Economic Instrument and Renewable Energy Policy – An Empirical Study of Green Electricity in Taiwan

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Abstract

Faced with pressure from greenhouse gas reductions and energy price hikes, the Taiwan government is in the process of developing an energy tax/subsidy regime to reflect environmental external costs and support renewable energy consumption (such as green electricity), as well as mitigate CO_2 emissions through an adequate pricing system. This study utilizes a CGE (computable general equilibrium) model to simulate and analyze the economic impacts of the Renewable Energy Act and its complementary fiscal measures.

In contrast to grey electricity, which is generated by traditional fossil fuels, the electricity generated from renewable energy is called green electricity (GE) or green power (GP) due to its small impact on the environment. Enhancing the use of renewable energy, replacing fossil fuels, and reducing greenhouse gas emissions are important measures in fighting climate change in Taiwan. In addition, promoting renewable energies is one of the major objectives for energy policy in many countries (Sioshansi, 2005). However, its high cost limits the progress of promoting green electricity while enormous efforts have been undertaken in many countries (Haas, et al., 2004).

For the last two decades, energy consumption has increased significantly along with the ongoing economic growth, especially in the industrial and services sectors in Taiwan. As a consequence, Taiwan has announced targets related to improving energy efficiency (i.e., energy conservation) and reducing CO_2 emissions when formulating their environmental and energy policies. The Executive Yuan of Taiwan promulgated the Framework of Taiwan's Sustainable Energy Policy in 2008, with the aim of improving energy efficiency by at least 2% per year in 2009-2015, thereby reducing Taiwan's energy intensity by at least 20% from the 2005 level by 2015. A further

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objective of this plan is to achieve a reduction of more than 50% by 2025 through technological breakthroughs, Renewable Energy Act, and supportive measures such as educative promotion.

One of the aims of this study is to simulate the FIT subsidy policy of green electricity in Taiwan. Under the assumption of tax revenue neutrality, the use of grey-electricity tax revenue generated for the purposes of supporting green power FIT subsidy in supply side, reducing purchasing price of green power in demand side, and promoting green power R&D programs will be evaluated individually. It has been verified in this study that having adequate public-finance policy measures is the key to realizing the policy target. The present study will be useful not only to administrative officials but also to academic researchers.

Key words: Energy instrument, green power, CGE model, renewable energy, CO_2 emissions control