



Commercial Buildings Energy Consumption Survey (CBECS) Questionnaire content & changes summary: 2012 to 2018 CBECS

- **Building Size, Structural Characteristics, and Age**
 - Square footage (exact—categorical if exact is unknown)
 - ✗ **Removed:** Follow-ups about inclusion of any parking and common areas included in square footage figure
 - Wall construction material, Roof construction material
 - ✓ **Updated:** Cool roof (now *Roof characteristics*: white or highly reflective coating or paint/tiles or shingles, aluminum coating, ballasted roof, vegetated roof, other)
 - Roof pitch
 - Building shape
 - Percent of exterior that is glass (categorical)
 - ✗ **Removed:** Whether the glass is equal on all sides of the building and if not, Whether the sides receiving direct sunlight have more or less glass than the other sides
 - Number of floors, Number of underground floors
 - Floor-to-ceiling height, Presence of an attic
 - Elevators, Escalators (presence and number)
 - Year of construction (exact—categorical if exact is unknown)
 - Renovations since 2000 (updated reference year) (and a list of 13 specific types)
- **Building Activity**
 - If one activity accounts for 75% or more of the floorspace, the primary activity is collected, otherwise the top three activities and the percent of floorspace occupied by each activity are collected:
 - Office/Professional
 - Data center
 - Warehouse/Storage
 - Food sales or service
 - Retail
 - Education
 - Religious worship
 - Public assembly
 - Health care
 - Service
 - Lodging
 - Public order and safety
 - Residential
 - Industrial/Manufacturing
 - Agricultural
 - Vacant
 - Other (specify)
 - Building activity subcategories (100+); respondent chooses from a subset of the subcategories, dependent on the primary activity
 - ✗ **Removed:** If any office space, presence and location of open plan office space
 - Special measures of size, dependent on the main activity (e.g., number of classroom seats, number of licensed hospital beds, number of guest rooms)
 - ✓ **New:** Presence of a drive-thru window for food service buildings
 - Whether the building is on a multibuilding campus/complex, and if so:
 - Type of campus, Presence of a central plant, Whether the central plant is in the building, Output energy sources of the central plant
 - ✓ **New:** Number of buildings on the campus/complex
- **Building Ownership/Occupancy, Operating Hours, and Employment**
 - Building ownership: government (federal, state, local) or other type of owner (REIT; other corporation, partnership, LLC, or LLP; individual owner(s); religious organization; other non-profit organization; private academic institution; other)

- Number of businesses or organizations that use space full-time (exact—categorical if exact is unknown)
- Whether the building is owner occupied
- ✓ **New:** Number of tenants that lease space
- ✓ **Updated:** Owner operator: *Is the building owner responsible for the operation and maintenance of the energy systems?*
- Purchasing power: *Does the building owner also have direct input on decisions regarding purchases of energy-related equipment?*
- Nonowner operator or nonowner with purchasing power (property management company/leasing agent; business owner/tenant; facilities personnel employed directly by the owner; facilities/energy management consultant; volunteer member of the organization; manager with general supervisory duties; other)
- Number of months the building was in use
- Percent occupancy (for office buildings, enclosed malls, outpatient health care, hotels, motel/inns, and retirement homes)
- ✗ **Removed:** Annual number of events for public assembly buildings, annual meals served for restaurants
- ✗ **Removed:** Seasonal use, “high season” questions
- Whether the building is normally open 24 hours a day, on weekdays, and/or on weekends
- Weekly operating hours (exact—categorical if exact is unknown)
- Number of employees on the main shift (exact— categorical if exact is unknown)
- ✗ **Removed:** Whether fire station personnel are career or volunteer
- **Energy Sources, Uses, and Equipment**
 - End uses: whether energy was used during 2018 for: heating, air conditioning, water heating, cooking, manufacturing, or electricity generation
 - Energy sources used: electricity, natural gas, fuel oil/diesel/kerosene, propane/bottled gas/LPG, district steam, district hot water, district chilled water, wood, coal, solar, or other
- ✓ **New:** If solar chosen above, whether they have solar panels for generating electricity or solar thermal energy
- Percent of the building that is heated and cooled
- ✓ **Updated:** Space heating source(s) and equipment: instead of simply asking what energy source(s) were used for heating and then what types of equipment, the equipment type is linked to each energy source reported for heating. The equipment type response options for each heating energy source are shown in the grid on page 5.
- ✓ **Updated:** Boiler/steam/hot water distribution (air handlers, fan coil or induction units, duct reheat, radiators, radiant floor/ceiling panels, water loop heat pumps, other)
- ✗ **Removed:** Type of furnace (packaged central, split system, duct furnace, individual)
- ✗ **Removed:** Type of packaged heating/cooling (unitary, custom built-up), packaged heating components (furnace, heat pump, heating coil, powered induction unit, duct reheat)
- ✓ **New:** Whether the packaged unit contains a heat pump
- ✗ **Removed:** Heat pump heating/cooling system type (packaged, split, individual, ductless mini-split, variable refrigerant flow)
- ✓ **New:** If individual heater or heat pump, whether it is a packaged terminal heat pump (PTHP)
- ✓ **New:** If heat pump, whether the system is variable refrigerant flow (VRF)
- ✗ **Removed:** Type of individual heater (infrared radiant, baseboard, portable heater, wall heater, individual furnace, unit heater, heating element in PTAC)
- Heat pump type (air source, ground source, combination)
- Percent heated by each equipment/source combination, Main heating equipment
- ✓ **Updated:** Air conditioning source(s) and equipment: similar to space heating, the equipment type is linked to each energy source reported to be used for cooling. The equipment type response options for each air conditioning energy source are shown in the grid on page 5.

- Chiller/chilled water distribution (air handlers, fan coil or induction units, chilled beam, water loop heat pump, other)
- Type of chiller (air cooled, water cooled, absorption)
- ✓ **New:** If heat pump or residential-type split system, whether it is variable refrigerant flow (VRF)
- Percent cooled by each equipment/source combination, Main air conditioning equipment
- ✗ **Removed:** Heater chiller
- Building Automation System (BAS)
- ✓ **New:** Which system the BAS controls (heating, cooling, lighting)
- ✓ **New:** “Smart” or internet-connected thermostat
- ✓ **Updated:** Other method used to control the indoor temperature during the heating/cooling season: setting a programmable thermostat, manually adjusting temperature setting, or turning the equipment on or off.
- ✓ **Updated:** Heating/cooling ventilation equipment is now *Airflow control*: variable air volume (VAV) system, dedicated outdoor air system (DOAS), demand-controlled ventilation (DCV)
- Economizer cycle, Cooling tower, Regular HVAC maintenance
- ✗ **Removed:** Type of economizer cycle (air-side or water-side)
- Energy sources for water heating, cooking, manufacturing
- Type of water heating equipment: centralized and/or point-of-use
- Booster water heaters (for food service, inpatient health, dry cleaner/laundromat, car wash)
- ✗ **Removed:** Whether the water is hot as soon as it is turned on (for lodging)
- Electricity generation technologies (solar panels, reciprocating engine generator, fuel cells, large turbines, microturbines, wind turbines, other)
- ✓ **New:** Energy sources by generation technology (other than solar panels or wind turbines)
- Cogeneration system
- Use of generated electricity (back-up, during high demand, or whenever electricity is used)
- ✗ **Removed:** How electricity and natural gas are purchased (local utility, independent power producer, non-local utility, broker)
- ✓ **New:** Whether the capacity of the generators is greater than 1MW (for buildings larger than 50,000 square feet)
- ✓ **New:** Electric vehicle charging stations associated with the building
- ✓ **New:** Natural gas clothes dryers (for dry cleaners/laundromats)
- Categorical amounts of propane and wood used, wood expenditures, if applicable
- Whether the building has a formal energy management plan in which energy targets are set and consistently monitored
- **Miscellaneous Equipment** (*Note: Many of these questions are only asked for certain building activities.*)
 - Commercial food preparation space (list of 7 types) and square footage follow-up for selected spaces (snack bar, fast food, cafeteria, commercial kitchen)
 - Activities requiring large amounts of hot water
 - Linens laundered onsite
 - ✗ **Removed:** Space in fire stations for non-fire station activities, living quarters
 - Space in hotels/motels for conferences or social events and estimate of percent of floorspace
 - Medical equipment (overall presence and follow-up for number of X-ray, CT scan, MRI, linear accelerators)
 - Percent outpatient care (in Inpatient health buildings)
 - Operating rooms for outpatient surgery (in Outpatient health)
 - Laboratory equipment, Machine equipment
 - Indoor heated pool (and energy source if present), Indoor ice rink
 - Sterilizers or autoclaves
 - Refrigeration and/or freezer types (full-size residential-type, half-size/compact, walk-in, open cases/cabinets, closed cases/cabinets, refrigerated vending, commercial ice makers, large cold storage areas)—presence and number of each type
 - Refrigeration waste heat recovery system (for food sales, large hotel/motels) and whether it is used for space heating, water heating or some other use

- Computers, Laptops, Servers—presence and number (exact—categorical if exact is unknown)
 - Multiple monitors—presence and category of prevalence
 - ✓ **New:** Tablets charged in the building—presence and number
 - ✗ **Removed:** Flat screen monitors – presence and category of prevalence
 - ✓ **New:** Power usage effectiveness (PUE) for data center buildings
 - Separate computer areas (data center, computer-based training, student/public computer center, trading floor) and square footage follow-up for data centers
 - ✓ **New:** Data center characteristics (raised floor, separate cooling system, humidity control, UPS, controlled access)
 - ✗ **Removed:** Square footage of trading floors
 - ✗ **Removed:** Number and type (inkjet/laser) of printers
 - Interactive whiteboards, TV or video displays— presence and number
 - ✓ **New:** Large floor-standing office devices (any combination of printer/copier/scanner/FAX machine), Smaller desktop devices, Point-of-sales or cash registers—presence and number
 - ✗ **Removed:** Cash registers, Photocopiers, Separate FAX machines
 - ✓ **New:** Number of ATMs for bank buildings
 - Percent of building lit during usual business hours and during off hours (exact—categorical if exact is unknown)
 - Types of lighting (fluorescent, compact fluorescent, incandescent, halogen, HID, LED, other) and the percent of floorspace lighted by each
 - Lighting controls (scheduling, occupancy sensors, multi-level lighting/dimming, daylight harvesting, high-end trimming/light-level tuning, plug-load control, demand responsive)
 - Percent exterior lighted (categorical)
 - ✓ **Updated:** Lighted parking area that is included in building’s electrical service and whether it is part of the building (e.g., indoor parking level) or separate (e.g., outdoor lot or garage), Number of parking spaces in that lighted area
 - Window glass type (single/multi-layer)
 - Daylighting features (tinted window glass, reflective window glass, external overhangs or awnings, skylights or atriums)
 - Percent of building that receives enough outside light so that the lights do not need to be turned on
- **Energy Usage**
 - Consumption and expenditures data are collected for electricity, natural gas, fuel oil, district steam, and district hot water.
 - Building respondents are asked to provide annual consumption and expenditures (for calendar year 2018).
 - Energy suppliers will be contacted to obtain monthly data.
 - ✓ **New:** Buildings with on-site electricity generation are asked to provide both the total electricity used and the amount of *purchased* electricity, if available
 - ✗ **Removed: Water Usage Questions**
 - **Green Building Certification**
 - ✗ **Removed:** In the past 3 years, has this building been certified as a “green building,” such as Energy Star, LEED, or Green Globes? If yes, which type(s). (*Note:* As reported by the respondent, this information was found to have low validity in the 2012 CBECS. This information can be added via record matching for the 2018 CBECS.)
 - ✓ **New: Tenant billing and metering**
 - For offices, retail and warehouses over 10,000 square feet, new questions about whether electricity and/or natural gas is included in the tenants’ rent or separately billed, whether there are meters dedicated to tracking energy use within individual tenants, and which end uses are tracked individually.

Heating source and equipment combinations

	EL	NG	FO	PR	ST	HW	WO	CO	SO	OT
Packaged central units	X	X		X						X
Boilers	X	X	X	X				X		X
Heat pumps	X	X		X						
Residential-type furnaces	X	X	X	X			X	X		X
Individual space heaters	X	X	X	X			X			X
Fireplaces	X	X		X			X			
Other [specify]	X	X	X	X			X	X	X	X
<i>Distribution for district steam/hot water/boiler:</i>										
<i>Central air handlers</i>					X	X				
<i>Fan coil or induction units</i>					X	X				
<i>Duct reheat</i>	X				X	X				
<i>Radiators</i>					X	X				
<i>Radiant floor/ceiling panels</i>					X	X				
<i>Water loop heat pumps</i>					X	X				
<i>Other</i>					X	X				

Air conditioning source and equipment combinations

	EL	NG	FO	PR	ST	CW	OT
Packaged A/C units	X						
Central chillers	X	X	X	X	X		
Heat pumps for A/C	X						
Residential-type split system A/C	X						
Individual room or portable A/C	X						
“Swamp” coolers or evaporative coolers	X						
Other [specify]	X	X	X	X	X		X
<i>Distribution for district chilled water/chiller:</i>							
<i>Central air handlers</i>						X	
<i>Fan coil or induction units</i>						X	
<i>Chilled beam</i>						X	
<i>Water loop heat pump</i>						X	
<i>Other</i>						X	