



<p><b>Example Biogas Plant for Food Industry</b></p> <p><b>Doc.-No.: 042</b></p>	<div style="text-align: center;">  <p><b>PROBIOPOL</b> Biogas Polygeneration for Romania</p> <p>Promoting and Supporting Implementation of Biogas-Polygeneration: A systematic Approach towards Sustainable Energy Consumption in Romania</p> <p>An official Project of the EC, founded from the Community's Sixth Framework Programme</p> </div>	<p>Project Coordinator</p>  <p><b>AGIMUS</b> Umwelt Sicherheit Qualität</p> <p>Braunschweig, Germany</p>
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## Example Biogas Plant for Food Industry

**The Example is a Food-Industry Plant, producing fresh, frozen, cooked and tinned products from fish and meat. [490 Employees]**

### Actual Cost Situation:

Waste Treatment Costs Fat&Greases 1600 m <sup>3</sup> . 17,90 EUR / m <sup>3</sup>	28.640,00 €
Waste Treatment Food wastes 1035 t. 16,80 EUR / m <sup>3</sup>	17.388,00 €
Aerobic Treatment Liquid Wastes / Waste Water	311.000,00 €
el. Energy for Liquid Waste Treatment	45.000,00 €
Maintenance	28.000,00 €
labour costs	25.000,00 €

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**Total Costs for Treatment of digestible Substrates** **455.028,00 €**



- Liq. Treatment 620 m<sup>3</sup>/d
- Wastes 3,5 m<sup>3</sup>/d
- Fats 3,5 m<sup>3</sup>/d
- Need of Surface: 250 m<sup>2</sup>
- COD Ø incl. Cofermentate 5.600 mg/l
- Max. COD dayrate 3.500 kg/d
- Input-Temperature 30°C
- Capacity: 30 m<sup>3</sup>/h
- Volume: 600 m<sup>3</sup>, insulated
- Operating temperature: 35 - 38 °C
- Biogas yield: 53 m<sup>3</sup>/h

Photo: Envirochemie GmbH

**Solution: Anaerobic Digestion instead of aerobic Waste treatment.** **Investment: 1.150.000 EUR**

Amortisation	115.000,00 €
Interests (Financing)	69.000,00 €
NaOH (incr. pH)	8.000,00 €
N <sub>2</sub>	3.000,00 €

Maintenance (Full-Service)	28.000,00 €
labour costs	25.000,00 €
el energy for anaerobic Digestion: 200.000 kWh/a	18.000,00 €

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**Total Costs for Treatment of Digestible Substrates** **266.000,00 €**

Biogas 53 m <sup>3</sup> /h * 8760 h [m <sup>3</sup> ]	464.280,00 m <sup>3</sup>
Energy Content 22,5 MJ/m <sup>3</sup> [MJ]	10.446.300,00 MJ
Energy content in kWh / a	2.901.750,00 kWh

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**Gain (Biogas used only for Heating)** **87.052,50 €**

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**Annual Benefit (Former Costs – New Costs + Gain)** **276.080,50 €**



- Liq. Treatment 620 m<sup>3</sup>/d
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- Fats 3,5 m<sup>3</sup>/d
- Need of Surface: 250 m<sup>2</sup>
- COD Ø incl. Cofermentate 5.600 mg/l
- Max. COD dayrate 3.500 kg/d
- Input-Temperature 30°C
- Capacity: 30 m<sup>3</sup>/h
- Volume: 600 m<sup>3</sup>, insulated
- Operating temperature: 35 - 38 °C
- Biogas yield: 53 m<sup>3</sup>/h

Plus  
Polygeneration Plant 145 kW el.

**Photo:** Envirochemie GmbH

**Solution:** Anaerobic Digestion instead of aerobic Waste treatment. **Investment:** 1.650.000 EUR

Amortisation Anaerobic Digestion + 145 kW el Polygeneration Plant)	165.000,00 €
Interests (Financing)	99.000,00 €
NaOH (incr. pH)	8.000,00 €
N2	3.000,00 €
Maintenance (Full-Service)	29.017,50 €
labour costs	15.000,00 €
el energy for anaerobic Digestion: 200.000 kWh/a	18.000,00 €

**337.017,50 €**

Biogas 53 m <sup>3</sup> /h * 8760 h [m <sup>3</sup> ]	464.280,00	m <sup>3</sup>
Energy Content 22,5 MJ/m <sup>3</sup> [MJ]	10.446.300,00	MJ
Energy content in kWh / a	2.901.750,00	kWh
Polygeneration el. Energy yield 40 %	1.160.700,00	kWh
Polygeneration th. Energy (45 %)	1.305.787,50	kWh

<b>Gain (el. current)</b>	<b>127.677,00 €</b>
<b>Gain (th. energy)</b>	<b>39.173,63 €</b>

**Annual Benefit 284.861,13 €**

***Biogas is a very profitable business!***