B-14 Evaluation of technological measures to cope with global warming

Contact Person Hiroshi Shimizu
Head, Traffic Pollution Control Research Team
Regional Environment Division, National Institute for Environmental Studies, Environment Agency.
16-2 Onogawa, Tsukuba, Ibaraki 305 Japan
Tel:+81-298-51-6111(Ext.397) Fax:+81-298-51-4732

Total Budget for FY1990-1993 170,726,000 Yen (FY1993; 42,109,000Yen)

Key words Greenhouse gas, Countermeasure, Energy consumption, Evaluation, Input-output analysis

The purpose of this research project is firstly to develop methodologies for assessing various technical countermeasures to reduce greenhouse gases (GHG), from the comprehensive viewpoints including effectiveness, economic efficiency, safety, public acceptance and difficulties of technological innovation, and secondly to develop methodologies for integrating results from the individual evaluation to assess the overall effectiveness of countermeasures. This study is composed of four stages, namely, systematic inventory of GHG emission (GHG analysis), identification of conventional and innovative technologies, assessment of individual sectoral technologies, and comprehensive evaluation of countermeasures as a whole. Sectoral studies are carried out on fields of energy conversion, manufacturing, urban, transportation, residential, commercial (R&C) and agriculture. Major contents of the study are as follows;

1)Evaluation of alternative technologies such as cogeneration, energy efficiency improvement and automobile manufacturing, using element separation method, Input-Output analysis, Optimization model. 2)Development of evaluation method based on a energy system model MARKAL, selection of principal criteria for evaluation, application of the model to the evaluation of electricity generation technologies, analysis of mechanism of reducing CO_2 emission by demand technologies, tentative evaluation of the effect of imported hydorogen utilizataion. 3)Estimation of effect of CO_2 emission controls in construction field, promotion of construction technologies with less amount of cement, promotion of utilizing electric furnace steel products and promotin of rationalization of heavy construction materials, gravel, wastes. 4)Analysis on costs and effectiveness of alternative fuel vehicles to reduce CO_2 emissions. Model on effective economic incentive to introduce these vehicles into the market. 5)Analysis of the trend and the structure of CO_2 emission from the R&C sector based on the input-output analysis from the viewpoint of final demand, and estimation of CO_2 reduction by household actions, 6)Development of sampling and analytical methods for GHG and related compounds and their application to municipal solid waste (MSW) incinerators, MSW landfill sites and night soil treatment plants, 7)Analysis of present consumption of energy, petrochemical products and electricity and its resultant CO_2 emission, and clarification of features of the techniques, of CO_2 emission control, energy conservation and environmental protection in agriculture.