

## **Performance analysis of cogeneration system using biogas from sewage fermentation**

### **Abstract**

Nowadays, because of the continuously increasing of world population, demand for current energy resources increase in a great quantity. This would lead to the critical problems such as extinction of energy sources and increasing of environment problem. Therefore, efficient energy utilization is found as a key to cope with the increasing energy demand by world population. One of the methods is sourcing new energy for fulfilling the demand. It was expected that Cogeneration system (CGS) using micro gas turbine (MGT) could realize the efficient gas utilities, independent power producers (IPPs) and energy supply companies (ESCOs). This system was estimated to be valuable energy sources to a wide range of commercial and industrial customers in the future (Scott, 1997). In Japan, for instance, was facing problem when electricity demand is on the increase year by year. This situation had caused the increasing of electricity loss generation. The problem had become serious when about 25% of total primary energy in Japan was occupied by generation of electricity loss. CGS was ensured as one of the methods that could decrease the amount of energy loss and help to reduce the emissions of green house gases (Yagawa, 2001). Recently, the new concept of MGT based cogeneration was introduced in Japan as one way to improve thermal efficiency of the system at office and public buildings. The system had been compacted in package completed with heat recovery steam generator (HRSG) (Mochizuki et al, 2006). In my study, the main focus is analyzing the current performance of CGS at Kitami Sewage Treatment Center, Hokkaido, Japan. This analysis is very important in order to improve the performance of the system in the future. At Kitami Sewage Treatment Center in Hokkaido, Japan, biogas hydrate formation was suggested to be one of the effective methods to cope with the high production of methane biogas in the summer and the highest demand in the cold season. The hydrate formation was expected as the effective biogas storage to adapt with the delay between the both peak energy supply and peak energy demand (Naing et al, 2006).