

Training - Low-Carbon Hydrogen - H2BC



H2BC-EN-P



Face-to-face only



3 days

To provide the necessary technical knowledge on hydrogen, its value chain and its production methods, making it possible to understand and anticipate the challenges of the development of hydrogen as a solution in the energy transition

Level

Expert

Public

Engineers, technical executives or project managers involved in hydrogen logistics and/or production

Objectives

Attendees will be able to implement the following skills:

- describe the different modes of production, storage and transport of hydrogen
- understand the strengths and limiting elements of each pathway

Pedagogical & technical resources

- Highly interactive synchronous training. Quiz.
- Through our LMS, training documentation, applications and complementary content are shared.

Assessment of achievements

Quiz

Prerequisites

No prerequisites are necessary to follow this course

Responsible

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

CONTEXT

0.5 day

Brief overview of climate change: current situation, regulatory framework, impacts on businesses.
Priority applications for low-carbon hydrogen: energy carrier, chemical intermediates, industrial H2
Hydrogen “rainbow,” low-carbon hydrogen: distinguishing between different qualifiers, costs, orders of magnitude, advantages, and limitations.

HYDROGEN STORAGE AND TRANSPORT

0.75 day

Physicochemical properties of hydrogen.
Regulatory aspects - Safety.
Packaging : Compression, liquefaction, hydrogen transformation.
Description of the different types of hydrogen storage:

- Buffer storage in production sites before transport.
- Natural cavities.

- Cryogenic storage.
- Absorption or adsorption of hydrogen in a solid or liquid.

Description and use of the different modes of transport for hydrogen:

- Pipeline Transportation.
- Transport by road, rail and sea.

HYDROGEN USES

0.25 day

Hydrogen needs in the refining industry.

Hydrogen for mobility.

Manufacture of synthetic fuels.

FOSSIL HYDROGEN PRODUCTION

0.25 day

Grey hydrogen production methods: reforming and catalytic steam reforming of hydrocarbons, partial oxidation (POx), "hybrid" autothermal reforming (ATR) route:

- Schematic diagram, main operating conditions. Examples of achievements.
- Characteristics of the hydrogen produced.
- Energy considerations. Selection criteria.

FOCUS ON ELECTROLYSIS

0.5 day

Electrolysis: principles and reactions.

Presentation of the different technological blocks around the electrolyser: water treatment, hydrogen purification, storage, compressors and other equipment.

Dimensioning of the electrolyzer power supply. Specific constraints related to intermittency. Electrical auxiliaries.

The different types of electrolyzers: alkaline, PEM and solid oxide:

- Description.
- Special features. Pros and Cons.
- Maturity and initial feedback.
- LCOH, Efficiencies, Current Density, and Power Requirements.

Possible recovery of the heat and oxygen produced by the electrolyser.

LOW-CARBON HYDROGEN PRODUCTION WAYS

0.75 day

Production of fossil hydrogen with CCS. The different modes of CO₂ capture: cryogenics, amine process, other solvent-based processes, membrane-based processes, etc.

Water electrolysis with renewable energy.

Production from biomass: gasification.

Purchases of Renewable Certificates of Origin.

Other pathways: photoelectrolysis, native H₂, plasma, etc.

Comparison of the different production methods.

Case Studies.

To French entities : IFP Training is referenced to DataDock ; you may contact your OPCO about potential funding.

Please contact our disabled persons referent to check the accessibility of this training program : referent.handicap@ifptraining.com