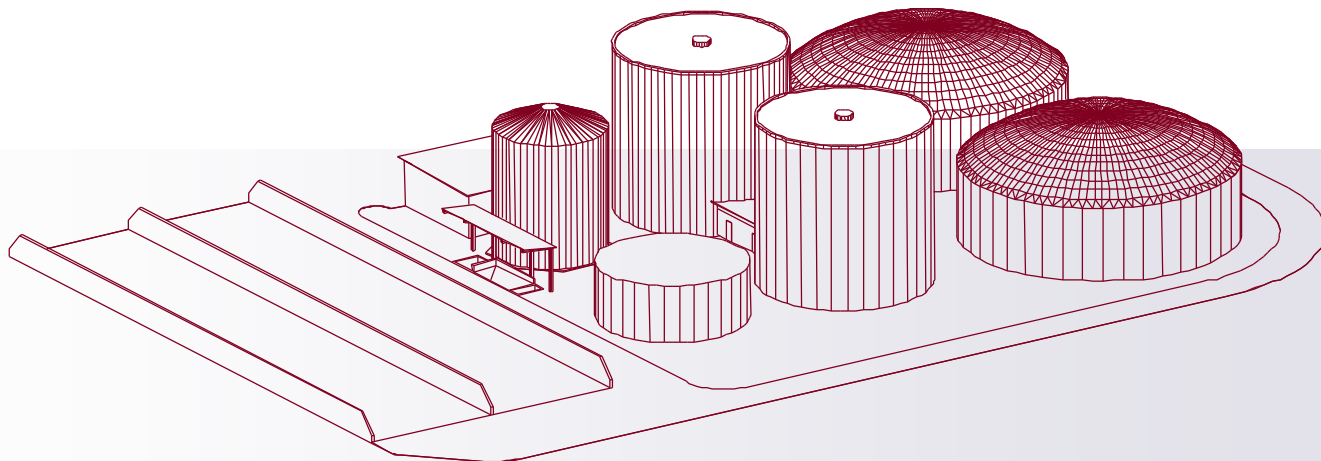


your partner for all solutions in the field of  
biogas

---

## WASTE to ENERGY Anaerobic Digestion (AD)



**entec biogas gmbh**  
is providing know how and services for anaerobic digestion plants

**consulting**  
**feasibility studies**  
**process design**  
**detailed engineering**  
**key equipment supply**  
**construction supervision**  
**general contractor**  
**biological start-up**  
**staff training**

**entec biogas gmbh**  
is offering its services worldwide for the following main plant applications

**dairy manure**

**pig manure**

**chicken and poultry manure**

**AD of energy crops**

**AD of food residues and MSW**

**AD of slaughter house waste**

**AD of sewage sludge**

**AD of distillery mash**

**AD of waste from the food processing industry**

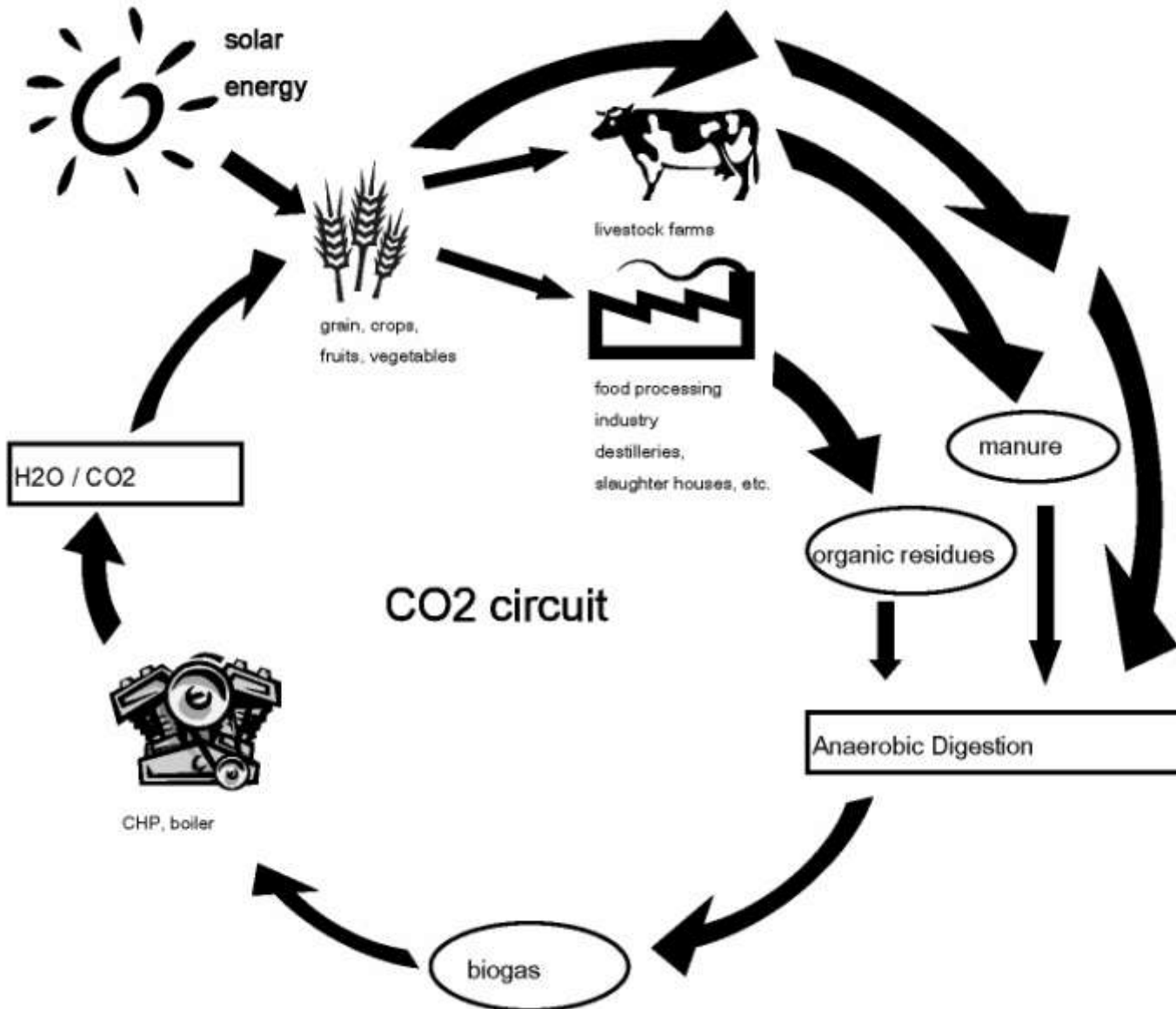
**AD of organic polluted waste water**

**entec biogas gmbh**  
is offering different digester technologies for various applications

**CSTR - digester**  
**BIMA-digester**  
**MBS-digester**  
**UASB-digester**  
**anaerobic filter**

as well as key components for biogas plants

**digester agitators**  
**biogas storage tanks**  
**biogas scrubbers**  
**biogas flares**



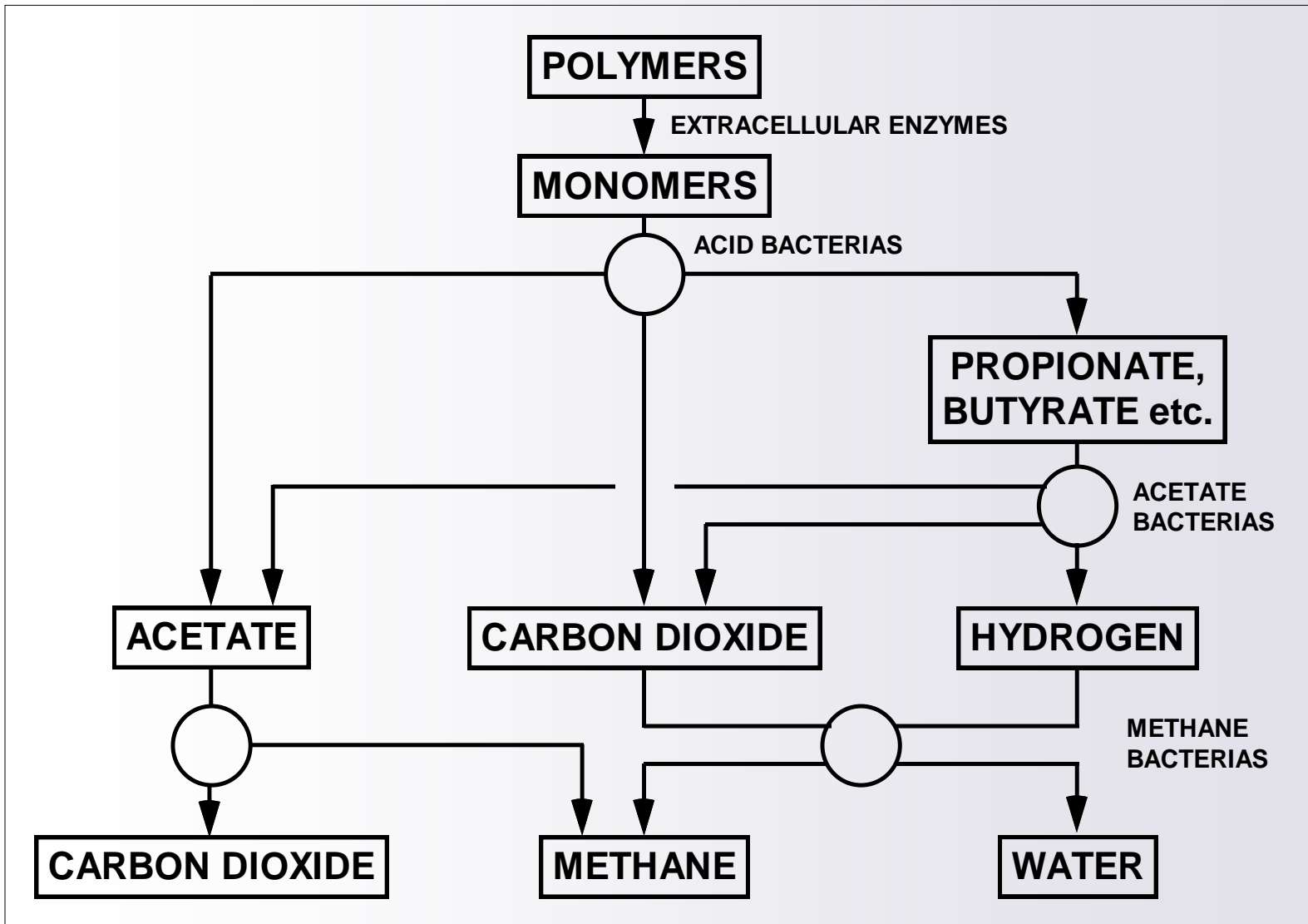
## What is Anaerobic Digestion (AD)?

---

- Anaerobic Digesters produce conditions that encourage the natural breakdown of organic matter by bacteria in the absence of air
- AD provides an effective method for converting organic residues from livestock farming, food processing industries and other sources into:
  - **biogas** which can be used to generate heat and/or electricity
  - **digestate** which can be used for liquid or solid fertilizer
- Energy from AD offers a great potential for using renewable resources for electricity, heat and combined heat and power generation
- Energy from AD is carbon neutral. By replacing fossil fuels it can avoid emissions that cause climatic changes and acid rain.

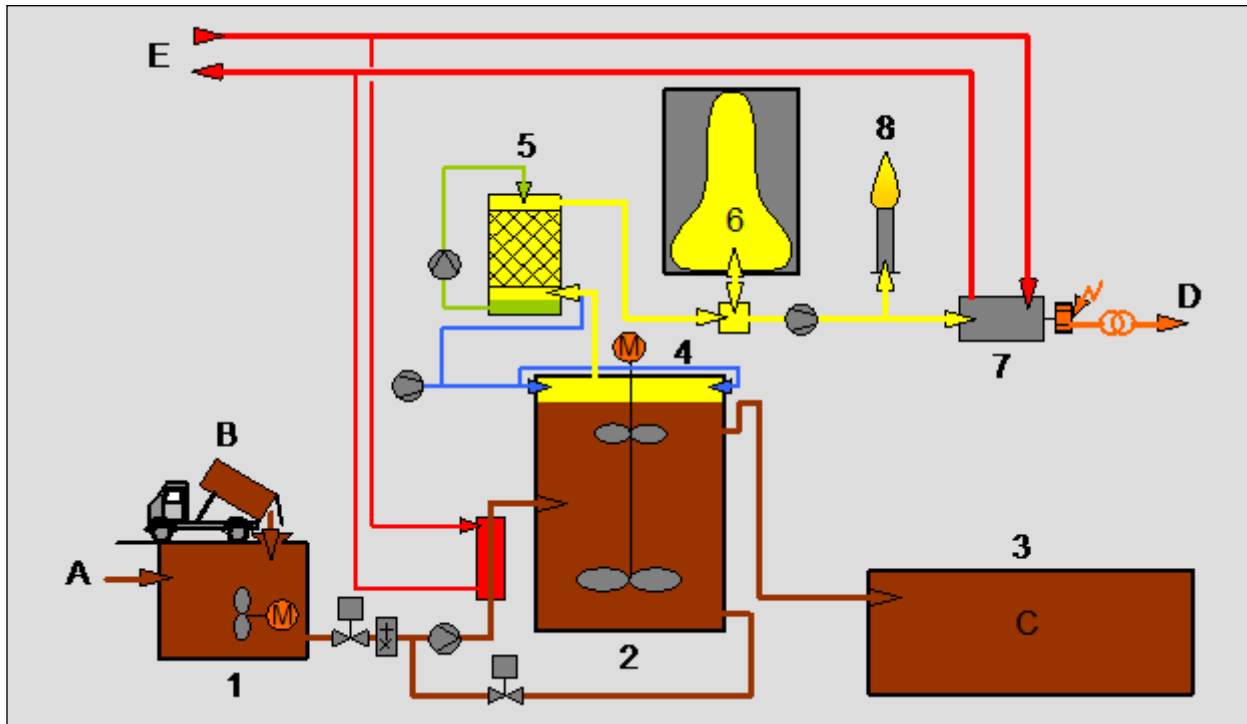
| Agriculture  | Industry   | Municipality                                |
|--|--|---|
| manure from pig farms (breeding and fattening farms) | solid residues from the food processing industry and waste water | municipal solid waste from households (MSW) |
| manure from dairy and cattle farms                   | distillery plants  | sewage sludge                               |
| manure from chicken layer and broiler farms          | slaughter houses (soft waste)                                    |   |
| energy crops (silage and grain)                      | food residues and fats from kitchen and canteen                  |   |

How does AD work?





Biogas Plant  
general process sheem



A liquids  
B solid waste  
C digestate  
D electric power  
E heat

1 Mixing tank  
2 CSTR-digester  
3 Storage tank  
4 Internal desulfurization  
5 Biogas scrubber  
6 gasholder  
7 Gas engine  
8 Gas flare



**plant data:**

|                          |                              |
|--------------------------|------------------------------|
| location                 | Ludhiana/India               |
| start of operation       | 2003                         |
| capacity                 | 86.000 t/a                   |
| Electric power installed | 1.000 kW                     |
| digester size/type       | 2* 5.000 m <sup>3</sup> BIMA |



**plant data:**

|                          |                           |
|--------------------------|---------------------------|
| location                 | Gundorf/Germany           |
| start of operation       | 2003                      |
| capacity                 | 40 000 t/a                |
| Electric power installed | 380 kW                    |
| digester size/type       | 3 200 m <sup>3</sup> CSTR |



**plant data:**

|                          |                           |
|--------------------------|---------------------------|
| location                 | Tornitz/Germany           |
| start of operation       | 2002                      |
| Capacity pig manure      | 90.000 t/a                |
| Electric power installed | 625 kW                    |
| digester size/type       | 5.100 m <sup>3</sup> CSTR |



**plant data:**

|                          |                              |
|--------------------------|------------------------------|
| location                 | Namakkal/India               |
| start of operation       | 2008                         |
| Capacity chicken manure  | 30.000 t/a                   |
| Electric power installed | 1.500 kW                     |
| digester size/type       | 2* 5.000 m <sup>3</sup> BIMA |



**plant data:**

|                          |                              |
|--------------------------|------------------------------|
| location                 | Kogel/Germany                |
| start of operation       | 2002                         |
| capacity                 | 40 000 t/a                   |
| Electric power installed | 1.416 kW + 511 kW            |
| digester size/type       | 2* 2 600 m <sup>3</sup> CSTR |

**plant data:**

|                          |                              |
|--------------------------|------------------------------|
| location                 | Malchin/Germany              |
| start of operation       | 2007                         |
| capacity                 | 50 000 t/a                   |
| Electric power installed | 2* 1021 kW                   |
| digester size/type       | 2* 3.500 m <sup>3</sup> CSTR |



**plant data:**

location        Senftenberg/Germany  
 start-up        October 2006

|                             |   |
|-----------------------------|---|
| capacity                    | 40 000 t/a<br>(88,200,000 lbm/yr)                 |
| digester capacity/type      | 3 * 3 500 m <sup>3</sup> CSTR<br>(3* 924,400 gal) |
| post-digester capacity/type | 4 * 2 400 m <sup>3</sup> MBS<br>(4* 633,900 gal)  |
| power installed             | 3 * 1.021 kW                                      |

biogas plant for slaughter house waste  
 reference



**plant data:**

location  
 start-up

Rudram Village (Medak)/India  
 2003

capacity .  
 digester capacity/type  
 Biogas generation

22 000 t/a  
 2.200 m<sup>3</sup> BIMA  
 2.600 m<sup>3</sup>/day



**plant data:**

|                       |  |
|-----------------------|--|
| location              | Penzberg/Germany                         |
| start of operation    | 2000                                     |
| inhabitants or equiv. | 50,000                                   |
| digester capacity     | 2 * 1 500 m <sup>3</sup><br>(2* 396,200) |
| digester type         | BIMA                                     |

## Increase income and saving

- AD generates income from sale of biogas (as electricity and/or heat)
- AD can offer financial savings through the use of the products on-site avoiding the costs of synthetic fertilizers and other soil conditioner
- AD offers financial savings for energy replacing the existing bought-in electricity and heat
- AD can offer financial savings avoiding or reducing the costs for waste disposal and waste water treatment fees.



Thank you for your attention!

