

Developing higher tier data for estimation of GHG emissions from fossil fuel power plants in Thailand

Awassada Phongphiphat¹, Suthum Patumsawad¹ and Sirintornthep Towprayoon^{1*}

¹ *The joint graduate school of energy and environment (JGSEE), Centre of Excellence on Energy Technology and Environment (CEE), King Mongkut's University of Technology Thonburi (KMUTT), 126 Prachauthit Rd, Bangmod, Tungkru, Bangkok, 10140, Thailand*

² *Faculty of Engineering, King Mongkut's University of Technology North Bangkok (KMUTNB), 1518 Pracharaj Rd, Bangsue, Wong Sawang, Bangkok, 10800, Thailand*

* *Corresponding author: sirin@jgsee.kmutt.ac.th*

Abstract

Electric power generation in Thailand relies heavily on fossil fuels. Although recently the country succeeds in elevating share of renewable energy, fossil-fuel combustion in power plants still remain the biggest greenhouse gas polluter. It accounts for roughly 30% of total national emission, making '1A1 Energy industries' most significant key source category. However, readily available official data for GHG estimation of this category were compatible only for Tier 1 estimation approach. This study aimed to investigate the possibility of collecting and developing higher tier activity data (AD) and emission factor (EF) for this key source category. The study reviewed existing information from all relevant national authorities, evaluated data gaps, acquired missing data by using questionnaire and interview, calculated, and suggested approaches for developing country-, technology-specific ADs and EFs for fossil fuel power plants. For estimating EFs, information from 16 power plants during 2007 – 2011 were collected and examined. This was equal to 69% of the total fossil-fuel power production. It included 7 combined-cycle power plants, 6 thermal power plants, 2 gas engine power plants, and 1 diesel engine power plant. The results from this study pointed out that detailed information of fuel use were mostly available in official database of Ministry of Energy. In order to access and make use of these data, unprecedented data sharing system between national authorities, particularly of confidential data provided by private power production companies, must be officially established. The study could suggest country-specific CO₂ EFs as follows: 61,026 kg/TJ for natural gas-fired combined-cycle power plants; 59,966 kg/TJ for natural gas-fired thermal power plants; 53,357 kg/TJ for natural gas-fired gas engine power plants; 74,290 kg/TJ for diesel-fired gas engine and diesel engine power plants; 78,355 kg/TJ for fuel oil-fired thermal power plants; 89,047 kg/TJ for bituminous-fired thermal power plants; and 94,229 kg/TJ for lignite-fired thermal power plants. Comparing to 2006 IPCC default EFs of different fuel type, values of EFs presented by this study for natural gas, diesel and fuel oils were higher. On the other hand, EFs for bituminous and lignite from this study are lower than default values. (Acknowledgement: Department of Alternative Energy Development and Efficiency, Ministry of Energy.)

References

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