Analysis of Co2 Emission from Thailand's Thermal Power Sector by Divisia Decomposition Approach

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Abstract : Electricity is vital to every country's economy in the world. For Thailand, the electricity generation sector plays an important role in the economic system, and it is the largest source of CO2 emissions. The aim of this paper is to use the decomposition analysis to investigate the key factors contributing to the changes of CO2 emissions from the electricity sector. The decomposition analysis has been widely used to identify and assess the contributors to the changes in emission trends. Our study adopted the Divisia index decomposition to identify the key factors affecting the evolution of CO2 emissions from Thailand's thermal power sector during 2000-2011. The change of CO2 emissions were decomposed into five factors, including: Emission coefficient, heat rate, fuel intensity, electricity intensity, and economic growth. Results have shown that CO2 emission in Thailand's thermal power sector increased 29,173 thousand tons during 2000-2011. Economic growth was found to be the primary factor for increasing CO2 emissions, while the electricity intensity played a dominant role in decreasing CO2 emissions. The increasing effect of economic growth was up to 55,924 million tons of CO2 emissions because the growth and development of the economy relied on a large electricity supply. On the other hand, the shifting of fuel structure towards a lower-carbon content resulted in CO2 emission decline. Since the CO2 emissions released from Thailand's electricity generation are rapidly increasing, the Thailand government will be required to implement a CO2 reduction plan in the future. In order to cope with the impact of CO2 emissions related to the power sector and to achieve sustainable development, this study suggests that Thailand's government should focus on restructuring the fuel supply in power generation towards low carbon fuels by promoting the use of renewable energy for electricity, improving the efficiency of electricity use by reducing electricity transmission and the distribution of line losses, implementing energy conservation strategies by enhancing the purchase of energy-saving products, substituting the new power plant technology in the old power plants, promoting a shift of economic structure towards less energy-intensive services and orienting Thailand's power industry towards low carbon electricity generation.

Keywords : co2 emission, decomposition analysis, electricity generation, energy consumption
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