

## Joint Crediting Mechanism under the Paris Agreement and Its Implication to the Climate Policy in Korea

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### ABSTRACT

Before the Conference of Parties (COP) 21 of the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, most parties of UNFCCC had submitted their intended nationally determined contributions (INDCs) and to achieve their voluntary targets, some parties consider using international market mechanisms. As one of such mechanisms, Japan promoted its own bilateral mechanism called Joint Crediting Mechanism (JCM). In this study, feasibility studies and projects under JCM have been analyzed by project type, sector, country and region, which could provide some implications in designing Korea's future climate policy to achieve Korea's targets of 11.7% using international market mechanism in INDC. Since 2010, JCM has promoted 542 projects and feasibility studies in 44 countries according to the Institute for Global Environmental Strategies (IGES) database. Among 542 projects, about 80% were feasibility studies implying that JCM was more focused on project identification. However, current trends of JCM show that more projects will be soon implemented based on these feasibility studies. For sectoral categorization, projects were categorized into seven sectors-energy technology, energy efficiency, renewable energy, waste management, city, strategic planning and projects related to the country's efforts to reduce emissions from deforestation and forest degradation (REDD+). JCM projects were mitigation focused with more than 70% of projects were related to energy efficiency, renewable energy and energy technology. At the regional and country level, JCM is highly focused on Asia and especially, more than 100 projects were developed in Indonesia. Based on the analysis of JCM, in order to develop bilateral international mechanism for Korea, it is worthwhile to emphasize that Korea considers Asian countries as her partner. In addition, Korea may consider the collaboration with Multilateral Development Banks (MDBs) to implement projects identified by Korea and Asian partner countries. Furthermore, strategically, it is recommendable to develop jointly with Japan who has already capacity and networks with other Asian countries to mitigate GHG emissions. Such financial resources from MDBs and Japan may contribute to meet the 11.3% of GHG reduction target from abroad according to INDC of Korea.

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*Key words:* Joint Crediting Mechanism, Bilateral Mechanism, Paris Agreement

### 1. INTRODUCTION

In the 21<sup>st</sup> Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, Paris agreement for the new climate regime has been adopted with the goal of limiting the temperature rise to 1.5 degrees celsius.

Unlike the Kyoto protocol, this agreement will be applied to the all parties including developed and developing member countries. With this bottom-up approach, all parties were required to submit their intended nationally determined Contributions (INDCs) in achieving the global reduction target.

According to the Article 6 of the Agreement, the use of internationally transferred mitigation outcomes towards nationally determined contributions had been prescribed, which will facilitate the technology transfer to developing countries and contribute to the reduction target for developed countries.

Korea had submitted its INDC indicating emission reduction by 37% from the Business-As-Usual (BAU) level by 2030, 11.3% of reduction from BAU level will be from international market mechanism, which means that this amount should be covered by overseas projects. In financing those projects, Korea could consider to facilitate its domestic financial sources, co-financing with MDBs or with other bilateral donors. JCM

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is one of the bilateral mechanisms that Japan has developed to meet its own domestic mitigation target, working together with developing countries. The objective of this study is to analyze JCM with its projects and funding mechanisms, which could provide some implications in designing Korea's future climate policy to achieve Korea's INDCs with overseas reduction using international market mechanism.

This study will first review the Korea's climate policy and the Paris agreement focusing on financial mechanisms in the following section. The structure and management of JCM will be further discussed in the section 3. After analyzing the JCM feasibility studies and projects in the section 4, conclusion including implication to Korea's climate policy will be presented in the final section.

## 2. KOREA'S CLIMATE POLICY AND THE PARIS AGREEMENT

According to Stavins (1997), there can be domestic and international policy instruments in addressing climate change issues. Domestic policy instruments can be largely divided into command-and-control instruments such as standards to energy efficiency and market-based instruments such as taxes or tradable permits. In terms of regulating green house gas (GHG) emissions, a government can choose either price control or quantity control and many literatures had compared these two options, most of which concluded that the price is more efficient than quantity as an emission control (Yu and Mallory, 2015). Some studies suggests optimal hybrid systems as in Pizer (2002) that even though the taxes are more efficient than permits for controlling GHG emissions, a hybrid permit system is politically more feasible when quantity control policies are preferred. Among available lists of specific policy measures, the lists of policy instruments identified by the Intergovernmental Panel on Climate Change (IPCC) is regarded as most authoritative, as Compston and Bailey (2014) assumed. Six key instruments has been selected, which are carbon taxes, emission trading scheme (ETS), feed-in-tariffs (FIT), Quotas (RPS), fossil fuel power plant bans, vehicle emission standards and adaptation policy (national plan). Korea has adopted several policy measures except carbon taxes and fossil fuel power plant bans among these six instruments. Especially,

Korea has adopted domestic emission trading system (ETS) in 2015 (Yun and Yoon, 2016). This measure was one of efforts to achieve Korea's target in INDC, to relieve the burden from industrial sector. However, until 2020, it is not permitted to convert the emission reduction amount from overseas project to domestic reduction amount, according to the domestic ETS in Korea (Yu, 2016). This was to protect the Korea's emission trading market to defend the market price but this made no incentives for Korean companies to invest in overseas emission reduction project. Thus, along with the ETS scheme, Korea supports and promotes renewable energy projects through Ministry of Trade, Industry and Energy and Ministry of Environment. However, both strategies are not directly targeted to achieve overseas emission reduction. There are issues on how to achieve overseas emission reduction target due to lack of specific policy measures, which is 11.3 percent of BAU level, according to Korea's INDC. To develop concrete international policy and measures, it would be necessary to review the bilateral and multilateral policy measures.

Currently, the scale of global climate finance flows was approximately USD 391 billion in 2014 and using various measures, bilateral or multilateral institutions accounts for 42 percent of these climate related funds (Buchner *et al.*, 2015). However, under the Paris agreement, developed countries are strongly urges to scale up their financial support and specifically, to mobilize USD 100 billion annually considering the needs and priorities of developing countries (UNFCCC, 2015). Along with the national reduction target, this calls for a new multilateral mechanism and there had been discussions on new market-based mechanisms after the clean development mechanism (CDM) under Kyoto Protocol. At the following COP17, the framework for various approaches (FVA) with more bottom-up approaches by countries and the new market mechanism (NMM) with more top-down approach overseen by UNFCCC had been proposed. However, the criteria and procedure for approaches that can be recognized under the FVA had not yet been decided (Koatkutsu *et al.*, 2016). Nonetheless, many countries had proposed their own market mechanisms and Japan also has launched its own bilateral mechanism that can contributed to both Japan and developing countries. Joint Crediting Mechanism (JCM) started its operation in 2013 and 16 countries have signed the bilateral document to implement JCM

projects with Japan (as of May 2016) (MOEJ, 2016). JCM has differentiated its mechanism by involving developing country as a joint implementing country and its funding mechanism. JCM had also been the only mechanism that appeared in the Party's submissions to the FVA negotiation (IGES, 2015).

As one of FVA, JCM is directly related with the Article 6 of the Paris Agreement<sup>1)</sup>, which states the use of emission reductions that has been realized overseas towards national emission reduction targets. Under the JCM, the amount of emission reductions and removals acquired by Japan will be counted as Japan's reduction in accordance with the Paris Agreement. To be adopted by CMA<sup>2)</sup>, Japan is going to develop the rules and guidelines for robust accounting in order to avoid double counting (MOEJ, 2016). Although the reduction amount is to be credited by the difference between reference emissions and project emissions, this credit will be non-tradable type but at least half of the credit issued will be delivered to Japanese government, which will be contributed to its reduction target (MOEJ, 2016; Koatkutsu and Umemiya, 2015; Sugino *et al.*, 2013).

### 3. JOINT CREDITING MECHANISM (JCM)

#### 3.1 Overview

JCM is a bilateral mechanism between Japanese government and the government of partner country that contributes to GHG emission reduction from both countries by introducing low-carbon technologies. Major goals of JCM are to disseminate advanced low carbon technologies to developing countries, quantify the emissions reductions achieved, and use part of the reductions for fulfilling Japan's emissions reductions targets by 2020 and 2030 (Koakutsu *et al.*, 2016; Otsuka, 2015). Unlike other market-based mechanisms such as Clean Development Mechanism (CDM) under the Kyoto Protocol where only Annex 1 parties can be participated, developing parties can

participate in the project as joint implementing country in the JCM scheme. JCM was launched in 2013 by the government of Japan and has established the JCM partnership with 16 countries as of June 2016: Mongolia, Bangladesh, Ethiopia, Kenya, Maldives, Viet Nam, Lao PDR, Indonesia, Costa Rica, Palau, Cambodia, Mexico, Saudi Arabia, Chile and Thailand (MOEJ, 2016).

Each country operates JCM with the establishment of Joint Committee (JC), where representatives from both government participates. JC develops rules and guidelines and approves methodologies that can be applied in future JCM projects. JC is also responsible for the issuance of credits achieved from each project. Credits are calculated as difference between reference emissions and project emissions and the reference emissions are set under the BAU level in the partner country (MOEJ, 2016; Koatkutsu *et al.*, 2016). Credits will be shared between two countries but cannot be traded internationally. However, these credits can be used to achieve Japan's emission reduction target, according to the article 6 of the Paris agreement (Hoang, 2015; Koatkutsu *et al.*, 2016).

#### 3.2 Financial Structure of JCM

Under the JCM, there are four types of JCM financing program and feasibility studies by Ministry of Environment (MOE) and Ministry of Economy, Trade and Industry (METI), Japan (Table 1). Each financing program supports different types of projects with different budget amount. As for the projects financed through the MOE, the government supports up to half of the initial cost and the funding source of this subsidy is the revenue from the Tax for Measures to cope with Global Warming, "GW Tax" (Kuramochi, 2015)<sup>3)</sup>.

"JCM model projects" is supported by MOE. MOE has launched this program in 2013 and this program covers financing not only the facilities, equipments, and vehicles which reduce CO<sub>2</sub> emission from fossil fuel combustion but the con-

1) 2. Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. 3. The use of internationally transferred mitigation outcomes to achieve nationally determined contributions under this Agreement shall be voluntary and authorized by participating Parties (UNFCCC, 2015).

2) the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

Table 1. JCM program and feasibility studies by MOE and METI

Type	Program	Supporting agency
Project finance support	JCM model projects	MOE
	JCM REDD+ model projects	MOE
	Collaborative financing program	MOE
	Japan fund for the joint crediting mechanism	MOE
	JCM demonstration projects	METI
Feasibility studies support	JCM feasibility study	MOE/METI
	JCM project planning study	MOE
	Large scale JCM feasibility (City-to-city collaboration)	MOE
	REDD+ feasibility study	METI
	Capacity building	MOE
	Technical support	MOE

Source: Ministry of Environment, Japan (2016).

struction cost for installing those facilities. In financing these projects, MOE financially supports part of the initial cost (up to half), given that at least half of the JCM credits issued by the program to be delivered to the government of Japan. The budget for Fiscal Year (FY) 2015 was 2.4 billion Japanese yen (Approx. USD20 million) per year by FY2017 (Total 7.2 billion JPY) (MOEJ, 2016). These projects include collaboration with projects supported by Japan International Cooperation Agency (JICA) and other governmental affiliated financial institute<sup>4</sup>. “JCM REDD+ Model project” supports activities for REDD+ and use them to contribute to Japan’s emission reduction target. The activities include participatory monitoring of illegal logging, disaster prevention, forest restoration, and provision of alternative livelihoods (IGES, 2016). The budget for FY2015 is 80 million Japanese yen (Approx. USD 6.6 million) (MOEJ,

2016). The government finance part of the cost and at least half of JCM credits issued are expected to be delivered to the government of Japan except for the amount which is allocated to the partner country based on its legislation. “Collaborative Financing program” was launched in 2014 to finance the projects that have higher efficiency of reducing GHG emission in collaboration with other projects supported by JICA and other governmental-affiliated financial institute. This program is differentiated itself from other programs with its focus on building low carbon society in wider fields by expanding superior and advanced low-carbon technologies. The budget for FY2015 is 1.8billion Japanese yen (Approx. USD 15 million) per year by FY2018 (Total 7.2 billion JPY) (MOEJ, 2016).

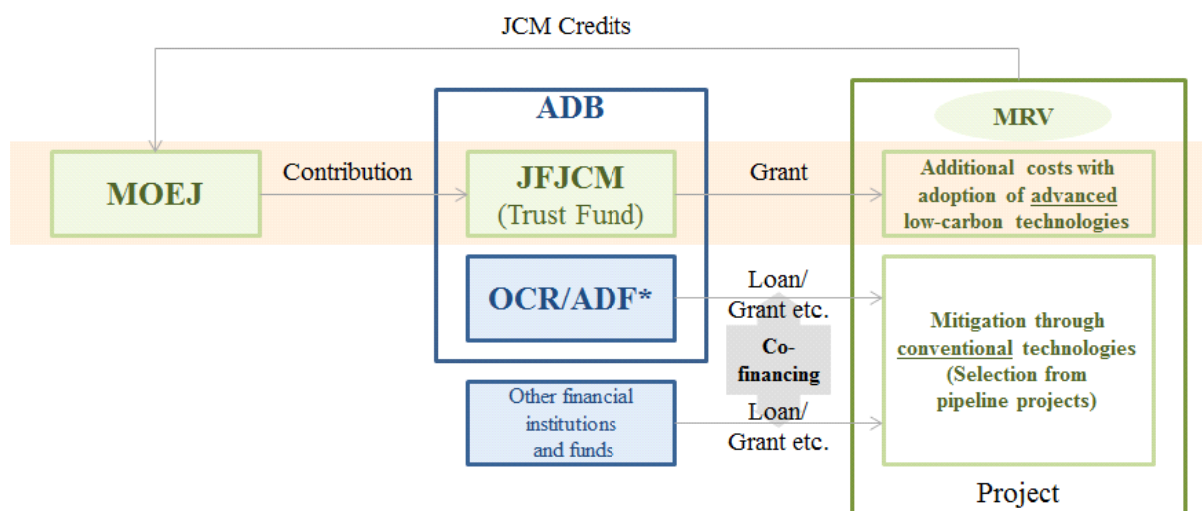
“Japan Fund for the Joint Crediting Mechanism (JFJCM)” is a single donor trust fund, established in 2014 to provide grants and technical assistance for Asian Development Bank (ADB)’s projects utilizing JCM. The fund is managed by ADB and aims to increase the sustainability of ADB-financed and administered projects through the use of advanced low carbon technologies.<sup>5</sup> The projects that can be supported by JFJCM should be implemented in eligible countries, have a component that adopts an advanced low-carbon technology, and meet the JCM application requirements (ADB, 2015). The JFJCM grants can support both sovereign and non-sovereign investment projects and is be co-financed with ADB’s existing financial instruments-ordinary capital resources (OCR) and Asian development fund (ADF)-providing ten percent of total project cost or USD 10 million, whichever is lower (ADB, 2015; Koatkutsu *et al.*, 2016).

“JCM demonstration projects” are implemented by New Energy and Industrial Technology Development Organization (NEDO), which supports the project costs needed to verify the amount of GHG amount reduction in line with JCM rules and guidelines. Under this scheme, the project cost covers the cost of the JCM demonstration projects necessary for MRV. The budget for each JCM financing program is summarized in Table 2 (MOEJ, 2016).

3) GW Tax is an upstream environment tax enacted in 2012. Japan has levied this tax on all fossil fuels based on specific CO<sub>2</sub> emissions. This tax is a surtax on the existing upstream Petroleum and Coal Tax. The revenue it generates will be used to promote energy conservation, renewable energy, and innovative technologies (Public relations office, Government of Japan, 2012).

4) Global Environment Centre Foundation (GEC) website. “JCM” <http://gec.jp/jcm/about/index.html>

5) JFJCM official page. <http://www.adb.org/site/funds/funds/japan-fund-for-joint-crediting-mechanism>



\*OCR: Ordinary Capital Resources, ADF: Asian Development Fund

Fig. 1. JFJCM Structure (Source: Ministry of Environment, Japan (2016)).

### 3.3 Analysis on JCM Schemes

Since 2010, 542 feasibility studies and projects have been supported by JCM in 44 countries including 16 partner countries and other countries considered to be partnered with, according to the Institute for Global Environmental Strategies (IGES) database (as of Jun. 2016). Among 542 projects, about 80% were feasibility studies implying that JCM was more focused on project identification, mostly in Asian region (Fig. 2). However, the current trend of JCM shows more projects will be soon implemented, based on these feasibility studies. Therefore, feasibility studies for several years should be preceded before the actual implementation of project.

All projects are categorized into seven sectors which are as follows: energy efficiency, renewable energy, energy technology, REDD+, waste management, city and strategic planning.

Examples of projects included in each sectors are summarized in Table 3. Energy technology covers projects that implements high-end technologies such as Carbon Capture Storage (CCS), smart micro-grid, IT technologies and energy efficiency projects refers to projects with energy saving technology. The scope of renewable energy projects includes biomass, hydro, solar, wind and geothermal. Projects related to energy planning, financing schemes or promotion of eco-friendly facilities were fall into strategic planning category while city-wide projects or city-to-city collaboration projects were classified as city category.

Most JCM projects were mitigation focused with more than 70% of projects were related to energy efficiency, renewable energy and energy technology. Balances between mitigation and adaptation projects are required with promoting more

Table 2. Budget for JCM financing program (in JPY)

Program	Supporting agency	Budget FY2014	Budget FY2015	Budget FY2016
Financing program for JCM model projects	MOE	3.6 B (by 2016)	7.2 B (by 2017)	6.7 B (by 2018)
JCM REDD+ model projects	MOE	.	.	80 M
Collaborative financing program	MOE	4.2 B	7.2B (by 2018)	.
ADB trust fund	MOE	1.8 B	1.8 B	1.2 B
JCM demonstration projects	METI	6 B	3 B	2.4 B

Source: Ministry of Environment, Japan (2016).

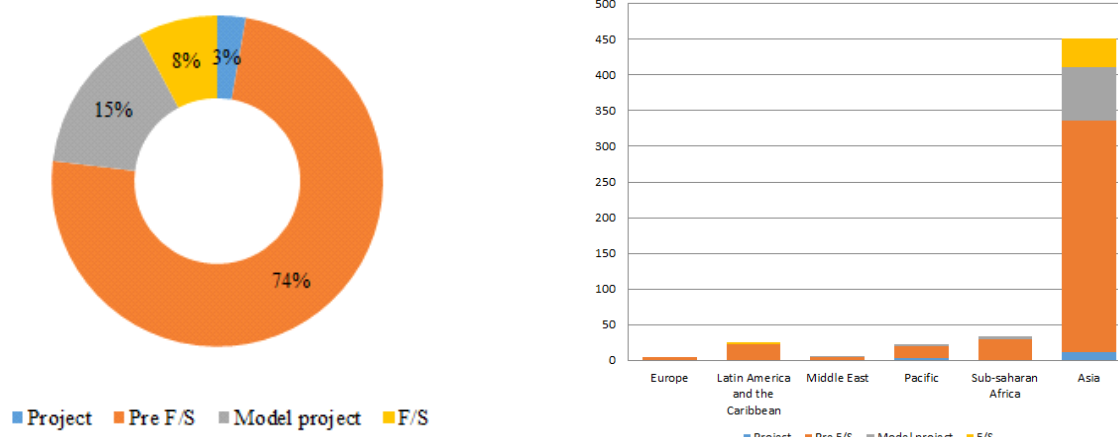


Fig. 2. By project type (Source: IGES database (as of Jun. 2016)).

Table 3. Criteria for project classification

	Sector	Examples
Mitigation	Energy efficiency	Energy saving technology
	Renewable energy	Biomass, hydro, solar, wind, geothermal
	Energy technology	CCS, installation of a technology, smart micro-grid, non-renewable, IT technologies
Adaptation	REDD+	REDD+ activities
	Waste management	Waste to energy
Both	City	City-wide projects
	Strategic planning	Eco-friendly facilities

Source: IGES database (as of Jun. 2016).

adaptation related projects such as REDD+ and waste management.

As shown in Fig. 3<sup>6)</sup>, most projects under JCM were developed in Asian countries, which indicates that Japan considers the Asian countries as her partners to mitigate GHG emissions in those countries, as well as to contribute to the economic development of those countries by transferring Japanese advanced technologies. Among JCM partner countries, Indonesia was the country with the highest number of projects and feasibility studies, followed by Viet Nam and Thailand. Most projects in Indonesia were focused on energy efficiency projects including replacement conventional lighting system to

LED or other energy saving processes in the industrial sector. In case of Vietnam, energy efficiency improvement projects and renewable energy areas are focused as in the case of Indonesia. Until now, JCM focused on project identification and development, as JCM is still in its early stage. Most JCM projects and feasibility studies were GHG mitigation-related, as more than 80% of them were projects developed in energy efficiency improvement and renewable energy. Also, most feasibility studies and projects were implemented in Asian region.

Fig. 4 shows the regional and sub-regional distribution of JCM projects. More than 350 projects were developed in the East Asian region that reflects both GHG reduction potentials

6) In Fig. 3, projects and feasibility studies implemented in countries which are not yet to be JCM partner countries were categorized into "Others". Among them, feasibility studies and projects in India and Malaysia accounted for more than half.

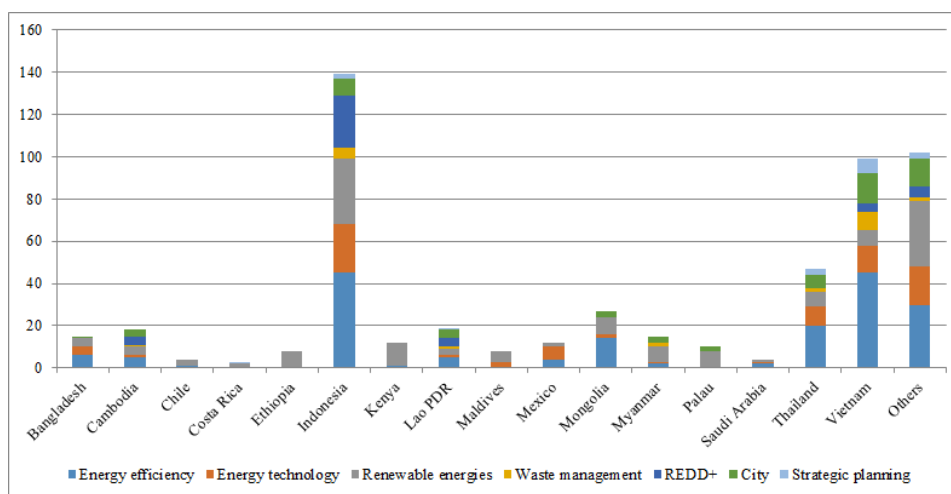


Fig. 3. By country (Source: Authors, based on IGES database (as of Jun. 2016)).

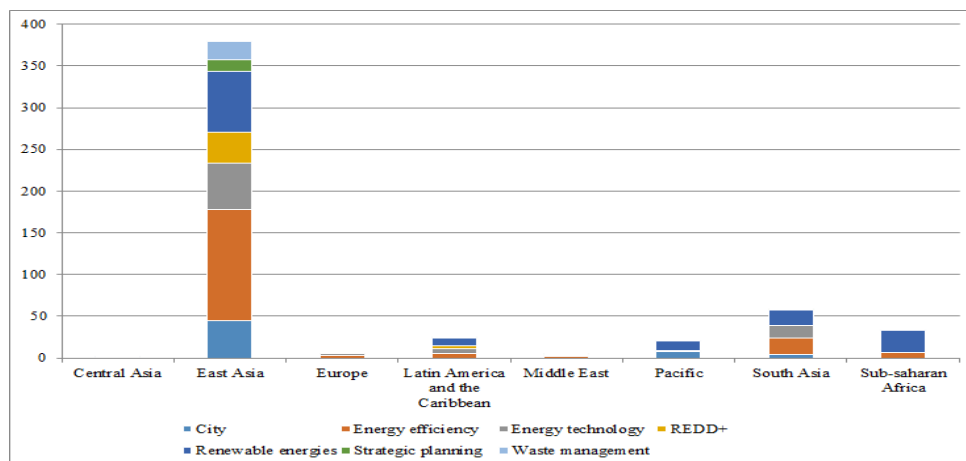


Fig. 4. By region (Source: Authors, based on IGES database (as of Jun. 2016)).

and the financial designing of JCM. Since the financial structure of JCM is linked with the operation of ADB, as shown in Fig. 1, the JCM projects identified are mostly concentrated in East Asia region where ADB’s operations are considered to secure financial resources to implement JCM projects. The projects in South Asia are also focused on renewable energy and energy efficiency areas, but the number of projects in this subregion is much less than that in East Asia. It is worthwhile to note that JCM projects in Pacific region are renewable energy and water management since the countries in this region are small island countries who are mostly vulnerable to climate change and have more potentials of renewable options, even if the size of projects are small.

#### 4. CONCLUSION

Under the Paris agreement, Korea needs to develop new climate policies in order to meet the GHG emission reduction target from international market mechanism. In regard to such efforts, Korea has developed advanced low-carbon technologies and promoted domestic renewable energy programs and energy efficiency improvement programs as well as emission trading schemes since 2009. Also, as one of OECD Development Assistance Committee (OECD DAC) member countries, Korea has increased its ODA programs to support the development of developing countries. Like the case of JCM by Japan, Korea seriously considers to link bilateral ODA pro-

grams with climate change related projects in developing countries. To meet 11.3% target of GHG mitigation from abroad, Korea needs to develop pre-feasibility studies or master plan development to mitigate GHG emissions among bilateral recipient countries of Korean ODA. Thus, Korea may provide specific climate policy measures that can support development and transfer of advanced low-carbon technologies to the developing countries and achieve Korea's target with overseas GHG reduction credit.

Since the share of climate change related sectors such as GHG mitigation and climate adaptation in Korean ODA has been less than 10% and the total volume of Korean ODA in those sectors is not large enough, compared with that of Japanese ODA, it would be desirable to consider strategic and effective approaches to develop collaborative frameworks with developing countries. Comprehensive and integrated capacity building and training programs for policy makers and stakeholders in developing countries to enhance their capacity in international negotiation and leadership in climate change areas could be a priority to increase the uniqueness of Korean ODA programs as well as minimize the overlap with Japanese JCM.

The collaboration with developing countries may focus on mitigation-related projects in Asian countries with Korea's advanced renewable energy and energy efficient technologies, considering the situation of most Asian developing countries where power sector is under-developed. However, to make a difference with JCM, Korea's climate projects and programs with developing countries in Asia could be more effective if those projects are strategically more related to new energy industry<sup>7)</sup>. Such projects may provide leap-frogging opportunities for developing countries to adopt advanced Korean technologies in the areas where developing countries are focusing for their low carbon and climate resilient society. For example, waste to energy projects may have more potentials to mitigate GHG emissions in developing countries with increasing urban areas. In fact, the urbanization in most Asian countries is very fast and the programs and policy experiences of Korea in the waste management is very advanced.

Korea may consider joint programs with other bilateral

mechanisms such as Japan's JCM due to the limited experience and knowledge in climate change areas as a donor country. This may accelerate the technical and managerial capacity of Korea to develop bilateral climate projects with developing countries. Such new types of collaboration with other donors may contribute to achieving the GHG mitigation target of Korea.

Another policy implication from the analysis of JCM in this study is for Korea to design financial arrangements with MDBs such as World Bank, Asian Development Bank (ADB) and Green Climate Fund (GCF) that could increase the number of projects implemented with much larger volumes of financial resources allocated to GHG mitigation projects in international financial institutes. The JCM projects are intended to develop GHG mitigation projects in developing countries in Asia with Japanese experts and institutes who conduct pre-feasibility studies and prepare master plan for low carbon development. Then, projects identified by JCM are linked with operations of MDBs by designing JCM focused funds in MDBs. Such steps and approaches may provide some lessons to Korea who is also developing bilateral and multilateral mechanism to mitigate GHG emissions from abroad.

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7) Korean government promotes "energy-related new industries" which include demand management programs, energy management services, electric vehicle services, energy independent islands, solar energy rental services, use of thermal effluent from power plants.



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