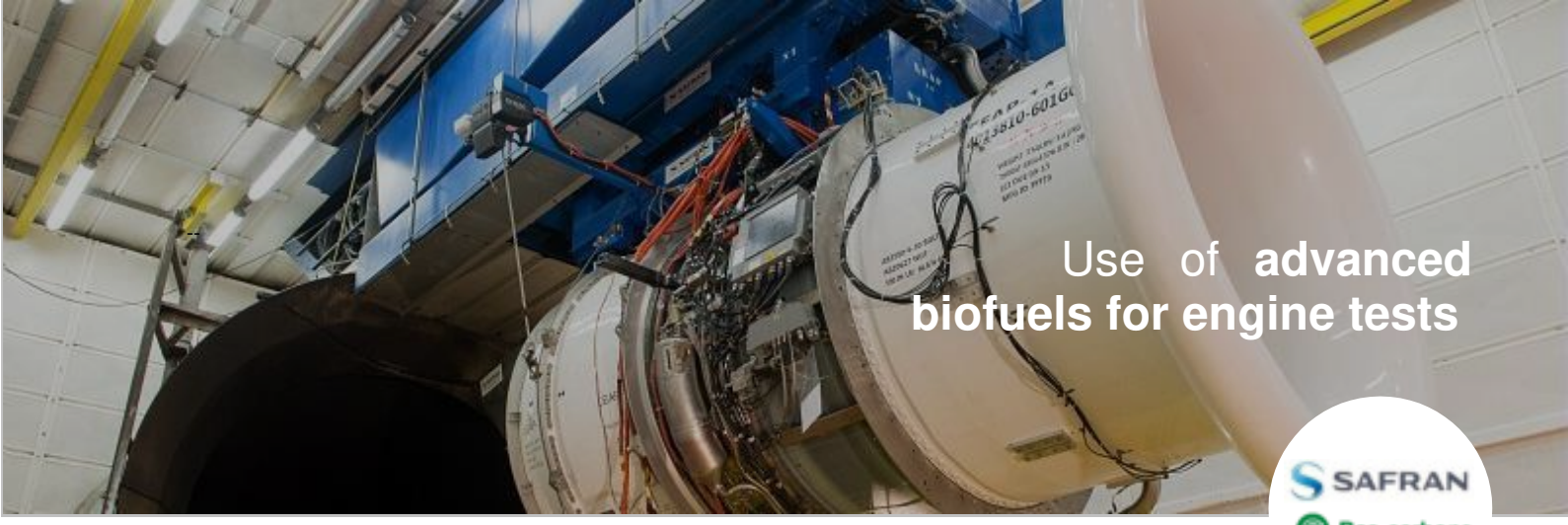

Use of **advanced biofuels for engine tests**

In order to reduce its greenhouse gas emissions and support the emerging sustainable aviation fuel sector, Safran decided to incorporate advanced biofuels into the kerosene used on aircraft and helicopter engine test benches in France. 10% of the kerosene will thereby be replaced by the end of 2021 and at least 35% by 2025.

Starting date of the project	2021
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	Project implemented on the Group's main engine test sites, which account for around 80% of Safran's kerosene consumption: Villaroche (Seine et Marne), Bordes (Pyrénées Altantiques) and Tarnos (Landes).
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	To reduce the greenhouse gas emissions generated by the burning of kerosene during engine test phases on Safran's main sites where civil-aircraft or helicopter engines are manufactured and tested. The project also supports demand for the emerging sustainable aviation fuel sector.
Detailed project description	A part of Safran's industrial activity consists of manufacturing aircraft and helicopter engines. To ensure that the engines are reliable and to guarantee passenger safety, they go through a number of test phases: in addition to tests for development or certification activities, all of the engines manufactured by Safran are tested as they come off the production line. In 2019, the Group used for this purpose 18 million liters of kerosene, around 80% of which was used on three sites: Villaroche (Safran Aircraft Engines), Bordes and Tarnos (Safran Helicopter Engines). This represents around 14,000 tons of kerosene, namely, 45,500 tons of CO_2 and around 2% of the air traffic emissions of mainland France. The project in question consists of incorporating a share of sustainable fuel into the fuel used for the engine tests. Like all engines that are in service, the engines currently manufactured by Safran can be used with a blend of sustainable fuel (50%) and kerosene (50%). However, this sustainable fuel is hardly used by today's air transport industry primarily for economic reasons and due to the absence of an incentive-based regulatory framework. Advanced biofuels constitute the only sector currently available. Consequently, Safran has retained, at this stage, biofuels made from used oil, which represent a greenhouse-gas saving of around 80% compared to an equivalent fossil fuel. Other industries that offer even greater greenhouse gas reductions, such as synthetic fuel, will develop in the future. Safran decided that sustainable fuel would make up 10% of the fuel used in its engine tests before the end of 2021, and at least 35% by 2025.
Main project's drivers for reducing the greenhouse gas emissions	

Reduction levers	**Details on the aspects of the project**
☐ Energy and resource efficiency (including behaviour)	
☒ Energy Decarbonisation	The replacement of kerosene with advanced biofuels to make up 10% of the volume of fuel by the end of 2021 and over 35% by 2025 will reduce greenhouse gas emissions: advanced biofuels, made with used oil, reduce emissions by around 80% over their life cycle in comparison with kerosene.
☐ Energy efficiency improvements	
☐ Improving efficiency in non-energy resources	

☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)	
☐ Financing low-carbon producers or disinvestment from carbon assets	
☐ Reduction of other greenhouse gases emission	

Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope

	Aspects of the project contributing to the reduction of emissions by emission category	**Quantification of associated GHG emissions by emission category** *Please follow the quantification methodology used in the Afep guidelines.*
Reduction of the company's carbon dependency		
Scope 1 *Direct emissions generated by the company's activity.*		-3,000 tCO_2 in 2022 -12,700 tCO_2 in 2025
Scope 2 *Indirect emissions associated with the company's electricity and heat consumption.*		
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*		
Increase of carbon sinks		
Emissions Absorption *Carbon sinks creation, (BECCS, CCU/S, …)*		
GHG emissions avoided by the company at third parties		
Avoided Emissions *Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.*		

Clarification on the calculation or other remarks:
The reduction of emissions corresponds to an incorporation rate of 10% over a full year, for the level of activity envisaged for 2022, and a rate of 35% for 2025. The calculation is based on the following assumptions:

- Emission factor of 3.06 $kgCO_2e/L$ for kerosene, taken from the official value of 89 gCO_2/MJ used in the CORSIA mechanism, which includes the complete emissions associated with the use of kerosene (including those generated during kerosene production);
- Greenhouse gas emission reduction factor of 80% in comparison with kerosene.

Modality of verification of the quantification.

Calculation standard used (ADEME base, GHG protocol, etc.): CORSIA mechanism

Verification of the calculation (internal or external): Internal verification

Other environmental and social benefits of the project

By reducing the greenhouse gas emissions generated by the burning of kerosene during engine tests and by favoring the emergence of innovative low-carbon fuel industrial sectors, the project contributes to SDG 9 Industry, Innovation and Infrastructure, and to SDG 12 Responsible consumption and production.

Project maturity level

☐ Prototype laboratory test (TRL 7)
☐ Real life testing (TRL 7-8)
☐ Pre-commercial prototype (TRL 9)
☐ Small-scale implementation
☐ Medium to large scale implementation

Remarks: The project will be implemented in 2021

Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	The project can be reproduced with the same climate-related gains. However, what is most important is the use of sustainable fuel for air transport itself, rather than for tests performed by engine manufacturers. Aside from the reduction in CO_2 that will be braought about by the project directly, this project will enable the engine manufacturer to make progress in mastering the use of this type of fuel (infrastructure, blends, etc.) and carry out research experiments (surpassing of the certified blend limit currently at 50%), all of which will contribute to meeting the 100% sustainable-fuel target necessary to decarbonize the aviation industry by 2050.
Amount of investment made (in €)	No investment. The project has recurrent additional operating costs associated with the purchase of sustainable fuel, whose price is around four to five times that of kerosene, given the emerging nature of the sector.
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☐ LT (> 10 years) **Remarks:** The project is not financially profitable insofar as sustainable fuel is more expensive than kerosene and there is no regulation that imposes the incorporation of sustainable fuel to the extent or within the time frame set by Safran.
Engaged partnerships	The project will be implemented under a contract with a sustainable-fuel supplier, which has not yet been selected.
Open comments from the project owner	/
More about the project	
Contact the company carrying the project	Thibaud.normand@safrangroup.com
Project URL links	/
Illustrations of the project