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## Technological models for biogas cleaning in the WWTP

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The treatment of the sludge coming from WWTP by anaerobic digestion is a process that allowing produced biogas. The biogas is a gases mixture formed by mainly methane and other gaseous components. This biogas is useful for energy production, both thermal and electricity energy, as well as, biofuel production too. The biogas can be use within the WWTP, to meet the energy need the own process. For example, the sludges must be heated to be digested or for the electricity production in this sense can meet electricity consumption of different equipment or for sale to electricity to the external grid.

The biogas is a multicomponent gas, both in their basic composition ( $\text{CH}_4$ ,  $\text{CO}_2$ ,  $\text{H}_2$ ,  $\text{O}_2$ ,  $\text{N}_2$ , water vapor, etc...) and, in its harmful components ( $\text{NH}_3$ , BTEX, VOCs,  $\text{H}_2\text{S}$ , etc.). In this case, must also add the presence of foam, particles and others component that are parts the biogas stream that out let of the digester.

To be able used the biogas in CHP system, It is must be cleaned prior. For them, there are different method of biogas cleaning at the market, that is related what kind of pollutants are wanted to remove. There are different way or model to do this inside of the biogas plants in WWTP.

In general, the biogas plant in a WWTP has the following parts.

1. Biogas production. Biodigester. There are many kinds of this equipment.
2. Biogas uptake facility and technologies for biogas cleaning
3. CHP unit. Energy generation. heat and electricity.

This work is focused on the different models there are for biogas cleaning inside of WWTP and what are the features of each one of them, that is, its advantages and disadvantages.

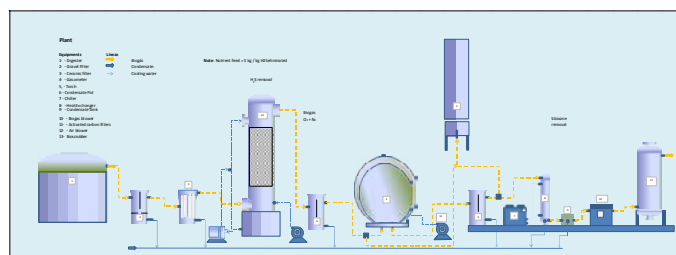


Figure 1. One of the model for biogas cleaning in WWTP.

## Biography

Joaquín Reina. Chemical Engineer, by the University of Oriente. Cuba and Ph.D Industrial Engineer by the Polytechnic University of Catalonia, 1999. Barcelona Spain. Professor at the University of Holguín 1983-1996. Cuba. Director of the R & D & I Department of the environmental company Hera Holding Barcelona 2000-2004 Spain. Develops several pioneering projects in the use and application of biogas and waste treatment, including the first biogas upgrading plant of the Spanish government 2003 -2005. In 2006, he created the company Energy & Waste. As a result of its R + D + I work and the introduction of several technologies in the market, it has won several awards, among them, at Genera Innovation Room 2012, the TPN-2012 Techno energy magazine, Best Business Practices 2014 by The College of Industrial Engineers of Catalonia. The technologies developed are the result of his R & D & I work on the biogas.

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