PACKAGE ID - 000679IBMPC00 PVFORM3.3

KWIC TITLE - Photovoltaic System Performance

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LIMITATION CODE -UNL **AUDIENCE CODE -** UNL

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DESCRIPTION - PVFORM3.3 is used to design a photovoltaic (PV) system using a set of design parameters which optimize the system's economic potential for the proposed location and the expected operating conditions. PVFORM3.3 has been used to determine PV system size and optimum mounting configuration. The anticipated electrical load determines the system size and the weather and the mounting configuration affect the system output. PVFORM3.3 uses program-supplied default values or their user-supplied equivalents for each of a large number of parameters describing the system and time-series data describing the environment to perform a series of hourly calculations to simulate the physical (photovoltaic) performance of a PV system for a one-year period. These iterative calculations sample the performance of the PV system throughout a simulated 365-day year of system operation. Within any simulated day on which system performance is sampled, the calculations are done hourly. The number of days sampled and the interval between them is determined by an input parameter. The results of these calculations are summarized on a monthly basis in output tables and an optional plot file. The program is applicable to grid interactive or stand-alone flat-plate systems. The grid interactive system is assumed to use power purchased from a local utility to supply that portion of the load not met by the simulated PV array. If the array produces more energy than can be consumed by the load, the excess energy is assumed to be sold back to the utility at a constant energy sellback price. If a stand-alone system is being modeled, the program assumes that all energy produced by the simulated PV array is first applied to the external load, and any excess is then used to charge the battery bank. Energy not consumed by the load or the batteries is considered to be wasted.

PACKAGE CONTENTS - Media Directory; Software Abstract; SAND85-2271C; SAND85-0376; Media Includes Source Code, Object Modules, Sample Problem Input, Data Libraries, Auxiliary Material, Control Information;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 5.25 Diskettes

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METHOD OF SOLUTION - PVFORM3.3 uses several submodels to predict photovoltaic system performance. The Perez anisotropic diffuse radiation model uses the total insolation on a horizontal surface and the direct normal insolation to compute the total insolation incident on the plane of the array (POA). The Fuentes model computes the cell temperature from the ambient temperature and the wind speed. The d.c. power submodel calculates the efficiency of conversion of solar energy into electrical energy by a solar cell and the a.c. power conversion submodel is used to compute the efficiency at which the power conversion unit converts d.c. power from the array into a.c. power to the load.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS DOS 3.0 or later

PROGRAMMING LANGUAGES - FORTRAN 77

SOFTWARE LIMITATIONS - Maximum of 56 input parameters.

SOURCE CODE AVAILABLE (Y/N) - Y

OTHER PROG/OPER SYS INFO - Input data files developed for earlier versions of PVFORM are not upwardly compatible with version 3.3. PVFORM3.3 will run on a microcomputer such as the DEC VAX 11/780. PVHELP.FOR compiled and linked without errors or warnings. TMYCON.FOR compile and link without errors or warnings. PVFORM33.FOR had 1 warning 'PVFORM33.FOR(2371) WARNING F4998:LIFE: Variable used but not defined. ERRORS. Linked with only the compile warning, no errors.

HARDWARE REQS - PVFORM3.3 requires an IBM PC or compatible computer, two disk drives and 256 KB of RAM. An 8087 or 80287 math co-processor, or equivalent microchip, is recommended.

REFERENCES - D.F. Menicucci and J.P. Fernandez, User's Manual for PVFORM: A Photovoltaic System Simulation Program For Stand-Alone and Grid-Interactive Applications, SAND85-0376, April 1988; D.F. Menicucci, PVFORM A New Approach to Photovoltaic System Performance Modeling, SAND85-2271C, 1985.

ABSTRACT STATUS - Released screened May 16, 1994.

SUBJECT CLASS CODE - T

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
P CODES
PHOTOVOLTAIC CONVERSION
PHOTOVOLTAIC POWER SUPPLIES
SIZING

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PERFORMANCE
FLAT PLATE COLLECTORS
INSOLATION
SOLAR ENERGY
ECONOMIC ANALYSIS
OPTIMIZATION

EDB SUBJECT CATEGORIES -
990200 140501

SPONSOR - DOE/CE

PACKAGE TYPE - SCREENED