

Project of Lead to Outstanding Technology for Utilization of Sludge (LOTUS Project)

Whole term

2004.4~2009.3

Text P.133~P.138

(Purpose)

In order to positively promote the conversion of sewage sludge into resources and the use of energy based on the Biomass Japan Overall Strategy and the Kyoto Protocol Target Accomplishment Plan, the Ministry of Land, Infrastructure and Transport selected a project of Lead to Outstanding Technology for Utilization of Sludge (LOTUS Project) as a second research subject of the sewerage technology development project (SPIRIT 21 : Sewage Project, Integrated and Revolutionary Technology for 21st Century), and has been proceeding with the development of new technology under the cooperation of industry, university and administration.

The LOTUS Project is largely classified into two technologies i.e. a sludge zero discharge technology (hereinafter referred to as ZD technology) with the aim of “enabling to recycle all sewage sludge at a lower cost than its disposal” and a green sludge energy technology (hereinafter referred to as “GE technology”) with the aim of “enabling to generate power at a lower cost than purchase power with the use of biomass such as sewage sludge.” Concerning both technologies, they have set development target cost, that make the disposal cost of sewage sludge or the the purchase power price standard, to proceed with the project.

Development target cost: ZD technology 16,000 yen / t (dehydrated sludge), 8,000 yen / t (incinerated ash)
GE technology 9.32 yen / kWh

(Situation)

Development of three ZD technologies, three GE technologies, one technology in which ZD and GE technologies are integrated, that is, seven technologies in total is under way as of February 2007 (Table 1). They extracted matters important to achieve the development target cost with respect to each technology, set an estimated target value, verify it through a demonstration experiment and existing data, and calculate cost.

Concerning five technologies of three ZD technologies and two GE technologies out of seven in total, technical evaluation was approved by the SPIRIT 21 Committee meeting held on 13 March, 2007, and it has become possible to introduce these technologies in actual businesses in and after fiscal 2007.

Table1 Outline of Proposed Technologies and Demonstrative Experiments

| Classification | No | Proposer of technology | Name of development technology | Outline of development technology | Place of Demonstrative experiment | Technical evaluation |
|-------------------|----|--|--|--|--|----------------------|
| ZD | 1 | Hitachi Zosen Corporation | Production of biosolids fuel from sewage sludge | The technology of producing biosolid fuel in combination with the technology of using and collecting heat energy and the technology of drying and granulating sewage sludge | Western Sewage Treatment Center in Maizuru city | Completed |
| | 2 | NGK Insulators, Ltd. Department of Waterworks and sewerage in Gifu | the system of recovering phosphorus from incinerated ash | The technology which collects the phosphoric acid by adding alkaline solution to incineration ash and makes it a value-added fertilizer raw material as a liquefied fertilizer or calcium salt phosphate | Plant in the north of Gifu city | Completed |
| | 3 | Kawasaki Environmental Engineering, Ltd. Kimura Manufacturing Co., Ltd. | Production of activated carbon from sewage sludge and reduction of costs for sludge treatment by its effective utilization | The technology of producing an activated carbon from dehydrated sludge and making it a sludge dehydration auxiliary agent, a sludge reforming agent or an adsorbent for dioxin of a garbage incinerator | Manufacturing demonstration: Western Water Quality Management Center in Nanao City Hyogo Factory of Kimura Manufacturing Co., Ltd. Application demonstration : Hojo Sewage Treatment Center in Matsuyama city Nishihata Sewage Treatment Center in Ayabe city | Completed |
| GE | 4 | Tsukishima Kikai Co., Ltd. | Energy recovery from sewage sludge and biomass with synchronous digestion | The technology of ultrasonic-solubilizing sewage sludge, digesting other biomass combined with sewage sludge, increasing the amount of a digestive gas generated and generating electric power | Southern Sludge Resources Center in Yokohama city Inagawa Regional Sewerage System Harada Sewage Treatment Plant | Completed |
| | 5 | JFE Engineering Corporation Daiki Ataka Engineering Co., Ltd. Kajima Corporation Dainen Co., Ltd. | Electrical generating system with low operation cost by using mixed digestion gas | The technology of digesting other biomass combined with sewage sludge, increasing the amount of a digestion gas generated and generating electric power. Cost reduction by introducing a biological desulfurizer is considered. | Southern Sludge Resources Center in Yokohama city | Completed |
| | 6 | Hitachi Plant Technologies, Ltd. Kurita Water Industries Ltd. | Power generation improved anaerobic digestion system | The technology of promoting digestion by ozone-treating sewage digestion sludge, reducing the amount of sludge and increasing the amount of a digestion gas generated and generating electric power. | Tokamachi Sewage Treatment Center in Tokamachi city | |
| Both technologies | 7 | Kawasaki Environmental Engineering, Ltd. | Integrated system of digestion, power generation, and activated carbon production for wet biomass treatment | The technology of receiving biomass, combining biomass with sewage sludge to ferment methane and generate electric power, and technology of producing an activated carbon from fermentation remnants to do environmental purification. | ZD demonstration: Southern Sewage Treatment Center in Kumamoto city Hyogo Factory of Kimura Manufacturing Co., Ltd. GE demonstration: Southern Sewage Treatment Center in Kumamoto city | |

(Schedule)

Concerning five technologies which was completed at the end of March 2007, “technical manual” which becomes support of planning and a design when introducing the technology of the LOTUS Project will be issued in the first half of fiscal 2007, after the Technical Material Study Committee approves it.

Meanwhile, concerning the two technologies of No.6 and No.7, the technical evaluation will be completed by the end of fiscal 2007.

Secretariat : Toshiaki Shimizu, Yoshiyasu Onoda, Toshimitsu Watanabe, Tomohiro Ohfukuji

Key words

Biomass, effective use, gas power generation, cost target