

“33 years of experience in LFG extraction...”

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"33 years of experience in LFG extraction from theoretical gas prognoses to realistic gas extraction systems with LFG2E-Energy by CHP units and flares"

17th Intern. Waste Management and Landfill Symposium Sardinia 2019, Sept. 30th - Oct. 4th

Wolfgang H. Stachowitz

DAS - IB GmbH

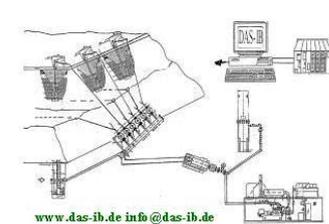
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Biogas, sludge gas and landfill gas technology:

- Consulting, planning, project management
- Training of system operators
- Expert i.a. in accordance with § 29 a/b of the Federal Immission Control Act; and Qualified Person reg. the Ordinance on Industrial Safety and independent expert

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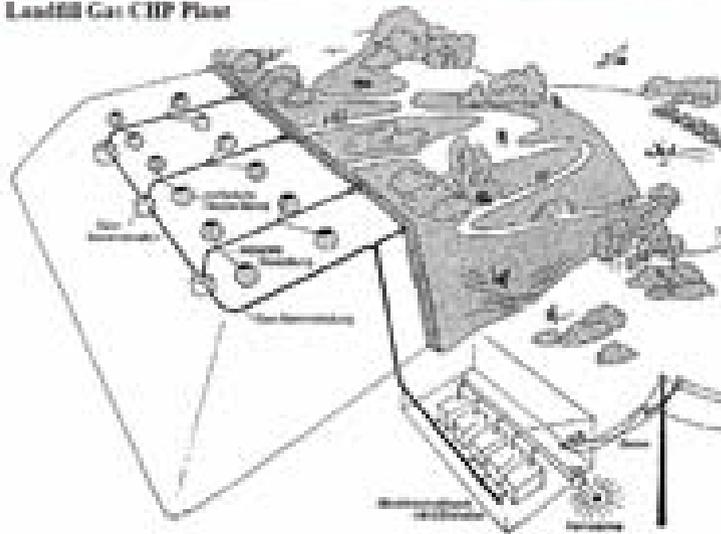
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“Many” years from now – half of an oil tank (sister company) www.das-ib.de

Pioneer project: Neumuenster landfill site, 1984

Landfill Gas CHP Plant



My time for:

HAASE Energietechnik GmbH
1987 – 2001

Construction “Turn key projects” of approx. 420 landfills in Germany and over 80 sites in foreign countries (Turkey, South Africa, Portugal, Italy, England, Wales, Scotland, Austria, Switzerland etc. :

whole gas extraction systems consists of: gas wells, pipes, manifold stations, condensate shafts, condensate knock out pots, booster & flare systems, CHP – units as project engineer and later on as managing director for Haase Energietechnik GmbH, Neumünster

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“Many” years from now –> actual solutions

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Historic gas wells



- Gas wells:
Learning by
experience



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Gas collection systems

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Grabbing is better than drilling WHY?



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Gas wells - BestAvailableTechnique



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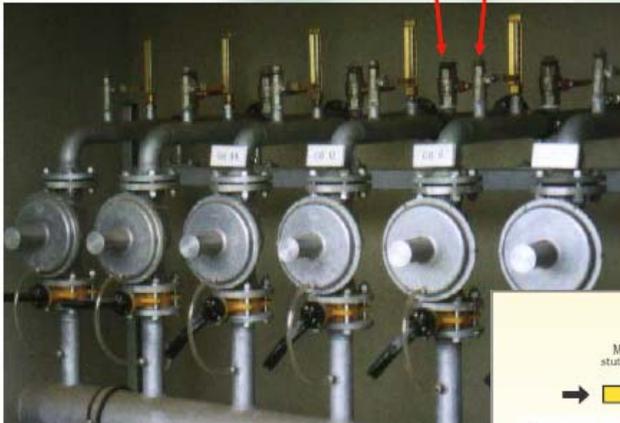
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Gas manifold station – Old fashion: BestAvailableTechnique

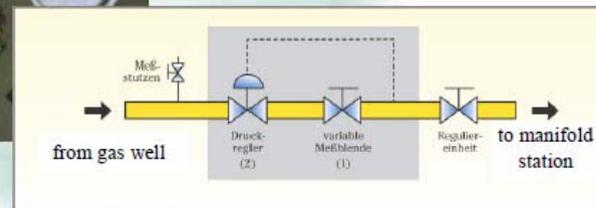
Dewatering of gas pipelines (Haase patent)

Flow measuring point

Gas sampling point



- Pressure-controlled dewatering system in between manifold station and gas well



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Gas collection systems

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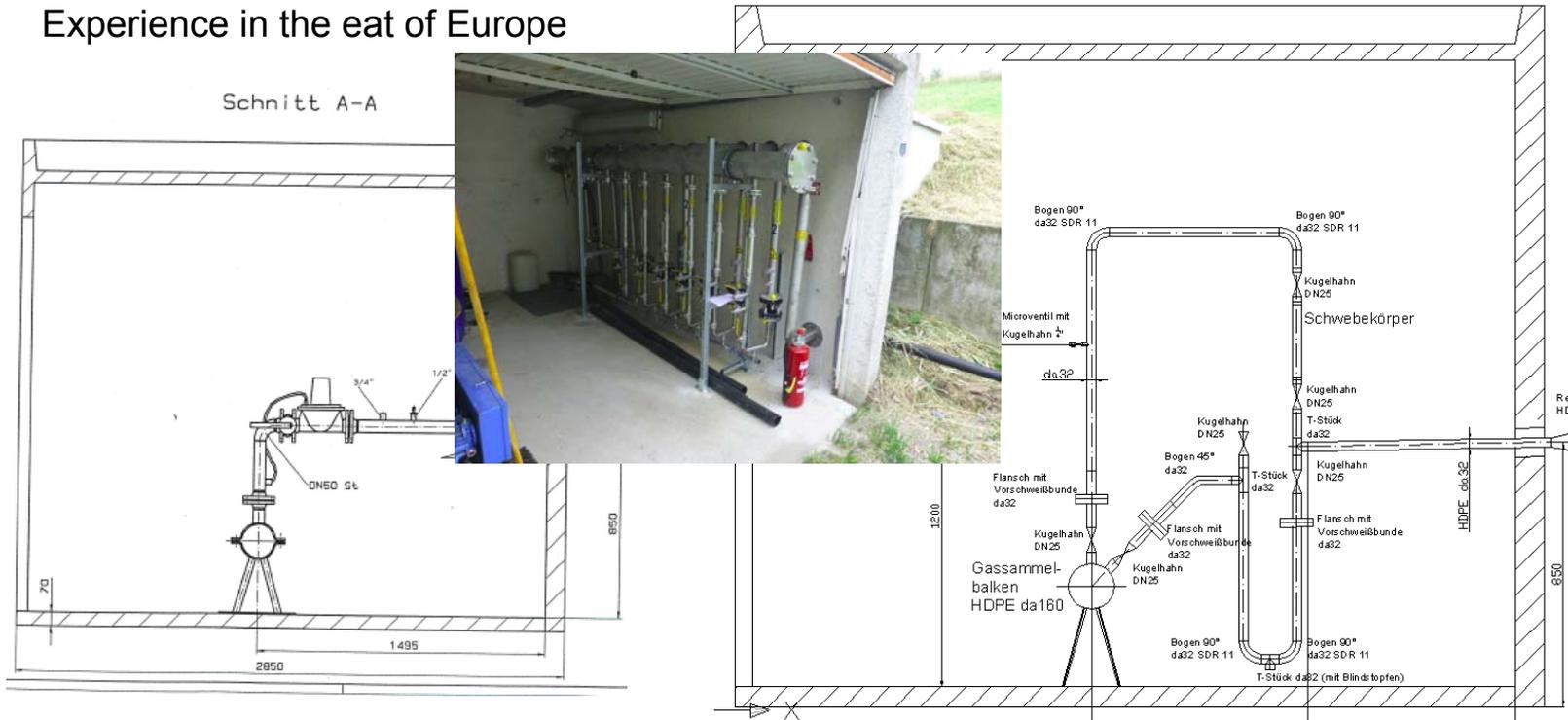
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Gas manifold station – actual: BestAvailableTechnique

In 2019 we start with the first upgrades of manifoldstation in Germany. Because: Learning & Experience in the east of Europe



Vorher hier: Haase Patent
automatische Gasdruck-Entwässerung

Nachher mit automatischer Durchflußanzeige
(Rotarmeter) und Entwässerung

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To start your LFG extraction system – horizontal pipes are better than wells: WHY?



t > 25 Jahre

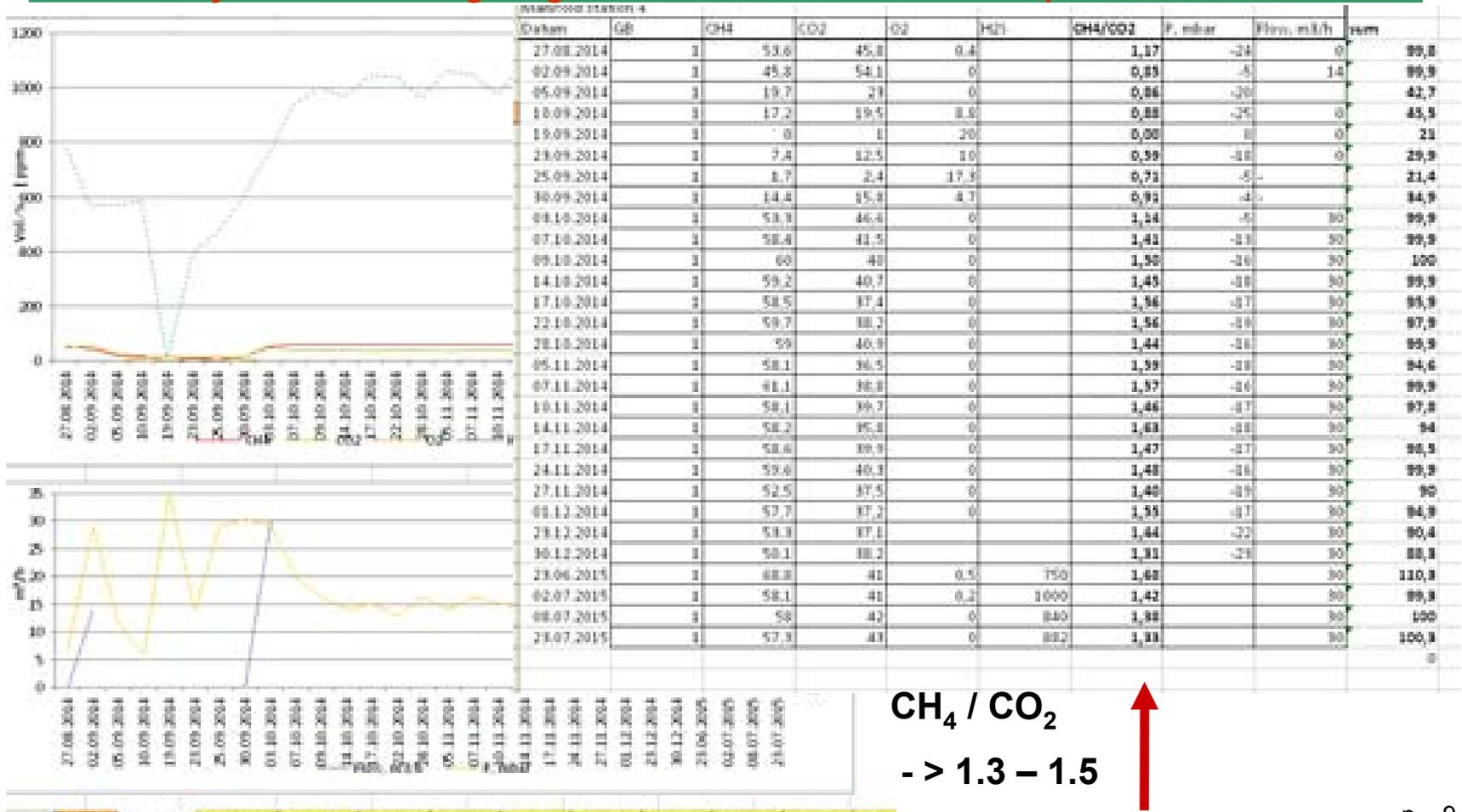


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No efficiency - without the right figures of measurement and interpretation



CH₄ / CO₂
-> 1.3 – 1.5

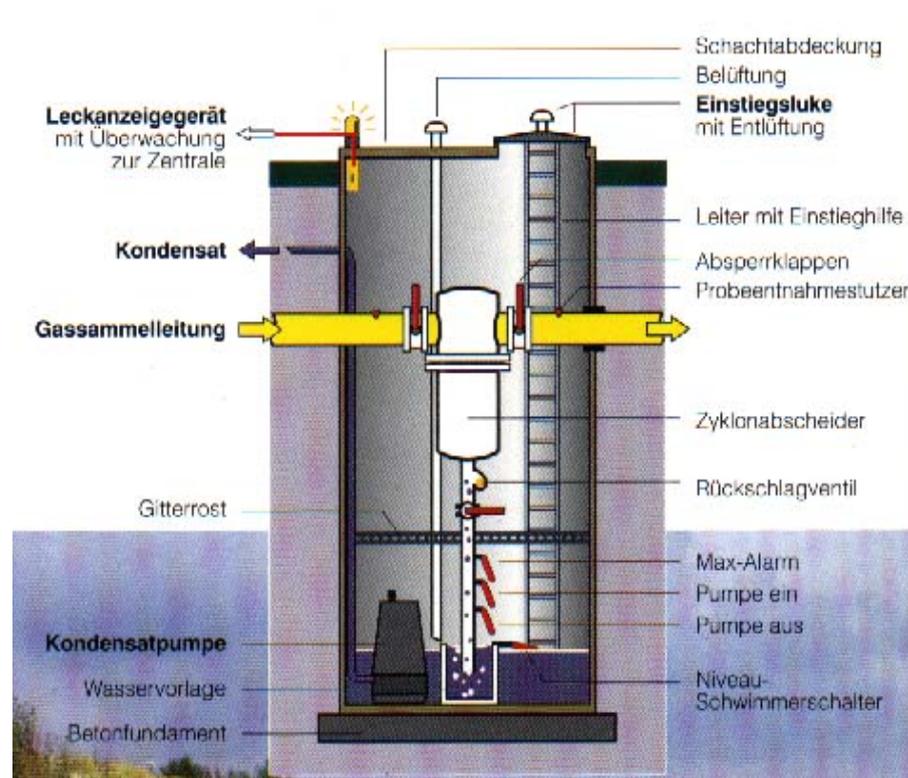


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Condensate shafts



after $t > 33$ years – still the same state of the art BAT
BestAvailableTechnology

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Double check the extraction system

alldationen

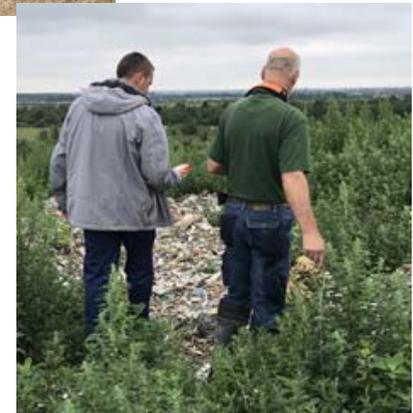
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tedt)

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NEWS and better: Laser instead of „FID“ for the doublecheck of the extraction system or surface emissions

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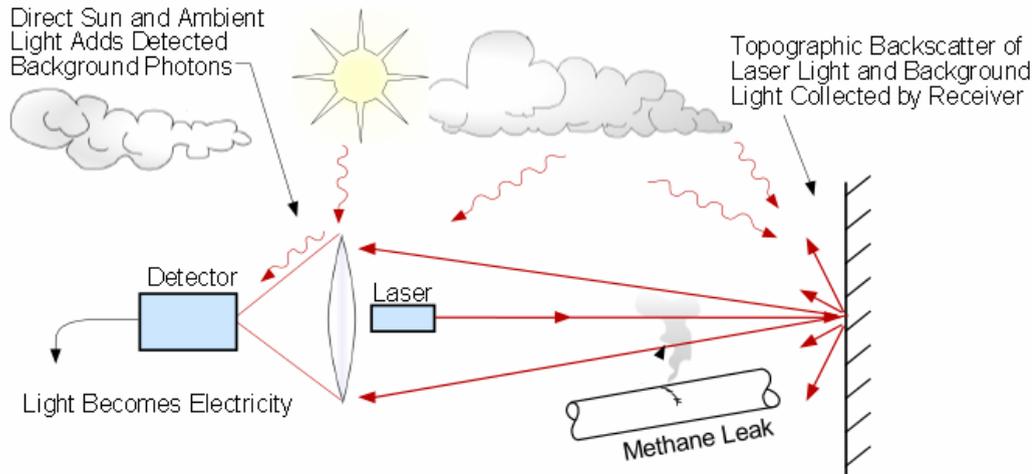
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General about the LASER system we use

RMLD

(Remote Methane Leak Detector)
– Laserabsorptionsspectrometer

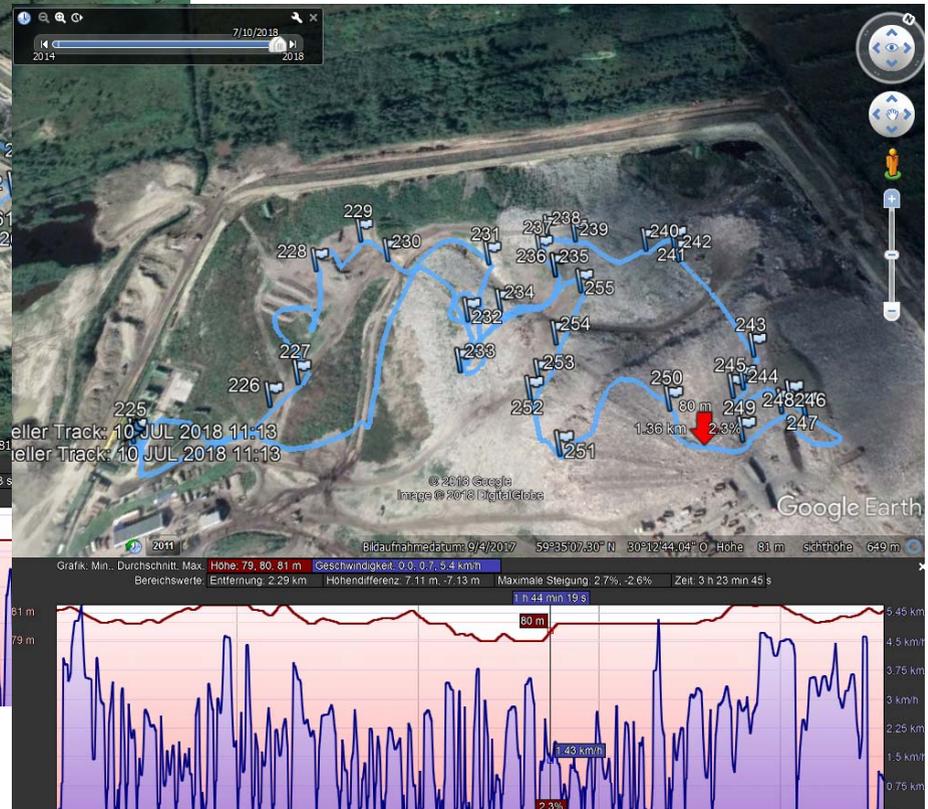
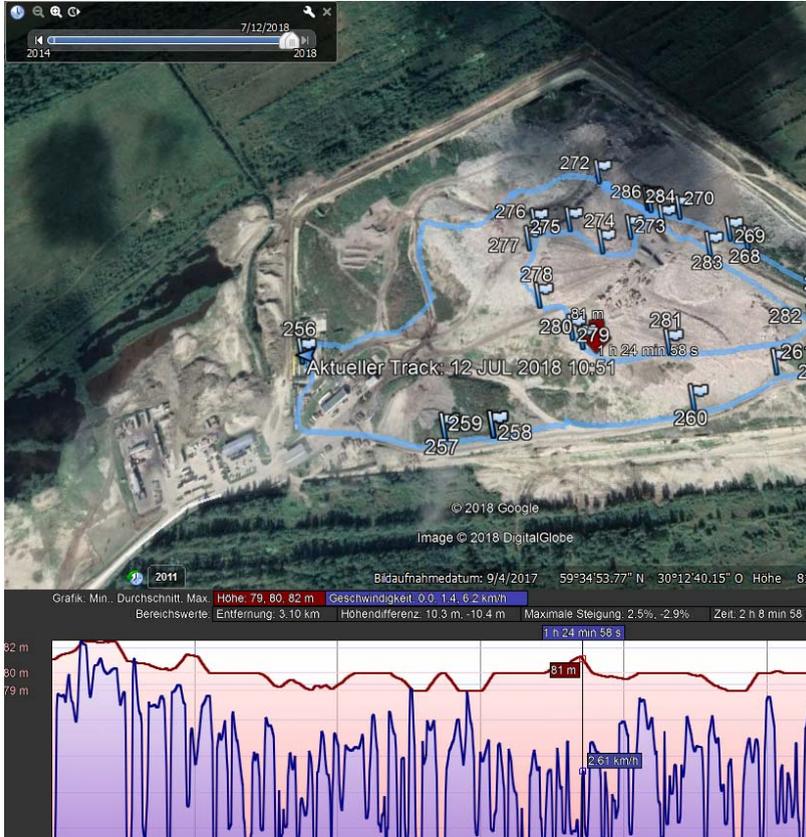


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Waypoints and track over a site

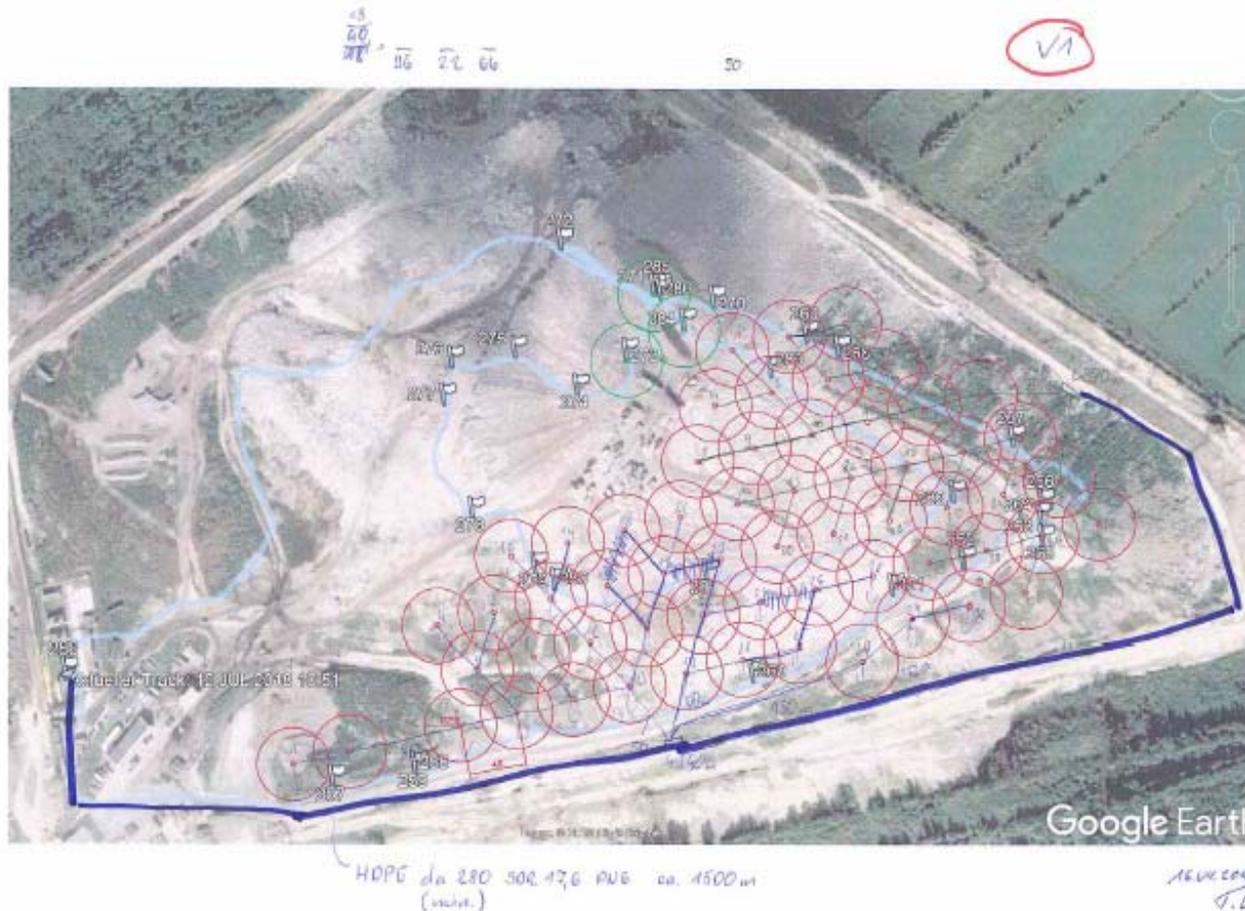


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Upgrade of the LFG extraction system



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Technic solutions upons

Open booster units (England)



- Cheap, easy to handle
- Centrifugal booster
- Skid-mounted booster system
- Roots booster
- Higher efficiency on power request

Different countries
– different solutions

UPONS

- * local weather condition
- * kind / structure of waste
- * how to fulfill the landfill site
- * local operators and there skills and tools
- * local grid
- *

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Booster systems

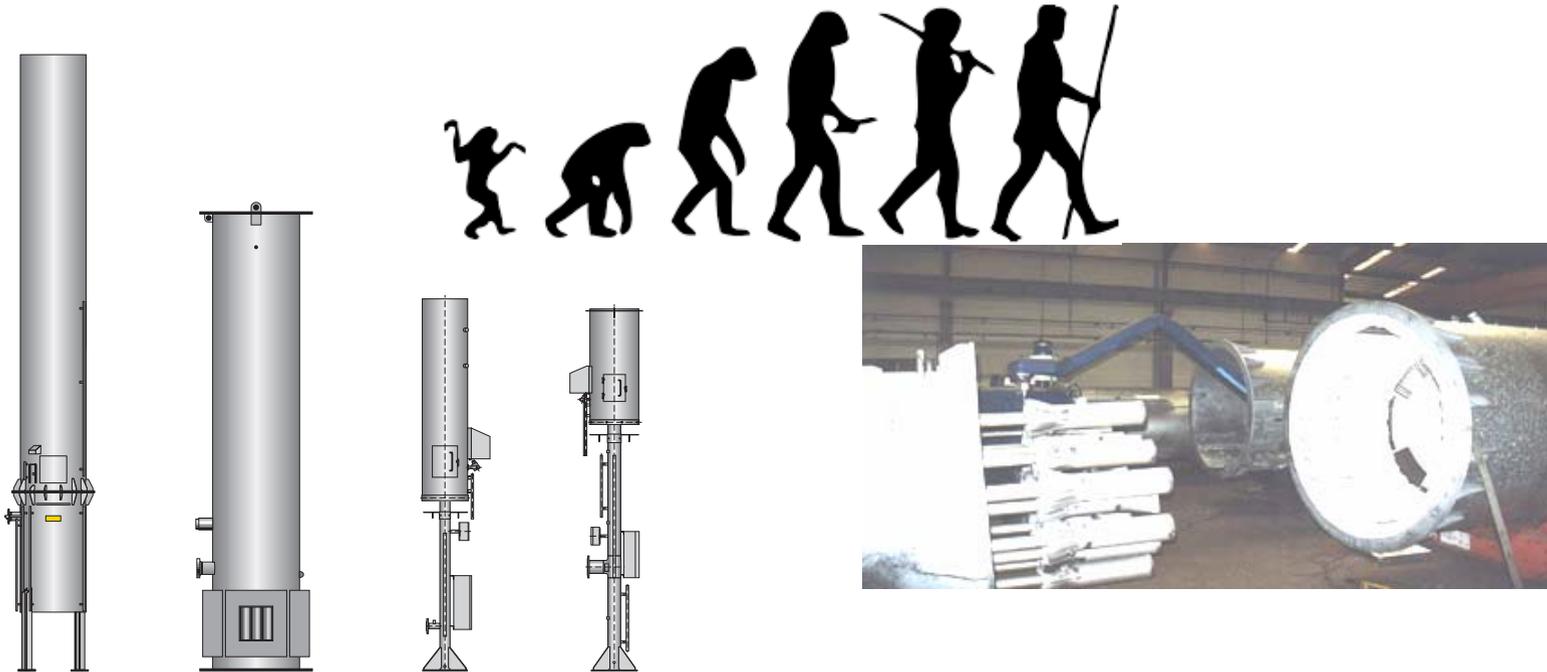
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Open candle flares or high temperature flares – emission standard on site?



HTF: High Temperature Flare T: 1.200°C / retention time 0,3s

MTF: Middle Temperature Flare T: 1.000°C / no retention time

LTF: Low Temperature Flare approx. T: 800°C / open or close combustion

OF: Open Flare – candle flare ca. T: 800°C

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Containerized CHP / engines & booster stations



after t > 33 years – still the same state of the art BAT
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Never ever spray to much leachate over your organic waste –

less is often more

- But the bubbles show you the landfill gas (LFG)



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Calorific value

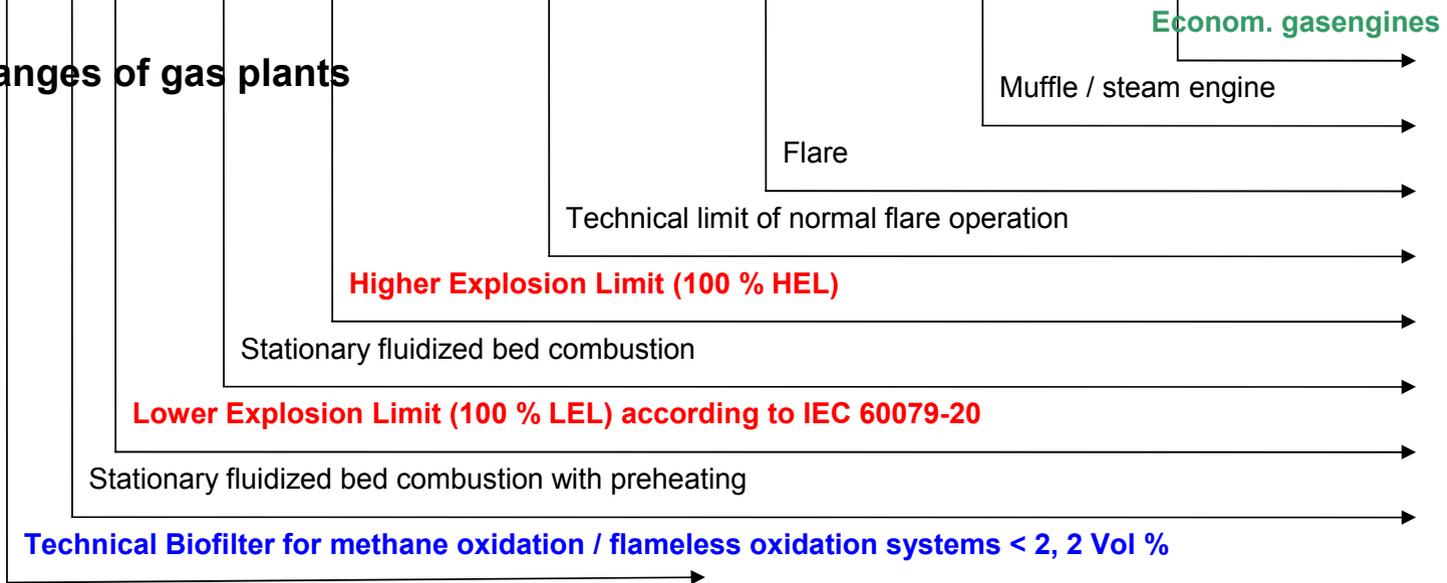
0 | 0.22 | 0.4 | 0.5 | 1 | 1.5 / 1.7 | 2 | 2.5 | 3.5 | 4.5 | kWh/m³

Methane content

2.2 | 4 | 5 | 10 | 15 / 17 | 20 | 25 | 35 | 45 | Vol: % CH₄



Operation ranges of gas plants

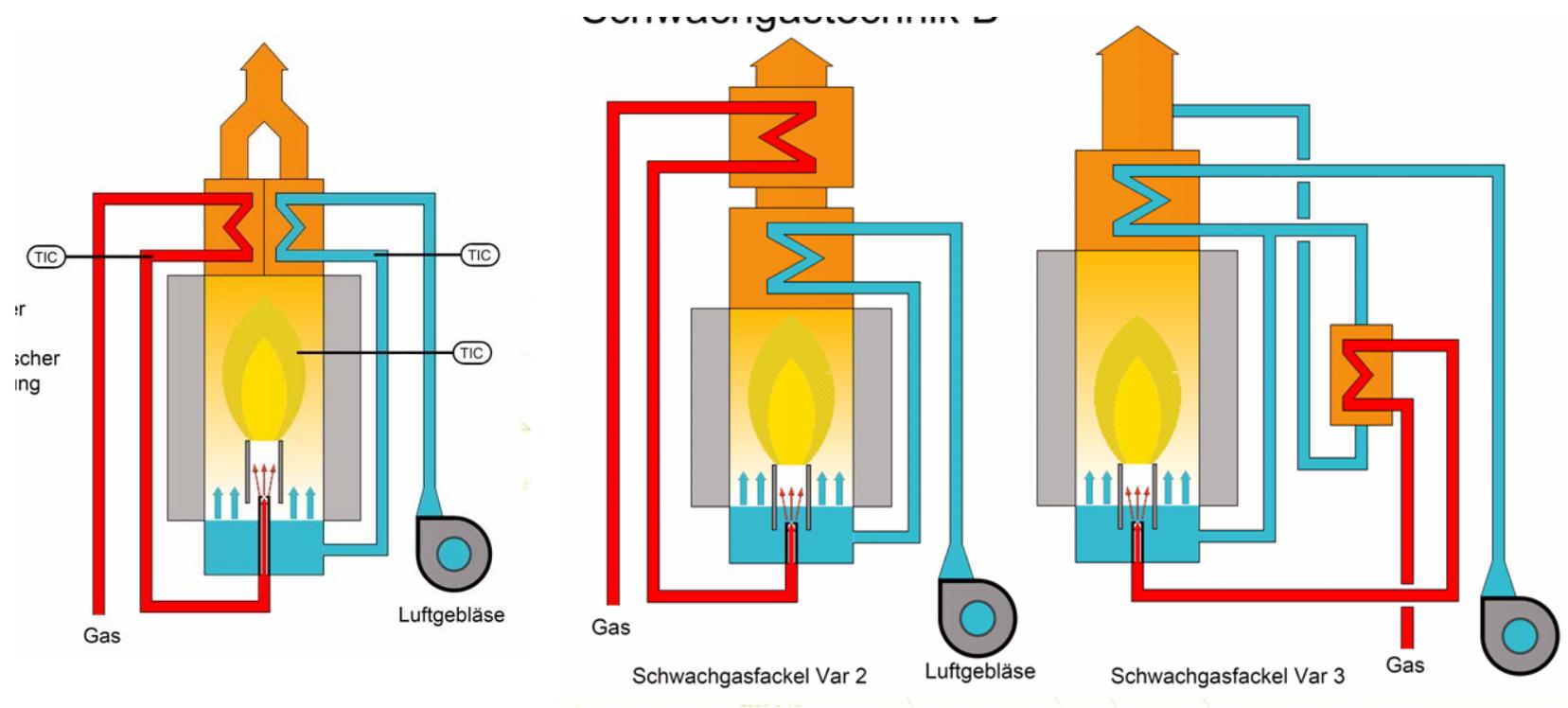


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Solutions for low calorific LFG



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Solutions for low calorific LFG



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Earning money from LFG / carbon credits - not so easy as you think ...

Emissions of methane: The story of environment and money ..

Methane + O₂ =

+ CO₂



GWP: 28



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Plastic in your waste gives you a lot problems for a running extraction system

.... the extraction is in use – but still high emissions over the surface and a lot of water in the pipe systems to the manifold stations



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Whether conditions gives you a lot problems for a running extraction system

The big three: To dry – to cold – to much water



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How the waste come in gives a lot problems for a running extraction system

And a landfill is never full filled



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The missing „good“ service (O&M) gives a lot problems for earning money

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At all the sites, gas leakages can be found at the engines (turbo charger and cylinder):



But we also find out: This is a general aspect all over – the emissions belongs to the work of O&M (not engines and countries)

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Conclusions:

No efficiency - without a good gas extraction system

No efficiency - without good workers and measurement devices

No efficiency - without good gas prognoses and equipment on site

No efficiency - without any knowing of local conditions

No efficiency - without any measurement on site from gas well via surface

No efficiency - without any measurement on site from ... via manifold station ..

No efficiency - without the right local solutions

No efficiency - without the right figures of measurement and interpretation

No efficiency - without knowing of the raw gas

No efficiency - without knowing of the right gas flow – so make realistic pumping trails – normally 3 until 6 months

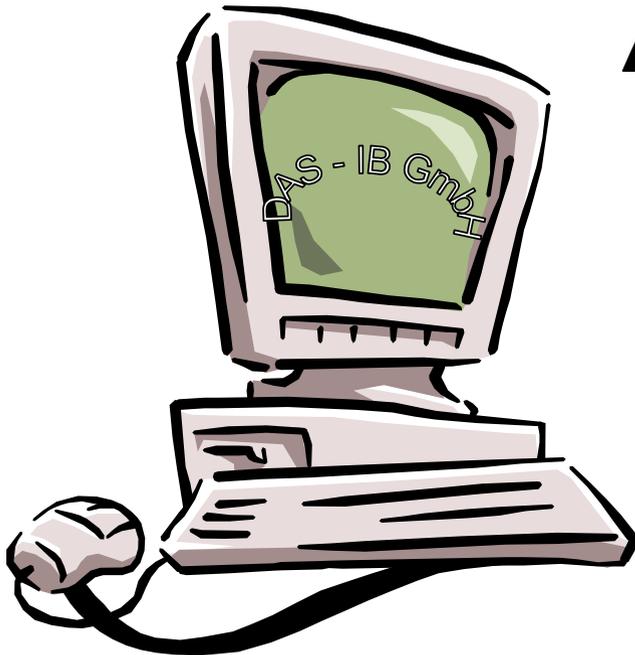
Be on site in summer and winter time !

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Any questions left?



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Or we see us at your site or here e.g. next break

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Another approx. 95 sites in Germany and foreign countries

(e.g. Hungary, Finland, Lithuania, Morocco, Russia, Belgium, Belarus, Austria, Switzerland, Italy,..).

Whole gas extraction systems consists of: wells, pipes, manifold stations, condensate shafts, condensate knock out pots, booster & flare systems, CHP – units as consulter and independent expert for DAS – IB GmbH (www.das-ib.de)

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