Study on Policy Support System for Regional Recycling of Domestic Organic Wastes

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1. INTRODUCTION

Now that domestic wastes treatment system is so complex that it has a lot of options and combination, it is difficult to find out if the system is appropriate without quantitative evaluation. Especially the disposal of organic wastes is almost depending on incineration, so it is important to consider the prospect of the alternative method. The purpose of this study is to develop the model evaluating domestic wastes treatment system quantitatively and calculating the cost, the volume of carbon dioxide emissions and energy consumed.

2. OUTLINE OF THE MODEL

This model is based on the wastes system model developed by Tanaka (1998). I add flow path to the methane fermentation facility to his model, and deal with two composting devices, domestic electric waste disposer and domestic composter. Those flows make it possible that the fermentation residual dross is not only used as fertilizer but brought to the incineration facility. Moreover, the new calculation method of the total transportation distance by GIS is developed.

3. DERIVATION MODEL SPECIFIC TO THE TARGET CITY

Through cooperation from “a target city”, I build a derivation model specific to the target city. First amount of domestic wastes for each person a day is estimated. Second the flows of the model is adjusted to the existing facilities in the target city, such as the incineration facility, the bulky wastes disposal facility, the volume reduction and solidification facility and the recycle facility. Third transportation is evaluated by using 15” mesh including population data in each mesh.

4. SCENARIOS FOR THE FUTURE OUTLOOK

I set eight scenarios for the future outlook based on regional characteristics of the target city. 0:BaU, 1:promotion of recycling, 2:promotion of recycling and reducing wastes, 3:promotion of domestic disposal of organic wastes, 4:metan fermentation of organic wastes, 5:methane fermentation of flammable garbage including organic wastes, 6:promotion of recycling and methane fermentation of flammable garbage, -1:promotion of thermal recycling

5. RESULTS AND CONCLUSION

Because of population decrease, amount of CO_2 emission, incineration, ash and landfill is decreased But energy consumption is increased. (Table1) Compared between scenarios, the best scenario for reducing CO_2 emission and amount of landfill is scenario 2: promotion of recycling and reducing wastes. And the best scenario for reducing cost and consumption of energy is scenario -1: promotion of thermal recycling. (Table 2)

Table 1 comparison of 2003 with 2004

index	emission of CO_2	consumption of energy	total cost	incineration	ash	landfill
measure	t-C/year	Tcal/year	million-en/year	t/year	t/year	t/year
2003	40,357	828	7,850	123,512	13,468	7,409
2034	38,282	844	7,731	113,383	12,364	6,801
percentage of change	-5.1	2.0	-1.5	-8.2	-8.2	-8.2

Table 2 comparison of scenario 0 with the other scenarios

	scinario	emission of CO_2	consumption of energy	total cost	incineration	ash	landfill	lower calorific value
1	promotion of recycling	-15.8	-0.7	1.5	-10.8	-6.4	-16.9	-4.1
2	1 + domestic disposal	-16.1	1.0	-0.2	-16.6	-11.1	-24.2	-3.6
3	domestic disposal of wastes	6.4	4.9	1.9	-5.6	-1.3	-1.7	5.8
4	CH_4 of oganic wastes	2.1	2.7	1.2	-8.2	-2.2	-3.6	7.3
5	CH_4 of flammable garbage	3.4	9.4	4.8	-5.0	-10.4	0.0	-24.7
6	1 + 5	-13.0	7.8	5.8	-14.9	-15.0	-16.9	-28.0
-1	thermal recycling	45.3	-5.9	-8.3	37.3	29.4	-7.2	24.0

measure[%]