Environmental impacts allocation rules chemical recycling

CE Delft
Committed to the Environment

CE Delft

- Independent research and consultancy since 1978
- Transport, energy and resources
- Know-how on economics, technology and policy issues
- 80 employees, based in Delft, the Netherlands
- Not-for-profit

Clients

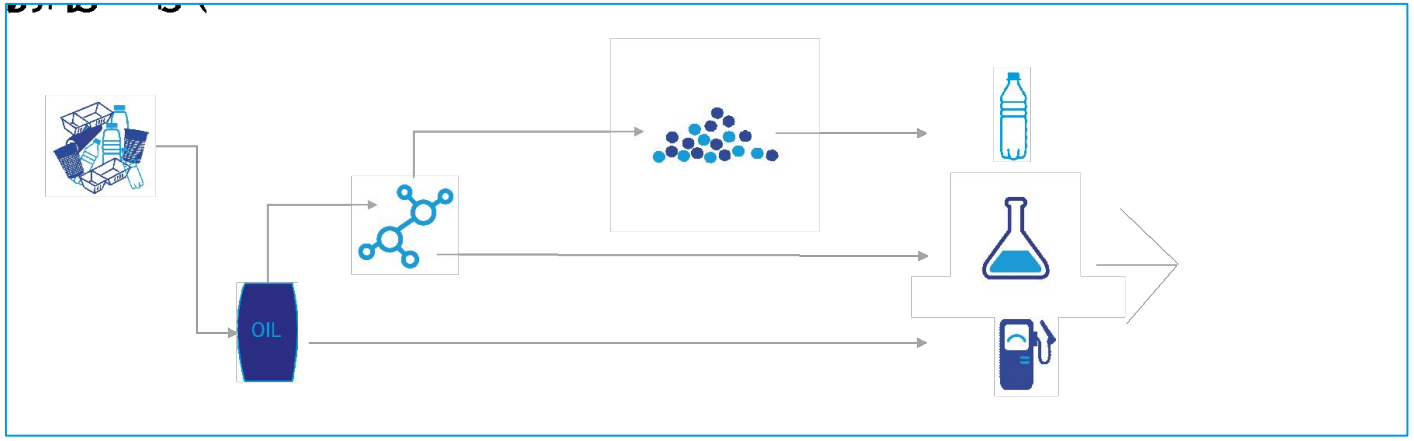
Industries
(Small and medium size enterprises, transport, energy and trade associations)

Governments
(European Commission, European Parliament, regional and local governments)

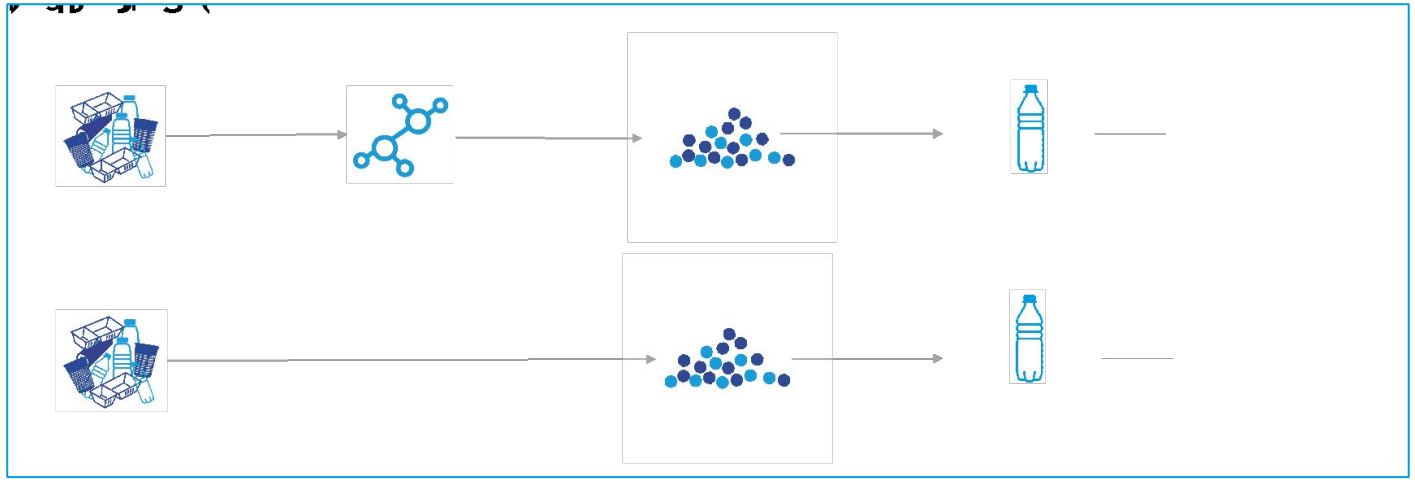
NGOs

Background chemical recycling (long loop vs short loop)

- Allocation rules required to match plastic waste inputs with multiple outputs of long loop chemical recycling process (plastics, chemicals, fuels)



- No allocation rules required for mechanical recycling and short loop chemical recycling (single output)



Allocation rules for chemical recycling under discussion

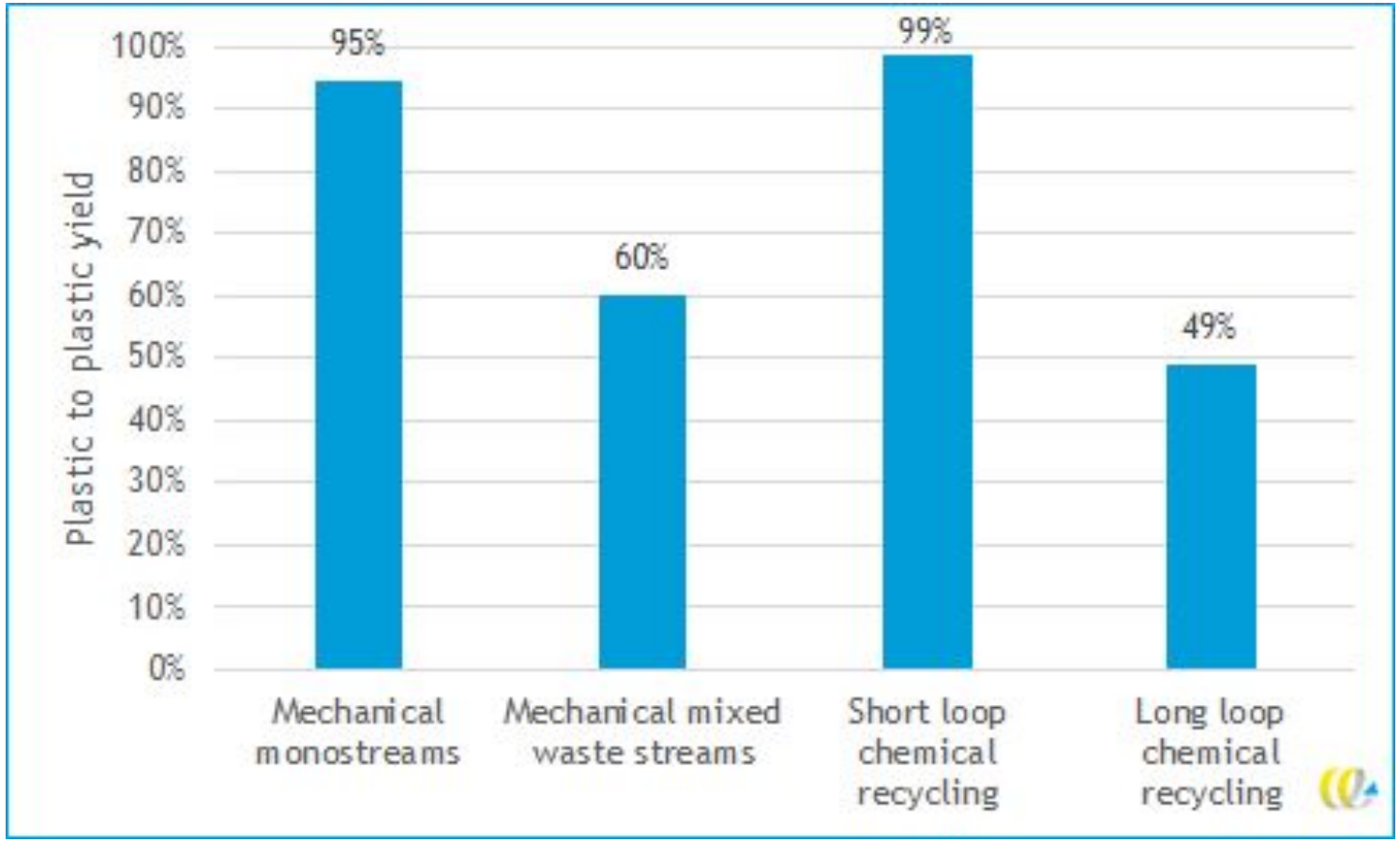
- Three allocation rules under discussion in Europe:
  - Proportional allocation (little allocation freedom)
  - Polymers only (more allocation freedom)
  - Fuels exempt (most allocation freedom)

- Allocation freedom increases financial benefits of long loop chemical recycling, but not for mechanical and short loop chemical recycling

- Risk that long loop chemical recycling outcompetes mechanical/short loop and buys up plastic waste

Plastic to plastic yields

Mechanical and short loop convert plastic waste more effectively in new plastic than long loop recycling

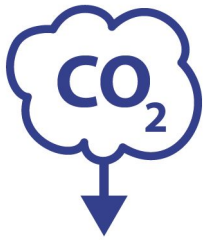


Calculated in the CE Delft project "Monitoring of chemical recyling" for the Dutch government with cases studies with industry (11 companies)

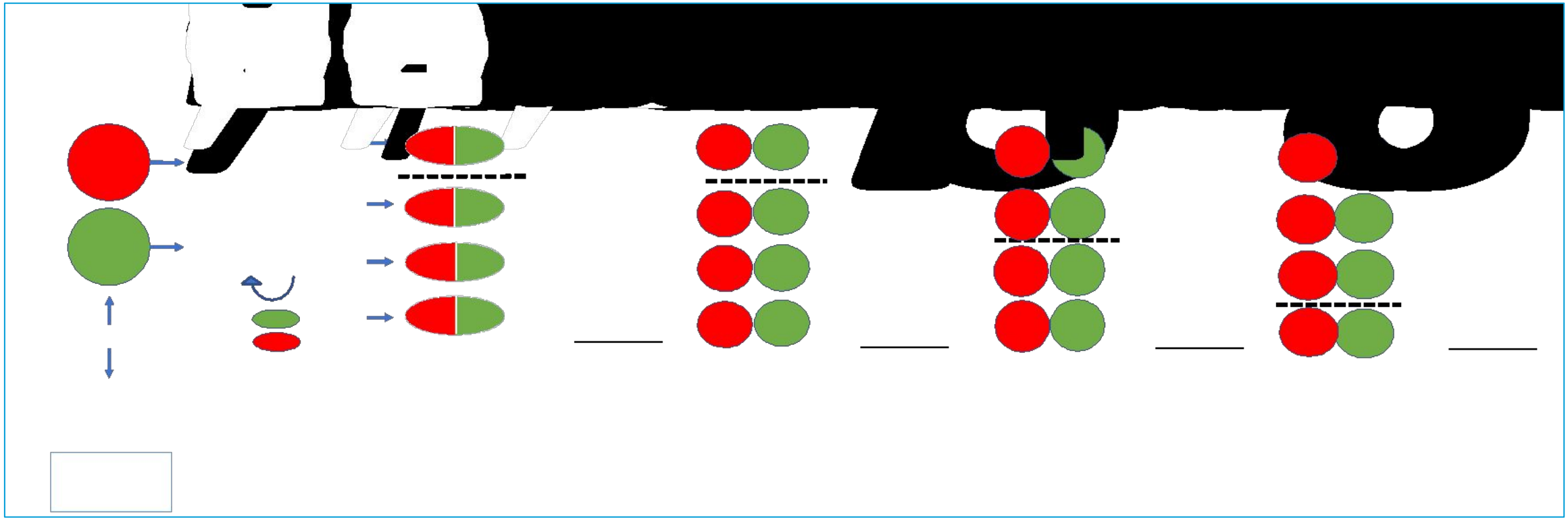
(Link Monitoring chemical recycling. How to include chemical recycling in plastic recycling monitoring? - CE Delft – EN)

Objective of this study

Determine the impacts of allocation rules on environment and level playing field between recycling technologies



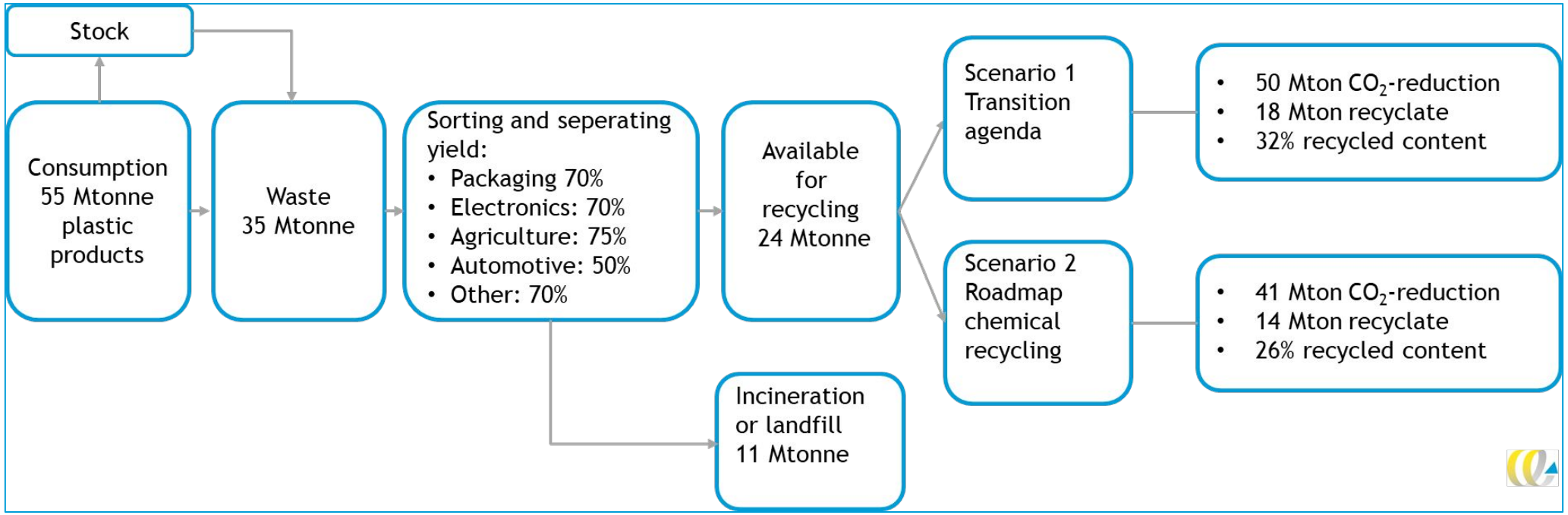
Impacts on level playing field



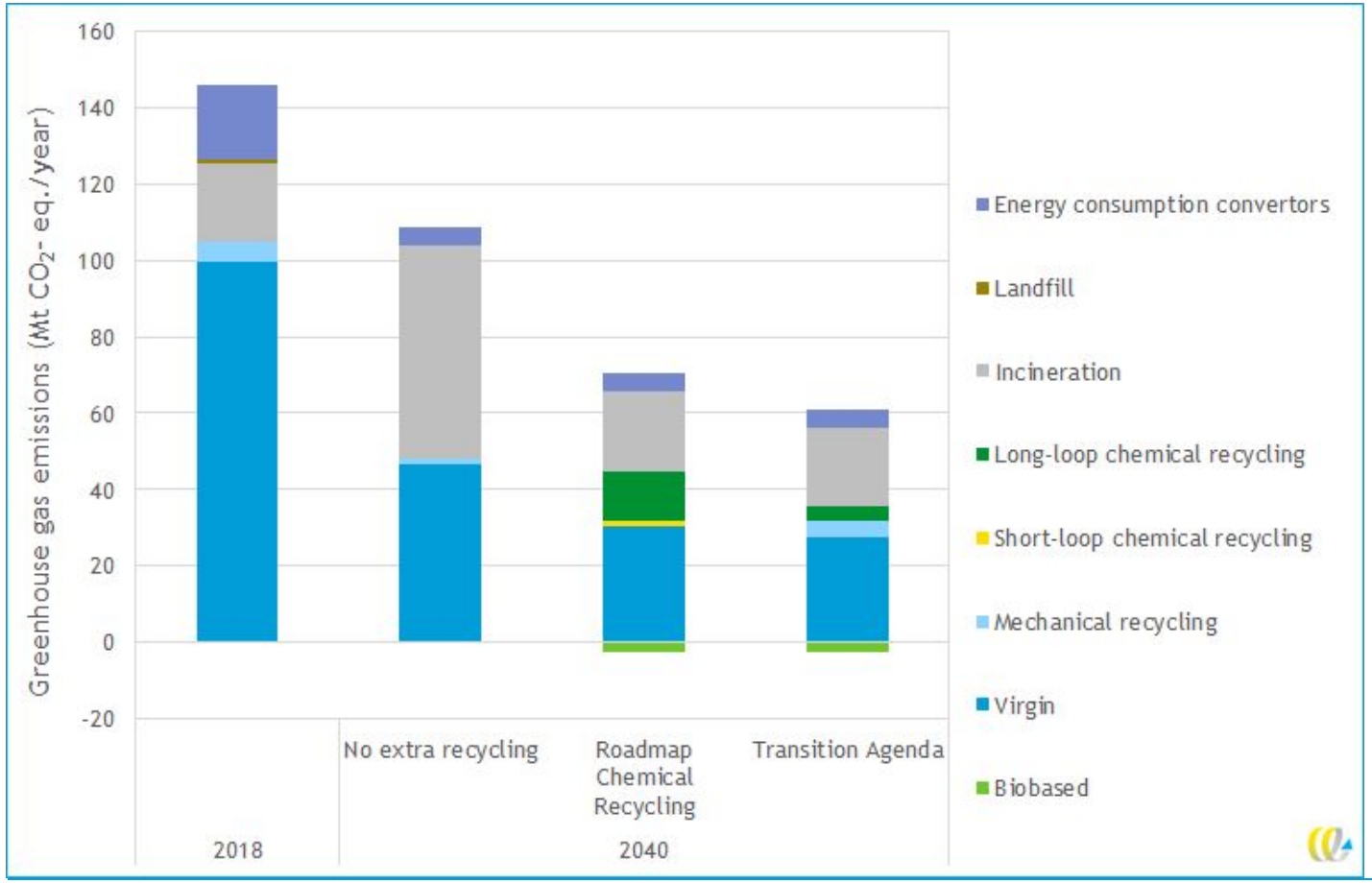
Environmental impacts calculated with 2 scenarios

Scenario 1: Transition Agenda: 75% mechanical, 20% long loop, 5% short loop
Scenario 2: Roadmap Chem. Rec: 0% mechanical, 80% long loop, 20% short loop

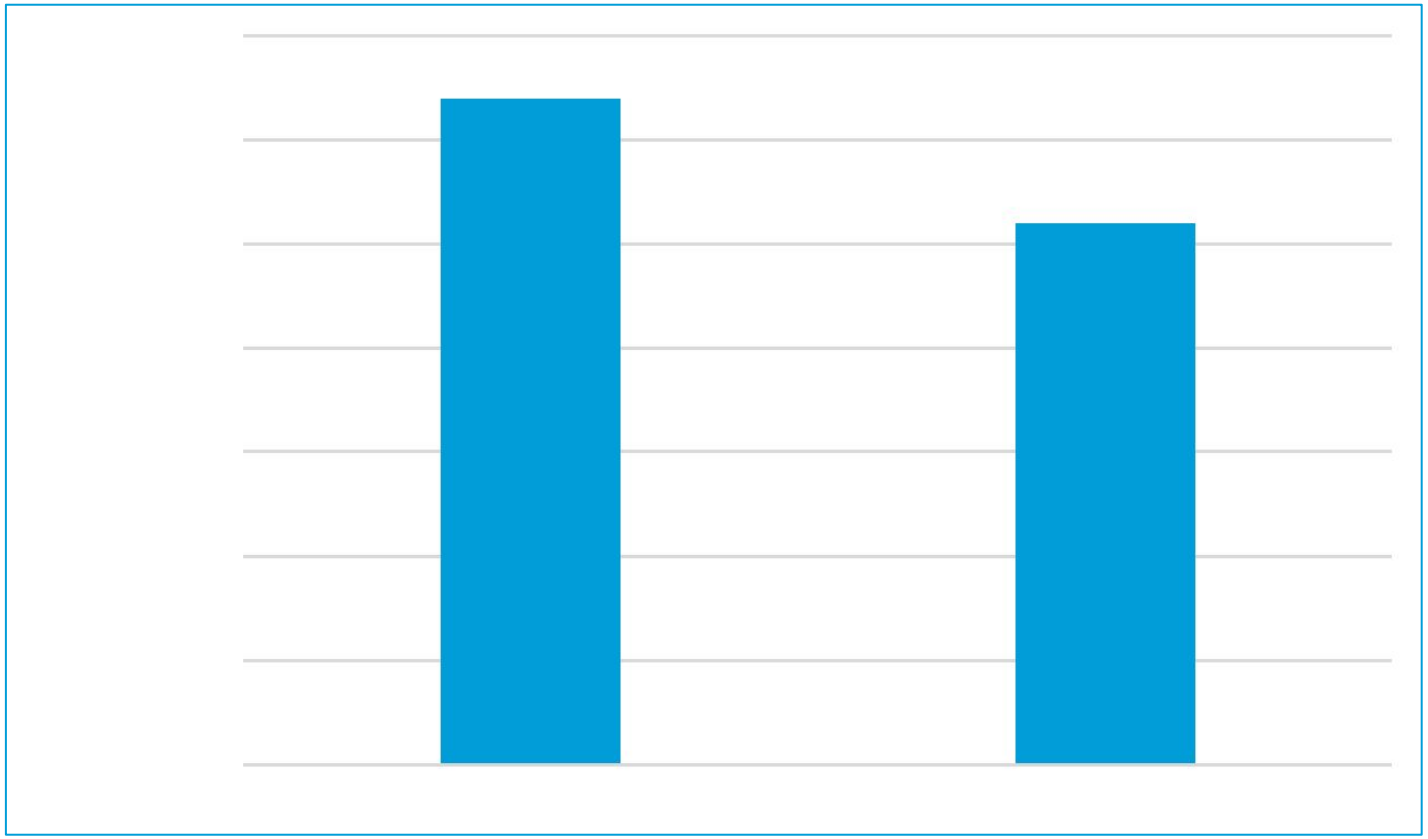
Scenarios for EU based on two Dutch scenarios made with/by industry adopted by the Dutch government



EU greenhouse gas emissions of plastics lifecycle in 2018 and 2040



Maximum potential recycling percentage 2040



Conclusions

- Proportional allocation reduces the risk of scenarios with a large share of long-loop chemical recycling.
- In such a scenario, the maximum CO_2 benefits of plastics recycling are 9 Mtonne lower in 2040 than in a scenario with more mechanical recycling, while the maximum achievable recycling rate is 32% instead of 26%
- If larger allocation freedom is chosen, a cap on chemical recycling could be considered to decrease the risks of chemical recycling outcompeting mechanical recycling.
- A maximum of 12,5 to 25% long-loop recycling, based on the percentages which have been suggested in the Dutch transition Agenda, could be an option for such a cap.

Further recommendations

- Consider to implement more norms on product groups that can meet the targets with mechanical recyclate.
- Such a policy will be implemented in the Netherlands: recyclate and/or biobased norm of 25% to 30% in the Netherlands for all polymers in 2030 (with recyclate and biobased 60% renewable plastic is possible.

See also the new Dutch obligation policies and CE Delft studies (policies in Dutch but studies in English):

Extra pakket maatregelen dicht gat tot klimaatdoel 2030 | Nieuwsbericht | Rijksoverheid.nl
(Announcement of 25% or 30% recycled or biobased obligation in all new plastics in 2030 on the Dutch market)

Mandatory percentage of recycled or bio-based plastic. In the European Union

Sustainability of biobased plastics. Analysis focusing on CO2 for policies

Monitoring chemical recycling. How to include chemical recycling in plastic recycling monitoring?

CO2 reduction with circular plastics in the Netherlands. Scenario analysis for 2030

Questions?