MGE Commercial Building Analytics / Benchmarking

Sustainable Madison Committee

02/23/2020
Background and objectives
Objective

Provide MGE with a robust dataset that can be used to develop city-wide programming that targets specific business segments and augments traditional energy efficiency programs.
Compiling the datasets

Utility dataset

Property tax data

Dataset linked by address

Manual lookups

Commercial Building Energy Consumption Survey

Analytic dataset
Linked dataset

Utility dataset
7,207 records

Property tax data
2,978 records

Matched data
2,347
Results
Results

Energy use intensity summary

Total properties with both fuel data = 1941

EUI - kBtu per ft²

Business segment

- Individual business
- CBECs EUI range between 20th and 80th percentile
Office – Total EUI
Office – Heating EUI

![Graph showing the relationship between site EUI (kBTU/ft²·yr) and gross floor area (ft²). The graph includes a scatter plot with data points and a line representing CBECs Office - Heating EUI.]
Food Service – Total EUI

Site EUI (kBtu/ft²·yr)

Gross Floor Area (ft²)

MGE - Total EUI

CBEC - Food Service Average
Food Service – EUI Breakout

![Graph showing Site EUI (kBtu/ft²·yr) vs Gross Floor Area (ft²) with various lines representing different energy use intensity levels for Food Service.]
All Business Types
Energy efficiency opportunities
Characterizing potential energy savings

• Calculated the potential energy savings through applying typical energy conservation measures to select building types

• Ran 91 energy models using DOE2.2 – an industry standard modeling software

• For the following buildings and assumed size:
  • Small office (5,000 SF)
  • Large office (80,000)
  • Food service (5,000 SF),
  • Lodging (40,000 SF) retail (7,000 SF)
### Measures

<table>
<thead>
<tr>
<th>Envelope</th>
<th>Lighting / Plug load</th>
<th>HVAC</th>
<th>DHW</th>
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| • Increase roof insulation  
  • Increase wall insulation  
  • Improve window properties | • Decrease plug or process loads  
  • Retrofit lighting  
  • Install lighting controls  
  • Retrofit exterior lighting  
  • Install exterior lighting controls | • Implement demand controlled ventilation or make-up air controls  
  • Increase heating efficiency  
  • Increase cooling efficiency | • Increase domestic hot water efficiency  
  • Install low flow fixtures |
EUI impacts - Small Office
EUI impacts - Large Office
EUI impacts - Retail (non-mall)
Overall Energy Savings by Building

- Office Large: 13.5 kBtu
- Lodging: 22.2 kBtu
- Education: 43.1 kBtu
- Retail non-mall: 26.2 kBtu
- Food Service: 35.7 kBtu
- Office Small: 22.4 kBtu
Focus on Energy

2020 BUSINESS OFFERINGS

LIGHTING

PROCESS SYSTEMS

COMMERCIAL REFRIGERATION
MGE Benchmarking tool

Building Energy Use Comparison

Compare your electric and natural gas use per square foot with similar building types in the MGE service territory.

Yearly kWh: 146,858
Yearly Therm: 9,811

Select Building Type

- Bakery
- Bowling Alley
- Child Care
- Clinic
- Cold Storage
- Community Center
- Convenience Store
- Data Center
- Distribution
- Fitness Center
- Grocery
- Group Home
- Hotel
- Laboratory
- Library
- Manufacturing
- Office - Small
  less than 25,000 sq. ft.
- Office - Medium
  25,000 to 50,000 sq. ft.
Opportunities for MGE / Focus on Energy collaboration

• Targeting marketing to encourage MGE customers to benchmarking through Benchmarking tool and participate in Focus on Energy
• Promote and leverage Focus on Energy’s new small business offerings that include an online assessment and sector-specific energy saving starter packs.