

Assessment of Climate Change Impact on Cooling Water: Economic Evaluations for the Thermal Electricity Sector

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Due to global warming, it is concerned that cooling water for thermoelectric generation would be running short more frequently in many places of the world. We used a Computable General Equilibrium (CGE) model to quantify the socio-economic impact of a hypothetical shock of capital productivity, which represents shortage of cooling water on thermal power generation plants. The results showed that the magnitude of electricity generation change and subsequent economic indicators change due to 1% capital productivity reduction were varied by region. The mean electricity generation loss was largest in Southeast Asia and smallest in North Africa when an identical shock was given to all regions throughout the simulation period. Considerable regional differences in GDP and electricity price were attributed to not only the capital productivity, but also the amount of capital in thermoelectric sector and its contribution for GDP. Additionally, thermoelectric sector shock propagates into the global economy. These findings demonstrate the significance in quantifying the economic consequence of cooling water shortage.

Keywords: climate change, cooling water shortage, thermoelectric sector, socio-economic impact, computable general equilibrium (CGE) model