

The particularity of the power network incorporating with the aggregation of distributed PV systems
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Japan set up the long-term R&D roadmap called “PV2030” in June 2004. Its accelerated scenario is assuming that the mass deployment of 100GW PV aggregation will supply 10 % of national electricity up to year 2030. Around a half of this PV installation will be fulfilled by residential rooftop applications. In such a state, PV penetration will reach 100 % or more in the majority of urban areas and might become less harmonized with the conventional power grid approach due to frequent and apparently high-level reversal power flow from PVs to upstream grids. The author proposes a new concept to realize a less dependent PV aggregation on the existing power grids by adding power electronics and energy storages, which is named “autonomy-enhanced PV clusters” (AE-PVC). Early results have already been obtained including conceptual definitions of autonomy-enhanced, community-base clustered PV systems.

He will also add another approach of Very Large Scale Photovoltaic Power Generation (VLS-PV) Systems on deserts, ranging from ten mega watts to giga watts scale. Nowadays, it is not a simple dream story but becomes very realistic. The third volume of “Energy from the Deserts” is to be published soon, in which more practical case are studied over the world deserts such as the Mediterranean region, the Middle East, Asia and Oceania as well as global deployment scenario toward world major energy source up to 2100 including a vision of global network infrastructure.