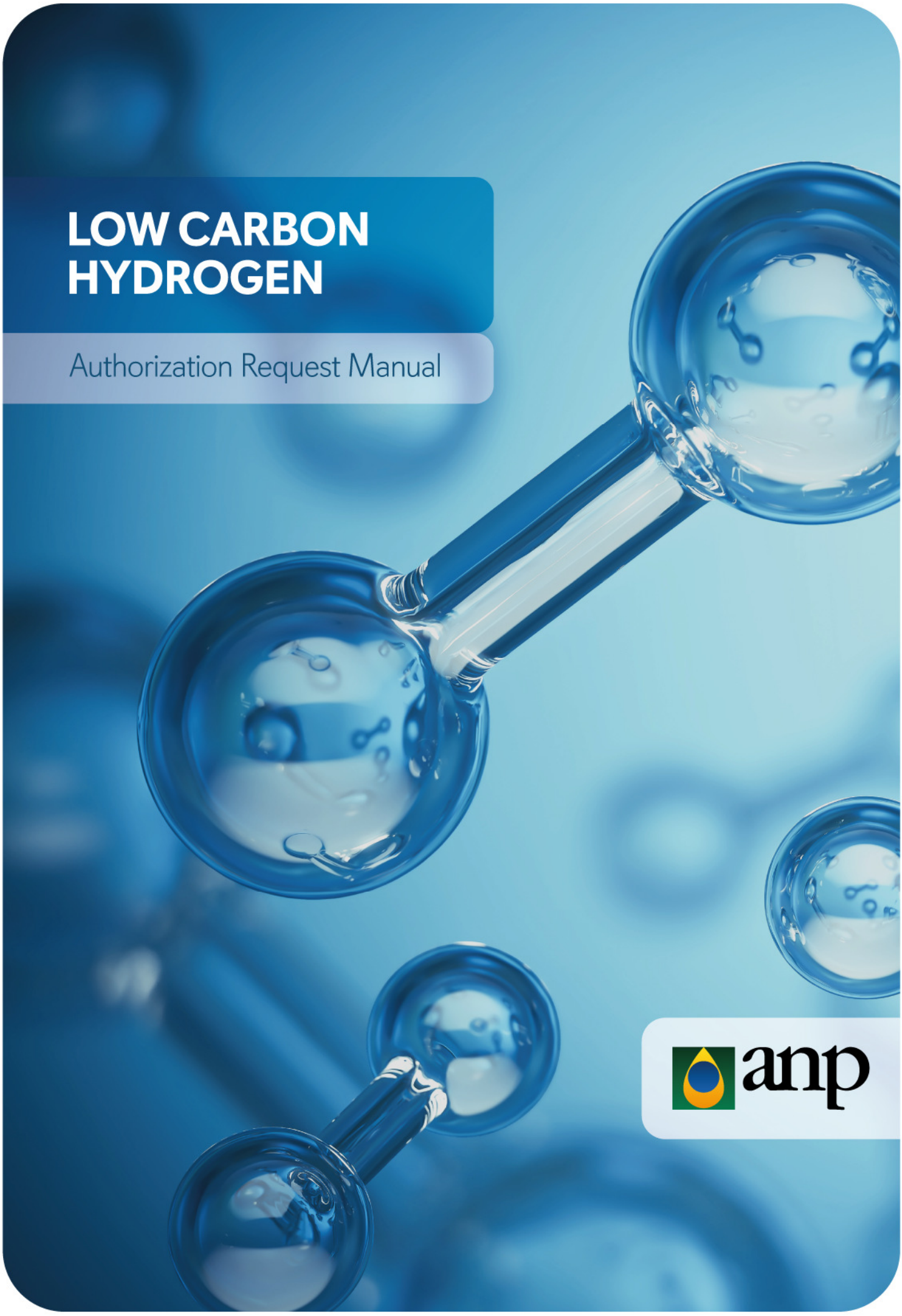
LOW CARBON HYDROGEN

Authorization Request Manual



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Brazilian National Agency for Petroleum, Natural Gas and Biofuels - ANP

Hydrogen Working Group - Ordinance nº 148/2022

LOW CARBON HYDROGEN

Authorization Request Manual

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Brazilian National Agency for Petroleum, Natural Gas and Biofuels

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Message from the Working Group

Since 2022, ANP has been studying issues related to hydrogen through a working group (WG) coordinated by the Center for Research and Technological Analysis (CPT) and with representatives from all the Agency's Directorates.

The WG meets monthly, coordinating the ANP's actions regarding the National Hydrogen Program (PNH2), established by the National Energy Policy Council (CNPE), which aims to strengthen the hydrogen market and industry.

In addition, the WG is responsible for supporting the ANP's representation in all other institutional committees, commissions, or working groups of a decision-making nature related to the use of hydrogen as an energy vector, allowing for greater technical and institutional solidity for the Agency's votes and initiatives.

With the publication of the national legal framework for low-carbon hydrogen, through Law n°. 14.948/20241, on August 2, 2024, much of the regulation of industry activities became the responsibility of the ANP.

In view of this, the WG mapped regulatory demands and analyzed the possibility of leveraging existing regulations, identifying the related ANP superintendencies within the internal structure and points of attention in each case, resulting in the Report on the Implementation of the Regulatory Framework for Low-Carbon Hydrogen in Brazil.

This report allows interested parties to follow, with complete transparency, the treatment that has been given to each topic, in addition to highlighting the activities and directions adopted by the Agency. In total, the WG identified twelve major topics to be developed within the scope of the ANP. The following are highlighted in this manual:

- Authorizations for the production of low carbon hydrogen;
- Authorizations for the loading, import, export, storage, packaging, transportation, transfer, distribution, resale, and commercialization of hydrogen.
- Physical-chemical specification and product quality assurance.

Far beyond representing the WG's response to a request from the ANP's Collegiate Board, this manual seeks to present to the nascent industry our structure, the rational for analyzing requirements, and paths that can and should be accessed by interested parties, even before we have our regulations fully in place.

This document is in line with the provisions of the sole paragraph of Article 12 of Law n°. 14.948/2024, which states that the ANP may adopt individual solutions aimed at complying with the provisions of the Law, respecting its decision-making process, until specific regulations are issued. We hope that the document will be useful to all those who see hydrogen as one of the great global energy bets of the 21st century. Enjoy your reading!

Summary

1. INTRODUCTION

1. Introduction

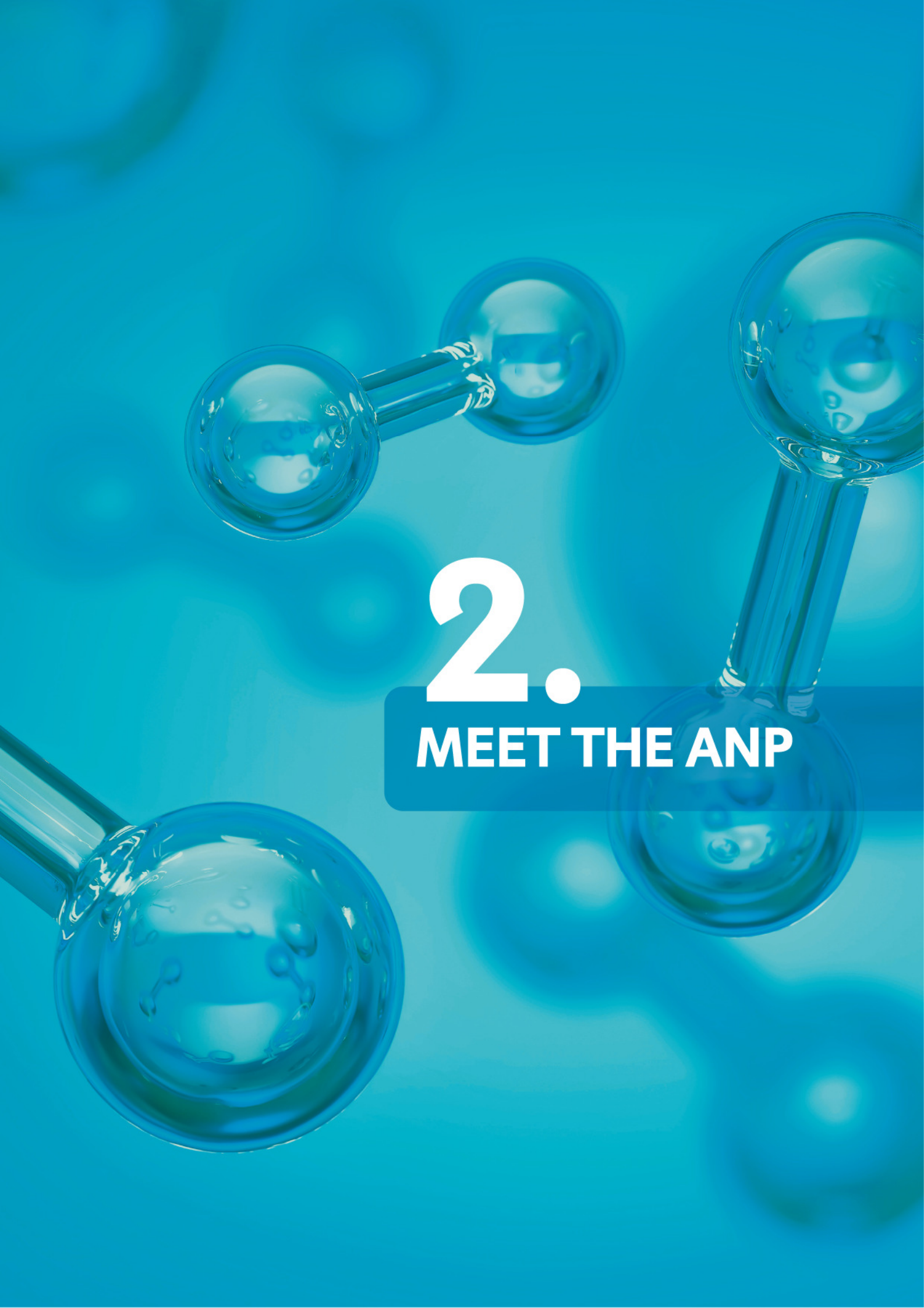
There is much debate about Brazil's enormous energy potential: a country with countless options, whether in the exploration and production of oil and gas, an industry that has been growing with great responsibility, with low carbon emission rates in its activities, or in the field of renewables, a sector in which Brazil has clear competitive advantages.

Brazil is the world's second-largest producer and consumer of fuel ethanol. Produced from the fermentation of sugarcane and corn in particular, Brazil is the only country that uses hydrated ethanol (E100) as the final fuel for consumers throughout its territory. In addition, 30% anhydrous ethanol is added to domestic automotive gasoline, further increasing the renewable content of Otto Cycle vehicle fuels in the country.

In Diesel Cycle vehicles, we stand out in the production of biodiesel, being the third largest producer and consumer in the world, using a 15% blend with fossil diesel oil.

In addition, Federal Law No. 14.993/2024, known as the 'Fuel of the Future' Law, provides for mandates for biomethane, green diesel, and sustainable aviation fuels. With this demand, Brazil is expected to position itself even better in the field of advanced renewable fuels. Still in the renewable energy scenario, low-carbon hydrogen presents itself as an exceptional, modern, and flexible alternative for decarbonization and the use and transport of clean energy. With the publication of Federal Law n° 14.948/2024, which establishes the legal framework for low-carbon hydrogen in Brazil, the country has positioned itself as one of the first to have a legal framework on the subject. More than just a vector, this modern energy source is a bridge between energy industries. Boosted by a clean electricity matrix, a rapidly growing solar and wind energy industry, and the availability of biomass to produce renewable hydrogen, Brazil has the potential to be one of the major global players in the low-carbon hydrogen industry. In addition to this potential, the country has a thriving domestic market, scientific centers that have been studying the subject for decades, and a stable institutional landscape with an environment conducive to investment.

The ANP, designated by Law n°. 14.948/2024 as one of the main institutions to regulate the topic in the country, has been working to make the regulatory environment attractive and, with this guide, seeks to illuminate the necessary paths for agents to familiarize themselves with the organizational environment and the flow necessary for the first authorizations in the sector.



2.
MEET THE ANP

2. Meet the ANP

The National Agency of Petroleum, Natural Gas and Biofuels (ANP) is a federal regulatory agency whose purpose is to promote the regulation, contracting, and supervision of economic activities related to petroleum, natural gas, biofuels, synthetic fuels, and hydrogen industries. Its institutional authority is established in Law No. 9,478/1997 (Petroleum Law), regulated by Decree No. 2,455/1998.

Since the enactment of the Petroleum Law, the ANP's tasks have been expanded through other legal provisions. In addition to its responsibilities for regulating biodiesel, introduced in 2005 through Law No. 11,097/2005, the Petroleum Law was amended to assign new powers to the ANP relating to natural gas (Law No. 11,909/2009), revoked by Law No. 14,134/2024, to the legal framework for the exploration and production of oil, natural gas, and other hydrocarbons, to biofuels (Law No. 12,490/2011), to hydrogen, its derivatives, and carriers (Law No. 14,948/2024) and carbon capture and storage (CCS) and synthetic fuels (Law No. 14,993/2024).

The Agency is part of the indirect Federal Administration, linked to the Ministry of Mines and Energy (MME) and subject to a special autonomous regime. It acts in areas as broad as: distribution of royalties and special participations, refining, natural gas processing, biodiesel production, transportation and storage, distribution and resale of fuels, fuel quality monitoring, and price surveys.

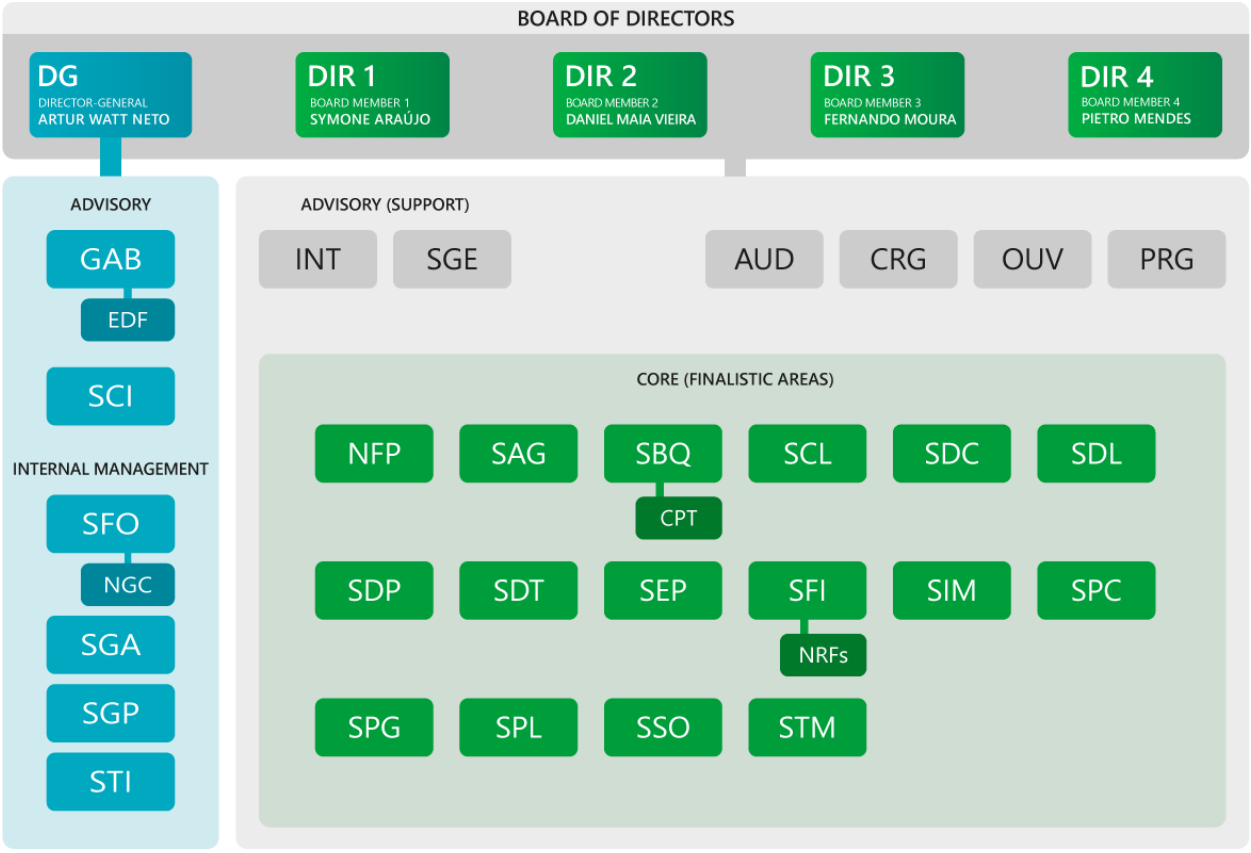
The Agency operates "from the well to the pump," regulating more than 130,000 companies in activities ranging from oil and natural gas exploration in Brazil's sedimentary basins to procedures to ensure the quality of fuels sold to the end consumer. Regulatory activity necessarily involves constant monitoring of compliance with established standards.

Figure 1 – ANP responsibilities

2.1. Organizational chart, Board of Directors, and governance model

The ANP has five Directorates with a Director-General and four Technical Directorates. The members of the Collegiate Directorate are appointed by the President of the Republic and their names are approved by the Federal Senate pursuant to subparagraph "f" of item III of Article 52 of the Federal Constitution, serving five-year terms, which do not coincide, and may not be reappointed.

Figure 2 – ANP Organizational Chart



In 2025, the ANP adopted a governance model that separates the final units (Superintendencies focused on regulated activities) from a specific technical board, linking them to the Collegiate Board as a whole. The model provides for the random assignment of case reporting duties among the Directors who are part of the Collegiate Board, except for the Director-General, who will continue to serve as the natural rapporteur for cases relating to administrative matters related to the internal management of the ANP.

The cases assigned to the Reporting Directors are those that require deliberation by the Board of Directors. They are monitored by the respective rapporteurs from their creation to their conclusion.

The processes of editing normative acts are motivated and necessarily indicate the factual and legal assumptions that determine the ANP's decisions.

In addition, Law n°. 13,848/2019 requires constant social participation through consultations and public hearings to support regulatory decision-making. The ANP also has a regulatory agenda in its annual management plan.

2.2. Regulation of Low Carbon Hydrogen

The ANP has been actively participating in the new legal and regulatory framework for the low-carbon hydrogen industry and is organizing itself to best meet the different demands on the subject.

Also in 2022, with the aim of initiating negotiations and proposing internal debate on the ANP's strategy guiding its participation in the PNH2 - National Hydrogen Program, ANP Ordinance n° 148/2022 was published, indicating the formation of the Working Group on Hydrogen within the Agency. The group, coordinated by the CPT - Center for Research and Technological Analysis, was officially created on October 19, 2022, and is composed of members from the Agency's five Directorates, with monthly meetings, and studies the response to the most immediate needs and prospects for the development of hydrogen at the ANP.

With broad knowledge, the ANP was assigned a series of tasks related to the new low-carbon hydrogen industry. The Agency is responsible, according to Law n° 14,948/2024, for regulating, contracting, and supervising the hydrogen industry. In addition, as announced by the Ministry of Mines and Energy, it will participate in the Brazilian Hydrogen Certification System (SCBH2) and will be responsible for authorizing activities related to production, loading, processing, treatment, import, export, storage, packaging, transportation, transfer, resale, and commercialization of hydrogen, its derivatives, and carriers. The ANP was also tasked with regulating the natural or geological hydrogen industry. Due to the complexity and scope of the issues related to the new industry, five subgroups were established throughout 2024, which currently make up the Working Group:

Subgroup I: Study of the possibility of mixing hydrogen into the existing natural gas network, focusing on quality, transportation service conditions, measurement systems, and operational safety;

Subgroup II: Natural hydrogen E&P activities in Brazil;

Subgroup III: Authorization of low-carbon hydrogen processes, derivatives, and carriers;

Subgroup IV: Operational safety in low carbon hydrogen;

Subgroup V: Environmental emissions certification for low-carbon hydrogen.

In addition to this manual, under the responsibility of Subgroup III coordinated by SPC/ANP, the following products are being developed by the teams:

1) Individualized reports and executive summaries referring to the findings of the ongoing subgroups (Scheduled for December 2025)
2) Final report and executive summary covering all working group activities (Scheduled for April 2026).

With the Regulatory devices still in the development stage were distributed among the ANP's organizational units, along with the main industry interface topics, as shown in the table below:

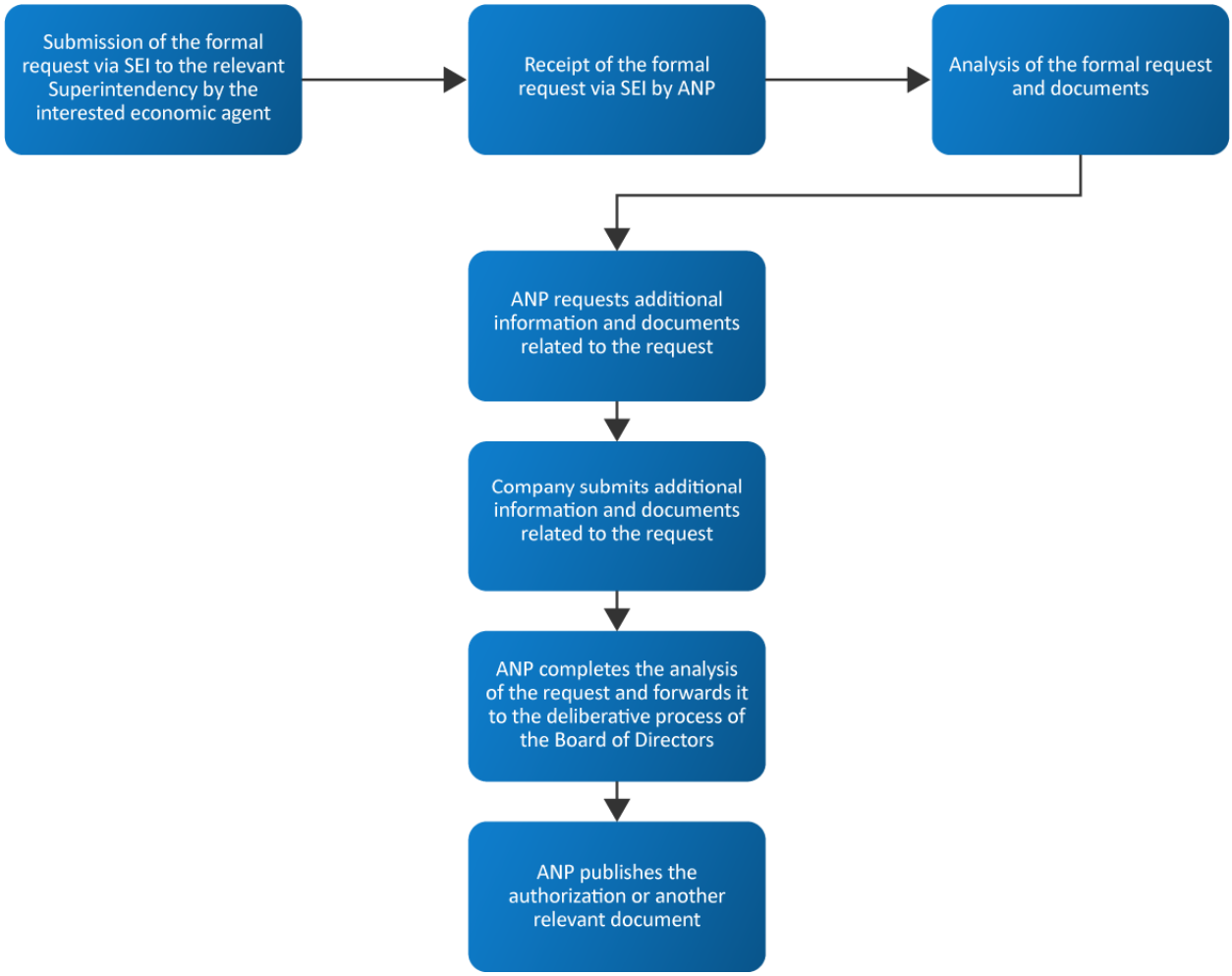
Type of authorization	Organizational Unit
Low-carbon hydrogen production activity	Fuel Production Superintendency (SPC) – Contact: contato.spc@anp.gov.br
Low-carbon hydrogen loading activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen certification activity (Emissions and Technical Specifications)	Superintendency of Biofuels and Product Quality (SBQ) – Contact: hidrogenio@anp.gov.br
Low-carbon hydrogen import activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen export activities	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen storage activities	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen packaging activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen transportation activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen transfer activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br
Low-carbon hydrogen refueling station activity	Supply and Logistics Superintendency (SDL) - revenda.sdl@anp.gov.br or autorizacoes.sdl@anp.gov.br
Low-carbon hydrogen sales activity	Superintendency of infrastructure and transportation (SIM) – Contact: sim@anp.gov.br

3. OBJECTIVES

3. Objectives of the manual

This manual aims to provide interested economic agents with clear and accessible guidance on the regulatory process applicable to authorizations for the production, operation, and commercialization of low-carbon hydrogen. including a list of documents, contacts, and necessary steps. To request the above authorizations, economic agents interested in the process should follow the flowchart below.

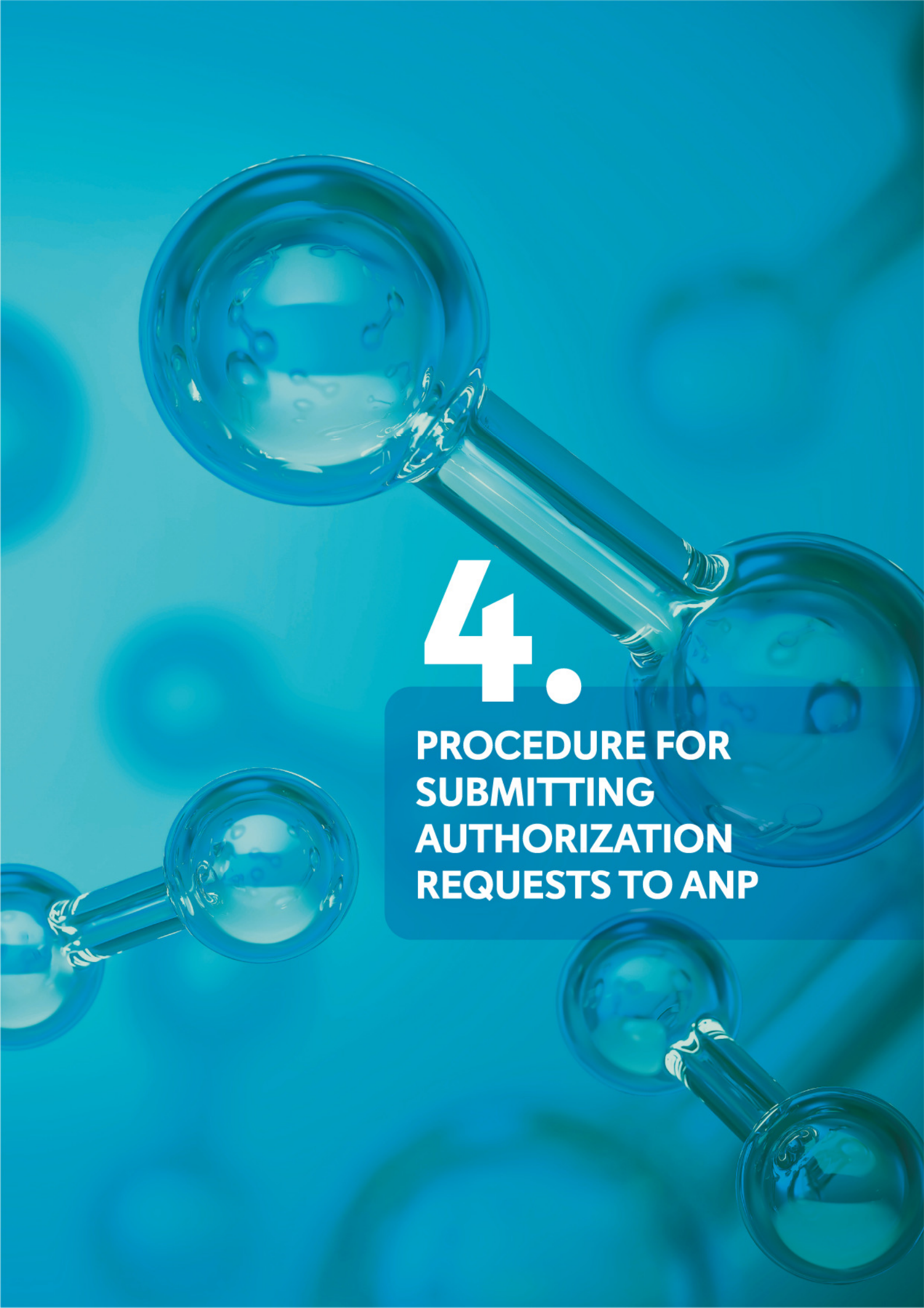
Figure 3 – Authorization request flowchart



It is important to note that authorizations relating to hydrogen industry activities not covered in this document and procedures for certifying low-carbon hydrogen will be the subject of Manuals, Guides, or additional documentation to be published by the ANP to supplement the guidelines contained in this Manual. This finding also considers the definition of the possibility of low-carbon hydrogen being an interchangeable gas with natural gas under the terms of Article 4 of Decree n° 10.712/21, not possible now

determine whether the same rules that apply to natural gas will be applied to low-carbon hydrogen.

Finally, it should be noted that guidelines relating to the exploration and production of Natural hydrogen are also outside the scope of this manual. Requests for information on omitted cases or questions about the procedures outlined in this manual should be sent to e-mail: hidrogenio@anp.gov.br.



4.

PROCEDURE FOR SUBMITTING AUTHORIZATION REQUESTS TO ANP

4. Procedure for Submitting Authorization Requests to ANP

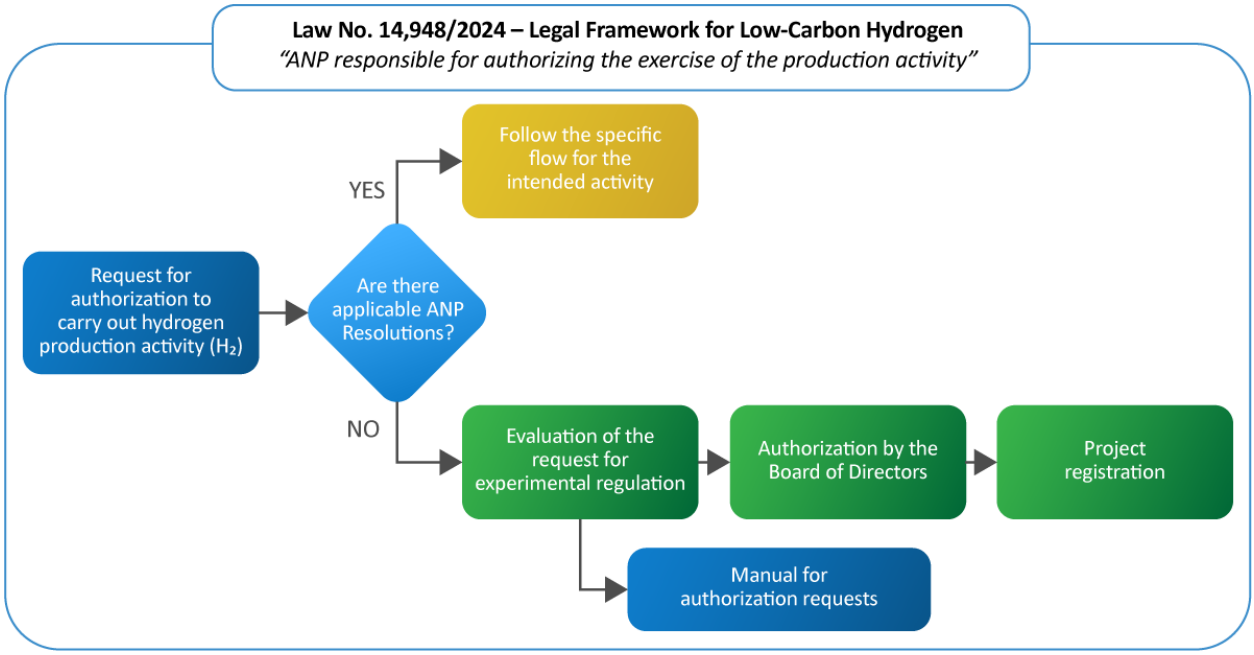
To request authorization from the ANP, the person responsible for the project must submit basic project information and supporting documents via the Electronic Information System (SEI) in a formal application containing all basic information, in the form of digital files in formats compatible with the computer system.

It is recommended that all documents, diagrams, and plans submitted are understandable and legible to request authorization, as described in this manual. Once the request is received, the organizational units will analyze the material and may request additional information or clarifications.

After analyzing the application and all documentation, the electronic file will be forwarded to the ANP's Collegiate Board for deliberation.

Until ANP resolutions on low-carbon hydrogen come into effect, special authorizations will be granted. For this to occur, companies must submit the necessary documentation for the execution of the project, as shown in the flowchart below, which demonstrates the example of authorization for the exercise of production activities. The flowchart also applies to other types of authorization.

Figure 4 – Flowchart for requesting project authorization



4.1. Description of submitted information and documents

Authorization requests must be submitted via SEI to the ANP Superintendents identified in the table presented in item 2.2 of this manual, according to the matters under the responsibility of each one, as detailed in item 4.2. Requests must contain the information and documents indicated in this manual.

It is important to note that the list of information and documents mentioned in this document reflects the ANP's recognized experience with authorization processes in the oil, natural gas, and biofuel industries. This relationship will be subject to improvement and discussion with the market throughout the process of drafting specific resolutions for authorizing activities related to the low-carbon hydrogen industry.

For ease of understanding, for each activity mentioned, the ANP organizational units receiving the request will be identified, which will be responsible for analyzing the documentation and procedural instructions for deliberation by the Collegiate Board.

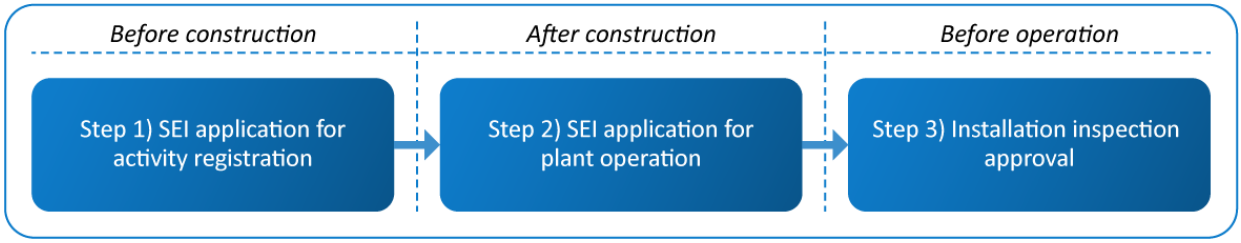
4.1.1. Low-carbon hydrogen production activity authorization - *Fuel Production Superintendency (SPC)*

According to Law n° 14,948/2024, low-carbon hydrogen has greenhouse gas (GHG) emissions, according to life cycle analysis, with an initial value less than or equal to **7 kgCO2eq/kgH2 (seven kilograms of CO2 equivalent per kg of H2 produced).** Therefore, hydrogen production projects involving steam reforming natural gas or non-renewable processes that have emissions above the ceiling established by law are outside the scope of this manual and their effects are not covered by current legislation (such as existing UGHs and reforming plants). The hypotheses of exemptions defined in the regulatory decree of the legal framework for low-carbon hydrogen will be used as criteria for analyzing the application, without exempting the applicant from submitting projects.

Applications for authorizations related to Low Carbon Hydrogen Production Activities must be submitted to the Fuel Production Superintendency (SPC) via SEI.

The processes will be structured in three stages, in which specific documents will be analyzed.

Figure 5 – Stages of the authorization processes



Such requests must be submitted with a specific application and accompanied by the documents and information listed below. Documents may be requested, information or additional measures that the ANP deems relevant to the investigation of the cases mentioned in this subitem.

4.1.1.1. Step 1 - For the communication of the construction of low-carbon hydrogen production plants

Before starting construction of a new low-carbon hydrogen production plant, the interested legal entity should send the application for registration of the activity with the ANP, containing, at a minimum:

- Company registration data including full address, georeferenced data of the plant, responsible parties and contact information;
- Company incorporation documents – bylaws or articles of incorporation, accompanied by the minutes of the election of its administrators (in the case of a corporation), duly registered with the Board of Trade, and identification of consortium legal entities, if applicable;
- Project presentation (PDF file), specifying production volume and indicating whether the project qualifies for exemption under the regulatory Decree of Law n° 14,948, dated August 2, 2024, with appropriate justification;
- Document with technical basis demonstrating that the plant will produce low-carbon hydrogen;
- Type of energy source used for production Economic and financial feasibility analysis of the project;
- Hydrogen production route, technology licensor, and company responsible for the design of the production facility.;
- Expected start and end dates of construction;
- List of all hydrogen production modules and their respective capacities;
- Hydrogen production capacity, in Nm^3/day.

Questions should be sent to e-mail: contato.spc@anp.gov.br

4.1.1.2. Step 2 - For the authorization of operation of low-carbon hydrogen production plants

After completion of the construction of the new low-carbon hydrogen production plant, the legal entity shall apply for operating authorization of the facility accompanied by the following documentation:

- Commissioning certificate signed by the technical manager stating that the low-carbon hydrogen production plant is ready to operate.
- This type of document certifies that the works have been completed, the equipment installed and connected, and the necessary interventions have been carried out to comply with the technical norms and standards applicable to the activity, and must include a Technical Responsibility Note (ART) issued by the competent Class Council;
- Environmental licensing;
- Inspection Report issued by the competent Fire Department;
- Certificates of tax compliance;
- Updated design data for the low-carbon hydrogen production plant, in accordance with applicable technical norms and standards, containing, at a minimum:
  - *i. process flowcharts;*
  - *ii. mass balance;*
  - *iii. general layout plan;*
  - *iv. process description;*
  - *v. description of the hydrogen and derivatives storage area, if applicable.*
- Photographic report;
- General logistics and market data to be served;
- Confirmation or update of the information provided in the Stage 1 application.

Questions should be sent to e-mail: contato.spc@anp.gov.br

4.1.1.3. Step 3 - Inspection of the Installation

After completing step 2, the ANP will inspect the low-carbon hydrogen production plant. At a minimum, the following documents will be verified:

- Risk analysis and management of implementation of recommendations;
- Change management studies;
- Operational procedures;
- Proof of staff training;
- Internal and external emergency plans;
- Fire safety and protection system plans, approved by the competent fire department;
- Area classification studies;
- Reports on the Atmospheric Discharge Protection System (SPDA) and the electrical grounding system;
- Proof of work permit use;
- Equipment and system inspection and maintenance plans and reports;
- Vulnerability and consequence analysis;
- Equipment safety interlock system design (cause and effect matrix);
- Material Safety Data Sheets (MSDS) for all chemicals used in the production facility.

Questions should be sent to e-mail: contato.spc@anp.gov.br

4.1.2. Low-carbon hydrogen loading activity authorization - *Superintendency of infrastructure and transportation (SIM)*

For authorizations related to low-carbon hydrogen loading activities, the application must be submitted to the Superintendency of infrastructure and transportation (SIM), within the scope of SEI, accompanied by the following documentation:

- Application by the interested party, signed by a legal representative or agent, accompanied by a copy of the signatory's identification and, in the case of an agent, also a copy of the power of attorney;
- Copy of the current contract or articles of association, whose corporate purpose must provide for compatible activity, duly filed with the competent Registry, accompanied, in the case of corporations, the minutes of the election of its administrators or directors and, in the case of a consortium, the corresponding instrument of its constitution, which must provide for the joint and several liability of the members for acts performed in the consortium in the activity of loading;
- Proof of registration in the National Register of Legal Entities and in the State and Municipal Taxpayers' Register, when applicable.

Questions should be sent to sim@anp.gov.br

4.1.3. Low-carbon hydrogen sales activity authorization – *Superintendency of infrastructure and transportation (SIM)*

For authorizations related to the commercialization of low-carbon hydrogen, the application must be submitted to the Superintendency of infrastructure and transportation (SIM) within the scope of SEI, accompanied by the following documentation:

- Application by the interested party, signed by the legal representative or agent, with a copy of the signatory's identification document and, in the case of an attorney, also a certified copy of the power of attorney
- Copy of the signatory's identification document and, in the case of an attorney, also a certified copy of the power of attorney
- Copy of the contract or articles of association in force in the case of business companies, whose corporate purpose must include commercial activity, duly filed with the competent registry, accompanied, in the case of corporations, by the minutes of the election of their administrators or directors
- In the case of consortia, a certified copy of the instrument of incorporation, duly filed with the competent registry, as established in Article 279 of Law No. 6,404/1976
- Proof of registration with the Federal, State, and Municipal Taxpayer Registry
- Proof of partial qualification with the Unified Supplier Registration System (SICAF) or presentation of the corresponding negative debt certificates or positive certificates with negative effect referring to the parent company's establishments and branches related to commercial activity.

Questions should be sent to sim@anp.gov.br

4.1.4. Authorization for the construction and operation of low-carbon hydrogen handling facilities - *Superintendency of infrastructure and transportation (SIM)*

For authorizations related to the construction and operation of low-carbon hydrogen handling facilities, the application must be submitted to the Infrastructure and Handling Superintendency (SIM) within the SEI.

The application for authorization to construct and operate pipelines, auxiliary facilities, and handling terminals must be submitted to the ANP, signed by the legal representative or agent, accompanied by the following documentation:

4.1.4.1. Authorization for the construction of low-carbon hydrogen storage and handling facilities – Superintendency of infrastructure and transportation (SIM)

Before starting the construction of a new low-carbon hydrogen handling facility, the interested legal entity must submit the application to the Infrastructure and Movement Superintendency (SIM) within the SEI, accompanied by the following documentation:

- Company registration details, full address, with georeferenced data of the plant, responsible parties, and contacts
- Copy of the articles of incorporation, with the respective corporate amendments, duly filed with the Board of Trade, whose corporate purpose includes the construction and/or operation of facilities for the handling and storage of hydrogen, with a copy of the documents of election of the administrators or directors, if they are not expressly designated in the articles of incorporation
- Copy of the simplified certificate issued by the Board of Trade
- Proof of registration with the Federal and State Treasuries of the head office and branches
- Copy of the Installation License (LI) issued by the competent environmental agency
- Descriptive report, signed by the responsible engineer, of the intended project, including a description of the facilities, the service involved, the process, the handling and storage capacities, the products handled and stored, the maximum, minimum, normal, and design operating conditions (such as temperature, pressure, and flow), Brazilian, foreign, and/or international technical standards relevant to the design and execution of the project, as well as basic technical data relevant to each type of facility

  Details of the tanks must be included, including the type of roof, safety valves, drains, fixed fire protection system, as well as a description of the road and rail loading/unloading platforms. ***Continue***

Continuation

- Site plan, identifying the location of the land reserved for the construction of the facility, the boundaries, main access roads, or existing geographical features;
- General layout plan, containing the layout of equipment, buildings, boundaries, roads, product receiving and delivery facilities (waterway, pipeline, rail, and road modes), as well as the respective dimensions;
- Data sheets for the main equipment of the facilities involved;
- Process and engineering flowcharts identifying pipes, equipment, process control instruments, operating conditions (normal, maximum, and minimum), and design conditions;
- Georeferenced data file, in digital format, for each facility to be authorized, which complies with the guidelines on the ANP website and with the ANP04C standard, or any other that may replace it;
- Certificate of Conformity for the facility design, signed by the responsible engineer, covering all specialties involved in the project (such as, but not limited to: civil, mechanical, electrical, instrumentation/control, process), issued by a specialized technical entity, independently incorporated from the company requesting the CA and the company that will carry out the construction and assembly, certifying that it complies with the applicable technical standards, accompanied by:

  I. *list of all documents, with their respective revisions, used to support the issuance of the Certificate;*

  II. *Technical Responsibility Note (ART), issued by the competent Professional Council, duly signed by the contractor and the contracting party, with the respective payment slip paid;*

  III. *copy of the current articles of association, registered with the Board of Trade, of the company contracted to carry out this activity.*

- Physical and financial schedule containing the stages of implementation of the project, detailing the main cost items for the following phases: design, licensing, supply of materials, construction and assembly, commissioning, testing, pre-operation, and start-up. Description of the road and rail loading/unloading platforms.

Questions should be sent to sim@anp.gov.br

4.1.4.1.1. Authorization for the construction of terminal

In the case of a request for a construction permit for terminals, in addition to the documents mentioned in the previous item, the following must also be submitted:

- Cross-sections and longitudinal sections of the tank farm or vessels, with dimensions, elevations, and indication of the containment basin dikes;
- Piping design, comprising, at a minimum: general piping plan and plans by area (pump station, loading or unloading platforms for tank trucks or tank cars);
- Firefighting system design, including, at a minimum: firefighting system process flowchart, calculation report including sizing of technical water reserve, piping and equipment, minimum volume of foam-generating liquid, and fire system plans (general plan, drawing showing the location of hydrants and monitor cannons, including their coverage radii, fire pump house, and foam generator liquid system);
- Tank basin plans;
- Electrical design, including, at a minimum: general grounding plan, lightning protection system (SPDA) plan, and area classification plan;
- Proof of land ownership, lease agreement, or any other means of proving the relationship between the AC applicant and the land where the facility will be built or, where applicable, a document of consent from the Port Authority;
- Authorization from the National Waterway Transportation Agency (ANTAQ) and consent from the Local Maritime Authority, in accordance with NORMAM-11/DCP, or any standard that may replace it, when applicable.

Questions should be sent to sim@anp.gov.br

4.1.4.2. Authorization to operate low-carbon hydrogen storage and handling facilities

The application for operating authorization shall be submitted to the ANP, containing the following documentation:

- Copy of the Operating License (LO) issued by the competent environmental agency
- Summary of operating, inspection, and maintenance procedures
- Commissioning Certificate for the project, covering all specialties involved in the venture (such as, but not limited to: civil, mechanical, electrical, instrumentation/control, and process), issued by a specialized technical entity, independently incorporated from the requesting company and the company that carried out the construction and assembly, focusing on the safety of the facilities and certifying that they were built according to appropriate technical standards and are fit to operate safely, accompanied by:
  - I. *Technical Responsibility Note (ART), issued by the competent Professional Council, duly signed by the contractor and the contracting party, with the respective payment slip paid*
  - II. *Copy of the current articles of association, registered with* the Board of Trade, of the company contracted to carry out this activity
- Copy of the Inspection Certificate issued by the local Fire Department, where applicable
- Photographic report in digital media showing the completion of the works
- Flowcharts, plans, and descriptive reports submitted at the time of the AC request, revised in the “as built” version
- Details of unit price and budget spreadsheets containing the costs and expenses incurred in the execution of the project
- Copy of the Responsibility Protocol (PR) and Mutual Operation Procedure (PMO) covering all stages of operation, including pre-operation and decommissioning, where applicable
- Georeferenced data file, in digital format, for each facility to be authorized, which complies with the guidelines on the ANP website and with the ANP04C standard, or another that may replace it, if there has been a change in the data reported during construction

Questions should be sent to sim@anp.gov.br

4.1.5. Authorization of activities and facilities for the storage and handling of bulk compressed hydrogen by alternative modes of transport other than pipelines – *Superintendency of infrastructure and transportation (SIM)*

Authorizations relating to the activity and facilities for the storage and transportation of bulk compressed hydrogen by means other than pipelines must be submitted to the Infrastructure and Transportation Superintendency (SIM) within the SEI.

4.1.5.1. Authorization for the operation of facilities for the storage and handling of bulk compressed hydrogen by alternative modes of transport other than pipelines

The application for authorization to operate facilities for the storage and handling of bulk compressed hydrogen by alternative modes of transport other than pipelines must be submitted to the ANP, signed by the legal representative or agent, accompanied by the following documentation

- Identification document of the signatory of the application and, in the case of a representative, power of attorney;
- The company's articles of incorporation with the respective corporate amendments, registered with the Board of Trade or Civil Registry of Legal Entities, whose corporate purpose includes activities in the hydrogen industry;
- Documents of election of administrators or directors, if they are not expressly designated in the articles of incorporation;
- Simplified certificate issued by the Board of Trade;
- Proof of registration with the National Registry of Legal Entities (CNPJ) and registration with the Federal, State, and Municipal Treasuries;
- Operating license or other equivalent document issued by the competent environmental agency;
- Descriptive report of the packaging facility, signed by a qualified professional, containing, at least a description of the container storage area, loading platforms and points, fire protection system, lightning protection system, drainage system, waste and effluent treatment system, measurement system, safety valves, or other devices in the loading area;

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- General layout and floor plan of the site covering, at a minimum, storage, receiving, shipping, measurement, loading, unloading, maneuvering, administrative, and other buildings within the boundaries of the facility, highlighting the location and identification of the main systems and equipment, clearance distances, and area classification
- Risk analysis of the facility, signed by qualified professionals, containing, at a minimum, the methodology adopted in the identification of hazards, preventive and mitigating measures, recommendations, and conclusions
- Emergency response plan, signed by qualified professionals, supported by regulatory standards, safety regulations, technical standards, and current legislation
- Engineering flowcharts for equipment and instruments
- Certificate of commissioning of the installation, focusing on the safety of the facilities, issued by a technical entity independent of the applicant company and the construction company, which verifies, at a minimum:

  I. *signature of the respective technical managers of the specialties involved in the project, such as civil construction, mechanics, electrical, instrumentation, control, process, in a non-exhaustive manner;*

  II. *a statement signed by the legal representatives that the installation was built in accordance with the appropriate technical standards and is fit for safe operation, indicating all documents used to support the issuance of the commissioning certificate, including, among others, at least those relating to the safety and fire protection system, classification of areas with explosive atmospheres, lightning protection system (SPDA) and grounding system and minimum safety distances;*

  III. *technical responsibility note (ART) from the respective technical managers, issued by the competent professional association, signed by the contractor and the contracting party, with proof of payment; and*

  IV. *copy of the articles of association of the company contracted to perform this technical activity, registered with the commercial registry.*
- Inspection certificate or other document replacing it, issued by the Fire Department;
- Photographic report of the complete installation covering the container storage areas, loading areas, main equipment, and facilities;
- Statement of costs and expenses incurred in implementing the project;
- Georeferenced data file, in digital format, that complies with the guidelines on the ANP website regarding the requested georeferenced data files.

Questions should be sent to e-mail sim@anp.gov.br

4.1.5.2. Authorization for the movement of bulk compressed hydrogen

The application for authorization to distribute bulk compressed hydrogen, implement a project for own use, or implement a structural project involving compressed hydrogen must be accompanied by:

- Application, with identification document of the signatory and, in the case of a representative, power of attorney
- Company articles of incorporation with the respective corporate amendments, registered with the Board of Trade or Civil Registry of Legal Entities, whose corporate purpose includes activities in the hydrogen industry, with documents of election of administrators or directors, if they are not expressly designated in the articles of incorporation
- Simplified certificate issued by the Board of Trade
- Proof of registration with the National Register of Legal Entities (CNPJ) and registration with the Federal, State, and Municipal Treasuries
- Environmental licensing
- Proof of ownership of the packaging facility, or the service agreement, authorized by the ANP
- Registration with the competent professional association of the professional who will perform the function of technical manager for operations related to the distribution of bulk compressed hydrogen, in accordance with the relevant legislation, who may be formally linked to the applicant company or consortium, or hired for this purpose, and a note of technical responsibility (ART) for the performance of the position and function of the technical manager, together with proof of payment;
- Description of the flow of intended operations, including, at a minimum:
    i. *intended purpose(s), stating that it will serve the distribution of bulk compressed hydrogen, a structural project with compressed hydrogen, or for own use;*
    ii. *estimated period of the supply contract and structural projects with compressed hydrogen or for own use;*
    iii. *source(s) of hydrogen acquisition;*
    iv. *characteristics of hydrogen in compliance with current legislation;*
    v. *mode(s) of transport between origin and destination, providing the respective geographic coordinates;*
    vi. *monthly and annual estimate of the volume of compressed hydrogen to be packaged, marketed, and distributed and carried out by project for own use or structural project; and*
    vii. *potential markets and geographic regions served or to be served.*
- Descriptive summary of the project, including, at a minimum:
    i. *type(s) of mode(s), quantity(ies), characteristics of compressed hydrogen transport modes and load capacity, and whether they are owned or outsourced.*
    ii. *description of hydrogen storage equipment and facilities with respective geographic coordinates, including the characteristics and capacity of Compressed Hydrogen compressors;*

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iii. description of the compressed hydrogen loading area, number of loading points for compressed hydrogen transport vehicles, and measurement points; and

iv. description of the compressed hydrogen storage area and type(s) of storage (cylinder bundle, mobile compressed hydrogen assembly, or other).

Questions should be sent to e-mail sim@anp.gov.br

4.1.6. Low-carbon hydrogen imports activity authorization – *Superintendency of infrastructure and transportation (SIM)*

For authorizations relating to the importation of low-carbon hydrogen, the application must be submitted to Superintendency of Infrastructure and Movement (SIM) within the scope of SEI, accompanied by the following documentation:

- Application signed by the legal representative or authorized representative, identification document of the signatory and, in the case of an authorized representative, power of attorney, including the following information: name of the company or consortium; National Legal Entity Registration Number (CNPJ); Full address; Telephone numbers and email address; Volume of hydrogen to be imported and country of origin; Expected start date of imports; potential market to be served, also identifying, in the case of self-importers, the final destination of the product to be imported as raw material or fuel at their industrial facilities; mode of transport to be used for importing hydrogen; type of capacity contract to be used, in the case of imports via pipeline; place of delivery in the country; and specification of the hydrogen to be imported;
- Articles of incorporation, with respective corporate amendments, duly filed with the competent Board of Trade, accompanied, in the case of corporations, by the minutes of the election of their administrators or directors and, in the case of a consortium, by the corresponding instrument of its incorporation;
- Simplified certificate issued by the Board of Trade;
- Proof of registration in the Federal, State, and Municipal Taxpayer Registry for the parent company and branches related to the activity of importing low-carbon hydrogen.

Questions should be sent to e-mail sim@anp.gov.br

4.1.7. Low-carbon hydrogen exports activity authorization– *Superintendency of infrastructure and transportation (SIM)*

For authorizations relating to the export of low-carbon hydrogen, the application must be submitted to the Superintendency of Infrastructure and Movement (SIM) within the scope of SEI, accompanied by the following documentation:

- Application signed by the legal representative or agent, with identification document of the signatory, in the case of an agent, power of attorney, including the following information: name of the company or consortium; National Legal Entity Registration Number (CNPJ); full address; telephone numbers and email address; volume of hydrogen to be exported; Expected start date of exports; justification for exports
- Proof of registration with the Federal, State, and Municipal Taxpayer Registry for the parent company and branches involved in hydrogen exports;
- Articles of incorporation, with respective amendments, duly filed with the competent Board of Trade, accompanied, in the case of corporations, by the minutes of the election of their administrators or directors and, in the case of a consortium, by the corresponding instrument of its incorporation; and
- Simplified certificate issued by the Board of Trade.

Questions should be sent to e-mail sim@anp.gov.br

4.1.8. Hydrogen Refueling Station Authorization – *Supply and Logistics Superintendency (SDL)*

For authorizations relating to the retail sale of low-carbon hydrogen, the application must be submitted to the Superintendency of Supply and Logistics (SDL) within the scope of SEI, accompanied by the following documentation:

- Authorization request from the interested party signed by the legal representative or attorney, accompanied by a certified copy of the legal representative's identification document or a certified copy of the power of attorney and the respective identification document, when applicable;
- Company registration details, full address, with georeferenced data of the facility, responsible parties, and contacts
- Copy of the articles of incorporation of the legal entity and all amendments made or the latest consolidated contractual amendment, registered and filed with the Board of Trade, specifying the activity of retail resale of hydrogen, whose records may not differ from those contained in the CNPJ (National Register of Legal Entities) registry;
- Certificate from the Board of Trade containing the history of amendments to the articles of incorporation of the legal entity;
- Copy of the operating license
- Environmental License
- Inspection Certificate or equivalent document from the competent Fire Department
- Hydrogen Refueling Station Commissioning Certificate, signed by an Engineer with a degree in a subject relevant to the topic
- Information about the installation project

Questions should be sent to revenda.sdl@anp.gov.br or autorizacoes.sdl@anp.gov.br

5.

TECHNICAL SPECIFICATIONS OF HYDROGEN FUEL

5. Specifications of hydrogen fuel

Among the mandatory requirements for hydrogen regulation is the physical-chemical specification that depends on its end use, especially if it is intended for applications such as vehicle fuel (hydrogen fuel), industrial use, or chemical processes.

For technical reference purposes, internationally established specifications can be considered, especially for vehicle-grade hydrogen fuel (hydrogen used in fuel cells for vehicles) referenced in ISO 14687 – Hydrogen fuel – Product specification.

In turn, the NBR ISO 14687 standard - Hydrogen fuel - Product specification - Part 1: All applications except proton exchange membrane (PEM) fuel cells for motor vehicles, adopted in Brazil as a technical standard by ABNT, establishes the quality and purity requirements for hydrogen fuel used in fuel cell applications. Its purpose is to ensure the safety, performance, and service life of hydrogen-based energy systems, especially those used in mobility, stationary installations, and portable equipment.

The above standard specifies the minimum purity of hydrogen and the maximum permissible limits for various impurities, which, if present in higher concentrations, can compromise the functioning of the fuel cell.

Compliance with this standard is essential for the international standardization of hydrogen fuel and for the safe development of the hydrogen economy, especially in the context of the energy transition.

Applications are organized into three classes of use: vehicle (high purity requirements and low tolerance for contaminants), stationary (continuous or long-term use in fixed power generation or cogeneration systems), and portable (use in mobile and electronic devices with fuel cells).

ISO 21087 – Hydrogen fuel – Analytical methods – Proton exchange membrane (PEM) fuel cell applications for road vehicles is the international standard that defines the analytical methods applicable to determine the composition and contaminants in hydrogen fuel used in fuel cells, especially PEM (Proton Exchange Membrane) type. This is not a single analytical method, but a reference guide that standardizes the quality and sensitivity required in analytical tests of hydrogen fuel. It defines minimum criteria for any laboratory to verify product compliance with ISO 14687. It is worth mentioning that "fuel-grade hydrogen" should be understood as high-purity "hydrogen gas" suitable for use as fuel in proton exchange membrane fuel cells.

5.1. Quality control of hydrogen fuel

To verify that hydrogen complies with quality specifications, especially in the case of vehicle-grade hydrogen fuel, the quality control procedure must follow internationally recognized technical guidelines, such as ISO 14687 (specifications) and ISO 21087 (analytical methods).

It should be noted that sampling and testing must be carried out by laboratories with recognized technical competence. Like other products regulated by the ANP, it is understood that hydrogen fuel made available to the end consumer will be accompanied by a quality certificate issued by an accredited laboratory or the production unit, as will be proposed in specific ANP regulations.

For reference, below are the physical and chemical specifications for hydrogen fuel according to ISO 14687.

Table 1 – Physical and Chemical Specifications of Hydrogen Fuel (ISO 14687) Reference: ISO 21087

Parameter	Unit	Class A (Vehicular)	Class B (Stationary)	Class C (Portable)	Standard
Minimum purity of H_2 (% mol)		≥ 99,97	≥ 99,99	≥ 99,0	ISO 14687
Moisture (H_2O)	µmol/mol	≤ 5	≤ 5	≤ 50	ISO 21087
Oxygen	µmol/mol	≤ 5	≤ 5	≤ 2.000	ISO 21087
Carbon monoxide	µmol/mol	≤ 0,2	≤ 0,2	≤ 10	ISO 21087
Carbon dioxide	µmol/mol	≤ 2	≤ 2	≤ 300	ISO 21087
Methane	µmol/mol	≤ 100	≤ 100	≤ 100	ISO 21087
Hydrocarbons (C ≥ 2)	µmol/mol	≤ 2	≤ 2	≤ 10	ISO 21087
Formaldehyde / Formic acid	µmol/mol	≤ 0,2	≤ 0,2	-	ISO 21087
Sulfur compounds (e.g., H_2S)	µmol/mol	≤ 0,004	≤ 0,004	≤ 0,1	ISO 21087
Ammonia	µmol/mol	≤ 0,1	≤ 0,1	≤ 100	ISO 21087
Halides (total)	µmol/mol	≤ 0,05	≤ 0,05	≤ 0,2	ISO 21087
Chlorides (e.g., HCl)	µmol/mol	≤ 0,05	≤ 0,05	≤ 0,2	ISO 21087
Nitrogen	µmol/mol	≤ 300	≤ 300	≤ 2.000	ISO 21087
Helium	µmol/mol	≤ 300	≤ 300	≤ 2.000	ISO 21087
Argon	µmol/mol	≤ 100	≤ 100	≤ 2.000	ISO 21087
Solid particles	µmol/mol	undetectable	undetectable	-	ISO 21087

Notes:

(1) Supply pressure: typically 35 MPa (H35) or 70 MPa (H70), depending on the type of supply.
(2) Physical state: gaseous (H_2) or cryogenic liquid (LH_2), depending on the application.
(3) Class A: Hydrogen for vehicular applications;
(4) Class B: Hydrogen for stationary systems;
(5) Class C: Hydrogen for portable applications.
(6) Contaminant: Any compound present in hydrogen fuel that could compromise the performance, durability, or safety of the fuel cell.

Table 2 shows the recommended analytical techniques for determining contaminants and physical-chemical parameters for fuel-grade hydrogen, according to the specifications set out in Table 1 (Reference: ISO 21087).

Table 2 – Recommended analytical techniques by characteristic

Characteristic	Recommended Analytical Technique	Remarks
Purity of hydrogen (H_2)	Gas chromatography (GC-TCD)	Determination of the molar fraction of H_2
H_2O (water vapor)	Electrolytic sensor, IR spectroscopy, or GC with water trap	LOD ≤ 0.5 µmol/mol
O_2	GC-TCD or paramagnetic detector	LOD ≤ 0.5 µmol/mol
N_2 and Ar	GC-TCD	Separation of inert gases
CO_2	GC-TCD or GC-FID with methanation	Important to avoid interference with H_2
CO	GC-FID with methanation or photoionization detector (PID)	Sensitive technique; LOD ≤ 0.02 µmol/mol
CH_4	GC-FID	Quantification of light hydrocarbons
Hydrocarbons (C ≥ 2)	GC-FID	Analysis of ethane, ethene, propane, etc.
Total sulfur (H_2S + COS etc.)	GC with sulfur chemiluminescence detector (SCD)	LOD ≤ 0.0004 µmol/mol
NH_3	GC with derivatization or mass spectrometry (MS)	May require preconcentration
Halides (HF, HCl, etc.)	Liquid collection + ion chromatography or mass spectrometry	Requires passive or active sampling
Formaldehyde/Formate	HPLC or GC-MS with derivatization	Trace-sensitive technique
Formic acid	HPLC or GC-MS with derivatization	Same as above

Notes:

(7) The limits of detection (LOD) of the methods used should preferably be less than 10% of the limits established in ISO 14687:2019.

(8) The collection and packaging of samples should follow practices that prevent the adsorption of contaminants on surfaces or loss due to secondary reactions.

(9) The frequency of equipment calibration, the use of traceable standards, and internal validation of methods are essential requirements to ensure the metrological traceability of results.

(10) Laboratories must submit a technical report containing the methods used, the respective detection limits, and analytical uncertainties.

(11) Methods must be validated for accuracy, precision, and selectivity. Os limites de detecção (LOD) dos métodos utilizados devem ser, preferencialmente, menores que 10% dos limites estabelecidos na ISO 14687:2019.

Additional questions can be clarified by email: hidrogenio@anp.gov.br


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