BUREAU
FRANÇAIS
des e-fuels

E-FUELS OFFICE ROADMAP:
A UNIQUE OPPORTUNITY FOR THE FRENCH ECONOMY

Achieving carbon neutrality is imperative to tackle climate change. All sectors must be decarbonized – even those which are most dependent on fossil resources – using solutions that can be deployed rapidly, on a large scale.

OUR GOAL

In recent years, e-fuels have appeared as one of the major alternatives to fossil fuels for industry, and air and sea transportation. Developing e-fuels requires:

- **Insights and support for the public policies which promote e-fuels as a means of decarbonizing industry and heavy transportation.**
- **Public awareness around e-fuels as a solution for use cases that are most difficult to decarbonize.**
- **Education by industry leaders who must take part in the reindustrialization of our economy.**

The primary goal is to bring hope to a world overwhelmed by resignation and denial in the face of climate disruption. An issue often perceived as inevitable and even insurmountable.

To this end, all levers need to be activated and prioritized according to their merit order. Firstly, **energy sobriety and efficiency must be promoted**. Secondly, **electrification of various energy uses must be developed wherever possible**, including in the light mobility sector, the service sector, and the residential sector. Finally, **new molecules -** such as biofuels and synthetic fuels, also known as "e-fuels" – **must provide solutions for sectors that cannot be decarbonized in another way**. This is the case for heavy mobility (air and sea), due to the energy power they require, and for chemical industries using these molecules as feedstock.

**Faced with climate disruption, the signatories of the Paris Agreement in 2015 set the target of limiting global warming to 1.5°C above pre-industrial levels. However, scientists estimate that current commitments would induce a temperature rise of 3 - 4°C by 2100.*

REINDUSTRIALIZATION AT THE CROSSROADS OF HYDROGEN AND CARBON

The first e-fuels* projects are beginning to appear around the world. France, like many other countries, is on the starting line. **Without a strong commitment from the French government, local authorities, and stakeholders (manufacturers, researchers and investors) during the 2020s**, the French e-fuel industry faces the risk of increasing competition from imported e-fuels. France would lose the opportunity to export its knowledge and reduce its industrial, and energy, dependency.

France has three competitive advantages to be placed at the forefront of this new industry:

- **A continuous production of nuclear electricity, perfectly suited to the needs of the electrolysers, currently available, complemented by electricity from growing renewable sources (wind and photovoltaic solar power in particular).**

- **Major integrated industrial platforms in the region, with the capacity to provide necessary services, equipment, and skills.**
- **Dynamic aeronautical, maritime, and chemical industries, with players such as Air France-KLM, CMA-CGM, Airbus, Safran, Dassault and ARKEMA committed to decarbonizing their activities.**

**E-fuels are molecules produced by combining low-carbon hydrogen, from water electrolysis, with carbon dioxide captured from industrial or biogenic activities. The aim is to chemically store low-carbon electricity - nuclear or renewable - in molecules identical to conventional fuels derived from fossil resources, ammonia, methanol or kerosene. Depending on their electrical and carbon supply, life-cycle analyses prove that e-fuels can reduce greenhouse gas emissions by 70% to 95%, compared with fossil fuels.*

LOW-CARBON ELECTRICITY AT THE HEART OF THE FRENCH E-FUELS STRATEGY

The cost of producing e-fuels lies in the power supply to the electrolysers, totaling 50% to 75% of the final cost.

The competitiveness of French projects will depend on their ability to secure long-term low-carbon electricity purchase contracts at a sufficiently low price.

Subject to the terms and conditions of the European electricity market reform**, the French government will have an essential role to play in two phases:**

- **Phase 1: ensure that part of the country's low-carbon electricity production can be allocated to e-fuel projects, to enable a strategic industry that will meet France's commitments at a European level by 2035 (estimated need between 15 and 20 TWh).**
- **Phase 2: launch the massive development of additional low-carbon electricity generation resources, both nuclear and renewable, to meet the growing needs arising from the decarbonization of the economy after 2035, including the aviation and maritime sectors.**

The French industry is eager and ready to go, with 9 projects of over 50,000 tons of production capacity per year under development, reported by the first French e-fuels Observatory, published in July 2023 by the French E-fuels Office. Although substantial, the electricity, water and carbon requirements remain manageable. These projects can accelerate industrialization, stimulating synergies in various regions with a balanced distribution across France. They will have a major impact in terms of job creation, reducing greenhouse gas emissions and readjusting the balance of trade.

E-FUELS OFFICE: AN AMBITION TO SERVE THE ENERGY TRANSITION

This sector plays a crucial role in national and European policies. Thus, the E-fuels Office seeks to roll out a roadmap to initiate solutions to meet future objectives and catch up in our fight against climate change. Hard-to-abate sectors now benefit from mature solutions that we must support to achieve carbon neutrality and promote a virtuous economy. To achieve this, **we must**:

- **Develop the first national e-fuel production projects in our territories.**

- **Shed light on the technological and industrial improvements required.**
- **Secure existing and additional low-carbon electricity capacities.**
- **Create an innovative industry in France with domestic references that can be exported internationally.**

Developing an ambitious roadmap requires close collaboration between all players. Manufacturers play a key role by investing in the research and development of technological building blocks and deploying the first industrial-scale projects throughout France. Consumers and CO2 suppliers are equally committed to the development of the sector, as stakeholders of e-fuel projects in both upstream and downstream activities. Finally, public authorities are responsible for setting favorable policies to adamantly support e-fuel production, with mechanisms such as public subsidies, and securing competitive electricity purchasing and consumption schemes, such as certification schemes and sector-specific incorporation thresholds. By working together, we can decarbonize our economy, which is far too dependent on fossil fuels today.

The E-fuels Office, launched in July 2023, aims to bring together manufacturers, consumers, professors, researchers, suppliers, and financiers to promote a virtuous, competitive, and sustainable e-fuel industry in France. By federating all players of the value chain and beyond, informing relevant audiences, developing knowledge with pedagogy, and highlighting key issues, the E-fuels Office will catalyze the energy of its members to promote a national industry that will make France one of the world's leading producers and consumers of e-fuels.

The E-fuels Office has released the French e-fuels observatory, produced by Sia Partners, which provides a regularly updated review of the e-fuel industry for public authorities, journalists, and consumers. It includes an outline of projects and technological building blocks, and an evaluation of input requirements, socio-economic and environmental impacts.

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