

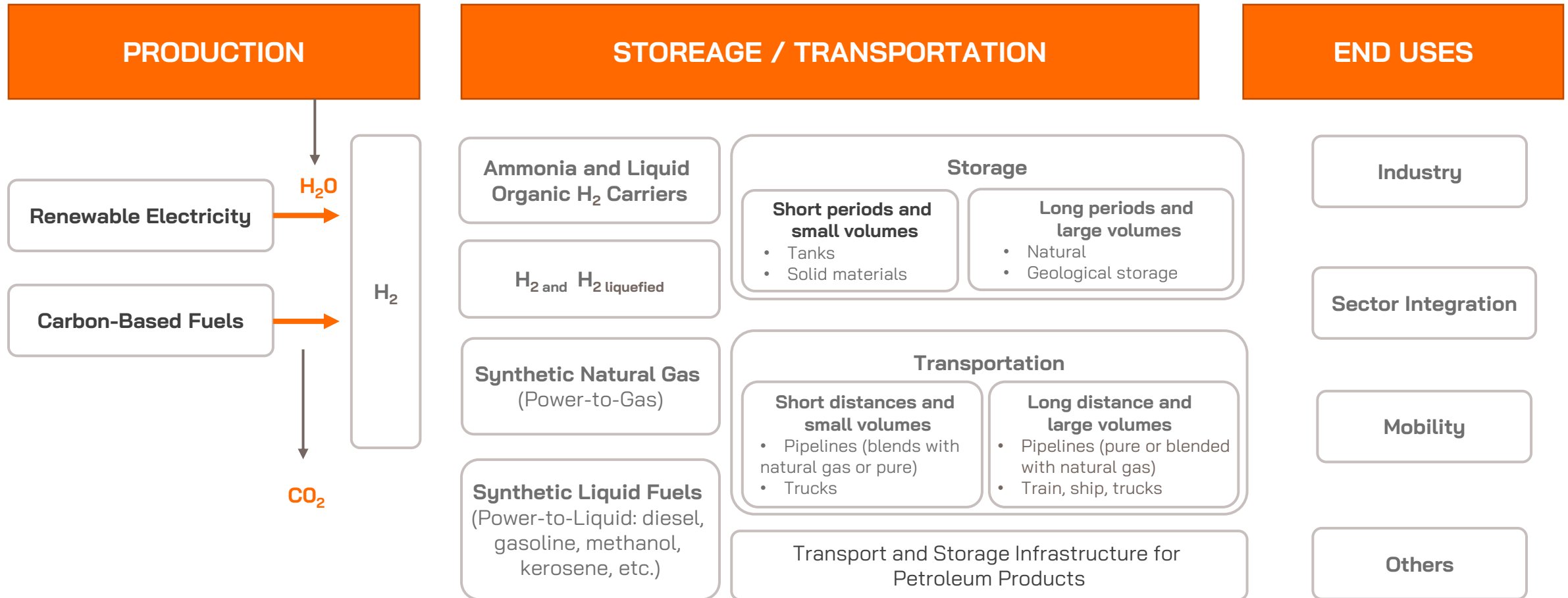


Hydrogen

Applus+

▶ 2025





Generation

Storage

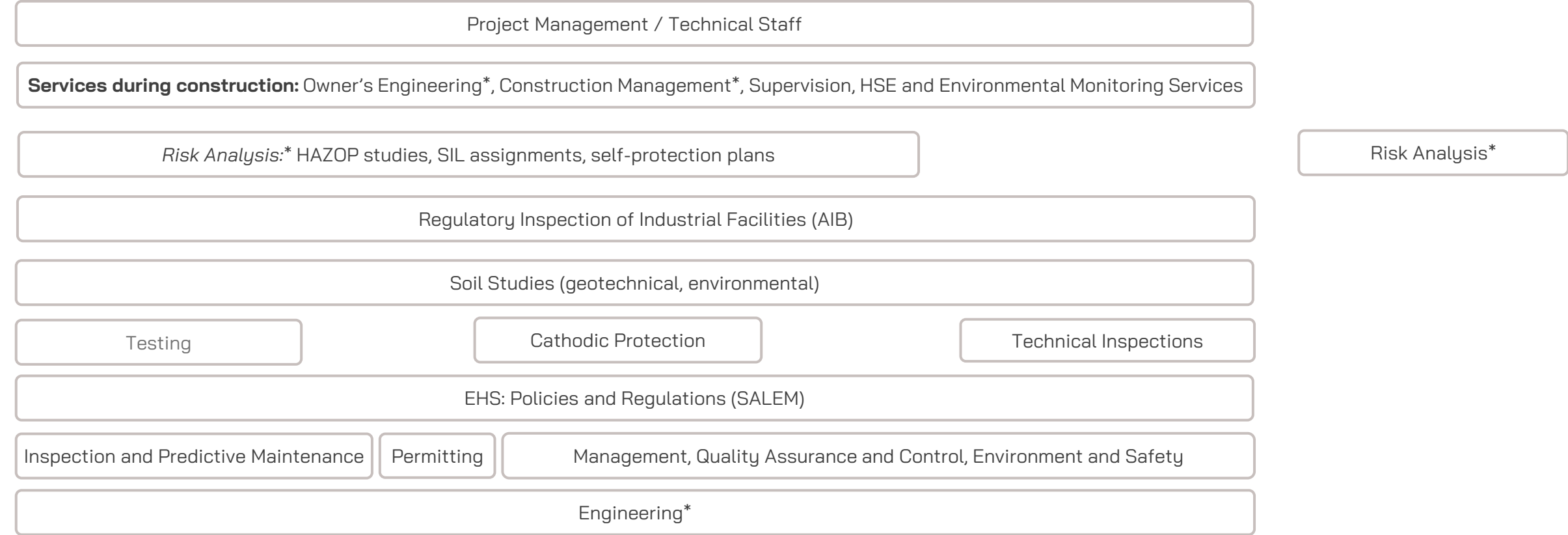
Transportation

Distribution

End use



VALUE CHAIN



* According to widely accepted standards, we do not provide accredited consulting, engineering, and inspection services for the same client on the same subject. We also do not provide consulting services for the same client on the same management system.

VALUE CHAIN

Production

Storage

Transportation

Distribution

End Use

During the construction process

- + Project management, property engineering, technical supervision, safety and health coordination, environmental monitoring, and control and assurance of inspection measurement equipment.
- + ARisk analysis: HAZOP studies, SIL assignment, self-protection plans.
- + Identification of applicable legislation in occupational risk prevention (PRL), industrial safety, and environment (SALEM).
- + Soil characterization studies, including geotechnical and environmental studies.

During the maintenance process

- + Regulatory inspections as an Authorized Inspection Body.
- + Inspection and predictive maintenance.
- + Analysis of produced hydrogen.

Implementation of the Customer Management System

- + Quality, Safety, and Environmental Management Systems
- + Technical inspection procedures.



VALUE CHAIN

Production

Storage

Transportation

Distribution

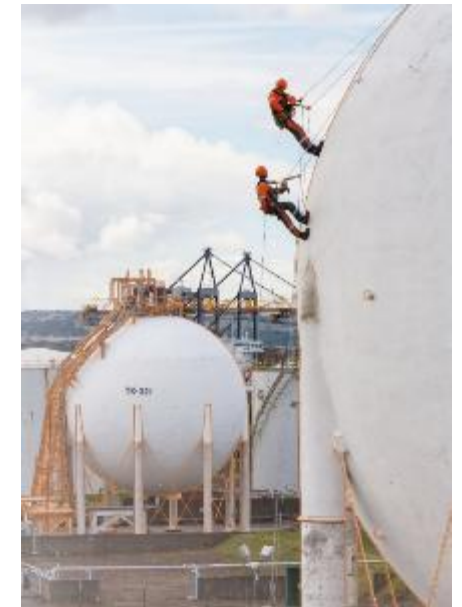
End Use

During the construction process

- + Project management, property engineering, technical supervision, safety and health coordination, environmental monitoring, and control and assurance of inspection measurement equipment.
- + Risk analysis: HAZOP studies, SIL assignment, self-protection plans.
- + Identification of applicable legislation in occupational risk prevention (PRL), industrial safety, and environmental matters (SALEM).
- + Engineering.
- + Soil characterization studies, including geotechnical and environmental studies.

During the maintenance process

- + Regulatory inspections as an Authorized Inspection Body.
- + Inspection and predictive maintenance.
- + Implementation of the Customer Management System
 - Quality, Safety, and Environmental Management Systems.
 - Technical inspection procedures.



VALUE CHAIN

Production

Storage

Transportation

Distribution

End Use

Service management and processing

- + Conceptual design; grid connection point.
- + Energy quality studies.
- + Environmental permits (environmental, urban planning, cultural heritage permits, etc.).

During the construction process

- + Project management, property engineering, technical supervision, safety and health coordination, environmental monitoring, and control and assurance of inspection measurement equipment.
- + Risk analysis: HAZOP studies, SIL assignment, self-protection plans.
- + Identification of applicable legislation in occupational risk prevention (PRL), industrial safety, and environmental matters (SALEM).
- + Engineering: onshore–onshore; ship-to-shore.

During the maintenance process

- + Regulatory inspections as an Authorized Inspection Body.
- + Inspection and predictive maintenance.
- + Cathodic protection.



VALUE CHAIN

Production

Storage

Transportation

Distribution

End Use

During the construction process

- + Project management, property engineering, technical supervision, safety and health coordination, environmental monitoring, and control and assurance of inspection measurement equipment.
- + Identification of applicable legislation in occupational risk prevention (PRL), industrial safety, and environmental matters (SALEM).
- + Engineering.

During the maintenance process

- + Regulatory inspections as an Authorized Inspection Body.
- + Inspection and predictive maintenance.



VALUE CHAIN

Production

Storage

Transportation

Distribution

End Use

Implementation of the Customer Management System

- + Quality, Safety, and Environmental Management Systems.
- + Technical inspection procedures.
- + Risk analysis: HAZOP studies, SIL assignment, self-protection plans.





REFERENCES

- ▶ 2025
- ▶ Applus+

ACTIVITY	PROJECT	DATE
Engineering	Conceptual engineering study for the implementation of green hydrogen production plants (by electrolysis), green ammonia, and green methanol in the national territory (Bolivia).	2025
Supervision	Supervision of the medium-voltage interconnection works (Colombia).	2023
Engineering	Service for the Integration of Electrical Engineering for the H2 Project (Chile).	2022
Engineering	Senior Protection Specialist Service for the H2 project. (Chile)	2022
Inspection	Technical Audit Service. (Chile).	2022
Inspection	Third-party inspection of pressure vessels at a green hydrogen plant (Belgium).	2025
Inspection	Analysis of the effect of hydrogen on the autoignition temperature of gas streams.	2025

ACTIVITY	PROJECT	DATE
ATEX	ATEX Assistance: Technical report for the siting of a new hydrogen (H ₂) pressure reduction station from 60 to 16 bar.	2025
ATEX	Hydrogen in cylinders. Ethanol stored in small laboratory containers.	2025
ATEX	Hazardous area classification for trucks with lead-acid batteries (H ₂ emissions).	2025
ATEX	Hydrogen in cylinders for laboratory use. Ethanol produced as a reaction product in reactors.	2025
ATEX	Hydrogen cylinder storage.	2025
Engineering	Process engineering (P&IDs and operating descriptions) for the systems of a 20 MW electrolysis plant.	2025
Engineering	Detailed engineering of a plant with a 2.5 MW electrolysis capacity, including a compression system, high-pressure storage, and a refueling station for buses.	2021

ACTIVITY	PROJECT	DATE
Engineering	Detailed engineering for a plant with a 1.25 MW electrolysis capacity, including a compression system, high-pressure storage, and connection to the factory grid.	2022
Studies including cases of leaks	New hydrocarbon hydrogenation plant using hydrogen in cylinder platforms.	2025
Studies including cases of leaks	Use of hydrogen in process platforms at nuclear power plants.	2025
Studies including cases of leaks	Hydrogen in cylinder platforms.	2019
Studies including cases of leaks	Health and Safety coordination in the 2.5 MW electrolyzer project at Petronor, Muskiz.	2022
Studies including cases of leaks	Use of hydrogen in refinery processes. Use of ethanol for gasoline blending.	2025
Studies including cases of leaks	Use of hydrogen for petrochemical processes in polyolefin production.	2025

ACTIVITY	PROJECT	DATE
Studies including cases of leaks	Detailed engineering for a plant with a 1.25 MW electrolysis capacity, including a compression system, high-pressure storage, and connection to the factory grid.	2025
Studies including cases of leaks	Use of hydrogen in petrochemical processes for polyolefin production.	2025
HAZOP studies and SIL assignment	Use of hydrogen for reducing sulfur content in petroleum distillates.	2025
HAZOP studies and SIL assignment	Use of hydrogen for diolefin reduction and sweetening (removal of sulfur compounds).	2020
HAZOP studies and SIL assignment	Use of hydrogen for olefin reduction in pyrolysis gasoline.	2020
HAZOP studies and SIL assignment	Use of hydrogen for reducing the content of petroleum distillates.	2025
HAZOP studies and SIL assignment	Use of hydrogen for the utilization of heavy fractions.	2025

ACTIVITY	PROJECT	DATE
HAZOP studies and SIL assignment	Hydrogen production by catalytic reforming.	2025
Geotechnical study	Soil and groundwater baseline report.	2025
Environmental Impact Studies	Drafting of the Environmental Impact Study and application for Integrated Environmental Authorization.	2025
Safety study	Safety study for the green hydrogen plant.	2025
Preliminary study – report on the legal framework	Green hydrogen generation plant in Pego.	2025
Health and safety coordination	H&S Coordination Services (CSO) at the Green Hydrogen Plant.	2025
Environmental Impact Study	Drafting of the Environmental Impact Assessment and application for the Integrated Environmental Authorization.	2025

ACTIVITY	PROJECT	DATE
Safety Study	Safety study for an ammonia plant.	2025
Environmental Impact Study	Drafting of the Environmental Impact Assessment and application for the Integrated Environmental Authorization.	2025
Environmental Impact Studies	Preparation of the required documentation for the Integrated Environmental Authorization (IEA) application for green hydrogen production through water electrolysis.	2025
HAZOP studies and SIL assignment	HAZOP and SIL assignment for the G1 middle distillate desulfurization unit.	2025
Verification of SIL levels	Verification of SIL levels for the G1 middle distillate desulfurization unit.	2025
Verification of SIL levels	Verification of SIL levels for the G4 diesel desulfurization unit.	2025
Verification of SIL levels	Verification of SIL levels for the N2 naphtha desulfurization unit.	2025

ACTIVITY	PROJECT	DATE
Verification of SIL levels	Verification of SIL levels for the N1 naphtha desulfurization unit.	2025
HAZOP studies and SIL assignment	Verification of SIL levels for the Hydrodesulfurization Unit 3 (HD3).	2025
HAZOP studies and SIL assignment	Use of hydrogen for reducing the sulfur content in petroleum distillates.	2025
HAZOP studies and SIL assignment	HAZOP and SIL assignment for the H4 hydrogen production plant.	2025
HAZOP studies and SIL assignment	Use of hydrogen for the utilization of heavy fractions.	2025
HAZOP studies and SIL assignment	Use of hydrogen for the utilization of heavy fractions.	2025

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