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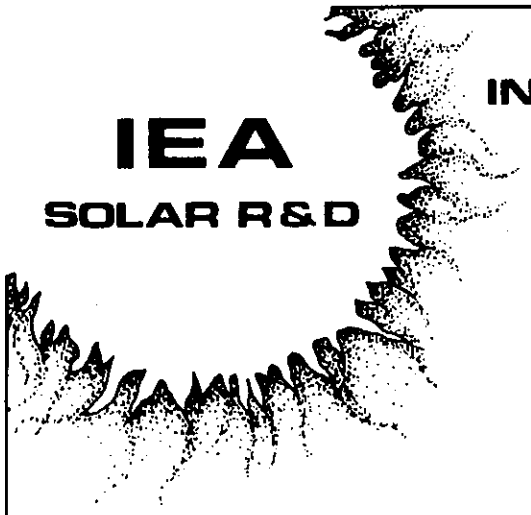

INTERNATIONAL ENERGY AGENCY
SOLAR HEATING AND COOLING - TASK VIII

Passive and Hybrid
Solar Low Energy Buildings
Subtask "C": Design Methods

DESIGN TOOL SURVEY

by

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

PAGE NO.

LIST OF TABLES

PAGE NO.

PREFACE

INTRODUCTION TO THE INTERNATIONAL ENERGY AGENCY

BACKGROUND

The International Energy Agency was formed in November 1974 to establish cooperation among a number of industrialized countries in the vital area of energy policy. It is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OEDC). Twenty-one countries are presently members, with the Commission of the European Communities also participating in the work of the IEA under a special arrangement.

One element of the IEA's program involves cooperation in the research and development of alternative energy resources in order to reduce excessive dependence on oil. A number of new and improved energy technologies which have the potential of making significant contribution to global energy needs were identified for collaborative efforts. The IEA Committee on Energy Research and Development (CRD), comprising representatives from each member country, supported by a small Secretariat staff, is the focus of IEA RD&D activities. Four Working Parties (in Conservation, Fossil Fuels, Renewable Energy, and Fusion) are charged with identifying new areas for cooperation and advising the CRD on policy matters in their respective technology areas.

SOLAR HEATING AND COOLING PROGRAM

Solar Heating and Cooling was one of the technologies selected for joint activities. During 1976-77, specific projects were identified in key areas of this field and a formal Implementing Agreement drawn up. The Agreement covers the obligations and rights of the Participants and outlines the scope of each project or "task" in annexes to the document. There are now eighteen signatories to the Agreement:

Australia	Federal Republic of Germany	Norway
Austria	Greece	Spain
Belgium	Italy	Sweden
Canada	Japan	Switzerland
Denmark	Netherlands	United Kingdom
Commission of the European Communities	New Zealand	United States

The overall program is managed by an Executive Committee, while the management of the individual tasks is the responsibility of Operating Agents. The tasks of the IEA Solar Heating and Cooling Program, their respective Operating Agents, and current status (ongoing or completed) are as follows:

Task I Investigation of the Performance of Solar Heating and Cooling Systems - Technical University of Denmark (Completed).

Task II Coordination of Research and Development on Solar Heating and Cooling - Solar Research Laboratory - Girin, Japan (Completed).

Task III Performance Testing of Solar Collectors - University College - Cardiff, U.K. (Ongoing).

Task IV Development of an Insulation Handbook and Instrument Package - U.S. Department of Energy (Completed).

Task V Use of Existing Meteorological Information for Solar Energy Application - Swedish Meteorological and Hydrological Institute (Completed).

Task VI Performance of Solar Heating, Cooling, and Hot Water Systems Using Evacuated Collectors - U.S. Department of Energy (Ongoing).

Task VII Central Solar Heating Plants with Seasonal Storage - Swedish Council for Building Research (Ongoing).

Task VIII Passive and Hybrid Solar Low-Energy Buildings - U.S. Department of Energy (Ongoing).

Task IX Solar Radiation and Pyranometry Studies - Canadian Atmospheric Environment Service (Ongoing).

The participants in Task VIII are involved in research to study the design integration issues associated with using passive and hybrid solar and energy conservation techniques in new residential buildings. The overall objective of Task VIII is to accelerate the development and use of passive and hybrid heated and cooled low-energy buildings in the participants' countries. The results will be an improved understanding of the design and performance of buildings using active and passive solar and energy conservation techniques, the interaction of these techniques, and their effective combination in various climatic regions and verification that passive and hybrid solar low-energy

buildings can substantially reduce the building load and consumption of non-renewable energy over that of conventional buildings while maintaining acceptable levels of year-round comfort. The subtasks of this project are:

O - Technology Baseline Definition

A - Performance Measurements and Analysis

B - Modeling and Simulation

C - Design Methods

D - Building Design, Construction, and Evaluation

The participants in this Task are: Austria, Belgium, Canada, Denmark, Federal Republic of Germany, Italy, The Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United States, and United Kingdom. The United States serves as Operating Agent for this Task.

This report documents work carried out under Subtask C of this Task.

EXECUTIVE SUMMARY

This document presents the results of a survey of design tools conducted as part of Subtask C (Design Methods) of Task VIII of the IEA Solar Heating and Cooling Program.

At the start of the task, the participants agreed that it would be useful to identify and characterize the various design tools which existed for predicting the energy performance of passive and hybrid solar low energy buildings. A standard survey form was adopted, and Subtask C representatives from the member countries collected and submitted information on the design tools in use in each country. These responses were compiled into the present survey document.

The first draft of the survey, completed in November 1982, was originally intended as an internal task report, but it was subsequently decided that the material contained much information which could be of use to builders and designers. Moreover, a significant number of new tools had been developed which were not included in the first survey. Thus, it was decided to prepare an expanded survey document and to publish and disseminate the results widely.

The purpose of the survey was to compile information on a wide range of design tools which would assist design professionals in selecting the proper design tools for their particular needs. The report categorizes these tools in such a way as to facilitate the selection process.

The design tools identified in the survey are categorized according to the following:

- Machine Type or Equipment Required
- Intended Application
- Input/Output Data

The tools were then arrayed in tables which provided further information on these other important characteristics:

- Initial Cost
- Range of Energy Calculation Applications
- Intended User(s)
- Building Design Phase Applicability
- System Compatibility
- Type and Number of Input Required
- Output Data Produced

Once a preliminary selection of a suitable tool has been made, the reader can refer to Appendix B where information on availability of each design tool is provided. The designer can order the tool or contact the listed address for more details.

Some interesting observations about the state-of-the-art of design tool development can be drawn from the survey results:

- Many design tools surveyed appear to have had little or no credible verification undertaken. This is a problem that Task VIII is attempting to address through a design tool evaluation activity.

- The number of design tools has been proliferating: In 1982 only 164 design tools were reported. When the survey was updated in 1984, the number increased to 230.

- An increasing number of tools are being developed for use with microcomputers.

- Until recently there were very few tools for calculating the performance of commercial buildings and those that existed required mainframe computers. During the past two years, a number of microcomputer-based design tools have been developed for commercial buildings. Some of these design tools are suitable for calculating the savings in lighting energy attributable to the use of daylighting.

- Most of the design tools for active solar energy systems use either the F-chart or the component-based simulation method. Most of the design tools for passive solar energy systems use the Solar Load Ratio or the Thermal Network Method.

- The survey has shown that the capabilities of microcomputer-based design tools are increasing at a rapid rate. More and more powerful design tools are being developed.

- When design tools are developed for simplicity and ease of use during the design process, they are generally incapable of evaluating the more sophisticated strategies that an energy-conscious designer is interested in investigating. Consequently, the desire for accuracy in analyzing unusual design features and the need for inexpensive, fast, and easy-to-use design tools have been incompatible features thus far.

° The portability of design tools was a serious issue in the 1982 survey. However, the design tools developed during 1982-84 use CP/M and/or MS-DOS operating system and are therefore more portable.

The design tool survey forms were completed by a number of different individuals and some differences of interpretation may have arisen. It is, therefore, recommended that the contact person for individual design tools be contacted for the most accurate information. For some countries, the survey has not been updated since November 1982.

I. INTRODUCTION

1.1 BACKGROUND

This survey of design tools was undertaken as part of Subtask C, Design Methods, of IEA Task VIII, Passive and Hybrid Solar Low Energy Buildings. The goal of Subtask C is to provide improved and appropriate interactive design tools and methods for use by designers and builders in the design decision-making process. To develop improved and appropriate design tools, it is necessary to first understand what tools are currently available and what their application and characteristics are. The insight provided by the survey, and the analysis carried out using some of the tools in other subtasks, resulted in Task VIII participants being able to identify the kind of design tools that are needed.

A standard survey form was designed (Appendix A) which was used by the Subtask C representatives in 14 countries to gather the design tool information. The completed design tool surveys were sent to the Subtask C leader, who compiled the information into this Report.

The first series of survey forms were completed in 1982, and a draft Design Tool Survey was prepared in November 1982. Additional design tools were surveyed in 1983-84 and the present updated Design Tool Survey prepared in February 1985.

1.2 PURPOSE OF THIS REPORT

The purpose of this report is (1) to inform designers and builders about the availability of a wide variety of design tools for passive and hybrid solar buildings, (2) to present key information on the characteristics of these tools, and (3) to aid in the design tool selection process.

Although the information about design tools was originally collected as an internal IEA Task VIII, Subtask C working document, it was decided by the Task participants that the survey contained valuable information which could be of considerable benefit to the building industry.

The response of the building industry to the 1982 Design Tool Survey results, which were published in various solar conference proceedings, was very positive and many requests were received for the complete report.

In order to disseminate the information on the design tools to the largest group of people, a decision was made to publish the Design Tool Survey as a formal IEA technical report. It is hoped that this report will assist design professionals in selecting the proper design tools for their particular needs. The report also serves as a valuable historical reference for design tools developed prior to February 1985.

1.3 STRUCTURE OF THE REPORT

Section II explains the survey methodology and discusses the major characteristics of design tools which the survey was designed to elicit.

Section III presents the design tool categorization methodology and discusses the three sets of tables developed to present the information collected on the design tools. A sample design tool selection process is also provided. This section also contains the aforementioned table, on which all the surveyed tools are arrayed with their characteristics and capabilities clearly indicated.

Another series of tables is presented in Section IV in which the design tools have been tabulated by different classifications, giving a quantitative picture of design tool development to date. In addition, the major findings of the survey are contained in this section as well as an indication of information which could not be obtained.

The Appendix includes a sample survey form and a listing of design tools by country. This useful listing contains the name of the tool, a brief description, date developed and ordering information.

The detailed questionnaires for each design tool are listed in a separate document, Appendix 'C' to the Design Tool Survey, and is available for interested readers (see "Document Control Information" title page).

1.4 INTENDED AUDIENCE

The primary audience for the Design Tool Survey are those connected with the building industry - architects, engineers, builders, technicians, contractors, developers, manufacturers, etc. In addition, this report can be useful to universities, research laboratories, government agencies, code enforcement officials, etc.

1.5 ACKNOWLEDGEMENTS

This report was made possible by close cooperation between the IEA participating researchers and the government agencies which sponsored the work in the respective countries. The excellent cooperation extended by the authors/developers of design tools was a decisive factor in the completion of this report and is greatly appreciated. The individuals who provided comments and criticism on earlier drafts are thanked for their effort, without which this report could not have been completed.

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II. SURVEY METHODOLOGY

2.1 SURVEY ORGANIZATION

The design tool survey was intended to produce information which would allow building design professionals to select the appropriate design tool for their needs, based on one or more key criteria. The survey form was therefore designed to obtain essential information on the design tool characteristics and availability. A sample survey form is found in Appendix A.

The survey forms were sent to design tool developers/authors by the Subtask C representatives in the participating countries. Some of the survey forms were completed and/or checked by telephone directly with the authors.

The information on the survey forms was then organized by Burt Hill Kosar Rittelmann Associates (U.S.) which categorized the design tools and developed the design tool selection procedure described in Section III.

Some of the information in the Design Tool Survey was not updated after 1982.

2.2 INFORMATION REQUIREMENTS

To determine the applicability or usefulness of various design tools for building design professionals, information on a number of important characteristics is required. Some of these are:

- Machine or Equipment Required
- Building Type Applicability
- Phase of Building Design for Which the Tool is Suitable
- Initial Cost
- Operating Costs
- Ease of Use
- Range of Building Energy Calculation Applications (Flexibility)
- Calculation Method Used
- Type and Number of Inputs Required
- Quality and Quantity of Output Produced
- Probable Effect on the Overall Project Cost

Each of the above criteria is discussed below.

2.2.1 System or Machine Required

Each design tool utilizes one of four types of equipment for its operation: mainframe computer, microcomputer, programmable calculator, or manual method. It is important to be able to select the tool appropriate to the equipment the user has available or prefers to use.

2.2.2 Building Type

It is important to know whether a tool is applicable to a particular type of building. Design tools tend to be suitable for either residential or small commercial buildings or large commercial buildings, the former being envelope-dominated and the latter being internal load-dominated buildings.

2.2.3 Phase of Building Design

A design tool may be applicable to one or more than one phase of the building design process. These phases are Pre-Design, Schematic, Design Development, Post-Design Services, and Research. Design professionals have different requirements during various phases of the building design and, therefore, need to match the design tool to the design phase for effective building energy performance estimation. During early design phases only a few details about the building may be known so that applicability of a tool to a certain phase of design is particularly important.

2.2.4 Initial Cost

The purchase price of the tool is the least part of the cost. The cost of the learning time may be many times the purchase price. Ancillary costs for some tools may not be obvious. For example, a microcomputer program which costs $250 may also require the purchase of the compiler of a new language which in itself may cost more than $250. Also, the program may require two days of setup and familiarization. Thus, $250 may escalate to a true cost of well over $1,000. Some factors to be considered in looking at the cost of the design tools are:

- The purchase price of the tool.
- Cost of additional books, languages, and hardware.
- The time required by a novice user to be able to operate the tool.
- The time required by an expert user to be able to use the tool.
- The time required by novice/expert to become proficient in the use of the tool.

2.2.5 Operating Costs

Time and money are the critical concerns. Cash outlay for the operating costs may be zero or several hundred dollars. The time aspect of use will, of course, vary as experience is gained, and will also vary across the range of user sophistication and prior experience. There are other aspects to user involvement that affect time, and some of these issues are:

- The time required for the single use of the tool. The time required for subsequent uses of the tool (with the same problem). The influence of user background on the time required for use.

- Typical dollar cost per use, and variability with the problem and the environment.

- Maintenance costs.

2.2.6 Ease of Use

The ease of use of a particular tool may depend upon the user's background, orientation, and personal preferences. Some aspects of a tool which will affect a potential user's interest in a design tool are:

- Type of Design Tool:
  - Graphic, tabular, computer, etc.
  - Level of entry, design variable, or material characteristics.

- Professional Background:
  - Architect
  - Engineer
  - Builder
  - Technician
  - Researcher

- Transportability of Tool:
  - Equipment required.
  - Time to use.

2.2.7 Range of Energy Calculation Applications (Flexibility)

Current energy design tools cover such a wide range of applications that both their generality and their focal points need to be explained. The limitations of the tools need to be known, especially the applicability of design tools for the following general categories:

° Applications for Energy Calculation:

- Heating:
  - Loads
  - HVAC Systems
  - Passive Solar
  - Active Solar
  - Underground Loads

- Cooling:
  - Loads
  - HVAC System
  - Passive Solar
  - Active Solar
  - Underground Loads

- Lighting:
  - Loads
  - Daylight
  - Artificial Lighting

- Domestic Hot Water (DHW):
  - Loads
  - Passive Solar
  - Active Solar

- Miscellaneous:
  - Fans
  - Pumps
  - Miscellaneous Electrical
  - Number of Building Zones That Can Be Handled

- Economics

2.2.8 Calculation Method Used

Most tools are developed using algorithms which model certain physical phenomena, for example: the dependence of convective heat transfer coefficient on wind speed. The algorithm used describes this physical phenomenon (confirmed by actual measurements). If the variation is extreme, the user should be made aware of the limitations of the method used, or should be referred to the technical literature if it applies. The user also must be informed about the validation efforts or the lack thereof.

2.2.9 Type and Number of Inputs Required

The type and the number of inputs required has an important bearing on the use of a particular tool. Some input details are not available until late in the design process, and design tools which require these details, and cannot provide default values, may not be very useful. There are mainframe computer programs which may require a large number of inputs depending on the intended use in the building design phase. In some cases, appropriate default values may be used.

To adequately evaluate some design strategies, many designers will know which variables, as a minimum, must be considered. If a particular tool doesn't take those variables as input, the designer will know it is inappropriate for the particular evaluation.

2.2.10 Quality and Quantity of Output Produced

An important factor in determining usefulness of a design tool in a certain phase of the design is the quality and quantity of output produced. Some tools may give yearly output while others will give monthly output; still others may be able to show hourly results if necessary. Some design tools may have the economic calculations built into them and are capable of generating report quality output, while the others may give the results in the form of numbers and symbols without the mention of units. Many tools may calculate only the loads for equipment sizing and not the actual energy consumption for the building's systems.

III. CATEGORIZATION OF DESIGN TOOLS

3.1 DESIGN TOOL CATEGORIZATION METHODOLOGY

The information collected in the Design Tool Survey forms was organized in various ways in order to simplify the design tool selection for the design professionals. Each design tool reported in the survey was listed in three tables which categorize tools (1) by equipment required (Tables 3.1 - 3.4); (2) by intended energy calculation applications (Tables 3.5 and 3.6), and (3) by input/output data (Tables 3.7 and 3.8). Tables in categories 2 and 3 are further subdivided by building type. This categorization is shown in Figure 3.1

The categorization structure and the information contained in each table is discussed in more detail in the following sub-sections.

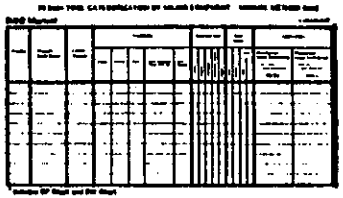
3.1.1 Categorization by Equipment Type Required

The design tools were first categorized according to the machine required to use the design tool. All tools were listed under one of four categories: mainframe computer, microcomputer, programmable calculator, and manual methods. Four different tables were developed according to machine type. The following common headings, shown in Figures 3.2 through 3.5, were utilized in each of these tables:

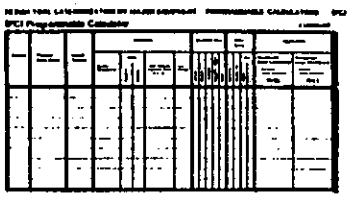
- Country of origin.
- Program code name.
- Date of latest version.
- Intended Users such as Architects, Engineers, Technicians, Research Analyst, or Builders.
- Method of data entry and the units of calculation, such as interactive mode of inputs or file preparations, English units or SI units of calculation.
- Application by Building Type. The building types have been defined as:
  - Residential/Small Commercial (R/SC)
    In these buildings, the envelope load is the significant portion of the total building load for heating and cooling. Typically, small

EQUIPMENT TYPE

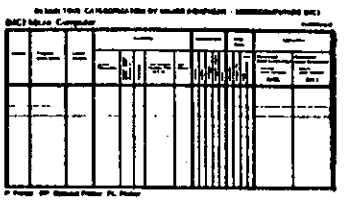
(MN) Manual



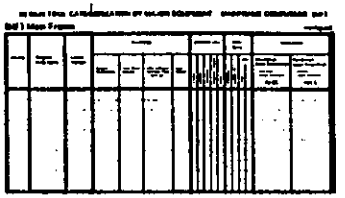
(PC) Programmable Calculator



(MC) Micro-Computer

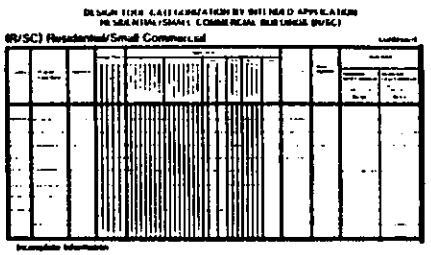


(MF) Main Frame

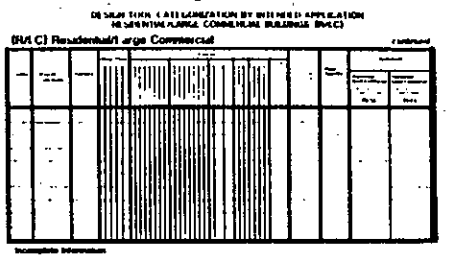


BUILDING TYPE APPLICATION

(R/SC) Residential/Small Commercial

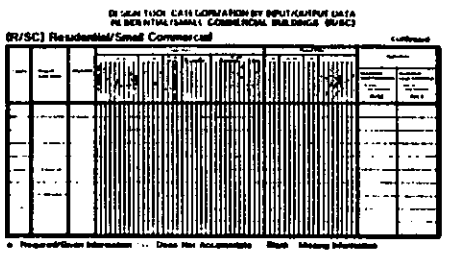


(R/LC) Residential/ Large Commercial



INPUT/ OUTPUT DATA

(R/SC) Residential/Small Commercial



(R/LC) Residential/Large Commercial

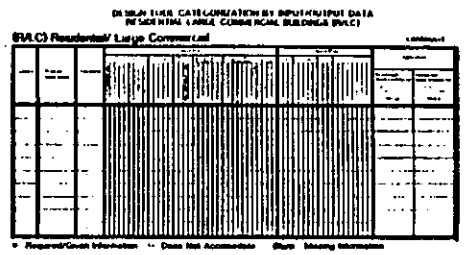


FIGURE 3.1 - SUMMARY OF DESIGN TOOL CATEGORIZATION PROCEDURE

DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT – MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate)	Residential/ Large Commercial (Internal Loads Dominate)
														English	SI		
																R/SC	R/LC

FIGURE 3.2 – FIRST STAGE OF DESIGN TOOL CATEGORIZATION BY THE EQUIPMENT TYPE REQUIRED – MAIN FRAME COMPUTERS (MF)

DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT – MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate)	Residential/ Large Commercial (Internal Loads Dominate)
															English	SI		
																	R/SC	R/LC

FIGURE 3.3 – FIRST STAGE OF DESIGN TOOL CATEGORIZATION BY THE EQUIPMENT TYPE REQUIRED – MICROCOMPUTERS (MC)

DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT - PROGRAMMABLE CALCULATORS (PC)

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Printer		1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate)	Residential/ Large Commercial (Internal Loads Dominate)
				Required	Optional										English	SI	R/SC	R/LC

FIGURE 3.4 - FIRST STAGE OF DESIGN TOOL CATEGORIZATION BY THE EQUIPMENT TYPE REQUIRED - PROGRAMMABLE CALCULATORS (PC)

DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT - MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units		Residential/ Small Commercial (Envelope Loads Dominate)	Residential/ Large Commercial (Internal Loads Dominate)
															English	SI	R/SC	R/LC

FIGURE 3.5 - FIRST STAGE OF DESIGN TOOL CATEGORIZATION BY THE EQUIPMENT TYPE REQUIRED - MANUAL METHODS (MN)

commercial buildings with few zones (commercial facilities with very minor internal loads) and residences fall into this category. These buildings are very climate-sensitive.

- Residential/Large Commercial (R/LC)
  These buildings are characterized by the dominance of internal loads (such as lights, appliances, people). The envelope load for these buildings is a relatively small part of the building heating and cooling requirements. Typically, large commercial buildings with a large number of zones fall into this category. These buildings tend to be relatively insensitive to climate. The word "residential" appears in this definition because it is possible to use the design tools for both large commercial buildings and single zone residential calculations. It may not, however, be a cost effective method for residential energy calculations.

° Availability - The information under this heading differs according to machine type:

- Mainframe Computers:

  System compatability (such as the computer system required, IBM, VAX, etc.).

  Time-sharing network (Is the program available for use on timesharing networks?).

  Software purchase price in U.S. currency.

  Availability of user's manual.

- Microcomputers

  System compatability (the microcomputer or the operating system for which the design tool was developed).

  Random Access Memory (RAM) required to use the design tool.

  Peripherals (such as printers, plotters, etc.). The symbol "P" is used if a printer is required; "PL" is used if a plotter is required; and "OP" is used if the use of a printer is optional.

  Software purchase price in U.S. currency.

  Availability of user's manual.

- Programmable Calculators

  System compatability (the type of programmable calculator such as TI-59, HP-41, etc.).

  Printer requirements, given as "required" or "optional".

  Software purchase price in U.S. currency.

  Availability of user's manual.

- Manual Methods

  Type of design tool - graphic, tabular, or both.

  Software purchase price in U.S. currency.

The actual completed tables for the categorization by equipment type required are found on pp. , , , and . A filled-in circle in these tables indicates that a tool is suitable for a particular application or denotes a positive answer.

3.1.2 Categorization by Intended Application

The design tools were further categorized by grouping according to their intended building energy calculation application. In this categorization, the design tools for Residential/Small Commercial buildings (R/SC) are combined. Design tools for Residential/Large Commercial buildings (R/LC) are also combined. The type of information listed in this categorization method is shown in Figure 3.6.

In this categorization, the following information is given:

- Country of origin.
- Program code name.
- Key words - this identifies whether the design tool is intended for mainframe computers (MF), microcomputer (MC), programmable calculators (PC), or manual methods (MN).
- Phase of building design for which the tool is suitable (pre-design, schematic design, design development, post-design services, and research are listed).

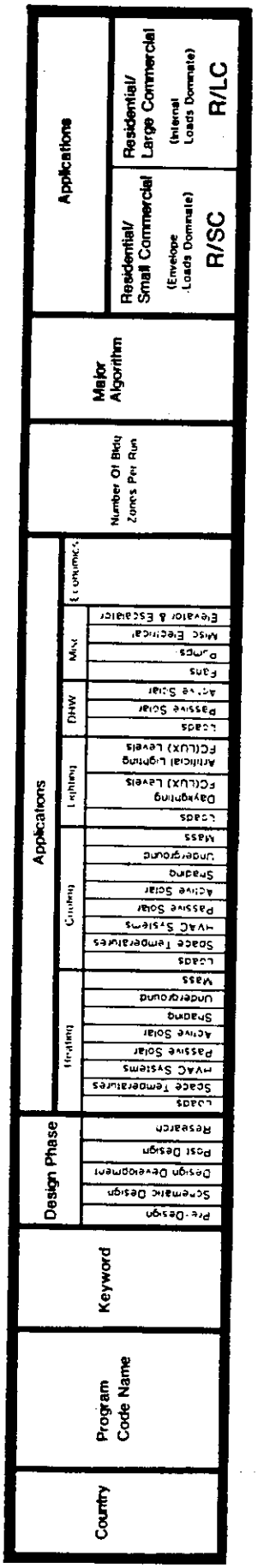


FIGURE 3.6 - SECOND STAGE OF DESIGN TOOL CATEGORIZATION BY THE APPLICATIONS FOR BUILDING ENERGY CALCULATIONS

- Applications of the design tool for building energy calculation. The following general calculation categories are given:

  - Calculations for Heating. Includes load determination, space temperature, HVAC systems, passive solar energy systems, active solar energy systems, shading calculations, and the effects of mass.

  - Calculations for Cooling. Includes load determination, space temperatures, HVAC systems, passive solar energy systems, active solar energy systems, shading calculations, underground loads calculations, and the effects of mass.

  - Lighting Calculations. Includes lighting load determination, daylighting calculations, including footcandles (lux) levels of artificial lighting requirements.

  - Domestic/Service Hot Water. Includes the load determination, passive solar energy systems for hot water heating (such as "breadbox water" heaters), active solar energy systems.

  - Miscellaneous Energy Calculations. Includes energy for fans, pumps, blowers, electrical appliance, elevators and escalators, etc.

  - Economic Analysis.

  - Number of Building Zones Per Run. This information gives the number of zones that can be handled per run/calculation of the design tool. Typically, the design tools that calculate ten or fewer zones are classified as R/SC. This criterion of classification was used if the design tool developer did not specifically recommend the use of the design tool for either R/SC or R/LC.

- Algorithm Used. This gives the major calculation method used by the design tool. This information is approximate because one design tool may use several different algorithms.

The tables for the categorization by intended application are found on pp. 65 and 85. A darkened circle indicates positive capability or applicability of the design tool.

3.1.3 Categorization by Input/Output Data

The third method of the design tool categorization is by the Input/Output data, that is, the input required and the output produced. In this categorization, the design tools for Residential/Small Commercial buildings (R/SC) are combined

together. Similarly, the design tools for Residential/Large Commercial (R/LC) are combined. The type of information listed in this stage of categorization is shown in Figure 3.7.

The completed tables for categorization by input/output data are found from pp. 93 to 119. The symbols utilized in the tables have the following meaning:

● - Darkened circle means required/given information.

○ - Hollow circle means that the design tool does not accommodate this information.

Blank - A blank space denotes that information was not provided.

This categorization provides the following information:

- Country of origin.
- Program code name.
- Key words - MF, MC, PC, MN, denoting the machine type required by the design tool.
- Input data - Indication is provided regarding the inputs required at various phases of buildings design process. The weather data requirements are also provided. The inputs that may be considered during the phases of building design are:

  - Pre-Design

    Building location (city)
    Building type and schedule
    Occupancy rates
    Building floor area
    Space temperatures
    Local energy costs
    Building shape and orientation
    Lighting requirements
    Code requirements (such as National Fire Protection Code, National Electrical Code, Basic Building Code, Basic Plumbing Code, etc.)

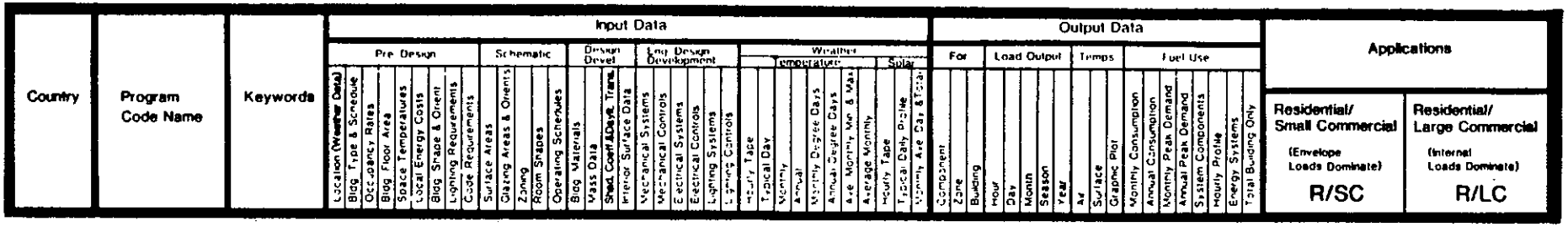


FIGURE 3.7 - THIRD STAGE OF DESIGN TOOL CATEGORIZATION BY THE INPUT/OUTPUT REQUIREMENTS

- Schematic Design

  Envelope surface areas
  Glazing area and orientation
  Zoning of the building
  Room shapes
  Building operating schedule

- Design Development

  Building material characteristics
  Shading coefficient and daylighting transmission
  Interior surface data

- Engineering Design Development

  Mechanical systems
  Mechanical controls
  Electrical systems
  Electrical controls
  Lighting system
  Lighting controls

Weather Data - Information on temperature and solar radiation is required for effective design. The table indicates what kind of ambient temperature information a tool utilizes - hourly tape, typical day, monthly average, annual average, monthly degree days, annual degree days, average monthly maximum and minimum. The required type of solar radiation information, such as hourly tape, typical daily profile, monthly average daily total, is provided.

° Output data - The type of output which the design tool can provide is indicated. The categories of outputs are as follows:

- Load determination (for the building energy calculations)

  Components
  Zone
  Building

- Load output (the frequency at which the building energy requirements are calculated)

  Hour
  Day
  Month
  Season
  Year

- Temperatures (building temperatures which are used for the energy calculation)

  Air temperature
  Surface temperature
  Graphic plot of temperature

- Fuel use (the energy use in the form of fuel supply)

  Monthly consumption
  Annual consumption
  Monthly peak demand
  Annual peak demand
  System components
  Hourly profile
  Energy systems
  Total building only

3.2 DESIGN TOOLS SELECTION METHODOLOGY

A method of using the information in the design tool categorization tables for design tool selection is shown in Figure 3.8. This supposes that a design tool is required for use on a mainframe computer, for large commercial buildings (R/LC), has certain inputs and outputs, and handles heating and cooling energy calculations. The procedure to be followed starts at point "A", the table for "mainframe". In this table, in column "B", all the design tools which are suitable for R/LC applications are indicated. An appropriate design tool can then be selected and more information about it determined from Appendix B.

In the next step, the table for R/LC and categorization by energy calculation application can be used to determine energy calculation capabilities. In this table, at point "C", the key word denotes (MF) - mainframe computer. Again, the Appendix can be referenced for more information on promising design tool(s).

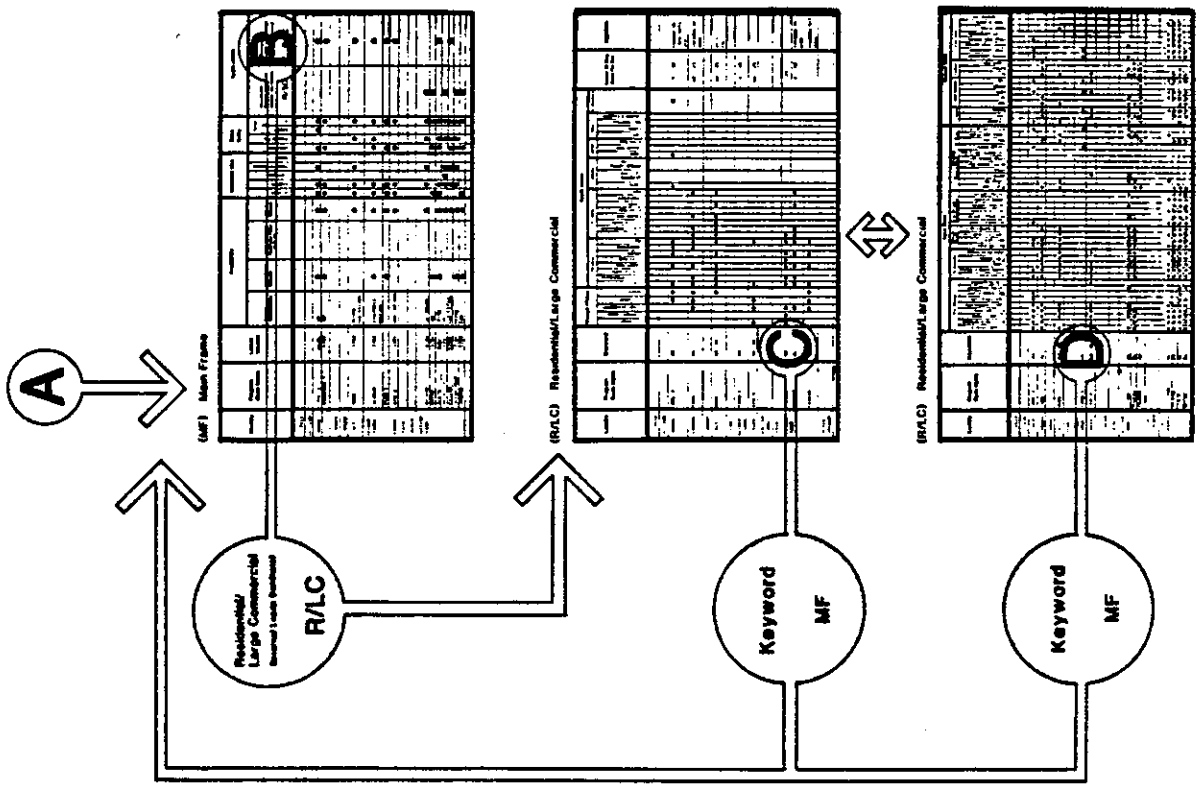


FIGURE 3.8 - A SAMPLE PROCESS OF DESIGN TOOL SELECTION

Similarly, the categorization table for Input/Output Data and R/LC can be examined for a particular design tool(s). The procedure can be started at any point in Figure 3.8. With this categorization procedure, a design tool can be selected on the basis of any number of requirements and the likelihood of identifying desirable and appropriate tools is very high.

3.3 DETAILED LISTING OF DESIGN TOOL CATEGORIZATION

The following tables list various categories of design tools in this organization methodology described above.

Table 3.1 Design Tool Categorization by the equipment type required - Mainframe Computers (MF)

Table 3.2 Design Tool Categorization by the equipment type required - Microcomputer (MC)

Table 3.3 Design Tool Categorization by the equipment type required - Programmable Calculators (PC)

Table 3.4 Design Tool Categorization by the equipment type required - Manual Methods (MN)

Table 3.5 Categorization of Design Tools by Intended Application for Residential/Small Commercial Buildings (R/SC)

Table 3.6 Categorization of Design Tools by Intended Application for Residential/Large Commercial Buildings (R/LC)

Table 3.7 Design Tool Categorization by Input/Output Data for Residential/Small Commercial Buildings (R/SC)

Table 3.8 Design Tool Categorization by Input/Output Data for Residential/Large Commercial Buildings (R/LC)

TABLE 3.1 DESIGN TOOL CATEGORIZATION BY EQUIPMENT TYPE REQUIRED: MAINFRAME COMPUTERS (MF)

TABLE 3.1 - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
AUSTRIA																	
BELGIUM	LPB1	/83	IBM	●			●	●	●			●	●		●		●
	SOLPA	/81	HP	●			●	●			●	●	●		●	●	
CANADA	CMHC-2	10/82	IBM	●		●	●	●		●		●		●	●	●	
	ENERPASS-1	4/82	IBM	●		●	●	●				●			●	●	
	HQUE	3/82	IBM	●		●	●	●	●	●			●	●	●		●
	REMAS	6/82	VAX	●		●		●	●			●		●	●		●
DENMARK																	
WEST GERMANY																	

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
ITALY	MORE	2/82	UNIVAC VAX 11/780			●	●	●		●			●		●		●
NETHER-LANDS	ALADIN	7/82	HONEYWELL BULL/66	●		●	●	●				●	●		●	●	●
NEW ZEALAND																	
NORWAY	EFB-3	2/81	IBM, HP1000			●	●	●				●			●		●
SPAIN																	
SWEDEN	BRIS	/82	CDC, PRIME 750				●	●	●	●	●		●		●	●	
	LTH DEROB	/82	IBM, CDC UNIVAC			●	●	●		●			●	●	●	●	
SWITZER-LAND	BAUDYN	1/81	CDC PRIME			●		●		●			●		●	●	
	DYWAN	1/81	IBM	●			●					●			●	●	
	HELIOS 1	1/82	CDC			●		●	●	●			●		●	●	

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND CTD.	IGLOU	3/82	PRIME	●		●	●	●				●	●		●		●
	PASSIM	12/81	VAX 11/780			●		●		●		●	●		●		●
	SOLAR TRAP	1/81	PRIME	●		●		●		●		●	●		●	●	
	STEMOD	1/81	IBM	●		●	●					●			●	●	
UNITED KINGDOM	ESP	/84	VAX, PRIME,H.WELL		£10,000	●	●	●		●		●			●	●	
	SEU 2	/83	CDC, GEC, HONEYWELL		$5,000.00	●		●				●			●	●	
UNITED STATES	AXCESS VERSION 7	1/81	IBM	●	$12,500.00	●	●	●		●			●	●			●
	BLAST	1/80	IBM, CDC	●		●	●	●		●		●		●			●
	BLDSIM							●									●
	BRIDG & PAXTON EN ANAL PROG		IBM, DEC				●	●					●	●	●		●

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	CALPAS 1	1/81	IBM, DATA	●	$ 55.00	●	●	●	●		●		●	●	●	●	
	CALPAS 3	5/84	IBM	●	$ 695.00	●	●	●		●			●	●		●	
	DEROB	1/79	CDC		$ 200.00	●	●	●		●			●	●			●
	DOE-2	1/80	IBM, CDC	●	$ 400.00	●	●	●		●		●	●	●			●
	ECP	1/78	UNIVAC		$ 335.00	●	●	●			●		●	●			●
	EMPS 2	1/82	IBM UNIVAC			●	●	●		●			●	●		●	
	ENERGY ANALYST			●							●	●		●		●	
	EPDS			●		●					●	●		●			●
	ESAS		IBM, VAX PRIME, UNIVAC					●		●			●	●			●
	ESP-2	1/78	IBM, CDC GEMARK 3000		$6,000.00	●	●	●				●		●			●

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
														English	SI		
UNITED STATES	F-CHART	1/80	IBM, CDC, UNIVAC	●	$ 800.00	●	●	●			●	●		●	●	●	
	F-LOAD BLDG LOAD CALC	2/81	IBM, UNIVAC		$ 800.00	●	●	●				●		●	●	●	
	HACE			●		●	●	●					●			●	
	HOUSE	1/82	CDC		$ 200.00	●	●	●				●		●		●	
	HUD-RSVP/2	1/79	CDC, UNIVAC	●	$ 175.00	●	●	●	●		●	●		●	●	●	
	LPMTZ	1/82	CDC, UNIVAC	●	$15,000.00	●	●	●		●		●		●		●	
	MEDSI ANN ENER CONS			●	$ 20.00 - $150.00/RUN			●					●				●
	MQAUDIT			●			●	●									●
	NECAP	1/75	CDC		$ 1,605.00	●	●	●					●	●			●
	PACE	1/80	CDC, UNIVAC		$ 100.00		●	●	●		●	●				●	

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	PASOLE		IBM, CDC			●		●		●			●			●	
	PASS-ONE			●		●	●	●				●		●	●		●
	QUIKEE		CDC	●		●	●	●		●			●	●			●
	SCM(OH)			●		●	●	●	●		●	●		●		●	
	SEE					●	●	●			●		●	●			●
	SESOP		UNIVAC		$650.00	●	●	●					●	●		●	
	SHCOST	1/79	UNIVAC		$580.00	●	●	●	●		●		●	●		●	
	SOL-300						●	●				●		●		●	
	SOLCOM			●		●	●	●	●		●	●		●		●	
	SOLCOST	1/79	IBM, CDC	●	$300.00	●	●	●	●	●	●	●		●	●	●	

TABLE 3.1 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MAINFRAME COMPUTERS (MF)

(MF) Main Frame

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Time-Share Network	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SOLTES	1/79	CDC		$ 175.00	●				●			●			●	
	SUNCODE	7.82	CDC, VAX 11/780, PRIME	●	$1,700.00	●	●	●	●	●		●		●	●	●	
	SYRSOL	1/78	IBM				●	●	●	●						●	
	TRACESOLAR	1/80	IBM	●			●	●		●			●				●
	TSD		IBM					●					●	●			●

TABLE 3.2 DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT: MICROCOMPUTERS (MC)

TABLE 3.2 - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
															English	SI		
AUSTRIA	EBIWAN	12/84	IBM	128			●	●	●				●			●	●	
BELGIUM	LPB4	/82	HP	64	P			●	●	●			●	●		●		●
CANADA	HOTCAN	5/82	APPLE II	48	P		●	●	●	●	●		●		●	●	●	
	HOUSING E	3/82	WANG 2200	5	P		●	●	●	●	●		●			●	●	
	PASWING	12/81	WANG 2200	7-5	P		●	●	●	●	●		●			●	●	
DENMARK	PAMA	5/82	LUXOR	16					●		●		●			●		●
	METHOD 5000	10/84	APPLE IIe, HP	48		$600.00		●	●				●			●	●	
WEST GERMANY																		
ITALY	MORE	2/82	HP 9845/B	140	P		●	●	●		●			●		●		●
NETHER-LANDS	ENERGIEBALANS		HP 85					●	●				●			●	●	●

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
NETHER-LANDS CID.	PSDM-1						●	●	●				●			●	●	
NEW ZEALAND																		
NORWAY	EFB-3	2/81	HP 200	32	P		●	●	●				●			●		●
	SOLGOR	5/84						●	●		●			●		●	●	
SPAIN																		
SWEDEN	LTH DEROB	/82	8086 CPU					●	●					●				●
	MEPA	/82	LUXOR					●					●			●	●	
SWITZER-LAND	ELCO							●	●								●	
	LMC-EPFL		HP 9825	23	P	FREE	●	●	●							●	●	
	LTA-EPFL		HP 9885	32	P			●	●								●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND	MODPAS	6/82	HP 9845/B	100	PL		●		●		●			●		●		●
	SORANE							●	●					●		●	●	
UNITED KINGDOM	BREADMIT	/83	PET		P	≈£100	●	●	●	●	●		●			●	●	
	SEU DESIGN METHOD	/83	BBC PET	32	OP	$100.00	●	●	●				●			●	●	
UNITED STATES	AC LOAD		CP/M SYST FORT COMP	48	OP	$500.00	●	●	●						●	●	●	
	AC PROGI/ENERGY	/80	WANG 2200 B-5, VP-8		P	WANG $2,500.00 OTHERS $500.00	●	●	●				●		●			●
	ADM-2	/83	16 BIT MACH & FORT COMP	64	OP		●	●	●	●			●		●			●
	ADM-3	/83	CP/M OR MS-DOS SYS	64	OP		●	●	●	●		●	●		●		●	
	ARTIF LTG LOADS ANAL PROG	/81	HP 9831A		OP	$500.00	●	●	●	●			●		●			●
	BAS. LOAD	/83	CP/M & MS-DOS SYS	56	P	$495.00	●		●	●		●	●		●			●

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	BILL		APPLE II, CPM	48	OP	$ 295.00	●	●	●	●		●	●		●	●	●	
	BUEHRER METHOD	/83	ELEC. SPR. SHT. W/COMP	64	OP	$ 100.00	●	●	●	●			●		●			●
	CADLIGHT	/83	IBM-PC WITH MS-DOS 2.0	128	P	$ 500.00	●	●	●	●			●		●			●
	CALPAS 3	/84	IBM PC	256	OP	$ 795.00	●	●	●		●			●	●		●	
	CARRIER E20-2	/83	CP/M SYSTEM	64	P	$ 700.00 $ 500.00	●	●	●	●		●	●		●			●
	CEAC						●	●	●	●			●		●			●
	CIRA				OP		●	●	●	●		●	●		●		●	
	CL4M		TRS, I, II III, CPM	48	P	$1,495.00	●	●	●				●		●	●		●
	COMM BLDGS EN ANAL PROG	/83	CP/M SYST OR MS-DOS	56 CP/M 128 MS-D	OP	$ 695.00	●	●	●	●		●	●		●			●
	COMM HVAC LOAD PROG	/83	CP/M SYST OR MS-DOS	56 CP/M 128 MS-D	OP	$ 595.00	●	●	●	●		●	●		●			●

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	COMM LOAD CALC PROG	/83	CP/M SYST & FORT COMP	64	OP	$350.00	●	●	●	●		●	●		●	●		●
	DAYLITE	/83	APPLE II, III, IBM PC	48	P	$750.00	●	●	●	●			●		●		●	
	E20-II PROG		TRS 80		OP			●	●	●							●	
	ECAL	/83	CP/M SYST & FORT COMP	32	P	$395.00	●	●	●	●		●	●		●		●	
	ECAP	/83	CP/M OR IBM PC	64	P	NOMINAL	●	●	●	●		●	●		●		●	
	EEDO	5/84	IBM PC OR XT W/MS-DOS 2.0	128	P	$495.00	●	●	●	●		●	●		●	●	●	
	ELSOL		CP/M SYST		P	$300.00	●	●	●	●		●	●		●		●	
	EN2M		TRS 80 I, II, III	48	P	$350.00	●		●				●		●	●	●	
	EN4M		TRS 80 I, II, III	48	P	$995.00	●		●				●		●	●	●	
	ENCON 2	/83	TI 99/4	48	P	$ 50.00	●	●	●	●		●	●				●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	ENECO	/84	CP/M SYST		P		●	●	●	●		●	●		●		●	
	ENERGY $AVE	/83	CP/M SYST IBM PC APPLE	64	P	$ 295.00	●	●		●		●	●		●		●	
	ENERGY ANALYST				P	$2,000.00	●					●	●		●		●	
	ENERGY BILL ANALYSIS	/83	APPLE II PLUS	64	P	$ 500.00	●	●	●	●		●	●		●			●
	ENERGY - I	/83	RAD. SHACK I, II, III	48	P	$ 650.00	●	●	●	●		●	●				●	
	ENERGY - II	/83	CP/M SYST	56	P	$ 450.00	●	●	●	●		●	●		●			●
	EWIREAS	/83	APPLE II PLUS	48	OP		●	●	●	●		●	●				●	
	EWIT	9/83	IBM OR WANG PC	64	P	$ 250.00	●	●	●				●		●		●	
	F-CHART PLUS	1/82	TRS 80 III APPLE II	48	P	$ 400.00	●	●	●	●			●		●	●	●	
	F-CHART SOL SYST. DESIGN		CP/M SYST		P	$ 300.00	●	●	●	●		●	●		●		●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	F-LOAD BLDG LOAD CALC	2/81	APPLE II	48	P	$ 425.00	●	●	●				●		●	●	●	
	FASER	/82	CP/M SYST W/ B-RUN MOD.	64	OP	$ 700.00	●	●	●	●		●	●		●			●
	GAIN		WNAG 2200	32	P	$2,000.00	●	●	●	●		●	●		●			●
	HCC III	/81	CP/M OR TRS-DOS W/FORT COMP	64	P	$ 200.00	●	●	●	●		●		●	●			●
	HEATING COOLING LOAD		CP/M SYST		P	$ 300.00	●	●	●	●		●	●		●		●	
	HELIOS		NORTHSTAR	48	OP	$ 395.00	●	●	●	●		●	●		●		●	
	HUBER	/83	CP/M SYST	48	OP	$ 95.00	●	●		●		●	●		●		●	
	HVAC PACKAGE	/83	HP9845B	64	OP	$5,000.00	●	●	●	●		●	●		●			●
	IMPSLR	6/80	APPLE, TRS 80, COMMADORE	32	OP	$ 250.00		●	●				●				●	
	INSULATE		APPLE II	48	OP	$ 195.00	●	●	●	●		●	●		●	●	●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	ISDP	1/81	DIGITAL	75	OP			●	●				●		●		●	
	LASL 81		TRS 80 III	32				●	●				●	●		●	●	
	LOAD GRAPHICS	/83	ANY CP/M BASED MACH	64	OP	$ 75.00	●	●	●	●			●		●		●	
	MEPA		TRS 80 III ABC-80 & 800	64	OP	$400.00	●	●	●				●		●	●	●	
	MICROFIX	1/81	APPLE HP85 COMMADORE	16	OP	$150.00	●	●	●				●		●	●	●	
	MICROLITE 1.0	/83	APPLE II IBM PC	48 AP 128 IBM	OP	$ 25.00	●	●	●	●			●		●		●	
	MICROPAS	/83	CP/M & MS-DOS SYST	64&96	P	$795.00 $895.00	●	●	●	●		●	●		●		●	
	NEATWORK	/81	COMMADORE	16	OP	$250.00	●	●	●					●	●	●	●	
	PASODE	1/81	APPLE II	48	OP	$295.00	●	●	●	●		●	●		●	●	●	
	PASSOL		DIGITAL	75	OP			●	●	●		●	●		●		●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.2 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MICROCOMPUTERS (MC)

(MC) Micro-Computer

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Random Access Memory (RAM) Required (K)	Peripherals	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SEEC1 F-CHART	1/82	TRS 80 I, II, III		OP	$200.00	●	●	●				●	●	●	●	●	
	SERI-SLR SEEC-VI							●	●					●	●	●	●	
	SOL-300	1/83	CP/M OR IBM PC				●	●	●	●			●		●		●	
	SOLITE 1	1/82	APPLE II	48	OP	$175.00	●	●	●				●		●		●	
	SOLPATH-COMM		HP 85 OR 87		OP		●	●	●				●		●	●		●
	STENET		HP 85				●	●	●				●		●	●		●
	SUNCODE	7/82	CORVUS	100		$125.00	●	●	●	●	●		●		●	●	●	
	SUNDAY	7/82	CORVUS APPLE II	64		$245.00	●	●	●				●		●		●	
	SUNEST		APPLE II	32	OP			●	●	●			●	●	●		●	
	SUNHEAT 1	7/81	APPLE II, IBM PC, TRS 80	16		$ 29.00	●	●	●	●			●		●		●	

P: Printer OP: Optional Printer PL: Plotter

TABLE 3.3 DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT: PROGRAMMABLE CALCULATORS (PC)

TABLE 3.3 - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
PROGRAMMABLE CALCULATORS

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Printer		1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
				Required	Optional										English	SI		
AUSTRIA																		
BELGIUM																		
CANADA																		
DENMARK	EFB1	2/80	TI-59	●			●	●	●					●		●	●	
WEST GERMANY																		
ITALY																		
NETHER-LANDS																		
NEW ZEALAND																		
NORWAY	TREC	1/81	HP41CV	●			●	●	●	●	●		●			●	●	

TABLE 3.3 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
PROGRAMMABLE CALCULATORS

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			System Compatibility	Printer		1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
				Required	Optional										English	SI		
SPAIN																		
SWEDEN																		
SWITZER-LAND	ARAS		HP41CV	●			●	●	●								●	
	HBF-ETHZ		HP41CV	●			●	●	●							●	●	
	LTA EPFL		HP41CV	●			●	●	●								●	
	SORANE		HP41CV					●	●	●							●	
	TREC-EPFL		HP41CV	●			●	●	●				●			●	●	
UNITED KINGDOM																		
UNITED STATES	ACG-80 AARDVARK	1/80	TI-59	●		$85.00	●	●	●	●			●		●	●	●	
	AHL-80 AARDVARK	1/80	TI-59	●		$55.00	●	●	●	●			●		●	●	●	

TABLE 3.3 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
PROGRAMMABLE CALCULATORS

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Printer Required	Printer Optional	1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units English	Units SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	CL4		TI-59	●		$595.00	●	●	●				●		●	●		●
	PEGFIX/PEGFLOAT	9/78	TI-59, HP41C HP67/97		●	$ 75.00	●	●	●					●	●	●	●	
	QUICKLITE 1		TI-59	●		FREE		●	●								●	
	RL5		TI-59 HP41C	●		$100.00	●	●	●	●			●		●	●	●	
	SEEC II REL AREAS	1/78	HP67/97		●	$ 95.00	●	●	●					●	●	●	●	
	SEEC III REL AREAS	8/78	HP67/97		●	$125.00	●	●	●					●	●	●	●	
	SEEC VIII SWIM POOLS	8/80	TI-59		●	$125.00	●	●	●					●	●	●	●	
	SEEC1 F-CHART	1/82	TI-59, HP41C HP67/97		●	$125.00	●	●	●				●	●	●	●	●	
	SERI-SLR SEEC-VI		TI-59 HP41C		●	$125.00	●	●	●					●	●	●	●	
	SOLAR ENERGY PROGRAM		TI-59 HP-41		●	$ 50.00	●	●	●	●		●		●	●	●	●	

TABLE 3.3 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
PROGRAMMABLE CALCULATORS

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Printer		1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
				Required	Optional										English	SI		
UNITED STATES	SOLAR ENGIN LIBRARY		TI-59 HP41C	●		$250.00	●	●	●	●		●	●		●	●	●	
	SOLARCON 326P, 327P		TI-59 HP41C	●		$145.00	●	●	●					●	●	●	●	
	SOLARCON 33		TI-59 HP41C	●		$138.00	●	●	●					●	●	●	●	
	SOLARCON 34		TI-59 HP41C	●		$ 95.00	●	●	●					●	●	●	●	
	SOLARCON 35, 36		TI-59 HP41C	●		$127.00	●	●	●					●	●	●	●	
	SOLARCON 355, 365		TI-59 HP41C	●		$142.00	●	●	●					●	●	●	●	
	SOLARCON 37, 371		TI-59 HP41C	●		$188.00	●		●					●		●	●	
	SOLARCON-PASSOLAR		TI-59 HP41C	●		$138.00	●	●	●					●	●	●	●	
	SUNPULSE II SOL. SIM.		TI-59		●	$100.00	●	●	●					●	●	●	●	
	TEANET III	1/81	TI-59	●		$ 90.00	●	●	●					●	●	●	●	

TABLE 3.3 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
PROGRAMMABLE CALCULATORS

(PC) Programmable Calculator

Country	Program Code Name	Latest Version	Availability				Intended Use					Data Entry				Applications	
			System Compatibility	Printer		1982 Software Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Interactive	Prepare File	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
				Required	Optional										English	SI		
UNITED STATES	VDD		TI-59 HP-67				●	●	●	●		●			●		●	

TABLE 3.4 DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT: MANUAL METHOD (MN)

TABLE 3.4 - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
															English	SI		
CANADA	HOUSING E	3/82		●			●	●	●	●	●	●	●			●	●	
	PASWING	12/81		●				●	●	●	●			●		●	●	
	UTILIZATION FACTOR METHOD	5/82	●	●				●	●				●	●	●	●	●	
WEST GERMANY	KEFF-METHOD	/83		●				●		●							●	
ITALY	ENERGY CONTROL	1/81	●					●						●		●	●	
	GRAPHIC SOLAR PERSPECTIVE	1/80		●				●					●				●	

° Includes EP Chart and EW Chart

TABLE 3.4 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
ITALY	SMECC	1/81		●				●	●				●			●	●	
	TTL	1/81		●				●	●		●		●			●	●	
NETHER-LANDS	DSGN. AIDS ENERGY BEW.ONTW	10/81	●				●	●	●				●	●		●	●	
NORWAY	MN. MTD. CALC. BLDG. EN. CONS.	1/82	●	●				●	●	●	●		●	●		●	●	
SWEDEN	BKL	1/82		●			●	●					●			●	●	
SWITZER-LAND	AARPLAN		●										●				●	
	ARAS			●				●	●				●				●	
	GRES-EPFL		●					●	●					●		●	●	

° Includes EP Chart and EW Chart

TABLE 3.4 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND CTD.	HBF-ETHZ			●				●	●				●			●	●	
	LTA-EPFL		●					●	●					●		●	●	
	SORANE		●					●	●					●		●	●	
	TREC-EPFL			●				●	●				●			●	●	
	UELI SCHAFER		●					●	●					●		●	●	
UNITED KINGDOM	BREDEM 1	/83		●				●	●	●			●			●	●	
UNITED STATES	ASHRAE BIN			●				●	●				●		●		●	
	ASHRAE DEGREE DAYS			●		FREE		●	●				●		●		●	
	CA ENER COMM PASS SOL HBK	1/80		●		$7.45		●	●			●	●		●		●	
	CARRIER MAN OF A.C.			●					●	●			●		●			●

° Includes EP Chart and EW Chart

TABLE 3.4 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units		Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
															English	SI		
UNITED STATES	CDA SUN-CHART		●			FREE		●	●	●		●		●	●		●	
	DG ADMIT MODEL		●			FREE		●	●	●		●		●	●		●	
	ENERGY GRAPHICS		●			$ 8.00	●	●	●	●		●		●	●		●	
	ENERGY NOMOGRAPHS		●				●	●						●	●			●
	EP-CHART°		●			$150.00°		●	●	●		●		●		●	●	
	EW-CHART°		●			$150.00°		●	●	●		●		●		●	●	
	G-CHART		●			$ 50.00		●	●	●		●	●		●	●	●	
	MOD. DEGREE DAY		●					●	●				●		●		●	
	P-CHART			●		$ 50.00		●	●	●		●					●	
	PASS SOL DSGN HNDBK VOL II			●		$ 31.50		●	●	●	●	●	●		●	●	●	

° Includes EP Chart and EW Chart

TABLE 3.4 (cont.) - DESIGN TOOL CATEGORIZATION BY MAJOR EQUIPMENT
MANUAL METHOD (MN)

(MN) Manual

Country	Program Code Name	Latest Version	Availability					Intended Use					Data Entry				Applications	
			Graphic	Manual	Both	1982 Purchase Price (U.S. $)	Users Manual	Architect	Engineer	Technician	Research Analyst	Builder	Tables	Graphs	Units: English	Units: SI	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	PASS SOLAR ENERGY BOOK	1/79		●		$14.95		●	●	●		●	●	●	●		●	
	RES ENERGY MAN (REM)			●			●	●	●			●	●	●	●	●	●	
	SOL HTG SYST DSGN MAN			●		$ 2.50		●	●	●		●	●		●		●	
	SOLCOST BY (SOLEC)			●		$ 8.00		●	●	●		●	●		●		●	
	TRANE A.C. MANUAL			●					●				●	●	●		●	
	W-CHART		●			$50.00		●	●	●		●		●	●		●	
	YORK RES AC ESTIM			●				●	●	●		●	●	●	●		●	

° Includes EP Chart and EW Chart

TABLE 3.5 DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION [RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)]

TABLE 3.5 - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																					Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating								Cooling							Lighting			DHW		Misc				Economics			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artifical Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				
AUSTRIA	EBIWAN	MC	●					●			●	●	●		●												●		●					●	2-10	STEADY STATE	●	
BELGIUM	SOLPA	MF	●	●	●			●			●		●																					1	STEADY-STATE	●	
CANADA	CMHC-2	MF				●	●	●			●		●	●	●									●			●							●	2-10	ASHRAE DEGREE DAYS	●	
	ENERPASS-1	MF			●			●	●		●		●		●																			●	2-10		●	
	HOTCAN	MC	●		●	●	●	●	●		●		●	●	●									●			●					●			2-10	OTHER*	●	
	HOUSING E	MC	●		●	●	●	●	●		●		●	●	●																				1	ASHRAE DEGREE DAY, SLR	●	
	HOUSING E	MN	●		●	●	●	●	●		●		●	●	●																				1	ASHRAE DEGREE DAY, SLR	●	
	PASWING	MC	●	●	●	●	●		●		●				●																				1		●	
	PASWING	MN	●	●	●	●	●		●		●				●																				1		●	
	UTILIZATION FAC. METHOD	MN			●	●		●			●			●	●																				1	RESPONSE FACTOR	●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc				Economics			
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
DENMARK	EFB1	PC	●		●	●		●							●																		2-10		●	
	METHOD 5000	MC	●	●	●			●	●		●	●	●		●																			2-10		●	
WEST GERMANY	KEFF-METHOD	MN	●			●		●			●																									●	
ITALY	ENERGY CONTROL	MN	●		●			●																										1		●	
	GRAPHIC SOLAR PERSPECTIVE	MN			●	●						●									●												1		●	
	SMECC	MN			●	●		●	●	●	●		●	●	●	●	●	●			●	●	●										1		●	
	TTL	MN	●		●		●	●	●	●	●		●	●	●	●	●				●	●	●										1		●	
NETHER-LANDS	ALADIN .	MF	●	●				●	●		●																						>25		●	
	DSGN AIDS ENE BEW. ONTW.	MN	●	●				●	●		●				●																		1		●	
	ENERGIEBALANS	MC	●	●	●	●		●			●				●																		1		●	
	PSDM-1	MC	●	●	●			●	●		●				●																		2-10		●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc							
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
NORWAY	MN.MTD.CALC. BLDG.EN.CONS.	MN	●		●			●			●												●											1		●	
	SOLGOR	MC	●	●	●	●	●	●	●	●	●		●			●	●	●			●			●						●					1		●	
	TREC	PC						●			●		●		●																					1		●	
SWEDEN	BKL	MN	●	●	●			●			●																									1		●	
	BRIS	MF	●	●	●		●	●	●	●	●		●		●	●	●	●	●		●		●	●												2-10		●	
	LTH DEROB	MC	●	●	●		●	●	●		●			●	●	●		●		●		●	●													2-10		●	
	LTH DEROB	MF	●	●	●		●	●	●		●			●	●	●		●		●		●	●													2-10		●	
	MEPA	MC	●	●	●			●			●		●		●																					1		●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating								Cooling								Lighting			DHW			Misc				Economics				
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND	AARPLAN	MN																																		
	ARAS	MN	●	●																															●	
	ARAS	PC	●	●																															●	
	BAUDYN	MF			●	●	●	●	●		●				●	●	●	●					●	●	●										●	
	DYWAN	MF	●			●	●	●	●								●	●																	1		●	
	ELCO	MC	●	●				●			●																									●	
	GRES-EPFL	MN	●					●			●																								1		●	
	HBF-ETHZ	MN	●	●				●			●																								1		●	
	HBF-ETHZ	PC	●	●				●			●																								1		●	
	HELIOS-1	MF		●	●		●	●	●		●				●	●	●						●												1		●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																									Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW		Misc				Economics						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND CID.	LMC-EPFL	MC	●	●	●			●			●	●														●		●						1		●	
	LTA-EPFL	MC																																	1		●	
	LTA-EPFL	MN	●	●				●			●																								1		●	
	LTA-EPFL	PC	●	●	●			●			●	●														●		●							1		●	
	SOLAR TRAP	MF			●		●	●	●		●			●																					1	THERMAL NETWORK	●	
	SORANE	MC	●	●				●			●	●	●	●												●		●							1		●	
	SORANE	MN	●	●				●			●	●														●		●							1		●	
	SORANE	PC	●	●				●			●	●														●		●							1		●	
	STEMOD	MF	●			●	●	●	●							●	●																		1		●	
	TREC-EPFL	MN	●	●				●			●	●														●		●							1	SLR	●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling						Lighting				DHW		Misc			Economics			
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND CTD.	TREC-EPFL	PC	●	●				●			●	●															●	●						1	SLR	●	
	UELI SCHAFER	MN	●					●			●																									●	
UNITED KINGDOM	BREADMIT	MC			●	●		●	●		●				●	●	●						●												1	ADMIT-TANCE	●	
	BREDEM 1	MN	●		●			●			●				●												●					●			1	STEADY STATE	●	
	ESP	MF					●	●	●	●	●		●		●	●	●	●			●		●	●			●								2-10	THERMAL NETWORK	●	
	SEU 2	MF	●		●		●	●	●	●		●			●												●	●							2-10	THERMAL NETWORK	●	
	SEU DESIGN METHOD	MC	●		●	●	●	●				●																●	●					●	1	OTHER*	●	
UNITED STATES	AC LOAD	MC		●				●		●			●		●		●							●				●		●	●				2-10	OTHER*	●	
	ACG-80 AARDVARK	PC		●				●				●																●	●					●	1	F-CHART	●	
	ADM-3	MC	●	●	●	●		●		●	●		●	●	●	●		●	●		●	●	●		●	●		●							2-10	RESPONSE FACTOR	●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	AHL-80 AARDVARK	PC		●				●																		●								1	ASHRAE DEGREE DAYS	●	
	ASHRAE BIN	MN	●	●				●							●																			1	ASHRAE BIN DATA	●	
	ASHRAE DEGREE DAYS	MN	●	●				●																										1	ASHRAE DEGREE DAYS	●	
	BILL	MC				●		●							●																		●		OTHER*	●	
	CA ENER COMM PASS SOL HEK	MN		●	●			●			●			●	●			●				●												1	OTHER*	●	
	CALPAS 1	MF		●	●			●	●		●		●		●	●		●		●		●	●					●		●				1	THERMAL NETWORK	●	
	CALPAS 3	MC			●			●	●		●		●		●	●		●		●		●						●						2	THERMAL NETWORK	●	
	CALPAS 3	MF			●			●	●		●		●		●	●		●		●		●						●						2	THERMAL NETWORK	●	
	CDA SUN-CHART	MN		●	●			●				●														●	●							1	OTHER*	●	
	CIRA	MC	●			●		●	●		●		●			●	●				●												●	1	MODIFIED DEGREE DAY	●	

* Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																									Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc										
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	DAYLITE	MC	●	●	●																			●	●	●									2-10	OTHER*	●	
	DG ADMIT. MODEL	MN	●	●					●		●				●		●						●												1	OTHER*	●	
	E20-II PROG.	MC	●	●	●			●	●	●						●	●	●						●			●			●	●			●	2-10	OTHER*	●	
	ECAL	MC	●	●	●			●		●						●		●						●											2-10	ASHRAE TC4.7	●	
	ECAP	MC	●	●	●	●		●	●	●			●			●	●	●				●		●	●	●	●							●	<12	BIN METHOD	●	
	EEDO	MC	●	●	●	●		●	●	●	●	●	●		●	●	●	●	●	●	●		●				●		●						●	1	MODIFIED DEGREE DAY	●	
	ELSOL	MC	●	●	●																																●	
	EMPS 2	MF		●	●			●	●	●	●		●	●	●	●	●	●			●	●	●	●	●			●		●	●	●	●	●	●	2-10	THERMAL NETWORK	●	
	EN2M	MC		●	●			●		●						●		●						●			●								1	ASHRAE DEGREE DAYS	●	
	EN4M	MC				●		●		●						●		●									●									ASHRAE TC4.7	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																					Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc				Economics			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				
UNITED STATES	ENCON 2	MC	●	●				●							●																		1 ONLY	DEGREE HOUR	●	
	ENECO	MC	●	●				●							●																	●	1 ONLY	DEGREE HOUR	●	
	ENERGY $AVE	MC	●	●				●							●																		1	ASHRAE STEADY STATE	●	
	ENERGY ANALYST	MC				●		●	●						●	●							●			●			●	●	●	●	●	1	STEADY STATE	●	
	ENERGY ANALYST	MF				●		●	●						●	●							●			●			●	●	●	●	●	1	STEADY STATE	●	
	ENERGY GRAPHICS	MN	●	●				●	●						●																		1	OTHER*	●	
	ENERGY-I	MC	●	●	●			●							●																		1	ASHRAE STEADY STATE	●	
	EP-CHART	MN	●	●					●																							●	1	SLR	●	
	EPDS	MF	●					●			●				●					●														1	OTHER*	●	
	EW-CHART	MN	●	●																								●							F-CHART PLUS OTHER*	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting				DHW		Misc				Economics				
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	EWIREAS	MC	●	●				●		●	●		●			●		●															2-10	STEADY STATE	●	
	EWIT	MC	●					●	●				●		●	●	●				●		●	●			●					●				●	
	F-CHART	MF		●	●							●																●					●	1	F-CHART	●	
	F-CHART PLUS	MC	●	●				●			●	●	●		●	●			●	●	●		●				●	●					●	1	F-CHART UNUTIL.	●	
	F-CHART SOL SYST. DESIGN	MC	●	●	●							●																●	●						F-CHART	●	
	F-LOAD BLDG LOAD CALC	MC	●	●				●					●		●	●					●		●				●								2-10	RESPONSE FACTOR	●	
	F-LOAD BLDG LOAD CALC	MF	●	●				●					●		●	●					●		●				●								2-10	RESPONSE FACTOR	●	
	G-CHART	MN	●	●				●				●																	●						1	F-CHART PLUS OTHER*	●	
	HACE	MF			●	●		●		●		●			●	●		●		●			●	●				●	●	●	●			●	2-10	RESPONSE FACTOR	●	
	HEATING COOLING LOAD	MC	●	●				●								●																			1 ONLY	STEADY STATE	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	HELIOS	MC	●	●				●	●		●		●																				●	1	STEADY STATE, SLR	●	
	HOUSE	MF	●	●	●	●		●	●	●	●		●	●	●	●								●										2-10	THERMAL NETWORK	●	
	HUBER	MC	●	●	●			●		●						●		●						●	●									1	F-CHART	●	
	HUD-RSVP/2	MF	●	●	●			●				●															●	●					●	1	STEADY STATE, SLR	●	
	IMPSLR	MC		●	●			●			●			●																				2-10	OTHER*	●	
	INSULATE	MC	●	●	●			●																									●	2-10	OTHER*	●	
	ISDP	MC	●	●	●	●		●		●	●	●	●														●	●					●	1	ST. STATE SLR, F-CHARI	●	
	LASL 81	MC		●	●			●			●			●	●								●				●							1	SLR	●	
	LOAD GRAPHICS	MC	●	●				●							●																			2-10	STEADY STATE	●	
	LPMTZ	MF					●	●	●	●	●		●	●	●	●	●	●		●	●	●	●										●	2-10	RES. FACTOR & THER. NET.	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting F(LUX) Levels	Artificial Lighting F(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	MEPA	MC	●	●	●			●	●		●		●	●	●	●		●		●	●	●	●		●									OTHER*	●	
	MICROFIX	MC		●				●			●																							1	THERMAL NETWORK	●	
	MICROLITE 1.0	MC	●	●																				●											LBL/CIE	●	
	MICROPAS	MC	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●		●	●	●											2-10	THERMAL NETWORK	●	
	MOD. DEGREE DAY	MN	●	●				●																											1	ASHRAE DEGREE DAYS	●	
	NEATWORK	MC		●				●	●		●			●	●	●		●				●								●	●				2-10	THERMAL NETWORK	●	
	P-CHART	MN	●	●							●																						●		1	SLR	●	
	PACE	MF	●	●				●			●	●	●														●		●					●		1	F-CHART, SLR	●	
	PASODE	MC	●	●				●			●																								1	SLR	●	
	PASOLE	MF		●	●			●	●		●		●	●	●	●		●			●	●	●												1	THERMAL NETWORK	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	PASS SOL DSGN HNDBK VOL II	MN	●	●	●			●		●				●																	●	1	SLR	●	
	PASS SOLAR ENERGY BOOK	MN	●	●	●			●		●		●		●																		1	OTHER*	●	
	PASSOL	MC	●	●	●			●		●																					●	1	STEADY STATE, SLR	●	
	PEGFIX/ PEGFLOAT	PC	●	●				●	●	●		●		●	●	●		●		●		●										1	THERMAL NETWORK	●	
	PEGSOL	MC		●				●	●	●		●		●	●	●		●		●		●										2	THERMAL NETWORK	●	
	QUICKLITE I	PC	●	●																		●	●	●										●	
	REAC	MC	●	●		●		●		●	●	●	●		●		●			●												1	STEADY STATE	●	
	RES. ENERGY MAN (REM)	MN		●	●			●			●		●	●	●			●		●	●	●									●	1		●	
	RES LOAD CALC PROG	MC	●	●	●			●				●	●	●	●		●			●	●	●			●							2-10	ASHRAE GRP-158	●	
	RL5	PC	●	●				●		●					●		●															2-10	STEADY STATE	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			OHW			Misc				Economics			
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	RL5M	MC	●	●				●		●					●		●																2-10	STEADY STATE	●	
	ROOMCALC	MC	●	●	●			●		●					●		●																2-10	STEADY STATE	●	
	SASEP	MC	●	●	●			●		●					●		●																1	ASHRAE BIN DATA	●	
	SCM(CO)	MC	●	●		●		●			●	●			●																		1	OTHER*	●	
	SCM(OH)	MF	●	●		●		●	●																						●		1	OTHER*	●	
	SE1M	MC	●	●				●				●													●	●							1	F-CHART	●	
	SEA	MC	●	●				●							●							●			●			●	●			●	2-10	ASHRAE TC4.7	●	
	SEEC II REL AREAS	PC		●	●			●				●													●	●						●	1	F-CHART	●	
	SEEC III REL AREAS	PC		●	●			●				●													●	●						●	1		●	
	SEEC VIII SWIM POOLS	PC		●																									POOL	HTG.					●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																				Economics	Number Of Bldg. Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW		Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SEEC1 F-CHART	MC	●	●				●				●														●	●						●	1	F-CHART	●	
	SEEC1 F-CHART	PC	●	●				●				●														●	●						●	1	F-CHART	●	
	SERI-SLR SEEC-VI	MC		●	●			●			●				●								●											1	SLR	●	
	SERI-SLR SEEC-VI	PC		●	●			●			●				●								●											1	SLR	●	
	SESOP	MF	●	●	●			●	●	●		●				●		●						●			●	●							1	RESPONSE FACTOR	●	
	SHCOST	MF		●	●			●				●														●	●						●	1	F-CHART, GFL	●	
	SOL-300	MC	●	●	●			●			●		●	●	●				●		●	●	●												1	THERMAL NETWORK	●	
	SOL-300	MF	●	●	●			●			●		●	●	●				●		●	●	●												1	THERMAL NETWORK	●	
	SOLAR ENGY PROGRAM	PC		●	●			●			●	●														●	●						●	1	ASHRAE DEG. DAYS, SLR	●	
	SOLAR ENGIN LIBRARY	PC	●	●	●			●				●														●									OTHER*	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW		Misc				Economics			
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SOL HTG SYST DSGN MAN	MN			●			●				●			●											●	●						●	1	ASHRAE DEG. DAYS, SLR	●	
	SOLARCON 326P, 327P	PC	●	●				●			●																							1	SLR	●	
	SOLARCON 33	PC	●	●				●	●		●				●																			1	THERMAL NETWORK	●	
	SOLARCON 34	PC	●	●				●	●		●				●												●	●						1	THERMAL NETWORK	●	
	SOLARCON 35, 36	PC	●	●				●				●																						1	F-CHART	●	
	SOLARCON 355, 365	PC	●	●							●																●	●						1	F-CHART SLR	●	
	SOLARCON 37, 371	PC	●	●								●															●	●						1	OTHER*	●	
	SOLARCON-PASSOLAR	PC	●	●				●			●																							1	SLR	●	
	SOLCOM	MF	●	●		●		●			●	●	●		●	●			●		●		●	●			●	●	●	●	●			●	1	OTHER*	●	
	SOLCOST	MF						●			●	●			●												●	●						●	1	OTHER*	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW		Misc				Economics			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				
UNITED STATES	SOLCOST BY (SOLEC)	MN		●	●																					●		●					●	1	OTHER*	●	
	SOLITE 1	MC	●	●	●																			●	●	●								●	2-10	OTHER*	●	
	SOLTES	MF					●	●		●	●	●				●			●	●	●						●		●					●	2-10	RESPONSE FACTOR	●	
	SUNCODE	MC			●	●	●	●	●	●	●	●	●			●	●	●	●	●	●		●							●					2-10	THERMAL NETWORK	●	
	SUNCODE	MF			●	●	●	●	●	●	●	●	●			●	●	●	●	●	●		●							●					2-10	THERMAL NETWORK	●	
	SUNDAY	MC		●	●			●			●				●	●							●												1	THERMAL NETWORK	●	
	SUNEST	MC		●	●			●			●	●	●		●	●			●	●			●				●		●						1	OTHER*	●	
	SUNHEAT 1	MC		●																							●		●						1	F-CHART	●	
	SUNOP	MC		●				●			●				●																			●	1	SLR	●	
	SUNPAS	MC		●	●			●			●		●		●																				1	SLR	●	

*Incomplete Information

TABLE 3.5 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SUNPULSE II SOL. SIM	PC		●	●			●			●	●														●	●						1	SLR F-CHART	●	
	SYRSOL	MF			●	●		●	●		●	●			●	●			●							●	●					●		OTHER*	●	
	TEANET III	PC		●				●	●		●	●		●	●	●		●		●		●											2-7	THERMAL NETWORK	●	
	TRANE A.C. MANUAL	MN	●	●				●							●																			OTHER*	●	
	TSWING	MC			●	●		●	●		●			●																			1	THERMAL NETWORK	●	
	VDD	PC	●	●		●		●			●				●																		1	MODIFIED DEGREE DAYS	●	
	W-CHART	MN	●	●																						●	●					●	1	F-CHART	●	
	YORK RES AC ESTIM	MN	●	●											●																		1	ASHRAE DEGREE DAYS	●	

*Incomplete Information

TABLE 3.6 DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION [RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)]

TABLE 3.6 - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/Large Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																										Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW		Misc				Economics									
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
BELGIUM	LPB1	MF	●	●	●			●	●		●		●	●	●	●		●			●	●												25	RESPONSE FACTOR		●
	LPB4	MC	●	●	●	●		●	●		●			●	●	●		●			●	●												10-25	THERMAL NETWORK		●
CANADA	HQUE	MF			●			●	●		●		●	●	●																		●				●
	REMAS	MF	●		●		●	●	●		●		●	●	●												●			●	●			●				●
DENMARK	PAMA	MC			●	●	●	●	●		●			●	●	●	●		●				●												10-25	THERMAL NETWORK		●
ITALY	MORE	MC					●	●	●	●	●		●		●	●	●	●	●		●		●												10-25			●
	MORE	MF					●	●	●	●	●		●		●	●	●	●	●		●		●												10-25	RESPONSE FACTOR		●
NORWAY	EFB-3	MC	●		●	●		●						●																					10-25			●
	EFB-3	MF	●		●	●		●						●																					10-25			●
SWITZER-LAND	IGLOU	MF	●	●	●			●	●		●	●	●		●	●																			25			●
	MODPAS	MC			●			●	●		●		●		●	●	●				●		●												2-10	THERMAL NETWORK		●
	PASSIM	MF			●	●	●	●			●		●		●																					THERMAL NETWORK		●

* Incomplete Information

TABLE 3.6 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/Large Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																										Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting				DHW			Misc				Economics						
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator					Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	AC PROG1/ ENERGY	MC		●	●			●					●			●					●			●											>25	ASHRAE STEADY STATE		●
	ADM-2	MC		●	●	●		●	●	●	●		●	●	●	●	●				●	●	●	●		●	●		●	●	●	●				>25	OTHER*		●
	ARTIF LTG LOADS ANAL PROG	MC	●	●	●																			●	●	●											>25	OTHER*		●
	AXCESS VER.7	MF	●	●	●	●	●	●	●	●		●			●	●	●	●					●	●			●		●	●	●	●	●				>25	RESPONSE FACTOR		●
	BAS. LOAD	MC		●	●			●					●	●	●	●					●	●	●														>25	ASHRAE STEADY STATE		●
	BLAST	MF		●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●		●	●			●		●	●	●	●	●				>25	OTHER*		●
	BLDSIM	MF		●	●			●		●					●		●						●	●			●			●	●	●	●				10-25	RESPONSE FACTOR		●
	BRIDG & PAXTON EN ANAL PROG	MF	●	●	●			●		●	●	●	●	●	●	●							●	●	●	●	●		●								>25	OTHER*		●
	BUEHRER METHOD	MC	●	●				●		●					●		●																				10-25	STEADY STATE		●
	CADLIGHT	MC	●	●																			●	●	●												>25	OTHER*		●

* Incomplete Information

TABLE 3.6 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/Large Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																						Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting				DHW			Misc				Economics			Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				
UNITED STATES	CARRIER E20-2	MC	●	●	●	●		●		●			●	●	●	●		●				●	●	●	●			●			●	●	●	●	●	>25	ASHRAE BIN METHOD		●
	CARRIER MAN OF A.C.	MN			●	●										●		●																		STEADY STATE		●
	CEAC	MC	●	●	●			●		●	●		●			●		●				●						●			●	●	●			10-25	STEADY STATE		●
	CL4	PC	●	●	●			●		●						●		●																		10-25	STEADY STATE		●
	CL4M	MC	●	●	●			●		●						●		●						●												>25	RESPONSE FACTOR		●
	COMM BLDGS EN ANAL PROG	MC	●	●	●	●		●		●			●	●	●	●		●				●	●	●				●			●	●	●	●	●	>25	RESPONSE FACTOR		●
	COMM HVAC LOAD PROG	MC	●	●	●	●		●		●						●		●																		>25	ASHRAE STEADY STATE		●
	COMM LOAD CALC PROG	MC	●	●	●			●					●	●	●	●						●	●	●				●			●	●	●	●		>25	ASHRAE GRP-158		●
	DEROB	MF		●	●	●	●	●	●		●		●		●	●	●		●			●		●												10-25	RESPONSE FACTOR		●
	DOE-2	MF		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	>25	OTHER*		●

* Incomplete Information

TABLE 3.6 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/Large Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc				Economics				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc. Electrical	Elevator & Escalator				
UNITED STATES	ECP	MF		●	●			●	●	●		●	●			●	●	●			●			●			●		●	●	●	●		●	10-25	RESPONSE FACTOR		●
	ENERGY BILL ANALYSIS	MC			●	●		●		●						●		●																	>25	OTHER*		●
	ENERGY NOMOGRAPHS	MN	●	●				●	●							●	●							●	●	●	●				●	●	●		10-25	STEADY STATE		●
	ENERGY II	MC	●	●				●		●						●		●																	>25	ASHRAE STEADY STATE		●
	ESAS	MF		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●		●	●	●	●	●	●	>25	OTHER*		●
	ESP-2	MF		●	●			●	●	●	●	●	●		●	●	●	●			●		●	●		●	●			●	●	●			>25	OTHER*		●
	FASER	MC	●	●	●			●		●		●	●			●		●			●			●				●			●	●	●	●	>25	OTHER*		●
	GAIN	MC	●	●				●								●								●											>25	STEADY STATE		●
	HCC III	MC	●	●	●	●		●		●			●	●	●	●		●			●	●	●	●											>25	RESPONSE FACTOR		●
	HVAC PKG	MC	●	●				●					●			●		●						●											>25	ASHRAE STEADY STATE		●

*Incomplete Information

TABLE 3.6 (cont.) - DESIGN TOOL CATEGORIZATION BY INTENDED APPLICATION
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/Large Commercial

Country	Program Code Name	Keyword	Design Phase					Applications																								Economics	Number Of Bldg Zones Per Run	Major Algorithm	Applications	
								Heating							Cooling							Lighting			DHW			Misc									
			Pre-Design	Schematic Design	Design Development	Post Design	Research	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Space Temperatures	HVAC Systems	Passive Solar	Active Solar	Shading	Underground	Mass	Loads	Daylighting FC(LUX) Levels	Artificial Lighting FC(LUX) Levels	Loads	Passive Solar	Active Solar	Fans	Pumps	Misc Electrical	Elevator & Escalator				Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	MEDSI ANN ENER CONS	MF		●	●			●		●						●		●						●						●	●	●	●		10-25	ASHRAE BIN DATA		●
	MQAUDIT	MF		●	●	●		●		●						●		●						●			●			●	●	●		●	10-25	RESPONSE FACTOR		●
	NECAP	MF		●	●			●	●	●			●	●	●	●	●	●				●	●	●			●				●	●	●			10-25	RESPONSE FACTOR		●
	PASS-ONE	MF		●	●			●	●	●		●	●		●	●	●	●		●	●		●	●			●		●	●						>25	THERMAL NETWORK		●
	QUIKEE	MF	●	●	●			●	●	●	●			●	●	●	●	●			●	●	●	●	●											>25	RESPONSE FACTOR		●
	REAP	MC		●	●			●		●			●		●		●				●			●			●			●	●	●	●	●		>25	ASHRAE BIN DATA		●
	SEE	MF			●	●		●	●	●		●	●		●	●	●	●	●		●			●			●	●		●	●	●	●	●		>25	RESPONSE FACTOR		●
	SOLPATH-COMM	MC		●				●		●						●		●						●			●			●	●					10-25	ASHRAE DEGREE DAYS		●
	STENET	MC		●	●			●	●	●	●	●		●		●	●	●	●		●		●													10-25	THERMAL NETWORK		●
	TRACESOLAR	MF			●	●	●	●		●		●				●		●			●			●		●	●	●							●	10-25	RESPONSE FACTOR		●
	TSD	MF		●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●						●		●				25	THERMAL NETWORK		●

* Incomplete Information

TABLE 3.7 DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA [RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)]

TABLE 3.7 - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Input Data (Pre-Design; Schematic)

Country	Program Code Name	Keywords	Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules
AUSTRIA	EBIWAN	MC	●		●	●	●	●				●	●	●		●
BELGIUM	SOLPA	MF	●		●		●						●			
CANADA	CMHC-2	MF	●	○	●	●	●	●	●			●	●	○	○	○
	ENERPASS-1	MF	●	○	●	○	●	●	●	○	○	●	●	●	○	○
	HOTCAN	MC	●	○	●	●	●	●	●	○	○	●	●	○	○	○
	HOUSING E	MC	●		●	●	●					●	●			
	HOUSING E	MN	●		●	●	●					●	●			
	PASWING	MC	●		●		●					●	●	●	●	
	PASWING	MN	●		●		●					●	●	●	●	
	UTILIZATION FAC. METHOD	MN	●		●	●						●	●			

Input Data (Design Devel; Eng Design Development; Weather)

Country	Program Code Name	Keywords	Design Devel: Bldg Materials	Mass Data	Shad Coeff & Dayl. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather – Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Weather – Solar: Average Monthly	Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total
AUSTRIA	EBIWAN	MC		●	●																		●
BELGIUM	SOLPA	MF	●		●								●	○	○	○	○	○	○	○	●	○	○
CANADA	CMHC-2	MF	●	●			○								○					●			●
	ENERPASS-1	MF	●	●	●	●	○	○	○	○	○	○	●								●		
	HOTCAN	MC	●	●	●	○	○	○	○	○	○	○			●								●
	HOUSING E	MC	●	●	●										●		●						●
	HOUSING E	MN	●	●	●										●		●						●
	PASWING	MC	●	●		●	●													●		●	
	PASWING	MN	●	●		●	●													●		●	
	UTILIZATION FAC. METHOD	MN	●	●	●										●	●							●

Output Data and Applications

Country	Program Code Name	Keywords	For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/Small Commercial (Envelope Loads Dominate) R/SC	Residential/Large Commercial (Internal Loads Dominate) R/LC
AUSTRIA	EBIWAN	MC			●				●											●		●	
BELGIUM	SOLPA	MF	●	○	○	●	○	○	○	○												●	
CANADA	CMHC-2	MF	●		●			●		●				●	●		●					●	
	ENERPASS-1	MF		●	●			●			●			●			●					●	
	HOTCAN	MC			●			●			●			●	●							●	
	HOUSING E	MC			●			●			●											●	
	HOUSING E	MN			●			●			●											●	
	PASWING	MC	●	●						●	●											●	
	PASWING	MN	●	●						●	●											●	
	UTILIZATION FAC. METHOD	MN			●				●						●						●	●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients.	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
DENMARK	EFB1	PC	●	●	●	●	●	○	○	○	○	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○			●									●		●		●		●												●	
	METHOD 5000	MC	●	●	●	●	●					●	●	●		●	●	●	●	●									●									●		●		●	●	●	●											●	
WEST GERMANY	KEFF-METHOD	MN		●	●	●	●					●	●	●			●		●										●																										●	
ITALY	ENERGY CONTROL	MN	●	●								●	●		●		●	●		●																			●			●														●	
	GRAPHIC SOLAR PERSPECTIVE	MN	●			●																																																	●	
	SMECC	MN	●	●	●	●	●		●			●	●	●			●	●	●	●														●				●				●													●	
	TTL	MN	●	●	●	●	●		●			●	●	●			●	●	●	●							●								●			●			●														●	
NETHER-LANDS	ALADIN	MF	●	●	●	●	●	○	●	○	○	●	●	●	●		●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	●	●	○	○	○	○	●	●	●	●	○	○	○	○	●	●	○	○	○	○	○	●	●	●		
	DSGN AIDS ENER BEW. ON TW.	MN	●	●	●	●	●	○	●	○	○	●	●	●	○	○			○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	●	●		●	○	○	○	●	●	○	○	○	○	○	○	○	○	●	
	ENERGIEBALANS	MC	●	●	●	●	●	○	●	○	○	●	●	●	○	○	●	○	●	○	○	○	○	○	○	○	○	○	●	○	○	○	●			○		●	○	●			●			○		●									●	
	PSDM-1	MC	●	●	●	●	●	○	●	○	○	●	●	●	●		●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	●	○	●	●	○	○	○	●	●	○	○	●	●	○	○		○	●	●	●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel: Bldg Materials	Mass Data	Shad. Cont./Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total	Output Data: For: Component	Zone	Bulding	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Bulding Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
NORWAY	MN.MTD.CALC BLDG.EN.CON	MN	●	●	●	●	●	●			●		●	●			●	●	●	●									●								●																				●	
	SOLGOR	MC	●	●	●	●	●	●	○	○	○	●	○	●	○	○	●	○	○	●	○	●	●	○	○	○	○													●				●	●							●			●					●	
	TREC	PC	●	●	●		●				●		●	●				●		●										●																													●	
SWEDEN	BKL	MN	●	●	●	●	●		●				●	●				●												●								●																				●	
	BRIS	MF	●	●	●	●	●		●	●	●		●	●	●	●		●	●	●	●							●								●				●	●	●		●	●	●											●	
	LTH DEROB	MC	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●							●								●				●	●	●		●	●	●											●	
	LTH DEROB	MF	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●							●								●				●	●	●		●	●	●											●	
	MEPA	MC	●	●	●	●	●		●			●	●				●	●		●								●	●	○						●	●								●													●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

			Input Data: Pre-Design									Schematic					Design Devel.				Eng Design Development						Weather: Temperature								Weather: Solar			Output Data: For:			Load Output					Temps			Fuel Use								Applications	
Country	Program Code Name	Keywords	Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Bldg Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total	Component	Zone	Building	Hour	Day	Month	Season	Year	Air	Surface	Graphic Plot	Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND	AARPLAN	MN																																																							●	
	ARAS	MN																																																							●	
	ARAS	PC																																						●			●		●												●	
	BAUDYN	MF	●			●	●			●	●	●	●				●	●	●	●								●								●		●			●					●	●										●	
	DYWAN	MF	●	●		●	●				●	●					●																									●			●												●	
	ELCO	MC																																																							●	
	GRES-EPFL	MN																																																							●	
	HBF-ETHZ	MN																																						●			●		●												●	
	HBF-ETHZ	PC																																						●			●		●												●	
	HELIOS-1	MF	●		●	●	●		●			●	●	●		●	●	●	●	●	●	●					●								●			●		●	●		●			●	●	●	●		●						●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design									Schematic					Design Devel.				Eng Design Development					
			Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Bldg Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls
SWITZER-LAND CID.	LMC-EPFL	MC	●	●	●	●	●					●	●				●	●	●							
	LTA-EPFL	MC																								
	LTA-EPFL	MN																								
	LTA-EPFL	PC																								
	SOLAR TRAP	MF																								
	SORANE	MC	●	●	●	●	●		○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○
	SORANE	MN																								
	SORANE	PC																								
	STEMOD	MF	●	●		●	●			○	●	●					●									
	TREC-EPFL	MN																								

Country	Program Code Name	Keywords	Input Data: Weather: Temperature								Solar			Output Data: For:			Load Output					Temps			Fuel Use								Applications: Residential/Small Commercial (Envelope Loads Dominate)	Residential/Large Commercial (Internal Loads Dominate)
			Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Component	Zone	Building	Hour	Day	Month	Season	Year	Air	Surface	Graphic Plot	Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	R/SC	R/LC
SWITZER-LAND CID.	LMC-EPFL	MC														●			●		●												●	
	LTA-EPFL	MC														●			●		●												●	
	LTA-EPFL	MN	●													●					●												●	
	LTA-EPFL	PC														●			●		●												●	
	SOLAR TRAP	MF	●								●			●	●		●	●	●	●	●	●	●	●									●	
	SORANE	MC														●			●		●												●	
	SORANE	MN																															●	
	SORANE	PC																															●	
	STEMOD	MF																●			●												●	
	TREC-EPFL	MN					●						●																				●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff.&Dayit. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps.: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
SWITZER-LAND CID	TREC-EPFL	PC																												●					●																				●	
	UELI SCHAFER	MN																																																								●	
UNITED KINGDOM	BREADMIT	MC	●		●	●	●	○	○	○	○	●	●	○	○	●	●	●	○	●								●								●		○	●	○	●	●	○	○	○	○	●	●	●									●	
	BREDEM 1	MN	●	●	●	●	●	○	○	○	○	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	●	○	○	○	○	●	○	○	○	○	●	○	○	○	○	○	○	○	●
	ESP	MF	●	○	●	○	●	○	○	○	○	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	●	○	○	●	●	●	●	●	●	●	●	●	●								●	
	SEU 2	MF	●	○	○	●	●	○	●	○		●	●	○	○	●	●	○	○	○	●	●	○	○	○	○	●	○	○	○	○	○	○	○	○	●	○	○	○	●	○	○	●	○	○	○	●	○	○								●	
	SEU DESIGN METHOD	MC	●	○	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	●	●	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	●																				●	
UNITED STATES	AC LOAD	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	○	●	○	●	○	●	●	○	●	○	●								●		●		●	●		●					●	●	●	●	●		●			●	
	ACG-80 AARDVARK	PC	●	○	○	●	●	●	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○			●			●					●		●			●																●	
	ADM-3	MC	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	●	●											○	●	●	○	○	○	○	●														●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients.	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff. & Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	AHL-80 AARDVARK	PC	●	●	●	●	●	○	○	○	○	●	●	●	●	○	●	○	●	○	○	○	○	○	○	○					●							●	●	●		●		●												●	
	ASHRAE BIN	MN	●	○	○	●	○	○	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○		●											●		●		●		●											●	
	ASHRAE DEGREE DAYS	MN	●	○	○	●	○	○	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○					●							●		●		●		●											●	
	BILL	MC																										●										●		●		●		●											●	
	CA ENER COMM PASS SOL HBK	MN	●	○	○	○	○	○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○								●	●		●			●	●		●							●	●				●	
	CALPAS 1	MF	●	●	●	●	●	○	●	○	●	●	●	○	○	○	●	●	●	●	●	●	○	○	○	○	●								●			●	●	●	●	●	●	●	●	●								●	
	CALPAS 3	MC	●	○	○	●	●	●	○	○	○	●	●	●	○	○	●	●	●	●	●	●	○	○	○	○	●								●			○	●	●	●	●	○	●	●	●	○								●	
	CALPAS 3	MF	●	○	○	●	●	●	○	○	○	●	●	●	○	○	●	●	●	●	●	●	○	○	○	○	●								●			○	●	●	●	●	○	●	●	●	●	○								●	
	CDA SUN-CHART	MN	●	○	●	○	○	○	○	○	○	●	●	○	○	○	●	○	●	○	○	○	○	○	○	○					●								●		●															●	
	CIRA	MC	●	●	●	●	●	●			●	●	●				●			●	●	●																●		●		●		●											●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients.	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coef./Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Solar: Average Monthly	Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps.: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	DAYLITE	MC	●	●	●	●	○	○	●	●	○	●	●	●	●	●	●	○	●	●	○	○	○	○	●	●												○	●	●						○	○	○	○	○	○	○	○	○	●	
	DG ADMIT. MODEL	MN	●	○	○	●		○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○							●				●				●		●													●	
	E20 - II PROG	MC	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	●	○	●	●	○	○	○	○												●	●	●	●	●		●					●	●							●	
	ECAL	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	○	○	○	●	○	●	○	○	○							●				○	○	●	○	○	●	○	○				●	●	○	○	○	●	○	○	●	
	ECAP	MC	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●		●	●	●	●	●	●	●	●												●	●	●	○	○	●	○	●	●	●	○	○	●	●	●	●	○	○	○	●	
	EEDO	MC	●	●	●	●	●	●			●	●	●				●				●		●															●			●		●	●						●	●							●	
	ELSOL	MC	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●
	EMPS 2	MF	●	●	●	●	●	●	○	●	○	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●									●				●		●		●	●					●	●					●	●	●	
	EN2M	MC	●	●	●	●	●	●	○	○	○	●	●	○	○	○	●	○	●	○	○	○	○	○	○	○						●							●																			●	
	EN4M	MC	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	●	●	●	●	●	○	○	○	○																																●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel: Bldg Materials	Mass Data	Shad. Coeff./Daysh. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	ENCON 2	MC	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	○	●	○	○	○	○	○	○	○	○												○	○	●	○	○	●	○	●												●	
	ENECO	MC	●	●	●	●	●	●	○	●	○	●	●	○	○	●	●	○	●	○	○	○	○	○	○	○												○	○	●	○	○	●	○	●				●	●	○	○	○	○	○	○	●	
	ENERGY $AVE	MC	●	○	●	●	●	●	○	○	○	●	●	○	○	○	●	●	○	○	●	○	○	○	○	○												○	○	●	○	○	○	○	●	●	○	○	●	●	○	○	○	○	○	○	●	
	ENERGY ANALYST	MC	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	●	○	●	●	●	●	●	●		●					●					●		●		●		●												●	
	ENERGY ANALYST	MF	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	○	●	○	●	●	●	●	●	●		●					●					●		●		●		●												●	
	ENERGY GRAPHICS	MN	●	●	●	●	●	●	●	○	●	●	●	●		●	●		●									●									●		●	●			●												●	
	ENERGY-I	MC	●	●	●	●	●	○	○	○	●	●	●	●	○	●	●	○	○	○	●	○	○	○	○	○												○	●	●																●	
	EP-CHART	MN																																																						●	
	EPDS	MF	●			●		●				●	●				●	●	●																			●		●		●	●			●	●									●	
	EW-CHART	MN																																																					●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel: Bldg Materials	Mass Data	Shad Coeff & Daylt. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	EWIREAS	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	●	○	○	●	○	○	○	●			○	●	○	○	○	○	○	○	●	
	EWIT	MC	●	●	●	●	●	○	●	●	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	●	●	●	●	○	●	●	●	●	●	●	●	○	○	○	●	●	●	●	●	●
	F-CHART	MF	●	●	●	○	○	●	○	○	○	●	●	○	○	○	●	○	●	○	●	●	○	○	○	○					●						●		●									●	●						●
	F-CHART PLUS	MC	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	○	●	●	○	○	○	○	○	○					●		●		●		●		●	●			●												●
	F-CHART SOL SYST. DESIGN	MC	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	●							○	○	○	○	○	○	○	○	○	○	○	●
	F-LOAD BLDG LOAD CALC	MC	●	●	●		●	●	○	○	○	●	●	●	●	○	●	●	●	○	○	○	○	○	○	○	●				●		●		●		●	●	●	●	●	●	●	●	●	●									●
	F-LOAD BLDG LOAD CALC	MF	●	●	●		●	●	○	○	○	●	●	●	●	○	●	●	●	○	○	○	○	○	○	○	●				●		●		●		●	●	●	●	●	●	●	●	●	●									●
	G-CHART	MN	●	○	○	○	○	○	●	○	○	○	○	○	○	○					○	○	○	○	○	○																														●
	HACE	MF	●	●	●	●	●	○	○		○	●	●	●	○	●	●	●	●	●	●		●		○	○	●												●	●			●	●												●
	HEATING COOLING LOAD	MC	●	○	●	●	●	○	○	●	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○												○	○	●						●	○	○	○	○	○	○	○	○	○	●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	HELIOS	MC	●	●	●	●	●	●	●			○	●		○	○	●	○	○	○	○	○	○	○	○	○					●					●			●		●		●	●	●		●		●								●	
	HOUSE	MF	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	●	●	○	●	○	○	○	○	○	●								●																						●	
	HUBER	MC	●	●	●	●	●	○	○	●	○	●	●	●	●	●	●	○	●	●	●	○	○	○	○	○					●					●	○	○	●	○	○	○	●	○				●	●	○	○	○	○	○	○	●	
	HUD-RSVP/2	MF	●	●	●	●	●	●	●	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○					●			●		●			●		●		●				●	●								●	
	IMPSLR	MC	●	○	○	●	○	○	○	○	○	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○					●					●	●	●			●		●														●	
	INSULATE	MC	●	●	●	●	●	●	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○					●					●			●		●		●														●	
	ISDP	MC	●	●	●	●	●	●	○	○	○	●	●	○	○	○	●	●	●	○	●	○	○	○	○	○										●			●		●		●														●	
	LASL 81	MC	●	○	●	●	○	○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○					●			●		●			●		●		●														●	
	LOAD GRAPHICS	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	○	○	○	○	○	○	○	○	○												○	●	●		●	●	●														●	
	LPMTZ	MF	●	●	●	●		●		●		●	●	●	○		●	●	●	○	●	○	●	○	○	●	●								●				●		●	●	●	●		●	●			●		●		●	●					●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	MEPA	MC	●	●	●	●	●	○	○	○	●	●	●	○	●	●	●	●	●	●	○	○	○	○	○	○	●								●	●			●		●	●	●		●	●	●				●								●	
	MICROFIX	MC	●	○	●	●	●	○	○	○	○	●	●	●	○	○	●	●	○	○	○	○	○	○	○	○			●		●					●	●		●			●	●																●	
	MICROLITE T.0	MC							●				●		●				●	●							○	○	○	○	○	○	○	○				●							○	○	○		○	○	○	○	○	○	○	○	○	●	
	MICROPAS	MC	●	●	●	●	●	●	●	○	●	●	●	●	○	○	●	●	○	○	●	○	●	○	○	○										●	●	●	●	●	●	●	●	●	○		●	●	●	●	●	○	○	●	●	●	
	MOD. DEGREE DAY	MN	●	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○							●				●		●		●																●	
	NEATWORK	MC	●	●	●	●	●	●	○	○	○	○	●	●	●	●	○	●	●	○	●	○	○	○	○	○	○	●							●	●	●		●	●	●		●	●		●	●	●										●	
	P-CHART	MN																																																									●	
	PACE	MF	●	●	●	●	●	●	○	○	○	●	●	○	○	○	●	●	●	○	●	●	●	●	●	●																																		●	
	PASODE	MC	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●		○	○	○	○	○	○	○	○					◐							●		●		●																●	
	PASOLE	MF	●	●	●	●	●	○	●	○	○	●	●	○	○	●	●	●	●	●	○	○	○	○	○	○	●									●				●	●	●	●		●	●	●											●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel: Bldg Materials	Mass Data	Shad. Coeff.&Dayit. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	PASS SOL DSGN HNDBK VOL II	MN	●	○	○	○	○	○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○					●						●			●		●		●				●	●								●	
	PASS SOLAR ENERGY BOOK	MN	●	○	○	○	●	○	○	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○	●			●						●			●		●		●													●	
	PASSOL	MC	●	●	●	○	○	●	●	○	○	○	●	●	○	○	○	●	●	○	○	●	○	○	○	○	○											●			●		●		●													●	
	PEGFIX/ PEGFLOAT	PC	●	○	●	●	●	○	○	○	○	○	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○							●				●			●	●	●				●	●								●	
	PEGSOL	MC	●	●	●	●	●	○	○	○	○	○	●	●	●	●	○	●	●	●	●	○	○	○	○	○	○	●		●						●	●			●	●	●	●	●	●			●	●								●	
	QUICKLITE 1	PC																																																							●	
	REAC	MC	●	●	○	●	○	○	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○	○											○	○	●	○	○	●	○	●				●	●	○	○	○	○	○	○	●	
	RES ENERGY MAN (REM)	MN	●		○	●		●	●			●	●	●	●		●	●	○		●																	●		●			●						●									●	
	RES LOAD CALC PROG	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○											○	●	●	●	○	○	○	○	○				○	○	○	○	○	○	○	○	●	
	RL5	PC	●	○	●	●	●	○	○	○	●	●	●	●	○	○	●	●	●	●	●	○	○	○	○	○	○																																●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coef.&Daylt. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	RL5M	MC	●	○	●	●	●	○	○	○	●	●	●	●	○	○	●	●	●	●	●	○	○	○	○	○																													●	
	ROOMCALC	MC	●	●	●	●	●	○	○	●	○	●	●	●	●	●	●	●	○	○	●	○	○	○	○	○												○	●	●															●	
	SASEP	MC	●	●	●	●	●	●	○		○	●	●	●	●	○	●	●	●	●	●	○	●	○	○	○													●		●		●		●					●	●					●	
	SCM(CO)	MC	●	●	●	●	●				●	●	●			●	●	●	●		●																	●		●		●													●	
	SCM(OH)	MF	●		●	●		●				●	●				●				●																																		●	
	SE1M	MC	●	●	●	●	●	●	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○					●			●		●			●			●		●											●	
	SEA	MC	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	●	○	●	●	○	○	○	○												●		●		●		●					●	●					●	
	SEEC II REL AREAS	PC	●	○	○	○	○	●	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○												●				●								●					●	
	SEEC III REL AREAS	PC	●	●	●	●	●	●	○	○	○	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○												●				●								●					●	
	SEEC VIII SWIM POOLS	PC																															●	●		●			●			●		●						●	●					●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Operating Schedules	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff.&Dayl. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SEEC1 F-CHART	MC	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	○	●	○	○	○	○	○	○	○								●			●			●			●									●	
	SEEC1 F-CHART	PC	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	○	●	○	○	○	○	○	○	○								●			●			●			●									●	
	SERI-SLR SEEC-VI	MC	●	○	○	●	○	●	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○											●			●			●									●	
	SERI-SLR SEEC-VI	PC	●	○	○	●	○	●	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○											●			●			●									●	
	SESOP	MF	●	●	●	●	●	○	○	●	○	●	●	●	○	○	●	●	●	○	○	○	○	○	○	○	●								●			●			●	●		●							●	●	●	●					●	
	SHCOST	MF																																																					●	
	SOL-300	MC	●	●	●	●	●	●	○	○	●	○	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	●	○	○	●	●	●	○	○	●	●	○	○	○								●	
	SOL-300	MF	●	●	●	●	●	○	○	○	●	○	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	●	○	○	●	●	●	○	○	●	●	○	○	○								●	
	SOLAR ENERGY PROGRAM	PC	●	○	○	●	○	○	○	○	○	●	●	○	○	○	●	○	○	○	○	○	○	○	○	○					●			●			●			●			●									●	
	SOLAR ENGIN LIBRARY	PC	●																															●			●																			●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff.&Dayl. Trans.	Interior Surface Data	Eng Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SOL HTG SYST DSGN MAN	MN	●	○	●	●	○	○	○	○	○	●	●	○	○	○	●	●	●	○	●	●	○	○	○	○					●					●		●		●	●													●	
	SOLARCON 326P, 327P	PC	●	○	○	○	●	●	○	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○							●			●		●		●	●													●	
	SOLARCON 33	PC	●	○	○	○	●	●	○	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○							●			●		●	●	●			●											●	
	SOLARCON 34	PC	●	○	○	○	●	●	○	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○							●			●		●	●	●			●											●	
	SOLARCON 35, 36	PC	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○								●			●																	●	
	SOLARCON 355, 365	PC	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○								●			●																	●	
	SOLARCON 37, 371	PC	●	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○							●			●																	●	
	SOLARCON-PASSOLAR	PC	●	○	○	○	●	●	○	○	○	○	●	●	○	○	○	●	●	○	○	○	○	○	○	○	○							●			●		●		●	●													●	
	SOLCOM	MF	●	●	●	●		●				●	●	●			●	●	●		●		●		●													●		●		●	●								●	●	●	●	●	●	
	SOLCOST	MF	●	●	●	●	●	●	○	○	○	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○	○					●		●			●		●		●	●													●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff.&Dayit. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps.: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SOLCOST BY (SOLEC)	MN	●	●	●	○	○	●	○	○	○	○	●	○	○	●	○	○	●	○	●	○	○	○	○	○		●		●			●		●																		●	
	SOLITE 1	MC	●	●				●	●	●		●	●	●	●	●	●	●	●	●	○	○	○	○	○	○																											●	
	SOLTES	MF	●	●	●	●	●	●	●		○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●				●	●		●		●	●			●	●				●	
	SUNCODE	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	●	●	○	○	○	○	○	○	●								●			●	●	●	●	●	●	●	●	●	●		●	●	●	●				●	
	SUNCODE	MF	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	●	●	○	○	○	○	○	○	●								●			●	●	●	●	●	●	●	●	●	●		●	●	●	●				●	
	SUNDAY	MC	●	●	●	●	○	○	○	○	○	●	●	○	○	●	●	●	○	○	○	○	○	○	○	○		●								●		●			●		●		●			●	●					●	
	SUNEST	MC	●	○	●	●	○	●	○	○	○	●	●	○	○	○	●	●	●	○	○	○	○	○	○	○					●			●		●		●														●	
	SUNHEAT 1	MC	●	○	○	○	○	○	○	○	○	●	●	○	○	●	○	○	○	○	○	○	○	○	○	○			●		●					●	●			●		●		●			●						●	
	SUNOP	MC	●	●	●	●	●	○	○	○	○	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○					●			●		●		●														●	
	SUNPAS	MC	●	●	●	●		○	○	○	○	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○					●			●		●		●														●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.7 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/SMALL COMMERCIAL BUILDINGS (R/SC)

(R/SC) Residential/Small Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel: Bldg. Materials	Mass Data	Shad. Coeff./Day/t. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	SUNPULSE II SOL SIM	PC	●	●	○	●	○	○	○	○	○	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○			●		●						●		●	●		●		●																●	
	SYRSOL	MF	●	●	●	●	●	●	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●											●	●	●	●	●	●	●	●				●	●							●	
	TEANET III	PC	●	●	●	●	●	○	○	○	○	●	●	●	●	○	●	●	○	○	○	○	○	○	○	○							●				●		●	●					●	●												●	
	TRANE A.C. MANUAL	MN	●	●	●	●	●	○	○	○	○	●	●	○	○	○	●	●	●	●	●	●	○	○	○	○														●		●																●	
	TSWING	MC	●	●	●	●	●	○	○	○	○	●	●	●	●	○	●	●	●	●	○	○	○	○	○	○						●		●				●		●		●	●	●													●	
	VDD	PC	●		●	●	●					●	●				●		●															●			●		●		●		●	●													●	
	W-CHART	MN																																																								
	YORK RES AC ESTIM	MN																													●												●													●	

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.8 DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA [RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)]

TABLE 3.8 - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/ Large Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff.&Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min. & Max.	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps.: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
BELGIUM	LPB1	MF	●	●	●	●	●	●		●		●	●	●		●	●	●	●	●							●	○	○	○	○	○	○	○	●	○	○	●	●	●	●	○	○	○	○	●	●	○	●	●	●	●	●	○	○	○		●
	LPB4	MC	●	●	●	●	●				●	●	●	●		●	●	●	●	●							○	○	○	○	○	○	○	●	○	○	●	●	●	●	○	●	○	○	●	○	○	●	●	●	●	○	○	○		●
CANADA	HQUE	MF	●	○	○	○	●	●	○	○	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●													●		●		●		●													●
	REMAS	MF	●	●	●	●	●	●		○	●	●	●			●	●	●	●											●		●	●		●			●	●		●		●	●		●			●					●				●
DENMARK	PAMA	MC	●	●	●	●	●					●	●	●	●	●	●	●		●							●								●			●	●	●	●	●															●
ITALY	MORE	MC	●	○	●	●	●					●	●	●	●	●	●	●	●	●							●	●							●	●		●			●					●											●		●
	MORE	MF	●	○	●	●	●					●	●	●	●	●	●	●	●	●							●	●							●	●		●			●					●											●		●
NORWAY	EFB-3	MC	●	●	●	●	●	○	○	○	●	●	●	●	○	●	○	○	○	○	○	○	○	○	○	○			●										●	●			●		●	●												●
	EFB-3	MF	●	●	●	●	●	○	○	○	●	●	●	●	○	●	○	○	○	○	○	○	○	○	○	○			●										●	●			●		●	●												●
SWITZERLAND	IGLOU	MF	●		●	●	●			●		●	●	●	●	●	●	●	●	●		●		●		●		●	●							●	●	●	●	●	●	●	●	●	●	●	●	●		●					●
	MODPAS	MC	●	●	●	●		○	○	○	○	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	●	●									●		●		●				●	●	●											●
	PASSIM	MF																									●								●		●	●	●	●	●	●	●	●	●	●	●									●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.8 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/ Large Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg Materials	Mass Data	Shad. Coeff. & Daylt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave Day &Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	AC PROG1/ ENERGY	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	○	○	○	●	○	○	○	○	○										●		○	●	●			●																●
	ADM-2	MC	●	●	●	●	●	○	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	○	●	○	●	●	●	●	●	●	○	●	●	○	●	●	●	●	●	○	○	●	●	●	●
	ARTIF LTG LOADS ANAL PROG	MC	●	○	○	○	○	○	○	○	○	○	●	●	●	○	○	○	●	●	○	○	○	○	●	○											○	●	●	○	●				○	○	○											●
	AXCESS VER.7	MF	●	●	●	●	●			○		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●		●	●		●				●	●	●	●	●	●	●					●
	BAS. LOAD	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	○	○	○	○	○	○	○	○	○							●				○	●	●	●	●	●	○	○	●	○	○											●
	BLAST	MF	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●
	BLDSIM	MF	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					●
	BRIDG & PAXTON EN ANAL PROG	MF	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●																							●
	BUEHRER METHOD	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	○	○	○	○	○	○	○	○	○	○											○	●	●	○	○	●	●	●														●
	CADLIGHT	MC	●	●	○	●	○	●	○	●	○	○	●	●	●	○	○	●	●	○	○	○	○	○	●	○											○	○	●	○	●	●	●	●														●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.8 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/ Large Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff.&Dayit. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	CARRIER E20-2	MC	●	●	●	●	●	●	○	●	○	●	●	●	○	●	●	●	○	○	●	○	●	○	●	○												○	●	●	●	○	●	○	○	●	○	○	○	●	●	●	●	○	○	○	○		●
	CARRIER MAN OF A.C.	MN																																																									●
	CEAC	MC	●	●	●	●	●	○	○	○	●	●	●	●	○	●	●	●	○	○	●	●																○	●	●	○	●	●	○	●	●	○	○	●	●	○	○	○	○	○				●
	CL4	PC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	●		●	●	●	●	●	○								●			●		●																					●
	CL4M	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	●	○	●	●	●	●	●	○								●			●		●	●		●					●	●											●
	COMM BLDGS EN ANAL PROG	MC	●	●	●	●	●	●	○	○	○	●	●	●	○	○	●	●	○	○	●	○	●	○	●	○												○	●	●	●									●	●	●	●	○	○	○	○		●
	COMM HVAC LOAD PROG	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	○	○	○	●	○	●	○	●	○			●								○	●	●	○	●	○	○	○													●
	COMM LOAD CALC PROG	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	○	●	○	○	○	○	○	○	○	○	○												○	●	●	●	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○		●
	DEROB	MF	●	●	●	●	●	○	●	○	○	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●										●	●	●	●	●	●		●	●	●											●
	DOE-2	MF	●	●	●	●	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.8 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/ Large Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff.&Dayt. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps.: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	ECP	MF	●	●	●	●	●	○	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●									●			●	●	●	●	●	●	●	●				●	●		●		●			●
	ENERGY BILL ANALYSIS	MC	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	●	○	●	○	○	●	○	●				●	●							●
	ENERGY NOMOGRAPHS	MN	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	●	●	○	○	○	○	●	●						●						●					●			●					●			●						●
	ENERGY II	MC	●	●	●	●	○	○	○	●	●	●	●	○	●	●	○	○	○	●	○	○	○	○	○	○												○	●	●																					●
	ESAS	MF	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	○			●
	ESP-2	MF	●	●	●	●	○	○	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●				●	●		●		●	●				●	●	●	●	●	●		●			●
	FASER	MC	●	●	●	●	●	●	○	●	○	●	●	●	○	●	●	○	○	○	●	○	●	○	●	○	○	○	○	○	○	○	○	●	●	○	○	○	●	●	●	○	●	●	○	●	●	○	○	●	●	○	○	●	●	○	●	●	●			●
	GAIN	MC	●	●	●	●	●	●	○	●	○	●	●	●	○	●	●	●	○	○	○	○	○	○	○	○												●	●	●					●																		●
	HCC III	MC	●	●	●	●	●	○	○	●	○	●	●	●	○	●	●	●	○	○	○	○	○	○	○	○												○	●	●	●	●	○	○	○	○															●
	HVAC PKG	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	○	●	○	○	○	●	○	○	○	○	○												○	●	●	●	●	○	○	○	○															●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

TABLE 3.8 (cont.) - DESIGN TOOL CATEGORIZATION BY INPUT/OUTPUT DATA
RESIDENTIAL/LARGE COMMERCIAL BUILDINGS (R/LC)

(R/LC) Residential/ Large Commercial

Country	Program Code Name	Keywords	Input Data: Pre-Design: Location (Weather Data)	Bldg. Type & Schedule	Occupancy Rates	Bldg. Floor Area	Space Temperatures	Local Energy Costs	Bldg. Shape & Orient.	Lighting Requirements	Code Requirements	Schematic: Surface Areas	Glazing Areas & Orients	Zoning	Room Shapes	Operating Schedules	Design Devel.: Bldg. Materials	Mass Data	Shad. Coeff. & Dayl. Trans.	Interior Surface Data	Eng. Design Development: Mechanical Systems	Mechanical Controls	Electrical Systems	Electrical Controls	Lighting Systems	Lighting Controls	Weather: Temperature: Hourly Tape	Typical Day	Monthly	Annual	Monthly Degree Days	Annual Degree Days	Ave. Monthly Min & Max	Average Monthly	Solar: Hourly Tape	Typical Daily Profile	Monthly Ave. Day & Total	Output Data: For: Component	Zone	Building	Load Output: Hour	Day	Month	Season	Year	Temps: Air	Surface	Graphic Plot	Fuel Use: Monthly Consumption	Annual Consumption	Monthly Peak Demand	Annual Peak Demand	System Components	Hourly Profile	Energy Systems	Total Building Only	Applications: Residential/ Small Commercial (Envelope Loads Dominate) R/SC	Residential/ Large Commercial (Internal Loads Dominate) R/LC
UNITED STATES	MEDSI ANN ENER CONS	MF	●	●	●	●	●	○	●	○		●	●	●	●	●	●	●	●	●	●	●	●	●	●											●	●	●			●		●				●	●					●			●
	MQAUDIT	MF	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●			●						●	●					●			●
	NECAP	MF	●	●	●	●	●	●		●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●			●			●			●	●					●			●
	PASS-ONE	MF	●	●	●	●		○	○	○	○	●	●	●	○	○	●	●	●	●	●	●	●	●	●	●								●			●	●			●			●			●	●					●			●
	QUIKEE	MF	●	●	●	●	●	○	●	○	○	●	●	●	●	●	●	●	●	○	○	○	○	○	○	○	●								●			●	●			●			●			●	●					●			●
	REAP	MC	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●											●	●			●			●			●	●	●	●	●	●	●	●		●
	SEE	MF	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●			●			●			●	●				●	●	●		●
	SOLPATH-COMM	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●					●		●			●	●			●			●								●	●	●	●		●
	STENET	MC	●	●	●	●	●	○	○	○	○	●	●	●	○	○	●	●	○	○	○	○	○	○	○	○							●			●			●	●			●														●
	TRACESOLAR	MF	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●								●			●	●			●			●			●	●				●	●	●		●
	TSD	MF	●	●	●	●	●	○	●	○	○	●	●	●	●	●	●	●	●	●	●		●		○	○	●								●			●	●																		●

● : Required/Given Information ○ : Does Not Accommodate Blank : Missing Information

IV. RESULTS OF DESIGN TOOL SURVEY

4.1 SURVEY RESULTS

The information obtained from the Design Tool Survey was compiled and classified in various ways. The result of this compilation process is presented in this section. The tables in this section give a statistical picture of the state of design tool development in IEA Task VIII, Subtask C participating countries.

4.1.1 Design Tools by Countries and Machine Type Required

Two hundred and thirty design tools were reported from participating countries, as shown in Table 4.1. The greatest number of design tools are for use with microcomputers, followed by mainframe computers.

TABLE 4.1 DESIGN TOOLS BY COUNTRY* AND MACHINE TYPE

PARTICIPATING COUNTRIES	MAINFRAME COMPUTERS (MF) NO. OF TOOLS	MICROCOMPUTERS (MC) NO. OF TOOLS	PROGRAMMABLE CALCULATORS (PC) NO. OF TOOLS	MANUAL METHODS (MN) NO. OF TOOLS
AUSTRIA	0	1	0	0
BELGIUM	2	1	0	0
CANADA	4	3	0	3
DENMARK	0	2	1	0
GERMANY, WEST	0	0	0	1
ITALY	1	1	0	4
NETHERLANDS	1	2	0	1
NORWAY	1	2	1	1
SWEDEN	2	2	0	1
SWITZERLAND	7	5	5	8
U. K.	2	2	0	1
U.S.A.	39	79	23	21
TOTAL	59	100	30	41

Total Number of Design Tools = 230

* Only the countries participating in Subtask C of Task VIII, which have reported design tool information, are listed here.

4.1.2 Design Tools by Intended Users and Machine Type Required

Most of the design tools surveyed are intended for use by more than one group of users. Table 4.2 shows the design tools organized by intended users and machine type. There appears to be almost an equal number of design tools for architects and engineers. There are 57 microcomputer-based design tools which are suitable for use by technicians.

TABLE 4.2 DESIGN TOOLS BY INTENDED USERS AND MACHINE TYPE

INTENDED USERS	MAINFRAME COMPUTERS (MF) NO. OF TOOLS	MICROCOMPUTERS (MC) NO. OF TOOLS	PROGRAMMABLE CALCULATORS (PC) NO. OF TOOLS	MANUAL METHODS (MN) NO. OF TOOLS
ARCHITECTS	45	94	29	38
ENGINEERS	54	96	30	35
TECHNICIANS	14	57	8	19
BUILDERS	14	38	3	17

4.1.3 Design Tools by Application to Building Energy Calculation and Machine Type

The number of design tools suitable for various building energy calculations are shown in Table 4.3. Of the 230 design tools surveyed, 212 are suitable for heating energy calculations and 127 for cooling energy calculations. There are few design tools using manual methods which are suitable for cooling energy calculations.

TABLE 4.3 DESIGN TOOLS BY APPLICATION TO BUILDING ENERGY CALCULATION AND MACHINE TYPE

Total number of design tools = 230

MACHINE REQUIRED	HEATING (HTG) NO. OF TOOLS	COOLING (CLG) NO. OF TOOLS	LIGHTING (LTG) NO. OF TOOLS	SERVICE HOT WATER (DHW) NO. OF TOOLS	MISCELLANEOUS (MIS) NO. OF TOOLS
MAINFRAME COMPUTER	59	43	27	29	21
MICRO-COMPUTER	92	66	32	33	18
PROGRAM-MABLE CALCULATOR	27	5	2	14	0
MANUAL METHODS	34	13	2	10	2
TOTAL	212	127	63	86	41

4.1.4 Design Tools by Application to Building Energy Calculations and Building Category

The number of design tools for various building energy calculations tabulated by the building category is shown in Table 4.4. For building category R/SC, 162 design tools are suitable for heating and 80 for cooling energy calculations. There are 33 design tools for lighting calculations in building category R/SC. For building category R/LC, about the same number of design tools are available for heating and cooling energy calculations. For lighting calculations, 30 design tools are available in this building category.

TABLE 4.4 DESIGN TOOLS BY APPLICATION TO BUILDING ENERGY CALCULATIONS AND BUILDING CATEGORY

Total number of design tools = 230

BUILDING CATEGORY	HEATING (HTG) NO. OF TOOLS	COOLING (CLG) NO. OF TOOLS	LIGHTING (LTG) NO. OF TOOLS	SERVICE HOT WATER (DHW) NO. OF TOOLS	MISCELLANEOUS (MIS) NO. OF TOOLS
RESIDEN-TIAL/SMALL COMMERCIAL (R/SC)	162	80	33	63	18
RESIDEN-TIAL/LARGE COMMERCIAL (R/LC)	50	46	30	23	23

4.1.5 Design Tools for Active Solar Energy Systems

Fifty-six of the 230 design tools surveyed are suitable for active solar energy system calculations. Table 4.5 shows the number of design tools for active solar energy system calculation organized by the method of calculation and the machine type required. There are 25 mainframe computer-based design tools for active solar energy system calculations. Most of the mainframe computer design tools use component-based simulation methods. Twenty design tools are available for microcomputers of which 10 use the F-Chart method. The greatest number of design tools use the F-Chart method of calculation followed by component-based simulation.

TABLE 4.5 DESIGN TOOLS FOR ACTIVE SOLAR ENERGY SYSTEMS BY MACHINE TYPE AND CALCULATION METHOD

Total Number of Design Tools for Active Solar Energy Systems = 56

ALGORITHMS FOR ACTIVE SOLAR ENERGY SYSTEMS	MAINFRAME COMPUTERS (MF) NO. OF TOOLS	MICROCOMPUTERS (MC) NO. OF TOOLS	PROGRAMMABLE CALCULATORS (PC) NO. OF TOOLS	MANUAL METHODS (MN) NO. OF TOOLS
F-CHART	4	10	5	2
COMPONENT BASED SIMULATION	14	1	0	0
AVERAGE DAY	0	1	0	0
OTHERS	7	8	2	2
TOTAL	25	20	7	4

4.1.6 Design Tools for Passive Solar Energy Systems

Table 4.6 shows that out of 230 design tools surveyed, 121 are suitable for passive solar energy calculations. Forty-six design tools are available for microcomputers, 13 of which use thermal network while 10 use the solar load ratio (SLR) method. Only two design tools for mainframe computers use the solar load ratio method. Considering the design tools for all machine types, 31 use the thermal network method, and 23 use the solar load ratio method.

TABLE 4.6 DESIGN TOOLS FOR PASSIVE SOLAR ENERGY SYSTEMS BY MACHINE TYPE AND ALGORITHM USED

Total Number of Design Tools for Passive Solar Energy Calculations = 121

ALGORITHMS FOR PASSIVE SOLAR ENERGY SYSTEMS	MAINFRAME COMPUTERS (MF) NO. OF TOOLS	MICROCOMPUTERS (MC) NO. OF TOOLS	PROGRAMMABLE CALCULATORS (PC) NO. OF TOOLS	MANUAL METHODS (MN) NO. OF TOOLS
SOLAR LOAD RATIO	2	10	7	4
THERMAL NETWORK	14	13	4	0
RESPONSE FACTOR	6	2	0	1
OTHERS	15	21	5	17
TOTAL	37	46	16	22

4.1.7 Design Tools for the Calculation of Underground Loads and Machine Required.

Table 4.7 shows that there are 33 design tools suitable for the calculation of underground loads, with about half intended for use with microcomputers and half for mainframe computers. Table 4.8 shows that 17 design tools are available for underground load calculation for R/SC and 16 design tools for underground load calculation for R/LC.

TABLE 4.7 DESIGN TOOLS FOR UNDERGROUND LOADS CALCULATION AND MACHINE TYPE

Total Number of Tools for Underground Calculations = 33

MAINFRAME COMPUTERS (MF) NO. OF TOOLS	MICROCOMPUTERS (MC) NO. OF TOOLS	PROGRAMMABLE CALCULATORS (PC) NO. OF TOOLS	MANUAL METHODS (MN) NO. OF TOOLS
13	15	0	5

TABLE 4.8 DESIGN TOOLS FOR UNDERGROUND LOADS CALCULATION AND THE BUILDING CATEGORY

Total Number of Tools for Underground Loads Calculation = 33

RESIDENTIAL AND SMALL COMMERCIAL BUILDINGS R/SC TOTAL NO. OF TOOLS	RESIDENTIAL AND LARGE COMMERCIAL BUILDINGS R/LC TOTAL NO. OF TOOLS
17	16

4.1.8 Design Tools by Application to Phase of Building Design

Table 4.9 shows the number of design tools suitable for use during various phases of building design and the machine required. The microcomputer-based design tools appear to have wide application to all phases of building design. The number of design tools by application to the phase of building design and the building category are shown in Table 4.10. For building category R/SC, there are 119 and 132 design tools suitable for pre-design and schematic design phases respectively. In the R/LC building category, fewer design tools are available for pre-design phase calculations.

TABLE 4.9 DESIGN TOOLS BY APPLICATION TO THE PHASE OF BUILDING DESIGN AND MACHINE REQUIRED

Total number of design tools = 230

TYPE OF MAJOR EQUIPMENT	PRE-DESIGN PHASE (PRDG) NO. OF TOOLS	SCHEMATICS PHASE (SCHM) NO. OF TOOLS	DESIGN DEVELOPMENT (DEDV) NO. OF TOOLS	POST DESIGN SERVICES (POSV) NO. OF TOOLS	RESEARCH (RSCH) NO. OF TOOLS
MAINFRAME COMPUTERS	24	36	45	22	22
MICRO-COMPUTER	69	81	61	29	9
PROGRAM-MABLE CALCULATOR	20	28	9	2	0
MANUAL METHODS	31	28	18	5	3

TABLE 4.10 DESIGN TOOLS BY APPLICATION TO THE PHASE OF BUILDING DESIGN AND THE BUILDING CATEGORY

Total number of design tools = 230

BUILDING CATEGORY	PRE-DESIGN PHASE (PRDG) NO. OF TOOLS	SCHEMATICS PHASE (SCHM) NO. OF TOOLS	DESIGN DEVELOPMENT (DEDV) NO. OF TOOLS	POST DESIGN SERVICES (POSV) NO. OF TOOLS	RESEARCH (RSCH) NO. OF TOOLS
RESIDENTIAL/ SMALL COMMERCIAL (R/SC)	119	132	89	39	23
RESIDENTIAL/ LARGE COMMERCIAL (R/LC)	25	41	44	19	11

4.1.9 Design Tools by Building Category and Machine Type

The total number of design tools suitable for small and large building types is shown in Table 4.11. For large buildings, about an equal number of design tools exist for use with mainframe and microcomputers. However, for small buildings about twice as many design tools are available for use on the microcomputer compared to mainframe-based design tools.

TABLE 4.11 DESIGN TOOLS BY BUILDING CATEGORY AND MACHINE TYPE

Total Number of Design Tools = 230

MACHINE REQUIRED	RESIDENTIAL AND SMALL COMMERCIAL BUILDINGS R/SC TOTAL NO. OF DESIGN TOOLS	RESIDENTIAL AND LARGE COMMERCIAL BUILDINGS R/LC TOTAL NO. OF DESIGN TOOLS
MAINFRAME COMPUTER	35	24
MICRO-COMPUTER	74	26
PROGRAMMABLE CALCULATOR	29	1
MANUAL METHODS	39	2

4.1.10 Design Tools by Units of Calculation

The total number of design tools capable of using English, SI, or both units are shown in Table 4.12. Most of the design tools suitable for use with microcomputers use English units. Only 45 microcomputer-based design tools use SI units, while 27 can use both units of calculation.

TABLE 4.12 DESIGN TOOLS BY THE UNITS OF CALCULATION

Total Number of Design Tools = 230

MACHINE REQUIRED	ENGLISH UNITS (ENG) NO. OF TOOLS	SI UNITS (SI) NO. OF TOOLS	BOTH UNITS (BOTH) NO. OF TOOLS
MAINFRAME COMPUTER	34	28	12
MICRO-COMPUTERS	74	45	27
PROGRAMMABLE CALCULATORS	21	25	20
MANUAL METHODS	18	20	3

4.2 FINDINGS

Based on the results of the Design Tool Survey presented above, a few general comments can be made.

- There are few design tools available for use with programmable calculators.
- Since 1979, the development of design tools for programmable calculators has been very slow.
- There are a number of design tools available for calculating the savings due to the use of daylighting. Most of the design tools for daylighting calculations were developed between 1982-1984; some of the most recent activity is in this field.
- Fewer simplified design tools are available for calculating cooling energy requirements than heating. There are many design tools for cooling calculations which require micro or mainframe computers.
- Very few design tools are available for use on microcomputers or programmable calculators for the calculation of miscellaneous loads.
- One hundred and seventy-four design tools exist for calculating various energy requirements for small buildings. Fewer design tools are available for large buildings.
- The majority of design tools for active solar energy systems use the F-Chart method. A considerable number of design tools use the component-based simulation method.
- There is a need for simplified methods for active solar energy systems calculations for heating, cooling, and DHW for large commercial buildings.
- The solar load ratio (SLR) and thermal network method are the most commonly-used algorithms for passive solar energy systems.
- There is the need for simplified design tools for calculating the performance of passive solar systems for commercial buildings.
- The weather data required for the mainframe computer-based design tools in most cases is hourly data. During 1982-84, a few microcomputer-based design tools have been developed which use statistically processed condensed weather data. This condensed data is created from the hour-by-hour weather data by the design tool developers.

- During 1982-84, a few microcomputer-based design tools have been developed for commercial buildings. Some of these design tools perform hour-by-hour simulation for multi-zoned buildings with a variety of HVAC system types.

- The design tools developed prior to 1982 tended to use operating systems which restricted them to a few types of microcomputers. Very few design tools had been developed for CP/M operating system. Thus, the issue of design tool portability was a very serious one. However, during 1982-84, most of the new design tools were developed for use with CP/M and/or MS-DOS operating systems. These design tools can usually be used on a wide variety of computers which support these operating systems.

- While most microcomputer design tools were developed using BASIC language, a few were developed using USCD PASCAL, or FORTRAN 77.

4.3 UNAVAILABLE INFORMATION

The following information could not be obtained:

- Equipment cost: The cost varies considerably and was not provided in most survey responses.

- Time to input and debug: Most developers did not respond to this question. Some said it was minimal, others said that it depends upon the person using the design tool.

- Run cost/input set-up time: This was not answered on most survey forms. Some responded that it depends on the level of detail required and the experience of the user.

- Validation: Very little information was available except for some government-sponsored design tools. Some of these design tools have been validated against a simulation program, a few have been validated with actual building data. In most cases, validation of any scientific significance did not exist. Any validation information which did exist was very difficult to obtain unless it had been previously published.

- List of users: Most design tool developers either did not maintain a list of users or would not make it available.

- It appears that a large (but indeterminant) number of design tools do not have a significant users group outside the author or developer's own organization.

- There is a very apparent lack of consistency in approach, definition, algorithms, units, etc. The lack of standardization and/or consensus among authors and developers causes substantial confusion.

- An important paradox has emerged in design tool development: when a design tool is simple, cheap, and easy to use, it usually can't analyze with any discrimination the types of sophisticated solar or energy conservation strategies the energy-conscious designer is interested in investigating. There is a need to reconcile the desire for accuracy in analyzing unusual design features with the need for inexpensive, fast and easy to use design tools.

APPENDIX A: SAMPLE SURVEY FORMS FOR ENERGY DESIGN TOOLS AND ANALYSIS MODELS

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 1

TASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

RETURN TO:

SUBTASK B - MODELLING & SIMULATION
SUBTASK C - DESIGN METHODS

GENERAL:

TOOL NAME: _____

DEVELOPED BY: _____

_____

_____

_____

_____

DATE DEVELOPED: _____

DATE OF LAST REVISION: _____

AVAILABLE THROUGH: _____

_____

_____

_____

PHONE NO.: _____

SUPPORTED BY: _____

_____

_____

_____

PHONE NO.: _____

BRIEF DESCRIPTION: _____

_____

_____

_____

_____

PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.

TOOL HARDWARE & AVAILABLE FORMS:

☐ MAIN FRAME COMPUTER
- ☐ CARD DECK
- ☐ TAPE
- ☐ TIME SHARING
- ☐ LISTING - HARD COPY

(COMPLETE SECTIONS 1, 2, 3)

☐ MICRO-COMPUTER
- ☐ DISC
- ☐ TAPE
- ☐ LISTING
- ☐ RECALL ONLY MEMORY-INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 4)

☐ HAND CALCULATOR
- ☐ MAGNETIC CARD
- ☐ LISTING
- ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 5)

☐ GRAPHIC OR MANUAL
- ☐ TEMPLATES, CHARTS, TABLES
- ☐ BOOK
- ☐ DEVICE

(COMPLETE SECTIONS 1, 2, 6)

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 1

COMMENTS:

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 2

INTENDED USE:

INTENDED FOR USE BY

☐ ARCHITECT ☐ ENGINEER ☐ TECHNICIAN ☐ RESEARCH ANALYSIST ☐ BUILDER

PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED

☐ PRE-DESIGN ☐ SCHEMATICS ☐ DESIGN DEVEL. ☐ POST DESIGN SERVICES ☐ RESEARCH

BUILDING TYPE WHICH CAN BE ANALYZED

☐ RESIDENTIAL/SMALL COMMERCIAL ☐ LARGE COMMERCIAL ☐ BOTH

MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL:

☐ HEATING	☐ COOLING	☐ LIGHTING	☐ DHW	☐ MISCELLANEOUS
☐ LOADS	☐ LOADS	☐ LOADS	☐ LOADS	☐ FANS
☐ SPACE TEMPS.	☐ SPACE TEMPS.	☐ FC (LUX) LEVELS	☐ SOLAR ACTIVE	☐ PUMPS
☐ HVAC SYSTEMS	☐ HVAC SYSTEMS	☐ SYSTEM DESIGN	☐ SOLAR PASSIVE	☐ MISC. ELECTRICAL
☐ PASSIVE SOLAR	☐ PASSIVE CLNG.	☐ ECONOMICS	☐ ECONOMICS	☐ ELEV. & ESCALATOR
☐ ACTIVE SOLAR	☐ SHADING	☐ DAYLIGHTING FC (LUX) LEVELS		
☐ SHADING	☐ SYSTEM DESIGN	☐ ARTIFICIAL LTNG. REDUCTION		
☐ SYSTEM DESIGN	☐ ECONOMICS			
☐ ECONOMICS	☐ UNDERGROUND LOADS			
☐ UNDERGROUND LOADS	☐ SLOPED GLAZING			
☐ MASS	☐ MASS			

INPUT DATA REQUIRED:

	DOES NOT ACCOMODATE	DEFAULT VALUES SUPPLIED	INPUT REQUIRED
PRE-DESIGN AND SITE ANALYSIS DATA			
LOCATION - ASSOCIATED WEATHER DATA	☐	☐	☐
BUILDING TYPE AND SCHEDULE	☐	☐	☐
OCCUPANCY RATES	☐	☐	☐
BUILDING AREA	☐	☐	☐
SPACE TEMPERATURES	☐	☐	☐
LOCAL ENERGY COSTS	☐	☐	☐
GENERIC BUILDING SHAPE DUE TO SITE RESTRICTIONS	☐	☐	☐
LOCAL CODE REQUIREMENTS (VENTIL., INSUL., ETC.)	☐	☐	☐
LIGHTING REQUIREMENTS	☐	☐	☐
SCHEMATIC DESIGN DATA			
BUILDING SURFACE AREAS	☐	☐	☐
GLAZING AREAS & ORIENTATIONS	☐	☐	☐
ZONING	☐	☐	☐
ROOM SHAPES	☐	☐	☐
OPERATING SCHEDULES & PROFILES	☐	☐	☐
ARCHITECTURAL DESIGN DEVELOPMENT DATA			
BUILDING MATERIALS & ASSOCIATED DATA (R, α, ϵ, ETC.)	☐	☐	☐
BUILDING MASS DATA	☐	☐	☐
SHADING COEFFICIENTS & DAYLIGHT TRANSMISSION	☐	☐	☐
INTERIOR SURFACE DATA	☐	☐	☐
ENGINEERING DESIGN DEVELOPMENT DATA			
MECHANICAL SYSTEM DESIGN	☐	☐	☐
MECHANICAL SYSTEM CONTROL	☐	☐	☐
ELECTRICAL SYSTEM DESIGN	☐	☐	☐
ELECTRICAL SYSTEM CONTROL	☐	☐	☐
LIGHTING SYSTEM DESIGN	☐	☐	☐
LIGHTING SYSTEM CONTROL	☐	☐	☐

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 2

COMMENTS:

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 2

WEATHER DATA:

TEMPERATURE DATA: ☐ HOURLY TAPE ☐ TYPICAL DAY ☐ MONTHLY DATA ☐ ANNUAL DATA ☐ MONTHLY DEGREE DAYS ☐ ANNUAL DEGREE DAYS ☐ AVE. MONTHLY MIN. AND MAX. ☐ AVE. MONTHLY TEMP. ☐ DAILY

SOLAR DATA: ☐ HOURLY TAPE ☐ TYPICAL DAY PROFILE ☐ MONTHLY AVE. DAILY & TOTAL

SOLAR ORIENS. CALC: ☐ ANY ORIEN. INCL. SLOPED ☐ ANY VERT. & HORIZ. ☐ HORIZ. & 4 CARDINAL DIREC. ☐ SLOPED FACING SOUTH ☐ SURFACE REFLECTANCE

DAYLIGHT CALC: ☐ HOUR-BY-HOUR ☐ TYPICAL CLEAR & CLOUDY DAY/MONTH ☐ TYPICAL DAY/MONTH ☐ ANNUAL AVERAGE ☐ OTHER _____

CALCULATION PROCEDURES:

LANGUAGE: ☐ FORTRAN ☐ BASIC ☐ MACHINE LANGUAGE ☐ OTHER _____ ☐ GRAPHS, CHARTS & SIMPLE CALC.

USER TYPE: ☐ INTERACTIVE ☐ INTERACTIVE GRAPHIC ☐ PREPARE FILE ☐ HAND CALCULATION

UNITS OF CALCULATION: ☐ SI UNITS ☐ ENGLISH ☐ BOTH

CHECK ALL APPROPRIATE BOXES:

HEAT TRANSFER:	☐ FINITE DIFFERENCE	☐ RESPONSE FACTOR	☐ STEADY STATE
SOLAR COMP. CALCULATED:	☐ DIFFUSE/DIRECT/RE-RADIATED	☐ DIFFUSE/DIRECT	☐ TOTAL
INTEGRATION:	☐ SIMPLE EULER	☐ IMPLICIT	☐ OTHER
SHADING:	☐ ANY SOLAR OBSTRUCTION	☐ OVERHANG ONLY	☐ NO SHADING
MOVABLE SHADING:	☐ DAILY & SEASONAL SWITCHING	☐ SEASONAL SWITCHING	☐ NOT CALCULATED
MASS EFFECT IS CALCULATED:	☐ TRANSIENT HEAT FLOW	☐ TIME CONSTANT FACTORS	☐ ASSUME NO MASS AFFECT
ROOM TEMP. BASED ON:	☐ SURFACE & AIR	☐ AIR ONLY	☐ NOT CALCULATED
INSIDE TEMPERATURE:	☐ INPUT SCHEDULE BY USER	☐ FIXED BY TOOL	☐ VARIED BY TOOL
U-VALUES:	☐ CHANGE W/WIND SPEED	☐ REMAIN CONSTANT	☐ MOVABLE INSULATION
INFILTRATION:	☐ AIR CHANGE PER HOUR	☐ CRACK METHOD	☐ VARIES W/WIND SPEED
INTERNAL LOADS INCLUDE:	☐ SENSIBLE & LATENT SEPARATE	☐ SENS. & LAT. TOTAL	☐ SENSIBLE ONLY
VENTILATION:	☐ SENSIBLE	☐ LATENT	☐ VARIES BY SCHEDULE OR COMMAND
DAYLIGHT COEFFICIENTS:	☐ SKY, REFL. & DIRECT	☐ SKY & REFL.	☐ SKY ONLY
ZONES PER RUN:	☐ > 25	☐ 10 - 25 ☐ 2 - 10	☐ 1 ONLY
SYSTEM MODELING:	☐ SYSTEM EFFIC. INPUT	☐ SYSTEM OPTIMIZING	☐ COMPONENT SENSITIVITY
ECONOMIC ANALYSIS:	☐ ANNUAL COST	☐ SIMPLE PAYBACK	☐ LIFE CYCLE COSTING

OUTPUT:

LOAD DETERMINANTS: ☐ COMPONENT ☐ ZONE ☐ BUILDING

LOADS OUTPUT BY: ☐ HOUR ☐ DAY ☐ MONTH ☐ SEASON ☐ YEAR

TEMPERATURES: ☐ AIR ☐ SURFACE ☐ GRAPHIC PLOT

FUEL USE BY: ☐ MONTHLY CONSUMPTION ☐ ANNUAL CONSUMPTION ☐ SYSTEM COMPONENTS
☐ MONTHLY PEAK DEMAND ☐ ANNUAL PEAK DEMAND ☐ ENERGY SYSTEMS
☐ OTHER _____ ☐ OTHER _____ ☐ TOTAL BUILDING ONLY

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 2

COMMENTS:

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 3

FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:

COMPUTER TYPE: ☐ IBM ☐ CDC ☐ UNIVAC ☐ OTHER _____

CORE REQUIRED: ☐ > 500K ☐ 100 - 500 K ☐ 25 - 100 K ☐ < 25 K

SUPPORT: ☐ USER'S GUIDE ☐ DATA MANUAL ☐ OTHER _____

EQUIPMENT: ☐ CRT ☐ PRINTER ☐ TEXTRONIX ☐ OTHER _____

COSTS:

ASSUMING PURCHASE OF SOFTWARE FOR USE ON PRESENT TIME-SHARING:

FIRST COST:

IN-OFFICE EQUIPMENT: CRT _____ PRINTER _____

SOFTWARE PURCHASE: CARD DECK _____ TAPE _____ LISTING _____

SUPPORT INFORMATION: USER'S GUIDE _____ DATA MANUAL _____ OTHER _____

TIME TO INPUT AND DEBUG: _____ MAN-DAYS _____ MAN-HOURS

RUN COST/TIME:

INPUT SET-UP TIME: _____ MAN-DAYS _____ MAN-HOURS

TYPICAL* RUN TIME: ☐ > 1 HR. ☐ 60 M - 30 M ☐ 30 M - 10 M ☐ < 10 M

TYPICAL* CPU TIME: ☐ > 1000 SEC. ☐ 100 - 1000 SEC. ☐ 5 - 100 SEC. ☐ < 5 SEC.

*FOR THIS FORM, ASSUME "TYPICAL" TO BE A SINGLE-ZONED 100 SQUARE METER RESIDENCE WITH ALL OUTPUTS CHECKED (✓) IN SECTION 2.

ASSUMING USE OF SOFTWARE ON PUBLIC TIME-SHARING NETWORKS:

NAMES AND CONTACTS OF TIME-SHARING SERVICES WHICH HAVE THIS PROGRAM AVAILABLE (EXACT COSTS CAN BE OBTAINED THROUGH THEM).

_____ _____

_____ _____

_____ _____

_____ _____

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 3

COMMENTS:

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

4 SECTION

FOR DESIGN TOOLS REQUIRING A MICRO-COMPUTER

HARDWARE:

MANUFACTURER AND MODEL NUMBER: _____

RANDOM ACCESS MEMORY (RAM) REQUIRED: _____ K

DOES THIS TOOL REQUIRE A PRINTER? ☐ YES ☐ NO

SUPPORT: ☐ USER'S GUIDE ☐ DATA MANUAL ☐ OTHER _____

COSTS:

FIRST COST:

MICRO-COMPUTER: _____

SOFTWARE: ROM IC _____ DISC _____ TAPE _____ LISTING _____

SUPPORT INFORMATION: USER'S GUIDE _____ DATA MANUAL _____ OTHER _____

TIME TO INPUT AND DEBUG: _____ MAN-DAYS _____ MAN-HOURS

RUN COST/TIME:

TYPICAL* INPUT SET-UP TIME: _____ MAN-DAYS _____ MAN-HOURS

TYPICAL* RUN TIME: _____ HRS. _____ MIN.

TYPICAL* PRINT TIME: _____ HRS. _____ MIN.

*FOR THIS FORM, ASSUME "TYPICAL" TO BE A SINGLE-ZONED 100 SQUARE METER RESIDENCE WITH ALL OUTPUTS CHECKED (✓) IN SECTION 2.

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 4

COMMENTS:

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

5 SECTION

FOR DESIGN TOOLS REQUIRING A HAND-HELD CALCULATOR

HARDWARE:

MANUFACTURER AND MODEL NUMBER: _____

DOES THIS TOOL REQUIRE A PRINTER? ☐ YES ☐ NO

SUPPORT: ☐ USER'S GUIDE ☐ DATA MANUAL ☐ OTHER _____

COSTS:

FIRST COST:

HARDWARE: CALCULATOR _____ PRINTER _____

SOFTWARE: MAGNETIC CARD _____ LISTING _____ OTHER _____

SUPPORT INFORMATION: USER'S GUIDE _____ DATA MANUAL _____ OTHER _____

RUN COST/TIME:

TYPICAL* INPUT SET-UP TIME: _____ HRS. _____ MIN.

TYPICAL* RUN TIME: _____ HRS. _____ MIN.

TYPICAL* PRINT TIME: _____ HRS. _____ MIN.

*FOR THIS FORM, ASSUME "TYPICAL" TO BE A SINGLE-ZONED 100 SQUARE METER RESIDENCE WITH ALL OUTPUTS CHECKED (✓) IN SECTION 2.

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

5 SECTION

COMMENTS:

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SECTION 6

FOR DESIGN TOOLS REQUIRING OTHER DEVICES

HARDWARE:

ITEM: _____

SUPPORT: ☐ USER'S GUIDE ☐ DATA MANUAL ☐ OTHER _____

COSTS:

FIRST COST:

ITEM COST: _____

SUPPORT INFORMATION: USER'S GUIDE _____ DATA MANUAL _____ OTHER _____

RUN COST/TIME:

TYPICAL* INPUT SET-UP TIME: _____ MAN-HOURS

TYPICAL* CALCULATION TIME: _____ MAN-HOURS

*FOR THIS FORM, ASSUME "TYPICAL" TO BE A SINGLE-ZONED 100 SQUARE METER RESIDENCE WITH ALL OUTPUTS CHECKED (✓) IN SECTION 2.

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION 6

COMMENTS:

APPENDIX B: LISTING AND DESCRIPTION OF DESIGN TOOLS BY COUNTRY

AUSTRIA

General

TOOL NAME: EBIWAN
DEVELOPED BY: M. Bruck and G. Schaffar
Austrian Solar and Space Agency and
Bundesinnung der Sanitar-und Heizungs-
installateure
Wien, Austria
DATE DEVELOPED: Jan., 1984
DATE OF LAST REVISION: Dec., 1984

AVAILABLE THROUGH: Fa. O. Folger
Blindengasse 36
A-1080 Wien, Austria
PHONE NO.: (0222) 432639
SUPPORTED BY: Dr. G. Schaffar
A-2180 Niederflattnitz, Hofern 14
Austria
PHONE NO.: 02949/2311

BRIEF DESCRIPTION: EBIWAN is to be used as a "quick" design tool in the early layout of a building; it calculates the seasonal heat balance (transmission and ventilation losses, solar gains, heat gains from occupants and from electric appliances) of - smaller - buildings, the energy balance of the heating system (air/water heat pump, oil or gas burner, electric heating) and the life cycle costs of the entire system. A base case and an arbitrary number of variations can be analyzed within one run.

General

TOOL NAME: QEFH
DEVELOPED BY: Austria - no other information known about design tool at time of printing
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION:

BELGIUM

General

TOOL NAME: LPB1
DEVELOPED BY: Laboratoire de Physique du Batiment, Universite de Liège Faculté des Sciences Appliquees 15, Avenue des Tilleuls - Bat D1 4000 Liège Belgique
DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Laboratoire de Physique du Batiment, Universite de Liège, Faculté des Sciences, Appliquees 15, Avenue des Tilleuls - Bat D1, 4000 Liege Belgique
PHONE NO.: 041/520180, Ext. 367
SUPPORTED BY: The SPPS
Rue de la Sciences No. 8
1040 Bruxelles - Belgique
PHONE NO.: 02/2304100

BRIEF DESCRIPTION: LPB1 is a program designed to compute thermal loads and temperatures in a building. This is done taking all capacity effects into account, thus in a dynamic way.

General

TOOL NAME: LPB4
DEVELOPED BY: Laboratoire de Physique du Batiment, Universite de Liege, Faculte des Sciences Appliquees 15, Avenue des Tilleuls Bat D1, 4000 Liege Belgique
DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: Laboratoire de Physique Du Batiment, Universite de Liege, Faculte des Sciences Appliquees 15, Avenue des Tilleuls Bat D1, 4000 Liege Belgique
PHONE NO.: 041/520180, Ext. 367
SUPPORTED BY: The EEC and the SPPS
Rue de la Sciences No. 8
1040 Bruxelles - Belgique
PHONE NO.: 02/2304100

BRIEF DESCRIPTION: LPB4 is a static multi-zone program. The results that we are able to obtain from this program are natural temperatures with or without heating, power required to maintain a given temperature, the consumption for heating, the solar gain.

General

TOOL NAME: SOLPA
DEVELOPED BY: A. De Herde - E. Gratia
Unite d'architecture
Batiment Vinci
Place du Levant, 1
1348 Louvain la Neuve Belgique
DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: A. De Herde
Unite d'architecture, Batiment Vinci
Place du Levant, 1 - 1348 Louvain la Neuve
Belgique
PHONE NO.: 010/43.21.39
SUPPORTED BY: A. De Herde
Same as above
PHONE NO.:

BRIEF DESCRIPTION: This design tool calculates the performances of a window with a "porch roof". It calculates, hour by hour, the shaded surface and the balance sheet.

CANADA

General

TOOL NAME: CMHC-2
DEVELOPED BY: Canada Mortgage Housing Corporation
National Office, Montreal Road,
Ottawa, Ontario K1A 0P7
DATE DEVELOPED: Available October 1982
DATE OF LAST REVISION:

AVAILABLE THROUGH: Wayne Webster
Technical Research Division, CMHC
PHONE NO.: (613) 748-2308
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The Computer Model for Heating Cost-effectivity (CMHC-2) provides an economic evaluation of the competing alternative energy conservation options for new residential construction. The program identifies the most cost-effective alternative for a given capital expenditure. The thermal analysis component is primarily developed from the DBR Hotcan program with passive solar capabilities treated in accordance with DBR-NRC correlation curves.

General

TOOL NAME: Enerpass-1
DEVELOPED BY: Stephen Carpenter
Enermodal Engineering Limited
421 King Street, North
WATERLOO, Ontario. N2J 4E4
DATE DEVELOPED: April 1982
DATE OF LAST REVISION:

AVAILABLE THROUGH: Enermodal Engineering Limited
PHONE NO.: (519) 884-6421
SUPPORTED BY: Enermodal Engineering Limited
PHONE NO.: (519) 884-6421

BRIEF DESCRIPTION: The Enerpass-1 program estimates the monthly thermal performance of residential passive solar heating systems based on hour-by-hour simulation. The passive solar systems which can be simulated include direct gain, water wall, Trombe wall and sunspace. Each system can include the option of overhang, night time insulating shutter and thermal mass. The aim of the program is not to accurately model the heat loss from the building but to identify the change in energy consumption through adding solar components.

General

TOOL NAME: Hotcan
DEVELOPED BY: R.S. Dumont
H.W. Orr
M.E. Lux
Division of Building Research
DATE DEVELOPED: 1980
DATE OF LAST REVISION: May 1982

AVAILABLE THROUGH: Division of Building Research
National Research Council of Canada
SASKATOON, (Saskatchewan) S7N 0W9
PHONE NO.: (306) 665-4200
SUPPORTED BY: Same
PHONE NO.:

BRIEF DESCRIPTION: The Hotcan program which incorporates several user-friendly features calculates on a month-by-month basis, the annual space heating consumption for residences and small buildings. The calculation procedure includes the effect of solar gain on all window orientations, south window shading, air infiltration, and differing thermal masses and internal heat gains. The passive solar gain calculation is based on the Barakat solar utilization method.

General

TOOL NAME: Housing E
DEVELOPED BY: Okins, Leipciger, Cuplinskas,
Kaminker and Associates Limited
DATE DEVELOPED: 1979
DATE OF LAST REVISION: March 1982

AVAILABLE THROUGH: Okins, Leipciger, Cuplinskas,
Kaminker and Associates Limited
TORONTO, Ontario
PHONE NO.: (416) 445-8255
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The Housing E program calculates the auxiliary energy required on a monthly basis. It is based on month-by-month degree day calculation with monthly effectiveness of solar gains determined by a solar/load ratio algorithim. To compensate for internal and solar gains, the base temperature for degree-day calculations is 18°C which is lower than common thermostat settings.

General

TOOL NAME: HOUE (Hydro-Quebec Utilization of Energy)
DEVELOPED BY: Equipe Ressources techniques, Service Utilisation de l'energie-H.Q. Under Project "CALMERES" by Gerald Jutras, Roma Desjardins, Gilles Grou, Quoc-Anh Ton-That and Alain Rover
DATE DEVELOPED: May 1981
DATE OF LAST REVISION: March 1982

AVAILABLE THROUGH: Direction Commercialisation Hydro Quebec 75 Dorchester West, Montreal (Quoc-Anh-Ton-That or Roma Desjardins)
PHONE NO.: (514) 289-3393 or 289-3385
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The HOUE program calculates the annual space heating consumption for residences and small buildings based on an hour-by-hour calculation for a typical average day each month. The energy balance equation used by the program is a differential equation derived from the Fournier equation in one dimension that takes into account different heat transfer surfaces and the capacity of the heating system simultaneously.

General

TOOL NAME: PASWING
DEVELOPED BY: Okins, Leipciger, Cuplinskas, Kaminker and Associates Limited
For:
Ontario Ministry of Energy
DATE DEVELOPED: 1979
DATE OF LAST REVISION: December 1981

AVAILABLE THROUGH: Okins, Leipciger, Cuplinskas, Kaminker and Associates Limited
TORONTO, Ontario
PHONE NO.: (416) 445-8255
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The PaSwing method calculates the maximum temperature swing for direct gain systems under typical sunny winter conditions. The calculation takes into account the number and type of surfaces enclosing the solar receiving space and also the effects of furniture and adjacent spaces including basements.

General

TOOL NAME: REMAS
DEVELOPED BY: Energy Building Group Ltd.
53 Queen Street, Studio 21
OTTAWA, (Ontario)
CANADA
DATE DEVELOPED: January 1982
DATE OF LAST REVISION: June 1982

AVAILABLE THROUGH: Energy Building Group Ltd.
53 Queen Street, Studio 21
OTTAWA, (Ontario), CANADA
PHONE NO.: (613) 232-5393
SUPPORTED BY:
PHONE NO.: (613) 282-5393

BRIEF DESCRIPTION: The REMAS program calculates on a month-by-month basis, the annual space heating consumption based on data describing building characteristics use and actual weather data. Recorded fuel data can be entered to assist in the analysis. The REMAS program is associated with a data base which captures all entered data for any number of buildings.

General

TOOL NAME: Utilization Factor Method
DEVELOPED BY: S. Barakat and D. M. Sander
Division of Building Research
National Research Council of Canada
DATE DEVELOPED: May 1982
DATE OF LAST REVISION:

AVAILABLE THROUGH: Division of Building Research
National Research Council of Canada
Ottawa, Canada K1A 0R6
PHONE NO.: (613) 746-0623
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The Utilization Factor Method is a simple graphical method which can be used during the design process to find the combination of south window area and thermal storage mass that minimizes the purchased space heating energy requirement. It is applicable to the wide range of different types of house construction in Canada.

DENMARK

General

TOOL NAME: EFB1
DEVELOPED BY: Anker Nielsen
Thermal Insulation Laboratory
Technical University of Denmark
Building 118
DK-2800 Lyngby, Denmark
DATE DEVELOPED: February 1980
DATE OF LAST REVISION:

AVAILABLE THROUGH: Ove Mörck
Thermal Insulation Laboratory
Technical University of Denmark
Building 118, DK-2800 Lyngby, Denmark
PHONE NO.: (02) 88 35 11
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: EFB1 is developed on the basis of a detailed simulation program, BA4. In short, the principle used is to calculate the heating load of an infinitely heavy house and of a house without heat capacity. The actual energy consumption for a given house is found by interpolation between the two limits.

General

TOOL NAME: PAMA
DEVELOPED BY: Ove Mörck
Thermal Insulation Laboratory
Technical University of Denmark
Building 118
DK - 2800 Lyngby, Denmark
DATE DEVELOPED: January, 1982
DATE OF LAST REVISION: May, 1982

AVAILABLE THROUGH: Not Available
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This is a general network approach like PASOLE, where the differential equations for the thermal nodes are solved simultaneously at each (one hour) time step by matrix inversion. Two inverted matrixes are stored, one for the night situation (closed insulated shutters) and one for the day situation (open shutters).

General

TOOL NAME: METHOD 5000
DEVELOPED BY: Dialogic
70 Bd. de Magenta
75010 Paris
FRANCE

DATE DEVELOPED: July 1982
DATE OF LAST REVISION: October 1984

AVAILABLE THROUGH: Dialogic
70 Bd. de Magenta
75010 Paris
FRANCE
PHONE NO.:
SUPPORTED BY: Same as above

PHONE NO.:

BRIEF DESCRIPTION: METHOD 5000 is a manual method programmed for use on a microcomputer. The method is based on 5 utilizability curves for 5 different mass levels of the building considered.

ITALY

General

TOOL NAME: Energy Control Graphic Method
DEVELOPED BY: S. Los, L. Agnoletto, N. Torbol
Istituto Universitario Architettura
Tolentini 197-30125 Venezia

DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: By means of this tool the seasonal energetic demand can be met in a given climatic area for a building to be heating when the first planning takes place. (Please find herewith enclosed paper).

General

TOOL NAME: Graphic Solar Perspective
DEVELOPED BY: Sergio Los
C.N.R. P.F.E. - Instituto Universita
Rio Di Architecttura
Tolentini 197, 30125 Venezia
Italia

DATE DEVELOPED: 1980
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: C.N.R.
CONSIGLIO NAZIONALE delle RICERCHE

PHONE NO.:
SUPPORTED BY: Dr. Franco Vivona
Direzione CNR/PFE
via Nizza, 128
00198 Roma

PHONE NO.: 06-854383

BRIEF DESCRIPTION: The tool allows the graphic construction, through an axonometric drawing, of the building as seen by the sun. (Please find enclosed paper).

General

TOOL NAME: MORE
DEVELOPED BY: B. Boni, M. Dalponte, R. Pozzi
Fiat Engineering
via Belfiore 23-TORINO-

DATE DEVELOPED: 1976
DATE OF LAST REVISION: February 1982

AVAILABLE THROUGH: CNR

PHONE NO.:
SUPPORTED BY: Dr. Franco Vivona
Direzione CNR/PFE
via NIZZA 128
00198 ROMA ITALY

PHONE NO.: 06-854389

BRIEF DESCRIPTION: MORE is a sophisticated simulation tool to analyze transient loads using transfer functions.

General

TOOL NAME: SMECC
DEVELOPED BY: L. Agnoletto, P. Brunello,
R. Zecchin:
Instituto di Fisica Tecnica
Universita di Padova

DATE DEVELOPED: 1978
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: C.N.R.
Consiglio Nazionale delle Ricerche

PHONE NO.:
SUPPORTED BY: Dr. Franco Vivona
Direzione CNR/PFE
via Nizza, 128
00198 Roma

PHONE NO.: 06-854383

BRIEF DESCRIPTION: SMECC is a simplified correlation method which allows an accurate evaluation of building's energy needs.

General

TOOL NAME: TTL
DEVELOPED BY: L. Agnoletto, P. Brunello
R. Zecchin
Istituto di Fisica Tecnica
Universita di Padova

DATE DEVELOPED: 1979
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: CNR

PHONE NO.:
SUPPORTED BY: Dr. Franco Vivona
Direzione CNR/PFE
via Nizza 128
00198 Roma

PHONE NO.: (06) 854383

BRIEF DESCRIPTION: TTL is a simplified correlation method which allows an accurate hourly evaluation of inside temperature.

NETHERLANDS

General

TOOL NAME: Programma ALADIN
DEVELOPED BY: DHV Raadgevend Ingenieursbureau BV

DATE DEVELOPED: 1981
DATE OF LAST REVISION: 13.7.1982

AVAILABLE THROUGH: DHV

PHONE NO.: 033-682358
SUPPORTED BY: M. Dieleman DHV
A.v.d. Bremer DHV

PHONE NO.: 033-682358

BRIEF DESCRIPTION: Relatively simple stationary calculation of the yearly energy demand and heat balance of houses and other similar building (degree-hours method TH Eindhoven). Also a calculation of the maximum heat capacity per room (DIN 4701, 1979), the insulation quality of the building (NEN 1068, 1981), the specific heat losses of the different structure types, the yearly solar radiation gains.

General

TOOL NAME: Design Aids Energ. Bew. Ontw.
DEVELOPED BY: Nationale Woningraad/
Technische Hogeschool
Eindhoven

DATE DEVELOPED: oktober 1981
DATE OF LAST REVISION: oktober 1981

AVAILABLE THROUGH: Nationale Woningraad
Markenlaan 1, Postbus 50051
1305 AB ALMERE

PHONE NO.: 03240-91911
SUPPORTED BY:
Ministerie van Volkshuisvesting en
Ruimtelijke Ordening

PHONE NO.:

BRIEF DESCRIPTION: By means of a number of graphs and tables the energetic consequences of decisions taken during a design process can be evaluated. An important design tool is a simple calculation of the annual heating demand. The graphs and tables represent the resultrs of calculations with the dynamic computer programme kli.

General

TOOL NAME: Energiebalans
DEVELOPED BY: Adviesbureau voor Klimaat-
beheersing,
Ir. G.G.B. Halmos B.V.

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Adviesbureau voor Klimaatbeheersing
Halmos B.V., Wassenaarseweg 32
2596 CJ 's-GRAVENHAGE
PHONE NO.: 070-451121
SUPPORTED BY: Ir. G.G.B. Halmos

PHONE NO.:

BRIEF DESCRIPTION: The energy consumption is calculated for each hour of 60 reference days. The output is graphic and numeric.

General

TOOL NAME: PSDM-1
DEVELOPED BY: Bouwcentrum-Infraplan

DATE DEVELOPED: June 1982
DATE OF LAST REVISION: Under development

AVAILABLE THROUGH: Bouwcentrum-Infraplan
Weena 700, Postbus 299
3000 AG ROTTERDAM

PHONE NO.: 010 - 116181
SUPPORTED BY: Energiecentrum Nederland
Petten

PHONE NO.:

BRIEF DESCRIPTION: Steady state programme to calculate the energy consumption; the results of the programme will be found between a maximum and a minimum energy consumption. The method has been developed from a programme of the thermal insulation laboratory, Lyngby, Denmark.

NORWAY

General

TOOL NAME: EFB 3
DEVELOPED BY: Anker Nielsen
Thermal Insulation Laboratory
Technical University of Denmark
Building 118
DK-2800 Lyngby, Denmark
DATE DEVELOPED: February 1981
DATE OF LAST REVISION:

AVAILABLE THROUGH: Anker Nielsen
Norwegian Building Research Institute
N-7034 TRONDHEIM - NTH
Norway
PHONE NO.: (075) 39 930
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: EFB 3 is developed on the basis of the simplified method EFB 1. It is designed for calculations of buildings with rooms at different temperature levels and/or room without heating. For each room, the energy consumption is calculated. In rooms without heating, the mean temperature is calculated.

General

TOOL NAME: Manual Method of Calculating Energy Consumption of Buildings
DEVELOPED BY:
B. T. Larsen
Norwegian Building
Research Institute
Oslo, Norway
DATE DEVELOPED: 1982
DATE OF LAST REVISION: --

AVAILABLE THROUGH:
Norwegian Building
Research Institute
PHONE NO.: (02) 469880
SUPPORTED BY: Norwegian Building
Research Institute

PHONE NO.: (02) 469880

BRIEF DESCRIPTION:

General

TOOL NAME: SOLGOR
DEVELOPED BY: Sintef Div. 15/HVAC Group
N-7034 Trondheim
NORWAY
DATE DEVELOPED: 1983/1984
DATE OF LAST REVISION: May 1984

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: SOLGOR is developed for preliminary analysis of temperature, energy, load, and systems in buildings and glazed spaces. The average solar gains are described as a function of outdoor temperature. The simulations are done day-by-day (24 hour averages) over a year. Normalized annual duration curves are used.

General

TOOL NAME: TREC (Triangular Energy Calculation)
DEVELOPED BY: Jon Borge Johnsen
Sintef Division 62
Architecture and Building Technology
N-7034 Trondheim-NTH
Norway
DATE DEVELOPED: 1981
DATE OF LAST REVISION:

AVAILABLE THROUGH: SINTEF division 62
Architecture and Building Technology
Phone: 75-92620
PHONE NO.: 7-592620 (from 1982-11-19)
SUPPORTED BY: NTNF (Royal Norwegian Council for Scientific and Industrial Research)

PHONE NO.:

BRIEF DESCRIPTION:

SWEDEN

General

TOOL NAME: BKL
DEVELOPED BY: BYGGNADSKONSTRUKTIONSLARA LTH
Arkitektur - Husbyggnad, KTH
DATE DEVELOPED: 1982
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: Arkitektur - Husbyggnad
KTH
100 44 Stockholm, Sweden
PHONE NO.: 08-787 70 00
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: A manual method for calculating monthly and annual heat requirements in direct gain passive systems.

General

TOOL NAME: BRIS
DEVELOPED BY: Royal Institute of Technology
Fack
S-10044 Stockholm, Sweden
Gbstr Brown, Engelbrekt Isfalt,
Axel Bring
DATE DEVELOPED: 1960
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: BRIS DATA AB
Verkstedsgatan 21
S-11236 Stockholm, Sweden
PHONE NO.: 08-680955
SUPPORTED BY: Axel Bring BRIS DATA AB
Teddy Rosenthal DALAB
PHONE NO.: 08-680955 - 08-7305460

BRIEF DESCRIPTION: This program uses an implicit finite difference method to calculate the non-stationary heat conduction in the structure. The boundary conditions (convection, long and shortwave radiation) are treated in detail. Available installed capacities can be controlled in many ways, in sequences maintaining the required indoor temperature range with a minimum use of energy. The choice of objects being simulated is very flexible, from single rooms or groups of coupled rooms to whole buildings.

General

TOOL NAME: LTH DEROB 1.0
DEVELOPED BY: Byggnadskonstr.lara
Lunds Tekniska Hogskola
Box 725
22007 Lund, Sweden
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Staffan Salo
Byggnadskonstruktionslada
Lunds Tekniska Hogskola
Box 725, 22007 Lund, Sweden
PHONE NO.: 046/109603
SUPPORTED BY: LTH
PHONE NO.:

BRIEF DESCRIPTION: System of Fortran programs capable of dynamic simulation of hourly thermal performance of buildings composed of multiple coupled spaces of arbitrary geometries.

General

TOOL NAME: MEPA
DEVELOPED BY: B. Andersson
Royal Institute of Technology
Architecture - Dept. of Building Design
S-100 44 Stockholm
DATE DEVELOPED: 1982
DATE OF LAST REVISION: November 1982

AVAILABLE THROUGH: Royal Institute of Technology
Architecture - Dept. of Building Design
S-100 44 Stockholm, Sweden
PHONE NO.: (08) 787 7000
SUPPORTED BY: Swedish Council for Building Research
PHONE NO.: (08) 54 06 40

BRIEF DESCRIPTION: A program that calculates building heating and cooling loads (direct gain). Used in the early stage of the building phase, it makes it possible to evaluate different changes in the building towards each other. Among changeable factors are: Different building materials, windows, glazing, orientation, ventilation, internal heating loads, storage of heat, etc. It is quick, understandable, and cheap.

SWITZERLAND

General

TOOL NAME: AARPLAN
DEVELOPED BY: M. Leibundgut
Atelier fur Architektur und Planung
Wildhainweg 19
3012 Berne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION:

General

TOOL NAME: ARAS
DEVELOPED BY: Mme F. Stuby
Arch d.e.s.a.
Les Fontanettes
1268 Begnins
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The program calculates the building loads, and also calculates the performance of passive solar systems. Active solar energy systems cannot be considered. Available for programmable calculators and manual calculations. The calculation method used for passive solar calculation is the solar load ratio method.

General

TOOL NAME: BAUDYN
DEVELOPED BY: Sulzer/Ponomareff
DATE DEVELOPED: 1981
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY: PONOMAREFF
PHONE NO.: (052) 814148

BRIEF DESCRIPTION:

General

TOOL NAME: DYWAN
DEVELOPED BY: Büro 'ur'
Turnerstr 24
8006 Zurich
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: U. Roth, Dipl. Arch. ETH
Büro f. Raumplanung
Turnerstr. 24
8006 Zurich
PHONE NO.: 01/361-33-21
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION:

General

TOOL NAME: ELCO
DEVELOPED BY: Thomas Nordmann Elco
7324 Wildhaus
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This is a microcomputer program which can be used for determining building loads and the calculation of performance of passive solar energy systems.

General

TOOL NAME: GRES-EPFL
DEVELOPED BY:
Atelier d'Architecture Solaire Passive
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: Manual method for calculation of building loads and performance of indirect gain and direcr gain passive solar energy systems.

General

TOOL NAME: HBF-ETHZ
DEVELOPED BY: M. Nussbaum
HBF Institut für Hochbanforschung
ETHZ Hönggerberg
8093 Zurich
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: M. Nussbaum
HBF Institut für Hochbanforschung
ETHZ Honggerberg
8093 Zurich, Switzerland
PHONE NO.:
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: The program calculates the building loads and the performance of the passive solar systems. Available for programmable calculators and manual calculations. Active systems cannot be accommodated.

General

TOOL NAME: HELIOS I
DEVELOPED BY: EMPA Abt. ASA
(Th. Frank)
DATE DEVELOPED: 1980/1982
DATE OF LAST REVISION: June 1982

AVAILABLE THROUGH: EMPA abt. ASA
PHONE NO.: 01/823 55 11
SUPPORTED BY: NF

PHONE NO.:

BRIEF DESCRIPTION: Single zone model for simulating the thermal behavior of a building, taking into account the radiation processes (shortwave and longwave) at the buildng envelope.

General

TOOL NAME: IGLOU
DEVELOPED BY: Motor-Columbus Ing. AG
Parkshasse 27, 5400 Baden
and
Hohere Techn. Lehranstalt
Brugg-Windisch
DATE DEVELOPED: 1979
DATE OF LAST REVISION: 11.03.1982

AVAILABLE THROUGH:
Motor-Columbus, Ing. AG
Parkstrasse 27, 5400 Baden
PHONE NO.: 056 20 1121
SUPPORTED BY: Motor-Columbus, Ing. AG
Parkstrasse 27, 5400 Baden
J. Lanz, A. Schopfer

PHONE NO.: 056 20 11 21

BRIEF DESCRIPTION: Warmetechnische Analysen im Hochbau
J. Lanz, A. Schopfer
Schweizer Ingenieur und Architect, Heft 20/1981

General

TOOL NAME: LMC-EPFL
DEVELOPED BY:
M. Claude Roulet
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Mr. M. Claude Roulet
32 Ch. de Bellerive
1007 Lausanne
Switzerland
PHONE NO.:
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: The program calculates the yearly heating energy requirements of buildings. The program is useful for houses only. The passive solar contribution is only approximately calculated. The calculation method used is given in "Amelioration Thermique Des Batiments," Manuel Etudes & Projects EDMZ No. 724-500.

General

TOOL NAME: LTA-EPFL
DEVELOPED BY: Prof. P. Suter
LTA EPEL Ecublens
1015 Lusanne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Prof. P. Suter
LTA-EPFL Ecublens
1015 Lausanne
Switzerland
PHONE NO.:
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: The program calculates the building loads, active solar energy systems, and is available for handheld calculators, microcomputers and tables. Passive solar energy systems are considered in a limited manner. The passive solar contribution is calculated by solar load ratio method.

General

TOOL NAME: LTA-EPFL
DEVELOPED BY: R. Kriesi
LTA-EPFL Ecublens
1015 Lausanne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This design tool calculates the building loads and space temperatures for indirect gain passive solar systems. Active solar energy calculations and other passive solar features are being added. It is a manual/graphic tool.

General

TOOL NAME: MODPAS
DEVELOPED BY: J. C. Hadorn - D. Chvard
Sorane S.A.
Route du Chatelard 52
1018 Lausanne
Tél. 021/37 11 75
DATE DEVELOPED: May 1982
DATE OF LAST REVISION: June 1982

AVAILABLE THROUGH: Not available as present
PHONE NO.: (021) 37 11 75
SUPPORTED BY: Sorane S.A.
PHONE NO.:

BRIEF DESCRIPTION: MODPAS Nodel for Passive Systems solves a nodal network describing the thermal interactions between nodes representing parts of the system, by means of equivalent conductances and capacities.

General

TOOL NAME: PASSIM
DEVELOPED BY: Nicolas MOREL
Laboratory for Solar Energy
and Building Physics (LSB)
DATE DEVELOPED: 1981
DATE OF LAST REVISION: Dec. 1981

AVAILABLE THROUGH: Nicolas MOREL
LSB - EPFL
LESO - Building
1015 LAUSANNE
PHONE NO.: 021/47'45'47
SUPPORTED BY: IEA Solar Task I and EPFL
PHONE NO.:

BRIEF DESCRIPTION: Nodal decomposition of system (max. 30 to 50 nodes); the nodes may be connected by therma conductance, natural convection on radiation coupling.

General

TOOL NAME: SOLAR TRAP
DEVELOPED BY: Dr. C. Filleux/P. Jemelka
Basler & Hofmann
Consulting Engineers
Forchstrase 395
8029 Zurich
DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: Basler & Hofmann
Consulting Engineers
PHONE NO.: 01/55 11 22
SUPPORTED BY: Nationales Energie-Forschuigs Fords
PHONE NO.:

BRIEF DESCRIPTION: Dynamic simulation of energy flows in an active/passive system. Nodal decomposition of system. Finite difference solution method. Brace box for active part of system.

General

TOOL NAME: SORANE
DEVELOPED BY: D. Chuard
S. A. Sorance
Rte du Chatelard 52
1008 Lausanne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Same
PHONE NO.:
SUPPORTED BY: Same
PHONE NO.:

BRIEF DESCRIPTION: This is a microcomputer program for the calculation of active and passive solar energy systems.

General

TOOL NAME: SORANE
DEVELOPED BY: Chuard Hadorn
Sorane S.A.
Rte du Chatelard 52
1008 Lausanne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This program available in various computers, programmable calculators, and manual versions. Determines the building load, performance of active and passive solar energy systems.

General

TOOL NAME: STEMOD
DEVELOPED BY: Büro 'ur'
Turnerstr. 24
8006 Zurich
DATE DEVELOPED: 1981
DATE OF LAST REVISION:

AVAILABLE THROUGH: U. Roth, Dipl. Arch. ETH
Büro f. Raumplanung
Turnerstr. 24
8006 Zurich
PHONE NO.: 01/361.33.21
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION:

General

TOOL NAME: TREC-EPFL
DEVELOPED BY: C. R. Perrin
Department of Architecture
14, AV de l'Englise-Anglaise
1006 Lausanne
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: C. R. Perrin
Department of Architecture
14 AV de l'Englise-Anglaise
1006 Lausanne, Switzerland
PHONE NO.:
SUPPORTED BY: As above
PHONE NO.:

BRIEF DESCRIPTION: The program uses solar load ratio method for estimating the performance of passive solar systems. Also can be used for the active solar energy system. Available for programmable calculators and manual calculations.

General

TOOL NAME:
DEVELOPED BY: Ueli Schafer
Dipl. Architect ETH/SIA
Zollikonstrasse 20
8122 BINZ
Switzerland
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.: 01-980-2577
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This unpublished design tool works with diagrams in the stereographic projection together with the Horizontoskop by F. Tonne. The existing diagrams as described in Konigsburgers et al "Manual of Tropical Housing and Buildings" have been enlarged to a set of diagrams including the circles of transmission factors for double-glazed windows, etc.

UNITED KINGDOM

General

TOOL NAME: BREADMIT
DEVELOPED BY: Building Research Station

AVAILABLE THROUGH: D. Bloomfield
B.R.S.
Garston
Walford, Herts WD2 7JR, UNITED KINGDOM
PHONE NO.: 09273-76040
SUPPORTED BY:
Same as above
PHONE NO.:

DATE DEVELOPED: September 1983 (current version)
DATE OF LAST REVISION: September 1983 (current version)

BRIEF DESCRIPTION: An interactive microcomputer heating/cooling load and temperature prediction tool based on steady cyclic (admittance) theory. Calculations are performed for a typical day.

General

TOOL NAME: BREDEM 1
DEVELOPED BY: C. Uglow/B. Anderson
Building Research Establishment
(BRE)

AVAILABLE THROUGH: G. Henderson
Building Research Establishment
Garston
Watford, Herts WD275R ENGLAND
PHONE NO.: 0923-674040
SUPPORTED BY:
Same as above
PHONE NO.:

DATE DEVELOPED: 1981/1983
DATE OF LAST REVISION: 1981/1983

BRIEF DESCRIPTION: A steady state equation is used to estimate domestic building energy requirements. Appropriate values for terms in this equation are selected from tables. These are based on a comprehensive survey of existing knowledge of actual observed quantities and allow for e.g. mass of building, intermittent heating. Values for useful solar are based on results obtained with more complex calculation methods.

General

TOOL NAME: ENVIRONMENTAL SYSTEMS PERFORMANCE (ESP)
DEVELOPED BY: Joe Clarke
Abacus
University of Strathclyde
Dept. of Architecture, 131 Rotten Row
Glawgow G4 ONG

AVAILABLE THROUGH: Joe Clarke
PHONE NO.: 041-552-4400, Ext. 3021
SUPPORTED BY: Abacus
PHONE NO.:

DATE DEVELOPED: 1977
DATE OF LAST REVISION: September 1983

BRIEF DESCRIPTION: ESP is a large finite-difference based program running on a main frame or mini computer providing a detailed simulation of hourly heat flows in a multi-zone construction.

General

TOOL NAME: SEU 2
DEVELOPED BY: P B Howells
Solar Energy Unit
University College
Cardiff CF2 1TA
United Kingdom

AVAILABLE THROUGH: Solar Energy Unit
PHONE NO.: 041-222-44211, Ext. 7075
SUPPORTED BY:
Same as above
PHONE NO.:

DATE DEVELOPED: 1980
DATE OF LAST REVISION: 1983

BRIEF DESCRIPTION: SEU 2 is a modular system simulation code employing a variable time-step. The solution procedure is very fast and accurate, so that control functions can be correctly represented and the computing time requirement is so short that multiple runs and optimization studies can be performed quickly and cheaply.

General

TOOL NAME: SEU DESIGN METHOD
DEVELOPED BY: J. P. Kenna, R. H. Marshall
Solar Energy Unit
University College
Cardiff CF2 1TA
UNITED KINGDOM

AVAILABLE THROUGH: Solar Energy Unit
PHONE NO.: 041-222-44211, Ext. 7075
SUPPORTED BY:
Same as above
PHONE NO.:

DATE DEVELOPED: 1980
DATE OF LAST REVISION: 1983

BRIEF DESCRIPTION: Design Method is a correlation of solar fraction on system dimensionless groups for active SH, DHW and combined systems. Correlations derived from SEU 2 System Simulation Code. Load size and pattern is input.

UNITED STATES

General

TOOL NAME: ACLOAD
DEVELOPED BY: Inatome & Associates
10140 West Nine Mile
Oak Park, MI 48237

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Computer Mart, Inc.
1824 West Maple
Troy, MI 48084

PHONE NO.: 313-288-0040
SUPPORTED BY: Joseph Inatome
Inatome and Associates
10140 West Nine Mile
Oak Park, MI 48237
PHONE NO.: 313-542-4862

BRIEF DESCRIPTION: This is a load analysis program, room by room, zone by zone calculation with peak load, diversity, and does 6 months at a time. Ideal for VAV systems, typical day weather profile required, uses ASHRAE 1972 algorithm. ELSOL program used as input for ACLOAD.

General

TOOL NAME: AC PROG1/ENERGY
DEVELOPED BY:

DATE DEVELOPED:
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: Robert Z. Gibson
Gibson and Associates
3118 Fulton Avenue, Suite 1
Sacramento, California 95821
PHONE NO.: (916) 484-6716
SUPPORTED BY: Gibson and Associates
3118 Fulton Avenue, Suite 1
Sacramento, California 95821
PHONE NO.: (916) 484-4616

BRIEF DESCRIPTION: It is a chained HVAC calculation and Energy Analysis program based on the ASHRAE TETD method. The program also provides HVAC design information and simulates the building system operation on an annual basis.

General

TOOL NAME: ACG-80 AARDVARK Active System
DEVELOPED BY: Size Calculation

Aardvark & Sun Solar, Inc.
167 Webbers Path
West Yarmouth, MA 02673
DATE DEVELOPED:
DATE OF LAST REVISION: January 1980

AVAILABLE THROUGH:
Aardvark & Sun Solar, Inc.
167 Webbers Path
West Yarmouth, MA 02673
PHONE NO.: 617-394-6391
SUPPORTED BY: John Murphy

PHONE NO.: 617-394-6391

BRIEF DESCRIPTION: This TI-59 program will give monthly and yearly system performance for all active systems. You can change collector size, storage size, efficiency, tilt, deviation from south or initial memory inlet temp. to see how the performance is affected.

General

TOOL NAME: ADM-2
DEVELOPED BY: ADM Associates
601 University Avenue
Sacramento, CA 95825

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Taghi Alereza
ADM Associates
601 University Avenue
Sacramento, CA 95825
PHONE NO.: 916-929-5595
SUPPORTED BY: ADM Associates
601 University Avenue
Sacramento, CA 95825
PHONE NO.: 916-929-5595

BRIEF DESCRIPTION: This is an hour by hour calculation model which can simulate all sorts of complex HVAC equipment (such as VAV systems with reheat, double bundle condensers, various types of chillers, absorption machine, various distribution systems, etc.) The program uses transient heat flow method to perform energy calculations for each hour for the year.

General

TOOL NAME: ADM-3
DEVELOPED BY: ADM Associates
601 University Avenue
Sacramento, CA 95825

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Taghi Alerega
ADM Associates
601 University Avenue
Sacramento, CA 95825
PHONE NO.: 916-929-5595
SUPPORTED BY: ADM Associates
601 University Avenue
Sacramento, CA 95825
PHONE NO.: 916-929-5595

BRIEF DESCRIPTION: This program uses variable base heating and cooling degree hours to calculate energy requirements of small buildings. The program handles natural ventilation, ventilative cooling, daylighting, evaporative cooling, etc. Solar DHW systems are also simulated using F-chart method.

General

TOOL NAME: A-H-L - 80 AARDVARK
DEVELOPED BY: Aardvark & Sun Solar, Inc.
167 Webbers Path
West Yarmouth, MA 02673
DATE DEVELOPED:
DATE OF LAST REVISION: January 1980

AVAILABLE THROUGH: Aardvark & Sun Solar, Inc.
167 Webbers Path
West Yarmouth, MA 02673
PHONE NO.: 617-394-6391
SUPPORTED BY: John Murphy
Same
PHONE NO.: 617-394-6391

BRIEF DESCRIPTION: This is a TI-59 program for calculation of the monthly heat loss and yearly heat loss (with or without hot water load). The local monthly degree day and design temp are permanently stored on data cards. The printout also lists the percentage loss for each building component.

General

TOOL NAME: ARTIFICIAL LIGHTING LOADS
DEVELOPED BY: ANALYSIS PROGRAM
DATE DEVELOPED:
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: Moreland, Unruh Smith PC
44 Club Road, Suite 200
P. O. Box 1650, Eugene, Oregone 97440
PHONE NO.: (503) 686-2014
SUPPORTED BY: Moreland, Unruh Smith PC
44 Club Road, Suite 200
P. O. Box 1650
Eugene, Oregon 97440
PHONE NO.: (503) 686-2014

BRIEF DESCRIPTION: The program computes hourly, monthly, and annual artificial lighting needs for commercial buildings utilizing natural daylighting. The primary application is to office areas located in the northern hemisphere occupied 8:00 a.m. to 5:00 p.m.

General

TOOL NAME: ASHRAE BIN
DEVELOPED BY: American Society of Heating Refrigeration and Air Conditioning Engineering
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: This method uses the " bins" of temperature for the hours that the ambient temperature is in a particular range. The bin data for different areas is available primarily from U.S. Air Force weather data. The bin method is useful in determining the heating and cooling requirements of buildings.

General

TOOL NAME: ASHRAE DEGREE DAYS
DEVELOPED BY: American Society for Heating, Refrigeration and Air Conditioning Engineering
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The method allows the calculations of the heating requirements of buildings which are climate dominated. The overall loss coefficient of the building is used to determine the monthly heating requirements. The degree days with 65°F base are given for various locations in the country.

General

TOOL NAME: AXCESS Version 7
DEVELOPED BY: Seeyle, Stevenson, Value and Krecht, under contract to the Edison Electric Institute
DATE DEVELOPED: 1969
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: Vanocar Pace Engineering Services, Inc.
135 Old York Road
Jenkintown, PA 19046
PHONE NO.: 215-885-5900
SUPPORTED BY: As above
Bill Hemphill or
Eddie Douglas
PHONE NO.:

BRIEF DESCRIPTION: The program provides the comparative energy uses of alternative methods of meeting energy requirements of buildings and processes. The program has a large number of default values.

General

TOOL NAME: BAS, LOAD
DEVELOPED BY: Mr. Louis Abernethy

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Louis Abernethy
A. O. Software, Inc.
2001 Beverley Drive
Charlotte, NC 28207
PHONE NO.: (704) 332-4093
SUPPORTED BY: Louis Abernethy
A. O. Software, Inc.
2001 Beverley Drive
Charlotte, NC 28207
PHONE NO.: (704) 332-4093

BRIEF DESCRIPTION: The program is used to calculate the peak loads and also gives the daily load profile. It uses ASHRAE steady state method.

General

TOOL NAME: BILL
DEVELOPED BY: Londe, Parker, Michels
St. Louis, MO

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Londe, Parker, Michels
150 North Meramec, Suite 205
St. Louis, MO 63105
PHONE NO.: 314-725-5501
SUPPORTED BY: As above
Attn: Steve Andes
PHONE NO.: 314-725-5501

BRIEF DESCRIPTION: The program performs a regression analysis from the energy bills and correlates it to the weather, thus being able to predict the building performance in any weather. The tool is suitable as post-design services.

General

TOOL NAME: BLAST
DEVELOPED BY: U.S. Army Construction Engineering Research Lab.
P.O. Box 4005
Champaign, IL 61820

DATE DEVELOPED: Release 3 1978
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: U.S. Army CERL or NTIS or National Energy Software Center
PHONE NO.: NTIS, National Energy Software Center 312-972-7250
SUPPORTED BY: Dale Herron
PHONE NO.: 217-352-6511

BRIEF DESCRIPTION: The program is written to permit analysis and design of energy conservation in new and existing buildings including application of liquid type active and passive energy systems. Many of the methods used are based on ASHRAE and NBSLD algorithms, and some new ones which were developed.

General

TOOL NAME: BLDSIM
DEVELOPED BY: Dr. Gideon Shavit
Honeywell, Inc.

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Honeywell, Inc.
Commercial Division
1500 West Dundee Road
Arlington Heights, IL 60004
PHONE NO.: 312-394-4000
SUPPORTED BY: Same as above
Attn: Dr. Gideon Shavit
PHONE NO.: 312-394-4000

BRIEF DESCRIPTION: The program analyses system performance and energy conservation impact of alternative building, system, and control designs. The output consists of load on interior and exterior zones and fan systems, energy requirements to maintain operating conditions, zone temperatures, daily totals, KW demand and Kwh profiles.

General

TOOL NAME: BRIDGERS AND PARTON ENERGY ANALYSIS PROGRAM
DEVELOPED BY: Frank H. Bridgers
Albuquerque, NM 87108

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Not available for public use yet. Will run for them.
PHONE NO.:
SUPPORTED BY: Bridgers and Paxton Consulting Engineers, Inc., 213 Truman Street, N.E., Albuquerque, NM 87108
PHONE NO.: 505-265-8577

BRIEF DESCRIPTION: The program calculates the yearly energy consumption for heating and cooling of buildings. Program considers various types mechanical equipment and systems, active solar collectors, etc. Output is the yearly energy consumption for various types of HVAC equipment.

General

TOOL NAME: BUEHRER METHOD
DEVELOPED BY: Charles Eley Associates
519 Mission Street
San Francisco, CA 94105
DATE DEVELOPED:
DATE OF LAST REVISION: March 1983

AVAILABLE THROUGH: Charles Eley
Charles Eley Associates
519 Mission Street
San Francisco, CA 94105
PHONE NO.: 415-957-1977
SUPPORTED BY: Charles Eley Associates
519 Mission Street
San Francisco, CA 94105
PHONE NO.: 415-957-1977

BRIEF DESCRIPTION: This program uses Buehrer method for calculating the heating and cooling energy requirements for commercial buildings. This method uses variable base degree hours and calculates the effective temperature difference for walls and roofs based on material properties. The program can be used with electronic spread sheet programs on any microcomputer.

General

TOOL NAME: California Energy Commission
DEVELOPED BY: Passive Solar Handbook
Philip B. Niles & Kenneth L. Haggard
California Polytechnic State Univ.
San Luis Obispo, CA 916-920-6216
DATE DEVELOPED: January 20, 1980
DATE OF LAST REVISION:

AVAILABLE THROUGH: California Energy Commission (CEC)
1111 Howe Avenue
Sacramento, CA 95825
PHONE NO.: 916-920-6216
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: Handbook designed for building professionals who are interested in planning for designing and constructing passive solar buildings. Provides definitions and basic principles along with conceptual, analytical and technical information required in the design of passive solar buildings. Designed for California estimates only. Uses performance and sensitivity curves developed through computer simulations.

General

TOOL NAME: CADLIGHT
DEVELOPED BY: Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Doug Mackenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.: (617) 926-8600
SUPPORTED BY: Doug Mackenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.: (617) 926-8600

BRIEF DESCRIPTION: This is a set of two programs, one for daylighting and the other for artificial lighting calculations. These programs are used during the building design process to model the lighting performance of buildings. The profiles for artificial lighting energy consumption are obtained from the program.

General

TOOL NAME: CALPAS 1
DEVELOPED BY: Philip Niles
Professor of Environmental Engineering
California Polytechnic University in San Luis Obispo, CA
DATE DEVELOPED: 1979
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: California Energy Commission (CEC)
1111 Howe Avenue
Sacramento, CA 95825
PHONE NO.: 916-920-6216
SUPPORTED BY: As above
PHONE NO.: 916-924-2269

BRIEF DESCRIPTION: The program can perform a thermal analysis of a simple building. It was designed to assess the potential of passive solar heating and night ventilation cooling. It uses hourly weather data to simulate performance of a building for the whole year.

General

TOOL NAME: CALPAS 3
DEVELOPED BY: Berkeley Solar Group
3140 Martin Luther King, Jr. Way
Berkeley, CA 94703
DATE DEVELOPED: 1980
DATE OF LAST REVISION: Spring 1984

AVAILABLE THROUGH:
Same
PHONE NO.: 415-843-7600
SUPPORTED BY: Same
PHONE NO.:

BRIEF DESCRIPTION: Hourly simulation program for analysis of residential and small commercial buildings.

General

TOOL NAME: Carrier E20-2
DEVELOPED BY: Carrier Corporation
Syracuse, NY

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Andy Schwartz
Twenty Twenty Software
700 Wheaton Plaza North
Wheaton, MD 20902
PHONE NO.: (301) 565-2020
SUPPORTED BY: CP/M version of the program supported by above.

PHONE NO.: (301) 565-2020

BRIEF DESCRIPTION: The program uses bin method to calculate the building energy requirements, by zones and at various times of the day. This program is a CP/M version of the original Carrier program.

General

TOOL NAME: Carrier Manual of Air Conditioning
DEVELOPED BY: Systems Design
Carrier Corporation
Carrier Parkway
Syracuse, NY 13221

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
As above
PHONE NO.:
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: A set of books in the form of a manual for the air conditioning systems design.

General

TOOL NAME: CDA Sun-Chart
DEVELOPED BY: Solar Energy Systems
Copper Brass Bronze Design Handbook
Copper Develop. Association, Inc.
405 Lexington Avenue
New York, NY 10174

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Same
PHONE NO.:
SUPPORTED BY:
Same
PHONE NO.: 212-953-7300

BRIEF DESCRIPTION: Calculation procedure using charts, tables, nomographs to calculate solar fraction for active space and domestic hot water systems.

General

TOOL NAME: CEAC
DEVELOPED BY: Energy Management Service
Portland, Oregon

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Energy Management Service
434 S.W. Iowa
Portland, Oregon 97201
PHONE NO.: 800-547-4232
SUPPORTED BY:
Same as above
PHONE NO.: 503-244-3613

BRIEF DESCRIPTION: This is an hourly system simulation energy analysis program that uses profiled weather data and executes on a microcomputer. The program can handle 12 HVAC zones and a large number of HVAC equipment types.

General

TOOL NAME: CIRA
DEVELOPED BY:
Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Robert Sanderegges
Lawrence Berkeley Laboratory
Building 90-3074
University of CA, Berkeley, CA 94720
PHONE NO.: 415-486-4029
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: The program calculates the daily and nightly heating and cooling requirements of buildings. The effect of sun on building surfaces is considered. The program also gives the monthly and yearly energy requirement and the dolar expenditures.

General

TOOL NAME: CL4
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143

PHONE NO.: 305-666-1300
SUPPORTED BY: As above
Attn: R. C. McClintock

PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: This is a cooling and heating load program which uses ASHRAE 1977 methods, which takes into account building thermal inertia. The program calculates air handling equipment specifications and does ASHRAE 90-75 Energy Analysis. A maximum of 99 prompted input values can be used.

General

TOOL NAME: CL4M
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143

PHONE NO.: 305-666-1300
SUPPORTED BY: As above
Attn: R. C. McClintock

PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: This is a cooling and heating load program which uses ASHRAE 1977 methods, which takes into the account building thermal inertia. The program calculates air handling equipment specifications, and does ASHRAE 90-75 Energy Analysis; max. of 255 zones can be handled.

General

TOOL NAME: COMM BLDG ENERGY ANAL PGM
DEVELOPED BY: Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806

DATE DEVELOPED:
DATE OF LAST REVISION: July 1983

AVAILABLE THROUGH: Bill Smith
Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806
PHONE NO.: (409) 775-1782
SUPPORTED BY: Bill Smith
Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806
PHONE NO.: (409) 775-1782

BRIEF DESCRIPTION: The program calculates the heating and cooling loads and performs a systems simulation to give the energy required for heating and cooling. The energy use profile is also given. The program has a built-in economic analysis program.

General

TOOL NAME: COMM. HVAC LOAD PGM.
DEVELOPED BY: Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806

DATE DEVELOPED:
DATE OF LAST REVISION: May 1983

AVAILABLE THROUGH: Bill Smith
Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806
PHONE NO.: (409) 775-1782
SUPPORTED BY: Bill Smith
Elite Software Development Inc.
P. O. Drawer 1194
Bryan, TX 77806
PHONE NO.: (409) 775-1782

BRIEF DESCRIPTION: The program calculates heating and cooling loads for commercial buildings for 1000 zones (or more). The basic method used to calculate the peak loads is 1981 ASHRAE Handbook of Fundamentals method.

General

TOOL NAME: COMM. LOAD CALC. PGM
DEVELOPED BY: Jim Ford
Paoluccio Willis Nau Assoc.
7175 Construction Court
San Diego, CA 92121

DATE DEVELOPED:
DATE OF LAST REVISION: June 1983

AVAILABLE THROUGH: Jim Ford
Paoluccio Willis Nau Assoc.
7175 Construction Court
San Diego, CA 92121
PHONE NO.: (619) 578-5910
SUPPORTED BY: Jim Ford
Paoluccio Willis Nau Assoc.
7175 Construction Court
San Diego, CA 92121
PHONE NO.: (619) 578-5910

BRIEF DESCRIPTION: The program uses ASHRAE GRP-158 procedure for the calculation of heating and cooling loads for commercial buildings. Any number of building zones can be used. The loads are calculated for equipment sizing only. The program does not calculate the energy requirements for heating and cooling.

General

TOOL NAME: DAYLITE
DEVELOPED BY: Solarsoft Inc.
Box 124
Snowmass, CO 81654

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Solarsoft Inc.
Box 124
Snowmass, CO 81654

PHONE NO.: (303) 927-4411
SUPPORTED BY: Solarsoft Inc.
Box 124
Snowmass, CO 81654

PHONE NO.: (303) 927-4411

BRIEF DESCRIPTION: It is a daylighting design and analysis tool developed to provide the building design professionals with fast, flexible and effective means of designing energy efficient lighting systems. The program is based on the most recent research done at SERI and Lawrence Berkeley Laboratory.

General

TOOL NAME: DEROB
DEVELOPED BY: F. Arumi
University of Texas
Austin, TX

DATE DEVELOPED: 1972
DATE OF LAST REVISION: 1979

AVAILABLE THROUGH: F. Arumi
Solenco, Inc.
P.O. Box 7907
Austin, TX 78712

PHONE NO.:
SUPPORTED BY: F. Arumi
Solenco, Inc.
P.O. Box 7907
Austin, TX 78712

PHONE NO.:

BRIEF DESCRIPTION: The program is its current version is capable of simulation of a variety of passive solar system designs. Calculates building geometric factors relating to radiation interchanges, material properties, and calculation of hourly loads and interior distribution. Allows modelling of multi-zone configuration.

General

TOOL NAME: Direct Gain Admittance Model
DEVELOPED BY:
California State Polytech. University
San Luis Obispo, CA 93407

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Department of Mechanical Engineering
California State Polytechnic Institute
San Luis Obispo, CA

PHONE NO.: 805-546-2643
SUPPORTED BY: As above
Philips W. B. Niles

PHONE NO.: 805-546-2643

BRIEF DESCRIPTION: This tool consists of a direct gain admittance model which is a closed form solution for direct gain passive solar systems. It is a graphical method although can be programmed as well. Calculates the performance of passive solar systems (direct gain).

General

TOOL NAME: DOE-2
DEVELOPED BY: Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720

DATE DEVELOPED: 1979
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: NTIS
5285 Port Royal Road
Springfield, VA 22161 or National Energy Software Center, Argonne, IL 60439

PHONE NO.:
SUPPORTED BY: (Limited support)
Mr. Richard Curtis,
LBL, Berkeley, CA 94720

PHONE NO.: 415-486-5711

BRIEF DESCRIPTION: The program uses a component base approach whereby the user defines which components are present and the manner in which they are connected. Suitable for simulation of building components as well as systems, HVAC equipment and economic analyses.

General

TOOL NAME:: E20-II Programs
DEVELOPED BY: Carrier Corporation
P.O. Box 4808
Syracuse, NY 13221

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
As above

PHONE NO.:
SUPPORTED BY: 315-451-2660

As above
PHONE NO.: 316-451-2660

BRIEF DESCRIPTION: A set of microcomputer programs; the set consists of operating cost analysis, commercial load estimating, life cycle cost, residential load estimating, duct design, equipment selection, specification writings, piping data and automated procedures for engineering consultants) APEC program.

General

TOOL NAME: ECAL
DEVELOPED BY: Mr. Louis Abernethy

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Louis Abernethy
A. O. Software, Inc.
2001 Beverley Drive
Charlotte, NC 28207
PHONE NO.: (704) 332-4093
SUPPORTED BY: Louis Abernethy
A. O. Software, Inc.
2001 Beverley Drive
Charlotte, NC 28207
PHONE NO.: (704) 332-4093

BRIEF DESCRIPTION: Uses ASHRAE bin method of analysis similar to TC4.7. Peak heating and cooling loads are input for six occupancy periods. The program gives the energy requirements for heating and cooling, along with energy use profile by the equipment for heating and cooling.

General

TOOL NAME: ECAP
DEVELOPED BY: Tennessee Valley Authority
400 West Summit Hills Drive, W4C126
Knoxville, TN 37902

DATE DEVELOPED:
DATE OF LAST REVISION: November 1983

AVAILABLE THROUGH: George Arnold
Tennessee Valley Authority
400 West Summit Hills Drive, W4C126
Knoxville, TN 37902
PHONE NO.: 615-632-3698
SUPPORTED BY: Tennessee Valley Authority
400 West Summit Hills Drive, W4C126
Knoxville, TN 37902
PHONE NO.: 615-632-3698

BRIEF DESCRIPTION: This is a 12-zone commercial buildings energy calculation program which includes economic analysis. The program uses condensed weather data and performs extensive HVAC systems simulation. The information on energy requirement and the electric demand is also provided.

General

TOOL NAME: ECP
DEVELOPED BY: California Institute of Technology/
Jet Propulsion Laboratory

DATE DEVELOPED: 1978
DATE OF LAST REVISION:

AVAILABLE THROUGH: COSMIC
Suite 112, Barrowe Hall
University of Georgia
Athens, GA 30602
PHONE NO.: 404-542-3265
SUPPORTED BY: COSMIC
112 Barrowe Hall, University of
Georgia, Athens, GA 30602
Attn: Ms. Jamie Ferguson
PHONE NO.: 404-542-3265

BRIEF DESCRIPTION: The program is used for accurate simulation of a building's thermal performance while maintaining low computational cost and requiring a minimum of input data. Inputs required are weather, control information, information on building construction, and basic system configuration.

General

TOOL NAME: EEDO
DEVELOPED BY: Burt Hill Kosar Rittelmann
Associates
400 Morgan Center
Butler, Pennsylvania 16001
U.S.A.
DATE DEVELOPED: April 1984
DATE OF LAST REVISION: April 1984

AVAILABLE THROUGH: Burt Hill Kosar Rittelmann
Associates
400 Morgan Center
Butler, Pennsylvania 16001, U.S.A.
PHONE NO.: 412/285-4761
SUPPORTED BY:
Same as above
PHONE NO.:

BRIEF DESCRIPTION: EEDO is the IBM microcomputer version of CIRA program which was developed by Lawrence Berkeley Laboratory. EEDO calculates daily and nightly heating and cooling requirements of buildings. The effect of sun on building surfaces is considered. EEDO is extremely user friendly. The economic optimization produces output of energy retrofits which could be implemented in a given budget. EEDO is easy to translate into any modern language without changing source code.

General

TOOL NAME: ELSOL
DEVELOPED BY: Inatome & Associates
10140 West Nine Mile Road
Oak Park, MI 48237

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Computer Mart, Inc.
1824 West Maple
Troy, MI 48084
PHONE NO.: 313-288-0040
SUPPORTED BY: Joseph Inatome
10140 West Nine Mile Road
Oak Park, MI 48237
PHONE NO.: 313-542-4862

BRIEF DESCRIPTION: The program outputs the diffuse and direct radiation components. The incident angle, the vertical and horizontal radiation components and the total amount of solar radiation inputted to a collector on a clear day. The input data is then used with a modified F-Chart program.

General

TOOL NAME: EMPS 2
DEVELOPED BY: Arthur D. Little, Inc.
20 Acorn Park
Cambridge, MA 02140

DATE DEVELOPED: 1982
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: Software Distribution Center
Electric Power Research Institute (EPRI)
3412 Hillview Ave., Palo Alto, CA 94304
PHONE NO.: 415-855-2168
SUPPORTED BY: Dick Meriam
Arthur D. Little, Inc.
20 Acorn Park
Cambridge, MA 02140
PHONE NO.: 617-864-5770

BRIEF DESCRIPTION: The program is a detailed thermal network type program which was developed under sponsorship by EPRI (Electric Power Research Institute). Suitable for residences with up to 10 zones. Detailed systems calculations as well as economics is included.

General

TOOL NAME: EN2M
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143
PHONE NO.: 305-666-1300
SUPPORTED BY: As above
R. C. McClintock
PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: The program uses the variable base, degree day method for computing monthly and/or annual HVAC systems energy consumption. The building is treated as a single zone. The building loads are calculated using NBS/DOE procedure for Residential Energy Analysis.

General

TOOL NAME: EN4M
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143
PHONE NO.: 305-666-1300
SUPPORTED BY: As above
R. C. McClintock
PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: This program uses an improved ASHRAE TC 4-7 simplified energy calculation procedure to estimate monthly and/or annual building energy consumption. The program is primarily intended for use in existing buildings energy audit and retrofit applications.

General

TOOL NAME: ENCON2
DEVELOPED BY: Prof. Larry O. Dengelman
Department of Architecture
Texas A & M University
College Station, TX 77843

DATE DEVELOPED:
DATE OF LAST REVISION: September 1983

AVAILABLE THROUGH: Prof. Larry O. Dengelman
Department of Architecture
Texas A & M University
College Station, TX 77843
PHONE NO.: 409-845-1015
SUPPORTED BY: Department of Architecture
Texas A & M University
College Station, TX 77843
PHONE NO.: 409-845-1015

BRIEF DESCRIPTION: This program performs the energy analysis for single zone building using modified Ruherer Method and degree hour approach. The weather data required is in the form of average and maximum temperature for the months and their standard deviations. Monthly average due point temperature is also required.

General

TOOL NAME: ENECO
DEVELOPED BY: Prof. Larry O. Dengelman
Department of Architecture
Texas A & M University
College Station, TX 77843

DATE DEVELOPED: January 1984
DATE OF LAST REVISION:

AVAILABLE THROUGH: Prof. Larry O. Dengelman
Department of Architecture
Texas A & M University
College Station, TX 77843
PHONE NO.: 409-845-1015
SUPPORTED BY: Department of Architecture
Texas A & M University
College Station, TX 77843
PHONE NO.: 409-845-1015

BRIEF DESCRIPTION: This program uses modified degree hours method (similar to Buherer Method) to calculate the heating and cooling energy requirements of buildings. The program also performs the economic analysis. The weather data requirements are similar to the program ENCON2.

General

TOOL NAME: ENERGY-$AVE
DEVELOPED BY: Peachtree Associates
P. O. Box 1312
Decatur, Georgia 30031

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Peachtree Associates
P. O. Box 1312
Decatur, Georgia 30031
PHONE NO.: (404) 373-3000
SUPPORTED BY: Peachtree Associates
P. O. Box 1312
Decatur, Georgia 30031
PHONE NO.:

BRIEF DESCRIPTION: The program is a simplified energy calculation methodology for residential use. It uses ASHRAE Handbook of Fundamentals and Solar Load Ratio methodology. The program is extremely simple to use and has extensive defaults built in. The output is on a yearly basis.

General

TOOL NAME: Energy Analyst
DEVELOPED BY:
American Energy Service
727 Massachusetts Avenue
Cambridge, MA 02139

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
American Energy Service
727 Massachusetts Avenue
Cambridge, MA 02139
PHONE NO.:
SUPPORTED BY: Michael Mark

PHONE NO.: 617-547-1345

BRIEF DESCRIPTION: It is a residential program suitable for home owners. Available in microcomputer and time sharing basis. The usefullness of the program is to give the energy use by end use. Interactive, more than 100 questions, building description, system and equipment descriptions needed.

General

TOOL NAME: ENERGY BILL ANALYSIS
DEVELOPED BY: Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Doug Mackenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.: (617) 926-8600
SUPPORTED BY: Doug Mackenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.: (617) 926-8600

BRIEF DESCRIPTION: This program calculates the month by month fuel bill for any type of building based on a base consumption, for heating and cooling equipment. The base year energy consumption is modified to take into account the weather variations and the building use pattern.

General

TOOL NAME: ENERGY GRAPHICS
DEVELOPED BY:
Booz Allen & Hamilton, Inc.
4330 East West Highway
Bethesda, MD 20814

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Booz Allen & Hamilton, Inc.
4330 East West Highway
Bethesda, MD 20814
PHONE NO.:
SUPPORTED BY: John Kurtz

PHONE NO.: 301-951-2000

BRIEF DESCRIPTION: Energy graphics calculates heating and cooling loads by constructing a typical daily load profile for each season. The daily profile is a summary of shell, solar, outside air, and internal loads. Actual building load is that area below the heating line and above the allowable heat gain line.

General

TOOL NAME: The Energy Nomographs
DEVELOPED BY: Burt Hill Kosar Rittelmann Associates
400 Morgan Center
Butler, Pennsylvania 16001

DATE DEVELOPED: December 1984
DATE OF LAST REVISION: December 1984

AVAILABLE THROUGH: Burt Hill Kosar Rittelmann Associates
400 Morgan Center
Butler, Pennsylvania 16001
PHONE NO.: 412/285-4761
SUPPORTED BY:

Same as above

PHONE NO.:

BRIEF DESCRIPTION: The Energy Nomographs are a series of graphic calculation sheets which predict the energy consumption of commercial buildings early in the design phase. The graphic procedure provides a visual concept of the importance of each design variable.

General

TOOL NAME: ENERGY - I
DEVELOPED BY: Disco Tech
P. O. Box 1569
600 B Street
Santa Rosa, California 95401
DATE DEVELOPED:
DATE OF LAST REVISION: June 1983

AVAILABLE THROUGH: Ed Henry
Disco Tech
P. O. Box 1659, 600 B Street
Santa Rosa, California 95401
PHONE NO.: (707) 523-1600
SUPPORTED BY: Disco Tech
P. O. Box 1659
600 B Street
Santa Rosa, California 95401
PHONE NO.: (707) 523-1600

BRIEF DESCRIPTION: The program checks the compliance of the residential buildings with Title 24 of California Energy Code. The program calculates heating and cooling loads for residences.

General

TOOL NAME: ENERGY - II
DEVELOPED BY: Disco Tech
P. O. Box 1659
600 B. Street
Santa Rosa, California 95401
DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Ed Henry
Disco Tech
P. O. Box 1569, 600 B Street
Santa Rosa, California 95401
PHONE NO.: (707) 523-1600
SUPPORTED BY: Disco Tech
P. O. Box 1569
600 B Street
Santa Rosa, California 95401
PHONE NO.: (707) 523-1600

BRIEF DESCRIPTION: This program checks the compliance of the commercial building with Title 24 of California Energy legislation. ASHRAE steady state method is used to calculate the heating and cooling loads of commercial buildings by zones.

General

TOOL NAME: EP-CHART
DEVELOPED BY: Dr. G. F. Lamerio
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Design
Corporation of America
P.O. Box 67
Ft. Collins, CO 80522
PHONE NO.:
SUPPORTED BY: Dr. G. F. Lamerio
Department of Business
Colorado State University
Ft. Collins, CO 80523
PHONE NO.: 303-484-2019

BRIEF DESCRIPTION: It is a simplified design procedure for determining the optimum solar aperture area for passive solar systems. This program is for use in Europe and has the data for 150 European cities included in the documentation. The basic methodology used is solar load ratio (SLR).

General

TOOL NAME: EPDS
DEVELOPED BY:
Owens-Corning Fiberglas Corporation
Toledo, Ohio
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Tim Grether
Insulation Division
Owens-Corning Fiberglas Corporation
Toledo, Ohio
PHONE NO.: 419-248-8000
SUPPORTED BY: As above
PHONE NO.:

BRIEF DESCRIPTION: The program allows the builders to predict heating and cooling requirements of homes in the planning stage. The effects of varying building components can be easily seen. The program also gives the annual energy cost based on the local energy rates.

General

TOOL NAME: ESAS
DEVELOPED BY: Ross F. Meriwether & Associates
San Antonio, Texas
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Ross G. Meriwether
Ross G. Meriwether & Associates, Inc.
Northwood Executive Building, 1600
Northeast Loop 410, San Antonio, TX 78209
PHONE NO.: 512-824-5302
SUPPORTED BY:
Same as above
PHONE NO.:

BRIEF DESCRIPTION: The program consists of a series of different programs put together. Very complex HVAC systems can be simulated. The program determines the annual energy consumption of various types of systems and equipments.

General

TOOL NAME: ESP-2
DEVELOPED BY: Automatic Procedures for Engineering Consultants.

DATE DEVELOPED: 1977
DATE OF LAST REVISION: 1978

AVAILABLE THROUGH: Automatic Procedures for Engineering Consultants, Inc.
Grant-Doneau Tower, Suite M-15
40th. and Ludlow Street, Dayton, OH 45402
PHONE NO.: 513-228-2602
SUPPORTED BY: As above

PHONE NO.: 513-228-2602

BRIEF DESCRIPTION: Energy simulation program intended to simulate HVAC system performance. The program consists of thermal loads program and an HVAC system simulation program. The program allows for variable schedule of lights, equipment, people, systems and building temperatures. Individual peak load requirements and monthly and yearly total loads are output.

General

TOOL NAME: EW-CHART
DEVELOPED BY: Dr. G. F. Lamerio

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Design Corporation of America
P.O. Box 67
Ft. Collins, CO 80522
PHONE NO.:
SUPPORTED BY: Dr. G. F. Lamerio
Department of Business
Colorado State University
Ft. Collins, CO 80521
PHONE NO.: 303-484-2019

BRIEF DESCRIPTION: It is a simplified procedure for determining the optimum collector area for solar hot water systems. This optimum is based on thermal and economic optima. It is a five-step procedure and has weather data for 150 European cities. The basic methodology used is F-Chart.

General

TOOL NAME: EWIREAS
DEVELOPED BY: Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172

DATE DEVELOPED:
DATE OF LAST REVISION: March 1983

AVAILABLE THROUGH: Doug MacKenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.: (617) 926-8600
SUPPORTED BY: Doug MacKenzie
Energy Works, Inc.
44 Hunt Street
Watertown, MA 02172
PHONE NO.:

BRIEF DESCRIPTION: This is a residential energy auditing program, the kind used by the utilities for residential energy auditing. The program gives the energy used by the houses on a yearly basis.

General

TOOL NAME: EWIT
DEVELOPED BY: Area, Inc.
Union Square
111 Gold Avenue, S.E.
Albuquerque, NM 87102

DATE DEVELOPED: September 1983
DATE OF LAST REVISION: September 1983

AVAILABLE THROUGH: Area, Inc.
Union Square
111 Gold Avenue, S.E.
Albuquerque, NM 87102
PHONE NO.: 505/243-0653
SUPPORTED BY: Same

PHONE NO.:

BRIEF DESCRIPTION: A user friendly microcomputer design tool for analysis of building loads by architects. Provides graphical output to examine the timing and magnitude of loads caused by changes in design.

General

TOOL NAME: F-CHART
DEVELOPED BY: University of Wisconsin
Solar Energy Laboratory

DATE DEVELOPED: 1976
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: University of Wisconsin
Solar Energy Laboratory
Madison, WI 53706
PHONE NO.: 608-263-1589
SUPPORTED BY: University of Wisconsin
Solar Energy Laboratory
Attn: Jim Braun

PHONE NO.: 608-263-1589

BRIEF DESCRIPTION: Models residential, liquid or air solar water heating or combined water heating and space heating systems. Also the economic analysis can be performed.

General

TOOL NAME: F-CHART PLUS
DEVELOPED BY: F-Chart Software
Box 5562
Madison, WI 53705

DATE DEVELOPED:
DATE OF LAST REVISION: January 1982

AVAILABLE THROUGH: Same
Bill Beckman

PHONE NO.: 608-263-1590
SUPPORTED BY: Not specified

PHONE NO.:

BRIEF DESCRIPTION: Interactive computer program for analysis and design of active and passive solar heating systems. Available for TRS 80 Model III and Apple II.

General

TOOL NAME: F-CHART SOLAR SYSTEM DESIGN
DEVELOPED BY: Inatome & Associates
10140 West Nine Mile Road
Oak Park, MI 48237

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Computer Mart, Inc.
1824 West Maple
Troy, MI 48084

PHONE NO.: 313-288-0040
SUPPORTED BY: Joseph Inatome
10140 West Nine Mile Road
Oak Park, MI 48237

PHONE NO.: 313-542-4862

BRIEF DESCRIPTION: This program uses the F-Chart method for sizing the residential solar heating and DHW systems. The program ELSOL is used to calculate solar radiation on surfaces of various tilts and orientations.

General

TOOL NAME: F-Load Building Load Calculation
DEVELOPED BY:
Beckman-Duffie and Associates
4406 Fox Bluff Road
Middleton, WI 53562

DATE DEVELOPED:
DATE OF LAST REVISION: February 1981

AVAILABLE THROUGH:
Same

PHONE NO.: 608-263-1590
SUPPORTED BY: Dr. Sandy Klein

PHONE NO.: 608-263-1590

BRIEF DESCRIPTION: An interactive computer program which calculates monthly/annual building loads for conventional/passive buildings as well as economic evaluations of conservation measures.

General

TOOL NAME: FASER
DEVELOPED BY:
Software Engineering Company
Box 836
Seattle, Washington 98111

DATE DEVELOPED:
DATE OF LAST REVISION: November 1982

AVAILABLE THROUGH: Mr. Ade Bright
Software Engineering Company
Box 836
Seattle, Washington 98111

PHONE NO.: (206) 852-2522
SUPPORTED BY: Software Engineering Company
Box 836
Seattle, Washington 98111

PHONE NO.: (206) 852-2522

BRIEF DESCRIPTION: This is a complete data management program which performs energy usage calculations for large buildings of the institutional and industrial type. The output of the program is a complete energy usage report.

General

TOOL NAME: G-Chart
DEVELOPED BY: Dr. G. F. Lamerio

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Design Corporation of America
Box 67
Ft. Collins, CO 80522

PHONE NO.:
SUPPORTED BY: Dr. G. F. Lamerio
Department of Business
Colorado State University
Ft. Collins, CO 80523

PHONE NO.: 303-484-2019

BRIEF DESCRIPTION: It is a simple design procedure for sizing liquid type active solar energy systems for space heating and hot water. Each calculation takes 10 minutes with a four function calculator. Weather data and other system constants for 150 cities are supplied. Basic calculation method used is from F-Chart.

General

TOOL NAME: GAIN
DEVELOPED BY: Holguin & Associates
5822 Cromo Drive
El Paso, Texas 79912

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: David Claudio
Holguin & Associates
5822 Cromo Drive
El Paso, Texas 79912
PHONE NO.: 1-800-351-1061
SUPPORTED BY: Holguin & Associates
5822 Cromo Drive
El Paso, Texas 79912
PHONE NO.: 1-800-351-1061

BRIEF DESCRIPTION: The program calculates the heating and cooling loads for commercial buildings.

General

TOOL NAME: HACE
DEVELOPED BY:
William Tao & Associates, Inc.
St. Louis, MO

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Time sharing only

PHONE NO.:
SUPPORTED BY: WTA Computer Services, Inc.
2357 59th. Street
St. Louis, MO 83110
Attn: Judy Sachs
PHONE NO.: 314-644-1400

BRIEF DESCRIPTION: The program uses thermal response factors to calculate the cooling and heating loads for each hour. Various alternative configurations of HVAC equipment can then be evaluated.

General

TOOL NAME: HCC-III
DEVELOPED BY: Automated Procedures for Engineering Consultants
Dayton, OH

DATE DEVELOPED:
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: Automated Procedures for Engineering Consultants (APEC)
Miami Valley Towers, Suite 2100
40 West 4th St., Dayton, OH 45402
PHONE NO.: (513) 228-2602
SUPPORTED BY: Automated Procedures for Engineering Consultants (APEC)
Miami Valley Towers, Suite 2100
40 West 4th St., Dayton, OH 45402
PHONE NO.: (513) 228-2602

BRIEF DESCRIPTION: This program is used to calculate coincident cooling load for 12 hours of peak cooling day every month. It is useful for small and large commercial buildings.

General

TOOL NAME: HEATING/COOLING LOAD
DEVELOPED BY: Inatome & Associates
Oak Park, MI

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Computer Mart, Inc.
1824 West Maple
Troy, MI 48084

PHONE NO.: 313-288-0040
SUPPORTED BY: Joseph Inatome
Inatome & Associates
10140 West Nine Mile
Oak Park, MI 48237
PHONE NO.: 313-542-4862

BRIEF DESCRIPTION: This is a heating and cooling load calculation program based on 1972 ASHRAE Handbook of Fundamentals. The program can be used for any five month spread to search for the month with the most severe requirements.

General

TOOL NAME: HELIOS
DEVELOPED BY:
Leonard A. Rydell
601 Pinehurst Drive
Newberg, OR 97132

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Leonard A. Rydell
601 Pinehurst Drive
Newberg, OR 97132
PHONE NO.:
SUPPORTED BY: Leonard A. Rydell

PHONE NO.: 503-538-5700

BRIEF DESCRIPTION: This is a passive solar/heat loss program written for skin dominated structures. Using 20 variables plus window size, shading, orientation, and number of glazings; any of which can be individually changed. The program calculates a monthly profile of solar gain, auxiliary, and total heating load including annual costs for electric, natural gas, oil or wood heat.

General

TOOL NAME: HOUSE
DEVELOPED BY:

DATE DEVELOPED: 1982
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Department of Mechanical Engineering, University of Washington, Seattle, WA 98195
PHONE NO.: 206-543-5338
SUPPORTED BY: As above
Attn: Dr. A. F. Emery
PHONE NO.: 206-543-5338

BRIEF DESCRIPTION: This program uses hour by hour simulation technique for solving thermal network. The program is useful for residential, small commercial and large commercial buildings. The solar systems which can be evaluated are passive hearing and cooling system.

General

TOOL NAME: HUBER
DEVELOPED BY: Derringer Group
111 7th Street, N.E.
Washington, DC 20002

DATE DEVELOPED:
DATE OF LAST REVISION: September 1983

AVAILABLE THROUGH: Joseph Derringer
Derringer Group
111 7th Street, N.E.
Washington, DC 20002
PHONE NO.: (202) 544-5000
SUPPORTED BY: Derringer Group
111 7th Street, N.E.
Washington, DC 20002
PHONE NO.: (202) 544-5000

BRIEF DESCRIPTION: It is a degree hour calculation program for single and multi-zoned buildings. The use of daylighting is calculated in a simple manner. The energy required by the equipment is calculated on the basis of seasonal equipment efficiency.

General

TOOL NAME: HUD-RSVP/2
DEVELOPED BY:
Booz, Allen & Hamilton, Inc.
Bethesda, MD

DATE DEVELOPED: 1977
DATE OF LAST REVISION: 1979

AVAILABLE THROUGH: NTIS
5285 Port Royal Road
Springfield, VA 22161
PHONE NO.:
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: The program calculates the performance of residential solar heating and DHW systems. The basic methodology used is the F-Chart, along with comprehensive economic analysis developed by Booz, Allen & Hamilton, Inc.

General

TOOL NAME: HVAC PACKAGE
DEVELOPED BY: TAG Architects
1010 Washington Street, East
Charleston, WV 25301

DATE DEVELOPED:
DATE OF LAST REVISION: June 1983

AVAILABLE THROUGH: Bonnie Kelley
TAG Architects
1010 Washington Street, East
Charleston, WV 25301
PHONE NO.: (304) 344-2521
SUPPORTED BY: Bonnie Kelley
TAG Architects
1010 Washington Street, East
Charleston, WV 25301
PHONE NO.: (304) 344-2521

BRIEF DESCRIPTION: The program uses ASHRAE steady state method to calculate the heating and cooling loads for residential and commercial buildings.

General

TOOL NAME: IMPSLR
DEVELOPED BY:
Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540

DATE DEVELOPED:
DATE OF LAST REVISION: June 1980

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY: Michael Piserchio
PHONE NO.: 809-921-1965

BRIEF DESCRIPTION: Interactive design and applying the solar load ratio method, it predicts the annual auxiliary needs of buildings employing DG, MW, WW for passive heating. Up to 10 different subsystems in a single building.

General

TOOL NAME: INSULATE
DEVELOPED BY: Londe, Parker, Michels,
St. Louis, MO

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Londe, Parker, Michels
150 North Meramec, Suite 205
St. Louis, MO 63105

PHONE NO.: 314-725-5501
SUPPORTED BY: As above
Attn: Steve Andes

PHONE NO.:

BRIEF DESCRIPTION: The program is used to optimize the insulation in structures. The program calculates the building loads and then with the given economic criterion, optimizes the insulation thickness.

General

TOOL NAME: ISDP
DEVELOPED BY:
Perkins and Will, Inc.
2 North Lasalle Street
Chicago, IL 60602
(312) 977-1100
DATE DEVELOPED: 1981
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH:
Perkins & Wills Group, Inc.
2 North Lasalle Street
Chicago, IL 60602
PHONE NO.: 312-977-1100
SUPPORTED BY: Same as above
Mr. Guy Gehlhausen

PHONE NO.: 312-977-1100

BRIEF DESCRIPTION: For use by architects for the design of active, passive and hybrid solar systems for buildings. The design, analysis and specification routines are combined in a single program. Methodology used is F-Chart and solar savings fraction method.

General

TOOL NAME: LASL 81
DEVELOPED BY:
Earth Integral
Suite 5
2655 Portage Bay Avenue
Davis, CA 95816
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY: Bruce Maeda/Ken Nittler

PHONE NO.: 916-920-7334

BRIEF DESCRIPTION: The program calculates the performance of passive solar energy systems including the sunspaces. The method used is the solar load ratio method.

General

TOOL NAME: LOAD GRAPHICS
DEVELOPED BY: Charles Eley Associates
519 Mission Street
San Francisco, CA 94105

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Charles Eley
Charles Eley Associates
519 Mission Street
San Francisco, CA 94105
PHONE NO.: 415-957-1977
SUPPORTED BY: Charles Eley Associates
519 Mission Street
San Francisco, CA 94105

PHONE NO.: 415-957-1977

BRIEF DESCRIPTION: This program is based on the methodology developed for U.S. DOE by Booz-Allen and Hamilton, Inc. The inputs for this program are similar to those of the Buehrer method. The output is the building thermal performance for a typical day.

General

TOOL NAME: LPMTZ
DEVELOPED BY: F. Stephen Andes
Londe Parker Michels, Inc.
150 N. Meramec, Suite 205
St. Louis, MO 63105

DATE DEVELOPED: 1977
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: Londe Parker Michels, Inc.
150 N. Meramec, Suite 205
St. Louis, MO 63105

PHONE NO.: (314) 725-5501
SUPPORTED BY: Enertronics Research, Inc.
150 N. Meramec, Suite 205
St. Louis, MO 63105

PHONE NO.: (314) 725-5566

BRIEF DESCRIPTION: In terms of modeling technique, the Two-Zone uses a dynamic model, simulating the thermal response of a specific design based on the hour-to-hour changes in environmental conditions including the diurnal benefit of passive solar inputs. The transient nature of loads and environmental inputs is analyzed using transfer functions. A construction library is attached which contains the coefficients necessary for the equations.

General

TOOL NAME: MEDSI Annual Energy Consumption
DEVELOPED BY: Charles J. R. McClure and Associates, Inc.

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: United Computing Systems, Inc.
2525 Washington Street
Kansas City, MO 64108

PHONE NO.: 816-221-9700
SUPPORTED BY: Mechanical Engineering Data Services, Inc.
7616 Big Bend Boulevard
St. Louis, MO 63119
PHONE NO.: 314-645-6232

BRIEF DESCRIPTION: The program calculates the heating and cooling energy for commercial buildings. The equipment efficiency and partload performance characteristics are inputs.

General

TOOL NAME: MEPA (Micro-Computer Energy Programs for Architects)
DEVELOPED BY: Brandt Andersson
184 Moraga Way
Orinda, CA 94563
DATE DEVELOPED: January - July, 1981
DATE OF LAST REVISION: September 1982

AVAILABLE THROUGH: Same

PHONE NO.: (415) 486-4251
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: MEPA was developed as a general building energy analysis tool for residential and small commercial buildings. It is intended for use by Architects during the design sketching stage. It is an inexpensive, interactive, and accurate energy analysis too which is understandable to and usable by Architects.

General

TOOL NAME: MICROFIX
DEVELOPED BY: Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540

DATE DEVELOPED:
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH: Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540

PHONE NO.:
SUPPORTED BY: Michael Piserchio

PHONE NO.: 609-921-1965

BRIEF DESCRIPTION: This is an interactive program which simulates direct gain or attached sunspaces.

General

TOOL NAME: MICROLITE 1.0
DEVELOPED BY: Harvey J. Bryan
Department of Architecture
Massachusetts Institute of Technology
Cambridge, MA 02139

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Designer's Software Exchange
Laboratory of Architecture and Planning
Massachusetts Institute of Technology
77 Mass Avenue, Cambridge, MA 02139
PHONE NO.: 617-253-1350
SUPPORTED BY: Designer's Software Exchange
Laboratory of Architecture and Planning
Massachusetts Institute of Technology
77 Mass Avenue, Cambridge, MA 02139
PHONE NO.: 617-253-1350

BRIEF DESCRIPTION: The program at the present time gives the illumination levels at various surfaces in the room. It uses LBL and CIE algorithms. Further updates to the program are planned in the near future.

General

TOOL NAME: MICROPAS
DEVELOPED BY: Enercomp
757 Russell Boulevard, Ste A3
Davis, CA 95616

DATE DEVELOPED: 1981-1982
DATE OF LAST REVISION: October 1984

AVAILABLE THROUGH: Enercomp
757 Russell Boulevard, Ste A3
Davis, CA 95616

PHONE NO.: 916/753-3400
SUPPORTED BY: Enercomp

PHONE NO.: 916/753-3400

BRIEF DESCRIPTION: MICROPAS is a sophisticated annual hour-by-hour building energy analysis program for CP/M-80 and MS-DOS microcomputers. The program analyzes the conventional and passive solar aspects of space heating, cooling, and ventilation for residential and small commercial buildings. The MICROPAS model offers multiple building zones, various types of thermal mass, building envelope surfaces of arbitrary orientation, and modeling of heating, cooling, and ventilation systems. MICROPAS is certified by the State of California to show compliance with the new Title24 Residential Energy Standards.

General

TOOL NAME: Modified Degree Day
DEVELOPED BY: Syska and Hennessy
1100 West 42 Street
New York, NY 10036

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
As above
PHONE NO.: 212-921-2300
SUPPORTED BY: As above
PHONE NO.: 212-921-2300

BRIEF DESCRIPTION: This is a modified degree day calculation method. The occupied and unoccupied hours are considered separately and thus modified degree days are used instead of the usual degree days.

General

TOOL NAME: MQAUDIT
DEVELOPED BY:
Varkie C. Thomas

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Time sharing only
PHONE NO.:
SUPPORTED BY: McQuay Group
McQuay - Perfex, Inc.
13600 Industrial Park Boulevard
P.O. Box 1551, Minneapolis, MN 55440
PHONE NO.: 612-533-5330

BRIEF DESCRIPTION: Various energy saving options are compared by the program. The effects of changes in various building envelope parameters can be examined. The effects of energy management systems and other changes in equipment can also be studied.

General

TOOL NAME: NEATWORK
DEVELOPED BY: Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540

DATE DEVELOPED:
DATE OF LAST REVISION: 1981

AVAILABLE THROUGH:
Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540
PHONE NO.:
SUPPORTED BY: Michael Piserchio
PHONE NO.: 609-921-1965

BRIEF DESCRIPTION: A general thermal network program. The maximum number of building nodes depends upon computer capability. Over 30 on any 16K or larger. Up to 10 on 8K single network. Later versioning will be multiple networks.

General

TOOL NAME: NECAP
DEVELOPED BY: NASA
Langley Research Center

DATE DEVELOPED: 1975
DATE OF LAST REVISION:

AVAILABLE THROUGH: COSMIC
Suite 11, Barrowe Hall
University of Georgia
Athens, GA 30602
PHONE NO.: 404-542-3265
SUPPORTED BY: COSMIC
112 Barrowe Hall, University of Georgia,
Athens, GA 30602
Attn: Ms. Jenie Ferguson
PHONE NO.: 404-542-3265

BRIEF DESCRIPTION: The program follows ASHRAE procedures. Annual heating and cooling loads, equipment performance and economic analysis is performed. Inputs consist of building and systems descriprion. Output can be various loads, and energy uses. Also can give response factors for various building components.

General

TOOL NAME: P-CHART
DEVELOPED BY: Dr. G. F. Lamerio

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Design Corporation of America
P.O. Box 67
Ft. Collins, CO 80522
PHONE NO.:
SUPPORTED BY: Dr. G. F. Lamerio
Department of Business
Colorado State University
Ft. Collins, CO 80523
PHONE NO.: 303-484-2019

BRIEF DESCRIPTION: It is a simple design procedure for determining the optimum solar aperture area for passive solar systems. The data for 200 cities is included. The basic methodology used is Solar Load Ratio (SLR).

General

TOOL NAME: PACE
DEVELOPED BY: Booz, Allen & Hamilton, Inc.
Bethesda, MD

DATE DEVELOPED: 1980
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: NTIS
5285 Port Royal Road
Springfield, VA 22161

PHONE NO.:
SUPPORTED BY: Design Tool Manager
Buildings Applications Branch
Solar Energy Research Institute
1617 Cole Blvd., Golden, CO 80401
PHONE NO.: 303-231-1261

BRIEF DESCRIPTION: The program is based on F-Chart and solar load ratio method for active and passive systems for residences. Comprehensive economic analysis is included. The program was designed for detailed economic analysis. The program has extensive defaults built into it.

General

TOOL NAME: PASODE
DEVELOPED BY: Londe, Parker, Michels
St. Louis, MO

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Londe, Parker, Michels
150 North Meramec, Suite 205
St. Louis, MO 63105

PHONE NO.: 314-725-5501
SUPPORTED BY: As above
Attn: Steve Andes

PHONE NO.: 314-725-5501

BRIEF DESCRIPTION: The program is used for calculating the performance of passive solar energy systems using solar load ratio method.

General

TOOL NAME: PASOLE
DEVELOPED BY: Robert D. McFarland
Los Alamos National Laboratory

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: National Energy Software Center,
Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439
PHONE NO.: 312-972-7250
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: To analyse the thermal performance of passive solar systems for building heating. Hour by hour solution of user-defined network.

General

TOOL NAME: PASS-ONE
DEVELOPED BY:
Energy Management Consultants, Inc.
Suite 38
672 S. Lafayette Park Place
Los Angeles, CA

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Time sharing systems
Denver, CO
Through Telenet
PHONE NO.:
SUPPORTED BY: James D. Roberts

PHONE NO.: 213-383-3195

BRIEF DESCRIPTION: This program is available on time sharing network. Will be available on microcomputer in the next year. Calculates loads, simple plants, and systems for residential or small commercial buildings.

General

TOOL NAME: Passive Solar Design Handbook, Vol.II
DEVELOPED BY: V. Douglas Balcomb
Los Alamos National Laboratory
University of California

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: NTIS
5285 Port Royal Road
Springfield, VA 22161
(also available from ASHRAE)
PHONE NO.:
SUPPORTED BY: J. Douglas Balcomb

PHONE NO.:

BRIEF DESCRIPTION: The book describes the Solar Load Ratio Method for various types of passive solar systems. Sensitivity studies are given. Design process is given followed by the economic analysis procedure.

General

TOOL NAME: The Passive Solar Energy Book
DEVELOPED BY: Edward Mazria
1979

DATE DEVELOPED: 1979
DATE OF LAST REVISION:

AVAILABLE THROUGH: Rodale Press
33 East Minor Street
Emmaus, PA 18049
PHONE NO.: 215-967-5171
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: Provides fundamental concepts of solar energy along with various passive system types and applications. Rules-of-thumb developed for schematic design along with technical information for "fine tuning" a system during design development.

General

TOOL NAME: PASSOL
DEVELOPED BY: Perkins & Wills Group, Inc.
Chicago, IL

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Perkins & Wills Group, Inc.
2 North LaSalle Street
Chicago, IL 60602
PHONE NO.: 312-977-1100
SUPPORTED BY: As above
Mr. Guy Gehlhausen

PHONE NO.:

BRIEF DESCRIPTION: This program contains a building load calculation routine and a passive solar fraction calculation routine. The passive solar performance is calculated by solar saving fraction method.

General

TOOL NAME: PEGFIX/PEGFLOAT
DEVELOPED BY: Princeton Energy Group
575 East Street
Princeton, NJ 08540

DATE DEVELOPED:
DATE OF LAST REVISION: September 1978

AVAILABLE THROUGH:
Princeton Energy Group
575 East Street
Princeton, NJ 08540
PHONE NO.:
SUPPORTED BY: Ms. Sharon McHugh

PHONE NO.: 609-921-1965

BRIEF DESCRIPTION: These programs perform a 24-hour simulation of direct gain or attached sunspaces. They can account for night insulation, auxiliary and excess heat.

General

TOOL NAME: PEGSOL
DEVELOPED BY: Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540

DATE DEVELOPED:
DATE OF LAST REVISION: March 1981

AVAILABLE THROUGH:
Princeton Energy Group
575 Ewing Street
Princeton, NJ 08540
PHONE NO.:
SUPPORTED BY: Michael Piserchio

PHONE NO.: 609-921-1965

BRIEF DESCRIPTION: Thermal network design tool for 2 zone passive solar building, simulated hour by hour performance.

General

TOOL NAME: QUICKLITE I
DEVELOPED BY: H. Bryan et al
Massachusetts Institute of Technology
and R. Clear et al
Lawrence Berkeley Laboratory

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Age August 1981
pp. 37-47

PHONE NO.:
SUPPORTED BY: None

PHONE NO.:

BRIEF DESCRIPTION: A set of programs which uses CIE sky luminance distribution functions for the overcast and clear skies to calculate the daylighting available. The output of these programs compares well with other daylighting calculation procedures, as well as a series of scale-model measurements.

General

TOOL NAME: QUIKEE
DEVELOPED BY: Donald Pedreyra, Energy Systems Engineers, Denver, CO
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Time share only.
PHONE NO.:
SUPPORTED BY: Energy Systems Engineers, 8000 E. Girad Ave., Suite 508, Denver, CO 80231
PHONE NO.: 303-696-6241

BRIEF DESCRIPTION: The program uses transfer function technique to compute hour-by-hour energy transfer through a building envelope. The program is suited for passive solar applications.

General

TOOL NAME: REAC
DEVELOPED BY: Energy Management Service, Portland, Oregon
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Energy Management Service, 434 S.W. Iowa, Portland, Oregon 97201
PHONE NO.: 800-547-4232
SUPPORTED BY: Same as above
PHONE NO.: 503-244-3613

BRIEF DESCRIPTION: This program uses the degree-hour method for calculating residential energy consumption. The program calculates the effect on heating and cooling by installation of various conservation measures and active and passive solar energy systems.

General

TOOL NAME: REAP
DEVELOPED BY: Carrier Corporation, Carrier Parkway, P.O. Box 4808, Syracuse, NY 13221
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.:
SUPPORTED BY: Mr. Dennis Yeddow
PHONE NO.: 315-432-6000

BRIEF DESCRIPTION: The REAP Program calculates the operating cost of systems for commercial buildings. Available on Radio Shack microcomputer. Uses bin method and carrier algorithms to calculate the heating/cooling/lighting and other energy uses.

General

TOOL NAME: RESIDENTIAL ENERGY MANUAL (REM)
DEVELOPED BY: Russell G. Derickson, P.E., Michael J. Holtz, A.I.A.
DATE DEVELOPED: Fall 1982
DATE OF LAST REVISION: Summer 1984

AVAILABLE THROUGH: Architectural Energy Corporation, 8752 Yates Drive, Suite 105, Westminster, CO 80030
PHONE NO.: (303) 428-8228
SUPPORTED BY: Authors and various contract R&D clients
PHONE NO.:

BRIEF DESCRIPTION: A complete and comprehensive REM is not currently available. Only selected areas of the world are covered including Fairbanks, Alaska; Forsyth, Montana; Bedford, Massachusetts; southeast England; central Belgium and central Netherlands. Work is in progress to complete REM for the entire U.S. and selected foreign locations.

General

TOOL NAME: RESID. LOAD CALC. PGM.
DEVELOPED BY: Jim Ford, Paoluccio Willis Nau Assoc., 7175 Construction Court, San Diego, CA 92121
DATE DEVELOPED:
DATE OF LAST REVISION: June 1983

AVAILABLE THROUGH: Jim Ford, Paoluccio Willis Nau Assoc., 7175 Construction Court, San Diego, CA 92121
PHONE NO.: (619) 578-5910
SUPPORTED BY: Jim Ford, Paoluccio Willis Nau Assoc., 7175 Construction Court, San Diego, CA 92121
PHONE NO.: (619) 578-5910

BRIEF DESCRIPTION: The program uses ASHRAE GRP158 procedure for the calculation of heating and cooling load for residences. These loads are calculated for equipment sizing only. The energy requirements for heating and cooling are not calculated.

General

TOOL NAME: RL5
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143

PHONE NO.: 305-666-1300
SUPPORTED BY: As above
R. C. McClintock

PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: The program uses the method of Air Conditioning Contractors Association of America (ACCA) manual J to calculate residential cooling and heating loads. The loads by rooms and total for the building is printed out.

General

TOOL NAME: RL5M
DEVELOPED BY: McClintock Corporation

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, Florida 33143

PHONE NO.: 305/666-1300
SUPPORTED BY: Same as above
Attention: R. C. McClintock

PHONE NO.: 305/666-1300

BRIEF DESCRIPTION: The program uses the method of Air Conditioning Contractors Association of America (ACCA) manual J to calculate residential cooling and heating loads. The loads by rooms and total for the building is printed out.

General

TOOL NAME: ROOMCALC
DEVELOPED BY: Universal Software Applications, Inc.
13001 Cannes
St. Louis, Missouri 63141

DATE DEVELOPED:
DATE OF LAST REVISION: 1982

AVAILABLE THROUGH: Dale Missler
Universal Software Applications, Inc.
13001 Cannes
St. Louis, Missouri 63141
PHONE NO.: 314-878-1277
SUPPORTED BY: Universal Software Applications, Inc.
13001 Cannes
St. Louis, Missouri 63141

PHONE NO.: 314-878-1277

BRIEF DESCRIPTION: This is a heat gain/heat loss calculation program, which is used for small buildings. The loads for occupied and unoccupied periods are calculated separately. The methodology used is ASHRAE steady-state.

General

TOOL NAME: SASEP
DEVELOPED BY: SUD Associates

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: SUB Associates
Consulting Engineers
1805 Chapel Hill Road
Durham, NC 27702
PHONE NO.: 919-493-5277
SUPPORTED BY:
Same as above
Attn: Kevin Vaughan

PHONE NO.:

BRIEF DESCRIPTION: The program calculates the block design heating and cooling loads and annual energy consumption for buildings. The weather data used is the bin temperature data from Air Force manual.

General

TOOL NAME: SCM (Simplified Computer Model) (Colo.)
DEVELOPED BY: Colorado Office of Energy Conservation
1525 Sherman Street, Fourth Floor
Denver, CO 80203
303/866-2508

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: David Ford
Colorado Office of Energy Conservation
1525 Sherman Street, Fourth Floor
Denver, CO 80203
PHONE NO.: 303/866-2508
SUPPORTED BY: Nancy Schaleb
City of Boulder Energy Office
P.O. Box 791
Boulder, CO 80306
PHONE NO.: 303-441-3270

BRIEF DESCRIPTION: The program is based on the NBS variable degree days method, and allows over 100 inputs. Occupant behaviour is also considered in the model. Active and passive solar energy systems are also evaluated. The output includes monthly and annual energy uses for heating and cooling.

General

TOOL NAME: Simplified Computer Model (SCM) (Ohio)
DEVELOPED BY: Ohio Department of Energy
30 East Broad Street
Columbus, OH 43215
DATE DEVELOPED: 1979
DATE OF LAST REVISION:

AVAILABLE THROUGH: Tom Crown
Ohio Department of Energy
30 East Broad Street
Columbus, OH 43215
PHONE NO.:
SUPPORTED BY: As above
PHONE NO.:

BRIEF DESCRIPTION: The program uses modified degree day method to calculate the heat loss. The output gives the percentage of heat loss due to each building component's annual costs and economic analysis are also given. The program has Ohio energy units and weather data built in.

General

TOOL NAME: SE1M
DEVELOPED BY: McClintock Corporation
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: McClintock Corporation
P.O. Box 430980
Miami, FL 33143
PHONE NO.: 305-666-1300
SUPPORTED BY: As above
Attn: R. C. McClintock
PHONE NO.: 305-666-1300

BRIEF DESCRIPTION: The program calculates the monthly heat demand, heat supplied by the solar collector system and percent solar using F-Chart method. Weather data for 261 North American cities, as well as the economic analysis program, is included.

General

TOOL NAME: SEA
DEVELOPED BY: Ferreira & Kalasinsky Associates
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Ferreira & Kalasinsky Associates, Inc., 13 Welby Road
P.O. Box 1-6
New Bedford, MA 02745
PHONE NO.: 617-996-4499
SUPPORTED BY: As above
PHONE NO.: 617-996-4499

BRIEF DESCRIPTION: This program is based upon the proposed ASHRAE TC4-7 procedure for energy analysis utilizing a modified bin weather method. The program includes the modules for weather, loads, systems, primary plants, and financial analysis.

General

TOOL NAME: SEE
DEVELOPED BY: The Singer Company, S. Fleming and Associates and Syracuse University
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Presently will run from data. Will become available on time sharing.
PHONE NO.:
SUPPORTED BY: Snyder General Corporation
Climate Control Division
62 Columbus Street
Auburn, NY 13021 Attn: Philip Parrman
PHONE NO.: 315-253-2771

BRIEF DESCRIPTION: Calculates heating and cooling loads in buildings. Simulates energy consumption of the entire building system. Also provides comparative economic and/or life cycle financial analysis of alternative building systems.

General

TOOL NAME:. SEEC II Relative Areas
DEVELOPED BY: Sizing Program
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
DATE DEVELOPED:
DATE OF LAST REVISION: 1978

AVAILABLE THROUGH:
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
PHONE NO.:
SUPPORTED BY: Same
Loren Lantz
PHONE NO.: 303-221-5166

BRIEF DESCRIPTION: The relative areas method is a simplification of the F-Chart method and allows the user to find the optimal collector area in one step based on user specified economic parameters. Annual solar fraction determined in one step.

General

TOOL NAME: SEEC III Relative Areas
DEVELOPED BY: Collector and Insul
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
DATE DEVELOPED:
DATE OF LAST REVISION: August 1978

AVAILABLE THROUGH:
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
PHONE NO.:
SUPPORTED BY: Same
Loren Lantz
PHONE NO.: 303-221-5166

BRIEF DESCRIPTION: For each porrion of the building shell, the program chooses from up to nine options. The material which optimizes the trade-off between construction costs and heating expenses for both solar and conventional systems.

General

TOOL NAME: SEEC VIII Swimming Pool Analysis
DEVELOPED BY: Program
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
DATE DEVELOPED:
DATE OF LAST REVISION: August 1980

AVAILABLE THROUGH:
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
PHONE NO.:
SUPPORTED BY: David Guenther
PHONE NO.:

BRIEF DESCRIPTION: Active pool heating collectors and/or pool covers can be sized for desired performance with this program. A life cycle costing is also included.

General

TOOL NAME: SEEC] F-CHART
DEVELOPED BY: Solar Analysis
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
DATE DEVELOPED:
DATE OF LAST REVISION: January 1982

AVAILABLE THROUGH:
Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524
PHONE NO.:
SUPPORTED BY: David Guenther
PHONE NO.: 303-221-5166

BRIEF DESCRIPTION: Heat load analysis program, allows fast and accurate estimate of load. Monthly and annual percentage solar heating is calculated by F-Chart. Life cycle costing and economic maximum first cost.

General

TOOL NAME: SERI-SLR SEEC-VI
DEVELOPED BY:
Solar Environmental Energy Company
2524 E. Vine Street
Ft. Collins, CO 80524
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
PHONE NO.: C. B. Winn/David Guenther
SUPPORTED BY: 303-221-5166
PHONE NO.:

BRIEF DESCRIPTION:

General

TOOL NAME: SESOP
DEVELOPED BY: Lockheed Electronics, Company
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: COSMIC
112 Barrow Hall
University of Georgia
Athens, GA 30602
PHONE NO.: 404-542-3265
SUPPORTED BY: As above
Ms. Jenie Ferguson
PHONE NO.: 404-542-3265

BRIEF DESCRIPTION: The program is used for the analysis of HVAC systems which use solar energy for space heating and hot water. Building description is used to calculate hourly load, and then hourly energy demand is calculated. Solar energy contribution is estimated. The detailed calculation take into account all types of internal gains.

General

TOOL NAME: SHCOST
DEVELOPED BY: NASA Marshall Space Flight Center

DATE DEVELOPED: 1979
DATE OF LAST REVISION:

AVAILABLE THROUGH: COSMIC
112 Barrowe Hall
The University of Georgia
Athens, GA 30602
PHONE NO.: 404-542-3265
SUPPORTED BY: As above
Attn: Jenie Ferguson

PHONE NO.: 404-542-3265

BRIEF DESCRIPTION: This program can be used for economically sizing the solar energy systems for residences and small commercial buildings. The basic method used is GFL method which is in turn based on F-Chart. Weather data in the form of constants for large number of cities is supplied with the program.

General

TOOL NAME: SOL-300 (MC)
DEVELOPED BY: Tennessee Valley Authority
400 West Summit Hill Drive, W4C126
Knoxville, TN 37902

DATE DEVELOPED:
DATE OF LAST REVISION: 1983

AVAILABLE THROUGH: Parks Mitchael
Tennessee Valley Authority
400 West Summit Hill Drive, W4C126
Knoxville, TN 37902
PHONE NO.: 615-632-2358
SUPPORTED BY: Tennessee Valley Authority
400 West Summit Hill Drive, W4C126
Knoxville, TN 37902

PHONE NO.: 615-632-2358

BRIEF DESCRIPTION: This is a thermal network program which uses average day weather to calculate the hourly performance of single zoned buildings. The average day performance is then used to estimate the monthly and yearly energy requirements.

General

TOOL NAME: SOL 300 (MF)
DEVELOPED BY: Tennessee Valley Authority

DATE DEVELOPED:
DATE OF LAST REVISION: 5-26-83

AVAILABLE THROUGH: Tennessee Valley Authority
Architectural Branch
400 Summit Hill Drive
Knoxville, TN 37902
PHONE NO.: 615/632-3120
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: SOL 300 is a Fortran computer program used to analyze heating and cooling requirements of a single zone, passive solar building. An average weather day for each month is allowed to cycle until the building reaches equilibrium. Data taken at equilibrium are used to estimate monthly and annual loads for an average year.

General

TOOL NAME: Solar Energy Programs
DEVELOPED BY: F-Chart
Box 5562
Madison, WI 53705

DATE DEVELOPED:
DATE OF LAST REVISION: September 1980

AVAILABLE THROUGH:
F-Chart
Box 5562
Madison, WI 53705 Dr. Sandy Klein
PHONE NO.: 606-263-5626
SUPPORTED BY: None

PHONE NO.:

BRIEF DESCRIPTION: This is a book containing a large number of program listings for TI-59 and HP41C or HP41CV calculations. The programs included are: F-Chart for active solar, RHIF for solar contribution of closed loop processes, PHIEAR collector urilizability method for direct gain passive solar, ECON economic analysis and many others. The terminology used is the same as given in "Solar Engineering of Thermal Processes" by Duffie and Beckman.

General

TOOL NAME: SOLAR ENGINEERING LIBRARY
DEVELOPED BY: Sunshine Power Company

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Sunshine Power Company
1018 Lancer Drive
San Jose, CA 95129

PHONE NO.: 408-446-2446
SUPPORTED BY: As above
Attn: Gary Shramek

PHONE NO.: 408-446-2446

BRIEF DESCRIPTION: This is a library of solar programs for calculating radiation on various surfaces and the calculation of solar energy system performance for active solar systems using F-Chart methodology.

General

TOOL NAME: Solar Heating Systems Design Manual
DEVELOPED BY: Bell & Gossett ITT
ITT Training & Education Dept.
Fluid Handling Division
Morton Grove, IL 60053
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Same
PHONE NO.: 312-966-3700
SUPPORTED BY:
Same
PHONE NO.:

BRIEF DESCRIPTION: Manual to calculate and size active solar system for residential applications. Building load is calculated (DD Method) then active system is sized for heating, cooling, DHW.

General

TOOL NAME: SOLARCON 326P and 327P
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104
PHONE NO.: 313-769-6588
SUPPORTED BY: As above
Dr. Roderich W. Graeff
PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: These two programs allow the evaluation of two different sized surfaces with and without night insulation.

General

TOOL NAME: SOLARCON 33
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104
PHONE NO.: 313-769-6588
SUPPORTED BY: Same as above
Dr. Roderich W. Graeff
PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: This program simulates a trombe wall installation calculating the temperature distribution in the trombe wall and the room connected to it as well as all energy flows to and from the room. The program helps to evaluate the hourly or daily effects of trombe wall installations.

General

TOOL NAME: SOLARCON 34
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104
PHONE NO.: 313-769-6588
SUPPORTED BY: Same as above
Dr. Roderich W. Graeff
PHONE NO.:

BRIEF DESCRIPTION: This program simulates a direct gain system with a thermal mass, either in the floor or in the wall, or filled with a liquid, calculating the temperature distribution in the wall and in the room as well as all energy flows to and from the room. The program calculates the hourly or daily effects of passive direct gain systems.

General

TOOL NAME: SOLARCON 35, 36
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104
PHONE NO.: 313-769-6588
SUPPORTED BY: As above
Dr. Roderich W. Graeff
PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: These two programs are based on the calculation of active solar energy system performance, by F-Chart method for air and liquid type collectors. The programs are used to evaluare space heating and domestic hot water systems for residences.

General

TOOL NAME: SOLARCON 355 and 365
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104

PHONE NO.: 313-769-6588
SUPPORTED BY: As above
Dr. Roderich W. Graeff

PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: These two programs are simplified F-Chart programs for active solar energy system performance for air and liquid type collectors. The programs are used to evaluate space heating and domestic hot water systems for residences.

General

TOOL NAME: SOLARCON 37 and 371
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104

PHONE NO.: 313-769-6588
SUPPORTED BY: As above
Dr. Roderich W. Graeff

PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: The program calculates the flat plate collector utilizability and evaluates closed loop solar energy system. The basic methodology is the one developed by S. Klein at the University of Wisconsin.

General

TOOL NAME: SOLARCON-PASSOLAR
DEVELOPED BY: Solarcon, Inc.
Ann Arbor, MI

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solarcon, Inc.
607 Church
Ann Arbor, MI 48104

PHONE NO.: 313-769-6588
SUPPORTED BY: As above
Dr. Roderich W. Graeff

PHONE NO.: 313-769-6588

BRIEF DESCRIPTION: The program consists of the main program which together with a weather data card allows the estimation of the annual performance of passive solar buildings incorporating a direct gain , trombe wall or a water wall, following the solar load ratio method.

General

TOOL NAME: SOLCOM
DEVELOPED BY:
Solar Computer Corporation
Denver, CO

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Charles R. Booz
Solar Computer Corporation
Denver, CO

PHONE NO.: 303-320-7707
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: The program provides an annual energy demand profile. The energy use is disaggregated by the end use. The program identifies various energy contributions, such as appliances. It also considers active and passive solar energy systems. Comprehensive economic analysis is performed.

General

TOOL NAME: SOLCOST
DEVELOPED BY: Martin Marietta
Aerospace Corporation

DATE DEVELOPED: 1978
DATE OF LAST REVISION: 1979

AVAILABLE THROUGH: Solar Environmental Energy Company
2524 E. Vine Drive
Ft. Collins, CO 80524

PHONE NO.: 303-221-5166
SUPPORTED BY: Loren J. Lantz
Solar Environmental Energy Company
Ft. Collins, CO

PHONE NO.: 303-221-5166

BRIEF DESCRIPTION: Calculates heating loads for small commercial or residential buildings. Calculates a day per month, optimizes the collector area for active solar systems. Latest version has the ability to calculate passive solar energy features.

General

TOOL NAME: SOLCOST by SOLEC
DEVELOPED BY: Simplified version of original Martin Marietta SOLCOST program DHW only

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Corporation
553 Pretty Brook
Princeton, NJ 08546

PHONE NO.: 609-924-1879, 737-1112
SUPPORTED BY: Solar Energy Corporation

PHONE NO.:

BRIEF DESCRIPTION: Simplified solar domestic hot water design tool (see enclosed brochure).

General

TOOL NAME: SOLITE 1
DEVELOPED BY: Solite
P.O. Box 17581
San Diego, CA 92117

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: SOLITE
P.O. Box 17581 (5188 Balboa Arms Drive, Suite D-8)
San Diego, CA 92117

PHONE NO.: 714-278-7069
SUPPORTED BY: As above

PHONE NO.: 714-278-7069

BRIEF DESCRIPTION: This program converts the calculated or measured daylighting factors for cloudy skies (and optional clear skies) with minimum effort. The program also performs economic analysis for energy savings due to daylighting use and the reduction of peak loads for costing, etc.

General

TOOL NAME: SOLPATH - COMMERCIAL
DEVELOPED BY:
Solar Pathways, Inc.
Valley Commercial Plaza
3710 Highway 82
Glennwood Springs, CO 81601

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY: Robert Clarke or John Elhers

PHONE NO.: 303-945-6503

BRIEF DESCRIPTION: It is a program for calculating the heating and cooling loads of commercial buildings using average weather data. Basically, ASHRAE algorithms are used. Overhangs and wingwalls can be considered.

General

TOOL NAME: SOLTES
DEVELOPED BY: Sandia Laboratories

DATE DEVELOPED: 1978
DATE OF LAST REVISION: 1979

AVAILABLE THROUGH: National Energy Software Center,
Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439

PHONE NO.: 312-972-7250
SUPPORTED BY: Sandia Laboratories
Division 4722, P.O. Box 5800
Albuquerque, NM 87185
Attn: Norman Yrandjean

PHONE NO.: 505-846-0024

BRIEF DESCRIPTION: It is a modular solar program based on component method. Calculates the performance of systems and can perform economic analysis, etc. It is basically a large buildings simulation program.

General

TOOL NAME: STENET Hewlett Packard
DEVELOPED BY: User's Group

Hewlett Packard User's Group
1000 N. E. Circle Boulevard
Corvallis, OR 97330

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
Hewlett Packard User's Group
1000 N. E. Circle Boulevard
Corvallis, OR 97330

PHONE NO.:
SUPPORTED BY: Chris Koffin

PHONE NO.: 503-757-2000

BRIEF DESCRIPTION: This is a thermal network program for passive solar buildings. The program is based on the type of calculations done by TEANET program available as listing for $6.00 or on disc or tape for HP 85 in HP Basic.

General

TOOL NAME: SUNCODE
DEVELOPED BY: Tery Wheeling & Larry Palmiter
Corms Concept version adapted by
David Straub

DATE DEVELOPED: 1977-1982
DATE OF LAST REVISION: July 3, 1982

AVAILABLE THROUGH: ECOTOPE, Inc.
2328 E. Madison Avenue
Seattle, WA 98112

PHONE NO.: 206-322-3753
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: Hourly simulation, multi-zone, passive solar, greenhouse, rock bin, phase change material, trombe wall, direct gain, residential, light commercial, shading, arbitrary orientation, moveable shutters, exterior solar absorption, wind-speed dependent infiltration, sensible latent load, heating, cooling, ventilation, full scheduling.

General

TOOL NAME: SUNDAY
DEVELOPED BY: Davis Straub
2328 E. Madison Avenue
Seattle, WA 98112

DATE DEVELOPED: January 1981 - July 1982
DATE OF LAST REVISION: July 16, 1982

AVAILABLE THROUGH: Ecotope, Inc.
2328 E. Madison Avenue
Seattle, WA 98112

PHONE NO.: 206-322-3753
SUPPORTED BY: Author (Davis Straub)

PHONE NO.: 206-322-3753

BRIEF DESCRIPTION: Microcomputer based, single node model. Uses daily weather data, accounts for internal gains, solar gain, heating or cooling set point temperature, thermal mass. Seasonal shading, eight vertical orientations of glazing - 1 - 4 layers. Design evaluation tool for Second National Passive Solar Conference, Design contest.

General

TOOL NAME: SUNEST
DEVELOPED BY:
Earth Integral
Suite 5
2655 Portage Bay Avenue
Davis, CA 95616

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY: Bruce Maeda/Ken Nittler

PHONE NO.: 916-920-7334

BRIEF DESCRIPTION: The program calculates the performance of passive solar energy systems using the solar load ratio method.

General

TOOL NAME: SUNHEAT 1
DEVELOPED BY: Solartek
R. D. #1, Box 255A
West Hurley, NY 12491

DATE DEVELOPED: July 1981
DATE OF LAST REVISION: July 1981

AVAILABLE THROUGH: Solartek
R. D. #1, Box 255A
West Hurley, NY 12491

PHONE NO.: 914-679-5366
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: Evaluates solar hot water systems.

General

TOOL NAME: SUNOP A computer solar design
DEVELOPED BY: program
Solarsoft, Inc.
Box 124
Snowmass, CO 81654

DATE DEVELOPED:
DATE OF LAST REVISION: February 1982

AVAILABLE THROUGH:
Solarsoft, Inc.
Box 124
Snowmass, CO 81654

PHONE NO.:
SUPPORTED BY: Bill Ashton/Matt Crosby

PHONE NO.: 303-927-4411

BRIEF DESCRIPTION: The program is divided into two sections. The first economically optimizes the insulation and energy conservation levels and then gives the optimized solar saving fraction and passive collector area. Second optimizes passive collector area and performs a yearly cash flow analysis after setting the building heating load.

General

TOOL NAME: SUNPAS A computer solar design program
DEVELOPED BY: Solarsoft, Inc.
Box 124
Snowmass, CO 81654

DATE DEVELOPED:
DATE OF LAST REVISION: April 1982

AVAILABLE THROUGH: Solarsoft, Inc.
Box 124
Snowmass, CO 81654
PHONE NO.:
SUPPORTED BY: Matt Crosby/Bill Ashton

PHONE NO.: 303-927-4411

BRIEF DESCRIPTION: Interactive solar analysis program based on methodology from LASL. Uses building configuration, locations t-stat selling, I gains, and other factors to calculate auxiliary for DG, trombe wall, water wall and sunspaces.

General

TOOL NAME: Sunpulse II Solar Simulation
DEVELOPED BY: McGraw Hill Book Company
1221 Avenue of the Americas
26th. Floor
New York, NY 10020

DATE DEVELOPED:
DATE OF LAST REVISION: December 1979

AVAILABLE THROUGH: McGraw Hill Book Company
1221 Avenue of the Americas
26th. Floor
New York, NY 10020
PHONE NO.: 212-997-2388
SUPPORTED BY: John Stockwell

PHONE NO.: 212-997-2388

BRIEF DESCRIPTION: Three magnetic cards plus user's manual will simulate active space and/or water heating systems including some passive gain or will approximate passive solar contribution for 1-zone systems. 30 user specified inputs.

General

TOOL NAME: SYRSOL
DEVELOPED BY: Syracuse University
Syracuse, NY 13210

DATE DEVELOPED: 1976
DATE OF LAST REVISION: 1978

AVAILABLE THROUGH: Department of Mechanical Engineering, Syracuse University
Syracuse, NY 13210
PHONE NO.: 315-423-3038
SUPPORTED BY: Same
Attn: Dr. Manas Ucar
PHONE NO.: 315-423-3038

BRIEF DESCRIPTION: Simulates the hourly thermal performance of a multi-zoned building with a solar assisted series of water-to-air heat pumps in a closed loop. The flat plate solar collectors can be used along with cooling towers, etc.

General

TOOL NAME: TEANET III Computer Program
DEVELOPED BY: Total Environmental Action, Inc.
1 Church Hill
Harrisville, NH 03450

DATE DEVELOPED:
DATE OF LAST REVISION: January 1981

AVAILABLE THROUGH: Total Environmental Action, Inc.
1 Church Hill
Harrisville, NH 03450
PHONE NO.:
SUPPORTED BY: Pam Carlson

PHONE NO.: 603-827-3374

BRIEF DESCRIPTION: It is a numerical thermal network algorithm for simulating the performance of passive systems. Maximum of 7 nodes can be used. Has a radiation generator and ambient temperature generator.

General

TOOL NAME: TRACESOLAR
DEVELOPED BY: The Trane Company
La Crosse, WI 54601

DATE DEVELOPED: 1973
DATE OF LAST REVISION: 1980

AVAILABLE THROUGH: The Trane Company, Building Energy Systems Engineering, 3600 Pammel Creek Road, La Crosse, WI 54601
PHONE NO.: 608-787-3524
SUPPORTED BY: As above
Attn: Mike Pawdski

PHONE NO.: 608-787-3524

BRIEF DESCRIPTION: The program was developed as an aid to architects and engineers in comparing life-cycle costs of various architectural, HVAC systems and equipment alternatives. It is a very detailed simulation program suitable for large buildings.

General

TOOL NAME: TRANE Air Conditioning Manual
DEVELOPED BY: The Trane Company
La Crosse, WI

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY:

PHONE NO.:

BRIEF DESCRIPTION: This book which covers the fundamentals and practical applications of air conditioning.

General

TOOL NAME: TSD
DEVELOPED BY:
G. K. Associates
157 Stanton Avenue
Auburndale, MA 02166

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
G. K. Associates
157 Stanton Avenue, Auburndale, MA 02166
PHONE NO.:
SUPPORTED BY: George W. Kimball

PHONE NO.: 617-527-0666

BRIEF DESCRIPTION:

General

TOOL NAME: TSWING A computer solar design program
DEVELOPED BY: Solarsoft, Inc.
Box 124
Snowmass, CO 81654

DATE DEVELOPED:
DATE OF LAST REVISION: January 1982

AVAILABLE THROUGH:

PHONE NO.:
SUPPORTED BY: Matt Crosby/Bill Ashton

PHONE NO.: 303-927-4411

BRIEF DESCRIPTION: It is a thermal network program which calculates the temperature savings in a building. Particularly useful in passive solar structures, for sizing and placement of mass to prevent overheating. Also considers hybrid system.

General

TOOL NAME: VDD
DEVELOPED BY:
National Bureau of Standards
Washington, DC

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Tamami Kusuda
National Bureau of Standards
Department of Commerce
Washington, DC
PHONE NO.:
SUPPORTED BY: As above

PHONE NO.:

BRIEF DESCRIPTION: The program uses the ASHRAE modified degree days to calculate the heating and cooling requirements. Passive solar features such as greenhouses can be considered. The results have been varified with DOE-2 program as being within 10%.

General

TOOL NAME: W-CHART
DEVELOPED BY: Dr. G. F. Lamerio

DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH: Solar Energy Design Corporation of America
Box 67
Ft. Collins, CO 80522
PHONE NO.:
SUPPORTED BY: Dr. G. F. Lamerio
Department of Business
Colorado State University
Ft. Collins, CO 80523
PHONE NO.: 303-484-2019

BRIEF DESCRIPTION: It is a simplified procedure for determining the optimum collector area for solar hot water systems. This optimum is based on thermal and economic optima. It is a five-step procedure and has the weather data for 500 cities. The basic methodology used is F-Chart.

General

TOOL NAME: York Residential Air Conditioning
DEVELOPED BY: Estimator
Developed by: York
P.O. Box 1592
York, PA 17405
DATE DEVELOPED:
DATE OF LAST REVISION:

AVAILABLE THROUGH:
York
P.O. Box 1592
York, PA 1592
PHONE NO.:
SUPPORTED BY: As above
PHONE NO.:

BRIEF DESCRIPTION: It is a slide rule type of nomograph which allows for air conditioning estimations for residents.

WEST GERMANY

General

TOOL NAME: KEFF METHOD
DEVELOPED BY: K. Gertis, G. Hauser, H. Künzel, V. Nikolic, L. Rouvel, H. Werver
DATE DEVELOPED: 1979 - 1983
DATE OF LAST REVISION:

AVAILABLE THROUGH: Prof.-Dr.Ing.habil Karl Gertis
Fraunhofer-Institut Für Bauphysik
Nobelstr. 12, D-7000 Stuttgart 80
PHONE NO.: (0711) 6868-303
SUPPORTED BY:
PHONE NO.:

BRIEF DESCRIPTION: Steady state calculation considering a solar gain coefficient within the U-value.

* U.S. GOVERNMENT PRINTING OFFICE: 1986-491-176:20265