



"H₂, CO₂ and CH4 Consultations: Future Prospects" process

Launch webinar on 4 April 2025 Questions & answers arising from the webinar

Is there a scenario anticipating a delay in the electrification of energy uses, and thus an increased need for gas?

Answer: Scenario B anticipates a slower evolution of the energy mix (five years behind scenario A), which includes a delay in electrification and a slower decline in methane consumption than in scenario A.

However, all the scenarios anticipate a drop in methane consumption in the short or medium term as a result of changes in the energy mix and energy efficiency improvements. Please let us know what you think about this issue and which sensitivities you think it is important to consider in this consultation.

Are transits also part of your thought process?

Answer: Yes, transits are also part of our thinking. The methane and hydrogen flows in France and Europe will result from European-scale simulations carried out on the basis of the scenarios submitted for consultation. The Hydrogen and Methane workshops will provide an opportunity to discuss the underlying assumptions in greater detail.

Have any assumptions been made about energy consumption in the maritime sector? There is no minimum proportion for incorporation of low-carbon fuels, but the maritime roadmap does set out decarbonisation targets. How did you integrate them?

Answer: Assumptions were made about energy consumption in the maritime sector. Yes, the European FuelEU Maritime regulation sets targets for reducing the carbon intensity of marine propulsion (as a % reduction in gCO₂/MJ) between 2025 and 2050. Several potential fuels could help meet these targets: methane (LNG, e-methane and biomethane), methanol (e-methanol and biomethanol), e-ammonia and biodiesel. The trend in energy consumption in the maritime sector was forecast based on several assumptions:

- Energy efficiency gains (by type of vessels)
- Rate of renewal of the bunkering fleet in France, through orders for new vessels, purchases of second-hand vessels or retrofits of existing vessels (by type of vessel)
- Choice of engines for new vessels (including dual-fuel methane-fuel oil-diesel or methanol-fuel oil-diesel engines)
- Energy consumption in ships, particularly vessels equipped with dual-fuel engines that can run on fossil and sustainable fuels in varying proportions over time to meet the targets of FuelEU Maritime.

In addition, FuelEU Maritime has specific targets for RFNBOs in 2030. Finally, assumptions were made about whether or not the sustainable fuels bunkered at French ports are produced in France. These elements are available in the Excel file submitted for consultation.

nalran



You consider H_2 imports in the methodology – are H_2 exports also taken into account?

Answer: Hydrogen imports are being studied. Given France's ambitions in terms of national energy sovereignty, only scenario B considers imports of H₂ (6%) in 2035. We consider more likely a scenario in which France's hydrogen demand is met by domestic production and the flows transported by BarMar or potential imports via the ports are intended essentially to meet the needs of cross-border countries such as Germany (transit flows). At this stage, none of the proposed scenarios anticipates France producing an annual surplus of hydrogen. Please let us know what you think about this issue and which sensitivities you think it is important to consider in this consultation. This point could be discussed at the H₂ workshop.

How will the need for CO₂ networks be taken into account to decarbonise process emissions in hard-to-abate industries (excluding energy)? The infrastructure projects emerging in the various basins (Dunkirk, St Nazaire, Fos, South West) meet the vast majority of non-energy CO₂ needs for CCS. Will there be any sensitivities about these needs? CCU is a marginal (and opportunistic) need that emerges due to the networks developed for CCS.

Answer: This is examined in more detail in the presentation of the CO_2 Infrastructure Master Plan:

- We take process emissions (hard-to-abate industries such as cement manufacturers) into account for the in-depth development (in terms of volume & territory) of CO₂ networks.
- We want feedback from stakeholders precisely in order to establish these sensitivities.
- We consider that CCU will ultimately account for a large proportion of CO₂ flows in France (see the 2050 targets in the French government's CCUS strategy).

If I understand correctly, the set of scenarios proposed does not include a trajectory where the acceleration of decarbonisation is based on stronger demand management? Even though: - the PPE, which constitutes the reference scenario, does not respect France's commitment to efficiency,

- the DGEC has pointed out the principle that energy efficiency must take priority,

- the potential for additional energy efficiency and sobriety is very high, and is the only way to provide margins in relation to the various resource constraints mentioned.

Answer: The scenarios proposed are based on assumptions of energy efficiency and sobriety, which vary in scale depending on the scenario. Please let us know what you think about this issue and which sensitivities you think it is important to consider in this consultation.

For industry, energy sobriety doesn't even appear as a lever... Is it at least addressed explicitly in the other sectors?

Answer: For industry, levers based on sobriety are taken into account in the evolution of industrial production. This is calculated on the basis of assumptions about trends in industrial demand and the balance of trade (imports/exports). Some scenarios anticipate a drop in demand for raw materials as a result of sobriety measures (e.g. sobriety in the use of fertilisers or concrete/glass in construction), which, depending on the sector, would lead to lower industrial production in France (for a constant trade balance). Please let us know what you think about this issue and which sensitivities you think it is important to consider in this consultation.





Unless I'm mistaken, nothing was said in the introduction about the macroeconomic framework. Is there a frame of reference (growth, prices, etc.), and if so, what is it? And what sensitivity is provided for (including stress tests, given the level of volatility induced by the geopolitical situation)?

Answer: As a precursor to the obligations relating to the Fourth European Gas Package (Regulation (EU) 2024/1789 and Directive (EU) 2024/1788), which must be transposed into French law by August 2026, and in order to avoid overloading stakeholders, we propose to use the macroeconomic framework that will emerge from the current consultation for RTE's Electricity Generation Adequacy Report. If this framework is not relevant to the particular analyses and needs of gas systems, this will be indicated transparently.

Several natural hydrogen exploration projects are under way in France. Have you included assumptions about potential production?

Answer: Exploration projects for natural hydrogen (known as "white" hydrogen) are under way in France. Depending on the scenario, this potential production is taken into account from 2035 onwards. There are uncertainties about the volumes, timing and cost of this hydrogen. Please let us know what you think.

If e-fuel projects do not get their FID by Q1 2026, they will not be able to deliver molecules in 2030. FEED phases must already have been launched for 2030 to be a realistic scenario for e-fuel projects.

Answer: The e-fuel production projects that have been announced and related investment decisions are being studied. This point can also be discussed at the H₂ workshop.

It would be interesting to include the existing H₂ networks that are not operated by NaTran or Teréga.

Answer: We are open to all H_2 and CO_2 network operators joining this approach and making their contribution. Our aim is to position ourselves as an "aggregator" of H_2 and CO_2 transmission needs. Specifically, for CO_2 , the prospective development plan takes projects operated by other operators into account (Dunkirk area, Rhone Valley, etc.). The existing H_2 networks, including Air Liquide's, are covered in our thinking and our network studies (Fos-sur-Mer, Le Havre, etc.).

The success of CCS will depend greatly on trends in the price of a tonne of CO_2 on the carbon market (ETS), and consequently on European regulations. Is this sensitivity taken into account in the deployment scenarios?

Answer: As things stand, the scenarios for deploying carbon pipelines are studied by comparing the full cost of the CCS chain with the climate action value. The ETS value (and its increase) has an influence combined with the availability and volume of public aid for financing projects (CCfD, subsidies, etc.).

How are the flows that will be associated with CO2 storage accounted for in the scenarios?

Answer: For the moment, we have counted the volumes from the main emission sites to be captured at the various industrial hubs, in order to direct them towards the most economically attractive outlets. These flows need to be adapted according to the volumes and locations of the CO_2 to be captured and the CO_2 to be recovered and the development of sovereign storage facilities.

We can discuss these issues in the workshops.

nalran



Are the CO_2 maps shown based on ETS data (EU, i.e. excluding the biogenic CO_2 figures not currently included in this data)?

Answer: The map backgrounds used correspond to the CO_2 emissions subject to the ETS in 2023. However, the volumes shown on the hubs are estimates of the proportion of these fossil emissions that can be captured over different time scales, and we are currently assessing the potential (location/volume) for capturing biogenic CO_2 as well as recovered CO_2 . The aim of this consultation is also to exchange views between CO_2 emitters and consumers so that they can be taken into account fully in infrastructure development.

Have the existing quantities of biogenic CO_2 in the region over the time scales been taken into account as a brake on the deployment of synthetic molecules?

Answer: The existing quantities of biogenic CO_2 in France have been taken into account in the technical and economic feasibility of developing French production of synthetic molecules. As mentioned, these elements are still being studied, and we are keen to receive any quantitative analyses that you can share with us.

Projects already announced for the production of synthetic molecules are planned to be located close to sources of biogenic CO₂ (such as paper mills or incineration sites).

In the medium and long term, assumptions are included about trends in biogenic CO₂ emissions and the proportion captured, particularly in industry, the energy sector (heat production, waste sector, biorefineries) and the production of green gas (anaerobic digestion). In these sectors, the gradual incorporation of biomass into the energy mix as a means of decarbonisation is taken into account, as is the development of CO₂ infrastructure.

Does the forecasting exercise include the economic aspect of developing new infrastructure? In particular, what financial contributions will be made by Spain (hydrogen producer) and Germany (consumer of half the hydrogen that will transit through BarMar)?

Answer: The forecasting exercises include economic aspects, both in the construction of the scenarios (such as the comparison between decarbonisation pathways as presented) and in the analysis of the infrastructure implications. The full-cost analysis can be carried out once we have consolidated the feedback we receive from you. The question of financial and contractual contributions goes beyond the scope of these prospective studies.

Will shipowners be involved in the consultation, and what about the link with the MEET2050 institute, which is working with the government specifically on the national roadmap for alternative maritime fuels and port transitions?

Answer: A number of strategic partners and members of the MEET2050 Institute are involved in the consultation process. We will add any contacts you suggest that have not yet been included. The upcoming workshops will provide an opportunity to explore the maritime sector's preferred decarbonisation options in greater depth.

In addition, discussions are taking place with certain shipowners, either bilaterally or as part of regional studies (such as the ZIBAC low-carbon industrial zone studies, including the Fos-sur-Mer study).

The map at the centre of the 2030 scenario forecasts CO_2 exports to foreign countries. Is this scenario in line with European regulations and protocols, whether ratified by France or not?

Answer: Ratification of the London Protocol is under way in the EU countries (including France) and in Norway. Bilateral agreements have been signed (FR-DK) or will soon be signed (FR-NO). The CO₂ Infrastructure Master Plan also serves as a reminder of this issue for the public authorities.





Are you already working on the specifications for the CO₂ that can be transported in these networks?

Answer: Our R&D teams are working on the constraints associated with the CO_2 specifications for transport. In terms of standardisation, we are working in particular with AFNOR to define specifications for transported CO_2 at European level.

The arrow on the map seems to suggest a flow of imported CO_2 from Germany. Are you also considering a connection in the other direction to the German CO_2 network to enable export – via Wilhelmshaven, for example, by ship or pipeline – or even to Denmark, in order to access the future onshore storage sites planned for this purpose?

Answer: At this stage, all options remain open and depend mainly on the speed of infrastructure development on both sides of the southern Rhine valley, the cost of access/use and the decarbonisation/recovery needs in Alsace & Lorraine on one hand and Baden-Württemberg & Bavaria on the other. We are fully integrating cooperation and interoperability with cross-border operators into this prospective development plan.

Is the transport of CO₂ envisaged only by pipeline, or are other modes of transport (road, rail) being considered, with the associated intermodality issues (e.g. transport of CO₂ by train from the Lafarge cement plant in Montalieu to the Elyse Energy site in Roussillon)?

Answer: The aim of the prospective development plan for CO_2 transport infrastructure is not to propose an organisation for this type of logistics (road, rail, river, sea), which will probably not be regulated, nor to prescribe stakeholders' individual choices. However, as part of the drive to achieve the deepest and most economically efficient decarbonisation possible, including multimodal CO_2 transport in France, we are open to discussions with the relevant operators, especially to take any interface requirements between vectors into account (loading/unloading/cabotage).

As part of an integrated vision of infrastructure, will you be including underground storage facilities and gas terminals, and how?

Answer: As far as CH₄ is concerned, Teréga and NaTran are already in discussions with adjacent infrastructure stakeholders, whether they are operators in neighbouring countries, storage operators, distributors or terminals, in accordance with well-established procedures.

For H_2 and CO_2 , the aim of this consultation is to establish an initial stage of interaction with adjacent logistics operators, whether existing or future.

We already have contacts with cross-border operators and the storage and terminal operators we have identified.

This approach based on cooperation between logistics operators, with a view to openly constructing both shared forecast scenarios and prospective development plans jointly with stakeholders, is of course open to operators wishing to support these operating principles and contribute actively to this process.