

Decentralized innovative treatment of ammonium-rich urban wastewater

FUTURE PERSPECTIVES

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LIFE DeNTreat FINAL EVENT – web meeting

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THE INHERITANCE OF THE PROJECT

The case study of SCR

- The **procedure and the results** of the **audit** carried out on SCR;
- the **results of the experimental activity** with the demonstration plant;
- the definition of the costs and of the economic and environmental benefits determined for SCR;

are the **basis for assessing the applicability** of the Life DeNTreat technology for other users.

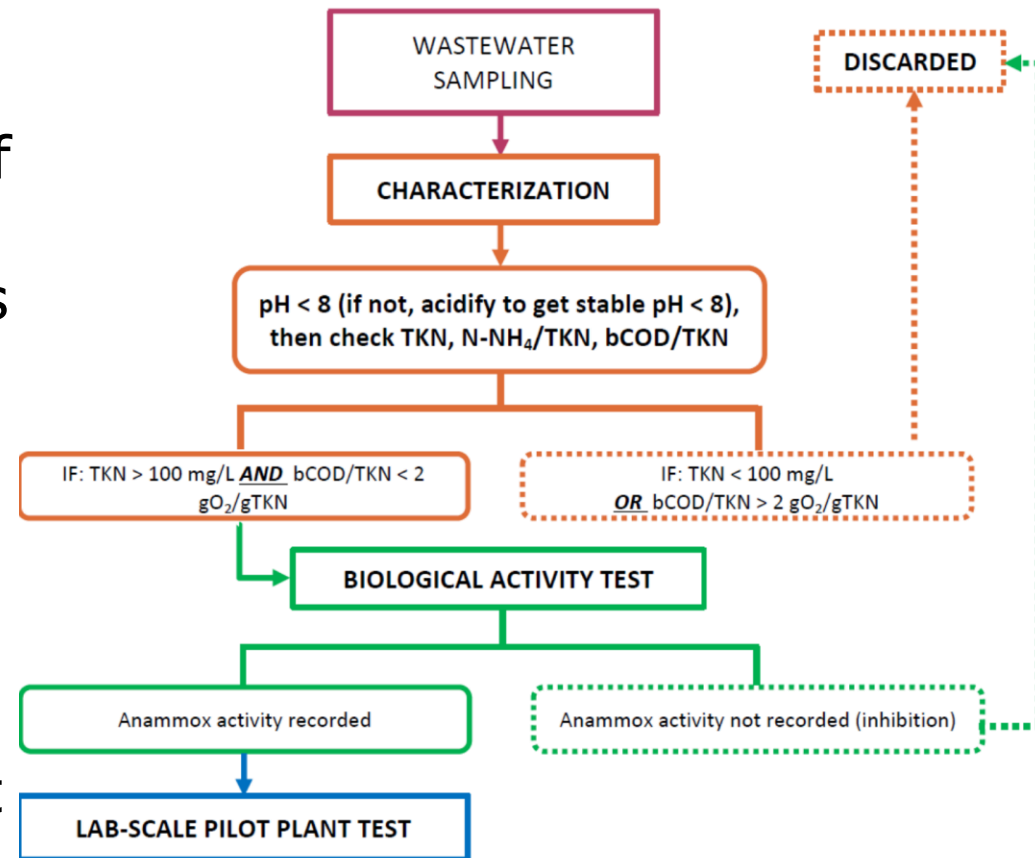


THE INHERITANCE OF THE PROJECT

If-then schema and HDK procedure

A kind of “if – then schema” was developed to put into direct relationship the characteristics of the to be-treated wastewater and the high-level characteristics of the Anammox-based equipment to be adopted.

A sort of “**Hardware Development Kit**” [HDK] was elaborated easing the replicability of the LIFE DeNTreat experience to the widest application contexts possible.



THE INHERITANCE OF THE PROJECT

Activity test procedure and Lab scale pilot

Development of an internal **standardized method for testing Anammox biomass activity** on specific wastewater

Availability of a **lab-scale pilot**, based on the Life DeNTreat technology, validated **as a “portable clinic”** intended to quickly test heterogeneous wastewater samples and providing a reliable feasibility for industrial-scale treatment plants



The project Partners will support prospective adopters by consultancy activity.

THE INHERITANCE OF THE PROJECT

The demo plant

A pre-industrial wastewater treatment plant based on an Anammox biomass, TRL7-compliantly demonstrated in a representative operational environment processing 40 m³/day of wastewater;



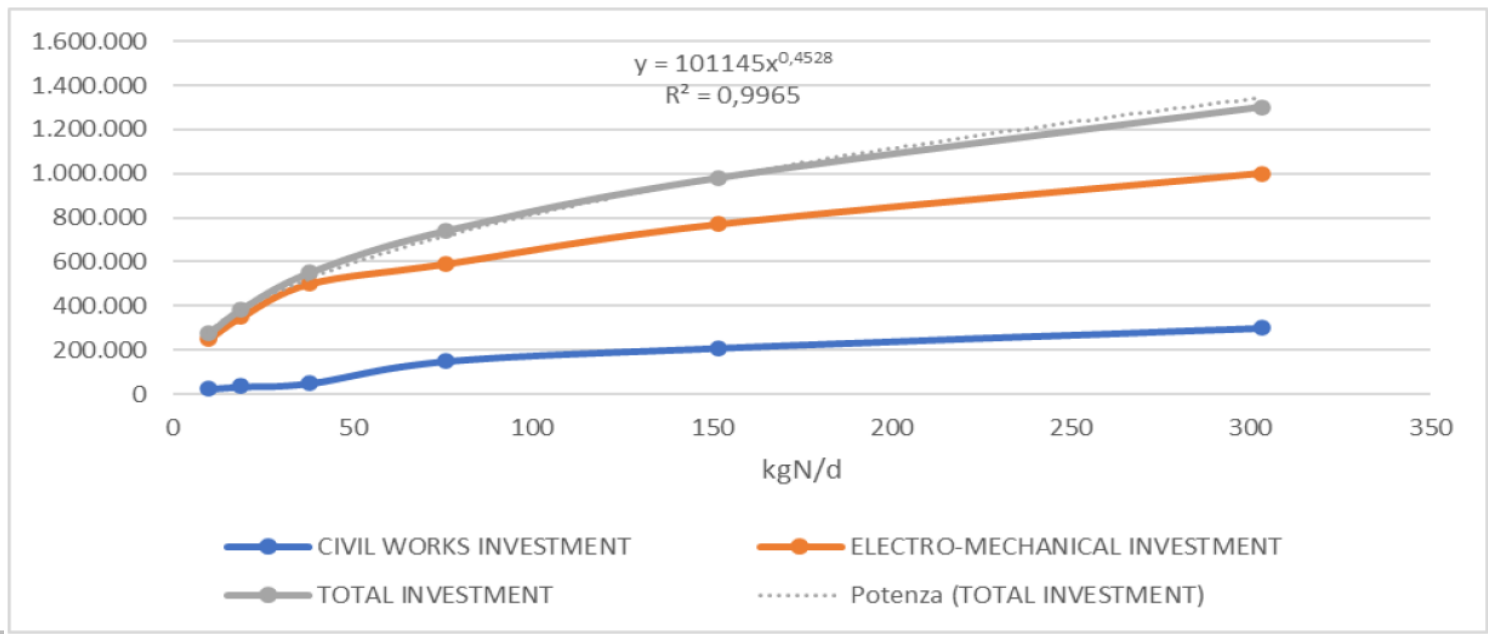
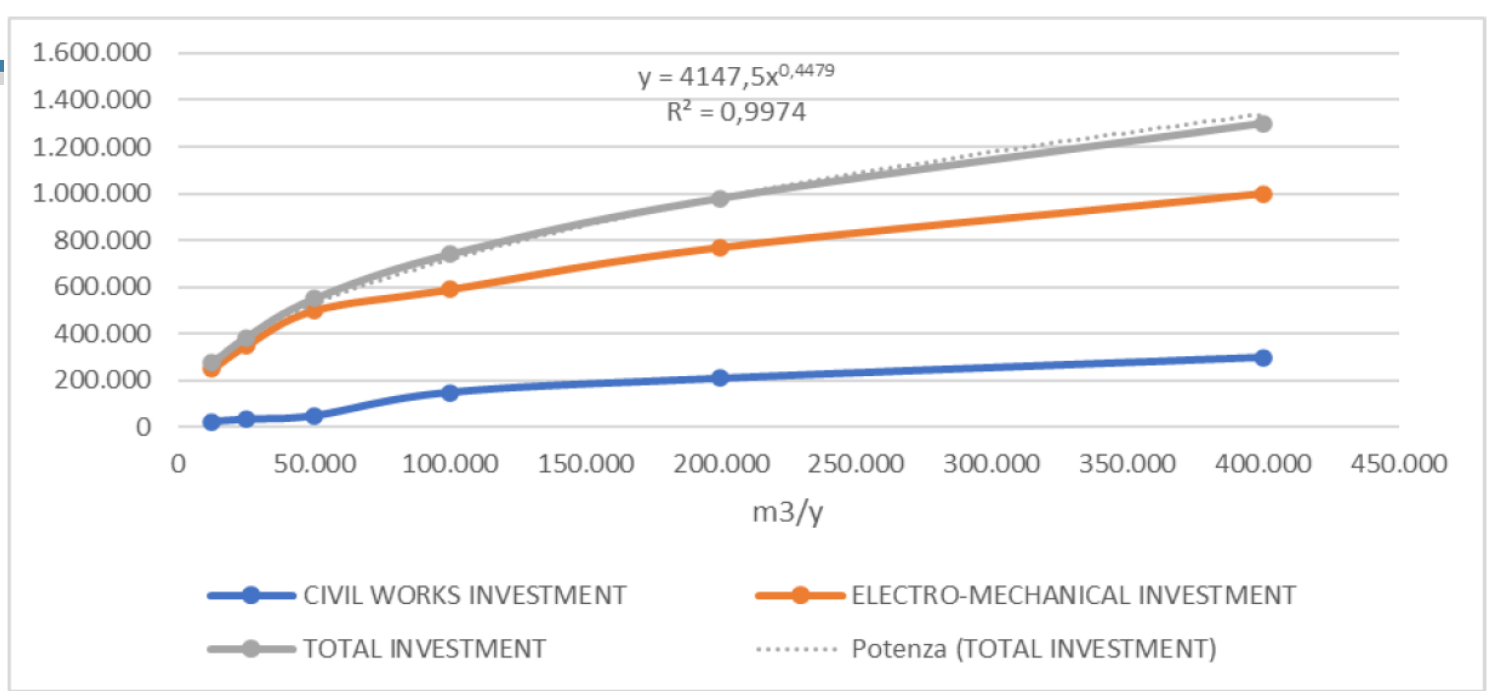
After the end of the project **the demo plant will be installed from time to time in the companies interested in adopting the new process** in order to acquire knowledge and detailed specifications useful for the design and construction of the specific equipment intended for the given application.

Investment estimation for scale-up design

	Volume		COD	N	N load	React vol.	Lines	Vol/line
	m ³ /y	m ³ /d	mg/l	mg/l	kg/d	m ³		
A	400.000	1.212	700	250	303	500	4	125
B	200.000	606	700	250	152	250	2	
C	100.000	303	700	250	76	125	1	
D	50.000	152	700	250	38	72	4	15
E	25.000	76	700	250	19	36	2	
F	12.500	38	700	250	10	18	1	

	CIVIL WORKS INVESTMENT	ELECTRO-MECHANICAL INVESTMENT	TOTAL INVESTMENT	Specific investment on the volume	Specific investment on N load
	€	€	€	€/m ³ /d	€/kgN/d
A	300.000	1.000.000	1.300.000	1.073	4.290
B	210.000	770.000	980.000	1.617	6.447
C	150.000	590.000	740.000	2.442	9.737
D	50.000	500.000	550.000	3.618	14.474
E	35.000	350.000	385.000	5.066	20.263
F	25.000	250.000	275.000	7.237	27.500

Investment estimation for scale-up design [€]



Investment estimation for potential real adopters

DTP company	Volume	N	N	INVESTMENT for construction			INVESTMENT for design and construction management		INVESTMENT
				based on the volume	Based on the N load	<i>Average</i>	Design	Construction management and safety	Total
				€	€	€	€	€	€
1	380.000	176	203	1.182.745	1.120.612	1.152.000	81.880	58.080	1.291.960
2	74.522	203	46	577.553	571.697	575.000	44.375	35.000	654.375
3	27.801	319	27	374.260	448.899	412.000	33.780	24.480	470.260
4	223.801	200	136	936.970	934.298	936.000	67.840	49.440	1.053.280
5	107.098	360	117	677.470	873.253	775.000	57.375	43.000	875.375
6	55.192	237	40	506.072	535.265	521.000	40.865	32.840	594.705
7	24.182	175	13	351.984	321.110	337.000	28.905	21.480	387.385
8	108.220	292	96	680.584	798.033	739.000	55.035	41.560	835.595
9	49.764	187	28	483.536	458.791	471.000	37.615	26.840	535.455
10	39.774	187	23	438.137	414.524	426.000	34.690	25.040	485.730
11	450.000	200	273	1.274.089	1.281.865	1.278.000	90.070	63.120	1.431.190
12	50.000	200	30	484.544	473.981	479.000	38.135	31.160	548.295

Investment assessment for potential real adopters

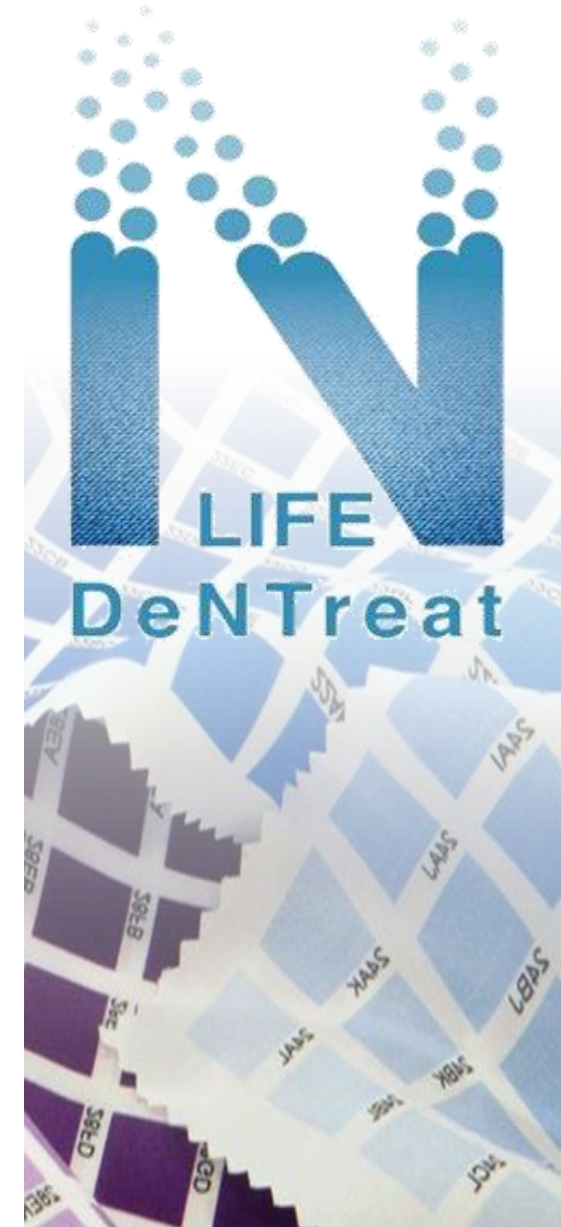
DTP company	Volume m3/a	BEFORE ON SITE TREATMENT	AFTER ON SITE TREATMENT	Saving on WW treatment tariff €/y	Service cost for on-site WW treatment €/y	Net Saving €/y	Investment €	Payback year (Investment/ge nerated cash flow - gross)	OPEX per Annual Volume €/m3
		WW treatment tariff (centralised wwtp) €/y							
11	450.000	922.297	602.886	319.411	159.107	160.305	1.278.000	8,0	0,35
1	380.000	814.084	549.502	264.582	145.764	118.818	1.152.000	9,7	0,38
8	108.220	268.153	150.786	117.368	92.485	24.882	739.000	29,7	0,85
4	223.801	438.915	290.668	148.247	115.279	32.967	936.000	28,4	0,52
5	107.098	314.580	197.613	116.967	93.364	23.604	775.000	32,8	0,87
6	55.192	125.675	74.578	51.097	73.769	-22.672	521.000	never reached	1,34
2	74.522	138.590	87.699	50.891	77.917	-27.025	575.000	never reached	1,05
12	50.000	105.011	67.832	37.179	72.443	-35.264	479.000	never reached	1,45

The calculated PBT does not take into account the shadow costs (the avoided environmental costs associated with reduction of nitrogen load in the water, GHG emission, sludge disposal, ...)

The reasons for investing in Life DeNTreat technology are to **increase sustainability** and to **reduce risk** of stopping production due to potential restrictions on the discharge limits.

Conclusions

- Life DeNTreat technology can be a solution to the problems of high nitrogen concentration in the discharge of DTP;
- specific insights are required for each DTP company considering the sensitivity of the anammox process and the potential peculiarities of the wastewater of the individual companies;
- the project developed a good knowledge of the process and the tools for verifying the wastewater treatability at laboratory and demonstration scale;
- the scale-up design criteria and cost estimates were developed in order to assess the feasibility of applying the Life DeNTreat technology for a real user.



Thank you

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