



Financing instruments for SAF Upscaling

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EU policies

European Green Deal and Fit for 55

RED / 996 IR
(intermediate crops, soil C)

REFuelEU aviation

FuelEU maritime

ETS/
CRCF

ESR

ETD

CO2 standards

Hydrogen and decarbonised gas markets package

Renewable gases

Low carbon gases with $\leq 70\%$ GHG emissions on LCA basis

Low Carbon Fuels DA

The Green Deal Industrial Plan

EU Net-Zero Industry Act

Sustainable biogas and biomethane

Sustainable alternative fuels for aviation and maritime

RFNBOs

Three IAs on criteria, sustainability, markets

Competitiveness Compass & Clean Industrial Deal

Affordable Energy

Lead Markets

Financing: leverage >100 b €

Circularity Access to Materials

Global Markets INTPAs

Skills Simplification

Industrial Accelerator Act

Transport

Strategic Transport Investment Plan

Industrial Maritime Strategy

European Ports Strategy

Aviation Strategy

ICAO SAF IMO (2026)

Climate

COM(2024) 63 final - Europe's 2040 climate target: reducing EU's net GHG emissions by 90% by 2040

Carbon Removals and Carbon Farming for voluntary and (possibly) mandated carbon markets

ETS revision (2026)

ETS2 in buildings, road transport, additional sector fuels (2027)

CO2 Regulation for cars, LDV, HDV

R&I

The SET Plan
The EU Startup and Scaleup Strategy

European Innovation Act

Horizon Europe Work Programme 2026 – 2027

Horizon Europe 2028 – 2034

Innovation Act COM(2026) 567 final

- Channel more public funds towards R&I, and help innovative firms secure finance to bring technologies to market faster
- Reduce uncertainties for intellectual property valuation, making it easier for firms to use intellectual property (IP) to access financing
- Enabling more public procurement of R&D services to boost innovation
 - *R&D procurement includes pre-commercial procurement where public buyers compare several competing solutions across multiple phases of development*
 - *Buyers' needs drive R&D, but as IP rights remain with R&D providers, common rules for public procurement of R&D services are introduced*

AccelerateEU - Energy Union COM(2026) 370 final

- Affordable and Secure Energy through Accelerated Action
- Immediate action from the Commission to step up EU-level coordination includes
 - *[May 2026] The Commission will ...work on measures,... as well as to **increase domestic EU production of sustainable biofuels***
 - Immediate action from the Commission to support Member States includes
 - *[2026 onwards] ..the Commission will continue supporting initiatives to advance the production of ...sustainable **biogas and biomethane** taking careful consideration to the **scaling up** of existing plants, reducing permitting bottlenecks and improving the **transport of sustainable feedstock** across regions*
 - *[Q2 2026] ...the Commission ...will support industrial decarbonisation and accelerate the development of **hydrogen-based** Sustainable Aviation electro-Fuels (eSAF) and Sustainable Maritime electro-Fuels (eSMF).*

Mobilization of Industrial Capacity Building for Advanced Biofuels

Final Report

edited by

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The project was executed by a Consortium comprising:



Objective

Identifying and proposing ways to realize **essential industrial value chains** contributing to EU targets, considering technical, financial, business and feedstock-related aspects via collecting data **directly from industries and funding providers**

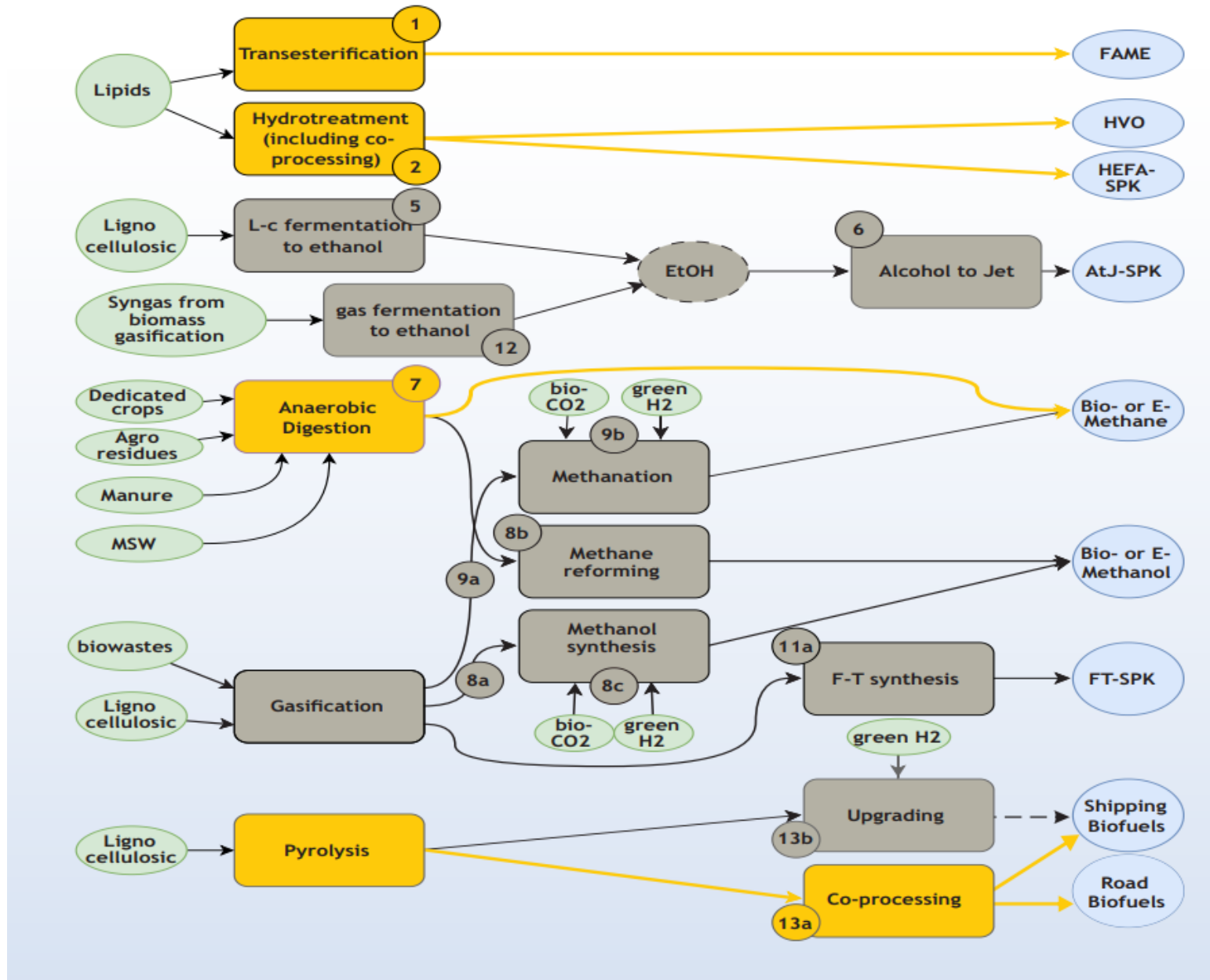
Key findings

A **significant increase** in biofuel production capacities based on **RED/Annex IX feedstocks** required **now to 2030-2040** to meet EU targets, also compensating for possible delays in e-mobility and e-fuels.

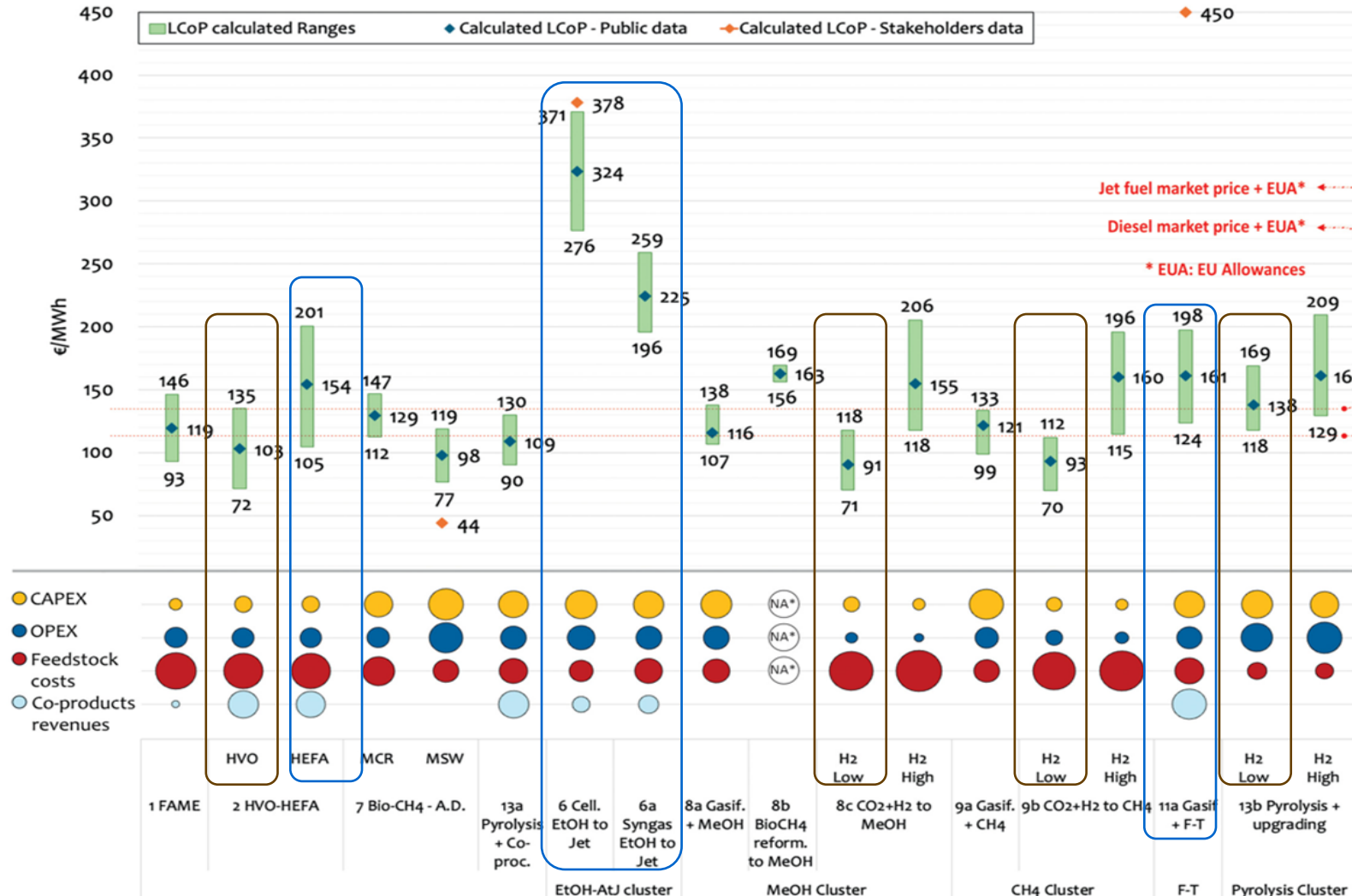
No single value chain can deliver more than 50% of the required sustainable fuels - need a portfolio of **complementary solutions** with a **diverse mix of technologies** to utilize the full range of eligible feedstocks and produce the complete spectrum of necessary fuels.

The **scale-up** of value chains towards these targets requires further **financial and administrative support** to enable **both** feedstock mobilization and industrial capacity build-up.

Essential IVCs 2025-2040



LCoP for essential value chains



Well-aligned with existing literature

SAF pathways: wide range of expected LCoP 154 / 324 €/MWh (1,845 / 3,867 €/t)

AtJ still on the higher side especially from EU-based ligno-cellulosic ethanol

Diesel 84 €/MWh, JetA1 65 €/MWh

“H₂ low” scenario overly optimistic: 2.3 €/kgH₂ (literature value electrolysis-based in 2030 +

No inflation, no taxes

* For IVC 8b the use of existing refineries leveraging on guarantees of origin is considered, thus CAPEX, OPEX values need different calculation.

HVO – HEFA Industrial Value Chain



Feedstock

Lipidic feedstocks:

- Oil crops (intermediate or from degraded land)
- Residual and/or waste lipids



Main output(s)

- HVO
- HEFA-SAF
- Bio-naphtha
- Bio-LPG



Sector(s) of use

- Road
- Aviation



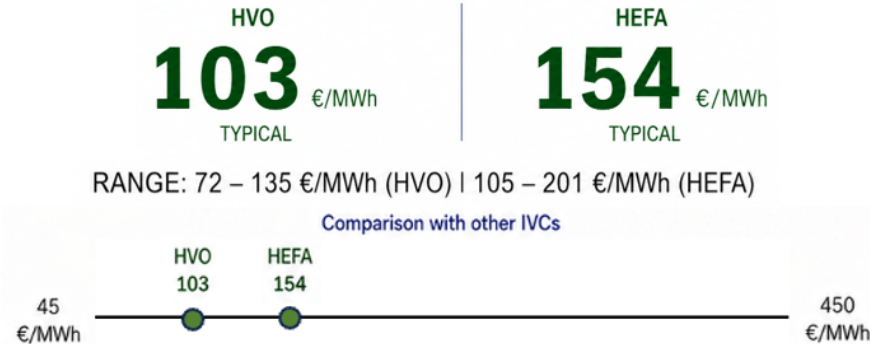
Maturity level

Proven commercial

TRL 9/9



LEVELIZED COST OF PRODUCTION*



KEY INSIGHTS



Feedstock

- Waste lipids: limited availability, dependency from imports.
- V.O. from intermediate crops or degraded land to play a role in the near future



Technology

- Flexibility is crucial for operational stability and economic viability.
- Ren. H₂ and soil C accumulation to further reduce GHG impact.



Market

- Growing demand and strong support from policies and mandates.
- Competition on feedstock use between markets

ANNUAL SUPPORT TO DEVELOP THE IVC

REDUCTION OF LCoP TO ACHIEVE PARITY TO FOSSIL FUEL COMPARATOR (road - aviation)

5 - 38 %



4.21 Mtoe in 2030 (overall output)

Expected contribution to meet the RED III target

2030

PER-MWh SUPPORT €/MWh fuel

Farmers and aggregators **3.2 – 7.3**

Industrial unit (HVO - HEFA focused) **7 – 75**

TOTAL SUPPORT mln EUR / yr

Upstream mobilisation **157 – 357**

Industrial develop. **343 – 3,672**

Total IVC **499 – 4,029**

Ligno-Cell. EtOH | L-C EtOH-to-Jet | Gasification + F-T Industrial Value Chains

- Feedstock**
- Ligno-cellulosic biomass, including agricultural and forestry residues.
 - Gasification:** all the above + Sewage Sludge and Biowastes

- Main output(s)**
- EtOH:** Bio Ethanol
 - AtJ, F-T:** SAF + gasoline + diesel

- Sector(s) of use**
- EtOH:** Road
 - AtJ, F-T:** Aviation, Road

Maturity level

Ligno-cell. EtOH



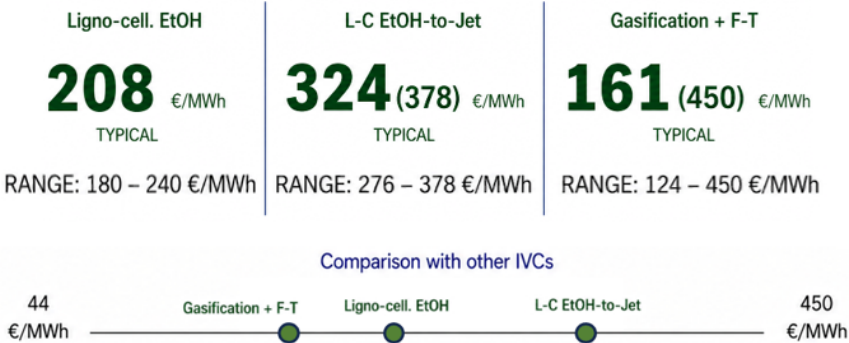
EtOH-to-Jet



Gasification +F-T



LEVELIZED COST OF PRODUCTION*



KEY CHALLENGES



Ligno-cell. EtOH + L-C EtOH-to-Jet
Technically demanding and cost-intensive
Feedstock: need approval of EU crops competitive with bagasse
Technology: Pre-treatment, enzyme efficiency, pentose sugars conversion



Gasification + F-T
Lower TRL, interdependent advancements
Feedstock: Ensure access to low-cost, sustainable residues
Technology: Upscaling gasification, integration of F-T process with biomass-derived syngas

ANNUAL SUPPORT TO DEVELOP THE IVC

REDUCTION OF LCoP TO ACHIEVE PARITY TO FOSSIL FUEL COMPARATOR (Aviation fossil without penalties)

70 % ATJ
38 % FT-SPK



2.29 Mtoe ATJ
1.49 Mtoe FT-SPK

in 2040

Expected contribution considering a RED III (2030) and Fit-for-55 (2050) trajectory

	ATJ	FT-SPK
PER-MWh SUPPORT €/MWh fuel		
Farmers and aggregators	15.4	11.9 – 19.5
Industrial unit	281	74
TOTAL SUPPORT mln EUR / yr		
Upstream mobilisation	410	207
Industrial develop.	7,484	1,282
Total IVC	7,894	1,489

Indicative collective support for SAF

Indicative collective support in monetary value (million EUR/yr) for selected distinct SAF IVCs, 2030

Industrial Value Chain	IVC level			Collective plan		
	Support to farmers (€/t)	Support to farmers (€/MWh)	Operational support to the industrial unit (€/MWh)	Support for securing the mobilization of the upstream part (mln EUR/yr)	Support for industrial <u>units</u> development (mln EUR/yr)	Total support for the operation of the entire IVC (mln EUR/yr)
IVC2 - Hydrotreatment (HVO/HEFA) of oil from eligible oil crops	25 – 40	3.2 – 7.9	min. 7 - 75	ca. 157 – 357	from 343 (slate 1) to 3,672 (slate 2) ⁷²	ca. 499 - 4,029

Indicative collective support in monetary value (million EUR/yr) for the selected distinct SAF IVCs, 2040

IVC #	Industrial Value Chain	IVC level			Collective plan		
		Support to farmers (€/t feedstock)	Support to farmers (€/MWh fuel)	Operational support to the industrial unit (€/MWh fuel)	Support for securing the mobilization of the upstream part (mln EUR/yr)	Support for industrial <u>units</u> development (mln EUR/yr)	Total support for the operation of the entire IVC (mln EUR/yr)
IVC2	Hydrotreatment of lipids	25 – 40	3.2 – 7.3	7 - 75	27 - 61	59 - 628	85 - 689
IVC5+ IVC6	SAF production from Cellulosic Ethanol (EtOH-to-Jet)	11 – 18	9.4 – 15.4	102 – 281 ⁷⁴	251 - 410	2,717-7,484 ⁷⁵	2,967 – 7,894 ⁷⁶
IVC12+ IVC6a	SAF production from Syngas fermentation Ethanol (EtOH-to-Jet)	11 – 18	6.8 – 11.1	81 - 172	23 - 37	273 - 580	296 - 617
IVC11a	Gasification and F-T synthesis	11 – 18	11.9 – 19.5	74	207 - 338	1,282	1,489

EU financial instruments for commercial projects

- **Capital and operational risk support**
 - Grants, loans and interest-rate subsidies, credit support and institutional equity capital for FoK CAPEX-intensive investments on the refining / processing side provide access to investment capital and de-risking financing decisions for private investors.
 - Feed-in Tariffs (FiT), Feed-in Premia (FiP), Contracts for Difference (CfD) and tax incentives improve economic and risk profile at operational stage

EU Programs	Grants	Loans & subsidies	Credit support	Equity capital	FiT, FiP, CFD	Price Support	Tax incentives
Connecting Europe (CEF)	✓						
InvestEU		✓	✓	✗	✗		
Modernization Fund	✓	✓	✓	✗	✗		
Just Transition Fund	✓	✓	✓				
LIFE – Clean Energy	✗						
Cohesion Fund / ERDF	✓	✓	✓	✓	✗		
CAP - Basic Direct Pay	✓						
CAP - Eco-schemes	✓						
CAP - VCS	✓						
EAFRD - rural development	✓					✗	
EAFRD - financial instruments		✓	✓			✗	
FiT / FiP (national schemes)					✗		
Guarantees of Origin						✗	✗

✓ : Common / core financial instrument
 ✗ : Indirectly available or offered in blending facilities

Outcome



- Advanced biofuels can be sustainably produced **domestically**, without dependencies for technologies and feedstock
- Business models of industrial value chains illustrate **the gap** between the biofuels LCoP and the market price of fossil fuel counterparts
- By **2030**, annual financial support to build industrial plants and mobilize necessary feedstock from **€4.5 to €8.75 billion** for 60% of the foreseen demand; higher level of support needed for deployment towards **2040**
- **Existing** EU funding schemes and instruments at EU level
- **1/3 of MS** have effective support measures in national strategies, EU and state R&I funding suitable for development, European technology providers have know-how and personnel to build industry

R&I Roadmap

- Support technology development and scale up through EU research and innovation framework programme(s)
- Support deployment through EU and national de-risking instruments, as for example programs for grants, funds and loans
- Maintain a wide portfolio of complementary solutions with a diverse mix of technologies to utilize the full range of eligible feedstocks and produce the complete spectrum of necessary fuels
- Implement the SET Plan's Action on Renewable Fuels and Bioenergy CIIP, while raising awareness and stimulating action and support at national level
- Spur creating critical mass of activities and stakeholders to incentivise domestic production
- Stimulate a concerted action of European Commission, Member States, industry and finance sectors towards commercialization

“

Horizon Europe Work Programme

Climate, Energy and Mobility, Sustainable, secure and competitive energy supply

WP 2025

Large-scale
production of
liquid advanced
biofuels / RFNBOs

WP 2026-2027

De-risking renewable fuel
technologies and value chains

Establishing renewable fuel
value chains across Europe

”



NOT LEGALLY BINDING

HORIZON-CL5-2026-11-D3-04: De-risking renewable fuel technologies through transnational pre-commercial procurement of renewable fuel industrial value chains

- Create **market readiness** of **essential** renewable fuel technologies that can cost-effectively contribute to **domestic commercial production** beyond 2030, bringing their **industrial value chains** at **TRL 8**, and support **SET Plan** Renewable Fuels and Bioenergy Action
- Introduce **competitive** development of R&D, validation and possibly, first deployment of **industrial** value chains **in phases** from several providers in **any** EU MS/ACs by pre-commercial procurement, built on existing knowledge
- Increase **investment capacity** of R&D providers combining **additional** Union support and **foster deployment**
- Procurers contracting entities primarily **concerned** in transport decarbonization to boost real take off for solutions in this area of public interest, e.g., EU **airport** and **port** authorities, **aircraft operators** and **shipping companies**, other state, regional or local **authorities**
- **Pre-Commercial Procurement (PCP), 40 M, 1 project, opens 4 Aug 2026, closes 1 Dec 2026**

HORIZON-CL5-2026-11-D3-04: De-risking renewable fuel technologies through transnational pre-commercial procurement of renewable fuel industrial value chains

Scope includes

- **Competitive** development **in phases** of entire industrial value chains built upon **existing knowledge** on technology and value chain readiness based on existing **EU projects** and **studies** thus **speeding up** de-risking, and possibly **other**
 - i. Production of advanced bioEthanol and further processing into **ATJ-SPK**
 - ii. Biomass Gasification and FT-Synthesis to produce **FT-SPK**
 - iii. Production of BioMethanol for further processing into **MTJ**
 - iv. Hydrotreatment of Lipids from marginal/contaminated lands to produce **HEFA**
 - v. Biomass Pyrolysis and Upgrading or co-processing to produce **biokerosene** and bio-heavy fuel oil
 - vi. Biomethane from AD and Gasification and Methanation to produce biomethane for shipping or further processing into methanol (methanolysis) for shipping
 - vii. E-Methanol production from CO₂ and renewable H₂ for shipping

HORIZON-CL5-2027-02-D3-08: Co-funding Strategic Energy Technology (SET) Plan renewable fuel value chains at EU, national, regional, local levels

- Connect **regional** renewable fuel **value chain activities** across Europe, especially with partners from Eastern European MS and ACs, involving regions with lower innovation performances, to overcome fragmentation where different regions have different capacities (feedstock, technology, skills)
- Realize the **SET Plan Action** for renewable fuel technologies, at all TRL and market up-take, but also new identified interregional and transnational challenges across value chains and horizontal activities, with a joint comprehensive plan of activities
- Encourage participation of public interest legal entities such as **state**, and notably **regional** and **local** authorities with particular interest in regional development of renewable fuel value chains
- 70% funding rate of eligible costs, beneficiaries may provide financial support to third parties (FSTP)) in the form of grants
- Develop and implement **a joint** comprehensive **plan of activities** through joint transnational calls on an annual basis - learn from ERA-NET Bioenergy, BESTF3 and **LEAP-SE** EU-AU P
- **COFUND, 30 M€, 1 Project, opens 3 Dec 2026, closes 31 Mar 2027**

* European Commission (2025), [Good practices for implementing financial support to third parties \(FSTP\) in EU grants](#)

HORIZON-CL5-2027-02-D3-08: Co-funding Strategic Energy Technology (SET) Plan renewable fuel value chains at EU, national, regional, local levels

Scope includes

- Create collaboration at EU, national, regional or local level to collectively develop and implement complete value chains of renewable fuel technologies
- Basis **Implementation Plan** (IP) and its **updated** version(s) of the Implementation Working Group (IWG) of Renewable fuels and Bioenergy under the revamped SET Plan
- Activities should draw from the detailed R&I activities program of the IP of the SET Plan Action Renewable Fuels and Bioenergy (Annex I) regarding development, demonstration (also at pilot scale) and scale-up
- All renewable fuel technologies (**advanced liquid and gaseous biofuels, other renewable liquid and gaseous fuels, solid, liquid and gaseous intermediate bioenergy carriers**) are in scope
- R&I at all TRL, pilot actions, market uptake measures, networking and coordination, training and mobility, awareness raising and communication, and dissemination and exploitation are in scope
- Input from the Implementation Working Group on Renewable Fuels and Bioenergy, ETIP Bioenergy, EERA Bioenergy and the SET Plan Direct Solar Fuel forum

Building Industrial Capacity of Advanced biofuels



Biofuels have a vital role to play in helping reduce emissions in the transport sector as part of the FF55 and the climate neutrality goals, while contributing to increasing the EU's industrial competitiveness, gross domestic product, and net employment.

Such role is expected to further increase in the future, when advanced biofuels will become more and more available thanks to scale-up to full commercial technologies, processes, and value chains, driven by ambitious policies and sectorial targets and fostered by an EU strategy and R&I support.

Mobilising Industrial capacity of Advanced Biofuels

A significant increase in biofuel production capacities based on RED/Annex IX feedstocks is required between now and 2030-2040 to meet the EU targets.



No single value chain can deliver more than 50% of the required sustainable fuels, thus we need a portfolio of **complementary solutions** with a **diverse mix of technologies** to utilise the full range of eligible feedstocks and produce the complete spectrum of necessary fuels.

The scale-up of value chains towards these targets requires further **financial** and **administrative support** to enable feedstock mobilisation and industrial capacity build-up

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SET Plan Flagship topics for Renewable Fuel Value Chains

EUR 70 million available to establish and mobilise industrial value chains of renewable fuel technologies

Topic: HORIZON-CLS-2027-02-03-08: Co-funding Strategic Energy Technology (SET) Planrenewable fuel value chains at EU, national, regional, and local level - Co-fund Action

Topic: HORIZON-CLS-2026-11-03-04: De-risking renewable fuel technologies through transnational pre-commercial procurement of renewable fuel industrial value chains - Pre-commercial Procurement



Thank you!