

**Biolube**

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# PLATFORM FOR THE PRODUCTION OF ADVANCED BIOFUELS AND BIOLUBRICANTS



**BIOLUBE** represents an **important structure for the transition towards a decarbonized economy.**

It will enhance the **research and development activities** of ENEA's **Bioenergy, Biorefineries, and Green Chemistry Division** in the field of **biofuels and advanced biolubricants**, produced from the processing of **various raw materials**, including **vegetable oils of different origins.**

It is a **versatile platform** projected to produce **advanced biolubricants / hydrotreated biofuels** for many sectors including the **jet fuel sector** and in general **drop-in blends with conventional fuels.** The platform consists of 4 demonstration units, and it is currently projected to convert vegetable oils: **oligomerization unit; thin film evaporation; hydrogenation; distillation.**

The **oligomerization unit** is dedicated to the **liquid-phase synthesis of macromolecules** and consists of a **mixed-type reactor** with a volume of **300 liters** (heated with **diathermic oil, Tmax 200°C**) equipped with **recirculation on an external exchanger** (to control the Process T).

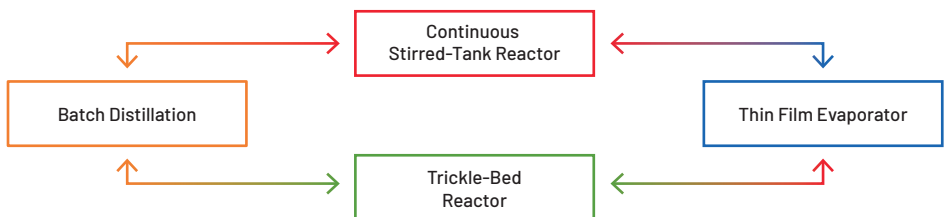
The oligomer mixture can be fed into a **thin-film evaporator** for the **separation of target fractions** based on **different molecular weights (MW).** The unit is designed to operate at a Tmax of **300°C** and a Pmin of **5 mbar.**

The **hydrogenation unit** consists of a **6" catalytic reactor (Trickle Bed Reactor type)** with a length of **approx. 6m**, designed to operate at **Pmax of 80 bar and Tmax of 400°C.**

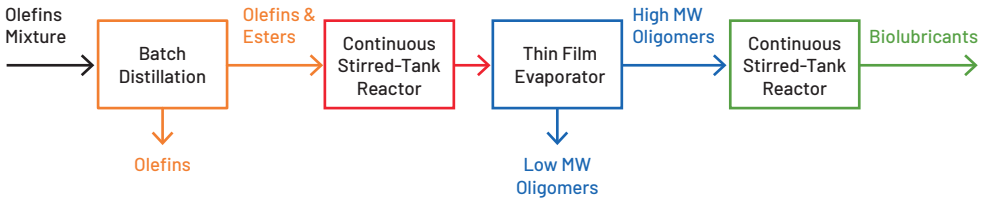
The platform is completed by a **batch distillation unit**, with a **30-stage equilibrium column**, designed for the **separation (at high purity > 95%) of the monomers** to be used in the oligomerization process. The unit has been designed to operate at **Pmin of 50 mbar and Tmax reboiler of 260 °C.**

Overall, ENEA is equipped with several **fully operational analytical laboratories for process monitoring and analysis.**

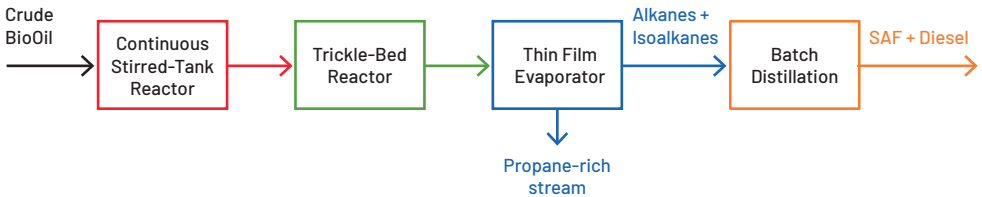
## **GENERAL FLEXIBLE PROCESS DIAGRAM OF THE TECHNOLOGY PLATFORM**



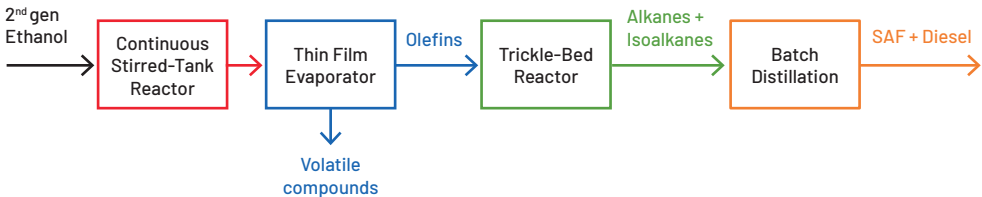
## Production of biolubricants



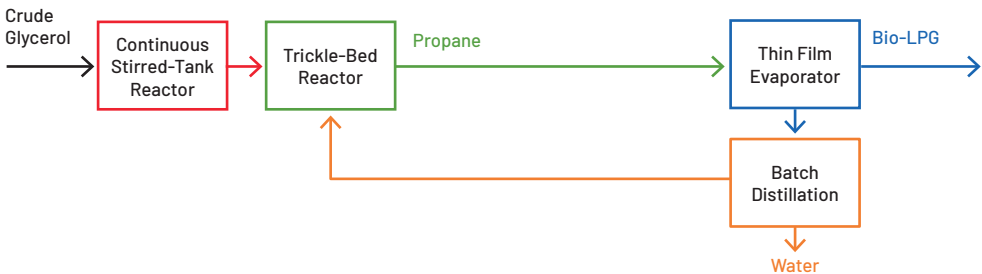
## Production of biofuels for aviation and heavy transport from triglycerides, pyrolysis oils, biocrude



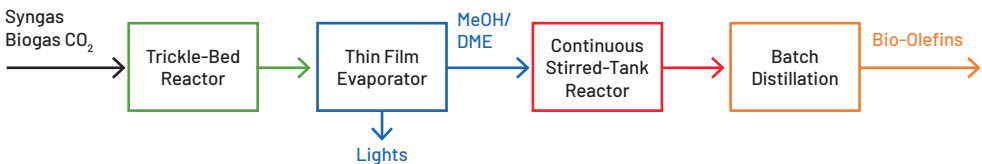
## Production of biofuels for aviation and heavy transport from bioethanol



## Production of bio-LPG from glycerol



## Production of biofuels for aviation and heavy transport from bioethanol





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