

Empirical Study on B-DASH Project (Practical use of methane collection with occlusion containers, Local production for local consumption type energy system, Global warming countermeasure type sludge combustion technology, Technology for improving sewage treatment capacity at low cost)

(Study period: from FY2015)

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1. Introduction

In order to promote energy saving and energy creation in sewerage, low-cost and efficient innovative technologies need to be developed. Accordingly, the Ministry of Land, Infrastructure, Transport and Tourism ("MLIT") has been promoting the "Breakthrough by Dynamic Approach in Sewage High Technology" (B-DASH) project since fiscal 2011 in order to realize cost reduction, creation of renewable energy, etc. in sewerage projects through acceleration of R&D and practical use of innovative technologies and to support overseas development of the water business by Japanese enterprises. In addition, National Institute for Land and Infrastructure Management (NILIM) has been studying innovative technologies as a commissioned research in the B-DASH Project. This paper outlines (i) "Empirical study on the technology for practical use of collection with methane refiner and occlusion container," which was adopted in fiscal 2015 as real-scale demonstration, (ii) Empirical study for practical use of the technology using local production for local consumption type energy with high-efficiency digestion system, "which was adopted in fiscal 2017 as real-scale demonstration, (iii) Empirical study on the generation type sludge combustion technology considering greenhouse gas reduction, and (iv) Empirical study on the technology for improving the treatment capacity of final settling tank.

2. Outline of real-scale demonstration technologies

(1) Empirical study on the technology for practical use of collection with methane refiner and occlusion container

(Joint Research Organization of JNC Engineering Co., Ltd., Adsorption Technology Industries Ltd., Kyudenko Corp., Sinko Co., Ltd., Yamaga City Gas Co., Ltd., Prefectural University of Kumamoto, Otsu-cho, Mashiki-cho and Yamaga-shi)

In order to conduct stable gas purification and power generation stable throughout the year, demonstration is proceeding for the technology of power generation

from surplus biogas that is generated, purified, and stored into occlusion containers at multiple small-and-medium-size sewage treatment facilities, and then transported by vehicles for concentration at one location.

Introduction of this technology is expected to promote effective use of sewage resources in small-and-medium-size sewage treatment facilities, reduction of maintenance cost by energy creation, etc.

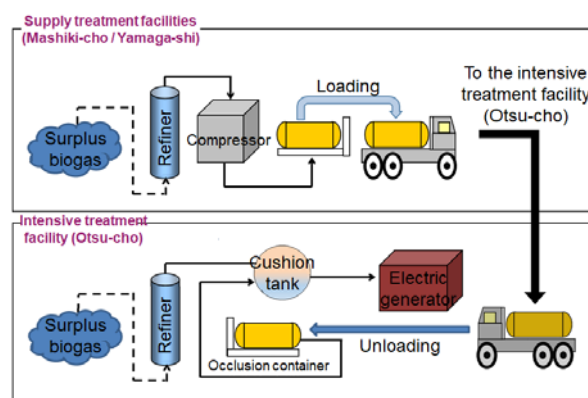


Fig. 1: Outline of the technology on practical collection using methane refiner and occlusion container

(2) Empirical study for practical use of the technology using local production for local consumption type energy with high-efficiency digestion system (Joint Research Organization of Mitsubishi Kakoki Kaisha, Ltd., Kyushu University, Japan Sewage Works Agency, and Karatsu-shi)

In order to verify stable digester operation, increase in gas yield, etc., demonstration is proceeding for the highly efficient digestion system technology developed in combination of utilization of unused biomass such as kitchen garbage, non-powered digester stirring equipment, sludge solubilization equipment to increase biogas generation, and a fuel cell that generates power with high generation efficiency using biogas.

Introduction of this technology is expected to reduce

sludge disposal cost due to concentrated treatment and to improve energy self-sufficiency rate in sewage treatment facilities.

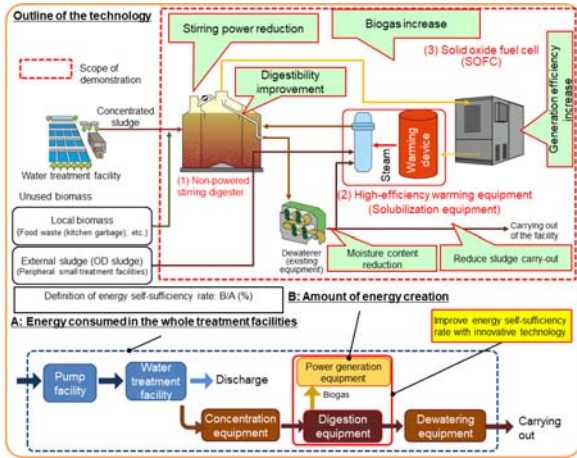


Fig. 2: Outline of technology for empirical study for practical use of the technology using local production for local consumption type energy with high-efficiency digestion system

(3) Empirical study on the generation type sludge combustion technology considering greenhouse gas reduction, and

(Joint Research Organization of JFE Engineering Corp., Japan Sewage Works Agency, and Kawasaki City)

This empirical study aims to demonstrate the effect of improvement in power generation against heat input and the effect of reducing NOx / N2O emissions for the system technology in combination of the high-efficiency power generation technology utilizing unused waste heat from the sludge incinerator and the local stirring air blowing technology that reduces NOx / N2O emissions and is applicable to existing sludge incinerators (fluidized bed).

Introduction of this technology is expected to improve power self-sufficiency rate and greatly reduce greenhouse gas emissions in sewage facilities.

(4) Empirical study on the technology for improving the treatment capacity of final settling tank

(Joint Research Organization of Metawater Co., Ltd., Japan Sewage Works Agency, and Matsumoto City)

Demonstration for checking the stability and the cost reduction effect of effluent quality is conducted using the existing final settling tank frame about the technology which ["which is improved quantitatively or qualitatively"] * make processing capacity at low cost by installation of a filtration part, without extending a final settling tank.

Introduction of this technology is expected to realize low-cost and efficient renewal of equipment in sewage

treatment facilities that are insufficient in treatment capacity and need to renew its equipment as well as stable water treatment when flow rate increased due to integration / abolition etc.

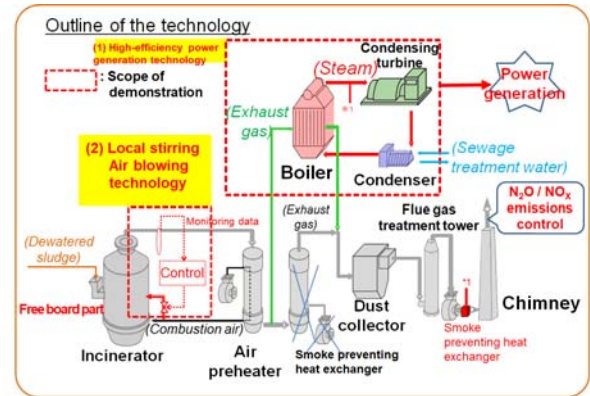


Fig. 3: Outline of the generation type sludge combustion technology considering greenhouse gas reduction

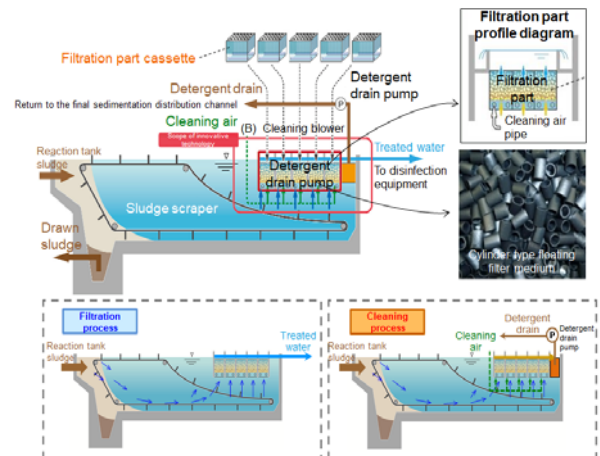


Fig 4: Outline of the technology for improving the treatment capacity of final settling tanks

* Quantitative improvement:

Water treatment in a volume twice the estimated daily max sewage flow without degrading the quality of treated water.

Qualitative improvement:

Water treatment to quality similar to rapid filtration water in estimated daily max sewage flow.

3. Future development

We have generally confirmed the effects for the four technologies introduced above.

NILIM is going to formulate guidelines for considering introduction of technologies based on study results, and promote dissemination and development of the guidelines.

See the following for details.

[Reference] Website introducing B-DASH
<http://www.nilim.go.jp/lab/ecg/bdash/bdash.htm>