Kanadevia INOVA

METHANOS® F³

The booster for flexible biogas plants

METHANOS® F³ bacteria are produced on an industrial scale.

Microorganisms: the way to demand-driven energy generation

Important information on use and handling

Changes to the German Renewable Energy Sources Act (EEG), in recent years have repeatedly thrown up new challenges for the biogas industry. The basic biological processes that take place in biogas plants have to keep pace with this. Stable service performance and reliable process flows are crucial.

Usable biomass now also has to be available at the right time. The stated goals are now electrical flexibility or heat generation geared to the season. Proven METHANOS® F³ bacteria can help meet these requirements.

METHANOS® F³ is a mixture of two different types of bacteria that occur naturally in biogas installations, albeit it in only very small quantities. Injecting METHANOS® F³ into the installation increases the concentration of these highly efficient bacteria, boosting the efficiency of the plant.

In the past, plant operators have achieved excellent improvements in output with METHANOS®. METHANOS® F³ high-performance bacteria have been developed further to make biogas installations even more efficient and flexible. Thanks among other things to optimised lab production, the new generation of bacteria has better cell quality.

METHANOS® F³ – high-performance bacteria that boost the process

Our experts will be glad to advise you

What METHANOS® F³ achieves: 100% better performance without great effort or expense
Injecting METHANOS® F³ into a biogas plant allows the targeted management and optimisation of the biogas process. The bottom line is a significant increase in the efficiency of the biogas plant without the great effort and expense of having to modify the technical conditions.

Increased volume load
In practice the specific volume load can be increased from 3.5 kg ODM per m³*day to more than 7 kg ODM/m³*day. A biogas plant can achieve more than twice the output without having to add digesters. This enables seasonal fluctuations in demand to be met with ease.

Improved pump and agitator capacity
There is a marked improvement in the homogeneity of the digester content and the ease with which it can be pumped and agitated. This makes the entire digestion process more stable.

Feed material substitution
Adding METHANOS® F³ permits traditional feed materials such as maize and whole-plant silage to be replaced by substitutes such as grass and solid manure that are more difficult to decompose. This reduces expenditure on feed materials.

Economic efficiency
METHANOS® F³ increases the profitability of a biogas plant. By increasing the volume load, it enables operation of the plant to be aligned more closely with demand. With the substrate easier to pump and agitate, component wear and power consumption are reduced, bringing down operating costs.

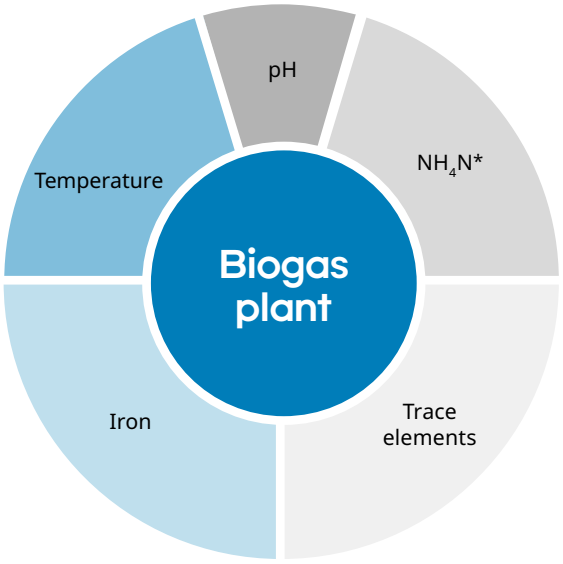
Compatibility
METHANOS® F³ can be successfully deployed in round digesters (wet fermentation) as well as in plug flow and garage-type digesters (dry fermentation). This means a variety of substrate variations can be used, from renewable raw materials and agricultural fertilisers to organic residues such as organic waste. The product can be employed trouble-free in a wide range of biogas installations, irrespective of plant size and substrate mix.

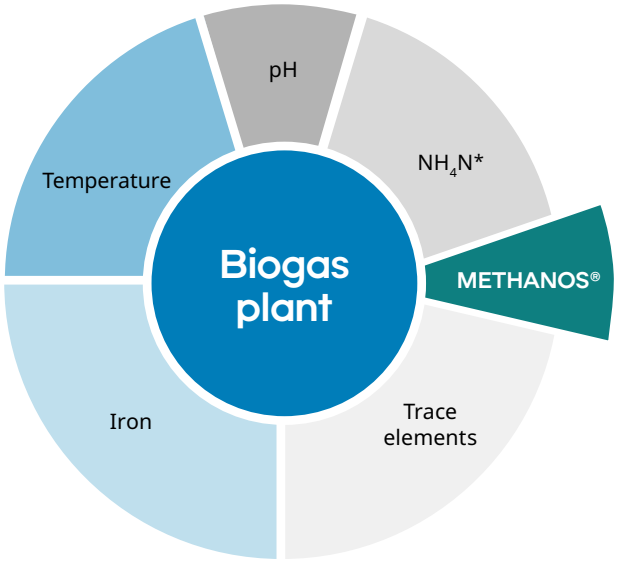
All the benefits at a glance:

- Doubles volume load with no accompanying increase in active digester size
- Enables demand-driven biogas production in summer and winter modes
- Reduces operating costs while increasing yield
- Optimises operation of the biogas plant
- Optimises substrate usage thanks to higher degradation rates
- Gives the freedom to alter substrate mix (substitution)
- Lowers energy consumption by reducing viscosity
- Adding METHANOS® F³ entails no additional costs
- Stable biogas plant performance during maintenance

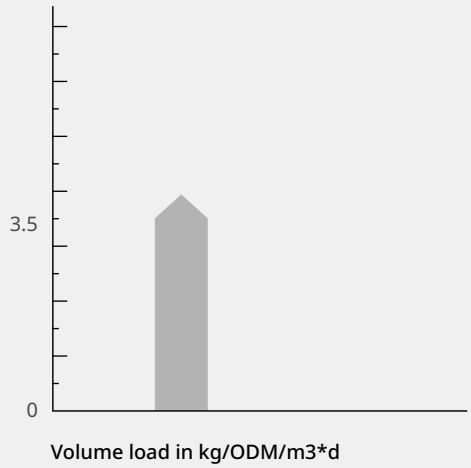
Biogas plant process parameters

Key factors in optimum plant operation

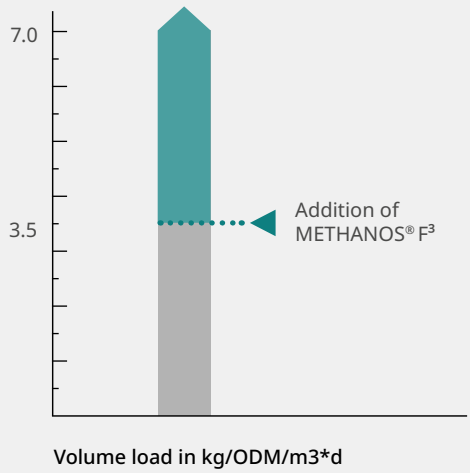




100% biogas plant performance is achieved when all controlling parameters have been fully met.



METHANOS® F³ can increase volume load up to threefold.



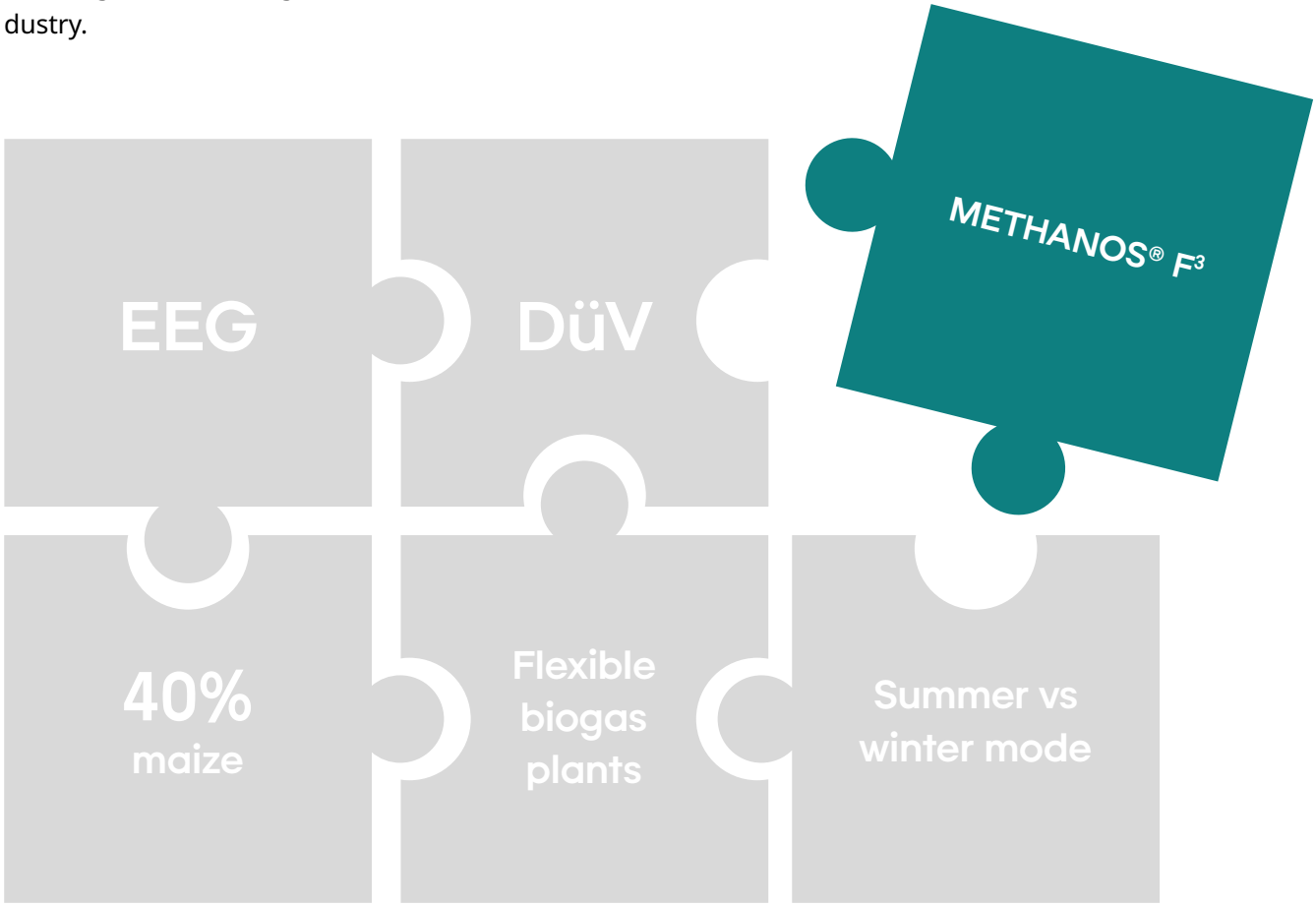
*Ammoniacal nitrogen

Fit for any challenge with METHANOS® F³

EEG:
From changes in feed materials to compliance with new quality requirements, the German Renewable Energy Sources Act (EEG) constantly throws up new challenges for the biogas industry.

DüV:
The 2020 Fertilisers Ordinance requires that biogas installations have nine months of storage capacity for digestate.

The effective solution in any scenario



Lower proportion of maize:
The following applies to new installations after the expiry of EEG tariffs: Feedstocks must be adjusted so that the maize cap is always adhered to.

Flexible biogas plants:
Improved CHP performance boosts the plant's ability to match power and heat generation to fluctuations in demand.

Summer vs winter mode:
The ability to generate biogas heat at the right time decisively improves the revenue situation.

The use of METHANOS® F³ in practice

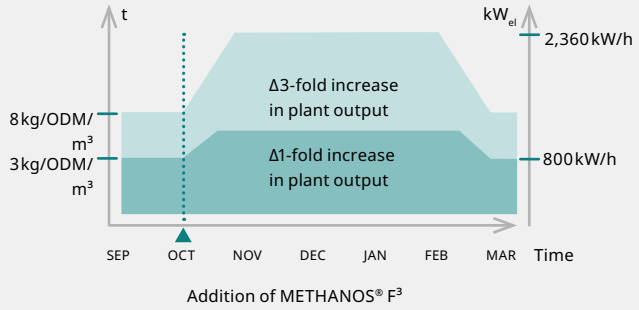
Typically improves performance up to 100% without additional digesters

Scenario I: demand-driven biogas production in summer and winter modes

In use since October 2020
1 x 80 m³ Pasco feeder
2 x 2,500 m³ COCCUS® round digesters
1 x 800 kW CHP
1 x 1,560 kW CHP
760 kW maximum rated output

Feeding:
Before introduction of METHANOS® F³: 3 kg/ODM/m³*day
After introduction of METHANOS® F³: 8 kg/ODM/m³*day

Feeder	Digester	Post-digester	CHP 1	CHP 2
80 m³	2,500 m³	2,500 m³	800 kW	1,560 kW



When plants are extended, injecting METHANOS® F³ is a straightforward way of increasing the installed capacity without an additional digester.

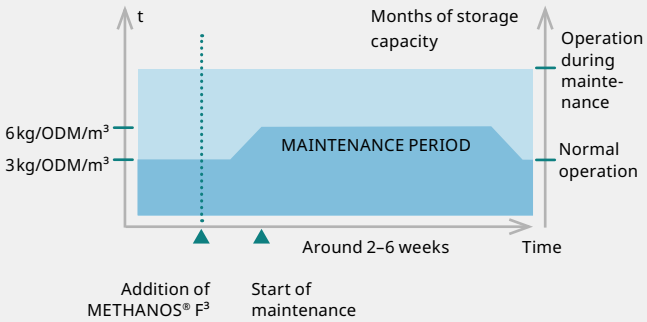
Plant capacity increased from 800 kW to 2,360 kW without technical modification

Reference plant for scenario II:

In use since March 2021
1 x 80 m³ Pasco feeder
2 x 2,500 m³ COCCUS® round digesters
1 x 800 kW CHP
1 x 1,560 kW CHP
760 kW maximum rated output

Feeding:
Before use of METHANOS® F³:
3 kg/ODM/m3*day
Maintenance period with METHANOS® F³:
6 kg/ODM/m3*day

Feeder	Digester	Post-digester/ residue store	Residue store	CHP 1	CHP 2
80 m³	2,500 m³	2,500 m³	6,100 m³	800 kW	1,560 kW



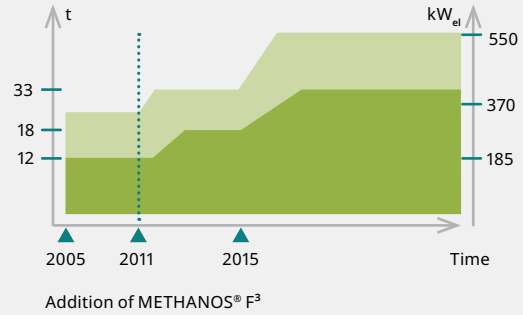
When METHANOS® F³ is added, the volume load in the digester or post-digester is increased so that the plant output does not drop during the 2–6 week maintenance period.

Performance of the biogas plant can be maintained at a stable level during maintenance. This significantly reduces loss of revenues in the retrofit phase.

Reference plant for scenario III:
In use since December 2011
1 x 30 m³ Pasco feeder
1 x 1,500 m³ COCCUS®
1 x 185 kW CHP (existing)
1 x 366 kW CHP (added)
1 x 550 kW CHP (flexible)

Feeding:
Before introduction of METHANOS® F³: steady
After introduction of METHANOS® v: 5–45 t/day
Additional substrate used: 15 t/day
Output before introduction of METHANOS® F³: 185 kW
Output after introduction of METHANOS® F³: 550 kW
Additional output: 300–700 kW
(without additional digester)

Feeder	Digester	CHP 1	CHP 2	CHP 3
30 m³	1,500 m³	185 kW	366 kW	550 kW



Addition of METHANOS® F³

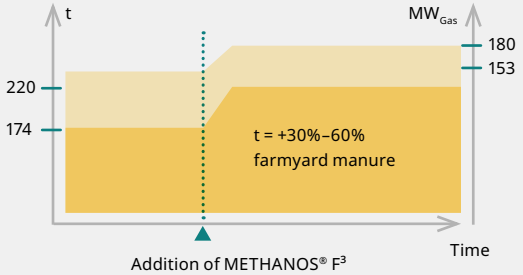
When plants are extended, injecting METHANOS® F³ is a straightforward way of increasing the installed capacity without an additional digester.

Plant capacity increased and in operation with 7 kg/ODM/m³*day for over 10 years

Reference plant for scenario IV:
In use since November 2022
2 x 120 m³ PASCO
2 x 4,000 m³ COCCUS®
1 x 4,000 m³ COCCUS®
1 x biogas upgrading unit, 700 Nm³ raw gas/h
2 x CHP 1,200 + 1,500 kW

Feeding:
Before introduction of METHANOS® F³: 174 t/d biomass
After introduction of METHANOS® F³: 220 t/d farmyard manure
Output before introduction: 153 MW gas/day
Output after introduction: 180 MW gas/day

Feeder	Digester 1	Digester 2	Gas upgrading
120 m³ 120 m³	4,000 m³ 4,000 m³	4,000 m³ 4,000 m³	700 Nm³/h 1,200 kW CHP 1,500 kW CHP



Addition of METHANOS® F³

METHANOS® F³ allows conventional feedstocks such as maize to be replaced with difficult-to-degrade substrates such as farmyard manure without any loss of performance.

Increase in the amount of farmyard manure or hard-to-degrade substrates in the biogas

Increase in the amount of farmyard manure to up to 60%

Other things you should know about METHANOS® F³

Important information on use and handling

To preserve their viability, METHANOS® F³ bacteria are introduced in deep-frozen form.

Handling
Start by setting the digester to the optimum concentration of METHANOS® F³ high-performance bacteria. A larger amount of METHANOS® F³ is used initially (a one-off "kick-start" dose). After that, the optimum dosage of METHANOS® F³ is determined on the basis of the digester volume and cell density parameters (0.5–1% bacteria concentration in the digester). Once normal operation has been established, METHANOS® F³ is fed into the process regularly in weekly doses. The normal individual dosage for a medium-sized biogas plant is approximately 1 kg, but "overdosing" with METHANOS® F³ does not result in any negative effects.

Delivery and storage
METHANOS® F³ is delivered to the plant regularly (every three months) in ready-portioned, deep-frozen form. It should be stored in a normal (proprietary) freezer at –20°C (freezer not included in the delivery). If stored properly, METHANOS® F³ can be kept for at least 12 months.

Introduction
METHANOS® F³ is fed into the digester via a screw-feed unit or dosing station. The feed unit should be completely empty prior to beginning the feed process. It must be ensured that the bacteria are not allowed to thaw out and re-freeze, since this can reduce their viability. Where an existing plant does not have adequate feed arrangements, the digester can be retrofitted with a special port allowing METHANOS® F³ to be fed into the main digester.

Biological service:

Our team of biological experts is always at your service. We can provide you with direct contacts for sampling the digester biology and feed materials.

When should you boost your gas production with METHANOS® F³?

Our experts will be glad to advise you

How to get started with METHANOS® F³
We offer you a METHANOS® F³ package to suit your needs. Our customer care specialists are on hand to check the dosage needed for your plant and advise you on the necessary biological support. The conditions of sale are clearly set out in a supply contract.

Stopping the supply of METHANOS® F³
The supply of METHANOS® F³ can be stopped at any time and the plant returned to the mode of operation prior to the introduction of METHANOS® F³. The natural conditions and microorganism composition that existed before the introduction of METHANOS® F³ will be re-established within a few weeks.

METHANOS® F³ is an award-winner
METHANOS® F³ is acknowledged as an outstanding innovation within the biogas sector. The product received an Award of Recognition at the Bavarian Energy Awards in 2010 and received the Innovation Award of the German Agricultural Society in 2011.

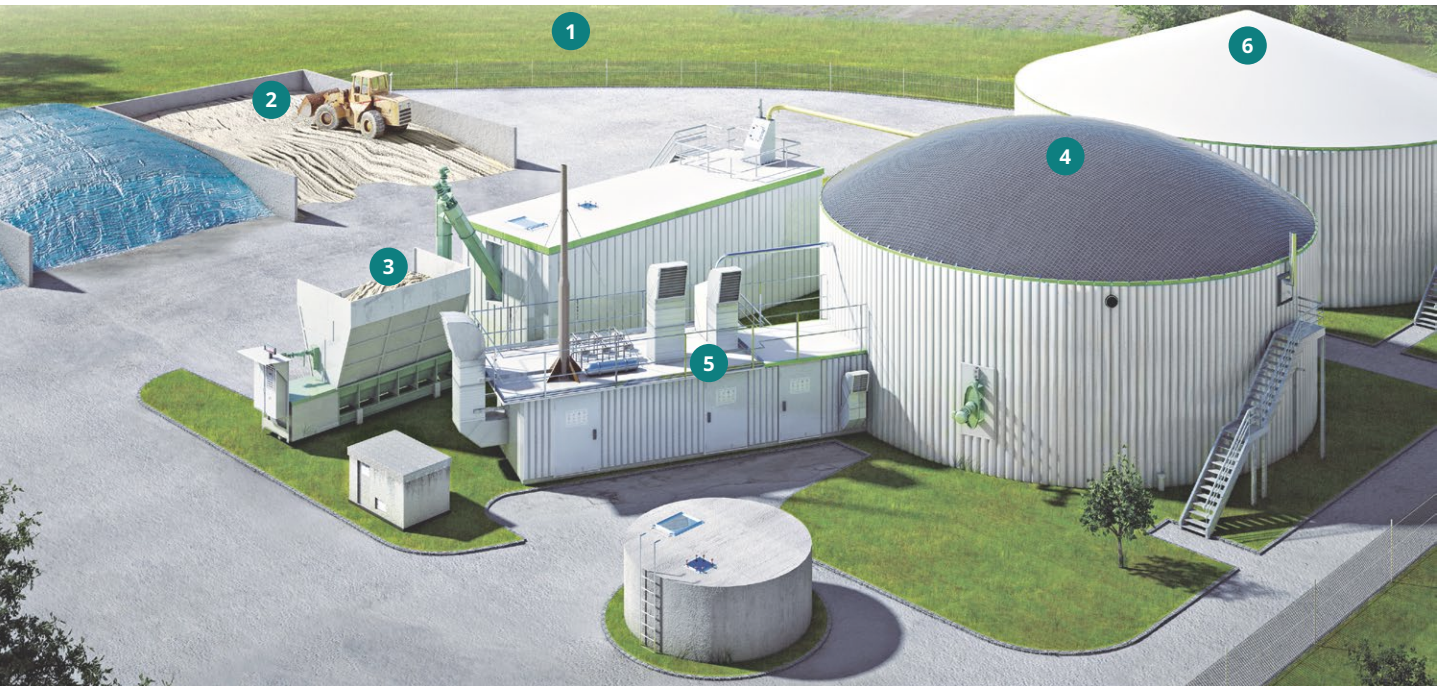
Note:

It should be ascertained in advance whether the existing agitator and feed-in technology is up to the requirements of greater volume load and higher substrate throughput.

METHANOS® F³ is simply introduced into the digester via a screw-feed unit or the feed-in system.

Our portfolio also includes these services

METHANOS® F³ and More



1 Entire plant
- Gas leakage and electrothermography
- Overall technical and biological optimisation and support
- Conversions and extensions
- Operational management
- Regular maintenance
- Design / approval
- Recurring inspections and documentation support

2 Raw materials/silo
- Raw material management
- Evaluation of feedstocks
- Silo extension
- Determination of DM/DMorg
- Fermentation tests/NIRS
- Silage quality

3 Charging
- Modernisation and optimisation:
  - Technical process
  - Biological processes
  - Energy usage
- Help with process disruptions
- Operating resources

4 Digester
- Review and optimisation of agitator technology
- Gas tank replacement / management
- Concrete dome renovation
- Wastewater analytics
- Process analytics

5 CHP unit / technology centre
- Regular maintenance
- Greater flexibility
- Biogas cleaning
- Heat utilisation / concept
- Gas conditioning

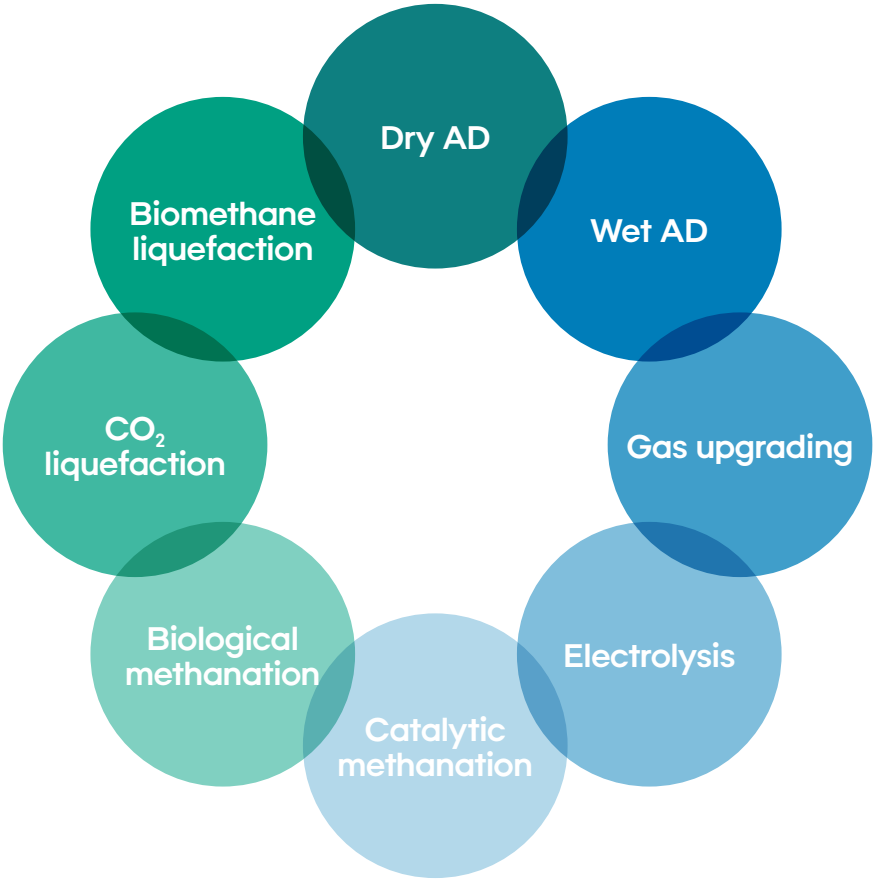
6 Fermentation residue store
- Modernisation and new build
- Fermentation residue analytics
- Fertiliser value (DüMV)
- Determination of heavy metals (BioAbfV)
- Fermentation residue treatment
- Fermentation residue management

Future-oriented solutions from a single source

From the regular inspection of individual components or the entire plant through to a comprehensive service contract, Kanadevia Inova Schmack GmbH in association with Kanadevia Inova AG offers you customised solutions to suit your requirements. The services we offer you are based on a modular concept.

Discover More Opportunities

In the context of the energy transition and global climate protection efforts there are also diverse opportunities in connection with biogas technology. This is because green gases from renewable sources are indispensable for energy supply and decarbonisation worldwide. From biogas and biomethane to hydrogen and synthetic natural gas, Kanadevia Inova offers the entire product range for the production of renewable gases and carbon-neutral fuels. In combination, these technologies provide solutions that will enable the efficient use of resources and sustainable energy generation for decades to come.



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