



“Gheorghe Asachi” Technical University of Iasi, Romania



APPLICATION OF ANALYTICAL HIERARCHY PROCESS (AHP) IN EVALUATING MEASURES FOR MITIGATION OF EMISSION IMPACT ON COMMUNITIES NEAR LIGNITE-FIRED POWER PLANT AT MAE MOH, THAILAND

Athikom Bangviwat*, Sakda Sittikruear

The Joint Graduate School of Energy and Environment, Center of Excellence on Energy Technology and Environment, King Mongkut's University of Technology Thonburi, Bangkok 10140, Thailand

Abstract

A coal-fired steam power plant, located near an open pit coal mine in Mae Moh, Lampang, a province in the north of Thailand, has been in operation since 1978, with a generating capacity of 2,400 megawatts, and lignite consumption of 40,000 tons/day. A maximum hourly concentration of SO₂ of 3,418 µg/m³ was measured and an emission of 150 tons/hour of SO₂ from the power plant was estimated. In order to mitigate the impacts of the emission on human health, crops and livestock, several measures have been implemented, such as (1) installation of flue gas desulphurization units (FGD), (2) remote monitoring stations, (3) corporate social responsibility (CSR) programs, and (4) community development fund. Nevertheless, there have still been complaints about the emission from the power plant and resistance to the operation of the plant. The objective of the study is to find out the preferred measures of the people who are directly exposed to the adverse effects of the pollution.

A survey was conducted in the area to interview the local villagers for their preferences among the four (4) measures with an inclusion of cessation of the plant as the fifth options. Fifty five (55) respondents who live in the vicinity of the power plant were asked to provide pair-wise comparison of their preferences of the five (5) alternatives based on four (4) different criteria as (A) job opportunity, (B) agricultural concern, (C) health improvement, and (D) public acceptability. Analytical hierarchy process (AHP) was applied to evaluate the results from the survey. The survey results show that health and income are the most important criteria. The community development fund is the most preferred alternative, while cessation of the power plant is the last option.

Key words: analytic hierarchy process, emission mitigation, Mae Moh coal-fired power plant

Received: August, 2013; Revised final: March, 2014; Accepted: March, 2014; Published in final edited form: December 2017

* Author to whom all correspondence should be addressed: e-mail: athikom.bangviwat@outlook.com; Phone: 662-470-8310; Fax: 662-872-6978