

## Device for the production of hydrogen or carbon products via plasma decomposition

### Development status

#### Phase 3

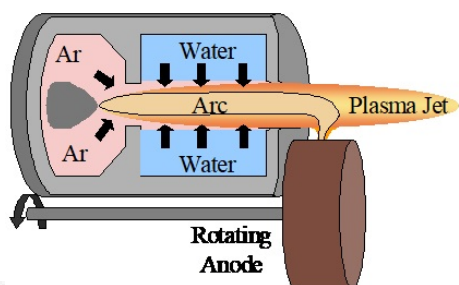
**Technology validation and implementing it in real environment.** Testing the technology outside of the laboratory and its adjustment to external conditions.

### IP protection status

Český patent CZ 305537 a CZ305206

### Partnering strategy

*licensing*



### Institution



Institute of plasma physics

### Challenge

Climate targets to decarbonise industry and new waste disposal legislation are putting pressure on the search for alternative solutions to help meet the conditions for an environmentally responsible economy and perhaps even slow global warming. Chemical recycling methods, which include our plasma technology, are one of the tools for these necessary changes. The field of using plasma digestion for various purposes is very complex and the profitability of the whole system depends on many factors. The aim is to convert input commodities or waste into output marketable products as efficiently as possible. Each plasma arc needs to be stabilized. How this is achieved has a major impact on the resulting quality and concentration of the output raw materials.

### Description

Most torches used in the market today are air stabilized, which results in both the addition of nitrogen to the plasma exit gas, but also less efficient conversion of inputs to chemical energy in the exit gas due to significant oxidation of the heating component. There are plasma torches that stabilize the arc with water vapor, resulting in a cleaner plasma and more efficient conversion of inputs to outputs. However, the use of steam results in the presence of carbon monoxide and unreacted steam in the output gas, the presence of which reduces the concentration of the more usable components of the gas. We offer a unique plasma torch technology that uses thermal plasma to decompose materials into basic elements ( $H_2$ , C, CO, metals) that can be further processed and are interesting market commodities. Our technology is also capable of working with contaminated waste. The Institute of Plasma Physics has developed a plasma torch design that eliminates nitrogen contamination of the exit gas and where the amount of steam, and therefore the concentration of CO in the exit gas, is minimal compared to other solutions available on the market.

## Commercial opportunity

- Hydrogen production by gasification of waste (mainly plastics) • Emission-free production of hydrogen and carbon products with high added value by pyrolysis of methane • Disposal of highly hazardous contaminated waste