ENERGY **CROSSROADS**

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All the molecules
Every single one
The atoms
Their spin
Their charge
Their charm
All and every one
In circles

"In circles"
Einstürzende Neubauten

When Michael Braungart began his triumphal march across the Netherlands, there were also critical questions from the audience. "You can make products that are Cradle to Cradle, but what if the energy used for that production is not Cradle to Cradle?" Now the stage is set for supplying electricity certified and approved by Braungart. So, would the interested parties please step forward?

Going round in circles?

Was it an underground carpark or did all those pipelines, valves, and measuring panels perhaps suggest that it was actually a basement used for heating? But if so, it was a pretty big one. At the time, at the beginning of 2008, my guide thought that these associations of mine did not show much respect for the immense challenge facing CERN. He was right. The quest for the God particle that was about to begin in Geneva was destined to make a major contribution to particle physics. The fact that I was given a chance to even take a look in the circular tunnel of the particle accelerator, the Large Hadron Collider, was almost a miracle in itself. Very soon, atoms would be spinning through the tunnel and colliding with each other in explosions of energy.

In our never-ending quest to understand our origin, we are learning more and more about smaller and smaller particles. And with every following discovery, it becomes increasingly clear to us that life is possible only because a certain balance exists at the microcosmic level. We should apply this same insight at the macrocosmic level, to the earth and our use of it. The balance between ourselves and the environment we live in is starting to become quite disrupted. We use the earth as if it's a disposable item of which we have many more in reserve. We are producing goods and energy using resources that are in short supply and that are non-renewable. There must be another way to do this, and there is.

We need to organize our production processes in such a fashion that we do not use up our natural resources but instead use them in line with their capacity to recover from such use, in other words to focus on reusability in relation to everything we produce or make.

The first description of a circular economic and industrial system dates from 2002, when a book by Michael Braungart and William McDonough was published with the title "Cradle to Cradle: Remaking the way we make things." The authors describe a product cycle that does not go from cradle to grave but from cradle to cradle. Products do not end up as waste but instead are used as input for new production cycles that can be endlessly repeated. In order to ensure that these production processes do not degrade the value of our resources but instead create value, Braungart and McDonough developed the Cradle to Cradle Certified Product Standard. With this quality standard, they aimed to discourage downcycling and encourage upcycling. In 2010, both originators transferred their product standard to the American Cradle to Cradle Products Innovation Institute, which by the way also has a branch office in the Netherlands. The institute has further developed the standard into a certification tool that supports product developers and manufacturers in a continuous improvement process.

One of the five assessment criteria is renewable energy and carbon management. The Product Standard states that the ultimate goal is "a future in which all manufacturing is powered by 100% clean renewable energy." The challenge faced by a producer in that regard is to "source renewable electricity (and offset carbon emissions for the product's final manufacturing stage)." As Cradle to Cradle (C2C) is also based on the concept of continuous improvement, the required percentage of renewable electricity increases with the value of the certificate. For silver certification the applicable standard is that "5% of purchased electricity is renewably sourced (or offset with renewable energy projects)" and that percentage increases to 50% for gold and 100% for platinum.

As one of the biggest producers of renewable energy in the Netherlands, Essent (a subsidiary of RWE) has of course also studied the C2C concept. Even before the C2C Products Innovation Institute published a detailed explanation of the product standard, Essent had asked Michael Braungart to carry out a study into the criteria for C2C energy. In a report commissioned by Essent in 2010, Braungart wrote "C2C applied to energy means a key focus on the use of current solar income: electromagnetic radiation from the sun, either directly or after conversion to other forms. It is available directly through technologies such as solar thermal, photovoltaic, photochemical, wave and wind energy, thermal mass storage, and heat exchange with ground, water and air. Secondary solar uses include biomass-derived energy from composting, biodigestion, (hydro)thermolysis, pyrolysis, gasification, and energy from fuel cells using fuel derived from biomass."

By now, the C2C Certified Product Standard also includes several regulations of a technical and/or administrative nature. One of these is that, in the US, Green-e RECs (Renewable Energy Credits) must be purchased. Outside the US, the use of equivalent, verified RECs is appropriate. Green-e is the leading US certification programme for renewable energy.

All this may seem quite complicated and perhaps it is, but after serious consideration Essent has concluded that it can produce and supply C2C energy in the form of electricity as well as gas. However, there is still one important obstacle that the company needs to overcome, namely finding clients for C2C energy. In Europe, and especially in the Netherlands, there is a large community of C2C companies that produce in accordance with C2C principles. So why are they not lining up to demand supply of C2C energy as a product as well as cooperation to achieve the transition of our entire industrial system towards C2C? Not only does the energy sector stand at a crossroads, but all of society. Regardless of whether we decide to take a left or a right turn, it will always be the wrong choice as long as it doesn't take us towards a circular economy driven by energy from sustainable sources.

Thinking back to that circular tunnel in Geneva with those tiniest of particles, I'm also reminded of the image that we chose when we started this series: the arrow. It was a symbol for the choices facing us. Now that this series is coming to an end, the time has come to reveal the answer. We need to think not in terms of left or right but in terms of renewable cycles. We should be going round in circles! ■
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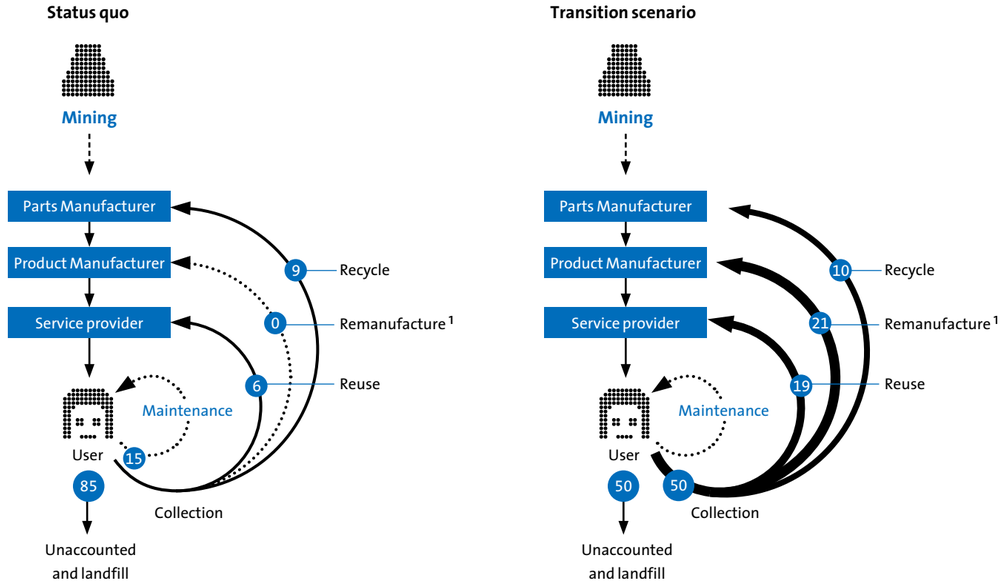

[1] Remanufacturing, here refers to the reuse of certain components and the recycling of residual materials.
Source: Gartner; EPA; Eurostat; UNEP; Ellen MacArthur Foundation circular economy team