

## Evaluation of a sewage sludge to fuel system based on the pyrolytic carbonization process.

Year of Research

2008 • 2009

### (Purpose)

This study evaluates a sewage sludge to fuel system based on the pyrolytic carbonization process.

This system can decrease negative environmental impacts from those of conventional sewage sludge treatment systems such as incineration, and can provide the following features.

- (1) It can produce less greenhouse effect gas than a high temperature(850°C) incineration system.
- (2) It can decrease consumption of electricity and fossil fuel.
- (3) It can produce solid fuel such as coal.
- (4) It has sufficient detoxification performance and operativeness.

### (Research)

#### 1. Outline of the technique

This system applies the pyrolysis process for treating sewage sludge and produces pyrolysis gas and solid carbon.

First, dewatered sludge is dried to about 20% water content by an indirect heating type dryer which uses steam as its heat resource.

Water evaporated from the sludge is condensed at a wet gas scrubber, then drained and returned to the sewage treatment plant.

Dried sludge is put into the pyrolysis kiln and transformed into solid fuel.

The pyrolysis kiln temperature is controlled in the range of 400 – 600 °C and fossil oil is used to stabilize operation of the system.

Exhaust gas from the pyrolysis gas burner is used as the heat source for the steam boiler which produces steam used for heating the dryer and which is finally exhausted from the stack after gas wash.

#### 2. Development target

Development targets are showed below.

Condition :

Dewatered sewage sludge : Water content 78%wt.  
Higher heat value of sewage sludge 18MJ/kg-DS

Target value :

Negative environmental impact: Less than 200 kg-CO<sub>2</sub>/t-dewatered sludge  
Energy consumption: Less than 2,040 MJ/t-dewatered sludge  
(Electricity and fossil oil)  
Fuel evaluation: Quantity of carbon fuel 75kg/t-dewatered sludge  
Higher heat value of carbon fuel 12MJ/kg-carbon  
Combustiblensess, safety, handling

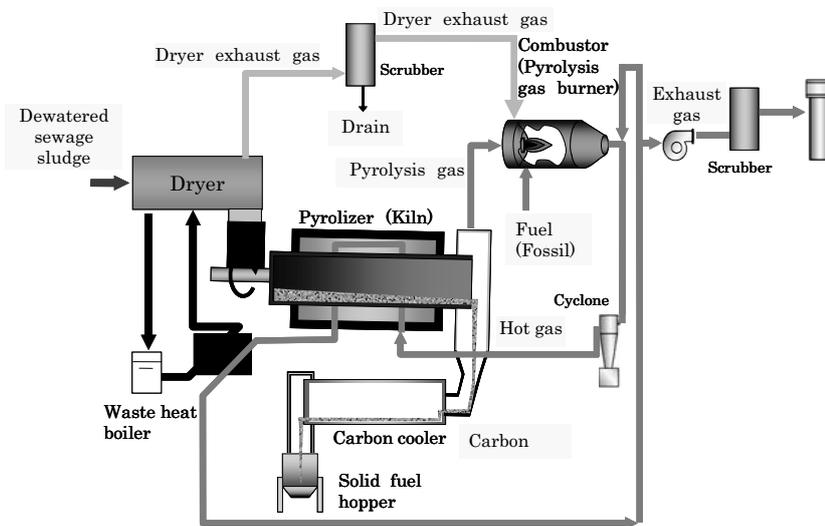


Fig.1: The Sewage Sludge to Fuel System

**(Schedule)**

The summer term and the autumn term field tests were completed at the end of March, 2009.

And, the winter term field test is now being carried out.

On the basis of all the field tests including an additional test, a technical manual will be published in the current year.

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Key words

sewage sludge, produce pyrolysis gas, solid fuel, carbonized sludge, biomass