IEA Bioenergy Task 37

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French Environment and Energy Management Agency
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Biogas Plant Inventory

AD plants in operation (ADEME, 2011):

- On-farm: > 30 (average of 150 kWe, 7000 tons)
- Centralised: 5 (average of 1.1 MWe, 25 000 tons)
- Industrial: 88
- Sewage sludge: 74
- MSW: 9 (3 biowaste & 6 grey waste) – 710 MT/yr
- Landfill: 262 inc. 71 with energy valorisation
Up-grading plants in operation

• 1 landfill (Claye Souilly) : 100 m$^3$/h of biomethane (PSA and membrane)

• 1 biowaste (Lille) : 1.200 m$^3$/h (water scrubber)

• 1 municipal sludge (Lille-Marquette) : 100 m$^3$/h (water scrubber) closed until 2014
Gas production 2008

(French Ministry for Environment and Energy, 2009)

- Raw biogas production : 3.300 GWh
- Energy production : 1.290 GWh
- Electricity production : 660 GWh inc. 77 GWh CHP
- Amount of heat recovered : 630 GWh inc. 70 GWh CHP
- Up-graded to biomethane (2011)
  - no amount injected into the natural gas pipeline
  - very low amount used as vehicle fuel
Performance data:

French Ministry for Environment and Energy, 2009

- electrical efficiency: 15.0%
- total energy efficiency: 39.1%
- emissions: nd
**Economic Data:**

- **Investment costs**
  - on-farm AD and centralised:
    - 8 600 €/kWe for 100 kWe
    - 5 600 €/kWe for 500 kWe
    - 5 200 €/kWe for 1 MWe
  - MSW AD: 540 €/t treated

- **Up-grading**

- **Operating Costs**
**Economic Support Data:**

- **Electrical feed-in tariffs**: new regulation in progress (attended on April 2011)
  - 20% of increase
  - Incentive for use of animal manure
  - Maximum: 20.1 c€/kWh

- **Upgrading feed-in tariffs**: new regulation in progress (attended on July 2011)
  - Maximum 103 €/MWh

- **Investment grants**
  - No change since the last meeting
national WG on up-grading and grid biomethane injection:

- leaders: French Environment and Energy Agency and GrDF (gas grid distribution operator)
- definition of technical specifications to inject biomethane into the grid
  Ex.: standardization of feasibility studies; content limit in $O_2$; control quality of biomethane; standard contracts;
- creation of a web site (attended in June)

- the situation today:
  - around 140 up-grading projects
  - 70% on farm or food processing industry
  - 75% with a flow rate > 100 m$^3$/h biomethane
Challenges:

- AD plant permitting
- Environmental licenses
- Grid connections (electricity, heat, gas pipeline)
- Digestate utilisation
Research Activities:

- Study on digestate valorization (DIVA program):
  - Inventory and characterize different types of digestate and management
  - Evaluate the capacity of digestate to be used on soils or to be transformed in commercial products
  - Realize a technical, economical and environmental balance of digestate post treatment compared with direct spreading
  - Set up a regulation to permit a evolution of digestate from a waste to a product

- Total cost: 3.8 M€; Total subsidies: 1.23 M€ (National Research Agency)