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Energy consumption and economic cost of typical wastewater treatment systems in Shenzhen, China

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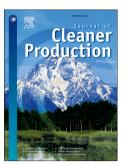
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10	
11	Abstract
12	Wastewater treatment, a great potential alternative to alleviate water shortage, has
13	been attached more and more importance in China, and has been developing very
14	fast. The quantity of wastewater treatment plants in China has increased up to 3272

in June 2013, and has a total handling capacity of 0.14 billion t/day. However, 15 wastewater treatment requires to consuming a lot of energy, and even energy 16 consumption is often the main operation cost of wastewater treatment systems. Thus, 17 it is very necessary to explore energy consumption of wastewater treatment systems 18 19 and its influential factors, and seek for some possible pathways to save energy and 20 lower cost. In this paper, we investigated the average energy consumption per unit 21 wastewater treatment in Shenzhen, and analyzed the effect of treatment capacity and treatment technology on the energy cost per unit of wastewater treatment. The results 22 showed that the average energy consumption of wastewater treatment plants in 23 24 Shenzhen was about 0.20±0.06 kWh/t, much less than those in such developed 25 countries as USA, Germany and Japan. This result may be related to the advanced wastewater treatment plants newly constructed and the low water quality 26 27 requirements of wastewater treatment in Shenzhen. As the key to wastewater treatment, biochemical treatment sub-process consumed 50-70% of total energy cost 28 29 in wastewater treatment. Secondly, the larger the treat capacity, the lower the energy 30 cost per unit of wastewater treatment was. And the difference of treatment 31 technologies can also significantly affect the energy consumption per unit of 32 wastewater treatment. Finally, labor cost and electricity consumption respectively 33 covered about 30.1% and 26.3% of total economic cost in the three typical wastewater treatment plants in original Shenzhen. Thus, upgrading treatment 34 machines & equipment and improving management level are two effective 35 alternatives to decrease energy consumption and lower total economic cost of 36

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