

modern culture\n00:04:18.000 appears to have adopted a strategy of tragedy.\n00:04:21.000 If we come here and say, "Well, I didn't intend\n00:04:23.000 to cause global warming on the way here,"\n00:04:24.000 and we say, "That's not part of my plan,"\n00:04:26.000 then we realize it's part of our de facto plan.\n00:04:29.000 Because it's the thing that's happening because we have no other plan.\n00:04:32.000 And I was at the White House for President Bush,\n00:04:34.000 meeting with every federal department and agency,\n00:04:36.000 and I pointed out that they appear to have no plan.\n00:04:40.000 If the end game is global warming, they're doing great.\n00:04:42.000 If the end game is mercury toxification of our children\n00:04:45.000 downwind of coal fire plants as they scuttled the Clean Air Act,\n00:04:48.000 then I see that our education programs should be explicitly defined as,\n00:04:52.000 "Brain death for all children. No child left behind."\n00:04:54.000 (Applause)\n00:04:58.000 So, the question is, how many federal officials\n00:05:02.000 are ready to move to Ohio and Pennsylvania with their families?\n00:05:05.000 So if you don't have an endgame of something delightful,\n00:05:09.000 then you're just moving chess pieces around,\n00:05:11.000 if you don't know you're taking the king.\n00:05:12.000 So perhaps we could develop a strategy of change,\n00:05:15.000 which requires humility. And in my business as an architect,\n00:05:18.000 it's unfortunate the word "humility" and the word "architect"\n00:05:22.000 have not appeared in the same paragraph since "The Fountainhead."\n00:05:25.000 So if anybody here has trouble with the concept of design humility,\n00:05:30.000 reflect on this -- it took us 5,000 years\n00:05:33.000 to put wheels on our luggage.\n00:05:37.000 So, as Kevin Kelly pointed out, there is no endgame.\n00:05:42.000 There is an infinite game, and we're playing in that infinite game.\n00:05:46.000 And so we call it "cradle to cradle,"\n00:05:48.000 and our goal is very simple.\n00:05:49.000 This is what I presented to the White House.\n00:05:51.000 Our goal is a delightfully diverse, safe, healthy and just world,\n00:05:54.000 with clean air, clean water, soil and power --\n00:05:57.000 economically, equitably, ecologically and elegantly enjoyed, period.\n00:06:01.000 (Applause)\n00:06:04.000 What don't you like about this?\n00:06:07.000 Which part of this don't you like?\n00:06:09.000 So we realized we want full diversity,\n00:06:11.000 even though it can be difficult to remember what De Gaulle said\n00:06:14.000 when asked what it was like to be President of France.\n00:06:16.000 He said, "What do you think it's like trying to run a country with 400 kinds of cheese?"\n00:06:20.000 But at the same time, we realize that our products are not safe and healthy.\n00:06:23.000 So we've designed products\n00:06:25.000 and we analyzed chemicals down to the parts per million.\n00:06:27.000 This is a baby blanket by Pendleton that will give your child nutrition\n00:06:30.000 instead of Alzheimer's later in life.\n00:06:32.000 We can ask ourselves, what is justice,\n00:06:34.000 and is justice blind, or is justice blindness?\n00:06:38.000 And at what point did that uniform turn from white to black?\n00:06:43.000 Water has been declared a human right by the United Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000 Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000

that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we see the end of the age of oil?"\n00:07:12.000 I don't know if you remember his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we ran out of stones."\n00:07:19.000 We see that companies acting ethically in this world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her childrens' environment,\n00:07:38.000 which is from copper.\n00:07:40.000 On the other hand, we see great signs of hope.\n00:07:42.000 Here's Dr. Venkataswamy in India, who's figured out\n00:07:45.000 how to do mass-produced health.\n00:07:47.000 He has given eyesight to two million people for free.\n00:07:51.000 We see in our material flows that car steels don't become car steel again\n00:07:54.000 because of the contaminants of the coatings --\n00:07:56.000 bismuth, antimony, copper and so on.\n00:07:58.000 They become building steel.\n00:07:59.000 On the other hand, we're working with Berkshire Hathaway,\n00:08:01.000 Warren Buffett and Shaw Carpet,\n00:08:04.000 the largest carpet company in the world.\n00:08:05.000 We've developed a carpet that is continuously recyclable,\n00:08:08.000 down to the parts per million.\n00:08:11.000 The upper is Nylon 6 that can go back to caprolactam,\n00:08:14.000 the bottom, a polyolephine -- infinitely recyclable thermoplastic.\n00:08:17.000 Now if I was a bird, the building on my left is a liability.\n00:08:21.000 The building on my right, which is our corporate campus for The Gap\n00:08:24.000 with an ancient meadow, is an asset -- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies' 1928 tower for Berlin,\n00:09:15.000 the question might be, "Well, where's the sun?"\n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, "Bill, you've got to understand- --\n00:09:43.000 solar energy has nothing to do with

architecture. " I guess he didn't read Vitruvius. In 1984, we did the first so-called "green office" in America for Environmental Defense. We started asking manufacturers what were in their materials. They said, "They're proprietary, they're legal, go away." The only indoor quality work done in this country at that time was sponsored by R. J. Reynolds Tobacco Company, and it was to prove there was no danger from secondhand smoke in the workplace. So, all of a sudden, here I am, graduating from high school in 1969, and this happens, and we realize that "away" went away. Remember we used to throw things away, and we'd point to away? And yet, NOAA has now shown us, for example -- you see that little blue thing above Hawaii? That's the Pacific Gyre. It was recently dragged for plankton by scientists, and they found six times as much plastic as plankton. When asked, they said, "It's kind of like a giant toilet that doesn't flush." Perhaps that's away. So we're looking for the design rules of this -- this is the highest biodiversity of trees in the world, Irian Jaya, 259 species of tree, and we described this in the book, "Cradle to Cradle." The book itself is a polymer. It is not a tree. That's the name of the first chapter -- "This Book is Not a Tree." Because in poetics, as Margaret Atwood pointed out, "we write our history on the skin of fish with the blood of bears." And with so much polymer, what we really need is technical nutrition, and to use something as elegant as a tree -- imagine this design assignment: Design something that makes oxygen, sequesters carbon, fixes nitrogen, distills water, accrues solar energy as fuel, makes complex sugars and food, creates microclimates, changes colors with the seasons and self-replicates. Well, why don't we knock that down and write on it? (Laughter) So, we're looking at the same criteria as most people -- you know, can I afford it? Does it work? Do I like it? We're adding the Jeffersonian agenda, and I come from Charlottesville, where I've had the privilege of living in a house designed by Thomas Jefferson. We're adding life, liberty and the pursuit of happiness. Now if we look at the word "competition," I'm sure most of you've used it. You know, most people don't realize it comes from the Latin *competere*, which means strive together. It means the way Olympic athletes train with each other. They get fit together, and then they compete. The Williams sisters compete -- one wins Wimbledon. So we've been looking at the idea of competition as a way of cooperating in order to get fit together. And the Chinese government has now -- I work with the Chinese government now -- has taken this up. We're also looking at survival of the fittest, not in just competition terms in our modern context of destroy the other or beat them to the ground, but really to fit together and build niches and have growth that is good. Now most

environmentalists don't say growth is good, because, in our lexicon, asphalt is two words: assigning blame. But if we look at asphalt as our growth, then we realize that all we're doing is destroying the planetary's fundamental underlying operating system. So when we see $E = mc^2$ come along, from a poet's perspective, we see energy as physics, chemistry as mass, and all of a sudden, you get this biology. And we have plenty of energy, so we'll solve that problem, but the biology problem's tricky, because as we put through all these toxic materials that we disgorge, we will never be able to recover that. And as Francis Crick pointed out, nine years after discovering DNA with Mr. Watson, that life itself has to have growth as a precondition -- it has to have free energy, sunlight and it needs to be an open system of chemicals. So we're asking for human artifice to become a living thing, and we want growth, we want free energy from sunlight and we want an open metabolism for chemicals. Then, the question becomes not growth or no growth, but what do you want to grow? So instead of just growing destruction, we want to grow the things that we might enjoy, and someday the FDA will allow us to make French cheese. So therefore, we have these two metabolisms, and I worked with a German chemist, Michael Braungart, and we've identified the two fundamental metabolisms. The biological one I'm sure you understand, but also the technical one, where we take materials and put them into closed cycles. We call them biological nutrition and technical nutrition. Technical nutrition will be in an order of magnitude of biological nutrition. Biological nutrition can supply about 500 million humans, which means that if we all wore Birkenstocks and cotton, the world would run out of cork and dry up. So we need materials in closed cycles, but we need to analyze them down to the parts per million for cancer, birth defects, mutagenic effects, disruption of our immune systems, biodegradation, persistence, heavy metal content, knowledge of how we're making them and their production and so on. Our first product was a textile where we analyzed 8,000 chemicals in the textile industry. Using those intellectual filters, we eliminated [7,962.] We were left with 38 chemicals. We have since databased the 4000 most commonly used chemicals in human manufacturing, and we're releasing this database into the public in six weeks. So designers all over the world can analyze their products down to the parts per million for human and ecological health.

(Applause) We've developed a protocol so that companies can send these same messages all the way through their supply chains, because when we asked most companies we work with -- about a trillion dollars -- and say, "Where does your stuff come from?" They say, "Suppliers." "And where does it go?" "Customers." So we need some help there. So the biological nutrients, the first fabrics -- the water coming out was clean enough to drink. Technical nutrients --

this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the industry forever, some of the materials go back to soil --\n00:15:44.000 it's all solar-powered.\n00:15:46.000 Here's a building at Oberlin College we designed\n00:15:48.000 that makes more energy than it needs to operate and purifies its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color photograph.\n00:16:06.000 These are our tools. These are how we sold it to Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country -- the home of biological. And putting them together.\n00:16:45.000 And so I will finish by showing you a new city\n00:16:47.000 we're designing for the Chinese government.\n00:16:49.000 We're doing 12 cities for China right now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our assignment is to develop protocols for the housing\n00:16:57.000 for 400 million people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use brick,\n00:17:01.000 they will lose all their soil and burn all their coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --\n00:17:18.000 and then we send them all our money, what we'll discover is that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are our cities.\n00:17:30.000 We're building a new city next to this city; look at that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally do green fields, but this one is about to be built,\n00:17:39.000 so they brought us in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We

studied the biota, the ancient biota, the current farming and the protocols. We studied the winds and the sun to make sure everybody in the city will have fresh air, fresh water and direct sunlight in every single apartment at some point during the day. We then take the parks and lay them out as ecological infrastructure. We lay out the building areas. We start to integrate commercial and mixed use so the people all have centers and places to be. The transportation is all very simple, everybody's within a five-minute walk of mobility. We have a 24-hour street, so that there's always a place that's alive. The waste systems all connect. If you flush a toilet, your feces will go to the sewage treatment plants, which are sold as assets, not liabilities. Because who wants the fertilizer factory that makes natural gas? The waters are all taken in to construct the wetlands for habitat restorations. And then it makes natural gas, which then goes back into the city to power the fuel for the cooking for the city. So this is -- these are fertilizer gas plants. And then the compost is all taken back to the roofs of the city, where we've got farming, because what we've done is lifted up the city, the landscape, into the air to -- to restore the native landscape on the roofs of the buildings. The solar power of all the factory centers and all the industrial zones with their light roofs powers the city. And this is the concept for the top of the city. We've lifted the earth up onto the roofs. The farmers have little bridges to get from one roof to the next. We inhabit the city with work/live space on all the ground floors. And so this is the existing city, and this is the new city. (Applause)

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\n\n\n\n\nForeword\n\nPredictions of the future can be hazardous or downright
foolish. But the \nfailure of foresight\u2014the inability to read the hand-writing
on the wall\u2014is \neven more so. Designers of all kinds work in the conflicted
space between \nthese two poles. Their goal is to improve small parts of a rapidly
changing \nworld with the tools of form, scale, materials, energy, water, color,
landscape, \nand the creativity that is found most often at the grassroots level. But
what \nneeds to be improved?\n\nThe short answer is \na great deal,\u201d
including an energy system that is rapidly \ndestabilizing the climate, an economy
driving tens of thousands of species to \nextinction, a political system that
sanctions gross inequality, an uncivil society, \nthe growing autism toward the
natural world, and a global system mired in \nconflict. These are related problems,
parts of a larger civilizational crisis with \nroots traceable to the seventeenth
century authors of the mechanical world \nview. But there are deeper pathologies with
footprints back to our ancient \nschizophrenia toward the natural world that had to be
tamed a bit before it \ncould be appreciated.\n\nDesigners, however, typically do not
work at the macro scale of civilization \nfor good reasons. Whether as architecture,
engineering, materials, or land-\nscape, design is bounded by the minute particulars
of projects in their spe-\ncific social, cultural, and historical context. As a result
designers work from the \nbottom up on projects at the building, neighborhood, and
city scales. But the \nbig problems mentioned above are in large part the sum total
of bad design \n(including that of public policies) at lower levels. There are many
reasons for \nbad design, not the least of which is a professional focus on form-
making, \noften oblivious to other consequences.\n\nBeginning in the 1970s a few

renegade architects like Sim Van der Ryn in California became concerned about the collateral environmental impacts of the design professions. Van der Ryn envisioned ecological design as the calibration of buildings with their places, which required further understanding of landscapes, energy flows, waste cycling, materials, sun, light, water, and ecological processes. Ecological design, in other words, aims to calibrate human actions with the way natural systems work as particular places, larger landscapes, and whole ecologies. It aims to work with, not against, the flows of energy and natural cycling of materials. The goal, in short, was to reduce environmental impacts of the built environment in a civilization that prized economic expansion above all else with hardly a thought for the morrow. What began so modestly in the 1970s has rapidly grown into a global movement to harmonize buildings, neighborhoods, and cities with the surrounding nature. After the publication of the Brundtland Commission report in 1987, the goals of ecological designers expanded to embrace the wider (but vague) mission of sustainability. But we know now that that word signifies more than was once assumed. Sustainability is the sum total of other qualities. As Chattanooga City Councilman, David Crockett puts it: "make it clean, green, safe, and fair and it will be sustainable." The left side of that equation, however, requires the elimination of the growing inequality that is a precursor to violence and ruined lives. It further requires rethinking our core assumptions about the relation between economic growth and real progress. Ecological design, in other words, must be large enough in foresight, scope, and heart to include the social and economic environment in which it is embedded. In that way ecological design is a radical endeavor in the true sense of the word, it gets to the root of what ails us. The work described in this book takes design to yet another level that aims to regenerate the fabric of life and repair the wounds and tears inflicted by the carelessness of the fossil-fuel-powered growth economy. Regenerative design strives to create the conditions of health which ecologist Aldo Leopold once defined as "the capacity of the land for self-renewal." It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, "Foreword vii" design, "unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature." In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, "transcend utility and conventional function-led, and especially technology-led approaches." Designers, in his view, must rise above "the calculated creation of dissatisfaction" and "think more comprehensively about the products we already produce and their implications."³ Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other⁴ the things that we once did naturally as capable people, good

neighbors, and active citizens. It helps ground us by better informing us of where we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance.

We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens who use them to train young people in the essentials of managed integrated ecologies.

5 Foreword

Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.

6 Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things.

A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.

7 These will likely cause interruptions in supplies of food, energy, and water and could trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.

8 The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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transcript\n# Ray Anderson: The business logic of sustainability\n#

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https://www.youtube.com/watch/iP9QF_lBOyA Believe me or not, I come offering a solution to a very important part of this larger problem, with the requisite focus on climate. And the solution I offer is to the biggest culprit in this massive mistreatment of the earth by humankind, and the resulting decline of the biosphere. That culprit is business and industry, which happens to be where I have spent the last 52 years since my graduation from Georgia Tech in 1956. As an industrial engineer, cum aspiring and then successful entrepreneur. After founding my company, Interface, from scratch in 1973, 36 years ago, to produce carpet tiles in America for the business and institution markets, and shepherding it through start-up and survival to prosperity and global dominance in its field, I read Paul Hawken's book, "The Ecology of Commerce," the summer of 1994. In his book, Paul charges business and industry as, one, the major culprit in causing the decline of the biosphere, and, two, the only institution that is large enough, and pervasive enough, and powerful enough, to really lead humankind out of this mess. And by the way he convicted me as a plunderer of the earth. And I then challenged the people of Interface, my company, to lead our company and the entire industrial world to sustainability, which we defined as eventually operating our petroleum-intensive company in such a way as to take from the earth only what can be renewed by the earth, naturally and rapidly -- not another fresh drop of oil -- and to do no harm to the biosphere. Take nothing: do no harm. I simply said, "If Hawken is right and business and industry must lead, who will lead business and industry? Unless somebody leads, nobody will." It's axiomatic. Why not us? And thanks to the people of Interface, I have become a recovering plunderer. (Laughter) (Applause) I once told a Fortune Magazine writer that someday people like me would go to jail. And that became the headline of a Fortune article. They went on to describe me as America's greenest CEO. From plunderer to recovering plunderer, to America's greenest CEO in five years -- that, frankly, was a pretty sad commentary on American CEOs in 1999. Asked later in the Canadian documentary, "The Corporation," what I meant by the "go to jail" remark, I offered that theft is a crime. And theft of our children's future would someday be a crime. But I realized, for that to be true -- for theft of our children's future to be a crime -- there must be a clear, demonstrable alternative to the take-make-waste industrial system that so dominates our civilization, and is the major culprit, stealing our children's future, by digging up the earth and converting it to products that quickly become waste in a landfill or an incinerator -- in short, digging up the earth and converting it to pollution. According to Paul and Anne Ehrlich and a well-

known environmental impact equation, \n00:03:48.330 impact -- a bad thing --
\n00:03:50.330 is the product of population, affluence and technology. \n00:03:54.330
That is, impact is generated by people, \n00:03:58.330 what they consume in their
affluence, \n00:04:00.330 and how it is produced. \n00:04:03.330 And though the equation
is largely subjective, \n00:04:05.330 you can perhaps quantify people, and perhaps
quantify affluence, \n00:04:09.330 but technology is abusive in too many ways to
quantify. \n00:04:13.330 So the equation is conceptual. \n00:04:15.330 Still it works to
help us understand the problem. \n00:04:18.329 So we set out at Interface, in
1994, \n00:04:23.330 to create an example: \n00:04:25.330 to transform the way we made
carpet, \n00:04:27.330 a petroleum-intensive product for materials as well as
energy, \n00:04:31.330 and to transform our technologies \n00:04:33.330 so they
diminished environmental impact, \n00:04:36.330 rather than multiplied
it. \n00:04:39.330 Paul and Anne Ehrlich's environmental impact
equation: \n00:04:42.330 I is equal to P times A times T : \n00:04:45.330 population,
affluence and technology. \n00:04:48.330 I wanted Interface to rewrite that equation so
that it read \n00:04:54.330 I equals P times A divided by T . \n00:04:57.330 Now, the
mathematically-minded will see immediately \n00:05:00.330 that T in the numerator
increases impact -- a bad thing -- \n00:05:03.330 but T in the denominator decreases
impact. \n00:05:07.330 So I ask, "What would move T , technology, \n00:05:11.330
from the numerator -- call it T_1 -- \n00:05:13.330 where it increases
impact, \n00:05:15.330 to the denominator -- call it T_2 -- \n00:05:18.330 where it
reduces impact? \n00:05:21.330 I thought about the characteristics \n00:05:25.330 of
first industrial revolution, \n00:05:27.330 T_1 , as we practiced it at
Interface, \n00:05:30.330 and it had the following characteristics. \n00:05:34.330
Extractive: taking raw materials from the earth. \n00:05:38.330 Linear: take, make,
waste. \n00:05:41.330 Powered by fossil fuel-derived energy. \n00:05:43.330 Wasteful:
abusive and focused on labor productivity. \n00:05:47.330 More carpet per man-
hour. \n00:05:50.330 Thinking it through, I realized that all those
attributes \n00:05:53.330 must be changed to move T to the denominator. \n00:05:58.330
In the new industrial revolution extractive must be replaced by
renewable; \n00:06:03.330 linear by cyclical; \n00:06:05.330 fossil fuel energy by
renewable energy, sunlight; \n00:06:09.330 wasteful by waste-free; \n00:06:11.330 and
abusive by benign; \n00:06:13.330 and labor productivity by resource
productivity. \n00:06:17.330 And I reasoned that if we could make those transformative
changes, \n00:06:21.330 and get rid of T_1 altogether, \n00:06:23.330 we could reduce our
impact to zero, \n00:06:26.330 including our impact on the climate. \n00:06:29.330 And
that became the Interface plan in 1995, \n00:06:32.330 and has been the plan ever
since. \n00:06:35.330 We have measured our progress very rigorously. \n00:06:39.330 So I
can tell you how far we have come in the ensuing 12 years. \n00:06:43.330 Net
greenhouse gas emissions \n00:06:45.330 down 82 percent in absolute
tonnage. \n00:06:49.330 (Applause) \n00:06:53.330 Over the same span of
time \n00:06:55.330 sales have increased by two-thirds and profits have
doubled. \n00:06:58.330 So an 82 percent absolute reduction \n00:07:01.330 translates
into a 90 percent reduction \n00:07:03.330 in greenhouse gas intensity relative to
sales. \n00:07:07.330 This is the magnitude \n00:07:09.330 of the reduction the entire
global technosphere \n00:07:12.330 must realize by 2050 \n00:07:15.330 to avoid
catastrophic climate disruption -- \n00:07:18.330 so the scientists are telling
us. \n00:07:21.330 Fossil fuel usage is down 60 percent per unit of
production, \n00:07:25.330 due to efficiencies in renewables. \n00:07:27.330 The

cheapest, most secure barrel of oil there is\n00:07:30.330 is the one not used through efficiencies.\n00:07:33.330 Water usage is down 75 percent\n00:07:36.330 in our worldwide carpet tile business.\n00:07:38.330 Down 40 percent in our broadloom carpet business,\n00:07:41.330 which we acquired in 1993\n00:07:43.330 right here in California, City of Industry,\n00:07:45.330 where water is so precious.\n00:07:48.330 Renewable or recyclable materials are 25 percent of the total, and growing rapidly.\n00:07:52.330 Renewable energy is 27 percent of our total,\n00:07:55.330 going for 100 percent.\n00:07:57.330 We have diverted 148 million pounds --\n00:08:00.330 that's 74,000 tons --\n00:08:02.330 of used carpet from landfills,\n00:08:05.330 closing the loop on material flows\n00:08:07.330 through reverse logistics\n00:08:09.330 and post-consumer recycling technologies\n00:08:12.330 that did not exist when we started 14 years ago.\n00:08:16.330 Those new cyclical technologies\n00:08:18.330 have contributed mightily to the fact that we have produced and sold\n00:08:21.330 85 million square yards of climate-neutral carpet\n00:08:25.330 since 2004,\n00:08:27.330 meaning no net contribution to global climate disruption\n00:08:31.330 in producing the carpet throughout the supply chain,\n00:08:33.330 from mine and well head clear to end-of-life reclamation --\n00:08:38.330 independent third-party certified.\n00:08:40.330 We call it Cool Carpet.\n00:08:43.330 And it has been a powerful marketplace differentiator,\n00:08:46.330 increasing sales and profits.\n00:08:48.330 Three years ago we launched carpet tile for the home,\n00:08:52.330 under the brand Flor,\n00:08:54.330 misspelled F-L-O-R.\n00:08:57.330 You can point and click today at Flor.com\n00:08:59.330 and have Cool Carpet delivered to your front door in five days.\n00:09:03.330 It is practical, and pretty too.\n00:09:06.330 (Laughter)\n00:09:07.330 (Applause)\n00:09:13.330 We reckon that we are a bit over halfway\n00:09:15.330 to our goal: zero impact, zero footprint.\n00:09:20.330 We've set 2020 as our target year for zero,\n00:09:23.330 for reaching the top, the summit of Mount Sustainability.\n00:09:28.330 We call this Mission Zero.\n00:09:30.330 And this is perhaps the most important facet:\n00:09:33.330 we have found Mission Zero to be incredibly good for business.\n00:09:37.330 A better business model,\n00:09:40.330 a better way to bigger profits.\n00:09:42.330 Here is the business case for sustainability.\n00:09:45.330 From real life experience, costs are down, not up,\n00:09:49.330 reflecting some 400 million dollars\n00:09:51.330 of avoided costs in pursuit of zero waste --\n00:09:55.330 the first face of Mount Sustainability.\n00:09:58.330 This has paid all the costs for the transformation of Interface.\n00:10:02.330 And this dispels a myth too,\n00:10:04.330 this false choice between the environment and the economy.\n00:10:08.330 Our products are the best they've ever been,\n00:10:10.330 inspired by design for sustainability,\n00:10:12.330 an unexpected wellspring of innovation.\n00:10:16.330 Our people are galvanized around this shared higher purpose.\n00:10:19.330 You cannot beat it for attracting the best people\n00:10:21.330 and bringing them together.\n00:10:24.330 And the goodwill of the marketplace is astonishing.\n00:10:27.330 No amount of advertising, no clever marketing campaign,\n00:10:31.330 at any price, could have produced or created\n00:10:34.330 this much goodwill.\n00:10:37.330 Costs, products, people, marketplaces --\n00:10:39.330 what else is there?\n00:10:41.330 It is a better business model.\n00:10:43.330 And here is our 14-year record of sales and profits.\n00:10:48.330 There is a dip there, from 2001 to 2003:\n00:10:51.330 a dip when our sales, over a three-year period,\n00:10:53.330 were down 17

percent.\n00:10:55.330 But the marketplace was down 36 percent.\n00:10:58.330 We literally gained market share.\n00:11:00.330 We might not have survived that recession\n00:11:03.330 but for the advantages of sustainability.\n00:11:06.330 If every business were pursuing Interface plans,\n00:11:10.330 would that solve all our problems?\n00:11:12.330 I don't think so.\n00:11:14.330 I remain troubled by the revised Ehrlich equation,\n00:11:17.330 I equals P times A divided by T2.\n00:11:21.330 That A is a capital A,\n00:11:23.330 suggesting that affluence is an end in itself.\n00:11:28.330 But what if we reframed Ehrlich further?\n00:11:32.330 And what if we made A a lowercase 'a',\n00:11:35.330 suggesting that it is a means to an end,\n00:11:37.330 and that end is happiness --\n00:11:40.330 more happiness with less stuff.\n00:11:43.330 You know that would reframe civilization itself --\n00:11:46.330 (Applause) --\n00:11:54.330 and our whole system of economics,\n00:11:57.330 if not for our species, then perhaps for the one that succeeds us:\n00:12:03.330 the sustainable species, living on a finite earth,\n00:12:06.330 ethically, happily and ecologically\n00:12:09.330 in balance with nature\n00:12:11.330 and all her natural systems for a thousand generations,\n00:12:14.330 or 10,000 generations --\n00:12:16.330 that is to say, into the indefinite future.\n00:12:19.330 But does the earth have to wait for our extinction as a species?\n00:12:24.330 Well maybe so. But I don't think so.\n00:12:27.330 At Interface we really intend to bring this prototypical\n00:12:30.330 sustainable, zero-footprint industrial company\n00:12:33.330 fully into existence by 2020.\n00:12:36.330 We can see our way now,\n00:12:38.330 clear to the top of that mountain.\n00:12:40.330 And now the challenge is in execution.\n00:12:43.330 And as my good friend and adviser Amory Lovins says,\n00:12:46.330 "If something exists, it must be possible."\n00:12:50.330 (Laughter)\n00:12:53.330 If we can actually do it, it must be possible.\n00:12:56.330 If we, a petro-intensive company can do it, anybody can.\n00:13:00.330 And if anybody can, it follows that everybody can.\n00:13:04.330 Hawken fulfilled business and industry,\n00:13:07.330 leading humankind away from the abyss\n00:13:11.330 because, with continued unchecked decline of the biosphere,\n00:13:16.330 a very dear person is at risk here --\n00:13:19.330 frankly, an unacceptable risk.\n00:13:21.330 Who is that person?\n00:13:23.330 Not you. Not I.\n00:13:25.330 But let me introduce you to the one who is most at risk here.\n00:13:28.330 And I myself met this person in the early days of this mountain climb.\n00:13:32.330 On a Tuesday morning in March of 1996,\n00:13:36.330 I was talking to people, as I did at every opportunity back then,\n00:13:39.330 bringing them along and often not knowing whether I was connecting.\n00:13:43.330 But about five days later back in Atlanta,\n00:13:46.330 I received an email from Glenn Thomas,\n00:13:49.330 one of my people in the California meeting.\n00:13:51.330 He was sending me an original poem\n00:13:53.330 that he had composed after our Tuesday morning together.\n00:13:56.330 And when I read it it was one of the most uplifting moments of my life.\n00:14:00.330 Because it told me, by God, one person got it.\n00:14:04.330 Here is what Glenn wrote. And here is that person, most at risk.\n00:14:08.330 Please meet "Tomorrow's Child." \n00:14:12.330 "Without a name, an unseen face, and knowing not your time or place,\n00:14:16.330 Tomorrow's child, though yet unborn,\n00:14:19.330 I met you first last Tuesday morn.\n00:14:22.330 A wise friend introduced us two.\n00:14:24.330 And through his sobering point of view\n00:14:26.330 I saw a day that you would see, a day for you but not for me.\n00:14:31.330 Knowing you has changed my

thinking.\n00:14:33.330 For I never had an inkling\n00:14:35.330 that perhaps the things I do might someday,\n00:14:38.330 somehow threaten you.\n00:14:41.330 Tomorrow's child, my daughter, son,\n00:14:43.330 I'm afraid I've just begun to think of you and of your good,\n00:14:45.330 though always having known I should.\n00:14:49.330 Begin, I will.\n00:14:51.330 The way the cost of what I squander, what is lost,\n00:14:54.330 if ever I forget that you\n00:14:56.330 will someday come and live here too."\n00:15:00.330 Well, every day of my life since,\n00:15:02.330 "Tomorrow's Child" has spoken to me\n00:15:04.330 with one simple but profound message,\n00:15:06.330 which I presume to share with you.\n00:15:08.330 We are, each and every one,\n00:15:10.330 a part of the web of life.\n00:15:13.330 The continuum of humanity, sure, but in a larger sense, the web of life itself.\n00:15:17.330 And we have a choice to make\n00:15:19.330 during our brief, brief visit\n00:15:21.330 to this beautiful blue and green living planet:\n00:15:25.330 to hurt it or to help it.\n00:15:28.330 For you, it's your call.\n00:15:31.330 Thank you.\n00:15:33.330 (Applause)\n", "cloud_doc_url": null}, {"matched_text": "\u001029\u0020source\u0011", "start_idx": 1088, "end_idx": 1099, "alt": null, "type": "file", "name": "tactiq-free-transcript-IoRjz8iTVoo.txt", "id": "file-015fyq55A9kPiWRmfng81lx4", "source": "my_files", "snippet": "# tactiq.io free youtube transcript\n# Cradle to cradle design | William McDonough\n# https://www.youtube.com/watch/IoRjz8iTVoo\n\n00:00:26.000 In 1962, with Rachel Carson's "Silent Spring,"\n00:00:30.000 I think for people like me in the world of the making of things,\n00:00:35.000 the canary in the mine wasn't singing.\n00:00:39.000 And so the question that we might not have birds\n00:00:42.000 became kind of fundamental to those of us wandering around\n00:00:45.000 looking for the meadowlarks that seemed to have all disappeared.\n00:00:48.000 And the question was, were the birds singing?\n00:00:51.000 Now, I'm not a scientist, that'll be really clear.\n00:00:55.000 But, you know, we've just come from this discussion of what a bird might be.\n00:00:59.000 What is a bird?\n00:01:00.000 Well, in my world, this is a rubber duck.\n00:01:04.000 It comes in California with a warning --\n00:01:06.000 "This product contains chemicals known by the State of California\n00:01:09.000 to cause cancer and birth defects or other reproductive harm."\n00:01:16.000 This is a bird.\n00:01:19.000 What kind of culture would produce a product of this kind\n00:01:22.000 and then label it and sell it to children?\n00:01:27.000 I think we have a design problem.\n00:01:30.000 Someone heard the six hours of talk that I gave\n00:01:35.000 called "The Monticello Dialogues" on NPR, and sent me this as a thank you note --\n00:01:41.000 "We realize that design is a signal of intention,\n00:01:43.000 but it also has to occur within a world,\n00:01:46.000 and we have to understand that world in order to\n00:01:50.000 imbue our designs with inherent intelligence,\n00:01:53.000 and so as we look back at the basic state of affairs\n00:01:58.000 in which we design, we, in a way, need to go to the primordial condition\n00:02:03.000 to understand the operating system and the frame conditions of a planet,\n00:02:08.000 and I think the exciting part of that is the good news that's there,\n00:02:13.000 because the news is the news of abundance,\n00:02:16.000 and not the news of limits,\n00:02:18.000 and I think as our culture tortures itself now\n00:02:23.000 with tyrannies and concerns over limits and fear,\n00:02:28.000 we can add this other dimension of abundance that is coherent,\n00:02:33.000 driven by the sun, and start to imagine\n00:02:35.000 what that would be like to share."\n00:02:42.000 That was a nice thing to get.\n00:02:44.000 That was one sentence.\n00:02:48.000 Henry James would be

proud.\n00:02:50.000 This is -- I put it down at the bottom,\n00:02:52.000 but that was extemporaneous, obviously.\n00:02:55.000 The fundamental issue is that, for me,\n00:02:58.000 design is the first signal of human intentions.\n00:03:00.000 So what are our intentions, and what would our intentions be --\n00:03:04.000 if we wake up in the morning, we have designs on the world --\n00:03:07.000 well, what would our intention be as a species\n00:03:09.000 now that we're the dominant species?\n00:03:11.000 And it's not just stewardship and dominion debate,\n00:03:14.000 because really, dominion is implicit in stewardship --\n00:03:20.000 because how could you dominate something you had killed?\n00:03:22.000 And stewardship's implicit in dominion,\n00:03:24.000 because you can't be steward of something if you can't dominate it.\n00:03:26.000 So the question is, what is the first question for designers?\n00:03:32.000 Now, as guardians -- let's say the state, for example,\n00:03:35.000 which reserves the right to kill, the right to be duplicitous and so on --\n00:03:40.000 the question we're asking the guardian at this point is\n00:03:43.000 are we meant, how are we meant,\n00:03:45.000 to secure local societies, create world peace\n00:03:47.000 and save the environment?\n00:03:49.000 But I don't know that that's the common debate.\n00:03:52.000 Commerce, on the other hand, is relatively quick,\n00:03:56.000 essentially creative, highly effective and efficient,\n00:03:58.000 and fundamentally honest, because we can't exchange\n00:04:01.000 value for very long if we don't trust each other.\n00:04:05.000 So we use the tools of commerce primarily for our work,\n00:04:07.000 but the question we bring to it is,\n00:04:09.000 how do we love all the children of all species for all time?\n00:04:13.000 And so we start our designs with that question.\n00:04:16.000 Because what we realize today is that modern culture\n00:04:18.000 appears to have adopted a strategy of tragedy.\n00:04:21.000 If we come here and say, "Well, I didn't intend\n00:04:23.000 to cause global warming on the way here,"\n00:04:24.000 and we say, "That's not part of my plan,"\n00:04:26.000 then we realize it's part of our de facto plan.\n00:04:29.000 Because it's the thing that's happening because we have no other plan.\n00:04:32.000 And I was at the White House for President Bush,\n00:04:34.000 meeting with every federal department and agency,\n00:04:36.000 and I pointed out that they appear to have no plan.\n00:04:40.000 If the end game is global warming, they're doing great.\n00:04:42.000 If the end game is mercury toxification of our children\n00:04:45.000 downwind of coal fire plants as they scuttled the Clean Air Act,\n00:04:48.000 then I see that our education programs should be explicitly defined as,\n00:04:52.000 "Brain death for all children. No child left behind."
00:04:54.000 (Applause)\n00:04:58.000 So, the question is, how many federal officials\n00:05:02.000 are ready to move to Ohio and Pennsylvania with their families?\n00:05:05.000 So if you don't have an endgame of something delightful,\n00:05:09.000 then you're just moving chess pieces around,\n00:05:11.000 if you don't know you're taking the king.\n00:05:12.000 So perhaps we could develop a strategy of change,\n00:05:15.000 which requires humility. And in my business as an architect,\n00:05:18.000 it's unfortunate the word "humility" and the word "architect" have not appeared in the same paragraph since "The Fountainhead."
00:05:25.000 So if anybody here has trouble with the concept of design humility,\n00:05:30.000 reflect on this -- it took us 5,000 years\n00:05:33.000 to put wheels on our luggage.\n00:05:37.000 So, as Kevin Kelly

pointed out, there is no endgame.\n00:05:42.000 There is an infinite game, and we're playing in that infinite game.\n00:05:46.000 And so we call it "cradle to cradle,"\n00:05:48.000 and our goal is very simple.\n00:05:49.000 This is what I presented to the White House.\n00:05:51.000 Our goal is a delightfully diverse, safe, healthy and just world,\n00:05:54.000 with clean air, clean water, soil and power --\n00:05:57.000 economically, equitably, ecologically and elegantly enjoyed, period.\n00:06:01.000 (Applause)\n00:06:04.000 What don't you like about this?\n00:06:07.000 Which part of this don't you like?\n00:06:09.000 So we realized we want full diversity,\n00:06:11.000 even though it can be difficult to remember what De Gaulle said\n00:06:14.000 when asked what it was like to be President of France.\n00:06:16.000 He said, "What do you think it's like trying to run a country with 400 kinds of cheese?"\n00:06:20.000 But at the same time, we realize that our products are not safe and healthy.\n00:06:23.000 So we've designed products\n00:06:25.000 and we analyzed chemicals down to the parts per million.\n00:06:27.000 This is a baby blanket by Pendleton that will give your child nutrition\n00:06:30.000 instead of Alzheimer's later in life.\n00:06:32.000 We can ask ourselves, what is justice,\n00:06:34.000 and is justice blind, or is justice blindness?\n00:06:38.000 And at what point did that uniform turn from white to black?\n00:06:43.000 Water has been declared a human right by the United Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000 Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000 that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we see the end of the age of oil?"\n00:07:12.000 I don't know if you remember his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we ran out of stones." \n00:07:19.000 We see that companies acting ethically in this world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her children's\n00:07:38.000 environment,\n00:07:40.000 which is from copper.\n00:07:42.000 On the other hand, we see great signs of hope.\n00:07:44.000 Here's Dr. Venkataswamy in India, who's figured out\n00:07:47.000 how to do mass-produced health.\n00:07:51.000 He has given eyesight to two million people for free.\n00:07:54.000 We see in our material flows that car steels don't become car steel again\n00:07:56.000 because of the contaminants of the coatings --\n00:07:58.000 bismuth, antimony, copper and so on.\n00:08:01.000 They become building steel.\n00:08:04.000 On the other hand, we're working with Berkshire Hathaway,\n00:08:07.000 Warren Buffett and Shaw Carpet,\n00:08:10.000 the largest carpet company in the world.\n00:08:13.000 We've developed a carpet that is continuously recyclable,\n00:08:16.000 down to the parts per million.\n00:08:19.000 The upper is Nylon 6 that can go back to caprolactam,\n00:08:22.000 the bottom, a polyolephine -- infinitely recyclable thermoplastic.\n00:08:25.000 Now if I was a bird, the building on my left is a liability.\n00:08:28.000 The building on my right, which is our corporate campus for The Gap\n00:08:31.000 with an ancient meadow, is an asset

-- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies's 1928 tower for Berlin,\n00:09:15.000 the question might be, 'Well, where's the sun?'
\n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --
\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, 'Bill, you've got to understand --
\n00:09:43.000 solar energy has nothing to do with architecture.'
\n00:09:51.000 I guess he didn't read Vitruvius.\n00:09:53.000 In 1984, we did the first so-called 'green office' in America\n00:09:57.000 for Environmental Defense.\n00:09:58.000 We started asking manufacturers what were in their materials.\n00:10:01.000 They said, 'They're proprietary, they're legal, go away.'
\n00:10:03.000 The only indoor quality work done in this country at that time\n00:10:05.000 was sponsored by R. J. Reynolds Tobacco Company,\n00:10:08.000 and it was to prove there was no danger\n00:10:09.000 from secondhand smoke in the workplace.\n00:10:12.000 So, all of a sudden, here I am, graduating from high school in 1969,\n00:10:16.000 and this happens, and we realize that 'away' went away.\n00:10:19.000 Remember we used to throw things away, and we'd point to away?
\n00:10:23.000 And yet, NOAA has now shown us, for example --
\n00:10:25.000 you see that little blue thing above Hawaii?
\n00:10:27.000 That's the Pacific Gyre.\n00:10:28.000 It was recently dragged for plankton by scientists,\n00:10:30.000 and they found six times as much plastic as plankton.\n00:10:34.000 When asked, they said, 'It's kind of like a giant toilet that doesn't flush.'
\n00:10:39.000 Perhaps that's away.\n00:10:40.000 So we're looking for the design rules of this --
\n00:10:42.000 this is the highest biodiversity of trees in the world, Irian Jaya,\n00:10:44.000 259 species of tree, and we described this\n00:10:48.000 in the book, 'Cradle to Cradle.'
\n00:10:49.000 The book itself is a polymer. It is not a tree.\n00:10:53.000 That's the name of the first chapter -- 'This Book is Not a Tree.'
\n00:10:56.000 Because in poetics, as Margaret Atwood pointed out,\n00:10:59.000 'we write our history on the skin of fish\n00:11:01.000 with the blood of bears.'
\n00:11:04.000 And with so much polymer, what we really need\n00:11:05.000 is technical nutrition, and to use something\n00:11:08.000 as

elegant as a tree -- imagine this design assignment:\n00:11:11.000 Design something that makes oxygen, sequesters carbon,\n00:11:13.000 fixes nitrogen, distills water, accrues solar energy as fuel,\n00:11:17.000 makes complex sugars and food, creates microclimates,\n00:11:21.000 changes colors with the seasons and self-replicates.\n00:11:27.000 Well, why don't we knock that down and write on it?\n00:11:29.000 (Laughter)\n00:11:35.000 So, we're looking at the same criteria\n00:11:37.000 as most people -- you know, can I afford it?\n00:11:39.000 Does it work? Do I like it?\n00:11:41.000 We're adding the Jeffersonian agenda, and I come from Charlottesville,\n00:11:43.000 where I've had the privilege of living in a house designed by Thomas Jefferson.\n00:11:47.000 We're adding life, liberty and the pursuit of happiness.\n00:11:53.000 Now if we look at the word "competition,"\n00:11:54.000 I'm sure most of you've used it.\n00:11:56.000 You know, most people don't realize it comes from\n00:11:57.000 the Latin competere, which means strive together.\n00:12:00.000 It means the way Olympic athletes train with each other.\n00:12:03.000 They get fit together, and then they compete.\n00:12:06.000 The Williams sisters compete -- one wins Wimbledon.\n00:12:08.000 So we've been looking at the idea of competition\n00:12:11.000 as a way of cooperating in order to get fit together.\n00:12:15.000 And the Chinese government has now --\n00:12:16.000 I work with the Chinese government now --\n00:12:18.000 has taken this up.\n00:12:20.000 We're also looking at survival of the fittest,\n00:12:22.000 not in just competition terms in our modern context\n00:12:24.000 of destroy the other or beat them to the ground,\n00:12:27.000 but really to fit together and build niches\n00:12:29.000 and have growth that is good.\n00:12:31.000 Now most environmentalists don't say growth is good,\n00:12:33.000 because, in our lexicon, asphalt is two words: assigning blame.\n00:12:38.000 But if we look at asphalt as our growth,\n00:12:41.000 then we realize that all we're doing is destroying\n00:12:43.000 the planetary's fundamental underlying operating system.\n00:12:47.000 So when we see E equals mc squared come along, from a poet's perspective,\n00:12:52.000 we see energy as physics, chemistry as mass,\n00:12:54.000 and all of a sudden, you get this biology.\n00:12:56.000 And we have plenty of energy, so we'll solve that problem,\n00:12:59.000 but the biology problem's tricky, because as we put through\n00:13:02.000 all these toxic materials that we disgorge,\n00:13:05.000 we will never be able to recover that.\n00:13:07.000 And as Francis Crick pointed out, nine years\n00:13:09.000 after discovering DNA with Mr. Watson,\n00:13:12.000 that life itself has to have growth as a precondition --\n00:13:16.000 it has to have free energy, sunlight\n00:13:18.000 and it needs to be an open system of chemicals.\n00:13:21.000 So we're asking for human artifice to become a living thing,\n00:13:24.000 and we want growth, we want free energy from sunlight\n00:13:26.000 and we want an open metabolism for chemicals.\n00:13:29.000 Then, the question becomes not growth or no growth,\n00:13:31.000 but what do you want to grow?\n00:13:34.000 So instead of just growing destruction,\n00:13:36.000 we want to grow the things that we might enjoy,\n00:13:38.000 and someday the FDA will allow us to make French cheese.\n00:13:41.000 So therefore, we have these two metabolisms,\n00:13:45.000 and I worked with a German chemist, Michael Braungart,\n00:13:47.000 and we've identified the two fundamental metabolisms.\n00:13:49.000 The biological one I'm sure you understand,\n00:13:51.000 but also the technical one, where we take materials\n00:13:53.000 and put them into closed cycles.\n00:13:55.000 We call them

biological nutrition and technical nutrition.\n00:13:58.000 Technical nutrition will be in an order of magnitude of biological nutrition.\n00:14:02.000 Biological nutrition can supply about 500 million humans,\n00:14:05.000 which means that if we all wore Birkenstocks and cotton,\n00:14:07.000 the world would run out of cork and dry up.\n00:14:10.000 So we need materials in closed cycles,\n00:14:12.000 but we need to analyze them down to the parts per million\n00:14:14.000 for cancer, birth defects, mutagenic effects,\n00:14:17.000 disruption of our immune systems, biodegradation, persistence,\n00:14:20.000 heavy metal content, knowledge of how we're making them\n00:14:23.000 and their production and so on.\n00:14:25.000 Our first product was a textile where we analyzed 8,000 chemicals\n00:14:29.000 in the textile industry.\n00:14:30.000 Using those intellectual filters, we eliminated [7,962.]\n00:14:35.000 We were left with 38 chemicals.\n00:14:37.000 We have since databased the 4000 most commonly used chemicals\n00:14:40.000 in human manufacturing, and we're releasing this database into the public in six weeks.\n00:14:45.000 So designers all over the world can analyze their products\n00:14:47.000 down to the parts per million for human and ecological health.\n00:14:52.000 (Applause)\n00:14:57.000 We've developed a protocol so that companies can send\n00:15:00.000 these same messages all the way through their supply chains,\n00:15:03.000 because when we asked most companies we work with -- about a trillion dollars\n00:15:06.000 -- and say, "Where does your stuff come from?" They say, "Suppliers." \n00:15:08.000 "And where does it go?" \n00:15:10.000 "Customers." \n00:15:11.000 So we need some help there.\n00:15:12.000 So the biological nutrients, the first fabrics --\n00:15:14.000 the water coming out was clean enough to drink.\n00:15:16.000 Technical nutrients -- this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the industry forever, some of the materials go back to soil --\n00:15:44.000 it's all solar-powered.\n00:15:46.000 Here's a building at Oberlin College we designed\n00:15:48.000 that makes more energy than it needs to operate and purifies its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color photograph.\n00:16:06.000 These are our tools. These are how we sold it to Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country -- the home of biological. And putting them together.\n00:16:45.000 And so I will

finish by showing you a new city\n00:16:47.000 we're designing for the Chinese government.\n00:16:49.000 We're doing 12 cities for China right now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our assignment is to develop protocols for the housing\n00:16:57.000 for 400 million people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use brick,\n00:17:01.000 they will lose all their soil and burn all their coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --\n00:17:18.000 and then we send them all our money, what we'll discover is that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are our cities.\n00:17:30.000 We're building a new city next to this city; look at that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally do green fields, but this one is about to be built,\n00:17:39.000 so they brought us in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We studied the biota, the ancient biota,\n00:18:08.000 the current farming and the protocols.\n00:18:10.000 We studied the winds and the sun to make sure everybody in the city\n00:18:12.000 will have fresh air, fresh water and direct sunlight\n00:18:18.000 in every single apartment at some point during the day.\n00:18:21.000 We then take the parks and lay them out as ecological infrastructure.\n00:18:25.000 We lay out the building areas.\n00:18:28.000 We start to integrate commercial and mixed use\n00:18:29.000 so the people all have centers and places to be.\n00:18:32.000 The transportation is all very simple,\n00:18:34.000 everybody's within a five-minute walk of mobility.\n00:18:37.000 We have a 24-hour street, so that there's always a place that's alive.\n00:18:42.000 The waste systems all connect.\n00:18:44.000 If you flush a toilet, your feces will go to the sewage treatment plants,\n00:18:49.000 which are sold as assets, not liabilities.\n00:18:51.000 Because who wants the fertilizer factory that makes natural gas?\n00:18:55.000 The waters are all taken in to construct the wetlands for habitat restorations.\n00:19:00.000 And then it makes natural gas, which then goes back into the city\n00:19:04.000 to power the fuel for the cooking for the city.\n00:19:08.000 So this is -- these are fertilizer gas plants.\n00:19:10.000 And then the compost is all taken back\n00:19:13.000 to the roofs of the city, where we've got farming,\n00:19:15.000 because what we've done is lifted up the city,\n00:19:19.000 the landscape, into the air to -- to restore the native landscape\n00:19:26.000 on the roofs of the buildings.\n00:19:28.000 The solar power of all the factory centers\n00:19:31.000 and all the industrial zones with their light roofs powers the city.\n00:19:34.000 And this is the concept for the top of the city.\n00:19:36.000 We've lifted the earth up onto the roofs.\n00:19:40.000 The farmers have little bridges to get from one roof to the next.\n00:19:44.000 We inhabit

the city with work/live space on all the ground floors.\n00:19:48.000 And so this is the existing city, and this is the new city.\n00:19:53.000 (Applause)\n",
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"snippet": "# tactiq.io free youtube transcript\n# Cradle to cradle design | William McDonough\n# https://www.youtube.com/watch/IoRjz8iTvoo\n\n00:00:26.000 In 1962, with Rachel Carson's 'Silent Spring,'
00:00:30.000 I think for people like me in the world of the making of things,
00:00:35.000 the canary in the mine wasn't singing.
00:00:39.000 And so the question that we might not have birds
00:00:42.000 became kind of fundamental to those of us wandering around
00:00:45.000 looking for the meadowlarks that seemed to have all disappeared.
00:00:48.000 And the question was, were the birds singing?
00:00:51.000 Now, I'm not a scientist, that'll be really clear.
00:00:55.000 But, you know, we've just come from this discussion of what a bird might be.
00:00:59.000 What is a bird?
00:01:00.000 Well, in my world, this is a rubber duck.
00:01:04.000 It comes in California with a warning --
00:01:06.000 'This product contains chemicals known by the State of California
00:01:09.000 to cause cancer and birth defects or other reproductive harm.'
00:01:16.000 This is a bird.
00:01:19.000 What kind of culture would produce a product of this kind
00:01:22.000 and then label it and sell it to children?
00:01:27.000 I think we have a design problem.
00:01:30.000 Someone heard the six hours of talk that I gave
00:01:35.000 called 'The Monticello Dialogues' on NPR, and sent me this as a thank you note --
00:01:41.000 'We realize that design is a signal of intention,
00:01:43.000 but it also has to occur within a world,
00:01:46.000 and we have to understand that world in order to
00:01:50.000 imbue our designs with inherent intelligence,
00:01:53.000 and so as we look back at the basic state of affairs
00:01:58.000 in which we design, we, in a way, need to go to the primordial condition
00:02:03.000 to understand the operating system and the frame conditions of a planet,
00:02:08.000 and I think the exciting part of that is the good news that's there,
00:02:13.000 because the news is the news of abundance,
00:02:16.000 and not the news of limits,
00:02:18.000 and I think as our culture tortures itself now
00:02:23.000 with tyrannies and concerns over limits and fear,
00:02:28.000 we can add this other dimension of abundance that is coherent,
00:02:33.000 driven by the sun, and start to imagine
00:02:35.000 what that would be like to share.'
00:02:42.000 That was a nice thing to get.
00:02:44.000 That was one sentence.
00:02:48.000 Henry James would be proud.
00:02:50.000 This is -- I put it down at the bottom,
00:02:52.000 but that was extemporaneous, obviously.
00:02:55.000 The fundamental issue is that, for me,
00:02:58.000 design is the first signal of human intentions.
00:03:00.000 So what are our intentions, and what would our intentions be --
00:03:04.000 if we wake up in the morning, we have designs on the world --
00:03:07.000 well, what would our intention be as a species
00:03:09.000 now that we're the dominant species?
00:03:11.000 And it's not just stewardship and dominion debate,
00:03:14.000 because really, dominion is implicit in stewardship --
00:03:20.000 because how could you dominate something you had killed?
00:03:22.000 And stewardship's implicit in dominion,
00:03:24.000 because you can't be steward of something if you can't dominate it.
00:03:26.000 So the question is, what is the first question for designers?
00:03:32.000 Now, as guardians --

let's say the state, for example, which reserves the right to kill, the right to be duplicitous and so on -- the question we're asking the guardian at this point is are we meant, how are we meant, to secure local societies, create world peace and save the environment? But I don't know that that's the common debate. Commerce, on the other hand, is relatively quick, essentially creative, highly effective and efficient, and fundamentally honest, because we can't exchange value for very long if we don't trust each other. So we use the tools of commerce primarily for our work, but the question we bring to it is, how do we love all the children of all species for all time? And so we start our designs with that question. Because what we realize today is that modern culture appears to have adopted a strategy of tragedy. If we come here and say, "Well, I didn't intend to cause global warming on the way here," and we say, "That's not part of my plan," then we realize it's part of our de facto plan. Because it's the thing that's happening because we have no other plan. And I was at the White House for President Bush, meeting with every federal department and agency, and I pointed out that they appear to have no plan. If the end game is global warming, they're doing great. If the end game is mercury toxification of our children downwind of coal fire plants as they scuttled the Clean Air Act, then I see that our education programs should be explicitly defined as, "Brain death for all children. No child left behind." (Applause) So, the question is, how many federal officials are ready to move to Ohio and Pennsylvania with their families? So if you don't have an endgame of something delightful, then you're just moving chess pieces around, if you don't know you're taking the king. So perhaps we could develop a strategy of change, which requires humility. And in my business as an architect, it's unfortunate the word "humility" and the word "architect" have not appeared in the same paragraph since "The Fountainhead." So if anybody here has trouble with the concept of design humility, reflect on this -- it took us 5,000 years to put wheels on our luggage. So, as Kevin Kelly pointed out, there is no endgame. There is an infinite game, and we're playing in that infinite game. And so we call it "cradle to cradle," and our goal is very simple. This is what I presented to the White House. Our goal is a delightfully diverse, safe, healthy and just world, with clean air, clean water, soil and power -- economically, equitably, ecologically and elegantly enjoyed, period. (Applause) What don't you like about this? Which part of this don't you like? So we realized we want full diversity, even though it can be difficult to remember what De Gaulle said when asked what it was like to be President of France. He said, "What do you think it's like trying to run a country with 400 kinds of cheese?" But at the same time, we

realize that our products are not safe and healthy.\n00:06:23.000 So we've designed products\n00:06:25.000 and we analyzed chemicals down to the parts per million.\n00:06:27.000 This is a baby blanket by Pendleton that will give your child nutrition\n00:06:30.000 instead of Alzheimer's later in life.\n00:06:32.000 We can ask ourselves, what is justice,\n00:06:34.000 and is justice blind, or is justice blindness?\n00:06:38.000 And at what point did that uniform turn from white to black?\n00:06:43.000 Water has been declared a human right by the United Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000 Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000 that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we see the end of the age of oil?"\n00:07:12.000 I don't know if you remember his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we ran out of stones."\n00:07:19.000 We see that companies acting ethically in this world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her children's environment,\n00:07:38.000 which is from copper.\n00:07:40.000 On the other hand, we see great signs of hope.\n00:07:42.000 Here's Dr. Venkataswamy in India, who's figured out\n00:07:45.000 how to do mass-produced health.\n00:07:47.000 He has given eyesight to two million people for free.\n00:07:51.000 We see in our material flows that car steels don't become car steel again\n00:07:54.000 because of the contaminants of the coatings --\n00:07:56.000 bismuth, antimony, copper and so on.\n00:07:58.000 They become building steel.\n00:07:59.000 On the other hand, we're working with Berkshire Hathaway,\n00:08:01.000 Warren Buffett and Shaw Carpet,\n00:08:04.000 the largest carpet company in the world.\n00:08:05.000 We've developed a carpet that is continuously recyclable,\n00:08:08.000 down to the parts per million.\n00:08:11.000 The upper is Nylon 6 that can go back to caprolactam,\n00:08:14.000 the bottom, a polyolephine -- infinitely recyclable thermoplastic.\n00:08:17.000 Now if I was a bird, the building on my left is a liability.\n00:08:21.000 The building on my right, which is our corporate campus for The Gap\n00:08:24.000 with an ancient meadow, is an asset -- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as

Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies' 1928 tower for Berlin,\n00:09:15.000 the question might be, "Well, where's the sun?"\n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, "Bill, you've got to understand- --\n00:09:43.000 solar energy has nothing to do with architecture."\n00:09:51.000 I guess he didn't read Vitruvius.\n00:09:53.000 In 1984, we did the first so-called "green office" in America\n00:09:57.000 for Environmental Defense.\n00:09:58.000 We started asking manufacturers what were in their materials.\n00:10:01.000 They said, "They're proprietary, they're legal, go away."\n00:10:03.000 The only indoor quality work done in this country at that time\n00:10:05.000 was sponsored by R. J. Reynolds Tobacco Company,\n00:10:08.000 and it was to prove there was no danger\n00:10:09.000 from secondhand smoke in the workplace.\n00:10:12.000 So, all of a sudden, here I am, graduating from high school in 1969,\n00:10:16.000 and this happens, and we realize that "away" went away.\n00:10:19.000 Remember we used to throw things away, and we'd point to away?\n00:10:23.000 And yet, NOAA has now shown us, for example --\n00:10:25.000 you see that little blue thing above Hawaii?\n00:10:27.000 That's the Pacific Gyre.\n00:10:28.000 It was recently dragged for plankton by scientists,\n00:10:30.000 and they found six times as much plastic as plankton.\n00:10:34.000 When asked, they said, "It's kind of like a giant toilet that doesn't flush."\n00:10:39.000 Perhaps that's away.\n00:10:40.000 So we're looking for the design rules of this --\n00:10:42.000 this is the highest biodiversity of trees in the world, Irian Jaya,\n00:10:44.000 259 species of tree, and we described this\n00:10:48.000 in the book, "Cradle to Cradle."\n00:10:49.000 The book itself is a polymer. It is not a tree.\n00:10:53.000 That's the name of the first chapter -- "This Book is Not a Tree."\n00:10:56.000 Because in poetics, as Margaret Atwood pointed out,\n00:10:59.000 "we write our history on the skin of fish\n00:11:01.000 with the blood of bears."\n00:11:04.000 And with so much polymer, what we really need\n00:11:05.000 is technical nutrition, and to use something\n00:11:08.000 as elegant as a tree -- imagine this design assignment:\n00:11:11.000 Design something that makes oxygen, sequesters carbon,\n00:11:13.000 fixes nitrogen, distills water, accrues solar energy as fuel,\n00:11:17.000 makes complex sugars and food, creates microclimates,\n00:11:21.000 changes colors with the seasons and self-replicates.\n00:11:27.000 Well, why don't we knock that down and write on it?\n00:11:29.000 (Laughter)\n00:11:35.000 So, we're looking at the same criteria\n00:11:37.000 as most people -- you know, can I afford it?\n00:11:39.000 Does it work? Do I like it?\n00:11:41.000 We're adding the Jeffersonian agenda, and I come from Charlottesville,\n00:11:43.000 where I've had the privilege of living in a house designed by Thomas Jefferson.\n00:11:47.000 We're adding life, liberty and the pursuit of happiness.\n00:11:53.000 Now if we look at the word "competition,"\n00:11:54.000 I'm sure most of you've used

it.\n00:11:56.000 You know, most people don't realize it comes from\n00:11:57.000 the Latin competere, which means strive together.\n00:12:00.000 It means the way Olympic athletes train with each other.\n00:12:03.000 They get fit together, and then they compete.\n00:12:06.000 The Williams sisters compete -- one wins Wimbledon.\n00:12:08.000 So we've been looking at the idea of competition\n00:12:11.000 as a way of cooperating in order to get fit together.\n00:12:15.000 And the Chinese government has now --\n00:12:16.000 I work with the Chinese government now --\n00:12:18.000 has taken this up.\n00:12:20.000 We're also looking at survival of the fittest,\n00:12:22.000 not in just competition terms in our modern context\n00:12:24.000 of destroy the other or beat them to the ground,\n00:12:27.000 but really to fit together and build niches\n00:12:29.000 and have growth that is good.\n00:12:31.000 Now most environmentalists don't say growth is good,\n00:12:33.000 because, in our lexicon, asphalt is two words: assigning blame.\n00:12:38.000 But if we look at asphalt as our growth,\n00:12:41.000 then we realize that all we're doing is destroying\n00:12:43.000 the planetary's fundamental underlying operating system.\n00:12:47.000 So when we see $E = mc^2$ come along, from a poet's perspective,\n00:12:52.000 we see energy as physics, chemistry as mass,\n00:12:54.000 and all of a sudden, you get this biology.\n00:12:56.000 And we have plenty of energy, so we'll solve that problem,\n00:12:59.000 but the biology problem's tricky, because as we put through\n00:13:02.000 all these toxic materials that we disgorge,\n00:13:05.000 we will never be able to recover that.\n00:13:07.000 And as Francis Crick pointed out, nine years\n00:13:09.000 after discovering DNA with Mr. Watson,\n00:13:12.000 that life itself has to have growth as a precondition --\n00:13:16.000 it has to have free energy, sunlight\n00:13:18.000 and it needs to be an open system of chemicals.\n00:13:21.000 So we're asking for human artifice to become a living thing,\n00:13:24.000 and we want growth, we want free energy from sunlight\n00:13:26.000 and we want an open metabolism for chemicals.\n00:13:29.000 Then, the question becomes not growth or no growth,\n00:13:31.000 but what do you want to grow?\n00:13:34.000 So instead of just growing destruction,\n00:13:36.000 we want to grow the things that we might enjoy,\n00:13:38.000 and someday the FDA will allow us to make French cheese.\n00:13:41.000 So therefore, we have these two metabolisms,\n00:13:45.000 and I worked with a German chemist, Michael Braungart,\n00:13:47.000 and we've identified the two fundamental metabolisms.\n00:13:49.000 The biological one I'm sure you understand,\n00:13:51.000 but also the technical one, where we take materials\n00:13:53.000 and put them into closed cycles.\n00:13:55.000 We call them biological nutrition and technical nutrition.\n00:13:58.000 Technical nutrition will be in an order of magnitude of biological nutrition.\n00:14:02.000 Biological nutrition can supply about 500 million humans,\n00:14:05.000 which means that if we all wore Birkenstocks and cotton,\n00:14:07.000 the world would run out of cork and dry up.\n00:14:10.000 So we need materials in closed cycles,\n00:14:12.000 but we need to analyze them down to the parts per million\n00:14:14.000 for cancer, birth defects, mutagenic effects,\n00:14:17.000 disruption of our immune systems, biodegradation, persistence,\n00:14:20.000 heavy metal content, knowledge of how we're making them\n00:14:23.000 and their production and so on.\n00:14:25.000 Our first product was a textile where we analyzed 8,000 chemicals\n00:14:29.000 in the textile industry.\n00:14:30.000 Using those intellectual filters, we eliminated [7,962.]\n00:14:35.000 We were left with 38 chemicals.\n00:14:37.000 We have since

databased the 4000 most commonly used chemicals\n00:14:40.000 in human manufacturing, and we're releasing this database into the public in six weeks.\n00:14:45.000 So designers all over the world can analyze their products\n00:14:47.000 down to the parts per million for human and ecological health.\n00:14:52.000 (Applause)\n00:14:57.000 We've developed a protocol so that companies can send\n00:15:00.000 these same messages all the way through their supply chains,\n00:15:03.000 because when we asked most companies we work with -- about a trillion dollars\n00:15:06.000 -- and say, "Where does your stuff come from?" They say, "Suppliers." \n00:15:08.000 "And where does it go?" \n00:15:10.000 "Customers." \n00:15:11.000 So we need some help there.\n00:15:12.000 So the biological nutrients, the first fabrics --\n00:15:14.000 the water coming out was clean enough to drink.\n00:15:16.000 Technical nutrients -- this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the industry forever, some of the materials go back to soil --\n00:15:44.000 it's all solar-powered.\n00:15:46.000 Here's a building at Oberlin College we designed\n00:15:48.000 that makes more energy than it needs to operate and purifies its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color photograph.\n00:16:06.000 These are our tools. These are how we sold it to Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country -- the home of biological. And putting them together.\n00:16:45.000 And so I will finish by showing you a new city\n00:16:47.000 we're designing for the Chinese government.\n00:16:49.000 We're doing 12 cities for China right now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our assignment is to develop protocols for the housing\n00:16:57.000 for 400 million people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use brick,\n00:17:01.000 they will lose all their soil and burn all their coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --\n00:17:18.000 and then we send them all our money, what we'll discover is

that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are our cities.\n00:17:30.000 We're building a new city next to this city; look at that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally do green fields, but this one is about to be built,\n00:17:39.000 so they brought us in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We studied the biota, the ancient biota,\n00:18:08.000 the current farming and the protocols.\n00:18:10.000 We studied the winds and the sun to make sure everybody in the city\n00:18:12.000 will have fresh air, fresh water and direct sunlight\n00:18:18.000 in every single apartment at some point during the day.\n00:18:21.000 We then take the parks and lay them out as ecological infrastructure.\n00:18:25.000 We lay out the building areas.\n00:18:28.000 We start to integrate commercial and mixed use\n00:18:29.000 so the people all have centers and places to be.\n00:18:32.000 The transportation is all very simple,\n00:18:34.000 everybody's within a five-minute walk of mobility.\n00:18:37.000 We have a 24-hour street, so that there's always a place that's alive.\n00:18:42.000 The waste systems all connect.\n00:18:44.000 If you flush a toilet, your feces will go to the sewage treatment plants,\n00:18:49.000 which are sold as assets, not liabilities.\n00:18:51.000 Because who wants the fertilizer factory that makes natural gas?\n00:18:55.000 The waters are all taken in to construct the wetlands for habitat restorations.\n00:19:00.000 And then it makes natural gas, which then goes back into the city\n00:19:04.000 to power the fuel for the cooking for the city.\n00:19:08.000 So this is -- these are fertilizer gas plants.\n00:19:10.000 And then the compost is all taken back\n00:19:13.000 to the roofs of the city, where we've got farming,\n00:19:15.000 because what we've done is lifted up the city,\n00:19:19.000 the landscape, into the air to -- to restore the native landscape\n00:19:26.000 on the roofs of the buildings.\n00:19:28.000 The solar power of all the factory centers\n00:19:31.000 and all the industrial zones with their light roofs powers the city.\n00:19:34.000 And this is the concept for the top of the city.\n00:19:36.000 We've lifted the earth up onto the roofs.\n00:19:40.000 The farmers have little bridges to get from one roof to the next.\n00:19:44.000 We inhabit the city with work/live space on all the ground floors.\n00:19:48.000 And so this is the existing city, and this is the new city.\n00:19:53.000 (Applause)\n",
"cloud_doc_url": null}, {"matched_text": "\u001029\u0020source\u0011", "start_idx": 2046, "end_idx": 2057, "alt": null, "type": "file", "name": "tactiq-free-transcript-IoRjz8iTVoo.txt", "id": "file-015fyq55A9kPiWRmfng81lx4", "source": "my_files", "snippet": "# tactiq.io free youtube transcript\n# Cradle to cradle design | William McDonough\n# https://www.youtube.com/watch/IoRjz8iTVoo\n\n\n00:00:26.000 In 1962, with Rachel Carson's "Silent Spring,"
00:00:30.000 I think for people like me in the world of the making of things,
00:00:35.000 the canary in the mine wasn't singing.
00:00:39.000 And so the question that we might not have birds
00:00:42.000 became kind of fundamental to those of us wandering around
00:00:45.000 looking for the meadowlarks that seemed to have all

disappeared.\n00:00:48.000 And the question was, were the birds singing?\n00:00:51.000 Now, I'm not a scientist, that'll be really clear.\n00:00:55.000 But, you know, we've just come from this discussion of what a bird might be.\n00:00:59.000 What is a bird?\n00:01:00.000 Well, in my world, this is a rubber duck.\n00:01:04.000 It comes in California with a warning --\n00:01:06.000 "This product contains chemicals known by the State of California\n00:01:09.000 to cause cancer and birth defects or other reproductive harm."\n00:01:16.000 This is a bird.\n00:01:19.000 What kind of culture would produce a product of this kind\n00:01:22.000 and then label it and sell it to children?\n00:01:27.000 I think we have a design problem.\n00:01:30.000 Someone heard the six hours of talk that I gave\n00:01:35.000 called "The Monticello Dialogues" on NPR, and sent me this as a thank you note --\n00:01:41.000 "We realize that design is a signal of intention,\n00:01:43.000 but it also has to occur within a world,\n00:01:46.000 and we have to understand that world in order to\n00:01:50.000 imbue our designs with inherent intelligence,\n00:01:53.000 and so as we look back at the basic state of affairs\n00:01:58.000 in which we design, we, in a way, need to go to the primordial condition\n00:02:03.000 to understand the operating system and the frame conditions of a planet,\n00:02:08.000 and I think the exciting part of that is the good news that's there,\n00:02:13.000 because the news is the news of abundance,\n00:02:16.000 and not the news of limits,\n00:02:18.000 and I think as our culture tortures itself now\n00:02:23.000 with tyrannies and concerns over limits and fear,\n00:02:28.000 we can add this other dimension of abundance that is coherent,\n00:02:33.000 driven by the sun, and start to imagine\n00:02:35.000 what that would be like to share." \n00:02:42.000 That was a nice thing to get.\n00:02:44.000 That was one sentence.\n00:02:48.000 Henry James would be proud.\n00:02:50.000 This is -- I put it down at the bottom,\n00:02:52.000 but that was extemporaneous, obviously.\n00:02:55.000 The fundamental issue is that, for me,\n00:02:58.000 design is the first signal of human intentions.\n00:03:00.000 So what are our intentions, and what would our intentions be --\n00:03:04.000 if we wake up in the morning, we have designs on the world --\n00:03:07.000 well, what would our intention be as a species\n00:03:09.000 now that we're the dominant species?\n00:03:11.000 And it's not just stewardship and dominion debate,\n00:03:14.000 because really, dominion is implicit in stewardship --\n00:03:20.000 because how could you dominate something you had killed?\n00:03:22.000 And stewardship's implicit in dominion,\n00:03:24.000 because you can't be steward of something if you can't dominate it.\n00:03:26.000 So the question is, what is the first question for designers?\n00:03:32.000 Now, as guardians -- let's say the state, for example,\n00:03:35.000 which reserves the right to kill, the right to be duplicitous and so on --\n00:03:40.000 the question we're asking the guardian at this point is\n00:03:43.000 are we meant, how are we meant,\n00:03:45.000 to secure local societies, create world peace\n00:03:47.000 and save the environment?\n00:03:49.000 But I don't know that that's the common debate.\n00:03:52.000 Commerce, on the other hand, is relatively quick,\n00:03:56.000 essentially creative, highly effective and efficient,\n00:03:58.000 and fundamentally honest, because we can't exchange\n00:04:01.000 value for very long if we don't trust each other.\n00:04:05.000 So we use the tools of commerce primarily for our work,\n00:04:07.000 but the question we bring to it is,\n00:04:09.000 how do we love all the children of all species for all time?\n00:04:13.000 And so we start our designs with that question.\n00:04:16.000 Because what we realize today is that

modern culture\n00:04:18.000 appears to have adopted a strategy of tragedy.\n00:04:21.000 If we come here and say, "Well, I didn't intend\n00:04:23.000 to cause global warming on the way here,"\n00:04:24.000 and we say, "That's not part of my plan,"\n00:04:26.000 then we realize it's part of our de facto plan.\n00:04:29.000 Because it's the thing that's happening because we have no other plan.\n00:04:32.000 And I was at the White House for President Bush,\n00:04:34.000 meeting with every federal department and agency,\n00:04:36.000 and I pointed out that they appear to have no plan.\n00:04:40.000 If the end game is global warming, they're doing great.\n00:04:42.000 If the end game is mercury toxification of our children\n00:04:45.000 downwind of coal fire plants as they scuttled the Clean Air Act,\n00:04:48.000 then I see that our education programs should be explicitly defined as,\n00:04:52.000 "Brain death for all children. No child left behind."\n00:04:54.000 (Applause)\n00:04:58.000 So, the question is, how many federal officials\n00:05:02.000 are ready to move to Ohio and Pennsylvania with their families?\n00:05:05.000 So if you don't have an endgame of something delightful,\n00:05:09.000 then you're just moving chess pieces around,\n00:05:11.000 if you don't know you're taking the king.\n00:05:12.000 So perhaps we could develop a strategy of change,\n00:05:15.000 which requires humility. And in my business as an architect,\n00:05:18.000 it's unfortunate the word "humility" and the word "architect"\n00:05:22.000 have not appeared in the same paragraph since "The Fountainhead."\n00:05:25.000 So if anybody here has trouble with the concept of design humility,\n00:05:30.000 reflect on this -- it took us 5,000 years\n00:05:33.000 to put wheels on our luggage.\n00:05:37.000 So, as Kevin Kelly pointed out, there is no endgame.\n00:05:42.000 There is an infinite game, and we're playing in that infinite game.\n00:05:46.000 And so we call it "cradle to cradle,"\n00:05:48.000 and our goal is very simple.\n00:05:49.000 This is what I presented to the White House.\n00:05:51.000 Our goal is a delightfully diverse, safe, healthy and just world,\n00:05:54.000 with clean air, clean water, soil and power --\n00:05:57.000 economically, equitably, ecologically and elegantly enjoyed, period.\n00:06:01.000 (Applause)\n00:06:04.000 What don't you like about this?\n00:06:07.000 Which part of this don't you like?\n00:06:09.000 So we realized we want full diversity,\n00:06:11.000 even though it can be difficult to remember what De Gaulle said\n00:06:14.000 when asked what it was like to be President of France.\n00:06:16.000 He said, "What do you think it's like trying to run a country with 400 kinds of cheese?"\n00:06:20.000 But at the same time, we realize that our products are not safe and healthy.\n00:06:23.000 So we've designed products\n00:06:25.000 and we analyzed chemicals down to the parts per million.\n00:06:27.000 This is a baby blanket by Pendleton that will give your child nutrition\n00:06:30.000 instead of Alzheimer's later in life.\n00:06:32.000 We can ask ourselves, what is justice,\n00:06:34.000 and is justice blind, or is justice blindness?\n00:06:38.000 And at what point did that uniform turn from white to black?\n00:06:43.000 Water has been declared a human right by the United Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000 Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000

that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we see the end of the age of oil?"\n00:07:12.000 I don't know if you remember his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we ran out of stones."\n00:07:19.000 We see that companies acting ethically in this world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her childrens' environment,\n00:07:38.000 which is from copper.\n00:07:40.000 On the other hand, we see great signs of hope.\n00:07:42.000 Here's Dr. Venkataswamy in India, who's figured out\n00:07:45.000 how to do mass-produced health.\n00:07:47.000 He has given eyesight to two million people for free.\n00:07:51.000 We see in our material flows that car steels don't become car steel again\n00:07:54.000 because of the contaminants of the coatings --\n00:07:56.000 bismuth, antimony, copper and so on.\n00:07:58.000 They become building steel.\n00:07:59.000 On the other hand, we're working with Berkshire Hathaway,\n00:08:01.000 Warren Buffett and Shaw Carpet,\n00:08:04.000 the largest carpet company in the world.\n00:08:05.000 We've developed a carpet that is continuously recyclable,\n00:08:08.000 down to the parts per million.\n00:08:11.000 The upper is Nylon 6 that can go back to caprolactam,\n00:08:14.000 the bottom, a polyolephine -- infinitely recyclable thermoplastic.\n00:08:17.000 Now if I was a bird, the building on my left is a liability.\n00:08:21.000 The building on my right, which is our corporate campus for The Gap\n00:08:24.000 with an ancient meadow, is an asset -- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies' 1928 tower for Berlin,\n00:09:15.000 the question might be, "Well, where's the sun?"\n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, "Bill, you've got to understand- --\n00:09:43.000 solar energy has nothing to do with

architecture. " I guess he didn't read Vitruvius. In 1984, we did the first so-called "green office" in America for Environmental Defense. We started asking manufacturers what were in their materials. They said, "They're proprietary, they're legal, go away." The only indoor quality work done in this country at that time was sponsored by R. J. Reynolds Tobacco Company, and it was to prove there was no danger from secondhand smoke in the workplace. So, all of a sudden, here I am, graduating from high school in 1969, and this happens, and we realize that "away" went away. Remember we used to throw things away, and we'd point to away? And yet, NOAA has now shown us, for example -- you see that little blue thing above Hawaii? That's the Pacific Gyre. It was recently dragged for plankton by scientists, and they found six times as much plastic as plankton. When asked, they said, "It's kind of like a giant toilet that doesn't flush." Perhaps that's away. So we're looking for the design rules of this -- this is the highest biodiversity of trees in the world, Irian Jaya, 259 species of tree, and we described this in the book, "Cradle to Cradle." The book itself is a polymer. It is not a tree. That's the name of the first chapter -- "This Book is Not a Tree." Because in poetics, as Margaret Atwood pointed out, "we write our history on the skin of fish with the blood of bears." And with so much polymer, what we really need is technical nutrition, and to use something as elegant as a tree -- imagine this design assignment: Design something that makes oxygen, sequesters carbon, fixes nitrogen, distills water, accrues solar energy as fuel, makes complex sugars and food, creates microclimates, changes colors with the seasons and self-replicates. Well, why don't we knock that down and write on it? (Laughter) So, we're looking at the same criteria as most people -- you know, can I afford it? Does it work? Do I like it? We're adding the Jeffersonian agenda, and I come from Charlottesville, where I've had the privilege of living in a house designed by Thomas Jefferson. We're adding life, liberty and the pursuit of happiness. Now if we look at the word "competition," I'm sure most of you've used it. You know, most people don't realize it comes from the Latin competere, which means strive together. It means the way Olympic athletes train with each other. They get fit together, and then they compete. The Williams sisters compete -- one wins Wimbledon. So we've been looking at the idea of competition as a way of cooperating in order to get fit together. And the Chinese government has now -- I work with the Chinese government now -- has taken this up. We're also looking at survival of the fittest, not in just competition terms in our modern context of destroy the other or beat them to the ground, but really to fit together and build niches and have growth that is good. Now most

environmentalists don't say growth is good, because, in our lexicon, asphalt is two words: assigning blame. But if we look at asphalt as our growth, then we realize that all we're doing is destroying the planetary's fundamental underlying operating system. So when we see $E = mc^2$ come along, from a poet's perspective, we see energy as physics, chemistry as mass, and all of a sudden, you get this biology. And we have plenty of energy, so we'll solve that problem, but the biology problem's tricky, because as we put through all these toxic materials that we disgorge, we will never be able to recover that. And as Francis Crick pointed out, nine years after discovering DNA with Mr. Watson, that life itself has to have growth as a precondition -- it has to have free energy, sunlight and it needs to be an open system of chemicals. So we're asking for human artifice to become a living thing, and we want growth, we want free energy from sunlight and we want an open metabolism for chemicals. Then, the question becomes not growth or no growth, but what do you want to grow? So instead of just growing destruction, we want to grow the things that we might enjoy, and someday the FDA will allow us to make French cheese. So therefore, we have these two metabolisms, and I worked with a German chemist, Michael Braungart, and we've identified the two fundamental metabolisms. The biological one I'm sure you understand, but also the technical one, where we take materials and put them into closed cycles. We call them biological nutrition and technical nutrition. Technical nutrition will be in an order of magnitude of biological nutrition. Biological nutrition can supply about 500 million humans, which means that if we all wore Birkenstocks and cotton, the world would run out of cork and dry up. So we need materials in closed cycles, but we need to analyze them down to the parts per million for cancer, birth defects, mutagenic effects, disruption of our immune systems, biodegradation, persistence, heavy metal content, knowledge of how we're making them and their production and so on. Our first product was a textile where we analyzed 8,000 chemicals in the textile industry. Using those intellectual filters, we eliminated [7,962.] We were left with 38 chemicals. We have since databased the 4000 most commonly used chemicals in human manufacturing, and we're releasing this database into the public in six weeks. So designers all over the world can analyze their products down to the parts per million for human and ecological health.

(Applause)

We've developed a protocol so that companies can send these same messages all the way through their supply chains, because when we asked most companies we work with -- about a trillion dollars -- and say, "Where does your stuff come from?" They say, "Suppliers." "And where does it go?" "Customers." So we need some help there. So the biological nutrients, the first fabrics -- the water coming out was clean enough to drink. Technical nutrients --

this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the industry forever, some of the materials go back to soil --\n00:15:44.000 it's all solar-powered.\n00:15:46.000 Here's a building at Oberlin College we designed\n00:15:48.000 that makes more energy than it needs to operate and purifies its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color photograph.\n00:16:06.000 These are our tools. These are how we sold it to Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country -- the home of biological. And putting them together.\n00:16:45.000 And so I will finish by showing you a new city\n00:16:47.000 we're designing for the Chinese government.\n00:16:49.000 We're doing 12 cities for China right now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our assignment is to develop protocols for the housing\n00:16:57.000 for 400 million people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use brick,\n00:17:01.000 they will lose all their soil and burn all their coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --\n00:17:18.000 and then we send them all our money, what we'll discover is that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are our cities.\n00:17:30.000 We're building a new city next to this city; look at that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally do green fields, but this one is about to be built,\n00:17:39.000 so they brought us in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We

studied the biota, the ancient biota, the current farming and the protocols. We studied the winds and the sun to make sure everybody in the city will have fresh air, fresh water and direct sunlight in every single apartment at some point during the day. We then take the parks and lay them out as ecological infrastructure. We lay out the building areas. We start to integrate commercial and mixed use so the people all have centers and places to be. The transportation is all very simple, everybody's within a five-minute walk of mobility. We have a 24-hour street, so that there's always a place that's alive. The waste systems all connect. If you flush a toilet, your feces will go to the sewage treatment plants, which are sold as assets, not liabilities. Because who wants the fertilizer factory that makes natural gas? The waters are all taken in to construct the wetlands for habitat restorations. And then it makes natural gas, which then goes back into the city to power the fuel for the cooking for the city. So this is -- these are fertilizer gas plants. And then the compost is all taken back to the roofs of the city, where we've got farming, because what we've done is lifted up the city, the landscape, into the air to -- to restore the native landscape on the roofs of the buildings. The solar power of all the factory centers and all the industrial zones with their light roofs powers the city. And this is the concept for the top of the city. We've lifted the earth up onto the roofs. The farmers have little bridges to get from one roof to the next. We inhabit the city with work/live space on all the ground floors. And so this is the existing city, and this is the new city. (Applause)

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\n\n\n\n\nForeword\n\nPredictions of the future can be hazardous or downright foolish. But the \nfailure of foresight\u2014the inability to read the hand-writing on the wall\u2014is \neven more so. Designers of all kinds work in the conflicted space between \nthese two poles. Their goal is to improve small parts of a rapidly changing \nworld with the tools of form, scale, materials, energy, water, color, landscape, \nand the creativity that is found most often at the grassroots level. But what \nneeds to be improved?\n\nThe short answer is \na great deal,\na including an energy system that is rapidly \ndestabilizing the climate, an economy driving tens of thousands of species to \nextinction, a political system that sanctions gross inequality, an uncivil society, \nthe growing autism toward the natural world, and a global system mired in \nconflict. These are related problems, parts of a larger civilizational crisis with \nroots traceable to the seventeenth century authors of the mechanical world \nview. But there are deeper pathologies with footprints back to our ancient \nschizophrenia toward the natural world that had to be tamed a bit before it \ncould be appreciated.\n\nDesigners, however, typically do not work at the macro scale of civilization \nfor good reasons. Whether as architecture, engineering, materials, or land-\nscapes, design is bounded by the minute particulars of projects in their spe-\ncific social, cultural, and historical context. As a result designers work from the \nbottom up on projects at the building, neighborhood, and city scales. But the \nbig problems mentioned above are in large part the sum total of bad design \n(including that of public policies) at lower levels. There are many reasons for \nbad design, not the least of which is a professional focus on form-making, \noften oblivious to other consequences.\n\nBeginning in the 1970s a few renegade architects like Sim Van der Ryn in \nCalifornia became concerned about the

collateral environmental impacts of the design professions. Van der Ryn envisioned ecological design as the *Foreword* calibration of buildings with their places, which required further integral understanding of landscapes, energy flows, waste cycling, materials, sun-light, water, and ecological processes. Ecological design, in other words, aims to calibrate human actions with the way natural systems work as particular places, larger landscapes, and whole ecologies. It aims to work with, not against, the flows of energy and natural cycling of materials. The goal, in short, was to reduce environmental impacts of the built environment in a civilization that prized economic expansion above all else with hardly a thought for the morrow. What began so modestly in the 1970s has rapidly grown into a global movement to harmonize buildings, neighborhoods, and cities with the surrounding nature. After the publication of the Brundtland Commission report in 1987, the goals of ecological designers expanded to embrace the wider (but vague) mission of sustainability. But we know now that that word signifies more than was once assumed. Sustainability is the sum total of other qualities. As Chattanooga City Councilman, David Crockett puts it: "make it clean, green, safe, and fair and it will be sustainable." The left side of that equation, however, requires the elimination of the growing inequality that is a precursor to violence and ruined lives. It further requires rethinking our core assumptions about the relation between economic growth and real progress. Ecological design, in other words, must be large enough in foresight, scope, and heart to include the social and economic environment in which it is embedded. In that way ecological design is a radical endeavor in the true sense of the word, it gets to the root of what ails us. The work described in this book takes design to yet another level that aims to regenerate the fabric of life and repair the wounds and tears inflicted by the carelessness of the fossil-fuel-powered growth economy. Regenerative design strives to create the conditions of health which ecologist Aldo Leopold once defined as "the capacity of the land for self-renewal." It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, *Foreword vii* "design, unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature." In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, "transcend utility and conventional function-led, and especially technology-led approaches." Designers, in his view, must rise above "the calculated creation of dissatisfaction" and "think more comprehensively about the products we already produce and their implications." Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other the things that we once did naturally as capable people, good neighbors, and active citizens. It helps ground us by better informing us of where

we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance.

We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens who use them to train young people in the essentials of managed integrated ecologies.

5 Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.

6 Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things.

A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.

7 These will likely cause interruptions in supplies of food, energy, and water and could trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.

8 The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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Foreword

Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.⁶ Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things.

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The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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save the environment?\n00:03:49.000 But I don't know that that's the common debate.\n00:03:52.000 Commerce, on the other hand, is relatively quick,\n00:03:56.000 essentially creative, highly effective and efficient,\n00:03:58.000 and fundamentally honest, because we can't exchange\n00:04:01.000 value for very long if we don't trust each other.\n00:04:05.000 So we use the tools of commerce primarily for our work,\n00:04:07.000 but the question we bring to it is,\n00:04:09.000 how do we love all the children of all species for all time?\n00:04:13.000 And so we start our designs with that question.\n00:04:16.000 Because what we realize today is that modern culture\n00:04:18.000 appears to have adopted a strategy of tragedy.\n00:04:21.000 If we come here and say, 'Well, I didn't intend\n00:04:23.000 to cause global warming on the way here,' and we say, 'That's not part of my plan,'\n00:04:26.000 then we realize it's part of our de facto plan.\n00:04:29.000 Because it's the thing that's happening because we have no other plan.\n00:04:32.000 And I was at the White House for President Bush,\n00:04:34.000 meeting with every federal department and agency,\n00:04:36.000 and I pointed out that they appear to have no plan.\n00:04:40.000 If the end game is global warming, they're doing great.\n00:04:42.000 If the end game is mercury toxification of our children\n00:04:45.000 downwind of coal fire plants as they scuttled the Clean Air Act,\n00:04:48.000 then I see that our education programs should be explicitly defined as,\n00:04:52.000 'Brain death for all children. No child left behind.'\n00:04:54.000 (Applause)\n00:04:58.000 So, the question is, how many federal officials\n00:05:02.000 are ready to move to Ohio and Pennsylvania with their families?\n00:05:05.000 So if you don't have an endgame of something delightful,\n00:05:09.000 then you're just moving chess pieces around,\n00:05:11.000 if you don't know you're taking the king.\n00:05:12.000 So perhaps we could develop a strategy of change,\n00:05:15.000 which requires humility. And in my business as an architect,\n00:05:18.000 it's unfortunate the word 'humility' and the word 'architect'\n00:05:22.000 have not appeared in the same paragraph since 'The Fountainhead.'\n00:05:25.000 So if anybody here has trouble with the concept of design humility,\n00:05:30.000 reflect on this -- it took us 5,000 years\n00:05:33.000 to put wheels on our luggage.\n00:05:37.000 So, as Kevin Kelly pointed out, there is no endgame.\n00:05:42.000 There is an infinite game, and we're playing in that infinite game.\n00:05:46.000 And so we call it 'cradle to cradle,'\n00:05:48.000 and our goal is very simple.\n00:05:49.000 This is what I presented to the White House.\n00:05:51.000 Our goal is a delightfully diverse, safe, healthy and just world,\n00:05:54.000 with clean air, clean water, soil and power --\n00:05:57.000 economically, equitably, ecologically and elegantly enjoyed, period.\n00:06:01.000 (Applause)\n00:06:04.000 What don't you like about this?\n00:06:07.000 Which part of this don't you like?\n00:06:09.000 So we realized we want full diversity,\n00:06:11.000 even though it can be difficult to remember what De Gaulle said\n00:06:14.000 when asked what it was like to be President of France.\n00:06:16.000 He said, 'What do you think it's like trying to run a country with 400 kinds of cheese?'\n00:06:20.000 But at the same time, we realize that our products are not safe and healthy.\n00:06:23.000 So we've designed products\n00:06:25.000 and we analyzed chemicals down to the parts per million.\n00:06:27.000 This is a baby blanket by Pendleton that will give your child nutrition\n00:06:30.000 instead of Alzheimer's later in life.\n00:06:32.000 We

can ask ourselves, what is justice,\n00:06:34.000 and is justice blind, or is justice blindness?\n00:06:38.000 And at what point did that uniform turn from white to black?\n00:06:43.000 Water has been declared a human right by the United Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000 Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000 that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we see the end of the age of oil?"\n00:07:12.000 I don't know if you remember his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we ran out of stones." \n00:07:19.000 We see that companies acting ethically in this world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her children's environment,\n00:07:38.000 which is from copper.\n00:07:40.000 On the other hand, we see great signs of hope.\n00:07:42.000 Here's Dr. Venkataswamy in India, who's figured out\n00:07:45.000 how to do mass-produced health.\n00:07:47.000 He has given eyesight to two million people for free.\n00:07:51.000 We see in our material flows that car steels don't become car steel again\n00:07:54.000 because of the contaminants of the coatings --\n00:07:56.000 bismuth, antimony, copper and so on.\n00:07:58.000 They become building steel.\n00:07:59.000 On the other hand, we're working with Berkshire Hathaway,\n00:08:01.000 Warren Buffett and Shaw Carpet,\n00:08:04.000 the largest carpet company in the world.\n00:08:05.000 We've developed a carpet that is continuously recyclable,\n00:08:08.000 down to the parts per million.\n00:08:11.000 The upper is Nylon 6 that can go back to caprolactam,\n00:08:14.000 the bottom, a polyolephine -- infinitely recyclable thermoplastic.\n00:08:17.000 Now if I was a bird, the building on my left is a liability.\n00:08:21.000 The building on my right, which is our corporate campus for The Gap\n00:08:24.000 with an ancient meadow, is an asset -- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies's 1928 tower for Berlin,\n00:09:15.000 the question might be, "Well, where's the sun?"\n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most

products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, "Bill, you've got to understand--\n00:09:43.000 solar energy has nothing to do with architecture."\n00:09:51.000 I guess he didn't read Vitruvius.\n00:09:53.000 In 1984, we did the first so-called "green office" in America\n00:09:57.000 for Environmental Defense.\n00:09:58.000 We started asking manufacturers what were in their materials.\n00:10:01.000 They said, "They're proprietary, they're legal, go away."\n00:10:03.000 The only indoor quality work done in this country at that time\n00:10:05.000 was sponsored by R. J. Reynolds Tobacco Company,\n00:10:08.000 and it was to prove there was no danger\n00:10:09.000 from secondhand smoke in the workplace.\n00:10:12.000 So, all of a sudden, here I am, graduating from high school in 1969,\n00:10:16.000 and this happens, and we realize that "away" went away.\n00:10:19.000 Remember we used to throw things away, and we'd point to away?\n00:10:23.000 And yet, NOAA has now shown us, for example --\n00:10:25.000 you see that little blue thing above Hawaii?\n00:10:27.000 That's the Pacific Gyre.\n00:10:28.000 It was recently dragged for plankton by scientists,\n00:10:30.000 and they found six times as much plastic as plankton.\n00:10:34.000 When asked, they said, "It's kind of like a giant toilet that doesn't flush."\n00:10:39.000 Perhaps that's away.\n00:10:40.000 So we're looking for the design rules of this --\n00:10:42.000 this is the highest biodiversity of trees in the world, Irian Jaya,\n00:10:44.000 259 species of tree, and we described this\n00:10:48.000 in the book, "Cradle to Cradle."\n00:10:49.000 The book itself is a polymer. It is not a tree.\n00:10:53.000 That's the name of the first chapter -- "This Book is Not a Tree."\n00:10:56.000 Because in poetics, as Margaret Atwood pointed out,\n00:10:59.000 "we write our history on the skin of fish\n00:11:01.000 with the blood of bears."\n00:11:04.000 And with so much polymer, what we really need\n00:11:05.000 is technical nutrition, and to use something\n00:11:08.000 as elegant as a tree -- imagine this design assignment:\n00:11:11.000 Design something that makes oxygen, sequesters carbon,\n00:11:13.000 fixes nitrogen, distills water, accrues solar energy as fuel,\n00:11:17.000 makes complex sugars and food, creates microclimates,\n00:11:21.000 changes colors with the seasons and self-replicates.\n00:11:27.000 Well, why don't we knock that down and write on it?\n00:11:29.000 (Laughter)\n00:11:35.000 So, we're looking at the same criteria\n00:11:37.000 as most people -- you know, can I afford it?\n00:11:39.000 Does it work? Do I like it?\n00:11:41.000 We're adding the Jeffersonian agenda, and I come from Charlottesville,\n00:11:43.000 where I've had the privilege of living in a house designed by Thomas Jefferson.\n00:11:47.000 We're adding life, liberty and the pursuit of happiness.\n00:11:53.000 Now if we look at the word "competition,"\n00:11:54.000 I'm sure most of you've used it.\n00:11:56.000 You know, most people don't realize it comes from\n00:11:57.000 the Latin competere, which means strive together.\n00:12:00.000 It means the way Olympic athletes train with each other.\n00:12:03.000 They get fit together, and then they compete.\n00:12:06.000 The Williams sisters compete -- one wins

Wimbledon. \n00:12:08.000 So we've been looking at the idea of competition \n00:12:11.000 as a way of cooperating in order to get fit together. \n00:12:15.000 And the Chinese government has now -- \n00:12:16.000 I work with the Chinese government now -- \n00:12:18.000 has taken this up. \n00:12:20.000 We're also looking at survival of the fittest, \n00:12:22.000 not in just competition terms in our modern context \n00:12:24.000 of destroy the other or beat them to the ground, \n00:12:27.000 but really to fit together and build niches \n00:12:29.000 and have growth that is good. \n00:12:31.000 Now most environmentalists don't say growth is good, \n00:12:33.000 because, in our lexicon, asphalt is two words: assigning blame. \n00:12:38.000 But if we look at asphalt as our growth, \n00:12:41.000 then we realize that all we're doing is destroying \n00:12:43.000 the planetary's fundamental underlying operating system. \n00:12:47.000 So when we see E equals mc squared come along, from a poet's perspective, \n00:12:52.000 we see energy as physics, chemistry as mass, \n00:12:54.000 and all of a sudden, you get this biology. \n00:12:56.000 And we have plenty of energy, so we'll solve that problem, \n00:12:59.000 but the biology problem's tricky, because as we put through \n00:13:02.000 all these toxic materials that we disgorge, \n00:13:05.000 we will never be able to recover that. \n00:13:07.000 And as Francis Crick pointed out, nine years \n00:13:09.000 after discovering DNA with Mr. Watson, \n00:13:12.000 that life itself has to have growth as a precondition -- \n00:13:16.000 it has to have free energy, sunlight \n00:13:18.000 and it needs to be an open system of chemicals. \n00:13:21.000 So we're asking for human artifice to become a living thing, \n00:13:24.000 and we want growth, we want free energy from sunlight \n00:13:26.000 and we want an open metabolism for chemicals. \n00:13:29.000 Then, the question becomes not growth or no growth, \n00:13:31.000 but what do you want to grow? \n00:13:34.000 So instead of just growing destruction, \n00:13:36.000 we want to grow the things that we might enjoy, \n00:13:38.000 and someday the FDA will allow us to make French cheese. \n00:13:41.000 So therefore, we have these two metabolisms, \n00:13:45.000 and I worked with a German chemist, Michael Braungart, \n00:13:47.000 and we've identified the two fundamental metabolisms. \n00:13:49.000 The biological one I'm sure you understand, \n00:13:51.000 but also the technical one, where we take materials \n00:13:53.000 and put them into closed cycles. \n00:13:55.000 We call them biological nutrition and technical nutrition. \n00:13:58.000 Technical nutrition will be in an order of magnitude of biological nutrition. \n00:14:02.000 Biological nutrition can supply about 500 million humans, \n00:14:05.000 which means that if we all wore Birkenstocks and cotton, \n00:14:07.000 the world would run out of cork and dry up. \n00:14:10.000 So we need materials in closed cycles, \n00:14:12.000 but we need to analyze them down to the parts per million \n00:14:14.000 for cancer, birth defects, mutagenic effects, \n00:14:17.000 disruption of our immune systems, biodegradation, persistence, \n00:14:20.000 heavy metal content, knowledge of how we're making them \n00:14:23.000 and their production and so on. \n00:14:25.000 Our first product was a textile where we analyzed 8,000 chemicals \n00:14:29.000 in the textile industry. \n00:14:30.000 Using those intellectual filters, we eliminated [7,962.] \n00:14:35.000 We were left with 38 chemicals. \n00:14:37.000 We have since databased the 4000 most commonly used chemicals \n00:14:40.000 in human manufacturing, and we're releasing this database into the public in six weeks. \n00:14:45.000 So designers all over the world can analyze their products \n00:14:47.000 down to the parts per million for human and ecological health. \n00:14:52.000

(Applause)\n00:14:57.000 We've developed a protocol so that companies can send\n00:15:00.000 these same messages all the way through their supply chains,\n00:15:03.000 because when we asked most companies we work with -- about a trillion dollars\n00:15:06.000 -- and say, 'Where does your stuff come from?'\n00:15:08.000 They say, 'Suppliers.'\n00:15:10.000 'Customers.'\n00:15:11.000 So we need some help there.\n00:15:12.000 So the biological nutrients, the first fabrics --\n00:15:14.000 the water coming out was clean enough to drink.\n00:15:16.000 Technical nutrients -- this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the industry forever, some of the materials go back to soil --\n00:15:44.000 it's all solar-powered.\n00:15:46.000 Here's a building at Oberlin College we designed\n00:15:48.000 that makes more energy than it needs to operate and purifies its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color photograph.\n00:16:06.000 These are our tools. These are how we sold it to Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country -- the home of biological. And putting them together.\n00:16:45.000 And so I will finish by showing you a new city\n00:16:47.000 we're designing for the Chinese government.\n00:16:49.000 We're doing 12 cities for China right now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our assignment is to develop protocols for the housing\n00:16:57.000 for 400 million people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use brick,\n00:17:01.000 they will lose all their soil and burn all their coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --\n00:17:18.000 and then we send them all our money, what we'll discover is that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are our cities.\n00:17:30.000 We're building a new city next to this city; look at that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally

do green fields, but this one is about to be built,\n00:17:39.000 so they brought us in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We studied the biota, the ancient biota,\n00:18:08.000 the current farming and the protocols.\n00:18:10.000 We studied the winds and the sun to make sure everybody in the city\n00:18:12.000 will have fresh air, fresh water and direct sunlight\n00:18:18.000 in every single apartment at some point during the day.\n00:18:21.000 We then take the parks and lay them out as ecological infrastructure.\n00:18:25.000 We lay out the building areas.\n00:18:28.000 We start to integrate commercial and mixed use\n00:18:29.000 so the people all have centers and places to be.\n00:18:32.000 The transportation is all very simple,\n00:18:34.000 everybody's within a five-minute walk of mobility.\n00:18:37.000 We have a 24-hour street, so that there's always a place that's alive.\n00:18:42.000 The waste systems all connect.\n00:18:44.000 If you flush a toilet, your feces will go to the sewage treatment plants,\n00:18:49.000 which are sold as assets, not liabilities.\n00:18:51.000 Because who wants the fertilizer factory that makes natural gas?\n00:18:55.000 The waters are all taken in to construct the wetlands for habitat restorations.\n00:19:00.000 And then it makes natural gas, which then goes back into the city\n00:19:04.000 to power the fuel for the cooking for the city.\n00:19:08.000 So this is -- these are fertilizer gas plants.\n00:19:10.000 And then the compost is all taken back\n00:19:13.000 to the roofs of the city, where we've got farming,\n00:19:15.000 because what we've done is lifted up the city,\n00:19:19.000 the landscape, into the air to -- to restore the native landscape\n00:19:26.000 on the roofs of the buildings.\n00:19:28.000 The solar power of all the factory centers\n00:19:31.000 and all the industrial zones with their light roofs powers the city.\n00:19:34.000 And this is the concept for the top of the city.\n00:19:36.000 We've lifted the earth up onto the roofs.\n00:19:40.000 The farmers have little bridges to get from one roof to the next.\n00:19:44.000 We inhabit the city with work/live space on all the ground floors.\n00:19:48.000 And so this is the existing city, and this is the new city.\n00:19:53.000 (Applause)\n",
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Chapter 1: evolution

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33 Premise: Co-evolution among humans and natural systems can only be undertaken in specific places, using approaches that are precisely fitted to them.
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Principle: Call forth a collective vocation.
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engineering, materials, or land-scapes, design is bounded by the minute particulars of projects in their specific social, cultural, and historical context. As a result designers work from the bottom up on projects at the building, neighborhood, and city scales. But the big problems mentioned above are in large part the sum total of bad design (including that of public policies) at lower levels. There are many reasons for bad design, not the least of which is a professional focus on form-making, often oblivious to other consequences.

Beginning in the 1970s a few renegade architects like Sim Van der Ryn in California became concerned about the collateral environmental impacts of the design professions. Van der Ryn envisioned ecological design as the careful calibration of buildings with their places, which required further integral understanding of landscapes, energy flows, waste cycling, materials, sun-light, water, and ecological processes. Ecological design, in other words, aims to calibrate human actions with the way natural systems work as particular places, larger landscapes, and whole ecologies. It aims to work with, not against, the flows of energy and natural cycling of materials. The goal, in short, was to reduce environmental impacts of the built environment in a civilization that prized economic expansion above all else with hardly a thought for the morrow.

What began so modestly in the 1970s has rapidly grown into a global movement to harmonize buildings, neighborhoods, and cities with the surrounding nature. After the publication of the Brundtland Commission report in 1987, the goals of ecological designers expanded to embrace the wider (but vague) mission of sustainability. But we know now that that word signifies more than was once assumed. Sustainability is the sum total of other qualities. As Chattanooga City Councilman, David Crockett puts it: "make it clean, green, safe, and fair and it will be sustainable." The left side of that equation, however, requires the elimination of the growing inequality that is a precursor to violence and ruined lives. It further requires rethinking our core assumptions about the relation between economic growth and real progress. Ecological design, in other words, must be large enough in foresight, scope, and heart to include the social and economic environment in which it is embedded. In that way ecological design is a radical endeavor in the true sense of the word, it gets to the root of what ails us.

The work described in this book takes design to yet another level that aims to regenerate the fabric of life and repair the wounds and tears inflicted by the carelessness of the fossil-fuel-powered growth economy. Regenerative design strives to create the conditions of health which ecologist Aldo Leopold once defined as "the capacity of the land for self-renewal." It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, "Foreword vii" design, "unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature."

In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, "transcend utility and conventional function-led, and especially technology-led approaches." Designers, in his view, must rise above "the calculated creation of dissatisfaction" and "think more comprehensively about the products we

already produce and their implications. Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other—the things that we once did naturally as capable people, good neighbors, and active citizens. It helps ground us by better informing us of where we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance. We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens who use them to train young people in the essentials of managed integrated ecologies.⁵

Foreword

Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.⁶ Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things.

A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.⁷ These will likely cause interruptions in supplies of food, energy, and water and could trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.⁸

The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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transcript\n# Ray Anderson: The business logic of sustainability\n#
https://www.youtube.com/watch/iP9QF_lBOyA\n00:00:18.330 Believe me or not, I come offering a solution\n00:00:22.330 to a very important part of this larger problem,\n00:00:26.330 with the requisite focus on climate.\n00:00:28.330 And the solution I offer\n00:00:30.330 is to the biggest culprit\n00:00:32.330 in this massive mistreatment of the earth\n00:00:36.330 by humankind,\n00:00:38.330 and the resulting decline of the biosphere.\n00:00:41.330 That culprit is business and industry,\n00:00:44.330 which happens to be where I have spent the last 52 years\n00:00:47.330 since my graduation from Georgia Tech in 1956.\n00:00:51.330 As an industrial engineer,\n00:00:53.330 cum aspiring and then successful entrepreneur.\n00:00:57.330 After founding my company, Interface, from scratch\n00:01:00.330 in 1973, 36 years ago,\n00:01:03.330 to produce carpet tiles in America\n00:01:05.330 for the business and institution markets,\n00:01:08.330 and shepherding it through start-up and survival\n00:01:11.330 to prosperity and global dominance in its field,\n00:01:14.330 I read Paul Hawken's book,\n00:01:16.330 "The Ecology of Commerce," \n00:01:18.330 the summer of 1994. \n00:01:21.330 In his book, Paul charges business and industry\n00:01:24.330 as, one, the major culprit\n00:01:27.330 in causing the decline of the biosphere,\n00:01:29.330 and, two, the only institution that is large enough,\n00:01:32.330 and pervasive enough, and powerful enough,\n00:01:34.330 to really lead humankind out of this mess.\n00:01:38.330 And by the way he convicted me\n00:01:41.330 as a plunderer of the earth.\n00:01:43.330 And I then challenged the people of Interface, my company,\n00:01:46.330 to lead our company and the entire industrial world to sustainability,\n00:01:50.330 which we defined as eventually operating\n00:01:52.330 our petroleum-intensive company in such a way\n00:01:55.330 as to take from the earth\n00:01:57.330 only what can be renewed by the earth, naturally and rapidly -- \n00:02:01.330 not another fresh drop of oil --\n00:02:03.330 and to do no harm to the biosphere.\n00:02:07.330 Take nothing: do no harm. \n00:02:09.330 I simply said, "If Hawken is right\n00:02:11.330 and business and industry must lead,\n00:02:13.330 who will lead business and industry?\n00:02:15.330 Unless somebody leads, nobody will." \n00:02:18.330 It's axiomatic. Why not us?\n00:02:21.330 And thanks to the people of Interface,\n00:02:23.330 I have become a recovering plunderer.\n00:02:26.330 (Laughter)\n00:02:27.330 (Applause)\n00:02:32.330 I once told a Fortune Magazine writer\n00:02:36.330 that someday people like me would go to jail.\n00:02:39.330 And that became the headline of a Fortune article.\n00:02:41.330 They went on to describe me as America's greenest CEO.\n00:02:45.330 From plunderer to recovering plunderer,\n00:02:48.330 to America's greenest CEO in five years --\n00:02:51.330 that, frankly, was a pretty sad commentary\n00:02:53.330 on American CEOs in 1999. \n00:02:58.330 Asked later in the Canadian documentary, "The Corporation," \n00:03:01.330 what I meant by the "go to jail" remark,\n00:03:04.330 I offered that theft is a crime. \n00:03:08.330 And theft of our children's future would someday be a crime. \n00:03:13.330 But I realized, for that to be true --\n00:03:15.330 for theft of our children's future to be a crime --\n00:03:18.330 there must be a clear, demonstrable alternative\n00:03:21.330 to the take-make-waste industrial system\n00:03:24.330 that so dominates our civilization,\n00:03:27.330 and is the major culprit, stealing our children's future,\n00:03:30.330 by digging up the earth\n00:03:32.330 and converting it to products that quickly become waste\n00:03:36.330 in a landfill or an incinerator -- \n00:03:38.330 in short, digging up the earth and converting it to

pollution.\n00:03:43.330 According to Paul and Anne Ehrlich\n00:03:45.330 and a well-known environmental impact equation,\n00:03:48.330 impact -- a bad thing --\n00:03:50.330 is the product of population, affluence and technology.\n00:03:54.330 That is, impact is generated by people,\n00:03:58.330 what they consume in their affluence,\n00:04:00.330 and how it is produced.\n00:04:03.330 And though the equation is largely subjective,\n00:04:05.330 you can perhaps quantify people, and perhaps quantify affluence,\n00:04:09.330 but technology is abusive in too many ways to quantify.\n00:04:13.330 So the equation is conceptual.\n00:04:15.330 Still it works to help us understand the problem.\n00:04:18.329 So we set out at Interface, in 1994,\n00:04:23.330 to create an example:\n00:04:25.330 to transform the way we made carpet,\n00:04:27.330 a petroleum-intensive product for materials as well as energy,\n00:04:31.330 and to transform our technologies\n00:04:33.330 so they diminished environmental impact,\n00:04:36.330 rather than multiplied it.\n00:04:39.330 Paul and Anne Ehrlich's environmental impact equation:\n00:04:42.330 $I = P \times A \times T$ \n00:04:45.330 population, affluence and technology.\n00:04:48.330 I wanted Interface to rewrite that equation so that it read\n00:04:54.330 $I = P \times A / T$ \n00:04:57.330 Now, the mathematically-minded will see immediately\n00:05:00.330 that T in the numerator increases impact -- a bad thing --\n00:05:03.330 but T in the denominator decreases impact.\n00:05:07.330 So I ask, "What would move T, technology,\n00:05:11.330 from the numerator -- call it T1 --\n00:05:13.330 where it increases impact,\n00:05:15.330 to the denominator -- call it T2 --\n00:05:18.330 where it reduces impact?\n00:05:21.330 I thought about the characteristics\n00:05:25.330 of first industrial revolution,\n00:05:27.330 T1, as we practiced it at Interface,\n00:05:30.330 and it had the following characteristics.\n00:05:34.330 Extractive: taking raw materials from the earth.\n00:05:38.330 Linear: take, make, waste.\n00:05:41.330 Powered by fossil fuel-derived energy.\n00:05:43.330 Wasteful: abusive and focused on labor productivity.\n00:05:47.330 More carpet per man-hour.\n00:05:50.330 Thinking it through, I realized that all those attributes\n00:05:53.330 must be changed to move T to the denominator.\n00:05:58.330 In the new industrial revolution extractive must be replaced by renewable;\n00:06:03.330 linear by cyclical;\n00:06:05.330 fossil fuel energy by renewable energy, sunlight;\n00:06:09.330 wasteful by waste-free;\n00:06:11.330 and abusive by benign;\n00:06:13.330 and labor productivity by resource productivity.\n00:06:17.330 And I reasoned that if we could make those transformative changes,\n00:06:21.330 and get rid of T1 altogether,\n00:06:23.330 we could reduce our impact to zero,\n00:06:26.330 including our impact on the climate.\n00:06:29.330 And that became the Interface plan in 1995,\n00:06:32.330 and has been the plan ever since.\n00:06:35.330 We have measured our progress very rigorously.\n00:06:39.330 So I can tell you how far we have come in the ensuing 12 years.\n00:06:43.330 Net greenhouse gas emissions\n00:06:45.330 down 82 percent in absolute tonnage.\n00:06:49.330 (Applause)\n00:06:53.330 Over the same span of time\n00:06:55.330 sales have increased by two-thirds and profits have doubled.\n00:06:58.330 So an 82 percent absolute reduction\n00:07:01.330 translates into a 90 percent reduction\n00:07:03.330 in greenhouse gas intensity relative to sales.\n00:07:07.330 This is the magnitude\n00:07:09.330 of the reduction the entire global technosphere\n00:07:12.330 must realize by 2050\n00:07:15.330 to avoid catastrophic climate disruption --\n00:07:18.330 so the scientists are telling us.\n00:07:21.330 Fossil fuel usage is down 60 percent per unit of

production, due to efficiencies in renewables. The cheapest, most secure barrel of oil there is is the one not used through efficiencies. Water usage is down 75 percent in our worldwide carpet tile business. Down 40 percent in our broadloom carpet business, which we acquired in 1993 right here in California, City of Industry, where water is so precious. Renewable or recyclable materials are 25 percent of the total, and growing rapidly. Renewable energy is 27 percent of our total, going for 100 percent. We have diverted 148 million pounds -- that's 74,000 tons -- of used carpet from landfills, closing the loop on material flows through reverse logistics and post-consumer recycling technologies that did not exist when we started 14 years ago. Those new cyclical technologies have contributed mightily to the fact that we have produced and sold 85 million square yards of climate-neutral carpet since 2004, meaning no net contribution to global climate disruption in producing the carpet throughout the supply chain, from mine and well head clear to end-of-life reclamation -- independent third-party certified. We call it Cool Carpet. And it has been a powerful marketplace differentiator, increasing sales and profits. Three years ago we launched carpet tile for the home, under the brand Flor, misspelled F-L-O-R. You can point and click today at Flor.com and have Cool Carpet delivered to your front door in five days. It is practical, and pretty too. (Laughter) (Applause) We reckon that we are a bit over halfway to our goal: zero impact, zero footprint. We've set 2020 as our target year for zero, for reaching the top, the summit of Mount Sustainability. We call this Mission Zero. And this is perhaps the most important facet: we have found Mission Zero to be incredibly good for business. A better business model, a better way to bigger profits. Here is the business case for sustainability. From real life experience, costs are down, not up, reflecting some 400 million dollars of avoided costs in pursuit of zero waste -- the first face of Mount Sustainability. This has paid all the costs for the transformation of Interface. And this dispels a myth too, this false choice between the environment and the economy. Our products are the best they've ever been, inspired by design for sustainability, an unexpected wellspring of innovation. Our people are galvanized around this shared higher purpose. You cannot beat it for attracting the best people and bringing them together. And the goodwill of the marketplace is astonishing. No amount of advertising, no clever marketing campaign, at any price, could have produced or created this much goodwill. Costs, products, people, marketplaces -- what else is there? It is a better business model. And here is our 14-year record of sales and profits. There is a dip there, from 2001 to 2003: a dip

when our sales, over a three-year period, \n00:10:53.330 were down 17 percent. \n00:10:55.330 But the marketplace was down 36 percent. \n00:10:58.330 We literally gained market share. \n00:11:00.330 We might not have survived that recession \n00:11:03.330 but for the advantages of sustainability. \n00:11:06.330 If every business were pursuing Interface plans, \n00:11:10.330 would that solve all our problems? \n00:11:12.330 I don't think so. \n00:11:14.330 I remain troubled by the revised Ehrlich equation, \n00:11:17.330 $I = P \times A \div B$ T2. \n00:11:21.330 That A is a capital A, \n00:11:23.330 suggesting that affluence is an end in itself. \n00:11:28.330 But what if we reframed Ehrlich further? \n00:11:32.330 And what if we made A a lowercase 'a', \n00:11:35.330 suggesting that it is a means to an end, \n00:11:37.330 and that end is happiness -- \n00:11:40.330 more happiness with less stuff. \n00:11:43.330 You know that would reframe civilization itself -- \n00:11:46.330 (Applause) -- \n00:11:54.330 and our whole system of economics, \n00:11:57.330 if not for our species, then perhaps for the one that succeeds us: \n00:12:03.330 the sustainable species, living on a finite earth, \n00:12:06.330 ethically, happily and ecologically \n00:12:09.330 in balance with nature \n00:12:11.330 and all her natural systems for a thousand generations, \n00:12:14.330 or 10,000 generations -- \n00:12:16.330 that is to say, into the indefinite future. \n00:12:19.330 But does the earth have to wait for our extinction as a species? \n00:12:24.330 Well maybe so. But I don't think so. \n00:12:27.330 At Interface we really intend to bring this prototypical \n00:12:30.330 sustainable, zero-footprint industrial company \n00:12:33.330 fully into existence by 2020. \n00:12:36.330 We can see our way now, \n00:12:38.330 clear to the top of that mountain. \n00:12:40.330 And now the challenge is in execution. \n00:12:43.330 And as my good friend and adviser Amory Lovins says, \n00:12:46.330 "If something exists, it must be possible." \n00:12:50.330 (Laughter) \n00:12:53.330 If we can actually do it, it must be possible. \n00:12:56.330 If we, a petro-intensive company can do it, anybody can. \n00:13:00.330 And if anybody can, it follows that everybody can. \n00:13:04.330 Hawken fulfilled business and industry, \n00:13:07.330 leading humankind away from the abyss \n00:13:11.330 because, with continued unchecked decline of the biosphere, \n00:13:16.330 a very dear person is at risk here -- \n00:13:19.330 frankly, an unacceptable risk. \n00:13:21.330 Who is that person? \n00:13:23.330 Not you. Not I. \n00:13:25.330 But let me introduce you to the one who is most at risk here. \n00:13:28.330 And I myself met this person in the early days of this mountain climb. \n00:13:32.330 On a Tuesday morning in March of 1996, \n00:13:36.330 I was talking to people, as I did at every opportunity back then, \n00:13:39.330 bringing them along and often not knowing whether I was connecting. \n00:13:43.330 But about five days later back in Atlanta, \n00:13:46.330 I received an email from Glenn Thomas, \n00:13:49.330 one of my people in the California meeting. \n00:13:51.330 He was sending me an original poem \n00:13:53.330 that he had composed after our Tuesday morning together. \n00:13:56.330 And when I read it it was one of the most uplifting moments of my life. \n00:14:00.330 Because it told me, by God, one person got it. \n00:14:04.330 Here is what Glenn wrote. And here is that person, most at risk. \n00:14:08.330 Please meet "Tomorrow's Child." \n00:14:12.330 "Without a name, an unseen face, and knowing not your time or place, \n00:14:16.330 Tomorrow's child, though yet unborn, \n00:14:19.330 I met you first last Tuesday morn. \n00:14:22.330 A wise friend introduced us two. \n00:14:24.330 And through his sobering point of view \n00:14:26.330 I saw a day that you would see, a

day for you but not for me.\n00:14:31.330 Knowing you has changed my
thinking.\n00:14:33.330 For I never had an inkling\n00:14:35.330 that perhaps the
things I do might someday,\n00:14:38.330 somehow threaten you.\n00:14:41.330
Tomorrow's child, my daughter, son,\n00:14:43.330 I'm afraid I've just
begun to think of you and of your good,\n00:14:45.330 though always having known I
should.\n00:14:49.330 Begin, I will.\n00:14:51.330 The way the cost of what I squander,
what is lost,\n00:14:54.330 if ever I forget that you\n00:14:56.330 will someday come
and live here too."\n00:15:00.330 Well, every day of my life since,\n00:15:02.330
"Tomorrow's Child" has spoken to me\n00:15:04.330 with one simple but
profound message,\n00:15:06.330 which I presume to share with you.\n00:15:08.330 We
are, each and every one,\n00:15:10.330 a part of the web of life.\n00:15:13.330 The
continuum of humanity, sure, but in a larger sense, the web of life
itself.\n00:15:17.330 And we have a choice to make\n00:15:19.330 during our brief,
brief visit\n00:15:21.330 to this beautiful blue and green living
planet:\n00:15:25.330 to hurt it or to help it.\n00:15:28.330 For you, it's your
call.\n00:15:31.330 Thank you.\n00:15:33.330 (Applause)\n", "cloud_doc_url": null},
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\n\nForeword\n\nPredictions of the future can be hazardous or downright foolish. But the \n failure of foresight\u2014the inability to read the hand-writing on the wall\u2014is \neven more so. Designers of all kinds work in the conflicted space between \nthese two poles. Their goal is to improve small parts of a rapidly changing \nworld with the tools of form, scale, materials, energy, water, color, landscape, \nand the creativity that is found most often at the grassroots level. But what \nneeds to be improved?\n\nThe short answer is \u201ca great deal,\u201d including an energy system that is rapidly \ndestabilizing the climate, an economy driving tens of thousands of species to \nextinction, a political system that sanctions gross inequality, an uncivil society, \nthe growing autism toward the natural world, and a global system mired in \nconflict. These are related problems, parts of a larger civilizational crisis with \nroots traceable to the seventeenth century authors of the mechanical world \nvview. But there are deeper pathologies with footprints back to our ancient \nschizophrenia toward the natural world that had to be tamed a bit before it \ncould be appreciated.\n\nDesigners, however, typically do not work at the macro scale of civilization \nfor good reasons. Whether as architecture, engineering, materials, or land-\nsapes, design is bounded by the minute particulars of projects in their spe-\ncific social, cultural, and historical context. As a result designers work from the \nbottom up on projects at the building, neighborhood, and city scales. But the \nbig problems mentioned above are in large part the sum total of bad design \n(including that of public policies) at lower levels. There are many reasons for \nbad design, not the least of which is a professional focus on form-making, \noften oblivious to other consequences.\n\nBeginning in the 1970s a few renegade architects like Sim Van der Ryn in \nCalifornia became concerned about the collateral environmental impacts \nof the design professions. Van der Ryn envisioned ecological design as the \nvi Foreword\n\n calibration of buildings with their places, which required further integral \nunderstanding of landscapes, energy flows, waste cycling, materials, sun-\nlght, water, and ecological processes. Ecological design, in other words, \naims to calibrate human actions with the way natural systems work as par-\nticular places, larger landscapes, and whole ecologies. It aims to work with, \nnot against, the flows of energy and natural cycling of materials. The goal, \nin short, was to reduce environmental impacts of the \nbuilt environment\u201d in a civilization that prized economic expansion above all else with hardly a \nthought for the morrow.\n\nWhat began so modestly in the 1970s has rapidly grown into a global move-\nment to harmonize buildings, neighborhoods, and cities with the surround-\ning nature. After the publication of the Brundtland Commission report in

1987, the goals of ecological designers expanded to embrace the wider (but vague) mission of sustainability. But we know now that that word signifies more than was once assumed. Sustainability is the sum total of other qualities. As Chattanooga City Councilman, David Crockett puts it: "make it clean, green, safe, and fair and it will be sustainable." The left side of that equation, however, requires the elimination of the growing inequality that is a precursor to violence and ruined lives. It further requires rethinking our core assumptions about the relation between economic growth and real progress. Ecological design, in other words, must be large enough in foresight, scope, and heart to include the social and economic environment in which it is embedded. In that way ecological design is a radical endeavor in the true sense of the word, it gets to the root of what ails us. The work described in this book takes design to yet another level that aims to regenerate the fabric of life and repair the wounds and tears inflicted by the carelessness of the fossil-fuel-powered growth economy. Regenerative design strives to create the conditions of health which ecologist Aldo Leopold once defined as "the capacity of the land for self-renewal." It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, "Foreword vii" design, "unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature." In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, "transcend utility and conventional function-led, and especially technology-led approaches." Designers, in his view, must rise above "the calculated creation of dissatisfaction" and "think more comprehensively about the products we already produce and their implications." Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other the things that we once did naturally as capable people, good neighbors, and active citizens. It helps ground us by better informing us of where we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance. We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens

who use them to train young people in the essentials of managed integrated ecologies.⁵ Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.⁶ Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things. A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.⁷ These will likely cause interruptions in supplies of food, energy, and water and could trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.⁸ The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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mess. \n00:01:38.330 And by the way he convicted me\n00:01:41.330 as a plunderer of the earth. \n00:01:43.330 And I then challenged the people of Interface, my company, \n00:01:46.330 to lead our company and the entire industrial world to sustainability, \n00:01:50.330 which we defined as eventually operating\n00:01:52.330 our petroleum-intensive company in such a way\n00:01:55.330 as to take from the earth\n00:01:57.330 only what can be renewed by the earth, naturally and rapidly -- \n00:02:01.330 not another fresh drop of oil --\n00:02:03.330 and to do no harm to the biosphere. \n00:02:07.330 Take nothing: do no harm. \n00:02:09.330 I simply said, "If Hawken is right\n00:02:11.330 and business and industry must lead, \n00:02:13.330 who will lead business and industry?\n00:02:15.330 Unless somebody leads, nobody will."\n00:02:18.330 It's axiomatic. Why not us?\n00:02:21.330 And thanks to the people of Interface, \n00:02:23.330 I have become a recovering plunderer. \n00:02:26.330 (Laughter)\n00:02:27.330 (Applause)\n00:02:32.330 I once told a Fortune Magazine writer\n00:02:36.330 that someday people like me would go to jail. \n00:02:39.330 And that became the headline of a Fortune article. \n00:02:41.330 They went on to describe me as America's greenest CEO. \n00:02:45.330 From plunderer to recovering plunderer, \n00:02:48.330 to America's greenest CEO in five years --\n00:02:51.330 that, frankly, was a pretty sad commentary\n00:02:53.330 on American CEOs in 1999. \n00:02:58.330 Asked later in the Canadian documentary, "The Corporation,"\n00:03:01.330 what I meant by the "go to jail" remark, \n00:03:04.330 I offered that theft is a crime. \n00:03:08.330 And theft of our children's future would someday be a crime. \n00:03:13.330 But I realized, for that to be true --\n00:03:15.330 for theft of our children's future to be a crime --\n00:03:18.330 there must be a clear, demonstrable alternative\n00:03:21.330 to the take-make-waste industrial system\n00:03:24.330 that so dominates our civilization, \n00:03:27.330 and is the major culprit, stealing our children's future, \n00:03:30.330 by digging up the earth\n00:03:32.330 and converting it to products that quickly become waste\n00:03:36.330 in a landfill or an incinerator -- \n00:03:38.330 in short, digging up the earth and converting it to pollution. \n00:03:43.330 According to Paul and Anne Ehrlich\n00:03:45.330 and a well-known environmental impact equation, \n00:03:48.330 impact -- a bad thing -- \n00:03:50.330 is the product of population, affluence and technology. \n00:03:54.330 That is, impact is generated by people, \n00:03:58.330 what they consume in their affluence, \n00:04:00.330 and how it is produced. \n00:04:03.330 And though the equation is largely subjective, \n00:04:05.330 you can perhaps quantify people, and perhaps quantify affluence, \n00:04:09.330 but technology is abusive in too many ways to quantify. \n00:04:13.330 So the equation is conceptual. \n00:04:15.330 Still it works to help us understand the problem. \n00:04:18.329 So we set out at Interface, in 1994, \n00:04:23.330 to create an example: \n00:04:25.330 to transform the way we made carpet, \n00:04:27.330 a petroleum-intensive product for materials as well as energy, \n00:04:31.330 and to transform our technologies\n00:04:33.330 so they diminished environmental impact, \n00:04:36.330 rather than multiplied it. \n00:04:39.330 Paul and Anne Ehrlich's environmental impact equation: \n00:04:42.330 I is equal to P times A times T: \n00:04:45.330 population, affluence and technology. \n00:04:48.330 I wanted Interface to rewrite that equation so that it read\n00:04:54.330 I equals P times A divided by T. \n00:04:57.330 Now, the mathematically-minded will see immediately\n00:05:00.330 that T in the numerator increases impact -- a bad thing --\n00:05:03.330 but T in the denominator decreases impact. \n00:05:07.330 So I ask, "What would move T, technology, \n00:05:11.330

from the numerator -- call it T1 --\n00:05:13.330 where it increases impact,\n00:05:15.330 to the denominator -- call it T2 --\n00:05:18.330 where it reduces impact?\n00:05:21.330 I thought about the characteristics\n00:05:25.330 of first industrial revolution,\n00:05:27.330 T1, as we practiced it at Interface,\n00:05:30.330 and it had the following characteristics.\n00:05:34.330 Extractive: taking raw materials from the earth.\n00:05:38.330 Linear: take, make, waste.\n00:05:41.330 Powered by fossil fuel-derived energy.\n00:05:43.330 Wasteful: abusive and focused on labor productivity.\n00:05:47.330 More carpet per man-hour.\n00:05:50.330 Thinking it through, I realized that all those attributes\n00:05:53.330 must be changed to move T to the denominator.\n00:05:58.330 In the new industrial revolution extractive must be replaced by renewable;\n00:06:03.330 linear by cyclical;\n00:06:05.330 fossil fuel energy by renewable energy, sunlight;\n00:06:09.330 wasteful by waste-free;\n00:06:11.330 and abusive by benign;\n00:06:13.330 and labor productivity by resource productivity.\n00:06:17.330 And I reasoned that if we could make those transformative changes,\n00:06:21.330 and get rid of T1 altogether,\n00:06:23.330 we could reduce our impact to zero,\n00:06:26.330 including our impact on the climate.\n00:06:29.330 And that became the Interface plan in 1995,\n00:06:32.330 and has been the plan ever since.\n00:06:35.330 We have measured our progress very rigorously.\n00:06:39.330 So I can tell you how far we have come in the ensuing 12 years.\n00:06:43.330 Net greenhouse gas emissions\n00:06:45.330 down 82 percent in absolute tonnage.\n00:06:49.330 (Applause)\n00:06:53.330 Over the same span of time\n00:06:55.330 sales have increased by two-thirds and profits have doubled.\n00:06:58.330 So an 82 percent absolute reduction\n00:07:01.330 translates into a 90 percent reduction\n00:07:03.330 in greenhouse gas intensity relative to sales.\n00:07:07.330 This is the magnitude\n00:07:09.330 of the reduction the entire global technosphere\n00:07:12.330 must realize by 2050\n00:07:15.330 to avoid catastrophic climate disruption --\n00:07:18.330 so the scientists are telling us.\n00:07:21.330 Fossil fuel usage is down 60 percent per unit of production,\n00:07:25.330 due to efficiencies in renewables.\n00:07:27.330 The cheapest, most secure barrel of oil there is\n00:07:30.330 is the one not used through efficiencies.\n00:07:33.330 Water usage is down 75 percent\n00:07:36.330 in our worldwide carpet tile business.\n00:07:38.330 Down 40 percent in our broadloom carpet business,\n00:07:41.330 which we acquired in 1993\n00:07:43.330 right here in California, City of Industry,\n00:07:45.330 where water is so precious.\n00:07:48.330 Renewable or recyclable materials are 25 percent of the total, and growing rapidly.\n00:07:52.330 Renewable energy is 27 percent of our total,\n00:07:55.330 going for 100 percent.\n00:07:57.330 We have diverted 148 million pounds --\n00:08:00.330 that's 74,000 tons --\n00:08:02.330 of used carpet from landfills,\n00:08:05.330 closing the loop on material flows\n00:08:07.330 through reverse logistics\n00:08:09.330 and post-consumer recycling technologies\n00:08:12.330 that did not exist when we started 14 years ago.\n00:08:16.330 Those new cyclical technologies\n00:08:18.330 have contributed mightily to the fact that we have produced and sold\n00:08:21.330 85 million square yards of climate-neutral carpet\n00:08:25.330 since 2004,\n00:08:27.330 meaning no net contribution to global climate disruption\n00:08:31.330 in producing the carpet throughout the supply chain,\n00:08:33.330 from mine and well head clear to end-of-life reclamation --\n00:08:38.330 independent third-party certified.\n00:08:40.330 We call it Cool Carpet.\n00:08:43.330 And it has been a powerful marketplace

differentiator,\n00:08:46.330 increasing sales and profits.\n00:08:48.330 Three years ago we launched carpet tile for the home,\n00:08:52.330 under the brand Flor,\n00:08:54.330 misspelled F-L-O-R.\n00:08:57.330 You can point and click today at Flor.com\n00:08:59.330 and have Cool Carpet delivered to your front door in five days.\n00:09:03.330 It is practical, and pretty too.\n00:09:06.330 (Laughter)\n00:09:07.330 (Applause)\n00:09:13.330 We reckon that we are a bit over halfway\n00:09:15.330 to our goal: zero impact, zero footprint.\n00:09:20.330 We've set 2020 as our target year for zero,\n00:09:23.330 for reaching the top, the summit of Mount Sustainability.\n00:09:28.330 We call this Mission Zero.\n00:09:30.330 And this is perhaps the most important facet:\n00:09:33.330 we have found Mission Zero to be incredibly good for business.\n00:09:37.330 A better business model,\n00:09:40.330 a better way to bigger profits.\n00:09:42.330 Here is the business case for sustainability.\n00:09:45.330 From real life experience, costs are down, not up,\n00:09:49.330 reflecting some 400 million dollars\n00:09:51.330 of avoided costs in pursuit of zero waste --\n00:09:55.330 the first face of Mount Sustainability.\n00:09:58.330 This has paid all the costs for the transformation of Interface.\n00:10:02.330 And this dispels a myth too,\n00:10:04.330 this false choice between the environment and the economy.\n00:10:08.330 Our products are the best they've ever been,\n00:10:10.330 inspired by design for sustainability,\n00:10:12.330 an unexpected wellspring of innovation.\n00:10:16.330 Our people are galvanized around this shared higher purpose.\n00:10:19.330 You cannot beat it for attracting the best people\n00:10:21.330 and bringing them together.\n00:10:24.330 And the goodwill of the marketplace is astonishing.\n00:10:27.330 No amount of advertising, no clever marketing campaign,\n00:10:31.330 at any price, could have produced or created\n00:10:34.330 this much goodwill.\n00:10:37.330 Costs, products, people, marketplaces --\n00:10:39.330 what else is there?\n00:10:41.330 It is a better business model.\n00:10:43.330 And here is our 14-year record of sales and profits.\n00:10:48.330 There is a dip there, from 2001 to 2003:\n00:10:51.330 a dip when our sales, over a three-year period,\n00:10:53.330 were down 17 percent.\n00:10:55.330 But the marketplace was down 36 percent.\n00:10:58.330 We literally gained market share.\n00:11:00.330 We might not have survived that recession\n00:11:03.330 but for the advantages of sustainability.\n00:11:06.330 If every business were pursuing Interface plans,\n00:11:10.330 would that solve all our problems?\n00:11:12.330 I don't think so.\n00:11:14.330 I remain troubled by the revised Ehrlich equation,\n00:11:17.330 $I = P \times A$ divided by T2.\n00:11:21.330 That A is a capital A,\n00:11:23.330 suggesting that affluence is an end in itself.\n00:11:28.330 But what if we reframed Ehrlich further?\n00:11:32.330 And what if we made A a lowercase a,\n00:11:35.330 suggesting that it is a means to an end,\n00:11:37.330 and that end is happiness --\n00:11:40.330 more happiness with less stuff.\n00:11:43.330 You know that would reframe civilization itself --\n00:11:46.330 (Applause) --\n00:11:54.330 and our whole system of economics,\n00:11:57.330 if not for our species, then perhaps for the one that succeeds us:\n00:12:03.330 the sustainable species, living on a finite earth,\n00:12:06.330 ethically, happily and ecologically\n00:12:09.330 in balance with nature\n00:12:11.330 and all her natural systems for a thousand generations,\n00:12:14.330 or 10,000 generations --\n00:12:16.330 that is to say, into the indefinite future.\n00:12:19.330 But does the earth have to wait for our extinction as a species?\n00:12:24.330 Well maybe so. But I don't think

so. At Interface we really intend to bring this prototypical sustainable, zero-footprint industrial company fully into existence by 2020. We can see our way now, clear to the top of that mountain. And now the challenge is in execution. And as my good friend and adviser Amory Lovins says, "If something exists, it must be possible." (Laughter) If we can actually do it, it must be possible. If we, a petro-intensive company can do it, anybody can. And if anybody can, it follows that everybody can. Hawken fulfilled business and industry, leading humankind away from the abyss because, with continued unchecked decline of the biosphere, a very dear person is at risk here -- frankly, an unacceptable risk. Who is that person? Not you. Not I. But let me introduce you to the one who is most at risk here. And I myself met this person in the early days of this mountain climb. On a Tuesday morning in March of 1996, I was talking to people, as I did at every opportunity back then, bringing them along and often not knowing whether I was connecting. But about five days later back in Atlanta, I received an email from Glenn Thomas, one of my people in the California meeting. He was sending me an original poem that he had composed after our Tuesday morning together. And when I read it it was one of the most uplifting moments of my life. Because it told me, by God, one person got it. Here is what Glenn wrote. And here is that person, most at risk. Please meet "Tomorrow's Child." "Without a name, an unseen face, and knowing not your time or place, Tomorrow's child, though yet unborn, I met you first last Tuesday morn. A wise friend introduced us two. And through his sobering point of view I saw a day that you would see, a day for you but not for me. Knowing you has changed my thinking. For I never had an inkling that perhaps the things I do might someday, somehow threaten you. Tomorrow's child, my daughter, son, I'm afraid I've just begun to think of you and of your good, though always having known I should. Begin, I will. The way the cost of what I squander, what is lost, if ever I forget that you will someday come and live here too." Well, every day of my life since, "Tomorrow's Child" has spoken to me with one simple but profound message, which I presume to share with you. We are, each and every one, a part of the web of life. The continuum of humanity, sure, but in a larger sense, the web of life itself. And we have a choice to make during our brief, brief visit to this beautiful blue and green living planet: to hurt it or to help it. For you, it's your call. Thank you. (Applause)

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<https://www.youtube.com/watch/IoRjz8iTVoo> In 1962, with Rachel Carson's "Silent Spring," I think for people like me in the world of the making of things, the canary in the mine wasn't singing. And so the question that we might not have birds became kind of fundamental to those of us wandering around looking for the meadowlarks that seemed to have all disappeared. And the question was, were the birds singing? Now, I'm not a scientist, that'll be really clear. But, you know, we've just come from this discussion of what a bird might be. What is a bird? Well, in my world, this is a rubber duck. It comes in California with a warning -- "This product contains chemicals known by the State of California to cause cancer and birth defects or other reproductive harm." This is a bird. What kind of culture would produce a product of this kind and then label it and sell it to children? I think we have a design problem. Someone heard the six hours of talk that I gave called "The Monticello Dialogues" on NPR, and sent me this as a thank you note -- "We realize that design is a signal of intention, but it also has to occur within a world, and we have to understand that world in order to imbue our designs with inherent intelligence, and so as we look back at the basic state of affairs in which we design, we, in a way, need to go to the primordial condition to understand the operating system and the frame conditions of a planet, and I think the exciting part of that is the good news that's there, because the news is the news of abundance, and not the news of limits, and I think as our culture tortures itself now with tyrannies and concerns over limits and fear, we can add this other dimension of abundance that is coherent, driven by the sun, and start to imagine what that would be like to share." That was a nice thing to get. That was one sentence. Henry James would be proud. This is -- I put it down at the bottom, but that was extemporaneous, obviously. The fundamental issue is that, for me, design is the first signal of human intentions. So what are our intentions, and what would our intentions be -- if we wake up in the morning, we have designs on the world -- well, what would our intention be as a species now that we're the dominant species? And it's not just stewardship and dominion debate, because really, dominion is implicit in stewardship -- because how could you dominate something you had killed? And stewardship's implicit in dominion, because you can't be steward of something if you can't dominate it. So the question is, what is the first question for designers? Now, as guardians -- let's say the state, for example, which reserves the right to kill, the right to be duplicitous and so on -- the question we're asking the guardian at this point is, are we meant, how are we meant, to secure local societies, create world peace and save the environment? But I don't know that that's the common debate. Commerce, on the other hand, is relatively quick, essentially creative, highly effective and efficient, and fundamentally

honest, because we can't exchange value for very long if we don't trust each other. So we use the tools of commerce primarily for our work, but the question we bring to it is, how do we love all the children of all species for all time? And so we start our designs with that question. Because what we realize today is that modern culture appears to have adopted a strategy of tragedy. If we come here and say, "Well, I didn't intend to cause global warming on the way here," and we say, "That's not part of my plan," then we realize it's part of our de facto plan. Because it's the thing that's happening because we have no other plan. And I was at the White House for President Bush, meeting with every federal department and agency, and I pointed out that they appear to have no plan. If the end game is global warming, they're doing great. If the end game is mercury toxification of our children downwind of coal fire plants as they scuttled the Clean Air Act, then I see that our education programs should be explicitly defined as, "Brain death for all children. No child left behind." (Applause) So, the question is, how many federal officials are ready to move to Ohio and Pennsylvania with their families? So if you don't have an endgame of something delightful, then you're just moving chess pieces around, if you don't know you're taking the king. So perhaps we could develop a strategy of change, which requires humility. And in my business as an architect, it's unfortunate the word "humility" and the word "architect" have not appeared in the same paragraph since "The Fountainhead." So if anybody here has trouble with the concept of design humility, reflect on this -- it took us 5,000 years to put wheels on our luggage. So, as Kevin Kelly pointed out, there is no endgame. There is an infinite game, and we're playing in that infinite game. And so we call it "cradle to cradle," and our goal is very simple. This is what I presented to the White House. Our goal is a delightfully diverse, safe, healthy and just world, with clean air, clean water, soil and power -- economically, equitably, ecologically and elegantly enjoyed, period. (Applause) What don't you like about this? Which part of this don't you like? So we realized we want full diversity, even though it can be difficult to remember what De Gaulle said when asked what it was like to be President of France. He said, "What do you think it's like trying to run a country with 400 kinds of cheese?" But at the same time, we realize that our products are not safe and healthy. So we've designed products and we analyzed chemicals down to the parts per million. This is a baby blanket by Pendleton that will give your child nutrition instead of Alzheimer's later in life. We can ask ourselves, what is justice, and is justice blind, or is justice blindness? And at what point did that uniform turn from white to black? Water has been declared a human right by the United

Nations.\n00:06:46.000 Air quality is an obvious thing to anyone who
breathes.\n00:06:48.000 Is there anybody here who doesn't breathe?\n00:06:51.000
Clean soil is a critical problem -- the nitrification, the dead zones\n00:06:54.000 in
the Gulf of Mexico.\n00:06:56.000 A fundamental issue that's not being
addressed.\n00:06:58.000 We've seen the first form of solar energy\n00:07:00.000
that's beat the hegemony of fossil fuels in the form of wind\n00:07:03.000 here
in the Great Plains, and so that hegemony is leaving.\n00:07:06.000 And if we remember
Sheikh Yamani when he formed OPEC,\n00:07:09.000 they asked him, "When will we
see the end of the age of oil?"\n00:07:12.000 I don't know if you remember
his answer, but it was,\n00:07:15.000 "The Stone Age didn't end because we
ran out of stones."\n00:07:19.000 We see that companies acting ethically in this
world\n00:07:23.000 are outperforming those that don't.\n00:07:24.000 We see the
flows of materials in a rather terrifying prospect.\n00:07:29.000 This is a hospital
monitor from Los Angeles, sent to China.\n00:07:32.000 This woman will expose herself
to toxic phosphorous,\n00:07:35.000 release four pounds of toxic lead into her
childrens'; environment,\n00:07:38.000 which is from copper.\n00:07:40.000 On the
other hand, we see great signs of hope.\n00:07:42.000 Here's Dr. Venkataswamy in
India, who's figured out\n00:07:45.000 how to do mass-produced
health.\n00:07:47.000 He has given eyesight to two million people for
free.\n00:07:51.000 We see in our material flows that car steels don't become car
steel again\n00:07:54.000 because of the contaminants of the coatings --\n00:07:56.000
bismuth, antimony, copper and so on.\n00:07:58.000 They become building
steel.\n00:07:59.000 On the other hand, we're working with Berkshire
Hathaway,\n00:08:01.000 Warren Buffett and Shaw Carpet,\n00:08:04.000 the largest
carpet company in the world.\n00:08:05.000 We've developed a carpet that is
continuously recyclable,\n00:08:08.000 down to the parts per million.\n00:08:11.000
The upper is Nylon 6 that can go back to caprolactam,\n00:08:14.000 the bottom, a
polyolephine -- infinitely recyclable thermoplastic.\n00:08:17.000 Now if I was a bird,
the building on my left is a liability.\n00:08:21.000 The building on my right, which
is our corporate campus for The Gap\n00:08:24.000 with an ancient meadow, is an asset
-- its nesting grounds.\n00:08:29.000 Here's where I come from. I grew up in Hong
Kong,\n00:08:31.000 with six million people in 40 square miles.\n00:08:33.000 During
the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the
relationship to landscape was that of farmers who have been\n00:08:40.000 farming the
same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same
piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient
flow.\n00:08:49.000 My childhood summers were in the Puget Sound of
Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My
grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of
tree karma I am working off.\n00:09:01.000 I went to Yale for graduate
school,\n00:09:03.000 studied in a building of this style by Le
Corbusier,\n00:09:05.000 affectionately known in our business as
Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see
with Mies'; 1928 tower for Berlin,\n00:09:15.000 the question might be, "Well,
where's the sun?"\n00:09:17.000 And this might have worked in Berlin, but we
built it in Houston,\n00:09:20.000 and the windows are all closed. And with most
products\n00:09:23.000 appearing not to have been designed for indoor
use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went
to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first

solar-heated house in Ireland\n00:09:33.000 as a student, which I then built --
\n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard
Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give
me criticism,\n00:09:41.000 and he would say, "Bill, you've got to
understand- --\n00:09:43.000 solar energy has nothing to do with
architecture."\n00:09:51.000 I guess he didn't read Vitruvius.\n00:09:53.000
In 1984, we did the first so-called "green office" in America\n00:09:57.000
for Environmental Defense.\n00:09:58.000 We started asking manufacturers what were in
their materials.\n00:10:01.000 They said, "They're proprietary, they're
legal, go away."\n00:10:03.000 The only indoor quality work done in this country
at that time\n00:10:05.000 was sponsored by R. J. Reynolds Tobacco
Company,\n00:10:08.000 and it was to prove there was no danger\n00:10:09.000 from
secondhand smoke in the workplace.\n00:10:12.000 So, all of a sudden, here I am,
graduating from high school in 1969,\n00:10:16.000 and this happens, and we realize
that "away" went away.\n00:10:19.000 Remember we used to throw things away,
and we'd point to away?\n00:10:23.000 And yet, NOAA has now shown us, for example
--\n00:10:25.000 you see that little blue thing above Hawaii?\n00:10:27.000
That's the Pacific Gyre.\n00:10:28.000 It was recently dragged for plankton by
scientists,\n00:10:30.000 and they found six times as much plastic as
plankton.\n00:10:34.000 When asked, they said, "It's kind of like a giant
toilet that doesn't flush."\n00:10:39.000 Perhaps that's
away.\n00:10:40.000 So we're looking for the design rules of this --
\n00:10:42.000 this is the highest biodiversity of trees in the world, Irian
Jaya,\n00:10:44.000 259 species of tree, and we described this\n00:10:48.000 in the
book, "Cradle to Cradle."\n00:10:49.000 The book itself is a polymer. It is
not a tree.\n00:10:53.000 That's the name of the first chapter -- "This Book
is Not a Tree."\n00:10:56.000 Because in poetics, as Margaret Atwood pointed
out,\n00:10:59.000 "we write our history on the skin of fish\n00:11:01.000 with
the blood of bears."\n00:11:04.000 And with so much polymer, what we really
need\n00:11:05.000 is technical nutrition, and to use something\n00:11:08.000 as
elegant as a tree -- imagine this design assignment:\n00:11:11.000 Design something
that makes oxygen, sequesters carbon,\n00:11:13.000 fixes nitrogen, distills water,
accrues solar energy as fuel,\n00:11:17.000 makes complex sugars and food, creates
microclimates,\n00:11:21.000 changes colors with the seasons and self-
replicates.\n00:11:27.000 Well, why don't we knock that down and write on
it?\n00:11:29.000 (Laughter)\n00:11:35.000 So, we're looking at the same
criteria\n00:11:37.000 as most people -- you know, can I afford it?\n00:11:39.000 Does
it work? Do I like it?\n00:11:41.000 We're adding the Jeffersonian agenda, and I
come from Charlottesville,\n00:11:43.000 where I've had the privilege of living
in a house designed by Thomas Jefferson.\n00:11:47.000 We're adding life, liberty
and the pursuit of happiness.\n00:11:53.000 Now if we look at the word
"competition,"\n00:11:54.000 I'm sure most of you've used
it.\n00:11:56.000 You know, most people don't realize it comes from\n00:11:57.000
the Latin competere, which means strive together.\n00:12:00.000 It means the way
Olympic athletes train with each other.\n00:12:03.000 They get fit together, and then
they compete.\n00:12:06.000 The Williams sisters compete -- one wins
Wimbledon.\n00:12:08.000 So we've been looking at the idea of
competition\n00:12:11.000 as a way of cooperating in order to get fit
together.\n00:12:15.000 And the Chinese government has now --\n00:12:16.000 I work

with the Chinese government now --\n00:12:18.000 has taken this up.\n00:12:20.000 We're also looking at survival of the fittest,\n00:12:22.000 not in just competition terms in our modern context\n00:12:24.000 of destroy the other or beat them to the ground,\n00:12:27.000 but really to fit together and build niches\n00:12:29.000 and have growth that is good.\n00:12:31.000 Now most environmentalists don't say growth is good,\n00:12:33.000 because, in our lexicon, asphalt is two words: assigning blame.\n00:12:38.000 But if we look at asphalt as our growth,\n00:12:41.000 then we realize that all we're doing is destroying\n00:12:43.000 the planetary's fundamental underlying operating system.\n00:12:47.000 So when we see E equals mc squared come along, from a poet's perspective,\n00:12:52.000 we see energy as physics, chemistry as mass,\n00:12:54.000 and all of a sudden, you get this biology.\n00:12:56.000 And we have plenty of energy, so we'll solve that problem,\n00:12:59.000 but the biology problem's tricky, because as we put through\n00:13:02.000 all these toxic materials that we disgorge,\n00:13:05.000 we will never be able to recover that.\n00:13:07.000 And as Francis Crick pointed out, nine years\n00:13:09.000 after discovering DNA with Mr. Watson,\n00:13:12.000 that life itself has to have growth as a precondition --\n00:13:16.000 it has to have free energy, sunlight\n00:13:18.000 and it needs to be an open system of chemicals.\n00:13:21.000 So we're asking for human artifice to become a living thing,\n00:13:24.000 and we want growth, we want free energy from sunlight\n00:13:26.000 and we want an open metabolism for chemicals.\n00:13:29.000 Then, the question becomes not growth or no growth,\n00:13:31.000 but what do you want to grow?\n00:13:34.000 So instead of just growing destruction,\n00:13:36.000 we want to grow the things that we might enjoy,\n00:13:38.000 and someday the FDA will allow us to make French cheese.\n00:13:41.000 So therefore, we have these two metabolisms,\n00:13:45.000 and I worked with a German chemist, Michael Braungart,\n00:13:47.000 and we've identified the two fundamental metabolisms.\n00:13:49.000 The biological one I'm sure you understand,\n00:13:51.000 but also the technical one, where we take materials\n00:13:53.000 and put them into closed cycles.\n00:13:55.000 We call them biological nutrition and technical nutrition.\n00:13:58.000 Technical nutrition will be in an order of magnitude of biological nutrition.\n00:14:02.000 Biological nutrition can supply about 500 million humans,\n00:14:05.000 which means that if we all wore Birkenstocks and cotton,\n00:14:07.000 the world would run out of cork and dry up.\n00:14:10.000 So we need materials in closed cycles,\n00:14:12.000 but we need to analyze them down to the parts per million\n00:14:14.000 for cancer, birth defects, mutagenic effects,\n00:14:17.000 disruption of our immune systems, biodegradation, persistence,\n00:14:20.000 heavy metal content, knowledge of how we're making them\n00:14:23.000 and their production and so on.\n00:14:25.000 Our first product was a textile where we analyzed 8,000 chemicals\n00:14:29.000 in the textile industry.\n00:14:30.000 Using those intellectual filters, we eliminated [7,962.]\n00:14:35.000 We were left with 38 chemicals.\n00:14:37.000 We have since databased the 4000 most commonly used chemicals\n00:14:40.000 in human manufacturing, and we're releasing this database into the public in six weeks.\n00:14:45.000 So designers all over the world can analyze their products\n00:14:47.000 down to the parts per million for human and ecological health.\n00:14:52.000 (Applause)\n00:14:57.000 We've developed a protocol so that companies can send\n00:15:00.000 these same messages all the way through their supply chains,\n00:15:03.000 because when we asked most companies we work with -- about a

trillion dollars\n00:15:06.000 -- and say, "Where does your stuff come from?"
They say, "Suppliers."\n00:15:08.000 "And where does it
go?"\n00:15:10.000 "Customers."\n00:15:11.000 So we need some help
there.\n00:15:12.000 So the biological nutrients, the first fabrics --\n00:15:14.000 the water coming out was clean enough to drink.\n00:15:16.000 Technical nutrients --
this is for Shaw Carpet, infinitely reusable carpet.\n00:15:20.000 Here's nylon
going back to caprolactam back to carpet.\n00:15:23.000 Biotechnical nutrients -- the
Model U for Ford Motor,\n00:15:26.000 a cradle to cradle car -- concept
car.\n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely
recyclable,\n00:15:32.000 the bottoms are biodegradable soles.\n00:15:35.000 Wear your
old shoes in, your new shoes out.\n00:15:37.000 There is no finish line.\n00:15:39.000 The idea here of the car is that some of the materials\n00:15:41.000 go back to the
industry forever, some of the materials go back to soil --\n00:15:44.000 it's all
solar-powered.\n00:15:46.000 Here's a building at Oberlin College we
designed\n00:15:48.000 that makes more energy than it needs to operate and purifies
its own water.\n00:15:52.000 Here's a building for The Gap, where the ancient
grasses\n00:15:54.000 of San Bruno, California, are on the roof.\n00:15:58.000 And
this is our project for Ford Motor Company.\n00:16:00.000 It's the revitalization
of the River Rouge in Dearborn.\n00:16:02.000 This is obviously a color
photograph.\n00:16:06.000 These are our tools. These are how we sold it to
Ford.\n00:16:10.000 We saved Ford 35 million dollars doing it this way, day
one,\n00:16:13.000 which is the equivalent of the Ford Taurus\n00:16:15.000 at a four
percent margin of an order for 900 million dollars worth of cars.\n00:16:19.000 Here
it is. It's the world's largest green roof, 10 and a half
acres.\n00:16:22.000 This is the roof, saving money,\n00:16:25.000 and this is the
first species to arrive here. These are killdeer.\n00:16:29.000 They showed up in five
days.\n00:16:32.000 And we now have 350-pound auto workers\n00:16:34.000 learning bird
songs on the Internet.\n00:16:38.000 We're developing now protocols for cities --
\n00:16:40.000 that's the home of technical nutrients.\n00:16:42.000 The country
-- the home of biological. And putting them together.\n00:16:45.000 And so I will
finish by showing you a new city\n00:16:47.000 we're designing for the Chinese
government.\n00:16:49.000 We're doing 12 cities for China right
now,\n00:16:52.000 based on cradle to cradle as templates.\n00:16:54.000 Our
assignment is to develop protocols for the housing\n00:16:57.000 for 400 million
people in 12 years.\n00:16:59.000 We did a mass energy balance -- if they use
brick,\n00:17:01.000 they will lose all their soil and burn all their
coal.\n00:17:04.000 They'll have cities with no energy and no food.\n00:17:06.000 We signed a Memorandum of Understanding --\n00:17:08.000 here's Madam Deng Nan,
Deng Xiaoping's daughter --\n00:17:10.000 for China to adopt cradle to
cradle.\n00:17:12.000 Because if they toxify themselves, being the lowest-cost
producer,\n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart --
\n00:17:18.000 and then we send them all our money, what we'll discover is
that\n00:17:21.000 we have what, effectively, when I was a student,\n00:17:24.000 was
called mutually assured destruction.\n00:17:27.000 Now we do it by molecule. These are
our cities.\n00:17:30.000 We're building a new city next to this city; look at
that landscape.\n00:17:33.000 This is the site.\n00:17:35.000 We don't normally
do green fields, but this one is about to be built,\n00:17:39.000 so they brought us
in to intercede.\n00:17:41.000 This is their plan.\n00:17:43.000 It's a rubber
stamp grid that they laid right on that landscape.\n00:17:46.000 And they brought us

in and said, "What would you do?"\n00:17:49.000 This is what they would end up with, which is another color photograph.\n00:17:53.000 So this is the existing site, so this is what it looks like now,\n00:17:56.000 and here's our proposal.\n00:17:58.000 (Applause)\n00:18:02.000 So the way we approached this\n00:18:04.000 is we studied the hydrology very carefully.\n00:18:06.000 We studied the biota, the ancient biota,\n00:18:08.000 the current farming and the protocols.\n00:18:10.000 We studied the winds and the sun to make sure everybody in the city\n00:18:12.000 will have fresh air, fresh water and direct sunlight\n00:18:18.000 in every single apartment at some point during the day.\n00:18:21.000 We then take the parks and lay them out as ecological infrastructure.\n00:18:25.000 We lay out the building areas.\n00:18:28.000 We start to integrate commercial and mixed use\n00:18:29.000 so the people all have centers and places to be.\n00:18:32.000 The transportation is all very simple,\n00:18:34.000 everybody's within a five-minute walk of mobility.\n00:18:37.000 We have a 24-hour street, so that there's always a place that's alive.\n00:18:42.000 The waste systems all connect.\n00:18:44.000 If you flush a toilet, your feces will go to the sewage treatment plants,\n00:18:49.000 which are sold as assets, not liabilities.\n00:18:51.000 Because who wants the fertilizer factory that makes natural gas?\n00:18:55.000 The waters are all taken in to construct the wetlands for habitat restorations.\n00:19:00.000 And then it makes natural gas, which then goes back into the city\n00:19:04.000 to power the fuel for the cooking for the city.\n00:19:08.000 So this is -- these are fertilizer gas plants.\n00:19:10.000 And then the compost is all taken back\n00:19:13.000 to the roofs of the city, where we've got farming,\n00:19:15.000 because what we've done is lifted up the city,\n00:19:19.000 the landscape, into the air to -- to restore the native landscape\n00:19:26.000 on the roofs of the buildings.\n00:19:28.000 The solar power of all the factory centers\n00:19:31.000 and all the industrial zones with their light roofs powers the city.\n00:19:34.000 And this is the concept for the top of the city.\n00:19:36.000 We've lifted the earth up onto the roofs.\n00:19:40.000 The farmers have little bridges to get from one roof to the next.\n00:19:44.000 We inhabit the city with work/live space on all the ground floors.\n00:19:48.000 And so this is the existing city, and this is the new city.\n00:19:53.000 (Applause)"

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\n\n\nv\n\nForeword\n\nPredictions of the future can be hazardous or downright foolish. But the \nfailure of foresight\u2014the inability to read the hand-writing on the wall\u2014is \neven more so. Designers of all kinds work in the conflicted space between \nthese two poles. Their goal is to improve small parts of a rapidly changing \nworld with the tools of form, scale, materials, energy, water, color, landscape, \nand the creativity that is found most often at the grassroots level. But what \nneeds to be improved?\n\nThe short answer is \u201ca great deal,\u201d including an energy system that is rapidly \ndestabilizing the climate, an economy driving tens of thousands of species to \nextinction, a political system that sanctions gross inequality, an uncivil society, \nthegrowing autism toward the natural world, and a global system mired in \nconflict. These are related problems, parts of a larger civilizational crisis with \nroots traceable to the seventeenth century authors of the mechanical world \nview. But there are deeper pathologies with footprints back to our ancient \nschizophrenia toward the natural world that had to be tamed a bit before it \ncould be appreciated.\n\nDesigners, however, typically do not work at the macro scale of civilization \nfor good reasons. Whether as architecture, engineering, materials, or land-\nscales, design is bounded by the minute particulars of projects intheir spe-\ncific social, cultural, and historical context. As a result designers work from the \nbottom up on projects at the building, neighborhood, and

city scales. But the big problems mentioned above are in large part the sum total of bad design (including that of public policies) at lower levels. There are many reasons for bad design, not the least of which is a professional focus on form-making, often oblivious to other consequences.

Beginning in the 1970s a few renegade architects like Sim Van der Ryn in California became concerned about the collateral environmental impacts of the design professions. Van der Ryn envisioned ecological design as the calibration of buildings with their places, which required further integral understanding of landscapes, energy flows, waste cycling, materials, sun-light, water, and ecological processes. Ecological design, in other words, aims to calibrate human actions with the way natural systems work as particular places, larger landscapes, and whole ecologies. It aims to work with, not against, the flows of energy and natural cycling of materials. The goal, in short, was to reduce environmental impacts of the built environment in a civilization that prized economic expansion above all else with hardly a thought for the morrow.

What began so modestly in the 1970s has rapidly grown into a global movement to harmonize buildings, neighborhoods, and cities with the surrounding nature. After the publication of the Brundtland Commission report in 1987, the goals of ecological designers expanded to embrace the wider (but vague) mission of sustainability. But we know now that that word signifies more than was once assumed. Sustainability is the sum total of other qualities. As Chattanooga City Councilman, David Crockett puts it: make it clean, green, safe, and fair and it will be sustainable. The left side of that equation, however, requires the elimination of the growing inequality that is a precursor to violence and ruined lives. It further requires rethinking our core assumptions about the relation between economic growth and real progress. Ecological design, in other words, must be large enough in foresight, scope, and heart to include the social and economic environment in which it is embedded. In that way ecological design is a radical endeavor in the true sense of the word, it gets to the root of what ails us.

The work described in this book takes design to yet another level that aims to regenerate the fabric of life and repair the wounds and tears inflicted by the carelessness of the fossil-fuel-powered growth economy. Regenerative design strives to create the conditions of health which ecologist Aldo Leopold once defined as the capacity of the land for self-renewal. It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, in the Foreword vii design, unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature.

In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, transcend utility and conventional function-led, and especially technology-led approaches. Designers, in his view, must rise above the calculated creation of dissatisfaction and think more comprehensively about the products we already produce and their implications.

Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as

designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other the things that we once did naturally as capable people, good neighbors, and active citizens. It helps ground us by better informing us of where we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance.

We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens who use them to train young people in the essentials of managed integrated ecologies.

⁵ Foreword

Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.⁶ Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things.

A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.⁷ These will likely cause interruptions in supplies of food, energy, and water and could trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.⁸

The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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 https://www.youtube.com/watch/iP9QF_lBOyA\n00:00:18.330 Believe me or not, I come
 offering a solution\n00:00:22.330 to a very important part of this larger

problem,\n00:00:26.330 with the requisite focus on climate.\n00:00:28.330 And the solution I offer\n00:00:30.330 is to the biggest culprit\n00:00:32.330 in this massive mistreatment of the earth\n00:00:36.330 by humankind,\n00:00:38.330 and the resulting decline of the biosphere.\n00:00:41.330 That culprit is business and industry,\n00:00:44.330 which happens to be where I have spent the last 52 years\n00:00:47.330 since my graduation from Georgia Tech in 1956.\n00:00:51.330 As an industrial engineer,\n00:00:53.330 cum aspiring and then successful entrepreneur.\n00:00:57.330 After founding my company, Interface, from scratch\n00:01:00.330 in 1973, 36 years ago,\n00:01:03.330 to produce carpet tiles in America\n00:01:05.330 for the business and institution markets,\n00:01:08.330 and shepherding it through start-up and survival\n00:01:11.330 to prosperity and global dominance in its field,\n00:01:14.330 I read Paul Hawken's book,\n00:01:16.330 "The Ecology of Commerce," \n00:01:18.330 the summer of 1994. \n00:01:21.330 In his book, Paul charges business and industry\n00:01:24.330 as, one, the major culprit\n00:01:27.330 in causing the decline of the biosphere,\n00:01:29.330 and, two, the only institution that is large enough,\n00:01:32.330 and pervasive enough, and powerful enough,\n00:01:34.330 to really lead humankind out of this mess.\n00:01:38.330 And by the way he convicted me\n00:01:41.330 as a plunderer of the earth.\n00:01:43.330 And I then challenged the people of Interface, my company,\n00:01:46.330 to lead our company and the entire industrial world to sustainability,\n00:01:50.330 which we defined as eventually operating\n00:01:52.330 our petroleum-intensive company in such a way\n00:01:55.330 as to take from the earth\n00:01:57.330 only what can be renewed by the earth, naturally and rapidly -- \n00:02:01.330 not another fresh drop of oil --\n00:02:03.330 and to do no harm to the biosphere.\n00:02:07.330 Take nothing: do no harm.\n00:02:09.330 I simply said, "If Hawken is right\n00:02:11.330 and business and industry must lead,\n00:02:13.330 who will lead business and industry?\n00:02:15.330 Unless somebody leads, nobody will." \n00:02:18.330 It's axiomatic. Why not us?\n00:02:21.330 And thanks to the people of Interface,\n00:02:23.330 I have become a recovering plunderer.\n00:02:26.330 (Laughter)\n00:02:27.330 (Applause)\n00:02:32.330 I once told a Fortune Magazine writer\n00:02:36.330 that someday people like me would go to jail.\n00:02:39.330 And that became the headline of a Fortune article.\n00:02:41.330 They went on to describe me as America's greenest CEO.\n00:02:45.330 From plunderer to recovering plunderer,\n00:02:48.330 to America's greenest CEO in five years --\n00:02:51.330 that, frankly, was a pretty sad commentary\n00:02:53.330 on American CEOs in 1999.\n00:02:58.330 Asked later in the Canadian documentary, "The Corporation," \n00:03:01.330 what I meant by the "go to jail" remark,\n00:03:04.330 I offered that theft is a crime.\n00:03:08.330 And theft of our children's future would someday be a crime.\n00:03:13.330 But I realized, for that to be true --\n00:03:15.330 for theft of our children's future to be a crime --\n00:03:18.330 there must be a clear, demonstrable alternative\n00:03:21.330 to the take-make-waste industrial system\n00:03:24.330 that so dominates our civilization,\n00:03:27.330 and is the major culprit, stealing our children's future,\n00:03:30.330 by digging up the earth\n00:03:32.330 and converting it to products that quickly become waste\n00:03:36.330 in a landfill or an incinerator -- \n00:03:38.330 in short, digging up the earth and converting it to pollution.\n00:03:43.330 According to Paul and Anne Ehrlich\n00:03:45.330 and a well-known environmental impact equation,\n00:03:48.330 impact -- a bad thing -- \n00:03:50.330 is the product of population, affluence and technology.\n00:03:54.330

That is, impact is generated by people, \n00:03:58.330 what they consume in their affluence, \n00:04:00.330 and how it is produced. \n00:04:03.330 And though the equation is largely subjective, \n00:04:05.330 you can perhaps quantify people, and perhaps quantify affluence, \n00:04:09.330 but technology is abusive in too many ways to quantify. \n00:04:13.330 So the equation is conceptual. \n00:04:15.330 Still it works to help us understand the problem. \n00:04:18.329 So we set out at Interface, in 1994, \n00:04:23.330 to create an example: \n00:04:25.330 to transform the way we made carpet, \n00:04:27.330 a petroleum-intensive product for materials as well as energy, \n00:04:31.330 and to transform our technologies \n00:04:33.330 so they diminished environmental impact, \n00:04:36.330 rather than multiplied it. \n00:04:39.330 Paul and Anne Ehrlich's environmental impact equation: \n00:04:42.330 $I = P \times A \times T$ \n00:04:45.330 population, affluence and technology. \n00:04:48.330 I wanted Interface to rewrite that equation so that it read \n00:04:54.330 $I = P \times A / T$ \n00:04:57.330 Now, the mathematically-minded will see immediately \n00:05:00.330 that T in the numerator increases impact -- a bad thing -- \n00:05:03.330 but T in the denominator decreases impact. \n00:05:07.330 So I ask, "What would move T, technology, \n00:05:11.330 from the numerator -- call it T1 -- \n00:05:13.330 where it increases impact, \n00:05:15.330 to the denominator -- call it T2 -- \n00:05:18.330 where it reduces impact?" \n00:05:21.330 I thought about the characteristics \n00:05:25.330 of first industrial revolution, \n00:05:27.330 T1, as we practiced it at Interface, \n00:05:30.330 and it had the following characteristics. \n00:05:34.330 Extractive: taking raw materials from the earth. \n00:05:38.330 Linear: take, make, waste. \n00:05:41.330 Powered by fossil fuel-derived energy. \n00:05:43.330 Wasteful: abusive and focused on labor productivity. \n00:05:47.330 More carpet per man-hour. \n00:05:50.330 Thinking it through, I realized that all those attributes \n00:05:53.330 must be changed to move T to the denominator. \n00:05:58.330 In the new industrial revolution extractive must be replaced by renewable; \n00:06:03.330 linear by cyclical; \n00:06:05.330 fossil fuel energy by renewable energy, sunlight; \n00:06:09.330 wasteful by waste-free; \n00:06:11.330 and abusive by benign; \n00:06:13.330 and labor productivity by resource productivity. \n00:06:17.330 And I reasoned that if we could make those transformative changes, \n00:06:21.330 and get rid of T1 altogether, \n00:06:23.330 we could reduce our impact to zero, \n00:06:26.330 including our impact on the climate. \n00:06:29.330 And that became the Interface plan in 1995, \n00:06:32.330 and has been the plan ever since. \n00:06:35.330 We have measured our progress very rigorously. \n00:06:39.330 So I can tell you how far we have come in the ensuing 12 years. \n00:06:43.330 Net greenhouse gas emissions \n00:06:45.330 down 82 percent in absolute tonnage. \n00:06:49.330 (Applause) \n00:06:53.330 Over the same span of time \n00:06:55.330 sales have increased by two-thirds and profits have doubled. \n00:06:58.330 So an 82 percent absolute reduction \n00:07:01.330 translates into a 90 percent reduction \n00:07:03.330 in greenhouse gas intensity relative to sales. \n00:07:07.330 This is the magnitude \n00:07:09.330 of the reduction the entire global technosphere \n00:07:12.330 must realize by 2050 \n00:07:15.330 to avoid catastrophic climate disruption -- \n00:07:18.330 so the scientists are telling us. \n00:07:21.330 Fossil fuel usage is down 60 percent per unit of production, \n00:07:25.330 due to efficiencies in renewables. \n00:07:27.330 The cheapest, most secure barrel of oil there is \n00:07:30.330 is the one not used through efficiencies. \n00:07:33.330 Water usage is down 75 percent \n00:07:36.330 in our

worldwide carpet tile business.\n00:07:38.330 Down 40 percent in our broadloom carpet business,\n00:07:41.330 which we acquired in 1993\n00:07:43.330 right here in California, City of Industry,\n00:07:45.330 where water is so precious.\n00:07:48.330 Renewable or recyclable materials are 25 percent of the total, and growing rapidly.\n00:07:52.330 Renewable energy is 27 percent of our total,\n00:07:55.330 going for 100 percent.\n00:07:57.330 We have diverted 148 million pounds --\n00:08:00.330 that's 74,000 tons --\n00:08:02.330 of used carpet from landfills,\n00:08:05.330 closing the loop on material flows\n00:08:07.330 through reverse logistics\n00:08:09.330 and post-consumer recycling technologies\n00:08:12.330 that did not exist when we started 14 years ago.\n00:08:16.330 Those new cyclical technologies\n00:08:18.330 have contributed mightily to the fact that we have produced and sold\n00:08:21.330 85 million square yards of climate-neutral carpet\n00:08:25.330 since 2004,\n00:08:27.330 meaning no net contribution to global climate disruption\n00:08:31.330 in producing the carpet throughout the supply chain,\n00:08:33.330 from mine and well head clear to end-of-life reclamation --\n00:08:38.330 independent third-party certified.\n00:08:40.330 We call it Cool Carpet.\n00:08:43.330 And it has been a powerful marketplace differentiator,\n00:08:46.330 increasing sales and profits.\n00:08:48.330 Three years ago we launched carpet tile for the home,\n00:08:52.330 under the brand Flor,\n00:08:54.330 misspelled F-L-O-R.\n00:08:57.330 You can point and click today at Flor.com\n00:08:59.330 and have Cool Carpet delivered to your front door in five days.\n00:09:03.330 It is practical, and pretty too.\n00:09:06.330 (Laughter)\n00:09:07.330 (Applause)\n00:09:13.330 We reckon that we are a bit over halfway\n00:09:15.330 to our goal: zero impact, zero footprint.\n00:09:20.330 We've set 2020 as our target year for zero,\n00:09:23.330 for reaching the top, the summit of Mount Sustainability.\n00:09:28.330 We call this Mission Zero.\n00:09:30.330 And this is perhaps the most important facet:\n00:09:33.330 we have found Mission Zero to be incredibly good for business.\n00:09:37.330 A better business model,\n00:09:40.330 a better way to bigger profits.\n00:09:42.330 Here is the business case for sustainability.\n00:09:45.330 From real life experience, costs are down, not up,\n00:09:49.330 reflecting some 400 million dollars\n00:09:51.330 of avoided costs in pursuit of zero waste --\n00:09:55.330 the first face of Mount Sustainability.\n00:09:58.330 This has paid all the costs for the transformation of Interface.\n00:10:02.330 And this dispels a myth too,\n00:10:04.330 this false choice between the environment and the economy.\n00:10:08.330 Our products are the best they've ever been,\n00:10:10.330 inspired by design for sustainability,\n00:10:12.330 an unexpected wellspring of innovation.\n00:10:16.330 Our people are galvanized around this shared higher purpose.\n00:10:19.330 You cannot beat it for attracting the best people\n00:10:21.330 and bringing them together.\n00:10:24.330 And the goodwill of the marketplace is astonishing.\n00:10:27.330 No amount of advertising, no clever marketing campaign,\n00:10:31.330 at any price, could have produced or created\n00:10:34.330 this much goodwill.\n00:10:37.330 Costs, products, people, marketplaces --\n00:10:39.330 what else is there?\n00:10:41.330 It is a better business model.\n00:10:43.330 And here is our 14-year record of sales and profits.\n00:10:48.330 There is a dip there, from 2001 to 2003:\n00:10:51.330 a dip when our sales, over a three-year period,\n00:10:53.330 were down 17 percent.\n00:10:55.330 But the marketplace was down 36 percent.\n00:10:58.330 We literally gained market share.\n00:11:00.330 We might not have survived that

recession\n00:11:03.330 but for the advantages of sustainability.\n00:11:06.330 If every business were pursuing Interface plans,\n00:11:10.330 would that solve all our problems?\n00:11:12.330 I don't think so.\n00:11:14.330 I remain troubled by the revised Ehrlich equation,\n00:11:17.330 $I = P \times A$ divided by T2.\n00:11:21.330 That A is a capital A,\n00:11:23.330 suggesting that affluence is an end in itself.\n00:11:28.330 But what if we reframed Ehrlich further?\n00:11:32.330 And what if we made A a lowercase 'a',\n00:11:35.330 suggesting that it is a means to an end,\n00:11:37.330 and that end is happiness --\n00:11:40.330 more happiness with less stuff.\n00:11:43.330 You know that would reframe civilization itself --\n00:11:46.330 (Applause) --\n00:11:54.330 and our whole system of economics,\n00:11:57.330 if not for our species, then perhaps for the one that succeeds us:\n00:12:03.330 the sustainable species, living on a finite earth,\n00:12:06.330 ethically, happily and ecologically\n00:12:09.330 in balance with nature\n00:12:11.330 and all her natural systems for a thousand generations,\n00:12:14.330 or 10,000 generations --\n00:12:16.330 that is to say, into the indefinite future.\n00:12:19.330 But does the earth have to wait for our extinction as a species?\n00:12:24.330 Well maybe so. But I don't think so.\n00:12:27.330 At Interface we really intend to bring this prototypical\n00:12:30.330 sustainable, zero-footprint industrial company\n00:12:33.330 fully into existence by 2020.\n00:12:36.330 We can see our way now,\n00:12:38.330 clear to the top of that mountain.\n00:12:40.330 And now the challenge is in execution.\n00:12:43.330 And as my good friend and adviser Amory Lovins says,\n00:12:46.330 'If something exists, it must be possible.'
00:12:50.330 (Laughter)\n00:12:53.330 If we can actually do it, it must be possible.\n00:12:56.330 If we, a petro-intensive company can do it, anybody can.\n00:13:00.330 And if anybody can, it follows that everybody can.\n00:13:04.330 Hawken fulfilled business and industry,\n00:13:07.330 leading humankind away from the abyss\n00:13:11.330 because, with continued unchecked decline of the biosphere,\n00:13:16.330 a very dear person is at risk here --\n00:13:19.330 frankly, an unacceptable risk.\n00:13:21.330 Who is that person?\n00:13:23.330 Not you. Not I.\n00:13:25.330 But let me introduce you to the one who is most at risk here.\n00:13:28.330 And I myself met this person in the early days of this mountain climb.\n00:13:32.330 On a Tuesday morning in March of 1996,\n00:13:36.330 I was talking to people, as I did at every opportunity back then,\n00:13:39.330 bringing them along and often not knowing whether I was connecting.\n00:13:43.330 But about five days later back in Atlanta,\n00:13:46.330 I received an email from Glenn Thomas,\n00:13:49.330 one of my people in the California meeting.\n00:13:51.330 He was sending me an original poem\n00:13:53.330 that he had composed after our Tuesday morning together.\n00:13:56.330 And when I read it it was one of the most uplifting moments of my life.\n00:14:00.330 Because it told me, by God, one person got it.\n00:14:04.330 Here is what Glenn wrote. And here is that person, most at risk.\n00:14:08.330 Please meet 'Tomorrow's Child.'
00:14:12.330 'Without a name, an unseen face, and knowing not your time or place,\n00:14:16.330 Tomorrow's child, though yet unborn,\n00:14:19.330 I met you first last Tuesday morn.\n00:14:22.330 A wise friend introduced us two.\n00:14:24.330 And through his sobering point of view\n00:14:26.330 I saw a day that you would see, a day for you but not for me.\n00:14:31.330 Knowing you has changed my thinking.\n00:14:33.330 For I never had an inkling\n00:14:35.330 that perhaps the things I do might someday,\n00:14:38.330 somehow threaten you.\n00:14:41.330

Tomorrow's child, my daughter, son, I'm afraid I've just begun to think of you and of your good, though always having known I should. Begin, I will. The way the cost of what I squander, what is lost, if ever I forget that you will someday come and live here too.

"Tomorrow's Child" has spoken to me with one simple but profound message, which I presume to share with you. We are, each and every one, a part of the web of life. The continuum of humanity, sure, but in a larger sense, the web of life itself. And we have a choice to make during our brief, brief visit to this beautiful blue and green living planet to hurt it or to help it. For you, it's your call. Thank you. (Applause)

"cloud_doc_url": null, "matched_text": "\u001029\u0020source\u0011", "start_idx": 5037, "end_idx": 5048, "alt": null, "type": "file", "name": "tactiq-free-transcript-IoRjz8iTVoo.txt", "id": "file-015fyq55A9kPiWRmfng81lx4", "source": "my_files", "snippet": "# tactiq.io free youtube transcript\n# Cradle to cradle design | William McDonough\nhttps://www.youtube.com/watch/IoRjz8iTVoo\nIn 1962, with Rachel Carson's \"Silent Spring,\" I think for people like me in the world of the making of things, the canary in the mine wasn't singing. And so the question that we might not have birds became kind of fundamental to those of us wandering around looking for the meadowlarks that seemed to have all disappeared. And the question was, were the birds singing? Now, I'm not a scientist, that'll be really clear. But, you know, we've just come from this discussion of what a bird might be. What is a bird? Well, in my world, this is a rubber duck. It comes in California with a warning -- \"This product contains chemicals known by the State of California to cause cancer and birth defects or other reproductive harm.\" This is a bird. What kind of culture would produce a product of this kind and then label it and sell it to children? I think we have a design problem. Someone heard the six hours of talk that I gave called \"The Monticello Dialogues\" on NPR, and sent me this as a thank you note -- \"We realize that design is a signal of intention, but it also has to occur within a world, and we have to understand that world in order to imbue our designs with inherent intelligence, and so as we look back at the basic state of affairs in which we design, we, in a way, need to go to the primordial condition to understand the operating system and the frame conditions of a planet, and I think the exciting part of that is the good news that's there, because the news is the news of abundance, and not the news of limits, and I think as our culture tortures itself now with tyrannies and concerns over limits and fear, we can add this other dimension of abundance that is coherent, driven by the sun, and start to imagine what that would be like to share.\" That was a nice thing to get. That was one sentence. Henry James would be proud. This is -- I put it down at the bottom, but that was extemporaneous, obviously. The fundamental issue is that, for

me,\n00:02:58.000 design is the first signal of human intentions.\n00:03:00.000 So what are our intentions, and what would our intentions be --\n00:03:04.000 if we wake up in the morning, we have designs on the world --\n00:03:07.000 well, what would our intention be as a species\n00:03:09.000 now that we're the dominant species?\n00:03:11.000 And it's not just stewardship and dominion debate,\n00:03:14.000 because really, dominion is implicit in stewardship --\n00:03:20.000 because how could you dominate something you had killed?\n00:03:22.000 And stewardship's implicit in dominion,\n00:03:24.000 because you can't be steward of something if you can't dominate it.\n00:03:26.000 So the question is, what is the first question for designers?\n00:03:32.000 Now, as guardians -- let's say the state, for example,\n00:03:35.000 which reserves the right to kill, the right to be duplicitous and so on --\n00:03:40.000 the question we're asking the guardian at this point is\n00:03:43.000 are we meant, how are we meant,\n00:03:45.000 to secure local societies, create world peace\n00:03:47.000 and save the environment?\n00:03:49.000 But I don't know that that's the common debate.\n00:03:52.000 Commerce, on the other hand, is relatively quick,\n00:03:56.000 essentially creative, highly effective and efficient,\n00:03:58.000 and fundamentally honest, because we can't exchange\n00:04:01.000 value for very long if we don't trust each other.\n00:04:05.000 So we use the tools of commerce primarily for our work,\n00:04:07.000 but the question we bring to it is,\n00:04:09.000 how do we love all the children of all species for all time?\n00:04:13.000 And so we start our designs with that question.\n00:04:16.000 Because what we realize today is that modern culture\n00:04:18.000 appears to have adopted a strategy of tragedy.\n00:04:21.000 If we come here and say, 'Well, I didn't intend\n00:04:23.000 to cause global warming on the way here,' and we say, 'That's not part of my plan,'\n00:04:26.000 then we realize it's part of our de facto plan.\n00:04:29.000 Because it's the thing that's happening because we have no other plan.\n00:04:32.000 And I was at the White House for President Bush,\n00:04:34.000 meeting with every federal department and agency,\n00:04:36.000 and I pointed out that they appear to have no plan.\n00:04:40.000 If the end game is global warming, they're doing great.\n00:04:42.000 If the end game is mercury toxification of our children\n00:04:45.000 downwind of coal fire plants as they scuttled the Clean Air Act,\n00:04:48.000 then I see that our education programs should be explicitly defined as,\n00:04:52.000 'Brain death for all children. No child left behind.'\n00:04:54.000 (Applause)\n00:04:58.000 So, the question is, how many federal officials\n00:05:02.000 are ready to move to Ohio and Pennsylvania with their families?\n00:05:05.000 So if you don't have an endgame of something delightful,\n00:05:09.000 then you're just moving chess pieces around,\n00:05:11.000 if you don't know you're taking the king.\n00:05:12.000 So perhaps we could develop a strategy of change,\n00:05:15.000 which requires humility. And in my business as an architect,\n00:05:18.000 it's unfortunate the word 'humility' and the word 'architect'\n00:05:22.000 have not appeared in the same paragraph since 'The Fountainhead.'\n00:05:25.000 So if anybody here has trouble with the concept of design humility,\n00:05:30.000 reflect on this -- it took us 5,000 years\n00:05:33.000 to put wheels on our luggage.\n00:05:37.000 So, as Kevin Kelly pointed out, there is no endgame.\n00:05:42.000 There is an infinite game, and we're playing in that infinite game.\n00:05:46.000 And so we call it 'cradle

to cradle, and our goal is very simple. This is what I presented to the White House. Our goal is a delightfully diverse, safe, healthy and just world, with clean air, clean water, soil and power -- economically, equitably, ecologically and elegantly enjoyed, period. (Applause) What don't you like about this? Which part of this don't you like? So we realized we want full diversity, even though it can be difficult to remember what De Gaulle said when asked what it was like to be President of France. He said, "What do you think it's like trying to run a country with 400 kinds of cheese?" But at the same time, we realize that our products are not safe and healthy. So we've designed products and we analyzed chemicals down to the parts per million. This is a baby blanket by Pendleton that will give your child nutrition instead of Alzheimer's later in life. We can ask ourselves, what is justice, and is justice blind, or is justice blindness? And at what point did that uniform turn from white to black? Water has been declared a human right by the United Nations. Air quality is an obvious thing to anyone who breathes. Is there anybody here who doesn't breathe? Clean soil is a critical problem -- the nitrification, the dead zones in the Gulf of Mexico. A fundamental issue that's not being addressed. We've seen the first form of solar energy that's beat the hegemony of fossil fuels in the form of wind here in the Great Plains, and so that hegemony is leaving. And if we remember Sheikh Yamani when he formed OPEC, they asked him, "When will we see the end of the age of oil?" I don't know if you remember his answer, but it was, "The Stone Age didn't end because we ran out of stones." We see that companies acting ethically in this world are outperforming those that don't. We see the flows of materials in a rather terrifying prospect. This is a hospital monitor from Los Angeles, sent to China. This woman will expose herself to toxic phosphorous, release four pounds of toxic lead into her children's environment, which is from copper. On the other hand, we see great signs of hope. Here's Dr. Venkataswamy in India, who's figured out how to do mass-produced health. He has given eyesight to two million people for free. We see in our material flows that car steels don't become car steel again because of the contaminants of the coatings -- bismuth, antimony, copper and so on. They become building steel. On the other hand, we're working with Berkshire Hathaway, Warren Buffett and Shaw Carpet, the largest carpet company in the world. We've developed a carpet that is continuously recyclable, down to the parts per million. The upper is Nylon 6 that can go back to caprolactam, the bottom, a polyolephine -- infinitely recyclable thermoplastic. Now if I was a bird, the building on my left is a liability. The building on my right, which is our corporate campus for The Gap with an ancient meadow, is an asset -- its nesting grounds. Here's where I come from. I grew up in Hong Kong, with six million people in 40 square miles. During

the dry season, we had four hours of water every fourth day.\n00:08:37.000 And the relationship to landscape was that of farmers who have been\n00:08:40.000 farming the same piece of ground for 40 centuries.\n00:08:44.000 You can't farm the same piece of ground for 40 centuries\n00:08:46.000 without understanding nutrient flow.\n00:08:49.000 My childhood summers were in the Puget Sound of Washington,\n00:08:52.000 among the first growth and big growth.\n00:08:54.000 My grandfather had been a lumberjack in the Olympics,\n00:08:56.000 so I have a lot of tree karma I am working off.\n00:09:01.000 I went to Yale for graduate school,\n00:09:03.000 studied in a building of this style by Le Corbusier,\n00:09:05.000 affectionately known in our business as Brutalism.\n00:09:09.000 If we look at the world of architecture,\n00:09:12.000 we see with Mies's 1928 tower for Berlin,\n00:09:15.000 the question might be, 'Well, where's the sun?' \n00:09:17.000 And this might have worked in Berlin, but we built it in Houston,\n00:09:20.000 and the windows are all closed. And with most products\n00:09:23.000 appearing not to have been designed for indoor use,\n00:09:25.000 this is actually a vertical gas chamber.\n00:09:28.000 When I went to Yale, we had the first energy crisis,\n00:09:31.000 and I was designing the first solar-heated house in Ireland\n00:09:33.000 as a student, which I then built -- \n00:09:35.000 which would give you a sense of my ambition.\n00:09:37.000 And Richard Meier, who was one of my teachers,\n00:09:39.000 kept coming over to my desk to give me criticism,\n00:09:41.000 and he would say, 'Bill, you've got to understand -- \n00:09:43.000 solar energy has nothing to do with architecture.' \n00:09:51.000 I guess he didn't read Vitruvius.\n00:09:53.000 In 1984, we did the first so-called 'green office' in America\n00:09:57.000 for Environmental Defense.\n00:09:58.000 We started asking manufacturers what were in their materials.\n00:10:01.000 They said, 'They're proprietary, they're legal, go away.' \n00:10:03.000 The only indoor quality work done in this country at that time\n00:10:05.000 was sponsored by R.J. Reynolds Tobacco Company,\n00:10:08.000 and it was to prove there was no danger\n00:10:09.000 from secondhand smoke in the workplace.\n00:10:12.000 So, all of a sudden, here I am, graduating from high school in 1969,\n00:10:16.000 and this happens, and we realize that 'away' went away.\n00:10:19.000 Remember we used to throw things away, and we'd point to away?\n00:10:23.000 And yet, NOAA has now shown us, for example -- \n00:10:25.000 you see that little blue thing above Hawaii?\n00:10:27.000 That's the Pacific Gyre.\n00:10:28.000 It was recently dragged for plankton by scientists,\n00:10:30.000 and they found six times as much plastic as plankton.\n00:10:34.000 When asked, they said, 'It's kind of like a giant toilet that doesn't flush.' \n00:10:39.000 Perhaps that's away.\n00:10:40.000 So we're looking for the design rules of this -- \n00:10:42.000 this is the highest biodiversity of trees in the world, Irian Jaya,\n00:10:44.000 259 species of tree, and we described this\n00:10:48.000 in the book, 'Cradle to Cradle.' \n00:10:49.000 The book itself is a polymer. It is not a tree.\n00:10:53.000 That's the name of the first chapter -- 'This Book is Not a Tree.' \n00:10:56.000 Because in poetics, as Margaret Atwood pointed out,\n00:10:59.000 'we write our history on the skin of fish\n00:11:01.000 with the blood of bears.' \n00:11:04.000 And with so much polymer, what we really need\n00:11:05.000 is technical nutrition, and to use something\n00:11:08.000 as elegant as a tree -- imagine this design assignment:\n00:11:11.000 Design something that makes oxygen, sequesters carbon,\n00:11:13.000 fixes nitrogen, distills water,

accrues solar energy as fuel,\n00:11:17.000 makes complex sugars and food, creates microclimates,\n00:11:21.000 changes colors with the seasons and self-replicates.\n00:11:27.000 Well, why don't we knock that down and write on it?\n00:11:29.000 (Laughter)\n00:11:35.000 So, we're looking at the same criteria\n00:11:37.000 as most people -- you know, can I afford it?\n00:11:39.000 Does it work? Do I like it?\n00:11:41.000 We're adding the Jeffersonian agenda, and I come from Charlottesville,\n00:11:43.000 where I've had the privilege of living in a house designed by Thomas Jefferson.\n00:11:47.000 We're adding life, liberty and the pursuit of happiness.\n00:11:53.000 Now if we look at the word "competition,"\n00:11:54.000 I'm sure most of you've used it.\n00:11:56.000 You know, most people don't realize it comes from\n00:11:57.000 the Latin competere, which means strive together.\n00:12:00.000 It means the way Olympic athletes train with each other.\n00:12:03.000 They get fit together, and then they compete.\n00:12:06.000 The Williams sisters compete -- one wins Wimbledon.\n00:12:08.000 So we've been looking at the idea of competition\n00:12:11.000 as a way of cooperating in order to get fit together.\n00:12:15.000 And the Chinese government has now --\n00:12:16.000 I work with the Chinese government now --\n00:12:18.000 has taken this up.\n00:12:20.000 We're also looking at survival of the fittest,\n00:12:22.000 not in just competition terms in our modern context\n00:12:24.000 of destroy the other or beat them to the ground,\n00:12:27.000 but really to fit together and build niches\n00:12:29.000 and have growth that is good.\n00:12:31.000 Now most environmentalists don't say growth is good,\n00:12:33.000 because, in our lexicon, asphalt is two words: assigning blame.\n00:12:38.000 But if we look at asphalt as our growth,\n00:12:41.000 then we realize that all we're doing is destroying\n00:12:43.000 the planetary's fundamental underlying operating system.\n00:12:47.000 So when we see $E = mc^2$ come along, from a poet's perspective,\n00:12:52.000 we see energy as physics, chemistry as mass,\n00:12:54.000 and all of a sudden, you get this biology.\n00:12:56.000 And we have plenty of energy, so we'll solve that problem,\n00:12:59.000 but the biology problem's tricky, because as we put through\n00:13:02.000 all these toxic materials that we disgorge,\n00:13:05.000 we will never be able to recover that.\n00:13:07.000 And as Francis Crick pointed out, nine years\n00:13:09.000 after discovering DNA with Mr. Watson,\n00:13:12.000 that life itself has to have growth as a precondition --\n00:13:16.000 it has to have free energy, sunlight\n00:13:18.000 and it needs to be an open system of chemicals.\n00:13:21.000 So we're asking for human artifice to become a living thing,\n00:13:24.000 and we want growth, we want free energy from sunlight\n00:13:26.000 and we want an open metabolism for chemicals.\n00:13:29.000 Then, the question becomes not growth or no growth,\n00:13:31.000 but what do you want to grow?\n00:13:34.000 So instead of just growing destruction,\n00:13:36.000 we want to grow the things that we might enjoy,\n00:13:38.000 and someday the FDA will allow us to make French cheese.\n00:13:41.000 So therefore, we have these two metabolisms,\n00:13:45.000 and I worked with a German chemist, Michael Braungart,\n00:13:47.000 and we've identified the two fundamental metabolisms.\n00:13:49.000 The biological one I'm sure you understand,\n00:13:51.000 but also the technical one, where we take materials\n00:13:53.000 and put them into closed cycles.\n00:13:55.000 We call them biological nutrition and technical nutrition.\n00:13:58.000 Technical nutrition will be in an order of magnitude of biological nutrition.\n00:14:02.000 Biological

nutrition can supply about 500 million humans, \n00:14:05.000 which means that if we all wore Birkenstocks and cotton, \n00:14:07.000 the world would run out of cork and dry up. \n00:14:10.000 So we need materials in closed cycles, \n00:14:12.000 but we need to analyze them down to the parts per million \n00:14:14.000 for cancer, birth defects, mutagenic effects, \n00:14:17.000 disruption of our immune systems, biodegradation, persistence, \n00:14:20.000 heavy metal content, knowledge of how we're making them \n00:14:23.000 and their production and so on. \n00:14:25.000 Our first product was a textile where we analyzed 8,000 chemicals \n00:14:29.000 in the textile industry. \n00:14:30.000 Using those intellectual filters, we eliminated [7,962.] \n00:14:35.000 We were left with 38 chemicals. \n00:14:37.000 We have since databased the 4000 most commonly used chemicals \n00:14:40.000 in human manufacturing, and we're releasing this database into the public in six weeks. \n00:14:45.000 So designers all over the world can analyze their products \n00:14:47.000 down to the parts per million for human and ecological health. \n00:14:52.000 (Applause) \n00:14:57.000 We've developed a protocol so that companies can send \n00:15:00.000 these same messages all the way through their supply chains, \n00:15:03.000 because when we asked most companies we work with -- about a trillion dollars \n00:15:06.000 -- and say, "Where does your stuff come from?" They say, "Suppliers." \n00:15:08.000 "And where does it go?" \n00:15:10.000 "Customers." \n00:15:11.000 So we need some help there. \n00:15:12.000 So the biological nutrients, the first fabrics -- \n00:15:14.000 the water coming out was clean enough to drink. \n00:15:16.000 Technical nutrients -- this is for Shaw Carpet, infinitely reusable carpet. \n00:15:20.000 Here's nylon going back to caprolactam back to carpet. \n00:15:23.000 Biotechnical nutrients -- the Model U for Ford Motor, \n00:15:26.000 a cradle to cradle car -- concept car. \n00:15:28.000 Shoes for Nike, where the uppers are polyesters, infinitely recyclable, \n00:15:32.000 the bottoms are biodegradable soles. \n00:15:35.000 Wear your old shoes in, your new shoes out. \n00:15:37.000 There is no finish line. \n00:15:39.000 The idea here of the car is that some of the materials \n00:15:41.000 go back to the industry forever, some of the materials go back to soil -- \n00:15:44.000 it's all solar-powered. \n00:15:46.000 Here's a building at Oberlin College we designed \n00:15:48.000 that makes more energy than it needs to operate and purifies its own water. \n00:15:52.000 Here's a building for The Gap, where the ancient grasses \n00:15:54.000 of San Bruno, California, are on the roof. \n00:15:58.000 And this is our project for Ford Motor Company. \n00:16:00.000 It's the revitalization of the River Rouge in Dearborn. \n00:16:02.000 This is obviously a color photograph. \n00:16:06.000 These are our tools. These are how we sold it to Ford. \n00:16:10.000 We saved Ford 35 million dollars doing it this way, day one, \n00:16:13.000 which is the equivalent of the Ford Taurus \n00:16:15.000 at a four percent margin of an order for 900 million dollars worth of cars. \n00:16:19.000 Here it is. It's the world's largest green roof, 10 and a half acres. \n00:16:22.000 This is the roof, saving money, \n00:16:25.000 and this is the first species to arrive here. These are killdeer. \n00:16:29.000 They showed up in five days. \n00:16:32.000 And we now have 350-pound auto workers \n00:16:34.000 learning bird songs on the Internet. \n00:16:38.000 We're developing now protocols for cities -- \n00:16:40.000 that's the home of technical nutrients. \n00:16:42.000 The country -- the home of biological. And putting them together. \n00:16:45.000 And so I will finish by showing you a new city \n00:16:47.000 we're designing for the Chinese government. \n00:16:49.000 We're doing 12 cities for China right

now, \n00:16:52.000 based on cradle to cradle as templates. \n00:16:54.000 Our assignment is to develop protocols for the housing \n00:16:57.000 for 400 million people in 12 years. \n00:16:59.000 We did a mass energy balance -- if they use brick, \n00:17:01.000 they will lose all their soil and burn all their coal. \n00:17:04.000 They'll have cities with no energy and no food. \n00:17:06.000 We signed a Memorandum of Understanding -- \n00:17:08.000 here's Madam Deng Nan, Deng Xiaoping's daughter -- \n00:17:10.000 for China to adopt cradle to cradle. \n00:17:12.000 Because if they toxify themselves, being the lowest-cost producer, \n00:17:16.000 send it to the lowest-cost distribution -- Wal-Mart -- \n00:17:18.000 and then we send them all our money, what we'll discover is that \n00:17:21.000 we have what, effectively, when I was a student, \n00:17:24.000 was called mutually assured destruction. \n00:17:27.000 Now we do it by molecule. These are our cities. \n00:17:30.000 We're building a new city next to this city; look at that landscape. \n00:17:33.000 This is the site. \n00:17:35.000 We don't normally do green fields, but this one is about to be built, \n00:17:39.000 so they brought us in to intercede. \n00:17:41.000 This is their plan. \n00:17:43.000 It's a rubber stamp grid that they laid right on that landscape. \n00:17:46.000 And they brought us in and said, "What would you do?" \n00:17:49.000 This is what they would end up with, which is another color photograph. \n00:17:53.000 So this is the existing site, so this is what it looks like now, \n00:17:56.000 and here's our proposal. \n00:17:58.000 (Applause) \n00:18:02.000 So the way we approached this \n00:18:04.000 is we studied the hydrology very carefully. \n00:18:06.000 We studied the biota, the ancient biota, \n00:18:08.000 the current farming and the protocols. \n00:18:10.000 We studied the winds and the sun to make sure everybody in the city \n00:18:12.000 will have fresh air, fresh water and direct sunlight \n00:18:18.000 in every single apartment at some point during the day. \n00:18:21.000 We then take the parks and lay them out as ecological infrastructure. \n00:18:25.000 We lay out the building areas. \n00:18:28.000 We start to integrate commercial and mixed use \n00:18:29.000 so the people all have centers and places to be. \n00:18:32.000 The transportation is all very simple, \n00:18:34.000 everybody's within a five-minute walk of mobility. \n00:18:37.000 We have a 24-hour street, so that there's always a place that's alive. \n00:18:42.000 The waste systems all connect. \n00:18:44.000 If you flush a toilet, your feces will go to the sewage treatment plants, \n00:18:49.000 which are sold as assets, not liabilities. \n00:18:51.000 Because who wants the fertilizer factory that makes natural gas? \n00:18:55.000 The waters are all taken in to construct the wetlands for habitat restorations. \n00:19:00.000 And then it makes natural gas, which then goes back into the city \n00:19:04.000 to power the fuel for the cooking for the city. \n00:19:08.000 So this is -- these are fertilizer gas plants. \n00:19:10.000 And then the compost is all taken back \n00:19:13.000 to the roofs of the city, where we've got farming, \n00:19:15.000 because what we've done is lifted up the city, \n00:19:19.000 the landscape, into the air to -- to restore the native landscape \n00:19:26.000 on the roofs of the buildings. \n00:19:28.000 The solar power of all the factory centers \n00:19:31.000 and all the industrial zones with their light roofs powers the city. \n00:19:34.000 And this is the concept for the top of the city. \n00:19:36.000 We've lifted the earth up onto the roofs. \n00:19:40.000 The farmers have little bridges to get from one roof to the next. \n00:19:44.000 We inhabit the city with work/live space on all the ground floors. \n00:19:48.000 And so this is the existing city, and this is the new city. \n00:19:53.000 (Applause) \n",

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223\n\n\nv\n\nForeword\n\nPredictions of the future can be hazardous or downright foolish. But the \n failure of foresight\u2014the inability to read the hand-writing	

on the wall\u2014is \neven more so. Designers of all kinds work in the conflicted space between \nthese two poles. Their goal is to improve small parts of a rapidly changing \nworld with the tools of form, scale, materials, energy, water, color, landscape, \nand the creativity that is found most often at the grassroots level. But what \nneeds to be improved?\n\nThe short answer is \u201ca great deal,\u201d including an energy system that is rapidly \ndestabilizing the climate, an economy driving tens of thousands of species to \nextinction, a political system that sanctions gross inequality, an uncivil society, \nthe growing autism toward the natural world, and a global system mired in \nconflict. These are related problems, parts of a larger civilizational crisis with \nroots traceable to the seventeenth century authors of the mechanical world \nview. But there are deeper pathologies with footprints back to our ancient \nschizophrenia toward the natural world that had to be tamed a bit before it \ncould be appreciated.\n\nDesigners, however, typically do not work at the macro scale of civilization \nfor good reasons. Whether as architecture, engineering, materials, or land-\nscapes, design is bounded by the minute particulars of projects in their spe-\ncific social, cultural, and historical context. As a result designers work from the \nbottom up on projects at the building, neighborhood, and city scales. But the \nbig problems mentioned above are in large part the sum total of bad design \n(including that of public policies) at lower levels. There are many reasons for \nbad design, not the least of which is a professional focus on form-making, \noften oblivious to other consequences.\n\nBeginning in the 1970s a few renegade architects like Sim Van der Ryn in \nCalifornia became concerned about the collateral environmental impacts \nof the design professions. Van der Ryn envisioned ecological design as the \n\n\nvi Foreword\n\n calibration of buildings with their places, which required further integral \nunderstanding of landscapes, energy flows, waste cycling, materials, sun-\nlight, water, and ecological processes. Ecological design, in other words, \naims to calibrate human actions with the way natural systems work as par-\nticular places, larger landscapes, and whole ecologies. It aims to work with, \nnot against, the flows of energy and natural cycling of materials. The goal, \nin short, was to reduce environmental impacts of the \nbuilt environment\u201d in a civilization that prized economic expansion above all else with hardly a \nthought for the morrow.\n\nWhat began so modestly in the 1970s has rapidly grown into a global move-\nment to harmonize buildings, neighborhoods, and cities with the surround-\ning nature. After the publication of the Brundtland Commission report in 1987, \nthe goals of ecological designers expanded to embrace the wider (but vague) \nmission of sustainability. But we know now that that word signifies more \nthan was once assumed. Sustainability is the sum total of other qualities. As \nChattanooga City Councilman, David Crockett puts it: \u201cmake it clean, green, \nsafe, and fair and it will be sustainable.\u201d The left side of that equation, how-\never, requires the elimination of the growing inequality that is a precursor to \nviolence and ruined lives. It further requires rethinking our core assumptions \nabout the relation between economic growth and real progress. Ecological \ndesign, in other words, must be large enough in foresight, scope, and heart \nto include the social and economic environment in which it is embedded. In \nthat way ecological design is a radical endeavor in the true sense of the word, \nit gets to the root of what ails us.\n\nThe work described in this book takes design to yet another level that aims \nto regenerate the fabric of life and repair the wounds and tears inflicted \nby the carelessness of the fossil-fuel-powered growth economy. Regenera-\ntive design strives to create the conditions of health which ecologist Aldo \nLeopold once defined as

the capacity of the land for self-renewal. It aims, in other words, for wholeness, a word linked etymologically with healing, health, and Holy. Designers in this sense are midwives to the birth of a larger, deeper, and more resilient kind of order capable of regenerating the conditions of life and health. It is predicated on the co-evolution of human and natural systems, each supporting the other. In Robert Grudin's words, "Foreword vii" design, unlike any other concept . . . calls for us to create a unity of part with whole, a concord of form and function, a finished product that is harmonious with society and with nature. In this history the trend is for design questions to go to deeper levels and design projects to become catalysts for still further changes. In architect Stuart Walker's words design must, transcend utility and conventional function-led, and especially technology-led approaches. Designers, in his view, must rise above the calculated creation of dissatisfaction and think more comprehensively about the products we already produce and their implications. Design, in other words, must be an act of integration, not just specialization, with the goal of creating a wholeness that includes spiritual well-being. And it should start with those who serve as designers.⁴ Regenerative design has many effects. For one, it changes the relationship of people to their places. It can restore the reservoir of practical ecological competence at the local level allowing us to do more for ourselves and for each other the things that we once did naturally as capable people, good neighbors, and active citizens. It helps ground us by better informing us of where we are and the ecology and energy flows by which we are sustained in a particular place. In a world where any one place has come to look much like any other, we have lost sight of the fine print of our lives and how we are provisioned with food, energy, materials, and spiritual sustenance. We are mostly ignorant of the costs and consequences of the systems that provide for us so seamlessly and oblivious to their inherent fragility. Regenerative design helps us know where we are and how to be competent, respectful, and generous there. Our places should be ecologically designed landscapes whose multiple functions retain water for drought periods, manage floods, grow food and fiber, sustain wildlife, and absorb carbon. They should be working systems that blend agro-forestry, mixed-use permacultures, intensive agricultural and gardening zones, viticulture, aquaculture, water purification, restoration, and recreation. And they should be loved and managed by local citizens who use them to train young people in the essentials of managed integrated ecologies.⁵ "viii" Foreword Further, regenerative design should enhance the opportunities for caring, conviviality, celebration, and face-to-face democracy.⁶ Communities with front porches, public squares, community gardens and solar systems, neighborhood stores, corner pubs, and open places of worship are more likely to thrive in the years ahead. This is because they create the conditions favorable to neighborliness, community cohesion, and buffering from hardships. Good design should engage people in the making of their homes, neighborhoods, towns, and regions. It should increase civic intelligence, sense of potential, and joy in life. In this way, designers are facilitators in a larger public conversation, architects of better possibilities, not just makers of buildings and things. A rapidly warming climate will add to the design challenges ahead. Designers must reckon with a world of higher temperatures, stronger winds, more frequent and larger storms, rising ocean levels, longer droughts, much larger rainfall events, and new diseases.⁷ These will likely cause interruptions in supplies of food, energy, and water and could

trigger social disruptions. We must design with the awareness of the fragility of our civilization, as Jared Diamond and others warn. We must build in the ability to maintain hope and function as a society in emergency (and possibly breakdown) and lay the basis for recovery.⁸

The Great Work of our generation is to create a post-fossil-fuel and post-consumer economy that is regenerative, fair, durable, resilient, convivial, and democratic. It must be powered by renewable energy. It must be a circular economy that recycles, reuses, or transforms its wastes. Of necessity it will be much more focused on essentials of food, energy, shelter, clean water, education, the arts, and rootedness in place and bioregion. It will be built by local people who cherish and understand their places.

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When discussing the adoption of sustainable practices with a client from a resource-intensive field such as natural gas, oil, plastic production, or cattle ranching, it is essential to frame the conversation in terms that resonate with their conservative or capitalist values. This approach means focusing on the financial benefits, risk management, and regulatory compliance, while subtly appealing to their legacy and long-term strategic goals.

Firstly, sustainability can be presented as a pathway to significant cost savings and efficiency improvements. For instance, implementing energy-efficient technologies can considerably reduce operational costs. Upgrading to more efficient machinery lowers energy consumption, resulting in direct savings on utility bills. Moreover, reducing waste and optimizing resource use can lower raw material costs. For example, in the oil industry, better extraction technologies can minimize waste, thereby improving yield and profitability.

In terms of market differentiation and consumer demand, adopting sustainable practices can enhance brand value. Consumers are increasingly favoring companies with strong sustainability credentials, which can lead to enhanced brand loyalty and a premium on products. A study by Nielsen found that 66% of consumers are willing to pay more for sustainable goods. Furthermore, sustainable practices can open doors to new markets, including those with stringent environmental regulations, crucial for expanding market share and staying competitive globally.

Risk management and regulatory benefits also play a crucial role in the argument for sustainability. Adopting sustainable

practices helps ensure compliance with existing and upcoming regulations, thereby avoiding fines and legal issues. For example, regulations on emissions are tightening worldwide, and early adoption of cleaner technologies can prevent future compliance costs. Additionally, companies with strong sustainability records often enjoy lower insurance premiums and better financing terms, as they are perceived as lower risk by insurers and investors.

Appealing to the client's long-term strategy and legacy can further strengthen the argument. Sustainable practices ensure the long-term availability of natural resources, which is critical for the ongoing operations of resource-intensive industries. This foresight can safeguard the company's future and maintain its competitive edge. Additionally, younger generations of workers prefer to work for companies that are environmentally responsible, enhancing the company's ability to attract top talent, which is crucial for innovation and growth.

Highlighting the positive impact on legacy and corporate responsibility is another powerful argument. Sustainable practices offer the opportunity to leave a positive legacy that benefits future generations, framing it as a way to protect the environment while ensuring the prosperity of the company and its stakeholders. Enhanced reputation through sustainable practices leads to stronger community relations and better public perception, particularly important during times of scrutiny or crisis.

To frame the conversation effectively, it is crucial to adopt a data-driven approach. Presenting evidence through case studies and data demonstrating the financial benefits of sustainability can be compelling. For instance, showcasing how a competitor reduced costs and increased profits through sustainable practices can illustrate the practical benefits. Discussing how sustainability metrics and key performance indicators (KPIs) can be integrated into the company's reporting framework to track progress and benefits further reinforces the argument.

Collaborative goal-setting can ensure the client's buy-in and a sense of ownership. Proposing a collaborative approach to set sustainability goals that align with the company's strategic objectives can foster a cooperative relationship. Suggesting pilot projects to test the feasibility and benefits of sustainable practices can provide tangible results and build confidence in broader implementation.

Approaching the topic of sustainability with a conservative or capitalist client requires a focus on financial benefits, risk management, and strategic advantage. By framing sustainability as a pathway to cost savings, market differentiation, regulatory compliance, and long-term viability, these practices can align with the client's self-interest and business goals. Engaging in a data-driven, collaborative dialogue will further reinforce the practical and profitable aspects of adopting sustainable practices.

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`{ "content_type": "tether_browsing_display", "result": "# \u003c\u003e2020GDP (current US$) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020Canada | Data - World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1960 - 2022.\n# \u003c\u003e2020Canada | Data - World Bank Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nHCI and GDP Per Capita PPP (log scale, horizontal axis) Productivity relative to benchmark of complete education and full health. Canada. The Human Capital Index (HCI) database provides data at the country level for each of the components of the Human Capital Index as well as for the overall index, disaggregated by gender. The index measures ... \n# \u003c\u003e2020GDP per capita (current US$) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP per capita (current US$) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1960 - 2022.\n# \u003c\u003e2020Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nCanada from The World Bank: Data. Free and open access to global development data. Data. This page in: English; Espa\u00f1ol; Fran\u00e7ais; ... GDP per capita (current US$) Most recent value (2022) 54,917.7 (2022) Trend. GDP growth (annual %) GDP growth (annual %) Most recent value ... \n# \u003c\u003e2020GDP growth (annual %) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP growth (annual %) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1961 - 2022.\n# \u003c\u003e2020GDP per capita, PPP (current international $) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP per capita, PPP (current international $) - Canada. International Comparison Program, World Bank | World Development Indicators database, World Bank | Eurostat-OECD PPP Programme. License : CC BY-4.0. LineBarMap. Also Show Share Details.\n# \u003c\u003e2020GDP per capita growth (annual %) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP per capita growth (annual %) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. LineBarMap. Also Show Share Details. Label. 1961 - 2022.\n# \u003c\u003e2020GDP (current US$) - Canada, Euro area | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP (current US$) - Canada, Euro area. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1960 - 2022. GDP (current US$) - Canada, Euro area from The World Bank: Data.\n# \u003c\u003e2020World Bank Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nWorld Bank Data\n# \u003c\u003e2020GDP per capita (constant LCU) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP per capita (constant LCU) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. LineBarMap. Also Show Share Details. Label. 1960 - 2022.\n# \u003c\u003e2020GDP per capita (constant 2015 US$) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nGDP per capita (constant 2015 US$) - Canada | Data. GDP per capita (constant 2015 US$) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0.\n# \u003c\u003e2020Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nHCI and GDP Per Capita PPP (log scale, horizontal axis) Productivity relative to benchmark of complete education and full health. Canada. The Human Capital Index (HCI) database provides data at the country level for each of the components of the Human Capital Index as well as for the overall index, disaggregated by gender. The index measures ... \n# \u003c\u003e2020Inflation, GDP deflator (annual %) - Canada | Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nInflation, GDP deflator (annual %) - Canada from The World Bank: Data. Free and open access to global development data. Data. ... GDP deflator: linked series (base year varies by country) GDP deflator (base year varies by country) GDP per capita growth (annual %) Oil rents (% of GDP)\n# \u003c\u003e2020World Bank Data\u003c\u003e2020data.worldbank.org\u003c\u003e2020nHow does`

Canada's GDP per capita compare to other countries and regions? Find out the latest data and insights on World Bank Data, the official source of global development statistics. \n# \u301014\u2020GDP (constant 2015 US\$) - Canada | Data - World Bank Data\u2020data.worldbank.org\u3011\nGDP (constant 2015 US\$) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1981 - 2022. \n# \u301015\u2020GDP per capita, PPP (current international \$) - Canada | Data\u2020data.worldbank.org\u3011\nGDP per capita, PPP (current international \$) - Canada from The World Bank: Data. Free and open access to global development data. Data. This page in: English; Espa\u00f1ol; ... GDP per capita PPP (constant 2017 international \$) GDP per capita growth (annual %) GDP per capita (constant LCU)\n# \u301016\u2020GDP per capita (current US\$) - United States, Canada | Data\u2020data.worldbank.org\u3011\nGDP per capita (current US\$) - United States, Canada from The World Bank: Data. Free and open access to global development data. Data. This page in: ... GDP per capita, PPP (constant 2017 international \$) Inflation, GDP deflator (annual %) Oil rents (% of GDP) Download. CSV XML EXCEL. DataBank. \n# \u301017\u2020Research and development expenditure (% of GDP) - Canada | Data\u2020data.worldbank.org\u3011\n2020. 1.77. Upper middle income. 2020. 1.80. Research and development expenditure (% of GDP) - Canada from The World Bank: Data. \n# \u301018\u2020GDP (current LCU) - Canada | Data\u2020data.worldbank.org\u3011\nGDP (current LCU) - Canada. World Bank national accounts data, and OECD National Accounts data files. License: CC BY-4.0 ... \n# \u301019\u2020General government final consumption expenditure (% of GDP) - Canada | Data\u2020data.worldbank.org\u3011\nGeneral government final consumption expenditure (% of GDP) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. 1961 - 2022. Country. \nVisible: 0% - 100%", "summary": null, "assets": [], "tether_id": null}, "status": "finished_successfully", "end_turn": null, "weight": 0.0, "metadata": {"_cite_metadata": {"citation_format": {"name": "tether_og", "regex": "\u3010(\d+)(?:\d+)?\u2020([\u2020\u3010\u3011]*)[\u3010\u3011]*?\u3011"}, "metadata_list": [{"type": "webpage", "title": "GDP (current US\$) - Canada | Data", "url": "https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?most_recent_value_desc=true&locations=CA", "text": "\nGDP (current US\$) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1960 - 2022. \n", "pub_date": "2024-05-27T02:15:00.000000Z", "extra": null}, {"type": "webpage", "title": "Canada | Data - World Bank Data", "url": "https://data.worldbank.org/country/Canada", "text": "\nHCI and GDP Per Capita PPP (log scale, horizontal axis) Productivity relative to benchmark of complete education and full health. Canada. The Human Capital Index (HCI) database provides data at the country level for each of the components of the Human Capital Index as well as for the overall index, disaggregated by gender. The index measures ... \n", "pub_date": "2024-05-16T04:26:00.000000Z", "extra": null}, {"type": "webpage", "title": "GDP per capita (current US\$) - Canada | Data", "url": "https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=CA&most_recent_value_desc=true", "text": "\nGDP per capita (current US\$) - Canada. World Bank national accounts data, and OECD National Accounts data files. License : CC BY-4.0. Line Bar Map. Label. 1960 - 2022. \n", "pub_date": "2024-05-27T16:28:00.000000Z", "extra": null}, {"type": "webpage", "title": "Canada from The World Bank: Data.", "url": "https://data.worldbank.org/country/CA", "text": "\nCanada from The World Bank: Data.