

Renewable Energy Use and Modern Energy Access Improvement in Developing Countries

Ken Koyama, PhD
Chief Economist, Managing Director
The Institute of Energy Economics, Japan

On July 24-25, I had an opportunity to attend a United Nations meeting in New York to participate in discussions on renewable energy use and its contributions to improving modern energy access, poverty and other social problems in developing countries.

Renewable energy has been expanding globally and greatly. According to BP statistics, global consumption of modern renewable energy (solar photovoltaics, wind power, geothermal energy, biomass, etc.) in 2016 grew by 14.1% from the previous year to 420 million tons of oil equivalent. The average annual growth between 2005 and 2015 was as high as 16.1%. Renewable energy's share of global primary energy consumption in 2016 was still limited to 3.2%, though indicating a steady increase from 0.5% in 2000. Renewable energy power generation totaled 1.85 trillion kilowatt-hours in 2016, accounting for 7.5% of global power generation, a substantial rise from 1.4% in 2000.

Of 420 mtoe in global renewable energy consumption in 2016, the Organization for Economic Cooperation and Development accounted for 64% and non-OECD countries for 36%, indicating that developed countries have so far played a leading role in modern renewable energy use. By country, however, China was the largest renewable energy consumer accounting 20.5% of the total, followed by the United States, Germany and Japan.

Developed countries and China have rapidly expanded renewable energy consumption as they have widely recognized the macro merits of renewable energy and implemented various forms of policy support for renewable energy use. The merits are that (1) the promotion of renewable energy that is domestically produced can contribute to increasing national energy self-sufficiency rates and enhancing energy security, (2) renewable energy is free from carbon, emitting no carbon dioxide during power generation and supply stages, and (3) the expansion of renewable energy use can be expected to increase new industry, business and employment opportunities.

However, renewable energy as well as other energy sources is not a perfect energy. Relatively high supply costs have been viewed as one of the largest problems with renewable energy. As policy support for renewable energy has made progress, however, renewable energy costs have declined rapidly thanks to "learning effects" of technological advancement. Some of the recent bid prices for solar PV and wind power generation projects in the world are close to "grid parity," indicating competitive power generation costs. Such cost reduction has provided momentum for the

promotion of renewable energy as well.

As a matter of course, it is important to note that the recently proposed low costs for renewable energy power generation depend on some unique (and in some case, exceptional) natural conditions such as insolation and wind conditions, land costs, equipment capacity and construction costs. While solar PV and wind power generation costs have been falling generally, it is important to collect and analyze cost data globally as much as possible to have more broad and correct data base. The expansion of intermittent renewable energy including solar PV and wind must be accompanied by power supply stabilization measures including auxiliary fossil power generation, introduction of storage batteries and enhanced electricity supply networks. In this way, “integration cost” of intermittent renewable energy is an important problem.

The abovementioned points represent basic, universal viewpoints or issues regarding the promotion of renewable energy. As for the promotion of renewable energy in developing countries where energy demand is expected to expand in the future, however, there are different viewpoints, expectations or issues. They are related to poverty or energy poverty. As noted in “A Japanese Perspective on the International Energy Landscape (323),” there are a great number of absolutely poor people in the world. In the world, 1.3 billion people are left without modern energy access including electricity, concentrating in Asia and Africa. The interior burning of traditional biomass fuels leads to more than one million deaths annually, according to an analysis. Energy poverty is a key problem that the United Nations’ sustainable development goals, known as SDGs, seek to eliminate globally by 2030.

There are some economic reasons for difficult access to modern energy and power supply in developing countries. The first reason is that costs for supply to some developing countries are extremely high due to the difficult construction of supply facilities (power generation and distribution facilities). The second reason is that consumers in these countries cannot afford to bear such high costs. The third reason is that if policy-driven funding is given with the above two reasons taken into account, the funding may become too large to sustain.

On the other hand, the international community cannot be allowed to leave the serious poverty (or energy poverty) issue untouched. Then, hopes are growing on renewable energy as an option for distributed power sources, with the abovementioned three merits taken into account. In many islands and other regions plagued with energy poverty that are far away from existing power grids, distributed power sources may be effective. These regions have solar PV, wind and geothermal energy potentials and various forms of biomass fuel sources, depending on natural conditions.

In most of these cases, however, the establishment of renewable energy facilities as distributed power sources for modern energy supply to the poor is commercially difficult. Therefore, policy support is required to achieve the SDGs from the social viewpoint. Then, what the most significant, effective policy schemes are becomes subject to discussions. Given that regional conditions are various, there may be various combinations of renewable energy supply systems and technology portfolios. It is important to pursue various potentials.

The UN related meeting in New York provided an opportunity for intensive discussions on specific cases regarding the utilization of renewable energy for the improvement of modern energy access in developing countries. As renewable energy has various potentials and challenges, a wide range of matters must be analyzed and considered. In this sense, the meeting was an opportunity for me to recognize anew that the energy poverty viewpoint is too important to be forgotten.

Contact: report@tky.ieej.or.jp

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