



Progress beyond

Green Hydrogen Platform

Bertrand Pavageau

R&I Partnerships & Technology Development Leader

3^{èmes} Rencontres académie-industrie du CNC

L'Hydrogène vecteur énergétique et réactif chimique



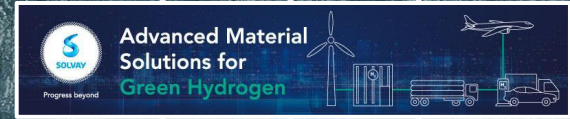
**FRANCE
CHIMIE**

December 7th 2023, Maison de la Chimie, Paris



“ I believe that water will one day be employed as fuel.

Jules Verne "The Mysterious Island" 1874



Let's make it happen !

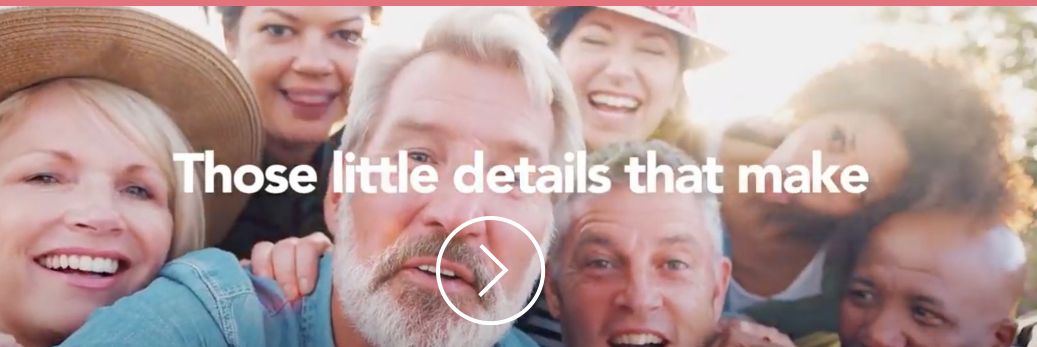


Solvay Today

We are a science company, founded in 1863, whose technologies bring benefits to many aspects of daily life.

Our innovative solutions contribute to safer, cleaner, and more sustainable products found in homes, food and consumer goods, planes, cars, batteries, smart devices, health care applications, and water and air purification systems.

Our Group seeks to create sustainable shared value for all, notably through its Solvay One Planet plan crafted around three pillars: protecting the climate, preserving natural resources and fostering better life.



Those little details that make



€13.4^{bn}
Met sales



€3.2^{bn}
Underlying
EBITDA



53%
Net sales from
sustainable
solutions



+21,000
Employees



63
Countries



98
Industrial sites

2022 figures

2030 Solvay One Planet goals

Broad and strong progress



Climate



Resources



Better Life



Target	2030 targets	2021	Progress versus 2018	Comments
Reduce GHG emissions, scope 1 and 2, and Align with Science Based Targets initiative (SBTi)	Reduce by 30% (-2.5%/yr)	11Mt	-14% -11% structural	Above Paris Agreement
Phase out coal wherever renewable alternatives exist	Achieve 100%	27 pj (1 plant exiting coal)	-18%	Rheinberg in 2020, Dombasle in 2021, Devnya in 2022
Reduce negative pressure on Biodiversity	Reduce by 30%	-13%	-24%	Torrelavega Cuchia quarry restoration (CEFIC award), Paulinia's (WHC Gold Certification), Santa Lucia conservation area
Increase sustainable solutions, % of Group sales	Achieve 65%	53%	+3pp	Solef® PVDF, Addibond™, Actizone™, SOLVAir® Marine
Increase circular economy, % of Group sales	More than double	5%	+1pp	Silica HDS, RhodiaSolv® IRIS, Amodel® Bios, Natural Vanillin, Augeo® Green Solvent
Reduce non-recoverable industrial waste	Reduce by 30%	58 kt	-34%	45 projects initiated
Reduce intake of freshwater	Reduce by 25%	315 Mm ³	-5%	71 projects initiated
Safety with a zero accident policy (RIIR* indicator)	Aim for zero	0.43	-16%	Action plan on globalizing near misses
Accelerate DEI: Gender parity in mid & senior management	Achieve 50% by 2030	25%	+1.3pp	Launched Solvay One Dignity 9 objectives and action plans
Extend parental leave time	16 weeks since 2021	implemented	achieved	16 weeks policy open to all co-parents regardless of orientation since January 2021

* Reportable Injuries and Illnesses Rate

Accelerating the transition to Green Hydrogen

Energy transition has to happen.

It is fundamental to reaching **Net Zero**, and **hydrogen** is an essential part of the mix.

Chemistry holds the key to transforming hydrogen into a **green energy solution** for the future.

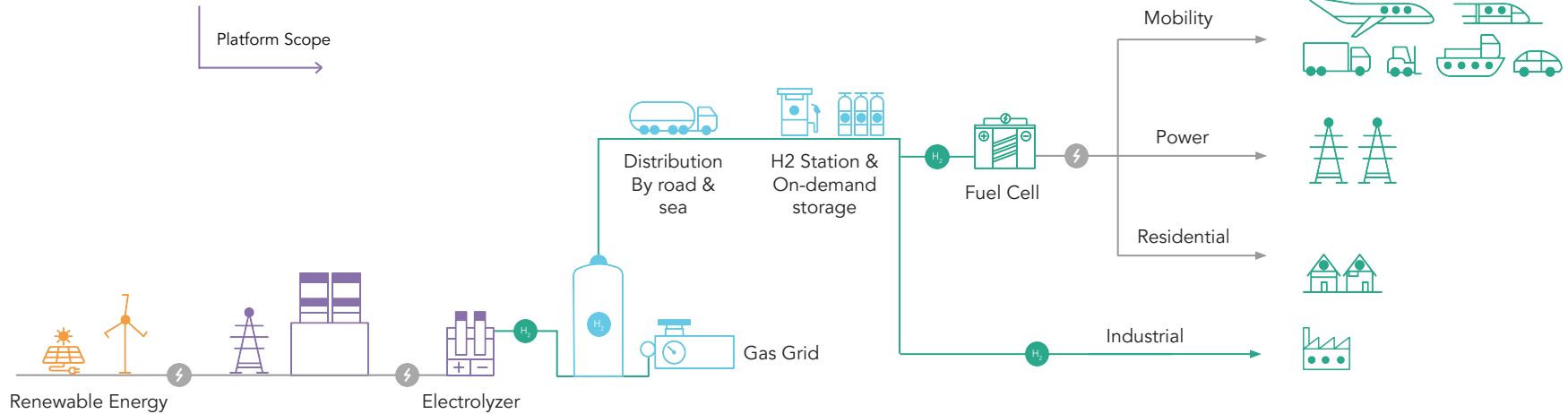
At Solvay, we're developing solutions based on our specialty materials to **drive the green hydrogen economy** forward.

We're committed to enabling a faster transition to a green hydrogen economy for a clean planet.



Solvay Green Hydrogen platform:

Relevant products and solutions all along the Green Hydrogen Value Chain



↑
Ionomers for Membranes (Redox Flow Batteries)

↑
Polymers & Additives for Electrolyte and Electrodes + Advanced Materials For Balance of Stack

↑
Material for H2 Storage Vessels

↑
Polymers & Additives for Electrolytes and Electrodes + Advanced Materials For Balance of Stack

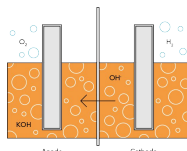
↑
Advanced Material for FC power trains (Balance of Plant) + Materials for H2 Storage Vessels

Solvay Advanced Materials relevant and meaningful in Water Electrolysis across two key technologies

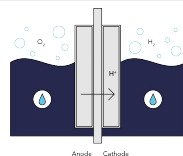


Today's two main electrolyzers technologies
(for producing Green H₂)

AEL
Alkaline Electrolysis
(Established)



PEM-EC
Proton Exchange
Membrane Elec.
(Establishing)

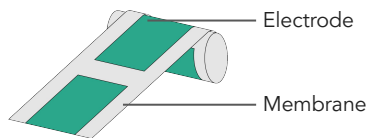
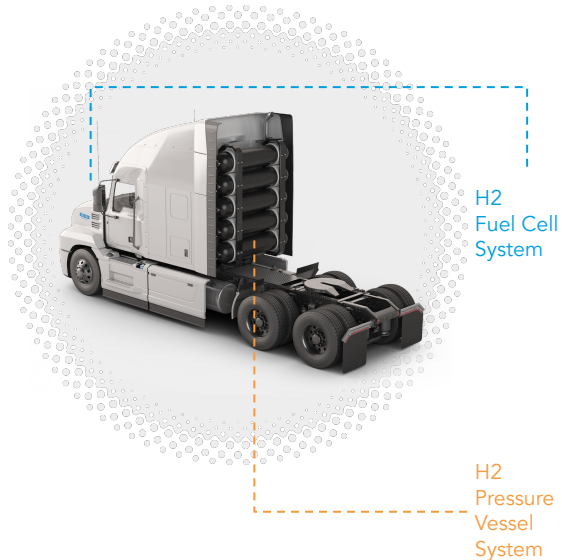


1 Core of stack	2 Balance of stack (BoS)	3 Balance of Plant (BoP)
<p>MEA</p>	<p>Stack</p>	<p>Electrolyzer Plant</p>
<p>Sulfone polymers For separator diaphragm</p>	<p>Sulfone/Sulfide polymers For cell frame</p>	<p>Materials GBU E&I Cluster Coatings & liners</p>
<p>Fluoro-ionomers For membranes & electrode binders</p>	<p>Sulfone polymers For sub-gasket, spacers ...</p>	

Solvay Advanced Materials relevant and meaningful Green H2 fuel cells for Mobility

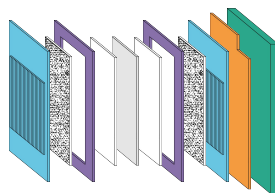


H2 Fuel Cell Vehicle



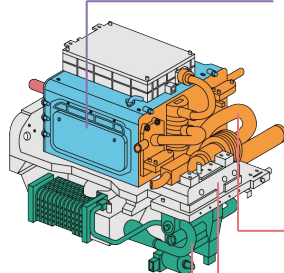
Membrane Electrode Assembly (MEA)

Fluoro-Ionomers
For membranes & electrode binders



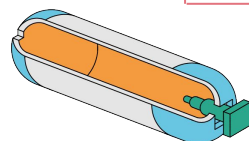
Balance of Stack (BoS)

PPSU / PPS / PPA / TPC
For sub gaskets, endplates, bipolar plates...



Balance of Plant (BoP)

Specialty Polymers
Solutions for hydrogen, air and thermal management loops



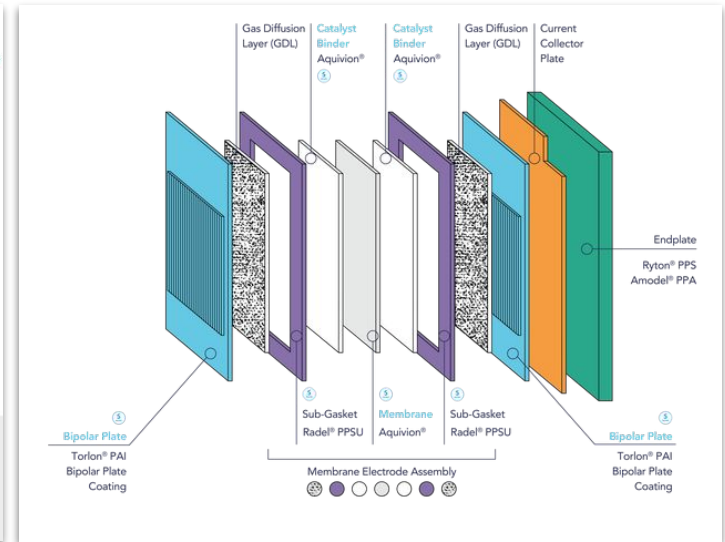
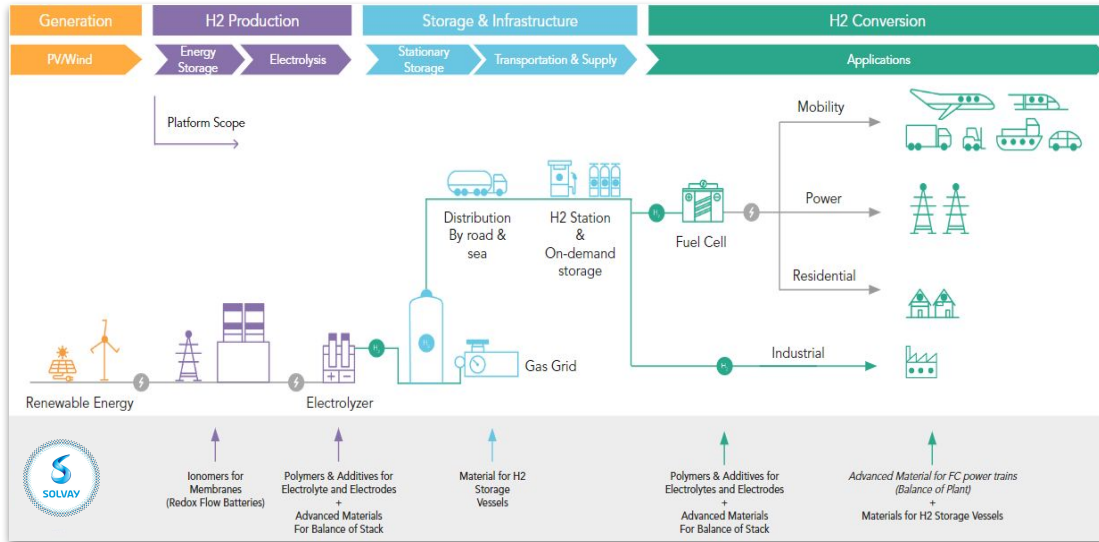
H2 Tanks

Specialty Polymers & Composites

Solvay's extensive range of critical advanced materials is engaged to produce, store and convert Green H2



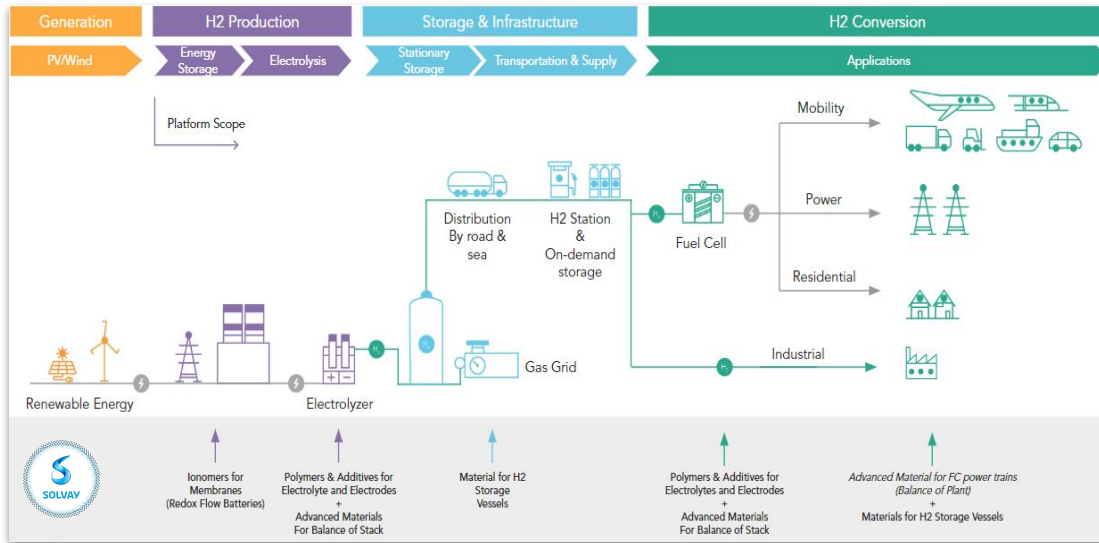
- Solvay is developing ionomers & structural materials for the PEM/AEL/AEM balances of stack and for the advanced H2 storage systems.



Eu collaborative projects enabling to design the technology value chains of the Green H2 market applications



- Solvay is co-developing the next generations of materials with key industry market makers and academic partners through collaborative European and Country funded projects...



H2 Production (Green energy storage)



H2 Production (Electrolysis)



H2 Storage (Mobility & transport)



H2 Conversion (Mobility)



... and is still open to engage into the next collaboration opportunities !

Key Takeaways

From our Advanced Material Solutions for Green Hydrogen

Making it happen.

We're a key enabler of the green hydrogen evolution.

Supporting leading hydrogen innovation

Our innovation focuses on enhancements in system durability, efficiency, safety and total cost of ownership, helping our customers improve the viability and scalability of green hydrogen technologies.

Creating Unique Technology Expertise

Our platform of innovative materials and chemical solutions and fully dedicated global teams means we bring together unique scientific know-how that enables us to work with any technology and bring the solutions you need

Accelerating through Partnerships

As the green hydrogen economy accelerates, we will continue to collaborate and create partnerships to make it happen



Progress beyond

FASTER TOGETHER.



Green Hydrogen Platform

