

**SUPPORTING STATEMENT PART A  
FOR FORMS EIA-871A-J  
COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY**

OMB NO: 1905-0145

**INTRODUCTION**

The Energy Information Administration (EIA) of the U.S. Department of Energy (DOE) is requesting reinstatement for a three-year approval of the Commercial Buildings Energy Consumption Survey (CBECS), Forms EIA-871A through J. These forms will be used to collect data on energy consumption and expenditures and energy-related building characteristics for the commercial sector of the U.S. economy for calendar year 2012. This supporting statement covers the following forms:

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| 871A  | Building Questionnaire                                     |
| 871B  | Authorization Form   |
| 871C  | Natural Gas Usage  |
| 871D  | District Heating Usage                                     |
| 871E  | Electricity Usage  |
| 871F  | Fuel Oil Usage   |
| 871G  | Worksheet 1: Characteristics, Energy Sources and Equipment |
| 871H  | Worksheet 2: Energy Amounts Used and Dollars Spent         |
| 871I  | Mall Building Questionnaire                                |
| 871 J | Mall Establishment Questionnaire                           |

The CBECS is a national multistage probability sample survey of commercial buildings and the energy suppliers to these buildings. The sampling unit is the building. The data are collected during a voluntary computer-assisted interview with buildings' owners, managers or tenants. Data collection has generally been conducted in person, except in 1999<sup>1</sup> when it was by telephone, and a mixed personal-telephone mode is planned for 2012. A follow-on survey of energy suppliers is conducted for about half the buildings (those for which the building respondent cannot provide reliable consumption data); the supplier survey has historically been a mail survey. The 2012 CBECS will be the tenth iteration of the survey. Since 1995, the CBECS has been conducted on a quadrennial basis. Planning had begun for a 2011 CBECS, but work was suspended in April 2011 for budgetary reasons.

The overall objective of the CBECS is to collect basic statistical information on energy consumption and expenditures in commercial buildings, and the energy-related characteristics of the buildings. The CBECS is the only national-level data source for this information. The CBECS is one of a suite of end-use surveys conducted by EIA (the other two surveys are the Residential Energy Consumption Survey, or RECS, and the Manufacturing Energy Consumption

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<sup>1</sup> The 1999 CBECS resurveyed the 1995 sampled buildings.

Survey, or MECS) which capture information about the demand for energy. The data are masked to protect the identity of individual respondents and are made available to the public in electronic tables and reports at [www.eia.gov/consumption/commercial](http://www.eia.gov/consumption/commercial).

The information collection proposed in this supporting statement has been reviewed in light of applicable information quality guidelines. It has been determined that the information will be collected, maintained and used in a manner consistent with the OMB, DOE, and EIA information quality guidelines.

### **Changes for the 2012 CBECS**

The proposed design, procedures, and forms for the 2012 CBECS reflect a number of changes from the 2007 CBECS. These changes include:

- The sample size for the 2012 CBECS will be 50 percent larger relative to the previous CBECS. The increase in sample size will allow for:
  - Fewer suppressed cells in published tables,
  - Better capture of emerging energy phenomena, such as new technologies for on-site electricity generation,
  - Lower relative standard errors for key statistics for publishable sample domains,
  - More publishable data for more principal building activities, and
  - More releasable microdata on the public use dataset.
- A portion of the 2012 CBECS interviews will be conducted by telephone. Previous CBECS designs have relied on in-person interviews for data collection. In 2007, field interviewers needed an average of six contacts to complete a building interview; this process can be time-consuming and costly when done in-person. For 2012, certain respondents (large buildings for which contact information is usually available) will be initially contacted by telephone. After the initial contact, all respondents will be given the option to complete the interview by phone.
- Approximately 200 buildings will be visited by a building energy professional to collect objective information about certain energy-consuming equipment and building characteristics in addition to the traditional CBECS interview. In 2010, EIA commissioned the National Academy of Sciences to convene a panel on improving the CBECS and the RECS; one of the early recommendations from the panel was to explore the value of using these professionals. The purpose of this post interview assessment is to validate key instrument questions and assess the overall validity of the building's energy characteristics as captured on the survey instrument.
- Based on review of the 2007 CBECS and consultation with many CBECS stakeholders (see Section A-8), there have been changes, additions, and deletions within the Building Questionnaire (Form EIA-871A), Mall Building Questionnaire (EIA-871I) and the Mall Establishment Questionnaire (EIA-871J). The Mall Building and Mall Establishment

Questionnaire each contain questions that are subsets of the Building Questionnaire, so any changes made to the Building Questionnaire were made in parallel on the Mall Building and Mall Establishment Questionnaires.

The following bullets detail the substantive changes that were made to the 2012 CBECS questionnaire. In addition to these listed changes, there were other minor wording changes, additions of clarifying definitions, and modification to edits within the survey instrument to help preclude call-backs to respondents. The goal of all changes to the questionnaire was either to clarify questions in order to decrease cognitive burden on the respondents or to accommodate the requests of key CBECS stakeholders. All stakeholder requests were evaluated to ensure that any additions would not add undue burden and would improve the value of the CBECS data.

- o A short series of follow-up questions was added following the collection of the building's gross square footage, a key indicator for calculating energy intensities. The purpose of the new questions is to verify which portions of the building are covered in the square footage value given by the respondent. The first question asks whether any parking area is included in the square footage figure and then, if so, whether the included parking areas are completely enclosed or open to the outside. If the included parking areas are open to the outside or are enclosed but not attached to the building, the square footage of the parking area is requested. The last question in this new series asks whether the square footage includes all the common areas, such as hallways, stairways, and lobbies; the intent of this question is to ensure that the respondent has provided the gross area and not just the leasable area. (Stakeholder request)
- o A question was added to detect the presence of a "cool roof" (a roof that is designed to reduce solar heat gain). (Stakeholder request)
- o A question was added to collect the typical floor-to-ceiling height. The information will provide another dimension for estimating the heating and cooling requirements of the buildings. (Stakeholder request)
- o For office buildings, enclosed malls, and strip malls, a question was added to collect the percent of floorspace occupied during the year. (Stakeholder request)
- o For hotels, motels, inns, and retirement homes, a question was added to collect the average percent of lodging rooms occupied during the year. This information will also help EIA reconcile data discrepancies after the field collection. (Stakeholder request)

- For social or meeting public assembly buildings, a question was added to collect the number of events held during the reference year. This information will help define the usage levels within the building. (Stakeholder request)
- For restaurants, a question was added to collect the number of meals served during the reference year. This information will help define the usage levels within the building. (Stakeholder request)
- Leading into the series of questions on the hours of operation and number of workers in the building, a question was added that asks whether the building is a seasonal building. If so, the respondent is asked to provide the number of months of “high use.” The screener question helps frame questions about the hours of operation and number of workers, alleviating confusion and reducing burden for seasonal building respondents. Seasonal buildings are also asked for a categorization of hours for their “off season.”
- A few new questions were added specifically for fire stations: whether the personnel are career or volunteer; whether the station contains living quarters, whether space is used for non-fire station activities (e.g. hall rental) and if so, the percentage of the total floorspace for these activities. Fire stations vary widely in their energy use patterns and these questions will help explain differences between types fire stations. (Stakeholder request)
- Substantial changes were made to the heating and cooling equipment sections. New follow-up questions were added and others were deleted, and specific types of equipment within the follow-up categories were modified, added and deleted. The changes should not add any additional questions and should make it easier for respondents to map their systems onto improved response sets in the redesigned questions.
- A question was added to collect the presence of a “building automation system” or BAS. In recent CBECS cycles, the presence of these systems were embedded within the response set for how heating and cooling is reduced, and based on the data collected, it appears that this approach may have underestimated the presence of these systems. BAS systems are of interest to many stakeholders, so their presence will be collected in a standalone question, reducing any inadvertent downward response bias.
- A question was added to determine whether there is a formal energy management plan for the building, in which energy targets are set and consistently monitored. This question provides a simple measure of behavior that could explain consumption differences between similar buildings. (DOE stakeholder request)

- For certain types of buildings (restaurants, Laundromats, hospitals, and car washes) that report having a point-of-use water heater, a question was added to collect the number of these that are “booster” water heaters (used to raise the water temperature, usually for sterilizing). (EIA stakeholder request)
- There were a few additions to the response set for energy generation technologies: wind turbines, large turbines, and reciprocating engines were added to the question which already included microturbines, fuel cells, and photovoltaic cells. (EIA stakeholder request)
- A question was added for buildings that use electricity asking whether they have advanced metering infrastructure (AMI), also known as “smart metering.” Smart metering is a relatively new technology and is of interest to many in the energy community. (Stakeholder request)
- Modifications were made to the food preparation area questions which should provide improved question flow. To preclude redundancy, food service buildings will no longer be asked whether they have space for food preparation. The lead-in question about whether there is any space for food preparation has been eliminated. In the 2012 CBECS, all buildings (except food service) that reported cooking as an end use will now be shown a list of special food areas and asked which ones they have. Buildings that report a snack bar/concession stand, small restaurant, large restaurant/cafeteria, or commercial kitchen will be asked to report the square footage of the food service area. This extra information will be useful as an explanatory variable for energy use. (Stakeholder request)
- For hotels and motels, a question was added to find out if any space is used for conferences and/or social events, and if so, its percent of the total floorspace.
- A series of questions about the use of high-intensity medical equipment was added. The number of X-ray machines, CT scan machines, MRI machines, and linear accelerators will be collected in all inpatient health care buildings and outpatient health care buildings that report having any diagnostic medical equipment. These types of equipment use significant amounts of energy and accounting for them should improve accuracy for end use estimates.
- For hospitals, the percent of floorspace used for outpatient care will be collected. There are significant differences in energy use for hospitals with large areas for outpatient care versus those that are mainly inpatient.
- For outpatient health care, a question was added to determine if there is an outpatient surgery center. Outpatient buildings with operating rooms are more intensive energy users than those without. (Stakeholder request)

- For hotels and food sales buildings, a question was added to capture the presence of a waste heat recovery system as part of the refrigeration system, and if present, whether it is used for space heating or water heating. Data editing in past cycles has shown that respondents for buildings with these systems have trouble determining where to classify these systems within the existing CBECS questions.
- Buildings with very few computers will no longer be asked if they have separate specialized computer areas. The separate computer areas question was also revised so that it only asks about a few specific areas (data centers, trading floors, computer-based training rooms, and student or public access computing centers) and does not ask the respondent to specify any other areas. For buildings that report data centers and/or trading floors, the square footage of these areas will be collected. (Stakeholder request)
- For education and office buildings, a question was added about the presence and number of interactive whiteboards. The penetration of this energy-intensive technology is increasing and should be tracked. (Stakeholder request)
- A question was added about the presence and number of televisions or video displays. Such displays are becoming ubiquitous in certain building types and they should be accounted for in helping to explain energy use. (Stakeholder request)
- The question asking how often the computers and other office equipment were turned off when the building was not normally open (always, sometimes, or never) was eliminated. Considering the wide range of office equipment types and the varying degrees of how they can be “turned off,” the question added little value.
- The two questions asking about specular reflectors and electronic ballasts as part of the lighting equipment were removed. Stakeholders indicated that most all modern lights now have these features.
- A question was added to collect information on lighting controls, such as occupancy sensors, daylight harvesting, dimming, and plug load control. A couple of these categories were removed from the existing daylighting features question because they are not daylighting features but more appropriately part of the lighting controls question. These changes will bring the lighting section more up-to-date with current technologies. (Stakeholder request)
- For buildings that generate electricity whenever electricity is used (as opposed to emergency backup only), if the respondent provides electricity usage information for the building, a question was added to determine if electricity consumption includes the electricity generated on-site or if it is all purchased

electricity.

- In the electricity usage section, if the respondent reports that other major uses outside the building were included in the usage figures, a question was added to find out what these uses are: parking lot lights, exterior lights, signs or billboards, large pumps, swimming pools, or other. The addition of this question eliminates a separate question that was asked in the 2007 CBECS about whether parking lot lights were included in the electricity consumption figures.
- In the natural gas usage section, if the respondent reports that other major uses outside the building were included in the usage figures, a new question asks whether these uses are kilns, gas space heaters, exterior or decorative lighting, compressed natural gas vehicles, pumps not used in the building, or other.
- For enclosed malls, in the electricity and natural gas usage sections, a follow-up question was added to determine which areas of the mall have been included in the consumption figures (the anchor stores, food court, common areas, individual stores, or any other areas). For areas that were not included, the respondent is asked to provide the square footage.
- Two questions have been removed in the fuel oil usage section; introduced in the 2007 CBECS, they asked about the amount of fuel oil actually used, as opposed to purchased. Upon review of the 2007 data, EIA concluded that the question about the amount of fuel oil consumed did not add much, if any, value to the fuel oil data. Careful review of the question wording across the survey cycles indicated possible ambiguities in the past wording of the fuel oil purchasing questions. The questions have been revised to again ask only about fuel oil purchased, but improvements have been made to the wording to eliminate past ambiguities.
- For buildings that report using district chilled water, a few questions were added to explore the feasibility of collecting chilled water consumption data in future CBECS. If the chilled water is provided from a central plant on the same campus as the building, the respondent is asked whether the usage is metered and if so, to have a copy of the records scanned. If the chilled water comes from a utility, a scan of the bill is requested. Reviewing the scanned records or bills will help EIA determine if there are standard units in which chilled water is metered and help to frame questions for the next CBECS if collecting the data proves feasible. There is currently a piece missing in the total energy consumption collected by the CBECS for buildings that use district chilled water, and there are indications that central district chilled water systems are becoming more prevalent in the U.S. (EIA stakeholder request)
- Water usage questions introduced in the 2007 were improved and remain in the 2012 CBECS. The Office of Wastewater Management within the U.S.

Environmental Protection Agency (EPA) sponsored questions related to water use on the 2007 CBECS. Getting better information on how water is used by commercial buildings is the first step toward understanding commercial water use and the energy impact of that use. The CBECS data collection instrument is already well-suited to collect this information.

The revisions to the water questions were based on extensive review by EIA of the data collected in 2007. The changes will smooth the interview process on the water questions and result in cleaner data. Details of these changes are provided here:

- A lead-in question asks whether the building uses water. This will allow buildings that don't use water at all (e.g. vacant buildings, warehouses) to skip the section entirely.
- A question was added to collect the units in which the volume of water is provided (e.g. gallons, million gallons, or hundred cubic feet). This will preclude the interviewer and respondent from having either having to convert to gallons themselves, or enter a note. It will also result in cleaner data; inspection of the 2007 data revealed that in many cases the data were not provided in gallons, but there was nothing explicit in the data to provide this essential piece of information.
- A new question asks whether any water was used outside the building (for irrigation) and, if so, whether it is metered separately and, if so, the volume of water used outside. The 2007 questions simply asked for the amount of water used outside, and the data were difficult to interpret without the leading questions (for example, there was no way to differentiate whether zero mean that no outside water was used or that it wasn't metered).
- If the cooling equipment includes a central chiller, packaged unit, or heat pumps, a question was added that asks if there is a cooling tower. If there is a cooling tower, another question asks if the water for the cooling tower is metered, and if so, the volume of water used for the cooling tower. The 2007 CBECS question simply asked for the cooling tower consumption and, as with the outside water question, the data were difficult to interpret.
- A question was added to determine if reported water consumption includes water usage for any other buildings besides the sampled building. This will allow EIA to effectively disaggregate the data and make consumption estimates just for the sampled building.
- A question was added requesting that the interviewer scan a sample water bill. In 2007, energy bills were scanned but water bills were not directly requested. However, in many cases respondents spontaneously provided a water bill, too. The water bills proved to be valuable during data editing, so requesting them outright in 2012 will enable EIA to make

fuller use of bills, for example, to validate extreme values in reported data.

- Water data collection was extended to establishments in strip malls so that an estimate of water consumption for the entire stock of commercial buildings can be estimated.
- o A question was added to determine whether the building has any type of green building certification (Energy Star, LEED, Green Globes, or Other) and if so, which type. (Stakeholder request)

## A. JUSTIFICATION

### A- 1. Legal Authority

The authorization for collecting the data on Forms EIA-871A-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 by means of Forms EIA-871A-J 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.

As the authority for invoking 5(b) above, section 5(a) of the FEA Act, 15 U.S.C. 764(a), 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...”

## **A-2. Needs for and Uses of the Data**

The EIA has a series of surveys in place that describe what’s contributing to the demand for energy within consuming units in the United States and the effect of that demand on the nation’s social and economic needs. These systems are the: Residential Energy Consumption Survey (Forms EIA-457A-H); Manufacturing Energy Consumption Survey (Forms EIA-846A-C); and Commercial Buildings Energy Consumption Survey (Forms EIA-871A-J). The three surveys span end-use sectors that account for over 70 percent of the energy consumed in the United States. Not included in these surveys are the agriculture, mining, construction, and transportation sectors.

The CBECS, conducted on a quadrennial basis, fulfills multiple needs in DOE. 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 constitute the only data series that allow policy makers and program implementers in both the public and private sectors to keep track of national trends in energy consumption for the

commercial sector and 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. To better understand the needs of the CBECS customers, EIA has, over the survey cycles, sought input from them. For the 2012 CBECS, in order to ensure that crucial data used by the CBECS users are not eliminated, EIA collaborated with data users to gain their input on essential core questions.

The CBECS data provide 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 White House 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 to create benchmarking models by EPA 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 the CBECS data, the EPA has developed an innovative energy management tool called Portfolio Manager that helps building owners, managers and operators evaluate energy use and document performance. Building owners and management companies use Portfolio Manager results 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.

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.

- **Building Energy Simulation Studies—Pacific Northwest National Laboratory (PNNL):** The output of the various building energy simulation studies undertaken by PNNL attempt to characterize the national and regional energy savings potential of specific building technologies, the impact of changes in national energy codes and standards, and the impact of 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. PNNL relies on CBECS for a defensible and broad understanding of the nature and characteristics of buildings and their energy using equipment and systems by building size, age, geographic location and climate zone.

- **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.
- **Appliance Standards—Lawrence Berkeley National Laboratory (LBNL) and the DOE Office of Energy Efficiency and Renewable Energy (EERE):** CBECS data are used by LBNL and EERE for analyzing impacts from current and proposed energy efficiency standards for commercial appliances and HVAC equipment.
- **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.
- **Prototype for Canadian Commercial Buildings Energy Use Surveys—Natural Resources Canada:** CBECS was used as the model for the 2000 Commercial Institutional Building Energy Use Survey (CIBEUS) conducted by the Natural Resources Canada and the Statistics Canada. The CBECS design and methodology were used to develop the CIBEUS. Both building characteristics and energy consumption data were collected in a sample of Canadian commercial buildings. EIA was also consulted by Natural Resources Canada as they were developing the 2008 Commercial & Institutional Consumption of Energy Survey.

- **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 Automated, Electronic, Mechanical or Other Forms of Information Technology**

The Building Questionnaire (Form EIA-871A) will be administered using a computer assisted survey instrument, which allows for more rapid data collection and extensive use of skip patterns that requires respondents to answer only questions that are pertinent to their specific situations. This, in turn, provides an abbreviated interview for many respondents and lessens the need for extensive follow-up.

Interviewers will be equipped with portable scanners to electronically capture images of energy and water bills provided by the building respondents. In the 2003 CBECS, respondents were asked to provide copies of their electricity and natural gas bills to the interviewers; for the 2007 CBECS, scanners were successfully introduced, relieving respondents from the burden of copying the bills themselves. These bills are used in support of data editing and data capture of energy account information needed for a follow-on survey of energy suppliers to the sampled building.

EIA will introduce Computer Assisted Recorded Interviewing (CARI) in the 2012 CBECS. CARI technology is a standard survey tool which enables the data collector to record and monitor interviewer and respondent interactions for specific portions of the interviews. This is similar to telephone monitoring that occurs in centralized telephone facilities. As required by OMB, the survey firm solicits and documents respondent consent to be recorded. As with telephone interview monitoring, the interviewer only knows that some portion of the interview will be recorded, but the actual points at which the recording start and stop are not known by the respondent and interviewer. For the 2012 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 us to produce cleaner, higher-quality data.

### **A-4. Efforts to Identify Duplication and the Inadequacies of Similar Data**

EIA has carefully examined several Federal government surveys to ascertain to what extent, if any, they overlap Forms EIA-871A-J. 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. In fact, this is why the CBECS was used by EPA in 2007 to collect data on water consumption. The search identified several energy-supplier surveys that provide data on the commercial sector. The identified supplier surveys are:

- Form EIA-7A—Coal Production and Preparation Report
- Form EIA-8A—Coal Stocks Report-Annual
- Form EIA-176—Annual Report of Natural and Supplemental Gas Supply and Disposition
- Form EIA-782A—Refiners'/Gas Operators' Monthly Petroleum Product Sales Report
- Form EIA-821—Annual Fuel Oil and Kerosene Sales Report;
- Form EIA-826—Monthly Electric Utility Sales and Revenue Report with State Distributions
- Form EIA-857—Monthly Report of Natural Gas Purchases and Deliveries to Consumers
- Form EIA-861—Annual Electric Power Industry 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 data on the total energy supplied to the commercial sector, not on the end use of energy within commercial buildings. The reporting unit for the CBECS is the commercial building. The CBECS focuses on 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 in the commercial buildings sector, not just general sector trends.

From the CBECS information, it is possible to produce national and regional energy consumption and expenditures data and to profile the commercial building stock in terms of their energy-related consumption characteristics. These analyses would not be possible using only the total energy supplied that is collected by the energy supplier surveys mentioned above because the data are not available at the commercial building level and thus cannot provide information on deliveries or purchases at the building level. Therefore, there would be no direct link to the building characteristic data collected on the CBECS Building Questionnaire.

#### **A-5. Reduction of the Burden on Small Businesses and Other Small Entities**

The EIA has designed the CBECS so that small businesses are not unduly burdened. All buildings of 1,000 square feet and smaller will not be surveyed in the 2012 CBECS. Additionally, building owners, managers, and tenants will receive worksheets (Forms EIA-871G and H) prior to the interview to assist them during the interview.

Because the CBECS is administered using a computer-assisted interview, it is possible to program complicated skip patterns into the instrument that would not be practical on a paper form. Smaller buildings tend to have less equipment and as a result will be asked far fewer questions than large buildings with various uses of space and complex energy systems.

Finally, in addition to not requesting consumption of district chilled water or bottled gas, EIA does not request energy consumption or expenditure data for wood or coal. The buildings that use these energy sources or 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**

As mentioned in Section A-2, “Needs for and Uses of the Data,” CBECS is conducted on a quadrennial basis. This schedule complements the other energy end-use data collections that EIA is conducting, such as the RECS and the MECS.

If the CBECS were to be conducted less frequently than on a quadrennial basis, serious breaks in the continuity of the series could develop that would directly impact on the ability to forecast energy use in the commercial buildings sector. The use of quadrennial cycle is based on the belief that long-term shifts in energy markets are best examined by studying energy demand. Major shifts in energy demand in the commercial sector are tied to the number of commercial buildings and the energy-related characteristics of existing buildings. It requires a medium- to long-term planning process to construct new buildings, enlarge existing buildings or make the capital-intensive changes that would significantly affect the energy consumption of a building. A four-year cycle of data collection is effective for monitoring such changes.

#### **A-7. Compliance with 5 CFR 1320.5**

There are no special circumstances that would require the 2012 CBECS to be conducted in a manner inconsistent with the guidelines in 5 CFR 1320.5.

#### **A-8. Summary of Consultations Outside the Agency**

EIA conducted an extensive outreach effort with CBECS stakeholders to seek input on the 2012 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 6, 2011, EIA met with the Environmental Protection Agency (EPA) Office of Water to discuss the results water questions that were introduced in the 2007 CBECS and ways to improve the questions for the next data collection.
- On December 22, 2011, EIA met with representatives from the Real Estate Roundtable (RER), the U.S. Green Building Council (USGBC), the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), and the Alliance to Save Energy (ASE).
- On February 22, 2012, EIA hosted a meeting with members of the RER and USGBC, about 10 representatives from the commercial real estate community which included: Tishman Speyer, Transwestern, Jones Lang LaSalle, YR&G, Zia for Buildings, e4NY, Inc., and Forest City Enterprises. At this meeting, the CBECS questionnaire was discussed in great detail.
- On March 8, 2012 the National Institute of Building Sciences (NIBS) hosted a roundtable discussion about CBECS for interested members of the buildings community; there were about 18 attendees. Organizations represented at this meeting included: ASHRAE, Institute for Market Transformation (IMT), National Environmental Balancing Bureau (NEBB), American Council for an Energy Efficient Economy (ACEEE), American Institute of Architects (AIA), National Association of State Energy Officials (NASEO), Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), and Center for Environmental Innovation in Roofing (CEIR).
- On March 15, 2012, the CBECS survey manager spoke at the Federal Energy Management Program (FEMP)'s Interagency Sustainability Working Group meeting, attended by sustainability delegates from a wide variety of Federal agencies.
- On March 20, 2012, EIA and ASHRAE met to review and discuss written recommendations that had been submitted by ASHRAE.
- On March 22, 2012, EIA and EPA Energy Star met to discuss CBECS questionnaire recommendations related to the Energy Star program.
- On April 6, 2012, the AIA hosted a meeting with EIA to discuss their data needs related to CBECS. AIA followed up with written comments following this meeting.
- On April 10, 2012, the CBECS survey manager held a webinar for the DOE Office of Energy Efficiency (EERE)'s Commercial Buildings Energy Alliances. The webinar provided key milestones for the 2012 CBECS development and provided information on ways for users to submit any feedback on the questionnaire.
- On May 15, 2012, the USGBC hosted a stakeholder workshop in which EIA presented their proposed questionnaire changes and final input was requested regarding

improvements to the CBECS questionnaire. The event was widely publicized by e-mail invitation and on the EIA web site. The workshop was attended either in-person or by webinar by about 60 individuals, which included representatives from: USGBC, RER, ASHRAE, AIA, EPA, ACEEE, IMT, CEIR, NASEO, YR&G, EIA Office of Energy Analysis, Pacific Northwest Laboratory (PNL), National Renewable Energy Laboratory (NREL), Lawrence Berkeley National Laboratory (LBNL), International Council of Shopping Centers (ICSC), National Resource Defense Council (NRDC), Resources for the Future (RFF), Architect of the Capitol, California Energy Commission (CEC), General Services Administration (GSA), National Institute of Standards and Technology (NIST), Northeast Energy Efficiency Partnerships (NEEP), Northwest Power and Conservation Council, BuildingWise, BCS Partners, Snow Energy Group, Good Company Associates, Grundfos, Itron, Lutron Electronics, Opaxis, Quality Supply Chain Co-op, Inc., Resource Professionals Group, Sedesco, Sebesta Blomberg, WattStopper, and the South Central Partnership for Energy Efficiency as Resource (SPEER).

EIA received one comment in response to a March 28, 2012 Federal Register notice (Volume 77, Number 60, pages 18799-18801):

- Mr. Dennis Fixler, Chief Statistician, Bureau of Economic Analysis: 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 (VPIP). The 17 VPIP categories are those such as "Residential buildings," "Commercial," "Office," "Health care," "Power," and "Manufacturing" – and 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.

#### **A-9. Remuneration**

Currently, there are no plans to provide any payment or gift to respondents.

#### **A-10. Provisions for Confidentiality of Information**

The confidentiality of individual respondents is protected under the Confidential Information Protection and Statistical Efficiency Act of 2002 (P.L. 107-347). In addition, any employee of the survey contractor who is involved with CBECS must undergo CIPSEA training and sign a pledge not to release the information. The specific 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. Reporting Burden Estimates

The annual respondent burden for the 2012 CBECS is estimated at 3,978 hours. (The survey is conducted quadrennially; however, the burden estimates are annualized over the requested 3-year approval period.) The following table provides a detailed breakout of this figure.

|  | <b>Building<br/>Questionnaire<br/>Forms<br/>(EIA-871A,<br/>G, and H)</b> | <b>Mall Building<br/>Questionnaire<br/>Forms<br/>(EIA-871I<br/>and G)</b> | <b>Mall<br/>Establishment<br/>Questionnaire<br/>Forms<br/>(EIA-871J,<br/>G, and H)</b> | <b>Energy<br/>Supplier<br/>Forms<br/>(EIA-<br/>871C-F)</b> | <b>Total<br/>for All<br/>Forms</b> |
|--|--|---|--|--|------------------------------------|
| <b>Response Time...</b>  | 60 min.<br>(40 min. + 20 min.)   | 25 min.<br>(15 min. + 10 min.)  | 45 min.<br>(25 min. + 20 min.)   | 30 min.  |                                    |
| <b>Number of Forms</b>   | 7,880  | 520   | 1,300  | 5,725  |                                    |
| <b>Reporting<br/>Burden-Hours:</b>                               |  |   |  |  |                                    |
| <b>Survey.....</b>   | 7,880  | 217   | 975  | 2,863  | <b>11,278</b>                      |
| <b>Annual.....</b><br>(Prorated over 3-<br>year approval period) | 2,627  | 72  | 325  | 954  | <b>3,978</b>                       |

The approximate average time for each Building Questionnaire (EIA-871A), 40 minutes, is based on the 2007 CBECS, for which the average completion time of a personal interview was 38 minutes. Although more questions were added than were deleted for the 2012 CBECS, a substantial portion of the 2012 CBECS interviews will be completed by telephone, which are by nature shorter interviews, so the average total interview time is not expected to increase considerably. The approximate average time for each Mall Establishment Questionnaire (EIA-871I), 25 minutes, is based on the 2007 CBECS, for which the average time for an establishment interview was 23 minutes. The approximate average time for each Mall Building Questionnaire (EIA-871J), 15 minutes, is based on the 2007 CBECS, for which the average time for a mall building questionnaire was 16 minutes, and, as with the building interviews, the fact that many of these will be completed over the telephone. The average time to complete the two worksheets (Forms EIA-871G and H) is estimated at 20 minutes, or 10 minutes per form.

### A-13. Total Annual Cost Burden to Respondents

There are no additional capital and start-up cost components, or operations and maintenance and purchase of services component for this data collection.

It is estimated that the total cost to respondents will be \$808,420, for an average annual cost of \$269,473. (See table below for detailed calculations.) An average per hour cost of \$67.74 is used because that is the average loaded (salary plus benefits) hourly cost for an EIA employee. EIA assumes that the survey respondent workforce completing surveys for EIA is comparable with the EIA workforce.

It should be noted that over half of CBECS interviews are with building owners/managers or energy managers who are already responsible for collecting and monitoring the type of information that is requested in the CBECS questionnaire. Keeping records on energy systems and usage is often already part of their job and retrieving this information for the CBECS should not add much work.

|                                 | <b>Building<br/>Questionnaire<br/>Forms<br/>(EIA-871A,G,<br/>and H)</b> | <b>Mall Building<br/>Questionnaire<br/>Forms<br/>(EIA-871I<br/>and G)</b> | <b>Mall Establishment<br/>Questionnaire<br/>Forms<br/>(EIA-871G, H,<br/>and J)</b> | <b>Energy<br/>Supplier<br/>Forms<br/>(EIA-871C-F)</b> |
|---------------------------------|---|---|--|---|
| <b>Hourly Rate.....</b>         | \$67.74   | \$67.74   | \$67.74  | \$67.74   |
| <b>Response Time...</b>         | 60 min.   | 25 min.   | 45 min.  | 30 min.   |
| <b>Cost per Form.....</b>       | \$67.74   | \$67.74   | \$67.74  | \$67.74   |
| <b>Number of<br/>Forms.....</b> | 7,880   | 520   | 1,300  | 5,725   |
| <b>Respondent<br/>Costs</b>     |   |   |  |   |
| <b>Survey.....</b>              | \$533,791   | \$14,677  | \$66,047   | \$193,906   |
| <b>Annual.....</b>              | \$177,930   | \$4,892   | \$22,016   | \$64,635  |

#### **A-14. Annualized Costs to the Federal Government**

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

The cost to the government of the 2012 CBECS is estimated at \$19.3 million. Based on a four-year cycle, the annualized cost to the Government is approximately \$4.8 million.

Of the \$19.3 million, \$16.2 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 22 FTE's for the four-year survey cycle, at an average cost of \$141,400 per FTE, yielding staff costs of \$3.1 million for the survey cycle, or \$770,700 per year. Staff costs include (1) interfacing with data users; (2) specifying the survey design; (3) programming and testing the questionnaires; (4) directing and monitoring the survey contractor on the sample design, data collection and nonresponse follow-up procedures; (5) editing the data; (6) developing the nonresponse adjustments (imputations); (7) analyzing the data; (8) preparing the data reports for dissemination; and (9) preparing public use data for release on the internet.

#### **A-15. Reasons for Changes in Burden**

Because this is a reinstatement, the overall total change in hours is the total annual burden hours proposed. Therefore, an increase due to agency discretion (program change) is 3,978 hours.

Since the 2007 CBECS (2,544 hours), there has been a 1,434 hour increase in the annual burden hours. Almost all of the increase in burden is due to the 50 percent increase in sample size. Even with this increase, the CBECS sample size is still quite small relative to the total population of commercial buildings, which is about 5 million buildings.

The total number of all the different types of forms (Building Questionnaire Forms, Mall Building Questionnaire Forms, and Mall Establishment Questionnaire Forms) increased for the 2012 CBECS relative to the 2007 CBECS due to the increase in sample size (total forms went from 9,700 forms to 15,425 forms). However, because of the gains of efficiency that telephone interviewing will provide, interviewing times per form will decrease slightly and the average burden-hours per form for the survey has **decreased** from 2007, from 0.79 hours per form in 2007 to 0.77 hours per form in 2012. The following table provides a detailed calculation of these figures.

|  | <b>Building<br/>Questionnaire<br/>Forms<br/>(EIA-871A,<br/>G, and H)</b> | <b>Mall Building<br/>Questionnaire<br/>Forms<br/>(EIA-871I<br/>and G)</b> | <b>Mall<br/>Establishment<br/>Questionnaire<br/>Forms<br/>(EIA-871J,<br/>G, and H)</b> | <b>Energy<br/>Supplier<br/>Forms<br/>(EIA-<br/>871C-F)</b> | <b>Total<br/>for All<br/>Forms</b> |
|--|--|---|--|--|------------------------------------|
| <b>2007 Response<br/>Time Estimate.....</b>              | 60 min.<br>(40 min. + 20 min.)   | 30 min.<br>(20 min. + 10 min.)  | 40 min.<br>(20 min. + 20 min.)   | 30 min.  |                                    |
| <b>2007 Number of<br/>Forms.....</b>                     | 5,275  | 350   | 875  | 3,200  | 9,700                              |
| <b>2007 Reporting<br/>Burden-Hours:<br/>Survey.....</b>  | 5,275  | 175   | 583  | 1,600  | <b>7,633</b>                       |
| <b>2007 Average<br/>Burden-Hours per<br/>Survey Form</b> |  |   |  |  | <b>0.79</b>                        |
| <b>2012 Response<br/>Time Estimate.....</b>              | 60 min.<br>(40 min. + 20 min.)   | 25 min.<br>(15 min. + 10 min.)  | 45 min.<br>(25 min. + 20 min.)   | 30 min.  |                                    |
| <b>2012 Number of<br/>Forms.....</b>                     | 7,880  | 520   | 1,300  | 5,725  | 15,425                             |
| <b>2012 Reporting<br/>Burden-Hours:<br/>Survey.....</b>  | 7,880  | 217   | 975  | 2,863  | <b>11,935</b>                      |
| <b>2012 Average<br/>Burden-Hours per<br/>Survey Form</b> |  |   |  |  | <b>0.77</b>                        |

#### A-16. Schedule for Collecting and Publishing Data

The results of the CBECs will be published by the EIA in electronic form on the EIA website at [www.eia.gov/emeu/cbecs](http://www.eia.gov/emeu/cbecs). All data will be published in aggregated form only and will be prepared by EIA in accordance to 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 data 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 2013 through September 2013    |
| Collect Energy Supplier Data.....               | September 2013 through December 2013 |
| Preliminary Characteristics Data Available..... | April 2014                           |
| Preliminary Consumption Data Available.....     | October 2014                         |

**A-17. Approval to Not Display Expiration Date**

The expiration date will be displayed on the form.

**A-18. Certification Statement**

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