

PACKAGE ID - 000762IBMPC00 ZIP

KWIC TITLE - Economic Insulation Levels for Houses

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

COMPLETION DATE - 05/01/1989 **PUBLICATION DATE** - 01/01/1989

DESCRIPTION - ZIP was developed to support the calculations and database used to estimate the economic levels of insulation published in the U.S. Department of Energy's Insulation Fact Sheet. The program allows the user to estimate economic levels of insulation for attics, exterior walls, floors over unheated areas, slab floors, and basement and crawlspace walls for new and existing houses in any 3-digit zip code location in the U.S., based on local climate data, local prices for energy and insulation, and the type and estimated efficiency of its heating and cooling system. ZIP recognizes five different heating systems: natural gas, oil furnaces, electric furnaces, electric baseboard, and electric heat pump and two cooling systems: central and window electric air conditioners. An evaporative cooling system can also be specified, but this is not treated as a true air-conditioning system. In addition, the user can specify the approximate operating efficiency of the heating and cooling systems (low, medium, high, or very high). ZIP can be run for a single zip code and specified heating and cooling system or in a batch mode for any number of consecutive zip codes to provide a table of economic insulation levels for use at the state or national level.

PACKAGE CONTENTS - NESC Note 89-52; Software Abstract; ORNL/TM-11009; Media Includes Source Code, Executable, Climate Data, Default Insulation Prices, DOE Region Price Projections, Machine Readable Documentation;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 5.25 Diskette

METHOD OF SOLUTION - The economic levels of insulation calculated are based on an incremental type of analysis. Successive levels of insulation in each part of the house are evaluated independently to determine how far it pays to keep adding insulation, and when to stop. Climate parameters are included for every 3-digit Zip Code and automatically retrieved when the program is run. Regional energy and insulation price data for both new and existing houses are also available, but these can be overridden if desired to more closely correspond to local prices. Economic calculations are based on a reduction in long-term heating and cooling costs. For new houses, a 30-year life is used in calculating the economic level of insulation. That is, the economic level of insulation calculated

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METHOD OF SOLUTION - (CONT) for a new house will be the level which has the lowest combined insulation cost plus energy cost over a 30-year period. For existing houses, a 20-year life is used in the calculations. In performing these calculations, a minimum 7% annual rate of return, over and above general inflation, is used to discount future savings to present value. If there is ductwork in attics, crawlspaces, or other unheated areas, an adjustment is also made to the equipment efficiency in order to reflect duct loss.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS-DOS

PROGRAMMING LANGUAGES - Microsoft QuickBASIC 4.0

SOFTWARE LIMITATIONS - ZIP is currently limited to calculating economic insulation levels for attic floors, exterior walls, floor over crawlspaces, and crawlspace and basement walls.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - The reduction in annual heating and cooling requirements due to insulation in attics and in wood-frame and masonry walls are estimated using equations derived from the PEAR program.

HARDWARE REQS - ZIP requires an IBM PC/XT/AT or compatible computer with a minimum of 256 Kbytes of memory. A printer is useful, but not necessary.

REFERENCES - S.R. Petersen, ZIP - The ZIP-Code Insulation Program (Version 1.0) Economic Insulation Levels for New and Existing Houses by Three-Digit ZIP Code, ORNL/TM-11009, January 1989.

ABSTRACT STATUS - Released tested November 21, 1994.

SUBJECT CLASS CODE - T

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
THERMAL INSULATION
ECONOMIC ANALYSIS
R FACTORS
COST BENEFIT ANALYSIS
HOUSES
ATTICS
BASEMENTS
FLOORS
WALLS
REGIONAL ANALYSIS

EDB SUBJECT CATEGORIES -
990200 320107

E S T S C
ENERGY SCIENCE & TECHNOLOGY SOFTWARE CENTER
SOFTWARE ABSTRACT

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SPONSOR - DOE/CE

PACKAGE TYPE - TESTED