France Report

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French Environment and Energy Management Agency
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AD plants in operation (ADEME, 2011):

- On-farm: 40
- Centralised: 7
- Industrial: 80
- Sewage sludge: 60
- MSW: 10 (4 biowaste & 6 grey waste)
- Landfill: 243 inc. 71 with energy valorisation (to be updated)
Up-grading plants in operation

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

- 2 biowaste
  - Lille: water scrubber 700 m$^3$/h
  - Forbach: membrane (starting)

- 1 municipal sludge (Lille-Marquette): 100 m$^3$/h (stopped temporarily)
• **Investment costs**
  - on-farm AD and centralised:
    - 8 600 €/kWe for 100kWe
    - 5 600 €/kWe for 500 kWe
    - 5 200 €/kWe for 1MWe

  - MSW AD: 540 €/t treated

• **Up-grading**

• **Operating Costs**
• **Electricity tariffs**: new regulation published on May 2011
  - Landfills from 8.121 to 9.745 c€/kWh on basis
  - AD plants from 11.19 to 13.37 c€/kWh on basis
  - CHP bonus from 0 to 4 c€/kWh
  - Manure use bonus from 0 to 2.6 c€/kWh (except landfills)
  
  Min: 8.121 – Max: 19.97 c€/kWh

• **Upgrading tariffs**: new regulation published on November 2011
  - Biomethane from landfills from 45 to 95 €/MWh depending on volume
  - AD tariff: basis from 64 to 95 €/MWh depending on volume and feedstock material
  - Biomethane from AD plants from 69 to 125 €/MWh

• **Investment grants**
  No change since the last meeting
Tariff between \(11.79 \text{ c€ and } 19.97 \text{ c€} /\text{kWh}\)

+ 10% for DOM

Electricity feed-in tariffs
Tariff = Basis tariff + bonus feedstock materials (en c€/kWh PCS)

\[ T_{\text{Base}} = \sum \text{Pi1} \times \text{p1} + \sum \text{Pi2} \times \text{p2} \]

**Table: Biomethane flow rate vs. feed-in tariffs**

<table>
<thead>
<tr>
<th>Biomethane flow rate</th>
<th>( \text{Pi1} ) (en c€/kWh PCS)</th>
<th>( \text{Pi2} ) (en c€/kWh PCS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 m³/h</td>
<td>0.5</td>
<td>3</td>
</tr>
<tr>
<td>50 &lt; c &lt; 350 m³/h</td>
<td>0.5</td>
<td>Linear interpolation</td>
</tr>
<tr>
<td>&gt; 350 m³/h</td>
<td>0.5</td>
<td>2</td>
</tr>
</tbody>
</table>

- **Pi1**: MSW (except sewage sludge), restaurant and canteen waste
- **Pi2**: cover crops; agricultural, wood and food processing feedstock materials
- **p1**: quantity of Pi1
- **p2**: quantity of Pi2
National Strategy/Support for injection of biomethane

- national WG on up-grading and grid biomethane injection
  - leaders: French Environment and Energy Agency and GrDF (DSO)
  - 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 [www.injectionbiomethane.fr](http://www.injectionbiomethane.fr) in January 2012

- status quo on injection projects
  - up than 280 projects
  - 72 % are technically possible
  - 80 % with a flow rate > 100 m$^3$/h biomethane
  - 81 % from agricultural or food processing feedstock materials

- new regulation and tariffs
Mechanism for guarantee of origin

Source: Solagro
Recent ADEME publications/studies

- Agronomic quality and sanitary aspects of digestate (Report, October 2011)
  [Link](http://www2.ademe.fr/servlet/getDoc?cid=96&m=3&id=79519&p1=30&ref=12441)

- Complete process monitoring of 11 on-farm, centralized, food processing and sewage sludge AD plants (in progress)
  - Optimizing process
  - Measure of technical and environmental performance (establish ratios and indicators)
  - Economical results
  - Social impact (measured by specific indicators)
  - Measure of digestate properties
  - Establish success stories for following projects

- Complete process monitoring of 5 MSW AD plants (in progress)
On farm, centralized and food processing AD plant monitoring

Lot 1 AMO : APESA & Biomasse Normandie
Lot 2 : S3D
Lot 3 : LDAR with Méthaneva
Lot 4 : S3D with APAVE
Lot 5 : Méthaneva

- Coordinated by a consortium of two engineering societies
- Monitoring by 4 consulting firms or monitoring specialists
  - 6 on-farm
  - 2 centralized
  - 2 food processing
  - 1 urban sewage sludge
MSW AD plant monitoring

3 biowaste
2 grey waste & biowaste

• Coordinated by an engineering society
• Monitoring by 6 consulting firms or monitoring specialists

• Lot 1: project coordination
• Lot 2: feedstock management, economic data, energy balance
• Lot 3: mass balance, compost quality

• Biowaste (Carribean Sea)