Taking circular economy to the next level

June 15 2017

In recent years a growing number of businesses, governments and environmental advocates have embraced the concept of a "circular economy," which aims to achieve greater sustainability by keeping more resources and materials in use for as long as possible—through strategies such increased product durability, reuse and recycling.

Adopted by such businesses as Google, Unilever, and Renault, as well as by the European Union and China, this framework has become an important element of environmental policy and management worldwide and spawned a growing consulting industry.

But in a new special issue of Yale's *Journal of Industrial Ecology*, leading researchers make the case that it is time to take the discussion and analysis to the next level.

With the concept gaining traction globally, five experts write in the lead editorial, there is a growing urgency for shared understandings, a common language, and hard examinations of the complexities and opportunities in the circular economy.

Such discussions, they write, must tackle three fundamental aspects of the circular economy: 1. the challenge of increasing the scale of circularity efforts beyond individual initiatives; 2. the magnitude of potential environmental benefits and impacts in the context of material flows, resource use, and product design; and 3. opportunities for innovative business models, institutional change, and informed policy action.

"As the circular economy gains worldwide attention and as implementation spreads, challenges and tradeoffs are emerging," said Reid Lifset, editor-in-chief of the *Journal of Industrial Ecology* and co-author of the editorial. "Industrial ecology is well-placed to provide insight and guidance on the environmental and resource implications of this emerging framework."

Highlights of the 25-article issue include:

- A provocative examination of whether circular economy activities might promote more production, and thus trigger a "circular economy rebound"
- Assessments of the challenges to circular strategies posed by hazardous materials, including arsenic in treated wood
- Estimates of the current level of circularity in the economy and of the feasibility of running the economy on recycled materials
- A description of why it is critical to address social and institutional forces when promoting circularity
- Product design methods and challenges in a circular economy
- A proposal for circular economy metrics for products
- A rigorous study of how much recycled material actually goes to industry
- Challenges and potential for recovering tantalum—a conflict resource—from e-waste

"The effort to close loops and to increase resource efficiency is a key element in the pursuit of sustainability," said Indy Burke, dean of the

Yale School of Forestry & Environmental Studies. "This special issue of the *Journal of Industrial Ecology* brings the technical prowess of industrial ecology tothe understanding ofthe environmental and resource dimensions ofour production and consumption systems."

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Provided by Yale School of Forestry & Environmental Studies