

A long, dark tunnel with a bright light at the end, symbolizing a path forward. The tunnel is constructed from many layers of material, creating a textured, circular interior. The light at the end is bright and circular, creating a strong contrast with the dark tunnel walls. A dark, narrow path leads from the foreground towards the light at the end of the tunnel.

# MakingIt

Number 26

Industry for Development

**Time to go circular**



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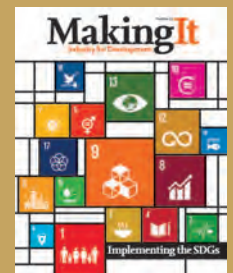
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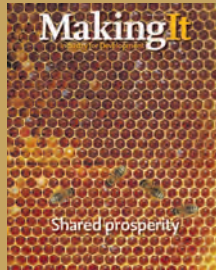
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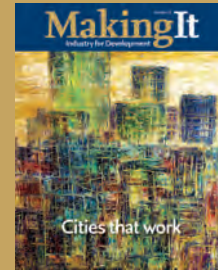
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A quarterly magazine. Stimulating, critical and constructive. A forum for discussion and exchange about the intersection of industry and development.



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# Editorial

In her book, *Doughnut Economics*, Kate Raworth writes that “the last two hundred years of industrial activity have been based upon a linear industrial system whose design is inherently degenerative.” She describes the essence of this industrial system as “the cradle-to-grave manufacturing supply chain of take, make, use, lose...”

Raworth goes on to describe how industrial manufacturing is beginning a metamorphosis from degenerative to regenerative design through the circular economy. It is regenerative by design, she writes, “because it harnesses the endless flow of the sun’s energy to continually transform materials into useful products and services”.

The circular economy is a set of processes that create more value, and are designed to do away with waste. Value is maintained for as long as possible. Products are designed to last, their components to be re-used.

In this issue of *Making It* our contributors look at the circular economy from a variety of angles, from Ken Webster’s introduction to systems thinking to Ewa Lewandowska’s argument for social equality to be included in the design of the new circular economy.

Alexandre Lemille rails against the focus on recycling, claiming that we should instead understand the circular economy as the way to prevent waste from being created in the first place.

We also take a look at the design and re-design aspects of circularity, and introduce the Rizhao industrial park, one of the best examples of the impact of Chinese government policies that encourage industrial symbiosis as part of its circular economy drive.



Editor: Charles Arthur  
[editor@makingitmagazine.net](mailto:editor@makingitmagazine.net)  
Chair of editorial committee:  
Kai Bethke

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Telephone: (+43-1) 26026-0,  
E-mail: [unido@unido.org](mailto:unido@unido.org)

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# GLOBAL FORUM

The Global Forum section of *Making It* is a space for interaction and discussion, and we welcome reactions and responses from readers about any of the issues raised in the magazine. Letters for publication in *Making It* should be marked 'For publication', and sent either by email to: [editor@makingitmagazine.net](mailto:editor@makingitmagazine.net) or by post to: The Editor, *Making It*, Room D2150, UNIDO, PO Box 300, 1400 Vienna, Austria. (Letters/emails may be edited for reasons of space).

## LETTERS

### The new asbestos?

By chance I came across a copy of the very first issue of *Making It* (ten years ago now – back in 2009) and noticed an article by Gareth Leather titled “Why we need to green the global automotive industry”, about the production of more environmentally-friendly vehicles.

Gareth wrote: “In the short-term, hybrids in the United States will face increasing competition from diesel-powered vehicles, which are 20-30 per cent more efficient than petrol vehicles, particularly with the advent of cleaner (reduced NOx) diesel and higher-performance diesel engines.”

I had forgotten how far we have moved on in such a short space of time. Back then, governments, alarmed by rising carbon emissions, urged us to switch to diesel fuel, which was thought to emit less CO2 than petrol.

Three years after Gareth's article came the first major evidence of some truly dreadful health impacts and the World Health Organisation declared diesel exhaust a carcinogenic, a cause of lung cancer in the same category as asbestos and mustard gas.

Then in 2015 Volkswagen,



which had been running its own marketing campaign in favour of “clean diesel”, admitted that it had cheated on its emission tests. We had trusted the car industry when it said the fuel was clean. In fact emissions analytics found that 97% of the diesel cars made since 2011 exceeded NOx safety limits.

In fact diesel never did make huge inroads into the US, where gasoline remained cheap, and where American automakers focused their efforts on hybrid and electric vehicles. But in Europe, diesel passenger cars still remain a major part of the auto industry: astonishingly, they accounted for nearly half of all new cars sold across the continent in 2016.

It is unlikely that governments will want to face the ire of their motorists and tell them to ‘forget what we said, do differently and oh you will have to pay for it as well’.

But I've noticed a lot of big cities are thankfully taking a

stand. Paris, Madrid, Athens and Mexico City have now agreed to completely outlaw diesel vehicles from the centre of their cities by 2025 and the C40 group of global megacities are all taking steps to crack down on diesel vehicles and reduce smog.

Look at Germany. Berlin has already banned the oldest, highest-polluting diesel cars from its centre, while Munich is developing a clean air programme that will bring in some form of diesel ban this year.

Now, I must find an article in *Making It* extolling the virtues of plastic containers...

● Nic Claesen, Brussels

### Good nukes?

Roberta Bliss (Letters, *Making It* number 23) asks whether a “resource-efficient, low-carbon global economy” can include nuclear power?

I would argue it could. Nuclear power is one of the cleanest sources of energy

because it emits little carbon dioxide.

It can be a more prominent part of a diverse, energy supply alongside renewables, in the face of dwindling fossil fuel reserves and skyrocketing electricity demand.

Despite successful deployments and falling prices for solar and wind power, renewable energy alone will not be sufficient to bring about the deep, rapid reductions in carbon emissions that are urgently needed.

By their very nature, sunshine and wind are not constant and there can sometimes be too little renewable power available on days when there is heavy demand, and too much on days when demand is lower. There is currently no economical way to store commercial-scale quantities of surplus electricity from solar or wind for days or even months at a time.

No energy system is risk free. But as environmental campaigner and journalist George Monbiot says, “atomic energy is far less dangerous to human beings and the living world than fossil fuels.”

As he points out: “The Fukushima disaster, a level 7 nuclear accident (the highest category), caused by a massive earthquake and tidal wave hitting an antiquated reactor, has so far killed no one as a result of radioactive discharge, and is unlikely to



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do so in the future. Fossil fuel burning, by contrast, kills hundreds of thousands of people every year through air pollution, and presents a possibly existential threat to civilisation through climate change.”

The engineering challenges of running a modern society entirely on renewable energy are enormous, requiring not only cheaper storage technologies but also a reconfiguration of the electricity grid. Nuclear power is able to supply a consistent supply and could expand faster than renewable energy by building new reactors. Monbiot has championed the building of smaller modular reactors that use nuclear waste as fuel.

Four countries already get at least 50 percent of their electricity from nuclear, and 13 countries get at least 25 percent. If every country built reactors at the same rate that France did in the 1980s the world could reach its decarbonization goal by 2050.

● **Tony Marchi, Iowa, USA**

## Daylight robbery

Excellent issue on the Belt and Road Initiative (*Making It* number 24) about China underwriting billions of dollars of infrastructure investment along the old Silk Road routes.

Given the scope of the BRI you could easily miss another road initiative, a project that

China is saying is the world’s first photovoltaic highway.

In Jinan, in the north eastern Shandong province, traffic is now rolling over a one-kilometre stretch of expressway that’s also generating electricity from the sun.

It is made of three layers: transparent concrete on the top, photovoltaic panels in the middle, and insulation on the bottom and could handle 10 times more pressure than the normal asphalt variety. In a year it is due to generate one million kilowatt hours of electricity, which will be used to power streetlights and a snow-melting system on the road. It’s also designed to supply power to charging stations for electric vehicles, should those be added in the future.

A week after it opened in December 2017, it was discovered that thieves had stolen a 1.8 metre section. It is suspected it was pinched in an attempt to duplicate the

technology. They must be onto something!

China is now the world’s top solar-energy producer – it boosted its photovoltaic capacity to around 78 gigawatts in 2016, almost twice that of second-placed Japan, and it’s aiming for 105 by 2020.

Together with its scope of investment across the globe China really is showing the way.

● **Tom Mitchell, by email**

## Food for thought

Kate Raworth (“Change the mindset”, *Making It* number 25) is so right when she says that “economists have fixated on GDP as the first measure of economic progress...” If policymakers considered GDP only as a measure of raw market economic activity in conjunction with many other metrics, the flaws in it would be less important. If poverty rates, inequality levels, natural capital accounts, and other metrics were taken into

account as heavily as GDP, then different policies and priorities would begin to emerge. As Kate went on to say: “GDP is a false goal waiting to be ousted”.

● **Melissa Aleksic, by email**

Raworth’s reference to the “doughnut” is all about the dilemma currently facing global industrial development.

The dough provides a “safe and just space for humanity”.

The hole in its centre represents “critical human deprivation” while “critical planetary degradation” lies in the space beyond the outer crust.

The dilemma is how to eradicate the former without exacerbating the latter. Unless a more intelligent growth model is adopted, involving a shift from GDP to broader measures of well-being, the world will face severe crises.

● **Stephanie Carr, website comment**

Does everyone know what GDP covers and what it doesn’t and therefore how reliable is it? For example, GDP also does not capture the value added by volunteer work, and does not capture the value of caring for one’s own children. For example, if a family hires someone for childcare, that counts in GDP accounting. If a parent stays home to care for their child, however, the value is not counted in GDP.

● **Roberta Bliss, Lyon, France, by email**





Photo: www.istock.com/FS-floor

## Working women transforming the

Debate in the West about technology and work often centres on the risks the rise of robots and algorithms will pose to job security. In other parts of the world, though, the same advances are bringing about a cultural and economic revolution.

This is certainly the case in much of the Muslim world. These countries, which

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