

Symbio



HYWAY PRESENTATION

World Efficiency Solution 2017


tenerdis
PRÉSENTE

HYWAY

LIBERTÉ
MOBILITÉ
HYDROGÈNE

**ZÉRO ÉMISSION,
PLUS LOIN,
MAINTENANT !**



Hydrogen mobility in 2013

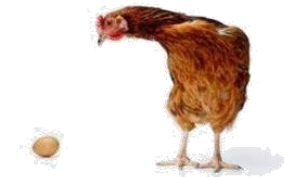
- Unknown in France by 99,99% of the population
- When known, eventually suffering from a negative image

Paradigm

- NO Hydrogen refilling station
- No cars
- No cars in OEM roadmap for France



HRS map in 2013





PROJECT OBJECTIVES

Deployment

- Significant fleet of LCVs (50) simultaneously with 2 HRS (Grenoble and Lyon)

Document

- Identify an documents the authorization and certification process fro both HRS and vehicle

Measure

- Reliability and security
- Monitoring and statistics on operational parameters of HRS and LCVs

Share

- Communicate to large audience and disseminate the pattern to other regions of France
- Establish the link between renewable energy and hydrogen production

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SETTING-UP AND INDUSTRIAL CONSORTIUM TO BUILD A CLUSTER



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Vehicles



Symbio



Electrolyser



McPhy
energy

H₂ Prod.



AIR LIQUIDE

ENGIE

CNR
Compagnie Nationale du Rhône
L'ÉNERGIE À L'ÉTAT POUR

HRS Supp.



AIR LIQUIDE

McPhy
energy

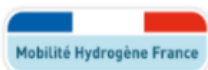
HRS Op.



AIR LIQUIDE
ADVANCED BUSINESS & TECHNOLOGIES

ENGIE

GNVERT
GDF SUEZ



Note : H₂ Mobility France is an industrial consortium with Symbio as coordinator

SUPPORTED BY STRONG INSTITUTIONAL ORGANIZATION

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**Authorization
and
Regulation**



**Technology
monitoring**



**Vehicle
support**

ADEME



Agence de l'Environnement
et de la Maîtrise de l'Energie

**HRS
&
infrastructure
support**



**Project
coordinator**



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ENERGY CLUSTER



WITH RANGE EXTENSION, SYMBIO H₂ KIT ENABLES TO MORE THAN DOUBLE VEHICLE MILEAGE, WITH NO « WINTER » EFFECT

48 kWh Electricity, 24 kWh Heat

- 26 kWh of power provided by the Fuel Cell + 22kWh provided by the batteries
- In cold weather, heat produced in the Fuel Cell is diverted to vehicle cockpit : no impact of cold conditions on comfort or range



No climate effect on Hydrogen Electric Vehicle, as shown with real life “Mail delivery” cycles in urban areas (Poste office)



20 °C

Kangoo ZE

Kangoo ZE + Kit H2



5 °C

Kangoo ZE

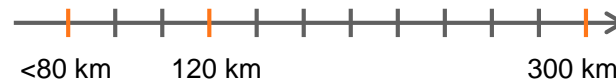
Kangoo ZE + Kit H2



-5 °C

Kangoo ZE

Kangoo ZE + Kit H2



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OUTCOMES



DEPLOYMENT OUTCOMES

Customer acquisition

- From major fleet (Post/DHL) to SME
- Acceptance easier than expected, validation of the business model

HRS

- 2 HRS in Grenoble and Lyon
- Process and regulation in place for quick deployment, improvement of HRS monitoring

Data outcomes

- Majors improvements in H₂ FC design and AFS procedures
- Full understanding of customer cycles

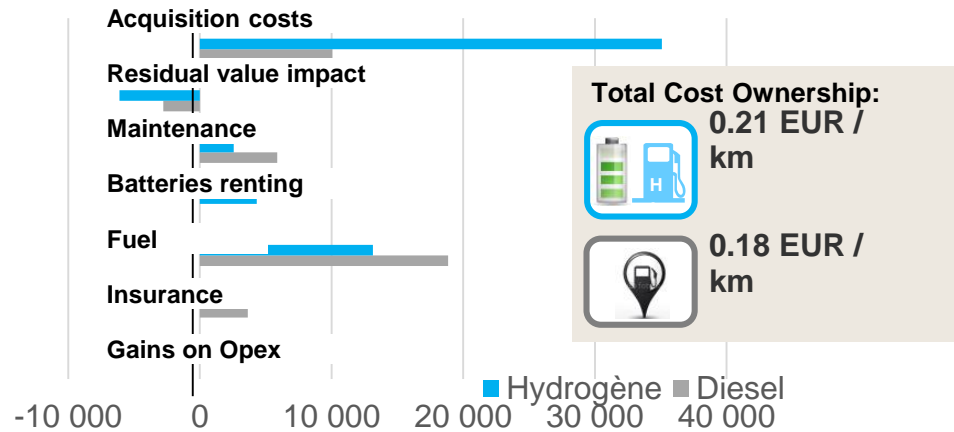


HRS Lyon



HRS Grenoble

Cost of ownership



- **Working Hypothesis :**
 - Depreciation on 5 years
 - Mileage 130 km/day, 5 days/week => 39 000 km/year
- **Extra possible valorization points of the Kangoo ZE H2 :**
 - Depreciation on 6 years (suits to VE, batteries excluded)
 - Change in the refile mix: grid refile/hydrogen refile
 - Better communication for the company

Operating costs: focus on “fuel”

Autonomy: 300 km in city

- 120 Km on battery
- 180 Km on H₂

Energy costs: 20-22 EUR



2-4 EUR for the 120 Km electric (battery)

18 EUR for the 180 Km electric (H₂)

Compared to Diesel : 27-29 EUR



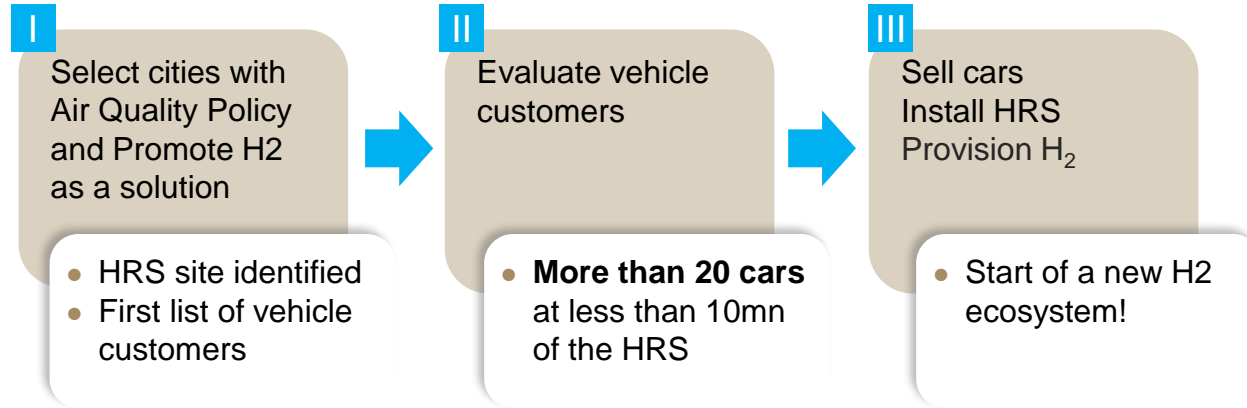
Consumption equivalent 7,5l/100km in diesel i.e. 22,5l/300Km

What is a local Hydrogen Cluster?

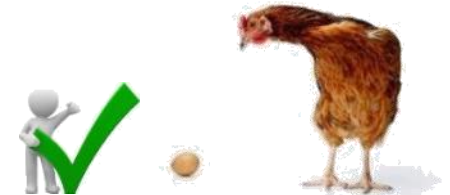


- **1 or several Hydrogen stations** covering a territory (City > Departement > Region...)
- **1 « captive fleet » of 20-30 vehicles** running day by day on the territory and always recharging at the same station: parcel service, transportation...
- Local solution to « chicken & egg » investment dilemma
Vehicles => Station or Station => vehicles ?

3-Step sales model



Thanks to Local Hydrogen Ecosystems... « Chicken & egg » problem solved !



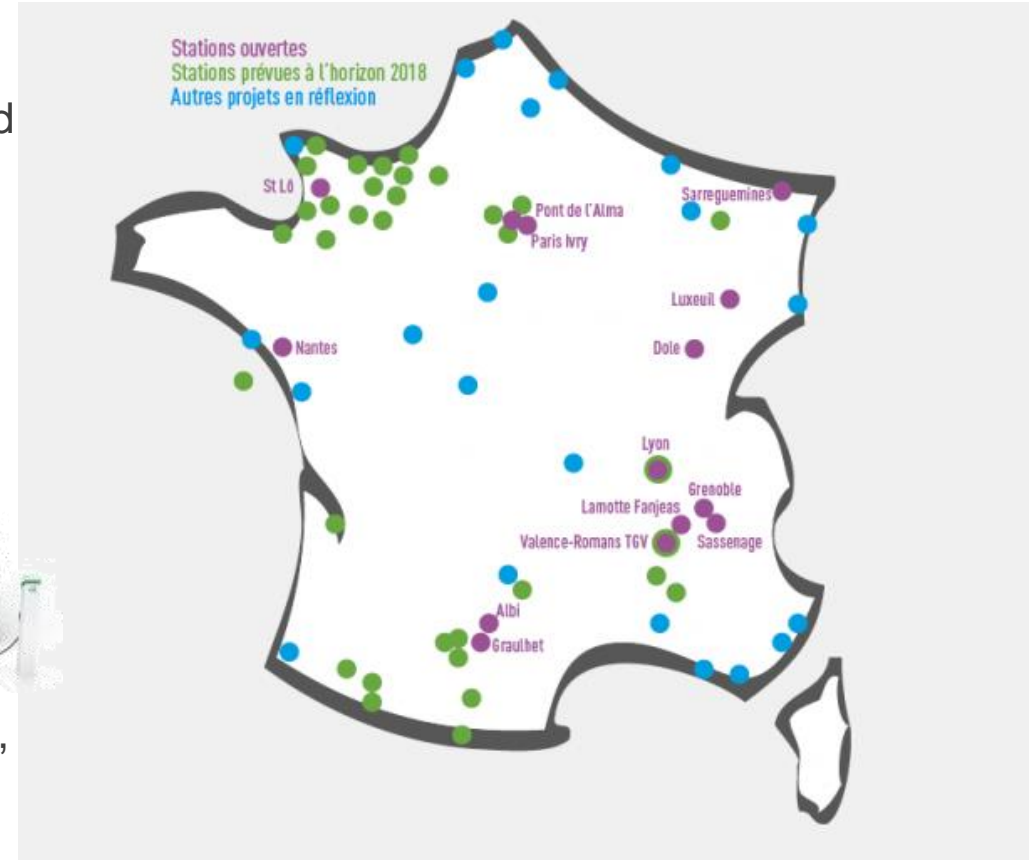
Hydrogen mobility in 2017

- Over 300 Renault Kangoos deployed
- Over 100 Hyundai and Toyota deployed in Taxi cluster
- First fleet of busses on road
- Over 100 new stations on the roadmap



Paradym

- Densify the HRS network
- Extend the type of H₂ vehicles (VAN, Trucks, Train, ...)



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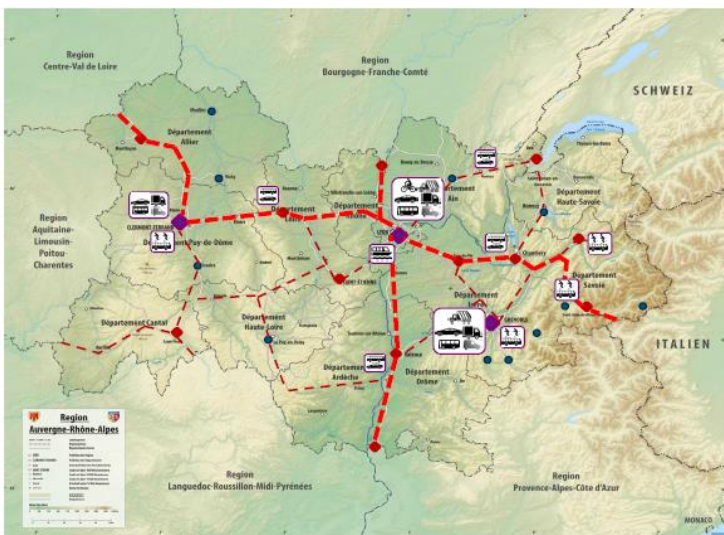


COMING NEXT



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FROM HYWAY TO ZERO EMISSION VALLEY



Infrastructure

- ◆ Grosses stations (150-200kg/j)
- Moyennes stations (50-60kg/j)
- Petites stations (15-20kg/j)

Véhicules Liaison

- Ligne de Cars
- Transport Individuel
- Applications fluviales

Véhicules Usages locaux

- Bus et SkiBus
- Utilitaires
- Bennes À Ordures
- Camions urbains

« ZERO EMISSION VALLEY” PROJECT, CONSISTING IN THE ROLL-OUT OF 20 HYDROGEN REFUELING STATIONS AND 1000 VEHICLES, HAS REINFORCED OUR VISIBILITY ON THIS TOPIC, TOGETHER WITH THE PARTICIPATION OF OUR REGION TO THE “REGIONS AND CITIES INITIATIVE” LAUNCHED BY THE FCH-JU.”





THANK YOU



THE TEAM CONSISTS OF 35 INDIVIDUALS, INCLUDING THE FOLLOWING MANAGERS & CO-FOUNDERS:



Fabio Ferrari, CEO

At Symbio FCell, Fabio primarily focuses on establishing key partnerships. He brings to the Company 20 years of entrepreneurial experience, particularly in NetCentrex in which he was Director of Media Services before its successful trade sale in 2006. Fabio is also investor and co-founder of several start-ups in sustainable mobility, and highly committed to developing cutting-edge technologies and businesses in the transportation industry



Dr Luc Rouveyre, CTO

Luc brings to the Company nearly 20 years of experience in Fuel Cell systems: he formerly designed high efficiency Fuel Cell systems for Renault, Nissan and Idatech; has contributed to 40 industry patents for Fuel Cells and Fuel Cell Systems. Throughout his extensive experience, Luc has built powerful tools that help to the expand Fuel Cell usage by reducing entry costs and improving product length of life



Pierre-Yves Le Berre, VP Sales & Bus Dev

Before co-founding Symbio FCell, Pierre-Yves had been in charge of business & value-chain development and strategic marketing at groups such as Matra Communication, Nortel Networks and NetCentrex for over 20 years



Didier Belin, COO

Didier brings to the Company over 15 years of organization in software manufacturing and system architecture. His true passion for car architectures and organization are key to speed up Symbio FCell's new developments and reduce the related risks, from software development to mechanical integration

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