bio360 EXPO le salon bioénergie – bioéconomie
24-25 janv/jan 2024 Nantes FR
l'événement Biotransition / the Biotransition event

Sustainable Aviation Fuels (Part 1)

- Green Deal
  - NZE by 2050
  - Emissions reduction of 55% by 2030 (fit for 55)
- Transportation sector:
  - Emissions reduction by 90% in 2050
  - Road transportation electrification in EU by 2035
- Aviation and Shipping sectors
  - Most difficult to abate sectors
  - ~5% of global GHG emissions

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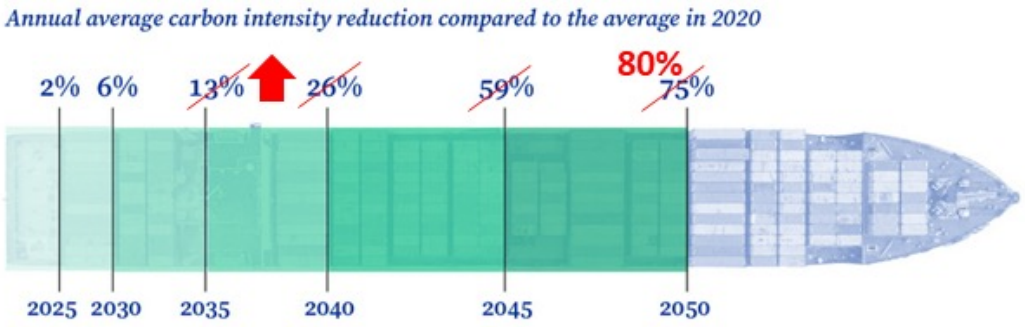
Sustainable Aviation Fuels (Part 1)

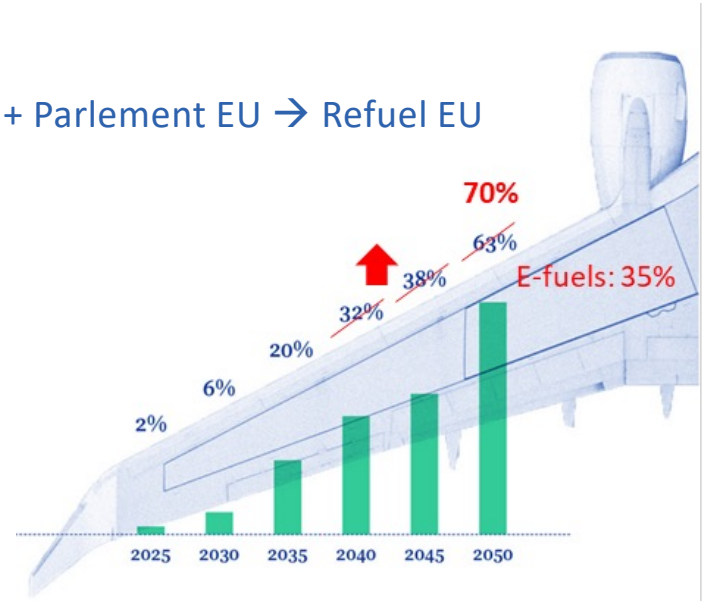
IMO: -50% GHG emissions by 2050/2008

Green deal: -80% carbon intensity by 2050/2020 → Refuel EU Maritime



ICAO: Neutral carbon footprint growth starting from 2020

Green deal + Parlement EU → Refuel EU



Alternative Fuels: Pillars of aviation and shipping decarbonation

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Sustainable Aviation Fuels (Part 1)

Today

SAF ~ 0,16% (6 00 Ml /360 Mm^3 worldwide, 2023)
~ 0,05% (23,5 kt/47 Mt in EU, 2019)

ASTM

- 8 SAF pathways
  - 50% Max in the blends
- + 3 in Coprocessing
  - 5% blending rate

2050

NZE Worldwide

SAF = 70% (out of 50 Mt in EU)

- 35% E-fuels
- Up to 100% blends

EU and USA are the main leaders

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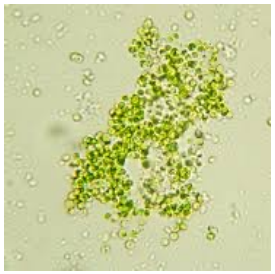
Sustainable Aviation Fuels (Part 1)

- Increase the potential and the incorporation levels
  - New pathways, including Sustainable Aviation Gasoline
  - New feedstock, including new (low ILUC) lipid feedstock, algae, CO_2 and biowastes
  - New prodction plants (~110 in EU RfuelEU Aviation)
  - Increasing aromatics in SAF/ adapting engine technologies

- Derisk investments
  - Clear and stable policies
  - Creation of decision tools to select the most appropriate technology



- Reduction of cost and carbon footprint
  - Chain circularity (including biorefineries and carbon sinks (ex. Biochar))
  - New materials and catalysts
  - Low cost Renewable electricity

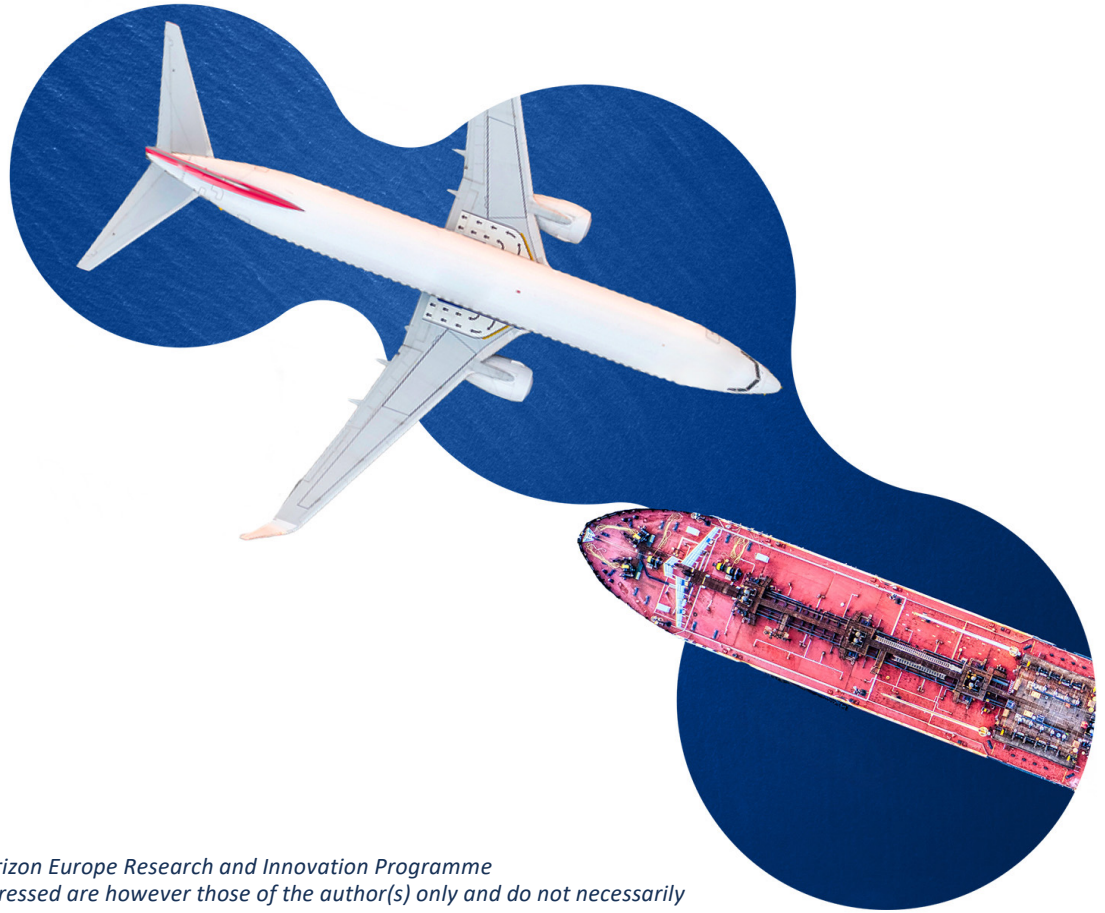
Sustainable Aviation Fuels (Part 1)

- 10h00 Introduction and overview of Cocpit project, Sary AWAD, IMT Atlantique
- 10h15 Sustainable Aviation Fuels for Greener Skies, Argyro KALEA, Ramboll
- 10h35 Production of e-fuels from biogenic CO2: prospects and profitability of capture projects, Yann LESESTRE, Sia Partners
- 10h55 Global Bioenergies : a new path to Sustainable Aviation Fuels, Marc DELCOURT, Global Bioenergies
- 11h15 PureSAF A Step Towards a Greener Future, Yawar Abbas NAQVI, KBR-Swedish Biofuels
- 11h35 Celignis Analytical activities around SAF, Dan HAYES, Celignis Analytical
- 11h55 Sustainable low-ILUC lipids for a carbon-negative SAF production: the biochar approach, Tommaso BARSALI, RE-CORD
- 12h15 Open to the floor

COCPIT Project

Prepared by:
Sary AWAD

January 24th 2024
Biotransition event



IMT Atlantique
Bretagne-Pays de la Loire
École Mines-Télécom

COCPIT

Funded by the European Union

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COCPIT

Project Objectives

- Intensifying lipid-rich micralgae strain production in an innovative photobioreactor
- Enhancing HEFA production chain from microalgal lipids
- Conducting HTL-based SAF to ASTM certification
- Creating a decision tool helping to identify appropriate pathway based on project's specificities
- Increasing the circularity of the SAF production chain and reducing its carbon footprint (biorefinery approach)

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COCPIT

COCPIT in a glance

48 Months (01/10/2023 – 30/09/2027)

Scalable solutions optimisation and decision tool creation for low impact SAF production chain from lipid-rich microalgae strain

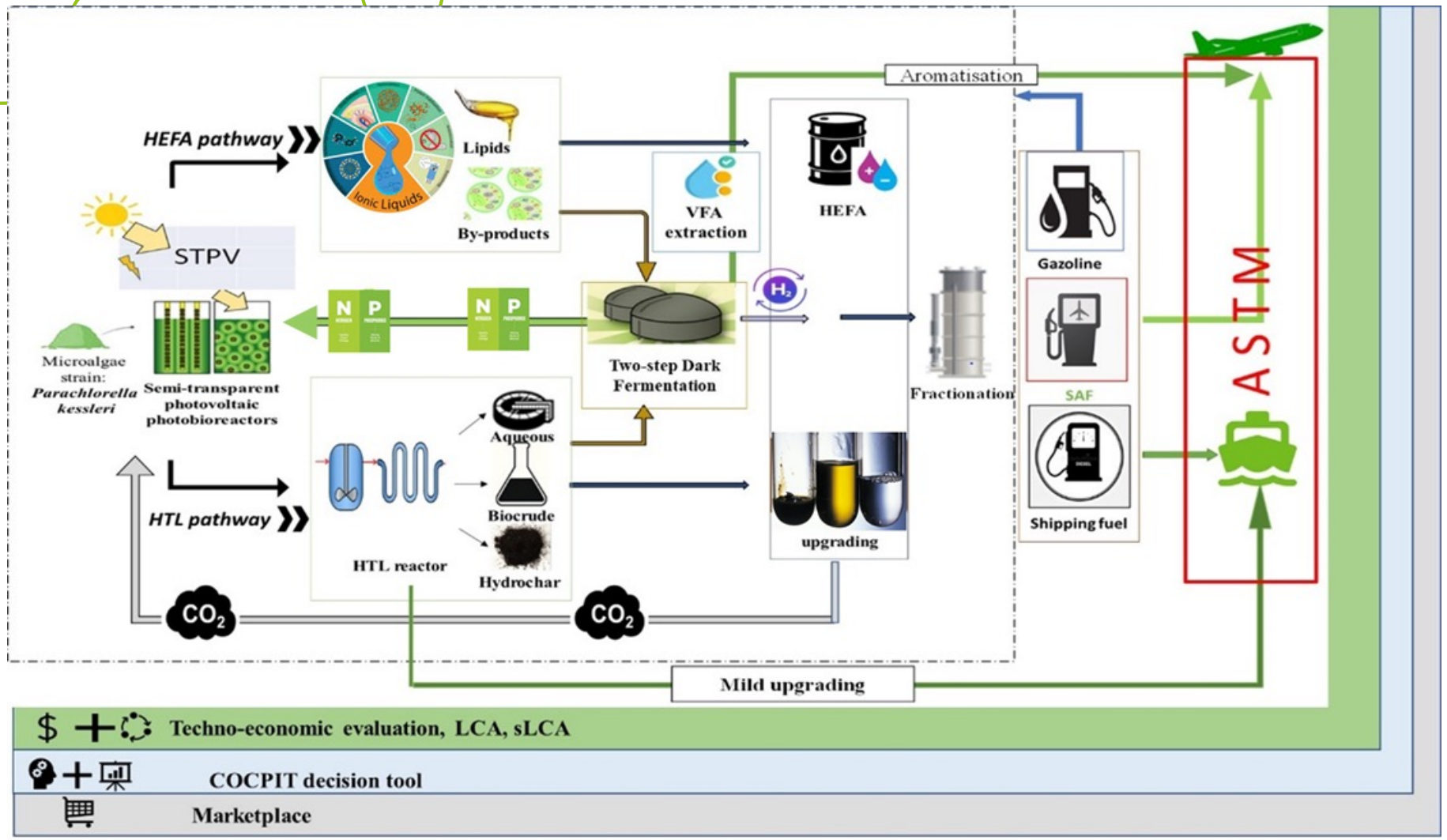
11 Partners → **GEPEA, ~1,7 M€**

6 EU Countries **VERTE, Coordination BAM**

5 M€

IMT Atlantique
Bretagne-Pays de la Loire
École Mines-Télécom
Nantes Université
GEPEA UMR CNRS 6144
AlgoSource
DLR
HELLENiQ ENERGY
AGRICULTURAL UNIVERSITY OF ATHENS
AALBORG UNIVERSITET
URV UNIVERSITAT ROVIRA i VIRGILI
etaflorence renewableenergies
LEITAT managing technologies
WINGS ICT SOLUTIONS

Concept


HEFA pathway
Lipids
Ionic Liquids
By-products
STPV
Microalgae strain: Parachlorella kessleri
Semi-transparent photovoltaic photobioreactors
N
P
Two-step Dark Fermentation
VFA extraction
HEFA
Aromatisation
Fractionation
Gazoline
SAF
Shipping fuel
ASTM
HTL pathway
HTL reactor
Aqueous
Biocrude
Hydrochar
upgrading
CO2
CO2
Mild upgrading
Techno-economic evaluation, LCA, sLCA
COCPIT decision tool
Marketplace

COCPIT

IMT Atlantique (VERTE Team) tasks

IMT Atlantique
Bretagne-Pays de la Loire
École Mines-Télécom

GEPEA
UMR CNRS 6144

➢ Design and construction of a continuous HTL reactor

- Multiphysics based modelling of thermochemical phenomena occurring inside the reactor
- Design and construction of a continuous reactor
- Energy integration of the plant
- Studying the flexibility of the system (SAF + Maritime)

➢ Enhancing the circularity of the production chain

- In-situ H_2 production (production chain residues + biogenic effluents)
- Fuel additives production (aromatics) to increase final blending ratio> 50%
- Recirculation of CO_2 and nutrients (N et P)
- Carbon sequestration in hydrochar
- Aqueous phase treatment

Thank you!

COCPIT

cocpit-horizon.eu

COCPIT_Project

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