
APPENDIX 1:

Summary Tables for Key Characteristics

In addition to the tables and figures throughout the report, we provide full tables of key characteristics as a separate Excel file for ease of review. Most tables provide standard errors, allowing users to calculate confidence intervals for 2019 and 2025 estimates. Tables also include the 2025 Adjusted estimates. For additional information on re-creating these tables, see [Appendix 2](#).

APPENDIX 2:

Analytical Decisions and Assumptions

Throughout the report, all data presented are available in the CBSA analytic and CSV tables. To calculate all presented values, data are aggregated to the building level to apply the web survey or site visit weight, where appropriate. The CBSA 2025 User Guide provides additional detail and examples on how data should be aggregated to accurately apply weights.

Metrics provided throughout the report can each be calculated in a variety of ways. Where ratios are compared between groups (e.g., energy use intensity, lighting power density), the ratio is calculated using the sum-product of the weights with the metrics to estimate the numerator value (e.g., sum of weighted lighting wattage for buildings in each geographic subregion) and the denominator value (e.g., sum of weighted floor area for buildings in each geographic subregion) to estimate the ratio by geographic subregion.

To provide transparency and facilitate replication efforts, supplementary R syntax files in the compressed folder *2025_CBSA_table_syntax* are available to help data users re-create all tables throughout the report. These files rely entirely on the 2019 and 2025 analytic and CSV tables available through NEEA for reproducibility. Please see the *README* file in the folder for reference.

HVAC System Types. In collaboration with NEEA and the 2025 CBSA Workgroup, Westat developed broader analytic categories for HVAC system types, focused primarily on heating attributes, including the heat source and use of electric resistance heating (Table A2.1). These categories are used throughout the report and can be found both in the analytic tables and in the supplementary syntax files. The data dictionary includes the explicit data values for recreating the HVAC system category.

Table A2.1. HVAC System Categorization

HVAC System Type	Heat Source	VAV/Reheat	HVAC System Category
Packaged terminal AC (PTAC) Packaged terminal heat pump (PTHP)	All	All	Packaged Terminal AC and Heat Pumps (PTAC/PTHP)
Ductless heat pump head unit VRF system indoor unit	All	All	Ductless Minisplits and VRF Heat Pumps
Furnace Makeup air unit Air handling unit Packaged rooftop unit	Electric resistance	All	Ducted HVAC: Electric Resistance Heat
Furnace Makeup air unit Air handling unit Packaged rooftop unit	All	Electric Resistance	

HVAC System Type	Heat Source	VAV/Reheat	HVAC System Category
Furnace Dedicated outdoor air system (DOAS) Makeup air unit Air handling unit Packaged rooftop unit	Remote (split system) heat pump, Built-in (packaged) heat pump	All	Ducted HVAC: Heat Pump Heat
Dedicated outdoor air system (DOAS) Makeup air unit Air handling unit Packaged rooftop unit	Hot water, Steam	≠ Electric resistance	Ducted HVAC: Hydronic Heat
Dedicated outdoor air system (DOAS) Makeup air unit Air handling unit Packaged rooftop unit	All	Hot water	
Furnace Dedicated outdoor air system (DOAS) Makeup air unit Air handling unit Packaged rooftop unit	Built-in fossil fuel based combustion	≠ Electric resistance, ≠ Hot water	Ducted HVAC: Combustion Heat
Furnace Dedicated outdoor air system (DOAS) Makeup air unit Air handling unit Packaged rooftop unit	-7. Valid Skip, -9. Could Not Assess	≠ Electric resistance, ≠ Hot water	Ducted HVAC: No or Unknown Heat
Baseboard Radiant floor Unit heater Fan coil unit Unit ventilator	Hot water, Steam	All	Hydronic Radiant or Fan Coil Unit (FCU) Heat
Baseboard Radiant floor Radiant overhead Unit heater	Electric resistance	All	Zonal Electric Resistance Heat
Radiant overhead Unit heater	Built-in fossil fuel based combustion	All	Zonal Combustion Heat
Radiant overhead Unit heater	-7. Valid Skip, -9. Could Not Assess, Other	All	Zonal Other or Unknown Heat
Other	All	All	Other
-9. Could Not Assess	All	All	Unknown

Note. For 2025, HVAC System Type can be found in E_HVAC_System.heating_system_type and E_HVAC_System.cooling_system_type. Heat Source can be found in E_HVAC_System.hvac_heat_source. VAV/Reheat can be found in E_HVAC_System.hvac_vav_reheat. For 2019, HVAC System Type can be found in hvac-hvac_system.heating_system_type and hvac-hvac_system.cooling_system_type. Heat Source can be found in hvac-hvac_system.primary_heat_fuel. VAV/Reheat can be found in hvac-hvac_system.electric_resistance_heat_type.

Primary Building Activity. Throughout the report, findings are analyzed by 2025 CBSA primary building activity. These primary building activities can all be mapped to 2019 CBSA building types, as shown in Table A2.2. In the CBSA analytic files, each building is also mapped

to both a 2019 building type and an ENERGY STAR® Portfolio Manager type based on its 2025 primary building activity.

Table A2.2. CBSA Building Activity Crosswalk

2025 primary building activities	2019 CBSA building types	ENERGY STAR® Portfolio Manager types
Automotive	Retail/Service - Auto/Boat Dealer/Showroom Retail/Service - Car Wash Retail/Service - Vehicle Repair	Vehicle Dealership
Education	School - Elementary School School - Middle School School - High School School - Pre-School School - Other K-12 School Other - Adult/Career Education Other - Vocational Training Mixed Commercial - Majority School	Adult Education College/University K-12 School Pre-school/Daycare Vocational School Other - Education
Enclosed Mall		Enclosed Mall Other - Mall
Food Sales	Grocery - Gas Station with Convenience Store Grocery - Convenience Store (<=5000 sq ft) Grocery - Other Grocery Grocery - Grocery (> 5000 sq ft) Restaurant - Truck Stop Mixed Commercial - Majority Grocery	Convenience Store with Gas Station Convenience Store without Gas Station Food Sales Supermarket/Grocery Store
Food Service	Restaurant - Bar/Pub/Lounge Restaurant - Cafeteria Restaurant - Catering Service Restaurant - Coffee/Doughnut/Bagel Shop Restaurant - Fast Food Restaurant Restaurant - Ice Cream/Frozen Yogurt Shop Restaurant - Sit Down Restaurant Restaurant - Take-Out Restaurant Restaurant - Other Restaurant Mixed Commercial - Majority Restaurant	Bar/Night Club Fast Food Restaurant Food Service Restaurant Other - Restaurant/Bar
Gas Station		
Health Care	Hospital - Hospital Residential Care - In-Patient Rehab Office - Dental Office Office - Medical Clinic/Outpatient Medical Office - Medical Office Office - Medical Urgent Care Clinic Office - Outpatient Rehab Office - Veterinarian Office/Clinic Other - Asylum Mixed Commercial - Majority Hospital	Ambulatory Surgical Center Hospital (General Medical & Surgical) Medical office Outpatient Rehabilitation/Physical Therapy Urgent Care/Clinic Other Outpatient Other - Specialty Hospital Veterinary Office
Laboratory		Laboratory
Laundry/Dry Cleaner	Retail/Service - Dry Cleaner Retail/Service - Laundromat (Self Service)	Personal Services (Health/Beauty, Dry Cleaning, etc.)
Lodging	Lodging - Hotel Lodging - Motel Lodging - Bed & Breakfast Lodging - Boarding/Rooming House/Apt Hotel Lodging - Convent/Monastery Lodging - Dormitory Lodging - Fraternity/Sorority Lodging - Halfway House Lodging - Hotel - Resort	Hotel Residence Hall/Dormitory Other - Lodging/Residential

2025 primary building activities	2019 CBSA building types	ENERGY STAR® Portfolio Manager types
	Lodging - Shelter/Orphanage/Children's Home Lodging - Other Lodging Mixed Commercial - Majority Lodging	
Multi-Family Residential		Multifamily Housing
Nursing Home	Residential Care - Assisted Living Residential Care - Nursing Home Residential Care - Retirement Home Residential Care - Other Residential Care Mixed Commercial - Majority Residential Care	Residential Care Facility Senior Living Community
Office	Office - Admin/Professional/Government/Financial Office - Call Center Office - Retail Banking Office - Sales Office Office - Other Office Mixed Commercial - Majority Office	Bank Branch Financial Office Office
Other	Other - Airplane Hanger Other - Crematorium Other - Data Center/Server Farm Other - Telephone Switching Mixed Commercial - Majority Mixed Commercial Mixed Commercial - Majority Other Mixed Commercial - No Majority	Data Center Mixed Use Property Transportation Terminal/Station Other - Technology/Science
Other Service	Assembly - Health Spa Retail/Service - Beauty/Barber Retail/Service - Repair Shop	Personal Services (Health/Beauty, Dry Cleaning, etc.) Repair Services Other - Services
Post Office/Mailing Center	Retail/Service - Post Office	Mailing Center/Post Office
Public Assembly	Assembly - Arena Assembly - Auditorium Assembly - Boat Slips/Marina/Yacht Club Assembly - Bowling Alley Assembly - Casino Assembly - Club/Lodges Assembly - Community Center Assembly - Convention Center Assembly - Gym/Exercise Assembly - Ice Skating Assembly - Library Assembly - Museum Assembly - Movie Theater Assembly - Performing Arts Theater Assembly - Pool Assembly - Recreation Center Assembly - Roller Skating Assembly - Senior Center Assembly - Other Assembly Retail/Service - Studio/Gallery Office - City Hall Mixed Commercial - Majority Assembly	Aquarium Bar/Nightclub Bowling Alley Casino Convention Center Fitness Center/Health Club/Gym Ice/Curling Rink Indoor Arena Movie Theater Museum Performing Arts Race Track Roller Rink Social/Meeting Hall Stadium (closed) Stadium (open) Swimming Pool Zoo Other - Entertainment/Public Assembly Other - Recreation Other - Stadium Library Other - Public Services
Public Order and Safety	Other - Courthouse Other - Fire Station Other - Police Station Other - Police and Fire	Courthouse Fire Station Police Station
Religious Worship	Assembly - Religious Assembly	Worship Facility

2025 primary building activities	2019 CBSA building types	ENERGY STAR® Portfolio Manager types
Retail	Retail/Service - Auto Parts	Wholesale Club/Supercenter Retail Store
	Retail/Service - Beer/Wine/Or Liquor Store	
	Retail/Service - Clothing	
	Retail/Service - Department Store	
	Retail/Service - Department Store with Grocery	
	Retail/Service - Electronics/Appliances	
	Retail/Service - Florist/Nursery	
	Retail/Service - Hardware	
	Retail/Service - Home Improvement	
	Retail/Service - Pharmacy	
	Retail/Service - Rental Center	
	Retail/Service - Warehouse Club	
	Retail/Service - Other Specialty Merchandise	
	Mixed Commercial - Majority Retail/Service	
Strip Shopping Center		Lifestyle Center Strip Mall
Urban Strip Shopping Center		
Vacant – Commercial		
Vacant – Multi-Family Residential		
Warehouse	Warehouse - Ministorage	Self-Storage Facility Distribution Center Non-Refrigerated Warehouse Refrigerated Warehouse
	Warehouse - Warehouse/Distribution	
	Warehouse - Warehouse/Storage	
	Warehouse - Cold Storage/Nonammonia Refrigerated	
	Warehouse - Other Warehouse	
	Mixed Commercial - Majority Warehouse	

APPENDIX 3:

Virtual Listing Manual – Chapter 2

Identifying Eligible Buildings

2

In This Chapter

2.1 Eligible Buildings
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2.1.2 Definition of a Commercial Building
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2.6.2 Attached Buildings
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2.7.2 Strip Shopping Centers and Enclosed Malls
2.7.3 Storage Facilities, Hotels and Motels, Blocks of Classrooms
2.7.4 Buildings Adjoined by Connecting Structures

The purpose of listing is to create a list of commercial and multi-family residential buildings in a specified geographic area. Therefore, it is critically important that you understand how CBSA defines the terms “commercial,” “multi-family residential,” and “building.” Some types of buildings are eligible for CBSA, and some types of buildings are ineligible.

This chapter:

- defines eligible buildings for CBSA;
- describes how to determine if a building is multi-family residential;
- describes the types of commercial activities that are eligible; and
- explains the rules for distinguishing one building from another.

2.1 Eligible Buildings

Simply put, a **building** is a structure with a roof and walls that is larger than 500 square feet.

There are two main types of eligible buildings for CBSA:

- Multi-family residential buildings, and
- Commercial buildings.

2.1.1 Definition of a Multi-Family Residential Building

To be **eligible** as a multi-family residential building for CBSA, a building must contain:

- Four or more floors used for residential purposes, and
- Five or more separate dwelling units.
 - A **dwelling unit** is defined as a separate living quarter that has direct access to the outside or a common hall in the building.

2.1.2 Definition of a Commercial Building

To be eligible as a commercial building for CBSA, the building must:

- Not be a multi-family residential building, and
- Be used for a purpose other than residential, manufacturing/industrial, or agricultural.

2.1.3 Characteristics of Building Eligibility

To determine building eligibility, you will need to understand and apply CBSA guidelines in all three of these areas:

1. The building's **structure**.
2. The building's **size**.
3. The building's **function**.

These concepts are explained in the following sections.

2.1.3.1 Structure

For a structure to be eligible, it must be **completely enclosed**, with a roof and walls that extend from the foundation to the roof.

Structures that are covered with a roof, but are not fully enclosed, are not considered buildings, and are **ineligible** for CBECS. These types of structures include:

- sheds for wood storage,
- covered parking garages (eligible building space above or below a parking garage is eligible), and
- open structures characteristic of steel mills or refineries.

Other examples of **ineligible** structures include:

- water, radio, TV, or cellular towers that have neither a roof nor walls,
- buildings that are dilapidated to the point of missing portions of the walls or roofs, and
- buildings with “condemned” signs posted.

There are two exceptions to the eligibility rule requiring a roof and walls:

- **A building constructed on stilts or pillars** with elevated levels that are fully enclosed by walls and a roof is eligible, even though the structure is open on all sides at the ground level.
- **A building under construction** is eligible, even if construction has not yet been completed, **if** construction of the building’s foundation has begun.

NOTE: Mobile offices, such as those at construction sites, and temporary classrooms, often called portables or trailers, are eligible if they meet the size requirements (Section 2.1.3.2) and if they are permanently attached to foundations.

2.1.3.2 Size

To be eligible, a building must be larger than 500 square feet. We are not interested in very small buildings such as toll booths, ticket booths, and small sheds. Five hundred (500) square feet is about the size of a two-car garage.

2.1.3.3 Function

Function refers to the activities that take place within a building. CBSA is a study of nonresidential (except multi-family residential as described on page 2-1), nonindustrial, nonagricultural buildings. Buildings that are used solely for non-multi-family residential, industrial/manufacturing, or agricultural purposes are ineligible. Instructions for determining a building’s function are provided below.

2.2 Residential Buildings

As you learned earlier in this chapter, some residential buildings are eligible for CBSA, and others are not. Making this determination requires several steps.

First you need to understand the definition of a residential building. By **residential**, we mean a building:

- that contains one or more **separate living quarters**, and
- in which residents have **direct access** to their dwelling unit from the outside of the building or through a common hall.

Common examples of residential buildings include:

- Houses,
- Townhouses,
- Apartment buildings,
- Condominiums, and
- Mobile homes.

Next, if the building is residential, then you need to determine if it meets the CBSA definition of a multi-family residential building, or not.

- ✓ For CBSA, a multi-family residential building has four or more floors of residential space, and 5 or more dwelling units. These are usually mid to high rise apartment and condo buildings. **Multi-family buildings are eligible. Do list these buildings.**
- ✗ Residential buildings that do not meet the definition of multi-family, **are not eligible**. Non-eligible residential buildings include houses, townhouses, mobile homes, and small apartment and condo buildings—those with fewer than four floors and five dwelling units. **Do not list these buildings.**

Group Quarters

- ✓ **Group quarters** are places where unrelated people live or stay in a group living arrangement that is owned or managed by an entity or organization providing housing and/or services for the residents. Group quarters include college residence halls, residential treatment centers, skilled nursing facilities, group homes, and workers' dormitories. Group quarters are eligible for CBSA, so **do list these buildings.**



Voice of Experience:

When **deciding** if a residential building might also contain a business, look around for visual signs, such as expanded parking areas, service or delivery trucks, and other clues that could suggest there is business or commercial activity at the location.

If a building contains **both businesses and residences**, use the following guidance to determine whether or not to list the structure:

✓ If any portion of the building meets the definition of multi-family residential (at least four floors and five dwelling units), the building is eligible: **do list**.

If the building does not meet the definition of multi-family residential:

✓ If the residential portion occupies **less than 50 percent** of the building, the building is eligible; **do list**.

✗ If the residential portion occupies **more than 50 percent** of the building the building is ineligible; **do not list**.

For example, a two-story building with shops on the first floor and apartments on the second floor **should be listed** if the first and second floors appear to be the same size. Even though the second floor and the first floor are about the same size, the building is considered commercial, with a general use category of retail (see Section 2.4), because the residential portion does not meet the definition of a multi-family building.

2.3 Other Ineligible Building Activities

This section discusses the other types of building activities that are ineligible for CBSA. It also identifies some exceptions that may make certain buildings eligible, even when they are used for ineligible activities.

2.3.1 Industrial/Manufacturing Buildings

Buildings used for industrial or manufacturing purposes are typically ineligible. Industrial/manufacturing buildings are those where activities involve the producing, processing or assembly of goods, merchandise, or food.

Examples include factories and manufacturing plants, construction site buildings, mining buildings, meat packing plants, printing or publishing plants, and utility or sanitary buildings.

However, some buildings may have both industrial/manufacturing and commercial activities. When this happens, you must determine how much of the building is used for the commercial activity to know whether or not to list it:

✓ If the industrial/manufacturing activity occupies **75 percent or less** of the building, it is eligible; **do list**.

✗ If the industrial/manufacturing activity occupies **more than 75 percent** of the building, it is ineligible; **do not list**.



Voice of Experience:

Many campuses that are referred to as “**industrial parks**” would not be considered industrial/manufacturing by CBSA definition. Some industrial parks are made up of buildings or strips of establishments containing service-related businesses, offices, retail, wholesale, or light industrial. These types of buildings are eligible for CBSA and should be listed as any other eligible campus.

Exception #1: Retail Businesses

If ANY portion of the industrial/manufacturing building is used for a retail business (i.e., goods are sold to the public) it is **eligible**, regardless of how small the retail portion is. For example, a building containing a printing plant and a small store that sells books to the public is eligible. It does not matter what percentage of the building is devoted to retail sales – if any retail activity takes place, it should be listed.

However, a building containing a printing plant and offices for management and accounting would only be eligible if the offices take up 25 percent or more of the building.

Exception #2: Industrial/Manufacturing Campuses¹

For buildings that are part of an industrial/manufacturing campus, first assess the campus as a whole according to the 75/25 rule. If you are looking at a multi-building campus in which more than 75 percent of the combined space from all of the buildings is used for industrial/manufacturing purposes, do not list any of the buildings.

If at least 25 percent of the combined space on the campus is used for commercial purposes, proceed with assessing each building on the campus according to the usual rules for listing individual buildings.

If you are unsure, list the campus following the procedures described in Chapter 3 of this manual, making clear notes to explain the situation.

¹ See section 2.6.1 for the CBSA definition of a campus.

2.3.2 Agricultural Buildings

Buildings used for the growth and storage of agricultural products or for housing farm animals are typically ineligible. Examples of agricultural buildings include greenhouses, nurseries, agricultural equipment storage buildings, horse stables, barns, and other farm buildings such as silos and grain elevators.

However, some buildings can have both agricultural and other commercial activities:

- ✓ If the agricultural use activity occupies **75 percent or less** of the building, it is eligible; **do list**.
- ✗ If the agricultural use activity occupies **more than 75 percent** of the building, it is ineligible; **do not list**.

The same exceptions that apply to industrial/manufacturing buildings apply to agricultural buildings:

Exception #1: Retail Businesses

If ANY portion of the building is used for retail sales to the public, then the building is **eligible**. A greenhouse where the public can enter and buy plants is eligible.

Exception #2: Agricultural Campuses

For buildings that are part of an agricultural campus, you must first assess the campus as a whole according to the 75/25 rule. If you are looking at a multi-building campus in which more than 75 percent of the combined space from all of the buildings is used for agricultural purposes, do not list any of the buildings.

If at least 25 percent of the combined space is used for commercial purposes, proceed with assessing each building on the campus according to the 75/25 rule. List any individual buildings in which the agricultural activity occupies 75 percent or less of the building.



2.3.3 Summary Rules for Residential, Agricultural, and Manufacturing Buildings

The rules for listing or not listing residential, manufacturing, and agricultural buildings are shown below (Exhibit 2-1). You will receive a job aid like this at training.

Exhibit 2-1. Rules for Listing Job Aid



2.3.4 Military Bases

- ✗ Do not list military bases that are closed to the public or have restricted public access (i.e., military bases where you need to be cleared through security to enter).
- ✓ However, open military sites, such as military hospitals or military academies, are eligible; list them as you would any other building or campus. An off-base building that houses military activity, such as a recruiting center, is also eligible for CBSA.

2.3.5 Other Ineligible Structures

In addition to residential, industrial/manufacturing, and agricultural buildings, there are other kinds of buildings that are ineligible.

Do not list:

- ✗ Foreign embassies;
- ✗ Correctional facilities (due to entrance security requirements);
- ✗ Buildings that people usually do not enter, such as the cooling towers of a nuclear power plant, and pumping stations;
- ✗ Parking garages (eligible building space above or below a parking garage is eligible);
- ✗ Monuments; and
- ✗ Oil refineries and oil storage tanks.

2.4 Eligible Building Activities

The job aid in Exhibit 2-2 contains examples of eligible activities you may encounter—these are referred to as “general use categories.” The first category on the list is multi-family residential. The remaining categories are organized by general uses for commercial buildings. The commercial building uses listed here are not meant to be exhaustive, but they do illustrate the wide range of eligible commercial activities that occur in buildings. You will assign one general use category from the job aid to each building you list in the VLS. You will receive a job aid like this at training.

Examples of eligible commercial buildings are offices, banks, auto repair shops, hotels, restaurants, and retail stores. There are other types of eligible buildings that you might not think of as commercial. These include vacant buildings, schools, churches, and buildings that are used for non-profit activities, examples of which are described in the next sections.



It is important to remember that the **current** activity or use of the building, not its original intended use, determines whether or not it is eligible as multi-family residential or commercial. For example, a barn that has been converted into an art gallery is eligible.

Exhibit 2-2. Eligible Building Activities by General Use Category

 Listing Job Aid Eligible Building Activities by General Use Category		
Category	Building Examples	
1. Multi-Family Residential Building with 4 or more residential floors and 5 or more dwelling units.	- Apartments - Condominiums	
2. Office Buildings used for general office space, professional offices, and administrative offices.	- Administration - Bank - Brokerage/securities firm - Consulting - Government - Insurance - Law - Mixed professional - Non-profit - Real estate - Research and development - Sales or leasing	
3. Warehouse Buildings used to store goods, manufactured products, merchandise, or raw materials.	- Refrigerated warehouse/storage - Non-refrigerated warehouse/storage - Self-storage (public rental storage units) - Distribution center	
4. Health Care Buildings used as diagnostic and treatment facilities for inpatient or outpatient care.	<u>Inpatient Facilities</u> treat patients with overnight care: - Medical care hospital - Rehabilitation facility for alcohol and substance abuse <u>Veterinary Facilities</u>	<u>Outpatient Care</u> may be medical, dental, or psychiatric, and involves diagnosis and treatment that does not require overnight services: - Dental clinic/office - Medical clinic/office - Mental health/psychiatric clinic - Outpatient surgery center - Urgent care clinic - Women's health clinic
5. Nursing Home Buildings used as facilities that offer 24-hour nursing/medical care.	- Skilled nursing facility - Assisted living - Home for the aged	
6. Education Buildings used for academic or technical classroom instruction. NOTE: Other activities that occur on school campuses should be coded separately, for example, administration as 1. <i>Office</i> , and infirmary as 3. <i>Health Care</i> .	- Preschool/day care - Elementary school - Middle/junior high school - High school - College/university classroom - Vocational school/career training - Religious education	
7. Public Assembly Buildings in which people gather for social or recreational activities.	<u>Entertainment</u> - Art gallery/exhibit hall/museum - Casino - Concert hall - Night club - Observatory/planetarium - Stadium/arena/coliseum - Theater/cinema <u>Recreational</u> - Amusement arcade - Bowling alley - Community center - Gym/indoor racquet sports - Indoor pool - Recreation center - Skating rink	<u>Social/Public/Civic Assembly</u> - Assembly hall/auditorium - Convention center - Funeral home - Lecture hall - Library - Lodge hall - Meeting hall - Student union - Town hall - Senior center <u>Other Enclosed Assembly Buildings</u> - Airport terminal/train station/bus station/other transportation terminal - Armory - Radio/TV station or studio

Exhibit 2-2. Eligible Building Activities by General Use Category (continued)

8. Religious Worship Buildings in which people gather for religious activities.	- Chapel - Church - Mosque	- Synagogue - Temple
9. Lodging Buildings used to offer multiple accommodations for short-term or long-term residents.	- Hotel/motel/inn - Dormitory/sorority/fraternity - Shelter/group home/children's home	- Halfway house - Convent/monastery
10. Public Order & Safety Buildings used for the preservation of law and order or public safety.	- Courthouse/probation office - Fire/police station	- Reformatory - Sheriff's office
11. Food Sales Buildings used for retail or wholesale sale of food.	- Convenience store or market - Farmer's market/fruit/vegetable market	- Grocery store/supermarket - Meat/seafood store - Specialty food store
12. Food Service Buildings used for preparation and sale of food and beverages for consumption.	- Restaurant - Cafeteria - Caterer - Coffee shop	- Fast-food - Sandwich shop - Bar
13. Retail Buildings used for sales and display of goods.	- Antique shop - Bookstore - Clothing store - Crafts/gifts/floral - Department store - Drugstore - Farm equipment	- Furniture/appliances - Home improvement/gardening/building supplies - Liquor store - Pawn shop - Wholesale club
14. Strip Shopping Center	- A strip shopping center building contains three or more individual establishments (stores, restaurants, and services such as hair salons) with separate exterior entrances for each establishment.	
15. Urban Strip Shopping Center	- Similar to a regular strip shopping center but located in an urban setting with no on-site parking.	
16. Enclosed Mall	- An enclosed shopping mall contains multiple stores and other establishments, often "anchored" by one or more department stores, with interior walkways and common areas.	
17. Automotive Buildings used for sales, care, and maintenance of automotive vehicles.	- Automobile dealer/showroom - Motor vehicle repair/service/maintenance - Car wash	
18. Gas Station	- Gasoline station	
19. Post Office/Mailing Center	- U.S. post office - Mailbox facility	- UPS/FedEx store/shipping center
20. Laundry/Dry Cleaner	- Laundromat - Dry Cleaner	- Commercial laundry
21. Other Service Buildings that offer services not included in any other category.	- Animal shelter - Barber shop - Copy center/printing - Kennel	- Public restrooms/showers - Repair or maintenance shop (non-automotive) - Salon/spa
22. Laboratory Buildings used for activities that utilize equipment for testing or for analysis.	- Mechanical/electrical laboratory - Medical/dental laboratory - Agricultural laboratory	
23. Vacant – Commercial	- Buildings that are currently vacant or being vacated, but were previously used for or intended to be used for commercial purposes.	
24. Vacant – Multi-Family Residential	- Buildings that are currently vacant or being vacated, but were previously used for or intended to be used for multi-family residential purposes.	
25. Other	- Airplane hangar - Crematorium	- Data center - Telephone exchange

2.4.1 Vacant Buildings

You may find multi-family residential and commercial buildings that are vacant. List buildings that are currently vacant, or that are being vacated, if the size and recent or intended activities meet our requirements.

When you encounter a vacant building, do your best to determine what kinds of activities it was used for, or what it will be used for when it is occupied. If these activities are considered eligible, it does not matter that the building is unoccupied at the time you list it. As shown in Exhibit 2-2, there are two general use categories of vacant—one for **vacant commercial buildings**, the other for **vacant multi-family residential buildings**. Be sure to list the building using the proper vacant category based on the building's intended use.

2.4.2 Buildings with Non-profit Activities

Buildings used for non-profit activities are still considered “commercial” and are eligible. These types of buildings include churches, synagogues, mosques, hospitals, schools, libraries, and government buildings. In short, any building that is not used solely for residential (except those meeting the definition of multi-family residential), manufacturing, or agricultural use is potentially eligible for CBSA.

2.5 Summary of Eligibility Rules for Commercial and Multi-family Residential Buildings



Remember, for a building to be eligible for CBSA, it must be:

- Totally enclosed by walls which extend from the foundation to the roof,
and
- Over 500 square feet,
and
- Used for an eligible CBSA activity.

2.6 Identifying Building Boundaries

Most of the time, you will easily be able to distinguish individual buildings. However, sometimes it may be unclear where one building ends and another begins. This section explains how to identify separate buildings. Although some of the rules seem obvious, read this section carefully, remembering that the listing must be completed in a standardized manner.

We describe buildings in two broad categories:

1. Freestanding buildings, which are detached from any other structure, and
2. Buildings that adjoin (are attached to) another structure.

2.6.1 Freestanding Buildings

Freestanding or detached buildings do not share any walls, or portions of walls, with another structure. Even if two buildings are constructed very near to each other, as long as their adjacent walls do not touch, the buildings are considered freestanding.

Exhibit 2-3 illustrates the concept of a freestanding building. This building is obviously a single freestanding building; it is detached from any other building and you would list it as one building.

Exhibit 2-3. Freestanding Building



2.6.2 Attached Buildings

Structures that are attached to each other could be listed as one building or as more than one building, depending on certain factors. When you encounter buildings that are attached, look for obvious structural differences that may help you determine if you are looking at one building, or more than one building. Multiple attached buildings may have differences in age, rooflines, window styles, dimensions, and general architectural styles.

In the examples that follow, we will describe how to handle:

- Architecturally distinct attached buildings;
- Architecturally similar attached buildings; and
- Single buildings that appear to be attached buildings.

Example 1: Architecturally Distinct Attached Buildings

Upon close inspection of the structures in Exhibit 2-4, we see that there are six separate buildings along this street—they make up two sets of three attached buildings each. Although attached, the differences in the overall architectural style of the buildings indicate that each building is separate from the other.

The buildings appear to be of different ages, colors, and/or construction materials, and they have different rooflines. Any of these factors might lead you to conclude that these are six separate buildings. Since you are clearly able to determine that these are separate buildings, even though they abut (border on or touch) one another, list each separately.

Exhibit 2-4. Architecturally Distinct Attached Buildings



Example 2: Architecturally Similar Attached Buildings

In Exhibit 2-5, the structures appear to have a similar architectural style but there are enough differences to suggest that they might be different buildings. This is an example where, based only on **observation**, you may be unable to determine whether to list as one freestanding building or multiple attached buildings. What should you do?

Exhibit 2-5. Architecturally Similar Attached Buildings



If you cannot determine from observation alone whether the structure represents one or more than one building, you will need to conduct additional research to try to determine if each of these buildings is owned by the same person or entity who owns the attached building next door.

Example 3: A Single Building that Appears to be Multiple Attached Buildings

Based on the architectural styles in Exhibit 2-6, you might initially believe the three attached structures with the red awnings are three distinct buildings. However, they all have awnings for the same business. If you looked at these structures from an aerial view, you would see that they all have the same roofline, it is only their facades that look different from one another. If additional research on these structures confirms that they are owned by the same entity, list them as one building.

Exhibit 2-6. Single Establishment Building



Attached structures are considered to be a single building if, and only if the structures have the same owner.



In summary, for attached structures:

- **List as separate buildings** if you determine that the structures have separate owners.
- **List as one building** if the structures have one owner. Enter both the primary address and any alternative addresses associated with the building in the VLS.
- **List as one building** if, after additional research, you still cannot determine whether to list the structures separately or together. Enter clear notes about the situation in the VLS Notes field.

There are many other variations of freestanding and attached buildings that will be explained during training and as you begin to complete your work.

2.7 Special Listing Situations

You will encounter a wide variety of structures and building layouts during your listing work on CBSA. These include: multi-building campuses/complexes; enclosed malls and strip shopping centers; storage facilities, motels, and blocks of classrooms; and buildings adjoined by connecting structures. This section provides instructions for listing these kinds of structures, activities, and buildings.

2.7.1 Campuses/Complexes

For CBSA we need to make a distinction between buildings that are located on a campus and buildings that are not.

We define a campus or complex as:

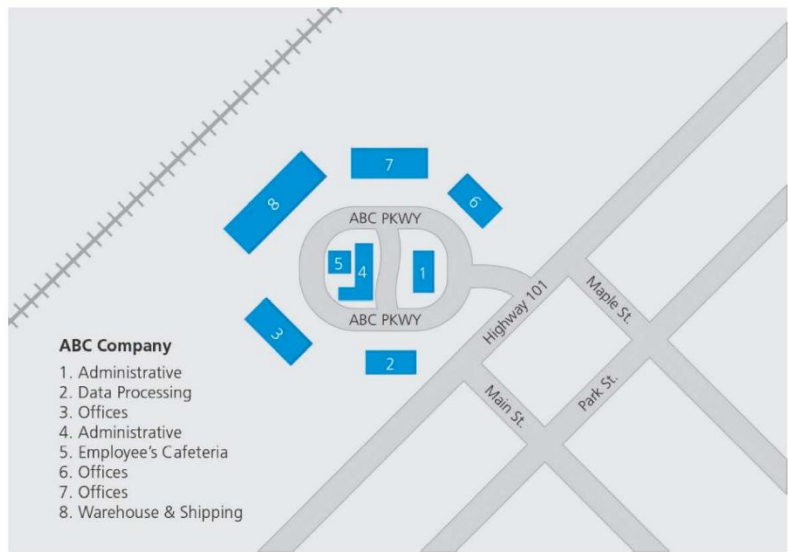
- two or more buildings,
- clustered together in a well-defined geographic area, and
- operated as a unit.

When determining if buildings are located on a campus or complex, look for features such as a fence, a gate or guardhouse, a common architectural style, signs, shared grounds outside, and overhead walkways.

A campus or complex may be occupied by just one entity, such as a college, university, hospital, company, or government agency, or, it may be occupied by a number of entities, such as businesses in an industrial park. The example in Exhibit 2-7 depicts the campus of a single entity, the ABC Company, which is comprised of eight buildings.

The steps for listing a campus/complex are covered in Chapter 3.

Exhibit 2-7. Campus of ABC Company



2.7.2 Strip Shopping Centers and Enclosed Malls

A **strip shopping center (or strip mall)** (Exhibit 2-8) is one building:

- separated into three or more individual establishments (stores, restaurants, and services such as hair salons),
- managed as a business entity,
- with separate external entrances for each establishment, and
- with on-site parking, usually located in front of the stores.

Open canopies or overhangs may connect the store fronts, but a strip shopping center does not have enclosed walkways linking the stores. A strip shopping center building may be configured in a straight line, or have an L or U shape.

Exhibit 2-8. Strip Shopping Center



An **urban strip shopping center** (Exhibit 2-9) building is similar to the CBSA definition of a strip shopping center (above), but due to its urban location **it does not have on-site parking**. Urban strip shopping centers may be confused as multiple buildings. Although this type of building contains multiple establishments, it has a consistent roofline and architectural style across all of the businesses, and therefore is considered one building.

Exhibit 2-9. Urban Strip Shopping Center



Strip shopping centers vs. rows of stores: You might have trouble distinguishing between a strip shopping center, an urban strip shopping center, and a row of stores in a commercial area. Here are some clues to help you decide if you have encountered a strip shopping center:

- Strip shopping centers and urban strip shopping centers are usually built as a unit and all establishments have a similar architectural style.
- Strip shopping centers are usually set back from the street, although urban strip shopping centers may not be.
- Regular strip shopping centers have parking facilities as part of the shopping center, which is usually located in the front of the building; urban strip shopping centers do not have on-site parking.
- Strip shopping centers usually have names associated with them, such as “Wintergreen Plaza” or “Wildwood Shopping Center.” When deciding if a group of stores qualifies as a strip shopping center, look around for signs like those near the main entrances to the parking areas.

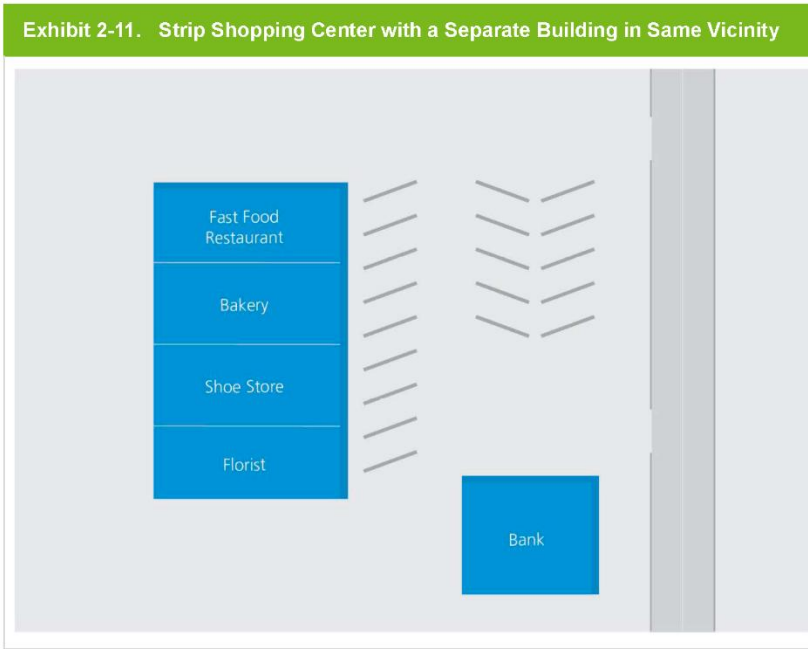
An **enclosed mall** is a building that houses multiple stores, often “anchored” by one or more department stores, with interior walkways and common areas (Exhibit 2-10). Most stores will not have entrances accessible from outside, with the exception of the anchor stores.

Exhibit 2-10. Enclosed Mall

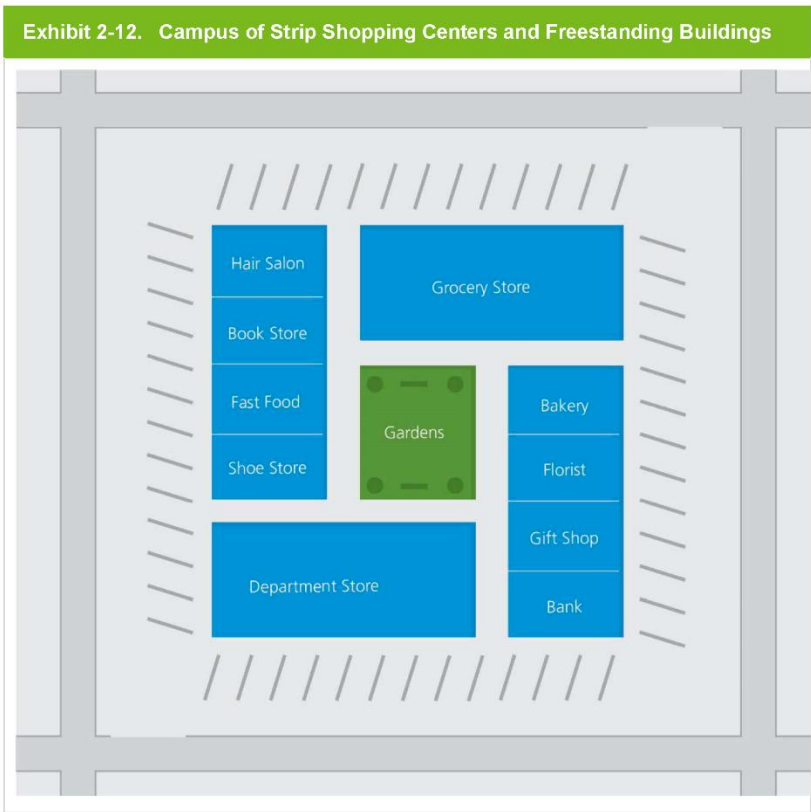


For purposes of this study, list a strip shopping center, an urban strip shopping center, or an enclosed shopping mall as one building.

A **building located in the same vicinity** as a strip shopping center or enclosed mall – for example, a bank located in the parking lot next to a strip shopping center, is considered a freestanding building, so list it separately (Exhibit 2-11).



A **campus of strip shopping centers**: Likewise, if a strip shopping center consists of more than one strip building (or building with multiple establishments), list each strip building separately (Exhibit 2-12). As discussed in Chapter 3, this type of shopping area should be listed as a campus/complex.



2.7.3 Storage Facilities, Hotels and Motels, Blocks of Classrooms

In some cases, storage facilities, hotels and motels, and blocks of classrooms are easily identifiable as one building because all adjoining rooms can be entered from a shared interior hallway.

However, occasionally these types of structures are built as units without shared hallways; in order to get from one room or unit to another, a person must go outside. Schools in warm climates are often built this way, as are some schools with portable classrooms.

Older motels often have separate individual units or cabins, while newer motels may have several large structures with rooms linked by a shared hallway or covered walkway.

Storage facilities may be built like this to facilitate storage of different types of materials, or to limit access between the units. However, all of the rental lockers or rooms that are attached in one structure are considered one building and should be listed as one.

For any of these types of buildings, if the structures are clearly freestanding, list them as individual buildings on a campus/complex.

2.7.4 Buildings Adjoined by Connecting Structures

Some structures may be connected by passageways, walkways, tunnels, or corridors elevated above, at, or below ground level, as shown in Exhibit 2-13.



Voice of Experience:

If a walkway connecting two structures is more than one story tall, it is considered an architectural feature rather than a connector of two buildings. Thus, both structures plus the walkway should be listed together as one building.

Exhibit 2-13. Buildings Connected by Walkways



When determining whether to list structures linked by a walkway as one building or separate buildings, you must evaluate whether the walkway is used for any commercial activity, or if it is only an enclosed passageway connecting the two buildings.

An example of commercial activity in a walkway is a hospital that has a one-story x-ray facility in a structure that connects two multi-story sections of the hospital. In this situation, the two linked structures and the structure linking them would all be listed as a single building. If the walkway only provides access between the structures and has no commercial activity taking place in it, the two connected structures would be listed as two separate buildings.

If you are uncertain whether to consider a structure one building or several, list it as single building and record very clear comments in the VLS regarding the nature of the connecting structure, including whether any activity is observed, and the number of floors.

APPENDIX 4:

CBSA Recruitment Notice to Utilities

NEEA Recruitment Notice Email to Utilities

Dear {CONTACT FIRST NAME} {CONTACT LAST NAME},

We are reaching out to you on behalf of the Northwest Energy Efficiency Alliance (NEEA) with some important information about the upcoming 2025 Commercial Building Stock Assessment Study (CBSA). The CBSA studies provide critical insights into commercial and multi-family residential building energy use in the Northwest:

- Building owners and managers use them to compare their own energy-related information with other similar buildings;
- Local utilities use them to plan for future energy changes and needs; and
- State and local government agencies use them to inform energy policies.

NEEA staff and regional partners have been planning for this important study of energy information in commercial and multi-family buildings. NEEA and Westat, a national research organization conducting the study on NEEA's behalf, will be asking some of your customers who own or manage commercial and multi-family buildings to participate in our regional study.

Customers who are selected for the 2025 CBSA will be contacted soon. Westat will reach out to approximately {NUMBER} {UTILITY NAME} customers beginning on {DATE} with the aim to recruit approximately {NUMBER} commercial and multi-family buildings in your service territory. Prior to the start of recruiting, an **advance letter** will be mailed on {DATE} followed by an **invitation letter** which will be mailed on {DATE}. Attached are letters for the lowest incentive amount. Incentives are set at \$100, \$200, and \$300, based on building size.

Buildings that choose to participate will also be asked to complete and sign the attached **billing request form** that Westat will submit to {UTILITY NAME} for study participants billing data in late 2025.

This email is meant to notify you about the {WAVE #} of up to four waves of recruitment for the study. We will reach out again if your customers are included in any additional waves.

The 2025 CBSA can answer questions for you and your customers. We have prepared a number of resources to assist in handling any inquiries from your customers that come your way.

- Support specialists from Westat are ready to assist you or your customers on the CBSA 2025 helpdesk at 1-855-662-5694, or via email at CBSA2025@westat.com
- You may also direct customers to visit the 2025 CBSA website at neea.org/CBSA2025. This site will go live by June 24th, 2024 at the latest.
- Additionally, a **brochure** and **FAQ document** are attached with talking points, key facts and materials about the study should your staff wish to answer any customer inquiries directly.

Should you have any questions or concerns, please do not hesitate to reach out to me, Ben Spearing, Senior Program Coordinator, and Mike Psaris, Senior Program Manager at NEEA by replying to this email. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at CBSA2025@westat.com or 1-885-662-5694.

Sincerely,

Ben Spearing

SENIOR PROGRAM COORDINATOR

NORTHWEST ENERGY EFFICIENCY ALLIANCE

APPENDIX 5:

Respondent Outreach Materials

Advance Letters



Dear Building Owner or Manager,

The Northwest Energy Efficiency Alliance (NEEA), in partnership with Avista, the Bonneville Power Administration, Idaho Power, and several regional utilities and energy efficiency organizations across the Northwest, is inviting you to participate in the 2025 Commercial Building Stock Assessment (CBSA) study. The 2025 CBSA provides important energy use information in commercial and multi-family buildings to identify trends, needs, and investments made in energy efficiency in similar facilities throughout the region. Your facility has been randomly selected as a prime candidate for this study.

The information collected in the CBSA has many important uses and objectives:

- End-use customers use it as a barometer to gauge how their facility's energy usage compares to others of similar size and scope.
- Utilities use it to explore opportunities that may help support your future investments in cost-effective energy conservation and project management.
- State and local government agencies use it as a foundation to guide future energy policies and practices implemented through emerging technologies and innovation.

Participation in this study will include a web-based survey and an in-person, no-cost, site visit. As a token of our appreciation, we will include a \$150 as our way of thanking you for your time and participation.

Unless approved otherwise, all your information will be confidential. While the aggregate data will be publicly available, the information you provide will be used for statistical purposes only with no information that will allow identification of you or the building individually.

NEEA and Westat, the national research organization conducting the study on our behalf, will reach out to you in the coming weeks to coordinate your participation.

If you have any questions or concerns, please contact:

Mike Psaris, NEEA's Energy Use Studies Manager, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations, at CBSA2025@westat.com or 1-855-662-5694.

For more information, please visit the 2025 CBSA website at neea.org/CBSA2025.

Sincerely,



Susan Hermet
Vice President of Analytics, Research, and Evaluation
Northwest Energy Efficiency Alliance

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700 NE Multnomah Street, Suite 1300, Portland, OR 97232
503.688.5400 | Fax 503.688.5447
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Oregon

Tina Kotek, Governor



550 Capitol St. NE
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www.oregon.gov/energy

Dear Building Owner or Manager,

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Your participation is very important. The information from this study is used for many purposes:

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The study will provide a participation incentive of \$150. After completing a web survey and an in-person site visit, you will receive this incentive as a token of appreciation.

Your information will be kept confidential. The information you provide us is confidential and will be used for statistical purposes only. The information you provide will be combined with information from other buildings in the Northwest. No information will allow identification of you or your building.

On behalf of Oregonians across the state, ODOE achieve our mission by providing: a central repository of energy data, information, and analysis; a venue for problem-solving Oregon's energy challenges; energy education and technical assistance; regulation and oversight; and energy programs and activities that save energy, support the state's decarbonization efforts, make communities more resilient, and position Oregon to lead by example. The CBSA 2025 aligns with ODOE's mission with its focus on energy efficiency and reducing greenhouse gas emissions in the commercial sector as well as ODOE's program that focuses on schools and industrial buildings.

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www.oregon.gov/energy

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The Northwest Energy Efficiency Alliance (NEEA), an alliance of local utilities and energy efficiency organizations in the Northwest, has randomly selected this building to be part of a study called the Commercial Building Stock Assessment (CBSA) 2025. CBSA 2025 provides important energy information about commercial and multi-family buildings in the Northwest. The Oregon Department of Energy views NEEA and the organizations that make up the alliance as valuable partners in achieving our mission to help Oregonians make informed decisions and maintain a resilient and affordable energy system and to advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

Your participation is very important. The information from this study is used for many purposes:

- Building owners and managers use it to compare their own energy-related information with other similar buildings;
- Local utilities like the one serving your area use it to plan for future energy changes and needs; and,
- State and local government agencies use it to inform energy policies.

The study will provide a participation incentive of \$300. After completing a web survey and an in-person site visit, you will receive this incentive as a token of appreciation.

Your information will be kept confidential. The information you provide us is confidential and will be used for statistical purposes only. The information you provide will be combined with information from other buildings in the Northwest. No information will allow identification of you or your building.

On behalf of Oregonians across the state, ODOE achieve our mission by providing: a central repository of energy data, information, and analysis; a venue for problem-solving Oregon's energy challenges; energy education and technical assistance; regulation and oversight; and energy programs and activities that save energy, support the state's decarbonization efforts, make communities more resilient, and position Oregon to lead by example. The CBSA 2025 aligns with ODOE's mission with its focus on energy efficiency and reducing greenhouse gas emissions in the commercial sector as well as ODOE's program that focuses on schools and industrial buildings.

You will be contacted soon. NEEA and Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you in the coming weeks. Should you have any questions or concerns, please do not hesitate to contact Mike Psaris, Senior Program Manager at NEEA at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the CBSA 2025 website at <https://neea.org/CBSA2025>.

Sincerely,



Janine Benner, Director
Oregon Department of Energy



We strengthen communities

Dear Building Owner or Manager:

The Northwest Energy Efficiency Alliance (NEEA), an alliance of local utilities and energy efficiency organizations in the Northwest, has randomly selected this building to be part of a study called the 2025 Commercial Building Stock Assessment (CBSA). The 2025 CBSA provides important energy information about commercial and multi-family buildings in the Northwest.

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- Building owners and managers use it to compare their own energy-related information with other similar buildings;
- Local utilities like the one serving your area use it to plan for future energy changes and needs; and,
- State and local government agencies, including the Washington Department of Commerce, use it to inform energy policies.

The study will provide a \$150 participation incentive. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time.

Your information will be kept confidential. While the aggregate data will be publicly available, the information you provide is confidential and will be used for statistical purposes only. The information you provide will be combined with information from other buildings in the Northwest. No information will allow identification of you or the building individually.

You will be contacted soon. NEEA and Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you in the coming weeks. Should you have any questions or concerns, please do not hesitate to contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

Sincerely,



Michael Furze
Assistant Director, Energy Division
Washington State Department of Commerce

OFFICE LOCATIONS: Olympia Ph. 360-725-4000 | Seattle Ph. 206-256-6100 | Spokane Ph. 360-725-5000 | www.commerce.wa.gov



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- Local utilities like the one serving your area use it to plan for future energy changes and needs; and,
- State and local government agencies, including the Washington Department of Commerce, use it to inform energy policies.

The study will provide a \$200 participation incentive. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time.

Your information will be kept confidential. While the aggregate data will be publicly available, the information you provide is confidential and will be used for statistical purposes only. The information you provide will be combined with information from other buildings in the Northwest. No information will allow identification of you or the building individually.

You will be contacted soon. NEEA and Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you in the coming weeks. Should you have any questions or concerns, please do not hesitate to contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

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- Building owners and managers use it to compare their own energy-related information with other similar buildings;
- Local utilities like the one serving your area use it to plan for future energy changes and needs; and,
- State and local government agencies, including the Washington Department of Commerce, use it to inform energy policies.

The study will provide a \$300 participation incentive. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time.

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You will be contacted soon. NEEA and Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you in the coming weeks. Should you have any questions or concerns, please do not hesitate to contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

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Invitation Letters

December, 2024



Hello [NAME],

We need your help. Several of your buildings have been chosen to participate in the 2025 Commercial Building Stock Assessment (CBSA), endorsed by local utilities and administered by the Northwest Energy Efficiency Alliance (NEEA), an alliance of local utilities and energy efficiency organizations in the Northwest.

Your participation is very important. People use the information from this study to understand energy use in the Northwest, compare energy efficiency across buildings, and plan for future energy needs. Your participation will include a visit to your buildings from a field technician and a brief survey. During the visit, the field technician will tour your facility and collect data on your buildings and equipment, including building size and use; types of energy and energy equipment used; and how much energy is used.

The study will provide a participation incentive per building. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time. You could receive up to [INCENTIVE] for participating.

Your information will be kept confidential. The information you provide is confidential and will be used for statistical purposes only. The information you provide will be combined with information from other buildings in the Northwest. No information will allow identification of you or the building individually.

Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you soon to complete a web survey and schedule a site visit. Or you can call 1-855-662-5694 to learn more about participating in this important study. Should you have any questions or concerns, please do not hesitate to contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

Thank you for participating in this important study!

Sincerely,

A handwritten signature in cursive script that reads "Susan Hermet".

Susan Hermet
Vice President of Analytics, Research, and Evaluation

Northwest Energy Efficiency Alliance
700 NE Multnomah Street, Suite 1300, Portland, OR 97232
503.688.5400 | Fax 503.688.5447
neea.org | info@neea.org



Dear Building Owner or Manager:

We need your help. Your building has been chosen to participate in the 2025 Commercial Building Stock Assessment (CBSA), endorsed by local utilities and administered by the Northwest Energy Efficiency Alliance (NEEA), an alliance of local utilities and energy efficiency organizations in the Northwest.

Your participation is very important. People use the information from this study to understand energy use in the Northwest, compare energy efficiency across buildings, and plan for future energy needs. Your participation will include a visit to your building from a field technician and a brief survey. During the visit, the field technician will tour your facility and collect data on your building and equipment, including building size and use; types of energy and energy equipment used; and how much energy is used.

The study will provide a \$150 participation incentive. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time.

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Sincerely,



Susan Hermenet
Vice President of Analytics, Research, and Evaluation

Northwest Energy Efficiency Alliance
700 NE Multnomah Street, Suite 1300, Portland, OR 97232
503.688.5400 | Fax 503.688.5447
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The study will provide a \$200 participation incentive. After completing a web survey and an in-person site visit, you will receive the incentive to thank you for your time.

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Susan Hermenet
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CBSA 2025 Study Brochure



2025 cbsa
Commercial Building
Stock Assessment



Welcome to the 2025 Commercial Building Stock Assessment Study (CBSA)!

The Northwest Energy Efficiency Alliance (NEEA), an alliance of local utilities and energy efficiency organizations in the Northwest, has randomly selected this building to be part of a study that provides important energy information about commercial and multi-family buildings in the Northwest. This building represents many others with similar characteristics and energy use.

Your participation is very important. People use information from the CBSA study for many purposes:

- Building owners and managers use it to compare their own energy-related information with other similar buildings.
- Local utilities like the one serving your area use it to plan for future energy changes and needs.
- Architects use it for planning. Energy demand plays an important role in a building's overall design.
- State and local government agencies use it to inform energy policies.

How do I get started on CBSA?

Westat, a national research organization conducting the study on NEEA's behalf, will reach out to you soon to schedule an in-person site visit and complete a brief web survey. Or you can call 1-855-662-5694 to learn more about participating in this important study.

If you have questions or need additional assistance, you may also contact Westat via email at CBSA2025@westat.com. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.





CBSA Questionnaire Items

Study participation includes an in-person site visit to your building by a field technician. You'll also be asked to complete a brief web survey ahead of the site visit. The information below will be collected for most buildings, but all items might not apply for your building.



In-Person Site Visit

During the in-person site visit, a field technician will tour your building and collect detailed technical information about the building and equipment using a tablet. When you make the appointment, a CBSA specialist will provide more details about the process. The field technician will need to access the following spaces and equipment:

- Envelope of the building: walls, windows, floors, roof
- Mechanical room(s)
- HVAC (heating and cooling) equipment, which may be on the roof or outside the building
- Water heating equipment
- Refrigeration equipment
- Indoor and outdoor lighting fixtures
- Building controls
- Pumps and motor



Web Survey

The web survey will collect basic information about your building, including its usage, structure, ownership and occupancy, and energy sources and uses. We will also request permission to access energy billing data for your building. Feel free to refer to records or energy bills, or consult with others at your building when responding to survey items, such as building activity, square footage, number of floors, year of construction, and energy sources used.

- Building activity
- Total square footage
- Number of floors
- Year of construction
- Energy sources used: electricity; natural gas; oil, propane, wood; purchased steam, hot water, or cooling
- Uses of each energy source: heating, cooling, water heating, cooking

If you have any questions or concerns, contact Westat: Cindy Good, CBSA Director of Study Operations, at 1-855-662-5694 or cbsa2025@westat.com. To speak directly with someone at NEEA, contact Mike Psaris, Manager, Energy Use Studies, at cbsa2025@neea.org.

neea.org/CBSA2025



Frequently Asked Questions

What is this study about?

The 2025 CBSA collects and analyzes building characteristics and energy use data for commercial buildings and multi-family buildings in the Northwest. This data is used in energy resource planning and energy efficiency programs.

Who sponsors this study?

This important study is sponsored on behalf of your utility and the region’s utilities by the Northwest Energy Efficiency Alliance (NEEA). NEEA is an alliance of utilities and energy efficiency organizations in Idaho, Montana, Oregon, and Washington that have worked together for more than 25 years to enact permanent market changes that drive energy efficiency and benefit 13 million energy consumers in the Northwest. The 2025 CBSA is endorsed by local utilities throughout the Northwest. Additional information about NEEA and the CBSA study can be found at neea.org/CBSA2025.

Why us? Why not some other building?

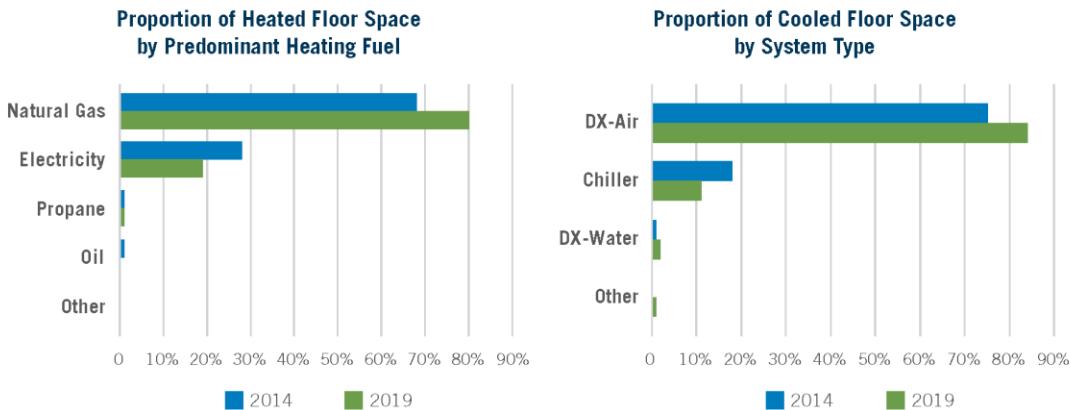
Your building was statistically selected to represent many others similar to yours in energy characteristics and use. For the results to be statistically valid and representative of all buildings, we cannot substitute another building for yours.

Am I required to participate?

The 2025 CBSA is voluntary. Your participation will contribute greatly to the quality and accuracy of the results, so we encourage you to respond.

What are the benefits of participating?

Data collected from the 2025 CBSA will allow people in commercial and multi-family buildings to compare their energy use with similar buildings across the region. Energy costs are a large part of operating expenses for a business, and money saved on energy can be spent on something else.



neea.org/CBSA2025



Frequently Asked Questions

The data collected via the study can be used to help both your building and millions of other building owners and tenants become more energy efficient. As a token of appreciation for your time, upon completion of the online questionnaire and in-person site visit, you will receive a debit card.

Is the study website secure?

Yes! Westat operates a secure computer facility dedicated to confidentiality and data protection of this and other important studies. Your data will be encrypted and transmitted to and from Westat web servers through the use of Secure Socket Layer (SSL) technology. This proven security protocol is widely used to support e-commerce transactions, server account authentication, and data encryption.

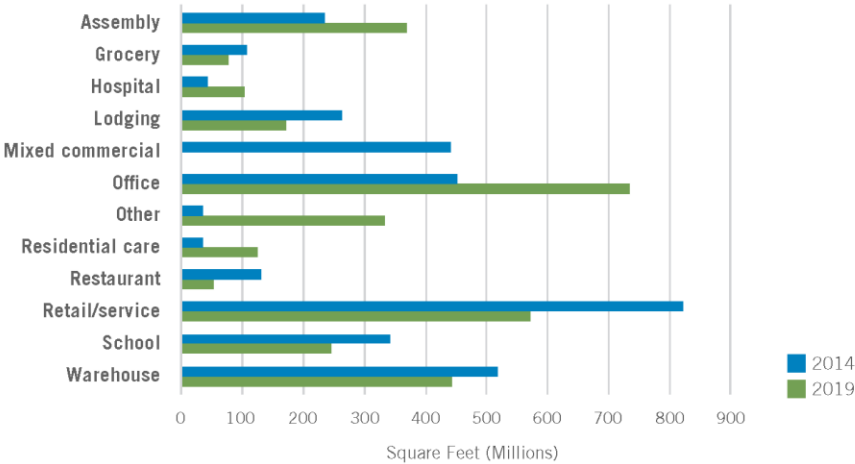
Are my survey responses confidential?

All participant responses will remain confidential. The 2025 CBSA results relased for public use will be grouped by building-types and all personal or identifying information will be removed.

Where can I find more information about the CBSA?

You can learn more about NEEA and the 2025 CBSA at neea.org/CBSA2025.

Total Floor Area by Building Type



FAQs



Welcome to the 2025 Commercial Building Stock Assessment Study (CBSA)!



What is this study about?

The 2025 CBSA collects and analyzes building characteristics and energy use data for commercial buildings and multi-family buildings in the Northwest United States. This data is used in energy resource planning and energy efficiency programs.

Who sponsors this study?

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Northwest. Additional information about NEEA and the CBSA study can be found at neea.org/CBSA2025.

What does participation entail?

Study participation includes an **in-person site** visit to your building by a field technician. You'll also be asked to complete a **brief web survey** ahead of the site visit. The information below will be collected for most buildings, but all items might not apply for your building.



What will happen during the in-person site visit?

During the site visit, a field technician will tour your building and collect detailed technical information about the building and equipment using a tablet. When you make the appointment, a CBSA specialist will provide more details about the process. The field technician will need to access the following spaces and equipment:

- Envelope of the building, including: walls, windows, floors, and roof
- HVAC (heating and cooling) equipment, which may be on the roof or outside the building
- Mechanical room(s)
- Water heating equipment
- Refrigeration equipment
- Indoor and outdoor lighting fixtures
- Building controls
- Pumps and motor



What kind of information will I be asked to provide in the web survey?

In preparation for the in-person site visit, you will be asked to complete a brief web survey. The web survey will collect basic information about your building, including its usage, structure, ownership and occupancy, and energy sources and uses. We will also request permission to access energy billing data for your building. Feel free to refer to records or energy bills, or consult with others at your building when responding to survey items, such as building activity, square footage, number of floors, year of construction, and energy sources used.



Who will contact me about the study?

NEEA contracted with Westat, a national research organization with headquarters located in Rockville, Maryland, to coordinate the 2025 CBSA activities with all study participants. Westat will reach out to buildings to share information about participating, answer any questions, and facilitate participation in the in-person site visit and web survey. Some site visits will be conducted by Michaels Energy, based in LaCrosse, Wisconsin.

Why us? Why not some other building?



Your building was statistically selected to represent many others similar to yours in energy characteristics and use. For the results to be statistically valid and representative of all buildings, we cannot substitute another building for yours.

Am I required to participate?

The 2025 CBSA is voluntary. Your participation will contribute greatly to the quality and accuracy of the results, so we encourage you to respond.



What are the benefits of participating?

Data collected from the 2025 CBSA allow people in commercial and multi-family buildings to compare their energy use with similar buildings across the region. Energy costs are a large part of operating expenses for a business, and money saved on energy can be spent on something else. The data collected via the study can be used to help both your building and millions of other building owners and tenants become more energy efficient. As a token of appreciation for your time, upon completion of the online questionnaire and in-person site visit, you will receive a debit card.

How will the 2025 CBSA information be used?



The results of this study will provide immense value to the region by allowing us to more effectively characterize current energy loads to meet future demand and by identifying opportunities to save energy and lower utility bills while growing the economy of the Northwest.

Is the study website secure?

Yes! Westat operates a secure computer facility dedicated to confidentiality and data protection of this and other important studies. Your data will be encrypted and transmitted to and from Westat web servers through the use of Secure Socket Layer (SSL) technology. This proven security protocol is widely used to support e-commerce transactions, server account authentication, and data encryption.

Is the information collected about my building confidential?

All data collected are confidential. The 2025 CBSA results released for public use will be grouped by building type and all personal or identifying information will be removed.

How do I get started on CBSA?

Westat will send you a link to a self-administered web survey to collect some basic information on your building. Also, an employee from Westat or Michaels Energy will schedule a convenient time for a visit to your building to collect additional building information. The site visit is estimated to take 3 to 8 hours.



What do I do if I have problems or questions about the web survey or site visit?

If you have questions or need additional assistance with the survey or site visit, including site visit scheduling, please contact Westat at 1-855-662-5694 or by email at CBSA2025@westat.com. To speak directly with someone at NEEA, contact Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org.

Can I participate in only some parts of the study?

The 2025 CBSA is voluntary. You can opt out of the study at any part. However, your full participation will contribute greatly to the quality and accuracy of the results, so we encourage you to respond to all parts of the study.

Who do I contact if I lose my debit card, or have problems with it?

If you have questions or need additional assistance with your debit card, please contact Westat at 1-855-662-5694 or by email at CBSA2025@westat.com.

How do I see the results of the study?



NEEA plans to publish the CBSA study report on the NEEA website. Information about the study and publications can be found at neea.org/CBSA.



Why is the return address different from NEEA's address?

The 2025 CBSA is administered by NEEA. NEEA contracted with Westat, a national research organization with headquarters located in Rockville, Maryland, to coordinate the 2025 CBSA activities with all study participants. All mail comes from and should be returned to Westat at 1600 Research Blvd, RA 1161F, Rockville, MD 20850-3129.

Commercial Building
Stock Assessment
Study (CBSA)
neea.org/CBSA2025

JANUARY 2025



SIMY



SORRY

I missed you!

Sorry I missed you today. I'll try to contact you again soon.

I visited today to talk with you about the **2025 Commercial Building Stock Assessment (CBSA)**.

Your building has been selected to take part in this important energy study. You may have already received a letter about the study from the Northwest Energy Efficiency Alliance (NEEA), an alliance of utilities and energy efficiency organizations.

If you would like more information about the 2025 CBSA, the participation incentive, or to schedule an appointment for me to return, please call 1-855-662-5694 between 9:00 am and 5:00 pm Pacific Time. Or email us at **CBSA2025@westat.com**. For additional information, visit **neea.org/CBSA2025**.

Thank you in advance for your participation.

Sincerely,

_____, CBSA Field Technician

_____ Date

Web Survey Summary



2025 CBSA Web Survey Summary

In the 2025 CBSA web survey, you will be asked to provide information about your building's usage, structure, ownership and occupancy, types of equipment, and energy sources. The number and types of questions asked will depend on the building type and your responses about the building's characteristics. You will be asked only questions applicable to your building. Below are the most common types of questions in the survey.

Feel free to refer to records or energy bills or consult with others at your building to answer these questions. If you are not sure how to answer a question, you can provide your best estimate, an educated guess, or leave the answer blank.

Building Characteristics

- Building name
- Total square footage, total square footage heated/cooled
- Year constructed
- Recent renovations
- Number of floors
- Number of elevators/escalators

Building Activity

- Primary building activities and building type
- Depending on the type(s) of primary building activities reported, there are some follow-up questions, such as:
 - For lodging buildings: Number of guest rooms, in-unit kitchens and refrigerators, and types of in-unit heating and cooling equipment
 - For medical buildings: Number of surgery rooms and patient beds
 - For education buildings: Number of students and classrooms
 - For multi-family residential buildings: Number of residential units, and square footage of residential and commercial space



2025 CBSA Web Survey Summary

Ownership, Occupancy, and Hours

- Building ownership, year purchased, number of businesses in building, percent of building occupied by owners/tenants
- Building's operating schedule for employees and/or public; number of employees in building
- Lighting controls and lighting during occupied and unoccupied hours

Energy Sources and Uses

- Energy sources used in building (electricity, natural gas, propane, purchased steam, etc.)
- Building automation system, use of smart thermostats, temperature control strategies, general heating and cooling setpoints

On-site Energy Generation and Storage

- Solar panels: Total capacity, connection to utility company and power storage
- On-site energy generation: Type, fuel type, capacity, storage, storage duration
- Microgrid

Computers and Data Centers

- Number of desktops, laptops, monitors, servers
- Servers: Virtualization, energy-star certified
- Computer spaces: Size, capacity, load, temperature setpoint, numbers and types (server closets, server rooms, data centers, etc.)
- Number of data storage units, telecommunications equipment, and uninterruptable power supply units

Food Service Equipment

- Food preparation: Kitchen type, fuel used, number of meals prepared
- Kitchen and dining area square footage
- Year majority of current kitchen equipment was added or upgraded

Other Equipment and Spaces

- Number of refrigerators, dishwashers, ice machines, vending machines, air compressors, coolers
- Laundry: Laundry type, number and type of washers and dryers, usage frequency
- Laboratory space: Specialized lab equipment that requires extra energy consumption, fume hoods
- Medical machines: Equipment for medical diagnosis or treatment that requires extra energy consumption
- Parking: Off-street parking, type of parking space, number of spaces, parking lighting



Site Visit Infographics



2025 CBSA In-Person Site Visit Information

During the in-person site visit, a field technician will perform a 2- to 4-hour site visit, depending on the size of your building, to gather information on your building's construction and energy use equipment.

Scheduling

Staff from either Westat or Michaels Energy will call you to schedule a site visit date and time that work for you. We understand that this may need to be after-hours, on the weekend, or at some other time that does not disrupt your business.

In-Person Site Visit

For the on-site assessment, a field technician will spend time touring your facility and collecting data on the building and energy use equipment. Our visit will include the following activities:



Introductions (5–10 minutes)

We would like a few minutes to meet the staff who will guide our field technician around the facility to explain our goals and answer any questions.



Data Collection (1–3 hours)

The field technician will use a phone or tablet to gather data on building systems: primarily heating, cooling, water heating, lighting, and refrigeration equipment, as applicable. The field technician will need access to mechanical rooms and to any HVAC equipment on the roof. We will not install any monitoring equipment or disturb operating equipment. We will take photos of your building and your equipment, but will not take any photos of people. These photos will not be made public.



Wrap-up Meeting (10–15 minutes)

Before we leave, we would like to meet with key members of your staff to discuss the data we've collected and clarify any issues or discrepancies. At this time, we will also give you your incentive for participating.

Who do I call if I have questions?

Westat works on NEEA's behalf to implement the 2025 CBSA. Contact Westat at 1-855-662-5694 or by email at CBSA2025@westat.com. To speak directly with someone at NEEA, contact Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org.

Commercial Building Stock Assessment Study (CBSA)

neea.org/CBSA2025

January 2025





2025 CBSA In-Person Site Visit Information

During the in-person site visit, a field technician will perform a 4- to 6-hour site visit, depending on the size of your building, to gather information on your building's construction and energy use equipment.

Scheduling

Staff from either Westat or Michaels Energy will call you to schedule a site visit date and time that work for you. We understand that this may need to be after-hours, on the weekend, or at some other time that does not disrupt your business.

In-Person Site Visit

For the on-site assessment, a field technician will spend time touring your facility and collecting data on the building and energy use equipment. Our visit will include the following activities:



Introductions (10–15 minutes)

We would like a few minutes to meet the staff who will guide our field technician around the facility to explain our goals and answer any questions.



Data Collection (3–5 hours)

The field technician will use a phone or tablet to gather data on building systems: primarily heating, cooling, water heating, lighting, and refrigeration equipment, as applicable. The field technician will need access to mechanical rooms and to any HVAC equipment on the roof. We will not install any monitoring equipment or disturb operating equipment. We will take photos of your building and your equipment, but will not take any photos of people. These photos will not be made public.



Wrap-up Meeting (10–20 minutes)

Before we leave, we would like to meet with key members of your staff to discuss the data we've collected and clarify any issues or discrepancies. At this time, we will also give you your incentive for participating.

Who do I call if I have questions?

Westat works on NEEA's behalf to implement the 2025 CBSA. Contact Westat at 1-855-662-5694 or by email at CBSA2025@westat.com. To speak directly with someone at NEEA, contact Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org.

Commercial Building Stock Assessment Study (CBSA)

neea.org/CBSA2025

January 2025





2025 CBSA In-Person Site Visit Information

During the in-person site visit, a field technician will perform a 6- to 8-hour site visit, depending on the size of your building, to gather information on your building's construction and energy use equipment.

Scheduling

Staff from either Westat or Michaels Energy will call you to schedule a site visit date and time that work for you. We understand that this may need to be after-hours, on the weekend, or at some other time that does not disrupt your business.

In-Person Site Visit

For the on-site assessment, a field technician will spend time touring your facility and collecting data on the building and energy use equipment. Our visit will include the following activities:



Introductions (15–30 minutes)

We would like a few minutes to meet the staff who will guide our field technician around the facility to explain our goals and answer any questions.



Data Collection (5–7 hours)

The field technician will use a phone or tablet to gather data on building systems: primarily heating, cooling, water heating, lighting, and refrigeration equipment, as applicable. The field technician will need access to mechanical rooms and to any HVAC equipment on the roof. We will not install any monitoring equipment or disturb operating equipment. We will take photos of your building and your equipment, but will not take any photos of people. These photos will not be made public.



Wrap-up Meeting (15–30 minutes)

Before we leave, we would like to meet with key members of your staff to discuss the data we've collected and clarify any issues or discrepancies. At this time, we will also give you your incentive for participating.

Who do I call if I have questions?

Westat works on NEEA's behalf to implement the 2025 CBSA. Contact Westat at 1-855-662-5694 or by email at CBSA2025@westat.com. To speak directly with someone at NEEA, contact Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org.

Commercial Building Stock Assessment Study (CBSA)
neea.org/CBSA2025

January 2025



Next Steps Card

Thank you for participating in the 2025 CBSA!

The data collected in this study will be used to help millions of buildings, including yours, become more energy efficient, lower utility bills, and grow the economy of the Northwest.

NEXT STEPS



Confirm your site visit

- ☐ Your site visit is scheduled for _____
- ☐ To schedule your site visit, contact Michaels Energy at 971-261-1664, or cbsa@michaelsenergy.com.

OR

- ☐ Michaels Energy will contact you to schedule your site visit.



Complete the web survey

- ☐ To complete the survey, log onto <https://cbsasurvey.com> and enter your unique PIN: _____

Please complete the web survey **before** your scheduled site visit!



Look for these important emails

- ☐ CBSA welcome email containing instructions for completing the web survey.
- ☐ An email on behalf of DocuSign to authorize release of your utility billing data for analysis as part of the study. The email will be from **Terence Htoo** or **Jill Carle**.
- ☐ Information about what to expect during the site visit.



Receive your debit card

After the web survey, billing release, and site visit are complete, you will receive a debit card with \$_____, as a **thank you** for participating in the CBSA!

If you have questions about the study or need assistance with your web survey, contact Westat at **855-662-5694** or CBSA2025@westat.com.

For more information about the 2025 CBSA, visit neea.org/CBSA2025.

Authorization Letter



Fall 2024

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of utilities and energy efficiency organizations in the Northwest that has contracted with Westat, a survey research firm located in Rockville, Maryland, and Michaels Energy, a consulting firm located in LaCrosse, Wisconsin, to conduct the 2025 Commercial Building Stock Assessment (CBSA).

The 2025 CBSA is a comprehensive research study of energy efficiency in Northwest commercial and multi-family buildings. The 2025 CBSA will provide the region with useful information for businesses, utilities, researchers, and regional power planners.

The person with whom you are speaking is a Westat or Michaels Energy employee who has been hired to contact buildings for the 2025 CBSA and must carry an official photo ID badge displaying their printed name. We appreciate your help in assisting the staff member with the completion of their assignment. Any information you provide will only be used for statistical purposes and will remain confidential.

Should you have any questions or concerns, please contact Mike Psaris, Manager, Energy Use Studies at NEEA, at CBSA2025@neea.org. Questions for Westat may be directed to Cindy Good, CBSA Director of Study Operations at Westat, at CBSA2025@westat.com or 1-855-662-5694.

More information about CBSA and NEEA is available at <https://neea.org/CBSA2025>. To learn more about our contractors visit: Westat – www.westat.com; Michaels Energy – <https://michaelsenergy.com/>.

Sincerely,

Mike Psaris

Mike Psaris
Manager, Energy Use Studies
Northwest Energy Efficiency Alliance

Northwest Energy Efficiency Alliance
700 NE Multnomah Street, Suite 1300, Portland, OR 97232
503.688.5400 | Fax 503.688.5447
neea.org | info@neea.org

Email Templates

**EMAIL CONFIRMING ELIGIBILITY FROM RECRUITMENT SPECIALIST
2025 CBSA**

Subject Line: Follow-up invitation for the 2025 Commercial Building Stock Assessment (CBSA) Study

Dear [Building Owner or Manager OR NAME]:

We need your help. We're hoping to include your building at [ADDRESS] as part of the 2025 Commercial Building Stock Assessment (CBSA), endorsed by local utilities and administered by the Northwest Energy Efficiency Alliance (NEEA). To be sure that your building is eligible for inclusion, please let us know - **is your building less than 1,000 square feet?**

Your building's participation is very important. People use the information from this study to understand energy use in the Northwest, compare energy efficiency across buildings, and plan for future energy needs. Study participation includes an in-person site visit to your building by a field technician. During the visit, the field technician will tour your facility and collect data on your building and equipment, including building size and construction, and types of energy and energy equipment. You'll also be asked to complete a brief web survey prior to the site visit.

After completing the web survey and site visit, you will receive a debit card for \$[INCENTIVE] as a token of appreciation for your time. The information collected will be combined with information from other buildings in the Northwest. No information will allow identification of respondents or the building individually and data will be used only for statistical purposes. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025 or you may contact us at CBSA2025@westat.com or 1-855-662-5694.

Thank you for participating in this important study!

Sincerely,

[RECRUITER NAME]
2025 CBSA Project Staff
[RECRUITER PHONE NUMBER]

Office Use: [OrganizationCode]

**INITIAL/FOLLOW-UP EMAIL
2025 CBSA**

Subject Line: Invitation for the 2025 Commercial Building Stock Assessment (CBSA) Study

Dear [Building Owner or Manager OR NAME]:

We recently tried to contact you about participating in the 2025 Commercial Building Stock Assessment (CBSA) endorsed by local utilities and administered by the Northwest Energy Efficiency Alliance (NEEA). **Are you the person who can answer questions about your building's energy use and equipment?**

The participation of your building at [ADDRESS] is very important. People use the information from this study to understand energy use in the Northwest, compare energy efficiency across buildings, and plan for future energy needs. Study participation includes an in-person site visit to your building by a field technician. You'll also be asked to complete a brief web survey prior to the site visit.

During the visit, the field technician will tour your facility and collect data on your building and equipment, including building size and construction, and types of energy and energy equipment. After completing a site visit and web survey, you will receive a debit card for \$[INCENTIVE] as a token of appreciation for your time. The information collected will be combined with information from other buildings in the Northwest. No information will allow identification of respondents or the building individually and data will be used only for statistical purposes. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025 or you may contact us at CBSA2025@westat.com or 1-855-662-5694.

Thank you for participating in this important study!

Sincerely,

[RECRUITER NAME]
2025 CBSA Project Staff
[RECRUITER PHONE NUMBER]

Office Use: [OrganizationCode]

**EMAIL IDENTIFYING SURVEY RESPONDENT
2025 CBSA**

Subject Line: Follow-up invitation for the 2025 Commercial Building Stock Assessment (CBSA) Study

Dear [CONTACT NAME]:

We need your help. We're hoping to include your building at [ADDRESS] as part of the 2025 Commercial Building Stock Assessment (CBSA), endorsed by local utilities and administered by the Northwest Energy Efficiency Alliance (NEEA). Your colleague, [INSERT INITIAL CONTACT NAME], indicated you were the right person to talk with about your building's energy use.

As part of the 2025 CBSA, we will collect data in two ways: an in-person site visit and a brief web survey. The web survey will collect basic information about your building, including the building's use, structure, ownership, and energy sources and uses. As a token of our appreciation, you will receive a debit card for \$[INCENTIVE] after the site visit is completed. **Would you be the right person to answer these questions?**

The information collected will be combined with information from other buildings in the Northwest. No information will allow identification of respondents or the building individually and data will be used only for statistical purposes. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025 or you may contact us at CBSA2025@westat.com or 1-855-662-5694. We look forward to hearing from you!

Thank you for participating in this important study!

Sincerely,

[RECRUITER NAME]
2025 CBSA Project Staff
[RECRUITER PHONE NUMBER]

Office Use: [OrganizationCode]

**NEXT STEPS EMAIL
2025 CBSA**

Subject Line: Next Steps for the 2025 Commercial Building Stock Assessment (CBSA)

Dear [SURVEY RESPONDENT NAME]:

Thank you again for agreeing to participate in the 2025 Commercial Building Stock Assessment (CBSA) for your building at [ADDRESS]! As a reminder, you may get up to three emails providing information about the following next steps:

- Confirm your building's site visit with Michaels Energy at 971-261-1664 or CBSA@MichaelsEnergy.com, or wait for Michaels to reach out to you.
- Complete your brief web survey ahead of your scheduled site visit date.
- Sign a billing release form via DocuSign (emails come from Terence Htoo or Jill Carle).

When you receive these emails, please complete your web survey and billing release forms as soon as possible, prior to your scheduled site visit. For assistance, please contact Westat at 1-855-662-5694 or CBSA2025@westat.com. For more information about the 2025 CBSA, visit neea.org/CBSA2025.

Your participation is vital to the continued success of this program. Thank you again and we greatly appreciate your support for this study.

Sincerely,
[RECRUITER NAME]
2025 CBSA Project Staff
[RECRUITER PHONE NUMBER]

Office Use: [OrganizationCode]

**SITE VISIT HANDOFF EMAIL V1
2025 CBSA**

Subject Line: In-Person Site Visit for the 2025 Commercial Building Stock Assessment (CBSA)

Dear [SITE VISIT RESP. FIRST NAME] [SITE VISIT RESP. LAST NAME]:

You or someone in your building at [STREET_ADDRESS] recently completed a web survey as part of the 2025 Commercial Building Stock Assessment (CBSA) and indicated you are the appropriate person to assist with an in-person site visit. During the in-person site visit, a field technician will tour your building and collect detailed technical information about the building and equipment using a tablet. This information allows us to gather specific information on your building's construction and energy use equipment. Across all participating buildings, this information provides an important picture of energy use and efficiency in the Northwest United States.

The next step is to schedule your in-person site visit. Staff from Michaels Energy will call you soon to schedule a site visit date and time that work for you. Or you may call 971-261-1664 to schedule the visit. We understand that this may need to be after-hours, on the weekend, or at some other time that does not disrupt your business. The attached information sheet provides more details about what to expect on the day of your scheduled site visit. At the end of the visit, we will give you a debit card for \$[INCENTIVE] as a thank you for participating.

All data collected for the 2025 CBSA will be aggregated and used only for statistical purposes. No individual respondents or buildings will be identified. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025, or contact us at CBSA2025@westat.com or 1-855-662-5694.

Thank you for participating in this important study!

Sincerely,
2025 CBSA Project Staff

**SITE VISIT HANDOFF EMAIL V2
2025 CBSA**

Subject Line: In-Person Site Visit for the 2025 Commercial Building Stock Assessment (CBSA)

Dear [SITE VISIT RESP. FIRST NAME] [SITE VISIT RESP. LAST NAME]:

[NAME] in your building at [STREET_ADDRESS] recently completed a web survey as part of the 2025 Commercial Building Stock Assessment (CBSA) and indicated you are the appropriate person to assist with an in-person site visit. During the site visit, a field technician will tour your building and collect detailed technical information about the building's construction and energy use equipment. Across all participating buildings, this information provides an important picture of energy use and efficiency in the Northwest United States.

The next step is to schedule your in-person site visit. Staff from Michaels Energy will call you soon to schedule a site visit date and time that work for you. Or you may call 971-261-1664 to schedule the visit. We understand that this may need to be after-hours, on the weekend, or at some other time that does not disrupt your business. The attached information sheet provides more details about what to expect on the day of your scheduled site visit. At the end of the visit, we will give you a debit card for \$[INCENTIVE] as a thank you for participating.

All data collected for the 2025 CBSA will be aggregated and used only for statistical purposes. No individual respondents or buildings will be identified. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025, or contact us at CBSA2025@westat.com or 1-855-662-5694.

Thank you for participating in this important study!

Sincerely,
2025 CBSA Project Staff

Nonresponse Letters

Dear [CONTACT NAME],

We're writing to ask for your help. Several of your buildings at [AFFILIATION NAME] have been chosen to participate in the 2025 Commercial Building Stock Assessment (CBSA), which collects important energy information about buildings in the Northwest. The data is used in energy resource planning and energy efficiency programs.

The CBSA has been conducted since 2001 by the Northwest Energy Efficiency Alliance (NEEA). NEEA is an alliance of utilities and energy efficiency organizations in Idaho, Montana, Oregon, and Washington that have worked together for more than 25 years to advance energy efficiency and benefit 13 million energy consumers in the Northwest. The 2025 CBSA is endorsed by local utilities throughout the Northwest. Additional information about NEEA and the CBSA study can be found in the enclosed brochure and at neea.org/CBSA2025.

We are offering a participation incentive per building. You will receive the incentive after completing a brief web survey and an in-person site visit by one of our field technicians. You could receive up to \$[INCENTIVE].

Your information will be kept confidential and will be used for statistical purposes only. No information will allow identification of you or the buildings.

Your buildings are extremely important to this research study and represent many other buildings like yours. If your buildings do not participate, data about your buildings will not be included in the study results. This is your chance to have input into the energy planning and efficiency programs in your area!

To get started with scheduling an in-person site visit or to find out more about the study, please contact us at CBSA2025@westat.com or 1-855-662-5694. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

If you have questions, please contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org or Cindy Good, CBSA Director of Study Operations at Westat, at 1-855-662-5694 or CBSA2025@westat.com.

Thank you so much for being a part of this important study!

Sincerely,

A handwritten signature in blue ink that reads "Michelle Ruddick".

Michelle Ruddick
Westat Project Director, 2025 CBSA

Office Use: [OrganizationCode]

Dear [CONTACT NAME],

We're writing to ask for your help. One of the buildings associated with [AFFILIATION NAME] has been chosen to participate in the 2025 Commercial Building Stock Assessment (CBSA), which collects important energy information about buildings in the Northwest. [RESPONDENT NAME] at [VLS Description] has indicated that they are willing to participate in the 2025 CBSA, with your approval.

The CBSA has been conducted since 2001 by the Northwest Energy Efficiency Alliance (NEEA). NEEA is an alliance of utilities and energy efficiency organizations in Idaho, Montana, Oregon, and Washington that have worked together for more than 25 years to advance energy efficiency and benefit 13 million energy consumers in the Northwest. The 2025 CBSA is endorsed by local utilities throughout the Northwest. The data is used in energy resource planning and energy efficiency programs. Additional information about NEEA and the CBSA study can be found in the enclosed brochure and at neea.org/CBSA2025.

We are offering a participation incentive of \$[INCENTIVE]. Buildings will receive the incentive after completing an in-person site visit by a field technician and a brief web survey.

Your building information will be kept confidential and will be used for statistical purposes only. No information will allow identification of the building or personnel.

Your building is extremely important to this research study and represents many other buildings like it. If your building does not participate, data about your building will not be included in the study results. This is your chance to have input into the energy planning and efficiency programs in your area!

To provide approval for your building to participate in the 2025 CBSA, please contact us at CBSA2025@westat.com or 1-855-662-5694. A recruitment specialist will also reach out to you to answer any questions you might have. For more information, you can visit the 2025 CBSA website at neea.org/CBSA2025.

If you have questions, please contact Mike Psaris, Manager, Energy Use Studies, at NEEA, at CBSA2025@neea.org or Cindy Good, CBSA Director of Study Operations at Westat, at 1-855-662-5694 or CBSA2025@westat.com.

Thank you so much for being a part of this important study!

Sincerely,

A handwritten signature in blue ink that reads "Michelle Ruddick".

Michelle Ruddick
Westat Project Director, 2025 CBSA

Office Use: [OrganizationCode]

Dear [NAME],

We recently tried to reach you about the Commercial Building Stock Assessment (CBSA).

We're writing to ask for your help.

Your building has been selected to be part of the 2025 CBSA, which collects important energy information about buildings in the Northwest. The data is used in energy resource planning and energy efficiency programs.

The CBSA has been conducted since 2001 by the Northwest Energy Efficiency Alliance (NEEA). NEEA is an alliance of utilities and energy efficiency organizations in Idaho, Montana, Oregon, and Washington that have worked together for more than 25 years to advance energy efficiency and benefit 13 million energy consumers in the Northwest. The 2025 CBSA is endorsed by local utilities throughout the Northwest. Additional information about NEEA and the CBSA study can be found in the enclosed brochure and at neea.org/CBSA2025.

It's easy to be part of the study and you will receive \$[INCENTIVE] for participating! After completing a brief web survey and a site visit by one of our field technicians, you will receive a prepaid debit card to thank you for your time. The survey and site visit can be completed at your convenience.

Your information will be kept confidential and will be used for statistical purposes only. No information will allow identification of you or the building.

Your building is extremely important to this research study and it represents many other buildings like yours. If your building does not participate, data about your building and many others will not be included in the study results. This is your chance to have input into the energy planning and efficiency programs in your area!

To get started on the web survey for your building at [BUILDINGADDRESS] [BUILDING CITY], [BUILDINGSTATE] [BUILDING ZIP] ([VLS_Description]):

1. Go to our secure website: <https://cbsasurvey.com>
2. Enter this PIN: **[PIN]**

If you have questions, please contact Mike Psaris, Senior Program Manager at NEEA, at CBSA2025@neea.org or Cindy Good, CBSA Director of Study Operations at Westat, at 1-855-662-5694 or CBSA2025@westat.com.

Thank you so much for being a part of this important study!

Sincerely,

A handwritten signature in blue ink that reads "Michelle Ruddick".

Michelle Ruddick
Westat Project Director, 2025 CBSA

Office Use: [OrganizationCode]

Dear [NAME],

We're looking forward to hearing from you!

Thank you again for agreeing to participate in the 2025 Commercial Building Stock Assessment (CBSA). We sent you credentials to complete the web survey. *It looks like you started the survey, but haven't completed it.* Your building's participation is critical to the success of the 2025 CBSA. Utilities and researchers use the information from this study to understand energy use in the Northwest, compare energy efficiency across buildings, plan for future energy needs, and provide energy efficiency programs and incentives for commercial buildings.

Please log back into the survey and complete it as soon as possible. To thank you for your time, you will receive an increased incentive of \$[INCENTIVE] after completing the web survey and an in-person site visit.

This letter contains your PIN to access the web survey to provide information about your building at:

[BUILDING ADDRESSLINE1]

[BUILDING CITY], [BUILDINGSTATECODE], [BUILDINGZIP]

Building Description: [VLS_Description]

To access the web survey, visit the website below and enter your unique PIN where indicated. **Your PIN is below.**

Website: <https://cbsasurvey.com>

PIN: [PIN]

Please complete your web survey as soon as possible. Thank you for participating in this important study!

Sincerely,

The 2025 CBSA Team

CBSA2025@westat.com

1-855-662-5694

Office Use: [OrganizationCode]

APPENDIX 6:

Data Collection Protocols

Data Collection Tool Overview

Launching the Data Collection Tool

The data collection process for commercial and multi-family residential buildings can be broken down into seven major sections, as shown below. The seven sections are:

- Welcome page
- Background Information
- Your Information
- General Building Information
- On-Site Visit
- Final Questions
- Submit Page

Welcome page

The first page in the CBSA Survey123 Data Collection Tool includes building or site ID and site address, as shown below. If the technician finds that the address shown on this page is not accurate, then they make a general note of it to inform Westat.

Welcome

This form is for the building located at:

Building name: Hilton Garden Inn
1807 OFFENDER ST NE
MEDFORD, OR 97504

If this is correct, please continue to the next page.

If this is incorrect or you are unsure, please contact Westat.



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Background Information

The background information page is a read-only page that includes some of the web survey results for the site technician's reference. The site technician may go through this information to prepare themselves for the site visit and ask any relevant questions to the building manager. This information was collected from the customer via the web survey and the technician does not need to collect/correct this data while on site unless asked to. A complete set of web survey questions can be found in Appendix A – Web Survey Information for reference.

Background Information

The following building information reported in the web survey is for your reference. After reviewing, continue to the next page to start the site visit.

Building name: Hilton Garden Inn

Total square footage: 246750

Conditioned square footage: 200000

Unconditioned square footage: 46750

Building activity: Lodging

Year of construction: not reported

Parking garage: separate stand-alone garage

Primary heating system: Rooftop unit

Secondary heating system: Packaged terminal AC (PTAC)

Back-up heating system:

Primary cooling system: Rooftop unit

Secondary cooling system: Packaged terminal AC (PTAC)

Laundry done on-site at this building: Yes

Building activity: Lodging

Year of construction: not reported

Parking garage: separate stand-alone garage

Primary heating system: Rooftop unit

Secondary heating system: Packaged terminal AC (PTAC)

Back-up heating system:

Primary cooling system: Rooftop unit

Secondary cooling system: Packaged terminal AC (PTAC)

Laundry done on-site at this building: Yes

Number of clothes washers: 155

Number of clothes dryers: 01010

Solar panels with battery storage: Yes

Electricity supplier: Oregon Trail Electric Consumers Cooperative, Inc.

Natural gas supplier: Cascade Natural Gas



3 of 9



3 of 9



Site Technician Information

The technician enters their name, the date, and the time they started the on-site visit.

Your Information

Enter your name *

Ayush Gupta

What day and time did you start the on-site visit? *

Wednesday, July 17, 2024

9:03 AM

< 4 of 9 >

General Building Information

This section includes the responses from the web-survey for the site, such as primary building activity and gross total area, and asks the technician to verify this information. If found to be different, the technician can enter data in this section based on their own assessment. The field technicians should carry a laser distance meter or a measuring tape, to get an estimate for the total building area. The technician can also upload pictures of general building items and any notes about general building items/spaces/systems.

General Building Information

The web survey respondent reported the primary building activity is:

Lodging

Is this correct?

Yes

The web survey respondent reported the gross or total square footage of this building as:

246750 square feet

Is this correct?

No

What is the gross or total square footage of all the space in this building, both finished and unfinished, including basements, hallways, lobbies, stairways, elevator shafts, and indoor parking levels?

250000

If needed, take photo(s) of general building items

1 of 1



<

5 of 9

>

On-Site Visit

After the preliminary site level interview and data collection is complete, the field technician will then collect detailed data on the building and individual businesses/floors/rooms being surveyed. This page is broken out into sections, as shown below.

On-Site Visit ▶ Lodging Rooms ▶ Floors ▶ Roofs ▶ Walls ▶ Windows ▶ Web Survey HVAC Review Reminder: For the following sections, if there are multiple of the same type of equipment or system with different controls, record them separately. ▶ HVAC Systems ▶ Ventilation ▶ Boilers ▶ Chillers ▶ HVAC Heat Rejection ▶ Energy Management System	Reminder: For the following sections, if there are multiple of the same type of equipment or system with different controls, record them separately. ▶ HVAC Systems ▶ Ventilation ▶ Boilers ▶ Chillers ▶ HVAC Heat Rejection ▶ Energy Management System ▶ Water Heaters ▶ Pumping Systems ▶ Food Service Equipment ▶ Refrigeration Equipment ▶ Indoor and Outdoor Lighting ▶ Miscellaneous
< 6 of 9 >	< 6 of 9 >

PORTION OF SITE TO SURVEY

Follow the Collaboration Between Westat and Michaels Energy

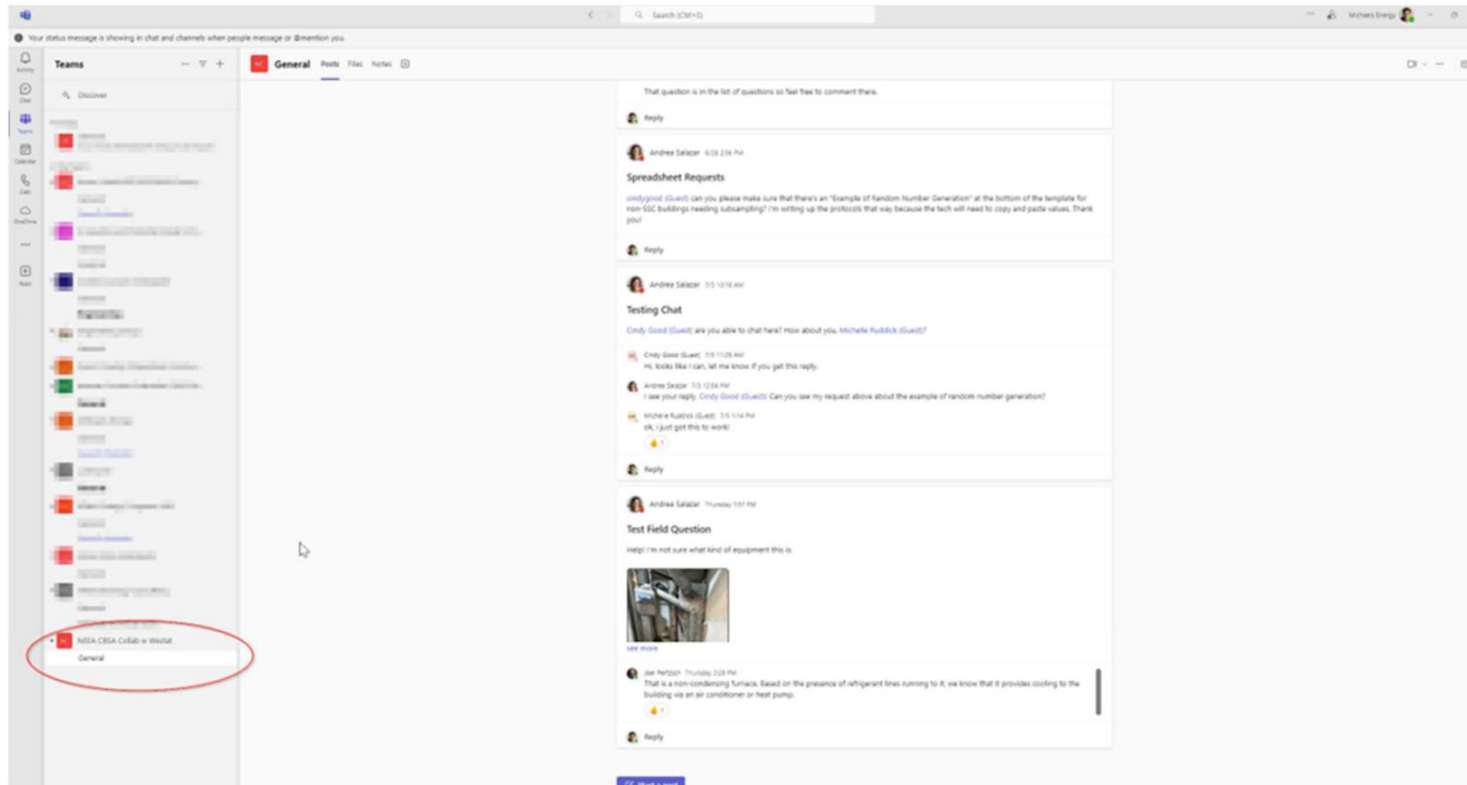
This section is focused on how field technicians from Westat and Michaels Energy will collaborate using Microsoft Teams. While in the field, the technicians may face challenges such

as difficulty in identifying equipment properly or difficulty in recording all the data into the field survey instrument.

A Microsoft Teams channel, named “NEEA CBSA Collab w Westat”, has been established on Michaels’ instance of Microsoft teams for the field technicians to ask any questions that might help them record accurate and comprehensive data from their field visit. This channel may also be used to share specific directions with the technicians regarding any special cases or site equipment. For Westat field staff to access the Michaels Microsoft Team, follow the steps below.

16. Go to the top of your teams window and click on your picture/initials.

17. You should see "Michaels Energy" in the list where "City and County of Denver" in the image above are located.
18. Click on "Michaels Energy" and on the left-hand side where your different teams normally are you should see a team called "NEEA CBSA Collab w Westat" as shown in the image below.



9. Click on it and check out the posts and post any questions and accompanying photos you may have. Michaels staff will be monitoring this channel and answering questions in real time.

Sub-Sampling Protocols to determine what portion(s) of the building to survey.

- Note that a new Survey123 form will need to be filled out for each building and each sub-sampled business/floor/room.
- Technicians will not cover the systems or equipment that are already covered in the web-survey. Refer to Appendix A – Web Survey Information for all the data that is covered in the web-survey.

Site Visit Review

After the onsite survey is complete, the technician will move to the next page of the form to select all sections that they completed during the visit. They will also list any spaces in the building that they were unable to access during the visit, along with any final comments about the building.

Site Visit Review

Please check all the sections that you completed during this on-site visit. If you missed any sections that are relevant to this building, please go back and enter the information now.

Select all that apply

- ☐ Floors
- ☐ Roofs
- ☐ Walls
- ☐ Windows
- ☐ HVAC Systems
- ☐ Ventilation
- ☐ Boilers
- ☐ Chillers
- ☐ Heat Rejection
- ☐ Energy Management System
- ☐ Water Heaters
- ☐ Pumping Systems
- ☐ Food Service Equipment
- ☐ Refrigeration Equipment
- ☐ Indoor and Outdoor Lighting
- ☐ Miscellaneous

Please list any spaces or equipment you were unable to access at this building.

- ☐ Windows
- ☐ HVAC Systems
- ☐ Ventilation
- ☐ Boilers
- ☐ Chillers
- ☐ Heat Rejection
- ☐ Energy Management System
- ☐ Water Heaters
- ☐ Pumping Systems
- ☐ Food Service Equipment
- ☐ Refrigeration Equipment
- ☐ Indoor and Outdoor Lighting
- ☐ Miscellaneous

Please list any spaces or equipment you were unable to access at this building.

Please enter any other comments about the information collected at this building.

<
7 of 9
>

<
7 of 9
>

Exit Interview

After all site visit data and additional comments have been recorded, the field technician will ask a few wrap-up questions to conclude the site visit with the building manager or on-site contact. The technician will ask the building manager whether they would be willing to participate in further surveys in future. If yes, then the technician will record the building manager's name and their contact information for further surveys.

Exit Interview

Would [your site visit contact] be willing to participate in further surveys at a later date?

Yes

Please enter site visit contact name and contact information for further surveys.

255

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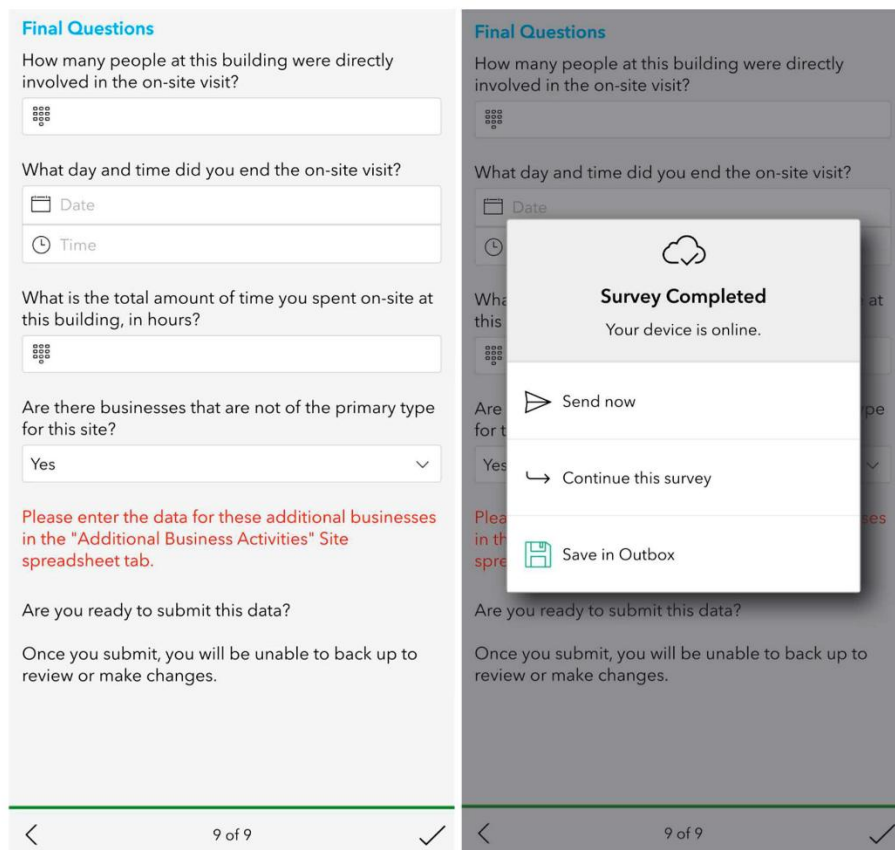
Final Questions

Once done, the technician will move to the final page of the survey to put data about:

- how many people at the building were directly involved in the site visit
- day and time the on-site visit was completed
- total amount of time (hours) it took the technician on-site
- presence of businesses that are not of the primary type for this site

If there is a business on site that is of a different type than the primary type of business for the building (i.e., a grocery store with a bank, an office building with a deli, etc.). The field technicians will fill out information about different types of businesses (other than the main activity type), the technician will record it in the “Additional Business Activities” spreadsheet.

When ready with all edits and ready for final submission, select the submit arrow in the bottom right-hand corner of the screen. Note that once the survey is submitted, the technician will be unable to back up to make changes.



To save and exit a form without submitting it, click on the cross on the top left-hand corner of the screen, and select “Save in Drafts”.

To come back to the form to edit/submit it later, go back to “CBSA_Site_Visit_v3” inbox where you can “Collect” new forms, view saved “Drafts” of in-progress forms and “Sent” forms that are already submitted.

Click on the “Drafts” inbox and find the form that you want to edit. Update the form as necessary and when you are done, go to the final page to hit the arrow button at the bottom of the screen to submit it.

The On-site Visit section of the survey instrument is where the technician will spend most of their time recording data. The remainder of this document will cover this section in detail.

Building Shell/Envelope

The first few sections of the survey are where the site technician will input information on the building shell. The information collected should include the shell information for the entire building and should be included in the whole-building survey if subsampling applies per the Sub-Sampling Protocols – MICHAELS ONLY except Lighting Subsampling.

It is highly recommended to take clear pictures of every item for each record of building shell section.

As much as possible, the field technician should try to get accurate data on each section of building shell within the constraints of time, access, knowledge, etc. The technician will get the building shell information from the following sources in this order of preference-

- On-site measurement
- Plans review
- Google Earth measurement
- On-site Interview
- Educated Guess/Visual Estimate
- Other

Floors

The site technician will record the following information –

- Ground floor construction type (basement, crawl space, concrete pour in ground, etc.)
- Ground floor area
 - Source of information for the ground floor area
- Average height between floors
 - Source of information for average height between floors
- Total number of floors above grade
- Shape of the building
- Any notes about flooring that they may want to record

The technician will take any relevant pictures of the flooring and upload them to this section.

▼ Floors

Ground floor type

Which shape best represents the ground floor of this building?
This may also be referred to as the "footprint" of the building.

☐

Square

☐

Wide rectangle

☐

Narrow rectangle

☐

Rectangle or square with an interior courtyard

☐

"H" shaped

☐

"U" shaped

☐

"E" shaped

☐

"T" shaped

☐

"L" shaped

☐

"+" or cross shaped

☐

Other shape

☐

Could Not Assess

☐

Could Not Assess

Ground floor perimeter (feet)

If missing:

☐

 Could Not Assess

Ground floor area (square feet)

If missing:

☐

 Could Not Assess

Total number of floors above grade

If missing:

☐

 Could Not Assess

If needed, take photo(s) of flooring

Record any notes about flooring

<

6 of 9

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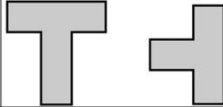
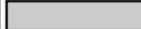
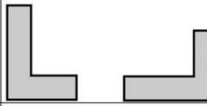
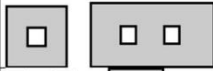
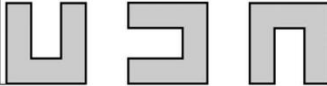
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Building Shape

The technician will enter the shape (as shown below) that best resembles the building's floorplan at the ground level (also known as footprint).

Response options	Image		
1. Square		7. "E" shaped	
2. Wide rectangle		8. "T" shaped	
3. Narrow rectangle		9. "L" shaped	
4. Rectangle or square with an interior courtyard		10. "+" or cross shaped	
5. "H" shaped		11. Other shape	
6. "U" shaped			

Which shape best represents the ground floor of this building?

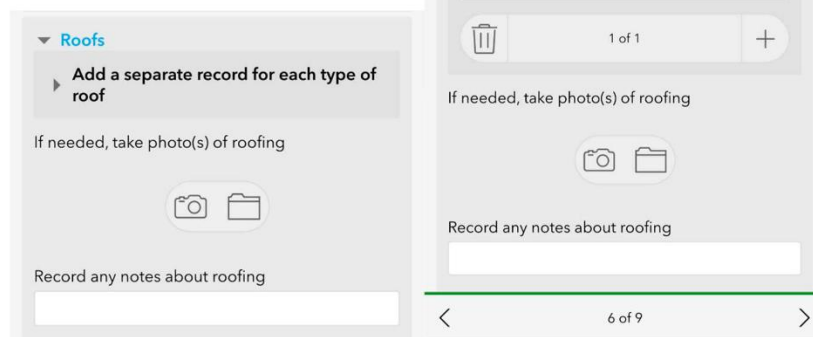
This may also be referred to as the "footprint" of the building.

-  ☐ Square
-  ☐ Wide rectangle
-  ☐ Narrow rectangle
-  ☐ Rectangle or square with an interior courtyard
-  ☐ "H" shaped
-  ☐ "U" shaped
-  ☐ "E" shaped
-  ☐ "T" shaped
-  ☐ "L" shaped
-  ☐ "+" or cross shaped
- ☐ Other shape
- ☐ Could Not Assess

Roofs

This section collects information about the roof for the site. To start recording data, expand the roof entry section, as shown below. The site technician will record the following information –

- Roof type
- Roof type area
 - Source of roof type area
- Presence of skylights (Yes/No)
- Number of skylights present
- Percent of roof area taken by skylights
- Skylight glazing characteristics
 - Source of percent roof area taken by skylights



Roofs

▼ Add a separate record for each type of roof

Roof type

Roof type area (square feet)
Total area measured in plan view (straight down, not including slope).

If missing:

Are skylights present on this roof?

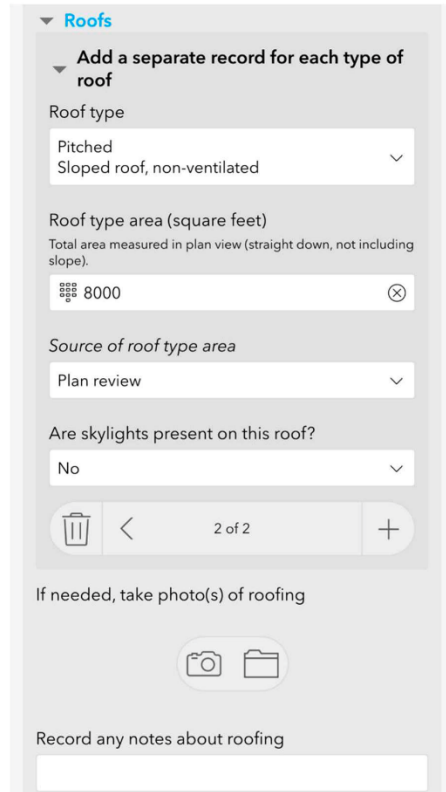
If needed, take photo(s) of roofing

Record any notes about roofing

1 of 1

6 of 9

The technician will add a separate record for each type of roof/ceiling entry by clicking/pressing on the plus symbol on the bottom right-hand corner of the roof section, as shown below.



Note that upon answering the questions for roof type area and percent roof type taken by skylight, the survey will ask follow-up questions that were originally hidden, to record the source of this data. This conditional logic works to ensure that the technician can input all the relevant information for that roof type.

For cases where the building manager is aware of the insulation type for the roof or this information is available in the building plans, the field technician will mention it in the notes for the roof entry.

Walls

This section collects information about the exterior walls for the site. To start recording data, expand the wall entry section, as shown below. The site technician will record the following information:

- Wall surface type
- Wall location type
- Overall wall thickness
- Perimeter
- Source of wall area

Walls

Add a separate record for each type of exterior wall

If needed, take photo(s) of walls




Record any notes about walls

Walls

Add a separate record for each type of exterior wall

Exterior wall surface type
Concrete Block

Exterior wall location type
Select all that apply
Above Grade

Wall thickness (inches)
8

Source of wall thickness
Field measurement


1 of 1

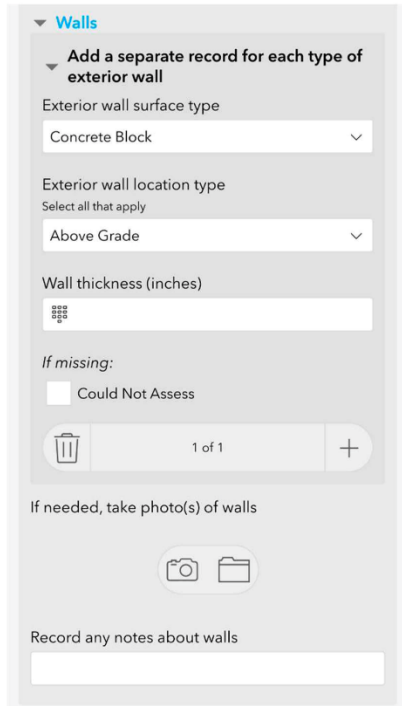


If needed, take photo(s) of walls




Record any notes about walls

The technician will add a separate record for each type of wall entry by clicking/pressing on the plus symbol on the bottom right-hand corner of the wall section, as shown below.



Note that upon answering the questions for wall thickness, the survey will ask the follow-up question that was originally hidden, to record the source of this data. This conditional logic works to ensure that the technician can input all the relevant information for that wall type.

For cases where the building manager is aware of the insulation type for the wall or this information is available in the building plans, the field technician will mention it in the notes for the wall entry.

Windows

The technician will use this section to enter all data about windows on site, such as percent of gross wall area that is covered by windows, percent of openable windows, egress windows, and presence of blinds, shades, or other window coverings.

To start recording data, expand the window entry section, as shown below. The site technician will record the information for every window type, window frame type, number of layers of glazing, source of glazing count, low emissivity coating, and glazing characteristics.

Windows

Which range best describes the percentage of the exterior wall surface that is covered with window glass or glass doors?

☐ 1% or less

☐ 2 to 10%

☐ 11 to 25%

☐ 26 to 50%

☐ 51 to 75%

☐ 76 to 100%

☐ Could Not Assess

What percent of windows are operable?

If missing:

☐ Could Not Assess

What percent of windows are egress windows?

If missing:

☐ Could Not Assess

☐ 26 to 50%

☐ 51 to 75%

☐ 76 to 100%

☐ Could Not Assess

What percent of windows are operable?

What percent of windows are egress windows?

Are there blinds, shades, or other window coverings?

Select all that apply

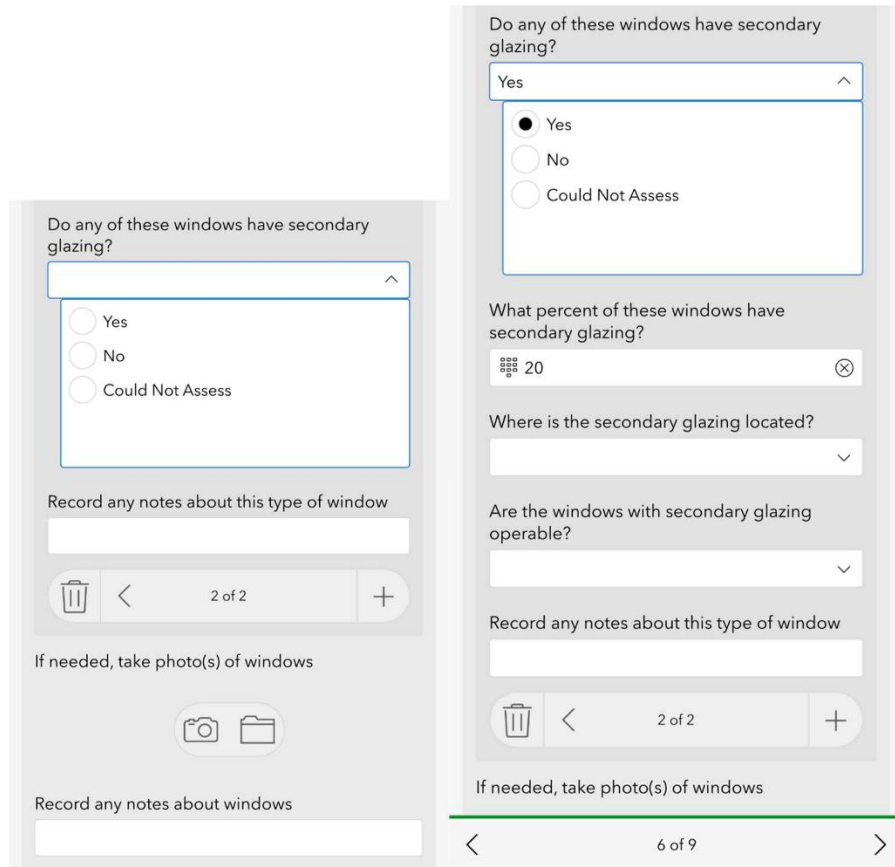
Operable Coverings

Add a separate record for each type of window

If needed, take photo(s) of windows

Record any notes about windows

To add a separate record for each window type, click/press on the plus symbol on the bottom right-hand corner of the window entry section, as shown below.



Do any of these windows have secondary glazing?

☐ Yes

☐ No

☐ Could Not Assess

Record any notes about this type of window

2 of 2

If needed, take photo(s) of windows

Record any notes about windows

Do any of these windows have secondary glazing?

Yes

☒ Yes

☐ No

☐ Could Not Assess

What percent of these windows have secondary glazing?

20

Where is the secondary glazing located?

Are the windows with secondary glazing operable?

Record any notes about this type of window

2 of 2

If needed, take photo(s) of windows

6 of 9

Note that upon answering some of the questions for windows such as glazing and low-emissivity coating, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that window type.

For example, when the technician answers the question "Do any of these windows have secondary glazing" with "Yes", the tool unlocks follow-up questions asking the percent of windows that have secondary glazing, the location of secondary glazing, and whether these windows with secondary glazing are operable or not. Refer to the images above.

The field technician should select the appropriate window type. The window type options included are:

Punched Opening Windows- Punched opening windows are inset into the wall and have wall material surrounding them. These windows are like most windows in a building. Note that a floor-to-ceiling window is still a punched opening window if the window is installed on, and within the boundary of, the floor and ceiling slabs.

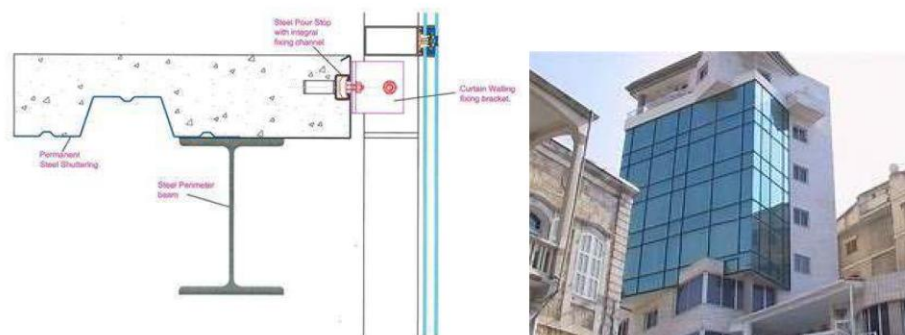


Ribbon Windows- Ribbon windows are punched opening windows that are set side-by-side to create a ribbon of windows across a window façade. Like other punched opening windows, they are inset into the wall. Ribbon window should be selected in cases where four or more windows are installed side-by-side, with no wall between them, or the window array comprises a large percent of the width of the building.



Glass Curtain Wall- Glass curtain walls are non-structural windows installed on the outer façade of the building. Unlike punched opening windows, which are installed within the boundary of the floor and ceiling slabs, curtain walls are “hung” onto the outside of the building, as shown in the figure below. Curtain walls are commonly found in high-rise applications. Note that in some cases a curtain wall may not be floor-to-ceiling glass. In these cases, the glass sections may be combined with opaque spandrel sections to create window and wall sections.

However, the window and spandrel assembly are still hung on the outside of the building like a curtain, rather than installed within the floors.



Storefront Window- A storefront window is a large window opening, typically found on the first floor in commercial spaces. They usually are comprised of multiple window sections that are part of a single window assembly. They are often field constructed and glazed.



Low-E glass Window- Low emissivity (or low e) glass is an extremely thin layer or layers of metallic particles coating applied to the glass usually on the interior side of the outer pane for double-pane windows. The coating reflects radiant infrared energy or heat from the outside while still letting in visible light. This also reflect the heat back inside your house if you have your heater running, thus keeping your home warm.³

³ Source: <https://greenfilmusa.com/blogs/post/how-to-tell-if-your-windows-have-low-e-glass>

How to Check for Low E Glass

- Using a lighter or laser, hold it close to the glass and look at the 4 reflections
- 1 of the 4 should be slightly clearer and a different color
- This indicates the presence of Low E glass
- No differences in reflection means no Low E



To test if your window has low-e coating, simply use either a match/lighter or a pen light. Using a lighter is the easiest way to tell the difference between the flame's color. Place it close to the double-pane window where you can see 4 reflections of the flame (two for each pane), as shown in the image⁴ above. If one of the four reflections has a slightly different color, this indicates that you have low e coating on your window. If all the reflections are the same color, you do not have low e glass.

HVAC (Heating, Ventilation and Air Conditioning)

There are seven tabs related to HVAC systems and equipment. Depending on the equipment present in the facility, not all the tabs must be completed. Each HVAC tab is discussed below.

As much as possible, the technician should try to get accurate data for all units and equipment in HVAC systems within the constraints of time, access, knowledge, etc. The technician will get the HVAC systems information from the following sources in this order of preference-

- Observation and nameplate data
- Plans review
- Model number lookup
- Interview
- Educated Guess
- Other

⁴ Source: <https://geoshieldusa.com/blogs/blog/low-e-windows-detection>

For larger buildings, there will likely be HVAC equipment that serves common areas and individual/private spaces. For sites with subsampled businesses and rooms, the field technicians will inspect all hallways, stairwells, lobby area equipment, etc. in the general building survey instrument. For sites with subsampled floors, the field technicians will inspect all equipment in common area hallways, lobbies, etc. in the general building survey instrument. Then the field technician will inspect the equipment in the hallways and stairwells, etc. on the subsampled floors and not necessarily every hallway/stairwell as these may be repetitive. Group equipment together based on their common characteristics.

Web Survey HVAC Review

The web survey HVAC section is a review of the information imported from the web-survey filled by the customer. There is no input needed in this from the field technician. It lists the primary and secondary heating systems, backup heating system, and primary and secondary cooling systems (refer to the image below).

▼ Web Survey HVAC Review

The following HVAC equipment was reported by the web survey respondent:

Primary heating system: Rooftop unit

Secondary heating system: Packaged terminal AC (PTAC)

Back-up heating system:

Primary cooling system: Rooftop unit

Secondary cooling system: Packaged terminal AC (PTAC)

Reminder: For the following sections, if there are multiple of the same type of equipment or system with different controls, record them separately.

HVAC Systems

This tab is for the entire system of all equipment operating together to provide cooling, heating, or ventilation in the building. A “system” here is defined as any group of equipment that operates and is controlled together. If there are multiple of the same type of system equipment with different controls, the technician will record them as separate systems. In case of different types of control methods for identical HVAC Systems, the technician will list each piece of HVAC equipment separately in their own entry so that we have more granular information about all types of HVAC equipment and their control features.

This tab collects information for various equipment such as packaged systems, split systems, window/wall & PTAC units, air handling units, furnaces, heat pumps, variable refrigerant flow systems, make-up air units, fan coil units, dedicated outdoor air systems (DOAS), etc. Exhaust and ventilation information for these systems is captured in the Ventilation tab.

To start recording data, expand the HVAC Systems entry section, as shown below.

▼ HVAC Systems

A “system” is defined as any group of equipment that operates and is controlled together.

▶ Add a separate record for each HVAC system

Record any notes about HVAC systems

▼ Add a separate record for each type of HVAC system

System type

Brief description of HVAC system

How many identical units or systems are there?

If missing:

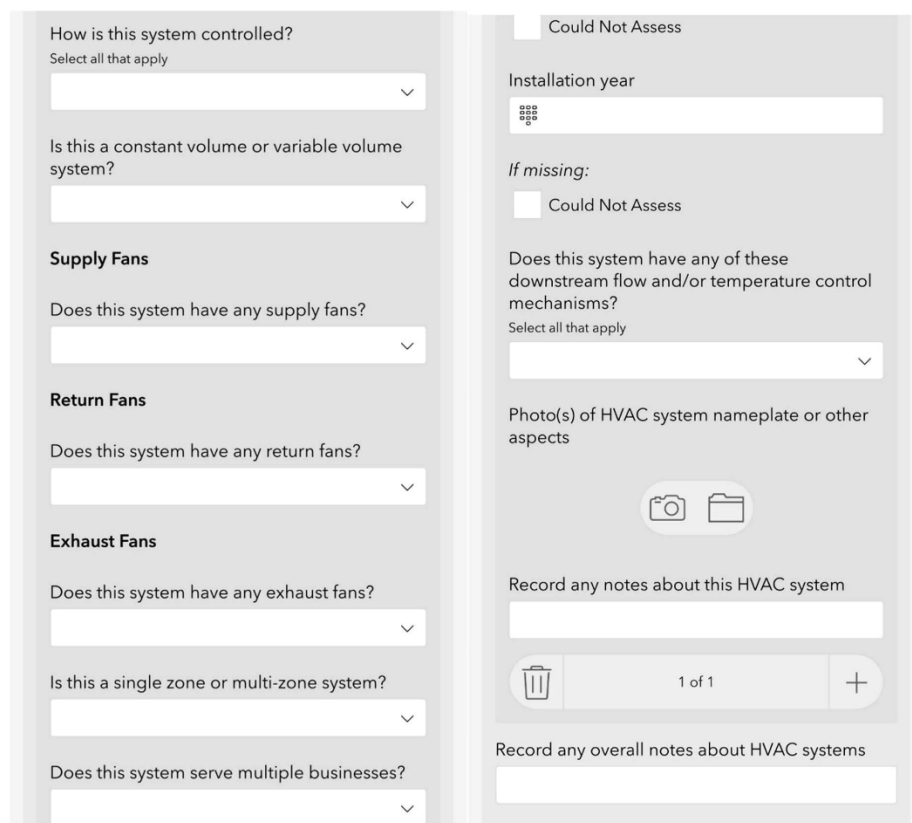
System rated airflow (CFM)

If missing:

What does this system provide?

How is this system controlled?

The technician will add a separate record for each type of HVAC system by clicking/pressing on the plus symbol on the bottom right-hand corner of the HVAC Systems section, as shown below. For cases where there are identical HVAC systems that are controlled differently, the technician will still add separate records.



How is this system controlled?
Select all that apply

Is this a constant volume or variable volume system?

Supply Fans
Does this system have any supply fans?

Return Fans
Does this system have any return fans?

Exhaust Fans
Does this system have any exhaust fans?

Is this a single zone or multi-zone system?

Does this system serve multiple businesses?

Could Not Assess

Installation year

If missing:
☐ Could Not Assess

Does this system have any of these downstream flow and/or temperature control mechanisms?
Select all that apply

Photo(s) of HVAC system nameplate or other aspects

Record any notes about this HVAC system

Record any overall notes about HVAC systems

The major components of an HVAC system are:

- System type
- System use – heating, cooling, ventilation
- Source of heating, cooling
- Rated capacities and efficiencies of heating and cooling systems/equipment
- Controls for the system

- Supply fans – quantity, speed control, fan power, motor efficiency, motor type, etc.
- Return fans – quantity, speed control, fan power, motor efficiency, motor type, etc.
- System manufacturer, model number, system age
- Flow control mechanisms downstream of the system
- Space type served by the system

What space types are served by this system?

Select all that apply

☐ Building Support - Other
 ☐ Building Support - Mechanical Room
 ☐ Building Support - Garbage
 ☐ Building Support - Electrical
 ☐ Building Support - Mechanical Mezzanine
 ☐ Process - Other
 ☐ Process - Stage/Backstage
 ☐ Process - Kitchen
 ☐ Process - Food Prep (Deli/Bakery/Meat)
 ☐ Process - Repair/Service Area
 ☐ Process - Medical Exam
 ☐ Process - Medical Procedure
 ☐ Process - Data Center
 ☐ Process - Laboratory
 ☐ Process - Laundry/Housekeeping
 ☐ Public Access - Other
 ☐ Public Access - Auditorium
 ☐ Public Access - Seating Area
 ☐ Public Access - Dining
 ☐ Public Access - Playing/Court Area
 ☐ Public Access - Gym

☐ Living Quarters - Guest Room
 ☐ Living Quarters - Patient Room
 ☐ Unknown - All

Manufacturer

If no match is found, select "Other"

Model number

Manufacture year

If missing:

☐ Could Not Assess

Installation year

If missing:

☐ Could Not Assess

Does this system have any of these downstream flow and/or temperature control mechanisms?

Select all that apply

The rated heating/cooling capacity of an HVAC system refers to the maximum amount of heat it can add/remove to/from the air being circulated in the space. The field technician will follow the steps below in recording rated heating/cooling capacities:

1. The preferred and reliable method to find this information is from the building's mechanical prints and schedules.
2. If building prints are unavailable, then the field technician should look for the manufacturer's nameplate for the equipment. This nameplate or label typically contains essential information such as model number and rated capacities.
3. If the nameplate is absent, then the technician will look for any technical specifications data sheet on site. These documents are either left on site near the equipment or are with the building manager. The specifications sheet would include heating/cooling capacities or model number.
4. If no data sheet or manual is available on site, but the technician can record a model number of the packaged RTU or AHU, then they will look up the manufacturer's specifications or the unit's technical data sheet on the internet.
5. Sometimes, a unit may have a user manual nearby, instead of a data sheet, which can also provide the model number and rated heating/cooling performance data.
6. Most packaged equipment has a serial number on it, that can be looked up online on the manufacturer's website. This will give details for that specific equipment such as make, model, year manufactured, rated heating/cooling performance, etc.
7. Sometimes, for custom units a model number or data sheet or performance specification sheet may not be available. The last resort for the technician would be to note down the fan size (HP/kW), rated airflow (CFM), and dimensions of the size of the heating/cooling element. This information can then be used to find a similar sized packaged AHU/RTU from the manufacturer's website and the corresponding heating/cooling capacity. There are inherent assumptions in this last method of estimation which brings a potential for error in estimated data.

Air handling unit (AHU) and packaged rooftop unit (RTU) HVAC types are traditional commercial equipment. AHU or RTU is a packaged or built-up HVAC system that includes both conditioning (heating and/or cooling) as well as building air-moving (supply and/or return fans) sections within the same unit. It can provide a combination of heating, cooling, and ventilation to the building.



It should be noted that RTUs may appear similar to air conditioning condensing units. However, AHUs and RTUs will always have a fan section with supply and return ductwork for building air (and may or may not include openings for exhaust air, ventilation air, and/or outdoor air). The AHU/RTU may be affixed to a rise (raised roof penetration) with the ductwork may be under the unit (as in the picture above). Condensing units only have electrical and refrigerant connections and often are loosely set on a pad on the roof or other location.

A **makeup air unit (MAU)** provides 100% outside air to make up for the air exhausted from the building through dedicated exhaust systems. MAUs may appear similar to RTUs or AHUs, however, since a MAU is 100% outdoor air it will typically have a larger intake hood, as shown below.



An **energy recovery ventilator (ERV)** is like an MAU except the exhaust air is returned to the ERV where energy from the exhaust air is recovered and used to pretreat the make-up air. An ERV will be larger than a MAU for a similar air flow CFM level and will have both an intake and exhaust hood.



The term **furnace** is usually used for forced air furnace system that provides heating to a space by forcing supply air across a combustion-based furnace or electric resistance coil. It operates with a separate air conditioning unit (AC) to provide cooling for the space. Mostly common in small spaces like homes, offices, retail stores, etc., this combination is known as a furnace and

AC combo, or a forced-air system. The furnace draws the air from the space's interior and then a blower motor distributes the conditioned air throughout the space via ductwork. The AC unit usually contains a compressor and a condenser fan and is located remotely (somewhere outside) to remove heat from the air returned from the space.



A **ductless heat pump**, also known as mini-split heat pump, is a heating and cooling system that does not require ductwork for air distribution. It consists of an outdoor unit and one or more indoor units, with refrigerant lines connected between them. The two images below show the indoor unit and how that is generally connected with the outdoor unit. The outdoor unit will be recorded in the **Heat Rejection** section.





A **variable refrigerant flow (VRF)** system is an advanced type of HVAC system that can provide heating, cooling, or both simultaneously to a building. A VRF system uses a refrigerant as medium of heating/cooling, with multiple indoor units connected to a single or multiple outdoor units. It varies the flow of refrigerant as the cooling and heating demand changes during the day in different parts of the building.

Radiant floor heating (or in-floor heating) is a heating system that warms a building by circulating hot water or electric heat through pipes or heating elements, beneath the floor surface.



Radiant overhead heating (or radiant ceiling heating) is designed to provide heat from above using an electric heating element or hot water pipe that radiates heat uniformly downwards. This system can be installed in ceilings or mounted on walls.



A **unit ventilator** provides heating, ventilation, and cooling and is commonly used in individual rooms in educational and commercial buildings for its localized control use. It has a cooling coil, heating coil, fan, outdoor air damper, all housed in a cabinet type of housing.

A **fan coil unit (FCU)** uses a coil (2- or 4-pipe) and a fan to provide heating and/or cooling to a space. The fan circulates the room air across the heating/cooling coil and filter to maintain temperature with a thermostat.

The technician will enter information on how heating is provided (such as built-in fossil fuel-based combustion, steam, hot water, electric resistance, etc.). Note that upon answering some of these questions for system use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example, when the technician answers the question "What does the system provide" with "Heating", it unlocks follow-up questions such as how the heating is provided, rated heating input capacity, heating efficiency, role/end use of this heat supplied into the building, etc. Refer to the images below.

What does this system provide?
Select all that apply

☐ Heating
☐ Cooling
☐ Ventilation

How is this system controlled?
Select all that apply

Is this a constant volume or variable volume system?

Supply Fans

Does this system have any supply fans?

Return Fans

Does this system have any return fans?

Exhaust Fans

Does this system have any exhaust fans?

What does this system provide?
Select all that apply

☒ Heating
☐ Cooling
☐ Ventilation

How is heating provided?

What is the rated heating input capacity, in kBtu/h?

What role does this system have in providing heating to this building?

Does this system have any auxiliary or backup heating?

How is this system controlled?

Is this a constant volume or variable volume system?

Similarly,

- Upon answering the question “What does this system provide” as “Cooling”, it unlocks follow-up questions such as how cooling is provided, rated cooling capacity, role/end use of this cooling supplied into the building, etc.
- Upon choosing built-in fossil fuel-based combustion as the heat source, the technician will be asked to enter the type of fuel and rated output capacity of the heating unit in the HVAC system.

What does this system provide?
Select all that apply

Cooling

How is cooling provided?

What is the rated cooling capacity, in kBtu/h?

If missing:

☐ Could Not Assess

What role does this system have in providing cooling to this building?

How is this system controlled?
Select all that apply

Is this a constant volume or variable volume system?

Supply Fans

Does this system have any supply fans?

What does this system provide?
Select all that apply

Heating

How is heating provided?

Built-in fossil fuel based combustion

What type of fuel is used?

What is the rated output capacity, in kBtu/h?

What is the rated efficiency? (%)

What is the rated heating input capacity, in kBtu/h?

The technician will document the supply, return, and exhaust fan rated power, fan speed control method, as well as fan motor type. If the system provides heating or cooling, then the technician will record the rated capacity of the heating/cooling coil for the HVAC system. This would require the technician to capture the heating/cooling coil size and model number from the HVAC system. This can be done by:

- Direct visual inspection of coil nameplate/tag for a model number and coil size on the HVAC equipment
- Mechanical plans review
- Educated estimation by looking up model number

If the central HVAC system provides heating using a boiler system, information of the associated boiler will be recorded in the **Boiler** tab. If the central HVAC system provides cooling using a chiller system, information of the associated chiller will be recorded in the **Chiller** tab.

The technician will provide the associated reference number from the Boiler and Chiller tabs for the equipment that is the primary source of heat or cool in the respective HVAC system record.

Boilers, chillers, and cooling towers are centralized equipment and can support numerous air handling units in a building and serve multiple businesses/spaces/rooms/floors. This equipment data is to be collected even if the equipment is not located within the surveyed building, if it serves the surveyed building alone. For large commercial building complexes there will often be a single location that houses boilers, chillers, meters, etc. that serve the entire building complex. The site contact may call this their “central plant” or “mechanical building” or anything else. If this central plant houses equipment or meters that solely serves the surveyed building, then the technician will record that equipment data in the survey as well. However, if a surveyed building is served by a central plant that serves multiple other buildings and neither it nor the other buildings have been selected for the survey, then the technician will not record that equipment in the survey as that equipment is being shared among several other buildings and is not dedicated to the surveyed building alone. In such a case the fact that the surveyed building is served by a central plant should be noted in the survey notes.

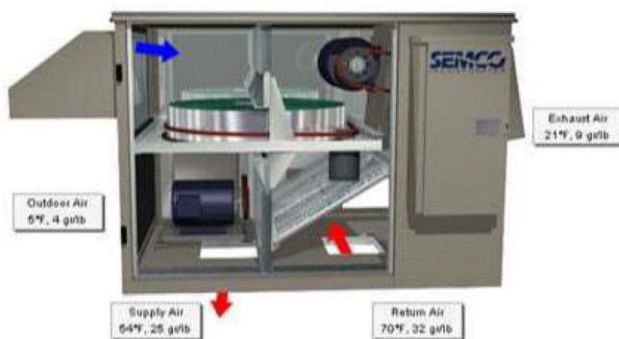
During the arrival check-in, the field technician will learn if such central equipment is present and where they are located to make sure this information is collected. It is highly likely that the site contact or a facilities manager will accompany the field technician to view this central equipment.

The technician will document any ventilation heat or energy recovery systems installed on the HVAC System. A common type of heat recovery system is a crossflow **heat exchanger**, like the one shown below. However, other types, such as heat pipes or run-around-loops may be found

in some cases. Systems with heat recovery are typically larger (longer) than systems without heat recovery.



Energy recovery systems are similar to heat recovery systems. However, energy recovery systems recover both sensible (temperature) and latent (water vapor) loads. These systems are commonly rotating disk/drum systems, like the unit shown below. These systems are usually smaller than systems with just heat recovery (but larger than systems without any heat/energy recovery).



The technician will identify the presence of HRV/ERV systems through inspection of the unit and/or nameplate, as well as by feeling the exhaust air stream temperature. If the unit has heat/energy recovery the exhaust temperature will be closer to the outdoor air temperature than the indoor air temperature. For example, the exhaust temperature on a 50°F-day would likely be

around 55°F for a system with heat or energy recovery but be close to 70°F for systems without heat/energy recovery.

Additional questions may also be asked about the **ventilation** control (outside air damper control, fan speed modulation, etc.), downstream flow and/or temperature control mechanisms associated with this equipment.

Ventilation

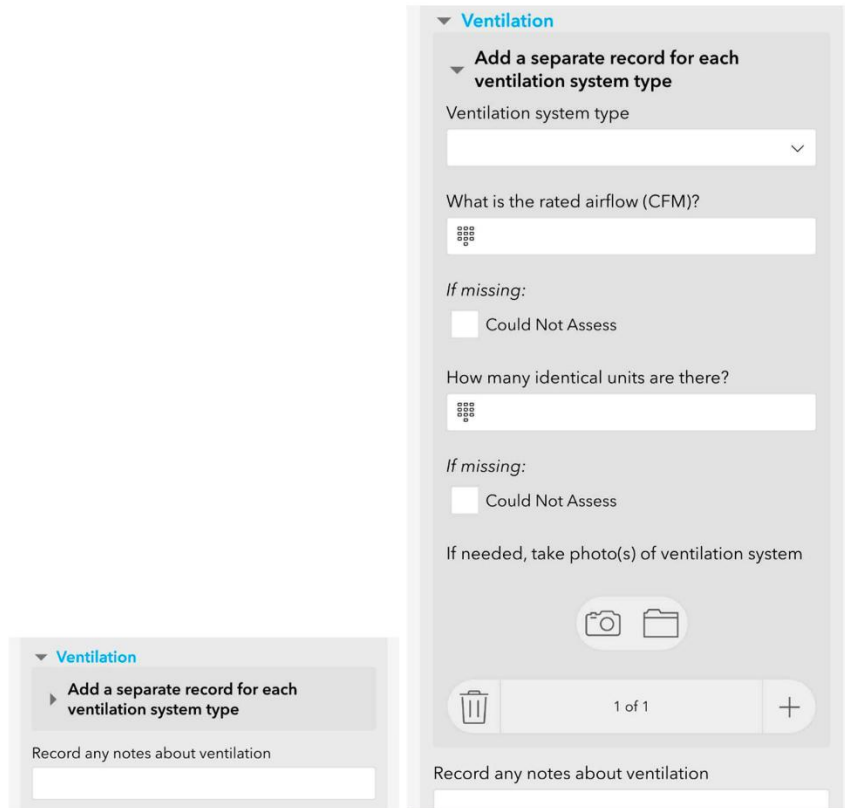
This tab collects information about exhaust fans, and ventilation units associated with the site. Ventilation includes more specialized equipment than a standard AHU or RTU. These are the mechanical units that bring fresh outdoor air into a space, heated/cooled or otherwise. They include exhausts for bathrooms, labs and kitchens, energy recovery ventilators (ERVs), heat recovery ventilators (HRVs), garage ventilation, etc. These units differ from AHUs as they are not designed to condition the space but to exhaust air from the space, in particular.

In case of different types of control methods for identical ventilation equipment, the technician will list each of them separately in their own entry so that we have more granular information about all types of ventilation equipment and their control features.

While entering data for a ventilation equipment, the technician will record whether there is a makeup air unit or other HVAC system/equipment tied to the ventilation unit, that is intended to balance the airflow by bringing fresh outdoor air (heated/cooled or otherwise) into the space.

Note that ERVs and HRVs are bring in fresh outdoor air as well as exhaust air from the space they serve. The technician will input the ERV and HRV data into the HVAC Systems section and put their unit ID from HVAC Systems as an associated makeup air unit in the Ventilation section.

To start recording data, expand the ventilation entry section, as shown below.



The technician will add a separate record for each type of ventilation unit by clicking/pressing on the plus symbol on the bottom right-hand corner of the ventilation section, as shown above.

Note that upon answering some of the questions for ventilation equipment use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example, when the technician selects a ventilation system type, the survey tool follows up by asking about a makeup air unit. When the technician answers the question "Is there a makeup air unit tied to this ventilation system" with "Yes", it unlocks follow-up questions such as the associated HVAC system, manufacturer, model number, rated fan motor size, presence of

energy recovery mechanism on exhaust air, control method for the system, and control method for the fan speed. Refer to the images below.

Ventilation

▼ Add a separate record for each ventilation system type

Ventilation system type

Bathroom exhaust ▼

What is the rated airflow (CFM)?

000

If missing:

☐ Could Not Assess

How many identical units are there?

000

If missing:

☐ Could Not Assess

Is there a makeup air unit or other similar HVAC equipment tied to this ventilation system that is intended to balance the airflow (controlled together)?

▼

If needed, take photo(s) of ventilation system

Is there a makeup air unit or other similar HVAC equipment tied to this ventilation system that is intended to balance the airflow (controlled together)?

Yes ▼

HVAC System 1: AHU1

HVAC System 2: MAU - Kitchens

Which HVAC system is associated with this ventilation system?

Select all that apply

▼

Manufacturer

Model number

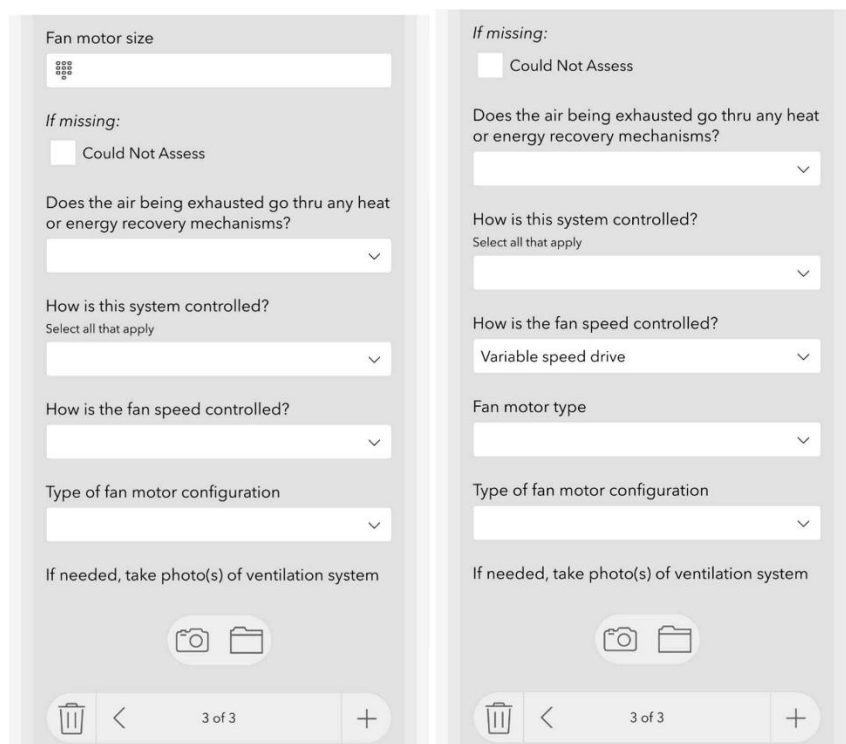
Fan motor size

000

If missing:

☐ Could Not Assess

Does the air being exhausted go thru any heat or energy recovery mechanisms?



Fan motor size

☐ Could Not Assess

If missing:

☐ Could Not Assess

Does the air being exhausted go thru any heat or energy recovery mechanisms?

How is this system controlled?

Select all that apply

How is the fan speed controlled?

Type of fan motor configuration

If needed, take photo(s) of ventilation system

3 of 3

If missing:

☐ Could Not Assess

Does the air being exhausted go thru any heat or energy recovery mechanisms?

How is this system controlled?

Select all that apply

How is the fan speed controlled?

Variable speed drive

Fan motor type

Type of fan motor configuration

If needed, take photo(s) of ventilation system

3 of 3

Similarly, when the technician answers the question “How is fan speed controlled” with any option other than ECM or Q-sync motor, it unlocks the follow-up question for fan motor type.

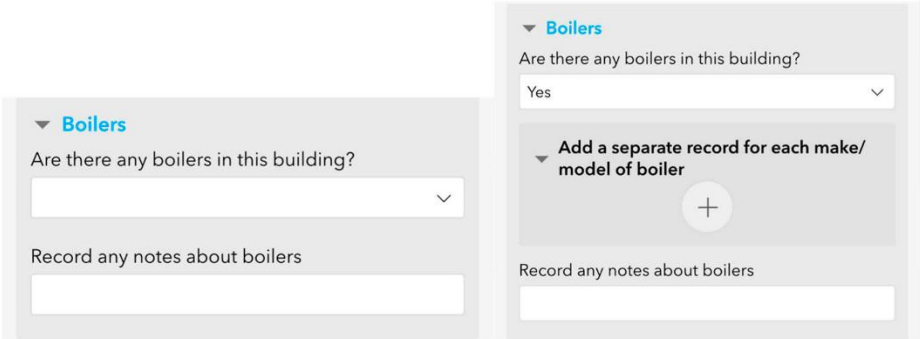
Note that **garage ventilation** can vary but will include either a supply or return fan with the purpose of supplying or drawing in fresh outside air into the parking structure. These systems will typically have specialized controls to limit operation based on car exhaust levels via carbon monoxide controls (CO) not to be confused with interior ventilation controls of carbon dioxide (CO₂).

Boilers

This tab collects information on the boiler systems in the building. The technician is expected to identify, as accurately as possible, the details about the boiler such as fuel type, draft type, manufacturer, model number, rated capacities, efficiency, capacity control, quantity, boiler age,

any features, etc. The technician will first answer the gate question for whether there is a boiler in the building. If yes, then the survey tool will follow-up by asking about the details.

To start recording data, expand the boiler entry section, as shown below.



In case of different types of control methods for identical boilers, the technician will list each of them separately in their own entry so that we have more granular information about all types of boiler equipment, controls, and their control features.

The technician will add a separate record for each type of boiler by clicking/pressing on the plus symbol on the bottom right-hand corner of the boiler section, as shown below.

Boilers

Are there any boilers in this building?

Yes

Add a separate record for each make/model of boiler

Boiler type

Fuel type

Capacity control

Number of identical units

If missing:

Could Not Assess

Rated input capacity (kBtu/hr)

If missing:

Could Not Assess

If missing:

Could Not Assess

Boiler use

Select all that apply

Does this boiler provide steam or hot water to any HVAC system?

Is this boiler connected to an energy management system?

Photo(s) of boiler nameplate or other aspects

1 of 1

Record any notes about boilers

Boilers generate hot water or steam that can be utilized by a facility for multiple purposes. The steam boilers can be identified by pressure gauges on the boiler with low pressure systems (LPS) being below 15 PSI while high pressure systems (HPS) reaching pressures above 100 psi. The hot water boilers will have temperature gauges and will never be above the boiling point. Boilers can come in a variety of configurations including instantaneous (no tank) or a tank with the fire/combustion tubes running through the water in the boiler. They most commonly burn natural gas but can run on other fuels such as electricity, propane, wood or coal. The efficiency of the boiler will vary widely based on its designs but are typically about 80% efficient with efficient models up to 87%. Above 87% efficiency the boiler is considered a condensing boiler. Large non-condensing boilers are typically a horizontal cylinder (like the image below at left) while smaller boilers and condensing boilers are typically in a rectangular enclosure (like

the image below at right). If the boiler is condensing, the field technician will select condensing for combustion type.



Note that upon answering some of the questions about equipment use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example, when the technician answers the question of fuel type with "Natural Gas", it unlocks the follow-up question asking for draft type and features. Refer to the image below.

▼
Boilers

Are there any boilers in this building?

Yes ▼

▼
Add a separate record for each make/
model of boiler

Boiler type

Steam ▼

Fuel type

Natural Gas ▼

Draft type?

▼

Which features are present?

Select all that apply

▼

Capacity control

▼

Number of identical units

000

000

0

If missing:

Could Not Assess

Chillers

Input data regarding chillers, if any, on site. The technician is expected to identify, as accurately as possible, the details about the chiller such as manufacturer, model no., rated capacities, efficiency, motor sizes, any features, etc. The technician will first answer the gate question for whether there is a chiller in the building. If yes, then the survey tool will follow-up by asking about the details. To start recording data, expand the chiller entry section, as shown below.

▼ **Chillers**

Are there any chillers in this building?

☐ Yes
 ☐ No
 ☐ Could Not Assess

Record any notes about chillers

▼ **Chillers**

Are there any chillers in this building?

Yes

► **Add a separate record for each make/model of chiller**

Record any notes about chillers

In the case of different types of control methods for identical chillers, the technician will list each of them separately in their own entry so that we have more granular information about all types of chillers, controls, and their control features.

The technician will add a separate record for each type of chiller by clicking/pressing on the plus symbol on the bottom right-hand corner of the chiller section, as shown below.

Chillers

Are there any chillers in this building?

Yes

Add a separate record for each make/model of chiller

Chiller type

Chiller use

Does this chiller provide chilled water to any HVAC system?

Number of identical units

If missing:

Could Not Assess

Manufacturer

If no match is found, select "Other"

Model number

Rated capacity

If missing:

Could Not Assess

What features are present?

Select all that apply

Heat rejection mechanism

Is this chiller connected to an energy management system?

Photo(s) of chiller nameplate or other aspects

1 of 1

Record any notes about chillers

Chillers provide cooling via circulated chilled water. Chillers are intended to meet large cooling loads, and therefore would typically only be found in high-rise buildings or large mid-rise buildings. Common types include Trane, York, Carrier, or Multistack. Chillers will have piping connected to them to circulate the chilled water and will utilize pumps to circulate the chilled water. The information on these pumps is collected under the “pumping systems” section. Chillers come in four primary configurations.

Air-cooled chillers are typically located outside. They will typically be constructed as a “skid” with the compressors on the bottom and the condensers located above to cool the refrigerant, as shown below.

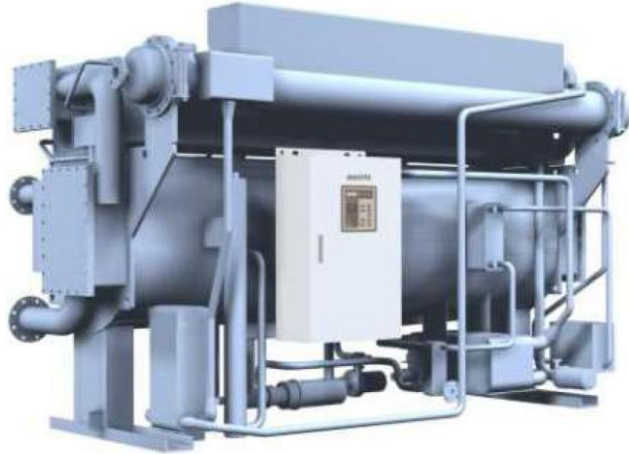


Water-cooled chillers are typically larger chillers. They will have two tube bundles (large circular horizontal chambers), as shown below. One of the chambers is for the chilled building water and one for warmer condenser water that will circulate to a cooling tower to reject the heat. Electric chillers will have a reciprocating, rotary screw, or centrifugal compressor on top. In addition to the chilled water pumps, water-cooled chillers will have condenser (or tower) pumps to circulate the warm water to the cooling towers.



Absorption chillers utilize heat (such as steam) to drive a thermodynamic process to provide cooling. They are typically very large and will not have the compressors found on other chiller

systems but will have pumps to circulate the chemical solution within.



Heat Recovery Chillers capture, and reuse waste heat generated during the cooling process. These chillers are designed to both cool a building and recover the heat the chiller extracted from the space, to then use it for other purposes, such as heating water or providing space heating.

Note that upon answering some of the questions for chiller equipment use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example, when the technician answers the question of chiller type, it unlocks the follow-up question asking for compressor type. Refer to the images below.

▼ Add a separate record for each make/model of chiller

Chiller type

☐ Air-Cooled
☐ Water-Cooled
☐ Heat Recovery Chiller
☐ Absorption
☐ Could Not Assess

Chiller use

Does this chiller provide chilled water to any HVAC system?

Number of identical units

If missing:

☐ Could Not Assess

Manufacturer

If no match is found, select "Other"

▼ Add a separate record for each make/model of chiller

Chiller type

☐ Air-Cooled

Compressor type

☐ Centrifugal
☐ Screw
☐ Reciprocating
☐ Scroll
☐ Other

Chiller use

Does this chiller provide chilled water to any HVAC system?

HVAC System 1: AHU1

HVAC System 2: MAU - Kitchens

Which HVAC system does this chiller provide chilled water to?

Select all that apply

HVAC Heat Rejection

This tab collects information about any equipment on site for heat rejection, such as a remote condenser, cooling tower, heat pump, or a dry cooler. The technician is expected to identify, as accurately as possible, the details about the equipment such as manufacturer, model, rated capacities, end use, control methods, etc.

To start recording data, expand the heat rejection entry section, as shown below.

HVAC Heat Rejection

Add a separate record for each type of heat rejection equipment associated with HVAC

You have recorded a total of 2 heat rejection units in this building. Is this correct?

How are the heat rejection units sequenced?

How many heat rejection units are used for backup or standby?

If missing:

☐ Could Not Assess

Record any notes about heat rejection equipment

HVAC Heat Rejection

Add a separate record for each type of heat rejection equipment associated with HVAC

Type of heat rejection equipment

Heat rejection equipment use
Select all that apply

Is this heat rejection equipment connected to any HVAC system?

Manufacturer

Model number

Manufacture year

If missing:

☐ Could Not Assess

Number of identical pieces of equipment

In the case of different types of control methods for identical heat rejection equipment, the technician will list each of them separately in their own entry so that we have more granular information about all types of heat rejection equipment and their control features.

The technician will add a separate record for each type of heat rejection system/unit by clicking/pressing on the plus symbol on the bottom right-hand corner of this section, as shown below.

Fan drive type

Rated efficiency of heat rejection system

If missing:

☐ Could Not Assess

Can some or all of the rejected heat be recovered, when appropriate?

Is the heat rejection equipment connected to an energy management system?

If needed, take photo(s) of heating rejection equipment

Record any notes about heat rejection equipment

Major components of this section are:

- Type of heat rejection system – cooling tower, dry cooler, evaporative cooler, remote air-cooled condenser, heat pump
- Equipment use – space cooling, process cooling, commercial refrigeration, industrial refrigeration
- Manufacturer, model number, unit age, rated capacity, rated efficiency
- Fan motor power, motor type, fan control method
- Opportunity for heat recovery
- Heat rejection units' operation sequence

Cooling Towers utilize ambient air conditions to cool water through evaporation that is used by chillers or water-source heat pump systems to provide building cooling. Cooling towers are mostly located on the roof but can be located on the ground surrounding a building as well. The cooling tower will either have a fan on top to draw air up through the tower (as shown below at left) or a fan on the bottom to push air through the tower (as shown below at right). Common types include Evapco and Baltimore AirCoil (BAC).



Energy Management Systems (EMS)

This tab collects information about the centralized controls on cooling, heating, and ventilation equipment in the building. This tab captures the controls capabilities of the existing system, any controls related issues that are apparent to the technician, and the presence of hydronic loops in the space. The technician will first answer the gate question for whether there is an energy management system in the building. If yes, then the survey tool will follow-up by asking about the details.

Energy Management System

Is there an energy management system in this building?

☐ Yes
 ☐ No
 ☐ Could Not Assess

Record any notes about energy management system

▼

Energy Management System

Is there an energy management system in this building?

Yes

Energy management system type

Are there any notable control issues at the facility?

If so, please describe.

Does the building have any hydronic loops or condenser water loops?

Does the building have any multi-zone HVAC systems?

Which of these control capabilities exist and are enabled for the HVAC equipment in this building?

Select all that apply

Which control capabilities exist but are disabled?

Select all that apply

Note that upon answering some of the questions for system use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example,

- when the technician answers the question for type of energy management system with a DDC energy management system, it unlocks the follow-up question asking for accessibility of the EMS off-site
- when the technician confirms the presence of hydronic loops or condenser water loops, it unlocks the follow-up question asking for hydronic loop controls enabled on site

Energy management system type

DDC energy management system ^

☒ DDC energy management system
☐ Pneumatic
☐ Mix of DDC and pneumatic
☐ Could Not Assess

Is the DDC system accessible from off-site?

^

Are there any notable control issues at the facility?
If so, please describe.

Does the building have any hydronic loops or condenser water loops?

^

Does the building have any multi-zone HVAC systems?

^

Which of these control capabilities exist and are enabled for the HVAC equipment in this building?
Select all that apply

^

Does the building have any hydronic loops or condenser water loops?

Yes v

Which hydronic loop controls are installed and enabled?
Select all that apply

^

☐ Hot water temperature reset
☐ Chilled water temperature reset
☐ Condenser water temperature reset
☐ Other advanced controls
☐ None of these

Which hydronic loop controls are installed but disabled?
Select all that apply

^

Does the building have any multi-zone HVAC systems?

^

Which of these control capabilities exist and are enabled for the HVAC equipment in this building?
Select all that apply

^

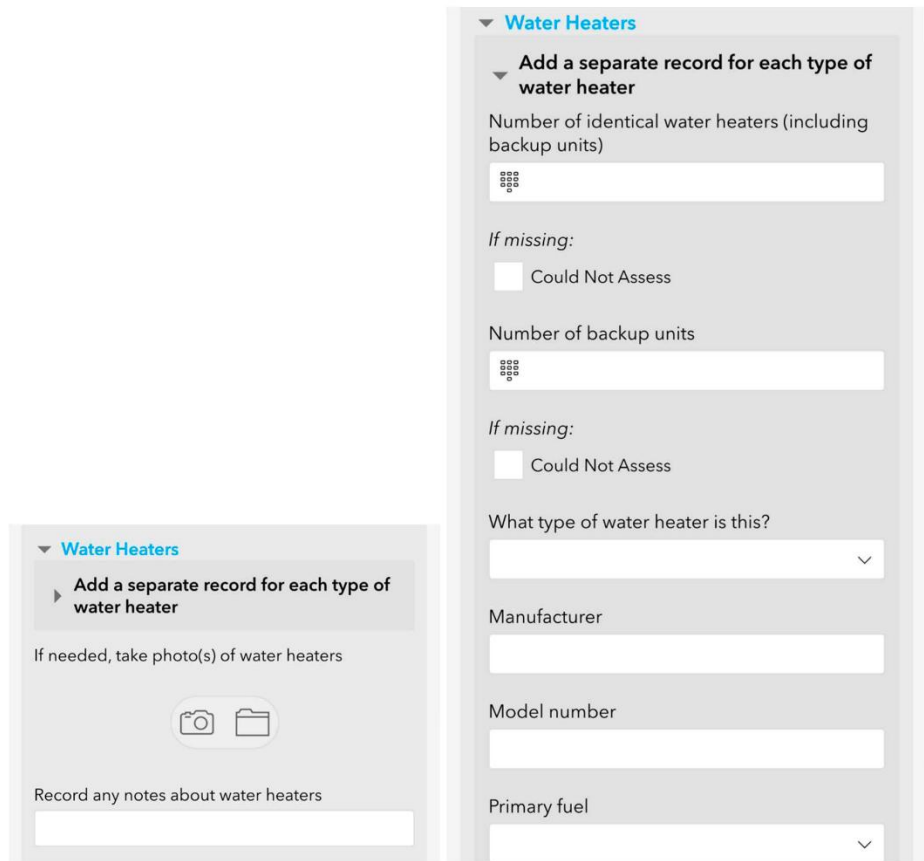
Water Heaters

The technician will group the identical water heaters together by their characteristics (e.g., type of water heater, fuel, installation, capacity, etc.). Input data such as

- number of identical water heaters, type of water heater, unit age
- primary and backup fuels
- tank capacity for heated water storage
- heating input capacity (in kW or kBtu)
- ENERGY STAR certification
- external tank insulation

- recirculation system, recirculation pump rated capacity, pump rated efficiency, pump control method

To start recording data, expand the water heater entry section, as shown below.



Water Heaters

Add a separate record for each type of water heater

Number of identical water heaters (including backup units)

If missing: ☐ Could Not Assess

Number of backup units

If missing: ☐ Could Not Assess

What type of water heater is this?

Manufacturer

Model number

Primary fuel

If needed, take photo(s) of water heaters

Record any notes about water heaters

The technician will add a separate record for each type of water heater by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown below.

In case of different types of recirculation pump controls method for identical water heater, the technician will list each of them separately in their own entry so that we have more granular information about types of hot water recirculation system.

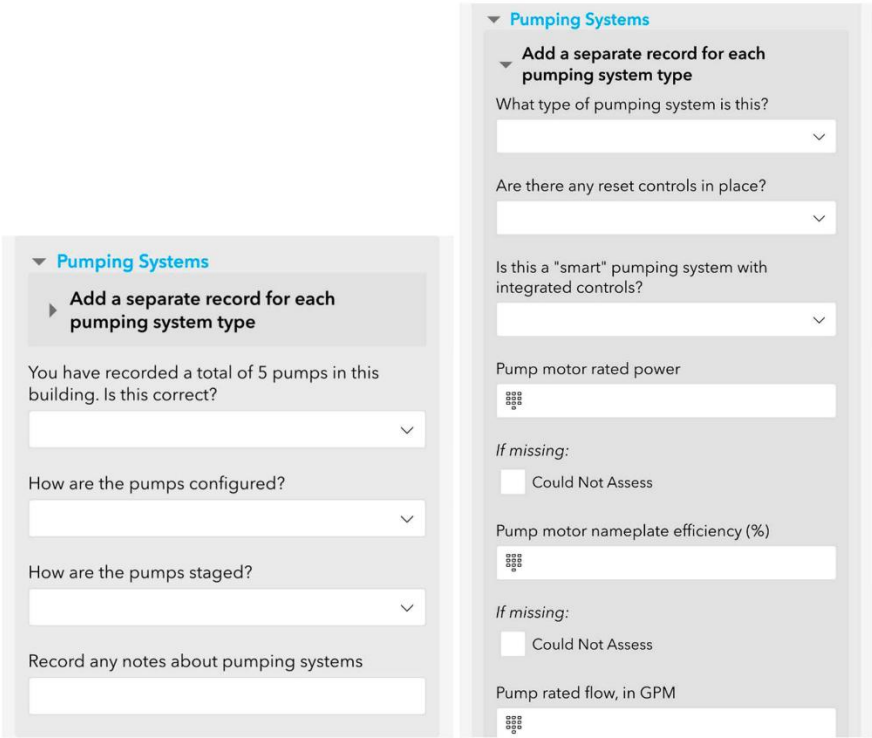
The technician will record all the pumps associated with the water heaters in the **Pumping Systems** section.

Pumping Systems

This section includes HVAC heating and cooling pumps, process heating and cooling pumps, domestic hot water pumps, water booster pumps, circulation pumps, cooling tower (condenser water) pumps, or any other pumps found on-site. In case of different types of pump controls methods for identical pumps, the technician will list each of them separately in their own entry so that we have more granular information about pumping systems.

For pumps that are connected to a central equipment like a boiler, chiller, or water heater, the technician will enter the associated central equipment ID in respective pumping system record.

To start recording data, expand the pumping system section, as shown below.



Pumping Systems

+ Add a separate record for each pumping system type

You have recorded a total of 5 pumps in this building. Is this correct?

How are the pumps configured?

How are the pumps staged?

Record any notes about pumping systems

Pumping Systems

+ Add a separate record for each pumping system type

What type of pumping system is this?

Are there any reset controls in place?

Is this a "smart" pumping system with integrated controls?

Pump motor rated power

If missing:

☐ Could Not Assess

Pump motor nameplate efficiency (%)

If missing:

☐ Could Not Assess

Pump rated flow, in GPM

The technician will add a separate record for each type of pumping system by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown below.

If missing:

☐ Could Not Assess

Pump Energy Index (PEI)

If missing:

☐ Could Not Assess

Manufacturer

Model number

Number of identical pumps in the system

If missing:

☐ Could Not Assess

If needed, take photo(s) of pumping system

  3 of 3 

The site technician will record the following major components-

- Type of pumping system
- Smart pumping systems with integrated controls
- Configuration (such as primary/secondary, constant/variable)
- Quantity of identical pumps
- Rated power and flow, nameplate efficiency, model number, manufacturer
- Any reset controls present on the system
- Associated HVAC systems, if any

Note that upon answering some of the questions for pumping equipment use and type, the survey will ask follow-up questions that were originally hidden. This conditional logic works to

ensure that the technician can input all the relevant information for that equipment and/or system.

For example,

- when the technician answers the question for type of pumping system with a hydronic HVAC heating or cooling system, it unlocks the follow-up question asking for the associated HVAC system, pumping loop configuration, any reset control, etc.
- when the technician confirms the loop configuration as being variable for primary or secondary pump, it unlocks the follow-up questions for the method and basis of pump controls

Pumping Systems

Add a separate record for each pumping system type

What type of pumping system is this?
Hydronic HVAC cooling (chilled water) loop

Is this pumping system associated with any HVAC system?

Loop configuration?

Are there any reset controls in place?

Is this a "smart" pumping system with integrated controls?

Pump motor rated power

If missing:
☐ Could Not Assess

Pump motor nameplate efficiency (%)

Loop configuration?
Variable primary

How is pumping being controlled?

What is the pump control based on?

Are there any reset controls in place?

Is this a "smart" pumping system with integrated controls?

Pump motor rated power

If missing:
☐ Could Not Assess

Pump motor nameplate efficiency (%)

If missing:
☐ Could Not Assess

Food Service Equipment

The field technician will collect information about commercial food service equipment – i.e., equipment that is used in a commercial setting such as a restaurant or cafeteria. This includes kitchen hoods, electric warmers, food holding cabinets, broilers, fryers, ovens, dishwasher booster heaters, griddles and grills, steamers, ranges, microwaves, pre-rinse spray valves, commercial freezers, and commercial refrigerators (full and half height).

To start recording data, expand the food service equipment section, as shown below. Answer the gate question for whether there is any food service equipment in the building. If yes, then the survey tool will follow up by asking about the types of food service equipment present in the building. Select all the relevant equipment types from the drop down and enter their respective data in the follow-up questions after that.

▼ **Food Service Equipment**

Is there any food service equipment in this building?

Yes ▼

Which of these food service equipment types are in this building?

Select all that apply

^

- ☐ Kitchen hoods
- ☐ Electric warming equipment to maintain temperatures below 135°F
- ☐ Hot food holding cabinets to maintain temperatures above 135 °F
- ☐ Broilers
- ☐ Fryers
- ☐ Ovens (convection/hot air or combination type)
- ☐ Ovens (regular, non-convection type)
- ☐ Dishwasher booster heaters heater provides 180°F (82°C) final rinse water
- ☐ Griddles or grills
- ☐ Ranges
- ☐ Steamers
- ☐ Microwaves
- ☐ Pre-rinse spray valves
- ☐ Commercial freezers

▼ **Food Service Equipment**

Is there any food service equipment in this building?

▼

Which of these food service equipment types are in this building?
Select all that apply

Kitchen hoods, Electric warming equipment to maintain temperatures below 135°F, Hot food holding cabinets to maintain temperatures above 135°F, Broilers, Fryers

Total linear feet of kitchen hood

If missing:

☐ Could Not Assess

Number of electric warmers (to maintain temperatures below 135°F)

If missing:

☐ Could Not Assess

Number of hot food holding cabinets (to maintain temperatures above 135°F)

If missing:

☐ Could Not Assess

Number of broilers

Refrigeration Equipment

The refrigeration equipment tab collects information for reach-in refrigerators, refrigerated display cases, walk-ins (coolers and freezers), storage boxes, refrigeration compressors, and refrigeration condenser units.

The technician will first answer the gate question of whether there is any refrigeration equipment in the building. If yes, then the technician will record data. To start recording data, expand the refrigeration equipment section, as shown below. Expand the refrigeration equipment sub-sections found on site from the four options and record the respective data.

▼
Refrigeration Equipment

Is there any refrigeration equipment in this building?

Yes

☒ Yes
☐ No
☐ Could Not Assess

▶ Reach-Ins & Display Cases

▶ Walk-Ins & Storage Boxes

▶ Refrigeration: Compressors

▶ Refrigeration: Condensers

Reach-ins and Display Cases

This sub-section records data for any reach-in refrigeration units or display cases found on site. The technician will record the refrigerated case type, temperature range, whether it's a self-contained compressor/condenser, refrigerant type, dimensions of the unit, door type, number of doors, presence of anti-sweat door (ASH) with/without controls, primary and secondary lighting, lighting length, count and wattages, lighting schedule, etc.

To start recording data, expand the Reach-in & Display Cases section, as shown below.

Reach-Ins & Display Cases

Add a separate record for each type of reach-in or display case

If needed, take photo(s) of reach-ins or display cases




Record any notes about reach-ins or display cases

Reach-Ins & Display Cases

Add a separate record for each type of reach-in or display case

Case type

Temperature type

Self-contained compressor/condenser?

Refrigerant type

Length (feet)

If missing:

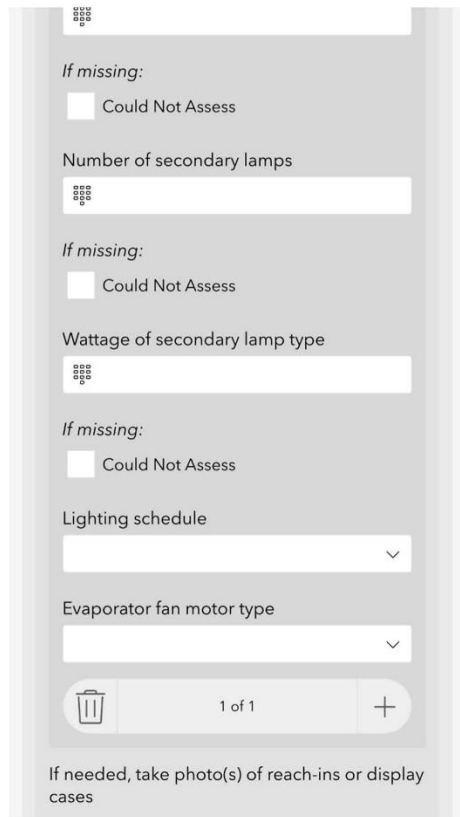
☐ Could Not Assess

Depth (feet)

If missing:

☐ Could Not Assess

The technician will add a separate record for each type of reach-in or display case by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown in the image below.



If missing:
☐ Could Not Assess

Number of secondary lamps

If missing:
☐ Could Not Assess

Wattage of secondary lamp type

If missing:
☐ Could Not Assess

Lighting schedule

Evaporator fan motor type

 1 of 1 

If needed, take photo(s) of reach-ins or display cases

Walk-ins and Storage Boxes

This sub-section records data for any walk-in coolers or freezers, and storage boxes found on site. Refrigerated walk-ins (walk-in coolers or freezers) are meant for regular access by customers or employees, while storage boxes are meant for only temporary access by employees (such as for re-stocking).

The technician will record the presence and number of walk-ins or storage boxes, temperature range, refrigerant type, dimensions, type of doorway protection, primary and secondary lighting type, lighting length, count and wattages, lighting schedule, and evaporator fan controls.

To start recording data, expand the Walk-ins & Storage Boxes section, as shown below.

Walk-Ins & Storage Boxes

Add a separate record for each type of walk-in or storage box

If needed, take photo(s) of walk-ins or storage boxes




Record any notes about walk-ins or storage boxes

Walk-Ins & Storage Boxes

Add a separate record for each type of walk-in or storage box

Walk-in or storage box?

Number of identical units

If missing:

☐ Could Not Assess

Temperature type

Refrigerant type

Internal width (feet)

If missing:

☐ Could Not Assess

Internal depth (feet)

The technician will add a separate record for each type of walk-in or storage box by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown in the image below.

☐ Could Not Assess

Number of secondary lamps

If missing:
☐ Could Not Assess

Wattage of secondary lamp type

If missing:
☐ Could Not Assess

Lighting schedule

Evaporator fan controls?

Evaporator fan motor type

1 of 1

If needed, take photo(s) of walk-ins or storage boxes

Refrigeration: Compressors

The technician will record data about refrigeration compressors found on site, such as compressor type, system type, design suction temperature, number of identical compressors, rated power per compressor, and type of heat recovery system on the compressor (if any).

To start recording data, expand the compressor section, as shown below.

Refrigeration: Compressors

Add a separate record for each type of compressor

If needed, take photo(s) of refrigeration compressors




Record any notes about refrigeration compressors

Refrigeration: Compressors

Add a separate record for each type of compressor

Compressor type

System type

Is VFD present?

Type of compressor control

Design suction temp

Number of identical compressors

If missing:

☐ Could Not Assess

Total HP (per compressor)

The technician will add a separate record for each type of refrigeration compressor by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown in the image above.

Type of compressor control

Design suction temp

Number of identical compressors

If missing:

☐ Could Not Assess

Total HP (per compressor)

If missing:

☐ Could Not Assess

Heat recovery type

Select all that apply



1 of 1



If needed, take photo(s) of refrigeration compressors

Refrigeration: Condensers

The technician will record data about refrigeration condensers found on site, such as condenser type, number of identical units, rated power per condenser fan, and presence of floating head/suction pressure controls on the condenser.

To start recording data, expand the condenser section, as shown below.

Refrigeration: Condensers

Add a separate record for each type of condenser

If needed, take photo(s) of refrigeration condensers

Record any notes about refrigeration condensers

Refrigeration: Condensers

Add a separate record for each type of condenser

Condenser type

Number of identical condensers

If missing:

☐ Could Not Assess

Total HP (per condenser fan)

If missing:

☐ Could Not Assess

Fan control method

Fan drive type

Rated efficiency of condenser

The technician will add a separate record for each type of refrigeration condenser by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown in the image above.

Fan control method

Fan drive type

Rated efficiency of condenser

If missing:

☐ Could Not Assess

Can some or all of the rejected heat be recovered, when appropriate?

Is the condenser connected to an energy management system?

Are there floating head or suction pressure controls?

1 of 1

+

If needed, take photo(s) of refrigeration condensers

Indoor and Outdoor Lighting

This section includes all data about interior and exterior lighting equipment. The technician will record information such as:

- fixture type
- space type served by this fixture
- total number of identical fixtures
- lamp technology – LED, fluorescent, halogen, incandescent, etc.
- number of lamps per fixture
- watts per lamp

- source of information – observation, plans, interview, replacement stock, educated guess, etc.
- lighting application
- fixture length
- percent of fixtures that are always on (such as emergency lights)
- indoor or outdoor
- fixture height
- lighting control strategies in use
- lighting control sensors in use
- lighting control communication in use

To start recording data, expand the indoor/outdoor lighting section, as shown below.

▼ Indoor and Outdoor Lighting

► Add a separate record for each lighting fixture type

If needed, take photo(s) of indoor or outdoor lighting




Record any notes about indoor or outdoor lighting

▼ Indoor and Outdoor Lighting

▼ Add a separate record for each lighting fixture and space type

Fixture type

Space type served by this fixture

Total number of identical fixtures (including redundant units)

If missing:

☐ Could Not Assess

Lamp technology

Number of lamps per fixture

If missing:

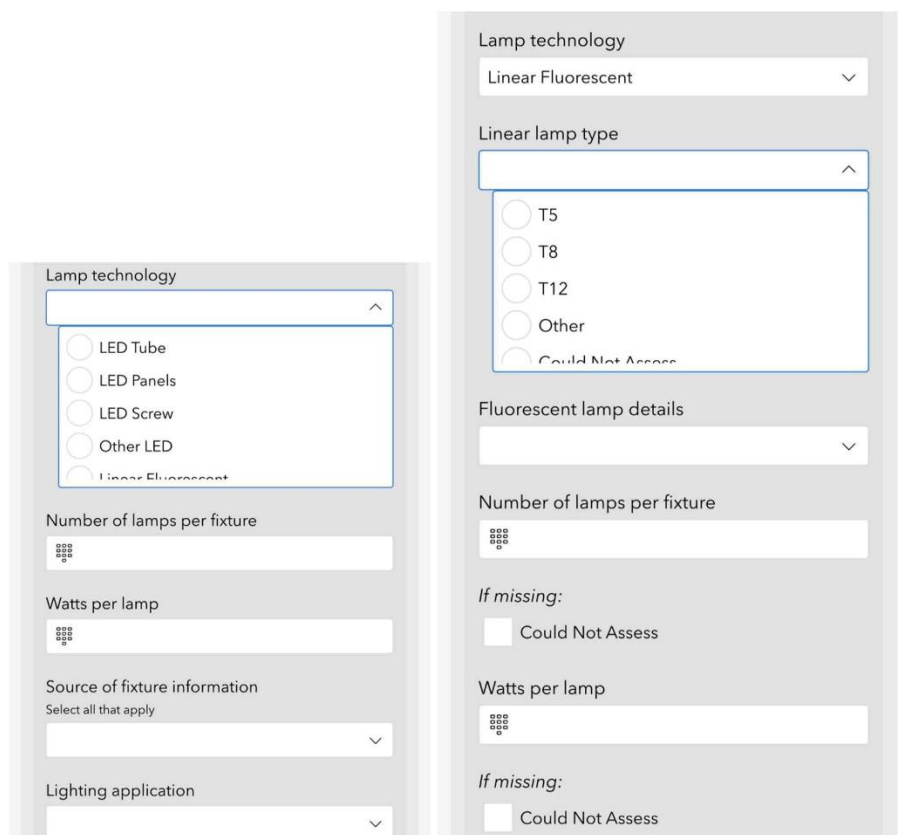
☐ Could Not Assess

Watts per lamp

In the case where identical lighting equipment have different types of lighting controls methods or serve different types of spaces, this lighting equipment will be listed separately in unique entries so that we have more granular information about all types of lighting equipment, their controls, and space types served.

The technician will add a separate record for each type of lighting by clicking/pressing on the plus symbol on the bottom right-hand corner of the section, as shown in the image below.

For example, when the technician answers the question of lamp technology with "Linear fluorescent", the survey unlocks the follow-up question asking for linear lamp type. Refer to the images below.



Lamp technology

Linear Fluorescent

Linear lamp type

T5
T8
T12
Other
Could Not Assess

Fluorescent lamp details

Number of lamps per fixture

Watts per lamp

Source of fixture information
Select all that apply

Lighting application

Lamp technology

LED Tube
LED Panels
LED Screw
Other LED
Linear Fluorescent

Number of lamps per fixture

Watts per lamp

Source of fixture information
Select all that apply

Lighting application

Fluorescent lamp details

Number of lamps per fixture

Watts per lamp

If missing:
Could Not Assess

If missing:
Could Not Assess

Similarly, when the technician selects whether the light fixture is indoor or outdoor, the survey unlocks the relevant follow-up question -

- Indoor lights - fixture height, lighting control strategies, lighting control sensors, and lighting control communications in use, etc.
- Outdoor lights - location of outdoor light, control type, controls functional or not, etc.

Indoor or Outdoor?

Indoor

Select all lighting control strategies in use

Select all that apply

Select all lighting control sensors in use

Select all that apply

Select all lighting control communications in use

Select all that apply

Are controls functional and used?

Source of fixture information

Record any notes about lighting fixture type

1 of 1

Indoor or Outdoor?

Outdoor

Where is the outdoor lighting located?

Control type

Are controls functional and used?

Source of fixture information

Record any notes about lighting fixture type

1 of 1

If needed, take photo(s) of indoor or outdoor lighting

As much as possible, the technician should try to get accurate data for the lighting equipment within the constraints of time, access, knowledge, etc. The technician will enter their source of lighting equipment information in the following order of preference-

- Observation
- Plans
- Interview
- Replacement Stock
- Educated Guess
- Other

For larger buildings with many identical fixtures and lamps in common areas, field technicians will follow the Lighting Sub-Sampling Protocol and inspect only a sample of hallway, stairwell and parking area fixtures and lamps. Group lights together based on their common characteristics (space, fixture, light, ballast, wattage, hours).

Exterior Lighting

This includes exterior lighting on the site of the building, lighted walkways, parking lots, and parking garages that are a part of the building's property. Follow the Lighting Sub-Sampling Protocol to determine how many fixtures to survey.

Lighting in Common Areas

For buildings where there are multiple floors with repeating hallway configurations (i.e., the same layout with identical fixture types and counts), or repeating stairwell configurations, the field technician will follow the Lighting Sub-Sampling Protocol to determine which fixtures to survey.

Miscellaneous

The technician will collect additional information on the building such as any ENERGY STAR certification, electrical panel capacity, presence of onsite battery, presence of any EV charging stations, floor perimeters, and utility meter IDs.

▼ **Miscellaneous**

Does this building have ENERGY STAR certification?

The following laundry equipment was reported by the web survey respondent:

Number of clothes washers: 155

Number of clothes dryers: 01010

Are you able to observe or access this laundry equipment?

The web survey respondent reported this building has solar panels with battery storage.

Are you able to observe or access the battery?

What is the capacity of the electrical panel for this building?

Is there an irrigation system included on the same electricity meter as the building?

Are you able to observe or access the battery?

What is the capacity of the electrical panel for this building?

Is there an irrigation system included on the same electricity meter as the building?

▶ If possible, record all electricity meter IDs for the building

▶ If possible, record all natural gas meter IDs for the building

Does this building have any associated electric vehicle charging stations?

Take a photo of the main building entrance




Record any notes about miscellaneous items

To record meter data, expand the Meter IDs sub-section. The technician will add a separate record for each type of meter ID by clicking/pressing on the plus symbol on the bottom right-hand corner of the sub-section, as shown in the image below.

▼ If possible, record all electricity meter IDs for the building

Electricity meter ID:


1 of 2
>
+

▼ If possible, record all natural gas meter IDs for the building

Natural gas meter ID:


1 of 2
>
+

If the building is part of a campus or group of buildings with common/shared meters or central plants that are not in this surveyed building, then, in the survey field for meter IDs, the field technician should note “##### - central plant” for meters that serve central plants and “##### - shared meter” for meters (electric or gas) that serve the surveyed building in addition to other buildings (none of which are a central plant).

Irrigation System

The technician will record information on whether there is an irrigation system included on the same electricity meter as the building. If yes, then the technician will record the number of pumps and their capacity in HP.

Is there an irrigation system included on the same electricity meter as the building?

Yes

Number of pumps for irrigation system

If missing:

☐ Could Not Assess

Irrigation pump HP

If missing:

☐ Could Not Assess

EV Charging Stations

The technician will record the information on any electric vehicle charging stations on site. In addition, the site technician will record the type of charging station, 208/240V or DC Fast Charge (DCFC), number of chargers used by public or employee vehicles, number of chargers used by fleet vehicles, charging rates of these chargers, and their plug types.

Does this building have any associated electric vehicle charging stations?

Yes

Types of EV charging stations?

Select all that apply

Level 2
208V or 240V

Charging rate of level 2 chargers (kW)

If missing:

☐ Could Not Assess

Number of level 2 chargers used by public or employee vehicles

If missing:

☐ Could Not Assess

Number of level 2 chargers used by fleet vehicles

If missing:

☐ Could Not Assess

Note that upon answering some of the questions for miscellaneous equipment, the survey will ask follow-up questions that were originally hidden. This conditional logic works to ensure that the technician can input all the relevant information for that equipment and/or system.

For example, when the technician answers the question for the presence of electric vehicle charging stations with "Yes", the survey unlocks the follow-up question asking for type of EV charging stations, charging rate of the chargers, number of chargers used by public or staff, number of chargers used by fleet vehicles, and plug types for the chargers.

APPENDIX 7:

Billing Data Collection Utility Outreach Materials

Billing Data Collection - Advance Email Example

TO: {CONTACT'S EMAIL ADDRESS}
CC: CBSA2025@neea.org
FROM: CBSA2025@westat.com
SUBJECT: Upcoming NEEA Survey (CBSA)

Dear {CONTACT FIRST NAME} {CONTACT LAST NAME}:

We are contacting you because one or more of your customers participated in the 2025 Commercial Building Stock Assessment (CBSA) study and identified your company as their electric and/or natural gas utility. The 2025 CBSA is sponsored by the Northwest Energy Efficiency Alliance (NEEA) and collects and analyzes building characteristics and energy use data for commercial buildings in the Northwest. The data is used in energy resource planning and energy efficiency programs.

At this time we are looking to identify the appropriate contact person at your company to assist with this data collection effort.

Please respond to this email to either:

- a) confirm that you are the correct contact to report energy usage for your company's commercial customers, and provide the best phone number to reach you,
or
- b) provide the name, telephone number, and email address of the appropriate contact person.

Once a contact is identified, a CBSA specialist from Westat—NEEA's contractor for this data collection—will follow up with more information. If you have any immediate questions, please contact Westat's toll-free CBSA helpdesk at 1-855-662-5694. We are available to support you throughout the study.

For more information, please visit the 2025 CBSA website at neea.org/CBSA2025.

Thank you in advance for your timely response.

Sincerely,

Michelle Ruddick
Westat Project Director, 2025 CBSA

{SUPPLIERID}

Billing Data Collection - Introductory Email

TO: {CONTACT'S EMAIL ADDRESS}
CC: <mailto:{SPECIALIST'S EMAIL ADDRESS}>; CBSA2025@neea.org; {If BPA: EER EMAIL ADDRESS}
FROM: CBSA2025@westat.com
SUBJECT: NEEA Survey (CBSA)

Dear {FirstName} {LastName}:

I am following up on your recent conversation with Westat staff about the **2025 Commercial Building Stock Assessment (CBSA)**, an important study sponsored by the Northwest Energy Alliance (NEEA).

We are contacting you because one or more commercial buildings participating in the 2025 CBSA have identified your company as their electric and/or natural gas utility. As part of the next phase of the study, we are collecting energy usage and billing data from utility providers for these buildings, covering the 24-month period from July 2023 through June 2025.

On the CBSA Billing Data Collection website, you will be able to access a list of your customers who participated in the 2025 CBSA. You can select one of two options to submit the requested data for your selected customers: an online web form, or a downloadable and ready-to-use spreadsheet.

The participating customers have each signed a 2025 CBSA Utility Data Sharing Release Agreement giving Westat permission to request their billing data from you. These forms can be made available upon request if required in order to provide customer data.

To access the CBSA Billing Data Collection website, you will need two unique login credentials: your secure user ID and your password. Your username is below.

Website: CBSA25.com

Username: {User ID}

For security reasons, your password will be sent in a separate email; you should receive it soon after this email arrives. If you do not receive the password email, please contact Westat as soon as possible at the email address or toll-free number below.

The **due date** to complete the 2025 CBSA Billing Data Collection is **{DUE DATE}**.

Westat support specialists stand ready to assist you at 1-855-662-5694, or via email at CBSA2025@westat.com. You may also contact NEEA directly by emailing Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org. For more information about the CBSA, please visit neea.org/CBSA2025, where you will find answers to FAQs for participants.

Your participation is vital to the continued success of this study. Thank you again. We greatly appreciate your support and engagement in this effort.

Sincerely,



Michelle Ruddick
Westat Project Director, 2025 CBSA
{SUPPLIER ID}

Billing Data Collection - Password Email

TO: {CONTACT'S EMAIL ADDRESS}
FROM: cbsa2025@westat.com
SUBJECT: CBSA Billing Data Collection Survey Password

Dear {FirstName} {LastName}:

You should have already received an email with information about the CBSA Billing Data Collection being conducted by Westat on behalf of the Northwest Energy Efficiency Alliance (NEEA). The first email provided your username to access the secure CBSA Billing Data Collection website. This email provides your **password** for the website. The website includes a list of participating customer addresses and instructions on how to submit the requested data.

To access the CBSA Billing Data Collection website, you will need two unique login credentials: your secure username and your password. Your password is below.

Website: CBSA25.com
Password: {Password}

If you have not received the email with your username, please contact Westat as soon as possible at the toll-free number below.

On your first login, you will be asked to change your password. Please save your new password in a secure place. If you delegate the completion of this data request to someone else, please have them contact us to receive their own username and password.

The **due date** for completion of the CBSA Billing Data Collection is {DueDate}.

Westat support specialists are available to assist you at 1-855-662-5694 or CBSA2025@westat.com. You may also contact NEEA directly by emailing Mike Psaris, Manager, Energy Use Studies, at CBSA2025@neea.org.

Your participation is vital to the continued success of this program. Thank you again and we greatly appreciate your support for this study.

Sincerely,
Michelle Ruddick
Westat Project Director, 2025 CBSA

{SUPPLIER ID}

Billing Data Collection - Check-in Email

TO: {CONTACT'S EMAIL ADDRESS}

CC: CBSA2025@westat.com; CBSA2025@neea.org; {If BPA: EER EMAIL ADDRESS}

FROM: {SPECIALIST'S EMAIL ADDRESS}

SUBJECT: CBSA Survey 2nd Reminder

Dear {CONTACT FIRST NAME} {CONTACT LAST NAME},

This is a friendly reminder that your 2025 CBSA Billing Data Collection due date is {**DUE DATE**}.
{IF 1 OR 2 CASES, SAY: It should take less than 30 minutes of your time.}

If I can answer any questions, offer other assistance, or if you need us to resend the emails with the link to the survey website, your username, and password, please contact me by phone or email.

Your participation is vital to the success of this important study, and we sincerely appreciate your time and effort.

Regards,

{SPECIALIST WESTAT SIGNATURE BLOCK}

Billing Data Collection - Reminder Email

TO: {CONTACT'S EMAIL ADDRESS}
FROM: cbas2025@westat.com
CC: CBAS2025@neea.org; {If BPA: EER EMAIL ADDRESS}
SUBJECT: CBSA Survey Final Reminder

Dear {CONTACT FIRST NAME} {CONTACT LAST NAME},

Recently, we contacted you about how to complete the 2025 CBSA Billing Data Collection through a secure website. As of today, our records indicate that your submission for {COMPANY NAME} has not been completed. This is a reminder that data for the CBSA Billing Data Collection is due on **{DUE DATE}**.

Please log in to the CBSA Billing Data Collection website ([CBAS2025.com](https://cbas2025.com)) to securely submit your data. It is NOT recommended that you submit these data via email.

If you have any questions or need an extension of the due date, please contact your specialist or the CBSA Billing Data Collection helpdesk at 1-855-662-5694 or CBAS2025@westat.com.

Regards,

The CBSA Team

APPENDIX 8:

2025 CBSA NRBA Report



Improving Lives Through Research®

2025 Commercial Building Stock Assessment (CBSA) Nonresponse Bias Analysis Report

December 19, 2025

Prepared For
Northwest Energy Efficiency Alliance
700 NE Multnomah Street
Suite 1300
Portland, OR 97232

Prepared By
Westat
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Bethesda, MD 20814-6527
301-251-1500

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1. Introduction

The 2025 Commercial Building Stock Assessment (CBSA) uses a web survey and in-person site visit to collect information on the stock of commercial buildings and multi-family residential buildings in Idaho, Montana, Oregon, and Washington, including their energy-related building characteristics and energy usage data (consumption and expenditures). The study also includes schools, hospitals, correctional institutions, and buildings used for religious worship. The aim of CBSA is to produce estimates of the commercial and multi-family residential building energy consumption and expenditures for the Northwest region, by each of the four states within the Northwest region, and by various energy related building characteristics.

The goal of the nonresponse bias analysis (NRBA) is to answer the following question: Do the site visit respondents and nonrespondents to the 2025 CBSA differ in meaningful ways with respect to their energy consumption and expenditures?¹ In an ideal nonresponse bias assessment, data would be obtained from nonrespondents that could be compared to the obtained responses. For CBSA, this would mean obtaining energy consumption estimates for nonresponding buildings that could be compared to those obtained from responding buildings, which is not part of the 2025 study design. Therefore, we have used several alternative approaches to assess the potential for nonresponse bias.

Our analysis focuses on an examination of the auxiliary variables used for the nonresponse weighting adjustments and the strength of their relationship to important characteristics associated with nonresponse. Auxiliary variables used in the nonresponse adjustment process are considered to be effective at reducing potential nonresponse bias when they are correlated with both the likelihood of a sampled unit to respond (i.e., response propensity) and the key outcome variables (Little and Vartivarian, 2005). If the auxiliary variables are only correlated with response, the nonresponse adjustments may increase the variation in the weights and weighted estimates without providing the desired corresponding reduction in the bias in the weighted estimates. The overall goal of this analysis is to confirm that we have reasonable confidence in the accuracy of the estimates resulting from this sample and assess the risk of nonresponse bias.

The following three steps were taken to evaluate the risk of nonresponse bias in the 2025 CBSA survey results:

- We evaluated the relationship between response status and energy consumption auxiliary variables that are known with a high degree of accuracy and believed to be correlated with the survey outcome and response propensity.
- We used these auxiliary variables as predictors in response propensity models to help form nonresponse adjustment cells.
- After implementing weighting adjustments using these nonresponse cells, we examined the effect of the weighting adjustments that were used to minimize potential bias.

Section 2 of this document describes our examination of the relationship between the auxiliary variables and the response propensity for sampled buildings. This section presents the calculation of the unweighted and base weighted response rates, overall and by the auxiliary variables used in the nonresponse adjustments.

¹ Although the 2025 CBSA provides both site visit respondent weights and web survey respondent weights, this report focuses solely on potential nonresponse bias in estimates from the site visit interview.

Section 3 begins with a description of the nonresponse adjustment process and presents visualizations of the two separate nonresponse classification trees used to generate two sets of nonresponse adjustments cells. One tree and the resulting set of adjustment cells are for adjusting the base weights of buildings of known eligibility status (i.e., responding buildings, eligible nonresponding buildings, ineligible buildings) to account for buildings whose eligibility status was unknown. The second tree and its resulting set of adjustment cells are for adjusting the unknown eligibility adjusted weights for responding buildings to account for eligible buildings who did not respond. We also present results from two stepwise logistic regression models used to support our selection of auxiliary variables for the nonresponse adjustment process.

Section 4 provides an investigation of the effectiveness of the nonresponse adjustments in terms of the distributions of the auxiliary variables before and after the final nonresponse adjustment step. Specifically, the investigation compares the distribution of the building characteristics among the following groups:

- Group A – Respondents and eligible nonrespondents, using the unknown eligibility adjusted weights;
- Group B – Weighted respondents only, after the unknown eligibility adjustment; and
- Group C – Weighted respondents, after all nonresponse adjustments.

The purpose of the Section 4 analysis is to examine if any significant differences in the distributions of the building characteristics found when comparing groups A and B are resolved by the final nonresponse adjustment such that groups A and C have no significant differences in their building characteristic distributions.

Lastly, Section 5 discusses our conclusions about the evaluation of risk of nonresponse bias, and recommendations for future CBSA data collections.

2. Evaluating the Relationship Between Response Status and Nonresponse Adjustment Auxiliary Variables

Missing data can occur when buildings selected in the sample are not contacted or refuse to participate (referred to as unit nonresponse) or fail to respond to a particular survey item (referred to as item nonresponse). Under ideal conditions, every eligible building in the target population would have a nonzero chance of selection, a knowledgeable respondent would always be located, and the respondent would always agree to participate in the study, respond to all survey items, and complete a site visit. In practice, these ideal circumstances are not realized in any survey. Calculating the survey response rate helps researchers understand the extent to which a respondent was not identified or interviewed for the study from the sampled units (for CBSA, sampled buildings). Both the overall response rate, and variations in response rate across key subgroups of interest, provide important indicators about the potential for bias in the final survey estimates.

2.1 Data Collection Procedure and Categories of Response

The 2025 CBSA is a multimode study, in which data collection was comprised of the following components.

- Westat contacted the selected building via telephone, mail, email, or an in-person visit, identified the person most knowledgeable about the building's energy usage, and recruited them to participate in the study.
- The recruited person completed a web survey about the building's characteristics and energy usage, and also signed a data release agreement providing the building's electricity and natural gas company name(s) and account number(s) authorizing the utility to share their data with Westat during the billing data collection component of the study (conducted after the building survey).
- A field technician visited the building in person and conducted a site visit where they collected energy-related information such as the presence and quantity of types of energy-using equipment, the characteristics of this equipment, information about the building, and the energy use behavior/control strategies of its occupants.

Furthermore, the 2025 CBSA data collection contained a multi-building structure subsampling procedure to mitigate nonresponse and contain data collection costs. Selected structures that were identified as representing two or more buildings (multi-building structures) were handled in a specific manner, which has implications for defining survey response categories. A list of eligible buildings that represented the originally selected structure was created and a set of buildings was selected. If the originally selected structure represented two to five buildings, two buildings were selected.² To recognize the association between the originally selected structure and the newly selected buildings, the originally selected structure was called the "parent" case, and the newly selected buildings were called "children." All originally sampled "parent" structures were considered out-of-scope because they were not eligible to be worked once the associated child buildings were selected. The response rate categories were defined in the same way for the "child" buildings as they were for the other selected buildings.

Based on the results of the data collection process and the subselection of buildings within a multi-building structure, five major response categories were defined. A description of these categories follows.

Respondent. This category includes the 568 buildings that completed site visits.

Eligible Nonrespondent. This category consists of 3,078 buildings determined to be eligible during the recruitment process, but a site visit was never conducted.

Ineligible. Ineligibility was determined based on information gathered during the recruitment process, the web survey, or the site visit. A building was considered ineligible if it was either: not sufficiently commercial or multi-family residential in use; a high security building where an interviewer was not able to contact a knowledgeable respondent; or fewer than 1,001 square feet. There were 317 ineligible buildings in the 2025 CBSA.

² No originally selected structures represented more than five buildings. If an originally selected structure had represented six to fifteen buildings, three buildings would have been selected. A situation where an originally selected structure represented more than fifteen buildings was not anticipated and if occurred would have been reviewed by the 2025 CBSA sampling team to determine next steps.

Out-of-Scope. Buildings classified as out-of-scope fall into one of the following groups:

- **Group 1:** Selected buildings determined to be a frame duplicate or listed in error during the data collection process (n=33);
- **Group 2:** All originally selected “parent” cases of multi-structure buildings (n=14);

Unknown Eligibility. The 1,672 buildings that did not align with one of the four response rate categories above were considered to be of unknown eligibility. Therefore, any building that was not classified as out-of-scope or ineligible during the data collection process and for which eligibility could not be determined was considered to be of unknown eligibility. The causes of unknown eligibility include language barriers, interviews conducted with the wrong building, final refusals, the identified respondent being unavailable to complete the web survey, the inability to identify the person most knowledgeable about the building’s energy usage, and the inability to contact the person identified as the most knowledgeable.

Table 1 shows the distribution of sampled buildings by major response categories. Out-of-scope cases were excluded from all analyses presented in this report, including the calculation of response rates.

Table 1. Number of sampled buildings by major response categories	
Major response categories	Number of sampled buildings
1. Respondent	568
2. Eligible nonrespondent	3,078
3. Ineligible	317
4. Out-of-scope	47
5. Unknown eligibility	1,672
Total	5,682

2.2 Response Rate Computation

Survey response rates are commonly calculated for both the unweighted and weighted samples. For CBSA, the unweighted response rates at the building-level were computed as follows:

$$\text{Unweighted response rate} = 100 * \frac{C}{C + NR + e * UNK}$$

where

- C = number of completed site visits
- NR = number of eligible nonresponding buildings
- UNK = number of buildings of unknown eligibility
- e = interview eligibility rate among buildings of known eligibility status, estimated as $\frac{C + NR}{C + NR + I}$ and
- I = number of buildings identified as ineligible but not out of scope

Note that we used the eligibility rate among in-scope buildings of known eligibility (i.e., respondents, eligible nonrespondents, and ineligible) to estimate the number of eligible buildings among those of unknown eligibility. The weighted response rates were calculated in the same way

as the unweighted rates, except that each sampled building was weighted by the inverse of the overall probability of selection (i.e., the “base weights”).

The overall unweighted response rate was:

$$RR = 11.0\%$$

The overall base weighted response rate was:

$$RR_w = 12.7\%$$

2.3 Unweighted and Weighted Response Rates by Auxiliary Variables

Table 2 shows the unweighted and weighted response rates for the 2025 CBSA site visit, overall and by six auxiliary variables. The unweighted response rate measures the success in completing site visits from the sampled, in-scope buildings. The weighted response rate estimates the proportion of the building population represented by the sampled, in-scope buildings that would have completed a site visit if all buildings in the target population had been asked to participate in the study, and thus provides a measure of the potential impact of nonresponse on the study estimates. The table also shows the unweighted number of respondents, eligible nonrespondents, ineligible, and cases of unknown eligibility.

The six auxiliary variables believed to be correlated with response propensity and building use energy, are:

- Building size class, based on building square footage estimated during the virtual listing process (See the *2025 CBSA Final Report* for further details on the process of virtually listing all eligible buildings within selected tracts.)
- Number of floors, estimated during the virtual listing process.
- Principal building activity, identified during the virtual listing process.
- National Center for Education Statistics (NCES) Locale status (Geverdt, D., 2015), which was geocoded to each virtually listed building by longitude and latitude. The NCES Locale variable is one of the most widely used urbanicity indicators within the United States.
- Tract size, the tract-level sampling stratum of Small (6 to 30 estimated eligible buildings) and Large (more than 30 estimated eligible buildings). This tract-level stratum was based on building-level data purchased from Dun and Bradstreet. (See the *2025 CBSA Sample Design and Weighting Plan* for further details on the tract level sample design.)
- Bonneville Power Administration (BPA) geographic subregion

These six auxiliary variables and their corresponding categories shown in Table 2 were also used to form the unknown eligibility and nonresponse adjustment cells. The values for each of these six variables had to be known for all sampled buildings (respondents and nonrespondents) to be able to calculate response rates and be included as predictor variables in the nonresponse adjustment process.

Within each auxiliary variable, none of the categories had weighted response rates that differed by more 7.5 percentage points. During CBSA data collection, the proportion of the number of completed site visits by state, building size, building use, and NCES Locale was closely monitored, with the goal of achieving the same proportion of completed site visits by subgroup category (e.g.,

proportion of total completed site visits from buildings located in Oregon) as a proportion of sampled buildings by subgroup category (proportion of sampled buildings located in Oregon). When the proportion of completed site visits for a subgroup category was lower than the proportion of sampled buildings in that category, the data collection contractor attempted to prioritize site visits among those buildings.

In terms of building size category from the sampling frame, the weighted response rates were lowest for buildings greater than 200,000 square feet at 6.3 percent, while the weighted response rates in the remaining, smaller building size categories ranged from 10.6 to 13.4 percent. Due to the positive correlation between building size and number of floors, similar weighted response results occurred for number of floors. Buildings with six or more floors had the lowest weighted response rate (10.9 percent), while the weighted response rates in the remaining building floor categories ranged from 12.3 to 15.3 percent. Buildings with activities related to education, lodging, or public order had a higher weighted response rate (16.1 percent) compared to those respondents whose buildings were associated with other activities. In addition, weighted response rates were highest among buildings in the most rural areas. Buildings located in a rural NCES Locale had a weighted response rate of 16.1 percent, which was higher than the weighted response rates in buildings in less rural areas that ranged from 11.5 percent to 12.8 percent. Buildings in "Small" tracts that were believed to have 6 to 30 eligible buildings based on Dun and Bradstreet data (12.9 percent) had a higher weighted response rate than buildings in "Large" tracts believed to have more than 30 eligible buildings (10.5 percent). Within BPA subregion, buildings in Idaho (8.7 percent) and Puget Sound (10.1 percent) had the lowest weighted response rates. Buildings in the Western Oregon subregion (16.2 percent) had the highest weighted response rate, which led to Oregon (15.2 percent) having the highest weighted response rate among the four northwest states in the CBSA target population. The weighted response rates in other BPA subregions fell between 11.4 and 13.5 percent.

Auxiliary variable	Completed site visits	Eligible nonrespondents	Ineligibles	Unknown eligibility	Unweighted response rate (%)	Weighted response rate (%)
Overall	568	3,078	317	1,672	11.0	12.7
Frame Building Size						
1,001 to 10,000	327	1,752	216	853	11.4	13.3
10,001 to 25,000	84	554	45	274	9.5	10.6
25,001 to 50,000	57	257	26	175	12.0	13.4
50,001 to 100,000	56	286	18	198	10.7	11.5
100,001 to 200,000	32	162	8	108	10.9	12.2
Greater than 200,000	12	67	4	64	8.7	6.3
Frame Number of Floors²						
One floor	373	2,231	232	1,074	10.4	12.3
Two floors	107	479	48	242	13.2	15.3
Three to five floors	58	238	27	241	11.2	12.4
Six or more floors	30	130	10	115	11.3	10.9

Auxiliary variable	Completed site visits	Eligible nonrespondents	Ineligibles	Unknown eligibility	Unweighted response rate (%)	Weighted response rate (%)
Frame Principal Building Activity						
Assembly, office, food sales, mercantile, service	278	1,582	130	753	10.9	12.6
Education, lodging, public order	85	279	23	214	15.2	16.1
Food service, healthcare, laboratory, other	35	295	9	154	7.4	10.3
Warehouse, vacant	127	727	137	400	10.4	12.5
Residential, Multi-family	43	195	18	151	11.4	13.2
NCES Locale						
City	287	1,703	183	1,072	9.6	11.5
Suburb	102	530	51	211	12.3	12.7
Town	94	486	31	214	12.1	11.5
Rural	85	358	56	175	14.1	16.0
Frame Tract Size						
Large (31+ eligible buildings)	27	128	22	132	9.8	10.5
Small (6-30 eligible buildings)	541	2,949	299	1,540	11.0	12.9
State and BPA Subregion						
Idaho	64	430	21	185	9.6	8.7
Montana	69	358	22	158	12.1	13.5
Oregon	179	754	85	451	13.3	15.7
Eastern Oregon	20	92	6	48	12.8	13.5
Western Oregon	159	662	79	403	13.3	16.2
Washington	256	1,535	193	878	9.9	11.7
Eastern Washington	86	480	46	87	13.3	14.3
Western Washington	41	243	21	57	12.2	11.4
Puget Sound	129	812	126	734	8.0	10.1

¹ The counts of respondents, eligible nonrespondents, ineligibles, and cases of unknown eligibility in Table 2 are unweighted. The base weighted response rates presented in this table cannot be calculated using the unweighted counts.

² The estimated number of floors for each building on the building-level sampling frames was based on virtual listers' best estimates of the number of floors in the building during the listing process.

3. Creation of the Nonresponse Adjusted Weights

3.1 Overview of the Two-Step Nonresponse Adjustment Weighting Process

Nonresponse in surveys creates a potential for bias in the survey estimates. To reduce this potential bias, CBSA sampling base weights were first adjusted for unknown eligibility, then also for nonresponse (among known eligible buildings). Both adjustments are standard practice in survey estimation. Applying these weights to the responding buildings adjusts the distribution to align

with the distribution of all sampled buildings not identified as ineligible or out-of-scope during data collection. As a result, the weighted estimates should have reduced potential for nonresponse bias compared to the base weighted estimates.

We used a response propensity method to adjust the weights for all in-scope cases (i.e., respondents, eligible nonrespondents, ineligibles, and cases of unknown eligibility). Among in-scope cases, two key components were required to be considered a respondent: (1) a determination that the case was eligible, and (2) the completion of the site visit.

The eligibility component required careful consideration because of the large number of cases considered to be of unknown eligibility. We therefore considered it likely that factors contributing to eligibility propensity might differ from factors affecting response propensity. Thus, our objective was to develop two separate statistical models: (a) one which estimates the known eligibility propensities among all in-scope buildings and (b) another which estimates the response propensities among all eligible buildings. We attempted to form two separate sets of homogeneous subgroups based on these two separate statistical models. One set of homogeneous subgroups was formed with respect to known eligibility propensity among all in-scope buildings (i.e., subgroups (a) from above), and the other was based on response propensity among all eligible cases (i.e., subgroups (b) from above). The weights for subgroups (a) were adjusted to account for cases with unknown eligibility. For subgroups (b), the weights were then additionally adjusted for nonresponse.

As mentioned in Chapter 2, the six auxiliary variables employed in forming the unknown eligibility and nonresponse adjustment cells had to be known for all in-scope cases.

If nonresponse is independent of substantive variables (e.g., building characteristics of interest, energy consumption and expenditures) within nonresponse adjustment cells, then nonresponse-adjusted weights produce unbiased estimates. For both the known eligibility propensity model and the response among known eligible models, we formed the adjustment cells so that the variation in propensity within the cells was minimized. We used the *ctree* function (Hothorn, Hornik, and Zeileis, 2006) in the partykit R package (Hothorn and Zeileis, 2017, Lin et al, 2022) to guide the formation of the cells. The *ctree* function implements an algorithm that partitions data into homogeneous subgroups with respect to the selected target outcome (that is, known eligibility, or response propensity). The procedure is stepwise and creates a hierarchical tree-like structure. It selects the single predictor with largest variation in response rates across its levels and uses it to form the first branch in a classification tree. It continues applying the same process within the subgroups (nodes) defined by the “best” predictor chosen in the preceding step. This process continues until either no significant predictor is found, or a specified minimum node size is reached.

Although nonresponse adjustment should reduce bias, it can also increase the variance of estimates. Small adjustment classes and/or low response rates (or large nonresponse adjustment factors) may increase the variance substantially and give rise to unstable estimates via increased variability in weights. In order to prevent an excessive increase in variance and thereby an adverse effect on the mean square error of the estimates, we limit the smallest size class (nodes) to 30 respondents and closely examine the tree to see if any branches need to be trimmed to avoid large nonresponse adjustment factors that could lead to outsized increases in weight variance.

3.2 Adjustments for Nonrespondents of Unknown Eligibility

The weighting status codes used to generate unknown eligibility nonresponse adjustments are shown in Table 3:

Status	Description
1	Completed Site Visit
2	Eligible nonrespondent
3	Ineligible
4	Nonrespondents of unknown eligibility

For the unknown eligibility adjustment tree, at each split the algorithm implemented by the *ctree* function looked to generate the largest difference in known eligibility propensity (i.e., the likelihood of an in-scope building being a respondent, eligible nonrespondent, or ineligible). Figure 1 shows the initial known eligibility propensity classification tree. See the Appendix for definitions of the variables and categories of the variables listed in the cells in Figure 1.

Each cell in Figure 1 contains the number of cases of known eligibility (*n* resp), the total number of cases in the cell (*n* total), the unweighted known eligibility rate (Unweighted RR, which is (*n* resp)/(*n* total)), the base weighted known eligibility rate (Weighted RR), and the unknown eligibility adjustment factor (Adj. Factor, which is the inverse of Weighted RR). The cells highlighted in blue are terminal nodes that would be used as adjustment cells if no trimming of this initial classification tree occurred. In the terminal nodes, no further significant predictor variables can split the cases within the node further or the split would create a cell with less than 30 respondents. Node 1, the root node at the top of the classification tree, contains all in scope buildings and shows that the base weighted overall known eligibility rate for the 2025 CBSA was 71 percent. If the classification tree model had produced no significant predictors and no nodes beyond the root node, each known eligible building would have received an unknown eligibility adjustment factor of 1.40. The initial known eligibility propensity classification tree shown in Figure 1 is a relatively large tree with a depth of seven, meaning that longest path from the root node to a terminal node was seven splits (i.e., the bottom row of nodes in Figure 1 are all at a depth of 7).

The single predictor with the highest variation in known eligibility rates was BPA Subregion. The BPA subregion of Eastern Washington (BPA_SUBREGION_NUM = 2) had a base weighted known eligibility rate of 88.9 percent, which was over 20 percentage points higher than the weighted known eligibility rate of all other BPA subregions combined (68.4 percent). The adjustment factors in the terminal nodes in the initial known eligibility classification tree model ranged from 1.06 (Node 37) to 3.10 (Node 5).

After reviewing this initial classification tree, Westat decided to trim Nodes 5 and 6 back to Node 4 for two reasons. First, the adjustment factor for Node 5 (3.10) was more than two times that of the root node (1.40) and approximately 1.5 times larger than the next largest adjustment factor (Node 28: 2.11). Trimming back the most extreme adjustment factors reduces the variation in final weights, which in turn helps increase precision in the survey estimates. Second, the number of respondents for both Nodes 5 and 6 were at or very close to the minimum value of 30. With this trimming, Node 4 became a terminal node, and the final classification tree model contained 20 terminal nodes (i.e., unknown eligibility adjustment cells).

Within each known eligibility propensity cell, the unknown eligibility factor (displayed in Figure 1 as Adj. Factor) was computed as the ratio of the sum of the base weighted number of buildings with known eligibility and unknown eligibility to the sum of the base weighted number of buildings with known eligibility. Table 4 provides formulas for the calculation of the unknown eligibility adjustment factors within each cell by weighting status code:

Table 4. Unknown eligibility adjustment factor (δ_{UNK_i}) by weighting status code	
Status	UNK ELIG adjustment (UNKFACTOR)
1	$(S_1 + S_2 + S_3 + S_4)/(S_1 + S_2 + S_3)$
2	$(S_1 + S_2 + S_3 + S_4)/(S_1 + S_2 + S_3)$
3	$(S_1 + S_2 + S_3 + S_4)/(S_1 + S_2 + S_3)$
4	0

Where:

S_1 = the sum of the base weights of the completed site visits;

S_2 = the sum of the base weights of the eligible, nonresponding buildings;

S_3 = the sum of the base weights of the ineligible buildings; and

S_4 = the sum of the base weights of the buildings whose eligibility status is unknown.

The unknown eligibility adjusted weight (w_{UNK}) is calculated as follows, redistributing the base weights of the unknown eligibility cases across the buildings that completed site visits, the nonresponding buildings, and the ineligible buildings:

$$w_{UNK} = w_{Base} * \delta_{UNK_i}$$

where:

w_{Base} = the base weight

δ_{UNK_i} = the unknown eligibility adjustment factor within known eligibility adjustment cell i

3.3 Adjustments for Nonrespondents of Known Eligibility

For the weight adjustments for nonrespondents of known eligibility, we modeled response propensity via the same conditional inference tree algorithm described in Section 3.2 and used the resulting cells as nonresponse adjustment classes. The variables employed in forming nonresponse adjustment classes were the same as those used for the unknown eligibility adjustment model. The overall weighted response rate among known eligibles for the 2025 CBSA was 17.9 percent, which indicates that if the classification tree algorithm had found no significant predictors, all responding buildings would have received a nonresponse adjustment factor of 5.60.

As discussed in Section 3.1, weighting adjustment cells and low response rates are two elements that can lead to increased variance and unstable estimates, and both elements factored in limiting the size of the response propensity tree. To prevent an excessive increase in variance, we did not want to allow an individual nonresponse adjustment cell to have fewer than 30 completed site visits or an adjustment factor of greater than 8.0 (a weighted response rate of 12.5 percent). Table 5

presents the final response among known eligibles propensity tree, with the final five nonresponse adjustment cells highlighted in bold and italic font. In the initial response propensity classification tree (not shown), splits beyond these five final cells generated many additional cells that did not meet our minimum cell size or exceeded our maximum adjustment factor limit.

Similar to the known eligibility tree, BPA Subregion was the auxiliary variable with the highest variation in response propensity, but the split by subregion was different. Eastern Oregon, Montana, and Eastern Washington had a weighted response rate among known eligibles of 21.7 percent, which was 6.5 percentage points higher than the weighted response rate of the other BPA subregions combined (15.2 percent). The primary building activity and frame building size variables split the Eastern Oregon, Montana, and Eastern Washington branch further, generating three final cells with factors ranging from 2.56 to 7.41. The other BPA subregions branch was split by number of floors, resulting in a nonresponse adjustment factor of 7.23 for the 210 responding buildings in those subregions with one floor and a factor of 5.42 for responding buildings with two or more floors.

Table 5. Final nonresponse among known eligible adjustment cells and adjustment factors

Nonresponse adjustment cell description	Number of eligible buildings	Number of completed site visits	Unweighted response rate	Weighted response rate	Nonresponse adjustment factor
Overall	3,646	568	15.6	17.9	
BPA Subregion: Eastern Oregon, Montana, Western Oregon	1,361	248	18.2	21.7	
Frame Primary Building Activity: All except Education, lodging, public order	1,221	201	16.5	20.1	
<i>Frame Building Size Category: 1,000 – 10,000 square feet</i>	<i>755</i>	<i>134</i>	<i>17.8</i>	<i>22.2</i>	<i>4.50</i>
<i>Frame Building Size Category: Greater than 10,000 square feet</i>	<i>466</i>	<i>67</i>	<i>14.4</i>	<i>13.5</i>	<i>7.41</i>
<i>Frame Primary Building Activity: Education, lodging, public order</i>	<i>140</i>	<i>47</i>	<i>33.6</i>	<i>39.0</i>	<i>2.56</i>
BPA Subregion: Eastern Washington, Idaho, Puget Sound, Western Washington	2,285	320	14.0	15.2	
<i>Number of Floors: 1</i>	<i>1,602</i>	<i>210</i>	<i>13.1</i>	<i>13.8</i>	<i>7.23</i>
<i>Number of Floors: 2 or more</i>	<i>683</i>	<i>110</i>	<i>16.1</i>	<i>18.4</i>	<i>5.42</i>

Within each nonresponse adjustment cell, the nonresponse adjustment factor was computed as the ratio of the sum of the unknown eligibility adjusted weighted number of eligible buildings (i.e., respondents and eligible nonrespondents) to the sum of the unknown eligibility adjusted weighted number of respondents. Table 6 provides formulas for the calculation of the nonresponse adjustment factors within each cell by weighting status code:³

³ The weighting status codes used to generate nonresponse adjustments were the same as those used for the unknown eligibility adjustments, shown in Table 3.

Table 6. Nonresponse adjustment factor (δ_{NR_j}) by weighting status code	
Status	Nonresponse adjustment (NRFACTOR)
1	$(S_1 + S_2)/S_1$
2	0
3	0
4	0

where:

S_1 = the sum of the unknown eligibility adjusted weights of the buildings with completed site visits;

S_2 = the sum of the unknown eligibility adjusted weights of the eligible, nonresponding buildings.

The nonresponse adjusted weight is calculated as follows:

$$w_{Final} = w_{UNK} * \delta_{NR_j}$$

where:

w_{UNK} = unknown eligibility adjusted weight, and

δ_{NR_j} = the nonresponse adjustment factor.

3.4 Stepwise Logistic Regression to Validate Classification Tree Models Employed in Nonresponse Adjustment Process

Two weighted stepwise logistic regression models were used to identify significant predictors for known eligibility propensity and response propensity for subgroups (a) and (b), as defined in Section 3.1. These models, which were run using the SURVEYLOGISTIC procedure in SAS using the base weights, were employed as a sensitivity check on the selection of variables used to construct the adjustment cells. Known eligibility and response status were used as binary dependent variables for the two separate models, respectively, and the same set of auxiliary variables described in Section 3.1 were used as the predictors. In each model, an F test was performed for each auxiliary variable to determine if it was significantly related to the propensity type (e.g., known eligibility propensity for the first model and response propensity for the second), after accounting for the other auxiliary variables. Any variables that were available for all sampled cases were considered for these models.

As described in Section 3.1, base weighted machine learning classification tree models were used to identify the variables to be used in the nonresponse adjustment process. There are certain benefits to using the machine learning classification models in the actual construction of the adjustment cells, particularly regarding the handling of interactions between model predictor variables. The logistic models shown here are main effects models only, and do not include interactions. Therefore, the purpose of using these logistic regression models was to provide an additional check of the variable selection resulting from the machine learning models.

The results from the propensity model predicting known eligibility among all in-scope buildings are shown in Table 7. Variables for tract size, BPA subregion, NCES Locale, and principal building activity were found to be significant at the 5 percent α level. Similarly, Table 8 contains the results of the propensity model predicting response among eligible buildings and shows that BPA

subregion is again significant at the 5 percent α level and principal building activity at the 10 percent α level.

Nearly all significant variables displayed in the eligibility and response propensity logistic models in Tables 7 and 8 were important contributors to the respective known eligibility and response propensity classification tree models used in the formation of the nonresponse adjustment cells. The lone exceptions were NCES Locale being significant at the 10 percent α level in Table 8, whereas number of floors and frame building size were two of the predictors in the response propensity classification tree model. The stepwise variable selection process used standard regression methods that did not consider the complex survey design, whereas the final model results shown in Table 7 and Table 8 used survey regression procedures that did account for survey design weights. For NCES Locale and Principal Building Activity in the model predicting response among all known eligibles, that difference resulted in exceeding the 0.05 threshold for inclusion in the model.

Table 7. Results of stepwise logistic regression model predicting known eligibility among all in-scope buildings¹

Auxiliary variable	F statistic	Degrees of freedom		p value
		Numerator	Denominator	
Overall fit	14.33	14	5,570	<0.0001
Tract size [2 categories]	26.38	1	5,583	<0.0001
BPA Subregion [7 categories]	24.53	6	5,578	<0.0001
NCES Locale [4 categories]	9.53	3	5,581	<0.0001
Principal Building Activity [5 categories]	3.61	4	5,580	0.0060

¹ Table 7 does not include the analysis variables frame building size and number of floors because the stepwise logistic regression predicting response among all eligible cases dropped those two variables from the final model

Table 8. Results of stepwise logistic regression model predicting response among all eligible cases (i.e., completed site visits and eligible nonrespondents)¹

Auxiliary variable	F statistic	Degrees of freedom		p value
		Numerator	Denominator	
Overall fit	2.46	13	3,582	0.0025
BPA Subregion [7 categories]	3.05	6	3,589	0.0056
NCES Locale [4 categories]	2.30	3	3,592	0.0749
Principal Building Activity [5 categories]	2.26	4	3,591	0.0604

¹ Table 8 does not include the analysis variables frame building size, number of floors, and tract size because the stepwise logistic regression predicting response among all eligible cases dropped those three variables from the final model

Because the stepwise logistic models only include main effects and do not include interactions, the comparison of predictors in the classification trees to the logistic models is not expected to always be a one-to-one match. However, the close alignment of the predictors in both models makes us confident that these are appropriate and effective weighting variables to use in the effort to minimize the risk of nonresponse bias. In the next section, we present further analyses to confirm that the nonresponse adjustment process was effective at diminishing the risk of nonresponse bias.

4. Assessing Effectiveness of the Nonresponse Weight Adjustment

4.1 Comparison of Respondents and Full Sample of Known Eligible Buildings Using Auxiliary Variables for Both Groups

To reduce bias effectively while minimizing the impact on variance, response propensity predictors should be correlated with both response propensity and outcome variables. The covariates used in the nonresponse adjustment model are intended to be strongly correlated with the outcome variables or the survey variables of interest. A comparison of respondents and the full sample of eligible buildings, using auxiliary variables known for both groups, provides some indication of the potential for nonresponse bias in resulting survey estimates if the known auxiliary variables are correlated with outcome statistics. Statistical testing on the difference between the two groups needs to take into account the correlation between the two overlapping samples. The set of respondents contributing to the one estimate is a subset of the set of eligible buildings contributing to the other estimate, and thus it is not appropriate to treat the two estimates as independent. Estimates of statistics and the associated variances across subgroups can be computed using the unknown eligibility adjusted weights for all eligible cases and using the nonresponse adjusted weights and replicate weights for the respondents. Estimates of the difference between the two subgroup estimates can also be computed.

This approach is generally used to assess the potential for nonresponse bias that remains after weighting procedures are applied. The weighting procedures attempt to reduce the potential for nonresponse bias by creating nonresponse adjustment classes for which the respondents' propensities to respond are similar to the nonrespondents' propensities. The extent of the reduction in nonresponse bias depends on the correlation of the weighting class variables with survey estimates.

In this assessment, the percent distribution of sample auxiliary characteristics is compared between the eligible sample and the respondents before and after weighting for nonresponse. Large changes in the percent distribution could suggest potential bias before the weighting adjustment was conducted and could also indicate how effective the adjustment was to reduce such bias, though increases are also possible. We note that if there is no difference in the distributions, a definitive statement about bias cannot be appropriately made. Such a result could be an indication that there was no nonresponse bias to begin with, or it could mean that any bias was successfully addressed by the adjustment. In contrast, if the distribution changes after adjustment for nonresponse, one can be fairly sure that there was potential bias and it has been affected by the adjustment. The most effective use of this type of analysis is to illustrate that even if there is variation in response rates across subgroups, the survey estimates are not inevitably biased.

We have conducted comparisons for the auxiliary variables used in the nonresponse adjustment, as well as the auxiliary measures of tract size and NCES Locale that were used in the unknown eligibility adjustment, but not the nonresponse adjustment. Table 9 shows the distributions at three different points in the weighting process:

- A. For the full set of eligible sampled cases, using the unknown eligibility adjusted weights;
- B. For the respondents only, using the unknown eligibility adjusted weights; and
- C. For the respondents only, using the nonresponse adjusted weights.

The comparison between points A and B shows potential nonresponse bias prior to the nonresponse adjustment. The comparison between A and C illustrates whether the nonresponse adjustment process was effective in accounting for the nonresponse.

In this analysis, there should be differences between A and B if nonresponse biases existed prior to the nonresponse adjustment, and the differences between A and C should be smaller (and ideally close to zero) if the nonresponse adjustment was effective. In Table 9, there are some differences between A and B, and, for the vast majority of characteristics, the differences between A and C were smaller. The two main causes for the remaining differences between A and C are the small number of completed site visits and low response rates – the two factors mentioned in Section 3.3 that led to a small set of final nonresponse adjustment cells. Small sample sizes mean that cells of size 30 or less were generated after only a few splits, leading to fewer nonresponse adjustment cells. With a higher final sample size and higher response rates, more nonresponse adjustment cells could have been generated without concern for an excessive increase in variance, and more nonresponse adjustment cells could, in turn, correct for more sources of potential nonresponse bias. Low response rates also generate larger nonresponse adjustment factors, which can increase the variance of the estimated percent distribution and the variance of the difference between A and C. Some observed differences between A and C could be due to these large variances. As discussed by Brick et al (2025), in comparison to the nonresponse biases in surveys with high response rates “in low response rate surveys the biases may be more variable and some estimates with large biases may be more likely to occur.”

Table 9. A comparison of the distribution of building characteristics of unknown eligibility adjustment weighted respondents and eligible nonrespondents [A] to the distributions of unknown eligibility adjustment weighted respondents [B] and full nonresponse adjustment weighted respondents [C]

Auxiliary variable	A: Respondent and eligible nonrespondent distribution (based on unknown eligibility adjusted weight)		B: Respondent distribution (based on unknown eligibility adjusted weight)		C: Respondent distribution (based on nonresponse adjusted weight)		Percent estimated difference [B-A] ¹	Percent estimated difference [C-A] ¹
	Percent	Standard error	Percent	Standard error	Percent	Standard error		
Frame Building Size								
1,001 to 10,000	70.1	0.9	73.5	2.1	71.8	2.3	3.4	1.6
10,001 to 25,000	16.5	0.7	12.9	1.7	15.2	1.9	-3.6	-1.3
25,001 to 50,000	6.4	0.4	7.2	1.1	6.9	1.1	0.8	0.5
50,001 to 100,000	4.3	0.3	4.1	0.7	3.8	0.7	-0.3	-0.5
100,001 to 200,000	2.0	0.2	2.0	0.5	1.9	0.5	0.0	-0.1
Over 200,000 square feet	0.6	0.1	0.3	0.1	0.4	0.2	-0.3	-0.2
Number of Floors								
1 floor	79.0	0.8	75.7	2.2	77.7	2.1	-3.3	-1.3
2 floors	14.8	0.7	17.6	2.0	15.8	1.9	2.8	1.0
3 to 5 floors	5.0	0.3	5.6	0.9	5.4	0.9	0.6	0.4
6 or more floors	1.1	0.1	1.1	0.3	1.1	0.3	-0.1	-0.1
Frame Principal Building Activity								
Assembly, office, food sales, mercantile, service	50.2	1.1	47.2	2.8	51.4	2.8	-3.0	1.1
Education, lodging, public order	10.8	0.7	15.1	2.0	10.7	1.5	4.2	-0.1
Food service, healthcare, laboratory, other	10.3	0.7	8.7	2.0	8.4	1.8	-1.6	-1.9
Warehouse, vacant	25.5	1.0	25.6	2.5	26.1	2.5	0.1	0.6
Residential, Multi-family	3.2	0.2	3.4	0.6	3.5	0.6	0.2	0.3
NCES Locale								
City	42.9	0.8	38.2	2.5	40.4	2.5	-4.7	-2.5
Suburb	22.0	0.6	21.1	1.9	22.9	2.1	-0.9	0.9
Town	15.1	0.4	13.8	1.4	13.9	1.5	-1.3	-1.2
Rural	20.0	0.8	27.0	2.6	22.9	2.5	6.9	2.8

Auxiliary variable	A: Respondent and eligible nonrespondent distribution (based on unknown eligibility adjusted weight)		B: Respondent distribution (based on unknown eligibility adjusted weight)		C: Respondent distribution (based on nonresponse adjusted weight)		Percent estimated difference [B-A] ¹	Percent estimated difference [C-A] ¹
	Percent	Standard error	Percent	Standard error	Percent	Standard error		
Tract Size								
Large (31+ eligible buildings)	6.0	0.1	6.6	1.1	6.0	1.1	0.5	-0.1
Small (6-30 eligible buildings)	94.0	0.1	93.4	1.1	94.0	1.1	-0.5	0.1
State and BPA Subregion								
Idaho	12.9	0.3	9.0	1.3	11.0	1.5	-3.9	-1.8
Montana	13.1	0.3	14.9	1.8	11.6	1.5	1.8	-1.5
Oregon	28.9	0.5	36.9	2.5	30.4	2.3	8.0	1.5
Eastern Oregon	5.0	0.2	5.3	1.3	4.5	1.1	0.2	-0.5
Western Oregon	23.9	0.4	31.7	2.4	26.0	2.1	7.8	2.1
Washington	45.1	0.5	39.1	2.4	46.9	2.6	-5.9	1.8
Eastern Washington	14.6	0.3	12.8	1.5	15.9	1.8	-1.7	1.3
Western Washington	9.2	0.4	7.2	1.3	8.9	1.6	-2.0	-0.3
Puget Sound	21.3	0.4	19.1	2.0	22.2	2.3	-2.2	0.9

¹ All values are rounded to the first decimal place.

5. Conclusions

This report assessed the potential for nonresponse bias using auxiliary variables available for both respondents and nonrespondents as well as outcome variables known only for respondents. For the 2025 CBSA, we have limited data on the nonrespondents, mostly building characteristic and geographic information, which limits the statistical analyses and comparisons. However, the known characteristics examined here for both respondents and nonrespondents are critical predictors of energy consumption and are therefore highly relevant to this analysis of nonresponse effects in the 2025 CBSA.

In Chapter 2, we compared unweighted and weighted response rates, overall and by subgroups of interest. The overall unweighted and weighted response rates were 11.0 and 12.7 percent, respectively. Although the overall response rate was lower than desired, within each subgroup of interest, none of the categories had weighted response rates that differed by more than 7.5 percentage points. This minimization of differential response rates by subgroup category was partly due to the efforts of the operations team to try to achieve the same proportion of completed site visits by subgroup category as the proportion of sampled buildings by subgroup category. Even with these minimal differences in response rates in subgroup categories, we identified some differences which if not addressed could indicate a potential for nonresponse biases.

In Chapter 3, we described the nonresponse adjustment process and assessed its effectiveness in three separate analyses. The standard nonresponse adjustment approach used in the 2025 CBSA was to try to reduce any potential nonresponse bias by creating two distinct statistical models that identified auxiliary variables that differentiated the (1) likelihood to determine the eligibility status (eligible or ineligible) among all sampled, in-scope buildings and (2) likelihood to complete a site visit among all eligible buildings. Based on the results of these models, two separate sets of homogenous nonresponse adjustment cells were formed: (a) one for redistributing the base weights of the cases of unknown eligibility among cases of known eligibility; and (b) the other for redistribution of the unknown eligibility adjusted weights (i.e., the result of (a) above) for all eligible nonrespondents among respondents. Machine learning classification algorithms were used to construct these two models and identify the two sets of nonresponse adjustment cells. Two stepwise logistic regression analyses, using the same set of auxiliary variables as predictors and the two desired outcomes (known eligibility propensity among all sampled, in-scope buildings and response propensity among eligible buildings), led to nearly the same set of variables used in the two-step nonresponse adjustment process.

The analyses presented in Chapter 4 examined the effectiveness of the nonresponse adjustments by comparing the weighted distributions of respondents and eligible buildings using auxiliary variables for both groups. This analysis showed some differences for each of the auxiliary variables between the weighted distributions for all eligible units using the unknown eligibility weight and all respondents using the nonresponse-adjusted weight. Most of these differences were less than two percentage points, but a few characteristics, such as very urban and very rural areas, were larger than that. However, these differences were smaller for the majority of the auxiliary variables than the differences observed between the weighted distributions for all eligible units and all respondents both using the unknown eligibility weight. For buildings in very urban and very rural areas, the difference when using the nonresponse-adjusted weight for respondents was roughly half the difference when using the unknown eligibility weight for respondents. Based on this result, we determined that although there is some evidence for the potential for nonresponse bias in some of the examined characteristics, the nonresponse adjustment was effective in improving the

alignment of the estimates of these characteristics for the respondents with those of the in-scope sample.

If the auxiliary variables examined in this report are correlated with the key energy usage outcome measures, these results suggest the adjustments are likely to have reduced nonresponse bias for most estimates, but the low and variable response rates may result in some estimates having nonresponse bias.

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Appendix

Auxiliary Variables and Definitions of Values

Appendix

Auxiliary Variables and Definitions of Values

Frame Building Size (Variable name: BLDG_SIZE_CAT_COL)

- 1 = 1,001 to 10,000 square feet
- 2 = 10,001 to 25,000 square feet
- 3 = 25,001 to 50,000 square feet
- 4 = 50,001 to 100,000 square feet
- 5 = 100,001 to 200,000 square feet
- 6 = Greater than 200,000 square feet

Frame Number of Floors (Variable name: FLR_CAT)

- 1 = One floor
- 2 = Two floors
- 3 = Three to five floors
- 4 = Six or more floors

Frame Principal Building Activity (Variable name: BLDGUSE_CAT_NUM)

- 1 = Assembly, office, food sales, mercantile, service
- 2 = Education, lodging, public order
- 3 = Food service, healthcare, laboratory, other
- 4 = Warehouse, vacant
- 5 = Residential, Multi-family

National Center for Education Statistics Locale (Variable name: NCES_LOCALE_CAT)

- 1 = City
- 2 = Suburb
- 3 = Town
- 4 = Rural

Frame Tract Size (Variable name: TRACT_SIZE)

- 1 = Large tract (31+ eligible buildings in tract)
- 2 = Small tract (6-30 eligible building in tract)

BPA Subregion (Variable name: BPA_SUBREGION_NUM)

1 = Eastern Oregon

2 = Eastern Washington

3 = Idaho

4 = Montana

5 = Puget Sound

6 = Western Oregon

7 = Western Washington