



France Task 37 Country report

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IEA Bioenergy

Biogas Plant Inventory (2016)

Plant type	Number of plants	Electricity production (GWh/year)	Heat production incl. injection (GWh/year)
Sewage sludge	88	41	416
Biowaste from MSW	16	67	22
Industrial	80	7	350
On-farm and centralized plants	319	712	607
Landfills with biogas recovery	113	953	294
Total	616	1780	1689

Biogaz upgrading status

- Upgrading plants
 - 2 ww sludge
 - 3 municipal waste (biowaste or separated waste)
 - 21 agricultural and/or agrofood waste



Key figures (2016)

215 GWh
 renewable
 production⁹
 + 162% in 2016

0,05% of
 natural gas
 consumption
 + 146% in 2016

410 GWh/an
 maximum
 capacity
 + 47% en 2016

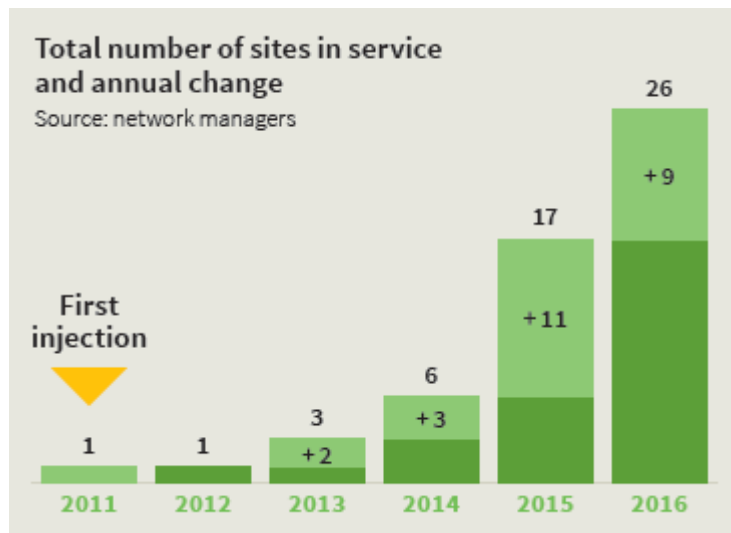
26
 biomethane
 injection sites
 + 53% en 2016

1GO
 = **1MWh**
 of injected
 biomethane

18
 suppliers
 registered
 on the GO register

24
 sites registered
 out of 26 which injected
 as of 31/12/2016

80 %
 of the GOs used
 as Bio-NGV
 since the creation
 of the register



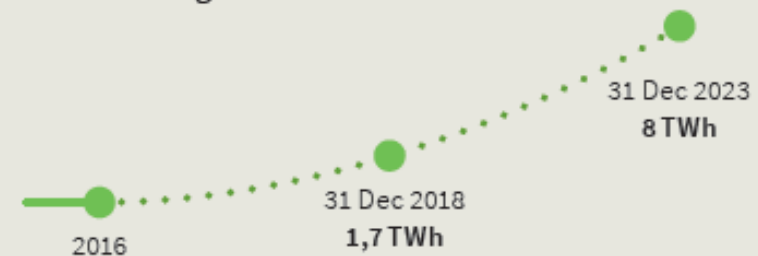
Source : Overview of renewable gas in 2016 (English version in press)

Biomethane targets

→ FIRST AMBITIOUS OBJECTIVES FOR BIOMETHANE

The Decree governing the Multiannual Energy Programme (PPE) under the Energy Transition Law (Article 176) was published on 27 October 2016. Objectives are based on two roadmaps – the first of which lasts three years (2016-2018) and the second, five years (2019-2023). This is the first regulatory text providing the biomethane sector with developmental objectives. The developmental objectives for biomethane injection into the gas network in terms of overall production are: 1.7 TWh in 2018 and 8 TWh in 2023. Despite this, the current rate of projects is not meeting the government's target of 8 TWh of biomethane injected in 2023, set by the EPP.

PPE targets for the injection of biomethane into natural gas networks





Biogas upgrading News

Wagabox / Waga Energy (in operation Feb. 2017)

- Breakthrough technology : membrane + cryogenic distillation
- Landfill gas euration to biomethane
- 25 GWh for 500-800 Nm³/h biogas
- injection into the distribution grid (150 Nm³/h)

www.waga-energy.com

BioGNVal / Cryopur (in operation 2017)

- Biogas from WWTP
- 3 cryogenic steps (“cascade”)
- Production of bio-LNG and bio-L-CO₂

Biomet / AROL Energy (in operation 2017)

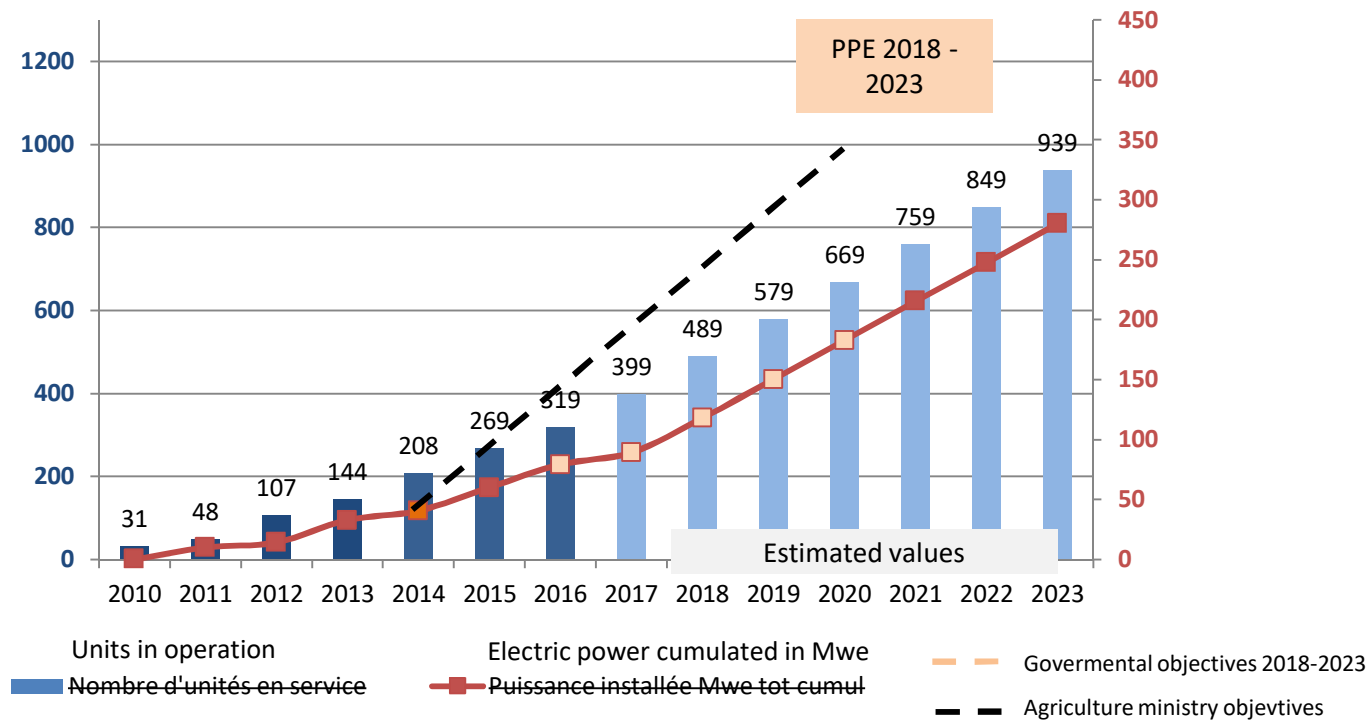
- Centralized AD (agriculture/biowaste 40,000 T/y)
- Amine cleaning
- injection into the distribution grid (110 Nm³/h)
- Financed by Danone Group



IEA Bioenergy

On-farm and centralized AD plant development forecast by 2020

Number of built units and MWe installed, ADEME Jan. 17



2015 : 80 new plants / y → not sufficient to reach the aims



Financial Support Systems for Biogas

Feed-in tariffs

- paid by the consumer of electricity/gas
- Electricity (2016) : 15 to 22,5 c€/kWh (on 20 years)
- Biomethane (2011) : 4,5 to 13 c€/kWh HHV (on 15 years)

Investment grants : 25 % subsidies by

- ADEME (15 %)
- Regional councils and EU funds (10 %)



Performance and Economic Data

Investment costs AD plant with CHP
economics data from 80 plants for investment(2016) ,

- On-farm :7,500€/kWe
- centralized : 7,200 €/kWe
- small scale : 11 000€/kWe

Investment costs for AD plant with upgrading
Average figures

- Around 40,000 € /Nm³/h



Biogas/biomethane seen by ADEME

Position paper (2016)

- AD incl. injection
- transmitted to TF37
- For AD profession and decision makers

R&D Roadmap (2016)

- built with a team of experts (univ., technical centres, public research, private groups, etc.)
- basis of a shared R&D program
- target → 2050 :
 - which type of development for AD ?
 - main R&D subjects to investigate ?