

INTERNATIONAL ENERGY AGENCY

solar heating and cooling programme

task VIII
passive and hybrid
solar low energy buildings

ANALYSIS MODEL SURVEY

december 1983

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Prepared by
Ove Jørgensen

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PREFACE

INTERNATIONAL ENERGY AGENCY

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 (OECD). 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 programme 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 contributions 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 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
Austria
Belgium
Canada
Denmark
Commission of the
European Communities
Federal Republic of
Germany
Greece

Italy
Japan
Netherlands
New Zealand
Norway
Spain
Sweden
Switzerland
United Kingdom
United States

The overall programme 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 Programme, 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 (Ongoing).
- Task III Performance Testing of Solar Collectors KFA-Julich, F.R. Germany (Ongoing).
- Task IV Development of an Insolation 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).

TASK VIJI - PASSIVE AND HYBRID SOLAR LOW ENERGY BUILDINGS

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 The overall objective of in new residential buildings. 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 nonerenewable energy over that of conventional buildings while maintaning acceptable levels of year-round comfort. subtasks of this project are:

- 0. Technology Baseline Definition
- A. Performance Measurement 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.

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

Michael J. Holtz, A.I.A. Operating Agent (On behalf of the U.S. Department of Energy)

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1. EXECUTIVE SUMMARY

This document presents the findings and conclusions of a survey of the currently available building thermal analysis simulation models, their analysis capabilities, characteristics and limitations. Thirty-one models from ten different member countries of the IEA Solar Heating and Cooling Programme are included in this survey.

The survey was undertaken to serve two main objectives:

1

- to assess the state of the art in order to identify what future model evaluation and developments are necessary; and
- 2. to create an overview of available building thermal analysis simulation tools which can serve as a guide for the selection of an appropriate model for a given problem.

A survey form was generated and distributed to the participating countries of Task VIII. The thirty-one completed and returned forms are all included as Appendix 1. In a second round the Subtask B representatives were asked to clarify what passive and hybrid systems the programs could simulate and the current status of model validation.

Chapter 3 summarizes the major findings of the survey in tabular form, thus making it possible to quickly assess the important features of the models.

The most important conclusion that can be drawn from the compiled information is that only a few programs can be used to simulate hybrid systems.* Another important point is that even though most of the programs have been written in FORTRAN, they

* A hybrid system can be defined as a system that incorporates both natural and forced heat (energy) transport phenomena.

are very machine-dependent and therefore not easily transferable. The third major conclusion is that most of the programs have been developed by researchers for research purposes; they do not represent energy analysis tools useful to building designers.

Chapter 4 includes a table on validation of the different models. From this table it appears that, aside from direct gain systems, the validation experience for passive systems is extremely limited. This table was part of the background material for the development of the validation activity plan within Subtask B. Results from this work will be documented in future reports.

To sum up, these conclusions direct future model development to focus on hybrid systems, to produce real computer-independent, user-friendly and design-oriented programs.

Also, all of the models reported require further validation against measured data to increase confidence in their use.

The present survey has created an important overview of existing models and their capabilities and limitations, which provides valuable guidance for the planning of further model development efforts.

2. INTRODUCTION

Analysis models for passive and hybrid solar low energy buildings are computer simulation programs which have been designed for a detailed thermal analysis of a building and its components. The basis of these programs is a mathematical model of the total building as a thermal system. Usually this fundamental model is equipped with input and output routines, routines for calculating solar radiation input, routines for calculating energy flows into and out of the building, and, in some cases, routines for calculating HVAC system performance.

Of course there are many ways to set up a model, from the choice of basic mathematics to the creation of output data files. Since different people have different opinions and different needs, several different models exist and new models are being developed.

The development of a new model is very time-consuming, so if an existing model can cover ones needs, it is much more preferable to use that. The problem is to find out whether one of the existing models suits a given purpose, for example provides hourly temperature output plots for different rooms, handles water walls and attached sunspaces, performs an economic analysis, and so on.

The present survey attempts to provide the reader with sufficient information on the different models from the IEA Task VIII participating countries to decide which model can be used for which purpose. At the same time, it presents a clear picture of the state of art, which can be used to identify necessary future model developments.

METHODOLOGY

At the outset of this activity a survey form was developed and distributed to all the participating countries. A total number of 31 completed survey forms were returned. The following table shows the number of survey forms received from each country.

Country	Number Survey	
Belgium	2	ang paggang an
Canada	4	
Denmark	1	
Germany	1	
Italy	3	
Netherlands	2	
Norway	2	
Switzerland	8	
United Kingdom	1	
USA	7	
Total	31	

All the completed survey forms have been included in an Appendix to this report.

After the compilation of all the survey forms, the information was condensed into 5 summary tables presented in Chapter 3.

3. SURVEY SUMMARY TABLES

Five tables have been generated based on the information from the completed survey forms in order to present an overview of the information contained in the forms.

The tables have been ordered according to a logical search for a model:

- . Which models are capable of handling my problem?
- . Which of these are available and for what are they intended?
- . What results do they provide?
- . What input data is needed?
- . What is the calculation procedure?

When one or more models have been tentatively identified by screening through the five tables, the next step is to find the completed survey forms for the selected models, to check the information, and finally, to contact the person or organization responsible for the distribution of the model.

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A =ACTIVE, P=PASSIVE =THERMO SYPHON, 1) OVERHANG ONLY

Table 3.1 Summary of application and capability of the surveyed models

APPLICATION, CAPABILITY

Passive and hybrid systems

It is no surprise that all the thirty-one programs can be used to simulate direct gain systems. What is more interesting is that only half of the programs are able to simulate Trombe wall systems, and only twelve attached sunspaces.

Hybrid systems, combining features of active and passive (forced and natural heat transfer) solar components (primarily collector and storage), can only be simulated by four models, two of which are general network programs, that in principle can be set up to simulate anything. However, they cannot be used by the average engineer or architect. By employing some very advanced modelling, a few of the other models might also be used (SERI-RES, ESP) for the simulation of some hybrid systems. It should, however, be noted that at present there is a lack of knowledge of some of the most important parameters to be used for the simulation of hybrid systems, such as heat transfer coefficients in different block and channel geometries. Without any doubt, this is the field of development for the coming years.

Heating

All programs calculate heating loads and space temperatures. Active solar heating systems can be simulated by six of the programs. Underground loads seem to be a weak point in many of the models with only eleven claiming to be able to analyse this condition. It is striking that almost all the American programs can be used to simulate heating, ventilation and airconditioning systems. This is obviously an area which has been given far greater attention in the US than in Western Europe.

Cooling

The pattern is very similar to that of heating. It is seen that a few programs do not include any cooling calculations at all.

Lighting

Eleven of the programs have routines for switching the artificial lighting on and off based on solar radiation incident on windows. Probably this ought to be included in all programs as the impact of artificial lighting can be significant on both heating and cooling loads.

DHW

Only few of the programs can be used for simulating active and/or passive solar domestic hot water systems.

Zones

Most of the programs have been designed to simulate more than two zones, but nine programs can still only deal with one zone.

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Table 3.2
Summary of intended use and availability

of surveyed models

') E=ENGLISH, S=SI, B=BOTH

INTENDED USE AND AVAILABILITY

Intended use

Table 3.2 clearly shows that the majority of the programs have been developed for research purposes, and the intended users are therefore primarily engineers and researchers. of the programs have been developed for design development; however, most of the programs can be used for this purpose. About half of the programs are also said to be useful for post design services, whereas considerably few can be used for predesign, site analysis and schematic design. Obviously, any complex model can be used for these purposes by setting up a simple building model using numerous default values. however, only makes sense provided a simplified model, capable of analyzing the same building configuration, does not exist. This approach has the advantage that moving from a simple building model with few modes to a more complex model for design development, can be done quite easily. With this in mind, probably more of the models can be said to be useful for the pre-design, site analysis and schematic phases.

Availability

Almost all of the programs are available on main frame computers only; two are run on micro-computers. IBM is the most common computer used; however, the spread is rather large with a tendency that many American programs are run on CDC-machines. This is really one of the most crucial points, as it is often not possible to transfer a computer program from one machine to the other even if the program has been written in "Standard" FORTRAN.

Support

Most of the programs are supported by a "users guide" at a minimum and for several a "data manual" exists.

Run time

The run time quoted is for an annual simulation of a single-zone, 100 square meter residence using an hourly time step. The range is rather broad: 5 - 1000 CPU-seconds. The number of CPU seconds is very machine-dependent. It can easily vary by a factor of 5 for the same program run on different machines.

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1) HOURLY, 2) DAILY, 3) 6 MINUTES, 4) HOURLY & DAILY

Table 3.3 Summary of results and output of surveyed models

RESULTS - OUTPUT

Temperature profiles, loads and, if an HVAC system is included in the simulation, energy consumption are the fundamental outputs of these programs. Depending on the program, these variables can be given by component, zone or total building and for time-intervals of one hour, one day, one week, one month and one year. For a selected number of these possible outputs, table 3.3 shows whether or not they can be delivered by the programs.

Loads

The fact that most of these programs have been developed for detailed analysis shows up in the table. Hourly loads are given by almost all of the programs and for those that simulate multizone buildings, output is available for each zone or component.

Temperatures

All programs produce indoor air temperature as output, but it is interesting that as many as twenty also produce surface—temperatures. The existence of graphic plotting routines in a program is not that important as this tends to be very system-dependent. Obviously the possibility of producing output files with hourly data for subsequent data handling and plotting by other programs ought to be inherent in any of the programs.

Fuel consumption

When an HVAC system or plant is included in the simulation, monthly consumption and peak demand are obviously provided by most programs. Also, most programs provide energy consumption by system componenets separately.

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Summary of input data for surveyed models

Table 3.4

INPUT DATA

File type

Eleven programs create files through interactive data input but most of them require the preparation of an input file to be read by the program while it is executed.

Required/possible input data

The high density of the dots in the middle of Table 3.4 shows that most of the programs accept schematic design and architectural design data as input. This indicates that most of the programs can be used to analyse the impact of varying these data. The nature of these data is that they are very concise: for example building surface areas, building material data, building mass data etc. This is very much in line with the typical computer model of a house: a "shoebox" with windows. Only a few programs accept data on the generic building shape or building type.

Weather data

Hourly data are used in all cases, except for one which requires data given at smaller time intervals. For the rest of the programs, hourly weather data can be given for a "typical" day, or as a typical meteorological year, TMY, or any weather data file of hourly values. The data variables needed for a given program has to be explored with the program distributor. Typical data variables needed are two radiation data variables, wind speed, ambient temperature and dew point temperature.

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Summary of calculation procedures for surveyed models

Table 3,5

CALCULATION PROCEDURES

Programming language

FORTRAN is the most common language employed in the programs surveyed. Three of the models have been programmed in BASIC and two in ALGOL. However, this does not mean that the 25 FORTRAN programs can be run by any machine having a FORTRAN-compiler. The compiler is very machine-dependent, so before requesting a program it is necessary to determine on which computers the program has been running. This information is included in the survey forms but should also be checked with the authors to avoid any difficulties in implementing the program.

Heat transfer

Heat transfer is primarily modelled by finite differences but also to quite a large extent by response factors.

Solar orientation and shading

Most of the programs have routines for the calculation of solar radiation on any given surface, but when it comes to shading, only half of them can take wing-walls or any other obstruction into account.

Room temperatures

Surface and air temperatures are calculated by half of the programs and air only by the other half.

U-values

Again, half of the programs include the effect of wind speed on building U-values and half of them can also deal with moveable insulation.

Infiltration

A given air change per hour is the most common way of handling infiltration but 13 programs vary infiltration with wind speed.

Internal loads

9 programs handle sensible and latent internal loads separately while 15 consider sensible loads only.

Ventilation

Ventilation is primarily calculated as a sensible heat exchange; only two programs include latent heat exchange as well.

4. STATUS OF VALIDATION OF MODELS USED IN THE PARTICIPATING COUNTRIES

Model development is not finished after the programming phase. The model must be checked in every possible way to ensure that it is a reliable tool. The ultimate check of a model is a comparison to reality. For thermal analysis models this involves a comparison to measured data from either test cells or real houses. However, the process of validating a model against measured data is a very tedious process which is often complicated by the lack of adequate performance data. For these reasons the Task VIII participants considered it important to establish, at the outset of the work in Subtask B, the status of validation of the models used in the member countries.

Table. 4.1 was generated at one of the early working group meetings (Summer 1982) and has since been updated by the participants. It appears that the number of fully documented validation studies is very limited. DEROB, BLAST and SERI-RES are the only programs which have been validated for Trombe walls and attached sunspaces and only about seven of the programs have been validated for direct gain system data. The table provides clear indication that further work is needed in this area.

Table 4.1

IEA SOLAR HEATING AND COOLING PROGRAMME, TASK VIII, SUBTASK B

Analysis capabilities and validation experiences on highly instrumented facilities of the models used in the participating countries.

Elm-meeting, Switzerland, July, 1982

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[?] possible, not known

DG: Direct Gain

TW: Trombe Wall

SS: Sunspace

TS: Thermo-syphon system

O some work made - not documented - or work underway

validation study performed

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APPENDIX 1

COMPLETED SURVEY FORMS



IEA BOLAR RED

☐ MAIN FRAME COMPUTER

☐ CARD DECK
☐ TAPE
☐ TIME SHARING
☐ LISTING - HARD COPY

(COMPLETE SECTIONS 1, 2, 3)

☐ MICRO-COMPUTER

LISTING
RECALL ONLY MEMORY-

INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 4)

D DISC

BELGIUM

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



, pie 1	
TASK VIII - PASSIVE AND HYBRID LOW ENERGY DWELLI	
SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS	
GENERAL:	
TOOL NAME: LPB1	AVAILABLE THROUGH: Laboratoire de Physique
DEVELOPED BY: Laboratoire de Physique du	du Batiment: Universite de Liege,
Batiment: Universite' de Liege	Faculte des Sciences, Applique'es
Faculte des Sciences Applique'es	15, Avenue des Tilleuls - Bat Dl
15, Avenue des Tilleuls - Bat Dl	4000 Liege Belgique PHONE NO.: <u>041/590180</u> ext 367
4000 Liege Belgique	SUPPORTED BY: The SPPS
DATE DEVELOPED: 81	Rue de la Sciences no. 8
DATE OF LAST REVISION: 83	1040 Bruxelles - Belgique
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TOOL HARDWARE & AVAILABLE FO	DRMS:

C HAND CALCULATOR

☐ MAGNETIC CARD
☐ LISTING
☐ RECALL ONLY MEMORY

INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 5)

C GRAPHIC OR MANUAL

☐ TEMPLATES, CHARTS, TABLES ☐ BOOK ☐ DEVICE

(COMPLETE SECTIONS 1, 2, 6)



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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BELGIUM



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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CALCULATIO	N PROC	CEDURES:			,	
LANGUAGE: 1 FORTR	an 🗍 bas	IC MACHINE LAN	GUAGE 🗀 OTHER	Part Control of Contro] GRAPHS, CHART	S & SIMPLE CALC.
USER TYPE:	NTERACTIVE '	Interactive	GRAPHIC 🛭	PREPARE FILE	☐ HAND CALC	ULATION
UNITS OF CALCULATION	: ⊠ S	UNITS .	☐ ENGLISH		□ BOTH	
CHECK ALL APPROPRIAT	E BOXES:					
HEAT TRANSFER:		FINITE DIFFERENCE	E 😰	RESPONSE FACTOR	☐ STEADY	STATE
SOLAR COMP. CALCU	LATED:	DIFFUSE/DIRECT/R	E-RADIATED []	DIFFUSE/DIRECT	☐ TOTAL	
INTEGRATION:		C SIMPLE EULER	8)	IMPLICIT	OTHER	
SHADING:		🔯 ANY SOLAR OBSTRU	CTION []	OVERHANG ONLY	□ NO SHA	DING
MOVABLE SHADING:		🔯 DAILY & SEASONAL	SWITCHING [SEASONAL SWITCHIN	G D NOT CA	LCULATED
MASS EFFECT IS CA	LCULATED:	TRANSIENT HEAT F	row D	TIME CONSTANT FAC	TORS 🔲 ASSUME	NO MASS AFFECT
ROOM TEMP. BASED	ON:	SURFACE & AIR	5	AIR ONLY	O NOT CA	LCULATED
INSIDE TEMPERATUR	E:	M INPUT SCHEDULE B	y user 🔲	FIXED BY TOOL	□ VARIED	BY TOOL
U-VALUES:		CHANGE W/WIND SP	EED 🔯	REMAIN CONSTANT	O MOVABL	E INSULATION
INFILTRATION:		M AIR CHANGE PER H	our 🔲	CRACK METHOD	O VARIES	W/WIND SPEED
INTERNAL LOADS IN	CLUDE:	SENSIBLE & LATEN	T SEPARATE []	SENS. & LAT. TOTA	L 🗆 SENSIB	LE ONLY
VENTILATION:		☐ SENSIBLE	D	LATENT	O VARIES OR COM	BY SCHEDULE MAND
DAYLIGHT COEFFICI	ENTS:	SKY, REFL. & DIR	ect D	SKY & REFL.	SKY ON	LY
ZONES PER RUN:		(2) > 25	10 - 25	O 2 - 1	0 🖸	1 ONLY
SYSTEM MODELING:		SYSTEM EFFIC. IN	PUT D	SYSTEM OPTIMIZING	COMPON	ENT SENSITIVITY
ECONOMIC ANALYSIS	:	ANNUAL COST	D	SIMPLE PAYBACK	C LIFE C	YCLE COSTING
OUTPUT:						
LOAD DETERMINANTS:	COMPONEN			BUILDING		
LOADS OUTPUT BY:	M HOUR	D DAY		HTMOITH	SEASON .	☐ YEAR
TEMPERATURES:	⊠ AIR	🖾 SURFAC	E 🖺 0	GRAPHIC PLOT		
FUEL USE BY:		CONSUMPTION PEAK DEMAND	M ANNUAL CON MINUAL PEA		SYSTEM COM SHERGY SYS TOTAL BUIL	TEMS

LPB1

BELGIUM



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



HARDWARE:						
COMPUTER TYPE:	Ø IRM	CI coc	☐ UNIVAC	f7 other	,	
CORE REQUIRED:				unava		PROVINCES AND ASSESSED AND ASSESSED AND ASSESSED
SUPPORT:			TA MANUAL		bud \ & J &	
EQUIPMENT:	CRT CRT		TEXTRONIX			
•		2 Mille	EJ IBAIRONIA	ej ornek		المتعادل والمتعادل والمتعا
COSTS:		•				
ASSUMING PURCHASE OF	SOFTWARE FOR US	E ON PRESENT TIME	-SHARING:			
FIRST COST: ?						
IN-OFFICE EQUIPME	NT: CRI		PRINTER			
SOFTWARE PURCHASE	: CAS	D DECK	TAPE	The control of the co	LISTING	
SUPPORT INFORMATI	on: use	R'S GUIDE	DATA HANUAI		OTHER	
TIME TO INPUT AND	DEBUG:	man-days	MAN*	-nours		
RUN COST/TIME: ?				•		
INPUT SET-UP TIME	:	HAN-DAYS	MAN-	-HOURS		
TYPICAL* RUN TIME	: 0 > 1	HR. D	60 м - 30 м	□ 30 M - 1	ом [] < 10 M
TYPICAL* CPU TIME	: 🗆 🗅 > 1	000 SEC.	100 - 1000 SEC.	D 5 - 100	SEC.] < 5 SEC.
*FOR THIS FORM, ASSUM SECTION 2.	E "TYPICAL" TO E	E A SINGLE-ZONED	100 SQUARE METER RES	SIDENCE WITH AL	L OUTPUTS CHECK	ED (,') IN
ASSUMING USE OF SOFT	WARE ON PUBLIC T	IME-SHARING NETWO	RKS:			
NAMES AND CONTACT THROUGH THEM).	S OF TIME-SHARIN	G SERVICES WHICH	HAVE THIS PROGRAM AV	Allable (EXACT	COSTS CAN BE O	BTAINED
Laboratoire	e de Physic	que du Bati	ment.			
Universite	de Liege	. Faculte'	des .	State Mar Deliverier and the state of the st		
Sciences Ap	plique'es	15 Avenue	des			The state of the s
Sciences T			1000			unter-manuscraftelylpforform informer in thely melassass
4000 Liege	Belgique	3	A TO COMPANY OF THE PROPERTY O	·	economic and a second contract of the second	Pilithia mithiaga balan nagganakan pri madalihilan m

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	4600	PASSIVE	AND	HYBRID	SOLAR	RETURN	TO:
			LOW ENE	RGY	DWELLI	٧G		

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

GENERAL:	
TOOL NAME: SOLPA	AVAILABLE THROUGH: A De Herde
DEVELOPED BY: A De Herde - E Gratia	Unite' d'architecture, Bat.Vinci
Unite' d'architecture	Place du Levant l
Batiment Vinci	1348 Louvain-la-Neuve BELGIQUE
Place du Levant l	PHONE NO.: 010/418181 ect 2139
1348 Louvain-la-Neuve BELGIQUE	SUPPORTED BY: A. De Herde
DATE DEVELOPED: 1981	Unite' d'architecture, Bat.Vinci
DATE OF LAST REVISION: 1981	Place du Levant l
	1348 Louvain-la-Neuve - Belgique
	PHONE NO.: 010/418181 ext 2139
BRIEF DESCRIPTION: This design tool calcu	lates the performances of a window
with a "porch roof". It calculate	es, hour by hour, the shaded surface
and the balance sheet.	
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	The state of the s
TOOL HARDWARE & AVAILABLE F	ORMS:
⋈ MAIN FRAME COMPUTER ☐ MICRO-COMPUTER	☐ HAND CALCULATOR ☐ GRAPHIC OR MANUAL
☐ CARD DECK ☐ DISC ☑ TAPE ☐ TAPE	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES ☐ BOOK
☐ TIME SHARING ☐ LISTING ☐ LISTING ☐ RECALL ONLY MEMORY—	☐ RECALL ONLY MEMORY ☐ DEVICE INTEGRATED CIRCUIT
(COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 3)	(COMPLETE SECTIONS 1, 2, 6) 4)

SOLPA

BELGIUM



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



INTENDED USE:						
INTENDED FOR USE BY:						
■ ARCHITECT	TECHNICIAN	☐ RESEARCH A	NALYST X BI	uilder		
PHASE FOR WHICH DESIGN TOOL WAS DEVELO			🗀 🗷	~ L L C C L		
PRE-DESIGN SITE ANALYSIS	S SCHEMATICS	DESIGN DEV	EL. [] POST-	DESIGN SE	RV. 🔘 RESI	EADCU
PHASE(S) FOR WHICH DESIGN TOOL MAY BE	USEFUL (ANY NO.):			201011 001	EJ KEJI	CARCH
☐ PRE-DESIGN ☐ SITE ANALYSIS	☐ SCHEMATICS	D DESIGN DEV	EL. 🛛 POST-I	DESIGN SE	RV. · □ RESE	EARCH
MAJOR & MINOR ENERG	SY COMPO	NENTS A	DDRESSE	n Ry	TOOL	
M HEATING COOLING	☐ LIGHTING		DHW	THE COLUMN TWO IS NOT THE OWNER.	MISCELLANEOU	is
LOADS SPACE TEMPS.	EMS D SYSTI	UX) LEVELS EM DESIGN DMICS	☐ LOADS ☐ SOLAR ACTIV ☐ SOLAR PASSI ☐ ECONOMICS	'E	O FANS O PUMPS O MISC. ELE	CTRICAL
INPUT DATA REQUIRED: PRE-DESIGN AND SITE ANALYSIS DATA			DOES NOT ACCOMMODATE	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
LOCATION - ASSOCIATED WEATHER DATA BUILDING TYPE AND SCHEDULE OCCUPANCY RATES BUILDING AREA SPACE TEMPERATURES LOCAL ENERGY COSTS GENERIC BUILDING SHAPE DUE TO SITE R LOCAL CODE REQUIREMENTS (VENTIL., IN LIGHTING REQUIREMENTS	ESTRICTIONS SUL., ETC.)		00000000		000080808	
SCHEMATIC DESIGN DATA					Seed	E.J
BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES ARCHITECTURAL DESIGN DEVELOPMENT DATA						600
BUILDING MATERIALS & ASSOCIATED DATA	(D 500c)		-			
BUILDING MASS DATA SHADING COEFFICIENTS & DAYLIGHT TRANS INTERIOR SURFACE DATA						
ENGINEERING DESIGN DEVELOPMENT DATA						
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL						



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



THAMP					
WEATHER DATA:					
CONTRACTOR DATA & UNIDIV T	APE TYPICAL EGREE DAYS A	DAY [] MONTH VE. MONTHLY MIN	LY DATA	ATA MONTHLY E	
SOLAR DATA: 1 HOURLY T	APE 🗆 TYPI	CAL DAY PROFILE	MONTHLY	AVE. DAILY & TOTAL	
SOLAR ORIENS. CALC: MANY ORIENS. CALC: SLOPED F.	N. INCL. SLOPED ACING SOUTH		T. & HORIZ. TEFLECTANCE	ORIZ. & 4 CARDINAL	DIREC.
DAYLIGHT CALC: HOUR-BY-		CAL CLEAR & CLC	DUDY DAY/MONTH TY	PICAL DAY/MONTH	
CALCULATION PROC	DEDURES:		·	•	
LANGUAGE: 🛭 FORTRAN 🔲 BAS	IC MACHINE	LANGUAGE 🔘	OTHER	GRAPHS, CHARTS & S	
USER TYPE: D INTERACTIVE	INTERACT:	VE GRAPHIC	PREPARE FILE	C HAND CALCULATION	N
UNITS OF CALCULATION:	I UNITS	. D EN	GLISH	□ BOTH	
CHECK ALL APPROPRIATE BOXES:					
HEAT TRANSFER:	FINITE DIFFE	RENCE	C RESPONSE FACTOR	STEADY STATE	E
SOLAR COMP. CALCULATED:	DIFFUSE/DIRE	CT/RE-RADIATED	DIFFUSE/DIRECT	☐ TOTAL	
INTEGRATION:	SIMPLE EULER		IMPLICIT	C OTHER	
SHADING:	ANY SOLAR OB	STRUCTION	OVERHANG ONLY	no shading	
MOVABLE SHADING:	M DAILY & SEAS	ONAL SWITCHING	SEASONAL SWITCHING		
MASS EFFECT IS CALCULATED:	TRANSIENT HE	AT FLOW	TIME CONSTANT FACTO	ORS 🔯 ASSUME NO M	ASS AFFECT
ROOM TEMP. BASED ON:	SURFACE & AI	R	AIR ONLY	NOT CALCULA	TED
INSIDE TEMPERATURE:	INPUT SCHEDU	LE BY USER	C FIXED BY TOOL	O VARIED BY T	OOL
U-VALUES:	CHANGE W/WIN	D SPEED	C) REMAIN CONSTANT	MOVABLE INS	ULATION
INFILTRATION:	AIR CHANGE P	ER HOUR	CRACK METHOD	U VARIES W/WI	ND SPEED
INTERNAL LOADS INCLUDE:	SENSIBLE & L	ATENT SEPARATE	🖸 SENS. & LAT. TOTAL	☐ SENSIBLE ON	LLY
VENTILATION:	☐ SENSIBLE		☐ LATENT	OR COMMAND	CHEDULE
DAYLIGHT COEFFICIENTS:	🛭 SKY, REFL. &	DIRECT	SKY & REFL.	SKY ONLY	
ZONES PER RUN:		C 10 - 2	25 🔘 2 - 10	☐ 1 ONI	.Υ
SYSTEM HODELING:	SYSTEM EFFIC	. INPUT	SYSTEM OPTIMIZING	COMPONENT S	ENSITIVITY
ECONOMIC ANALYSIS:	ANNUAL COST		SIMPLE PAYBACK	O LIFE CYCLE	COSTING
OUTPUT:		•			
LOAD DETERMINANTS: S COMPONE	NT C) ZC	NE	BUILDING		
LOADS OUTPUT BY: NOUR	D D/	ľ	C) HONTH	☐ SEASON	C) YEAR
TEMPERATURES: [] AIR	[i] si	IRFACE	GRAPHIC PLOT	•	
FUEL USE BY: MONTHLY	CONSUMPTION PEAK DEMAND	C ANNU.	AL CONSUMPTION AL PEAK DEMAND	SYSTEM COMPONER ENERGY SYSTEMS TOTAL BUILDING	

SOLPA

BELGIUM



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



HARDWARE:					
COMPUTER TYPE:	[] IBM	CDC	☐ UNIVAC	M OTHER Hewle	tt Packard
CORE REQUIRED:	□ > 500K	100 - 500	K 🔯 25	- 100 K	< 25 K
SUPPORT:	☑ USER'S GUIDE	☐ DAT	A MANUAL	O OTHER	derlik françosas digyesis first-rismer ya silipaddirif mildi bishi sari adalariy, a maji yiki sirindiki filipa
EQUIPMENT:	⊠ CRT '	PRINTER	☐ TEXTRONIX	C) OTHER	pagamagaph karband draki-managapapaga ind and ne probjects angles / cross/nearl/Com-PPO ne
COSTS:					
ASSUMING PURCHASE O	F SOFTWARE FOR USE	ON PRESENT TIME-	SHARING:		
FIRST COST: ?					
IN-OFFICE EQUIPME	ENT: CRT		PRINTER	en-rough-granifigates personal automorphysiologia	
SOFTWARE PURCHASE	E: CARD	DECK	TAPE	LIS	TING
SUPPORT INFORMAT	ion: user	'S GUIDE	DATA MANUAL	OTH	ER
TIME TO INPUT AN	DEBUG:	MAN-DAYS	MAN	HOURS	
RUN COST/TIME: ?				`	
INPUT SET-UP TIM	E:	MAN-DAYS	MAN-	HOURS	
TYPICAL* RUN TIM	E: 🔘 > 1 1	ir. 🔘	60 M - 30 M	☐ 30 M - 10 M	□ < 10 M
TYPICAL* CPU TIM	E: 🗆 > 100	00 SEC.	100 - 1000 SEC.	□ 5 - 100 SEC.	□ < 5 SEC.
*FOR THIS FORM, ASSUM SECTION 2.	HE "TYPICAL" TO BE	A SINGLE-ZONED 1	00 SQUARE METER RES	IDENCE WITH ALL OUTP	JTS CHECKED (/) IN
ASSUMING USE OF SOF	WARE ON PUBLIC TIE	E-SHARING NETWOR	KS:		
NAMES AND CONTACT	IS OF TIME-SHARING	SERVICES WHICH H	AVE THIS PROGRAM AV	AILABLE (EXACT COSTS	CAN BE OBTAINED
Laboratoir	e de Coinie	Ciul	the contains an	angeriannen en	nggili ili ili ili ili ili ili ili ili il
Batiment V	inci Place	du Levant	gg.gg. gr. spilytfilmfiltsspilytmanspillmannssistemante	enter protesse entre de grande paraticular alla de un monerco que mosta de grande de la comencia de la comencia	gynalogi (proteintyr yn ein 146 cynal Noeineaddiol y ei y hysgelyg y y y y y y y y y y y y y y y y y y
1348 Louva	in-la-Neuve	Belgique	gaza gazatata-umananananananananananananananananananan		ng Balansa Blave VIII (Balador maio P.O(Balador Promisio respecta productiva account account account to the
					novembereise me modelle die belog degenskelske betregensk open verkenske 1940.

IEA SOLAR RED

SIVE HOUSE DESIGN

CANADA

RETURN TO:

Michael Glover Solar Energy Program

Bldg. R-92

National Research Council

SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



TASK	VIII	6/9m	PASS	SIVE AND	HYBRID	SOLAR
			LOW	ENERGY	DWELLIN	VG.

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

G	E	N	E	R	A	L	
Saleman	-	-	-	-	-	ntestan	-

GENERAL:	Ottawa, Ontario KIA OR6
TOOL NAME: Passive House Design	AVAILABLE THROUGH: M. Zaheeruddin
DEVELOPED BY:M. Zaheeruddin and R.R. Gilpin	Department of Mechanical Engineering
Dept. of Mechanical Engineering	The University of Alberta
The University of Alberta	EDMONTON, Canada.
EDMONTON, Alberta T6G 2G8	PHONE NO.: (403) 432-3251
	SUPPORTED BY:
DATE DEVELOPED: July 1980 DATE OF LAST REVISION: July 1981	Department of Mechanical Engineering
	PHONE NO.:
BRIEF DESCRIPTION: The Passive House Design s	
to variations in radiation fluxes and am	bient air temperatures. The program can
investigate the effect of thermal mass i	n the structure and contribution of soil
mass surrounding the basement.	
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	

TOOL HARDWARE & AVAILABLE FORMS:

MA 🏙	IN F	EMAS	сомри	TER
------	------	------	-------	-----

- ☐ MICRO-COMPUTER
- ☐ HAND CALCULATOR
- C GRAPHIC OR MANUAL

- ☐ DISC
- ☐ MAGNETIC CARD
- ☐ TEMPLATES, CHARTS, TABLES ☐ BO'X ☐ DEVICE

- CARD DECK TIME SHARING
- ☐ TAPE
 ☐ LISTING

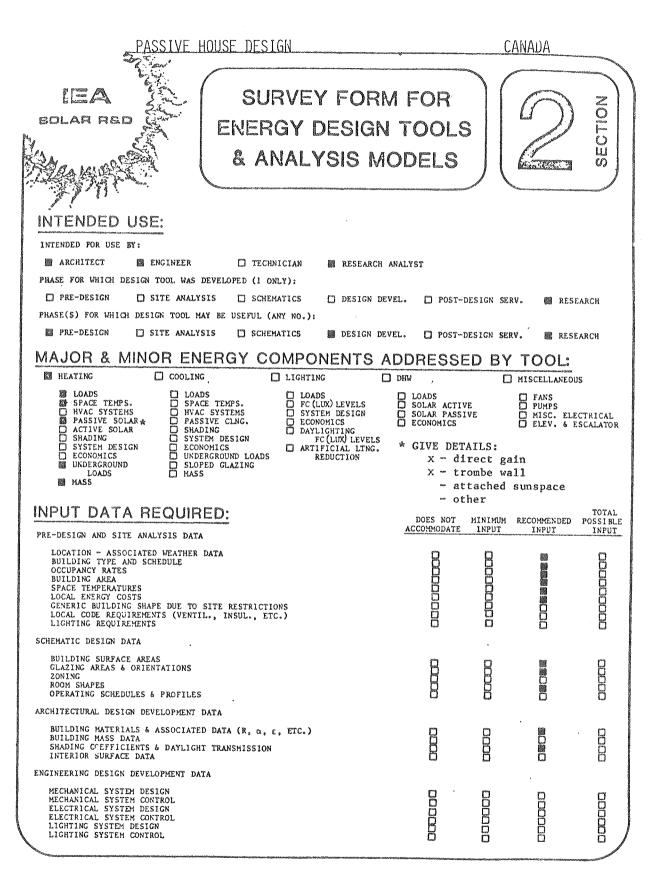
- [] LISTING HARD COPY
- T RECALL ONLY MEMORY-INTEGRATED CIRCUIT
- LISTING
 RECALL ONLY MEMORY
 INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 6)

(COMPLETE SECTIONS 1, 2, 3)

(COMPLETE SECTIONS 1, 2, 4)

(COMPLETE SECTIONS 1, 2, 5)





SURVEY FORM FOR



	ENERGY DE	SIGN TOOLS	II // El
	2 ANALVO	IS MODELS	O O
MAKINGTON	(a VIAVE 12	19 MODELS	
		a parametris com un primeiro es es primeiros es es primeiros com como con circo de presentacion de la como como como como como como como com	Managa Adapti (Autorita Adapti Antonia
WEATHER DATA:			
TEMPERATURE DATA: HOUR	LY TAPE TYPICAL DAY M AL DEGREE DAYS AVE. MONTHLY	ONTHLY DATA ANNUAL D	ATA
SOLAR DATA: B HOUR	LY TAPE TYPICAL DAY PRO	FILE D MONTHLY	AVE. DAILY & TOTAL
SOLAR ORIENS. CALC: ANY	ORIEN. INCL. SLOPED ANY DED FACING SOUTH SUR	VERT. & HORIZ.	ORIZ. & 4 CARDINAL DIREC.
DAYLIGHT CALC: HOUR-	-BY-HOUR	CLOUDY DAY/MONTH TY	PICAL DAY/MÓNTH
CALCULATION PR	OCEDURES:		,
LANGUAGE: FORTRAN	BASIC	O OTHER	GRAPHS, CHARTS & SIMPLE CALC.
	VE INTERACTIVE GRAPHIC		
UNITS OF CALCULATION:	I SI UNITS	ENGLISH	🗀 вотн
CHECK ALL APPROPRIATE BOXES:			
HEAT TRANSFER:	FINITE DIFFERENCE	RESPONSE FACTOR	STEADY STATE
SOLAR COMP. CALCULATED:	DIFFUSE/DIRECT/RE-RADIATE	ED DIFFUSE/DIRECT	☐ TOTAL
INTEGRATION:	SIMPLE EULER	IMPLICIT	☐ OTHER
SHADING:	ANY SOLAR OBSTRUCTION	OVERHANG ONLY	O NO SHADING
MOVABLE SHADING:	M DAILY & SEASONAL SWITCHIN	G SEASONAL SWITCHING	☐ NOT CALCULATED
MASS EFFECT IS CALCULATED:	TRANSIENT HEAT FLOW	TIME CONSTANT FACTOR	S ASSUME NO MASS AFFECT
ROOM TEMP. BASED ON:	SURFACE & AIR	C) AIR ONLY	O NOT CALCULATED
INSIDE TEMPERATURE:	INPUT SCHEDULE BY USER	FIXED BY TOOL	☐ VARIED BY TOOL
U-VALUES:	CHANGE W/WIND SPEED	D REMAIN CONSTANT	MOVABLE INSULATION
INFILTRATION:	air Change per hour	CRACK METHOD	☐ VARIES W/WIND SPEED
INTERNAL LOADS INCLUDE:	SENSIBLE & LATENT SEPARAT	E 🗍 SENS. & LAT. TOTAL	SENSIBLE ONLY
VENTILATION:	SENSIBLE	☐ LATENT	WARIES BY SCHEDULE OR COMMAND
DAYLIGHT COEFFICIENTS:	SKY, REFL. & DIRECT	C SKY & REFL.	C) SKY ONLY
ZONES PER RUN:	D > 25	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: COMPO	NENT D ZONE	BUILDING	
LOADS OUTPUT BY:	D DAY	MONTH [SEASON YEAR
TEMPERATURES: MAIR	☐ SURFACE	GRAPHIC PLOT	
		UAL CONSUMPTION [SYSTEM COMPONENTS DENERGY SYSTEMS TOTAL BUILDING ONLY



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



HARDWARE	u 9				
COMPUTER TYPE:	☐ IBM	☐ CDC	□ UNIVAC	OTHER	AMDHAL V/470
CORE REQUIRED:	□ > 500K	🗍 100 - 5	00 K 📓 25	- 100 K	□ < 25 K
SUPPORT:	USER'S GUI	DE 🖸 D.	ATA MANUAL	O OTHER	
EQUIPMENT:	O CRT	PRINTER	☐ TEXTRONIX		
COSTS:					
ASSUMING PURCHASE O	F SOFTWARE FOR I	SE ON PRESENT TIM	E-SHARING:		
FIRST COST: Not	known				
IN-OFFICE EQUIPM	ENT: CF		PRINTER		
SOFTWARE PURCHAS			TAPE		LISTING
SUPPORT INFORMAT			DATA MANUAL		OTHER
TIME TO INPUT AN	D'DEBUG:	MAN-DAYS	MAN-	-HOURS	And a second
RUN COST/TIME:				t	
INPUT SET-UP TIM	E:	MAN-DAYS	1 MAN-	-HOURS	
TYPICAL* RUN TIM	E: 🔲 >	I HR.	60 м - 30 м	☐ 30 M - 10) и О < 10 и
TYPICAL* CPU TIM	E: 🗇 >	1000 SEC. D	100 - 1000 SEC.	■ 5 - 100 s	EC.
*FOR THIS FORM, ASSUM SECTION 2.	ME "TYPICAL" TO	EE A SINGLE-ZONED	100 SQUARE METER RES	SIDENCE WITH ALL	OUTPUTS CHECKED (/) IN
ASSUMING USE OF SOFT	TWARE ON PUBLIC	TIME-SHARING NETWO	RKS:		
NAMES AND CONTACT THROUGH THEM).	S OF TIME-SHARI	G SERVICES WHICH	HAVE THIS PROGRAM AV	AILABLE (EXACT	COSTS CAN BE OBTAINED
_					•
	And the second s	The second of the second secon		AND AND A SECOND	
	name (name in the control of the con	SECONDARION SECON	VETS-VETSOPPORT OF LEGIS (Incide de manaren estador)		of the Conference or assume the processing of the second process and the School
			Mic Condo.	harifele Elligelaursynau og de philosomete gegin des dy mittel fram akteur gena y yppog	

ENCORE - CANADA

CANADA



SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



TASK	VIII	400.00	PASS	IVE AND	HYBRID	SOLAR
			LOW	ENERGY	DWELLI	NG

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

G		N	E	R	A	L	
---	--	---	---	---	---	---	--

TOOL	NAME:	Encore-	-Canada	
DEVE	LOPED BY:	A. Koni	rad	
****	Division	of Buil	lding Research	
***	National	Researc	ch Council of	Canada
	Ottawa, (Ontario.	KLA OR6	
				,
DATE	DEVELOPED:	August	1978	
DATE	OF LAST REV	ISION:	1980	

RETURN TO:

Michael Glover Solar Energy Program National Research Council Bldg. R-92 Ottawa, Ontario , KlA OR6

AVAILABLE THROUGH:
Thermal Performance Section
Division of Building Research
National Research Council of Canada
PHONE NO.: Ottawa, KIA OR6 (613) 993-1421
SUPPORTED BY:
Thermal Performance Section
Division of Building Research
National Research Council of Canada
PHONE NO.: Ottawa, KlA OR6 (613) 993-1421
447/Authorisenshare has not an experience of the control of the co

BRIEF DESCRIPTION: The Encore-Canada program performs a dynamic simulation of energy use on an hourly basis using real weather data. Internal heat storage is taken into account. Air infiltration calculations are based on mass flow balance. Solar effects are Temperature variation from room to room is permitted provided that electric heaters controlled by proportioning thermostats are used. Oil-fired furnace heated

PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.

(continued over)

TOOL HARDWARE & AVAILABLE FORMS:

- MAIN FRAME COMPUTER
- ☐ MICRO-COMPUTER
- [] HAND CALCULATOR
- C GRAPHIC OR MANUAL

- CARD DECK
 - TAPE
 TIME SHARING
- D DISC ☐ TAPE | LISTING
- D LISTING

MAGNETIC CARD

☐ TEMPLATES, CHARTS, TABLES D BOCK

- LISTING HARD COPY
- RECALL ONLY MEMORY-
- RECALL ONLY MEMORY
 INTEGRATED CIRCUIT
- DEVICE

(COMPLETE SECTIONS 1, 2, 3)

INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 5)

(COMPLETE SECTIONS 1, 2, 6)

(COMPLETE SECTIONS 1, 2, 4)

.ENCORE- CANADA

CANADA

EA EDLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS SECTION

COMMENTS:

houses with hot air distribution systems can also be simulated. Internal heat gains (occupancy, lighting, appliances, hot water) are described by 24-hour schedules. Heat transfer through basement walls and floor is computed on the basis of a yearly cycle of ground surface sol-air temperature and constant basement indoor temperature.

CANADA

SURVEY FORM FOR



SOLAR RED	ENERGY DESIGN	TOOLS			5
Manus Si I	& ANALYSIS MO	DDELS			SE
		nany arouten violate menananjeng ng ng ng ng ng ng ng ng ng		Parasa antana per selepara de la constitució de	nemaassi liilil
INTENDED USE:					
INTENDED FOR USE BY:					
☐ ARCHITECT ☐ ENGINEER	🗋 TECHNICIAN 💮 RESEARCH	walyst			
PHASE FOR WHICH DESIGN TOOL WAS	DEVELOPED (1 ONLY):				
PRE-DESIGN	rsis 🔘 schematics 📋 design dev	rel. 🛛 Post-di	ESIGN SERV	. 📓 RESE.	ARCH
PHASE(S) FOR WHICH DESIGN TOOL M	MAY BE USEFUL (ANY NO.):				
☐ PRE-DESIGN ☐ SITE ANALY	SIS D SCHEMATICS DESIGN DEV	EL. 📳 POST-DI	ESIGN SERV	. RESE	arch
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FUEL USE MY:	O MONTHLY			L CONSUMPTION L PEAK DEMAND		SYSTEM COMPONENTS ENERGY SYSTEMS	



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



HARDWARE:						
COMPUTER TYPE:	■ IBM	CDC CDC	UNIVAC	OTHER		promoter and the second of the
CORE REQUIRED:	□ > 500K	[] 100 - 500 K	C) 25 -	100 K	□ < 25 K	
SUPPORT:	user's Guide	C) DATA	MANUAL	O OTHER CON	<u>versational</u>	Front-end
EQUIPMENT:	C CRT	PRINTER	[] TEXTRONIX	O OTHER		
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ASSUMING PURCHASE OF	SOFTWARE FOR US	E ON PRESENT TIME-SH	LARING:			
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IN-OFFICE EQUIPME	NT: CRT	diamiti 200 Provi Elechti (El 201 I Nillondo) delphoj dephoje menede representación a secretario	PRINTER	, Kaliman ng Angliyan shimin ni iliya na kitya ng pagaga ay 1926		
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TIME TO INPUT AND	DEBUG:	HAN-DAYS	MAN-HC	ours		
RUN COST/TIME:				3 .		
INPUT SET-UP TIME	<u>1</u>	/2 HAN-DAYS	MAN-HC	ours		
TYPICAL* RUN TIME	: 0 > 1	ик. □ 60	M - 30 M	O 30 H - 10 H	1	< 10 M
TYPICAL® CPU TIME	: 0 > 10	000 SEC. 🔞 100	0 - 1000 SEC.	□ 5 - 100 SEC		< 5 SEC.
°FOR THIS FORM, ASSUME SECTION 2.	e "typical" to be	E A SINGLE-ZONED 100	square meter resid	SENCE WITH ALL O	OUTPUTS CHECKED	(/) IN
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PASSIVE FEA SOLAR RED

SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



<u>CANAD</u>A

TASK VIII - PASSIVE AND HYBRID SOLAR

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

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RETURN TO:

Michael Glover Solar Energy Program National Research Council

Ottawa, Ontario
KIA OR6
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and Associates Limited,
Ontario
16) 445–8255
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C GRAPHIC OR MANUAL
TEMPLATES, CHARTS, TABLES BOCK DEVICE COMPLETE SECTIONS 1, 2, 6)

PASSIVE CANADA SURVEY FORM FOR SECTION EDLAR RED **ENERGY DESIGN TOOLS** & ANALYSIS MODELS INTENDED USE: INTENDED FOR USE MY: [] ARCHITECT ENGINEER TECHNICIAN M RESEARCH ANALYST PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY): PRE-DESIGN SITE ANALYSIS ☐ SCHEMATICS DESIGN DEVEL. D POST-DESIGN SERV. RESEARCH PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.): SITE ANALYSIS SCHEMATICS DESIGN DEVEL. D POST-DESIGN SERV. RESEARCH MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: COOLING # HEATING I LIGHTING ☐ DHW MISCELLANEOUS LOADS
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PASSIVE

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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MOVABLE SHADING:		☐ DAILY	& SEASONAL	SWITCHING	SEASONAL	SWITCHING	D NOT CALCU	
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PASSIVE EDLAR RED

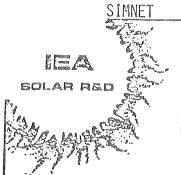
CANADA

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MICRO-COMPUTER

HARDWAR MANUFACTURER AND	MODEL NUMBER: Wang	g 2200 MVP	(Mini)		,
RANDOM ACCESS ME	ORY (RAM) REQUIRED:	12.5	K		
DOES THIS TOOL RE	EQUIRE A PRINTER?	W YES	О ио	,	
SUPPORT:	USER'S GUIDE	D	DATA MANUAL	O OTHER	
COSTS:					
FIRST COST:					
MICRO-COMPUTER			an-massife assage		
SOFTWARE:				LISTING	
SUPPORT INFORM	MATION: USER	'S GUIDE	D/	TA MANUAL	OTHER
TIME TO INPUT	AND DEBUG:	MAN-DAY	\$	MAN-HOURS	
RUN COST/TIME:				7	
TYPICAL* INPUT	SET-UP TIME: 1	MAN-DAY	S - CONTRACTOR CONTRAC	MAN-HOURS	
TYPICAL* RUN T	IME:	HRS.	2.0	_ MIN.	
TYPICAL* PRINT	TIME:	HRS.	0.1	_ HIN.	
*FOR THIS FORM, AS SECTION 2.	SUME "TYPICAL" TO BE	A SINGLE-ZONE	D 100 SQUARE METE	CR RESIDENCE WITH ALL OF	JTPUTS CHECKED (/) IN
	_				
	·				



GENERAL:

TOOL NAME: SIMNET

DEVELOPED BY: Robin Barker

SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



<u>CANADA</u>

TASK VIII - PASSIVE AND HYBRID SOLAR

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

LOW	ENERGY	DWELLING	
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Michael Glover Solar Energy Program National Research Council Bldg. R-92

	6	
	Ottaw	va, Ontario
	Kla C	
VAILABLE	THROUGH:	University of Guelph,
-	The state of the s	GIELPH, Ontario.

RETURN TO:

uto	Margo Mandy	GIELPH, Ontario.
	Watershed Energy Systems	
	97 Six Point Road	PHONE NO.: (519) 824 4120
***	TORONTO, Ontario. M8Z 2X3	PHONE NO.: (519) 824-4120 SUPPORTED BY:
DATE	DEVELOPED: January 1982	
DATE	of last revision: June 1982	
	The STMNITT THE STATE OF THE ST	PHONE NO.:

BRIEF DESCRIPTION: The SIMNET program performs a dynamic simulation on an hourly basis using real meteorological input. The program is similar to PASOLE program. In addition to simulating passive solar systems (direct gain, trombe wall and attached SUN space systems) the program simulates hybrid passive systems incorporating isolated rock storage which is either blower or heat pump charged.

PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.

TOOL HARDWARE & AVAILABLE FORMS:

- MAIN FRAME COMPUTER
- ☐ MICRO-COMPUTER
- C HAND CALCULATOR
- C GRAPHIC OR MANUAL

- D DISC
- MAGNETIC CARD

- CARD DECK
- [] TAPE [] LISTING
- ☐ LISTING ☐ RECALL ONLY MEMORY
- D TEMPLATES, CHARTS, TABLES □ BOCK

- TAPE
 TIME SHARING [] LISTING - HARD COPY
- C RECALL ONLY MEMORY -
- INTEGRATED CIRCUIT
- DEVICE

- (COMPLETE SECTIONS 1, 2, 3)
- INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 5)

(COMPLETE SECTIONS 1, 2, 6)

(COMPLETE SECTIONS 1, 2, 4)

SIMNET

SIMNET

BOLAR RED

CONTROL

SIMNET

CANADA

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



& ANALYSIS MO	nnere	Principle of the Party of the P	C. P.	m
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INTENDED USE:				
INTENDED FOR USE BY:				
□ ARCHITECT 📓 ENGINEER □ TECHNICIAN 🥮 RESEARCH A	NALYST			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☐ DESIGN DEV	EL. 🛛 POST-I	ESIGN SER	RV. E RES	EARCH
PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):				
☐ PRE~DESIGN ■ SITE ANALYSIS ■ SCHEMATICS ■ DESIGN DEVI	EL. 🛭 POST-I	esign ser	. RESI	EARCH
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SCHEMATIC DESIGN DATA .				
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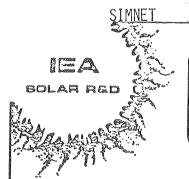
IEA SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

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ROOM TEMP. BASED OF	N:	[] SURFAC			AIR ONLY				
INSIDE TEMPERATURE			SCHEDULE BY	USER	FIXED BY	7		NOT CALCULATE	
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ZONES PER RUN:		C) > 25		[] 10 - 25		2 - 10		[] 1 ONLY	
SYSTEM MODELING:		C SYSTEM	EFFIC. INPU	T	O SYSTEM OF	TIMIZING		COMPONENT SEN	SITIVITY
ECONOMIC ANALYSIS:		LAUWWAL	COST		SIMPLE PA	YBACK		LIFE CYCLE COS	STING
DUTPUT:									
LOAD DETERMINANTS: [] COMPONENT		ZONE	i i	BUILDING				
CADS OUTPUT BY:	a Hour		₩ DAY	-	MONTH	r] SEASO		Ø vr.⇔
TEMPERATURES:	air		SURFACE		GRAPHIC PLO		u uenau	***	YEAR
C	J MONTHLY C J MONTHLY P J OTHER	EAK DEMAND		ANNUAL	CONSUMPTION PEAK DEMAND] ENERG	M COMPONENTS Y SYSTEMS BUILDING ONL	



CANADA

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMPUTER TYPE:	IBM IBM		Ti chc		D UNIVAC		ເ ປັດພາກ	,	
	E > 500K	•							
SUPPORT:	D USER'S						100 K		
EQUIPMENT:	C) CRT	,			ANUAL			Andrews Proposition Williams	
EQUITIENT:	C CKI	E	B PRINIES		☐ TEXTRON	IX	LJ OTHER _	kahilidendergankumanyon esibi Arken umminrelydyympayersym	~~~~~ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
COSTS:									
ASSUMING PURCHASE O	F SOFTWARE F	FOR USE ON	PRESENT	TIME-SHA	RING:				
FIRST COST:					•				
IN-OFFICE EQUIPM	ENT:	CRT			PRINT	er X			
SOFTWARE PURCHAS	E:	CARD DE	CK					LISTING	X
SUPPORT INFORMAT	ion:	user's	GUIDE						
TIME TO INPUT AND	DEBUG:	1	MAN-D	AYS		Man-ho	ours		
RUN COST/TIME:									
INPUT SET-UP TIME	E:	-	MAN-D	AYS	1/2	_ MAN-H(ours		
TYPICAL* RUN TIM	:: E) > 1 HR.		[] 60 H	4 - 30 M		O 30 M -	10 M	□ < 10 m
TYPICAL® CPU TIM	E: [) > 1000	SEC.	[] 100	- 1000 SE	.	■ 5 - 10	O SEC.	□ < 5 SEC.
FOR THIS FORM, ASSUM	Æ "TYPICAL"	TO BE A	SINGLE-ZO	ned 100 s	QUARE MET	ER RESII	DENCE WITH	ALL OUTPUTS C	HECKED (/) IN
ASSUMING USE OF SOFT	WARE ON PUB	LIC TIME-	SHARING N	ETWORKS:					
NAMES AND CONTACT THROUGH THEM).	S OF TIME-S	HARING SEI	RVICES WH	ICH HAVE	THIS PROG	IAVA MAS	LABLE (EXA	CT COSTS CAN	BE OBTAINED
Robin Barker		various encourage and non-constitution to the		ani walioliwa kananya ana					
97 Six Point	Road		wentineserromonace entering	destination destinations	Paretmoreau				and an analysis of the second
TORONTO, (On	tario).								The second secon

IEA BOLAR RED DENMARK

SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



TASK	VIII	6000	PASSIVE AND	HYBRID SOLAR	RETURN	TO
			LOW ENERGY	DWELLING		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHO

ODDINGR C - DESIGN METHODS	
GENERAL:	
TOOL NAME: BA4	AVAILABLE THROUGH:
DEVELOPED BY: Hans Lund	ALINOUSIE COMPANIE CO
Thermal Insulation Laborato	ry Thermal Insulation Laboratory
Technical University of Deni	mark
Building 118 - DK-2800 Lyng	DY PHONE NO.:
Denmark	SUPPORTED BY:
DATE DEVELOPED:	madeline 44-by 1935-to-me the Philipping must find a single fine 4 single rest of the specific and produce on the specific and an appropriate and appropriate appropriate and appropriate appropriate and appropriate appropriate appropriate and appropriate appropriate appropriate and appropriate
DATE OF LAST REVISION:	
	PHONE NO.:
BRIEF DESCRIPTION: The programme calculate	es for a room half-hour values during
a whole year of room tempera	tures, utilizing a simplified method.
Further it can calculate hea	ting and cooling loads, taking into
	and movable sun shading devices, va-
rying ventilation and infilt	ration, electric lighting and other
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	heat sources in the room, etc.
TOOL HARDWARE & AVAILABLE FO	TOME.
AATN FRAME COMPUTED CO WY COO COMPUTED	HAND CALCULATOR GRAPHIC OR MANUAL
S CARD DECK ☐ DISC ☐ TAPE ☐ TAPE ☐ TIME SHARING ☐ LISTING ☐ LISTING ☐ HARD COPY ☐ RECALL ONLY MEMORY— INTEGRATED CIRCUIT	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES ☐ BOOK ☐ DEVICE ☐ DEVICE
(COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 4)	(COMPLETE SECTIONS 1, 2, 5)

DENMARK

SURVEY FORM FOR

BOLAR RED	ENERGY DESIG	AN TOOLS	3 -		0
Marayes ?	& ANALYSIS				SEC
A A 1 THE PART OF A 1 THE PART OF A 1					200
INTENDED USE:					
INTENDED FOR USE BY:					
☐ ARCHITECT 🔯 ENGINEER		RCH ANALYST			
PHASE FOR WHICH DESIGN TOOL WAS I	EVELOPED (1 ONLY):				
PRE-DESIGN SITE ANALYS	6.13 SACE CO	N DEVEL. POST-	DESIGN SE	RV. 🔊 RES	EARCH
PHASE(S) FOR WHICH DESIGN TOOL MA	Y BE USEFUL (ANY NO.):				• " "
☐ PRE-DESIGN ☐ SITE ANALYS	IS [] SCHEMATICS [2] DESIG	N DEVEL. 👸 POST-	DESIGN SE	RV. 👸 RESI	EARCH
MAJOR & MINOR EN	ERGY COMPONENTS	S ADDRESSI	n Ry	′ TOOI •	
★ HEATING ★ COOLING	[LIGHTING	O DHW	CONTROL OF THE PROPERTY OF THE PARTY OF THE] MISCELLANEON	is
HVAC SYSTEMS HVAC PASSIVE SOLAR PASS CALL SHADING SHADING SYSTEM DESIGN ECONOMICS	E TEMPS. FC(LUX) LEVELS SYSTEMS SYSTEM DESIGN IVE CLNG. DECONOMICS ING DAYLIGHTING EM DESIGN FC(LUX) LEVI	D LOADS D SOLAR ACTIVED SOLAR PASS:D ECONOMICS ELS	Æ	D PUMPS D MISC. ELE	CTRTCAT
INPUT DATA REQUIRE PRE-DESIGN AND SITE ANALYSIS DATA	no D a	DOES NOT ACCOMMODATE	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
LOCATION - ASSOCIATED WEATHER E BUILDING TYPE AND SCHEDULE OCCUPANCY RATES BUILDING AREA SPACE TEMPERATURES LOCAL ENERGY COSTS GENERIC BUILDING SHAPE DUE TO S LOCAL CODE REQUIREMENTS (VENTIL LIGHTING REQUIREMENTS	TTF BECTEI/TYOUG				
SCHEMATIC DESIGN DATA		133-	hal		O
BUILDING SURFACE AREAS SLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES		S			
ARCHITECTURAL DESIGN DEVELOPMENT D.	ATA T		Qued!	tú.J	بعه
BUILDING MATERIALS & ASSOCIATED BUILDING MASS DATA SHADING COEFFICIENTS & DAYLIGHT INTERIOR SURFACE DATA	DATA (R, Q, E, ETC.) TRANSMISSION	B			(X)
ENGINEERING DESIGN DEVELOPMENT DATA	4				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL		3 3			

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BOLAR RED

DENMARK

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



						ranamanananan	/ \		
WEATHER DA	ATA:								
TEMPERATURE DATA:	(X HOURLY T.		TYPICAL DAY			ANNUAL DA		☐ MONTHLY DEG	
SOLAR DATA:	MOURLY T	APE [TYPICAL DA			MONTHLY A	AVE. DA	AILY & TOTAL	
SOLAR ORIENS. CALC:	ANY ORIEN		.oped {	S ANY VERT D SURFACE	. & HORIZ. REFLECTANC	Е 🛭 Н(ORIZ.	& 4 CARDINAL DI	IREC.
DAYLIGHT CALC:	☐ WANNAT		TYPICAL CL			TH C) TYI	PICAL 1	DAY/MONTH	
CALCULATIO	N PROC	EDUR	ES:						
LANGUAGE: DE FORTRA	an 🖸 bas	IC D HA	CHINE LANGUA	GE 🗆 OT	HER		GRAPHS,	, CHARTS & SIMP	PLE CALC.
USER TYPE: [] IN	NTERACTIVE		TERACTIVE GRA		🕸 prepar			ND CALCULATION	
UNITS OF CALCULATION:	; Ø s:	I UNITS		[] ENGL	ISH			BOTK	
CHECK ALL APPROPRIATE	E BOXES:								
HEAT TRANSFER:		₩ FINITE	DIFFERENCE		☐ RESPONS	E FACTOR	D	STEADY STATE	
SOLAR COMP. CALCUI	LATED:	DIFFUSE	e/direct/re-p	RADIATED	O DIFFUSE	/DIRECT		TOTAL	
INTEGRATION:		SIMPLE	EULER		C IMPLICI	T		OTHER	
SHADING:		ANY SOL	LAR OBSTRUCTI	ion x	🖏 overhan	G ONLY		NO SHADING	
MOVABLE SHADING: X	other	DAILY &	SEASONAL S	VITCHING	C SEASONA	L SWITCHING		NOT CALCULATED)
MASS EFFECT IS CAL	CULATED:	TRANSIE	ENT HEAT FLOW	7	TIME CO	NSTANT FACTOR	rs 🖺	ASSUME NO MASS	AFFECT
ROOM TEMP. BASED (: MC	SURFACE	& AIR		☐ AIR ONL	Y	D	NOT CALCULATED)
INSIDE TEMPERATURE	š:	🖄 INPUT S	SCHEDULE BY U	JSER	C FIXED B	Y TOOL		VARIED BY TOOL	_
U-VALUES:		C CHANGE	W/WIND SPEED)	8 REMAIN	CONSTANT	8	MOVABLE INSULA	ATION
INFILTRATION:	_	M AIR CHA	ange per houp	ŧ	CRACK M	ETHOD	O	VARIES W/WIND	SPEED
INTERNAL LOADS INC	CLUDE:	C SENSIBL	LE & LATENT S	SEPARATE	☐ SENS. &	LAT. TOTAL	(2)	SENSIBLE ONLY	
VENTILATION:		SENSIBI	Œ.		C LATENT		O	VARIES BY SCHE	EDULE
DAYLIGHT COEFFICIE	ents:	☐ SKY, RE	EFL. & DIRECT	r	□ SKY & R	EFL.		SKY ONLY	
ZONES PER RUN:		[] > 25	i	1 0 - 25		D 2 - 10		☑ 1 ONLY	
SYSTEM MODELING:		SYSTEM	EFFIC. INPUT	r	C SYSTEM	OPTIMIZING	O	COMPONENT SENS	YTIVITI
ECONOMIC ANALYSIS:	•	TAUNUAL	COST		C SIMPLE	PAYBACK	0	LIFE CYCLE COS	STING
OUTPUT:									
LOAD DETERMINANTS:	COMPONENT	T	O ZONE	C	a Buirding				
LOADS OUTPUT BY:	Hour Hou		MA E	C	MONTH &		SEA	SON	⊠ YEAR
TEMPERATURES:	AIR		SURFACE	C] GRAPHIC	PLOT			
FUEL USE BY:	MONTHLY MONTHLY OTHER			O ANNUAL O OTHER		ID .	ENE	TEM COMPONENTS RGY SYSTEMS AL BUILDING ONI	LY /

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



HARDWARE:								
COMPUTER TYPE:	Ø IBM	C) CD	C	D UNIVAC		C) OTHER	,*	
CORE REQUIRED:	D > 500K	129	100 - 500 %	c	D 25 -	100 K	□ < 25	K
SUPPORT:								195 GEETS was khanp (sammanan as a a a a a a a a a a a a a a a a
EQUIPMENT:	EJ CRT							
COSTS:								
ASSUMING PURCHASE OF	SOFTWARE FO	R USE ON PRES	ENT TIME-SH	LARING:				
FIRST COST:								
IN-OFFICE EQUIPMEN	NT:	CRT		PRINT	ER	hintaraanaanaanaa		
SOFTWARE PURCHASE	:	CARD DECK				\$		
SUPPORT INFORMATIO	on:	USER'S GUIDE	10 \$					
TIME TO INPUT AND		5					wheeler	and the speciment will have been been been been been been been be
RUN COST/TIME:								
INPUT SET-UP TIME:		-enantemanananananan M	an-days	<u>A</u>	Han-ho	URS		
TYPICAL* RUN TIME:	O	> 1 HR.	D 60	м - 30 м		О 30 м -	10 M	🖾 < 10 m
TYPICAL* CPU TIME:		> 1000 SEC.	[] 10d	0 1000 SE	c.	5 - 100	SEC.	[] < 5 SEC.
*FOR THIS FORM, ASSUME SECTION 2.	"TYPICAL"	TO BE A SINGL	E-ZONED 100	SQUARE MET	ER RESID	ENCE WITH ,	ALL OUTPUTS CHI	ECKED (/) IN
ASSUMING USE OF SOFTW	ARE ON PUBL	IC TIME-SHARI	NG NETWORKS	ô		;		
NAMES AND CONTACTS THROUGH THEM).	OF TIME-SH	ARING SERVICE	S WHICH HAVE	E THIS PROGI	RAM AVAI	LABLE (EXAC	T COSTS CAN BE	OBTAINED
4935-full de designar for the figure (section of the full coldinative section research of the full for the full	THE STATE OF THE S	The third has a salar springly supply to the control of the contro	water the subpression of the sub	er constructions and	Art mount of him hope on pro-	is the Administration of the Section Control of the Section of the		nterior negative de l'agricule appropriet propriet de consequent
COOL magain proceedings of Control and Control and Assessment of the Control of t	**************************************	Norman contraction and a super-	moreovales views endidates	a sometimen	Direct and Control State of St	Office and the second control of the second	SANOPEENINEENINEENINEENINEENINEENINEENINEE	Nama da walioning na manaka na
\$1990/2000/Statement State exceeding of a polythic behavior continued and continued and continued and continued the continued of the continued	TO THE STATE OF TH	and the content of th	marcon vigarante constituira	40° b Uniona sortigeno	dentale settymajada		Markelija kalender op de state	and the second district of the second distric
distributes which studies in the control of control of the control	Philips Vision and a any appoint produce amount produc		Charles of the control of the contro	astaceaconcu	ндомі блиморумін портудіў, і іскарую	niver the transfer in Nation between the transfer in the trans		CP-45780 Wilde a month of the biamen, in my ferry lands with COP in

HAUSER BOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

GERMANY

TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:
LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

GENERAL:	
TOOL NAME: HAUSER	AVAILABLE THROUGH:
DEVELOPED BY: DrIng. Gerd Hauser	
<u> </u>	
- Gesamthochschule -	
o. Prof. DrIng. Karl Gertis	PHONE NO.:
Universitätsstraße 2 - Postfach 6843	SUPPORTED BY:
DATE DEVELOPED: 1974-19780 Essen 1	
DATE OF LAST REVISION: 1982	
	PHONE NO.:
BRIEF DESCRIPTION: Time-step method for	the calculation of the transient thermal
behaviour of buildings of any s	ize and construction.
Testing report: Hauser, G.: Ver	fahren zur Berechnung des Temperaturver-
haltens und Energieverbrauchs v	on Gebäuden. KI 6 (1978), H. 2, S. 53-56.
· ·	
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE	FORMS:
☐ MAIN FRAME COMPUTER ☐ MICRO-COMPUTER	☐ HAND CALCULATOR ☐ GRAPHIC OR MANUAL
COMPLETE SECTIONS 1, 2, 3)	(COMPLETE SECTIONS 1, 2, 6)

GERMANY

ENERGY DESIGN	IOOLS			5
A ANALYSIS M	ODELS			₩
	anaan in deel oo daa ka k		And the state of t	
INTENDED USE:			,	
INTENDED FOR USE BY:				
🗋 ARCHITECT 🔲 ENGINEER 🔲 TECHNICIAN 😹 RESEARCH	ANALYST			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☐ DESIGN DE	VEL. 🛛 POST-I	ESIGN SE	RV. KESI	EARCH
PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):			, ,	
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS · ☐ DESIGN DE	VEL. 🏻 POST-E	ESIGN SEI	RV. RESI	EARCH
MAJOR & MINOR ENERGY COMPONENTS A	DDRESSE	ED BY	TOOL:	,
Paris Contract Contra) DHV	******************	MISCELLANEOU	IS
LOADS SPACE TEMPS. SPACE TEMPS. HVAC SYSTEMS HVAC SYSTEMS PASSIVE SOLAR PASSIVE CLNG. ACTIVE SOLAR SHADING SYSTEM DESIGN SYSTEM DESIGN ECONOMICS UNDERGROUND UNDERGROUND LOADS MASS LOADS FC (LUX) LEVELS D FC (LUX) LEVELS FC (LUX) LEVELS D APYLIGHTING FC (LUX) LEVELS ARTIFICIAL LING. REDUCTION	D LOADS D SOLAR ACTIV EX SOLAR PASSI D ECONOMICS	E VE	☐ FANS ☐ PUMPS ☐ MISC. ELE ☐ ELEV. 6 E	CTRICAL SCALATOR
INPUT DATA REQUIRED:	DOES NOT	MIKIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
PRE-DESIGN AND SITE ANALYSIS DATA			The state of the same and the state of the s	James Hill Printer and Printers and Advantage And Advantag
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	000000000	A CCCCA CACACA	00000000	
SCHEMATIC DESIGN DATA				
BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES				
ARCHITECTURAL DESIGN DEVELOPMENT DATA			Cas	
BUILDING MATERIALS & ASSOCIATED DATA (R, Q, E, ETC.) BUILDING MASS DATA SHADING CCEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA	8	否		
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL				

HAUSER **GERMANY** IEA SURVEY FORM FOR SOLAR RED **ENERGY DESIGN TOOLS** & ANALYSIS MODELS WEATHER DATA: ET HOURLY TAPE | TYPICAL DAY | MONTHLY DATA | ANNUAL DATA | MANUAL DEGREE DAYS | AVE. MONTHLY MIN. AND MAX. | AVE. MONTHLY TEMP. TEMPERATURE DATA: M HOURLY TAPE MONTHLY DEGREE DAYS DAILY SOLAR DATA: HOURLY TAPE TYPICAL DAY PROFILE O MONTHLY AVE. DAILY & TOTAL SOLAR ORIENS. CALC: MANY ORIEN. INCL. SLOPED C) ANY VERT. & HORIZ. ☐ HORIZ. & 4 CARDINAL DIREC. SLOPED FACING SOUTH SURFACE REFLECTANCE MOUR-BY-HOUR DAYLIGHT CALC: TYPICAL CLEAR & CLOUDY DAY/MONTH [] TYPICAL DAY/MONTH ANNUAL AVERAGE OTHER _ **CALCULATION PROCEDURES:** LANGUAGE: K FORTRAN ☐ BASIC ☐ MACHINE LANGUAGE ☐ OTHER ____ C GRAPHS, CHARTS & SIMPLE CALC. ☐ INTERACTIVE ' USER TYPE: ☐ INTERACTIVE GRAPHIC O PREPARE FILE [] HAND CALCULATION UNITS OF CALCULATION: C SI UNITS D ENGLISH 🗀 вотн CHECK ALL APPROPRIATE BOXES: HEAT TRANSFER: FINITE DIFFERENCE T RESPONSE FACTOR [] STEADY STATE SOLAR COMP. CALCULATED: DIFFUSE/DIRECT/RE-RADIATED ☐ DIFFUSE/DIRECT ☐ TOTAL INTEGRATION: SIMPLE EULER ☐ IMPLICIT OTHER SHADING: MANY SOLAR OBSTRUCTION O OVERHANG ONLY O NO SHADING MOVABLE SHADING: DAILY & SEASONAL SWITCHING SEASONAL SWITCHING O NOT CALCULATED MASS EFFECT IS CALCULATED: ET TRANSIENT HEAT FLOW ☐ TIME CONSTANT FACTORS ☐ ASSUME NO MASS AFFECT ROOM TEMP. BASED ON: SURFACE & AIR AIR ONLY O NOT CALCULATED INSIDE TEMPERATURE: INPUT SCHEDULE BY USER ☐ FIXED BY TOOL C VARIED BY TOOL U-VALUES: CHANGE W/WIND SPEED CONSTANT MOVABLE INSULATION INFILTRATION: AIR CHANGE PER HOUR CRACK METHOD U VARIES W/WIND SPEED INTERNAL LOADS INCLUDE: SENSIBLE & LATENT SEPARATE ☐ SENS. & LAT. TOTAL SENSIBLE ONLY VENTILATION: ☐ SENSIBLE OR COMMAND [] LATENT DAYLIGHT COEFFICIENTS: SKY, REFL. & DIRECT ☐ SKY & REFL. SKY ONLY ZONES PER RUN: D 10 - 25 D 2 - 10 D 1 ONLY SYSTEM MODELING: SYSTEM EFFIC. INPUT SYSTEM OPTIMIZING COMPONENT SENSITIVITY ECONOMIC ANALYSIS: ANNUAL COST SIMPLE PAYBACK LIFE CYCLE COSTING **OUTPUT:**

O ZONE

E SURFACE

DAY

A BUILDING

C GRAPHIC PLOT

SEASON

☐ SYSTEM COMPONENTS

TOTAL BUILDING ONLY

D ENERGY SYSTEMS

YEAR YEAR

□ MONTH

ANNUAL CONSUMPTION

OTHER

ANNUAL PEAK DEMAND

LOAD DETERMINANTS: COMPONENT

HOUR

M AIR

MONTHLY CONSUMPTION D HONTHLY PEAK DEMAND

LOADS OUTPUT BY:

TEMPERATURES:

FUEL USE BY:

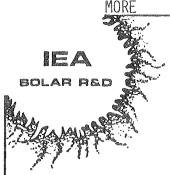
HAUSER BOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

GERMANY

SECTION

HARDWARE	, o				_	1-
COMPUTER TYPE:	□ IBM .	C) CDC	□ UNIVAC	OTHER _	7R4	ES/Sieme
CORE REQUIRED:	□ > 500K	2 100 - 500	K . 🗀 25	- 100 K	□ < 25	K
SUPPORT:	USER'S GUIDE	D DAT	A HANUAL	OTHER		
EQUIPMENT:	CRT '	A PRINTER	☐ TEXTRONIX	OTHER		
COSTS:						
ASSUMING PURCHASE	OF SOFTWARE FOR US	E ON PRESENT TIME-	SHARING:			
FIRST COST:						
IN-OFFICE EQUIP	MENT: CRI		PRINTER			
SOFTWARE PURCHA	SE: CAF	D DECK	TAPE		LISTING	
SUPPORT INFORMA	TION: USE	R'S GUIDE	DATA MANUA	L	OTHER	
TIME TO INPUT A	ND DEBUG:	MAN-DAYS	MAN	-Hours		
RUN COST/TIME:						
INPUT SET-UP TI	ME:	MAN-DAYS	MAM	-Hours		
TYPICAL* RUN TI	ME: 🗆 > 1	HR. D	50 M - 30 M	□ 30 M - 3	10 м	C) < 10 M
TYPICAL* CPU TI	ME: D > 1	000 SEC.	100 - 1000 SEC.	□ 5 - 100	SEC.	[] < 5 SEC.
*FOR THIS FORM, ASS SECTION 2.	UME "TYPICAL" TO B	E A SINGLE-ZONED 10	00 square meter re	SIDENCE WITH A	LL OUTPUTS C	HECKED (/) IN
ASSUMING USE OF SO	FTWARE ON PUBLIC T	IME-SHARING NETWORK	<u>us</u> :			
NAMES AND CONTAI THROUGH THEM).	CTS OF TIME-SHARIN	S SERVICES WHICH HA	AVE THIS PROGRAM A	VAILABLE (EXACT	COSTS CAN	BE OBTAINED
					THE REAL PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS OF THE PROPERTY AND ADDRESS OF THE PROPERTY ADDRESS	
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS ITALY



TASK	VIII	Q23a	PASSIVE AND	HYBRID SOLAR	RETURN TO
			LOW ENERGY	DWELLING	

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

GENERAL:					
TOOL NAME: More	AVAILABLE THROUGH: CNR				
DEVELOPED BY: B. Boni, M. Dalponte,					
R. Rozzi,					
Fiat Engineering					
via Belfiore 23 - Torino -	PHONE NO.:				
	SUPPORTED BY: Dr. Franco Vivona				
DATE DEVELOPED:	Direzione CNR/PFE				
DATE OF LAST REVISION:					
	00198 Roma				
	PHONE NO.: 06-854389				
BRIEF DESCRIPTION: More is a sophisticate	d simulation tool to analyze transient				
loads using transfer functions.	(Please find enclosed paper)				
***************************************	The second of th				
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.					
TOOL HARDWARE & AVAILABLE F	ORMS:				
MAIN FRAME COMPUTER	☐ HAND CALCULATOR ☐ GRAPHIC OR MANUAL				
CARD DECK TAPE TIME SHARING LISTING - HARD COPY (COMPLETE SECTIONS 1, 2, 3)	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES ☐ LISTING ☐ BOOK ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 6)				
(COMPLETE SECTIONS 1, 2, 3)	(COMPLETE SECTIONS 1, 2, 5)				

IEA BOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

ITALY



par y								Comment of the Commen
INTENDED U	SE:							
INTENDED FOR USE BY	Principal de la company de la							
ARCHITECT [M ENGINEER	TECHNICIAN	2 RESEARCE	TOVIANA P				
PHASE FOR WHICH DESI	IGN TOOL WAS DEVELO							
Office	SITE ANALYSIS	☐ SCHEMATICS	D DESIGN 1	DEVEL. F	ግ ክለፍተ _ሞ ተ	ESIGN SEF	u Managara	
PHASE(S) FOR WHICH D	DESIGN TOOL MAY BE (2012D1 E	1 1031-f	ESIGN SEP	tV. 🔯 RESE	ARCH
(MA)	SITE ANALYSIS	☐ SCHEMATICS	DESIGN I	DEVEL. Ç	g post-d	ESIGN SER	.v. 👸 Rese	ARCH
MAJOR & MII	NOR ENERG	Y COMPO	VENTS					
₩ HEATING	₩ COOLING	[] LIGHTIN		D DHW		the State of the State of Stat	MISCELLANEOU	c
LOADS SPACE TEMPS. HVAC SYSTEMS PASSIVE SOLAR ACTIVE SOLAR SHADING SYSTEM DESIGN CECONOMICS UNDERGROUND LOADS MASS	SHADING SYSTEM DES	D LOADS ET ARTE	S UX) LEVELS EM DESIGN	LOAD SOL	OS AR ACTIV AR PASSI NOMICS	E	D FARS D PUMPS D MISC. ELE ELEV. & E	רבי ז אידי
INPUT DATA	AND COMPANY OF THE PROPERTY OF				S NOT	MINIMUM INPUT	RECOMMENDED	TOTAL POSSIBLE
PRE-DESIGN AND SITE A LOCATION - ASSOCIA BUILDING TYPE AND OCCUPANCY RATES BUILDING AREA SPACE TEMPERATURES LOCAL ENERGY COSTS GENERIC BUILDING S LOCAL CODE REQUIRE LIGHTING REQUIREME	ATED WEATHER DATA SCHEDULE SSHAPE DUE TO SITE RE	STRICTIONS UL., ETC.)					INPUT	INPUT
SCHEMATIC DESIGN DATA					Concil	Back	W	U
BUILDING SURFACE A GLAZING AREAS & OR ZONING ROOM SHAPES OPERATING SCHEDULES	IENTATIONS							
ARCHITECTURAL DESIGN I	DEVELOPMENT DATA					628	i,	£1
BUILDING MATERIALS BUILDING MASS DATA SHADING COEFFICIENT INTERIOR SURFACE DA	& ASSOCIATED DATA IS & DAYLIGHT TRANSPATA			المال الم]			
ENGINEERING DESIGN DEV	VELOPMENT DATA							(
MECHANICAL SYSTEM E MECHANICAL SYSTEM C ELECTRICAL SYSTEM C ELECTRICAL SYSTEM CO LIGHTING SYSTEM DES LIGHTING SYSTEM CON	CONTROL DESIGN CONTROL SIGN							00000
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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WEATHER D	ATA:								
TEMPERATURE DATA:	(C) HOURLY TO ANNUAL I		PICAL DAY	HTMOM []	LY DATA . AND MAX.	O ANNUAL D AVE. MO	DATA NTHLY TE	O MONTHLY DE	GREE DAYS
SOLAR DATA:	M HOURLY T	TAPE 8	TYPICAL DA	Y PROFILE		☐ MONTHLY	AVE. DA	LILY & TOTAL	
SOLAR ORIENS. CALC:		N. INCL. SLO FACING SOUTH			T. & HORIZ REFLECTAN		HORIZ. 6	- 4-CARDIKAL D	irec.
DAYLIGHT CALC:	ANNUAL A	HOUR C	TYPICAL CL	EAR & CLO	UDY DAY/MO	NTH D T	YPICAL D	HTROM\YAC	
CALCULATIO	N PRO	CEDURE	S:						
LANGUAGE: S FORTR	AN 🗍 BAS	IC D MAC	CHINE LANGUA	GE 🗀 O	THER		GRAPHS,	CHARTS & SIM	PLE CALC.
USER TYPE: 🔘 I	NTERACTIVE	☐ INTE	RACTIVE GRA	PHIC	□ PREPA	RE FILE	☐ HAN	D CALCULATION	
UNITS OF CALCULATION	: 🛭 🗀 S	I UNITS		C ENG	LISH		D B	OTH	
CHECK ALL APPROPRIAT	E BOXES:								
HEAT TRANSFER:		C FINITE I	IFFERENCE		RESPON	SE FACTOR		STEADY STATE	
SOLAR COMP. CALCU	LATED:	DIFFUSE/	DIRECT/RE-R	ADIATED	O DIFFUS	E/DIRECT	D	TOTAL	
INTEGRATION:		SIMPLE E	ULER		☐ IMPLIC	IT		OTHER	
SHADING:		ANY SOLA	R OBSTRUCTI	ON	O OVERHA	NC ONTA		NO SHADING	
MOVABLE SHADING:		🖾 DAILY &	SEASONAL SW	ITCHING	SEASON	AL SWITCHING		NOT CALCULATE	D
MASS EFFECT IS, CA	LCULATED:	TRANSIEN	T HEAT FLOW		TIME C	ONSTANT FACTO	ORS 🗀	ASSUME NO MAS	S AFFECT
ROOM TEMP. BASED	ON:	SURFACE	& AIR		AIR ON	LY		NOT CALCULATE	D
INSIDE TEMPERATUR	E:	C INPUT SC	HEDULE BY U	SER	[] FIXED	BY TOOL		VARIED BY TOO	L
U-VALUES:		CHANGE W	/WIND SPEED		C REMAIN	CONSTANT		MOVABLE INSUL	ATION
INFILTRATION:		AIR CHAN	GE PER HOUR		C CRACK	METHOD		VARIES W/WIND	SPEED
INTERNAL LOADS IN	CLUDE:	SENSIBLE	& LATENT S	EPARATE	□ SENS.	& LAT. TOTAL		SENSIBLE ONLY	
VENTILATION:		O SENSIBLE			C LATENT			Varies by sch Or command	EDULE
DAYLIGHT COEFFICI	ENTS:	SKY, REF	L. & DIRECT		□ SKY &	REFL.	D	SKY ONLY	
ZONES PER RUN:		C > 25	G	3 10 ~ 25		D 2 - 10		☐ 1 ONLY	
SYSTEM MODELING:		O SYSTEM E	FFIC. INPUT		O SYSTEM	OPTIMIZING	0	COMPONENT SEN	SITIVITY
ECONOMIC ANALYSIS	•	☐ ANNUAL C	rzo		C SIMPLE	PAYBACK	0	LIFE CYCLE CO	STING
OUTPUT:									
LOAD DETERMINANTS:	COMPONENT	r (] ZONE	100] BUILDIN	G			
LOADS OUTPUT BY:	Hour	E	YAG (1	☐ MONTH		□ SEAS	ON	T YEAR
TEMPERATURES:	⊠ AIR	C] SURFACE	1] GRAPHIC	PLOT			
FUEL USE BY:	O MONTHLY O	CONSUMPTION PEAK DEMAND OUTLY			CONSUMPTI PEAK DEMA		C ENER	EM COMPONENTS GY SYSTEMS L BUILDING ON	LY

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:					
COMPUTER TYPE:	□ IBM	CDC	UNIVAC	O OTHER DIGITAL S	/AX 11/780
CORE REQUIRED:	□ > 500к	₩ 100 - 500	K 🖺 25 -	100 к □ < 25	K
SUPPORT:	🕲 USER'S GUIDE	☐ DATA	MANUAL	OTHER	
EQUIPMENT:	₿ CRT	PRINTER	TEXTRONIX	80 OTHER PLOTTER	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
COSTS: ASSUMING PURCHASE OF	SOFTWARE FOR USE	ON PRESENT TIME-S	HARTNG.		
FIRST COST:		010101011111111111111111111111111111111			
IN-OFFICE EQUIPME	NT: CRT		PRINTER		
SOFTWARE PURCHASE		DECK			
SUPPORT INFORMATION			DATA MANUAL		
TIME TO INPUT AND		man-days			er ver verminnen midrollen Grungseck en maganisk store
RUN COST/TIME:	13		NOTIFIED TO AN ORDER OF THE PROPERTY OF THE PR		
INPUT SET-UP TIME	: 1-2	MAN-DAYS	HAN-H	ours	
TYPICAL* RUN TIME	: 🔘 > 1 1	ir. 🔲 6) н - 30 н	🖾 30 m - 10 m	□ < 10 M
TYPICAL* CPU TIME	: 🗇 > 100	0 SEC. Ø 1	00 - 1000 SEC.	[] 5 - 100 SEC.	C < 5 SEC.
*FOR THIS FORM, ASSUMI	E "TYPICAL" TO BE	A SINGLE-ZONED 100	SQUARE METER RESID	DENCE WITH ALL OUTPUTS C	HECKED (/) IN
ASSUMING USE OF SOFT	WARE ON PUBLIC TIM	E-SHARING NETWORK	2:		
NAMES AND CONTACTS THROUGH THEM).	S OF TIME-SHARING	SERVICES WHICH HAV	E THIS PROGRAM AVA	ILABLE (EXACT COSTS CAN	BE OBTAINED
Ing. Br	runo Boni	in demonstrative and the second secon			
c/o Fia	t Engineeri	ng	# Etransfire(code) and make the company to the company		
Via Bel	fiore 23	teretyskal profesorores et andre delice simboromety. Valgities et legeter eje skalans et del	CONSTRUCTOR PROPERTY AND		
Torino		Control - 1 - Mariah - 1900 Shankarakingi ngihi, man ging dikumun a sanggan (Shankarakingi ngihi	COLUMN AND SOLUTION OF AN ANGENCY AND ANGENCY AND ANGENCY AND	·	

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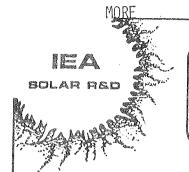
ITALY

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MICRO-COMPUTER

ANDOM ACCESS MEMO	RY (RAM) REQUIRED:	9845/B 140		italia kanana ka garana mana ka 1826 ka 1826 ka 1828 ka	
	JIRE A PRINTER?				
UPPORT:	🛭 USER'S GUIDE	O	DATA MANUAL	COTHER	gamandananing sections and approach confidence registration and account of a society of the section and the se
COSTS:					
IRST COST:					
	~ 50.000.00	00 Lire			
				LISTING	
SUPPORT INFORMA	***************************************		************	DATA MANUAL	
TIME TO INPUT, A		MAN-DA		MAN-HOURS	DELECOM THE STATE OF THE STATE
UN COST/TIME:			appear or the same and a same and a same		
TYPICAL* INPUT	SET-UP TIME:	1 MAN-DA	YS	MAN-HOURS	
TYPICAL* RUN TII	Œ: >	l HRS.	etrifector	MIN.	
TYPICAL* PRINT	TIME:	HRS.	anggum milandarqua.	MIN.	
	JME "TYPICAL" TO BE	A SINGLE-ZON	ED 100 SQUARE	METER RESIDENCE WITH ALL	DUTPUTS CHECKED (/) IN
ECTION 2.				·	



SURVEY FORM FOR ENERGY DESIGN TOOLS

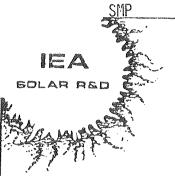
& ANALYSIS MODELS

ITALY



FOR DESIGN TOOLS REQUIRING A HAND-HELD CALCULATOR

HARDWARE:					
MANUFACTURER AND MODEL NUME	SER: TEXAS I	NSTRUM.	TI-59		
DOES THIS TOOL REQUIRE A PR	INTER?	YES D	NO		
SUPPORT: SUPPORT:	R'S GUIDE	☐ DATA	MANUAL	OTHER	
COSTS:					
FIRST COST:					
HARDWARE:	CALCULATOR	P (SPRE) A P (Service a come halder Henricognophy and physical gray (Spreads	PRINTER	1794 kinnishta separat sa Guaya (1894 (1894 ki wana da hana way sepanja (1895) (1894 ki ki	
SOFTWARE:	MAGNETIC CARD	Markett - Markett ann an de san air an a			
SUPPORT INFORMATION:	USER'S GUIDE	THE PARTY OF THE P			
RUN COST/TIME:					The state of the s
TYPICAL* INPUT SET-UP TI	ME:	HRS.	MIN.		
TYPICAL* RUN TIME:	CONTROL Of the contro	HRS.	MIN.		
TYPICAL* PRINT TIME:		HRS.	MIN.		
*FOR THIS FORM, ASSUME "TYPIC SECTION 2.	CAL" TO BE A SING	GLE-ZONED 100	O SQUARE METER RESI	DENCE WITH ALL	OUTPUTS CHECKED (v') IN



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TASK	VIII -	PASSIVE AND	HYBRID SOLAR	RETURN TO:
		LOW ENERGY	DWELLING	

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS	
GENERAL: TOOL NAME: SMP (Passive Modules Simulation) DEVELOPED BY: FEDERICO BUTERA SERGIO FARRUGGIA GIANFRANCO RIZZO CHANNI SILVESTRINI	AVAILABLE THROUGH: FEDERICO BUTERA ISTITUTO DI FISICA TECNICA VIALE DELLE SCIENZE - PALERMO (ITAL'
GIANNI SILVESTRINI	PHONE NO.: 091 - 488780 SUPPORTED BY: CONSIGLIO NAZIONALE DELLE RICERCI
DATE DEVELOPED: 1980 DATE OF LAST REVISION: JUNE 1982	DELIVER DE LE CONTRACTOR DE LE CONTRACTO
Direct gain, Trombe wall an	PHONE NO.: ermal behaviour of one or two rooms and sunspaces can be analyzed.
TOOL HARDWARE & AVAILABLE FO	DRMS:
MAIN FRAME COMPUTER	
CARD DECK TAPE TAPE TAPE TAPE TAPE LISTING LISTING HARD COPY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 3)	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TAELES ☐ LISTING ☐ BOOK ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 6)

SMP SMP SMP

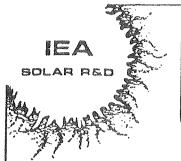
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

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COMMENTS:

A subroutine may be activated in order to evaluate the comfort conditions.



SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



INTENDED USE:

INTENDED	FOR	USE	BY:

ARCHITECT

M ENGINEER

TECHNICIAN

C RESEARCH ANALYST

PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (I ONLY):

PRE-DESIGN

SITE ANALYSIS

☐ SCHEMATICS

D DESIGN DEVEL. D POST-DESIGN SERV.

☐ DHW

RESEARCH

PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):

☐ PRE-DESIGN

SITE ANALYSIS

D SCHEMATICS

DESIGN DEVEL. POST-DESIGN SERV. RESEARCH

MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: HEATING COOLING # LIGHTING

₩.	111.	71110
4	B	LOADS
		SPACE TEMPS.
7		HVAC SYSTEMS
	7	PASSIVE SOLAR
		ACTIVE SOLAR
- 7		SHADING
٠	W	SYSTEM DESIGN
	\Box	ECONOMICS
		UNDERGROUND
		LOADS
	M	MASS

	•	60
JB.	LOADS	
	SPACE TEMPS.	
	HVAC SYSTEMS	
	PASSIVE CLNG.	
	SHADING	
	SYSTEM DESIGN	
	ECONOMICS	
	UNDERGROUND LOAD	DS

SLOPED GLAZING



	LOADS	
Ö	SOLAR	ACTIVE
	SOLAR	PASSIVE
	ECONO!	41 CS

☐ FANS
☐ PUMPS
☐ MISC. ELECTRICAL
☐ ELEV. & ESCALATOR

MISCELLANEOUS

INPUT DATA REQUIRED: TOTAL DOES NOT MINIMUM RECOMMENDED POSSIBLE ACCOMMODATE INPUT INPUT PRE-DESIGN AND SITE ANALYSIS DATA LOCATION - ASSOCIATED WEATHER DATA BUILDING TYPE AND SCHEDULE OCCUPANCY RATES OUCUPANCY KATES
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, Q, E, ETC.) BUILDING MASS DATA SHADING CCEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA ENGINEERING DESIGN DEVELOPMENT DATA MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL 000000 ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL

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WEA	TH	ER	DA	TA:

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TEMPERATURE DATA:	O HOURLY ANNUAL	TAPE Ø 1 DEGREE DAYS	TYPICAL DA	Y @ MONT MONTHLY M)	THLY DATA	☐ ANNUAL	DATA ONTHLY	☐ MONTHL	Y DEGREE DAYS
SOLAR DATA:	d Hourly	TAPE (TYPICAL	DAY PROFIL	E	MONTHL	Y AVE.	DAILY & TOT	'Al.
SOLAR ORIENS. CALC:	ANY ORI	EN. INCL. SI FACING SOUTH	LOPED	☐ ANY VE	RT. & HORIZ. E REFLECTANCI		HORIZ	6 4 CARDIN	AL DIREC.
DAYLIGHT CALC:	B HOUR-BY	∽HOUR f	TYPICAT	CI FAR A CI	CNCM\YAG YGUO	C11 8777 4			
CALCULATIO	N PRO	CEDURI	ES:					,	
LANGUAGE: FORTA	****CP********************************	Control of the second s	- AND COMPANY OF THE PARTY OF T	GUAGE []	OTHER	-	מפאס ר	C CHARTE C	SIMPLE CALC.
USER TYPE:	NTERACTIVE	, 🗀 ini	ERACTIVE (GRAPHIC	PREPARE	FILE	מ מו	AND CALCIDA	SIMPLE CALC.
UNITS OF CALCULATION:	: 89 9	31 UNITS			GLISH	- 1102		BOTH	1100
CHECK ALL APPROPRIATE	E BOXES:						East.	2011.	
HEAT TRANSFER:		FINITE	DIFFERENCE	:	RESPONSE	FACTOR	r	STEADY STA	4TF
SOLAR COMP. CALCUI	ATED:	diffuse	/DIRECT/RE	-RADIATED	D DIFFUSE/	DIRECT	c	TOTAL	**
INTEGRATION:		SIMPLE I			☐ IMFLICIT			OTHER	
SRADING:		ANY SOL	AR OBSTRUC	TION	O OVERHANG	ONLY		NO SHADING	•
MOVABLE SHADING:	:				SEASONAL			NOT CALCUL	
MASS EFFECT IS CAL	CULATED:				☐ TIME CON				
ROOM TEMP. BASED O	w:	SURFACE	& AIR		AIR ONLY			NOT CALCUL	
INSIDE TEMPERATURE	:	INPUT SO	CHEDULE BY	USER	☐ FIXED BY	TOOL		VARIED BY	
U-VALUES:					☐ REMAIN Œ			MOVABLE IN	
INFILTRATION:		AIR CHAR						VARIES W/W	
INTERNAL LOADS INC	LUDE:				D SENS. & I	AT. TOTAL		SENSIBLE O	
VENTILATION:		D SENSIBLE			[] LATENT		-	VARIES BY OR COMMAND	SCHEDULE
DAYLIGHT COEFFICIES	NTS:				SKY & REF			SKY ONLY	
ZONES PER RUN:		25		D 10 - 25		2 - 10		[] 1 ON	LY
SYSTEM MODELING:		SYSTEM E	FFIC. INPU	Л	SYSTEM OF	TIMIZING		COMPONENT :	SEKSITIVITY
ECONOMIC ANALYSIS:		ANNUAL C	TZC		SIMPLE PA	YBACK	D	LIFE CYCLE	COSTING
OUTPUT:									U-OCTED percentionage
LOAD DETERMINANTS: [COMPONENT	ı 🥻	ZONE		☐ BUILDING				A Mary Company
	HOUR		DAY		∅ MONTh		SEA	SOK	☐ YEAR
TEMPERATURES:	AIA 🕷	<u> </u>	2 SURFACE		GRAPHIC PL		GE OLK	2011	III IEAN
FUEL USE BY:		CONSUMPTION PEAK DEMAND			CONSUMPTION PEAK DEMAND		SYST	TEM COMPONEN RGY SYSTEMS AL BUILDING	/

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE	•					
COMPUTER TYPE:	₽ IBM	□ cdc	D UNIVAC	, 🗖 OTHER	,	
CORE REQUIRED:	□ > 500к		ок 📋 :			
SUPPORT:	☐ USER'S GUIDE	□ DAT	ra manual	OTHER D	escription	of olgorithm
EQUIPMENT:	CRT '	☐ PRINTER	TEXTRONIX	□ OTHER _		used
COSTS:						
ASSUMING PURCHASE	OF SOFTWARE FOR USE	ON PRESENT TIME-	-SHARING:			
FIRST COST:			Walter Control of the			
IN-OFFICE EQUIPM	MENT: CRT		PRINTER _			
SOFTWARE PURCHAS			TAPE		LISTING	
SUPPORT INFORMAT	CION: USER					
TIME TO INPUT AN		MAN-DAYS				
RUN COST/TIME:		•				
INPUT SET-UP TIM	IE:	MAN-DAYS		N-HOURS		
TYPICAL* RUN TIM	E: 🗆 > 1 1	ir. D	60 м - 30 м	□ 30 M - 1	10 м	€ < 10 M
TYPICAL* CPU TIM	E: 🗇 > 100	oo sec.	100 - 1000 SEC.	5 - 100	SEC.	□ < 5 SEC.
*FOR THIS FORM, ASSU SECTION 2.	ME "TYPICAL" TO BE	A SINGLE-ZONED I	00 square meter r	ESIDENCE WITH AL	L OUTPUTS CH	ECKED (//) IN
ASSUMING USE OF SOF	TWARE ON PUBLIC TI	E-SHARING NETWOR	KS:			
inkough [HEM).	TS OF TIME-SHARING		AVE THIS PROGRAM	AVAILABLE (EXACT	COSTS CAN BE	E OBTAINED
ISTITUTO I	DI FISICA TECNI	CA	cuc			
FACOLTA' [DI INGEGNERIA		CENT	TRO UNIVERSIT	CARIO DI CA	AL COLO
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GENERAL:

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	fótta	PASSIVE AN	D	HYBRID SOLAR	RETURN	TO.
			LOW ENERG	V	DIMETINA		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

AZIZ

TOOL NAME: AZIZ	
DEVELOPED BY: FEDERICO BUTERA	AVAILABLE THROUGH: FEDERICO BUTERA
SERGIO FARRUGGIA	ISTITUTO DI FISICA TECNICA
GIANFRANCO RIZZO GIANNI SILVESTRINI	VIALE DELLE SCIENZE - PALERMO (ITALY) PHONE NO.: (091) - 488780
DATE DEVELOPED: 1980 DATE OF LAST REVISION: JUNE 1982	SONOTALIO MALIONALE DELLE RICERCHE
first phases of mu of internal partit	PHONE NO.: model SMP, is intended to be used during the ltistorey buildings design process. The description ions is simplified in order to reduce the number systems may be simulated.
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS TOOL HARDWARE & AVAILAE	
MAIN FRAME COMPUTER D MICRO-COMPUTER	phrase and a second contract of the contract o
CARD DECK TAPE TIME SHARING DALISTING - BARD COPY COMPLETE SECTIONS 1, 2, 3) COMPLETE SECTION	D MAGNETIC CARD D LISTING D RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 6)

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Ada lange	A &)	NALYSIS M	ODELS			SS
	and the second s		Supports Section and Conference of the particular Section Sect	$\mathcal{I} \setminus$	The second secon	
, pro fr						
INTENDED USE:	e e 					
INTENDED FOR USE BY:						
-		CHNICIAN D RESEARCH	ANALYST			
PHASE FOR WHICH DESIGN TO	•	•				
•			DEVEL. POST-I	DESIGN SEI	RV. D RESE	LARCH
PHASE(S) FOR WHICH DESIGN			evel. 🛛 Post-i	DECION CEN	y Fa neer	· Anch
•			-			AKCH
MAJOR & MINO M HEATING	K ENERGY C	h/	A STATE OF THE PARTY OF THE PAR		A CONTRACTOR OF THE PARTY OF TH	
ZÓ LOADS	M LOADS	20 LOADS	□ DHW □ LOADS	L	MISCELLANEOU	S
THE SPACE TEMPS.	SPACE TEMPS. D HVAC SYSTEMS D PASSIVE CLNG.	D FC (LUX) LEVELS D SYSTEM DESIGN	D SOLAR ACTIV		D FANS D PUMPS D MISC. ELE	CTRICAL
M HVAC SYSTEMS D PASSIVE SOLAR ACTIVE SOLAR SHADING	D PASSIVE CLNG. SHADING SYSTEM DESIGN	D ECONOMICS D DAYLIGHTING	☐ ECONOMICS		D ELEV. & E	SCALATOR
SYSTEM DESIGN CONOMICS	SYSTEM DESIGN ECONOMICS UNDERGROUND LOAD	FC (LUX) LEVELS ARTIFICIAL LING.				
UNDERGROUND LOADS	SLOPED GLAZING MASS	S REDUCTION				
MASS	,					
INPUT DATA RE	QUIRED:					TOTAL
PRE-DESIGN AND SITE ANALY	and the second of the second o		DOES NOT ACCOMMODATE	INPUT	RECOMMENDED INPUT	POSSIBLE INPUT
LOCATION - ASSOCIATED	WEATHER DATA	,	Ö	D	۳٦	79%
BUILDING TYPE AND SCHE	DULE		8		- <u>Š</u>	Ē
BUILDING AREA SPACE TEMPERATURES LOCAL ENERGY COSTS			5	H	8	-12. -12.
GENERIC BUILDING SHAPE LOCAL CODE REQUIREMENT	DUE TO SITE RESTRIC	TIONS FTC.)	وومهموموه		Action code	0\$00\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
LIGHTING REQUIREMENTS	Contract, Modes,		Ö	D	Ř	Ô
SCHEMATIC DESIGN DATA						
BUILDING SURFACE AREAS GLAZING AREAS & ORIENT ZONING					B	003\$
ROOM SHAPES OPERATING SCHEDULES &	PROFILES			Ħ	<u>D</u>	
ARCHITECTURAL DESIGN DEVE			surror	-	D	松
BUILDING MATERIALS & A	SSOCIATED DATA (R, o	, E, ETC.)	p	p	p	Ø
BUILDING MASS DATA SHADING CCEFFICIENTS & INTERIOR SURFACE DATA	DAYLIGHT TRANSMISSIO	ON	B		Ë	阿拉克克
ENGINEERING DESIGN DEVELO	PMENT DATA		bud	لسا	Band	الحاء
MECHANICAL SYSTEM DESI	GN PO		Ø .	D	C :	ם
MECHANICAL SYSTEM CONT ELECTRICAL SYSTEM DESI ELECTRICAL SYSTEM CONT	GN		<u> </u>		B	g
LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTRO			\$080X0	A CO E		
				pine .		_ /

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WEATHER DA	TA:						
TEMPERATURE DATA: E				in the live.	LJ AVA. MUN	IBLY TEMP.	E DATEA C
SOLAR DATA:	HOURLY TAPE	■ TYPICAL	DAY PROFIL	E	MONTHLY	AVE. DAILY & T	OTAL.
SOLAR ORIENS, CALC:	ANY ORIEN. I SLOPED FACIN	NCL. SLOPED G SOUTH	D ANY VE	RT. & HORIZ. E REFLECTANCE	□ н	DRIZ. & 4 CARD	INAL DIREC.
DAYLIGHT CALC:	HOUR-BY-HOUR ANNUAL AVERA	CE COTHER	CLEAR & CL	OUDY DAY/MONTH	וצד 🗆 די	PICAL DAY/MONT	H
CALCULATION	PROCE	DURES:				,	
LANGUAGE: S FORTRAN	D BASIC	☐ MACHINE LANGE	DAGE F7 (ገግዝና p		D (D) A	
USER TYPE: INTE	RACTIVE '	☐ INTERACTIVE GR	RAPHIC	S PREPARE			
UNITS OF CALCULATION:	Darsi uni		□ ENG		r Llat	HAND CALCUI	ATION
CHECK ALL APPROPRIATE BO				.2.50.1		🗆 вотн	
HEAT TRANSFER:	2 1	INITE DIFFERENCE		F) Prepower	r a crop		
SOLAR COMP. CALCULATE	D: g o	IFFUSE/DIRECT/RE-	RADIATED	C) Dirence /n:	TREET	O STEADY S	TATE
INTEGRATION:		IMPLE EULER		☐ IMPLICIT		O TOTAL	
SHADING:	5 2 € A	NY SOLAR OBSTRUCT	TON	O OVERHANG		OTHER	
MOVABLE SHADING:		AILY & SEASONAL S				D NO SHADI	
MASS EFFECT IS CALCUL	•	RANSIENT HEAT FLO		S SEASONAL S		O NOT CALC	
ROOM TEMP. BASED ON:		URFACE & AIR	•		ANI FACTORS	S D ASSUME NO	
INSIDE TEMPERATURE:			nerp	AIR ONLY		D NOT CALC	
U-VALUES:		HANGE W/WIND SPEED		D FIXED BY T		S VARIED BY	
INFILTRATION:		IR CHANGE PER HOUF		CI REMAIN CON		MOVABLE :	
INTERNAL LOADS INCLUD				CRACK METH		X VARIES W	
VENTILATION:		ENSIBLE & LATENT S	SEPARALE		T. TOTAL	₩ SENSIBLE	ONLY
				☐ LATENT		OR COMMAN	SCHEDULE D
DAYLIGHT COEFFICIENTS	: 🗀 SK	Y, REFL. & DIRECT	•	☐ SKY & REFL	•	SKY ONLY	
ZONES PER RUN:	D >	25	10 ~ 25	C] 2 - 10	₽ 10	NLY
SYSTEM MODELING:	□ SY	STEM EFFIC. INPUT		SYSTEM OPT	LMIZ1NG	3 COMPONENT	
ECONOMIC ANALYSIS:	[] AN	NUAL COST		SIMPLE PAY	BACK	LIFE CYCL	
DUTPUT:		,					
LOAD DETERMINANTS: 🔲 C	OMPONENT	Z ZONE	173	BUILDING			
LOADS OUTPUT BY: 🗷 H		Æ DAY		₹ MONTH	prod		
TEMPERATURES: [2] A	lr.	D SURFACE		GRAPHIC PLOT	•	SEASON	D AEMY
D M	ONTHLY CONSUM ONTHLY PEAK DI THER	PTION EMAND	_	CONSUMPTION PEAK DEMAND	0.0	SYSTEM COMPONE ENERGY SYSTEMS TOTAL BUILDING	



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A. MAIN FRAME COMPUTER

HARDWARE:					
COMPUTER TYPE:	₩ IBM	CD CDC	□ UNIVAC	OTHER	
CORE REQUIRED:	□ > 500K	2 100 - 500) к 📋 25		
SUPPORT:	□ user's guide	□ DAT	TA MANUAL	OTHER Descr	iption of olgor thmoused
EQUIPMENT:	CRT '	☐ PRINTER	☐ TEXTRONIX	O OTHER	usul
COSTS:					
ASSUMING PURCHASE OF	SOFTWARE FOR USE (ON PRESENT TIME-	-SHARING:		
FIRST COST:					
IN-OFFICE EQUIPMEN	TT: CRT _	www.waran.o.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a.a	PRINTER	n and combined state of the sta	
SOFTWARE PURCHASE:	CARD I)ECK	TAPE	LI	ISTING
SUPPORT INFORMATIO	N: USER'S	GUIDE	DATA MANUA	L OT	THER
TIME TO INPUT AND	DEBUG:	MAN-DAYS	MAN-	-Hours	
RUN COST/TIME:		`			
INPUT SET-UP TIME:	strate on dominations	MAN-DAYS	-MAN	-HOURS	
TYPICAL* RUN TIME:	□ > 1 HF	. D	60 M - 30 M	□ 30 M - 10 M	₽ < 10 M
TYPICAL* CPU TIME:	D > 1000	SEC.	100 - 1000 SEC.	₿ 5 - 100 SEC.	□ < 5 SEC.
*FOR THIS FORM, ASSUME SECTION 2.	"TYPICAL" TO BE A	SINGLE-ZONED 1	00 SQUARE METER RES	SIDENCE WITH ALL OUT	PUTS CHECKED (.') IN
ASSUMING USE OF SOFTW.	ARE ON PUBLIC TIME	-SHARING NETWOR	KS:		
NAMES AND CONTACTS THROUGH THEM).	OF TIME-SHARING S	ERVICES WHICH H	AVE THIS PROGRAM AV	VAILABLE (EXACT COST	'S CAN BE OBTAINED
	FISICA TECNIC	A	CL	JC	
***************************************				ENTRO UNIVERSITA	ARIO DI CALCOLO
VIALE DELLE	SCIENZE	The second secon			VZE
					(TALY)

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

RETURN TO:

Ove Jørgensen Laboratoriet for Varmeisol Danmarks Tekniske Højskole Bygning 118 2800 Lyngby - Danmark

		2800	Lyngby - Danmark
GENERAL:			,
TOOL NAME: BYVOK		AVAILABLE THROUGH:	
DEVELOPED BY:			Institute of Technolog
B.T. Larsen,		Trondheim,	Norway
Norwegian Buildi	ng Research	A TO A CONTROL OF THE PARTY OF	naminga ang terkita mendapang menganahan pi (ingkan dapang dapang pang penggan pinang pang pang penggan pengga
Institute, Oslo,	Norway	PHONE NO.: (075)	94000
	er beningsgrundlavelg dan epispology stokk entsprekspolikassesskood sin dasprinninge gestoliklijke egge	SUPPORTED BY:	
DATE DEVELOPED: 1970	nell traditioning to be a controlled and the contro	Department	of Heating, Ventila-
DATE OF LAST REVISION: 197	2	ting and Sa	anitary Engineering,
		Norwegian J	Institute of Technolog
		PHONE NO.: (075)	94000
	The state of the s		y heating or cooling
loads of a room	(zone) using the	response factor m	ethod. The program
also calculates	nourly temperatur	es of the room su	urfaces and the room
air if the room	is ventilated by	unconditioned out	door air.
PLEASE ATTACH ANY VALIDATION OF	R TESTING REPORTS.		Strategies des des mentions propriet de la des empres de la des de la compresión de la desta en managen de la dest
TOOL HARDWARE	& AVAILABLE FO	DRMS:	•
☐ MAIN FRAME COMPUTER ☐	MI CRO-COMPUTER	HAND CALCULATOR	C GRAPHIC OR MANUAL
CARD DECK TAPE TIME SHARING LISTING - HARD COPY (COMPLETE SECTIONS 1, 2, 3)	☐ DISC ☐ TAPE ☐ LISTING ☐ RECALL ONLY MEMORY— INTEGRATED CIRCUIT	☐ MAGNETIC CARD ☐ LISTING ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2,	☐ TEMPLATES, CHARTS, TABLES ☐ BOOK ☐ DEVICE (COMPLETE SECTIONS 1, 2, 6)
	(COMPLETE SECTIONS 1, 2, 4))	3)

IEA BOLAR RED 6 NORWAY

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Program is a computer implementation of:

- D.G. Stephenson and G.P. Mitalas:
 Cooling load calculations by thermal response factor method.
 Ashrae transactions, vol. 73, part 1, 1967.
- G.P. Mitalas and D.G. Stephenson:
 Room thermal response factors.
 Ashrae transactions, vol. 73, part 1, 1967.
- K. Kimura and D.G. Stephenson: Solar Radiation on cloudy days Ashrae transactions, vol. 75, part 1, 1969.
- 4. K. Kimura and D.G. Stephenson:
 Theoretical Study of cooling load caused by lights.
 Ashrae transactions, vol. 74, part 2, 1968.

000000

BYVOK NORWAY SURVEY FORM FOR IEA Z BOLAR RED **ENERGY DESIGN TOOLS** ECH & ANALYSIS MODELS ഗ INTENDED USE: INTENDED FOR USE BY: ☐ ARCHITECT M ENGINEER TECHNICIAN E RESEARCH ANALYST PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY): PRE-DESIGN [7] SITE ANALYSIS 🛛 DESIGN DEVEL. 🔲 POST-DESIGN SERV. ☐ SCHEMATICS C RESEARCH PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.): D PRE-DESIGN SITE ANALYSIS ☐ SCHEMATICS ☑ DESIGN DEVEL. ☐ POST-DESIGN SERV. E RESEARCH MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: B HEATING ⊠ COOLING 2 LIGHTING ☐ DHW MISCELLANEOUS LOADS
ED SPACE TEMPS.

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HVAC SYSTEMS
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SHADING
SYSTEM DESIGN
ECONOMICS
UNDERGROUND LOADS
UNDERGROUND LOADS
SLOPED GLAZING
HASS M LOADS

Control

Con FANS
PUMPS
MISC. ELECTRICAL
ELEV. & ESCALATOR D LOADS
SOLAR ACTIVE
SOLAR PASSIVE
ECONOMICS ECONOMICS
UNDERGROUND
LOADS
MASS INPUT DATA REQUIRED: DOES NOT MINIMUM RECOMMENDED POSSIBLE ACCOMMODATE INPUT INPUT INPUT 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 LIGHTING REQUIREMENTS SCHEMATIC DESIGN DATA BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES

ARCHITECTURAL DESIGN DEVELOPMENT DATA

ENGINEERING DESIGN DEVELOPMENT DATA

MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL

BUILDING MATERIALS & ASSOCIATED DATA (R, α , ϵ , ETC.) BUILDING MASS DATA SHADING C'EFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA

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LANGUAGE: [] FORTR	AN D BAS	sic D	MACHINE LANG	UAGE ₽ (other Algo	l n	CRAPHS CHAP	IS & SIMPLE CALC.
USER TYPE: [] I	NTERACTIVE		NTERACTIVE G				HAND CAL	
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CHECK ALL APPROPRIATI	E BOXES:						W00 10 10 11	
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SOLAR COMP. CALCUI	LATED:	🛭 DIFFUS	SE/DIRECT/RE-	-RADIATED	DIFFUSE/I	DIRECT	D TOTAL	
INTEGRATION:		C SIMPLE	EULER		[] IMPLICIT		OTHER	
SHADING:		C ANY SO	LAR OBSTRUCT	rion	OVERHANG	oner & f	ins no saz	LDING
MOVABLE SHADING:		Daily	& SEASONAL S	SWITCHING	SEASONAL		□ NOT CA	
MASS EFFECT IS CAL	CULATED:	₩ TRANSI	ENT HEAT FLO	OM.	TIME CONS	TANT FACTO		NO MASS AFFECT
ROOM TEMP. BASED C	ON:	S SURFAC	E & AIR		AIR ONLY		[] NOT CA	
INSIDE TEMPERATURE	:	☐ INPUT	SCHEDULE BY	USER	FIXED BY	TOOL	C) VARIED	BY TOOL
U-VALUES:		☐ CHANGE	w/wind spee	α:	REMAIN CO	NSTANT	[] MOVABL	E INSULATION
INFILTRATION:		AIR CH	ANGE PER HOU	TR.	CRACK MET	HOD		W/WIND SPEED
INTERNAL LOADS INC	LUDE:	C SENSIB	LE & LATENT	SEPARATE	O SENS. & L	AT. TOTAL		1
VENTILATION:		S SENSIB	LE		☐ LATENT		O VARIES OR COM	BY SCHEDULE MAND
DAYLIGHT COEFFICIE	NTS:	C SKY, R	EFL. & DIREC	т	C SKY & REF	L.	☐ sky on	ľÃ
ZONES PER RUN:						D 2 - 10	段.	1 OKTA
SYSTEM HODELING:		D SYSTEM	EFFIC. INPU	T	C SYSTEM OF	TIMIZING	COMPON	ENT SEKSITIVITY
ECONOMIC ANALYSIS:		☐ ANNUAL	COST		C SIMPLE PA	YBACK	C LIFE C	YCLE COSTING
OUTPUT:								mozaconomia.
LOAD DETERMINANTS:	COMPONENT	•	Ø ZONE	(] BUILDING			SECULIAR SECU
LOADS OUTPUT BY:	M HOUR		D DAY		THOM C	1	SEASON .	O YEAR
TEMPERATURES:	M AIR		SURFACE	ε	GRAPHIC PLO			Special Control of the Control of th
	O MONTHLY O MONTHLY P OTHER			O ANNUAL O OTHER	CONSUMPTION PEAK DEMAND	1	SYSTEM COME ENERGY SYST	Tems /

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE	Ţ 0				
COMPUTER TYPE:	_ IBM	fl cpc	₩ UNIVAC	Cl Owner	,
CORE REQUIRED:			500 K 1 25		< 25 K
SUPPORT:	Ø USER'S GUI		DATA MANUAL	OTHER	
EQUIPMENT:	ER CRT			O OTHER	
COSTS:				and departure minimated in the spring of process of the spring of the sp	
ASSUMING PURCHASE O	F SOFTWARE FOR	USE ON PRESENT TIE	Æ-SHARING:		
FIRST COST:			EED 1995- Annual Control of the State of the		
IN-OFFICE EQUIPM	ENT: C		PRINTER		
SOFTWARE PURCHAS		ARD DECK			NG
SUPPORT INFORMAT		SER'S GUIDE			
TIME TO INPUT AN	D DEBUG:	MAN-DAYS			participation of the second se
RUN COST/TIME:					
INPUT SET-UP TIM	E:	MAN-DAYS	4 MAN	-HOURS	
TYPICAL* RUN TIM	E: 🗆 >	1 HR.] 60 м - 30 м	CJ 30 M - 10 M	⊠ < 10 m
TYPICAL* CPU TIM	E: 🗆 >	1000 SEC. [] 100 - 1000 SEC.	☑ 5 - 100 SEC.	<pre>0 < 5 SEC.</pre>
*FOR THIS FORM, ASSU SECTION 2.	ME "TYPICAL" TO	BE A SINGLE-ZONED	100 SQUARE METER RE	SIDENCE WITH ALL OUTPUT	S CHECKED (,') IN
ASSUMING USE OF SOF	TWARE ON PUBLIC	TIME-SHARING NETW	ORKS:		
NAMES AND CONTACT THROUGH THEM).	IS OF TIME-SHARI	NG SERVICES WHICH	HAVE THIS PROGRAM AV	ALLABLE (EXACT COSTS C	AN BE OBTAINED
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all the property of the state o	And the second section to the second second section to the section to the second section to the section to th				and the state of t
Communication of the Communica	· · · · · · · · · · · · · · · · · · ·	the same of the sa	Edwarder and and an analysis a		Armanian Ario Carl Asiansia (Ario Carl Carlos Carlo
	THE PUBLIC AND ADDRESS OF THE PROPERTY OF THE		mildetirada Gellinas(r),qyas,landminas y ya qenegri		Volumbile for his British and the Jaboba (Green Springers and Springers and Springers)

ENCORE SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS NORWAY



TASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

RETURN TO:
Ove Jørgensen
Laboratoriet for Varmeisoler
Danmarks Tekniske Højskole
Bygning 118
2800 Lyngby - Danmark

	2800 Lyngby - Danmark
GENERAL:	
TOOL NAME: ENCORE	AVAILABLE THROUGH:
DEVELOPED BY:	Norwegian Building
B.T. Larsen	Research Institute
Norwegian Building	Oslo . Norway
Research Institute, O	PHONE NO. (02) 46 98 80
Oslo, Norway	SUPPORTED RY.
DATE DEVELOPED: 1977	Hans Engelbretsen
DATE OF LAST REVISION: 1983	Norwegian Building Res. Inst.
	PHONE No.: (02) 46 98 80
BRIEF DESCRIPTION: Encore is a program	n for calculating energy consumption of
Residential buildings. Within	certain limits (max.20 rooms, 50 surfaces
etc.) Buildings of any shape a	and room subdivision can be analysed. Calcu
lations are done hour by hour	according to the "transfer function method
of Ashrae. Contrary to most er	lergy programs infiltration is an in-
using the principle of mass ba	alance. Both stack and wind forces are taken
THE TABLE VALIDATION OR TESTING REPORTS.	into account.
TOOL HARDWARE & AVAILABL	E FORMS:
MAIN FRAME COMPUTER	☐ HAND CALCULATOR ☐ GRAPHIC OR MANUAL
CARD DECK TAPE TIME SHARING LISTING - HARD COPY COMPLETE SECTIONS 1, 2, 3)	MAGNETIC CARD INTEMPLATES, CHARTS, TABLES INTEGRATED CIRCUIT
(COMPLETE SECTIONS	

ENCORE

NORWAY





INTENDED USE:				
INTENDED FOR USE BY:				
□ ARCHITECT ☑ ENGINEER □ TECHNICIAN ☒ RESEARCH	ANALYST			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☐ DESIGN DE	EVEL. POST-D	ESIGN SER	v. 🛭 Rese	ARCH
PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):				
PRE-DESIGN SITE ANALYSIS SCHEMATICS DESIGN DE	VEL. 🛭 POST-D	ESIGN SER	v. 🛭 RESE	ARCH
MAJOR & MINOR ENERGY COMPONENTS A	ADDRESSE	D BY	TOOL:	
	₫ DHW		MISCELLANEOU	s
LOADS SPACE TEMPS. SPACE TEMPS. PASSIVE SOLAR PASSIVE CLNG. ACTIVE SOLAR SYSTEM DESIGN FC(LUX) LEVELS ARTIFICIAL LING. REDUCTION REDUCTION MASS	⊠ LOADS □ SOLAR ACTIV: □ SOLAR PASSI □ ECONOMICS		FANS PUMPS MISC. ELE ELEV. 6 E	
INPUT DATA REQUIRED:	DOES NOT ACCOMMODATE	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
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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	000000		00000000	0000000
SCHEMATIC DESIGN DATA				
BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES	8			0000
ARCHITECTURAL DESIGN DEVELOPMENT DATA				
BUILDING MATERIALS & ASSOCIATED DATA (R, Q, E, ETC.) BUILDING MASS DATA SHADING COEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA		8 8 8 8		0000
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL	5 5 6			

SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

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INTEGRATION:		C SIMPLE	EULER		[] IMPLICIT		OTHER	
SHADING:		ANY SO	LAR OBSTRUCT	CION			nso no sha	DING
MOVABLE SHADING:		☐ DAILY	& SEASONAL S	WITCHING	SEASONAL		☐ NOT CA	
MASS EFFECT IS CAL	CULATED:	TRANS	ENT HEAT FLO	W				NO MASS AFFECT
ROOM TEMP. BASED O	N:	SURFAC	E & AIR		AIR ONLY		□ NOT CA	
INSIDE TEMPERATURE	:	D INPUT	SCHEDULE BY	USER	[] FIXED BY	TOOL	□ VARIED	
U-VALUES:		CHANGE	W/WIND SPEE	D .	REMAIN O	NSTANT		E INSULATION
INFILTRATION:		AIR CH	ANGE PER HOU	R	CRACK MET			W/WIND SPEED
INTERNAL LOADS INC	LUDE:	☐ SENSIB	LE & LATENT	SEPARATE				
VENTILATION:		SENSIB	LE		[] LATENT			BY SCHEDULE
DAYLIGHT COEFFICIE:	NTS:	C SKY, R	EFL. & DIREC	T	SKY & REF	L.	SKY ON	LY
ZONES PER RUN:				[] 10 - 25		O 2 - 10		1 ONLY
SYSTEM MODELING:		SYSTEM	EFFIC. INPU	r	SYSTEM OF	TIMIZING	Сомром	ENT SENSITIVITY
ECONOMIC ANALYSIS:		☐ ANNUAL	COST		C SIMPLE PA	YBACK	C LIFE C	YCLE COSTING
DUTPUT:								
LOAD DETERMINANTS:	COMPONENT	:	ZONE		⊠ BUILDING			
	Hour		⊠ DAY		MONTH	çm	CEACON.	. 623 *** -
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HA	ARDWARE:											
COM	PUTER TYPE:	☐ IBM		CDC		UNIVAC	23	OTHER		·10/5	MINI	COMPUTE
COR	E REQUIRED:	□ > 500K		🛛 100 -	500 K	23	25 - 10	00 K		100	25 K	
sup	PPORT:	🖾 USER'S G	UIDE	8	DATA MAN	JAL	C	OTHER		man and the article of the Marketon		
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CC	DSTS:											
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FIR	RST COST:											
	IN-OFFICE EQUIPME	NT:	CRT		-province-construction	PRINTER	3		empily -			
	SOFTWARE PURCHASE	:	CRT	(TAPE X	^{∜)} (s∈	e co	m- rrts)	LISTIN	}	illum aniel mietek ei Krotrijskoh
	SUPPORT INFORMATION	ON:	USER'S G	iide <u>Nk r</u>	. 100,	- DATA M	anual <u>N</u> k		,			ma _{nd} -park-case-decode
4	TIME TO INPUT AND	DEBUG:	2	MAN-DA	.YS		MAN-HOUI	RS				
RUN	COST/TIME:											
	INPUT SET-UP TIME	:		MAN-DA		3	MAN-HOUI	RS				
Jniva	TYPICAL* RUN TIME	: 0	> 1 HR.		□ 60 M	- 30 м	1	□ 30 м	- 10	М	8	< 10 M
NITT A S	TYPICAL* CPU TIME	: 0	> 1000 Si	EC.	□ 100 -	1000 SEC.	•	3 0 5 -	100 SE	С.		< 5 SEC.
	R THIS FORM, ASSUM CTION 2.	E "TYPICAL"	TO BE A S	INGLE-ZON	TED 100 SQ	UARE METER	R RESIDE	NCE WIT	H ALL	OUTPUTS	CHECKED	(,') IN
ASS	SUMING USE OF SOFT	WARE ON PUBL	IC TIME-SI	HARING NE	TWORKS:							
	NAMES AND CONTACT THROUGH THEM).	S OF TIME-SH	ARING SER	VICES WHI	CH HAVE T	HIS PROGRA	LIAVA MA	ABLE (E	XACT C	OSTS CA	N BE OBT	AINED
				And the state of t	and the state of t	State of the state		manager or in April 1994 to 1994	o-varanthical master	70.44. 12 pt. 6		
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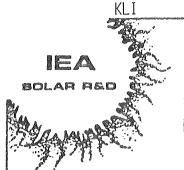


SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Price of program depends on buyer category: Research Institutions are given considerably reduced price. Commercial companies pays Nkr. 15000,- (approx., depending on support).



SURVEY FORM FOR ENERGY DESIGN TOOKS & ANALYSIS MODELS



TASK	VIII	dena	PASSIVE AND	HYBRID SOLAR	RETURN TO
			LOW ENERGY	DWELLING	

ROBTASK B - MODELLING & SIMULATION GUBTASK C - DESIGN METHODS

GENERAL

TOOL NAME: KLI	AVAILABLE THROUGH: Univ	versity of Technology
DEVELOPED BY: FAGO - Findhoven	P o O	.Box 513.
University of Technology	5600	O MB EINDHOVEN
	COM SQN 2007 QO Sale Say also a manifold the filling the side of the sale of t	raditorphonachthioshappyys ophinaanspegalaspassa san rämplaadier tork ophily-oly or ole gr. og e. e. ar som on
	PHONE 80.: 040	- 47 24 00
	SUPPORTED BY:	prijumų sakumanijų gliopitaidos piegrynis, kily nijumės myretindos (dispositus dispositus piegros piegros pieg
DATE DEVELOPED: since 1971	والمنافر المرافر المنافر المنا	isstersjärgingeryrissbaggjent (1900-bilginggrod)gagginglemann militaristräpt Emethöligin dillelyer-yr ocionar Heisifyld (1-9)s
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BRIEF DESCRIPTION: KLI is a computermodel with w		
in buildings can be simulated	under the influence	of the outdoor-
climate and any present heat-		
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.		Annual Control of the
1987 (Sh. offic.)		
TOOL HARDWARE & AVAILABLE FO	RMS:	
Main frame computer ☐ Micro-computer ☐	HAND CALCULATOR	GRAPHIC OR MANUAL
CARD DECK DISC TAPE	☐ MAGNETIC CARD	☐ TEMPLATES, CHARTS, TABLES ☐ BOOK
TIME SHARING LISTING	D RECALL ONLY MEMORY INTEGRATED CIRCUIT	D DEAICE
INTEGRATED CIRCUIT		(COMPLETE SECTIONS 1, 2, 6)
(COMPLETE SECTIONS 1, 2, 3)	(COMPLETE SECTIONS 1, 2, 5)	



SURVEY FORM FOR ENERGY DESIGN TOOLS

	4 IOOL	>		51
& ANALYSIS M	ODELS			SE
INTENDED USE:				
INTENDED FOR USE BY:				
☐ ARCHITECT ☐ ENGINEER ☐ TECHNICIAN ☐ RESEARCH	ANATVCT			•
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):	WILL ST			
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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	وووووووو		وووووووو	00000000
SCHEMATIC DESIGN DATA				
BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES	8			
ARCHITECTURAL DESIGN DEVELOPMENT DATA		-	tu	buds
BUILDING MATERIALS & ASSOCIATED DATA (R, Q, E, ETC.) BUILDING MASS DATA SHADING C'EFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA	8	8		
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL			00000	





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WEATHER DA					- Construction of the Cons
TEMPERATURE DATA:	HOURLY TO ANNUAL E	TAPE [] TYPICAL DAY [] MON: DEGREE DAYS [] AVE. MONTHLY M	THLY DATA ANNUAL IN. AND MAX. AVE. MO	DATA [] MONTRLY ONTHLY TEMP. [] D	
SOLAR DATA:	M HOURLY T	TAPE TYPICAL DAY PROFII	TE D MONTHLY	Y AVE. DAILY & TOTAL	
SOLAR ORIENS. CALC:			ERT. & HORIZ.	HORIZ. & 4 CARDINAL	DIREC.
DAYLIGHT CALC:	MOUR-BY-	HOUR TYPICAL CLEAR & CI	LOUDY DAY/MONTH	TYPICAL DAY/MONTH	
CALCULATIO	N PRO	renipes.		,	
Experience of the second secon	entre care extrement characteristic extrapo	North Advanta Charles Community continues and continues of the special control of the speci	ALGOT 60		
LANGUAGE: FORTR	1	☐ INTERACTIVE GRAPHIC	· ·	GRAPHS, CHARTS & S	
UNITS OF CALCULATION			PREPARE FILE	[] HAND CALCULATION	ON
CHECK ALL APPROPRIATION	, ,	I UNITS Q EN	GCLISH	□ вотн	
HEAT TRANSFER:	a boars.	M FINITE DIFFERENCE	☐ RESPONSE FACTOR	en annemy anem	•
SOLAR COMP. CALCUI	LATED:	Diffuse/direct/re-radiated		☐ STEADY STAT	3
INTEGRATION:		SIMPLE EULER	M IMPLICIT		
SHADING:		ANY SOLAR OBSTRUCTION	OVERHANG ONLY	☐ OTHER ☐ NO SHADING	
MOVABLE SHADING:		M DAILY & SEASONAL SWITCHING	`		ren
MASS EFFECT IS CAL	LCULATED:	M TRANSIENT HEAT FLOW	TIME CONSTANT FACT	-	
ROOM TEMP. BASED (SURFACE & AIR	X AIR ONLY	ONS O RESULTE NO LE	
INSIDE TEMPERATURE		INPUT SCHEDULE BY USER	☐ FIXED BY TOOL	□ VARIED BY TO	
U-VALUES:		CHANGE W/WIND SPEED	☐ REMAIN CONSTANT	☐ MOVABLE INSI	
INFILTRATION:		AIR CHANGE PER HOUR	CRACK METHOD	☐ VARIES W/WII	
INTERNAL LOADS INC	CLUDE:	SENSIBLE & LATENT SEPARATE			
VENTILATION:		SENSIBLE	[] LATENT	U VARIES BY SO	
DAYLIGHT COEFFICIE	INTS:	SKY, REFL. & DIRECT	C SKY & REFL.	SKY ONLY	
ZONES PER RUN:		(2) > 25 (2) 10 - 2	•		,
SYSTEM MODELING:		SYSTEM EFFIC. INPUT		COMPONENT SI	
ECONOMIC ANALYSIS:		ANNUAL COST	SIMPLE PAYBACK	☐ LIFE CYCLE (

OUTPUT:					
LOAD DETERMINANTS:	COMPONENT	r 💢 zone	BUILDING		
LOADS OUTPUT BY:	Mons X	DAY	A HONTH	E SEASON	[] YEAR
TEMPERATURES:	AIR	SURFACE	D GRAPHIC PLOT	`	
FUEL USE BY:	MONTHLY (6,50	L CONSUMPTION L PEAK DEMAND	SYSTEM COMPONENT	's



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:							
COMPUTER TYPE:	О Івн	☐ CDC		□ UNIVAC	OTHER	BURROUGHS	
CORE REQUIRED:			0 - 500 K	□ 25	100 K	[] < 25 }	
SUPPORT:)S USER'S G	UIDE	DATA P	ianual	OTHER	PLOTTER	
EQUIPMENT:	CRT CRT	X PRINT	ER	[] TEXTRONIX	other		
COSTS:		•					
ASSUMING PURCHASE OF	SOFTWARE FO	R USE ON PRESEN	T TIME-SHA	RING: NOT FO	R SALE	1	
FIRST COST:							
IN-OFFICE EQUIPME	nt:	CRT		PRINTER			
SOFTWARE PURCHASE	:			TAPE			PO AN AND INCOMES AS EXEMPLIANCES AND
SUPPORT INFORMATI	on:			DATA MANUAL			PO NOT MANUFACTURE OR ANTHROPOLISM AND ANTIQUES ANTIQUES AND ANTIQUES ANTIQUES AND ANTIQUES AND ANTIQUES AND ANTIQUES AND ANTIQUES AND
TIME TO INPUT AND	DEBUG:			MAN-H		pro-	- Carrier of against hamiging in factories and in 1995 to 1995
RUN COST/TIME:							
INPUT SET-UP TIME	*	0,5-1 MAN	-DAYS	MAN-HO	ours		
TYPICAL* RUN TIME	: 🗅	> 1 NR.	D 60	м - 30 м	□ 30 м	- 10 M	X < 10 M
TYPICAL* CPU TIME	: 0	> 1000 SEC.	100	- 1000 SEC.	.D.5 - 1	00 SEC.	
*FOR THIS FORM, ASSUM SECTION 2.	E "TYPICAL"	TO BE A SINGLE-	ZONED 100	SQUARE METER RESIL	DENCE WITH	ALL OUTPUTS CHE	CKED (/) IN
ASSUMING USE OF SOFT	VARE ON PUBL	IC TIME-SHARING	NETWORKS:				
NAMES AND CONTACTS OF TIME-SHARING SERVICES WHICH HAVE THIS PROGRAM AVAILABLE (EXACT COSTS CAN BE OBTAINED THROUGH THEM).							
Comment and a representative or the control of the	P. Maliyara and A. Sarana and Sara	TO ANNOUNCE OF METICANES NO TONE ON SHARE AND ANNOUNCE OF THE STATE OF	our manufacture in the high physical program, a segment	KERPERSON OF THE STREET STREET, STREET	Print The Charles and a company of the desired control of the cont	Oldernia Marien v egyptytyj, oddyddiaid allo aill dd yddiaid yn dd	Miller Mille (Miller Miller) (1900) (Miller Jacobs and Miller) (1900) (1900)
	and the second s	MEMOLEH (***)	Orden Gillpurenhaloghönige	die die Englische Versche der der der der der der der der der de	e-terroret sandanthe-projector New	The "Familian same type segregate regular trade statistics and "home victors" constitution of the constitu	
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	CP-MAIN-FIRM NEW STREET AND ASSOCIATION ASSOCIATIO	((((())))				The transfer of the transfer o	
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SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO: LOW ENERGY DWELLING

BUSTASK B - MODELLING & SIMULATION JUBTASK C - DESIGN METHODS

GENERAL:

COOL HAME: BFEP	AVAILABLE THROUGH: Augenbroe, G.L.M.
eveloped my: Augenbroe, G.L.M.	adress: Building Physics Group
Building Physics Group	Dept. of Civil Engineering
Dept. of Civil Engineering	Delft University of Technology, postbus 5048
Delft University of Technology	PHONE NO.: 015-783386 PELFT, The Neth.
Delft, The Netherlands	surported by: same as above
ATE DEVELOPED: Started: 1979	BFEP is implemented on an AMDAHL 470V/7B
TATE OF LAST REVISION: Version 2.1, may 1982	at the computer-centre of the Delft Univ.
	of Technology
r .	PRONE MAL.

BRIEF DESCRIPTION: BFEP is a finite element-based computer-program intended for the calculation of temperatures in buildings. It consists of a library of FORTRAN-coded subroutines. Due to the modular approach, the user can define any load, climate, control, algorithm, etc. in a user-written main program and additional user-subroutines. Alternatively the user can simply select standard options by supplying appropriate input data. The actual computation stage is preceded by seperate input preparation stage, the latter thus lending itself to inter-

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		ny sunted computer env	
ovious from the above	it is felt necessary	/ to elaborate on the	purpose and intended use
f BFEP: (continued or			
OOL HARDWARE	8 AVAILABLE F	FORMS:	
The state of the s	en e	Maria and a series of the seri	~
M MAIN FRAME COMPUTER [) H1CRO-COMPUTER	☐ HAND CALCULATOR	☐ GRAPHIC OR MANUAL
C CARD DECK	O DISC	☐ MAGNETIC CARD	[] TEMPLATES, CHARTS, TABLES
S TAPE	□ TAPE	[LISTING	□ воок
☐ TIME SHARING	☐ LISTING	☐ RECALL ONLY MEMORY	☐ DEVICE
ME LISTING - HARD COPY	C RECALL ONLY MEMORY-	INTEGRATED CIRCUIT	
	INTEGRATED CIRCUIT		(COMPLETE SECTIONS 1, 2, 6)
(COMPLETE SECTIONS 1, 2, 3	3)	(COMPLETE SECTIONS 1, 2,	5.)
	(COMPLETE SECTIONS 1 2	4)	

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INTENDED US	de:			
INTENDED FOR USE BY:	snerovacumungsia			
☐ ARCHITECT	ENGINEER DT	ECHNICIAN 👪 RESEARCI	ANALYST	
PHASE FOR WHICH DESIG	N TOOL WAS DEVELOPED (ONLY):		
☐ PRE-DESIGN ☐	SITE ANALYSIS [] SO	CHEMATICS DESIGN I	DEVEL. D POST-DESIGN	SERV. RESEARCH
PHASE(S) FOR WHICH DE	SIGN TOOL MAY BE USEFUI	(ANY NO.):		200 L. D. D. O. V. O. S.
☐ PRE-DESIGN ☐	SITE ANALYSIS D SC	CHEMATICS 🔞 DESIGN I	DEVEL. POST-DESIGN	SERV. RESEARCH
MAJOR & MIN	OR ENERGY	COMPONENTS	ADDRESSED B	Y TOOL:
M HEATING	COOLING	Printer.	D DHW .	☐ HISCELLANEOUS
BE LOADS BE SPACE TEMPS. BE HVAC SYSTEMS PASSIVE SOLAR CITYE SOLAR SHADING SYSTEM DESIGN ECONOMICS UNDERGROUND LOADS BE HASS	LOADS SPACE TEMPS. HAVAC SYSTEMS PASSIVE CLING. SHADING CHARACTER DESIGN C	■ LOADS ■ FC (LUX) LEVELS □ SYSTEM DESIGN □ ECONOMICS ■ DAYLIGHTING ■ C(LUX) LEVELS ■ ARTIFICIAL LING. DS REDUCTION		☐ FANS ☐ PUMPS ☐ MISC. ELECTRICAL ☐ ELEV. & ESCALATOR
INPUT DATA F	REQUIRED:		DOES NOT MINIMU	TOTAL M RECOMMENDED POSSIBLE

INPUT DATA REQUIRED: PRE-DESIGN AND SITE ANALYSIS DATA	DOES NOT ACCOMMODATE	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
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	00000000		وووووووو	00000000
SCHEMATIC DESIGN DATA				
SCHEMATIC DESIGN DATA BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES	8			
ARCHITECTURAL DESIGN DEVELOPMENT DATA				
BUILDING MATERIALS & ASSOCIATED DATA (R, a, e, ETC.) BUILDING MASS DATA SHADING CFEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA			B	
ENGINEERING DESIGN DEVELOPHENT DATA				
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WEATHER DA	ATA:	full	year (36	5 d) or any ot	syntheti her (use	cal referen r-defined)	ice year (56	a.) or
TEMPERATURE DATA:	M HOURLY T	APE DAYS	TYPICAL DAY () AVE. M	HTROM []	Y DATA AND MAX.	C ANNUAL DAT		DEGREE DAYS
SOLAR DATA:	MOURLY T	APE 1	TYPICAL D	AY PROFILE		C HONTHLY AV	E. DAILY & TOTA	l,
_)LAR ORIENS. CALC:	M ANY ORTE				. & HORIZ. REFLECTANCI		IZ. & 4 CARDINA	L DIREC.
DAYLIGHT CALC:	® HOUR-BY- □ ANUMAL A	HOUR (TYPICAL CI	ny; user	dy pay/how defined	CH C TABI	CAL DAY/HONTH	is one something
CALCULATIO	N PRO	CEDUR	ES:					###PREAMPRIME
LANGUAGE: PORTR		demili dar station militarian in the same of the same	ACHINE LANGU	AGE [] OT	NER	· (1) GR	APHS, CHARTS &	SIMPLE CALC.
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CHECK ALL APPROPRIAT								0.00
HEAT TRANSFER:		M FINITE	elements		C RESPONSI	E FACTOR	STEADY STA	те
SOLAR COMP. CALCU	LATED:	M DIFFUSI	E/DIRECT/RE-	RADIATED	O DIFFUSE	/DIRECT	[] TOTAL	nghiosir se
INTEGRATION:		SIMPLE	EULER		C INPLICE	r	M other : P	red-corr.
SHADING:		(C) ANY SOI	LAR OBSTRUCT	ion	O OVERHAN	G ONLY	O NO SHADING	any other
MOVABLE SHADING:			prep) s seasonal si user-det.		. SEASONA	L SWITCHING	O NOT CALCUL	ATED
HASS EFFECT IS CA	LCULATED:	any t	JSET-GET. ENT HEAT FLO	Control: ₄	TIME CO	NSTANT FACTORS	ASSUME NO	MASS AFFECT
ROOM TEMP. BASED		SURFACI	E & AIR		ALR ONL	γ	☐ HOT CALCUL	ATED
INSIDE TEMPERATUR	E:	M INPUT	SCHEDULE BY	USER	C FIXED B	Y TOOL	O VARIED BY	TOOL
U-VALUES:		E CHANGE	w/wind speci so destrec	9,	T REMAIN	CONSTANT	MOVABLE IN	ISULATION
INFILTRATION:		@ AIR CH	SO GESTIEG ANGE PER HOU	1) . R	CRACK H	ЕТНОВ	BY YARJES W/	IND SPECO
INTERNAL LOADS IN	CLUDE:	SENSIBI	LE & LATENT	SEPARATE	C SENS. &	LAT. TOTAL	SENSIBLE O	
ventilation:		S SENSIBI	LE .		C LATENT		OF COMMAND	
DAYLIGHT COEFFICE	ENTS:	SKY, RI	EFL. & DIREC	r	SKY 6 R	EFL.	SKY ONLY	the displayed
ZONES PER RUN:		[S] > 25		[] 10 - 25		□ 2 - 10	[] 1 ON	ILY
SYSTEM MODELING:		SYSTEM	EFFIC. INPU	r	SYSTEM	OPTIMI" ING	M COMPONENT	SENSITIVITY
ECONOMIC ANALYSIS	:	☐ ANNUAL	COST		C) SIMPLE	PAYBACK	C LIFE CYCLE	COSTING
OUTPUT:								POPENTALLO
LOAD DETERMINANTS:	COMPONEN		M ZONE		BUILDING		•	and the same of th
LOADS OUTPUT BY:	M Hour; O	r any d interv	D DAY		NTMOM [SEASON	C) YEAR
TEMPERATURES:	AIR AIR		SURFACE and in	ternal (S GRAPHIC			PAGE STATE OF THE PAGE STATE O
FUEL USE BY:	MONTHLY MONTHLY OTHER		И	M ANNUAL	CONSUMPTIO PEAK DEMAN NY ENERG	D	SYSTEM COMPONE ENERGY SYSTEMS TOTAL BUILDING	/

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

		•,				
HARDWARE:					,	
COMPUTER TYPE:	87 18 H	(ច្រុំcoc (in prep)ច	UNIVAC	(D) OTHER H	² 1000 (in prep)	
CORE REQUIRED:	□ > 500ж	100 - 500 k (large system Data Hanu) 23 25	- 100 K	□ < 25 K	
SUPPORT:	M user's Guide	C) DATA HANU	AL	other theor manual		
EQUIPMENT:	CRT CRT	M PRINTER O	TEXTRONIX	OTHER		
COSTS:						
ASSUMING PURCHASE C	F SOFTWARE FOR USE	ON PRESENT TIME-SHARIN	<u>c</u> :			
FIRST COST:						
IN-OFFICE EQUIPM	ENT: CRT	EQUE COS	PRINTER			
SOFTWARE PURCHAS	E: CARD	DECK on an	TAPE \$350	0 (appr)	LISTING included	
SUPPORT INFORMAT	ion: · user	s GUIDE included	DATA MANUAL	+ + + + + + + + + + + + + + + + + + +	отнек <u>theor. man.(</u> in	
TIME TO INPUT AN	D DEBUG: 1-5	MAN-DAYS	MAN-	HOURS		
RUN COST/TIME:					/ problem-siz	
INPUT SET-UP TIM	e: from se	veralman-days to_	MAN-	Hours, depend		
TYPICAL® RUN TIP	E: (turn-arour	R time inch 60 M -	30 M	O 30 M - 10	(not incl)	
TYPICAL* CPU TIM	väl: 365 days¹∝		1000 sec. accurate)	acceptal	ofe acc) C < 5 SEC.	
FOR THIS FORM, ASSU	ME "TYPICAL" TO BE	A SINGLE-ZONED 100 SQU	are meter res	SIDENCE WITH ALL	OUTPUTS CHECKED (,') IN	
ASSUMING USE OF SOF	TWARE ON PUBLIC TIM	E-SHARING NETWORKS:				
NAMES AND CONTACT THROUGH THEM).	TS OF TIME-SHARING	SERVICES WHICH HAVE TH	IS PROGRAM AV	Allable (EXACT	COSTS CAN BE OBTAINED	
Not availabl	2	entralisation of a sparse and college of the colors of the sparse of the	46.00.40.40.40.40.40.40.40.40.40.40.40.40.	TB-Principles The Mark of the Complete Laboratory and inclinate production of the Complete Co	ngg enggenanggankan bisa si 469 di pina malaying kina malaying kina si pina si pina si pina si pina si pina si	
Note: BFEP i	s primarily dev	reloped for Batch-	pr <u>ocessin</u> g	, during wh	ich data from the	
this file to	be filled dun	ead from a standar ing a (hardwa re-d urea is lacking.	d input fi ep endent)	le. The BFEI interactive	Papproach enables pre-processing stage	
No rec exper	ichoc in onto c	11 - 12 14 - 1119 ·	474 c/7574 524-A-700cc 44-74-74-74-74-74-74-74-74-74-74-74-74-7	Michigan continuous in the company of the company		

IEA, Task VIII, suppl. 1

THE NETHERLANDS BFEP

PURPOSE OF BFEP

The major distinction of BFEP as apposed to similar programs is that the user has to perform his own modelling tasks before any BFEP-calculations are performed. In this way its fruitful use is limited to a group of users, equipped with sufficient know-how and experience in the application field; moreover BFEP prohibits black-box use by inexperienced users, unaware of its limitations, as indeed any program should.

On the other hand the user-modelling facility guarantees maximal flexibility and use in almost unlimited application areas.

INTENDED USE OF BFEP

Standard BFEP-use comprises two stages:

stage 1: preperation-stage, requiring system modelling and preparation of the
input-file.

This stage can be thought of as being rather dependent upon the available computer environment (i.e. interactive file preparation, whenever possible). BFEP merely supplies so-called generation subroutines for generating the element data for the input-model of standard components (i.e. walls, rooms, etc.).

The use of finite elements allows a flexible space-discretization on component-level. Components such as solar collectors, packed beds, storage tanks, etc. are all treated uniformly, requiring only different elements.

In this stage the main program acts as a master-routine for all user-selected actions, every action requiring the call of a BFEP-subroutine. Different standard files, containing climate data can be connected during this stage, along with the specification of loads, control-actions, etc. in user-subroutines.

LITERATURE

Background:

- 1. Augenbroe, G.L.M.; Finite elements in building physics.
 Building Physics Group, Delft University of Technology (1978).
- 2. Augenbroe, G.L.M.; A finite element-based computer program for the simulation of the thermal behaviour of complex systems. 8th CIB-Congres, Oslo (1980).

IEA, Task VIII, suppl. 2

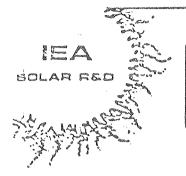
3. Augenbroe, G.L.M.; Temperature calculations in buildings using a finite element-based computer program.

Third Int. Symp. on Energy Conservation in the Built Environment, Dublin (1982).

BFEP-Manuals: (in Dutch):

4. Augenbroe, G.L.M.; Temperature calculations in buildings using BFEP. Part 1-4.

Building Physics Group, Delft University of Technology (1982).



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



ASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION STASK C - DESIGN METHODS

RETURN TO:

EMPA

Ueberlandstrasse 129 att. Mr. R. Hastings 8600 <u>Dübendorf</u>

ENERAL:							
PA PACE:	SSIM	AVAILABLE THROUGH:	Nicolas MOREL				
Ni Ni Ni	colas MOREL	LSB - EPFL					
Laboratory for	· Solar Energy	LESO - Building					
and Building Physics (LSB)		1015 LAUSANNE					
	одо о философия на принципент на при	PHONE NO.: 021/47'4	5 ' 47				
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TOOL HARDW	ARE & AVAILABLE F	ORMS:					
R MAIN FRAME COMPUTE	R D MICRO-COMPUTER	THAND CALCULATOR	CRAPHIC OR MANUAL				
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(COMPLETE SECTIONS	integrated circuit 1, 2, 3) (COMPLETE SECTIONS 1, 3,	(COMPLETE SECTIONS 1, 2, 3	(COMPLETE SECTIONS 1, 2, 6)				

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

COMMENTS:

- Mainly used for research work, PASSIM is actually used by an Ingeneer Office at design level.
- The documentation of PASSIM is in project.

PASSIM

SWITZERLAND

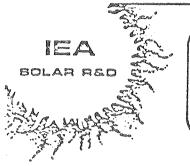




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PASSIM

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

The input data required is :

- (1) a description file for the system, which describes :
 - the chosen nodes (type, ie, floating, assigned temperature, or thermostatcontrolled; initial temperature or assignation on lower / upper limit)
 - the thermal capacity of each node
 - the coupling constants between nodes (which may be pure conductance, natural convection, or radiation).
 - the externalheat sources on certain nodes
 - the definition at solar irradiation measurements tabulation and solar constants
 - the times (simulation and display timesteps, beginning end of simulation)
 - an optimal title
 - multiplying expressions for coupling constants
- (2) a tabulated data file, which tabulates:
 - the temperature of assigned nodes
 - the horizontal and diffuse solar irradiation if one uses the "solar generator"
 - the external heat sources if necessary

The tabulation interval may be anything, typically one may use half hour or one hour. The format has to be "GRES - format"; it is described in an internal report, which may be obtained by the GRES/EPFL ("Format-GRES 81", N. MOREL)

PASSIM SWITZERLAND SURVEY FORM FOR IE L ECTION NO. SOLAR RED **ENERGY DESIGN TOOLS** & ANALYSIS MODELS WEATHER DATA: [] TYPICAL DAY [] MONTHLY DATA . [] ANNUAL DATA TEMPERATURE DATA: M HOURLY TAPE O MONTHLY DEGREE DAYS ANNUAL DEGREE DAYS | AVE. MONTHLY MIN. AND MAX. | AVE. MONTHLY TEMP. DAILY TYPICAL DAY PROFILE SOLAR DATA: E HOURLY TAPE MONTHLY AVE. DAILY & TOTAL ANY ORIEN. INCL. SLOPED SOLAR ORIENS, CALC: [] ANY VERT. & HORIZ. THORIZ. & 4 CARDINAL DIREC. SLOPED FACING SOUTH SURFACE REFLECTANCE TYPICAL CLEAR & CLOUDY DAY/MONTH L./LIGHT CALC: D HOUR-BY-HOUR TYPICAL DAY/MONTH ANNUAL AVERAGE () OTHER CALCULATION PROCEDURES: ☐ MACHINE LANGUAGE ☐ OTHER LANGUAGE: Z FORTRAN D BASIC C GRAPHS, CHARTS & SIMPLE CALC. M INTERACTIVE M INTERACTIVE GRAPHIC (X PREPARE FILE C) HAND CALCULATION be si units FT ENGLISH UNITS OF CALCULATION: 17 ROTH CHECK ALL APPROPRIATE BOXES: S FINITE DIFFERENCE C RESPONSE FACTOR C STEADY STATE HEAT TRANSFER: SOLAR COMP. CALCULATED: O DIFFUSE/DIRECT/RE-RADIATED M DIFFUSE/DIRECT ATOTAL OTHER INTEGRATION: C SIMPLE EULER E IMPLICIT SHADING: ANY SOLAR OBSTRUCTION O OVERHANG ONLY O NO SHADING HOVABLE SHADING: SI DAILY & SEASONAL SWITCHING SEASONAL SWITCHING O NOT CALCULATED MASS EFFECT IS CALCULATED: TI TRANSIENT HEAT FLOW [] TIME CONSTANT FACTORS [] ASSUME NO MASS AFFECT ROOM TEMP. BASED ON: [] SURFACE & AIR DE AIR ONLY [] NOT CALCULATED INSIDE TEMPERATURE: EZ INPUT SCHEDULE BY USER O VARIED BY TOOL I FIXED BY TOOL Hallattes. CHANGE W/WIND SPEED TREMAIN CONSTANT MOVABLE INSULATION AIR CHANGE PER HOUR C VARIES W/WIND SPEED INFILTRATION: (") CRACK METHOD INTERNAL LOADS INCLUDE: SENSIBLE & LATENT SEPARATE C SENS. & LAT. TOTAL SENSIBLE ONLY O VARIES BY SCHEDULE OR COMMAND VENTILATION: IT SENSIBLE [] LATENT DAYLIGHT COEFFICIENTS: [] SKY, REFL. & DIRECT SKY & REFL. SKY ONLY ZONES PER RUN: () > 25 [] 10 - 25 C 2 - 10 ☐ 1 ONTA SYSTEM MODELING: C SYSTEM EFFIC. INPUT SYSTEM OPTIMIZING COMPONENT SENSITIVITY ECONOMIC AMALYSIS: IT ANNUAL COST SIMPLE PAYBACK ☐ LIFE CYCLE COSTING **OUTPUT:**

S BUILDING

S GRAPHIC PLOT

S SEASON

SYSTEM COMPONENTS

ENERGY SYSTEMS

TOTAL BUILDING ONLY

DE YEAR

HINOH [3]

ANNUAL CONSUMPTION

[ANNUAL PEAK DEMAND

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TEMPERATURES:

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☐ MONTHLY CONSUMPTION

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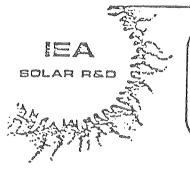
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PASSIM

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE	an ⇔ ¢ ≈ ¢			•	,	
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COSTS:			4012/40	75		
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FIRST COST:						
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Support informa		'S GUIDE		NUAL		
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RUN COST/TIME:						
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TIME SHARING [] LISTING - HARD COPY

(COMPLETE SECTIONS 1, 2, 3)

SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



TASK	VIII	Elita y	PASSIVE AND	HYBRID SOLAR	RETURN	TO:
			LOW ENERGY	DWELLING		

RECALL ONLY MEMORY-

INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 4)

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

GENERAL: TOOL NAME: MODPAS AVAILABLE THROUGH: Not available DEVELOPED BY: J.C. Hadorn - D. Chuard at present Sorane S.A. ' Route du Chatelard 52 1018 Lausanne PHONE NO.: (021) 37 11 75 SUPPORTED BY: Sorane S.A. DATE DEVELOPED: May 1982 DATE OF LAST REVISION: June 1982 PHONE NO.: BRIEF DESCRIPTION: MODPAS = Model 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 PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS. **TOOL HARDWARE & AVAILABLE FORMS:** M. HAIN FRAME COMPUTER ☐ MICRO-COMPUTER HAND CALCULATOR C GRAPHIC OR MANUAL CARD DECK D DISC MAGNETIC CARD [] TEMPLATES, CHARTS, TABLES ☐ TAPE M TAPE M LISTING C) LISTING
C) RECALL ONLY MEMORY D BOOK

INTEGRATED CIRCUIT

(COMPLETE SECTIONS 1, 2, 5)

(COMPLETE SECTIONS 1, 2, 6)

MODPAS

SWITZERLAND

SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

COMMENTS:

Example of a validation test: winter week

Simulation of a greenhouse linked to an hospital (CH)

Time Step: A hour - 6 nodes network =

Conductances (conduction, connection, radiation) constant during

the whole period



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



& ANALYSIS MO	DELS			SE SE
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INTENDED FOR USE BY:				•
ARCHITECT MENGINEER DITECHNICIAN MERESEARCH AND	VLYST			
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MODPAS

SWITZERLAND

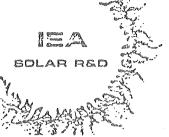


SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

- in general conductances and capacities are treated as constant, i.e. independant of the nodes temperatures (except for a free convection path), so that the indoor geometry is not an input: this is given through the conductances and capacities input.
- The glazing geometry is a real input and the transmitted radiation is computed for any inclination and orientation
- The repartition of the transmitted solar radiation between all nodes is also an input. It is considered as a constant for one month.



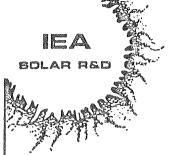
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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LANGUAGE: D FORTE	RAN [[] BAS	SIC [] MACHINE LANG	GUAGE 🗀 O	THER [] GRAPHS, CHARTS	& SIMPLE CALC.
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CHECK ALL APPROPRIAT	TE BOXES:					
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INTEGRATION:		SIMPLE EULER		E IMPLICIT	OTHER	
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INFILTRATION:		AIR CHANGE PER HO	OUR	CRACK METHOD	O VARIES W	WIND SPEED
INTERNAL LOADS IN	CLUDE:	SENSIBLE & LATENT	SEPARATE	SENS. 6 LAT. TOTA	L A SENSIBLE	Y.I'NO
VENTILATION:		C SENSIBLE		C) LATENT	O VARIES BY OR COMMAN	
DAYLIGHT COEFFICE	ENTS:	() SKY, REFL. & DIRE	ECT	O SKY & REFL.	SKY ONLY	
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SYSTEM MODELING:		SYSTEM EFFIC. IN	PUT	SYSTEM OPTIMIZING	COMPONENT	SENSITIVITY
ECONOMIC ANALYSIS	S:	ANNUAL COST		C) SIMPLE PAYBACK	C) LIFE CYCI	E COSTING
OUTPUT:						
LOAD DETERMINANTS:	COMPONE.	T ZONE	,	O BRITTING		
LOADS OUTPUT BY:	ET HOUR	CJ DAY	,	D HONTH	☐ SEASON	D LEAR
TEMPERATURES:	D AIR	SURFACE		C GRAPHIC PLOT		
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

The main uses of this tool are:

- Check of the maximum/minimum temperature of rooms air in greenhouse passive systems.
- Optimisation of thermal mass
- Interest and need for shading devices
- general thermal haviour of a passive house or greehouse during typical weeks or days

Example of output: follows

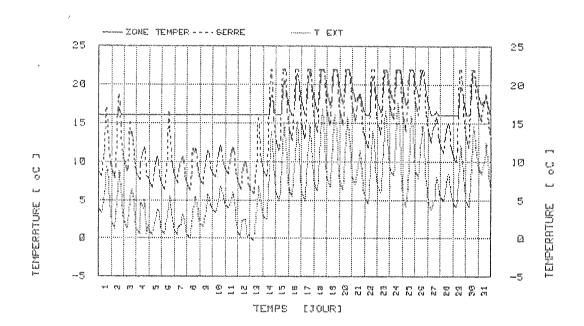
MODPAS

SWITZERLAND

SORANE SA / MAI 1982

SERRE

/ DOUBLE ESPACE 1



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3	1160741	31183	31183
20	3286630	865654	865654

Simulation, hour by hour during March, of a

2 arge Greenhause (220m²) in suitzerland,

MODPAS

BOLAR RED

SOLAR RED

MODPAS

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MICRO-COMPUTER

I I A PTO TOO I A / A PTO PTO.
HARDWARE:
MANUFACTURER AND MODEL NUMBER: HP 9845 B
RANDOM ACCESS MEMORY (RAM) REQUIRED: ~ 100 K bytes
DOES THIS TOOL REQUIRE A PRINTER? YES NO and a plotter
SUPPORT: USER'S GUIDE DATA MANUAL OTHER Short description
COSTS: FIRST COST: MICRO-COMPUTER: unknown
SOFTWARE: ROM IC DISC TAPE LISTING
SUPPORT INFORMATION: USER'S GUIDE DATA MANUAL OTHER
TIME TO INPUT AND DEBUG: ~ 20 MAN-DAYS MAN-HOURS
RUN COST/TIME:
TYPICAL* INPUT SET-UP TIME: MAN-DAYS 1 to 3 MAN-HOURS
Typical* run time: ~ 5 Hrs. Min.
Typical* print time: ~ 0.5 Hrs. Min. with plots
*FOR THIS FORM, ASSUME "TYPICAL" TO BE A SINGLE-ZONED 100 SQUARE METER RESIDENCE WITH ALL OUTPUTS CHECKED (/) IN SECTION 2. + (time step: 1 hour period of simulation: 1 year (8760 steps)

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	mpa	PASSIVE AND	HYBRID SOLAR	RETURN	TO:
			IOW ENERGY	DWELLING		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL:	
TOOL NAME: IGLOU	AVAILABLE THROUGH:
DEVELOPED BY: MOTOR-COLUMBUS ING. AG	MOTOR-COLUMBUS, ING. AG
Parkstrasse 27, 5400 Baden	Parkstrasse 27, 5400 Baden
and	
Höhere Techn. Lehranstalt	PHONE NO.: 056 20 11 21
Brugg-Windisch	SUPPORTED BY: Motor-Columbus, ING.AG.
DATE DEVELOPED: 1979	Parkstrasse 27, 5400 Bade
DATE OF LAST REVISION: 11.03.1982	J. Lanz, A. Schopfer
	PHONE NO.: 056 20 11 21
BRIEF DESCRIPTION: Wärmetechnische Analysen	
J. Lanz, A. Schopfer	
Schwelzer Ingenieur und A	rchitekt Heft 20/1981
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PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE FOR	PAR.
MAIN EPAME COMMUNICA	A NOTE OF A STATE OF A
CARD DECK	AND CALCULATOR GRAPHIC OR MANUAL
☑ TAPE ☐ TAPE	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES
ES TIME SHARING [] LISTING	RECALL ONLY MEMORY CO DEVICE
INTEGRATED CIRCULT	INTEGRATED CIRCUIT
	COMPLETE SECTIONS 1, 2, 6)

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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WEATHER D						
TEMPERATURE DATA:	[] HOURLY 1		PICAL DAY [] MOI [] AVE. MONTHLY	THLY DATA \(\bigcap \) ANNU \(\text{ANN AND MAX.} \(\bigcap \) AVE.	AL DATA	DEGREE DAYS
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SOLAR ORIENS. CALC:		EN. INCL. SLOI FACING SOUTH		VERT. & HORIZ. ACE REFLECTANCE	☐ HORIZ. & 4 CARDINA	L DIREC.
DAYLIGHT CALC:	☐ HOUR-BY-		TYPICAL CLEAR & OTHER	CLOUDY DAY/MONTH	TYPICAL DAY/MONTH	
CALCULATIO	N PRO	CEDURE	S :		,	
LANGUAGE: S FORTE	RAN D BAS	IC D MACI	HINE LANGUAGE	OTHER	GRAPHS, CHARTS &	SIMPLE CALC.
USER TYPE: 🔯 I	NTERACTIVE'	O INTER	RACTIVE GRAPHIC	PREPARE FILE	HAND CALCULAT	ION
UNITS OF CALCULATION	i: 🛭 🖾 S	I UNITS	D :	ENGLISH	🖸 вотн	
CHECK ALL APPROPRIAT	E BOXES:					
HEAT TRANSFER:		🗆 FINITE DI	FFERENCE	RESPONSE FACTOR	STEADY STA	TE
SOLAR COMP. CALCU	LATED:	B DIFFUSE/	DIRECT/RE-RADIATE	O DIFFUSE/DIRECT	☐ TOTAL	
INTEGRATION:		SIMPLE EL	JLER	[] IMPLICIT	⊠ OTHER	
SHADING:		ANY SOLAR	OBSTRUCTION	OVERHANG ONLY	O NO SHADING	;
MOVABLE SHADING:		M DAILY & S	EASONAL SWITCHING	S SEASONAL SWITCH	ING D NOT CALCUL	ATED
MASS EFFECT IS CA	LCULATED:	TRANSIENT	HEAT FLOW	TIME CONSTANT F	ACTORS D ASSUME NO	MASS AFFECT
ROOM TEMP. BASED	ON:	SURFACE &	AIR	C AIR ONLY	O NOT CALCUL	ATED
. INSIDE TEMPERATUR	E:	g input sch	REDULE BY USER	TIXED BY TOOL	VARIED BY	TOOL
U-VALUES:		CHANGE W/	WIND SPEED	REMAIN CONSTANT	☐ MOVABLE IN	SULATION
INFILTRATION:		AIR CHANG	JE PER HOUR	C CRACK METHOD	☑ VARIES W/W	IND SPEED
INTERNAL LOADS IN	CLUDE:	SENSIBLE	& LATENT SEPARATI	C SENS. & LAT. TO	TAL SENSIBLE C	NLY
VENTILATION:		S SENSIBLE		□ LATENT	OR COMMAND	
DAYLIGHT COEFFICE	ENTS:	C SKY, REFI	& DIRECT	[] SKY & REFL.	SKY ONLY	
ZONES PER RUN:		⊠ > 25	O 10 -	25 🔘 2 -	10 🖺 1 08	TLY
SYSTEM MODELING:		SYSTEM E	FFIC. INPUT	SYSTEM OPTIMIZI	NG COMPONENT	SENSITIVITY
ECONOMIC ANALYSIS	:	ANNUAL CO	OST	C SIMPLE PAYBACK	☐ LIFE CYCLE	COSTING
OUTPUT:			,			
LOAD DETERMINANTS:	COMPONEN	T 🛭	ZONE	S BUILDING		
LOADS OUTPUT BY:	2 Hour		DAY	☐ MONTH	SEASON	[] YEAR
TEMPERATURES:	M AIR	Ø	SURFACE	GRAPHIC FLOT		
FUEL USE BY:		CONSUMPTION PEAK DEMAND	D ANNI	JAL CONSUMPTION JAL PEAK DEMAND	SYSTEM COMPONE DENERGY SYSTEMS	1

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:						
COMPUTER TYPE:	□ IBM	□ CDC	□ UNIVAC	OTHER	PRIME	
CORE REQUIRED:	⊠ > 500K	[] 100 - 50i	O K 📋 25 -	- 100 K	□ < 25	K
SUPPORT:	☑ USER'S GUIDE		TA MANUAL			
EQUIPMENT:	KQ CRT	PRINTER	M TEXTRONIX	OTHER	A CARLON CONTROL OF THE CARLON CONTROL OF TH	A - A - A - A - A - A - A - A - A - A -
COSTS:				-		Charles Carrier and American Charles Charles Annual Charles Ch
ASSUMING PURCHASE O	F SOFTWARE FOR USE	ON PRESENT TIME-	-SHARING:			
FIRST COST:						
IN-OFFICE EQUIPM	ENT: CRT		PRINTER			
SOFTWARE PURCHASI			TAPE			
SUPPORT INFORMAT			DATA MANUAL			
TIME TO INPUT AND			MAN-H		bride la constitución de la cons	and and a series of the control of t
RUN COST/TIME:						
INPUT SET-UP TIME	1	10 MAN-DAYS	MAN-H	ours		
TYPICAL* RUN TIME			60 m - 30 m		10 M	C) < 10 M
TYPICAL* CPU TIME	:: 🗆 > 100	o sec.	100 - 1000 SEC.	5 - 100	SEC.	[] < 5 SEC.
*FOR THIS FORM, ASSUM	E "TYPICAL" TO BE	A SINGLE-ZONED 1	00 square meter resi	DENCE WITH	ALL OUTPUTS CHE	CKED (/) IN
ASSUMING USE OF SOFT	WARE ON PHRITC TIM	Emeliadithic atemilon	ve.			
			AVE THIS PROGRAM AVA	ILABLE (EXAC	TT COSTS CAN BE	OBTAINED
J. Lanz,	A. Schopfer					
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	65350	PASSIVE AND	HYBRID SOLAR	RETURN	TO
			LOW ENERGY	DWELLING		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL: TOOL NAME: BAUDYN DEVELOPED BY: SULZER / Ponomareff	AVAILABLE THROUGH: SULZER / Winterhein
DATE DEVELOPED: 81 DATE OF LAST REVISION:	PHONE NO.: SUPPORTED BY: PONOMAREFF
BRIEF DESCRIPTION: Calculates dynamic heat air and surface temperate the loads of heating and	tures. Can also be used to calculate
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS. TOOL HARDWARE & AVAILABLE FO	DRMS:
EN MATHERINE CONTINUE	HAND CALCULATOR GRAPHIC OR MANUAL HAGNETIC CARD LISTING RECALL ONLY MEHORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 6)



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



. Pro No.					
INTENDED US	3E:				
INTENDED FOR USE BY:	and op, thereto				
☐ ARCHITECT	ENGINEER C	TECHNICIAN	₿ RESEARC	H ANALYST	
PHASE FOR WHICH DESIG	ON TOOL WAS DEVELOPE.	O (1 ONLY):			
☐ PRE-DESIGN ☐	SITE ANALYSIS	SCHEMATICS	DESIGN	DEVEL. POST-DES	IGN SERV. 🛭 RESEARCH
PHASE(S) FOR WHICH DE	SIGN TOOL MAY BE USI	EFUL (ANY NO.)	: .		
☐ PRE-DESIGN ☐	SITE ANALYSIS) SCHEMATICS	Ø DESIGN	DEVEL. 🛛 POST-DES	IGN SERV: 🔯 RESEARCH
MAJOR & MIN	OR ENERGY	COMPO	NENTS	ADDRESSED	BY TOOL:
Ed HEATING	⊠ COOLING	⊠ LIGHT	- Company of the Comp	☐ DHW	MISCELLANEOUS
B LOADS B SPACE TEMPS. C HVAC SYSTEMS PASSIVE SOLAR ACTIVE SOLAR SHADING SYSTEM DESIGN ECONOMICS UNDERGROUND LOADS	M LOADS D SPACE TEMPS. D HYAC SYSTEMS D PASSIVE CLNC D SHADING D SYSTEM DESIG D ECONOMICS D UNDERGROUND D SLOPED GLAZI MASS	S SYS	ADS (LUX) LEVELS STEM DESIGN DONOMICS VLIGHTING FC (LUX) LEVEL: IFICIAL LING REDUCTION	☐ LOADS ☐ SOLAR ACTIVE ☐ SOLAR PASSIVE ☐ ECONOMICS	D FANS D PUMPS MISC. ELECTRICAL ELEV. & ESCALATOR

INPUT DATA REQUIRED: PRE-DESIGN AND SITE ANALYSIS DATA	DOES NOT	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
LOCATION - ASSOCIATED WEATHER DATA BUILDING TYPE AND SCHEDULE OCCUPANCY RATES BUILDING AREA SPACE TEMPERATURES LOCAL EMERGY COSTS GENERIC BUILDING SHAPE DUE TO SITE RESTRICTIONS LOCAL CODE REQUIREMENTS (VENTIL., INSUL., ETC.) LIGHTING REQUIREMENTS	0000000			
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BUILDING MATERIALS & ASSOCIATED DATA (R, Q, E, ETC.) BUILDING MASS DATA SHADING CCEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA	8			
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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TEMPERATURE DATA:	O HOURLY T] MONTHLY	T DATA D ANNUAND MAX. D AVE.			
SOLAR DATA:	O HOURLY T	ape 🔯	TYPICAL DAY	PROFILE			. DAILY & TOTAL	
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CALCULATIO	N PRO	CEDURE	S:					
LANGUAGE: S FORTRA	AN 🗍 BAS	IC 🖺 MAC	HINE LANGUAGE	от 🗆	IER	□ GRA	PHS, CHARTS & SI	MPLE CALC.
USER TYPE: 🔲 IN	NTERACTIVĖ	O INTE	RACTIVE GRAPE	HIC	PREPARE FILE		HAND CALCULATIO	N
UNITS OF CALCULATION	: ⊠ s	I UNITS		☐ ENGL	ISH		□ вотн	
CHECK ALL APPROPRIATE	E BOXES:							
HEAT TRANSFER:		☐ FINITE D	ifference		RESPONSE FACTOR		STEADY STATE	:
SOLAR COMP. CALCUI	LATED:	O DIFFUSE/	direct/re-rad	DIATED [DIFFUSE/DIRECT		☐ TOTAL	
INTEGRATION:		C SIMPLE E	ULER	(I IMPLICIT		₩ OTHER	
SHADING:		ANY SOLA	R OBSTRUCTION	3 !	OVERHANG ONLY		🔯 NO SHADING	
MOVABLE SHADING:		☐ DAILY &	SEASONAL SWIT	CHING (SEASONAL SWITCH	ING	MOT CALCULAT	ED
MASS EFFECT IS CAL	LCULATED:	TRANSIEN	T HEAT FLOW	1	TIME CONSTANT FA	ACTORS	ASSUME NO MA	SS AFFECT
ROOM TEMP. BASED O	ON:	SURFACE	& AIR	į] AIR ONLY		O NOT CALCULAT	ED
INSIDE TEMPERATURE	E:	☐ INPUT SC	HEDULE BY USE	er (] FIXED BY TOOL		VARIED BY TO	OOL
U-VALUES:		CHANGE W	/WIND SPEED	1	T REMAIN CONSTANT		MOVABLE INSU	ULATION
INFILTRATION:		C) AIR CHAN	GE PER HOUR		CRACK METHOD		U VARIES W/WIN	D SPEED
INTERNAL LOADS INC	CLUDE:	C SENSIBLE	& LATENT SER	PARATE	SENS. & LAT. TO	TAL	SENSIBLE ON	Υ.Υ
VENTILATION:		☐ SENSIBLE		1] LATENT		OR COMMAND	CHEDULE
DAYLIGHT COEFFICIE	ENTS:	SKY, REF	L. & DIRECT	1	🗇 sky & refl.		SKY ONLY	
ZONES PER RUN:		D > 25	D	10 - 25	□ 2 -	10	[2] 1 ONLY	?
SYSTEM MODELING:		O SYSTEM E	FFIC. INPUT	į	SYSTEM OPTIMIZIO	NG	COMPONENT SI	NSITIVITY
ECONOMIC ANALYSIS:	:	ANNUAL C	ost	(SIMPLE PAYBACK		C LIFE CYCLE (OSTING
OUTPUT:								
LOAD DETERMINANTS:	2 COMPONEN	т [] ZONE	C	BUILDING			
LOADS OUTPUT BY:	⊠ HOUR	Į.	YAQ [C	MONTH		SEASON	C YEAR
TEMPERATURES:	M AIR	8	3 SURFACE	C	GRAPHIC PLOT			
FUEL USE BY:		CONSUMPTION PEAK DEMAND		ANNUAL (ANNUAL I OTHER	CONSUMPTION PEAK DEMAND		SYSTEM COMPONENT ENERGY SYSTEMS TOTAL BUILDING (/

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:						
COMPUTER TYPE:	☐ IBM	Ø CDC	O UNIVAC	OTHER P	RIME	
CORE REQUIRED:	□ > 500K	[] 100 - 500 I	C 🔲 25 -	100 K	⊠ < 25 K	
SUPPORT:	☑ USER'S GUIDE	C) DATA	MANUAL	OTHER	den anne per de gal halle se message ha sera es se se proposition de sant se se	
EQUIPMENT:	S CRT	PRINTER	☐ TEXTRONIX	OTHER	**************************************	Market Washington Control of the Constitution
COSTS:						
ASSUMING PURCHASE OF	F SOFTWARE FOR USE	ON PRESENT TIME-SH	MARING:			
FIRST COST:						
IN-OFFICE EQUIPME	ENT: CRT_	T	PRINTER			
SOFTWARE PURCHASE	: CARD	DECK	TAPE	****	LISTING	-Printers and the second production of the contraction
SUPPORT INFORMATI	ON: USER*	's GUIDE	DATA MANUAL		OTHER	
TIME TO INPUT AND	DEBUG:	MAN-DAYS	MAN-H	ours		
RUN COST/TIME:						
INPUT SET-UP TIME		MAN-DAYS	MAN	OURS		
TYPICAL* RUN TIME	: D > 1 F	ar. 🗍 60) м - 30 м	□ 30 M - 10	Э м	□ < 10 M
TYPICAL* CPU TIME	:: D > 100	00 SEC. 🔲 10	00 - 1000 SEC.	D 5 - 100 :	SEC.	図 < 5 SEC.
☆FOR THIS FORM, ASSUM SECTION 2.	E "TYPICAL" TO BE	A SINGLE-ZONED 100	SQUARE METER RESI	DENCE WITH ALL	OUTPUTS CHEC	KED (,') IN
ASSUMING USE OF SOFT	WARE ON PUBLIC TIP	E-SHARING NETWORKS	3 *			
NAMES AND CONTACT THROUGH THEM).	•		Æ THIS PROGRAM AVA	ILABLE (EXACT	COSTS CAN BE	DBTAINED
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

TASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

RETURN TO:

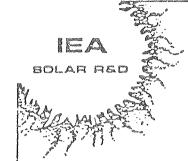
EMPA Ueberlandstrasse 129 att. Mr. R. Hastings 8600 Dübendorf

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TOOL NAME: STEMOD	/ DYWAN	AVAILABLE THROUGH:	U. f	Roth. Dipl.Arch.ETH
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DATE OF LAST REVISION:			100mmanorana	FRY Y TRANSPORT AND AND THE STATE OF THE STA
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CHANCE AND A CONTROL OF THE CONTROL				
PLEASE ATTACH ANY VALIDATION	OR TESTING REPORTS.			
TOOL HARDWARE	& AVAILABLE FO	DRMS:		
MAIN FRAME COMPUTER] HICRO-COMPUTER [HAND CALCULATOR		GRAPHIC OR MANUAL
CARD DECK TAPE TIME SHARING LISTING - HARD COPY	☐ TAPE ☐ LISTING ☐ RECALL ONLY MEMORY— INTEGRATED CIRCUIT	☐ LISTING ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT	:	(COMPLETE SECTIONS 1, 2, 6)
(COMPLETE SECTIONS 1, 2, 3	(COMPLETE SECTIONS 1, 2, 4	(COMPLETE SECTIONS 1,	2, 5)	

STEMOD / DYWAN

SWITZERLAND



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Taking into account geographical location and elevation above sea level (maximum theoretical radiation available), shade, cloudiness, haze, orientation (horizontal and vertical) and transmittance of glazed areas STEMOD computes the solar energy available behind translucent surfaces for any period of time by hourly aggregation.

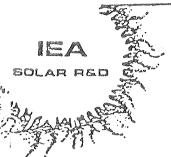
DYWAN is a dynamic procedure to simulate the energy-household of entire buildings and their zones in hourly intervals, taking into account the changes in climate (solar heat gain, temperature, wind, humidity), the building's capacity for heat storage and the user behavior (ventilation when spaces are overheated by solar heat gain).

DYWAN is based on so-called 'Beuken-models' and produces realistic data for heating and cooling loads and energy required for any period of time when sufficient meteorological information is available.

The solar heat gain-input is derived from STEMOD. Thus, DYWAN is always combined with STEMOD.

m applies to STEMOD

🕱 applies to DYWAN



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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INTENDED USE:				
INTERNET FOR USE 84:				
SE ARCHITECT ENGINEER TECHNICIAN RESEARCH /	walyst			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
PRE-DESIGN	EL. 🏻 POST-I	ESIGN SE	ev. (Die resi	FARCH
P' E(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):			()	
PRE-DESIGN SITE ANALYSIS SCHEMATICS DESIGN DEV	el. G Ø post-t	ESIGN SEF	v. GE resi	EARCH
MAJOR & MINOR ENERGY COMPONENTS A	DDRESSE	D BY	TOOL:	
FORTH IN THE PARTY AND THE PAR	DHW		MISCELLANEON	JS
Commits Comm	☐ LOADS ☐ SOLAR ACTIV ☐ SOLAR PASSI ☐ ECONOMICS		D FANS D PUMPS D MISC. ELE	CTRICAL SCALATOR
INPUT DATA REQUIRED:	DOES NOT	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
PRE-DESIGN AND SITE ANALYSIS DATA	de contraction de la faction de la region de la faction de		ATTE U.S.	411.79
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BUILDING SURFACE AREAS		,		
GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES			8	
ARCHITECTURAL DESIGN DEVELOPMENT DATA				
BUILDING MATERIALS & ASSOCIATED DATA (R, α, ε, ETC.) BUILDING MASS DATA SHADING C'EFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA				
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN HECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL		000000	000000	



SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



A A Pro 1 / 1 1 1 Pro 1 1 · Pro		
TEMPERATURE DATA:	☐ HOURLY TAPE ☐ TYPICAL DAY ☐ MONTHLY DATA ☐ ANNUAL DEGREE DAYS ☐ AVE. MONTHLY MIN. AND MAX.	☐ ANNUAL DATA ☐ HONTHLY DEGREE DAYS ☐ AVE. HONTHLY TEMP. ☐ DAILY
SOLAR DATA:	☐ HOURLY TAPE	M HONTHLY AVE. DAILY & TOTAL
SOLAR ORIENS. CALC:	☐ ANY ORIEN. INCL. SLOPED ☐ SLOPED FACING SOUTH ☐ SURFACE REFLECTANCE	O HORIZ. & 4 CARDINAL DIREC.
'VLIGHT CALC:	HOUR-BY-HOUR TYPICAL CLEAR & CLOUDY DAY/HONT OTHER	TH C TYPICAL DAY/HONTH

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-	-	STATE	TOUR BOAR	websen.	-	atama emili	distance of	-	-			-	-										

			·
CALCULATION PRO	OCEDURES:		
LANGUAGE: 🗆 FORTRAN 🕸	BASIC MACHINE LANGUAGE	OTHER GI	RAPHS, CHARTS & SIMPLE CALC.
user type: 🛛 🗶 interactiv	E INTERACTIVE GRAPHIC	C PREPARE FILE	AND CALCULATION
UNITS OF CALCULATION:	K SI UNITS DE	NGLISH	П вотн
CHECK ALL APPROPRIATE BOXES:			_
HEAT TRANSFER:	Tinite difference	RESPONSE FACTOR	BYNAMIC BU SEADY STATE
	🕱 DIFFUSE/DIRECT/RE-RADIATED		O TOTAL
INTEGRATION:	SIMPLE EVLER	☐ IMPLICIT	O OTHER
SHADING:	ANY SOLAR OBSTRUCTION	Overhang only	O NO SHADING
HOVABLE SHADING:	M DAILY & SEASONAL SWITCHING	SEASONAL SWITCHING	O NOT CALCULATED
HASS EFFECT IS CALCULATED:	TRANSIENT HEAT FLOW	TIME CONSTANT FACTORS	ASSUME NO MASS AFFECT
	SURFACE & AIR		
INSIDE TEMPERATURE:	☼☐ INPUT SCHEDULE BY USER	C FIXED BY TOOL	O VARIED BY TOOL
U-VALUES:	CHANGE W/WIND SPEED		
INFILTRATION:	Ø□ AIR CHANGE PER HOUR	CRACK METHOD	O VARIES W/WIND SPEED
	SENSIBLE & LATENT SEPARATE		
VENTILATION:	C SENSIBLE	☐ LATENT	O VARIES BY SCHEDULE OR COMMAND
LAYLIGHT COEFFICIENTS:	K SKY, REFL. & DIRECT	C SKY & REFL.	SKY ONLY
ZONES PER RUN:			
SYSTEM MODELING:	SYSTEM EFFIC. INPUT		
	ANNUAL COST		
OUTPUT:			
LOAD DETERMINANTS: COMPON	TE.ST D ZONE	☐ BUILDING	
LOADS OUTPUT BY: HOUR	ADIT DAY	M MONTH 600	Ara

\mathcal{C}

LOAD	DETERMINANTS:	

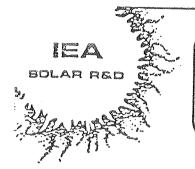
SURFACE

- C GRAPHIC PLOT

- TEMPERATURES: FUEL USE BY:
- ☐ MONTHLY CONSUMPTION
 ☐ MONTHLY PEAK DEMAND
 ☐ OTHER _____

C AIR

- ANNUAL CONSUMPTION
 ANNUAL PEAK DEMAND
 OTHER
- ☐ SYSTEM COMPONENTS
 ☐ ENERGY SYSTEMS
 ☐ TOTAL BUILDING ONLY



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

I \RDWARE	25 25 0 25 0 25 0 26 0 26 0 26 0 26 0 26 0 26 0 26 0 26					
COMPUTER TYPE:	& ibh	D coc	O UNIVAC	O OTHER	•	
CORE REQUIRED:	□ > 500K					
SUPPORT:	X USER'S GUIDE	□ DA				
EQUIPMENT:	CRT '	E PRINTER	☐ TEXTRON	X O OTHER		
COSTS:						
ASSUMING PURCHASE	OF SOFTWARE FOR USE	ON PRESENT TIME	-SHARING:	•		•
FIRST COST:			magan magan manangan manangan magan ma			
IN-OFFICE EQUIP	HENT: CRT	m Deliverer de copiet e sudo v gora piggen com personale a comme	PRINTE	K management of the second		
SOFTWARE PURCHA						
SUPPORT INFORMA				ANUAL		
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AUN COST/TIME:				•		
INPUT SET-UP TI	ME:	HAN-DAYS	4)4/1-терей Андром Соминского ступандура	MAN-HOURS		
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TYPICAL® CPU TI	ME: 🗇 > 100					
	UME "TYPICAL" TO BE					
ASSUMING USE OF SO	FTWARE ON PUBLIC TIM	E-SHARING NETWOR	RKS:			
NAMES AND CONTAC THROUGH THEM).	CTS OF TIME-SHARING	SERVICES WHICH F	HAVE THIS PROGRA	M AVAILABLE (EXA	CT COSTS CAN !	BE OBTAINED
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	Magner Constitution and Magnetic from the constitution of the cons		taren évidolmenostaman		WPM-A-VARIANTE ARROWS A	and any of the contract of the
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PROGRAMME MUR-DIODE

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:
LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL:			
TOOL NAME: Pro-	gramme Mur-Diode	AVAILABLE THROUGH:	O. Rudaz
DEVELOPED BY: O.	Rudaz	1000aa	O. Guisan
Ec	ole de Physique	elegato	same address
24	q. E. Ansermet		
12:	ll Geneve 4	PHONE NO.:	(022) 21 93 55
Commence of the Commence of th	noon as his billion of the property and the state of the		Universite de Geneve
DATE DEVELOPED: Ju	illet 1981	MARIANIA A Managarina ang 400 pangarang ang ang ang ang ang ang ang ang ang	
DATE OF LAST REVISI	ON:		
		PHONE NO.:	
BRIEF DESCRIPTION:	Etude d'une cellute-t	est en energie so	laire passive avec
	mur-diode et stockage	e. Mesures, simula	ation et validation.
		erretative de de la compressión de la commentación de la commentación de la commentación de la commentación de	
			aligne get verste der finde der der eine men de fotogreverte der der anderde der verste finde fiche der der de
PLEASE ATTACH ANY VA	ALIDATION OR TESTING REPORTS.		error wedges state and damme on restate the sequence of the relative for the rest of the service of the sequence of the sequen
TOOL HARD	WARE & AVAILABLE	FORMS:	
MAIN FRAME COMPL	JTER	HAND CALCULATOR	GRAPHIC OR MANUAL
☐ CARD DECK ☑ TAPE ☐ TIME SHARING ☑ LISTING - HA (COMPLETE SECTION	DISC DISC TAPE CONTROL DISTING RECALL ONLY MEMORY INTEGRATED CIRCUIT	☐ MAGNETIC CARD ☐ LISTING ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1,	(COMPLETE SECTIONS 1 2 6)
	(COMPLETE SECTIONS 1,	2, 4)	~, J,

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Bibliographie:

- Etude d'une structure solaire passive M. Baussiere, O. Guisan, O. Rudaz 3 Sywposium R + D Energie Solaire en Suisse EPFL, Ecublens 19/10/81 pp. 191-200 ef.annexe
- Travail de diplome M. Baussiere, O. Rudaz Bibliotheque Ecole de Physique 24 q. E. Ansermet 1211 Geneve 4 Energie Solaire: Bilanthermique d'une cellule test
- Le programme est peu documente, doc peu utilisable par d'autres.
 Les resultats sont tres satisfaisants.
 Cette etude ponctuelle n'est actuellement pas poursuivie.

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

INTENDED USE:				
INTENDED FOR USE BY:				
☐ ARCHITECT ☐ ENGINEER ☐ TECHNICIAN ☑ RESEARCH AN	NALYST			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☐ DESIGN DEVE	EL. 🗆 POST-D	ESIGN SER	. 🛭 RESE	ARCH
PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):				
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☑ DESIGN DEVE	EL. 🔲 POST-D	ESIGN SER	V. 🖾 RESE	ARCH
MAJOR & MINOR ENERGY COMPONENTS AT	DDRESSE	D BY	TOOL:	
	DHW	Ö	MISCELLANEOU	s
☐ HVAC SYSTEMS ☐ HVAC SYSTEMS ☐ SYSTEM DESIGN	□ LOADS □ SOLAR ACTIV □ SOLAR PASSI □ ECONOMICS		D FANS D PUMPS D MISC. ELE	CTRICAL SCALATOR
INPUT DATA REQUIRED: PRE-DESIGN AND SITE ANALYSIS DATA	DOES NOT ACCOMMODATE	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
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	克姆 塔姆 四氢	000000000000000000000000000000000000000	80008000	00000000
SCHEMATIC DESIGN DATA				
BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES				00000
ARCHITECTURAL DESIGN DEVELOPMENT DATA				
BUILDING MATERIALS & ASSOCIATED DATA (R, \alpha, \epsilon ETC.) BUILDING MASS DATA SHADING COEFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA			점 점 점 점	0000
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL		00000	. 00000	30000

PROGRAMME MUR-DIODE

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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WEATHER D	ATA: p	6 min	utes-dat	a				
TEMPERATURE DATA:	O HOURLY TO ANNUAL D	APE D EGREE DAYS 1-data	TYPICAL DAY On South	O MONTHI ONTHLY MIN O Verti	LY DATA	NTHLY 1	TEMP. 🗍 DAI	GREE DAYS LY
SOLAR DATA:	HOURLY T	APE	TYPICAL D	AY PROFILE	☐ MONTHLY	AVE.	DAILY & TOTAL	
SOLAR ORIENS. CALC:	SLOPED F	ACING SOUT	s	E. 5014.1102	reflectance			IREC.
DAYLIGHT CALC:	D ANNUAL A		OTHER		JDY DAY/MONTH [] T	YP1CAL	DAY/MONTH ,	
CALCULATIO	N PRO	CEDUR	ES:					
LANGUAGE: 🔯 FORTR	AN 🖺 BAS	іс 🛛 м	ACHINE LANGUA	AGE DO	THER	GRAPHS	. CHARTS & SIM	PLE CALC.
USER TYPE: 🔘 I	•		TERACTIVE GRA		PREPARE FILE		ND CALCULATION	
UNITS OF CALCULATION	: ⊠ s	I UNITS		□ ENGI	JISH		BOTH	
CHECK ALL APPROPRIAT	E BOXES:							
HEAT TRANSFER: a	nd monay	M FINITE	DIFFERENCE		RESPONSE FACTOR	С	STEADY STATE	
					DIFFUSE/DIRECT		TOTAL	
INTEGRATION:		SIMPLE	EULER		IMPLICIT		OTHER	
SHADING:		ANY SO	LAR OBSTRUCT	ION	O OVERHANG ONLY	8	NO SHADING	
MOVABLE SHADING:		D DAILY	SEASONAL SU	JITCHING	C SEASONAL SWITCHING	83	NOT CALCULATE	0
MASS EFFECT IS CA	LCULATED:	TRANSII	ent heat flow	1	TIME CONSTANT FACTO	ors 🗀	ASSUME NO MAS	S AFFECT
ROOM TEMP. BASED	ON:	SURFACE	E & AIR		M AIR ONLY		NOT CALCULATE)
INSIDE TEMPERATUR	Ĕ:	INPUT :	SCHEDULE BY U	JSER	TIXED BY TOOL	8	VARIED BY TOO	L
U-VALUES:		CHANGE	W/WIND SPEED)	REMAIN CONSTANT		MOVABLE INSUL	ATION
INFILTRATION: neg	ligeable	⊇⊠ AIR CH	ange per hour	₹	CRACK METHOD		VARIES W/WIND	SPEED
INTERNAL LOADS IN	CLUDE:	SENSIB	LE & LATENT S	SEPARATE	🖸 SENS. & LAT. TOTAL	8	SENSIBLE ONLY	
VENTILATION:		SENSIBI	Æ		☐ LATENT		VARIES BY SCH OR COMMAND	EDULE
DAYLIGHT COEFFICI	ENTS:	C SKY, RI	EFL. & DIRECT	ŗ	O sky & refl.	C	SKY ONLY	
ZONES PER RUN:		C > 25		D 10 - 25			1 ONLY	
SYSTEM MODELING:		C SYSTEM	EFFIC. INPUT	ſ	SYSTEM OPTIMIZING	E	COMPONENT SEN	SITIVITY
ECONOMIC ANALYSIS	:	☐ ANNUAL	COST		SIMPLE PAYBACK	E	LIFE CYCLE CO:	STING
OUTPUT:								
LOAD DETERMINANTS:	COMPONENT	r	O ZONE	1] BUILDING			
LOADS OUTPUT BY:	O HOUR 🗵	6 min	DAY	1	Д нтион	C SEA	SON	O YEAR
TEMPERATURES:	AIR		C) SURFACE	£	GRAPHIC PLOT			
FUEL USE BY:	O MONTHLY O OTHER)		CONSUMPTION PEAK DEMAND	D ENE	TEM COMPONENTS RGY SYSTEMS AL BUILDING ON	v /

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:					
COMPUTER TYPE:	C IBM	CDC	UNIVAC	OTHER	
CORE REQUIRED:	□ > 500K	[] 100 - 50	0 к 🔲 25	- 100 K	Ø3 < 25 K
SUPPORT:	🛭 USER'S GUIDE	⊠ DA`	TA MANUAL	OTHER	and the second of the second o
EQUIPMENT:	C CRT	PRINTER	TEXTRONIX		
COSTS:		•			
ASSUMING PURCHASE OF	SOFTWARE FOR US	ON PRESENT TIME	-SHARING:		
FIRST COST:					
IN-OFFICE EQUIPME	ENT: CRT		PRINTER		
SOFTWARE PURCHASE	: CARI	DECK			LISTING
SUPPORT INFORMATI	ON: USE	R'S GUIDE	DATA MANUA		OTHER
TIME TO INPUT AND	DEBUG:	MAN-DAYS	MAN	-Hours	
RUN COST/TIME:					
INPUT SET-UP TIME	J:	MAN-DAYS	MAN-	-HOURS	
TYPICAL* RUN TIME	:	HR. O	60 M - 30 M	□ 30 M - 10 I	м 🖸 < 10 м
TYPICAL* CPU TIME	: 🗆 🗆 > 10	000 SEC.	100 - 1000 SEC.	🗀 5 - 100 SE	C.
*FOR THIS FORM, ASSUM SECTION 2.	E "TYPICAL" TO BE	A SINGLE-ZONED	100 SQUARE METER RE	SIDENCE WITH ALL	DUTPUTS CHECKED (/) IN
ASSUMING USE OF SOFT	WARE ON PUBLIC TO	ME-SHARING NETWOR	us:		
NAMES AND CONTACT	S OF TIME-SHARING	SERVICES WHICH I	HAVE THIS PROGRAM AV	VAILABLE (EXACT C	OSTS CAN BE OBTAINED
THROUGH THEM).					
MODEL AND THE CONTRACT OF THE PROPERTY OF THE				Manual and the party of the state of the sta	THE CONTRACTOR OF THE CONTRACT
	and the second of the second s	and the state of t	in Companyation or companyation of the company		empindinining mingkalikan i Philip ing Milip Strict Will all karaming pepinding adam ayan ing pamanah 1879 ing
	an material for the contrast, who was properly and the contrast of the contras		William quality of the control of th	described the second and the second s	
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	tran	PASSIVE AN	D	HYBRID SOLAR	RETURN	TO
			LOW ENERG	Y	DWELLING		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

TOOL NAME: SOLAR TRAP	AVAILABLE THROUGH: Basler & Hofmann
DEVELOPED BY: Dr. C. Filleux / P. Jemelka	Consult. Engineers
Basler & Hofmann	
Consulting Engineers	
Forchstrasse 395	PHONE NO.: 01/55 11 22
8029 Zürich	SUPPORTED BY:
DATE DEVELOPED: 1981	Nationaler Energie-Forschungs-
DATE OF LAST REVISION: 1981	Fonds
BRIEF DESCRIPTION: Dynamic simulation of ene	PHONE NO.: ergy flows in a active/passive system. em . First difference solutine method
Black box for active parts o	
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TO THE PERSON OF ANY LAW PLI VILLE	
Validation over 1 year period in a ac	tive/passive test-cell.
Validation over 1 year period in a ac	

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Mainly used for research work, i.e. for optimisation of the Solar Trap system (see e.g. Proceedings Solar World Forum, Brighton 1981, section B). Easy to use input.



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



				DEFENDE
INTENDED USE:				
INTENDED FOR USE BY:				
☐ ARCHITECT ☑ ENGINEER ☐ TECHNICIAN ☒ RESEARCH ANALYST				
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):				
🗋 PRE-DESIGN 📋 SITE ANALYSIS 📋 SCHEMATICS 🔯 DESIGN DEVEL. [D POST-D	ESIGN SER	v. 🛭 Rese	ARCH
PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):				
🗆 PRE-DESIGN 🔯 SITE ANALYSIS 📋 SCHEMATICS 🙇 DESIGN DEVEL.	POST-D	ESIGN SER	v. 🛮 RESE	ARCH
MAJOR & MINOR ENERGY COMPONENTS ADDR	ESSE	DBY	TOOL:	
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	DES NOT	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
PRE-DESIGN AND SITE ANALYSIS DATA	gaca.	gas	para.	pan
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, a, e, ETC.) BUILDING MASS DATA SHADING COEFFICIENTS & DAYLIGHT TRANSHISSION INTERIOR SURFACE DATA				
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL				00000

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

- Programs has been developped for 1 zone only
- Input file describing building geometry as well as material constants must be set up.
- Coupling constants (conductance, convective or by radiation) are defined.
- Input required is solar irradiation, horizontal or vertical south and air temperature

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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	400			and the control of th			
WEATHER D	DATA:						
TEMPERATURE DATA:	M HOURLY ANNUAL			NTHLY DATA ANN MIN. AND MAX. AVE	UAL DATA . MONTHLY		DEGREE DAYS
SOLAR DATA:	HOURLY	TAPE 🗍 TYI	PICAL DAY PROF	ILE 🔲 MON	THLY AVE	DAILY & TOTA	ıL.
SOLAR ORIENS. CALC:		EN. INCL. SLOPED FACING SOUTH		VERT. & HORIZ. ACE REFLECTANCE	☐ HORIZ	Z. & 4 CARDINA	L DIREC.
DAYLIGHT CALC:	☐ HOUR-BY		PICAL CLEAR &	CLOUDY DAY/MONTH	TYPICA	AL DAY/MONTH	
CALCULATIO	ON PRO	CEDURES:				•	
LANGUAGE: S FORT	RAN 🔲 BA	SIC [] MACHINE	LANGUAGE [] OTHER	C GRAE	PHS, CHARTS &	SIMPLE CALC.
USER TYPE:	INTERACTIVE	☑ INTERACT	IVE GRAPHIC	PREPARE FILE		HAND CALCULAT	ION
UNITS OF CALCULATIO	n: 🛭	SI UNITS '		ENCLISH	1] вотн	
CHECK ALL APPROPRIA	TE BOXES:						
HEAT TRANSFER:		B FINITE DIFFE	RENCE	C RESPONSE FACTOR	R	STEADY STA	TE
SOLAR COMP. CALC	ULATED:	🔯 DIFFUSE/DIRE	:CT/RE-RADIATE	D DIFFUSE/DIRECT	or	TOTAL	
INTEGRATION:		SIMPLE EULER	!	IMPLICIT		OTHER	
SHADING:		ANY SOLAR OF	STRUCTION	O OVERHANG ONLY		O NO SHADING	
MOVABLE SHADING:		C DAILY & SEAS	ONAL SWITCHIN	G SEASONAL SWITCH	HING	O NOT CALCUL	ATED
MASS EFFECT IS C	ALCULATED:	[3] TRANSIENT HE	AT FLOW	TIME CONSTANT	FACTORS	ASSUME NO	MASS AFFECT
ROOM TEMP. BASED	ON:	SURFACE & A	R	AIR ONLY		O NOT CALCUL	ATED
INSIDE TEMPERATU	RE:	2 INPUT SCHEDU	LE BY USER	TIXED BY TOOL		U VARIED BY	TOOL
U-VALUES:		CHANGE W/WIN	D SPEED	🛭 REMAIN CONSTAN	r (. MOVABLE IN	SULATION
INFILTRATION:		AIR CHANGE F	ER HOUR	CRACK METHOD		U VARIES W/W	IND SPEED
INTERNAL LOADS I	NCLUDE:	SENSIBLE & L	ATENT SEPARAT	e 🛭 Sens. & Lat. To	DTAL	SENSIBLE C	NLY
VENTILATION:		C SENSIBLE		[] LATENT		OR COMMAND	
DAYLIGHT COEFFIC	IENTS:	🔘 SKY, REFL. 6	DIRECT	O SKY & REFL.		SKY ONLY	
ZONES PER RUN:		C > 25	D 10 -	25 🗓 2	- 10	⊠ 1 ON	LY
SYSTEM MODELING:		SYSTEM EFFIC	. INPUT	SYSTEM OPTIMIZ	ING	COMPONENT	SENSITIVITY
ECONOMIC ANALYSI	S:	ANNUAL COST		SIMPLE PAYBACK		C LIFE CYCLE	COSTING
OUTPUT:							
LOAD DETERMINANTS:	COMPONEN	rr 🛭 🖾 20	NE	O BUILDING			
LOADS OUTPUT BY:	M HOUR	DA 🖾	.Y	MONTH 🔯	ស្ថា s	EASON	YEAR
TEMPERATURES:	M AIR	⊠ su	RFACE	S GRAPHIC PLOT	•		
FUEL USE BY:	MONTHLY	CONSUMPTION PEAK DEMAND LY HOURLY		UAL CONSUMPTION UAL PEAK DEMAND	[] E	YSTEM COMPONE NERGY SYSTEMS	

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:					
COMPUTER TYPE:	□ IBM	CD CDC	☐ UNIVAC	O OTHER PRIME 45	0
CORE REQUIRED:	□ > 500K	🗍 100 - 500 K	⊠ 25	100 к □ < 25	K
SUPPORT:	USER'S GUIDE	☐ DATA	HANUAL	M OTHER Final rep	ort to NEFF
EQUIPMENT:	☐ CRT	PRINTER	☐ TEXTRONIX	M oTHER calcomb	plotter
COSTS:					
ASSUMING PURCHASE OF	SOFTWARE FOR USE	ON PRESENT TIME-SH	ARING:		
FIRST COST:			anning socialization		
IN-OFFICE EQUIPME	NT: CRT		PRINTER		
SOFTWARE PURCHASE		DECK			
SUPPORT INFORMATION		'S GUIDE			- Company
TIME TO INPUT AND		man-days	MAN-H		
RUN COST/TIME:					
INPUT SET-UP TIME	***************************************	MAN-DAYS	2-3 ман-но	OURS	
TYPICAL* RUN TIME	: 🗀 > 1	HR. 🔲 60	M - 30 M	□ 30 M - 10 M	O < 10 m
TYPICAL* CPU TIME	: 🗀 > 10	00 SEC. 20 10	0 - 1000 SEC.	5 - 100 SEC.	C) < 5 SEC.
*FOR THIS FORM, ASSUME SECTION 2.	E "TYPICAL" TO BE	A SINGLE-ZONED 100	or 1 season square meter resi	DENCE WITH ALL OUTPUTS C	HECKED (/) IN
ASSUMING USE OF SOFT	JARE ON PUBLIC TI	ME-SHARING NETWORKS	:		
NAMES AND CONTACTS THROUGH THEM).	OF TIME-SHARING	SERVICES WHICH HAVE	E THIS PROGRAM AVAI	LABLE (EXACT COSTS CAN	BE OBTAINED
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	**************************************	and the second s	# SSASOV PERSONAL COMMON COMMO	ingersynthetis we to make the second state of the second s	
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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Additional information of interest for passive solar task VIII:

SOL TRAP is able to simulate three of the four commonly used design types, namely

- direct gain
- trombe wall (with vents)

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



TASK	VIII	-	PASSIVE AND	HYBRID SOLAR	RETURN	TO:
			LOW ENERGY	DWELLING		

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS GENERAL: TOOL NAME: HELIOS 1 AVAILABLE THROUGH: EMPA Abt.151 DEVELOPED BY: EMPA Abt. 151 (Th. Frank) PHONE NO.: 01/823 55 11 SUPPORTED BY: NF DATE DEVELOPED: 1980/82 DATE OF LAST REVISION: JUNI 1982 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 building envelope. PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS. TOOL HARDWARE & AVAILABLE FORMS: MAIN FRAME COMPUTER ☐ MICRO-COMPUTER HAND CALCULATOR C GRAPHIC OR MANUAL CARD DECK D DISC MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES M TAPE

TIME SHARING

LISTING - HARD COPY LISTING RECALL ONLY MEMORY INTEGRATED CIRCUIT ☐ TAPE ☐ LISTING D BOOK
DEVICE RECALL ONLY MEMORY-INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 6) (COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 5) (COMPLETE SECTIONS 1, 2, 4)

HELIOS.

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

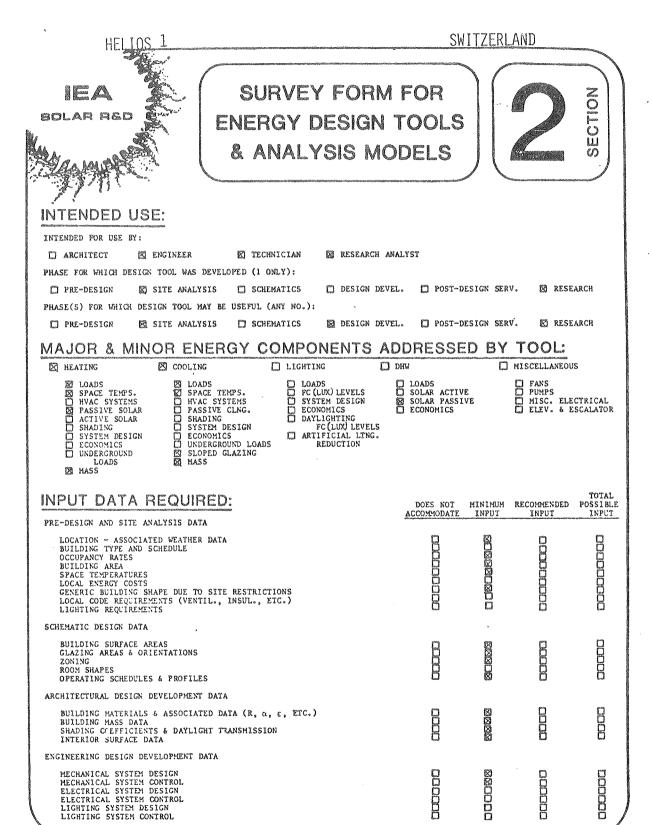
COMMENTS:

The simulation model has been developed to investigate the influence of radiation processes at the building envelope to the energy consumption - influence of solar radiation on elements heat loss and

to the net heat loss

- influence of infrared radiation
 exchange (study of selective surfaces)
- influence of glazed walls (absorber walls) to the solar gain

The simulation model is based on the detailed thermal balance method. The model has been validated against two test cells.



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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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SOLAR ORIENS. CALC:		N. INCL. SLOPE ACING SOUTH	D ANY V	VERT. & HORIZ. ACE REFLECTANO	Е П НОЯ	RIZ. & 4 CARI	DINAL DIREC.
DAYLIGHT CALC:	M HOUR-BY-		YPICAL CLEAR & C	CLOUDY DAY/MON	TH D TYPE	ICAL DAY/MONT	гн
CALCULATIO	N PROC	EDURES	; o			•	
LANGUAGE: Ø FORTR	AN 🗆 BAS	IC 🔘 MACHI	ne language 🛚	OTHER	C GF	RAPHS, CHART:	S & SIMPLE CALC.
USER TYPE:	NTERACTIVÈ	O INTERA	CTIVE GRAPHIC	PREPAR	e file [HAND CALC	JLATION
UNITS OF CALCULATION	: 123 S	UNITS		ENGLI S H		□ вотн	
CHECK ALL APPROPRIATI	E BOXES:						
HEAT TRANSFER:		☐ FINITE DIF	FERENCE	🛭 RESPONS	E FACTOR	C STEADY	STATE
SOLAR COMP. CALCUI	LATED:	DIFFUSE/DI	RECT/RE-RADIATE	O DIFFUSE	/DIRECT	TOTAL	
INTEGRATION:		SIMPLE EUL	ER	[] IMPLICI	T	OTHER	
SHADING:		ANY SOLAR	OBSTRUCTION	O OVERHAN	G ONLY	🖾 no shai	DING
MOVABLE SHADING:		C DAILY & SE	ASONAL SWITCHING	S SEASONA	L SWITCHING	NOT CAL	CULATED
MASS EFFECT IS CAL	LCULATED:	[] TRANSIENT	HEAT FLOW	C) TIME CO	NSTANT FACTORS	ASSUME	NO MASS AFFECT
ROOM TEMP. BASED	ON:	SURFACE &	AIR	AIR ONL	Y	☐ NOT CAL	CULATED
INSIDE TEMPERATUR	E:	O INPUT SCHE	dule by user	🖸 FIXED B	A LOOF	☑ VARIED	BY TOOL
U-VALUES:		CHANGE W/W	IND SPEED	C REMAIN	CONSTANT	⊠ MOVABLI	E INSULATION
INFILTRATION:		AIR CHANGE	PER HOUR	CRACK M	ETHOD	∇aries	W/WIND SPEED
INTERNAL LOADS IN	CLUDE:	O SENSIBLE &	LATENT SEPARATE	E 🔘 SENS. &	LAT. TOTAL	☑ SENSIBI	LE ONLY
VENTILATION:		☐ SENSIBLE		C) LATENT		VARIES OR COM	BY SCHEDULE MAND
DAYLIGHT COEFFICI	ENTS:	SKY, REFL.	& DIRECT	D SKY & B	EFL.	SKY ON	C.A.
ZONES PER RUN:		C) > 25	🗖 10 -	25	D 2 - 10		ONLY
SYSTEM MODELING:		SYSTEM EFF	IC. INPUT	SYSTEM	OPTIMIZING	COMPONI	ENT SENSITIVITY
ECONOMIC ANALYSIS	•	D ANNUAL COS	r	C) SIMPLE	PAYBACK	C LIFE C	CLE COSTING
OUTPUT:							
LOAD DETERMINANTS:	OMPONENT	r O	ZONE	BUILDING			
LOADS OUTPUT BY:	MOUR	D	DAY	MONTH	Į] SEASON	☐ YEAR
TEMPERATURES:	AIR		SURFACE	GRAPHIC	PLOT		
FUEL USE BY:	MONTHLY OF MONTHLY OF MONTHLY	CONSUMPTION PEAK DEMAND		JAL CONSUMPTIC JAL PEAK DEMAN ER	D Č	SYSTEM COME DENERGY SYST TOTAL BUILT	TEMS /

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:						
COMPUTER TYPE:	f") TRM	₹7 cnc	F) INTUAC	C oruce		
CORE REQUIRED:						
		•				
SUPPORT:						
EQUIPMENT:	(X) CRT	PRINTER	☐ TEXTRONIX	OTHER	Die Plantiff Charles VIII/VIII/A Edwyla drogog gandyna brywn fer naedd ad	da yandaydiri dina kurancan maninari aynaa mayyayayayayay germidir dinirk
COSTS:						
ASSUMING PURCHASE OF	SOFTWARE FOR USE	ON PRESENT TIME-SH	ARING:			
FIRST COST:		•				
IN-OFFICE EQUIPME	ENT: CRT_		PRINTER	nua		
SOFTWARE PURCHASE	: CARD	DECK \$ 30,-	TAPE \$	100,-	LISTING \$	10,-
SUPPORT INFORMATI	ON: USER*	s GUIDE \$ 20	DATA MANUA	L	OTHER	
TIME TO INPUT AND	DEBUG:	MAN-DAYS	MAN	-HOURS		
RUN COST/TIME: 1 I	month -					
INPUT SET-UP TIME	nanapyrotom-passing.	1 man-days	MAN	-HOURS		
TYPICAL* RUN TIME	:	R. 🗇 60) м - 30 м	□ 30 M -	10 и	□ < 10 M
TYPICAL* CPU TIME	:: D > 100	o sec. 🔯 10	00 - 1000 SEC.	O 5 - 100	SEC.	□ < 5 SEC.
*FOR THIS FORM, ASSUM	ME "TYPICAL" TO BE	A SINGLE-ZONED 100	SQUARE METER RE	SIDENCE WITH A	LL OUTPUTS CHI	ECKED (/) IN
ASSUMING USE OF SOFT	WARE ON PUBLIC TIM	e-sharing networks	<u>.</u> :			
NAMES AND CONTACT THROUGH THEM).	S OF TIME-SHARING	SERVICES WHICH HAV	E THIS PROGRAM A	VAILABLE (EXAC	T COSTS CAN BE	OBTAINED
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	kajana kajunggijaja ngan nyapan kajunun kajuja in Munasii pantantakun nu madi ini sai effici (1986).	-Allah -iddinara -add-add-add-add-add-add-add-add-add-a		The state of the s		all Parket and a work opposite group of the parket parket and control and the parket p
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BLAST EA BOLAR RED

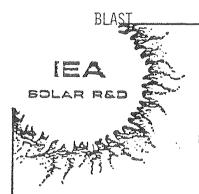
SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS

il.S.A.



TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO: LOW ENERGY DWELLING

SUBTASK C - DESIGN METHODS	
GENERAL:	,
TOOL NAME: BLAST 3.0	AVAILABLE THROUGH: U.S. Army Construction
BEVELOPED BY: U.S. Army Construction	Engineering Research Laboratory
Engineering Research Laboratory	P.O. Box 4005
P.O. Box 4005	Champaign, Illinois 61820
Champaign, Illinois 61820	PHONE NO.:
	SUPPORTED BY: U.S. Army Construction
DATE DEVELOPED: March, 1981	Engineering Research Laboratory
DATE OF LAST REVISION: March, 1981	P. <u>O. Box 4005</u>
	Champaign, Illinois 61820
ř	PHONE NO.:
energy systems performance and cost in build	n which predicts energy consumption and dings.
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS. TOOL HARDWARE & AVAILABLE FO	RMS:
# HAIN FRAME COMPUTER	HAND CALCULATOR D'GRAPHIC OR MANUAL
CARD DECK DISC V TAPE DISC TAPE Time Sharing Disting Disting Disting Disting Disc Tape Time Sharing Disting Disting Disc Tape Time Sharing Disting Disc Tape Time Sharing Disc Tape Time Sharing Disc Tape Time Sharing Disc Tape Time Sharing Complete Sections 1, 2, 4)	☐ MAGNETIC CARD ☐ L'STING ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 5) ☐ TEMPLATES, CHARTS, TABLES ☐ BOOK ☐ DEVICE (COMPLETE SECTIONS 1, 2, 6)



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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



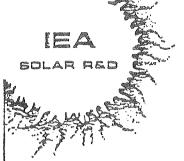
COMMENTS:

BLAST - 3.0 NOTES

- 1). Daylighting: In experimental version.
- 2). Interior surface data: Only by specifying a paint type in materials library.
- Surface reflectance: Assume this means ground reflectivity based on TMY indication of snow.
- 4). Solution technique: conduction through envelope based on response factors, zonal effects based on simultaneous equations.

BLA.ST

USA



SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



INTENDED USE:

INTENDED FOR USE BY:

ARCHITECT

ENGINEER

TECHNICIAN

D RESEARCH ANALYST

PRASE FOR WEIGE DESIGN TOOL WAS DEVELOPED (1 ONLY):

D PRE-DESIGN D SITE ANALYSIS

SCHEMATICS

D DESIGN DEVEL. D POST-DESIGN SERV.

T RESEARCE

PHASE(S) FOR WEICH DESIGN TOOL MAY BE USEFUL (ANY NO.):

PRE-DESIGN SITE ANALYSIS

SCHEMATICS

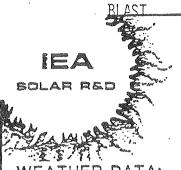
D DESIGN DEVEL.

D POST-DESIGN SERV.

RESEARCH

M	JOR .	& MINO	? E	NERGY	COP	ЛF	PONENTS	A	DI	DRE	SSED	BY	TC	OL	t po
凶	HEATING	Q.	coo:	IKG '	(1)	LIC	SHTING	Ø	DH	n n		α	MISC	ellan	EOUS
	D HVAC S D PASSIVE D ACTIVE D SHADIN	edesign Cics Cround		OADS PACE TEMPS. VAC SYSTEMS ASSIVE CLNG. HADING YSTEM DESIGN CONOMICS NDERGROUND LO LOPED GLAZING ASS	ads -		LOADS FC (LUX) LEVELS FC (LUX) LEVELS FC (LUX) LEVELS ECONOMICS DAYLIGHTING FC (LUX) LEVELS ARTIFICIAL LING. REDUCTION				ACTIVE PASSIVE HICS		B P		ELECTRICAL 6 ESCALATOR

INPUT DATA REQUIRED:	DOES NOT	MINIMUM INPUT	RECOMMENDED INPUT	TOTAL POSSIBLE INPUT
PRE-DESIGN AND SITE ANALYSIS DATA	California in the California and Cal	CONTRACTOR OF STREET	THE RESERVE OF THE PROPERTY OF	ngan na agamenta negari pendagan
LOCATION - ASSOCIATED WEATHER DATA BUILDING TYPE AND SCHEDULE OCCUPANCY RATES EUILDING AREA SPACE TEMPERATURES LOCAL EMERGY COSTS GENERIC EUILDING SHAPE DUE TO SITE RESTRICTIONS LOCAL CODE RECUIREMENTS (VENTIL., INSUL., ETC.) LIGHTING REQUIREMENTS				
SCHEMATIC DESIGN DATA BUILDING SURFACE AREAS GLAZING AREAS & ORIENTATIONS ZONING ROOM SHAPES OFERATING SCHEDULES & PROFILES	B			
ARCHITECTURAL DESIGN DEVELOPMENT DATA BUILDING MATERIALS & ASSOCIATED DATA (R, d, t, ETC.) BUILDING MASS DATA SHALING C'EFFICIENTS & DAYLIGHT TRANSMISSION INTERIOF SURFACE DATA				
ENGINEERING DESIGN DEVELOPMENT DATA MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DORING ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL		ממנונוסם	pung bang pung pung pung pung pung pung pung pu	



SECTION

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TEMPERATURE DATA:	E HOURLY TA	UPE (E) I ECREE DAYS	"D WAE" WO	D HONTHI	d Y. Ka	ata D annual i D max. D ave. Mor	ATA THL	O HONTHLY DEC TEMP. O DAI	GREE DAYS LY
SCLAR DATA:	X HOURLY IA	UPE [TYPICAL DA	Y PROFILE		☐ WONIETA	AVE	. DAILY & TOTAL	
SOLAR ORIENS. CALC:	SLOPED FA	R. INCL. SL ACING SOUTH	.oped [ANY VERT	r. & Ref	HORIZ. LECTANCE	iori:	2. & 4 CARDINAL D	IREC.
DAYLIGHT CALC:	D HOUR-BY-I	Hour [Verage [TYPICAL CL TOTHER	EAR & CLOU	צענ	DAY/MONTE [] IN	(PIC.	AL DAY/MONTH	
CALCULATIO	N PROC	EDUR	ES:	•					
LANGUAGE: D FORTE	AR 🔘 BAS	ic D H	CHINE LANGUA	CE 🗆 07	THER		GRA	PHS, CHARTS & SIM	PIE CALC.
USER TYPE: D IN	TERACTIVE	מאז 🗅 זאז	ERACTIVE GRA	PHIC		PREPARE FILE		HAND CALCULATION	
UNITS OF CALCULATION:	: 🛭 🖾 S:	UNITS		ENG!	LISH		:	🕽 вотн	
CHECK ALL APPROPRIATE	E BOXES:								
HEAT TRANSFER:		🗆 PINITĘ	DIFFERENCE			RESPONSE FACTOR		D STEADY STATE	
SOLAR COMP. CALCUT	LATED:	Ø DIFFUSE	./DIRECT/RE-R	ADIATED		DIFFUSE/DIRECT		D TOTAL	
INTEGRATION:		SIMPLE	EULER			IMPLICIT :		OTHER	
SHADING:		Ø AN. SO1	AR OBSTRUCTI	ON		OVERHANG ONLY		O NO SHADING	
MOVABLE SHADING:	• *	DAILY &	SEASONAL ST	ITCHING	Ø	SEASONAL SWITCHING		O NOT CALCULATE	Œ
MASS EFFECT IS CAL	CULATED:	TRANSIE	INT HEAT FLOW			TIME CONSTANT FACTO	DRS	C ASSUME NO MAS	S AFFECT
ROOM TEMP. BASED (ON:	SURFACE	6 ATR			AIR ONLY		O NOT CALCULATE	D
INSIDE TEMPERATURE	£:	M INPUT S	CHEDULE BY U	SER		FIXED BY TOOL		D VARIED BY TOO	i
U-VALUES:		CHANGE	W/WIND SPEED		$ \mathfrak{D} $	REMAIN CONSTANT		MOVABLE INSUL	ATION
INFILTRATION:		E ADA CHA	JNGE PER HOUR			CRACK METHOD		T VARIES W/WIND	SPEED
INTERNAL LOADS IN	CLUDE:	SENSIBI	e & latent s	EPARATE		SENS. & LAT. TOTAL		SENSIBLE ONLY	
VENTILATION:		S SENSIBI	Σ			Latent		VARIES BY SCHOOL OR COMMAND	edule
DAYLIGHT COEFFICIE	ents:	S SKY, RE	FL. & DIRECT			SKY & REFL.		SKY ONLY	
ZONES PER RUN:		Ø > 25	Į) 10 - 25		D 2 - 10	:	D 1 OVER	
SYSTEM MODELING:		SYSTEM	EFFIC. INPUT		\boxtimes	SYSTEM OPTIMIZING		COMPONENT SEN	SITIVITY
ECONOMIC ANALYSIS	:	LAUVIAL 🕲	cost .		Ø	SIMPLE PAYBACK :		D like cicre co	STING
OUTPUT:									
LOAD DITTERHINANTS:	COMPONENT	<u>.</u>	D ZONE	1	E) B	UILDING .			
	E HOUR		DAY	1	Ø M	ATAC	2	SEASON	D YEAR
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BOLAR RED

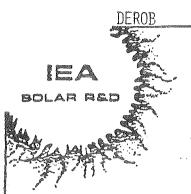
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

USA

SECTION

FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE	5 6 6						
COMPUTER TYPE:	D IBM	තු සාද	O OKIVA	c	OTHER _	J milymatorianistosoootikatiliitatoootooorinistooristo	en Den eller Stelphillippe (immedichter sonschlorus er kanzlicher)
CORE REQUIRED:	□ > 500x	100	∽ 500 K	D 25 -	100 K	C < 25	K
SUPPORT:	D user's Gui	DE D	DATA HANVAL		OTHER _	en familieren kanlen la Biblioteken kallanfing Fild New London en samt als	Service approach discontrate of the contrate o
EQUIPMENT:	E CRT	O PRINTER	O text	ZINO	OTHER _	Colombi - Andrew - Andrews	
COSTS:							
ASSUMING PURCHASE	of software for	USE ON PRESENT	Time-sharing:				
FIRST COST:							
IN-OFFICE EQUIP	MENT: C	RT X	PRI	KTER X			
SOFTWARE PURCHA	se: c	and decr	TAF			LISTING	the annument work of the control of
SUPPORT INFORMA	rion: u	ser's cuide X	DAT	a hanual _	X	OTHER	
LA TUPNI OF THIT	NO DEBUC:	4 man-d	AYS	OH-WAM	URS		
BUN COST/TIME:						- .	
INPUT SET-UP TIS	A.B.	2 Haif-d	AYS	нан-но	URS		
TYPICAL* RUN TI	Æ: 🖔 >	1 HR.	□ 60 M - 30 M	**	□ 30 m -	10 M	O < 10 H
TYPICAL® CPU 711	4: D >	1000 SEC.	D 100 - 1000	SEC.	S 5 - 10	C SEC.	C < 5 SEC.
FOR THIS FORM, ASSI SECTION 2.	TYPICAL" TO	BE A SINGLE-20	NED 100 SQUARE M	ETER RESID	ence with	ALL OUTPUTS CH	ECKED (,') IN
ASSUMING USE OF SOI	TWARE ON PUBLIC	TIME-SHARING N	ETWORKS:				
NAMES AND CONTACT THROUGH THEM).	ITS OF TIME-SHAR	ING SERVICES WH	ic: have this pr	ogram avai	Lable (Exa	ct costs can i	E OBTAINED
Boeing Ti	me Share Ser	vice	entrementario responsivo	ybernet	User Se	rvice	
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TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:
LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL:	,
TOOL NAME: DEROB IV	AVAILABLE THROUGH: SOLENCO
DEVELOPED BY: Francisco Arumi - Noe	P.O. Box 7907
University of Texas at Austin	Austin, TX 78712
School of Architecture	
Austin, TX 78712	PHONE NO.: 471-7729
	SUPPORTED BY: SOLENCO
DATE DEVELOPED: 1979	P.O. Box 7907
DATE OF LAST REVISION: 1981	Austin, TX 78712
·	PHONE NO.: 471-7729
BRIEF DESCRIPTION: DEROB IV is a computer program	
transfer mechanisms of a building and calcul	lates the energy Consumption of that building
	30
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE FO	DAAC.
	quadratic to the property of t
S MAIN FRAME COMPUTER D MICRO-COMPUTER D	HAND CALCULATOR GRAPPIC OR MANUAL
C CARD DECK D DISC E TAPE D TIME SHARING D LISTING	☐ HAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES ☐ L'STING ☐ BOOK ☐ RECALL ONLY MEMORY ☐ DEVICE
COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 4)	INTEGRATED CIRCUIT. (COMPLETE SECTIONS 1, 2, 6) (COMPLETE SECTIONS 1, 2, 5)

DEROB BOLAH RED

LISA

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

DEROB IV

Movable shading: Possible by using movable insulation option. Daylighting subroutines available on request from code author.

DEROB SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

USA

			200000000000000000000000000000000000000	ONLY CORPORATION CO.
INTENDED USE:	**			
INTENDED FOR USE EX:				
X ARCHITECT Z ENGINEER D TECHNICIAN & RESEARCH	anai yst			
PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):	omvenas & 12 &			
☐ PRE-DESIGN ☐ SITE ANALYSIS ☐ SCHEMATICS ☐ DESIGN DE	EVEL. [7 POST-1	DESIGN SE	RV. 🖄 RESI	C 1 D CV
PHASE(S) FOR WHICH DESIGN TOOL HAY BE USEFUL (ANY NO.):	Last Control	-2012 OK.	- u., En VE21	LAKUR
🖾 PRE-DESIGN 🖾 SITE ANALYSIS 🔯 SCHEMATICS 🖾 DESIGN DE	VEL. 🔯 POST-1	DESIGN SE	RV. Ø RESI	EARCH
MAJOR & MINOR ENERGY COMPONENTS A	ADDRESSE	D BY	TOOL	
V 117 (2716] DHW	A STATE OF THE PROPERTY OF THE	MISCELLANEON)S
LOADS SPACE TEMPS. SPACE TEM	D LOADS D SOLAR ACTIV SOLAR PASSI D ECONOMICS	E VE	Ø FANS D PUMPS MISC. ELE	CTRICAL ESCALATOR
INPUT DATA REQUIRED:	DOES NOT	KIKIMUM	RECOMENDED	TOTAL POSSIBLE
PRE-DESIGN AND SITE ANALYSIS DATA	ACCOMMODATE	INPUT	INPUT	INPUT
LOCATION - ASSOCIATED WEATHER DATA BUILDING TYPE AND SCHEDULE OCCUPANCY RATES BUILDING AREA SPACE TEMPERATURES LOCAL EMERCY COSTS GENERIC BUILDING SHAPE DUE TO SITE RESTRICTIONS LOCAL CODE REGUIREMENTS (VENTIL:, INSUL:, ETC.) LIGHTING REQUIREMENTS	80080080		0000000	
SCHEMATIC DESIGN DATA				
BUILDING SURFACE AREAS GLATING AREAS & ORIENTATIONS ZONING ROOM SHAPES OPERATING SCHEDULES & PROFILES	8	8		
ARCHITECTURAL DESIGN DEVELOPMENT DATA			\$cau	Range .
BUILDING MATERIALS & ASSOCIATED DATA (R, Q, E, ETC.) BUILDING MASS DATA SHALING CREFFICIENTS & DAYLIGET TRANSMISSION INTERIOR SURFACE DATA			B	
ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL				

DEROB

USA



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



WEATHER DATA: TEMPERATURE DATA: B BOURLY C ANNUAL	TAPE TYPICAL DAY		·
TEMPERATURE DATA: S HOURLY	TAPE TYPICAL DAY DEGREE DAYS TO AVE. MO	רין גדגת ומונשאג רין ארגה פועדשהש רין	•
	4 4 4 5	NTELY MIN. AND MAX. O AVE. MONTHLY TEMP.	HONTHLY DEGREE DAYS D DAILY
SCLAR DATA: & HOURL	TAPE [] TYPICAL DA	y profile	& TOTAL
SOLAR ORIENS. CALC: E ANY OF	TIEN. INCL. SLOPED	ANY VERI. & HORIZ. D HORIZ. & 4	CARDINAL DIREC.
DAYLIGHT CALC: D HOUR-E	Y-BOUR D TYPICAL CL AVERAGE D OTHER	EAR & CLOUDY DAY/MONTH TYPICAL DAY/	HONTE
CALCULATION PRO	CEDURES:		
LANGUAGE: E PORTRAN DE	ASIC D HACHINE LANGUA	CE CO OTHER CE GRAPHS, CE	LARTS & SIMPLE CALC.
USER TYPE: INTERACTIVE			ALCULATION
UNITS OF CALCULATION:	SI UNITS	E ENGLISH D BOTH	l
CHECK ALL APPROPRIATE BOXES:			
Heat transfer:	FINITE DIFFERENCE	🔘 RESPONSE FACTOR 🔲 STE	LADY STATE
SOLAR COMP. CALCULATED:	DIFFUSE/DIRECT/RE-F	ADIATED & DIFFUSE/DIRECT	'AL
integration:	C) SIMPLE EULER	M IMPLICIT OTH	ier
SHADING:	E ANY SOLAR OBSTRUCTI	ON O OVERRANG ONLY	SHADING
HOVABLE SHADING:	M DAILY & SEASONAL SW	itching [] seasonal switching 🛣 not	CALCULATED
mass effect is calculated:	TRANSIENT HEAT FLOW	🗇 TIME CONSTANT FACTORS 🔘 ASS	iume no mass affect
ROOM TEMP. BASED ON:	D SURFACE & AIR	M AIR ONLY	CALCULATED
INSIDE TEMPERATURE:	M INPUT SCHEDULE BY U	SER 🔲 FIXED BY TOOL 🗷 VAR	KIED BY TOOL
U-VALUES:	CHANGE W/WIND SPEED	🗆 remain constant 🔯 mov	ABLE INSULATION
INFILTRATION:	DE AIR CHANGE PER HOUR	□ CRACK HETHOD □ VAR	cies u/wind speed
INTERNAL LOADS INCLUDE:	D SENSIBLE & LATENT S	eparate 🛭 sens. & lat. total 🔻 sen	SIBLE ONLY
VENTILATION:	SENSIBLE		CHAND
DAYLIGHT COEFFICIENTS:	C SKY, REFL. & DIRECT	☐ SKY & REFL. ☐ SKY	ONTA
ZONES PER RUN:	C) > 25	10 - 25 20 - 10 .	D 1 OKTA
:DXIJGCH YITZY2	D system effic. Indut	C SYSTEM OPTIMIZING COM	PONENT SENSITIVITY
ECONOMIC ANALYSIS:	D ANNUAL COST -	☐ SIMPLE PAYBACK · ☐ LIF	E CACTE COSTING
OUTPUT:			
LUAD DETERMINANTS: ED COMPON	ENI S ZONE	E BUILDING	
LOADS OUTPUT BY: E HOUR	D DAY	MONTH D SEASON	AREY OR
TIMFIFUTURES: S AIR	(X SURFACE	C GRAPEIC PLOT	
FUEL USE BY: MONTHLE MONTHLE DOCTHER	Y CONSUMPTION Y PEAK DEMAND	□ ANNUAL CONSUMPTION □ SYSTEM □ ANNUAL PEAR DEHAND □ ENERGY □ OTHER □ TOTAL B	COMPONENTS SYSTEMS WILDING ONLY

DEROB

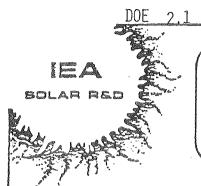
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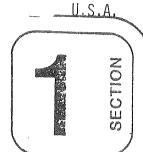
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

9	_					
HARDWARE						
COMPUTER TYPE:			☐ UNIVAC			
CORE REQUIRED:	□ > 500K	D 100 -	- 500 K	∑ 25 − 100 K	☐ < 25 ¥	
SUPPORT:	🛭 USER'S G	UIDE C) DATA MANUAL	OTHER .		and the second section of the section of th
EQUIPMENT:	Ø CRT	💢 PRINTER	☐ TEXTRON	IX OTHER		والمنافقة المنافذة والمنافذة
COSTS:						
ASSUMING PURCHASE	OF SOFTWARE FO	R USE ON PRESENT	TIME-SHARING:			
FIRST COST:						
IN-OFFICE EQUIP	MENT:	CRT X	PRINT	er X	ao-	
SOFTWARE PURCHA	SE:	CARD DECK		v	LISTING	nympysynyhymetrise stakkan dellerkunkopissi haden de
SUPPORT INFORMA	TION:	USER'S GUIDE	X DATA	MANUAL	OTHER	-co-to
TIME TO INPUT A	ND DEBUG:	5 MAN-D	AYS	_ MAN-HOURS		
RUN COST/TIME:						
INPUT SET-UP TI	ME:	2 man-d	AYS	man-hours	·	
TYPICAL* RUN TI	me: 👸	> 1 HR.	□ 60 M - 30 M	□ 30 м	- 10 M	[] < 10 M
TYPICAL* CPU TI	ME: 🔘	> 1000 SEC.	Ø 100 - 1000 SE	c. D 5 - 1	00 SEC.	() < 5 SEC.
*FOR THIS FORM, ASS SECTION 2.	UME "TYPICAL"	TO BE A SINGLE-ZO	NED 100 SQUARE MET	ER RESIDENCE WITH	ALL OUTPUTS CHI	ECKED (,') IN
ASSUMING USE OF SO	FTWARE ON PUBL	IC TIME-SHARING N	ETWORKS:			
NAMES AND CONTA THROUGH THEM).	CTS OF TIME-SH	ARING SERVICES WH	ICH HAVE THIS PROG	RAM AVAILABLE (EX	ACT COSTS CAN BE	OBTAINED
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TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:
LOW ENERGY DWELLING

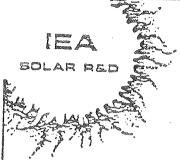
SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL:	,
TOOL NAME: DOE-2.1	AVAILABLE THROUGH: National Technical Infor-
DEVELOPED BY: Building Energy Analysis Group	mation Service - U.S. Department of Com-
Energy and Environment Division	merce - 5285 Port Royal Road
Lawrence Berkeley Laboratory	Springfield, Virginia 22161
Berkeley, California	PHONE No. (703) 557-4650
CONTRACTOR	supported by: Building Energy Analysis Group
DATE DEVELOPED: May 1980	Energy and Environment Division
DATE OF LAST REVISION:	Lawrence Berkeley Laboratory
	Berkeley, California
,	PHONE NO.:
BRIEF DESCRIPTION: DOE-2 is a public domain compu	ter program which can be used to explore
the energy behavior of proposed and existing b	
ventilation and air conditioning systems.	The state of the s
600000(1)3346e	
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE FO	PRMS:
X MAIN FRAME COMPUTER D MICRO-COMPUTER D	HAND CALCULATOR GRAPHIC OR MANUAL
CARD DECK TAPE TAPE TIME SHARING LISTING - BARD COPY (COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 4)	☐ MAGNETIC CARD ☐ L'STING ☐ RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 5) ☐ TEMPLATES, CHARTS, TAELES ☐ BOOK ☐ DEVICE ☐ COMPLETE SECTIONS 1, 2, 6)

DOE 2.1-

USA



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

DOE 2.1

Solution Technique:

Conduction through envelope based on response factors Zonal effects based on weighting factors

Daylighting: In experimental version





INTENDED USE:

INTENDED FOR USE EY:

BY ARCRITECT

IX ENGINEER

II TECHNICIAN

S RESEARCH ANALYST

PHASE FOR WEIGE DESIGN TOOL WAS DEVELOPED (I ONLY):

D PRE-DESIGN D SITE ANALYSIS ☐ SCHEMATICS

M DESIGN DEVEL. D POST-DESIGN SERV.

C RESEARCH

PHASE(S) FOR WHICE DESIGN TOOL MAY BE USEFUL (ANY NO.):

COOLING

D PRE-DESIGN

SITE AKALYSIS

DO SCHEMATICS

DHC DHC

D DESIGN DEVEL. D POST-DESIGN SERV.

D RESEARCH

MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: (X) LIGHTING

CX	Heating	\boxtimes
	TO LOADS	
	E HVAC SYSTEMS	
	ACTIVE SOLAR	
	DADS SPACE TEMPS. SPACE TEMPS. NE HYAC SYSTEMS Y PASSIVE SOLAR DI SHADIMO Y SYSTEM DESIGN DI ECONOMICS UNDERCROUND.	
	SO ECONOMICS CUNDERGROUND.	
	LOADS IZ HASS	
	• •	

SCAOL (S) SPACE TEMPS. EVAC SYSTEMS PASSIVE CLMG. BENERONS SHADING SYSTEM DESIGN ECONOMICS UNDERGROUND LOADS SLOPED GLAZING MASS

D LOADS C ECONOMICS
C SASTER DESIGN
C (FOX) FENETS
D TOWNS D ECONOMICS
D DAYLICHTING
FC (LUX) LEVELS
D ARTIFICIAL LING.
REDUCTION C LOADS
C SOLAR ACTIVE
C SOLAR PASSIVE
D ECONOMICS

MISCELLANEOUS

E) FARS

E) PUMPS

E) MISC. ELECTRICAL

E) ELEV. 6 ESCALATOR

INPUT DATA 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 RECUIREMENTS (VENTIL., INSUL., ETC.) LIGHTING REQUIREMENTS SCHEMATIC DESIGN DATA

BUILDING SURFACE AREAS GLAZING AREAS 6 ORIENTATIONS ZONING ROOM SHAPES OFERATING SCHEDULES & PROFILES

ARCHITECTURAL DESIGN DEVELOPMENT DATA

BUILDING MATERIALS 6 ASSOCIATED DATA (R. G., ETC.) BUILDING MASS DATA SHADING CRESSICIENTS 6 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 LIGHTING SYSTEM CONTROL

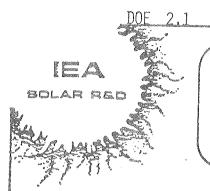
TOTAL POSSIBLE DOES NOT MINIMUM RECOMMENDED ACCOMMODATE INPUT INPUT INPUT DONOR 0000.





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TIMPERATURE DATA:	D HOURLY	TAPE & DEGREE DA	AS "[] WAF. WO	athom []	LY DATA D .	ANNUAL DA: AVE. HONTI	A D MONTH	HLY DEGREE DAY
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SOLAR ORIENS. CALC:	© any or D sloped	IEN. IHCL. FACING SO	SLOPED [] any ver] Surface	T. & HORIZ. REFLECTANCE	□ нов	IZ. 6 4 CARDI	INAL DIREC.
DAYLIGHT CALC:	TYRANY 🔘	y—Bour Average	O TYPICAL CL	EAR & CLO	UDY DAY/HORTH	D tibi	CAL DAY/MONTE	1
CALCULATIO							,	
		To first state the description of the state	minutoingainnege					
LANGUAGE: (X) FORT	man Libi	rzić 🗅	MACHINE LANGUA	SE 🗆 0	The R	. GR	APHS, CHARTS	& SIMPLE CALC
USER TYPE:								ATION
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SOLAR COMP. CALC					RESPONSE FAC			TATE
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SHADING:					[] IMPLICIT			
HOVABLE SHADING:					O OVERHANG ONL			
					SEASONAL SWI		D NOT CALC	
MASS EFFECT IS CA			IENT HEAT FLOW		C TIME CONSTANT			
ROOM TIMP. BASID			CE & AIR		M AIR ONLY	-	C NOT CALC	
INSIDE TEMPERATUR	Li e		SCHEDULE BY US		OF FIXED BY TOO		W VARIED E	
U-VALUES:			E W/WIND SPEED		TREMAIN CONST.		MOVABLE	INSULATION
			hange per hour		CRACK METHOD		VARIES W.	
INTERNAL LOADS IN	CLUDE:		BLE & LATENT SE		Ø sens. 6 lat.	TOTAL	SENSIBLE	ONTA
VENTILATION:		🖄 SENSI			O LATENT		VARIES EN OR COMMA	₹D
DAYLIGHT COEFFICE	ENTS:							
ZONES PER RUN:		② > 25					. 🛭 1 (DKTA
SYSTEM MODELING:					SYSTEM OPTIM	IZING	OMPONENT	SENSITIVITY
ECONOMIC ANALYSIS	:	LAUTANA 🖄	L COST _		SIMPLE PAYBAC	X.	D TILE CACI	E COSTING
OUTPUT:								
LOAD DETERMINANTS:	COMPONE!	ero V e	D ZONE	D	BUILDING			
LOADS OUTPUT EY:	AUCH 🖄		M DAY	C	MONTH	120	SEASON	Z YEAR
TIMENTIRES:	E AIR		D SURFACE	Ş	GRAPHIC PLOT			
FUEL USE BY:	MANTALY MAHTYON MAH	CONSUMPTION PLAN DEMAN	CT CT	ANNUAL :	CONSUMPTION PLAK DEMAND		NOGMOD METEYE METEYE YERGE	ENTS S C ONE V
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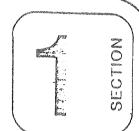


FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

				•		
HARDWARE:		•				
COMPLTER TYPE:	IX IBM	M coc	I UNIVAC	O OTHER	er Portugina til til statistiska statistiska statistiska statistiska statistiska statistiska statistiska statistis	
CORE REQUIRED:	[] > 500K		C) 25 •			peopleter-vorsuses
SUPPORT:	M nzek, 2 chide	DATA!	Manual	O OTHER	ille kan katilanga kan kangan sili katilanga kangan palabag sili kangan bersa kangan kangan kangan kangan kang	
equipment:	DO CRT	g) printer	[] TEXTRONIX			
COSTS:					The state of the s	was-in-industry page (Industry)
ASSUMING PURCHASE OF	SOFTWARE FOR USE O	or present time-sh	ARING:			
FIRST COST:		•				
1N-OFFICE EQUIPMEN	T: CRT	A CONTRACTOR OF CONTRACTOR CONTRACTOR OF CON	aus PRINTER enseuver			
SOFTWARE PURCHASE:	CARD I	ECK	Tape	X	LISTING	
SUPPORT INFORMATIO	R: USER'S	CUIDE X	DATA MANUAL	X	OTHER approximations of the contraction of the cont	ESPARAN.
CNA IUGNI OF IMIT	Debug: 3	MAN-DAYS	WWW and H	ours		
RUN COST/TIME:						
INPLY SET-UP TIME:	accommon and a second	MAN-DAYS	Harian	OURS		
TYPICAL RUN TIME:	Ď > 1 HR	. 🗇 60	н - 30 н	□ 30 H - 10	н 🛭 < 10 н	
TYPICAL* CPU TIME:	D > 1000	SEC. 🗇 100	- 1000 SEC.	Ø 5 − 100 s	EC. D < 5 SE	c.
FOR THIS FORM, ASSUME SECTION 2.	"TYPICAL" TO BE A	SINGLE-ZONED 100	square meter resti	DENCE WITH ALL	OUTPUTS CHECKED (,') I	X
ASSIMING USE OF SOFTWI	ARE ON PUBLIC TIME	-SHARING NETWORKS:				
HAMES AND CONTACTS THROUGH THEM).	OF TIME-SHARING SI	ERVICES WHICH HAVE	THIS PROGRAM AVAI	ILABLE (EXACT	COSTS CAN BE OBTAINED	
Airflow Science	Corporation/B	ACS, Inc	Cybernet	<u>User Servic</u>	CO	
Arga Associates	en were a newstature om two etc. est despréségations en entrans à tamp que mette mistant des	- management consistency of the constraint of th	_		ustriel de la	
Dabcock and Will	COX	ACCUPATION OF THE PROPERTY OF			QUA:	
Boeing Computer	Services	«Поднострой выпольности по при	Intermoun		logies, Inc.	
University of Ma McDonnell Dougla	assachusetts Co	mouting Contor	· Minnesota	Energy Age		

EMPS EDLAR FED EDLAR FED

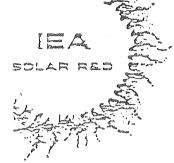
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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TASK VIII - PASSIVE AND HYBRID		TO:
LOW ENERGY DWELLING SUBTASK B - MODELLING & SIMULATION	AG	
SUBTASK C - DESIGN METHODS		
· ·		
'GENERAL:		
TOOL NAME: EMPS 2.0	AVAILABLE THROUGH: <u>Flec</u>	tric Power Research
DEVELOPED BY: D. R. Merriam	<u>Institute, 3412</u>	Hillview Ave.
Arthur D. Little, Inc.	Palo Alto, Calif	
for Electric Power Research Inst.	Attn: Gary G. F	Purcell
	PHONE NO.: (415) 855-	-2168
Extracted the department of th	supported by: Arthur	D. Little, Inc.
DATE DEVELOPED: Feb. 1982	400 A the last table to be made by the company of the last table to the company of the company o	
DATE OF LAST REVISION: Feb. 1982	CORPORATE AND	and California and Annual California and the Supplemental Annual California and California Annual Cali
	######################################	The state of the s
ı	риоке но.: (617) 864-	
BRIEF DESCRIPTION: EMPS 2.0 models more common pa	assive solar designs an	d conventional
design residential buildings. Multiple	conditioned or uncondi	tioned spaces,
which communicate by conductive and conv	vective transport, can	be modeled.
Heat or cooling energy requirements to m		
calculated for unitary, central or combi	ination systems. Syste	m part load performance
PLEASE ATTACE ANY VALIDATION OR TESTING REPORTS.	ост-Тонгордон од отнишения (Д. г.)чест-турке (Д. с. н.	Montable germann - Makkann naan oriannyalah lassiriski bili diga khahahay ngaga nggapayan khahaki Profisio
TOOL HARDWARE & AVAILABLE FO	DRMS:	
	HAND CALCULATOR D	GRAPHIC OR MANUAL
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(COMPLETE SECTIONS 1, 2, 3) (COMPLETE SECTIONS 1, 2, 4)	(COMPLETE SECTIONS 1, 2, 5)	Comment Speciality of 17

USA



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

and duct losses (or gains) are simulated. Through the house or individual room ventilations can be modeled. Slab and/or basement heat transfers with the soil are included. The thermal balance method for establishing space thermal loads (including internal radiative couplings) is used. The user has the choice of a simplified solar gain analysis or of a detailed analysis of solar heat inputs to individual walls/floors, etc., using solar radiation scattering matrices. Daylighting analysis is carried out. Shading by building structural elements or by detached elements is included. Backup heating/cooling equipment can be controlled by schedule and/or time of day thermostats. Room moisture balances (including the potential for moisture condensation on cold surfaces) can be simulated. The most common passive solar designs simulated are detailed solar gain, attached sunspaces, trombe wall, water wall, controlled and natural ventilation, off peak electrical heat input to massive elements, moveable insulation. A new version of the program, scheduled for completion by Dec. 1982, will include active solar water heating, dedicated heat pump, water heating, and ground coupled heat pump.

LIGHTING SYSTEM CONTROL

EMPS 2.0 USA [EA SURVEY FORM FOR SECTION BOLAR RED ENERGY DESIGN TOOLS & ANALYSIS MODELS INTENDED USE: INTENDED FOR USE EY: I ARCHITECT ENGINEER D TECHNICIAN E RESEARCH ANALYST PHASE FOR WEIGH DESIGN TOOL WAS DEVELOPED (1 ONLY): D PRE-DESIGN DISTE ANALYSIS C SCHEMATICS D DESIGN DEVEL. D POST-DESIGN SERV. E RESEARCH PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.): FRE-DESIGN I SITE AKALYSIS D DESIGN DEVEL. D POST-DESIGN SERV. D SCHEMATICS D RESEARCH MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: K HEATING A COOLING ' DHW DHW [LIGHTING MISCELLANEOUS TO LOADS

DESTACE TEMPS.

DEST E LOADS

FC (LUX) LEVELS

SYSTEM DESIGN

ECONOMICS

DAYLICHTING

FC (LUX) LEVELS

ARTIFICIAL LING.

REDUCTION D LOADS
D SOLAR ACTIVE
D SOLAR PASSIVE
D ECONOMICS D FANS
D PUMPS
E MISC. ELECTRICAL
D ELEV. 6 ESCALATOR next version Z MASS INPUT DATA REQUIRED: TOTAL DOES NOT MINIMUM RECOMMENDED POSSIBLE INPUT INPUT INFUT PRE-DESIGN AND SITE ANALYSIS DATA LOCATION - ASSOCIATED WEATHER DATA
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EVILLING AREA
SFACE TEMPERATURES - Schedule for thermostat
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LOCAL GOOD RECUIREMENTS (VENTIL., INSUL., ETC.)
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USA



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

The program is primarily a research tool. It can be used with various levels of detail in building/system description. For example, building shading may or may not be evaluated. The building can consist of only one space or as many as ten mutually coupled spaces. Walls may be "UA" type or have as many as 10 nodes.

USA



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



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TEMPERATURE DATA:	HOURLY :	TAPE [] DEGREE DAY	TYPICAL DA	THOM CL Y	HLY DATA	ANNUAL DA	TA [] MONTHLY DEGR	
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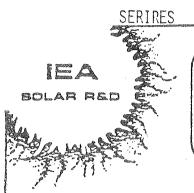


SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

	HARDWARE:	•			•			,	
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j J	FIRST COST:			***************************************	andrivitive bill delicere continuous dimpira, de				
1	IN-OFFICE EQUIPME	NT:	CRT	e+-c-i-v	PRI	NTER			
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;	SUPPORT INFORMATION	ON:	USER'S G	IDE	DAT	A MANUAL		OTHER	
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	ASSUMING USE OF SOFT	WARE ON PUBL	IC TIME-SI	ARING NETW	ORKS:				
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SECTION

U.S.A.

TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:
LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION

SUBTASK C - DESIGN METHODS

GENERAL:	
TOOL NAME: SERI - RES	AVAILABLE THROUGH: National Energy Software Cent
DEVELOPED BY: SERI and Larry Palmiter	Argonne National Laboratory
Terry Wheeling '	Argonne, IL 60439
Ecotope Group	Where a real and the contract
2238 East Madison	PHONE NO.:
Seattle, WA 98112	SUPPORTED BY: Ecotope Group
DATE DEVELOPED: August, 1981	2238 East Madison
DATE OF LAST REVISION: August, 1981	Seattle, WA 98112
ı	PHONE NO.:
residential buildings.	
FLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE FO	DRMS:
MAIN FRAME COMPUTER D MICRO-COMPUTER	HAND CALCULATOR D'GRAPHIC OR MANUAL
C CARD DECK D DISC X TAPE D TAPE D TIME SMARING D LISTING D LISTING - EARD COPY D RECALL ONLY MEMORY-	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES ☐ L'STING ☐ BOOK ☐ RECALL ONLY MEMORY ☐ DEVICE

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SURVEY FORM FOR **ENERGY DESIGN TOOLS** & ANALYSIS MODELS



	N	T		N	D	-	D	U	S	COLUMN CO	9
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M ARCHITECT

E ENGINEER

TECHNICIAN

B RESEARCH ANALYST

PHASE FOR WEIGE DESIGN TOOL WAS DEVELOPED (1 ONLY):

PRE-DESIGN

SITE ANALYSIS

SCHEMATICS

DESIGN DEVEL. DOST-DESIGN SERV.

C RESEARCH

PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):

ER PRE-DESIGN

K HEATING

SITE ANALYSIS

COOLING .

SCHEMATICS

DHW

D DESIGN DEVEL. Z POST-DESIGN SERV.

KO RESEARCH

MISCELLANEOUS

MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: D LIGHTING

LOADS SPACE TEMPS. SPACE TEMPS. PASSIVE SOLAR ACTIVE SOLAR SHADING SYSTEM DESIGN CONOMICS UNDERGROUND LOADS HASS	E LOADS SPACE TEMPS. HVAC SYSTEMS PASSIVE CLNG. SEADING SYSTEM DESIGN CONOMICS WHOSE GROUND LOADS SLOPED GLAZING HASS	D LOADS D FC (LEX) LEVELS D SYSTEM BESIGN E ECONOMICS D DAYLIGHTING FC (LUX) LEVELS ARTIFICIAL LING. REDUCTION	D LOADS D SOLAR ACTIV D SOLAR PASSI D ECONOMICS		FANS D PUMPS D MISC. ELE	
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BUILDING MATERIALS & ASSOCIATED DATA (R, o, c, ETC.) BUILDING MASS DATA SHALING CREFFICIENTS & DAYLIGHT TRANSMISSION INTERIOR SURFACE DATA

ENGINEERING DESIGN DEVELOPMENT DATA

MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM CONTROL LIGHTING SYSTEM CONTROL





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	e-ye-ruoh C Va lau <i>kk</i> a C				DY DAY/MONT	TH D TY	PICAL D	DAY/MONTE	•
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INTERNAL LOADS INCL	.UDE:	S sensible	& LATENT S	EPARATE	SENS. &	LAT. TOTAL	۵	SENSIBLE ONLY	
VERTILATION:		S SENSIBLE	:		B LATENT			VARIES BY SCHI OR COMMAND	IDULE
DAYLIGHT COEFFICIEN	TS:	C SKY, REF	l. & DIRECT			CPL.		SKY ONLY	
ZONES PER RUN:	-	D > 25	Į	7 10 - 25		2 2 - 10		· 🔲 1 OKTY	
SYSTEM MODELING:		D SYSTEM E	FFIC. INPUT		D SYSTEM	OPTIMIZING		COMPONENT SEN	SITIVITY
ECONOMIC ANALYSIS:		D ANNUAL C	pst -		SIMPLE I	PAYBACK		LIFE CYCLE COS	STING
OUTPUT:	•								
	COMPONENT	C	Z ZONE	15	3 BUILDING	•			
	B HOUR	•	DAY		MONTH		SEAS	ON	S YEAR
	B AIR	_	S SURFACE	_] GRAPHIC !				
FUEL USE EY: C	D MONTHLY C D MONTHLY P	NOITEMEZAC		D ANNUAL	CONSUMPTION PEAK DEMANT	;	ENER	TEM COMPONENTS ROY SYSTEMS ON	u /

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SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

	•						
HARDWARE						-	
COMPUTER TYPE:	IBM	M CDC	Nainn 28	ic 🛛	OTHER GO	enerally ANSI	standard code
CORE REQUIRED:			- 500 K				code
SUPPORT:	Ø neek, e eni	DE [DATA HANUAL		OTHER		
EQUIPMENT:	D CC	(3 PRINTER	O texts	CONIX D	OTHER		gan acamphocar ed storios redistros o de 1,400 h digital (1,400 partir).
COSTS:							
ASSUMING PURCHASE	OF SOFTWARE FOR	USE ON PRESENT	Time-sharing:				
FIRST COST:							
IN-OFFICE EQUIP	ment: C	RT X	PR:	KTER			
SOFTWARE PURCHA	SE: C	ARD DECK	TAI	E	X	LISTING	aparament visit or the second provide a little
SUPPORT INFORMA	TION: L	ser's cuide X	DA!	ta hanual	use to successive and the succes	OTHER	edo-dado-rolhozago-l-cumingans
TIME TO IMPLE	ND DEBUG:	5 MAN-D	AYS	man-hour	S		
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TYFICAL* CPU TI	me: D	1000 SEC.	D 100 - 1000	SEC.	8 5 - 100	SEC.] < 5 SEC.
*FOR THIS FORM, ASS SECTION 2.	OHE "TYPICAL" TO	BE A SINGLE-ZO	MED 100 SQUARE I	teter residen	ICE WITH A	LL OUTPUTS CHECK	ED (,') IN
ASSUMING USE OF SO	OFTWARE ON PUBLIC	TIME-SHARING N	TETWORKS:				
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	THE THE COMPANY OF THE PROPERTY OF THE PROPERT						

TRNSYS 11.1 EEA BOLAR RED LOW ENERGY DWELLING

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



II.S.A

TASK VIII - PASSIVE AND HYBRID SOLAR RETURN TO:

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

'GENERAL:		
TOOL KAME: TRNSYS 11.1	AVATLARIE TERMINE. C	olom Engage to Lead of
DEVELOPED BY: University of Wisconsin	distribution and a series of the series	olar Energy Laboratory
Solar Energy Laboratory	deformable of an elementary common or only properly and described in any given 200 Advistance constraints	noderstellt in givinism till til som skrivet kriste, av trette fill som sterre til som
1500 Johnson Drive .	Antible Classified Advancy's responsed by All Probability army (CCV) in Classified All Code (CCC) are taking properly	
Madison, Wisconsin 53706	PHONE NO.: (608) 263	3-1586
	SUPPORTED BY: Solar	Energy Laboratory
DATE DEVELOPED: 3/75	J.E.	
DATE OF LAST REVISION: 4/81		The second section is a second
	at the distribution of the same of the same without the same state of the same state	B. David program (1998) a politic grain operation of the College of the State of th
	PHONE NO.: (608) 263	
BRIEF DESCRIPTION: TRNSYS is a modular system s	imulation program It	VOCCONI 70C a punt
description language in which the user s	necifies which company	nte counties a system
system and the manner in which they are	The Thicke	IIIS CONSTITUTE THE
system and the manner in which they are	connected Ine IRNSYS	library includes
many of the active and passive component	s commonly found in so	lar energy systems.
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.		
TOOL HARDWARE & AVAILABLE FO	ORMS:	
The same of the sa	Contraction of the second of t	D GRAPHIC OF MANUAL
CARD DECK DISC E TAPE TAPE M TIME SHARING DISTING M LISTING - EARD COPY RECALL ONLY MEMORY-INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 3)	D MACHETIC CARD D L'STING D RECALL ONLY MEMORY INTEGRATED CIRCUIT (COMPLETE SECTIONS 1, 2, 1	COMPLETE SECTIONS 1, 2, 6)
(COMPLETE SECTIONS 1, 2, 4)	,,

IRNSYS II.

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

The present version of TRNSYS is supplied with the following standard component models:

Data Reader Solar Radiation Data Processor Shading Algorithm Flat Plate Collector CPC Collector Mass Wall Direct Gain Window Pipe And Duct Pump/Fan Flow Divertor/Mixing Valve/Tee Piece Controller With Hysteresis Three-Stage Thermostat Microprocessor Controller Relief Valve Heat Exchanger Storage Tank Rock Bed

Heat Pump
Absorption Air Conditioner
Auxiliary Heater
Liquid Collector - Storage Subsystem
Air Collector - Storage Subsystem
Domestic Hot Water Subsystem
Energy/(degree-Hour) Space Heating or Cooling

USA

Wall
Roof and Attic
Room and Basement
Cyclic Time-Dependent Function Generator
Algebraic Operations Unit
Quantity Intergrator
Printer
Plotter
Time and Frequency Distribution Plotter
Simulation Summarizer
Lifecycle Ecomonmic Analysis

In addition to the standard components listed above, TRNSYS 11.1 also contains a library of user-contributed components. These components are supported by the contributors rather than the Solar Lab. Prsesntly, this library contains models for photovoltaic and combined photovoltaic/thermal systems. They are:

PV/Thermal Collector Storage Battery Regulator Inverter Electrical Subsystem

These subroutines were developed by Professor Don Evans of Arizona State University ((602) 965-3291).

The TRNSYS Manual is a 650 page document explaining the construction of the TRNSYS program and its use. The manual presents the concepts central to the TRNSYS approach to system simulation, as well as general and mathematical descriptions of each component model. Methods for formulating component models and preparing input data for system simulation are given. There are also a variety of example problems covering water heating, active or passive space heating, space cooling and building load generating simulations.

TRNSYS 11.1 **USA** SURVEY FORM FOR IEA ECTIO SOLAR RAD ENERGY DESIGN TOOLS & ANALYSIS MODELS S INTENDED USE: INTENDED FOR USE EY: C ARCHITECT E ENGINEER D TECHNICIAN RESEARCH ANALYST PHASE FOR WEICE DESIGN TOOL WAS DEVELOPED (1 ONLY): SITE ANALYSIS SCHEMATICS D DESIGN DEVEL. D POST-DESIGN SERV. X3 PESTABLE THASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.): PRE-DESIGN SITE ANALYSIS D SCHEMATICS B DESIGN DEVEL. POST-DESIGN SERV. E RESEARCH MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: E HEATING @ COOLING . LIGHTING DHW MISCELLANEOUS | LOADS | FC (LUE) LEVELS | SYSTEM DESIGN | ECONOMICS | DAYLIGHTING | FC (LUE) LEVELS | ARTIFICIAL LING. | KEDUCTION E LOADS
E SPACE TEMPS.
E HVAC SYSTEMS
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D SOLAR PASSIVE
E ECONOMICS B FANS 思 LOADS 記 SPACE TEMPS。 記 HVAC SYSTEMS 記 PASSIVE CLNG。 題 SHADING 図 SYSTEM DESIGN FIGURE PUMPS

MISC. ELECTRICAL

ELEV. & ESCALATOR ACTIVE SOLAR SYSTEM DESIGN ECONOMICS E ECONOMICS
UNDERGROUND LOADS
SLOPED GLAZING
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U-VALUES:	•	CHANGE W/WIND SPEE		REMAIN CONSTANT	B MOVABLE	INSULATION	
INFILTRATION:		S AIR CHANGE PER HOU	R D	CRACK METHOD	□ VARIES	W/WIND SPEED	
INTERNAL LOADS IN	CLUDE:	SENSIBLE & LATENT	SEPARATE []	SENS. & LAT. TOTAL	. D SENSIBI	E ONLY	
VENTILATION:		SENSIBLE	8	LATENT	型 VARIES OR のPA	ey schedule (AND	
DAYLIGHT COEFFICI	ents:	D SKY, REFL. & DIRECT	: 0	SKY & RIFL.	מאס גאז 🖂	.Y	
ZONES PER RUN:	-	№ > 25	D 10 - 25	D 2 - 10		ONLY	
SAZIEM RODEFING:		O SYSTEM EFFIC. INPUT					
ECONOMIC ANALYSIS	:	TROUBLE COST		SIMPLE PAYBACK	O LIFE C	CLE COSTING	
OUTPUT:		•					
LOAD DETERMINANTS:	COMPONENT	E ZONE		BUILDING			
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TRNSYS 11.1

USA

FEA SOLAR RED

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

TRNSYS is highly flexible in terms of the systems it models, the level of detail of the analysis and the outputs of the simulation. Many components may operate in any of several modes, offering several degree of model complexity.

Also, the capabilities of several component routines may overlap. Building loads, for example, may be calculated using the simple "degree-day" (or in this case "degree-hour") load model. When more exact determination of the dynamics of a particular building is desired, the transfer function "walls", "roof", and "rooms" can be assembled to model virtually any structure. Alternatively, TRNSYS can accept hourly loads generated by even more sophisticated load programs.

Although TRNSYS can handle several zones, it does not conveniently model

natural convection between zones.

IRNSYS II.I

SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS

SECTION

USA

FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

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ARDWARE	150		•			
			M UNIVAC			
			- 500 K			
SUPPORT:	🛭 USER'S GUID		LAUNAH ATAD			
EQUIPMENT:	€ CRT	PRINTED	☐ TEXTRON	IX OTHER_		
COSTS:	•			•		
ASSUMING PURCHASE	of software for u	SE ON PRESENT	TIME-SHARING:			
FIRST COST:					•	
IN-OFFICE EQUIP	MENT: CR	T	PRINT	ER	<u>.</u>	
SOFTWARE PURCHA	SE: CA	RD DECK	TAPE	\$800,00	LISTING	Inc.
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TRNSYS 11.1

USA

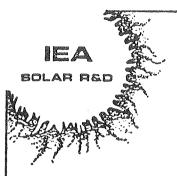


SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

TRNSYS is written in standard ANSI FORTRAN. The program has been run on a wide variety of machines with very little or no modification. No serious problem should be anticipated in setting up the program, provided core space requirements are met.





TASK VIII - PASSIVE AND HYBRID SOLAR LOW ENERGY DWELLING

SUBTASK B - MODELLING & SIMULATION SUBTASK C - DESIGN METHODS

RETURN TO:

Richard Rittelmann
Burt Hill Kosar Rittelmann
Assoc.

400 Morgan Center Butler PA 16001 USA

GENERAL:

Control and the control and th	*
TOOL NAME: Environmental Systems Peri	For- available through: Joe Clarke
DEVELOPED BY: Joe Clarke mance (ES	5P)
ABACUS	
University of Strathclyde	
Dept. of Architecture, 131	PHONE NO.: 041-552-4400 Ext. 3021
Rotten Row - Glasgow G40NG	SUPPORTED BY: ABACUS
DATE DEVELOPED: 1977	
DATE OF LAST REVISION: September 1983	
-	
	PHONE NO.: 041 552 4400 Ext. 3021
BRIEF DESCRIPTION: ESP is a large finite	-difference based program running on
a mainframe or mini computer	providing a detailed simulation of
hourly heat flows in a multiz	one construction.
PLEASE ATTACH ANY VALIDATION OR TESTING REPORTS.	
TOOL HARDWARE & AVAILABLE	FORMS:
MAIN FRAME COMPUTER	☐ HAND CALCULATOR ☐ GRAPHIC OF MANUAL
☐ CARD DECK ☐ DISC TAPE ☐ TAPE	☐ MAGNETIC CARD ☐ TEMPLATES, CHARTS, TABLES
TIME SHARING LISTING	☐ LISTING ☐ BOOK ☐ RECALL ONLY MEMORY . ☐ DEVICE
COMPLETE SECTIONS 1, 2, 3)	INTEGRATED CIRCUIT (COMPLETE SECTIONS 1 2 6)
(COMPLETE SECTIONS 1, 2, 3)	(COMPLETE SECTIONS 1 2 5)





INTENDED USE:

INTENDED FOR USE BY:

- ARCHITECT
 - ENGINEER

國 SITE ANALYSIS 國 SCHEMATICS

- TECHNICIAN
- RESEARCH ANALYST

PHASE FOR WHICH DESIGN TOOL WAS DEVELOPED (1 ONLY):

2 COOLING

- SITE ANALYSIS
 - ☐ SCHEMATICS
- D DESIGN DEVEL. D POST-DESIGN SERV.
- RESEARCH

- PHASE(S) FOR WHICH DESIGN TOOL MAY BE USEFUL (ANY NO.):
- DESIGN DEVEL. POST-DESIGN SERV.

MAJOR & MINOR ENERGY COMPONENTS ADDRESSED BY TOOL: 2 LIGHTING

MEATING B LOADS
SPACE TEMPS.
HVAC SYSTEMS
PASSIVE SOLAR
ACTIVE SOLAR
SHADING
SYSTEM DESIGN
CONOMICS
UNDERGROUND
LOADS

LOADS MASS

PRE-DESIGN

- D LOADS
 STACE TEMPS.
 D HYAC SYSTEMS
 D PASSIVE CLNG.
 STADING
 SYSTEM DESIGN
 D ECONOMICS
 UNDERGROUND LOADS
 SLOPED GLAZING
 MASS
- LOADS
 D FC (LUX) LEVELS
 SYSTEM DESIGN
 ECONOMICS
 D APPLIGHTING
 FC (LUX) LEVELS
 ARTIFICIAL LING.
 REDUCTION
- B DHW LOADS
 SOLAR ACTIVE
 SOLAR PASSIVE
 CONOMICS
- FANS
 D PUMPS
 MISC. ELECTRICAL
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MISCELLANEOUS

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ARCHITECTURAL DESIGN DEVELOPMENT DATA				
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ENGINEERING DESIGN DEVELOPMENT DATA				
MECHANICAL SYSTEM DESIGN MECHANICAL SYSTEM CONTROL ELECTRICAL SYSTEM DESIGN ELECTRICAL SYSTEM CONTROL LIGHTING SYSTEM DESIGN LIGHTING SYSTEM CONTROL	20 20 20 20 20 20 20 20 20 20 20 20 20 2	موممه	00000	



SURVEY FORM FOR



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INTEGRATION: ,		SIMPLE EULER		IMPLICIT	Ø	OTHER	
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MOVABLE SHADING:		M DAILY & SEASON	AL SWITCHING	SEASONAL SWITCHING		NOT CALCULATED)
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U-VALUES:		CHANGE W/WIND	SPEED	REMAIN CONSTANT		MOVABLE INSULA	ATION
INFILTRATION:		AIR CHANGE PER	HOUR	CRACK METHOD	8	VARIES W/WIND	SPEED
INTERNAL LOADS INC	CLUDE:	SENSIBLE & LATI	ENT SEPARATE	SENS. & LAT. TOTAL	(2)	SENSIBLE ONLY	
VENTILATION:		SENSIBLE .		☐ LATENT		VARIES BY SCHE	IDULE
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ESP

UNITED KINGDOM



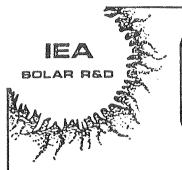
SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Finite difference integration method: Crank-Nicolson,

The choice of output period is under control of the user.



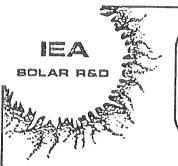


FOR DESIGN TOOLS REQUIRING A MAIN FRAME COMPUTER

HARDWARE:	,			1	DEC 10, DEC HP3000, Hor 6060, SEL,	neywell Burroughs
COMPUTER TYPE:		CDC				UNIVAC1108
CORE REQUIRED:						
SUPPORT:		☐ DATA				
EQUIPMENT:	CRT	☐ PRINTER	TEXTRONIX	OTHER _		
COSTS:		•.				
ASSUMING PURCHASE OF	SOFTWARE FOR USE	ON PRESENT TIME-SI	HARING:			the majoration of the state of
FIRST COST:						transporter
IN-OFFICE EQUIPME		£ 3000				######################################
SOFTWARE PURCHASE	: CARD	DECK	TAPE E 1	.000	LISTING	
SUPPORT INFORMATI	on: USE	s's GUIDE Free	DATA MANUAL	**************************************	OTHER	
TIME TO INPUT AND	DEBUG:	MAN-DAYS	MAN	HOURS See	comments	Commission of
RUN COST/TIME:				,		
INPUT SET-UP TIME	Ç:	MAN-DAYS	2 MAN-	HOURS		
TYPICAL* RUN TIME	:	ик. □ 60	0 м - 30 м	🗷 30 M -	10 M	C < 10 M
TYPICAL® CPU TIME	E: 🗇 > 10	000 SEC.	00 - 1000 SEC.	□ 5 - 10	O SEC.	C < 5 SEC.
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ESP

UNITED KINGDOM



SURVEY FORM FOR ENERGY DESIGN TOOLS & ANALYSIS MODELS



COMMENTS:

Cost of source code: £ 1000 for Educationel or Research Application £ 10000 for commercial Application

Time to input and debug:

For machine identical to one on which code already implemented 10 days. For machine similar to one on which code already implemented 30 days. For new machine with no existing graphics facilities 120 days.

Run costtime:

Single-user machine 7 month heating season assumed.

APPENDIX 2.

IEA Solar Heating and Cooling Programme, Task VIII

Subtask B Reprensentatives

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Garston, Hertfordshire

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Solar Energy Research Institute

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