A Development of an estimation method of air pollutant emissions from transportation sector in Asia
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2012 ACCENT-IGAC-GEIA Conference; June 11-13, 2012; Toulouse, France

Abstract
Air pollutants such as NOx and PM are mainly emitted by transportation sector. Therefore, it is important to estimate the amount of air pollutants emitted from transportation sector in order to evaluate the health impact of these pollutants and to apply effective countermeasures to them. In this research, emissions of CO2, NOx, and PM, by transportation sector in Asia were estimated.

Generally, to estimate the emissions from transportation sector, transportation demand derived from statistics is multiplied by emission factors. However, there are a lot of errors and inconsistencies in transportation statistics. Therefore we applied the adjustment method to interpolate and correct data in transportation statistics on Asia and estimated national transportation demand in 2005. In addition, future transportation demands were also estimated by using future scenario such as modal shift under high carbon society. Finally, air pollutant emissions in Asia were estimated by using bottom-up enduse model, and it was discussed change in transportation demands and emissions in Asia.

In this research, emissions of CO2, NOx, and PM, by transportation sector in Asia were estimated. We need to set detail scenarios and reliable emission factors for each country. This research aims to test three models and it was discussed change in transportation demands and emissions in Asia.

In this research, we developed an estimation method of transportation demands, its energy consumptions, and air pollutant emissions by connecting some models effectively. We used three models in this research such as transportation data correction model, bottom-up enduse model and CGE model. Main outcomes of these models are passenger and freight transportation demand, energy consumptions and CO2, NOx, PM emissions in transportation sector in 2030 to 2050. Further analysis about these models is explored next.

Transportation Data Correction Model
A lot of errors and losses are included in Traffic statistics. Minimizing the errors from reference values, such as stock amount, mileage, freight amount, energy consumption and ratios between these values (mileage/vehicle, load factor, energy consumption per mileage etc.) Reference values are derived from domestic and international statistics. Constraining the trend from large swing to avoid the discontinuous of time series. Relation between parameters:

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Transportation Demand Model

Determination of error from reference values

Definition of change of trend

Definition of error function

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Enduse Model

Bottom-up type technology selection model developed by AIM project team (AIM/Enduse model)

Technology selection is based on a linear optimization framework in which total costs are minimized by several constraints such as service demands and energy supply.

Analysis tool for policies related to global warming and local air pollution like emission tax, subsidy, regulation and so on.

Conclusions
In this research, we developed an estimation method of transportation demands, its energy consumptions, and air pollutant emissions by connecting some models effectively. We used three models in this research such as transportation data correction model, bottom-up enduse model and CGE model. In this research, we tried only what-if analysis for estimating future transportation demands, and emission factors in Enduse model was tentative one. We need to test detail scenarios and reliable emission factors for each country.