



**G20 OECD-BNCT WORKSHOP**  
**Bioeconomy in the OECD countries**  
**Presidency of council of Ministers**  
**July 16, 2021**

***Carbon management;***  
***a potential policy framework integrating the bioeconomy,***  
***carbon recycling and renewable energy***

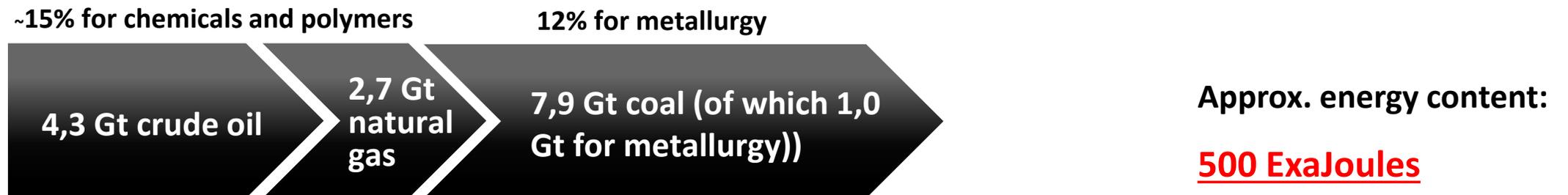
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# The green shift; the bioeconomy can't do it alone



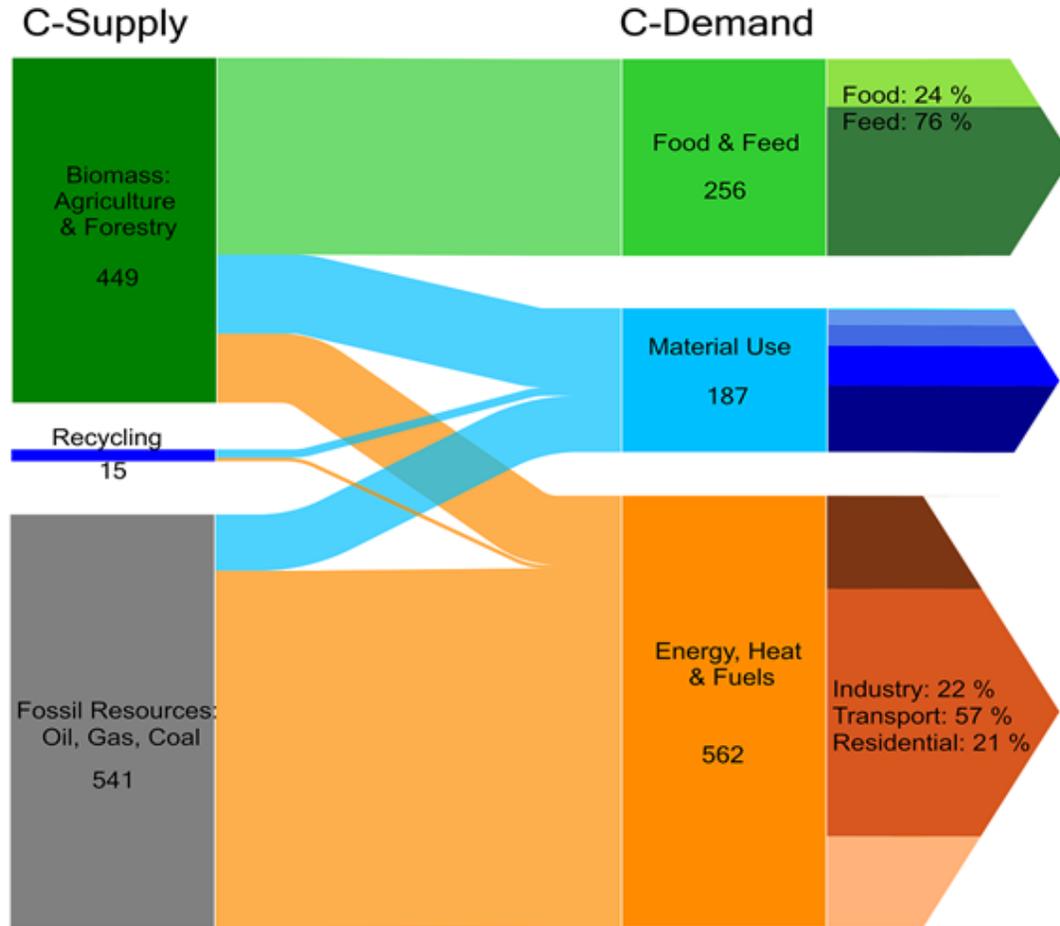
Source: FAO Annual Yearbook 2020 (2018 figures)



Source: Global data, Statista, IEA, OECD (2019 figures)



# The green shift; the bioeconomy can't do it alone



## Current European carbon consumption:

- 2018: Fossil carbon is 20% higher than biogenic carbon.
- Food and feed is only 25% of carbon demand
- Chemicals and materials are 19%.



**European Commission 2021:**  
*Carbon Economy; studies on support to research and innovation policy in the area of bio-based products and services*



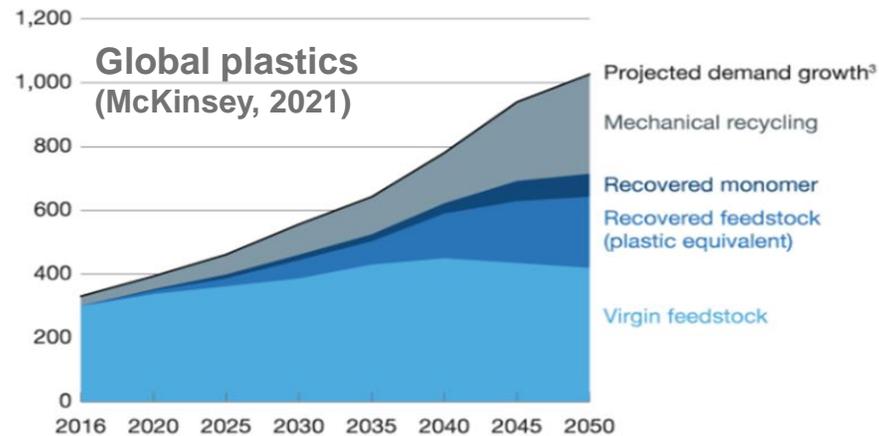
# The green shift; the bioeconomy can't do it alone



Aviation fuel consumption in the EU is 62,8 mill tones (2018).

Using sunflower oil and the HEFA process would require 60% of EU arable land (Nova Inst., 2020)

<http://news.bio-based.eu/can-the-european-unions-kerosene-demand-be-met-by-the-amount-of-biomass-produced-in-the-eu/>



<https://www.mckinsey.com/industries/chemicals/our-insights/how-plastics-waste-recycling-could-transform-the-chemical-industry>

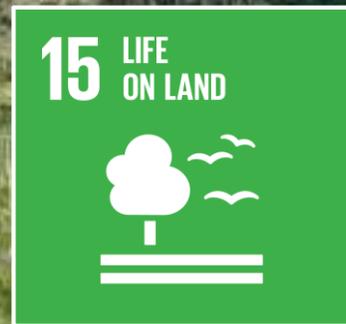
Polymers in Europe has about the same volume, i.e. 64 mill tones (2019).

Global demand projected to grow to 1.000 Mt in 2050 (McKinsey, 2021).

Even with 60% recycling (mechanical and chemical), this implies a fossil replacement of about 400 Mt.



# Increasing demand leading to competition for land

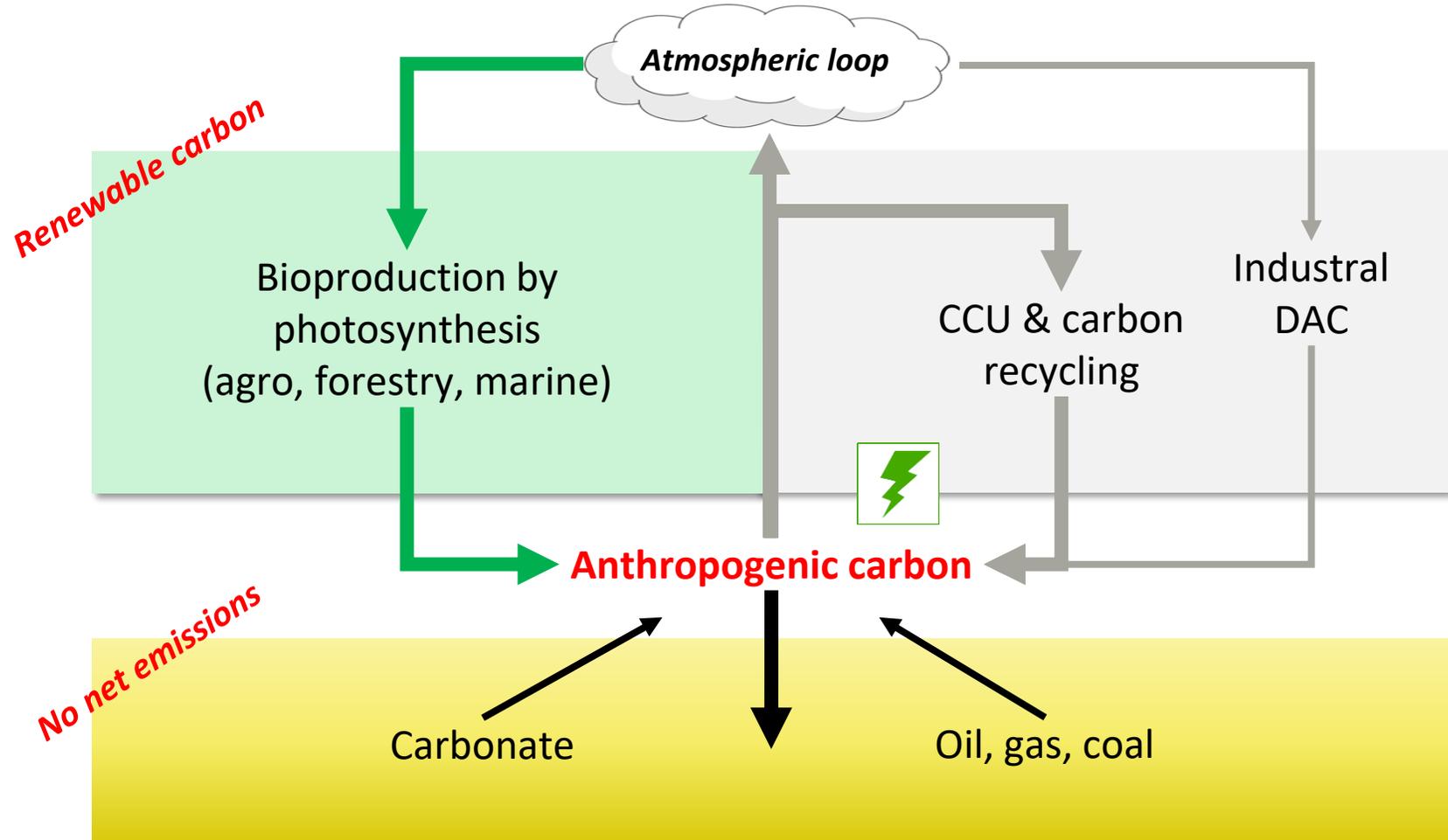


Implications for policy development:  
How should the international  
community deal with trade-offs?

*Foto: V. Moriyama, Greenpeace*



# Carbon Management – a more complete narrative





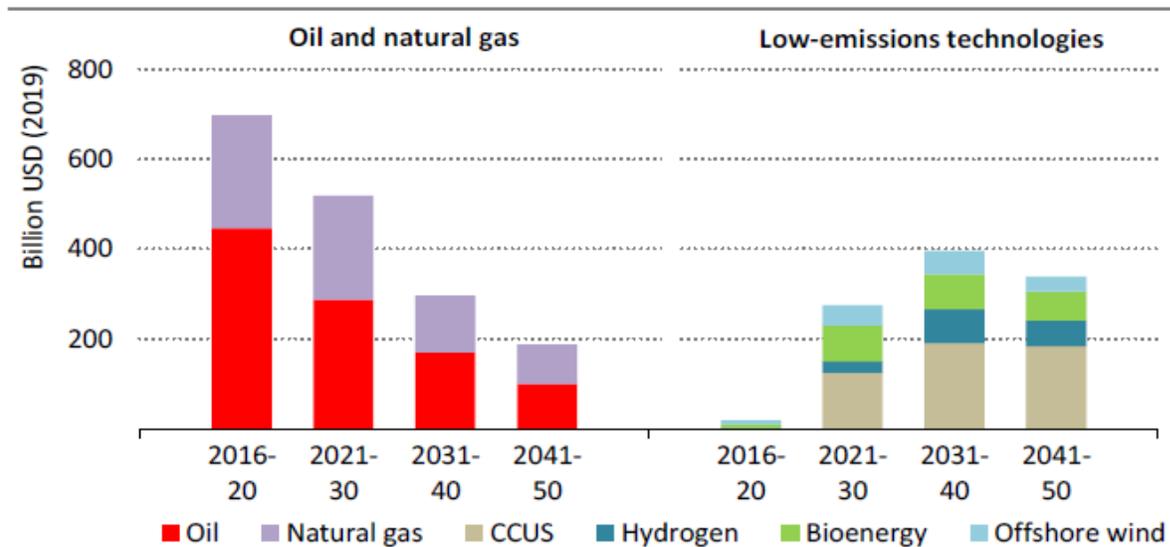
# IEA's "net zero in 2050" calls for investment in CCUS



In 2050 the IEA scenario predicts a CCUS level of 7,6 Gt CO<sub>2</sub> (20% of current emissions).

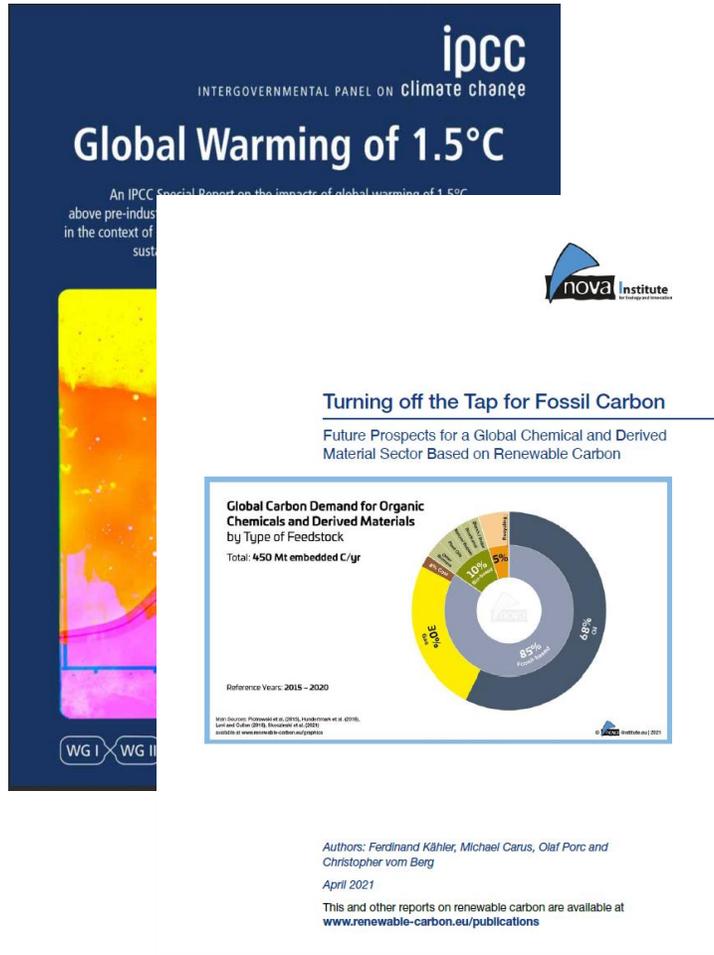
1,0 Gt DAC (direct air capture), of which 50% is stored.

This should be reflected in a shift of investments:





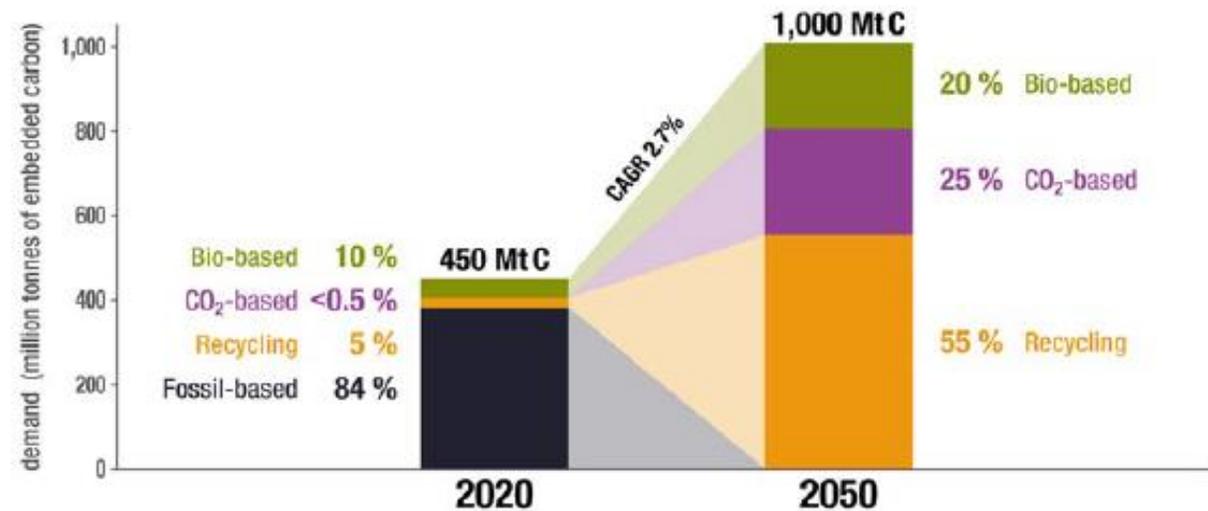
# Nova Instituts' scenario for chemicals and materials



Demand for “embedded carbon” will double by 2050.

Virgin carbon supply is equally split between biomass and CCU/DAC.

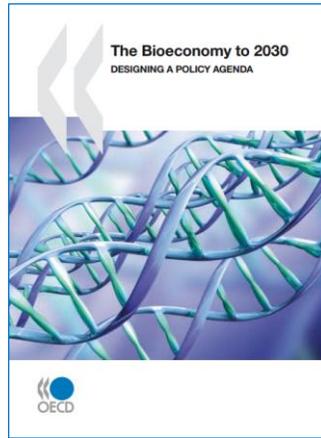
250 Mt DAC-derived carbon (■) = 916 Mt CO<sub>2</sub>.



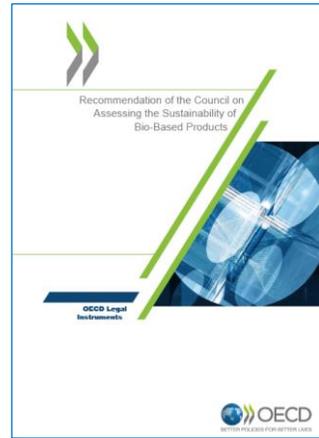


# OECD; from bioeconomy to carbon management

2009



2013



2018



*“What is needed is not just any bioeconomy; ...but a sustainable and more circular one!”*

## Working Party on Biotechnology, Nanotechnology and Converging Technologies (BNCT) 2021-22 work program:

- Within the bioeconomy, can the major sustainability trade-offs be better identified, in order to better help countries make strategic decisions?
- Would the perspective of carbon management foster sustainability policies with a better balance between potentially conflicting sustainability goals?



# Carbon Management Workshop October 2020;

## *Key policy lessons*

1. Carbon management includes strategies and policies to ensure that our limited carbon resources are used for the optimal application.
2. **In principle, all carbon feedstocks, whether fossil or renewable, should be judged by the same sustainability criteria.**
3. The relative weight given to these criteria will determine the feedstock's attractiveness of use and for what purpose.
4. **There is not enough biomass available to substitute the entire fossil carbon system, without damaging consequences for biodiversity and food security.**
5. **Biomass is not alone, however, and can be complemented by recycling of carbon waste and industrial fixation of atmospheric CO<sub>2</sub>.**
6. Moreover, future carbon demand will be significantly reduced by decarbonisation of the energy sector.
7. **Both the decarbonisation of the energy sector and energy requirements for carbon recycling calls for integration of carbon management and renewable energy policies.**
8. New carbon supply chains depend on novel technologies; hence implementation of carbon management is strongly connected to innovation policies.



# Carbon management in the BNCT work program

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*Steering group: Austria, Canada, France, Germany, Great Britain, Italy, Japan, Korea, Mexico, Norway, The Netherlands, Portugal, USA.*

## **Case studies and workshop, October 2021;**

To illustrate the impact of novel enabling technologies and national policies within carbon capture (recycling or DAC) and carbon sequestration (CCS).

To be presented and discussed at an OECD event hosted by Norway in October 2021.

## **OECD high level conference, 6-7<sup>th</sup> December 2021;**

### **Technology in and for society: Innovating well for inclusive transitions**

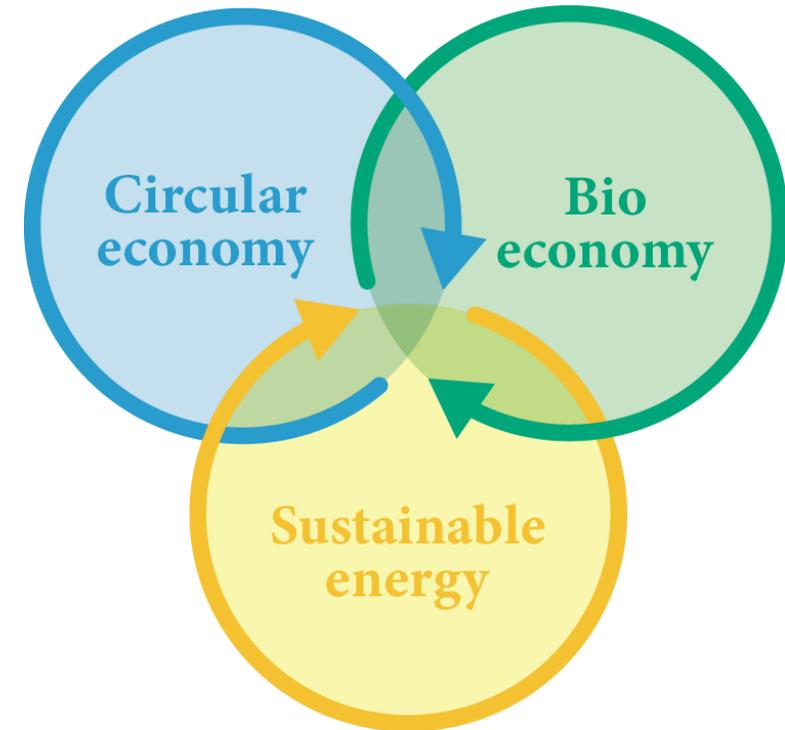
Session to explore the carbon management paradigm within green industry policies.



**Biomass alone can not replace carbon demand in 2050.**

**Bioeconomy policies need to be integrated with carbon capture and recycling.**

**OECD is currently exploring a carbon management policy framework.**



*Thank you for your attention!*