

Research on proper form of global warming countermeasures and energy saving countermeasures by utilization of sewerage system resources (“SHIGEN-NO-MICHI(Passage of Resources)” Project)

Whole term

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(Purpose)

The report of the Sewerage Vision 2100 Subcommittee describes the creation of a system called “SHIGEN-NO-MICHI(Passage of Resources)” which will utilize the resource recovery/supply functions possessed by sewerage systems and achieve energy self-sufficiency in sewage treatment plants, and thereby contributing to prevention of global warming, etc. With the aim of realizing the “SHIGEN-NO-MICHI” laid out in the above-mentioned Vision, in the present study, the current status of sewage sludge treatment and the condition of energy utilization were arranged, and setting of mid- and long-term indexes and targets in connection with sewage sludge utilization and facilities development were studied. In fiscal year 2006, operation of the “SHIGEN-NO-MICHI Committee” and preparation of materials were continued from FY2006, and the materials were used for the preparation of the Final Report of the SHIGEN-NO-MICHI Committee covering the 2-year period.

(Results)

(1) Current status of energy consumption/environmental loads in sewerage business

Electric power accounts for approximately 90% of energy consumption in the sewerage business. Energy consumption for sewerage accounts for approximately 0.3% of Japan’s total energy supply and approximately 0.5% of the country’s greenhouse gas (GHG) emissions.

(2) Changes in social conditions surrounding energy and the environment

The amount of sewage sludge generated has increased. However, with progress in effective utilization, the amount buried in landfills has decreased. As effective utilization, the percentage of use in cement has increased. On the other hand, the study revealed that GHG emissions increased by approximately 54% from 1990 to 2004, which exceeded the increase in the amount of waste water treated (increase of approximately 36% over the same period).

(3) Resource/energy potential of sewerage systems

It is possible to utilize sewage/sewage treatment water as potential energy (energy derived from falling water) by using the head (height difference) at the time of discharge, and as thermal energy by using the feature that the temperature is cooler in summer and warmer in winter in comparison with atmospheric temperature. Furthermore, sewage sludge is carbon neutral, and energy use as a concentrated biomass resource which is stable in both quality and quantity is possible. Sewage also contains useful resources, and in particular, influent sewage contains phosphorus equivalent to approximately 10-20% of Japan’s imports. Thus, sewage facilities have the potential for use as natural energy facility sites, etc. and also as collection, transportation, treatment, and recycling systems for biomass, heat, etc.

(4) Basic concept for realization of “SHIGEN-NO-MICHI”

The energy self-sufficiency ratio of sewage treatment plants is limited to approximately 7%, and these facilities discharge large amounts of GHG. It is possible to reduce CO₂ emissions from Japan’s sewage treatment plants as a whole by approximately 1.8 million tons by implementing efforts to reduce unit CO₂ emissions at these plants to at least the average level at present; this is the result of a trial calculation assuming that CO₂ emissions are reduced by half. In order to reduce CO₂ emissions, it is necessary to promote the introduction of energy saving equipment. Technical evaluation/provision of information by an equipment energy efficiency and energy saving labeling system which evaluates the energy saving effects of technologies developed in the private sector and other measures is necessary.

(5) Efforts toward realization of “SHIGEN-NO-MICHI”

Necessary efforts include the construction of effective resource/energy circulation systems at the regional level, construction of efficient resource/energy circulation system between all main players, construction of resource/energy circulation systems which provide the optimal solutions for regions, etc.

(Summary)

It is thought that the results of this research will contribute to the creation of the “SHIGEN-NO-MICHI” system through the construction of efficient regional resource/energy circulation systems with sewage treatment plants as the core facility.

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Researchers : Osamu Fujiki, Yoshiyasu Onoda, Takeyoshi Matsui, Tatsuhiko Akiba

Key words

Passage of Resources, sewerage system resources, global warming countermeasures