

# eco@work

September 2022

Sustainable reading  
from the Oeko-Institut

## A perfect circle

How does the  
circular economy work?

Product lifespans Interview with Walter R. Stahel

# A major part of the solution



Jan Peter Schemmel  
CEO, Oeko-Institut  
j.schemmel@oeko.de

The warning signs from the climate crisis are becoming increasingly clear. And yet this crisis is still viewed primarily in terms of the energy supply and perhaps transport, with no regard for another major part of the solution: the required radical shift in our economic paradigm towards the establishment of a genuine circular economy.

Our high consumption of primary raw materials releases large quantities of greenhouse gases. Extracting these resources destroys ecosystems and biodiversity. Primary raw materials consumption must therefore be drastically reduced and the materials themselves integrated, as far as possible, into closed loops. This is not limited to recycling as much waste as possible – the approach often equated with the concept of the circular economy in the German context. A circular economy is about maintaining and processing products, and the resources they contain, for a variety of uses and users for as long as possible, creating minimal waste later on.

This is not an easy task. Our economic system is geared towards a high throughput of products and resources and is still based on the principle that businesses and consumers should not have to bear any environmental costs. Instead, these costs continue to be passed on to the whole of society. The complexity of our economic model, with its great diversity of products and widely branching value chains, confronts us with another challenge: what can be achieved with regulatory instruments, what form should these instruments take, and which product groups should they apply to? What is technically feasible and economically viable? What might profitable and sustainable business models look like?

There are already countless ways to conserve resources. We need only to think of repair cafés, zero waste shops and products that are created from recycled materials or are easy to repair. And of course, another question arises: do we really have to own everything we use? For example, I sometimes borrow my neighbours' car, and some people happily use handbag rental services. And one more question: is there really any need to discard items immediately if we are no longer using them? At the Oeko-Institut, for example, computers or mobile phones that are taken out of service are made available to staff for their private use.

We need small-scale approaches and innovations in progressive niches, but we also need to exert leverage at critical points by making use of economic mechanisms or continuing to extend producer responsibility, for example. And not least, we need a different mindset. We have lived beyond our means for far too long – at the expense of the environment, the climate and people in other countries. For their sake – for all our sakes – we need the courage to act. The right time is now.

Yours,  
Jan Peter Schemmel

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Phone: +49 (0) 30/4050 85-0, redaktion@oeko.de, www.oeko.de

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# “A circular economy always works in times of scarcity”

What can be done to progress the circular economy? What advantages does it offer – not only for the environment and the climate, but also for the economy? We discussed these questions with Walter R. Stahel. In 1982, he founded the Product-Life Institute in Geneva, which is dedicated to product-life extension of goods and components. Walter R. Stahel has also advised the European Commission in various capacities and is a member of the Club of Rome.

**Mr Stahel, a circular economy is not an invention of our modern era. How long has this concept existed?**

It has existed for centuries. The circular economy always works in times of scarcity. After the Second World War, for example, women sorted the rubble from bombed-out buildings so that it could be used to build something new. In many countries of the Global South, a circular economy is quite normal. I am thinking of the reuse of old oil drums in Nepal: they are turned into turbines or kitchen appliances, for example. It's only in an affluent society that no one entertains these ideas.

**Does this mean that we also need a period of scarcity for the circular economy to take off?**

What is needed is either external compulsion or inner conviction. For example, what I am seeing among many young people here in Switzerland is a tendency to reduce and simplify consumption. There is certainly a shift of mindset here. But at the same time, we are also seeing that large segments of industry have no interest in rethinking their business models at present, even

though doing so would be more beneficial for many companies than their current approach.

**In what sense?**

Manufacturers must learn that in a circular economy, they do not earn their money at the point of sale: they earn it through use. You can either sell a product or you can supply it to someone on a long-term basis and offer servicing and maintenance as well. In the former case, I earn money once; in the latter, I earn more money, but over a longer period. This requires a very different mindset. But there are already examples of this performance economy, as it is called, which show that this can work.

**Such as?**

Public transport is just one example. Taking a taxi is equally a case in point. There are also companies that offer a specific product for use by the customer, such as garment and textiles leasing services that provide uniforms in civil aviation or linen for hotels.

**What kind of strategy is needed to progress the circular economy?**

The main problem is that we import most of our raw materials and the price we pay is far less than the real cost. If we were to provide decent working conditions in the mining industry, for example, or internalised environmental costs such as water pollution or soil erosion, raw materials would be so expensive that over-consumption would no longer be possible. Maintenance and repair would suddenly start to pay off. In general, taxes and charges are a key mechanism. There should be no more taxes on human labour. If it is

cheaper to recondition existing goods than to produce new ones, manufacturers will be compelled to sell the use of the goods. And then it will be worthwhile for them to ensure that products have a long lifespan and can be dismantled and repaired.

We also need to build products in a way which makes it easier to recover the raw materials they contain. A passenger car, for example, should not consist of countless different steel and aluminium alloys which cannot be properly separated in a simple shredder.

**If you were the head of the government and had complete freedom to make any policy decision you liked, what would you decide in relation to the circular economy?**

I would ensure that redundancy and resilience were built into all the country's vital systems. They need to be able to function even if supplies of raw materials or energy from abroad were to cease for any reason. Of course, for a country like Switzerland, this is difficult, but it is feasible for Germany.

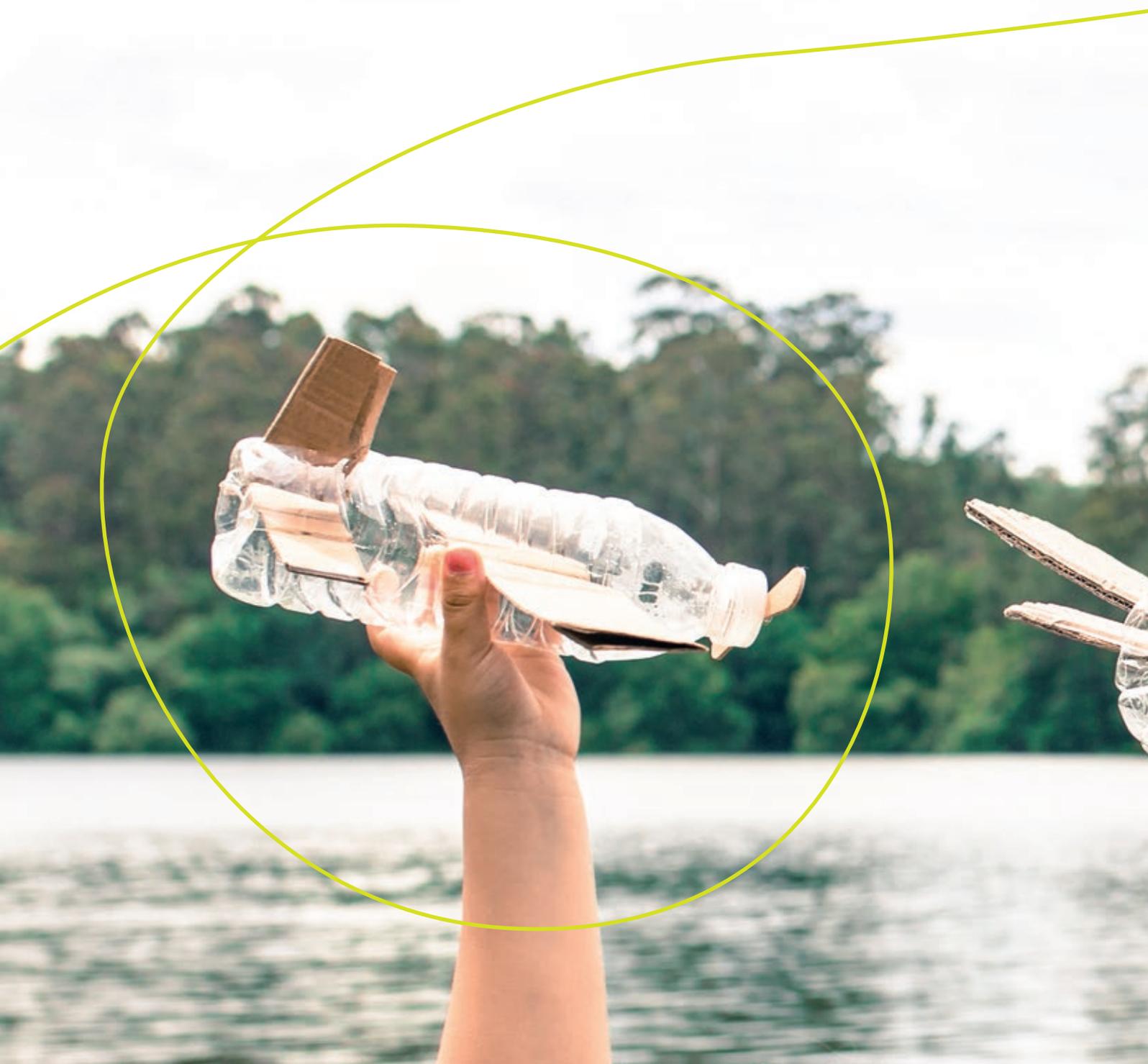
**Thank you for talking to eco@work.**  
The interviewer was Christiane Weihe.



Talking to eco@work:  
Walter R. Stahel, Founder-Director of the  
Product-Life Institute in Geneva.  
wrstahel2014@gmail.com  
<http://www.product-life.org/en>

# More than waste management

## The circular economy



Very often, the circular economy only extends as far as the nearest rubbish bin. For many people, the circular economy simply means waste management – the plastic bottle that is later converted into a park bench. But there is much more to it than that. The aim is not just to create closed loops for raw materials but to slow down substance cycles altogether – not only in waste management, but also in buildings, transport and the garment industry. A circular economy recognises concepts such as waste prevention, reuse and repair. It starts with product design and encompasses manufacturing and (re)use. Reducing consumption is a key building block in the move towards a circular economy.

“When we talk about a circular economy, what we are talking about is nothing less than a new economic model – a structural transformation in line with environmental principles and a paradigm shift at the same time,” says Siddharth Prakash, Senior Researcher and Head of Subdivision at the Oeko-Institut. “The circular economy is a key field of action in this sustainable transformation as it is relevant not only to greenhouse gas emissions but also to biodiversity loss, resource consumption and pollution.”

#### MORE IS NEEDED

The German government’s coalition agreement includes a commitment to reducing resource consumption and creating closed loops in the economy. A relative decoupling of economic growth from resource consumption is not enough, however: due to the multiple impacts of our consumption

habits and lifestyles on the environment and climate, resource use must be reduced in absolute terms. “What is needed, for example, are measures that significantly lengthen product lifespans and usage times, such as minimum durability requirements,” says Siddharth Prakash. And, not least, sufficiency: this means cutting our resource and energy consumption. “Waste prevention and reuse are right at the top of the waste hierarchy, with recycling following behind. Without sufficiency, we cannot achieve the goals of the circular economy. We need to talk about the size of our apartments, the number of cars on the road or textile usage times.” And as Siddharth Prakash points out, while many politicians shy away from discussing sufficiency, Russia’s war of aggression against Ukraine makes it clear that sufficiency is essential for economic sovereignty and the independence of our resource supply.



## A CIRCULAR ECONOMY IN EUROPE

The European Commission adopted the Circular Economy Action Plan in 2020 as part of the European Green Deal. Then in March 2022, it unveiled various measures and initiatives to clear the way for a circular product policy. Aims include promoting product longevity, the right to repair, and recyclability. A new Ecodesign for Sustainable Products Regulation (ESPR) will replace the current Ecodesign Directive. Other products such as textiles and furniture are to be included and more ambitious criteria applied to almost every type of product.

The Sustainable Products Initiative (SPI) is a core element of the circular economy measures adopted at European level. Together with project partners, the Oeko-Institut is advising the European Commission on its implementation. "For example, we are analysing data and information about the destruction of unsold consumer goods in the EU," says project leader Kathrin Graulich from the Oeko-Institut. "We can thus gain feedback on the environmental impacts of these practices and assess

the economic drivers and outcomes for the businesses concerned." The Oeko-Institut is also analysing the norms and standards that are directly relevant to successful implementation of the digital product passport. "This will be a central element of European product policy. It will include detailed information about products and thus enhance consumer choice while making it easier to repair and recycle," says Kathrin Graulich.

In the donation-funded project "An appeal and proposals for a circular economy", the Oeko-Institut will be focusing intensively on closed loops. "Among other things, we will be analysing the factors that hinder the progress of a circular economy and developing policy solutions," says Siddharth Prakash. The researchers will examine innovative utilisation concepts which exist away from the spotlight, and will look at ways to increase the proportion of reusable packaging. "The reasons for short product lifespans and usage periods lie in the prevailing cost structures," says Siddharth Prakash. High costs of wages and replacement parts in Germany mean that repair costs seem excessively high compared with the price of a new purchase, and this deters consumers. "Granted, long-lasting devices are more expensive to buy, but they are generally easier to repair," he emphasises.

In order to solve the problem of shrinking lifespans and usage periods for electrical and electronic devices, a different cost structure is required, in the Oeko-Institut's view – one in which manufacturers contribute to covering the environmental and social costs of production and disposal. "Extended producer responsibility should go beyond the financing of collection and recycling and focus on promoting waste prevention, reuse and repair," says Siddharth Prakash. Product policy measures are also required, such as ambitious minimum service life requirements and an expansion of consumer protection, including longer guarantee periods. "In the donation-funded project, we will develop a strategy showing how technical, economic and legal measures

can meaningfully complement each other in the interests of a genuine circular economy. The environmental value-added is clear: if smartphones lasted seven years and TVs 13 years, this would result in an annual saving of almost three million tonnes of CO<sub>2</sub> equivalents in Germany."



# 3

**If smartphones lasted seven years and TVs 13 years, an annual saving of almost three million tonnes of CO<sub>2</sub> equivalents could be achieved in Germany.**



# 16

**Germany consumes around 16 tonnes of raw materials per capita per year.**

## THE CIRCULAR ECONOMY IN THE INTERNATIONAL CONTEXT

Implementing the circular economy is no easy task, for there are many conflicts of interest. "The circular economy is often lauded as a win-win situation for everyone. But when products become more expensive because resource costs increase, the impacts are felt mainly by people on low incomes. So it is important to be mindful of the social dimension and strike a balance here." The topic gains in complexity because it requires an international perspective. "We are part of global value chains and

have to tailor our action accordingly, because it will have consequences for the environment and people in other countries and their jobs and wellbeing," says Siddharth Prakash.

The Oeko-Institut is involved in several projects that focus on the circular economy in other countries. In Mexico, for example, it is working with the Instituto Nacional de Ecología y Cambio Climático (National Institute of Ecology and Climate Change – INECC). "Taking the examples of textiles and smartphones, we have shown that circular economy measures in Mexico have the potential to save around six million tonnes of CO<sub>2</sub> equivalents annually. This corresponds to the combined annual per capita greenhouse gas emissions of 1.6 million Mexicans." On this basis, the Oeko-Institut has identified areas where action is required in Mexican product policy. In addition, with financial support from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the Oeko-Institut is assisting countries in South-East Asia to develop strategies, action plans and mechanisms to promote a circular economy. "In Malaysia, the circular economy was then included as a central pillar in the country's 12th five-year plan," Siddharth Prakash explains. And in Thailand, researchers are supporting the government's efforts to develop a national strategy on the bio-circular-green economy. "But individual efforts at the national level will not be effective. We need a global agreement so that material flows and environmental impacts are not simply shifted to other countries."

### A MODEL FOR THE CIRCULAR ECONOMY IN GERMANY

How will the establishment of a circular economy affect the conservation of the environment, resources and biodiversity – and the German economy as a whole? On behalf of WWF Germany, researchers from the Oeko-Institut are currently exploring this question in a feasibility study, entitled "Model Circular Economy Germany", in collaboration



**The proportion of recycled materials in total resource consumption in Germany amounts to just 12 per cent.**

with Fraunhofer ISI and Freie Universität Berlin. "We are laying the scientific bases for a comprehensive and effective strategy to make a sustainable circular economy a reality," Senior Researcher Siddharth Prakash explains. "To that end, we are identifying relevant material flows, products and sectors, among other things, and defining potential circular economy measures in each sector. We are also looking at possible interactions, conflicts of interest and structural conditions in the market that affect the implementation of individual measures." The goal is to clarify basic technical and methodological issues of relevance to the modelling of the environmental and economic impacts of circular economy measures. "We are talking about 100 to 150 measures in 11 sectors, including textiles, the automotive industry, construction and food production. In the next phase, the measures will be clustered and analysed in terms of their impacts on greenhouse gas emissions, resource consumption, biodiversity, employment and value-added," says Siddharth Prakash. "On this basis, we are supporting WWF's efforts to develop a policy roadmap for the circular economy in Germany. WWF's goal here is to identify an integrated pathway towards the circular economy on a sound scientific basis. The organisation is keen to progress mandatory and ambitious implementation of the national circular economy strategy announced by the German government in its coalition agreement."

### FAR-REACHING BUT STILL FAR OFF

A radical transformation is required – but time is running out. "Ecological tipping points are being reached more quickly than many people were willing to acknowledge – the melting of the ice sheets is a case in point," says Siddharth Prakash. This radical transformation therefore requires an ambitious and integrated approach by all stakeholders – the business community, policy-makers and civil society. "Unfortunately, we are nowhere near the right path yet. Most circular economy models are still not economically viable, and policy-makers are not doing enough. For example, we are clearly lagging behind other European countries in our use of reusable materials." So what would the Senior Researcher suggest? "Let's get on with it! Right now. In every sector. No delays, no excuses, no claiming that it is a complex issue. The Oeko-Institut is happy to identify the first steps in the right direction."

*Christiane Weihe*



*Sustainable consumption in Germany, Europe and worldwide is the main focus of Siddharth Prakash's work. As Head of Subdivision in the Sustainable Products and Material Flows Division, his areas of expertise include product longevity and obsolescence, ecodesign and ecolabelling, and social and environmental standards in global value chains.*  
s.prakash@oeko.de

# More than once

## The packaging cycle

The yoghurt in the fridge, the shampoo in the shower, the cheese on the dinner table all have one thing in common: they rarely reach us without some kind of packaging. In 2019, a total of 18.9 million tonnes of packaging waste was generated in Germany alone – an average of around 227 kg per capita. It consists of paper and glass, various types of metal, and plastic – precious raw materials whose extraction and processing have an impact on the environment and climate. How can the consumption of these raw materials be substantially reduced, and how can they be integrated more effectively into a closed loop? Or to rephrase the question: what can be done to improve the circular economy in relation to packaging?

“Packaging performs important functions. It protects products so that food stays fresh, for example,” says Günter Dehoust, a Senior Researcher at the Oeko-Institut. “It is important to use as little packaging as possible and reuse or recycle it wherever we can in order to minimise resource consumption.” In terms of establishing a circular economy, it makes sense to look at the packaging we use, not only due to the large quantities involved. Most packaging is only used for short periods and has a relatively high throughput, so recycling is certainly worthwhile. “Furthermore, since 1991, it has been very easy for consumers to separate their packaging waste and recycle it via the dual system.”

In the current project “Lifecycle assessment of the dual system’s performance in the recycling of packaging”, the Oeko-Institut took a closer look at this system. The study was commissioned by the dual system companies, which organise the collection, sorting and recovery of packaging waste. “We produced a lifecycle assessment of their

performance, focusing particularly on the greenhouse gas potential but also on aspects such as energy requirement and terrestrial acidification,” says the Oeko-Institut’s waste management expert. Measured in terms of greenhouse gas emissions and other environmental criteria, the recovery of 6.6 million tonnes of packaging waste and production from it of secondary materials and substitute fuels was shown to be beneficial in comparison to the use of primary raw materials and fuels. “In 2020, 297 kg of CO<sub>2</sub> equivalents was saved for each tonne of quantity collected, adding up to almost two million tonnes of CO<sub>2</sub> equivalents. In addition, a total of four million tonnes of secondary raw materials was fed back into the substance cycle.” The researchers also provide policy recommendations, e.g. on increased recycling of mixed plastics and – specifically aimed at packaging manufacturers – improving the recyclability of this waste fraction.

### POSITIVE AND NEGATIVE TRENDS

When it comes to packaging, there are certainly some positive trends, such as the rising proportion of unpackaged goods on sale, or the option of reusable containers. And according to the German Environment Agency (UBA), at least 71.6% of packaging in Germany was recycled in 2019, with particularly high rates achieved for glass (84.1%) and paper/cardboard (89.5%). The figure for plastics was 55.5%. However, the volume of packaging has increased substantially since 1991 – from 15.6 to 18.9 million tonnes. The reasons, says Günter Dehoust, include a rise in online trade, but also the coronavirus pandemic, which encouraged many people to order home deliveries of food, etc.

Less packaging does not necessarily mean a closed loop. “Packaging which uses less material is often difficult to recycle – an example is plastic film, which consists of several layers of different materials. As a general principle, we need to carefully examine and assess each approach. With reusable containers, for example, the inputs required for washing and transport may, in some cases, cancel out the environmental benefit of resource conservation. There are different quality categories with multi-use as well. “If a beverage supplier uses a special type of bottle, this increases the transport distances, which in turn pushes up CO<sub>2</sub> emissions.” The Oeko-Institut expert therefore wants all packaged products to be examined in detail so that the pros and cons of the various options can be weighed up.

Perhaps the most effective way to reduce packaging is through pricing. Until 2024, Dr Johannes Betz, a researcher in the Oeko-Institut’s Resources and Transport Division, will be working with several partners on a project for the German Environment Agency which



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**Germany generated almost 3.2 million tonnes of plastic packaging waste in 2019 – around double the 1991 figure.**



looks at how economic mechanisms can reduce packaging use and boost plastic recycling. "This might include a surcharge on single-use packaging, for example," he says. "The money could be used to support the development of recyclates and expand recycling infrastructures."

The Oeko-Institut is also working on another ongoing project for the German Environment Agency which addresses regulatory options, focusing on Section 21 of the Packaging Act. "This section regulates the licence fees that must be paid by anyone placing packaging on the market. The aim is to achieve an environmental steering effect – particularly with regard to the recyclability of packaging," Günter Dehoust explains. This section of the Act is due to be revised, so the Oeko-Institut, together with cyclos GmbH and Institut cyclos-HTP GmbH, has drafted recommendations. "An economic mechanism that is fit for purpose could include a special levy on non-recyclable packaging."

Consumers have a hand in reducing the amount of packaging as well. "We are only human: unfortunately, we are very complacent and the solution that is better for the environment often involves more effort," he says. "So here too, the starting point must be the price so that consumers and producers choose the more sustainable option." How might this work? The answer is provided by the "Environmental Consumption Tax for Eco-Friendly Steering of the Beverage Packaging Market" project on behalf of the German Nature and Biodiversity Conservation Union (NABU). "A tax on beverage packaging could save 2.8 million tonnes of CO<sub>2</sub> equivalents in Germany per year," says Günter Dehoust. According to the study, which was conducted by the Oeko-Institut

in collaboration with Professor Stefan Klinski from Berlin School of Economics and Law (HWR), the tax should initially focus on primary materials. "All forms of packaging would be allocated a specific tax rate based on their environmental impact. This would increase the cost of using resources for packaging. It would create incentives for resource conservation, give a boost to multi-use packaging and promote the use of recycled materials." According to the project team's calculations, the tax would result in non-alcoholic soft drinks in one-litre non-refillable PET bottles becoming 62 cents more expensive for the consumer, compared with only seven cents for refillable bottles of the same size if the bottle achieved 18 rotations.

#### PACKAGING IN SOUTH-EAST ASIA

The Oeko-Institut is not only concerned with packaging in Germany; it also shares its wide-ranging project experience and expertise with other countries. With funding from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, the researchers

are providing support to policy-makers in Malaysia, Indonesia and Thailand. "These countries have a massive waste problem, and current measures often focus on recycling, incineration and landfill," says Senior Researcher Siddharth Prakash. "Additional policy measures and standards that aim to reduce the use of packaging are therefore needed here as well."

*Christiane Weihe*



*Sustainable material flows and a circular economy are the main focus of Günter Dehoust's research. A graduate in Environmental Engineering who has worked in the Oeko-Institut's Resources and Transport Division for more than 30 years, he develops waste management strategies and provides advice to policy-makers and businesses. [g.dehoust@oeko.de](mailto:g.dehoust@oeko.de)*