Biogas in the virtuous loop of the circular economy

Examples of WWTP

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wastewater and methanisation
What exactly is it about?

- **Wastewater Treatment**
- **boues**
- **digerester**
- **CO-Méthanisation**
  - Local valorisation of territorial organic waste + boost biogas production + valorise infrastructure

**Sludge treatment line**

**Beneficial use**

**Treated water**

**BIOGAS**
Production of a local and low carbon green energy

**Biogas production**
(65% méthane)

**LESS SLUDGE**
30% minimum od sludge disposal = 30% less problems

**30%** LEwSLUDGE

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wastewater and methanisation
an overview of the situation in France

In France, **85% of WWTP (>30 000 PE) without digesters**

**Sludge digestion**
Germany / France 2014

- **600 units** in Germany
- **60 units** in France

**100% of WWTP > 30 000 EH**

**Biomethane potential in France**

- **420 units > 30 000 EH**
- **1 530 GWh/year**

Equivalent to the production of **350 wind turbines**

For a city of **100 000 residents**, methanisation leads to ~ **3 Gwh/year** of biomethane and the capacity to supply in biofuel

- **20 ou** Bus
- **20 ou** Refuse collection vehicle
- **100 ou** Cars
- **900 ou** LEB houses

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SUEZ and the biogas
a long history in SUEZ

- 40 years of expertise in methanisation
- 1st builder of digesters in France
- 1.5 Million m³ of digesters built in the world
- More than 21 Million PE operated by methanisation in the world

Louis Fargues – Clos de Hilde
30 000 m³
France (Bordeaux)

Valenton – 60 000 m³
France (Paris)

Achères – 246 000 m³
France (Paris)

As Samra – 64 000 m³
Jordanie (Amman)

Le Caire – 80 000 m³
Égypte

La Farfana – 120 000 m³
Chili (Santiago)
A wide range of installations

- Sivom de la Baie (22) - 84 000 PE
- Lyon la Feyssine (69) - 300 000 PE
- Évreux (27) - 204 000 PE
- Meistratzheim (67) - 204 000 PE
- Laval (53) - 250 000 PE
- Hagondange (57) - 57 000 PE
- Les Mureaux (78) - 120 000 PE
- La Roche / Foron (74) - 90 000 PE
- Saint-Marcellin (38) - 47 500 PE
- Folschviller (57) - 30 000 PE
- Sallanches (74) - 53 000 PE
- Weyersheim (67) - 30 000 PE

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Biovaste and co-methanisation
SUEZ expertise throughout the value chain….

Feedstock
Pretreatment & Conditioning
Characterisation
Methanisation
Beneficial use of biogas
Beneficial use of digestat

Depackaging of Biowaste

Grease from food industries, unsold food from supermarkets, distillery waste, whey, waste from food industries, manure, Sauerkraut juice ….

Significant R&D investments (10 Million euros over 10 years)
More than 1100 analysis of co-substrates
Pilot-lab and Pilot-scale demonstration
Development of a predictive tool to optimise design and operating of digesters.

Dedicated department
METHALab- METHAmax

10 co-methanisation

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SUEZ, pioneer in biomethane
From WWTP

2010
Development of our Biomethane expertise

2014
Publication of orders for permits

2017
4 running installations in France

Strasbourg (67)
First WWTP injecting biomethane in the natural gas network

Grenoble (38)

Angers (49)

Valenton (94)
Production of BioLNG et BioCO₂ by cryogenie

Annecy (74)

Santiago du Chili
Injection in natural gas network (WWTP 3.3 millions PE)

Le biométhane sur les petites installations

Hagondange (57)
57,000 PE

La Roche sur Foron (74)
90,000 PE
la Roche sur Foron – Demonstration unit
Biogas upgrading by membrane technology since April 2014
Strasbourg (67)

- 1 million PE
- 4th WWTP in France
- 2 000 000 m3 de biogas / year
- Operated by Suez

- Studies by « Délégataire de Service Public »

- **EVONIK membrane technology** (400 Nm3/h de biogaz)

- **3 partners**:
  SUEZ Eau, Suez Traitement de l’Eau, Réseau Gaz de Strasbourg

- **Support from European Union**: LIFE+ program

- **USE**: Heating of 5000 houses
Grenoble (38)

- WWTP: 500,000 PE

Excess Biogas 320 Nm3/h

EPURATION MEMBRANAIRE EVONIK

Biomethane 200 Nm3/h 17 GWh/year

INJECTION in the NATURAL GAS NETWORK

USE: Valorisation in 70 GNV city buses Existing GNV station

- Aquabiogaz (DEGREMONT Services + Gaz Electricité de Grenoble)
  Design / Building / Financing / Operating 15 ans

- Announcement: 17/11/2014
- Start up: Avril 2016
Wastewater treatment plant la Baumette
285 000 PE
Operated by Suez Eau

Biogas valorisation to produce and inject biomethane in the natural gas network

- Heat recovery from drying condensates to heat digesters → optimisation of biogas beneficial use
- Average biogas flow: 200 Nm³/h
- Design between 100 et 300 Nm³/h of biogas
- EVONIK Membrane technology to upgrade biogas and produce bioCH4
Les Mureaux (78)

**context**

- Renovated WWTP 120,000 PE
- 1 Digester of 3,000 m³
- Injection of biomethane in the natural gas network
context

- Existing WWTP 230,000 PE
- Limited capacity of external incinerator
- Expensive sludge disposal cost (16,000 t/year, 150 €/t)
- External substrates: Sludge and Grease

39% Less Sludge
Payback < 4 years

Evolution of methanisation from mesophilic to THERMOPHILIC operating conditions
And BIOMETHANE production with an injection in the natural gas network
(2 digesters of 4,250 m³/unit)
Hagondange (57)

context
✓ Completely New WWTP
✓ Capacity : 57.000 PE

Heating digester with heat pump
Biogas Beneficial-use by injection of biomethane in the natural gas network
Example GRAND LYON – La Feyssine (69) - 2011

context
✓ WWTP : 300,000 PE
✓ 1 Digester: 4,000 m³
✓ Biogas beneficial use on drying

Current Tender
Biomethane injection
Production of Liquified Biomethane fuel (BioLNG)

Investissements d’Avenir
BIOGNVAL
Demonstration unit- production of BioLNG

BioLNG : Reduction of storage volume

Volume divided by 100

1000 Nm3 of Biogas

1 m3 of BioLNG

0.6 m3 of diesel fuel

Reduction of storage volume

Energy equivalent
BIOGNVAL
Demonstration unit - production of BioLNG

Investissements d’Avenir

Partenaires industriels

Mandataire
Production Biogaz

CRYO-PUR®
Epuration / Liquéfaction du Méthane

Logistique
BioGNL

Essais
Camion
SUEZ, pioneer in biomethane
From WWTP
Biogas in the virtuous loop of the circular economy

- The WWTP benefits the territory
- Methanisation participates locally in energitic transition

Citizen in the heart of the building of the city of tomorrow

BIOMETHANE from wastewater
A New ENERGY for the territories
Biogas in the virtuous loop of the circular economy

Examples of WWTP

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