Promotion of Climate Change Countermeasures using Sewerage

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1. Introduction

To promote climate change countermeasures, the Water Quality Control Department is proceeding with studies on the dissemination and promotion of technology for reducing GHG emissions by controlling the generation of dinitrogen oxide ("N_2O"), one of the greenhouse gases ("GHG") emitted from water treatment processes and utilizing the biomass resources and energy available from sewage.

2. Control of GHG emissions from water treatment processes

As for the N_2O generated by bio-reaction, since there are still many unclear factors including its development mechanism, sufficient measures are not taken to control the generation of N_2O from water treatment processes. This division, therefore, conducted a survey to grasp the status of N_2O generation at actual sewage treatment facilities, and found that the N_2O conversion rate was low and that generation was controlled at treatment facilities with a high nitrogen removal rate, particularly by MBR method (**Figure Fig. 1**). As the result of microorganism community analysis conducted to examine the development mechanismdeveloping factors, it was found that the MBR method successfully keeping kept high the abundance ratiopercentage of slow-growing nitrite-oxidizing bacteria high since nitrite-oxidizing bacteria are retained for a relatively held long period of time and the design allows for longer A-SRT (time during which active sludge is under aerobic conditions), which resulted in sufficient nitrification and control of N_2O generation. Therefore, the possibility was suggested that even a treatment facility that has not adopted the MBR method can control N_2O generation with an appropriate operating method, such as longer A-SRT. Since the survey so far shows a sudden increase in N_2O generation in the treatment facilities where no nitrogen is removed, measures for such phenomena should be sufficiently considered.

3. Climate change countermeasures by effective use of sewage sludge

In recent years, treatment facilities that introduce recycling / energy recovery technology (biogas power generation, solid fuel forming, etc.) using sewage resources have been increasing, mainly in large cities. However, since the rate of energy recovery from sewage sludge as of the end of fiscal 2010 is about 13%, further introduction of energy recovery technology is required in light of the potential of the country's sewage treatment facilities.

This division, therefore, formulated guidelines for considering the introduction of recycling / energy recovery technology for sewerage (**Fig. 2**), and calculation tools for estimating the effect of introduction into target treatment facilities, in order to support the dissemination of technologies that effectively use sewage sludge. These materials are expected to promote the dissemination of technologies that reduce GHG emissions in sewerage projects.

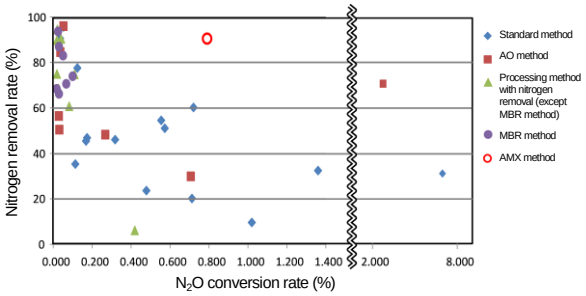

Figure 1: Relationship between Nitrogen Removal Rate and N2O Conversion Rate by Treatment Method

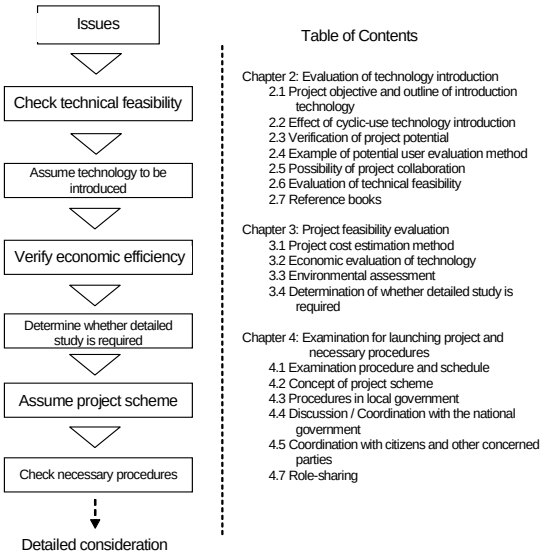

Figure 2: Guidelines for Considering the Introduction of Recycling / Energy Recovery Technology --- Table of Contents and Flow (Draft)