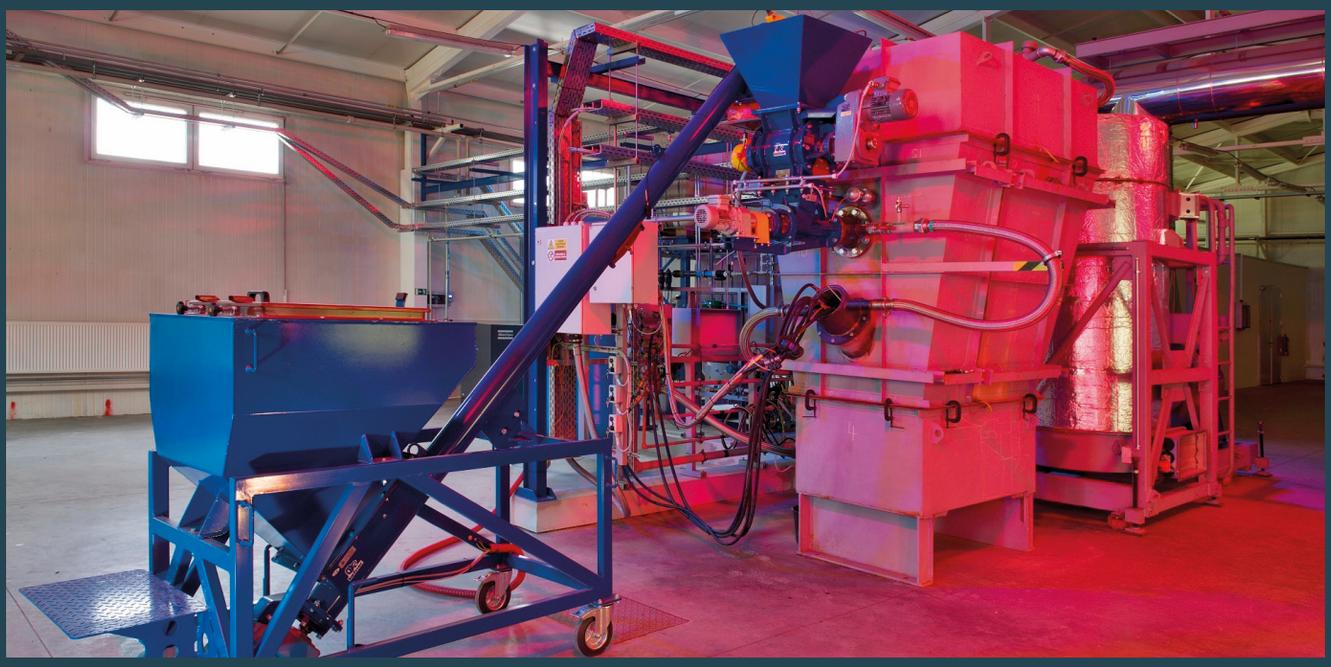
Millenium Technologies a.s.

The company has long been focusing on the use of secondary energy sources and advanced gasification technologies, especially high temperature plasma utilization.

In 1998, it implemented the first installation of energy use of landfill gas in the Czech Republic. To date, the project uses gas from the Ďáblice and Dolní Chabry landfills, produces electricity in cogeneration units and heats over two thousand flats in the Letňany housing estate.

Since 2003, the company has been dedicated to plasma gasification technology, holds several patents in this area and manufactures its own plasmatrons (plasma generators).

Millenium Technologies has a team of top experts and managers with expertise in plasma, gasification, cleaning and power generation and experience in managing and implementing complex technology projects.



STP Dubá

The company's research and development activities take place in its own Science and Technology Park in Dubá.

Plasma gasification is the only non-university scientific workplace in the Czech Republic and Central Europe. In 2018, a new installation of plasma gasification technology was put into operation to test state-of-the-art knowledge and optimize plasma gasification technology for various input materials.

Millenium Technologies a.s. is your partner in energy efficiency and waste disposal with maximum emphasis on economy and environmental protection.

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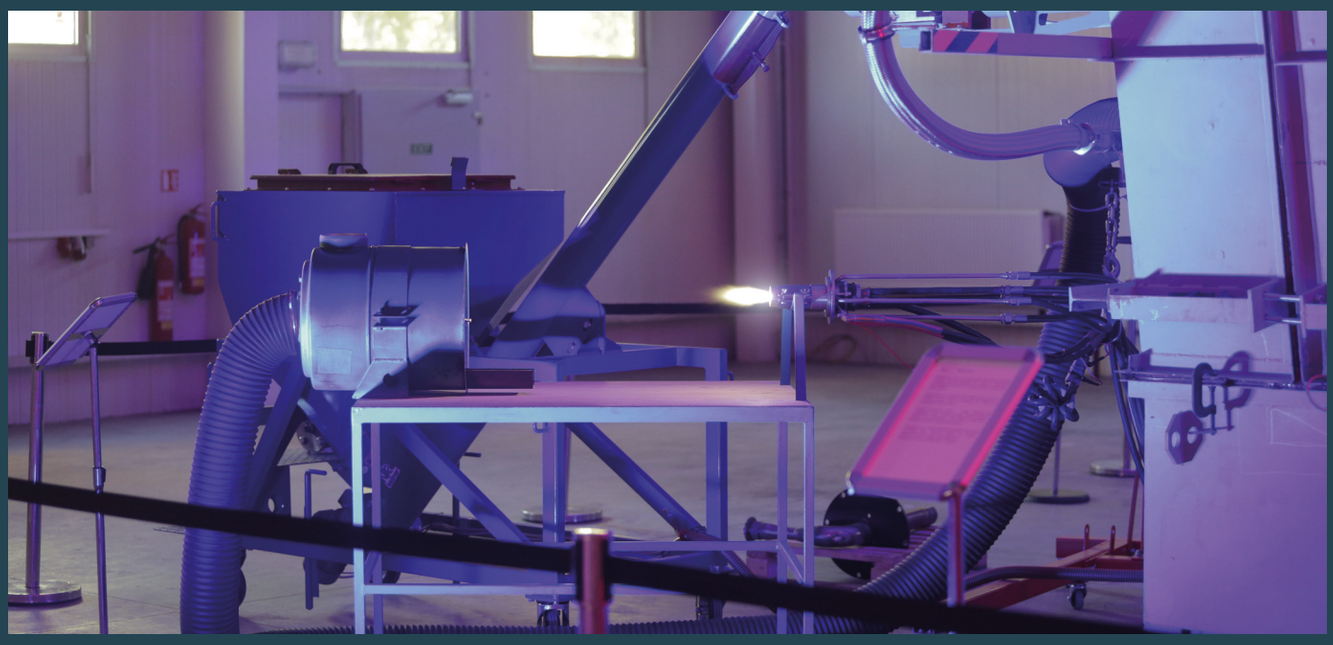
What is plasma gasification

Plasma gasification is a process by which the organic portion of any input material is converted to synthesis gas. The synthesis gas is similar to the gas produced by gasification of coal used before the sale of natural gas.

There is no burning in the gasification process and therefore no flue gases that emit emissions and thus lead to air pollution.

In the gasification process, the carbonaceous compounds or organic portion of any material is converted into gas by the high temperatures, which is further useful as a base material.

To achieve gasification conditions, we supply the process of gasification with the help of plasmatrons and then by partial oxidation, bringing a small amount of oxygen into the process, which is not enough to burn the input material and to produce enough energy for the gasification process.



Gasification is not combustion

- No emission
- Small device dimensions
- All income materials
- All harmful substances disposal

The synthesis gas, sometimes even the generator gas produced in this way, is mostly made up of CO, H2, CO2 and N. After cooling and cleaning, it can be used:

- As a fuel for electricity and heat generation in cogeneration units
- As a fuel for district heating systems
- As a raw material for hydrogen separation, or
- As a raw material for the production of synthetic fuels

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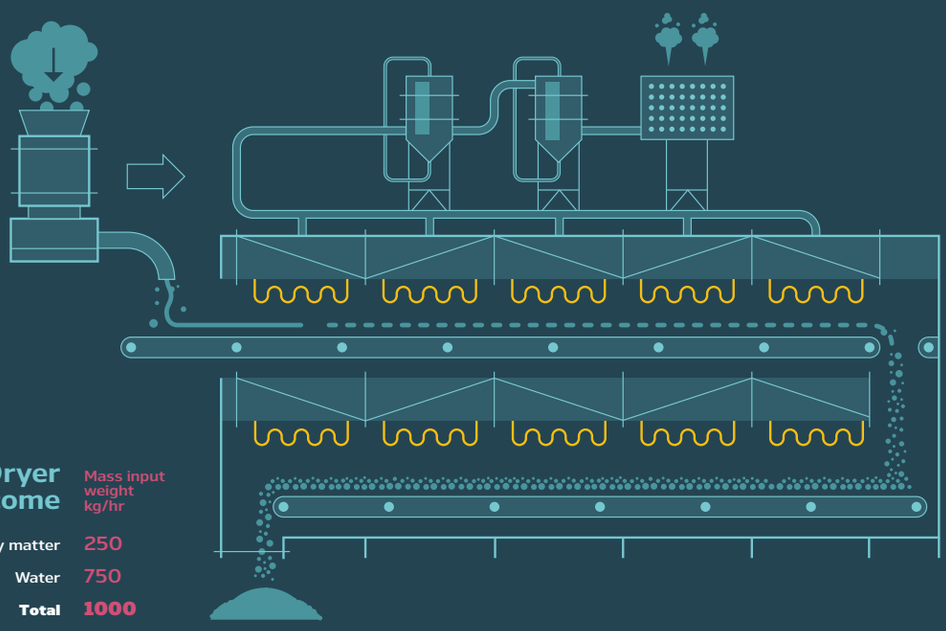
High-temperature waste water sludge gasification

In 2020, the conditions for handling the sludge from sewage plant and exporting it to the field will be made much more stringent. The other remaining options for disposing of the sludge will also make it more expensive.

At a time when the end of landfilling is approaching, it is becoming a matter of current concern to find a technology that would not only be economically efficient but also environmentally friendly to handle this waste.

Millenium Technologies offers sludge treatment solutions for sewage plant operators employing technologies of high temperature plasma gasification.

Sludge Dryer

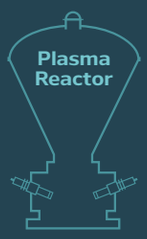


Dryer income	Mass input weight kg/hr
Dry matter	250
Water	750
Total	**1000**

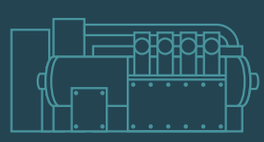
Dryer Exit	Mass output weight kg/hr
Dry matter	250
Water	24
Total	**274**

	kW/per kg of water
Electricity consumption	0,14
Therm. energy consumption	0,9

	Mass input weight kg/hr
Feedstock	274
Lime	6
Plastic	50
93% O2 - Oxygen	0
Plazma energy	76
Total	**405**



	Mass output weight kg/hr
SynGas Sensible	331
Slag energy content	74
Total	**405**



	Output power kW/hr
Electric power production	642
Own consumption	418
Electricity sales	**223**
Heat production	932
Own consumption	654
Heat sales	**278**

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The plasma gasification process consists of the following steps:

- Pressed or skimmed sludge with a water content between 65% and 75% is dried in the first step with a belt dryer. The result is a dry granulate with a residual water content of about 9.5%.
- The dried sludge is carried to the plasma reactor by a spiral conveyor, where the organic substances are converted to synthesis gas at high temperatures. The inorganic part of the sludge melts and forms a lava which, after cooling in a water bath, no longer constitutes waste and can be certified, for example, as a building material.
- The synthesis gas produced is subsequently cooled and removed from the impurities so that it can be used as fuel in the next step.
- The purified synthesis gas is used in cogenerator units to produce electric and thermal energy.

Distinctive features of the technology:

- The technology is environmentally friendly and there are no secondary waste materials to be disposed of.
- The only by-product is slag. This material is not leachable and it filters with its crystalline lattice unwanted heavy metals.
- The technology produces more electrical and thermal energy than it consumes, so it is not necessary to buy any other fuel for its operation, and excess energy can be used or sold in other customer operations.
- Waste plastics or biomass can be mixed into the dried sewage sludge to boost electricity and heat production.
- The technology does not need a chimney and does not produce emissions like combustion technologies. Hence, its implementation is easier in terms of the licensing procedure.
- Another advantage over combustion is the smaller footprint of the technology.

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