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MASTER

DATA REPORT FOR THE
SOUTHWEST RESIDENTIAL EXPERIMENT STATION
NOVEMBER 1981

18 December 1981

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ABSTRACT

The Residential Experiment Stations of the Solar Photovoltaic Residential Project have been designed by Massachusetts Institute of Technology Lincoln Laboratory under Department of Energy sponsorship to develop residential photovoltaic systems and to gather and disseminate performance data for the photovoltaic community, cognizant institutions, and ultimately, the public.

The Southwest Residential Experiment Station (SW RES) is operated by the New Mexico Solar Energy Institute at New Mexico State University in Las Cruces. This report tabulates physical performance data obtained from the photovoltaic energy systems under test at the SW RES for the month of November 1981.

DATA REPORT FOR THE
SOUTHWEST RESIDENTIAL EXPERIMENT STATION
NOVEMBER 1981

The New Mexico Solar Energy Institute, under the management of the Massachusetts Institute of Technology (MIT) Lincoln Laboratory, has established a Residential Experiment Station in Las Cruces, New Mexico, to monitor the performance of state-of-the-art residential solar photovoltaic (PV) systems. This Southwest Residential Experiment Station (SW RES) is one of two Residential Experiment Stations funded under the U.S. Department of Energy's National Photovoltaic Program--the other is the Northeast Residential Experiment Station (NE RES) established and operated by MIT Lincoln Laboratory in Concord, Massachusetts.

This report presents one month of performance data obtained from the eight SW RES Prototype Systems. Data drawn from the Residential Data System (RDS) appears in several formats. Section 1 includes a one-page summary as well as a more detailed hour-by-hour tabulation for an average day of the month. In Section 2, energy histograms for each Prototype System are provided; they are based on RDS data and recording kilowatt hour meters. The histograms also present horizontal and plane-of-array insolation data as well as comments that explain data and/or energy production anomalies.

This report is distributed to the SW RES Consulting Committee, the other field centers in the National Photovoltaic Program, the Jet Propulsion Laboratory lead center, the Department of Energy (DOE), and, through DOE/Technical Information Center, the technical community involved in the development of PV energy systems. The objective of this report is to disseminate authoritative and accurate information concerning the performance of residential PV systems and the typical loads they serve. Such timely information is needed by the overall DOE PV program to ensure a uniform and correct understanding of the performance of the developmental systems.

Presently eight prototype residential PV systems are under test at the SW RES. Each Prototype System consists of a roof-mounted PV array, sized to meet at least 50 percent of the annual electric demand of an

energy-conserving house, and an enclosed structure to house the remainder of the PV system equipment, test instrumentation, and work space. All eight of these Prototype Systems were designed and built by industry participants in the SW RES effort. The arrays provide dc energy, which is converted to ac energy by power conditioning equipment to service all of the usual loads of the residence. A common feature of all the Prototype Systems is that excess solar-generated electric energy is fed back to the local utility grid, thereby eliminating the need for on-site storage. To quantitatively gauge the ability of the Prototype Systems to meet residential load demands, five homes in the vicinity of the SW RES, representative of the occupancy and loads found in the area, have been equipped with instrumentation that continually measures the home's electrical energy consumption. A telephone line carries load information from these monitored residences to the SW RES, where the data is assimilated and recorded. One of the monitored houses is chosen to command a programmable load in each Prototype PV System--thereby simulating a typical residential electrical load profile.

Features of the residential PV systems and monitored houses are listed in Tables 1 and 2, respectively.

Figure 1 illustrates the sequence by which the attached monthly data reports are generated from the data obtained from the PV systems and monitored houses. The hour-by-hour tabulation of information for an average day of the month (see "Brief Monthly Report") and the monthly summary (see "Monthly Summary") are the end products of processing data measured every five seconds and averaging it over six-minute intervals. The quantities measured at the monitored houses are intended for use by both electric utilities and PV system designers. This information will be particularly useful in the numerical simulation of PV system performance and in determining the system's ability to meet actual residential loads. The information concerning the Prototype Systems is also addressed to PV system designers and electric utilities, as well as to institutional observers and the institutions represented on the RES Consulting committees. It is expected that this information will provide a basis for understanding the performance implications for the various design differences among the Prototype Systems.

Additional information on the retrieval, processing, and dissemination of data collected by the RDS has been reported in a recent DOE publication entitled Information Gathering, Data Reduction, and Information Dissemination for Residential Experiment Station Operations, (Report No. DOE/ET/20279-141, June 1981) authored by P. Raghuraman and E. C. Kern of MIT Lincoln Laboratory. Copies of this publication are available through the National Technical Information Service. Information concerning the reliability and durability of the various residential systems, as well as assessments of their performance vis-à-vis the DOE price goals and milestones, will be presented in annual reports.

For additional information on the photovoltaic system activity at MIT Lincoln Laboratory, please write to the address below:

Solar Photovoltaic Residential Project
MIT Lincoln Laboratory
Room D-437
Lexington, MA 02173

For additional information on the photovoltaic system activity at NMSEI, please write to the following address:

Information and Education Division
New Mexico Solar Energy Institute
New Mexico State University
Box 3 SOL
Las Cruces, NM 88003

TABLE 1
FEATURES OF THE PHOTOVOLTAIC ENERGY SYSTEMS
IN THE SOUTHWEST RES PROTOTYPES

Prototype System	Module Supplier	Array Area (m ²)	Array Peak Power (kWp)	Mounting Method	Array Tilt (°)	Inverter Supplier	Inverter Size (kva)
ARCO Solar	ARCO Solar	87.8	7.4	Direct	25	Windworks	8
ARTU	ARCO Solar	53.5	4.9	Standoff	45	Windworks	8
BDM	Motorola	54.0	4.4	Standoff	35	Abacus	6
General Electric	General Electric	74.3	6.7	Direct	26.6	Abacus	6
Solarex	Solarex	67.8	4.6	Standoff	26	Abacus	6
TEA	Motorola	49.4	4.2	Rack	26	Abacus	6
TriSolarCorp	Applied Solar	58.0	5.2	Integral	30	Windworks	8
Westinghouse	ARCO Solar	70.8	5.5	Integral	30	Abacus	6

TABLE 2
MONITORED HOUSE (MH) FEATURES

	MH1	MH2	MH3	MH4	MH5
Occupants	5	3	4	4	2
Working adults (daytime)	1	1	2	2	Retired
Size/Type of home	2,060 ft ² single family detached	2,400 ft ² single family detached	2,650 ft ² single family detached	1,700 ft ² single family detached	1,600 ft ² attached town house
Space Heating System	Electric/ solar	Heat pump	Electric	Natural gas	Heat pump
Cooling System	Evaporative	Heat pump	Evaporative	Evaporative	Heat pump
Domestic Hot Water System	Solar/ electric backup	Electric	Electric	Electric	Solar/ electric backup
Cooking	Electric	Electric	Electric	Electric	Electric
Clothes Drying	Electric	Electric	Electric	Electric	Electric

Figure 1. Flow Chart for Data Acquisition and Reporting of RES Operations

SECTION 1

RDS DATA FOR NOVEMBER

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MONTHLY SUMMARY (Based on Complete Days Only*)

SW RES MONTHLY SUMMARY

Month: November Year: 1981

Site Location
Latitude: 32°17' N
Longitude: 106°45' W
Elevation: 1,198 meters

METEOROLOGICAL INFORMATION

	SW RES
Average maximum ambient air temp. (°C).....	19.66
Average minimum ambient air temp. (°C).....	3.13
Average ambient air temp. (°C).....	11.40
Average degree days (°C day).....	-6.70
Total precipitation (cm).....	1.47
Average wind speed (m/s).....	2.06
Average total horizontal insolation (kWh/m ² /day).....	3.62

MONITORED HOUSE (MH) INFORMATION

	MH1	MH2	MH3	MH4	MH5
Average total electric energy used (kWh/day).....	45.09	52.49	53.90	32.22	-----
Average electric energy use: sunhours (kWh/day).....	21.85	23.02	24.25	13.38	-----

NUMBER OF COMPLETE DAYS OF MH DATA*.....29 26 25 29 -----

PROTOTYPE PHOTOVOLTAIC ARRAY INFORMATION

	TSC	SX	ARTU	ARCO	TEA	BDM	GE	WST
Average PV DC energy (kWh/day).....	29.31	24.14	29.49	36.66	-----	-----	33.76	30.28
Average PV DC energy/rated power (kWh/day/kWp).....	5.64	5.25	6.02	4.95	-----	-----	5.04	5.50
Maximum array peak power (kW).....	5.12	4.50	4.89	6.78	3.84	4.04	5.69	4.95
Average array peak power (kW).....	4.62	3.95	4.34	5.97	-----	-----	5.30	4.57
Average total tilt insolation: sunhours (kWh/m ² /day).....	5.78	5.40	6.12	5.27	5.42	5.74	5.42	5.81
Insolation during system on hours/total insolation (%).....	99.87	96.31	99.70	98.65	-----	-----	98.85	98.80
Maximum peak insolation (kW/m ²).....	1.04	1.01	1.09	1.00	1.00	1.06	0.99	1.04
Average peak insolation (kW/m ²).....	0.91	0.85	0.95	0.85	0.86	0.90	0.87	0.91
PV array efficiency (%).....	8.26	6.15	8.26	7.31	-----	-----	7.66	6.79
Average maximum panel temp. (°C).....	44.23	55.47	50.80	53.68	48.45	53.89	58.18	50.09
Average minimum panel temp. (°C).....	0.19	-0.45	1.36	-1.49	-0.44	1.00	-0.94	1.64

PROTOTYPE POWER CONDITIONING UNIT (PCU) INFORMATION

	TSC	SX	ARTU	ARCO	TEA	BDM	GE	WST
Average PCU AC energy output (kWh/day).....	27.12	20.87	26.01	32.66	-----	-----	28.67	25.69
Average PCU AC peak power output (kW).....	4.29	3.45	3.86	5.36	-----	-----	4.55	3.92
Maximum PCU AC peak power output (kW).....	4.77	3.88	4.43	6.06	3.25	3.60	4.86	4.22
PCU efficiency (%).....	92.91	87.20	88.73	89.70	-----	-----	85.42	85.41

PROTOTYPE AC ENERGY FLOW

	TSC	SX	ARTU	ARCO	TEA	BDM	GE	WST
Average imposed load 5 a.m. to 8 p.m. (kWh/day)**.....	20.58	18.46	20.04	24.84	-----	-----	19.51	20.08
Average energy supplied to utility feed (kWh/day).....	18.52	13.95	17.58	23.00	-----	-----	20.68	17.51
Average energy supplied by utility feed (kWh/day).....	12.77	11.48	12.15	15.92	-----	-----	12.03	12.57

NUMBER OF COMPLETE DAYS OF PROTOTYPE DC AND AC DATA+ 19 23 19 25 5 5 16 26

NUMBER OF COMPLETE DAYS OF PROTOTYPE LOAD, UTILITY DATA† 24 23 26 25 8 0 16 26

*A complete day is defined as more than 23 hours of data collected.

**Load imposed by MH4.

+A complete day is defined as a full day of dc and ac data available for comparison.

†A complete day is defined as a full day of load, energy to utility, and energy from utility data available for comparison.

Notes: No data is included from 24 November due to a systemwide test.

TSC was on-line all month. It had some nighttime load problems and invalid dc data.

SX was on-line all month. It had some nighttime load and instrumentation problems.

ARTU was on-line all month. It had some nighttime load problems and invalid dc data.

ARCO was on-line until Gemini inverter failure 30 November. It had some nighttime load problems.

TEA was off-line 3-20 November. Data base was not sufficient for meaningful comparison; data was deleted.

BDM was off-line until 22 November. Data base was not sufficient for meaningful comparison; data was deleted.

GE was off-line 3-9 and 12-13 November due to Abacus inverter failure. There were also some data transmission problems.

WST was on-line all month.

BRIEF MONTHLY REPORT (Including Partial Days)

MONTHLY REPORT FOR MONITORED HOUSES

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

TOTAL ELECTRIC ENERGY USED (KWH) ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.82	1.01	0.71	0.60	0.66	0.62	0.76	2.12	2.66	1.73	1.86	2.46	2.27	1.77	2.24	2.30	1.93	2.87	2.68	2.34	2.20	2.41	2.65	2.25	45.06
MH2	1.20	1.11	1.10	1.66	2.34	2.20	2.45	3.20	2.99	1.95	2.10	2.64	2.04	2.05	1.82	1.68	1.37	2.25	2.25	2.65	3.38	2.94	2.56	1.85	52.20
MH3	1.02	0.93	1.13	1.20	1.12	1.23	3.85	4.84	3.85	3.00	2.13	1.47	1.47	1.53	1.23	1.39	1.62	2.81	3.72	2.66	2.73	3.03	3.12	1.60	62.70
MH4	0.69	0.58	0.62	0.51	0.55	0.50	0.55	1.85	1.84	1.36	0.86	1.06	1.23	1.01	1.19	1.28	1.31	2.07	2.49	2.02	2.44	2.93	1.93	1.05	31.97
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY REPORT FOR PROTOTYPES

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

DC ARRAY OUTPUT (KWH) ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.88	2.35	3.50	3.83	4.34	4.30	3.89	3.16	2.18	0.74	0.04	0.0	0.0	0.0	0.0	0.0	0.0	29.95
SX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	1.90	2.92	3.26	3.69	3.74	3.33	2.58	1.69	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.14
ARTU	0.0	0.0	0.0	0.0	0.0	0.0	0.04	1.12	2.57	3.60	3.81	4.05	4.04	3.82	3.24	2.38	0.33	0.04	0.0	0.0	0.0	0.0	0.0	0.0	29.58
ARCO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	2.72	4.31	5.08	5.65	5.66	5.08	4.00	2.54	0.74	0.02	0.00	0.00	0.00	0.00	0.00	0.00	36.74
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.87	2.78	4.03	4.39	4.85	5.08	4.60	3.75	2.46	0.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.80
BST	0.0	0.0	0.0	0.0	0.0	0.0	0.01	1.04	2.61	3.64	3.93	4.35	4.35	4.00	3.31	2.26	0.31	0.02	0.0	0.0	0.0	0.0	0.0	0.0	30.36

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

AC INVERTER - REAL ENERGY OUTPUT (KWH) ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.0	0.0	0.0	0.0	0.0	0.0	0.03	0.79	2.18	3.25	3.65	4.02	3.80	3.61	2.92	2.01	0.65	0.03	0.0	0.0	0.0	0.0	0.0	0.0	27.18
SX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.44	1.63	2.55	2.85	3.22	3.26	2.90	2.23	1.43	0.35	0.00	0.0	0.0	0.0	0.0	0.0	0.0	20.88
ARTU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	2.27	3.19	3.38	3.59	3.58	3.38	2.86	2.09	0.73	0.03	0.00	0.00	0.00	0.00	0.00	0.00	26.07
ARCO	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.76	2.41	3.36	4.36	5.07	5.08	4.56	3.57	2.25	0.61	0.01	0.00	0.00	0.00	0.00	0.00	0.00	32.74
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.68	2.36	3.46	3.77	4.25	4.36	3.96	3.22	2.09	0.55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.70
BST	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.77	2.20	3.13	3.42	3.74	3.74	3.43	2.83	1.90	0.60	0.01	0.0	0.0	0.0	0.0	0.0	0.0	25.77

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

LOAD IMPOSED ON THE PROTOTYPE (KWH) ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.0	0.0	0.0	0.0	0.0	0.44	0.60	1.86	1.86	1.37	0.87	1.05	1.14	1.03	0.98	1.21	1.23	1.84	2.34	1.88	0.25	0.06	0.08	0.04	20.23
SX	0.0	0.0	0.0	0.0	0.0	0.45	0.57	1.36	1.58	1.24	0.81	0.98	1.06	1.08	0.97	1.11	1.23	1.75	2.16	1.78	0.13	0.05	0.07	0.04	18.51
ARTU	0.0	0.0	0.0	0.0	0.0	0.42	0.57	1.91	1.90	1.33	0.34	1.03	1.12	1.02	0.96	1.18	1.13	1.88	2.32	1.87	0.24	0.06	0.07	0.03	19.93
ARCO	0.00	0.00	0.00	0.00	0.00	0.43	0.59	1.80	1.86	1.46	1.19	1.31	1.36	1.28	1.27	1.46	1.43	2.23	2.67	2.13	0.69	0.43	0.44	0.40	24.49
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.0	0.0	0.0	0.0	0.0	0.40	0.48	1.67	1.61	1.33	0.89	1.00	1.19	0.96	1.04	1.17	1.31	1.81	2.33	1.85	0.24	0.0	0.0	0.0	19.42
BST	0.0	0.0	0.0	0.0	0.0	0.43	0.58	1.92	1.82	1.35	0.86	1.03	1.12	0.97	0.97	1.18	1.22	1.89	2.33	1.88	0.25	0.0	0.0	0.0	19.89

MONTHLY REPORT FOR PROTOTYPES

MONTHLY HOURLY AVERAGE
NOVEMBER 1981ENERGY SUPPLIED TO UTILITY (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.14	1.06	2.09	2.82	3.04	2.89	2.82	2.43	1.23	0.28	0.01	0.0	0.0	0.0	0.0	0.0	0.0	18.67
SX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.13	0.75	1.64	2.17	2.36	2.36	2.14	1.56	0.73	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.93
ARTU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	1.14	2.18	2.65	2.67	2.60	2.53	2.10	1.24	0.27	0.01	0.0	0.0	0.00	0.00	0.00	0.00	17.61
ARCO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.21	1.25	2.55	3.55	3.88	3.90	3.48	2.63	1.36	0.22	0.00	0.0	0.0	0.0	0.0	0.0	0.0	22.12
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.17	1.37	2.41	2.89	3.29	3.30	3.18	2.43	1.34	0.21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.69
WST	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.15	1.05	2.11	2.69	2.81	2.77	2.64	2.09	1.10	0.22	0.00	0.0	0.0	0.0	0.0	0.0	0.0	17.63

MONTHLY HOURLY AVERAGE
NOVEMBER 1981ENERGY SUPPLIED BY UTILITY (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.03	0.04	0.04	0.03	0.03	0.48	0.60	1.21	0.82	0.41	0.15	0.13	0.18	0.25	0.25	0.40	0.73	1.85	2.37	1.92	0.28	0.09	0.11	0.07	12.53
SX	0.03	0.03	0.03	0.03	0.33	0.46	0.57	1.01	0.67	0.32	0.14	0.13	0.16	0.32	0.28	0.39	0.91	1.68	2.08	1.73	0.25	0.09	0.10	0.07	11.51
ARTU	0.00	0.00	0.00	0.00	0.00	0.44	0.61	1.13	0.75	0.34	0.16	0.17	0.21	0.27	0.25	0.39	0.75	1.93	2.33	1.89	0.26	0.06	0.08	0.04	12.05
ARCO	0.02	0.02	0.02	0.02	0.02	0.45	0.62	1.27	0.73	0.29	0.23	0.15	0.14	0.26	0.38	0.61	1.14	2.25	2.68	2.15	0.71	0.44	0.46	0.42	15.63
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.02	0.02	0.02	0.03	0.03	0.42	0.51	1.17	0.63	0.31	0.13	0.07	0.16	0.21	0.27	0.43	1.01	1.83	2.35	1.87	0.26	0.02	0.02	0.02	11.91
WST	0.03	0.04	0.03	0.03	0.33	0.46	0.61	1.32	0.80	0.37	0.16	0.15	0.10	0.22	0.26	0.41	0.36	1.80	2.35	1.90	0.27	0.02	0.02	0.02	12.43

MONTHLY HOURLY AVERAGE
NOVEMBER 1981MAXIMUM INVERTER AC POWER (KW)
MAX POWER FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
TSC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.17	1.58	2.87	3.66	4.11	4.22	4.20	3.99	3.42	2.61	1.37	0.05	0.0	0.0	0.0	0.0	0.0
SX	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.12	2.18	2.98	3.35	3.43	3.40	3.21	2.71	1.95	0.83	0.00	0.0	0.0	0.0	0.0	0.0	0.0
ARTU	0.00	0.00	0.00	0.00	0.00	0.00	0.18	1.70	2.92	3.51	3.77	3.78	3.72	3.59	3.27	2.66	1.48	0.03	0.00	0.00	0.00	0.00	0.00	0.00
ARCO	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1.62	3.26	4.45	5.16	5.31	5.30	5.02	4.20	2.88	1.34	0.01	0.00	0.00	0.00	0.00	0.00	0.00
TEA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BDM	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GE	0.0	0.0	0.0	0.0	0.0	0.0	0.02	1.61	3.12	3.94	4.27	4.51	4.47	4.28	3.69	2.77	1.24	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WST	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1.60	2.82	3.45	3.81	3.90	3.88	3.73	3.25	2.50	1.25	0.01	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY REPORT FOR PROTOTYPES

MONTHLY HOURLY AVERAGE
NOVEMBER 1981TOTAL TILT INSULATION (KWH/M**2)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
TSC	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.23	0.43	0.63	0.73	0.87	0.87	0.77	0.60	0.39	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.84
SX	0.00	0.00	0.00	0.00	0.33	0.00	0.01	0.20	0.43	0.62	0.71	0.80	0.80	0.71	0.57	0.39	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.40
ARTU	0.0	0.0	0.0	0.0	0.0	0.00	0.01	0.22	0.47	0.68	0.79	0.90	0.91	0.82	0.66	0.47	0.21	0.01	0.00	0.00	0.00	0.00	0.00	0.00	6.15
ARCO	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.20	0.43	0.62	0.70	0.79	0.78	0.70	0.55	0.36	0.15	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.31
TEA	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.21	0.45	0.64	0.73	0.82	0.81	0.71	0.56	0.37	0.18	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.46
BDM	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.20	0.42	0.64	0.74	0.85	0.85	0.74	0.63	0.44	0.13	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.73
GE	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.21	0.45	0.66	0.74	0.81	0.81	0.71	0.57	0.37	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.49
WST	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.24	0.48	0.67	0.76	0.85	0.85	0.76	0.61	0.42	0.13	0.01	0.00	0.00	0.00	0.00	0.00	0.00	5.85

BRIEF MONTHLY REPORT FOR MONITORED HOUSE

MONTHLY HOURLY AVERAGE
NOVEMBER 1981ARCO - HYPOTHETICAL ENERGY TO UTILITY IF ARCO WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	0.89	2.24	2.85	2.99	3.18	2.90	1.77	0.70	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.69
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03	0.86	2.40	2.72	3.12	3.48	2.70	2.05	1.05	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.49
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.06	0.60	2.13	3.24	3.93	3.75	3.30	2.43	1.22	0.15	0.00	0.0	0.0	0.0	0.0	0.0	0.0	20.94
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	0.95	2.59	3.70	4.03	3.96	3.67	2.73	1.25	0.19	0.00	0.0	0.0	0.0	0.0	0.0	0.0	22.18
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981ARTJ - HYPOTHETICAL ENERGY TO UTILITY IF ARTJ WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.19	0.81	1.69	1.79	1.78	1.73	1.78	1.25	0.56	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.63
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.03	0.77	1.74	1.62	1.84	2.21	2.04	1.68	0.99	0.12	0.00	0.0	0.0	0.0	0.0	0.0	0.0	13.05
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.06	0.51	1.64	2.11	2.52	2.46	2.20	1.74	1.10	0.17	0.00	0.0	0.0	0.0	0.0	0.0	0.0	14.52
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.15	0.86	1.93	2.51	2.59	2.54	2.54	2.04	1.15	0.23	0.00	0.0	0.0	0.0	0.0	0.0	0.0	16.54
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 198190M - HYPOTHETICAL ENERGY TO UTILITY IF 90M WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981G6 - HYPOTHETICAL ENERGY TO UTILITY IF G6 WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	0.87	1.83	1.95	2.11	2.19	2.29	1.47	0.49	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.42
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.86	1.81	1.63	2.11	2.83	2.33	1.76	0.98	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.51
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.56	1.81	2.46	3.17	3.00	2.63	2.04	1.13	0.12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.95
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.07	0.86	2.07	2.86	3.20	3.23	3.07	2.32	1.07	0.14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.00
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BRIEF MONTHLY REPORT FOR MONITORED HOUSE

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

SX - HYPOTHETICAL ENERGY TO UTILITY IF SX WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.49	1.19	1.30	1.36	1.55	1.47	0.83	0.20	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.44
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.44	1.28	1.36	1.64	1.80	1.38	0.96	0.43	0.02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.23
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03	0.29	1.18	1.70	2.26	2.11	1.82	1.26	0.65	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.36
MH4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.05	0.53	1.42	2.06	2.25	2.26	2.09	1.47	0.63	0.05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.83
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

TEA - HYPOTHETICAL ENERGY TO UTILITY IF TEA WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

TSC - HYPOTHETICAL ENERGY TO UTILITY IF TSC WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.12	0.74	1.73	2.00	2.05	2.02	1.87	1.21	0.56	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.38
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.02	0.67	1.85	2.09	2.43	2.63	2.27	1.69	0.86	0.03	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.61
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.08	0.45	1.58	2.28	2.91	2.81	2.35	1.81	1.01	0.15	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.42
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.11	0.87	2.04	2.75	2.90	2.83	2.68	2.05	1.15	0.21	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.60
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

WST - HYPOTHETICAL ENERGY TO UTILITY IF WST WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.11	0.76	1.67	1.83	1.83	1.96	1.93	1.25	0.48	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.88
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.03	0.69	1.69	1.76	2.01	2.25	1.85	1.47	0.80	0.03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.64
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.06	0.50	1.63	2.24	2.71	2.56	2.30	1.75	0.86	0.13	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.86
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	0.82	1.93	2.63	2.76	2.72	2.61	2.03	0.97	0.15	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.72
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BRIEF MONTHLY REPORT FOR MONITORED HOUSE
MONTHLY HOURLY AVERAGE
NOVEMBER 1981

ARCO - HYPOTHETICAL ENERGY FROM UTILITY IF ARCO WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.62	0.83	0.69	0.59	0.67	0.66	0.76	1.50	1.14	0.22	0.08	0.30	0.12	0.10	0.50	0.82	1.07	2.74	2.61	2.28	2.21	2.39	2.56	2.19	28.77
MH2	1.28	1.13	1.17	1.49	2.04	2.45	2.67	2.66	1.38	0.30	0.25	0.27	0.09	0.25	0.28	0.42	1.35	2.37	2.32	2.69	3.29	2.50	2.45	1.86	36.85
MH3	1.02	0.84	1.07	1.14	0.94	1.09	3.61	3.89	1.50	0.45	0.26	0.05	0.05	0.11	0.04	0.25	1.01	2.72	3.15	2.26	2.55	2.77	2.99	1.29	35.24
MH4	0.70	0.59	0.65	0.51	0.56	0.50	0.57	1.26	0.50	0.10	0.02	0.01	0.04	0.36	0.13	0.22	0.31	1.94	2.41	1.92	2.22	3.05	2.03	1.07	21.80
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

ARTU - HYPOTHETICAL ENERGY FROM UTILITY IF ARTU WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.57	0.83	0.66	0.54	0.57	0.61	0.77	1.32	1.17	0.37	0.31	0.57	0.45	0.23	0.55	0.83	1.15	2.85	2.78	2.43	2.40	2.46	2.59	2.24	30.35
MH2	1.38	1.23	1.17	1.37	1.75	2.18	2.48	2.74	1.42	0.48	0.61	0.73	0.29	0.20	0.23	0.37	1.03	2.45	2.58	2.90	3.26	2.73	2.98	1.90	38.54
MH3	1.06	1.03	1.19	1.48	1.35	1.46	4.04	4.35	1.77	0.67	0.43	0.14	0.18	0.24	0.07	0.26	0.93	2.37	2.88	2.32	2.71	2.63	3.34	1.73	38.77
MH4	0.71	0.58	0.66	0.54	0.54	0.52	0.57	1.05	0.55	0.17	0.08	0.05	0.16	0.11	0.18	0.22	0.72	1.87	2.52	2.06	2.19	3.12	1.88	0.99	22.05
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

BUM - HYPOTHETICAL ENERGY FROM UTILITY IF BUM WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

SE - HYPOTHETICAL ENERGY FROM UTILITY IF SE WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.63	0.85	0.66	0.57	0.53	0.64	0.74	1.14	1.08	0.30	0.23	0.50	0.33	0.16	0.66	0.98	1.45	2.61	2.61	2.45	2.32	2.23	2.64	2.27	29.76
MH2	1.48	1.29	1.40	1.50	1.37	2.41	2.86	3.16	1.50	0.43	0.55	0.55	0.15	0.31	0.32	0.39	1.31	2.54	2.56	3.22	3.78	2.97	2.72	1.71	40.80
MH3	1.06	1.06	1.22	1.52	1.43	1.52	4.17	4.50	1.81	0.73	0.54	0.11	0.12	0.20	0.04	0.23	1.20	2.36	2.86	2.66	2.43	2.87	3.56	1.92	40.28
MH4	0.75	0.56	0.63	0.52	0.54	0.52	0.55	1.23	0.50	0.18	0.05	0.03	0.11	0.09	0.20	0.35	1.04	1.92	2.60	2.28	2.35	3.27	1.93	1.08	23.24
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

BRISB MONTHLY REPORT FOR MONITORED HOUSE
MONTHLY HOURLY AVERAGE
NOVEMBER 1981

SX - HYPOTHETICAL ENERGY FROM UTILITY IF SX WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.67	0.88	0.68	0.60	0.59	0.67	0.75	1.56	1.52	0.58	0.46	0.82	0.50	0.37	0.80	1.31	1.51	2.68	2.58	2.31	2.19	2.25	2.62	2.28	32.47
MH2	1.33	1.17	1.18	1.52	1.36	1.39	2.92	3.08	1.62	0.67	0.93	0.83	0.37	0.58	0.63	0.63	1.63	2.42	2.21	2.72	3.36	2.75	2.66	1.73	41.16
MH3	1.06	1.00	1.16	1.31	1.25	1.33	3.88	4.44	2.06	0.83	0.49	0.16	0.18	0.31	0.12	0.45	1.17	2.64	3.17	2.44	2.64	2.81	3.17	1.88	38.74
MH4	0.73	0.68	0.66	0.50	0.33	0.51	0.55	1.52	0.87	0.31	0.11	0.11	0.18	0.17	0.27	0.46	1.01	2.01	2.43	2.01	2.34	3.13	2.02	1.07	24.14
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

TEA - HYPOTHETICAL ENERGY FROM UTILITY IF TEA WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

TSC - HYPOTHETICAL ENERGY FROM UTILITY IF TSC WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.78	1.03	0.72	0.68	0.58	0.69	0.80	1.27	1.28	0.38	0.24	0.56	0.37	0.27	0.68	0.87	1.23	2.60	2.86	2.41	2.27	2.37	2.62	2.22	30.75
MH2	1.41	1.26	1.15	1.46	2.17	2.38	2.50	2.69	1.53	0.46	0.41	0.42	0.14	0.16	0.20	0.54	1.43	2.14	2.53	3.04	3.85	2.95	2.92	2.02	39.89
MH3	1.15	1.05	1.21	1.45	1.36	1.46	3.68	4.12	1.87	0.72	0.43	0.12	0.14	0.23	0.08	0.34	0.95	2.23	3.10	2.38	2.50	2.64	3.50	1.80	38.43
MH4	0.72	0.64	0.69	0.55	0.53	0.55	1.11	0.50	0.16	0.06	0.05	0.12	0.13	0.19	0.14	0.71	1.69	2.53	1.96	2.14	3.09	2.08	1.09		22.03
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

MONTHLY HOURLY AVERAGE
NOVEMBER 1981

WST - HYPOTHETICAL ENERGY FROM UTILITY IF WST WERE INSTALLED AT EACH MH (KWH)
ENERGY FOR EACH HOUR ENDING AT LOCAL STANDARD TIME

HOURL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
MH1	1.63	0.89	0.69	0.60	0.58	0.67	0.76	1.48	1.26	0.39	0.27	0.59	0.35	0.24	0.65	0.84	1.24	2.74	2.70	2.31	2.21	2.41	2.60	2.22	30.64
MH2	1.27	1.14	1.16	1.48	2.02	2.38	2.75	2.77	1.51	0.48	0.57	0.65	0.29	0.44	0.41	0.48	1.34	2.30	2.28	2.68	3.41	2.63	2.58	1.84	38.83
MH3	1.07	0.87	1.14	1.28	1.18	1.28	4.02	4.23	1.62	0.69	0.36	0.11	0.14	0.20	0.07	0.31	0.93	2.71	3.22	2.40	2.60	2.84	3.16	1.50	38.88
MH4	0.72	0.61	0.66	0.53	0.57	0.52	0.58	1.27	0.57	0.16	0.06	0.06	0.11	0.11	0.17	0.27	0.83	1.83	2.42	1.94	2.25	3.06	2.02	1.08	22.51
MH5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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SECTION 2

ENERGY HISTOGRAMS FOR NOVEMBER

Source of data is RDS and recording kilowatt hour meters. Comments on each histogram explain data and/or energy production anomalies. These November histograms inaugurate a new feature: vertically shaded bars depict 8 percent of the daily available solar energy falling on each Prototype System's active array area, enabling an immediate evaluation of production efficiency.

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ARCO - November 1981

ARTU - November 1981

BDM - November 1981

General Electric - November 1981

Solarex - November 1981

NO RDS DATA

WHEN METER READINGS SPAN MORE THAN ONE DAY, VALUES ARE DETERMINED BY WEIGHTING WITH RDS DATA IF APPLICABLE OR BY AVERAGING.

DATE

11-3 PDC PYRANOMETER CIRCUIT RECALIBRATED.
11-6 INVERTER OUTPUT TRANSDUCER REPAIRED - TILT INSULATION LOOKS LOW.
11-10 I-V CURVES TRACES PERFORMED.
11-11 INVERTER DOWN @ 1700 HRS.
11-12 INVERTER RESTARTED @ 0900 HRS.
11-13 INVERTER OFF A FEW MINUTES EVERY 20 HRS. FOR TESTS.
11-19 SAME AS 11-12
11-24 8-INVERTER TEST PERFORMED.
11-25 OPEN CIRCUIT IN STRING 4.

METER READINGS - [Pattern] AVERAGE/WEIGHTED METER VALUES - [Pattern] RDS READINGS - [Pattern] 8X OF AVAILABLE SOLAR ENERGY - [Pattern]

TEA - November 1981

NO RDS DATA

WHEN METER READINGS SPAN MORE THAN ONE DAY, VALUES ARE DETERMINED BY WEIGHTING WITH RDS DATA IF APPLICABLE OR BY AVERAGING.

DATE

11-3 PDC PYRANOMETER CIRCUIT RECALIBRATED.
11-12 PDC SHUT DOWN FROM 1535 TO 1600 TO INSTALL FAN.
11-19 & 20 STRANGE METER DATA PROBABLY ERRONEOUS.
11-24 8-INVERTER TEST PERFORMED.

METER READINGS - [Pattern] AVERAGE/WEIGHTED METER VALUES - [Pattern] RDS READINGS - [Pattern] 8X OF AVAILABLE SOLAR ENERGY - [Pattern]

TriSolarCorp - November 1981

Westinghouse - November 1981