Commercial Building Energy Asset Scoring Tool
Application Programming Interface

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JUNE 14, 2013
Commercial Building Energy Asset Score

- Energy asset score evaluates the as-built physical characteristics of a building and its overall energy efficiency, independent of occupancy and operational choices.

- The physical characteristics include:
  - Building envelope (window, wall, roof)
  - HVAC systems (heating, cooling, air distribution)
  - Lighting system (luminaire and lighting control systems)
  - Service hot water system
  - Other major energy-using equipment (e.g. commercial refrigerator, commercial kitchen appliances, etc.)

Building energy use is affected by many factors.
Asset Scoring Tool

Users enter data

Other Tools

API

Web Server

Identify Energy Efficiency Measures

Apply Inference Engine & Run Energy Simulation Model

Rerun Energy Simulation with Improvements

Report Generator

Users receive report

June 20, 2013
Asset Score Report

- Report (four sections)
  - Score
  - Structure and Systems
  - Opportunities
  - Building Assets

### COMMERCIAL BUILDING ENERGY ASSET SCORE

<table>
<thead>
<tr>
<th>Score</th>
<th>Structure and Systems</th>
<th>Opportunities</th>
<th>Building Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80</td>
<td>59</td>
<td>100</td>
</tr>
</tbody>
</table>

**1 Uses Energy Efficient Fixtures**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Flow Faucets</td>
<td>Yes</td>
</tr>
<tr>
<td>LED Lighting</td>
<td>Yes</td>
</tr>
<tr>
<td>Efficient HVAC</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**2 Use Alternative Energy Sources**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Panels</td>
<td>Yes</td>
</tr>
<tr>
<td>Wind Turbines</td>
<td>Yes</td>
</tr>
<tr>
<td>Geothermal</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**3 Reduce Energy Intensive Operations**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Energy Use</td>
<td>1.6</td>
</tr>
<tr>
<td>Compressed Air</td>
<td>0.8</td>
</tr>
<tr>
<td>Lighting</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**4 ENERGY STAR Certified**

<table>
<thead>
<tr>
<th>Certification</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGY STAR</td>
<td>1.1</td>
</tr>
</tbody>
</table>

### COMMERCIAL BUILDING ENERGY ASSET SCORE

<table>
<thead>
<tr>
<th>Score</th>
<th>Structure and Systems</th>
<th>Opportunities</th>
<th>Building Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>73</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**Building Systems**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVAC Systems</td>
<td>6.35</td>
</tr>
<tr>
<td>Lighting</td>
<td>5.8</td>
</tr>
<tr>
<td>Water Systems</td>
<td>4.3</td>
</tr>
<tr>
<td>Energy Management</td>
<td>3.4</td>
</tr>
</tbody>
</table>

**Cost Effective Upgrades Opportunities**

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Score</th>
</tr>
</thead>
</table>
| Water Systems Upgrade Water Systems with New Technology | 3 - 55%
| HVAC Systems Upgrade HVAC Systems with New Technology | 5 - 15%
| Building Systems Upgrade Building Systems with New Technology | 5 - 15%
| Lighting Upgrade Lighting with New Technology | 5 - 15%

**Potential Total Savings**

<table>
<thead>
<tr>
<th>Total Savings</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>23 - 29%</td>
<td>6 - 19%</td>
</tr>
</tbody>
</table>

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June 20, 2013
API Development Plan, Nov 2012 – Jan 2013
Asset Scoring Tool Update based on pilot #1 feedback and user research, Oct 2012 – Jun 2013
API Development, Feb 2013 – Jun 2013
Pilot 2, Jun – Sep 2013
API testing, July – Sep 2013
What is New?

- Two-stage data entry process
  - Build your building component inventories
  - Build your building geometry and assign component properties
- Refined data collection form based on sensitivity analysis
- Updated building system evaluation method
- Updated scoring method (not finalized yet)
NEW Asset Scoring Tool Demo
API Framework

► RESTful
  ■ URL base – [https://assetscoreapi.pnnl.gov/api/v1](https://assetscoreapi.pnnl.gov/api/v1)
  ■ HTTP Methods (e.g., GET, PUT, POST, or DELETE)
  ■ Supports JSON and XML

► Versioned

► Resources
  ■ Users
    ■ [https://assetscoreapi.pnnl.gov/api/v1/users](https://assetscoreapi.pnnl.gov/api/v1/users)
  ■ Buildings
    ■ [https://assetscoreapi.pnnl.gov/api/v1/buildings](https://assetscoreapi.pnnl.gov/api/v1/buildings)

► Documentation
  ■ [https://assetscoreapi.pnnl.gov/docs](https://assetscoreapi.pnnl.gov/docs)
API Authentication

- Token-based
- SSL required
- Generate token through authenticate service
  - POST to https://assetscoreapi.pnnl.gov/api/v1/users/authenticate
  - Can pass email and password via JSON, XML or URL parameters
    - JSON Example:
      
      ```json
      {"username": "someone@somewhere.com",
       "password": "test"
      }
      ```
    - Response will contain token:
      
      ```json
      {"token": "xzysuLdC2hiJfRGgMkAv"}
      ```
  - All REST resources require the token
    - https://assetscoreapi.pnnl.gov/api/v1/buildings/1?token=yadfav34x623
  - Token does not expire
    - Each call to “authenticate” will generate a new token
API Testing

- Dedicated server for API testing
  - [https://assetscoreapi.pnnl.gov](https://assetscoreapi.pnnl.gov)
- Completely independent from pilot server
  - Separate instance of code
  - Separate database
- Data generated against API testing server will NOT be migrated
  - For testing purposes only
Questions?

Energy Asset Score website
http://www1.eere.energy.gov/buildings/commercial/assetscore.html

Energy Asset Scoring Tool
buildingenergyscore.energy.gov/

API Test Server
assetscoreapi.pnnl.gov

Please email us at asset.score@ee.doe.gov for more information.
Please email us at asset.score@pnnl.gov for technical support.