Overview of “NEDO PV Challenges” and the future created by high performance PV

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In 2014, New Energy and Industrial Technology Development Organization (NEDO) drew out a strategy "NEDO PV Challenges" in order to support society after the large-capacity installation of photovoltaic (PV). This is different from preceding strategies that aimed at “dissemination of photovoltaic power generation.” The background of this strategical transition is that Japan is about to face the situation with large-capacity photovoltaic power generation owing to the feed-in-tariff scheme.

"NEDO PV Challenges” proposes technological development for PV to be a major option as an energy source and points out the necessary actions: reduction in power generation cost, establishment of reliability, elimination of the geological constraint for PV installation, construction of recycling system, and creation of high value in industry.

In particular, the cost target of PV electricity at 2030 is 7 yen/kWh, which value is lower than that of conventional thermal power generation. PV electricity cost has been along the steady trend of reduction, but conventional cost reduction strategies such as large-scale installation and the enhancement of utilization ratio by design optimization do not necessarily bring about further cost reduction in recent situations. Therefore, there is increasing necessity for the research and development on the PV modules itself for fundamental cost reduction.

NEDO has successfully promoted projects for the reduction of PV power generation cost such as “Development of high performance and reliable PV modules to reduce levelized cost of energy.” Among the remarkable achievements are the modules with the world-record efficiency (Figs. 1 and 2), which encouraged us toward the realization of the electricity cost target and implied the possibility of new market for PV.

NEDO will strengthen the effort for the reduction of system cost in order to make it sure to realize the achievement of the cost target. New applications of PV will be also promoted in transportation and business sectors, in which PV installation adjacent to the area with large power consumption is highly demanded.

Fig. 1 III-V triple-junction PV module with an efficiency of 31.17% by Sharp.

Fig. 2 Crystalline silicon PV module with an efficiency of 24.37% by Kaneca.