

An evaluation of operation and maintenance costs of wastewater treatment plants: Gebze wastewater treatment plant sample

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ABSTRACT

Gebze wastewater treatment plant (GWWTP) is one of the biggest wastewater treatment projects of Kocaeli Metropolitan Municipality, a leading industrial zone in Turkey, and it has been built to collect and treat domestic wastewater coming from a population of 670,000 living in Çayırova, Şekerpınar, Eskihisar, Darıca and Gebze settlements in city of Kocaeli. GWWTP has been designed to have a dry-air flow rate of 120,000 m³/d and a wet-air flow rate of 144,000 m³/d. The system is made up of pre-treatment, biological removal of phosphorus, denitrification through extended aeration, nitrification and final clarifier stages. In the plant, removal of many contaminants has been aimed, mainly that of chemical oxygen demand (COD), biological oxygen demand (BOD₅), suspended solids (SS), nitrogen and phosphorus. Approximate removal efficiency of COD, BOD₅ and SS are determined to be 96%, 93%, 95%, respectively. As the treatment of the wastewater has been succeeded with the treatment plant, flow of wastewater into the rivers in the region has been prevented, as well. The total annual cost is 16,900,000 TL (Turkish Liras). Unit wastewater consumption cost is 0.39 TL/m³. Thanks to these costs, the water pollution is avoided by the treatment of wastewaters. In accord with relevant national legislation and the standards declared in UN directives, treatment of the wastewater produced in the Gebze district is provided in order not to cause any harm neither on the environment nor on the public health. Decreases in costs can be attained by the convenient operation of the plant.

Keywords: Wastewater treatment plant; Operation cost; Biological treatment; Evaluation

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