

# Quality and competence – worldwide

## **Innovative company – with a wide experience.**

Bionardo Repower constructs the plants and has all major components made by self and german partner companies. The advantage: Worldwide continuous high quality.

## **Comprehensive advice**

A successful biogas project is based on comprehensive know-how in a variety of disciplines and starts with the manufacture of the plant. We therefore will support you in every phase of the project. This comprises amongst others:

- **Comprehensive plant dimensioning**
- **Feasibility analysis and financing concepts**
- **Analytics, process and substrate consultancy for a stable operation and optimal gas utilization**



### **Complete plants with complete service**

In order to provide best advice every plant will be supported by our trained distribution partners on site and right from the start and during every phase of the project.

### **Individual possibilities due to modular construction**

Since every plant and every customer has different specifications our biogas plants are manufactured in a modular construction. This enables individual and flexible solutions – from a small plant version to a computer controlled biogas plant in the megawatt area.

Optimally coordinated technologies are the basis of a reliable operation of our plants: the substances used are shredded and mixed and the gas produced is processed and efficiently utilised. This is why we only use established plant components and develop a large part of the technology ourselves



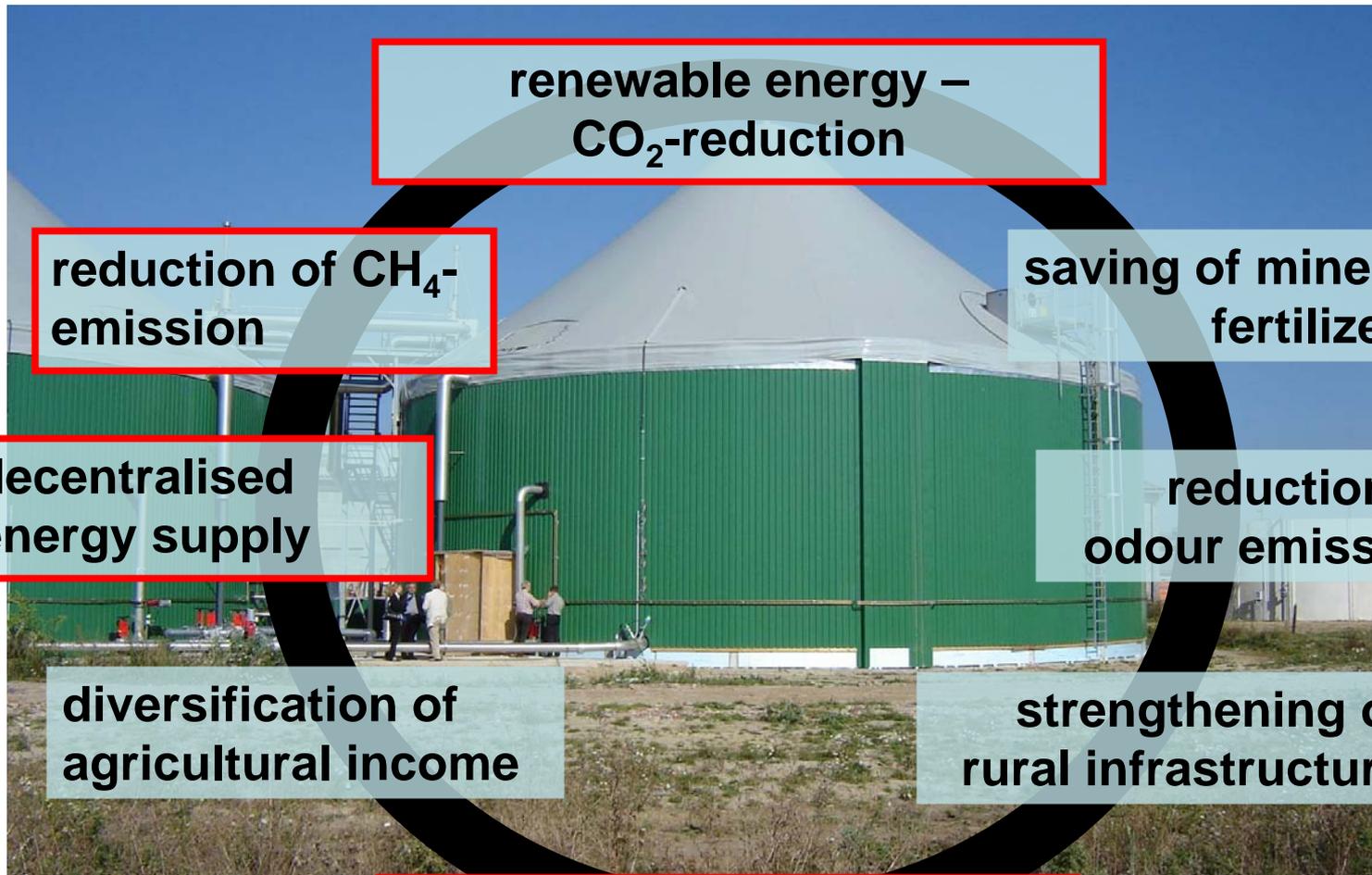
# What is biomass?



Biomass generally refers to the organic matter deriving from plants and that is generated through the photosynthesis. Biomass not only provides food but also construction materials, fibers, medicines and energy. In particular, biomass can be referred to as solar energy stored in the chemical bonds of the organic material.



# Why we need biogas?



renewable energy –  
CO<sub>2</sub>-reduction

reduction of CH<sub>4</sub>-  
emission

saving of mineral  
fertilizers

decentralised  
energy supply

reduction of  
odour emission

diversification of  
agricultural income

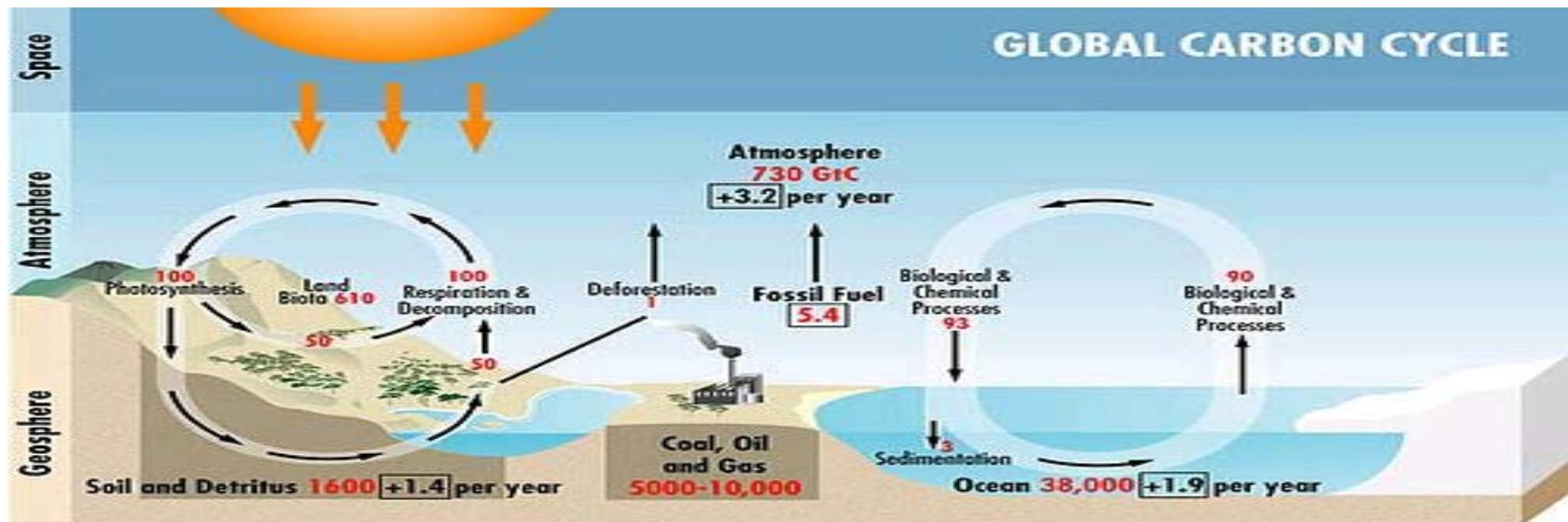
strengthening of  
rural infrastructure

reliable energy supply

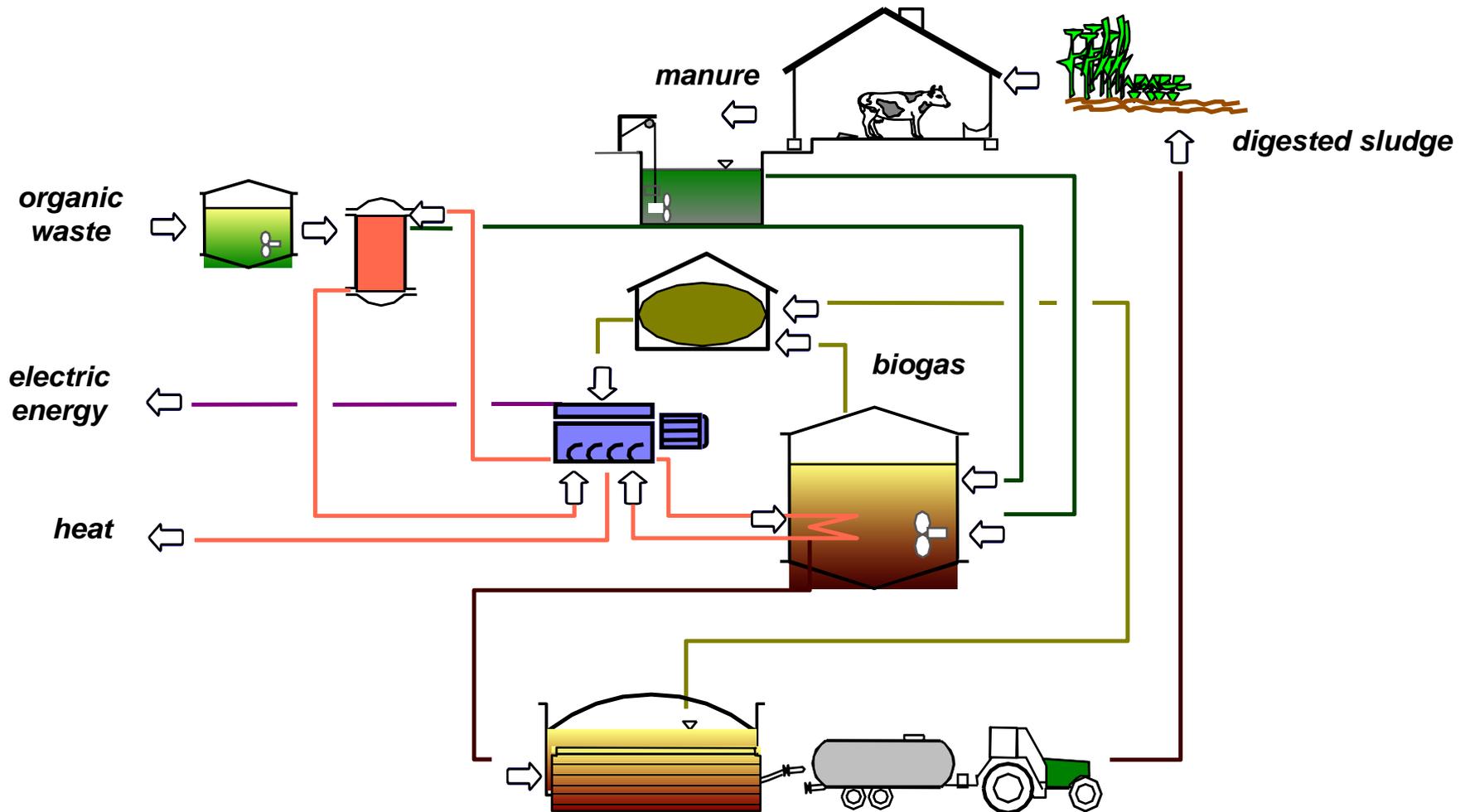
## Where does biomass come from?

Carbon dioxide (CO<sub>2</sub>) from the atmosphere and water absorbed by the plants roots are combined in the photosynthetic process to produce carbohydrates (or sugars) that form the biomass. The solar energy that drives photosynthesis is stored in the chemical bonds of the biomass structural components. During biomass combustion, oxygen from the atmosphere combines with the carbon in biomass to produce CO<sub>2</sub> and water. The process is therefore cyclic because the carbon dioxide is then available to produce new biomass. This is also the reason why bio-energy is potentially considered as carbon-neutral, although some CO<sub>2</sub> emissions occur due to the use of fossil fuels during the production and transport of biofuels.

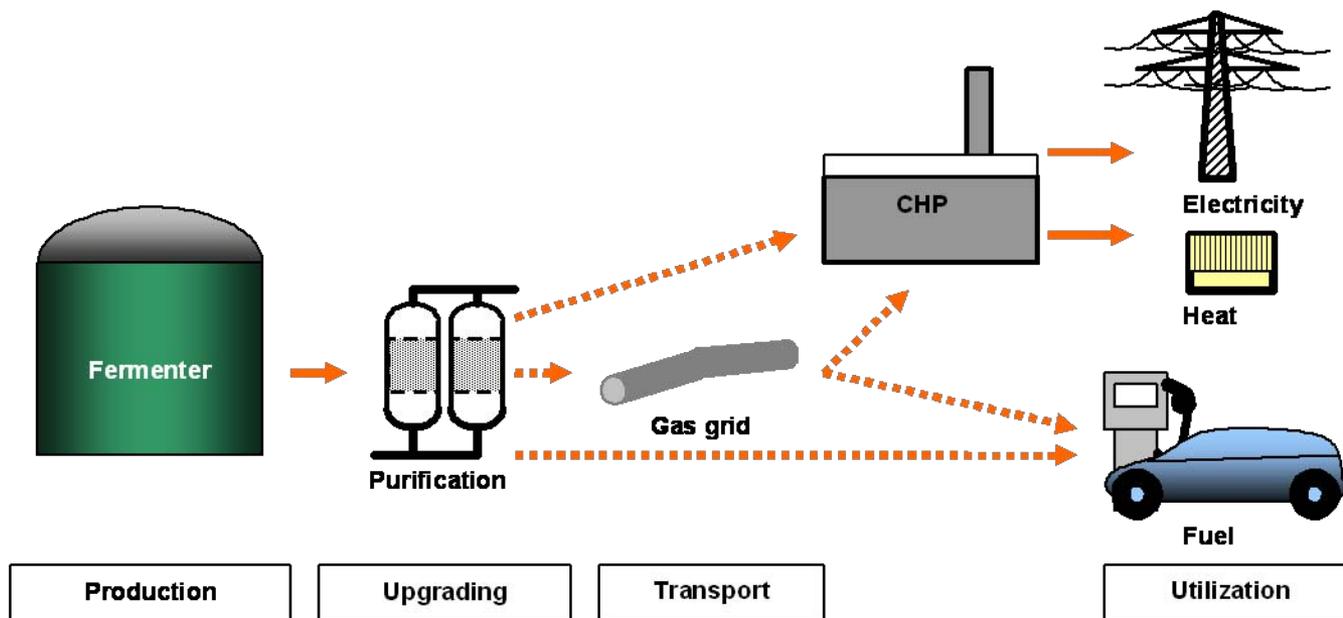
The figure below shows the global carbon reservoirs in gigatonnes of carbon (1GtC = 1012 kg) and the annual fluxes and accumulation rates in GtC/year, calculated over the period 1990 to 1999. The values shown are approximate and considerable uncertainties exist as to some of the flow values.



# Biogas production today



# Biogas in the near future

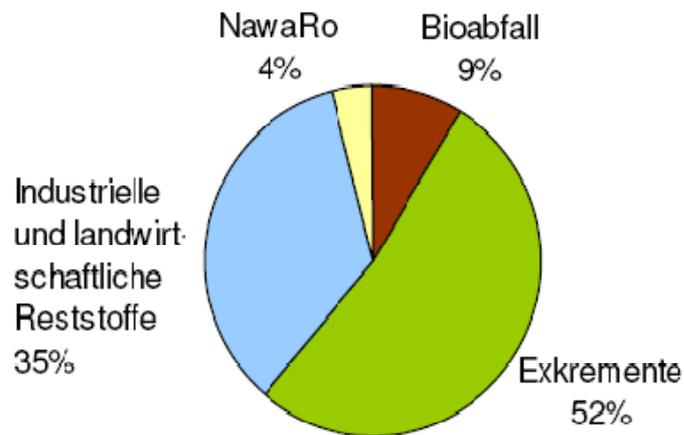


**Green Gas** = the produced energy is transported there, where you can be best used !

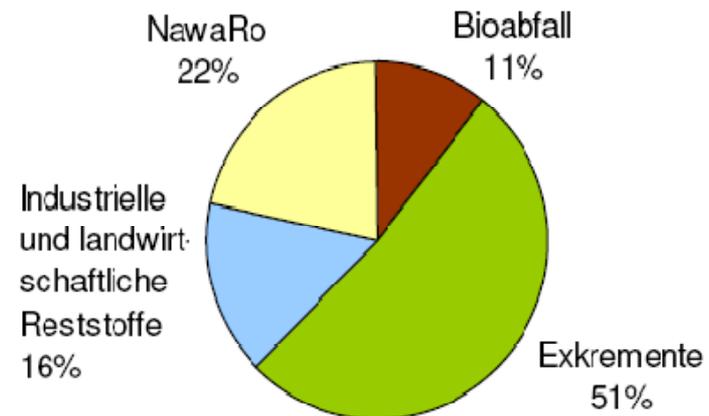
# Substrates today and in future



Substrateinsatz (Stand 6/2005)



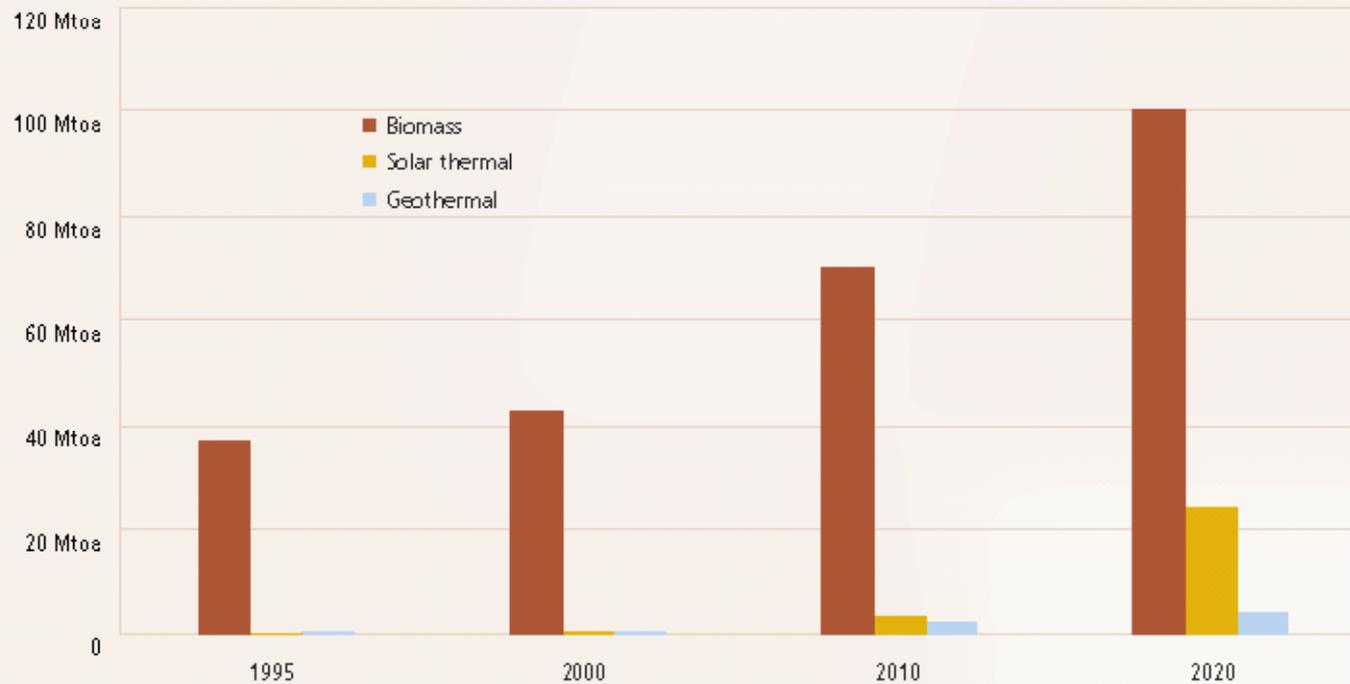
Substrateinsatz (Stand 12/2005)



# Renewable Heat Production



Renewable Heat Production 1995-2020



# Combined Heat and Power Unit (CHP)



To convert the biogas produced in the plant to electricity and heat energy a combined heat and power unit is required. This is why Bionardo Repower integrates suitable solutions for CHP units directly into the plant design. Depending on local conditions a CHP unit can be erected in a building or in an external container.

## Container vs. building installation

### Building installation

#### Advantages:

- Customised space division
- A lot of available space
- Separate space for control and documentation is possible

#### Disadvantages:

- Higher costs
- Expansion for further unplanned engines is costly

### Container installation

#### Advantages:

- Less cost for generator space and installation
- Expansion for further unplanned engines is possible without problems

#### Disadvantages:

- Less available space
- Limited flexibility in space division



# Control system



Several individual factors determine the optimal operation of a biogas plant. To ensure that these factors are optimally matched with each other Bionardo® Repower has equipped the plants with a central control system that controls and manages all processes.

Smaller plants require a relatively simple system that will reliably control all major factors. More comprehensive plant types require normally a more sophisticated control system. We therefore individually match our control systems depending on the individual requirements of the required plant.

## Control of input parameters

A decisive feature for optimal use of the plant is a balanced and well-adjusted substrate feed. The control system will ensure that the substrate is fed according to requirements and that the fermenter volume is optimally used.

To do this the system will record, store and process all important input parameters like substrate types, daily fed quantities or feeding times.



# Mixing technology



**A refined mixer technology is decisive for a reliable and efficient mixing of the fermenting substrates and forms the basis for an even yield of gas.**

**Depending on the individual fermenter size a combination of long axle and submersible mixers are used.**

## **Co-ordinated system**

The system developed by Bionardo Repower is optimally adjusted and has the following features:

- **Substrate mixing in accordance with Requirements**
- **Prevention of sedimentation**
- **Guaranteed low energy consumption**

## **Long axle mixers**

The task of long axle mixers is to mix the substrate evenly and carefully. At approx. 40 rpm it creates a flow and motion in the vessel and ensures that the gas creating bacteria will have continuous and optimal conditions.

The motor and bearing support is located outside the fermenter and is guided at an angle through a gas-tight wall opening into the vessel.



# Sanitation



Biogas plants can utilise a wide range of feedstocks. Apart from organic energy sources these can also be substrates that are governed by hygiene regulations and that may not be disposed off without prior treatment.

If such disease and photo hygienic substances are utilised,

Pasteurisation of the Feedstock will become necessary.





Thank you very much for your attention !

Bionardo Repower GmbH

Karl-Schmid-Str. 16

D-81829 München

+49 89 51099737

+49 89 51099738 Fax

[www.bionardo.com](http://www.bionardo.com)

[info@bionardo.com](mailto:info@bionardo.com)