The Value of Energy Benchmarking for Commercial Buildings

Israeli Green Building Council 8th Annual Conference
September 10, 2019
**The New York Times**  
*Some Buildings Not Living Up to Green Label*

**USA TODAY**  
In U.S. building industry, is it too easy to be green?

**Forbes**
LEED-Certified Buildings Are Often Less Energy-Efficient Than Uncertified Ones

**The New Republic**
Bank of America’s Toxic Tower

New York’s “greenest” skyscraper is actually its biggest energy hog

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**Energy Star Rating by LEED Level**

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**ENERGY STAR** The simple choice for energy efficiency.
6 billion products
35,000 buildings
200 industrial plants
2 million homes
Recognized by more than 90% of Americans
In the beginning . . .
... there was lighting

1991  1995  1999
Myth #1: Age Matters

My building is new, so I know it’s energy efficient.
New Doesn’t Equal Efficient

- Based on survey of 4,000 office buildings.
- Top performing buildings use 3 to 4 times less energy per ft² than the worst performers.

<table>
<thead>
<tr>
<th>Best Performers</th>
<th>Worst Performers</th>
</tr>
</thead>
<tbody>
<tr>
<td>86.0</td>
<td>339.4</td>
</tr>
<tr>
<td>121.1</td>
<td></td>
</tr>
<tr>
<td>165.7</td>
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</tbody>
</table>

39% of buildings in top quartile are less than 25 years old
35% of buildings in bottom quartile are less than 25 years old
Myth #2: Technology Matters

I installed energy efficient technologies, so I know my building is energy efficient.
Technology Doesn’t Equal Performance

Source: CBECs = U.S. Department of Energy’s Commercial Building Energy Consumption Survey
“We designed the best, most energy efficient building you could possibly want, but then we ran into one big problem . . .

. . . the people moved in.”

-- Anonymous Architect
**benchmark**  **verb**

benchmark, benchmarked; benchmarking; benchmarks

*business*: to study (something, such as a competitor's product or business practices) in order to improve the performance of one's own company

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**benchmark**  **noun**

*bench-mark | ˈbench-ˌmärk |

a : something that serves as a standard by which others may be measured or judged

//a stock whose performance is a benchmark against which other stocks can be measured

b : a point of reference from which measurements may be made
What Gets Measured Gets Managed
ENERGY STAR Retail Partner: Performance Variation Within a Portfolio

Over 100% variation in energy use intensity across portfolio

Retail partner “randomly” selected 10% of its properties across 3 prototype designs

Annual Energy Use

Prototype 1
Prototype 2
Prototype 3
What is ENERGY STAR® Portfolio Manager ®?

Assess energy, water and waste/materials consumption

Track changes over time

1-100 ENERGY STAR score

Apply for ENERGY STAR certification

www.energystar.gov/benchmark
Portfolio Manager Annual Benchmarking

- Represents all building types “actively” benchmarking
- Scores added for new building types at various times
  - Office only in 1999
  - 7 Building types in 2002
  - Retail added in 2007
  - Multifamily added in 2014
  - 20 Building types currently
- Largest growth in benchmarking is for buildings that can’t get a score.
The 1-100 ENERGY STAR Score

One simple number understood by ALL stakeholders.
ENERGY STAR Certified Buildings

- More efficient than 75% of similar buildings
- Use 35% less energy (on average)
- Cause 35% fewer greenhouse gas emissions (on average)
- Over 35,000 buildings certified (5 billion ft² of space)
Benchmarking Leads to Savings

Consistent benchmarking results in energy savings and improved performance.
1900 K Street, Washington, DC

- 380,000 ft², Constructed in 1996
  - 1999 scored 32
  - 2002 scored 75
  - ENERGY STAR Certified in 2002
  - Certified every year since 2004; 2018 score of 86
- New owner in 1999 found quality construction with energy efficiency in mind, but oversized
- Improvements instituted
  - VFDs on chillers to match measured demand
  - Improved operating standards - static pressure, set points
  - Tracked and managed energy use continuously
  - Improved lighting controls

“Did not really cost us anything to implement—just a change in the way things get done.”
West Middle School
Shelbyville, Kentucky

- 97,000 ft², Constructed in 2000
- Participant in 2013 ENERGY STAR Battle of the Buildings
  - Achieved 28.9% energy use reduction in 1 year
  - $35,275 Annual cost savings
  - ENERGY STAR Score of 83
  - ENERGY STAR Certified in 2014
- Improvements instituted
  - Updated building controls to remotely operated system (3 month payback)
  - Installed sensors to monitor humidity and CO² levels
  - Routine inspections of mechanical equipment by maintenance staff
  - Engaged staff and students in energy saving activities

“Knowing how much energy your facilities use compared to other organizations is very important when considering an energy management program. Using ENERGY STAR Portfolio Manager allows me to see how my buildings are ranked nationally and on what facilities I need to focus my efforts.”
ENERGY STAR Gets Results

In 2017 alone:
- ENERGY STAR helped commercial buildings avoid:
  - $9 billion in energy costs ($150 billion since 1992)
  - 160 billion kWh of electricity (5% of US electricity use)
  - 110 million MT of GHG emissions
ENERGY STAR and Green Building Rating Systems
Why Do U.S. Green Building Rating Systems Use ENERGY STAR?

- Trusted standard for energy efficiency for over 20 years
- Based on frequently updated data gathered in credible process with transparent statistical method
- Portfolio Manager is no-cost, easy-to-use, and universally accessible
- “Normalizes” data to account for unique characteristics of each building type

<table>
<thead>
<tr>
<th>Percent cooled</th>
<th>Number of staffed hospital beds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of residential living units</td>
<td>Occupancy</td>
</tr>
<tr>
<td>Weekly operating hours</td>
<td>Energy usage data</td>
</tr>
<tr>
<td>Gross floor area</td>
<td>Percent heated</td>
</tr>
<tr>
<td>Number of MRI machines</td>
<td>Heating degree days</td>
</tr>
<tr>
<td>Number of walk-in refrigerators</td>
<td>Number of workers on main shift</td>
</tr>
<tr>
<td>Number of commercial washing machines</td>
<td>Number of computers</td>
</tr>
<tr>
<td>Number of cash registers</td>
<td>Maximum resident capacity</td>
</tr>
</tbody>
</table>
Benchmarking in the Commercial Market
Local and State Governments Require Use of ENERGY STAR Portfolio Manager

30+ laws nationwide - Buildings must:

1. Benchmark their energy use
2. Report it on an annual basis
3. Disclose to public or potential buyers/lessees
4. Put a label on the front of the building (Chicago and New York City)
5. Meet specific energy performance standards (Washington, DC and Washington State)
6. Meet specific GHG caps (New York City)
Benchmarking Leads to Savings in New York City

And in Seattle Too
Cities Sharing Benchmarking Results
Welcome to the greenest building in Israel

ISRAEL21c tours the new Porter School of Environmental Studies building in Tel Aviv, Israel’s first LEED Platinum edifice.
Homepage - www.energystar.gov/buildings
Portfolio Manager - www.energystar.gov/benchmark
Training - www.energystar.gov/buildingstraining
Help - www.energystar.gov/buildingshelp

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