



Introduction to Building Energy Asset Score

Webinar

**Tuesday, April 28, 2020
10:00 AM – 11:00 AM PDT**

Presented by

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buildingenergyscore.energy.gov



PNNL is operated by Battelle for the U.S. Department of Energy

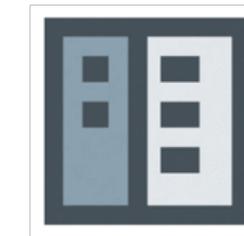


DOE Building Technologies Office Analysis Tools

Tools



Schema



Brick Schema

Terms and Definitions



BTO's Building Energy Data subprogram:

www.energy.gov/eere/buildings/building-energy-data



Join Upcoming DOE Data Tool Training Webinars!

Introduction to SEED ([Register Here](#))

April 29, 3-4pm ET

Learn about the Standard Energy Efficiency Exchange Database (SEED) Platform, a central hub for building energy datasets located across multiple sources. SEED makes data collection, analysis, and sharing simpler and easier.

Introduction to Audit Template ([Register Here](#))

April 30, 1-2pm ET

Learn about Audit Template, a web-based tool for entering building energy audit data, performing data validation, exporting and sharing audit data, and submitting data to cities that have local energy audit ordinances. Register here.

Introduction to SEED: Advanced Features ([Register Here](#))

May 19, 3-4pm ET

Learn about SEED's advanced capabilities, including GIS data integration, uploading interval and meter data, and the ability to connect with other tools such as Portfolio Manager, BuildingSync, Audit Template, and the Open Efficiency Platform.

Learning Objectives and Course Outline

Learning Objectives

- Awareness of the Asset Score tool
- Understand basics of data collection, tool navigation, data entry, and score reports
- Insight into tool best practices
- Know where to go for help and additional resources



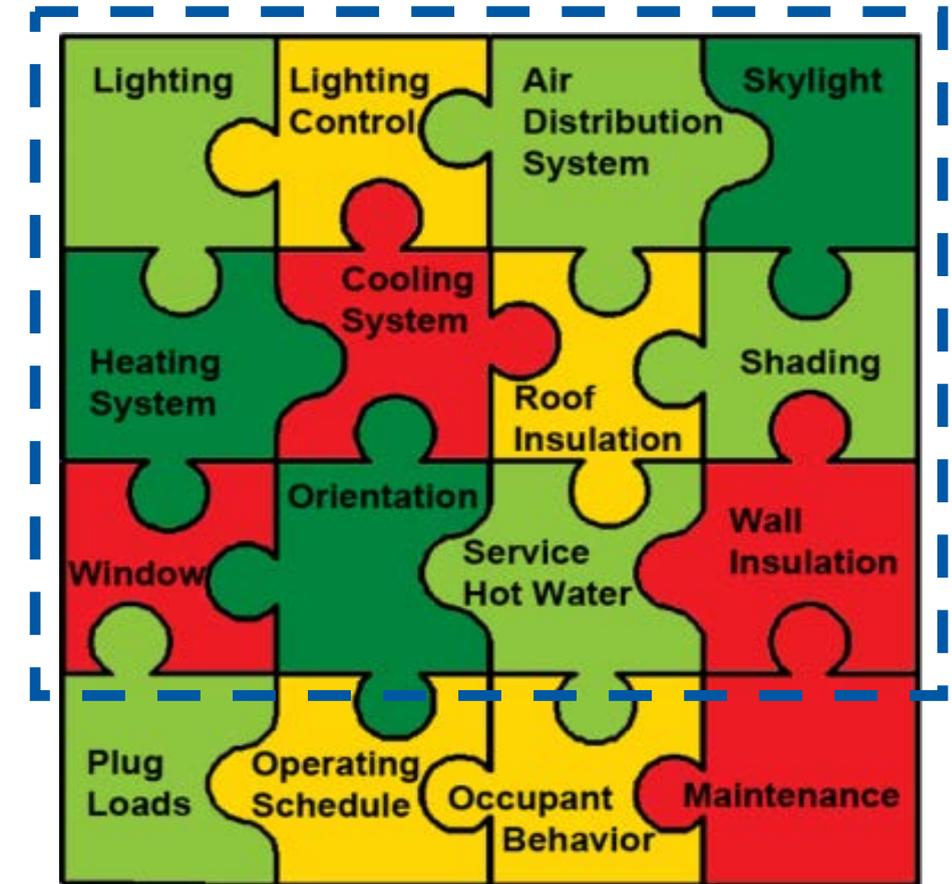
Course Outline

- I. Introduction to Asset Score
- II. Data Collection
- III. Using Asset Score: Entering Data and Generating Score Reports
- IV. Demonstration



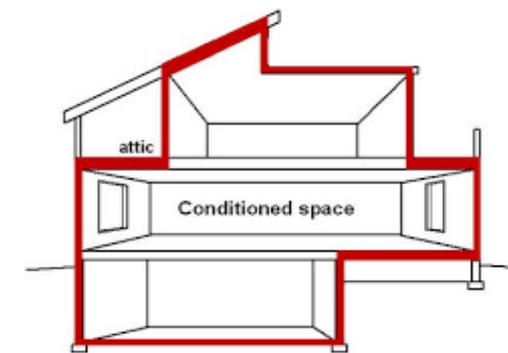
What is Asset Score?

- Free web-based tool for assessing the physical and structural energy efficiency of commercial and multifamily residential buildings
- Evaluates building energy “assets”: envelope and major energy-related systems and equipment
- Identifies opportunities to invest in energy efficiency upgrades



Available as part of the suite of analysis tools for commercial buildings sponsored by the U.S. Department of Energy Building Technologies Office:

<https://www.energy.gov/eere/buildings/building-technologies-office>



Why was the Asset Score Tool Developed?

- Expand nationwide awareness of opportunities to invest in building energy upgrades.
- Quick, easy to use tool to help guide energy improvement decisions and investments.
- Help make your job easier and faster
- Thousands of potential savings identified to date by both private and public sector organizations

Note: Asset Score was not intended as a replacement for building energy usage benchmarking or building energy audits, but a complimentary tool.



Asset Score vs. ENERGY STAR

Building Asset Data Includes:

- ✓ Building attributes (stories, conditioned space, orientation, age, etc.)
- ✓ Building envelope (roof, insulation & air sealing, windows, foundation)
- ✓ Building equipment (HVAC, lighting, hot water, etc.)



How your building *should* perform based on construction

Building Performance Data Includes:

- ✓ Occupant behavior (hours of operation, occupant density, etc.)
- ✓ Actual energy usage (metered data by fuel type)
- ✓ Actual energy spend (utility bills, etc.)



How your building *actually* performs based on use

Using Asset Score and ENERGY STAR for Portfolio Assessment

Scores are not directly comparable

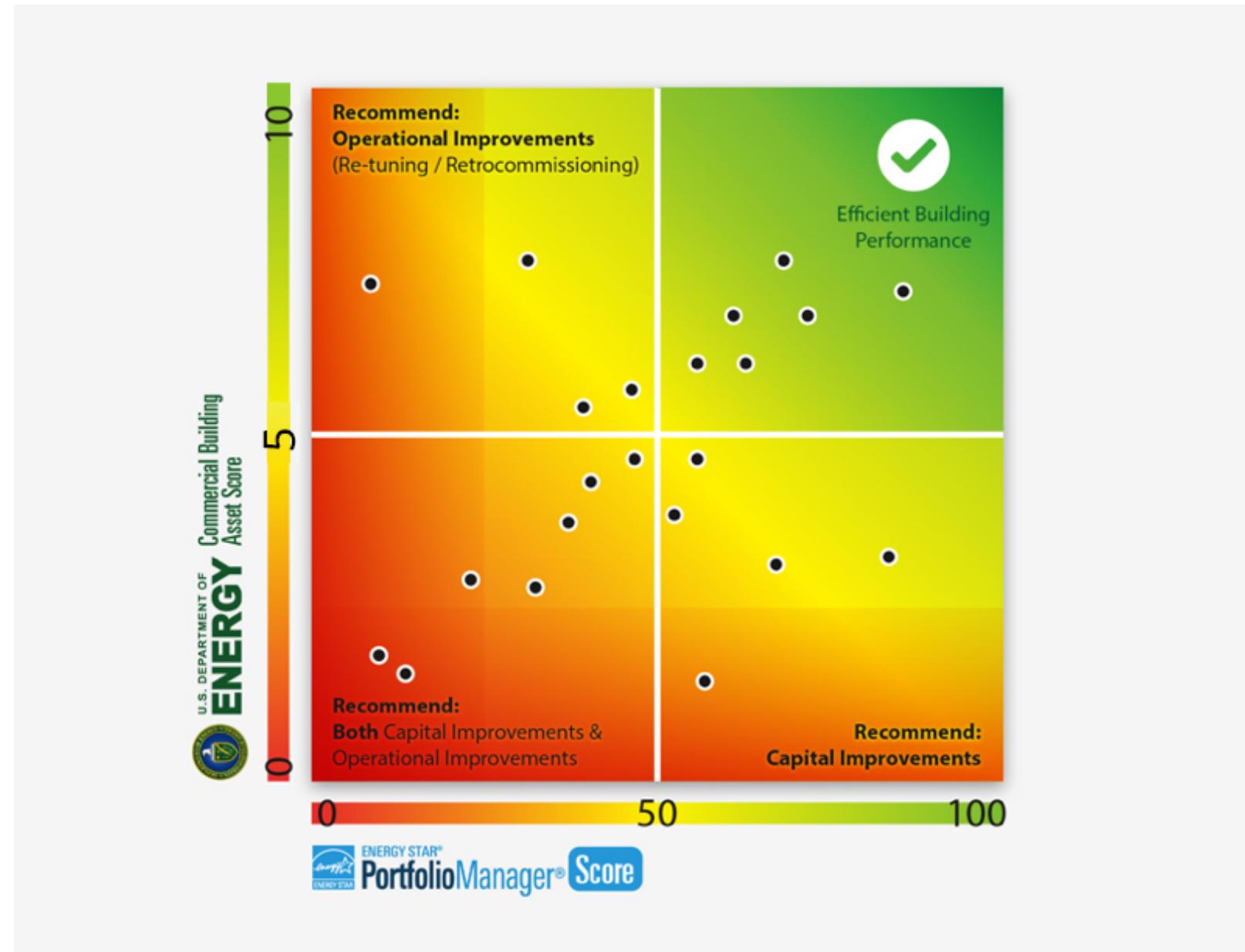
however

Using both provides powerful information that can identify energy upgrades and improvements in building operations

Case Study:

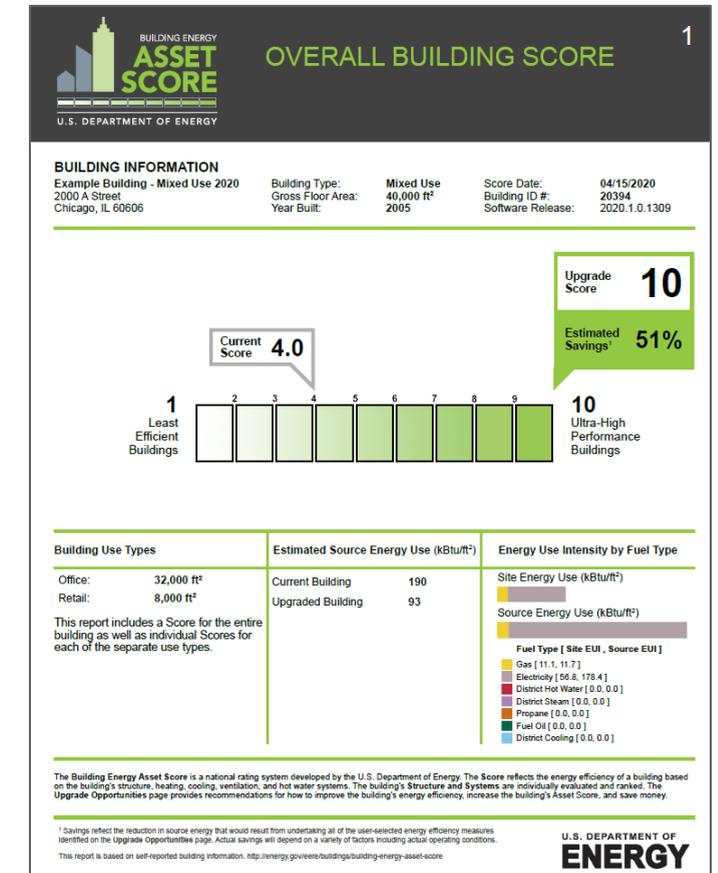
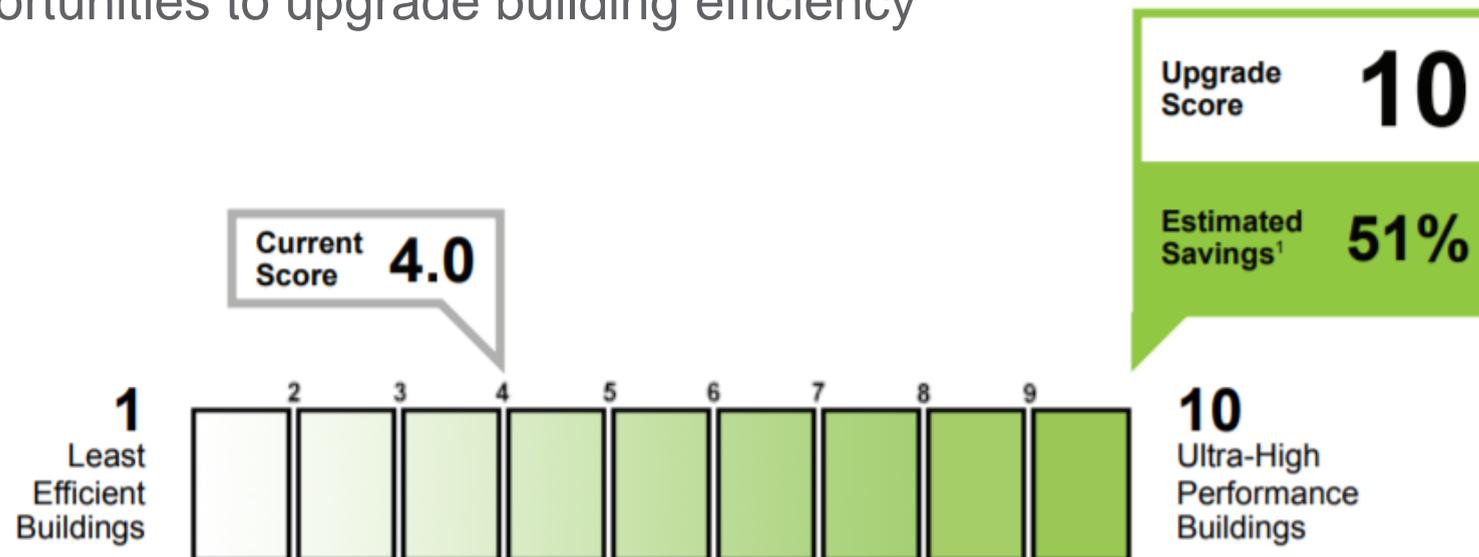
Seattle Building Tune-Up Accelerator Program

www.seattle.gov/environment/climate-change/buildings-and-energy/building-tune-ups/tune-up-accelerator



What Does the Asset Score Tool Do?

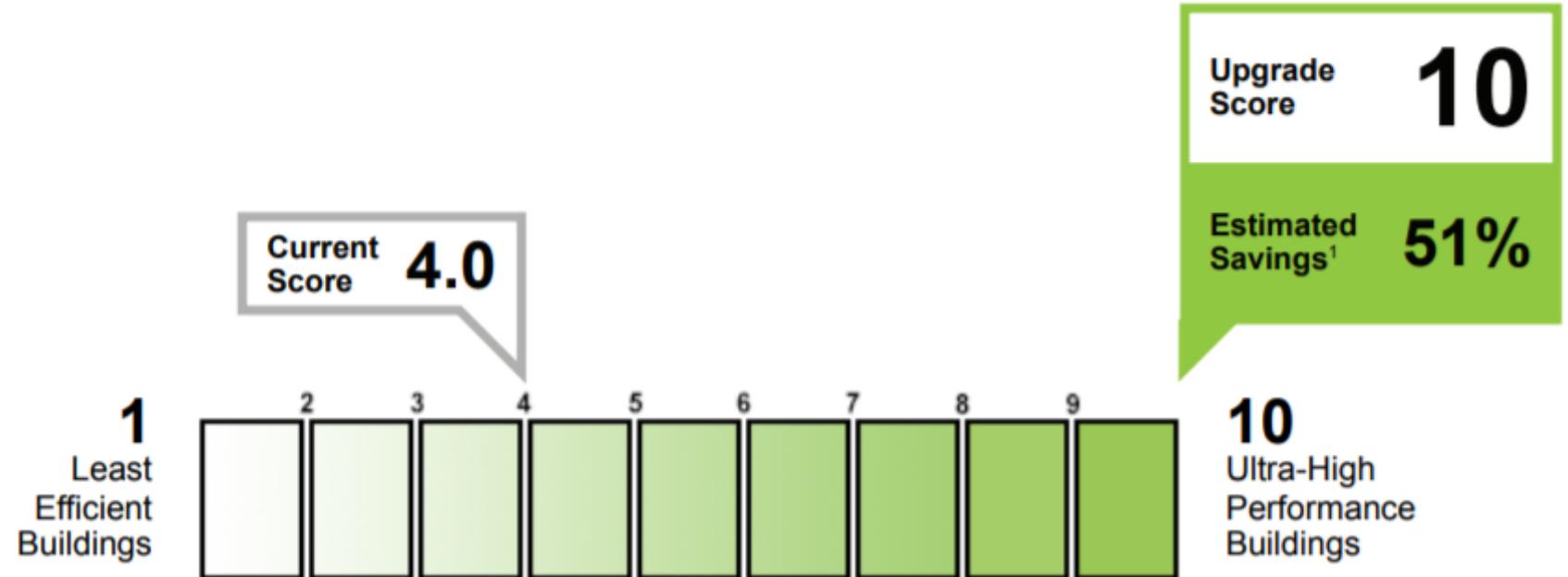
- Generates an energy **asset score** - a simple energy efficiency rating that enables comparison among buildings
- Produces an **asset score report** which includes:
 - Total estimated building energy usage and energy use by end use under standard operating conditions
 - An energy efficiency assessment of the building's individual systems
 - Opportunities to upgrade building efficiency



Asset Score Scale

Key components:

- Shaded 10-point gradient represents a building's efficiency
- Current Score
- Potential Score
- Estimated savings



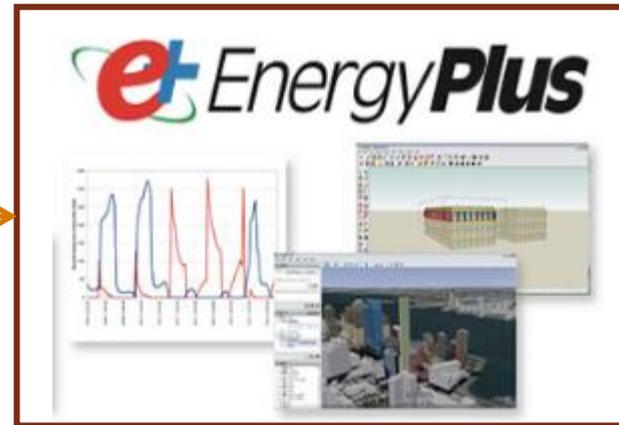
A score of 10 represents a building where the lowest expected energy usage using current energy efficiency technologies, which can be modeled using the Asset Score tool; would qualify it to be considered a high-performance building.

How does Asset Score Work?

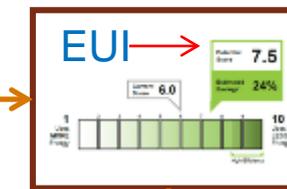
Collect data during
Assessment



Web interface



Estimated EUI
converted to Score



Outputs

- Energy simulation using building energy modeling engine (EnergyPlus)
- Normalizes for building operations, occupancy and tenant behavior

How Do I Score a Building?

- Collect Building Data During “Assessment” Phase
- Enter Data into the Asset Score Tool
- Submit to generate an Asset Score Report



Asset Score Data Collection Forms:

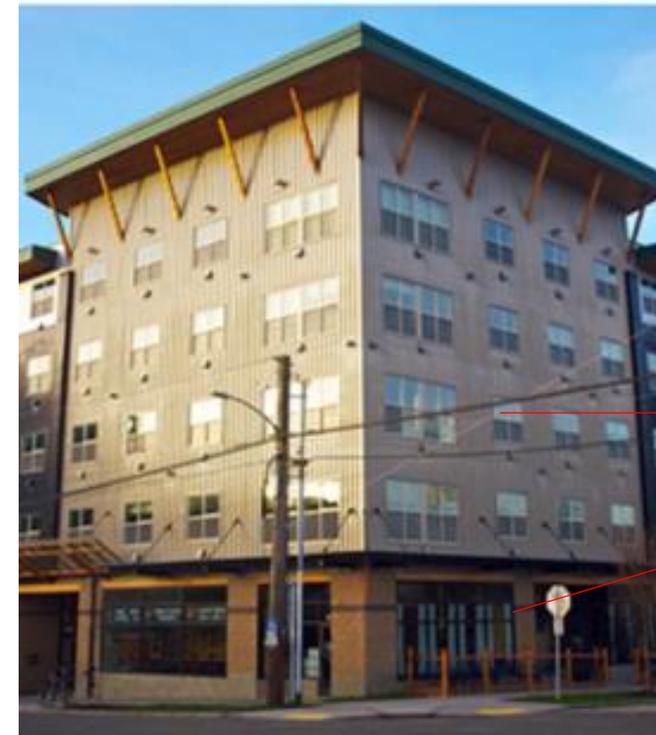
Download from the Asset Score Resources page: <https://buildingenergyscore.energy.gov/resources>

Let's get started!

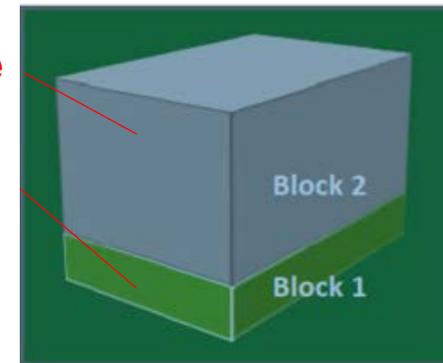
Example Building:

Example Building - Mixed Use
123 Example Street
Chicago, IL 60601

Building Information		
Building Name	Example Building - Mixed Use 2020	
Year Completed	1980	
Total Area	40000	
Address Zip	60606	
Use Type	Retail	Office
Sqft/geometry	8,000; 80x100x1 floor	32,000; 80x100x4 floors
Envelope		
Roof Type	Built-up w/ metal deck	Built-up w/ metal deck
Wall Type	Brick/Stone on masonry	Brick/Stone on masonry
Window Type	Metal; Single Pane; U-0.68	Metal; Double Pane w/ Low-E
Window-to-wall Ratio	0.6	0.4
Floor Type	Slab-on-Grade; R-30	Slab-on-Grade; R-30
Lighting		
Lighting Type	T8 - 100%	T8 - 50%; LED - 50%
Fixture details	T8=32 W; 2 lamps; pendant	LED=12 W; 1 lamps; recessed
HVAC		
System Type	Packaged Rooftop Unit	Packaged Rooftop Unit
HVAC details	DX/Central Furnace; CAV fans	DX/Central Furnace; CAV fans



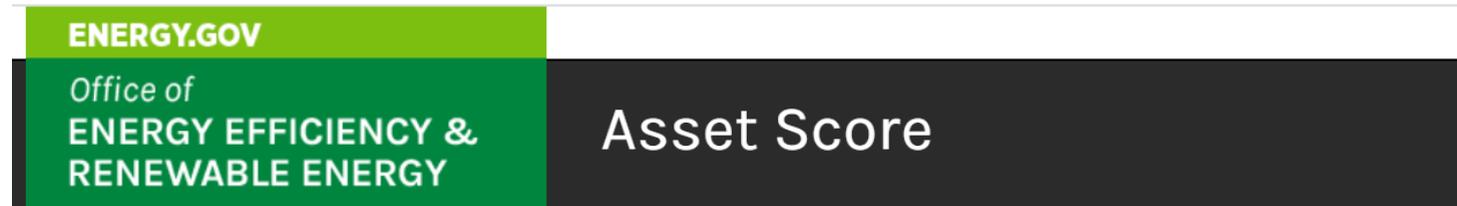
Office
Retail



Connect and log in to Asset Score

Register for an account and log in:

<https://buildingenergyscore.energy.gov>



[EERE](#) » [Building Energy Asset Score](#) » [Asset Score Home](#)

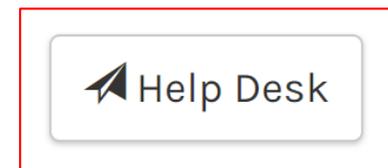
LOG IN ?

Email

Password

[Log In](#)

[Forgot your password?](#) | [Register](#)



Getting Started: Collect building data, register for an account, log in, select the Asset Score tab from the home page, create a building, input data and submit for a score. View the [Quick Start Guide](#) for details.



Steps 1-3: Input Data

Step 1: Input Basic Building Information

Step 2: Identify Building Use Types

Step 3: Create Inventory of Building Features

Add a Building

Start by naming this building, providing the building's location and a couple additional details.

Building Name*
 This field is required.

Year Completed*
 This field is required.

Year in which construction was completed OR year of last major retrofit.

Total Floor Area* ft²
 This field is required.

Location*

Street
 This field is required.

City Please sele Zip Code
 This field is required. This field is required. This field is required.

Assessment Type

Real - This is an actual building

Test - This building is created for hypothetical or comparison analysis

Options

Display Advanced System Parameters

Checking this box displays some system parameters that use standard assumptions in the Asset Score model. These fields can be overridden if known; otherwise the standard assumptions will be used.

Generate a verified Total HVAC System Performance Ratio

Checking this box sets a subset of Asset Score inputs as 'Required'. These inputs would then need to be provided to score the building.

Selecting this option will make the feature to automatically create HVAC systems unavailable.

Add notes about this building

Assemblies

New Roof

Name* Roof 1

Roof Type* Please select

Thermal Properties Please select

Intended Occ Metal surfacing

New Wall

Name*

Wall Type

Thermal Properties

Intended Occupancy

New Floor

Name* Floor 1

Floor Type* Please select

Slab Insulation I don't know

Thermal Properties I don't know

Intended Occupancy Type* Please select

Step 4: Create a 3-D Image of the Building

BLOCKS +

Office Block

H-shape, 7,600.0 ft²

New Block ?

Name*

Above Ground **Below Ground**

Number of Floors*

Avg. Floor-to-Floor Height* ft

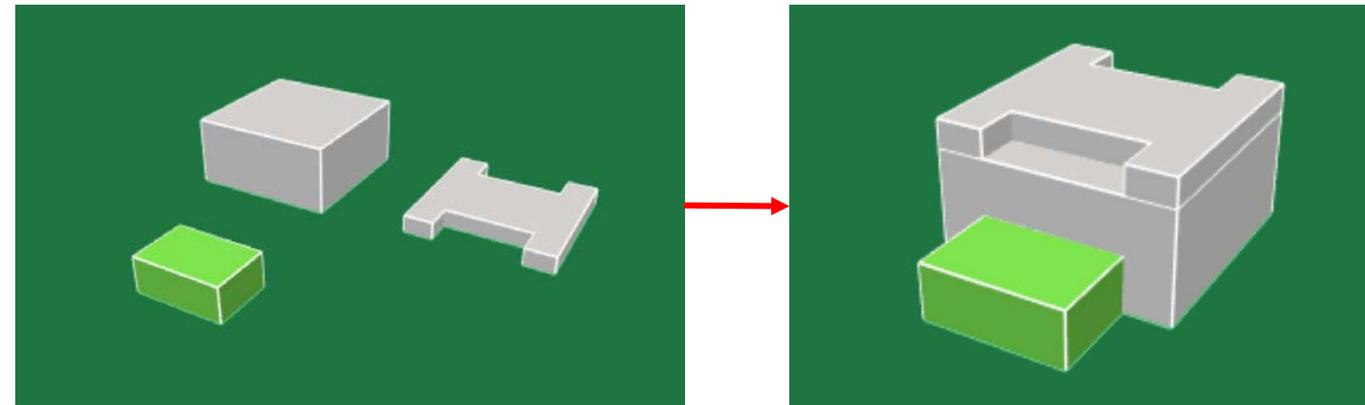
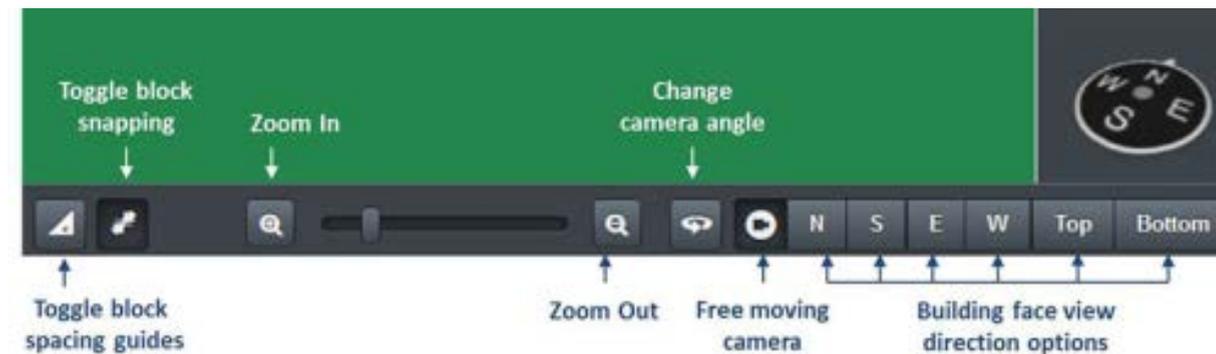
Avg. Floor-to-Ceiling Height* ft

Orientation* ° from North

Rectangle **H-shape** **L-shape** **T-shape** **U-shape**

Total Block Floor Area: 0 ft²



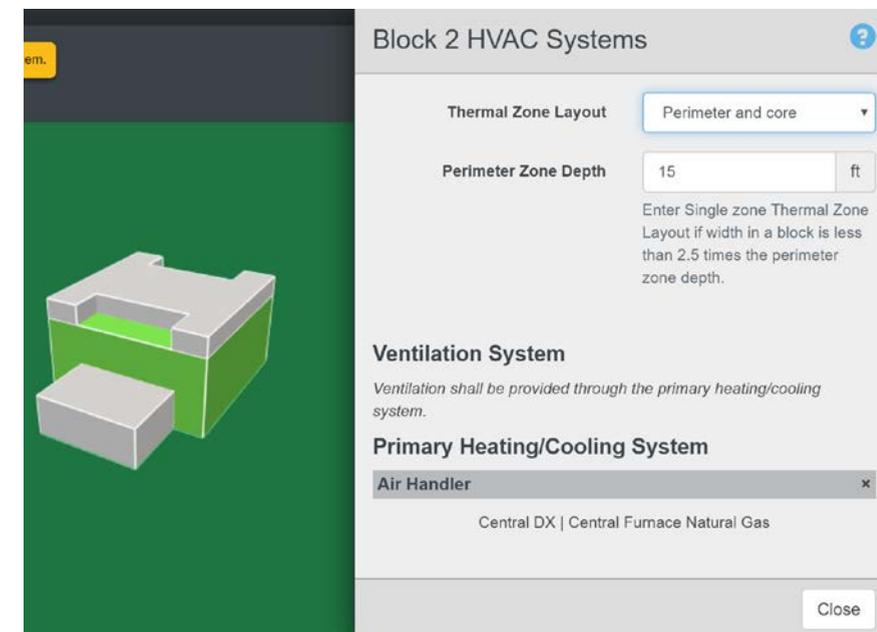
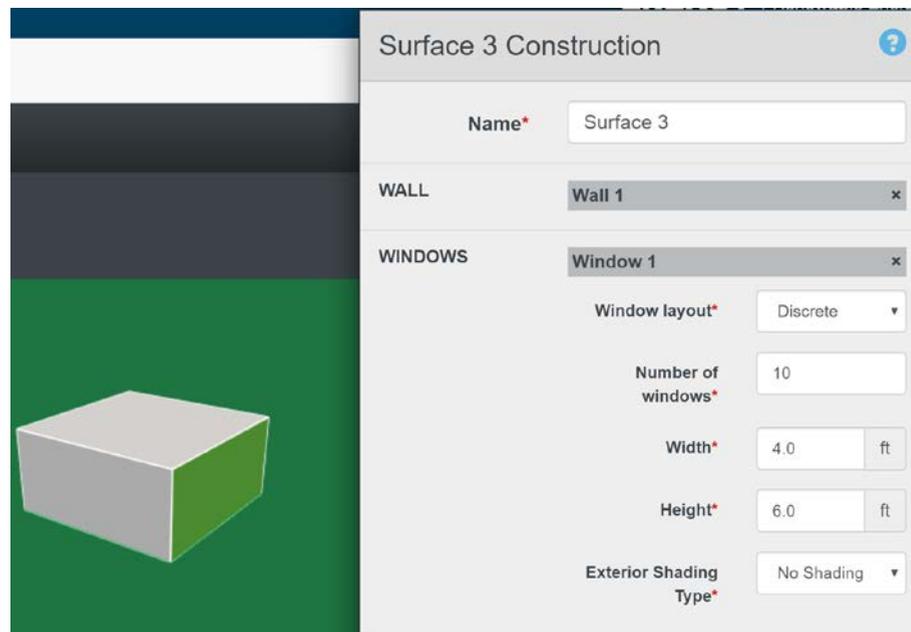
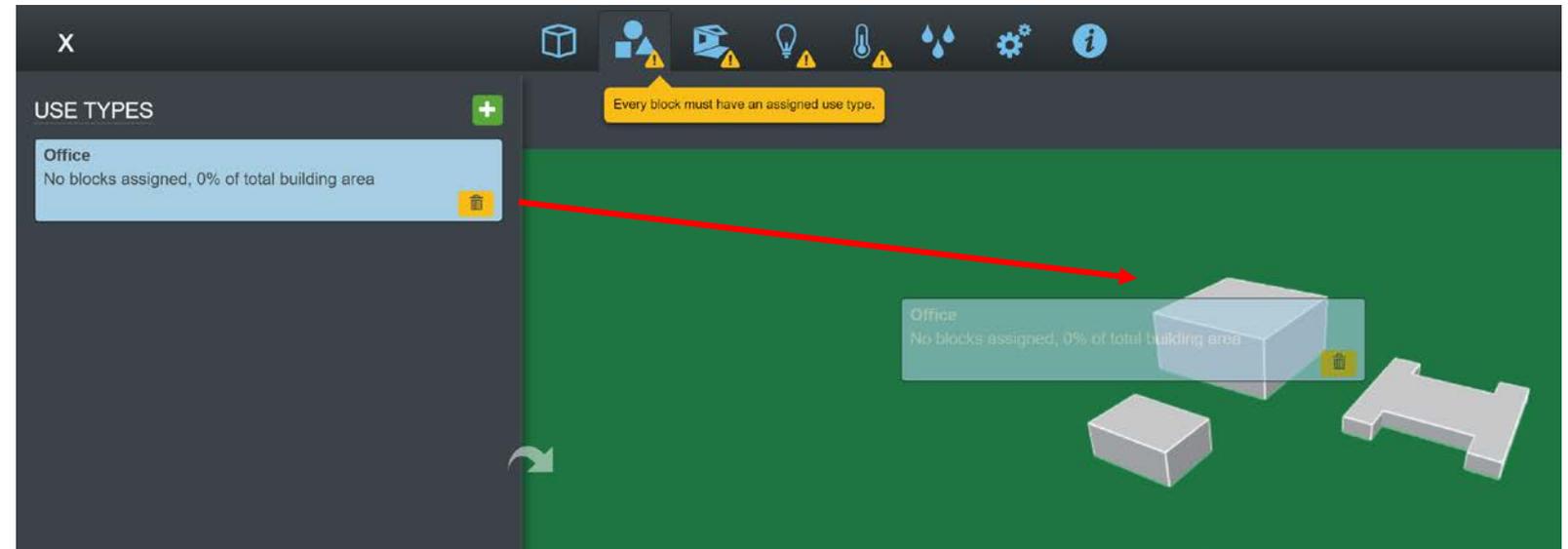
Toggle block snapping Zoom In Change camera angle

Toggle block spacing guides Zoom Out Free moving camera Building face view direction options

N S E W Top Bottom

Step 5: Assign Use Types and Components

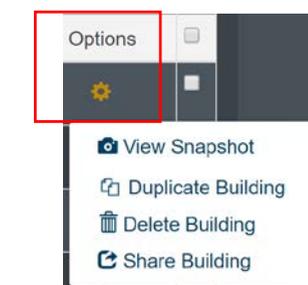
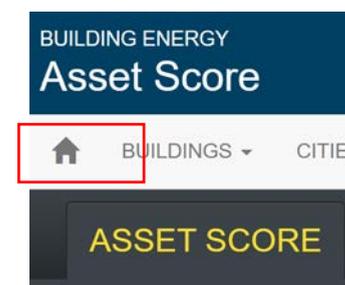
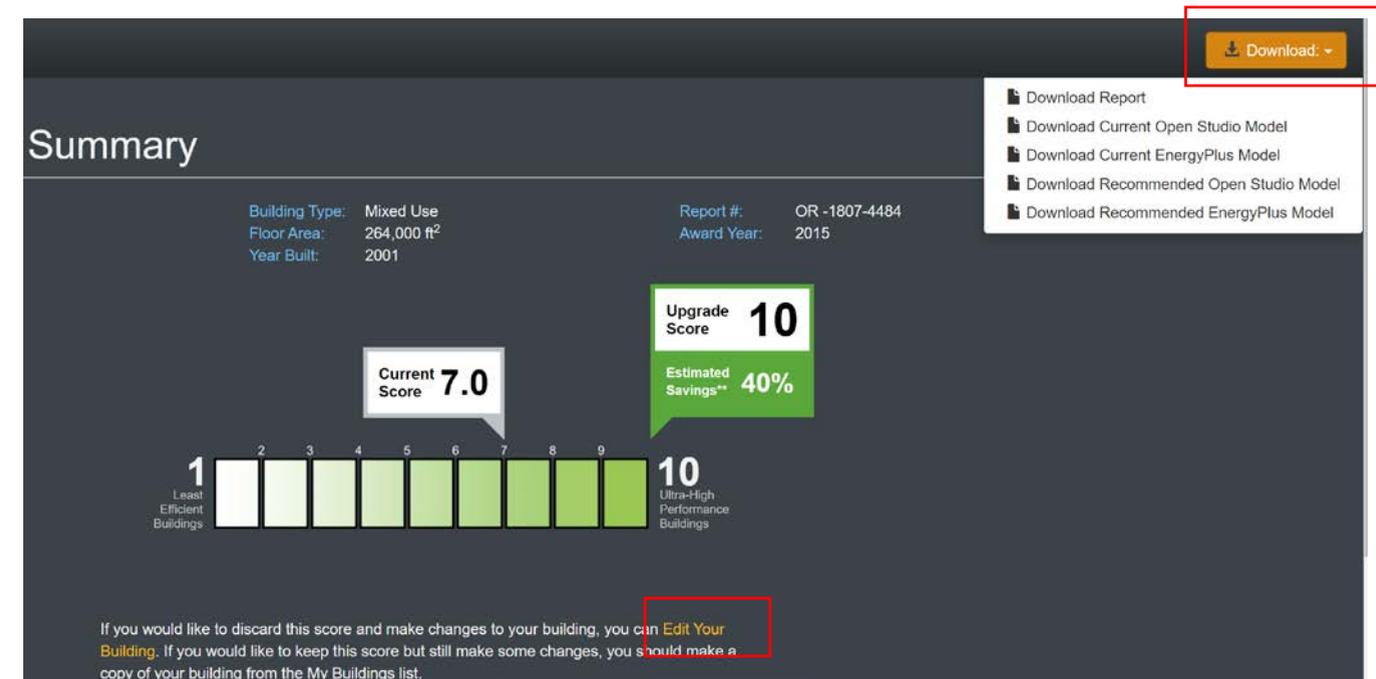
- Drag and drop assets onto blocks
- Click blocks to add details for surfaces, lighting, HVAC, water heaters



Step 6: Score Building and Review Score Report



- Review inputs and address warnings (if needed)
- Select Score button
- Preview preliminary recommendations and modify if desired
- Wait for Email notification or monitor Home page status icons
- Download report
- Return to edit mode to edit as needed
- Duplicate building and score for comparative analysis



Asset Score Report

- Review score results and report sections
- See score report and building upgrade guides for details – available from the Resources page

Overall Building Score



Upgrade Opportunities



Structure and Systems



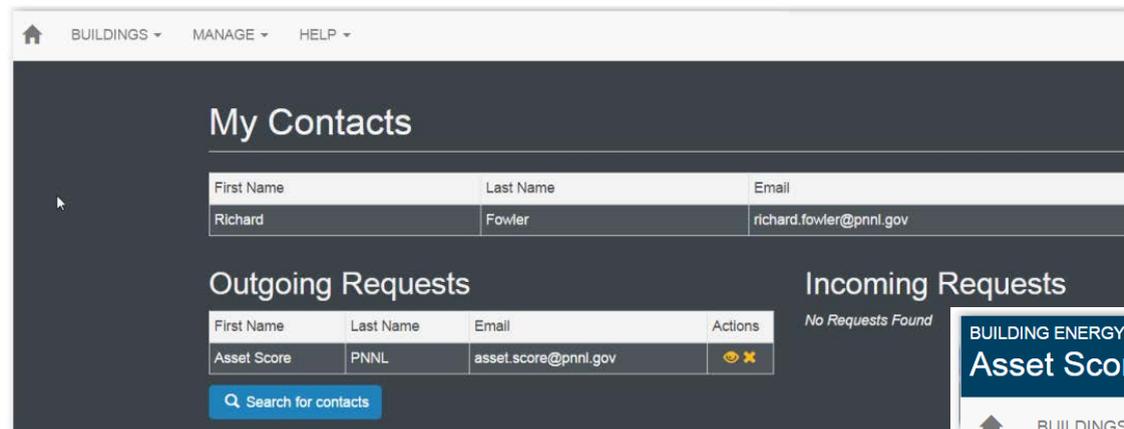
Building Assets



Creating Contacts and Sharing Buildings

Share buildings with contacts:

- Add Contacts
- Share Buildings



My Contacts

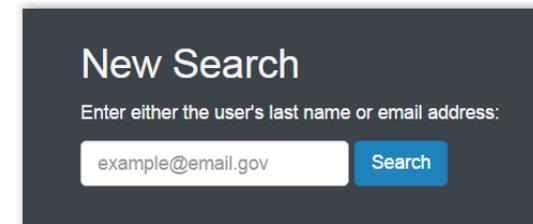
First Name	Last Name	Email
Richard	Fowler	richard.fowler@pnnl.gov

Outgoing Requests

First Name	Last Name	Email	Actions
Asset Score	PNNL	asset.score@pnnl.gov	

Incoming Requests
No Requests Found

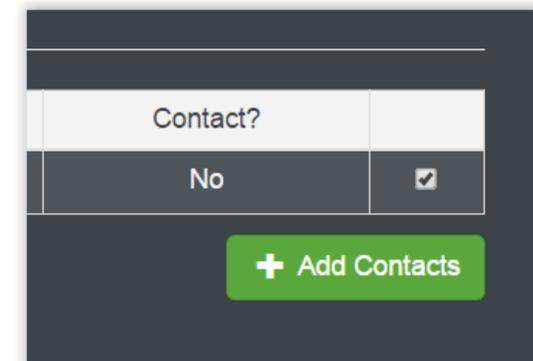
[Search for contacts](#)



New Search

Enter either the user's last name or email address:

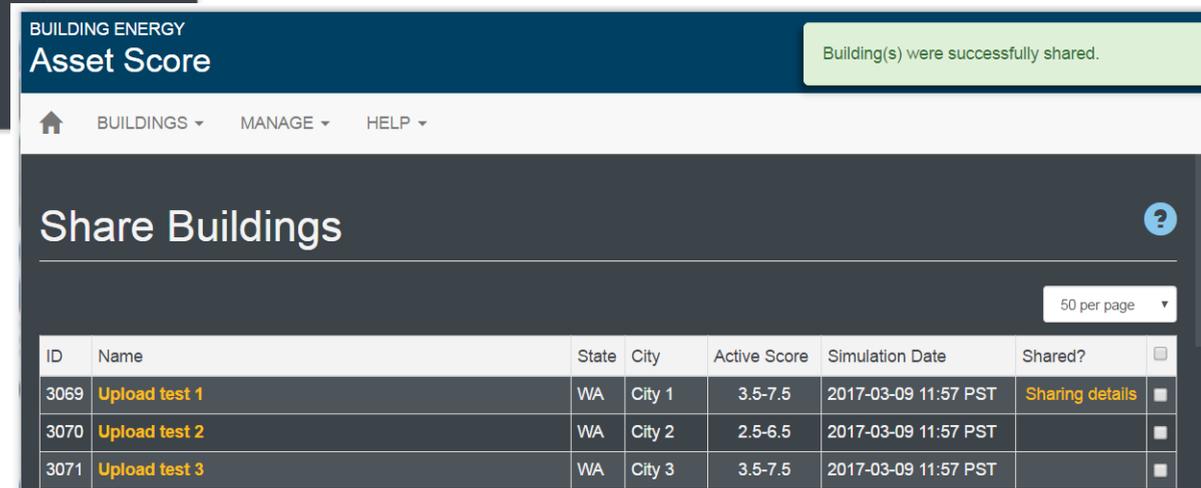
[Search](#)



Contact?

No

[+ Add Contacts](#)



BUILDING ENERGY
Asset Score

Building(s) were successfully shared.

Share Buildings

50 per page

ID	Name	State	City	Active Score	Simulation Date	Shared?	
3069	Upload test 1	WA	City 1	3.5-7.5	2017-03-09 11:57 PST	Sharing details	<input type="checkbox"/>
3070	Upload test 2	WA	City 2	2.5-6.5	2017-03-09 11:57 PST		<input type="checkbox"/>
3071	Upload test 3	WA	City 3	3.5-7.5	2017-03-09 11:57 PST		<input type="checkbox"/>

Asset Score Suite of Tools: Audit Template

- Collect, store and report building energy audit data
- Includes fields present in an ASHRAE Level 2 audit
- Audit data report may be submitted to cities to demonstrate audit completion
- Report includes calculated tables and charts outlining building energy use

Introduction to the Audit Template

Tuesday, 4/30/20; 10:00 AM – 11:00 AM PDT

<https://register.gotowebinar.com/register/1739469582854201100>

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BUILDING ENERGY AUDIT DATA REPORT OVERVIEW

BUILDING INFORMATION

Example Building 123 Main Street Washington, DC 20037	Report Type: Alternate City Report Gross Floor Area: 418,000 ft ² Year Built: 1975	Report Date: October 31, 2016 Building ID #: 979 Software Release: 2.1.0
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AUDIT TEAM

Energy Services, Inc.
123 Park Street
Washington, DC 20037
(202) 123-4567

DATA SUMMARY

This report was generated from data entered into the Building Energy Asset Score (Asset Score) tool, developed by the Pacific Northwest National Laboratory (PNNL) for the U.S. Department of Energy (DOE). Asset Score is a national standardized tool for assessing the physical and structural energy efficiency of commercial and multifamily residential buildings. It also facilitates building energy audit data collection and reporting.

This report follows the ASHRAE/ACCA Standard 211P, Standard for Commercial Building Energy Audits. It also includes additional data fields required by specific cities, where applicable. The icons below identify data categories.

- ASHRAE Level 2 inputs
- City specific inputs

If this report is used to comply with a local energy audit ordinance, the fields marked with "*" indicate the minimum data to be reported. The audit team listed above is responsible for any information entered and reported through Asset Score. DOE and PNNL do not warranty data accuracy, completeness, legality, and reliability.

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BUILDING ENERGY AUDIT DATA REPORT ENERGY SAVINGS OPPORTUNITIES

Building Name: City of Atlanta Example Building

Package Measure; Status (*); Measuring Calculation Approach (**)	Annual Energy & Cost Savings				Payback with Incentives							
	Total Cost Savings	Peak Demand Savings (kW)	Electricity Savings (kWh)	Fuel Oil #1 Savings (Gallons)	Measure cost	Potential incentives	Measure life (years)	Net measure cost	Simple ROI (%)	10 Year NPV	Simple Payback (w/o incentives - years)	Simple Payback (w/ incentives - years)
Potential Capital Recommendations												
Package: HVAC Package	1800.0	25.0	800.0	20.0				2450	73%	3000.0	2.8	1.4
Replace boiler; *1; **2					1800.0	550.0	2.0					
Convert CAV system to VAV system; *1; **1					900.0	300.0	4.0					
Replace chiller; *3; **2					2000.0	1500.0	3.0					
Insulate ducts; *2; **1					300.0	200.0	1.0					
Totals (recommended measures)	1800.0	25.0	800.0	20.0	5000.0	2550.0		2450.0				

Additional Resources

- Resources page

buildingenergyscore.energy.gov/resources

- DOE Asset Score FAQ page

energy.gov/eere/buildings/building-energy-asset-score-frequently-asked-questions

- Asset Score Help Desk

help.buildingenergyscore.com

Center for Building Knowledge (CBK): Asset Score Training and Certification Program

www.assetscorecertificate.org

Thank you!