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CRADLE TO CRADLE DESIGN TO MAKE IT RIGHT:
A GIFT TO THE NATION

My name is William McDonough. I am the founder of William McDonough + Partners, an architecture and community design practice and co-founder of McDonough Braungart Design Chemistry (MBDC), a process and product design firm, both based in Charlottesville, Virginia. I am also a venture partners at Vantage Point Venture Partners, based in San Bruno, California. Together with the German chemist Dr. Michael Braungart, I am co-author of a book called *Cradle to Cradle: Remaking the Way We Make Things*, in which we describe a design protocol for a positive future for human production and reindustrialization.

I would like to talk to you today about design as the first signal of human intention. At this point in history, I believe we need to ask "What is our intention as a species?" because we have become the dominant one. Therefore, all of us, as the designers of our future, can start by asking "What is our *long-term* intention? And what profitable short-term actions can we take now to achieve our long-term goals?"

Thomas Jefferson understood this idea. As the dean of the School of Architecture at the University of Virginia from 1994 to 1999, I had the privilege of living in house designed by Thomas Jefferson and came to see his as an astounding designer. Importantly, he saw his designs as his legacy; his tombstone references the things he left behind—the Declaration of American Independence, the Statute of Virginia for Religious Freedom (which matured into the Bill of Rights), and the University of Virginia. Notice, he does not mention his "activities," such as having been President of the United States—twice.

Today, I want to talk about how we need a new design. Make It Right, about which Tom Darden III has told you, represents a piece of this bold, new design—imbued with innovation, goodwill, cost-effectiveness, new technologies, and jobs to support a local community.

Brad Pitt has honored me and my colleagues by bringing us in as part of the core team of Make It Right. Brad asked us to bring our Cradle to Cradle® thinking to his vision for New Orleans as we came together to make a humble project but one of significance and generosity. William McDonough + Partners and MBDC had been looking for a way to help the people of New Orleans after Katrina, and this turned out to be it. When Brad first called me, we thought about whether one should build there at all, given the potential for future flooding. We concluded that it would be cynical not to support people in returning home if we could find a way to build there and make sure they would be safe.

We decided that instead of one house, we would support 150 because that is a neighborhood. But it would not be a neighborhood designed by one architect or one firm, but by many firms from around the world, so that the residents would have lots of choices. What an amazing opportunity to share Cradle to Cradle with a local community

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and with a large and diverse group of architects and other consultants from around the world. On that, we worked with Graft, an architecture firm based in Berlin that Brad had worked with before studying New Orleans architectural typologies. We also recommended that Brad invite someone with professional real estate experience on difficult sites. Tom Darden II joined us to make this professional and make it work. What a delight to work together with this group and make this real! Tom's son, Tom Darden III ultimately became the Executive Director; he has spoken with you earlier about what we've been able to do in New Orleans.

For Make It Right, we decided to take a fresh look at the issues of modern life, bringing on designers and design protocols that could help create cost effective, ecologically intelligent buildings and communities that are as safe and healthy as possible, whose systems that allow innovation, and whose results would delight and surprise those who spend time there.

Materials here are not just recycled but safe and healthy materials intended for continuous technical or biological recovery and re-use. Energy use in this Lower 9th Ward neighborhood is about creating jobs while making sure that people of modest means enjoy low operating costs and ease of maintenance so those families can have more discretionary income to help make their children's dreams come true. As you will hear in a moment, these dreams are beginning to manifest.

Recently, while Brad Pitt and I were at a conference in New York, we heard a story from one Make It Right resident and it really illustrates the point. Deirdre and her family had been living in Texas after Katrina and she never thought she could go home to the Lower 9th in New Orleans. (To take a look at the neighborhood, you'd have to agree with her. Almost no one was there when Brad and I first walked around together to imagine how we might offer help. It was devastated.) People who had lost their homes were trying to navigate a complex web of steps and procedures to get on the path to rebuilding, but it was daunting. Deirdre was in Texas, thinking "how will I ever get home." Then she heard that some of her neighbors were working with Make It Right. So she reached out for help. And today she lives in a home designed by a talented architect—with an affordable mortgage ($400 a month). As she explains it, "My kids have their own bedrooms and I have my own little office, and my energy bill is $50 a month. Now I can afford for my son to get karate lessons and my daughter to get dance lessons." All of this in a home built on love and friendship. She went on to say something later that was equally moving: Her daughter's asthma, since they have moved back home to New Orleans, has *gone away*. Now she really can become a dancer *because she can breathe*. This is Cradle to Cradle thinking in practice, and it goes way beyond recycling: we are innovating safe and healthy products today, and we could expand this protocol to design at all scales—from the molecule to the product, to the building, to the region and even to the nation.

It was always important to all of us that the Make It Right work be replicable—so that other communities could benefit from what we were learning about design, economics, infrastructure, materials, and construction. This is a learning laboratory for its residents, its designers and buildings—a hub of jobs and an inspiration for the children. At the

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heart, it's about better housing, but it's also about a healthy economy, culture, and environment.

One key to success at Make It Right was something that my firms try to do with all our clients: lead with principles, rather than metrics. Metrics are critically important; business people often say, if you cannot measure it, you cannot manage it. But if one only starts with simple metrics (such as per capita use of energy or least material per person or lowest cost), one are quickly mired in a path of simple tactics seeking those simple metrics. That may get you to achieve some goals (housing people for low cost) but will not enable the innovation that is feasible when you are driven by principles and values. When they drive, they pull the project even higher—e.g. safe, healthy, delightful housing at low cost.

EFFECTIVE, THEN EFFICIENT: MORE GOOD, THEN LESS BAD

When we are thinking about what we intend to do, I like to refer to a Peter Drucker, the famous management guru. He pointed out that a manager's job is to be efficient and do something the right way. An executive's job is to do the right thing. What if we are doing the wrong thing efficiently? That's not getting us where we want to go. In fact, being efficient at the wrong thing is pernicious—it perpetuates the wrong system. If you are efficiently doing bad things, the world gets worse, instead of better. So let's try to do things right and then be efficient, not just make the buildings more efficient with poisonous recycled content.

For Make It Right, we felt that the right thing to do was to facilitate people coming home, and then help them do so in a way that was economically, socially, and environmentally effective. Our goal was to make that happen for 150 families and our goal was to make it affordable to them (at conventional costs for the market).

Eco-efficiency, an easing of ecological stress, has been an important step towards a more just and healthful world. But it is yesterday's step. The time has come to adopt a truly hopeful strategy, Cradle to Cradle that will solve rather than merely mitigate the problems associated with buildings and construction, a strategy that will transform architecture into a celebration of a human ecological footprint with wholly positive effects.

From my designer's perspective, I ask: why can't I design a building like a tree? A building that makes oxygen, fixes nitrogen, sequesters carbon, distils water, builds soil, accrues solar energy as fuel, makes complex sugars and food, creates microclimates, and changes colors with the seasons. It's a delightful prospect.

CRADLE TO CRADLE

The goal of Cradle to Cradle is, therefore, *more good*. It is a celebration of abundance of renewable energy income, clean water, and social fairness. We will be 9 billion people by mid-century. We can celebrate abundance and fairness rather than being terrified of

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limits and destitution. Our goal is clear: A delightfully diverse, safe, healthy and just world—with clean air, water, and soil—economically, equitably, ecologically, and elegantly enjoyed. Period.

We honor the fact that commerce represents the engine of change. In order for there to be innovation, there must be revenues in excess of costs driving this R&D and returning profit to the company. This is a frame condition of the commercial activity. If you take the same positive approach to social dimension of change, we ask that all people, as Jefferson did, have the right to life, liberty, and the pursuit of happiness. Instead of seeing a child being born as a population problem, we see them as someone to be welcomed into a safe place where they can manifest their dreams. With regard to environmental change, we actually see the opportunity for a positive human footprint, one that leaves the world better than we found it. You can see our approach honors commerce, honors government and society, and also honors the environment that we all live in. To honor present and future generations, this design framework can serve as the cornerstone for the celebration of American ingenuity in the pursuit of sustainable solutions for a secure and thriving nation.

The human species is the most critical part of the world now. Given this, it's time we started behaving responsibly while we enjoy being on this planet. This is not a no-growth strategy or a reduced-growth strategy, but one that asks instead, What do we want to grow? Prosperity, health, security, community, culture. We can grow all these things by following these design principles:

- eliminate the concept of waste (all things are nutrients; value is continuously created and extracted; waste equals food);
- use solar and renewable carbon-free energy;
- celebrate diversity.

These three principles are guiding us to a new paradigm. Rather than seeing materials as a waste management problem in which interventions here and there slow their trip from cradle to grave, Cradle to Cradle thinking sees materials as nutrients and recognizes *two safe metabolisms* in which they flow. Biological nutrients safely cycle back to the soil or water or the air, and technical nutrients stay safely encapsulated within the manufacturing industrial cycles. I see this as a critical concept for the nation, a tremendous economic opportunity. Today, at least half of what we are doing and making is being lost. We have the potential to recapture these materials—a boon to the economy as well as a relief to the environment. We can substitute good design and safe production and create an entirely new job creation opportunity that we have not seen since World War II. Eliminating the concept of waste, along with employing renewable energy and celebrating diversity, could be a powerful innovation engine. *Indeed, it already is.*

Let me give some examples at different scales. In my companies, we have worked at all scales, from the molecule to the region, re-designing products, buildings, and communities with companies and governments who share our positive vision for the future. Many product manufacturers have discovered that Cradle to Cradle products typically reduce costs by about 20 percent due to the greater simplicity and less need for

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regulation. The same effectiveness can be realized across our systems for buildings, neighborhoods, and cities.

SHAW INDUSTRIES

In the commercial interiors sector, there have been tremendous advances in Cradle to Cradle work since the early 1980s. Some of the largest American furniture companies, such as Herman Miller and Steelcase, are seeing profits having adopted these protocols. In fact, the largest carpet company in the world, Shaw Industries, has made significant strides in this area.

Shaw, a Berkshire Hathaway Company, made the ground-breaking decision several years ago to design an environmentally sustainable carpet tile with the same cost and performance as standard carpet tiles. As the leading flooring provider to the commercial market, Shaw began its product development work using Cradle to Cradle thinking internally and then hired MBDC to review its product.

Focusing first on materials, the Shaw team searched for ones that were safe, lightweight and could be recycled at a very high level of quality. Eco Solution Q®, a nylon 6 carpet fiber which Shaw had already developed, could be recycled back into virgin quality fiber again and again. The dilemma, however, was that product designers had to identify a material for the carpet tile backing that would not interfere with the recycling of the nylon 6 fiber, as well as meet the other necessary performance criteria.

Shaw developed a polyolefin backed carpet that would do everything expected of a potentially PVC backed carpet, and more. The material allowed the overall carpet tile to be 40% lighter than conventional PVC emulsion coated tiles. Shaw called the new backing EcoWorx®, and made this the standard for all new tile products. Shaw currently is establishing its own carpet recycling systems, in preparation for the day when customers call to have their carpets removed and replaced.

In 2003, as a result of this work, Shaw Industries and MBDC won the first Presidential Green Chemistry Challenge award from President George W. Bush and the EPA. Shaw provided the carpet for the Make It Right houses.

U.S. POSTAL SERVICE

The United States Postal Service (USPS) has pursued the Cradle to Cradle framework as part of its efforts to differentiate itself from its competitors through sustainability, as well as demonstrate the range of services it can provide to its customers.

USPS has now gone further than any other shipping service provider in understanding its ingredient chemistry for human health, environmental health and recyclability attributes, down to the level of 100 ppm (0.01%). As a result, the organization is exceeding regulatory requirements (e.g., FDA) and industry averages for ingredient data knowledge. The Postal Service is working to eliminate hazardous ingredients from its

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packaging, with its suppliers' collaboration, and also applying aggressive sustainability criteria, while maintaining strict cost neutrality and highest performance. Where preferred ingredient chemistry was identified, USPS and MBDC created contract modifications to maintain suppliers' use of these materials.

NASA SUSTAINABILITY BASE

The government is just as likely to be the innovative client as the corporation, by the way. The NASA Ames Sustainability Base, being constructed now in Moffett Field California, is expected to be the nation's highest performing federal building. The building aims to go beyond LEED Platinum to be a Net Positive Building, meaning it is designed to generate more energy than it uses. But more than just an impressive, efficient building, Sustainability Base with NASA's commitment to research and analysis will provide the kind of feedback that is needed to help continually improve buildings to promote wellness and productivity. Here again, a commitment to principles helped the collaborative team create a building that will be a new benchmark—not something that is just less bad than its conventional counterparts.

With the creation of Sustainability Base, the science is about to get more exact. The data that NASA will glean from Sustainability Base could change the way architects design buildings and choose materials, affecting they practitioners think about lighting, acoustics and everything in between.

As we explore the economics of this project, the potential becomes clear. Beginnning ROI analyses suggest that factoring in savings in energy costs, water consumption, decreased maintenance, reduced landscaping costs, and greater worker productivity, the building is likely to pay back in savings the *entire* initial cost in about a 15 year period. If that happens, then this high-performance federal facility will cost the American tax payer *little to nothing after that* for the entire life cycle of the building. Quite a deal!

FORD ROUGE

A favorite large-scale application of this thinking has to be the revitalization of the River Rouge plant for Ford, which Bill Ford started in 1999.

We decided to look carefully at this planning/architecture/landscape architecture project, which we were hired to lead, through a Cradle to Cradle lens. After assessing innovation opportunities and costs, we found that the world's largest green roof, a porous landscape, would be able to handle a stormwater problem that would have required some $48 million in conventional engineering (for an impervious site with thousands of feet of large concrete pipes, three chemical treatment plants, and more …buried assets). Instead, this new water-filtering landscape would cost only $13 million, saving the company up to $35 million in capital expense on day one.

We explained to the board that the economics of the up to $35 million savings was the equivalent of an order for $900 million worth of new cars. The project was approved in

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minutes and was built on time and on budget. The roof thrives today. (It's also a thermal and wind barrier, adding to its effectiveness.)

After the roof was installed on the auto plant, birds started nesting there within five days. Remember a building like a tree—this building is like a meadow. It makes oxygen, fixes nitrogen, sequesters carbon, purifies water, changes colors, creates micro-climates, absorbs particulates, makes habitats, and causes the building to be incredibly energy effective. The workers enjoy a place that is full of daylight and fresh air; it's a place that is an environment asset to the community, not a liability.

WALMART

Cradle to Cradle agendas are not marginal at this point in history. Even Walmart, the world's largest retailer, is making change in this space. Lee Scott, former CEO of Walmart, initiated a significant program looking into issues of sustainability for Walmart; these efforts are proceeding under the leadership of current CEO Mike Duke. During the last half-decade, the results have been quite impressive from an economic, social, and environmental perspective. As most people are aware, Walmart's primary stated business intention is to have the lowest possible prices. But it is interesting to watch the enterprise as it moves forward to not only have lowest cost but also higher quality, especially as it relates to issues of sustainability.

Walmart has brought together universities, NGOs, and their supply chains to communicate about opportunities to become more efficient and drive down costs for the benefit of their consumers and their position in the marketplace. Walmart has stated goals for the corporation that it will become renewably powered, seek to have zero waste, and offer sustainable products. This is an immensely potent signal to the marketplace of how we will go forward to define quality in the retail sector and product design and manufacturing. Walmart is under way with actively moving its initiative toward a more public process, called The Sustainability Consortium. This will be an engagement of many retailers and supply chains, so that the sustainability protocols that result from the research and experience being brought to bear by this broad range of participants will become a standard index for all retailers and manufacturers in the future.

As a result of initiatives like this by Walmart and its partners, as well as those on the part of companies and individuals across the United States, we are about to see the markets respond in dramatic ways. Make It Right is a good example of this type of activity.

One of the first things we hear from businesses when "green" or "sustainable" or even Cradle to Cradle attributes are mentioned in real estate or product development is that this must represent extra cost. This is not so. If designers take a positive attitude and are prepared to explore opportunities for optimization based on these principled sustainable criteria, we can drive the cost to the appropriate levels so that society can well afford to benefit from and enjoy its fruits. There are small and large examples being manifested every day. Furniture, like that of Steelcase and Herman Miller, that is easy to take apart so that materials can be easily recycled anywhere. But this often means that these products are easier to put together, too, which reduces costs and increases productivity

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in the workforce and marketplace. Textiles with no toxic materials reduce the cost of complex regulatory regimes, reduce anxieties on the part of workers and customers, and eliminate special handling and end-of-pipe treatments, for example. There are thousands of examples coming, wave upon wave, that represent these dramatic shift in attitude and implementation making it quickly become just simple “common sense.”

We are reaching a tipping point, very important to attend politically, that has engaged far beyond five percent of the thinking population in our country. Many world leaders, including Thomas Jefferson and those since, have expressed the concept that five percent of the thinking population adopting and manifesting a new idea is enough to cause revolutionary change in society.

These ideas are actually practiced by our largest companies. Imagine when we will see them in the cars we make, the chemicals we manufacture, the products we enjoy, and in the buildings we inhabit, the local communities we belong to, the infrastructure that supports us, the regions we share, and nations we are dedicated to. What a delightful prospect—opportunity for innovation and economic activity at every scale. These innovations can be realized today and the government can support them.

I’d be happy to provide further information including other examples of how this strategy can benefit our economy, help reduce our debt, provide meaningful jobs, reindustrialize the nation, and support local economies. This is a way that the human species can re-imagine a relationship to the planet as one where it is celebrating abundance of renewable energy in all its forms, clean water, minerals and polymers continuously and safely reused for generations, and a safe and healthy environment in which to raise children.

Thomas Jefferson, in the Declaration of Independence, called for the celebration of life, liberty, and the pursuit of happiness. This was done in the recognition that remote tyranny was an unacceptable frame condition and as part of a revolution in how people would relate to each other and the world. This was written seven generations ago, and we still benefit from his foresight. We as his ancestors can rise now to the critical occasions of our time, recognizing that within the last 250 years, the system that we have adopted—manufacturing, mobility, habitation—have resulted in as many liabilities as benefits. Besides the wonderful advances in health care, technology, transportation, communications, economic well-being, etc., we also have created systems that, if designed, would have had a design assignment that looks like this:

Design a system of production that

- puts billions of pounds of toxic material into the air, water, and soil every year;
- produces some materials so dangerous that they will require constant vigilance by future generations;
- results in gigantic amounts of waste;
- puts valuable materials in holes all over the planet, where they can never be retrieved;
- requires thousands of complex, expensive regulations—not to keep people and natural systems safe, but rather to keep them from being poisoned too quickly;

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- measures productivity by how few people are working;
- creates prosperity by digging up or cutting down natural resources and then burying or burning them;
- erodes the diversity of species and cultural praoctices;
- puts carbon where it doesn't belong (it should be in the soil)—
    - in the atmosphere causing climate concerns and
    - in oceans threatening coral reefs and the bottom of our food chain; and
- creates a garbage patch in the ocean that's twice the size of Texas with far more plastic than plankton

Was this our intention? Intended or not, it has been our design to adopt a strategy of tragedy. If we say that tragedies are not our plan, we must admit that they are our *de facto plan:* they are happening because we have no other plan. It is time for America to come together and create a new plan. Any business or government realizing the scope of this tragedy must urgently adopt a strategy of change not just to survive but to rise above, now, and thrive once again.

Once again, America needs to call for life, liberty, and the pursuit of happiness—this time, free from the dangers of a badly designed industrial system. It is time, once again, to have a revolution based on a strategy of hope. I believe that Cradle to Cradle thinking, as we have seen in Make It Right and projects like the Ford Rouge, is the core of this strategy.

IT IS TIME FOR A NEW DESIGN

In 1789, Thomas Jefferson was communicating with James Madison about how to fund the federal government. Jefferson thought the borrowing power of the government would only be one generation (he thought it should be 19 years, it became 30 years). His logic can be paraphrased: The Earth belongs to the living. No man, by natural right, may oblige the lands he owns or operates to debts greater than those that may be paid during his own lifetime. For if he could, the world would belong to the dead and not to the living. The world would belong to the dead.

Our nation's debts are huge, our national economy is in trouble, and our industrial system of production has produced not only delights but serious problems that we must address now. We need a new design. But first, we need a new design philosophy like Cradle to Cradle, in order for our in order for our generation to leave a legacy that future generations will celebrate rather than bemoan. We celebrate Jefferson's legacies, the Declaration of Independence, the Bill of Rights, and public education, here now, some seven generations later. How will our seventh generation celebrate our legacy? This is up to you, our leaders. We, the commercial and environmental sectors will join you if you lead and we will forge ahead as best we can if you don't.

Let's all work together and *make it right*.

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