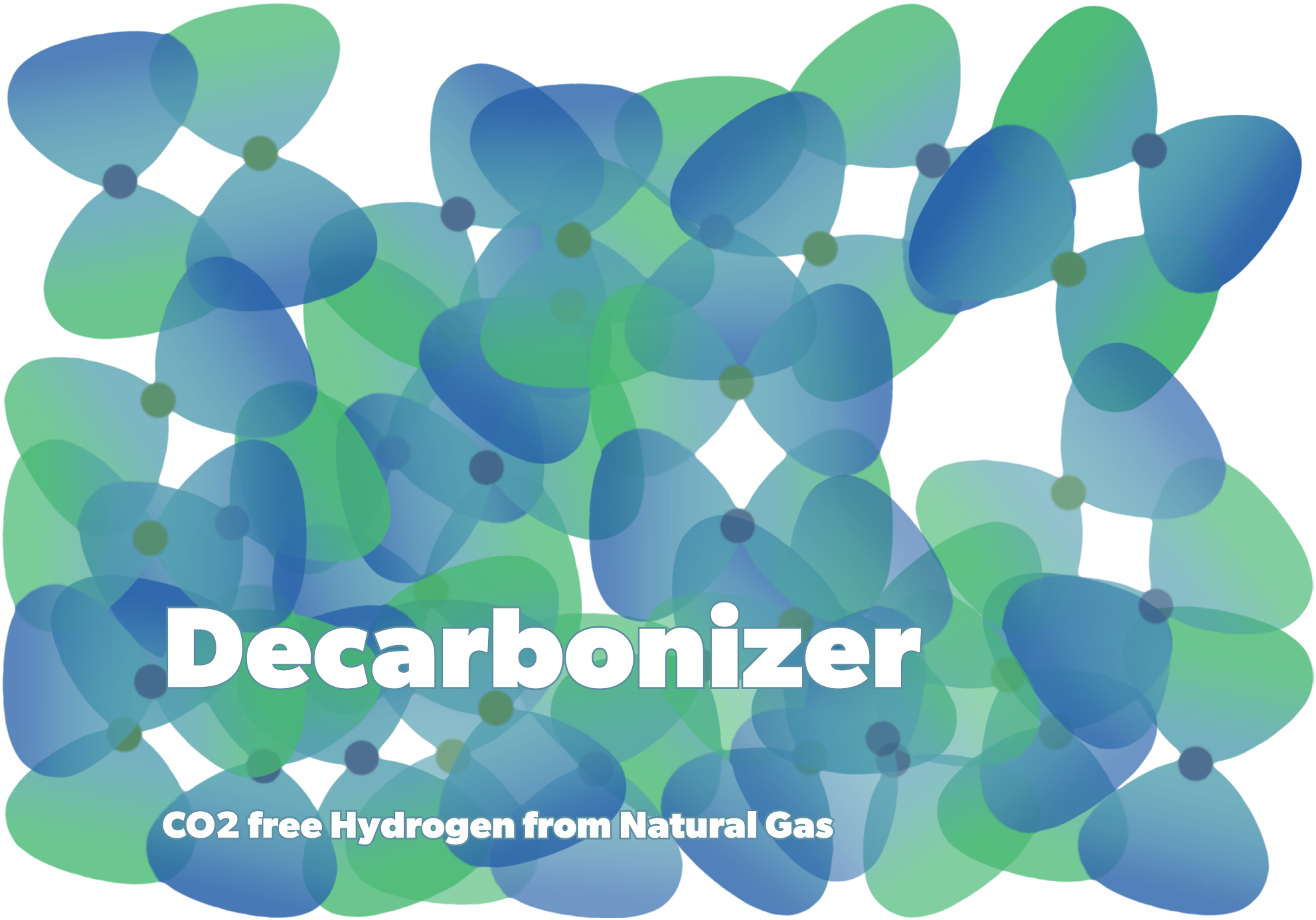


Decarbonizer

CO2 free Hydrogen from Natural Gas

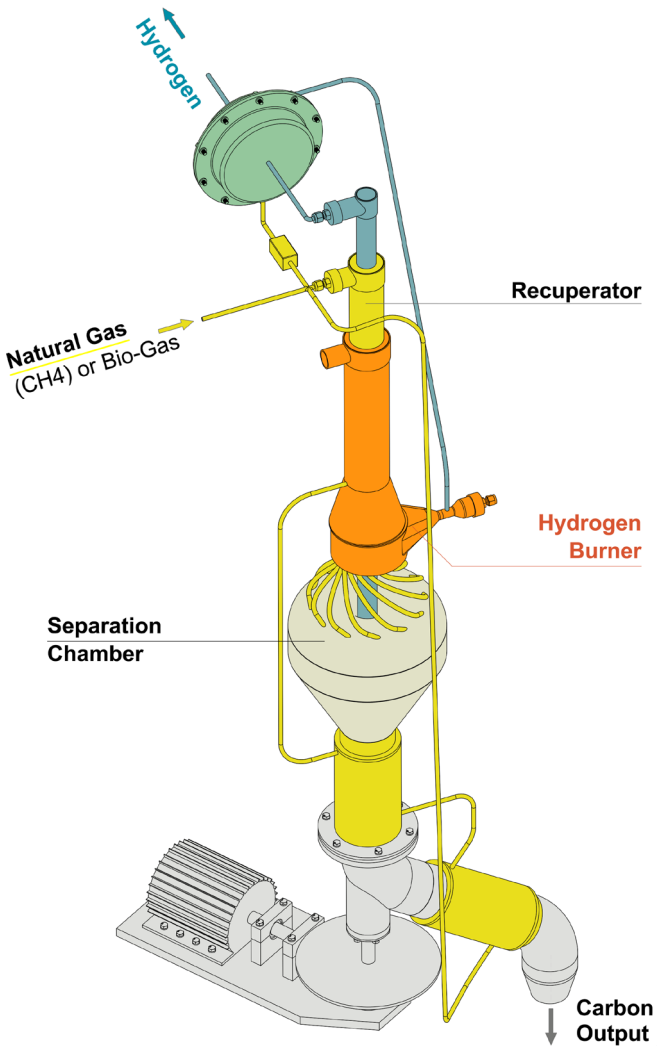
The ThermoDyne **Decarbonizer** needs only 1/8 of the energy of electrolysis

The ThermoDyne **Decarbonizer** is a device for separation of carbon and hydrogen from hydrocarbon-containing gases, in particular (CH4) natural gas or bio-gas, under the cracking effect of high temperature and flow dynamic forces.
No CO2 is produced, the outputs are:

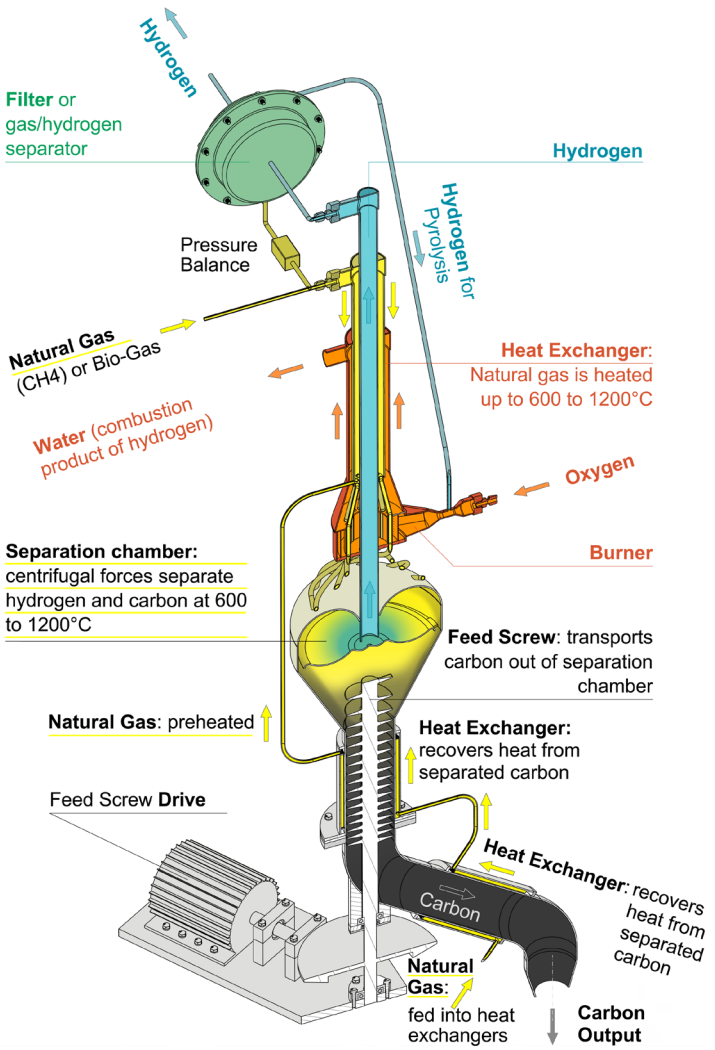
a) **hydrogen** gas
b) solid non-toxic pure **carbon** (a high-quality raw material)
c) drinking **water** (harvested and stored)

Our novel pyrolysis process requires **only 1/8 of the energy of electrolysis**. The energy needed for the process is provided by the use of about 15% of the hydrogen produced.

The existing natural gas infrastructure can be preserved – and yet CO2-free energy can be supplied to households and businesses by connecting a decarbonizer upstream of every hydrogen-powered heating and cooling system. Hydrogen can be used for many other purposes, such as transportation or very low temperature cooling (see hydrogen paper in 2021). The decarbonizer is a high volume, low cost, standardized mass production solution. It can be manufactured in any scale from very small to very large.



Main Components



How it works

ThermoDyne International

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No CO2, only clean **Hydrogen**, Carbon and Water.

Our novel pyrolysis process breaks down natural gas into hydrogen and pure carbon at very high temperature (+/- 1,200 degrees Celsius) - or at a slightly lower temperature (+/- 600 degrees Celsius) with catalytic support. The **Decarboniser** device obtains the cracking energy for this by burning a small part (15%) of the hydrogen produced while **no CO2** is produced in the process.

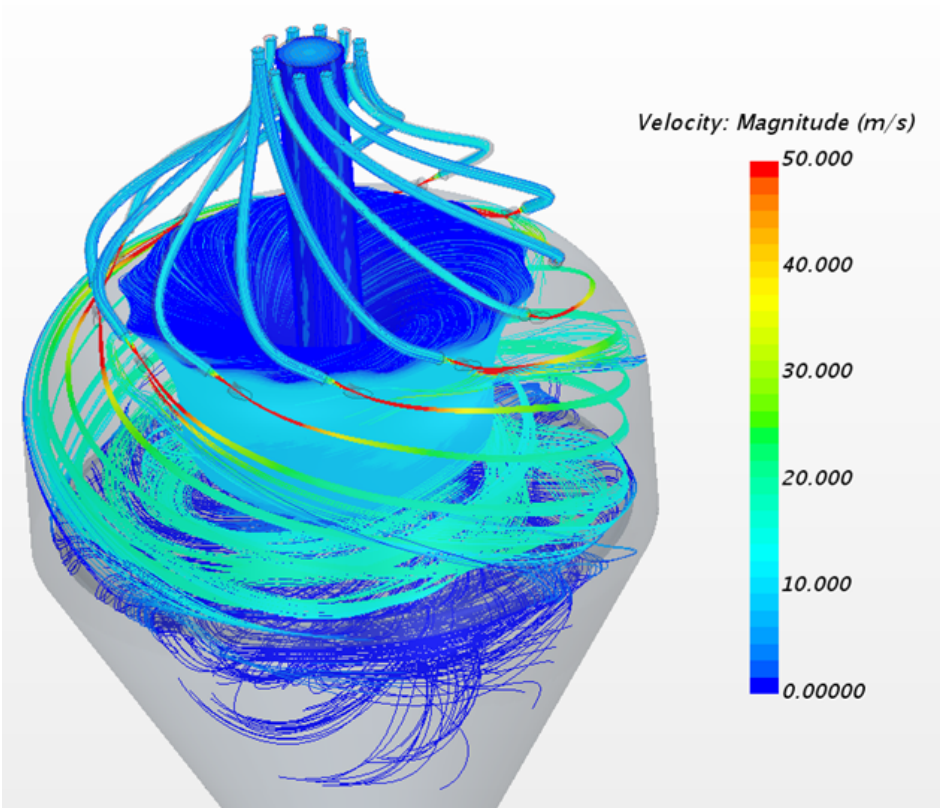
Pure carbon is a by-product of the novel pyrolysis process - a completely non-toxic, valuable raw material that can be used in many ways. Commodity markets exist for inks, paints, tires, batteries and growing. In the future, carbon fibers could be used to reinforce high-strength concrete, which is still very expensive today. Hydrogen produced by thermal fission is therefore the actually „green hydrogen", because unlike so-called blue hydrogen, no CO2 is produced or needs to be sequestered.

A comparison of hydrogen production by electrolysis and pyrolysis shows that the pyrolysis process consumes 7.6 times less energy than electrolysis. Neither of the processes releases CO2 into the atmosphere. Why then is electrolysis favored today as an eco friendly, green process? **Pyrolysis is therefore certainly the more efficient and environmentally friendly process.**

See Yue Xin Huang: Pyrolysis needs seven times less energy in hydrogen production than Electrolysis.

The device is a hydrogen supplier for many applications, whether as a built-in additive in hydrogen heat pumps or as a stand-alone unit to provide fuel for hydrogen cars and other hydrogen devices.

ThermoDyne International is a high-tech engineering company that holds a license for the Decarbonizer patent.



At very high temperature of pyrolysis and very high velocity in the decarbonizing chamber, the simulation shows that hydrogen and carbon are separated by centrifugal forces.

Simulation by Prof. Jing Ping Liu, PhD, Dr. Jinhuan Guan, Research Center for Advanced Powertrain Technologies (RCAPT), Hunan University (China).

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