

**Externality Analysis of the Flue Gas Desulphurization System
at Mae Moh Lignite-Fired Power Plant in Thailand
from LCA-NETS Point of View**

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The mine mouth coal-fired power generation plant in Mae Moh region is the biggest thermal power generation plant in Thailand, which has used coal-lignite as fuel. It has held the second share of utility power generation about 22.7% of all utility-produced electricity referred from the Electricity Generating Authority of Thailand (EGAT). In year 2000, the gross electricity production by type of fuels used are approximately from natural gas, lignite, fuel oil, hydro, diesel oil and others about 52.5%, 22.7%, 16.8%, 7.8%, 0.2% and 0.0026%, respectively. Due to the lignite fuel in Mae Moh region contains high amount of sulphur about 3% therefore, in some year, the number of health complaints have increased during the cool season when high concentrations of SO₂ has been emitted. EGAT responded this problem by gradually installing the flue gas desulphurization systems (FGD) in power generation unit 4-13 since 1992 and have completed in January 2000. Sulphur dioxide has been controlled by FGD and produced satisfactory results. On the other hand, Life cycle thinking point of view, it is important to study and understand about the environmental impacts of the power generation plant after installation of FGD in whole life cycle (from cradle to grave). Moreover, when EGAT installed and operate the FGD, it has also required high investment budget, operation cost, maintenance cost and other cost. Therefore, the externality analysis of SO₂ ought to be investigated for whole life span of the FGD. This paper discussed about Life Cycle Assessment (LCA) and externality study, in which focus on Mae Moh lignite-fired power generation plant with the generated capacity of 2,625 MW and generated electricity 15,547.56 GWh (2000). The aim of the study is first to apply LCA with Numerical Environmental Total Standards (*NETS*), which used for evaluating the environmental burdens by identifying and quantifying energy and materials used and waste released to environment, and to identify and determine the opportunities for environmental improvement methods. The impacts due to the global and regional environmental issues are numerically evaluated in *NETS*, which is based on the balance of L & R (Loader and Receiver) theory. The second is to estimate the externality cost by using cost and benefit ratio on the basis of LCA-*NETS* method. As the result according to the Life cycle thinking point of view, the environmental load and the externality cost are discussed and the green lignite-fired power generation technology and the environmental cost are recommended for further ecological and economical improvement.

Keyword: Life Cycle Assessment, Life Cycle Costing, Numerical Eco-load Total Standardization, Flue Gas Desulphurization, Lignite-fired Power Generation Plant