

Clean hydrogen in France

A new legal framework to kick-start an ambitious national strategy?

Background: Renewable and low-carbon hydrogen is a key priority to achieve Europe's clean energy transition as part of the wider Green Deal ambition¹. The French Government presented on 9 September 2020 its own national hydrogen strategy,² aiming at installing 6.5 GW of clean hydrogen production by 2030 and mobilising €7 billion for that goal. To enable this strategy, the French Government has now issued the foundations of a much-needed dedicated legal framework through an Ordinance dated 17 February 2021 (the **Ordinance**).

What's in the Ordinance – Three important issues for sponsors and investors are included:

- It provides **key definitions** of “renewable hydrogen” (from renewable electricity such as wind and solar) and “low-carbon hydrogen” (opening the door to nuclear energy);
- It lays down the principles of a **traceability system** to certify the content of hydrogen production across the supply chain, under the umbrella of a national registry;
- The Ordinance sets the architecture for a **new subsidy scheme**, with significant differences compared to current systems for renewables: (i) tender procedures will be mandatory (no open counter) in order to prioritise competitive projects and retain control on the budgetary costs; (ii) the public subsidy may include an initial financial aid to cover a portion of the construction costs; (iii) and an operating aid will be granted as part of an up to 20-year contract, entered into directly with the State.

Next steps: The practical impact of the Ordinance will depend on the implementing regulations, expected in the coming months. They will help investors better understand the economics of the support scheme as well as to prepare future contractual architectures and legal documentation. For now, open questions remain about (i) the distinction between low-carbon and renewable hydrogen, (ii) the upcoming regulations on transport and distribution as well as safety rules, and (iii) the articulation of this framework with the on-going EU-wide support scheme (IPCEI), for which many French companies are currently preparing bids.

¹ See our article « The EU Commission's Hydrogen Strategy: A turning point? » [\[link\]](#). The Commission's hydrogen strategy is available here [\[link\]](#).

² Stratégie nationale pour le développement de l'hydrogène décarboné en France [\[link\]](#).

What is in the Ordinance?

The Ordinance³ dated No. 2021-167 dated 17 February 2021,⁴ sets the general framework on three key items for hydrogen⁵ production: Definitions of the different types of hydrogen, creation of traceability system, and a support scheme for hydrogen production projects (in focus in the next section).

Defining clean hydrogen

The EU Commission identifies several types of hydrogen, depending on the process, the primary energy used for its production, or the level of greenhouse gas emissions associated with the process.⁶ This is an on-going technical debate with important legal and policy implications.

Three categories of hydrogen

The Ordinance aims at offering a clear terminology, distinct from the traditional color (green, blue, grey, pink, etc.) distinction used in a more technical context.⁷

- **Renewable hydrogen** is hydrogen produced either by electrolysis of water using electricity generated exclusively from renewable energy sources (or, if not through electrolysis, by any other technology using exclusively renewable energy). The production process must emit a quantity of CO₂/kg below a threshold which shall be set by ministerial order;
- **“Low-carbon” hydrogen** must meet the same emissions threshold criteria as renewable hydrogen but is not required to be produced using renewable energy sources.

This definition specifically aims at supporting hydrogen produced using electricity generated

from nuclear energy. It is not clear yet whether “blue” hydrogen (“grey” hydrogen, combined with Carbon Capture and Storage (CCS) technology in order to reduce total emissions of the process) could be covered by this definition.⁸

- **“Carbonaceous hydrogen”** refers to hydrogen that is neither renewable nor low carbon (similar to “grey” hydrogen).⁹

Emissions thresholds and other conditions will be specified by ministerial order of the minister of Energy. The characteristics of the production processes and the associated emissions calculation methodology are currently under study by the Agency for Ecological Transition (formerly, ADEME).

Implications

In its opinion on the draft ordinance,¹⁰ the French Energy Commission (CRE) questioned the relevance of this distinction, arguing that the key objective is to produce carbon-free hydrogen and thus that the electricity used is itself carbon-free, not necessarily from renewables.

The Government decided to keep distinct definitions for low-carbon and renewable hydrogen. At present, both low-carbon and renewable hydrogen are, for

³ Under French law, an ordinance is first authorised by the French Parliament. It is then drafted and enacted by the Government. Finally, the Parliament ratifies the Ordinance. Eventually, the Ordinance’s provisions are legislative, i.e., have the same nature as legislative provisions enacted by Parliament.

⁴ Available [here](#).

⁵ Hydrogen is commonly used to refer to dihydrogen (H₂).

⁶ European Commission questions and answers: A Hydrogen Strategy for a climate-neutral Europe – 8 July 2020. Available [here](#).

⁷ New Article L. 811-1 of the Energy Code. The distinction between renewable hydrogen and low-carbon hydrogen was created by the Energy and Climate Act (Law No 2019-1147 of 8 November 2019 relating to energy and climate).

⁸ Inversely, the Ordinance provides that hydrogen co-produced during an industrial process whose function is not to obtain this hydrogen and which is self-consumed within the same process is not considered as low-carbon hydrogen within the meaning of the present code.

⁹ The thresholds defined subsequently must comply with Europe’s objectives of a low-carbon electricity mix.

¹⁰ Deliberation No 2020-231 dated 24 September 2020 providing an opinion on the draft Ordinance on hydrogen: <https://www.cre.fr/Documents/Deliberations/Avis/projet-d-ordonnance-relative-a-l-hydrogene>.

most requirements, subject to the same legal regime. There are some differences however, for instance, with respect to guarantees of origin (see below).

A new system to evidence the hydrogen's origin

Background

The Ordinance aims at bolstering production and sales of hydrogen for a growing number of uses. It sets the principle that renewable hydrogen production and sales to final consumers are not regulated under the Energy Code.¹¹ Prices are not regulated,¹² but in practice will be influenced by the available State financial support, including the new subsidy scheme (see below). Similarly, consumers' right to self-consumption is guaranteed, an important feature for industrial players willing to develop on-site production projects to meet their own hydrogen demand.¹³

A key enabler for clean hydrogen is the ability to evidence the product meets the legal criteria for qualifying as renewable or low carbon hydrogen. This is a condition for obtaining subsidies. Further, for end-customers looking to increase the sustainability of their businesses, it is important to justify the extra costs of using green hydrogen.

Accordingly, policymakers and stakeholders recognise the need for a public system providing transparency. European energy regulators (represented by ACER and CEER) also stressed the need for such a dedicated system.¹⁴

The proposed system

The Ordinance sets the basic principle that renewable or low-carbon hydrogen gives rise to a guarantee at the time of its production, for a

maximum quantity of 1 MWh for each guarantee. Carbonaceous hydrogen is logically excluded from this scheme.

The Ordinance innovates by differentiating two types of guarantees:¹⁵

- **Guarantee of origin (GO):** A GO is issued if the hydrogen is either (i) likely to be mixed with another type of hydrogen or another gas (e.g. natural gas) or (ii) if the GO is likely to be transferred independently of the hydrogen produced.

The system is similar to GOs for renewable electricity.¹⁶

- **Guarantees of traceability (GT):** GTs are issued when the physical traceability of hydrogen is technically possible (e.g. the hydrogen is not mixed with any other type of hydrogen or gas). The guarantee is issued at the same time as the hydrogen is produced. As a result, a GT cannot be transferred independently of the related quantity of hydrogen. If the related hydrogen is sold to a third party, the GT may be either annulled or transformed into a GO.

GTs thus evidence the physical traceability and aim at certifying the origin of the hydrogen for the end-customers, in turn allowing the producer to give the hydrogen additional value. This requires significant monitoring to ensure the absence of mixing, particularly during the hydrogen transport phase.

In its opinion on the draft ordinance,¹⁷ CRE challenged the relevance of the distinction between GTs and GOs, arguing it is likely to increase system-management costs. It also stressed that GTs are likely to be used in a limited number of situations.

¹¹ Article L. 851-1 of the Energy Code (« Hydrogen sale »).

¹² Only sales of renewable gas injected into the natural gas grid are regulated (Article L. 851-2 of the Energy Code).

¹³ Article L. 813-1 of the Energy Code (« Self-consumption »).

¹⁴ Regulatory White Paper series (paper #2) relevant to the European Commission's Hydrogen and Energy System Integration Strategies, 11 February 2021 [accessible online]. Among the points raised in the second Regulatory White Paper series: ACER and CEER suggested measures to improve traceability of the hydrogen, such as the implementation of a Guarantees of Origin system.

¹⁵ Article L. 821-1 of the Energy Code (« Guarantees of traceability and origin »).

¹⁶ The EU Renewable Energy Directive (2009/28/EC) provides legal provisions for GO tracking systems. The RED II directive in 2018 provides that electricity suppliers and consumers of power shall use Guarantees of Origin to document and report renewable electricity claims in Europe.

¹⁷ Opinion of CRE, Deliberation No 2020-231 dated 24 September 2020, section 3.2, p. 4.

Management of guarantees

Despite differences, both GOs and GTs (similar to guarantees of origin for renewables):

- are canceled as soon as the certified hydrogen has been consumed, or is injected into the natural gas network; and
- will be valid for a maximum of 12 months after production. After that, they may no longer be transferred.

Importantly, projects benefitting from a subsidy under the new support scheme (see below) will not be entitled to GOs, in order to avoid excessive remuneration and profitability (a condition for being granted an operational aid). GOs for these projects will be issued to the State.¹⁸

In turn, municipalities where projects are located and using that hydrogen for their own consumption are entitled to have the same GOs transferred to them in order to evidence that the hydrogen is renewable or low carbon.¹⁹

Finally, GOs held by the State (and not transferred to municipalities) shall be auctioned by the registry manager, similar to what Pownext organises for renewables guarantees of origin.²⁰ It is expected hydrogen suppliers will thus be able to purchase such GOs, as evidence for customers willing to contribute to clean hydrogen development.

Monitoring and enforcement

GOs and GTs will be managed within a national registry operated by a management body designated by the minister of Energy.²¹

Existing investigation and control powers for electricity and gas in the French Energy Code are extended to hydrogen. Similar to renewable assets, State services will be keen to monitor hydrogen

production, transportation and certification so as to avoid potential fraud and safety risks.

A key concern: EU-wide coordination

There is currently no EU-wide system to recognise hydrogen GOs, similar for instance to the EU registry on emissions allowances as part of the EU-ETS system. This is needed for the construction of the EU market and to enable exchange of guarantees across Member States.

An initiative is however on-going in the hydrogen field, launched by public and private stakeholders under the umbrella of the Fuel Cells and Hydrogen Joint Undertaking (itself guided by the EU Commission).²²

The Ordinance aims at anticipating coordination with other, future national EU governmental systems:

- With respect to GOs for renewable hydrogen,²³ the Ordinance sets an equivalence principle with GOs issued by other systems in the EU, to the extent they comply with the requirements of the RED II Directive.²⁴
- For GOs for low-carbon hydrogen (i.e. not from renewables), the Ordinance merely outlines the possibility to recognise equivalent GOs, provided such GOs meet “similar” requirements. A decree will be needed to further specify this regime.

No coordination is provided with respect to GTs, which is consistent with the fact that they cannot be sold or transferred.

It remains to be seen how in practice stakeholders will be effectively able to use, trade and transfer GOs easily across Member States. The European Commission is likely to monitor this issue closely, as it has done with capacity mechanisms in the field of electricity generation.

¹⁸ Article L. 822-2 of the Energy Code.

¹⁹ Article L. 822-3 of the Energy Code. Municipalities may not sell or transfer them.

²⁰ Article L. 822-4 of the Energy Code.

²¹ Guarantees for renewable gas in natural gas network will also be managed by a registry. It is not clear whether it will be the same registry as for GOs and GTs.

²² More information [here](#).

²³ Article L. 824-1 of the Energy Code.

²⁴ Directive (EU) 2018/2001 (recast) on the promotion of the use of energy from renewable sources.

Storage, transportation and distribution

In addition to producing clean hydrogen, storage, transportation and distribution is another important challenge. In addition to existing hydrogen pipelines connecting mostly industrial sites, developing hydrogen uptake for heavy and light transport will require many steps: Using existing natural gas pipelines, creating hydrogen stations (there are about 40 currently, hundreds will be needed), transporting hydrogen by truck, etc.

The Ordinance provides first steps for building the necessary infrastructure and regulatory framework.

Hydrogen storage: Hydrogen storage falls within the legal regime's underground storage scope under the French Mining Code.²⁵ Holders of fuel gas or natural gas storage concessions are exempt from obtaining a new mining title to store hydrogen, which should facilitate the development of such capabilities.²⁶

Transportation and distribution: The Ordinance distinguishes networks dedicated to hydrogen from provisions applicable to the injection of hydrogen in into transport and distribution systems. In the latter case, existing provisions of the Energy Code on gas transport, distribution, network access and connection are applicable to injections of hydrogen.²⁷ Additional provisions are expected through dedicated implementing regulations.

In addition, a system of guarantees of origin for so-called "renewable gas" injected into the natural gas network will be set up, for which renewable hydrogen is eligible. The implementation of such system is not expected before 2023, when injection of significant amounts of hydrogen in existing networks should start.

Safety provisions

Given the nature and characteristics of hydrogen, setting appropriate regulations and procedures is a key element for the overall strategy, as emphasised by the newly-formed National Hydrogen Council (see below, "What's next?"). Hydrogen indeed raises specific safety concerns, in particular in case of leaks.

So far, there is little detail in the Ordinance regarding safety requirements for the production, transportation and use of renewable and low-carbon hydrogen. Natural gas networks operators are required to take appropriate measures concerning the functioning, balancing, continuity of supply and safety of persons and property.²⁸

INERIS (a French public institution) is currently developing safety regulations. Existing EU regulations²⁹ setting safety requirements for existing hydrogen automotive vehicles will need to be updated for new uses (airplanes, trains, etc.).

²⁵ Article L. 841-1 of the French Energy Code.

²⁶ Article 6 of the Ordinance amending Article L. 231-6 of the Mining Code.

²⁷ Article L. 831-2 and 832-2 of the Energy Code.

²⁸ Article L. 443-14 of the Energy Code.

²⁹ Regulation (EC) No 79/2009 of the European Parliament and of the Council of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC.

Focus: The upcoming support scheme for H₂ production

Background

To compensate for higher costs compared to grey hydrogen, the Ordinance outlines a support mechanism with the aim that low-carbon and renewable hydrogen reach 20 to 40% of total French hydrogen consumption by 2030. It will target:

- Exclusively production of renewable hydrogen and low-carbon hydrogen, produced by electrolysis of water.³⁰
- Production units located on the French territory.³¹

This scheme is coordinated with EU initiatives:

- It will come in addition to the Important Project of Common European Interest (IPCEI) under preparation for hydrogen (see last section below).³²
- It is expected to be notified to the European Commission.³³ It will need to comply with EU state aid rules.³⁴

Procedure for granting the contract

The procedure will be subject to the public procurement principles of transparency and equal treatment. The Ordinance only sets the basic architecture and will be further specified by decree.

The procedure involves three phases:

- **Call for projects** (*appel à projets*): The Government launches the call for projects and sets the requirements.
- **Selection phase**: Candidates are selected according to criteria and conditions defined in the call for projects.
- **Designation phase**: Eligible applicants will be subject to an individual examination of their project in light of several criteria: (i) Economic profitability (in particular of the hydrogen produced); (ii) Global amount of GHG emissions of the facility; (iii) the facility's contribution to the achievement of national objectives for clean hydrogen production.

CRE has expressed doubts on the possibility of launching traditional bidding processes similar to wind and solar, arguing that the hydrogen sector was not yet mature enough for tenders to be effective.³⁵ The Ordinance reflects this concern by providing some flexibility for the selection of candidates and the negotiation of the terms of the contracts.

Structure of the support scheme

This mechanism consists in granting, through a tender procedure, and by contract:

- An additional remuneration (“**operating aid**”). The French Energy Commission has indicated such aid should be based on the quantity of hydrogen effectively produced, but the

³⁰ Article L. 812-1 of the Energy Code.

³¹ Article L. 812-2 of the Energy Code.

³² Senate report No 138 on finance bill 2021, 19 November 2020: <http://www.senat.fr/rap/I20-138-311-1/I20-138-311-11.pdf>, p. 68. An Important Project of Common European interest is a specific possibility to find aid compatible with the internal market. This is a system of aid aimed at supporting projects considered essential for Europe's competitiveness, as in the battery sector.

³³ Under Article 108 § 3 TFEU (Notice AN No 3400 on finance bill 2021, 9 October 2021: https://www.assemblee-nationale.fr/dyn/15/rapports/cion-eco/I15b3400-txiv_rapport-avis.pdf, p. 36-39).

³⁴ The revision of the State aid framework, including the State aid guidelines for energy and environmental protection, is expected in 2021. The European Commission has already approved, under EU State aid rules, a €30 billion Dutch scheme to support projects to reduce greenhouse gas emissions, including hydrogen production (European Commission, Press release, 14 December 2020: https://ec.europa.eu/commission/presscorner/detail/en/MEX_20_2414).

³⁵ Opinion of the CRE, Deliberation No 2020-231 dated 24 September 2020, point 3.3.

mechanics of this aid will be set at a larger stage by the Government.

- For some projects, an **investment aid** may be granted, in addition to the operating aid. Such aid details have not been set yet but may consist in a subsidy covering a portion of a project's initial capital expenditures (CAPEX).

The scheme fundamentally differs from power purchase agreements used for wind and solar until 2017, which featured a right for producers to sell the electricity to EDF and smaller regional system operators. For hydrogen, producers will need to find customers. It remains to be seen whether the system will, for some projects, resemble the premium system (contract for difference, "*complément de rémunération*") currently in place for wind and solar. Such a system would indeed require producers to sell hydrogen on the market, which could be challenging given there is not yet a mature, liquid market for renewable and low-carbon hydrogen.

Finally, the mechanism also differs from carbon contracts for difference (CCfD)³⁶ envisaged by the European Commission in its July 2020 strategy and for which a pilot program is expected.³⁷

Conditions for setting the aid

The Ordinance sets out strong checks to the intensity of the aid granted to the beneficiary:³⁸

- The aid granted may not lead to a total remuneration of the capital invested exceeding a "reasonable" level of income, taking into account the inherent level of risks of the activity.
- Accordingly, the terms of the operating aid take into account other subsidies and tax breaks which projects may benefit from.

- As the case may be, the support contract may provide that the project holder shall give up such subsidies and tax breaks.

These conditions will require sponsors to design projects carefully.

These rules also build on past experience with renewables with situations where the State found that some projects had secured what was presented as excessive profitability. This led recently to legislative provisions aimed at forcing the renegotiation of solar power purchase agreements concluded during the 2006-2010 period.

Support contracts

Each winning bidder will be entitled to enter into a contract with the State or any person mandated to act on its behalf. The contract will:

- Last up to 20 years.
- Indicate the amount of the aid, the timeline of payments, and the conditions for payment.
- Include the economic and environmental commitments of the beneficiary over the duration of the contract.

The need for sponsors and investors to assess and limit regulatory risks raises the questions of the nature of the contract. While the draft ordinance provided that such contracts are administrative contracts (as for premium contracts for wind and solar),³⁹ the final Ordinance remains silent on this point. The nature (private or administrative) of the agreement determines competent jurisdictions and the legal protection of the project holder, for instance, in case of a unilateral modification of the contract.⁴⁰ As the case may be, it will be up to the Courts to answer this question.

³⁶ CCfDs pay out the difference between the price of emissions allowances (EUAs) and the contract price, thus effectively ensuring a guaranteed carbon price for the project. Project-based Carbon Contracts for Differences (CCfDs) include providing some form of guarantee via a fixed price that rewards CO₂ emission reductions above the current price levels in the EU ETS.

³⁷ "A hydrogen strategy for a climate-neutral Europe", section 4 (p. 13).

³⁸ Article L. 812-5 of the Energy Code.

³⁹ Article L. 314-24 of the Energy Code.

⁴⁰ The administrative authority may unilaterally amend an administrative contract at any time, subject to certain conditions.

France's National Hydrogen Strategy: Estimated Timeline to 2030



What's next?

Upcoming regulations

Many provisions of the Ordinance will require implementing regulations in the form of decrees and ministerial orders.

The timing for these texts' publication is not yet clear but may take up to several months.

In that regard, on 25 February 2021, the newly-formed "National Hydrogen Council" (comprising public and private stakeholders) convened, and several decisions were made regarding the creation of additional support mechanisms, the preparation of the IPCEI as well as other dedicated training in the field of hydrogen technologies. The National Hydrogen Council is expected to convene again before the summer of 2021, with a focus on (i) regulatory and standardization issues, including in the field of safety, (ii) the implementation of support schemes, and (iii) distribution and transportation challenges.

Thus, significant regulatory work is expected in the coming months to finalise the legal framework necessary for future French hydrogen production projects.

On-going support and initiatives

The Ordinance is part of a broader strategy to sustain the hydrogen industry, involving the commitment of €7.2 billion in public aid by 2030.

France participates in the on-going **Important Project of Common European Interest (IPCEI)** on hydrogen, designed to support R&D and electrolyzers' industrialisation. France has currently reserved €1.5 billion in potential subsidies as part of the hydrogen IPCEI.⁴¹ The timing of IPCEI is summarised in the graph above.

In addition, the Agency for Ecological Transition (formerly, ADEME) is currently managing a number of calls for projects called "Territorial Hydrogen Hubs", which includes:

- "Hydrogen technology bricks and demonstrators", which aims to support innovation work, making it possible to develop or improve components and systems related to the production, transport, and use of hydrogen.
- "Hydrogen Territorial Ecosystems", which aims to support investments in ecosystems by combining hydrogen production/distribution infrastructures and hydrogen uses. It targets

⁴¹ The National hydrogen strategy, September 2020 (p. 8).

specifically industrial and mobile uses as well as certain stationary applications.

Several cooperation agreements have also been entered into by French and foreign players for which an adequate legal framework is an important tool to move forward with projects in the coming months.

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