Appendices

Appendix E – Mechanical

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Product Specification

Technical Specifications and Descriptions
for a Single Capstone® MicroTurbine™ (Enclosed and Recuperated)

Summary

This Product Specification describes the Capstone MicroTurbine power generating system (hereafter referred to by Capstone as a MicroTurbine). The MicroTurbine provides on-site electrical power for primary or standby applications, and for peak shaving, base loading, and/or capacity additions. MicroTurbine(s) may generate power in parallel with an electrical utility (Grid Connect mode), or isolated from the utility (Stand Alone mode). The system consists of a turbine engine, solid-state power electronics, a fuel system, and an indoor/outdoor-rated enclosure.

MicroTurbine systems are available in 30, 60, or 65 kW versions, known as C30, C60 or C65 models. The C60 and C65 have an option to include a top-mounted heat exchanger, marketed by Capstone as the Integrated Combined Heat and Power package (ICHP). The ICHP option includes an exhaust heat recovery unit and exhaust diverter to allow full or partial recovery of exhaust energy. This allows the user to realize high total system efficiency with respect to incoming fuel energy, while providing economical operation and operational flexibility.

Major MicroTurbine components include a compressor, a recuperator (exhaust gas heat exchanger), a combustor, a turbine, and a generator. The turbine engine is air-cooled and supported on air-lubricated compliant foil bearings. The compressor impeller, turbine rotor, and generator rotor are mounted on a single shaft, which comprises the only moving part in the engine. Power electronics are solid-state, double conversion type, producing three-phase alternating current output power from the high-frequency alternating current engine output.

Definitions

- ISO conditions are defined as: 15 °C (59 °F), 60% relative humidity, and sea level pressure of 101.3 kPa (14.696 psia).
- SCFM: Standard Cubic Feet per Minute (standard references ISO temperature and pressure)
- HHV: Higher Heating Value
- LHV: Lower Heating Value
- HPNG: High Pressure Natural Gas
- LPNG: Low Pressure Natural Gas
- kW_{th} – Kilowatt (thermal)
- kW_e – Kilowatt (electric)
- Scf: Standard cubic feet (standard references ISO temperature and pressure)
- SG: Sour Gas
- SLPM: Standard Liters per Minute (standard references ISO temperature and pressure).
- L/DG: Landfill/Digester Gas.

Performance Ratings at Full Load Power

Table 1 summarizes performance ratings at full load power and ISO conditions.

Table 1. Performance Ratings

Product	Net Power Output	Net Efficiency (LHV)	Nominal Net Heat Rate (LHV)	Nominal Generator Heat Rate
Model C30 (HPNG, SG, or L/DG) (without gas compression option)	30 (+0/-1) kW net 3 Phase 400/480 Volts AC 46 A per phase max continuous, 50/60 Hz	26 (± 2)% (Efficiency values might be lower if fuel gas compression is required for L/DG)	13,800 kJ (13,100 Btu /kWh)	12,800 kJ (12,200 Btu/kWh)
Model C30 (LPNG)	28 (+0/-1) kW net 3 Phase 400/480 Volts AC 46 A per phase max continuous, 50/60 Hz	25 (± 2)% (at 5 psig fuel inlet pressure)	14,400 kJ (13,700 Btu /kWh)	12,300 kJ (11,600 Btu/kWh)
Model C30 (Liquid Fuel)	29 (+1/-1) kW net 3 Phase 400/480 Volts AC 46 A per phase max continuous, 50/60 Hz	25 (± 2)%	14,400 kJ (13,700 Btu /kWh)	13,400 kJ (12,700 Btu/kWh)
Model C60 (HPNG) (without gas compression option)	60 (+0/-2) kW net 3 Phase 400/480 Volts AC 100 A per phase max continuous, 50/60 Hz	28 (± 2)%	12,900 kJ (12,200 Btu /kWh)	12,000 kJ (11,400 Btu/kWh)
Model C65 (HPNG) (without gas compression option)	65 (+0/-2) kW net 3 Phase 400/480 Volts AC 100 A per phase max continuous, 50/60 Hz	29 (± 2)%	12,400 kJ (11,800 Btu /kWh)	11,600 kJ (11,000 Btu /kWh)

Performance Derating

Performance is affected by ambient temperature and elevation. The performance ratings listed are at full load power at ISO conditions. Performance derating occurs at ambient temperatures and elevations above ISO conditions and is also affected by air inlet pressure, back pressure and system parasitic loads (i.e. gas compressor, battery charging).

Typical derating curves for power output and efficiency based on ambient temperature are shown in the curves on the following pages. These curves assume no parasitic losses and zero inlet and exhaust back pressure.

Electrical Performance Ratings at Full Load Power

Table 2 presents the electrical performance ratings for C30, C60 and C65 MicroTurbines operating in the Grid Connect mode at ISO conditions with zero back pressure.

Table 2. Electrical Performance Ratings in Grid Connect Mode

Parameter	Model C30 (HPNG)	Model C60 & ICHP (HPNG)	Model C65 & C65 ICHP (HPNG)
Net Power Output (without gas compression)	30 (+0/-1) kW net 30 kVA max at 480 VAC	60 (+0/-2) kW net 60 kVA max at 480 VAC	65 (+0/-2) kW net 65 kVA max at 480 VAC
Net Electrical Efficiency (LHV)	26 (±2) %	28 (±2) %	29 (±2) %
Nominal Net Heat Rate (LHV)	13,800 kJ (13,100 Btu /kWh)	12,900 kJ (12,200 Btu /kWh)	12,400 kJ (11,800 Btu /kWh)
Nominal Voltage Operating Range	400 to 480 VAC	400 to 480 VAC	400 to 480 VAC
Nominal Frequency Operating Range	50/60 Hz	50/60 Hz	50/60 Hz
Output Voltage Connection	3-phase, 3 or 4 wire wye (The Grid must be neutral grounded)	3-phase, 3 or 4 wire wye (The Grid must be neutral grounded)	3-phase, 3 or 4 wire wye (The Grid must be neutral grounded)
Output Current (maximum)	46 Amps RMS steady state	100 Amps RMS steady state	100 Amps RMS steady state
Current THD	IEEE 519 compliant, 5%	IEEE 519 compliant, 5%	IEEE 519 compliant, 5%

Table 3 presents the electrical performance ratings for a MicroTurbine operating in the Stand Alone mode at ISO conditions.

Table 3. Electrical Performance Ratings in Stand Alone Mode

Parameter	Model C30	Model C60	Model C65
Net Power Output	30 (+0/-1) kW net 38.2 kVA max at 480 VAC	60 (+0/-2) kW net 83 kVA max at 480 VAC	65 (+0/-2) kW net 83 kVA max at 480 VAC
Nominal Voltage Operating Range	400 to 480 VAC	400 to 480 VAC	400 to 480 VAC
Frequency Operating Range	10 to 60 Hz	10 to 60 Hz	10 to 60 Hz
Output Voltage Connection	3-phase, 4 wire wye (Neutral must be solidly grounded)	3-phase, 4 wire wye (Neutral must be solidly grounded)	3-phase, 4 wire wye (Neutral must be solidly grounded)
Output Current (1)	46 Amps RMS maximum steady state	125 Amps RMS maximum steady state	125 Amps RMS maximum steady state
Voltage THD	IEEE 519 Compliant, 5%	IEEE 519 Compliant, 5%	IEEE 519 Compliant, 5%

(1) Values assume linear load

Fuel Input Requirements at Full Load Power

Table 4 presents fuel input requirements at full load power and ISO conditions.

Table 4. Fuel Input Requirements

Product	Fuel Type	Fuel Heat Content Range (HHV)	Nominal Full Power Steady State Fuel Flow (HHV) (Notes 1 and 2)
Model C30 (HPNG, SG)	NG	30,700 – 47,500 kJ/m^3 (825 to 1275 Btu/scf)	457,000 kJ/hr (433,000 Btu/hr)
	High Btu	46,600 – 79,400 kJ/m^3 (1252 to 2131 Btu/scf)	
Model C30 (LPNG)	NG	30,700 – 47,500 kJ/m^3 (825 to 1275 Btu/scf)	444,000 kJ/hr (420,000 Btu/hr)
Model C30 (L/DG)	Low Btu	12,100 – 32,100 kJ/m^3 (325 to 861 Btu/scf)	457,000 kJ/hr (433,000 Btu/hr)
	Sour Low Btu	12,100 – 32,100 kJ/m^3 (325 to 861 Btu/scf)	
Model C30 (Liquid Fuel)	-	ASTM D975 Diesel Fuel No. 2-D ASTM D3699 Kerosene No. 1-K ASTM D1655 (Jet-A) MIL-DTL-83133E (JP-8) MIL-DTL-5624U (JP-5)	459,000 kJ/hr (435,000 Btu/hr)
Model C60 & C60 ICHP	NG	30,700 – 47,500 kJ/m^3 (825 to 1275 Btu/scf)	849,000 kJ/hr (804,000 Btu/hr)
	High Btu	46,600 – 79,400 kJ/m^3 (1252 to 2131 Btu/scf)	
	LPG	93,700 – 110,000 kJ/m^3 (2516 to 2962 Btu/scf)	
Model C65 & C65 ICHP	NG	30,700 – 47,500 kJ/m^3 (825 to 1275 Btu/scf)	888,000 kJ/hr (842,000 Btu/hr)
	High Btu	46,600 - 67,000 kJ/m^3 (1250 to 1800 Btu/scf)	
	Landfill	12,100 - 22,300 kJ/m^3 (325 to 600 Btu/scf)	
	Digester	20,500 - 32,600 kJ/m^3 (550 to 875 Btu/scf)	
	Propane	91,300 - 95,000 kJ/m^3 (2450 to 2550 Btu/scf)	

Note 1. The ratio of Higher Heating Value (HHV) to Lower Heating Value (LHV) is assumed to be 1.1.
Note 2. Onload fuel flows can be up to two times higher than the steady state values.

Exhaust Output Ratings at Full Load Power

Table 5 presents exhaust output ratings at full load power and ISO conditions, using natural gas.

Table 5. Exhaust Output Ratings

Parameter	Model C30	Model C60	Model C65
Nominal Exhaust Gas Temp	HPNG: 275°C (530°F) Liquid: 275°C (530 °F)	305 °C (580 °F)	309 °C (588 °F)
Nominal Total Exhaust Energy	HPNG: 327,000 kJ/hr (310,000 Btu/hr) Liquid: 327,000 kJ/hr (310,000 Btu/hr)	571,000 kJ/hr (541,000 Btu/hr)	591,000 kJ/hr (561,000 Btu/hr)
NOx Emissions	HPNG: <9 ppm V @ 15% O_2 Liquid: <35 ppm V @ 15% O_2	<9 ppm V @ 15% O_2	<9 ppm V @ 15% O_2
Exhaust Mass Flow	HPNG: 0.31 kg/s (0.69 lbm/s) Liquid: 0.31 kg/s (0.69 lbm/s)	0.48 kg/s (1.06 lbm/s)	0.49 kg/s (1.08 lbm/s)

NOTE: These are the final exhaust temperature and exhaust energy if the heat exchanger is bypassing exhaust heat. Temperature and exhaust energy will be lower while recovering heat.

Acoustic Emissions Ratings at Full Load Power

Table 7 presents nominal acoustic emissions ratings, captured at full rated output power at a distance of 10 meters (33 feet).

Table 7. Acoustic Emissions Ratings

	Model C60 and C65 (Industrial Package)	Model C30 (Industrial Package)
Acoustic Emissions	70 dBA*	65 dBA

* Note 65 dVA with inlet silencer option.

MicroTurbine Dimensions and Weights

Table 8 summarizes dimensions and weights of the MicroTurbine systems.

Table 8. MicroTurbine Dimensions and Weights

Parameter	Model C30 (Industrial Package)	Model C60 & C65	Model C60 & C65 ICHP
Height	1943 mm (76.5 inches)	2110 mm (83 inches)	2,390 mm (94 inches)
Width	762 mm (30 inches)	762 mm (30 inches)	762 mm (30 inches)
Depth	1516 mm (59.7 inches)	1956 mm (77 inches)	1956 mm (77 inches)
Weight	405 kg (891lb) (Grid Connect) 578 kg (1271lb) (Dual Mode)	758 kg (1671lb) (Grid Connect) 1121 kg (2471 lb) (Dual Mode)	1000 kg (2,200 lb) (Grid Connect) 1,364 kg (3,000 lb) (Dual Mode)

MicroTurbine Temperature Ratings

Table 9 summarizes the temperature ratings of MicroTurbine systems. The C60 and C65, and C60 and C65 ICHP systems maybe stored dry within a temperature range of -40 to 65 °C (-40 to 149 °F). System is not to be stored wet.

Table 9. MicroTurbine Temperature Ratings

Parameter	Model C30	Model C60/ C65 (and C60/C65 ICHP)
Operating Temperature	-20 to 50°C (-4 to 122°F)	-20 to 50°C (-4 to 122°F)
Storage Temperature	-40 to 65 °C (-40 to 149 °F)	-40 to 65 °C (-40 to 149 °F)

Engine Cycling Life

Consult Capstone for specific guidance if application requires more than 10,000 onload operations from idle to full power, or repeated cycling of more than 50% of engine power range within five minute intervals.

Integral Heat Exchanger

The ICHP heat exchanger, in heat recovery mode, recovers the exhaust energy of the C60 MicroTurbine. Tables 10 thru 12 show the ICHP system heat recovery in full heat recovery mode for water at various inlet water temperatures. The minimum heat recovery is 3 kW_{th}(10 MBtu/hr) in full bypass mode.

Table 10. C60 ICHP with Copper Core Heat Recovery Module

Water Temperature		Heat Recovery
Inlet	**Outlet**	
30°C (85°F)	41°C (106°F)	123 kW_{th} (420 MBtu/hr)
60°C (140°F)	70°C (159°F)	110 kW_{th} (375 MBtu/hr)
85°C (185°F)	94°C (201°F)	98 kW_{th} (335 MBtu/hr)

Table 11. C65 ICHP with Copper Core Heat Recovery Module

Water Temperature		Heat Recovery
Inlet	**Outlet**	
30°C (85°F)	41°C (106°F)	126 kW_{th} (430 MBtu/hr)
60°C (140°F)	70°C (159°F)	112 kW_{th} (380 MBtu/hr)
85°C (185°F)	94°C (202°F)	100 kW_{th} (345 MBtu/hr)

Table 12. C65 ICHP with Stainless Steel Heat Recovery Module

Water Temperature		Heat Recovery
Inlet	**Outlet**	
30°C (85°F)	37°C (98°F)	78 kW_{th} (265 MBtu/hr)
60°C (140°F)	67°C (152°F)	70 kW_{th} (240 MBtu/hr)
85°C (185°F)	91°C (196°F)	63 kW_{th} (215 MBtu/hr)

Conditions:

- ±10% performance range
- 2.5 l/s (40 gal/min) water flow
- Full power output @ 60 kW_e or 65 kW_e
- ISO Conditions

Condo Heating

Month	Days	Usage (Mlbs)		lbs / hr																							Max (lbs/hr)
			lbs/day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
03/29/06	30	86	2866.7	143	159	159	159	159	143	143	127	127	111	96	80	96	96	96	96	80	80	96	111	111	127	127	143	159.3
02/27/06	28	112	4000.0	200	222	222	222	222	200	200	178	178	156	133	111	133	133	133	133	111	111	133	156	156	178	178	200	222.2
01/30/06	32	95	2968.8	148	165	165	165	165	148	148	132	132	115	99	82	99	99	99	99	82	82	99	115	115	132	132	148	164.9
12/29/05	30	128	4266.7	213	237	237	237	237	213	213	190	190	166	142	119	142	142	142	142	119	119	142	166	166	190	190	213	237.0
11/29/05	33	87	2636.4	132	146	146	146	146	132	132	117	117	103	88	73	88	88	88	88	73	73	88	103	103	117	117	132	146.5
10/27/05	29	42	1448.3	72	80	80	80	80	72	72	64	64	56	48	40	48	48	48	48	40	40	48	56	56	64	64	72	80.5
09/28/05	30	34	1133.3	57	63	63	63	63	57	57	50	50	44	38	31	38	38	38	38	31	31	38	44	44	50	50	57	63.0
08/29/05	31	35	1129.0	56	63	63	63	63	56	56	50	50	44	38	31	38	38	38	38	31	31	38	44	44	50	50	56	62.7
07/29/05	30	34	1133.3	57	63	63	63	63	57	57	50	50	44	38	31	38	38	38	38	31	31	38	44	44	50	50	57	63.0
06/29/05	29	34	1172.4	59	65	65	65	65	59	59	52	52	46	39	33	39	39	39	39	33	33	39	46	46	52	52	59	65.1
05/31/05	32	42	1312.5	66	73	73	73	73	66	66	58	58	51	44	36	44	44	44	44	36	36	44	51	51	58	58	66	72.9
04/29/05	29	44	1517.2	76	84	84	84	84	76	76	67	67	59	51	42	51	51	51	51	42	42	51	59	59	67	67	76	84.3
03/31/05	30	84	2800.0	140	156	156	156	156	140	140	124	124	109	93	78	93	93	93	93	78	78	93	109	109	124	124	140	155.6
03/01/05	29	87	3000.0	150	167	167	167	167	150	150	133	133	117	100	83	100	100	100	100	83	83	100	117	117	133	133	150	166.7
01/31/05	32	127	3968.8	198	220	220	220	220	198	198	176	176	154	132	110	132	132	132	132	110	110	132	154	154	176	176	198	220.5
12/30/04	29	98	3379.3	169	188	188	188	188	169	169	150	150	131	113	94	113	113	113	113	94	94	113	131	131	150	150	169	187.7
12/01/04	34	60	1764.7	88	98	98	98	98	88	88	78	78	69	59	49	59	59	59	59	49	49	59	69	69	78	78	88	98.0
10/28/04	29	33	1137.9	57	63	63	63	63	57	57	51	51	44	38	32	38	38	38	38	32	32	38	44	44	51	51	57	63.2
09/29/04	30	28	933.3	47	52	52	52	52	47	47	41	41	36	31	26	31	31	31	31	26	26	31	36	36	41	41	47	51.9
08/30/04	31	28	903.2	45	50	50	50	50	45	45	40	40	35	30	25	30	30	30	30	25	25	30	35	35	40	40	45	50.2
07/30/04	30	22	733.3	37	41	41	41	41	37	37	33	33	29	24	20	24	24	24	24	20	20	24	29	29	33	33	37	40.7
06/30/04	29	30	1034.5	52	57	57	57	57	52	52	46	46	40	34	29	34	34	34	34	29	29	34	40	40	46	46	52	57.5

Office Heating

Month	Days	Usage (Mlbs)	lbs/hr	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Max (lbs/hr)
03/29/06	30	775	25833.3	1292	1435	1435	1435	1435	1292	1292	1148	1148	1005	861	718	861	861	861	861	718	718	861	1005	1005	1148	1148	1292	1435.2
02/27/06	28	1,024	36571.4	1829	2032	2032	2032	2032	1829	1829	1625	1625	1422	1219	1016	1219	1219	1219	1219	1016	1016	1219	1422	1422	1625	1625	1829	2031.7
01/30/06	32	871	27218.8	1361	1512	1512	1512	1512	1361	1361	1210	1210	1059	907	756	907	907	907	907	756	756	907	1059	1059	1210	1210	1361	1512.2
12/29/05	30	1,112	37066.7	1853	2059	2059	2059	2059	1853	1853	1647	1647	1441	1236	1030	1236	1236	1236	1236	1030	1030	1236	1441	1441	1647	1647	1853	2059.3
11/29/05	33	681	20636.4	1032	1146	1146	1146	1146	1032	1032	917	917	803	688	573	688	688	688	688	573	573	688	803	803	917	917	1032	1146.5
10/27/05	29	341	11758.6	588	653	653	653	653	588	588	523	523	457	392	327	392	392	392	392	327	327	392	457	457	523	523	588	653.3
09/28/05	30	231	7700.0	385	428	428	428	428	385	385	342	342	299	257	214	257	257	257	257	214	214	257	299	299	342	342	385	427.8
08/29/05	31	344	11096.8	555	616	616	616	616	555	555	493	493	432	370	308	370	370	370	370	308	308	370	432	432	493	493	555	616.5
07/29/05	30	364	12133.3	607	674	674	674	674	607	607	539	539	472	404	337	404	404	404	404	337	337	404	472	472	539	539	607	674.1
06/29/05	29	244	8413.8	421	467	467	467	467	421	421	374	374	327	280	234	280	280	280	280	234	234	280	327	327	374	374	421	467.4
05/31/05	32	365	11406.3	570	634	634	634	634	570	570	507	507	444	380	317	380	380	380	380	317	317	380	444	444	507	507	570	633.7
04/29/05	29	464	16000.0	800	889	889	889	889	800	800	711	711	622	533	444	533	533	533	533	444	444	533	622	622	711	711	800	888.9
03/31/05	30	923	30766.7	1538	1709	1709	1709	1709	1538	1538	1367	1367	1196	1026	855	1026	1026	1026	1026	855	855	1026	1196	1196	1367	1367	1538	1709.3
03/01/05	29	1,058	36482.8	1824	2027	2027	2027	2027	1824	1824	1621	1621	1419	1216	1013	1216	1216	1216	1216	1013	1013	1216	1419	1419	1621	1621	1824	2026.8
01/31/05	32	1,376	43000.0	2150	2389	2389	2389	2389	2150	2150	1911	1911	1672	1433	1194	1433	1433	1433	1433	1194	1194	1433	1672	1672	1911	1911	2150	2388.9
12/30/04	29	1,091	37620.7	1881	2090	2090	2090	2090	1881	1881	1672	1672	1463	1254	1045	1254	1254	1254	1254	1045	1045	1254	1463	1463	1672	1672	1881	2090.0
12/01/04	34	832	24470.6	1224	1359	1359	1359	1359	1224	1224	1088	1088	952	816	680	816	816	816	816	680	680	816	952	952	1088	1088	1224	1359.5
10/28/04	29	480	16551.7	828	920	920	920	920	828	828	736	736	644	552	460	552	552	552	552	460	460	552	644	644	736	736	828	919.5
09/29/04	30	256	8533.3	427	474	474	474	474	427	427	379	379	332	284	237	284	284	284	284	237	237	284	332	332	379	379	427	474.1
08/30/04	31	275	8871.0	444	493	493	493	493	444	444	394	394	345	296	246	296	296	296	296	246	246	296	345	345	394	394	444	492.8
07/30/04	30	166	5533.3	277	307	307	307	307	277	277	246	246	215	184	154	184	184	184	184	154	154	184	215	215	246	246	277	307.4
06/30/04	29	90	3103.4	155	172	172	172	172	155	155	138	138	121	103	86	103	103	103	103	86	86	103	121	121	138	138	155	172.4

Condo Electric

Month	Days	Usage (kWh)	kWh per da	kWh/ hr 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Max (kWh)
3/29/2006	30	10,880	362.7	8.5	8.5	8.5	8.5	8.5	11.7	13.9	14.9	16.0	19.2	21.3	21.3	21.3	19.2	19.2	21.3	21.3	19.2	17.1	16.0	14.9	12.8	10.7	8.5	21.33
2/27/2006	28	10,240	365.7	8.6	8.6	8.6	8.6	8.6	11.8	14.0	15.1	16.1	19.4	21.5	21.5	21.5	19.4	19.4	21.5	21.5	19.4	17.2	16.1	15.1	12.9	10.8	8.6	21.51
1/30/2006	32	11,840	370.0	8.7	8.7	8.7	8.7	8.7	12.0	14.1	15.2	16.3	19.6	21.8	21.8	21.8	19.6	19.6	21.8	21.8	19.6	17.4	16.3	15.2	13.1	10.9	8.7	21.76
12/29/2005	30	10,080	336.0	7.9	7.9	7.9	7.9	7.9	10.9	12.8	13.8	14.8	17.8	19.8	19.8	19.8	17.8	17.8	19.8	19.8	17.8	15.8	14.8	13.8	11.9	9.9	7.9	19.76
11/29/2005	33	11,840	358.8	8.4	8.4	8.4	8.4	8.4	11.6	13.7	14.8	15.8	19.0	21.1	21.1	21.1	19.0	19.0	21.1	21.1	19.0	16.9	15.8	14.8	12.7	10.6	8.4	21.11
10/27/2005	29	11,520	397.2	9.3	9.3	9.3	9.3	9.3	12.9	15.2	16.4	17.5	21.0	23.4	23.4	23.4	21.0	21.0	23.4	23.4	21.0	18.7	17.5	16.4	14.0	11.7	9.3	23.37
9/28/2005	30	23,760	792.0	18.6	18.6	18.6	18.6	18.6	25.6	30.3	32.6	34.9	41.9	46.6	46.6	46.6	41.9	41.9	46.6	46.6	41.9	37.3	34.9	32.6	28.0	23.3	18.6	46.59
8/29/2005	31	25,280	815.5	19.2	19.2	19.2	19.2	19.2	26.4	31.2	33.6	36.0	43.2	48.0	48.0	48.0	43.2	43.2	48.0	48.0	43.2	38.4	36.0	33.6	28.8	24.0	19.2	47.97
7/29/2005	30	25,840	861.3	20.3	20.3	20.3	20.3	20.3	27.9	32.9	35.5	38.0	45.6	50.7	50.7	50.7	45.6	45.6	50.7	50.7	45.6	40.5	38.0	35.5	30.4	25.3	20.3	50.67
6/29/2005	29	17,360	598.6	14.1	14.1	14.1	14.1	14.1	19.4	22.9	24.6	26.4	31.7	35.2	35.2	35.2	31.7	31.7	35.2	35.2	31.7	28.2	26.4	24.6	21.1	17.6	14.1	35.21
5/31/2005	32	13,680	427.5	10.1	10.1	10.1	10.1	10.1	13.8	16.3	17.6	18.9	22.6	25.1	25.1	25.1	22.6	22.6	25.1	25.1	22.6	20.1	18.9	17.6	15.1	12.6	10.1	25.15
4/29/2005	29	12,240	422.1	9.9	9.9	9.9	9.9	9.9	13.7	16.1	17.4	18.6	22.3	24.8	24.8	24.8	22.3	22.3	24.8	24.8	22.3	19.9	18.6	17.4	14.9	12.4	9.9	24.83
3/31/2005	30	12,240	408.0	9.6	9.6	9.6	9.6	9.6	13.2	15.6	16.8	18.0	21.6	24.0	24.0	24.0	21.6	21.6	24.0	24.0	21.6	19.2	18.0	16.8	14.4	12.0	9.6	24.00
3/1/2005	29	11,040	380.7	9.0	9.0	9.0	9.0	9.0	12.3	14.6	15.7	16.8	20.2	22.4	22.4	22.4	20.2	20.2	22.4	22.4	20.2	17.9	16.8	15.7	13.4	11.2	9.0	22.39
1/31/2005	32	11,920	372.5	8.8	8.8	8.8	8.8	8.8	12.1	14.2	15.3	16.4	19.7	21.9	21.9	21.9	19.7	19.7	21.9	21.9	19.7	17.5	16.4	15.3	13.1	11.0	8.8	21.91
12/30/2004	29	10,960	377.9	8.9	8.9	8.9	8.9	8.9	12.2	14.5	15.6	16.7	20.0	22.2	22.2	22.2	20.0	20.0	22.2	22.2	20.0	17.8	16.7	15.6	13.3	11.1	8.9	22.23
12/1/2004	34	12,800	376.5	8.9	8.9	8.9	8.9	8.9	12.2	14.4	15.5	16.6	19.9	22.1	22.1	22.1	19.9	19.9	22.1	22.1	19.9	17.7	16.6	15.5	13.3	11.1	8.9	22.15
10/28/2004	29	18,080	623.4	14.7	14.7	14.7	14.7	14.7	20.2	23.8	25.7	27.5	33.0	36.7	36.7	36.7	33.0	33.0	36.7	36.7	33.0	29.3	27.5	25.7	22.0	18.3	14.7	36.67
9/29/2004	30	24,720	824.0	19.4	19.4	19.4	19.4	19.4	26.7	31.5	33.9	36.4	43.6	48.5	48.5	48.5	43.6	43.6	48.5	48.5	43.6	38.8	36.4	33.9	29.1	24.2	19.4	48.47
8/30/2004	31	25,280	815.5	19.2	19.2	19.2	19.2	19.2	26.4	31.2	33.6	36.0	43.2	48.0	48.0	48.0	43.2	43.2	48.0	48.0	43.2	38.4	36.0	33.6	28.8	24.0	19.2	47.97
7/30/2004	30	11,040	368.0	8.7	8.7	8.7	8.7	8.7	11.9	14.1	15.2	16.2	19.5	21.6	21.6	21.6	19.5	19.5	21.6	21.6	19.5	17.3	16.2	15.2	13.0	10.8	8.7	21.65
6/30/2004	29	6,000	206.9	4.9	4.9	4.9	4.9	4.9	6.7	7.9	8.5	9.1	11.0	12.2	12.2	12.2	11.0	11.0	12.2	12.2	11.0	9.7	9.1	8.5	7.3	6.1	4.9	12.17
6/1/2004	33	7,600	230.3	5.4	5.4	5.4	5.4	5.4	7.5	8.8	9.5	10.2	12.2	13.5	13.5	13.5	12.2	12.2	13.5	13.5	12.2	10.8	10.2	9.5	8.1	6.8	5.4	13.55
4/29/2004	29	8,400	289.7	6.8	6.8	6.8	6.8	6.8	9.4	11.1	11.9	12.8	15.3	17.0	17.0	17.0	15.3	15.3	17.0	17.0	15.3	13.6	12.8	11.9	10.2	8.5	6.8	17.04

Office Electric

Month	Days	Usage (kWh)	kWh/ hr																								Max (kWh)
			kWh per da	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
3/29/2006	28	366,966	13105.9	308	308	308	308	308	424	501	540	578	694	771	771	771	694	694	771	771	694	617	578	540	463	385	308	770.94
3/1/2006	29	389,779	13440.7	316	316	316	316	316	435	514	553	593	712	791	791	791	712	712	791	791	712	633	593	553	474	395	316	790.63
1/31/2006	32	383,628	11988.4	282	282	282	282	282	388	458	494	529	635	705	705	705	635	635	705	705	635	564	529	494	423	353	282	705.20
12/30/2005	29	359,923	12411.1	292	292	292	292	292	402	475	511	548	657	730	730	730	657	657	730	730	657	584	548	511	438	365	292	730.07
12/1/2005	33	405,047	12274.2	289	289	289	289	289	397	469	505	542	650	722	722	722	650	650	722	722	650	578	542	505	433	361	289	722.01
10/29/2005	29	396,403	13669.1	322	322	322	322	322	442	523	563	603	724	804	804	804	724	724	804	804	724	643	603	563	482	402	322	804.06
9/30/2005	34	526,654	15489.8	364	364	364	364	364	501	592	638	683	820	911	911	911	820	820	911	911	820	729	683	638	547	456	364	911.17
8/27/2005	28	479,409	17121.8	403	403	403	403	403	554	655	705	755	906	1007	1007	1007	906	906	1007	1007	906	806	755	705	604	504	403	1007.16
7/30/2005	31	497,050	16033.9	377	377	377	377	377	519	613	660	707	849	943	943	943	849	849	943	943	849	755	707	660	566	472	377	943.17
6/29/2005	32	448,960	14030.0	330	330	330	330	330	454	536	578	619	743	825	825	825	743	743	825	825	743	660	619	578	495	413	330	825.29
5/28/2005	29	346,209	11938.2	281	281	281	281	281	386	456	492	527	632	702	702	702	632	632	702	702	632	562	527	492	421	351	281	702.25
4/29/2005	30	355,141	11838.0	279	279	279	279	279	383	453	487	522	627	696	696	696	627	627	696	696	627	557	522	487	418	348	279	696.35
3/30/2005	29	327,971	11309.3	266	266	266	266	266	366	432	466	499	599	665	665	665	599	599	665	665	599	532	499	466	399	333	266	665.26
3/1/2005	31	347,842	11220.7	264	264	264	264	264	363	429	462	495	594	660	660	660	594	594	660	660	594	528	495	462	396	330	264	660.04
1/29/2005	30	344,878	11495.9	270	270	270	270	270	372	440	473	507	609	676	676	676	609	609	676	676	609	541	507	473	406	338	270	676.23
12/30/2004	29	325,874	11237.0	264	264	264	264	264	364	430	463	496	595	661	661	661	595	595	661	661	595	529	496	463	397	331	264	661.00
12/1/2004	33	379,358	11495.7	270	270	270	270	270	372	440	473	507	609	676	676	676	609	609	676	676	609	541	507	473	406	338	270	676.22
10/29/2004	29	367,308	12665.8	298	298	298	298	298	410	484	522	559	671	745	745	745	671	671	745	745	671	596	559	522	447	373	298	745.05
9/30/2004	33	450,378	13647.8	321	321	321	321	321	442	522	562	602	723	803	803	803	723	723	803	803	723	642	602	562	482	401	321	802.81
8/28/2004	29	396,021	13655.9	321	321	321	321	321	442	522	562	602	723	803	803	803	723	723	803	803	723	643	602	562	482	402	321	803.29
7/30/2004	31	412,261	13298.7	313	313	313	313	313	430	508	548	587	704	782	782	782	704	704	782	782	704	626	587	548	469	391	313	782.28
6/29/2004	31	326,301	10525.8	248	248	248	248	248	341	402	433	464	557	619	619	619	557	557	619	619	557	495	464	433	372	310	248	619.17
5/29/2004	29	287,271	9905.9	233	233	233	233	233	320	379	408	437	524	583	583	583	524	524	583	583	524	466	437	408	350	291	233	582.70
4/30/2004	34	295,870	8702.1	205	205	205	205	205	282	333	358	384	461	512	512	512	461	461	512	512	461	410	384	358	307	256	205	511.89

New Design - # Microturbines Used - Condo

Hr	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

New Design - Fraction Microturbine Usage

Month	Days	Usage (therm)	lbs/hr																							
			lbs/day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
3/29/2006			2866.7	0.49	0.55	0.55	0.55	0.55	0.49	0.49	0.44	0.44	0.38	0.33	0.27	0.33	0.33	0.33	0.33	0.27	0.27	0.33	0.38	0.38	0.44	0.44	0.49
2/27/2006			4000.0	0.69	0.76	0.76	0.76	0.76	0.69	0.69	0.61	0.61	0.53	0.46	0.38	0.46	0.46	0.46	0.46	0.38	0.38	0.46	0.53	0.53	0.61	0.61	0.69
1/30/2006			2968.8	0.51	0.57	0.57	0.57	0.57	0.51	0.51	0.45	0.45	0.40	0.34	0.28	0.34	0.34	0.34	0.34	0.28	0.28	0.34	0.40	0.40	0.45	0.45	0.51
12/29/2005			4266.7	0.73	0.81	0.81	0.81	0.81	0.73	0.73	0.65	0.65	0.57	0.49	0.41	0.49	0.49	0.49	0.49	0.41	0.41	0.49	0.57	0.57	0.65	0.65	0.73
11/29/2005			2636.4	0.45	0.50	0.50	0.50	0.50	0.45	0.45	0.40	0.40	0.35	0.30	0.25	0.30	0.30	0.30	0.30	0.25	0.25	0.30	0.35	0.35	0.40	0.40	0.45
10/27/2005			1448.3	0.25	0.28	0.28	0.28	0.28	0.25	0.25	0.22	0.22	0.19	0.17	0.14	0.17	0.17	0.17	0.17	0.14	0.14	0.17	0.19	0.19	0.22	0.22	0.25
9/28/2005			1133.3	0.19	0.22	0.22	0.22	0.22	0.19	0.19	0.17	0.17	0.15	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.13	0.15	0.15	0.17	0.17	0.19
8/29/2005			1129.0	0.19	0.22	0.22	0.22	0.22	0.19	0.19	0.17	0.17	0.15	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.13	0.15	0.15	0.17	0.17	0.19
7/29/2005			1133.3	0.19	0.22	0.22	0.22	0.22	0.19	0.19	0.17	0.17	0.15	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.13	0.15	0.15	0.17	0.17	0.19
6/29/2005			1172.4	0.20	0.22	0.22	0.22	0.22	0.20	0.20	0.18	0.18	0.16	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.13	0.16	0.16	0.18	0.18	0.20
5/31/2005			1312.5	0.23	0.25	0.25	0.25	0.25	0.23	0.23	0.20	0.20	0.18	0.15	0.13	0.15	0.15	0.15	0.15	0.13	0.13	0.15	0.18	0.18	0.20	0.20	0.23
4/29/2005			1517.2	0.26	0.29	0.29	0.29	0.29	0.26	0.26	0.23	0.23	0.20	0.17	0.14	0.17	0.17	0.17	0.17	0.14	0.14	0.17	0.20	0.20	0.23	0.23	0.26
			2800.0	0.48	0.53	0.53	0.53	0.53	0.48	0.48	0.43	0.43	0.37	0.32	0.27	0.32	0.32	0.32	0.32	0.27	0.27	0.32	0.37	0.37	0.43	0.43	0.48
			3000.0	0.51	0.57	0.57	0.57	0.57	0.51	0.51	0.46	0.46	0.40	0.34	0.29	0.34	0.34	0.34	0.34	0.29	0.29	0.34	0.40	0.40	0.46	0.46	0.51
			3968.8	0.68	0.76	0.76	0.76	0.76	0.68	0.68	0.61	0.61	0.53	0.45	0.38	0.45	0.45	0.45	0.45	0.38	0.38	0.45	0.53	0.53	0.61	0.61	0.68
			3379.3	0.58	0.64	0.64	0.64	0.64	0.58	0.58	0.52	0.52	0.45	0.39	0.32	0.39	0.39	0.39	0.39	0.32	0.32	0.39	0.45	0.45	0.52	0.52	0.58
			1764.7	0.30	0.34	0.34	0.34	0.34	0.30	0.30	0.27	0.27	0.24	0.20	0.17	0.20	0.20	0.20	0.20	0.17	0.17	0.20	0.24	0.24	0.27	0.27	0.30
			1137.9	0.20	0.22	0.22	0.22	0.22	0.20	0.20	0.17	0.17	0.15	0.13	0.11	0.13	0.13	0.13	0.13	0.11	0.11	0.13	0.15	0.15	0.17	0.17	0.20
			933.3	0.16	0.18	0.18	0.18	0.18	0.16	0.16	0.14	0.14	0.12	0.11	0.09	0.11	0.11	0.11	0.11	0.09	0.09	0.11	0.12	0.12	0.14	0.14	0.16
			903.2	0.16	0.17	0.17	0.17	0.17	0.16	0.16	0.14	0.14	0.12	0.10	0.09	0.10	0.10	0.10	0.10	0.09	0.09	0.10	0.12	0.12	0.14	0.14	0.16
			733.3	0.13	0.14	0.14	0.14	0.14	0.13	0.13	0.11	0.11	0.10	0.08	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.08	0.10	0.10	0.11	0.11	0.13
			1034.5	0.18	0.20	0.20	0.20	0.20	0.18	0.18	0.16	0.16	0.14	0.12	0.10	0.12	0.12	0.12	0.12	0.10	0.10	0.12	0.14	0.14	0.16	0.16	0.18

New Design - "Leftover" MBH

	MBH																							
lbs/day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2866.7	224	199	199	199	199	224	224	248	248	272	296	320	296	296	296	296	320	320	296	272	272	248	248	224
4000.0	138	104	104	104	104	138	138	171	171	205	239	272	239	239	239	239	272	272	239	205	205	171	171	138
2968.8	216	191	191	191	191	216	216	241	241	266	291	315	291	291	291	291	315	315	291	266	266	241	241	216
4266.7	118	82	82	82	82	118	118	154	154	189	225	261	225	225	225	225	261	261	225	189	189	154	154	118
2636.4	241	219	219	219	219	241	241	263	263	285	307	329	307	307	307	307	329	329	307	285	285	263	263	241
1448.3	331	318	318	318	318	331	331	343	343	355	367	379	367	367	367	367	379	379	367	355	355	343	343	331
1133.3	354	345	345	345	345	354	354	364	364	373	383	392	383	383	383	383	392	392	383	373	373	364	364	354
1129.0	355	345	345	345	345	355	355	364	364	374	383	393	383	383	383	383	393	393	383	374	374	364	364	355
1133.3	354	345	345	345	345	354	354	364	364	373	383	392	383	383	383	383	392	392	383	373	373	364	364	354
1172.4	351	342	342	342	342	351	351	361	361	371	381	391	381	381	381	381	391	391	381	371	371	361	361	351
1312.5	341	330	330	330	330	341	341	352	352	363	374	385	374	374	374	374	385	385	374	363	363	352	352	341
1517.2	325	313	313	313	313	325	325	338	338	351	364	376	364	364	364	364	376	376	364	351	351	338	338	325
2800.0	229	205	205	205	205	229	229	252	252	276	299	323	299	299	299	299	323	323	299	276	276	252	252	229
3000.0	213	188	188	188	188	213	213	239	239	264	289	314	289	289	289	289	314	314	289	264	264	239	239	213
3968.8	140	107	107	107	107	140	140	174	174	207	240	273	240	240	240	240	273	273	240	207	207	174	174	140
3379.3	185	156	156	156	156	185	185	213	213	242	270	298	270	270	270	270	298	298	270	242	242	213	213	185
1764.7	307	292	292	292	292	307	307	322	322	336	351	366	351	351	351	351	366	366	351	336	336	322	322	307
1137.9	354	345	345	345	345	354	354	364	364	373	383	392	383	383	383	383	392	392	383	373	373	364	364	354
933.3	370	362	362	362	362	370	370	377	377	385	393	401	393	393	393	393	401	401	393	385	385	377	377	370
903.2	372	364	364	364	364	372	372	379	379	387	395	402	395	395	395	395	402	402	395	387	387	379	379	372
733.3	385	378	378	378	378	385	385	391	391	397	403	409	403	403	403	403	409	409	403	397	397	391	391	385
1034.5	362	353	353	353	353	362	362	371	371	379	388	397	388	388	388	388	397	397	388	379	379	371	371	362

New Design - Office Required Energy Usage

MBH																								
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
25833.3	1639	1870	1870	1870	1870	1639	1639	1408	1408	1177	946	715	946	946	946	946	715	715	946	1177	1177	1408	1408	1639
36571.4	2498	2825	2825	2825	2825	2498	2498	2172	2172	1845	1519	1192	1519	1519	1519	1519	1192	1192	1519	1845	1845	2172	2172	2498
27218.8	1746	1989	1989	1989	1989	1746	1746	1503	1503	1260	1018	775	1018	1018	1018	1018	775	775	1018	1260	1260	1503	1503	1746
37066.7	2554	2887	2887	2887	2887	2554	2554	2222	2222	1889	1556	1223	1556	1556	1556	1556	1223	1223	1556	1889	1889	2222	2222	2554
20636.4	1247	1434	1434	1434	1434	1247	1247	1059	1059	872	684	497	684	684	684	684	497	497	684	872	872	1059	1059	1247
11758.6	517	623	623	623	623	517	517	411	411	304	198	92	198	198	198	198	92	92	198	304	304	411	411	517
7700.0	201	272	272	272	272	201	201	129	129	58	-13	-84	-13	-13	-13	-13	-84	-84	-13	58	58	129	129	201
11096.8	445	544	544	544	544	445	445	347	347	248	150	52	150	150	150	150	52	52	150	248	248	347	347	445
12133.3	520	627	627	627	627	520	520	414	414	307	200	93	200	200	200	200	93	93	200	307	307	414	414	520
8413.8	255	332	332	332	332	255	255	178	178	101	23	-54	23	23	23	23	-54	-54	23	101	101	178	178	255
11406.3	481	584	584	584	584	481	481	379	379	277	174	72	174	174	174	174	72	72	174	277	277	379	379	481
16000.0	828	969	969	969	969	828	828	687	687	546	405	264	405	405	405	405	264	264	405	546	546	687	687	828
30766.7	1989	2259	2259	2259	2259	1989	1989	1719	1719	1449	1180	910	1180	1180	1180	1180	910	910	1180	1449	1449	1719	1719	1989
36482.8	2417	2734	2734	2734	2734	2417	2417	2099	2099	1782	1464	1147	1464	1464	1464	1464	1147	1147	1464	1782	1782	2099	2099	2417
43000.0	2959	3337	3337	3337	3337	2959	2959	2582	2582	2204	1826	1449	1826	1826	1826	1826	1449	1449	1826	2204	2204	2582	2582	2959
37620.7	2527	2857	2857	2857	2857	2527	2527	2198	2198	1868	1538	1208	1538	1538	1538	1538	1208	1208	1538	1868	1868	2198	2198	2527
24470.6	1457	1668	1668	1668	1668	1457	1457	1246	1246	1036	825	614	825	825	825	825	614	614	825	1036	1036	1246	1246	1457
16551.7	839	981	981	981	981	839	839	697	697	555	413	271	413	413	413	413	271	271	413	555	555	697	697	839
8533.3	246	322	322	322	322	246	246	169	169	93	17	-59	17	17	17	17	-59	-59	17	93	93	169	169	246
8871.0	268	346	346	346	346	268	268	189	189	110	32	-47	32	32	32	32	-47	-47	32	110	110	189	189	268
5533.3	14	65	65	65	65	14	14	-36	-36	-87	-137	-188	-137	-137	-137	-137	-188	-188	-137	-87	-87	-36	-36	14
3103.4	-138	-105	-105	-105	-105	-138	-138	-172	-172	-205	-239	-272	-239	-239	-239	-239	-272	-272	-239	-205	-205	-172	-172	-138

New Design - # Microturbines Used - Office

Hr	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	3	4	4	4	4	3	3	3	3	2	2	1	2	2	2	2	1	1	2	2	2	3	3	3
	5	6	6	6	6	5	5	5	5	4	3	2	3	3	3	3	2	2	3	4	4	5	5	5
	4	4	4	4	4	4	4	3	3	3	2	1	2	2	2	2	1	1	2	3	3	3	3	4
	6	6	6	6	6	6	6	5	5	4	3	2	3	3	3	3	2	2	3	4	4	5	5	6
	2	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2
	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	1	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	4	5	5	5	5	4	4	4	4	3	2	2	2	2	2	2	2	2	2	3	3	4	4	4
	5	6	6	6	6	5	5	4	4	4	3	2	3	3	3	3	2	2	3	4	4	4	4	5
	7	7	7	7	7	7	7	6	6	5	4	3	4	4	4	4	3	3	4	5	5	6	6	7
	6	6	6	6	6	6	6	5	5	4	3	2	3	3	3	3	2	2	3	4	4	5	5	6
	3	3	3	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	3
	1	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

New Design - Steam Energy Required

MBH																								Steam Required
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
25833.3	559	430	430	430	430	559	559	328	328	457	226	355	226	226	226	226	355	355	226	457	457	328	328	559	7.8507329
36571.4	698	665	665	665	665	698	698	372	372	405	439	472	439	439	439	439	472	472	439	405	405	372	372	698	10.584772
27218.8	306	549	549	549	549	306	306	423	423	180	298	415	298	298	298	298	415	415	298	180	180	423	423	306	7.5313395
37066.7	394	727	727	727	727	394	394	422	422	449	476	503	476	476	476	476	503	503	476	449	449	422	422	394	10.304543
20636.4	527	354	354	354	354	527	527	339	339	152	324	137	324	324	324	324	137	137	324	152	152	339	339	527	6.6711058
11758.6	157	263	263	263	263	157	157	411	411	304	198	92	198	198	198	198	92	92	198	304	304	411	411	157	4.942322
7700.0	201	272	272	272	272	201	201	129	129	58	0	0	0	0	0	0	0	0	0	58	58	129	129	201	2.2393284
11096.8	85	184	184	184	184	85	85	347	347	248	150	52	150	150	150	150	52	52	150	248	248	347	347	85	3.6969567
12133.3	160	267	267	267	267	160	160	414	414	307	200	93	200	200	200	200	93	93	200	307	307	414	414	160	4.998288
8413.8	255	332	332	332	332	255	255	178	178	101	23	0	23	23	23	23	0	0	23	101	101	178	178	255	3.0370688
11406.3	121	224	224	224	224	121	121	379	379	277	174	72	174	174	174	174	72	72	174	277	277	379	379	121	4.3240569
16000.0	468	249	249	249	249	468	468	327	327	186	405	264	405	405	405	405	264	264	405	186	186	327	327	468	6.9010305
30766.7	549	459	459	459	459	549	549	279	279	369	460	190	460	460	460	460	190	190	460	369	369	279	279	549	8.3119256
36482.8	617	574	574	574	574	617	617	659	659	342	384	427	384	384	384	384	427	427	384	342	342	659	659	617	10.412894
43000.0	439	817	817	817	817	439	439	422	422	404	386	369	386	386	386	386	369	369	386	404	404	422	422	439	9.8401846
37620.7	367	697	697	697	697	367	367	398	398	428	458	488	458	458	458	458	488	488	458	428	428	398	398	367	9.8350579
24470.6	377	588	588	588	588	377	377	526	526	316	465	254	465	465	465	465	254	254	465	316	316	526	526	377	9.0739472
16551.7	479	261	261	261	261	479	479	337	337	195	413	271	413	413	413	413	271	271	413	195	195	337	337	479	7.0939698
8533.3	246	322	322	322	322	246	246	169	169	93	17	0	17	17	17	17	0	0	17	93	93	169	169	246	2.8870505
8871.0	268	346	346	346	346	268	268	189	189	110	32	0	32	32	32	32	0	0	32	110	110	189	189	268	3.2377823
5533.3	14	65	65	65	65	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0.273991
3103.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Net Elec "Used"in Building - Positive = Consumption, Negative = Generation

	(kW/hr)																							
Hr	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	56.9	-8.1	-8.1	-8.1	-8.1	176	255	295	334	518	597	662	597	518	518	597	662	583	439	399	360	215	136	56.9
	-65	-130	-130	-130	-130	56.7	138	178	219	406	552	617	552	471	471	552	617	536	390	284	243	97.3	16.1	-65
	-34	-34	-34	-34	-34	74.8	148	249	285	394	532	597	532	459	459	532	597	524	387	285	249	176	103	-34
	-155	-155	-155	-155	-155	-43	32.4	135	172	350	490	555	490	415	415	490	555	480	340	237	200	59.9	-15	-155
	102	37.2	37.2	37.2	37.2	214	288	325	362	474	613	613	613	539	539	613	613	539	464	362	325	251	177	102
	201	201	201	201	201	325	408	514	556	680	762	762	762	680	680	762	762	680	597	556	514	431	349	201
	318	318	318	318	318	462	558	605	653	797	893	893	893	797	797	893	893	797	701	653	605	510	414	318
	292	292	292	292	292	450	556	674	726	885	990	990	990	885	885	990	990	885	779	726	674	568	463	292
	268	268	268	268	268	417	516	631	680	829	929	929	929	829	829	929	929	829	730	680	631	531	432	268
	279	279	279	279	279	408	494	537	580	709	796	796	796	709	709	796	796	709	623	580	537	451	365	279
	161	161	161	161	161	270	343	444	481	590	662	662	662	590	590	662	662	590	517	481	444	371	299	161
	158	93.5	93.5	93.5	93.5	267	339	375	411	519	656	656	656	584	584	656	656	584	512	411	375	303	231	158