

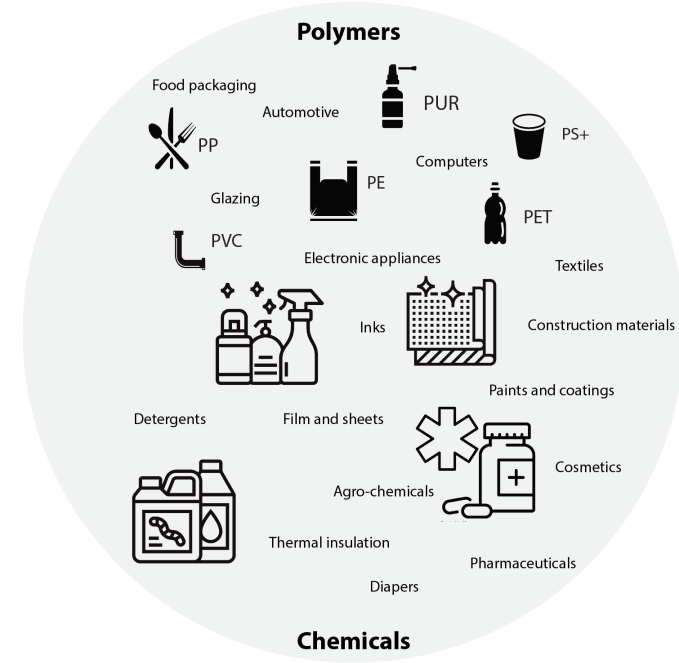
Solutions for the chemical industry: How the feedstock transition makes today's investments in refineries robust

Jasper Meijering – Researcher CIEP

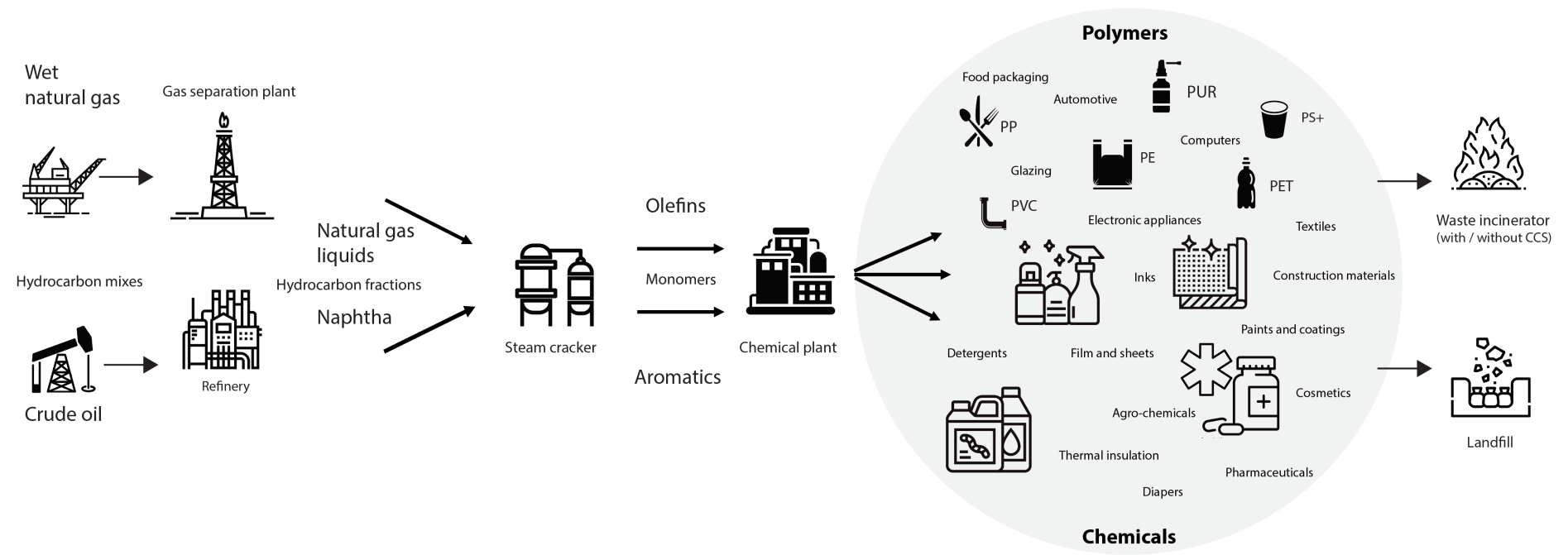
For the round table 'Preparing for larger risks in security of supply of fuels & feedstock and longer term, low carbon solutions'.

25-03-2022 VNO-NCW, VNPI, PHB, CIEP

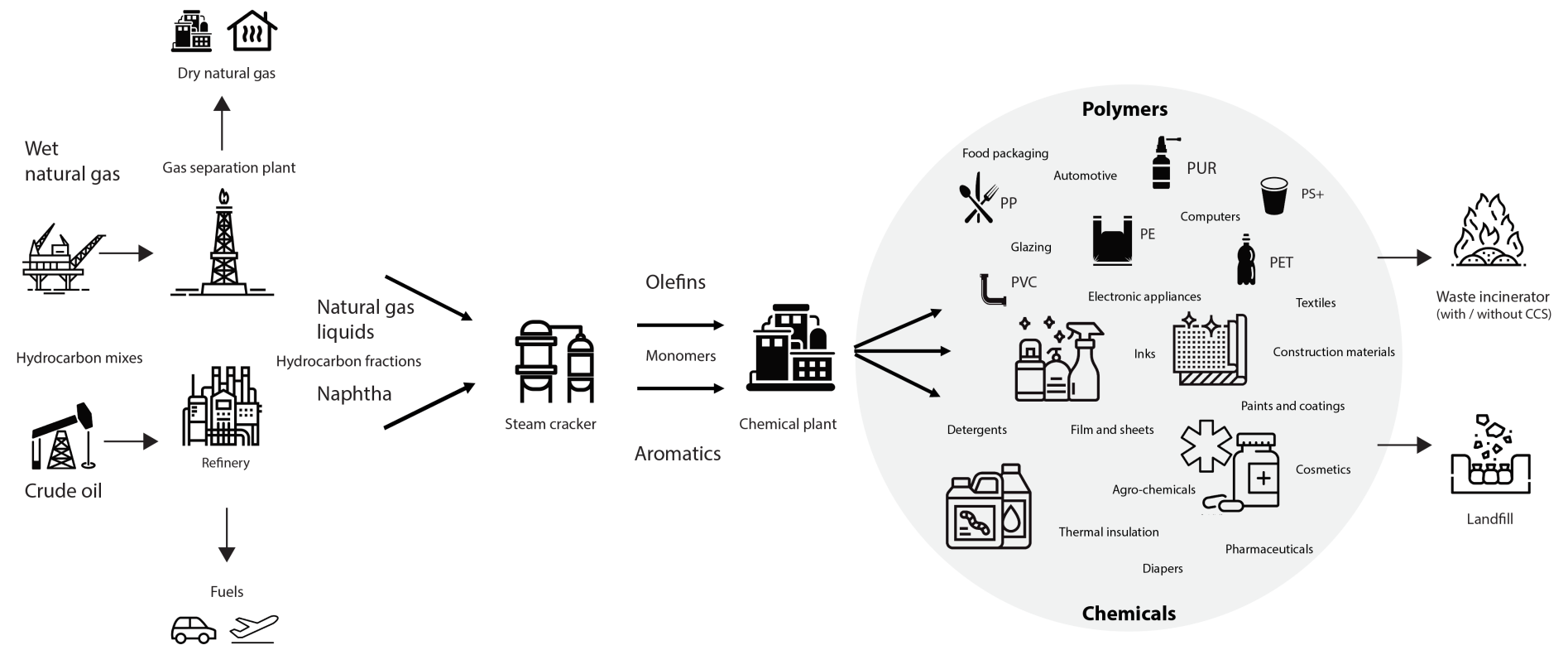
ENERGY AND FEEDSTOCK TRANSITION IN THE VALUE CHAIN FOR ORGANIC CHEMISTRY



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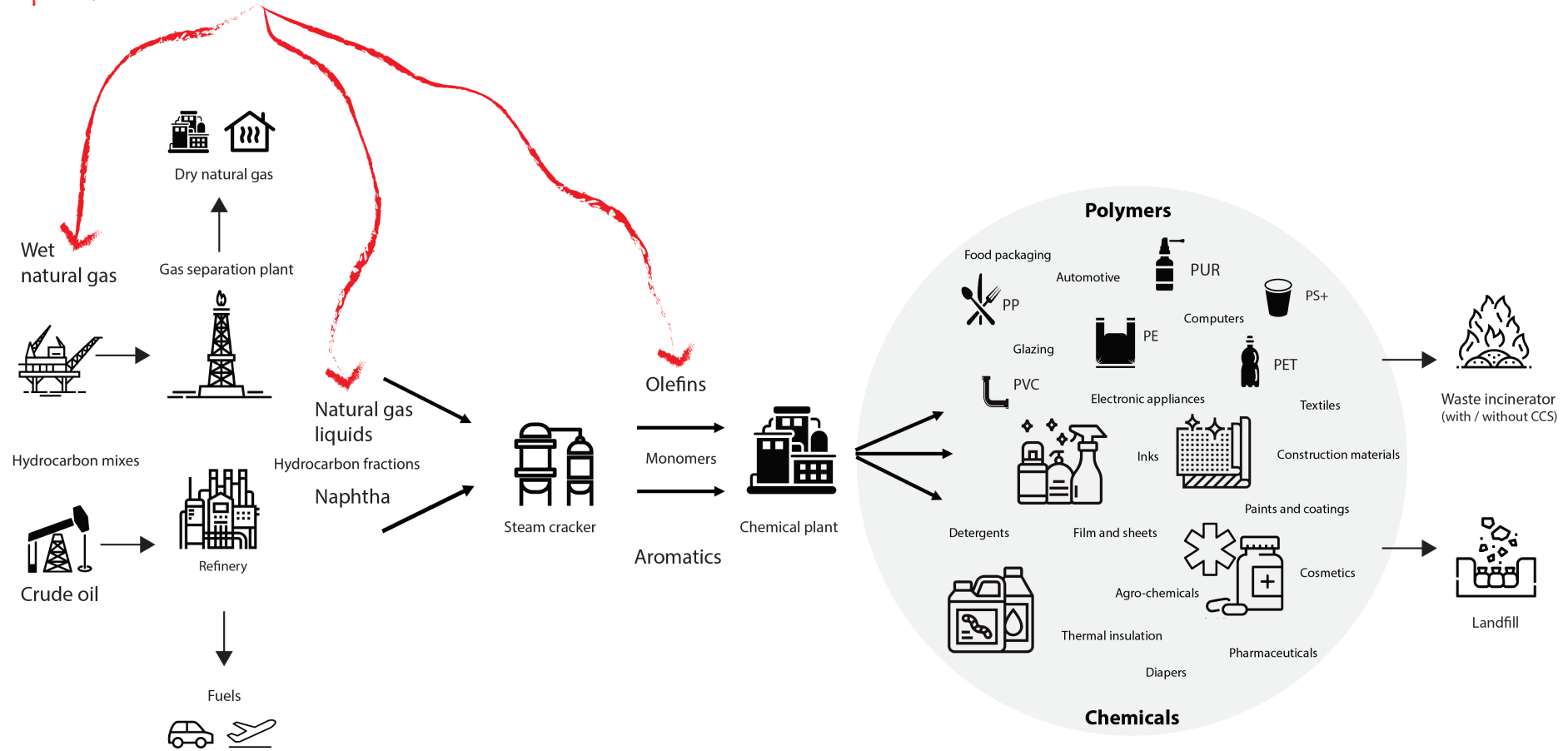
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ENERGY AND FEEDSTOCK TRANSITION IN THE VALUE CHAIN FOR ORGANIC CHEMISTRY

Change what goes in:

- * Use recycled waste as drop-in feedstock
- * Use captured carbon as drop-in feedstock
- * Use biomass as drop-in feedstock



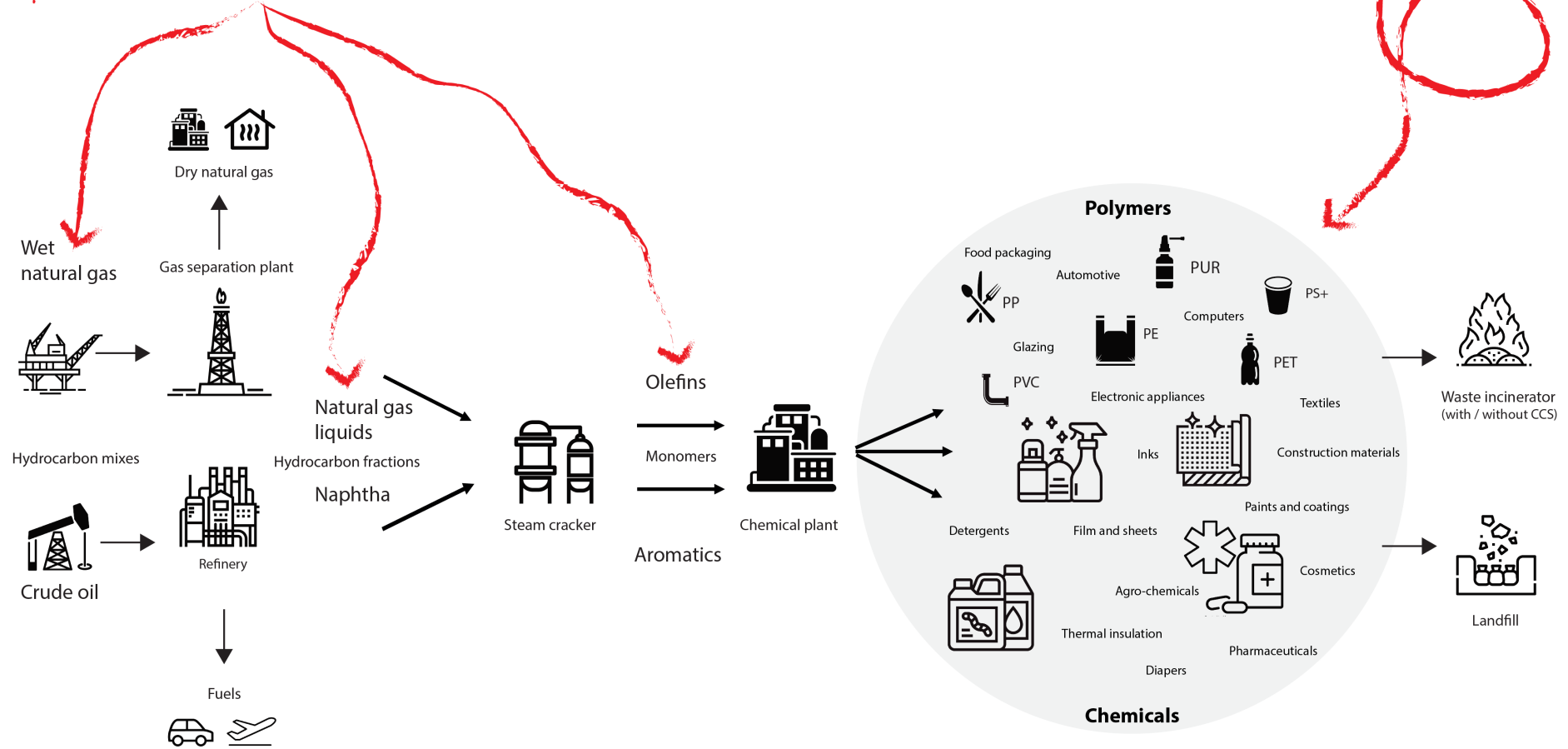
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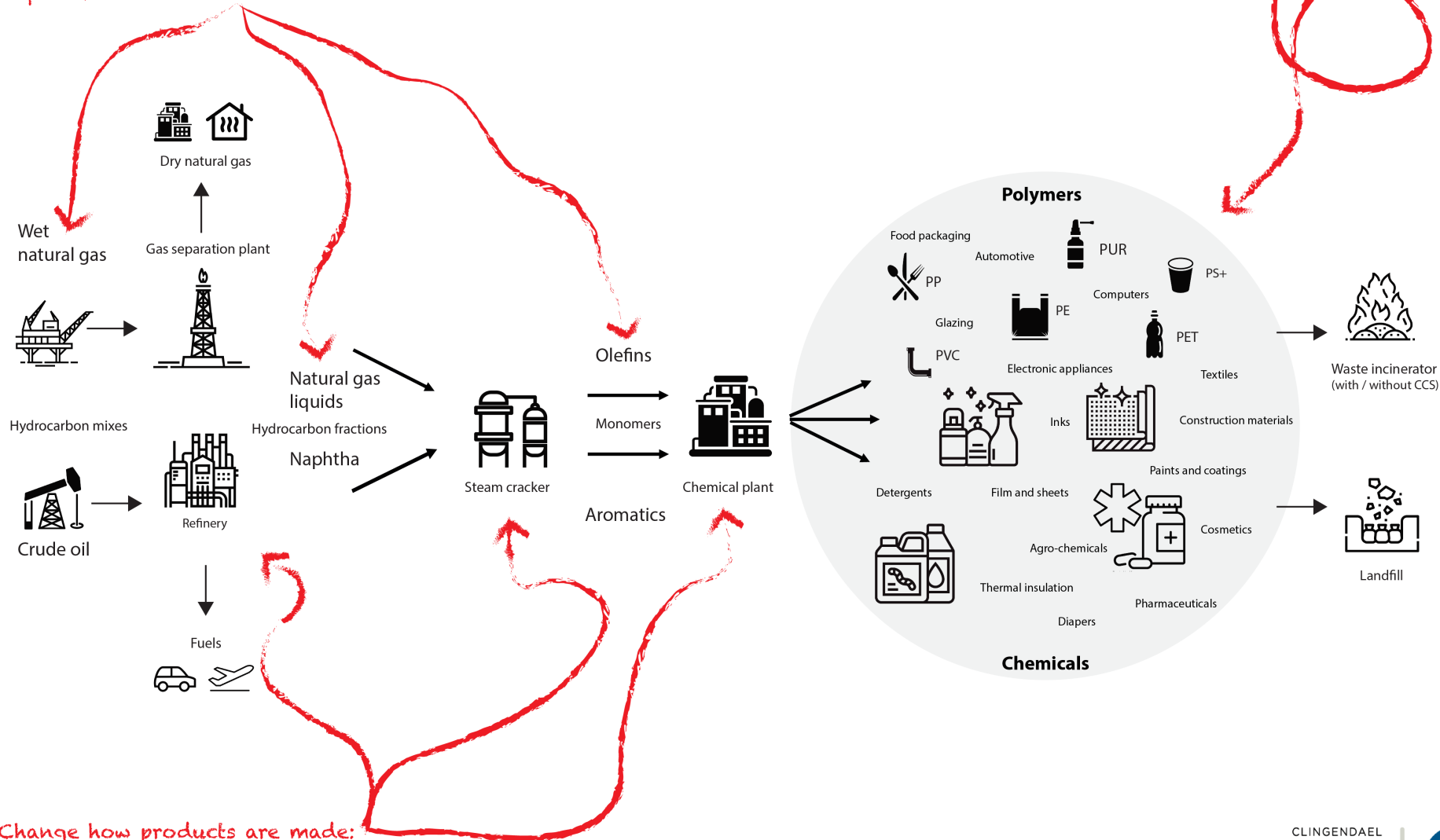
- * Volume of products
- * Types of products



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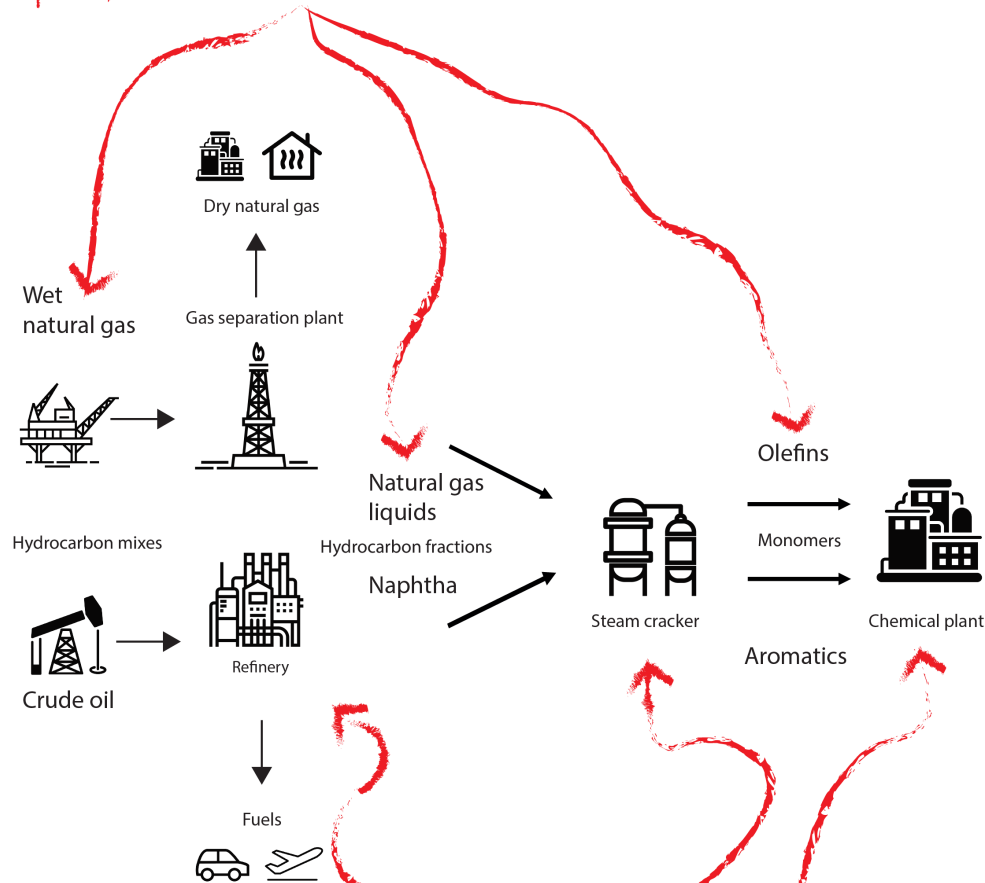
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- * Process and energy efficiency
- * Renewable energy consumption
- * Carbon capture and storage

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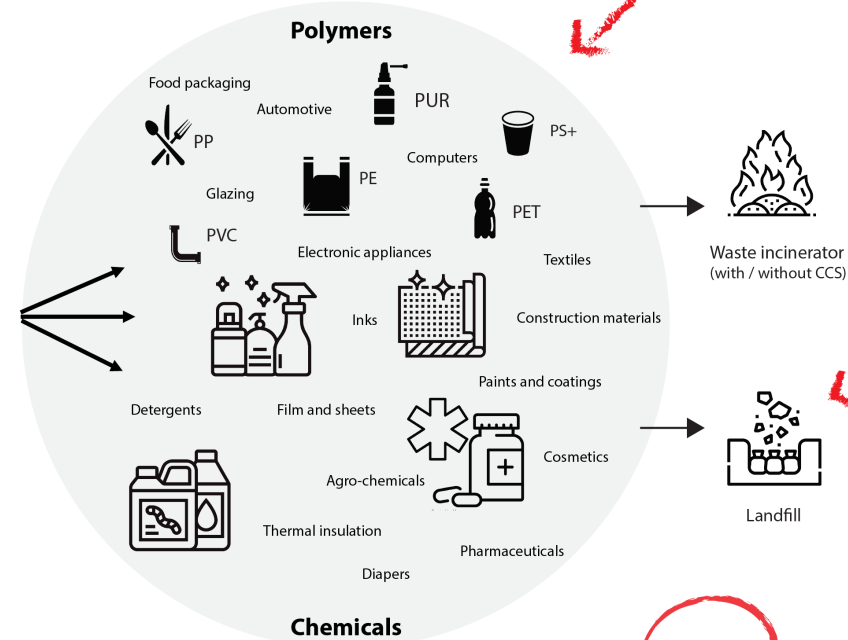


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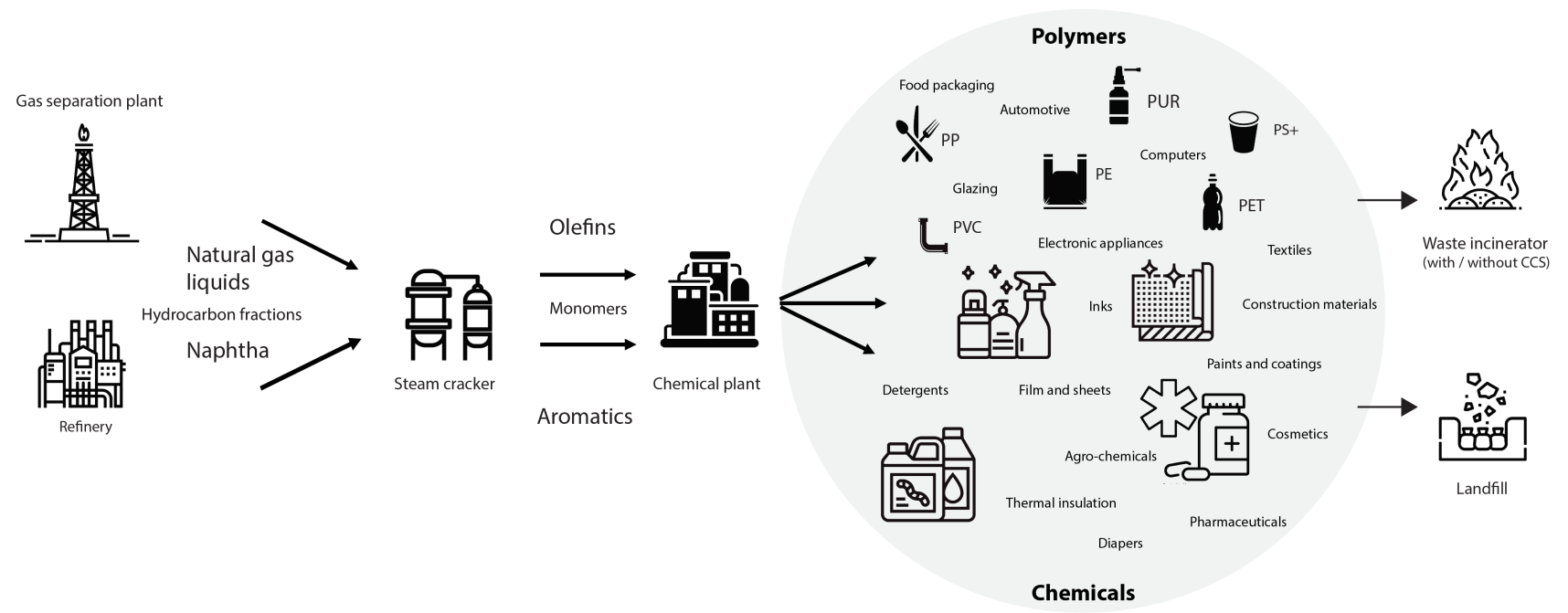


Change what happens with what comes out:

- * How products are used
- * How products are discarded

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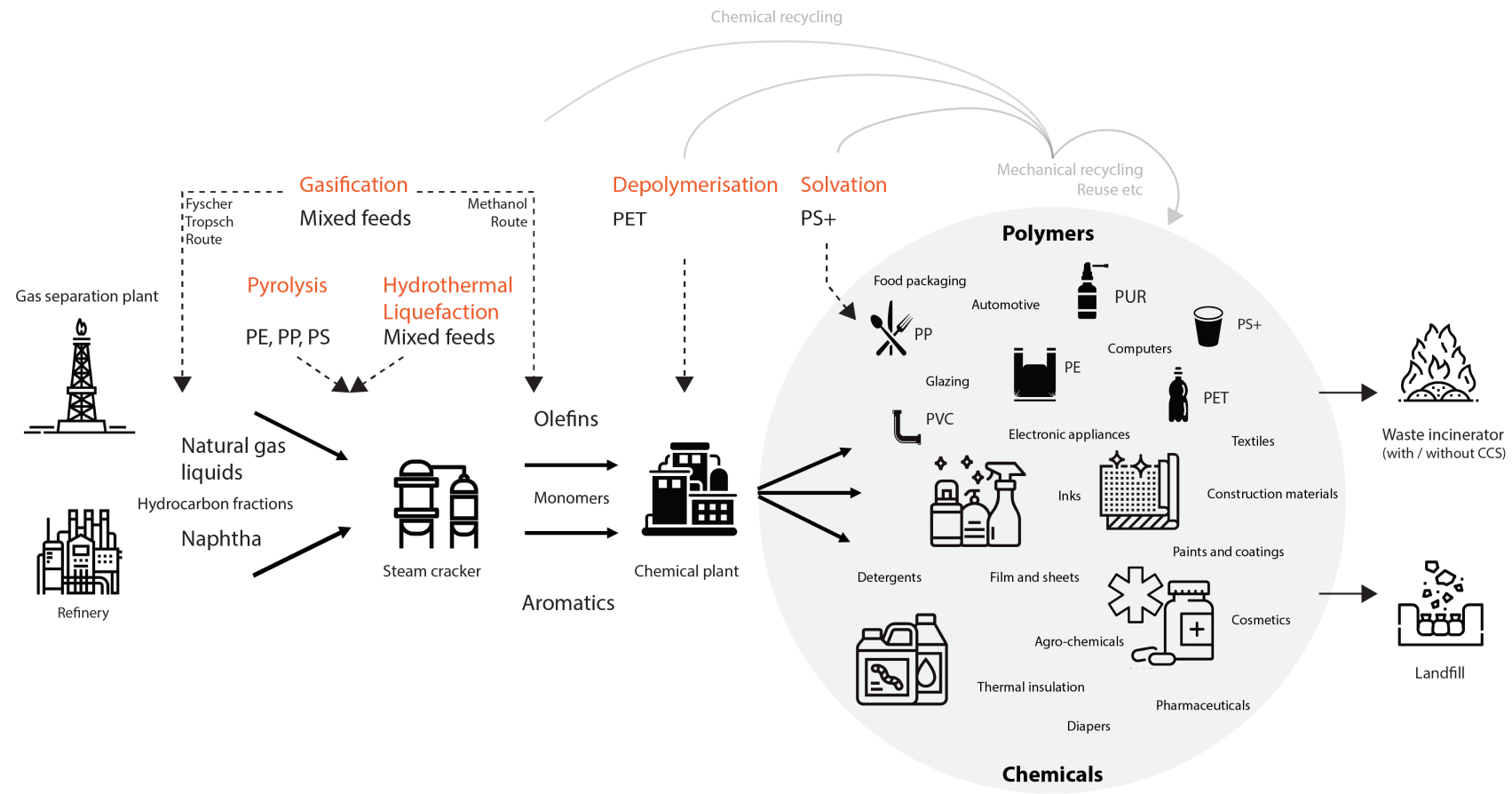
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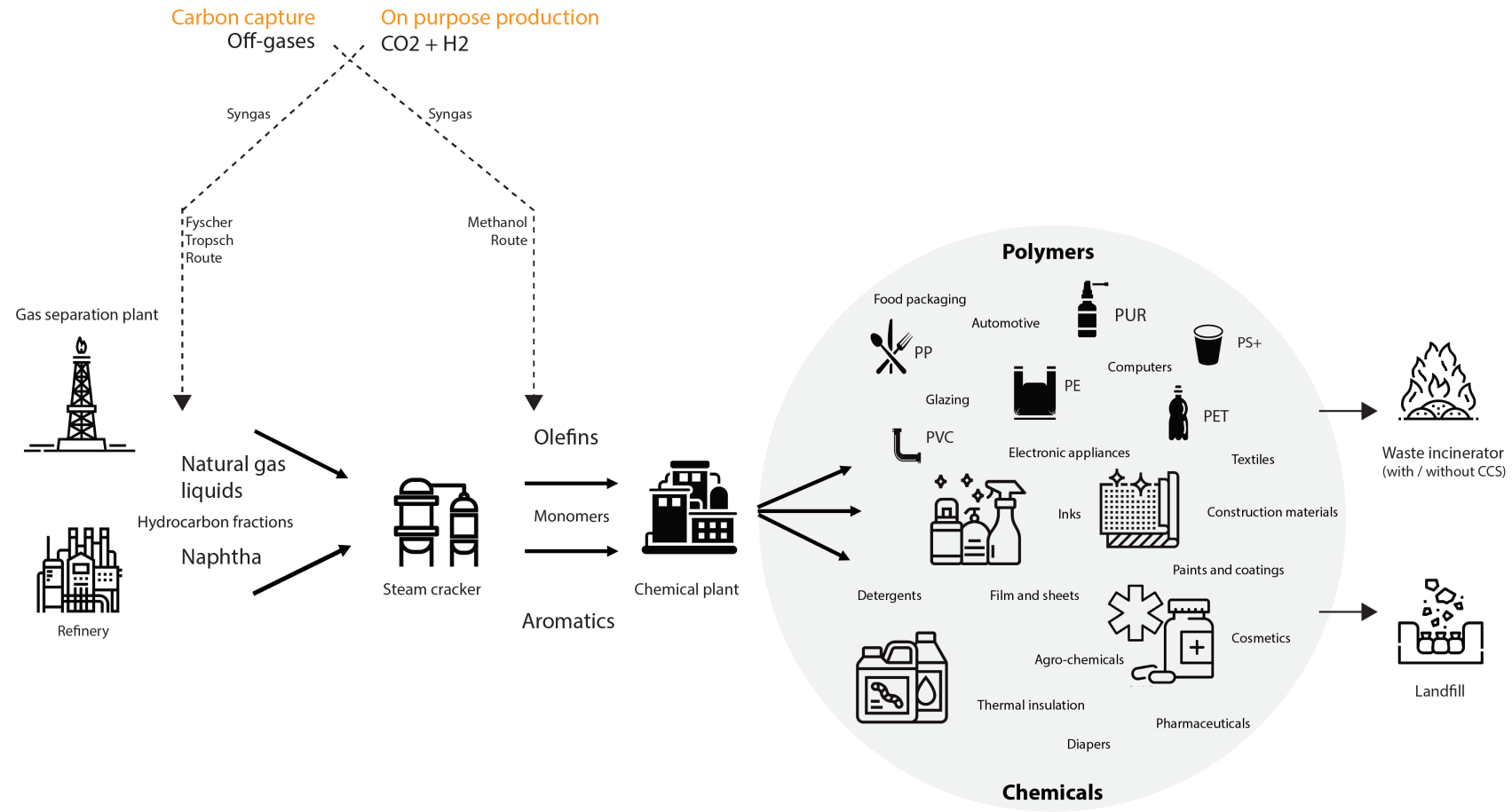
ENERGY AND FEEDSTOCK TRANSITION IN THE VALUE CHAIN FOR ORGANIC CHEMISTRY

Change what goes in:

- Barriers to using plastic waste as drop-in feedstock:
- * Inherent losses
 - * Growing (product) markets
 - * Availability of (pure) waste streams



ENERGY AND FEEDSTOCK TRANSITION IN THE VALUE CHAIN FOR ORGANIC CHEMISTRY

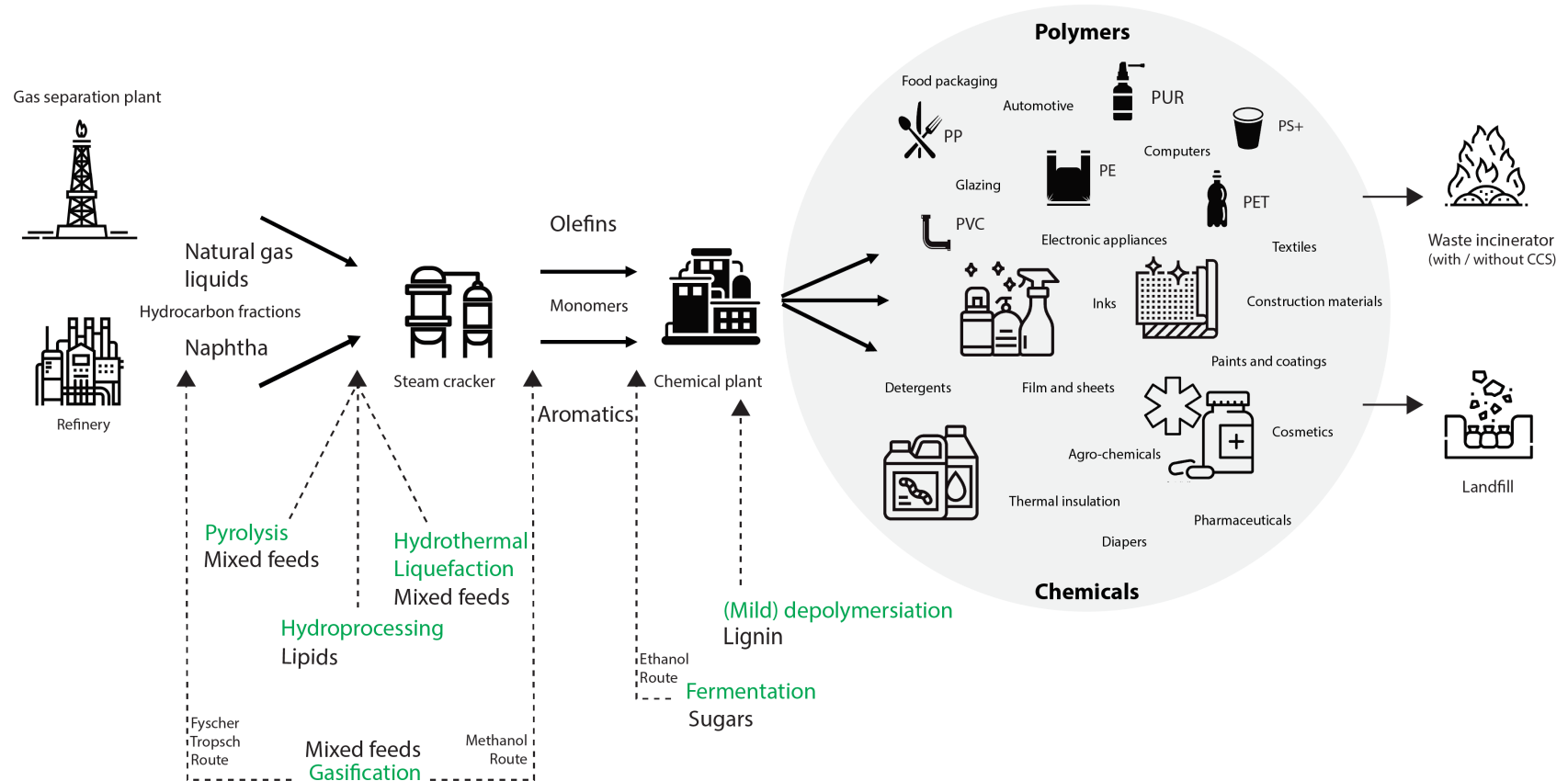


Barriers to using captured carbon as drop-in feedstock:

- * Availability of RES
- * Capital and energy intensity
- * Technology readiness level

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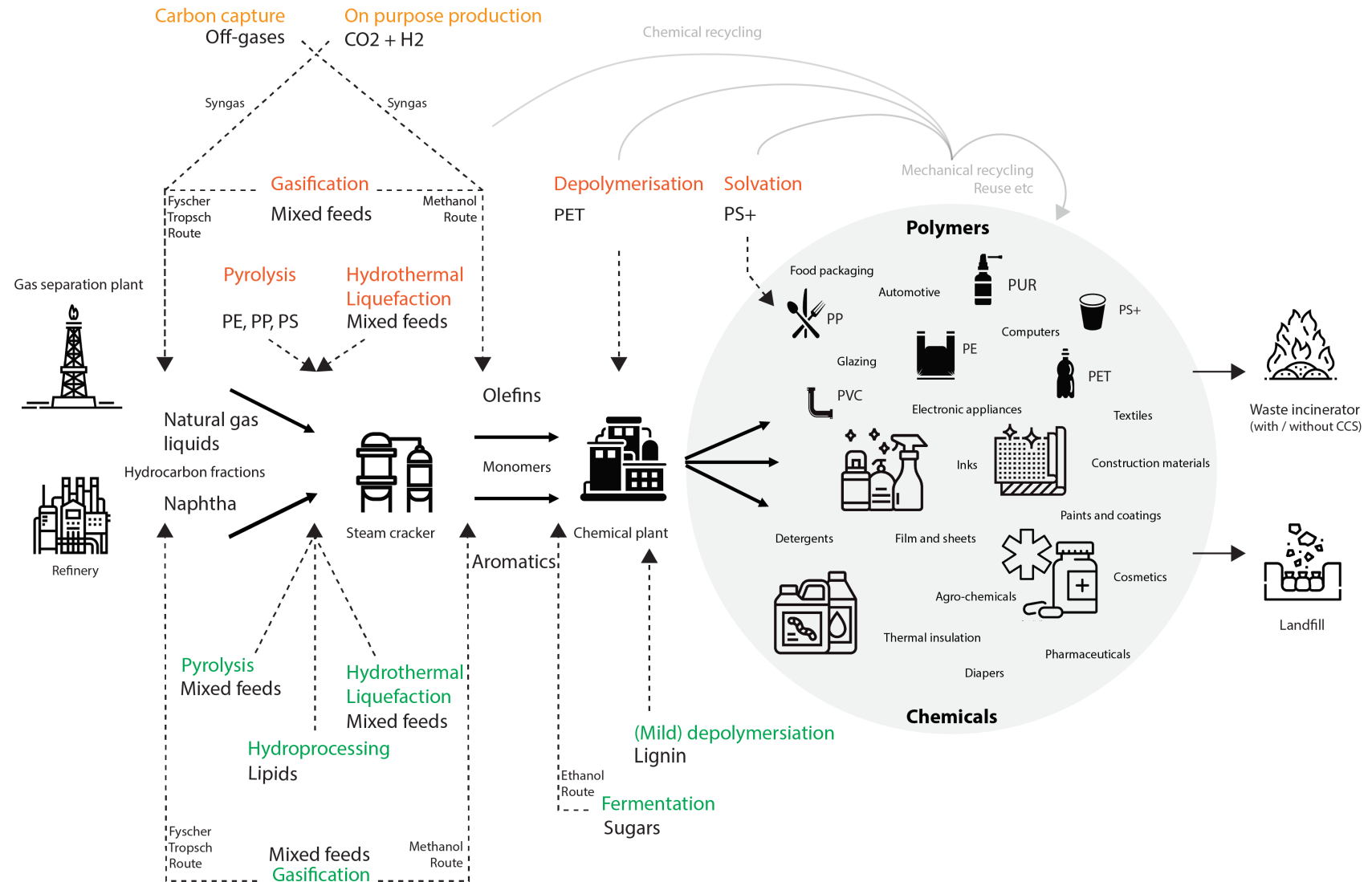


Barriers to using biomass as drop-in feedstock:

- * Competition for (waste) streams
- * (Indirect) land use change
- * Controversy spillover

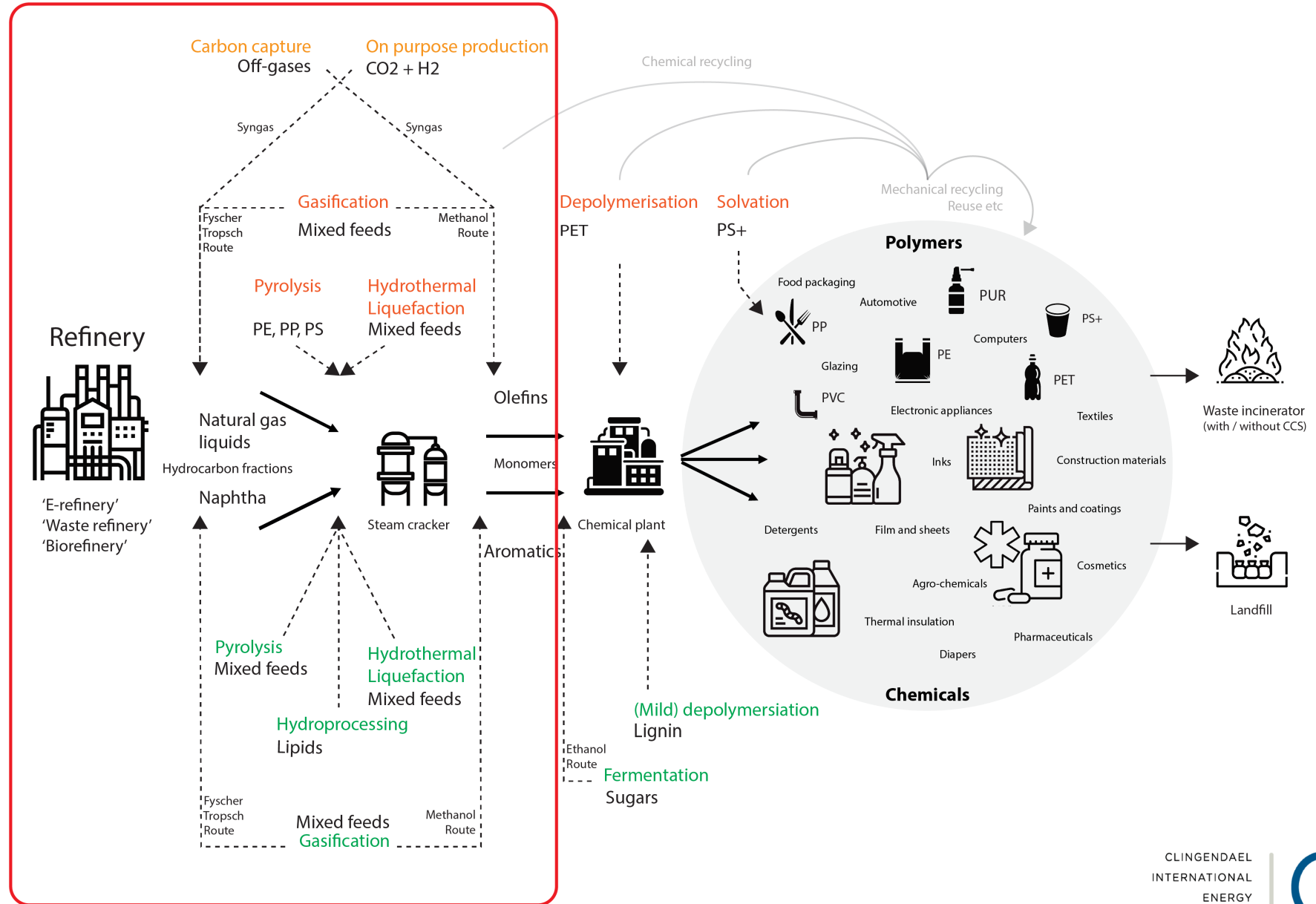
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Key take-aways: The feedstock transition makes today's investments in e/bio/waste refineries robust

- A 'low carbon' value chain for organic chemistry, relies on **plastic waste, captured carbon AND biomass** as alternative feedstocks.
- The feedstock transition in the value chain for organic chemistry makes today's investments in **CCS infrastructure, chemical recycling and biorefineries robust** as these investments:
 - **Lower emissions** in heavy transport, including aviation and shipping, in the short and medium term.
 - Simultaneously **push alternative feedstocks into the chemical value chain**, enabling the feedstock transition.
 - Produce the hydrocarbons that are - in the long term - **indispensable for the feedstock transition**.
- These investments **require shared commitments**, which can **be made today** and **increase diversity of supply**, which can be part of security of supply policy.

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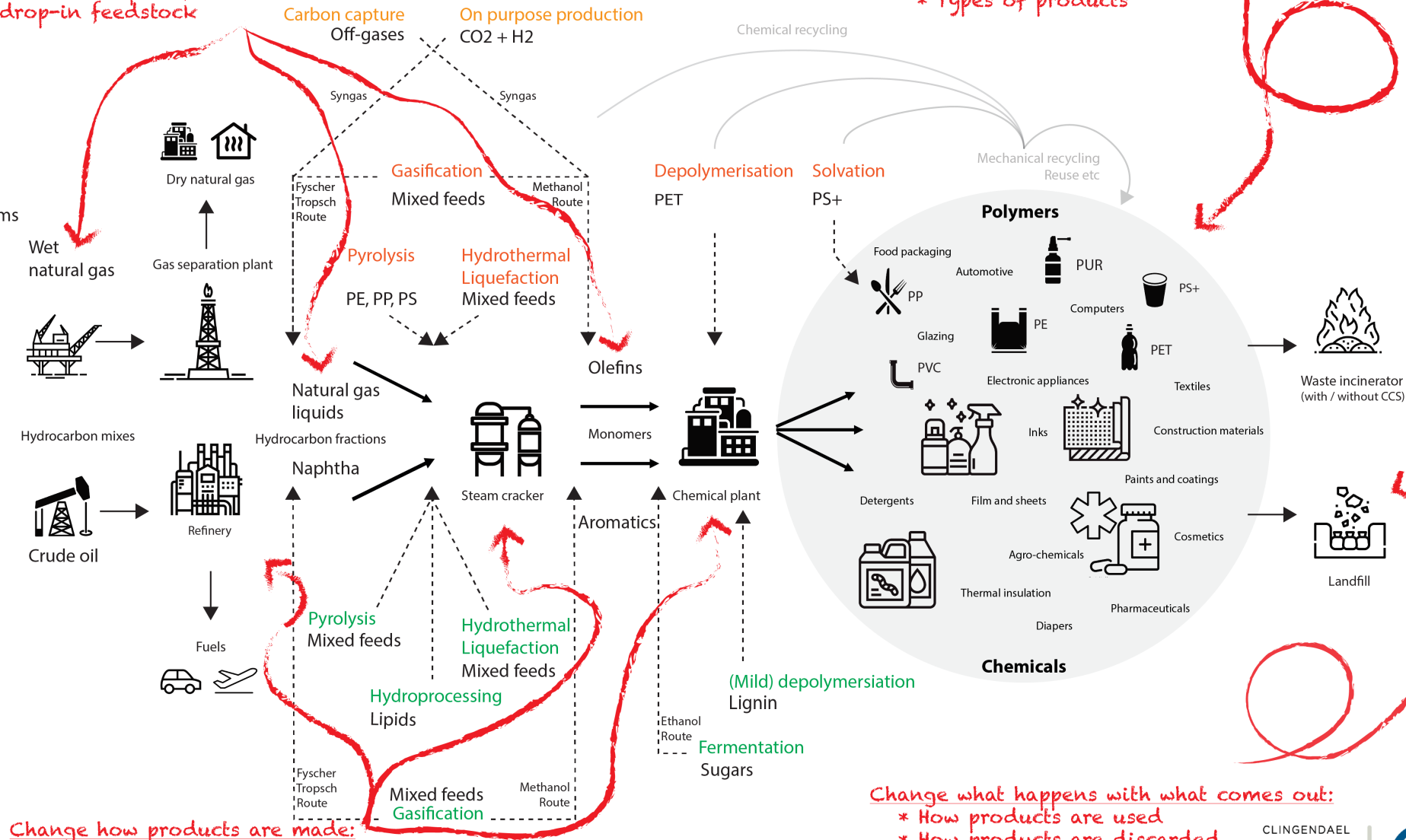
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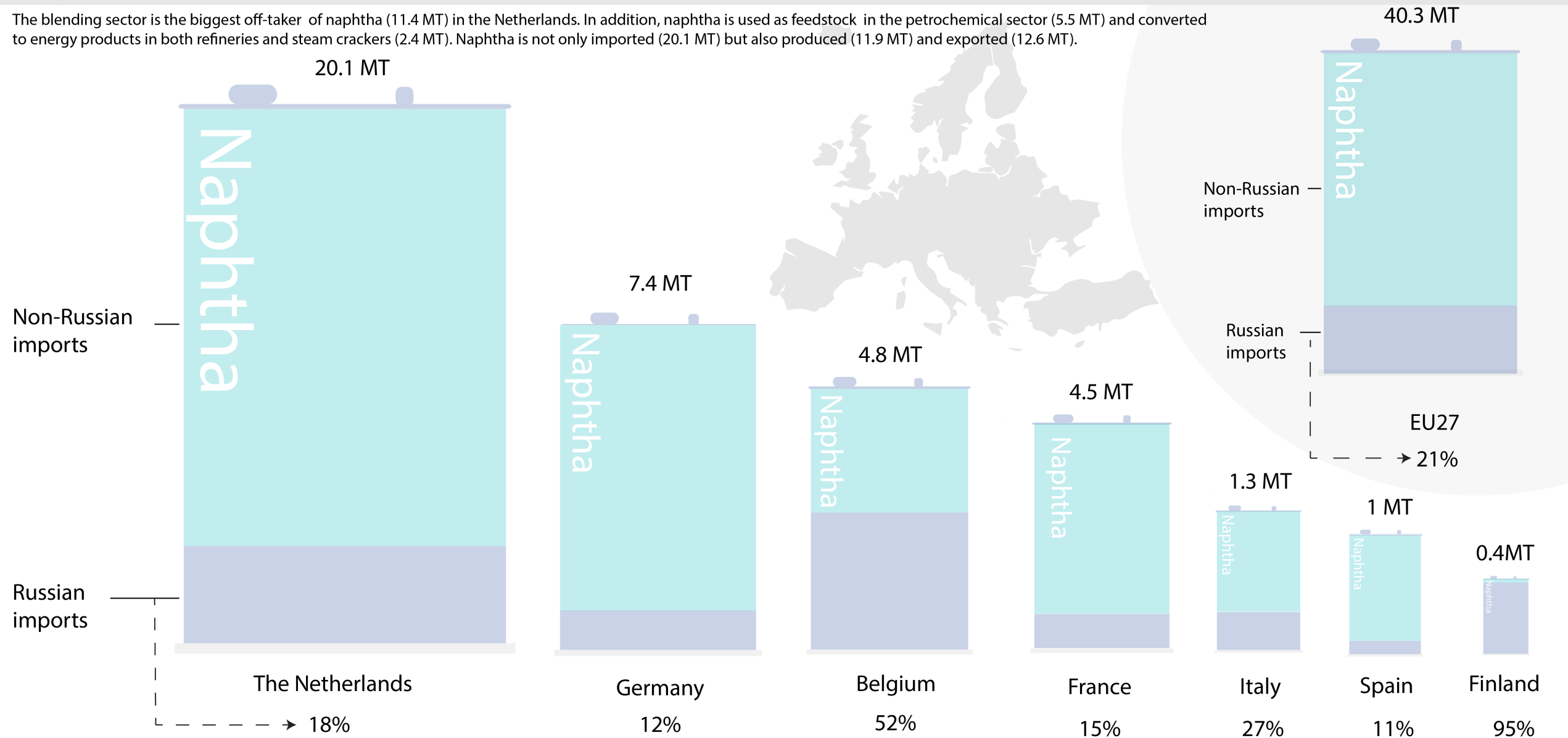
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THE NETHERLANDS ACCOUNTS FOR 50% OF ALL EU NAPHTHA IMPORTS

WITH 3.6 MT IT IS ALSO THE LARGEST IMPORTER OF RUSSIAN NAPHTHA

The blending sector is the biggest off-taker of naphtha (11.4 MT) in the Netherlands. In addition, naphtha is used as feedstock in the petrochemical sector (5.5 MT) and converted to energy products in both refineries and steam crackers (2.4 MT). Naphtha is not only imported (20.1 MT) but also produced (11.9 MT) and exported (12.6 MT).



CIEP analysis based on Eurostat (2022) Imports of oil and petroleum products by partner country for the year 2020 and CBS StatLine (2022) Crude and petroleum products balance sheet for the year 2020.