Small wastewater treatment plants in Italy: situation and case studies of upgrading with advanced technologies

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Received 18 September 2011; Accepted 21 August 2012

ABSTRACT

The choice between centralization and decentralization of wastewater treatment depends on many factors and requires a case-specific approach. In Italy, 92% of plants have a potentiality of less than 10,000 p.e., but altogether they treat 31% of total pollutant load. They must comply with different local regulations and they have higher specific costs than larger plants. This paper reports some examples of upgrading small overloaded plants with advanced technologies such as lamellar settlers, dissolved air flotation (DAF), moving bed biofilm reactors (MBBRs), and membrane biological reactors (MBRs). In plant nr. 1, nitrification was improved by converting part of the aerated tanks into hybrid MBBRs. Plant nr. 2 was upgraded by converting an out-of-use tank into a tertiary MBBR. Plant nr. 3 was upgraded by introducing lamellae into the settler and converting a thickener into a tertiary MBBR. In plant nr. 4, a DAF unit was installed as a primary treatment to remove Total Suspended Solids and part of Chemical Oxygen Demand. In plant nr. 5, a DAF unit was installed as a secondary treatment to work in parallel with the existing settler during rainy days. Plant nr. 6 is in a touristic locality and was upgraded with a new treatment line based on MBR.

Keywords: Small plants; Upgrading; Flotation; Lamellar settlers; Moving bed; Membrane

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