This is a preprint of an article published in Environmental Quality Management, Vol. 13, No. 3, Spring 2004. <http://www.interscience.wiley.com>

A Template for Assessing Corporate Performance: Benchmarking EHS Organizations

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A matrix-based selection system for identifying "best-in-class" EHS organizations

The performance of corporate environmental, health, and safety (EHS) organizations has been the subject of intense scrutiny during the last few years. Specifically, business executives have challenged EHS departments to demonstrate that they are both performing optimally and adding value.

There are, however, no standardized methods and procedures for assessing the performance of EHS organizations. Among the difficulties impeding such standardized approaches are issues relating to data quantification and validity, as well as information collection and "mining."

As a result, there is no absolute benchmark measurement of EHS performance. Indeed, there is not even common agreement over the definition of "superior EHS performance," as outlined in a prior article by Richard MacLean published in the winter 2003 issue of this journal.[1]

For researchers attempting to benchmark the "EHS leaders," the absence of a clear selection method presents the first hurdle.

CEI's "Organizations in Transition" Research Project

The study discussed in this article grew out of the need to identify corporations that utilize best practices for organizing and staffing their EHS departments. The study is the first phase of a benchmarking program in support of a research project called "Organizations in Transition: Guidelines and Best Practices for Structuring EH&S Organizations for Superior Performance."

The project is now underway at the Center for Environmental Innovation (CEI), with support from the Boston University School of Management and the Arizona State University College of Business. The key objectives of this phase of the benchmarking research are to:

- develop an evaluation matrix for the assessment of corporate EHS performance;

Published online in Wiley InterScience (www.interscience.wiley.com).
DOI: 10.1002/tqem.20001

- identify the top companies with superior EHS performance (i.e., those that are more likely to have superior EHS organizations and staffing practices); and
- serve as a preliminary exploration of the organizational and operational factors that contribute to EHS success.

The Evaluation Matrix

This article describes an evaluation matrix that has been developed to assess the performance of U.S.-based corporate environmental, health, and safety organizations, and explains how it was used to evaluate corporations' EHS performance over a recent three-year period.

By focusing on major corporations, the benchmarking will, we anticipate, yield insights into best practices that may also be applicable to small and mid-size corporations.

The matrix uses a system of input variables, intervening variables, and outcome indicators. The design of the matrix was purposely tailored to identify companies that are likely to have superior EHS organizational structures and staffing practices.

This selection process was developed to support benchmarking research into organizational best practices. By adjusting the weighting factors, or by adding or removing variables, researchers can adapt the evaluation matrix as a methodology for identifying other top-performing companies for benchmarking into other EHS areas of interest.

Research Methodology

Design Overview

The study described here focuses on corporate EHS performance during a recent three-year period (2000 through 2002) among companies listed in the Standard & Poor's 500 index (S&P 500).[2] The S&P 500, which is one of the most widely used benchmarks for U.S. equity performance, concentrates on manufacturing companies.

The research hypothesizes that EHS-related issues are important to S&P 500 companies (because of their size, the shareholder scrutiny they receive, and the importance of their reputations), and that leaders among these companies thus are likely to have superior EHS organizations and staffing practices.

Another consideration is that large corporations generally have sophisticated organizations. Some have several major business groups that themselves approximate mid-size to large corporations, as well as individual factories that resemble small corporations in their EHS organization and staffing practices. By focusing on major corporations, the benchmarking will, we anticipate, yield insights into best practices that may also be applicable to small and mid-size corporations.

The research design incorporates a two-phased approach, as illustrated in **Exhibit 1.**

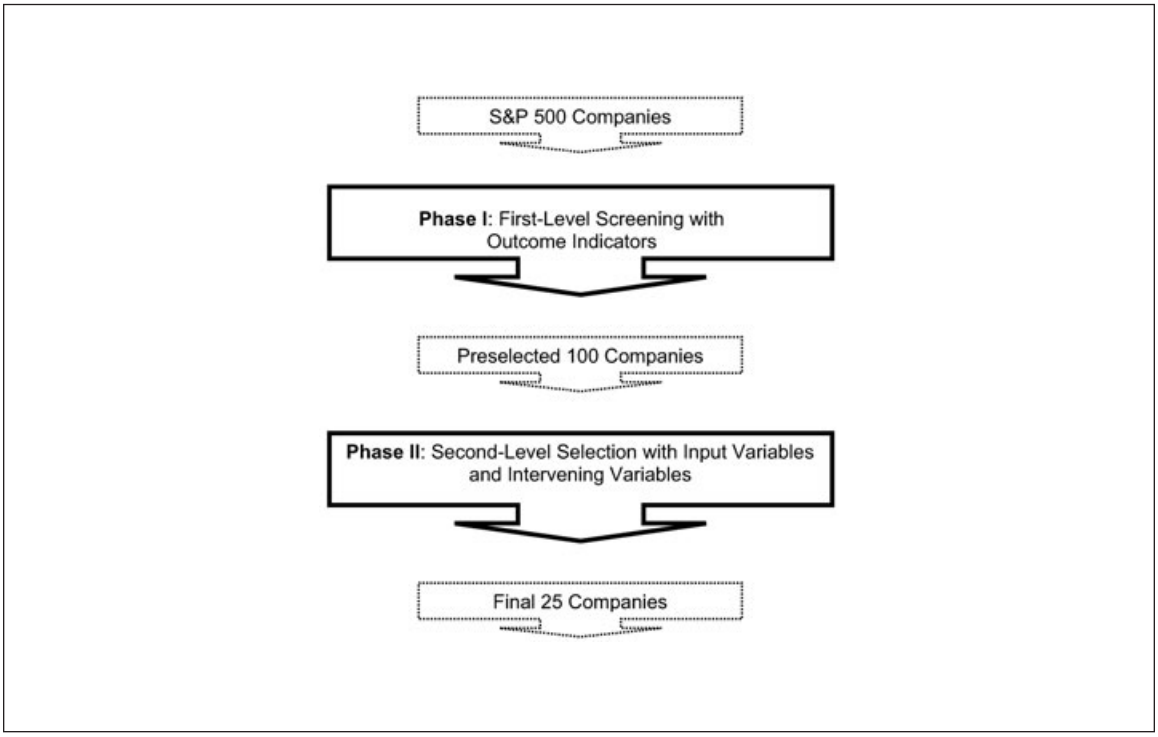
Phase I

Phase I ranks the S&P 500 companies by readily available outcome (i.e., results) indicators to narrow the list down to the top 100. Phase II rates these prescreened companies according to 16 internal management indicators that potentially reflect superior staffing and organization. The top 25 are then selected for follow-up benchmarking.

Phase I consists of five major categories subdivided into 19 outcome indicators:

- awards [six indicators];
- peer recognition [two indicators];
- classical performance measures [three indicators];
- financial results [two indicators]; and
- published composite EHS outcome indices [six indicators].

Exhibit 1. The Road Map of the Evaluation Research



The hypothesis is that superior EHS organizations will exist in financially viable corporations that are successfully managing EHS issues and attaining EHS peer recognition and awards.

The reasons for including common and customary EHS outcome indicators in Phase I are evident. The rationale for including overall business financial results may be less obvious, but is supported by research that has shown that the superior environmental performance of large U.S. corporations is often related to superior financial performance.[3]

The S&P 100 companies are leaders in their respective industries; they represent almost 53 percent of the market capital of the S&P 500.[4] Similarly, the companies in the Forbes Super 500 have the highest composite ranking scores for all four categories: sales, profits, assets, and market value.

Phase II

There are two major categories within Phase II:

- "input variables" measuring management support [one indicator] and the characteristics of the industry sector [three indicators]; and
- "intervening variables" measuring sophisticated organizational processes [three indicators], participation in progressive or cutting-edge trade associations or activities [six indicators], and specific cutting-edge programs established [three indicators].

The rationale for considering these factors is that a company that cultivates effective EHS leadership is more likely to focus its employees on environmental, health, and safety goals, while also fostering EHS programs that maximize the potential of all employees.

Similarly, companies that support long-standing membership in progressive trade associations and involvement with cutting-edge EHS programs are more likely to be well organized and staffed, since they have resources focused on issues beyond day-to-day compliance and "firefighting."

In Phase II, certain input variables (e.g., number of Superfund sites and Toxic Release Inventory information) were calculated as positive factors, while environmental violations and penalties were viewed as negative.

Using negative scoring to rank companies with recent compliance problems is intuitively obvious. Assigning positive scores for significant toxic emissions and Superfund sites appears, at first, counterintuitive. However, according to a 2001 U.S. Environmental Protection Agency (EPA) research program conducted by Professor Madhu Khanna of the University of Illinois at Urbana-Champaign, companies with a higher level of potential liabilities and larger levels of pollution per unit of output are more likely to have a higher-quality environmental management system.[5]

Using negative scoring to rank companies with recent compliance problems is intuitively obvious.

Because of this, large companies like DuPont and Johnson & Johnson are frequently identified as industrial leaders of corporate EHS practice, even though they still produce substantial quantities of toxic releases and wastes. On the other hand, the total dollar amount of fines levied by EPA for violations of environmental statutes may more accurately reflect the extent of poor environmental management performance.

Data Collection and Scoring

The primary data sources used were: EPA; the Investor Responsibility Research Center (IRRC); professional consulting companies; respected journals and magazines; and independent third-party research organizations.

In order to acquire a more complete collection of corporate EHS data, the study also includes information obtained through searches of major EHS issue-related sources and official Web sites. **Exhibit 2** contains a detailed listing of each data source, the nature of the information, and the weight (i.e., emphasis) it received in the scoring.

A preference matrix (**Exhibit 3**) was used to score each criterion from 1 (worst) to 5 (best). Each score is weighted according to its perceived importance, with the total of these weights equaling 100. The total score is the sum of the weighted scores (weight $\times$ score) for all the criteria.

For example, the Dow Jones Sustainability World Indexes (DJSWI) are assigned a weight of 6. If a DJSWI company receives the highest criterion score (5), the weighted score is $5 \times 6 = 30$ points. The Statistical Package for the Social Services (SPSS) and MS Excel are used to do the analysis and tabulation of results.

There is no scientific methodology to precisely determine the importance of each weight factor. In this study, the individual weight factors were determined by the best professional judgment of the six researchers associated with "Organizations in Transition." By varying the weight factors, the matrix can be adapted to other selection processes.

Initial Screening Results

Phase I screening results are summarized in **Exhibit 4,** which breaks down companies by industry sector. As shown, companies from two in-

Exhibit 2. Evaluation Criteria and Data Sources

Phase I: Outcome Indicators

EHS Awards & Recognitions

1a. World Environment Center Gold Medal <2 Points>
Source: The World Environment Center (WEC), The WEC News and Press Releases (May 2000; May 2001; May 2002).
- Commitment to developing innovative science, technology, and management systems to achieve environmental quality and sustainable economic development in a socially responsible manner
- Implemented cutting-edge management practices, technologies, products, and/or services that enhance quality of life.

1b. EPA Awards (Energy Star, Pesticide Environmental Stewardship, Green Chemistry, Natural Gas Star, ClimateWise, WasteWise, Partners for the Environment Program Award, Evergreen Award, Environmental Excellence Award) <6 Points>
Source: U.S. Environmental Protection Agency. http://www.epa.gov (August 2002); http://estar7.energystar.gov (August 2002); WasteWise Annual Report (September 2000; September 2001; September 2002); The Evergreen Award for Pollution Prevention (November 2000; November 2001; November 2002).
- Energy and Natural Resource Conservation; Pollution Control; Toxics Release Control.

1c. Corporate Health Achievement Award (CHAA) <6 Points>
Source: The American College of Occupational and Environmental Medicine, The CHAA News Release (May 2000; May 2001; May 2002).
- Management and Leadership: Administration, organization, innovation, and values;
- Healthy Company: Health education and counseling and assistance in control of illness-related absence from job.
- Healthy Environment: Evaluation, inspection, and abatement of workplace hazards and education of employees in jobs where potential occupational hazards exist that may be specific to the job.

1d. Safety Achievement Awards (Green Cross for Safety Medal, NSC, AGA, SAFE, MMS, OH) <6 Points>
Source: The National Safety Council, http://www.nsc.org (August 2002); http://www.lcasafe.org (August 2002); and The News Release of U.S. Department of the Interior Minerals Management Service (February 2001).
- Employee Safety: Five-year evaluation. Compare the 2002 total recordable incident rate (TRIR) to the four-year (1998-2001) average. An award is earned if the 2002 TRIR reflects at least 25 percent improvement over the four-year average or if the 2002 TRIR equals 0.00.

1e. Environmental Product Design Awards <2 Points>
Source: The Industrial Designers Society of America, Innovation (Fall 2000; Fall 2001; and Fall 2002)
- Design for Environment Strategy; Life-Cycle Assessment

1f. Other Awards <2 Points>
Source: The National Association for Female Executives (NAFE), Working Mother Magazine, http://www.workingmother.com (August 2002) and **The Silicon Valley Toxics Coalition (SVTC),** Annual Computer Report Card, 2002
- The 100 Best Companies for Working Mothers: corporate culture and EHS issues;
- The Computer Take Back Campaign (CTBC): take-back, recycling, and hazardous materials reductions and phase-outs.

Peer Recognitions

1g. By environmental, health, and safety professionals <12 Points>
Source: Center for Environmental Innovation (May 2003). Survey conducted by Richard MacLean, Project Manager for Organizations in Transition; opinion survey of 60 senior EHS professionals. See MacLean, R., Superior Environmental, Health, and Safety Performance: What Is It? Environmental Quality Management, 13(2), 13-20 (Winter 2003) (discussing a peer survey of what constitutes superior EHS performance, and which corporations have it).
- Companies recognized for their EHS performance

1h. By CEOs <8 Points>
Source: Maitland, A., Due recognition given for effort, **Financial Times** (December 2002).
- The world's most respected companies, environmentally.

Classical Performance Measures for EHS

1i. Safety (OSHA Violations) <12 Points>
Source: The Investor Responsibility Research Center (IRRC), The Workplace Ratings, http://www.idealswork.com (August 2002). The rating identifies those U.S.-based companies that had Occupational Safety & Health Administration (OSHA) violations classified as "serious" during the most recently reported three-year period. A serious violation is one that risks significant harm to workers—such as unacceptable levels of toxic airborne substances.
- In this study, the lower the number of violations a company has, the higher the score it earns.

(continued)

Exhibit 2. Evaluation Criteria and Data Sources *(continued)*

1j. Environmental Performance <12 Points>
Source: EPA and **IRRC,** The Environment Ratings, http://www.idealswork.com (August 2002).
- If a company's toxic emissions are decreasing over the last three years and if a company's oil and chemical spills are decreasing over the last three years, it gets a higher rating.
- The rating compares the total dollar amount of fines levied against each company by EPA for violations of environmental statutes. If a company's fine amounts have decreased over the last three years, it gets a higher rating.

1k. Environmental Performance (Compliance Violation Penalty—Civil Penalties 1994 and 1995) <–10 Points>
Source: EPA research conducted by Professor Madhu Khanna, University of Illinois at Urbana-Champaign, 2002

Financial Results

1l. S&P 100 <6 Points>
Source: Bos, R., An Overview of the Standard & Poor's 100 Index, **Standard & Poor's** (2002); Weber, J., The Best Performers, **Business Week** (March 2002).
The S&P 100 index represents almost 53 percent of the market capital of the S&P 500. The constituent companies are leaders in their respective industries, have actively traded equity options, and possess a very liquid share base.

1m. Forbes 100/500 <6 Points>
Source: The first 100 companies from the Forbes 500. The Forbes 500, Forbes (April 15, 2002)
Forbes magazine has long maintained that corporate size can't be measured with just one yardstick. The Forbes 500's universe of 824 companies is a multidimensional ranking of America's largest corporations by four different standards—sales, profits, assets, and market value. The companies in the Forbes Super 500 have the highest composite ranking scores for all four categories.

Composite Indicators of Performance (Indices)

1n. Dow Jones Sustainability World Indexes <6 Points>
Source: The Dow Jones Sustainability World Indexes (DJSI World) Guide, **Dow Jones & Company** and **SAM Group** (April 2002)
Corporate sustainability assessment consists of the following principles:
- Strategy: Sustainability leaders integrate long-term economic, environmental, and social aspects into their business strategies.
- Innovation: Sustainability leaders invest in product and service innovations that focus on technologies and systems that use financial, natural, and social resources in an efficient, effective, and economic manner.
- Governance: Sustainability leaders implement the highest standards of corporate governance, including management quality and responsibility, organizational capabilities, and corporate culture.
- Shareholders, employees, and other stakeholders.

1o. FTSE4GOOD US 100 Index <6 Points>
Source: The FTSE Group, Is FTSE4Good just stock market capitalism dressed in green? **The Ecologist** (November 2001)
The criteria of the FTSE4GOOD US 100 Index focus on the positive efforts of companies in three areas and are designed to be clear and achievable targets for companies to use in developing socially responsible policies and practices.
- Working toward environmental sustainability; developing positive relationships with stakeholders; and upholding and supporting universal human rights.

1p. Domini 400 Social Index <5 Points>
Source: The Domini 400 Social Index (DSI) by KLD Research & Analytics Inc. The responsible thing. **Funds International** (September 2002)
The Domini 400 Social Index (DSI), modeled on the S&P 500, is a socially screened, capitalization-weighted index of 400 common stocks.
- The DSI reflects the behavior of a portfolio of stocks in companies that a socially responsible investor might purchase; evaluation of environmental impact, citizenship, employee relations, and diversity.

1q. INNOVEST ranking system (EcoValue'21 Rating) <6 Points>
Source: The Innovest Strategic Value Advisors Inc., http://www.innovestgroup.com (August 2002).
Managerial risk efficiency capacity: strategic corporate governance capability; environmental management systems strength; audit/accounting capacity; training capacity and intensity; generic environmental management protocols; industry-specific protocols.

1r. 100 Best Corporate Citizens <4 Points>
Source: Klusmann, T., The 100 Best Corporate Citizens for 2000; Johansson, P., The 100 Best Corporate Citizens for 2001; and Miller, M., The 100 Best Corporate Citizens for 2002. Business Ethics—Corporate Social Responsibility Report, **SRI World Group Inc.**
Uses a synthesis of seven measures that reflect quality of service to seven stakeholder groups: stockholders, community, minorities and women, employees, environment, non-U.S. stakeholders, and customers.

(continued)

Exhibit 2. Evaluation Criteria and Data Sources *(continued)*

1s. Fortune 100 "Best to Work For" and "Most Admired" Companies <3 Points>
Sources: Levering, R., & Moskowitz, M., The 100 Best Companies To Work For, **Fortune** (January 10, 2000); Colvin, G., America's Most Admired Companies, **Fortune** (February 21, 2000); Levering, R., & Moskowitz, M., The 100 Best Companies to Work For, **Fortune** (January 8, 2001); Diba, A., & Munoz, L., America's Most Admired Companies, Fortune (February 19, 2001); Levering, R., & Moskowitz, M., The Best in the Worst of Times, **Fortune** (February 4, 2002); Sung, J., & Tkaczyk, C., Who's On Top and Who Flopped, **Fortune** (March 4, 2002).
The Hay Group consultancy asked 10,000 executives, directors, and securities analysts to rate the companies in their own industries based on eight criteria: innovation; financial soundness; social responsibility; quality of management; long-term investment value; employee talent; use of corporate assets; and quality of products and services.

Phase II: Input Variables

Industrial/Sector Characteristics

2a. Number of Superfund Sites <10 Points>

2b. Onsite Toxic Releases-Sales Ratio <10 Points>

2c. Offsite Transfers-Sales Ratio <10 Points>

Source (2a-2c): Professor Madhu Khanna provides the data about the variables listed above. According to her research, concerns about environmental liabilities and the threat of high costs of compliance with anticipated and existing mandatory regulations have a statistically significant influence on the incentives for corporate environmental management. The most important determinants include: offsite transfers of toxic releases, onsite toxic emissions, and number of Superfund sites.

Top-Management Support

2d. Clear, Aggressive Statement of Commitment <2 Points>
Source: Corporate reports from the selected companies

Phase II: Intervening Variables

Organizational Processes

2e. Best EHS organization and staffing: Peer recognitions by environmental, health, and safety professionals <12 Points>
Source: Center for Environmental Innovation. Survey conducted by Richard MacLean, Project Manager for Organizations in Transition (May 2003) (see 1g above for details).
- Companies recognized for their high-performing EHS staffs and organizations

2f. Leadership (The Ron Brown Award for Corporate Leadership) <3 Points>
Source: The Conference Board Inc., http://www.ron-brown-award.org (August 2002).
- Fostering diversity; developing healthcare and pension benefits; creating partnerships to resolve workplace issues; promoting workplace safety and security; supporting employees through family-friendly policies; and improving employee skills and career development.

2g. Baldrige Award (Baldrige National Quality Program) <5 Points>
Source: The National Institute of Standards and Technology (NIST), http://www.quality.nist.gov (August 2002)
For over 10 years, many companies have used the Baldrige Award criteria as the foundation of their corporate scorecards. The seven perspectives of the Baldrige Award are: customer satisfaction; employee satisfaction; financial performance; safety/environmental/public responsibility; operational performance; product/service quality; and supplier performance.

Participation in Progressive or Cutting-Edge Trade Associations or Activities

2h. Global Environmental Management Initiative (GEMI) <2 Points>
Source: GEMI Inc., http://www.gemi.org (August 2002).
GEMI is a nonprofit organization of leading companies dedicated to fostering environmental, health, and safety excellence worldwide through the sharing of tools and information in order for businesses to help businesses achieve environmental excellence.

2i. EPA Industry Partnerships (Project XL and National Environmental Performance Track) <10 Points>
Source: EPA, Project XL Report (April 2002) and National Environmental Performance Track Program Guide (October 2001).
Project XL is a national pilot program that allows state and local governments, businesses, and federal facilities to develop innovative strategies for testing better or more cost-effective ways of achieving environmental and public health protection. The National Environmental Performance Track is designed to recognize facilities that consistently meet their legal requirements and have implemented high-quality environmental management systems.

(continued)

Exhibit 2. Evaluation Criteria and Data Sources *(continued)*

2j. OSHA Strategic Partnership Program for Worker Safety and Health (OSPP) <6 Points>
Source: The Occupational Safety & Health Administration (OSHA), U.S. Department of Labor, http://www.osha.gov (August 2002).
OSPP is an expansion and formalization of OSHA's substantial experience with voluntary programs.
- OSHA enters into extended, voluntary, cooperative partnerships with groups of employers, employees, and employee representatives in order to encourage, assist, and recognize their efforts to eliminate serious hazards and achieve a high level of worker safety and health.

2k. Coalition for Environmentally Responsible Economies (CERES) <6 Points>
Source: The U.S. Coalition for Environmentally Responsible Economies, http://www.ceres.org (August 2002).
CERES is a network of over 80 companies that have committed to continuous environmental improvement by endorsing the CERES Principles, a ten-point code of environmental conduct.

2l. Organization Resources Counselors (ORC) <2 Points>
Source: ORC Inc., http://www.orc-dc.com (August 2002).
ORC is an international management and human resources consulting firm dedicated to advancing the art, knowledge, and practice of organizational and human relationships. ORC assists management in identifying needs, resolving issues, and achieving organizational objectives through effective use of human resources in a dynamic economic, social, and political environment.

2m. The Conference Board (TCB) <2 Points>
Source: The Conference Board Inc., http://www.conference-board.org (August 2002).
- TCB creates and disseminates knowledge about management and the marketplace to help businesses strengthen their performance and better serve society. The Townley Global Management Center for Environment, Health & Safety was established to foster and enable intellectual growth by providing small-group forums and a peer network for exchanging knowledge, practices, and strategies relating to EHS and sustainable development.

Specific Cutting-Edge Programs Established

2n. ISO 14001-certified environmental management system (or EMAS/BS 7750) <12 Points>
Source: The Capaccio Environmental Engineering Inc., http://www.iso14000.com (August 2002).
An ISO 14001 environmental management system is meant to develop a systematic management approach to the environmental concerns of an organization. The goal of this approach is continual improvement in environmental management.

2o. Reporting under the Global Reporting Initiative (GRI) framework <5 Points>
Source: The Global Reporting Initiative, http://www.globalreporting.org (August 2002).
- The Global Reporting Initiative is an international, multi-stakeholder effort to create a common framework for voluntary reporting of the economic, environmental, and social impacts of organization-level activity.

2p. Other significant, cutting-edge projects or alliance partnerships <3 Points>
Source: Environment-Business Partnerships Set a Green Trend, **The Environmental Defense** (2000), and **Green Century Capital Management Inc.,** http://www.greencentury.com (August 2002).
- When companies minimize their environmental risks, they also may gain a competitive advantage—by reducing costs, improving quality, and gaining access to new markets. The Green Century Balanced Fund seeks out well-managed, environmentally responsible companies, many of which also make positive environmental contributions.

dustries—information technology (including subsectors such as computer equipment, office electronics, semiconductor equipment, and telecoms and networking equipment) and health care (including subsectors such as health care equipment, supplies, facilities, and pharmaceuticals)—account for over 50 percent of the companies included in Phase I.

These results, we believe, do not demonstrate that EHS organizations from these two sectors are superior to those in other sectors. Corporate EHS management in certain other sectors (especially the chemical and petroleum industries) often faces more technical and political challenges.

The results may, however, suggest that executive managers in the information technology and health care sectors view EHS as a strategic issue, and purposely maintain a high profile in their EHS performance.

Exhibit 5 lists the 100 companies identified by Phase I screening.

Exhibit 3. The Corporate EHS Evaluation Matrix

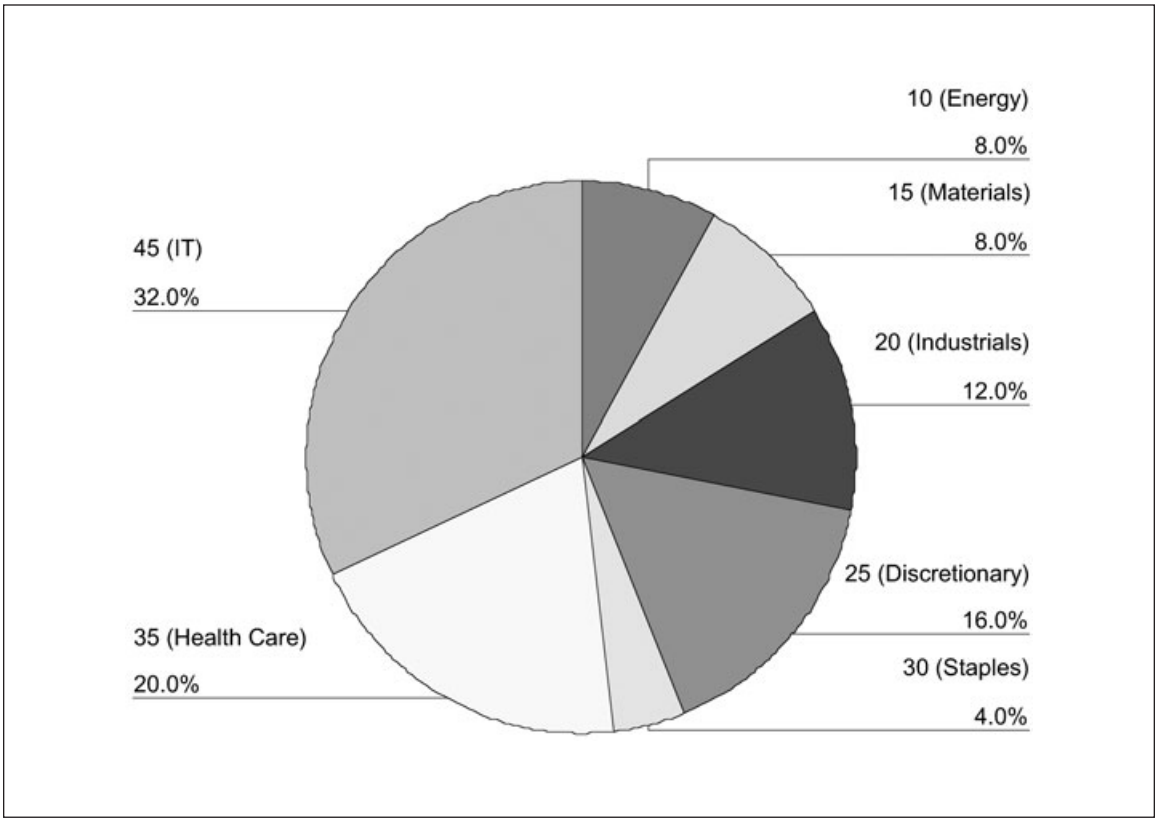
Corporate EHS Performance Measurement					Weight	S&P 500 Index Companies	
						Score	Weighted Score
Phase I Screening							
Outcome Indicators	EHS awards & recognitions		1a	World Environment Center Gold Medal	2		
			1b	EPA Awards (Energy Star, Pesticide Environmental Stewardship, Green Chemistry, Natural Gas Star, ClimateWise, WasteWise, Partners for the Environment Program Award, Evergreen Award, Environmental Excellence Award)	6		
			1c	Corporate Health Achievement Award	6		
			1d	Safety Achievement Awards (Green Cross for Safety Medal, NSC, AGA, SAFE, MMS, OH)	6		
			1e	Environmental Product Design Awards	2		
			1f	Other Awards	2		
	Peer recognitions		1g	By environmental, health and safety professionals	12		
			1h	By CEOs	8		
	Classical performance measures for EHS	Safety	1i	IRRC Rating of OSHA Violations	12		
		Environmental performance	1j	IRRC Research Data	12		
			1k	Compliance Violation Penalty (Civil Penalties 1994 and 1995)	-10		
	Financial results		1l	Standard & Poor's 100	6		
			1m	Forbes 100/500	6		
	Composite indicators of performance (indices)		1n	Dow Jones Sustainability World Indexes	6		
			1o	FTSE4GOOD US 100 Index	6		
			1p	Domini 400 Social Index	5		
			1q	INNOVEST ranking system (EcoValue'21 Rating)	6		
			1r	Business Ethics 100 Best Corporate Citizens	4		
			1s	Fortune 100 Best to Work For and Most Admired Companies	3		
				Phase I Total	100		
Phase II Selection							
Input Variables	Industrial/Sector characteristics		2a	Number of Superfund Sites	10		
			2b	On-site Toxic Releases-Sales Ratio	10		
			2c	Off-site Transfers-Sales Ratio	10		
	Top management support		2d	Clear, Aggressive Statement of Commitment	2		
Intervening Variables	Organizational processes		2e	Best EHS organization and staffing/ Peer recognitions by environmental, health, and safety professionals	12		
			2f	Leadership	3		
			2g	Baldrige Award (Baldrige National Quality Program)	5		
	Participation in progressive or cutting-edge trade associations or activities		2h	Global Environmental Management Initiative (GEMI)	2		
			2i	EPA Industry Partnerships (Project XL and National Environmental Performance Track)	10		
			2j	OSHA Strategic Partnership Program for Worker Safety and Health (OSPP)	6		
			2k	Coalition for Environmentally Responsible Economies (CERES)	6		
			2l	Organization Resources Counselors (ORC)	2		
			2m	The Conference Board (TCB)	2		
	Specific cutting-edge programs established		2n	ISO 14000 EMS Certification (or EMAS/BS 7750)	12		
			2o	Annual Report under Global Reporting Initiative (GRI)	5		
			2p	Other significant, cutting-edge projects or alliance partnerships	3		
				Phase II Total	100		

The Top 25

Out of these 100 companies, the top 25 with superior EHS practices were selected using the same preference matrix method that was used in the screening phase.

In Phase II, the corporate EHS evaluation matrix included five categories (two input variables and three intervening variables) and 16 indicators. **Exhibit 6** lists the 25 companies finally selected in Phase II.

Exhibit 4. Phase I Screen by Sector



Discussion of Findings

Selecting "best-in-class" companies is relatively straightforward if the attributes being benchmarked are very specific, with measurable and publicly available metrics to distinguish top performers. The challenge presented by this study is that no single rating or scoring system can provide an absolute measure of the "best" EHS organization.[6] Indeed, there is not even common agreement over what constitutes a "best-in-class" EHS organization.

In the early stages of this research, for example, 60 senior EHS professionals submitted answers to the following question: "When you think of companies that have the best EHS organization and staffing, what companies come to mind and why?"

As outlined in a prior article, a bewildering array of companies and reasons were returned by the survey participants.[7] In total, 74 companies were cited as having superior EHS organizations. No clear pattern emerged from the reasons provided. **Exhibit 7** lists the companies that were most often cited and summarizes the reasons for their inclusion.

This exhibit does illustrate, however, that the senior EHS professionals surveyed were 100 percent accurate in identifying top EHS performers—i.e., those companies that the evaluation matrix identified as among the top 25—assuming for the moment that our study offers the definitive analysis of best-in-class EHS organizations. Indeed, even the relative ranking within the top four closely approximated the top positions in our study.

So why not just solicit opinions as a means of selecting benchmark companies when the means for selection are not precisely defined or

Exhibit 5. Initial Screen—Phase I

Rank	Company	Score	Rank	Company	Score
1	Intel Corp.	440	51	J.P. Morgan Chase & Co.	95
2	Hewlett-Packard	335	52	Federal Express	93
3	Johnson & Johnson	326	53	United Parcel Service	93
4	Procter & Gamble	305	54	Anheuser-Busch	92
5	DuPont (E.I.)	292	55	Dell Computer	91
6	International Bus. Machines	275	56	Maytag Corp.	90
7	3M Company	261	57	Sears, Roebuck & Co.	88
8	Sun Microsystems	226	58	Merrill Lynch	84
9	Dow Chemical	200	59	Target Corp.	82
10	Bristol-Myers Squibb	194	60	Gillette Co.	80
11	Xerox Corp.	188	61	Johnson Controls	78
12	Motorola Inc.	181	62	Tyco International	76
13	General Electric	173	63	Lockheed Martin Corp.	72
14	Microsoft Corp.	172	64	Abbott Labs	72
15	Verizon Communications	171	65	Snap-On Inc.	70
16	Cisco Systems	164	66	Wal-Mart Stores	69
17	Texas Instruments	159	67	Advanced Micro Devices	68
18	McDonald's Corp.	158	68	Allergan Inc.	66
19	Home Depot	153	69	Conoco Inc.	66
20	Merck & Co.	152	70	Alcoa Inc.	62
21	Baxter International Inc.	150	71	Schlumberger Ltd.	60
22	Whirlpool Corp.	150	72	Weyerhaeuser Corp.	58
23	Eastman Kodak	149	73	Avon Products	58
24	AT&T Corp.	149	74	Kerr-McGee	52
25	Exxon Mobil Corp.	145	75	Philip Morris	50
26	General Motors	144	76	Cooper Tire & Rubber	44
27	Lucent Technologies	144	77	Millipore Corp.	44
28	NIKE Inc.	142	78	Solectron	40
29	PPG Industries	132	79	Honeywell Int'l Inc.	40
30	Fannie Mae	131	80	Colgate-Palmolive	40
31	Ford Motor	124	81	Micron Technology	38
32	Delphi Corporation	124	82	Sherwin-Williams	38
33	Goodyear Tire & Rubber	118	83	Apple Computer	36
34	Boeing Company	117	84	Lilly (Eli) & Co.	35
35	Pfizer Inc.	116	85	ChevronTexaco Corp.	32
36	Black & Decker Corp.	116	86	Rohm & Haas	32
37	QUALCOMM Inc.	114	87	Rockwell Collins	30
38	Walt Disney Co.	113	88	ITT Industries Inc.	20
39	American Int'l Group	109	89	Dana Corp.	20
40	Citigroup Inc.	108	90	Consolidated Edison	20
41	Bank of America Corp.	106	91	Caterpillar Inc.	16
42	Coca Cola Co.	104	92	Ryder System	12
43	Pitney-Bowes	104	93	Donnelley (R.R.) & Sons	10
44	Southwest Airlines	103	94	Corning Inc.	4
45	Duke Energy	102	95	International Paper	2
46	Visteon Corp.	98	96	Eaton Corp.	0
47	Kimberly-Clark	97	97	Textron Inc.	0
48	SBC Communications Inc.	97	98	Georgia-Pacific Group	–4
49	United Technologies	96	99	TRW Inc.	–8
50	AOL Time Warner Inc.	96	100	Occidental Petroleum	–30

Exhibit 6. Final Selection—Phase II

Rank	Company	Total Score
1	DuPont (E.I.)	668
2	Johnson & Johnson	584
3	Intel Corp.	571
4	3M Company	538
5	International Bus. Machines	537
6	Ford Motor	479
7	General Motors	468
8	Procter & Gamble	459
9	Hewlett-Packard	457
10	Bristol-Myers Squibb	400
11	Texas Instruments	400
12	Dow Chemical	396
13	Motorola Inc.	393
14	Baxter International Inc.	381
15	Eastman Kodak	381
16	Xerox Corp.	341
17	Lucent Technologies	334
18	Kerr-McGee	322
19	General Electric	307
20	Lockheed Martin Corp.	302
21	Pfizer Inc.	300
22	Merck & Co.	295
23	Visteon Corp.	288
24	Sun Microsystems	278
25	Exxon Mobil Corp.	271

readily available? In effect, why not leave this murky process to the experts?

This approach may be reasonable if a sufficiently large number of independent experts were solicited and one wanted to benchmark with only a few companies.

The latter point is critical. The outstanding companies generally are well known and readily identified by professionals in the field. As soon as one goes farther down the scale, however, consensus is elusive. In this case, once the top eight companies were identified, the remaining companies could not be differentiated.

Conclusion

The matrix-based selection methodology discussed in this article provides a technique capable of differentiating EHS performance among dozens of companies. Resources can then be applied to benchmarking EHS performance according to the priority implied by this ranking. By

Exhibit 7. Selection of Best EHS Organizations by Peer Group

Company	Number of Citations	Reasons	Rank in Top 25
DuPont	15	EHS part of culture; good mix of qualified staff; EHS integrated with business organization	1
Baxter International	9	EHS linked to operational excellence; centralized staff, many now in business units; strong international auditing network; line management owns EHS performance	14
Johnson & Johnson	7	Global management of risk and performance metrics; good blend of centralized/decentralized; very high staffing levels	2
Intel	6	Matrix-hybrid organization design; highly focused staff	3
3M	6	Strong innovation and cross-training; strong core corporate staff accountability at profit centers	4
Dow	4	Community involvement groups; board of external experts to evaluate EHS programs; integrated systems	12
Procter & Gamble	4	Organization designed around customer support and regional needs; good site EHS coordinator training and guidance; director of sustainability	8
Bristol-Myers Squibb	3	Good mix of qualified staff	10

using a matrix based on a variety of ranking systems, no single element dominates the outcome, lending greater credibility to the results.

Other researchers might consider using a similar matrix scoring system, and might even use many of the same variables discussed here, with weighted scores adjusted for the particular issue under investigation.

Acknowledgments

The authors gratefully acknowledge Associate Professor Madhu Khanna of the University of Illinois for supplying metrics on the S&P 500 companies for several of the parameters used in the evaluation matrix. In addition, we wish to thank our fellow researchers on the Organizations in Transition project for their review of, and advice on, this article: Associate Professor Andrew Hoffman, Boston University School of Management; Steve Rice, Environmental Opportunities Inc.; and Frank Friedman, Friedman Associates.

Notes

1. See MacLean, R. (2003). Superior environmental, health, and safety performance: What is it? Environmental Quality Management, 13(2), 13–20 (discussing a peer survey of what constitutes superior EHS performance, and which corporations have it).

2. Standard & Poor's. (2002). S&P 500 index. Source: http://www.standardandpoors.com/, November 9, 2002.

3. Cohen, M., Fenn, S., & Konar, S. (1995). Environmental and financial performance: Are they related? Washington, DC: Investor Responsibility Research Center.

4. Bos, R. J. (2000). An overview of the Standard & Poor's 100 index. New York: McGraw-Hill.

5. Khanna, M., & Anton, W. R. Q. (2002). Corporate environmental management: Regulatory and market-based incentives. Land Economics, 78, 539–558.

6. MacLean, R. (2002). Guidelines and best practices for structuring EH&S organizations for superior performance (Research Plan). Available at http://www.Enviro-Innovate.org.

7. For additional details on this survey, see the related article by Richard MacLean cited in note 1 above. The peer survey described in that article asked two separate questions. The first question related to EHS performance, and was used as the basis of the article cited in note 1; the results appeared as Exhibit 2 in that article. The second question related to superior EHS organizations, and was used as an input element (variable 2e) to the matrix described in this article. A summary of the results appears as Exhibit 7 in this article.

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