IEA Bioenergy
Technology Collaboration Programme

Task 39: Biofuels to decarbonize transport

Assessment of demonstration plants and commerzialisation progress

IEA Bioenergy Task 39 – Biofuels to Decarbonize Transport

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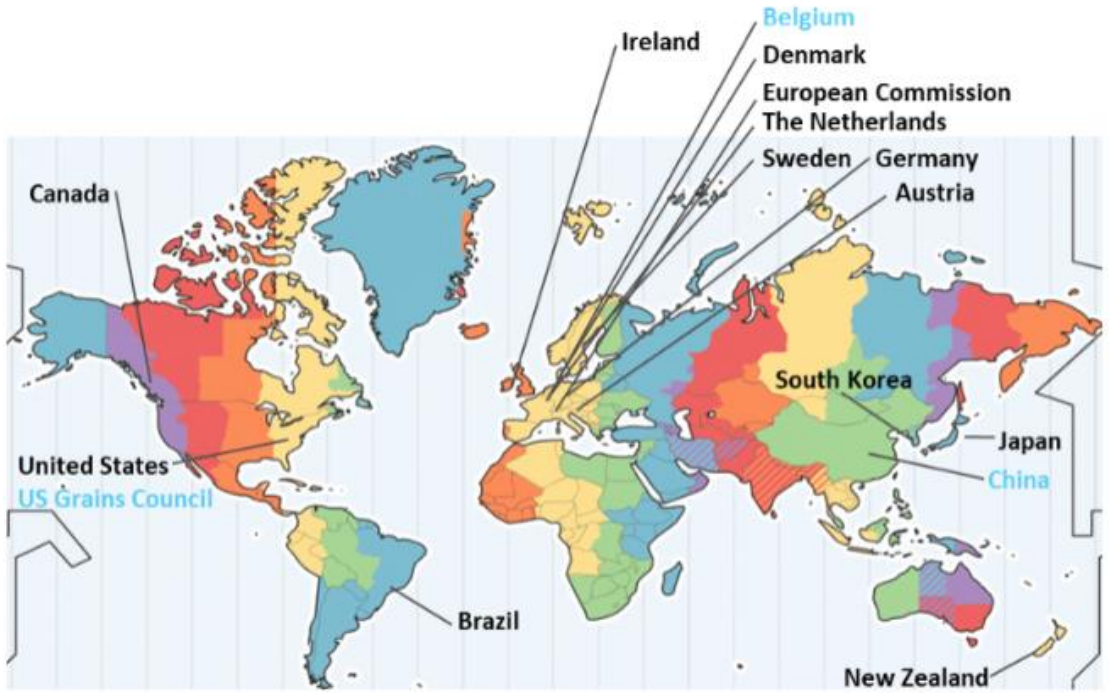
Online, 12.11.2024, Webinar Scaling up advanced biofuels production

IEA Bioenergy Task 39 – Biofuels to decarbonise transport

16 participants/member countries

Analyses policy, technology, markets and sustainable biofuel implementation

SAF/biojet	Drop-in fuels	Implementation Agendas
Marine fuels	Demonstration Facilities	Certification
Biofuel policies	Sustainability	Commerzialisation progress
Synergies with green hydrogen	Emerging countries	Cooperations



f.e. BioTheRoS

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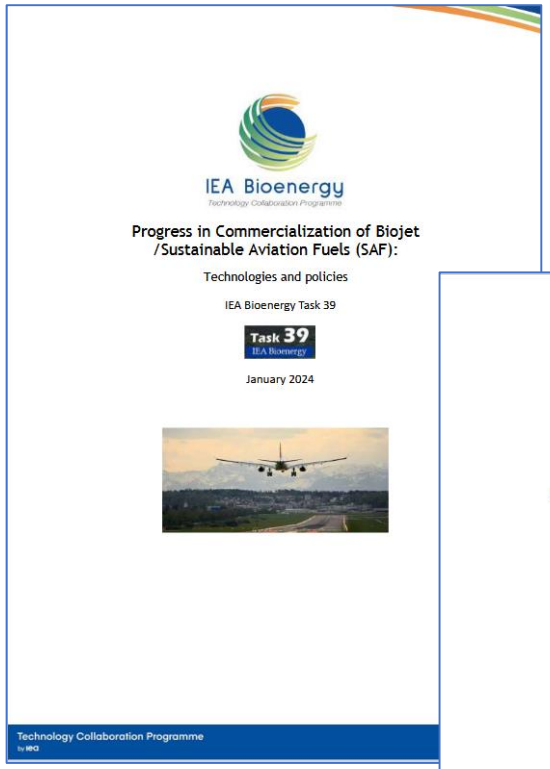
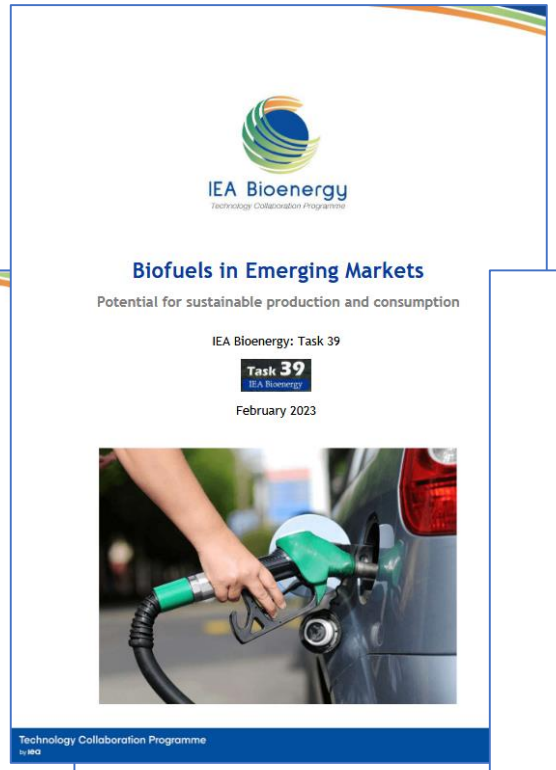
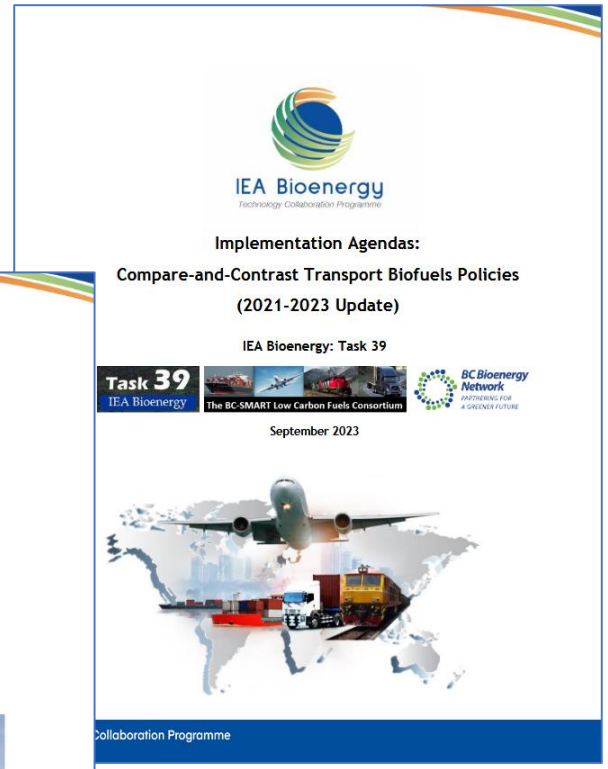
IEA Bioenergy Task 39 - Reports

https://task39.ieabioenergy.com/publications-new/

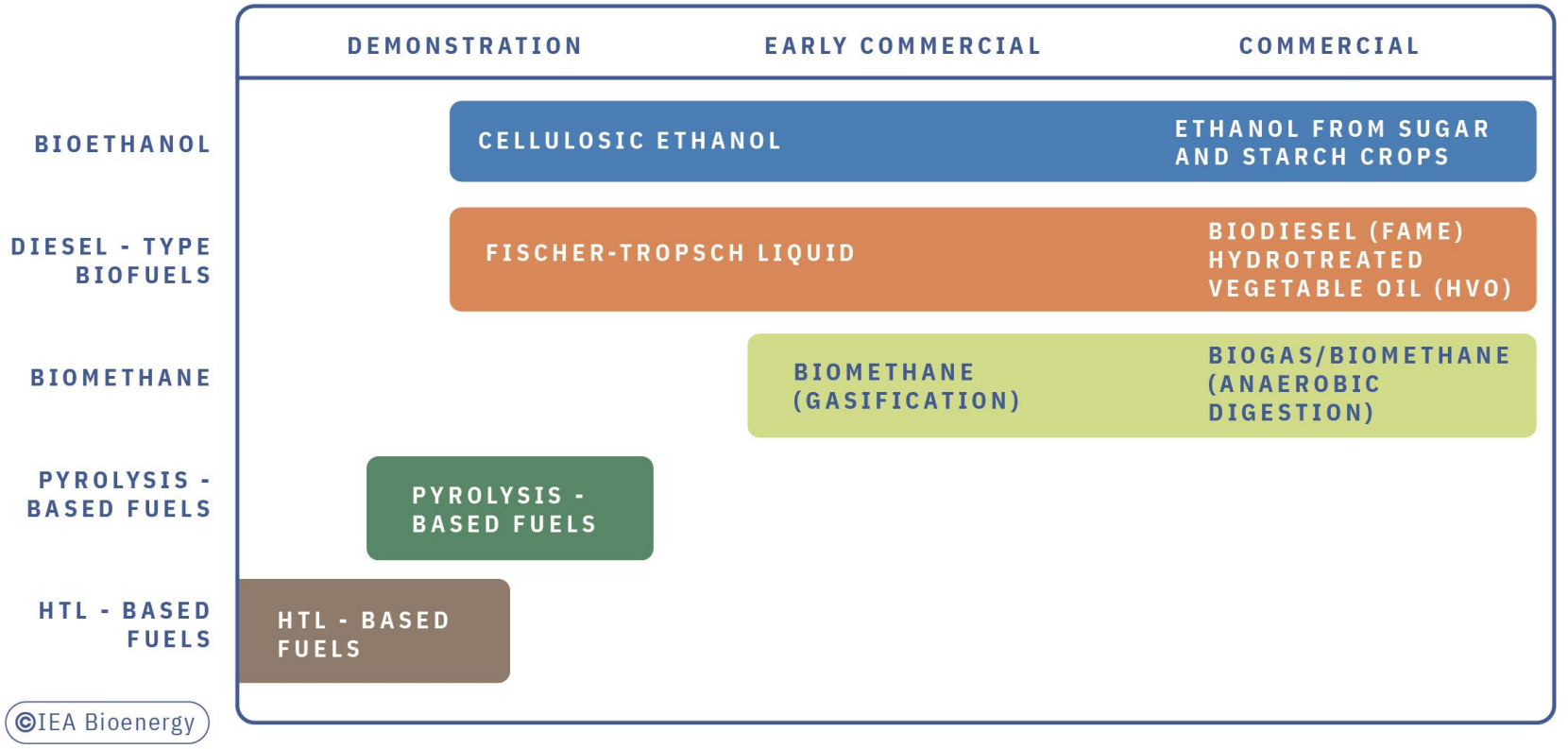






Technology pathways and TRLs

residues



crops

IEA Bioenergy, Bioenergy Review 2023, https://www.ieabioenergyreview.org/transport-biofuels/

Advanced Biofuels Demoplants Database

Technology Collaboration Programme
by IEA

Task 39: Biofuels to decarbonize transport

Database on facilities for the production of advanced liquid and gaseous biofuels for transport

Filter Projects

Type
- TRL 1-3 Research
- TRL 4-5 Pilot
- TRL 6-7 Demonstration
- TRL 8 First-of-a-kind commercial
- TRL 9 Commercial

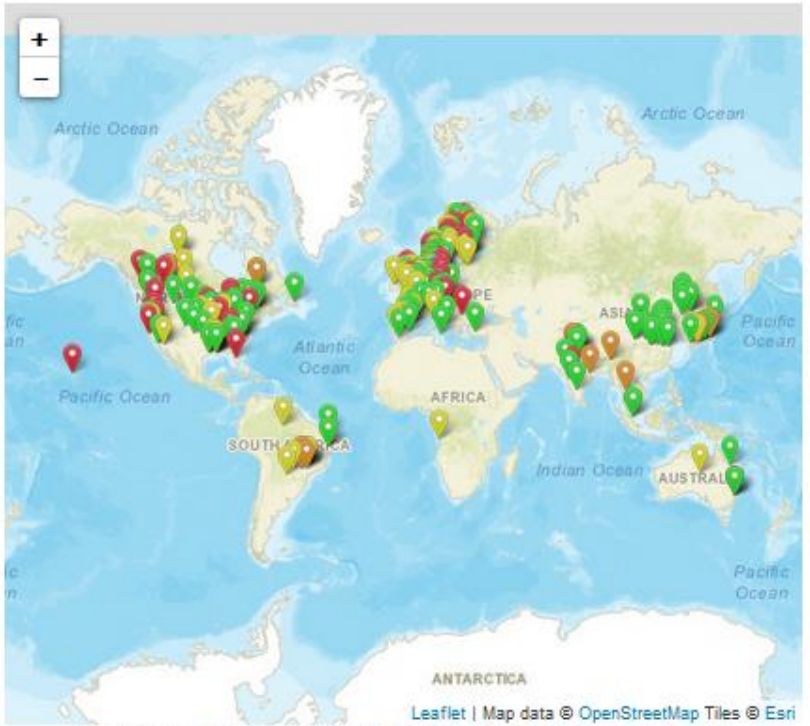
Technology
- Alcohol-to-jet
- E-Fuels Biomass Hybrids
- Fast Pyrolysis
- Fermentation
- Gasification
- Hydrothermal Liquefaction
- Hydrotreatment
- Lignin Depolymerisation
- Other Technology

Status
- no status
- planned
- under construction
- operational
- non operational
- cancelled
- idle
- on hold

Raw Material
- agricultural residues
- biomass / biomass coal blends
- forest residues
- lignocellulosics
- oilcrops, oils and fats
- organic residues and waste streams
- other
- sugar and starch crops
- unknown
- waste gases

Output
- bio-oil
- biogas
- butanol
- clean syngas
- diesel-type hydrocarbons
- diesel with biogenic content
- DME
- ethanol
- FT liquids
- gasoline-type fuels
- heat
- hydrogen
- isobutene
- methanol
- other
- pyrolysis oil
- renewable diesel (HVO)
- SNG
- sustainable aviation fuels SAF

Map



https://demoplants.best-research.eu/

This database has been elaborated and is maintained by BEST

Examples of demonstration facilities thermochemical technology routes

Pyrocell plant in Sweden

BTG-BTL pyrolysis technology

Production capacity:
25,000 t pyrolysis oil

Co-processing in existing refinery

BEST - Syngas Platform Vienna

Biomass gasification and FT-Synthesis

1 MW demonstration facility in Austria

Assessment of demonstration plants and commerzialisation progress – recent development

- **Main technologies**: Fermentation, gasification, **hydrotreatment** and fast pyrolyis
- **Rising number of (planned) facilities**, many announcements also for sustainable aviation fuels
- **Diversification and combination of technologies** (including E-Fuels, Hybrid Systems, Co-processing, Retro-fitting oil refineries…)
- **Utilization of waste streams** and waste streams from non-biologic origin for advanced fuels production
- Increasing development in **emerging countries and Asia**
- **Commerzialisation takes time** – slow progress for some technologies
- BUT many **set-backs in commerzialisation process** (cancelled projects, announcements)

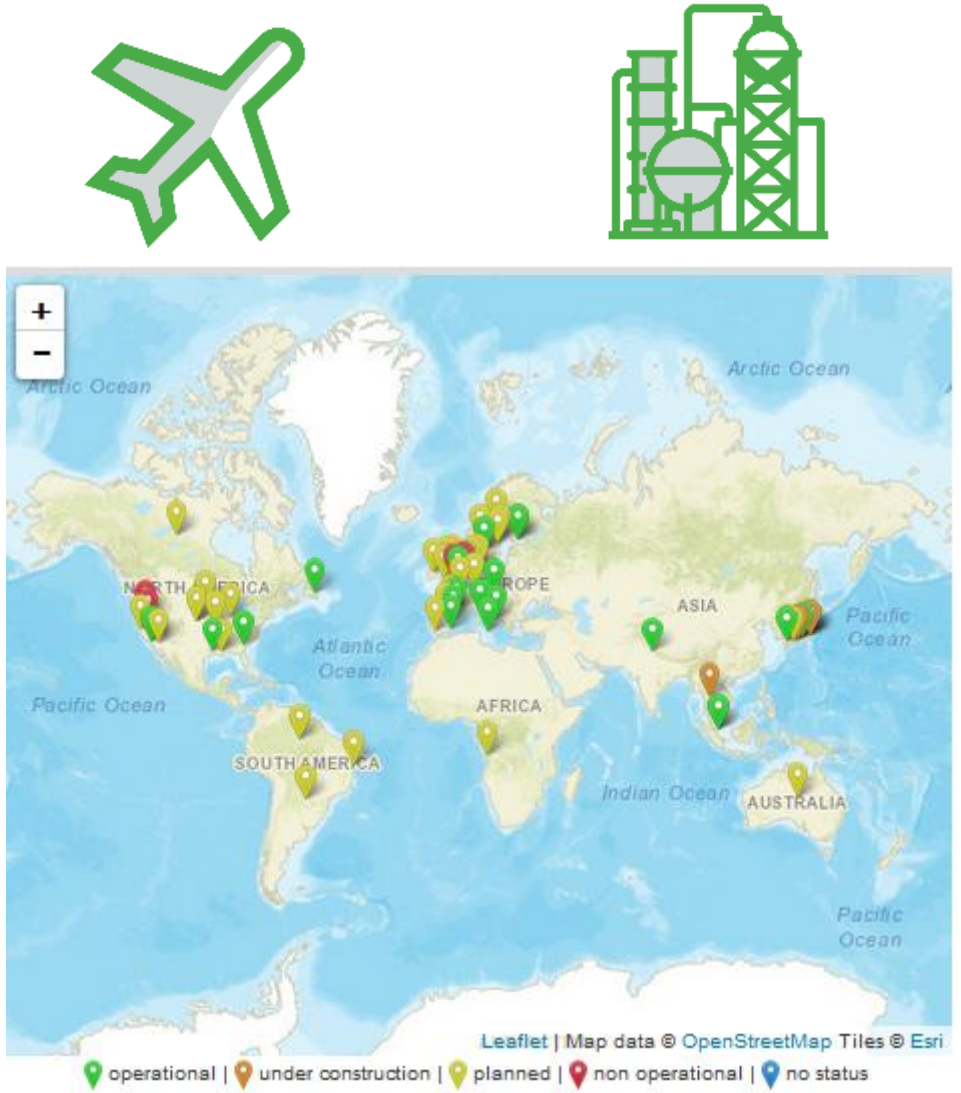
Sustainable Aviation Fuels production

Many plants with (planned) SAF capacity and many announcements

SAF is one of the possible products, SAF fraction can be increased

Technologies: **Hydrotreatment**, **Co-Processing**, Alcohol-to-Jet, Power to Liquid, Gasification

World Energy, Neste, Eni, Cepsa, TotalEnergies, BP, …



Importance of demonstration and scale up

- **Validates feasibility and efficiency**: Demonstrating biofuel technology in real-world settings confirms its effectiveness beyond laboratory conditions and provides crucial performance data.
- **Variety of feedstock**: Demonstration of different technologies is important – to use different feedstocks and waste streams
- **Reduces production costs**: Scaling up allows for cost reductions through economies of scale,
- **Reach commerzialisation is critical**: Commerzialisation takes time (from announcement to operation) – BUT risk of scaling up too fast
- **Challenges for demonstration and scale up**

Implementation barriers / opportunities

- High production **costs** of fuel
- **Financial risks** of demonstration and First-of-its-kind facility
- Uncertainty of regulatory framework and **policies**
- Availability and sustainability of **Feedstock**
- **Policy focus** on other options

- Based on broad variety of biomass feedstocks – **diversification of energy supply**
- Biomass production provides **regional income**
- Applicable in current vehicles now – offer **immediate GHG emission reductions**
- **High energy density** – alternative solution for sectors that are **hard-to-electrify**
- Passenger cars → trucks, ships, planes

Take home messages

Drive commercialization forward – need of:

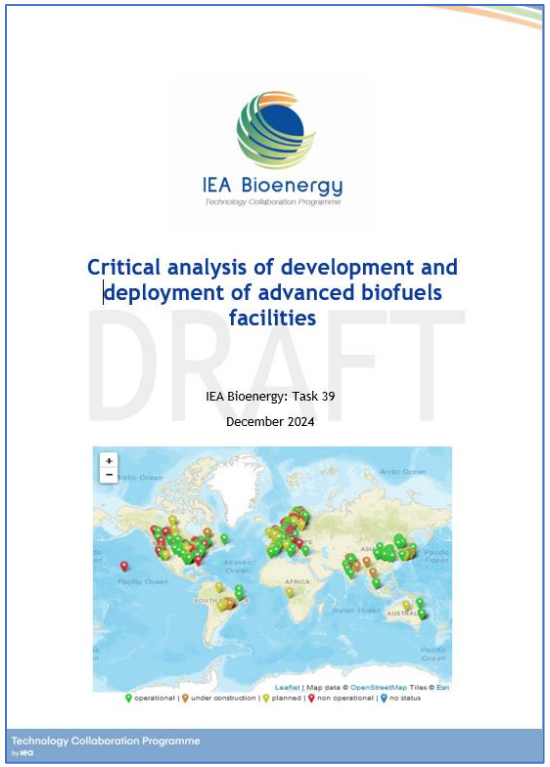
- Demonstration and scale-up of different technologies
- Reduction of costs and financial risks
- Long-term policies and comprehensive strategy

Positive development in emerging countries

Promising opportunity: long-distance transport

Variety of different technologies and new demonstration facilities

More information available in 2025 publication of IEA Bioenergy Task 39:



Thank you for your attention!

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https://demoplants.best-research.eu
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