

# Ramada Inn Geneva Lakefront Hotel



The 149 room hotel uses a Geoexchange system to heat, cool and provide hot water with a total capacity of 324 tons. About half of the ground loop is installed in the building pilings (33,660 ft. of pipe on eight circuits 198 pilings at 85 ft. depth). The other half is in 120 bore holes averaging 138 feet deep beneath the parking lot. One of the ten parking lot circuits used thermally enhanced grout. Four 10-ton water-to-water heat pumps supply all of the service hot water needs. Variable speed drives on the loop pumps minimizes pump electricity use to less than 8% of the total heat pump energy.

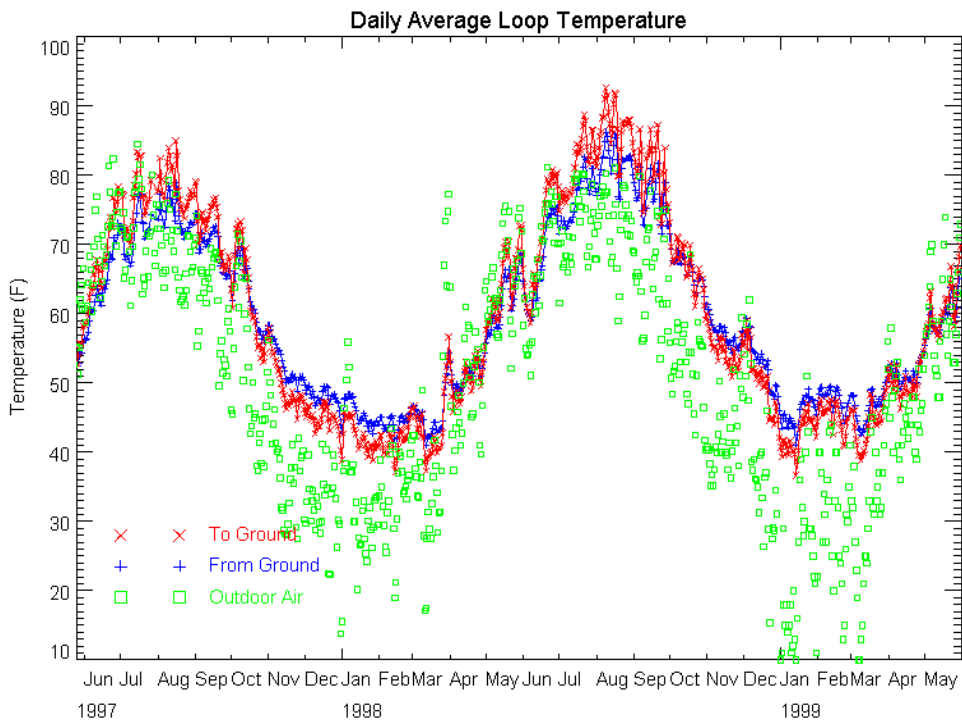


Figure 1. Daily Average Loop Temperature

## GeoExchange at the Ramada Inn Geneva Lakefront Hotel

Table 1. Monthly Data Summary

Date	Electricity Use (MWh)				Loop Energy Flows (10 <sup>6</sup> Btu)					
	Total Building	Water Heating	Loop Pump	Heat Pumps	Heat Rejected to Ground	Piling Heat Transfer Portion	Heat Extracted from Ground	Piling Heat Transfer Portion	Heat Taken from Loop for Water Heating	Hot Water Use (10 <sup>3</sup> gal)
Jun-97	122	8.4	3.1	27	425	56%	0	0%	81	n/a
Jul-97	136	8.3	3.5	35	504	57%	0	0%	87	n/a
Aug-97	139	9.8	3.5	32	438	56%	0	0%	94	190
Sep-97	126	9.1	3.1	17	223	54%	6	75%	83	191
Oct-97	135	11.2	2.7	11	88	51%	75	73%	102	226
Nov-97	125	10.0	2.5	13	1	0%	203	71%	75	155
Dec-97	137	9.5	3.0	19	0	0%	260	70%	64	125
Jan-98	145	13.1	3.4	24	0	0%	326	68%	82	134
Feb-98	139	13.3	3.5	18	2	0%	255	63%	88	144
Mar-98	151	13.8	3.9	16	21	45%	212	61%	96	160
Apr-98	128	15.3	3.0	7	28	45%	91	67%	127	189
May-98	141	14.3	3.5	19	274	55%	4	66%	83	208
<b>Total</b>	<b>1,624</b>	<b>135.9</b>	<b>38.5</b>	<b>239</b>	<b>2,004</b>	<b>-</b>	<b>1,432</b>	<b>-</b>	<b>1,062</b>	<b>-</b>
Jun-98	141	12.7	3.9	27	346	53%	8	64%	130	212
Jul-98	159	10.8	5.2	43	556	51%	0	0%	141	228
Aug-98	169	9.7	5.2	49	611	58%	0	0%	139	251
Sep-98	142	10.4	3.7	29	362	56%	3	0%	110	203
Oct-98	137	13.3	2.7	10	71	42%	38	73%	119	232
Nov-98	136	13.0	2.7	8	1	0%	177	69%	108	182
Dec-98	151	8.1	2.4	16	4	0%	251	67%	116	158
Jan-99	159	13.2	4.6	26	0	0%	357	66%	96	n/a
Feb-99	120	11.2	3.1	12	0	0%	201	67%	83	n/a
Mar-99	149	15.2	4.1	15	3	0%	240	66%	110	n/a
Apr-99	131	15.0	3.3	6	10	37%	118	66%	130	n/a
May-99	130	15.5	3.4	13	123	56%	16	63%	148	n/a
<b>Total</b>	<b>1,725</b>	<b>148.0</b>	<b>44.3</b>	<b>255</b>	<b>2,086</b>	<b>-</b>	<b>1,407</b>	<b>-</b>	<b>1,428</b>	<b>-</b>

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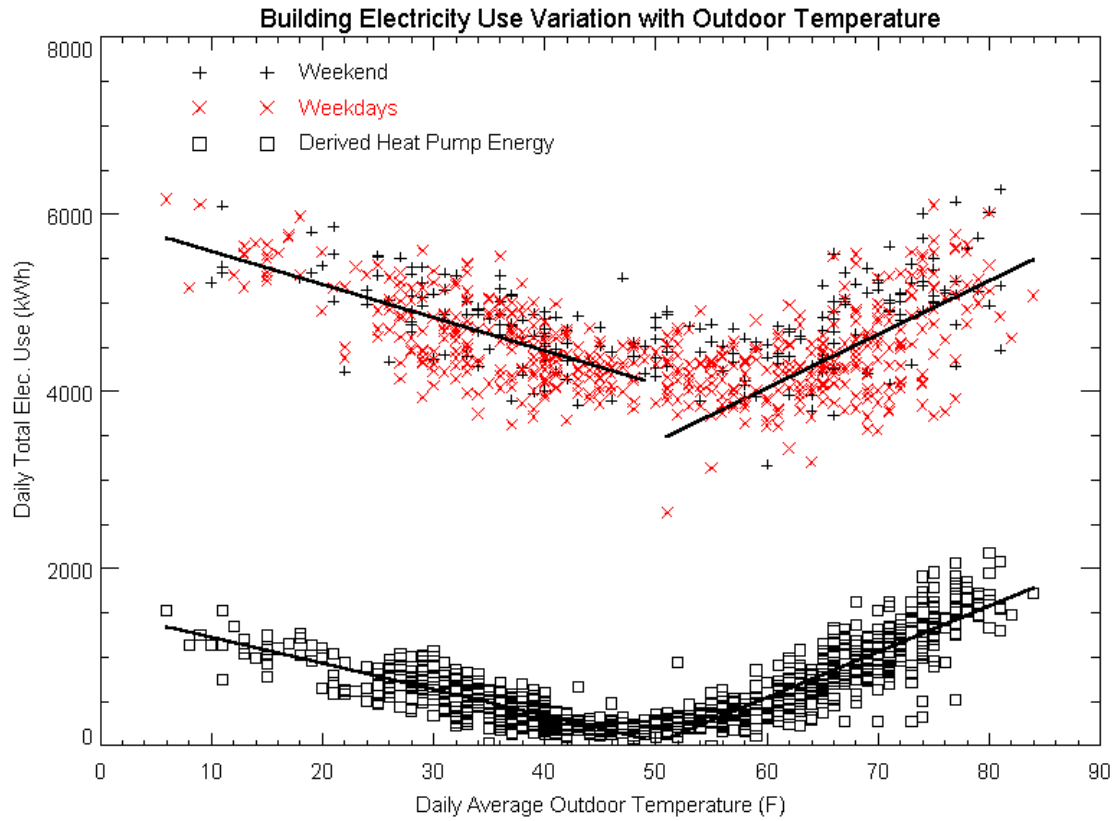


Figure 2. Building Electricity Use Variation with Outdoor Temperature