

Drop-in capability of renewable fuels for climate-friendly mobility and heat generation

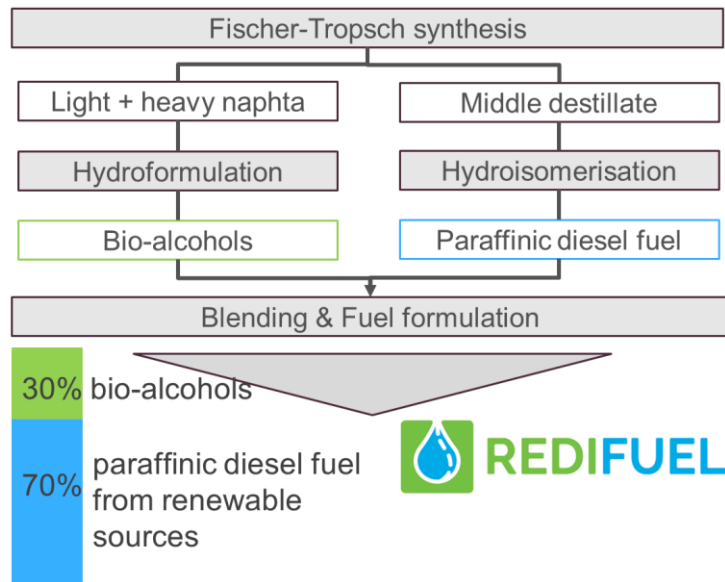
Successful R&I in Europe 2025: 12th European Networking Event

Dr. Sangeetha Ramaswamy, OWI Science for Fuels gGmbH, 07.03.2025

EU Projects

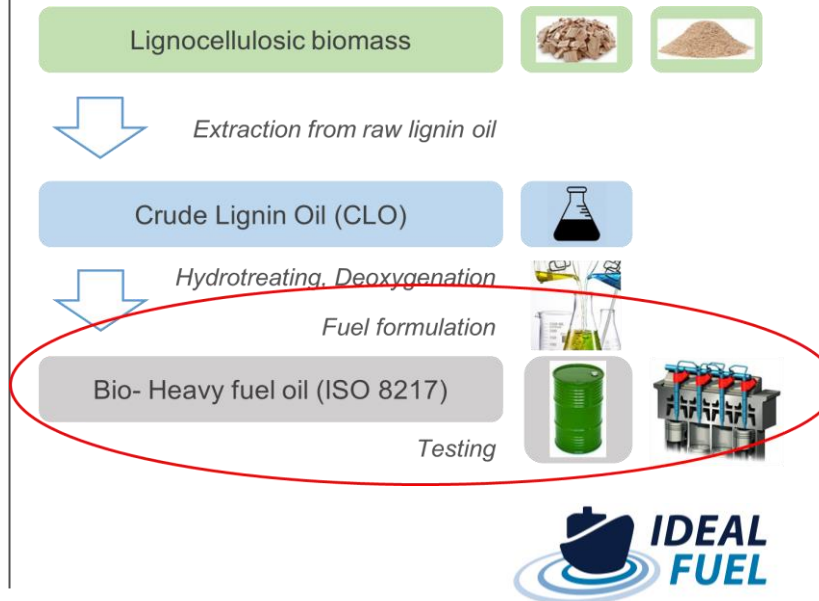
Redifuel

- Renewable fuel for heavy duty road applications
- Run time: 10/2018 - 01/2022
- Partners: FEV, Neste + 9 partners



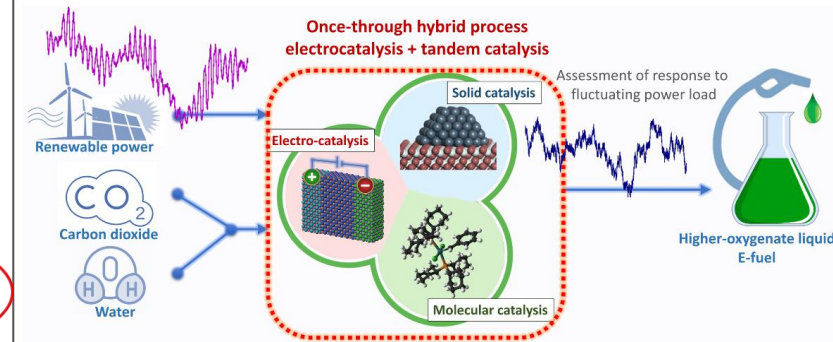
Idealfuel

- Sustainable marine fuels from lignocellulosic biomass
- Run time: 05/2020 - 04/2024
- Partners: TuE, WinGD + 9 partners



E-Tandem

- New combined catalytic process for production of alcohols and ethers as fuels
- Run time: 11/2023 - 04/2026
- Partners: CSIC + 7 partners



Drop-in capability of renewable fuels

- Why drop-in capability?
 - Use of existing infrastructure
 - Blending with fossil fuels

- What aspects are to be considered?

Compliance with existing standards

Fuel ageing stability

Compatibility with technical systems

Material
compatibility

Compatibility with
infrastructure

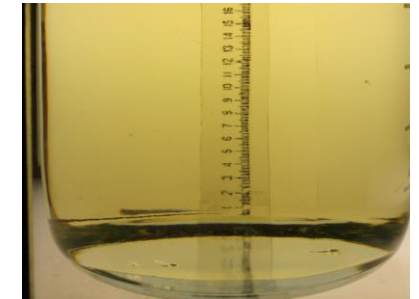
Compatibility with
operating fuels

Compatibility with
components

Compliance with existing standards

Does the new fuel and its blends with reference fuels comply with the relevant norms?

- Testing of the physico-chemical properties
 - Safety relevant properties
 - Flash point
 - Development of safety data sheets
 - Properties relevant to technical applications
 - Viscosity, Oxidation stability, low-temperatures characteristics, ...
 - Properties relevant to combustion technology
 - Coke residue, Cetane number , CHONS-ratio, ...
- If necessary, optimization of the fuel properties by means of additivation or adaptation of the manufacturing process



Safety Tips

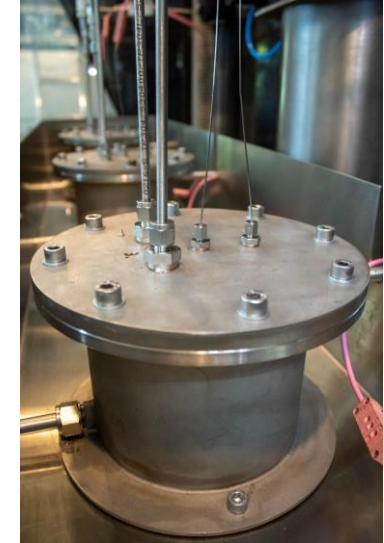
In Fuel Handling and Storage

Improper handling and storage of fuel can have serious consequences including potential health problems, contamination of the environment and damage to property. Here are some safety tips you can follow to avoid accidents and damage resulting from poor fuel handling and storage practices.

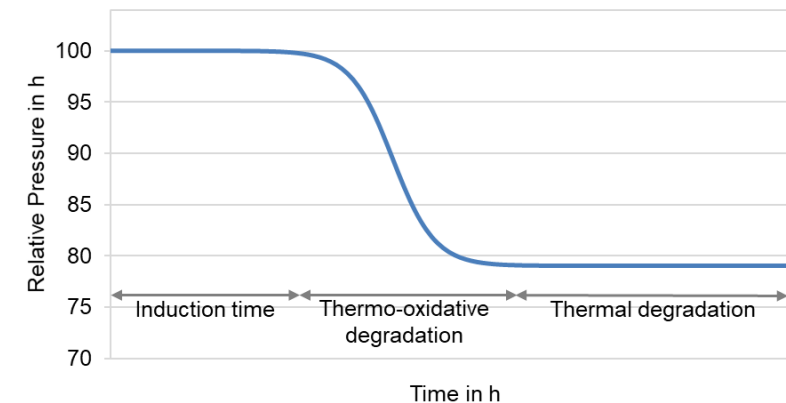
 Only use petrol as a fuel, never as cleaning solvent or fire-starter	 Any materials used in cleaning leakage must be disposed properly	 Place safety signage or warnings signs where fuel is stored	 Keep petrol away from eyes and skin
 Keep fuel away from ignition sources	 Never use petrol to wash your hands	 Avoid prolonged exposure to fuel vapour	 Never overfill the fuel tank
 Store fuel using an appropriate storage tank	 Properly label storage tanks by the product they contain	 Keep approved fire extinguishers close to fuel storage	 Always have a clear access route to the fuel storage area

Drop-in Capability: Fuel Stability

- Chemical induced changes
 - Formation of acids, water, polymers
 - Phase separation due to polarity differences
- Physical induced changes
 - Gas solubility
 - Phase separation due to density differences
- Cost- and time-efficient test methods at high temperatures and pressures
 - Big Oxy - based on the PetroOxy method for the determination of the oxidation stability with accelerated procedure and smaller samples quantity
 - Big Ranci - based on the Rancimat method for determining the oxidation stability using accelerated testing



Big Oxy test rig at OWI



Drop-in Capability: Material & Lubricant Compatibility

Material Compatibility

- Examination of polymers and metals with immersion experiments
 - Change of dimensions e.g. density, weight
 - Change of the mechanical properties
 - Corrosion
- Investigation of fuel properties: metal content
- Possible countermeasures: corrosion inhibitors, exchange of materials

Lubricant Compatibility

- Effects of the lubricating oil on the fuel
 - Oxidation stability
 - Ignition temperature, ignition delay, cetane number
- Effects of the fuel on the lubricating oil
 - Viscosity
 - Lubricity
 - Surface tension

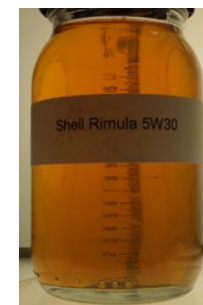


2 weeks



12 weeks

90% Heating oil + 10% FAME



Fresh lubricating oil



Used lubricating oil

We look forward to working with you!

- Research and industry partners
 - Renewable energy technology
 - Renewable Fuel production
 - End users in mobility and heat and power
 - Fuel suppliers

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**25 years experience in Energy Transition
Research**

