

## Hydrogen junior

Hydrogen is a colourless, odourless and non-toxic gas. It is very light, 14.4 times lighter than air. It is for this reason that hydrogen cannot be found on Earth, because it is dispersed in space, and it is the most abundant element in the Universe. However, it is present on the Earth bonded to other elements in many compounds: for example, every molecule of water is formed by an oxygen atom and two hydrogen atoms. Hydrogen is also present in mineral substances, hydrocarbons and in biological molecules.

Therefore, to obtain hydrogen, it is necessary to extract it from the substances that contain it, consuming a lot of energy. For this reason, hydrogen is not a primary source of energy, but an “energy vector”, i.e. a form of energy that cannot be found directly in nature (like natural gas, oil or coal).

In its gaseous state, hydrogen is a good fuel: when burnt it produces a quantity of heat that is 2.6 times greater than that produced by burning methane.

The use of hydrogen as a fuel was already known since the second half of the 20th century. Until the 50s, for example, houses in big Italian cities were heated with “city gas” which contained about 50% hydrogen. Moreover, hydrogen inflated big airships, such as the famous Zeppelin, that were used for incredible journeys.

Today hydrogen is an excellent fuel. When combined with oxygen it frees great quantities of energy that can be used to produce electricity and heat by using particular instruments called “fuel cells”. The combustion of hydrogen is clean because it produces only water. It is for this reason that in these days high hopes are placed on hydrogen for it could provide a clean and abundant source of energy for the future.

Hydrogen can be produced from fossil fuels or renewable sources of energy.

The extraction of hydrogen from fossil fuels involves different stages of refining and the breaking down of the hydrocarbon molecules in order to eliminate any trace of carbon.

As for the production of hydrogen from renewable energy sources, the process can be divided into:

- water production
- biomass production