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## Perspectives for an 'all-circular' plastics & carbon economy [CO<sub>2</sub> as 'renewable' feedstock & 'new' industrial commodity]

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### Abstract

Meeting the desire of a still growing, equity-separated world population for prosperity in a *sustainable* manner, clearly necessitates radical changes in production (and consumption!), which in turn require adequate technologies along with proper choices of materials and handling of matter/material streams. **Two technological pillars** for an innovation-driven, sustainable transformation have emerged: (1) the transition of the energy system from a fossil fuel-based energy system to an **all-renewable energy system**, and (2) the transition of the matter/material resource system from a currently linear resources-to-waste system to a future **circular material/matter system** ('Circular Economy').

In the lecture, the interaction of these two pillars along with the importance and potential role of the **hard-to-abate (HTA) materials industry** with special emphasis on **cross-sectoral and circular industrial carbon management** and the pivotal role of the **plastics industry** will be addressed. To support and drive the required radical, comprehensive and deep transformative changes of the European HTA materials industry to *Sustainable Development*, huge amounts of renewable energy are needed. From a policy perspective, and in best alignment with UN Sustainable Development Goal SDG 17, this should inspire immediate and urgent action towards establishing a **"New Green Deal for Africa & Europe"** in partnership at eye-level, creating multiple solutions!

**Short biography.** Reinhold W. Lang is Emeritus Professor at the Johannes Kepler University Linz (A), where he headed the *Institute for Polymeric Materials and Testing (IPMT)* and presided the *Polymer Engineering & Plastics Technology* study program until 2022. As a polymer material scientist, his research focus is in the fields of *"Mechanics, Fracture and Fatigue of Plastics and Polymer Composites"*, *"Polymeric Materials for Solar Energy Technologies"*, and *"Mechanical Recycling of Plastics"*. Since the early 1990ies, he has also strongly been engaged with the broad and transdisciplinary topic *"Polymer Technologies for Sustainable Development"*.

Referring to the JKU Development Plans, as of 2017 he has been in charge of establishing and expanding the new inter-faculty JKU focus-field *"Sustainable Development: Responsible Technologies & Management (JKUsustain)"*, and he was a member of the steering committee of the project *"Universities for Sustainable Development Goals (UniNETZ)"*, in which 16 Austrian universities collaborate on the UN Agenda 2030 and the SDGs.

He is also a long-standing member of the board of *AEE - Institute for Sustainable Technologies (AEE INTEC, Gleisdorf, AT)* and a member of the *Advisory Committee of PlasticsEurope*, the European association of plastics manufacturers. Up to 2022 he also was a board member of the *Climate Change Centre Austria (CCCA)*. On a socio-political level, he has been active as a co-initiator of *forumFUTURE*, a 'competence forum for sustainable development in politics, business and society' founded 2019.