Planning a biogas plant

The Company
- Independent of industry and trade
- Integrated in national and international networks
- Independent advice in all areas of business activities
- From project development to financing, planning and construction supervision up to commissioning
- Quality assurance

Project management within the autonomous business segments
- Environmental engineering and water management
- Waste water management and water supply facilities
- Surveying
- IT Services
- Facility management
- Consulting
- Renewable Energy

RENEWABLE ENERGY
Use of biomass
- Biogas
- Bioethanol
- Biodiesel
- Wood pellets
  - Combination of different technologies
  - Other sources of renewable energy

BIOGAS
Heat-, Electrical Power and Fuel Production

<table>
<thead>
<tr>
<th>Biomass from</th>
<th>Production of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Electrical power</td>
</tr>
<tr>
<td>Food industry</td>
<td>Heat</td>
</tr>
<tr>
<td>Animal feed industry</td>
<td>Fuel</td>
</tr>
<tr>
<td>Communal waste (biowaste)</td>
<td>Fertilizer</td>
</tr>
<tr>
<td>Gastronomy</td>
<td></td>
</tr>
</tbody>
</table>

Input material used

- Corn silage, grass silage, pig liquid manure, cattle liquid manure, chicken dung, energy grasses, vegetable waste, pomace, malt husks, food waste, kitchen waste, biowaste, old cooking oil, chip fat, flotation sludge, glycerin, slaughterhouse waste,
Biogas Process

- Multi-step fermentation process
- Breakdown of organic substances with high molecular weight into substances of lower molecular weight until it reaches methane
- Damp anaerobe environment

Stages of fermentation
1. Hydrolysis
2. Formation of acid
3. Formation of acetic acid
4. Formation of methane

Agricultural Biogas Plant (500 kW)

Biogas Plant Margarethen / Moos (Austria)

Substrate used (9.980 t/a):
- Corn silage, Sudan grass, liquid manure

Output:
- Electrical: 500 kW<sub>e</sub>
- Thermal: 535 kW<sub>t</sub>

Energy yield per year:
- Biogas: 1.4 Mil. Nm<sup>3</sup>/year
- Electricity: 3.9 Mil. kWh/year
- Heat: 4.2 Mil. kWh/year

Process flow of a biogas plant
Plant size, quantities, income, investment

<table>
<thead>
<tr>
<th>Size Class</th>
<th>100 kWel</th>
<th>500 kWel</th>
<th>1,000 kWel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat Capacity</td>
<td>110 kW</td>
<td>480 kW</td>
<td>1,650 kW</td>
</tr>
<tr>
<td>Biomass in t/yr</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Organic waste (t/yr)</td>
<td>2.500</td>
<td>10.000</td>
<td>20.000</td>
</tr>
<tr>
<td>Corn silage (t/yr)</td>
<td>5.000</td>
<td>20.000</td>
<td>45.000</td>
</tr>
</tbody>
</table>

- Heat capacity
- Biomass
- Income
- Investment

The investment costs depend on the equipment of the biogas plant, utilized biomass, location etc.

On site a connection to the power grid and the possibility for power feed-in is required.

Thank you for your attention!!

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REFERENCES
- 35 planned plants in Austria
- 65 planned plants worldwide
- Projects in Austria, Hungary, Slovenia, Germany, Croatia, Serbia, Bosnia-Herzegovina, Russia, Canada and Chile

www.agrinz.at