ALIGHT
SUSTAINABLE AVIATION

D8.5 Exploitation plan (updated version M36)

Version number:	3.0
Dissemination level	PU (public)
Work package:	WP8 – Exploitation and Replication Toolbox
Date:	24-10-2023
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Exploitation plan (version M36)

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1. Background

The overall mission of the ALIGHT project is to enhance sustainable aviation. With Copenhagen Airport (CPH) as lighthouse the project will bring forward the necessary solutions, knowledge, guidelines and best practice handbooks supporting an efficient airport paradigm shift towards zero emission aviation and airport operation. Fellow airports will replicate the example set by Copenhagen Airport. Through effective communication, the mission is to ensure maximum impact throughout the European and international aviation industry both during and beyond the duration of the project.

2. Objective

The purpose of Deliverables D8.1, D8.3 and now D8.5 exploitation plan is to report on activities implemented by respectively M6, M18 and now M36, and to present update of the exploitation plan of the ALIGHT consortium. It described in detail the organization of future activities, WPs development and communication & dissemination plan in support of ALIGHT concept for future sustainable aviation. This series of deliverables is before all a refinement of the plan from the project proposal stage.

Deliverable D8.3 has been published as an updated version after 18 months of activities (M18)

The present deliverable D8.5 updates the D8.3 (M18) exploitation plan of ALIGHT that was compiled in M36. It includes:

- ✓ List of ALIGHT deliverables (Chapter 4.2 and figure 5)
- ✓ Description of the exploitable deliverables of ALIGHT (Chapter 4.3 and figure 6)
- ✓ Consortium M18 exploitation plan – D8.3 - (all consortium partners) (Chapter 3)
- ✓ Updated consortium exploitation plan (all consortium partners) (Chapter 5)
- ✓ Individual exploitation plan (per Partner) (Chapter 6)

Target audience and stakeholders reporting, and updates are described in D10.1 deliverable from WP10 about communication and dissemination.

Metrics for transfer, including quality control, traceability, logistics, user survey feedback, involvement of national authorities and key economic indicators will be described in D8.2 deliverable (M50) from WP8 about Exploitation and Replication Toolbox.

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3. M18 updated Exploitation Plan

3.1 Purpose the Exploitation Plan

The Plan for the Exploitation is one of the measures to maximize the impacts of ALIGHT. It summarizes the beneficiaries' strategy and concrete actions related to the use, dissemination, protection and replication of the project results. The overall exploitation strategy will ensure that the partners are free to benefit from their complementarity, roles and synergies, experience and capabilities, to utilize the project results with proficiency and exploit their market position with due consideration for IPR. The general purpose is to achieve the widest possible impact both in Europe and globally, and to facilitate the introduction and adoption of SAF (and other possible propellants) and smart energy in airports and their wider contexts. Below is outlined the Key Exploitable Results (KERs) as well as an exploitation plan outline for the ALIGHT partners.

The Exploitation Plan is a living document which will be updated on a continuous basis. The plans will thus be directly connected to the impact of the project, as well as on the replicability/scaling-up potential protection, replication and exploitation of the project results. Networking and stakeholder engagement activities will be included, to address needs and requirements beyond the project consortium and to receive valuable input for the optimization of ALIGHT.

3.2 M18 Exploitation Plan (D8.3)

ALIGHT will contribute to the European regulatory, standardization, certification and technological progress by disseminating its results, throughout the whole project's duration, to a carefully defined target audience according to its specific interests and needs. Nevertheless, prior to exploitation and dissemination, an evaluation has been carried out, especially considering the provisions of the Grant Agreement (GA) and the Consortium Agreement (CA). This will ensure that confidentiality provisions are not jeopardized. To effectively disseminate and exploit the results of ALIGHT, an initial stakeholder analysis has been developed (see below 3.2.1). Relevant stakeholders will be continuously involved throughout the project.

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3.2.1 Stakeholder analysis

Stakeholders	Interest
Technology providers	Growing market demand for technologies to manufacture, supply, introduce and integrate SAF, new propellants and smart energy in airports, and to measure environmental impacts to meet national and international goals and requirements. Easy access to project results and achievements. Stakeholder events to gauge markets and provide relevant input to meet demand.
Industry, including SMEs	Growing need for strong value chains, feedstock suppliers, technologies, developers, including suppliers and service providers, to meet increasing demand for SAF and smart energy. Easy access to project results and achievements. Stakeholder events to provide input and build value chains.
Research community, including universities	Reference study cases and scientific journal publications. New research projects and conference presentations. Access to new knowledge, innovation, and assistance in preparing educational materials.
End users/consumers, including airlines, airport personnel and passengers	End user and consumer confidence in new and sustainable solutions, positive perceptions (including safety), safe and healthy work, travel, transport and airport environments, training activities, economic and sustainability assessments.
Fellow airports	Access to new knowledge and best practice guidelines, transfer opportunities, business models, sustainability assessments.
Airport surroundings, including infrastructure and neighborhood groups	Optimized integration, business model scenarios, reduced climate- and environmental impact (including air pollutants), societal impacts. Transfer opportunities.
Other project consortia	Knowledge exchange, best practices, access to new knowledge, cross countries, companies, institutions etc.
General public	Positive perception of SAF and smart energy, less impact on climate and the environment, good for the economy.
Standardization and certification bodies	Recommendations for new standards and revision of existing energy management related ones. Recommendation for specific airport context guidelines for standards implementation on Access to R&D results for SAF and smart energy developments.
Local/regional/national authorities & public bodies, including city planners	Recommendation for SAF and smart energy use and integration, vision of future airports/smart cities, access to new knowledge.
Investors	Business case scenarios, investment opportunities, economic impacts.

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Policy makers	Recommendations for SAF/smart energy legislation/regulatory initiatives, solutions for national, European and international strategies regarding sustainability and climate change. Access to project achievements and economic impacts.
Networks and industry associations	Support for concept and technology roll-out
European Commission	Best practice and guidelines on using SAF and smart energy in the airports of the future. Recommendations and sustainability assessments to achieve international goals.

The general purpose of the exploitation plan is to achieve the widest possible impact both in Europe and globally, and to facilitate the introduction and adoption of SAF and smart energy in airports and their wider contexts. Below are outlined the Key Exploitable Results (KERs) as well as an exploitation plan outline for the ALIGHT partners.

3.2.2 Key Exploitable Results (KERs)

ALIGHT will create several overall Key Exploitable Results (KERs), all of which have numerous sub- components, as outlined below.
This table is updated from the previous exploitation plan deliverables (D8.1 and D8.3), to reflect AIRBUS activities and contribution, as a new partner of ALIGHT (amendment).

WP	KER	Partners
2	SAF supply line: • establishment of a SAF supply line to CPH, including alignment with possible local production, Feedstocks, methods, producers options and assessment, product type, existing and future options, PtX (Power to X), MtJ (Methanol to jet), .., delivery options, purchase agreements, arrival and storage conditions, compliance, standards, criteria (including sustainability) price and scalability. Potential IPR: Technology- and energy- system integration	NISA, BKL, AirBP, IATA, CPH, TUHH, BMGI, UNIPR
2	SAF supply line transfer/replication model: • SAF Pool proposals, dialogues with suppliers and airlines • based on input from Fellow Airports regarding local conditions, considerations etc. Potential IPR: Blending, registration, controlling-capabilities	NISA, BKL, AirBP, IATA, CPH, TUHH, BMGI, UNIPR

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3	SAF integration, implementation and usage prototype: • including fuel logistics, infrastructure, sustainability data and field performance monitoring, e.g. Remote fuel quality control system - to ensure quality control of SAF supply line (potential patent/copy-right)-, End users and price issues. While SAF is the main task, other sustainable related solutions will be considered, such as electrical aircraft, hydrogen, in a way to "harmonize" the main steps/sequences and support the identification of challenges and pathways to solutions.	DLR, NISA, TUHH, BKL, AirBP, IATA, CPH, BMGI, A-CE
3	Software tools supporting sustainable fuel handling and logistics at airports, accounting & reporting (potential patent/copyright): • Results on LAQ and non-CO2 climate benefits of sustainable fuels (publication) • Update of sustainable fuel database (public access) • Input to guidelines for efficiency benefits of sustainable fuels (publication) • SAF implementation and usage replication model: including extrapolation of field performance data, adaptation of best practice and recommendation for local implementation challenges, e.g.: • Input to best practices for sustainable fuel handling and logistics at airports, quality control and accounting & reporting (publication). • Economic research results (publication)	BKL, AirBP, DLR, TUHH, IATA
4	Smart energy supply prototype: • Including concept design, mapping and characterization of energy consumption and resources, infrastructure, battery energy storage system (BESS), data interfaces, specifications and hybrid energy management system.	CPH, HG, DTI, ADR, LTOU, CPK, IATA, BMGI, UNIPR
4	Smart energy supply (fossil-free) roadmap input for replication: • Including optimal operating scenario, smart energy management software, best practice for integration and interoperability, baseline from energy use patterns.	CPH, HG, DTI, ADR, LTOU, CPK, IATA, BMGI, UNIPR
5	Smart energy usage prototype: • including energy mapping and efficiency measures, passenger transport planning and infrastructure, ground handling equipment infrastructure, feasibility demonstration and guidelines, smart energy buildings (heating, cooling, electricity), datalogging database	CPH, ADR, LTOU, CPK, DTI, SAS, IATA, HG, BMGI, UNIPR

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5	Roadmap input for greening passenger transport and ground equipment: • Strategies and guidelines.	ALL
5	Designs for smart airports of the future: • Design, infrastructure, safety measures, optimized energy usage, digitalization etc. for aircraft stand of the future. (May involve topics around aircraft with new fuels, electric aircraft, hydrogen aircraft and hybrid. topics that will be of great importance for the creation of the stand of the future. To the extent it becomes relevant, it will be included in deliveries from WP2)	CPH, ADR, LTOU, CPK, DTI, SAS, IATA, HG, BMGI, UNIPR (NISA)
6	Sustainability best practice protocol and optimized greenhouse gas emission monitoring system: • Recommendations for optimized sustainability and design and implementation of improved greenhouse gas monitoring system.	ALL
7	Best practice input from cooperation activities: • including integration, input to bold vision for smart airports (as a part of 'smart cities'), knowledge exchange, transfer, workshops with stakeholders regarding state of the art, smart requirements, vision), co-creation and recommendations.	CPH, ADR, LTOU, CPK, DTI, NISA, IATA, DLR, BMGI, RSB
8	Sustainable commercial scenario/business models	ALL
8	Guidelines and metrics for transfer: • including quality control, traceability, logistics, user survey feedback, involvement of national authorities and key economic indicators.	ALL
8	Best practice handbooks and toolboxes (SAF and Smart Energy): • compilation of best practices and toolboxes inputs from WP2-7, including assessment, infrastructure, management, practical recommendations, performance monitoring, sustainability, benchmarking database, procurement procedures, planning requirements, regulatory/legal recommendations, data security/protection aspects, requirements for standardization development. Support to the development of a CWA (CEN Workshop Agreement) about SAF under WP10, in support of replication.	ALL
9	Input for transfer guidelines: • transfer support and input to best practice solutions from Fellow Airports.	CPH, ADR, LTOU, CPK

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3.2.3 M18 consortium exploitation plan for ALIGHT (D8.3)

The initial exploitation plan has been updated right after the beginning of Alight (M06), then again by M18, as part of WP8 activities. All partners will assess their exploitation activities on an ongoing basis and adjust to maximize the impact throughout and post-project.

Partner(s)	Consortium exploitation plan (updated M18)
ALIGHT end users (CPH, ADR, LTOU, CPK)	CPH together with ADR, LTOU and CPK, are the main end users of the ALIGHT concept. Initial activities at CPH include the state-of-the-art and reliable sustainable solutions for aircraft refueling with SAF, assessment of existing infrastructure and plan for integration into operations and logistics at CPH. The outcomes from the Smart Energy related workshops will feed the dedicated Toolbox. This aims to give concrete tools to assess the integrated BESS and V2G chargers at CPH. In October 2021 ADR, in collaboration with ENI, was the first airport in Italy to make available the SAF (Sustainable Aviation Fuel): a mixture of traditional jet with biogenic component, which is able to reduce CO2 emissions by 60-90%. The first flights operated by ITA has been refueled by SAF. The collaboration between ENI and ADR has allowed to carry 3000 tons of SAF with a ship until the port of Civitavecchia and from this to the airport of Fiumicino in March 2022, The fuel has been used for Ita flights. To decrease the amount for CO2 emissions related to vehicles, in November 2021 the first supply of approx. 5 thousand liters of HVO fuel (Hydrotreated Vegetable Oil), deriving from UCO (Used Cocked Oil) has been delivered. This fuel, with low emissions, has been used for ADR assistance (ADRA) vehicles. The use will be extended in the next few years to the other means of the group ADR not easy to electrify These experiences have highlighted the critical issues and the differences to be overcome from the regulatory point of view. ADR proceeds with the analysis of the state of the art of the airports involved and the way to make SAF available. SAF to CPH has been set in March 2023 with Air Greenland, with a contract 5% blend-in delivered by DCC Shell

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	On the subject of smart energy these are the solutions already implemented and those under study at the airports of FCO and CIA (e.g. photovoltaic, storage, charging columns, platforms for the management of consumption). Concerning the production of the energy from a renewable plant, ADR is building the first PV plant along a Runway in Europe, and after all the authorization phases, at the time of writing, is finally building the conduit that will link the PV plant to the airport electrical net. The timeline for the conclusion of this project is 2025, when it will provide to Fiumicino Airport almost 22 MW power. The other airport managed by ADR is a smaller airport located in Ciampino, a small town near Rome. ADR is now trying to replicate the Solar Farm also in this smaller site. This project will be an example of scalability and transferring of solutions from one airport to another. Other type of FV plants that ADR has planned to build with the aim of increasing the energy autonomy and reducing the CO2 emissions are: - A second PV plant along the other runway in FCO - A PV plant along the runway in CIA - A parking shelter PV plant in the long-term parking in FCO - A floating PV plant in a lake located in FCO Concerning the development of EV chargers in FCO airport, ADR has commissioned to the University La Sapienza di Roma an analysis on the Italian electrical vehicle market penetration. This study helped ADR planning the number of charging points along the years. The project is to install 500 charging points within 2025 and going on up to 2700 charging points in 2031. Concerning the storage, ADR is designing a system of second-life batteries from the automotive sector for the storage of excess power produced by a ~30MW solar photovoltaic plant. The BESS will cover evening peak-demand and provide flexibility services to the grid.
Industry/for-profit partners/SMEs (BMGI, HG, BKL, SAS, AirBP, A-CE)	BMGI has identified existing standardization structures where ALIGHT outcomes could be considered for inclusion in standardization work/development. So far, technical committees from ISO, ASTM and CEN have been identified in the field of SAF, while ISO, IEC and CEN/CENELEC in the field of Smart energy airports. From these inputs, Relevant Technical Committees will be approach to check opportunities for ALIGHT inputs towards consideration in revision of existing standards and development of new

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	ones, including Workshop Agreements (IWA and CWA). A guide for implementation of EN ISO 50001 (already referred in the EE Directive – 2012/27/EU) dedicated to airport is already considered as a good opportunity by CEN/CENELEC Sector Forum Energy Management-Energy Transition (SFEM) and CEN/CENELEC JTC14, as well as by ISO TC 268 (Sustainable Development of Cities and Communities) for a dedicated guide to implementation of ISO 37101 (Sustainable cities and communities management system). BMGI will link with those structures for engaging a link with ALIGHT then feeding them with outcomes from the ALIGHT project in due time. The main objective is to set a common reference for sustainable development and to reinforce the capacity to boost innovation to market, with direct support to replication and scaling-up. HG, BKL, SAS and AirBP will exploit KERs in a manner consistent with their business approach). A Key exploitable result for HG is the successful validation of its Smart Energy Management System in Copenhagen Airport. The system will be tested in close cooperation with DTI and will allow to bring the product to market, offering it as a solution for a fee to the partners in the project and new potential customers. The results stemming from the validation will demonstrate the benefits and commercial value of Hybrid Greentech's Smart Energy Management system.
RTOs (DTI, DLR)	DLR will apply the tools and learning from KER 3 and 4 to further develop SAF digital twin and smart sensors ensuring fuel quality, to support the deployment and utilization of SAF, to further identify the added values of SAF on aircraft performance and non-CO2 impacts. DTI will apply tools, learning from KER 4 and 5 to support validation, implementation and optimization of smart energy system, supporting data setup, battery energy storage system, smart charging infrastructure, PV systems ex. between runways, fleet management tools etc. DTI will secure involvement with the International Energy Agency (IEA) and their technology collaboration program on Advanced Motor Fuels (AMF). During the first 6 months of the project main focus has been on D4.1 Roadmap for workstream B and preparation of data infrastructure for workstream B activities incl. demo.
Universities (UNIPR, TUHH)	The universities will engage in collaborations and knowledge sharing with other universities, such as University of Southern Denmark, Technical University of Denmark and Chalmers University of Technology (Sweden).

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	TUHH will analyze possible and currently developed methodologies for reporting and accounting of SAF in the practical context of the ALIGHT project. Therefore, the SAF supply chain will be monitored according to the methodology and the transferability of the methodology into a real application will be investigated. Therefore, a PhD position will be established to investigate the transferability of the theoretical approach into the project and thereon into a globally applicable scheme. In addition, TUHH provides support in questions and analyses related to the operational use of SAF as well as environmental and economic analyses and issues. UNIPR will exploit project results as a knowledge base for civil and mechanical engineer instruction and will activate a PhD position to investigate further development of project results and their transferability to other sectors.
Associations/public bodies (RSB, NISA, IATA)	RSB will use the project to develop standard guidance for airports and the broader aviation sector for the identification and procurement of sustainable SAF. RSB will also the project to broaden its engagement with airports globally with a view to capacitate airport companies to influence SAF procurement decisions in favor of SAF with the highest sustainability criteria, such as RSB certified SAF, and understand the impact these decisions may have on the overall sustainability performance and image of the airport. Moreover, RSB is engaged with ICAO in the development of CORSIA (providing technical advice on sustainability standards and certification systems). RSB will be able to share relevant experience gained from this project at future ICAO meetings on CORSIA implementation. Lastly, the ALIGHT project will help RSB to gain further experience on EU airports' sustainability needs, which will inform the future development of the RSB standard and sustainability solutions. NISA and IATA will use the ALIGHT project to promote SAF and smart energy to their members.

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4. Report on the progress of all WPs of ALIGHT activities between M18 and M36

Between M18 and M36, several major achievements have been met in the different ALIGHT WPs. Thanks to moving to low COVID-19 restrictions, planned actions have been implemented in a full cooperative manner by all Alight partners. However, in order to accelerate the activities, and to accommodate with all Alight partners and external stakeholders' participation (when concerned) , workshops and meetings have been mainly organized in hybrid mode (physical and virtual), in a very successful and fruitful manner.

In addition, and as a consequence of the COVID restriction period, Alight project has been agreed (amendment) for an extension of one year (12 months), which means that the project will be a 5-year based one (60 months), running until October 2025.

Other important parts of the amendment concern:

- AIRBUS as a new partner.
- New task and deliverables to strengthened efforts on Non-CO2:
- Strengthened standardization work with the development of a CEN Workshop Agreement (CWA)

The acceptance of the amendment has been formally notified to Alight in July 2023 (M33).

Consequently, this Deliverable D8.5, about update of the previous versions of exploitation plan, will integrate the changes from the amendment:

- Sub-chapter 4.1 below sum-ups the Work Plan, and its Work Packages.
- Sub-chapter 4.2 summarizes List of ALIGHT deliverables
- Sub-chapter 4.3 describes exploitable deliverables of ALIGHT
- Sub-chapter 4.4 details progress of activities and achievements from each WP in the present project implementation period (M19 – M36)

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4.1 Work plan and Work Packages

ALIGHT is divided into two distinct aspects, Sustainable Aviation Fuels (SAF) and Smart and Sustainable Energy, with several cross-cutting WPs.

Figure 1 depicts ALIGHT Work Package structure,

Figure 2 lists ALIGHT Work Packages, while

Figure 3 maps ALIGHT Work Plan (Gantt Chart),

Figure 4 lists ALIGHT Main milestones, and

Figure 5 lists ALIGHT project's deliverables.

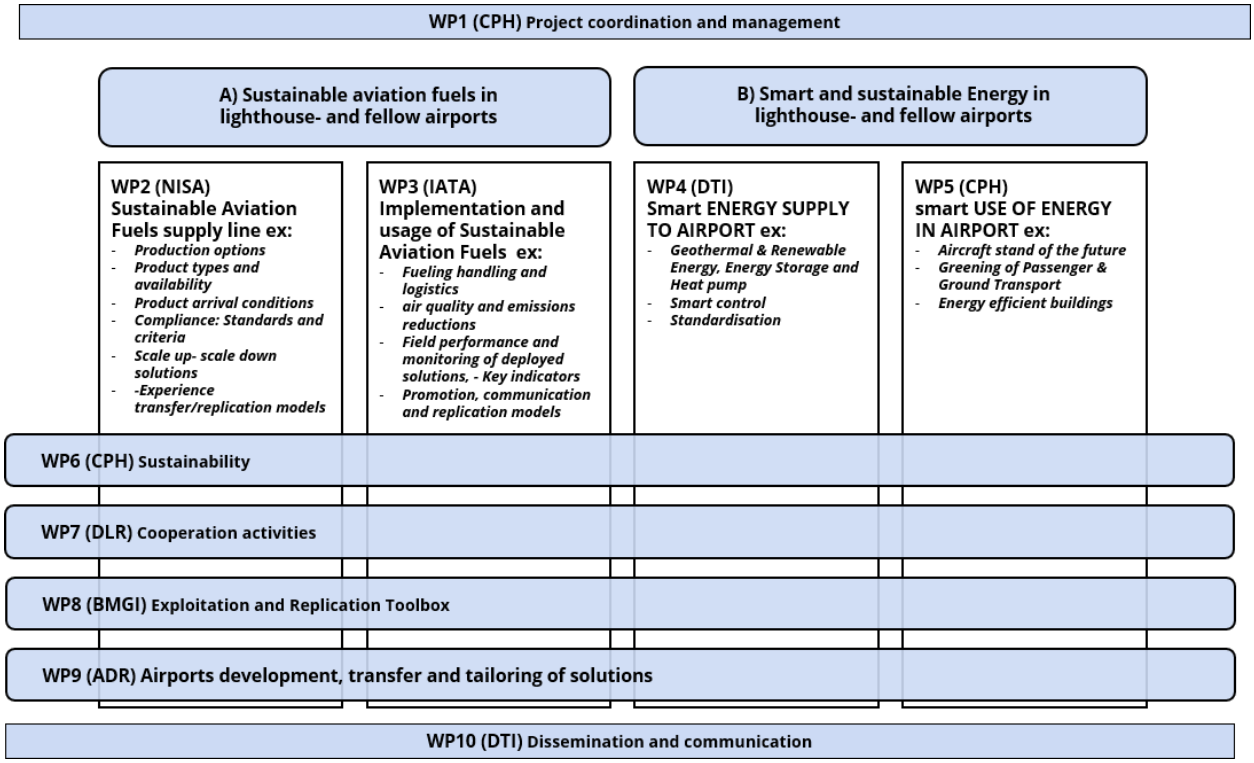

Figure 1: ALIGHT Work Package structure

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Work package no.	Work package title	Lead participant short name	Start month	End month
1	Project coordination and Management	CPH	1	60
2	Sustainable Aviation Fuels supply line	NISA	10	60
3	Implementation and usage of Sustainable Aviation Fuels	IATA	1	60
4	Smart Energy Supply to Airport	DTI	1	60
5	Smart Use of Energy in Airport	CPH	1	58
6	Sustainability	CPH	1	60
7	Cooperation activities	DLR	1	60
8	Exploitation and Replication Toolbox	BMGI	1	60
9	Airports' development, transfer and tailoring of solutions	ADR	1	60
10	Dissemination and communication	DTI	1	60

Figure 2: ALIGHT Work Packages

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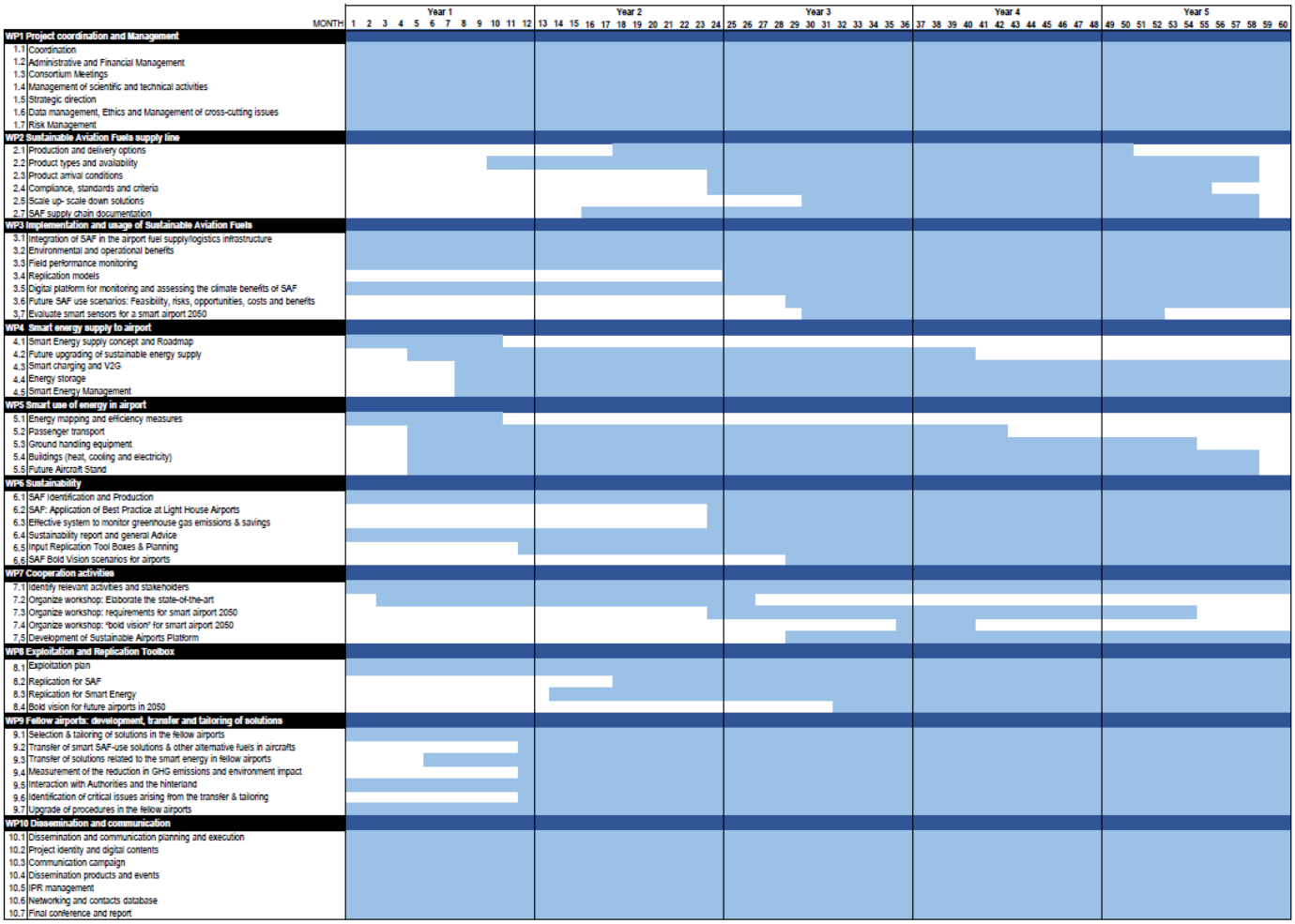

Figure 3: ALIGHT Gantt Chart

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Mile-stone number	Milestone name	WPs	Due date (in month)	Means of verification
1	Project Kick-Off	1 (all)	2	Kick-off meeting held
2	Lighthouse collaboration begun	7	9	"Bold vision" workshop planned
3	Conditions for the supply of sustainable aviation fuels to Copenhagen Airports are identified	2	58	Best practice handbook and tools for fuel logistics, fuel quality monitoring and accounting
4	Approach to ensure that SAF will be more efficient and cost-saving adopted	3	20	Best practices will be developed based on the JIG standard
5	Buildings ready for smart energy management	4 & 5	40	Equipment SAT and Installation -reports
6	Sustainability requirements met	6	36	Sustainability report completed
7	CPH's Lighthouse concept demonstrated	2-5	50	System complete and qualified
8	Fellow airports start replication	9	52	Smart energy solutions transferred and tailored in fellow airport
9	Wider adaptation of Lighthouse solutions	8 & 10	44	Presentation of the ALIGHT online replication toolbox
10	Project Closure	1 (all)	60	Final consortium meeting held

Figure 4: ALIGHT Main milestones

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4.2 List of ALIGHT deliverables

Deliverable Number	Deliverable Title	WP number	Lead beneficiary	Type	Dissemination level	Due Date (months)
D1.1	Project Management Plan	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	2
D1.2	Report presenting project management collaborative workspace	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	3
D1.3	Data Management Plan	WP1	1 - CPH	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	6
D1.4	Project Management Plan Update 1	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	17
D1.5	Updated Data Management Plan	WP1	1 - CPH	ORDP: Open Research	Confidential, only for members of the consortium (including the Commission	18

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				Data Pilot	Services)	
D1.6	Project Management Plan Update 2	WP1	1 - CPH	ORDP: Open Research Data Pilot	Confidential, only for members of the consortium (including the Commission Services)	37
D1.7	Final updated data management plan	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	53
D1.8	Ethics and cross-cutting issues report	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	55
D1.9	Report on the cumulative expenditure incurred by the beneficiaries from the starting date of the action (Art.20.5)	WP1	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	49
D2.2	Guidance on sustainability criteria and best practice framework	WP2	8 - NISA	Report	Public	60

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D3.1	Detailed plan of field performance monitoring and parameters captured in SimFuel	WP3	10 - DLR	Report	Public	30
D3.2	Best practice handbook and tools for fuel logistics, quality monitoring and accounting	WP3	9 - IATA ESPANA SL	Report	Public	58
D3.3	Report on broader environmental benefits	WP3	9 - IATA ESPANA SL	Report	Public	27
D3.4	Definition of parameters and metrics for field performance monitoring	WP3	9 - IATA ESPANA SL	Report	Public	6
D3.5	Report on field performance monitoring	WP3	1 - CPH	Report	Public	58
D3.6	Report on feasibility and added values of Smart Sensors for the Smart Airport in 2050	WP3	10 - DLR	Report	Public	52
D3.7	Report on the digital platform for smart use of SAF	WP3	10 - DLR	Report	Public	58
D3.8	SAF usage scenarios	WP3	17 - A-CE	Report	Confidential, only for members of the consortium (including the Commission Services)	36
D3.9	System design requirements for smart SAF usage - on-ground & in-	WP3	17 - A-CE	Report	Confidential, only for members of the consortium (including the	48

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	flight				Commission Services)	
D3.10	SAF Best Practices: Risks and mitigations for non-drop-in fuels	WP3	17 - A-CE	Report	Confidential, only for members of the consortium (including the Commission Services)	58
D4.1	Fossil Free Airport Roadmap report - infrastructure, supply, use and flexibility	WP4	5 - DTI	Report	Confidential, only for members of the consortium (including the Commission Services)	11
D4.2	Smart Energy Management and ancillary services SAT and Software Functionality test descriptions	WP4	13 - HG ApS	Report	Confidential, only for members of the consortium (including the Commission Services)	48
D4.3	Best practises for smart energy supply and management collected as guidelines, handbooks, case studies, business case tools	WP4	5 - DTI	Report	Public	60
D5.1	Best practise toolbox for Greening of Ground Equipment and Passenger Transport	WP5	1 - CPH	Report	Public	54

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D5.2	Best practise toolbox on Greening of Airport Buildings with a smart energy management	WP5	1 - CPH	Report	Public	58
D5.3	Design manual for Aircraft Stand of the future	WP5	1 - CPH	Report	Public	58
D6.1	Guidance on procurement of SAF for EU airports	WP6	12 - RSB	Report	Public	24
D6.2	Certification of SAF at lighthouse airports	WP6	1 - CPH	Report	Public	60
D6.3	GHG monitoring system	WP6	1 - CPH	Report	Public	60
D6.4	Sustainability report	WP6	1 - CPH	Report	Public	60
D6.5	Results for Cost Benefit Analysis of Smart Usage scenarios of SAF	WP6	10 - DLR	Report	Confidential, only for members of the consortium (including the Commission Services)	56
D7.1	Report on "state-of-the- art WS"	WP7	5 - DTI	Report	Public	12
D7.2	Report on "Requirements for Smart Airport 2050 WS"	WP7	10 - DLR	Report	Public	50
D7.3	Report on "bold vision 2050 WS"	WP7	10 - DLR	Report	Public	38
D7.4	Report on the main findings of SAP for sustainable development in airports	WP7	12 - RSB	Report	Public	58
D8.1	Exploitation plan 1	WP8	14 - BMGI	Report	Public	6

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D8.2	Table of metrics	WP8	14 - BMGI	Report	Public	50
D8.3	Exploitation plan 2	WP8	14 - BMGI	Report	Public	18
D8.4	Recommendation for replication	WP8	14 - BMGI	Report	Public	32
D8.5	Exploitation plan 3	WP8	14 - BMGI	Report	Public	36
D8.6	Replication Toolbox for SAF	WP8	1 - CPH	Report	Public	56
D8.7	Replication Toolbox for Smart Energy	WP8	5 - DTI	Report	Public	56
D8.8	Guidelines to a bold vision 2050	WP8	14 - BMGI	Report	Public	58
D8.9	Exploitation Plan 4	WP8	14 - BMGI	Report	Public	50
D9.1	Detailed scheme and report of the infrastructure tailored solution for delivering SAF in fellow and other airports	WP9	2 - ADR	Report	Public	42
D9.2	Detailed scheme and description of the organisation tailored solution for delivering SAF in fellow and other airports	WP9	2 - ADR	Report	Public	58
D9.3	Detailed report of the data and quality control tailored solution for delivering SAF in fellow and other	WP9	2 - ADR	Report	Public	58

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	airports					
D9.4	Detailed report of the local/national regulatory compliance for delivering SAF in the fellow airports, and in other airports	WP9	2 - ADR	Report	Public	54
D9.5	Detailed report on smart energy solutions transferred and tailored in fellow and other airports	WP9	2 - ADR	Report	Public	54
D10.1	Communication and Dissemination Plan	WP10	5 - DTI	Report	Public	4
D10.2	Project website	WP10	5 - DTI	Websites, patents filing, etc.	Public	6
D10.3	Project video, social media	WP10	5 - DTI	Websites, patents filing, etc.	Public	10
D10.4	IPR inventory and IPR management strategy	WP10	5 - DTI	Report	Confidential, only for members of the consortium (including the Commission Services)	5

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D10.5	Network development 1	WP10	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	30
D10.6	Network development 2	WP10	1 - CPH	Report	Confidential, only for members of the consortium (including the Commission Services)	60
D10.7	Report on final conference	WP10	1 - CPH	Report	Public	60
D10.8	CEN Workshop Agreement (CWA): Guidance Towards Implementation of SAF air airports – organization, infrastructure and management	WP10	14 - BMGI	Report	Public	58
D11.1	H - Requirement No. 1	WP11	1 - CPH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	6
D11.2	POPD - Requirement No. 2	WP11	1 - CPH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	6

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D11.3	EPQ - Requirement No. 4	WP11	1 - CPH	Ethics	Confidential, only for members of the consortium (including the Commission Services)	6

Figure 5: ALIGHT Deliverables

4.3 Exploitable deliverables of ALIGHT

Figure 6, below, lists all exploitable deliverables of ALIGHT

Deliverable (no)	Deliverable name	Brief description	Delivery date (in months)
D2.2	Guidance on sustainability criteria and best practice framework	1.**Identification** - Map out SAF production- and delivery options **2.Consolidation, -** reduced list: a. short term supply options b. short/medium supply options c. medium term options **Main elements** in 1. and 2. : Feedstock, pathway, technology, price, amounts, availability, when able to deliver, continuous production/supply, GHG reduction/neat SAF, sustainability data/whole supply chain, certification, - compare SAF products on	M60

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		available and comparable parameters. Exp adv....	
D3.2	Best practice handbook and tools for fuel logistics, quality monitoring and accounting	The handbook will equip airports and other stakeholders (i.e.: fuel suppliers, airlines, etc.) with a detailed and practical best practices and recommended guidelines for the implementation and usage of SAF downstream the value chain; from blending and delivery to the airport right up to the wing of the plane. Best practices will be defined and described for processes, methods and tools for the SAF supply and usage for the following areas: ✓ Fuel handling and logistics at the airport ✓ Safety aspects ✓ Technical quality ✓ Accounting & Reporting	M58
D3.3	Report on broader environmental benefits	This report is about analysing the benefits of SAF beyond carbon reduction . as the analysis includes effects to local air quality, non-CO_2 climate impact, fuel efficiency, and economic benefits. The analysis will be based primarily on a literature review exercise and complemented with the field performance monitoring and/or SimFuel database results.	M27
D4.3	Best practices for smart energy supply and	This deliverable relates to WP4 and will deliver best practices collected as guidelines, handbooks,	M60

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	management collected as guidelines, handbooks, case studies, business case tools	case studies and business case tools. Input will support replication effort in WP8 where toolbox dedicated to Smart Energy will be developed based on the inputs from other WPs, mainly 4 and 5, in collaboration with WP6, 7 and 9. Input will be derived from smart energy supply and roadmap, sustainable energy supply, smart charging, energy storage and smart energy management. International practices will also be derived from partners, as relevant, and used for input.	
D5.1	Best practices toolbox for Greening of Ground Equipment and Passenger Transport	This deliverable relates to WP5, task 5.2 and 5.3. It will deliver a comprehensive best practice toolbox for greening of ground equipment and passenger transport. Input will support replication effort in WP8 where toolbox dedicated to workstream B of Smart Energy and use, will be developed based on the inputs from other WPs, mainly 4 and 5, in collaboration with WP6, 7 and 9. Input will be derived from smart energy supply and roadmap, sustainable energy supply, smart charging and infrastructure, energy storage, smart energy management and use-case based investigation using anthropological methods. International practices will also be derived from partners, as relevant, and used	M54

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		for input. Indicator of success: Best practice toolbox developed and approved	
D5.2	Best practices toolbox on Airport Buildings ready for smart energy management	This deliverable relates to WP5, task 5.4. The Pilot-site demonstrate feasibility of smart and efficient energy management in several specific activities. Flexible data logging for heating, cooling and electricity will be established to a database (or datalake for unstructured data). It will also include remote control, heat capacity, EV-charge infrastructure and energy assessment of individual buildings. Input will support replication effort in WP8 where toolbox dedicated to workstream B of Smart Energy and use, will be developed based on the inputs from other WPs, mainly 4 and 5, in collaboration with WP6, 7 and 9. International practices will also be derived from partners, as relevant, and used for input. Best practice will be compiled in toolbox. Indicator of success: Best practices toolbox compiled and approved	M58
D5.3	Design manual for Aircraft Stand of the future	This deliverable relates to WP5, task 5.5 and will deliver a design manual for the aircraft stand of the future encompassing new	M58

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		aircraft design incl. suitable infrastructure and safety measures and contribute to the preparation for electrical aircraft and autonomous solutions. The 'aircraft stand of the future' will cover all relevant sustainable mobility, technical, operational, economic, environmental and societal aspects to provide input to airports of the future. This deliverable is related to workstream B and will have input derived from smart energy supply and roadmap, sustainable energy supply, smart charging and infrastructure, energy storage and smart energy management. This deliverable also require collaboration with the workstream A for optimal success of the design manual. International practices will also be derived from partners, as relevant, and used for input. Indicator of success: Design manual developed and approved	
D6.1	Guidance on procurement of SAF for EU airports	The guidance will equip airports with a detailed and practical understanding of the sustainability aspects of SAF production, from feedstock right up to production and delivery to the airport. Equipping airports with the tools to recognize and possibly incentivize the most sustainable SAF supply will help airports manage	M24

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		their risks (internal and external) and influencing SAF supply decisions.	
D6.3	GHG monitoring system	This deliverable relates to T6.3. A system to monitor GHG emissions and savings will be developed and implemented. Input to best practice will be obtained. Indicator of success: GHG monitoring system implemented.	M60
D8.2	Table of Metrics	The table of metrics is about key metrics (towards KPIs) to be used for following progress. News on this will include expected findings that can be replicable to other airports etc. Metrics for transfer, including quality control, traceability, logistics, user survey feedback, involvement of national authorities and key economic indicators will be developed based on the inputs from WPs mainly "vertical" WPs (WP2, WP3, WP4 and WP5), in collaboration with WP6, 7 and 9. This full list of metrics aims at supporting replication & Scaling-up, as well as at complementing with bold vision airport 2050 deliverables.	M50
D8.3	Recommendation for	Specific guidelines on how to	M32

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	replication	move from planning through implementation to replication and scaling-up of the successful demonstrated solutions in two different contexts will be developed: 1. Existing airports, 2. New build airports. This deliverable will be developed from WorkStream A, WorkStream B and WP6 (Sustainability) initial work towards replication, and, thus, reflects what needs to be considered for the final replication Toolboxes Deliverables (D8.6 and D8.7)	
D8.6	Replication Toolbox for SAF	Toolbox dedicated to SAF will be developed, based on the inputs from WPs, mainly "vertical" WPs 2 and 3, in collaboration with WP6, 7 and 9. In addition to the SAF handbook(s), the outcomes from the SAF related workshops will feed the dedicated Toolbox, considering especially: ✓ The state-of-the-art and reliable sustainable solutions for aircraft fueling with SAF, including procurement, relation with suppliers and other stakeholders, ✓ assessment of its impact on the airport energy system, ✓ airport planning requirements and operational processes to support large-scale roll-out, ✓ availability of storage and blending facilities, ✓ assessment of existing infrastructure and specifications for new ones. ✓ Practical recommendations relating to regulatory, legal	M56

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		and data security/protection aspects, ✓ description of effective business models, ✓ needs expressed in workshops, ✓ requirements for standardization development.	
D8.7	Replication Toolbox for Smart Energy	Toolbox dedicated to Smart Energy will be developed based on the inputs from WPs, mainly "vertical" WPs 4 and 5, in collaboration with WP6, 7 and 9. In addition to the Smart Energy handbook(s), the outcomes from the Smart Energy related workshops will feed the dedicated Toolbox, considering especially: ✓ electro-mobility (including assessment of its impact on the energy system within the boundaries of the airport), ✓ infrastructure management and planning tools capable of combining data, ✓ best practice examples, ✓ recommendations about interactions with authorities and local communities, ✓ best practice examples of energy management, performance monitoring and benchmarking, ✓ other specific needs as expressed during workshops.	M56
D8.8	Guidelines to a bold vision 2050	A strengthened cooperation with WP7 (Cooperation activities) and WP9 (fellow airports and new Warsaw airport hub), as well as with the Advisory Board and from the outcomes from the bold	M58

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		vision dedicated workshop will be ensured, in order to feed the development and organization of the guidelines. Guidelines will consider: ✓ relevant sustainable mobility, ✓ technical, operational, economic, environmental and social aspects, expected to shape airports of the future. ✓ Coherent consideration between the development of future airports and the surrounding urban/city sustainable development plans, to ensure common and complementary roadmaps, with optimization and alignment of work, infrastructures' development and costs.	
D10.2	Project website	An easy-to-use and intuitive project website has been built and launched in M6 after kickoff. The website aims to reach the target audience in the most effective way. The project website, digital newsletter and social media platform are linked together and forms the backbone of the communication gateway to stakeholders and others outside the project consortium. The website is up-dated at least every 3 months during the project and 2 years beyond with contribution from all project partners. Link to website: ALIGHT (alight-aviation.eu)	M6

Figure 6: Exploitable deliverables of ALIGHT

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5. Updated consortium exploitation plan (by M36)

The initial consortium exploitation plan, as described in the project proposal phase, has been updated by M6, then again considering the development from ALIGHT until M18. The following table represents the updated exploitation plan of the consortium by M36, corresponding to the implementation period M19-M36. Among the main changes, in addition to progresses, the project has been amended with a 12 months extension, and with AIRBUS as a new partner of ALIGHT. Consequently, dates of WPs related milestones and deliverables have been reorganized.

Partner(s)	Consortium exploitation plan (updated M36)
ALIGHT end users (CPH, ADR, LTOU, CPK)	CPH together with ADR, LTOU and CPK, are the main end users of the ALIGHT concept. Initial activities at CPH include the state-of-the-art and reliable sustainable solutions for aircraft refueling with SAF, assessment of existing infrastructure and plan for integration into operations and logistics at CPH. The outcome and subsequent work conducted in Alight, will enable CPH to further the work with sustainability and the overall decarbonization of the operations at CPH. The lessons learned from both WS-A and WS-B will be crucial going forward, especially the learnings from the delivery of SAF and the barriers an airport faces in that respect. The project will serve as a compilation of best practices to both replicate for others, but likewise to further enhance and build upon. In addition to these perspectives, the learnings generated from leading such a high-complex innovative strategic partnership will be disseminated throughout CPH to encourage and stimulate further partnerships within the same impact field of sustainability and green transition. These learnings are already being exploited internally at CPH and knowledge exchanged to various focus areas and departments. The outcomes from the Smart Energy related workshops will feed the dedicated Toolbox. This aims to give concrete tools to assess the integrated BESS and V2G chargers at CPH. With the current state of Workstream B, it became evident during the last period that it was essential to simultaneously address ongoing work and facilitate knowledge sharing alongside ongoing assessments. CPK, responsible for planning the new future airport and facilities, indicated the need to gather experiences to inform their planning process rather than waiting until the project reached its final

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	stages. Topic specific sessions were initiated, and exchange have been on-going since then, focusing on areas such as energy infrastructure, charging facility opportunities, fleet varieties and more. In addition to our existing exploitation planning, which involves delivering results to the right audience for the greatest impact, we have adopted a more proactive approach to address specific perspectives. For sure, our intention is to tailor the output to align with the needs of our organization and fellow airport partners. By discussing these topics in a bimonthly forum, we can identify any necessary corrections that need to be made moving forward. As we progress through the assessments and demonstration activities, we gain a deeper understanding of the ongoing challenges and concerns that must be addressed and considered. These findings and learnings are essential to our commitment to transparency in the output of our workstream. We aim to share this knowledge so that not only can we learn from it, but also partners who opt for similar solutions can plan to navigate potential obstacles more effectively. In October 2021 ADR, in collaboration with ENI, was the first airport in Italy to make available the SAF (Sustainable Aviation Fuel): a mixture of traditional jet with biogenic component, which is able to reduce CO2 emissions by 60-90%. The first flights operated by ITA has been refueled by SAF. The collaboration between ENI and ADR has allowed to carry 3000 tons of SAF with a ship until the port of Civitavecchia and from this to the airport of Fiumicino in March 2022, The fuel has been used for Ita flights. To decrease the amount for CO2 emissions related to vehicles, in November 2021 the first supply of approx. 5 thousand liters of HVO fuel (Hydrotreated Vegetable Oil), deriving from UCO (Used Cocked Oil) has been delivered. This fuel, with low emissions, has been used for ADR assistance (ADRA) vehicles. The use will be extended in the next few years to the other means of the group ADR not easy to electrify These experiences have highlighted the critical issues and the differences to be overcome from the regulatory point of view. ADR proceeds with the analysis of the state of the art of the airports involved and the way to make SAF available. In March 2023 the first SAF was delivered to Copenhagen airport. Air Greenland agreement with DCC Shell resulted in a continuous supply of

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	5% blend-in for all Air Greenland flights in and out of Copenhagen. The amount is equal to approximately 2-3% SAF in all Danish Domestic flights. Fuel type is HEFA produced by NESTE. WP2 and Air Greenland agreed to follow up on the agreement and further integrate the experiences into the ALIGHT project. On the subject of smart energy will share the solutions already implemented and those under study at the airports of FCO and CIA (e.g. photovoltaïc, storage, charging columns, platforms for the management of consumption). Concerning the production of the energy from a renewable plant, ADR is building the first PV plant along a Runway in Europe, and after all the authorization phases, at the time of writing, is finally building the conduit that will link the PV plant to the airport electrical net. The timeline for the conclusion of this project is 2025, when it will provide to Fiumicino Airport almost 22 MW power. The other airport managed by ADR is a smaller airport located in Ciampino, a small town near Rome. ADR is now trying to replicate the Solar Farm also in this smaller site. This project will be an example of scalability and transferring of solutions from one airport to another. Other type of FV plants that ADR has planned to build with the aim of increasing the energy autonomy and reducing the CO2 emissions are: - A second PV plant along the other runway in FCO - A PV plant along the runway in CIA - A parking shelter PV plant in the long-term parking in FCO - A floating PV plant in a lake located in FCO Concerning the development of EV chargers in FCO airport, ADR has commissioned to the University La Sapienza di Roma an analysis on the Italian electrical vehicle market penetration. This study helped ADR planning the number of charging points along the years. The project is to install 500 charging points within 2025 and going on up to 2700 charging points in 2031. Concerning the storage, ADR is designing a system of second-life batteries from the automotive sector for the storage of excess power produced by a

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	~30MW solar photovoltaic plant. The BESS will cover evening peak-demand and provide flexibility services to the grid.
Industry/for-profit partners/SMEs (BMGI, HG, BKL, SAS, AirBP, A-CE)	BMGI has identified existing standardization structures where ALIGHT outcomes could be considered for inclusion in standardization work/development. So far, technical committees from ISO, ASTM and CEN have been identified in the field of SAF, while ISO, IEC and CEN/CENELEC in the field of Smart energy airports. From these inputs, CEN CENELEC has been approached to check opportunities for ALIGHT inputs towards consideration in revision of existing standards and/or development of new ones, including Workshop Agreements (IWA and CWA). A guide for implementation of EN ISO 50001 (already referred in the EE Directive – 2012/27/EU) dedicated to airport is already considered as a good opportunity by CEN/CENELEC Sector Forum Energy Management-Energy Transition (SFEM) and CEN/CENELEC JTC14, as well as by ISO TC 268 and CEN TC 465 (Sustainable Development of Cities and Communities) for a dedicated guide to implementation of ISO 37101 (Sustainable cities and communities management system). BMGI is linking with those structures for liaising with ALIGHT then feeding them with outcomes from the ALIGHT project in due time. The main objective is to set a common reference for sustainable development and to reinforce the capacity to boost innovation to market, with direct support to replication and scaling-up. HG, BKL, SAS and AirBP will exploit KERs in a manner consistent with their business approach). Furthermore, following recommendation from its General Assembly 2022 then amendment of its Grant Agreement, ALIGHT will developed a CWA (CEN Workshop Agreement) for SAF, as a guiding document towards engaging in integrating SAF at airports (support to replication of ALIGHT outcomes and replication toolboxes). In addition, ALIGHT SAF related development and outcomes are also feeding AZEA (Alliance for Zero Emission Aviation) initiative and activities, in the context of EU decarbonization of the aviation sector. By participating to the different working group of AZEA, ALIGHT contributes to the deployment of decarbonized fuels through harmonization of guidance towards decision making, integrated planning (airport level and responsibilities), implementation, monitoring and reporting.

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	A Key exploitable result for HG is the successful validation of its Smart Energy Management System (EMS) in Copenhagen Airport. The system will be tested in close cooperation with DTI and will allow to bring the product to market, offering it as a solution for a fee to the partners in the project and new potential customers. The results stemming from the validation will demonstrate the benefits and commercial value of Hybrid Greentech's Smart Energy Management system The EMS is expected to enable airports and other similar entities to improve their ESG reporting, making the value significantly easier to capture. Furthermore, HG will exploit the findings related to the provision of ancillary services. Already early in the project a setup where ancillary services based on frequency measurements has been matured and exploitation has started with HG's commercial business. In the later parts of the project, a portfolio based ancillary services provision will be exploited through implementation in HG's and HGEI's commercial business.
RTOs (DLR, DTI)	DLR will apply the tools and learning from KER 3 and 4 to further develop SAF digital twin and smart sensors ensuring fuel quality, to support the deployment and utilization of SAF, to further identify the added values of SAF on aircraft performance and non-CO2 impacts. Portions of the tools created during the project and the amassed data will be made accessible to the public, particularly benefiting other airports seeking to enhance their Sustainable Aviation Fuels (SAF) deployment strategies. This accessibility will primarily be facilitated through interactive dashboards. DLR will explore various scenarios for the future utilization of SAF at airports, recognizing that SAF availability will remain limited for the foreseeable future. This necessitates unlocking SAF's full potential in reducing aviation's climate footprint, with a particular emphasis on strategically deploying SAF for missions with significant climate impact. DTI will apply tools, learning from KER 4 and 5 to support validation, implementation and optimization of smart energy systems, supporting data setup, battery energy storage systems, smart charging infrastructure, PV systems ex. between runways, fleet management tools etc. Portions of the tools, methods and processes created during the project and the collected data will be made accessible to other airports and stakeholders with similar challenges seeking to enhance their deployment strategies for ex.

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	smart energy system setup and management, energy storage and PV deployment, fleet management supported by PEMS real operation measurements and data based value creation in general. DTI will explore various scenarios for the future utilization of energy, mainly electricity and biofuels, in airports. As an example of new technological service DTI can now also support safety testing of BESS systems in accordance to airport demands. DTI will secure involvement with the International Energy Agency (IEA) and their technology collaboration program on Advanced Motor Fuels (AMF). The alignment with IEA/AMF will ensure that ALIGHT is updated with regards to relevant info from IEA and will as an example deal with the development in IEA/AMF Task 63 on Sustainable Aviation Fuels and the update of their fuel info page comparisons table on aviation fuels.
Universities (UNIPR, TUHH)	The universities will engage in collaborations and knowledge sharing with other universities, such as University of Southern Denmark, Technical University of Denmark and Chalmers University of Technology (Sweden). TUHH will analyze possible and currently developed methodologies for reporting and accounting of SAF in the practical context of the ALIGHT project. Therefore, the SAF supply chain will be monitored according to the methodology and the transferability of the methodology into a real application will be investigated. Therefore, a PhD position will be established to investigate the transferability of the theoretical approach into the project and thereon into a globally applicable scheme. In addition, TUHH provides support in questions and analyses related to the operational use of SAF as well as environmental and economic analyses and issues. UNIPR will exploit project results as a knowledge base for civil and mechanical engineer instruction and will activate a PhD position to investigate further development of project results and their transferability to other sectors.

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Associations/public bodies (RSB, NISA, IATA)	NISA works in ALIGHT in accordance with NISA's goal of promoting sustainability within Nordic aviation. In other contexts, NISA has participated in a number of projects that focus on sustainability issues. NISA contributes with experience and a broad network and will thereby be able to inspire concrete initiatives regarding SAF and new propellants, not least through cooperation with other knowledge institutions and actors who can help create solid development steps which are also among the objectives of ALIGHT RSB will use the project to develop standard guidance for airports and the broader aviation sector for the identification and procurement of sustainable SAF. RSB will also the project to broaden its engagement with airports globally with a view to capacitate airport companies to influence SAF procurement decisions in favor of SAF with the highest sustainability criteria, such as RSB certified SAF, and understand the impact these decisions may have on the overall sustainability performance and image of the airport. This is done by the launch of the Sustainable Airport Platform (SAP) which happened in March 2022. This platform is led by RSB and it brings together relevant industry stakeholders in an informal grouping working group to discuss and provide information and recommendations on: • The current and future role of airports in the SAF value chain • How SAF contributes to airports' own GHG reductions • The development of a protocol for SAF sustainability for airports • How to communicate SAF to airports' customers and travelers SAP has quartely meetings to discuss relevant topics for the airport and aviation industry. SAP will help RSB to gain further experience on EU airports' sustainability needs, which will inform the future development of the RSB standard and sustainability solutions. Moreover, RSB is engaged with ICAO in the development of CORSIA (providing technical advice on sustainability standards and certification systems). RSB will be able to share relevant experience gained from this project at future ICAO meetings on CORSIA implementation. IATA will use the ALIGHT project to promote SAF and smart energy to their members.

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6. Updated Individual exploitation plan (per Partner)

Besides ALIGHT vision and mission as a project, each Partner of the consortium has its own and distinct exploitation opportunities and perspective.

Indeed, many results from the projects are or will be used by the partners in their development plans and activities. The use of these results can refer to developing, creating and marketing or improving a product or process, or to creating and providing a service, as well as in standardization activities or shaping a policy. Exploitation can be commercial, societal, political, or aimed at improving public knowledge and action.

The subchapters hereafter detail these individual exploitation plans.

6.1 Copenhagen Airport A/S (CPH)

CPH has set ambitious climate goals and the first goal was met in 2019, by achieving the Airport Carbon Accreditation (ACA) level 4+, currently the highest ACA level Through CPH's Sustainability strategy the goal of achieving net-zero emission on own operations (scope 1+2) have been set. Thus, emission free ground support operations, including transport to and from the airport. In that respect all Ground Support Equipment is undergoing a yearly audit to monitor progress in the phase out of fossil fuels. CPH's 2050 goal accounts for the entire airport to be free from Climate harming emissions, as a lesson learned throughout the beginning of ALIGHT shows that also non-CO2 emissions holds a negative climate effect. Further we are actively working on sustainability more generally, beyond only emissions, such as circularity, biodiversity and local air quality among others. Understanding the scope of sustainability is as such a crucial part of our operations and our future license to continue operation. The work in Alight aids us in this regard, as the complexity and wide-reaching effects of aviation require collaboration across the entire sector.

CPH has intention of or already implemented the following initiatives to support the transition towards a more sustainable airport operation:

- Installation of solar power plants,
- Installation of electrical battery storage for solar power plant (BESS included i ALIGHT),
- Usage of CNG for vehicles (with a fraction of biogas),
- Replacement of fossil fueled vehicles by electric vehicles,
- Increased EV charging points both fast chargers and "standard" chargers,
- Planning for the V2G chargers as part of ALIGHT

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Through WS-A the work to enable and understand the area of Sustainable Aviation Fuels (SAF) is conducted, especially the supply of fuel which is a major a challenge for Copenhagen Airport, as well as most other airports operating. Primarily because to reach reaching our climate goals mitigation of conventional aircraft fuel consumption, which accounts for approximately 98 % of our emissions, is required Beyond Alight, CPH is a partner in a consortium applying for funding to establish production of electro-fuels (Power to X) based on 100% renewable energy sources, however production in a scale where it is feasible for use in aviation will most likely not happen before the end of ALIGHT. Nevertheless, all the work done in ALIGHT ensuring both availability and up handling for airport use of SAF will most certainly be valid when PtX is available.

Examples of WS-A activities:

- **SAF, grades of sustainability (WP2/WP3/WP6)**
  From a sustainability and local air quality perspective, CPH wish to attract as much SAF to the airport as possible. However, there are many different types of SAF on market, and ALIGHT will help CPH to differ between the different types, and thereby focusing on the types with maximum impact on climate impact and scope 3 emissions via maximum CO_2 reduction.

- **SAF pool (WP2)**
  As an airport, CPH is looking into incentives to present for the airlines and travelers from CPH in order to increase the total uptake of SAF. RefuelEU Aviation will set a minimum blending mandate from 2025, but to speed up improvements of local air quality, and minimize climate impact from aircrafts departing from CPH, we wish to do what we can to exceed the minimum level of SAF required.

- **Local air quality improvement (WP3)**
  The short and long term measurement campaign will create new knowledge regarding local air quality improvements as SAF availability increases. This knowledge will be used to re-visit the existing CPH local air quality program, to make sure it is up to date and relevant.

- **Smart use of SAF (WP3)**
  SAF will for many years to come be a scarce resource within aviation. Task 3.6 will define a range of different scenarios, with the common goal to use the available amount of SAF in the smartest way possible. From an airports perspective, CPH will exploit the

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results in order to have the maximum effect regarding local air quality and climate impact without compromising safety. The scenarios will answer difficult questions, and through a cost and benefit analysis help balance CO_2 as well as non-CO_2 effects up against the invest needed during implementation.

WS-B equal to WS-A serves an important role for CPH's overall sustainability goals and mitigating our scope 2 emissions, especially the maturing of a smart energy airport is a necessary part. CPH being the lighthouse airport in Alight provides the opportunity to learn from the specific tasks related to energy and the sustainability of it, both through knowledge sharing with our partners as well as through actual projects being carried out on our premises.

The activities within the scope of Workstream B offer numerous operational opportunities for an airport to enhance and optimize its standard operations, patterns, and control mechanisms. Through the introduction of new possibilities facilitated by a project of this nature, we can conduct simulations and demonstrations that can be assessed for potential implementation in daily operations.

Examples of WS-B activities:

- **Battery Energy Storage System, BESS (T4.4/T4.5)**
  The exploitation of this unique asset, coupled with the experience gained from it as the first of its kind in our airport operations, not only contributes to our effective management approach but also offers substantial added value. This experience serves as a valuable resource for addressing questions related to requirements and regulations, asset ownership, maintenance protocols, operational decision-making, control strategies, safety considerations, backup options, and various other associated aspects. Furthermore, by leveraging this knowledge, we can enhance our preparedness for future installations, ensuring that we are well-equipped to handle similar projects efficiently and effectively as well as deciding the right solutions for our infrastructure power capacity needs.

- **Upgrading sustainable energy supply (T4.2)**
  The exploitation of the work on open area PV plants holds immense potential for adding value in several critical ways. It empowers us to gain valuable insights into the challenges and opportunities associated with open area PV plants, offering the prospect of more efficient and cost-effective solutions. Collaborating with fellow airport partners undergoing similar processes promotes knowledge exchange and benchmarking, al-

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lowing us to access a wider pool of expertise and experiences, which can vary depending on the different locations involved. Moreover, this study assists us in identifying relevant stakeholders and formulating optimal guidelines for other partners embarking on renewable energy investigations. From our standpoint, we intend to leverage this knowledge to thoroughly analyze the decision-making processes required in the upcoming years to align with our strategic goals, thus maximizing the long-term value of our efforts.

- **Intelligent use and control of energy (T4.3/T5.3)**
  The exploitation of our analysis of GSE data and fleet patterns holds significant value. It enables us to pinpoint areas where diverse use cases can be deployed to intelligently manage energy consumption. Furthermore, by showcasing the opportunities presented by recent and forthcoming standardizations, we can proactively envisage the most effective solutions for microgrid management, particularly in the context of mitigating peak EV charging loads for both internal, external, and customer utilization. The predictive capabilities arising from this analysis empower us to make well-informed decisions regarding the testing of various solutions in specific areas, optimizing our energy management strategies. As we engage in these complex setups that involve equipment, components, and backend providers, we add valuable experiences that push us toward the realization of our societal sustainability objectives for future operations. These emerging possibilities not only promise to revolutionize our daily operations but also extend their impact to site owners with large energy consumption needs. Such advancements align perfectly with the broader trend of transitioning toward more sustainable practices, making this work not only technologically promising but also environmentally and economically advantageous.

- **Design criteria for the aircraft stand of the future that can supply future propellants (T5.5/WS-B activities)**
  This work entails the consideration of numerous variables to determine a suitable solution for future needs, and it offers significant exploitation value. To set the stage effectively, we must address inspirations and preparation methods in a manner that benefits partners with diverse perspectives. There are three core essentials to prepare for: 1. New aircrafts (Hybrid-electric, Electric, EVTOLs, Hydrogen), 2. Safety (new propellants, aircraft handling etc.), and 3. Infrastructure requirements. By focusing on these topics, we can, to some extent, make preparations or, at the very least, consider how our priorities should align in upcoming discussions within the organization to raise awareness

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of the future needs. Furthermore, this process not only enhances our internal preparedness but also contributes to the broader industry knowledge base. Sharing our insights and experiences with stakeholders through networking discussions is of top importance, as the assignment requires collaboration with external parties. By actively engaging with stakeholders, we not only advance our own goals but also foster a collective environment of learning and progress, thus boosting the exploitation value of our efforts.

- Creating the dashboard of the future, designed to provide an advanced overview for analysis and reporting purposes. (T5.1/T5.4)
- Climate Strategy content - contributions to the roadmap for conversion of GSE equipment towards 2030. (T5.2/T5.3)

WP6 and the sustainability of the tasks carried out in Alight aligns very well with the previous mentioned overall sustainability strategy of CPH and allows for the gaining of new relevant knowledge as well as heightening the ambitions for what sustainability should be for an airport such as CPH. The examples below showcase how the WP both work across the project as well to gather how sustainability serves as an integral part of all tasks in Alight.

Through task 6.3 *Putting in place an effective system to monitor greenhouse gas emissions and savings at airports*, CPH will be able to learn from our fellow airports as well as explore how our own monitoring of emissions aligns with the best practice, which will be established trough this task and the adhering deliverable D6.3 *GHG monitoring system.* Understanding, the monitoring tools available and the data to be monitored is a crucial learning for any airport. Airports will all have various degrees of availability for monitoring emissions from the many sources at an airport beyond emissions from actual aircraft activities e.g., energy related emissions, catchment traffic etc. Therefore, establishing a best practice will be able to enable a higher degree of reporting on such emissions as well as perhaps open up for improvements with an already established monitoring system otherwise unnoticed.

Task 6.4 *Sustainability report and general advice* will gather information and learnings from across the project and aid future airports in understanding how sustainability measures can be implemented as well as perhaps work as a measure for the highest degree of sustainability within the ability of a given actor. Both SAF and smart energy are crucial to achieve the road towards a more sustainable aviation sector, why such a report highlighting best practices will

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be a determining factor for future replication and further work within the field of sustainable aviation.

Lastly, it should be mentioned that CPH's function as lead partner in the ALIGHT project continues to generate significant learnings to CPH in terms of engagement in international innovative strategic partnerships such as ALIGHT. These learnings build the foundation for CPH's future engagement in similar initiatives and provides an in-depth understanding of the capacities and resources necessary to not only lead such initiatives but also to ensure the effective and holistic development and implementation of results and innovations.

Based on the above, CPH is committed to driving change and creating the impact necessary for a more sustainable tomorrow, and the learnings and data generated throughout our participation in the ALIGHT project will be systematically and constructively disseminated and exploited within and beyond our organization.

6.2 Aeroporti di Roma (ADR)

Climate change is a very important issue for ADR.

For this reason, ADR has recently undertaken the commitment to become Net Zero Carbon at 2030 for its emissions, also using the help of the Energy Management System updated in 2020 to the latest version of the ISO 50001:2018, which includes important management, monitoring and control tools.

In addition to the airport's emissions, ADR is committed to also reducing the emissions of the entire aviation sector, airlines and passenger access, for this has obtained the highest level of existing ACA 4+ certification, as the first European airport.

To define the road map to achieve the sustainability objectives of the all air transport sector ADR took part to the "Pact for Decarbonizing Air Transport".

The Pact has been drawn up to give a radical change to the achievement of sustainability objectives in the air transport sector in the context of SDGs and the 2030 Agenda and, in this context, the goal of Net Zero Emissions by 2050.

The Observatory will therefore gather and disseminate scientific knowledge by rationalizing resources and skills in different Italian sectors and academic realities that are an active part of the decarbonization process, with the aim of providing concrete answers to a series of questions that the sector must ask itself and which needs to be replicate in the most rigorous way

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possible, such as defining the methodological context in which to pursue "science-based" objectives, identifying the time limits for implementing the identified solutions, outlining the necessary interventions to ensure operational practicability, technological and economic within precise European and national regulatory frameworks. ADR will also use the solutions that will emerge by trying to connect them in the most efficient way to the existing reality.

ADR intends to proceed with green investments including:

- installation of large photovoltaic power plants,
- use of biomethane,
- replacement of the vehicle fleet by electric vehicles,
- use HVO in those vehicles hard to convert in electrical,
- replacement GSE with electrical or HVO ones,
- purchase of green energy from the market,
- installation of electrical and thermal storage,
- introduction of the SAF,
- involvement of all airport stakeholders,
- development of a Vertiport,
- Development of software system for the overall optimization of production systems
- the gradual decarbonization of airport access.

An important point is represented by the analysis of energy consumption. It is in the interest of ADR to try to improve what has been done so far, so we can use energy in the most intelligent way.

ADR Energy Management System is certified according to ISO 50001 since 2012, in this context, the use of smart metering, the implementation of intelligent software, that allow predictive analyses and control on consumption, is fundamental. In the last ten years we reduced the energy consumption by 52%

Another aspect on which ADR intend to invest is the creation of energy communities with the existing realities around the airport, in order to produce, store and use renewable energy with benefits for all participants.

ADR will use the results of the WSA analysis as a guide to develop higher volumes of SAF in Fiumicino airport in an efficient way.
Regarding the WSB ADR will look at all the smart energy solutions that are part of the project in particular to the BESS in order to prevent and manage eventual critical points along their development.

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6.3 Lithuanian Airports (LTOU)

Vilnius airport is constantly strengthening its commitment to climate change. Vilnius airport started its sustainability journey by adopting its Environmental policy in 2015, however more sound commitment to the principles of the sustainable development was declared by LTOU on 31 of October 2016, by signing the Airport sustainability declaration. Following the sustainability goals by UN, Lithuanian airports has distinguished the main fields, where it can have a positive impact, in three areas: Environmental, Social, Economic and legal. One of the main fields of impact in the Environmental area is CO_2 emissions management. It was emphasized in the Environmental Strategy of Lithuanian airports, adopted in the beginning of 2018. Following the principle "monitor, comply, improve", established in LTOU Environmental strategy, Airport Council International Airport Carbon Accreditation scheme is used to follow the climate neutrality pathway. Vilnius airport started at level 1 (Mapping) of the Program in 2015 and was the first airport in Eastern Europe to be certified at Level 2, Reduction in 2019, aiming to upgrade to Level 3 Optimization, by the end of 2022.

Annual and monthly accounting of our CO_2 emissions let us understand the main sources of CO2 and what direction our actions should be oriented. About 80 percent of our Scope 1 and 2 emissions are accounted to electricity use, therefore our main task is to reduce the CO2 emissions through energy efficiency and implementation of renewable energy sources and reduce overall emissions by incorporating CO2 reducing solutions in all the projects and processes of Vilnius airport.

Parallel to the implementation of solutions at Lighthouse airport, Vilnius airport (VNO) will be analyzing all of them and choose the relevant ones considering their relevance based on the importance of the specific solution, the expected positive impact, the applicability and the need for additional investment.

Vilnius airport is planning to do following:

1. Analyze current VNO aviation fuel supply system, resulting in recommendations for improvements needed for inclusion of SAF. Include the SAF related requirements into the procurement documents and contract with the potential leaser of aviation fuel base of Vilnius airport (new agreement to be signed by the end of 2021).
2. Interact with National and local authorities to prepare or improve the regulatory framework for biofuels production, supply and use in aviation; interact and advocate with authorities to strengthen support for both legal and financial needs in the field of CO_2 management and reduction.
3. Analyze ability of local biofuel production companies to produce and/or supply of SAF.

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4. Align the measures, included in current VNO Carbon management plan, with the smart energy solutions, applied in the Lighthouse airport, prioritize and implement them (electric power generators at the aircraft stands; installation of solar power units; increased number of electric car charging stations; optimization of energy consumption using BMS, LED lightning program; electric vehicles; buying of renewable energy, etc.).
5. Prepare a detailed energy audit to set a baseline for the transfer and tailoring of the selected solutions (will be concluded by the end of 2021).
6. Prepare a Stakeholders engagement plan, involving all the main parties at the airport into the process of mapping and reduction of CO_2 emissions (by the end of 2021).
7. Will prepare annual detailed Carbon footprint reports, including forecasts for different scenarios (expected impact of planned solutions and different airport development scenarios).
8. Perform a detailed analysis of ground transportation (railway, taxis, buses, private vehicles) and prepare a detailed improvement plan.

By joining the ALIGHT consortium, Vilnius airport has a strong ambition to become the first airport in Eastern Europe with infrastructure, suitable for SAF. This way, by scaling and incorporating solutions from both ALIGHT works streams A and B, Vilnius airport is aiming to become an example to the airports of similar size and geographical location.

6.4 CENTRALNY PORT KOMUNIKACYJNY (New Warsaw Airport) (CPK)

Both ALIGHT work streams A and B had significant impact on The Sustainable Development Strategy of CPK Airport and had been implemented in relevant Key Performance Indicators and Key Initiatives. The objectives of CPK are to consider sustainable solutions, through:

- Supply chain strategy and implementation of biofuels in the future CPK airport
- Planning and related infrastructure solutions (including charging and warehousing infrastructure)
- Collaboration with stakeholders to achieve CPK's sustainability commitments (to provide open access to SAF and smart energy technology)
- Incorporating sustainable electrical and thermal solutions
- Incorporating digital tools for smart energy efficiency solutions
- Regional and strategic sustainable investments

As part of its commitment to sustainability and Net Zero Carbon airport objectives, CPK has planned further works to incorporate ALIGHT sustainable strategic and design solutions into operating plans and technical design of future airport.

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6.5 Danish Technological Institute (DTI)

No IPR, nor individual concerns and specific requests/needs regarding exploitation plan.

DTI will exploit KERs and other project results in a manner consistent with our ongoing business servicing Danish and international companies and public organizations with our technological services expanding in the area of business development support based on our data infrastructure and tools in the EnergyFlexLab. DTI expects to provide other Danish and international airports as well as other customers with similar infrastructures with an increasing amount of knowledge and lab-based services within the areas of digitalization, smart energy solutions, alternative fuels, fleet optimization and emission monitoring.

Through our engagement in WS-A DTI will build onto our existing knowledge and technological services within other transport modes where alternative fuels, fuel handling, combustion technology and emissions measurements (both tailpipe and ambient air) have been in focus for decades. DTI have consequently offered our knowledge and testing equipment as backup to the setup from DLR, heading the SAF measurement campaign in ALIGHT, and will further exploit our services to other airports. DTI, directly involved in multiple IEA activities and annexes, will secure ALIGHT involvement with the International Energy Agency (IEA) and their technology collaboration program on Advanced Motor Fuels (AMF). The alignment with IEA/AMF will as an example ensure that ALIGHT is updated with regards to relevant info from IEA and will deal with the alignment between ALIGHT and the IEA/AMF Task 63 on Sustainable Aviation Fuels and the update of their fuel info page comparisons table on aviation fuels.

Through our engagement in WS-B DTI will apply tools and learnings to support validation, implementation and optimization of smart energy systems, supporting data setup, battery energy storage systems, smart charging infrastructure, PV systems ex. between runways, fleet management tools etc. Portions of the tools, methods and processes created during the project and the collected data will be made accessible to other airports and stakeholders with similar challenges seeking to enhance their deployment strategies for ex. smart energy system setup and management, energy storage and PV deployment, fleet management supported by PEMS real operation measurements and data based value creation in general. DTI will explore various scenarios for the future utilization of energy, mainly electricity and biofuels, in airports. As examples of technological service to airports and stakeholders with similar infrastructure and/or challenges DTI can offer:

- Guidance on smart energy roadmap development
- Guidance on PV deployment in airports
- Battery- and BESS specification support

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- Guidance on grid connection approval of BESS
- Safety testing of batteries and BESS systems in accordance to airport demands
- Site acceptance testing for BESS
- Smart energy management support and emulations in laboratory environment
- Support on Vehicle to Grid deployment
- Vehicle and GSE documentation of energy efficiency and emissions with ex. PEMS equipment
- Support to databased and measurement supported fleet management
- Support on databased value generation linked to smart energy setup in airports

6.6 Brændstoflageret Københavns Lufthavn I/S (BKL)

The objective for BKL in this project is to promote the use of SAF in Copenhagen Airport, and to understand how we can make the most efficient use of the limited availability of SAF in the - most likely long - transition period. By transition period, we mean the period from today with less than a 1 percent blend, to the date in the future where we achieve a 100 percent SAF based fuel.

Today SAF is simply blended with conventional fuel and distributed across the entire delivery of fuel in the airport. There are no special requirements to the operation of a SAF blend in an airport storage and hydrant operation today. Should this change, for varies reasons, BKL will contribute with practical knowledge and provide support to eventual test facilities.

6.7 Scandinavian Airlines System Denmark-Norway-Sweden (SAS)

Scandinavian Airlines has ambitious environmental sustainability targets where results from ALIGHT may contribute to expand the potential areas of improvement, accelerate the development, and potentially achieve even further emission reductions. SAS 2025 target is to reduce absolute climate affecting CO2 emissions by 25% and to buy SAF equivalent to our domestic production (on average 18% the last 5 years) by 2030 if the prerequisites are in place. The usage of SAF is one of the key activities in order for the aviation industry to achieve the anticipated journey towards net zero emissions and increased efficiency at the airports are also important improvement areas supporting the transition. Scandinavian Airlines will seek opportunities to promote ALIGHT in order to raise further awareness about the project and its purpose.

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6.8 Nordic Initiative for Sustainable Aviation (NISA)

NISA is a Nordic association working to promote and develop a more sustainable aviation industry, with a specific focus on alternative sustainable aviation fuels and the development of new propellants for the aviation sector. The goal of NISA is to accelerate the development and the commercialization of sustainable aviation fuels and electric- and hydrogen driven aircraft. This is achieved by organizing activities, initiate and participate in projects and analyses, strengthening the cooperation across the value chain and by focusing on opportunities in the Nordic region. The actors behind the membership driven initiative are the Nordic airports, Nordic airlines and their organizations, and the aviation authorities. Also, the aircraft manufacturers Airbus and Boeing are members of NISA.

6.9 International Air Transport Association (IATA)

Sustainability and the Environment are clear objectives for air transport and IATA, with SAF constituting one of the key solutions to achieve industry targets.

Through its participation in the ALIGHT project, IATA's brings advanced knowledge on the need for a 'A fit-for-purpose SAF accounting framework' to ensure a cost-effective and environmentally efficient way to incentivize the scaling-up of all technologies, feedstocks, methods, and approaches required for reducing lifecycle greenhouse gas (GHG) emissions across the SAF supply chain, and for rendering immaterial the physical matching of SAF supply and demand in any specific geographic location.

Similarly, IATA's Net Zero Tracking Methodology provides the ALIGHT project with a transparent framework for accurate reporting that can be used industry-wide for emissions tracking and measurement, including best practices for data collection and validation

IATA's participation in industry events, as well as its Europe Region blog and other media channels, will ensure the promotion of ALIGHT to raise awareness on Sustainability, the project itself, and their common goal to support airlines achieve net-zero CO_2 emissions by 2050, uniting all efforts in the mission to accelerate and maximize the production of SAF.

6.10 German Aerospace Center (DLR)

DLR will use the results from the project to further identify the added values of SAF on aircraft performance and non-CO2 impacts. The developed tools will be used to support the smart use

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of SAF aiming at minimizing aviation climate impact. The SAF digital twin and smart sensors will be further developed ensuring fuel quality along the fuel life cycle. Insights from the project will be used to contribute to the further optimization of aviation fuel specifications.

These goals will be addressed with the following approaches:

- Deliver a suite of digital tools to the ALIGHT consortium, leveraging the DLR SimFuel platform (WP3, T3.5). These tools encompass an extensive repository housing information on both traditional and alternative aviation fuels. Additionally, they include predictive models for intricate jet fuel properties and the ability to estimate emissions based on key fuel characteristics.
- Enhance and customize the DLR SimFuel platform to cater to the specific needs of industrial stakeholders engaged in airport fuel supply chains (WP3 and 2). This adaptation entails providing user-friendly access to SimFuel's data and models via tailor-made interactive dashboards.
- Develop a comprehensive set of tools tailored for the fuel supply infrastructure of future smart airports. This encompasses the creation of a digital twin for aviation fuels and the conceptualization of a hybrid sensor system for precise fuel characterization (WP3 T3.5).
- Undertake field performance monitoring campaigns at airports to gain deeper insights into the real-world impact of Sustainable Aviation Fuels (SAF) on local air quality during operational activities (WP3 T3.3).
- Contribute expertise to the SAF handbook and an extensive report addressing broader environmental advantages associated with SAF (WP 3).
- Keep the consortium updated about recent developments pertaining to SAF approval and upcoming production pathways, leveraging DLR's extensive network with SAF producers and certification authorities such as ASTM (WP 7).
- Explore various scenarios for the future utilization of SAF at airports, recognizing that SAF availability will remain limited for the foreseeable future. This necessitates unlocking SAF's full potential in reducing aviation's climate footprint, with a particular emphasis on strategically deploying SAF for missions with significant climate impact (WP3 T3.8).
- Provide a climate modeling tool capable of assessing the environmental impact of individual flight missions, considering the specific type of SAF used and its blend ratio. This tool enables the evaluation of the scenarios in terms of their potential to mitigate climate impact (WP3 T3.5).

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- Estimate the costs associated with different SAF utilization scenarios, encompassing the necessary infrastructure and operational modifications, as well as potential future expenses related to non-CO2 emissions (WP3 T3.8).
- Conduct a comprehensive cost-benefit analysis for the various SAF utilization scenarios, culminating in recommendations for optimizing SAF deployment (WP3 T3.8).
- Collaborate with other ALIGHT partners to organize workshops focusing on current SAF and smart energy developments, articulating a visionary perspective for future airports, and outlining the policy requirements essential for realizing this bold vision (WP7).

From these content-related tasks and objectives, the insights gained will be passed on as knowledge through the following approaches:

- **Accessibility of Developed Tools:** Portions of the tools created during the project and the amassed data will be made accessible to the public, particularly benefiting other airports seeking to enhance their Sustainable Aviation Fuels (SAF) deployment strategies. This accessibility will primarily be facilitated through interactive dashboards.
- **Scientific Publications:** Building upon the project's discoveries, DLR will compile a range of scientific publications. One publication, which concentrates on the concept of a digital twin for fuels, was already presented at the 2022 AIAA SciTech conference (https://doi.org/10.2514/6.2022-1294). Another article, focusing on climate impact modeling for smart SAF utilization scenarios, has been submitted for consideration at the 2023 ECATS conference (4th ECATS conference 24 – 26th October 2023 "ECATS" (ecats-network.eu)). Further publications in leading peer-reviewed journals are anticipated, centered on the outcomes of the cost-benefit analysis for SAF scenarios and the development of the hybrid sensor system concept.
- **Knowledge Sharing via Specialist Conference Lectures:** DLR will share project insights with diverse audiences through presentations and lectures at specialized conferences. These talks will utilize ALIGHT's lighthouse airport as a valuable case study to demonstrate how concepts and findings regarding SAF utilization can be practically applied. Notable appearances have already been made at events such as the 2023 Heraeus Seminar on "Sustainable Aviation Fuels - Design, Production and Climate Impact" (catering to young researchers from various SAF-related fields, (Wilhelm und Else Heraeus-Stiftung: 789. WE-Heraeus-Seminar (we-heraeus-stiftung.de)), the 2023 ECATS Summer School on "Climate Impact of Aviation" (targeting PhD students and early career researchers in aviation and climate modeling, (More&Less Autumn School 2023 «

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ECATS (ecats-network.eu)), and the 2023 CRC Aviation Meeting (attended by fuel producers and other stakeholders in the fuel supply chain, (2023 CRC Aviation Committee Meetings - Coordinating Research Council (crcao.org)).

- **Integration into Academic Lectures:** As part of their educational responsibilities, DLR's Institute of Combustion Technology at the University of Stuttgart will incorporate insights and findings from the ongoing ALIGHT research into their lectures, seminars, and curricula. These educational initiatives will be organized by the Institute of Combustion for Aerospace and Aviation Applications (IVLR), enriching the learning experiences of students.
- **Recommendations for Optimized SAF Deployment:** Drawing from the results of the cost-benefit analysis, a set of recommendations will be formulated to guide the optimal deployment of SAF at airports, with the overarching goal of reducing aviation's climate impact.
- **Integration with Other SAF-Related Research Projects:** The knowledge and discoveries generated within this project will be seamlessly integrated into other SAF-related research initiatives that DLR is actively engaged in, including projects like Horizon 2020 FlexiGreenFuels (https://doi.org/10.3030/101007130) and Horizon Europe Refolution (https://doi.org/10.3030/101096780), both focusing on the future production of SAF. The practical insights gained from the ALIGHT project will complement these efforts, contributing to a more comprehensive understanding of, and improvements to, the entire SAF fuel lifecycle.
- **Future Research Projects:** Plans are in place to build on the success of the ALIGHT project by launching future research initiatives that delve deeper into various aspects explored during the project. These forthcoming projects may place particular emphasis on the detailed development of hybrid sensor systems for jet fuels, among other research avenues.
- **Online Presence, social media, and Networking:** DLR will actively promote the project's content and findings through its customary communication and public relations activities on relevant websites and social media platforms. Leveraging its extensive and well-established network with fuel producers, the project's outcomes will also be conveyed to the production side of the SAF supply chain, fostering greater collaboration and advancements in the field.

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6.11 AirBP

Air bp is participating the ALIGHT project to demonstrate the safe, compliant, sustainable and scalable implementation of SAF at a commercial airport. It is important to demonstrate the safe operations that are compliant with existing jet fuel handling requirements. The sustainable procedures that should be followed as industry best practice and following operational procedures that are scalable to much larger quantities at more airports without introducing operational constraints on the existing fuel supply infrastructure.

bp has 20 sustainability aims, which guide towards the ambition of being a net zero company by 2050 or sooner. As part of the aims and specifically Aim 3, bp is aiming to reduce to net zero the lifecycle carbon intensity of the products that bp sells by 2050 or sooner. SAF is a key product to progress towards this aim, and Air bp has demonstrated its capability to bring this product to market in more than 20 locations across 7 countries in 2022, including enabling supply of physical synthetically manufactured jet fuel (SPK) towards the ALIGHT project for the purpose of testing local air quality for differences of fossil derived and biologically derived jet fuel.

It is also important to be embedded into industry with practical examples, to ensure visions described in this project can be embedded into practice. Air bp can count on its experience of supplying more than 700 locations worldwide with jet fuel to make sure there is a connection to the knowledge base of aviation refueling.

6.12 The Roundtable on Sustainable Biomaterials (RSB)

RSB will use the project to develop standard guidance for airports and the broader aviation sector for the identification and procurement of sustainable. This has been done in the framework of WP6, where in October 2022 RSB delivered the report D6.1 SAF Guidance for airports. This report main aim was to support the wider airport community to better understand the role they can play to support SAF development, and how SAF can in turn help meet their sustainability and decarbonization goals. The guidance starts with an assessment of the current role of airports in the SAF value chain , identifying key challenges and opportunities and showcasing best practices developed by leading airports, such as the development of research and development studies, including feedstock assessments, to identify SAF potential, the creation of SAF incentive schemes at airports, and the support of SAF production, among other actions. It also has a section about how SAF delivers significant greenhouse gas (GHG) emission reductions compared to fossil jet, and specifically how these reductions can be linked to airports' own decarbonization

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goals. Besides RSB developed different tools to be used for airports such as SAF Sustainability Toolkit for Airports and communication tool The main aim is to equip sustainability teams at airports with comprehensive, non-technical information around SAF sustainability to facilitate SAF sustainability discussions and decision-making. T which is an excel based tool that assess sustainability risks in SAF value chain using the RSB 12 Sustainability Principles and Criteria as a guidance and it also has methodologies to calculate airport GHG emissions.

SAF Guidance for airports has been disseminated in different media such as RSB website and LinkedIn. It has also been presented to stakeholders in SAP meetings and during several in person events such as SB Innovations meeting in Boston (November 2022) and RSB Ports Meeting in CPH (March 2023).

RSB will also use the project to broaden its engagement with airports globally with a view to capacitate airport companies to influence SAF procurement decisions in favor of SAF with the highest sustainability criteria, such as RSB certified SAF, and understand the impact these decisions may have on the overall sustainability performance and image of the airport. This is being done through the Sustainable Airport Platform (SAP) which was launched in 2022 in WP6 and with the project amendment approved in 2023 it was moved to WP7- Cooperation. Main actors of SAP are ALIGHT and sister project partners (TULIPS and OLGA) , airports and other relevant stakeholders from aviation sector.

The platform offers an opportunity for collaboration, engagement, and knowledge exchange among global stakeholders, and will develop a series of informative tools and guidance documents that represent current best practice and capacitate airports on SAF sustainability

It holds quarterly meetings to discuss and provide information and recommendations on relevant topics to aviation sector such as :

- The current and future role of airports in the SAF value chain
- How SAF contributes to airports' own GHG reductions
- Non CO2 effects of SAF
- Tools used to help decarbonization aviation sector

Moreover, RSB is engaged with ICAO in the development of CORSIA (providing technical advice on sustainability standards and certification systems). RSB will be able to share relevant experience gained from this project at future ICAO meetings on CORSIA implementation. Lastly, the ALIGHT project will help RSB to gain further experience on EU airports' sustainability needs, which will inform the future development of the RSB standard and sustainability solutions.

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6.13 Hybrid Greentech (HG)

Through the ALIGHT project, Hybrid Greentech will further develop and deploy its AI smart energy management system (EMS) in Copenhagen Airport. Successful deployment of the platform will allow HG to validate its smart energy management system and bring it to market as a commercial solution. During the project, the solution will be deployed for free at Copenhagen Airport and tested in close cooperation with DTI. Following the end of the project, the solution, available through HG's server, will be made available for a fee to all the partners in the project as well as to potential new clients. The EMS is expected to enable airports and other similar entities to improve their ESG reporting, making the value significantly easier to capture.

Furthermore, HG will exploit the findings related to the provision of ancillary services. Already early in the project a setup where ancillary services based on frequency measurements has been matured and exploitation has started with HG's commercial business. In the later parts of the project, a portfolio based ancillary services provision will be exploited through implementation in HG's and HGEI's commercial business.

The IP strategy is to keep innovations within HG and with trusted partners as long as possible. This will provide protection for a longer time, and at the same time keep potential patent costs low in the start-up phase. Some potentially patentable elements may result from WPs 4. It will be assessed during the project whether protection of any such elements is feasible, coupled with a freedom-to-operate analysis for HG. However, the knowledge gained during the ALIGHT project is a very important component for Hybrid Greentech and will increase the business value for its software solution. The results stemming from the validation will demonstrate the benefits and commercial value of Hybrid Greentech's Smart Energy Management system. Results from the validation will not only support sales and marketing figures but also provide accumulated results for further research within Hybrid Greentech.

6.14 BMGindroz Consulting (BMGI)

No IPR, nor individual concerns and specific requests/needs regarding exploitation plan. BMGI will feed the standardization communities, where further development will be made on a consensus basis, feeding the standardization communities in due time with inputs validated and agreed by the entire ALIGHT consortium. This includes all EU standardization activities in the framework of SAF, as well as ISO activities in the field of Sustainable cities and communities, BMGI is an active member.

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Concerning SAF, BMGI will feed CEN and CENELEC with Alight activities about development of a CWA (CEN Workshop Agreement) for SAF, as part of WP10 activities.

Concerning Smart Energy Airport, BMGI is feeding ISO Technical Committee "Sustainable Cities and Communities" (ISO TC 268) as well as the EU related Technical Committee (CEN TC 465) with outcomes from Alight, in a way to support consideration of airports as part of smart and sustainable cities strategies, and especially in a context of implementing ISO 37101 standard (EN ISO 37101 as adopted at EU level – ISO 37101 being "sustainable cities and communities management system"), with the aim to accelerate consideration of airports in the scope of smart and sustainable cities towards dissemination of Alight outcomes and replication.

Activities from Alight, will also feed the work launched in the context of the Green Deal and its fit for 55 roadmap, under the Alliance for Zero Emission Aviation (AZAE) as an important EU initiative towards decarbonization of the aviation sector. Alight being represented by several of its members (NISA, CPH, BMGI) in AZEA, as well as BMGI cooperating with CEN and CENELEC for setting appropriate standardization work in support of integrating decarbonized energy carriers for aviation at airport level.

While AZEA concentrates on electrification and Hydrogen in the aviation sector, outcomes of Alight in the framework of SAF could serve as a reference "scheme" for other energy carriers, supporting the consideration of a full value chain where issues and challenges identified by Alight for SAF remain valid for other energy carriers. Such alignment will ease holistic approach and decision making at airport level.

6.15 University of Parma (UNIPR)

University of Parma through the participation in the activities of WP4 and WP5 is increasing its knowledge on smart energy systems, with particular reference to the local production of renewable electrical energy, its storage and the optimal management of the integrated system. This complements the experience of UniPR that has been focused on smart energy in the heating sector and allows for a more holistic approach in its future activities. Moreover, UniPR participating to WP2 increased its experience about sustainable fuels, that was mainly focused on bio- and electro- gaseous fuels for heat and power generation.

This knowledge can be exploited the following areas:

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- Teaching: University of Parma can include it into the courses program for industrial and civil engineering master's degrees, instructing a new generation of engineers that can act as multipliers for ALIGHT project outcomes;
- Research: University of Parma can evaluate the applicability of the solutions developed in ALIGHT to other sectors through curiosity driven research (e.g. activating a PhD fellowship or through MSc theses) or participating to joint research projects through the exploitation of its national and international networks. For example, limiting to possible follow-up projects in the aviation sector, UniPR collaborates with Politecnico di Torino (partner of Tulips projects) in a smart cities and community project, with Malardalen University (that is participating to HECARRUS project for aircraft electrification) in smart energy and electrofuel projects and with EMPA (that is working on aviation fuel synthesis) in hydrogen methanation research. Moreover, in the large field of sustainability (WP6), UniPR is involved in the activities of "The European Universities alliance for sustainability: responsible Growth, inclusive Education and Environment" (EUGreen). These new research and projects will lead to the production of scientific papers that prolong the impact of ALIGHT outcomes;
- Technology transfer: UniPR is strongly active in this field with its Technology Hub that is a node of the Emilia-Romagna region High Technology Network. The knowledge created within the ALIGHT project can be used in commissioned research, with particular reference to smart energy in the tertiary sector (e.g. hospital, University campus). Parma is one of the cities selected for the "EU Mission: Climate-Neutral and Smart Cities" and aims to be climate neutral within 2030. The airport of the city is currently presenting its masterplan: the development of the new airport can benefit from the outcome (e.g. the Toolboxes from WP8) of the ALIGHT project by means of UniPR transfer.

6.16 Hamburg University of Technology (TUHH)

The primary task of TUHH is to analyze potential and currently developed concepts for the reporting and accounting of SAF (Chain-of-Custody concepts for SAF) within the practical context of the ALIGHT project. Additionally, TUHH offers expertise in questions and analyses related to the operational use of SAF, as well as environmental and economic analyses and issues. Through this, TUHH also contributes to tasks in other WPs (e.g., in the development of a SAF airport handbook in WP3).

The actual steps of work that are necessary or appropriate to conduct the above mentioned tasks have changed (and are still under an ongoing change) during the course of the project.

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This is because, on one hand, the industrial SAF landscape itself has evolved, and on the other hand, certain regulatory frameworks have been adjusted and implemented (e.g. ReFuelEU aviation). For instance, the discussion and development of reporting and accounting of SAF concepts for SAF have been significantly advanced at the industrial level.

To continue addressing the above task within the context of this progressing development, three primary overarching approaches are pursued.

- Firstly, contact was established with consortia that aim to discuss such reporting and accounting of SAF initially at a German level (among German industry stakeholders) and then promote a proper concept (e.g. a Book & Claim concept) at the European level in the context of ReFuelEU aviation. Through this exchange, the aim is to incorporate practical experiences into the academic development and evaluation of reporting and accounting of SAF concepts for SAF according to the aforementioned task.
- To derive and investigate the possible future development and system integration of SAF for various potential system developments, and with a holistic consideration of the many influencing factors that co-determine this development (e.g., air traffic growth, biomass availability, CO_2 compensation within CORSIA, SAF production costs, ramp-up of SAF production plants, etc.), and based on this, not only to draw conclusions about necessary actions for the scale-up of SAF but also about the design of SAF reporting and accounting concepts, TUHH has developed appropriate models (mathematical optimization models) with which such aspects can be addressed and analyzed.
- As described above, verification concepts for SAF are already being advanced at the industrial level today. Currently, so-called Book & Claim concepts are primarily pursued. While these concepts aim to address the needs and challenges of SAF verification in the short term, they have not yet been discussed in the context of the non-CO_2 effects of aviation, which will likely be essential in the long run. TUHH aims to practically evaluate the mutual conditions and aspects of SAF reporting and accounting concepts (e.g., Book & Claim) also considering non-CO2 effects. For this purpose, TUHH has started to integrate academically established models for analyzing the global effects of non-CO2 effects of aviation into its research to investigate specific interactions between the targeted use of SAF and the emergence of corresponding non-CO2 effects (e.g., contrails) in order to derive required actions for the mid and long term design of SAF reporting and accounting concepts.

From these content-related tasks and objectives, the insights gained will be passed on as knowledge through the following approaches:

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- **Scientific publications.** Based on the findings, TUHH will produce various scientific publications. One publication has already been created from the ALIGHT experiences and content (https://doi.org/10.1016/j.fuel.2022.126269), and another article has been submitted for peer review. In the further course, at least two more publications based on the above explanations will be created and published.
- **Publications in specialist books.** Similar to scientific publications, the acquired knowledge and insights will also be disseminated in the form of publications in relevant specialist books. In the area of SAF reporting and accounting concepts, a corresponding contribution has already been created and submitted for publication in a specialist book.
- **Lectures at specialist conferences.** The acquired knowledge and insights will be shared in the form of scientific lectures at relevant specialist conferences and, for example, webinar series. Research content based on ALIGHT resources has already been presented at two major conferences ((a): https://www.fuels-of-the-future.com/en/programme-overview/speakers; (b): https://tore.tuhh.de/dspace-cris-server/api/core/bitstreams/27b2308c-4dc9-436a-89a3-a1c8b06803e9/content), with more to follow.
- **Academic lectures.** As part of the teaching obligations of TUHH, insights and results of the up-to-date research conducted within the ALIGHT project will be included in lectures, seminars, and curricula organized by the involved Institute of Environmental Technology and Energy Economics (IUE).
- **Student research tasks.** By also addressing the research questions and implementing them into theses (such as bachelor and master theses), the ALIGHT project will be directly implemented in the education of mechanical, environmental, and process engineers.
- **Websites and social media.** TUHH promotes the project content and results as part of its usual communication and public relations activities on the relevant websites and social media appearances.

By developing and implementing suitable Chain-of-Custody concepts for SAF and their reporting and accounting (e.g. in environmental instruments like the EU-ETS or CORSIA) the projects results will also be implemented within the recent research activities of TUHH. By including all these stakeholders within the project, the results can also be provided back to the industry and implemented therein. With more regards to the scientific results, the exploitation is planned to be realized by planning future research projects based on the results as well as finishing a PhD thesis on the relevant topics.

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6.17 AIRBUS (A-CE)

In a consensus that SAF is the fundamental pillar of aviation decarbonization, there is a very strong pressure and a very dynamic communication around SAF by most industry actors: airlines, OEMs, fuel producers.

AIRBUS has been deeply involved in performing “100% SAF” demonstration flights.

Recognizing the very limited availability of absolute SAF volume (today less than 0.1% with projection to around 5% by 2030), the actual need for “100% SAF” capability will be limited to a marginal number of flights/routes/locations over at least a decade.

Nevertheless, AIRBUS objective is to make aircraft “100% SAF” capable by 2030 to ensure their products will not be the bottleneck limiting SAF ramp-up.

Two approaches towards “100% SAF” are envisioned: “drop-in” (=JET-A1) and “100% paraffinic”. AIRBUS is currently supporting both approaches to maximize fleet coverage, fuel availability and environmental benefits.

The ALIGHT project will highly help AIRBUS to build its best view of the key challenges and opportunities raised by each approach, and at proposing a way forward for potential “100% paraffinic” implementation on AIRBUS products.

ALIGHT project will allow to progress on the following key questions:

- What is the Jet-X impact on fuel logistics, on airport operations, and on airlines operations?
- What is the Jet-X market? (fleet penetration of capable a/c)
- What volumes of Jet-X and drop-in fuels can be expected in the long term
- Which SAF production pathways are expected, and at which cost?

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