

BIOMETHANE MEASUREMENTS AT GoBiGas: RESULTS OF THE EXPERIMENTAL CAMPAIGN CARRIED OUT FROM WOOD PELLETS GASIFICATION AND METHANATION

The production of synthetic methane from gasification and methanation of biomass and other materials (like refuse-derived fuel, non-recycled waste, etc.) is expanding with different experimental programs in Europe such as **GoBiGas** (Sweden), **GAYA** (France), **Synthane**⁽⁴⁾ (France), **Plainénergie**⁽⁵⁾ (France), **Ambigo** (Netherlands) and **GoGreenGas** (UK).

GoBiGas : demonstration and research facility for large scale production of **biomethane** from wood residues through **gasification** and **methanation**.

- Located at **Göteborg (Sweden)**. Managed by **Göteborg Energi**.
- **Capacity : till 2000 scm/hour (max. = 20 MW)**.
- Production of biomethane from **2014 to 2018, with injection into the gas grid**.



The GoBiGas facility

CAMPAIGN OF MEASUREMENTS OF THE BIOMETHANE QUALITY AT GoBiGas

2-DAYS CAMPAIGN (2018)



Operation at Gobigas

- **Continuous production and injection to the grid of biomethane**: @1,500 scm/h.
- Sampling performed by the research centers of **GRTgaz (RICE)**, **ENGIE (ENGIE Lab CRIGEN)** with the support of **GoBiGas**.
- Financed by: **Storengy, GRTgaz, Teréga** and **GRDF**.

ANALYTICAL METHODS



Biomethane analysis at RICE (GRTgaz)

SAMPLING OF BIOMETHANE

- After the odorization unit.
- 3 sampling methods: **canisters, sorbent tubes and bubbling**.

ANALYSIS OF BIOMETHANE

- **6 analytical techniques**: μ GC-TCD, GC-PFPD, TD-GC-MS, OFCEAS, Atomic Fluorescence Spectroscopy and Ionic Chromatography.
- Analysis performed by **GRTgaz at RICE** gas quality laboratories. **ENGIE Lab CRIGEN** participated on the TD-GC-MS analytical chain.

EXTENDED ANALYSIS RESULTS

MAIN COMPOUNDS

- **CH₄ content**: similar to the contents on biomethane from methanisation injected in the French grid.
- **Compliant** with French biométhane specifications.

Compound	GRTgaz (RICE lab)	GoBiGas (on-line)
O ₂	0.01% mol	Not measured
N ₂	0.6% mol	0.5% mol
CH ₄	96.4% mol	97.1% mol
CO ₂	0.04% mol	0.1% mol
CO	<100 ppm	Not measured
H ₂	3.0% mol	2.3% mol

OTHER COMPOUNDS (>100 COMPOUNDS)

- No **sulphur compounds** were detected except some thiophene at very low level (< 0.06 mgS/scm).
- **Tars** : BTEX and Polycyclic aromatic hydrocarbon were detected at concentrations below 100 μ g/scm.
- Other trace compounds included in the operators specifications:
 - *Ammonia* <0.4 mg/scm
 - *Mercury* = 0.007 μ g/scm
 - *Total chlorine* <1 mgCl/scm
 - *Total fluorine* <10 mgF/scm
- Other compounds like siloxanes, amines, etc., were either non-detectable or at negligible levels.

CONCLUSIONS

A 2-days campaign of extended analyses (> 110 compounds) of the biomethane produced at GoBiGas from wood residue gasification and méthanation shows that the biomethane :

- Was fully compliant with biomethane standard EN 16723-1 and with the French gas operators specifications.
- Had very high gas quality (almost no impurities).

More broadly:

- **A biomethane from gasification/méthanation can be fully adapted for injection into the grid.**
- This kind of measurements are highly valuable as few complete data are available in the literature.

RICE DEVELOPS ANALYTICAL METHODS TO FULLY CHARACTERIZE GASES from gasification/méthanation for injection into the gas grid in order to:

- verify the compliance with the operators specifications,
- assess the absence of impacts of the gas quality on the whole gas chain (end users, environment, security, network integrity).

(4) **Synthane**: Production of methane by gasification + methanation from waste and biogenic resources. Partners: ETIA and GRTgaz.

(5) **Plainénergie**: Production of methane from gasification of non-recycled waste + biological methanation. Partners : Communes de la Plaine de l'Ain (CCPA), Syndicat Mixte du Parc Industriel de la Plaine de l'Ain (SMPIPA), GRTgaz, Sèche Environnement, ENOSIS, PROVADEMSE/INSAVALOR, laboratoires DEEP and LISBP from INSA Lyon and Toulouse.