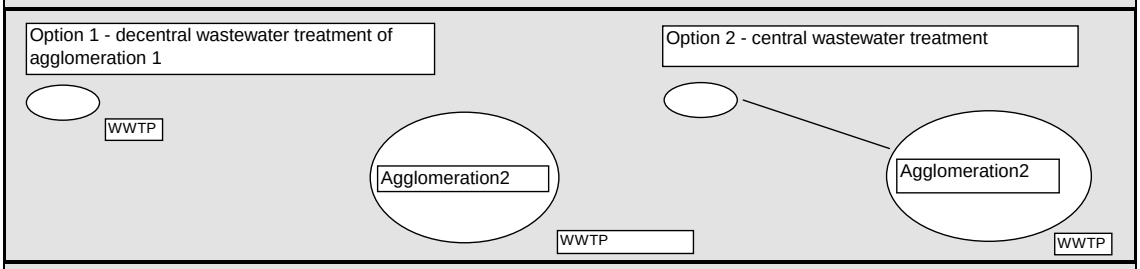
Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations
County: Mures
Agglomeration 1: NADES
Agglomeration 2: TIGMANDRU
Agglomeration 3: MAGHERUS
Agglomeration 4: PIPEA



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	1.228	1.228
Size of agglomeration 2	[PE]	931	931
Size of agglomeration 3	[PE]	148	148
Size of agglomeration 4	[PE]	99	99
Size of agglomeration 1+2+3+4	[PE]		2.406
No. of WTP modules	**[items]**	4	
Specific wastewater amount	[l/cap x d]	80	80
Specific wastewater amount	[l/cap x d]	110	110
Infiltration rate	[%]	25	25
Wastewater amount of agglomeration 1	[m³/d]	123	
Wastewater amount of agglomeration 2	[m³/d]	93	
Wastewater amount of agglomeration 3	[m³/d]	15	
Wastewater amount of agglomeration 4	[m³/d]	10	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		241
Connection details			
Lenth of the transportation line	[m]	-	13.000
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	G
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	0
Costs			
Specfic price WWTP agglomeration 1 (according formula)	[€/PE]	250	-
Specfic price WWTP agglomeration 2 (according formula)	[€/PE]	250	
Specfic price WWTP agglomeration 3 (according formula)	[€/PE]	250	
Specfic price WWTP agglomeration 4 (according formula)	[€/PE]	250	
Specfic price WWTP agglomeration 1+2+3+4(according formula)	[€/PE]	-	250
Specific price transportation line (according Unit Price Data Base)	[€/m]	-	171
I. Investment costs			
A. Civil works			
(1.1) WWTP for agglomeration 1 (40 % of total costs)	[€]	137.800	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	108.100	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	29.800	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	24.900	
(2) WWTP for agglomeration (40 % of total costs)	[€]		255.600
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) Transportation line	[€]	-	2.216.500
(5) *free*	[€]		
(6) *free*	[€]		
(7) *free*	[€]		
(8) *free*	[€]		
(9) *free*	[€]		
(10) *free*	[€]		
Total costs civil works	[€]	300.600	2.472.100
Writting-off period	[years]	40	40
	[€/a]	7.515	61.803
Cost of capital, average	[%]	3	3
	[€/a]	9.018	74.163
Annual costs civil works	**[€/a]**	**16.533**	**135.966**

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	199.200	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	154.650	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	37.200	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	29.850	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	375.900
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	
(4) *free*	[€]		
(5) *free*	[€]		
(6) *free*	[€]		
(7) *free*	[€]		
(8) *free*	[€]		
(9) *free*	[€]		
(10) *free*	[€]		
Total costs mechanical and electricial equipment	[€]	420.900	375.900
Writting-off period	[years]	12	12
	[€/a]	35.075	31.325
Cost of capital, average	[%]	3	3
	[€/a]	12.627	11.277
Annual costs mechanical and electrical equipment	[€/a]	**47.702**	**42.602**
Annual costs I. (Investment)	**[€/a]**	**64.235**	**178.568**
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	**[€/a]**	**16.836**	**15.036**
III. Labour costs			
specific labour costs	[€/h]	5	5
annual expenses option 1 (2 full-time workers/module)	[h/a]	35.040	-
annual expenses option 2 (2 full-time workers)	[h/a]	-	8.760
Annual costs III. (labour)	**[€/a]**	**175.200**	**43.800**
IV. Operation costs consumption			
A. Energy consumption			
A 1 - Option 1			
A 1.1 WWTP agglomeration 1			
Wastewater amount of agglomeration 1	[m³/d]	123	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	116	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	93	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,64	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	153	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	15	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,18	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	32	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	10	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,32	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	23	-
Total A 1	**[kWh/d]**	**324**	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	108
Maximum difference in height Dh (only in case of pumping station)	[m]	-	0
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	0
A 2.2 WWTP agglomeration 1+2+3+4			
Specfic price WWTP agglomeration 2 (according formula)	[m³/d]		241
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,42
Daily energy consumption WWTP agglomeration 2	[kWh/d]		342
Total A 1 - A 2	**[kWh/d]**	**324**	**342**
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	**[€/d]**	**49**	**51**

B. Chemicals consumption
The difference in the consumption of chemicals is neglectable.

C. Sludge disposal
The sludge amounts produced in both options is almost the same.
The difference in the sludge disposal costs is neglectable.

Total IV.	**[€/d]**	**49**	**51**
Annual costs IV. (consumption)	**[€/a]**	**17.749**	**18.718**

Summary

Annual costs I. (Investment)	**[€/a]**	**64.235**	**178.568**
Annual costs II. (Maintenance / Repairs)	**[€/a]**	**16.836**	**15.036**
Annual costs III. (labour)	**[€/a]**	**175.200**	**43.800**
Annual costs IV. (consumption)	**[€/a]**	**17.749**	**18.718**
Total annual costs	**[€/a]**	**274.020**	**256.121**

Conclusion : according to the option analysis the Consultant proposed centralized solution to be followed.