PACKAGE ID - 001115IB48600 HYBRID2

KWIC TITLE - Predicts the Long Term Performance and Economic Feasibility of Hybrid Power Sys

AUTHORS - Manwell, J.F.
University of Massachusetts, Amherst, MA (United States)

Deng, D.
University of Massachusetts, Amherst, MA (United States)

Baring-Gould, E. Ian
National Renewable Energy Lab., Golden, CO (United States)

Guile, M.
Capitol Software, Lakewood, CO (United States)

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

COMPLETION DATE - 06/25/1996 **PUBLICATION DATE -** 06/01/1996

DESCRIPTION - HYBRID2 is a combined probalistic/time series model designed to study a wide variety of hybrid power systems. Hybrid power systems combine a number of sources of power generation and, usually, a form of energy storage to supply an electrical load. Hybrid power systems are mainly used in areas such as islands or remote communities that are removed from a power distribution network. These power systems can range from large, multi-megawatt systems to those supplying single family dwellings. HYBRID2 simulates systems that include diesel generators, wind turbines, battery storage, different power conversion devices and a photovoltaic array. Systems can be modeled with components on the AC, DC or multiple buses. A variety of different operating strategies have been allowed as well as an economic analysis tool. The HYBRID2 code has a user-friendly Graphical User Interface (GUI) as well as a glossary of terms commonly associated with hybrid power systems. HYBRID2 is also packaged with an extensive library of equipment to assist the user in designing hybrid power systems. Each piece of equipment is commercially available and uses manufacturer's specifications. In addition the library includes resource data and some sample power systems and projects that can be used as templates. Two levels of output are provided, a summary as well as a detailed time step by time step description of power flows. A Graphical Results Interface (GRI) allows for easy and in-depth review of the detailed simulation results.

PACKAGE CONTENTS - Media Directory; Softawre Abstract; NREL/TP-440-21182; NREL/TP-440-21272; HYBRID2 Installation instructions; Media Includes Executable Module, Auxiliary Material, Sample Problem Input Data;

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PACKAGE CONTENTS -(CONT)
SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 3 3.5 Diskettes

METHOD OF SOLUTION - HYBRID2 uses a system configuration specified by the user, including power systems design, community load and renewable resources to predict the performance of the power system specified by the user. HYBRID2 is a logistical time series simulation that reads in resource and load information every time step, which can be from 5 minutes to 2 hours in length, and then computes the system performance for each time step. An energy balance approach is used where the sum of the generated power must equal the load specified for that time step. The software also includes a probalistic method that accounts for the variability in both the wind and load during each time step. An advanced user defined algorithm that determines which system components are operational at any given time is also included. The system performance for the whole simulation is then based on the system performance for each of the specific time steps.

COMPUTER - IBM PC 486

OPERATING SYSTEMS - Microsoft Windows version 3.1 or better

PROGRAMMING LANGUAGES - Microsoft Visual BASIC and a Microsoft Access Database.

SOFTWARE LIMITATIONS - Not all potential hybrid power systems can be modeled. System configurations are limited to those involving any of the following equipment: gensets, wind turbines, photovoltaics, power converters, batteries and dump load. actual dispatch of system components may have to be approximated in HYBRID2.

SOURCE CODE AVAILABLE (Y/N) - N

UNIQUE FEATURES - HYBRID2 has a large number of unique features that separate it from other hybrid power system simulation codes. The GUI allows the user to manipulate and design systems that would normally be too complicated. The library of components and resource data allow for the creation of a project to conduct pre-feasibility analysis. HYBRID2 may also model a large number of different hybrid power configurations and loads, more than any other hybrid system model. The model provides substantial flexibility to define the dispatch of individual components.

RELATED SOFTWARE - HYBRID2 includes a Microsoft excel spreadsheet that allows the user to calculate a daily load profile based on hourly power usage. the hourly load may then be scaled seasonally from within the HYBRID2 software to create a yearly load profile.

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HARDWARE REQS - DOS based PC with a 486 processor and a math coprocessor. The computer must include a mouse, at least 4 MB of RAM and approximately 20 MB of available hard disk space.

TIME REQUIREMENTS - Run time requirements depend highly on the length of the simulation, the complexity of the hybrid system being modeled and speed of the computer. A year long simulation of a complex power system will take from 5 to 20 minutes depending on the computer speed.

REFERENCES - J.F. Manwell, A. Rogers, G. Hayman, C.T. Avelar, and J.G. McGowan, Draft Theory Manual for HYBRID2: The Hybrid System Simulation Model, NREL/TP-440-21182, June 1996; E. I Baring-Gould, HYBRID2: The Hybrid System simulation Model Version 1.0, User Manual, NREL/tp-440-21272, June 1996;\ Vincent van Dijk and E. Ian Baring-Gould, Validation of HYBRID2 with the Froya Island Data Set, NREL/TP-441-20796.

ABSTRACT STATUS - Submitted 9/13/96. Released AS-IS 9/24/96

SUBJECT CLASS CODE - RT

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
H CODES
COMPUTER-AIDED DESIGN
COMPUTER CALCULATIONS
WIND POWER
SOLAR ENERGY
POWER SYSTEMS
AIR POLLUTION
EMISSION
SYSTEMS ANALYSIS
PROBABILISTIC ESTIMATION
MANUALS
POWER GENERATION
LOAD MANAGEMENT

EDB SUBJECT CATEGORIES -
990200 240100 170600 140600 140700 250000

SPONSOR - DOE/EE

PACKAGE TYPE - AS - IS