Cost Estimation for Wastewater Treatment Unit Processes (Dataset)

The data in the table below are based on the simulations and regressions performed with WTRNet (Joksimović 2006) and additional work and expert workshops. Each cost factor can be calculated with an equation in the form of: $\mathbf{y= C \cdot Q^B}$, w*here:* **Q** = Average flow [m^3/day], **y** = any cost component calculated (construction cost [1,000 USD 2006], land requirements [ha], Energy requirements [kWh/y], labor requirements [person-hour/month], other operation & maintenance [1,000 USD2006/y], **C** and **B** being the coefficients in the table below.

Unit process	Regression coefficient	Bar screen	Coarse screen	Grit Chamber	Equalization Basin	Sedimentation without coagulant	Sedimentation with coagulant	Anaerobic stabilization ponds	Activated sludge	Low Loaded Activated Sludge w/o de-N + Sec Sedim.	Low Loaded Activated Sludge w de-N + sec. Sedim.	High Loaded Activated Sludge + Sec. Sedim.	Extended aeration	Trickling filter with secondary sedimentation	Rotating biological contactor (RBC)	Stabilization ponds: Aerobic	Stabilization ponds: Facultative	Membrane bioreactor (MBR)	Constructed wetland	Enhanced biological phosphorus removal (EBPR)
Construction cost	B	0.512377	0.5138	0.446445	0	0.5146	0.468	0.896305	0	0.7209	0.7205	0.75104	0.75104	0.7361	0.7135	0.813302	0.844919	0.75	0.392608	0.522899
	C	4.044137	6.40085	9.13003	0	16.16125	29.05172	0.301345	0	7.787028	8.217256	4.859582	4.859582	5.055175	4.56597	1.108493	1.050282	8.193527	9.716189	1.700555
Land requirements	B	0.516602	0.357506	0.400943	0	0.947658	1.018748	1.000779	0	0.987576	1.003578	1.06568	1.06568	0.98438	0.984624	1.365297	0.903106	0.972166	0.957868	0.964509
	C	0.000108	0.00014	0.000119	0	5.17E-06	1.42E-06	0.00031	0	3.05E-05	3.21E-05	1.91E-05	1.91E-05	1.38E-05	2.09E-06	5.56E-05	0.001703	7.5E-06	0.002216	4.92E-06
Energy requirements	B	0	0	1.007629	0	0.998126	0.998126	0	0	0.985572	1.000008	0.999984	0.999984	1	1	0	0	1	0.999962	1.000815
	C	0	0	4.135609	0	1.303594	1.303594	0	0	181.3654	183.3218	91.67819	91.67819	55	55	0	0	219	36.678	1.821608
Labor requirements	B	0	0	0	0	0	0.054688	0.424123	0	0.144917	0.144917	0.190664	0.190664	0.190664	0.19172	0.416493	0.945928	0.715122	0.238406	0
	C	4	4	8	0	8	12.84873	1.400421	0	159.8641	159.8641	87.21185	87.21185	87.21185	86.87102	0.12485	0.026548	1.154627	6.142528	0
Other O&M	B	0.487562	0.516725	0.443285	0.78685	0.525599	0.518036	0.860822	0	0.928824	0.921522	1.204618	1.204618	0.696239	1.12612	0.839442	0.796592	0.693806	0.615594	0.58907
	C	0.46051	0.623897	0.900323	0.17251	0.288647	1.562384	0.028052	0	0.076386	0.077983	0.008541	0.008541	0.490095	0.033488	0.034076	0.033291	1.047075	0.449722	0.05249

Unit process		P-Precipitation	Denitrification	Dual media filter	Microfiltration	Ultrafiltration	Nanofiltration	Reverse osmosis	Activated Carbon	Ion exchange	Advanced oxidation process	Soil-aquifer treatment (SAT)	Maturation pond	Flocculation	Electrodialysis	Ozonation	Chlorine gas	Chlorine dioxide	Ultraviolet disinfection

Construction cost	B	0.145001	0.145001	0.593608	0.600001	0.600001	0.844997	0.844997	0.880302	0.999991	0.650751	0.99993	0.798678	0.196785	0.999991	0.732601	0.639202	0.639202	0.739904	
	C	12.14062	12.14062	3.096288	5.764633	5.764633	1.012361	1.012361	1.520823	0.177783	1.541952	0.024184	0.408424	29.82688	0.177783	2.481176	4.154137	4.154137	1.946311	
Land requirements	B	0	0	0.288012	0.584242	0.584242	0.498218	0.498218	0.981242	1.000271	1.00844	0.913122	0.999307	-2.2E-32	1.000271	0.495343	0.316981	0.316981	0.876243	
	C	0.0075	0.0075	0.019249	0.000144	0.000144	0.000151	0.000151	2.68E-06	7.27E-06	1.43E-06	6.95E-06	0.00035	0.0033	7.27E-06	6.56E-05	0.004053	0.004053	2.72E-05	
Energy requirements	B	0.996376	0.996376	0.99987	0.999957	1	0.999976	1	1	0.950291	0.888885	1	0	1.000063	1	0.999974	0.999787	0.999787	1	
	C	0.377218	0.377218	27.40468	91.28175	109.5	164.2818	365	182.5	147.7337	1873.141	87.6	0	5.299073	1058.5	208.0859	18.28174	18.28174	87.6	
Labor requirements	B	0	0	0.055642	0.184421	0.184421	0.184421	0.184421	0.342606	0.236782	0.264711	0.054727	0.305671	0	0.236782	0.264711	0.302861	0.302861	0.303461	
	C	0	0	51.1519	57.01982	57.01982	57.01982	57.01982	10.22092	17.4136	13.85992	108.4598	2.504125	24	17.4136	13.85992	4.684957	4.684957	4.68509	
Other O&M	B	0.999459	0.999459	0.006866	1.072667	1.076042	1.353971	1.095594	0.824784	1.097682	1.265371	1.050556	0.842496	0.401581	1.097682	1.074854	0.566581	0.566581	1.149077	
	C	0.003026	0.003026	13.02714	0.015008	0.014016	0.001879	0.009753	0.180252	0.005254	0.002112	0.024053	0.026887	0.737011	0.005254	0.001872	0.652346	0.652346	0.000657	

References

Joksimović, Darko. 2006. “Decision Support System for Planning of Integrated Water Reuse Projects.” University of Exeter.