

## Energy Accounting Report - Part 1

Complete ONLY if you are NOT able to complete Assignment 2A

Building Name: Medical  
 Building Square Footage: 572,444 sq ft  
 Building Type (e.g., school, office bldg., hospital, etc.): Hospital

| Year          | Electricity  |                                  |               | Natural Gas     |                            |          |
|---------------|--------------|----------------------------------|---------------|-----------------|----------------------------|----------|
| Month         | Consumed kWh | Electric MMBTU<br>kWh x 0.003413 | Electric Cost | Consumed Therms | Gas MMBTU<br>Therms x 0.10 | Gas Cost |
| January       | 1129648      | 3855.48                          | 112965        | 906             | 90.6                       | 906      |
| February      | 1200382      | 4096.90                          | 120038        | 933             | 93.3                       | 933      |
| March         | 1164066      | 3972.95                          | 116407        | 1030            | 103.3                      | 1030     |
| April         | 1169832      | 3992.63                          | 116983        | 952             | 95.2                       | 952      |
| May           | 1290330      | 4403.89                          | 129033        | 980             | 98.0                       | 980      |
| June          | 1315080      | 4488.36                          | 131508        | 866             | 86.6                       | 866      |
| July          | 1398754      | 4773.97                          | 139875        | 927             | 92.7                       | 927      |
| August        | 1369504      | 4674.11                          | 136950        | 748             | 74.8                       | 748      |
| September     | 1214870      | 4146.35                          | 121487        | 625             | 62.5                       | 625      |
| October       | 1201550      | 4100.89                          | 120155        | 1471            | 147.1                      | 1471     |
| November      | 1164890      | 3975.77                          | 116489        | 936             | 93.6                       | 936      |
| December      | 1165976      | 3979.47                          | 116598        | 1022            | 102.2                      | 1022     |
| Annual Totals | 14784882     | 50460.8                          | 1478488       | 11396           | 1139.6                     | 11396    |

1. Enter monthly electrical kWh and cost from utility bill.
2. Convert monthly kWh to MMBTU.
3. Enter monthly natural gas Therms and cost from utility bill.
4. Convert monthly Therms to MMBTU.
5. Total all columns

# Energy Accounting Report - Part 2

Use the annual totals from the previous page for the following calculations:

1. Calculate Energy Use Index (BTU / Square Foot / Year)

$$\begin{array}{ccccccccc}
 \boxed{50460.8} & + & \boxed{1139.6} & = & \boxed{51600.4} & \div & \boxed{572,444} & \times & \boxed{1,000} & = & \boxed{90.1} \\
 \text{Annual Electric} & & \text{Annual Gas} & & \text{Annual Total} & & \text{Square Footage} & & \text{Conversion} & & \text{Energy Use Index} \\
 \text{MMBTU} & & \text{MMBTU} & & \text{MMBTU} & & & & \text{Factor} & & \text{1,000 BTU/FT}^2
 \end{array}$$

2. Calculate Annual Cost per Square Foot (Dollars / Square Foot)

$$\begin{array}{ccccccc}
 \boxed{1478488} & + & \boxed{11396} & = & \boxed{1489884} & \div & \boxed{572,444} & = & \boxed{2.60} \\
 \text{Annual Electric} & & \text{Annual Gas} & & \text{Annual Energy} & & \text{Square Footage} & & \text{Annual Cost} \\
 \text{Cost} & & \text{Cost} & & \text{Cost} & & & & \text{Per Ft}^2
 \end{array}$$

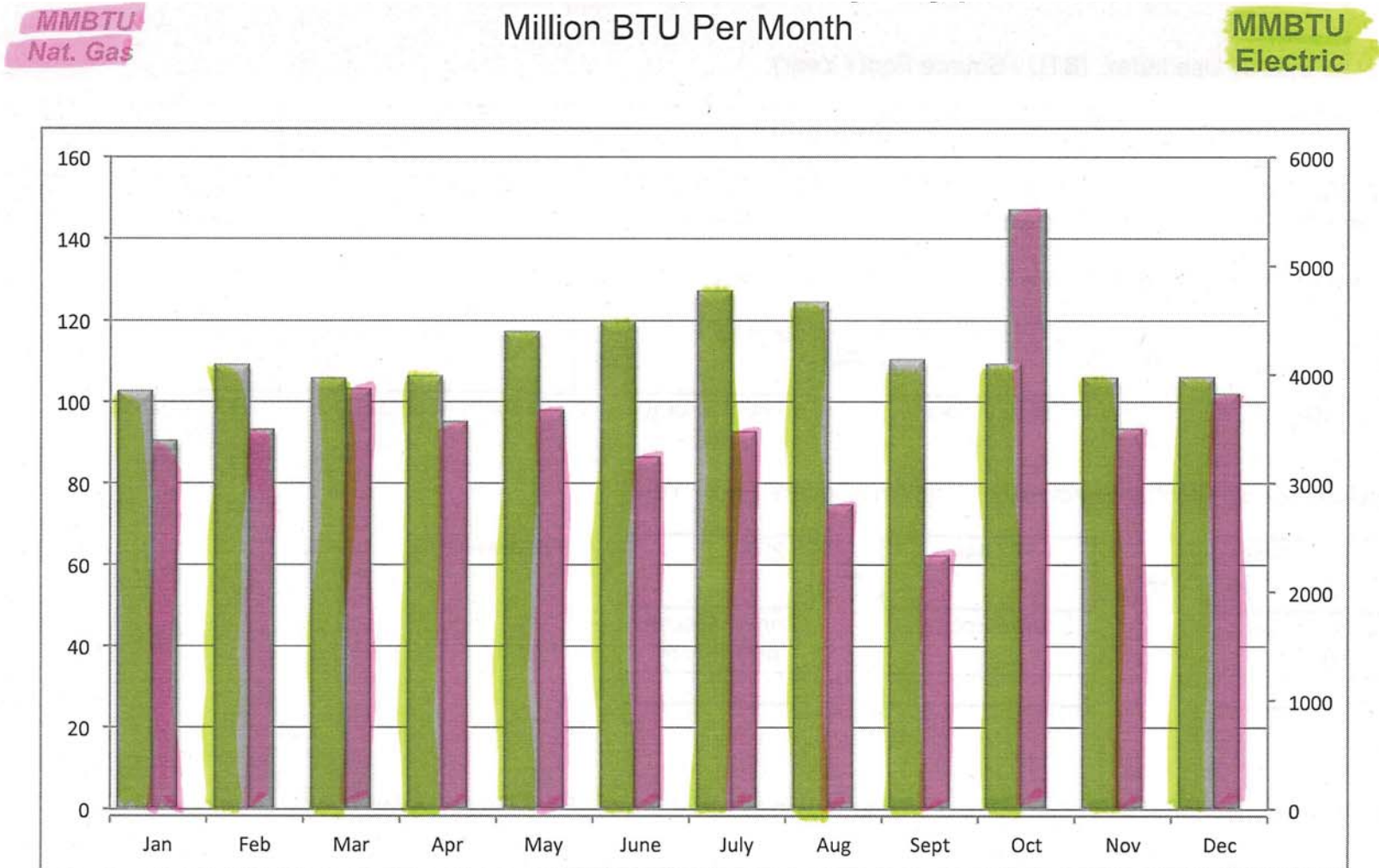
3. Calculate Annual Electric Benchmark (kWh / Square Foot / Year)

$$\begin{array}{ccc}
 \boxed{14784882} & \div & \boxed{572,444} & = & \boxed{25.8} & \text{(For Base Year)} \\
 \text{Annual Electric} & & \text{Square Footage} & & \text{Annual Electric} & \\
 \text{kWh} & & & & \text{Benchmark} & \\
 \hline & & \hline & & \hline & 
 \end{array}$$

4. Complete the Benchmark Analysis Worksheet found on page 21 in your BOC Project Workbook.

## Energy Accounting Report - Part 3

Using MMBTU columns from Part 1, graph monthly MMBTUs for both gas and electric consumption on the graph below, and then complete the Benchmark Analysis Worksheet (Part 4) found on page 21 of this workbook.



### Benchmark Analysis Worksheet

1. What was the site energy use index (EUI) of your building? 90.1
2. Find your building type in the charts below and CIRCLE it. If the building type is not listed, CIRCLE the "Other" line.

#### U.S. National Averages for Site Energy Use Intensity (EUI)

| Building Type                     | Average Site Energy Use Intensity (annual kBtu/SF) |
|-----------------------------------|--|
| Health Care                       | 135.7  |
| Inpatient                         | 253.8  |
| Outpatient                        | 84.4   |
| Education                         | 80.6   |
| College/University (campus-level) | 120  |
| Food Sales                        | 225  |
| Food Service                      | 351  |
| Fast food                         | 534  |
| Restaurant/Cafeteria              | 302  |
| Lodging                           | 87   |
| Office                            | 88   |
| Mercantile                        | 94.4   |
| Retail (Non-Malls)                | 86.4   |
| Retail (Malls)                    | 99.5   |

| Building Type                    | Average Site Energy Use Intensity (annual kBtu/SF) |
|----------------------------------|--|
| Public Assembly                  | 66   |
| Entertainment/Culture            | 95   |
| Library                          | 104  |
| Recreation                       | 65   |
| Social/Meeting                   | 52   |
| Public Order and Safety          | 90   |
| Fire Station/Police Station      | 78   |
| Service (vehicle repair/service, | 77   |
| Storage/Warehouse                | 33.3   |
| Non-refrigerated Warehouse       | 1  |
| Religious Worship                | 46   |
| Multifamily (5 or more units)    | 49.5   |
| Other (e.g. mixed-use)           | 104  |

3. Compare your building's site EUI to the average for your building type. What percentage over or under the average building consumption is your building's use?

(To determine this, divide your building's EUI by the value in the table above and multiply by 100. Example: My college campus building site EUI is: 131. The average for a college or university is 120. Therefore, 131.8 divided by 120 = 1.09 x 100 = 109 or 9%)

Your Answer:  $90.1 / 84.4 = 1.06 \times 100 = 106.7$  or 6.7%

4. List the reasons your building may use more or less energy than the average building of the same type? (e.g., inefficient lighting fixtures, no energy management control system, inefficient HVAC, etc.)

- A. More energy due to inefficient lighting and
- B. no occupancy sensors or CO2 sensors.