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Key to Success: Measures to Promote Climate Technology-Finance Linkage between South Korea and MDBs

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Abstract As the climate crisis intensifies, the need to improve the climate resilience of developing countries is ever increasing. Hence, the international community is seeking ways to effectively conduct climate technology transfer by linking the projects with financial mechanisms. However, commercialization of climate technology in developing countries is no easy feat as comprehensive knowledge on the target country is a prerequisite for seeking a suitable technology-financial linkage measure. Hence, in-depth discussions on effective climate technology and financial linkage measures have become an important global agenda, and South Korea, as a country with long experience in climate technology transfer, and a strong ecosystem for public climate technology, should step forward to take up a leading role. Against this backdrop, this paper proposes strategies and implementation measures for linking funds from the Multilateral Development Banks (MDB) with Korea's Public Climate Technology (PCT) by examining several key areas of R&D, international cooperation, and technology commercialization.

Keywords Climate Technology, Climate Financing, Commercialization, Multilateral Development Banks, Research and Development

I. Introduction

In December 2015, the Paris Agreement was signed by 195 countries, and it was the introduction of a new climate regime that would replace the Kyoto Protocol (Falkner, 2016). South Korea has always been actively participating in the global climate agenda and ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. Furthermore, in October 2020, a national goal of carbon neutrality was

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announced to the world. In May 2022, the leaders of South Korea and the U.S. reaffirmed their bilateral commitment to 2030 greenhouse gas (GHG) reduction goals and 2050 carbon neutrality agenda. This summit highlighted the importance of South Korea's responsibility and role as a developed country in responding to the global climate crisis. Hence, it is time for South Korea to put the words into action by taking the lead in international cooperation in climate technology development and commercialization. Also, climate technology cooperation, unlike the other forms of cooperation that focus on national interests, is for the benefit and survivability of humanity; thus, there are more reasons for nations to actively participate and support the cause (Song et al., 2021).

The launch of a new climate regime has promoted climate technology transfer and carbon offset projects around the world, and the demand to support these projects through climate financial mechanisms (Asian Development Bank; ADB, Green Climate Fund; GCF, etc.) has increased as well. The possibility of developing and utilizing financial tools that promote climate technology transfer has been increasing over time (Corsi et al., 2020). However, commercialization of climate technology in developing countries is no easy feat as comprehensive knowledge (nationally determined contribution (NDC), technology needs assessment (TNA), etc.) on the target country is a prerequisite for seeking a suitable technology-financial linkage measure. Hence, in-depth discussions on effective climate technology and financial linkage measures have become an important global agenda, and South Korea, as a country with long experience in climate technology transfer, and a strong ecosystem for public climate technology, should step forward to take up a leading role.

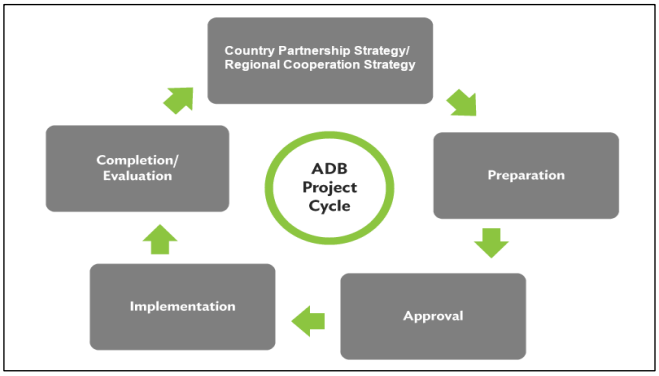
The countries are at a critical point to collectively act on technology and innovation cooperation (Song, 2023) as not to antagonize and compete for the long journey toward climate neutrality in the Asia-Pacific region (Song et al., 2023). South Korea should be a mediator that bridges the developed and developing countries. Furthermore, the transfer and commercialization of public climate technologies to developing countries is a win-win strategy that enhances the climate resilience of developing countries, while also contributing to the increase in the national economic value of South Korea and meeting the national carbon neutrality goals (Song & Kim, 2022).

Against this backdrop, this paper proposes strategies and implementation measures of linking funds from the Multilateral Development Banks (MDB) with Korea's Public Climate Technology (PCT) by examining several key areas of R&D[1], international cooperation, and technology commercialization.

[1] Climate change is a long-term problem which needs to be solved from a long-term perspective. Therefore, R&D capabilities are paramount for sustainable development and self-sustaining capabilities in developing countries. R&D is important to developing countries for

II. Development Projects Cycles

Development projects tend to follow a similar project cycle comprising several stages, typically following the steps of project identification, project design, feasibility study, approval, implementation, and evaluation. During the implementation phase, the progress is monitored and managed to make sure that the project is being carried out according to the plan. In the post-implementation phase, an evaluation is conducted to assess the project's outcomes, identify lessons learned, and provide any recommendations for future improvements. This project cycle ensures that the current projects are well executed and makes sure the lessons learned are reflected in future projects to maximize the impact and value of the organization's project.



Source: ADB (2023).

Figure 1. ADB's Project Cycle

In the case of the Asian Development Bank (ADB), they place significant emphasis on a well-structured project design and management process to ensure the successful implementation of its initiatives across the Asia-Pacific region (ADB, 2023). The project design and management phases for public sector financing are simplified into five stages: 1) Country Partnership Strategy; 2)

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the following reasons: a) pursuit based on simply acquiring foreign technology is bound to be the next best option (Bell and Albu, 1999); b) two faces of R&D - the ability to absorb as well as create new knowledge (Cohen and Levinthal, 1990); c) R&D can contribute to the development of industry and agriculture in the country (competitiveness and productivity agenda); d) R&D contributes to solving social challenges such as water and energy supply and health (social agenda); e) R&D investment is the interrelationship between the creation and maintenance of a high level of education and the scientific community; and f) R&D is key to promoting economic diversification toward high value-added activities, and these structural changes are key to economic prosperity (Hausman and Hidalgo, 2011).

Preparation; 3) Approval; 4) Implementation; and 5) Completion and Evaluation (see Figure 1). In addition to the project cycle, ADB emphasizes the importance of environmental risks and social influence when evaluating environmental investment and development projects (Buntaine, 2011).

Source: GCF (2023).

Figure 2. GCF's Project Activity Cycle

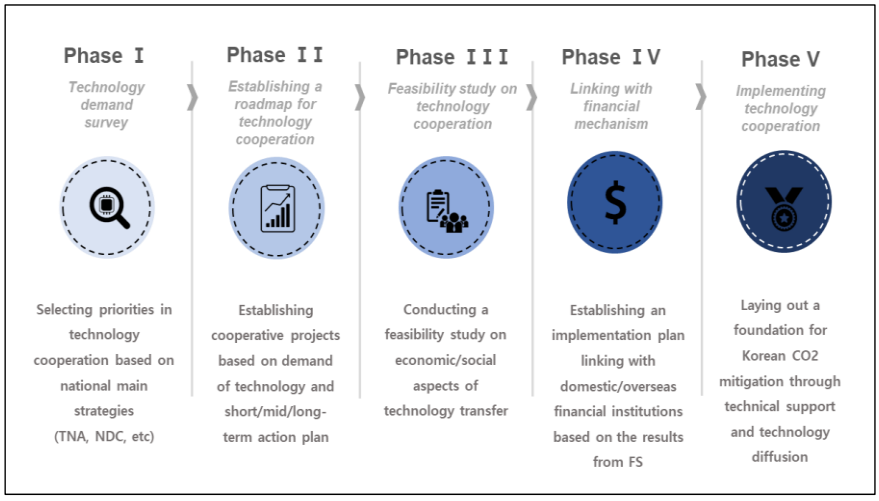
On the other hand, the Green Climate Fund (GCF) employs a more granular and structured project cycle to effectively channel the climate finance towards mitigation and adaptation projects (GCF, 2023). The GCF's project activity cycle consists of four phases: 1) Strategy, Origination and Structuring; 2) Technical Review and Appraisal; 3) Approval and Legal Arrangements; and 4) Implementation. However, the phases are further subdivided into 10 stages (see Figure 2), which is double that of ADB's project cycle. The reason for having numerous stages is that the GCF has several stakeholders involved in the designing of the project, such as accredited entity (AE) and national designated authority (NDA). Afterwards, the projects need to be internally assessed by the GCF secretariat, independent technical advisory panel (ITAP) and the board.

Chaudhury (2020) explains that, unlike general project planning and implementation procedures, GCF emphasizes Learning Models when conducting climate-related projects. This means that GCF aims to promote mutual learning and capacity building among stakeholders in their projects. Hence, if it is not a disaster relief project, every project should enhance the

climate resilience of residents, improve the endogenous self-learning capacity, and strengthen long-term learning capabilities.

III. South Korea's Contribution to Climate Technology Transfer

Similar to international organizations, South Korea's public climate technology (PCT) follows five phases of the climate technology cooperation process, starting with systematic support for demand analysis to implementing technology cooperation (see Figure 3). In Phase 1, a climate technology demand analysis is conducted to select priorities of technology cooperation through discussions with relevant institutions and matching them with the target nation's key strategies (Technology Needs Assessment (TNA), Nationally Determined Contributions (NDCs), national cooperative strategies, etc.).



Source: Authors' design

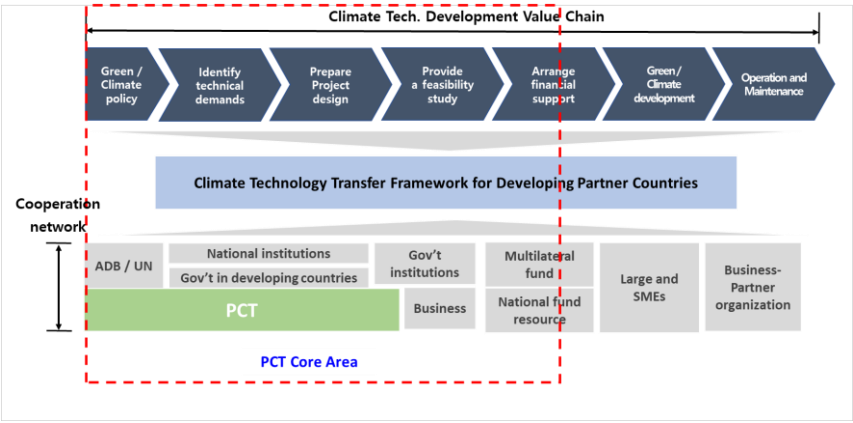
Figure 3. PCT's Project Cycle

In Phase 2, a roadmap for climate technology cooperation and implementation plan is established to diffuse climate technology using appropriate technology packages based on the demand analysis of Phase 1. In Phase 3, a feasibility study is conducted on climate technology cooperation to assess the opportunity and possibility of a climate technology transfer project. In Phase 4, a suitable type of climate finance based on the bankability of the feasibility study (F/S) is examined. Lastly, in Phase 5, a tailor-made project is designed based on the partner countries' development stages, their key priorities, and other

requirements identified from communication with the governments. Hence, the key advantage of PCT is that the project phases are aligned with the international project cycles, which can expedite the implementation of development projects.

IV. Joint Project of PCT and MDB

MDB's goal is to assist developing countries in implementing innovative solutions to challenges posed by climate change. Similarly, PCT aims to support developing countries to enhance their climate resilience through climate technology transfers. Hence, PCT's core role is to support four major areas – identifying technology needs; designing projects; conducting F/S; and linking with financial resources – in the climate technology development value chain (see Figure 4). PCT has the experience and know-how to conduct various development projects before and three joint projects with MDBs can be designed to assist developing countries: 1) Access to services by Technology License Office (TLO)[2]; 2) Joint project with green startups; 3) Joint R&D based pipeline for projects.



Source: Authors' design

Figure 4. PCT's Core Area along the Development Value Chain

[2] The Korean government has established the basis for national roles and support projects centered on the Technology Transfer and Commercialization Promotion Act (Sohn et al., 2020). Furthermore, the National Research Council of Science & Technology (NST) is promoting the commercialization of climate technology by connecting the government-funded research institutes (GRIs) with private companies, and provide support for expert training, infrastructure construction, technology incubation, and technology financing (NST, 2023).

First, TLO is under the National Research Council of Science & Technology (NST) with a range of patents and technologies that are ready to be disseminated and commercialized. A joint technology transfer project to developing countries can be organized using TLO's large database with a list of available climate technologies. Also, several senior-level researchers can assist in the planning and execution of the projects to accelerate the process.

Second, there are several green startups that are funded and supported by PCT to pursue mutual benefits and comprehensive networks among climate technology companies with the goal of achieving the 2030 national GHG reduction goal. Hence, these green startups aim to lead the green technology transfer project in developing countries by linking domestic and foreign official development assistance (ODA) projects and the technology-finance of the MDBs. Therefore, joint projects by green startups and MDBs can actively support overseas technology transfer and commercialization of these companies' climate technologies in developing countries.

Thirdly, developing countries have minimal climate resilience as they do not have the capacity to effectively manage climate risks. Hence, a fair and appropriate technology transfer from leading countries is necessary. The joint projects with TLO and green startups could achieve the short to mid-term goals. However, as a long-term goal, the R&D capacity of developing countries should be developed to minimize the transition risk and achieve a net-zero society. Technological innovation is a delicate artwork of coordinating R&D, policy, and finance: 1) develop human resources with R&D-based capacity; 2) strong government support to nurture the technology; 3) research funded until commercialization. Joint projects of PCT and MDBs should support all three areas to establish a R&D-based ecosystem within the developing countries.

V. Suggestions

The Korean government has managed to attract and establish the Global Green Growth Institute (GGGI), the GCF, and the Climate Technology Centre and Network (CTCN) regional offices in South Korea. In the next year, the ADB Climate Tech K-Hub Center (K-Hub) is planned to be established. Hence, the Korean government's policies in responding to the climate crisis and managing the network between international organizations have become ever more important. Therefore, this paper highlights the measures of climate technology-financial linkage through the cooperation between Korea's public R&D infrastructure and MDB's financial mechanisms and proposes the following items as possible channels of joint projects by PCT and MDBs:

1. Analyzing and evaluating the requisition for climate technology by Asia-Pacific countries based on their NDC and TNA,
2. Matchmaking South Korea's top 5 climate technologies based on the requirements of developing countries,
3. Designing and supporting the technology cooperation of climate technology SMEs of South Korea and developing countries (including successful practices),
4. Establishing and operating a platform for the transfer and commercialization of public climate technologies of South Korea,
5. Establishing and operating a platform to commercialize ASEAN+3 (Korea, China, Japan) Public-Private Partnership (PPP),
6. Organizing an expert pool with highly experienced researchers of Korean public R&D institutes for technology transfer projects.

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