Biogas

BIOGAS Digest

- Basics
- Framework Conditions
- Application and Product Development

Biogas plants constitute a widely disseminated branch of technology that came into use more than 30 years ago in developing countries. There are hundreds of thousands of simple biogas plants now in operation, and each one of them helps to improve the living conditions of people in rural areas. Biogas systems are an efficient way of dealing with organic waste, dung and crop residues while making optimal use of their energetic as well as nutrient content.

In addition to generating renewable energy, biogas systems help to stimulate ecologically beneficial closed-loop systems in the agricultural

sector while improving soil quality and promoting progress in animal husbandry and farming.

While the main focus is on biogas systems of simple design, the technology is nonetheless complex enough to warrant close attention to its proper application, planning and construction. Only a well-planned, carefully constructed and properly functioning biogas system will fulfill its purpose of improving living conditions in rural areas.

You will find useful and detailed information about all aspects of biogas plant design and maintainance, biogas appliances, social, political, economic and ecological framework conditions, planning and dissemination of biogas systems and last but not least country- and project-specific information.

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H

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I

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L

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P

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S

sans-serif, square, style

T

text/css, text-align, text-decoration, text-ident, text-indent, title, TOC, TYPE

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Biogas

Imprint

This information service on biogas technology has been developed and produced on the order of the GTZ project Information and German Appropiate Technology Exchange (GATE) for the GATE Website in a collaborative effort of the following institutions and individuals:

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distributed organizations, to supercomputers, to a small home server, if it's Linux, we know it.)

Biogas

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- Framework Conditions
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Biogas

AT Information Biogas - Index

Biogas Basics

- What is biogas?
- Biogas and the global carbon cycle
- Biology of methanogenesis
- Substrate and material balance of biogas production
- Composition and properties of biogas
- Utilization
- The Benefits of Biogas Technology
- The Costs of Biogas Technology
- Fuel and Fertilizer
- Public and Political Awareness

What is the section Basics about?

History of Biogas Technology

- Europe/Germany

Substrate solids content and agitation

Substrate solids content
Agitation

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Microbiology

The three steps of biogas production
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Acidification
Methane formation
Symbiosis of bacteria

The Contribution of Biogas Technology to Conservation and Development

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Development
Under which conditions can biogas technology contribute to development and conservation?

The Physical Appearance of Different Types of Biogas Plants

Balloon plants
Fixed-dome plants
Floating-drum plants

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Gas demand

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Gas demand

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Organic Fertilizer from Biogas Plants

Organic substances in fertilizers

Nutrients and soil organisms

Reduction of soil erosion

Reduction of nitrogen washout

Effects on crops

Nitrogen-content and C/N-ratio of organic substrates

Biogas - Framework Conditions

Social aspects in the planning process
Social and political aspects in the dissemination process
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National energy & fertilizer supply strategies
Chemical fertilizer
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Fertilization

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Biogas - Application and Product Development

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Parts of a biogas plant
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Digester

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Further Reading:

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Fixed-dome gasholders

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Determining the biomass supply via literature data

Determining the biomass supply via regional reference data

Determining biomass availability via user survey

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0. Initial situation

1. Natural / Agricultural conditions
2. Balancing the energy demand with the biogas production
3. Plant Design and Construction
4. Plant operation / maintenance / repair
5. Economic analysis
6. Social acceptance and potential for dissemination
7. Summarization

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Sizing a biogas plant

Sizing the digester

Calculating the daily gas production G

Establishing the plant parameters

Specific gas production **Gp**

Digester loading **Ld**

- Sizing the gasholder

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- Stable
- Biogas plant

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- Cattle dung and manure
- Pig dung and manure
- Goat dung
- Chicken droppings
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- The problem of scum
- Separation of material
- Substrate

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- Pipe diameters
- Lay-out of the piping system
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- Types of pumps
- Rotary pumps
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- Internal and external heating systems

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Bitumen (several layers)

Bitumen coat with aluminum foil
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Annual Manure Yield and Nutrient Content of Animal Excrements

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The Benefits for Biogas Users

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Procedure of dynamic approach

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A) Net Present Value (NPV)

B) Internal Rate of Return (IRR)

C) Dynamic Unit Cost criterion (C_{dyn})

D) Dynamic Annuity criterion (A_{dyn})

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Cost data

Benefit data

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Cost benefit relation (investment calculation, sensitivity analysis)

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Further reading:

The Annuities Method

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- Global Environmental Benefits of Biogas Technology
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  - Sources of methane emissions in the agricultural field
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- Biogas - Program Implementation

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- Running, maintenance and repair costs
- Financing by credit
- State support
- Families with low income
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Asia
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Biogas

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Underground Water
Utilization
Vietnam
Vietnam, Geography, population and agriculture
What is the section *Basics* about?