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Residential Solar Data Center: Data Resources and Reports

U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards
National Engineering Laboratory
Center for Building Technology
Washington, DC 20234

October 1981



Prepared for:

Department of Housing and Urban Development
Office of the Assistant Secretary for Policy Development and Research
Division of Energy, Building Technology and Standards
Washington, DC 20410

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**RESIDENTIAL SOLAR DATA CENTER:
DATA RESOURCES AND REPORTS**

Patricia M. Christopher
Audrey O. Houser

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U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

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FOREWORD

From January to October 1978 the Residential Solar Data Center (SDC) of the National Bureau of Standards (NBS) issued a bimonthly publication known as "Status Reports".[1] These reports contained sets of tables and charts designed to inform selected participants (primarily the Department of Housing and Urban Development and its contractors) in the Residential Solar Heating and Cooling Demonstration Program about the volume of data stored in the solar data base maintained by the SDC, and about the types of computer printouts that were available. The availability of computer printouts to a larger, more varied group of potential users was announced at the Department of Energy's Solar Heating and Cooling Systems Operational Results Conference held in Colorado Springs, Colorado, November 28 - December 1, 1978.

In June 1979 the document, "Residential Solar Data Center Data Resources and Reports,"[2] was published in an effort to enhance comprehension of the computer printouts of Residential Solar Demonstration Program data by this more general audience. Included was a summary of the history and background of the SDC and the demonstration program, an explanation of grant cycles and data collection procedures, and a full description of the files which comprise the solar data base.

The present document is an update to the June 1979 issue. It contains much of the same information, updated to reflect the current status of the SDC. This is the final update. As of the date of publication, the Residential Solar Data Center no longer exists. The data described in this report have been archived with their sponsor at HUD.*

*HUD User

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RESIDENTIAL SOLAR DATA CENTER:
DATA RESOURCES AND REPORTS

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Residential Solar Data Center:
Data Resources and Reports

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The Residential Solar Data Center (SDC) was responsible for the establishment and operation of a computerized data base containing non-instrumented residential data collected from the DoE/HUD Solar Heating and Cooling Demonstration Program. This document includes a summary of the history and background of the SDC and its role in the demonstration program, a list of the final computer reports which are available, sample pages of representative reports, and a description of the data files which comprised the solar data base.

Key words: automatic data processing; data base; residential buildings; solar data base; solar heating and cooling; solar energy systems.

1. BACKGROUND

In 1974, Congress passed the Solar Heating and Cooling Demonstration Act to establish a program of research, development, and demonstration directed towards reducing the nation's dependence upon non-renewable resources through stimulating the development and use of solar energy systems. The Department of Energy (DoE) is responsible for the management of the total Federal Solar Energy Research, Development, and Demonstration Program. DoE was assisted in the demonstration portion of the program (which terminated in 1981) by the Department of Housing and Urban Development (HUD), the National Bureau of Standards (NBS), and other Federal agencies and private contractors.

The demonstration program was divided into two parts: a Residential Program for which HUD had prime responsibility; and a Commerical Program, directed by DoE. In both programs, funds were allocated for new and retrofit building projects in a variety of climatic and geographic regions. These projects were designed to demonstrate the economic viability of the use of solar energy systems for heating and cooling.

A principal objective of the demonstration program was to provide data on the technical aspects of solar energy systems and on their acceptance by the building industry, regulatory agencies, and the consumer. Data were collected in two ways: manually (non-instrumented data) and electronically (instrumented data).

Non-instrumented data, technical and non-technical, were collected on questionnaires or take-off forms for entry into the computer. Included were data describing the demonstration projects and their solar energy systems as well as data concerning the progress of the grant from construction through marketing, market acceptance, etc.

Instrumented technical data were derived principally from sensors installed when construction activities were completed at selected project sites. These data, when analyzed, defined the thermal performance of the solar energy systems and the climatic conditions affecting that performance.

DoE contractors were responsible for the collection of both instrumented and non-instrumented data in the commercial program and for the collection of instrumented data only in the residential program. The responsibility for collection of non-instrumented data in the residential program resided with HUD. Figure 1 illustrates the assignment of data collection, evaluation, and dissemination responsibilities in the Solar Demonstration Program. The Residential Solar Data Center (as shown in figure 1) was the entity responsible for storage, retrieval, and dissemination of non-instrumented solar data in the residential program.

Responsibilities	Commercial		Residential	
	Instrumented Data	Non-Instr. Data	Instrumented Data	Non-Instr. Data
Activities				
Store, Retrieve, and Disseminate Data	DoE / Contractors			HUD Contractor (Solar Data Center of NBS)
				HUD/ Contractors
Evaluate Data and Document Results				
Maintain Printed Reports, etc.	DoE Technical Information Center (TIC) P. O. Box 62 Oak Ridge, Tennessee 37830		HUD User (see page 111)	
Disseminate Information	Conservation and Renewable Energy Inquiry and Referral Service P. O. Box 1607 Rockville, MD 20850			

Figure 1. Solar demonstration program data collection, evaluation and dissemination activities and responsibilities.

In implementing the Residential Demonstration Program, HUD had established four main objectives. They were:

1. Residential demonstrations of solar equipment;
2. Development of performance criteria and certification standards for solar equipment;
3. Encouragement of the acceptance and use of solar technology by the housing industry and the general public; and
4. Dissemination of demonstration and market development data.

In order to accomplish these objectives, HUD funded demonstration projects (by awarding grants) in six cycles initiated approximately every nine to twelve months.* Data collected from funded projects in each cycle enabled HUD and its contractors to apply increased awareness of solar technology, marketplace dynamics, and data collection techniques towards enhancing the effectiveness of projects in succeeding cycles.

In addition, HUD, in cooperation with DoE, had established a national clearinghouse and reference center for the effective dissemination of information regarding solar energy systems - technical and non-technical, domestic and foreign, residential and commercial. The center functioned as a major reference resource for all elements of the solar community, as well as for the general public. The latest demonstration information was made available by the center through publications, conferences, and exhibits and through its toll-free telephone and national mailing response mechanism.

*For a count of grants per cycle, see section 7.

2. THE RESIDENTIAL SOLAR DATA CENTER

In the Fall of 1976, the design for a solar data center was initiated by the Institute for Computer Sciences and Technology (ICST) at the National Bureau of Standards (NBS). A series of publications [3] developed the framework for what was to become the Residential Solar Data Center (SDC).

In March 1977 the SDC became operational at NBS and operated until October 1981 when the program ended. The SDC was responsible for the establishment and operation of a data base containing non-instrumented solar data collected by participants in the Residential Solar Demonstration Program which was managed by the Department of Housing and Urban Development (HUD).

The principal data collection contractor for HUD in the demonstration program was the Boeing Aerospace Corporation (BAC) which had subcontracted with the American Institute of Architects/Research Corporation (AIA/RC); Dubin, Bloome Associates (DBA); and the Real Estate Research Corporation (RERC). These contractors collected and forwarded data to the SDC which maintained a solar data base consisting of the following files:

1. Grant File: This file contained basic project and system information for each application funded by HUD. These data were derived from grant applications submitted to HUD and updated with information from periodic field reports. More detailed information about this file is available in [4].
2. Grantee Report File: Data in this file were based upon reports submitted by each grantee to BAC describing the progress of the grant from design and award of construction financing through actual construction, sale, and permanent financing. The grantee's perception of the ease or difficulty in obtaining construction or permanent financing and building and zoning approval, as well as construction, equipment, or installation problems were included.
3. Technical Description File: This file contained basic system design and predicted performance data collected by DBA from a large number of selected non-instrumented systems and for all instrumented systems. A more detailed set of data was collected by AIA/RC for those systems which were instrumented. The data sample corresponded to the marketing survey and the utility consumption samples.
4. Technical Concerns File: Contained in this file were data on problems found during the design, construction or operational

phase which were recorded in field activity reports submitted by DBA and BAC field representatives. It also contained data on problems found after construction, as recorded by the grantee.

5. Marketing Survey File: This file contained extensive survey questionnaire results collected by RERC from selected builders, lenders, homebuyers, code officials, utility companies, and other market participants. The data sample included representatives of those who chose to build, lend, or buy a funded solar house and "comparatives" who did not become involved. Data were also collected after the sale to gauge builder and consumer reactions over a period of time. The data sample selected for these surveys (about 25 percent of all grants) is the same sample for which technical description data and utility consumption data were collected.
6. Utility Consumption File: This file contained information on auxiliary or "backup" fuel consumed for selected projects. The projects selected were those for which marketing survey results were collected. The data were collected from utility companies (with purchaser agreement). "Comparative" data were also collected.*

The following is a brief description of the services which were provided by the SDC:

Receipt and Maintenance of Data

The SDC provided a central location for the receipt, storage, processing and reduction of non-instrumented, residential solar data collected from the Solar Demonstration Program. Data were collected and transcribed onto computer forms by HUD and its contractors. These forms were sent to the SDC and from there to NBS contractors who keyed the information into machine-readable formats. The incoming data were then edited, catalogued, reformatted, translated, and validated. These activities provided the necessary control and prepared the data for use in the production of appropriate reports.

Production of Printed Reports

A major function of the SDC was the production of reports ranging from complete listings of all data in a file to more detailed "custom" computer reports. Custom reports were produced to meet specific user requirements and may have printed only selected data from a file and may have re-sorted the selected data into a new sequence. New report

*A more complete description of data files and specific data elements is contained in section 5.

requirements were defined by HUD or its contractors in the Residential Demonstration Program. These reports were generated whenever a data file was updated.*

Provision of Online Access to the Data

Some data files could be accessed by authorized users (as determined by HUD) via a computer terminal. Access was made possible through the use of a query package called MIRADS (Marshall Information Retrieval and Display System).

Ad Hoc Functions

In addition to the operation and maintenance of the data base, the SDC also provided the following user services (see [4], [5]):

1. technical expertise to answer user questions and to provide assistance;
2. development of computer programs in response to users' special needs;
3. user training in online access to the data base and in procedures for transcription and validation of data;
4. documentation of available data, reports, and online access techniques;
5. interface with data collectors and users;
6. development of standards for terminology, programs, and documentation.
7. archiving of files, computer listings, documentation, and programs.

*See section 3 for a list of the final computer reports available from HUD.

3. SUMMARY OF COMPUTER REPORTS AVAILABLE*

The tables in this section show final computer output reports which are available from HUD. (See address on page iii.) Tables 1 - 6 summarize content, and indicate report sequence (i.e., sorted by grant number, sorted by manufacturer, etc.). Sample pages from all these reports are contained in section 4.

The following is an explanation of terms used in the headings of tables 1 - 6:

Description: A brief description of the data elements included in each report. (See section 5 for additional information.)

Sequence of Data: The order in which line items are sorted.

Report Number: Number by which the report is referenced when requesting a copy from HUD. This same number appears at the top of each page of the report.

*Summary statistics of Grant, Grantee, Technical Description, and Utility Consumption file data are currently being compiled and will be available from the Department of Housing and Urban Development (HUD).

Table 1. Summary of Grant File Computer Reports

Description	Sequence of Data	Number of Report
Most of these computer reports are available in [4].		
Complete listing of all data collected for each grant awarded. (492 pages)	Grant Number	SG-C1
Analysis of units and costs for grant awarded showing average unit cost. (1 page)	System Type	SG-C2
Listing of grants awarded with grantee name, project city and state, housing type, construction type, dwelling count, solar system, number of buildings, system type, system kind, collector sq. ft., designer cost to government, builder cost to government, solar fraction, and solar manufacturer. (25 pages)	Grant Number	SG-C3
Same as SG-C3 except auxiliary fuel type and storage medium are shown instead of solar fraction. (25 pages)	Grant Number	SG-C3F
Same as SG-C3 except collector sq. ft. and cost per MBtu is shown instead of designer and builder costs to government. (25 pages)	Manu- facturer	SG-C4BC
Same as SG-C3 except cost to government is shown instead of designer and builder costs to government and solar fraction. (32 pages)	Manu- facturer	SG-C4CG
Same as SG-C3 except grantee city and state are shown instead of project city and state. (28 pages)	Grantee City and State	SG-C5AS
Same contents as SG-C3. (28 pages)	Project City and State	SG-C5PS
Same as SG-C3 except HUD region is also shown. (26 pages)	HUD Region	SG-C7

Table 2. Summary of Grantee File Computer Reports

Description	Sequence of Data	Number of Report
Listing of all Grantee Report data. (500 pages)	Grantee Report, Card Number, Project ID	BA-R1
One page per project of all Grantee Report 1, 3 and 4 data, with field titles. (937 pages)	Project ID	B-R2
Listing of all project IDs for each grantee report in the data base. (19 pages)	Project ID	B-P4

Table 3. Summary of Technical Description File Computer Reports

Description	Sequence of Data	Number of Report
Listing of data on instrumented and non-instrumented systems for which F-Chart calculations were done. This listing includes the F-Chart input and output data. (200 pages)	Project ID, System Number	DA-R1
Listing of data on instrumented systems including: - the site and building with a solar system - the collector subsystem - the thermal storage subsystem - the controls subsystem - the circulation subsystem - the auxiliary energy subsystem, and - the predicted system performance. (10,000 pages)	Project ID	AC-R1 available on micro-film or microfiche

Table 4. Summary of Technical Concerns File Computer Reports

Description	Sequence of Data	Number of Report
Listing of all technical concerns data for each system with problems. Codes are translated for hardware element, actions, and events. (223 pages)	Grant Number, System Number, Date	CB-D3
Simplified listing of CB-D3, with hardware element and events data in "summarized" form. Additional data shown is cycle, number of units, new or retrofit, housing type, system type, system kind, and transfer medium. (67 pages)	Grant Number, System Number	CB-D3A
Summary of hardware element with technical concerns. (22 pages)	Grant Number, System Number	CB-HAS

Table 5. Summary of Marketing Survey File Computer Reports

Description	Sequence of Data	Number of Report
Question and answer dictionary, showing abbreviated forms for all marketing survey questions and all the possible answers, both coded and uncoded. (463 pages)	Questionnaire ID, Question number, Project ID	RA-R1 thru RZ-R1
Listing of all answers for the marketing survey questionnaire from single family builder thru follow-up comparative renter. (200 pages)	Questionnaire ID, Question number, Project ID	RA-2 thru RZ-2

Table 6. Summary of Utility Consumption File Computer Reports

Description	Sequence of Data	Number of Report
Listing of all utility consumption data (usually monthly) and comparative data, including averages of fuel usage for each unit. (650 pages)	Project ID, Fuel type, Billing Start date	BF-R1
Listing of only the yearly average fuel usage data for each unit. (15 pages)	Project ID, Fuel type	BF-R1-AVG
Listing of utility supplier data for those companies supplying fuel to units. Report includes name and address of supplier, as well as code by which data was stored on computer. (6 pages)	Utility supplier code	BF-SUP-R1

4. SAMPLE PAGES OF REPORTS

This section contains copies of actual pages from each report. Since these examples may contain out-of-date or out-of-context data, they should be viewed as "samples" only. The title of the report, the date it was produced, the report identification number, and sequential page number are shown on the top of each page. An explanation of "not applicable" codes (as seen on pgs. 22 and 23) is given below. Other codes may be directly interpreted since meaningful abbreviations were used whenever possible. Codes are more fully explained with the complete report.

"Not Applicable" Codes

Missing data in these reports were usually indicated by one of four "not applicable" codes. The four codes and their translations are shown below. When space is available in the report, the code was translated and only the interpretation was printed.

<u>N/A Code</u>	<u>Translation</u>
XX	Information will be available later
XA	Information will not be collected
XB	Information not required
XC	See additional comments

GRANT/ ID NUM	APPLCT NUMBER	CYC	BUILDER/APPLICANT AND ADDRESS	ORGANIZATION	CONTACT PERSON	BUILDER/APPLICANT CONTACT PERSON	ORGANIZATION	ORGN TYPE	TOT COST OF SOLAR	APPL REQUEST	GRANT AWARD
H2474	0177	1	PUERTO RICO URBAN RENEWAL CORP 606 BARBOSA AVE PO BOX W RIO PEDRAS PR 00928 TEL: 202 293-2139		DAVID C. BLUM TEL: 202 293-2139 EXT:			LHA	\$ 48000	\$ 48000	\$ 21000

TYPE OF FINANCING: HUD PUBLIC HOUSING

BUILDING NUMBER 1: 1. 2. 3

PROJ LOC 01

ADR: CSZ: RIO PEDRAS PR 0092B COUNTY:
HUD/GSA REGION: 02 SEA: DEGREE DAYS:

MOD SEQ 1 HOUSING TYPE: MFM NUMBER DWELLING UNITS: 4 NUMBER SOLAR SYSTEMS: 4
CONSTRN TYPE: NEW NUMBER BUILDINGS: 1 COND AREA/SYSTEM(S): 26520 SQ FT

DESIGNATORS: 1

SYSTEM:	TRANSFR	COL	COL	TOT COST	COST TO	LOAD	USED	BTU/DD/	AUXILIARY	SOLAR MANUFACTURER	STR AUX
1	W PAS LIQUID	FLP	26	\$ 4000	\$ 1750	16	6	10.00	STATE INDUSTRIES		

MOD SEQ 2 HOUSING TYPE: MFM NUMBER DWELLING UNITS: 4 NUMBER SOLAR SYSTEMS: 4
CONSTRN TYPE: NEW NUMBER BUILDINGS: 1 COND AREA/SYSTEM(S): SQ FT

DESIGNATORS: 2

SYSTEM:	TRANSFR	COL	COL	TOT COST	COST TO	LOAD	USED	BTU/DD/	AUXILIARY	SOLAR MANUFACTURER	STR AUX
1	W PAS LIQUID	FLP	38	\$ 4000	\$ 1750	16	8	8.00	HELIO THERM INC		

MOD SEQ 3 HOUSING TYPE: MFM NUMBER DWELLING UNITS: 4 NUMBER SOLAR SYSTEMS: 4
CONSTRN TYPE: NEW NUMBER BUILDINGS: 1 COND AREA/SYSTEM(S): SQ FT

DESIGNATORS: 3

SYSTEM:	TRANSFR	COL	COL	TOT COST	COST TO	LOAD	USED	BTU/DD/	AUXILIARY	SOLAR MANUFACTURER	STR AUX
1	W PAS LIQUID	FLP	36	\$ 4000	\$ 1750	16	8	8.00	SOLAR ENERGY PROD		

GRANT/ ID NUM	APPLCT NUMBER	CYC	BUILDER/APPLICANT AND ADDRESS	ORGANIZATION	CONTACT PERSON	BUILDER/APPLICANT CONTACT PERSON	ORGANIZATION	ORGN TYPE	TOT COST OF SOLAR	APPL REQUEST	GRANT AWARD
H2475	0082	1	NEWARK HOUSING AUTHORITY 57 SUSSEX AVE NEWARK NJ 07103 TEL: 201 622-1030		MELVIN GLICKMAN TEL: 201 622-1030 EXT:			LHA	\$ 30182	\$ 30182	\$ 30182

TYPE OF FINANCING: HUD PUBLIC HOUSING

UNITS AND COST ANALYSIS FOR ALL GRANTS

SG-C2

CYCLES 1,2,3,4,4A,5 AND P1

	** OWELLING UNITS **		***** COST TO GOVT *****		** AVERAGE UNIT COST **		SOLAR		NO OF BLDGs		
	NEW	RETRO	TOTAL	RETRO	TOTAL	NEW	RETRO	SYSTS			
SINGLE FAMILY DETACHED											
HOT WATER ONLY	30	49	79	52072	77154	129226	1736	1575	1636	78	81
HOT WATER &/OR HEATING	467	19	486	3992097	188839	4180936	8548	9539	8603	560	485
HEATING & COOLING	166	11	177	1211711	23000	1234711	7299	2091	6976	177	177
HEATING, COOLING & HOTWATER	37	1	38	383957	2000	385957	10377	2000	10157	58	38
ALL UNITS TOTAL	700	80	780	5639837	290993	5930830	8057	3637	7604	873	781
SINGLE FAMILY ATTACHED											
HOT WATER ONLY	38	46	84	59143	57249	116392	1556	1245	1386	51	22
HOT WATER &/OR HEATING	283	33	316	1891451	194067	2085518	6884	5881	6600	304	141
HEATING & COOLING	6	4	10	46000	8000	54000	7667	2000	5400	10	7
HEATING, COOLING & HOTWATER	60	1	61	99996	11700	111696	1667	11700	1831	61	21
ALL UNITS TOTAL	387	84	471	2096590	271016	2367606	5418	3226	5027	426	191
GARDEN APARTMENTS											
HOT WATER ONLY	188	533	721	250199	449997	700196	1331	844	971	43	51
HOT WATER &/OR HEATING	333	251	584	1257148	893302	2150450	3775	3559	3682	91	75
HEATING & COOLING	0	0	0	0	0	0	0	0	0	0	0
HEATING, COOLING & HOTWATER	0	92	92	313500	313500	313500	0	3408	3408	2	2
ALL UNITS TOTAL	521	876	1397	1507347	1656799	3164146	2893	1891	2265	136	128
MULTI-FAMILY MID RISE											
HOT WATER ONLY	498	1762	2260	447338	1521504	1968842	898	864	871	44	37
HOT WATER &/OR HEATING	406	492	898	788321	797359	1585680	1942	1621	1766	27	17
HEATING & COOLING	0	29	29	0	105000	105000	0	3621	3621	2	2
HEATING, COOLING & HOTWATER	0	28	28	0	60000	60000	0	2143	2143	4	2
ALL UNITS TOTAL	904	2311	3215	1235659	2483863	3719522	1367	1075	1157	77	58
MULTI-FAMILY HI RISE											
HOT WATER ONLY	694	2418	3112	345479	1563372	1908851	498	647	613	15	15
HOT WATER &/OR HEATING	0	317	317	0	209159	209159	0	660	660	1	1
HEATING & COOLING	0	0	0	0	0	0	0	0	0	0	0
HEATING, COOLING & HOTWATER	0	0	0	0	0	0	0	0	0	0	0
ALL UNITS TOTAL	694	2735	3429	345479	1772531	2118010	498	648	618	16	16
OTHER											
	0	1328	1328	0	1054307	1054307	0	794	794	8	11
ALL UNITS											
HOT WATER ONLY	1448	4808	6256	1154231	3669276	4823507	797	763	771	231	206
HOT WATER &/OR HEATING	1489	1112	2601	7929017	2282726	10211743	5325	2053	3926	983	719
HEATING & COOLING	172	44	216	1257711	136000	1393711	7312	3091	6452	189	186
HEATING, COOLING & HOTWATER	97	122	219	483953	387200	871153	4989	3174	3978	125	63
ALL UNITS GRAND TOTAL	3206	7414	10620	10824912	7529509	18354421	3376	1016	1728	1536	1185

NUMBER OF ACTIVE SYSTEMS 1036
NUMBER OF PASSIVE SYSTEMS 500

*CANCELLED AND DELETED GRANTS ARE NOT INCLUDED IN TOTALS.

SUMMARY OF SOLAR GRANTS. SORTED ON GRANT NUMBER																			CYCLES 1,2,3,4,4A,5 AND P1				PAGE NO.		
																							SG-C3		
B1 JUL 22 PRINTED																									
B1 JUL 20 LOADED																									
DSG/BLD	B	GRANTEE NAME	PROJECT	CITY & STATE	HSG	CNS	DWL	SOL	NBR	SYS	A	CLTR	DSGR	COST	BLDR	COST	SOLAR	SG-C3							
GRANT ID	D				TYP	TYP	CNT	CNT	SYS	BLD	TYP	P	SOFT	TO GOVT	TO GOVT	TO GOVT	FRAC(%)	MFGR							
H2423	B	INNOVATIVE BUILDING SYSTEMS	HAMBURG	NY	SFD NEW	1	1	1	1	1	H	W	A	700	15000	(	64.8	PPGI							
H2424	B	ARMSTRONG DEVELOPMENT CORP	CLAREMONT	CA	SFO NEW	3	3	3	3	3	H	W	A		(	29680	SCOA								
H2425	B	CITY OF ST PETERSBURG	ST PETERSBURG	FL	GAL RET	4	4	4	4	4	1	W	A	212	53078	(	70.6	GULF							
H2426	B	PERL-MACK ENTERPRISES CO	AURORA	CO	SFO NEW	1	1	1	1	1	H	W	A	432	(	8000	LENX								
H2427	B	SPECTRUM DEVELOPMENT CORP	MOODY	AL	SFD NEW	1	1	1	1	1	H	W	A	195	39000	(	40.9	SRON							
H2428	B	CAMBRIDGE DEVELOPMENT GROUP INC	COLUMBIA	SC	SFA NEW	4	2	2	2	2	H	W	A	1120	9732	(	52.6	SITE							
H2429	B	FRIEDMAN ROSEN & ZIEN	SUMMIT	WI	SFO NEW	1	1	1	1	1	H	W	A	576	9732	(	57.3	ZIEN							
H2430	B	LAMAR SAVINGS ASSN	AUSTIN	TX	SFD NEW	1	1	1	1	1	H	W	A	144	(	29581	NORT								
H2431	B	BROWN CUSTOM BUILDERS	DALLAS	TX	SFD NEW	1	1	1	1	1	H	W	A	401	37600	(	56.4	MIRO							
H2432	B	BLDG INDUSTRY ASSN OF CEN OHIO	DUBLIN	OH	SFD NEW	1	1	1	1	1	H	W	A	538	(	48.2	MIRO								
H2433	B	WAYNE NICHOLS COMMUNICO	SANTA FE	NM	SFO NEW	1	1	1	1	1	H	P	A	1166	(	19100	SRON								
H2434	B	THE YEONAS COMPANY	VIENNA	VA	SFD NEW	1	1	1	1	1	W	A	A	38	1875	(	74.0	SITE							
H2435	B	SELF HELP ENTERPRISES	SELMA	CA	SFD NEW	3	3	3	3	3	H	P	A	63	12210	(	50.0	SUNS							
H2436	B	DREXEL UNIVERSITY	PHILADELPHIA	PA	CAL RET	5	1	1	1	1	W	A	A	270	6780	(	54.5	SWOR							
H2437	B	WILLIAM F ETTLICH	SHINGLE SPRINGS	CA	SFO NEW	1	1	1	1	1	H	W	A		(	94.3	SKYT								
H2438	B	RUST CONSTRUCTION CO	ALEXANDRIA	VA	SFD NEW	1	1	1	1	1	H	W	A	222	(	80.7	PPGI								
H2439	B	WINFORD LINDSAY	DACULA	GA	SFD NEW	1	1	1	1	1	H	W	A	6400	(	4000	TOMS								
H2440	B	ECO-ERA INC	FORT COLLINS	CO	SFD NEW	1	1	1	1	1	H	W	A	390	6000	(	79.2	REVE							
H2441	B	TERRACOR UTAH	STANSBURY PARK	UT	SFD NEW	1	1	1	1	1	H	A	A	585	15600	(	72.8	SRON							
H2442	B	LEISURE TECH OF CALIFORNIA INC	CAMARILLO	CA	SFA NEW	2	2	2	2	2	W	A	A	72	4400	(	62.2	SRON							
H2443	B	KORMAN CORP	BLACKWOOD	NJ	SFO NEW	1	1	1	1	1	W	A	A	72	80.0	(	80.0	RAPP							
H2444	B	CITY OF SANTA CLARA	SANTA CLARA	CA	SFD NEW	1	1	1	1	1	H	W	A	614	31186	(	80.0	RAPP							
H2445	B	CITY OF PUEBLO	PUEBLO	CO	SFD RET	5	1	1	1	1	H	W	A	216	80.0	(	74.4	GENE							
H2446	B	HOOKER BARNES	ATLANTA	GA	SFD NEW	1	1	1	1	1	H	W	A	166	31186	(	74.4	GENE							
H2447	B	GORDON DEERING	LUBBOCK	TX	SFD NEW	1	1	1	1	1	H	W	A	465	40000	(	57.7	GENE							
H2448	B	SOLAR STRUCTURES INC	LAGRANGEVILLE	NY	SFD NEW	1	1	1	1	1	H	W	A	312	40000	(	57.7	GENE							
H2449	B	CITY OF COLORADO SPRINGS	COLORADO SPRINGS	CO	SFA RET	12	1	1	1	1	H	W	A	1200	40000	(	57.5	SKIN							
H2450	B	HELIO THERMICS INC	GREENVILLE	SC	SFD NEW	1	1	1	1	1	H	W	A	216	40000	(	58.8	SKIN							
H2451	B	UNIVERSITY OF PENNSYLVANIA	PHILADELPHIA	PA	SFA RET	1	1	1	1	1	H	W	A	192	40000	(	74.0	SKIN							
H2452	B	JESPA ENTERPRISES	OLD BRIDGE	NJ	SFD NEW	1	1	1	1	1	H	W	A	216	40000	(	74.0	SKIN							
H2453	B	CLASSIC DEVELOPMENT CORP	BREA	CA	SFD NEW	1	1	1	1	1	W	A	A	62	58.8	(	58.8	SKIN							
H2454	B	LONG ISLAND SAVINGS BANK	MT SINAI	NY	SFD NEW	1	1	1	1	1	H	W	A	166	16000	(	27.8	RAPP							
H2455	B	STONEBRAKER INVESTMENTS	BOULDER	CO	GAL NEW	8	1	1	1	1	H	W	A	804	2280	(	68.3	REVE							
H2456	B	UNITED DEVELOPMENT CO	VERNON HILLS	IL	SFA NEW	1	1	1	1	1	H	W	A	288	9000	(	71.2	SRON							
H2457	B	BABCOCK COMPANY	MIAMI	FL	SFA NEW	1	1	1	1	1	H	W	A	256	15000	(	67.4	REVE							
H2458	B	CHURCH COMMUNITY CORPORATION	MIAMI	FL	SFA NEW	1	1	1	1	1	H	W	A	21	69729	(	75.1	SRIS							
H2459	B	COLBURN DEVELOPMENT CORP	NEWPORT	RI	SFD NEW	1	1	1	1	1	W	A	A	21	3000	(	76.0	HLIO							
H2460	B	MARVIN H ANDERSON	STOW	MA	SFD NEW	1	1	1	1	1	H	W	A	450	12980	(	39.8	PPIE							
H2461	B	KELLEY FISCHER CO	BLOOMINGTON	MO	SFD NEW	1	1	1	1	1	H	W	A	378	10800	(	58.2	SWOR							
H2462	B	UNIVERSITY OF WISCONSIN	ST LOUIS	WI	SFD NEW	1	1	1	1	1	W	A	A	62	7000	(	63.3	SWOR							
			MILWAUKEE	WI	SFD RET	1	1	1	1	1	W	A	A		(	7000	RAPP								
											H	W	A	(	10000	GRUM									
											H	W	A	(	22450	KTAC									
											H	W	A	804	40000	41.9	OWEN								
											H	W	A	288	40000	41.9	OWEN								
											H	W	A	256		39.8	OWEN								
											H	W	A	256		39.7	OWEN								
											H	W	A	268		50.0	CPTL								
											H	W	A	21	1830	50.0	CPTL								
											H	W	A	450	5000	55.7	SITE								
											H	W	A	(	17062	SRON									
											H	W	A	646	16250	58.8	LENX								
											H	W	A	378	(	16250	LENX								
											H	W	A	(	17000	REVE									
											H	W	A	(	13800	SRON									
											H	W	A	507		56.8	SRON								

81 JUL 22 PRINTED		SUMMARY OF SOLAR GRANTS, SORTED ON GRANT NUMBER										CYCLES 1.2.3.4.A.5 AND P1										PAGE NO.
81 JUL 20 LOADED		WITH AUXILIARY FUEL TYPE AND STORAGE MEDIUM										SG-C3F										
DSG/BLD	GRANTEE NAME	PROJECT	CITY & STATE	HSG CYS	DWL	SOL	NBR	SYS	A	CLTR	DSGR	COST	BLDR	COST	AUX	STO	SOL	FUL	MED	MFGR		
GRANT ID	D			TP	TP	CNT	BLO	TP	P	SOFT	TO	GOVT	TO	GOVT								
H2423	B INNOVATIVE BUILDING SYSTEMS	HAMBURG	NY	SFD	NEW	1	1	1	H	W	A	700			15000	EE	LQ	PPG1				
H2424	B ARMSTRONG DEVELOPMENT CORP	CLAREMONT	CA	SFO	NEW	3	3	3	H	W	A			(29680)	E	O	SCCA					
H2425	B CITY OF ST PETERSBURG	ST PETERSBURG	FL	GAL	RET	4	4	1	W	A	A	212			9428	E	LQ	GULF				
H2426	B PERL-MACK ENTERPRISES CO	AURORA	CO	SFD	NEW	1	1	1	H	W	A	432			53078	E	LQ	LENX				
H2427	B SPECTRUM DEVELOPMENT CORP	MOODY	AL	SFD	NEW	1	1	1	H	W	A	195			(8000)	E	O	SRON				
H2428	B CAMBRIDGE DEVELOPMENT GROUP INC	COLUMBIA	SC	SFA	NEW	4	2	2	H	W	A	1120			39000	E	LQ	SITC				
H2429	B FRIEDMAN ROSEN & ZIEN	SUMMIT	WI	SFD	NEW	1	1	1	H	A	A	576			9732	E	ST	ZIEN				
H2430	B LAMAR SAVINGS ASSN	AUSTIN	TX	SFD	NEW	1	1	1	H	W	A	144			(29581)	E	O	NORT				
H2431	B W BROWN CUSTOM BUILDERS	DALLAS	TX	SFD	NEW	1	1	1	H	W	A	161			37600	G	E	LQ	MIRO			
H2432	B BLDG INDUSTRY ASSN OF CEN OHIO	DUBLIN	OH	SFD	NEW	1	1	1	H	W	A	538			(19100)	E	G	LQ	MIRO			
H2433	B WAYNE NICHOLS COMMUNICO	SANTA FE	NM	SFD	NEW	1	1	1	H	P	A	409			7958	E	O	SITE				
H2434	B THE YEONAS COMPANY	VIENNA	VA	SFO	NEW	1	1	1	W	A	A	38				E	LQ	SUNS				
H2435	B SELF HELP ENTERPRISES	SELMA	CA	SFO	NEW	3	3	3	H	C	P	63			1875	E	LQ	SWOR				
H2436	B DREXEL UNIVERSITY	PHILADELPHIA	PA	GAL	RET	5	1	1	W	A	A	270			12210	EEE	LQ	SKYT				
H2437	B WILLIAM F ETTLICH	SHINGLE SPRINGS	CA	SFD	NEW	1	1	1	H	W	A			(4000)	E	O	TOMS					
H2438	B RUST CONSTRUCTION CO	ALEXANDRIA	VA	SFO	NEW	1	1	1	H	W	A			(6000)	E	O	SOCA					
H2439	B WINFORD LINDSAY	DACULA	GA	SFO	NEW	1	1	1	H	W	A	222			6400			LQ	REVE			
H2440	B ECO-ERA INC	FORT COLLINS	CO	SFD	NEW	1	1	1	H	W	A	390			6000	G	ST	SRON				
H2441	B TERRACOR UTAH	STANSBURY PARK	UT	SFD	NEW	1	1	1	H	A	A	585			15600	E	ST	SRON				
H2442	B LEISURE TECH OF CALIFORNIA INC	CAMARILLO	CA	SFA	NEW	2	2	1	W	A	A	72			4400	E	G	LQ	RAYP			
H2443	B KORMAN CORP	BLACKWOOD	NJ	SFD	NEW	1	1	1	H	W	A	614			31186	E	E	LQ	GENE			
H2444	B CITY OF SANTA CLARA	SANTA CLARA	CA	SFD	NEW	1	1	1	H	W	A	614			40000	E	E	LQ	GENE			
H2445	B CITY OF PUEBLO	PUEBLO	CO	SFD	RET	5	1	5	W	A	A	166			16000	G	X	LQ	SKIN			
H2446	B HOOKER BARNES	ATLANTA	GA	SFD	NEW	1	1	1	H	W	A	485			2280	G	X	LQ	REVE			
H2447	B GORDON DEERING	LUBBOCK	TX	SFD	NEW	1	1	1	H	W	A	312			9000	G	X	ST	SRON			
H2448	B SOLAR STRUCTURES INC	LAGRANGEVILLE	NY	SFD	NEW	1	1	1	H	W	A	1200			15000	E	E	LQ	REVE			
H2449	B CITY OF COLORADO SPRINGS	COLORADO SPRINGS	CO	SFA	RET	12	1	2	H	W	A	1152			69729	G	G	LQ	SRIS			
H2450	B HELIO THERMICS INC	GREENVILLE	SC	SFD	NEW	1	1	1	H	W	A	351			3000	G	G	ST	HLIO			
H2451	B UNIVERSITY OF PENNSYLVANIA	PHILADELPHIA	PA	SFA	RET	1	1	1	H	W	A	583			12980	G	X	LQ	PPIE			
H2452	B JESPA ENTERPRISES	OLD BRIDGE	NJ	SFO	NEW	1	1	1	H	A	A	62			10800	O	ST	SWOR				
H2453	B CLASSIC DEVELOPMENT CORP	BREA	CA	SFD	NEW	1	1	1	H	W	A			(7000)	E	O	RAYP					
H2454	B LONG ISLAND SAVINGS BANK	MT SINAI	NY	SFD	NEW	1	1	1	H	W	A			(10000)	E	O	GRUM					
H2455	B STONEBRAKER INVESTMENTS	BOULDER	CO	GAL	NEW	8	1	1	H	W	A	864			22450	E	LQ	KTAC				
H2456	B UNITED DEVELOPMENT CO	VERNON HILLS	IL	SFA	NEW	1	1	1	H	W	A	208			40000	EE	LQ	OWEN				
				SFA	NEW	1	1	1	H	W	A	256			EE	LQ	OWEN					
				SFA	NEW	1	1	1	H	W	A	208			EE	LQ	OWEN					
H2457	B BABCOCK COMPANY	MIAMI	FL	SFD	NEW	1	1	1	H	W	A	21			1830	E	LQ	CPTL				
H2458	B CHURCH COMMUNITY CORPORATION	MIAMI	FL	SFA	NEW	1	1	1	W	A	A	21				E	LQ	CPTL				
H2459	B COLBURN DEVELOPMENT CORP	NEWPORT	RI	SFD	NEW	1	1	1	H	W	A	450			5000	O	X	ST	SITE			
H2460	B MARVIN H ANDERSON CONSTRUCTN CO	STOW	MA	SFO	NEW	1	1	1	H	W	A	646			(17062)	E	O	SRON				
H2461	B KELLEY FISCHER CO	BLOOMINGTON	MN	SFO	NEW	1	1	1	H	W	A	378			16250	G	G	LQ	LENX			
H2462	B UNIVERSITY OF WISCONSIN	ST LOUIS	MO	SFD	RET	1	1	1	H	W	A			(17000)	E	O	REVE					
		MILWAUKEE	WI	SFD	RET	1	1	1	H	W	A	507			13800	G	X	ST	SRON			

81 JUL 22 PRINTED	SUMMARY OF SOLAR GRANTS	CYCLES 1,2,3,4,4A,5 AND P1	PAGE NO. 4
81 JUL 20 LOADED	SORTED DN MANUFACTURER, WITH COST PER MBTU		SG-C48C
DSG/BLD	PROJECT	SOL NBR SYS A CLTR	SOLAR
GRANT ID	CITY & STATE	SYS BLD TYP P SFT	MANUFACTURER
H8813	D CENTER FOR HOUSING PARTNERSHIP	NY MFM RET 98 1 1 W A 1134	118 DAYSTAR
H8813	8 CENTER FOR HOUSING PARTNERSHIP		
H8843	D EAGLENEST HILL CORP	NJ SFD NEW 0* 1 O*HCW A 21D	* DAYSTAR
H8843	8 EAGLENEST HILL CORP		
H8853	D DON WHITNER BUILDERS & DEVELOPER	DH SFD NEW 0* 1 O* W A	* DAYSTAR
H8853	8 DON WHITNER BUILDERS & DEVELOPER		
	TOTALS FOR MFR	2383* 38* 39* 47573*	\$147*
H8331	8 HOBMAR HOMES	MN SFD NEW 1 1 1 H W A 542	161 ENERGY ALTERNATIVE
	TOTALS FOR MFR	1 1* 1*	542 \$161
H8919	D LARRY D RATLIFF CONSTRUCTION	ID SFD NEW 0* 1 O* W A 58	21 ENERGY TRANSFER SY
H8919	8 LARRY D RATLIFF CONSTRUCTION		
	TOTALS FOR MFR	0 1* 0*	58 \$21
H8016	8 SUNDMAN REALTY CO	MA SFD NEW 1 1 1 H W A 351	308 FERN ENGINEERING C
	TOTALS FOR MFR	1 1* 1*	351 \$308
H2705	8 FLETCHER MYERS INC	NH SFD NEW 1 1 1 H W A 840	94 FLETCHER MYERS
	TOTALS FOR MFR	1 1* 1*	840 \$94
H2600	D MISSION VIEJO CD	CA SFD NEW 0 2 1 W A	* FRED RICE PRDD
H2600	8 MISSION VIEJO CD		
	TOTALS FOR MFR	0 2* 1*	0* \$0*
H8201	8 FRONTIER DEVELOPMENT CO	NV SFD NEW 5 5 5 H W A 2625 (	125) FRONTIER DEVELOPME
	TOTALS FOR MFR	0* 0* 0*	D* \$0
H2443	8 KORMAN CORP	PA SFD NEW 1 1 1 H W A 614	269 GENERAL ELECTRIC
	TOTALS FOR MFR	1 1 1 H W A 614	347 GENERAL ELECTRIC
H2596	D DAVIDSON-PHILLIPS INC	DH SFD NEW 2 2 2 HCW A 1280	355 GENERAL ELECTRIC
H2596	8 DAVIDSON-PHILLIPS INC		
H2727	8 TOWN COUNCIL, CITY OF GRETN	FL SFD NEW 16 16 H W A 2784	368 GENERAL ELECTRIC
H2757	8 CITY OF FLINT/DEPT OF COMM DEV	MI SFA NEW 6 1 1 HCW A 1079 (	64) GENERAL ELECTRIC
	TOTALS FOR MFR	20* 20* 20*	5292* \$332
H8338	8 ROY D MOON	TX SFD NEW 1 1 1 H W A 282	277 GENERAL ENERGY DEV
H8395	8 LOYOLA UNIVERSITY	LA DTH RET 225 1 1 W A 5076	246 GENERAL ENERGY DEV
H8428	8 LAMPLIGHTER CONSTRUCTION CO	ID SFD NEW 1 1 1 H W A 341	204 GENERAL ENERGY DEV
	TOTALS FOR MFR	227 3* 3*	5699 \$245
H8190	8 IPK CORPORATION	UT SFD NEW 3 3 3 H A 540	244 GRIEP HEATING
	TOTALS FOR MFR	3 3* 3*	540 \$244

SORTED ON MANUFACTURER, WITH COST TO GOVT													SG-C4CG	
DSG/BLD GRANT ID	B GRANTEE NAME	PROJECT CITY & STATE	HSG CNS TYP	CNS TYP	DWL CNT	SOL SYS	NBR BLO	SYS TYP	A P	CLTR SOFT	COST TO GOVT	SOLAR MANUFACTURER		
H2730	B CONTEMPORARY HOMES INC	COHUTTA	GA SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2731	B LAMAR WILBANKS	COMMERCE	GA SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2733	B OWEN AND PARKS INC	DALTON	GA SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2736	B WILBURN BROWN	ROSSVILLE	GA SFD NEW	2	2	2	2	W	A	96	(2800)	JACKSON		
H2738	B THOMSON AND ASSOC	ASHEVILLE	NC SFD NEW	1	1	1	1	W	A	48	(4200)	JACKSON		
H2739	B FRANK ROBUCK JR INC	ASHEVILLE	NC SFD NEW	2	2	2	2	W	A	96	(4200)	JACKSON		
H2743	B GLS CONSTRUCTION CO	RALEIGH	NC SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2746	B MILES AND TEAL BLDGS	WINSTON-SALEM	NC SFD NEW	5	5	5	5	W	A	245	(7000)	JACKSON		
H2748	B RALSTON HOMES INC	COWARD	SC SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2749	B LYNN REDMON	HIXSON	TN SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2750	B RICHARD RAMSDEN	KNOXVILLE	TN SFD NEW	2	2	2	2	W	A	96	(2800)	JACKSON		
H2751	B R H SINCLAIR CONST CO INC	KNOXVILLE	TN SFD NEW	1	1	1	1	W	A	48	(1400)	JACKSON		
H2752	B D K DOSSETT	KNOXVILLE	TN SFD RET	1	1	1	1	W	A	48	(1400)	JACKSON		
H2753	B ARCHITECTURAL DEVELOPERS CORP	KNOXVILLE	TN SFD NEW	5	5	5	5	W	A	240	(7000)	JACKSON		
TOTALS FOR MFR													485* \$7000*	
H8102	B WALNUT RIDGE INC	WASHINGTON	PA SFO NEW	1	1	1	1	H	W	A	502	10850 KALWALL		
TOTALS FOR MFR													502 \$10850	
H2455	B STONEBRAKER INVESTMENTS	BOULDER	CO GAL NEW	B	1	1	1	H	W	A	864	22450 KTA CORP		
H2712	B D.W.S. HOLDINGS INC.	NEW YORK	NY GAL NEW	1	1	1	1	H	W	A	254	(39180) KTA CORP		
			GAL NEW	1	1	1	1	H	W	A	254	KTA CORP		
			GAL NEW	1	1	1	1	H	W	A	254	KTA CORP		
			GAL NEW	1	1	1	1	H	W	A	254	KTA CORP		
			GAL NEW	1	1	1	1	H	W	A	254	KTA CORP		
H2781	B NAUMANN, ROBERT C	BOULDER	CO SFA RET	2	1	1	1	H	W	A	104	5000 KTA CORP		
H8057	B POMONA HEIGHTS INC	SPRING VALLEY	NY SFD NEW	1	1	1	1	H	W	A	832	12000 KTA CORP		
H8061	B DAMASCUS LANO CORPORATION	WASHINGTON	DC SFD NEW	1	1	1	1	H	W	A	315	11700 KTA CORP		
H8181	B DOUGLAS E MYERS	BOULDER	CO SFD NEW	1	1	1	1	H	W	A	424	9250 KTA CORP		
H8384	B GREENBELT HOMES INC	GREENBELT	MD SFA RET	20	1	4	4	W	A	696	20000 KTA CORP			
TOTALS FOR MFR													3235* \$80400*	
H2426	B PERL-MACK ENTERPRISES CO	DENVER	CO SFD NEW	1	1	1	1	H	W	A	432	53078 LENNOX-HONEYWELL		
H2460	B MARVIN H ANDERSON CONSTRUCTN CO	BLOOMINGTON	MN SFD NEW	1	1	1	1	H	W	A	378	16250 LENNOX-HONEYWELL		
H2463	B SAN ANTONIO RANCH LTD	SAN ANTONIO	TX SFD NEW	1	1	1	1	HCW	A	752	75000 LENNOX-HONEYWELL			
			SFD NEW	1	1	1	1	HCW	A	752	LENNOX-HONEYWELL			
H2602	O MISSION VIEJO CO	AURORA	CO SFD NEW	1	1	1	1	H	W	A	233	50107 LENNOX-HONEYWELL		
H2602	B MISSION VIEJO CO		SFD NEW	1	1	1	1	H	W	A	233	45057 LENNOX-HONEYWELL		
			SFO NEW	1	1	1	1	H	W	A	269	LENNOX-HONEYWELL		
			SFO NEW	1	1	1	1	H	W	A	214	LENNOX-HONEYWELL		
H2716	B STEWART-TEELE-MITCHELL CONST	ELNORA	NY SFD NEW	1	1	1	1	H	W	A	432	12995 LENNOX-HONEYWELL		
H2717	B FOREST CITY DILLON INC	CLEVELAND	OH MFM NEW	188	1	1	1	W	A	2592	129000 LENNOX-HONEYWELL			
H2761	B CREEK ASSOCIATES	MINNEAPOLIS	MN MFM NEW	77	1	1	1	H	W	A	6048	225000 LENNOX-HONEYWELL		
H2778	B COLORADO UNIV OF	BOULDER	CO MFM RET	95	1	1	1	H	W	A	3402	245025 LENNOX-HONEYWELL		
H8096	B MIDDLE CREEK INVESTMENT CORP	INWOOD	WV SFO NEW	6	6	6	6	H	W	A	858	30000 LENNOX-HONEYWELL		
H8100	B UNITED METHODIST HOMES FOR AGING	MECHANICSBURG	PA MFM NEW	150	1	1	1	W	A	1790	97237 LENNOX-HONEYWELL			
H8123	B WILLOW CREEK II LTD PARTNERSHIP	E LANSING	MI GAL NEW	23	1	1	1	W	A	1145	71000 LENNOX-HONEYWELL			

81 JUL 22 PRINTED		SUMMARY OF SOLAR GRANTS										CYCLES 1.2.3.4.4A.5 AND P1										PAGE NO. 1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
B1 JUL 20 LOADED		SORTED ON GRANTEE CITY AND STATE																				SG-CSAS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
DSG/BLD	B GRANTEE NAME	GRANTEE CITY & STATE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCHORAGE	ANCH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SUMMARY OF SOLAR GRANTS SORTED ON PROJECT CITY AND STATE										CYCLES 1.2.3.4.4A.5 AND P1										PAGE NO. 1	
PROJECT CITY & STATE										HSG CNS DWL SOL NBR SYS A CLTR DSGR COST BLDR COST TO GOVT SOLAR COST SOLAR FRACTION MFGR											
PROJECT CITY & STATE										HSG CNS DWL SOL NBR SYS A CLTR DSGR COST BLDR COST TO GOVT SOLAR COST SOLAR FRACTION MFGR											
D SOLARCTIC CONSTRUCTION CO.										2000											
H8938	D	SOLARCTIC CONSTRUCTION CO.	MAT-SU							AK SFD NEW	1	1	1	H	P	565	DELTD	62.1	SITE		
D LAND TRUST DEV CON INT										2000											
H8939	D	LAND TRUST DEV CON INT	EAGLE RIVER							AK SFD NEW	1	1	1	H	P	313	10000	42.2	SITE		
TOTALS FOR STATE										\$4000 \$10000*											
MOBILE										320											
H8909D	B	EDSEL INC	MOBILE							AL SFD NEW	1	1	1	H	W	A	10000	95.7	REVE		
H2427	B	SPECTRUM DEVELOPMENT CORP	MOODY							AL SFD NEW	1	1	1	H	W	A	(8000)	40.9	SRON		
H2725	B	CHESTER WEST INC	HUNTSVILLE							AL SFD NEW	1	1	1	H	W	A	10000	63.2	DAYS		
H2726	B	HOUSING DEVELOPMENT CO	MADISON							AL SFA NEW	5			W	A	(7000)		JACK			
D THE SOUTHWEST COMPANIES										2000											
H8872	B	THE SOUTHWEST COMPANIES	HUNTSVILLE							AL SFD NEW	1	1	1	H	P	413	10000	23.2	SITE		
D SIMMONS BUILDERS										2000											
H8873	B	SIMMONS BUILDERS	PRATTVILLE							AL SFD NEW	1	1	1	HC	P	169	DELTD	36.8	SITE		
TOTALS FOR STATE										\$4000 \$30000*											
LITTLE ROCK										156											
H8443	B	PAULETTE & CO	LITTLE ROCK							AR SFD NEW	1	1	1	H	W	A	7000	47.1	SRON		
H8444	B	FAIRFIELD BAY INC	FAIRFIELD BAY							AR SFD NEW	1	1	1	H	W	A	(5250)	61.8	SRON		
D WINROCK HOMES, INC										2000											
H8897	D	WINROCK HOMES, INC	LITTLE ROCK							AR SFD NEW	1	1	1	H	P	372	10000	58.3	SITE		
D EDMISTON PREWITT BUILDERS										2000											
H8898	B	EDMISTON PREWITT BUILDERS	SPRINGDALE							AR SFD NEW	1	1	1	H	W	P	758	54.2	SITE		
D VILLAGE HOMES INC										2000											
H8899	B	VILLAGE HOMES INC	HOT SPRINGS VIL.							AR SFD NEW	1	1	1	H	P	578	10000	70.0	SITE		
TOTALS FOR STATE										\$6000 \$27000*											
YAVAPAI										1864*											
H8178	B	RAY L HASSE	YAVAPAI							AZ SFD NEW	1	1	1	H	W	A	5500	100.0	SITE		
D HULLCO CONSTRUCTION COMPANY										2000											
H8179	B	HULLCO CONSTRUCTION COMPANY	PRESCOTT							AZ SFD NEW	1	1	1	H	P	140	6125	96.1	SITE		
H8431	B	KIVEL MANOR WEST	PHOENIX							H AZ MFM RET	65			1	H	W	A	(105429)	70.8	SGEN	
H2471	B	DANIEL W BROCK	MESA							AZ SFD NEW	1	1	1	H	W	A	(6593)				
D BOBRICK CONSTRUCTION CO										1500											
H2604	B	BOBRICK CONSTRUCTION CO	TUCSON							AZ SFD NEW	1	1	1	HC	P	2708	DELTD	74.6	SKYT		
D BURNS/PETERS GROUP ARCH-PLANNERS										5000											
H8736	D	BURNS/PETERS GROUP ARCH-PLANNERS	TSAILE							AZ SFA NEW	24	24	6	HCW	P	4032	5000	67.5	SITE		
D GOLDBLATT COHEN & AROS										5000											
H8737	D	GOLDBLATT COHEN & AROS	TUCSON							AZ SFD NEW	1	1	1	HCW	P	168	9000	63.2	SITE		
D JAMES HOFFMAN DESIGN GROUP										5000											
H8738	B	JAMES HOFFMAN DESIGN GROUP	TEMPE							AZ SFD NEW	1	1	1	HC	P	245	7000	84.2	SITE		
D SUN SYSTEM ENGINEERING										5000											
H8739	D	SUN SYSTEM ENGINEERING	COTTONWOOD							AZ SFD NEW	1	1	1	HC	P	156	DELTD	89.5	SITE		
D ENVIRONMENTAL ARCHITECTURE										5000											
H8740	B	ENVIRONMENTAL ARCHITECTURE	FLAGSTAFF							AZ SFD NEW	1	1	1	HC	P	750	(13000)	62.8	SITE		
D HERBERT L KAUFFMAN										2000											
H2788	B	HERBERT L KAUFFMAN	MAYER							AZ GAL NEW	5			1	H	W	P		SITE		
D WILLIAM L PRITCHETT & SONS INC										2000											
H8916	B	WILLIAM L PRITCHETT & SONS INC	TUCSON							AZ SFD NEW	1	1	1	H	P	324	10000	70.4	SITE		
D GARY E WAGLEY GENERAL CONTRACTOR										2000											
H8917	D	GARY E WAGLEY GENERAL CONTRACTOR									1			W	A	26	73.3	ISLC			

SUMMARY OF SOLAR GRANTS SORTED AND TOTALED BY PROJECT HUD REGIONS										CYCLES 1,2,3,4,4A,5 AND P1										PAGE NO.	
81 JUL 22 PRINTED 81 JUL 20 LOADED										SG-C7										1	
DSC/BLD GRANT ID	8 GRANTEE NAME	PROJECT CITY & STATE	HUD HSG RGN TYP	CNS TYP	DWL CNT	SOL SYS	NBR BLD	SYS BLD	SOLAR FRAC(%)	CLTR P SQFT	DSGR TO GOVT	COST TO GOVT	BLDR TO GOVT	COST TO GOVT	SOLAR FRAC(%)	SOL MFRG					
H2469	8 CRANE BUILDERS	GRANBY	CT	01	SFD NEW	1	1	1	HCW	A	1242		(55000)		66.1	SWOR					
H2700	8 J. CAPONE CONSTRUCTION CO.	NEW HAVEN	CT	01	SFA NEW	10	1	1	H W	A	5134		50000		52.8	SWOR					
H8045	8 UTILITY ELECTRICAL CONTRACTOR	NEW HAVEN	CT	01	GAL RET	26	1	1	H W	A	5134		260000		50.0	SWOR					
H8046	8 FRANK CHAPMAN	NEW HAVEN	CT	01	GAL RET	26	1	1	H W	A	4471		18600		79.5	SEST					
H8047	8 WILLIAM FRANCINI	UNIONVILLE	CT	01	GAL NEW	5	1	1	H W	A	1155		12500		50.5	DAYS					
H8048	8 THE MADRID CORP	VERNON	CT	01	SFD NEW	1	1	1	H W	A	315		11000		50.5	DAYS					
H8310	8 JEAN CAYER INC	SHELTON	CT	01	SFD NEW	1	1	1	H W	A	331		25065		64.5	SWOR					
H8311	8 MARY ANN INC	CHESHIRE	CT	01	SFD NEW	1	1	1	H W	A	576		207633		76.3	SITE					
H8312	8 SUMMERWOOD ASSOCIATES	NORWALK	CT	01	MFM RET	54	1	1	H W	A	5341		42412		83.1	SWOR					
H8362	8 NEW MILFORD INTERFAITH HSG IN NEW MILFORD		CT	01	SFA NEW	2	2	2	H W	A	756		105345		70.5	SWOR					
H8363	8 ACTION FOR BRIDGEPORT COMM DE BRIDGEPORT		CT	01	SFA NEW	1	1	1	H W	A	448				79.3	REVE					
H8364	8 CHESHIRE HILLSIDE VILLAGE	NEW HAVEN	CT	01	GAL RET	18	1	1	H W	A	302				78.6	REVE					
H8365	8 VILLAGE ASSOCIATES	GLASTONBURY	CT	01	GAL RET	12	1	1	H W	A	226				83.1	REVE					
H8618	8 SUNBORNE DESIGNS	STAMFORD	CT	01	GAL RET	48	4	1	H W	A	812				80.2	REVE					
H8619	8 TEAMWORKS		CT	01	GAL RET	24	2	1	H W	A	542		13600		53.3	SURE					
H8620	8 CHAS MIGANI & SONS	ANSONIA	CT	01	SFD RET	1	1	1	H W	A	490		112277		47.5	SWOR					
H8621	8 ARMSER SCIENTIFIC CORP	SHELTON	CT	01	GAL NEW	50	1	5	H W	A	4037		(134232)		67.1	REVE					
H8621	8 STEPHAN LASAR ARCHITECT	WASHINGTON	CT	01	SFA NEW	3	3	1	H W	A	1011		5000		73.5	REVE					
H8621	8 DESIGN ASSOCIATES		CT	01	SFA NEW	7	7	1	H W	A	2359		5000		62.7	SITE					
H8606	8 BRIDGEPORT NEIGHBORHOOD HSG S	BRIDGEPORT	CT	01	SFD NEW	1	1	1	HC	P	465		5000		40.5	SITE					
H8606	8 BRIDGEPORT NEIGHBORHOOD HSG S	BRIDGEPORT	CT	01	SFA NEW	2	2	1	HC	P	800		5000		67.9	SITE					
H8607	8 NEIGHBORHOOD HOUSING INC	NEW HAVEN	CT	01	SFD NEW	1	1	1	HC	P	504		7000		49.1	SITE					
H8607	8 NEIGHBORHOOD HOUSING INC		CT	01	UNS UNS	6	1	1	HC	P	552		(5000)								
H8635	8 HARTFORD WEST INC	WEST SIMSBURY	CT	01	GAL RET	6	1	1	H	P	480		5000		30.1	SITE					
H8635	8 HARTFORD WEST INC		CT	01	GAL RET	7	1	1	H	P	1428		2000		41.8	SITE					
H8836	8 H AND H CUSTOM HOMES	NEW MILFORD	CT	01	SFD NEW	1	1	1	H W	P	396		2000		35.0	SITE					
H8836	8 H AND H CUSTOM HOMES		CT	01	SFD NEW	1	1	1	H W	P	74		2000		60.0	SWOR					
H8837	8 BUILDING CO-ORDINATORS INC	SHELTON	CT	01	SFD NEW	1	1	1	H W	P	503		2000		61.1	SITE					
H8837	8 BUILDING CO-ORDINATORS INC		CT	01	SFD NEW	1	1	1	H	P	225		2000		48.8	SITE					
H8838	8 SUNCATCHER CONSTRUCTION	SHELTON	CT	01	SFD NEW	1	1	1	H	P	160		2000		47.4	CTEM					
H8838	8 SUNCATCHER CONSTRUCTION		CT	01	SFD NEW	1	1	1	H	P	349		2000		58.5	SITE					
H2459	8 COLBURN DEVELOPMENT CORP	HUDSON	MA	01	SFD NEW	1	1	1	H W	A	646		DELTD		17062	SRON					
H2593	8 THE NYQUIST COMPANY	ACTON	MA	01	SFD NEW	2	2	2	W	A			DELTD		(1100)	SWOR					
H2593	8 THE NYQUIST COMPANY		MA	01	SFD NEW	1	1	1	W	A			3000			RAYP					
H2594	8 SADDLE HILL TRUST	NEEDHAM	MA	01	SFD NEW	1	1	1	W	A	45		21400		52.6	DAYS					
H2594	8 SADDLE HILL TRUST	NEEDHAM	MA	01	SFD NEW	1	1	1	H W	A	315				54.7	DAYS					
H2701	8 GREENFIELD HOUSING AUTHORITY	GREENFIELD	MA	01	SFD NEW	16	1	1	W	A	78		(12329)		40.0	SRON					
H2702	8 TOWN OF MARION	MARION	MA	01	GAL RET	16	1	2	W	A			(95000)		59.1	DAYS					
H2703	8 EXEC.OFFICE OF COMMUN & DEVEL BOSTON	BOSTON	MA	01	SFA NEW	12	6	3	H W	A	2160		(20000)		45.1	SRON					
H8015	8 FRIENDS' COMMUNITY DEVELOPMEN NORTH EASTON	NORTH EASTON	MA	01	SFA RET	7	7	6	H W	A	819		(112851)		60.0	SRON					

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**NUMBER 1 CARDS

PROJ ID	GRANT AWARD DATE	REPT 1 DATE	INST OR NOT (GRANT)	NEW OR RETRO
21501BA01	012376	040276	NO	RE
21502BA01	012376	020976	NO	NE
21503BA01	012376	020576	NO	NE
21504BA01	012376	030376	NO	NE
21507BA01	012376	020376	NO	NE
21509BA01	012376	022576	NO	NE
21510BA01	012376	030376	NO	NE
21511BA01	012376	020676	NO	NE
21512BA01	012376	031777	NO	NE
21513BA01	012376	112376	NO	NE
21513BA01	012376	031376	NO	NE
21519BA01	012376	020376	NO	NE
21521BA01	012376	032576	NO	NE
21522BA01	012376	060276	NO	NE
21523BA01	012376	060376	NO	NE
21527BA01	012376	031376	NO	NE
21534BA01	012376	030376	NO	NE
21534BA01	012376	032576	NO	NE
21533BA01	012376	022576	NO	NE
21533BA01	012376	022376	NO	NE
21534BA01	012376	020976	NO	NE
21535BA01	012376	042376	NO	NE
21536BA01	012376	030176	NO	NE
21537BA01	012376	022376	NO	NE
21538BA01	012376	072376	NO	NE
21539BA01	012376	021376	NO	NE
21540BA01	012376	021176	NO	NE
21541BA01	012376	031676	NO	NE
21543BA01	012376	022376	NO	NE
21544BA01	012376	012376	NO	NE
21543BA01	041376	012376	NO	NE
21546BA01	012376	021176	NO	NE
21547BA01	012376	012676	NO	NE
21548BA01	012376	021676	NO	NE
21549BA01	012676	032376	NO	NE
21550BA01	012376	022376	NO	NE
21551BA01	XX	031676	NO	XX
21552BA01	012376	031176	NO	NE
21553BA01	012376	022676	NO	NE
21553BA01	012376	021176	NO	NE
22001BA01	102376	112376	IN	NE

 * GRANTEE REPORT 1 DATA SUMMARY *

 PROJECT 10 = 230908010000
 GRANT AVARO DATE = 06/07/77 REPORT DATE = 06/08/77
 INSTRUMENTATION (GRANT) = NO CONSTRUCTION = NE
 ADDRESS = ALBUQUERQUE
 BERNALILLO
 NM 87122
 CONSTRUCTION FINANCIAL STATUS = YES
 CONSTRUCTION FINANCE PROBLEMS:
 - NO PROBLEM

 * GRANTEE REPORT 3 DATA SUMMARY *

 PROJECT 10 = 230908010000 REPORT 2 DATE = 09/07/77
 REPORT 3 DATE = 08/21/78 FINAL DESIGN COMPLETE DATE = 08/01/77
 CONSTRUCTION: BEGIN = 08/28/77 BEGIN SOLAR INSTAL = 10/25/77
 COMPLETE = 06/14/78 SOLAR TEST COMPLETE = 05/10/78
 BUILDING PERMIT DATA:
 APPROVING AUTHORITY = BERNALILLO COUNTY ZONING
 BUILDING PERMIT PROBLEMS: - NONE
 ADDRESS = 513 6TH N.W.
 ALBUQUERQUE NM 87102
 OCCUPANCY PERMIT DATA:
 APPROVING AUTHORITY = BERNALILLO COUNTY ZONING
 OCCUPANCY PERMIT PROBLEMS: - NO PROBLEM
 ADDRESS = 513 6TH N.W.
 ALBUQUERQUE NM 87102
 ZONING/LAND USE DATA:
 APPROVING AUTHORITY = BERNALILLO COUNTY ZONING
 ZONING/LAND USE PROBLEMS: - NO PROBLEM
 ADDRESS = 513 6TH N.W.
 ALBUQUERQUE NM 87102

 * GRANTEE REPORT 4 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 5 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 6 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 7 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 8 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 9 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 10 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 11 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

 * GRANTEE REPORT 12 DATA SUMMARY *

 PROJECT 10 = 230908010000
 INITIAL SALES PRICE = 0119000
 FINAL SALES PRICE = 0119000
 INITIAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 FINAL RENTAL RATES: 1 BR =
 2 BR =
 3 BR =
 MORTGAGE DATA: APPROVAL DATE = 06/20/78 TYPE = CONV
 AMOUNT = 008000 INT RATE = 9.78% PERIOD (MOS) = 360
 POINTS/FEE = MTG ARRANGED BY = PURCHASER
 MORTGAGOR = ALBUQUERQUE FEDERAL SAVINGS & LOAN
 ADDRESS = 6400 UPTOWN BLVD. N.E.
 ALBUQUERQUE NM 87110 PHONE: (505) 883-3100
 MORTGAGE PROBLEMS:
 - NONE
 - FAVORABLE, ENTHUSIASTIC
 MARKETING DATA: HOUSE 1ST OFFERED XB MKT PER 1WKS) XA
 SALES CONTRACT = 06/20/78 OCUP DATE = 07/15/78
 NO. OF VISITORS = XA NO. OF PURCHASERS = XA
 MARKETING PROBLEMS:
 MARKETING PUBLIC REACTION:

GRANTEE REPORTS SUMMARY

REPORT B-P4

BATCH NO.:	1-113	DATE SUBMITTED TO NBS:	OCT 1980
CONTENTS:	REPORT 1	REPORT 3	REPORT 4
			PAGE SEQ
21501UA980000	21501BBU10000	21501RC010000	1
21502HA980000	21502UJ980000	21502BC980000	2
	21504BU10000	21504UC010000	3
	21504HH020000	21504BC020000	4
	21504BU030000	21504DC030000	5
	21504BU040000	21504HC040000	6
	21504BU050000	21504BC050000	7
			8
			9
21504BA980000	21505J3980000	21505BC980000	10
21505BA980000	21507U3980000	21507UC980000	11
21507BA980000	21509BB010000	21509DC010000	12
			13
215093A980000	21510U3980000	21510BC980000	14
21510BA980000	21511BB980000	21511RC980000	15
21511BA980000	21512BB010000	21512BC010000	16
	21512U3020000	21512DC020000	17
	21512BB030000	21512BC030000	18
	21512BU040000	21512UC040000	19
	21512BU050000	21512BC050000	20
			21
21512UA980000	21514BB980000	21514BC980000	22
21514BA980000	21515BB980000	21515BC980000	23
21515BA980000	21519UB980000	21519RC980000	24
21521UA980000	21521BB980000	21521BC980000	25
	21522BB030000	21522UC030000	26
	21522BB050000	21522UC050000	27
	21522BB060000	21522RC060000	28
			29
21522BA980000	21523J3010000	21523DC010000	30
	21525BB020000	21525BC020000	31
			32
21525BA980000	21527BB980000	21527BC980000	33
21527BA980000		21530DC010000	34
		21530HC020000	35
		21530BC030000	36
			37
			38
			39
			40
			41
			42
			43
			44

25

* BUILDING AND SITE DESCRIPTION *

PROJECT LOCATION
CITY: MEDWAY
STATE: MA

ZIP: 02053
BUILDING DESIGNER
FIRM: DAYSTAR CORP

CONTACT: DOUG PECK LESS NELSON
ADDRESS: 90 LANBRIDGE ST.
CITY: BURLINGTON

STATE: MA
ZIP: 01603
PHONE: 617 2728460

SOLAR SYSTEM DESIGNER
FIRM: DAYSTAR CORP

CONTACT: DOUG PECK LESS NELSON
ADDRESS: 90 LANBRIDGE ST.
CITY: BURLINGTON

STATE: MA
ZIP: 01603
PHONE: 617 4353509

OTHER PARTICIPANT
FIRM: PATIEN'S PLUMBING AND HEATING

CONTACT: GORDON HENDERSON
ADDRESS: 2 WOOD ST.
CITY: WOKINGTON

STATE: MA
ZIP: 01740
PHONE: 617 4353509

DI MONITOR
FIRM: MASSDESIGN INC.

CONTACT: JOHN M HUCHANAN
ADDRESS: 18 BHATTLE ST.
CITY: CAMBRIDGE

STATE: MA
ZIP: 02138
PHONE: 617 4910961

TYPE OF SOLAR SYSTEM INTERACTION:
AFTER HRC DESIGN WAS FIXED
APPLICABLE REGULATORY CODES

NAME AND YEAR OF CODE/REGULATION
BUILDING: MASS. STATE BUILDING CODE 1975

MECHANICAL: MASS. STATE BUILDING CODE 1975

ELECTRICAL: MASS. STATE BUILDING CODE 1975

PLUMBING: MASS. STATE BUILDING CODE 1975

MODEL CODES: BASIS FOR REGS-NAME/IR

BUILDING: BOCA

MECHANICAL: BOCA

ELECTRICAL: BOCA

PLUMBING: BOCA

GENERAL CHARACTERISTICS

BUILDING TYPE

SINGLE FAMILY DETACHED

PLANNED TYPE OF OWNERSHIP

INDIVIDUAL OR FAMILY

PLANNED TYPE OF OCCUPANCY

OWNER

DEVELOPMENT TYPE

SUBDIVISION

SITE

LATITUDE (DEGREES) 42

LONGITUDE (DEGREES) 71

ALTITUDE (FEET) 200

BUILDING

FRONT OF BUILDING FACES

N

AVERAGE STORIES ABOVE GROUND 2.0

AVERAGE STORIES BELOW GROUND 1.0

TOTAL HGT ABOVE GROUND (FEET) 33

CONDITIONED FLOOR AREA (SQ FT) 1913

ROOF TYPE AT COLLECTOR LOCATION

SLOPED: PITCH ANGLE (DEG) 42

ATTIC:

VENTILATED

DESIGN SHADED GLASS AREAS

HEATING SEASON (SQ FT) 0

COOLING SEASON (SQ FT) 0

BUILDING VENTILATION RATES

HEATING SEASON-MECHANICAL (CHG PER HR) 0.0

HEATING SEASON-NATURAL (CHG PER HR) 1.3

INTERNAL HEAT GAIN ASSUMPTIONS:

METABOLIC LOAD (BTU PER OCCUPANT PER HR) 480

NUMBER OF OCCUPANTS 6

DOMESTIC HOT WATER DAILY DEMAND (GAL/DAY) 120

SITE

(1) (2)

MONTH HEATING

DEGREE

BTU/FT2

PER DAY

JAN 1088 553

FEB 972 797

MAR 046 1144

APR 513 1438

MAY 200 1776

JUN 36 1994

JUL 0 1801

AUG 9 1622

SEP 60 1314

OCT 316 941

NOV 603 592

DEC 983 402

HEATING DEGREE DAYS PER YEAR: 5634

FOOTNOTE (1) ASHRAE-SYSTEMS 1973

FOOTNOTE (2) NAT'L CLIMATIC CENTER

• TECHNICAL CONCERNS SUMMARY REPORT •

DATE : 08 JUL 81

PAGE : 1
REPORT : CB-D3

SORTING KEYS ARE : ID #, SYS #, DATE

[illegible][illegible]

2420	01	07/10/78	4	THIR COLL/LIQUID PIPE ASSEMBLY	REPLACE	STRUCTURAL FAILED TO OPERATE BURST	B \$	Q	N
		09/23/78	2	DURA COLL/HEADERS-CONNECTORS	REPAIR	LEAKAGE DAMAGED LEAKAGE OF SYSTEM FLUIDS BETWEEN COMPONENTS	1 \$	Q <td>N</td>	N

HUD SOLAR DEMONSTRATION RESIDENTIAL PROJECTS

* TECHNICAL CONCERNS SIMPLIFIED DUMP *

DATE: 06 JUL 81
PAGE: 1
REPORT: CB-D3A

SORTING KEYS ARE: ID #, SYS #

ID #	SYS #	# OF SYS	HARDWARE ELEMENT	ACTION	EVENT	CYCLE	# OF UNITS	NEW/RET	HSGTYPE	SYSYTYPE	SYSKIND	TRMED
2423	1	D1	TRANSPORT/OIST	REPLACE	FREEZE-UP	1	1	N	SFD	HW	A	L
			AUXILIARY	REPAIR	MECHANICAL							
			COLLECTOR	REPAIR	LEAKAGE							
			CONTROLS/SENSORS	REPLACE	ELECTRICAL							
			TRANSPORT/DIST	REPAIR	THERMAL							
			COLLECTOR	REPAIR	LEAKAGE							
% DF SYSTEMS IN GRANT WITH FAILURES: 100.00%												
2426	1	O1	COLLECTOR	REPLACE	STRUCTURAL	1	1	N	SFD	MCW	A	L
			COLLECTOR	REPAIR	LEAKAGE							
			COLLECTOR	REPLACE	DEGRADATION							
			COLLECTOR	PENDING	LEAKAGE							
			CONTROLS/SENSORS	PENDING	ELECTRICAL							
			ACTIVE SYSTEM	REMOVE	STRUCTURAL							
			TRANSPORT/DIST	REPLACE	FREEZE-UP							
			CONTROLS/SENSORS	REPLACE	MECHANICAL							
			TRANSPORT/DIST	REPLACE	MECHANICAL							
			AUXILIARY	REPAIR	MECHANICAL							
% OF SYSTEMS IN GRANT WITH FAILURES: 100.00%												
2429	2	D1	TRANSPORT/DIST	REPAIR	STRUCTURAL	1	4	N	SFA	HW	A	L
			COLLECTOR	REPAIR	LEAKAGE							
			COLLECTOR	REPAIR	STRUCTURAL							
			TRANSPORT/OIST	REPAIR	CORROSION							
			COLLECTOR	REPAIR	LEAKAGE							
	D2		TRANSPORT/DIST	REPAIR	STRUCTURAL	1	4	N	SFA	HW	A	L
			COLLECTOR	REPAIR	LEAKAGE							
			COLLECTOR	REPAIR	STRUCTURAL							
			TRANSPORT/DIST	REPAIR	CORROSION							
% OF SYSTEMS IN GRANT WITH FAILURES: 100.00%												
2429	2	D1	TRANSPORT/DIST	REPLACE	FREEZE-UP	1	1	N	SFD	H	A	A
			COLLECTOR	REPAIR	LEAKAGE							
			CONTROLS/SENSORS	REPAIR	ELECTRICAL							
	O2		COLLECTOR	REPAIR	MATERIALS DURA	1	1	N	SFD	W	A	A

HUD SOLAR DEMONSTRATION RESIDENTIAL PROJECTS
• TECHNICAL CONCERNS SUMMARY REPORT - HARDWARE ELEMENT •

DATE: 06 JUL 81
PAGE: 2
REPORT: CB-HAS

SORTING KEYS ARE: ID #, SYS #													REPORT: CB-HAS		
# OF SYS		*****HARDWARE ELEMENT*****													
ID #	SYS #	COLL	TRAN/OIST	STOR	CONT	AUX	OTHER	TOTAL	CYCLE	# OF UNITS	NEW/RET	HSGTYPE	SYSTYPE	SYSKIND	TRMED
2451	1 01	1						1	1	1	R	SFA	H W	A	L
2455	1 01	1			1			2	1	8	N	GAL	H W	A	L
2456	4 01	2					1	1	1	4	N	SFA	H W	A	L
	02	2		1			1	4	1	4	N	SFA	H W	A	L
	03	2		1			1	4	1	4	N	SFA	H W	A	L
	04	2		1			1	4	1	4	N	SFA	H W	A	L
2463	3 01		2			3	2	7	1	3	N	SFO	HCW	A	L
	02					3	1	4	1	3	N	SFO	HCW	A	L
	03					3	1	4	1	3	N	SFO	HCW	A	L
2465	1 01	2						2	1	1	N	SFO	H W	A	L
2466	1 01						1	1	1	1	N	SFO	H W	A	L
2468	1 01		1					1	1	1	N	SFO	H	A	A
2470	1 01	3	4	1	1	1	1	11	1	1	N	SFO	H W	A	L
2472	1 01		1	1	1			2	1	1	N	SFO	H W	A	L
	02							1							
2473	5 01	4	1	1	1		2	9	1	5	R	SFO	H W	A	L
	02	1	1	1	1			4	1	5	R	SFO	H W	A	L
	03	1	1	1	1			4	1	5	R	SFO	H W	A	L
	04	1	1	1	1			4	1	5	R	SFO	H W	A	L
	05						1	1	1	1	5	R	SFO	H W	A
2474	12 01	1						1	1	12	N	MFM	W	P	L
2475	8 01						1	1	1	6	N	SFA	W	A	L
	03	1					1	3	1	6	N	SFA	W	A	L
	05	1						1	1	6	N	SFA	H W	A	L
2476	1 01	2	1	2	1			6	1	1	N	SFO	H W	A	L
2477	5 01	1	1		1		1	4	1	5	N	SFO	H W	A	A
	02	1	1		1		1	4	1	5	N	SFO	H W	A	A
	03	1	1		1		1	3	1	5	N	SFO	H W	A	A
	04	1	1		1	1	2	6	1	5	N	SFO	H W	A	A

REPORT: RA-R1
PAGE: 44
DATE: 04 DEC 78

R.E.R.C. QUESTION/ANSWERS DICTIONARY
SINGLE FAMILY BUILDER QUESTIONNAIRE

QUESTION NUMBER	QUESTION	WHAT CODE MEANS	CODED VALUES	CODE
		TECHNICAL FEASIBILITY		00
		FINAN INST ACCEPTNCE		09
91A	OTHER BLDRS OUTLOOK TOWARD SOLAR IN RES	INTRSTD & COMMITTD		01
		INTRSTD, NOT COMMITD		02
		NOT INTERESTED		03
		NOT AT ALL INTRSTD		04
		NO OPINION/DON'T KHW		05
		DID NOT ANSWER		06
91B	PLEASE EXPLAIN	WAIT & SEE ATTITUDE		01
		LACK OF FIN COMMIT		02
		PAYBACK/FIN FEASILITY		03
		LACK OF PAYBACK KNOWL		04
		PUBLIC INTEREST		05
		NOT ENUF RES + DEVEL		06
		CONVIRT HOMES SELLING		07
		UNWARE OF FUTURE TRND		08
		LACK OF KNOWLEDGE		09
		EXPRESSED INTEREST		10
92A	TRADE PUBL AS SOURCE FOR MECH/OPER DATA	YES		01
		NO		02
92B	OTHR DEVS AS SOURCE FOR MECH/OPER DATA	YES		01
		NO		02
92C	MFRS AS SOURCE FOR MECH/OPER DATA	YES		01
		NO		02
92D	NTL/LOC ASN AS SOURCE FOR MECH/OPER DATA	YES		01
		NO		02
92E	UNIV/IND ORG AS SOURCE FOR MECH/OPER DAT	YES		01
		NO		02
92F	GOVT AGENCY AS SOURCE FOR MECH/OPER DATA	YES		01
		NO		02

[illegible]

UTILITY CONSUMPTION REPORT

PROJECT ID: 21504BF020000

ENERGY TYPE: ELECTRIC

CODE: OK 03

SUPPLIER: EAST CENTRAL ELECTRIC

ADDRESS: DRAWER 1178

OK 74447

START DATE OF BILLING PERIOD	END DATE OF BILLING PERIOD	PRESENT METER READING	PREVIOUS METER READING	ENERGY CONSUMED	RATE	ENERGY COST	SURCHARGE	TAX	TOTAL COST THIS PERIOD	FLGS
U	N	I	S							
060877	070577	8562	8146	416	K	20.32	3.00		23.32	
070577	080577	9112	8562	550	K	23.80	3.00		26.80	
080577	090577	9510	9112	398	K	18.50	3.00		21.50	
090577	100577	10053	9510	543	K	24.29	3.00		27.29	
100577	110577	11027	10053	974	K	40.68	3.00		43.68	
110577	120577	11327	11027	300	K	16.30	3.00		19.30	
120577	010578	11557	11327	230	K	13.13	3.00		16.13	
010578	020578	11762	11557	205	K	11.78	3.00		14.78	
020578	030578	12359	11762	597	K	24.91	3.00		27.91	
030578	040578	12609	12359	250	K	13.67	4.05		17.72	
040578	050578	12997	12609	388	K	20.52	4.05		24.57	
050578	060578	13382	12997	385	K	19.81	4.05		23.86	
AVERAGE ENERGY CONSUMED FOR 1 YR:										
060578	070578	13724	13382	342	K	17.31	4.05		21.36	
070578	080578	14274	13724	550	K	24.10	4.05		28.15	
080578	090578	14274	14274		K	4.03	4.05		8.08	
090578	100578	14656	14274	382	K	19.99	4.05		24.04	
100578	110578	15630	14656	974	K	42.31	4.05		46.36	
110578	120578	15630	15630		K	4.03	4.05		8.08	
120578	010579	16263	15630	633	K	28.42	4.05		32.47	
010579	020579	16468	16263	205	K	11.29	4.05		15.34	
020579	030579	17213	16468	745	K	31.24	4.05		35.29	
030579	040579	18086	17213	873	K	37.65	4.05		41.70	
040579	050579	18474	18086	388	K	21.92	4.05		25.97	
050579	060579	18533	18474	59	K	5.78	4.05		9.83	
AVERAGE ENERGY CONSUMED FOR 1 YR:										
060579	070579	18885	18533	352	K	19.59	4.05		24.72	
070579	080579	19924	18885	1039	K	40.46	4.05		44.51	
080579	090579	20543	19924	619	K	27.06	4.05		31.11	
090579	100579	20925	20543	382	K	20.60	4.05		25.12	
100579	110579	21064	20925	139	K	10.87	4.05		14.92	
110579	120579	21064	21064		K	4.03	4.05		8.08	
120579	010580	21697	21064	633	K	30.03	4.05		34.08	

UTILITY PROVIDES A MONTHLY BILL

UTILITY CONSUMPTION AVERAGES REPORT

21504BF020000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	436 K	AVERAGE ENERGY COST FOR 1 YR:	23.90 ***
21504BF020000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	429 K	AVERAGE ENERGY COST FOR 1 YR:	24.72 ***
21504BF020000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	517 K	AVERAGE ENERGY COST FOR 1 YR:	27.01 ***
21504BF020000 P	AVERAGE ENERGY CONSUMED FOR 1 YR:	115 G	AVERAGE ENERGY COST FOR 1 YR:	43.68 ***
21504BF030000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	391 K	AVERAGE ENERGY COST FOR 1 YR:	21.36 ***
21504BF030000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	420 K	AVERAGE ENERGY COST FOR 1 YR:	25.52 ***
21504BF030000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	73 C	AVERAGE ENERGY COST FOR 1 YR:	15.50 ***
21504BF030000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	70 C	AVERAGE ENERGY COST FOR 1 YR:	16.20 ***
21504BF030000 P	AVERAGE ENERGY CONSUMED FOR 1 YR:	85 G	AVERAGE ENERGY COST FOR 1 YR:	30.13 ***
21505BF010000 E	AVERAGE ENERGY CONSUMED OVER 17 MOS:	43 G	AVERAGE ENERGY COST OVER 17 MOS:	15.36 ***
21505BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	504 K	AVERAGE ENERGY COST FOR 1 YR:	1.00 ***
21505BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	713 K	AVERAGE ENERGY COST FOR 1 YR:	17.86 ***
21505BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	631 K	AVERAGE ENERGY COST FOR 1 YR:	31.67 ***
21505BF010000 Q	AVERAGE ENERGY CONSUMED FOR 1 YR:	35 C	AVERAGE ENERGY COST FOR 1 YR:	10.37 ***
21505BF010000 Q	AVERAGE ENERGY CONSUMED FOR 1 YR:	47 C	AVERAGE ENERGY COST FOR 1 YR:	14.96 ***
21505BF010000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	39 C	AVERAGE ENERGY COST FOR 1 YR:	13.04 ***
21505BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	953 K	AVERAGE ENERGY COST FOR 1 YR:	45.94 ***
21505BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1130 K	AVERAGE ENERGY COST FOR 1 YR:	50.84 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	1159 K	AVERAGE ENERGY COST FOR 1 YR:	56.16 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	177 C	AVERAGE ENERGY COST FOR 1 YR:	41.91 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	179 C	AVERAGE ENERGY COST FOR 1 YR:	48.22 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	143 C	AVERAGE ENERGY COST FOR 1 YR:	34.67 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	148 C	AVERAGE ENERGY COST FOR 1 YR:	40.59 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	916 K	AVERAGE ENERGY COST FOR 1 YR:	45.96 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	34 T	AVERAGE ENERGY COST FOR 1 YR:	6.99 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	18 T	AVERAGE ENERGY COST FOR 1 YR:	5.67 ***
21505BF099000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	70 T	AVERAGE ENERGY COST FOR 1 YR:	13.37 ***
21512BF020000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	57 T	AVERAGE ENERGY COST FOR 1 YR:	15.46 ***
21512BF020000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	26 T	AVERAGE ENERGY COST FOR 1 YR:	4.46 ***
21512BF030000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	16 T	AVERAGE ENERGY COST FOR 1 YR:	5.16 ***
21512BF030000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	78 T	AVERAGE ENERGY COST FOR 1 YR:	15.79 ***
21512BF040000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	47 T	AVERAGE ENERGY COST FOR 1 YR:	12.83 ***
21512BF050000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	66 T	AVERAGE ENERGY COST FOR 1 YR:	12.75 ***
21512BF050000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	34 T	AVERAGE ENERGY COST FOR 1 YR:	9.40 ***
21512BF050000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	44 T	AVERAGE ENERGY COST FOR 1 YR:	7.29 ***
21512BF050000 G	AVERAGE ENERGY CONSUMED FOR 1 YR:	47 T	AVERAGE ENERGY COST FOR 1 YR:	9.43 ***
21515BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1502 K	AVERAGE ENERGY COST FOR 1 YR:	59.13 ***
21515BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1549 K	AVERAGE ENERGY COST FOR 1 YR:	69.99 ***
21515BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1661 K	AVERAGE ENERGY COST FOR 1 YR:	78.87 ***
21519BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	2310 K	AVERAGE ENERGY COST FOR 1 YR:	51.33 ***
21519BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	936 K	AVERAGE ENERGY COST FOR 1 YR:	22.55 ***
21525BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1691 K	AVERAGE ENERGY COST FOR 1 YR:	73.53 ***
21525BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1973 K	AVERAGE ENERGY COST FOR 1 YR:	87.85 ***
21525BF020000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1366 K	AVERAGE ENERGY COST FOR 1 YR:	58.02 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1240 K	AVERAGE ENERGY COST FOR 1 YR:	55.32 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1227 K	AVERAGE ENERGY COST FOR 1 YR:	54.35 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	949 K	AVERAGE ENERGY COST FOR 1 YR:	41.37 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	727 K	AVERAGE ENERGY COST FOR 1 YR:	32.27 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1119 K	AVERAGE ENERGY COST FOR 1 YR:	48.43 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1086 K	AVERAGE ENERGY COST FOR 1 YR:	47.67 ***
21525BF099000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	1611 K	AVERAGE ENERGY COST FOR 1 YR:	73.94 ***
21527BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	675 K	AVERAGE ENERGY COST FOR 1 YR:	30.43 ***
21527BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	811 K	AVERAGE ENERGY COST FOR 1 YR:	39.56 ***
21527BF010000 E	AVERAGE ENERGY CONSUMED FOR 1 YR:	909 K	AVERAGE ENERGY COST FOR 1 YR:	52.17 ***

NATIONAL BUREAU OF STANDARDS

UTILITY SUPPLIERS FOR SOLAR PROJECT

REPORT: BF-SUP-R1

DATE :06 JUL 81

UTL-CD	STATE LN	SUPPLIER NAME	SUPPLIER ADDRESS	CITY	ZIP	PAGE-NO.	ST
IN 04		NORTHERN INDIANA PUB. SERVICE CO.	74 N. BROADWAY	PERU	IN 46970	2	IN
IN 05		INDIANA & MICHIGAN ELECTRIC CO.	PO BOX 60	FT. WAYNE	IN 46801		IN
KS 01		THE KANSAS POWER & LIGHT COMPANY	BOX 59	SALINA	KS 67401		KS
LA 01		NEW ORLEANS PUBLIC SERVICE INC	317 BARONNE STREET	NEW ORLEANS	LA 70112		LA
LA 02		CLECO	BOX 32	PINEVILLE	LA 71360		LA
MA 01		BAY STATE GAS CO.	2025 ROOSEVELT AVENUE	SPRINGFIELD	MA 01101		MA
MA 02		BOSTON EDISON COMPANY	P.O. BOX 488	BOSTON	MA 02199		MA
MA 03		BAY STATE GAS COMPANY	120 ROYALL STREET	CANTON	MA 02021		MA
MA 04		BAY STATE GAS CO.	995 BELMONT STREET	BROCKTON	MA 02401		MA
MA 05		MASSACHUSETTS ELECTRIC	170 MEDFORD STREET	MALDEN	MA 02148		MA
MA 06		WESTERN MASS. ELECTRIC CO.	300 CADWELL DRIVE	SPRINGFIELD	MA 01104		MA
MA 07		C & S OIL HEATING CO.; INC.	TMIDDLESEX AVE	NATICK	MA 01760		MA
MA 08		PINTO'S FUEL SERVICE	319-1/2 MAIN STREET	MILFORD	MA 01757		MA
MA 09		WESTERN MASS. ELEC. CO.	174 BRUSH HILL AVE.	W. SPRINGFIELD	MA 01089		MA
MD 01		BALTIMORE GAS & ELECTRIC CO.	1508 WOOLAWN DRIVE	BALTIMORE	MD 21207		MD
MI 01		BERRIEN CITY FARM BUREAU OIL CO	M-140 8N-62	EAU CLAIRE	MI 49111		MI
MI 02		CONSUMERS POWER COMPANY	4000 CLAY AVE SW	GRAND RAPIDS	MI 49508		MI
MI 03		BATTLE CREEK GAS COMPANY	23 EAST MICHIGAN MALL	BATTLE CREEK	MI 49018		MI
MN 01		MINNEAPOLIS/MINNESOTA GAS CO.	626 NICOLLET MALL	MINNEAPOLIS	MN 55402		MN
MN 02		NORTHERN STATES POWER	414 NICOLLET MALL	MINNEAPOLIS	MN 55401		MN
MN 03		DAKOTA ELECTRIC ASSOCIATION	4300 220TH STREET WEST	FARMINGTON	MN 55204		MN
MN 04		EAST CENTRAL ELECTRIC ASSN	412 NORTH MAIN	BRAMHAM	MN 55006		MN
MO 01		THE GAS SERVICE CO.	2460 PERSHING RD.	KANSAS CITY	MO 64108		MO
MO 02		KANSAS CITY POWER & LIGHT CO.	13330 BALTIMORE AVENUE	KANSAS CITY	MO 64145		MO
MO 03		BOONE ELECTRIC COOPERATIVE	1413 RANGE LINE	COLUMBIA	MO 65201		MO
MO 04		CUIVER RIVER ELECTRIC	PO BOX 160	TROY	MO 63379		MO
MT 01		PACIFIC POWER AND LIGHT	PO BOX 250	KALISPELL	MT 59901		MT
NC 01		DUKE POWER COMPANY	DRAWER A D SALEM STATION	WINSTON-SALEM	NC 27108		NC
NC 02		CAROLINA POWER & LIGHT COMPANY	205 WEST CABARRUS STREET	RALEIGH	NC 27698		NC
NE 01		CENGAS/MINNESOTA GAS CO.	1201 N STREET	LINCOLN	NE 68512		NE
NE 02		LINCOLN ELECTRIC SYSTEM	1200 N STREET STE 300	LINCOLN	NE 68501		NE
NH 01		PUBLIC SERVICE CO. OF NEW HAMPSHIRE	CRYSTAL AVENUE	DIRRY	NH 03038		NH
NH 02		PUBLIC SERVICE CO. OF NEW HAMPSHIRE	370 AMHERST STREET	NASHUA	NH 03061		NH
NH 03		NEW HAMPSHIRE ELEC. COOPERATIVE, INC.	RED 2 TENNEY MT HWY	PLYMOUTH	NH 03264		NH
NH 04		LANGUREUX OF DIVISION OF JAMES HORNE	63 FOURTH STREET	DOVER	NH 03820		NH
NH 05		NORTHERN UTILITIES	78 MARKET STREET	PORTSMOUTH	NH 03801		NH
NH 06		EXETER HAMPTON ELECTRIC	WATER STREET	EXETER	NH 03842		NH
NH 07		PUBLIC SERVICE OF NEW HAMPSHIRE	1000 ELM STREET, PO BOX 330	MANCHESTER	NH 03105		NH
NJ 01		PSE & G COMPANY	222 E STATE STREET	THENTON	NJ 08604		NJ
NJ 02		H AND H GAS CORP	PO BOX 208	HIGHTSTOWN	NJ 08520		NJ
NJ 03		JERSEY CENTRAL POWER AND LIGHT CO	501 GRAND AVE	A'SBURY PARK	NJ 07712		NJ
NM 01		GAS CO. OF NEW MEXICO	P.O. BOX 1632	ALBUQUERQUE	NM 87103		NM
NM 02		PUBLIC SERVICE CO. OF NEW MEXICO	414 SILVER AVE. N.W.	ALBUQUERQUE	NM 87103		NM
NM 03		PUBLIC SERVICE CO. OF NEW MEXICO	124 E. MARCY	SANTA FE	NM 87501		NM
NM 04		PUBLIC SERVICE OF NEW MEXICO	PO BOX 407	BELEN	NM 87002		NM
NM 05		EL PASO ELECTRIC	BOX 910	LAS CRUCES	NM 88001		NM
NV 01		SIERRA PACIFIC POWER CO.	PO BOX 10100	RENO	NV 89510		NV
NY 01		NEW YORK STATE ELECTRIC & GAS	150 LANCASTER STREET	LANCASTER	NY 14075		NY
NY 02		NATIONAL FUEL GAS	455 MAIN STREET	BUFFALO	NY 14203		NY
NY 03		ORANGE & ROCKLAND ELECTRIC & GAS CO.	ONE BLUEHILL PLAZA	PEARL RIVER	NY 10965		NY

5. DATA FILE ELEMENTS

This section provides a detailed description of the data in the files which comprised the Solar Data Base. These data are available on tape from the National Technical Information Service (see page 59).

GRANT FILE ELEMENTS

These data were requested by HUD from organizations or individuals applying for grants for building homes with solar energy systems. Subsequently, data concerning applicants who received grants were stored in a file on the NBS computer. There were 668 grants awarded during the Residential Demonstration Program (1975-1980).

Description of Data

Grant ID*

Grantee Information:

- Name, type and address of grantee contact person(s)
- Total solar energy system cost (\$)
- Portion of solar system cost requested by grantee (\$)

Project Information:

- Project location address

Model Information:

- Housing type
- Number of dwelling units
- Number of buildings
- Number of solar systems
- Total conditioned area per building
- State economic area code

Solar Energy System Information:

- System type (heating, cooling or water)
- System kind (active, passive or hybrid)
- Transfer media (air or liquid)
- Solar collector - manufacturer code, type, aperture area in square feet
- Auxiliary fuel type
- Total cost for each solar system (\$)
- Storage medium
- Cost to government for each solar system (\$)
- Total load in Btu x 10^6
- Solar energy used in Btu x 10^6

*The Grant File uses a different numbering scheme from the other files in order to comply with Federal privacy requirements.

GRANTEE FILE ELEMENTS

These data were received via three separate input forms. Grantee Reports 1, 3, and 4 were completed by grantees during different phases of the solar project. Grantee Report 1 was filed after the grant was awarded. Grantee Report 3 was filed after the construction was completed. Grantee Report 4 was filed after the building(s) or unit(s) was sold or rented.

Description of Data

Grantee Report #1

Project ID
Project Information:
 Address
 Grant award date
 Report #1 date
 Instrumented or non-instrumented data (yes or no)
 New or retrofit
Construction Financing:
 Financing arrangements (yes, no, pending)
 Experience/problems

Grantee Report #3

Dates:
 Date Grantee Report #2 submitted (see Technical Description file)
 Date Grantee Report #3 submitted
 Final design completion date
 Begin solar installation date
 Solar test completion date
 Construction completion date
Building Permit Data:
 Approval date
 Approving authority
 Address
 Experience/problems
Occupancy Permit Data:
 Approval date
 Approving authority
 Address
 Experience/problems
Building Codes:
 National code models, if any
 Local codes
 Experience/problems
Construction Financing Data:
 Confirmed approval date
 Mortgage type

GRANTEE FILE ELEMENTS (CONTINUED)

Period (months)
Interest rate
Amount (\$)
Financing organization
Address
Rental/Sales Agreement:
Sales/rental terms
HUD access terms
Construction Problems:
Equipment delivery problems
Equipment breakdown problems
Labor problems
Building interface problems
Other construction problems
Solar Oriented Events:
Warranty on file
Owner's manual on file
Auxiliary energy type

Grantee Report #4

Sale Price and Mortgage Data:
Final sale price (\$)
Final rental rate (\$)
Mortgage amount (\$)
Period (months)
Interest rate
Mortgage approval date
Mortgage type (FHA, VA, private, etc.)
Points/fees
Mortgagor
Address
Unit status (model, sold, rental)
Report date
Initial sales price (\$)
Initial rental rate (\$)
Instrumentation (unit)
Mortgage arranged by (purchaser, builder, grantee)
Problems obtaining mortgage
Marketing Data:
Marketing period (weeks)
Date house first offered
Sales contract date
Occupancy date
Number of visitors
Number of prospective buyers
Marketing problems
General reaction by public

TECHNICAL DESCRIPTION FILE ELEMENTS

Two sets of technical data were collected. The first was collected on about 25 percent of all non-instrumented systems and all of the instrumented systems. It contained a brief description of the solar energy system which was to be installed and information concerning predicted system performance. These data were basically extracted from Grantee Report #2, a report submitted by the grantee when the design of his system was completed and approved by HUD.

Description of Data

Project ID

Collector/Absorber Information:

- Azimuth angle
- Tilt angle
- Net area - collector
- Cover plate material information
- Cover plate thickness
- Number of cover plates
- Absorber coating
- Absorber substrate material
- Fluid passage material
- Material back insulation
- Overall R-value of back insulation
- Panel intercept (collector performance curve)
- Panel slope (collector performance curve)
- Incidence angle modifier
- Freeze protection

Storage and Transport Information:

- Main tank storage volume (heat)
- Main tank storage volume (DHW)
- Main tank storage medium (heat)
- Main tank storage medium (DHW)
- Pre-heat tank storage volume (heat)
- Pre-heat tank storage volume (DHW)
- Auxiliary tank storage volume (heat)
- Auxiliary tank storage volume (DHW)
- Storage temperature in main tank - upper
- Storage temperature in main tank - lower
- Thermal capacitance
- Storage capacity
- Combined heat exchanger efficiency: Collector-to-storage
- Combined heat exchanger efficiency: Storage-to-load
- Transport medium
- Water (percent by volume)
- Density
- Specific heat
- Flow rate

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Air flow correction factor
Liquid load correction factor

Backup, Heat Pump, and DHW Information:

Backup energy type - heat
Backup energy type - cooling
Backup energy type - DHW
Backup capacity - heat
Backup efficiency
Heat pump type
Heat pump - nominal capacity
Backup capacity - DHW
DHW usage
DHW set temperature
Monthly DHW inlet temperature

Miscellaneous Information:

FR-prime-tau-alpha (system performance curve)
FR-prime-UL (system performance curve)
Ventilation
Total heat loss factor - UA
CD (correction factor to be used with the degree day calculation method)
Internal heat gain
City code (reference number for local weather and insolation data)
System type

Solar Energy System Performance Information:

Available insolation - monthly
Solar contribution - monthly
Auxiliary contribution - monthly
Cooling load - monthly
Heating load - monthly
DHW load - monthly
Total load - monthly
Solar fraction - monthly
Degree days - monthly
Solar contribution - yearly
Auxiliary contribution - yearly
Cooling load - yearly
Heating load - yearly
DHW load - yearly
Total load - yearly
Solar fraction - yearly
Degree days - yearly

The second set of technical data was collected on the components of the solar energy system to be instrumented. Predicted performance data,

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

schematics of the system and a site drawing were also included. These data were recorded on microfilm or microfiche.

Description of Data

System Schematics and Site Drawings

Project ID

Building and Site Description:

- Project location
- Building designer
- Mechanical designer
- Solar system designer
- General contractor
- Mechanical contractor
- Solar contractor
- Other participants (if any)
- Design integration monitor
- Type of solar system integration
- Regulatory codes
- Name and year of state or local code/regulation
- Model codes which are the basis for regulations
- General Characteristics:
 - Building type
 - Planned type of ownership
 - Planned type of occupancy
 - Development type

Site:

- Latitude
- Longitude
- Altitude
- Average summer temperature
- Average winter temperature

Heating Design Temperatures:

- Outdoor
- Indoor

Cooling Design Temperatures:

- Outdoor
- Indoor

Building:

- Front of building faces (direction)
- Average number of stories above ground
- Average number of stories below ground

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Total height above grade
Total conditioned floor area
Roof type

Design Heat Loss/Load and Related Building Data:

Design heat loss/load to design conditions
Heat loss/load calculation method
Attic
Design shaded glass areas
Building ventilation rates
Internal heat gain assumptions

Site:

Heating degree days per month
Insolation per month
Heating degree days per year

Solar System Description:

System ID:

Firm
Model name/number

Type of system:

Air, active
Air, passive
Liquid, active
Liquid, passive

System and component summary:

Number of collector types
Number of circulation loops
Number of thermal storage units
Number of operational modes
Number of pumps
Number of valves
Number of blowers
Number of dampers
Number of sensors
Number of flow regulators
Number of pressure regulators
Number of subsystem fail-safe controls

Solar System Cost and Lifetime Estimates:

System design life
Design life collector #1
Design life collector #2

Equipment Costs:

Collectors (\$)
Storage units (\$)
Distributon and controls (\$)

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Other Costs:

Installation costs (\$)

Other (\$)

Collector:

Identification (manufacturer, address)

Model name/number

Type

Location, orientation, tilt

Array and collector characteristics

Collector shading

Cover Plates:

Number of cover plates

Location

Manufacturer

Product name/number

Material

Physical dimensions

Optical properties

Edge or surface treatment

Absorber:

Identification

Material

Number of absorbers per collector

Coating

Heat transfer fluid passages

Insulation:

Layer one - sides

Layer two - sides

Layer one - back

Layer two - back

Gaskets and Sealants:

Location

Material (sealants)

Material (gaskets)

Frame:

Identification

Material

Protective coating

Standoffs

Number of structural attachment points

Built-in collector

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Reflector:

- Identification
- Number of reflectors
- Substrate material
- Reflective coating
- Protective coating
- Physical dimensions

Other Information:

- Desiccant
- Freeze protection
- Overheating protection
- Passive collector heat transfer control

Collector Performance

Thermal Storage Unit

Sensible Heat Solid:

- Container information
- Storage medium
- Heat transport to and from medium
- Container materials
- Interior lining
- Container location
- Insulation types
- Exterior finish types
- Filters

Sensible Heat Liquid:

- Container information
- Storage medium
- Heat transport to and from medium
- Container construction
- Container materials
- Interior lining
- Container location
- Auxiliary heaters
- Container insulation
- Exterior finish types
- Filters
- Getters

Latent Storage Medium:

- Container information
- Storage medium
- Materials
- Additives
- Properties of medium

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

- Module for latent medium
- Heat transport to and from medium
- Auxiliary heaters
- Container construction
- Container materials
- Interior lining
- Container location
- Exterior insulation types
- Exterior finish types
- Getters
- Auxiliary heaters

Circulation Loop:

Air:

- Flow rate
- Components within circulation loop

Ducting:

- Duct types
- Location types
- Joint types
- Internal duct insulation
- Internal finish
- External duct insulation
- External finish
- Filters

Liquid:

- Flow rate
- Heat transfer medium

Piping:

- Rigid piping type
- Interior coating type
- Flexible coupling type
- Coupling reinforcement type
- Piping and coupling connection type
- Piping insulation type
- Location
- Exterior finish types
- Finish and insulation - joint type
- Filter types
- Strainer types
- Getters

Distribution:

Pump (Circulator):

- Pump information
- Design conditions

Valve

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Blower:

Blower information

Design conditions

Damper

Heat Exchanger:

Air to air

Air to liquid:

Material types

Heating

Cooling

Liquid to liquid:

Material types

Heating

Cooling

Air to refrigerant

Liquid to refrigerant

Controls:

Control mode selector information

Sensors

Subsystem fail-safe controls

Tracking mount drive controls

Auxiliary Energy:

Domestic water heater:

Energy source

Burner ignition method

Automatic flue vent

Furnace:

Energy source

Burner ignition method

Automatic flue vent

Electric resistance heaters

Boiler:

Energy source

Burner ignition method

Automatic flue vent

Air conditioning:

Air conditioning information

Refrigeration machine:

Description

Operating characteristics

Burner ignition method

Automatic flue vent

Heat rejection device

Dehumidifiers:

Description

Operating conditions

TECHNICAL DESCRIPTION FILE ELEMENTS (CONTINUED)

Humidifiers:

Description

Operating conditions

Supplemental heater

Heat pumps (reverse cycle air conditioner):

Type

Heating mode

Cooling mode

Heat pumps (reverse cycle refrigeration machine):

Description

Heat pump heat exchanger:

Liquid to refrigerant

Air to refrigerant

Predicted System Performance:

Space temperature (heating)

Space temperature (cooling)

Domestic hot water temperature

Total demand load (MMBtu)

Energy supplied by solar system (MMBtu)

Energy supplied by auxiliary systems (MMBtu)

Solar system operating energy (kWh)

Simulation time period

TECHNICAL CONCERNS FILE ELEMENTS

Data for this file were generated when a technical representative made contact with a solar project where technical concerns were being experienced. These technical concerns ranged from minor concerns (such as delivery delays due to weather) to significant concerns (such as out-gassing due to faulty material selection). Selected reports documenting technical concerns during design, construction, or operational phase of the project were transcribed and put onto the computer.

Description of Data

Project ID

System Number

Date of Contact

Hardware Element With a Technical Concern

Action Taken (i.e., repair, replace, etc.)

Event(s) Which Caused Technical Concern (i.e., breakage,
delivery delay, etc.)

Action Taken by HUD, Grantee, etc.

Direct Cost of Action (\$)

Performance Area (thermal, structural, mechanical, etc.)

Project Status (completed or action pending)

Phase (design, construction, operation)

Cycle Number

Type of Failure Which Caused the Technical Concern (catastrophic
to questionable)

Frequency of Technical Concern

MARKETING SURVEY FILE ELEMENTS

This file contains survey research data from builders, lenders, zoning officials, solar homebuyers, and other market participants. Data are non-technical and designed to provide marketplace and attitudinal information as well as perceptions of constraints on the entry of solar energy to the residential housing market.

The data were obtained using one or a combination of 26 sets of interview questionnaires. Most collected information was used in several studies and analyses, including studies of building code regulations, economic performance modeling, financial feasibility, consumer attitudes, legal issues, and land use. About 25 percent of all grants were included in this sample. The same set of grants had technical description and utility consumption data collected.

Description of Data

Single Family Builder/Developer
Comparative Single Family Builder/Developer
Multi-Family Builder/Developer
Comparative Multi-Family Builder/Developer
Purchaser
Comparative Purchaser
Prospective Purchaser
Renter
Comparative Renter
Building Management
Participating Construction Lender
Participating Permanent Lender
Non-Participating Lender
Insurance Company
Utility Company (Auxiliary)
Utility Company (Alternative)
Local Planning and Zoning Official
Local Building Code Official
Local Tax Assessor
Purchaser Follow-Up
Comparative Purchaser Follow-Up
Renter Follow-Up
Comparative Renter Follow-Up
Participating Builder Follow-Up
Comparative Builder Follow-Up
Site/House Description

UTILITY CONSUMPTION FILE ELEMENTS

The utility consumption reports contain data solicited from utility companies which supply service to grant units. Information regarding auxiliary (non-solar) fuel consumed by housing units equipped with solar devices was collected along with comparative fuel consumption data on non-solar equipped units of similar size and design. About 25 percent of all grants contained systems for which utility consumption data were collected. This sample corresponded to the Marketing Survey File sample.

Description of Data

Project ID

Supplier:

Auxiliary energy type

Meter number

Supplier code

Billing Information:

Start of billing period

End of billing period

Present meter reading

Previous meter reading

Energy consumed

Billing frequency

Cost Information:

Rate code

Energy cost (\$)

Surcharge, if any

Tax

Total cost this period (\$)

6. INTERACTIVE ACCESS TO SOLAR DATA

Some users of the data which was collected in the Residential Solar Heating and Cooling Demonstration Program (those specifically authorized by HUD to do so) were able to directly access interactive files of the solar data base (see figure 2, page 51) through remotely situated computer terminals which were tied to the main computer at the National Bureau of Standards by telephone lines. The Solar Data Center (SDC) had provided access to the files through MIRADS (Marshall Information Retrieval and Display System).

MIRADS is an online storage and retrieval system generally used for retrieval of non-technical data, such as Grant File data. Under MIRADS, in response to the issuance of four basic commands: QUERY, SORT, COMPUTE, and PRINT; the system searches the data base (based on the selection criteria in the query command), sorts and retrieves selected data as specified, performs any computations requested, and prints the results.

The SDC had written the MIRADS User's Guide [6] for users of the interactive solar files. It contains the basic MIRADS language rules, examples of use, and a step-by-step walk-through of a typical interactive session.

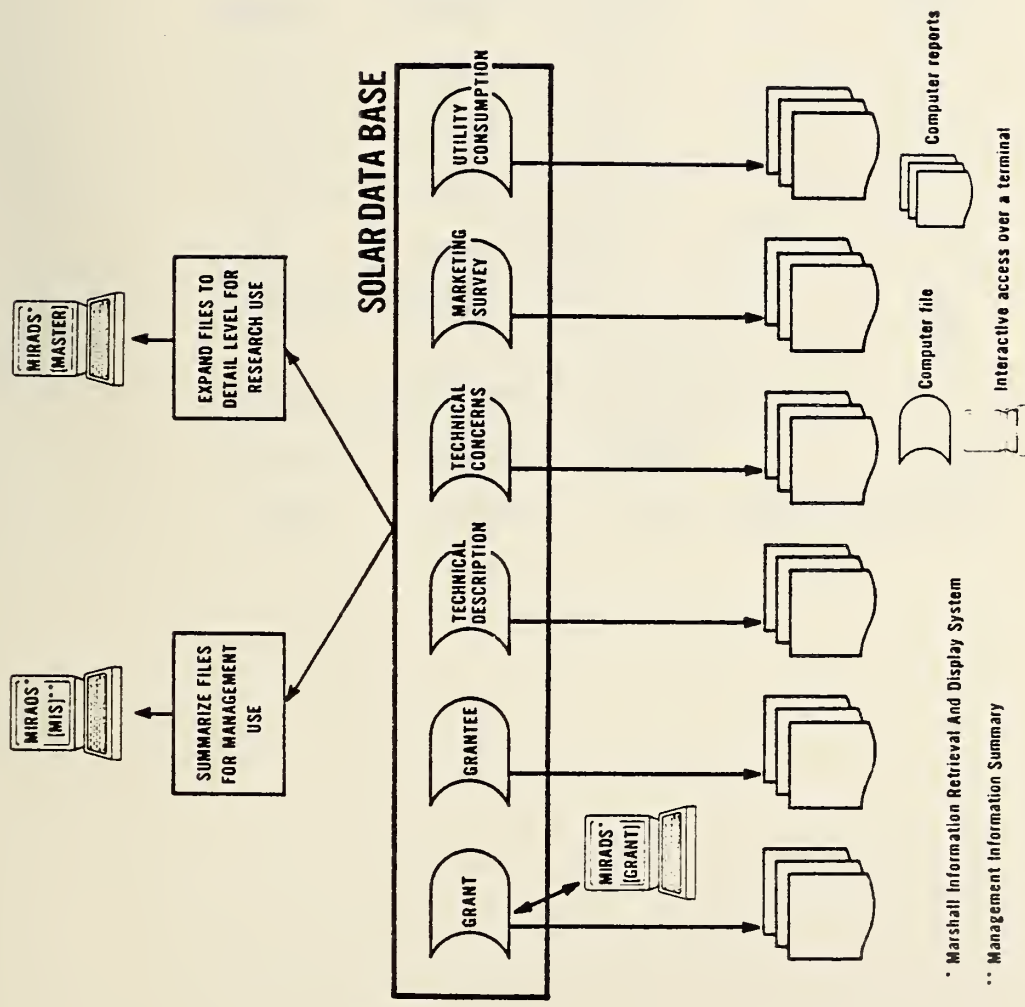


Figure 2. Solar data system.

7. AMOUNT OF DATA COLLECTED

The tables in this section show the amount of data collected during the Residential Solar Demonstration Program from 1975-1981.

Table 7. Summary of Grant File Data

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling Units</u>	<u>Systems</u>
1	50	135	113
2	70	1290	253
3	145	3093	415
4	36	1709	58
4A	75	3617	236
5	130	175	101
P1	<u>162</u>	<u>79</u>	<u>79</u>
TOTAL ALL CYCLES:	668	10,098	1255

Table 8. Summary of Grantee File Data

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling Units</u>	<u>Systems*</u>
1	50	88	
2	70	206	
3	145	262	
4	36	44	
4A	75	87	
5	130	31	
P1	<u>162</u>	<u>61</u>	
TOTAL ALL CYCLES:	668	779	

*Data not collected at this level.

Table 9. Summary of Technical Description File Data

Non-instrumented Systems

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling*</u> <u>Units</u>	<u>Systems</u>
1	26		43
2	44		168
3	60		154
4	9		30
4A	<u>12</u>		<u>33</u>
TOTAL ALL CYCLES:	151		428

Instrumented Systems

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling*</u> <u>Units</u>	<u>Systems</u>
1	6		10
2	26		31
3	19		26
4	2		3
4A	4		5
P1	<u>4</u>		<u>5</u>
TOTAL ALL CYCLES:	61		80

*Data not collected at this level.

Table 10. Summary of Technical Concerns File Data

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling*</u> <u>Units</u>	<u>Systems</u>
1	36		70
2	57		171
3	99		217
4	13		14
4A	33		80
5	2		2
P1	<u>2</u>		<u>2</u>
TOTAL ALL CYCLES:	242		556

*Data not collected at this level.

Table 11. Summary of Marketing Survey File Data

<u>Reference</u>	<u>Questionnaire Administered To:</u>	<u>Sample Size</u>
RA	Single-Family (SF) Builder or Developer	138
RB	Comparative SF Builder or Developer	260
RC*	Multi-family (MF) Builder or Developer	
RE	Purchaser	276
RF	Comparative Purchaser	252
RG	Prospective Purchaser	52
RH*	Renter	
RJ*	Comparative Renter	
RL	Participating Construction Lender	105
RM	Participating Permanent Lender	
RN	Non-participating Lender	129
RO	Insurance Company/Agency	112
RP	Auxiliary Utility Company	92
RQ	Alternative Utility Company	43
RR	Local Planning/Zoning Official	105
RS	Local Building Code Official	104
RT	Local Tax Assessor	68
RU	Follow-up Builder	121
RV*	Follow-up Comparative Builder	137
RX*	Follow-up Comparative Purchaser	28
RW	Follow-up Purchaser	173
RW2	Second Follow-up Purchaser	117
RW3	Third Follow-up Purchaser	51
SI**	House/Site Description	531

* This data is available from RERC only in hard-copy files.

** The house/site description sample is approximately 80% of all possible single family, for-sale grants.

Table 12. Summary of Utility File Data

<u>Cycle</u>	<u>Grants</u>	<u>Dwelling Units</u>	<u>Comparative Dwelling Units</u>	<u>Systems*</u>
1	26	65	26	
2	32	105	30	
3	41	64	36	
4	6	9	4	
4A	4	9	0	
5	2	2	0	
P1	<u>28</u>	<u>29</u>	<u> </u>	
TOTAL ALL CYCLES:	139	283	96	

*Data not collected at this level.

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*Will be available from: National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161

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11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here) The Residential Solar Data Center (SDC) was responsible for the establishment and operation of a computerized data base containing non-instrumented residential data collected from the DoE/HUD Solar Heating and Cooling Demonstration Program. This document includes a summary of the history and background of the SDC and its role in the demonstration program, a list of the final computer reports which are available, sample pages of representative reports, and a description of the data files which comprised the solar data base.			
12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) Automatic data processing; data base; residential buildings; solar data base; solar heating and cooling; solar energy systems.			
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