

Catalysts Europe's contribution to Green Deal

Catalysts Europe (CE) believes that industrial catalysts will be a key element in the EU pursuit to be the first climate neutral continent of the world by 2050 and to reduce emissions by at least 55% by 2030 compared to 1990 levels. The ambitious targets of the Green Deal will be impossible to achieve without harnessing the capability of industrial catalysts in enabling novel chemistries which provide:

- cleaner energy – reducing greenhouse gases
- longer lasting products that can be repaired, recycled and re-used
- greener chemistry – progressively transitioning production processes and products towards climate neutral technologies
- boosting reaction kinetics, reducing energy footprint of processes, better atom economy and reducing waste
- increasing product selectivity creating less hazardous products

Below are just a few examples to showcase how catalyst solutions provided by member companies of Catalysts Europe are contributing to realize the objectives of the Green Deal.

Cleaner energy^{i,ii,iii}

Biofuels produced from renewable such as non-food biomass feedstocks - e.g. wood, agricultural residues, algae, aquatic plants, and municipal waste offer a cleaner alternative to traditional fuels by generating at least 60% reduction in greenhouse gas emissions and yet providing the same energy density. Advanced biofuel catalysts are instrumental to increase the yield of hydrocarbons and lowering costs while achieving product specifications required for transport fuels.

Chemical Recycling^{iv,v,vi}

Premium polyolefin materials produced either from renewable feedstocks, mechanical recycling or chemical recycling (molecular recycling) are now provided by multiple members of Catalysts Europe often with same specifications, regulatory and performance characteristics as those obtained from fossil based feedstocks. A common feature of chemical recycling is conversion of the collected plastic waste following cleaning and shredding to pyrolysis oil in a reactor. Innovative catalysts solutions are helping to run the pyrolysis processes at lower temperature and therefore reducing the CO₂ footprint of the associated technologies.

Greener chemistry

Catalysts are at the heart of green chemistry solutions which focuses on economically feasible innovations that have a positive impact on us and our environment. The essence of green chemistry is to design chemical products, applications and processes that reduce or eliminate the use or generation of substances with hazardous potential and limited socio-economic benefit. Catalytic reagents are included among the 12 principles of Green Chemistry^{vii} recognizing their contribution towards better atom economy and reducing waste. Examples of catalyst products made using Green Chemistry principles include improved air filters^{viii} used at waste-incineration plants, sodium silicates/zeolite based municipal water treatment solutions^{ix} helping to remove harmful metals from

potable drinking water and green hydrogen produced from electrolysis of water^x, or to convert nitrous-oxide emissions -mainly coming from nitric acid plants used to make fertilizers- into nitrogen, oxygen and water molecules.^{xi}

Boosting energy kinetics, reducing waste, improving product selectivity

A lion's share of the world's gasoline is now produced using Fluid Catalytic Cracking (FCC)^{xii} which demands significantly lower energy conditions as compared to Thermal Cracking. With FCC innovative catalysts solutions are now available which enable refiners to optimize their operations as per changing market economics, reduce waste and improve product selectivity.

Concluding remarks

Catalysts solutions offered by member companies of Catalysts Europe are essential to many industrial and manufacturing processes, from producing fuels and fertilizers to medicines and plastics. Catalysts are “the matchmakers” of the molecular world. They spur chemical reactions without changing themselves. More importantly, catalysts speed things up, save energy, and help chemical reactions generate less waste. It goes without saying that realizing the goals of the EU Green Deal would not be possible without the nudge from industrial catalysts. Please note that whilst only a few such examples are presented in this document all members of Catalysts Europe are contributing to realize the objectives of the Green Deal. *Further details can be found on their respective company websites.*

ⁱ [Producing alternative transportation fuels from renewable resources with IH2](#)

ⁱⁱ [Green fuels - Honeywell](#)

ⁱⁱⁱ [sunliquid® \(clariant.com\)](#)

^{iv} [MoReTec LyondellBasell](#)

^v [Borcycle™ C](#)

^{vi} [BASF – Chemical Recycling](#)

^{vii} [12 principles of green chemistry](#)

^{viii} [We provide clean air - Evonik Industries](#)

^{ix} [PQ Chemicals - Sustainability \(pqcorp.com\)](#)

^x [Green Hydrogen | Efficient green hydrogen electrolysis \(topsoe.com\)](#)

^{xi} [Decoding Catalysts](#)

^{xii} [70% of the global refinery catalyst market in 2018](#)