

# HYDROGEN TERRITORY

## hydrogen starts here

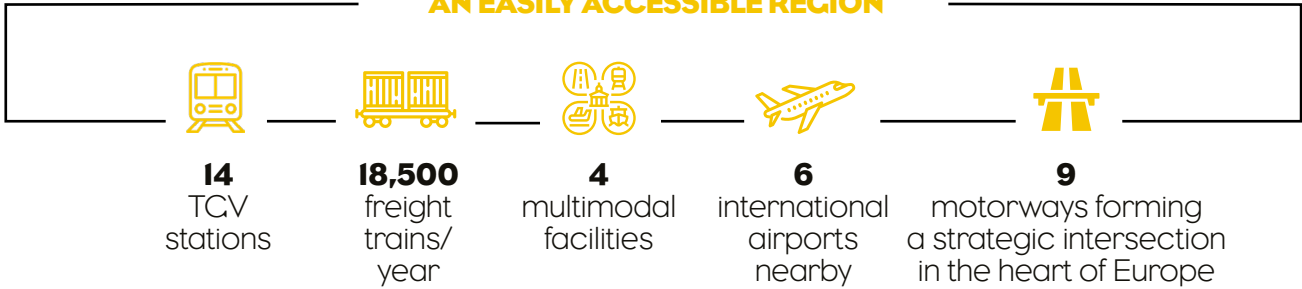
RÉGION  
BOURGOGNE-  
FRANCHE-COMTÉ



## A STRATEGIC POSITION IN EUROPE

With its business parks, infrastructure and business services, Bourgogne-Franche-Comté creates ideal conditions for the successful completion of your projects.

### AN EASILY ACCESSIBLE REGION



#### POPULATION

**2.8 MILLION**  
**42 MILLION**  
WITHIN 4 HOURS' REACH



#### EDUCATION

**80,000 STUDENTS**  
**30,000 YOUNG**  
APPRENTICES



#### BUSINESSES

**367,200 BUSINESSES**  
**19,300 INDUSTRIAL ESTABLISHMENTS**



#### JOBS

**1.3 MILLION PEOPLE IN THE WORKFORCE**  
**23% OF EMPLOYEES IN INDUSTRY**



**No.1**

**INDUSTRIAL REGION**  
IN TERMS OF JOBS  
(1 IN 5 EMPLOYEES)

**2<sup>nd</sup>**





**BEST REGION FOR**  
**SHARE OF INDUSTRIAL**  
**ADDED VALUE**

**3<sup>rd</sup>**

**LARGEST**  
**EXPORTING REGION**

**81.7**

**€81.7 BILLION**  
**GDP**

-  European main roads and high speed trains
-  International airports
-  Capital cities
-  Main cities

Reference data:  
figures available in 2024





## REGIONAL SUPPORT FOR HYDROGEN

The objective of Bourgogne-Franche-Comté is to become a Positive Energy and carbon neutral region looking forward to 2050. The Hydrogen roadmap, developed in conjunction with all those involved in the hydrogen ecosystem, confirms the Bourgogne-Franche-Comté region's commitment to embracing the challenge of ecological and energy transition. The projects and territories committed to hydrogen in Bourgogne-Franche-Comté have received more than €800 million in support from the French State and the Region.

### SUPPORT FROM THE REGION



research



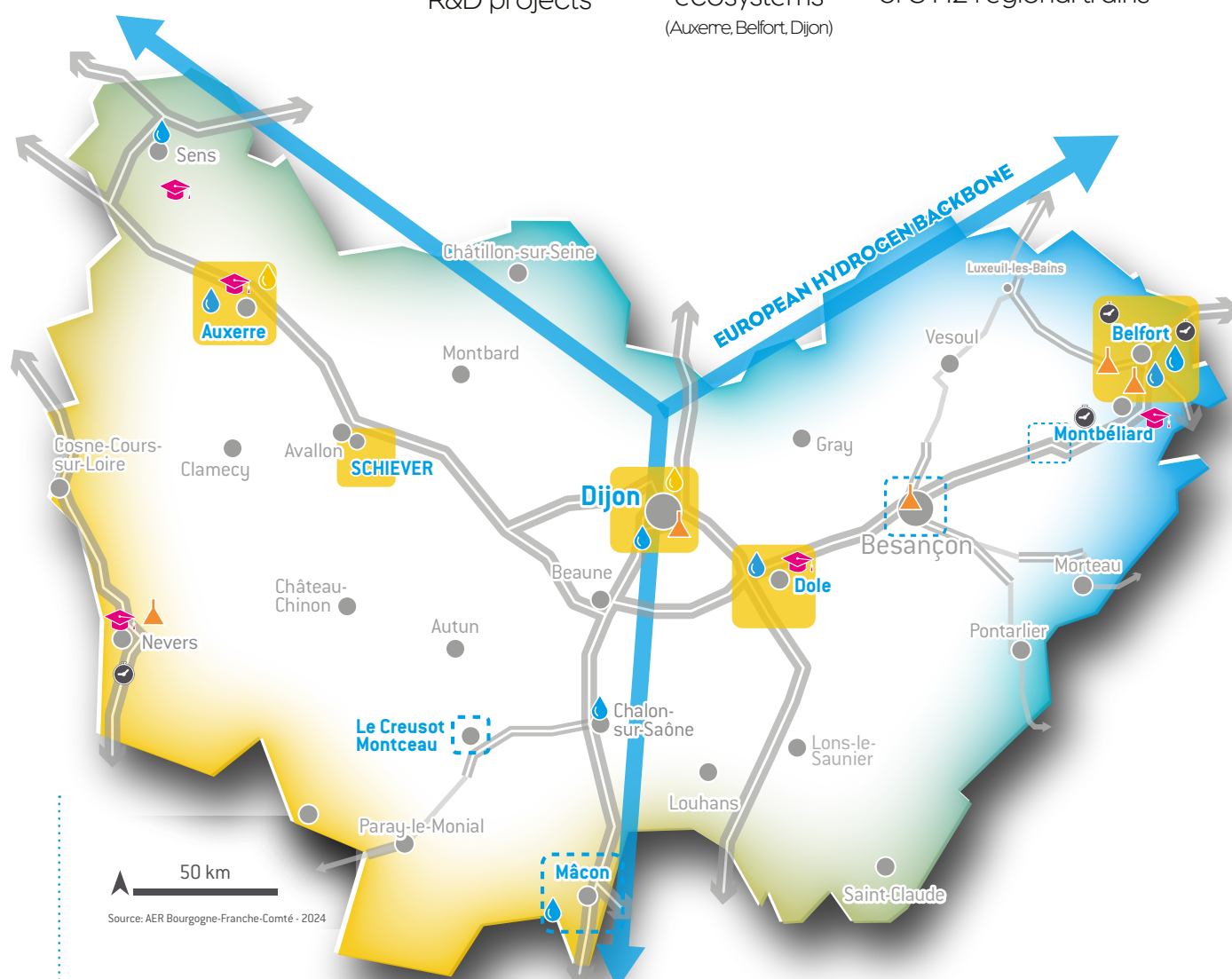
businesses' R&D projects



regional ecosystems  
(Auxerre, Belfort, Dijon)



acquisition of 3 H2 regional trains



H<sub>2</sub> ecosystem projects



H<sub>2</sub> mobility ecosystems



H<sub>2</sub> station planned or under construction



H<sub>2</sub> operational station



Fuel cell and storage test centres



Laboratories, research



H<sub>2</sub> stations and vehicles in 5 high schools



Highways

## STRONG PRESENCE OF BUSINESSES ALONG THE ENTIRE H2 VALUE CHAIN FROM PRODUCTION TO USES

As part of its regional strategy, Bourgogne-Franche-Comté is building an industrial ecosystem to cover the Hydrogen value chain as extensively as possible, from production and storage to the various uses (mobile or stationary, etc.).



### TRAINING

(find out more on pages 10 and 11)

### RESEARCH

University of Burgundy  
University of Franche-Comté  
University of Technology of Belfort-Montbéliard  
Vocational and technological lycées  
AFPA  
CNAM  
SupMicroTech - ENSMM  
UIMM  
Bureau Veritas  
H2 School FORVIA

FEMTO-ST  
FCLAB  
UTBM  
ICB Laboratory  
Drive Laboratory  
Alstom  
FORVIA Faurecia  
General Electric  
Oreca  
Schrader Pacific

### ENERGY SUPPLIERS

Air Liquide  
Avia  
DATS24  
Engie  
FluidExpert  
Remote, stand-alone H2 production units  
General Electric  
Hynamics  
H2sys  
Hydrogen-fuelled hybrid electric generators for a power range from 5 kVA to 130 kVA  
INTHY  
Total Energies

### ENGINEERING CONSULTANCY FIRMS

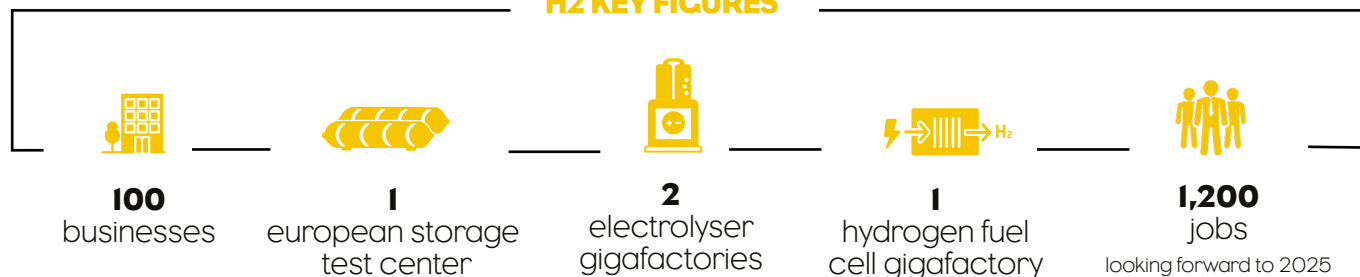
AKKA  
Bertrandt  
Bureau Veritas  
DYG Energy  
H2sys  
Segula  
Synopsis

### STORAGE

ISTHY  
FORVIA Faurecia  
Complete gaseous and liquid hydrogen storage tanks and systems, for mobile and stationary applications  
Mahytec Hensoldt  
Hydrogen tanks and storage technologies for mobile and stationary applications  
Mincatec Energy  
Schrader Pacific  
High-technology valves and safety devices for high-pressure storage systems  
Sundyne

### SUPPORT AND MENTORING STRUCTURES COMPETITIVENESS AND PERFORMANCE

## H2 KEY FIGURES



## BUSINESSES \*

COMPONENTS  
AND SPECIALITIES

## HYDROGEN FUEL CELLS

## ELECTROLYSERS

## VEHICLE INTEGRATION AND SOLUTIONS

Adhex

Delfingen  
Fluid transfer  
solutions for  
adaptation  
to Hydrogen  
applications

FluidExpert  
High-efficiency H2  
compressors

Gen-Hy  
Patented electrodes/  
membranes

Laser Cheval

Presse Etude

SON SAS  
Nanoproducts

Streit  
Design, machining  
and assembly  
of mechanical  
components,  
including  
components for  
hydrogen fuel cell  
systems

Suntec  
H2 gas/natural gas  
mixer

Technitube

Clhynn

H2sys

Inocel  
High-power fuel  
cells (300 kW and  
more)

Gen-Hy  
AEM electrolyzers

McPhy

Alstom  
Development  
of a Hydrogen  
version of its  
new Prima H4  
locomotive

Avionéo

Avions  
Mauboussin

Danielson

FPT Iveco

Fruehauf  
H2-powered  
autonomous trailer

H2Sys  
Special vehicles

Ligier

Oreca

Packmat System

RH2  
H2 thermal  
retrofitting

Stellantis

Texy's Group  
H2 motorbikes

Vaison Sport  
H2-powered buggies

Valmétal

TESTBEDS,  
TESTS AND  
CERTIFICATION

ISTHY

FCLAB

FORVIA Faurecia

Emitech Groupe

Oreca

Gen-Hy  
Service life and  
operating point  
testbeds



MECATEAMCLUSTER





## HYDROGEN IS IN OUR GENES!

The earliest work on Hydrogen Fuel Cell systems in Bourgogne-Franche-Comté began in 1999 with the members of the FC Lab research federation (later known as UAR FC Lab), associated with the CNRS (National Centre for Scientific Research).

In 2016, the region was certified as a "Hydrogen Territory" following a number of major demonstration projects putting the Hydrogen energy vector into practice in the region.



**2002**

**1<sup>st</sup> research facility** dedicated to Hydrogen Fuel Cell systems

**2011**

**1<sup>st</sup> French registration** of an approved Hydrogen vehicle: the F-City H<sub>2</sub>

**2015**

Creation of the **1<sup>st</sup> Master of Engineering course: Hydrogen Energy and Energy Efficiency** at uFC, ONE OF A KIND IN FRANCE

**2017**

Creation of the H2SYS spin-off

Marketing of the **1<sup>st</sup> H2 power generators** by H2SYS

1<sup>st</sup> financing for ENRgHy projects

**1999**

**1<sup>st</sup> research activities** related to Hydrogen Energy and Hydrogen Fuel Cells

**2008**

Start of Hydrogen-related activities at **MAHYTEC**

**2014**

**1<sup>st</sup> "Moby Post" and "MobilHy Test" experiments** in Bourgogne-Franche-Comté

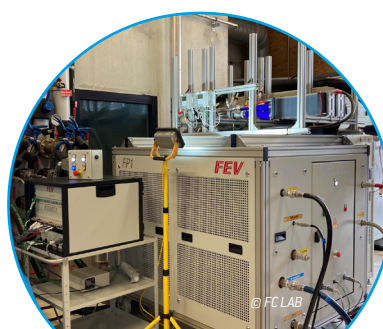
**2016**

**"Hydrogen Territory" certification** for Bourgogne-Franche-Comté with ENRgHy

**2019**

Rougeot Energie company founded (now INTHY) to implement the **ISTHY project (International test and trial facility for qualification of H2 storage solutions)**

HYBAN project: France's only testbed for high-power hydrogen fuel cells, supported by FCLAB





2019

Auxerre winner of ADEME's nationwide H2 ecosystem calls for projects in 2019 and 2020

Nord-Franche-Comté, **winner of the Territoires d'Innovation call for projects** as part of the Programme d'Investissements d'Avenir (Investing in the Future Programme): €70 M

Hydrogen stations and vehicles in 5 *lycées*

Application submitted for experimentation of the first H2 train

Launch of the Dijon mobility ecosystem (H2 station, buses and refuse collection vehicles)



2020

Inauguration of the **FAURECIA centre of global expertise on H2 tanks**

Faurecia plant announced for production of fuel tanks in the Belfort-Montbéliard urban area

McPhy

2021

Opening of new H2SYS premises: transition to the industrial phase

Announcement of a **McPhy site** coming to Fontaine, Belfort: the 1<sup>st</sup> alkaline electrolyser factory in France

Inauguration of Auxerre's **AuxHyGen** station and introduction of the 1<sup>st</sup> H2 buses

Completion of FAURECIA's H2 tank production factory

Success of the **1<sup>st</sup> Hydrogen Business For Climate Forum** in Belfort


 gen-hy  
HYDROGEN SOLUTIONS

2022

**Setting up of GEN-HY** in Technoland, France's 1<sup>st</sup> H2 electrolyser plant featuring its AEM technology

2023

Inauguration of the **FORVIA plant for the mass production of hydrogen tanks** in Allenjoie

Opening of the Danjoutin H2 station (Belfort)

**Setting up of the INOCEL gigafactory** to manufacture hydrogen fuel cells in Belfort


 inocel  
Hydrogen powered solutions


@ Inocel

## MAJOR OPERATIONAL PROJECTS

Since Bourgogne-Franche-Comté became a certified Hydrogen Territory in 2016, many projects have been funded and deployed across the region, including the following\*...



### BELFORT E-START

Creation of France's largest renewable energy community and number one in office buildings, with a photovoltaic production capacity of 3.3 MWc, combined with energy storage solutions based on batteries and green hydrogen



### AUXR\_H2

Development of an ecosystem focused primarily on mobility applications (Bus, HGV, LV, RCV, regional trains), retrofitting and training



### DANJOUTIN STATION (BELFORT)

Multimodal H2 production, storage and distribution station, to power buses in the Greater Belfort area, within an industrial ecosystem



### TES - ENERGY TRANSITION OF THE SCHIEVER GROUP

First private ecosystem for heavy H2 mobility: production, storage and distribution station + fleet of H2 refrigerated trucks



### FCLAB

Industrial testbed for electrolyzers and high-power PEMFC hydrogen fuel cells (100-120 kWe)



### TERRITOIRE HABITAT 90

New demonstrator building equipped with a hydrogen production, storage and use system for heating and domestic hot water



### DIJON METROPOLE SMART ENERGY

Deployment of a hydrogen ecosystem with mobile applications: refuse collection vehicles, buses, lorries, LVs, etc.



### ISTHY - HYDROGEN STORAGE INSTITUTE

Centre for tests, certification and periodic requalification of H2 tanks and components, one of a kind in France



### A MAJOR INDUSTRIAL ECOSYSTEM

Alstom  
FORVIA Faurecia  
Gen-Hy  
General Electric  
Inocel  
McPhy  
...



## INDUSTRIAL EXPERTISE ESSENTIAL TO THE SECTOR

The local presence of an industrial network specialising in **metals and materials processing** and expertise in **surface treatment** are valuable assets for providing **complete manufacturing of the Hydrogen systems of tomorrow**.



Please contact us  
to find out more

## RESEARCH & INNOVATION

In Bourgogne-Franche-Comté, there is a very high level of synergy between research and businesses. This close connection is maintained by those involved therein.

### COMPETITIVENESS CLUSTERS INVOLVED IN HYDROGEN PROJECTS



This competitiveness cluster for vehicles and mobility solutions supports projects and their deployment in the Hydrogen field (stationary, mobile application, energy, carbon intensity reduction in industry), coordinates the H2BFC Club and organises the H2BFC Forum.



Cluster of industrial and academic stakeholders involved in the design and manufacture of low-carbon solutions (hydrogen, renewable energy, nuclear, etc.) and the reduction in the carbon intensity of industrial activities and uses



MECATEAMCLUSTER

Cluster specialising in the design, development and maintenance of heavy-duty railway machinery and infrastructure, studying electrification solutions.



Competitiveness cluster dedicated to rubber, plastic and composites supporting H2 storage and transport reduction solutions as well as innovative new materials for electrolyzers.



Agribusiness and agricultural equipment competitiveness cluster relating to the H2 sector: vehicle fleets, agrivoltaism, carbon intensity reduction in industry

### CUTTING-EDGE PUBLIC RESEARCH



FEMTO-ST INSTITUTE

Internationally renowned research laboratory (CNRS, uFC, SUPMICROTECH-ENSM, UTBM)  
=> 120 researchers in H2 energy



FC LAB UAR

European Support and Research Unit on hydrogen fuel cells



HYDROGEN ENERGY FACILITY

One of the largest European public facilities devoted to research, testing and the industrial transfer of H2 system



ISAT'S DRIVE LABORATORY

Optimisation of thermal and hybrid propulsion energy, composite materials and durability, vibratory and acoustic behaviours.



ICB LABORATORY

Research into materials for hydrogen fuel cells, high-temperature electrolyzers and solid storage



## SPECIALIST TRAINING

### CMI H3E - A MASTER OF ENGINEERING COURSE THAT'S ONE OF A KIND IN FRANCE

The Hydrogen Energy and Energy Efficiency (H3E) CMI offered by the university of Franche-Comté is a 5-year programme in the energy production and management engineering trades for students who will become experts in the fields of energy efficiency and clean energy, with specific expertise in Hydrogen Energy (production, transport and stationary applications, etc.).

#### UNIVERSITÉ FRANCHE-COMTÉ

From the BUT (university Bachelor of technology) to Master's level, UFC delivers courses focused on renewable energies and energy efficiency.

26 courses focusing on hydrogen and 1 Hydrogen Energy and Energy Efficiency (H3E) CMI



uB schools of engineering deliver courses focused on the physics of materials, civil engineering, mechanics (POLYTECH Dijon) and courses on the design, production and operation of vehicles (ISAT).



RÉGION ACADÉMIQUE  
BOURGOGNE-  
FRANCHE-COMTÉ  
*Liberté  
Égalité  
Fraternité*

RÉGION  
BOURGOGNE  
FRANCHE  
COMTÉ



Specialised Master's in Hydrogen Energy courses: Energy production, Networks, conversion and storage, Transport and embedded energy systems, Electrical engineering by apprenticeship

1 Master's Degree course in Electrical Energy

#### VOCATIONAL

#### AND TECHNOLOGICAL LYCÉES

In 2024, seven lycées in Bourgogne-Franche-Comté will offer vocational **Baccalauréats** and BTS (senior technician diplomas) with a focus on hydrogen (Renewable energy installer, Electrical professions and related environments, Energy efficiency and maintenance, Maintenance of production systems, Vehicle maintenance, Motor drives, Chemical and water processes, etc.).

RÉGION  
BOURGOGNE  
FRANCHE  
COMTÉ

Since 2023, a training module dedicated to risks of explosion (ATEX) is delivered to all jobseekers trained by the Region in industrial professions: welding/boiler-making/pipe assembly, industrial production and maintenance operator.



2 BTS courses in maintenance of H2 systems Master's degree in Quality, Health, Safety, Environment with a focus on Hydrogen maintenance

le **cnam**  
Bourgogne – Franche-Comté



CNAM vocational bachelor's degree in maintenance of H2 energy systems



H2-related "Skills incubator"  
Training courses dedicated to the installation and maintenance of hydrogen equipment  
Senior Technician in industrial maintenance with a focus on H2



Studies in mechanical, industrial, and energy engineering



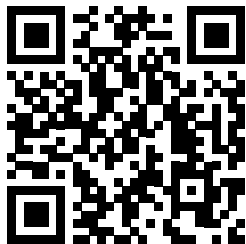
Schools of engineering specialising in mechanics and microtechnology

#### HYDROGEN SCHOOL PROJECT

Submission for the France 2030 Compétences et Métiers d'Avenir AMI (call for expression of interest)



SCAN  
TO WATCH THE H2 VIDEO



### YOUR HYDROGEN SECTOR CONTACT

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Local economic developers  
in all 8 of the region's departments

## THE REGIONAL ECONOMIC AGENCY OF BOURGOGNE-FRANCHE-COMTÉ

The Regional Economic Agency cooperates closely with stakeholders in business development, innovation, training, and employment for:



Business project  
engineering  
for each regional  
strategic sector



Financial  
engineering



Innovative project  
engineering,  
ecological transition  
and energy recovery



Economic  
changes



Promotion and  
communication