

# 琉球大学学術リポジトリ

## 低炭素社会実現のための入力と排出の環境負荷低減に関する研究

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## 論文要旨

### 論文題目

A Study on Environmental Loads of Input and Discharge for Low Carbon Society  
低炭素社会実現のための入力と排出の環境負荷低減に関する研究

The problem of climate change due to energy consumption and resulting CO<sub>2</sub> emissions is increasingly urgent. The study on Environmental Loads of input and discharge for low carbon society is important. Municipal solid waste management has a great impact on the realization of low carbon society. Recent increase of population and economic growth has resulted in a larger production of waste in China, which exerts more pressure on the management of municipal solid waste system. Therefore, this reach aimed to predict the amount of waste discharge, which can provide reference for the construction of garbage dump and the management of domestic solid wastes. Quantitative data about the amount of domestic waste in Beijing, Shanghai, Nanjing and Guangzhou from 2009 to 2017 were collected. The projection of the domestic waste in the 4 cities in the future by the multiple regression analysis indicates that the total amount of domestic waste in Beijing, Shanghai, Nanjing and Guangzhou will reach 13 million tons, 13 million tons, 6 million tons and 7.5 million tons in 2027, respectively. In order to find out the reasons and solutions for the continuous increase of the domestic waste, a field investigation of domestic waste was conducted in Nanjing. The result indicates that the residents discharge various kinds of waste together without sorted collection. The separate waste collection system is still at the pilot stage in Nanjing as well as Beijing, Shanghai and Guangzhou, which is one of the main reasons for the increase of waste. The questionnaire indicated the people would reduce the waste in Beijing, if the collection fee like Japanese system would be innovated. The amount of domestic waste was projected when the collection fee is innovated. The results show that about 600,000 tons of waste per year will be reduced in Beijing.

On the other hand, it is reported that in the European Union, buildings account for 40% of energy consumption and 36% of CO<sub>2</sub> emissions, therefore improving the energy efficiency of buildings can significantly contribute to lower CO<sub>2</sub> emissions. One of the important passive ways to improve energy efficiency of Buildings is cool roof system. Another reach aimed to compare the performance of 4 types of cool roof system through field tests. Cool roof means solar protection on roof surface. The tested systems were solar cells as a shading device, several types of thermal insulation paint as heat reflectors, a rooftop garden as an outside thermal insulator on a roof and a water pond on a roof as a coolant with sensible heat and evaporation. The test results indicated obvious temperature difference between the cool roof and the ordinary surface. The heat flux was calculated from the results to estimate the cooling load saving. Finally, these results were examined from the viewpoint of cost performance.

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