"Economic and Emission Reduction of JCM/BOCM:
Analysis using an Input-Output model"

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**Abstract**

Emissions reductions from developing countries are essential in achieving the atmospheric $CO_2$ concentration of 450 ppm. The Clean Development Mechanism (CDM) has been effective in reducing emissions from developing countries. However, the CDM has been criticized by various parties.

A survey of listed firms in Japan, conducted in 2010, revealed that Japanese firms were not satisfied with the CDM for four main reasons; time consuming process, strict additionality requirements, the available volume of CER's were less than anticipated and the geographic unbalance of CDM projects (Arimura et al., 2012 ). As solutions to these problems, new mechanisms have evolved in Europe and Japan. The EU has proposed the Sectoral Crediting Mechanism (SCM) as a new method to increase the delivery of offset credits. In contrast, the Japanese government has proposed and advocated the Joint Crediting Mechanism/Bilateral Offset Crediting Mechanism (JCM/BOCM).

The proposed JCM/BOCM is similar to the CDM, however differs in the details. For example, the type of projects suitable in the JCM/BOCM will be determined by a joint committee between Japan and the host country, but may include electrical appliances and infrastructure projects such as transportation systems. However, the list has yet been developed.

The Ministry of the Economy, Trade and Industry (METI), and the Ministry of the Environment (MOE) have conducted Feasibility Studies (FS) since 2010. These studies have been focusing on identifying technological needs, MRV methods, and capacity building, but have not investigated the economic impacts and the reduction possibilities that JCM/BOCM may create.

In this paper, we will estimate the economic impacts including the employment effect along with the reduction of emissions anticipated with the introduction of JCM/BOCM.

We rely on the 2005 Japanese domestic input-output table as our base dataset and disaggregate the automobile industry to capture hybrid cars. We use the

disaggregated input-output table and employ an input-output model to estimate the economic impacts of JCM/BOCM. Then, we estimate the annum and total emission reduction of the JCM/BOCM by using country-specific emission coefficients for five different countries.

We assume that the JCM/BOCM will increase the Japanese exports by 10 billion yen for seven technology/products; coke dry quenching plant (CDQ), boilers, LED light bulbs, air conditioner, refrigerator/washing machine and automobiles (hybrid vehicle). This figure is based on the assumption that one CDQ costs 10 billion yen to construct. We also assume that the 10 billion yen increase in exports will origin from Vietnam, Thailand, Philippines, Indonesia and India.

We find that the economic impacts of automobiles and air conditioners are high, whereas boilers and light bulbs produce smaller effects. The results for the employment effects show that the CDQ's and refrigerator/washing machine creates more jobs.

The results from the emission reduction analysis show that washing machines have the highest per annum emission reduction. On the other hand, LED's and refrigerators have small annum emission reductions. The total emission reduction calculated using the life time of the technology/item yielded that CDQ's had the highest reduction, followed by washing machines.

These results from the economic/employment effects and the emission reduction effects suggest that it is important in choosing technology/items by balancing their expected economic and reduction effects. Therefore, the Japanese government must assess various technology/items before deciding on which technology/item should be eligible for JCM/BOCM projects.