2007 Commercial Buildings Energy Consumption Survey (CBECS)

Mall Building Questionnaire - *Form EIA-871I*

HOW TO USE THIS QUESTIONNAIRE

The purpose of this questionnaire is to document the question text, fills, and skip patterns within the 2007 CBECS questionnaire, which is a *computer-assisted personal interview* programmed using a software called Blaise.

PLEASE NOTE: All fills and skip patterns will be transparent to the interviewer.

Each question is formatted as follows:

A1	**Question name** *SASVAR9*
ASK	
FILL	
Question text	
RANGE	
NEXT	

The **black box** (A1 here) contains a question number, followed by the **Question name** and the *SAS variable* (if applicable) in the same row. If the SAS variable area says "*see below,*" the variables are found within the Question text box.

The **ASK** line describes what needs to be true for a question to be asked. The first line of each ASK box describes the type of structures that are asked the question. There are 4 different possible structure types (and this information is preloaded into each case):

In the ASK box, <u>at least one</u> of the statements must be true.

There are two variables that are preloaded into each case and used for routing in some questions:

- Freestanding – a building that is not attached on any sides
- Enclosed mall – the building is an enclosed mall building

The **FILL** line describes any question fills and the conditions under which each appears. If the fill appears as something such as "A1 [Square footage]" this means that the figure given in question A1 will be filled in.

The **Question text** box shows the question text, and any other elements for each question, such as Show Card indicators or instructions, and the answer choices for each question.

The **RANGE** line is only applicable to numeric questions. It shows the range of answers that will be accepted by Blaise.

The **NEXT** line details the routing for the next question. Follow these instructions <u>in order</u>. Once a true statement is reached, go to the question indicated by the arrow (➔).

WORKSHEET AND RESPONDENT QUESTIONS

WS	**Worksheet 1**	*WS1RS09 – WS1RS99*
ASK	All cases not yet done with Section E	
	Do you have Worksheet 1 with you and completed? 1 Yes 2 No	
NEXT	IF First time case started ➔ R1 [Respondent title] IF Restart ➔ R2 [Respondent title]	

R1	**Respondent function**	*RJOBRS09*
ASK	All cases on first start	
	SHOW CARD R1 ◆ Take out the Show Card booklet. It is very important to use these cards, as some of them contain more information than can be found on your CAPI screens Before we get started, I'm going to give you this booklet of Show Cards to look at for some of the questions. Please turn to Show Card R1. Looking at this list, please tell me which of these best describes your job function. 1 Operations, maintenance, or engineering 2 Property management 3 Store management 4 Mall management 5 Administration or company management 6 Energy or environmental management 7 Building owner 8 Business owner 9 Accounting, finances, or payroll 10 Executive official 11 School official 12 Religious official 13 Support staff 14 Other	
NEXT	IF Other ➔ R3 [Other job function] Anything but Other ➔ A1 [Square footage]	

R2	**Respondent function**	*RJOBRS19 – RJOBRS99*
ASK	All restarted cases	

- ASK if interview is with a new respondent
- If interview is with same respondent as previous interview, ENTER "0"

SHOW CARD R1

Before we get started, I'm going to give you this booklet of Show Cards to look at for some of the questions. Please turn to Show Card R1.

Looking at this list, please tell me which of these best describes your job position.

0 Same respondent as previous interview
1 Operations, maintenance, or engineering
2 Property management
3 Store management
4 Mall management
5 Administration or company management
6 Energy or environmental management
7 Building owner
8 Business owner
9 Accounting, finances, or payroll
10 Executive official
11 School official
12 Religious official
13 Support staff
14 Other

NEXT	IF Other ➔ R3 [Other job function] Anything but Other ➔ A1 [Square footage]

R3	**Other job function**	*RJOBXR09 – RJOBXR99*
ASK	IF R1 or R2 [Respondent function] = Other	

What is your job function?

NEXT	➔ A1 [Square footage]

SECTION A: BUILDING SIZE AND AGE

A1	**Square footage** *SQFT9*
ASK	All Mall Buildings
FILL	**{Worksheet1Intro}** IF R has Worksheet 1 = "Please refer to Worksheet 1 for some of these next questions on general characteristics." OTHERWISE = BLANK

HELP <F1>

{Worksheet1Intro}

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

- DEF: [Total square footage = Length of building multiplied by width of building multiplied by the number of floors.]
- VERIFY number digit by digit

RANGE	1 to 999,999,999
NEXT	IF DK/RF ➔ A2 [Square footage category] OTHERWISE ➔ A3 [Food court]

A2	**Square footage category**	*SQFTC9*
ASK	IF A1 [Square footage] = DK/RF	

HELP <F1>

SHOW CARD A1

I understand that it may be difficult to give an exact figure for square footage. However, the size of your building is very important in helping understand its use of energy.

Please look at this list and tell me which category best describes the total gross square footage in this building. There are examples provided to help you estimate.

- If respondent gives the category code,
  VERIFY the response by reading the full answer

1 1,000 square feet or less
2 1,001 to 5,000 square feet
3 5,001 to 10,000 square feet
4 10,001 to 25,000 square feet
5 25,001 to 50,000 square feet
6 50,001 to 100,000 square feet
7 100,001 to 200,000 square feet
8 200,001 to 500,000 square feet
9 500,001 to 1 million square feet
10 Over 1 million square feet

NEXT	➔ A3 [Wall construction material]

A3	**Wall construction material**	*WLCNS9*
ASK	All Mall Buildings	

HELP <F1>

SHOW CARD A2

Here is a list of different types of construction materials. Which best describes the major type of exterior wall construction material used on this building?

1 Brick, stone, or stucco
2 Pre-cast concrete panels
3 Concrete block or poured concrete (above grade)
4 Aluminum, asbestos, plastic, or wood siding, shingles, tiles, or shakes
5 Sheet metal panels
6 Window or vision glass (glass that can be seen through)
7 Decorative or construction glass
8 IF VOLUNTEERED: No one major type
9 IF VOLUNTEERED: Other

NEXT	➔ A4 [Roof construction material]

A4	**Roof construction material**	*RFCNS9*
ASK	All Mall Buildings	

HELP <F1>

SHOW CARD A3

Here is a list of different types of roofing materials. Which best describes the building's predominant exterior roof surface?

1 Built-up (tar, felts, or fiberglass and a ballast, such as stone)
2 Slate or tile shingles
3 Wood shingles, shakes, or other wooden materials
4 Asphalt, fiberglass, or other shingles
5 Metal surfacing
6 Plastic, rubber, or synthetic sheeting (single or multiple ply)
7 Concrete
8 IF VOLUNTEERED: No one major type
9 IF VOLUNTEERED: Other

NEXT	➔ A5 [Building shape]

A5	**Building shape**	*BLDSHP9*
ASK	All Mall Buildings	

SHOW CARD A4

Here is a card that shows some common building shapes. Which one most resembles the floorplan of this building at ground level? This is sometimes called the "footprint" of the building.

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

NEXT	➔ A6 [Percent exterior glass]

A6	**Percent exterior glass**	*GLSSPC9*
ASK	All Mall Buildings	

SHOW CARD A5

Which of the ranges on this card best describes the percent of the exterior wall surface of this building that is covered with window glass or glass doors?

1 1 percent or less
2 2 to 10 percent
3 11 to 25 percent
4 26 to 50 percent
5 51 to 75 percent
6 76 to 100 percent

NEXT	➔ A7 [Equal glass on all sides]

A7	**Equal glass on all sides**	*EQGLSS9*
ASK	All Mall Buildings	

Is the amount of glass about the same for all sides of the building?

1 Yes
2 No

NEXT	IF Yes ➔ A9 [Number of floors] IF No OR DK/RF ➔ A8 [Glass sides most sunlight]

A8	**Glass sides most sunlight**	*SUNGLS9*
ASK	IF A7 [Equal glass on all sides] = No OR DK/RF	

Do the sides receiving direct sunlight have more or less glass area than the sides that do not receive direct sunlight?

1 More glass area
2 Less glass area
3 IF VOLUNTEERED: About the same amount

NEXT	➔ A9 [Number of floors]

A9	**Number of floors** *NFLOOR9*
ASK	All Mall Buildings

HELP <F1>

How many floors are in the tallest section of the building, including basements, parking levels, or any other floors below ground level, but excluding half-floors, mezzanines, balconies, and lofts?

- ◆ PROBE for estimate if DK

RANGE	1 to 999
NEXT	IF Only one floor ➔ A14 [Year of construction] IF More than one floor ➔ A10 [Elevators]

A10	**Elevators** *ELEVTR9*
ASK	IF A9 [Number of floors] >1 OR DK/RF

Are there any elevators in this building?

1 Yes
2 No

NEXT	IF Yes ➔ A11 [Number of elevators] IF No OR DK/RF ➔ A12 [Escalators]

A11	**Number of elevators** *NELVTR9*
ASK	IF A10 [Elevators] = Yes

How many elevators are there?

- ◆ PROBE for estimate if DK

RANGE	1 to 99
NEXT	➔ A12 [Escalators]

A12	**Escalators** *ESCLTR9*
ASK	IF A9 [Number of floors] >1 OR DK/RF

Are there any escalators in this building?

1 Yes
2 No

NEXT	IF Yes ➔ A13 [Number of escalators] IF No OR DK/RF ➔ A14 [Year of construction]

A13	**Number of escalators**	*NESLTR9*
ASK	IF A12 [Escalators] = Yes	
	How many escalators are there? Count <u>each</u> one, for example, a pair of up and down escalators should be counted as two. ◆ PROBE for estimate if DK	
RANGE	1 to 99	
NEXT	➔ A14 [Year of construction]	

A14	**Year of construction**	*YRCON9*
ASK	All Mall Buildings	
	HELP <F1> What year was this building constructed? If there have been major additions, give the year the <u>largest portion</u> of the building was completed.	
RANGE	1600 to 2008	
NEXT	IF DK/RF ➔ A15 [Year of construction category] IF 2007 ➔ A17 [Month ready for occupancy] IF 2008 ➔ A16 [End of interview] OTHERWISE ➔ B1 [On a multibuilding complex]	

A15	**Year of construction category**	*YRCONC9*
ASK	IF A14 [Year of construction] = DK/RF	
	HELP <F1> SHOW CARD A6 Please look at this card and tell me which range best describes when this building was constructed. 1 Before 1920 2 1920 to 1945 3 1946 to 1959 4 1960 to 1969 5 1970 to 1979 6 1980 to 1989 7 1990 to 1999 8 2000 to 2003 9 2004 to 2007 10 IF VOLUNTEERED: 2008	
NEXT	IF 2008 ➔ A16 [End of interview] IF Before 1999 ➔ A18 [Renovations] IF 2000 to 2007 ➔ B1 [On a multibuilding complex]	

A16	**End of interview**
ASK	IF A14 [Year of construction] OR A15 [Year of construction category] = 2008
FILL	**{CollectWorksheet}** IF R has Worksheet 1 = "However, I would like to collect Worksheet 1 and any other worksheets that you may have completed."

Thank you, that's all the questions that I have at this time, since we are only interviewing structures that were ready for occupancy before January 1, 2008. {CollectWorksheet}

Thank you for your time and help.

◆ <F10> to Exit

NEXT	TERMINATE

A17	**Month ready for occupancy**	*MONCON9*
ASK	IF A14 [Year of construction] = 2007	

HELP <F1>

In what month of 2007 was this building first ready for occupancy?

1 January
2 February
3 March
4 April
5 May
6 June
7 July
8 August
9 September
10 October
11 November
12 December

NEXT	➔ B1 [On a multibuilding complex]

A18	**Renovations** *RENOV9*
ASK	IF A14 [Year of construction] OR A15 [Year of construction category] = Before 1999
FILL	**{Since1980}** IF A14 [Year of construction] OR A15 [Year of construction category] = Before 1980 = "since 1980" OTHERWISE = BLANK

Has any portion of this building undergone major renovations {Since1980}?

1 Yes
2 No

NEXT	IF Yes ➔ A19 [What renovations] IF No OR DK/RF ➔ B1 [On a multibuilding complex]

A19	**What renovations** *see below*
ASK	IF A18 [Renovations] = Yes
FILL	**{Since1980}** IF A14 [Year of construction] OR A15 [Year of construction category] = Before 1980 = "since 1980" OTHERWISE = BLANK

SHOW CARD A7

Please look at this card and tell me which types of renovations have been done {Since1980}.

- PROBE for any others
- ENTER all that apply

1	Addition or annex	*RENADD9*
2	Reduction of enclosed floorspace	*RENRDC9*
3	Interior or exterior cosmetic improvements	*RENCOS9*
4	Exterior replacement	*RENEXT9*
5	Interior wall re-configuration	*RENINT9*
6	HVAC equipment upgrade	*RENHVC9*
7	Lighting upgrade	*RENLGT9*
8	Window replacement	*RENWIN9*
9	Plumbing system upgrade	*RENPLB9*
10	Insulation upgrade	*RENINS9*
11	Structural upgrade	*RENSTR9*
12	Other	*RENOTH9*

NEXT	IF Other ➔ A20 [Other renovation] OTHERWISE ➔ B1 [On a multibuilding complex]

A20	Other renovation
ASK	IF A19 [What renovations] = Other
Please describe the other type of renovation. ◆ RECORD in open box	
NEXT	➔ B1 [On a multibuilding complex]

SECTION B: BUILDING ACTIVITY

B1	**On a multibuilding complex** *FACIL9*
ASK	All Mall Buildings
	HELP <F1> Is this building part of a multibuilding campus or complex? ◆ DEF: [A campus or complex is a group of two or more buildings on the same site that are owned or operated by a single organization or individual. It may also be referred to as a multibuilding facility.] 1 Yes 2 No
NEXT	IF Yes ➔ B2 [Federal complex] IF No OR DK/RF ➔ C1 [Government owned]

B2	**Federal complex** *FEDFAC9*
ASK	IF B1 [On a multibuilding complex] = Yes
	HELP <F1> Is this campus or complex owned by the Federal government? 1 Yes 2 No
NEXT	➔ B3 [Type of complex]

B3	**Type of complex**	*FACACT9*
ASK	IF B1 [On a multibuilding complex] = Yes	

HELP <F1>

SHOW CARD B1

Looking at this list, what is the primary business or function of this group of buildings as a whole?

1 College, university, or junior college
2 Primary or secondary school [GRADES K-12]
3 Other type of school
4 Office complex
5 Retail complex
6 Storage complex
7 Religious campus or complex
8 Hospital or other health care complex
9 Lodging or resort complex
10 Post office complex
11 Other type of government complex
12 Industrial complex
13 Transportation complex such as a terminal, depot, or airport
14 Other type of campus or complex

NEXT	IF Industrial complex ➔ B4 [Manufacturing industrial] IF Any other type ➔ C1 [Government owned]

B4	**Manufacturing industrial**	*MANIND9*
ASK	IF B3 [Type of complex] = Industrial complex	

HELP <F1>

Is it a manufacturing industrial complex?

◆ DEF: [Manufacturing industrial complexes involve the production or processing of goods, merchandise, raw materials, or food.]

1 Yes
2 No

NEXT	IF Yes ➔ B5 [Same owner as manufacturing] IF No OR DK/RF ➔ C1 [Government owned]

B5	**Same owner as manufacturing** *MANFAC9*
ASK	IF B4 [Manufacturing industrial] = Yes

HELP <F1

Does this building have the same owner and operator as the manufacturing campus or complex?

1 Yes
2 No

NEXT	IF Yes ➔ B6 [End of interview] IF No OR DK/RF ➔ C1 [Government owned]

B6	**End of interview**
ASK	IF B5 [Same owner as manufacturing] = Yes
FILL	**{CollectWorksheet}** IF R has Worksheet 1 = "However, I would like to collect Worksheet 1 and any other worksheets that you may have completed."

Thank you, that's all the questions that I have at this time, since this study does not include buildings on manufacturing facilities. {CollectWorksheet}

Thank you for your time and help.

◆ <F10> to Exit

NEXT	TERMINATE

SECTION C. OCCUPANCY AND OPERATING HOURS

C1	**Government owned** *GOVOWN9*
ASK	All Mall Buildings
FILL	**{BldgIntro}** IF B1 [On a multibuilding complex] = Yes = "For the rest of this survey, I will be asking you only about the building, not the entire campus or complex." OTHERWISE = BLANK
	HELP <F1> {BldgIntro} Is this building owned by a government agency? 1 Yes 2 No
NEXT	IF Yes ➔ C2 [Type of government] IF No OR DK/RF ➔ C3 [Owner]

C2	**Type of government** *GOVTYP9*
ASK	IF C1 [Government owned] = Yes
	HELP <F1> Is it owned by the Federal government, a State government, or a local government? 1 Federal 2 State 3 Local
NEXT	➔ C9 [Owner occupies]

C3	**Owner** *OWNER9*
ASK	IF C1 [Government owned] ≠ Yes
	SHOW CARD C1 Looking at this list, please tell me which of these best describes the owner of this building. 1 Property management company 2 Other corporation, partnership, LLC, or LLP 3 Individual owner(s) 4 Religious organization 5 Non-profit organization (other than religious or government) 6 Private academic institution 7 Other
NEXT	IF Anything except Other ➔ C5 [Number of businesses] IF Other ➔ C4 [Other owner]

C4	**Other owner**
ASK	IF C3 [Owner] = Other
	Please describe this other owner. ◆ RECORD in open box
NEXT	➔ C5 [Number of businesses]

C5	**Number of businesses** *NOCC9*
ASK	All Mall Buildings
RANGE	0 to 9,999
	HELP <F1> How many different businesses or organizations use space full-time in this building?
NEXT	IF Zero ➔ C6 [Any occupants] IF DK/RF ➔ C8 [Number of businesses category] IF Number given ➔ C9 [Owner occupies]

C6	**Any occupants**	*VACCHK9*
ASK	IF C5 [Number of businesses] = Zero	

HELP <F1>

Unless a building is completely vacant and unused, it should be considered to have at least one occupant. At this time, is any space used by a company, business, school, organization, non-profit company, religious organization, government agency or establishment?

1 Yes
2 No

NEXT	IF Yes ➔ C7 [Number of businesses] IF No ➔ C10 [Owner operates] IF DK/RF ➔ C8 [Number of businesses category]

C7	**Re-ask number of businesses**	*NOCC29*
ASK	IF C5 [Number of businesses] = Zero & C6 [Any occupants] = Yes	

HELP <F1>

How many businesses or organizations are there?

RANGE	1 to 9,999
NEXT	IF DK/RF ➔ C8 [Number of businesses category] IF Number given ➔ C9 [Owner occupies]

C8	**Number of businesses category**	*NOCCAT9*
ASK	IF C5 [Number of businesses] = DK/RF OR C6 [Any occupants] = DK/RF OR C7 [Re-ask number of businesses] = DK/RF	

HELP <F1>

SHOW CARD C2

Which category on this list best describes the number of businesses or organizations that currently use space full time in this building?

0 Zero
1 One
2 2 to 5
3 6 to 10
4 11 to 20
5 21 to 50
6 51 to 100
7 More than 100

NEXT	➔ C9 [Owner occupies]

C9	Owner occupies *OWNOCC9*
ASK	IF C1 [Government owned] ≠ DK/RF OR C3 [Owner] ≠ DK/RF
FILL	**{IsAreBusinesses}** IF One business/organization = "Is this business or organization" IF More than one business/organization = "Are any of these businesses or organizations" IF DK/RF number of businesses/organizations = "Are any of the businesses or organizations"
{IsAreBusinesses} owned, operated, or managed by the owner, or by an employee or representative of the owner? 1 Yes 2 No	
NEXT	➔ C10 [Owner operates]

C10	Owner operates
ASK	IF C1 [Government owned] ≠ DK/RF OR C3 [Owner] ≠ DK/RF
Is the building owner responsible for the operation and maintenance of the energy systems? 1 Yes 2 No	
NEXT	IF Yes ➔ C11 [Owner has purchasing power] IF No ➔ C13 [Nonowner operator] IF DK/RF ➔ C17 [Months in use]

C11	Owner has purchasing power
ASK	IF C10 [Owner operates] = Yes
Does the building owner also have direct input on decisions regarding purchases of energy-related equipment? 1 Yes 2 No	
NEXT	IF Yes OR DK/RF ➔C17 [Months in use] IF No ➔ C12 [Nonowner has purchasing power]

C12	Nonowner has purchasing power
ASK	IF C11 [Owner has purchasing power] = No

SHOW CARD C3

Looking at this list, please tell me who does have direct input (on decisions regarding purchases of energy-related equipment).

1 Property management company/leasing agent
2 Facilities personnel employed directly by the owner
3 Facilities/energy management consultant
4 Volunteer member of the organization
5 Manager with general supervisory duties
6 Other

NEXT	IF Other ➔ C16 [Other with purchasing power] OTHERWISE ➔C17 [Months in use]

C13	Nonowner operator
ASK	IF C10 [Owner operates] = No

SHOW CARD C4

Looking at this next list, please tell me who is responsible for the operation and maintenance of the energy systems.

1 Property management company/leasing agent
2 Facilities personnel employed directly by the owner
3 Facilities/energy management consultant
4 Volunteer member of the organization
5 Manager with general supervisory duties
6 Other

NEXT	IF Other ➔ C14 [Other operator] OTHERWISE ➔ C15 [Who has purchasing power]

C14	Other operator
ASK	IF C13 [Nonowner operator] = Other

Please describe who is responsible for the operation and maintenance of the energy systems.

◆ RECORD in open box

NEXT	➔ C15 [Who has purchasing power]

C15	Who has purchasing power
ASK	IF C10 [Owner operates] = No
	Who has the most direct input on decisions regarding purchases of energy-related equipment - the building owner or the party responsible for the energy systems? 1 Building owner 2 Party responsible for building operations 3 IF VOLUNTEERED: Both (either they have equal input, or are the same person) 4 IF VOLUNTEERED: Other
NEXT	IF Other ➔ C16 [Other with purchasing power] OTHERWISE ➔C17 [Months in use]

C16	Other with purchasing power
ASK	IF C15 [Who has purchasing power] = Other
	Please describe who has the most direct input on decisions regarding purchases of energy-related equipment. ◆ RECORD in open box
NEXT	➔C17 [Months in use]

C17	Months in use *MONUSE9*
ASK	All Mall Buildings
	HELP <F1> Thinking of the past 12 months, for how many months was this building in use?
RANGE	0 to 12
NEXT	IF Zero ➔ D1 [Heating] IF 1-3 months ➔ D1 [Heating] IF 4-12 months OR DK/RF➔ C18 [Space vacant 3 months in row]

C18	**Space vacant 3 months in row**	*PORVAC9*
ASK	IF C17 [Months in use] = 4-12 OR DK/RF	

HELP <F1>

Was any space in the building vacant or unoccupied for at least 3 consecutive months during the past 12 months?

1 Yes
2 No

NEXT	➔ D1 [Heating]

SECTION D. ENERGY USE AND EQUIPMENT

D1	**Heating** *HT19*
ASK	All Mall Buildings
FILL	**{Worksheet1Intro}** IF R has Worksheet 1 = "Please continue to refer to Worksheet 1 for some of these next questions on energy sources, uses, and equipment." OTHERWISE = BLANK

[F1]-HELP

{Worksheet1Intro}

For the next five questions, please tell me if energy was used in this building for any of these purposes during calendar year 2007.

Was any energy used for heating the building?

1 Yes
2 No

NEXT	➔ D2 [Cooling]

D2	**Cooling** *COOL9*
ASK	All Mall Buildings

[F1]-HELP

(Was any energy used...)

For air conditioning?

1 Yes
2 No

NEXT	➔ D3 [Water heating]

D3	**Water heating**	*WATR9*
ASK	All Mall Buildings	
	[F1]-HELP (Was any energy used...) For heating water for purposes such as washing hands, dishes, or clothes? 1 Yes 2 No	
NEXT	➔ D4 [Cooking]	

D4	**Cooking**	*COOK9*
ASK	All Mall Buildings	
	[F1]-HELP (Was any energy used...) For cooking? 1 Yes 2 No	
NEXT	➔ D5 [Manufacturing]	

D5	**Manufacturing**	*MANU9*
ASK	All Mall Buildings	
	[F1]-HELP (Was any energy used...) For manufacturing? 1 Yes 2 No	
NEXT	IF No & D1 [Heating] = No & D2 [Cooling] = No & D3 [Water heating] = No & D4 [Cooking] = No ➔ D6 [Any energy used] OTHERWISE ➔ D7 [Electricity generation capability]	

D6	**Any energy used** *NOENGY9*
ASK	IF D1 [Heating] = No & D2 [Cooling] = No & D3 [Water heating] = No & D4 [Cooking] = No & D5 [Manufacturing] = No
I did not record any uses of energy for this building. Did this building use <u>any</u> energy in 2007 for other purposes, such as lighting or appliances? 1 Yes, some energy was used in 2007 2 True, no energy was used	
NEXT	IF Yes, some energy was used in 2007 OR DK/RF ➔ D7 [Electricity generation capability] IF True, no energy was used ➔ End of Interview

D7	**Electricity generation capability** *CAPGEN9*
ASK	IF D1 [Heating] = Yes OR D2 [Cooling] = Yes OR D3 [Water heating] = Yes OR D4 [Cooking] = Yes OR D5 [Manufacturing] = Yes OR D6 [Any energy used] = Yes, some energy was used OR DK/RF
[F1]-HELP Does this building have the ability to generate electricity, including for emergency backup? 1 Yes 2 No	
NEXT	➔ D8 [Energy sources used]

D8	**Energy sources used** *see below*
ASK	IF D1 [Heating] = Yes OR D2 [Cooling] = Yes OR D3 [Water heating] = Yes OR D4 [Cooking] = Yes OR D5 [Manufacturing] = Yes OR D6 [Any energy used] = Yes, some energy was used OR DK/RF

[F1]-HELP

SHOW CARD D1

Looking at the second list on this card, please tell me which of these energy sources were used in this building for any purpose in 2007.

- EXP: [Include fuel oil, diesel, or kerosene if it was purchased or delivered in 2007, even if it was not used during that time.]
- EXP: [Do not include any fuels used in vehicles outside the building.]
- PROBE for any others
- ENTER all that apply

11	Electricity	*ELUSED9*
12	Natural gas	*NGUSED9*
13	Fuel oil, diesel, or kerosene	*FKUSED9*
14	Bottled gas, also known as LPG or propane	*PRUSED9*
15	District steam piped in from a separate building or utility	*STUSED9*
16	District hot water piped in from a separate building or utility	*HWUSED9*
17	District chilled water piped in from a separate building or utility	*CWUSED9*
18	Wood, coal, or solar thermal panels	
24	Other source or sources	*OTUSED9*

NEXT	IF Fuel, oil, diesel, or kerosene selected ➔ D9 [Fuel oil, diesel, or kerosene] IF Wood, coal, or solar thermal panels selected ➔ D10 [Wood, coal, or solar] IF Other source or sources selected ➔ D11 [Other energy source 1] IF District steam or District hot water selected ➔ D14 [From central plant] IF DK/RF: IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] IF D7 [Electricity generation capability] ≠ Yes ➔ E1 [Section E Routing] OTHERWISE: IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D9	**Fuel oil, diesel, or kerosene** *FKTYPE9*
ASK	IF Fuel oil, diesel, or kerosene IN D8 [Energy sources used]

[F1]-HELP

◆ VERIFY if volunteered in previous question

You mentioned fuel oil, diesel, or kerosene. Which of these were used [in this building in 2007]?

◆ ENTER all that apply

1 Fuel oil
2 Diesel
3 Kerosene

NEXT	IF Wood, coal, or solar thermal panels IN D8 [Energy sources used] ➔ D10 [Wood, coal, or solar] IF Other source or sources IN D8 [Energy sources used] ➔ D11 [Other energy source 1] IF District steam or District hot water selected ➔ D14 [From central plant] OTHERWISE: IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D10	**Wood, coal, or solar**	*see below*
ASK	IF Wood, coal, or solar thermal panels IN D8 [Energy sources used]	

◆ VERIFY if volunteered in previous question

You mentioned wood, coal, or solar thermal panels. Which of these were used [in this building in 2007]?

◆ ENTER all that apply

1	Wood	*WOUSED9*
2	Coal	*COUSED9*
3	Solar thermal panels	*SOUSED9*

NEXT	IF Other source or sources IN D8 [Energy sources used] ➔ D11 [Other energy source 1] IF District steam or District hot water selected ➔ D14 [From central plant] OTHERWISE: IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D11	**Other energy source 1**	*OTUSDX19*
ASK	IF Other source or sources IN D8 [Energy sources used]	

What was the first other energy source used [in this building in 2007]?

◆ ENTER the first energy source used

NEXT	➔ D12 [Other energy source 2]

D12	**Other energy source 2**	*OTUSDX29*
ASK	IF Other source or sources IN D8 [Energy sources used]	

Were there any other energy sources used [in this building in 2007]?

- ENTER the next energy source
- <ENTER> if no others

NEXT	IF Source entered here ➔ D13 [Other energy source 3] IF No source entered here: IF District steam or District hot water selected ➔ D14 [From central plant] OTHERWISE: IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D13	**Other energy source 3**	*OTUSDX39*
ASK	IF Source was entered in D12 [Other energy source 2]	

Were there any other energy sources used [in this building in 2007]?

- ENTER the next energy source
- <ENTER> if no others

NEXT	IF District steam or District hot water selected ➔ D14 [From central plant] OTHERWISE: IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D14	From central plant	*DHFRPL9*
ASK	IF District steam or District hot water IN D8 [Energy sources used]	
	Is the district steam or hot water piped in from a central plant that is part of the same complex as your building? 1 Yes 2 No	
NEXT	IF No OR DK/RF ➔ D19 [Purchase from offsite] IF Yes: IF ONLY District steam and NOT District hot water IN D8 [Energy sources used] ➔ D16 [Plant produces district hot water] OTHERWISE ➔ D15 [Plant produces district steam]	

D15	Plant produces district steam	*FACDST9*
ASK	IF D14 [From central plant] = Yes IF ONLY District hot water and NOT District steam IN D8 [Energy sources used]	
	HELP <F1> Does the central physical plant produce... District steam? 1 Yes 2 No	
NEXT	➔ D17 [Plant produces district chilled water]	

D16	Plant produces district hot water	*FACDHW9*
ASK	IF D14 [From central plant] = Yes IF ONLY District steam and NOT District hot water IN D8 [Energy sources used] OR District steam & District hot water IN D8 [Energy sources used]	
	HELP <F1> [Does the central physical plant produce...] District hot water? 1 Yes 2 No	
NEXT	➔ D17 [Plant produces district chilled water]	

D17	**Plant produces district chilled water**	*FACDCW9*
ASK	IF D14 [From central plant] = Yes	
	HELP <F1> [Does the central physical plant produce...] District chilled water? 1 Yes 2 No	
NEXT	➔ D18 [Plant produces electricity]	

D18	**Plant produces electricity**	*FACELC9*
ASK	IF D14 [From central plant] = Yes	
	HELP <F1> [Does the central physical plant produce...] Electricity? 1 Yes 2 No	
NEXT	IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]	

D19	**Purchase from offsite**	*DHOFF9*
ASK	IF D14 [From central plant] = No OR DK/RF	
	Is it [the district steam or hot water] purchased from somewhere off-site, such as a commercial or municipal plant? 1 Yes 2 No	
NEXT	IF D1 [Heating] = Yes ➔ D20 [Source for main heating] IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]	

D20	**Source for main heating** *see below*
ASK	IF D1 [Heating] = Yes
FILL	**{Ht1SourcesList}** = List of all energy sources used **{Electricity} – {Other3}** = If a source is used, it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]

What was the main energy source for heating? [Was it {Ht1SourcesList}?]

- DEF: [The main energy source for heating is the energy source used to heat most of the square footage in this building most of the time.]
- EXP: [Do not include electricity if it is used only to run fan motors.]
- Only sources already selected are shown here

11	{Electricity}	*ELHT19*
12	{Natural gas}	*NGHT19*
13	{FuelOilType}	*FKHT19*
14	{Bottled gas}	*PRHT19*
15	{District steam}	*STHT19*
16	{District hot water}	*HWHT19*
18	{Wood}	*WOHT19*
19	{Coal}	*COHT19*
20	{Solar}	*SOHT19*
21	{Other1}	*OTHT19*
22	{Other2}	*OTHT19*
23	{Other3}	*OTHT19*
24	Some other energy source	

NEXT	IF Some other energy source ➔ D21 [Other source for main heating] IF Anything but Some other energy source OR DK/RF: IF More than one energy source used ➔ D22 [Other sources for heating] IF Only one energy source used ➔ D23 [Other sources for heating]

D21	**Other source for main heating** *see below*
ASK	IF D20 [Source for main heating] = Some other energy source

What was the other energy source used for main space heating?

11	Electricity	*ELHT19*
12	Natural gas	*NGHT19*
13	Fuel oil/Diesel/Kerosene	*FKHT19*
14	Bottled gas	*PRHT19*
15	District steam	*STHT19*
16	District hot water	*HWHT19*
18	Wood	*WOHT19*
19	Coal	*COHT19*
20	Solar	*SOHT19*
24	Some other energy source	*OTHT19*

NEXT	➔ D22 [Other sources for heating]

D22	**Other sources for heating**	*HT29 & see below*
ASK	IF D1 [Heating] = Yes & More than one energy source used	
FILL	**{Ht2SourcesList}** = List of all energy sources used, minus the one used for main heating **{Electricity} – {Other3}** = If a source is used (other than for main space heating), it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]	

Which other energy sources, if any, were used for heating? [{Ht2SourcesList}]

- EXP: [Do not include electricity if it is used only to run fan motors.]
- Only sources already selected are shown here
- PROBE for any others
- ENTER all that apply

11	{Electricity}	*ELHT29*
12	{Natural gas}	*NGHT29*
13	{FuelOilType}	*FKHT29*
14	{Bottled gas}	*PRHT29*
15	{District steam}	*STHT29*
16	{District hot water}	*HWHT29*
18	{Wood}	*WOHT29*
19	{Coal}	*COHT29*
20	{Solar}	*SOHT29*
21	{Other1}	*OTHT29*
22	{Other2}	*OTHT29*
23	{Other3}	*OTHT29*
24	Some other energy source	
99	No other sources for heating	

NEXT	IF Some other energy source➔ D24 [Other source for heating] IF Anything but Some other energy source OR DK/RF ➔ D25 [Percent heated]

D23	Other sources for heating	*HT29*
ASK	IF D1 [Heating] = Yes & Only one energy source used	

Were there any other energy sources used for heating?

1 Yes
2 No

NEXT	IF Yes ➔ D24 [Other source for heating] IF No OR DK/RF ➔ D25 [Percent heated]

D24	Other source for heating
ASK	IF D22 [Other sources for heating] = Some other energy source OR D23 [Other sources for heating] = Yes

What was the other energy source used for secondary space heating?

11	Electricity	*ELHT29*
12	Natural gas	*NGHT29*
13	Fuel oil/Diesel/Kerosene	*FKHT29*
14	Bottled gas	*PRHT29*
15	District steam	*STHT29*
16	District hot water	*HWHT29*
18	Wood	*WOHT29*
19	Coal	*COHT29*
20	Solar	*SOHT29*
24	Some other energy source	*OTHT29*

NEXT	➔ D25 [Percent heated]

NOTE ON ENERGY SOURCES:

Throughout the rest of this questionnaire, there will be references such as “Electricity used” or “Natural gas used.” In addition to the energy sources that were given in D8 [Energy sources used], if sources are added along the way, such as in D21 [Other source for main heating] OR D24 [Other source for heating], those sources are then also considered to be used.

D25	**Percent heated** *HEATP9*
ASK	IF D1 [Heating] = Yes
FILL	**{SqFt}** IF A1 [Square footage] known = "A1 [Square footage]" IF A1 [Square footage] = DK/RF = "floorspace"

[F1]-HELP

What percentage of the {SqFt} in this building was heated to at least 50 degrees Fahrenheit in the past 12 months, including basements and enclosed garages if they were heated to at least 50 degrees?

- If heated square footage is known, but not the percent, RECORD square footage in comments, then code DK
- PROBE for estimate if DK

RANGE	0 to 100
NEXT	IF Zero ➔ D26 [Heated to less than 50 degrees] IF Anything else ➔ D28 [Heating equipment types]

D26	**Heated to less than 50 degrees** *HTLS509*
ASK	IF D25 [Percent heated] = Zero

Was any of this building heated to less than 50 degrees Fahrenheit?

- EXP: [Areas may be heated to less than 50 degrees to prevent pipes from freezing.]

1 Yes
2 No

NEXT	IF Yes OR DK/RF ➔ D28 [Heating equipment types] IF No: IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

[D27 deleted]

D28	**Heating equipment types**	*see below*
ASK	IF D25 [Percent heated] > 0 OR D26 [Heated to less than 50 degrees] = Yes OR DK/RF	

[F1]-HELP

SHOW CARD D2

Looking at this list of heating equipment types, please tell me which types are used in this building.

- PROBE for any others
- ENTER all that apply

1	Furnaces that heat air directly, without using steam or hot water	*FURNAC9*
2	Packaged central unit (roof mounted)	*PKGHT9*
3	Boilers inside (or adjacent to) the building that produce steam or hot water	*BOILER9*
4	District steam or hot water piped in from outside the building	*STHW9*
5	Heat pumps	*HTPMPH9*
6	Individual space heaters, other than heat pumps	*SLFCON9*
7	Other heating equipment	*OTHTEQ9*

NEXT

IF Furnaces ➔ D29 [Type of furnace]
IF Packaged central unit ➔ D32 [Type of packaged unit]
IF Boilers ➔ D34 [Type of boiler system]
IF District steam or hot water ➔ D35 [Type of district system]
IF Heat pumps ➔ D36 [Heat pump heating system]
IF Individual space heaters ➔ D38 [Type of individual heater]
IF Other heating equipment ➔ D39 [Other heat specify]
IF DK/RF:
  IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling]
  IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating]
  IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking]
  IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing]
  IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation]
  OTHERWISE ➔ D76 [Any other sources]

D29	Type of furnace
ASK	IF Furnaces IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D3

Looking at this list, please tell me the type or types of furnace systems used in the building.

- ENTER all that apply

1 Residential-type split system
2 Packaged central unit (roof mounted)
3 Individual room furnace (freestanding or floor-mounted)

NEXT	IF Packaged central unit ➔ D30 [Classify as packaged] IF Individual room furnace ➔ D31 [Classify as space heater] OTHERWISE: IF Packaged central unit IN D28 [Heating equipment types] ➔ D32 [Type of packaged unit] IF Boilers IN D28 [Heating equipment types] ➔ D34 [Type of boiler system] IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: Assign Furnace as Main heating equipment, THEN IF More than one energy source used for heating ➔ D40 [Explain sources for heating] OTHERWISE ➔ D44 [Heating ventilation types]

D30	Classify as packaged
ASK	IF D29 [Type of furnace] = Packaged central unit

For the purposes of this study, I am going to refer to your packaged central furnace as a "packaged unit."

- ENTER "1" to continue

NEXT	IF Individual room furnace IN D29 [Type of furnace] ➔ D31 [Classify as space heater] OTHERWISE: IF Packaged central unit IN D28 [Heating equipment types] ➔ D32 [Type of packaged unit] IF Boilers IN D28 [Heating equipment types] ➔ D34 [Type of boiler system] IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D31	Classify as space heater
ASK	IF D29 [Type of furnace] = Individual room furnace
	For the purposes of this study, I am going to refer to your individual room furnace as an "individual space heater." ◆ ENTER "1" to continue
NEXT	IF Packaged central unit IN D28 [Heating equipment types] ➔ D32 [Type of packaged unit] IF Boilers IN D28 [Heating equipment types] ➔ D34 [Type of boiler system] IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D32	Type of packaged unit
ASK	IF Packaged central unit IN D28 [Heating equipment types]
	[F1]-HELP SHOW CARD D4 Looking at this card, please tell me if the packaged unit is a central roof mounted unit or a packaged heat pump. 1 Packaged central unit (roof mounted) 2 Packaged heat pump 3 [IF VOLUNTEERED] Both central and packaged heat pumps
NEXT	IF Packaged heat pump or Both central and packaged heat pumps ➔ D33 [Classify as heat pump] OTHERWISE: IF Boilers IN D28 [Heating equipment types] ➔ D34 [Type of boiler system] IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D33	Classify as heat pump
ASK	IF D32 [Type of packaged unit] = Packaged heat pump OR Both central and packaged heat pumps

For the purposes of this study, I am going to refer to your packaged unit heat pump as a "heat pump."

- ◆ ENTER "1" to continue

NEXT	IF Boilers IN D28 [Heating equipment types] ➔ D34 [Type of boiler system] IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D34	Type of boiler system
ASK	IF Boilers IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D5

Looking at this list, please tell me the type or types of distribution systems used with the boiler.

- ◆ ENTER all that apply

1 Radiators
2 Fan coil units in rooms (or areas)
3 Central air handling system

NEXT	IF District steam or hot water IN D28 [Heating equipment types] ➔ D35 [Type of district system] IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D35	**Type of district system**
ASK	IF District steam or hot water IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D6

Looking at this list, please tell me the type or types of distribution systems used with the district steam or hot water.

◆ ENTER all that apply

1 Radiators
2 Fan coil units in rooms (or areas)
3 Central air handling system

NEXT	IF Heat pumps IN D28 [Heating equipment types] ➔ D36 [Heat pump heating system] IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D36	**Heat pump heating system**	*see below*
ASK	IF Heat pumps IN D28 [Heating equipment types]	

[F1]-HELP

SHOW CARD D7

Please look at the first list on this card and tell me which heat pump systems are used for heating in this building.

◆ ENTER all that apply

1	Packaged unit	*PKGHPS9*
2	Residential-type split system	*SPLHPS9*
3	Individual room heat pump	*RMHPS9*

NEXT	➔ D25 [Heat pump heating type]

D37	**Heat pump heating type** *see below*
ASK	IF Heat pumps IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D8

Looking at the second list on this card, which types of heat pumps are these?

◆ ENTER all that apply

1	Air source heat pump	*AIRHPT9*
2	Ground source or ground water heat pump	*GRDHPT9*
3	Water loop heat pump	*WTRHPT9*

NEXT	IF Individual space heaters IN D28 [Heating equipment types] ➔ D38 [Type of individual heater] IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D38	**Type of individual heater**
ASK	IF Individual space heaters IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D9

Looking at this list, please tell me the type or types of individual heaters used in the building.

◆ ENTER all that apply

1 Infrared radiant heater (permanent)
2 Baseboard heater (permanent)
3 Portable space heater
4 Wall heater
5 Individual furnace

NEXT	IF Other heating equipment IN D28 [Heating equipment types] ➔ D39 [Other heat specify] OTHERWISE: IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D39	Other heat specify
ASK	IF Other heating equipment IN D28 [Heating equipment types]
Please describe the other type of heating equipment. ◆ RECORD in open box	
NEXT	IF More than one heating equipment type ➔ D41 [Percent heated by each type] IF Only one heating equipment, assign as Main heating equipment, THEN: IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating ➔ D40 [Explain sources for heating] IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D41 [Percent heated by each type]

D40	Explain sources for heating
ASK	IF ONLY Boiler, Furnace, OR District heat as heating equipment but more than one energy source used for heating
FILL	**{HeatEquip}** IF Boilers = "boiler" IF Furnace = "furnace" IF District heat = "district heating system" **{HeatSources}** = list of the energy sources given for heating
I've recorded just one type of heating equipment - a {HeatEquip} - but more than one energy source – {HeatSources} - for heating. For clarification, will you please briefly explain how these sources are used for operating the {HeatEquip}. ◆ RECORD in open box	
NEXT	IF Any type except District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D41	**Percent heated by each type**	*FURNP9, BOILP9, PKGHP9, SLFCNP9, HTPHP9, STHWP9, OTHTP9*
ASK	For each equipment type given in D28 [Heating equipment types]	
FILL	**{Introduction}** IF First equipment = "The next questions are about the percent of floorspace heated by the equipment you just mentioned. Please keep in mind:" OTHERWISE = BLANK **{Explanation}** IF First equipment and D25 [Percent heated] ≠ 100 = "We are talking only about the heated portion of the floorspace, so these percents must add up to at least 100, but since more than one type of equipment can heat the same area, it is also possible for them to add up to more than 100." IF First equipment and D25 [Percent heated] = 100 = "These percents must add up to at least 100, but since more than one type of equipment can heat the same area, it is also possible for them to add up to more than 100." OTHERWISE = BLANK **{Equipment}** IF Furnaces that heat air directly IN D28 [Heating equipment types] = "furnace" IF Boilers inside the building IN D28 [Heating equipment types] = "boiler" IF Packaged heating units IN D28 [Heating equipment types] = "packaged heating" IF Individual space heaters IN D28 [Heating equipment types] = "space heater" IF Heat pumps IN D28 [Heating equipment types] = "heat pump" IF District steam or hot water IN D28 [Heating equipment types] = "district steam or hot water" IF Other heating equipment IN D28 [Heating equipment types] = "other heating equipment"	
SHOW CARD D10 {Introduction} {Explanation} What percent of the heated area in this building is served by the {Equipment}? ◆ PROBE for estimate if DK		
RANGE	0 to 100	
NEXT	IF There are equal maximum percents OR DK/RF ➔ D42 [Main heating equipment] IF There is an equipment with a maximum percent, assign that equipment as the Main heating equipment [*MAINHT9*]. THEN: IF Main equipment NOT District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]	

D42	**Main heating equipment** *MNHTEQ9*
ASK	IF D41 [Percent heated by each type] has equal maximum percents OR DK/RF
FILL	**{EquipmentList}** = List of the equipments with equal maximum percents **{Furnace} – {Other heating equipment}** = Each equipment with an equal maximum percent appears on this list; otherwise the line is blank

Which do you consider to be your main heating equipment – {EquipmentList} ?

- Only equipment types with equal percentages are shown here

1 {Furnace}
2 {Boiler}
3 {Packaged heating}
4 {Space heater}
5 {Heat pump}
6 {District steam or hot water}
7 {Other heating equipment}

NEXT	IF Main equipment NOT (District steam or hot water OR DK/RF) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003) ➔ D43 [Main heating replaced] OTHERWISE ➔ D44 [Heating ventilation types]

D43	**Main heating replaced** *NWMNHT9*
ASK	IF Main heating equipment known & NOT District steam or hot water & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007)
FILL	**{MainHeatEquip}** IF Main heating equipment = Furnace = "Has the furnace" IF Main heating equipment = Boiler = "Has the boiler" IF Main heating equipment = Packaged heating = "Has the packaged heating unit" IF Main heating equipment = Individual space heater = "Have any of the individual space heaters" IF Main heating equipment = Heat pump = "Has the heat pump" IF Main heating equipment = Other = "Has the other type of heating equipment"

{MainHeatEquip} been replaced since 1990?

- EXP: [If there is more than one of this equipment type and at least one has been replaced, answer "Yes."]

1 Yes
2 No

NEXT	➔ D44 [Heating ventilation types]

D44	**Heating ventilation types**
ASK	IF D28 [Heating equipment types] ≠ DK/RF

[F1]-HELP

SHOW CARD D11

Looking at this list of mechanical ventilation equipment types, please tell me which types are used with the heating system.

1 No mechanical ventilation equipment
2 Central air handling unit(s) with outside air system and constant air volume control
3 Central air handling unit(s) with outside air system and variable air volume (VAV) control
4 Packaged unit(s) with outside air damper
5 Through-the wall packaged units
6 Stand-alone exhaust fans (or relief blowers)
7 Dedicated outside air system

- PROBE for any others
- ENTER all that apply

NEXT	IF D2 [Cooling] = Yes ➔ D45 [Sources for cooling] IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D45	**Sources for cooling** *see below*
ASK	IF D2 [Cooling] = Yes
FILL	**{CoolSourcesList}** = List of all possible air conditioning energy sources used **{Electricity} – {Other3}** = If a source is used, it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]

Which energy sources were used for air conditioning? [{CoolSourcesList}]

- ◆ Only sources already selected are shown here
- ◆ PROBE for any others
- ◆ ENTER all that apply

11	{Electricity}	*ELCOOL8*
12	{Natural gas}	*NGCOOL9*
13	{FuelOilType}	*FKCOOL9*
14	{Bottled gas}	*PRCOOL9*
15	{District steam}	*STCOOL9*
16	{District hot water}	*HWCOOL9*
17	{District chilled water}	*CWCOOL9*
21	{Other1}	*OTCOOL9*
22	{Other2}	*OTCOOL9*
23	{Other3}	*OTCOOL9*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D46 [Other source for cooling] OTHERWISE ➔ D47 [Percent cooled]

D46	**Other source for cooling** *see below*
ASK	IF Some other energy source IN D45 [Sources for cooling]

What was the other energy source used for air conditioning?

11	Electricity	*ELCOOL9*
12	Natural gas	*NGCOOL9*
13	Fuel oil/Diesel/Kerosene	*FKCOOL9*
14	Bottled gas	*PRCOOL9*
15	District steam	*STCOOL9*
16	District hot water	*HWCOOL9*
17	District chilled water	*CWCOOL9*
24	Some other energy source	*OTCOOL9*

NEXT	➔ D47 [Percent cooled]

D47	**Percent cooled** *COOLP9*
ASK	IF D2 [Cooling] = Yes
FILL	**{SqFtIn}** IF A1 [Square footage] known = "A1 [Square footage]" IF A1 [Square footage] = DK/RF = "floorspace"

[F1]-HELP

What percentage of the {SqFt} in this building was cooled by air conditioning equipment in 2007?

- If cooled square footage is known, but not the percent, RECORD square footage in comments, then code DK
- PROBE for estimate if DK

RANGE	0 to 100
NEXT	IF 1-100, DK/RF ➔ D48 [Cooling equipment types] IF Zero: IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D48	**Cooling equipment types**	*see below*
ASK	IF D47 [Percent cooled] > 0	

[F1]-HELP

SHOW CARD D12

Looking at this list of cooling equipment types, please tell me which types are used in this building.

- PROBE for any others
- ENTER all that apply

1	Residential-type central air conditioners, other than heat pumps, that cool air directly and circulate it without using chilled water	*RCAC9*
2	Packaged air conditioning units, other than heat pumps	*PKGCL9*
3	Central chillers inside the building that chill water for air conditioning	*CHILLR9*
4	District chilled water piped in from outside the building	*CHWT9*
5	Heat pumps for cooling	*HTPMPC9*
6	Individual room air conditioners, other than heat pumps	*ACWNWL9*
7	"Swamp" coolers or evaporative coolers	*EVAPCL9*
8	Other cooling equipment	*OTCLEQ9*

NEXT

IF Packaged air conditioning units ➔ D49 [Type of packaged cooling]
IF Central chillers ➔ D50 [Type of chiller system]
IF District chilled water ➔ D51 [Type of chilled water system]
IF Heat pumps for cooling AND NOT Heat pumps for heating ➔ D52 [Heat pump cooling system]
IF Other cooling equipment ➔ D54 [Other cool specify]
IF DK/RF:
  IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating]
  IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking]
  IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing]
  IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation]
  OTHERWISE ➔ D76 [Any other sources]
OTHERWISE:
  IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation]
  OTHERWISE:
    IF More than one selected ➔ D56 [Percent cooled by each type]
    IF Only one selected, assign as Main cooling equipment. THEN:
      IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced]
      IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating]
      OTHERWISE ➔ D60 [Cooling ventilation types]

D49	**Type of packaged cooling** *see below*
ASK	IF Packaged air conditioning units IN D48 [Cooling equipment types]

[F1]-HELP

SHOW CARD D13

Looking at this card, please tell me if the packaged unit is a central roof mounted unit or a split system with outdoor and indoor units.

1 Packaged central unit (roof mounted)
2 Split system, with outdoor (condensor) and indoor (evaporator/blower) units
3 [IF VOLUNTEERED] Both central unit and split system

NEXT	IF Central chillers IN D48 [Cooling equipment types] ➔ D50 [Type of chiller system] IF District chilled water IN D48 [Cooling equipment types] ➔ D51 [Type of chilled water system] IF Heat pumps for cooling IN D48 [Cooling equipment types] AND NOT Heat pumps for heating ➔ D52 [Heat pump cooling system] IF Other cooling equipment IN D48 [Cooling equipment types] ➔ D54 [Other cool specify] OTHERWISE: IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation] OTHERWISE: IF More than one type in D48 [Cooling equipment types] ➔ D56 [Percent cooled by each type] IF Only one type in D48 [Cooling equipment types], assign as Main cooling equipment. THEN: IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced] IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D60 [Cooling ventilation types]

D50	**Type of chiller system** *see below*
ASK	IF Central chillers IN D48 [Cooling equipment types]

[F1]-HELP

SHOW CARD D14

Looking at this card, please tell me if the water from the chiller is distributed through a central air handling system or by fan coil units.

1 Central air handling system
2 Fan coil units in rooms (or area)
3 [IF VOLUNTEERED] Both air handling and fan coil units

NEXT	IF District chilled water IN D48 [Cooling equipment types] ➔ D51 [Type of chilled water system] IF Heat pumps for cooling IN D48 [Cooling equipment types] AND NOT Heat pumps for heating ➔ D52 [Heat pump cooling system] IF Other cooling equipment IN D48 [Cooling equipment types] ➔ D54 [Other cool specify] OTHERWISE: IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation] OTHERWISE: IF More than one type in D48 [Cooling equipment types] ➔ D56 [Percent cooled by each type] IF Only one type in D48 [Cooling equipment types], assign as Main cooling equipment. THEN: IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced] IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D60 [Cooling ventilation types]

D51	**Type of chilled water system**	*see below*
ASK	IF Residential-type central air conditioners IN D48 [Cooling equipment types]	

[F1]-HELP

SHOW CARD D15

Looking at this card, please tell me if the water from the chiller is distributed through a central air handling system or by fan coil units.

1 Central air handling system
2 Fan coil units in rooms (or area)
3 [IF VOLUNTEERED] Both air handling and fan coil units

NEXT

IF Heat pumps for cooling IN D48 [Cooling equipment types] AND NOT Heat pumps for heating
➔ D52 [Heat pump cooling system]
IF Other cooling equipment IN D48 [Cooling equipment types] ➔ D54 [Other cool specify]
OTHERWISE:
IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation]
OTHERWISE:
IF More than one type in D48 [Cooling equipment types] ➔ D56 [Percent cooled by each type]
IF Only one type in D48 [Cooling equipment types], assign as Main cooling equipment. THEN:
IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced]
IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating]
OTHERWISE ➔ D60 [Cooling ventilation types]

D52	**Heat pump cooling system**	*see below*
ASK	IF Heat pumps IN D48 [Cooling equipment types] & Heat pumps NOT IN D28 [Heating equipment types]	

[F1]-HELP

SHOW CARD D16

Please look at the first list on this card and tell me which heat pump systems are used for cooling in this building.

◆ ENTER all that apply

1	Packaged unit	*PKGCPS9*
2	Residential-type split system	*SPLCPS9*
3	Individual room heat pump	*RMCPS9*

NEXT ➔ D53 [Heat pump cooling type]

D53	**Heat pump cooling type** *see below*
ASK	IF Heat pumps in D48 [Cooling equipment types] & Heat pumps NOT IN D28 [Heating equipment types]

[F1]-HELP

SHOW CARD D17

Looking at the second list on this card, which types of heat pumps are these?

◆ ENTER all that apply

1	Air source heat pump	*AIRCPT9*
2	Ground source or ground water heat pump	*GRDCPT9*
3	Water loop heat pump	*WTRCPT9*

NEXT

IF Other cooling equipment IN D48 [Cooling equipment types] ➔ D54 [Other cool specify]
OTHERWISE:
IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation]
OTHERWISE:
IF More than one type in D48 [Cooling equipment types] ➔ D56 [Percent cooled by each type]
IF Only one type in D48 [Cooling equipment types], assign as Main cooling equipment. THEN:
IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced]
IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating]
OTHERWISE ➔ D60 [Cooling ventilation types]

D54	**Other cool specify**
ASK	IF Other cooling equipment in D48 [Cooling equipment types]

Please describe the other type of cooling equipment.

◆ RECORD in open box

NEXT

IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] ➔ D55 [Cool source explanation]
OTHERWISE:
IF More than one type in D48 [Cooling equipment types] ➔ D56 [Percent cooled by each type]
IF Only one type in D48 [Cooling equipment types], assign as Main cooling equipment. THEN:
IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced]
IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating]
OTHERWISE ➔ D60 [Cooling ventilation types]

D55	Cool source explanation
ASK	IF Any source(s) other than electricity or chilled water reported in D45 [Sources for cooling] OR D46 [Other sources for cooling] & Central chillers NOT IN D48 [Cooling equipment types]
FILL	**{CoolSources}** = List of the energy sources given for cooling, other than electricity or chilled water **{IsAre}** = IF Only one cooling source in list = "is" IF More than one cooling source in list = "are"
Among the sources for cooling, I have recorded that {CoolSources} {IsAre} used. Because it is somewhat unusual to use sources other than electricity or chilled water for cooling, will you please briefly describe how the {CoolSources} {IsAre} used with the cooling equipment. ◆ RECORD in open box	
NEXT	IF More than one type in D45 [Cooling equipment types] ➔ D56 [Percent cooled by each type] IF Only one type in D45 [Cooling equipment types], assign as Main cooling equipment. THEN: IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A20 [Year of construction] < 1990 OR A21 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced] IF D1 [Heating] = Yes & D39 [Heating ventilation types] was answered ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D57 [Cooling ventilation types]

D56	**Percent cooled by each type**	*PKGCP9, RCACP9, ACWNCP9, HTPCP9, CHWTP9, CHILP9, EVAPP9, OTCLP9*
ASK	For each equipment type given in D48 [Cooling equipment types]	
FILL	**{Introduction}** IF First equipment = "The next questions are about the percent of floorspace cooled by the equipment you just mentioned. Please keep in mind:" OTHERWISE = BLANK **{Explanation}** IF First equipment and D47 [Percent cooled] ≠ 100 = "We are talking only about the cooled portion of the floorspace, so these percents must add up to at least 100, but since more than one type of equipment can cool the same area, it is also possible for them to add up to more than 100." IF First equipment and D47 [Percent cooled] = 100 = "These percents must add up to at least 100, but since more than one type of equipment can cool the same area, it is also possible for them to add up to more than 100." OTHERWISE = BLANK **{Equipment}** IF Packaged air conditioning units IN D48 [Cooling equipment types] = "packaged cooling" IF Residential-type central air conditioners IN D48 [Cooling equipment types] = "central air conditioner" IF Individual room air conditioners IN D48 [Cooling equipment types] = "room air conditioner" IF Heat pumps for cooling IN D48 [Cooling equipment types] = "heat pump" IF District chilled water IN D48 [Cooling equipment types] = "district chilled water" IF Central chillers inside the building IN D48 [Cooling equipment types] = "central chiller" IF "Swamp" coolers or evaporative coolers IN D48 [Cooling equipment types] = "swamp cooler" IF Other cooling equipment IN D48 [Cooling equipment types] = "other cooling equipment"	

SHOW CARD D18

{Introduction}

{Explanation}

What percent of the cooled area in this building is served by the {Equipment}?

- PROBE for estimate if DK

RANGE	0 to 100
NEXT	IF there are equal maximum percents OR DK/RF ➔ D57 [Main cooling equipment] IF there is an equipment with a maximum percent, assign that equipment as the Main cooling equipment [*MAINCL9*]. THEN: IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced] IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D60 [Cooling ventilation types]

D57	**Main cooling equipment** *MNCLEQ9*
ASK	IF D56 [Percent cooled by each type] has equal maximum percents OR DK/RF
FILL	**{EquipmentList}** = List of the equipments with equal maximum percents **{Packaged cooling} – {Other cooling equipment}** = Each equipment with an equal maximum percent appears on this list; otherwise the line is blank

Which do you consider to be your main cooling equipment – {EquipmentList} ?

- Only equipment types with equal percentages are shown here

1 {Packaged cooling}
2 {Central air conditioner}
3 {Room air conditioner}
4 {Heat pump}
5 {District chilled water}
6 {Central chiller}
7 {Swamp coolers}
8 {Other cooling equipment}

NEXT	IF NOT District chilled water & NOT Packaged cooling (if the Main heating equipment was Packaged heating) & NOT Heat pump (if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003 OR 2004 to 2007) ➔ D58 [Main cooling replaced] IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D60 [Cooling ventilation types]

D58	**Main cooling replaced** *NWMNCL9*
ASK	IF Main cooling equipment known & NOT District chilled water & (Main cooling equipment NOT Packaged cooling if the Main heating equipment was Packaged heating) & (Main cooling equipment NOT Heat pump if the main heating equipment was Heat pump) & (A16 [Year of construction] < 1990 OR A17 [Year of construction category] ≠ 2000 to 2003)
FILL	**{MainCoolEquip}** IF Main cooling equipment = Packaged cooling = "Has the packaged air conditioning unit" IF Main cooling equipment = Central air conditioner = "Has the central air conditioner" IF Main cooling equipment = Room air conditioner = "Have any of the room air conditioners" IF Main cooling equipment = Heat pump = "Has the heat pump" IF Main cooling equipment = Central chiller = "Has the central chiller" IF Main cooling equipment = Swamp coolers = "Has the swamp cooler" IF Main cooling equipment = Other cooling equipment = "Has the other type of cooling equipment"

{MainCoolEquip} been replaced since 1990?

- EXP: [If there is more than one of this equipment type and at least one has been replaced, the answer is "Yes."]

1 Yes
2 No

NEXT	IF D1 [Heating] = Yes & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF ➔ D59 [Cooling ventilation same as heating] OTHERWISE ➔ D60 [Cooling ventilation types]

D59	**Cooling ventilation same as heating**
ASK	IF D48 [Cooling equipment types] ≠ DK/RF & D44 [Heating ventilation types] ≠ No mechanical ventilation equipment OR DK/RF

Is the ventilation system for cooling the same as the one for heating?

1 Yes
2 No

NEXT	IF Yes ➔ D61 [Economizer cycle] IF No ➔ D60 [Cooling ventilation types]

D60	Cooling ventilation types
ASK	IF D59 [Cooling ventilation same as heating] = No

[F1]-HELP

SHOW CARD D19

Looking at this list of mechanical ventilation equipment types, please tell me which types are used with the heating system.

1 No mechanical ventilation equipment
2 Central air handling unit(s) with outside air system and constant air volume control
3 Central air handling unit(s) with outside air system and variable air volume (VAV) control
4 Packaged unit(s) with outside air damper
5 Through-the wall packaged units
6 Stand-alone exhaust fans (or relief blowers)
7 Dedicated outside air system
8 Fans, including ceiling fans

- PROBE for any others
- ENTER all that apply

NEXT	➔ D61 [Economizer cycle]

D61	Economizer cycle	*ECN9*
ASK	IF D47 [Percent cooled] > 0 & Cooling equipment used other than just Room air conditioner	

[F1]-HELP

Does this building have any equipment that uses outside air for cooling, often called an "economizer cycle"?

1 Yes
2 No

NEXT	➔ D62 [Regular HVAC maintenance]

D62	**Regular HVAC maintenance** *MAINT9*
ASK	IF ((D26 [Percent heated > 0 OR D26 [Heated to less than 50 degrees] = Yes) OR D47 [Percent cooled] > 0 & Heating or cooling equipment used other than just Space heater and/or Room air conditioner
FILL	**{HeatCool}** IF Heating only = "heating" IF Cooling only = "cooling" IF Heating & Cooling = "heating and cooling"

[F1]-HELP

Is there any regularly scheduled maintenance and repair for the {HeatCool} system?

1 Yes
2 No

NEXT	IF D3 [Water heating] = Yes ➔ D63 [Sources for water heating] IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D63	**Sources for water heating** *see below*
ASK	IF D3 [Water heating] = Yes
FILL	**{WatrSourcesList}** = List of all energy sources used **{Electricity} – {Other3}** = If a source is used, it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]

Which energy sources were used for water heating? [{WatrSourcesList}]

- Only sources already selected are shown here
- PROBE for any others
- ENTER all that apply

11	{Electricity}	*ELWATR9*
12	{Natural gas}	*NGWATR9*
13	{FuelOilType}	*FKWATR9*
14	{Bottled gas}	*PRWATR9*
15	{District steam}	*STWATR9*
16	{District hot water}	*HWWATR9*
18	{Wood}	*WOWATR9*
19	{Coal}	*COWATR9*
20	{Solar}	*SOWATR9*
21	{Other1}	*OTWATR9*
22	{Other2}	*OTWATR9*
23	{Other3}	*OTWATR9*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D46 [Other water heating source] OTHERWISE ➔ D47 [Water heating equipment]

D64	**Other water heating source**	*see below*
ASK	IF Some other energy source IN D63 [Sources for water heating]	

What was the other energy source used for water heating?

11	Electricity	*ELWATR9*
12	Natural gas	*NGWATR9*
13	Fuel oil/Diesel/Kerosene	*FKWATR9*
14	Bottled gas	*PRWATR9*
15	District steam	*STWATR9*
16	District hot water	*HWWATR9*
18	Wood	*WOWATR9*
19	Coal	*COWATR9*
20	Solar	*SOWATR9*
24	Some other energy source	*OTWATR9*

NEXT	➔ D47 [Water heating equipment]

D65	**Water heating equipment**	*WTHTEQ9*
ASK	IF D3 [Water heating] = Yes	

[F1]-HELP

Does this building have one or more centralized water heaters, one or more "point-of-use" water heaters, or both of these types [of water heaters]?

1 One or more centralized water heaters
2 One or more "point-of-use" water heaters
3 Both types

NEXT	IF D4 [Cooking] = Yes ➔ D66 [Sources for cooking] IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D66	**Sources for cooking** *see below*
ASK	IF D4 [Cooking] = Yes
FILL	**{CookSourcesList}** = List of all energy sources used **{Electricity} – {Other3}** = If a source is used, it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]

Which energy sources were used for cooking? [{CookSourcesList}]

- Only sources already selected are shown here
- PROBE for any others
- ENTER all that apply

11	{Electricity}	*ELCOOK9*
12	{Natural gas}	*NGCOOK9*
13	{FuelOilType}	*FKCOOK9*
14	{Bottled gas}	*PRCOOK9*
15	{District steam}	*STCOOK9*
16	{District hot water}	*HWCOOK9*
18	{Wood}	*WOCOOK9*
19	{Coal}	*COCOOK9*
20	{Solar}	*SOCOOK9*
21	{Other1}	*OTCOOK9*
22	{Other2}	*OTCOOK9*
23	{Other3}	*OTCOOK9*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D67 [Other cooking source] OTHERWISE: IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D67	Other cooking source
ASK	IF Some other energy source IN D66 [Sources for cooking]

What was the other energy source used for cooking?

11	Electricity	*ELCOOK9*
12	Natural gas	*NGCOOK9*
13	Fuel oil/Diesel/Kerosene	*FKCOOK9*
14	Bottled gas	*PRCOOK9*
15	District steam	*STCOOK9*
16	District hot water	*HWCOOK9*
18	Wood	*WOCOOK9*
19	Coal	*COCOOK9*
20	Solar	*SOCOOK9*
24	Some other energy source	*OTCOOK9*

NEXT	IF D5 [Manufacturing] = Yes ➔ D68 [Sources for manufacturing] IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] OTHERWISE ➔ D76 [Any other sources]

D68	**Sources for manufacturing** *see below*
ASK	IF D5 [Manufacturing] = Yes
FILL	**{ManuSourcesList}** = List of all energy sources used **{Electricity} – {Other3}** = If a source is used, it appears in this list; if not, the line is blank **{FuelOilType}** = Type or types specified in D9 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]

Which energy sources were used for manufacturing? [{ManuSourcesList}]

- ◆ Only sources already selected are shown here
- ◆ PROBE for any others
- ◆ ENTER all that apply

11	{Electricity}	*ELMANU9*
12	{Natural gas}	*NGMANU9*
13	{FuelOilType}	*FKMANU9*
14	{Bottled gas}	*PRMANU9*
15	{District steam}	*STMANU9*
16	{District hot water}	*HWMANU9*
18	{Wood}	*WOMANU9*
19	{Coal}	*COMANU9*
20	{Solar}	*SOMANU9*
21	{Other1}	*OTMANU9*
22	{Other2}	*OTMANU9*
23	{Other3}	*OTMANU9*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D69 [Other manufacturing source] OTHERWISE: IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] IF D7 [Electricity generation capability] ≠ Yes ➔ D76 [Any other sources]

D69	**Other manufacturing source**	*see below*
ASK	IF Some other energy source IN D68 [Sources for manufacturing]	

What was the other energy source used for manufacturing?

11	Electricity	*ELMANU9*
12	Natural gas	*NGMANU9*
13	Fuel oil/Diesel/Kerosene	*FKMANU9*
14	Bottled gas	*PRMANU9*
15	District steam	*STMANU9*
16	District hot water	*HWMANU9*
18	Wood	*WOMANU9*
19	Coal	*COMANU9*
20	Solar	*SOMANU9*
24	Some other energy source	*OTMANU9*

NEXT	IF D7 [Electricity generation capability] = Yes ➔ D70 [Energy for generation] IF D7 [Electricity generation capability] ≠ Yes ➔ D76 [Any other sources]

D70	**Energy for generation**	*GENR9*
ASK	IF D7 [Electricity generation capability] = Yes	

Was any energy actually <u>used</u> for generating electricity in this building during 2007, even if just a small amount was used for emergency backup or for testing generators?

1	Yes
2	No

NEXT	IF Yes ➔ D71 [Sources for electricity generation] IF No OR DK/RF ➔ D76 [Any other sources]

D71	**Sources for electricity generation**	*see below*
ASK	IF D70 [Energy for generation] = Yes	
FILL	**{Other1} – {Other3}** = Sources specified in D11 [Other energy source 1] – D13 [Other energy source 3]	

SHOW CARD D20

Looking at this first list, please tell me which energy sources were used for electricity generation.

- PROBE for any others
- ENTER all that apply

12	Natural gas	*NGGENR9*
13	Fuel oil/Diesel/Kerosene	*FKGENR9*
14	Bottled gas/LPG/Propane	*PRGENR9*
18	Wood	*WOGENR9*
19	Coal	*COGENR9*
20	Solar thermal panels	*SOGENR9*
21	{Other1}	*OTGENR9*
22	{Other2}	*OTGENR9*
23	{Other3}	*OTGENR9*
24	Some other energy source	*OTGENR9*

NEXT	➔ D72 [Generation technologies]

D72	**Generation technologies**	*see below*
ASK	IF D70 [Energy for generation] = Yes	

SHOW CARD D21

Looking again at this card, were any of the technologies on this second list used for generating electricity?

- PROBE for any others
- ENTER all that apply

1	Photovoltaic cells	*PHOTVL9*
2	Fuel cells	*FUELCL9*
3	Microturbines	*MCROTB9*
4	IF VOLUNTEERED: None of these	

NEXT	➔ D73 [Use of generated electricity]

D73	**Use of generated electricity**	*GENUSE9*
ASK	IF D70 [Energy for generation] = Yes	

[F1]-HELP

During 2007, was the electricity generated in this building used: primarily for emergency back-up, during periods of high electricity demand, or whenever electricity was used?

1 Primarily for emergency back-up
2 During periods of high electricity demand
3 Whenever electricity was used

NEXT	IF Primarily for emergency back-up OR DK/RF ➔ D76 [Any other sources] IF During periods of high electricity demand OR Whenever electricity was used ➔ D74 [Cogeneration system]

D74	**Cogeneration system**	*COGEN9*
ASK	IF D73 [Use of generated electricity] = During periods of high electricity demand OR Whenever electricity was used	

[F1]-HELP

Is the electric power generating system also a cogeneration system? That is, in addition to producing electric power, does the same system simultaneously produce heat that <u>is used</u> in this or another building for space heating, water heating, or industrial processes?

1 Yes
2 No

NEXT	➔ D75 [Deliver electricity to grid]

D75	**Deliver electricity to grid**	*GRID9*
ASK	IF D74 [Cogeneration system] =Yes	

Is the cogeneration or generation system interconnected with an electric utility so that it is able to deliver or sell electricity <u>to the grid</u>?

1 Yes
2 No

NEXT	➔ D76 [Any other sources]

D76	Any other sources
ASK	IF D8 [Energy sources used] was answered
FILL	**{SourcesList}** = List of all energy sources used

As a final check, were there any energy sources used in this building other than {Sources List} ?

1 Yes
2 No

NEXT	IF Yes ➔ D77 [Other sources] IF No OR DK/RF: Check that every energy source given in D8 [Energy sources used] (other than electricity or district chilled water) was assigned an end use. THEN: IF Yes ➔ End of interview IF No ➔ D78 [{Energy source} use]

D77	Other sources *see below*
ASK	IF D76 [Any other sources] =Yes
FILL	**{Electricity} – {Solar}** = If a source has NOT been mentioned, it appears in this list; if it has, the line is blank

What other sources were used?

- PROBE for any others
- ENTER all that apply

11	{Electricity}	*ELUSED9*
12	{Natural gas}	*NGUSED9*
13	{Fuel/Diesel/Kerosene}	*FKUSED9*
14	{Bottled gas}	*PRUSED9*
15	{District steam}	*STUSED9*
16	{District hot water}	*HWUSED9*
17	{District chilled water}	*CWUSED9*
18	{Wood}	*WOUSED9*
19	{Coal}	*COUSED9*
20	{Solar}	*SOUSED9*
24	Other	*OTUSED9*

NEXT	➔ D78 [{Energy source} use]

D78	**{Energy source} use** *see below where {XX} is the energy source abbreviation*
ASK	For each source selected in D77 [Other sources]
FILL	**{EnergySource}** IF Electricity IN D77 [Other sources] = "electricity" IF Natural gas IN D77 [Other sources] = "natural gas" IF Fuel oil/Diesel/Kerosene IN D77 [Other sources] = "fuel oil/diesel/kerosene" IF Bottled gas IN D77 [Other sources] = "bottled gas" IF District steam IN D77 [Other sources] = "district steam" IF District hot water IN D77 [Other sources] = "district hot water" IF Wood IN D77 [Other sources] = "wood" IF Coal IN D77 [Other sources] = "coal" IF Solar IN D77 [Other sources] = "solar" IF Other IN D77 [Other sources] = "other fuel" **{Cooling}** Does not appear as a choice for Wood use, Coal use, OR Solar use **{Electricity generation}** Does not appear as a choice for Electricity use, District steam use, OR District hot water use

What was the {EnergySource} used for?

1	Heating	*{XX}HT19/HT29*
2	{Cooling}	*{XX}COOL9*
3	Water heating	*{XX}WATR9*
4	Cooking	*{XX}COOK9*
5	Manufacturing	*{XX}MANU9*
6	{Electricity generation}	*{XX}GENR9*
7	Some other use	*{XX}OTH9*
8	Incorrectly recorded--source not used	

NEXT	Check that every energy source given in D8 [Energy sources used] (other than electricity or district chilled water) was assigned an end use: IF Yes ➔ End of interview IF No ➔ D79 [{Energy source} use]

D79	**{Energy source} use** *see below where {XX} is the energy source abbreviation*
ASK	For every energy source given in D8 [Energy sources used] that was not assigned an end use (other than electricity or district chilled water)
FILL	**{EnergySource}** IF No end use for Natural gas = "natural gas" IF No end use for Fuel oil = Type or types specified in D6 [Fuel oil, diesel, or kerosene] IF No end use for Bottled gas = "bottled gas" IF No end use for District steam = "district steam" IF No end use for District hot water = "district hot water" IF No end use for Wood = "wood" IF No end use for Coal = "coal" IF No end use for Solar = "solar" IF No end use for Other = "another energy source" (second fill = "other energy source") **{Cooling}** Does not appear as a choice for Wood use, Coal use, OR Solar use **{Electricity generation}** Does not appear as a choice for District steam use OR District hot water use

I have recorded that {EnergySource} was used in this building but not how it was used. What was the {EnergySource} used for?

1	Heating	*{XX}HT19/HT29*
2	{Cooling}	*{XX}COOL9*
3	Water heating	*{XX}WATR9*
4	Cooking	*{XX}COOK9*
5	Manufacturing	*{XX}MANU9*
6	{Electricity generation}	*{XX}GENR9*
7	Some other use	*{XX}OTH9*
8	Incorrectly recorded--source not used	

NEXT	➔ End of interview