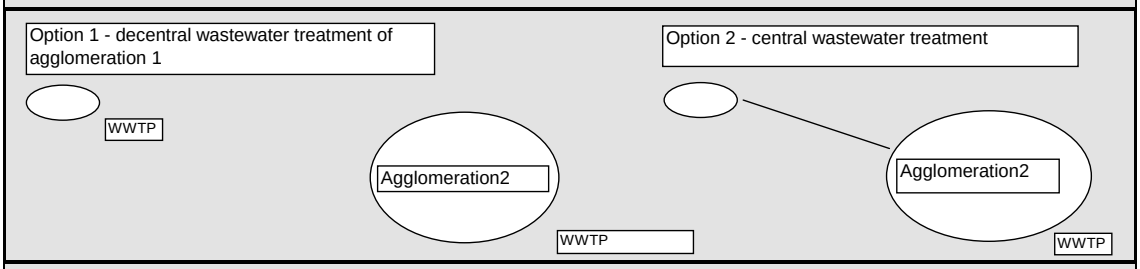
Master Plan, Chapter 5, Option Analysis on Wastewater Agglomerations
County: Mures
Agglomeration 1: BALAUSERI+AGRISTEU
Agglomeration 2: CHENDU+DUMITRENI
Agglomeration 3: SENEREUS
Agglomeration 4: FILITELNIC



		Option 1	Option 2
Data Base			
Size of agglomeration 1	[PE]	2.013	2.013
Size of agglomeration 2	[PE]	2.056	2.056
Size of agglomeration 3	[PE]	725	725
Size of agglomeration 4	[PE]	200	200
Size of agglomeration 1+2+3+4	[PE]		4.994
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]	201	
Wastewater amount of agglomeration 2	[m³/d]	206	
Wastewater amount of agglomeration 3	[m³/d]	73	
Wastewater amount of agglomeration 4	[m³/d]	20	
Wastewater amount of agglomeration 1+ 2+3+4	[m³/d]		499
Connection details			
Lenth of the transportation line	[m]	-	14.700
Kind of connection (g = by gravity, p = by pressure main)	[-]	-	P
Diameter of the transportation line	[mm]	-	250
Maximum difference in height Δh (only in case of pumping station)	[m]	-	10
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)	[€]	216.300	-
(1.2) WWTP for agglomeration 2 (40 % of total costs)	[€]	220.600	
(1.3) WWTP for agglomeration 3 (40 % of total costs)	[€]	87.500	
(1.4) WWTP for agglomeration 4 (40 % of total costs)	[€]	35.000	
(2) WWTP for agglomeration (40 % of total costs)	[€]		514.400
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	36.323
(4) Transportation line	[€]	-	2.506.350
(5) *free*	[€]		
(6) *free*	[€]		
(7) *free*	[€]		
(8) *free*	[€]		
(9) *free*	[€]		
(10) *free*	[€]		
Total costs civil works	[€]	559.400	3.057.073
Writting-off period	[years]	40	40
	[€/a]	13.985	76.427
Cost of capital, average	[%]	3	3
	[€/a]	16.782	91.712
Annual costs civil works	**[€/a]**	**30.767**	**168.139**

B. Mechanical and electrical equipment			
(1.1) WWTP for agglomeration 1 (60 % of total costs)	[€]	316.950	-
(1.2) WWTP for agglomeration 2 (60 % of total costs)	[€]	323.400	
(1.3) WWTP for agglomeration 3 (60 % of total costs)	[€]	123.750	
(1.4) WWTP for agglomeration 4 (60 % of total costs)	[€]	45.000	
(2) WWTP for agglomeration (60% of total costs)	[€]	-	764.100
(3) Pumping station agglomeration 1 (if necessary)	[€]	-	3.700
(4) *free*	[€]		
(5) *free*	[€]		
(6) *free*	[€]		
(7) *free*	[€]		
(8) *free*	[€]		
(9) *free*	[€]		
(10) *free*	[€]		
Total costs mechanical and electricial equipment	[€]	809.100	767.800
Writting-off period	[years]	12	12
	[€/a]	67.425	63.983
Cost of capital, average	[%]	3	3
	[€/a]	24.273	23.034
Annual costs mechanical and electrical equipment	[€/a]	**91.698**	**87.017**
Annual costs I. (Investment)	**[€/a]**	**122.465**	**255.156**
II. Maintenance / Repairs			
in % of the mechanical and electrical equipment installed	[%/a]	4	4
Annual costs II. (Maintenance / Repairs)	**[€/a]**	**32.364**	**30.712**
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]	201	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	0,94	-
Daily energy consumption WWTP agglomeration 1	[kWh/d]	190	-
A 1.2 WWTP agglomeration 2			
Wastewater amount of agglomeration 2	[m³/d]	206	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,46	-
Daily energy consumption WWTP agglomeration 2	[kWh/d]	299	-
A 1.3 WWTP agglomeration 3			
Wastewater amount of agglomeration 3	[m³/d]	73	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	1,71	-
Daily energy consumption WWTP agglomeration 3	[kWh/d]	124	-
A 1.4 WWTP agglomeration 4			
Wastewater amount of agglomeration 4	[m³/d]	20	-
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]	2,08	-
Daily energy consumption WWTP agglomeration 4	[kWh/d]	42	-
Total A 1	**[kWh/d]**	**655**	
A 2 - Option 2			
A 2.1 Pumping station agglomeration 1 (if necessary)			
Wastewater amount of agglomeration 1	[m³/d]	-	278
Maximum difference in height Dh (only in case of pumping station)	[m]	-	10
Daily energy consumption pumping station agglomeration 1	[kWh/d]	-	13
A 2.2 WWTP agglomeration 1+2+3+4			
Specfic price WWTP agglomeration 2 (according formula)	[m³/d]		499
Specific energy consumption WWTP agglomeration 1 (acc. formula)	[kWh/m³]		1,27
Daily energy consumption WWTP agglomeration 2	[kWh/d]		635
Total A 1 - A 2	**[kWh/d]**	**655**	**647**
Specific energy price	[netto €/kWh]	0,15	0,15
Energy costs	**[€/d]**	**98**	**97**

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]**	**98**	**97**
Annual costs IV. (consumption)	**[€/a]**	**35.853**	**35.433**

Summary

Annual costs I. (Investment)	**[€/a]**	**122.465**	**255.156**
Annual costs II. (Maintenance / Repairs)	**[€/a]**	**32.364**	**30.712**
Annual costs III. (labour)	**[€/a]**	**175.200**	**43.800**
Annual costs IV. (consumption)	**[€/a]**	**35.853**	**35.433**
Total annual costs	**[€/a]**	**365.882**	**365.101**

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