INTRODUCTION TO ENERGY STAR PORTFOLIO MANAGER®

June 24, 2020

Dr. Amy Thompson, Associate Professor-In-Residence, Systems Engineering UTC Institute for Advanced Systems Engineering University of Connecticut Innovation Partnership Building Room 218, Storrs, CT Email: amy.2.thompson@uconn.edu
Part I

WHY USE ENERGY STAR PORTFOLIO MANAGER?
Portfolio Manager (PM) Capabilities

ENERGY TRACKING. Know how meters match to buildings. Know your total Site Energy kBtu by converting unlike units of energy usage (kWh, ccf, gallons). Know how your total building energy changes over time.

WEATHER NORMALIZATION. Know your Weather-Normalized Site Energy in kBtu. Know if changes in Site Energy are due to weather or performance of building.

GET YOUR BENCHMARK. Know your ENERGY STAR Rating or Energy Benchmark Comparison*

SHARE YOUR DATA. One internal shared database for building and energy information

STRATEGIC ENERGY MANAGEMENT SUPPORT. Select and plan projects. Correlate energy changes to projects.

GET RECOGNIZED. Share your achievements.
Example: What you can learn

Your Benchmark

Weather-Normalized Source EUI (kBtu/ft²) Why not score?

Current EUI: 328.7
(163.3% worse than median.)

Baseline EUI: 263.9
(111.4% worse than median.)

What Can I Learn?

• Do I have a high performing or low performing building?
• Is my building performance improving since my baseline year?
• Should I perform a building audit to find out why my building is performing so poorly?
• I’ve installed two EE measures, why is my building still performing so poorly?
Example: What you can learn

Your Metrics Summary

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGY STAR Score (1-100)</td>
<td>43</td>
<td>97</td>
<td>54.00 (125.60%)</td>
</tr>
<tr>
<td>Source EUI (kBtu/ft²)</td>
<td>144.4</td>
<td>63.0</td>
<td>-81.40 (-56.40%)</td>
</tr>
<tr>
<td>Site EUI (kBtu/ft²)</td>
<td>75.0</td>
<td>26.8</td>
<td>-48.40 (-64.50%)</td>
</tr>
<tr>
<td>Energy Cost ($)</td>
<td>722,880.66</td>
<td>339,025.06</td>
<td>-383,855.60 (-53.10%)</td>
</tr>
<tr>
<td>Total GHG Emissions Intensity (kgCO2e/ft²)</td>
<td>5.6</td>
<td>1.8</td>
<td>-3.80 (-67.90%)</td>
</tr>
<tr>
<td>Water Use (All Water Sources) (gallons)</td>
<td>Not Available</td>
<td>Not Available</td>
<td>N/A</td>
</tr>
<tr>
<td>Total Waste (Disposed and Diverted) (Tons)</td>
<td>Not Available</td>
<td>Not Available</td>
<td>N/A</td>
</tr>
</tbody>
</table>

What Can I Learn?

- Do I have a high performing or low performing building?
- Is my building performance improving since my baseline year?
- How much money am I saving comparing any two years?
- What is my carbon footprint, and is it improving?
- Am I lowering my water and waste usage?
Example: What Can I Learn

**Energy Use Trend**

**What Can I Learn?**

- What fuels are used in my building?
- Are my heating and cooling peaks increasing or decreasing over time?
- How large is my cooling peak during the summer?
- Do I have a problem with my heating system?
Example: What Can You Learn?

Understand the Benchmark and Goal Setting

<table>
<thead>
<tr>
<th>Metric</th>
<th>Nov 30 2013 (Energy Baseline)</th>
<th>Jan 31 2019 (Energy Current)</th>
<th>Target*</th>
<th>Median Property*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGY STAR cost ($1-100)</td>
<td>13</td>
<td>11</td>
<td>76</td>
<td>50</td>
</tr>
<tr>
<td>Source EUI (kBtu/ft²)</td>
<td>164.5</td>
<td>175.0</td>
<td>67.3</td>
<td>113.5</td>
</tr>
<tr>
<td>Site EUI (kBtu/ft²)</td>
<td>80.0</td>
<td>73.0</td>
<td>36.5</td>
<td>47.4</td>
</tr>
<tr>
<td>Source Energy Use (Btu/ft²)</td>
<td>8698.9</td>
<td>6594.23</td>
<td>4178568.3</td>
<td>6207123.3</td>
</tr>
<tr>
<td>Site Energy Use (kBtu)</td>
<td>3773766.4</td>
<td>3684329.5</td>
<td>1803469.6</td>
<td>2691012.6</td>
</tr>
<tr>
<td>Energy Cost ($)</td>
<td>140789.21</td>
<td>164909.81</td>
<td>77325.07</td>
<td>109693.26</td>
</tr>
<tr>
<td>Total GHG Emissions (Metric Tons CO₂e)</td>
<td>263.2</td>
<td>270.2</td>
<td>139.3</td>
<td>181.1</td>
</tr>
</tbody>
</table>

* To compute the metrics at the target and median levels of performance, we will use the fuel mix associated with your property’s current energy use.

What Can I Learn?

- Why is my ENERGY STAR rating so low compared to typical properties similar to mine?
- How much energy do I need to save to attain ENERGY STAR certification?
- How much money could I save annually if I achieve a median rating or an ENERGY STAR rating?
Example: What Can You Learn?

Energy Usage By Building

What Can I Learn?

• Which buildings are my highest energy users?
• Where should I focus my effort?
Example: What Can You Learn?

Advanced Reporting
1000+ Metrics

What Can I Learn?

- What is the breakdown of my annual energy usage by fuel type in kBtu?
- What is the difference or change in any metric from one year to the next?
- What is the breakdown of my total energy cost by fuel by building?

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kWh)</th>
<th>Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kBtu)</th>
<th>Natural Gas Use (kBtu)</th>
<th>Site Energy Use (kBtu)</th>
<th>Weather Normalized Site Energy Use (kBtu)</th>
<th>Total GHG Emissions (Metric Tons CO2e)</th>
<th>Site EUI (kBtu/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/31/2019</td>
<td>3,321,300</td>
<td>11,332,276</td>
<td>9,816,869</td>
<td>21,149,136</td>
<td>21,534,342</td>
<td>1,371</td>
<td>141</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year Ending</th>
<th>Energy Cost ($)</th>
<th>Electricity (Grid Purchase) Cost ($)</th>
<th>Natural Gas Cost ($)</th>
<th>Energy Cost Intensity ($/ft²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/31/2019</td>
<td>580,582.57</td>
<td>554,207.72</td>
<td>26,374.85</td>
<td>3.87</td>
</tr>
</tbody>
</table>
Building Energy Benchmarking Process

1. Initial Kick-Off Meeting
2. Determine baseline year
3. Determine buildings to benchmark by ownership or control boundary
4. Collect initial data and describe CEC Process
5. Create ENERGY STAR Portfolio Manager® account and enter account info
6. Collect building, space, and energy data and enter into ENERGY STAR Portfolio Manager®
7. Analyze existing data
8. Summarize needed data
9. Email request to data owner
10. Receive additional data
11. Collect on-site data, if needed, review building energy systems, take photos
12. Set-Up Tours
13. Publish Draft Report
14. Verify & validate all data and entry methods
15. Create draft report for review
Thank You!

- The US EPA, Linda Darveau
- ENERGIZE CT and the Connecticut Energy Efficiency Fund
- UI, SCG, CNG, and Eversource

Questions?