



**ENVIRONMENT  
PARK** Parco Scientifico  
Tecnologico per l'Ambiente

# *Hydrogen initiatives in Piemonte*

*SHREC - January 21<sup>st</sup> 2021*

 REGIONE  
PIEMONTE



## Environment Park - Cleantech technology Park

Environment Park [ENVIPARK] is the cleantech technopark based in Torino, active since 2000 in the domain of clean innovation, providing location and support services to companies and research institutions.

Park offers 30.000 sqm to host **70+ companies and research institutions**

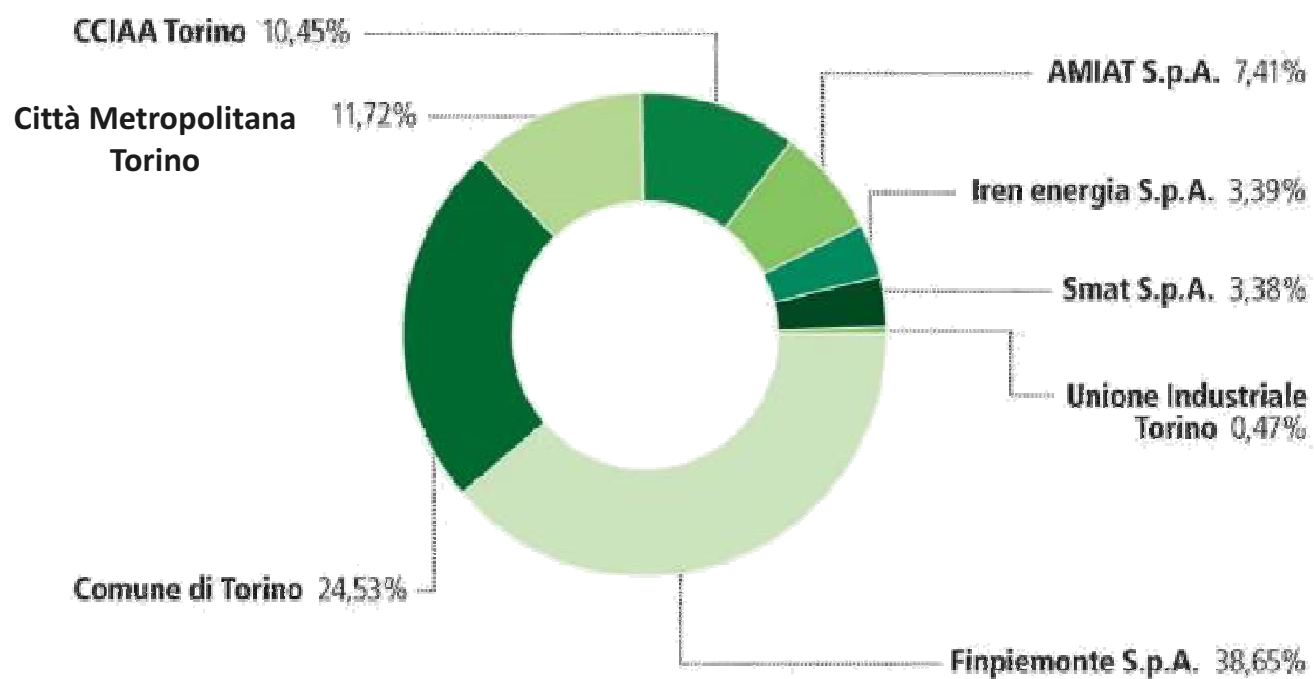


20+ years experience  
in eco-innovation

100+ yearly contracts  
for innovation services

Availability of open  
facilities

## The company managing the Park - Environment Park S.p.A.



## Infrastructures

- 100.000+ mq for tenants (firms and R&D centres)
- Portfolio of services for tenants
- Community counting 70+ entities
- Conference center
- Mini-hydropower plant providing clean power
- Technological infrastructures available for demo projects



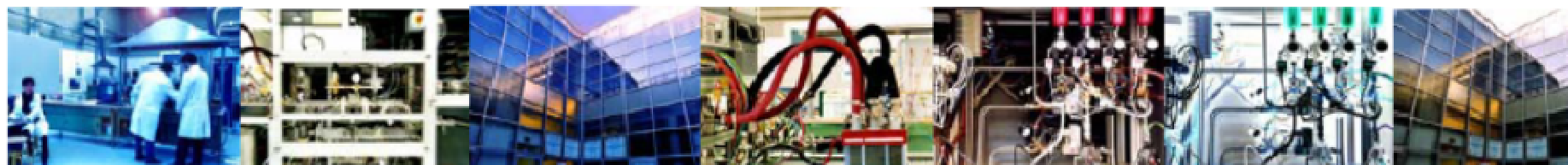
## Innovation services

- ✓ Consultancy
- ✓ Project design e management
- ✓ Open laboratory facilities for experimental activities
- ✓ Management of the **Cleantech Regional Innovation Cluster (CLEVER)**, a 150+ companies network cooperating on industrial research





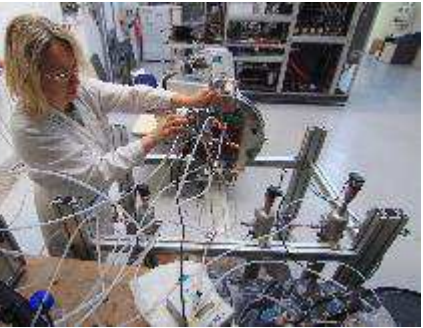
# ***HYDROGEN IN PIEMONTE A SYSTEMIC EXPERIENCE***



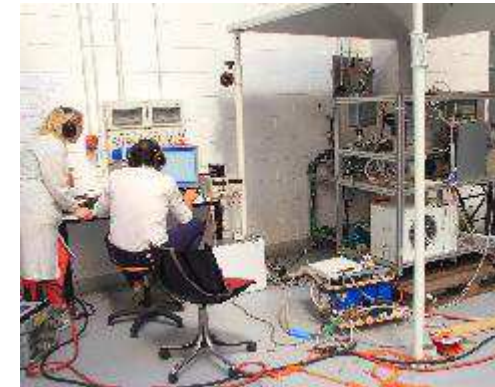


# A Public Private Initiative

R&D lab



Test facility



Training infrastructure

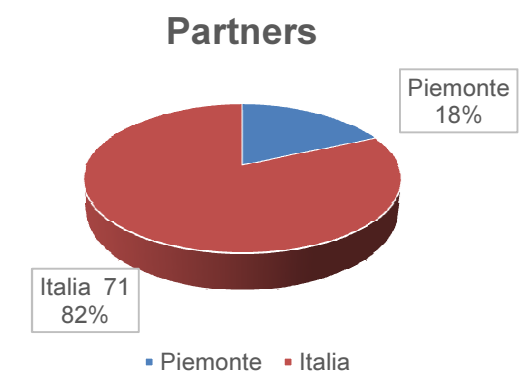
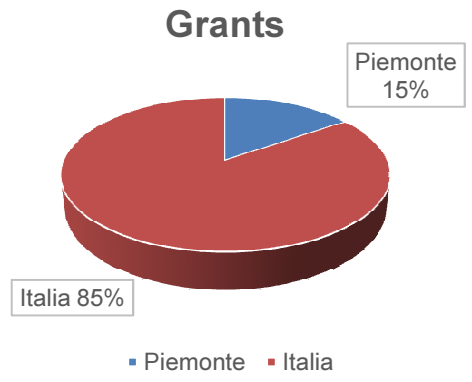
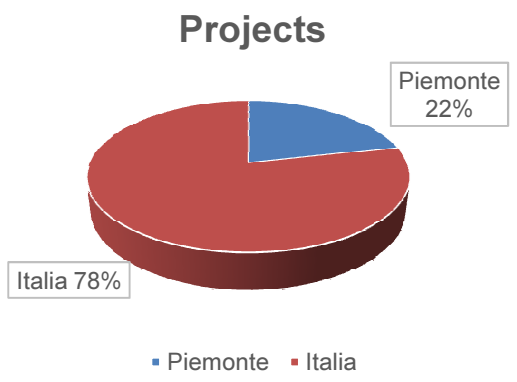


Competence centre



50+ SMEs involved in a deep scouting action in order to check their position in H2 value chain  
specific industry regional cluster launched to conceive research and innovation initiatives  
5+ MEuro invested by SMEs in R&D projects (2009-2013) with co-funding by the Regional ERDF  
strong positioning in the EU framework

## FCH JU 1 (2008-2013)



# 2006 - 2013 Achievements



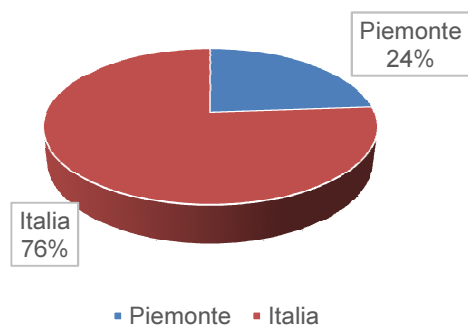


Huge decrease in «popularity» of hydrogen  
Lack of a national framework  
Need to preserve know how and experience  
EU R&D programmes as key tool

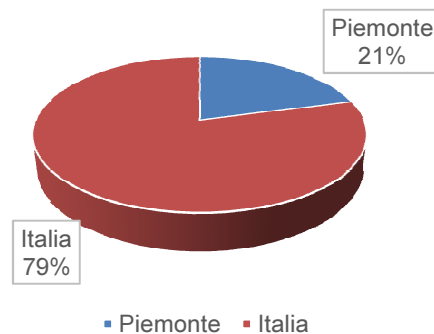


## FCH JU 2 (2014-2018)

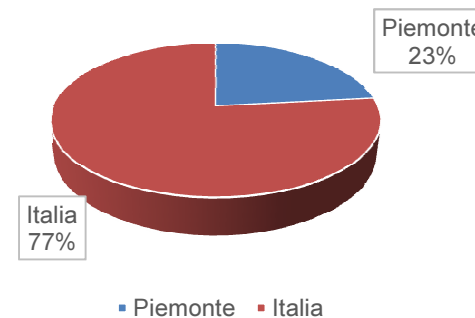
Projects



Grants



Partners



## Hydrogen is back

### A pillar in the energy transition

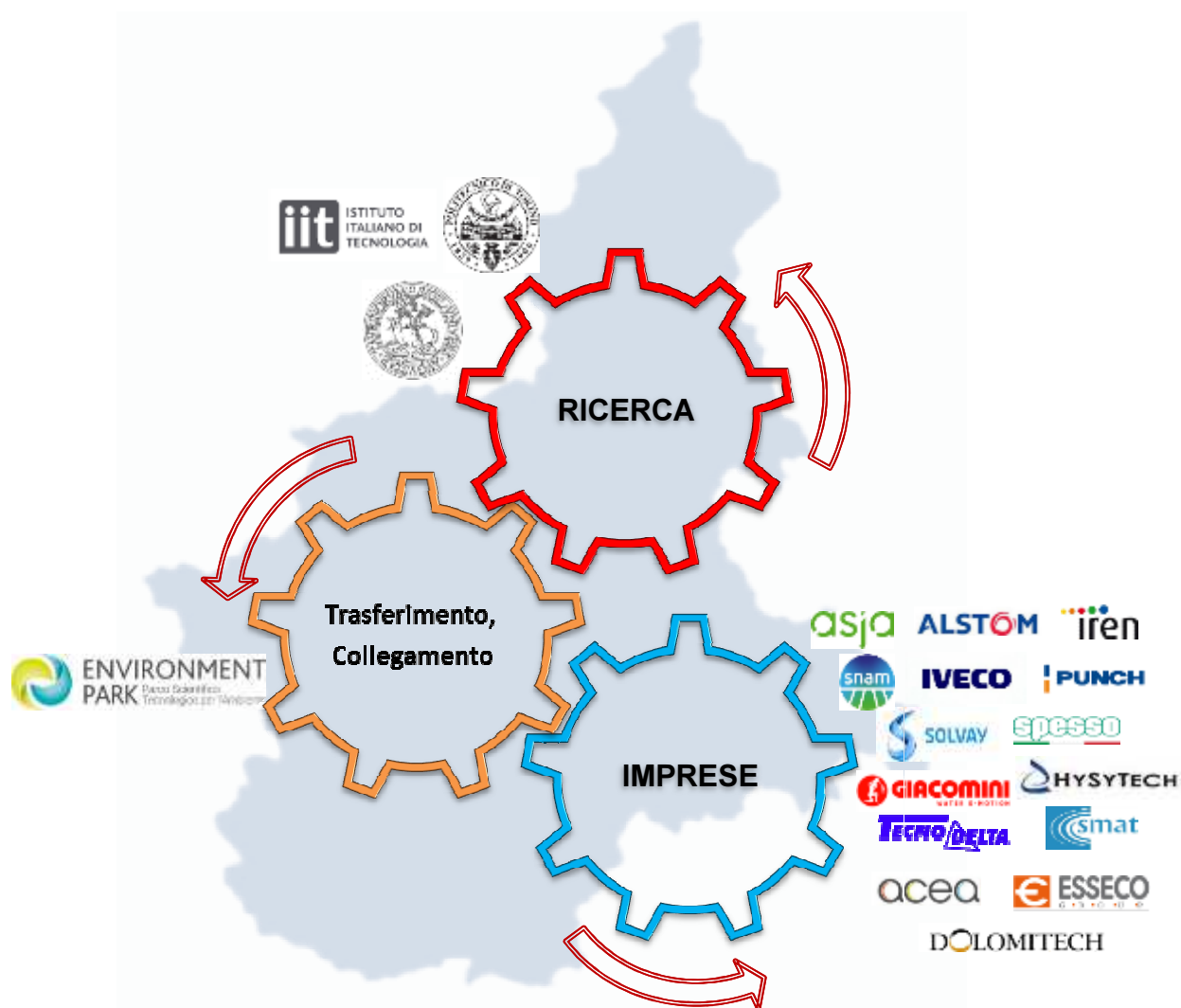
European strategy on hydrogen

Advanced effort toward Paris targets

Recovery after the pandemic

Hydrogen is among the emerging technologies





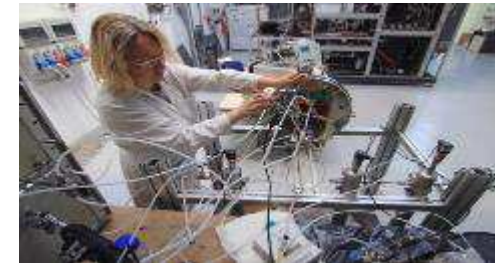
2003 - 2020

H<sub>2</sub>

Piemonte

Hydrogen production (electrolysis PEM e SOEC, SMR, biological)  
Fuel cells (SOFC, PEMFC)  
Hydrogen storage (P, metal hydrides. underground)  
CO2 conversion through hydrogen  
Energy and chemical modeling  
Safety of hydrogen systems

- Several research groups with **15+ years experience** in the sector
- Coordination of several **EU funded projects**
- Availability of **lab infrastructures to organize services** (tests and demo)
- Strong **international networks**





# The hydrogen laboratory @Envipark



Strong synergy among Envipark, Polito and IIT

Safe area for components test with hydrogen sensors and active protection system

Dedicated test benches for several activities in H<sub>2</sub>/FC domain

LT/HT single electrochemical cells and stacks

Electrolysers (low T, high T)

CSP-fed chemical looping

Photo-catalytic processes

BoP components

H<sub>2</sub> storage (gas, solid matrix, liquid)

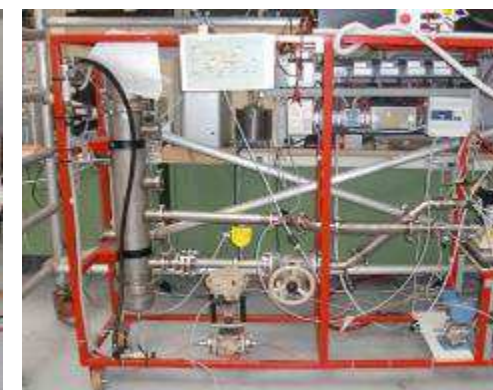
Dedicated test areas for H<sub>2</sub>/CO<sub>2</sub> processes

Synthetic (solar) chemicals

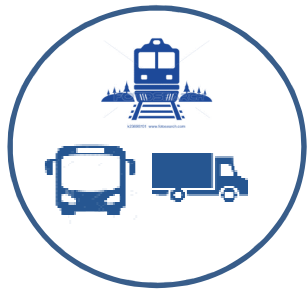
CO<sub>2</sub> capture (absorption, membranes)

CO<sub>2</sub> reduction (electrochemical, thermochemical, photo-catalytic, bio-chemical)

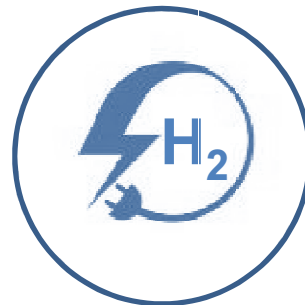
IT and HP area for test activities in the domain of underground H<sub>2</sub> storage



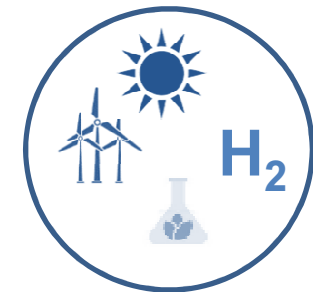
## H<sub>2</sub> Mobility



## Energy



## Upstream



- Several industrial players/**head of chains**
- **SMEs with experience** and vision in the sector
- Presence of **utilities** interested in integrating H<sub>2</sub> in their processes
- Availability of infrastructures viable to support **pilot initiatives**



## Mobility

**CNH - FPT INDUSTRIAL:** Development of a fuel cell truck planned on the market on 2023

**ALSTOM:** Development of the first italian Fuel cell train replacing diesel - planned at end of 2023

**PUNCH Torino:** development of hydrogen power systems for bus applications



## Upstream

**IREN:** Plan for a pilot plant for CO2 capture and methanation with green hydrogen at the Torino waste treatment plant



## Energy

**SMAT** – Completed test of a SOFC industrial CHP at the wastewater treatment plant using biogas as a fuel. First of a kind in Europe at a 100 kw scale



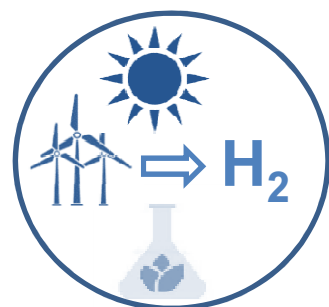
## Mobility



## Energy



## Upstream



## Expected outcomes

- Introduction of **hydrogen as a fuel** in the region
- Significant contribution to the **decarbonisation** of energy and transport
- Significant contribution to the **improvement of air quality** in particular connected to the Local Public Transportation
- Relevant push to the **industrial competitiveness** in the affected sectors
- Relevant contribution to the **excellence in research**



## Regional hydrogen system



*Industrial research*

*Investments*

*Networks*



# Operational framework

Increased and growing interest by industries

potentially complete supply chains driven by big industrial players:

Production

Logistics and transportation (including storage assets)

Final uses

- ❖ Mobility
- ❖ Industry
- ❖ Distributed residential energy generation
- ❖ Infrastructures

## H2IT MEMBERS



# HYDROGEN NATIONAL STRATEGY UNDER DEVELOPMENT



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**ENVIRONMENT PARK S.p.A.**

Via Livorno, 60 - 10144 Torino - IT

T +39.011.2257111

F +39.011.2257225

**envipark.com**

Davide Damosso

E [davide.damosso@envipark.com](mailto:davide.damosso@envipark.com)

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