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Review on investment direction of green technology R&D in Korea

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ABSTRACT

As climate changes and resource crisis have globally emerged as practical threats, the capability to deal with environment issues and energy issues has been highlighted as an important variable determining the future of the national economy. Korea, however, has lacked active measures against energy and environment issues so far due to rapid industrialization, and with the deterioration of driving force since IT industry in 1990s, it has become desperately necessary to make R&D investments in green technology to develop green technology as a new national driving force and create new jobs. Accordingly, this article analyzes investment status of green technology R&D in Korea, through which the policy direction for improving investment efficiency and efficient distribution of green technology R&D was proposed. So far, based on this study, the following conclusion could be drawn. First, the domestic/foreign green technology development and policy and Korea's green technology preoccupancy strategy and objective were investigated. Second, Korea's green technology R&D investment performance and plan, green technology R&D investment per government department, green technology R&D per-step investment, and industry-academic cooperative study and such Korea's green technology R&D investment status were analyzed. Third, based on Korea's green technology R&D investment status, differentiated investment strategy for each priority green technology, establishment of role division within government for multi-department business, fusion between green priority technologies and strengthened greening of existing industries, strengthened support for green technology experts and green technology R&D investment direction were proposed.

Contents

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1. Introduction

1.1. Research background purpose

As climate changes and resource crisis have globally emerged as practical threats, the capability to deal with environment issues and energy issues has been highlighted as an important variable determining the future of the national economy [1]. As the capability to countermeasure environment issue and energy issue has been magnified, the environment issue has been recognized not as a limiting factor of economic growth, but as a new opportunity. Therefore, Korean government has announced "low-carbon green growth" as a new national growth development paradigm and core issue for governmental administration [2].

So far, Korea has lacked active measures against energy and environment issues due to rapid industrialization. Also, as the deterioration of driving force since IT industry and jobless growth has continued [3], a new growth model was urgently required.

Accordingly, Lee Myung-Bak government took 'low-carbon green growth' as the core policy task and announced it as the vision of national growth (August 2008). Active investment expansion for green technology R&D is in promotion. The Korean government is in promotion of an ambitious plan for expanding green technology R&D investment by twice until 2012, selecting 27 priority green technologies, and growing them to be global core strategic technologies in order to secure green technology competitiveness between green technology advanced countries such as U.S. or Europe. Through this, they are promoting goals to enter seven biggest green countries in the world such as creation of 160,000 jobs in green technology, 90% of technology level against advanced countries (taking U.S. and Japan as 100%) by 2020, and 10% of global market occupancy [4].

Green technology R&D investment of Korean government must have systematic status recognition and evaluation as premise. Accordingly, this article analyzes Korea's green technology R&D investment status, and the goal was proposed for policy direction of efficient distribution and investment efficiency improvement of green technology R&D.

1.2. Research contents and methods

This study targeted green technology R&D among the entire national R&D projects (198 projects, 1 trillion 946.6 billion KRW) and reviewed for analysis of green technology R&D investment status and policy('green technology R&D total policy'/'green growth national strategy and 5-year plan') by Lee Myung-Bak government. Based on this, Korea Institute of Science & Technology Evaluation and Planning (KISTEP), Ministry of Education, Science and Technology and such R&D-related institution interviews were conducted for expert opinions which were reflected in this article to propose direction for green technology R&D.

2. Domestic/foreign green technology development and policy

2.1. Japan

Japan's Abe administration proposed 'low-carbon society' since 2007 and set the objective of 14% reduction of CO_2 against the current status by 2020, and 60–80% by 2050 as the national vision [5]. In 2008, according to 'Cool Earth energy innovative technology plan,' flow of energy supply to demand were considered to select 21 carbon reduction technology which enables energy efficiency improvement and CO_2 reduction. Also, the roadmap for technological development was proposed as shown in Table 1 [6].

2.2. U.S.

U.S. is promoting advancement into green market through next-generation green technology development and achievement of energy independence for U.S. by actualization of new energy economy policy such as 2006 'cutting-edge energy plan' announcement. Also, U.S. is doubling the budget (148 million dollars) from 2006 for next-generation green technology R&D such as large-sized solar generation, wood-type bio-ethanol, and IGCC (Integrated Gasification Combined Cycle) in 2007 [7,8]. Its objective is to create 5 million new jobs and create the green energy industry market by investing 150 billion dollars in clean energy industry over the course of next 10 years.

Energy efficiency and demand management are being enforced such as supply of 1 million plug-in hybrid vehicles in order to escape from oil-oriented energy industry by 2015 [9].

Table 1
Carbon-reduction technology.

Field	Core technology
Power generation · power transmission	High-efficiency natural gas generation, high-efficiency coal generation, CCS, solar energy, nuclear power, high-conductivity power transmission
Transportation	High-speed transportation system, fuel-cell vehicle, hybrid car, bio-fuel manufacturing
Industry	innovative material, manufacturing, processing, innovative steel manufacture process
Livelihood	Energy-saving residences, next-generation high-efficiency lighting, fixed fuel-cell, ultra-high-efficiency heat pump, energy-saving information device, home energy management system
Others	High-performance power storage, power electronics, hydrogen manufacturing/storage