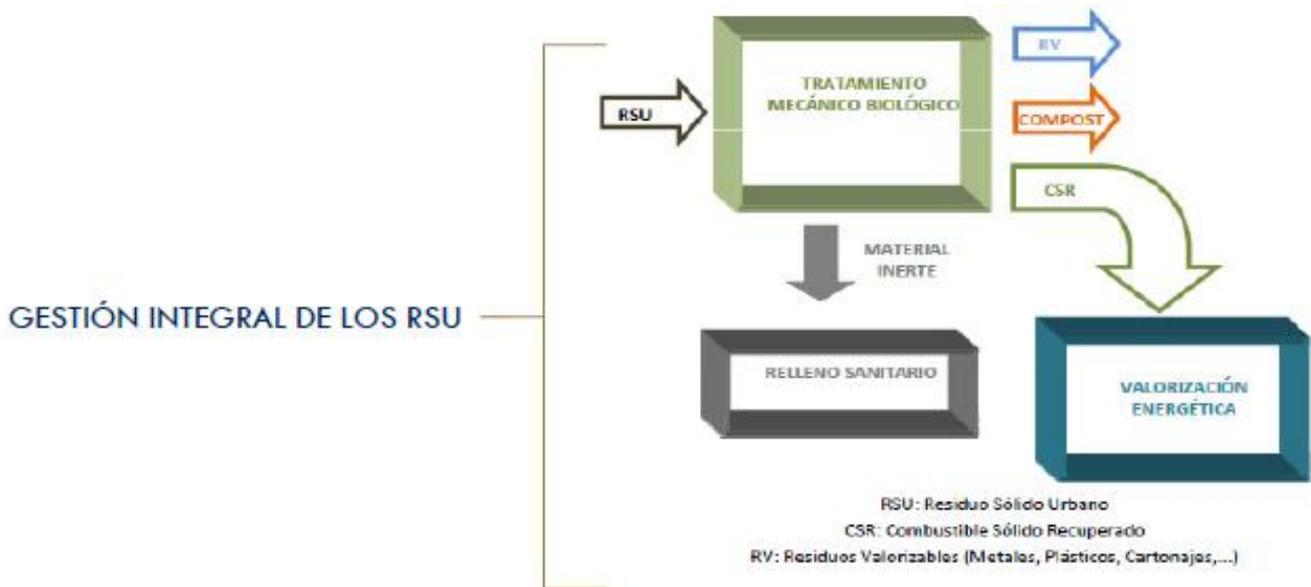


GASIFICATION TECHNOLOGY FOR THE VALORIZATION OF URBAN SOLID WASTE



¿ What is gasification technology?

Gasification is a process that converts carbonaceous base or fossil materials into carbon monoxide, hydrogen, carbon dioxide, and methane. This is achieved by reacting the material at temperatures ($> 800\text{ }^{\circ}\text{C}$), without combustion, with a controlled amount of oxygen and/or steam. The resulting gas mixture is called SYNGAS (synthesis gas or synthetic gas) and is itself a fuel.

The energy derived from gasification is considered to be a renewable energy source.

The overall thermal efficiency of the gasification process is more than 75%

Gasification can be adapted to a wide variety of gases, liquids and raw materials and has been widely used in commercial applications in the production of fuel and chemicals for over 50 years.

Difference between pyrolysis technology and our gasification technology solution

The system operates at ambient pressure. Gasification is more used and more developed than pyrolysis for various reasons:

- Firstly, it is a highly efficient process that only produces a gaseous product (SYNGAS)
- Secondly, gasification does not have the heat transfer problems associated with pyrolysis

Pyrolysis technology serves only one type of waste because they cannot control temperature and speed. The process is very expensive because the biomass has to be finely ground and homogenized before feeding. The operating costs and energy consumption are very high and finally there are problems with the tar.

One of our technological differences is that we can mix all kinds of materials.

Gasification for electrical generation in a rotary reactor



Gasification process

Waste, air and/or oxygen and water vapor are introduced throughout the rotary reactor, which is a cylindrical, horizontal container that is rotating.

Gasification is carried out along the length of the reactor in stages, until the synthesis gas is obtained. This is released from one end, while the ash is removed at the other.

It allows complete mixing of waste with air, while the process is controlled through rotational speed and air flow.

Gas temperatures are between 800 and 900 °C, high enough to remove tar and oils facilitating the removal of ashes.



¿ How does it work?

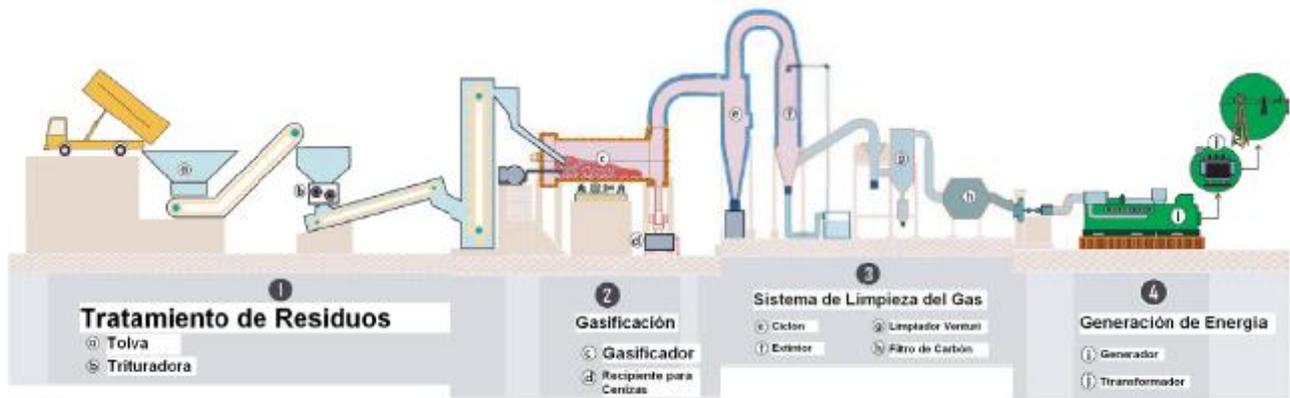
The rotary kiln gasifier facilitates natural rotation, providing the agitation of the raw material at high temperatures and allows a more complete conversion of all the material to synthesis gas.

Contrary to traditional gasifiers, it is located horizontally and on a slight slope, allowing a gravitational flow that moves the material through the system.

The rotating reactor moves the raw material from the point of entry to the point that it completely passes from its biomass state to a biogas state.

Speed and angle are controlled and therefore we control movement speed from input to output.

Gasification, Gas Cleaning and Electric Generation



- In waste disposal

Virtually all of the incoming waste is removed:

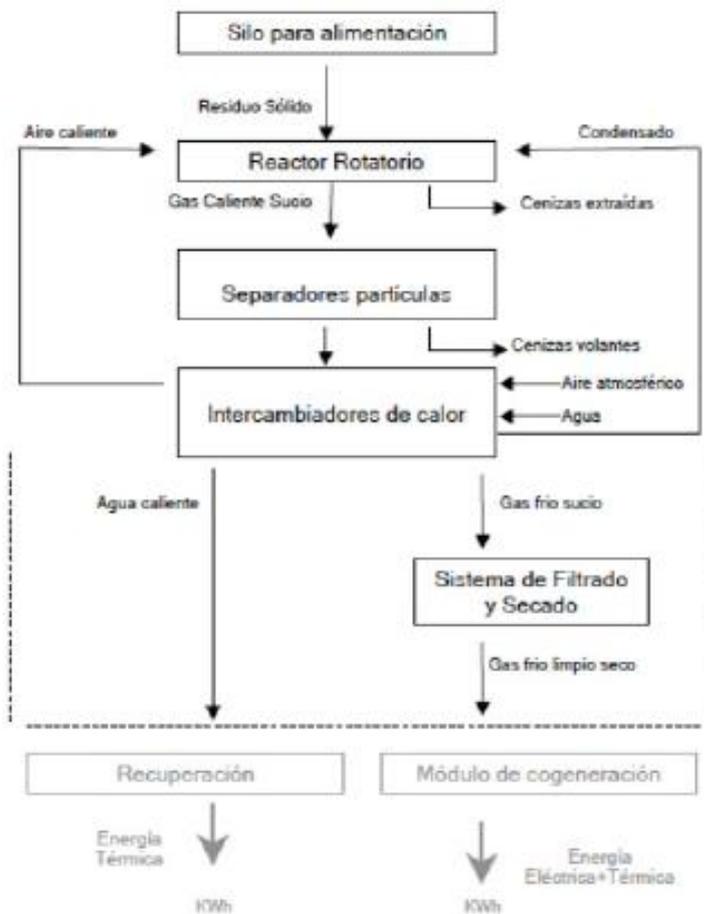
- The resulting ashes, of minimal volume, with inert
- Easy to recycle or treat. Possibility of recovering heavy metals

Additionally, it helps to reduce the emission of harmful gases to the environment:

- Reduces the emission of greenhouse gases: 40% CO² emissions and 100% CH₄
- The emission of toxic gases is avoided
 - SO₂, SO₃ y NO_x (acid rain promoters)
 - Furans and dioxins (carcinogens)
 - No bad odors are produced

- In electricity generation
 - Obtaining synthesis gas, totally clean and usable
 - High energy efficiency
 - Decreases external dependence on fuel supply
 - Opens possibilities to supply electricity in remote areas
 - High profitability

Modular plants



Features for modular plants:

- Capacity: from 2 to 20 Tn/day
- 100% portable
- 100% autonomous
- No need for civil works
- Easy to install and operate
- Plug and Play