Uncertainty Analysis of CO_2 Emission
from Municipal Solid Waste Incineration Plant

Seungdo Kim and Jeejae Lim

Department of Environmental Sciences and Biotechnology, Hallym University, Chuncheon 24252, Korea

Abstract

This paper addresses the uncertainty analysis (UA) results of continuous emission monitoring system (CEMs) of CO_2 emission from seven incineration plants of municipal solid waste (MSW) in Korea. Uncertainty analysis methodologies for assessing the CO_2 emissions from MSW incineration plants were developed for Tier 1, Tier 3 of the IPCC estimation method as well as CEMs. CO_2 emitted from MSW incineration plants can be distinguished into two sources: fossil fuel origin such as waste plastics and biogenic origin. We analyzed fossil carbon fraction (FCF) of flue gases and commingled solid wastes by isotope method. The average UA result of Tier 1, Tier 3, and CEMs are 27.8±9.1%, 14.5±2.6%, and 6.6±3.3% within a confident interval of 95%, respectively (Table 1). In view of UA, CEMs is turned out to be the most accurate method to measure the CO_2 emission from the MSW incineration plant. However, high installation and operation costs may frustrate the application of the CEMs to estimate CO_2 emissions from MSW incineration plants. Instead, Tier 1 or Tier 3 would be recommended to determine CO_2 emission from MSW incineration plant. UA results for Tier 1 would be expected to range from 22 to 36% (average: 27.8%, n=8) and for Tier 3 from 13 to 17% (average 14.5%, n=8).

Table 1. Uncertainty results of Tier 1, Tier 3 and CEMs

Incineration Plant	Tier 1	Tier 3	CEMs
Gwangmyeong	26.9	14.9	5.6
Bucheon	24.7	14.9	7.6
Songdo	24.7	13.0	7.0
Uijeongbu	27.2	17.0	6.3
Goyang	22.8	13.6	-
Suji	26.1	13.0	4.6
Sunglim	35.5	14.8	5.7
KGETS	34.3	15.1	9.8
Average	27.8	14.5	6.6
Standard Deviation	4.6	1.3	1.7
95% Confidence interval	9.1	2.6	3.3

References

IPCC(2000), Good Practice Guidance and Uncertainty Management in National Greenhouse

Abstract for your presentation at WGIA14: about 400 words (one page)

Gas Inventories.