



LANDFILL GAS EXTRACTION SYSTEMS AND UTILISATION IN HUNGARY PUSZTAZAMOR LANDFILL SITE OF FKF ZRT. BUDAPEST

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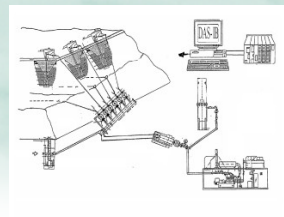
11th International Waste Management and Landfill Symposium / Sardinia 2007

October 1st – 5th

DAS – IB GmbH
LFG - & Biogas - Technology

Biogas-, Sludge gas and Landfill gas technology:

- Consulting, planning & design, project management
- Familiarisation and training of system operators
- Independent Expert & Specialist
- Expert in ATEX – Zoning according to 99/92/EG and 94/9/EG



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Carbon Trading with Landfill Gas (LFG) and carbon credits; JI and CDM – projects

Trade with greenhouse gas emissions resp. greenhouse gas allowance

Do You remember ?

10th International Waste Management and Landfill Symposium / Sardinia 2005

3 – 7 October 2005

Learn CO₂e – Trading ...

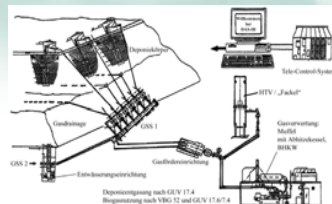
... and get into the pole position.

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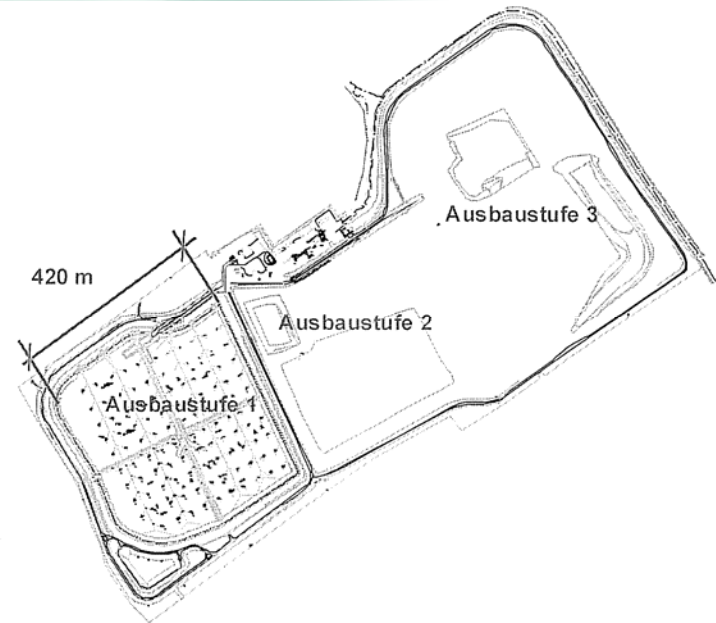
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4.X.2005



So we came to Hungria – Budapest – FKF Zrt (Budapest sanitation department) at Eastern 2005 to undertake our first steps



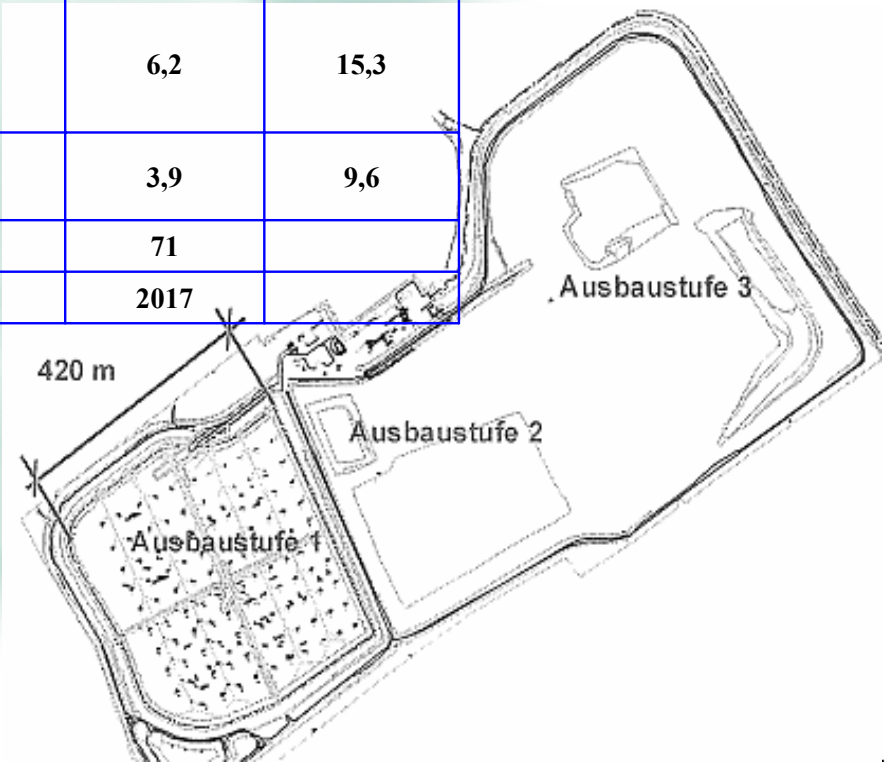
The Pusstazámor landfill site was first started up with a area of approx. 18 ha for the disposal of waste in 2000. The entire future landfill placement area is divided into three segments with four sections each.

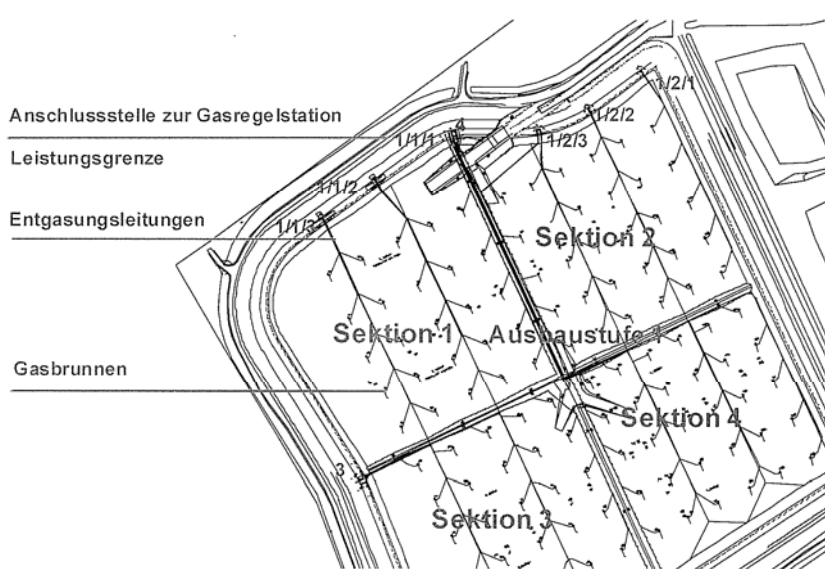


		Expansion stage 1	Expansion stage 2	Expansion stage 3	Total
Base area	ha	18,4	14,2	21,7	54,3
Dumping volume (without surface sealing)	mill.m ³	4,6	4,5	6,2	15,3
Amount of residual waste	mill. t	2,9	2,8	3,9	9,6
Filling height	m	65	65	71	
Start-up		2000	2010	2017	



New situation later here



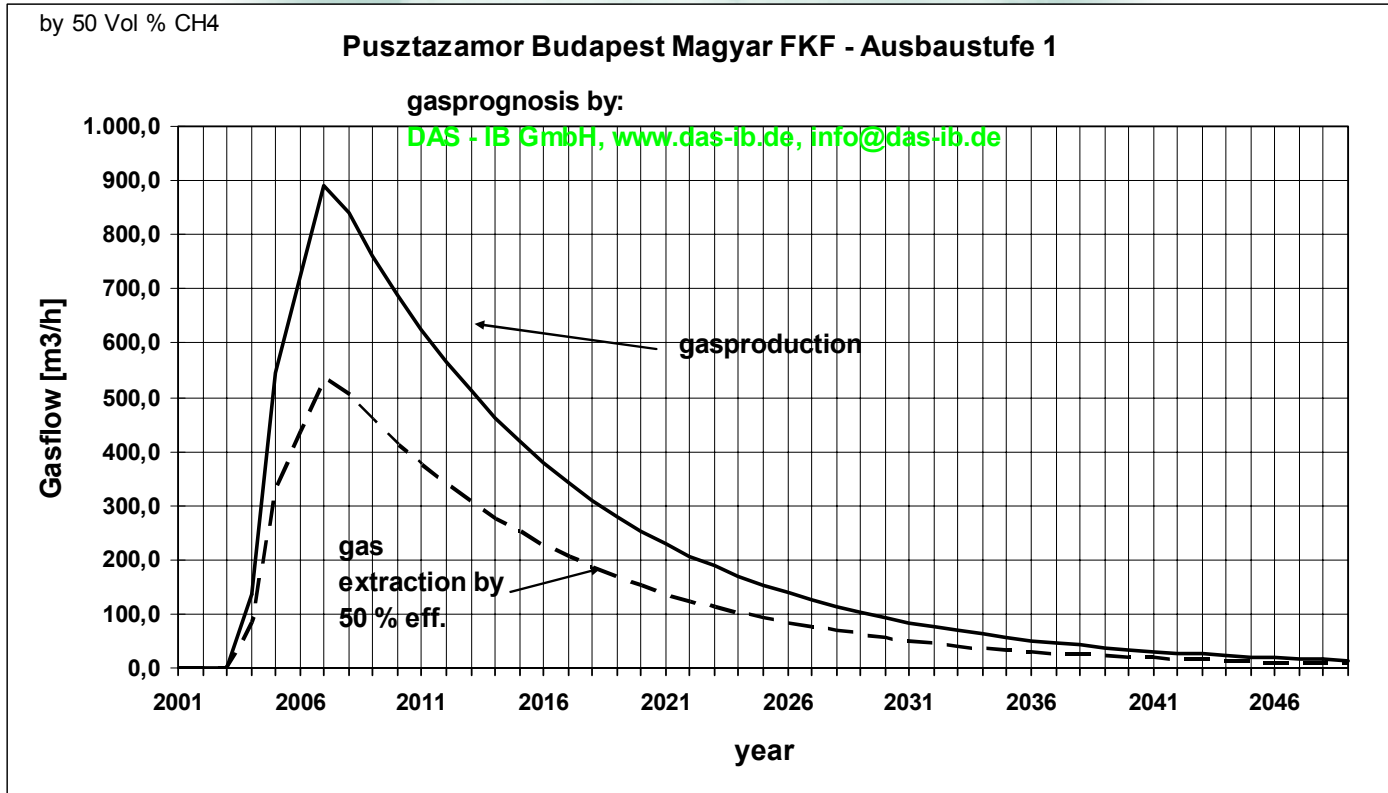


4th Section in segment 1 - Shows the connection point for the gas manifold station / Limit of performance & supply, pipes and gas wells and the civil work

Pumping trial in section IV because of the water situation in the side (wells)



The gas extraction system causing / with problems ... 109 gas wells at all in 60 pipes



Signing the contracts for the gas extraction system of
Pusztazamor Landfill site, Budapest - Hungary
www.das-ib.de

Companies of the Project

- **Budapest Sanitation Department (FKF Zrt.)**
- **DAS - IB GmbH**
- **ERBE ENERGETIKA Kft**
- **MÉLYÉPTERV KOMPLEX ENGINEERING Kft.**
- **Pro2-Anlagentechnik GmbH**
- **HEERS & BROCKSTEDT UMWELTECHNIK GmbH**





Construction phase in July and August 2006



3% gradient

Bellow expansion

GBS on hire

GMS & CS bought

Leachate water



2,5 MWth firing capacity
German „TA Luft“ standard
Boiler since April 2007







-CH₄, CO₂, O₂ (Vol%)

-F (m³/h)

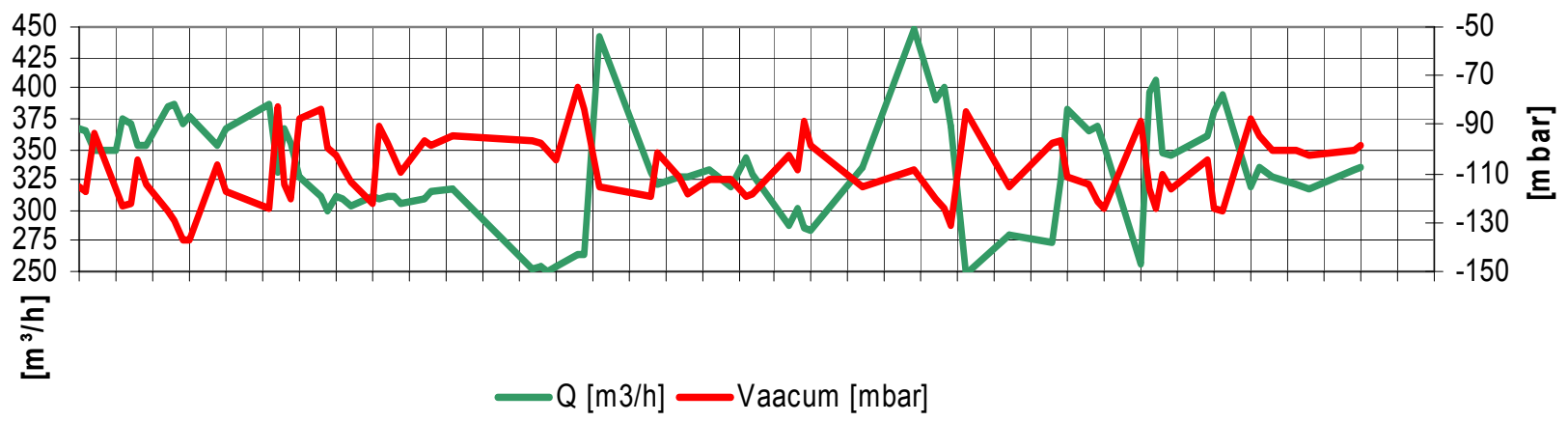
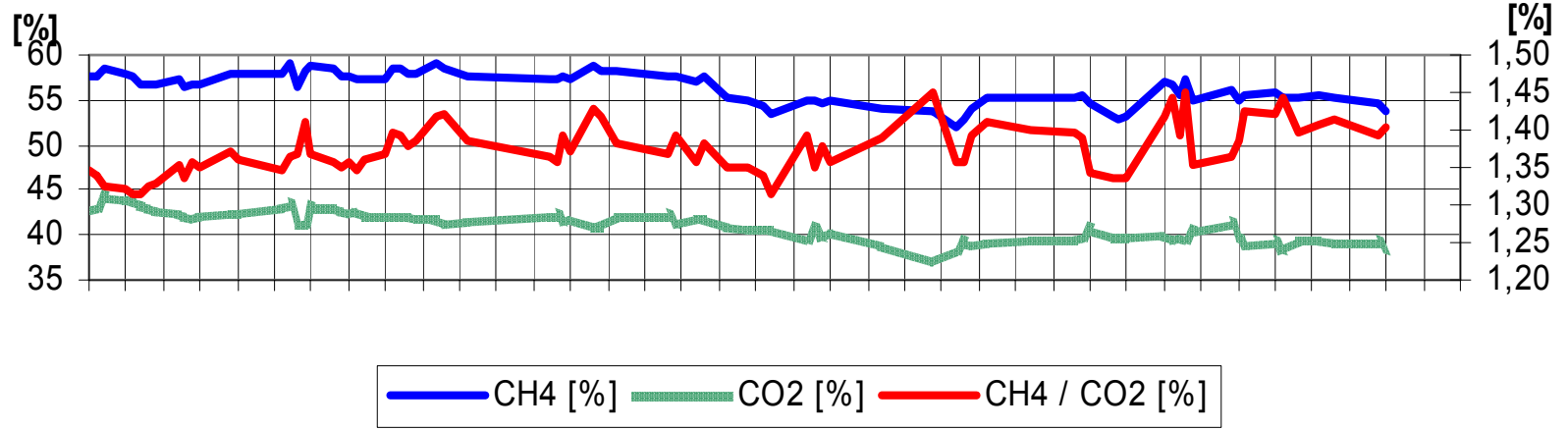
-p (mbar)

-T (°C)

-FID (ppm)

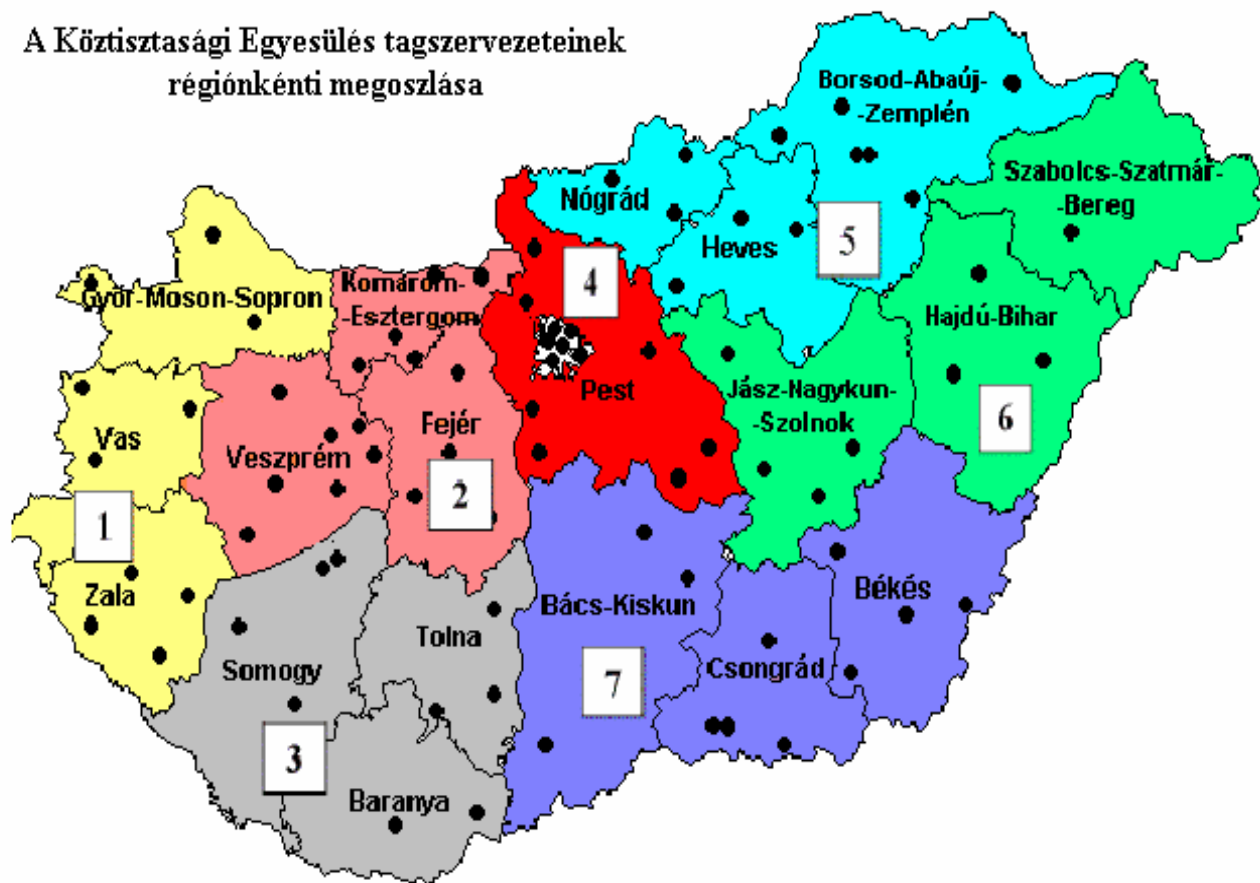
-Full raw gas analysis







A Köztisztasági Egyesülés tagszervezeteinek régiónkénti megoszlása





raw gas concentrations

Parameters, compound		Concentration		
		September 2006	März 2007	September 2007
Oxygen	Vol-%	0,7	0,9	<0,5
Nitrogen	Vol-%	3,6	4	11,3
Methane	Vol-%	54,4	54	51,6
Carbon dioxide	Vol-%	41	40,2	38,4
Total chlorine	mg/m ³	11,5	19	7,4
Total fluorine	mg/m ³	15	11	2
Total sulphur	mg/m ³	110	25	26
Hexamethylene disiloxane	mg/m ³	0,21	1,27	0,22
Hexamethylene cyclotrisiloxane	mg/m ³	<0,19	<0,57	<0,28
Octamethylene trisiloxane	mg/m ³	<0,06	<0,18	<0,09
Octamethylene cyclotrisiloxane	mg/m ³	0,42	3,31	1,35
Decamethylene tetrasiloxane	mg/m ³	<0,08	<0,18	<0,09
Decamethylene cyclopentasiloxane	mg/m ³	0,11	0,99	0,52

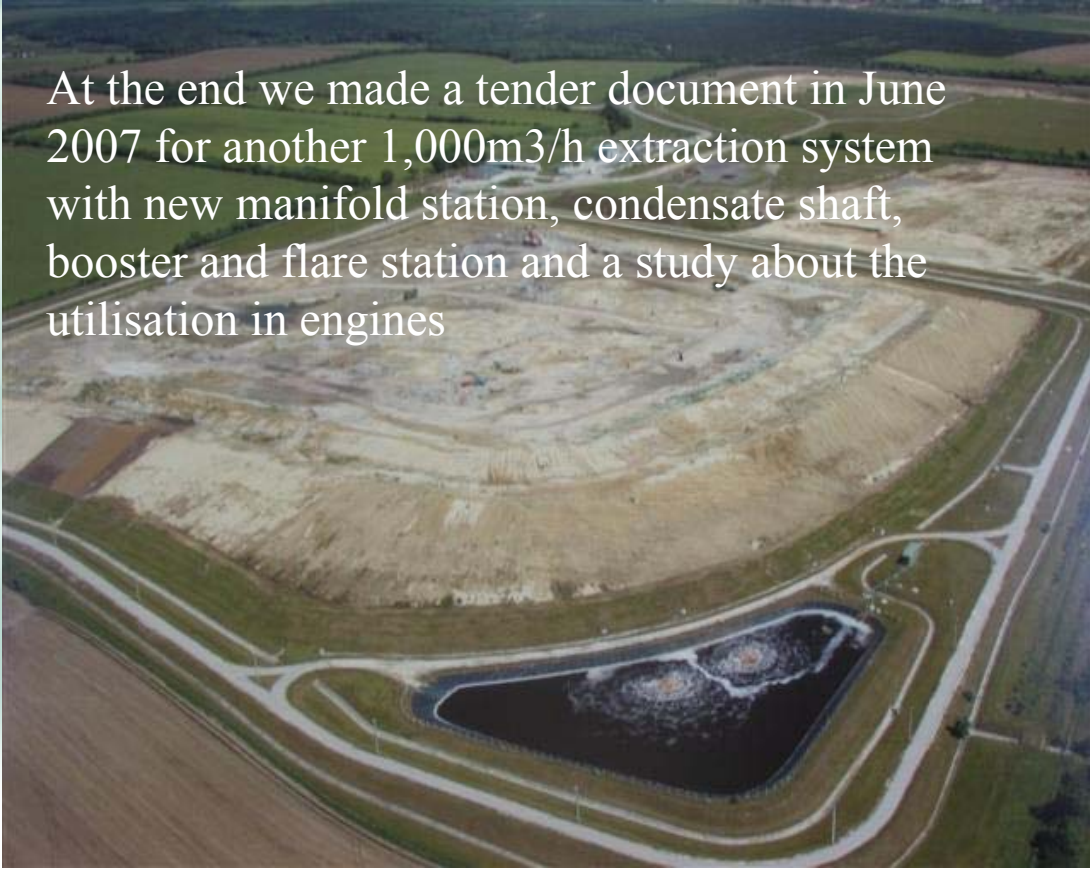


Further steps

- * Aim to know the max. gas quantity
- * New gas extraction system with existing wells
- * New wells
- * Gas engines

Problems & surprises:

- * gas prognosis models
- * water lenses
- * gas temperature
- * foams in the condensate shaft

An aerial photograph showing a large-scale construction site for a biogas plant. The site is a large, rectangular area with a dirt and gravel surface. In the foreground, there is a large, dark, irregularly shaped pond or reservoir. The surrounding area is green with grass and some trees. The sky is blue with some light clouds.

At the end we made a tender document in June 2007 for another 1,000m³/h extraction system with new manifold station, condensate shaft, booster and flare station and a study about the utilisation in engines



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tutti trascorrono a Budapest un periodo più lungo del previsto
i romani 400 anni gli ottomani 150 anni i sovietici 45 anni

**Thank you for your attention – I've been
there for over 2.5 years now**