2018 Commercial Buildings Energy Consumption Survey (CBECS)

Mall Building Questionnaire – *Form EIA-871I*

VERSION 2: Last Updated April 25, 2018

OMB No.: XXXX-YYYY Expires: MM/DD/YYYY

HOW TO USE THIS QUESTIONNAIRE

The 2018 Commercial Buildings Energy Consumption Survey (CBECS) is programmed using a software called Blaise. The purpose of this paper representation of the questionnaire is to document the question text, fills, and skip patterns within the 2018 CBECS questionnaire. All the question fills and skip patterns are handled automatically by the software and will be transparent to the interviewer and respondent.

Each question is formatted as follows:

A1	**Question name** *SASVAR*
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 for a particular building.

The **FILL** line describes any question fills and the conditions under which each appears. If the fill appears as something such as "A6 [Square footage]" this means that the figure given in question A6 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 in order. Once a true statement is reached, go to the question indicated by the arrow (➔).

RESPONDENT QUESTIONS

NOTE: Questions R1-R5 are asked each time a case is started and re-started (if more than one contact is necessary to complete the interview), except as specified in the ASK line.

R1	**Consent** *R1CARI - RXCARI*
ASK	All Mall Buildings
Some parts of this interview will be recorded for quality control purposes. I'd like to continue now unless you have any questions. 1 Gives consent to record interview 2 Does <u>not</u> give consent to record interview	
NEXT	IF First time case started OR Restart but not done with Section D ➔ R2 [Respondent function] OTHERWISE ➔ R3 [Respondent function]

R2	**Respondent function** *R1JOB*
ASK	Mall Buildings starting interview OR Restart but not yet done with Section D
SHOW CARD 1 ◆ Take out the Show Card booklet or make sure the respondent has access to them. It is <u>very important</u> to use these cards, as some of them contain more information than can be found on your CAPI screens Before we get started, we need to make sure that we have Show Cards available for some of the questions. Please turn to Show Card 1. 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 ➔ R4 [Other job function] OTHERWISE ➔ R5 [Building boundaries]

R3	**Respondent function**	*R2JOB – RXJOB*
ASK	Mall Buildings restarting after Section D	

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

SHOW CARD 1

Before we get started, we need to make sure that we have Show Cards available for some of the questions. Please turn to Show Card 1.

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

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 ➔ R4 [Other job function] OTHERWISE ➔ R5 [Buildings boundaries]

R4	**Other job function**	*R1JOBX – RXJOBX*
ASK	IF R2 [Respondent function] = Other OR R3 [Respondent function] = Other	

What is your job function?

NEXT	➔ R5 [Building boundaries]

R5	**Building boundaries**
ASK	All Mall Buildings

The building that we're going to be talking about today is…

- EXP: [Describe the boundaries of the building as described in the header. The amount of detail necessary will vary by the situation.]
- ENTER "1" to continue

NEXT	➔ A1 [Building name]

SECTION A: BUILDING SIZE AND AGE

A1	**Building name**	*BLDGNAM*
ASK	All Mall Buildings	
What is the name of this shopping center?		
NEXT	➔ A2 [Street address]	

A2	**Street address**	*ADDRESS*
ASK	All Mall Buildings	
Please tell me the address of the building, beginning with the street address.		
NEXT	➔ A3 [City]	

A3	**City**	*CITY*
ASK	All Mall Buildings	
What is the city?		
NEXT	➔ A4 [State]	

A4	**State**	*STATE*
ASK	All Mall Buildings	
What is the state? ◆ ENTER the two letter abbreviation		
NEXT	➔ A5 [ZIP code]	

A5	**ZIP code**	*ZIP*
ASK	All Mall Buildings	
And what is the ZIP code?		
NEXT	➔ A6 [Square footage]	

A6	**Square footage**	*SQFT*
ASK	All Mall Buildings	
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? ◆ VERIFY number digit by digit		
RANGE	1 to 999,999,999	
NEXT	IF DK/RF ➔ A7 [Square footage category] IF 1,000 square feet or less ➔ A8 [End of interview] OTHERWISE ➔ A9 [Wall construction material]	

A7	**Square footage category**	*SQFTC*
ASK	IF A6 [Square footage] = DK/RF	
SHOW CARD A1 I understand that it may be difficult to give an exact figure for square footage. Please look at Show Card A1 and tell me which category best describes the total gross square footage in this building. There are examples provided to help you estimate. 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	IF 1,000 square feet or less ➔ A8 [End of interview] OTHERWISE ➔ A9 [Wall construction material]	

A8	**End of interview**
ASK	IF A6 [Square footage] ≤ 1000
Thank you, that's all the questions that I have at this time, since we are only interviewing buildings that are larger than one thousand square feet. Thank you for your time and help. ◆ [F10]-Exit	
NEXT	TERMINATE

NOTE: For the rest of this document, "All Mall Buildings" refers to buildings > 1,000 square feet.

A9	**Wall construction material**	*WLCNS*
ASK	All Mall Buildings	

SHOW CARD A2

Please look at Show Card A2 for a list of different types of construction materials. Which of these best describes the predominant 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 materials (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 Other

NEXT	➔ A10 [Roof construction material]

A10	**Roof construction material**	*RFCNS*
ASK	All Mall Buildings	

SHOW CARD A3

Please look at Show Card A3 for a list of different types of roofing materials. Which of these 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 Other

NEXT	➔ A11 [Cool roof materials]

A11	**Cool roof materials**
ASK	All Mall Buildings

SHOW CARD A4

Please look at Show Card A4. Does the roof of this building have any of the following properties that allow it to reflect more sunlight or absorb less heat than a standard roof?

- ENTER all that apply

1	White or highly reflective coating or paint	*WTCLRF*
2	Aluminum coating	*ALCLRF*
3	Highly relective tiles or shingles	*TSCLRF*
4	Ballasted roof system	*BLCLRF*
5	Vegetative roof	*VGCLRF*
6	Other	*OTCLRF*

NEXT	IF Other selected ➔ A12 [Other cool roof] OTHERWISE ➔ A13 [Roof tilt]

A12	**Other cool roof**
ASK	IF A11 [Cool roof materials] = Other

Please describe the other property of the roof of this building.

- RECORD in open box

NEXT	➔ A13 [Roof tilt]

A13	**Roof tilt**	*RFTILT*
ASK	All Mall Buildings	

SHOW CARD A5

Looking at Show Card A5, please tell me which best describes the tilt or pitch of the roof of this building.

1	Flat
2	Shallow pitch
3	Steeper pitch

NEXT	➔ A14 [Building shape]

A14	**Building shape**	*BLDSHP*
ASK	All Mall Buildings	

SHOW CARD A6

Looking at Show Card A6, which of these shapes 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	➔ A15 [Percent exterior glass]

A15	**Percent exterior glass**	*GLSSPC*
ASK	All Mall Buildings	

SHOW CARD A7

Which of the ranges on Show Card A7 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	➔ A16 [Number of floors]

A16	**Number of floors**	*NFLOOR*
ASK	All Mall Buildings	

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	➔ A17 [Floor-to-ceiling height]

A17	**Floor-to-ceiling height**	*FLCEILHT*
ASK	All Mall Buildings	
What is the typical floor-to-ceiling height in this building measured in feet?		
RANGE	7 to 500	
NEXT	IF A16 [Number of floors] = 1 ➔ A22 [Year of construction] OTHERWISE ➔ A18 [Elevators]	

A18	**Elevators**	*ELEVTR*
ASK	IF A16 [Number of floors] ≠ 1	
Are there any elevators in this building? 1 Yes 2 No		
NEXT	IF Yes ➔ A19 [Number of elevators] OTHERWISE ➔ A20 [Escalators]	

A19	**Number of elevators**	*NELVTR*
ASK	IF A18 [Elevators] = Yes	
How many elevators are there? ◆ PROBE for estimate if DK		
RANGE	1 to 999	
NEXT	➔ A20 [Escalators]	

A20	**Escalators**	*ESCLTR*
ASK	IF A16 [Number of floors] ≠ 1	
Are there any escalators in this building? 1 Yes 2 No		
NEXT	IF Yes ➔ A21 [Number of escalators] OTHERWISE ➔ A22 [Year of construction]	

A21	**Number of escalators**	*NESLTR*
ASK	IF A20 [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. “Moving sidewalks” should be counted as escalators. ◆ PROBE for estimate if DK		
RANGE	1 to 99	
NEXT	➔ A22 [Year of construction]	

A22	**Year of construction**	*YRCON*
ASK	All Mall Buildings	
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 2019	
NEXT	IF DK/RF ➔ A23 [Year of construction category] IF 2018 ➔ A25 [Month ready for occupancy] IF 2019 ➔ A24 [End of interview] IF 2012 or earlier ➔ A26 [Renovations] IF 2013 to 2017 ➔ B1 [On a multibuilding complex]	

A23	**Year of construction category**	*YRCONC*
ASK	IF A22 [Year of construction] = DK/RF	
SHOW CARD A8 Please look at Show Card A8 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 2009 9 2010 to 2012 10 2013 to 2018 12 2019		
NEXT	IF 2019 ➔ A24 [End of interview] IF Any category (OR DK/RF) except 2013 to 2018 ➔ A26 [Renovations] IF 2013 to 2018 ➔ B1 [On a multibuilding complex]	

A24	**End of interview**
ASK	IF A22 [Year of construction] OR A23 [Year of construction category] = 2019
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, 2019. Thank you for your time and help. ◆ [F10]-Exit	
NEXT	TERMINATE

A25	**Month ready for occupancy** *MONCON*
ASK	IF A22 [Year of construction] = 2018
In what month of 2018 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]

A26	**Renovations** *RENOV*
ASK	IF A22 [Year of construction] = 2012 or earlier OR A23 [Year of construction category] = Any category (OR DK/RF) except 2013 to 2018
FILL	**{Since2000orConstructed}** IF A22 [Year of construction] = 2000 or later OR A23 [Year of construction category} = 2000 to 2009 OR 2010 to 2012 = "since it was constructed" OTHERWISE = "since 2000"
Has any portion of this building undergone renovations {Since2000orConstructed}? 1 Yes 2 No	
NEXT	IF Yes ➔ A27 [What renovations] OTHERWISE ➔ B1 [On a multibuilding complex]

A27	**What renovations** *see below*
ASK	IF A26 [Renovations] = Yes
FILL	**{Since2000orConstructed}** IF A22 [Year of construction] = 2000 or later OR A23 [Year of construction category} = 2000 to 2009 OR 2010 to 2012 = "since it was constructed" OTHERWISE = "since 2000"

SHOW CARD A9

Please look at Show Card A9 and tell me which types of renovations have been done {Since2000orConstructed}.

- PROBE for any others
- ENTER all that apply

1	Cosmetic improvements (interior or exterior)	*RENCOS*
2	Addition or annex	*RENADD*
3	Reduction of enclosed floorspace	*RENRDC*
4	Interior wall re-configuration	*RENINT*
5	Roof replacement	*RENRFF*
6	Window replacement	*RENWIN*
7	HVAC equipment upgrade	*RENHVC*
8	Lighting upgrade	*RENLGT*
9	Plumbing system upgrade	*RENPLB*
10	Electrical upgrade	*RENELC*
11	Insulation upgrade	*RENINS*
12	Fire, safety, or security upgrade	*RENSAF*
13	Structural upgrade	*RENSTR*
14	Other	*RENOTH*

NEXT	IF Other ➔ A28 [Other renovation] OTHERWISE ➔ B1 [On a multibuilding complex]

A28	**Other renovation**
ASK	IF A27 [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	*FACIL*
ASK	All Mall Buildings	

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 [Number of buildings on complex] OTHERWISE ➔ C1 [Owner]

B2	Number of buildings on complex	*FACBLDGS*
ASK	IF B1 [On a multibuilding complex] = Yes	

How many buildings are part of this 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.]
- PROBE for estimate if DK

RANGE	2 to 500
NEXT	➔ B3 [Multibuilding complex name]

B3	Multibuilding complex name	*FACNAME*
ASK	IF B1 [On a multibuilding complex] = Yes	

By what name is this multibuilding campus or complex most commonly referred?

- 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.]
- RECORD in open box

NEXT	➔ B4 [Type of complex]

B4	**Type of complex**	*FACACT*
ASK	IF B1 [On a multibuilding complex] = Yes	

SHOW CARD B15

Looking at the list on Show Card B15, 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 or distribution complex
7 Religious campus or complex
8 Hospital or other health care complex
9 Lodging or resort complex
10 Post office complex
11 Prison or correctional facility
12 Other type of government complex
13 Industrial complex
14 Transportation complex such as a terminal, depot, or airport
15 Other type of campus or complex

NEXT	➔ C1 [Owner]

SECTION C. OCCUPANCY AND OPERATING HOURS

C1	**Owner** *OWNER*
ASK	All Mall Buildings
SHOW CARD C1 Looking at Show Card C1, please tell me which category best describes the owner of this building. 1 Real estate investment trust (REIT) 2 Other public or private 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 Other ➔ C2 [Other owner] OTHERWISE ➔ C3 [Number of businesses]

C2	**Other owner**
ASK	IF C1 [Owner] = Other
Please describe this other owner. ◆ RECORD in open box	
NEXT	➔ C3 [Number of businesses]

C3	**Number of businesses** *NOCC*
ASK	All Mall Buildings
How many tenant spaces are there in this building, including vacant spaces?	
RANGE	0 to 9,999
NEXT	IF DK/RF ➔ C4 [Number of businesses category] OTHERWISE ➔ C5 [Owner occupies]

C4	**Number of businesses category**	*NOCCAT*
ASK	IF C3 [Number of businesses] = DK/RF	

SHOW CARD C2

Please look at Show Card C2 and tell me which category best describes the number of tenant spaces in this building.

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	➔ C5 [Owner occupies]

C5	**Owner occupies**	*OWNOCC*
ASK	All Mall Buildings	

Does the owner occupy any space in this building?

1 Yes
2 No

NEXT	IF C1 [Owner] = DK/RF ➔ C13 [Months in use] OTHERWISE ➔ C6 [Owner operates]

C6	**Owner operates**	*OWNOPR*
ASK	IF **NOT** (C1 [Owner] = DK/RF)	

Is the building owner responsible for the operation of the energy systems?

1 Yes
2 No

NEXT	IF Yes ➔ C7 [Owner has purchasing power] IF No ➔ C9 [Nonowner operator] IF DK/RF ➔ C13 [Months in use]

C7	**Owner has purchasing power**	*OWNPPR*
ASK	IF C6 [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 ➔C13 [Months in use] IF No ➔ C8 [Nonowner with purchasing power]

C8	**Nonowner with purchasing power**	*NWNPPR*
ASK	IF C7 [Owner has purchasing power] = No	

SHOW CARD C3

Looking at Show Card C3, please tell me who does have direct input (on decisions regarding purchases of energy-related equipment).

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

NEXT	IF Other ➔ C12 [Other with purchasing power] OTHERWISE ➔C13 [Months in use]

C9	**Nonowner operator**	*NWNOPR*
ASK	IF C6 [Owner operates] = No	

SHOW CARD C3

Looking at Show Card C3, please tell me who is responsible for the operation of the energy systems.

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

NEXT	IF Other ➔ C10 [Other operator] OTHERWISE ➔ C11 [Who has purchasing power]

C10	**Other operator**
ASK	IF C9 [Nonowner operator] = Other
Please describe who is responsible for the operation of the energy systems. ◆ RECORD in open box	
NEXT	➔ C11 [Who has purchasing power]

C11	**Who has purchasing power** *WHOPPR*
ASK	IF C6 [Owner operates] = No
Who has the most direct input on decisions regarding purchases of energy-related equipment - the building owner or the party who is 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 ➔ C12 [Other with purchasing power] OTHERWISE ➔C13 [Months in use]

C12	**Other with purchasing power**
ASK	IF C16 [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	➔C13 [Months in use]

C13	**Months in use** *MONUSE*
ASK	All Mall Buildings
Thinking of calendar year 2018, for how many months was this building in use?	
RANGE	0 to 12
NEXT	IF Zero ➔ D1 [Heating] OTHERWISE ➔ C14 [Percent occupancy]

C14	**Percent occupancy** *OCCUPYP*
ASK	IF C13 [Months in use] ≠ Zero
FILL	**{MonthsInUse}** IF C18 [Months in use] < 12 = "Thinking about the months that this building was in use in 2018, about " OTHERWISE = "In 2018, about "
{MonthsInUse} what percent of the total floorspace of this building was occupied? If occupancy varied, please provide an average percent occupancy.	
RANGE	0 to 100
NEXT	➔ D1 [Heating]

SECTION D. ENERGY USE AND EQUIPMENT

D1	**Heating** *HT1*
ASK	All Mall Buildings
	For the next five questions, please tell me if energy was used in this building for any of these purposes during calendar year 2018. Was any energy used for heating the building? 1 Yes 2 No
NEXT	IF No ➔ D2 [Why no heating] OTHERWISE ➔ D4 [Cooling]

D2	**Why no heating** *NOHEAT*
ASK	IF D1 [Heating] = No
	Which of the following reasons best explains why there was no heating in this building during 2018? 1 Previous answer incorrect, building does have heating 2 Climate doesn't require heating 3 Building not used during the 2018 heating season 4 Waste heat from other equipment is sufficient 5 Heating equipment was broken during 2018 6 Some other reason
NEXT	IF Some other reason ➔ D3 [Other no heating specify] OTHERWISE ➔ D4 [Cooling]
NOTE	If "Previous answer incorrect, building does have heating" is selected, interview will proceed as if D1 [Heating] = Yes.

D3	**Other no heating specify**
ASK	IF D2 [Why no heating] = Some other reason
	Please briefly explain why there was no heating in this building during 2018. ◆ RECORD in open box
NEXT	➔ D4 [Cooling]

D4	**Cooling** *COOL*
ASK	All Mall Buildings
(Was any energy used...) For air conditioning? 1 Yes 2 No	
NEXT	IF No & NOT (A22 [Year of construction] = 2018 & A25 [Month ready for occupancy] = September, October, November, OR December) ➔ D5 [Why no cooling] OTHERWISE ➔ D7 [Water heating]

D5	**Why no cooling** *NOCOOL*
ASK	IF D4 [Cooling] = No & NOT (A22 [Year of construction] = 2018 & A25 [Month ready for occupancy] = September, October, November, OR December)
Which of the following reasons best explains why there was no cooling in this building during 2018? 1 Previous answer incorrect, building does have cooling 2 Climate doesn't require cooling 3 Building not used during the 2018 cooling season 4 Building is used for storage 5 Air conditioning equipment was broken during 2018 6 Can not afford air conditioning 7 Some other reason	
NEXT	IF Some other reason ➔ D6 [Other no cooling specify] OTHERWISE ➔ D7 [Water heating]
NOTE	If "Previous answer incorrect, building does have cooling" is selected, interview will proceed as if D4 [Cooling] = Yes.

D6	**Other no cooling specify**
ASK	IF D5 [Why no cooling] = Some other reason
Please briefly explain why there was no cooling in this building during 2018. ◆ RECORD in open box	
NEXT	➔ D7 [Water heating]

D7	**Water heating**	*WATR*
ASK	All Mall Buildings	

(Was any energy used...)

For heating water for purposes such as washing hands, dishes, or clothes?

1 Yes
2 No

NEXT	IF No ➔ D8 [Why no water heating] OTHERWISE ➔ D10 [Cooking]

D8	**Why no water heating**	*NOWATR*
ASK	IF D7 [Water heating] = No	

Which of the following reasons best explains why there was no water heating in this building during 2018?

1 Previous answer incorrect, building does have water heating
2 No plumbing in building
3 Cold water only
4 Water heater was broken during 2018
5 Some other reason

NEXT	IF Some other reason ➔ D9 [Other no water heating specify] OTHERWISE ➔ D10 [Cooking]
NOTE	If "Previous answer incorrect, building does have water heating" is selected, interview will proceed as if D7 [Water heating] = Yes.

D9	**Other no water heating specify**
ASK	IF D8 [Why no water heating] = Some other reason

Please briefly explain why there was no water heating in this building during 2018.

◆ RECORD in open box

NEXT	➔ D10 [Cooking]

D10	**Cooking**	*COOK*
ASK	All Mall Buildings	

(Was any energy used...)

For cooking?

- EXP: [If there is only minimal cooking, such as microwaves, hot plates, or toaster ovens, answer "No."]

1 Yes
2 No

NEXT	IF D1 [Heating] = DK/RF & D4 [Cooling] = DK/RF & D7 [Water heating] = DK/RF & D10 [Cooking] = DK/RF ➔ D11 [Missing end uses] OTHERWISE ➔ D12 [Manufacturing]

D11	**Missing end uses**
SHOW	IF D1 [Heating] = DK/RF & D4 [Cooling] = DK/RF & D7 [Water heating] = DK/RF & D10 [Cooking] = DK/RF

- INTERVIEWER: You have entered DK or RF for the four major end use questions. **This information is important for understanding how energy is used in this building.** You may need to find a new respondent at this point. Explain to the current respondent that the remainder of the questionnaire contains technical information about energy use and equipment and ask whether the respondent would want us to consult someone else in the building for these questions.

- ENTER "1" when you are ready to continue

NEXT	➔ D12 [Manufacturing]

D12	**Manufacturing**	*MANU*
ASK	All Mall Buildings	

(Was any energy used...)

For manufacturing?

1 Yes
2 No

NEXT	IF No & D1 [Heating] = No & D4 [Cooling] = No & D7 [Water heating] = No & D10 [Cooking] = No ➔ D13 [Any energy used] OTHERWISE ➔ D14 [Energy sources used]

D13	**Any energy used** *ANYEGY*
ASK	IF D1 [Heating] = No & D4 [Cooling] = No & D7 [Water heating] = No & D10 [Cooking] = No & D12 [Manufacturing] = No

I did not record any uses of energy for this building. Did this building use <u>any</u> energy in 2018 for other purposes, such as lighting or appliances?

1 Yes, some energy was used in 2018
2 No, no energy was used

NEXT	IF Yes, some energy was used OR DK/RF ➔ D14 [Energy sources used] IF No, no energy was used ➔ L1 [Response effort]

D14	**Energy sources used** *see below*
ASK	IF D1 [Heating] = Yes OR D4 [Cooling] = Yes OR D7 [Water heating] = Yes OR D10 [Cooking] = Yes OR D12 [Manufacturing] = Yes OR D13 [Any energy used] = Yes, some energy was used OR DK/RF

SHOW CARD D1

Looking at this list of energy sources on Show Card D1, please tell me which ones were used <u>in this building</u> for any purpose in 2018.

- EXP: [Include fuel oil, diesel, or kerosene if it was purchased or delivered in 2018, 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	*ELUSED*
12	Natural gas	*NGUSED*
13	Fuel oil, diesel, or kerosene	*FKUSED*
14	Propane, also known as bottled gas or LPG	*PRUSED*
15	District steam piped in from a separate building or utility	*STUSED*
16	District hot water piped in from a separate building or utility	*HWUSED*
17	District chilled water piped in from a separate building or utility	*CWUSED*
18	Wood or coal	
19	Solar	*SOUSED*
24	Other source or sources	*OTUSED*

NEXT	IF Fuel, oil, diesel, or kerosene selected ➔ D15 [Fuel oil, diesel, or kerosene] IF Wood or coal selected ➔ D16 [Wood or coal] IF Solar selected ➔ D17 [Type of solar] IF Other source or sources selected ➔ D18 [Other energy source 1] IF DK/RF ➔ D123 [Electricity generation capability] OTHERWISE: IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] OTHERWISE ➔ D123 [Electricity generation capability]

D15	**Fuel oil, diesel, or kerosene**	*FKTYPE*
ASK	IF Fuel oil, diesel, or kerosene IN D14 [Energy sources used]	

◆ VERIFY if volunteered in previous question

You mentioned fuel oil, diesel, or kerosene. Which of these were used (in this building in 2018)?

◆ ENTER all that apply

1 Fuel oil
2 Diesel
3 Kerosene

NEXT	IF Wood or coal IN D14 [Energy sources used] ➔ D16 [Wood or coal] IF Solar IN D14 [Energy sources used] ➔ D17 [Type of solar] IF Other source or sources IN D14 [Energy sources used] ➔ D18 [Other energy source 1] IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] OTHERWISE ➔ D123 [Electricity generation capability]

D16	**Wood or coal**	*see below*
ASK	IF Wood or coal IN D14 [Energy sources used]	

◆ VERIFY if volunteered in previous question

You mentioned wood or coal. Which of these were used (in this building in 2018)?

◆ ENTER all that apply

1 Wood *WOUSED*
2 Coal *COUSED*

NEXT	IF Solar IN D8 ➔ D17 [Type of solar] IF Other source or sources IN D14 [Energy sources used] ➔ D18 [Other energy source 1] IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] OTHERWISE ➔ D123 [Electricity generation capability]

D17	**Type of solar** *see below*
ASK	IF Solar IN D14 [Energy sources used]

◆ VERIFY if volunteered in previous question

Which type of solar was used: solar panels to generate electricity or solar thermal energy, which is the direct use of solar energy without generating electricity?

◆ ENTER all that apply

1 Solar panels used to generate electricity *PVC/SOGENR/CAPGEN*
2 Solar thermal energy (use of solar energy without generating electricity) *SOTHERM*

NEXT	IF Other source or sources IN D14 [Energy sources used] ➔ D18 [Other energy source 1] IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF Solar panels used to generate electricity ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D18	**Other energy source 1** *OTUSDX1*
ASK	IF Other source or sources IN D14 [Energy sources used]

What was the first other energy source used (in this building in 2018)?

◆ ENTER the first energy source used

NEXT	➔ D19 [Other energy source 2]

D19	**Other energy source 2** *OTUSDX2*
ASK	IF Other source or sources IN D14 [Energy sources used]

Were there any other energy sources used (in this building in 2018)?

◆ ENTER the next energy source

◆ [ENTER] if no others

NEXT	IF Source entered here ➔ D20 [Other energy source 3] IF No source entered here: IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D20	**Other energy source 3** *OTUSDX3*
ASK	IF Source was entered in D19 [Other energy source 2]
Were there any other energy sources used (in this building in 2018)? ◆ ENTER the next energy source ◆ [ENTER] if no others	
NEXT	IF D1 [Heating] = Yes ➔ D21 [Percent heated] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D21	**Percent heated** *HEATP*
ASK	IF D1 [Heating] = Yes
FILL	**{SqFt}** IF A6 [Square footage] known = "A6 [Square footage]" IF A6 [Square footage] = DK/RF = "floorspace"
These next questions are about heating in the building. What percent of the {SqFt} in this building was heated to at least 50 degrees Fahrenheit during 2018, including basements and indoor parking levels 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 ➔ D22 [Heated to less than 50 degrees] OTHERWISE ➔ D23 [Source for main heating]

D22	**Heated to less than 50 degrees**	*HTLS50*
ASK	IF D21 [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 ➔ D23 [Source for main heating] IF No: IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D23	**Source for main heating**	*see below*
ASK	IF D1 [Heating] = Yes & NOT ([D21 [Percent heated] = Zero & D22 [Heated to less than 50 degrees] = No)	
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 D15 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [Other energy source 3]	

What was the <u>main</u> energy source for heating? Do not include electricity if it is used only to run fan motors. (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.]

- Only sources already selected are shown here

11	{Electricity}	*ELHT1*
12	{Natural gas}	*NGHT1*
13	{FuelOilType}	*FKHT1*
14	{Propane}	*PRHT1*
15	{District steam}	*STHT1*
16	{District hot water}	*HWHT1*
18	{Wood}	*WOHT1*
19	{Coal}	*COHT1*
20	{Solar thermal}	*SOHT1*
21	{Other1}	*OTHT1*
22	{Other2}	*OTHT1*
23	{Other3}	*OTHT1*
24	Some other energy source	

NEXT	IF Some other energy source ➔ D24 [Other source for main heating] IF DK/RF ➔ D29 [Heating equipment for unknown source] OTHERWISE: IF More than one energy source used ➔ D25 [Which other sources for heating] IF Only one energy source used ➔ D26 [Any other sources for heating]

D24	**Other source for main heating**	*see below*
ASK	IF D23 [Source for main heating] = Some other energy source	

What was the other energy source used for <u>main</u> space heating?

11	Electricity	*ELHT1*
12	Natural gas	*NGHT1*
13	Fuel oil/Diesel/Kerosene	*FKHT1*
14	Propane	*PRHT1*
15	District steam	*STHT1*
16	District hot water	*HWHT1*
18	Wood	*WOHT1*
19	Coal	*COHT1*
20	Solar thermal	*SOHT1*
24	Some other energy source	*OTHT1*

NEXT	➔ D25 [Which other sources for heating]

D25	**Which other sources for heating**	*HT2 & see below*
ASK	IF D1 [Heating] = Yes & D23 [Source for main heating] ≠ DK/RF & 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 D15 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [Other energy source 3]	

Which other energy sources, if any, were used for heating? Do not include electricity if it is used only to run fan motors. ({Ht2SourcesList})

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

11	{Electricity}	*ELHT2*
12	{Natural gas}	*NGHT2*
13	{FuelOilType}	*FKHT2*
14	{Propane}	*PRHT2*
15	{District steam}	*STHT2*
16	{District hot water}	*HWHT2*
18	{Wood}	*WOHT2*
19	{Coal}	*COHT2*
20	{Solar thermal}	*SOHT2*
21	{Other1}	*OTHT2*
22	{Other2}	*OTHT2*
23	{Other3}	*OTHT2*

	24 Some other energy source 99 No other sources for heating
NEXT	IF Some other energy source ➔ D27 [Other source for heating] OTHERWISE ➔ D28 [Main heating routing]

D26	**Any other sources for heating** *HT2*
ASK	IF D1 [Heating] = Yes & D23 [Source for main heating] ≠ DK/RF & Only one energy source used
	Were there any other energy sources used for heating? 1 Yes 2 No
NEXT	IF Yes ➔ D27 [Other source for heating] IF No OR DK/RF ➔ D28 [Main heating routing]

D27	**Other source for heating**	
ASK	IF D25 [Which other sources for heating] = Some other energy source OR D26 [Any other sources for heating] = Yes	
	What was the other energy source used for secondary space heating?	
	11 Electricity	*ELHT2*
	12 Natural gas	*NGHT2*
	13 Fuel oil/Diesel/Kerosene	*FKHT2*
	14 Propane	*PRHT2*
	15 District steam	*STHT2*
	16 District hot water	*HWHT2*
	18 Wood	*WOHT2*
	19 Coal	*COHT2*
	20 Solar thermal	*SOHT2*
	24 Some other energy source	*OTHT2*
NEXT	➔ D28 [Main heating routing]	

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 D14 [Energy sources used], if sources are added along the way, such as in D24 [Other source for main heating] OR D27 [Other source for heating], those sources are then also considered to be used.

D28	Main heating routing
NEXT	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Electricity ➔ D30 [Elec main heating equipment] IF D23 [Source for main heating] OR D24 [Other source for main heating] = Natural gas ➔ D31 [Nat gas main heating equipment] IF D23 [Source for main heating] OR D24 [Other source for main heating] = Fuel oil/Diesel/Kerosene ➔ D32 [Fuel oil main heating equipment] IF D23 [Source for main heating] OR D24 [Other source for main heating] = Propane ➔ D33 [Propane main heating equipment] IF D23 [Source for main heating] OR D24 [Other source for main heating] = District steam ➔ D34 [District steam distribution] IF D23 [Source for main heating] OR D24 [Other source for main heating] = District hot water ➔ D35 [District hot water distribution] IF D23 [Source for main heating] OR D24 [Other source for main heating] = Wood ➔ D36 [Wood main heating equipment] IF D23 [Source for main heating] = Coal OR D24 [Other source for main heating] = Coal ➔ D37 [Coal main heating equipment] IF D23 [Source for main heating] OR D24 [Other source for main heating] = Solar thermal ➔ D38 [Solar thermal heating equipment] IF D23 [Source for main heating] = {Other} OR D24 [Other source for main heating] = Some other energy source ➔ D39 [Other source main heating equipment]

D29	Heating equipment for unknown source	*see below*
ASK	IF D23 [Source for main heating] = DK/REF	

SHOW CARD D2

Even though you aren't sure of the energy source used for heating this building, you may still be familiar with the equipment. Looking at the list of heating equipment and distribution types on Show Card D2, please tell me which one (or ones) are used in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT*
2	Boilers that produce steam or hot water	*BOILER*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH*
4	Residential-type furnaces	*FURNAC*
5	Individual space heaters (other than heat pumps)	*SLFCON*
6	Fireplace	*FIREPLC*
7	Central air handlers	*AIRHAND*
8	Fan coil units	*FANCOIL*
9	Duct reheat	*REHEAT*
10	Radiators	*RADIATR*
11	Other heating equipment	*OTHTEQ*

NEXT	IF Other heating equipment selected ➔ D40 [Unknown source main equip specify] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D30	**Elec main heating equipment**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Electricity	

SHOW CARD D3

Looking at the list of heating equipment types on Show Card D3, please tell me which one (or ones) are powered by <u>electricity</u> in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_EL*
2	Boilers that produce steam or hot water	*BOILER_EL*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH_EL*
4	Residential-type furnaces	*FURNAC_EL*
5	Individual space heaters (other than heat pumps)	*SLFCON_EL*
6	Duct reheat coils	*REHEAT_EL*
7	Other heating equipment	*OTHTEQ_EL*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D42 [Elec other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D31	**Nat gas main heating equipment**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Natural gas	

SHOW CARD D4

Looking at the list of heating equipment types on Show Card D4, please tell me which one (or ones) are fueled by <u>natural gas</u> in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_NG*
2	Boilers that produce steam or hot water	*BOILER_NG*
1	Heat pumps (other than components of a packaged unit)	*HTPMPH_NG*
4	Residential-type furnaces	*FURNAC_NG*
5	Individual space heaters (other than heat pumps)	*SLFCON_NG*
6	Fireplace	*FIREPLC_NG*
7	Other heating equipment	*OTHTEQ_NG*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D43 [Nat gas other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D32	**Fuel oil main heating equipment**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Fuel Oil/Diesel/Kerosene	
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]	

SHOW CARD D5

Looking at the list of heating equipment types on Show Card D5, please tell me which one (or ones) are fueled by {FuelOilType} in this building.

- PROBE for any others
- ENTER all that apply

1	Boilers that produce steam or hot water	*BOILER_FK*
2	Residential-type furnaces	*FURNAC_FK*
3	Individual space heaters (other than heat pumps)	*SLFCON_FK*
4	Other heating equipment	*OTHTEQ_FK*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D44 [Fuel oil other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D33	**Propane main heating equipment**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Propane	

SHOW CARD D4

Looking at the list of heating equipment types on Show Card D4, please tell me which one (or ones) are fueled by <u>propane</u> in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_PR*
2	Boilers that produce steam or hot water	*BOILER_PR*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH_PR*
4	Residential-type furnaces	*FURNAC_PR*
5	Individual space heaters (other than heat pumps)	*SLFCON_PR*
6	Fireplace	*FIREPLC_PR*
7	Other heating equipment	*OTHTEQ_PR*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D45 [Propane other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D34	**District steam distribution**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = District steam	

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the district steam in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*AIRHAND_ST*
2	Fan coil units	*FANCOIL_ST*
3	Duct reheat	*REHEAT_ST*
4	Radiators	*RADIATR_ST*
5	Other distribution equipment	*OTDIST_ST*

NEXT	➔ D49 [Secondary heating routing]

D35	**District hot water distribution**	*see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = District hot water	

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the district hot water in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*AIRHAND_HW*
2	Fan coil units	*FANCOIL_HW*
3	Duct reheat	*REHEAT_HW*
4	Radiators	*RADIATR_HW*
5	Other distribution equipment	*OTDIST_HW*

NEXT	➔ D49 [Secondary heating routing]

D36	**Wood main heating equipment** *see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Wood

SHOW CARD D7

Looking at the list of heating equipment types on Show Card D7, please tell me which one (or ones) are fueled by wood in this building.

- PROBE for any others
- ENTER all that apply

1	Residential-type furnaces	*FURNAC_WO*
2	Individual space heaters (other than heat pumps)	*SLFCON_WO*
3	Fireplace	*FIREPLC_WO*
4	Other heating equipment	*OTHTEQ_WO*

NEXT	IF Other heating equipment selected ➔ D46 [Wood other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D37	**Coal main heating equipment** *see below*
ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Coal

SHOW CARD D8

Looking at the list of heating equipment types on Show Card D8, please tell me which one (or ones) are fueled by coal in this building.

- PROBE for any others
- ENTER all that apply

1	Boilers that produce steam or hot water	*BOILER_CO*
2	Residential-type furnaces	*FURNAC_WO*
3	Other heating equipment	*OTHTEQ_CO*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D47 [Coal other main heat equip specify] OTHERWISE ➔ D49 [Secondary heating routing]

D38	**Solar thermal heating equipment**

ASK	IF D23 [Source for main heating] OR D24 [Other source for main heating] = Solar thermal
Please describe the solar thermal heating system. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D39	**Other source main heating equipment** *see below*
ASK	IF D23 [Source for main heating] = {Other} OR D24 [Other source for main heating] = Some other energy source

SHOW CARD D9

Looking at the list of heating equipment types on Show Card D9, please tell me which one (or ones) are fueled by the other energy source in this building.

◆ PROBE for any others

◆ ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_OT*
2	Boilers that produce steam or hot water	*BOILER_OT*
3	Residential-type furnaces	*FURNAC_OT*
4	Individual space heaters (other than heat pumps)	*SLFCON_OT*
5	Other heating equipment	*OTHTEQ_OT*

NEXT	IF Boiler selected ➔ D41 [Boiler heat distribution] IF Other heating equipment selected ➔ D48 [Other source other main heat specify] OTHERWISE ➔ D49 [Secondary heating routing]

D40	**Unknown source main equip specify**
ASK	IF D29 [Heating equipment for unknown source] = Other heating equipment
Please describe the other type of heating equipment. ◆ RECORD in open box	
NEXT	IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D41	**Boiler heat distribution** *see below*
ASK	IF Boilers IN D30 [Elec main heating equipment] OR D31 [Nat gas main heating equipment] OR D32 [Fuel oil main heating equipment] OR D33 [Propane main heating equipment] OR D37 [Coal main heating equipment] OR D39 [Other source main heating equipment]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR*
2	Fan coil units	*BLRFNCL*
3	Duct reheat	*BLRDUCT*
4	Radiators	*BLRRAD*
5	Other distribution equipment	*BLROTDIST*

NEXT	IF Other heating equipment IN D30 [Elec main heating equipment] ➔ D42 [Elec other main heat equip specify] IF Other heating equipment IN D31 [Nat gas main heating equipment] ➔ D43 [Nat gas other main heat equip specify] IF Other heating equipment IN D32 [Fuel oil main heating equipment] ➔ D44 [Fuel oil other main heat equip specify] IF Other heating equipment IN D33 [Propane main heating equipment] ➔ D45 [Propane other main heat equip specify] IF Other heating equipment IN D36 [Wood main heating equipment] ➔ D46 [Wood other main heat equip specify] IF Other heating equipment IN D37 [Coal main heating equipment] ➔ D47 [Coal other main heat equip specify] IF Other heating equipment IN D39 [Other source main heating equipment] ➔ D48 [Other source other main heat specify] OTHERWISE ➔ D49 [Secondary heating routing]

D42	**Elec other main heat equip specify**
ASK	IF D30 [Elec main heating equipment] = Other heating equipment

Please describe the other type of heating equipment that is powered by electricity.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing]

D43	**Nat gas other main heat equip specify**
ASK	IF D31 [Nat gas main heating equipment] = Other heating equipment
Please describe the other type of heating equipment that is fueled by natural gas. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D44	**Fuel oil other main heat equip specify**
ASK	IF D32 [Fuel oil main heating equipment] = Other heating equipment
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]
Please describe the other type of heating equipment that is fueled by {FuelOilType}. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D45	**Propane other main heat equip specify**
ASK	IF D33 [Propane main heating equipment] = Other heating equipment
Please describe the other type of heating equipment that is fueled by propane. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D46	**Wood other main heat equip specify**
ASK	IF D36 [Wood main heating equipment] = Other heating equipment
Please describe the other type of heating equipment that is fueled by wood. ◆ RECORD in open box	

NEXT	➔ D49 [Secondary heating routing]

D47	**Coal other main heat equip specify**
ASK	IF D37 [Coal main heating equipment] = Other heating equipment
Please describe the other type of heating equipment that is fueled by coal. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D48	**Other source other main heat specify**
ASK	IF D39 [Other source main heating equipment] = Other heating equipment
Please describe the other type of heating equipment that is fueled by the other energy source. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing]

D49	Secondary heating routing	
NEXT	STEP 1	IF Electricity IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D50 [Elec secondary heating equipment]
	STEP 2	IF Natural gas IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D53 [Nat gas secondary heating equipment]
	STEP 3	IF Fuel Oil/Diesel/Kerosene IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D56 [Fuel oil secondary heating equipment]
	STEP 4	IF Propane IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D59 [Propane secondary heating equipment]
	STEP 5	IF District steam IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D62 [District steam distribution]
	STEP 6	IF District hot water IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D63 [District hot water distribution]
	STEP 7	IF Wood IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D64 [Wood secondary heating equipment]
	STEP 8	IF Coal IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D66 [Coal secondary heating equipment]
	STEP 9	IF Solar thermal IN D25 [Which other sources for heating] OR D27 [Other source for heating] ➔ D69 [Solar thermal secondary heating]
	STEP 10	IF {Other} IN D25 [Which other sources for heating] OR D27 [Other source for heating] = Some other energy source ➔ D70 [Other source secondary heating]
	STEP 11	IF (Furnaces IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]) & Furnaces for any other source main or secondary heating equipment ➔ D73 [Furnace with >1 source] IF Boilers for Two or more main or secondary heating equipment ➔ D74 [Boiler with >1 source] IF Heat pumps IN D31 [Nat gas main heating equipment] OR D33 [Propane main heating equipment] OR D53 [Nat gas secondary heating equipment] OR D59 [Propane secondary heating equipment] & NOT (Heat pumps IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]) ➔ D75 [Heat pump with no elec] IF Heat pumps for any other heating source ➔ D76 [Heat pump heating type] IF more than one selected heating source/equipment combination ➔ D77 [Percent heated by type] IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D50	**Elec secondary heating equipment**	*see below*
ASK	IF Electricity IN D25 [Which other sources for heating] OR D27 [Other source for heating]	

SHOW CARD D3

You mentioned that electricity was also used for heating. Looking at the list of heating equipment types on Show Card D3, please tell me which one (or ones) are powered by electricity in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_EL*
2	Boilers that produce steam or hot water	*BOILER_EL*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH_EL*
4	Residential-type furnaces	*FURNAC_EL*
5	Individual space heaters (other than heat pumps)	*SLFCON_EL*
6	Duct reheat coils	*REHEAT_EL*
7	Other heating equipment	*OTHTEQ_EL*

NEXT	IF Boiler selected ➔ D51 [Elec boiler heat distribution] IF Other heating equipment selected ➔ D52 [Elec other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 2

D51	**Elec boiler heat distribution**	*see below*
ASK	IF Boilers IN D50 [Elec secondary heating equipment]	

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the electric boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_EL*
2	Fan coil units	*BLRFNCL_EL*
3	Duct reheat	*BLRDUCT_EL*
4	Radiators	*BLRRAD_EL*
5	Other distribution equipment	*BLROTDIST_EL*

NEXT	IF Other heating equipment IN D50 [Elec secondary heating equipment] ➔ D52 [Elec other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 2

D52	**Elec other secondary heat equip**
ASK	IF Other heating equipment IN D50 [Elec secondary heating equipment]
Please describe the other type of heating equipment that is powered by electricity. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing] STEP 2

D53	**Nat gas secondary heating equipment** *see below*
ASK	IF Natural gas IN D25 [Which other sources for heating] OR D27 [Other source for heating]

SHOW CARD D4

You mentioned that natural gas was also used for heating. Looking at the list of heating equipment types on Show Card D4, please tell me which one (or ones) are fueled by natural gas in this building.

◆ PROBE for any others

◆ ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_NG*
2	Boilers that produce steam or hot water	*BOILER_NG*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH_NG*
4	Residential-type furnaces	*FURNAC_NG*
5	Individual space heaters (other than heat pumps)	*SLFCON_NG*
6	Fireplace	*FIREPLC_NG*
7	Other heating equipment	*OTHTEQ_NG*

NEXT	IF Boiler selected ➔ D54 [Nat gas boiler heat distribution] IF Other heating equipment selected ➔ D55 [Nat gas other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 3

D54	**Nat gas boiler heat distribution** *see below*
ASK	IF Boilers IN D53 [Nat gas secondary heating equipment]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the natural gas boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_NG*
2	Fan coil units	*BLRFNCL_NG*
3	Duct reheat	*BLRDUCT_NG*
4	Radiators	*BLRRAD_NG*
5	Other distribution equipment	*BLROTDIST_NG*

NEXT	IF Other heating equipment IN D53 [Nat gas secondary heating equipment] ➔ D55 [Nat gas other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 3

D55	**Nat gas other secondary heat equip**
ASK	IF Other heating equipment IN D53 [Nat gas secondary heating equipment]

Please describe the other type of heating equipment that is fueled by natural gas.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 3

D56	**Fuel oil secondary heating equipment** *see below*
ASK	IF Fuel Oil/Diesel/Kerosene IN D25 [Which other sources for heating] OR D27 [Other source for heating]
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]

SHOW CARD D5

You mentioned that {FuelOilType} was also used for heating. Looking at the list of heating equipment types on Show Card D5, please tell me which one (or ones) fueled by {FuelOilType} in this building.

- PROBE for any others
- ENTER all that apply

1	Boilers that produce steam or hot water	*BOILER_FK*
2	Residential-type furnaces	*FURNAC_FK*
3	Individual space heaters (other than heat pumps)	*SLFCON_FK*
4	Other heating equipment	*OTHTEQ_FK*

NEXT	IF Boiler selected ➔ D57 [Fuel oil boiler heat distribution] IF Other heating equipment selected ➔ D58 [Fuel oil other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 4

D57	**Fuel oil boiler heat distribution** *see below*
ASK	IF Boilers IN D56 [Fuel oil secondary heating equipment]
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the {FuelOilType} boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_FK*
2	Fan coil units	*BLRFNCL_FK*
3	Duct reheat	*BLRDUCT_FK*
4	Radiators	*BLRRAD_FK*
5	Other distribution equipment	*BLROTDIST_FK*

NEXT	IF Other heating equipment IN D56 [Fuel oil secondary heating equipment] ➔ D58 [Fuel oil other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 4

D58	**Fuel oil other secondary heat equip**
ASK	IF Other heating equipment IN D56 [Fuel oil secondary heating equipment]
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]

Please describe the other type of heating equipment that is fueled by {FuelOilType}.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 4

D59	**Propane secondary heating equipment**	*see below*
ASK	IF Propane IN D25 [Which other sources for heating] OR D27 [Other source for heating]	

SHOW CARD D4

You mentioned that propane was also used for heating. Looking at the list of heating equipment types on Show Card D4, please tell me which one (or ones) are fueled by propane in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged central units (such as roof mounted units, or RTUs)	*PKGHT_PR*
2	Boilers that produce steam or hot water	*BOILER_PR*
3	Heat pumps (other than components of a packaged unit)	*HTPMPH_PR*
4	Residential-type furnaces	*FURNAC_PR*
5	Individual space heaters (other than heat pumps)	*SLFCON_PR*
6	Fireplace	*FIREPLC_PR*
7	Other heating equipment	*OTHTEQ_PR*

NEXT	IF Boiler selected ➔ D60 [Propane boiler heat distribution] IF Other heating equipment selected ➔ D61 [Propane other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 5

D60	**Propane boiler heat distribution** *see below*
ASK	IF Boilers IN D59 [Propane secondary heating equipment]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the propane boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_FK*
2	Fan coil units	*BLRFNCL_FK*
3	Duct reheat	*BLRDUCT_FK*
4	Radiators	*BLRRAD_FK*
5	Other distribution equipment	*BLROTDIST_FK*

NEXT	IF Other heating equipment IN D59 [Propane secondary heating equipment] ➔ D61 [Propane other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 5

D61	**Propane other secondary heat equip**
ASK	IF Other heating equipment IN D59 [Propane secondary heating equipment]

Please describe the other type of heating equipment that is fueled by propane.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 5

D62	**District steam distribution** *see below*
ASK	IF District steam IN D25 [Which other sources for heating] OR D27 [Other source for heating]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the district steam in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*AIRHAND_ST*
2	Fan coil units	*FANCOIL_ST*
3	Duct reheat	*REHEAT_ST*
4	Radiators	*RADIATR_ST*
5	Other distribution equipment	*OTDIST_ST*

NEXT	➔ D49 [Secondary heating routing] STEP 6

D63	**District hot water distribution** *see below*
ASK	IF District hot water IN D25 [Which other sources for heating] OR D27 [Other source for heating]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the district hot water in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*AIRHAND_HW*
2	Fan coil units	*FANCOIL_HW*
3	Duct reheat	*REHEAT_HW*
4	Radiators	*RADIATR_HW*
5	Other distribution equipment	*OTDIST_HW*

NEXT	➔ D49 [Secondary heating routing] STEP 7

D64	**Wood secondary heating equipment** *see below*
ASK	IF Wood IN D25 [Which other sources for heating] OR D27 [Other source for heating]

SHOW CARD D7

You mentioned that wood was also used for heating. Looking at the list of heating equipment types on Show Card D7, please tell me which one (or ones) are fueled by wood in this building.

- PROBE for any others
- ENTER all that apply

1	Residential-type furnaces	*FURNAC_WO*
2	Individual space heaters (other than heat pumps)	*SLFCON_WO*
3	Fireplace	*FIREPLC_WO*
4	Other heating equipment	*OTHTEQ_WO*

NEXT	IF Other heating equipment selected ➔ D65 [Wood other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 8

D65	**Wood other secondary heat equip**
ASK	IF Other heating equipment IN D64 [Wood secondary heating equipment]

Please describe the other type of heating equipment that is fueled by wood.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 8

D66	**Coal secondary heating equipment** *see below*
ASK	IF Coal IN D25 [Which other sources for heating] OR D27 [Other source for heating]

SHOW CARD D8

You mentioned that coal was also used for heating. Looking at the list of heating equipment types on Show Card D8, please tell me which one (or ones) are fueled by coal in this building.

- PROBE for any others
- ENTER all that apply

1	Boilers that produce steam or hot water	*BOILER_CO*
2	Residential-type furnaces	*FURNAC_CO*
3	Other heating equipment	*OTHTEQ_CO*

NEXT	IF Boiler selected ➔ D67 [Coal boiler heat distribution] IF Other heating equipment selected ➔ D68 [Coal other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 9

D67	**Coal boiler heat distribution** *see below*
ASK	IF Boilers IN D66 [Coal secondary heating equipment]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the coal boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_CO*
2	Fan coil units	*BLRFNCL_CO*
3	Duct reheat	*BLRDUCT_CO*
4	Radiators	*BLRRAD_CO*
5	Other distribution equipment	*BLROTDIST_CO*

NEXT	IF Other heating equipment IN D66 [Coal secondary heating equipment] ➔ D68 [Coal other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 9

D68	**Coal other secondary heat equip**
ASK	IF Other heating equipment IN D66 [Coal secondary heating equipment]

Please describe the other type of heating equipment that is fueled by coal.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 9

D69	**Solar thermal secondary heating**
ASK	IF Solar thermal IN D25 [Which other sources for heating] OR D27 [Other source for heating]
You mentioned that solar thermal was also used for heating. Please describe the solar thermal heating system. ◆ RECORD in open box	
NEXT	➔ D49 [Secondary heating routing] STEP 10

D70	**Other source secondary heating** *see below*
ASK	IF {Other} IN D25 [Which other sources for heating] OR D27 [Other source for heating] = Some other energy source
SHOW CARD D9 You mentioned that some other energy source was also used for heating. Looking at the list of heating equipment types on Show Card D9, please tell me which one (or ones) are fueled by the other energy source in this building. ◆ PROBE for any others ◆ ENTER all that apply 1 Packaged central units (such as roof mounted units, or RTUs) *PKGHT_OT* 2 Boilers that produce steam or hot water *BOILER_OT* 3 Residential-type furnaces *FURNAC_OT* 4 Individual space heaters (other than heat pumps) *SLFCON_OT* 5 Other heating equipment *OTHTEQ_OT*	
NEXT	IF Boiler selected ➔ D71 [Other source boiler heat distribution] IF Other heating equipment selected ➔ D72 [Other source other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 11

D71	**Other source boiler heat distribution** *see below*
ASK	IF Boilers IN D70 [Other source secondary heating]

SHOW CARD D6

Looking at the list of heating distribution types on Show Card D6, please tell me which one (or ones) are used with the other energy source boiler in this building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*BLRAIR_OT*
2	Fan coil units	*BLRFNCL_OT*
3	Duct reheat	*BLRDUCT_OT*
4	Radiators	*BLRRAD_OT*
5	Other distribution equipment	*BLROTDIST_OT*

NEXT	IF Other heating equipment IN D70 [Other source secondary heating] ➔ D72 [Other source other secondary heat equip] OTHERWISE ➔ D49 [Secondary heating routing] STEP 11

D72	**Other source other secondary heat**
ASK	IF Other heating equipment IN D70 [Other source secondary heating]

Please describe the other type of heating equipment that is fueled by the other energy source.

- RECORD in open box

NEXT	➔ D49 [Secondary heating routing] STEP 11

D73	**Furnace with >1 source** *FURN2SRC*
ASK	IF (Furnaces IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]) & Furnaces for any other source main or secondary heating equipment
FILL	**{SecondFuel} =** The non-electric energy source reported with a furnace
	I've recorded that you use a furnace with electricity and {SecondFuel}. Is the electricity for components such as the fans, igniter, or thermostat, or do you have two or more furnaces that run on different energy sources? 1 Electricity is for fans, igniter, thermostat, etc. 2 Two or more furnaces
NEXT	IF Electricity is for fans, igniter, thermostat, etc. remove the reported electric furnace. THEN: IF Boilers for Two or more main or secondary heating equipment ➔ D74 [Boiler with >1 source] IF Heat pumps IN D31 [Nat gas main heating equipment] OR D33 [Propane main heating equipment] OR D53 [Nat gas secondary heating equipment] OR D59 [Propane secondary heating equipment] & NOT (Heat pumps IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]) ➔ D75 [Heat pump with no elec] IF Heat pumps for any other main heating source ➔ D76 [Heat pump heating type] IF more than one selected heating source/equipment combination ➔ D77 [Percent heated by type] IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D74	**Boiler with >1 source** *BOIL2SRC*
ASK	IF Boilers for Two or more main or secondary heating equipment
	I've recorded that you use a boiler with more than one energy source. Is the electricity used to run components such as the fans or pumps, is this one boiler that can switch fuels, or is it two or more boilers that run on different sources? 1 Electricity is for fans, pumps, controls, thermostat, etc. 2 The boiler can switch fuels 3 Two or more boilers
NEXT	IF Electricity is for fans, pumps, controls, thermostat, etc. remove the reported electric boiler. THEN: IF Heat pumps IN D31 [Nat gas main heating equipment] OR D33 [Propane main heating equipment] OR D53 [Nat gas secondary heating equipment] OR D59 [Propane secondary heating equipment] & NOT (Heat pumps IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]) ➔ D75 [Heat pump with no elec] IF Heat pumps for any other main heating source ➔ D76 [Heat pump heating type] IF more than one selected heating source/equipment combination ➔ D77 [Percent heated by type] IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D75	**Heat pump with no elec** *HPCHKEL*
ASK	IF Heat pumps IN D31 [Nat gas main heating equipment] OR D33 [Propane main heating equipment] OR D53 [Nat gas secondary heating equipment] OR D59 [Propane secondary heating equipment] & NOT (Heat pumps IN D30 [Elec main heating equipment] OR D50 [Elec secondary heating equipment]
FILL	**{GasType}** = "natural gas" or "propane" based on what type of heat pump is reported

I've recorded that you use a heat pump that is fueled only by {GasType}. This is fairly unusual. Is this correct or is it a dual-fuel/hybrid heat pump that also uses electricity?

1 Heat pump uses only natural gas
2 Heat pump also uses electricity
3 IF VOLUNTEERED: Correct, heat pump only uses electricity

NEXT	➔ D76 [Heat pump heating type]

D76	**Heat pump heating type** *see below*
ASK	IF Heat pumps for any main or secondary heating equipment

SHOW CARD D10

You reported using heat pumps. Looking at the second list on Show Card D10, which types of heat pumps are these?

◆ ENTER all that apply

1	Air source heat pump	*HPHAIR*
2	Ground source or ground water heat pump (geothermal)	*HPHGRD*
3	Combination air source and geothermal	*HPHDUAL*
4	Water loop heat pump	*HPHWTR*

NEXT	IF more than one selected heating source/equipment combination ➔ D77 [Percent heated by type] IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D77	**Percent heated by type** *FURNP_EL, PKGHP_EL, BOILP_EL, HTPHP_EL, SLFCNP_EL, REHEATP_EL, OTHTP_EL, FURNP_NG, PKGHP_NG, BOILP_NG, HTPHP_NG, SLFCNP_NG, FIREPLP_NG, OTHTP_NG, FURNP_FK, BOILP_FK, SLFCNP_FK, OTHTP_FK, FURNP_PR, PKGHP_PR, BOILP_PR, HTPHP_PR, SLFCNP_PR, FIREPLP_PR, OTHTP_PR, STHWP_ST, STHWP_HW, FURNP_WO, SLFCNP_WO, FIREPLP_WO, OTHTP_WO, FURNP_CO, BOILP_CO, OTHTP_CO, SLTHP, FURNP_OT, PKGHP_OT, BOILP_OT, SLFCNP_OT, OTHTP_OT*
ASK	For buildings with more than one selected heating source/equipment combination Question is repeated for each combination
FILL	**{Introduction}** IF First source/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 source/equipment and D21 [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 source/equipment and D21 [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 **{SourceEquipment}** Combination of selected heating source and equipment, for example: "electric furnace"

SHOW CARD D11

{Introduction}

{Explanation}

Please look at Show Card D11. What percent of the heated area in this building is served by the {SourceEquipment}?

- PROBE for estimate if DK

RANGE	1 to 100
NEXT	IF there are equal maximum percents OR DK/RF ➔ D78 [Main heating equipment] IF there is an equipment with a maximum percent, assign that equipment as the Main heating equipment [*MAINHT9*]. THEN: IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D78	**Main heating equipment** *MAINHTX*
ASK	IF D77 [Percent heated by type] has equal maximum percents OR DK/RF
FILL	**{SourceEquipmentMaxList}** = List of the source/equipment combinations with equal maximum percents, for example “the electric furnace or the natural gas boiler” **{SourceEquipmentMax}** = Source/equipment combinations with an equal maximum percent, for example “electric furnace”

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

- Only equipment types with equal percentages are shown here

1 {SourceEquipmentMax1}
2 {SourceEquipmentMax2}
3 {Etc.}

NEXT	IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D79 [Main heating replaced] IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D79	**Main heating replaced** *NWMNHT*
ASK	IF Main heating equipment known & NOT District steam or hot water & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018)
FILL	**{MainSourceEquipment}** Combination of main heating source and equipment, for example “electric furnace”. If more than one source/equipment combination was selected, the one with the largest percent reported in D77 [Percent heated by type] is used. If D77 [Percent heated by type] has equal maximum percents OR DK/RF, the answer from D78 [Main heating equipment] is used.

Has the {MainSourceEquipment} been replaced since 2000?

- 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	IF D4 [Cooling] = Yes ➔ D80 [Percent cooled] OTHERWISE ➔ D105 [Who has temperature control]

D80	**Percent cooled** *COOLP*
ASK	IF D4 [Cooling] = Yes
FILL	**{SqFt}** IF A6 [Square footage] known = A6 [Square footage] IF A6 [Square footage] = DK/RF = "floorspace"
What percent of the {SqFt} in this building was cooled by air conditioning equipment during 2018? ◆ 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 Electricity used & NOT District chilled water used ➔ D81 [Electricity only for cooling] IF District chilled water used ➔ D83 [EL or CW for cooling] OTHERWISE ➔ D82 [Sources for cooling]

D81	**Electricity only for cooling** *see below*
ASK	IF D4 [Cooling] = Yes & (Electricity used & NOT District chilled water used)
Was electricity the only energy source used for air conditioning in this building in 2018? 1 Yes, electricity was the only energy source for air conditioning *ELCOOL* 2 No, some other energy source was used in addition to or instead of electricity for air conditioning	
NEXT	IF Yes ➔ D86 [Cooling routing] IF No ➔ D82 [Sources for cooling] IF DK/RF & (D21 [Percent heated] ≠ 0 OR D80 [Percent cooled] ≠ 0) ➔ D105 [Who has temperature control] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D82	**Sources for cooling**	*see below*
ASK	IF D81 [Electricity only for cooling] = No OR (D4 [Cooling] = Yes & NOT Electricity used & NOT District chilled water used)	

Which energy source or sources were used for air conditioning?

- ◆ PROBE for any others
- ◆ ENTER all that apply

11	Electricity	*ELCOOL*
12	Natural gas	*NGCOOL*
13	Fuel oil/Diesel/Kerosene	*FKCOOL*
14	Propane	*PRCOOL*
15	District steam	*STCOOL*
17	District chilled water	*CWCOOL*
24	Some other energy source	*OTCOOL*

NEXT	IF Some other energy source selected ➔ D85 [Other type of cooling source] OTHERWISE ➔ D86 [Cooling routing]

D83	**EL or CW for cooling**	*see below*
ASK	IF D4 [Cooling] = Yes & District chilled water used	
FILL	**{ACSourceList}** IF Electricity used & District chilled water used = "(…electricity or district chilled water?)" IF District chilled water used & NOT Electricity used = "(Was district chilled water used?)" **{Electricity}** = If electricity is used it appears in this list; if not, the line is blank	

Which energy sources were used for air conditioning? {ACSourceList}

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

1	{Electricity}	*ELCOOL*
2	District chilled water	*CWCOOL*
3	Some other energy source	

NEXT	IF Some other energy source ➔ D84 [Other source for cooling] OTHERWISE ➔ D86 [Cooling routing]

D84	**Other source for cooling** *see below*
ASK	IF D83 [EL or CW for cooling] = Some other energy source

What was the other energy source used for air conditioning?

11	Electricity	*ELCOOL*
12	Natural gas	*NGCOOL*
13	Fuel oil/Diesel/Kerosene	*FKCOOL*
14	Propane	*PRCOOL*
15	District steam	*STCOOL*
17	District chilled water	*CWCOOL*
24	Some other energy source	*OTCOOL*

NEXT	IF Some other energy source ➔ D85 [Other type of cooling source] OTHERWISE ➔ D86 [Cooling routing]

D85	**Other type of cooling source**
ASK	IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling]

What was the other energy source used for air conditioning?

- ENTER the cooling source used

NEXT	➔ D86 [Cooling routing]

D86	**Cooling routing**
NEXT	IF D80 [Percent cooled] ≠ 0 THEN: IF D81 [Electricity only for cooling] = Yes OR (Electricity IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling]) ➔ D87 [Elec cooling equipment] IF Natural gas IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D90 [Nat gas cooling equipment] IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D92 [Fuel oil cooling equipment] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF D21 [Percent heated] ≠ 0 ➔ D105 [Who has temperature control] IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D87	**Elec cooling equipment** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (D81 [Electricity only for cooling] = Yes OR (Electricity IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling]))

SHOW CARD D12

Looking at the list of electric cooling equipment types on Show Card D12, please tell me which types are used in this building.

- PROBE for any others
- ENTER all that apply

1	Packaged air conditioning units (such as roof mounted units, or RTUs)	*PKGCL*
2	Central chillers that chill water for air conditioning	*CHILLR*
3	Heat pumps for cooling	*HTPMPC*
4	Residential-type central air conditioners that cool air directly and circulate it without using chilled water	*RCAC*
5	Individual room or portable air conditioners	*ACWNWL*
6	"Swamp" coolers or evaporative coolers	*EVAPCL*
7	Other cooling equipment	*OTCLEQ*

NEXT

IF Other cooling equipment selected ➔ D88 [Elec other cool equip specify]
IF Heat pumps selected & NOT Heat pumps for any main or secondary heating equipment
➔ D89 [Heat pump cooling type]
IF Natural gas IN D82 [Sources for cooling] OR D84 [Other source for cooling]
➔ D90 [Nat gas cooling equipment]
IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling]
➔ D92 [Fuel oil cooling equipment]
IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling]
➔ D94 [Propane cooling equipment]
IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling]
➔ D96 [District steam cooling equipment]
IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling]
➔ D98 [Other source other cool equip specify]
IF Chillers selected ➔ D99 [Chiller distribution]
IF District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR
D84 [Other source for cooling] ➔ D101 [Chilled water distribution]
IF More than one cooling equipment selected ➔ D102 [Percent cooled by type]
OTHERWISE ➔ D105 [Who has temperature control]

D88	Elec other cool equip specify
ASK	IF Other cooling equipment IN D87 [Elec cooling equipment]
Please describe the other type of <u>electric</u> cooling equipment. ◆ RECORD in open box	
NEXT	IF Heat pumps IN D87 [Elec cooling equipment] & NOT Heat pumps for any main or secondary heating equipment ➔ D89 [Heat pump cooling type] IF Natural gas IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D90 [Nat gas cooling equipment] IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D92 [Fuel oil cooling equipment] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one cooling equipment selected IN D87 [Elec cooling equipment] ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D89	**Heat pump cooling type** *see below*
ASK	IF Heat pumps IN D87 [Elec cooling equipment] & NOT Heat pumps for any main or secondary heating equipment

SHOW CARD D10

Looking at the list on Show Card D10, please tell me which types of heat pumps are used in this building.

◆ ENTER all that apply

1	Air source heat pump	*HPCAIR*
2	Ground source or ground water heat pump (geothermal)	*HPCGRD*
3	Combination air source and geothermal	*HPCDUAL*
4	Water loop heat pump	*HPCWTR*

NEXT	IF Natural gas IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D90 [Nat gas cooling equipment] IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D92 [Fuel oil cooling equipment] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distrubtion] IF More than one cooling equipment selected IN D87 [Elec cooling equipment] ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D90	**Nat gas cooling equipment** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (Natural gas IN D82 [Sources for cooling] OR D84 [Other source for cooling])

SHOW CARD D13

Looking at the list of cooling equipment types on Show Card D13, please tell me which types are fueled by natural gas in this building.

- PROBE for any others
- ENTER all that apply

1	Central chillers that chill water for air conditioning	*CHILLR*
2	Other cooling equipment	*OTCLEQ*

NEXT	IF Other cooling equipment selected ➔ D91 [Nat gas other cool equip specify] IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D92 [Fuel oil cooling equipment] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D91	**Nat gas other cool equip specify**
ASK	IF Other cooling equipment IN D90 [Nat gas cooling equipment]

Please describe the other type of cooling equipment that is fueled by natural gas.

- RECORD in open box

NEXT	IF Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D92 [Fuel oil cooling equipment] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D92	**Fuel oil cooling equipment** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (Fuel oil/Diesel/Kerosene IN D82 [Sources for cooling] OR D84 [Other source for cooling])
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]

SHOW CARD D13

Looking at the list of cooling equipment types on Show Card D13, please tell me which types are fueled by {FuelOilType} in this building.

- PROBE for any others
- ENTER all that apply

1	Central chillers that chill water for air conditioning	*CHILLR*
2	Other cooling equipment	*OTCLEQ*

NEXT	IF Other cooling equipment selected ➔ D93 [Fuel oil other cool equip specify] IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D93	**Fuel oil other cool equip specify**
ASK	IF Other cooling equipment IN D92 [Fuel oil cooling equipment]
FILL	**{FuelOilType}** = Type or types specified in D15 [Fuel oil, diesel, or kerosene]

Please describe the other type of cooling equipment that is fueled by {FuelOilType}.

- RECORD in open box

NEXT	IF Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D94 [Propane cooling equipment] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D94	**Propane cooling equipment** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (Propane IN D82 [Sources for cooling] OR D84 [Other source for cooling])

SHOW CARD D13

Looking at the list of cooling equipment types on Show Card D13, please tell me which types are fueled by propane in this building.

- PROBE for any others
- ENTER all that apply

1	Central chillers that chill water for air conditioning	*CHILLR*
2	Other cooling equipment	*OTCLEQ*

NEXT	IF Other cooling equipment selected ➔ D95 [Propane other cool equip specify] IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D95	**Propane other cool equip specify**
ASK	IF Other cooling equipment IN D94 [Propane cooling equipment]

Please describe the other type of cooling equipment that is fueled by propane.

- RECORD in open box

NEXT	IF District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D96 [District steam cooling equipment] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D96	**District steam cooling equipment** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (District steam IN D82 [Sources for cooling] OR D84 [Other source for cooling])

SHOW CARD D13

Looking at the list of cooling equipment types on Show Card D13, please tell me which types are fueled by district steam in this building.

- PROBE for any others
- ENTER all that apply

1	Central chillers that chill water for air conditioning	*CHILLR*
2	Other cooling equipment	*OTCLEQ*

NEXT	IF Other cooling equipment selected ➔ D97 [Steam other equip cool specify] IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D97	**Steam other equip cool specify**
ASK	IF Other cooling equipment IN D96 [District steam cooling equipment]

Please describe the other type of cooling equipment that is fueled by district steam.

- RECORD in open box

NEXT	IF Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D98 [Other source other cool equip specify] IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D98	Other source other cool equip specify
ASK	IF D80 [Percent cooled] ≠ 0 & (Some other energy source IN D82 [Sources for cooling] OR D84 [Other source for cooling])
	Please describe the cooling equipment that is fueled by the other energy source. ◆ RECORD in open box
NEXT	IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment] ➔ D99 [Chiller distribution] IF District chilled water IN D82 [Sources for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D99	Chiller distribution *see below*
ASK	IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment]
FILL	**{Chillers}** IF Chillers reported for only one energy source = “chiller” IF Chillers reported for more than one energy source = “chillers”
	SHOW CARD D14 Looking at the list of cooling distribution types on Show Card D14, please tell me which one (or ones) are used with the {Chillers} in the building. 1 Central air handlers *CHLAIR* 2 Fan coil units *CHLFNCL* 3 Chilled beam *CHLBEAM* 4 Other cooling distribution *CHLOTDIST*
NEXT	➔ D100 [Type of chiller]

D100	**Type of chiller** *see below*
ASK	IF Chillers IN D87 [Elec cooling equipment] OR D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment]
FILL	**{ChillerIs}** IF Chillers reported for only one energy source = "chiller is" IF Chillers reported for more than one energy source = "chillers are" **{Absorption}** IF Chillers reported for only one energy source = "an absorption chiller" IF Chillers reported for more than one energy source = "absorption chillers"

SHOW CARD D15

Please look at Show Card D15 and tell me whether the {Chillers} air-cooled, water cooled, or {Absorption}?

- ENTER all that apply

1	Air-cooled	*CHLAIRCL*
2	Water cooled	*CHLWTRCL*
3	Absorption	*CHLABSRP*

NEXT	IF District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling] ➔ D101 [Chilled water distribution] IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D101	**Chilled water distribution** *see below*
ASK	IF D80 [Percent cooled] ≠ 0 & (District chilled water IN D82 [Sources for cooling] OR D83 [EL or CW for cooling] OR D84 [Other source for cooling])

SHOW CARD D14

Looking at the list of cooling distribution types on Show Card D14, please tell me which one (or ones) are used with the district chilled water in the building.

- PROBE for any others
- ENTER all that apply

1	Central air handlers	*CWAIR*
2	Fan coil units	*CWFNCL*
3	Chilled beam	*CWBEAM*
4	Other cooling distribution	*CWOTDIST*

NEXT	IF More than one selected cooling source/equipment combination ➔ D102 [Percent cooled by type] OTHERWISE ➔ D105 [Who has temperature control]

D102	**Percent cooled by type**	*RCACP_EL, PKGCP_EL, CHILP_EL, HTPCP_EL, ACWNWP_EL, EVAPP_EL, OTCLP_EL, CHILP_NG, OTCLP_NG, CHILP_FK, OTCLP_FK, CHILP_PR, OTCLP_PR, CHILP_ST, OTCLP_ST CHWTP_CW, OTCLP_OT*
ASK	For buildings with more than one selected cooling source/equipment combination Question is repeated for each combination	
FILL	**{Introduction}** IF First source/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 source/equipment and D80 [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 source/equipment and D80 [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 **{SourceEquipment}** Combination of selected cooling source and equipment, for example: "electric chiller"	

SHOW CARD D16

{Introduction}

{Explanation}

Please look at Show Card D16. What percent of the cooled area in this building is served by the {SourceEquipment}?

- PROBE for estimate if DK

RANGE	0 to 100
NEXT	IF there are equal maximum percents OR DK/RF ➔ D103 [Main cooling equipment] IF there is an equipment with a maximum percent, assign that equipment as the Main cooling equipment [*MAINCL9*]. THEN: IF (Main equipment NOT District chilled water OR DK/RF) & (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) & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D104 [Main cooling replaced] OTHERWISE ➔ D105 [Who has temperature control]

D103	**Main cooling equipment** *MAINCLX*
ASK	IF D102 [Percent cooled by type] has equal maximum percents OR DK/RF
FILL	**{SourceEquipmentMaxList}** = List of the equipments with equal maximum percents, for example "the electric chiller or the heat pump" **{SourceEquipmentMax}** = Source/equipment combinations with an equal maximum percent, for example "electric chiller"

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

- ◆ Only equipment types with equal percentages are shown here

  1 {SourceEquipmentMax1}
  2 {SourceEquipmentMax2}
  3 {Etc.}

NEXT	IF (Main equipment NOT District chilled water OR DK/RF) & (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) & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018) ➔ D104 [Main cooling replaced] OTHERWISE ➔ D105 [Who has temperature control]

D104	**Main cooling replaced** *NWMNCL*
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) & (A22 [Year of construction] < 2000 OR A23 [Year of construction category] ≠ 2000 to 2009 OR 2010 to 2012 OR 2013 to 2018)
FILL	**{MainCoolSourceEquipment}** Combination of main cooling source and equipment, for example "electric chiller". If more than one source/equipment combination was selected, the one with the largest percent reported in D102 [Percent cooled by type] is used. If D102 [Percent cooled by type] has equal maximum percents OR DK/RF, the answer from D103 [Main cooling equipment] is used.

Has the {MainCoolSourceEquipment} been replaced since 2000?

- ◆ 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	➔ D105 [Who has temperature control]

D105	**Who has temperature control**	*WHOTC*
ASK	IF D21 [Percent heated] ≠ 0 OR D80 [Percent cooled] ≠ 0	
Do individual tenants have direct control of the temperature in their space? 1 Yes 2 No		
NEXT	IF No ➔ D106 [Building automation system] IF Yes OR DK/RF THEN: IF Any heating equipment other than Individual space heater or Fireplace reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]	

D106	**Building automation system**	*EMCS*
ASK	IF D105 [Who has temperature control] = No	
Does this building have a "Building Automation System" which may also be referred to as BAS, smart building controls, an energy management and control system, or EMCS? ◆ DEF: [These systems monitor changes in ambient temperature and operating conditions and automatically modify the heating and cooling levels in different interior zones. This is accomplished by means of remote sensing and control instruments, and interpretive and control software.] 1 Yes 2 No		
NEXT	IF Yes ➔ D107 [BAS system controls] IF No OR DK/RF ➔ D108 [Smart thermostats]	

D107	**BAS system controls** *see below*
ASK	IF D106 [Building automation system] = Yes
FILL	**{HeatingCooling}** IF D21 [Percent heated] ≠ 0 AND D80 [Percent cooled] ≠ 0 = "heating, cooling," IF D21 [Percent heated] ≠ 0 only = "heating" IF D80 [Percent cooled] ≠ 0 only = "cooling" **{Heating}** IF D21 [Percent heated] ≠ 0 = "heating", OTHERWISE blank **{Cooling}** IF D80 [Percent cooled] ≠ 0 = "cooling", OTHERWISE blank

Does the Building Automation System control the {HeatingCooling} and/or lighting?

◆ ENTER all that apply

1	{Heating}	*EMCSHT*
2	{Cooling}	*EMCSCL*
3	Lighting	*EMCSLT*

NEXT	IF (D21 [Percent heated] ≠ 0 & Any heating equipment other than Individual space heater OR Fireplace reported) OR Any cooling equipment other than Individual room air conditioner reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]

D108	**Smart thermostats** *SMRTTHRM*
ASK	IF D106 [Building automation system] = No OR DK/RF

Does this building use any "smart" or internet-connected thermostats?

1 Yes
2 No

NEXT	IF No OR DK/RF: IF D21 [Percent heated] ≠ 0 ➔ D109 [Reduce heating] IF D80 [Percent cooled] ≠ 0 ➔ D111 [Reduce cooling] IF Yes THEN: IF (D21 [Percent heated] ≠ 0 & Any heating equipment other than Individual space heater OR Fireplace reported) OR Any cooling equipment other than Individual room air conditioner reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]

D109	**Reduce heating**	*RDHTNF*
ASK	IF D108 [Smart thermostats] = No OR DK/RF & D21 [Percent heated] ≠ 0	
	When the building is not in full use, is there a change in the temperature setting for heating? 1 Yes 2 No	
NEXT	IF Yes ➔ D110 [How reduce heating] IF No OR DK/RF THEN: IF D80 [Percent cooled] ≠ 0 ➔ D111 [Reduce cooling] IF Any heating equipment other than Individual space heater OR Fireplace reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]	

D110	**How reduce heating**	*HWRDHT*
ASK	IF D109 [Reduce heating] = Yes	
	How is the temperature for heating usually changed – using a programmable thermostat, manually changing the thermostat, or manually shutting down the equipment? ◆ DEF: [A programmable thermostat, or ""time-clock thermostat"" is programmed to automatically change thermostat settings for times when the building is unoccupied.] 1 Programmable thermostat 2 Manually change thermostat 3 Manually shut down equipment	
NEXT	IF D80 [Percent cooled] ≠ 0 ➔ D111 [Reduce cooling] IF Any heating equipment other than Individual space heater OR Fireplace reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]	

D111	**Reduce cooling**	*RDCLNF*
ASK	IF D108 [Smart thermostats] = No OR DK/RF & D80 [Percent cooled] ≠ 0	
	When this building is not in full use, is there a change in the temperature setting for <u>cooling</u>? 1 Yes 2 No	
NEXT	IF Yes ➔ D112 [How reduce cooling] IF No OR DK/RF THEN: IF (D21 [Percent heated] ≠ 0 & Any heating equipment other than Individual space heater OR Fireplace reported) OR Any cooling equipment other than Individual room air conditioner reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]	

D112	**How reduce cooling**	*HWRDCL*
ASK	IF D111 [Reduce cooling] = Yes	

How is the temperature for cooling usually changed – using a programmable thermostat, manually changing the thermostat, or manually shutting down the equipment?

- DEF: [A programmable thermostat, or ""time-clock thermostat"" is programmed to automatically change thermostat settings for times when the building is unoccupied.]

1 Programmable thermostat
2 Manually change thermostat
3 Manually shut down equipment

NEXT	IF (D21 [Percent heated] ≠ 0 & Any heating equipment other than Individual space heater OR Fireplace reported) OR Any cooling equipment other than Individual room air conditioner reported ➔ D113 [Airflow control] OTHERWISE ➔ D115 [Regular HVAC maintenance]

D113	**Airflow control**	*VENT*
ASK	IF (D21 [Percent heated] ≠ 0 & Any heating equipment other than Individual space heater or Fireplace reported) OR Any cooling equipment other than Individual room air conditioner reported	

SHOW CARD D17

Please look at Show Card D17. Are any of these types of systems used to control the airflow in this building?

- ENTER all that apply

1	Variable air colume (VAV) system	*VAV*
2	Dedicated outside air system (DOAS)	*DOAS*
3	Demand controlled ventilation (DCV)	*FKWATR*
4	None of these types	*NOVENT*

NEXT	IF Any cooling equipment other than Individual room air conditioner reported ➔ D114 [Economizer cycle] OTHERWISE ➔ D115 [Regular HVAC maintenance]

D114	**Economizer cycle**	*ECN*
ASK	IF Any cooling equipment other than Individual room air conditioner reported	

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

1 Yes
2 No

NEXT	IF (Packaged air conditioning units OR Chillers OR Heat pumps for cooling IN D87 [Elec cooling equipment]) OR (Chillers IN D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment]) ➔ D114a [Cooling tower] OTHERWISE ➔ D115 [Regular HVAC maintenance]

D126a	**Cooling tower**	*CTOWER*
ASK	IF (Packaged air conditioning units OR Chillers OR Heat pumps for cooling IN D87 [Elec cooling equipment]) OR (Chillers IN D90 [Nat gas cooling equipment] OR D92 [Fuel oil cooling equipment] OR D94 [Propane cooling equipment] OR D96 [District steam cooling equipment])	
Does this building have a cooling tower for the cooling equipment? ◆ DEF: [A cooling tower is used to dispose of unwanted heat from the cooling equipment.] 1 Yes 2 No		
NEXT	➔ D115 [Regular HVAC maintenance]	

D115	**Regular HVAC maintenance**	*MAINT*
ASK	IF D21 [Percent heated] ≠ 0 OR D80 [Percent cooled] ≠ 0	
FILL	**{HeatCool}** IF Heating only = "heating" IF Cooling only = "cooling" IF Heating & Cooling = "heating and cooling"	
Is there any regularly scheduled maintenance and repair for the {HeatCool} system? 1 Yes 2 No		
NEXT	IF D7 [Water heating] = Yes ➔ D116 [Sources for water heating] IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]	

D116	**Sources for water heating** *see below*
ASK	IF D7 [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 D15 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [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}	*ELWATR*
12	{Natural gas}	*NGWATR*
13	{FuelOilType}	*FKWATR*
14	{Propane}	*PRWATR*
15	{District steam}	*STWATR*
16	{District hot water}	*HWWATR*
18	{Wood}	*WOWATR*
19	{Coal}	*COWATR*
20	{Solar thermal}	*SOWATR*
21	{Other1}	*OTWATR*
22	{Other2}	*OTWATR*
23	{Other3}	*OTWATR*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D117 [Other water heating source] OTHERWISE ➔ D118 [Water heating equipment]

D117	**Other water heating source** *see below*
ASK	IF Some other energy source IN D116 [Sources for water heating]

What was the other energy source used for water heating?

11	Electricity	*ELWATR*
12	Natural gas	*NGWATR*
13	Fuel oil/Diesel/Kerosene	*FKWATR*
14	Propane	*PRWATR*
15	District steam	*STWATR*
16	District hot water	*HWWATR*
18	Wood	*WOWATR*
19	Coal	*COWATR*
20	Solar thermal	*SOWATR*
24	Some other energy source	*OTWATR*

NEXT	➔ D118 [Water heating equipment]

D118	**Water heating equipment**	*WTHTEQ*
ASK	IF D7 [Water heating] = Yes	

Does this building have centralized water heaters, "point-of-use" water heaters, or both of these types (of water heaters)? Point-of-use water heaters may also be referred to as “tankless” water heaters.

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

NEXT	IF D10 [Cooking] = Yes ➔ D119 [Sources for cooking] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D119	**Sources for cooking**	*see below*
ASK	IF D10 [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 D15 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [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}	*ELCOOK*
12	{Natural gas}	*NGCOOK*
13	{FuelOilType}	*FKCOOK*
14	{Propane}	*PRCOOK*
15	{District steam}	*STCOOK*
16	{District hot water}	*HWCOOK*
18	{Wood}	*WOCOOK*
19	{Coal}	*COCOOK*
21	{Other1}	*OTCOOK*
22	{Other2}	*OTCOOK*
23	{Other3}	*OTCOOK*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D120 [Other cooking source] IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D120	**Other cooking source**	*see below*
ASK	IF Some other energy source IN D119 [Sources for cooking]	

What was the other energy source used for cooking?

11	Electricity	*ELCOOK*
12	Natural gas	*NGCOOK*
13	Fuel oil/Diesel/Kerosene	*FKCOOK*
14	Propane	*PRCOOK*
15	District steam	*STCOOK*
16	District hot water	*HWCOOK*
18	Wood	*WOCOOK*
19	Coal	*COCOOK*
24	Some other energy source	*OTCOOK*

NEXT	IF D12 [Manufacturing] = Yes ➔ D121 [Sources for manufacturing] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D121	**Sources for manufacturing**	*see below*
ASK	IF D12 [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 D15 [Fuel oil, diesel, or kerosene] **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [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}	*ELMANU*
12	{Natural gas}	*NGMANU*
13	{FuelOilType}	*FKMANU*
14	{Propane}	*PRMANU*
15	{District steam}	*STMANU*
16	{District hot water}	*HWMANU*
18	{Wood}	*WOMANU*
19	{Coal}	*COMANU*
21	{Other1}	*OTMANU*
22	{Other2}	*OTMANU*
23	{Other3}	*OTMANU*
24	Some other energy source	

NEXT	IF Some other energy source selected ➔ D122 [Other manufacturing source] IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D122	**Other manufacturing source**	*see below*
ASK	IF Some other energy source IN D121 [Sources for manufacturing]	

What was the other energy source used for manufacturing?

11	Electricity	*ELMANU*
12	Natural gas	*NGMANU*
13	Fuel oil/Diesel/Kerosene	*FKMANU*
14	Propane	*PRMANU*
15	District steam	*STMANU*
16	District hot water	*HWMANU*
18	Wood	*WOMANU*
19	Coal	*COMANU*
24	Some other energy source	*OTMANU*

NEXT	IF D17 [Type of solar] = Solar panels ➔ D125 [Generation technologies other than solar] OTHERWISE ➔ D123 [Electricity generation capability]

D123	**Electricity generation capability**	*CAPGEN*
ASK	IF NOT D17 [Type of solar] = Solar panels	

Does this building have the ability to generate electricity on-site, such as from solar panels or a generator? Please include generation equipment even if it is used for emergency backup purposes.

1 Yes
2 No

NEXT	IF Yes ➔ D124 [Generation technologies] OTHERWISE: IF Electricity used ➔ D131 [EV charging stations] OTHERWISE ➔ D132 [Any other sources]

D124	**Generation technologies**	*see below*
ASK	IF D123 [Electricity generation capability] = Yes	

SHOW CARD D18

Looking at Show Card D18, were any of the technologies on the list used on-site for generating electricity?

- PROBE for any others
- ENTER all that apply

1	Solar panels used to generate electricity	*PVC*
2	Reciprocating engine generator	*ENGINE*
3	Fuel cells	*FUELCL*
4	Large turbines	*LRGTRB*
5	Microturbines	*MCROTB*
6	Wind turbines	*WINDTRB*
7	Other technology to generate electricity on-site	*OTGENTECH*

NEXT	IF Other technology to generate electricity on-site ➔ D126 [Other gener tech specify] IF DK/RF OR (ONLY Solar panels OR Wind turbines) THEN: IF Electricity used ➔ D131 [EV charging stations] OTHERWISE ➔ D132 [Any other sources] OTHERWISE ➔ D127 [Cogeneration system]

D125	**Generation technologies other than solar**	*see below*
ASK	IF D17 [Type of solar] = Solar panels	

SHOW CARD D19

Earlier you mentioned that solar panels were used to generate electricity for this building. Looking at Show Card D19, were any of the other technologies on the list used on-site for generating electricity?

- PROBE for any others
- ENTER all that apply

1	No other electricity generation technologies used	
2	Reciprocating engine generator	*ENGINE*
3	Fuel cells	*FUELCL*
4	Large turbines	*LRGTRB*
5	Microturbines	*MCROTB*
6	Wind turbines	*WINDTRB*
7	Other technology to generate electricity on-site	*OTGENTECH*

NEXT	IF Other technology to generate electricity on-site ➔ D126 [Other gener tech specify] IF DK/RF OR (ONLY Solar panels OR Wind turbines) THEN: IF Electricity used ➔ D131 [EV charging stations] OTHERWISE ➔ D132 [Any other sources] OTHERWISE ➔ D127 [Cogeneration system]

D126	Other gener tech specify
ASK	IF Other technology to generate electricity on-site IN D124 [Generation technologies] OR D125 [Generation technologies other than solar]
Please describe the other way that this building generates electricity on-site. ◆ RECORD in open box	
NEXT	➔ D127 [Cogeneration system]

D127	Cogeneration system *COGEN*
ASK	IF Any technology other than Solar panels or Wind turbines in D124 [Generation technologies] OR Any response other than No other technologies or Wind turbines in D125 [Generation technologies other than solar]
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	➔ D128 [Sources for electricity generation]

D128	Sources for electricity generation *see below*
ASK	IF Any technology other than Solar panels or Wind turbines in D124 [Generation technologies] OR Any response other than No other technologies or Wind turbines in D125 [Generation technologies other than solar]
FILL	**{GenrTechList}** = List of generation technologies used excluding Solar and Wind **{Other1} – {Other3}** = Sources specified in D18 [Other energy source 1] – D20 [Other energy source 3]

SHOW CARD D20

Looking at Show Card D20, please tell me which energy sources were used for the {GenrTechList}.

◆ PROBE for any others

◆ ENTER all that apply

12	Natural gas	*NGGENR*
13	Fuel oil/Diesel/Kerosene	*FKGENR*
14	Propane	*PRGENR*
18	Wood	*WOGENR*
19	Coal	*COGENR*
21	{Other1}	*OTGENR*
22	{Other2}	*OTGENR*
23	{Other3}	*OTGENR*
24	Some other energy source	*OTGENR*

NEXT	➔ D129 [Use of generated electricity]

D129	**Use of generated electricity**	*GENUSE*
ASK	IF Any technology other than Solar panels or Wind turbines in D124 [Generation technologies] OR Any response other than No other technologies or Wind turbines in D125 [Generation technologies other than solar]	
During 2018, was the electricity generated in this building used: primarily for emergency back-up or testing, only during periods of high electricity demand, or whenever electricity was used? 1 Primarily for emergency back-up or testing 2 During periods of high electricity demand 3 Whenever electricity was used		
NEXT	IF Primarily for emergency back-up or testing OR During periods of high electricity demand ➔ D130 [Energy for generation] IF Electricity used ➔ D131 [EV charging stations] OTHERWISE ➔ D132 [Any other sources]	

D130	**Energy for generation**	*GENR*
ASK	IF D129 [Use of generated electricity] = Primarily for emergency back-up or testing OR During periods of high electricity demand	
Was any energy actually <u>used</u> for generating electricity in this building during 2018, even if just a small amount was used for emergency backup or for testing generators? 1 Yes 2 No		
NEXT	IF Electricity used ➔ D131 [EV charging stations] OTHERWISE ➔ D132 [Any other sources]	

D131	**EV charging stations**	*GENR*
ASK	IF Electricity used	
Are there any electric vehicle charging stations associated with this building, either inside or outside the building? 1 Yes 2 No		
NEXT	➔ D132 [Any other sources]	

D132	**Any other sources**
ASK	IF D14 [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 {SourcesList}?

1 Yes
2 No

NEXT	IF Yes ➔ D133 [Other sources] IF No OR DK/RF: Check that every energy source given in D14 [Energy sources used] (other than electricity) was assigned an end use. THEN: IF Yes: IF Heating OR Cooling ➔ D136 [Energy management plan] OTHERWISE ➔ L1 [Response effort] IF No ➔ D135 [Missed {energy source} use]

D133	**Other sources** *see below*
ASK	IF D132 [Any other sources] =Yes
FILL	**{Electricity} – {Coal}** = 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}	*ELUSED*
12	{Natural gas}	*NGUSED*
13	{Fuel/Diesel/Kerosene}	*FKUSED*
14	{Propane}	*PRUSED*
15	{District steam}	*STUSED*
16	{District hot water}	*HWUSED*
17	{District chilled water}	*CWUSED*
18	{Wood}	*WOUSED*
19	{Coal}	*COUSED*
20	{Solar thermal}	*SOUSED*
24	Other	*OTUSED*

NEXT	IF District chilled water selected, check that every energy source given in D14 [Energy sources used] (other than electricity) was assigned an end use. THEN: IF Yes: IF Heating OR Cooling ➔ D136 [Energy management plan] OTHERWISE ➔ L1 [Response effort] IF No ➔ D135 [Missed {energy source} use] OTHERWISE ➔ D134 [{Energy source} use]

D134	**{Energy source} use** *see below where {XX} is the energy source abbreviation*
ASK	For each source except District chilled water selected in D133 [Other sources]
FILL	**{EnergySource}** IF Electricity IN D133 [Other sources] = "electricity" IF Natural gas IN D133 [Other sources] = "natural gas" IF Fuel oil/Diesel/Kerosene IN D133 [Other sources] = "fuel oil/diesel/kerosene" IF Propane IN D133 [Other sources] = "propane" IF District steam IN D133 [Other sources] = "district steam" IF District hot water IN D133 [Other sources] = "district hot water" IF Wood IN D133 [Other sources] = "wood" IF Coal IN D133 [Other sources] = "coal" IF Solar thermal IN D133 [Other sources] = "solar thermal" IF Other IN D133 [Other sources] = "other fuel" **{Cooling}** Does not appear as a choice for District hot water, Wood, Coal, OR Solar thermal **{Electricity generation}** Does not appear as a choice for Electricity, District steam, OR District hot water

What was the {EnergySource} used for?

1	Heating	*{XX}HT1/HT2*
2	{Cooling}	*{XX}COOL*
3	Water heating	*{XX}WATR*
4	Cooking	*{XX}COOK*
5	Manufacturing	*{XX}MANU*
6	{Electricity generation}	*{XX}GENR*
7	Some other use	*{XX}OTH*
8	Incorrectly recorded--source not used	

NEXT	Check that every energy source given in D14 [Energy sources used] (other than electricity or district chilled water) was assigned an end use. THEN: IF Yes: IF Heating OR Cooling ➔ D136 [Energy management plan] OTHERWISE ➔ L1 [Response effort] IF No ➔ D135 [Missed {energy source} use]

D135	**Missed {energy source} use** *see below where {XX} is the energy source abbreviation*
ASK	For every energy source given in D14 [Energy sources used] that was not assigned an end use (other than electricity)
FILL	**{EnergySource}** IF No end use for Natural gas = "natural gas" IF No end use for Fuel oil = Type or types specified in D15 [Fuel oil, diesel, or kerosene] IF No end use for Propane = "propane" 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 District chilled water = "district chilled water" IF No end use for Wood = "wood" IF No end use for Coal = "coal" IF No end use for Solar thermal = "solar thermal" IF No end use for Other = "another energy source" (second fill = "other energy source") **{Heating}, {Water heating}, {Cooking}, {Manufacturing}** Do not appear as a choice for District chilled water use **{Cooling}** Does not appear as a choice for District hot water, Wood, Coal, OR Solar thermal **{Electricity generation}** Does not appear as a choice for District chilled water, District steam, OR District hot water

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}HT1/HT2*
2	{Cooling}	*{XX}COOL*
3	{Water heating}	*{XX}WATR*
4	{Cooking}	*{XX}COOK*
5	{Manufacturing}	*{XX}MANU*
6	{Electricity generation}	*{XX}GENR*
7	Some other use	*{XX}OTH*
8	Incorrectly recorded--source not used	

NEXT	IF Heating OR Cooling ➔ D136 [Energy management plan] OTHERWISE ➔ L1 [Response effort]

D136	**Energy management plan** *ENRGYPLN*
ASK	IF Heating OR Cooling

Does this building have a formal energy management plan in which energy targets are set and consistently monitored?

1 Yes
2 No

NEXT	➔ L1 [Response effort]

SECTION L. SURVEY CLOSEOUT

L1	**Response effort** *REFFORT*
ASK	All Mall Buildings
Including yourself, please tell me how many people were needed to compile the information for this interview.	
RANGE	1 to 99
NEXT	➔ L2 [Interview complete]

L2	**Interview complete**
ASK	All Mall Buildings
That completes our interview. Thank you so much for your time and help. ◆ ENTER "1", [ENTER], then [F10] to Exit	
NEXT	INTERVIEW COMPLETE