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Eco-Efficiency: Hype or the Future?

Don't get left behind in the race to save the planet and bolster profits

By Peter J. Knox, editor-in-chief & associate publisher



Imagine making more goods from fewer resources and throwing virtually nothing away. That's not just some utopian dream--it's part of the 10-year plan at a leading chemical company, and it's probably the future of the industry at large.

The process helping to make it possible is called "eco-efficiency," and it's a set of approaches that support the movement toward sustainable development. Sustainable development is growth that doesn't cause ecological damage.

Innovation's also needed for sustainable growth, which demands quantum leaps, rather than incremental gains, in environmental and economic performance.

And those ideas are penetrating the industry's consciousness at a critical juncture. At the very moment that the world is running out of places to put waste and pollution, resources are becoming scarce and more costly. It's a double whammy that can leave companies scrambling for success.

Many believe sustainable development and eco-efficiency underlie a paradigm shift

that's changing the nature of business and transforming environmental strategies--much like the shift in the balance among avoidance, control, monitoring and assessment, and remediation depicted in Fig. 1.

Eco-efficiency's value

What's the value of the eco-efficiency approach? According to Dow Europe's Claude Fussler, it's "the integration of sustainable development with business considerations--with a long-term vision of achieving both. Short-term conflicts are seen as temporary problems, rather than fundamental constraints.

"Eco-efficiency and cleaner production," Fussler said, "are closely related."

A book, *Eco-efficiency: The Business Link to Sustainable Development*, published by the World Business Council for Sustainable Development (WBCSD), outlines the following seven dimensions of eco-efficiency that "every business should take into account when developing products, introducing process changes or taking other actions with environmental implications." Those principles are:

1. Reduce the material intensity of goods and services;
2. Reduce the energy intensity of goods and services;
3. Reduce toxic dispersion;
4. Enhance material recyclability;
5. Maximize sustainable use of renewable resources;
6. Extend product durability;
7. Increase the service intensity of goods and services.

So the principles of eco-efficiency are emerging as important tools for companies with sustainable-development goals, because they help optimize two of the three underpinnings of sustainable development--environmental excellence and business growth. Those, in turn, support the third area--social responsibility. Eco-efficiency tools also benefit companies that have not embraced sustainable development by improving environmental and economic performance.

What do eco-efficiency methods mean to people working in the plants? According to Scott Noesen, Dow's Manager of EHS & Business Integration, most waste reduction suggestions (referred to as "resource productivity increases") come from the plant level rather than the business level.

Surveys by the consulting firm of Arthur D. Little Inc. (ADL) show that leading companies have responded to the escalating costs of environmental compliance in the past two decades by managing operations tightly and by meeting regulations before they take effect. By studying those successes and making the necessary changes, other companies can drastically reduce their "environmental footprints." Companies can even operate five to 10 years ahead of new regulations--at greatly reduced operating and capital costs.

Accordingly, ADL sees the idea of "eco-efficiency" as a valuable way to reduce environmental impact and costs. "Eco-

efficiency," an ADL report said, "provides a rigorous methodology for evaluating the entire life cycle of a company's operations, putting an economic value on all aspects of the life cycle findings, and then acting on those findings to reduce impacts and increase performance."

Is eco-efficiency enough?

While some companies have progressed in using eco-efficiency to strengthen operations, eco-efficiency methods by themselves can make only incremental changes, rather than the order of magnitude impact that's needed. Eco-efficiency gains can be diluted, for example, by increases in industrial output. So, according to ADL, "In order to push overall environmental impact down at the same time that global production is growing fast, an efficiency gain will need to be 'factors' better, not just 10% to 100% better. The Rocky Mountain Institute and the Wuppertal Institute propose a factor of 10 or more. Improvements of that order of magnitude are going to demand radical business innovation."

At the environmental session of the fall meeting of the Chemical Manufacturers Association (CMA) in Washington, DC, Motorola's Richard Guimond, corporate director of environment, health and safety, told chemical industry leaders that "in the long run, eco-efficiency will not be enough! We will need ways to recycle, so there is no waste."

Sustainable development

At the same CMA fall meeting, Dr. Bjorn Erik Dahlberg of Norway presented highlights of a survey commissioned by a consortium of seven companies in Europe on "Sustainable Development and Shareholder Value."

Key observations include:

- A transition is occurring from "command and control" environmental regulation to "self-control;"
- The winning companies will embrace sustainable development as part of their business strategies;
- Those who don't pursue sustainable development will eventually fall behind as the gap widens between the leaders and procrastinators;
- Opportunities will increase for companies that win the public trust (see Fig. 2).

An international survey by ADL of 481 executives from a cross-section of industries confirmed the importance of eco-efficiency and sustainable development. For example:

- Companies overwhelmingly (95%) agree that sustainable development is important and 82% think they can derive real business value from it;
- They see a number of facets to the business value of sustainable development, with eco-efficiency methods providing the most value (Fig. 3);
- Other industries, however, are ahead the chemical sector in applying eco-efficiency (54% of all industries, compared to 42% for the chemical industry);

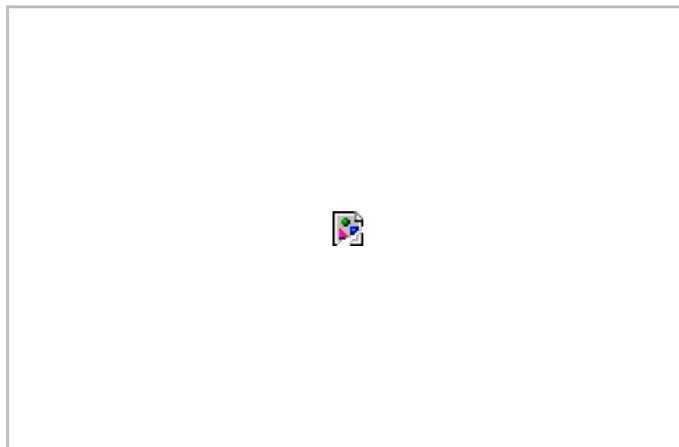
- o Europe has embraced sustainable development more vigorously than North America.

Steps toward eco-efficiency

Fig. 4 shows some critical steps suggested by ADL for a company to follow as it sets out to develop a pathway to eco-efficiency:

- o Put together a cross-functional eco-efficiency team with some members who believe in the potential of eco-efficiency and some who do not;
- o Use a diagnostic approach to determine what the staff already knows about environmental spending and performance, their impact on business performance, the role for eco-efficiency and the importance of measurement choices;
- o Develop a pilot project, launch it, measure progress and show value. Consider applying one of the WBCSD's seven optimization goals (above) across a specific process area. The teams should become self-funded by setting up a budget and expecting a return on investment;
- o Once the team shows measurable results with the pilot, members can help management expand the campaign, eventually leading to a rollout across a plant, division or entire company.

Fig. 1. Future balance between environmental strategies



ADL has found that the cross-functional team approach helps overcome resistance to change. Showing measurable results yearly goes a long way toward winning over the staff.

A range of approaches is available in the eco-efficiency tool kit, namely, life-cycle assessments, total-cost accounting and measurement systems. Total-cost

accounting is applied with life-cycle assessments to provide an accurate reading of costs, risks, and long-term benefits.

New software supports those methods. A recent study by ADL identified 41 life-cycle inventory and assessment tools and databases. Europe, however, leads North America in available software, including "eco-balancing" tools designed to automatically acquire data from in-house information technology systems throughout a company. That's of particular importance in ISO-14000 data management.

Progress is also being made in developing eco-efficiency metrics tailored for chemical manufacturers and users by a U.S.-based consortium of chemical companies.

Environmental management systems The evolution of environmental management systems such as ISO (International Standard Organization) 14000, or British

Standard 7750 (BS 7750) or the European Eco-Management and Audit Scheme (EMAS) is useful.

But do "these systems ignore, or worse, stifle innovation?" asked Dow Europe's Claude Fussler.

Environmental management systems have lots of beneficial features including consistency of standards across an organization, assignment of responsibility and an in-depth review of environmental effects. Those are important underpinnings of eco-efficiency, but do the systems foster environmental innovation? Or, instead, provide freedom more likely to result in incremental rather than radical change?

Fig. 3. Companies see a number of facets to the business value of sustainable development and eco-efficiency

Innovation is key



Fussler pointed to the importance of life cycle assessments and Dow Chemical Co.'s six-dimensional "eco-innovation compass" (see "Eco-efficiency gains a foothold," pg 33) as one of the more rigorous approaches needed for out-of-the box innovation. "Cleaner production, eco-efficiency, life-cycle

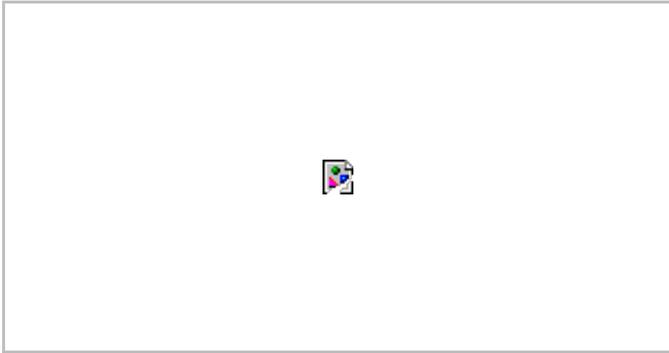
assessment and the eco-compass are designed to challenge the way we think," he said. "Do not settle for incremental thinking. Create value by being part of the solution, which is a long-term vision of sustainable business."

Hype or the future?

Critics William McDonough and Michael Braungart argue that "eco-efficiency--doing more with less--is admirable but still part of the industrial system that caused the problem. They said it presents little more than an illusion of change.

In their article, "The Next Industrial Revolution," McDonough and Braungart propose "eco-effectiveness," which they said "leads to human industry that is regenerative rather than depletive ... From an industrial-design perspective, it means products work within cradle-to-cradle life cycles rather than cradle-to-grave ones."

Fig. 4. Pathway to eco-efficiency



"Customers," the authors said, "should buy the service of industrial products, and when they have finished or want to upgrade, the manufacturer should take back the old ones and use their complex materials in new products."

That gives rise to the \$64,000 question: Is eco-efficiency hype or the

future?

It's probably the future, because the idea of "eco-effectiveness" bears similarities to eco-efficiency when combined with an aggressive pursuit of sustainable development.

And a consensus is emerging that for companies to succeed in the future they must embrace sustainable development principles, use eco-efficiency methods as tools to innovate and make quantum leap improvements in environmental and economic performance.

Anyone who doesn't will fall by the wayside.

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