

ALVEST



HELPING AVIATION  
BECOME  
LEANER & GREENER

# Summary

Alvest designs, manufactures, and promotes value-added solutions and products for the aviation industry, including Ground Support Equipment (GSE), spare parts and services. Alvest provides solutions to help the aviation and airports around the world become Leaner and Greener®, addressing approximately 33% of total emissions generated at airports. As a global leader in our market, our goal is not only to ensure that we adhere to the highest standards of ethics and integrity, but also to help define high standards and to show exemplarity in the way we do business. Through our People Company initiative, we aim to recognize talent, reward individual and collective performance, ensure equal opportunities based on merit, and offer everyone the opportunity to develop and achieve their potential.

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# Pathway built around innovation and sustainability



# Driving a step change in airport emissions

We recognize a shared responsibility to protect our planet and, considering the emissions generated by the aviation industry in the air and on the ground, our goal is to be a major contributor to the conversion of airport and aviation to greener operations worldwide. This is our mission, as our industry must control and reduce its impact on the environment and make a positive human and social contribution to society and the population.

We are committed to minimizing airports' environmental impact by designing, manufacturing, and providing sustainable, reliable and efficient solutions, including Ground Support Equipment, spare parts, and services. This commitment drives our Leaner & Greener® strategy.

## Key figures

**2-3%**

of global emissions are generated by the aviation industry today.

Airport emissions represent

**10 to 15%**

of aviation emissions

**4%**

of airport emissions are generated by GSE.

**55%**

of airport emissions are generated during the aircraft landing and take-off (LTO) cycle.

**52%**

of these emissions are generated by on-the-ground taxiing operations and aircraft auxiliary power units (APU) for which our solutions are substitutes and allow our customers to avoid emissions that they would otherwise have generated.

Key figures in a nutshell

**230**

engineers

**300+**

active engineering  
projects

**€20m+**

spent in engineering  
in 2023

+ 45% vs 2022

**c. 50%**

eGSE represented  
of our equipment sales  
in volume in 2023

Low carbon products  
& solutions accounted for

**c. 30%**

of Group revenues  
in 2023

# Transforming Aviation with Innovative Green Solutions

As a signatory of the UN Global Compact and committed to following the path set by the UN Sustainable Development Goals, we aim to play a decisive role in the sector's environmental transition by providing solutions that reduce the aviation industry's environmental footprint.

Our solutions address 52% of aircraft emissions generated at airports and approximately 33% of total airport emissions<sup>(1)</sup>, demonstrating our commitment to being a key player in the decarbonization of the industry.

<sup>(1)</sup> Ardian study published November 2022: The Fight for Net Zero Aviation



We are continuously investing in R&D, engineering and customer support to further strengthen our commitment to ESG and develop our sustainable solutions.

We have developed a full range of electric equipment, and the share of electric GSE has increased dramatically in recent years, from around 15% five years ago to 50% in 2023 and more than 60% today, making TLD a global leader in electric GSE. By the end of 2025, we will no longer offer internal combustion engine GSE for commercial use. Equally important, we have developed solutions and technologies that enable our customers to massively reduce aircraft emissions on the ground.

The development of our service activities, which extend the life of equipment and enable the conversion of internal combustion engine equipment to electric equipment will also accelerate the achievement of our goal and supports our long-term vision.”



**Antoine Maguin**  
ALVEST  
President & CEO



**Valentin Schmitt**  
ALVEST  
Deputy CEO & COO  
TLD Group Chairman



**Laurent Jamet**  
ALVEST  
Deputy CEO & CFO



**Erwan Jalil**  
TLD Group  
CEO



**Fabrice Denninger**  
Alvest Equipment Services  
CEO



**Maxime Mahieu**  
Smart Airport Systems  
CEO

## THE MOST COMPREHENSIVE AND EFFICIENT

### EGSE PRODUCT RANGE

#### > To help reduce greenhouse gas emissions and combat climate change,

we have decided to promote the switch from internal combustion engine equipment to electric equipment.

The modular design of our battery packs (TLD iBS) allows for enhanced battery life management with the ability to use the same pack on different units as power requirements vary. This technology enables customers to reuse second-hand batteries for less demanding and less energy-intensive applications. While allowing our customers to fully control their power source usage, this concept reduces costs and extends the life of their batteries.



#### > In order to measure and improve the carbon footprint

of our products and implement actions to reduce their environmental impact, we have established a structured and robust approach to evaluate both the upstream (CO<sub>2</sub>e emissions of assembled products) and downstream (CO<sub>2</sub>e emissions during operation) carbon footprint of our products.

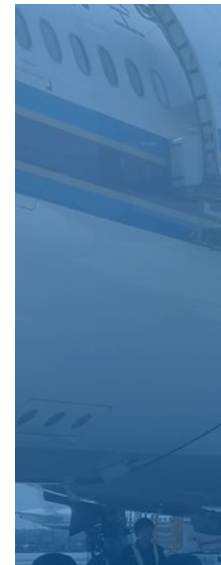
**The current product mix sold by TLD and the shift to electrification enable a significant reduction of Scope 3<sup>(1)</sup> emissions.** In 2023, our eGSE enable our customers to reduce their CO<sub>2</sub>e emissions by c. 272.000 tons compared to an equivalent internal combustion engine GSE. This corresponds to the emission of c. 190.000 cars (annual CO<sub>2</sub> emissions). For example, each TLD electric NBL on the ground avoids generating 119 tons<sup>(2)</sup> of CO<sub>2</sub>e over its entire lifecycle compared to a diesel NBL.



#### > In addition, and to facilitate the shift from internal combustion engine GSE to eGSE,

we plan to stop producing internal combustion engine GSE by the end of 2025 and have launched hybrid solutions which consist of a full electric driveline combined with flexible power sources (diesel, electric, hybrid, or hydrogen).

Such solutions allow customers to buy future-ready electric equipment now, using them hybrid until charging infrastructure is available, then easily convert it into full-electric by swapping the small generator for a battery pack. This solution will help decoupling the purchase of equipment from the infrastructure evolution.



<sup>(1)</sup> Scope 3 emissions are all indirect emissions that occur in the value chain, including both upstream and downstream emissions.

<sup>(2)</sup> Based on 12-year lifetime and 1,000 hours of use per year.

## UNIQUE SOLUTIONS TO MAKE AVIATION

### LEANER AND GREENER

Alvest, through its Smart Airport Systems (SAS) division, provides solutions to make aviation leaner and greener.

Our three solutions, certified by Solar Impulse, demonstrate our technological innovation and their economic viability, which is key to ensuring sustainable solutions:

#### > First, our Combo units

(combining Ground Power Units and Air Conditioning units) provide aircraft with electrical power and air conditioning to limit APU usage on the ground to a minimum (APU OFF).

#### > Second, our TaxiBot

aims to reduce emissions from jet engines during aircraft taxiing. TaxiBot is a semi-robotic hybrid towing vehicle designed to taxi aircraft on the ground, from the gate to the runway (and vice-versa) without using jet engine power. It is the only certified sustainable taxiing technology on the market.

**Learn more :** <https://taxibot-international.com/concept/>

#### > Finally, EZ-Tow®

a fully autonomous tow tractor with true level-4 (the most advanced level of autonomy) operations worldwide. It enables significant increases in productivity, efficiency, and safety.

### > 3 certified solutions

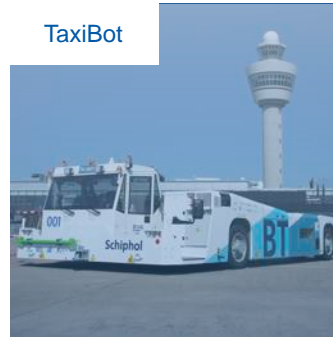


APU OFF



- APU emissions on the ground represent around 15% of aircraft emissions and 8% of airport emissions.
- Our APU OFF solution eliminates the emissions of the APU and also reduces noise pollution since these substitute units are significantly quieter than APUs.
- In 2023 our customers avoided releasing over 350.000 tons of CO<sub>2</sub>e into the atmosphere by using our Combo units.

TaxiBot



- Aircraft taxing emissions represent around 37% of aircraft emissions during landing and takeoff (LTO) and around 20% of airport emissions.
- On average, airplanes consume about 10 to 20 kg of jet fuel per minute during taxiing. By eliminating this need, TaxiBot directly contributes to a reduction in CO<sub>2</sub> emissions.
- By optimizing routes and reducing taxi times, TaxiBot can save several thousand tons of fuel per year for a large airport. 1 Narrow Body TaxiBot® in operation every day keeps 1.875 car's CO<sub>2</sub> away per year or 2.700 tons of CO<sub>2</sub>e.

EZ-Tow



- EZ-Tow, an autonomous electric tractor, replaces traditional towing vehicles that often run on diesel or gasoline, thereby eliminating the CO<sub>2</sub> emissions associated with these vehicles.



## ADVANCED SAFETY

### AND DRIVER ASSISTANCE SYSTEMS

#### > Customer safety and protection,

as well as ergonomic operation of all TLD products has always been a focus of TLD's product development activities... ASD+ system is an Aircraft Safe Docking assistance system that detects the position of the aircraft door, closed or opened, and steers the GSE on an optimal trajectory to dock with the door on its first attempt. It eliminates the need for additional maneuvering in the crowded aircraft service area. All ground support equipment used for the management of this turn-around were 100% electrically powered.

#### > Another key element of the Alvest Leaner & Greener Strategy

is Alvest Equipment Services (AES), whose activities include:

- Conversion of internal combustion engine GSE to eGSE,
- GSE maintenance and overhaul services to extend product life, reduce TCO (Total Cost of Ownership) and maximize the availability of the equipment,
- Fleet management and wear & tear control through dedicated FMS software and real time consumption data analysis.

#### > AES Management of products lifecycle



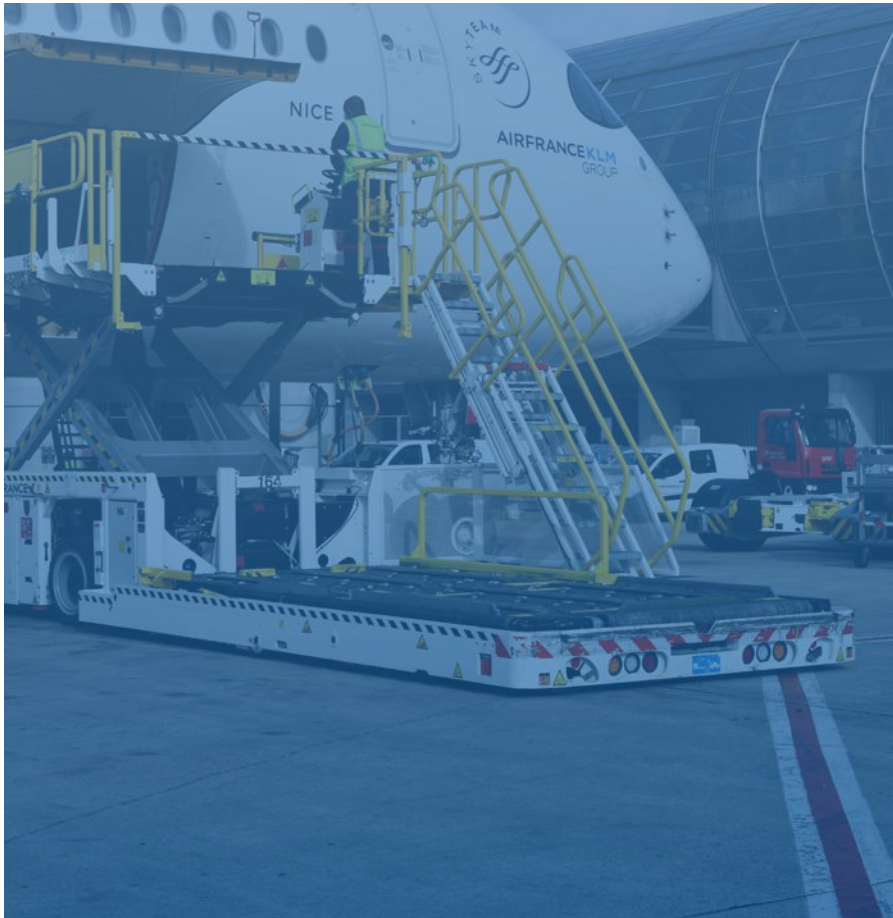
**ALVEST positively impacts the lifecycle of a GSE from design to disposal**

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# Producing responsibly for a sustainable future



In addition to the green solutions we provide to our customers, we also take a variety of actions to reduce our own environmental footprint in our operations. All these actions, together with the benefits we offer our customers as explained above, enable us to position ourselves as a key responsible player committed to the greening of the aviation industry.



# All our TLD plants are ISO 14001 certified

To standardize our environmental management practices in our factories across 3 continents, all of our 10 manufacturing facilities are certified to ISO 14001 standards. Our integrated management system (IMS) consolidates our environmental and quality management systems to strengthen our continuous improvement process and facilitate monitoring and audits. Even if our manufacturing and assembly processes consume very little quantities of energy, we strive to ensure the maximum efficiency of all our processes to minimize our environmental footprint.

## > Ensuring effective waste management to protect our environment

To prevent potential soil contamination, all manufacturing facilities store fluids in retention tanks to prevent leakage. Black and grey water piping and rainwater systems are regularly tested to meet local requirements. Rainwater and wash water exposed to contamination are collected and cleaned through an oil-grease/water separator.

# Monitor and reduce greenhouse gas emissions

To decarbonize our activities and combat global warming, we measure our direct and indirect greenhouse gas (GHG) emissions resulting from our activities since 2021.

**Scope 1 emissions** are “direct GHG emissions” occurring from sources owned or controlled by the company,

**Scope 2 emissions** are “indirect GHG emissions” from the generation of purchased electricity.

Metric	Unit of Measure	Manufacturing	Other <sup>(1)</sup>	Total
Scope 1 GHG emissions	tCO <sub>2</sub> e	1 905	621	2 526
Scope 2 GHG emissions	tCO <sub>2</sub> e	1 060	380	1 440



## > Leading the green transition to reduce energy consumption

To reduce our energy consumption and environmental footprint, TLD is leading the green transition on its own premises, worldwide.

For example, energy from testing is recycled to regulate the temperature in the assembly hall, starting with our factory located in Belgium. Renewable energy systems are also being implemented, such as the 6,000 m<sup>2</sup> of solar panels at the Wuxi site in China.

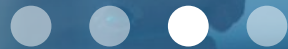


**The installation of solar panels at the Wuxi factory has led to a reduction of the SCOPE 2 emissions by 163 tons of CO<sub>2</sub>e, i.e. 40% of reduction.**

<sup>(1)</sup> Includes sites that conduct Research & Development, Sales, Service, Administration and other mixed-used facilities.

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# Placing people at the heart of our business



Conducting all aspects of Alvest business with the highest standards of ethics and integrity is essential to our mission of improving the quality of life for our employees. This business integrity, fueled by strong values and our social responsibility, is critical to our success and helps us achieve this mission by paying particular attention to people. We extend this responsibility to our entire supply chain by assessing our partners' social responsibility through dedicated supplier onboarding, sharing our values, and auditing their practices.

Since joining the United Nations Global Compact in 2020, the Group has committed to respecting and promoting its ten principles as well as the Universal Declaration of Human Rights. ALVEST is committed to ensuring that respect for human rights is a determining factor in the selection of its suppliers and has implemented a due diligence plan regarding respect for human rights in accordance with the recommendations of the OECD.

At the heart of our concerns is the creation of conditions conducive to the professional fulfillment and development of each one of our company's talents. We make every effort to develop an inclusive work environment that respects diversity and gender equality.

# Alvest

## “The People Company”

“ Alvest gathers passionate and engaged people with an entrepreneurial spirit. It is this spirit that motivates our employees, that ensures the Company is continuously innovating, developing pioneering technology to serve our customers around the world, as we adapt with agility to the ever-changing environment in which we operate. And we recognize that that fun is part of the journey and a key contributor to the engagement of our employees.”



**Yves Crespel,**  
Group Talent Director  
& Group Communication Director

Convinced that people are our most important assets for achieving success, we have developed a multi-faceted approach to grow talents and competencies to make Alvest companies a very attractive place to work.

The People Company is structured around six pillars:

- > Entrepreneurial spirit
- > Diversity
- > Talent development
- > Career management
- > Work-life balance
- > Having fun!

Hence, “the People Company” project draws on all the best people initiatives throughout the group to offer an employee experience based on a well-defined work-life balance. It prepares for the future with new working methods and provides space to express individual and collective talents. The goal is to foster sharing, agility, and cross-functionality.



**29%**

increase in total workforce  
(2022-2023)

**447**

women in 2023, representing  
17% of the workforce

**11%**

increase in the number of  
women recruited (2022-23)

**18.2**

lost time accident frequency  
rate and 0.88 lost time  
accident severity rate in 2023

# Developing and empowering human capital

Alvest aims to offer the best opportunities for development and employability to all its employees. The talent development and management programs at each level of the organization encourage initiative and creativity and reward performance based on results.

From the moment of recruitment, Alvest encourages its employees to develop a career plan, explore new professional horizons, and take on new responsibilities as the company grows and evolves its portfolio of activities. This approach provides multiple opportunities across the variety of professions.

## DEVELOPING TALENTS

### THROUGH TRAINING

To enhance the learning of all our employees, Alvest has invested in a web-based training platform to develop its own training portal called AGILE (Alvest General Information and Learning Experience). This action reflects the Group's commitment to facilitating the acquisition of new skills that will be valuable in the personal careers of its employees.

**15 hours**

**of training provided to each  
employee (2023)**

## DIVERSITY

Diversity is a core value embedded in our business across multicultural, intellectual, and gender dimensions. Indeed, our presence in multiple countries fosters multinationalism and multiculturalism within our teams. Similarly, the diversity of our employees' profiles provides a wide range of skills dedicated to our activities.

ALVEST has adopted for the past years a more active policy to promote gender diversity and professional equality between men and women. To foster diversity and improve the attraction and retention of women employees, in 2020, Alvest launched a Women's Network within the Group, to build bridges and support women in the workplace. It provides opportunities for professional growth, mentoring, knowledge sharing, personal development and training.



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# Commitment to ethical governance and conduct in business



We integrate the principles of respect for the environment and societal issues into our corporate governance, both through our dedicated committees and our actions in the areas of ethics, compliance and sustainability:

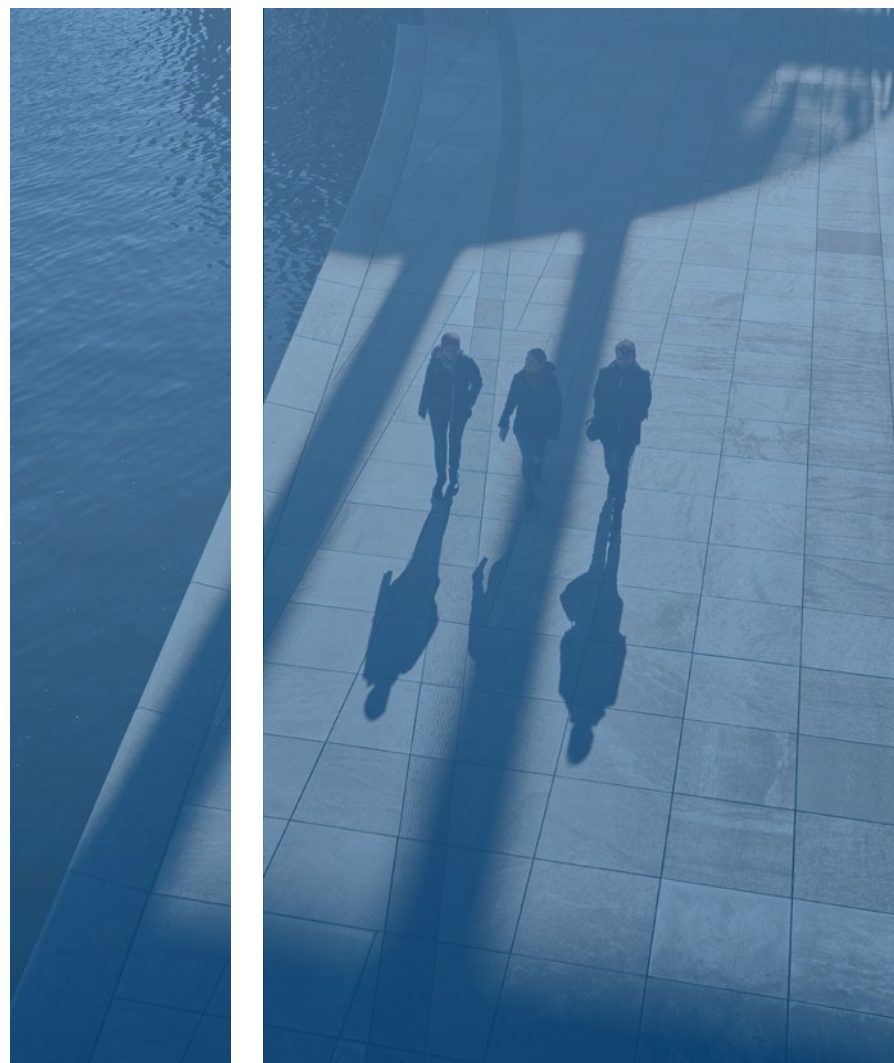
- › First, each **Alvest Group Steering Committee** member is in charge of promoting the Group culture and values, and conveying the priorities and messages defined by the Group.
- › Secondly, **Alvest Group Executive Committee** communicates, explains and deploys the Group culture and values among teams.
- › Thirdly, the **Alvest Group Ethics Committee** determines our Code of Ethics and Business Conduct and our policies regarding ethics & compliance.

Ethically, as a world leader in our market, we ensure that we, our companies, our procedures, our employees and our spirit are meeting effectively applicable laws and regulations. Additionally, we contribute to set high standards to show exemplarity in the way we conduct business.

#### **ALVEST Anti-Corruption Compliance**

promotes full compliance with ethical rules. It:


- › provides guidance to each employee and third parties for their conduct and operates its business under zero tolerance for corruption and bribery.
- › is structured so as to ensure that all Group employees own a real ethical culture.



## Towards continuous improvement of our sustainability approach

The Board prioritizes ESG stakes as key issues and actively works on them for continuous improvement, which is at the heart of our sustainability commitments. It is essential to our success and our performance. We're committed to reducing the environmental footprint of the aviation industry through our products and services. We prioritize environmental and societal principles in our governance. Our committees promote ethical culture, values, and conduct.

Our sustainability commitments are both collective and individual, to be taken into consideration in all operational decisions. We encourage participation at every level across the organization, and we work with stakeholders to advocate on behalf of the global workforce, improve our workplaces, contribute to the communities we serve, and ensure that our actions are socially, ethically, and environmentally responsible.

VISIT OUR CORPORATE SOCIAL RESPONSIBILITY (CSR) PAGE  
TO DISCOVER MORE ON OUR SUSTAINABLE  
COMMITMENTS AND VALUES! 



ALVEST

[alvest.fr](http://alvest.fr)