TULIPS – Green Airports

DemonsTrating lower pollUting soLutions
for sustaInable airPorts acrosS Europe

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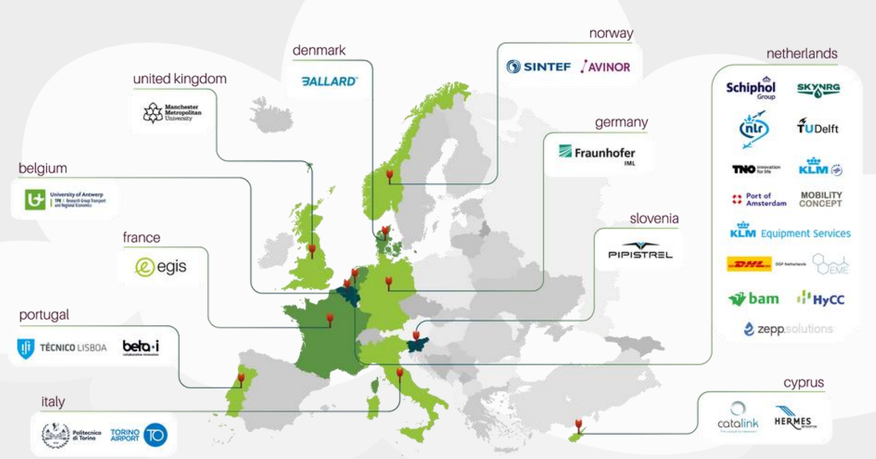


WORK PACKAGES WITH DEMO-ACTIVITIES

WP1
Sustainable Inter-modal Transport Connections

WP2
Energy Supply of Future Aircraft

WP3
Smart Airport Energy Hub

WP4
Zero Emissions Airside Operations

WP5
Scaling Up The SAF Market

WP6
Circular Airports

WP7
Green Air and Land

- Zero Waste & Zero Airport Emissions in 2030
- Net Zero Aviation Emissions in 2050

COLLABORATION, COORDINATION & ASSESSMENT WORK PACKAGES

WP8
Performance Monitoring and Economic Data Collection and Analysis

WP9
Deployability, Upscaling and Exploitation

WP10
Roadmaps Vision to 2030

WP11
Project Management

WP12
Dissemination and Communication

Grant Agreement No. 101036996

WP summary & involved demonstrators

WP1: Intermodal services

- Single source data & distributing information to services
- Increase use of:
  - electric freight transport
  - modal shift to green commuting modes
  - mobility as service
  - digital solutions for international green travel

WP2: Energy supply future aircraft

- Feasibility study incl. energy demand forecast (link with WP3)
- Demonstrate:
  - Unattended charging
  - Modmodular charging system
  - Airport-facilitated hydrogen flight

WP3: Smart energy hub

Implementing:

- Improved Airside electricity traffic incl storage and direct PV charging
- Fully integrated heat storage systems into existing hotel infrastructure

WP4: Zero emissions airside operations

Development & operation of:

- H2 GPU with a hydrogen fuel cell (H-GPU)
- Large size H2 tow tractor (able to move A380, B777 aircraft) which uses hydrogen powered fuel cells

WP5: SAF infrastructure

Scale-up of SAF market

- Set up EU Clearing house
- Enable airports to support the scale-up of SAF supply
- Demonstrate:
  - Large scale SAF supply
  - Incentives for airports to increase SAF usage

WP6: Circular airports

- Set up circular baseline for airport and circularity management system
- Demonstrate:
  - Application of circular building tooling
  - Elimination of operational consumer/ passenger waste

WP7: Green air & land

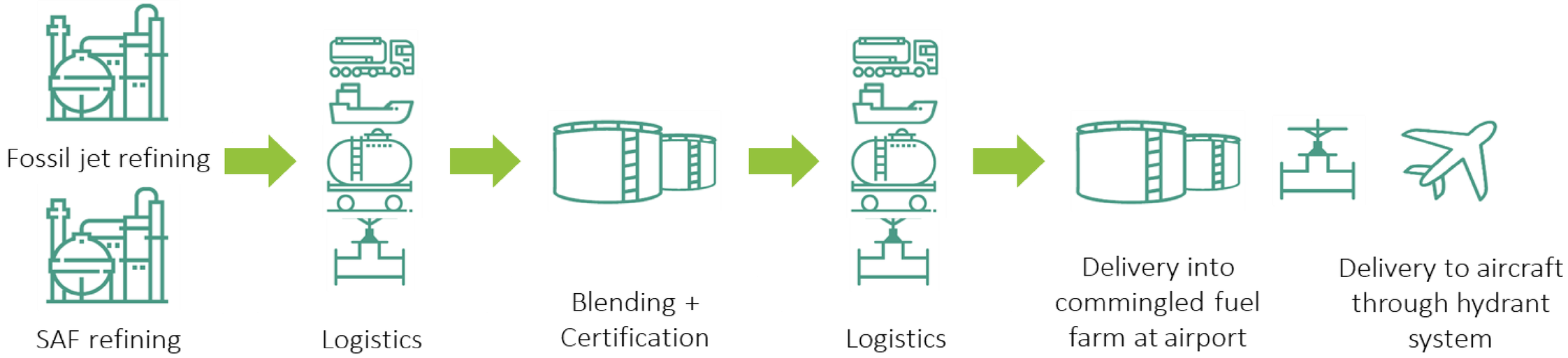
Focus at cross-cutting aspects through:

- Airside UFP mitigation measures and monitoring
- Airport land carbon sequestration with biochar, including nature based solutions

WP8: Performance monitoring

- Establish robust baselines for comparative analysis and implement an extensive data aggregation and collection toolkit
- Implement an extensive data aggregation and collection toolkit to facilitate the transfer of observable metrics and key data from demonstration activities
- Model target KPIs for emission and energy reduction
- Determine the achieved performance for each demonstrator activity
- Develop predictive scale-up scenario forecasting for use within deployment assessments (WP9) and building roadmaps (WP10)

Complementary EU-airport projects to tackle SAF challenge



AIRPORT

SAF production
Explore E-fuels local ecosystems

SAF transport
Optimize logistics on transport and storage

SAF blending
Testing of 5% blend & 50% blend

SAF Refueling
Large scale delivery

SAF clearing house
Set up structure + conditions

SAF uptake and increased demand
Increase use of SAF and airport incentives

Traceability
Proof of concept of the traceability of SAF along the value chain, using blockchain technology

Hydrogen roadmap RSG-RTHA

2023 | 2024 | 2025 | 2026 | 2027 | 2028

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- NLR Hydra 2 drone
- Operational demo

AeroDelft

- Sling 4 aircraft
- Both GH2 and LH2

nlr

- NLR Living Lab Electric Flight
- Hydrogen range extenders added to the PH-NLX

TU Delft

- Cessna Skymaster (DEAC)
- Retrofitted later on with a hydrogen-powered engine

ZEROAVIA

- Zeroavia ZA600 powertrain
- Project with Zeroavia and Shell – retrofit of a Dornier 228

CONSCIOUS AEROSPACE

- Formerly known as HAPPS – Dutch project
- Retrofit of a DeHavilland Dash 8

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Thank you!

Questions?