

Surveillance study on measures for preventing global warming in sewer

Whole term

2001.4 ~ 2003.3

(Purpose)

In the Kyoto Protocol, adopted in December 1997, Japan was required to reduce the emission of greenhouse gas by 6% compared to 1990 and the “Outline for Promotion Effects to Prevent Global Warming” was compiled in June 1998. Furthermore, efforts have been made to promote the measures against global warming in accordance with “Law Concerning the Promotion of the Measures to Cope with Global Warming”, put into force in April 1999, “Execution Planning Development Manual” and “Guideline for the Calculation Method”, announced by the Environment Agency (present Ministry of Environment). As for sewerages, “Guidance for Global Warming Prevention Execution Planning Development for Sewage Systems” was produced in August 1999 and the relevant measures have been promoted.

Having these situations as the background, this research is to contribute to prevent global warming by grasping the current situation of green house gas emission discharged from the sewage treatment facilities nationwide and of government-designated cities and, devising measures and estimating their expected reduction effect through case studies.

(Research content)

Based on the actual condition research on the case examples of global warming measures and amount of green-house emission of the sewage facilities conducted in 2001, targets of the global warming prevention measures are reviewed, global warming prevention measure items are selected and estimation of expected reduction effects of global warming gas emission through case studies and economic assessment of the items is conducted in 2002.

(Result)

(1) Review targets of the global warming prevention measures

Power consumption ratio of each equipment and instrument and CO₂ emission ratio are surveyed in the representative treatment facilities. The result shows that executing measures on sewage pump, blower, stirrer consuming much electricity, for water treatment facilities and, on high-power-consuming incineration, mechanical thickener and sludge dewatering facilities for sludge treatment facilities is effective to prevent global warming.

(2) Select global warming prevention measure items, estimate expected reduction effects of global warming gas emission and their economic assessment

Based on the results derived from (1), following are the items for global warming prevention measures reviewed in this research.

- Energy saving measures for the sewage pump(cases of employing a high-efficiency generator and RPM control and, increasing pump operation water level by 0.5m or 1m)
- Introduction of air quantity control of blower, new type blower, anaerobic bath stirrer and low-power thickener
- Introduction of a digestion gas generator (employ fuel battery, gas engine and micro gas turbine)
- Introduction of atmospheric pressure flotation thickening equipment for mechanical thickener and screw press dehydrator for sludge dewatering facility.
- Global warming prevention measures in sludge incinerator (introduction of fluidizing air control, high-temperature combustion, high-temperature heat recovery, reduction of moisture content in sludge, sludge dryer, circulating fluidized furnace, high-efficiency motor and utilization of waste heat and thermal inertia of scrubber drain water)
- Energy saving effect by replacing cool white fluorescent lamp with Hf fluorescent lamp

Employing the measures above allows decreasing the unit of CO₂ emission by 1% or more than the previous year resulting in the results that would be utilized by other facilities.

(Summary)

When expecting to achieve a specific target, e.g. decreasing the unit of CO₂ emission by 1% or more than the previous year, large investment is required to employ actual measures. Natural energy can be incorporated when reducing the electricity through energy saving is difficult. In the future, it is expected that introduction of natural energy is promoted through further dissemination of such energy and its price-reduction.

Collaborators: Sewage Technical Development Meeting

Person in charge of study: Tanaka Shuji, Take Toru, Tsugura Hiroshi, Ichimatsu Yuta

Keywords

Heat-trapping gas, Measures for preventing global warming, Measures to conserve energy