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Zeroing in on Waste

Reduce, reuse, recycle. These are familiar words to anyone living or born after 1976 when the Environmental Protection Agency (EPA) first announced its Resource Conservation and Recovery Act (RCRA) (“Municipal Solid Waste”). The plan seems effective; however, what happens if the rate of consumption is higher than the rate of recycle? Is recycling the best method for dealing with waste? With the challenges of a consumerist society and with old methods of solid waste management proven inadequate, a new trend known as zero waste is not only an ecological, but also an economical solution reinventing the way waste is perceived.

The effects of living in a throwaway society are evident. In the last forty years almost all solid waste growth has come directly from product waste. Biowastes and inorganics are growing at only a third of the rate (Speigelman). When it becomes cheaper to buy a new product than repair an old one, most people will buy a new one. It is this kind of consumption, added with a growing population that led to the challenges that the Municipal Solid Waste Program faced in the past (Speigelman). The Program’s best efforts basically led to dressing up the word “dump” to “landfill” where seventy-five percent of the United States’ trash ends up. That means that the 251 million tons of waste

produced in the United States per year, or nearly five pounds per person per day, is being buried in landfills. Presently, the rate of new landfills is decreasing, but interestingly enough, new landfills are bigger than they have ever been (“Municipal Solid Waste”).

This has all led to a new trend in waste management, or better yet, to the concept of zero waste. Zero waste is a philosophy that revolutionizes the way waste is managed, even created. The old model of waste management is one-way where a product is used and then discarded, i.e. buried. Zero waste is modeled after nature’s circular system where products are made to be reused, repaired, or recycled back into nature or the marketplace. Zero waste is maximum efficiency because natural resources are not exhausted; instead, they are reused. The philosophy works to front end the solution rather than magically recycling products at the end of their life cycle. Thus, the problem lies in the approach where recycling can only do so much and landfills are accomplishing next to nothing.

It is not that recycling is a bad idea; it was simply the first idea (Palmer). Zero waste received attention in the United States when the city of Seattle, Washington announced it was making zero waste a primary goal. The plan has been in effect since 1998, although the city is unlikely to reach zero waste any time soon. Yet, consultants report that the city should be recycling and composting seventy-two percent of its garbage by 2025, almost doubling the current amount (“Reducing Waste, Good for Earth”).

Zero waste is being adopted at an international level. By 2001, forty percent of municipalities in New Zealand took on zero waste goals (Walsh). Bath, England is on their second annual zero waste week where citizens are encouraged to waste nothing.

“It’s really made us rethink how complacent we’d become about packaging and waste,” said one resident (“Zero Waste Week Families Triumph”). Although the campaign may not be practicing true “zero” waste philosophies, it is covering ground and pushing the movement. Scotland is currently setting zero waste goals for their future. However nice this may sound, the truth is that the country seems to be focusing more on recycling and preventing the growth of its solid waste. Zero waste experts, like Scottish green party co-convenor Robin Harper MSP are in agreement that true zero waste targets should come first, before recycling and composting (“Zero waste’ target for Scotland”).

Companies are becoming more involved in zero waste methods as well. In 2005 Lee Scott, CEO of the largest company in the world, committed Wal-Mart to making zero waste. Because of the plan’s practical nature, the company is pioneering what may be the first sustainable strategy that may actually work, says Frank Dixon, manager of the largest corporate research firm, RSVA (Dixon). Mad River Brewing Company, CA is currently diverting 600 tons annually of waste from landfills thanks to its zero waste strategy (Tucker). The company is not absolutely zero, but with two percent waste it is setting the bar for other breweries. More companies are involved as well, such as Xerox, Electrolux, 3M, Sony, and Nike.

In reference to life-cycle issues, Germany and Sweden are two countries that consider where a product ends up after its use. Germany passed its Green Dot waste reduction program in 1991. The law requires companies to take back their products when the user is done with them, otherwise known as Extended Producer Responsibility (EPR). Germany was the “lightning rod” says Catherine Wilt of the University of Tennessee’s Center for Cleaner Products and Clean Technology. Sweden has had strong

commitments to EPR and life-cycle issues as far back as the 1970s. In 1975, Sweden enacted take-back programs for the automobile industry. More recently, in 1995, a law known as “Eco-cycle” was directed towards the take-back of Swedish packaging and products (Rembert).

It is the absence of extended producer responsibility that many zero wasters believe to be the philosophy’s greatest barricade. Producer take-back laws require companies to take back their products so that they can be de-manufactured, thus continuing their life cycles. Activist group Grassroots Recycling Network (GRRN) led a successful bottle bill campaign to get Pepsi and Coca-Cola to use recycled material in their plastic bottles as a first step in container take-back (“Producer Take-Back Campaigns”). In 1990, Pepsi broke their agreement to use recycled material in their plastic bottles. The bottle bills, also known as deposit laws, date back to Oregon in 1971 and have remained the most effective recycling laws. Yet, Pepsi has spent millions of dollars to fight bottle bills (“Pepsi 'Broke Recycling Promise”). Despite Pepsi’s noncompliance, GRRN is currently leading a multi-state campaign pushing Dell Computer to take back their computers and electronic parts. However, the list of examples is far too few to choose from; especially in a country like the United States, which, while it accounts for only five percent of the world’s population, contributes to thirty-five percent of its waste (“Producer Take-Back Campaigns”).

Often, it is the producers who are against many EPR initiatives. In China, domestic producers are competing with one another based on low-cost products. Adding another financial burden, like an EPR program, is going to have an affect on their pricing (Tong). However, in many countries a product is taxed with subsidiaries going to the

waste management system. These subsidiaries include resource extraction, cleaning up pollutants, and landfills, not to mention money spent on medical bills as a result of harmful toxins. In an EPR system, prices would more accurately reflect a product and its services (“Working to Build Zero Waste Communities”).

Zero waste is a reality of the 21st century. As consumption is expanding, industry waste is really the benchmark of the future in a sustainable system. When it comes down to it, waste is a product of bad design. Once products are designed to incorporate greener philosophies, the cycle can become complete. In Germany, traditions of conservation meet with present green legislations and together, are influencing industrial designers to now consider entire product life cycles, a revolution pioneered by a Cradle to Cradle philosophy.

When it comes to take back legislation and voluntary take back programs, Germany is more advanced than any other country. In 1991, what was first a grassroots voluntary movement led to the country passing legislation for companies to “take-back” products from the consumer at the end of their use. It is not a big surprise with Germany’s high population density, proximity to other nations, and tradition of conservation (Fishbein). Currently, Forbes cited Germany’s president, Horst Koehler, for her work done at the Group Eight Summit, getting leaders to concur on goals for cutting greenhouse gas emissions (BBC news). The country is also home to the best known environmentally friendly community, Vauben, which models car-free living (De Pommereau).

German interest in conservation is evident throughout history, even during Hitler’s reign. In “How Green Were the Nazis? Nature, Environment, and Nation in the

Third Reich”, author Jonathan Olsen investigates German National Socialism and environmental policy. Olsen interprets the Nazi notion of Dauerwald, or perpetual forest, to be, in today’s terms, sustainability, biodiversity, and habitat protection. However true to environmental policy the Nazis actually were remains almost irrelevant. What matters in this context is the intentions of these “early greens”, a term Olsen uses when referring to Germany’s green leaders, and how they reflect a country’s overall environmental concern (Olsen).

Despite Germany’s green reputation, estimates produced in 1990 showed that the country’s packaging alone contributed to fifty percent of its solid waste by volume, and thirty percent by weight. Germany’s take-back plan targeted this problem with a packaging ordinance. Implemented in 1993, the packaging ordinance calls for industry imposed packaging fees that are enforced by government-mandated recycling rates. Germany’s strategy is for the industry to take back what it produces instead of relying on the government to “micro-manage” the system. The industry is free to act as it pleases as long as it meets government quotas for recycling and refilling. It is a system where the “producer pays” for what it puts into the environment (Fishbein).

As a result, companies have responded to the legislation in significant ways. In the anticipation of the ordinance, packaging was reduced by four percent between 1991 and 1992. Packaging has been redesigned to be more effective, by making it lighter or using materials that are easily recycled (Fishbein). Some companies have even designed products that require no packaging whatsoever, like the German tape manufacturer Tesla (Rembert).

More recently, the trend has grown outside of the packaging ordinance with Europe's Waste Electrical and Electronic Equipment (WEEE) directive. Initiated in 2007, the directive holds manufacturers responsible to collect and recycle their goods (Murray). Now more than ever, companies are feeling the pressure to not only better manufacture, but better design their products.

William McDonough and Dr. Michael Braungart are two of the pioneers leading what they call the "next industrial revolution" through a new paradigm called Cradle to Cradle design (www.MBDC.com). The philosophy has become a contemporary manifesto for eco-friendly industrial design (Wee Generation Project). Together, they wrote Cradle to Cradle: Remaking the Way We Make Things. Perhaps the book itself is a perfect example of the principles they endorse: it is made from a waterproof polymer blend instead of paper, called Durabook. The entire book can then be up-cycled, instead of recycled, which means it loses no structural integrity in the process (McDonough 72). In the form of paper recycling, fibers break down over time and eventually become waste (Dwight). In essence, Cradle to Cradle products need to come from materials that can be recycled and repurposed or biodegradable. The old model of product and waste is left behind, creating one continuous life cycle.

Coined by Walter R. Stahel in the 1970s, Cradle to Cradle is not altogether a new idea, but instead one that has been improved upon (World Environment Day). In 1962, Rachael Larson wrote "Silent Spring", a publication that called out the insidious depletion of natural resources caused by mankind. She raised awareness on the dangers of industrial chemicals leading to the banishment of DDT in the United States and Germany (McDonough 47). McDonough and Braungart argue that an approach many

companies have adopted, known as eco-efficiency –making the most of process and materials- is outdated. It relies too much on the notion of “be less bad”. They insist, rather, on eco-effectiveness. Cradle to Cradle holds nature as its ultimate model. Like nature, in an eco-effective system, nothing is wasted; more accurately in fact, waste equals food. (Dwight)

Braungart is a German born chemist, who is widely recognized as a founding member of Germany’s Green Part, the largest green party in the world. In 1995, McDonough and Braungart founded a product design and development company called McDonough Braungart Design Chemistry (MBDC). In one of MBDC’s most famous projects, the designers helped DesignTex to manufacture a chair made from entirely compostable materials which is even safe enough to eat. (Huecker) Braungart makes it clear that systems focusing on zero waste by methods of eco-efficiency do not create sustainable life cycles; however, eco-effective cycles always create zero waste. Eco-efficient cycles portray industry and consumption as being bad. Eco-effectiveness celebrates industry, consumption, and abundance because materials don’t end up as waste. (Braungart)

In 1987 Braungart established the Environmental Protection and Encouragement Agency, (EPEA) a research and consultancy institute based in Hamburg, Germany whose goal is to improve product quality and environmental protection through eco-effectiveness and the Cradle to Cradle philosophy. (www.EPEA.com) In the Fall of 2007, the renowned international materials library, Material ConneXion announced a collaboration with MBDC and EPEA to create the first materials library ever to feature

Cradle to Cradle materials and product options (“Materials Innovators Engage Cradle to Cradle Protocol”).

When it comes to sustainable design, Germany is worth learning from. Design companies large and small are showing what it means to be green. For instance at Volvo’s SportsDesign 2008, held just outside of Munich, the young German design team at GrownSkis took first prize for their ski’s that are one hundred percent Cradle to Cradle from materials to take-back to production emissions. (ISPO) German outdoor company Vaude has made a jacket entirely out of polyester. The result: easy up-cycling at the end of its use. The company is also installing a solar energy system at its headquarters in Obereisenbach that will not only create enough energy to power the factory but also enough to provide electricity to one-hundred and thirty households (Vaude Produces Green Energy). The notion of a factory generating more energy than it uses is one strongly advocated by McDonough, Braungart, and Cradle to Cradle. After working with MBDC, German company BASF, was recognized by DAX 30 as the most environmentally sound corporation in a pool of thirty other big companies like Adidas and BMW. (BASF)

Dieter Rams is a highly influential German designer who understands the significance of environmental concern. Rams designed primarily for Braun throughout his career, a relationship born in the late 1950s. Although many of Rams’ designs came from a time before Cradle to Cradle, or even sustainability for that matter, his devotion to the value of durability opposed the trend in a world of what he calls “visual pollution” and “superficial, throwaway culture”. Rams’ values have made a long-lasting impact on design. Rams’ belief is that ethical and sustainable design can be realized through an

approach that collaborates between designers, manufacturers, politicians, and the buying public (Lovell).

It is only when design is understood by the whole population that a lasting rise in the quality of life can be achieved through design. The crisis of our product culture will force us to adopt a new design ethic: in the future, the value of design must be judged on the contribution it makes to survival in the widest sense. (Lovell)

With respect to Rams' view on the buying public, Coke has taken customer feedback into consideration when developing cans with a new resealable closure. Coke has pointed out that a consumer wants to feel a connection with a product: a product they feel was specifically designed for them. The new lid is also likely to reduce the waste of its contents that would otherwise often go flat (Taylor). The resealable lids were actually designed by a Dutch design company called 4Sight Innovation. However, the cans were designed for a German market, and for now, only a German market. Aluminum cans are one hundred percent recyclable and are easily sorted (Dornblaser). These factors, along with a new resealable design, are making the cans a more sustainable alternative to plastic bottles for many German consumers.

Germany has set a fine example, and designers in other countries are responding in creative ways. On a larger level, it means cities become living organisms, both taking in and giving off nutrients. In terms of product and package design, waste equals food. When an object reaches the end of its life cycle, its materials are repurposed so that none of the elements become waste. As in Germany, industrial designers are working throughout the United States, China, and Holland to address zero waste goals with a

Cradle to Cradle response to design because of government legislation, but also as part of an industrial revolution from socially conscious visionaries.

Much of Germany's environmental progress has come from legislation, serving as a role model for other countries developing their greener side. Without product take back laws and packaging ordinances, it is questionable if the country would be as green as it is today. The United States seems to be following the lead, with ten states practicing some form of take back-law. All but one state, California, take a similar approach to Germany called EPR or Extended Producer Responsibility where the manufacturer takes responsibility for the product once it is ready for disposal. California uses an AFR or Advanced Recycling Fee that is incorporated into the cost of the product that then goes to the state as part of its recycling program (Electronic Waste Recycling).

Products "designed by Apple in California" have been under scrutiny in terms of the amount of electronic waste, known as e-waste, the company produces. Apple has really been called out when it comes to their product's short life spans and what happens at the end of their life cycles. From Greenpeace's original 2003 inquiry about Apple's chemical policy, it took Steve Jobs four years to respond with an open letter on Apple's environmental policy ("iPoison + iWaste"). Apple announced that it will take back all of its electronics at the end of their life cycle. As far as what happens next, it seems somewhat uncertain, but Apple says the parts will not end up in China. Apple designers have managed to decrease the size of the iMac by 60%. Moreover, an iPod's packaging has been reduced by 75% since 1998 ("iPoison + iWaste"). It is a far cry from German tape manufacturer Tesla that requires no packaging whatsoever (Rambert). However Apple seems to be in the early stages of its own green movement and it will be interesting

to see if such an innovative company can keep the same image when it comes to being green.

The United States is not quite as far behind the green game thanks to Steelcase and German designer Glen Oliver Low's Think Chair, recipient of the first Cradle to Cradle Product Certification. "In developing the Think Chair, we considered where it comes from, how it is made, and what it will be when it's no longer a chair" says Low. Not only did Low and Steelcase consider how the chair would be put together, but how it will be taken apart: the chair comes with instructions for both assembly and disassembly (Think Chair). Thanks to Cradle to Cradle, designers are now thinking about the first and last parts of Low's statement, compared to years ago when all that was considered was how a product was made. Since the Think Chair, Steelcase has gone on to earn Cradle to Cradle certification for workstations, a privacy wall, seating and several other products (Quinn).

Other United States companies and designers are adapting to Cradle to Cradle. Herman Miller was recognized for the Design for the Environment (DfE) program, which uses the "Cradle to Cradle" protocol (Waste Wise Awards). Yves Behar, a designer working in the United States and Germany, designed the Leaf Lamp for Herman Miller. The lamp is one of the first task lamps to use LED technology, known for longevity and low energy consumption, and uses recycled aluminum (HermanMiller.com). Industrial designers must adapt to new technologies like LEDs, as well as be capable of thinking about both potential for recycle, and recycled content. Both German and U.S. designers, at least those in line with Cradle to cradle's values, are reacting in similar ways. This is

possibly because Cradle to Cradle is more than a trend; it is a protocol, or code of product design, where nothing is exhausted.

In China, in the midst of pollution and over-population, the country seems to be adopting McDonough's protocol as well. In 2005, more than five hundred Chinese cities failed to pass national air quality standards and nearly one-third of non-industrial sewage went untreated, all while the population is constantly rising (Richard). In this time of need, China has taken McDonough and Braungart's book, Cradle to Cradle, as government policy. Over the next few years, McDonough's ideas will take shape as seven new cities throughout China. "In biology, growth is good. If we could do something where growth is good, that would be a way of thinking of a good operating system for design," says McDonough. The cities have been dubbed the "next cities" and rest on the notion that waste equals food. For instance, a quarter of the city's food will be cooked by methane gas from animal, human, and agricultural waste (Twist).

However, McDonough's plans for China are falling short of original deliverables. Most recent reports from BBC and Newsweek alike give a dismal interpretation on the status of Huangbaiyu, one of McDonough's model cities in China. Most notably, many houses are not expected to reach desired energy savings due to construction modifications, and the biomass gasification facility, a resource intended to convert the waste, simply is not working. As a result, almost no one from the nearby village has volunteered to move in (Hvistendahl).

China's new cities are almost incomparable to Germany in that McDonough is building from the molecule up, instead of retracing from mistakes made in the past. What is similar is the origin of the Cradle to Cradle protocols in both China and Germany

is their conception: one of necessity. In the late 1980s Germany's landfills were filling up and product take back legislation came as a direct response. This is comparable to China's present pollution situation, a country that recently became the number one carbon emissions contributor (Fishbien).

In Holland, the entire town of Venlo has decided to make Cradle to Cradle its primary goal. From businessmen to designers, the trend is buzzing throughout the town. It started in 2006 when a Dutch television station broadcasted a program about Cradle to Cradle. Now German born Cradle to Cradle pioneer, Michael Braungart, is a regular visitor. Like McDonough's project in China, advocates of Cradle to Cradle in Venlo speak out that it's easier said than done. Like McDonough and Braungart, young designers at Qreamteam are unwilling to give up on the utopian ideal. They admit however, that even McDonough and Braungart don't have any real solid solutions. What is positive about Venlo is that it is a common collective of designers, politicians, business owners, and other people in the town, all involved in one sustainable project (Scholtus, Petz). What remains unclear about Venlo is what the city is actually achieving besides awareness and good intentions.

It seems like the only thing certain about Cradle to Cradle is its uncertain place in the future. The demands of Cradle to Cradle are unmistakably high and thus make its progress as a design trend, move painstakingly slowly. In the design world, it is held to the highest regard; yet, it remains on the fringe whether or not it will encapsulate the entire field. This being said, there is an arena of countries and designers who believe whole-heartedly in Cradle to Cradle values, especially when it comes to reaching zero waste objectives. What is evident is that industrial designers working in the United

States, China, and Holland, follow a similar archetype to those working in Germany in response to legislation and public environmental awareness. What is really developing, albeit only sprinkled throughout the world, is design at its most intrinsic level: to be a *true* service for all.

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