

REGIONE
ABRUZZO



Assessorato Parchi
Territorio Ambiente Energia



OUR FRIEND HYDROGEN AND HIS ADVENTURE

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If we want to tell children stories, getting their attention, it is necessary to make the story nice and enthralling, as parents and those who work with kids know very well. If we want to create stories and stimulate their fantasy, reading will be more useful and entertaining. But if we want to reach this aim, the book must create an exchange of ideas and advices and must be useful and playful. To be short, it is important that the book becomes a small friend that accompanies our children in everyday life.

Well, this book titled “**Our friend Hydrogen and his adventures**” was written so as to tell with easy and clear words, using the language of children, the big potentialities of this element bound to play an important role in scientific and technological researches in the field of energy, and not only.

I believe that reading it is useful, not only for its scientific contents, but also because it suggests how to invent stories for children and help them to invent their own stories. I am sure that this book reaches our objective: to make children love our planet and its resources, helping them to understand how to be better adults in the future.

Dr. Franco Caramanico
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The adventure of Hydrogen

This is the magic story of how our friend **Hydrogen** and his superpowers were born.



Everything started when

Planet Earth was threatened by its worst enemies: carbon dioxide (CO_2) and its dreadful assistants.



They are so bad that they want to change the balance of our Planet increasing the temperature



And polluting our air.

You must know, my friends, that we are the ones who created our unpleasant friends. In order to produce the energy that we need everyday for example to

Use the computer



Turn on the light



Watch television



Use hot water



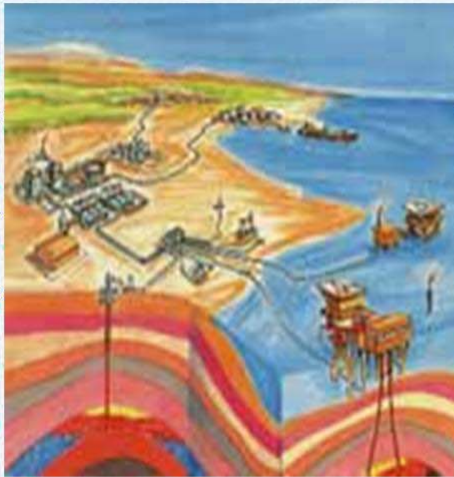
We use oil.

If we want to obtain energy from oil, we must burn it:

This is how we create and introduce CO_2 and his assistants in the air.

Oil is called fossil source, because it is obtained from decomposition of organic substances during many years under the crust of the Earth.

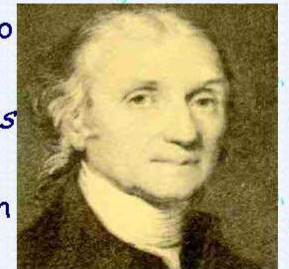
But if we continue to use it so much it could become impossible to live in our Planet.



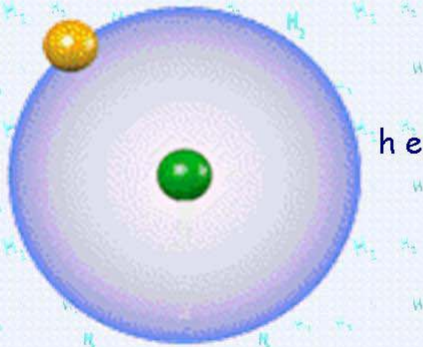
We have a superhero to help us: **Hydrogen**.



The word **Hydrogen** comes from two Greek words *hydro* (water) and *genes* (generate). Henry Cavendish



discovered **Hydrogen** in 1776 and our superhero became the first element of Mendeleev's periodic table. **Hydrogen** has a symbol: the symbol **H** and has an atom made of one **proton** and one **electron**.

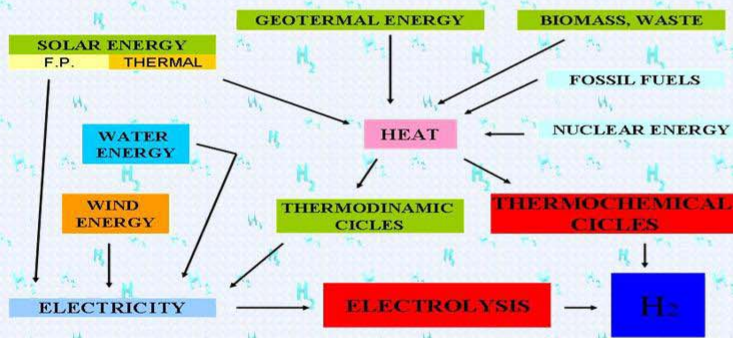


Usually, **Hydrogen** does not smell and does not have any color. **Hydrogen** is the lightest superhero in the world.

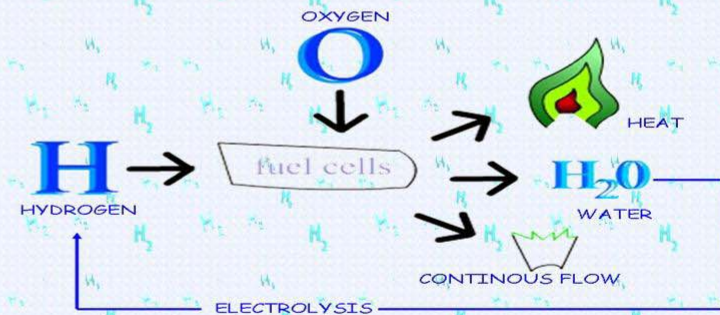
Among his powers the most important one is that he can produce energy in a totally clean way, without damaging the Earth and those who leave on it.

The other powers that Hydrogen has are:

- Hydrogen can be produced in many ways;



- Hydrogen is an endless fuel;



- Hydrogen can be stored without any pollution;



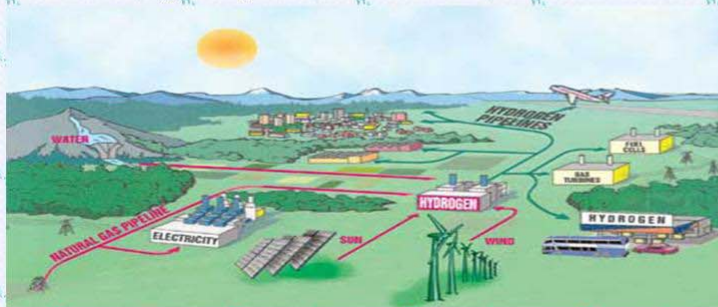
- Hydrogen can be easily transported;



- Hydrogen can be used in all the places where energy is necessary.



Just like all superheroes, also **Hydrogen** has a weak side: if we want to use it the best way, we need specific rules and good plants.

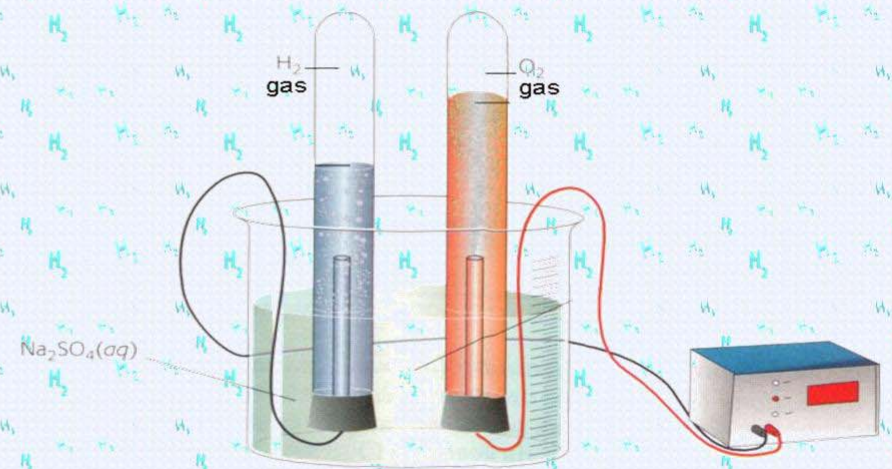


We can produce **Hydrogen** using fuel sources, but this creates pollution. Instead, we can use renewable energy sources (RES) which do not harm the environment. A totally clean and free way to produce **Hydrogen** is water electrolysis.

This method can use energy created from RES, like

the sun and the wind.

Electrolysis means to divide the water (H_2O) into two parts of **Hydrogen** (H_2) and one part of oxygen (O).

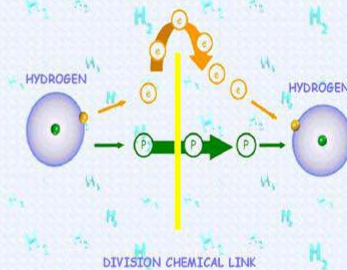


After producing our friend **Hydrogen** we can use it in two ways:

- Direct combustion;
- Fuel Cell technology.

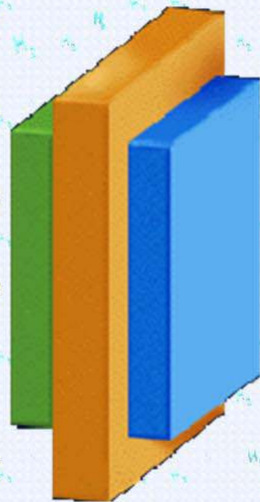
In the first case we burn **Hydrogen** to produce energy, while Fuel Cell Technology creates energy from simple

separation of the chemical link that there is between the **electron** and the **proton**.



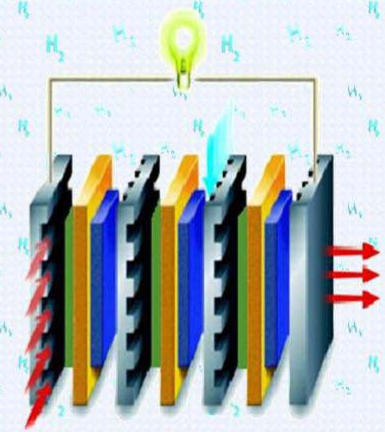
The Fuel Cell is made of different parts, called cells, one after the other (the number of cells changes according to the quantity of energy that we want to produce).

All the cells together are called stack



and it is the most important part of the Fuel Cell because this is where the division between the proton and electron takes place.

If we use the Fuel Cell

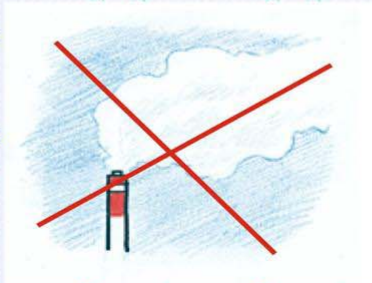


CELLS IN PARALLEL

there are many advantages:

- Little dispersion of energy;

- There is no production of fumes, therefore it does not pollute;



- The only emission is water;



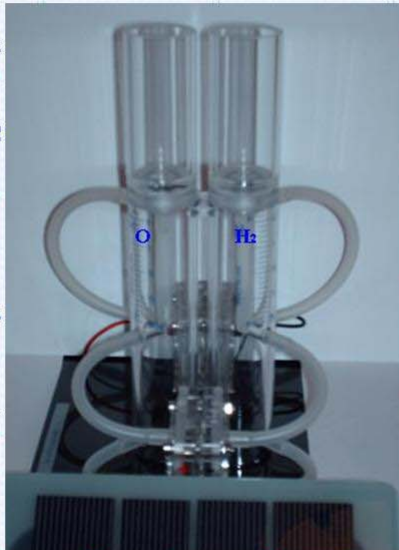
- It is not noisy.

An example of the production of Hydrogen through electrolysis and its use with Fuel Cell technology for the production of energy is shown in the picture aside. It uses the solar panel (which produces energy from the sun) for the functioning of the electrolyser (where electrolysis takes place).



In the column with the symbol H_2 Hydrogen is stocked.

In the column with the symbol O oxygen is conveyed.



At the end of production and stocking, the Fuel Cell uses Hydrogen when we need energy, for example when we turn on the light in our house, or to run the fridge.

In the picture the fan uses energy.

It is important to remember that it is totally free to produce Hydrogen using these kinds of plants. Thanks

to the energy produced by the solar panel and used in the electrolyser, there are no additional production costs.

By now it is clear, my friend, producing energy using **Hydrogen** saves the environment and our health.

Now we all understand why energy saving is so important.

Remember: do not leave the red light of the TV on... do not leave the light on if you are not in the room....

And we are also aware of alternative non polluting methods, like **Hydrogen** technology with all the potentialities.

My dear friends, we are at the end of the magic story of the superhero **Hydrogen** and his incredible superpowers which are so important to produce energy in a clean way.

Hydrogen will help us to defeat pollution and to save our Planet Earth.



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