

AL KAFAAT AIN SAADEH - PHASE 1

PV SOLAR SYSTEM - PRELIMINARY DESIGN ASSESSMENT

LOAD WITH SOLAR ENERGY SIMULATION

PRELIMINARY TECHNICAL DESIGN WITH BUDGET & COST SAVING ANALYSIS

ELECTRICAL CONSULTANT: ROGER NJEIM

DATE: JULY 8, 2024

PREPARED USING: PHOTOVOLTAIC GEOGRAPHICAL INFORMATION SYSTEM, (EUROPEAN COMMISSION JRC)

WEATHER DATA: PVGIS-SARAH2, Year 2020

TECHNICAL DESIGN BRIEF

PROJECT:	AL KAFaat AIN SAADEH - PHASE 1
DESCRIPTION:	<p>PHASE 1 OF THE PROJECT INCLUDES THE PRESENT LOADS WHICH DOES NOT INCLUDE THE FULL POWER OF THE PROJECT WHEN FULLY OPERATIONAL.</p> <p>THE LOADS ARE CURRENTLY MUCH LOWER, AND THIS HAS BEEN THE CASE SINCE 2017. FOR INSTANCE, THE ATELIER (MAIN KITCHEN) IS PRESENTLY NOT OPERATIONAL.</p> <p>PHASE 2 OF THE PROJECT SHALL BE CONSIDERED LATER ON WHEN THE PROJECT WILL BECOME FULLY OPERATIONAL AGAIN, AND WILL BE DESIGNED LATER ON TO COMPLEMENT AND CONNECT TO THE PRESENT PHASE WITH CAPACITIES AND SOLAR COLLECTORS THAT WILL CATER FOR THE ADDITIONAL LOADS.</p> <p>THE GENERATOR POWER AND CONTROL OPERATION WILL THEN ALSO HAVE TO BE UPGRADED ACCORDINGLY.</p> <p>IN SUMMARY, THE PRESENT PHASE 1 OF THE PROJECT AIMS AT REDUCING THE RUNNING HOURS OF THE SMALL GENERATOR 250KVA (200KW) PRIME. THUS, THE TOTAL CAPACITY OF THE SYSTEM IS DESIGNED ACCORDINGLY.</p> <p>THIS DOCUMENT SHALL BE FOLLOWED BY A FULL DESIGN INCLUDING NECESSARY LAYOUTS, PANEL DETAILS, SINGLE LINE DIAGRAMS, LOAD AND FEEDER SCHEDULES AND CLAUCATIONS.</p> <p>IT IS ALSO NECESSARY TO NOTE THAT A LOAD MONITORING UNIT SHALL BE INSTALLAED OVER A PERIOD OF TIME TO DOUBLE CHECK AND CONFIRM THE LOAD PROFILE PRESENTED IN THIS DOCUMENTS WHICH WAS OBTAINED FROM THE AVAILABLE ON SITE DATA.</p>

MATERIAL SPECIFICATIONS:	MANUFACTURERS OR EQUAL:	TEHCNICAL REFERENCES:
EDL KWH METER:	3X500A	SOLAR PANELS:
SMALL GENERATOR	250KVA, PRIME	JINKO
BIG GENRATOR:	600KVA, PRIME	HYBRID INVERTERS:
PROPOSED PV SYSTEM:	OFF GRID	DEYE
PV PANELS:	BIFACIAL N-TYPE, 605Wp	BATTERIES:
INVERTERS:	4 X HYBRID 50KW IN PARALLEL	DEYE
TOTAL INVERTER CAPACITY:	200KW	CABLES:
BATTERY TYPE:	48 x 5.12KWh LIFEPO4	NEXANS
BATTERY SYSTEM:	HIGH VOLTAGE CLUSTER BOX	AC BREAKERS:
STORAGE CAPACITY:	245.76KWh	SCHNEIDER, LEGRAND
DC CABLES:	TCU FLEX/XLPE/XLPE, 1.5KV	DC BREAKERS:
AC CABLES:	CU/PVC/PVC	SCHNEIDER, LEGRAND
GROUNDING CABLES:	CU/PVC	CONTACTOR:
		SCHNEIDER, LEGRAND
		CABLE TRAYS:
		UNITECH, EURO TRAY
		PV PANELS:
		IEC61215 & IEC61730
		DC CABLES:
		EN 50618 & IEC 62930
		INVERTERS:
		UL508, EN 61000-3-2, IEC
		60950-1, EN 60950-1, en
		55022, en 55024
		BATTERIES:
		EN 61000, IEC 62619, IEC
		62040
		MAX VD DC CABLES:
		2.50%
		MAX VD AC CABLES:
		3.00%

Radiation Database: PVGIS-SARAH2, Year 2020

Requested Location: **AL KAFaat AIN SAADEH - PHASE 1**

Latitude (Deg.): 33.868

Longitude (Deg.): 35.580

Elev (m): 336

DC System Size (kWp): 174.24

Number of PV Panels: 288

Panel Peak Power (Wp): 605

Array Type: Fixed on Elevated Racks

Array Tilt (Deg): 2

Array Azimuth (Deg): 0

System Losses: 14.00

Invert Efficiency: 96%

DC to AC Size Ratio: 1.2

SIMULATION FOR THE YEARLY - SOLAR ENERGY COLLECTED



Month	AC System Output (KWHr)	DC array Output (KWHr)	Max Day AC Output (KWHr)	Min Day AC Output (KWHr)	Average Day AC Output (KWHr)
JAN	9,961.67	10,376.74	592.37	76.38	321.34
FEB	11,714.87	12,202.99	725.42	91.77	403.96
MAR	18,062.58	18,815.19	857.49	129.13	582.66
APR	22,786.16	23,735.59	1,085.46	297.91	759.54
MAY	29,665.68	30,901.75	1,138.47	414.54	956.96
JUN	31,369.11	32,676.16	1,172.51	710.17	1,045.64
JUL	27,572.64	28,721.50	1,062.39	476.11	889.44
AUG	27,104.69	28,234.05	1,040.39	569.68	874.34
SEP	22,201.66	23,126.73	869.26	464.89	740.06
OCT	18,455.20	19,224.17	749.04	323.69	595.33
NOV	11,561.80	12,043.54	549.46	115.95	385.39
DEC	11,455.65	11,932.97	480.53	91.31	369.54
TOTAL YEAR	241,911.71	251,991.37			

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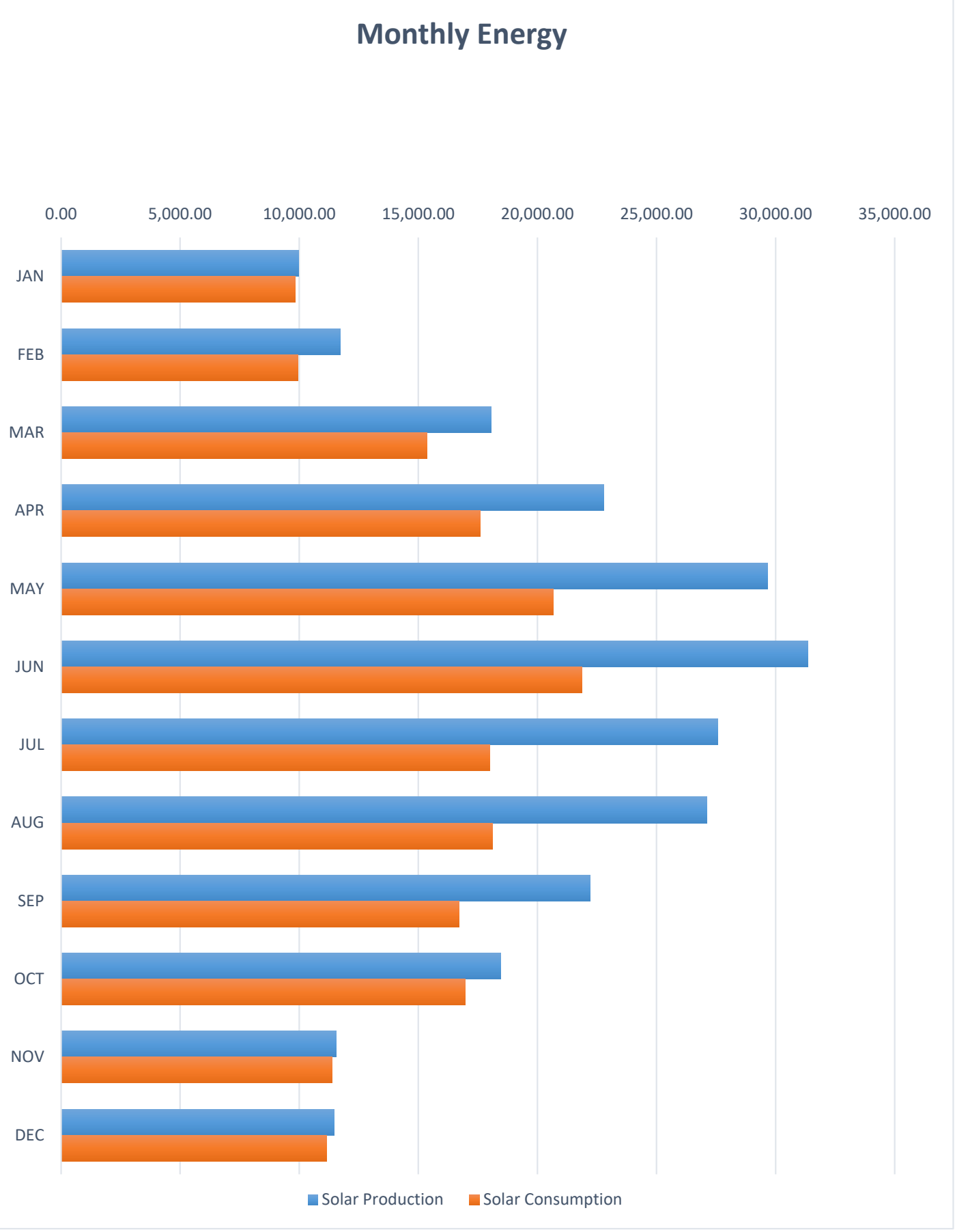
Array Azimuth (Deg): 0

System Losses: 14.00

Invert Efficiency: 96%

DC to AC Size Ratio: 1.2

Month	PV System Production (KWhr)	PV System Consumption (KWhr)	Average % Use
JAN	9,961.67	9,842.64	1%
FEB	11,714.87	9,958.54	15%
MAR	18,062.58	15,354.58	15%
APR	22,786.16	17,587.15	23%
MAY	29,665.68	20,659.06	30%
JUN	31,369.11	21,875.80	30%
JUL	27,572.64	17,988.93	35%
AUG	27,104.69	18,125.99	33%
SEP	22,201.66	16,723.52	25%
OCT	18,455.20	16,969.74	8%
NOV	11,561.80	11,388.28	2%
DEC	11,455.65	11,153.05	3%
TOTAL YEAR	241,911.71	187,627.29	



AL Kafaat AIN SAADEH - PHASE 1	PRELIMINARY BILL OF QUANTITIES & BUDGET ESTIMATE			
ITEM DESCRIPTION	QTY.	UP(US\$)	TP(US\$)	REMARKS
PV PANELS	288	\$115	\$33,120	<i>Bifacial N Type, 605Wp each</i>
DC CABLES	1	\$3,200	\$3,200	
STEEL STRUCTURE	1	\$28,800	\$28,800	<i>Rooftop flat structure 120Km/Hr wind</i>
HYBRID INVERTER 50KW	4	\$7,000	\$28,000	<i>Deye Hybrid Inverter</i>
BATTERY BANK 12 X 5.12KWh	4	\$15,000	\$60,000	<i>Deye HV with HV Cluster Control Box</i>
DC PANELS	1	\$2,000	\$2,000	
AC PANELS + AUTOMATIC BYPASS + SURGE ARREST.	1	\$8,000	\$8,000	
REFURBISHING OF EXISTING PANELS	1	\$25,000	\$25,000	
AC CABLES	1	\$8,000	\$8,000	<i>Including grounding Cables</i>
CABLE TRAYS	1	\$2,000	\$2,000	<i>Heavy duty, HDG after perforation</i>
INSTALLATION & OTHER WORKS	1	\$9,906	\$9,906	<i>Excluding generator cost</i>
DESIGN & SUPERVISION WORK	1	\$5,000	\$5,000	
TOTAL AMOUNT (VAT NOT INCLUDED):			\$213,026	
NOTES: The above budget estimate does not include the cost of a new generator, if needed.				

AL KAFaat AIN SAADEH - PHASE 1	PV SYMMARY ROI CALCULATIONS	
SAVINGS CALCULATIONS	AMOUNT	REMARKS
SOLAR ENERGY COLLECTED PER YEAR (KWHr/Yr):	241,912	
AVERAGE % OF SOLAR ENERGY USED FOR LOADS:	82%	From Monthly Average use
AVERAGE % OF SOLAR ENERGY UNUSED:	18%	
SOLAR ENERGY MAXIMUM USED PER YEAR (KWHr/Yr):	197,688	
OVERALL OCCUPANCY PERCENTAGE, CONDIERING WEEKENDS & OFF DAYS:	80%	
SOLAR ENERGY ACTUALLY USED PER YEAR (KWHr/Yr):	158,151	
ESTIMATED DIESEL PRICE (US\$ / L):	\$0.844	8-Jul-24
EFFECTIVE D.SP PRODUCTION OF GENERATOR (KWh/L):	3.00	
YEARLY DIESEL SAVING (L):	52,717	
YEARLY SIMPLE AMOUNT SAVING BASED ON FUEL SAVING (US\$):	\$44,493	
Units Cost of Production of 1 KWHr in Market:	\$0.28	8-Jul-24
YEARLY AMOUNT SAVING BASED OF PRODUCED KWHr:	\$55,353	
INITIAL COST OF THE SYSTEM (INVESTMENT):	\$213,026	REFER TO BUDGET BOQ
RETURN ON INVESTMENT (FLAT):	4.79	BASED ON FUEL SAVING VALUE
TOTAL ESTIMATED GENERATOR RUN HOUR PER YEAR:	1,272	NO EDL
TOTAL ESTIMATED GENERATOR OFF HOUR PER YEAR:	7,488	SOLAR + BATTERIES
AVERAGE DAILY GENERATOR RUN HOURS:	3.48	PER DAY MAXIMUM
AVERAGE DAILY GENERATOR RUN HOURS, COLD SEASON (SEP TO MAY):	5.50	
AVERAGE DAILY GENERATOR RUN HOURS, WARM SEASON (SUMMER):	1.50	
SYSTEM RESULTS: -24 HOUR AVAILABLE POWER -NO EDL -EXTRA VAILABLE SOLAR POWER DURING LOW SEASON COULD BE USED FOR OTHER LOADS -GENERATOR REQUIRED TO OPERATE THE SYSTEM: 250KVA PRIME		

DAY	AL KAFaat AIN SAADEH - PHASE 1				1 DAY SAMPLE LOAD PROFILE					WINTER DAY		220V
HOUR	Blocks ABCD	Rest.	Foyer	Theater	Atelier	Other		Total	Total Units	TOTAL LOAD (WHR)	TOTAL (AMP 1PH)	Remarks
CONN.	50,000 W	80,000 W	15,000 W	60,000 W	80,000 W	30,000 W	0 W	315,000 W	1	315,000 W	477.3 A	Max.
DAY	60%	50%	10%	1%	1%	30%	0%	Occup.=	80%	81,900 W	124.1 A	Peak
EVENING	10%	10%	30%	1%	1%	10%	0%			21,900 W	33.2 A	Peak
NIGHT	2%	5%	20%	1%	1%	2%	0%			10,000 W	15.2 A	Peak
0	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
1	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
2	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
3	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
4	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
5	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
6	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
7	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
8	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
9	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
10	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
11	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
12	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
13	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
14	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
15	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
16	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
17	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
18	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
19	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
20	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
21	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
22	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
23	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
TOTAL (WHR):	305,000	440,000	66,000	14,400	19,200	102,000	0	946,600		757,280		
% Consump.	32.22%	46.48%	6.97%	1.52%	2.03%	10.78%	0.00%	125.00%				
DAY -TOTAL ENERGY:										466.6 KWHr	88.4 A	
EVENING -TOTAL ENERGY:										169.1 KWHr	32.0 A	
NIGHT -TOTAL ENERGY:										56.0 KWHr	12.1 A	
TOTAL DAILY ENERGY:										757.3 KWHr		
HOURLY AVERAGE:										31.6 KWHr	47.8 A	

DAY	AL Kafaat AIN SAADEH - PHASE 1				1 DAY SAMPLE LOAD PROFILE					SPRING DAY		
HOUR	Blocks ABCD	Rest.	Foyer	Theater	Atelier	Other	0	Total	Total Units	TOTAL LOAD (WHR)	TOTAL (AMP 3PH)	Remarks
CONN.	50,000 W	80,000 W	15,000 W	60,000 W	80,000 W	30,000 W	0 W	315,000 W	1	315,000 W	477.3 A	Max.
DAY	60%	70%	10%	1%	1%	30%	0%	Occup.=	80%	97,900 W	148.3 A	Peak
EVENING	10%	30%	30%	1%	1%	10%	0%			37,900 W	57.4 A	Peak
NIGHT	2%	5%	20%	1%	1%	2%	0%			10,000 W	15.2 A	Peak
0	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
1	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
2	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
3	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
4	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
5	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
6	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
7	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
8	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
9	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
10	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
11	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
12	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
13	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
14	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
15	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
16	30,000	56,000	1,500	600	800	9,000	0	97,900		78,320	118.7 A	
17	5,000	24,000	4,500	600	800	3,000	0	37,900		30,320	45.9 A	
18	5,000	24,000	4,500	600	800	3,000	0	37,900		30,320	45.9 A	
19	5,000	24,000	4,500	600	800	3,000	0	37,900		30,320	45.9 A	
20	5,000	24,000	4,500	600	800	3,000	0	37,900		30,320	45.9 A	
21	5,000	24,000	4,500	600	800	3,000	0	37,900		30,320	45.9 A	
22	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
23	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
TOTAL (WHR):	305,000	664,000	66,000	14,400	19,200	102,000	0	1,170,600		936,480		
% Consump.	26.06%	56.72%	5.64%	1.23%	1.64%	8.71%	0.00%	125.00%				
DAY -TOTAL ENERGY:										556.2 KWHr	105.3 A	
EVENING -TOTAL ENERGY:										245.9 KWHr	46.6 A	
NIGHT -TOTAL ENERGY:										56.0 KWHr	12.1 A	
TOTAL DAILY ENERGY:										936.5 KWHr		
HOURLY AVERAGE:										39.0 KWHr	59.1 A	

DAY	AL KAFaat AIN SAADEH - PHASE 1				1 DAY SAMPLE LOAD PROFILE					SUMMER DAY		
HOUR	Blocks ABCD	Rest.	Foyer	Theater	Atelier	Other	0	Total	Total Units	TOTAL LOAD (WHR)	TOTAL (AMP 3PH)	Remarks
CONN.	50,000 W	80,000 W	15,000 W	60,000 W	1,500 W	30,000 W	0 W	315,000 W	1	315,000 W	477.3 A	Max.
DAY	60%	70%	10%	1%	1%	30%	0%	Occup.=	60%	97,115 W	147.1 A	Peak
EVENING	10%	10%	30%	1%	1%	10%	0%			21,115 W	32.0 A	Peak
NIGHT	2%	5%	20%	1%	1%	2%	0%			9,215 W	14.0 A	Peak
0	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
1	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
2	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
3	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
4	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
5	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
6	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
7	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
8	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
9	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
10	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
11	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
12	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
13	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
14	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
15	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
16	30,000	56,000	1,500	600	15	9,000	0	97,115		58,269	88.3 A	
17	5,000	8,000	4,500	600	15	3,000	0	21,115		12,669	19.2 A	
18	5,000	8,000	4,500	600	15	3,000	0	21,115		12,669	19.2 A	
19	5,000	8,000	4,500	600	15	3,000	0	21,115		12,669	19.2 A	
20	5,000	8,000	4,500	600	15	3,000	0	21,115		12,669	19.2 A	
21	5,000	8,000	4,500	600	15	3,000	0	21,115		12,669	19.2 A	
22	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
23	1,000	4,000	3,000	600	15	600	0	9,215		5,529	8.4 A	
TOTAL (WHR):	305,000	584,000	66,000	14,400	360	102,000	0	1,071,760		643,056		
% Consump.	40.28%	77.12%	8.72%	1.90%	0.05%	13.47%	0.00%	166.67%				
DAY -TOTAL ENERGY:										413.4 KWHr	78.3 A	
EVENING -TOTAL ENERGY:										132.7 KWHr	25.1 A	
NIGHT -TOTAL ENERGY:										38.7 KWHr	8.4 A	
TOTAL DAILY ENERGY:										643.1 KWHr		
HOURLY AVERAGE:										26.8 KWHr	40.6 A	

DAY	AL KAFaat AIN SAADEH - PHASE 1				1 DAY SAMPLE LOAD PROFILE					FALL DAY		
HOUR	Blocks ABCD	Rest.	Foyer	Theater	Atelier	Other	0	Total	Total Units	TOTAL LOAD (WHR)	TOTAL (AMP 3PH)	Remarks
CONN.	50,000 W	80,000 W	15,000 W	60,000 W	80,000 W	30,000 W	0 W	315,000 W	1	315,000 W	477.3 A	Max.
DAY	60%	50%	10%	1%	1%	30%	0%	Occup.=	80%	81,900 W	124.1 A	Peak
EVENING	10%	10%	30%	1%	1%	10%	0%			21,900 W	33.2 A	Peak
NIGHT	2%	5%	20%	1%	1%	2%	0%			10,000 W	15.2 A	Peak
0	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
1	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
2	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
3	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
4	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
5	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
6	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
7	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
8	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
9	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
10	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
11	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
12	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
13	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
14	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
15	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
16	30,000	40,000	1,500	600	800	9,000	0	81,900		65,520	99.3 A	
17	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
18	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
19	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
20	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
21	5,000	8,000	4,500	600	800	3,000	0	21,900		17,520	26.5 A	
22	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
23	1,000	4,000	3,000	600	800	600	0	10,000		8,000	12.1 A	
TOTAL (WHR):	305,000	440,000	66,000	14,400	19,200	102,000	0	946,600		757,280		
% Consump.	40.28%	58.10%	8.72%	1.90%	2.54%	13.47%	0.00%	125.00%				
DAY -TOTAL ENERGY:										466.6 KWHr	88.4 A	
EVENING -TOTAL ENERGY:										169.1 KWHr	32.0 A	
NIGHT -TOTAL ENERGY:										56.0 KWHr	12.1 A	
TOTAL DAILY ENERGY:										757.3 KWHr		
HOURLY AVERAGE:										31.6 KWHr	47.8 A	

DAY	AL KAFaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOUR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Jan			Battery WHr =	245,760	100%				150,884 W	
	Winter		January			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	321,344			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	112,000	46%	0	22,035	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	104,000	42%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	96,000	39%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	88,000	36%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	80,000	33%	0	8,000	0	OFF	
5	8,000	12.1 A	0	-8,000	0	-8,000	72,000	29%	0	8,000	0	OFF	
6	8,000	12.1 A	1,509	-6,491	0	-6,491	121,152	49%	0	0	0	GEN ON	
7	8,000	12.1 A	11,986	3,986	3,986	0	170,304	69%	0	0	3,986	GEN ON	
8	65,520	99.3 A	25,760	-39,760	0	-39,760	219,456	89%	0	0	0	GEN ON	
9	65,520	99.3 A	55,666	-9,854	0	-9,854	209,602	85%	0	9,854	0	OFF	
10	65,520	99.3 A	77,195	11,675	11,675	0	221,277	90%	11,675	0	0	OFF	
11	65,520	99.3 A	66,995	1,475	1,475	0	222,753	91%	1,475	0	0	OFF	
12	65,520	99.3 A	43,962	-21,558	0	-21,558	201,195	82%	0	21,558	0	OFF	
13	65,520	99.3 A	25,585	-39,935	0	-39,935	161,261	66%	0	39,935	0	OFF	
14	65,520	99.3 A	21,646	-43,874	0	-43,874	117,387	48%	0	43,874	0	OFF	
15	65,520	99.3 A	3,272	-62,248	0	-62,248	55,139	22%	0	62,248	0	OFF	
16	65,520	99.3 A	0	-65,520	0	-65,520	104,291	42%	0	0	0	GEN ON	
17	17,520	26.5 A	0	-17,520	0	-17,520	153,443	62%	0	0	0	GEN ON	
18	17,520	26.5 A	0	-17,520	0	-17,520	202,595	82%	0	0	0	GEN ON	
19	17,520	26.5 A	0	-17,520	0	-17,520	185,075	75%	0	17,520	0	OFF	
20	17,520	26.5 A	0	-17,520	0	-17,520	167,555	68%	0	17,520	0	OFF	
21	17,520	26.5 A	0	-17,520	0	-17,520	150,035	61%	0	17,520	0	OFF	
22	8,000	12.1 A	0	-8,000	0	-8,000	142,035	58%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	134,035	55%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		333,577	Extra Solar =	17,137	440,839		13,151	308,063	3,986	6	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	321KWH AV.	Load on Solar =	316,441		Total on Solar =	329,591		1%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOuR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Feb			Battery WHr =	245,760	100%				150,884 W	
	Winter		February			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	403,961			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	162,000	66%	0	36,737	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	154,000	63%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	146,000	59%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	138,000	56%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	130,000	53%	0	8,000	0	OFF	
5	8,000	12.1 A	0	-8,000	0	-8,000	122,000	50%	0	8,000	0	OFF	
6	8,000	12.1 A	4,206	-3,794	0	-3,794	118,206	48%	0	3,794	0	OFF	
7	8,000	12.1 A	11,984	3,984	3,984	0	122,190	50%	3,984	0	0	OFF	
8	65,520	99.3 A	42,297	-23,223	0	-23,223	98,967	40%	0	23,223	0	OFF	
9	65,520	99.3 A	48,646	-16,874	0	-16,874	82,093	33%	0	16,874	0	OFF	
10	65,520	99.3 A	56,694	-8,826	0	-8,826	73,267	30%	0	8,826	0	OFF	
11	65,520	99.3 A	98,446	32,926	32,926	0	122,419	50%	0	0	32,926	GEN ON	
12	65,520	99.3 A	94,461	28,941	28,941	0	171,571	70%	0	0	28,941	GEN ON	
13	65,520	99.3 A	80,997	15,477	15,477	0	220,723	90%	0	0	15,477	GEN ON	
14	65,520	99.3 A	55,112	-10,408	0	-10,408	210,316	86%	0	10,408	0	OFF	
15	65,520	99.3 A	23,045	-42,475	0	-42,475	167,841	68%	0	42,475	0	OFF	
16	65,520	99.3 A	0	-65,520	0	-65,520	102,321	42%	0	65,520	0	OFF	
17	17,520	26.5 A	0	-17,520	0	-17,520	84,801	35%	0	17,520	0	OFF	
18	17,520	26.5 A	0	-17,520	0	-17,520	67,281	27%	0	17,520	0	OFF	
19	17,520	26.5 A	0	-17,520	0	-17,520	116,433	47%	0	0	0	GEN ON	
20	17,520	26.5 A	0	-17,520	0	-17,520	165,585	67%	0	0	0	GEN ON	
21	17,520	26.5 A	0	-17,520	0	-17,520	214,737	87%	0	0	0	GEN ON	
22	8,000	12.1 A	0	-8,000	0	-8,000	206,737	84%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	198,737	81%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		515,888	Extra Solar =	81,328	322,720		3,984	298,896	77,344	6	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	404KWH AV.	Load on Solar =	434,560		Total on Solar =	438,545		15%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOUR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Feb			Battery WHr =	245,760	100%				150,884 W	
	Winter		February			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	403,961			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	162,000	66%	0	36,737	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	154,000	63%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	146,000	59%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	138,000	56%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	130,000	53%	0	8,000	0	OFF	
5	8,000	12.1 A	0	-8,000	0	-8,000	122,000	50%	0	8,000	0	OFF	
6	8,000	12.1 A	4,206	-3,794	0	-3,794	118,206	48%	0	3,794	0	OFF	
7	8,000	12.1 A	11,984	3,984	3,984	0	122,190	50%	3,984	0	0	OFF	
8	65,520	99.3 A	42,297	-23,223	0	-23,223	98,967	40%	0	23,223	0	OFF	
9	65,520	99.3 A	48,646	-16,874	0	-16,874	82,093	33%	0	16,874	0	OFF	
10	65,520	99.3 A	56,694	-8,826	0	-8,826	73,267	30%	0	8,826	0	OFF	
11	65,520	99.3 A	98,446	32,926	32,926	0	122,419	50%	0	0	32,926	GEN ON	
12	65,520	99.3 A	94,461	28,941	28,941	0	171,571	70%	0	0	28,941	GEN ON	
13	65,520	99.3 A	80,997	15,477	15,477	0	220,723	90%	0	0	15,477	GEN ON	
14	65,520	99.3 A	55,112	-10,408	0	-10,408	210,316	86%	0	10,408	0	OFF	
15	65,520	99.3 A	23,045	-42,475	0	-42,475	167,841	68%	0	42,475	0	OFF	
16	65,520	99.3 A	0	-65,520	0	-65,520	102,321	42%	0	65,520	0	OFF	
17	17,520	26.5 A	0	-17,520	0	-17,520	84,801	35%	0	17,520	0	OFF	
18	17,520	26.5 A	0	-17,520	0	-17,520	67,281	27%	0	17,520	0	OFF	
19	17,520	26.5 A	0	-17,520	0	-17,520	116,433	47%	0	0	0	GEN ON	
20	17,520	26.5 A	0	-17,520	0	-17,520	165,585	67%	0	0	0	GEN ON	
21	17,520	26.5 A	0	-17,520	0	-17,520	214,737	87%	0	0	0	GEN ON	
22	8,000	12.1 A	0	-8,000	0	-8,000	206,737	84%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	198,737	81%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		515,888	Extra Solar =	81,328	322,720		3,984	298,896	77,344	6	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	404KWH AV.	Load on Solar =	434,560		Total on Solar =	438,545		15%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOURLY	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Apr			Battery WHr =	245,760	100%				167,726 W	
	Spring		April			Battery C Rate =	49,152	20%			Gen. Size PRIME =	280 KVA	
	W	Daily Av.	759,539			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	162,000	66%	0	5,184	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	154,000	63%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	146,000	59%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	138,000	56%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	130,000	53%	0	8,000	0	OFF	
5	8,000	12.1 A	17,926	9,926	9,926	0	139,926	57%	9,926	0	0	OFF	
6	8,000	12.1 A	51,859	43,859	43,859	0	183,785	75%	43,859	0	0	OFF	
7	8,000	12.1 A	82,135	74,135	74,135	0	245,760	100%	61,975	0	12,160	OFF	
8	78,320	118.7 A	104,992	26,672	26,672	0	245,760	100%	0	0	26,672	OFF	
9	78,320	118.7 A	125,833	47,513	47,513	0	245,760	100%	0	0	47,513	OFF	
10	78,320	118.7 A	106,468	28,148	28,148	0	245,760	100%	0	0	28,148	OFF	
11	78,320	118.7 A	128,798	50,478	50,478	0	245,760	100%	0	0	50,478	OFF	
12	78,320	118.7 A	118,875	40,555	40,555	0	245,760	100%	0	0	40,555	OFF	
13	78,320	118.7 A	71,198	-7,122	0	-7,122	238,638	97%	0	7,122	0	OFF	
14	78,320	118.7 A	59,991	-18,329	0	-18,329	220,309	90%	0	18,329	0	OFF	
15	78,320	118.7 A	25,887	-52,433	0	-52,433	167,876	68%	0	52,433	0	OFF	
16	78,320	118.7 A	6,813	-71,507	0	-71,507	96,368	39%	0	71,507	0	OFF	
17	30,320	45.9 A	0	-30,320	0	-30,320	66,048	27%	0	30,320	0	OFF	
18	30,320	45.9 A	0	-30,320	0	-30,320	115,200	47%	0	0	0	GEN ON	
19	30,320	45.9 A	0	-30,320	0	-30,320	164,352	67%	0	0	0	GEN ON	
20	30,320	45.9 A	0	-30,320	0	-30,320	213,504	87%	0	0	0	GEN ON	
21	30,320	45.9 A	0	-30,320	0	-30,320	183,184	75%	0	30,320	0	OFF	
22	8,000	12.1 A	0	-8,000	0	-8,000	175,184	71%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	167,184	68%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	556.2 KWHr	105.3 A										
	EVENING -TOTAL ENERGY:	245.9 KWHr	46.6 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	936.5 KWHr		900,774	Extra Solar =	321,285	356,992		115,760	263,216	205,525	3	
	HOURLY AVERAGE:	39.0 KWHr	59.1 A	760KWH AV.	Load on Solar =	579,488		Total on Solar =	695,248		23%		

DAY	AL KAFaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOURLY	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-May			Battery WHr =	245,760	100%				167,726 W	
	Spring		May			Battery C Rate =	49,152	20%			Gen. Size PRIME =	280 KVA	
	W	Daily Av.	956,957			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	192,000	78%	0	20,790	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	184,000	75%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	176,000	72%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	168,000	68%	0	8,000	0	OFF	
4	8,000	12.1 A	1,000	-7,000	0	-7,000	161,000	66%	0	7,000	0	OFF	
5	8,000	12.1 A	30,154	22,154	22,154	0	183,154	75%	22,154	0	0	OFF	
6	8,000	12.1 A	62,479	54,479	54,479	0	237,633	97%	54,479	0	0	OFF	
7	8,000	12.1 A	87,540	79,540	79,540	0	245,760	100%	8,127	0	71,413	OFF	
8	78,320	118.7 A	107,813	29,493	29,493	0	245,760	100%	0	0	29,493	OFF	
9	78,320	118.7 A	122,240	43,920	43,920	0	245,760	100%	0	0	43,920	OFF	
10	78,320	118.7 A	128,434	50,114	50,114	0	245,760	100%	0	0	50,114	OFF	
11	78,320	118.7 A	129,272	50,952	50,952	0	245,760	100%	0	0	50,952	OFF	
12	78,320	118.7 A	120,043	41,723	41,723	0	245,760	100%	0	0	41,723	OFF	
13	78,320	118.7 A	102,978	24,658	24,658	0	245,760	100%	0	0	24,658	OFF	
14	78,320	118.7 A	85,686	7,366	7,366	0	245,760	100%	0	0	7,366	OFF	
15	78,320	118.7 A	54,075	-24,245	0	-24,245	221,515	90%	0	24,245	0	OFF	
16	78,320	118.7 A	21,099	-57,221	0	-57,221	164,294	67%	0	57,221	0	OFF	
17	30,320	45.9 A	0	-30,320	0	-30,320	133,974	55%	0	30,320	0	OFF	
18	30,320	45.9 A	0	-30,320	0	-30,320	103,654	42%	0	30,320	0	OFF	
19	30,320	45.9 A	0	-30,320	0	-30,320	73,334	30%	0	30,320	0	OFF	
20	30,320	45.9 A	0	-30,320	0	-30,320	122,486	50%	0	0	0	GEN ON	
21	30,320	45.9 A	0	-30,320	0	-30,320	171,638	70%	0	0	0	GEN ON	
22	8,000	12.1 A	0	-8,000	0	-8,000	220,790	90%	0	0	0	GEN ON	
23	8,000	12.1 A	0	-8,000	0	-8,000	212,790	87%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	556.2 KWHr	105.3 A										
	EVENING -TOTAL ENERGY:	245.9 KWHr	46.6 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	936.5 KWHr		1,052,812	Extra Solar =	404,398	288,066		84,760	232,216	319,638	3	
	HOURLY AVERAGE:	39.0 KWHr	59.1 A	957KWH AV.	Load on Solar =	648,414		Total on Solar =	733,174		30%		

DAY	AL Kafaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOURLY	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Jun			Battery WHr =	245,760	100%				167,726 W	
	Spring		June			Battery C Rate =	49,152	20%			Gen. Size PRIME =	280 KVA	
	W	Daily Av.	1,045,637			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	192,000	78%	0	23,953	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	184,000	75%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	176,000	72%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	168,000	68%	0	8,000	0	OFF	
4	8,000	12.1 A	408	-7,592	0	-7,592	160,408	65%	0	7,592	0	OFF	
5	8,000	12.1 A	30,713	22,713	22,713	0	183,121	75%	22,713	0	0	OFF	
6	8,000	12.1 A	61,986	53,986	53,986	0	237,107	96%	53,986	0	0	OFF	
7	8,000	12.1 A	90,697	82,697	82,697	0	245,760	100%	8,653	0	74,044	OFF	
8	78,320	118.7 A	99,772	21,452	21,452	0	245,760	100%	0	0	21,452	OFF	
9	78,320	118.7 A	113,580	35,260	35,260	0	245,760	100%	0	0	35,260	OFF	
10	78,320	118.7 A	133,156	54,836	54,836	0	245,760	100%	0	0	54,836	OFF	
11	78,320	118.7 A	131,738	53,418	53,418	0	245,760	100%	0	0	53,418	OFF	
12	78,320	118.7 A	121,154	42,834	42,834	0	245,760	100%	0	0	42,834	OFF	
13	78,320	118.7 A	110,919	32,599	32,599	0	245,760	100%	0	0	32,599	OFF	
14	78,320	118.7 A	93,107	14,787	14,787	0	245,760	100%	0	0	14,787	OFF	
15	78,320	118.7 A	64,549	-13,771	0	-13,771	231,989	94%	0	13,771	0	OFF	
16	78,320	118.7 A	31,013	-47,307	0	-47,307	184,682	75%	0	47,307	0	OFF	
17	30,320	45.9 A	5,095	-25,225	0	-25,225	159,457	65%	0	25,225	0	OFF	
18	30,320	45.9 A	0	-30,320	0	-30,320	129,137	53%	0	30,320	0	OFF	
19	30,320	45.9 A	0	-30,320	0	-30,320	98,817	40%	0	30,320	0	OFF	
20	30,320	45.9 A	0	-30,320	0	-30,320	68,497	28%	0	30,320	0	OFF	
21	30,320	45.9 A	0	-30,320	0	-30,320	117,649	48%	0	0	0	GEN ON	
22	8,000	12.1 A	0	-8,000	0	-8,000	166,801	68%	0	0	0	GEN ON	
23	8,000	12.1 A	0	-8,000	0	-8,000	215,953	88%	0	0	0	GEN ON	
	DAY -TOTAL ENERGY:	556.2 KWHr	105.3 A										
	EVENING -TOTAL ENERGY:	245.9 KWHr	46.6 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	936.5 KWHr		1,087,887	Extra Solar =	414,582	263,176		85,352	232,808	329,230	3	
	HOURLY AVERAGE:	39.0 KWHr	59.1 A	1,046KWH AV.	Load on Solar =	673,304		Total on Solar =	758,657		30%		

DAY	AL KAFaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOuR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Jul			Battery WHr =	245,760	100%				141,343 W	
	Summer		July			Battery C Rate =	49,152	20%			Gen. Size PRIME =	236 KVA	
	W	Daily Av.	889,440			Battery Cut-Off =	49,152	20%					
		220V											
0	5,529	8.4 A	0	-5,529	0	-5,529	149,471	61%	0	0	0	OFF	
1	5,529	8.4 A	0	-5,529	0	-5,529	143,942	59%	0	5,529	0	OFF	
2	5,529	8.4 A	0	-5,529	0	-5,529	138,413	56%	0	5,529	0	OFF	
3	5,529	8.4 A	0	-5,529	0	-5,529	132,884	54%	0	5,529	0	OFF	
4	5,529	8.4 A	1,589	-3,940	0	-3,940	128,944	52%	0	3,940	0	OFF	
5	5,529	8.4 A	25,643	20,114	20,114	0	149,058	61%	20,114	0	0	OFF	
6	5,529	8.4 A	57,454	51,925	51,925	0	200,983	82%	51,925	0	0	OFF	
7	5,529	8.4 A	84,794	79,265	79,265	0	245,760	100%	44,777	0	34,488	OFF	
8	58,269	88.3 A	100,805	42,536	42,536	0	245,760	100%	0	0	42,536	OFF	
9	58,269	88.3 A	106,908	48,639	48,639	0	245,760	100%	0	0	48,639	OFF	
10	58,269	88.3 A	106,847	48,578	48,578	0	245,760	100%	0	0	48,578	OFF	
11	58,269	88.3 A	105,302	47,033	47,033	0	245,760	100%	0	0	47,033	OFF	
12	58,269	88.3 A	108,572	50,303	50,303	0	245,760	100%	0	0	50,303	OFF	
13	58,269	88.3 A	101,153	42,884	42,884	0	245,760	100%	0	0	42,884	OFF	
14	58,269	88.3 A	82,281	24,012	24,012	0	245,760	100%	0	0	24,012	OFF	
15	58,269	88.3 A	59,233	964	964	0	245,760	100%	0	0	964	OFF	
16	58,269	88.3 A	30,820	-27,449	0	-27,449	218,311	89%	0	27,449	0	OFF	
17	12,669	19.2 A	5,173	-7,496	0	-7,496	210,815	86%	0	7,496	0	OFF	
18	12,669	19.2 A	0	-12,669	0	-12,669	198,146	81%	0	12,669	0	OFF	
19	12,669	19.2 A	0	-12,669	0	-12,669	185,477	75%	0	12,669	0	OFF	
20	12,669	19.2 A	0	-12,669	0	-12,669	172,808	70%	0	12,669	0	OFF	
21	12,669	19.2 A	0	-12,669	0	-12,669	160,139	65%	0	12,669	0	OFF	
22	5,529	8.4 A	0	-5,529	0	-5,529	154,610	63%	0	5,529	0	OFF	
23	5,529	8.4 A	0	-5,529	0	-5,529	149,081	61%	0	5,529	0	OFF	
	DAY -TOTAL ENERGY:	413.4 KWHr	78.3 A										
	EVENING -TOTAL ENERGY:	132.7 KWHr	25.1 A										
	NIGHT -TOTAL ENERGY:	38.7 KWHr	8.4 A										
	TOTAL DAILY ENERGY:	643.1 KWHr		976,575	Extra Solar =	456,254	122,735		116,816	117,206	339,438	0	
	HOURLY AVERAGE:	26.8 KWHr	40.6 A	889KWH AV.	Load on Solar =	520,321		Total on Solar =	637,137		35%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOUR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Aug			Battery WHr =	245,760	100%				141,343 W	
	Summer		August			Battery C Rate =	49,152	20%			Gen. Size PRIME =	236 KVA	
	W	Daily Av.	874,345			Battery Cut-Off =	49,152	20%					
		220V											
0	5,529	8.4 A	0	-5,529	0	-5,529	134,471	55%	0	0	0	OFF	
1	5,529	8.4 A	0	-5,529	0	-5,529	128,942	52%	0	5,529	0	OFF	
2	5,529	8.4 A	0	-5,529	0	-5,529	123,413	50%	0	5,529	0	OFF	
3	5,529	8.4 A	0	-5,529	0	-5,529	117,884	48%	0	5,529	0	OFF	
4	5,529	8.4 A	0	-5,529	0	-5,529	112,355	46%	0	5,529	0	OFF	
5	5,529	8.4 A	19,238	13,709	13,709	0	126,064	51%	13,709	0	0	OFF	
6	5,529	8.4 A	50,645	45,116	45,116	0	171,179	70%	45,116	0	0	OFF	
7	5,529	8.4 A	79,567	74,038	74,038	0	245,217	100%	74,038	0	0	OFF	
8	58,269	88.3 A	102,558	44,289	44,289	0	245,760	100%	543	0	43,746	OFF	
9	58,269	88.3 A	110,777	52,508	52,508	0	245,760	100%	0	0	52,508	OFF	
10	58,269	88.3 A	114,652	56,383	56,383	0	245,760	100%	0	0	56,383	OFF	
11	58,269	88.3 A	109,881	51,612	51,612	0	245,760	100%	0	0	51,612	OFF	
12	58,269	88.3 A	112,106	53,837	53,837	0	245,760	100%	0	0	53,837	OFF	
13	58,269	88.3 A	99,468	41,199	41,199	0	245,760	100%	0	0	41,199	OFF	
14	58,269	88.3 A	70,086	11,817	11,817	0	245,760	100%	0	0	11,817	OFF	
15	58,269	88.3 A	49,481	-8,788	0	-8,788	236,972	96%	0	8,788	0	OFF	
16	58,269	88.3 A	20,689	-37,580	0	-37,580	199,392	81%	0	37,580	0	OFF	
17	12,669	19.2 A	0	-12,669	0	-12,669	186,723	76%	0	12,669	0	OFF	
18	12,669	19.2 A	0	-12,669	0	-12,669	174,054	71%	0	12,669	0	OFF	
19	12,669	19.2 A	0	-12,669	0	-12,669	161,385	66%	0	12,669	0	OFF	
20	12,669	19.2 A	0	-12,669	0	-12,669	148,716	61%	0	12,669	0	OFF	
21	12,669	19.2 A	0	-12,669	0	-12,669	136,047	55%	0	12,669	0	OFF	
22	5,529	8.4 A	0	-5,529	0	-5,529	130,518	53%	0	5,529	0	OFF	
23	5,529	8.4 A	0	-5,529	0	-5,529	124,989	51%	0	5,529	0	OFF	
	DAY -TOTAL ENERGY:	413.4 KWHr	78.3 A										
	EVENING -TOTAL ENERGY:	132.7 KWHr	25.1 A										
	NIGHT -TOTAL ENERGY:	38.7 KWHr	8.4 A										
	TOTAL DAILY ENERGY:	643.1 KWHr		939,147	Extra Solar =	444,507	148,416		133,405	142,887	311,102	0	
	HOURLY AVERAGE:	26.8 KWHr	40.6 A	874KWH AV.	Load on Solar =	494,640		Total on Solar =	628,045		33%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOUR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Sep			Battery WHr =	245,760	100%				141,343 W	
	Summer		September			Battery C Rate =	49,152	20%			Gen. Size PRIME =	236 KVA	
	W	Daily Av.	740,055			Battery Cut-Off =	49,152	20%					
		220V											
0	5,529	8.4 A	0	-5,529	0	-5,529	104,471	43%	0	0	0	OFF	
1	5,529	8.4 A	0	-5,529	0	-5,529	98,942	40%	0	5,529	0	OFF	
2	5,529	8.4 A	0	-5,529	0	-5,529	93,413	38%	0	5,529	0	OFF	
3	5,529	8.4 A	0	-5,529	0	-5,529	87,884	36%	0	5,529	0	OFF	
4	5,529	8.4 A	0	-5,529	0	-5,529	82,355	34%	0	5,529	0	OFF	
5	5,529	8.4 A	6,541	1,012	1,012	0	83,367	34%	1,012	0	0	OFF	
6	5,529	8.4 A	38,467	32,938	32,938	0	116,305	47%	32,938	0	0	OFF	
7	5,529	8.4 A	68,499	62,970	62,970	0	179,275	73%	62,970	0	0	OFF	
8	58,269	88.3 A	91,852	33,583	33,583	0	212,858	87%	33,583	0	0	OFF	
9	58,269	88.3 A	106,485	48,216	48,216	0	245,760	100%	32,902	0	15,314	OFF	
10	58,269	88.3 A	113,695	55,426	55,426	0	245,760	100%	0	0	55,426	OFF	
11	58,269	88.3 A	113,728	55,459	55,459	0	245,760	100%	0	0	55,459	OFF	
12	58,269	88.3 A	103,845	45,576	45,576	0	245,760	100%	0	0	45,576	OFF	
13	58,269	88.3 A	86,857	28,588	28,588	0	245,760	100%	0	0	28,588	OFF	
14	58,269	88.3 A	62,766	4,497	4,497	0	245,760	100%	0	0	4,497	OFF	
15	58,269	88.3 A	32,546	-25,723	0	-25,723	220,037	90%	0	25,723	0	OFF	
16	58,269	88.3 A	4,975	-53,294	0	-53,294	166,743	68%	0	53,294	0	OFF	
17	12,669	19.2 A	0	-12,669	0	-12,669	154,074	63%	0	12,669	0	OFF	
18	12,669	19.2 A	0	-12,669	0	-12,669	141,405	58%	0	12,669	0	OFF	
19	12,669	19.2 A	0	-12,669	0	-12,669	128,736	52%	0	12,669	0	OFF	
20	12,669	19.2 A	0	-12,669	0	-12,669	116,067	47%	0	12,669	0	OFF	
21	12,669	19.2 A	0	-12,669	0	-12,669	103,398	42%	0	12,669	0	OFF	
22	5,529	8.4 A	0	-5,529	0	-5,529	97,869	40%	0	5,529	0	OFF	
23	5,529	8.4 A	0	-5,529	0	-5,529	92,340	38%	0	5,529	0	OFF	
	DAY -TOTAL ENERGY:	413.4 KWHr	78.3 A										
	EVENING -TOTAL ENERGY:	132.7 KWHr	25.1 A										
	NIGHT -TOTAL ENERGY:	38.7 KWHr	8.4 A										
	TOTAL DAILY ENERGY:	643.1 KWHr		830,257	Extra Solar =	368,266	181,065		163,405	175,536	204,861	0	
	HOURLY AVERAGE:	26.8 KWHr	40.6 A	740KWH AV.	Load on Solar =	461,991		Total on Solar =	625,396		25%		

DAY	AL KAFaat AIN SAADEH - PHASE 1							BATTERY ENERGY (WHr)					REMARKS
HOURLY	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Oct			Battery WHr =	245,760	100%				150,884 W	
	Fall		October			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	595,329			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	162,000	66%	0	12,144	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	154,000	63%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	146,000	59%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	138,000	56%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	130,000	53%	0	8,000	0	OFF	
5	8,000	12.1 A	2,239	-5,761	0	-5,761	124,239	51%	0	5,761	0	OFF	
6	8,000	12.1 A	31,381	23,381	23,381	0	147,620	60%	23,381	0	0	OFF	
7	8,000	12.1 A	60,670	52,670	52,670	0	200,290	81%	52,670	0	0	OFF	
8	65,520	99.3 A	82,778	17,258	17,258	0	217,548	89%	17,258	0	0	OFF	
9	65,520	99.3 A	97,041	31,521	31,521	0	245,760	100%	28,212	0	3,309	OFF	
10	65,520	99.3 A	92,811	27,291	27,291	0	245,760	100%	0	0	27,291	OFF	
11	65,520	99.3 A	74,179	8,659	8,659	0	245,760	100%	0	0	8,659	OFF	
12	65,520	99.3 A	75,404	9,884	9,884	0	245,760	100%	0	0	9,884	OFF	
13	65,520	99.3 A	64,493	-1,027	0	-1,027	244,733	100%	0	1,027	0	OFF	
14	65,520	99.3 A	26,828	-38,692	0	-38,692	206,041	84%	0	38,692	0	OFF	
15	65,520	99.3 A	2,727	-62,793	0	-62,793	143,248	58%	0	62,793	0	OFF	
16	65,520	99.3 A	0	-65,520	0	-65,520	77,728	32%	0	65,520	0	OFF	
17	17,520	26.5 A	0	-17,520	0	-17,520	60,208	24%	0	17,520	0	OFF	
18	17,520	26.5 A	0	-17,520	0	-17,520	109,360	44%	0	0	0	GEN ON	
19	17,520	26.5 A	0	-17,520	0	-17,520	158,512	64%	0	0	0	GEN ON	
20	17,520	26.5 A	0	-17,520	0	-17,520	207,664	84%	0	0	0	GEN ON	
21	17,520	26.5 A	0	-17,520	0	-17,520	190,144	77%	0	17,520	0	OFF	
22	8,000	12.1 A	0	-8,000	0	-8,000	182,144	74%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	174,144	71%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		610,551	Extra Solar =	170,664	317,393		121,521	268,977	49,143	3	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	595KWH AV.	Load on Solar =	439,887		Total on Solar =	561,408		8%		

DAY	AL KAFaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOUR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Nov			Battery WHr =	245,760	100%				150,884 W	
	Fall		November			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	385,393			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	98,000	40%	0	14,235	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	90,000	37%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	82,000	33%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	74,000	30%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	66,000	27%	0	8,000	0	OFF	
5	8,000	12.1 A	0	-8,000	0	-8,000	115,152	47%	0	0	0	GEN ON	
6	8,000	12.1 A	504	-7,496	0	-7,496	164,304	67%	0	0	0	GEN ON	
7	8,000	12.1 A	12,352	4,352	4,352	0	213,456	87%	0	0	4,352	GEN ON	
8	65,520	99.3 A	8,956	-56,564	0	-56,564	156,892	64%	0	56,564	0	OFF	
9	65,520	99.3 A	61,681	-3,839	0	-3,839	153,053	62%	0	3,839	0	OFF	
10	65,520	99.3 A	91,995	26,475	26,475	0	179,528	73%	26,475	0	0	OFF	
11	65,520	99.3 A	47,332	-18,188	0	-18,188	161,340	66%	0	18,188	0	OFF	
12	65,520	99.3 A	17,196	-48,324	0	-48,324	113,016	46%	0	48,324	0	OFF	
13	65,520	99.3 A	20,883	-44,637	0	-44,637	68,379	28%	0	44,637	0	OFF	
14	65,520	99.3 A	27,392	-38,128	0	-38,128	117,531	48%	0	0	0	GEN ON	
15	65,520	99.3 A	1,676	-63,844	0	-63,844	166,683	68%	0	0	0	GEN ON	
16	65,520	99.3 A	0	-65,520	0	-65,520	215,835	88%	0	0	0	GEN ON	
17	17,520	26.5 A	0	-17,520	0	-17,520	198,315	81%	0	17,520	0	OFF	
18	17,520	26.5 A	0	-17,520	0	-17,520	180,795	74%	0	17,520	0	OFF	
19	17,520	26.5 A	0	-17,520	0	-17,520	163,275	66%	0	17,520	0	OFF	
20	17,520	26.5 A	0	-17,520	0	-17,520	145,755	59%	0	17,520	0	OFF	
21	17,520	26.5 A	0	-17,520	0	-17,520	128,235	52%	0	17,520	0	OFF	
22	8,000	12.1 A	0	-8,000	0	-8,000	120,235	49%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	112,235	46%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		289,967	Extra Solar =	30,827	498,140		26,475	321,387	4,352	6	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	385KWH AV.	Load on Solar =	259,140		Total on Solar =	285,615		2%		

DAY	AL KAFaat AIN SAADEH - PHASE 1						BATTERY ENERGY (WHr)						REMARKS
HOuR	TOTAL LOAD (WHr)	TOTAL (AMP 3PH)	PV TOTAL (WHr)	ENERGY SUM (WHr)	EXTRA SOLAR (WHr)	NOT ON SOLAR (WHr)		BATTERY SOC	BATTERY SOLAR CHARGE	LOAD ON FROM BATTERY	UNUSED SOLAR (WHr)	GENERATOR	
			15-Dec			Battery WHr =	245,760	100%				150,884 W	
	Fall		December			Battery C Rate =	49,152	20%			Gen. Size PRIME =	251 KVA	
	W	Daily Av.	369,537			Battery Cut-Off =	49,152	20%					
		220V											
0	8,000	12.1 A	0	-8,000	0	-8,000	112,000	46%	0	9,467	0	OFF	
1	8,000	12.1 A	0	-8,000	0	-8,000	104,000	42%	0	8,000	0	OFF	
2	8,000	12.1 A	0	-8,000	0	-8,000	96,000	39%	0	8,000	0	OFF	
3	8,000	12.1 A	0	-8,000	0	-8,000	88,000	36%	0	8,000	0	OFF	
4	8,000	12.1 A	0	-8,000	0	-8,000	80,000	33%	0	8,000	0	OFF	
5	8,000	12.1 A	0	-8,000	0	-8,000	72,000	29%	0	8,000	0	OFF	
6	8,000	12.1 A	2,814	-5,186	0	-5,186	121,152	49%	0	0	0	GEN ON	
7	8,000	12.1 A	14,777	6,777	6,777	0	170,304	69%	0	0	6,777	GEN ON	
8	65,520	99.3 A	4,905	-60,615	0	-60,615	219,456	89%	0	0	0	GEN ON	
9	65,520	99.3 A	44,114	-21,406	0	-21,406	198,050	81%	0	21,406	0	OFF	
10	65,520	99.3 A	60,963	-4,557	0	-4,557	193,493	79%	0	4,557	0	OFF	
11	65,520	99.3 A	28,896	-36,624	0	-36,624	156,869	64%	0	36,624	0	OFF	
12	65,520	99.3 A	53,284	-12,236	0	-12,236	144,633	59%	0	12,236	0	OFF	
13	65,520	99.3 A	24,854	-40,666	0	-40,666	103,967	42%	0	40,666	0	OFF	
14	65,520	99.3 A	21,644	-43,876	0	-43,876	60,091	24%	0	43,876	0	OFF	
15	65,520	99.3 A	324	-65,196	0	-65,196	109,243	44%	0	0	0	GEN ON	
16	65,520	99.3 A	0	-65,520	0	-65,520	158,395	64%	0	0	0	GEN ON	
17	17,520	26.5 A	0	-17,520	0	-17,520	207,547	84%	0	0	0	GEN ON	
18	17,520	26.5 A	0	-17,520	0	-17,520	190,027	77%	0	17,520	0	OFF	
19	17,520	26.5 A	0	-17,520	0	-17,520	172,507	70%	0	17,520	0	OFF	
20	17,520	26.5 A	0	-17,520	0	-17,520	154,987	63%	0	17,520	0	OFF	
21	17,520	26.5 A	0	-17,520	0	-17,520	137,467	56%	0	17,520	0	OFF	
22	8,000	12.1 A	0	-8,000	0	-8,000	129,467	53%	0	8,000	0	OFF	
23	8,000	12.1 A	0	-8,000	0	-8,000	121,467	49%	0	8,000	0	OFF	
	DAY -TOTAL ENERGY:	466.6 KWHr	88.4 A										
	EVENING -TOTAL ENERGY:	169.1 KWHr	32.0 A										
	NIGHT -TOTAL ENERGY:	56.0 KWHr	12.1 A										
	TOTAL DAILY ENERGY:	757.3 KWHr		256,575	Extra Solar =	6,777	507,482		0	294,912	6,777	6	
	HOURLY AVERAGE:	31.6 KWHr	47.8 A	370KWH AV.	Load on Solar =	249,798		Total on Solar =	249,798		3%		