AN ENERGY AND PEAK LOADS ANALYSIS OF
THE TEXAS DEPARTMENT OF HEALTH BUILDING
FINAL REPORT

October 1986

Submitted by
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Prepared For

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Austin, Texas
SUMMARY

The energy use of the Department of Health Building at Austin, Texas, was analyzed using the DOE 2.1B building energy simulation program. An analysis was made for the building as specified in the building plans and the specifications provided by the State Purchasing and General Services Commission. Operating schedules for occupancy, lighting, office equipment, and infiltration were assumed. The proposed construction of the Health building reflects improvements in energy use over buildings built several years ago (EUs of 142 Kbtu/sf/yr compared to as much as 250 Kbtu/sf/yr). However, the energy consumption of the Health building can be reduced with certain modifications.

Four options for reducing the building energy use were studied: (i) reducing the lighting levels, (ii) reducing the ventilation rate from 20 cfm/person/hr to 10 cfm/person/hr (iii) having a variable speed fan with the VAV system and economiser cycle and (iv) improved glass. These options not only reduce the peak loads but also reduce the total energy use.

Finally the energy consumption of the Health building was compared with the energy consumption of the building modified to comply with the California standards. A net reduction of 44% was obtained using the California standards. The California standards are more stringent and are a better choice for state owned buildings which have a life of 30 to 40 years. The net effects are summarized in the table below.

<table>
<thead>
<tr>
<th>Modification Over the Base</th>
<th>Peak Cooling</th>
<th>Peak Heating</th>
<th>Total Cooling</th>
<th>Total Heating</th>
<th>Total Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilation Reduction</td>
<td>16.0</td>
<td>25.0</td>
<td>2.0</td>
<td>48.2</td>
<td>3.4</td>
</tr>
<tr>
<td>From 20 to 10 cfm/hr/person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VAV with Variable Speed Fan &amp; Economiser Cycle</td>
<td>0.0</td>
<td>0.0</td>
<td>7.2</td>
<td>-115.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Improved Glass</td>
<td>3.1</td>
<td>69.8</td>
<td>4.1</td>
<td>25.4</td>
<td>3.8</td>
</tr>
<tr>
<td>California Standards</td>
<td>35.3</td>
<td>-42.0</td>
<td>39.8</td>
<td>41.9</td>
<td>44.0</td>
</tr>
</tbody>
</table>
ABSTRACT

The energy use of the Department of Health Building at Austin, Texas was analyzed using the DOE 2.1B building energy simulation program. An analysis was made for the building as specified in the building plans and the specification provided by the State Purchasing and General Services Commission. The base energy consumption of the building was compared with two different alternatives. In addition, a glass with high reflectivity and low overall heat transfer coefficient was used to study the reduction of glass conduction and glass solar loads. Finally, the energy consumption of the Health building was compared with the energy consumption of the modified building which conformed to the California energy standards.
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<td>APPENDIX A</td>
<td>23</td>
</tr>
</tbody>
</table>
CHAPTER 1

INTRODUCTION

The cost of comfort heating and cooling is typically the largest single component of the annual energy costs in commercial buildings. The electrical costs in Texas are continuing to increase even though gas prices have moderated. In Texas, 63% of the total energy use in the commercial sector is used for heating, ventilation and air-conditioning (HVAC), which is about 8.5% of the total energy consumption [1].

The Energy Management Group at Texas A&M University is working with the Texas Public Utility Commission of Texas (PUCT) and the State Purchasing and General Services Commission (SPGSC) to analyze the energy use for new state buildings. The proposed Department of Health Building at Austin, Texas was one of the buildings chosen for analysis by SPGSC.

The United States Department of Energy (DOE), and the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE), have been developing energy standards for new buildings. The DOE's involvement in the development of energy standards for the new buildings is primarily a result of public laws which have mandated the development of building standards [2]. The proposed ASHRAE standards (1985) 90.1P are prescriptive. These prescriptive standards identify the thermal, electrical or physical parameters which should lead to the development of energy efficient designs.

The state of California has both prescriptive and performance standards for 16 different weather zones located in California [3]. The Cali-
fornia energy standards are similar to the proposed ASHRAE standards in many respects, except that the California standards are more stringent.

The purpose of both standards is to encourage innovative design of new buildings which use less energy without constraining the necessary building functions. The energy use of buildings designed with the proposed ASHRAE or existing California standards should be far less than the energy use of most existing buildings in Texas.

This study looked at the energy use of the Department of Health Building as proposed in preliminary plan design. Possible alternatives for reducing the energy use are investigated. In addition, the effects of the California standards on the energy use of the Health Building are studied.
CHAPTER 2
DESCRIPTION OF BUILDING

The operational schedules and their profiles are required to estimate the energy use of the Health Building using the DOE 2.1B computer program. This chapter provides a description of the Health Building operating schedules and their profiles, and various zones. Most of the profiles had to be assumed because they were not known.

ZONES

The Health Building is a seven story office building. Each floor is a separate conditioned zone. The second floor through the sixth were treated as five separate, but identical, zones. The first floor and the seventh floor are each treated different from other floors because these floors have heat transfer through the ground and the roof, respectively. The schematic of a typical zone is shown in Figure 2.1. The typical zone has a conditioned floor area of 18,314 square feet. The total exterior surface is 7,532 square feet on each floor, of which 2,233 square feet is glass. The total exterior surface area is 52,725 square feet. The gross floor area of the Health Building is 128,198 square feet.

SCHEDULES

The Health Building is assumed to have two operating schedules: one schedule for Monday through Friday and another for the holidays and weekends. Each operating schedule consists of four profiles: (1) occupancy, (2) lighting, (3) office equipment, (4) infiltration.
Figure 2.1—Schematic of a Typical Zone in the Health Building
Occupancy

The number of people occupying each zone was estimated from the total figures obtained from the personnel of the SPGSC. The occupancy schedules are shown in Table 2.1. The estimated maximum number of people in the building is 700.

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday-Friday</th>
<th>Holidays &amp; Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>12am-8am</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>8am-11am</td>
<td>0.9</td>
<td>0.2</td>
</tr>
<tr>
<td>11am-2pm</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>2pm-6pm</td>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>6pm-12am</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

+ where 1.0 = 175 people/floor

Lighting

The peak lighting levels were estimated to be 2.0 w/sf from the floor plan specifications given by SPGSC. This value is slightly larger than the 1.8 w/sf recommended by proposed ASHRAE standards [2] and the 1.5 w/sf by California standards [3]. The lighting schedules are shown in Table 2.2.

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday-Friday</th>
<th>Holidays &amp; Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>12am-8am</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>8am-5pm</td>
<td>0.9</td>
<td>0.2</td>
</tr>
<tr>
<td>5pm-12am</td>
<td>0.3</td>
<td>0.2</td>
</tr>
</tbody>
</table>

+ where 1.0 = 2.2 w/sf
Office Equipment

The peak equipment wattage for an office was estimated to be 1.25 w/sf. The main computers in the Health Building were assumed to use 0.75 w/sf. The office equipment wattage was estimated from the information provided in the SPGSC personnel. The estimate of the computers was an approximation based on the previous study of Travis building at Austin, TX [4]. The office equipment included: computer terminals, copying machines, typewriters, table lamps, coffee pots, microcomputers etc.

The office equipment schedules are shown in Table 2.3. During weekends and holidays, 20% of the equipment is assumed to be on, because the main computers are never shut down.

Table 2.3—Assumed Equipment Schedules for the Health Building.⁺

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday-Friday</th>
<th>Holidays &amp; Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>12am-8am</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>8am-12pm</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>12pm-2pm</td>
<td>0.4</td>
<td>0.2</td>
</tr>
<tr>
<td>2pm-6pm</td>
<td>0.5</td>
<td>0.2</td>
</tr>
<tr>
<td>6pm-12am</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

⁺ where 1.0 = 2.0 w/sf

Infiltration

Infiltration was assumed to be 0.55 air-changes/hr. This corresponds to about 20 cfm/person/hr for the building when fully occupied. The ASHRAE and the California standards recommend a fresh air requirement of 6–10 cfm/person/hr. The infiltration schedules are shown in Table 2.4. During week nights, weekends and holidays, the infiltration is cut down to
4.0 cfm/person/hr (20% of peak infiltration) because the movement of the people into and out of the building is reduced.

Table 2.4—Assumed Infiltration Schedules for the Health Building

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday-Friday</th>
<th>Holidays &amp; Weekends</th>
</tr>
</thead>
<tbody>
<tr>
<td>12am-8am</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>8am-6pm</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>6pm-12am</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

+ where 1.0 = 0.55 Air-Changes/hr
CHAPTER 3

SYSTEM DESCRIPTION

The building specifications show a two speed variable air volume system (VAV) without an economizer cycle is proposed for the Health Building. VAV systems are typically more efficient than other systems (dual duct, multi-zone, etc). A VAV system varies the quantity of air to match system load requirements. The air temperature is typically kept constant in a particular zone. Thus, the energy consumption closely parallels the load on the air conditioning systems.

The temperature for cooling was set at 75°F during the day and allowed to float to 85°F during the week nights, weekends and holidays. The temperature for heating was set at 75°F during day and 65°F during week nights, weekends and holidays. The humidity was set to a maximum of 70 % and a minimum of 40 %. The temperature set points are from the specifications provided by the SPGSC. Each zone, described earlier, was assigned a separate two speed fan.
CHAPTER 4
RESULTS & ANALYSIS

The energy consumption of the Health Building at Austin was analyzed using the DOE 2.1B building energy simulation program [5]. The program simulates hourly loads profile and hourly system simulation of the building. It also has a provision to output various data, such as, peak loads for each zone, peak loads for the entire building, and total energy use for each zone, total energy use for the entire building, etc. A sample output of the base run for the Health Building, is found in Appendix A.

The energy consumption of the Health Building was estimated for Austin weather data. Originally the Health Building had a fresh air requirement of 20 cfm/person/hr. This fresh air requirement was reduced to 10 cfm/person/hr, after discussing with SPGSC personnel. The proposed VAV system has a two speed fan without an economizer cycle. A test was performed to look at the change in energy use with a variable speed fan and temperature based economizer cycle added to the base VAV system. A glass with high reflectivity and low overall heat transfer coefficient was used to study the reduction of glass conduction and glass solar loads. Finally, the energy consumption of the Health Building modified to conform the proposed California standards was also studied [3].

BASE BUILDING RESULTS

Peak Cooling Loads

Figure 4.1 shows the distribution of the peak cooling loads for the base case of the building. The internal loads from equipments and lights
Figure 4.1—Peak Cooling Base Case for the Health Building
represent about 42% of the total peak load. The infiltration and ventilation constitute about 33% of the peak cooling loads. This load increases as the fresh air requirement is increased. The internal loads constitute about 53% as compared to 43% from the external loads.

**Peak Heating Loads**

Figure 4.2 shows the distribution of the peak heating loads for the building. The walls and glass conduction loads make up about 77% of the heating load. The infiltration and ventilation load in the case of heating is 12% of the peak heating load. Although, the building has more wall area than the glass area, the glass conduction loss constitutes 58% of the peak heating load, as compared to 19% from wall conduction losses.

**Total Cooling Energy**

Figure 4.3 shows the total cooling energy for the Health Building. The internal loads from equipment and lighting constitute the major portion of the total cooling energy use (69%). Glass solar and people each contribute 13%. Over 80% of cooling energy is caused by internal loads. Much of the load is unavoidable (people and equipment). Lighting is the only internal load offering the potential for saving.

**Total Heating Energy**

Figure 4.4 shows the total heating energy for the Health Building. The total heating energy is made up entirely of infiltration and ventilation loads. The glass conduction loss constitutes about 0.5% of the total heating energy, while infiltration and ventilation is about 97%. The roof, walls and underground surface constitute about 3% of the total heating.
Figure 4.2—Peak Heating Base Case for the Health Building.
Figure 4.3—Total Cooling Base Case for the Health Building.

All Units are in MBTU
Figure 4.4—Total Heating Base Case for the Health Building.
ANALYSIS OF CONSERVATION OPTIONS

Reduction of Fresh Air Requirements

Table 4.1 shows the distribution of various loads and also the Energy Use Index (EUI) for the base case and two conservation options. Test #1 changes the fresh air requirement from 20 cfm/hr/person to 10 cfm/hr/person. The peak cooling load decreased by 16% (51 tons) and the peak heating decreased 25%. The total cooling energy was not reduced significantly. The total heating energy was reduced by half (48%). There was a net change of 3.4% in the total energy use.

Variable Speed Fan With Economizer

The base building had a VAV with a two speed fan without an economizer cycle. Test #2 includes a temperature based economizer cycle and also a variable speed fan for the VAV system. There was no change in peak loads. The reduction in total cooling energy and the total energy use was 7% and 12% respectively. Because a variable speed fan with an economizer generates less internal heat gains than the VAV with a two speed fan. This reduction in internal heat gains from the equipments increased the total heating energy. However, as stated earlier there was a net reduction in total energy use.

Improved Glass

Glass is a significant contributor to the peak load and energy use in the Health Building. As shown in Figures 4.1 and 4.3, 12% of the peak cooling load and 13% of the total cooling energy use is due to glass.
Table 4.1—Comparison of Energy Use of the Base Case for the Health Building With Two Alternatives.

<table>
<thead>
<tr>
<th></th>
<th>Cooling [cop=3] MBTU</th>
<th>Heating MBTU</th>
<th>Lighting &amp; Equipment MBTU (MWH)</th>
<th>Fan MBTU (MWH)</th>
<th>Total MBTU</th>
<th>EUI+ KBTU/SF/YR</th>
<th>% Change in EUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>2489</td>
<td>1103</td>
<td>8689 (2546)</td>
<td>5950 (1743)</td>
<td>18231</td>
<td>142.0</td>
<td></td>
</tr>
<tr>
<td>Test #1</td>
<td>2440</td>
<td>571</td>
<td>8689 (2546)</td>
<td>5931 (1738)</td>
<td>17831</td>
<td>137.5</td>
<td>3.41</td>
</tr>
<tr>
<td>Test #2</td>
<td>2310</td>
<td>2376</td>
<td>8689 (2546)</td>
<td>2590 (762)</td>
<td>15974</td>
<td>125.0</td>
<td>12.0</td>
</tr>
</tbody>
</table>

+ Energy Use Index

Table 4.2—Comparison of Existing Glass and Improved Glass Properties for the Health Building.

<table>
<thead>
<tr>
<th>Type of Glass</th>
<th>Reflectivity</th>
<th>Transmissivity</th>
<th>'U' Value Btu/hr-sf-F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing</td>
<td>14.</td>
<td>53.</td>
<td>0.49</td>
</tr>
<tr>
<td>Improved</td>
<td>45.</td>
<td>19.</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Table 4.3 Comparison of Glass Solar, Glass Conduction (peak cooling) and Total Energy for the Base Case and the Building With Improved Glass for the Health Building.

<table>
<thead>
<tr>
<th>Type</th>
<th>Glass Solar MBtu/hr</th>
<th>Glass Conduction MBtu/hr</th>
<th>Total Energy MBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>0.30</td>
<td>0.17</td>
<td>18231</td>
</tr>
<tr>
<td>Glass-1</td>
<td>0.27</td>
<td>0.09</td>
<td>17537</td>
</tr>
<tr>
<td>% Reduction</td>
<td>10.0</td>
<td>47.1</td>
<td>3.8</td>
</tr>
</tbody>
</table>
solar and glass conduction. Using a glass which has a high reflectivity and low overall heat transfer coefficient would reduce the energy use of the building. An alternative way of reducing solar heat gains is by offsetting the windows and orienting them North (or South) on the East walls and South (or North) on the West walls. The proposed Health Building has window offsets of 24 inches on all four sides. However, the windows on the East walls are oriented to the East and those on the West walls are oriented to the West. These orientations (actual) increase the solar contribution to the total load because it is possible to get direct sunlight through the windows.

The glass in the Health Building is clear. There are other types of glass which reflect much of the direct solar energy and have a lower thermal conductivity. Table 4.2 shows one such glass which was documented in the DOE 2.1B library. Table 4.3 shows the percent reduction of the peak glass solar and glass conduction for cooling with the improved glass type and also the total energy use. There was 10% and 47% reduction in peak glass solar and glass conduction loads (cooling) respectively. The change in total energy was 4.1% and the change in total heating energy was 25.4%. However, the total energy use did not change significantly (3.8%). Hence it may not be economical to have an improved glass for the Health Building.

California Standards

California has had strict energy requirements for the past few years in all newly constructed buildings [3]. A copy of the California standards was obtained to evaluate what impact these standards might have on the
EUI for buildings in this part of the country. Table 4.4 shows the major differences between the base building and the California Standards.

**Table 4.4—Comparison of Base Building and California Standard Requirements**

<table>
<thead>
<tr>
<th>Item</th>
<th>Base</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>2.2 w/sf</td>
<td>1.5 w/sf</td>
</tr>
<tr>
<td>Design Heating</td>
<td>75°F</td>
<td>70°F</td>
</tr>
<tr>
<td>Design Cooling</td>
<td>75°F</td>
<td>78°F</td>
</tr>
<tr>
<td>Maximum Glazing</td>
<td>33% *</td>
<td>50%</td>
</tr>
<tr>
<td>Heating</td>
<td>Electrical</td>
<td>Non-Electrical or Heat pump</td>
</tr>
</tbody>
</table>

* Percent of the total exterior surface area

Table 4.5 shows the comparison of peak heating and cooling loads for the base building and the modified building which conformed to the California standards. The reduction in peak cooling load using the California standards was 35%. The principle reasons for the reduction of the peak cooling load were due to the reduction in fresh air requirements from 20 cfm/hr to 10 cfm/per per person, and the reduction of the lighting levels by 0.7 w/sf. The increase in peak heating load with the California standards was about 22%. The increase is the result of lower the heat gains from the reduced lighting loads.

Table 4.6 shows the comparison of total heating, cooling and electric energy for base building and building with the California standards. Because the California standards restrict the zone design temperatures, lighting levels, and requires a heat pump for heating, the total energy consumption has dropped by 44%. The major reduction in cooling energy use
Table 4.5—Comparison of Peak Loads of the Base Case for the Health Building With the Building Conforming to the California Standards. (MBtu/H)

<table>
<thead>
<tr>
<th>Option</th>
<th>Cooling Load</th>
<th>Heating Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE</td>
<td>3.74</td>
<td>0.18</td>
</tr>
<tr>
<td>CAL. STAND.</td>
<td>2.42</td>
<td>0.22</td>
</tr>
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</table>

Table 4.6—Comparison of Energy Use of the Base Case for the Health Building With the Building Conforming to the California Standards.

<table>
<thead>
<tr>
<th></th>
<th>Cooling [cop=3] MRTU</th>
<th>Heating MRTU</th>
<th>Lighting &amp; Equipment MRTU(MWH)</th>
<th>Fan MRTU(MWH)</th>
<th>Total MRTU</th>
<th>EUI↑ KBTU/SF/YR</th>
<th>% Change In EUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>2489</td>
<td>1103</td>
<td>8689(2546)</td>
<td>5950(1743)</td>
<td>18231</td>
<td>142.0</td>
<td>-</td>
</tr>
<tr>
<td>Cal. Stand.</td>
<td>1408</td>
<td>641</td>
<td>7095(2052)</td>
<td>1033(303)</td>
<td>10177</td>
<td>79.4</td>
<td>44.0</td>
</tr>
</tbody>
</table>

↑ Energy Use Index
was from heat gains from the lights and also because of an increase in the design cooling temperature. The reduction of the total heating energy is basically from the use of a heat pump and also due to the decrease in design heating temperature.

Although implementing the California standards shows a substantial reduction in both peak loads and total energy use, the economics still have to be worked out. The requirement for heat pumps for heating may increase the initial cost of the building significantly. More expensive direct expansion coils would have to be used as compared to relatively inexpensive electric resistance heaters. However, it would also be possible to use water source heat pumps to move heat from one section of the building to another. Thus, the heat extracted from an area needing cooling could be rejected in an area needing heating. This operation would also reduce the chiller power in the winter months.
CHAPTER 5

CONCLUSIONS & RECOMMENDATIONS

The energy use of the Department of Health Building at Austin, Texas was analyzed using the DOE 2.1B building energy simulation program. An analysis was made for the building as specified in the building plans and the specifications provided by the State Purchasing and General Services Commission. The assumed parameters include the operating schedules for occupancy, lighting, office equipment, and infiltration. The proposed construction of the Health Building reflects improvements in energy use over buildings built several years ago (EUI of 142 Kbtu/sf/yr compared to as much as 250 Kbtu/sf/yr). However, the energy consumption of the Health Building can be reduced with certain modifications to the proposed design.

Several options for reducing the building energy use were evaluated (i) reducing the lighting levels (ii) reducing the ventilation rate from 20 cfm/person/hr to 10 cfm/person/hr (iii) employing a variable speed fan for the VAV system with an economizer cycle, (iv) using an improved glass and (v) implementing the California Energy standards. A net reduction of 44% was obtained using the California standards. The California standards are more stringent and is a better choice for state owned buildings which have a life of 30 to 40 years.
REFERENCES


APPENDIX A
Results for Department of Health Building (Base).
### *** BUILDING ***

<table>
<thead>
<tr>
<th>FLOOR AREA</th>
<th>128190 SQFT</th>
<th>11910 SQMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLUME</td>
<td>1666602 CUFT</td>
<td>47198 CUMT</td>
</tr>
</tbody>
</table>

#### COOLING LOAD

<table>
<thead>
<tr>
<th>TIME</th>
<th>JUN 12 4PM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DRY-BULB TEMP</td>
<td>94F 34C</td>
<td></td>
</tr>
<tr>
<td>WET-BULB TEMP</td>
<td>75F 24C</td>
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### HEATING LOAD

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#### SENSIBLE (KBTU/H) (KW)  
#### LATENT (KBTU/H) (KW)

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| TOTAL   | 2607.847 763.773 518.704 151.915 | -147.711 -43.261 |

#### TOTAL LOAD

| 3125.551 KBTU/H | 915.688 KW | -147.711 KBTU/H | -43.261 KW |

#### TOTAL LOAD / AREA

| 24.39 BTU/H, 60FT | 76.884 W/SQFT | 1.15 BTU/H, 60FT | 3.63 W/SQMT |

---

* **NOTE 1)** THE ABOVE LOADS EXCLUDE OUTSIDE VENTILATION AIR LOADS*
* **-----**
* **2)** TIMES GIVEN IN STANDARD TIME FOR THE LOCATION IN CONSIDERATION*
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<th>MAXIMUM</th>
<th>HEATING ENERGY (MBTU)</th>
<th>HEATING TEMPERATURE</th>
<th>ELECTRICAL ENERGY (KWH)</th>
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### HEALTH BUILDING AUSTIN TEXAS

### REPORT - LS-F BUILDING MONTHLY LOAD COMPONENTS IN MBTU

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**Note:** The table above represents the monthly load components in MBTU for various months, including heating and other components. The total load is presented at the bottom of the table.
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