

>> **OPTISTRAHL, biogas upgrading**

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OPTISTRAHL

-biogas-upgrading process for small biogas plants-

1 Motivation

2 Conditions in Germany

3 Process description

4 First results of the pilot plant

5 Summary and Outlook

Initial situation

Shortage of natural gas resources

Rising prices for raw materials (gas, substrate)

Rising number of low capacity biogas plants

OPTISTRAHL
*-biogas-upgrading process
for small biogas plants-*

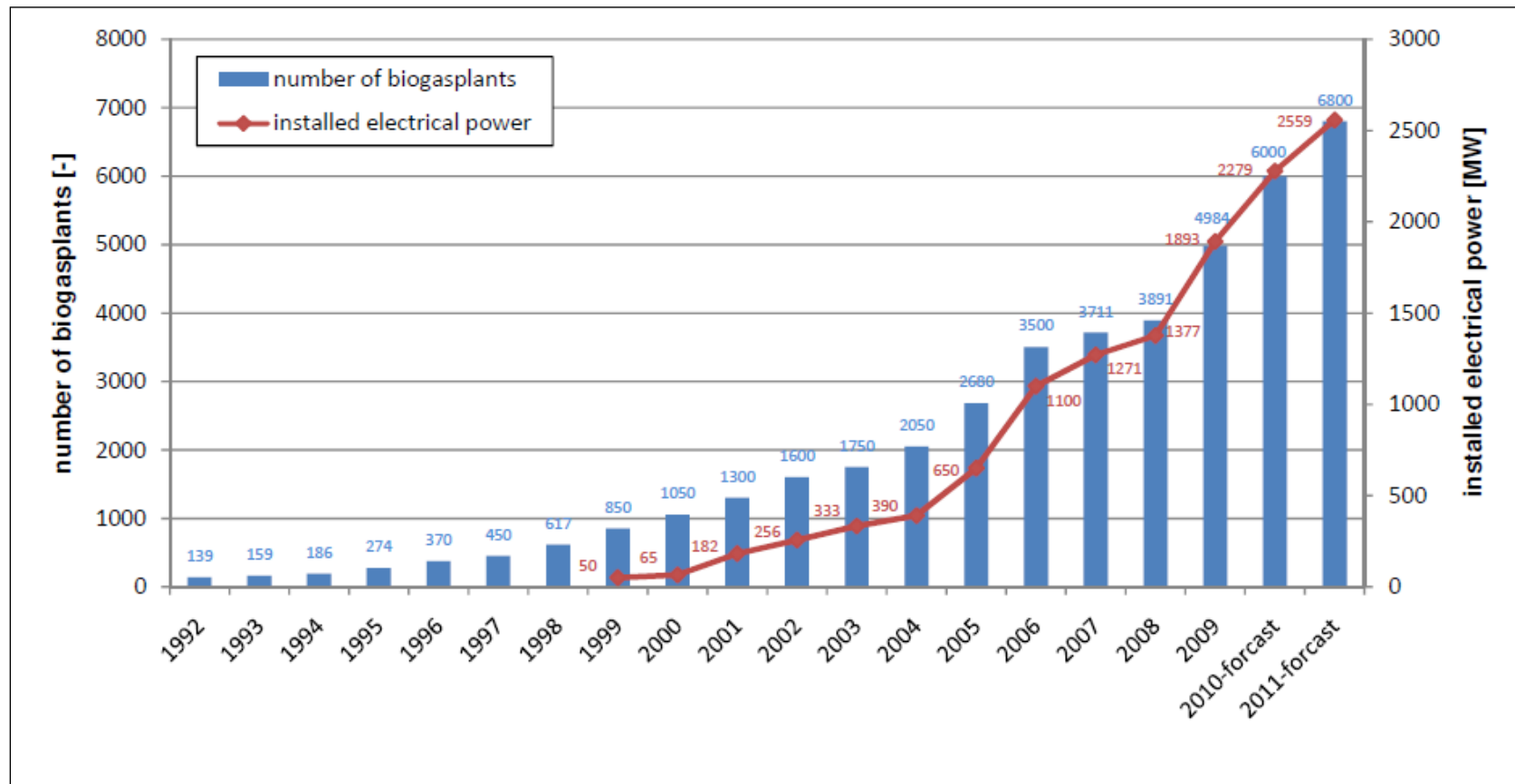
Increase the economic of small biogas plants

- Feed-in the natural gas-grid
- Use as fuel

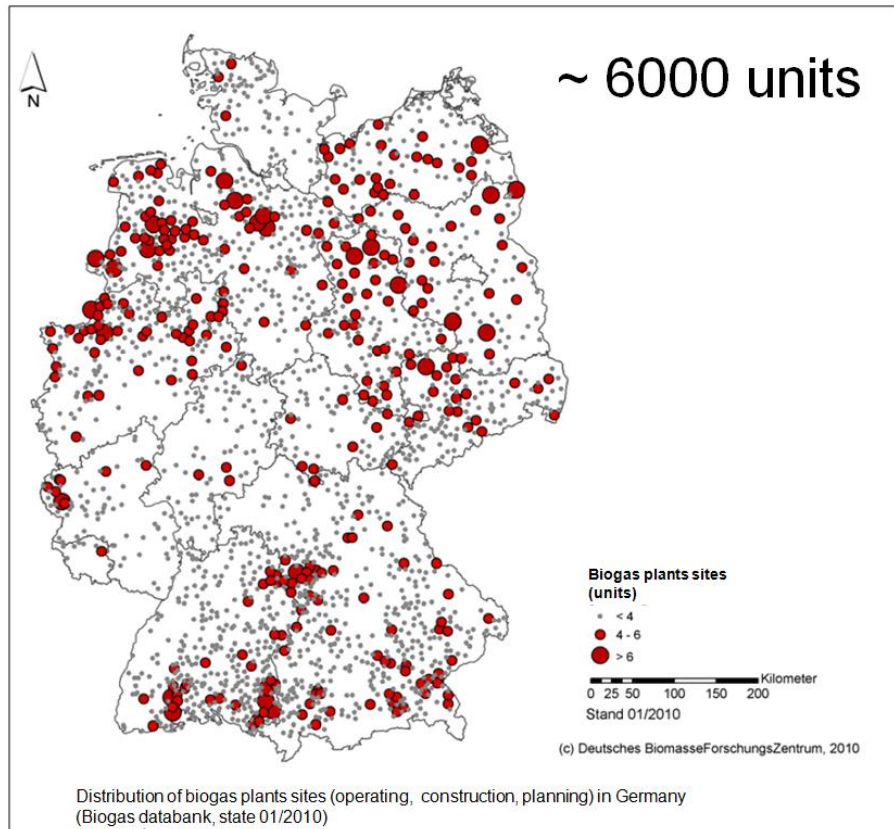
Using thermal energy at an adapted heat sink

- 1** Motivation
- 2** **Conditions in Germany**
- 3** Process description
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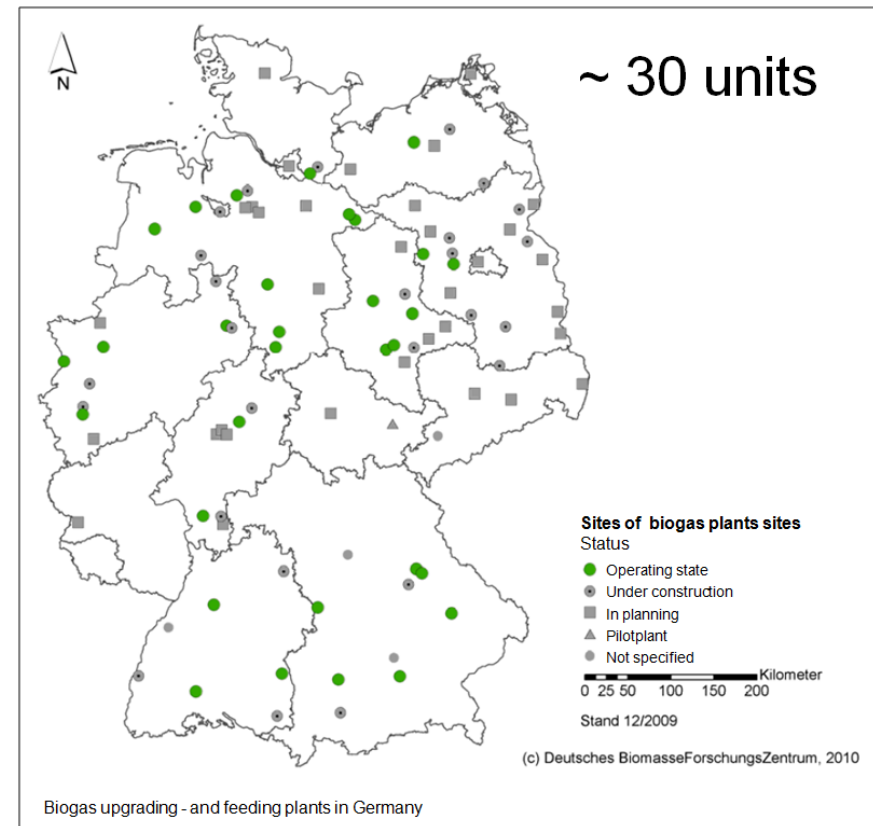
Development of biogas plants with total installed electrical power



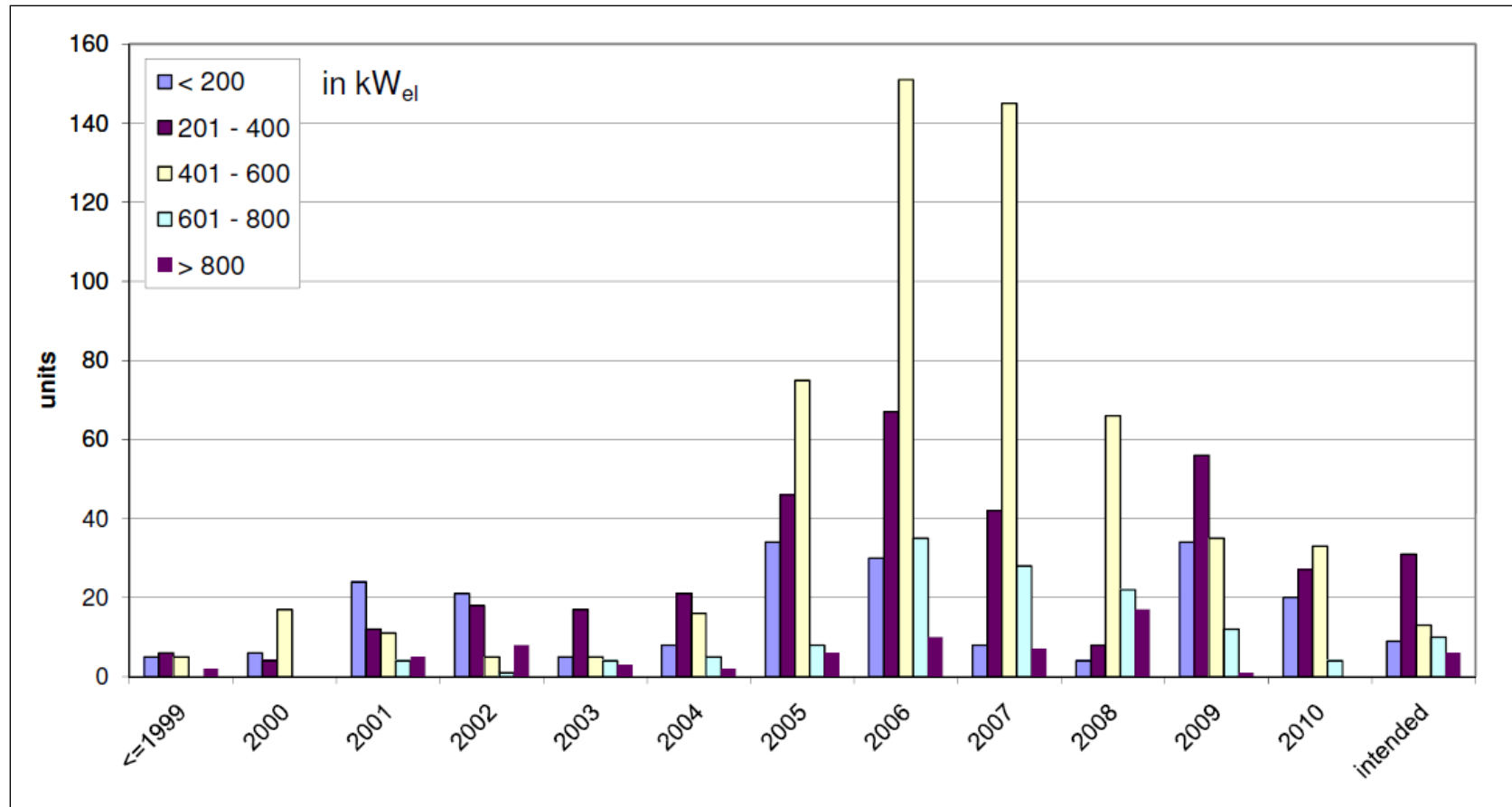
Biogas plants



Biogas treatment facilities

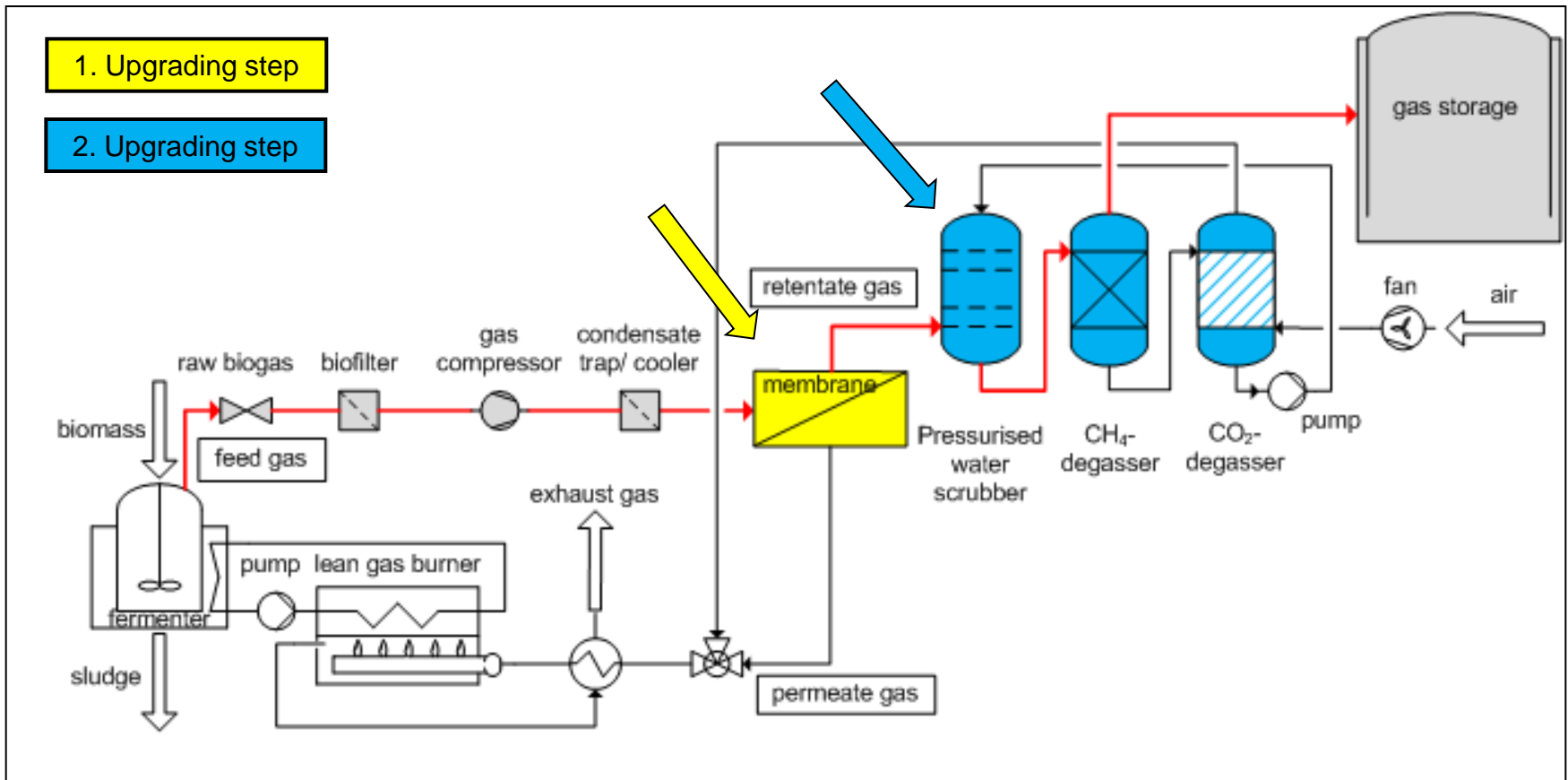


Size classes of reference systems in Germany



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Biogas upgrading steps



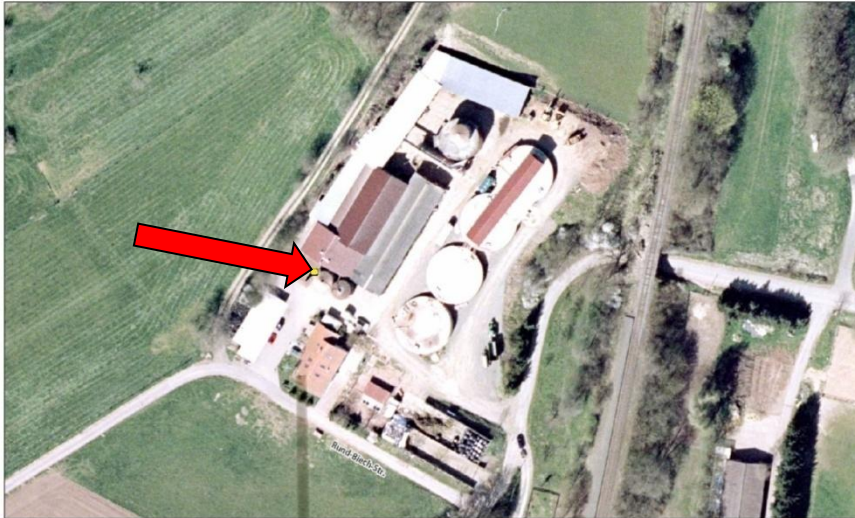
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First results of the pilot plant

Installation site

www.Geoportal-Saar.de präsentiert mit **POLYGIS** - Globe
Informationen zu POLYGIS-Globe und POLYGIS erhalten Sie unter www.sarbo.de

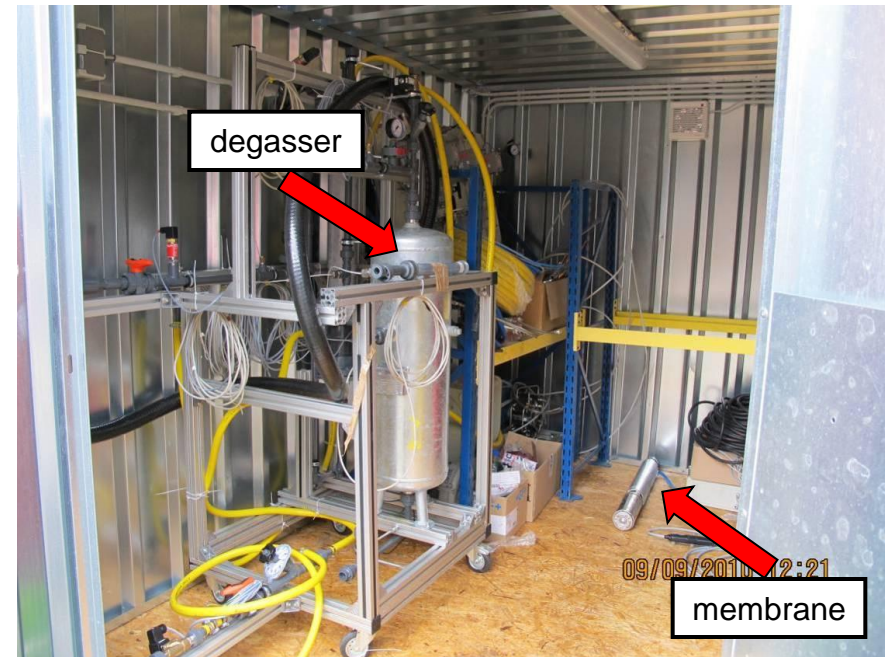
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Das Portal mit Raumbezug für das Saarland
© 1997-2009 - Software Büro Lothar Bublert GmbH

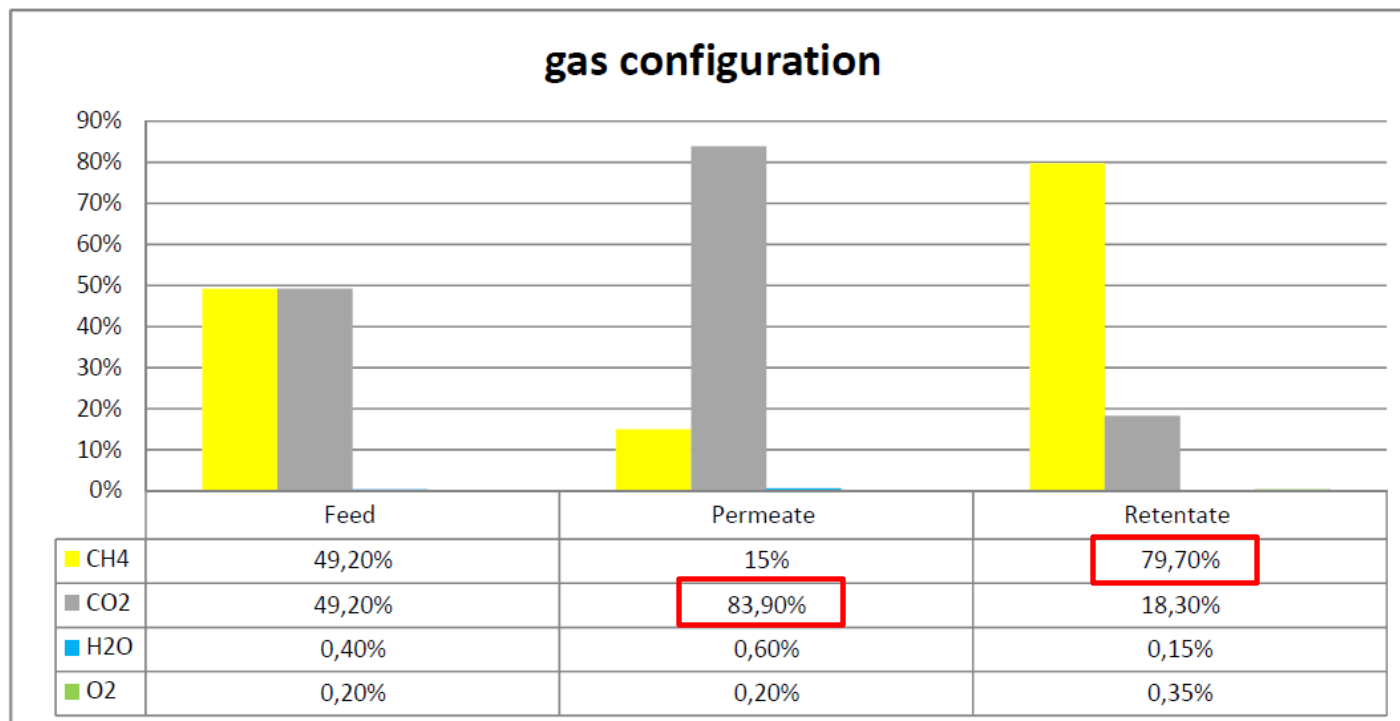


Pilot plant



→ Membrane cleaning stage; volumetric flow: 0,4 m³/h

Parameter	Feed	Permeate	Retentate
Temperatur	28 °C	28 °C	28 °C
Pressure	10 bar _{abs}	1 bar _{abs}	10 bar _{abs}
Volumetric flow	0,4 m ³ /h	0,188 m ³ /h	0,212 m ³ /h



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Facts

- Use a CO₂-selective membrane (CH₄ remains in the retentate gas stream) as pre-purifying step with a downstreamed pressurised water scrubber
- Produced off gas could be burned in a lean gas burner (produced heat can be used e.g. for the fermenter heating)
- Feed-in the prepared gas into the natural gas grid
- Avoiding heat energy losses in CHP's → Use the energy at adapted heat sinks
- It is additionally possible to use the gas direct and local as fuel for agricultural vehicles (appropriate compressor technology is available at the market)

Goals

optimisation of
particular steps and
of total procedure

upscaling and transfer
on a large biogas plant

Step 1

Step 2

Step 3

establish the application
and improve the
economic efficiency of
small biogas plants

Situation in Hungary

- ❖ The applications of this technology still take some time in Hungary since there are relatively few biogas plants (85 plants in year 2000¹, 45 in year 2009²)
- ❖ High potential for biogas plants and biogas upgrading plants due to high number of agricultural holdings (~960.000³)

¹Fraunhofer UMSICHT, Regenerative Energien in Mittel- und Osteuropa –Stand und Perspektiven- (2003)

²Lioudmila Möller, Expanding biogas production in Germany and Hungary: Good prospects for small scale farms? (2009)

³Ulrich Schmack, Schmack Biogas AG, Erschließungspotenziale für Biogas in Deutschland und Osteuropa (2004)

Thank you for your attention