Governments and industry should work with industrial ecologists to build the circular economy, say scientists

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Governments and companies planning to pursue the circular economy need to involve scientists more directly, states a new report published by the International Society for Industrial Ecology, and led by UCL's Dr. Stijn van Ewijk.

The report draws attention to the weight of relevant expertise found in the field of industrial ecology, a discipline that has been focusing on the minimization of waste, predicting the impacts of new products, and designing environmentally friendly systems for decades.

The circular economy is a model of production and consumption, which keeps products and materials in use. All forms of waste, including textiles, old electronics and scrap metal would be returned to the economy, or used more efficiently, extending the life cycle of products and reducing the impact on the environment. This contrasts with the current globalized "linear" economy in which we extract resources, manufacture products, use them, and then throw them away.

It's the first time these researchers—from the UK, the European Union, China and the US—have produced a guide, which sets out principles that are essential for policymakers and industry if the circular economy isn't to end up as meaningless hype—or worse, dismissed as "greenwashing."

Dr. Stijn van Ewijk (UCL Civil, Environmental and Geomatic Engineering), the lead author of the white paper, said, "The circular economy is seen as new, but we've been studying sustainability and what has been called an 'industrial ecology system' for decades. Industrial ecology is about measuring and reducing environmental impacts from the use of energy and materials. So there's huge expertise in this field, whether it's the ability to do systems analyzes, assess product life cycles, or plan circular economy systems."

One of the key insights in the report is a recommendation for a life cycle perspective that includes all impacts from raw material extraction to end-of-life waste—to ensure a potential answer to a problem doesn't simply end up creating a problem elsewhere. For example, reusable cups were adopted by fast food companies as an answer to disposable takeaway cups. But Dr. Van Ewijk says, "Reuse is often better, but it depends on

the type of cup and how often you use it. Many people now have many reusable cups at home and don't regularly reuse them, which only increases overall emissions."

A further insight from the report highlights that early, whole-system intervention will prevent waste. The group calls for policymakers and industry to look ahead and design systems that are more efficient and long lasting, rather than trying to tweak current systems to minimize impacts. One example could be electric cars—seen by some as a solution to fossil fuel pollution, they also reinforce the existing problem of more cars on the road, rather than reducing them in favor of better-designed public transport. Dr. van Ewijk suggests, "We need to rethink mobility from a systems perspective. Electric cars solve the problem of fossil fuel cars, but not the problem of cars."

The group says they do not have all the answers, but emphasize the need for a scientific approach to the circular economy. "On a purely practical level, we want to urge political leaders and companies to work with industrial ecologists to get the right evidence to develop new policies. If the evidence is already out there, we probably have access to it and know how to interpret it. If not, we can look for the answers by using tried and tested methods. Industrial ecology can't predict the future, but our forward-looking assessment methods help anticipate the environmental benefits of new technologies and practices," says Dr. Van Ewijk.

Stefanie Hellweg, former President of the International Society for Industrial Ecology and a Professor of Ecological Systems Design at ETH Zurich, says, "Optimizing materials and minimizing waste have been core topics in the field of industrial ecology since the early 1990s. We have tools for modeling material stocks and flows; we can identify opportunities to use waste material from one industry in another; we support environment-focused design; and we can provide methods for assessing impacts throughout the life cycle of products. I hope this paper

will inspire future discussions between scientists, policymakers and industry, and draw attention to the expertise that already exists and can be tapped."

More information: Stijn van Ewjik et al, 10 insights from industrial ecology for the circular economy. International Society for Industrial Ecology. (2023) is4ie.org/resources/documents/93

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