

Historical trend and Background of Municipal Solid Waste Incineration in China

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INTRODUCTION

Incinerators were used to treat municipal solid waste (MSW) in the mid-1980s in China. At the beginning of the reform and opening up in China, Shenzhen Municipal Sanitation Comprehensive Treatment Plant, the first modern municipal solid waste incinerator in China, was constructed in 1985. On March 17th, 2006, The Eleventh Five-Year Plan adopted by the National People's Congress was published, in which the first time the problem of MSW treatment had been included in the national planning outline (Bai, 2009). Before 2000, no more than ten incineration with waste to power generation projects with a total scale of no more than 1.0×10^4 t/d were completed and put into operation in China. By 2010, 85 projects with a total scale of 8.9×10^4 t/d, and by the end of 2018, 387 projects with a total scale of 3.7×10^5 t/d (SANITATION & ASSOCIATION, 2019). By the end of 2020, 580 projects were expected to be completed and put into operation (Jiao, Zhang, Shen, & Huang, 2020). China has witnessed the rapid development of MSW treatment, especially MSW incineration. This study aimed to identify the background of an increase in MSW treatment focusing on incineration in China, especially in Shenzhen City, Guangdong Province.

MATERIALS AND METHODS

The data was collected from the Ministry of Housing and Urban-Rural Development of the People's Republic of China and China Statistical Yearbook compiled by the National Bureau of Statistics of China. The number, capacity, and amount of MSW treatment plants were summarized with MS excel to deal with the data and Origin to show our statistical analysis results.

RESULTS AND DISCUSSION

Figure 1 shows the historical status of MSW treatment in China from 1980 to 2019. Harmless treatment refers to sanitary landfill, incineration, and others (biological treatment such as composting, anaerobic digestion). Note that the quantity of harmlessly treated from 1980 to 1995 includes the quantity of soil. Since 2006, treatment of MSW through sanitary landfill has adopted new certification standard, so the data of harmless treated waste were not comparable with those in the past years. By 2019, there were 18 harmless treatment plants with a total scale of no more than 2.6×10^4 t/d in Shenzhen City.

As for the process of MSW incineration in China, we can call it the initial exploration stage before 2000, the trial and improvement stage from 2001 to 2011, and the rapid development stage from 2011 to now. After the initial exploration stage, MSW incineration has been strongly supported by the state and has been included in various policies. The policies have promoted incineration development, and the number and capacity of MSW incineration have been increased (Figure 2). According to the statistical data, the proportion of incineration is increasing among harmless treatment no matter from number, capacity, or amount of MSW treatment plants aspects. The number of MSW incineration plants in Shenzhen City increased from three in 2002 to nine in 2019.

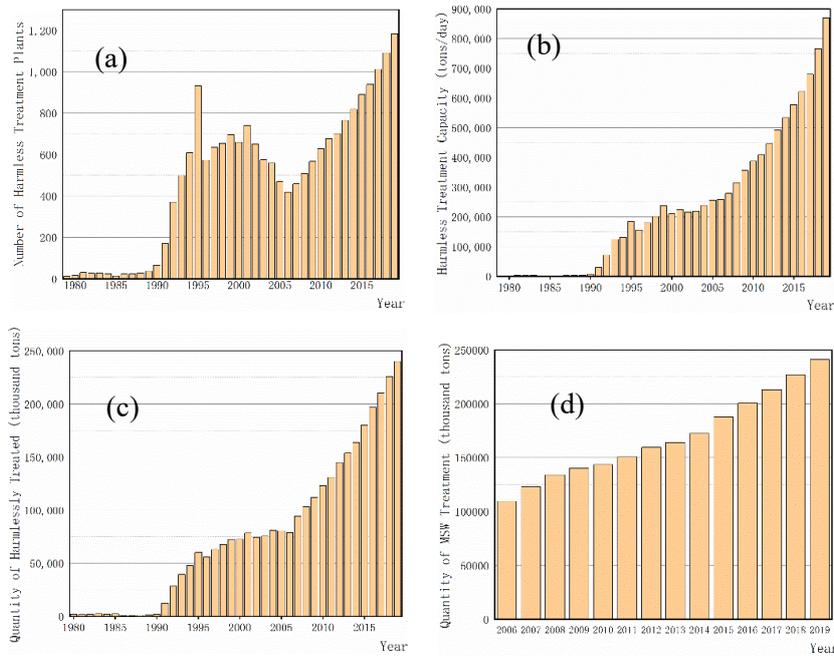


Figure 1. Status of MSW treatment in China; (a) number of harmless treatment plants, (b) daily capacity of harmless treatment in total, (c) MSW harmlessly treated per year, and (d) MSW treated with other treatment methods.

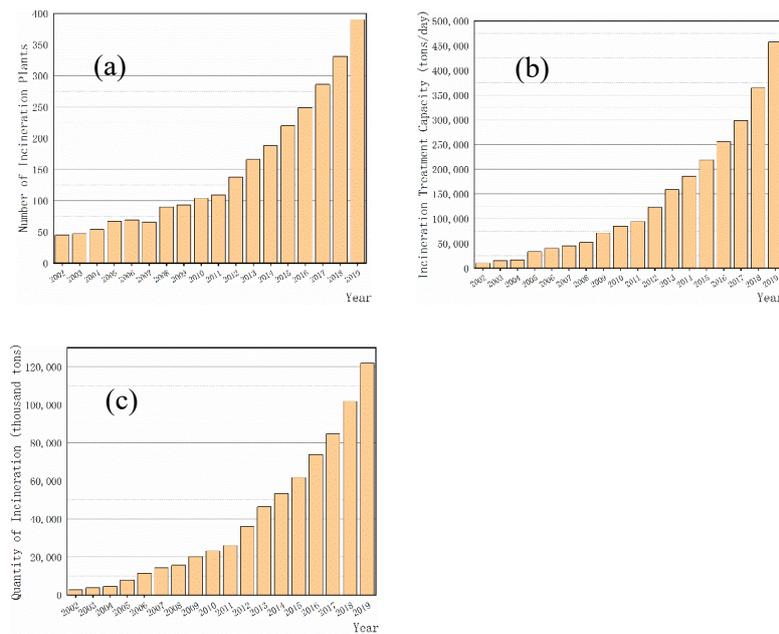


Figure 2. Status of MSW incineration in China; (a) number of incineration plants, (b) daily capacity of incineration treatment in total, and (c) MSW treated at incineration plants per year.

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