

Economic and Environmental Impacts from Change in the Power Sector - Scenario Analysis with Extended Input-Output Table -

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1. Introduction

The Great East Japan Earthquake on 11th March, 2011, and the accident at Fukushima Dai-ichi Nuclear Power Plants (Fukushima Accident) made it clear that Japan has to completely change its energy policy. Energy issue is related with various aspects of the society and both economic and environmental impact from each energy choice should be taken in to consideration when making a decision on future energy mix.

In this work, the baseline scenario which allow nuclear power plants with proper investment to improve their safety to re-start, and the less-re-start scenario which won't allow re-starting nuclear power plants after 2017, are analysed through input-output framework. Economic and environmental impacts from these two scenarios are compared to see what difference they have.

2. Results

(1) Economic Impacts

Reducing cumulative investment, which is for improving the safety of nuclear power plants, from 2015 to 2020 by 345 billion JPY and adding that 345 billion JPY to investment in renewable energy leads to additional 310 billion JPY of total output and 127 billion JPY of value added. Investment in renewable energy has larger economic spill over than investment for improving the safety of nuclear power plants. Reduced electricity generation from nuclear power should be substituted by thermal power. The cost for this substitution is 210 billion JPY.

(2) Environmental Impacts

Switching from investment for improving the safety of nuclear power to investment on renewable energy leads to less CO₂ emission of 33 thousand t-CO₂ from 2015 to 2020. Direct effects from operating additional thermal power is 22 million t-CO₂ in 6 years and the emission increase from spill over effect is 1.1 million t-CO₂. Limiting the re-start of nuclear power plants leads to an emission increase in short term.

3. Conclusion

Limiting the re-start of nuclear power plants and adding more to investment in renewable energy has both positive and negative spill over effect. On the economic side, these positive effects exceed negative effects. On the environmental side, CO₂ emission will be increased by certain amount.