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REEF2W Conference



ZAGREB AGGLOMERATION



Bojan Ribic, ZCH

Marko Zlonoga, REGEA

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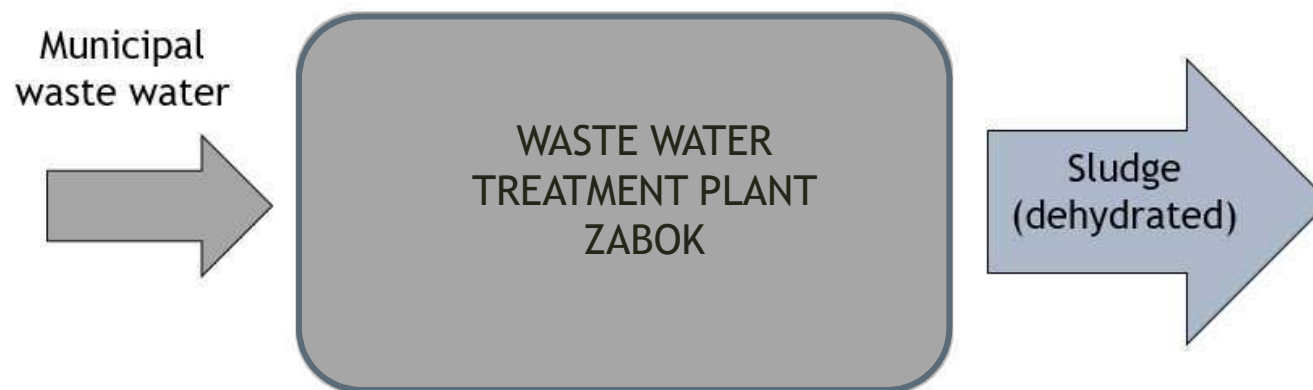
Zagreb urban agglomeration - main data

Location	Area (km ²)	Population (2011)	Portion (%)	
			Area	Population
City of Zagreb	641,3	790.017	22,0	72,7
Zagreb County	1.969,7	256.689	67,7	23,6
Krapina-Zagorje County	300,3	39.822	10,3	3,7
Total	2.911,3	1.086.528	100	100

Estimated quantities of sludge in Zagreb Urban Agglomeration

Zagreb Urban Agglomeration	Estimated quantities of sludge (t)	Required area of agricultural land for sludge disposal (ha)
Central waste water treatment plant Zagreb	50,000	9,036.2
Waste water treatment plant Zabok	1,117.5	361.4
Total	51,117.5	9,397.6





Zagreb Agglomeration	Location	Population	WWTP size (PE)	Sludge amount (m ³ /y)	Dry matter	Total amount (t/y)
WWTP Zabok	City of Zabok	9,000	36,940	1,490	75%	1,117.5

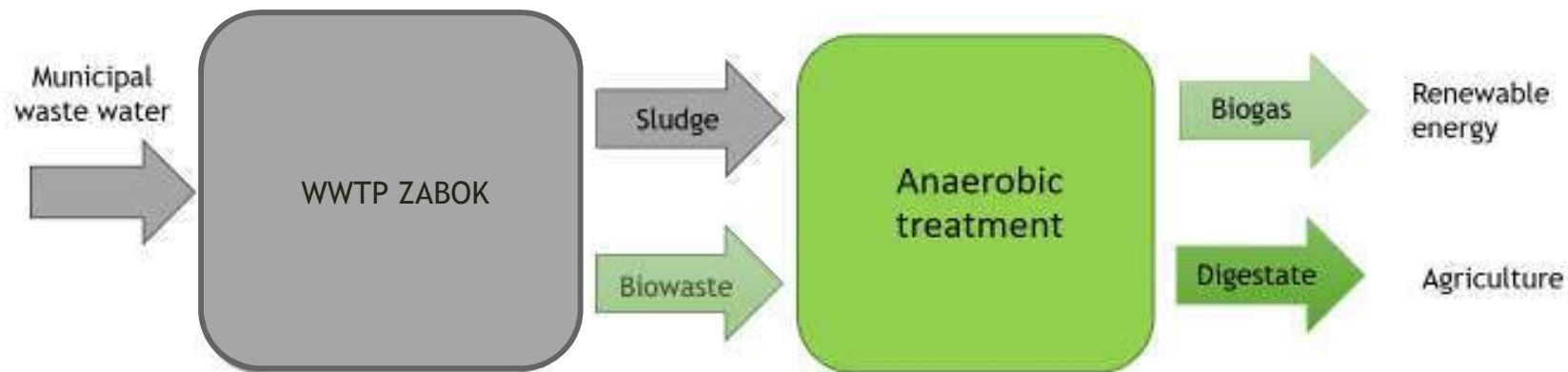




Layout of the WWTP Zabok



- I. Possibility to use biowaste fraction of municipal waste
- II. Anaerobic treatment - co-digestion of sludge and biowaste
- III. Utilization of biogas - CHP and biomethane
- IV. Application of digestate as a soil improver



Proposed REEF2W solution for WWTP Zabok



Biowaste potential in Zagreb agglomeration (in tonnes)

Zagreb Agglomeration	Total amount of produced mixed municipal waste, t	Total potential of biowaste, t	Expected amount of collected biowaste, t
City of Zagreb	217,380	65,214	26,085
Zagreb County	57,621	17,286	6,914
Krapina-Zagorje County	19,388	5,816	2,326
Total	294,389	88,316	35,325

Overview of the energy potential in the pilot location

Zagreb Agglomeration	Expected amount of collected biowaste, t/y	Energy content (m ³ biogas/t)	Biogas potential (m ³ /y)
City of Zagreb	26,085	100	2,608,500
Zagreb County	6,914		691,400
Krapina-Zagorje County	2,326		232,600



Overview of energy potential of the sludge at WWTP Zabok

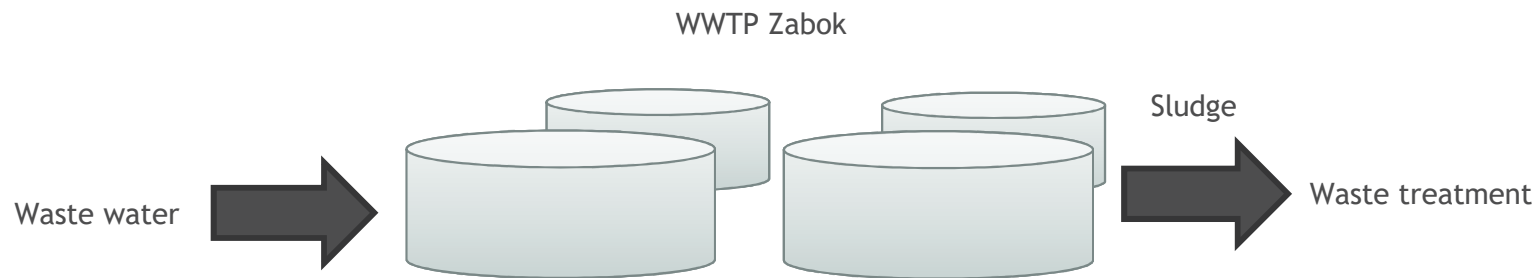
Total amount (t/y)	Energy content (m ³ biogas/t)	Anaerobic digestion				
		Biogas potential (m ³ /y)	Biomethane (m ³ /y)	CHP (kW)	Electricity (MWh/y)	Heat (MWh/y)
1,117.5	60	67,050	40,230	20.1	152.9	169.0

Estimated amount and required land for the pilot project

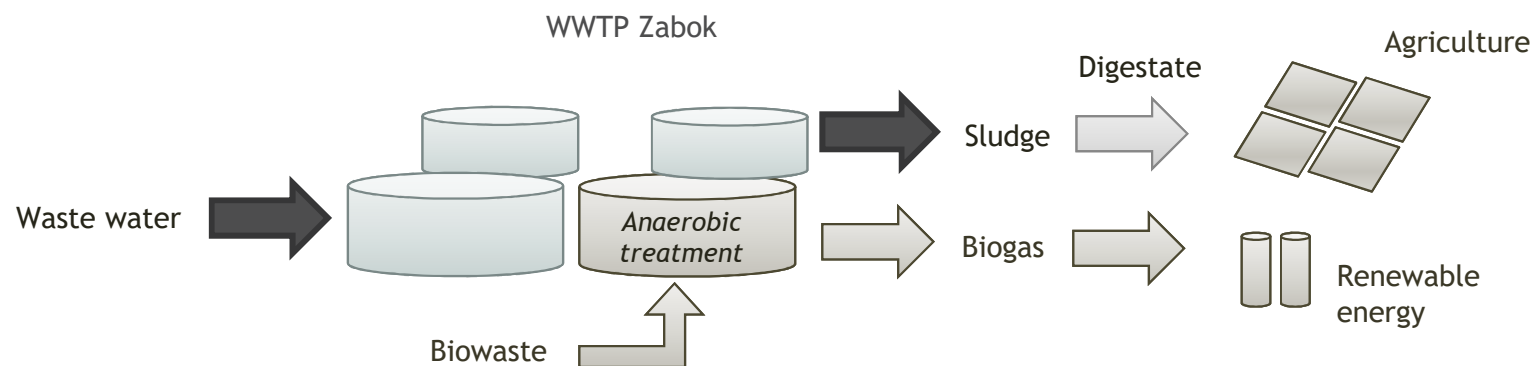
Total amount	Required land for sludge utilization
1,117.5	673.2



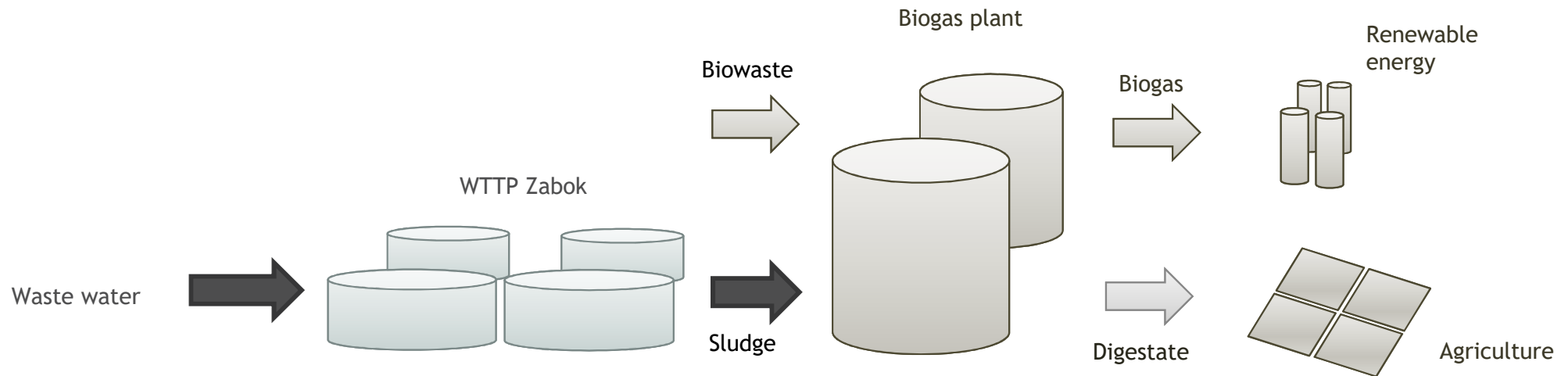
Scenario 1: Local sludge utilization



Scenario 2: Anaerobic digestion on site



Scenario 3: Utilization of biowaste and sludge at remote biogas plant



Scenario	Total amount (t/god)	Type of waste	Anaerobic digestion		Energy utilization				Sludge management	
			Biogas potential(m ³ /y)	Biomethane (m ³ /y)	CHP (kW)	Biomethane (t/god)	Electricity (MWh/god)	Heat (MWh/god)	Produced sludge (t/y)	Required land (ha)
1 - Local sludge recovery	1.117,5	Sludge	0	0	0	0	0	0	1.117,5	673,2
2 - Anaerobic treatment (on location)	3.443,5	Sludge	299.650	179.790	78.7	107,9	629,3	805,5	2.280,5	1.373,8
3 - Biogas plant (outdoor)	36.442,5	Biowaste /Sludge	3.599.550	2.159.730	944.9	1.295,8	7.559,1	9.675,6	18.780	11.313,3



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