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**Energy performance indicators of wastewater treatment - a field study with 17 Portuguese plants**

**Catarina Silva\*, Maria João Rosa\***

\* *Urban Water Division, Hydraulics and Environment Department, LNEC - National Civil Engineering Laboratory, csilva@lnec.pt, mjrosa@lnec.pt, Av. Brasil 101, 1700-066 Lisboa, Portugal*

**Abstract:** The energy costs usually represent the second largest part of the running costs of a wastewater treatment plant (WWTP). The energy Performance Indicators (PIs) are thus core measures of the Performance Assessment System developed for WWTPs. This paper presents the energy PIs proposed, which cover the unit energy consumption, production, net use and costs, and the results used to validate them and derive their reference values (PI costs excluded). The results of a field study with 17 Portuguese WWTPs (5-year period) were consistent with the results obtained for different countries through a literature survey on the energy consumption and production. The unit energy consumption showed an overall inverse relation with the volume treated, and the reference values reflect this relation for trickling filters and for activated sludge systems (conventional, with coagulation/filtration (C/F) and with nitrification and C/F). The reference values of energy production were derived from the methane generation potential and literature data, whereas those of energy net use consider the difference between the energy consumption and energy production.

**Keywords:** energy, performance assessment, performance indicators, wastewater treatment plants, activated sludge systems, trickling filters