

**Session Economy: April 13th 09.00 hrs**

**3s2 Monitoring and modelling the transition from linear to circular production chain in the bio-economy**

## **Drivers and enablers of bioplastic adoption**

Dooley KJ 1,2)

1) W. P. Carey School of Business, Arizona State University

2) The Sustainability Consortium

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As the use of plastic products and packaging expands, the impacts from the fossil fuel extraction used to make plastic also expand. The supply chain of plastic involves much energy consumption, and plastic typically ends up in a landfill, or as pollution. It's estimated that 15% of global carbon budget could be associated with plastic by 2050. To seek alternatives, companies are experimenting with the use of bioplastics. In this talk, I'll present the results of a study that identifies the "ideal state" of a future world dominated by bioplastics instead of fossil-fuel based plastics. From that ideal state we can derive the technical, sustainability, land use, and economic drivers that would enable a sustainable scenario involving broad bioplastics adoption.

In brief, there are technical requirements that the bio-feedstock would have to be at least as good, if not better, than its fossil-fuel equivalent in terms of market cost and availability, producibility, engineering functionality, adherence to food packaging laws; and that it be biodegradable.

There are sustainability requirements that bioplastic packaging would have to be at least as good, if not better, than its fossil-fuel equivalent in terms of total life cycle environmental impacts, amount of plastic leakage into environment, and ecotoxicology of plastic leaked into environment. Additionally, bio-feedstock would have to be grown to be net carbon neutral or positive, conserve/enhance its surrounding ecosystem, be socially responsible to workers and the communities they live in, and not raise human or animal food insecurity.

Third, it is not clear where sufficient quality and volume of land exists to meet a global plastics economy using bio-based sources. One external driver that could reduce this risk is industrialization of crop and livestock production.

Finally, bioplastic needs to be composted rather than landfilled, but bioplastic would still represent a minority of recovered material that could be composted. Widespread composting infrastructure will make the economics of composting feasible. Most of the available compostable material is food waste (consumer and industrial) and other organic waste (e.g., landscaping or yard waste). For this reason, bioplastics would benefit from a

buildup of support for investing in composting, driven by supporters of composting food and other organic waste.

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