

THE FRENCH E-FUELS OFFICE ESTIMATES THAT 3% OF NATIONAL ELECTRICITY WOULD ALLOW NEW SECTORS FOR MARITIME AND AIR TRANSPORT DECARBONATION TO BE LAUNCHED

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Sia Partners presents its International e-fuels Observatory, carried out on behalf of the French e-fuels office. It offers an overview of the e-fuels sector around the world.

Created in July 2023, the French e-fuels Office brings together experts, researchers, project developers, manufacturers, consumers and financiers, to promote e-fuels uses in the most difficult sectors to decarbonize, such as air and maritime transport, and uphold the emergence of a French industry.

The French e-fuels Bureau has expanded significantly in recent months, notably welcoming Bruno James from Airbus, Farid Trad from CMA-CGM, Florence Delprat-Jannaud from IFPen, Jean-Philippe Buisson from EDF, Bernard Hoffait from TotalEnergies, Hind Lammari from Téréga Solutions. To date, the French e-fuels Bureau has nearly a hundred members, with two spokespersons: Charlotte de Lorgeril, from Sia Partners, and Cédric de Saint-Jouan, president of the Vol-V group.

E-fuels are emerging all over the world and outlining a new global energy trade

The *International Observatory of e-fuels* produced by Sia Partners on behalf of the French e-fuels Office offers an overview of the dynamics of the e-fuels sector all over the world and focuses on the context and industrial issues for some of the most mature countries in Europe and North America: Denmark, Sweden, Spain, Canada and the United States. In these countries, the first projects are reaching the crucial stage of financing and construction, which gives them a significant industrial lead.

The global dynamic of the e-fuels sectors appears exceptional: more than 500 e-fuels production projects of varied sizes have been identified worldwide by the International Energy Agency, on all continents.

The *International Observatory of e-fuels* provides a detailed analysis of 77 large-scale projects worldwide, with a capacity equivalent or greater than 200,000 tonnes of oil equivalent (toe) per year.

The largest project identified in the world to date is being carried out by the German project developer Svevind energy group in Kazakhstan. Currently in the engineering study and preliminary design phase, it could ultimately represent a volume of 11 million tonnes of ammonia (4 600 ktoe) per year, or almost fifteen times the annual imports of ammonia in France.

These large projects are mainly located in areas with high potential for low-cost renewable electricity production, or areas with few land issues and local acceptability of large industrial projects, particularly in Chile, North Africa, the Middle East, the United States, Canada and Australia.

85% of these projects concern the production of e-ammonia, currently considered as a means of transportation for hydrogen, and whose main market is the production of nitrogen fertilizer. This ammonia could also eventually be used as an alternative marine fuel, once the issues, particularly safety, have been resolved. These projects are mostly aimed at export. Only 19 of them are located in major consuming countries, in North America, Europe and Australia.

The remaining 15% of these large-scale projects aim to produce e-methanol or e-kerosene molecules, which are used for the decarbonization of industries and as maritime or aviation fuel. These projects, unlike e-ammonia projects, are more limited in size because they require significant quantities of carbon, of which concentrated and qualified sources are restricted. Their location is therefore more constrained, and they are located, for the most part, in future major consuming areas, in Europe and North America. Furthermore, strong demand for maritime and aviation should reinforce a shortage effect in the short term.

France on the starting line

With a total of 7 e-methanol and sustainable aviation fuel projects in development on an industrial scale, identified in July 2023, France is showing its dynamism.

According to the *Roadmap towards the production of e-fuel* published in October 2023 by the French Academy of Technologies, “due to its carbon-free electricity mix, France is one of the rare countries to be able to consider rapid deployment on its territory of an industrial sector for the production of synthetic fuels”.

In addition to a large quantity of low-carbon nuclear electricity available throughout the year, France has industrial and port platforms with engineering ecosystems, and a strong presence in the aeronautics and maritime sectors.

It also has leading players across the entire value chain: end customers for these molecules such as Air France-KLM or CMA-CGM, world leaders in energy with TotalEnergies, EDF or Engie, manufacturers, including IFPen, Air Liquide or Technip Energies, specialized developers like Hy2Gen, Qair or Elyse Energy, and finally financiers, banks and infrastructure funds.

France therefore has all the necessary assets to enable the e-fuels sector to take off.

Backing the emergence of a national sector means both strengthening its industrial players and improving its energy independence.

While the National Hydrogen Council must soon ratify the revision of the national strategy for the deployment of carbon-free hydrogen, the French e-fuels Office welcomes the recognition of e-fuels as a major axis for decarbonization.

The French e-fuels Office believes that the role of the government is fundamental and mainly revolves around 2 axes linked to electricity supply:

- During a first period extending from 2025 to 2035, encourage the use of a share of the electricity production for hydrogen production in general, and e-fuels in particular. We estimate a need for 14 TWh, or 3% of national electricity production, at competitive rates, to bring about the first e-fuel projects and constitute a national center of expertise.
- Plan today the development of additional electricity production capacities, nuclear and renewable, to facilitate the deployment of these projects on a large scale after 2035. This involves being able to meet European objectives to incorporate e-fuels in the aviation and maritime sectors. The ReFuelEU Aviation initiative mandates the aviation fuels suppliers to integrate 35% of e-fuels in their offers by 2050.

State support must also be provided by simplifying administrative procedures for obtaining authorizations. Finally, the French e-fuels Office advocates for supporting the industrialization of existing technologies and preparing for the longer term with promising innovations such as high-temperature electrolysis.

LIST OF THE MAIN MEMBERS OF THE FRENCH E-FUELS BUREAU:

- Rafik Ammar, Manager of Government relations and EU Affairs at the Methanol Institute
- Olivier Astruc, Director BU H2, Qair
- Frédéric Balligand, Vice-President of Renewable Product Line, Axens
- Jean-Philippe Buisson, CCU Project Director, EDF
- Geoffroy Cagnet, Head of e-fuel projects, Bouygues Energies & Services
- Benoît Decourt, Co-founder and partner, Elyse Energy
- Florence Delprat-Jannaud, Director of the Energy Products Results Center, IFP Energies nouvelles
- Paul-Joël Derian, Vice-President Innovation and Sustainable Development, Avril Group, Member of the Academy of Technologies
- Cyril Dufau-Sansot, CEO, Hy2Gen
- Pierre-Etienne Franc, CEO, Hy24
- Christian Gauthier, Transformation & Sustainability EVP, Air France
- Gaylord Goulet, Director of Engineering Division, NEO2
- Bernard Hoffait, Director of Institutional Relations, TotalEnergies
- Daniel Iracane, Member of the Academy of Technologies
- Bruno James, Head of new energy business development, Airbus
- Oumar Khan, H2/e-NG Senior Process Engineer, TotalEnergies
- Hind Lammari, Director of the Hydrogen Business Unit, Teréga Solutions
- Raphaël Lance, Director of energy transition funds, Mirova
- Charlotte de Lorgeril, Partner Energy, Utilities & Environment, Sia Partners
- Jonathan Madec, Chief Technical Officer Motul
- Emeric Marin, Managing Director K9, evolves energies
- Amine Masnaoui, Business Development Manager, Yamna
- Olivier Nizou, co-founder and president of Hexana
- Arthur Parenty, Public Affairs Manager, Hynamics
- Romain Provost, General Delegate for Energy Transition, Evolen
- Cédric de Saint-Jouan, President of the Vol-V group
- Emeric Sarron, CTO of CRI and Board Member CO2 Value Europe
- Nicolas Serrie, CEO, Khimod

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