Reinventing the world:

building a hopeful path to prosperity with innovation and design

Designers are uniquely empowered to act on their hopes. As the creators of products and systems and the built environment, they are the dreamers who turn inspiration into the actual world we inhabit - the cherished things we use everyday, the places we live and work, our much loved modes of communication and mobility.

We could say, in fact, that design conceives our future; it is the first signal of human intention and it sets in motion a whole range of effects that ripple through human communities and the natural world - today, tomorrow and in some cases, nearly forever.

So what kind of future do we want to conceive? How can we act on our hopes intelligently to create a world of prosperity, abundance and delight? As part of our ongoing articulation of Cradle to Cradle Design, let us suggest some of the ways in which true innovation can achieve a broad spectrum of positive, regenerative effects on the world, allowing commerce, community and nature to thrive and grow.



"Design conceives our future;it is the first signal of human intention and it sets in motion a whole range of effects that ripple through human communities and the natural world - today, tomorrow and in some cases,nearly forever."

The Five-Step Path

Our five-step strategy of eco-effective design describes a process in which designers employ an ever-broadening ability to define, select, and ultimately re-invent product ingredients, industrial systems, and even the relationship between producers and customers. Its intention is nothing less than the transformation of human industry; it seeks a world in which the production and consumption of goods is not only safe and profitable but ecologically enriching and socially valuable.

The first step in the strategy aims to remove from a product a specific chemical widely known to be harmful, such as lead or chlorine. The second step begins a more comprehensive effort to articulate and implement a product design strategy for ecological intelligence.

Moving along the five-step path, designers begin to examine all of a product's materials rather than simply removing the most onerous substances or adding a few elements that are "less bad."

At Step Three designers examine the palette of materials used in an existing product while it continues to be manufactured. The goal is to replace problematic ingredients without missing a beat in the marketplace. A company that manufactures polyester fabric, for example, can keep its machines humming as it replaces the input of a dangerous polymer with one that does not contain substances of serious concern.

Step Four is the true entry into eco-effective design. At this point in the journey designers aim to actively define a product's ingredients, right from the start. The idea is not to limit the impact of a product or system but to conceive

one with positive effects on the world.

A designer aiming for positive effects employs the intelligence of natural systems - the effectiveness of nutrient cycling, the abundance of the sun's energy - to create products actively defined as nutrients for the Earth's two discrete metabolisms, the cycles of nature and the cycles of industry. In a world of what we call *cradle-to-cradle* design, a product's *biological nutrients* and *technical nutrients* would flow in one or the other of these discrete, closed-loop cycles, providing nourishment for something new after each useful life. In the textile industry, for instance, we've helped companies conceive fabrics as both biological and technical nutrients - food for local soils and rematerialized ingredients for industry.

And now Step Five, true innovation.

The Fruits of Re-Invention

We've used the preparation of a meal as a metaphor for the step-by-step process of eco-effective design. At each phase, the designer - the host and chef - begins to create the meal by asking a simple question: What is my intention? At Step One, aiming to be "free of" a dangerous ingredient, her meal might have resembled a humble dinner prepared to avoid an offending food - a meal without meat, or dairy, or sugar. Moving through the steps, the chef's choices widen as she identifies new intentions. By Step Four she actively chooses ingredients to create a meal that is nourishing, tasty, and fulfilling.

If Steps One to Four are a dinner of ever increasing pleasures, Step Five is more than dessert: It's a party.

From a design perspective, embracing a festive spirit means bringing inventive energy to the table and asking not simply what ingredients would be nutritious but how a product or service might best celebrate a basic human need, revitalize an aspect of culture, or renew our engagement with the natural world. One might begin to ask: How might my product fulfill people's wants, needs and loves? Are my current business practices the best way to provide my service to customers? What service am I providing, anyway?

Consider the automobile. We don't have to list the ways in which car owners have begun to feel that their need for mobility is in conflict with their desire for a convivial, healthy world. But rather than declare the car the enemy, we would suggest that it's just not serving our needs very effectively. It's ripe for innovation.

A designer might respond to this challenge by creating a more efficient car that has a minimal impact on the environment, such as a hydrogen-powered hypercar free of carbon emissions. One could also employ a preference for a safe, organic upholstery fabric, or begin to reassess each material used in the making of automobiles. Ultimately, manufacturers might optimize their vehicles by using positively defined biological and technical nutrients and creating a coherent system for the retrieval and reuse of the cars' valuable materials.

> "Products are essentially packaging for services. With this in mind, designers can begin to apply the Five Steps to all products of service, conceiving effective, intelligent systems for meeting the most basic human needs."

Each of these solutions reflects one of the values on the step-by-step path of eco-effective design. Together, they add up to revolutionary changes - changes that we are actively working to bring about with car manufacturers and auto parts suppliers. But we think there's yet another crucial step: What if we thought of the auto industry not simply as a maker of cars but as a provider of mobility? How might the industry best provide the service of mobility to meet the wants, needs and loves of its customers? Could we design new kinds of mobility systems that serve a rich social agenda?

Well, yes. If we explore not just the car but the many needs it fulfills, we can begin to imagine the re-invention of the whole paradigm of transportation. As a mobility provider, for example, a manufacturer might offer customers access to many different kinds of vehicles rather than selling them a car. Why own and maintain three cars when you could use the service of a big, spacious vehicle for family trips, a sports car for a weekend date, or a public community car to transport your children? In each case you'd be provided the service of mobility by an automaker that owned and reused the vehicles' valuable materials - and utilized them effectively by keeping their resources in motion.

Take the community car. As part of a broadly defined local or regional transportation plan, a fleet of community cars could provide people a range of services throughout the day. Responding to electronic calls, the cars could deliver people to transportation hubs in the morning; ferry groceries, laundry, and prescriptions during the day; deliver children from school to violin practice or their grandmother's house in the late afternoon; and take couples to the movies at night.

Built and used within an evolving system of coherent material flows, the community cars could manifest a wide spectrum of positive effects. People formerly excluded from transportation - children, the elderly, the handicapped - would have ready access to

mobility. The retirees operating the community cars would be able to maintain their sense of community and their ties to the young. The system's effectiveness - its ability to both optimize the use of materials and conveniently move people to the places they want to go - would generate wealth for providers and satisfaction, free time, and peace of mind for customers.

The re-invention of mobility illustrates a key principle of eco-effective innovation: products are essentially packaging for services. With this in mind, designers can begin to apply the Five Steps to all *products of service*, conceiving effective, intelligent systems for meeting the most basic human needs - like washing one's clothes.

A designer developing an eco-effective laundry detergent, for example, might follow Steps One-Four to progressively create a product with only safe, nutritious ingredients. A Step Four soap might be defined by the chemistry of the local water supply. It might also be produced locally in dry pellet form and sold in bulk, obviating the need for packaging and the expensive long-distance transportation of heavy, liquid concentrates.

At Step Five one might build on the reformulation of soap to develop a strategy for delivering an effective laundering service to the home. This strategy would include the washing machine itself, which would be conceived as a product of service designed for retrieval, disassembly and reuse. The machine would be delivered to a customer's home pre-loaded with detergent for 1000 loads of laundry—the customer pays not for the machine, but for the service. After the last of the machine's micro-filtered detergent has been dispensed, the appliance would be serviced or replaced, and its valuable materials would enter the technical metabolism to be used again in new machines.

An innovative commercial venture might focus on providing a community laundry service. Laundry could be picked up from customers in a community vehicle and delivered to one location, where washing machines would run on the power of the sun and wastewater would be purified by a system of botanical gardens.

The service might even provide a social venue, where those who chose to wash their own clothes could relax in a pleasant courtyard among the garden's flowering plants. Washing clothes, long considered environmentally unfriendly, suddenly begins to generate community wealth.

A Hopeful Agenda

When companies adopt an eco-effective strategy and engage in meeting customers needs with a broadly conceived, positive agenda, they are charting a course that departs from the conventional notion of sustainability or efficiency. Sustainability, after all, is merely a minimum precondition of survival - hardly an enticing prospect. Indeed, if minimizing the human impact on the world through ever more efficient design guided our vision it would be difficult to imagine a hopeful future.

> "What if we sought a bigger ecological footprint?Materials and products designed as nutrients can actually make humanity a regenerative once."

If, for example, the United States embraced efficiency and dramatically cut energy consumption and waste production down to current European levels, it would not forestall destruction nor significantly shrink our ecological footprint. The kinds of efficiencies required to sustain the current industrial system would be much more draconian, like cutting population by 75 percent. In such a world, celebrations of abundance, cultural diversity, or the lives of our children could only be muted, at best. But what if we sought a bigger ecological footprint? Materials and products designed as nutrients can actually make humanity a regenerative force. Industrial sites can restore landscapes and invite the return of native species. Buildings can purify water and create more energy than they consume. And nutritious material flows, while supporting life systems, can provide more people with more of what they need and love. Innovative companies already pursuing these strategies are finding their way by listening to signals from outside the company itself—signals in the community, the environment and the world at large.

And they are staying on track by allowing a few basic principles to guide their work:

Signal Your Intention: Commit to a new paradigm rather than to an incremental improvement of the old. The eco-effective strategy takes into account that we are not in a perfect world; we are all, in some ways, in transition. But successful ventures, such as the carpet industry's adoption of a system for the retrieval and reuse of floor covering materials, are showing that embracing real innovation within the context of today's market is not only possible, it's the key to a prosperous future.

Restore: Strive for "good growth," not just economic growth. Innovation allows a company to examine how it might generate community wealth or restore natural systems as it serves its customers. Ford Motor Company, for example, has embarked on the long-term restoration of its historic Rouge River site. Its new assembly plant will feature a roof covered with growing plants - a living roof - that filters stormwater runoff in concert with porous

paving and a series of wetlands and swales.

Replacing the expensive technical controls called for by new regulations, these measures stand to save Ford up to $35 million while purifying the waters flowing into the Rouge.

Feedforward: Perfecting an existing product is not necessarily a good investment. Maybe it's time to create a new niche. Currently, many designers are productively engaged developing safe dyes for fabric. But what if dye were obsolete? We looked to birds for guidance on that question and learned that the brilliance of avian plumage is a prismatic effect; birds' feathers are essentially clear and reflect different parts of the spectrum. Imagine polymers designed in various crystalline shapes shimmering with color. Imagine light replacing chemicals in the textile industry.

Prepare for the Learning Curve: Recognize that change is difficult, messy, and time consuming. Nike is currently working on a number of initiatives, such as designing shoe materials for true recycling, that will take time to come to fruition. The company is well aware that innovation typically has a success rate of about 10-15 percent, so it is initiating many pilot programs to under-stand the dynamics of its future product take-back program.

But the company presses on. As Nike's Darcy Winslow says, this is not about compliance, it's about leadership.

Celebrate Your Legacy: Understand and celebrate the far-reaching impact of your creative acts. Design can create effects from the molecule to the region, influencing everything from soil chemistry to the well-being of workers in a sunlit factory. The educator David Orr has pointed out that the design of buildings teaches us about our world - how we use resources, how we relate to nature - and he's embraced his legacy as a teacher by working with us to conceive a truly innovative university building, a building like a tree. Using nature as a model for design, the building accrues solar income, purifies water, provides habitat for native species and offers a generation of students an opportunity to develop a deep relationship with the natural world.

Accept Intergenerational Responsibility: David Orr's legacy answers the questions posed by our final principle: How can we support the rights of all living things to share in the world's abundance? How can we love all of the children of all species for all time? A building that nourishes its surroundings and the minds of those who inhabit it is a step in the right direction. As Orr commented.

"The X generation doesn't see much hope in the world. I wanted to give them a sense of hope and the competence to act on that hope. This building gives them possibilities, not just wishful thinking."

There's no better way to describe the true intention of innovative design.

William McDonough and Michael Braungart

This article originally appeared in the November/December 2001 issue of green@work Michael Braungart was a speaker on behalf of MBDC partnership at The Summit 2002 Conference.