

Sustainable mobility | Environmental Analysis of Transport

ENVIRONMENTAL ANALYSIS OF TRANSPORT

OUR SOLUTIONS

While the driving factor of future mobility, whether by land, sea or air, is **the carbon footprint issue**, other major impacts, such as **air quality, the use of critical resources or land use** are also vitally important.
To address all of these issues, it is necessary to be able to draw on data and models in order to understand current usages and project future use.
IFPEN's environmental analysis services are hinged around **a suite of tools dedicated to the quantification of future mobility trajectories**. They are developed on a common foundation that includes the Taipy Designer tool, developed in partnership with Avaiga, the company marketing it. They offer a large number of services aimed at the general public or at a more specialized audience. The tools are designed to meet several objectives:

-Help regions define mobility policies

-Measure, extrapolate and predict air quality on various scales

-Plan for the future via various technical and economic studies

-Inform citizens about the environmental impact of their mobility

SUPPORT TOOLS FOR THE ROLL-OUT OF REGIONAL POLICIES

Through the consolidation of anonymized usage data generated by mobile apps, IFPEN's tools can **map pollutant emissions in real time for a given region, and simulate specific situations in terms of pollutant emissions**. As a result, local authorities have access to tools enabling them to:

- understand traffic emission phenomena and critical zones,
- identify the impact of existing road infrastructures,
- **optimize traffic management measures and guide choices for future road design features**: traffic calming, traffic circles, on/off ramps, etc.
- simulate the impact of setting up low-emission zones (LEZ)

These aspects are addressed either at national level with general-purpose decision-making software such as **PLANET air**, or at local level with, for example, the ostmob platform dedicated to the Western Paris area.

PLANET air is part of the PLANET suite of tools dedicated to environmental analysis of transport.

PLANET air SaaS: a precise, reliable tool to guide decision-making concerning air quality and pollutant emissions

The **PLANET air SaaS** tool provides regions with crucial data enabling them to take action to improve air quality and reduce pollutant emissions. This tool can be deployed anywhere, making it a solution adapted to the local context. It provides accurate real-time data on road traffic emissions, from both exhaust (NOx, CO_2, PM) and non-exhaust (brake and tire abrasion) sources. It also measures road traffic noise levels in real time, providing a global view of the impact of mobility.

The PLANET air SaaS tool is underpinned by R&D work carried out within the framework of two European projects, OLGA and MAGPIE, both of which meet the objectives defined by the European Green Deal. In particular, IFPEN’s teams are working on the development of interactive dashboards with a view to conducting emissions inventories at partner ports and airports. This tool also capitalizes on IFPEN's research on the microscopic estimation of road transport pollutants and enables the integration of new mobility and/or emission data.

Ostmob: strategic regional mobility observatory

Within the framework of the *Territoires d'innovation de grande ambition* (TIGA, Ambitious Demonstrators and Innovative Territories) initiative for Ile-de-France, "*Construire au futur, habiter au futur*" (Building in the future, Living in the future), IFPEN, Paris Ouest La Défense (POLD) and Paris Nanterre University joined forces to analyze mobility data for the western Paris and La Défense area, with a particular focus on work-related journeys. The ostmob (Observatoire Territorial Stratégique de la Mobilité, or Strategic Regional Mobility Observatory) website was created to promote the bicycle master plan for this area and, more generally, to share and analyze mobility data and facilitate decision-making. IFPEN conducts analyses based on data generated by the Geco air ecomobility app and the connected service app dedicated to bicycles: Geovelo.

The **otsmob** website's functionalities are enriched by research carried out as part of the European UPPER and ELABORATOR projects.

REAL-TIME EMISSION MEASUREMENT TOOLS

Real-e: mobile and connected, real-world vehicle emission analyzer

IFPEN's teams have developed Real-e (Real emissions), an innovative connected tool that measures pollutant emissions in a vehicle's exhaust gases in real driving conditions. It is the first system to provide such a rapid, exhaustive and reliable evaluation of real emissions. Real-e is the result of the synergy between the numerical pollutant emission models developed by IFPEN and the gas analysis expertise of SME Capelec, a leading provider of automotive testing equipment. In concrete terms, the analysis system sends measurements to the Cloud in order to automatically recalibrate numerical models, thus providing a vehicle compliance factor with respect to the relevant pollutant standard.

Find out more about the REAL-E onboard diagnostic kit :

Flair: fixed or mobile gas cocktail monitoring station

The Flair range is dedicated to the environmental monitoring of gases in the atmosphere, on the ground, in the soil and underground. It uses UV spectrometry to analyze a wide range of substances at very low levels. THT, sulfur-containing substances, ammonia, nitrogen, etc. In addition to identifying and quantifying greenhouse gas emissions and gas pollutants of natural or industrial origin, it offers a

wide range of functions, such as geolocation, real-time visualization and determination of the source of emissions based on wind conditions, etc. The Flair analyzer can be fixed, carried by an operator moving over challenging terrain, or carried by a mobile device (car, drone, etc.), enabling gas emissions to be mapped and monitored over areas of various types and sizes.

ECONOMIC STUDIES

To address the challenges of the ecological transition in the field of individual mobility and goods transport, public and industrial players and citizens need to be supported as they make decisions concerning the most appropriate technologies for meeting **pollutant and CO_2 emission reduction objectives**.
This need to inform the various mobility sector players has become even more pressing with the introduction, in France, of low emission zones (LEZ) to address air quality problems in major cities (> 150,000 inhabitants).
IFPEN addresses the needs of various players by conducting **impact studies** incorporating different types of data and simulations as well as life-cycle analyses, often combined with web services and interactive dashboards to make the studies more dynamic, more informative and more accessible to everyone. The perspective analysis is provided for **different spatial** (country, major city, etc.) **and time scales**, and enables projections and comparisons taking into account various types of technologies and regulations (LEZ, pollution standards, etc.).
These resources are made available to public and industrial partners, as well as associations and citizens via the IFP Energies nouvelles “FAQ” website: Decarbonization of the transport sector. **They cover light-duty vehicles and trucks**, as well as sea and river traffic, and **the low-carbon energy sources** taken into account include **electricity, hydrogen and advanced biofuels**.

Heavy-duty vehicle emissions study
Between 2023 and 2024, IFPEN conducted a study on behalf of the French Ministry for the Energy Transition aimed at characterizing the influence of existing and future energy vectors on heavy truck emissions (greenhouse gases and local pollutants). The experimental campaign related to ten vehicles and different fuel types (B7, B100, HVO, GTL, CNG, LNG).

E4T 2040: energy, economic and environmental study of the transport sector to the year 2040
The E4T 2040 study, commissioned by ADEME and conducted between 2020 and 2022, involved a prospective analysis of the technologies to be prioritized in order to reduce the CO2 emissions of the road transport sector by 2040.

Concawe study: evaluating the emissions of PHEVs and heavy trucks in real operating conditions
A large-scale study was conducted between 2021 and 2023 on behalf of Concawe aimed at evaluating the environmental footprint of plug-in hybrid vehicles (PHEVs) and heavy trucks in real operating conditions. The results of both these studies (PHEV, heavy truck) can be accessed via two interactive comparators, one for PHEVs et the other for heavy trucks.

Study of the Greater Paris area vehicle fleet to the year 2030
A prospective study was carried out to simulate and analyze the state of the Greater Paris car fleet to the year 2030, with a view to quantifying polluting and greenhouse gases, depending on several possible scenarios for population growth and associated mobility (soft mobility, public transport, etc.).

ECO-MOBILITY APPLICATIONS FOR THE BENEFIT OF CITIZENS

Geco air: an app to encourage more sustainable mobility

Help drivers reduce the environmental footprint associated with their journeys: that is the aim of Geco air, **the free mobile app developed** by IFPEN with the support of Ademe. A veritable **barometer of clean mobility**, Geco air encourages users to drive in an eco-responsible manner by:

- estimating emissions relating to their journeys (CO_2, NO_x, fine particles, carbon monoxide),
- indicating the practices they should adopt at the wheel,
- encouraging them to favor soft transport modes wherever possible.

Available free on AppStore et GooglePlay, Gecoair™ represents:
+ 48 000 downloads
+ 100 million km traveled

± 20 % = variation in CO_2 emissions depending on the individual driver for the same urban journey

Green my fleet: support tool for vehicle fleet managers

Developed in partnership with la Fabrique de la logistique, the "Verdir ma flotte" (Green my Fleet) tool is aimed at logistics sector players seeking to decarbonize their vehicle fleets. It enables them to quantify the economic and ecological impact of alternative fuels and hybrid and electric technologies.

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Environmental Analysis of Transport: Our solutions

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