



STATE OF THE WORLD 2008

Rethinking Production

State of the World Brief Series, Chapter 3

Key Messages

- Business leaders and policymakers need to rethink the design and production of products and services to offer consumers a higher quality of life while also addressing social and environmental problems.
- Meeting human needs with goods and services that use less energy and fewer materials can be more profitable and deliver a higher standard of living than current practices.
- Production practices that raise resource efficiency, circulate materials, and imitate nature offer a new model of prosperity for today's environmentally degraded and poverty-stricken planet.

The Problem

Modern industrial economies extract raw materials from mines, oil wells, and forests, push them through factories to create finished products for consumers, and send them rapidly to landfills. At all stages of the process, this linear production system is riddled with waste, including pollution to air and water, factory inefficiencies, consumer packaging, and landfills.

From an economic perspective, waste is the inefficient use of resources. This inefficiency is not apparent in the prices of products and services because natural resources are often subsidized or essentially free. When an input is cheap, waste is regarded as costless as well. In contrast, labor and capital—for centuries the most costly inputs to capitalist production—have received the bulk of economic attention.

Today, however, the relative scarcity of inputs has changed. Labor and capital remain costly, but the loss of vital services that ecosystems provide—such as pollination, flood protection, and a stable climate—is increasingly a constraint on economic activity. Shortages of some natural resources, such as copper or lumber, have not yet been of great concern, in part because our voracious economy has become ever-more effective at extracting them. But flows of many other critical resources are now slowing: oil extraction may soon reach its peak, and oceanic fish harvests are constrained not by a lack of boats, but by a scarcity of fish.

Creating sustainable economic activity cannot be achieved unless policymakers and business leaders employ three main strategies: first, use resources far more productively; second, redesign products and how they are made; and third, manage all institutions to be restorative of human and natural capital.

Innovations/Solutions

Books such as *Natural Capitalism* and organizations like the World Business Council for Sustainable Development have shown that our use of energy and materials can be increased by a factor of 4 to 10, using new technologies such as efficient LED lighting and practices such as clean production and lean manufacturing. Mastering efficiency saves real money: by 2007, the chemical company DuPont had cut emissions 72 percent below 1991 levels, saving itself \$3 billion in the process.

Designing products and materials to circulate through an economy again and again—the “cradle-to-cradle” approach to product development and use—emerged from a key insight decades ago by Walter Stahel of the Product-Life Institute in Geneva. Stahel wrote that some three-quarters of the energy used in industry is expended in mining or producing basic materials such as steel and cement, and only about 25 percent is used to convert these materials into finished goods like machines or buildings. Conversely, three times as much labor is used to convert materials into higher value-added products as in the original mining. The bottom line: if economic activity were focused on reconditioning or reprocessing old products instead of making new ones, economies would use less energy and create more jobs.

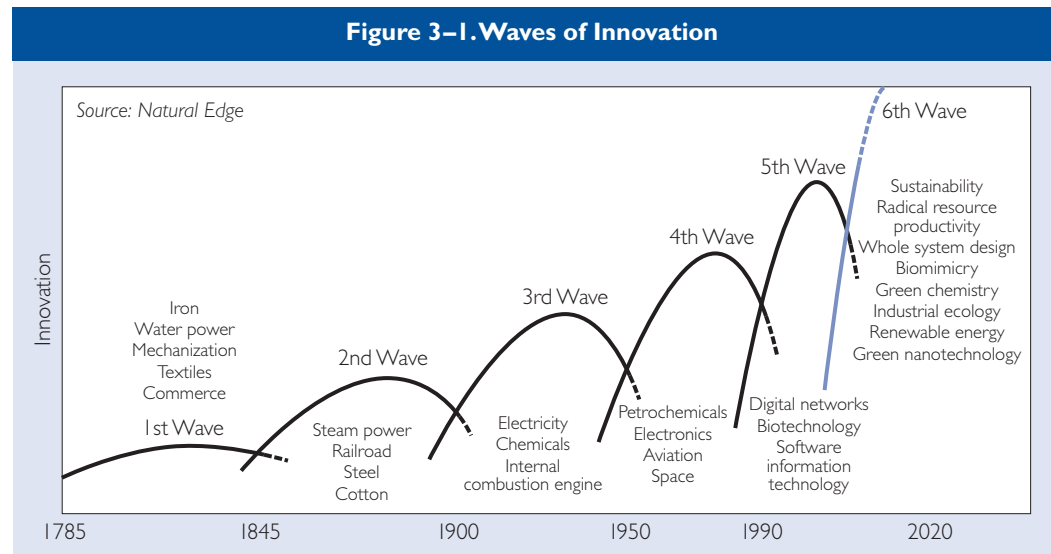
By the time most human products have been designed (but before they have been built), 80 to 90 percent of the economic and ecological costs they will generate over their lifetimes have already become inevitable. The emerging field of biomimicry, however, shows that “doing business as nature does it” can deliver cheaper and superior products with far less environmental impact. Unlike the “heat, beat,

and treat” approach of modern industry, nature runs on sunlight, not high flows of fossil energy. It makes very dangerous substances, but nothing like nuclear waste, which remains deadly for millennia. And it creates no waste, using the output of all processes as the input to some other process. Nature shops locally and creates beauty.

Innovative manufacturers are embracing biomimicry. Researchers at Sandia Labs in the United States have mimicked the way abalone build seashells to create mineral/polymer layers that are optically clear but almost unbreakable, for use as coatings to toughen windshields, airplane bodies, and other products that need to be lightweight but fracture-resistant. And EcoCover Ltd. of New Zealand produces a biodegradable mulch mat as an alternative to plastic landscaping sheeting that helps gardeners prevent moisture loss and weed growth naturally. These are just two of many companies that have taken biomimicry to heart in design and production processes.

Looking Ahead

Since the first industrial revolution, at least six waves of innovation have emerged, each based on new technologies that underpin economic prosperity. (See Figure 3-1.) Today, as in previous eras, older industries will become less com-



petitive unless they join those implementing the array of sustainable technologies and innovative practices that comprise the next wave of innovation.

Companies that implement resource productivity and sustainable production strategies—such as biomimicry and cradle-to-cradle—can improve every aspect of their shareholder value. Increasing shareholder value in this way requires the adoption of an “integrated bottom line” that recognizes the contribution of environmental and social performance, in addition to financial performance, to a company’s worth. Companies that do so are among the most competitive today. In 2007, the investment bank Goldman Sachs released a study showing that companies with strong environmental, social, and governance policies outperformed the stock market in general by 25 percent. And 72 percent of the companies on the list outperformed their industry peers.

This brief is based on Chapter 3, “Rethinking Production,” by Hunter Lovins, published in the Worldwatch Institute report *State of the World 2008: Innovations for a Sustainable Economy*. To order a copy of *State of the World 2008*, get more briefs in this series, listen to podcasts, and download discussion questions, visit www.worldwatch.org/stateoftheworld.