What is TSPR?

Total System Performance Ratio (TSPR) is a performance-based compliance path for HVAC systems which is defined as the ratio of the sum of a building's annual heating and cooling load in thousands of Btus to the sum of the annual carbon emissions in pounds from energy consumption of the building HVAC systems.

$$TSPR = \frac{Annual\ HVAC\ Loads}{Annual\ HVAC\ Carbon\ Emissions}$$

The DOE Building Energy Asset Score has included a TSPR tool to calculate a building's TSPR for compliance with the 2018 Washington State Energy Code (WSEC). This new path is applicable to *office*, *retail*, *library* and *education* occupancies.

Users may enter geometry, envelope and HVAC component inputs into the tool to create a building energy model that will used to estimate the HVAC annual energy use and carbon emissions to generate a proposed TSPR that will be compared against a baseline TSPR to determine compliance. The baseline TSPR is generated automatically by the tool by using the user's building and replacing the HVAC system with the baseline HVAC system as defined by the 2018 Washington State Energy Code, Appendix D.

How does TSPR show compliance?

To comply with the WSEC, the proposed system TSPR must be greater than or equal to the baseline system TSPR and meet all other prescriptive code requirements.

Proposed ratio ≥ Baseline ratio

The TSPR tool will generate a pdf report documenting the inputs and the TSPR of the both the proposed and baseline system that may be provided to code officials to demonstrate compliance.

Accessing the Tool

To access the TSPR tool, visit https://buildingenergyscore.energy.gov, register for an Asset Score account, and log in. To enter inputs and generate a TSPR report, create a building and follow the steps outlined on the next page of this guide.

Where to go for Help

To assist with data entry, each screen has a Help icon that links to an associated module of an online TSPR User Guide. The User Guide is connected to the Asset Score Help Desk, which may be used to submit a support ticket to request additional assistance.

- TSPR User Guide: https://help.buildingenergyscore.com/support/solutions/8000051362
- Asset Score Help Desk: https://help.buildingenergyscore.com/support/home

BUILDING ENERGY
TOTAL SYSTEM PERFORMANCE RATIO
U.S. DEPARTMENT OF ENERGY

Washington State
TSPR Quick Start Guide
Getting Started

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To create a TSPR for your building, complete the following steps from within the Asset Score tool. Refer to the <u>TSPR User Guide</u> for additional details.

Step 1: Click on the 'TSPR' tab from the Home page
This opens a list view of TSPR buildings. All TSPR buildings created by you or shared with you will be displayed here.

Step 2: Click on the 'Add a Building' button & enter basic building information
Enter a building name, location, year of construction, total floor area, and submitter details, and click the 'Create Building' to continue.

Step 3: Add building blocks to create building geometry
"Blocks" are used to construct a 3-D image that approximates the building's geometry, configuration, and orientation:
- Click on the ➕ icon to add a building block
- Simplify the building geometry using the pre-defined shapes available.
- Most buildings may be modeled as a single block, however multiple blocks may be added to represent different shapes, use types and HVAC systems present in the building

Step 4: Enter building components and assign to building blocks
Use the toolbar icons to navigate among building component sections. Click on the ➕ icon to add components and assign to blocks through a click, 'Drag and Drop' action from the left sidebar onto block images. Click on a block to view the assigned components and to specify additional inputs as needed.

Use Types -- The TSPR analysis can support occupancy types of 'Office', 'Retail', 'Library' and 'School'. Portions of the building that are occupancy types other than these should not be included in the analysis.

Construction – add envelope components and specify thermal properties for roofs, walls, windows, and floors.

Lighting -- Interior lighting is automatically set to the prescriptive requirements of the Washington State Energy Code based on the block use type.

Heating & Cooling – HVAC systems are entered into the tool by adding Air Handlers and/or Zone Equipment and the Plant Loops or VRF Systems that may serve them.
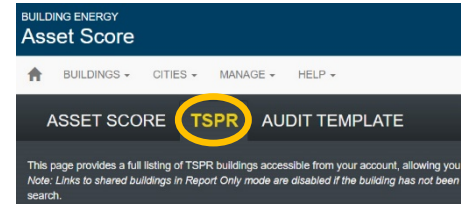
Step 5: Score your building and review your TSPR Report
Click the ℹ️ icon on the toolbar to perform a final review of all data inputs prior to scoring your building. Go back and make changes to your inputs if needed.
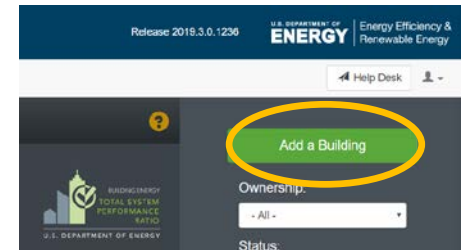
Select the "Score Building" button to submit your building. You will receive an email notice when a TSPR Report for your building is available to download and review. The Status of the building on the Home page will also change from 'Running' to 'Rated' when complete.
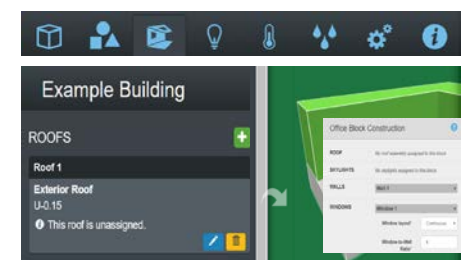
Step 1

Step 2

Step 3

Step 4

Step 5