

“I’m arguing for intelligent wastefulness.”

Edible chairs and self-dismantling coffee makers are just some of the many ideas Prof. Dr Michael Braungart wants to put into practice. The guru of Cradle to Cradle argues for sensible wastefulness that benefits nature, and even talks of a new industrial revolution thanks to intelligent design.

Michael Braungart, you talk about edible upholstery covers and biodegradable T-shirts. Are you an idealist?

No, just a good chemist. Chemistry cannot simply be “not harmful”; it must also be useful to biological processes. It’s all about quality, and the time is ripe for us to move on from 30 years of prophesying doom and bring really good-quality products to the market.

What exactly do you mean?

At the moment, we manufacture products and then try to find some way of recycling them. But because those products were not made to be recycled, what happens is actually “downcycling”: quality is lost, and so is the quantity of product. That isn’t true recovery. I am convinced that products must be designed from the outset in such a way that they can be fed back into technical or biological processes. Otherwise we end up with mediocre recycling and lose many valuable components in the process. All that is left is rubbish.

On a scale from 1 to 10, how far advanced is Europe towards the kind of recycling you envisage?

Things are still in their early stages. Across all the various industries, only 5 to 10% of the value of products is recovered. That means we also lose much of what we really need

to get back, especially the rare non-ferrous metals. Only a fraction of them are recovered from electrical and electronic equipment.

“It is pointless recovering a bit of gold from a mobile phone: we need to get all the materials back.”

How do you convince people of your concept?

In Switzerland, people have a completely different idea of the environment and environmental protection from mine. Here, looking after the environment means destroying as little as possible and saying “I’m protecting the environment, using my car less, taking the train, saving water.” But that doesn’t protect the environment, it just destroys less of it. And there are too many people on this planet for “destroying less” to be enough. After all, I don’t say that child protection involves hitting my child three times instead of five. Our problem is that we have made many products as good as they can be, but in a fundamentally wrong way. Let me give you

some examples: when we talk about recycled paper, we mean old paper that is being reused. But that paper contains printing inks, optical brighteners, stabilisers and additives, none of which were intended to be recycled. In Switzerland, toilet tissue made from recycled paper contains up to five grams of chlorinated hydrocarbons. A kilogram of that paper contaminates over five million litres of drinking water. My argument is this: products need to be designed in such a way that they can flow in cycles. In many countries, we have optimised the wrong things and, in doing so, made them perfectly wrong. Changing that is difficult, because all those wrong systems are highly optimised.

What do you believe environmental protection means?

It’s a large ecological footprint that benefits other living creatures. We want to have our computers, electronic goods and all that. That means we need to develop things in such a way that we can recover the technical nutrients. We’re talking about biological and technical cycles; it’s through these, or our metabolites, that we give something back. At the moment we are still trying to do less harm – but there are too many people on earth for that to work. It makes no sense.

Is Switzerland's concept of environmental protection old-fashioned?

Switzerland has focused very much on downstream environmental protection. It was one of the first countries to introduce a comprehensive system of waste incineration plants. But that meant that essentially the nutrients were lost. For instance, the copper content of slag from waste incineration plants in Switzerland is worth between EUR 20 and 30 million a year. And that copper is lost because it ends up in road construction or elsewhere.

Incinerating refuse is a bit archaic anyway: it's as if we feel threatened by something and use fire to banish evil from the world. The problem is that all the valuable raw materials are lost in the process. Switzerland was also the first country in Europe to have a comprehensive system of wastewater treatment. But none of the phosphorus is reclaimed. Phosphorus is scarcer than oil. And if we don't get it back, then we really will be looking at an overpopulated planet. Switzerland also lacks a ecological label that includes human beings. There are only "people-free" labels. We clearly feel so guilty about living on this earth that we believe things can only be organic if we are not involved. Switzerland was a pioneer in securing public acceptance of the organic concept, but failed to consider that human beings need to be part of it too.

Is Switzerland benefiting from your knowledge and convictions?

We are working with Swiss manufacturers to develop products that are biologically or technically useful in a whole new way. We've teamed up with office furniture maker Giroflex, for instance, to produce coverings that are edible. We're also involved with manufacturers of window frames. It is impossible to make energy-saving windows without using toxic substances.

How do established engineers respond to your theory?

It's vital that they understand one thing: you need to invest in product development and



Prof. Dr Michael Braungart, Professor of Process Engineering at the University of Lüneburg.

design right from the outset. For example, you stipulate useful lives, so that every manufacturer knows when they will get the materials back. That way you can manufacture much better and more attractive products. At the moment, everyone is trying to use whatever is cheapest.

It's also a matter of urgency that we have an open discussion about what we mean by nature. If – as in Switzerland – we talk about Mother Nature, then of course the child is always bad, because the mother should always be good. But the most carcinogenic substances are entirely natural. The same is true of the ones that are most poisonous: mould toxins, for example. When food goes off, it produces toxins that we have not yet

been able to replicate synthetically. Or venoms that are used by reptiles. But we can learn from nature: it can be our teacher, but not our mother. If you romanticise the mother, then the child is always bad. And feeling bad and having a guilty conscience is never a recipe for creativity.

We also need to appeal to the next generation: how many young people wanted to work in the chemical industry after Schweizerhalle and Chernobyl? We have lost almost an entire generation of good scientists, because those professions were held in such low esteem. These days we have brilliant managers and lawyers – but far too few good engineers and natural scientists. And those who studied in this field did so with a guilty conscience.



Prof. Dr Braungart speaking about material circulation and eco-effectiveness at the Greenforum 2010 at "Lake Side", Zurich.

Is Switzerland ready for Cradle to Cradle?

If people start to believe that human beings are fundamentally evil, the results are catastrophic. There are those who think the world would be better off without us – then we'd be carbon-neutral.

Switzerland has declared its intention of becoming carbon-neutral by 2050. But that is an impossible goal: we are only carbon-neutral when we do not exist. A tree is not carbon-neutral either. It's an absurd situation: we don't try to be good, we try to minimise how bad we are. What makes things even more complicated in Switzerland is Calvinism. Calvin taught human beings that they are evil anyway and only God can redeem them. In other words, there is the extra burden of a tradition that tells people they are a source of evil.

What about efficiency?

We devote our energies to optimising the wrong things instead of first asking what is right. Take paper, again. Paper should be designed so that it is combustible and the ash can be returned to biological cycles. Instead

of which we optimise the printing process so that it is faster and saves energy. That is a fundamentally wrong way of doing the wrong thing. The difference between efficiency and effectiveness is important: effectiveness means doing the right thing. Efficiency means doing something right. But when you do the wrong thing right, you are doing it completely wrong.

Is there a country in Europe that is setting an example in terms of sustainability?

Yes, the Netherlands. They were never in a position to romanticise the natural world, because a third of the country is below sea level. That's why they learned to establish a partnership with nature.

So what is your vision when you talk about eco-effectiveness?

Consider a cherry tree in spring. It doesn't save, or go without, or avoid doing things. It is wasteful, but in such a way that everything is useful. A tree is not carbon-neutral, it is carbon-positive. My vision is to construct buildings that are like trees. Not passive

houses like in Switzerland, but active ones: houses that benefit nature and the environment. Buildings that support species diversity, that clean the air and water. Buildings that are designed to generate energy and supply it to others. When it comes to electrical and electronic equipment, I could imagine a situation in which you sell the customer 3,000 washes instead of a washing machine. Then manufacturers would stop choosing the cheapest components and use the best materials instead. The washing machine would consist of 5 types of plastic instead of 150, and those could then be returned to the technical cycle as nutrients, resulting in much better products.

Is what you are striving for realistic, or is it just a utopia?

The Netherlands are currently moving towards Cradle to Cradle. If you like, it's the new version of "cradle to grave". The Dutch government has declared its intention to bring its entire public procurement operations into line with the system in 2012. The Belgian presidency also aims to adopt Cradle to Cradle. They understand that it's

essential for rare metals such as cobalt, manganese, tungsten, etc., to be returned to technical processes. It is pointless recovering a bit of gold from a mobile phone: we need to get all the materials back. That's why things are now moving at high speed. Companies have caught on to the fact that their labour costs are now lower than their materials costs. And I'm very optimistic when I see that major electrical and electronics firms such as Philips are placing it on the agenda. We need young people who are dedicated to the natural and engineering sciences. We need the smartest people – the ones who will help us start reinventing everything again. We need product designers who conceive products in a completely different way. For instance, we've been working together with a major chemicals manufacturer in the Netherlands to produce adhesive bonds where you basically just heat the electrical appliance to 80 degrees and then the adhesives contract, so that the product completely disassembles itself.

You are arguing that we should consume rather than going without.

I'm arguing for intelligent wastefulness. If we benefit other living organisms we can use many more things, but we need to ensure that they are useful again afterwards. The companies we are working with are making plans for the next 10 years. Carpet manufacturers are selling a useful life for their products of three, five or even eight years, for example. We have windows on the market which are sold on the basis that you can look through them for 25 years, because it is impossible to make energy-saving windows without toxic substances. The customer buys a service, which consists of the ability to look through the windows and their heat-insulating properties.

Are these products more expensive than existing ones?

They are actually cheaper. The edible coverings now used in aircraft are cheaper too. Everything is simpler. You don't need any

downstream environmental technologies to dispose of the materials. You incorporate the intelligence from the outset. The slogan is "intelligent wastefulness"!

Many people make good money out of recycling – and jobs are at stake. How can you convince those people of your idea?

Jobs won't be lost: new ones will be created, just at a different location. Sure, Switzerland (along with Germany and Denmark) is a world leader in the export of waste incineration plants. But this form of environmental technology is unsustainable in the long term, because it destroys scarce raw materials.

What do you hope to see from SWICO Recycling?

I'd like to see strategically focused design proposals. For example: in 10 years from now, all electrical and electronic equipment should be manufactured in a way that allows it to be fed back into biological and technical cycles. Then manufacturers can adapt, use Switzerland as a market for innovation, and show us what the future can look like. For Philips, for example, it would be a great help if this approach could be used to lay down rules that don't come from the government but from an institution such as SWICO, which says, "Our goal is materials management." And for a country like Switzerland, which has virtually no valuable metal raw materials of its own, that would be a crucial benefit, because it would transform the whole nation into a raw materials bank. SWICO has been a European leader in developing capture rates – and an awareness of how valuable materials are. That is an impressive achievement. The next step would be to involve designers and devise innovations in such a way that the materials are genuinely available. That would bring us closer to the goal of making secondary products virtually Europe's most important source of raw materials. What happens with all the products that are collected at the moment is just downcycling. Now that we have

a sufficiently developed consciousness and such high capture rates and people understand how valuable or toxic these materials are when they get into biological systems, that's something we can build on. We can take 30 years of "the end is nigh" discussions of the type so prevalent in Switzerland and translate them into quality. We could move away from greenwashing and scaremongering towards genuine innovation.

What will SWICO Recycling be doing in 10 years if Cradle to Cradle catches on?

In Switzerland, the only materials being returned to biological cycles will be those that are actually biologically useful. Everything else will be going into technical cycles. SWICO will have paved the way for all the other complex products, because it will have taught us how those products can be designed. SWICO will run its own product design school, and people will come from all over the world to learn how to design products. SWICO will license that knowledge and thus generate income. In China, India, Pakistan and Bangladesh SWICO will be offering advice on product manufacture.

Switzerland has a good industrial core in many areas. It can become to environmental protection what Porsche is for VW: the technological and innovation centre of industrialised society. But that requires ambition. All this naming and shaming, all this moralising, has generated plenty of knowledge about how to do things differently, which now needs to be deployed efficiently. Specifically, in five years from now paper in Switzerland should be combustible or compostable, and phosphorus should be reclaimed for biological cycles. Whether it's electronics, shoes or textiles – products that don't meet the criteria will be banned. Waste incineration plants will be converted into real power stations (and cease to be hazardous waste incineration plants in disguise).

Is Cradle to Cradle compatible with the Swiss mentality?

Switzerland is known around the world for good design, so that's a good starting point. If we make it clear to designers that what they have been creating up to now is just hazardous waste, they will soon say, "We're smarter than that." People in Switzerland want to be good and admired. So that feeling of self-worth, of being proud of oneself, which we find in Switzerland is a marvellous cultural basis for innovation. When people grasp that "less bad" is not "good", then they want to be "good". That's true in this country too and so I'm optimistic for Switzerland.

What is the relationship between human beings and nature?

Human beings will have to learn to fit in. That includes nutrition. For example, if corn is grown in Switzerland, between 11 and 30 tonnes of humus are lost per year. That's crazy. So is importing palm oil from Indonesia, where the rainforests are being cut down. We need to use our intelligence. A product is not attractive if it makes people ill and becomes refuse. And I believe we are now in a position to put that into practice. But we need to reinvent everything so that it is biologically or technically useful, and not just less harmful.

What drives you personally to invest time and energy in this idea?

I want to be the best chemist and materials scientist in the world. A chemist who makes poison is a bad chemist. I have made it to the top of the international tree, and that position enables me to drive Cradle to Cradle forward. Yes, I want to be proud of what I do.

People who ask questions and want to know more encourage me and give me the strength to continue. Humanity will survive without

Cradle to Cradle. But in doing so it will sacrifice everything that makes us human. We will cannibalise each other and reduce the global population to one or two billion. If we don't want that to happen, we have no choice but to remake everything from scratch and make it differently. As soon as people realise that they want to be useful, they will really catch on to Cradle to Cradle. I invite all young people to join in. We can do it and we'll make incredibly rapid progress.

What does that mean for the "average" citizen?

The challenge is mainly one for scientists and engineers, designers and logistics experts: the people who shape processes. As a customer, I don't need to know how an airbag works. What people in general need to understand is that less bad is not good. Nature doesn't save or go without, it wastes. If we carry on like this, we will end up destroying our natural environment. We are only nature when we are part of it ourselves. Those are simple messages, even if the background is highly complex.

What are your views on mankind?

All human beings are generous and friendly provided their existence is not put at risk. They only become greedy and petty-minded when they are afraid or uncertain. People have a right not to be threatened, and to feel safe. Yes, I am a fan of mankind. I look at people and I like what I see. I don't believe evil exists as a quality in its own right. People want to do the right thing if they are given the opportunity. Evil is the absence of good.

Interview: Angela Cadruvi, SWICO Recycling

About Prof. Dr Michael Braungart

Prof. Dr Michael Braungart was born in 1958 and is Professor of Process Engineering at the University of Lüneburg. He holds a professorship at the Erasmus University Rotterdam, where a Cradle to Cradle chair has been established. He is the founder of the Environmental Protection and Encouragement Agency (EPEA) Internationale Umweltforschung GmbH in Hamburg and a visiting professor at the Darden School of Business in Charlottesville, Virginia, USA. In addition to his teaching activities, Prof. Dr Michael Braungart focuses on the work of EPEA (successful collaboration with major industrial producers), notably materials assessment, waste and energy balance, life-cycle design, and design for disassembly.

www.braungart.com
