Joint Research on Surveying Energy Required for Gasification, Fuel Conversion, Etc. of Sewage Sludge,

Year of Research	2008	

(Goal)

To fight global warming, sewage sludge treatment by conventional energy consuming treatment methods must end. Thus a variety of technologies focused on limiting energy consumption have been proposed, and many of those which have been developed including those developed by the Lotus Project have increased diversity and complexity. Common properties and unique features of similar technologies and differences between their energy requirements and N_2O emissions are now unclear.

This study of digestion + fuel conversion, direct fuel conversion (high temperature carbonization, low temperature carbonization, and pelletization dried sludge), gasification, and incineration treatment methods, was a comparative study of input energy, energy of fuel created, and N_2O produced by treatment processes based on existing technical reports and interviews with makers by general combustion methods. The results are presented as quantitative outlines by treatment method and the achievements are summarized in a written report.

(Results)

The following are the goals of the joint research, certified contents of the research, and the types of surveys.

(1) Goals

① Clarifying standard values of input energy and energy products for each treatment method.

② N_2O emission coefficient (inventorying interview values etc.)

(2) Contents of the surveys

Inventorying contents related to planning, design, etc.

① Inventorying sewage system statistics and other results data

② Inventorying data by interviews with makers

③ Inventorying required energy and energy products

④ Calculating quantity of greenhouse effect gas emissions

(Achievements of the research)

As examples of achievements of the research, Figure 1 shows energy consumption considering the use of products, and Figure 2 shows greenhouse effect gas emissions considering the use of products.

This study included analysis limited to energy matters; it does not consider the transport of fuel products, environmental measures, etc.

- Combustion technologies based on drying and carbonization consume less energy and emit less greenhouse effect gasses than conventional incineration considering the use of products of fuel conversion.
- Digestion dewatering tends to be more energy efficient, but when using the sludge drying method that produces a large quantity of product, there is little variation in the greenhouse effect gas emission reduction effects according to whether or not digestion is performed.
- It is necessary to replace the concept of sludge treatment and disposal with the concept of efficient energy use.

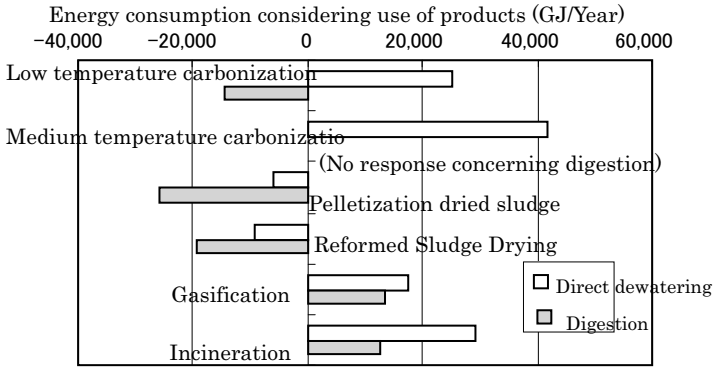

Figure 1. Energy Consumption Considering Use of Products
(concentrated sludge: 474m3/day, 90t-direct dewatering/day,
62.5t-Digestion/day)

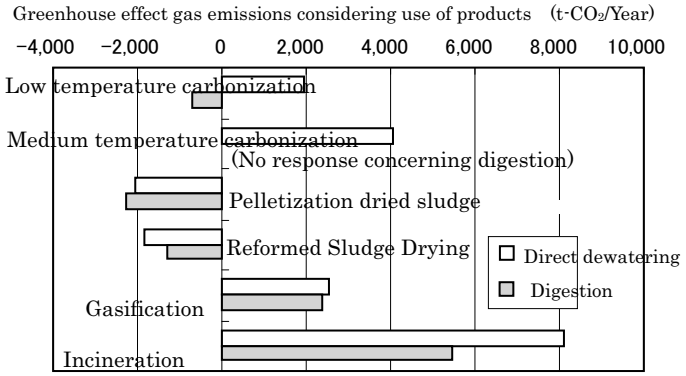

Figure 2. Greenhouse Effect Gas Emissions Considering Use Of Products
(concentrated sludge: 474m3/day, 90t-direct dewatering/day, 62.5t-Digestion/day)

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Key words	Required energy, energy products, N_2O emission coefficient