



Appendix B

Existing System Energy Analysis

Carrier's Hourly Analysis Program (HAP) output for the original VAV system:

ANNUAL COST SUMMARY:

Table 1. Annual Costs

Component	Gallaudet University SLCC (\$)
Air System Fans	10,409
Cooling	90,174
Heating	1,237
Pumps	7,579
Cooling Tower Fans	0
HVAC Sub-Total	109,399
Lights	20,222
Electric Equipment	23,381
Misc. Electric	0
Misc. Fuel Use	0
Non-HVAC Sub-Total	43,602
Grand Total	153,002

Table 3. Component Cost as a Percentage of Total Cost

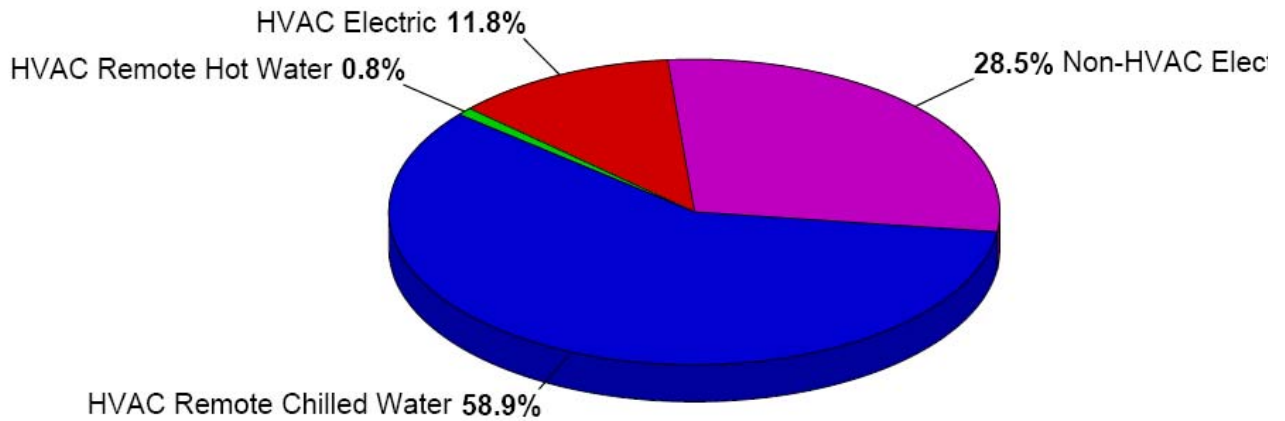
Component	Gallaudet University SLCC (%)
Air System Fans	6.8
Cooling	58.9
Heating	0.8
Pumps	5.0
Cooling Tower Fans	0.0
HVAC Sub-Total	71.5
Lights	13.2
Electric Equipment	15.3
Misc. Electric	0.0
Misc. Fuel Use	0.0
Non-HVAC Sub-Total	28.5
Grand Total	100.0

Table 2. Annual Cost per Unit Floor Area

Component	Gallaudet University SLCC (\$/ft ²)
Air System Fans	0.151
Cooling	1.307
Heating	0.018
Pumps	0.110
Cooling Tower Fans	0.000
HVAC Sub-Total	1.585
Lights	0.293
Electric Equipment	0.339
Misc. Electric	0.000
Misc. Fuel Use	0.000
Non-HVAC Sub-Total	0.632
Grand Total	2.217
Gross Floor Area (ft ²)	69014.0
Conditioned Floor Area (ft ²)	69014.0

Note: Values in this table are calculated using the Gross Floor Area.

ANNUAL ENERGY COSTS

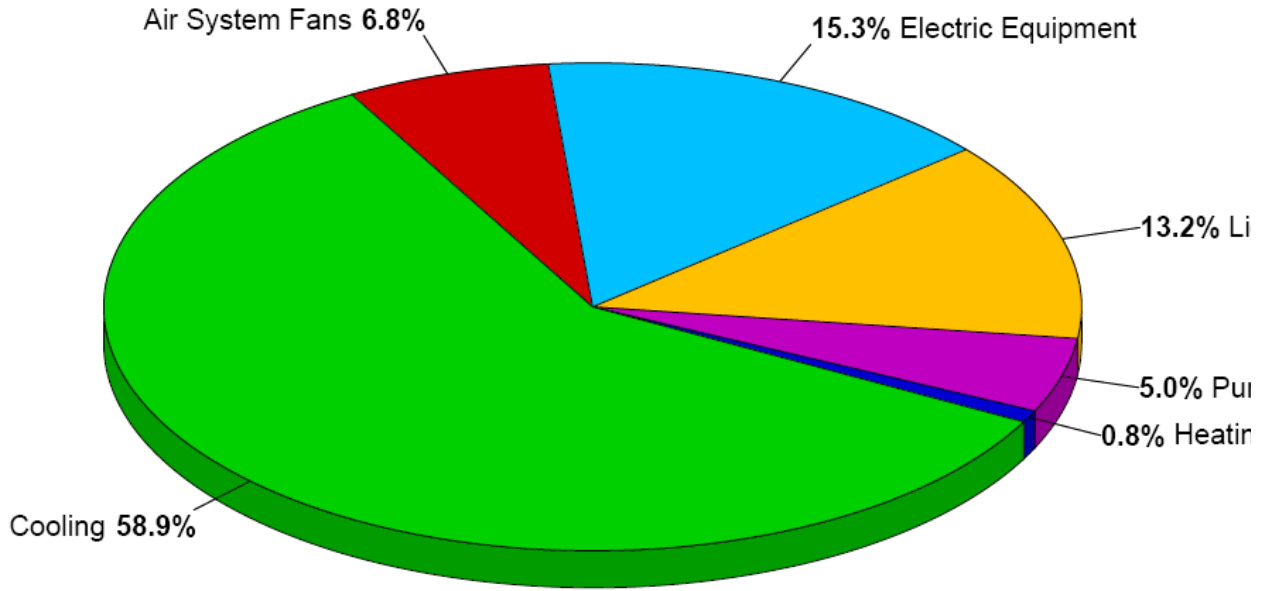


Component	Annual Cost (\$/yr)	(\$/ft ²)	Percent of Total (%)
HVAC Components			
Electric	17,988	0.261	11.8
Natural Gas	0	0.000	0.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	1,237	0.018	0.8
Remote Steam	0	0.000	0.0
Remote Chilled Water	90,174	1.307	58.9
HVAC Sub-Total	109,399	1.585	71.5
Non-HVAC Components			
Electric	43,607	0.632	28.5
Natural Gas	0	0.000	0.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Non-HVAC Sub-Total	43,607	0.632	28.5
Grand Total	153,006	2.217	100.0

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area 69014.0 ft²
 Conditioned Floor Area 69014.0 ft²

ANNUAL COMPONENT COSTS



Component	Annual Cost (\$)	(\$/ft ²)	Percent of Total (%)
Air System Fans	10,409	0.151	6.8
Cooling	90,174	1.307	58.9
Heating	1,237	0.018	0.8
Pumps	7,579	0.110	5.0
Cooling Tower Fans	0	0.000	0.0
HVAC Sub-Total	109,399	1.585	71.5
Lights	20,222	0.293	13.2
Electric Equipment	23,381	0.339	15.3
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	43,602	0.632	28.5
Grand Total	153,002	2.217	100.0

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area 69014.0 ft²
 Conditioned Floor Area 69014.0 ft²

ANNUAL ENERGY SUMMARY

Table 1. Annual Costs

Component	Gallaudet University SLCC (\$)
HVAC Components	
Electric	17,988
Natural Gas	0
Fuel Oil	0
Propane	0
Remote HW	1,237
Remote Steam	0
Remote CW	90,174
HVAC Sub-Total	109,399
Non-HVAC Components	
Electric	43,607
Natural Gas	0
Fuel Oil	0
Propane	0
Remote HW	0
Remote Steam	0
Non-HVAC Sub-Total	43,607
Grand Total	153,006

Table 2. Annual Energy Consumption

Component	Gallaudet University SLCC
HVAC Components	
Electric (kWh)	198,978
Natural Gas (na)	0
Fuel Oil (na)	0
Propane (na)	0
Remote HW (kBTU)	89,340
Remote Steam (na)	0
Remote CW (kBTU)	3,402,805
Non-HVAC Components	
Electric (kWh)	482,375
Natural Gas (na)	0
Fuel Oil (na)	0
Propane (na)	0
Remote HW (kBTU)	0
Remote Steam (na)	0
Totals	
Electric (kWh)	681,353
Natural Gas (na)	0
Fuel Oil (na)	0
Propane (na)	0
Remote HW (kBTU)	89,340
Remote Steam (na)	0
Remote CW (kBTU)	3,402,805

Table 4. Annual Cost per Unit Floor Area

Component	Gallaudet University SLCC (\$/ft ²)
HVAC Components	
Electric	0.261
Natural Gas	0.000
Fuel Oil	0.000
Propane	0.000
Remote HW	0.018
Remote Steam	0.000
Remote CW	1.307
HVAC Sub-Total	1.585
Non-HVAC Components	
Electric	0.632
Natural Gas	0.000
Fuel Oil	0.000
Propane	0.000
Remote HW	0.000
Remote Steam	0.000
Non-HVAC Sub-Total	0.632
Grand Total	2.217
Gross Floor Area (ft ²)	69014.0
Conditioned Floor Area (ft ²)	69014.0

Note: Values in this table are calculated using the Gross Floor Area.

Table 5. Component Cost as a Percentage of Total Cost

Component	Gallaudet University SLCC (%)
HVAC Components	
Electric	11.8
Natural Gas	0.0
Fuel Oil	0.0
Propane	0.0
Remote HW	0.8
Remote Steam	0.0
Remote CW	58.9
HVAC Sub-Total	71.5
Non-HVAC Components	
Electric	28.5
Natural Gas	0.0
Fuel Oil	0.0
Propane	0.0
Remote HW	0.0
Remote Steam	0.0
Non-HVAC Sub-Total	28.5
Grand Total	100.0

ENERGY BUDGET BY SOURCE

1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/ft ²)
Cooling Coil Loads	3,181,617	46.101
Heating Coil Loads	1,287,048	18.649
Grand Total	4,468,665	64.750

2. Energy Consumption by Energy Source

Component	Site Energy (kBTU)	Site Energy (kBTU/ft ²)	Source Energy (kBTU)	Source Energy (kBTU/ft ²)
HVAC Components				
Electric	678,911	9.837	2,424,683	35.133
Natural Gas	0	0.000	0	0.000
Fuel Oil	0	0.000	0	0.000
Propane	0	0.000	0	0.000
Remote Hot Water	1,250,765	18.123	1,250,765	18.123
Remote Steam	0	0.000	0	0.000
Remote Chilled Water	3,402,805	49.306	3,402,805	49.306
HVAC Sub-Total	5,332,481	77.267	7,078,252	102.563
Non-HVAC Components				
Electric	1,645,865	23.848	5,878,088	85.172
Natural Gas	0	0.000	0	0.000
Fuel Oil	0	0.000	0	0.000
Propane	0	0.000	0	0.000
Remote Hot Water	0	0.000	0	0.000
Remote Steam	0	0.000	0	0.000
Non-HVAC Sub-Total	1,645,865	23.848	5,878,088	85.172
Grand Total	6,978,346	101.115	12,956,340	187.735

Notes:

- 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
- 'Heating Coil Loads' is the sum of all air system heating coil loads.
- Site Energy is the actual energy consumed.
- Source Energy is the site energy divided by the electric generating efficiency (28.0%).
- Source Energy for fuels equals the site energy value.
- Energy per unit floor area is based on the gross building floor area.
 Gross Floor Area **69014.0** ft²
 Conditioned Floor Area **69014.0** ft²