Biomethane injection into the national grid

Lille, France

Population: 1,091,438	**Total waste: 663,904 t**	Recyclable: 109,935 t
Area: 611.45 km^2	Household waste: 591,594 t	Non-recyclable: 450,877 t
Density: 1,785/km^2	Commercial waste: 72,310 t	Organic waste: 30,782 t

2013

Success Stories: anaerobic digestion of biodegradeable municipal solid waste in European cities

The Urban Community of Lille Métropole (Lille Métropole Communauté Urbaine) is the intercommunal structure gathering the commune of Lille and surrounding metropolitan area that lies in France. The Urban Community stretches to 85 communes.

The Metropolitan area of Lille is responsible for waste collection and treatment and gives a mandate through a public tender to a company to do it. The Metropolitan area creates and owns the collection and treatment facilities, while the private companies exploit them through public-private partnerships. There are 17 infrastructural facilities that are used for collection and treatment of waste. Apart from 11 waste collection centres, 4 civic amenity sites, the Metropolitan area of Lille also owns a centre for energy recovery that treats non-recyclable waste and an organic recovery centre for the treatment of biowaste. Since the implementation of selective collection in 1994, the Metropolitan area of Lille has in place a separate collection of biowaste.

Organic Recovery Centre

The location for the Organic Recovery Centre was chosen in 2000. Completed in 2007, the Organic Recovery Centre has been put into operation progressively starting in September the same year. A Transfer and Handling Centre of residual household waste is associated with the treatment site. It now occupies 57,000 m^2.

Organic recovery was primarily intended to promote an advanced and responsible way to recover the nutritious and energy potential from biowaste through digestate and biogas. Successful intake of such waste stream is ensured by the establishment of separate collection systems upstream from the treatment, such as door-to-door, green waste recycling centres and civic amenity sites and collection of leftovers in canteens and other public institutions.

Digesters: 3 x 1,900 m^3
Capacity: 108,000 t/y
Treated: 64,702 t
Raw biogas: 7,400,000 m^3/y
Biomethane: 4,111,000 m^3/y
Digestate: 34,000 t/y
Employees: 39

Anaerobic digestion

This is the treatment process applied to organic waste, the biodegradeable fraction of household waste. Before waste is pumped into the digesters, it is crushed and then subjected to a biological pre-treatment in the presence of oxygen. Prepared and grounded waste is then digested in three anaerobic digesters through a thermophilic process at 57°C. The retention time is 3 weeks, during which the waste is pre-heated, while consuming of about 10% of the raw biogas produced.

Biogas upgrading

The total cost of investment of €90 million, including the bus depot resulted in a new facility consisting of 2 scrubbing towers. Raw biogas is compressed to a pressure of 9 bar which is then injected in two scrubbing towers with total upgrade capacity of 1,200 Nm^3/h. The beads in the scrubbers are used to increase the contact surface between the water and the biogas. The biogas flows upwards and water, at approximately 15°C, from top to bottom. Pollutants such as hydrogen sulphide (H_2S) and CO_2 are then dissolved in water. In the column, biogas has the required concentration of methane. It remains to dry to give him all the qualities of a fuel.

Biomethane injection

In October 2010, Lille Métropole won the license to operate the pipeline connecting the Organic Recovery Centre to the filing of nearby bus terminus. Thus the first bus filling trials of biomethane have been successfully completed in late 2010. In parallel, Lille Métropole has continued to work with contracting GrDF and GDF Suez to inject biomethane produced by the ORC in the natural gas network.

In July 2011, the valve was officially opened for the first time in France. Since 2012, a subsidized feed-in-tariff of biomethane was obtained and a 15 years contract was signed defining the price of green energy. The price of biomethane in 2012 was 125 €/MWh.