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

Whole term	2004.4～2009.3	

(Background)

LOTUS Project was proposed in 2004 as a part of "Sewage Project, Integrated and Revolutionary Technology for 21st Century (SPIRIT 21)" which consists of short-term R&D (Research and Development) activities and its practical application in industry, academic, and government organizations. The aim has been to develop technologies selectively in the field of sewerage considering various pertinent issues. This Project has been managed by the Japan Institute of Wastewater Engineering Technology (JIWET) through its Project Head Office.

Under this Project, in the year 2005, the target costs for disposal of sewage sludge, and the unit cost for purchased power was set as the minimum (until now) as development goal, and this project was started officially from 2006. The values of the decided target cost to be achieved are 16,000 yen/ton for sludge cake, 8,000 yen/ton for incinerator ash, 8.78 yen/kW for purchased power.

The objectives of this project are to expand and publicize the application of developed technology, to substantially increase the effective utilization of sewage sludge throughout the country and to promote the utilization of biomass energy produced from sewage sludge, thereby contributing towards measures against global warming.

(Condition / Activities)

The technology for recycling all sewage sludge at a cost lower than required for its disposal (Sludge Zero Discharge Technology) and the technology for generating energy by utilizing biomass such as sewage sludge, etc at a cost lower than that of purchased power (Green Sludge Energy Technology) was proposed in December 2004. Subsequently, the names of Municipalities that will participate in the Project (i.e. Municipality that requested technology included Sapporo City, Tokyo Metropolitan, Nagoya City, Maizuru City, Osaka Prefecture, Osaka City, Hyogo Prefecture, Kobe City, Matsuyama City, Kitakyushu City, Kumamoto City) were decided in March 2005. As of May 2006, the proposed technologies along with their Proposing Firms and location where demonstrations were carried out in various municipalities are mentioned in the Table below.

In 2005, the meeting of technological development study committee of "Sludge Zero Discharge" (Chairman: Hiroshi Tsuno, Professor of Tokyo University) was held three times, and the meeting of technological development study committee of "Green Sludge Energy" (Chairman: Tatsuo Ohmura, Professor of Tohoku University) was held two times. In these meetings of the committees, the R & D plans of all proposed technologies under the two categories were discussed. From the result of these discussions, R & D plan of proposed technologies under the two categories were approved in SPIRIT21 committee meeting (Chairman: Tomonori Matsuo, President of Toyo University) of September 2005, and the demonstration locations for these technologies were decided and demonstration experiment were conducted accordingly.

In February 2006, the meeting of technological development study committee was held again. In this meeting, formulation of the draft evaluation report, explanation of the progress and visits to demonstration experiment plant were presented and discussed. Furthermore, in March 2006, the meeting of SPIRIT21 committee was again held in which explanation of the progress and visits to demonstration experiment plant were made.

Table: List of Proposed and Demonstrated Technologies (as of May 2006)

	Name of Firm Proposing Technology	Developed Technology	Demonstration Location	Class
1	Hitachi Zosen Corporation	Production of biosolids fuel sewage sludge	Sewage Treatment Center in the west of Maizuru city	ZD
2	Ishikawajima-Harima Heavy Industries Co., Ltd.	Sludge reduction by hydrothermal reaction & high-rate anaerobic treatment, and the development of technology for sludge utilization.	Under Progress / Consideration	
3	NGK Insulators Ltd. Department of Waterworks and Sewerage in Gifu	The system of recovering phosplate from sewage sludge ash	Plant in the north of Gifu city	
4	Kobelco Eco-Solutions Co., Ltd.	Sewage sludge for Fuel technology with using high-efficiency drying process.	Under Progress / Consideration	
5	KAWASAKI HEAVY INDUSTRIES LTD. Kimura Manufacturing Co., Ltd.	Production of activated carbon from sewage sludge and reduction of costs for sludge treatment by its effective utilization	Manufacturing demonstration: Water Quality Management Center in the west of Nanao city Hyogo factory of Kimura Manufacturing Co., Ltd. Application demonstration: Hojyo Sewage Treatment Center in Matsuyama city Nishihata Sewage Treatment Center in Ayabe city (Rural sewerage project)	
6	Tsukishima Kikai Co., Ltd.	Energy recovery from sewage sludge and biomass with synchronous digestion	Sludge Recycling Center in the south of Yokohama city	GS
7	JFE Engineering Corporation Ataka Construction & Engineering Co., Ltd. Kajima Corporation Dainen Co., Ltd.	Electrical generating system with low operation cost using mixed digestion gas	Same as above	
8	Hitachi Plant Technologies Ltd. Kurita Water Industries Ltd.	Power generation improved anaerobic digestion system	Sewerage Treatment Center in Tokamachi city	
9	KAWASAKI HEAVY INDUSTRIES LTD.	Integrated system of digestion, powergenaration, and activated carbon production for wet biomass treatment	ZD demonstration: Sewage Treatment Center in the south of Kumamoto city Hyogo factory of Kimura Manufacturing Co., Ltd. GS demonstration: Sewage Treatment Center in the south of Kumamoto city	ZD GS

ZD: Sludge Zero Discharge technology **GS:** Green Sludge Energy technology

(Future Plan)

In order to achieve the target cost, the construction of demonstration experiment plant will be continued and the demonstration experiment will be carried out officially. The result of experiment will be reported as and when needed and the evaluation report shall be presented and discussed in meeting of technological development study committee. The result of this committee meeting will be further presented and discussed in the meeting of SPIRIT21 committee.

SPIRIT21 Home Page http://www.jiwet-spirit21.jp

Head Office: Nobuyuki Horie, Masahiro Kabata, Toshimitsu Watanabe, Susumu Kumano

key words	Biomass, Effective Utilization, Gas power, Cost target