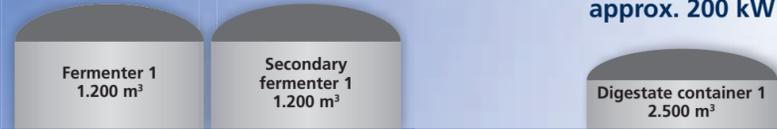


## Conventional

Existing plants    New equipment



Power  
For example:  
approx. 200 kW

## Repowering step 1

Secondary fermenter is used as digestate container

approx.  
400 kW



## Repowering step 2

approx. 800 kW



## Repowering step 1

The upflow/downflow unit will be connected to the main fermenter of the existing two-stage plant. The tank, which was previously used as a secondary fermenter, will then serve as accessory digestate tank. By installing a new CHP achieving a significantly higher degree of electrical efficiency, the overall plant efficiency can be increased substantially, while at the same time the energy and heat demand is reduced.

### Benefits repowering 1

- ✓ high space-time yield
- ✓ reduced energy requirements
- ✓ improved acid degradation
- ✓ minimum space requirements

## Repowering step 2

The existing secondary fermenter can be reintegrated into the UDR process as a main fermenter. That way, the plant capacity will be considerably expanded, which implies many well-known advantages.

### Benefits repowering 2

- ✓ steady growth within the scope of possibilities
- ✓ expandable modular technique ensures financial viability
- ✓ complete units assure manageability

There is no hurry for implementing all steps at once, you can repower your plant flexibly and in line with market conditions. The modularity and flexibility of the Röring repowering technology provides all necessary certainty to take the right decision at the right time. We will be pleased to accompany and advise you on your way to success.

## UDR-Systems: Repowering

Increased power, increased efficiency by repowering existing biogas plants

Full power for the future:  
Get started for a new age.

Do you need further information about our small biogas plants or do you have a specific enquiry? Please do not hesitate to contact us or ask for our preliminary check list. We will be glad to advise you!

  
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Check list and further information:



  
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## The intention: To improve the overall efficiency

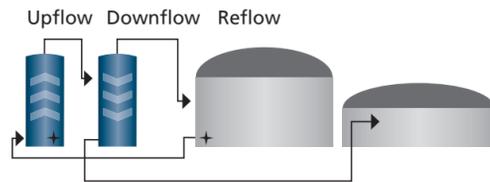
Repowering biogas plants means to implement all measures of enhancing efficiency and performance by also taking into account their economic profitability. Our ambition is to increase the overall efficiency. Before any measure is taken, it is essential to hold technical consultation and discussion. Only those who know their plant will be able to take the right steps. Sometimes it needs a complete set of measures to achieve the expected target.

Subject to the individual operational situation, we suggest concrete solutions which we will realize together with you. Changes in procedures, an alternative substrate usage and new subcomponents may make an important contribution to increasing the overall efficiency.

We know where the shoe often pinches. After completion of all repowering measures, you can still count on our support and advice – easy and simple either via remote maintenance or on-site at your premises.



## Our core repowering techniques: UDR system – biological optimization device



The UDR tanks operate on the principles of the small (upflow tank) and large (downflow tank) intestine. During the downflow process, active organic matter (with many living methane bacteria) will be retained through natural separation by taking advantage of the force of gravity and then reintroduced to the digestion process. At the same time, the fermentation residues (degraded, dead matter) will be removed solely from the lowest part of the downflow tank and next directed to the digestate tank. (A cover is virtually not required, as the potential for residual gas will be decreased to a minimum and all odour-forming substances will be decomposed.)

The UDR system is a biological method for post-optimization and stabilization of existing anaerobic fermentation plants. Its main technique is based on the bionic system of micro-organisms settling onto special surfaces. This fixed-bed technology has already been known to the water treatment sector for many years, but mainly in aerobic (rich in oxygen) areas. Through the application in anaerobic zones (under exclusion of oxygen), the fixed-bed technology allows for a very high space-time yield.

A biofilm, which forms on special, firmly installed surfaces, serves as a substrate for many micro-organisms. Contrary to standard stirred tank reactors, those micro-organisms will not be flushed out, but remain permanently symbiotically (jointly) in multiple layers inside the fermenter.

### Benefits UDR system:

- ✔ well-proven concept
- ✔ short assembly times
- ✔ minimum space requirements



## PlurryMaxx – an efficient disintegration technique

By enlarging the surface area and disintegration of hitherto not fermented matter an improvement in performance will be achieved. The trick is that the earnings have to exceed the expenditure. This is not always the case. Due to its particular construction, the PlurryMaxx offers a multi-phase comminution process without counter-cutting. The exchange of wear parts is easily and quickly done. The comminution is carried out after the first anaerobic stage during the patented UDR procedure. Only the settling organic material (floating layer) will be

reintroduced and disintegrated, similar to the ruminating workflow in a cow. Thus, a proper earnings/expenses ratio will be attained.

### Benefits at a glance:

- ✔ multi-phase comminution
- ✔ no contaminants
- ✔ low energy requirements

## DiaLogo® – an intelligent control technique



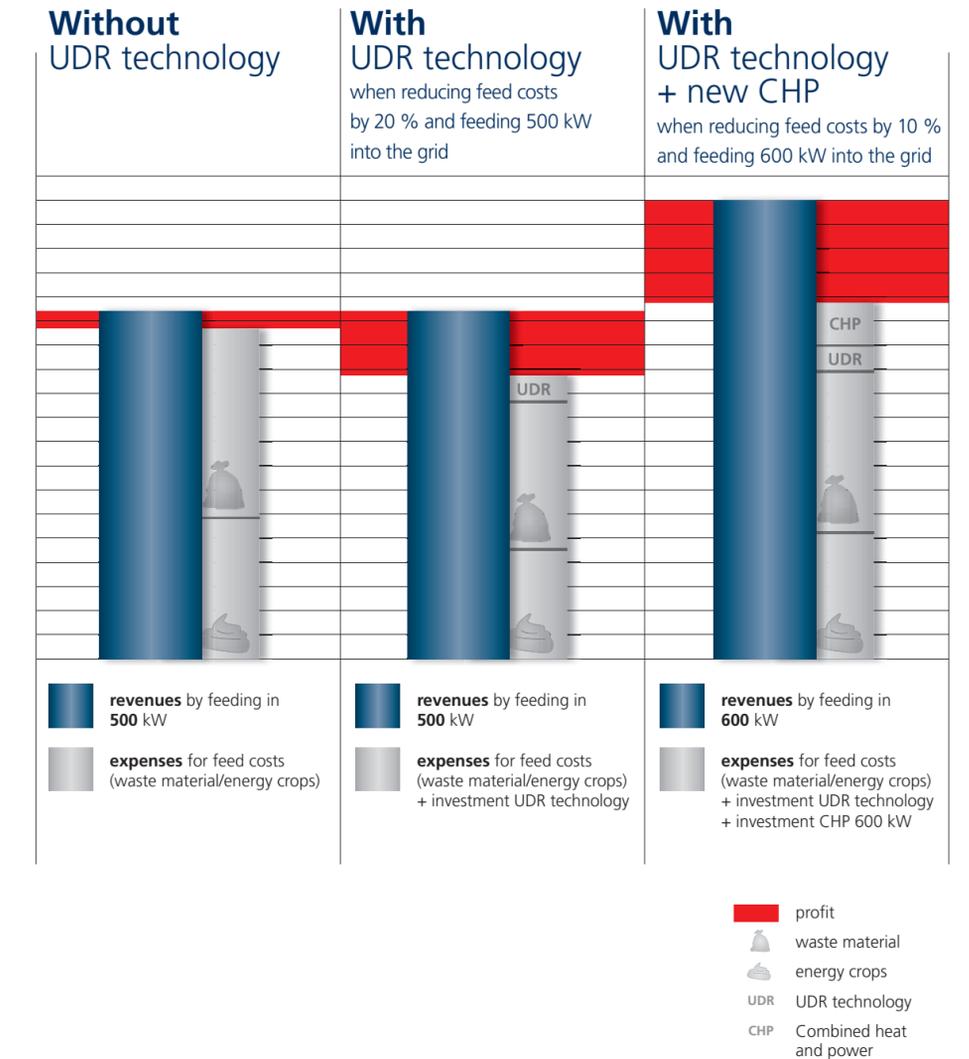
The very heart of each biogas plant is its control technique. Often being underestimated by 'tinkerers', a modern process measuring and control technology at industry level provides the necessary safety required for a 24/7 operation of the plant. Everything is on a watch. Only by applying DiaLogo, insurers and financiers may count on a reliable management and will be in a position to support projects accordingly. The change of entire control systems is also not as complex to implement as commonly assumed. The switch cabinets are all developed, constructed, checked and installed in-house. A system change from a third-party system to

DiaLogo can be carried out without serious disruption. Where necessary, we will gladly advise you and submit an interesting offer.

### Benefits DiaLogo:

- ✔ reliable process control system according to industry standard
- ✔ extensive service management (SMS, DynAD, RemoteControl)
- ✔ data management for environmental auditors

## Effectiveness provides for profit: Some examples of potential profit scenarios



### Our services:

- ✔ optimization of biogas plants
- ✔ UDR fixed-bed high-performance fermenters
- ✔ delivery of core modules
- ✔ control technology / visualization
- ✔ switch cabinet construction
- ✔ additional services