



Water

Source of our life

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What is water?

General information



„Water, Which have neither the taste nor the color or odor. We can not describe you. We drink without knowing you. You are not essential for life, you are life itself,,

A. Saint-Exupery



World Water Day

We celebrate this day at 22nd of March

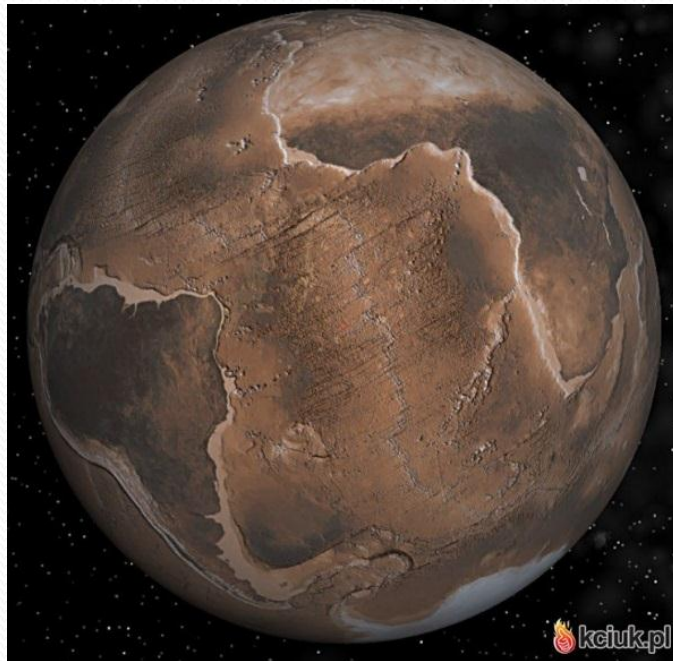
Idea of these celebrations is to awareness countries about impact correct water economy to their economic and social condition.



**WORLD
WATER DAY**
.....
MARCH 22

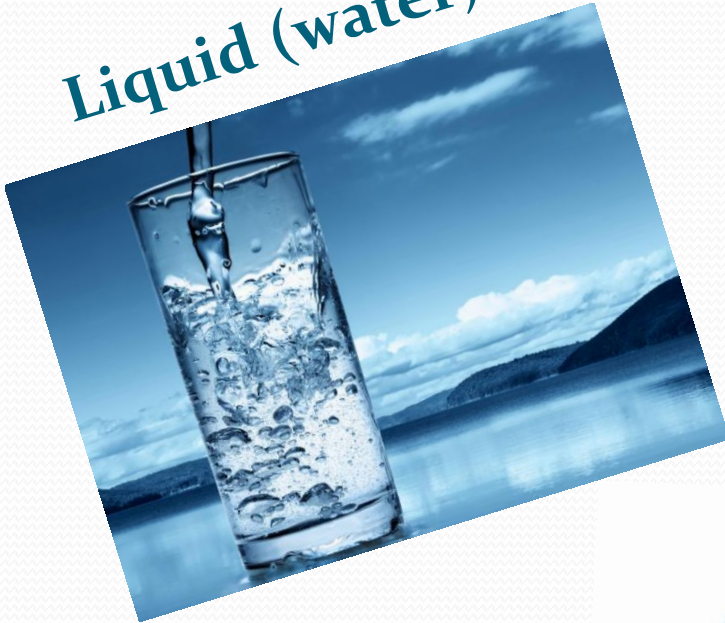
„Water is necessary to form a life.“

Earth, without water, will be like at that picture. There will not be even green colour on our loved Earth.

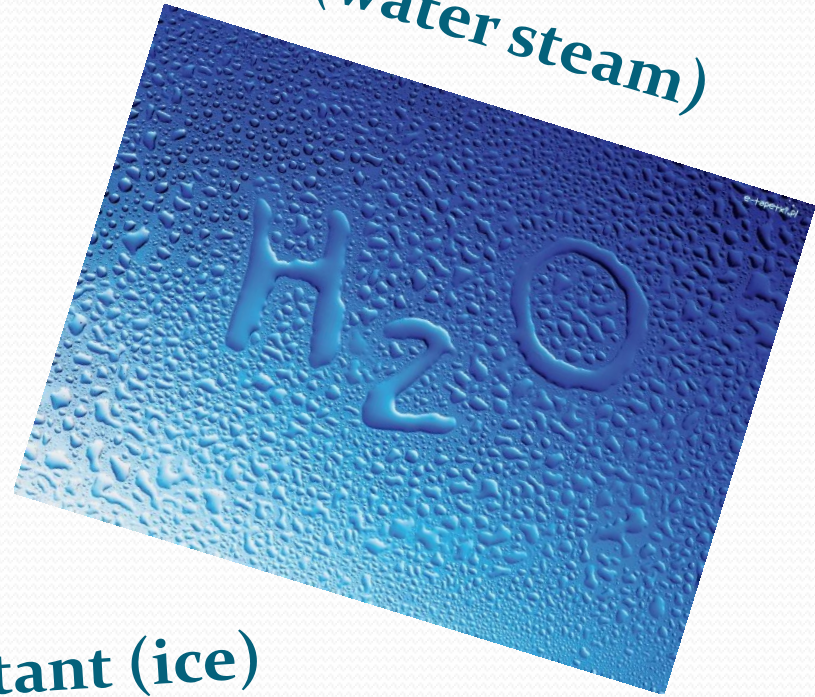


States of matter

Liquid (water)



Gas (water steam)



Constant (ice)



Temperatures' expansibility

In the temperature range 0-4 ° C, with the decrease of temperature (freezing), water increases in volume and decreases the density. That is why ice:

- floats on water surface,
- explodes dishes,
- destroys asphalt on roads etc.



Types of raw water:

- Rain water
- Surface water
- Underground water
- Salty water
- Sweet water
- Spring water
- Mineral water



Types of usable water:

- Drainage Water
- Potable water
- Industrial water
- Distilled water
- Twice distilled water



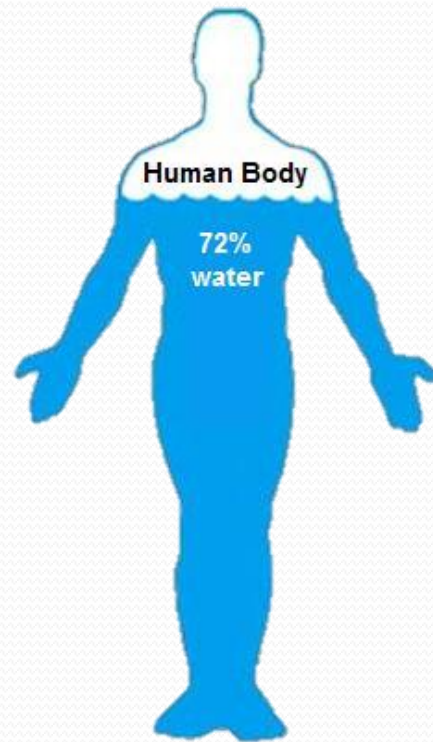
Water pollution:

- Municipal Sewages
- Poverty sewages
- Industrial sewages
- Bilge water
- Faecal
- Slurry
- Urine



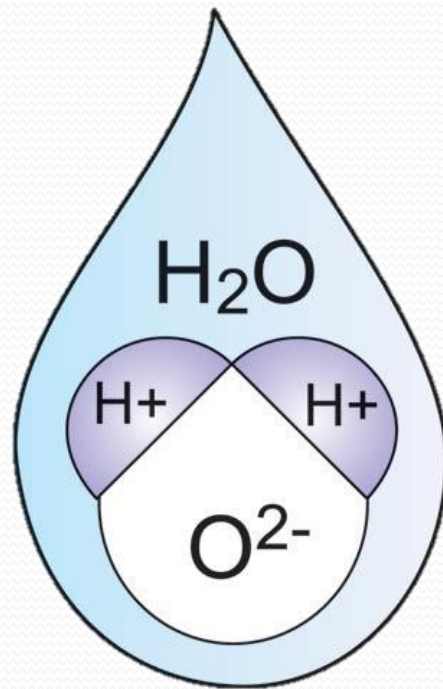
Water in human organism

The water comprises 70% of the total volume of the body.



Water - it is not only oxygen and hydrogen

With water to our organism is supplied 10-15% necessary minerals.



Water resources on the Earth

According to the World Health Organization (WHO), more than one billion people worldwide do not have access at all to clean drinking water, in Europe there are over 100 million.



No water in Africa

The United Nations estimates that the globe potable water missing nearly a billion people, of which 38% are African inhabitants.



Water in Poland...

Polish water resources are very small in comparison with other European countries. Per inhabitant in 1600 m³ of water per year, while in other countries it is 4500 m³ per year.



Water source



Water intake

Basic shots drinking water:

- underground water intake-underground wells, water sources occurring at a depth of about 200 m.
- surface water intake-reservoirs, lakes, rivers.



In Poland, 50% of the water is obtained from rivers.

Station of Treatment Water

Water sourced from the environment requires treatment, viz is the process of ensuring the its proper quality. It takes place in the so-called Stations of the Water Treatment.



Stages of the water treatment process

Obtaining the quality of water is a complicated process and requires different stages:

- mechanical filtration
- elimination of particles of iron and manganese
- aeration
- demineralization
- soften
- disinfection
- reverse osmosis.



Contamination of surface water

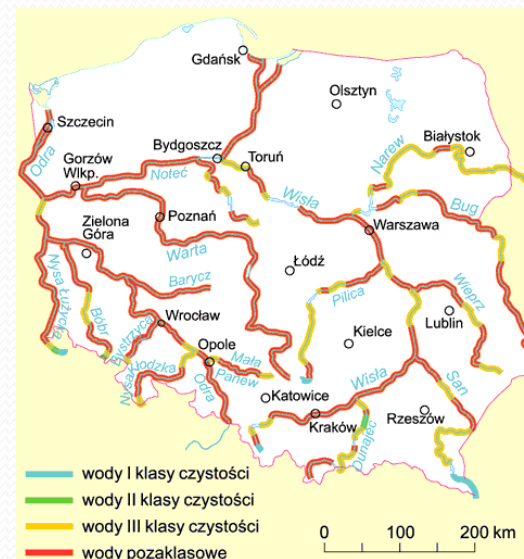
In Poland, we are forced to draw drinking water from rivers, and unfortunately, there goes all wastewater containing chemicals thrown out thoughtlessly into the environment. Therefore, it is important the state of water in our rivers.



Contamination of rivers in Poland

Half of the rivers in Poland shows unsatisfactory sanitary condition. In the last hundred years, the development of civilization and industrialization have turned many rivers into sewage.

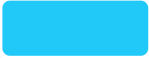



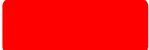
The water in the rivers were once divided into classes of cleanliness.



Class of water quality

Currently, we distinguish 5 classes of surface water quality, according to their ecological status. This is consistent with the Water Framework Directive of the European Union.

Presentation of the quality classes on the map:

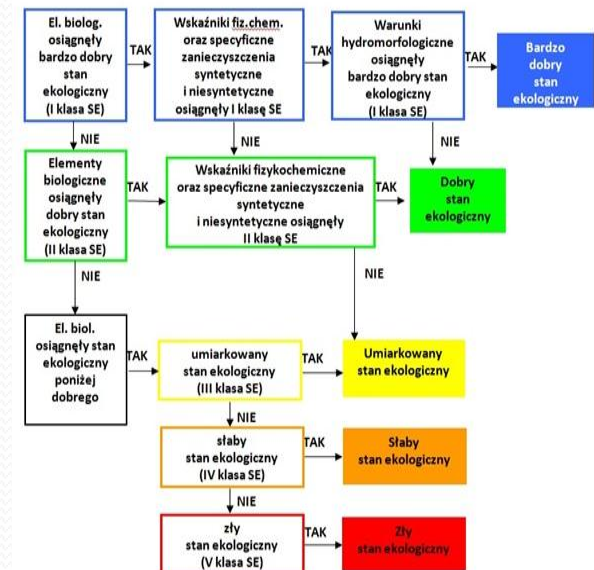
-  - Class I - very good ecological status
-  - Class II - good ecological status
-  - Class III - moderate ecological status
-  - Class IV - weak ecological condition
-  - Class V - bad ecological status

Water quality evaluation

Water quality is assessed by evaluating their status and ecological potential.

This is the assessment of the quality of the construction and functioning of the ecosystem on the basis of research:

- biological,
- indicators of physical-chemical,
- hydromorphological.



How sewage treatment plant work?

Is it possible to recover the useful water?



„For hundreds of years people believed, that the lizards in the well show, that the water is fresh and safe to drink. And in all that time they never asked themselves the question, where exactly lizards go to the toilet.”

Terry Pratchett



Sewage treatment plant

Group of technological objects and equipment, serving to clean industrial sewage and communal before discharge into rivers, lakes and seas.



Division sewage due to the size:

local – small amount of sewage

central – large amount of sewage

group – sewage collected from a specific region

Division sewage due to the methods of purification:

- mechanical
- biological
- hydrobotanical
- chemical



Mechanical

The use of physical processes, such as:

- comminution
- filtration
- drawl
- sedimentation



Biological

Use of biochemical processes that have reduced amounts of nitrogen, phosphorus and suspended solids.



Hydrobotanical

Sewage treatment of this type plants to use:

- floating
- rooted



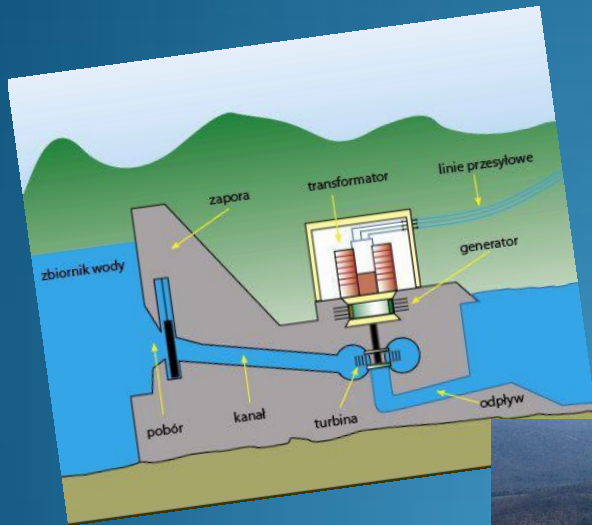
Chemical

Adding chemical triggers specific reactions to reduce the amount of pollution.



Hydro power stations

So, as with water, we produce electricity



The advantages of hydroelectric

- The low cost production of electric energy
- No environmental pollution
- The location in the natural areas
- The possibility of flood prevention



Disadvantages hydroelectric

- They require large areas
- Interference with the environment
- Forced migration of local residents
- Changing the natural structure of rivers
- Climate change (visible after a few years)



Firewalls

Three Gorges Dam - the largest hydroelectric power plant in the world. It has more than 175 m in height.



Small hydro power stations

In Poland, they have a power of less than 5 MW have a negligible impact on the environment



How to make hydrogen?

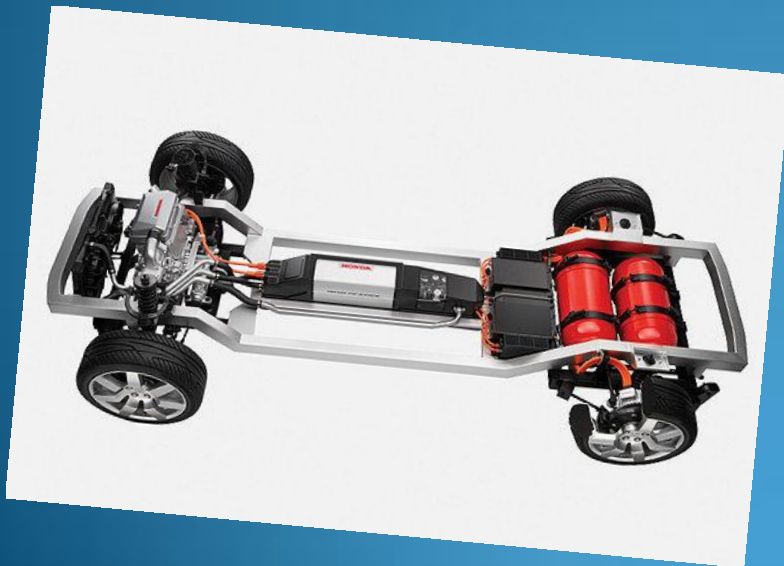
We invite you to watch a short film

Hydrogen is produced by electrolysis

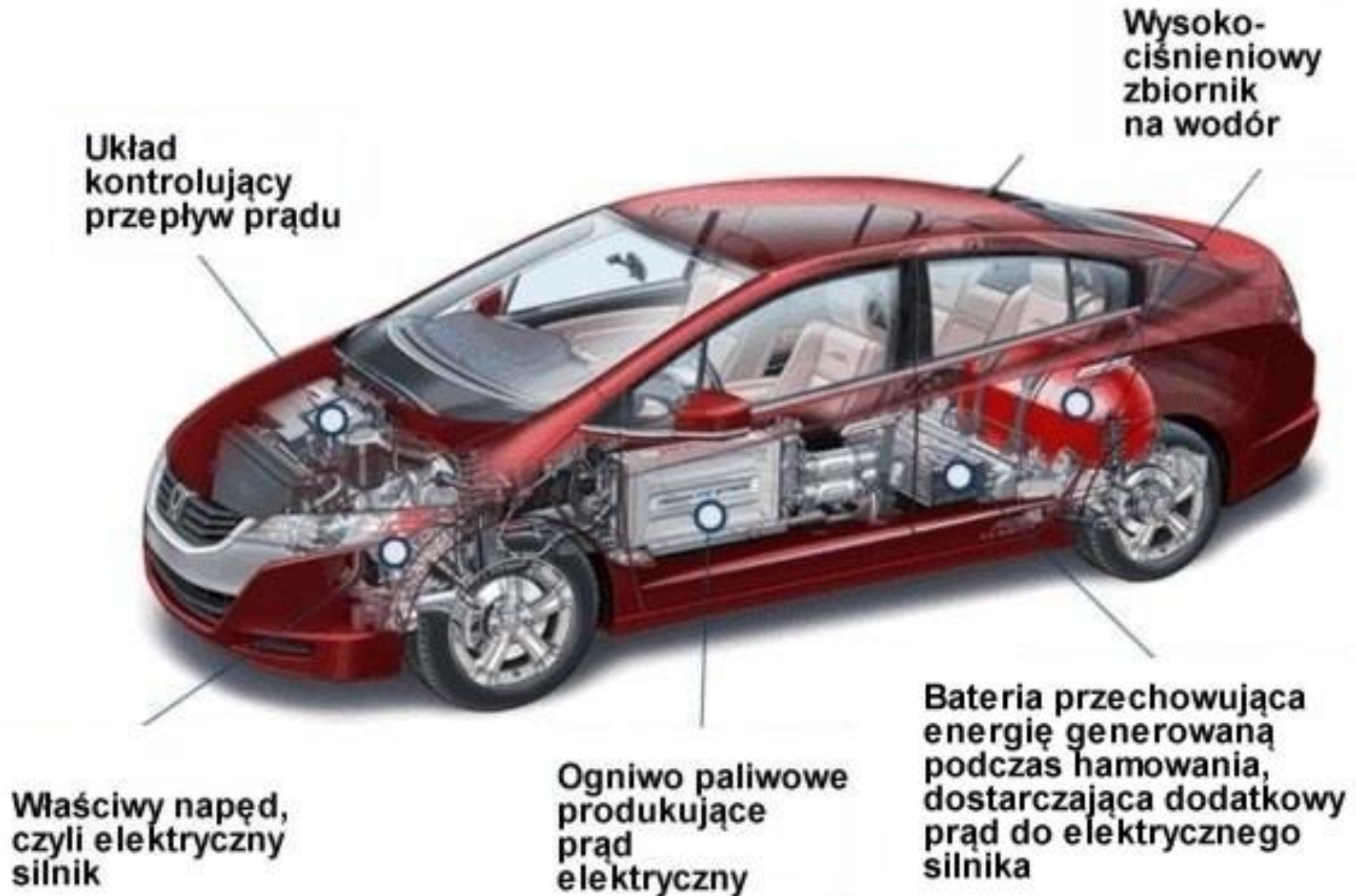


Hydrogen cars

Automotive innovation



Structure



Working

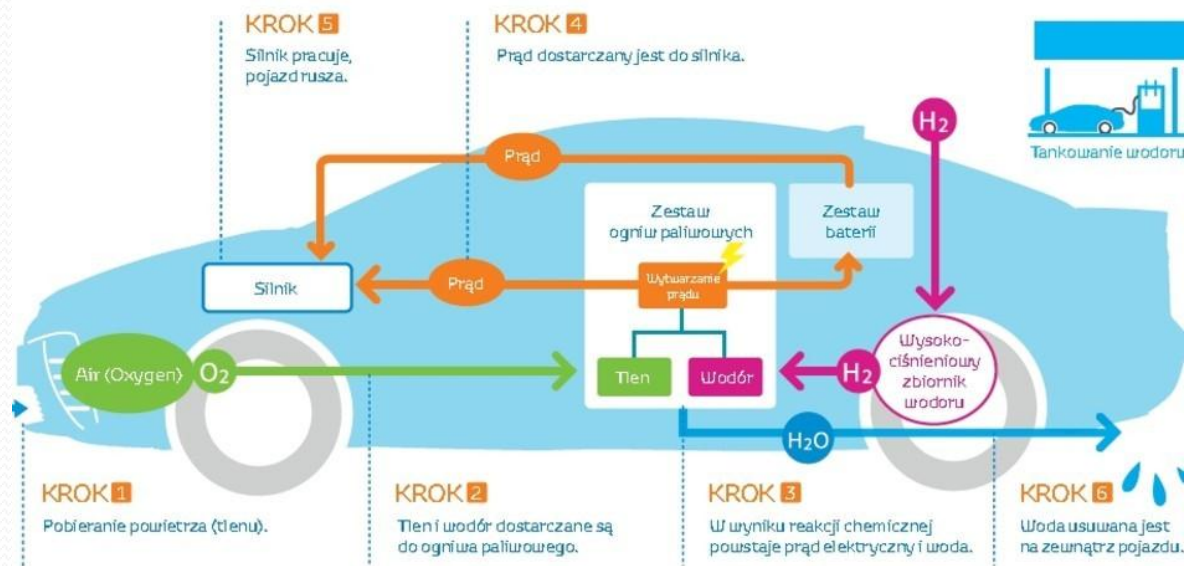
- The bonding energy of hydrogen and oxygen in the water molecule H_2O is less than the total bonding energy hydrogen molecules H_2 and O_2 .
- There is produced excess energy during the bonding reaction of hydrogen and oxygen in water molecule.
- That surplus of energy can be discharged from the system as a heat or a electrochemical energy.



Working

- In the first phase, hydrogen is carrying container from a cell, where air is also provided.
- Next, direct current is converted to alternating current.
- The last step is transmission torque to the wheels of the car.

Schemat działania wodorowej Toyoty



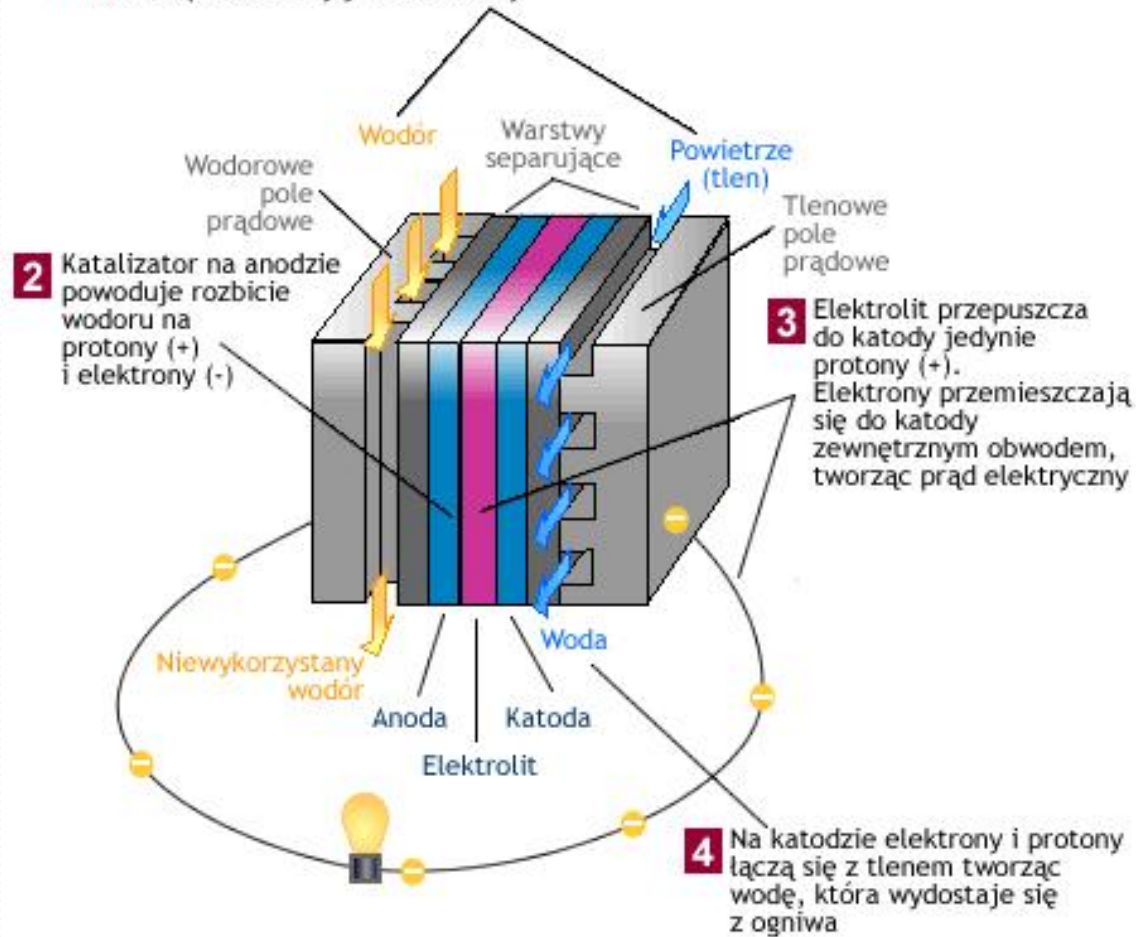
Fuel cell

Serce układu napędowego - ogniwo paliwowe Siemens'a.



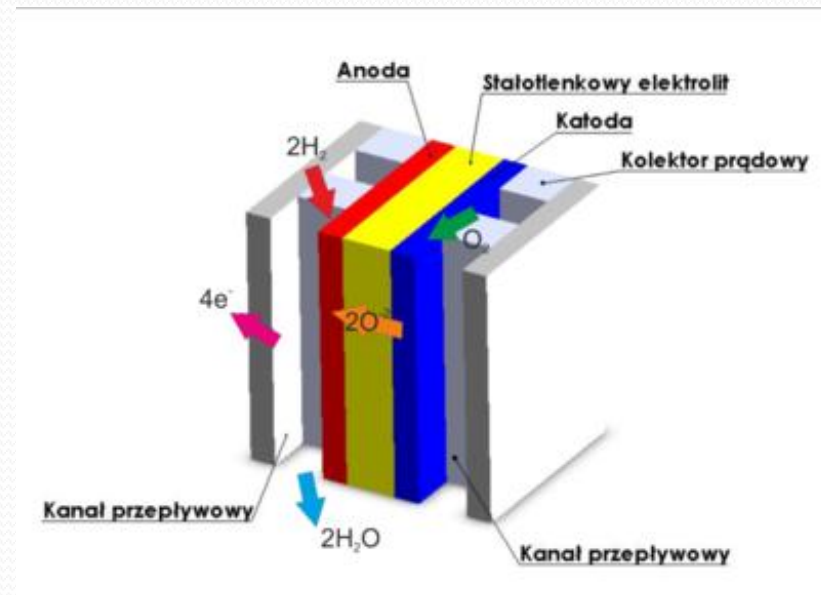
- The most important part of system are fuel cells. Cells are electrochemical devices and generate usefullenergy.
- Fuel cells are constructed of two electrodes: cathode and anode. Electrolyte separates them. **Electrolyte allows the flow of cathodes and block electrons.**
- **Cathode** - the electrode, emits minus charge;
Anoda - the electrode, emits plus charge;
- **Electrode** - the last element of systems, emits electric charge.
- Electrons flow to cathode in outboard circuit.

- 1** Wodór doprowadzany jest do anody
Tlen doprowadzany jest do katody



Fuel cell

- **Low-temperature fuel cells power a cars.** They worked in temperatures lower than 250°C but it is a need for a pure hydrogen. There is no need to use heat-resistant materials.



Hydrogen container

- The container pressure is 35 Mpa.
- The inner layer of container form 20% of full weight.
- Container is covered by composite material.



Water recreation

viz water into fun



How do we use water for recreation?

- On the water slides - to reduce friction
- In Jacuzzi - to heat body temperature
- In lakes - to soaking and cooling
- In the seas - to soaking and cooling



The end

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Thanks for your attention