environment as part of the action plan. For example, following Toyota's issuance of Green Supplier Guidelines in 2000, 98 percent of its North American suppliers became ISO 14001 certified/registered. Toyota, which set an example by reducing water and energy consumption 15 percent per unit of production since 2000, also shares best practices and ideas with its suppliers.

Toyota's Green Supplier Guidelines also require the elimination of chemicals included on Toyota's global chemical ban list and that suppliers create their own compliance systems for the handling and transportation of hazardous materials.

SOURCE: National Association of Manufacturers

In industry, finance professionals need to understand that investments in waste control will impact both cost and revenue performance. Product managers can boost their market competitiveness through waste minimization impacts. Operations staff need to understand the connections among waste reduction, profitability, and job retention. Top management's role is to structure the procedures, accountabilities and incentives needed to implement waste control strategies.

In government, regulators of various environmental media (air, water, and solid waste) will need to collaborate with information technology professionals, economic development staff, and with each other to achieve the vision offered by this report. This coordination will also require executive support if it is to be thoroughly implemented.

A practical, apolitical rallying cry that would resonate with all concerned is to support the ongoing viability of their local economy.

The role of benchmarking. How does benchmarking reduce costs? First, consider the everyday energy, water, and material handling activities that are common to most industrial processes. It is reasonable to assume that some facilities are better than others at managing certain wastes and related costs. Firms that excel at certain functions would share their expertise in return for gaining access to others' complementary knowledge. Government and industry expertise can be pooled to identify, document, and communicate "best practices" for waste minimization and environmental compliance. Benchmarking—a data-driven, networking discipline—communicates the ongoing improvement of best practices. Results are documented and communicated for the benefit of all benchmarking participants. Such information-sharing has virtually no proprietary consequence, because it focuses on common plant utility functions.

Case Study: Kimberly-Clark Corporation (KCC)

This personal care products manufacturer has a broad mandate for environmental stewardship. A global population of more than 165 paper mills allows KCC to generate its own proprietary benchmarking discipline for energy efficiency, air emissions abatement, wastewater treatment upgrades, process water use reduction, packaging reduction, landfill elimination, toxic chemical elimination and environmental management system implementation. Five-year plans help coordinate benchmarking efforts around the world. KCC's energy conservation efforts are currently in the middle of a second five-year plan, which seeks to expand on the success of the first plan (1995-2000). The first plan led to a corporate-wide, 11.7 percent reduction in energy use per ton of product.

SOURCE: Alliance to Save Energy

Consider also the activities that define the regulatory compliance agenda. It is equally reasonable to assume that some manufacturers are better than others at managing compliance data and related reporting activities. Benchmarking discipline can be applied to regulatory functions, with the goal of developing administrative best practices that are more cost-effective for both government and industry stakeholders.

WHAT IS BENCHMARKING?

"Benchmarking" is the ongoing refinement of performance targets for common activities. It defines state-of-the-art performance measures for distinct, repetitive activities. Benchmarks allow industry to judge its progress in boosting productivity and minimizing costs. Some examples of environmental benchmarking may include:

- Optimizing the frequency of cleaning soot from combustion chambers, to minimize the combined cost of maintenance, fuel purchases, and the production of unwanted emissions.
- Optimizing the frequency of boiler "blowdown," a process that removes accumulated solids from water used to make steam.
- Determining the break-even point for reclaiming scrap castings, where the cost of energy used for melting is weighed against the salvage value of scrap material.

Similarly, the design and administration of compliance processes can be refined through benchmarking. For example:

- Formalize data collection protocol that eliminates redundancy.
- Optimize the scheduling patterns for labor assigned to specific monitoring tasks.
- Collaboratively develop management "templates" (pre-approved action plans) that describe procedures for mitigating certain emission-producing activities.

The overall effectiveness of benchmarking increases with the number of participants. Benchmarking collaboratives save each participant from "reinventing the wheel." In addition, each participant saves money by gaining access to the full benefits of others' knowledge, in return for contributing a fraction of that knowledge.

A voluntary benchmarking activity may include a data collection protocol, technical assistance, and related communications. Collaborative benchmarking will (1) allow participating firms to obtain "best practice" knowledge at a fraction of the cost of working alone; (2) become a mechanism for government agencies to effectively gauge industry's compliance; and (3) reduce government's own regulatory administration costs. Firms with advanced resource management skills may become mentors to other firms. Regulatory authorities may consider rebating permit fees or duties to firms that offer mentoring assistance to other companies in the same jurisdiction.

For manufacturers, environmental benchmarking will outline techniques for improving business performance through waste minimization. For government, benchmarking becomes a more economical method for monitoring industry compliance. As a result, the costs of doing business in that state—its infrastructure costs—will have been improved. This makes the state more attractive for retaining and adding businesses.

Regional benchmarking initiatives are an opportunity for regulatory authorities to expand their traditional scopes of work. Regulators would still enforce environmental compliance. By facilitating benchmarking networks for industrial resource management, the regulators will also provide valuable technical assistance to industry. Benchmarking activities that lead to knowledge of more effective, less costly means for administering regulatory functions will also benefit government. This is because:

- An industrial benchmarking network will engage industry and government expertise related to energy, water, and waste management.
- It is to industry's benefit to pursue waste management knowledge that will reduce costs and improve business performance.
- The same analytical benchmarking activities that foster improved resource management can easily be applied to the administration of regulatory compliance tasks, such as performance monitoring and reporting.
- The collaborative format of a benchmarking network—which gathers government, industry, academic, and consulting expertise—will lead to a more robust understanding of compliance best practices.

In sum, a government-industry benchmarking network, devoted to resource management and improved regulatory compliance, should identify, document, and communicate increasingly cost-effective ways to attain regulatory goals.

Case Study: DuPont

DuPont's Energy Engineering Technology group uses Six Sigma™, a benchmark-driven quality control methodology, to manage energy costs. DuPont used Six Sigma™ methodologies to identify and implement more than 75 energy improvement projects across its global operations between 1999 and 2002. These efforts continue today.

By using the Six Sigma™ methodology, DuPont intended to implement a managing process that would lower manufacturing costs, reduce variability in monthly energy costs, and to replicate best practices across the company. Six Sigma™ supports replication by prescribing the means for discovery, remediation, documentation and communication of innovative solutions.

The average DuPont Six Sigma™ energy project is estimated to save more than \$250,000 per year. Data indicate that by 2002, DuPont achieved a 68 percent reduction of greenhouse gas emissions since 1990, thus exceeding its target level (65 percent) and target date (2010). Global energy consumption has been essentially flat since 1990, despite a 35 percent increase in production.

SOURCE: Alliance to Save Energy

The role of non-profit organizations. Land-grant universities, national research laboratories, and professional engineering societies are potential partners with experience in providing practical, non-commercial engineering expertise. These organizations can help sort out the

interpretation and application of compliance standards, assist with the development of environmental benchmarking protocol and organize technical information clearinghouses. These organizations have ongoing professional outreach and development activities. Regulators can partner with these organizations to identify, document, and communicate best practices in environmental data gathering and performance monitoring. The professional societies will serve their members by being a current resource for waste management and environmental compliance techniques. Professional societies are also a cost-effective channel for regulators to engage industry with regulatory issues.

The role of utility companies. Electric, gas, and water utilities are typically in close contact with manufacturers and have considerable understanding of the environmental issues that industry faces. Given their experience and expertise, utilities can be effective contributors to an environmental benchmarking initiative.

Benchmarking of environmental impacts avoids the issue of picking “winners and losers” though state economic development activity. Minimization of fuel, power, and water waste benefits all manufacturers. A vibrant manufacturing base will support related service and supply industries. Minimization of energy and water waste reduces stress on local utility distribution systems. All of these outcomes support economic development.

SELF-DESIGNED PLANS FOR ENVIRONMENTAL COMPLIANCE

Economic conditions can make it difficult for some manufacturers to comply with environmental regulations. Recognizing this problem, regulators in some states are working with industry to design compliance plans with alternative means for achieving regulatory goals. The advent of self-designed compliance reveals several opportunities:

- Self-design enhances companies' competencies in waste management, since their planning process will require them to inventory their exposures to environmental risk and their capacities to manage them. Compliance planning implies the need to budget for resources, skills, and knowledge.
- Practitioners in industry are better able than government to detect changes in the business climate and how these changes impact regulatory compliance duties. Flexibility (through self-designed compliance plans) allows for necessary adjustments.
- Self-design unleashes industry's powers of innovation. Regulatory authorities can develop clearinghouses for compliance strategies, building upon the variety of plans that are submitted by industry over time. All industry incumbents can benefit from this information.

V. BLUEPRINT FOR AN ECONOMIC DEVELOPMENT PARTNERSHIP

Government and industry can partner to reduce their mutual costs of environmental regulation. Industry's voluntary benchmarking discipline can support industrial cost competitiveness, thus sustaining economic development. The suggested steps for implementing this partnership are as follows:

1. **Assemble a clearinghouse of technical assistance material related to industrial energy, water, and waste management.** State and local chapters of professional engineering societies can help in organizing existing technical information. This kind of information is well-suited for Internet presentation. Similarly, regional networks of

industry practitioners can partner with regulatory authorities to support a technical assistance agenda. This collaboration will cost government agencies little or nothing. It is in the professional societies' interests to contribute to this activity.

2. **Promote environmentally-sustainable economic development through a government-business communications partnership.** Industry will respond better to an environmental agenda that communicates clear business value. The messenger is just as important as the message. Business leaders from forward-thinking companies need to “lend their faces” to this promotional effort, encouraging their peers to take action. Case studies can be used to illustrate success stories. Many recent waste minimization case studies exist. It will also be useful to generate local, “home grown” case studies and testimonials. Appendix A of this report presents *Business Outcomes for Environmental Strategies*.
3. **Encourage the voluntary benchmarking of waste minimization and environmental compliance.** Benchmarking of energy and water management practices should be a collaborative function, conducted by industry with state and university participation. Economic development is within the charter of most land-grant universities, which offer cutting-edge science and engineering knowledge with no commercial bias. State regulatory officials need to ensure that benchmarking activities contribute to environmental mitigation agendas, and that results are summarized for industry-wide benefit. Each industry participant bears a fraction of the cost of benchmarking. Therefore, the budgetary impact on individual companies and government agencies should be negligible.
4. **Progressively adopt environmental benchmarking activities that help industry to meet regulatory obligations in a more cost-effective manner.** Implementation of a voluntary benchmarking function does not have to happen all at once. It can be piloted for a single medium (air, water, or solid waste) and expanded with experience. In many cases, manufacturers can use their environmental compliance data to benchmark their waste efficiencies. Lessons learned from environmental benchmarking will bring value to industry through avoided waste, improved production capacity, and simplified, less-costly regulatory compliance. Neighboring states can and should collaborate in benchmarking efforts, since stronger industrial performance will benefit industry's service and supply allies that are a valuable part of interstate economies. Regulators should leverage benchmarking data to simplify their compliance monitoring duties.

VI. CALL TO ACTION

The South Carolina Environment & Business Roundtable endorses the alternative environmental vision offered in this report. Roundtable members are also willing to serve as advisors for the design and implementation of a pilot project to demonstrate the viability of these concepts.

Industry and government stakeholders in South Carolina can develop a model of business-smart regulation for other states to emulate. The Alliance to Save Energy seeks partnership with government and business entities to develop a South Carolina-based pilot effort. A suggested one-year project might include these steps:

- **Months 1-3:** Tabulate environmental compliance costs for a state or region; express as a percent of gross state product.

- **Month 3:** Given the inventory of compliance costs, identify and prioritize opportunities to reduce administrative costs—for both government and industry.
- **Months 1-3:** Develop an inventory of existing material designed to assist industry with waste minimization and environmental compliance. Prominent elements of this inventory will include technical “how-to” guidance for emissions reduction, energy management, and waste treatment.
- **Months 4-6:** Develop model compliance plans for industry’s reference.
- **Months 6-12:** Promote to regional industry the value of waste management and offer technical assistance that enables results. The choice of messenger is important: peer-to-peer business communication should be developed. Regulatory authorities should have an ongoing role in providing technical assistance materials to industry. Universities and consultants may assist in this regard.
- **Beyond Month 12:** Sustain support to industry. For example, make the future issuance of permits contingent upon applicant’s demonstration of progress relative to a compliance plan, and disseminate technical assistance to applicants accordingly.

The deliverable from the proposed South Carolina pilot project will be a report that documents the design, implementation, and impacts of this effort. Other states will be encouraged to review this information and initiate their own strategies for boosting economic development through business-smart environmental strategies.

APPENDIX A: BUSINESS OUTCOMES FOR ENVIRONMENTAL STRATEGIES

BUSINESS OUTCOMES SOUGHT	BUSINESS IMPACTS OF WASTE MINIMIZATION
<p>EXPENSE CONTAINMENT</p> <ul style="list-style-type: none"> • Reduced scrap rates, waste of inputs • Reduced per-unit expenditure for fuel, power and water • Avoided penalties and fees for regulatory non-compliance • Reduced hazard insurance premiums 	<p>Waste minimization techniques improve control of process inputs. Heat, power, and water applied at the correct temperature, for the correct duration, and in correct proportion to process materials will reduce scrap rates.</p> <p>Improved knowledge of utility consumption gives the plant leverage in purchasing utility inputs. Lower per-unit energy prices can be obtained in bulk commodity contracts.</p> <p>Efficient water and energy reduces emission of pollutants, helping to ensure compliance with environmental regulations.</p> <p>Waste control initiatives can also enhance operational integrity. An engineer’s log book that demonstrates a reduction of problem incidents may be leverage for a reduced hazard insurance premium.</p>
<p>FINANCIAL PERFORMANCE</p> <ul style="list-style-type: none"> • Improved profit margins and shareholder value. • Improved asset turnover • Increased free cash flow • Improved accounting of input costs • Improved understanding of asset productivity • Better understanding of capital investment priorities 	<p>A dollar saved through waste minimization is a dollar earned. Savings contribute directly to earnings per share.</p> <p>Waste minimization contributes to process integrity. As downtime is avoided, plant assets generate more product per period of time.</p> <p>The reduction of waste means less expense for energy, water, and raw material purchases. Avoided expenditures add to cash balances.</p> <p>A manufacturer’s environmental management system should generate information for accurate assignment of energy, water, and other input costs.</p> <p>Information derived from data-oriented waste management provides a window on asset productivity, which will suggest priorities for future asset management decisions.</p>
<p>MARKET & OUTPUT GROWTH</p> <ul style="list-style-type: none"> • Increased revenue • Improved capacity utilization • Enhanced marketability of “environmentally friendly” products 	<p>Energy and water efficiency measures improve the operational integrity of assets and help to control process inputs. Control provides reliability. Reliability reduces downtime and improves the utilization of productive capacity. Orders are filled faster, allowing more orders to be filled per year. More orders mean more revenue.</p> <p>Consumers are demanding more environmentally-friendly products. More product fabricators are seeking like-minded companies to supply their inputs.</p>
<p>RISK MANAGEMENT</p> <ul style="list-style-type: none"> • Reduced plant downtime, improved reliability • Reduced vulnerability to energy market turbulence • Increased capacity to handle the evolution of regulations and technology 	<p>Resource efficiency emphasizes technologies and procedures that support mechanical integrity.</p> <p>Waste management improves knowledge of input consumption. This knowledge gives the procurement officer some leverage in seeking advance-purchase contracts that lock in commodity prices.</p> <p>Facilities that understand the variables that drive their energy consumption are also in a better position to react to changes in emissions regulation. Increased knowledge of the connection between resource use and operating efficiency also prepares decision-makers to more effectively evaluate capital investment alternatives.</p>