

WE BELIEVE IN

THE INFINITE POTENTIAL OF HYDROGEN

FOR A SUSTAINABLE WORLD

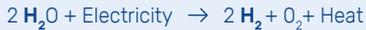
Did you know?
Hydrogen is the most abundant atom.



92% of the atoms in the universe are hydrogen.

It is also a wonderful energy vector

On Earth, hydrogen can be produced from water and electricity: a process called electrolysis.



The reverse reaction is made possible thanks to a fuel cell: the conversion of hydrogen into water produces electricity.



Hydrogen offers concrete solutions to develop clean transportation and store renewable energies.



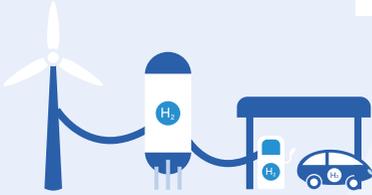
1kg (2.2lbs) of hydrogen used in a fuel cell is enough to drive **100km (62mi)** in a hydrogen car.



The tank of a Toyota Mirai holds **5kg (11lbs)** of hydrogen, enough to drive for **500km (310mi)** without having to recharge the car!

HYDROGEN IS ALSO

MOBILITY



Hydrogen cars have been on the road for **10 years** already and offer the best of both worlds: the range and charging time of a conventional gasoline car and the driving comfort of a battery-electric car.

3min
to fully recharge

500km (310mi)
enough to go from Paris to Amsterdam
without recharging the vehicle

0
vibrations
or noise

Consistent performances whether the tank is full or almost empty.
And, of course, zero polluting emissions!

But mobility is not only about cars, hydrogen can also power:



Buses



Regional and high-speed trains



Transport trucks



Forklifts



Delivery drones



Garbage trucks



Cargo ships' unloading
cranes



Boats and waterway
shuttle services

In 2030, we expect

15 million cars
500,000 trucks

And by 2050

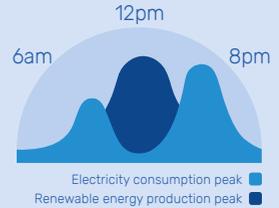
400 million cars
15 million trucks

HYDROGEN IS ESSENTIAL

TO MITIGATE THE INTERMITTENCY

OF RENEWABLE ENERGIES

When it's night time, cloudy or when the wind doesn't blow, a **complementary source of energy** is needed to remedy the intermittency of renewable energies. As hydrogen can be stored in large quantities and over the long term, it responds perfectly to fluctuations in demand.



Towards a 100% decarbonized energy stock

Production of renewable energy superior to demand at a given time



Conversion of the energy into hydrogen through electrolysis

H₂

Transport of hydrogen via the existing gas networks



Storage in a cavern

To store large amounts for agglomerations and factories

H₂



Medium storage

Ideal for interseasonal storage, can be easily transported and used in charging stations

H₂



On-board storage

To offer a significant range for cars, trains, buses, drones...

A cavern can hold enough hydrogen to power a city of **70,000** people in France or Germany for one year*

*on the basis of 5,112.4/people/year in France and 5,149.4/people/year in Germany. Source: US Energy Information Administration

WHAT PERSPECTIVES

FOR HYDROGEN?

The use of hydrogen is not new, with 55 millions of tons already produced and consumed each year in a variety of sectors. And its potential is infinite.

By 2030

10,000 tons
of hydrogen transported daily
to bring energy to sectors
and regions in demand.



26,000 buses
running on hydrogen
in South Korea.

By 2050



More than
30 million
jobs are created
in the energy sector.



30% of hydrogen-powered
buses enable CO₂ emissions
to decrease by 5 to 10
million tons per year.



20% of the current
diesel locomotives are
replaced by trains fueled
with hydrogen.

Source: Hydrogen Council report with the support of McKinsey, November 2017

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and exchange with other enthusiasts?
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