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Experts Seminar, 16-17 June 2010, Sevilla/Spain
Optimal recovery of material and energy resources:
The cases of the rest fraction of municipal waste and sewage
sludge

Sewage sludge management in Hungary

The sludge problematic at the Budapest Central Wastewater Treatment Plant

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Total area: 93 000 km²

Population: 10 million

Danube watershed

EU membership: 01.05.2004

EU Environmental requirements



The Urban Wastewater Directive (91/271/EC) vs Hungary's EU accession

	2007	2010	2015
Sewage network connection rate	65%		85% ¹ (91% ²)
Biological treatment		> 15 000 PE	2 000 PE
Tertiary treatment			> 10 000 PE
New investment needed to reach the target			13 000 km sewage network, 5 000 km connection pipes 50% increase of treatment capacity

- ¹ requirement
- ² target rate according to National Wastewater Collection and Treatment Program

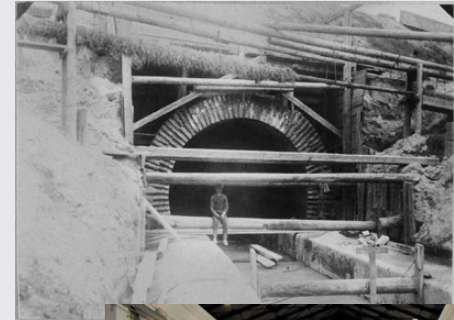


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Budapest wastewater history

The beginnings:

- Roman empire- Aquincum
- Middle ages
- Sewers in Pest- 1780-1868-1910
- Sewers in Buda- 1873-1914
- South Pest WWTP: 1966
- North Pest WWTP: 1980
- Budapest Central WWTP:
finishing now!





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Budapest wastewater figures

Area of Budapest :	525 km ²
Number of inhabitants :	1.85M
Length of sewer system	4 915 km
Total wastewater:	600 000 m ³ /d
Population connected to sewer system:	96%
Type of sewer system :	66 % combined 34 % separated
Population served by BCWWTP	49%
Wastewater treated by BCWWTP	350 000 m ³ /d





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North-Pest WWTP

- Since 1980
- $Q_d = 200\ 000\ m^3$

Central Wastewater Treatment Plant

- Completion date: end of 2010*
- $Q_d = 350\ 000\ m^3$

South-Pest WWTP

- Since 1966
- $Q_d = 80\ 000\ m^3$





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Budapest Central Wastewater Treatment Plant

Contract value: EUR 249 M

FIDIC Yellow Book

Technical data:

- 1 400 000 PE
- 350 000 m³/d biol. design capacity
- 525 000 m³ mechanical and 900 000 m³ maximum capacity
- Technology: activated sludge treatment technology with lamellar pre-sedimentation
- 29 ha total area, 80 000 m² biological facility area



Commissioning period of the plant started in summer 2009



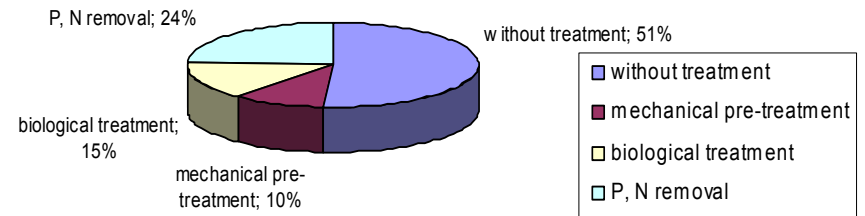
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Outcomes of the BCWWTP project:

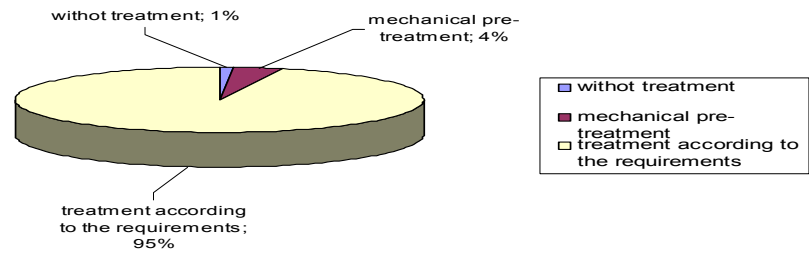
- ✓ Meet Urban Wastewater Directive 91/271/EC
- ✓ Prevention and mitigation of water contamination
- ✓ Sustainable water management (protection of drinking water wells)
- ✓ Development of local environment.



Budapest wastewater treatment situation in 2006.



Budapest wastewater treatment situation in 2010.

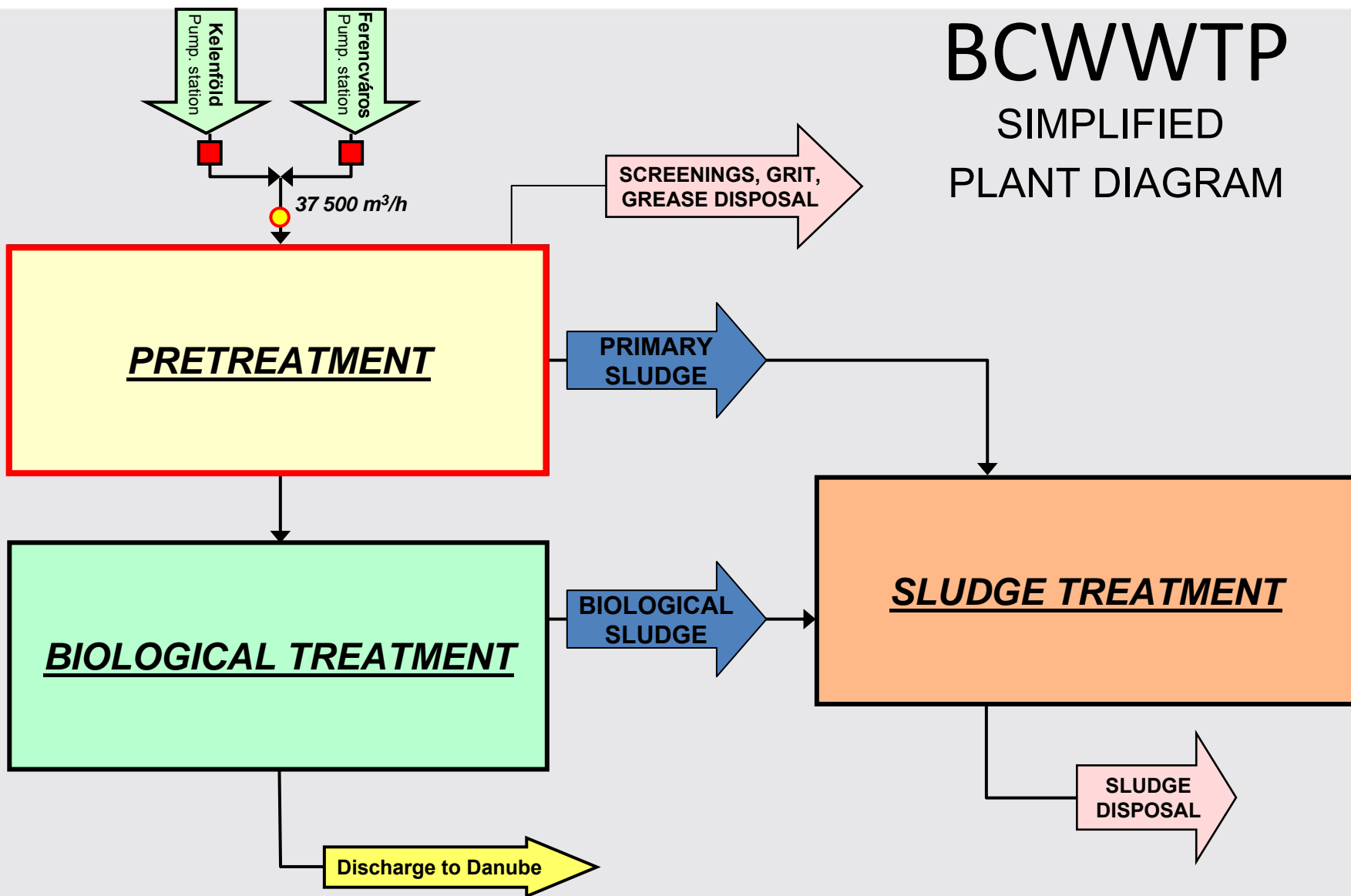




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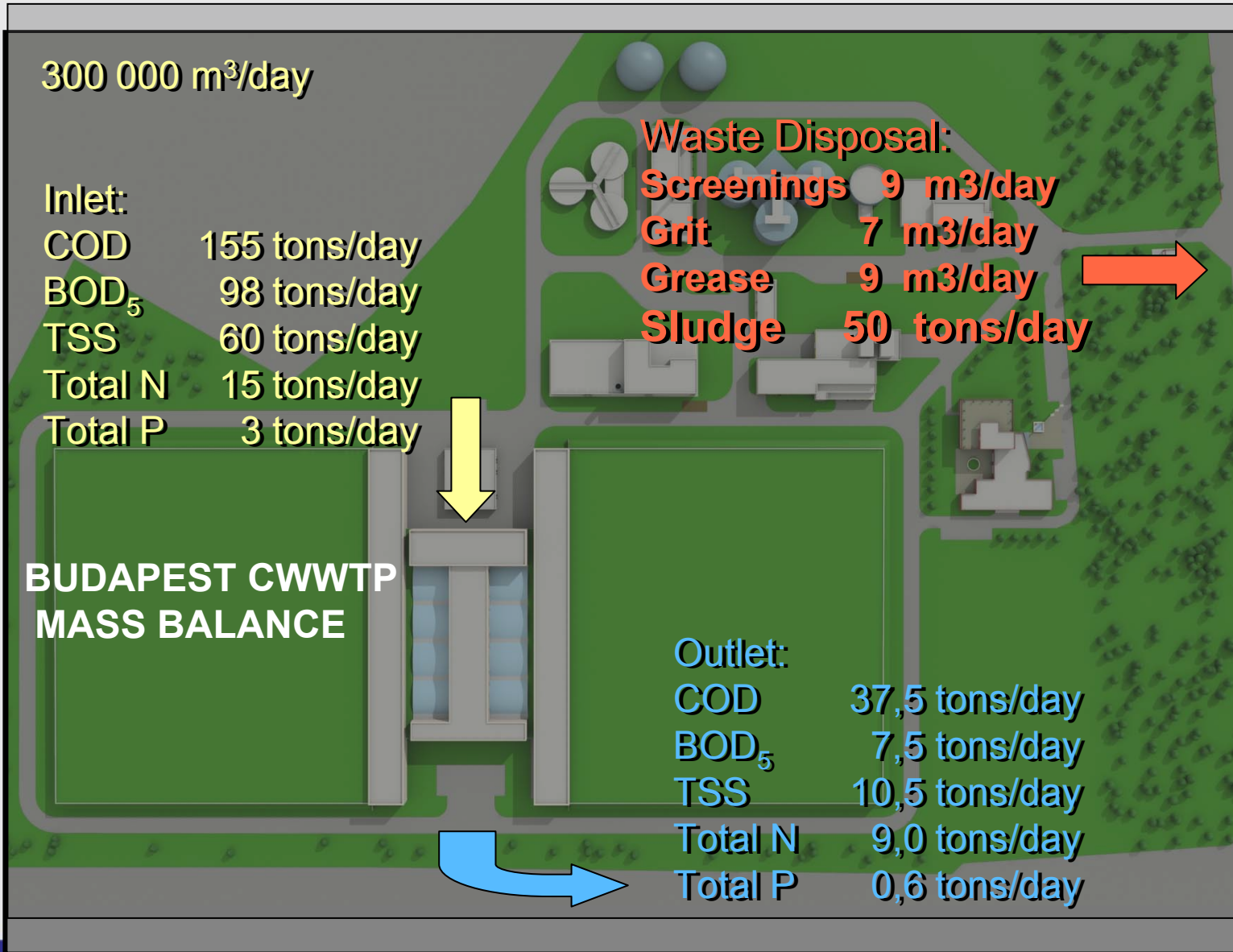


BCWWTP SIMPLIFIED PLANT DIAGRAM





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BCWWTP – sludge treatment

PRIMARY AND BIOLOGICAL
SLUDGE THICKENING

PASTEURIZATION

THERMOPHILIC ANAEROBIC
DIGESTION

SLUDGE DEWATERING



Raw water: 0.2 g/L

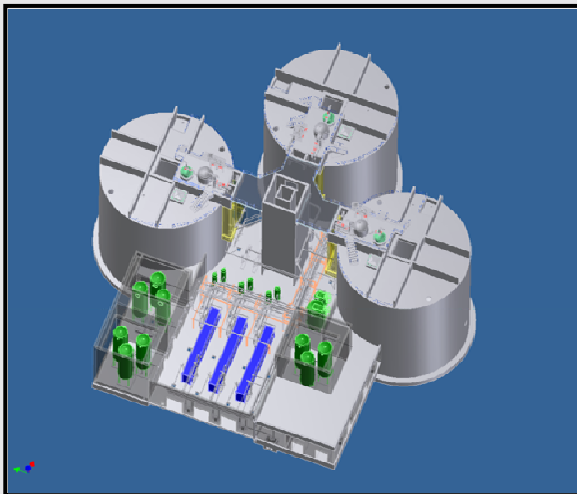
Primary sludge: 10 g/L (4000 m³/d)

Biological sludge: 7 g/L (6500 m³/d)

Thickened sludge: 60 g/L (825 m³/d)

Digested sludge: 40 g/L

Dewatered sludge: 260 g/L
(190 m³/d)





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Expected sludge figures in 2011

wwtp	waste-water 1000 m ³ /year	sludge t/year	Dry solid content	
			t/year	%
North Budapest	66.430	53.394	18.688	35,0
South Pest	23.000	31.000	9.000	29,0
Budapest Central	128.000	75.700	20.440	27,0
South Buda (cancelled)	20.988	24.768	6.935	28,0
Total	238.418	184.862	55.063	29.79



Sludge treatment and disposal in Budapest

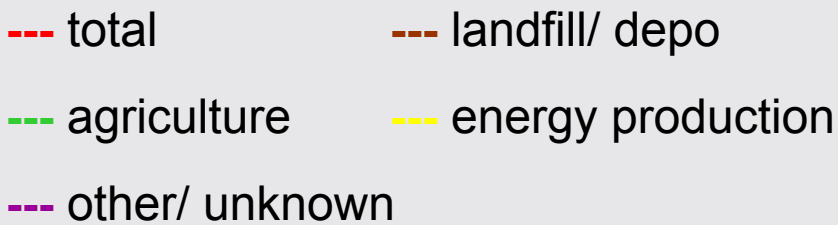
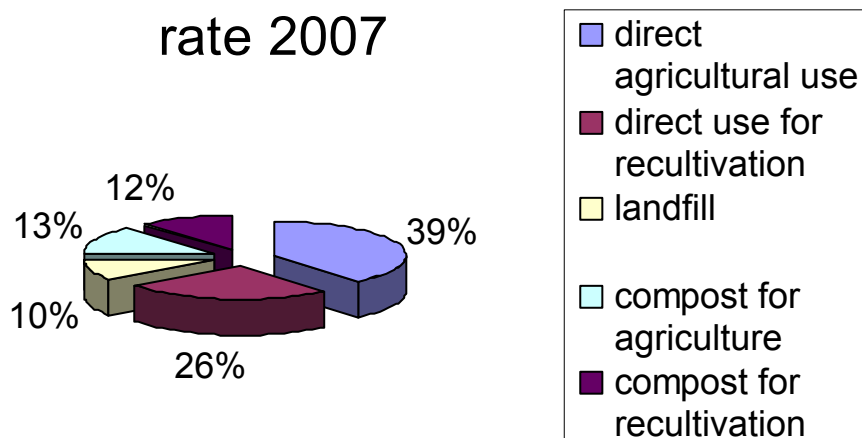
	WWTP	South Pest	North Pest	BP Central
recent	Sludge treatment	digestion, biogas utilisation	dewatering, chemical stabilisation	thermophilic digestion
	Sludge disposal	agriculture by contractors	landfill	landfill
future	Sludge treatment	digestion, biogas utilisation, ELODE trial (electro-osmosys dewatering)	digestion, biogas utilisation	digestion, biogas utilisation, composting
	Sludge disposal	agriculture by contractors	landfill	?



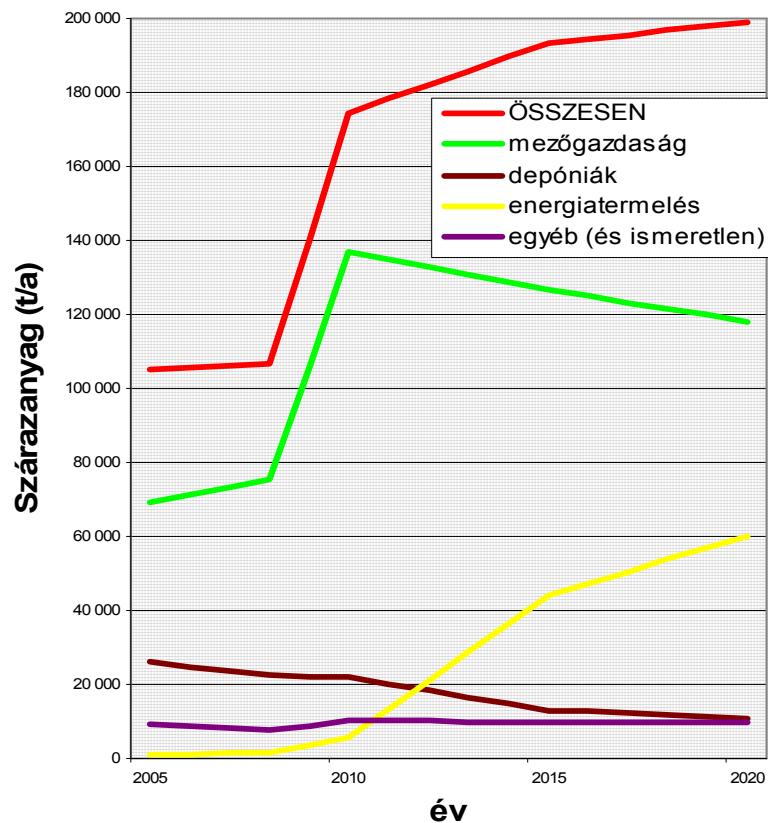
Sludge use prediction in Hungary 2005-2020

aggregated sludge disposal

rate 2007



Iszapelhelyezés időbeli alakulása





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Originally planned sewage sludge solution:

Composting plant (CMP):

Original technical scope:

100 000 t/y sludge from the Central Wastewater Treatment Plant

Closed system and technology: sludge is mixed with wood rest material, maturing process under controlled circumstances for 4 weeks time, postmaturation

Problems:

Civil protest in Distr. 18

Local Authority's aim to re-negotiate Agreement with Municipality

Csepel Local Authority's request to re-visit transport route

EU recommended to re-visit sludge concept

CMP is cancelled from the Project



Assessed options for sludge treatment and disposal

- Thermic utilization
 - Cement factory and power plant
 - Co-incineration at waste-to-energy plant
 - Mono-incineration
- Recultivation
 - Compost utilization
 - Almásfüzitő red mud depositories
 - Disposal at slag/fly-ash dump
- Utilization in agriculture
 - Use of compost
 - Production of energy plants
 - Operational issues





Constraints of sludge utilization

- civil protests/objection (implementation, transport, operation)
- lack of environmental consciousness
- local interest vs common goals
- regulatory/legal restrictions, discrepancy
- problems with reception:
 - capacity, aversion, hostility (agriculture)
 - economical aspects (energy purpose)
 - reliability (contractual)
- **Sustainability**





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Mitigation plan for sludge management in Budapest

- Issuing tender for a middle-term (10 years) Service Contract
=> Contractor to deliver sustainable management solutions for sludge transport and final disposal methods
- The Municipality of Budapest will provide for LONG TERM sustainable solution for the total quantity of the Budapest wastewaters by the end of the 10th year (incineration?)
- Implementation will require further EU funds





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Thank you for your attention!

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