



Independent Statistics & Analysis

U.S. Energy Information
Administration

Supporting Statement for Commercial Buildings Energy Consumption Survey (CBECS)

Part A: Justification

EIA-871A Building Questionnaire

EIA-871I Mall Building Questionnaire

EIA-871J Mall Establishment Questionnaire

EIA-871C Natural Gas Usage

EIA-871D District Energy Usage

EIA-871E Electricity Usage

EIA-871F Heating Oil Usage

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Terms of Clearance

The previous CBECS information collection was approved for three years with the following terms of clearance specified in an OMB Notice of Action (NOA) dated 1/29/13: 1) *prior to the renewal of this collection, EIA should work with survey respondents to verify the hourly burden estimates for each survey instrument, and 2) subject to available resources, EIA should develop a strategy for assessing consumer choice and consumer welfare issues associated with energy consumption and energy efficient products used in commercial buildings.*

1) *Burden Estimates:* The 2012 CBECS used a computerized survey instrument that recorded the times for completion of survey interviews. The 2018 burden estimates are based on those recorded times. For example, the average administration time for the 6,424 building interviews in 2012 was 41 minutes. After a few adjustments and additional time for gathering records, as described further in Section A.12, the 2018 burden estimate for the building survey is 50 minutes. Section A.12 provides the detailed calculation for this figure and for the other survey forms.

2) *Consumer choice:* EIA's analysis of the data it received demonstrates that CBECS is not the appropriate vehicle for measuring consumer choice. CBECS respondents are personnel who can report data across a range of building topics and characteristics and are rarely those who have the executive function of making purchasing decisions. CBECS data show that too few and an unrepresentative number of CBECS respondents with decision-making authority have also made equipment purchases.

In the 2012 CBECS, most respondents (98%) said the *building's owner* made the decisions regarding energy equipment purchases. Data from the 2012 CBECS show that just 8% of respondents are the building's owner. While many buildings have replaced heating or cooling equipment since 1990 (60% and 68% respectively), in only 178 out of 6,720 buildings was the survey respondent the same person who held purchasing power.

Relevant equipment purchases occur over a long time period during which decision-makers change. The respondents who had decision-making authority for purchases are very unlikely to be the same purchasers of equipment going back to 1990. Thus, the number of applicable cases is likely much less than the 178 commercial buildings and not representative; the results do not support reliable inferences to the population of the decision-makers. For these reasons, CBECS data cannot support consumer choice estimation or analyses.

Introduction

The U.S. Energy Information Administration (EIA) is the statistical and analytical agency within the U.S. Department of Energy (DOE). It collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding regarding energy and its interaction with the economy and the environment.

EIA is requesting a three-year extension, with changes, of the *Commercial Buildings Energy Consumption Survey (CBECS)*, Forms EIA-871A, C, D, E, F, I, and J. Forms EIA-871B, G, and H, which were used in the 2012 CBECS, are deleted. The retained forms will be used to collect data on energy consumption and

expenditures and energy-related building characteristics for the commercial buildings sector of the U.S. economy for calendar year 2018. This supporting statement covers the following forms:

- Buildings survey (part 1 of CBECS)
 - EIA-871A Building Questionnaire
 - EIA-871I Mall Building Questionnaire
 - EIA-871J Mall Establishment Questionnaire
- Energy suppliers survey (part 2 of CBECS)
 - EIA-871C Natural Gas Usage
 - EIA-871D District Energy Usage
 - EIA-871E Electricity Usage
 - EIA-871F Heating Oil Usage

CBECS is a national multistage probability sample survey of commercial buildings and the energy suppliers to these buildings. The sampling unit is a *building*. The overall objective of CBECS is to collect basic statistical information on energy consumption and expenditures in commercial buildings, and the energy-related characteristics of those buildings. CBECS is the only national-level data source for this information. The identity of individual respondents are confidential and the aggregate data are made available to the public in electronic tables and reports at www.eia.gov/consumption/commercial.

The 2018 CBECS will be the 11th iteration of this survey. The survey has been conducted periodically since 1979, the most recent iterations being in 2007 and 2012.

Overview of the Forms and How They Are Used

CBECS is a two-part data collection. In the first part, the *Buildings Survey*, detailed information about the buildings (such as building size, age, structural characteristics, operating hours, ownership, energy sources and uses, and the types of energy-related equipment used) are collected from building owners, managers, and tenants on a voluntary basis. This part of data collection has historically been administered by a trained interviewer, either in person or by telephone, using one of three forms: EIA-871A *Building Questionnaire*, EIA-871I *Mall Building Questionnaire*, or EIA-871J *Mall Establishment Questionnaire*. The latter two forms are specifically tailored for strip shopping center buildings (about 4% of the completed building cases), a building type which requires a different data collection approach than other buildings because of the diverse range of businesses within these structures. Interviews are conducted with multiple respondents associated with different aspects and uses of the building in order to collect data on structural and operating characteristics of the building as a whole. A building manager or leasing agent of the center is contacted to complete EIA-871I to provide general data about the whole building. Individual businesses within each building are subsampled (about two per strip center), and the tenants of those businesses are contacted to complete EIA-871J.

The second part of CBECS is the *Energy Suppliers Survey*, which is conducted under EIA's mandatory collection authority. During the building and mall establishment interviews, annual energy consumption and expenditures data are requested from the building respondents, along with information on their energy supplier(s) and account numbers. A follow-up survey is conducted with the individual energy suppliers for most of the buildings to collect monthly energy consumption and expenditures. These

surveys are Forms EIA-871E *Electricity Usage*, EIA-871C *Natural Gas Usage*, EIA-871F *Heating Oil Usage*, and EIA-871D *District Energy Usage*.

Changes for the 2018 CBECS

The proposed design, procedures, and forms for the 2018 CBECS reflect a number of changes from the 2012 CBECS. These changes include:

- Respondents will be offered the option to complete the CBECS using a self-administered online questionnaire. Interviewer debriefing following the 2012 CBECS indicated that some respondents would prefer a web mode option for responding to the CBECS. EIA estimates that 40% of respondents will choose web as their response mode. We are relying on the informed estimate of our contractor who conducts many establishment surveys via web. Web surveys are now the preferred design approach and mode for federal establishment surveys conducted by Census and the Bureau of Labor Statistics. Building respondents requested a web option during the 2012 CBECS, as reported by interviewers during debriefing of their experience. For these reasons, 40% represents a conservative estimate of the proportion of building respondents who will opt to complete the study online.
- The following associated forms will no longer be used: EIA-871B *Authorization Form*, EIA-871G *Worksheet 1: Characteristics, Energy Sources, and Equipment*, and EIA-871H *Worksheet 2: Energy Amounts Used and Dollars Spent*.
- EIA-871B *Authorization Form* is discontinued.

In the previous CBECS, respondents were asked to do two things: 1) report their building's energy supplier name(s) in response to interviewers' question(s) in the Buildings Survey interview (EIA-871A) and 2) write the name of each supplier that provided energy to the building record on schedule EIA-871B. On schedule EIA-871B, respondents were also asked to print and sign their name, their employer, and address.

Use of schedule EIA-871B resulted in duplicate information collection, because the name of the energy supplier was requested on two forms (871-A and 871-B). EIA will now only collect the energy supplier name for the building in the 871-A (the building questionnaire) using a database look-up function in the survey instrument. At that time, the respondent will also be informed that EIA may contact the supplier for further information. EIA collects data from the energy suppliers under its mandatory authority, so a signature and authorization from the building owner/manager is not required.

- EIA-871G *Worksheet 1* was provided to respondents to support gathering and preparing information about key characteristics of their building prior to a CBECS interview. The form is inherently redundant, it only served as a respondent aid in the interview, and does not collect any additional information beyond what is already collected from the building interview. Interviewers were not required to collect the worksheet EIA-871G from respondents during the last CBECS. EIA also determined that completing the worksheet was not a prerequisite for completing the interview.

- EIA-871H *Worksheet 2* was used mainly for building respondents to report monthly consumption and expenditures data for electricity and natural gas. For fuel oil/diesel/kerosene, district steam, district hot water and total water, it was used as a worksheet for building respondents to gather annual data in preparation for the in-person interview. EIA determined that the worksheet is no longer necessary for the 2018 CBECS. Monthly energy consumption data will be collected from the energy suppliers instead of building respondents, as these data are easily accessible from supplier databases. Building respondents have the option to provide annual consumption and expenditures for electricity, natural gas, fuel oil/diesel/kerosene, district steam, and district hot water. EIA kept this option available because there are some building environments, such as campuses, where the building respondent can provide more accurate data for the selected structure than the energy supplier.
- Most of the real-time questionnaire edits were deleted (from EIA-871A, EIA-871I, and EIA-871J). This will reduce the number of times an interview is interrupted to confirm a data item and will eliminate frustration for respondents; they will no longer be told that information that they are providing is questionable or incorrect.
- EIA will no longer ask the building respondents to provide monthly energy data, as these records are more easily accessed through energy suppliers. The Energy Suppliers Survey (Forms EIA-871C-F, as applicable to each building depending on which energy source or sources are used in the building) will be used for almost all buildings, instead of the previous methodology where only those buildings where the building respondent was not able to provide valid data were included in the supplier data collection. The building and establishment respondents reporting on Forms EIA-871A and EIA-871J will still be asked to provide annual energy data because EIA has found that there are situations where those respondents are better suited to provide data that corresponds correctly to the sampled CBECS structure. This reporting structure should provide the highest quality data while allocating the burden appropriately across survey respondents.
- Changes from the 2012 CBECS questionnaire follow on the next few pages. Deleted questions reference the 2012 questionnaire numbers. Added and revised questions reference the 2018 questionnaire numbers.
 - Delete questions A7-A11 from EIA-871A: These questions asked respondents if they included parking and common areas in the reported square footage. They were meant to improve the accuracy of the data reported for square footage but respondents had difficulty providing this information and EIA determined that other square footage editing procedures added more value than these questions.
 - Delete questions A20 and A21 from EIA-871A: 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, have been deleted for concerns about data quality.
 - Revise question A11 in EIA-871A and EIA-871I: The question about whether there is a *cool roof* was expanded to ask which, if any, properties the roof has that allow it to reflect more sunlight or absorb less heat than a standard roof, such as a white or highly reflective coating or paint or a vegetative roof. This change was made following discussions with stakeholders and is intended to preclude false positive responses.

- Delete question B12 from EIA-871A: Type of retail store question collected detail about whether the retail store was apparel specialty, drug store, home center, etc. There were not enough responses across the categories to publish the data, so it did not add any value.
- Delete questions B31-B33 from EIA-871A: Questions about the presence and location of open plan office space have been deleted for concerns about data quality.
- Add question B37 to EIA-871A: Food service buildings will be asked whether there is a drive-thru window. This low-burden question was added as a stakeholder request and will add information about the intensity of building use which will help in end-use modeling.
- Add questions B43 and B44 to EIA-871A and EIA-871I: For buildings that are on a multi-building campus/complex, these two questions were added to collect the number of buildings on the campus/complex and the name of the campus/complex. They will help EIA with data editing.
- Add question C9 to EIA-871A: For buildings that report more than one business or organization in the building, this question was added to collect the number tenants that lease space in the building. This is part of the effort to scope the ability to collect data for a future tenant data collection.
- Delete questions C22 and C23 from EIA-871A: Annual number of events for public assembly buildings, annual meals served for restaurants. These questions had high item nonresponse rates as many of the respondents did not have that information available.
- Delete questions C24, C25, C32, and C33 from EIA-871A and C6, C7, C14, and C15 from EIA-871J: Seasonal use and “high season” questions. These questions were meant to make answering questions about operation hours easier for respondents at buildings that were used more in certain months (e.g., summertime), but data review indicated that the questions added confusion and were not helpful.
- Delete question C36 from EIA-871A: The question about whether fire station personnel are career or volunteer has been deleted. This was added to the 2012 CBECS in response to a stakeholder request, but too few fire stations and police stations appeared at random in the sample, so the two building activities were combined in the published data tables and the public microdata.
- Add question D17 to EIA-871A, EIA-871I, and EIA-871J: If solar is reported to be used as an energy source in the building, this follow-up question is asked to determine whether the building has solar panels for generating electricity and/or solar thermal energy. As a growing number of commercial buildings are using solar, it has become more important to collect information on the specific technology used.
- Revise questions D22-D78 in EIA-871A, EIA-871I, and, EIA-871J: The questions on space heating source(s) and the equipment section of the questionnaire were revised. Instead of asking what energy source(s) were used for heating and then asking what types of equipment, EIA will link the equipment type to each reported energy source that is used for heating. Equipment type response choices will be specific to the selected energy source(s), which should make it easier for respondents to report equipment type and fuel use in their buildings. This information is useful for data users to know which source powers each equipment.

- Revise questions D91-D114 in EIA-871A, EIA-871I, and EIA-871J: The cooling source(s) and equipment section of the questionnaire was revised to streamline the question sequence. Similar to space heating, EIA will link the equipment type to each energy source reported to be used for cooling. In past clearances of CBECS, the respondent was presented with all of the previously reported energy sources to choose from as energy source(s) for cooling, e.g., electricity, natural gas, or fuel oil. Because the 2012 CBECS showed that 93% of buildings used *only* electricity for cooling, the energy source for cooling question was revised to ask, “Was electricity the only energy source used for air conditioning in this building in 2018?” If this is true, the next question provides a list of electric air conditioning equipment types from which the respondent selects the type(s) used in the building. For the 7% of buildings that use an energy source other than electricity, the respondents are given the opportunity to choose which energy source(s) they use. Then, for example, if natural gas is used for cooling, the equipment choices are limited to those that are known to use natural gas: a central chiller or some other type (*other* is provided as an option to catch rare or new equipment types). Reducing the response choices to only logical combinations of equipment and energy source reduces the reporting burden because it reduces the time respondents spend gathering the necessary information.
- Delete question D25 from EIA-871A, D29 from question EIA-871I, and question D27 from EIA-871J: The type of furnace (packaged central, split system, duct furnace, individual) has been deleted for concerns about data quality.
- Delete questions D36, D37, and D52 from EIA-871A; D40, D41, and D56 from EIA-871I; and D38, D39, and D50 from EIA-871J: The type of packaged heating/cooling (unitary, custom built-up) and packaged heating components (furnace, heat pump, heating coil, powered induction unit, duct reheat) questions have been deleted for concerns about data quality.
- Add questions D81 and D99 to EIA-871A, EIA-871I, and EIA-871J: These questions provide some of the information that was found in the questions deleted in the bullet above. For buildings that report a packaged unit, this question determines whether or not there is a heat pump as part of the packaged unit. This question was added in consultation with stakeholders and an engineer with heating, ventilation, and air conditioning (HVAC) expertise and will be less burdensome for respondents than the ones that were deleted.
- Delete questions D38 and D57 from EIA-871A; D42 and D61 from EIA-871I; and D40 and D55 from EIA-871J: The heat pump heating/cooling system type (packaged, split, individual, ductless mini-split, variable refrigerant flow) questions have been deleted for concerns about data quality.
- Add questions D85 and D102 to EIA-871A, EIA-871I, and EIA-871J: These questions provide some of the information that was found in the questions deleted in the bullet above. For buildings that report heat pumps or residential-type split system air conditioners, this question asks whether it is a variable refrigerant flow (VRF) system. This question was added in consultation with an engineer with HVAC expertise.
- Delete question D41 from EIA-871A; D45 from EIA-871I; and D43 from EIA-871J: The type of individual heater (infrared radiant, baseboard, portable heater, wall heater,

- individual furnace, unit heater, heating element in PTAC (Packaged Terminal Air Conditioner) questions has been deleted for concerns about data quality.
- Add questions D83, D86, D100, and D103 to EIA-871A, EIA-871I, and EIA-871J: These questions will clarify whether equipment reported as either heat pumps, individual space heaters, or individual room air conditioners are Packaged Terminal Heat Pumps (PTHPs). This question was added in consultation with an engineer with HVAC expertise.
 - Delete question D54 from EIA-871A; D58 from EIA-871I; and D52 from EIA-871J: Whether the absorption chiller has the capability to act as a heater chiller has been deleted for concerns about data quality.
 - Delete questions D43, D44, D61, D62, and D62a from EIA-871A; D47, D48, D65, D66, and D66a from EIA-871I; and D45, D46, D59, D60, and D60a from EIA-871J: Heating/cooling ventilation equipment CAV (Constant Air Volume), VAV (Variable Air Volume), underfloor distribution, dedicated outside air system, demand-controlled ventilation), however some of these response options have been incorporated into the new question D125 about airflow control, described below.
 - Add follow-up question D123 to EIA-871A, EIA-871I, and EIA-871J: For buildings that report using building automation systems (also referred to as BAS), this question will collect information on which systems (heating, cooling, and/or lighting) the BAS controls.
 - Add question D124 to EIA-871A, EIA-871I, and EIA-871J: For buildings without BAS systems, a new question asks whether “smart” or internet-connected thermostats are used. These types of thermostats are new since the last CBECS was conducted, and may be more common in small commercial buildings.
 - Add question D127 to EIA-871A, EIA-871I, and EIA-871J: This question will collect information about airflow control in the building: whether the building has a variable air volume (VAV) system, a dedicated outdoor air system (DOAS), or demand controlled ventilation (DCV). This modified version of the deleted ventilation question came from comments and discussion with stakeholders.
 - Add question D145 to EIA-871A, EIA-871I, and EIA-871J: A question about energy sources by generation technology (if not solar panels or wind turbines) will link the energy source used with these generation technologies reported to be used: reciprocating engine generators, fuel cells, large turbines, or microturbines.
 - Add question D148 to EIA-871A, EIA-871I, and EIA-871J: For buildings larger than 50,000 square feet that reported on-site electricity generation, a question will ask whether the capacity of the generators is greater than 1MW. This question is in response to a stakeholder request.
 - Delete questions D94, D95, and D96 from EIA-871A and D85, D86, and D87 from EIA-871J: How electricity and natural gas are purchased (local utility, independent power producer, non-local utility, broker).
 - Add question D149 to EIA-871A and EIA-871I: Ask all buildings that use electricity whether there are there any electric vehicle charging stations associated with the building. Stakeholders have expressed an interest in this information and this end use is expected to grow.
 - Add question D150 to EIA-871A and EIA-871J: For dry cleaner/laundromats that use natural gas, ask whether there are clothes dryers that run on natural gas. This will improve end use estimation in these types of buildings.

- Delete question D103 from EIA-871A, question D91 from EIA-871I, question D88 from EIA-871J: The question asking whether the building has advanced metering infrastructure (AMI) was deleted for data quality concerns.
- Delete questions E11, E12, and E13 from EIA-871A: The question collecting whether or not there was space use in fire stations for non-fire station activities or for living quarters has been deleted.
- Delete questions E49 and E50 from EIA-871A and E32 and E33 from EIA-871J: Questions about flat screen monitors (both their presence and prevalence) have been removed since they are now the leading type of monitor used with desktop computers.
- Delete question E60 from EIA-871A: The square footage of trading floors will no longer be collected because it was not publicly reportable due to confidentiality concerns.
- Revise questions E38-E59 in EIA-871A and EIA-871J: The series of questions on computing and office equipment have been revised following review of the 2012 data and discussions with stakeholders. A *select all that apply* question about computing equipment replaces individual questions about whether there are computers, laptops, and servers. An option for tablets has been added to the list of computing types. If selected, a new question will collect the number of tablets that are charged in the building. Respondents will be given the option to provide number of server racks if that figure is more readily available to them than the number of servers. When a respondent indicates that a data center is present in the building, a new question will ask about characteristics of the data center (such as a raised floor, separate cooling system and uninterruptible power supply) in order to help identify false positives and improve data quality. For standalone data center buildings, a question will ask for the power usage effectiveness (PUE). On the office equipment question, instead of asking about separate printers, copiers, and FAX machines, EIA will differentiate between large stand-alone office devices and smaller desktop devices, and collect the numbers of each type.
- Add question E60 to EIA-871A: A question about the number of ATMs is asked for buildings reported to be a bank or other financial institution. This was a stakeholder request and because ATMs are large energy users, this information will improve end-use estimation.
- Add question E81 to EIA-871A: This question is a follow-up to one that asks whether there is parking area associated with the building that is lighted through fixtures powered through the building's electrical service. This new question asks whether that parking area is part of building, such as an indoor parking level, or separate, such as an outdoor parking lot or garage. This will help data users to understand whether indoor parking is included as part of the building figures.
- Add questions F3, F5, and F6 to EIA-871A and EIA-871J: For buildings where on-site electricity generation was reported, these questions are used to determine whether the respondent can report the purchased and the generated electricity separately, and if so, to collect the purchased amount of electricity separately. Stakeholders have expressed interest in this information.
- Add questions K1-K9 to EIA-871A: These questions will be used to scope the ability to collect data for a future tenant data collection, as set forth by the Energy Efficiency Improvement Act of 2015, which requires EIA to collect data to support a

future Environmental Protection Agency program to promote energy efficiency in separate tenant spaces, similar to the current ENERGY STAR program. These questions ask about electricity and natural gas billing arrangements and metering, which electricity uses are metered, and who has access to the metered electricity and natural data.

- Delete questions K1-K20 from EIA-871A and K1-K14 from EIA-871J: Water usage and other water-related questions that were included in the 2007 and 2012 CBECS will be removed. EIA found the response rates for these data items were very low and much of the data received was of low quality. Additionally, EIA has no mandate to pursue usage data from water suppliers.
- Delete questions L14, L15, and L16 from EIA-871A and L2, L3, and L4 from EIA-871I: Questions about whether the building has any green certification, such as Energy Star or LEED, have been deleted. A thorough analysis of the performance of this question was conducted by comparing 2012 CBECS responses to databases of Energy Star and LEED certified buildings. This analysis indicated significant data quality issues with the CBECS reports for this question. Furthermore, due to confidentiality concerns and low sample sizes, the green building certification data from the 2012 CBECS could not be published.
- Delete the *Additional Questions* sections of EIA-871C-F. These sections contained from two to seven questions depending on the form:
 - Deleted questions 1 through 5 on the second page of EIA-871C *Natural Gas Usage*: (1) what charges were excluded from the total costs, (2) whether the responses included all active accounts during the reporting period, (3) whether the reported information included deliveries or sales to any buildings or units other than the building, (4) the account classification (commercial, residential, industrial), and (5) whether the building was eligible to participate in a “customer choice” program.
 - Deleted questions 1 through 6 on the second page of EIA-871D *District Energy Usage*: (1) whether the building is billed for the district steam or hot water piped into it, (2) whether the building itself is a heating plant, (3) whether the reported information included deliveries or sales to any buildings or units other than the building, (4) if yes to previous, the percent of reported consumption consumed by the building, (5) the square footage of the building, and (6) the square footage of all the buildings on the district loop.
 - Delete questions 1 through 7 on the second and third pages of EIA-871E *Electricity Usage*: (1) what charges were excluded from the total costs, (2) whether the responses included all active accounts during the reporting period, (3) whether the reported information included deliveries or sales to any buildings or units other than the building, (4) the account classification (commercial, residential, industrial), (5) whether the building has an advanced metering infrastructure (AMI or smart metering), (6) whether the building was eligible to participate in a “customer choice” program, and (7) whether the building participated in any dynamic pricing programs.
- Delete questions 1 and 2 on the second page of EIA-871F *Heating Oil Usage*: (1) whether the responses included all accounts during the reporting period and (2) whether the reported information included deliveries or sales to any buildings or units other than the building.

A.1. Legal Justification

The authorization for collecting the data on Forms EIA-871 A, C, D, E, F, I, and J is set forth in the Federal Energy Administration (FEA) Act of 1974, as amended (Pub. L. No. 93-275, 15 U.S.C. 761 et seq.). Section 13(b) of the FEA Act, 15 U.S.C. 772(b), states as follows:

All persons owning or operating facilities or business premises who are engaged in any phase of energy supply or major energy consumption shall make available to the [Secretary] such information and periodic reports, records, documents, and other data, relating to the purposes of this Act, including full identification of all data and projections as to source, time, and methodology of development, as the [Secretary] may prescribe by regulation or order as necessary or appropriate for the proper exercise of functions under this Act.

The data that the survey will yield will assist the Secretary in carrying out the functions and duties described in section 5(b) of the FEA Act, 15 U.S.C.764(b), which states that the Administrator of the FEA (now the [Secretary] of DOE) shall:

- (2) assess the adequacy of energy resources to meet demands in the immediate and longer range future for all sectors of the economy and the general public; ...
- (9) collect, evaluate, assemble, and analyze energy information on reserves, production, demand, and related economic data.

The energy consumption of commercial buildings is an important component for assessing the energy demand in the commercial end use sector and total energy consumption.

Section 5(a) of the FEA Act, 15 U.S.C. 764(a) provides the legal authority for invoking Section 5(b) above, and states:

Subject to the provisions and procedures set forth in this Act, the [Secretary] shall be responsible for such actions as are taken to assure that adequate provision is made to meet the energy needs of the Nation. To that end, he shall make such plans and direct and conduct such programs related to the production, conservation, use, control, distribution, rationing, and allocation of all forms of energy as are appropriate in connection with only those authorities or functions:

- (1) specifically transferred to or vested in him by or pursuant to this Act; ...
- (3) otherwise specifically vested in the [Secretary] by the Congress.

Authority for invoking Section 5(a) of the FEA Act, is provided in turn by Section 52 (15 U.S.C. 790a) of the FEA Act which states:

“(a) It shall be the duty of the (Director) to establish a National Energy Information System (hereinafter referred to in this Act as the “System”) ... [that] shall contain such

information as is required to provide a description of and facilitate analysis of energy supply and consumption within and affecting the United States on the basis of such geographic areas and economic sectors as may be appropriate...

(b) At a minimum, the System shall contain such energy information as is necessary to carry out the Administration's statistical and forecasting activities, and shall include, ... such energy information as is required to define and permit analysis of...

(2) the consumption of mineral fuels, nonmineral energy resources, and electricity by such classes, sectors, and regions as may be appropriate for the purposes of this Act..."

The Department of Energy (DOE) Organization Act of 1977, Public Law 95-91, created the Department of Energy. [42 U.S.C. 7135](#) of this law established the Energy Information Administration (EIA) to carry out a

. . . central, comprehensive, and unified energy data and information program which will collect, evaluate, assemble, analyze, and disseminate data and information which is relevant to energy resource reserves, energy production, demand, and technology, and related economic and statistical information, or which is relevant to the adequacy of energy resources to meet demands in the near and longer term future for the Nation's economic and social needs.

Section 42 U.S.C. 7135(k) provides specific statutory authority and justification for the Commercial Buildings Energy Consumption Survey (Forms EIA-871A-J). This section states:

(k) Survey procedure

Pursuant to section 52(a) of the Federal Energy Administration Act of 1974 ([15 U.S.C. 790a \(a\)](#)), the Administrator shall—

(1) conduct surveys of residential and commercial energy use at least once every 3 years, and make such information available to the public;¹

(2) when surveying electric utilities, collect information on demand-side management programs conducted by such utilities, including information regarding the types of demand-side management programs being operated, the quantity of measures installed, expenditures on demand-side management programs, estimates of energy savings resulting from such programs, and whether the savings estimates were verified; and

(3) in carrying out this subsection, take into account reporting burdens and the protection of proprietary information as required by law.

¹ The *Consolidated Appropriations Act, 2014* amended the required frequency from "once every three years" to "once every four years."

A.2. Needs and Uses of Data

EIA has a series of surveys in place that describe the contribution to energy demand within consuming units in the United States and the effect of that demand on the nation's social and economic needs. These data collections are the: Residential Energy Consumption Survey (Forms EIA-457A-G); Manufacturing Energy Consumption Survey (Forms EIA-846 A, B); and Commercial Buildings Energy Consumption Survey (Forms EIA-871 A, C, D, E, F, I, J). The three surveys span end-use sectors that account for over 70%² of the energy consumed in the United States. These surveys do not collect energy consumption data on the following sectors: agriculture, mining, construction, and transportation.

The CBECS fulfills multiple needs. The CBECS data constitute the only national data available on energy consumption in commercial buildings that are both comprehensive in nature and statistically reliable. As such, the CBECS data series is the only one that allows policy makers and program implementers in both the public and private sectors to keep track of national trends in energy consumption for commercial buildings. The CBECS is also an integral part of the overall EIA effort to collect and publish energy end-use consumption data.

Many of the uses of CBECS are long-term, ongoing projects. The CBECS data are essential inputs to the following:

- **National Energy Modeling System (NEMS)—Office of Energy Analysis, EIA:** The NEMS, EIA's modeling system meets a broad spectrum of Departmental needs. It is used frequently to assess policy questions posed by the Administration and the Congress. CBECS data are tailored to meet the needs of this model and are used to characterize the U.S. commercial sector in the NEMS. The commercial module of the NEMS provides the 30-year energy forecasts for the commercial sector that appear in a congressionally mandated publication reporting forecast data, the *Annual Energy Outlook*.
- **Benchmark for Energy Star Buildings—Environmental Protection Agency (EPA):** CBECS data are used by EPA to create benchmarking models that allow building owners or managers to assess and then rank their buildings' energy efficiency in order to apply for the Energy Star label. The models relate building energy consumption to statistically relevant drivers of energy consumption. Using CBECS data, EPA has developed an innovative energy management tool called Portfolio Manager that helps building owners, managers and operators track and evaluate energy use and document performance. Building owners and management companies use results from the Portfolio Manager query system to apply for the Energy Star efficiency label, satisfy Leadership in Energy and Environmental Design (LEED) requirements, support real estate transactions, and as a basis for establishing rents in long term leasing contracts, available at <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>. Building owners, managers and renters rely on Energy Star to meet state, regional, and municipal energy initiatives. For example, building owners can request Energy Star criteria for building design projects to fulfill state and local government performance-based targets. Many initiatives use EPA energy performance rating as the basis for energy use and goals.

²Energy Information Administration, Annual Energy Review (January 2018), Table 2.1a. (<http://www.eia.gov/totalenergy/data/annual/#consumption>)

- **Impact Analysis—U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE):** EERE used 2012 CBECS data to develop a software application through EERE’s Building Technologies Office for the purpose of evaluating the potential energy and CO2 emissions impacts of new building technologies and products. EERE’s Building Technologies Office also used CBECS data to create a Census division level climate zone conversion factors table for commercial building energy use.
- **Life Cycle Cost Analysis—Lawrence Berkley National Laboratory (LBNL):** LBNL used 2003, 2007, and 2012 CBECS data relating to energy use, water consumption, and expenditures data from all energy sources to analyze the relationships between domestic energy use and energy expenses to determine seasonal marginal energy prices by region. Marginal energy prices are the prices consumers pay for the last unit of energy used. Since marginal prices reflect a change in a consumer’s bill associated with a change in energy consumed, LBNL analyzed those prices to determine energy cost savings associated with possible change to efficiency standards. This information was used by LBNL to conduct life cycle cost analysis on commercial building appliances, including heating and cooling devices.
- **Building Energy Simulation Studies—Pacific Northwest National Laboratory (PNNL):** PNNL relies on CBECS data for a defensible and broad understanding of the energy characteristics of buildings, including their energy-using equipment and systems by building size, age, geographic location and climate zone. PNNL runs building energy simulation studies to—
 - characterize the national and regional energy savings potential of specific building technologies
 - measure the impact of changes in national energy codes and standards, and
 - support various DOE program initiatives, such as the Net Zero Energy Commercial Building Initiative. These energy simulations require accurate data to help establish a baseline building construction as input.
- **Definition of Market Potential—Manufacturers, Technology and Energy Service Companies:** From national diversified technology companies to small start-ups, many companies use the CBECS data for research, marketing, and product development.
- **Standardization and Codes for New Building Design—The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):** CBECS data are used by ASHRAE as input to evaluate existing and develop new standards and codes for buildings. CBECS data are also used in the development of ASHRAE’s Building Energy Quotient (Building eQ) building energy labeling program.
- **New Building Design—Architects:** CBECS is used to benchmark energy demand during the design phase of new and retrofit buildings and to meet targets for the 2030 Challenge. The 2030 Challenge asks the global architecture and building communities to design all new buildings and major renovations to meet energy consumption performance standard of 60% below the regional (or country) average for that building type, as reported by the CBECS.
- **Benchmark for Building Operations—Building Owners and Property Managers:** CBECS benchmarks are used to help building owners and property managers drive down fixed operating costs related to energy use in buildings. By establishing a baseline, building owners and managers can identify areas for improvement and measure their success. The energy

performance of buildings is becoming a more widely accepted criterion for determining rents and purchase prices.

- **Benchmark for Energy Reduction Targets for Federal Buildings**—The Energy Independence and Security Act of 2007 (EISA) cited the 2003 CBECS as the benchmark for energy reduction for federal buildings as well as for energy performance targets and standards for new federal buildings and buildings undergoing major renovations.

A.3. Use of Technology

All three questionnaire versions (Forms EIA-871A, I, and J) will be administered using a computer-assisted survey instrument (either interviewer-assisted or web). Interviewers will use Surface Pro tablets and web respondents will be able to use any device of their choosing. Computer-assisted instruments allow for rapid data collection and extensive use of skip patterns that require respondents to answer only questions that are pertinent to their specific situations. This provides an abbreviated interview for many respondents and minimizes the need for follow-up.

Interviewers will also be equipped with iPhones to electronically capture images of a sample energy bill provided by the building respondents. Each iPhone has authentication procedures to unlock the phone that requires a password. The photographs of the energy bills will be encrypted and uploaded to a secured server maintained by the contractor through Secure Socket Layer (SSL) technology. For web interviews, a portal will allow submission of the same materials.

The energy bill images provide key information to support the data quality of the consumption data:

- *They are the most reliable source for the name of the energy supplier(s) to the sampled building.* Respondents often refer to their energy supplier(s) in names other than they are legally known, e.g., “The Light Company”, “Edison”, or “(City) Edison”. The bill ensures that EIA begins with an accurate list of suppliers for the Energy Supplier Survey (ESS), the follow-on study to the building survey, and contacts the correct supplier(s) for the correct buildings.
- *The bill provides a precise energy service address.* This is the address by which the energy suppliers know the sampled building in their own records, i.e. where the energy is delivered. This is important because buildings are often known by several addresses, e.g., a physical address for 911 purposes, a ‘vanity address’ (for marketing purposes, which is often an address different from the physical address or main entrance), its mail drop address, and for security purposes a loading dock where unscreened, non USPS packages are delivered. Having the buildings energy service address improves the efficiency of the suppliers’ tasks in the ESS.
- *The bill confirms an energy account number associated with the sampled building.* The account numbers are often long, complex, punctuated alpha/numeric strings which are easily misreported by the building respondent.
- *A sample of the energy billing at that address.* The sampled bill image shows the units in what is delivered and the billing amount includes. This can be compared against data provided in the ESS to detect errors in magnitude and measure. For example, the consumption units and costs may be reported in different units (e.g., cubic feet or hundred cubic feet of natural gas).

EIA does not use or retain any information found on the bill images that is not relevant to the study. Use of the iPhone to capture sample bill images in this round replaces the use of portable scanners in prior rounds for the same purpose. iPhone use also reduces the luggage interviewers carry from building to building, adds security to the data storage, and reduces the time needed to capture the billing images during the building interview.

Computer Assisted Recorded Interviewing (CARI) technology is a widely used survey methodology³ that enables the data collector to record and monitor interviewer and respondent interactions. It is applied to specific portions of the survey interview that contain critical data elements to support the evaluation of the interviewer and survey question performance. CARI was introduced in the 2012 CBECS; EIA will continue to use CARI for the questionnaires completed in interviewer-assisted mode in 2018.

Prior to commencing the interview, the 2018 CBECS instrument includes a question that informs respondents that portions of the interview will be recorded for quality control purposes. EIA uses this CARI audio recording methodology to monitor the interviewers' work, identify if any falsification of responses occurred, assess interviewer performance, the effectiveness of the question to collect accurate data, and assess the quality of the interview. Should a respondent become uncomfortable during the conduct of the interview for any reason, over any questions, including the use of CARI, interviewers are trained to break the interview and reschedule at a time and conditions agreed upon by the respondent.

As with all the CBECS data and all associated assets, the CARI recordings are covered under the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA), which is described further in Section A-10, "Provisions for Confidentiality of Information." For the 2018 CBECS, CARI will be used in parallel with standard validation re-interviews for falsification detection. Using CARI will reduce the need for full interview validation (which requires re-contacting respondents) which will reduce burden. Since the digital recordings can be targeted to particular questions, they will also be used to review data which fail predefined edits. Using CARI brings EIA up to an industry survey production standard and enables EIA to produce higher-quality data.

When conducting the Energy Supplier Survey portion of the 2012 CBECS, the majority of the energy supplier respondents used electronic means as shown in the table below. EIA expects that the majority of the energy supplier respondents to the 2018 CBECS will report electronically based on the 2012 results.

CBECS Energy Supplier Reporting Method 2012	PERCENTAGE
Submitted electronic spreadsheets via the CBECS web portal	60%
Submitted data via an online form	31%
Used more than one method to submit data	5%
Mailed or sent by fax a paper form	4%

³ Here are two examples that describe the use of CARI for quality assurance in federal surveys:

Wendy D. Hicks, Brad Edwards, Karen Tourangeau, Brett McBride, Lauren D. Harris-Kojetin, Abigail J. Moss; Using CARI Tools To Understand Measurement Error, *Public Opinion Quarterly*, Volume 74, Issue 5, 1 January 2010, Pages 985 - 1003, <https://doi.org/10.1093/poq/nfq063>

Fee, H., Marlay, M., & Fields, J. (2015). Using Computer-Assisted Recorded Interviewing to Enhance Field Monitoring and Improve Data Quality. Proceedings of the 2015 Federal Committee on Statistical Methodology Research Conference. Retrieved March 19, 2019, https://nces.ed.gov/fcsm/pdf/J1_Fee_2015FCSM.pdf.

A.4. Efforts to Identify Duplication

EIA has carefully examined other federal government surveys to ascertain to what extent, if any, they overlap with CBECS forms. There are surveys that collect information from the energy suppliers about how much energy they supply to the commercial sector, but no other survey system collects data on the characteristics of commercial *buildings* and the energy consumption specifically for commercial *buildings*. The search identified several energy-supply surveys that provide data on the commercial sector. The identified supplier surveys are:

- Form EIA-176 *Annual Report of Natural and Supplemental Gas Supply and Disposition*
- Form EIA-782A *Refiner's'/Gas Operators' Monthly Petroleum Product Sales Report*
- Form EIA-821 *Annual Fuel Oil and Kerosene Sales Report*
- Form EIA-857 *Monthly Report of Natural Gas Purchases and Deliveries to Consumers*
- Form EIA-861 *Annual Electric Power Industry Report*
- Form EIA-861S *Annual Electric Power Industry Report (Short Form)*
- Form EIA-861M *Monthly Electric Power Industry Report*
- Form EIA 910 *Monthly Natural Gas Marketers Survey*
- Form EIA 923 *Power plant Operations Report*

The inadequacies of these data as a substitute for the energy supplier data collected on Forms EIA-871C-F for buildings sampled in CBECS are discussed below.

None of the supplier surveys are suitable as a substitute for the data that will be collected on Forms EIA-871C-F. These supplier surveys collect a limited set of data on the total energy delivered to the commercial sector as a whole, as such, they are intended to describe energy use in the aggregate. CBECS provides the only insight on what affects energy use within the commercial sector by surveying commercial buildings, which are the principal energy consumers in this sector. Thus, CBECS collects information on building structure, activities and occupancy characteristics, energy systems, equipment, local temperatures, and end uses. CBECS supports microeconomic analyses of the relationship between the building characteristics and the amount of energy consumed within a single building as reported by the building owners, managers, tenants or energy suppliers of the sampled buildings. Making this connection provides a picture of consumer trends and future energy needs within the commercial buildings sector, not just general sector trends.

CBECS provides the only insight into demand within the commercial sector, critical to projecting future energy needs at the U.S. region and division levels, and within unique subsectors of the built economy. CBECS profiles the commercial building stock by principal building activity in terms of their energy-specific and building-related consumption characteristics. Although EIA supply surveys referenced above in this section support macro-level analysis of energy supply conditions in the U.S. based on production and inventory, they do not support analysis of current and projected energy needs and causes for changes in demand. CBECS provides the only and authoritative source of building level energy characteristics and energy use data. Building-level energy data are necessary to relate the level of energy use and end uses for building types and activities to characteristics data collected on the CBECS Building Questionnaire. For example, CBECS supports analysis of energy use per square foot by the type of building and vintage. Building owners and operators rely on such data to benchmark their performance against similar buildings to gauge areas for improvement and future energy investments.

A growing number of U.S. cities, counties, and states have passed policies requiring benchmarking and transparency for energy use in large buildings. All cities and states that require benchmarking require the use of ENERGY STAR Portfolio Manager, a free online software tool created by the U.S. EPA, available at <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>. EPA uses CBECS data to develop a model for scoring building energy performance; building owners enter a limited set of data to compare their buildings performance against similar stock.

A.5. Provisions for Reducing Burden on Small Businesses

EIA has designed the CBECS sample so that small businesses are not unduly burdened. Small businesses are disproportionately located in small buildings. Smaller buildings are more common, more homogeneous relative to large buildings, and represent a larger share of the number of buildings relative to their share of energy consumption. Therefore, smaller buildings are sampled at a lower rate. Buildings that are 1,000 square feet or smaller are not in scope, i.e. not surveyed in the 2018 CBECS. Buildings over 1,000 square feet represent most of the energy use in the commercial sector, about 80-85 percent of what EIA's Annual Energy Outlook estimates sector demand to be.

CBECS is administered using a computer-assisted interview (either interviewer-assisted or web), which further reduces burden to small businesses. Computerized instruments are programmed to route respondents through the questions that apply to their building and to bypass questions that do not. Thus, CARI and web-based data collection methods provide easy navigation for complex question branching within the instrument. A complex question branching design is used in the collection instrument to minimize the time to complete CBECS and to tailor the CBECS experience across building types. Smaller buildings tend to have less equipment and as a result are asked far fewer questions than large buildings with various uses of space and complex energy systems.

EIA does not request energy consumption or expenditures data for propane, wood, or coal. The buildings that use these energy sources and their suppliers tend to be small businesses that often do not keep records of consumption and expenditures for long periods of time, or do not keep them in a readily accessible form.

A.6. Consequences of Less-Frequent Reporting

If CBECS were conducted less frequently, breaks in the continuity of the series will reduce the quality of EIA's annual projections of energy use in the commercial buildings sector. Congress requires EIA to conduct CBECS every four years pursuant to 42 U.S.C. §7135(k). The quadrennial cycle is based on the belief that long-term shifts in energy markets are best examined by studying energy demand through its consumers on a regular basis. Major shifts in energy demand in the commercial sector are tied to the number of commercial buildings, which changes relatively slowly compared to the energy-related characteristics, uses, and activities within existing buildings, which can change more rapidly (e.g., the adoption of new technologies and end uses). The four-year cycle of data collection has been effective in monitoring such changes, and this schedule complements the other energy end-use data collections that EIA is conducting, such as the Residential Energy Consumption Survey (RECS) and the Manufacturing Energy Consumption Survey (MECS).

A.7. Compliance with 5 CFR 1320.5

There are no special circumstances that would require the 2018 CBECS to be conducted in a manner inconsistent with the guidelines in 5 CFR 1320.5.

A.8. Summary of Consultations Outside of the Agency

To understand the needs of the CBECS user community, EIA seeks input from data users at the start of each new survey cycle. To ensure that crucial data used by CBECS users are not eliminated, EIA collaborates with data users to gain their input on essential core questions.

For the 2018 CBECS, EIA conducted an extensive outreach effort with CBECS stakeholders to seek input on the questionnaire. EIA met with various groups, held public webinars, solicited and received written comments, and published a Federal Register Notice. Further details about these outreach efforts are outlined below.

- On December 15, 2017, EIA met with staff from the National Renewable Energy Laboratory (NREL) to discuss their interest in adding questions to help track carbon emissions from small-scale (<1MW) carbon-emitting distributed generation. Discussions between NREL and EIA continued through August 2018.
- On February 13, 2018, EIA met with the Environmental Protection Agency (EPA) Energy Star team to review results of questions of interest from 2012 and discuss potential questionnaire changes related to the Energy Star program. EIA and EPA continued communication via email during questionnaire development.
- On February 15, 2018, EIA met with the internal Office of Energy Analysis (OEA) to discuss questionnaire items related to their forecasting models.
- On March 1, 2018, EIA held a webinar targeting the DOE Office of Energy Efficiency and Renewable Energy (EERE) and the DOE laboratories. EIA staff presented an overview of the 2018 CBECS, went through proposed questionnaire changes, posed some specific questions posed to the stakeholders, and then offered ways to provide feedback. Attendees were also able to ask questions during the webinar. There were 10 attendees representing: EERE, General Services Administration (GSA), Lawrence Berkeley National Laboratory (LBNL), National Renewable Energy Laboratory (NREL), and Pacific Northwest National Laboratory (PNNL).
- On March 6, 2018, EIA held another webinar targeting non-government entities. The content and format was the same as the previous webinar. There were about 25 attendees representing companies/organizations such as: Lutron Electronics, Inc., Envivity, Inc., Equiterre, Facility Performance Engineers, The Cadmus Group, Hunn Building Energy, The Real Estate Roundtable, the U.S. Green Building Council, Architecture 2030, American Institute of Architects (AIA), National Institute of Building Sciences, LaSalle Investment Management, DNV GL, Grumman/Butkus Associates, Entegriy, the University of Cincinnati, and Tennessee State University. Written comments followed from a few attendees.
- On April 10, 2018, EIA met with staff from the Lawrence Berkeley National Laboratory (LBNL) to get input on collecting information about data centers, both standalone data centers and data center spaces within buildings.
- On June 15, 2018, EIA gave a presentation about the proposed questions on sub-metering and tenant space characteristics at the Real Estate Roundtable's Sustainability Policy Advisory Committee (SPAC) meeting in Washington, DC. This presentation was followed by a phone call

on July 17, 2018 with some of the SPAC members to explore the members' comments on the questions in more detail.

- On August 13, 2018, EIA held a CBECS program update session at the American Council for an Energy Efficient Economy (ACEEE) Summer Study on Efficiency in Buildings in Pacific Grove, CA. EIA distributed a handout with an overview of the questionnaire changes from the 2012 to the 2018 CBECS. There were at least 25 attendees, from businesses and organizations such as EERE, Navigant consulting, ICF consulting, LBNL, PNNL, Energy Trust of Oregon, SBW Consulting, ACEEE, Northwest Energy Efficiency Alliance (NEEA), and Energy Insight of Minnesota. The group was very engaged and an informative discussion was held about potential improvements to some of the CBECS questions.

EIA received two comments in response to a May 15, 2018 *Federal Register* notice (Volume 83, Number 94, pages 22470-22473):

- Dr. Dennis Fixler, Chief Statistician, *Bureau of Economic Analysis*: Dr. Fixler sent a letter of support for the CBECS and suggested that CBECS building activity categories be made consistent with the U.S. Census Bureau's Survey of the Value of Construction Put-In-Place (VPIIP). The 17 VPIIP categories include classifications such as *Residential buildings, Commercial, Office, Health care, Power, and Manufacturing*. EIA responded, explaining that the proposed categories are either already a CBECS category, included in a different EIA end-use survey, or out of scope for the end-use surveys.
- Donald Brundage, Principal Codes and Standards Engineer, *Southern Company Service, Inc.* Mr. Brundage sent a letter stating that Southern Company agrees with the proposed revisions to the survey listed in the *Federal Register* Notice and that they are impressed with the thoroughness and quality of the proposed survey questionnaire. They included a few minor editing suggestions and suggested two additional questions: (1) the age of the main cooling system and (2) whether laundromats or dry cleaners use heat pump clothes dryers. EIA responded, explaining that (1) there is low confidence in respondents' ability to provide the age of the cooling equipment (earlier CBECS questionnaires asked for a categorical year that the main cooling equipment was installed and nonresponse was relatively high), and (2) market share of heat pump clothes dryers is low and sample surveys like CBECS are not well suited to capture rare occurrences in the population.

A.9. Payments or Gifts to Respondents

No payment or gifts will be provided to respondents.

A.10. Provisions for Protection of Information

The confidentiality of individual respondents is protected under the Confidential Information Protection and Statistical Efficiency Act of 2002 (P.L. 107-347) (CIPSEA). Interviewers, and any other employee of the survey contractor who has access to CBECS data, must take annual CIPSEA training to ensure that they have a current understanding of EIA's confidentiality rules and procedures. Contractors also sign a certificate pledge not to release the information.

Respondents receive the following pledge prior to data collection:

The information you provide on Form EIA-871 *Commercial Building Energy Consumption Survey* will be used for statistical purposes only and is confidential by law. In accordance with the Confidential Information Protection and Statistical Efficiency Act of 2002 and other applicable Federal laws, your responses will not be disclosed in identifiable form without your consent. Per the Federal Cybersecurity Enhancement Act of 2015, Federal information systems are protected from malicious activities through cybersecurity screening of transmitted data. Every EIA employee, as well as every agent, is subject to a jail term, a fine, or both if he or she publicly discloses any identifiable information that you report.

The contractor operates a secure computer facility dedicated to confidentiality and data protection. Data are encrypted and transmitted to and from the interviewers and the contractor's servers through the use of Secure Socket Layer (SSL) technology. The detailed provisions for handling data and other related survey materials in a manner that will provide the confidentiality protection required by CIPSEA is set forth in a contract between EIA and the survey contractor.

A.11. Justification for Sensitive Questions

No sensitive questions are asked on Forms EIA-871A-J.

A.12. Estimate of Respondent Burden Hours and Cost

Respondent burden hours

The annual respondent burden for the 2018 CBECS is estimated at 2,618 hours. The burden estimates are annualized over the *four year survey cycle* (note that in supporting statements for previous cycles, the burden estimates were erroneously annualized over the *three year approval period*). Table A1 provides a breakout of reporting burden by survey form, and an explanation of the calculation of each row follows the table.

Table A1. Estimated Respondent Burden

EIA Form Number/Title	Annual Reporting Frequency	Number of Responses	Annual Number of Responses	Burden Hours Per Response	Annual Burden Hours
EIA-871A <i>Building Questionnaire</i>	0.25	7,650	1,913	0.83	1,588
EIA-871I <i>Mall Building Questionnaire</i>	0.25	350	88	0.37	33
EIA-871J <i>Mall Establishment Questionnaire</i>	0.25	775	194	0.60	116
EIA-871C <i>Natural Gas Usage</i>	0.25	5,378	1,345	0.25	336
EIA-871D <i>District Heating Usage</i>	0.25	130	33	0.25	8
EIA-871E <i>Electricity Usage</i>	0.25	8,200	2,050	0.25	513
EIA-871F <i>Heating Oil Usage</i>	0.25	385	96	0.25	24
TOTAL		22,868	5,719		2,618

The burden hours per response for Form EIA-871A *Building Questionnaire* (0.83 hours) is based on interview timing data from the 2012 CBECS, for which the average completion time of an interviewer-assisted interview was just over 41 minutes. For the 2018 CBECS, we estimate 41 minutes for the assumed 60% of interviews that will be interviewer-assisted. For the 40% that are assumed to be web,

we estimate 27 minutes per completed questionnaire, two-thirds the length of the interviewer-assisted interview. The web interview time estimates are shorter than the in-person because web interviews eliminate the time necessary for an interviewer to read the question and a response-set aloud to the respondent. The most recent results of RECS showed that self-administered web interviews took about half of the time as interviewer-assisted⁴. Considering both modes, the weighted average interview time computes to 35 minutes per interview. An additional 15 minutes per interview is added to account for any information or record gathering prior to the interview⁵, for a total of 50 minutes (0.83 hours) estimated response time per building for EIA-871A.

Similarly, the burden hours per response for Form EIA-871I *Mall Building Questionnaire* is based on the 2012 CBECS, for which the average completion time of an interviewer-assisted interview for mall buildings was just less than 19 minutes. For 2018, we estimate 19 minutes for interviewer-assisted and 13 minutes for web completion, for a weighted average of 17 minutes per interview. An additional 5 minutes per interview is added to account for any information or record gathering prior to the interview. Mall buildings are not asked to provide any energy usage information or bills, so this estimate is lower than the other two interview types. The total estimated response time per mall for EIA-871I is 22 minutes (0.37 hours).

The burden hours per response for Form EIA-871J *Mall Establishment Questionnaire* is also based on the 2012 CBECS, for which the average completion time of an interviewer-assisted interview was slightly more than 24 minutes. For 2018, we estimate 24 minutes for interviewer-assisted and 16 minutes for web completion, for a weighted average of 21 minutes per interview. An additional 15 minutes per interview is added to account for any information or record gathering prior to the interview, for a total of 36 minutes (0.6 hours) of estimated response time for EIA-871J.

For the *Energy Supplier Survey* (ESS) forms (EIA871C-F) burden is calculated per form; each building requires one form for each energy source that is used in the building. Table A2 shows the estimated

⁴ 2015 RECS Technical Documentation Summary, May 31, 2017, <https://www.eia.gov/consumption/residential/reports/2015/methodology/>

⁵ Fifteen minutes represents an estimate informed by experience. Over ten rounds of CBECS in-person interviewing, we have observed that respondents make only modest efforts to prepare for the interview, which is scheduled by appointment, even when worksheets were provided (less than half the respondents reported filling out at least part of the worksheets in 2012). For the 2018 CBECS, there are no worksheets; instead, the advance materials will list some topical areas that will be covered in the questionnaire, to orient the respondent prior to the appointment or to when they begin the web instrument. Some respondents may choose to look-up information such as total square footage or their energy data, but it is not required. Questions are designed to ask about building attributes that typical respondents (e.g., a building managers or engineer) would know from memory or experience or would have access to because of their job role. Questions also balance knowledge and accuracy with burden; we make accommodations for differential knowledge and access. For example, we provide a categorical follow-up for total square footage if the respondent can't provide an exact number (in 2012, we observed that about 15% of respondents could not provide an exact square footage, but 96% of those were able provide a categorical response instead). Finally, many CBECS questions are in the *Yes/No* or *Check all that apply* format and don't require quantitative record-based retrieval. For these reasons, we surmise and have observed that little or no preparation is necessary nor taken before the survey interview.

number of forms for each energy source, calculated using the fraction of buildings that reported using each energy source in 2012, which varies slightly between buildings and establishments.

The burden hours per response is estimated at 15 minutes per form; the 2012 response time per form was estimated at 30 minutes per form. The estimate is being decreased because (1) the *Additional Questions* sections have been removed (as described in the *Introduction* section on page 8) and (2) the 2012 results showed that 60% of suppliers submitted spreadsheets and 40% of those used entirely their own layout, which means that the effort required by many suppliers was no more than retrieval and submission of information already present in their data systems. EIA is committed to a continuous improvement process for the ESS forms and strives to improve the accuracy of the burden per response estimates. To ensure our estimates of burden are reasonable and accurate, EIA will engage 2018 ESS respondents in a post collection assessment of the actual burden associated with the data collection phase (both gathering and submitting information) for each fuel group that reports on the forms shown in Table A2.

Table A2. Estimated Number of ESS Forms

EIA Form Number/Title	Estimated number of responding buildings	Fraction of buildings estimated to need ESS by energy source	Estimated number of building forms	Estimated number of responding establishments	Fraction of estabs estimated to need ESS by energy source	Estimated number of establishment forms
EIA-871E <i>Electricity Usage</i>	7,650	0.973	7,443	775	0.976	756
EIA-871C <i>Natural Gas Usage</i>	7,650	0.642	4,911	775	0.602	467
EIA-871F <i>Heating Oil Usage</i>	7,650	0.050	383	775	0.003	2
EIA-871D <i>District Heating Usage</i>	7,650	0.017	130	775	0.000	0
TOTAL			12,867			1,225

Respondent cost

Based on the estimated rate of \$74.02 per hour for employees who would complete these forms, the total annual respondent cost for all forms is estimated to be:

$$\$74.02/\text{hour} \times 2,618 \text{ hours/year} = \$193,784/\text{year}.$$

An average cost per hour of \$74.02 is used because that is the average loaded cost (salary plus benefits) for an EIA employee assigned to data survey work. EIA assumes that the survey respondent workforce completing surveys for EIA is comparable with EIA workforce.

A.13. Annual Cost to the Federal Government

The CBECS is a quadrennial survey and is funded over four fiscal years.

The cost to the government of the 2018 CBECS is estimated at \$26.8 million. Based on a four-year cycle, the annualized cost to the Government is approximately \$6.7 million.

Of the \$26.8 million, \$23.1 million is in the form of data collection contracts for both the Buildings Survey and the Supplier Survey. These contracts are for: (1) preparing the sample; (2) administering a pre-test; (3) training the interviewers; (4) collecting the data; (5) processing the data, including variance estimation; and (6) documenting the survey procedures.

The remaining costs are for EIA staff time, estimated at 24 FTE's for the four-year survey cycle, at an average cost of \$153,962 per FTE (\$74.02/hour x 2,080 hours/year) yielding staff costs of \$3.7 million for the survey cycle, or \$923,769 per year. The major tasks completed by EIA staff over the life cycle of the CBECS are outlined in Table A3 shown below.

Table A3. Major CBECS lifecycle tasks conducted by EIA federal staff

Phase of CBECS	Task
Pre data collection	Interfacing with data users
Pre data collection	Specifying the survey design
Pre data collection	Programming and testing the questionnaires
Ongoing	Directing and monitoring the survey contractor on sample design, data collection, and nonresponse follow-up procedures
During and post data collection	Editing the data
Post data collection	Developing nonresponse adjustments (imputations)
Post data collection	Analyzing the data
Post data collection	Preparing data reports of dissemination
Post data collection	Preparing public use data

A.14. Changes in Burden

Table A4. Changes in Burden

EIA Form Number/Title	Annual Reporting Frequency	Number of Responses (Previously Approved)	Number of Responses (Requested)	Annual Number of Responses (Previously Approved)	Annual Number of Responses (Requested)	Burden Hours Per Response (Previously Approved)	Burden Hours Per Response (Requested)	Annual Burden Hours (Previously Approved)	Annual Burden Hours (Requested)	Annual Number of Responses			Annual Burden Hours		
										Change Due to Agency Discretion	Change Due to Adjustment in Agency Estimate	Adjustment	Change Due to Agency Discretion	Change Due to Adjustment in Agency Estimate	Adjustment
EIA-871A / Building Questionnaire	0.25	7,880	7,650	1,970	1,913	1	0.83	1,970	1,588	-57	0	-57	-382	0	-382
EIA-871I / Mall Building Questionnaire	0.25	520	350	130	88	0.42	0.37	55	33	0	-42	-42	-22	0	-22
EIA-871J / Mall Establishment Questionnaire	0.25	1,300	775	325	194	0.75	0.6	244	116	0	-131	-131	-128	0	-128
EIA 871C-F / Energy Supplier Forms	0.25	5,726	14,092	1,432	3,524	0.5	0.25	716	881	2,092	0	2,092	82	83	165

Note that the annual number of responses previously approved and the annual burden hours previously approved have been adjusted from the 2012 figures so that they can be compared to the requested responses and burden. In 2012, they were annualized using the three year approval period; in 2018, they are being annualized using the four year survey cycle.

A.15. Reasons for Changes in Burden

There are a few reasons for the decrease in burden for Forms EIA-871 A, I, and J. The overall target for the number of building responses has been reduced from 8,400 completed interviews for the 2012 CBECS to 8,000 for the 2018 CBECS. The assumed number of malls and associated establishments, which are less than the 2012 assumed numbers, is based on 2012 results⁶ and provides a more accurate basis than the 2012 estimates. Also, the burden hours per response are all slightly lower than 2012 because the 2018 CBECS will include web responses where response times are shorter, as explained in Section A.12.

Forms EIA-871 A, I, and J also delete questions that are more burdensome than the ones that are added. For example, questions are removed that asked respondents to provide monthly billing data for electricity and natural gas and total water data; to estimate behavioral frequencies, e.g., meals served per year; and to perform complex cognitive tasks such as determining whether the sides of the building that receive direct sunlight have more or less glass than the other sides. The added questions are simpler, i.e., they ask respondents to clarify energy or building characteristics and are largely of the Yes/No variety.

Table A5. Summary of Change in Burden Per Response

Form	2012 Burden per response	2018 Burden per response
EIA-871A	60 minutes	50 minutes
EIA-871C	30 minutes	15 minutes
EIA-871D	30 minutes	15 minutes
EIA-871E	30 minutes	15 minutes
EIA-871F	30 minutes	15 minutes
EIA-871I	30 minutes	22 minutes
EIA-871J	40 minutes	36 minutes

The burden for Forms EIA-871 C-F changes for two reasons. Some planned changes increase the total number of responses while others decrease the estimated burden per form. The number of responses increase because rather than ask building and establishment respondents to self-report their monthly billing data, EIA will instead request that their energy suppliers do so (Table A4). (In prior rounds, EIA only requested monthly billing data from energy suppliers when building respondents were unable to provide valid data.) Energy suppliers maintain monthly billing records as part of their ordinary course of business. On Forms EIA871 C-F, EIA requests the monthly bills *as they reside in the company's record systems* for the sampled building for a few months prior to the reference year through a few months past the reference year. Because extracting the data from billing systems in this manner requires no data derivations or aggregations of existing records, this is the least burdensome way to request information for EIA's buildings energy statistics program. EIA applies statistical processes to annualize

⁶ The 2012 CBECS supporting statement assumed that 520 of the total target 8,400 sampled buildings (6%) would turn out to be strip shopping malls and that each mall would involve an additional 2.5 establishment interviews, for an estimated 1,300 mall establishments. Of the final responding sample of 6,720 buildings, 296 were malls (4.4%). Therefore, for the 2018 CBECS, 4.4% of the target 8,000 buildings (350 buildings) are assumed to be malls. For each mall, we are assuming about 2.2 establishment interviews, which was the yield in 2012, for an estimated 775 establishment interviews.

the consumption data, combined with weather data, to estimate key energy uses such as heating and cooling loads. As observed in the most recent iteration of the Energy Supplier Survey (the follow-on energy survey conducted in 2016 for the residential households sampled in 2015), 60 percent of energy suppliers now prefer to simply extract monthly billing records from their record systems and submit that information to EIA electronically via spreadsheets.

EIA estimates a decrease in the burden per response in Table A5 for each energy supply form for several reasons.

- First, we deleted from four to seven auxiliary, customer-related questions on these forms EIA-871 C-F, which were more difficult for supplier respondents to retrieve and report (e.g., meter-type questions, participation in utility choice programs, and account-type classification).
- Second, over the past decade, we observed energy suppliers choose modes that reduce their burden. More suppliers, especially the larger ones, deliver their data via spreadsheets. Data retrieval from their billing systems appears to be less labor intensive for them than manual data entry into our paper or web forms. This is far less burdensome than prior rounds where companies had staff dedicated to manually enter monthly data on paper or electric forms across all accounts for each building (see Section A.4).
- Third, we believe that the reduction in burden per request is responsible for the positive impact on overall response rates as well⁷. The most recent use of similar forms in our residential survey program shows a 96% response rate for Electricity forms, and 93% for Natural Gas.

For these reasons, EIA decreased the reporting burden estimates to 15 minutes per response to align with the most recent experience using the Energy Supplier Survey schedules to collect consumption data from the EIA 2015 Residential Energy Consumption Survey sample. The residential ESS and commercial building ESS request the same information, monthly energy consumption and billing amounts for a sampled service address. Thus, we assign the same level of burden per response here for the CBECS ESS as EIA reported for the recent residential ESS. The “data extract and submit” method of supplying energy records is the same, it uses less labor-intensive data submission methods, and more records are submitted in bulk across accounts by the responding energy suppliers.

Moving the reporting of monthly billing data to energy suppliers has two key benefits: we expect this reporting structure will provide higher quality data and we expect it will also significantly reduce real and perceived burden from building and establishment respondents, which may improve their willingness to participate. Under the previous design, one building or establishment respondent would be asked to provide monthly data for one or more energy sources. The new reporting structure allocates the burden across multiple supplier respondents, who would have the best and easiest access to the data because they produce, maintain, and retain those data electronically for long periods of time. While the total burden hours for EIA-871 C-F does increase, it is not proportional to the increase in the number of responses because we lower the burden estimate per form from 30 minutes to 15 minutes for the reasons provided above and in Section A.12.

⁷ 2015 Consumption and Expenditures Technical Documentation Summary, May 31, 2018, https://www.eia.gov/consumption/residential/reports/2015/methodology_c&e/

Table A6. Summary of changes to annual responses and burden

	Requested	Program Change Due to Agency Discretion	Change Due to Adjustment in Agency Estimate	Previously Approved ⁸
Total Annual Number of Responses	5,718	2,035	-173	3,856
Annual Burden Hours	2,618	-450	83	2,985

A.16. Collection, Tabulation, and Publication Plans

The results of the CBECS will be published by EIA in electronic form on the EIA website at <http://wwwdev.eia.gov/consumption/commercial/>. All data will be published in aggregated form only and will be prepared by EIA in accordance with EIA publication standards. Detailed tables will contain energy consumption and expenditures for electricity, natural gas, fuel oil and district heat by numerous energy-related building characteristics. Public use microdata files that have been masked to maintain the building’s confidentiality will also be available on the EIA web site.

The estimated time schedule for data collection and related publication activities is shown here.

- Conduct Building Interviews.....April 2019 through September 2019
- Collect Energy Supplier Data.....January 2020 through June 2020
- Preliminary Characteristics Data Available.....May 2020
- Preliminary Consumption Data Available.....May 2021

A.17. OMB Number and Expiration Date

OMB number 1905-0145 and the expiration date will be displayed on the forms.

A.18. Certification Statement

There will be no exceptions to the Certification for Paperwork Reduction Act Submissions of OMB Form 83-I.

⁸ The figures in the 2012 supporting statement were 5,142 total annual responses and 3,978 annual burden hours. They were annualized using the three year approval period instead of the four year survey cycle, as is being done for the 2018 CBECS. The values in this table have been adjusted to use the 4 year reporting cycle so they are comparable to the requested figures.