

Demonstration on the Efficient Energy Utilization Technology by Highly Concentrated Digestion and Energy Saving Biogas Purification (B-DASH)

(Research of FY 2018-2019)

1. purpose

The efficient energy utilization technology with highly concentrated digestion and energy saving biogas purification has two significant features. One is the major reduction of the tank capacity can reduce its initial costs. The another is its simple configuration makes O&M easy.

This study aims to demonstrate its treatment performance and adoption effects by the actual scaled facilities to promote the sludge digestion and biogas utilization at the domestic municipal WWTPs.

The demonstration is selected as B-DASH Project*¹ 2018 of MLIT*². The joint research group of Kobelco Eco-solutions, Co., Ltd, JS, and Fuji City conduct the demonstration as an entrusted research project of NILIM*³

*1.B-DASH Project: Breakthrough by Dynamic Approach in Sewage High Technology Project

*2.MLIT: Ministry of Land, Infrastructure, Transportation, and Tourism

*3.NILIM: National Institute for Land and Infrastructure Management

2. Past years progress

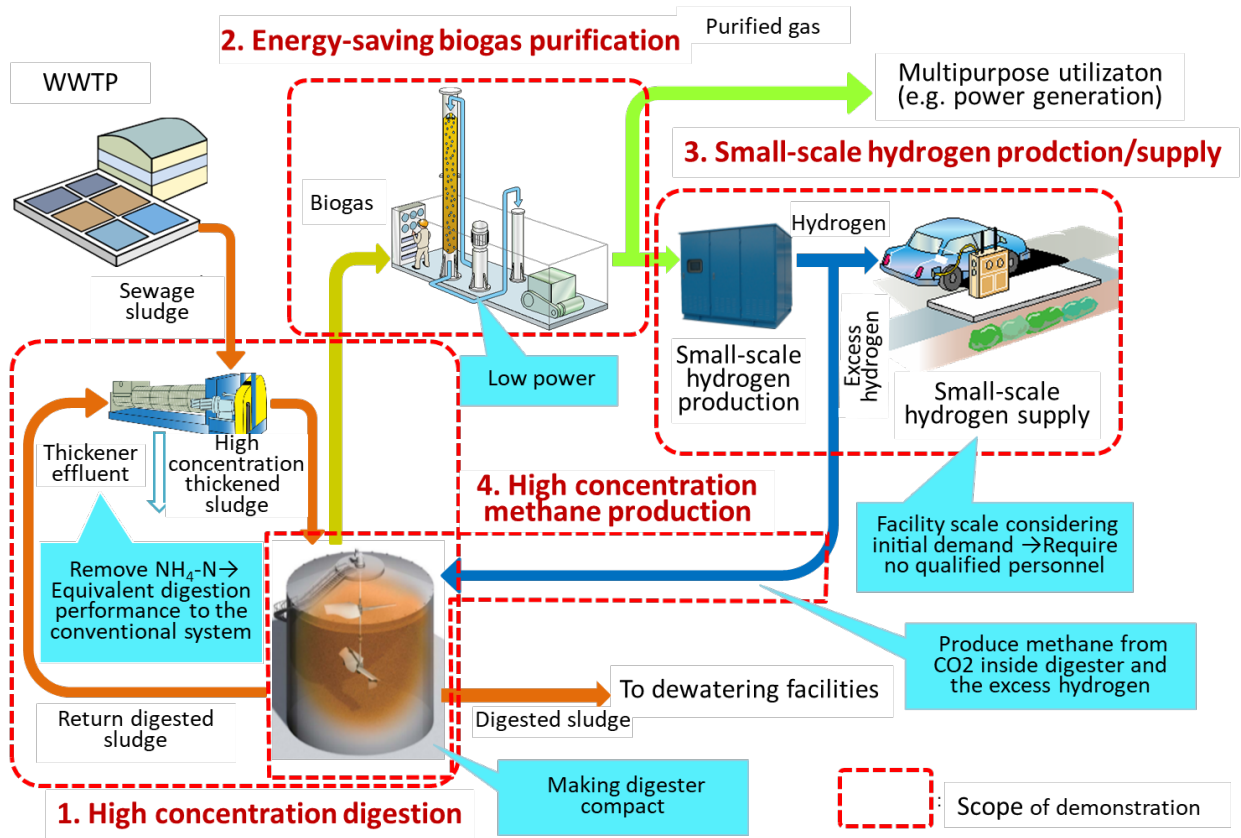


Figure 1. Treatment flowchart of the demonstration technology

As figure 1 describes, the demonstration technology consists the following four technologies.

- 1, High concentration digestion technology that high thickening of sludge supplied into a digester to make digester capacity compact
2. Energy-saving biogas purification technology that can generate high pure methane biogas with lower power than the conventional technologies
- 3, Small scale hydrogen production/supply technology that estimates demand on a fuel cell vehicle

4, High concentration methane production technology that returns excess hydrogen to a digester to reproduce methane with methanogenic bacteria

This study combines the above technologies to aim to establish the efficient energy utilization technology.

3. Outcomes of this year

The research group set up actual scale facilities of the demonstration technology at the Fuji city east region WWTP. The major results of this years are as follows.

1. The high concentration thickening device could concentrate the mixed sludge including primary sludge, excess sludge, and return digested sludge of TS 6% and more. NH₄-N existing in mixed sludge dissolved in thickener effluent and could be separated (Figure 2.)

2. The high concentration digester started running by using thickened sludge with TS 6%. Though it had loading factor of about 30%, the operation was in good shape.

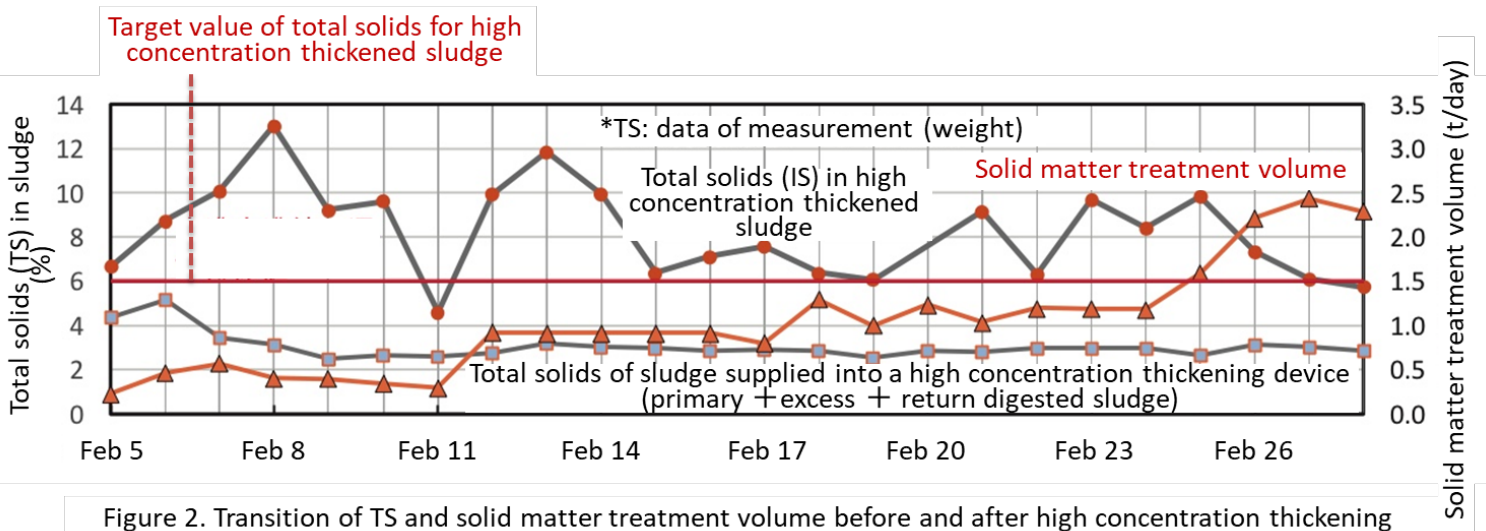


Figure 2. Transition of TS and solid matter treatment volume before and after high concentration thickening

4. Conclusion and future issues

The demonstration facilities have completed its construction within FY 2018 and their operation continue after FY 2019.

The research group will continue to supply sludge into a high concentration digester to increase its load through the year. The energy saving biogas purification technology and small-scale hydrogen production/supply technology will be also verified.

Keywords: High concentration digestion, Energy saving, Biogas, Small-scale hydrogen production