RÉGION
BOURGOGNE
FRANCHE
COMTÉ

Hydrogen

Extended presentation

Hydrogène
BOURGOGNE
FRANCHE-COMTÉ

aer
regional economic
agency of
bourgogne-franche-comté

editorial

Marie-Guite Dufay

President
of the Bourgogne-Franche-Comté
Regional Council

As a source of initiatives and solutions to ensure the development of the Hydrogen sector, the Region is firmly committed to energy transition.

The development of the Hydrogen sector is one of the Region's strategic goals. This sector is supported by a productive and pioneering university system, the dynamic involvement of the regional industrial network along with its globally renowned expertise in transportation, energy, railways and the territorial involvement of local authorities. Manufacturers are supported by the Véhicule du Futur competitiveness Cluster, the Wind for Future Cluster and the railway maintenance cluster (Mecateam) as well as by the Regional Economic Agency (AER) of Bourgogne-Franche-Comté. The solid and robust Hydrogen ecosystem of Bourgogne-Franche-Comté brings together all the region's components (research, industry, local authorities), and is able to unite them together in order to implement a common strategy. As such, it creates an exceptionally fertile ground for the development of this sector in the region.

Bourgogne-Franche-Comté is a pioneering region for the development of Hydrogen solutions with proven economic potential. With the ENRgHY project, it assembles "building blocks" that will benefit the entire national sector. Our desire to fully engage in energy transition is coupled with a desire to assist companies with entering new markets which provide and create further employment. The highly industrial component of our region, composed of large groups (PSA, Alstom, Faurecia, etc.) and a network of SMEs and quality start-ups, is a major asset for supporting the Hydrogen sector in the region across the long-term.

Now more than ever, our Region of Bourgogne-Franche-Comté is determined to bring the Hydrogen sector to the forefront with the ambition of creating knowledge, economic value and jobs, thus contributing to the transition towards a carbon-free society that fully values its resources.

Arnaud Marthey

President
of the AER BFC

Hydrogen dynamics in Bourgogne-Franche-Comté, 20 years of experience!

Bourgogne-Franche-Comté has many resources within its territories that can help provide answers to the challenges of the future. It relies on the expertise of its research laboratories and on the innovative capabilities of present stakeholders. Many solutions are available here to help with the energy transition that will go ahead. **The Hydrogen Energy sector is particularly active.** Our role is to participate, alongside our partners, in the development of this sector within our territory. Our strengths lie in our long industrial history, our spirit of invention and innovation, and our ability to create favourable conditions for the development and establishment of businesses.

Twenty years ago, the first research on "Fuel cells and Hydrogen tanks" began at University of Technology of Belfort-Montbéliard. Since then, France has achieved many original firsts. In late 2016, the region was certified as a "**Hydrogen Territory**" due to its ENRgHy project, which finances 7 new projects involving 3 territories. The Hydrogen dynamic is always increasingly active, determined, enterprising and dynamic, and can count on the support of the AER and regional institutions. With a productive and pioneering university system at its foundation, today it brings together numerous manufacturers and stakeholders who, now more than ever, are in the process of **establishing a sustainable Hydrogen economy in Bourgogne-Franche-Comté.**

arnaud marthey

summary

Bourgogne-Franche-Comté, Hydrogen in Our Genes

Hydrogen in Our Genes

The Hydrogen adventure began in Belfort in the late 20th century and subsequently expanded to the entire territory **particularly thanks to the involvement and support of local authorities.**

The first work on Fuel Cell systems began in 1999 thanks to the members of the research federation FC Lab, associated with the CNRS (National Centre for Scientific Research). Today, about **60% of the scientific production of French academic research** in the field of Fuel Cell system integration comes from Bourgogne-Franche-Comté.

SOME OF OUR ACHIEVEMENTS

The F-City H2, the 1st Fuel Cell urban electric vehicle with energy storage in the form of Hydrogen

In addition to the lack of pollution, there are many advantages to the F-City H2: the refill speed, with a Hydrogen filling time similar to that of a vehicle running on gasoline or diesel; its autonomy, which is much greater than that of vehicles only equipped with batteries (150 km with a tank of 1 kg of Hydrogen); the weight of the energy module, from 290 kg for the 100% battery version to 120 kg (with a small lithium battery and a fuel cell).

A Hydrogen battery to power a mountain refuge!

Since June 2015, the Col du Palet refuge in the heart of the Vanoise National Park, has experienced a revolution in its energy management. It uses electricity from renewable sources, regardless of the weather conditions, thanks to energy storage by Hydrogen technology. This system makes it possible to optimise the production and storage of solar energy over a long period of time and to redistribute it in a clean way while avoiding the emission of greenhouse gases.

More than 200,000 km driven by Hydrogen vehicles in Bourgogne-Franche-Comté

Since 2014, 10 MobyPost vehicles and 2 charging stations have been used by La Poste staff: a complete carbon-free transportation system based on Fuel Cell electric quadricycles fuelled by locally produced renewable Hydrogen. The electricity required for the production and daily distribution of Hydrogen is generated by photovoltaic panels. These also include Kangoo type vehicles with an "H_2 range extender" delivering La Poste packages to Luxeuil-les-Bains and Dole. This is a project supported by the Pôle Véhicule du Futur.

20 Years of the Hydrogen Adventure in Bourgogne-Franche-Comté

1998

1st "Fuel Cell" research project by the University of Franche-Comté

1999

1st research activities related to Hydrogen-Energy and the Fuel Cell

2002

Launch of the CNRT-Inéva cluster in Belfort and the **1st research platform dedicated to Fuel Cell systems**

2005

Creation of the **Pôle Véhicule du Futur** competitiveness cluster and registration of the strategic H_2 line.

2006

1st testing of an 80 kW Fuel Cell on a train engine

2008

Start of Hydrogen-related activities at MAHYTEC

2009

Equipment of heavy vehicle ECCE* with **the most powerful Fuel Cell** installed in France in a transport application

* *Evaluation of the components of an Electrical Chain*

2012

1st Hydrogen-powered lawn mower and inaugurated by the Grand Dole Urban Area

2015

Launch of the Hydrogen Regional Industrial Strategy

Creation of the **1st Master's Degree Course in Engineering**: Hydrogen Energy and Energy Efficiency **ONE-OF-A-KIND IN FRANCE**

2017

1st financing received for ENRgHy projects

Marketing of the 1st Hydrogen power generators made by H2SYS

Creation of JUSTY and H2SYS start-ups

2011

1st French registration of an approved Hydrogen vehicle: F-City H_2

2014

Design of a Hydrogen mini-motorcycle for the Éco-Challenge competition

1st "MobyPost" and "MobilHyTest" experiments in Bourgogne-Franche-Comté

2016

Certification of Bourgogne-Franche-Comté as a "Hydrogen Territory" with ENRgHy

1st H_2 stationary power generator

And the adventure continues...

a powerhouse of initiatives and solutions

Bourgogne-Franche-Comté, a powerhouse of initiatives and solutions to rise to the challenges of energy transition

The Bourgogne-Franche-Comté Region wants to actively contribute to **overcoming the challenges of ecological and energy transition**. **Through innovation - one of the 6 main competitiveness components of the Regional Economic Development Plan for Innovation and International Expansion - the region aims to lead businesses in its territory towards new markets to promote development and job creation.** The Hydrogen sector has emerged as an opportunity for the convergence of these two objectives, based on the territory's abundant stakeholders and expertise, and the Region has chosen to include the development of this sector as one of the main components in its strategy. An annual budget has been specifically allocated for this in order to fund collective actions, innovation projects and demos. An annual meeting, chaired by the Region, is organised each year in order to coordinate all internal and external stakeholders.

A TERRITORY OF INDUSTRIAL ENERGIES...

Bourgogne-Franche-Comté is the No. 1 French industrial region. It is in this environment that two industries have evolved to form the core of current developments in Hydrogen technologies:

› **the automotive and railway industry,** which relies on the expertise of microtechnology mechanics, from plastics to composite materials, favouring the creation of a particularly dense industrial network of companies, manufacturers, equipment manufacturers and suppliers;

› **the power generation equipment industry**, with many world leaders having already established their businesses here, attracted by the expertise available.

Energy and transportation have thus become the specialities of an entire territory!

Energies are currently focused on demonstrating low-cost, efficient, sustainable and viable models of complete **Hydrogen Energy production, storage et distribution systems, in conjunction with renewable energies.**

A COORDINATED HYDROGEN ECOSYSTEM

The regional **industrial network**, supported by **local authorities**, **research labs**, the **Pôle Véhicule du Futur**, the **Wind for Future and Mecateam clusters**, the **University of Technology of Belfort-Montbéliard**, **APRISTHY** and the **Regional Economic Agency of Bourgogne-Franche-Comté**, among others, form a **pluralist and robust ecosystem**.

A **Regional Working Group** (GTH2) meets every two months. It offers a unique venue for information sharing and collaboration for the **regional Hydrogen community** (research, hubs, clusters, companies, communities, etc.) and allows stakeholders to coordinate effectively and responsively, to discuss current or future structural projects, the latest market developments and national or international actions in progress.

LEADERS AND BUSINESSES

Alstom, Delfingen, Faurecia, Gaussin, H2Sys, Justy, Mahytec, Presse Étude, Schrader and more

PARTNERS IN DEVELOPMENT

› **Pôle Véhicule du Futur Cluster**
› **Wind for Future Cluster**
› **Mecateam Cluster**
› **AER Bourgogne-Franche-Comté**

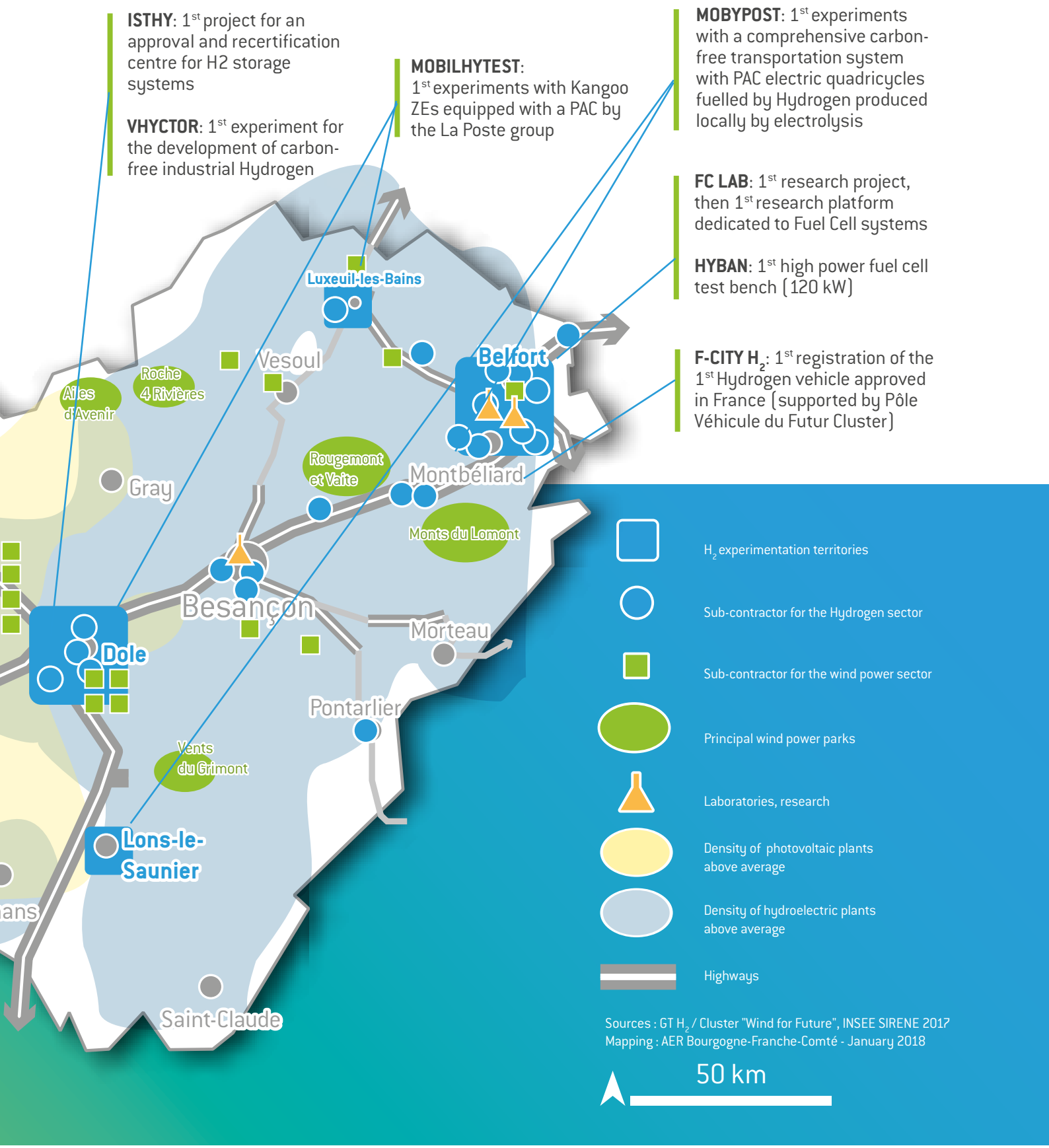
RESEARCH LABORATORIES

› **FC Lab Research Federation**, including members of the **ICB laboratory** and the **Femto-ST Institute**
› **Maison des Sciences de l'Homme** of Dijon

Pioneering territories

BOURGOGNE-FRANCHE-COMTÉ, certified as a "Hydrogen Territory", has the following assets:

› a state-of-the-art public research centre;
› leading industrial groups;
› SMEs and start-ups that generate innovations and business solutions;
› competitiveness clusters and active clusters;
› local authorities committed to Hydrogen energy and transportation.


ISTHY: 1st project for an approval and recertification centre for H2 storage systems
VHYCTOR: 1st experiment for the development of carbon-free industrial Hydrogen
MOBILHYTEST: 1st experiments with Kangoo ZEs equipped with a PAC by the La Poste group
MOBYPOST: 1st experiments with a comprehensive carbon-free transportation system with PAC electric quadricycles fuelled by Hydrogen produced locally by electrolysis
FC LAB: 1st research project, then 1st research platform dedicated to Fuel Cell systems
HYBAN: 1st high power fuel cell test bench (120 kW)
F-CITY H2: 1st registration of the 1st Hydrogen vehicle approved in France (supported by Pôle Véhicule du Futur Cluster)
Luxeuil-les-Bains
Vesoul
Belfort
Roche 4 Rivières
Ailes d'Avenir
Rougemont et Vaite
Montbéliard
Gray
Monts du Lomont
Besançon
Morteau
Dole
Pontarlier
Vents du Grimont
Lons-le-Saunier
Saint-Claude
H2 experimentation territories
Sub-contractor for the Hydrogen sector
Sub-contractor for the wind power sector
Principal wind power parks
Laboratories, research
Density of photovoltaic plants above average
Density of hydroelectric plants above average
Highways
Sources : GT H2 / Cluster "Wind for Future", INSEE SIRENE 2017
Mapping : AER Bourgogne-Franche-Comté - January 2018
50 km

Hydrogen economy demonstrations

ENRgHy is Bourgogne-Franche-Comté's answer to the call for projects for "Hydrogen Territories" launched by the Ministry of the Environment, Energy and the Sea in May 2016, the objective of which was to certify major demonstration projects implementing the Hydrogen energy vector in the territories.

ENRgHy, is the first step along the roadmap, coordinated by the Bourgogne-Franche-Comté Region, **for a strategic regional commitment** to the development of a Hydrogen Energy sector within its territory.

ENRgHy will make it possible to finance 7 new projects involving 3 territories:

› **Grand Dole Agglomeration**, with the first large-scale demonstration of an industrial sector based on the Hydrogen economy thanks to the projects "VHYCTOR" (use of Hydrogen from industrial processes), "NEWMHYLL" (use of Hydrogen produced from hydropower for navigation) and "ISTHY" (National Hydrogen Storage Institute);

› **Yonne**, with the projects "EOLBUS" in Auxerre and "HYCAUNAIS" in Saint-Florentin, which respectively aim to demonstrate that an urban area can switch to a 100% renewable energy system based on Hydrogen and that there is a future for power-to-gas technology;

› **Belfort-Montbéliard Urban Area**, with the projects "HYBAN" and "HYDATA" for testing high-power Fuel Cells and hydrogen technology for data centres, respectively.

Of the 7 projects selected, funding has already been obtained for 4 in 2017.

ENRgHy is also the dynamic involvement of the regional industrial network supported by local authorities and institutions.

> Hydrogen stakeholders support the ENRGHY dynamic in Paris in 2017!

ENRgHy
BOURGOGNE
FRANCHE-COMTÉ

“Marie-Guite DUFAY welcomes this important ministerial decision that will bring the region to the forefront of the Hydrogen sector: *“All our teams have been working on this issue for some months now with a great deal of shared momentum. Our proposal was firmly defended in Paris by Frédérique COLAS, Vice President in charge of energy transition, the project leaders, the sector representatives, the Regional Economic Agency of Bourgogne-Franche-Comté, the Wind for Future cluster, the Pôle Véhicule du Futur and the elected representatives of the territories concerned (Grand Dole, Yonne with Auxerre and Saint-Florentin, and Belfort-Montbéliard). Its scale, interest, and concrete participation in the Paris Climate Agreement were clearly demonstrated. I am proud to say today that it has been recognised and certified and will receive national support.”*”

Excerpt from the Press Release dated Thursday, 8th December 2016

THE ENRGHY DYNAMIC INCLUDES 7 PROJECTS, 3 REGIONS AND 0 CO_2 EMISSION!
ISTHY, HYBAN, EOLBUS, HYCAUNAIS, VHYCTOR, NEWMHYLL, HYDATA

2 FACILITY DEVELOPMENT PROJECTS FOR THE NATIONAL SECTOR

GRAND DOLE AGGLOMERATION
ISTHY - THE NATIONAL PLATFORM FOR HYDROGEN STORAGE

Supported by the Grand Dole Agglomeration, the ISTHY project brings together industrialists (SMEs and large groups), academics, organizations and agencies working in the field of Hydrogen as well as local authorities. The aim is to become the national approval and recertification centre for storage systems in France, as well as a training and R&D centre, in order to anticipate new developments.

APRISTHY / mr@vehiculedufutur.com

BELFORT-MONTBÉLIARD URBAN AREA
HYBAN - A HIGH POWER TEST BENCH

Launch of an exclusive industrial testbed for high-power (100 - 120 kWe) PEMFC and HT PEMFC Fuel Cells, which is essential for placing 'full fuel cell power' vehicles on the market, to supplement the Fuel Cell platform equipment in Belfort in 2018.

UTBM / michel.romand@utbm.fr

ENRgHy
BOURGOGNE
FRANCHE-COMTÉ

Hydrogen economy demonstrations

5 EXPERIMENTAL PROJECTS

AUXERRE
EOLBUS – A FRENCH PILOT PROJECT COMBINING WIND-POWER AND TRANSPORT

OBJECTIVE: To demonstrate the economic validity of switching to a "zero emission" transportation system based on Hydrogen and REs.

PROJECT: The project aims to create a Hydrogen production, storage and refuelling station supplied with renewable energy (through water electrolysis) and, more specifically, by the wind turbines surrounding the city. With European certification and financing, the project will launch 5 buses and light-duty vehicles by 2019. The goal is to convert the entire bus fleet by 2025.

DEMONSTRATION

The following must be demonstrated in 2 years:

› The relevance of storage solutions for so-called variable electrical sources: Hydrogen production through a wind farm and its management by a smart grid;

› The potential of a new economic model through large-scale experimentation with the development of energy transition.

WIND FOR FUTURE / contact@windforfuture.com
JUSTY / a.vaussanvin@justy.fr

SAINT-FLORENTIN
HYCAUNAIS – THE 1ST PROJECT TO PAIR UP ANAEROBIC DIGESTION AND METHANATION

OBJECTIVE: To demonstrate the future potential of "power to gas" technology and launch a new industrial sector.

PROJECT: This project, which implements a true "waste to energy" circular economy approach, proposes to recover the deadly CO_2 at the Saint-Florentin landfill using the process of methanation. The Hydrogen needed for this process is itself a product of wind power production.

DEMONSTRATION

Over 6 years, the objective is to contribute to energy transition in the region by demonstrating the replication possibilities for:

› large-scale energy storage in the gas network for the development of intermittent REs;

› management and optimization, through the use of smart grids;

› the removal of CO_2 before emission into the atmosphere.

SEM YONNE ÉNERGIE / irene.eulriet@yonne-energie.fr

GRAND DOLE AGGLOMERATION
VHYCTOR – A REFUELLING STATION FOR HYDROGEN PRODUCED BY INOVYN

OBJECTIVE: To demonstrate optimization and cost reduction compared to existing systems.

PROJECT: VHycTor makes it possible to use the carbon-free Hydrogen co-produced on a large scale by the company INOVYN located in the Jura, to subsequently distribute it in stations. Storage is carried out under high pressure in tanks designed and adapted for easy transport and distribution. The development of this new chain will allow simpler distribution: the production of Hydrogen and its compression will be performed in the same place. The reduction of this chain makes it possible to simplify the station, which will be scalable according to demand, without requiring a change of infrastructure.

DEMONSTRATION
Over 2 years of construction and 1 year of testing, VHycTor aims to reduce costs compared to existing solutions through the use of a large-scale Hydrogen source, high pressure transport and distribution through simplified stations.

MAHYTEC / dominique.perreux@mahytec.com

GRAND DOLE AGGLOMERATION
NEWMHYLL – HYDROPOWER AND HYDROGEN

OBJECTIVE: To demonstrate the feasibility of an economic model for the future of small-scale hydropower through Hydrogen and develop river applications.

PROJECT: The project aims to test the economic viability of standalone solutions based on low-pressure Hydrogen. The originality of this project consists of developing "zero emission" tourist services by providing ecological urban and river transportation solutions.

DEMONSTRATION
Over 3 years, the following goals must be achieved:
› to demonstrate the viability of small production units associated with local use;
› to convince the general public of the safe use of Hydrogen.

EDF / pascale.lyaudet@edf.fr

BELFORT-MONTBÉLIARD URBAN AREA
HYDATA, DOUBLE-ACTION STATIONARY HYDROGEN ENERGY FOR A DATA CENTRE

OBJECTIVE: To demonstrate the advantages and contributions of a standalone stationary Hydrogen Energy Production/Consumption solution.

PROJECT: The size of the digital universe doubles every 4 years, as data centres that host services for the processing, storage and retrieval of billions of GB of data seek to reduce their energy consumption and improve their availability. Power supply through a standalone system based on Hydrogen from renewable energies and the establishment of a backup application have emerged as interesting optimization solutions.

DEMONSTRATION
Over 2 years, HyDATA will validate the relevance of a stationary power application with:
› real-time smart management of renewable input - production/consumption;
› optimized management of the emitted heat (air conditioning);
› specific low-pressure/high-density hydrogen storage.

MAHYTEC / dominique.perreux@mahytec.com

2017-2018 Hydrogen events organised by regional stakeholders

2 AREAS OF WORK

- DEVELOPMENT OF SECTOR VISIBILITY
- CREATION OF A BUSINESS CLUSTER

Regional annual meeting of sector stakeholders

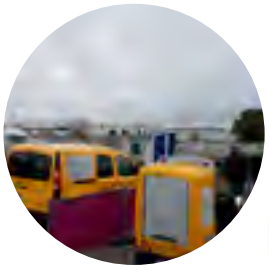
Objective: This meeting is chaired by Frédérique COLAS, Vice President of the Regional Council in charge of energy transition, and aims to take stock of regional actions with all of the eco-system's stakeholders, as well as discussing the prospects and actions to be taken.

1st meeting of regional manufacturers with H_2 potential

Objective: To bring together companies that can be positioned within the sector, to present them with the advantages of H_2 technology and the prospects for diversifying their activities, to help them gain visibility, find specificities, create a cluster led by experts, etc.

Bourgogne-Franche-Comté's contribution to the national plan for the development of Hydrogen for energy transition

On 2nd February, 2018, the President of the Regional Council and all of the partners of the regional Hydrogen ecosystem met in Dijon with the auditors sent by Nicolas Hulot to propose a strategy for Hydrogen innovation and development in France. The in-depth exchanges contributed to the national report that was submitted to the Minister. The auditors praised the efficient and dynamic ecosystem of our region and considered Bourgogne-Franche-Comté to be a player in the development of Hydrogen through the implementation of "Hydrogen-Economy" applications throughout the value chain.



Hydrogen-Powered Transportation Demonstration Day in Dijon

Objective: To make elected officials aware of Hydrogen-powered electrical transportation in order to mobilise all stakeholders to accelerate the transition and continue the regional dynamic. The elected officials were able to test H_2 Kangoo ZEs and MobyPosts and the recharging of vehicles at a Hydrogen station and to interact with partners.

The Energy Stakeholders Meeting at Belfort

Objective: To make Hydrogen developments known to regional stakeholders and energy contractors. The program included: conferences, B2B meetings, a village of experts, with the participation of the biggest contractors within the sector.

ENGIE, EDF and Afhypac leaders visit the region

Objective: To highlight the resources and assets of the H_2 sector in Bourgogne-Franche-Comté, involve leaders and create partnerships. The 3-visit programme included: INOVYN, Mahytec, Belfort's Fuel Cell platform, and exchanges with H2Sys and FC Lab.

Presentation of the EOLBUS project in San Diego

As part of the International Symposium on Energy Conversion and Storage and the Environment (5th-7th March, 2018) in San Diego, Justy presented the EOLBUS project for transforming wind and renewable electricity surplus into Hydrogen which can then be used as fuel for urban buses. This innovative and carbon-free project was regarded by participants as a potential solution for the future. This symposium brought together more than 2000 participants from around the world over 3 days to talk about energy solutions.

Bourgogne-Franche-Comté in Mainz (Germany)

Organization by the Region of a trip to Rhineland-Palatinate with elected officials, experts and regional companies involved in energy transition. The program includes: visit to a wind farm and an experimental H_2 production park. The arrival of the German delegation in Bourgogne-Franche-Comté is scheduled for 2018.

Bourgogne-Franche-Comté at the Hannover Fair

Objective: The positioning of Bourgogne-Franche-Comté stakeholders in the global Hydrogen competition. The Bourgogne Franche-Comté CCIR, in partnership with the Pôle Véhicule du Futur has offered regional companies the opportunity to participate in the HYDROGEN FUEL CELLS trade show. This trade show is part of the Hannover Fair and is the major show in the field of Hydrogen technologies.

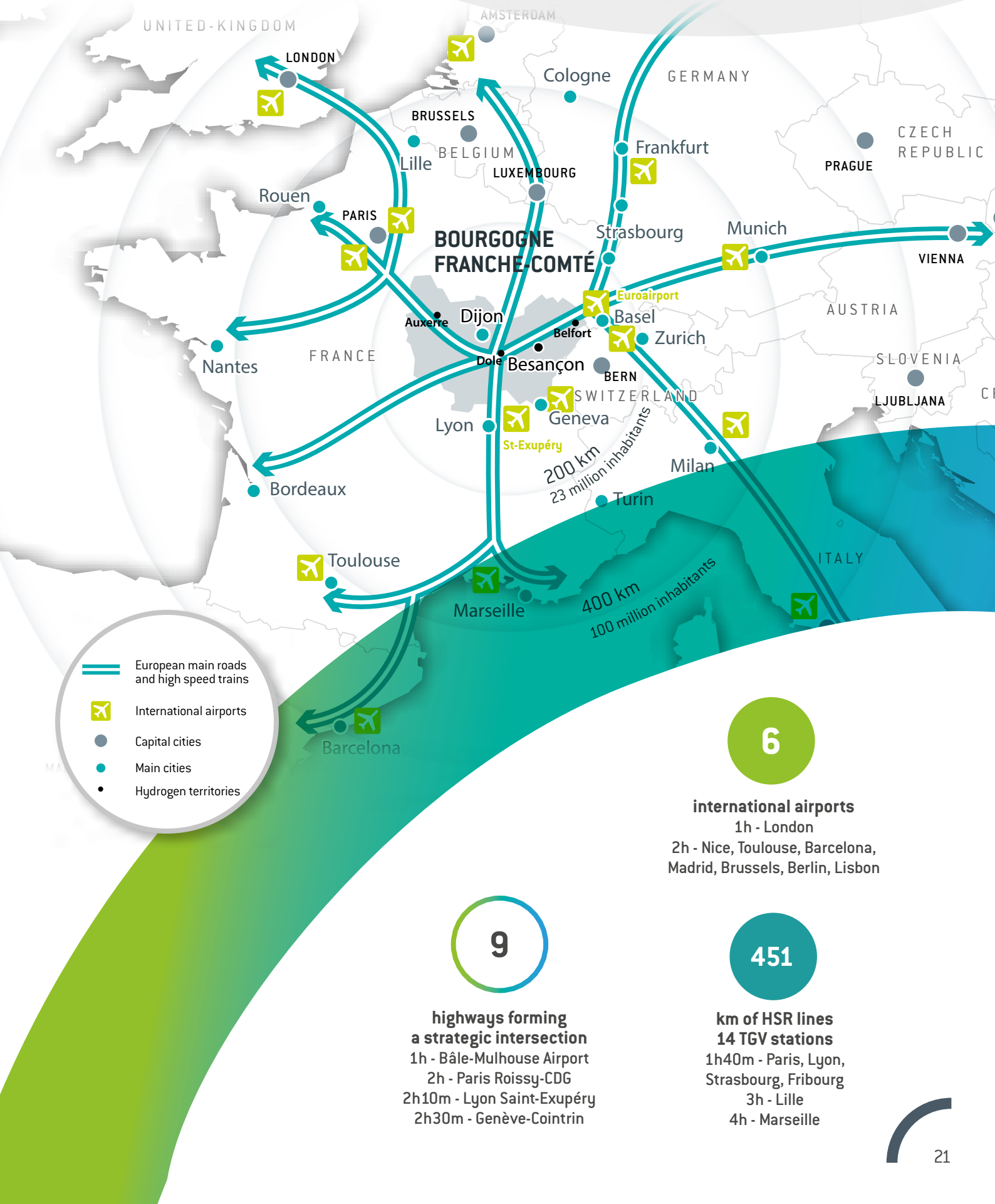
Subscribe to the blog
energhyflash.blogspot.fr

Launch of the Hydrogen blog hosted by Laurent Meillaud

Managed by the AER and hosted by journalist Laurent Meillaud, it includes collective contributions by stakeholders in the territory of general information on Hydrogen in the World and in Europe, techniques or markets, studies or projects, companies or territories.

a favourable environment for the development of an H_2 sector

Bourgogne-Franche-Comté, naturally European



6

international airports
1h - London
2h - Nice, Toulouse, Barcelona, Madrid, Brussels, Berlin, Lisbon

9

highways forming a strategic intersection
1h - Bâle-Mulhouse Airport
2h - Paris Roissy-CDG
2h10m - Lyon Saint-Exupéry
2h30m - Genève-Cointrin

451

km of HSR lines
14 TGV stations
1h40m - Paris, Lyon, Strasbourg, Fribourg
3h - Lille
4h - Marseille

Bourgogne-Franche-Comté,
No. 1 French industrial region

©Leonid Andronov/Shutterstock.com

With **industrial jobs making up 17%** of overall employment, Bourgogne-Franche-Comté ranks 1st in France in this area and **3rd in terms of its share of industrial added value** when compared with the national total.

The local presence of an industrial network specialising in **metal and material processing** and localised expertise in **surface treatment** are valuable assets for ensuring the **comprehensive manufacturing of tomorrow's Hydrogen systems**.

Metal pipework, polymer membranes, valves, sensors, surface treatment and microtechnology are all areas of expertise found in the region, making it a promising territory for Hydrogen and Fuel Cells manufactured in the future.

5 competitiveness clusters

10 regional clusters

11 technological platforms

› Senvion, development and operation of wind farms ©Senvion

> Peugeot 3008 on the finishing line, Sochaux site ©Communication Sochaux

No.1

region in **cutting-drawing** with 4,018 employees, or 16% of the national workforce

No.2

region in **manufacturing moulds, models and equipment** with 1,997 employees, or 12% of the national workforce

No. 3

region for the **manufacture of machines and tools** for metalworking, with 434 employees, nearly 9% of the national workforce

No. 3

region for the **manufacture of technical parts and packaging** made from plastics

No. 3

region for **bar turning** with 626 employees, making up 6% of the national workforce

No. 4

region for **metal processing and coating** with 2,088 employees, nearly 9% of the national workforce

No.1

French **export region** with an import/export coverage rate of 115%

No. 3

best French trade balance in 2017

Partners involved in assisting businesses

THE REGIONAL ECONOMIC AGENCY OF BOURGOGNE-FRANCHE-COMTÉ

ASSIST
the maintenance and development of economic activity and employment in the territory

SUPPORT AND DEVELOP
innovation and eco-innovation

BACK
economic development strategies in the territory

PROMOTE
the economic appeal of the territory

At each stage in a company's development: a single representative in the team provides confidential professional assistance and customised follow-ups.

Business project engineering

› Diagnosis of company needs
› Technical, Financial, Legal and HR Engineering
› Search for real estate and real estate companies
› Search for partners
› Association with the public and private ecosystem of economic development and innovation

Innovative project engineering

› Eco-innovation (carried out in partnership with ADEME Bourgogne-Franche-Comté)
› Intellectual property and collective technological and sector surveillance (carried out in partnership with CCI Bourgogne Franche-Comté)
› Presta'INNO funded by Bpifrance and the Bourgogne-Franche-Comté Region

Promotion and communication

› Promotion of sector groups and initiatives implemented by companies that benefited from our assistance, know-how and regional resources
› Participation at local, national and international shows

Economic changes

› In partnership with the State services

aer
regional economic agency of bourgogne-franche-comté

› YOUR HYDROGEN CONTACT AT THE AER
Nathalie Loch
h2@aer-bfc.com
Tel. +33 (0)3 81 81 82 83

energhyflash.blogspot.fr

PÔLE VÉHICULE DU FUTUR CLUSTER

Pôle Véhicule du Futur is an automotive and mobility Cluster for vehicles, mobility solutions and related services. It brings together and leads an ecosystem of 420 members in the Bourgogne-Franche-Comté and Grand Est regions. It unites companies, public research organisations, educational bodies and regions together around R&D innovative projects, industrial performance improvement programmes as well as new training and skills, with a business objective.

Through its actions for competitiveness, the Cluster contributes to creating wealth and jobs in the area.

Since its creation in 2005, the Cluster has been the driving force of the Hydrogen and Fuel Cell dynamics in Franche-Comté and Bourgogne. The challenge is to support the emergence of a Hydrogen industrial sector, helping companies in the sector to diversify towards components of the Hydrogen traction chain. In partnership with national bodies, such as AFHYPAC and the Mobilité Hydrogène France coalition, the Cluster participates in multiple studies and monitors calls for specific projects.

> F-City H2

Cluster Pôle Véhicule du Futur®
Solutions for future vehicles & mobility

420 members

88,000 jobs

182 projects financed with €651M

www.vehiculedufutur.com

WIND FOR FUTURE CLUSTER

The **cluster's goal is to develop synergies between businesses and the wind power sector** in Bourgogne-Franche-Comté. Wind for Future promotes the development of business and collaborative projects in France and abroad and refers member companies to major contractors. It helps to promote the professions and know-how, innovation and training needs of staff. The cluster has taken an interest in Hydrogen as **a way of storing wind energy.**

www.windforfuture.com

90 members

70 businesses

MECATEAMCLUSTER


© Jean-Luc Petit

MecateamCluster is a National Centre specialized in the **design and maintenance of railway machinery equipment**. Its aim is twofold, firstly to provide innovative solutions to improve the processes of construction or regeneration of infrastructure, and on the other hand, to find patterns for the reorganization of the maintenance of construction equipment in order to optimize its operation.
In the frame of its program "railway yard of the future" which objective is to create a safer and less polluting environment at the railway sites, MecateamCluster thoroughly studies **machinery and equipment electrification solutions from the technology of Hydrogen**. Many tracks are now being studied.

www.mecateamcluster.org

103 members

€300 k of annual budget

MECATEAMCLUSTER®

Innovative Businesses

MAHYTEC, 250 tanks installed worldwide

The only company in Europe to design and produce 2 types of Hydrogen storage technologies for mobile, nomadic or stationary applications: a pressurised system and a hydride system that stores Hydrogen in solid form at low pressure.

Control of the entire Hydrogen chain: the turnkey solution SECURITHY, developed by MAHYTEC, is composed of an electrolyser, a 30 bar storage tank, a Fuel Cell and batteries that allow it to provide electricity in all conditions.

By associating other regional expertise with its Hydrogen expertise, MAHYTEC will implement 5 bivalent stations to store electrical energy, restore it through a hybrid "Fuel Cell and batteries" system and supply a Hydrogen vehicle also provided. These systems, located in 5 high schools of Burgundy-Franche-Comté, aim to make the new generations aware of the potential of Hydrogen Energy within the context of energy transition.

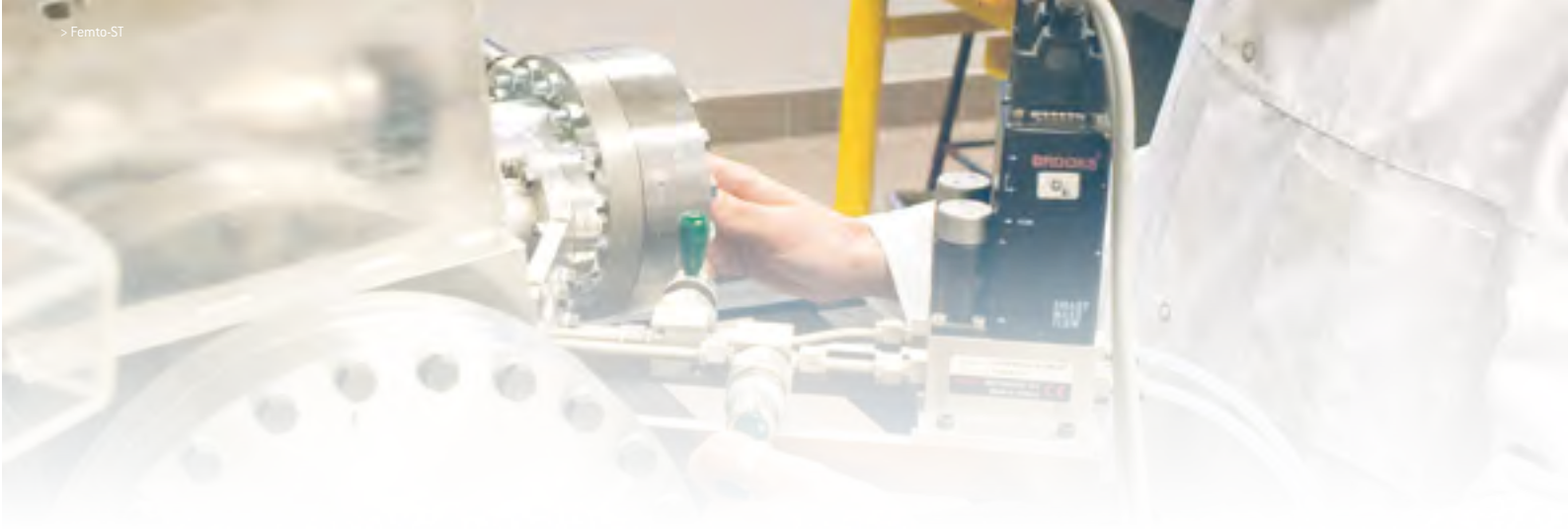
www.mahytec.com

H2SYS, silent electric generators, non-polluting and maintenance-free

H2SYS develops and sells systems of type PEM Hydrogen fuel cells and hybrid electric generators, powered up with Hydrogen, for powers levels from 1 kW to 20 kW. The start-up is based on the results of several years of applied research conducted within the FC Lab federation in Belfort and values the work of research for innovative solutions, meeting the environmental challenges of the 21st century.

These new generators, silent and "zero emission" can be used inside buildings, replace emergency generators or provide a power supply on construction sites or isolated sites. The scope of the H2SYS generators is quite wide and thanks to Hydrogen energy, the start-up was then in service of industrial development and energy transition.

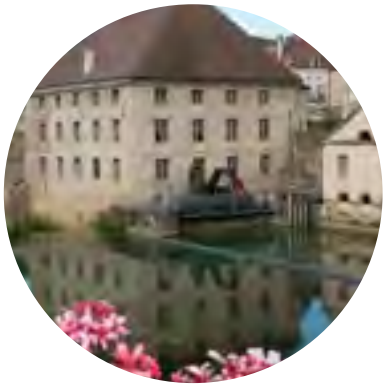
www.h2sys.fr


> Femto-ST

ALSTOM, a step ahead in Hydrogen

ALSTOM has successfully designed and marketed in Germany Coradia iLint, the first passenger train in the world that uses Hydrogen as propulsion energy, a result of 5 years of development by its engineers. At the regional level, the site ALSTOM in Belfort prepares the development of a Hydrogen version of its new Prima H4 locomotive in the frame of an R & D program.

www.alstom.com



EDF, partner of the NewMHyLL project

For EDF, hydro-electric power plants cover a significant amount of electricity production. Nevertheless, the profitability of small plants could be improved by Hydrogen production (electrolysis from hydropower) to be used for example to supply fleets of vehicles. This is one of the objectives of the NEWMHYLL project (see page 17) that seeks to demonstrate the economic relevance of this type of complementarity. The Moulin Neuf hydroelectric plant in Dole is being considered for the 1st demonstration, in partnership with EDF and its agency “Une Rivière, Un Territoire” Massif du Jura.

pascale.lyaudet@edf.fr

ENGIE, project partner in Bourgogne-Franche-Comté

ENGIE is committed to developing solutions for its customers Innovative Hydrogen: decarbonization of industrial processes, renewable energy storage or “zero emission” mobility. In France, ENGIE is also a pioneer figure in the field of Power-to-Gas through major experimentation projects, aiming to contribute with a real flexibility for the energy system. Convinced of the major role that Hydrogen will contribute for the energy transition, ENGIE recently established an international entity dedicated to the development of Renewable Hydrogen on a large scale.

www.engie.fr/hydrogene

Innovative Businesses

GAUSSIN, clean solutions for industrial logistics

GAUSSIN develops clean solutions for industrial logistic and is based on energy sources free of carbon emissions to move its vehicles. The Gaussin Hydrogen Powerpack is a hybrid technology Hydrogen / battery. It consists of a battery element and two H_2 hybridization blocks made of Fuel Cells 40 kW each, for a total power of 250 kW.

www.gaussin.com

JUSTY Energy Engineering supports H_2 projects

JUSTY is an independent engineering firm engaged in the energy transition. First specialized in wind power, it quickly turned into storage solutions for Renewable Energies and especially Hydrogen. It seeks to support different stakeholders, public and private, in carrying out H_2 projects as a prime contractor or project management assistant. As such, JUSTY is strongly involved in the realization of the EOLBUS project (see page 16).

www.justy.fr

SCHRADER, valves securing Hydrogen storage equipment

SCHRADER designs and manufactures high-tech valves for pressurized systems. SCHRADER valves are specialized in charge valves, pressure regulators, safety valves, check valves or fast connectors. The research and development department of SCHRADER develops safety devices for Hydrogen storage equipment allowing for a protection against fire and high pressure.

www.schrader.fr

VALMÉTAL, special custom vehicles

Specialising in metal processing by laser cutting and long-length folding, the company designs custom-built vehicles: vacuum sweepers, and recently electric washers. As a designer and assembler, VALMÉTAL is already considering several projects and partnerships for eco-responsible vehicles. The sale of its first two electric washers to the city of Paris has launched it to new markets and allows it to meet increasingly strict requirements in terms of environment, ecology and cost of use.

www.valmetal.fr

FAURECIA, for a world without emissions

Founded in 1997, FAURECIA has become in 20 years a major stakeholder of the automotive industry. With regards to Fuel Cells technology, FAURECIA brings its experience to systems integration, to combine storage, pressure management as well as the stacking technology of Fuel Cell into a complete solution to improve efficiency, capacity and the energy generation of the vehicle. Thanks to that collaboration with the expert stakeholders in their fields (Stelia Aerospace Composites, Ad-Venta, and CEA), FAURECIA explores different solutions to improve and industrialize Fuel Cell technology for the automotive industry.

www.faurecia.com

Innovative Businesses

DEPHIS, coatings for extreme environments through the PVD (Physical Vapor Deposition) process

As part of the Interreg ORCEPAC project, DEPHIS brings its know-how to the provision of protective Cerium oxide coatings for SOFC Fuel Cell components. The objective is to develop and validate a robust, economically viable process that is compatible with the constraints of the Hydrogen sector, for the treatment of electrodes of several tens of cm^2.

www.dephis.com

AERIS, expert in turbo machineries and reduction of polluting emissions

AERIS has extensive expertise in the design, fluid flow simulation (Numeca CFD calculations), manufacturing and balancing of turbochargers. As a user of superalloys common to aeronautics, AERIS is developing an IoT connected turbo and a tubular Fuel Cell, which are new and innovative technologies with very low environmental impact.

www.aeris-group.com

DELFINGEN, a specialist in fluid transfer

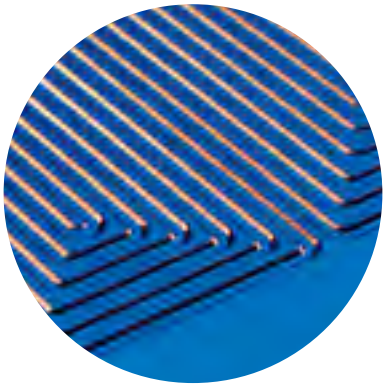
DELFINGEN designs and manufactures solutions for fluid transfer, especially for "reservoir" and "thermal management of batteries" applications. Combining multi-layer extrusion of smooth or corrugated tubes, 3D forming, precision assembly and leak tests from a patented process, DELFINGEN produces locally close to its customers. The Advanced Engineering Department dedicates resources to the development of relevant responses to the fuel cell needs.

www.delfingen.com

GEST'HYDROGÈNE, design and production of isolated Hydrogen sites

GEST'HYDROGÈNE's skills cover services for the whole technical equipment sector for buildings with a strong domain in the areas of low consumption and positive energy buildings. The company has acquired strong expertise in the area of isolated sites and Hydrogen. In particular, it has been a representative of the group for the design production of the first Hydrogen Fuel Cell in an isolated site at the refuge of the Col du Palet in the park of Vanoise (2600 m altitude). This achievement has been awarded by the COP21.

www.gestenvironnement.fr



PRESSE ÉTUDE, component for Hydrogen systems

PRESSE ÉTUDE designs and realizes, since 1969, high pressure (cutting, stamping) equipment destined to demanding and varied industrial sectors: energy, connectivity, defense, food, medical, detection, smart card, watch, and especially for bipolar Hydrogen fuel cell plates.

www.presse-etude.com

INOVYN values the carbon-free Hydrogen produced on its industrial site

INOVYN produces on the site of Tavaux approximately 1 million tons of chemicals per year (Chlorine, VCM, Caustic Soda, Organic Chlorine Derivatives) of which nearly 250,000 tons per year are PVC. These products are all derived from the chlorine obtained by electrolysis from salt and water. From this process are derived about 10,000 tons / year of "clean" Hydrogen that INOVYN values internally on its platform.

The Grand Dole Agglomeration, as part of the VHYCTOR project, aims to create a Hydrogen distribution station powered up by Hydrogen manufactured by the company INOVYN (see page 17).

www.inovyn.com

fertile ground for research & innovation

Research and innovation, a trailblazing spirit

The scientific activities and innovation developed for the Hydrogen-Energy systems in Bourgogne-Franche-Comté are both related to **application** purposes and **methodological** approaches.

Therefore, **the long-term storage of renewable energies by the Hydrogen vector, Hydrogen micro-cogeneration, the solid storage of Hydrogen and Fuel Cell systems for transport and mobility** are all points of interest in terms of application.

From a methodological point of view, the work is mainly focused on **increasing the energy efficiency and sustainability of Hydrogen-Energy systems.**

The socio-economic dimension provided to projects conducted in the regions is also essential. Therefore, researchers in **engineering sciences** work in an integrated manner on numerous projects with researchers in **economic and social sciences and humanities.**

THE FC LAB - CNRS RESEARCH FEDERATION

In 2017, the FC LAB doubled its capacity for testing in extreme conditions. With a team of **150 professors, engineers, doctoral students** and administrative staff from **6 labs**, the research federation is the only one in Europe **to combine research and high-level engineering** in a public structure of this scale on this subject.

The federation is supported by the Femto-ST Institute (University of Franche-Comté/UTBM/ENSMM/CNRS), the ICB (University of Burgundy/ UTBM/CNRS), and beyond the regional borders, to the Ampère laboratory of Lyon (INSA, Centrale Lyon, University of Lyon), the LEMTA lab in Nancy (University of Lorraine, CNRS) and the two IFSTTAR teams (French Institute of Sciences and Technologies of Transportation, Planning and Networks), the SATIE and LTE labs with staff in Belfort and, of course, the CNRS.

www.fclab.fr

Research and innovation, a trailblazing spirit

THE UTBM FUEL CELL FACILITY

It is currently **one of Europe's largest public facilities intended for research, testing and industrial transfer focused on Fuel Cell Systems** (900 m² of testing space for test powers of just a few watts up to nearly 200 kW). The work it carries out is aimed at positioning it fairly high on the TRL (Technology Readiness Level) scale, at least at the level of representative functional demonstrator, and therefore in close association with current industrial issues. The goal is, of course, to accelerate the industrial development of this technology. It is essential to be able to quickly transfer the research works conducted in particular by the FC LAB research federation that is mostly established in the building. As part of this dynamic, we can cite, for example, several projects such as **MobyPost,** which is currently in the industrial transfer phase or the creation of the spin-off **H2SYS**, resulting from research conducted on the platform and currently hosted by it.

The ambition of this platform is to further increase its industrial activity, notably by proposing **new means of testing H_2 systems available to manufacturers**, but also by supporting our partners in training their employees and certifying their products.

THE FEMTO-ST INSTITUTE

With 750 staff members, **FEMTO-ST** is a mixed unit associated with the CNRS and linked to the University of Franche-Comté, the National School of Mechanics and Microtechnology and the University of Technology of Belfort-Montbéliard. The research is structured in 7 departments: Automatic and micro-mechatronic systems (AS2M), Energy, Computing of Complex Systems (DISC), Applied Mechanics, Micro, Nanosciences and Systems (MN2S), Optics, Time-Frequency.

The activities related to Hydrogen energy are conducted by about a hundred researchers in **engineering sciences** of the Energy departments (hybrid systems, energy management, static converters, systemic optimisation, energy converter, diagnosis of health status, lifetime prognosis, fault-tolerant control, integration in transport and stationary applications), AS2M (life expectancy prognosis, linked with maintenance), Applied mechanics (solid storage of Hydrogen) and MN2S (micro-fuel cell). With a transversal focus on **humanities and social sciences**, RECITS was recently integrated into FEMTO-ST and is also very active in relation to societal issues regarding Hydrogen-Energy and Fuel Cells (business models, socio-technical transition, history of technology).

www.femto-st.fr

THE ICB LABORATORY

The **Interdisciplinaire Carnot de Bourgogne** is a joint laboratory associated with the CNRS and attached to the University of Bourgogne and the University of Technology of Belfort- Montbéliard. The research is structured along 6 axes:

› Quantitative Interactions & Controls
› Nanosciences
› Photonics
› Interfaces
› Metallurgical Processes & Materials Durability (PMDM)
› Design, Optimization & Modeling in Mechanics (COMM)

The research departments - Interfaces, PMDM and COMM - gather 30 researchers who develop work on SOFC and PCFC fuel cells, high temperature electrolysis, PEMFC battery catalysts, hydrolysis, photolysis, hydrides, Hydrogen storage and purification. Research focuses on development of advanced material, a study on their sustainability, reactivity processes and phenomena for the solid/ solid and solid/gas interphases.

icb.u-bourgogne.fr

THE MAISON DES SCIENCES DE L'HOMME OF DIJON

©H.Moujoud - MSH Dijon

The **Maison des Sciences de l'Homme of Dijon** (CNRS and University of Burgundy) plays a dual role as a mixed unit with its own resources, and a federation of the 15 laboratories of Humanities and Social Sciences of the Grand Campus. The activities related to Hydrogen Energy are conducted in relation to a multidisciplinary focus on Mobility, Exchanges and Space by two research teams that question territorial dynamics and sustainable development: **Hydrogen and Territory** (integration of Hydrogen in territories in a participative and citizen-focused dynamic) and **Environment** (appropriation of renewable energies and social issues related to territorial ecology). A network of research and innovation for the socio-environmental transition (**Transition Network**) coordinates multidisciplinary research initiatives related to Hydrogen at the Bourgogne-Franche-Comté scale.

msh-dijon.u-bourgogne.fr & reseau-transition.fr

a pool of expertise

Training courses
to dream up and design energy systems for tomorrow

The territory provides a **large and varied range of qualifying, targeted training courses** organized according to precisely identified needs. The courses are designed and implemented, both content and pace, to **constantly adapt to scientific and technological developments**: short or long degree courses, through initial training, apprenticeship training or continuous training.

A ONE-OF-A-KIND MASTER'S ENGINEERING COURSE (CMI) IN FRANCE

The **Hydrogen Energy and Energy Efficiency 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.).

ONE-OF-A-KIND IN FRANCE

HYDROGEN STATIONS AND VEHICLES IN 5 HIGH SCHOOLS

The training of the younger generations is essential to prepare for the future.

The Bourgogne-Franche-Comté Region has launched a program to implement **complete Hydrogen Energy solutions, both for energy storage and for mobility**, in 5 high schools.

The company MAHYTEC has responded by associating other companies and regional expertise to propose a "turnkey" solution comprising **a bivalent station for the storage of electrical energy and its restoration through a hybrid "Fuel Cell and batteries" system**. This station will also supply Hydrogen to a quadricycle that is able to transport a large payload. This will provide both educational activities for students and new functionalities for high schools. With this system, high school students will be provided with full-scale knowledge of Hydrogen Energy technologies for 21st century high schools.

Universities
with related specialisations

UNIVERSITY OF FRANCHE-COMTÉ

23,690
students

The university manages an educational platform on Hydrogen Energy.

Master's Degree Course in Energy
› Electric energy
› Thermal engineering and energy
› CMI Hydrogen-energy and Energy efficiency

Bachelor's Degree Courses
› Renewable energies
› Maintenance and energy
› Conduct of works and energy performance of buildings

DUT (University Diploma in Technology)
› Electrical engineering
› Civil engineering/sustainable construction
› Thermal engineering and energy

www.univ-fcomte.fr

UNIVERSITY OF BURGUNDY

29,400
students

Science and Technology Masters
› Control & Durability of Materials
› Controlling & Chemical Analysis
› Laser Physics and Materials

Bachelor's degree and Master's degree in human sciences
› Geography, Planning, Environment

DUT
› Mechanic and Production Engineering
› Civil Engineering
› Physical Measuring
› Material Sciences and Engineering

www.u-bourgogne.fr

> UFC

University Engineering Schools

UNIVERSITY OF TECHNOLOGY OF BELFORT-MONTBÉLIARD

4 sectors in the Energy Department:
› Energy production
› Networks, conversion and storage
› Transport and embedded energy systems
› High energy efficiency buildings

2 educational platforms:
› Electromagnetic compatibility
› Energy and land transport

1 Electrical Engineering Training by Apprenticeship

1 Master in Electrical Energy

2,800
students

www.utbm.fr

ENSMM BESANÇON

Higher National General Engineering School with specialization in Mechanics and Microtechnology

3 engineering degrees equivalent to Master's degree:
› An ENSMM diploma through a classical training with a student status
› Two ENSMM diplomas through apprenticeship training, with specialization in "Mechanics" and "Micro-engineering and Design"

9 specialization departments during the 3rd year of ENSMM (for classical training only): Advanced Mechanical Engineering, Design and Fabrication of Connected Objects, Functional Materials and Surfaces, Microsystems for Health, Mechatronics and Robotics Systems, Advanced Engineering of Production Systems, Micromechanics, Advanced Manufacturing and Process Engineering, Innovation Engineering

Other training programs:
› Two Master of Science and Technology degrees in Engineering Sciences
› Doctoral School in Engineering Sciences and Microtechnology

870
students

1/3
training in companies

4
research departments

www.ens2m.fr

ESIREM DIJON

The University School of Materials, Computer Science & Electronics Engineering offers 2 specializations:
› **Materials-Sustainable Development** (2 courses): Sustainable Development and Non-Destructive Control
› **Computers-Electronics** (3 options): Embedded Systems, Security and Network Quality, Software and Knowledge Engineering

With a network of more than 200 companies, the training promotes a fast and multi-sector professional integration in domains such as energy, metallurgy, transport, IT, R & D, telecommunications.

430 students

5 collaborating CNRS laboratories

8 patents

esirem.u-bourgogne.fr

ISAT NEVERS

The Institute for Automotive and Transportation Engineering has been training for more than 25 years world-class engineers for the entire automotive and transports industry: innovation and R & D, design, industrialization and production, operation of vehicles/machines...

2 engineering courses with student and apprentice status and **2 masters in research** with training in specializations on energy, mechanics, embedded intelligence, transport infrastructures and networks, ergonomics & biomechanics, technical purchasing, composite materials, vibro-acoustics.

Backed by ISAT, the Department of Research in Vehicle Engineering for the Environment (DRIVE) is specialized in energy optimization for propulsion, intelligent transport systems, composite materials and sustainability, vibration and acoustics.

685 students and doctorate students

2 research laboratories public and mixed

www.isat.fr

This publication is the reference document
for the Hydrogen sector in Bourgogne-Franche-Comté.
It was prepared with the involvement of all stakeholders and partners,
whom we would like to thank for their valuable contribution.

Publication Management: Arnaud Marthey, President of the AER BFC
Deputy Publication Management: Martine Abrahamse-Pleux, Director General of the AER BFC
Project Coordination and graphic design: Aline POIRIER/AER BFC
Hydrogen Sector Project Leader: Nathalie Loch/AER BFC
Cartography: Yoann DUMON/AER BFC

Contributors
AERIS, ALSTOM, DELFINGEN, DEPHIS, EDF, ENGIE, ENSMM, ESIREM, FAURECIA, FC LAB, FEMTO-ST, H2SYS,
GAUSSIN, GEST'HYDROGÈNE, INOVYN, JUSTY, ICB LABORATORY, MAHYTEC, MECATEAMCLUSTER, MSH DIJON, PRESSE ETUDE,
BOURGOGNE-FRANCHE-COMTÉ REGION, SCHRADER, VALMÉTAL, UNIVERSITY OF BURGUNDY, ISAT,
UNIVERSITY OF FRANCHE-COMTÉ, UTBM, GRAND DOLE,
PÔLE VÉHICULE DU FUTUR, WIND FOR FUTURE

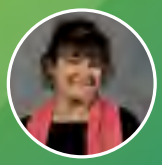
Photo Credits
AER BOURGOGNE-FRANCHE-COMTÉ, AERIS, ALSTOM, BIGSTOCK, DELFINGEN, DEPHIS, ENGIE,
ENSMM, ESIREM, FAURECIA, FC LAB, FEMTO-ST, GAUSSIN, GEST'HYDROGÈNE, H2SYS, ICB, INOVYN, ISAT,
JUSTY, LA POSTE, MAHYTEC, MECATEAMCLUSTER, PÔLE VÉHICULE DU FUTUR, PRESSE ÉTUDE,
PSA PEUGEOT-CITROËN, BOURGOGNE-FRANCHE-COMTÉ REGION, SENVION, SHUTTERSTOCK,
UNIVERSITY OF FRANCHE-COMTÉ, FRANÇOIS JOUFFROY/UTBM, VALMÉTAL, WIND FOR FUTURE.

Translation English version: ITC France

Printing: L'Imprimeur Simon

February 2018

regional economic agency of bourgogne-franche-comté



YOUR HYDROGEN SECTOR CONTACT
Nathalie LOCH
h2@aer-bfc.com
T. +33 (0)6 32 83 00 49

Maison de l'Économie
46 avenue Villarceau - 25 000 Besançon - FRANCE
T. +33 (0)3 81 81 82 83 - F. +33 (0)3 81 81 99 40

Maison Régionale de l'Innovation
64A rue Sully - CS 77124 - 21071 Dijon Cedex - FRANCE
T. +33 (0)3 80 40 33 88 - F. +33 (0)3 80 40 34 02

www.aer-bfc.com - h2@aer-bfc.com

FOR MORE INFORMATION

Agence financed by

RÉGION BOURGOGNE FRANCHE COMTE

Designed/Written by AER Bourgogne-Franche-Comté - Translated by IFC France - Printed by L'Imprimeur Simon - August 2019 - February 2018 version