Programs let architects design energy-saving homes

By JUDITH GREER

Computer aided design in architecture may very well save dollars for home owners and preserve energy resources.

Energy Economics of Design Options (EEDO) is a software package designed to help analyze energy saving options available to architects when installing HVAC systems and materials into either new or existing homes.

Developed by Burt Hill Kosar Rittelmann Associates and energy experts at Lawrence Berkeley Laboratory, the software is designed for use on the IBM personal computer, and principal features include design energy analysis capability, file oriented structure, extreme user friendliness, automatic (dynamic) defaults, economic optimization and output choices.

The EEDO program was demonstrated to area architects and students by Syed Faruq Ahmed, BHKRA mechanical engineer, recently at PC Solutions, a newly developed Station Square-based firm, which evaluates and recommends software to businesses.

Ahmed explained that, "EEDO is a collection of programs for building energy analysis and economic optimization of energy saving features," including life-cycle-costs, payback period, and/or return on investment.

"It uses state-of-the-art interactive features, and data base management capabilities, and is designed to be used by relatively non-technical users," said Ahmed.

EEDO can select from a large list of energy retrofits, that will maximize total energy savings in already existing houses, and indicate the order in which they should be installed. It can be done for any house in hundreds of different climates using economic parameters specified and input by the user, Ahmed said.

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Other features include energy analysis of new residence designs, energy audits and retrofits analysis, active and passive solar simulations, air infiltration models and HVAC systems simulations.

EEDO is helpful throughout the entire design process and gives figures, on even exotic designs, during the pre-design stage, at which point the details may not be known and where dynamic default can be most helpful, Ahmed said.

Dynamic Default is a feature whereby default values, which are not fixed, are supplied based on the answers to previous questions.

An intensive data base is provided which contains the thermal characteristics of building energy saving components, the cost of installing these components and the yearly maintenance costs. "A reference manual explains the structure of the data base, allowing the data base to be changed, for example to reflect local costs," said Ahmed.

The package consists of the reference manual, two 5¼-inch discs with compiled code, and two 5¼-inch discs with source code. In normal use, compiled EEDO code is used, which is done to speed the program execution time.

EEDO discs contain two parallel data bases, one for English units and one for metric (SI) units.

Only two discs are used at anytime, and all the utility programs are on the same two discs — one for configuring EEDO for use with the type of printer in use, and the second for adding or deleting weather data (12 cities' weather data can be shown at a time).

At any time a large number of data files with house descriptions can be maintained on the disc. No translation is required on the part of the user when moving from English units to metric units, because for example, house data entered in English units will show the same house data automatically translated into SI units, Ahmed explained.

According to Jean Purvis, BHKRA director of communications, the big feature of the package is its user friendliness. Usually, the hardest part of using any program is providing the input, but because of EEDO's interactive mode, the user is able to enter, delete, and edit building characteristics with a minimum of work.

Ahmed said that help can be obtained when a user does not understand a question, in both long descriptive and short form, whichever is preferred.

Building components which EEDO accepts as inputs are: walls, windows, doors; roof/ceiling and floor/subfloor; active and passive solar features; heating and cooling system; house orientation and shielding; occupant behavior related to energy use; and economic assumption.

One assumption which used to be made when architects first began analyzing energy consumption said Ahmed, was that the "boiler should be big enough to accommodate the number of people living there, so that the people aren't cold." Now, what is measured is the number of BTUs (British thermal units) which provides more accuracy, energy savings, thus financial savings.

And, according to Ryan Homes' John Crowley, director of project development, the question to answer now is whether "the energy saving device you are installing makes good economic sense."

Crowley said EEDO "helps us to evaluate the benefits of certain materials and systems with regards to energy consumption."

"This tool helps us to make decisions on how to save energy when designing the

Continued on page 4s