

Analysis of India's New and Renewable Energy Market and Policies and Implications for Korea-India Cooperation

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I. Introduction

The importance of new and renewable energy has been drawing attention since the Paris Climate Agreement was adopted in 2015. The Paris Agreement aims to keep the average temperature rise below 2°C compared to pre-industrialization levels and to limit the future temperature rise to 1.5°C or less. Since its adoption, many countries have become active in using eco-friendly energy, such as new and renewable energy, and providing policies to support the ecosystem of low-carbon industries.

In response to the Paris Climate Agreement, the Korean government declared its goal of achieving carbon neutrality by 2050 and announced policy plans to create a low-carbon ecosystem in 2020. However, the domestic market for new and renewable energy is limited, making it difficult to mass-produce

power generation devices. In addition, the international community's transition to a low-carbon ecosystem is proceeding at a rapid pace. For Korea to achieve its 2050 carbon neutrality target, it will be necessary to secure Nationally Determined Contributions (NDC) through various overseas cooperation projects. Thus, it is believed that energy cooperation with developing countries is needed to expand domestic markets and achieve overseas NDC reduction targets.

Considering India's recent market expansion and active policy in the area of renewable energy, India can be a good partner for Korea in the renewable sector. India is highly active in expanding the new and renewable energy sector to address its serious air pollution problem, and demand for energy from renewable sources is expected to continue in the long

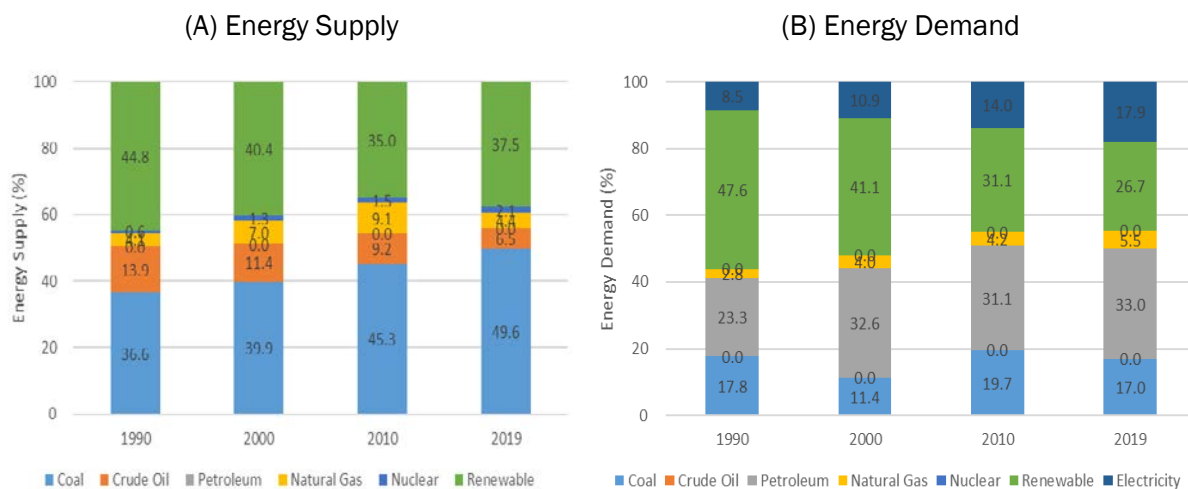
term. Currently, the size of India's renewable energy sector is second in the world, right behind China. To have a clear understanding of India's renewable energy market, we conduct an analysis on India's renewable energy market and policy, which we will explore in following sections.

II. India's Renewable Energy Market

Let us take a look on the Indian energy market and power production structure. When we look at the supply side of India's energy mar-

ket, energy supply is composed of domestically produced coal and renewable energy, and foreign-sourced oil and coal. In recent years, India's energy imports are increasing faster than domestic production due to the country's recent rapid economic growth and increased domestic demand, and the dependence on coal in both domestic production and imports is becoming more pronounced. The supply of new and renewable energy is steadily increasing, but in terms of proportion, the use of thermal energy is expanding more rapidly than that of new and renewable energy.

Figure 1. India's Energy Supply (A) and Demand (B) Composition by Energy Sources



Meanwhile, India's final energy consumption is changing from direct consumption of renewable energy to secondary energy consumption such as oil and power. Specifically, India's final energy consumption can mainly be attributed to industrial rather than housing and home demand. The final energy demand

in the industry is centered on coal, and the final energy demand from housing and homes is for electricity and crude oil rather than renewable energy. This implies that India's supply of renewable energy is expanding, but the supply of fossil energy, which is easy to supply on a large scale, is increasing due to rapid economic development, and this trend is reflected

in the consumption pattern. In addition, India's renewable energy is increasingly being converted into electricity rather than directly consumed, which has affected the decrease in the proportion of direct consumption of renewable energy. However, what is interesting is that power generation using renewable energy sources is expanding. For instance, Maharashtra, Gujarat, and Tamil Nadu provinces, where electricity production is active, are actively utilizing renewable energy sources along with coal.

When it comes to India's electricity generation from renewable energy sources, energy generation is mainly from wind power, solar energy, and bioenergy (Burgas). In other words, the demand and usage of renewable energy such as waste or new energy sources (e.g. hydrogen energy) are relatively low. Recently, the proportion of solar energy sources in India's renewable energy generation facilities and power generation has been increasing rapidly. Most of India's renewable energy generation facilities are privately operated. India's facilities for renewable energy generation and power generation are mainly located in southern and western India, with Karnataka, Tamil Nadu, and Maharashtra showing the most active performance.

III. India's Renewable Energy Policy

Next, let's look at India's new and renewable energy policies and systems. The size of the Indian federal government's clean energy

budget is larger than most countries, and the Indian government's willingness to switch to new and renewable energy is clear. The seminal policy on renewable energy is the National Action Plan on Climate Change (NAPCC), which was introduced in 2008. NAPCC is composed of several policies. The national solar plan is a representative new and renewable energy-related policy that has been effective so far through an upward revision of the solar energy generation target value. The national biofuel policy is a key policy for the spread of biofuels, and the national offshore wind energy policy, which began in 2015, is being promoted with the aim of developing and spreading wind power generation centered on EEZ. The hydrogen energy mission is a policy introduced in 2020. Hydrogen is an area where the Indian government is focusing its efforts. Electric vehicles are also actively being fostered by the Indian government. In addition, the Indian government is promoting renewable energy generation through the power rate policy, introducing mechanisms for certifying renewable energy generation and issuing certificates to implement RPOs in 2010, and providing incentives to power generation operators. In addition, the renewable energy auction system is also being implemented.

Recently, laws and systems on energy and renewable energy in India have been opening the market to wider participation. The amended Electricity Bill of 2021 includes abolition of the government license system for power distribution operators, now allowing companies to enter the renewable energy market freely. It

also imposes fines on power distributors who do not comply with Renewable Energy Purchase Obligations (RPOs), and it transfers the authority to set renewable energy purchase obligations from the state to the federal government.

Recently, the Indian government has been providing direct and indirect incentives to producers of green hydrogen and ammonia through hydrogen energy missions. In addition, companies are actively entering the Indian electric vehicle market thanks to the growth of the middle-class population, the possibility of mid- to long-term expansion of the Indian electric vehicle market based on battery price cuts, and related policies by the Indian government.

However, India's trade and investment policies related to the renewable energy industries show protectionist tendencies to foster its renewable industry. In the case of PV cells and modules, which have the largest imports in the renewable energy sectors, the import tariff rate has been raised from 0% to 40% and 25%, respectively. In addition, the Indian government's high-efficiency solar PV module and ACC battery storage production-linked incentive (PLI) system is difficult to access unless companies can make large-scale facility investments and satisfy local procurement conditions. In addition, as of September 2022, the companies selected for the high-efficiency solar PV modules and ACC battery storage PLI are all Indian companies.

IV. Policy Implications

When we consider India's fast-growing renewable energy market and its overseas cooperation with various global countries, as presented above, India's renewable energy sector can be a major area for cooperation with Korea in the near future. Also, there are many Clean Development System (CDM) projects in India, representing numerous opportunities for Korea to secure NDC reduction through projects with India. In addition, there is significant demand for products such as electric vehicles, batteries, hydrogen, and secondary batteries in India, based on which Korean firms can expand their markets in India through various Korea-India energy cooperation projects.

However, there are many obstacles to realizing Korea-India cooperation in new and renewable energy. First, Korea and India have no regular channels for the renewable energy sector. Second, we observe that India's trade and investment policies for the renewable energy market are quite protective of domestic firms. Third, it is difficult for a foreign firm to benefit from the Indian government's investment in incentives in the renewable energy sector when considering the huge scale of these projects and how incentives are provided after the completion of the projects. Fourth, price competition in the Indian renewable energy market is intensifying, lowering the price of electricity from renewable energy.

Therefore, to strengthen Korea-India cooper-

ation in new and renewable energy, it is necessary to establish a Korea-India energy dialogue and reach a Korea-India climate change cooperation agreement with discussions on reducing NDCs, and conduct large-scale pilot projects with India in new and renewable energy such as solar and wind power generation, and hydrogen ammonia production.

Since the relationship between Korea and India was upgraded to a strategic partnership in 2010, economic and human exchanges between the two countries have been rapidly expanding. However, compared to India's cooperation with other foreign countries in the renewable energy sector, only a few cooperation projects have taken place between Korea and India. Of course, the two governments exchanged dialogues for future energy cooperation during the 2015 and 2018 summits, but it is difficult to say that cooperation between Korea and India has become active in the renewable energy sector. From this perspective, building a regular discussion channel between Korea and India could be the first step to fostering renewable energy cooperation with India.

Also, Korea can achieve NDC overseas reduction through renewable energy cooperation projects with India. Under the Paris Agreement, carbon reduction using a cooperative approach between countries is defined as Internationally Transferred Mitigation Outcome (ITMO). To secure ITMO through such a cooperative approach, it is essential to discuss the long-term goals of cooperation, target

NDC, and the long-term low-carbon development strategy within the participating parties. Therefore, to secure overseas NDC reductions under the Paris system, it is necessary to reach a bilateral climate change cooperation agreement between Korea and India.

Lastly, considering the large size of power generation projects and the high level of competition in the market, we can think of a large-scale new and renewable energy project between Korea and India. Through the project, Korea can secure overseas NDC reduction, and renewable energy firms in Korea can participate in the large Indian renewable energy market. The project finance could be supported by public funds, such as ODA funds, or other funds from multilateral agencies, such as the ADB or the GCF. [KIEP](#)