

# B-Dash: Demonstration of Efficient Energy Utilization Technology with Highly Concentrated Digestion and Energy Saving Biogas Purification

(Research of FY 2018-2019)

## 1. Purpose

The efficient energy utilization technology with highly concentrated digestion and energy-saving biogas purification (demonstration technology) combines two technologies; digestion technology saving initial investments by reducing tank volume, and biogas utilization technology making O&M easy.

This study aims to demonstrate its treatment performance and adoption effects.

The demonstration is selected as B-DASH Project 2018 of MLIT. The joint research team of Kobelco Eco-solutions, Co., Ltd, JS, and Fuji City joined the demonstration as an entrusted research project of NILIM for 2018-19.

## 2. Past Years' Progress

FY2018: Completion of the demonstration facilities. The high concentration digestion tank started operation with a load rate of 30%.

FY2019: The high concentration digestion tank started a rated load operation to verify through four seasons.

### 3. Outcomes of This Year

The research team set up demonstration facilities at the Eastern Purification Center with a treatment capacity of 55,800m<sup>3</sup>/day in Fuji city of Shizuoka prefecture. The facility has a treatment capacity of 5.3t/day, capable of treating whole sludge generated in the center. Through collecting an entire year's data, the demonstration had the following outcomes.

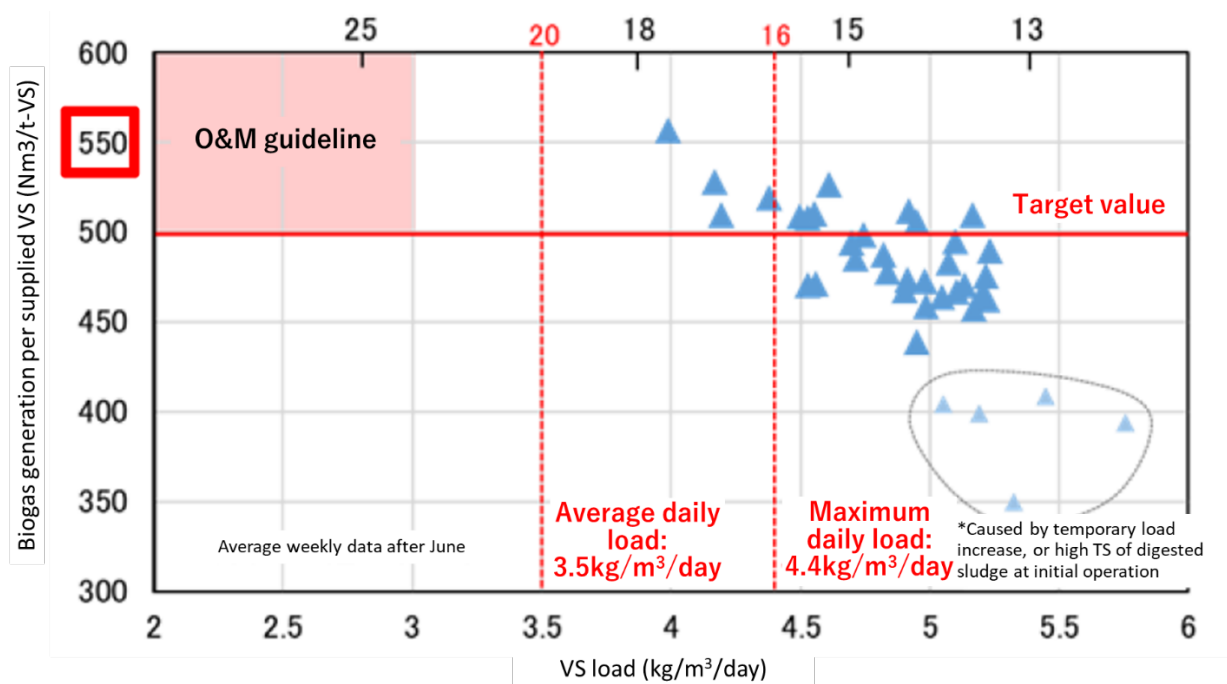


Figure 1. Relationship between VS load and biogas generation per VS

(1) Figure 1 describes a relationship between VS load and biogas generation per input VS. The demonstration facilities achieved a target value of 500Nm<sup>3</sup>/t-VS, biogas generation per input VS at VS load of 4.4kg/m<sup>3</sup>/day or less as a maximum design load.

(2) The demonstration has tried to save energy by reducing drive pressure from 0.9MPa to 0.7MPa for middle-scale treatment facilities. Figure 2 shows electric consumption per biogas volume. The average electric consumption of four seasons was 0.43kWh/N<sup>3</sup>-biogas in the average biogas volume of

2,400Nm<sup>3</sup>/day (100Nm<sup>3</sup>/h.) In 2011, the purification technology for large-scale facilities based on high-pressure water absorption, same as this technology, was demonstrated in the B-DASH project. Compared to this "existing" technology, this year's study showed that demonstration technology saved electric consumption by 30%.

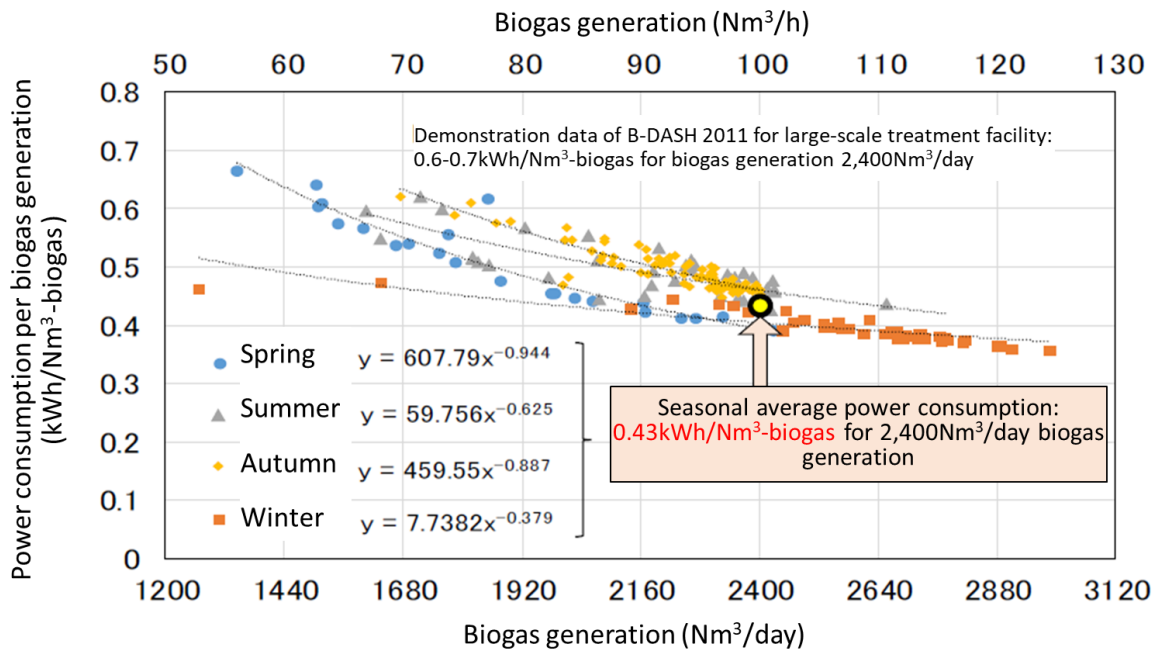


Figure 2. Relationship between VS load and biogas generation per VS

#### 4. Conclusion and Future Issues

The actual scale demonstration confirmed the performance of the Efficient energy utilization technology with Highly Concentrated Digestion and Energy Saving Biogas Purification under the specific condition. The demonstration results satisfied the following primary goals.

1. Biogas generation efficiency of the highly concentrated digestion facility: Biogas generation of 500Nm<sup>3</sup>/t-VS and over

2. Electric consumption unit of biogas purification technology: energy-saving compared to the existing technology

The research team will demonstrate the long-term stability of the technology and its adoption conditions, bringing more benefits.

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Keywords: **Highly concentrated digestion, Energy saving, Biogas, Biogas purification technol**