

Joint Research on Acceptance of Biomass (Raw Garbage, etc.) by Sewage Treatment Plants

Year of
research

2009~2010

Research of resource and
energy in sustainability

(Goals)

The “Sewage System Vision 2100 — 100 Year Plan to Replace Swage Systems with Recycling Channels”, which was compiled in September 2005, advocates working to achieve the goal of transforming present sewage treatment systems (transforming their facilities) into new sewage treatment systems which, in addition to conventional wastewater treatment system functions, also ensure sound water cycles (water channels) and natural resource cycles (natural resource channels) in order to create sustainable recycling societies.

Under these circumstances, in response to the first acceptance of combined biomass at the Ishikawa Prefecture Suzu City Purification Center, interest has focused on technologies to be used at sewage treatment plants for the joint treatment and resource recycling of biomass produced outside the plants, and either joint treatment by this method is being implemented or joint treatment systems are being constructed in Kita-hiroshima City, Kurobe City, and Eniwa City.

In this way, night soil treatment plant deterioration is advancing and the period when urban garbage incineration facility reconstruction and renewal must be carried out are approaching, increasing the demand for sewage treatment plants to accept raw garbage etc. But, sewage treatment plant operators who would accept such materials are presumably concerned about the treatment cost incurred accepting raw garbage etc. and its impact on water treatment.

The goals of this research were to organize the merits and the impacts on existing treatment plants of accepting biomass at sewage treatment plants (raw garbage, night soil, septic tank sludge) and introduction methods etc., and to prepare a manual to deepen the understanding of sewage treatment plant operators.

(Results)

(1) Technical organization

A typical biomass pre-treatment system flow based on the example of the LOTUS project, which is a proving test of the combined digestion of sewage sludge and raw garbage, and on interviews with manufacturers was shown. And the quantity of biomass which can be accepted, its impact on water treatment systems, and its impact on sludge treatment systems, etc. were organized based on the results of the LOTUS project, existing documents, and interviews with manufacturers.

(2) Legal organization and adaptability of subsidized works

Because the treatment of raw garbage and other ordinary waste is done at sewage treatment plants,

related laws etc. were organized. Facility construction can be conducting using various work systems of the Ministry of Land, Infrastructure, Transport and Tourism and the Ministry of the Environment, so subsidized works were organized.

(3) Case study

The impacts on economic efficiency and greenhouse effect gas emissions for a case where digestion gas was used to generate electric power while varying the types and quantities of biomass accepted and the existing capacity of sewage treatment plants were analyzed and evaluated.

In a case study conducted in City C, it was trial calculated that in the case where 9.2t/day of raw garbage was accepted at a treatment plant with existing treatment capacity of 43,700m³/day from a population of approximately 95,000 people, costs would be cut by 60 million yen per year and that CO₂ emissions would be reduced by 1,540 tons per year. In a case study of a virtual treatment plant, a trial calculation revealed that if only raw garbage were accepted by a municipality with a population of 150,000 people, cost would be cut by about 100 million yen/year, and if raw garbage plus night soil and septic tank sludge were all accepted, costs would be cut by between 240 million and 360 million yen.

(4) Preparation of a manual

The above achievements have been summarized as the Sewage Treatment Plant Biomass (Raw Garbage, etc.) Acceptance Manual.

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Key words

Biomass, night soil, raw garbage, combined digestion, anaerobic sludge digestion