

24. Study on Solar Photovoltaic Power Generation System for School Facilities

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As one of the three main pillars of the School New Deal Plan, formulated to address the recent economic crisis, the expansion of environment-focused renovations, such as through the use of solar photovoltaic power generation, has been advocated and is now in its implementation phase.

In order to smoothly promote the introduction of a solar photovoltaic power generation system nationwide, school founders are in need of information on a series of procedures starting from preliminary surveys to designing, installation, and the operation and maintenance of such system. A guidebook compiling the required information is necessary.

Therefore, the Education Facilities Research Center of the National Institute for Educational Policy Research, jointly with the Ministry of Education, Culture, Sports, Science and Technology, prepared this guidebook with due consideration of the characteristics and the current status of school facilities, while asking for cooperation from various related ministries and agencies, as well as from external experts.

1. Usefulness and effects of system introduction

Solar photovoltaic power generation is a renewable energy source free from emissions of CO² – the greenhouse gas said to be the cause of global warming. If a system of solar photovoltaic power generation, which can contribute significantly to the prevention of global warming, is introduced into a school, it may be utilized as a material for environmental education, providing children and local residents with opportunities to directly learn the effects of and structures for reducing CO² emissions and conserving energy on site. The guidebook introduces such facts with some example cases.

Specifically, environmental education can be conducted in the forms of (i) observation and experience by letting children touch real solar cell modules, and (ii) regular monitoring of the amount of electricity generated, with some devices employed for display contents and installation location of display units. Furthermore, by exercising ingenuity, environmental education can also be developed in many ways, involving guardians, local residents, and experts from manufacturing companies and NPOs.

The introduction of a solar photovoltaic power generation system into schools is expected to reduce CO² emissions by converting renewable energy into electricity, and as a result, electricity consumption per school will decrease by around 12% to 27%^{*1}. Electricity charges per school will decline by around 210,000 yen to 260,000 yen^{*2} on a yearly basis.

^{*1} Calculation based on the premise that 20kW-panels are installed at an average school (with the total floor area of 5,000m²)

*2 Calculation based on electricity charges of Tokyo Electric Power Company as of July 2009

2. Points for installation and use of the system

The guidebook compiles what should be done and points to note at each stage of introducing a solar photovoltaic power generation system into school (from the decision to take on the project, to the operation and maintenance of the system and efforts for environmental education) so that school founders can smoothly introduce the system in a systematic manner.

It is basically possible for any school founder to install a solar photovoltaic power generation system and determine to start the project, if only they can select a place to install the system and ensure the budget therefor.

In particular, government subsidy programs are well prepared to alleviate the financial burdens of local governments. Subsidies provided to public elementary schools and junior high schools cover the following: i) work necessary for solving technical problems (waterproofing of the roof surface, and the erection of a fence on the roof, etc.); ii) work necessary for implementing environmental education; and iii) repair work for energy conservation executed at the same time as the installation of the system.^{*3}

In addition, the guidebook contains matters that are mainly dealt with by the relevant architectural office but should also be understood by school founders (structural safety of the building and notes for repair work for waterproof layer on the roof, etc.).

*3 Types of covered work and the grant rates differ depending on subsidy programs.

3. Sales of surplus power and system maintenance

Surplus power can be sold and effectively utilized by installing an electric energy meter. Therefore, the guidebook also explains contracts and other matters necessary for selling surplus power. It would be more efficient if the revenues from surplus power sales, as well as the electricity expenses saved by power generation, could be properly appropriated for environmental/energy education and other activities at school.

A solar photovoltaic power generation system does not require maintenance basically, but the guidelines also provide information on points to be checked visually at regular intervals, system service life, and matters concerning periodic repairs.

Furthermore, there is also a checklist of items to confirm up to the system introduction, advanced example cases, and other reference materials for school founders.

4. Reports on this study

“Encouraging Children to Study and Support Use of the Sun’s Bounty – A Guidebook for Introducing Solar-Powered Electricity Generation to Schools” (July 2009)

<http://www.nier.go.jp/shisetsu/pdf/taiyoukou.pdf>