Title: A shortcut from post-consumer plastic waste to circular polyolefins.
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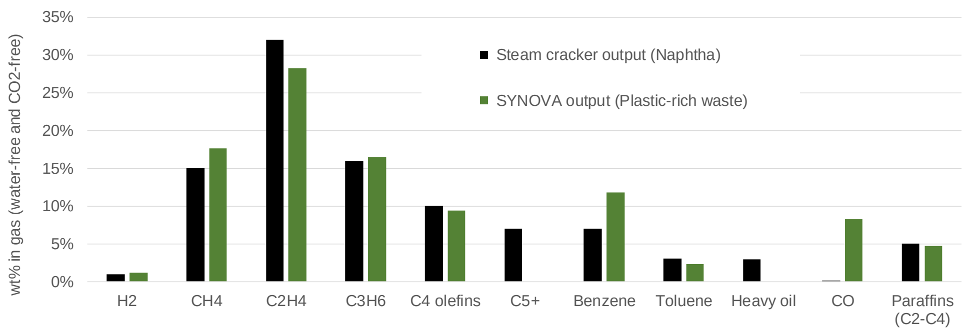
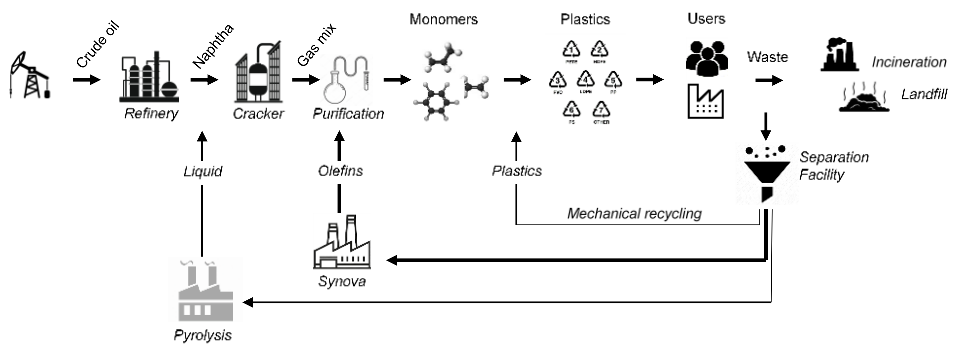
Introduction
A paper from 1996 from the University of Hamburg reported experiments of high-temperature pyrolysis of plastic waste and concluded: "*It is possible to obtain yields of the main products, which are comparable to those of common technical processes producing the same components*". They refer to naphtha steam cracking as the common technical process and ethylene, propylene, butadiene, and benzene as the products. But they were too early.

SYNOVA process
Now, the markets are desperately looking for options to recycle plastics in a cheap way that replaces fossil feedstock and reduces CO2 emissions. The high-temperature pyrolysis option mentioned above is a strong candidate. At 700-750°C, plastic waste breaks down to a gas that resembles gas made from naphtha steam cracking. Picture below compares the two. Compared to the early work done in Hamburg, the feedstock is not just plastics. It consists of ~60% plastic, ~30% biomass, and 10% water and inerts. The presence of contaminations such as biomass (paper labels, food residues) and ash (glass, metals, fillers, sand) do not change the earlier observation from Hamburg that the "*…yields are comparable…*".



The process has been developed by TNO and SYNOVA. It consists of three steps: (1) high temperature pyrolysis at 700-750°C, (2) removal of high-molecular weight contaminants and particles, and (3) purification to remove all other contaminants. Step 2 is the key innovative step that enables the use of contaminated waste streams to make the building blocks for new plastics in this 3-step process.

Circularity
SYNOVA's process is part of a circle that is shown below. It runs through monomers (olefins) and therefore produces recycled content with identical quality as plastics made from non-renewable feedstock like naphtha. At the same time, the circle is shorter than low-temperature pyrolysis that makes a liquid. This translates to benefits in yield, economics, and CO2 reduction for the Synova process. The presence of biomass "contamination" in the feedstock adds renewability and improves the CO2 footprint as compared to processes based on plastics only.



Benefits
The presentation will tell more about the feedstock requirements of the SYNOVA process and why that is relaxed compared to alternatives like low-temperature pyrolysis. Information will be shared about our partners, the status of the development, CO2 reduction, degree of circularity, and economics.