

COMPARISON OF DIFFERENT METHODS OF SLUDGE RECOVERY

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Different methods of urban sewage sludge energy recovery such as burning, gasification, pyrolysis and digestion based on the net energy production efficiency, advantages and disadvantages and complexity of these processes have been investigated in this article. The best method for energy production from sludge was selected among different methods according to energy and the amount of the greenhouse gas production. Quantitative and qualitative information on sludge was required to carry out this research so Ekbatan treatment plant-wastewater treatment sludge was analysed. The results showed that the sludge of this treatment plant has 5.7% solids, containing 65.7% volatiles and the dry heat value of 15.1×10^3 kJ/kg. It was found that the best scenario for sludge energy production in this treatment plant is a digestion process with pure net energy production of 73.2×10^7 kJ/d. The energy recovery in an anaerobic digester can prevent the emission of 16,680 tonnes of carbon dioxide annually and release about 1,460 tonnes of CO_2 per year. The chemical analysis showed that the existing sludge has a potential production of 25 m^3 of methane per m^3 of sludge in a digester. The annual amount of biogas that can be recovered from municipal sewage sludge is about 836543 m^3 . The heat value of this biogas is equal to $475,514 \text{ m}^3$ of natural gas. Therefore, with the correct utilization of the wastewater treatment plant, annual natural gas consumption will be saved up to $475,514 \text{ m}^3$. On the other hand, the biogas can be used to generate electricity, the power of the power plant to be 216.8 kW that with the construction of this power plant, an annual saving of 1.5 million dollars will decrease the cost of the plant.

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