INDIRECT IMPACT EVALUATION OF THE STATEWIDE ENERGY EFFICIENCY EDUCATION AND TRAINING PROGRAM

VOLUME III OF IV: SURVEY INSTRUMENTS

Study ID: CPU0014.03

Prepared for:

CALIFORNIA PUBLIC UTILITIES COMMISSION

ENERGY DIVISION

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1. BOILERS

[ASK IF Respondent Type=EUCC or EUCR, ELSE SKIP TO TA0]
MK1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the hot water system at your facility(ies)? [1=Yes, 2=No]

a. Modified the hot water distribution and plumbing system, including the faucets, showerheads, piping, and/or pumping.
b. Installed or replaced boilers, water heaters, and/or other water heating devices.
c. Installed or made changes to system controls, operation, and/or maintenance.

[ASK IF MK1A=1 ELSE NK2G]
NK2a-f. Thinking about your hot water distribution and plumbing system(s), did you make any of the following changes at your facility(ies)?
[1=Yes 2=No]

a. Insulated piping
b. Installed low-flow faucets or faucet aerators
c. Installed low-flow showerheads or showerhead aerators
d. Increased hot water storage
e. Installed structured plumbing
f. Other

[ASK IF MK1B=1 ELSE NK2K]
NK2g-j. Thinking about your boilers, tanks, and other water heating devices, did you make any of the following changes at your facility(ies)?
[1=Yes, 2=No]

g. Installed new or replacement high efficiency storage tank water heater (s).
h. Installed new or replacement high efficiency tankless water heater (s).
i. Installed new or replacement high efficiency boiler(s).
j. Installed a condensing boiler(s), cogeneration system(s) or other heat recovery approach(es) for heating water.

[ASK IF MK1C=1 ELSE MK3A]
NK2k-l. Thinking about your system controls, operations, and maintenance, did you make any of the following changes at your facility(ies)?
[1=Yes 2=No]

k. Installed or updated a control strategy or made operational changes on your hot water system.
l. Performed repair or maintenance measures on your hot water system.

[ASK IF ALL NK2A-L= 2 ELSE SKIP TO MK3B]
MK3a. It seems we have not captured the changes you have made. Please describe the changes you have made to your hot water system to save energy where you applied concepts taught in the course.
[OPEN END]

[ASK IF ANY NK2A-H=1, ELSE SKIP TO MK4]

MK3b. Please describe any additional changes you made to your hot water system to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MK4. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
98. Don't know

[ASK IF MK4 =1, ELSE SKIP TO SKIP BEFORE MK10]
MK5. In which program did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name
00. Other, Specify
98. Don't know

MK6. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
3. Don't know

[ASK IF MK6 =1]
MK7. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MK4=1 SKIP TO DC1]
MK10. Did you perform these energy saving water heating measures at more than one building?

1. Yes
2. No
98. Don't know

[ASK IF MK10=1, OTHERWISE SKIP TO MK9]
MK11. In how many buildings did you add these measures?
[NUMERIC OPEN END]

MK9. The State of California has asked us to provide them with some idea of the energy savings of your actions. Approximately, how many square feet is your facility(ies)? If the

changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 0-999999]

[SAY/INSERT ONLY IF MK11 > 1]
For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility and** that has been impacted the most by the energy saving changes you implemented.

MK12. Please enter the zip code of your facility.
[ZIPCODE OPEN END]

NK4. How many years old is your facility?
000. Less than one year
[NUMERIC OPEN END, 1-200]

MK13a. What type of building did the work occur in?
1. Assembly (e.g., an assembly hall or a church)
2. Primary or Secondary Education
3. University or College
4. Grocery
5. Health/Medical (e.g., a hospital or nursing home)
6. Lodging (e.g. hotel, motel)
7. Manufacturing (e.g., Bio Tech, light industrial manufacturing)
8. Small office building (less than 25,000 square feet)
9. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant
11. Retail
12. Storage
13. Refrigerated Warehouse
14. Single Family Residential
15. Multi-family Residential
16. Agricultural
00. Other (Specify:_____)

[ASK IF MK13a=2]
MK13b. Was the retrofit in a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[ASK IF MK13a=3]
MK13c. Was this a university or college?
1. University
2. College

[ASK IF MK13a=5]
MK13d. Was this a hospital or nursing home?
1. Hospital
2. Nursing home

3. Other, specify

[ASK IF MK13a=6]
MK13e. Was this a hotel or motel?
1. Hotel
2. Motel

[ASK IF MK13a=7]
MK13f. Was this a biotech or light manufacturing type of facility?
1. Biotech
2. Light Manufacturing
3. Other, specify

[ASK IF MK13a=10]
MK13g. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[ASK IF MK13a=11]
MK13h. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story (e.g. greater than or equal to 25,000 sq. ft.)
2. Large single-story (e.g. greater than or equal to 25,000 sq. ft.)
3. Small (e.g. less than 25,000 sq. ft.)

[ASK IF MK13a=12]
MK13i. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[ASK IF MK13a=14]
MK13j. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

[ASK IF MK13a=15]
NK13k. How many units in this multifamily home were affected?
[NUMERIC OPEN END, 0-9999]

MK14. Do you have an estimate of the total amount of hot water used per day for this building?
1. Yes
2. No
98. Don't know

[ASK IF MK14=1, ELSE NK8]
MK15. Approximately, how many gallons of hot water are used per day?
[NUMERIC OPEN END, 0-9999]

NK8. What type of water heating system do you have in your facility?
1. Water heater(s)
2. Boiler(s)
3. Both water heater(s) and boiler(s)
4. Other, specify

NK9. What type of fuel do you use primarily for your water heating?
1. Natural Gas
2. Electric
00. Other, specify

NK10. What are the operating hours of this facility? Please provide an average hours per day for each.
a. Weekdays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)
b. Saturdays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)
c. Sundays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)

[ASK IF NK2a =1 OR NK2b=1 OR NK2c=1 OR NK2d=1 OR NK2e=1 OR NK2f=1 or NK2g=1 or NK2h=1 ELSE SKIP TO MK75]
MK8. The next section asks about the technical details of the changes you made to the hot water system equipment at your facility. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO MK75]

Section 1: Replace Existing Piping

[ASK IF NK2a = 1, OTHERWISE SKIP TO MK39]
MK17. How many linear feet of new pipe did you insulate?
[NUMERIC OPEN END, 0-9999], DK

NK18. What is the average diameter of the pipe in inches? [4 CHARACTER NUMERIC RESPONSE ALLOWING DECIMALS]
[NUMERIC OPEN END, 0.00-99.99], DK

MK20. What is the average insulation level surrounding the old and new pipe in inches? [4 CHARACTER NUMERIC RESPONSE ALLOWING DECIMALS]
A. Old pipe insulation: [NUMERIC OPEN END] (Enter "99" if unknown)
B. New pipe insulation: [NUMERIC OPEN END] (Enter "99" if unknown)

[ASK IF NK2b=1, OTHERWISE SKIP TO MK40]
MK39. How many low flow showerheads did you install?
[NUMERIC OPEN END, 0-9999]

[ASK IF NK2c=1, OTHERWISE SKIP TO MK22b]
MK40. How many aerators did you install?
[NUMERIC OPEN END, 0-9999]

[ASK IF NK2d=1, OTHERWISE SKIP TO NK28]
MK22b. How many water heating units were affected by the increased hot water storage?

[NUMERIC OPEN END, 0-9999]

NK23. What type of fuel is used for the affected water heaters?
A. Gas
B. Electric
C. Other

[ASK IF NK23=b, OTHERWISE SKIP TO MK25]
NK24. What types of water heating units were affected? [MULTIPLE CHOICE]
A. Water heaters
B. Boilers
D. Other

MK25. What is the total storage capacity (in gallons) of your old and new system? [ALLOW, 0-9999]
A. Old system: [NUMERIC OPEN END] (Enter "9999" if unknown)
B. New system: [NUMERIC OPEN END] (Enter "9999" if unknown)

[ASK IF NK2e=1 ELSE NK42]
NK28. You indicated that you installed structured plumbing, which of the following changes did you make? [MULTIPLE RESPONSE]
A. Shortened plumbing distances
B. Installed a demand-controlled pumping system
C. Other, specify

Section 4: Installed Storage Tank Water Heaters

[ASK IF NK2g=1, ELSE SKIP TO NK50]
NK42. You indicated that you installed new and/or replaced high efficiency storage tank water heaters. How many new water heaters did you install? Please enter "0" if all installations were replacement units.
[NUMERIC OPEN END, 0-9999]

NK43. How many water heaters did you replace? Please enter "0" if all installations were new units.
[NUMERIC OPEN END]

[ASK IF NK43>0 ELSE NK44B]
NK44a. What was the fuel type of the **old** water heaters with storage tanks?
A. Gas
B. Electric
C. Other

NK44b. What is the fuel type of the **new** water heaters with storage tanks?
A. Gas
B. Electric
C. Other

[ASK IF NK43>0 ELSE NK47]
MK45. What was the average energy factor (EF) of the **old** water heaters?
[NUMERIC OPEN END, 0.00-99.99],DK

MK47. What is the average energy factor (EF) of the **new** water heaters?
[NUMERIC OPEN END, 0.0-1.0], DK

[ASK IF NK43>0 ELSE NK49]
MK48. What was the average storage capacity (in gallons) of your **old** water heater units?
[NUMERIC OPEN END, 0-9999], DK

MK49. What is the average storage capacity (in gallons) of your **new** water heater units?
[NUMERIC OPEN END, 0-9999], DK

Section 5a: Installed Tankless Water Heaters

[ASK IF NK2h=1, ELSE SKIP TO NK55]
NK50. You indicated that you installed new and/or replaced high efficiency tankless water heaters. How many new water heaters did you install? Please enter "0" if all installations were replacement units.
[NUMERIC OPEN END, 0-9999]

NK51. How many water heaters did you replace? Please enter "0" if all installations were new units.
[NUMERIC OPEN END]

[ASK IF NK51>0 ELSE NK52B]
NK52a. What was the fuel type of the **old** water heaters?
A. Gas
B. Electric
C. Other

NK52b. What is the fuel type of the **new** tankless water heaters?
A. Gas
B. Electric
C. Other

[ASK IF NK51>0 ELSE NK54]
NK53. What was the average energy factor of the **old** water heaters?
[NUMERIC OPEN END, 0.00-99.99], DK

NK54. What is the average energy factor of the **new** tankless water heaters?
[NUMERIC OPEN END, 0.00-99.99], DK

Section 5b: Installed Boilers

[ASK IF NK2i=1, ELSE SKIP TO MK59]
NK55. You indicated that you installed new and/or replaced high efficiency boilers. How many new boilers did you install? Please enter "0" if all installations were replacement units.
[NUMERIC OPEN END]

NK56. How many boilers did you replace? Please enter "0" if all installations were new units.
[NUMERIC OPEN END]

[ASK IF NK56>0 ELSE NK57B]
NK57a. What was the fuel type of the **old** boilers?
A. Gas
B. Electric
C. Other

NK57b. What is the fuel type of the **new** boilers?
A. Gas
B. Electric
C. Other

[ASK IF NK56>0 ELSE NK59]
NK58. What was the average efficiency (in AFUE) of the **old** boilers?
[NUMERIC OPEN END, 0-100], DK

NK59. What is the average efficiency (in AFUE) of the **new** boilers?
[NUMERIC OPEN END, 0-100], DK

[ASK IF NK56>0 ELSE NK61]
NK60. What was the storage capacity (in thousand Btuhs) of your **old** boilers?
[NUMERIC OPEN END, 0-9999], DK

NK61. What is the average storage capacity (in thousand Btuhs) of your **new** boilers?
[NUMERIC OPEN END, 0-9999], DK

Section 6: Installed Condensing boiler, cogeneration or other heat recovery system?

[ASK IF NK2J=1, ELSE SKIP TO MK65]
MK59. You indicated that you installed a condensing boiler(s), cogeneration system(s) or other heat recovery approach(es). Please indicate the type(s) of system(s) you installed.
[MULTIPLE RESPONSE]
1. Condensing boiler(s)
2. Cogeneration system(s)
00. Other, specify

[ASK IF MK59=1, OTHERWISE SKIP TO MK64]
MK60. How many boilers did you install?
[NUMERIC OPEN END, 0-9999]

MK61. What is the average size in thousand Btuhs of the boiler(s) you installed?
[NUMERIC OPEN END 0-9999], DK

MK62. What is the average efficiency (%) of the old and new boiler(s)?
A. Old boiler: [NUMERIC OPEN END, 0-9999] (Enter "9999" if unknown)
B. New boiler: [NUMERIC OPEN END, 0-9999] (Enter "9999" if unknown)

[ASK If MK59=1 OR 2, ELSE MK65]
MK64. Please describe the prime mover, waste heat application(s), and size of the cogeneration system you installed.
[OPEN END]

Section 7: Installed a control system or implemented an operational strategy such as boiler tuning, installing combustion efficiency controls, or controlling flow or temperature of water.

[ASK IF NK2K=1, ELSE SKIP TO MK73]

MK65. You indicated that you installed a control system or strategy on your new or existing hot water system. Which of the following control strategies did you undertake? Please select all that apply. [MULTIPLE RESPONSE]

a. Reduced temperature setpoint
b. Changed mix water temperature
c. Fuel/air controls
d. Oxygen trim controls
e. Excess combustion air controls
f. Flow rate controls
g. Demand controls
h. Other, specify

[ASK IF MK65a=1 or MK65b=1, OTHERWISE SKIP TO MK66C]

MK66. What are the old and new water temperature setpoints in degrees Farenheit that you deliver?

a. Old setpoint: [NUMERIC OPEN END, 0-9999] (Enter "9999" if unknown)
b. New setpoint: [NUMERIC OPEN END, 0-9999] (Enter "9999" if unknown)

[ASK IF MK65C=1, MK65d=1 or MK65e=1, OTHERWISE SKIP TO MK72]

MK66c. How many heater(s) or boiler(s) are you controlling?
[NUMERIC OPEN END 0-9999]

MK68. What is the average size of the water heater(s) or boiler(s) you are controlling?
a. size: [NUMERIC OPEN END, 0-9999] (Enter "9999" if unknown)
b. Units:

1. Gallons of hot water produced
2. Thousand Btus
3. Pounds of steam
4. Other
5. No units selected
6. DK

MK70. What was the average efficiency (%) of the heater(s)/boiler(s) before the controls were changed?
[NUMERIC OPEN END, 0-9999], DK

MK71. Please describe the control strategy that you have implemented.
[OPEN END]

MK72. Please describe the impact of the changes you made to the control strategy (including the value and the units). For example, raised boiler efficiency by 2%, or reduced excess oxygen level from 30% to 14%.
[OPEN END]

Section 8: Performed repair or maintenance measures on your water heating system

[ASK IF NK2L=1, ELSE SKIP TO MK75]

MK73 AND MK74. You indicated that you performed repair or maintenance measures on your water heating system. Which of the following repairs did you perform as a result of this course? Please select all that apply.

a. Clean plumbing inlets
b. Check pressure relief valve
c. Periodically flush system
d. Change anode rod
e. Clean central system
f. Repair thermocouples
g. Reset setpoints
h. Check and reduce condensate system losses
i. Check and reduce trap flash loss
j. Check and reduce steam trap leakage
k. Check and reduce blowdown losses
l. Check and reduce stack losses
m. Check and reduce boiler scaling
n. Other actions

MK75. Have you performed an engineering or post-installation analysis to determine how much electricity, gas, and/or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MK75=1 ELSE SKIP TO MK79]

MK76. Did you estimate electricity savings, therm savings, dollar savings, or both energy and dollar savings? [MULTIPLE RESPONSE]

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated therms saved

[ASK IF MK76=1, ELSE MK78]

MK77. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $999,999]

[ASK IF MK76=2, ELSE MK78b]

MK78. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 999,999 kWh]

[ASK IF MK76=3, ELSE MK79]
MK78b. Approximately how many therms did you save annually?
[NUMERIC OPEN END, limit 999,999 therms]

[ASK IF MK75=2 ELSE SKIP TO EO1]
MK79. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, therms or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

2. COMBINED HEAT AND POWER / GAS ENGINE

[ASK IF Respondent Type=EUCC or EUCR, ELSE SKIP TO TA0]
MX1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the engines or combined heat and power system at your facility(ies)?
[1=Yes, 2=No]

a. Installed or replaced a combined heat and power system.
b. Installed or replaced new gas or liquid fueled engines
c. Modified an existing CHP system.
d. Modified an existing gas or liquid-fueled engine

[ASK IF ALL MX1A-D= 2 ELSE SKIP TO MX6]
MX5. It seems we have not captured the changes you have made. Please describe the changes you have made to your engine or combined heat and power system to save energy where you applied concepts taught in the course.
[OPEN END]

[ASK IF ANY MX1A-D=1, ELSE SKIP TO MX7]
MX6. Please describe any additional changes you made to your engine or combined heat and power system to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

[ASK IF MX1A=1 or MX1C=1 ELSE MX4]
MX2. What is the primary product of your CHP system?

1. Electricity
2. Steam
3. Mechanical power
4. Cooling
00. Other (specify)

MX3. What is the secondary product of your CHP system?

1. Electricity
2. Steam
3. Cooling
4. Hot Water
00. Other (specify)

[ASK IF MX1b = 1, OTHERWISE SKIP TO MX7]
MX4. Thinking about your new engine(s), which of the following functions does the engine perform? Does it…
[MULTIPLE RESPONSE]

1. Generate Electricity
2. Produce cooling

3. Directly drive process equipment
00. Other (specify)

MX7. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
98. Don't know

[ASK IF MX7 =1, ELSE SKIP TO NX1]
MX8. In which program did you participate?

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. Self Generation Incentive Program
7. A rebate program, but I do not remember the name
8. Other, Specify
9. Don't know

MX9. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
3. Don't know

[ASK IF MX9 =1]
MX10. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MX7=1 SKIP TO D1]
NX1. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1.
[NUMERIC OPEN END, 1-9999]

NX2. Approximately, how many square feet is your facility(ies)? If the changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 1-999999]

[SKIP to NX3, IF NX1<2]
NX2b. For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility** and that has been impacted the most by the energy saving changes you implemented.

NX3. Please enter the zip code of the facility.

[NUMERIC OPEN END, 1-99999]

NX4. How many years old is your facility?
000. Less than one year
[NUMERIC OPEN END, 1-999]

NX5. What type of building did the work occur in?
01. Assembly (e.g., an assembly hall or a church)
02. Primary or Secondary Education (SKIP TO NX5a)
03. University or College (SKIP TO NX5b)
04. Grocery
05. Health/Medical (e.g., a hospital or nursing home) (SKIP TO NX5c)
06. Lodging (e.g. hotel, motel) (SKIP TO NX5d)
07. Manufacturing (e.g., Bio Tech, light industrial manufacturing) (SKIP TO NX5e)
08. Small office building (less than 25,000 square feet)
09. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO NX5f)
11. Retail (SKIP TO NX5g)
12. Storage [SKIP TO NX5h]
13. Refrigerated Warehouse
14. Single Family Residential [SKIP TO NX5i]
15. Multi-family Residential
16. Agricultural Building
00. Other (Specify:_____)

[SKIP TO NX6]

NX5a. Was this a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO NX6]

NX5b. Was this a university or college?
1. University
2. College

[SKIP TO NX6]

NX5c. Was this a hospital or nursing home?
1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO NX6]

NX5d. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO NX6]

NX5e. Was this a biotech or light manufacturing type of facility?

1. Biotech
2. Light Manufacturing
3. Other – specify

[SKIP TO NX6]

NX5f. Was this a fast food or sit down restaurant?

1. Fast Food
2. Sit Down

[SKIP TO NX6]

NX5g. Was this a large multistory, large single-story, or small retail building?

1. Large multi-story
2. Large single-story
3. Small

[SKIP TO NX6]

NX5h. Was this a conditioned or unconditioned storage space?

1. Conditioned
2. Unconditioned

[SKIP TO NX6]

NX5i. Was this a stationary or mobile single family home?

1. Stationary or immobile home
2. Mobile home

NX6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NX7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NX8. What type of heating system do you have in your facility? Select all that apply.

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. No heating system
8. Other, specify

NX9. What type of cooling system do you have in your facility? (Select all that apply)

1. Central AC
2. Room AC
3. No air conditioning

[SKIP IF NX9=3]
NX9B. Is your AC system a compression, evaporative, or heat pump system?

1. Compression
2. Evaporative

3. Heat pump

NX10. What are the operating hours of this facility?
a. Weekdays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)
b. Saturdays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)
c. Sundays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)

[ASK IF MX2a =1 OR MX2b=1 OR MX2c=1 OR MX2d=1 ELSE SKIP TO MX39]
MX11. The next section asks about the technical details of the changes you made to the engines or CHP system equipment at your facility. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO MX39]

Section 1: Installed CHP

[ASK IF MX1a=1, ELSE SKIP TO MX26]
MX12. You indicated that you installed or replaced a combined heat and power system. How many of these were…
A. Replacements for an old system: [NUMERIC OPEN END]
B. New installations: [NUMERIC OPEN END]

MX14. What are the operating hours of this system?
A. Weekdays: [NUMERIC OPEN END]
B. Saturdays: [NUMERIC OPEN END]
C. Sundays: [NUMERIC OPEN END]

[ASK IF MX2=1, ELSE SKIP TO MX17]
MX15. What is the capacity of the electric generator(s) that you installed? Please answer in kWs.
[NUMERIC OPEN END 1-100000]

MX16. What type of electric generation system do you utilize?
1. Reciprocating engine
2. Microturbine
3. Gas turbine
4. Steam turbine
5. Combined cycle
6. Fuel cell
00. Other (specify)

[ASK IF MX2=2, ELSE SKIP TO MX18]
MX17. What is the steam capacity in tons generated from your CHP system(s)?
[NUMERIC OPEN END 1-100000]

[ASK IF MX2=3, ELSE SKIP TO MX19]
MX18. What is the hp produced by your CHP system(s)?
[NUMERIC OPEN END 1-100000]

[ASK IF MX2=4, ELSE SKIP TO MX20]

MX19. What is the cooling capacity of your CHP system(s) in tons?
[NUMERIC OPEN END 1-100000]

[ASK IF MX2=5, ELSE SKIP TO MX21]
MX20. Please describe the primary output produced by your CHP system(s). If possible, please include quantity of power or other end product produced?
[OPEN END]

[ASK IF MX3=1, ELSE SKIP TO MX23]
MX21. What is the capacity of the secondary electric generator(s) that you installed? Please answer in kWs.
[NUMERIC OPEN END 1-100000]

MX22. What type of electric generation system do you utilize for capturing secondary output from your CHP system(s)?
1. Reciprocating engine
2. Microturbine
3. Gas turbine
4. Steam turbine
5. Combined cycle
6. Fuel cell
00. Other (specify)

[ASK IF MX3=2, ELSE SKIP TO MX24]
MX23. What is the steam capacity in tons generated as a secondary product of your CHP system(s)?
[NUMERIC OPEN END 1-100000]

[ASK IF MX3=3, ELSE SKIP TO MX25]
MX24. What is the cooling capacity in tons produced as a secondary product from your CHP system(s)?
[NUMERIC OPEN END]

[ASK IF MX3=5, ELSE SKIP TO MX26]
MX25. Please describe the secondary output produced by your CHP system(s). If possible, please include quantity of power or other end product produced?
[OPEN END]

Section 2: Install or Replace Engine

[ASK IF MX1b=1 ELSE SKIP TO MX34]
MX26. You indicated that you installed or replaced new gas or liquid fueled engines. How many of these engines were…

A. Replacements of old engines: [NUMERIC OPEN END 0-9999]
B. New installations: [NUMERIC OPEN END 0-9999]

[ASK IF MX4=1, ELSE SKIP TO MX28]
MX27. What is the capacity of the engine(s) that you installed? Please answer in kWs.
[NUMERIC OPEN END]

[ASK IF MX4=2, ELSE SKIP TO MX29]

MX28. What is the cooling capacity (in tons) generated from your engine(s)?
[NUMERIC OPEN END, 1-100,000 tons]

[ASK IF MX4=3, ELSE SKIP TO MX30]
MX29. What is the hp produced by your engine(s)? NUMERIC OPEN END]
[RANGE 1 HP TO 100,000 HP]

[ASK IF MX4=4, ELSE SKIP TO MX31]
MX30. Please describe the output produced by your engine(s). If possible, please include quantity of power or other end product produced?
[NUMERIC OPEN END]

MX31. What are the operating hours of this engine?
a. Weekdays [NUMERIC OPEN END, 0-24]
b. Saturdays [NUMERIC OPEN END, 0-24]
c. Sundays [NUMERIC OPEN END, 0-24]

MX32. What type of fuel powers the engine?
a. Natural gas
b. Propane
c. Methane or digester gas
d. Diesel fuel
e. Gasoline
f. Biofuels
g. Other

MX33. Do you capture any of the waste heat from the engine(s) and use it in a way that saves energy?
1. Yes
2. No

Section 3. Hot water generated as byproduct
[ASK IF MX3=4 OR MX33=1, ELSE SKIP TO MX38]
MX34. Approximately, what percent of waste hot water from your CHP system do you use?
[NUMERIC OPEN END, 0-100], DK

MX35. What type of water heating system does the engine or CHP system replace or supplement at your facility?
1. Water heater(s)
2. Boiler(s)
3. Both water heater(s) and boiler(s)
00. Other (specify)

MX36. What type of fuel do you primarily use for your water heating needs that are not supplied by the CHP?
01. Natural Gas
02. Electric
00. Other (Specify)

[ASK IF MX35=1, 2, OR 3]

MX37. What is the average efficiency (in AFUE) of your boilers/water heaters?
[NUMERIC OPEN END, 0-100], DK

Section 4: Modified Engine or CHP

[ASK IF MX1C=1 OR MX1D=1]
MX38. You indicated that you modified your engine or CHP system(s)? Please describe the modifications you made. If possible, please include quantity of power or other end product saved as a result of these modifications.
[OPEN END]

Section 5: Summary Questions

MX39. Have you performed an engineering or post-installation analysis to determine how much electricity, gas, and/or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MX39=1 ELSE SKIP TO MX44]
MX40. Please select the type of savings you calculate. (Select all that apply)

1. I have calculated dollars saved
2. I have calculated kWh saved
3. have calculated therms saved

[ASK IF MX40=1]
MX41. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $999,999]

[ASK IF MX40=2]
MX42. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 999,999 kWh]

[ASK IF MX40=3]
MX43. Approximately how many therms did you save annually?
[NUMERIC OPEN END, limit 999,999 therms]

ASK IF MX39=2 ELSE SKIP TO EOR1]
MX44. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, therms or as a percentage reduction in your energy costs. An approximation or your best guess if fine…
[OPEN END]

3. COMMERCIAL COOKING

[ASK IF Respondent Type=EUCC OR EUCR, ELSE IF Respondent Type=MA SKIP TO TA0]
MH1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the commercial cooking or refrigeration equipment?
[Yes =1, No =2, Ask for each]

a. Installed new and/or replaced existing equipment with energy efficient cooking, ventilation, refrigeration, or water equipment.
b. Made changes to existing cooking, ventilation, refrigeration, or water equipment (e.g. installed new components, changed placement of equipment, etc.)
c. Made changes to the operations and/or repair and maintenance of existing cooking, ventilation, refrigeration, or water equipment (e.g. used timers or changed the operating time of equipment)
d. Performed an Energy Use Analysis or cost-benefit analysis

[ASK IF MH1a-e = 2]
MH2a. It seems we have not captured the changes you have made. Please describe the commercial cooking changes you made to save energy where you applied concepts taught in the course.

[ASK IF MHa-e=1, ELSE SKIP TO MH2b]
MH2aa. Please describe any additional commercial cooking changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

MH3. In the course of making the changes you described, did you or any party to this project receive technical or financial assistance through a utility program?

1. Yes
2. No

Don't know

[ASK IF MH3=1, ELSE SKIP TO MH7]
MH4. In which program did you participate?

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name

00. Other, Specify
98. Don't know

MH5. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
98. Don't know

[ASK IF MH5=1]
MH6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[SKIP TO DC1, IF MH3=1]

[ASK IF MH1a-c=1, ELSE VH91]
MH2b. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1.
[NUMERIC OPEN END]

MH9. Approximately, how many square feet is your facility? If the changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 1-999999]

[SKIP to MH3, IF MH2b<2]
For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility and** that has been impacted the most by the energy saving changes you implemented.

MH8a. Please enter the zip code of the facility.
[NUMERIC OPEN END, 1-99999]

MH8b. What type of building did the work occur in?
01. Assembly (e.g., an assembly hall or a church)
02. Primary or Secondary Education (SKIP TO MH8c)
03. University or College (SKIP TO MH8d)
04. Grocery
05. Health/Medical (e.g., a hospital or nursing home) (SKIP TO MH8e)
06. Lodging (e.g. hotel, motel) (SKIP TO MH8f)
07. Manufacturing (e.g., Bio Tech, light industrial manufacturing) (SKIP TO MH8g)
08. Small office building (less than 25,000 square feet)
09. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO MH8h)
11. Retail (SKIP TO MH8i)
12. Storage (SKIP TO MH8j)
13. Refrigerated Warehouse
14. Single Family Residential (SKIP TO MH8k)
15. Multi-family Residential
16. Agricultural building
00. Other (Specify:_____)

[SKIP TO MH9]

MH8c. Was this a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO MH9]

MH8d. Was this a university or college?
1. University
2. College

[SKIP TO MH9]

MH8e. Was this a hospital or nursing home?
1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO MH9]

MH8f. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO MH9]

MH8g. Was this a biotech or light manufacturing type of facility?
1. Biotech
2. Light Manufacturing
3. Other, specify

[SKIP TO MH9]

MH8h. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[SKIP TO MH9]

MH8i. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story
2. Large single-story
3. Small

[SKIP TO MH9]

MH8j. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[SKIP TO MH9]

MH8k. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

MH10. How many years old is your facility? An estimate is fine.
[NUMERIC OPEN END, 1-999]

H6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

H7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

H8. What type of heating system do you have in your facility? [MULTIPLE RESPONSE]
1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. Other, specify
8. No heating system

H9. What type of cooling system do you have in your facility? (Select all that apply) [MULTIPLE RESPONSE]
1. Central AC
2. Room AC
3. No air conditioning

[SKIP TO NA10 IF NA9=3]
H9b. Is your AC system a compression, an evaporative, or a heat pump system?
1. Compression
2. Evaporative
3. Heat pump

H10. What are the operating hours of this facility? Please provide an average hours per day for each.
d. Weekdays [NUMERIC OPEN END, 0-24]
e. Saturdays [NUMERIC OPEN END, 0-24]
f. Sundays [NUMERIC OPEN END, 0-24]

MH7. The next section asks you about the technical details of the actions you took as a result of taking the course. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO VH91]

[ASK IF MH1a=1, ELSE SKIP TO MH25]
MH11. You indicated that you installed new and/or replaced existing equipment with energy efficient cooking, ventilation, refrigeration, or water equipment at your facility. Which of the following did you install in your efforts to save energy at your facility? [SELECT ALL THAT APPLY]
1. Fryer(s)
2. Warming and holding cabinet(s)

3. Steamer(s)
4. Griddle(s)
5. Broiler(s)
6. Oven(s)
7. New ventilation equipment
8. New refrigeration equipment
9. New water elements (e.g., ware washer, hot water heater)
00. Other, specify:

[FRYER-INSTALL] [ASK IF MH11=01 ELSE MH13A]
MH12. Please tell us about the fryer(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Fuel Type: Gas or Electric? [Drop down]
b. Old Number of Units Installed: [NUMERIC OPEN END, 1-99]
c. New Number of Units Installed: [NUMERIC OPEN END, 1-99]
d. Old Food Load (lb/day): [NUMERIC OPEN END, 0-999]
e. New Food Load (lb/day): [NUMERIC OPEN END, 0-999]
f. Operating hours:
    a. Old/New Hrs per day [NUMERIC OPEN END, 0-99]
    b. Old/New Days per week [NUMERIC OPEN END, 0-99]
    c. Old/New Weeks per year [NUMERIC OPEN END, 0-99]

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
98. Don't Know

[WARMING CABINET-INSTALL] [ASK IF MH11=02 ELSE MH14A]
MH13. Please tell us about the warming and holding cabinet(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of Units Installed: [NUMERIC OPEN END, 1-99]
b. Old Volume (cubic feet): [NUMERIC OPEN END, 0-999]
c. New Volume (cubic feet): [NUMERIC OPEN END, 0-999]
Operating hours:
    d/e Old/New Hrs per day [NUMERIC OPEN END, 0-99]
    f/g. Old/New Days per week [NUMERIC OPEN END, 0-99]
    h/i. Old/New Weeks per year [NUMERIC OPEN END, 0-99]

MH13J: If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[STEAMER-INSTALL] [ASK IF MH11=03 ELSE MH15A]
MH14. Please tell us about the steamer(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Number of Units Installed: [NUMERIC OPEN END, 1-9999]
B. Old Fuel Type: Gas or Electric [Drop down]
C. New Fuel Type: Gas or Electric [Drop down]
D. Old Heavy Load efficiency: [NUMERIC OPEN END, 1-9999]%
E. New Heavy Load efficiency: [NUMERIC OPEN END, 1-9999]%

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[GRIDDLE-INSTALL] [ASK IF MH11=04 ELSE MH16A]
MH15. Please tell us about the griddle(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Number of Units Installed: [NUMERIC OPEN END, 1-99]
B. Old Fuel Type: Gas or Electric [Drop down]
C. New Fuel Type: Gas or Electric [Drop down]
D. Old Heavy Load efficiency: [NUMERIC OPEN END, 1-99]%
E. New Heavy Load efficiency: [NUMERIC OPEN END, 1-99]%

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[BROILER-INSTALL] [ASK IF MH11=05 ELSE MH17A]

MH16. Please tell us about the broiler(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Number of Units Installed: [NUMERIC OPEN END, 1-99]
B. Old Preheat energy (Btu): [NUMERIC OPEN END, 0-999]
C. New Preheat energy (Btu): [NUMERIC OPEN END, 0-999]
D. Old Cooking Energy Rate (Btu/Hr): [NUMERIC OPEN END, 0-99]
E. New Cooking Energy Rate (Btu/Hr): [NUMERIC OPEN END, 0-99]

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[OVEN-INSTALL] [ASK IF MH11=06 ELSE MH18]
MH17. Please tell us about the oven(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Number of Units Installed: [NUMERIC OPEN END, 1-99]
B. Old Fuel Type: Gas or Electric [Drop down]
C. New Fuel Type: Gas or Electric [Drop down]
D. Old Oven Type: Combination, Convection, Conveyor, Gas rack [Drop down]
E. New Oven Type: Combination, Convection, Conveyor, Gas rack [Drop down]
Operating hours:
    f/g. Old/New Hrs per day [NUMERIC OPEN END, 0-99]
    h/i. Old/New Days per week [NUMERIC OPEN END, 0-99]
    j/k. Old/New Weeks per year [NUMERIC OPEN END, 0-99]

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[VENTILATION INSTALL] [ASK IF MH11=07 ELSE MH19]
MH18. You indicated that you installed new and/or replaced existing equipment with energy efficient ventilation equipment at your facility. What changes did you make and what savings occurred? [OPEN END]

[REFRIGERATION INSTALL] [ASK IF MH11=08 ELSE MH21]

MH19. You indicated that you installed new energy efficient refrigeration equipment at your facility. How many of each type of refrigeration system did you install? [SELECT ALL THAT APPLY]

a. Display Refrigerator(s)
b. Refrigerated Storeroom(s)/Walk-in(s)
c. Refrigerated Cabinet(s) (e.g., Reach-in(s), Roll-in(s))
d. Vending Machine(s)
e. Ice Machine(s)
f. Preparation Table(s)
g. Other, specify:

[DISPLAY REFRIGERATOR INSTALL] [ASK IF MH19a>1 ELSE AH2]
AH1. Please tell us about the display refrigerators you installed. If you did not install a particular type of refrigerator, please leave that row blank. Please enter "9999" if answer is unknown.

Type of Display Refrigerator	Number of units this type	Operating mode	Rating Temperature	Total Display Area (in cu ft, sq ft, or linear ft)
Vertical Open	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]
Semivertical Open	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]
Horizontal Open	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]
Vertical with transparent doors	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]
Horizontal with transparent doors	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]

Service over counter	[NUMERIC OPEN END]	(Remote condensing or self-contained)	(Medium (38 +/- 2°F) , Low (0 +/- 2°F, or Ice cream (-15 +/- 2°F))	[NUMERIC OPEN END]

[REFRIGERATED CABINET INSTALL] [ASK IF MH19c>1, ELSE MH20a]
AH2. What is the total volume of your refrigerated cabinet (in cubic feet)?
[NUMERIC OPEN END 0-9999]

[VENDING MACHINE INSTALL] [ASK IF MH19d>1 ELSE AH3c]
MH20a. Did you install a new vending machine that includes a passive infrared occupancy?
1. Yes, please describe the new vending machine and any savings that resulted from this installation: [OPEN END]
2. No

MH20B. When you installed the refrigeration system(s) did you replace any existing units?
1. Yes
2. No

MH20c. What was your primary reason for this replacement?
1. To save energy or money
2. Other reason (e.g., unit failed and/or wanted different size)
98. Don't know

AH3a. Does the vending machine include energy saving software?
1. Yes
2. No
98. Don't know

AH3b. What is the capacity of the vending machine in cans?
[NUMERIC OPEN END]

[ICE MACHINE INSTALL] [ASK IF MH19e>1 ELSE MH21]
AH3c. What type of ice machine did you install?
1. Ice making head
2. Remote condensing unit or split system unit
3. Self contained unit
98. Don't know

AH3d. What is the ice machine's harvest rate (in lbs ice/day)?
[NUMERIC OPEN END 0-9999]

[WATER ELEMENTS-INSTALL] [ASK IF MH11=09 ELSE MH25]
MH21. You indicated that you installed new water elements at your facility. Which of the following types of water elements did you install? [SELECT ALL THAT APPLY]
1. Low flow or energy efficient ware washer(s)
2. High efficiency hot water heater(s)

00. Other, specify:

[WARE WASHER-INSTALL] [ASK IF MH21=01 ELSE AH3E]
MH22. Please provide the following information regarding the Low flow or energy efficient ware washer you installed at your facility.

If this installation was not a replacement, please leave the "original" column blank. If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if answer is unknown.

a. Number of units installed	_____
b. Old/New Ware washer type	_____ *(Drop down list* Under Counter (High Temp), Under Counter (Low Temp), Door Type (High Temp), Door Type (Low Temp), Single Tank Conveyor (High Temp), Single Tank Conveyor (Low Temp), Multi Tank Conveyor (High Temp), Multi Tank Conveyor (Low Temp)
c. Old/New Water heater fuel type	_____ *(Drop down list, gas or electric)*

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[ASK IF MH21=02 ELSE MH25]
[HOT WATER HEATER-INSTALL]
AH3E-G. You indicated that you installed high efficiency hot water heaters. How many of each type did you install?
a. Tank storage [NUMERIC OPEN END]
b. Instantaneous [NUMERIC OPEN END]
c. Other [NUMERIC OPEN END]

[ASK IF AH3E>0, ELSE AH3I]
AH3H. What is the tank size (in gallons) of the tank storage hot water heater(s) you installed? [NUMERIC OPEN END 0-9999]

AH3I. What is the fuel source for the hot water heater(s) you installed? [MULTIPLE RESPONSE]
1. Gas
2. Electric
00. Other, specify

[HOT WATER HEATER-INSTALL]
MH24. What is the floor area of the facility where the hot water heater was installed?

square feet *(Enter "9999" if unknown)*
[NUMERIC OPEN END 1-999999]

[ASK IF MH1b=1 ELSE TH61]
MH25. You indicated that you made changes to existing cooking, ventilation, refrigeration, water, or lighting equipment (e.g. perform commissioning, change placement of equipment, etc.) Which of the following changes did you make in your efforts to save energy at your facility?
[SELECT ALL THAT APPLY]

1. Move the placement of appliances
2. Used Thermal energy storage to take advantage of lower energy costs during non-peak hours
3. Moved back kitchen equipment to maximize overhang and minimize rear gaps
4. Made changes or installed components to the existing ventilation system
5. Made changes or installed components to the refrigeration system(s)
6. Made changes or installed components to the hot water heater(s)
7. Made changes or installed components to the ware washer
8. Made other changes to existing cooking equipment, please specify

[ASK IF MH25=01 ELSE MH27A]
MH26. You indicated that you moved the placement of appliances. Please describe the changes you made.
[OPEN END]

[THERMAL ENERGY STORAGE] [ASK IF MH25=02 ELSE MH29]
MH27. Please tell us about the thermal energy storage you used in order to take advantage of lower energy costs during non-peak hours.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if answer is unknown.

a. Number of machines affected:	[NUMERIC OPEN END]
b. Rated capacity of the system (kW or tons):	[NUMERIC OPEN END]
c. System efficiency (%):	[NUMERIC OPEN END]

[ASK IF MH25=03 ELSE MH30]
MH29. You indicated that you moved back kitchen equipment to maximize overhang and minimize rear gaps. Please describe the changes you made.
[OPEN END]

[ASK IF MH25=04, ELSE MH39]
MH30. You indicated that you made changes or installed components to the ventilation system. Which of the following changes did you make?
[SELECT ALL THAT APPLY]

1. Installed hood side panels
2. Installed specialty hood(s)
3. Reset static pressure
4. Used variable speed drives
5. Used bigger hood(s)

00. Other, specify:

[HOOD SIDE PANEL-CHANGES] [ASK IF MH30=01 ELSE AH4A]
MH31. Please tell us about the hood side panel(s) you installed and/or replaced with an energy efficient model.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Linear Feet of Wall Mounted Exhaust Hoods: [NUMERIC OPEN END, 1-9999]
B. Old Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
C. New Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
D. Old Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
E. New Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
f/g. Old/New Hrs per day [NUMERIC OPEN END, 0-99]
h/i. Old/New Days per week [NUMERIC OPEN END, 0-99]
j/k. Old/New Weeks per year [NUMERIC OPEN END, 0-99]

If applicable, what was your primary reason for this replacement?
1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[SPECIALTY HOOD-CHANGES] [ASK IFMH30=02 ELSE MH34]
AH4. Please tell us about the specialty hood(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Type of specialty hood:
[DROP DOWN] (Wall-mounted canopy, Single-island canopy, Double island canopy, Proximity (backshelf), Other type, No type selected, Don't know)
B. Number of hoods installed:
[NUMERIC OPEN END]
C. How long is the hood (in linear feet)? An approximate value is fine.
[NUMERIC OPEN END, 1-99]
D. Is the new hood demand controlled (e.g. it has a variable frequency drive)
[YES/NO]
E. What was the exhaust rate of the old fan (in cfm)? An approximate value is fine.
[NUMERIC OPEN END, 100-999,999]
F. What is the exhausted rate of the new fan (in cfm)? An approximate value is fine.
[NUMERIC OPEN END, 100-999,999]

[PRESSURE RESET-CHANGES] [MH30=03 ELSE MH37A]
MH34. Please describe the static pressure before and after the reset.

	Pressure Drop	Delta CFM	Cubic Feet per Minute
Before reset:			

After reset:			
	Don't know	Don't know	Don't know

[PRESSURE RESET]
MH35. Please describe the duct dimensions before and after the static pressure reset.

	Select Shape [Drop Down]	Duct Dimensions
A. Before change:	(Circular, Square, Oval, Rectangular, DK, No Shape Selected)	[NUMERIC OPEN END, 1-999] Inches
B. After change:	(Circular, Square, Oval, Rectangular, DK, No Shape Selected)	[NUMERIC OPEN END, 1-999] Inches

[PRESSURE RESET]
MH36. What are the operating hours and the high and low set points of the duct where you performed a static pressure reset?

a. High set point: [NUMERIC OPEN END]
b. Low set point: [NUMERIC OPEN END]
Operating hours:
c. Hrs per day [NUMERIC OPEN END, 0-99]
d. Days per week [NUMERIC OPEN END, 0-99]
e. Weeks per year [NUMERIC OPEN END, 0-99]

[VARIABLE SPEED DRIVES-CHANGES] [ASK IF MH30=04 ELSE MH38]
MH37. Please describe the kitchen exhaust before and after the variable speed drives were installed.

	Horsepower	Airflow (CFM)
Before VSDs:	[NUMERIC OPEN END, 1-999]	[NUMERIC OPEN END, 1-999] (CFM)
After VSDs:	[NUMERIC OPEN END, 1-999]	[NUMERIC OPEN END, 1-999] (CFM)

[BIGGER HOOD-CHANGES] [ASK IF MH30=05 ELSE MH39]
MH38. You indicated that you installed a bigger hood(s). What savings did you see?
[OPEN END]
02. I did not see any savings.
98. Don't know

[ASK IF MH25=05 ELSE TH53]
[REFRIGERATION – INSTALLED COMPONENTS]
MH39. You indicated that you made changes or installed new energy efficient components to the refrigeration system(s) at your facility. Which refrigeration systems were affected by the refrigeration components you installed? [SELECT ALL THAT APPLY]

1. Display Refrigerator(s)
2. Refrigerated Storeroom(s)/Walk-in(s)
3. Refrigerated Cabinet(s) (e.g., Reach-in(s), Roll-in(s))
4. Vending Machine(s)

5. Ice Machine(s)
6. Preparation Table(s)
00. Other, specify:

[ASK IF MH39=01 ELSE NH1]
MH40. Which of the following areas of your display refrigerator(s) did you install components or make changes to? [SELECT ALL THAT APPLY]
1. Compressor
2. Condenser
3. Evaporator
4. Insulation
5. Infiltration
6. Lighting
7. Defrost
00. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF MH40=01 ELSE MH45]
MH41. Which of the following changes did you make to the compressor in your display refrigerator(s)?
[SELECT ALL THAT APPLY]
1. Installed new high efficiency compressor
2. Installed new components to the compressor
00. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [ASK IF MH41=01 ELSE MH44]
MH42. Please tell us about the high efficiency compressor(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN]
MH43a. What is the size of the DISPLAY REFRIGERATOR(s) in which you installed the high efficiency compressor(s)?
[NUMERIC OPEN END] (linear feet)

[COMPRESSOR COMPONENTS]
MH44. Please describe the components you installed to the compressor and any savings that resulted from this change.
[OPEN END]

[CONDENSER CHANGES] [ASK IF MH40=02 ELSE MH57]
MH45. Which of the following changes did you make to the condenser in your display refrigerator(s)? [SELECT ALL THAT APPLY]
1. Installed new high efficiency condenser

2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC
4. Replaced air cooled condenser(s) with evaporative condenser(s)
5. Other, specify

[HIGH EFFICIENCY CONDENSER] [ASK IF MH45=01 ELSE MH49A]
MH46. Please tell us about the high efficiency condenser you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old condenser	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN] [ASK IF MH46B=0 OR 99 ELSE MH48A]
MH47. What is the size of the DISPLAY REFRIGERATOR in which you installed the high efficiency condenser(s)?
[NUMERIC OPEN END] (linear feet)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER] [MH45=04 ELSE MH52]
MH49. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
MH50. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was it of the same size?
1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
MH51A. What is the size of the new evaporative condenser(s) you installed? If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[NUMERIC OPEN END]

MH51B. How many units of this size did you install?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF MH45=02 ELSE MH54A]
MH52. How many years old was the condenser in which you installed an energy efficient condenser fan(s)?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
MH53. Please tell us about the efficient condenser fan you installed?

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Old/New Number of units installed [NUMERIC OPEN END]
b. Old/New Size (in Inches) [NUMERIC OPEN END]
c. Old/New Capacity (in Tons) [NUMERIC OPEN END]
d. Old/New Efficiency (%)[NUMERIC OPEN END]

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
5. Don't Know

[EFFICIENT CONDENSER FAN MOTOR] [MH45=03 ELSE MH57]
MH54. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.
If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

A. Number of units installed	[NUMERIC OPEN END]
B. Number of Fans affected	[NUMERIC OPEN END]
C. Number of Refrigerators affected	[NUMERIC OPEN END]
D. Type of System	(EC or PSC)

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable
98. Don't Know

[EFFICIENT CONDENSER FAN MOTOR] [ASK IF MH54D=2 ELSE MH57]]
MH56. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK IF MH40=03 ELSE MH64]
MH57. Which of the following changes did you make to the evaporator in your display refrigerator(s)?

1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC
00. Other, specify

[EFFICIENT EVAPORATOR] [ASK IF MH57=01 ELSE MH61A]
MH58. Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number units installed	[NUMERIC OPEN END]
a. Number of Fans affected	[NUMERIC OPEN END]
b. Number of Refrigerators affected	[NUMERIC OPEN END]
c. Type of System	(EC or PSC)

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable

98. Don't Know

[EFFICIENT EVAPORATOR AND PSC] [ASK IF MH58D=2 ELSE MH61A]
MH60. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF MH57=02 ELSE MH64]
MH61. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable

98. Don't Know

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF MH61D=2 ELSE MH64]
MH63 Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[INSULATION CHANGES] [ASK IF MH40=04 ELSE MH69]
MH64. Which of the following changes did you make to the insulation in your display refrigerator(s)?

1. Installed insulation on the bare suction line
2. Installed insulation elsewhere

00. Other, specify

[INSULATION INSTALLED TO THE BARE SUCTION LINE] [ASK IF MH64=01 ELSE MH67A]
MH65. Please provide the following information regarding the insulation you installed to the bare suction line: cooler temperature, diameter, and suction line length.

_____ a. Cooler temperature in degrees Fahrenheit *(Enter "99" if unknown)*
_____ b. Diameter in inches *(Enter "99" if unknown)*
_____ c. Length of suction line in inches *(Enter "99" if unknown)*

[INSULATION INSTALLED TO THE BARE SUCTION LINE]
MH66. What are the approximate hours of operation for the bare suction line that you just described? An estimate is fine.

_____ a. Old/New Hrs per day *(Enter "99" if unknown)*
_____ b. Old/New Days per week *(Enter "99" if unknown)*
_____ c. Old/New Weeks per year *(Enter "99" if unknown)*

[IMPROVED INSULATION] [ASK IF MH64=02 ELSE MH69]
MH67. Please tell us about the improved insulation you installed.

a. Size of refrigeration unit (in linear feet)	[NUMERIC OPEN END]
b. Efficiency:	[NUMERIC OPEN END]

[IMPROVED INSULATION]
MH68. What are the approximate hours of operation for the improved insulation that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "99" if unknown)*
_____ b. Days per week *(Enter "99" if unknown)*
_____ c. Weeks per year *(Enter "99" if unknown)*

[INFILTRATION CHANGES] [ASK IF MH40=05 ELSE MH77]
MH69. Which of the following infiltration changes did you make to your display refrigerator(s)?

1. Installed night covers or night doors
2. Installed glass doors with low anti sweat heat

00. Other, specify:

[NIGHT COVERS] [ASK IF MH69=01] ELSE MH72]
MH70. Please tell us about the display cases in your facility where you installed night covers.

	Number of Cases	Average Length of case (ft)
Total display cases	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]
Open display cases	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]

Display cases that previously had night covers	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]
Display cases with new night covers	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable

98. Don't Know

[GLASS DOOR WITH ANTI SWEAT] [ASK IF MH69=02 ELSE MH77]
MH72A. How many glass doors with low anti sweat heat did you install?

MH72B. If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable

98. Don't Know

[GLASS DOOR WITH ANTI SWEAT]
MH73. What was the average square feet of the display case or reach in where the glass doors were installed?

[GLASS DOOR WITH ANTI SWEAT]
MH74. Did you eliminate door heaters when you installed glass doors with low anti sweat heat?

1. Yes
2. No
3. Don't know

[LIGHTING] [ASK IF MH40=06 ELSE MH89]
MH77. You indicated that you made changes to the lighting of your display refrigerator(s). Did you install new lighting?

1. Yes
2. No

[LIGHTING] [ASK IF MH77=1 ELSE MH89]
MH78. How many of each type of energy efficient lighting did you install?

a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other

[LIGHTING] [ASK IF MH78A>0 ELSE MH84]
MH79. What is the LPD now and before you installed the CFLs?

a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF MH79C=1 ELSE MH84]
MH80. How much did you reduce the LPD when you installed the CFLs?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF MH80=98 ELSE MH84]
MH81. What type of lamps were installed before?
[OPEN END], DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
MH82. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END], DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
MH83. What is the square footage of the refrigeration system?
[NUMERIC OPEN END], DK

[LIGHTING]
[ASK IF MH78B>0 ELSE MH89]
MH84. What is the LPD now and before you installed the T8s?

a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF MH84C=1 ELSE MH89]
MH85. How much did you reduce the LPD when you installed the T8s?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF MH85=98 ELSE MH89]
MH86. What type of lamps were installed before?
[OPEN END], DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
MH87. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END], DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
MH88. What is the square footage of the refrigeration system?
[NUMERIC OPEN END], DK

[DEFROST] [ASK IF MH40=07 ELSE NH1]
MH89. You indicated that you made changes to the defrost of the display refrigerator(s). Did you install a new energy efficient defrost system?

1. Yes
2. No

[DEFROST]
MH90. Please provide the following information regarding the old AND NEW defrost system at your facility: load size in tons, refrigeration type, size, and efficiency.

a. Old/New Consumption (kWh/yr)	_____ *(Enter "9999" if unknown)*
b. Old/New Refrigeration system size (Linear feet)	_____ *(Enter "9999" if unknown)*
c. Old/New Efficiency	_____% *(Enter "9999" if unknown)*

If applicable, what was your primary reason for this replacement?

1. To save energy of money
2. Other reason (e.g., unit failed and/or wanted different size
3. No reason selected
4. Not applicable

98. Don't Know

MH91. What are the approximate hours of operation for the energy efficient defrost that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[ASK IF MH39=02 ELSE OH1]
NH1. Which of the following areas of your refrigerated storeroom(s)/walk-ins(s) did you install components or make changes to?
[SELECT ALL THAT APPLY]

1. Compressor
2. Condenser
3. Evaporator
4. Insulation
5. Infiltration
6. Lighting
7. Defrost

00. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF NH1=01 ELSE NH6]
NH2. Which of the following changes did you make to the compressor in your refrigerated storeroom(s)/walk-ins(s)?
[SELECT ALL THAT APPLY]

1. Installed new high efficiency compressor
2. Installed new components to the compressor
3. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [NH2=01 ELSE NH4]

NH3. Please tell us about the high efficiency compressor(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN] [ASK IF NH3B=0 OR 99 ELSE NH4B]
NH4. What is the size of the refrigerated storeroom(s)/walk-ins(s) in which you installed the high efficiency compressor(s)?
[NUMERIC OPEN END] (square feet)

[COMPRESSOR COMPONENTS] [ASK IF NH2=02 ELSE NH6]
NH5. Please describe the components you installed to the compressor and any savings that resulted from this change.
[OPEN END]

[CONDENSER CHANGES] [ASK IF NH1=02 ELSE NH18]
NH6. Which of the following changes did you make to the condenser in your refrigerated storeroom(s)/walk-ins(s)?
[SELECT ALL THAT APPLY]

1. Installed new high efficiency condenser
2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC
4. Replaced air cooled condenser(s) with evaporative condenser(s)
5. Other, specify

[HIGH EFFICIENCY CONDENSER] [ASK IF NH6=01 ELSE NH10]
NH7 Please tell us about the high efficiency condenser(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old condenser	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN] [ASK IF NH7B=0 OR 99 ELSE NH9]
NH8 What is the size of the refrigerated storeroom(s)/walk-ins(s) in which you installed the high efficiency condenser(s)?
[NUMERIC OPEN END] (square feet)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]

[ASK IF NH6=04 ELSE NH13]
NH10. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
NH11. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was it of the same size?

1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
NH12A. Please provide the following information regarding the evaporative condenser(s) you installed in your refrigerated storeroom(s)/walk-in(s). If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown..

A. Number of units: [NUMERIC OPEN END]
B. Size: [NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF NH6=02 ELSE NH15A]
NH13. How many years old was the condenser in which you installed an energy efficient condenser fan(s)?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
NH14. Please tell us about the efficient condenser fan you installed?

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed [NUMERIC OPEN END]
b. Size (in Inches) [NUMERIC OPEN END]
c. Capacity (in Tons) [NUMERIC OPEN END]
d. Efficiency (%)[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] [ASK IF NH6=03 ELSE NH18]
NH15. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT CONDENSER FAN MOTOR] AND STOREROOM/WALKIN AND EC] [ASK IF NH15D=1 ELSE NH17A]

NH16. Please provide the length (in Inches) and age for the refrigeration system(s) in which you used an efficient condenser fan motor(s) with EC (Electronically Commutated).

a. Length (in Inches): [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] AND PSC] [ASK IF NH15D=2 ELSE NH18]
NH17 Please provide the number of condenser fan motors and age of the refrigeration system(s)..

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK IF NH1=03 ELSE NH25]
NH18. Which of the following changes did you make to the evaporator in your refrigerated storeroom(s)/walk-ins(s)?

1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC
3. Other, specify

[EFFICIENT EVAPORATOR] [ASK IF NH18=01 ELSE NH22A]
NH19 Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATOR] AND STOREROOM/WALKIN AND EC] [ASK IF NH19D=1 ELSE NH21A]
NH20. Please provide the length (in Inches) and age for the refrigeration system(s) in which you used an efficient condenser fan motor(s) with EC (Electronically Commutated).

a. Length (in Inches): [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATOR AND PSC] [ASK IF NH19D=2 ELSE NH22A]
NH21. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF NH18=02 ELSE NH25]
NH22. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]

b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATER FAN MOTOR] AND STOREROOM/WALKIN AND EC] [ASK IF NH22D=1 ELSE NH24]
NH23. Please provide the length (in Inches) and age for the refrigeration system(s) in which you used an efficient evaporator fan motor(s) with EC (Electronically Commutated).

a. Length (in Inches): [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF NH22D=2 ELSE NH25]
NH24. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[INSULATION CHANGES] [ASK IF NH1=04 ELSE NH30]
NH25. Which of the following changes did you make to the insulation in your refrigerated storeroom(s)/walk-ins(s)?

1. Installed insulation on the bare suction line
2. Installed wall, ceiling, floor, and/or door insulation in your walk-in Other, specify

[INSULATION INSTALLED TO THE BARE SUCTION LINE] [ASK IF NH25=01 ELSE AH5A]
NH26. Please provide the following information regarding the insulation you installed to the bare suction line: cooler temperature, diameter, and suction line length.

_____ a. Cooler temperature in degrees Fahrenheit *(Enter "9999" if unknown)*
_____ b. Diameter in inches *(Enter "9999" if unknown)*
_____ c. Length of suction line in inches *(Enter "9999" if unknown)*

[INSULATION INSTALLED TO THE BARE SUCTION LINE]
NH27. What are the approximate hours of operation for the bare suction line that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[IMPROVED INSULATION] [ASK IF NH25=02 ELSE NH30]
AH5A-E. Please tell us about the improved insulation you installed.

a. Approximately how many square feet were insulated?	[NUMERIC OPEN END]
b. How thick was the old insulation (in inches)?	[NUMERIC OPEN END]
c. How thick is the new insulation (in inches)?	[NUMERIC OPEN END]
d. What was the R-value of the old insulation (in R-value/inch)?	[NUMERIC OPEN END]

e. What is R-value of the new insulation (in R-value/inch)?	[NUMERIC OPEN END]

[IMPROVED INSULATION]
NH29. What are the approximate hours of operation for the improved insulation that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[INFILTRATION CHANGES] [ASK IF NH1=05 ELSE NH38]
NH30. Which of the following infiltration changes did you make to your refrigerated storeroom(s)/walk-ins(s)? [SELECT ALL THAT APPLY]

1. Installed strip curtain on walk-in boxes
2. Installed auto door-closers
3. Other, specify

[STRIP CURTAINS] [ASK IF NH30=01 ELSE NH36A]
AH6a. Are the walk-ins where you installed strip curtain coolers or freezers?

1. Coolers
2. Freezers
3. Both

[ASK IF AH6A=1 OR AH6B=3]
AH6b. In your cooler, what was the total number of doors that had strip curtains installed (count a double-door as two doors)? [NUMERIC OPEN END]

[ASK IF AH6A=2 OR AH6B=3 ELSE NH36]
AH6c. In your freezer,what was the total number of doors that had strip curtains installed (count a double-door as two doors)? [NUMERIC OPEN END]

[AUTO DOOR CLOSERS] [ASK IF NH30=02 ELSE NH38]
NH36. How many auto door closers did you install to walk-in coolers and walk-in freezers?

_____ a. Walk-in cooler doors *(Enter "9999" if unknown)*
_____ b. Walk-in freezer doors *(Enter "9999" if unknown)*
_____ c. Other auto door closers *(Enter "9999" if unknown)*

[LIGHTING] [ASK IF NH1=06 ELSE NH50]
NH38. You indicated that you made changes to the lighting of your refrigerated storeroom(s)/walk-ins(s). Did you install new lighting?

1. Yes
2. No

[LIGHTING] [ASK IF NH38=1 ELSE NH50]
NH39. How many of each type of energy efficient lighting did you install?

a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other, specify

[LIGHTING] [ASK IF NH39A>0 ELSE NH45]
NH40. What is the LPD now and before you installed the CFLs?
a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF NH40C=1 ELSE NH45]
NH41. How much did you reduce the LPD when you installed the CFLs?
1. 10%
2. 20%
3. 30%
4. 40%
00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF NH41=98 ELSE NH45]
NH42. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
NH43. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
NH44. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[LIGHTING]
[ASK IF NH39B>0 ELSE NH50]
NH45. What is the LPD now and before you installed the T8s?
a. Before:
b. After:
c. Don't know
[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF NH45C=1 ELSE NH50]
NH46. How much did you reduce the LPD when you installed the T8s?
1. 10%
2. 20%
3. 30%
4. 40%
00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF NH46=98 ELSE NH50]
NH47. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
NH48. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
NH49. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[DEFROST] [ASK IF NH1=07 ELSE OH1]
NH50. You indicated that you made changes to the defrost of the refrigerated storeroom(s)/walk-ins(s). Did you install a new energy efficient defrost system?

1. Yes
2. No

[DEFROST]
NH51. Please provide the following information regarding the old defrost system at your facility: load size in tons, refrigeration type, size, and efficiency.

a. Consumption (kWh/yr)	_____ *(Enter "9999" if unknown)*
b. Refrigeration system size (Square feet)	_____ *(Enter "9999" if unknown)*
c. Efficiency	_____% *(Enter "9999" if unknown)*

NH52. What are the approximate hours of operation for the energy efficient defrost that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[ASK IF MH39=03 ELSE PH1]
OH1. Which of the following areas of your refrigerated cabinet(s) (e.g., Reach-ins, Roll-ins) did you install components or make changes to? [SELECT ALL THAT APPLY]

1. Compressor
2. Condenser
3. Evaporator
4. Insulation
5. Infiltration
6. Lighting
7. Defrost
8. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF OH1=01 ELSE OH6]
OH2. Which of the following changes did you make to the compressor in your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency compressor
2. Installed new components to the compressor
3. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [OH2=01 ELSE OH4]
OH3 Please tell us about the high efficiency compressor(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]

Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN] [ASK IF OH3B=0 OR 99 ELSE OH4B]
OH4a What is the size of the refrigerated cabinet(s) in which you installed the high efficiency compressor(s)? [NUMERIC OPEN END] (cubic feet)

[COMPRESSOR COMPONENTS] [ASK IF OH2=02 ELSE OH6]
OH5. Please describe the components you installed to the compressor and any savings that resulted from this change. [OPEN END]

[CONDENSER CHANGES] [ASK IF OH1=02 ELSE OH18]
OH6. Which of the following changes did you make to the condenser in your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency condenser
2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC
4. Replaced air cooled condenser(s) with evaporative condenser(s)
5. Other, specify

[HIGH EFFICIENCY CONDENSER] [ASK IF OH6=01 ELSE OH10]
OH7 Please tell us about the high efficiency condenser(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old condenser	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN] [ASK IF OH7B=0 OR 99 ELSE OH9]
OH8 What is the size of the refrigerated cabinet(s) in which you installed the high efficiency condenser(s)? [NUMERIC OPEN END] (Cubic feet, square feet or linear feet depending on refrigeration type)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER] [ASK IF OH6=04 ELSE OH13]
OH10. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
OH11. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was

it of the same size?

1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
OH12a. What is the size of the new evaporative condenser(s) you installed? If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[NUMERIC OPEN END]
OH12B. How many units of this size did you install? [NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF OH6=02 ELSE OH15A]
OH13. How many years old was the condenser in which you installed an energy efficient condenser fan(s)? [NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
OH14. Please tell us about the efficient condenser fan you installed?

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed [NUMBERIC OPEN END]
b. Size (in Inches) [NUMERIC OPEN END]
c. Capacity (in Tons) [NUMERIC OPEN END]
d. Efficiency (%)[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] ASK IF OH6=03 ELSE OH18]
OH15. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
a. Number of Fans affected	[NUMERIC OPEN END]
b. Number of Refrigerators affected	[NUMERIC OPEN END]
c. Type of System	(EC or PSC)

[EFFICIENT CONDENSER FAN MOTOR] AND PSC] [ASK IF OH15D=2 ELSE OH18]
OH17. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK IF OH1=03 ELSE OH25]
OH18. Which of the following changes did you make to the evaporator in your refrigerated cabinet(s)?

1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC

3. Other, specify

[EFFICIENT EVAPORATOR] [ASK IF OH18=01 ELSE OH22A]
OH19 Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATOR AND PSC] [ASK IF OH19D =2 ELSE OH22A]
OH21. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF OH18=02 ELSE OH25]
OH22. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
a. Number of Fans affected	[NUMERIC OPEN END]
b. Number of Refrigerators affected	[NUMERIC OPEN END]
c. Type of System	(EC or PSC)

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF OH22D=1 ELSE OH25]
OH24. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[INSULATION CHANGES] [ASK IF NH1=04 ELSE NH30]
OH25. Which of the following changes did you make to the insulation in your refrigerated cabinet(s)?

1. Installed insulation on the bare suction line
2. Installed insulation elsewhere
3. Other, specify

[INSULATION INSTALLED TO THE BARE SUCTION LINE] [ASK IF OH25=01 ELSE NH28]
OH26. Please provide the following information regarding the insulation you installed to the

bare suction line: cooler temperature, diameter, and suction line length.

_____ a. Cooler temperature in degrees Fahrenheit *(Enter "9999" if unknown)*

_____ b. Diameter in inches *(Enter "9999" if unknown)*

_____ c. Length of suction line in inches *(Enter "9999" if unknown)*

[INSULATION INSTALLED TO THE BARE SUCTION LINE]

OH27. What are the approximate hours of operation for the bare suction line that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*

_____ b. Days per week *(Enter "9999" if unknown)*

_____ c. Weeks per year *(Enter "9999" if unknown)*

[IMPROVED INSULATION] [ASK IF OH25=02 ELSE OH30]

OH28. Please tell us about the improved insulation you installed.

a. Size of refrigeration unit (in cubic feet)	[NUMERIC OPEN END]
b. Efficiency:	[NUMERIC OPEN END]

AH7. Where did you install this insulation?

[OPEN END]

[IMPROVED INSULATION]

OH29. What are the approximate hours of operation for the improved insulation that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*

_____ b. Days per week *(Enter "9999" if unknown)*

_____ c. Weeks per year *(Enter "9999" if unknown)*

[INFILTRATION CHANGES] [ASK IF OH1=05 ELSE OH38]

OH30. Which of the following infiltration changes did you make to your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Installed night covers or night doors
2. Installed glass doors with low anti sweat heat

[NIGHT COVERS] [ASK IF OH30=01 ELSE OH33]

OH31. Please tell us about the display cases in your facility where you installed night covers.

	Number of Cases	Length of case (ft)
Open display cases	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]
Display cases that previously had night covers	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]
Display cases with new night covers	[NUMBERIC OPEN END]	[NUMBERIC OPEN END]

[GLASS DOOR WITH ANTI SWEAT] [ASK IF OH30=02 ELSE OH38]

OH33. How many glass doors with low anti sweat heat did you install?

[NUMERIC OPEN END]

[GLASS DOOR WITH ANTI SWEAT]
OH34. What was the average square feet of the display case or reach in where the glass doors were installed?
[NUMERIC OPEN END]

[GLASS DOOR WITH ANTI SWEAT]
OH35. Did you eliminate door heaters when you installed glass doors with low anti sweat heat?

1. Yes
2. No
3. Don't know

[LIGHTING] [ASK IF OH1=06 ELSE OH50]
OH38. You indicated that you made changes to the lighting of your refrigerated cabinet(s). Did you install new lighting?

1. Yes
2. No

[LIGHTING] [ASK IF OH38=1 ELSE OH50]
OH39. How many of each type of energy efficient lighting did you install?

a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other, specify

[LIGHTING] [ASK IF OH39A>0 ELSE OH45]
OH40. What is the LPD now and before you installed the CFLs?

a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF OH40C=1 ELSE OH45]
OH41. How much did you reduce the LPD when you installed the CFLs?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK OH41=98 ELSE OH45]
OH42. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
OH43. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]

OH44. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[LIGHTING]
[ASK IF OH39B>0 ELSE OH50]
OH45. What is the LPD now and before you installed the T8s?

a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK OH45C=1 ELSE OH50]
OH46. How much did you reduce the LPD when you installed the T8s?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF OH46=98 ELSE OH50]
OH47. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
OH48. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
OH49. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[DEFROST] [ASK IF OH1=07 ELSE PH1]
OH50. You indicated that you made changes to the defrost of the refrigerated cabinet(s). Did you install a new energy efficient defrost system?

1. Yes
2. No

[DEFROST]
OH51. Please provide the following information regarding the old defrost system at your facility: load size in tons, refrigeration type, size, and efficiency.

a. Consumption (kWh/yr)	_____ *(Enter "9999" if unknown)*
b. Refrigeration system size (Cubic feet)	_____ *(Enter "9999" if unknown)*
c. Efficiency	_____% *(Enter "9999" if unknown)*

OH52. What are the approximate hours of operation for the energy efficient defrost that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[ASK IF MH39=4 ELSE RH1]
PH1. Which of the following areas of your vending machine(s) did you install components or make changes to?
[SELECT ALL THAT APPLY]

1. Compressor
2. Condenser
3. Evaporator
4. Insulation
5. Lighting

00. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF PH1=01 ELSE PH6]
PH2. Which of the following changes did you make to the compressor in your vending machine(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency compressor
2. Installed new components to the compressor

00. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [ASK IF PH2=01 ELSE PH4A]
PH3 Please tell us about the high efficiency compressor(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN] [ASK IF PH3B=0 OR 99 ELSE PH4B]
PH4a What is the size of the vending machine(s) in which you installed the high efficiency compressor(s)?
[NUMERIC OPEN END] (# of cans)

[COMPRESSOR COMPONENTS] [ASK IF PH2=02 ELSE PH6]
PH5. Please describe the components you installed to the compressor and any savings that resulted from this change.
[OPEN END]

[CONDENSER CHANGES] [ASK IF PH1=02 ELSE PH18]
PH6. Which of the following changes did you make to the condenser in your vending machine(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency condenser
2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC

4. Replaced air cooled condenser(s) with evaporative condenser(s)
00. Other, specify

[HIGH EFFICIENCY CONDENSER] [ASK IF PH6=01 ELSE PH10]
PH7 Please tell us about the high efficiency condenser(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old condenser	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN] [ASK IF PH7B=0 OR 99 ELSE PH9]
PH8 What is the size of the vending machine(s) in which you installed the high efficiency condenser(s)?
[NUMERIC OPEN END] (capacity in tons)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
[ASK IF PH6 =04 ELSE PH13]
PH10. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
PH11. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was it of the same size?
1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
PH12a. What is the size of the new evaporative condenser(s) you installed? If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[NUMERIC OPEN END]

PH12B. How many units of this size did you install?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF PH6=02 ELSE PH15A]
PH13 How many years old was the condenser in which you installed an energy efficient condenser fan(s)?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
PH14. Please tell us about the efficient condenser fan you installed?

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed [NUMERIC OPEN END]
b. Size (in Inches) [NUMERIC OPEN END]
c. Capacity (in Tons) [NUMERIC OPEN END]
d. Efficiency (%)[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] [ASK IF PH6=03 ELSE PH18]
PH15. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT CONDENSER FAN MOTOR] AND PSC] [ASK IF PH15D=2 ELSE PH18]
PH17. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK PH1=03 ELSE PH28]
PH18. Which of the following changes did you make to the evaporator in your vending machine(s)?

1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC
3. Other, specify

[EFFICIENT EVAPORATOR] [ASK PH18=01 ELSE PH22A]
PH 19 Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATOR AND PSC] [ASK IF PHD=2 ELSE PH22A]
PH21 Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF PH18=02 ELSE PH28]
PH22. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF PH22D=2 ELSE PH28
PH24. Please provide the number of condenser fan motors and age of the refrigeration system(s).
a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[IMPROVED INSULATION] [ASK PF PH1=04 ELSE PH38]
PH28. Please tell us about the improved insulation you installed.

a. Capacity of refrigeration unit (in tons)	[NUMERIC OPEN END]
b. Efficiency:	[NUMERIC OPEN END]

[IMPROVED INSULATION]
PH29. What are the approximate hours of operation for the improved insulation that you just described? An estimate is fine.
_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[LIGHTING] [ASK IF PH1=05 ELSE RH1]
PH38. You indicated that you made changes to the lighting of your vending machine(s). Did you install new lighting?
1. Yes
2. No

[LIGHTING] [ASK IF PH38=1 ELSE RH1]
PH39. How many of each type of energy efficient lighting did you install?
a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other, specify

[LIGHTING] [ASK IF PH39A>0 ELSE PH45]
PH40. What is the LPD now and before you installed the CFLs?

a. Before:
b. After:
c. Don't know

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] ASK IF PH40C=1 ELSE PH45]
PH41. How much did you reduce the LPD when you installed the CFLs?
1. 10%
2. 20%
3. 30%
4. 40%
00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF PH41=98 ELSE PH45]
PH42. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
PH43. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
PH44. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[LIGHTING]
[ASK IF PH39B>0 ELSE RH1]
PH45. What is the LPD now and before you installed the T8s?
a. Before:
b. After:

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF PH45C=1 ELSE RH1]
PH46. How much did you reduce the LPD when you installed the T8s?
1. 10%
2. 20%
3. 30%
4. 40%
00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF PH46=98 ELSE RH1]
PH47. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
PH48. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
PH49. What is the square footage of the refrigeration system?

[NUMERIC OPEN END] DK

[ASK IF MH39=5 ELSE TH1]
RH1. Which of the following areas of your ice machine(s) did you install components or make changes to?
[SELECT ALL THAT APPLY]

1. Compressor
2. Condenser
3. Evaporator
4. Lighting
5. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF RH1=01 ELSE RH6]
RH2. Which of the following changes did you make to the compressor in your ice machine(s)?
[SELECT ALL THAT APPLY]

1. Installed new high efficiency compressor
2. Installed new components to the compressor

00. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [ASK IF RH2=01 ELSE RH4A]
RH3 Please tell us about the high efficiency compressor you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN] [ASK IF RH3B=0 OR 99 ELSE RH4B]
RH4a What is the size of the ice machine(s) in which you installed the high efficiency compressor(s)? [NUMERIC OPEN END] (lbs ice/day)

[COMPRESSOR COMPONENTS] [ASK IF RH2=02 ELSE RH6]
RH5. Please describe the components you installed to the compressor and any savings that resulted from this change.
[OPEN END]

[CONDENSER CHANGES] [ASK IF RH1=02 ELSE RH18]
RH6. Which of the following changes did you make to the condenser in your ice machine(s)?
[SELECT ALL THAT APPLY]

1. Installed new high efficiency condenser
2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC
4. Replaced air cooled condenser(s) with evaporative condenser(s)
5. Other, specify

[HIGH EFFICIENCY CONDENSER]
[ASK IF RH6=01 ELSE RH10]
RH7 Please tell us about the high efficiency condenser you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old condenser	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN]
[ASK IF RH7B=0 OR 99 ELSE RH9]
RH8 What is the size of the ice machine(s) in which you installed the high efficiency condenser(s)? [NUMERIC OPEN END] (LBS ICE/DAY)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
[ASK IF RH6=04 ELSE RH13]
RH10. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
RH11. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was it of the same size?

1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
RH12a. What is the size of the new evaporative condenser(s) you installed? If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[NUMERIC OPEN END]

RH12B. How many units of this size did you install?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF RH6=02 ELSE RH15A]
RH13. How many years old was the condenser in which you installed an energy efficient condenser fan(s)?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
RH14. Please tell us about the efficient condenser fan you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed [NUMBER OPEN END]
b. Size (in Inches) [NUMERIC OPEN END]
c. Capacity (in Tons) [NUMERIC OPEN END]
d. Efficiency (%)[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] [ASK IF RH6=03 ELSE RH18]
RH15. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT CONDENSER FAN MOTOR] AND PSC] ASK IF RH15D=2 ELSE RH18]
RH17 Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK IF RH1=03 ELSE RH38]
RH18. Which of the following changes did you make to the evaporator in your ice machine(s)?

1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC
00. Other, specify

[EFFICIENT EVAPORATOR] [ASK IF RH18=01 ELSE RH22A]
RH19 Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATOR AND PSC] [ASK IF RH19D=2 ELSE RH22A]
RH21. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]

b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF RH18=02 ELSE RH38]
RH22. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
a. Number of Fans affected	[NUMERIC OPEN END]
b. Number of Refrigerators affected	[NUMERIC OPEN END]
c. Type of System	(EC or PSC)

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF RH22D=2 ELSE RH38]
RH24. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[LIGHTING] [ASK IF RH1=04 ELSE TH1]
RH38. You indicated that you made changes to the lighting of your ice machine(s)). Did you install new lighting?

1. Yes
2. No

[LIGHTING] [ASK IF RH38=1 ELSE TH1]
RH39. How many of each type of energy efficient lighting did you install?

a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other, specify

[LIGHTING] [ASK IF RH39A>0 ELSE RH45]
RH40. What is the LPD now and before you installed the CFLs?

a. Before:
b. After:

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] ASK IF RH40C=1 ELSE RH45]
RH41. How much did you reduce the LPD when you installed the CFLs?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF RH41=98 ELSE RH45]
RH42. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
RH43. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
RH44. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[LIGHTING]
[ASK IF RH39B>0 ELSE TH1]
RH45. What is the LPD now and before you installed the T8s?

a. Before:
b. After:

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF RH45C=1 ELSE TH1]
RH46. How much did you reduce the LPD when you installed the T8s?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF RH46=98 ELSE TH1]
RH47. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
RH48. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
RH49. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[ASK IF RH1=05, ELSE TH1]
AH8a. What type of ice machine did you make changes to? What it a…

1. Ice making head
2. Remote condensing unit or split system unit
3. Self contained unit
98. Don't know

AH8b. What is the ice machine's harvest rate (in lbs ice/day)?
[NUMERIC OPEN END]

[ASK IF MH39=6 ELSE TH53]
TH1. Which of the following areas of your preparation table(s) did you install components or make changes to? [SELECT ALL THAT APPLY]

1. Compressor
2. Condenser
3. Evaporator
4. Insulation
5. Kitchen lids
6. Lighting

00. Other, specify:

[COMPRESSOR – CHANGES] [ASK IF TH1=01 ELSE TH6]
TH2. Which of the following changes did you make to the compressor in your preparation table(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency compressor
2. Installed new components to the compressor

00. Other, specify:

[HIGH EFFICIENCY COMPRESSOR] [ASK IF TH2=01 ELSE TH4A]
TH3. Please tell us about the high efficiency compressor(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY COMPRESSOR, IF CAPACITY UNKNOWN] [ASK IF TH3B=0 OR 99 ELSE TH4B]
TH4a. What is the size of the preparation table(s) in which you installed the high efficiency compressor(s)?
[NUMERIC OPEN END] (# of pans)

[COMPRESSOR COMPONENTS] [ASK IF TH2=02 ELSE TH6]
TH5. Please describe the components you installed to the compressor and any savings that resulted from this change.
OPEN END]

[CONDENSER CHANGES] [TH1=02 ELSE TH18]
TH6. Which of the following changes did you make to the condenser in your preparation table(s)? [SELECT ALL THAT APPLY]

1. Installed new high efficiency condenser
2. Installed efficient condenser fan
3. Installed new efficient condenser fan motor ECM & PSC
4. Replaced air cooled condenser(s) with evaporative condenser(s)
5. Other, specify

[HIGH EFFICIENCY CONDENSER] [TH6=01 ELSE TH10]
TH7. Please tell us about the high efficiency condenser(s) you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units installed	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age of old compressor	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[HIGH EFFICIENCY CONDENSER, IF CAPACITY UNKNOWN] [ASK IF TH7B=0 OR 99 ELSE TH9]
TH8 What is the size of the preparation table(s) in which you installed the high efficiency condenser(s)?
[NUMERIC OPEN END] (# OF PANS)

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER] [ASK IF TH6=04 ELSE TH13]
TH10. Please tell us about the old air cooled condenser(s) you replaced.

a. Age	[NUMERIC OPEN END]
b. Size	[NUMERIC OPEN END]
c. Efficiency	% [NUMERIC OPEN END]

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
TH11. When you replaced the air cooled condenser(s) with an evaporative condenser(s) was it of the same size?

1. Yes
2. No
3. Don't Know

[REPLACED AIR COOLED CONDENSER with EVAPORATIVE CONDENSER]
TH12a. What is the size of the new evaporative condenser(s) you installed? If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[NUMERIC OPEN END]

TH12B. How many units of this size did you install?
[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN] [ASK IF TH6=02 ELSE TH15A]
TH13. How many years old was the condenser in which you installed an energy efficient condenser fan(s)? [NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN]
TH14. Please tell us about the efficient condenser fan you installed?

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed [NUMERIC OPEN END]

b. Size (in Inches) [NUMERIC OPEN END]
c. Capacity (in Tons) [NUMERIC OPEN END]
d. Efficiency (%)[NUMERIC OPEN END]

[EFFICIENT CONDENSER FAN MOTOR] [ASK IF TH6=03 ELSE TH18]
TH15. Please tell us about the efficient condenser fan motor(s) that you used in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT CONDENSER FAN MOTOR] AND PSC] [ASK IF TH15D=2 ELSE TH18]
TH17. Please provide the number of condenser fan motors and age of the refrigeration system(s).
a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EVAPORATOR CHANGES] [ASK IF TH1=03 ELSE TH25]
TH18. Which of the following changes did you make to the evaporator in your preparation table(s)?
1. Installed new high efficiency evaporator
2. Installed new efficient evaporator fan motor ECM & PSC
3. Other, specify

[EFFICIENT EVAPORATOR] [ASK IF TH18=01 ELSE TH22A]
TH19 Please tell us about the efficient evaporator you installed.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATOR AND PSC] [ASK IF TH19D=2 ELSE TH22A]
TH21. Please provide the number of condenser fan motors and age of the refrigeration system(s).
a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[EFFICIENT EVAPORATER FAN MOTOR] [ASK IF TH18=02 ELSE TH25]
TH22. Please tell us about the efficient evaporator fan motor(s) that you installed in your refrigeration system.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
b. Number of Fans affected	[NUMERIC OPEN END]
c. Number of Refrigerators affected	[NUMERIC OPEN END]
d. Type of System	(EC or PSC)

[EFFICIENT EVAPORATER FAN MOTOR] AND PSC] [ASK IF TH22D=2 ELSE TH25]
TH24. Please provide the number of condenser fan motors and age of the refrigeration system(s).

a. Number of motors: [NUMERIC OPEN END]
b. Age: [NUMERIC OPEN END]

[INSULATION CHANGES] [ASK IF TH1=04 ELSE TH37]
TH25. Which of the following changes did you make to the insulation in your preparation table(s)?

1. Installed insulation on the bare suction line
2. Installed insulation elsewhere
3. Other, specify

[INSULATION INSTALLED TO THE BARE SUCTION LINE] ASK IF TH25=01 ELSE TH28]
TH26. Please provide the following information regarding the insulation you installed to the bare suction line: cooler temperature, diameter, and suction line length.

_____ a. Cooler temperature in degrees Fahrenheit *(Enter "9999" if unknown)*
_____ b. Diameter in inches *(Enter "9999" if unknown)*
_____ c. Length of suction line in inches *(Enter "9999" if unknown)*

[INSULATION INSTALLED TO THE BARE SUCTION LINE]
TH27. What are the approximate hours of operation for the bare suction line that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[IMPROVED INSULATION] [ASK IF TH25=02 ELSE TH37]
TH28. Please tell us about the improved insulation you installed.

a. Size of refrigeration unit (in # of pans)	[NUMERIC OPEN END]
b. Efficiency:	[NUMERIC OPEN END]

AH9. Where did you install this insulation? [OPEN END]

[IMPROVED INSULATION]
TH29. What are the approximate hours of operation for the improved insulation that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[KITCHEN LID] [ASK IF TH1=05 ELSE TH38]
TH37. How many kitchen lids did you install?.
[NUMERIC OPEN END]

[LIGHTING] [ASK IF TH1=06 ELSE TH53]
TH38. You indicated that you made changes to the lighting of your preparation table(s). Did you install new lighting?

1. Yes
2. No

[LIGHTING] [ASK IF TH38=1 ELSE TH53]
TH39. How many of each type of energy efficient lighting did you install?

a. ___ Compact fluorescent lights
b. ___ T8 with high power electric ballasts
c. ___Other, specify

[LIGHTING] [ASK IF TH39A>0 ELSE TH45]
TH40. What is the LPD now and before you installed the CFLs?

a. Before:
b. After:

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF TH40C=1 ELST TH45]
TH41. How much did you reduce the LPD when you installed the CFLs?

1. 10%
2. 20%
3. 30%
4. 40%

00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF TH41=98 ELSE TH45]
TH42. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
TH43. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
TH44. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[LIGHTING]
[ASK IF TH39B>0 ELSE TH53]
TH45. What is the LPD now and before you installed the T8s?

a. Before:
b. After:

[LIGHTING-IF LPD BEFOR/AFTER UNKNOWN] [ASK IF TH45C=1 ELSE TH53]
TH46. How much did you reduce the LPD when you installed the T8s?

1. 10%
2. 20%
3. 30%
4. 40%
00. Other, specify
98. Don't know

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN] [ASK IF TH46=98 ELST TH53]
TH47. What type of lamps were installed before?
[OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
TH48. How many lamps do you have in the refrigeration system in total?
[NUMERIC OPEN END] DK

[LIGHTING- IF NEITHER LPD QUESTION IS KNOWN]
TH49. What is the square footage of the refrigeration system?
[NUMERIC OPEN END] DK

[HOT WATER HEATER –CHANGE]
[ASK IF MH25=06 ELST TH58]
TH53. You indicated that you made changes or installed components to the hot water heater(s). Which of the following changes did you make?
[SELECT ALL THAT APPLY]

1. Installed an efficient motor(s) in the hot water heater
2. Installed an efficient pump(s) in the hot water heater
3. Installed insulation on the storage tank of the hot water heater
00. Other, specify

AH10a. What type of water heater did you modify?

1. Tank storage
2. Instantaneous
3. Other, specify

[ASK IF AH10a=01, ELSE AH10c]
AH10b. How many gallons does this water heater hold? [NUMERIC OPEN END]

AH10c. What is the fuel source for this hot water heater?.

1. Gas
2. Electric
3. Other, specify

[EFFICIENT MOTOR TO HOT WATER HEATER-CHANGE] [ASK IF TH53=01 ELST TH56]
TH54. Please tell us about the size and efficiency of the motor(s) before and after you installed a new energy efficient model in the hot water heater.
If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed
b. Previous motor size:
c. New motor size:
d. Previous motor efficiency:
e. New motor efficiency:

[EFFICIENT MOTOR TO HOT WATER HEATER-CHANGE]
TH55. What are the approximate hours of operation for the energy efficient motor(s) that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[PUMP IN HOT WATER HEATER-CHANGE] [ASK IF TH53=02 ELSE TH57a]
TH56. Please describe the new energy efficient pump(s) you installed in the hot water heater. [OPEN END]

[INSULATION TO STORAGE TANK-CHANGE] [ASK IF TH53=03 ELSE TH58]
TH57. Please tell us about the insulation you installed on the storage tank.

a. Fuel Type	[DROP DOWN, GAS OR ELECTRIC]
b. R-Value	[NUMERIC OPEN END]
c. Temperature settings	[NUMERIC OPEN END]
d. Size in gallons	[NUMERIC OPEN END]

[WARE WASHER–CHANGE]
[ASK IF MH25=07 ELSE TH61]
TH58. You indicated that you made changes or installed components to the ware washer(s). Which of the following changes did you make?

1. Low flow qualified pre-rinse spray valve
2. Other, specify:

[PRE-RINSE SPRAY VALVE-CHANGE] [ASK IF TH58=01 ELSE TH61]
TH59. Please provide the following information regarding the low flow pre-rinse spray valve you installed at your facility: water heater fuel type, water heater efficiency (%), and flow rate.
If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

a. Number of units installed	[NUMERIC OPEN END]
a. Water heater fuel type	_____ *(Drop down list Gas or Electric)*
b. Water heater efficiency	_____ % *(Enter "99" if unknown)*
c. Flow rate of previous valve (if applicable)	_____ *(Enter "99" if unknown) [ALLOW DECIMALS, 0.00-99.99]*
c. Flow rate of new valve	_____ *(Enter "99" if unknown) [ALLOW DECIMALS, 0.00-99.99]*

[PRE-RINSE SPRAY VALVE-CHANGE]
TH60. What are the approximate hours of operation for the low flow pre-rinse spray valve that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[ASK IF MH1c=1 ELSE VH91]
TH61. You indicated that you made changes to the operations, repair and/or maintenance of existing cooking, ventilation, refrigeration, or water equipment. Which of the following areas did you make a change to in your efforts to save energy at your facility? [SELECT ALL THAT APPLY]

1. Cooking equipment
2. Ventilation
3. Ware washer
4. Hot water heater
5. Refrigeration system
6. Other, specify

[ASK IF TH61=01 ELSE TH63]
TH62. You indicated that you made changes to the operations, repair, and/or maintenance of existing cooking equipment. Please describe the changes you made and any savings that resulted from these changes.
[OPEN END]

AH11. What fuel type does this cooking equipment use?

1. Electric
2. Natural gas
3. Other, specify

[ASK IF TH61=02 ELSE TH69]
TH63. You indicated that you made changes to the operations, repair, and/or maintenance of existing ventilation equipment. Which of the following changes did you make to the ventilation equipment at your facility? [SELECT ALL THAT APPLY]

1. Implemented static pressure reset
2. Turn off the exhaust hood when kitchen is closed
3. Other, specify

[PRESSURE RESET-CHANGES] [ASK IF TH63=01 AND NOT MH30=03, ELSE TH67]
TH64. Please describe the static pressure before and after the reset.

	Pressure Drop	Delta CFM	Cubic Feet per Minute
Before reset:			
After reset:			
	Don't know	Don't know	Don't know

[PRESSURE RESET]
TH65. Please describe the duct dimensions before and after the static pressure reset.

Select Shape [Drop Down]	Duct Dimensions
(Circular, Square, Oval, Rectangular, DK, No Shape Selected)	[NUMERIC OPEN END, 1-999] Inches

[PRESSURE RESET]
TH66. What are the operating hours and the high and low set points of the duct where you performed a static pressure reset?

a. High set point: [NUMERIC OPEN END]
b. Low set point: [NUMERIC OPEN END]
Operating hours:
c. Hrs per day [NUMERIC OPEN END, 0-99]
d. Days per week [NUMERIC OPEN END, 0-99]
e. Weeks per year [NUMERIC OPEN END, 0-99]

[TURN OFF EXHAUST HOOD] [ASK IF TH63=02 ELSE TH69]
TH67. What is the average size of the fan and efficiency of the exhaust hood(s)?

e. Number of hoods affected.	_____ [NUMERIC OPEN END]
b. Exhaust hood fan size	_____ CFM [NUMERIC OPEN END]
d. Efficiency	_____ % *(Enter "9999" if unknown)*

[TURN OFF EXHAUST HOOD]
TH68. What are the approximate hours of operation of the exhaust hood(s) before and after you made operational changes? An estimate is fine. [POSSIBLY MAKE INTO A GRID
_____ a. Hrs per day before change *(Enter "9999" if unknown)*
_____ c. Days per week before change *(Enter "9999" if unknown)*
_____ e. Weeks per year before change *(Enter "9999" if unknown)*
_____ b. Hrs per day after change *(Enter "9999" if unknown)*
_____ d. Days per week after change *(Enter "9999" if unknown)*
_____ f. Weeks per year after change *(Enter "9999" if unknown)*

[ASK IF TH61=03 ELSE TH82]
TH69. You indicated that you made changes to the operations, repair, and/or maintenance of existing ware washer equipment. Which of the following changes did you make to the ware washer(s) at your facility? [SELECT ALL THAT APPLY]
1. Fully load dish racks
2. Turn off dish machine when kitchen is closed
3. Run ware washer only in the evening
4. Calibrate supply water temperature of the ware washer(s)
5. Calibrate rinse pressure of the ware washer(s)
6. Adjust rinse water temperature of the ware washer(s)
7. Fix all leaks, damaged racks, wash curtains of the ware washer(s)
8. Clean ware washer(s) fixtures
9. Other, specify:

[FULLY LOAD DISH WASHER] [ASK IF TH69=01 ELSE TH71A]
TH70. Please provide the following information about the dish machine(s) where you now fully load before running.

a. Average Max kWh/year	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
b. Average Energy Factor (EF)	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
c. Average Load/kwh	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
d. Run load before change was made	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
e. Run load after change was made	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
f. Number of loads reduced per day after the change was made	[NUMERIC OPEN END] *(Enter "9999" if unknown)*

[TURN OFF DISH MACHINE WHEN KITCHEN IS CLOSED] [ASK IF TH69=02 ELSE TH72]
TH71. Please provide the following information about the dish machine(s) where you now turn off the machine when the kitchen is closed.

a. Average Max kWh/year	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
b. Average Energy Factor (EF)	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
c. Average Load/kwh	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
d. Run load before change was made	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
e. Run load after change was made	[NUMERIC OPEN END] *(Enter "9999" if unknown)*
f. Number of loads reduced per day after the change was made	[NUMERIC OPEN END] (Enter "9999" if unknown)

[RUN WARE WASHER DURING EVENING] [ASK IF TH69=03 ELSE TH74]
TH72. You indicated that you run the ware washer(s) only during the evening or off peak hours. How many ware washers were affected by this change? [NUMERIC OPEN END]

[RUN WARE WASHER DURING EVENING]
TH73. What was the demand load of the machines before and after you began running the ware washers only during the evening or off peak hours?

_____ a. KW/load before Change *(Enter "9999" if unknown)*
_____ b. KW/load after Change *(Enter "9999" if unknown)*

[CALIBRATE SUPPLY WATER TEMP] [ASK IF TH69=04 ELSE TH78]
TH74. How many ware washers were affected when you calibrated the supply water temperature?
[NUMERIC OPEN END]

[CALIBRATE SUPPLY WATER TEMP]
TH75. What is the average size of the ware washer(s) in which you calibrated the supply water temperature?
[NUMERIC OPEN END] Racks/hour

[CALIBRATE SUPPLY WATER TEMP]
TH76. What was the supply water temperature of the ware washer(s) before and after you calibrated it?
_____ a. Before Change in degrees Fahrenheit *(Enter "9999" if unknown)*
_____ b. After Change in degrees Fahrenheit *(Enter "9999" if unknown)*

[CALIBRATE SUPPLY WATER TEMP]
TH77. What are the approximate operating hours of the ware washer(s) where you calibrated the rinse pressure?
_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[CALIBRATE RINSE PRESSURE] [ASK IF TH69=05 ELSE TH82]
TH78. How many ware washers were affected when you calibrated the rinse pressure?
[NUMERIC OPEN END]

[CALIBRATE RINSE PRESSURE]
TH79. What is the average size of the ware washer(s) in which you calibrated the rinse pressure?
[NUMERIC OPEN END] Racks/hour

[CALIBRATE RINSE PRESSURE]
TH80. What was the rinse pressure of the ware washer(s) before and after you calibrated it?
_____ a. psi Before Change *(Enter "9999" if unknown)*
_____ b. psi After Change *(Enter "9999" if unknown)*

[CALIBRATE RINSE PRESSURE]
TH81. What are the approximate operating hours of the ware washer(s) where you calibrated the rinse pressure?
_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[HOT WATER HEATER-OPERATIONAL] [ASK IF TH61=04 ELSE UH1]
TH82. You indicated that you made changes to the operations, repair, and/or maintenance of existing hot water heater(s). Which of the following changes did you make to the hto water heater(s) at your facility? [SELECT ALL THAT APPLY]
1. Activate the automatic flue damper control for the hot water heater(s)
2. Turn off the hot water heater tank and booster heater when kitchen is closed
3. Other, specify

[AUTOMATIC FLUE DAMPER] [ASK IF TH82=01 ELSE TH84A]
TH83. For the hot water heater(s) in which you activated the automatic flue damper control, what is the average rated volume, energy factor, annual energy use, and are the flue dampers on or off?

a. Number of heaters affected	_____ *([NUMERIC OPEN END]*
b. Rated volume	_____ *([OPEN END]*
c. Energy factor	_____ *([OPEN END]*
d. Annual energy use	_____ kWh/yr *(Enter "9999" if unknown)*

[TURN OFF HOT WATER HEATER TANK] [ASK IF TH82=02 ELSE UH1]
TH84. What is the average size and efficiency of the hot water heater(s)? If you made changes to more than one, please provide average size and efficiency.

a. Number of heaters affected	_____ *([NUMERIC OPEN END] (Enter "9999" if unknown)*
b. Hot water heater size in gallons	_____ gallons *([NUMERIC OPEN END] (Enter "9999" if unknown)*
c. Hot water heater efficiency	_____ % *([NUMERIC OPEN END] (Enter "9999" if unknown)*

[TURN OFF HOT WATER HEATER TANK]
TH85. What are the approximate hours of operation for the hot water heater(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[ASK IF TH61=05 ELSE TH91]
UH1. You indicated that you made changes to the operations, repair, and/or maintenance of existing refrigeration system equipment. Please identify which refrigeration systems were affected by these changes. [SELECT ALL THAT APPLY]

1. Display Refrigerator(s)
2. Refrigerated Storeroom(s)/Walk-in(s)
3. Refrigerated Cabinet(s) (e.g., Reach-in(s), Roll-in(s))
4. Vending Machine(s)
5. Ice Machine(s)
6. Preparation Table(s)
7. Other, specify:

[ASK IF UH1=01 ELSE VH2]
UH2. Which of the following operations or maintenance changes did you make to your display refrigerator(s)? [SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Implemented microprocessor-based control system

8. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
UH3. For the next set of questions please think about the DISPLAY REFRIGERATOR(s) to which you made the changes that you just mentioned.

[GENERAL REFRIGERATION SYSTEM]
UH4. Please use the pull down menus to tell us about the DISPLAY REFRIGERATOR(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN][ASK IF UH4B=0 OR 99 ELSE UH7]
UH5 What is the size of the DISPLAY REFRIGERATOR(s) in which you made changes?
[NUMERIC OPEN END] (linear feet)

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.
[GENERAL REFRIGERATION]
UH7. What are the approximate hours of operation for the display refrigerator(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [UH2=1 ELSE UH10]
UH8. Which of the following operational or maintenance changes did you make to the compressor(s) in your display refrigerator(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF UH8=01 ELSE UH9]
AH12a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
98. Don't know

AH12b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature:

approximately 35°F)
3. Don't know

[HEAT RECLAIM] [ASK IF UH8=02 ELSE UH10]
UH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF UH2=2 ELSE UH16]
UH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your display refrigerator(s)?
[SELECT ALL THAT APPLY]
1. Implement subcooling of the condenser
2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
00. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP] [ASK IF UH10=02 OR 03 ELSE UH15]
UH11. What is the capacity of the DISPLAY REFRIGERATOR condenser(s) to which you made operational changes?
[NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF UH10=02 ELSE UH13]
UH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?
a. SST reset: [OPEN END]
b. SCT: [OPEN END

[LOWER CONDENSING TEMP] [ASK IF UH10=03 ELSE UH15]
UH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?
1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
UH14. What was the temperature default before and after you lowered the condensing temperature on cycle?
a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS] [ASK IF UH10=04 ELSE UH16]
UH15a. How often do you check the cleanliness of condenser coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a

month, 2-3 times a year, Once a year or less]

AH13. What is the size of the system with the condenser (tons)?
[NUMERIC OPEN END]

[EVAPORATOR] [ASK IF UH2=3 ELSE UH20]
UH16. Which of the following operational or maintenance changes did you make to the evaporator(s) in your display refrigerator(s)? [SELECT ALL THAT APPLY]

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF UH16=01 ELSE UH18A]
UH17. You indicated that you installed an evaporator fan controller(s). How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF UH16=02 ELSE UH19]
UH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]
b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
    h. Hrs per day [NUMERIC OPEN END, 0-99]
    i. Days per week [NUMERIC OPEN END, 0-99]
    j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF UH16=03 ELSE AH15A]
UH19a. How often do you check the cleanliness of evaporator coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

AH14. What is the size of the system with the evaporator (tons)? [NUMERIC OPEN END]
[REDUCT TEMP LIFT] [ASK IF UH2=4 ELSE UH21]
AH15a. Did you reduce temperature lift (i.e. the difference between the evaporating and condensing temperatures)?

1. Yes
2. No
3. Don't know

[ASK IF AH15a=ELSE AH15c]
UH20. When you reduced the temperature lift, how many degrees was it lowered?
[NUMERIC OPEN END, 0-99]
AH15b. Units:

a. Fahrenheit
b. Celsius

AH15c. Did you lower the approach temperature (i.e. the condenser water temperature)?

1. Yes
2. No
3. Don't know

[ASK IF AH15c=01 ELSE UH21]
AH15d. When you reduced the approach temperature how many degrees was lowered?
[NUMERIC OPEN END, 0-99]
AH15e. Units:

a. Fahrenheit
b. Celsius

[USE TIMER] [ASK IF UH2=5 ELSE UH23]
UH21. You indicated that you installed a refrigeration system timer(s). How many machines were affected by this change? [NUMERIC OPEN END]

[USE TIMER]
UH22. What was the demand load of the machines before and after refrigeration timers were installed?

_____ a. kW/yr Before Change *(Enter "9999" if unknown)*
_____ b. kW/yr After Change *(Enter "9999" if unknown)*

[COMMISSIONING] [ASK IF UH2=6 ELSE UH31A]
UH23. Please describe the changes you made when you performed commissioning and any savings that resulted. [OPEN END]

[ADDITIONAL GENERAL CHANGES] [ASK IF UH2=8 ELSE UH33]
UH31. You indicated that you made additional operational changes to the refrigeration system at your facility as a result of taking the course. Considering only changes made as a result of what you learned, how often do you employ the following changes?

Refrigeration system changes	Frequency
a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)
b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
e. Monitor all critical refrigeration pressures and temperatures	
i. Check fans and look for worn belts and failed motors	
j. Check suction line insulation	

k. Check refrigerant charge	
l. Check moisture barriers	
m. Check infiltration barriers	
n. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

[ASK IF UH1=02 ELSE WH2]
VH2. Which of the following operations or maintenance changes did you make to your refrigerated storeroom(s)/walk-in(s) ? [SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Install occupancy sensors
8. Implemented microprocessor-based control system
9. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
VH3. You indicated that, as a result of the course, you made changes to your refrigerated storeroom(s)/walk-in(s). For the next set of questions please think only about the changes you mentioned that occurred AFTER the course.

[GENERAL REFRIGERATION SYSTEM]
VH4. Please use the pull down menus to tell us about the refrigerated storeroom(s)/walk-in(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN] [ASK IF VH4B=0 OR 99 ELSE VH7]
VH5 What is the size of the refrigerated storeroom(s)/walk-in(s) in which you made changes? [NUMERIC OPEN END] (square feet)

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

[GENERAL REFRIGERATION]
VH7. What are the approximate hours of operation for the refrigerated storeroom(s)/walk-in(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [ASK IF VH2=1 ELSE VH10]
VH8. Which of the following operational or maintenance changes did you make to the compressor(s) in your refrigerated storeroom(s)/walk-in(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF VH8=01 ELSE VH9]
AH16a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
4. Don't know

AH16b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature: approximately 35°F)
3. Don't know

[HEAT RECLAIM] [ASK IF VH8=02 ELSE VH10]
VH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF VH2=2 ELSE VH16]
VH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your refrigerated storeroom(s)/walk-in(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling of the condenser
2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
5. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP]
[ASK IF VH10=02 OR 03 ELSE UH15]
VH11. What is the capacity of the refrigerated storeroom/walk-in condenser(s) to which you made operational changes? [NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF VH10=02 ELSE VH15]
VH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?

a. SST reset: [OPEN END]
b. SCT: [OPEN END]

[LOWER CONDENSING TEMP] [ASK IF VH10=03 ELSE V15]
VH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?

1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
VH14. What was the temperature default before and after you lowered the condensing temperature on cycle?

a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS] [ASK IF VH10=04 ELSE VH16]
VH15a. How often do you check the cleanliness of condenser coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[EVAPORATOR] [ASK IF VH2=3 ELSE VH20]
VH16. Which of the following operational or maintenance changes did you make to the evaporator in your refrigerated storeroom(s)/walk-in(s)? [SELECT ALL THAT APPLY]

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF VH 16=01 ELSE VH18A]
VH17. You indicated that you installed an evaporator fan controller(s). How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF VH16=02 ELSE VH19]
VH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]
b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
h. Hrs per day [NUMERIC OPEN END, 0-99]

i. Days per week [NUMERIC OPEN END, 0-99]
j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF VH16=03 ELSE VH20]
VH19. How often do you check the cleanliness of evaporator coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[REDUCT TEMP LIFT] [ASK IF VH 2=4 ELSE VH21]
VH20. When you reduced the temperature lift how many degrees was it lowered?
[NUMERIC OPEN END]
AH17. Units:

c. Fahrenheit
d. Celsius

[USE TIMER] [ASK IF VH2=5 ELSE VH23]
VH21. You indicated that you installed a refrigeration system timer(s). How many machines were affected by this change? [NUMERIC OPEN END]

[USE TIMER]
VH22. What was the demand load of the machines before and after refrigeration timers were installed?

_____ a. kW/yr Before Change *(Enter "9999" if unknown)*
_____ b. kW/yr After Change *(Enter "9999" if unknown)*

[COMMISSIONING] [ASK IF VH2=6 ELSE VH24]
VH23. Please describe the changes you made when you performed commissioning and any savings that resulted.
[OPEN END]

[OCCUPANCY SENSORS] [ASK IF VH2=7 ELSE VH31A]
VH24. You indicated that you installed occupancy sensors for walk-ins, break rooms, or store rooms. How many occupancy sensors were installed?
[NUMERIC OPEN END]

[OCCUPANCY SENSORS]
VH25. What types of lamps were installed?
[OPEN END]

[OCCUPANCY SENSORS]
VH26. How many lamps are controlled by the occupancy sensors?
[OPEN END]

[OCCUPANCY SENSORS]
VH27. How many months old are the lamps controlled by the occupancy sensors?
[NUMERIC OPEN END]

[OCCUPANCY SENSORS]
VH28. What is the square feet of the area affected by the occupancy sensors you installed?
[NUMERIC OPEN END]

[ADDITIONAL GENERAL CHANGES] [ASK IF VH2=9 ELSE UH65]
VH31. You indicated that you made additional operational changes to the refrigeration system at your facility as a result of taking the course. Considering only changes made as a result of what you learned, how often do you employ the following changes?

Refrigeration system changes	Frequency
a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)
b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
b. Monitor all critical refrigeration pressures and temperatures	
f. Check fans and look for worn belts and failed motors	
g. Check suction line insulation	
h. Check refrigerant charge	
i. Check moisture barriers	
i. Check infiltration barriers	
d. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

[ASK IF UH1=03 ELSE XH2]
WH2. Which of the following operations or maintenance changes did you make to your refrigerated cabinet(s) (e.g., reach-ins, roll-ins) ? [SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Implemented microprocessor-based control system
8. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
WH3. For the next set of questions please think about the refrigerated cabinet(s)to which you made the changes that you just mentioned.

[GENERAL REFRIGERATION SYSTEM]
WH4. Please use the pull down menus to tell us about the refrigerated cabinet(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN][ASK IF WH4B=0 OR 99 ELSE WH7]
WH5 What is the size of the refrigerated cabinet(s) in which you made changes? [NUMERIC OPEN END] (Cubic feet)

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

[GENERAL REFRIGERATION]
WH7. What are the approximate hours of operation for the refrigerated cabinet(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [ASK IF WH2=1 ELSE WH10]
WH8. Which of the following operational or maintenance changes did you make to the compressor(s) in your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF WH8=01 ELSE WH9]
AH18a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
98. Don't know

AH18b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature: approximately 35°F)
98. Don't know

[HEAT RECLAIM] [ASK IF WH8=02 ELSE WH10]
WH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF WH2=2 ELSE WH16]
WH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling of the condenser
2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
5. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP] [ASK IF WH10=02 OR 03 ELSE WH15]
WH11. What is the capacity of the refrigerated cabinet condenser(s) to which you made operational changes? [NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF WH41=02 ELSE WH13]
WH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?

a. SST reset: [OPEN END]
b. SCT: [OPEN END]

[LOWER CONDENSING TEMP] [ASK IF WH10=03 ELSE WH15]
WH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?

1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
WH14. What was the temperature default before and after you lowered the condensing temperature on cycle?

a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS] [ASK IF WH10=03 ELSE WH16]
WH15a. How often do you check the cleanliness of condenser coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[EVAPORATOR] [ASK IF WH2=3 ELSE WH20]
WH16. Which of the following operational or maintenance changes did you make to the evaporator(s) in your refrigerated cabinet(s)? [SELECT ALL THAT APPLY]

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF WH16=01 ELSE WH18A]
WH17. You indicated that you installed an evaporator fan controller(s). How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF WH16=02 ELSE WH19]
WH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]
b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
    h. Hrs per day [NUMERIC OPEN END, 0-99]
    i. Days per week [NUMERIC OPEN END, 0-99]
    j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF WH16=03 ELSE WH20]
WH19a. How often do you check the cleanliness of evaporator coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[REDUCT TEMP LIFT] [ASK IF WH2=4 ELSE WH21]
WH20. When you reduced the temperature lift how many degrees was it lowered?
[NUMERIC OPEN END]
AH19. Units:

a. Fahrenheit
b. Celsius

[USE TIMER] [ASK IF WH2=5 ELSE WH23]
WH21. You indicated that you installed a refrigeration system timer(s). How many machines were affected by this change? [NUMERIC OPEN END]

[USE TIMER]
WH22. What was the demand load of the machines before and after refrigeration timers were installed?

_____ a. kW/yr Before Change *(Enter "9999" if unknown)*
_____ b. kW/yr After Change *(Enter "9999" if unknown)*

[COMMISSIONING] [ASK IF WH2=7 ELSE WH31A]
WH23. Please describe the changes you made when you performed commissioning and any savings that resulted.
[OPEN END]

[ADDITIONAL GENERAL CHANGES] [ASK IF UH65=8 ELSE VH1]
WH31.You indicated that you made additional operational changes to the refrigeration system at your facility as a result of taking the course. Considering only changes made as a result of what you learned, how often do you employ the following changes?

Refrigeration system changes	Frequency
a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)
b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
b. Monitor all critical refrigeration pressures and temperatures	
f. Check fans and look for worn belts and failed motors	
g. Check suction line insulation	
h. Check refrigerant charge	
i. Check moisture barriers	
i. Check infiltration barriers	
d. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

[ASK IF UH1=04 ELSE YH2]
XH2. Which of the following operations or maintenance changes did you make to your vending machine(s) ? [SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Implemented microprocessor-based control system
8. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
XH3. For the next set of questions please think about the vending machine(s)to which you made the changes that you just mentioned.

XH4. Please use the pull down menus to tell us about the vending machine(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN] [ASK IF XH4B=0 OR 99 ELSE XH7]
XH5 What is the size of the vending machine(s) in which you made changes? [NUMERIC OPEN END] (# of cans)

[GENERAL REFRIGERATION]
XH7. What are the approximate hours of operation for the vending machine(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [XH2=1 ELSE XH10]
XH8. Which of the following operational or maintenance changes did you make to the compressor in your vending machine(s)? [SELECT ALL THAT APPLY]

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF XH8=01 ELSE XH9]
AH20a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
98. Don't know

AH20b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature: approximately 35°F)
98. Don't know

[HEAT RECLAIM] [ASK IF XH8=02 ELSE XH10]
XH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF XH2=2 ELSE XH16]
XH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your vending machine(s)?

1. Implement subcooling of the condenser
2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
5. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP] [ASK IF XH10=02 OR 03 ELSE XH15]
XH11. What is the capacity of the vending machine condenser(s) to which you made operational changes? [NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF XH10=02 ELSE XH13]
XH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?

a. SST reset: [OPEN END]
b. SCT: [OPEN END]

[LOWER CONDENSING TEMP] [ASK IF XH10=03 ELSE XH15]
XH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?

1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
XH14. What was the temperature default before and after you lowered the condensing temperature on cycle?

a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS] [ASK IF XH10=04 ELSE XH16]
XH15a. How often do you check the cleanliness of condenser coils?

[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[EVAPORATOR] [ASK IF XH2=3 ELSE XH20]
XH16. Which of the following operational or maintenance changes did you make to the evaporator(s) in your vending machine(s)? [SELECT ALL THAT APPLY]

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF XH16=01 ELSE XH18A]
XH17. You indicated that you installed an evaporator fan controller(s). How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF XH16=02 ELSE XH19]
XH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]
b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
h-j. Operating hours:
    h. Hrs per day [NUMERIC OPEN END, 0-99]
    i. Days per week [NUMERIC OPEN END, 0-99]
    j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF XH16=03 ELSE XH20]
XH19A. How often do you check the cleanliness of evaporator coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]
[ADDITIONAL GENERAL CHANGES] [ASK IF XH2=8 ELSE YH2]
XH31. You indicated that you made additional operational changes to the refrigeration system at your facility. How often do you employ them?

Refrigeration system changes	Frequency

a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)
b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
b. Monitor all critical refrigeration pressures and temperatures	
f. Check fans and look for worn belts and failed motors	
g. Check suction line insulation	
h. Check refrigerant charge	
i. Check moisture barriers	
i. Check infiltration barriers	
d. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

[ASK IF UH1=05 ELSE ZH2]
YH2. Which of the following operations or maintenance changes did you make to your ice machine(s)? [SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Made ice during off peak hours or at night
8. Implemented microprocessor-based control system
9. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
YH3. For the next set of questions please think about the ice machine(s) to which you made the changes that you just mentioned.

[GENERAL REFRIGERATION SYSTEM]
YH4. Please use the pull down menus to tell us about the ice machine(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]

Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)
AH21. Type of ice machine	(Ice making head, remote condensing unit or split system unit, or self contained unit)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN] [ASK IF YH4B=0 OR 99 ELSE YH7]
YH5 What is the size of the ice machine(s) in which you made changes? [NUMERIC OPEN END] (lbs ice/day)

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

[GENERAL REFRIGERATION]
YH7. What are the approximate hours of operation for the ice machine(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [ASK IF YH2=1 ELSE YH10]
YH8. Which of the following operational or maintenance changes did you make to the compressor(s) in your ice machine(s)?

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF YH8=01 ELSE YH9]
AH21a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
98. Don't know

AH21b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature: approximately 35°F)
3. Don't know

[HEAT RECLAIM] [ASK IF YH8=02 ELSE YH10]
YH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF YH2=2 ELSE YH16]
YH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your ice machine(s)?

1. Implement subcooling of the condenser

2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
5. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP] [ASK IF YH10=02 OR 03 ELSE YH15]
YH11. What is the capacity of the ice machine condenser(s) to which you made operational changes? [NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF YH10=02 ELSE YH13]
YH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?

a. SST reset: [OPEN END]
b. SCT: [OPEN END]

[LOWER CONDENSING TEMP] [ASK IF YH10=03 ELSE YH15]
YH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?

1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
YH14. What was the temperature default before and after you lowered the condensing temperature on cycle?

a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS]
YH15a. How often do you check the cleanliness of condenser coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[EVAPORATOR] [ASK IF YH2=3 ELSE YH20]
YH16. Which of the following operational or maintenance changes did you make to the evaporator in your ice machine(s)? [SELECT ALL THAT APPLY]

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF YH16=01 ELSE YH18A]
YH17. You indicated that you installed an evaporator fan controller(s). How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF YH16=02 ELSE YH19]
YH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]
b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
    h. Hrs per day [NUMERIC OPEN END, 0-99]
    i. Days per week [NUMERIC OPEN END, 0-99]
    j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF YH16=03 ELSE YH20]
YH19a. How often do you check the cleanliness of evaporator coils?

[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[MAKE ICE OFF PEAK] [ASK IF YH2=7 ELSE YH31A]
YH24. You indicated that you began making ice during off peak hours. How many machines were affected by this change? [NUMERIC OPEN END]

[MAKE ICE OFF PEAK]
AH22A. Which days of the week is ice made during off-peak hours? Please select all that apply. [MULTIPLE RESPONSE]

1. Monday
2. Tuesday
3. Wednesday
4. Thursday
5. Friday
6. Saturday
7. Sunday

AH22b. Does this change throughout the year?

1. Yes, describe changes
2. No
3. Don't know

[ADDITIONAL GENERAL CHANGES] [ASK IF YH2=9 ELSE ZH2]
YH31. You indicated that you made additional operational changes to the refrigeration system at your facility as a result of taking the course. Considering only changes made as a result of what you learned, how often do you employ the following changes?

Refrigeration system changes	Frequency
a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)

b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
b. Monitor all critical refrigeration pressures and temperatures	
f. Check fans and look for worn belts and failed motors	
g. Check suction line insulation	
h. Check refrigerant charge	
i. Check moisture barriers	
i. Check infiltration barriers	
d. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

[ASK IF UH1=06 ELSE VH91]
ZH2. Which of the following operations or maintenance changes did you make to your preparation table(s) ?
[SELECT ALL THAT APPLY]

1. Made changes to the compressor
2. Made changes to the condenser
3. Made changes to the evaporator
4. Reduced temperature lift and/or lower approach temperatures
5. Installed refrigeration timer
6. Perform commissioning
7. Implemented microprocessor-based control system
8. Made other operational or maintenance changes (e.g., changes to infiltration barriers, calibration)

[GENERAL REFRIGERATION SYSTEM]
ZH3. For the next set of questions please think about the preparation table(s) to which you made the changes that you just mentioned.

ZH4. Please use the pull down menus to tell us about the preparation table(s).

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

Number of units affected	[NUMERIC OPEN END]
Refrigerator Capacity (in Tons)	[NUMERIC OPEN END]
Age (in years)	[NUMERIC OPEN END]
Type of cooling	(Evaporative or Air)
Type of system	(Single or Multiplex)

[GENERAL REFRIGERATION, IF CAPACITY UNKNOWN] [ASK IF ZH4B=0 OR 99 ELSE ZH7]

ZH5 What is the size of the preparation table(s) in which you made changes?
[NUMERIC OPEN END] (# of pans)

If multiple units were affected and they are not identical, please provide details on just one of them. Please enter "99" if answer is unknown.

[GENERAL REFRIGERATION]
ZH7. What are the approximate hours of operation for the preparation table(s)? An estimate is fine.

_____ a. Hrs per day *(Enter "9999" if unknown)*
_____ b. Days per week *(Enter "9999" if unknown)*
_____ c. Weeks per year *(Enter "9999" if unknown)*

[COMPRESSOR CHANGES] [ASK IF ZH2=1 ELSE ZH10]
ZH8. Which of the following operational or maintenance changes did you make to the compressor(s) in your preparation table(s)?

1. Implement subcooling
2. Implement heat reclaim to utilize heat given off by the compressor(s)
3. Other, specify

[SUBCOOLING] [ASK IF ZH8=01 ELSE ZH9]
AH23a. Did you install mechanical or ambient subcooling?

1. Mechanical
2. Ambient
3. Other, specify
4. Don't know

AH23b. What is the system temperature?

1. Low (Evaporator temperature: approximately negative 20°F; Case temperature: approximately 0°F)
2. Medium (Evaporator temperature: approximately 20°F; Case temperature: approximately 35°F)
3. Don't know

[HEAT RECLAIM] [ASK IF ZH8=02 ELSE ZH10]
ZH9. Please describe the changes you made to implement heat reclaim.
[OPEN END]

[COMPRESSOR SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[CONDENSER] [ASK IF ZH2=2 ELASE ZH16]
ZH10. Which of the following operational or maintenance changes did you make to the condenser(s) in your preparation table(s)?

1. Implement subcooling of the condenser
2. Implement floating condenser head pressure
3. Lower condensing temperature on cycle efficiency
4. Check the cleanliness of condenser coils
5. Other, specify

[CONDENSER SUBCOOLING: NOTE COVERED IN ABOVE GENERAL QS]

[FLOATING CONDENSER HEAD PRESSURE OR LOWER CONDENSING TEMP] [ASK IF ZH10=02 OR 03 ELSE ZH15]
ZH11. What is the capacity of the preparation table condenser(s) to which you made operational changes?
[NUMERIC OPEN END, in tons]

[FLOATING CONDENSER HEAD PRESSURE] [ASK IF ZH10=02 ELSE ZH13]
ZH12. What is the Saturated Suction Temperature (SST) reset or Saturated Condensing Temperature (SCT) controlled by the floating condenser head pressure?

a. SST reset: [OPEN END]
b. SCT: [OPEN END]

[LOWER CONDENSING TEMP] [ASK IF ZH10=03 ELSE ZH15]
ZH13. Is there a variable speed condenser fan in the condenser(s) to which you lowered the condensing temperature on cycle?

1. Yes
2. No
3. Don't know

[LOWER CONDENSING TEMP]
ZH14 What was the temperature default before and after you lowered the condensing temperature on cycle?

a. Temperature default before: [NUMERIC OPEN END]
b. Temperature default after: [NUMERIC OPEN END]

[CHECK CLEANLINESS OF CONDENSER COILS] [ASK IF ZH10=03 ELSE ZH16]
ZH15a. How often do you check the cleanliness of condenser coils?

[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[EVAPORATOR] [ASK IF ZH2=3 ELSE ZH20]
ZH16. Which of the following operational or maintenance changes did you make to the evaporator(s) in your preparation table(s)?

1. Use evaporator fan controller (cycling)
2. Implement evaporator pressure reset
3. Check the cleanliness of evaporator coils
4. Other, specify

[EVAPORATOR FAN CONTROLLER] [ASK IF ZH16=01 ELSE ZH18A]
ZH17. You indicated that you installed an evaporator fan controller. How many evaporator fans and how many display refrigerators were affected?

a. Number of evaporator fans: [NUMERIC OPEN END]
b. Number of display refrigerators: [NUMERIC OPEN END]

[EVAPORATOR PRESSURE RESET] [ASK IF ZH16=02 ELSE ZH19]
ZH18. Please tell us about the evaporator pressure reset.

a. Pressure drop before reset: [NUMERIC OPEN END, 1-9999]

b. Pressure drop after reset: [NUMERIC OPEN END, 1-9999]
c. Delta (CFM) before reset: [NUMERIC OPEN END, 1-9999]
d. Delta (CFM) after reset: [NUMERIC OPEN END, 1-9999]
e. Compressor capacity (EER): [NUMERIC OPEN END, 1-9999]
f. Heating set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
g. Cooling set point in degrees Fahrenheit: [NUMERIC OPEN END, 1-99]
Operating hours:
h. Hrs per day [NUMERIC OPEN END, 0-99]
i. Days per week [NUMERIC OPEN END, 0-99]
j. Weeks per year [NUMERIC OPEN END, 0-99]

[CHECK CLEANLINESS OF EVAPORATOR COILS] [ASK IF ZH16=03 ELSE ZH20]
ZH19a. How often do you check the cleanliness of evaporator coils?
[SCALE: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less]

[ADDITIONAL GENERAL CHANGES] [ZH2=8 ELSE VH91]
ZH31. You indicated that you made additional operational changes to the refrigeration system at your facility as a result of taking the course. Considering only changes made as a result of what you learned, how often do you employ them?

Refrigeration system changes	Frequency
a. Load products properly (e.g. don't block return air grille, don't overload shelves, etc.)	(Drop down: Once a day or more, 2-3 times a week, Once a week, 2-3 times a month, Once a month, 2-3 times a year, Once a year or less)
b. Verify sequence of operations	
c. Provide diagnostics for operator	
d. Calibrate sensors	
b. Monitor all critical refrigeration pressures and temperatures	
f. Check fans and look for worn belts and failed motors	
g. Check suction line insulation	
h. Check refrigerant charge	
i. Check moisture barriers	
i. Check infiltration barriers	
d. Check for misaligned reach-in glass doors or broken hinges	

[MICROPROCESSOR-BASED CONTROL SYSTEM: NOTE COVERED IN ABOVE GENERAL QS]

VH91. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF VH 91=1 ELSE SKIP TO VH95]
VH92. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF VH92 =1 or 3]
VH93. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF VH92 =2 or 3]
VH94. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF VH91=2 ELSE SKIP TO QD1]
VH95. Please provide a rough estimate of the annual energy savings in dollars or kilowatt hours. [OPEN END]

4. COMMISSIONING

[ASK IF Respondent Type=EUCC, ELSE SKIP TO TA0]
MS1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, in what area(s) did you make changes?
[Yes =1, No =2, Ask for each]

a. Lighting
b. HVAC
c. Building Envelope/Windows/Cool Roofs
d. Pumps and Motors
e. Compressed Air
f. Solar water or building heating
g. Water Heating (excluding solar)
h. Pools (excluding solar water heating)
i. Boilers/Furnaces/Combined Heat and Power
j. Commercial Cooking/Food Service/Refrigeration
k. Controls/Emergency Management Systems
l. Title 24 Related
m. Other

[ASK EVERYONE]
MS2. Please describe the changes you made at your facility(ies) to save energy where you applied concepts taught in the course.
[OPEN END]

MS3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. (Don't know)

[ASK IF MS3=1, ELSE SKIP TO MS7]
MS4. In which program did you participate?
[OPEN END], DK

MS5. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
98. (Don't know)

[ASK IF MS5=1]
MS6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[SKIP TO DEMOS IF MS3=1]
MS7. In your opinion, how would you characterize the energy savings resulting from your actions? In general would you say you have achieved ….

1. Significant energy savings,
2. Moderate energy savings
3. Measurable but insignificant energy savings
4. No energy savings

MS8. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No
3. (Refused)

[ASK IF MS8=1 AND MS7 <=3 ELSE IF MS8=2 SKIP TO MS12 ELSE SKIP TO EO1]
MS9. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MS9=1 or 3]
MS10. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MS9=2 or 3]
MS11. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]
[ASK IF MS8=2 ELSE SKIP TO EO1]
MS12. Please provide a rough estimate of the annual energy savings in dollars or kilowatt hours?
[OPEN END]

5. COMPRESSED AIR

[ASK IF Respondent Type=EUCC, ELSE SKIP TO TA0]
MV1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the compressed air system at your facility(ies)? [1=Yes, 2=No]

a. Replaced existing compressor with new more efficient compressor
b. Installed an additional energy efficient compressor in an existing system
c. Installed new or replaced existing auxiliary components of an existing compressed air system (e.g. a VFD, heat recovery, air receiver, dryers, coolers)
d. Made changes to design of existing compressed air system (e.g. change location of compressor or auxiliary components, reconfigure piping)
e. Made changes to the operation of the compressed air systems operation to reduce the system demand or overall system pressure (e.g. changed end use equipment, sequenced compressors, adjusted manual staging, installed control system)
f. Changed compressed air system repair and maintenance practices (e.g. fixed leaks, changed air filters)

[ASK IF ALL MV1a-f = 2 ELSE SKIP TO MV3]
MV2. It seems we have not captured the changes you have made. Please describe the changes you have made to your compressed air system to save energy where you applied concepts taught in the course.

[ASK IF ANY MV1a-f=1, ELSE SKIP TO MV4]
MV3. Please describe any additional changes you made to your compressed air system to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

MV5. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MV5 =1, ELSE SKIP TO MV4]
0MV6. In which program did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name]
7. Other, Specify
98. Don't know

MV7. Did the course provide you information about the utility program in which you

participated?
1. Yes
2. No
98. Don't know

[ASK IF MV7 =1]
MV8. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

MV4. How many compressed air systems were affected by the changes you made? If you only made changes to one system please enter 1.
[NUMERIC OPEN END, 1-9999]

NV2. Approximately, how many square feet of your facility(ies) is served by the compressed air system(s)? If the changes were made to multiple facilities please provide an average. (An estimate is fine)
[NUMERIC OPEN END, 1-99999]

[SKIP to NV3, IF MV4<2]
For the next set of questions, please think about the largest compressed air system that has been affected by the changes you made.

NV3. Please enter the zip code of the facility served by this compressed air system.
[NUMERIC OPEN END, 1-99999]

NV4. How many years old is your facility? An estimate is fine.
000. Less than one year
[NUMERIC OPEN END, 1-200]

NV5. What type of building did the work occur in?

01. Assembly (e.g., an assembly hall or a church)
02. Primary or Secondary Education (SKIP TO NV5a)
03. University or College (SKIP TO NV5b)
04. Grocery
05. Health/Medical (e.g., a hospital or nursing home) (SKIP TO NV5c)
06. Lodging (e.g. hotel, motel) (SKIP TO NV5d)
07. Manufacturing (e.g., Bio Tech, light industrial manufacturing) (SKIP TO NV5e)
08. Small office building (less than 25,000 square feet)
09. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO NV5f)
11. Retail (SKIP TO NV5g)
12. Storage [SKIP TO NV5h]
13. Refrigerated Warehouse
14. Single Family Residential [SKIP TO NV5i]
15. Multi-family Residential
16. Agricultural
17. Other (Specify:_____)

[SKIP TO NV6]

NV5a. Was this a primary school, a secondary school or a relocatable classroom?

1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO NV6]

NV5b. Was this a university or college?

1. University
2. College

[SKIP TO NV6]

NV5c. Was this a hospital or nursing home?

1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO NV6]

NV5d. Was this a hotel or motel?

1. Hotel
2. Motel

[SKIP TO NV6]

NV5e. Was this a biotech or light manufacturing type of facility?

1. Biotech
2. Light Manufacturing
3. Other – specify

[SKIP TO NV6]

NV5f. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[SKIP TO NV6]

NV5g. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story (e.g. greater than or equal to 25,000 feet)
2. Large single-story (e.g. greater than or equal to 25,000 feet)
3. Small (e.g. less than 25,000 square feet)

[SKIP TO NV6]

NV5h. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[SKIP TO NV6]

NV5i. Was this a stationary or mobile single family home?
3. Stationary or immobile home
1. Mobile home

NV6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NV7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NV8. What type of heating system do you have in your facility?
1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. No heating system
8. Other, specify

NV9. What type of cooling system do you have in your facility? (Select all that apply)
1. Central AC
2. Room AC
3. No air conditioning

[SKIP TO NV10 IF NV9=3]
NV11. Was your AC system a compression, evaporative, or heat pump system?
1. Compression
2. Evaporative
3. Heat Pump

NV10. What are the operating hours of this facility?

a. Weekdays [NUMERIC OPEN END, 0-24] (enter '99' if unknown)
b. Saturdays [NUMERIC OPEN END, 0-24] (enter '99' if unknown)
c. Sundays [NUMERIC OPEN END, 0-24] (enter '99' if unknown)

[IF MV5=1 SKIP TO DC1]
[ASK IF MV1a =1 OR MV1b=1 OR MV1c=1 OR MV1d=1 OR MV1e=1 OR MV1f=1 ELSE SKIP TO MV43]
MV9. The next section asks about the technical details of the changes you made to the compressed air equipment at your facility. Do you personally have knowledge of these details?

3. Yes
4. No [SKIP TO MV43]

[ASK IF MV9=1]
MV10. The State of California has asked us to provide them with some idea of the energy savings of your actions. We have a number of questions that will help us estimate these savings. First, we need to know about your compressed air system and the compressors that are part of it. What type of product or service is your compressed air system used for?

1. Food
2. Textiles
3. Lumber
4. Paper
5. Chemicals
6. Petroleum
7. Stone/clay/glass
8. Primary metals (e.g. steel, aluminum)
9. Metal fabrication or machinery
10. Other (specify)

MV11. How many compressors are currently in your system?
[NUMERIC OPEN END]

MV12. Please fill in the following grid with the requested information on each of the compressors in your system. If you have more than 5 compressors in your system, please give information on the 5 that supply the largest percentage of compressed air to the system. If horsepower is unknown, please enter '9999'. If operating hours of the compressor are unknown, please enter operating hours of the facility.

Compressor Number	Manufactured after 1997?	Horsepower	Total Hours of Operation per Day (If don't know, please operating hours of facility)
1	a. Yes/No/DK	b. [NUMERIC OPEN END] DK	c. [NUMERIC OPEN END] DK
2	d. Yes/No/DK	e. [NUMERIC OPEN END] DK	f. [NUMERIC OPEN END] DK

3	g. Yes/No/DK	h. [NUMERIC OPEN END] DK	i. [NUMERIC OPEN END] DK
4	j. Yes/No/DK	k. [NUMERIC OPEN END] DK	l. [NUMERIC OPEN END] DK
5	m. Yes/No/DK	n. [NUMERIC OPEN END] DK	o. [NUMERIC OPEN END] DK

Section 1 Replace Compressor(s)
[ASK IF MV1a=1 ELSE SKIP TO MV14]
MV13. You indicated that you replaced an existing compressor(s) at your facility(ies). How many compressors did you replace?
[NUMERIC OPEN END], DK

MV13. In the grid below, please provide the requested information about your old compressor(s) (the ones you replaced). If you replaced more than five, please provide information on the 5 that supplied the largest percentage of compressed air to the system. If horsepower is unknown, please enter '9999'. If operating hours of the compressor are unknown, please enter operating hours of the facility.

Compressor Number	Manufactured after 1997?	Horsepower	Total Hours of Operation per Day
1	a. Yes/No/DK	b. [NUMERIC OPEN END] DK	c. [NUMERIC OPEN END] DK
2	d. Yes/No/DK	e. [NUMERIC OPEN END] DK	f. [NUMERIC OPEN END] DK
3	g. Yes/No/DK	h. [NUMERIC OPEN END] DK	i. [NUMERIC OPEN END] DK
4	j. Yes/No/DK	k. [NUMERIC OPEN END] DK	l. [NUMERIC OPEN END] DK
5	m. Yes/No/DK	n. [NUMERIC OPEN END] DK	o. [NUMERIC OPEN END] DK

MV13. In the grid below, please provide the requested information about your new compressor(s). If you replaced more than five, please provide information on the new compressors that replaced 5 compressors that supplied the largest percentage of compressed air to the system. If horsepower is unknown, please enter '9999'. If operating hours of the compressor are unknown, please enter operating hours of the facility.

Compressor Number	Horsepower	Total Hours of Operation per Day

1	p. [NUMERIC OPEN END] DK	q. [NUMERIC OPEN END] DK
2	r. [NUMERIC OPEN END] DK	s. [NUMERIC OPEN END] DK
3	t. [NUMERIC OPEN END] DK	u. [NUMERIC OPEN END] DK
4	v. [NUMERIC OPEN END] DK	w. [NUMERIC OPEN END] DK
5	x. [NUMERIC OPEN END] DK	y. [NUMERIC OPEN END] DK

Section 2 Install Additional Compressor
[ASK IF MV1b=1 ELSE SKIP TO MV15]
MV14. You indicated that you installed a new compressor(s) at your facility(ies).
How many compressors did you install?
[NUMERIC OPEN END], DK

MV14. In the grid below, please provide the requested information about your new compressor(s). If you installed more than five, please provide information on the 5 that supply the largest percentage of compressed air to the system. If horsepower is unknown, please enter '9999'. If operating hours of the compressor are unknown, please enter operating hours of the facility.

Compressor Number	Horsepower	Total Hours of Operation per Day (If don't know, please operating hours of facility)
1	a. [NUMERIC OPEN END] DK	b. [NUMERIC OPEN END] DK
2	c. [NUMERIC OPEN END] DK	d. [NUMERIC OPEN END] DK
3	e. [NUMERIC OPEN END] DK	f. [NUMERIC OPEN END] DK
4	g. [NUMERIC OPEN END] DK	h. [NUMERIC OPEN END] DK
5	i. [NUMERIC OPEN END] DK	j. [NUMERIC OPEN END] DK

Section 3 Installed or replaced auxiliary components
[ASK IF MV1c=1 ELSE SKIP TO MV21]

MV15. You indicated that you installed or replaced auxiliary components of a compressed air system. Did you install or replace any of the following components?

a. Installed or replaced variable frequency drive (VFD) on a compressor
b. Installed new heat recovery equipment
c. Installed or replaced auxiliary equipment such as air storage receivers, dryers, coolers, or condensate separators
d. Other (specify)

[ASK IF MV15a=1 ELSE SKIP TO MV17]
MV16. How many variable frequency drives did you install?
[NUMERIC OPEN END]
DK

[ASK IF MV15b=1 ELSE SKIP TO MV20]
MV17. In the grid below, please provide the requested information about the compressors from which you recover waste heat. Select entire system if appropriate.
If horsepower is unknown, please enter '9999'. If operating hours of the compressor are unknown, please enter operating hours of the facility.

Compressor Number	Horsepower	Total Hours of Operation per Day (If don't know, please provide operating hours of facility)
1	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
2	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
3	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
4	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
5	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK

MV18. How many of these compressors from which waste heat is recovered are water cooled?
[NUMERIC OPEN END], DK

MV19. Is the heat recovered used for space heating?

1. Yes
2. No
3. Don't know

[ASK IF MV15c=1 ELSE SKIP TO MV21]
MV20. What type of auxiliary equipment did you install or replace?

1. Air storage receiver
2. Coolers
3. Condensate separators

4. Dryers
5. Other (specify)

Section 4 Changed Design of Existing Compressed Air System

[ASK IF MV1d=1, ELSE SKIP TO MV22]

MV21. You indicated that you made changes to the design of an existing compressed air system. Have you made any of the following changes? [MULTIPLE RESPONSE]

1. Changed location of compressor
2. Changed location of auxiliary components
3. Reconfigured piping
4. Other (specify)

[ASK IF MV1e=1, ELSE SKIP TO MV39]

Section 5 Changed Operation of System

MV22. You indicated that you made changes to the operations of your compressed air system. Have you made any of the following changes? [Multiple Response]

a. Reduced overall system run time
b. Reduced overall system pressure
c. Eliminated or reduced unnecessary compressed air uses
d. Replaced end-use equipment with new equipment that operates at lower pressure
e. Replaced end-use equipment with new equipment that uses a source of energy other than compressed air
f. Sequenced compressors
g. Adjusted manual staging of compressors
h. Changed use of existing storage capacity to reduce demand
i. Installed individual or multiple compressor control system(s)
j. Changed source of air from room air to outside air when the outside air is cooler than the room air
k. Other (specify)

[ASK IF MV22a=1, ELSE SKIP TO MV24]

MV23. Please indicate the daily old and new hours of operation.

a. Total old hours: [NUMERIC OPEN END] DK
b. Total new hours: [NUMERIC OPEN END] DK

[ASK IF MV22b=1, ELSE SKIP TO MV25]

MV24. Please indicate the old and new operating pressure.

a. Old operating pressure: [NUMERIC OPEN END] *psig* DK
b. New operating pressure: [NUMERIC OPEN END] *psig* DK

[ASK IF MV22c=1, ELSE SKIP TO MV26]

MV25. What was percentage reduction in either air pressure, air volume or compressor energy consumption after you eliminated unnecessary compressed air uses?

a. [NUMERIC OPEN END] Percentage reduction in air pressure (enter '99' if unknown)
b. [NUMERIC OPEN END] Percentage reduction in air volume (enter '99' if unknown)
c. [NUMERIC OPEN END] Percentage reduction in compressor energy consumption (enter '99' if unknown)

[ASK IF MV22d=1 or MV22e=1, ELSE SKIP TO MV30]

MV26. What end-use equipment was affected by the changes?

[OPEN END], DK

[ASK IF MV22d=1, ELSE SKIP TO MV28]
MV27. What is the old and new operating pressure after the change to the end-use equipment?
a. Old Operating Pressure: [NUMERIC OPEN END] *psig* DK
b. New Operating Pressure: [NUMERIC OPEN END] *psig* DK

[ASK IF MV22e=1, ELSE SKIP TO MV30]
MV28. What is the percentage reduction either air pressure, air volume or compressor energy consumption after you replaced the equipment?
a. [NUMERIC OPEN END] Percentage reduction in air pressure (enter '99' if unknown)
b. [NUMERIC OPEN END] Percentage reduction in air volume (enter '99' if unknown)
c. [NUMERIC OPEN END] Percentage reduction in compressor energy consumption (enter '99' if unknown)

MV29. What is the energy source of the new equipment?
[OPEN END], DK

[ASK IF MV22f=1, ELSE SKIP TO MV31]
MV30. How many base and trim compressors does your system have?
a. Base compressors: [NUMERIC OPEN END] DK
b. Trim compressors: [NUMERIC OPEN END] DK

[ASK IF MV22g=1, ELSE SKIP TO MV32]
MV31. How many compressors were affected by the adjustment of the manual staging?
[NUMERIC OPEN END], DK

[ASK IF MV22i=1, ELSE SKIP TO MV39]
MV32. Did you install an individual or multiple control system?
1. Individual
2. Multiple
98. Don't Know

MV33. How many compressors are affected by the new control system?
[NUMERIC OPEN END] DK

MV34. Did the installation of the new control system result in a change in either the total hours of operation or a shift in operation hours from on-peak to off-peak for the compressed air system? (CHECK ALL THAT APPLY)
1. Yes, change in total hours of operation
2. Yes, shift in time of operation from on-peak to off-peak
3. No change in operating hours [SKIP TO MV37]
98. Don't know [SKIP TO MV37]

[ASK IF MV34=1, ELSE SKIP TO MV36]
MV35. What are the daily old and new hours of operation?
a. Old Hours: [NUMERIC OPEN END] DK
b. New Hours: [NUMERIC OPEN END] DK

[ASK IF MV34=2, ELSE SKIP TO MV37A]
MV36. How many hours per day were shifted from on-peak to off-peak?
[NUMERIC OPEN END]

[ASK IF MV32=1, ELSE SKIP TO MV38A]
MV37. Which of the following describe your individual control system before and after the change? (Select all that apply)

	A. Old Control System	B. New Control System
1. No control system	[CHECK BOXES]	[CHECK BOXES]
2. Simple start/stop		
3. Load/unload (or Constant-Speed Control)		
4. Modulating controls		
5. Dual-control/Auto-dual control		
6. Variable displacement		
7. Variable speed drive		
8. Other		

[ASK IF MV32=2, ELSE SKIP TO MV39]
MV38. Which of the following describe your multiple control system before and after the change? (Select all that apply)

	A. Old Control System	B. New Control System
1. No control system	[CHECK BOXES]	[CHECK BOXES]
2. Network control system		
3. System master controls		
4. Other		

[ASK IF MV1F=1, ELSE SKIP TO MV43]
Section 6 Changed Maintenance Practices
MV39. You indicated that you changed your compressed air system repair and maintenance practices. Have you made any of the following changes? [1. Yes, 2. No]

a. Performed preventative maintenance on compressors
b. Performed preventative maintenance on auxiliary components
c. Changed air filters or upgraded to higher performance filters
d. Fixed system leaks
e. Other (specify)

[ASK IF MV39a=1, ELSE SKIP TO MV41]
MV40. On how many compressors did you perform this maintenance?
[NUMERIC OPEN END], DK

[ASK IF MV39c=1, ELSE SKIP TO MV42]
MV41. How many air filters did you replace or upgrade?
[NUMERIC OPEN END], DK

[ASK IF MV39d=1, ELSE SKIP TO MV43]
MV42. Thinking about the air leaks that you fixed, how you describe the reduction in air leakage?

1. Very significant
2. Somewhat significant

3. Not very significant
98. Don't know

MV43. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No
98. Don't Know

[ASK IF MV43=1 ELSE SKIP TO MV47]
MV44. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MV44=1 or 3]
MV45. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MV44=2 or 3]
MV46. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MV43=2 ELSE SKIP TO DC1]
MV47. Please provide a rough estimate of the annual energy savings in dollars or kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

6. CONTROLS

[ASK IF Respondent Type=EUCC or EUCR, OTHERWISE SKIP TO TA0]
MM1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the controls or energy management system at your facility(ies)? [1=Yes, 2=No]

a. Installed or modified controls to HVAC system
c. Installed or modified controls to a lighting system
d. Installed or modified a combined heat and power system or controls for a heat and power system
e. Installed or modified a new or replacement energy management system

[ASK IF ALL MM1A-E= 2, OTHERWISE SKIP TO MM2A]
MM2. It seems we have not captured the changes you have made. Please describe the changes you have made to your controls or energy management system to save energy where you applied concepts taught in the course.

[ASK IF ANY MM1A-E= 1, OTHERWISE SKIP TO MM14]
MM2a. Please describe any additional changes you made to your controls or energy management system to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

MM14. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MM14 =1, OTHERWISE SKIP TO MM16]
MM14a. In which program did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name
7. Other, Specify
8. Don't know

MM14b. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
98. Don't know

[ASK IF QMM14B=1]

MM14c. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1 2 3 4 5 6 7

Not At All Influential Very Influential

[IF MM14=1 SKIP TO DC1]

[ASK IF MM1a =1 OR MM1b=1 OR MM1c=1 OR MM1d=1 OR MM1e=1 OTHERWISE SKIP TO MM75]

MM16. Did you make these controls or energy management system changes at more than one building?

1. Yes
2. No
98. Don't know

[ASK IF MM16=1, OTHERWISE SKIP TO MM17]

MM16a. In how many buildings did you make these changes?

[NUMERIC OPEN END], DK

MM17. What is the average square footage of the building(s) where you made the changes to the controls or energy management system? If you are unsure of the exact area, provide your best estimate.

[NUMERIC OPEN END]

[SAY INSERT ONLY IF MM16 > 1]

For the next set of questions, please think only about one facility that is served by a California investor owned utility and that has been impacted the most by the energy saving changes you implemented.

MM18. Please enter the zip code of your facility.

[ZIPCODE OPEN END]

MM19a. What type of building did the work occur in?

1. Assembly (e.g., an assembly hall or a church)
2. Primary or Secondary Education [SKIP TO MM19b]
3. University or College [SKIP TO MM19c]
4. Grocery
5. Health/Medical (e.g., a hospital or nursing home) [SKIP TO MM19d]
6. Lodging (e.g. hotel, motel) [SKIP TO MM19e]
7. Manufacturing (e.g., Bio Tech, light industrial manufacturing) [SKIP TO MM19f]
8. Small office building (less than 25,000 square feet)
9. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant [SKIP TO MM19g]
11. Retail [SKIP TO MM19h]
12. Storage [SKIP TO MM19i]
13. Refrigerated Warehouse
14. Single Family Residential [SKIP TO MM19j]
15. Multi-family Residential
16. Agricultural
17. Other (Specify:_____)

[SKIP TO MM20]

MM19b. Was the retrofit in a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO MM20]

MM19c. Was this a university or college?
1. University
2. College

[SKIP TO MM20]

MM19d. Was this a hospital or nursing home?
1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO MM20]

MM19e. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO MM20]

MM19f. Was this a biotech or light manufacturing type of facility?
1. Biotech
2. Light Manufacturing
3. Other, specify

[SKIP TO MM20]

MM19g. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[SKIP TO MM20]

MM19h. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story (e.g. greater than or equal to 25,000 square feet)
2. Large single-story (e.g. greater than or equal to 25,000 square feet)
3. Small (e.g. less than 25,000 square feet)

[SKIP TO MM20]

MM19i. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[SKIP TO MM20]

MM19j. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

MM20. How many floors of your facility are above ground?
[NUMERIC OPEN END]

MM21 How many floors of your facility are below ground?
[NUMERIC OPEN END]

NM22. What type of cooling system do you have in this building? (Select all that apply)
1. Central AC
2. Room AC
3. No air conditioning

[SKIP IF NM22=3]
NM24. Was your AC system a compression, evaporative, or heat pump system?
1. Compression
2. Evaporative
3. Heat pump

NM23. What type of heating system do you have in this building? (Select all that apply)
1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. Other (please describe)

NM10. What are the operating hours of this facility? Please provide an average hours per day for each.
a. Weekdays (Enter '99' if unknown)
b. Saturdays (Enter '99' if unknown)
c. Sundays (Enter '99' if unknown)

MM25. How many years old is your facility? An estimate is fine.
___ Years [NUMERIC OPEN END]
1. Less than one year

MM15. The next section asks about the technical details of the changes you made to the controls or energy management system equipment at your facility. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO MM75]

[ASK IF MM1A=1, ELSE MM7]
NM11. Which part(s) of the HVAC system did you make changes to? Select all that apply.
a. Air-side equipment and controls
b. Water-side equipment and controls
c. System-wide controls.

[ASK IF NM11a=1, ELSE NM13]

NM12. Thinking about changes you made to your air-side equipment and control systems, which of the following changes did you make at your facility(ies)? Please select all that apply

a. Installed heating and cooling time clock.
b. Installed new heating and cooling reset controls (i.e. set points, based on outside air, return air, or zone demand)
c. Adjusted existing heating and cooling reset controls (i.e. set points, based on outside air, return air, or zone demand)
d. Modulated the mixed air temperature warmer in winter and cooler in summer, based on return air temperature or zone averaging.
e. Adjusted thermostat set points.
f. Replaced thermostat with a thermostat having an adjustable proportional band or dead band.
g. Increased the thermostat's proportional band.
h. Pressure balanced the HVAC system.
i. Installed VAV fan controls on constant-volume system.
j. Installed a Static Adjustment from Volume (SAV) flow control calibrated using INCITe.
k. Reduced fan energy consumption by using tight ducts.
l. Resheaved the fan.
m. Installed ultra low leakage dampers.
n. Installed air handling unit high efficiency air filtration.
o. Installed outdoor air control (i.e. outside air damper and economizer).
p. Optimized outdoor air control (i.e. outside air damper and economizer).
q. Separated the heating and cooling dampers and installed controls to allow the dampers to operate independently.
r. Made other changes the air-side equipment and control systems

[ASK IF NM11b=1, ELSE NM14]

NM13. Thinking about changes you made to your water-side equipment and controls, which of the following changes did you make at your facility(ies). Please select all that apply

a. Installed new heating and cooling chilled water reset controls (i.e. set points).
b. Adjusted existing heating and cooling chilled water reset controls (i.e. set points).
c. Decreased entering water temperature.
d. Increased chilled water supply temperature.
e. Switched from running multiple chillers at part-load to a primary-secondary system.
f. Switched from a primary-secondary system to a variable-primary-flow chilled water system.
g. Used a centrifugal chiller instead of other chiller types when setpoint is 65 degrees or lower.
h. Cooled centrifugal and absorption chillers with water rather than air by separating the condenser water loops.
i. Installed a chilled water valve and cold deck sensor/controller.
j. Made other changes the water-side equipment and control systems

[ASK IF NM11c=1, ELSE NM15]

NM14. Thinking about changes you made to your system-wide controls, which of the following changes did you make at your facility(ies). Please select all that apply.

a. Stopped supplying heating and cooling simultaneously.
b. Provided only the heating or cooling actually needed.
c. Supplied cooling and heating from the most efficient source.
d. Blocked out heating to internal zones.

e. Used auxiliary cooling for high cooling load area such as a hospital operating room.
f. Made other changes the system-wide controls

NM15. Did the changes you made to how you control your HVAC system affect the entire facility?
1. Yes
2. No
98. Don't Know

[ASK IF NM15 = 2 ELSE MM7]
NM15a. What type of conditioned space was affected by this change? (Check all that apply)
1. Office space
2. Retail space
3. Storage
4. Bathrooms
5. Kitchen
6. Dormitories, hotels, hospital or nursing home rooms
7. Manufacturing floor
8. Other, please describe

MM6. What percentage of conditioned space was affected by the changes you made to how you control your HVAC system? If you made multiple changes across different areas, please give the average percentage of conditioned space across the areas.
[PERCENTAGE OPEN END]

[ASK IF MM1C=1, OTHERWISE SKIP TO MM9]
MM7. Thinking about the lighting controls you installed, which of the following changes did you make at your facility(ies)? Please select all that apply.
2. Installed occupancy sensors
3. Installed daylighting controls
4. Installed lighting time clock
5. Updated lighting management system.
6. Turned off lights in empty rooms, and lighting systems after employees leave for the evening.
7. Other, specify

NM16. Did the changes you made to your lighting controls affect the entire facility?
1. Yes
2. No
98. Don't Know

[ASK IF NM16 =2 ELSE MM9]
MM8a. What type of conditioned space was affected by this change? (Check all that apply)
1. Office space
2. Retail space
3. Storage
4. Bathrooms
5. Kitchen
6. Dormitories, hotels, hospital or nursing home rooms

7. Manufacturing floor
8. Other, please describe

MM8. What percentage of conditioned space was affected by the lighting controls you installed? If you made multiple changes across different areas, please give the average percentage of conditioned space across the areas.
[PERCENTAGE OPEN END], DK

[ASK IF MM1D=1, OTHERWISE SKIP MM12]
MM9. Thinking about the controls on the boiler, furnace or a combined heat and power system you installed, which of the following changes did you make at your facility(ies)? Please select all that apply.

1. Use a parallel chiller arrangement for optimal absorption chiller loading to fully utilize waste heat recovery from the combined heat and power systems.
2. Use combined heat and power with a boiler/furnace system.
3. Use combined heat and power with an HVAC system.
4. Other, specify

MM10. Is your combined heat and power system new or a redesign of an existing system?

1. New system
2. Redesign of an existing system
3. Don't know

[ASK IF MM10=2, OTHERWISE SKIP TO MM10B]
MM10a. Please describe the changes you made to your system.
[Open end]

MM10b. Approximately what percentage of the waste heat is utilized on an annual basis?
[PERCENTAGE OPEN END], DK

MM10c. What is the application of the waste heat? Please select all that apply. [ALLOW MULTIPLE RESPONSES]

1. Space heating
2. Water heating
3. Process steam/heat
4. Absorption cooling,
5. Other, please describe

MM10d. What type of prime mover does your system use?

1. Reciprocating engine
2. Microturbine
3. Fuel cell
4. Gas turbine
5. Other, please describe

MM10e. What is the electrical capacity in kW of your CHP system?
[NUMERIC OPEN END, Don't know 9999], DK

NM17. Did the changes you made to your combined heat and power system affect the entire facility?

1. Yes
2. No
98. Don't Know

[ASK IF NM17 =2 ELSE MM12]
MM11a. What type of conditioned space was affected by this change? (Check all that apply)
1. Office space
2. Retail space
3. Storage
4. Bathrooms,
5. Kitchen,
6. Dormitories, hotels, hospital or nursing home rooms
7. Manufacturing floor
00. Other, please describe

MM11. What percentage of conditioned space is affected by the changes you made to your combined heat and power system? If you made multiple changes across different areas, please give the average percentage of conditioned space across the areas.
[PERCENTAGE OPEN END], DK

[ASK IF MM1E=1, OTHERWISE SKIP TO MM26]
MM12. Thinking about the new or replacement energy management system you installed, which of the following changes did you make at your facility(ies). Please select all that apply.
1. Installed a new EMS system
2. Updated an Energy Management System (EMS or EMCS)
3. Use a Discharge Air Regulation Technique (DART)
4. Run equipment only when needed
5. Conducted a walk-through/Screening Analysis Audit
6. Use software in order to find problem areas within the building
7. Use high performance Zero-Energy Home designs
8. Reduced peak loads for air conditioning, forced air ducts, water heating, major appliances, and lighting
9. Used PCL Operating sequences.
00. Other, specify

NM18. Did the changes you made to your energy management system affect the entire facility?
1. Yes
2. No
98. Don't Know

[ASK IF NM18 =2 ELSE MM26]
MM13a. What type of conditioned space was affected by this change? (Check all that apply)
1. Office space
2. Retail space
3. Storage
4. Bathrooms,
5. Kitchen,
6. Dormitories, hotels, hospital or nursing home rooms
7. Manufacturing floor

00. Other, please describe

MM13. What percentage of conditioned space is affected by the changes you made to your energy management system? If you made multiple changes across different areas, please give the average percentage of conditioned space across the areas.
[PERCENTAGE OPEN END]

Section 1: Controls Added to HVAC System

[ASK IF NM13f=1, OTHERWISE SKIP TO MM30]
MM26. You indicated that you converted to a variable-primary flow chilled water system. How many chillers were affected by this change?
[NUMERIC OPEN END]

MM27. What was the average cooling capacity (tons) of these chillers?
[NUMERIC OPEN END], DK

[ASK IF NM12j=1]
MM30. You indicated that you added a SAV flow calibration with INCITe. Please describe what you did in detail.
[OPEN END]

Section 2: Changes in HVAC Control Strategy

[ASK IF NM13g=1]
MM32. You indicated that you switched to a centrifugal chiller instead of other chiller types when the set point is 65 degrees or lower. What type of chiller was used previously?

a. Scroll, Reciprocating, or Screw
b. Absorption
c. Packaged units with condensing fans

[ASK IF NM14e=1, OTHERWISE SKIP TO NM19]
MM33. You indicated that you use an auxiliary cooling system to cool a high load area such as a hospital operating room. What is the square feet of this specially conditioned space?
[NUMERIC OPEN END]

MM34. What is the current temperature set point, in degrees Fahrenheit, for this space?
[NUMERIC OPEN END]

MM35. What was the previous temperature set point, in degrees Fahrenheit, for this space?
[NUMERIC OPEN END]

MM36. Approximately how many hours is this high load space cooled?
a. Hours per day?
b. Days per week?
c. Weeks per year?
[NUMERIC OPEN END]

MM37. Please describe the auxiliary cooling devices you are using to cool this high load space.
[OPEN END]

[ASK IF NM14a=1, OTHERWISE SKIP TO NM20]
NM19. You indicated that you made changes to the operation of your HVAC system to stop supplying heating and cooling simultaneously. Please describe the changes you made in as much detail as possible.
[OPEN END]

[ASK IF NM14b=1, OTHERWISE SKIP TO NM21]
NM20. You indicated that you made changes to the operation of your HVAC system to provide only the heating or cooling actually needed. Please describe the changes you made in as much detail as possible.
[OPEN END]

[ASK IF NM14c=1, OTHERWISE SKIP TO MM38]
NM21. You indicated that you made changes to the operation of your HVAC system to supply cooling and heating from the most efficient source. Please describe the changes you made in as much detail as possible.
[OPEN END]

[ASK IF NM12p=1, OTHERWISE SKIP TO MM42]
MM38. You indicated that you optimized outdoor air control. Did you optimize set points?
1. Yes
2. No
3. Don't know

MM39. What is the current temperature set point, in degrees Fahrenheit, for this space?
[NUMERIC OPEN END]
DK

[ASK IF MM38=1]
MM40. What was the previous temperature set point, in degrees Fahrenheit, for this space?
[NUMERIC OPEN END]
DK

MM41. Did you repair malfunctioning dampers or other equipment?
1. Yes
2. No
3. Don't know

[ASK IF NM12l=1, OTHERWISE SKIP TO MM46]
MM42. You noted that you resheaved fans.

a. How many fans were resheaved? [NUMERIC OPEN END]
b. What is the average nameplate rating of these fans? [NUMERIC OPEN]
c. Units for the fan rating.
    i. Horsepower
    ii. KW
    iii. Other
    iv. DK

MM44. What was the percentage reduction of the fan speed?
[NUMERIC OPEN END] DK

[ASK IF NM12h=1]
MM46. You indicated that you pressure balanced your HVAC system. What has been the percentage reduction in annual HVAC energy consumption due to pressure balancing? An estimate is fine.
[PERCENTAGE OPEN END]
DK

[ASK IF NM13c=1, OTHERWISE SKIP TO MM50]
MM47. You indicated that you increased chiller efficiency by decreasing the entering condenser water temperature. Is the chiller drive fixed or variable speed?
1. Fixed drive
2. Variable speed drive
3. Don't know

MM48. How many degrees Fahrenheit did you change the condenser water temperature?
[NUMERIC OPEN END, Don't know 9999]

MM49. How many chillers were affected?
[NUMERIC OPEN END, Don't know 9999]

MM49a. What is the average cooling capacity (tons) of the affected chillers?
[NUMERIC OPEN END, Don't know 9999]
[ASK IF NM13d=1, OTHERWISE SKIP TO MM51]
MM50. You noted that you increased chiller efficiency by increasing the chilled water supply temperature. Is the chiller drive fixed or variable speed?
1. Fixed drive
2. Variable speed drive
3. Don't know

MM50a. How many degrees in Fahrenheit did you change the chilled water supply temperature? An estimate is fine.
[NUMERIC OPEN END]

MM50c. How many chillers were affected?
[NUMERIC OPEN END]

MM50d. What is the average cooling capacity (tons) of the affected chillers?
[NUMERIC OPEN END, Don't know 9999]

Section 3: Changes to Lighting Controls
[ASK IF MM7E=1]
MM51. You indicated that you updated your lighting management system. Please describe the changes you made in the lighting EMS in as much detail as possible.
[OPEN END]

[ASK IF MM7F=1]
MM52. You indicated that you turn off lights in empty rooms or after employees leave at

night. Please describe the changes you made to lighting control in as much detail as possible.

Section 4: Installed/Modified CHP or Controls for Heat/Power System
[ASK IF MM9A=1]
MM53. You indicated that you use a parallel chiller arrangement for optimal absorption chiller loading to fully utilize waste heat recovery from the combined heat and power systems. Please describe the changes in as much detail as possible.
[OPEN END]

[ASK IF MM9B=1]
MM54. You indicated that you use a combined heat and power system with a boiler/furnace system. Please describe the changes in as much detail as possible.
[OPEN END]

[ASK IF MM9C=1]
MM55. You indicated that you use a combined heat and power system with an HVAC system. Please describe the changes in as much detail as possible.
[OPEN END]

Section 5 Installed New EMS System
[ASK IF MM12A=1]
MM56. You indicated that you installed a new EMS system. Please describe the changes in as much detail as possible.
[OPEN END]

[ASK IF MM12B=1]
MM57. You indicated that you updated your EMS system. Please describe the changes in as much detail as possible.
[OPEN END]

[ASK IF MM12C=1]
MM58. You indicated that you now use a Discharge Air Regulation Technique (DART). Please describe the changes in as much detail as possible.
[OPEN END]

[ASK IF MM12D=1]
MM59. You indicated that you now run equipment only when needed. Please describe the changes in as much detail as possible, including the number of hours per year equipment runs less than it used to run.
[OPEN END]

[ASK IF MM12E=1]
MM60. You indicated that you conducted a walk-through/Screening Analysis Audit. Please describe this audit in as much detail as possible.
[OPEN END]

[ASK IF MM12F=1]
MM61. You indicated that you used software in order to find problem areas within the building. Please describe the findings in as much detail as possible.

[OPEN END]

[ASK IF MM12G=1]
MM62. You indicated that you used high performance Zero-Energy Home designs. Please describe the design as much as possible.
[OPEN END]

[ASK IF MM12H=1]
MM63. You indicated that you reduced peak loads for air conditioning, forced air ducts, water heating, major appliances, and lighting. Please describe the changes in as much detail as possible, including description of type of loads reduced.
[OPEN END]

[ASK IF MM12=I]
NM64. You indicated that you used PCL Operating sequences. Please describe the sequences in as much detail as possible.
[OPEN END]

MM75. Have you performed an engineering or post-installation analysis to determine how much electricity, gas, and/or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF MM75=1, OTHERWISE SKIP TO MM79]
MM76. Did you estimate electricity savings, therm savings, or dollar savings? (check all that apply)
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated therms saved

[ASK IF MM76=1]
MM77. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $999,999]

[ASK IF MM76=2]
MM78. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 999,999 kWh]

[ASK IF MM76=3]
MM78b. Approximately how many therms did you save annually?
[NUMERIC OPEN END, limit 999,999 therms]

[ASK IF MM75=2]
MM79. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours or therms, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

MM80. Have you performed an engineering or post-installation analysis to estimate a peak

kW savings?
1. Yes
2. No

[ASK IF MM80=1, OTHERWISE SKIP TO DC1]
MM81. Approximately how many kW of peak demand did you save?
[NUMERIC OPEN END, limit 999,999 kW]

7. CORE

INTRODUCTION
On [DATE], you attended a course, [COURSE NAME], offered through [CENTER]. In an effort to assess the impact of such courses and to determine what actions you may have taken as a result of participating in the course, we ask that you complete this brief survey. The survey should take no more than 15 minutes for you to complete.
SCREENERS
S1. Do you recall attending the [COURSE NAME] course on [COURSE DATE] at [CENTER]?
1. Yes, recall taking the course.
2. No, do not recall taking the course. [terminate]
3. Recall registering for the course, but did not attend. [terminate]

S2. Are you employed by or do you have any service contracts with any public utility or Energy Centers?
1. Yes [terminate]
2. No

ATTENDEE CHARACTERIZATION
AC1. Which of the following best describes your motivation for taking the [COURSE NAME] course?
1. to learn something that I could apply at my home
2. to learn something that I could apply at my work

[ASK IF AC1=2, ELSE SKIP TO K1]
AC1A. Do you work for the government?
1. Yes
2. No

[ASK IF QAC1=2]
AC2. Which of the following best describes where you intend to apply the information you learned in the course?
1. at the facility(ies) my [business / government agency] occupies
2. at the facility(ies) my [business / government agency] manages (e.g. property managers)
3. in facilities occupied or managed by customers to whom I provide services (e.g. architects, engineering firms, contractors, code inspectors)
4. in the classroom where I teach
5. other, specify

RESPONDENT TYPE DEFINED
[Classify QAC1=1, 3 as EUCR [residential end-use customer]]
[Classify QAC1=2 and QAC2=1, 2 as EUCC (commercial end-use customer)]
[Classify QAC1=2 and QAC2=3, 4, 00 as MA[market actor]]
KNOWLEDGE
K1. Did the [COURSE]course provide you with any new information?
1. Yes
2. No

[ASK IF K1=2]
K2. Although you don't think the course information was new, did your participation in the course move you any closer to implementing efforts to save energy that you were already considering?
1. Yes
2. No

K3. How much knowledge did you have about how to accomplish the concepts taught in the course prior to taking the course?
1. A lot
2. Some
3. Very little
4. None

K4. Using a scale of 1 to 7 where 1 is no more knowledgeable and 7 is significantly more knowledgeable, as a result of your participation in this course, to what degree did your knowledge of how to accomplish the course concepts increase?

1	2	3	4	5	6	7
No more knowledgeable						Significantly more knowledgeable

K5. Please read the following statements and rate your agreement with each statement using a scale of 1 to 7 where 1 is strongly disagree and 7 is strongly agree.

K5a. As a result of taking the course, I am better able to implement energy efficient solutions.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

K5b. As a result of taking the course, I am more aware of utility sponsored energy efficiency programs.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

[ASK IF Respondent Type = MA ELSE SKIP TO K5e]
K5c. As a result of taking the course, I am now more familiar with the tools and/or techniques that will enhance the service I provide to my [clients/students].

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

[SKIP TO QK5E IF QAC2=4]
K5d. As a result of taking the course, I have more confidence when I make recommendations for improving energy efficiency at my client's facilities that the expected level of energy savings will actually occur.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

[ASK IF Respondent Type = EUCC ELSE SKIP TO A1]

K5e. As a result of taking the course, I better understand how to improve the energy efficiency at my facility/the facilities I manage.

1 2 3 4 5 6 7
Strongly disagree Strongly agree

K5f As a result of taking the course, I have more confidence when I take steps to improve the energy efficiency at my facility(ies) that the expected level of energy savings will actually occur.

1 2 3 4 5 6 7
Strongly disagree Strongly agree

ATTRIBUTION

[ASK IF RESPONDENT TYPE = EUCC, ELSE IF RESPONDENT TYPE = EUCR SKIP TO A2, ELSE IF RESPONDENT TYPE = MA, SKIP TO A3]

A1a. How much did the course cause you to think differently about energy efficiency opportunities at your facility(ies)?

1 2 3 4 5 6 7
Not at all A great deal

A1b. How much did the course cause you to want to make energy efficiency changes at your facility(ies)?

1 2 3 4 5 6 7
Not at all A great deal

A1c. How much did the course increase your awareness of energy efficiency opportunities at your facility(ies)

1 2 3 4 5 6 7
Not at all A great deal

For the next question, please rate your agreement with this statement.

A1d. The course was a good way to explain the importance of taking advantage of energy efficiency opportunities at my facility(ies)?

1 2 3 4 5 6 7
Strongly disagree Strongly agree

[SKIP TO R1]

For the next four questions, please use a scale that ranges from 1 to 7 where one is "not at all" and 7 is "a great deal".

A2a. How much did the course cause you to think differently about energy efficiency opportunities at your home?

1 2 3 4 5 6 7

Not At All A great deal

A2b. How much did the course cause you to want to make energy efficiency changes at your home?
1 2 3 4 5 6 7
Not At All A great deal

A2c. How much did the course increase your awareness of energy efficiency opportunities at your home?
1 2 3 4 5 6 7
Not At All A great deal

For the next question, please rate your agreement with this statement.
A2d. The course was a good way to explain the importance of taking advantage of energy efficiency opportunities at my home.
1 2 3 4 5 6 7
Strongly disagree Strongly agree

[SKIP TO R1]

For the next four questions, please use a scale that ranges from 1 to 7 where one is "not at all" and 7 is "a great deal".

A3a. How much did the course cause you to think differently about how to introduce energy efficiency opportunities to your [clients/students]?
1 2 3 4 5 6 7
Not At All A great deal

A3b. How much did the course cause you to want to make changes in how you introduce energy efficiency opportunities to your [clients/students]?
1 2 3 4 5 6 7
Not At All A great deal

A3c. How much did the course increase your awareness of methods for introducing energy efficiency opportunities to your [clients/students]?
1 2 3 4 5 6 7
Not At All A great deal

For the next question please rate your agreement with this statement.

A3d. The course was a good way to explain the importance of introducing energy efficiency opportunities to my [clients/students].
1 2 3 4 5 6 7
Strongly disagree Strongly agree

[ASK CO=1 ELSE R1]

For the next four questions, please use a scale that ranges from 1 to 7 where one is "not at all" and 7 is "a great deal".

A4a. How much did the course cause you to think differently about how you enforce Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

A4b. How much did the course cause you to want to make changes in how you enforce Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

A4c. How much did the course increase your awareness of methods for enforcing Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

For the next question please rate your agreement with this statement.

A4d. The course was a good way to explain the importance of enforcing Title 24 code.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

MODULE TO SUPPORT REGRESSION ANALYSIS

[SKIP TO R2 IF Respondent Type = EUCR. SKIP TO QTA0 IF Respondent Type=MA]

R1. Using a scale of 1 to 7 where 1 means extremely difficult and 7 means extremely easy, please rate your ability to implement energy efficiency, operational, or equipment change in your organization.

1	2	3	4	5	6	7
Extremely Difficult						Extremely Easy

R2. How useful was the information presented in the course?

1	2	3	4	5	6	7
Not At All Useful						Very Useful

ACTIONS TAKEN – EUCC

[ASK IF Respondent Type = EUCC ELSE IF Respondent Type =EUCR SKIP TO TR4 ELSE SKIP TO QTA0]

TC1. Using a scale of 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate the degree to which you agree with the following statements:

a. As a result of taking the course, I recommend energy efficient technologies or practices to my management more often.

b. As a result of taking the course, I am better prepared to evaluate energy efficient options.

c. As a result of taking the course, my recommendations regarding energy efficient technologies or practices are viewed by my management as more informed.

1 2 3 4 5 6 7 8
Strongly disagree Strongly agree Not Applicable

TC6. Since you participated in the course, have you: [Yes =1, No =2, Ask for each]
a. Searched for additional information related to the concepts taught in the course?
b. Shared information you learned in the course with a colleague?
c. Helped convince others in your organization that energy saving actions are needed?
d. Helped convince others outside of your organization that certain types of actions help save energy?

TC2. Since your participation in the [COURSE NAME] course, have you made any efforts to save energy at the facility(ies) your business occupies or manages where you applied the concepts taught in the course?
1. Yes
2. No

[ASK IF TC2=1 ELSE SKIP TO TC4]
TC2a. We are interested in whether your facilities are served by an investor owned utility. Investor owned utilities are San Diego Gas and Electric, Southern California Edison, Southern California Gas, and Pacific Gas and Electric. Thinking about the facilities where you made these energy savings efforts, are all of them served by an investor owned utility, some of them, or are none of them served by an investor owned utility?
1. All served by investor owned utility
2. Some investor owned utility and some other utility
3. None served by investor owned utility [SKIP TO DC1]
4. Don't know

[INSERT OR READ IF TC2=1 AND TC2A = 2, ELSE SKIP TO TC3 IF TC2=1 AND TC2A=1 OR TC2=1 AND TC2A=4]
For the rest of the survey, please focus only on your facilities that are served by one of the California investor owned utilities.

TC3. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to make the effort to save energy at your facility(ies)?
1 2 3 4 5 6 7
Not At All Influential Very Influential

TC4. Using a scale of 1 to 7 where 1 means not at all likely and 7 means very likely, how likely is it that you will make an effort within the next 12 months, to save energy at the facility(ies) your business occupies or manages using the concepts taught in the course?
1 2 3 4 5 6 7
Not at all likely Very likely

[ASK IF TC2= 2 AND TC4<4]
TC5. What are the principal reasons you have not, and do not plan to use the concepts taught in the course to save additional energy at your facility(ies)? Select all that apply.
1. I was already applying the concepts

2. The course did not give me sufficient information to apply the concepts
3. There have been no appropriate situations for me to apply the concepts
4. Other, Specify

[IF TC2= 2 SKIP TO DC1, ELSE SKIP TO MA1]

ACTIONS TAKEN – EUCR
[ASK IF Respondent Type = EUCR ELSE IF Respondent Type =EUCC SKIP TO MODULES ELSE SKIP TO QTA0]

TR4. Since you participated in the course, have you: [Yes =1, No =2, Ask for each]
a. Searched for additional information related to the concepts taught in the course?
b. Shared information you learned in the course with a family member, friend or neighbor?

TR1. Since you participated in the course, have you made any efforts, such as installing new energy efficient equipment, to save energy in your home where you applied the concepts taught in the course?
1. Yes
2. No

TR1a. Is your home served by one of the investor owned utilities? Investor owned utilities are San Diego Gas and Electric, Southern California Edison, Southern California Gas, and Pacific Gas and Electric.
1. Yes
2. No [SKIP TO X1]
3. Don't know

[ASK IF TR1=1 ELSE SKIP TO TR2]
TR1b. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to make the effort to save energy at your home?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

TR2. Using a scale of 1 to 7 where 1 means not at all likely and 7 means very likely, how likely are you to take action or make changes within the next 12 months, such as installing new energy efficient equipment, to save energy at your home using the concepts taught in the course?

1	2	3	4	5	6	7
Not at all likely						Very likely

[ASK IF TR1= 2 AND TR2 <4]
TR3. What are the principal reasons you have not implemented any energy saving actions after attending the course. Select all that apply.
1. I was already applying or had applied the concepts
2. The course did not give me sufficient information to apply the concepts
3. There have been no appropriate applications for me to apply the concepts

4. Other, Specify

[IF TR1= 2 SKIP TO X1, ELSE SKIP TO MB1A]

IMPACT MODULE SECTION for EUCC and EUCR [each subject area is inserted here]

Other End-uses

[ASK IF Respondent Type=EUCC, ELSE SKIP TO EOR1]
EO1. Since your participation in the [COURSE NAME] course, have you made any other efforts to save energy at your facility in addition to those you have just described?
1. Yes
2. No

[ASK IF EO1=1, ELSE SKIP TO DC1]
EO2. What types of equipment or systems were affected through your efforts? (Check all that apply.)
1. Lighting
2. HVAC
3. Motors
4. Process equipment
5. Building Envelope
6. Cooking and Refrigeration
7. Plumbing
8. Renewables or Solar power
9. Other, Please specify

EO3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility?
1. Yes
2. No
3. Don't know

[ASK IF Respondent Type = EUCR]

EOR1. Since your participation in the [COURSE NAME] course, have you made any other efforts to save energy at your home in addition to those you have just described?
1. Yes
2. No

[ASK IF EOR1=1, ELSE SKIP TO X1]
EOR2. What types of equipment or systems were affected through your efforts? (Check all that apply.)
1. Lighting
2. HVAC
3. Pool pump
4. Weather stripping
5. Insulation
6. Other, Please specify

EOR3. For the changes you described above, did you receive technical or financial assistance through a utility program?
4. Yes
5. No
6. Don't know

ACTIONS TAKEN – MA

[ASK IF Respondent Type = MA, ELSE SKIP TO D1]

TA0. Based on a scale of 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate the degree to which you agree with the following statement: As a result of taking the [COURSE] course, I am more likely to recommend energy efficient equipment, designs or practices to my [clients/students].

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

TA12. Since you participated in the course, have you: [Yes =1, No =2, Ask for each]
a. Searched for additional information related to the concepts taught in the course?
b. Shared information you learned in the course with a colleague?
c. Changed your approach to selling your [clients/students] on the benefits of energy saving actions they could take

TA1. Since your participation in the [COURSE], have you changed or enhanced the service you provide to your [clients/students] where you applied the concepts taught in the course?
1. Yes
2. No

[ASK IF TA1= 1, ELSE SKIP TO TA11]
We'd like to learn more about the changes you have made to your services using what you learned in the course. If the change described is not something that you do in your work, please answer "does not apply".

TA13a. Since you took the course, do you recommend new or different energy efficient equipment or recommend energy efficient equipment more frequently?
1. Yes
2. No
3. Does not apply/Don't recommend equipment in my work

[ASK IF TA13A=1 ELSE SKIP TO TA14A]
TA13b. Please describe the energy efficient equipment you recommend. Please provide as much detail as possible.

TA13c. When you recommend energy efficient equipment to your [clients/students], approximately what percentage of them follow your recommendation and choose equipment that is more efficient instead of less efficient? An estimate is fine. [NUMERIC OPEN END]

[SKIP TO QTA3C IF QAC2=04]

TA14a. Still thinking about the changes you made to your services since you took the course…have you changed your approach for specifying the size of new energy consuming equipment that you install?
1. Yes
2. No
3. Does not apply/Do not size equipment in my work

[ASK IF TA14A=1 ELSE SKIP TO TA15A]
TA14b. Please describe the changes you have made to how you size energy consuming equipment. Please provide as much detail as possible.

TA15a. Still thinking about the changes you made to your services since you took the course…do you use different approaches to design buildings, building systems, or building shells?
1. Yes
2. No
3. Does not apply/Don't do design work

[ASK IF TA15A=1 ELSE SKIP TO TA16A]
TA15b. Please describe the different approaches you use to design buildings, building systems, or building shells. Please provide as much detail as possible.

TA16a. Still thinking about the changes you made to your services since you took the course…do you use new or different diagnostic tools?
1. Yes
2. No
3. Does not apply/Don't use diagnostic tools in my work

[ASK IF TA16A=1 ELSE SKIP TO TA17A]
TA16b. Please describe the new diagnostic tools that you use. Please provide as much detail as possible.

TA17a. Still thinking about the changes you made to your services since you took the course…have you changed how you maintain energy consuming equipment?
1. Yes
2. No
3. Does not apply/Don't maintain equipment in my work

[ASK IF TA17A=1 ELSE SKIP TO TA3c]
TA17b. Please describe the changes you have made to how you maintain energy consuming equipment. Please provide as much detail as possible.

TA3c. Please describe any additional changes you have made to help your [clients/students] save energy using what you learned in the course.
[OPEN END]
96. Did not make any other changes.

TA3b. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to make the changes you just described?

1 2 3 4 5 6 7

Not At All Influential Very Influential

TA4. Since your attendance at the [COURSE] course, have the changes or enhancements you just told me about become standard practice for you?

1. Yes
2. No

[SKIP TO QTA6 IF QAC2=4]

TA5. On approximately how many jobs over the past year (i.e., 2008) have you implemented these changes or enhancements to the service you provide to your clients? An estimate is fine. [NUMERIC OPEN END]

[ASK IF TA5 > 0]

TA5a. Again, thinking about the past year when you implemented these changes or enhancements to your service…approximately what percentage of your clients received financial support or technical assistance through a utility program? [NUMERIC OPEN END]

[ASK IF TA5a > 0]

TA5b. If you hadn't taken the course, approximately what percentage of your clients do you think would have received financial support or technical assistance through a utility program? Your best estimate is fine. [NUMERIC OPEN END]

TA6. In your opinion, have the changes or enhancements you have made to the service you provide resulted in measurable energy savings in the facilities operated by your [clients/students]?

1. Yes
2. No [SKIP TO D1]
3. Don't know [SKIP TO D1]

[ASK IF TA6=1]

TA7. In your opinion, how would you characterize the energy savings realized by your customers as a result of your participation in the course? In general would you say these are ….

1. Significant energy savings,
2. Moderate energy savings, or
3. Measurable but insignificant energy savings

[SKIP TO D1 IF TA7=2,3]

TA8a. Have you estimated the average savings per building in either dollars or in KWh?

1. Yes

2. No [SKIP TO TA11]

TA8b. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF TA8b=1 or 3]
TA9. Approximately how many dollars do you save per customer? [NUMERIC OPEN END]

[ASK IF TA8b=2 or 3]
TA10. Approximately how many kWh do you save per customer? [NUMERIC OPEN END]

[ASK IF TA1=2]
TA11. What is the principal reason you have not incorporated any of the concepts taught in the course to enhance the service you provide to your [clients/students]?
1. I was already incorporating the actions in my work.
2. The course did not give me sufficient information to implement the concepts.
3. There have been no appropriate applications to apply the concepts.
4. Other, Specify

DEMOGRAPHIC MODULE
[DON'T REQUIRE RESPONSES TO ANY OF THE REMAINING QUESTIONS BUT IF RESPONDENTS TO SKIP OVER THEM – CODE AS REFUSED]
[ASK IF RESPONDENT TYPE=MA, ELSE IF RESPONDENT TYPE=EUCC SKIP TO DC1, ELSE IF RESPONDENT TYPE=EUCR SKIP TO X1
SKIP TO EC1 IF MA AND QAC2=4 (YOU'RE A TEACHER)]

D1. What types of energy related services or equipment does your business provide? (Check all that apply)
1. Construction
2. Engineering or architectural design
3. Lighting design assistance, sales, installation
4. HVAC equipment sales, installation, repair or maintenance
5. Refrigeration equipment sales, installation, repair or maintenance
6. Motor equipment sales, installation, repair or maintenance
7. Pumping/hydraulic equipment sales, installation, repair or maintenance
11. Renewables/Solar power sales, installation, repair or maintenance
12. Boilers/Water Heating sales, installation, repair or maintenance
00. Other equipment sales, installation, repair or maintenance
09. Facility operations or maintenance
10. Energy technology research/consulting
13. Government or Regulatory agency
00. Other, please specify

D2. Which of the following best describes your business?
1. I/My business provides services to business customers.
2. I/My business provides services to residential customers.
3. I/My business provides services to business and residential customers.

4. I work for the government.
5. I work for private and/or public schools
6. Other, Specify

[ASK IF D2=1 OR 3]
D3. Which market segment do you work with most often?
1. Commercial
2. Agricultural
3. Industrial

D4. Please briefly describe the type of work you do on the typical project.
[OPEN END]

D5. Approximately how many jobs do you perfom a year?
[NUMERIC OPEN END]

[GO TO EC1]

DC1. In comparison to other companies in your industry, would you describe your company as…
1. A small company
2. A medium-sized company
3. A large company
4. Not applicable

DC2. Does your company lease or own your facility?
1. Lease
2. Own
3. Other, specify

DC3. How many years has your business been at this location?
[NUMERIC OPEN END]
1. Less than one year
2. Don't know

DC4. How many locations does your firm have in California?
1. 1
2. 2 to 4
3. 5 to 10
4. 11 to 25
5. Over 25
6. Don't know

DC5. Which category best describes your business?
1. Office
2. Retail (Non-food)
3. College/university
4. School
5. Grocery store
6. Convenience store

7. Restaurant
8. Health care / hospital
9. Hotel / motel
10. Warehouse
11. Personal service
12. Community service / church/ temple / municipality
13. Industrial process / manufacturing / assembly
14. Condo association / apartment management
15. Agriculture
16. Government
17. Contractor
18. Engineering
19. Information Technology
20. Airport
21. Transportation
22. Entertainment
23. Research/Laboratory

00. Other. Specify _____.

[GO TO EC1]

X1. In what type of building do you live?

1. A mobile home
2. A one-family home detached from any other house
3. A one-family home attached to one or more houses
4. A building with 2 apartments
5. A building with 3 or 4 apartments
6. A building with 5 or more apartments
7. Other, Specify

NX2. About when was this building first built?

1. Before 1978
2. 1978-1992
3. 1993-2001
4. 2002-2005
5. After 2005
6. Don't know

X3. What is the approximate square footage of your residence? An estimate is fine.
[NUMERIC OPEN END]
Don't know

QX11.. What is your zip code?
[NUMERIC OPEN END 1-99999]

X4. Including yourself, how many people currently live in your home year-round?
_____ people

X5. Which of the following best describes your age?

1 Less than 18 years old
2 18-24 years old

3 25-34 years old
4 35-44 years old
5 45-54 years old
6 55-64 years old
7 65 or older

(ASK IF X4>1)
X6. Including yourself, how many people currently living in your home year-round are in the following age groups?

____ Less than 18 years old
____ 18-24 years old
____ 25-34 years old
____ 35-44 years old
____ 45-54 years old
____ 55-64 years old
____ 65 or older
TOTAL SHOULD EQUAL QX4

X7. What is the highest level of education you have completed?

1 no schooling
2 less than high school
3 some high school
4 high school graduate or equivalent (e.g., GED)
5 trade or technical school
6 some college
7 college degree
8 some graduate school
9 graduate degree
10 other (SPECIFY)

X8. Which of the following best represents your annual household income from all sources in 2008, before taxes? Was it . . . .?

1 Less than $20,000 per year
2 $20,000-49,999
3 $50,000-74,999
4 $75,000-99,999
5 $100,000-149,999
6 $150,000-199,999
7 $200,000 or more

X9. What is your ethnicity?

1 White
2 Black, African American
3 American Indian or Alaska Native
4 Chinese
5 Japanese
6 Korean
7 Vietnamese
8 Filipino
9 Native Hawaiian

10 Guamanian or Chamorro
11 Samoan
12 Hispanic/Latina(o)
00 Other (SPECIFY)

X10. What is the primary language spoken in your home?
1 English
2 Spanish
3 Mandarin
4 Cantonese
5 Tagalog
6 Korean
7 Vietnamese
8 Russian
9 Japanese
10 Other

EC1. Have you taken any additional courses through a California Energy Center in 2009?
1. Yes
2. No

[IF EC1=1 ASK, ELSE SKIP TO CNT1]
EC2. What was the main subject matter of the course(s)? (Check all that apply.)
1. Lighting
2. HVAC
3. Building Envelope/Windows/Cool Roofs
4. Pumps and Motors
5. Compressed Air
6. Solar water or building heating
7. Water Heating (excluding solar)
8. Pools (excluding solar water heating)
9. Boilers/Furnaces/Combined Heat and Power
10. Commissioning/Retrocommissioning
11. Commercial Cooking/Food Services/Refrigeration
12. Controls/Emergency Management Systems
13. Title 24 Related
14. Financial Incentive Programs/Rebates
15. Renewables/Solar power
16. Other (specify)

CNT1. The State of California has asked us to provide them with some idea of the energy savings of your actions. We may get back in touch with you if we have additional questions. What is the best phone number to reach you at and the best time of day to call?
[NUMERIC OPEN END]

[Yes =1, No =2, Ask for each]
What is the best time of day to call?
a. Morning
b. Afternoon

c. Evening

Thank and Terminate.

8. GENERAL

[ASK IF Respondent Type=EUCC, ELSE SKIP TO MR1]
MQ1. You indicated that you have applied the concepts taught in the course to save energy at your facilit(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, in what area(s) did you make changes?
[MULTIPLE RESPONSE]
a. Lighting
b. HVAC
c. Building Envelope/Windows/Cool Roofs
d. Pumps and Motors
e. Solar water or solar building heating
f. Other (specify)

[SKIP IF ONLY CHOOSE ONE OF 1-5 IN MQ1 OR ONLY MQ1=00]
[ONLY INCLUDE END USES CHOSEN IN MQ1]
MQ2. You indicated that you made changes across a number of areas. Which one would say resulted in the most energy savings?
1. Lighting
2. HVAC
3. Building Envelope/Windows/Cool Roofs
4. Pumps and Motors
5. Solar water or solar building heating

MQ3. Please describe any additional areas that you made changes in order to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

[SKIP TO APPROPRIATE MODULE IF MQ1a-e=1]

ENERGY SAVINGS Qs FOR EUCC "OTHER" ACTIONS
MQ4. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF MQ4=1 ELSE SKIP TO MQ8]
MQ5. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MQ5=1 or 3]
MQ6. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MQ5=2 or 3]

MQ7. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MQ4=2 ELSE SKIP TO EO1]
MQ8. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

GENERAL IMPACT MODULE SECTION for EUCR
[ASK IF Respondent Type=EUCR, ELSE SKIP TO TA0]
MR1. You indicated that you have applied the concepts taught in the course to save energy at your home. In what area(s) did you make changes? [MULTIPLE RESPONSE]
a. Lighting
b. HVAC
c. Building Envelope/Windows/Cool Roofs
d. Pumps and Motors
e. Solar water or solar building heating
f. Other (specify)

[SKIP IF ONLY CHOOSE ONE OF 1-5 IN MR1 OR ONLY MR1=00]

[ONLY INCLUDE END USES CHOSEN IN MR1]
MR2. You indicated that you made changes across a number of areas. Which one would say resulted in the most energy savings?
1. Lighting
2. HVAC
3. Building Envelope/Windows/Cool Roofs
4. Pumps and Motors
5. Solar water or solar building heating

MR3. Please describe any additional areas that you made changes in order to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

[SKIP TO APPROPRIATE MODULE IF MR1a-e=1]

ENERGY SAVINGS Qs FOR EUCR "OTHER" ACTIONS
MR4. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF MR4=1 ELSE SKIP TO MR8]
MR5. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MR5=1 or 3]
MR6. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MR5=2 or 3]
MR7. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MR4=2 ELSE SKIP TO EOR1]
MR8. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

9. GREEN BUILDING / BUILDING ENVELOPE

[ASK IF Respondent Type=EUCC, ELSE SKIP TO MF1]
ME1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the shell of your building(s)? [Yes =1, No =2, Ask for each]

a. Installed temperature barriers in the floor, wall, roof, and/or ceiling (e.g. floor insulation, radiant barrier)
b. Installed roof framing or a cool roof
c. Installed new energy efficient windows or upgraded existing windows
d. Installed window framing
e. Installed window film
f. Installed window shading with fins, awnings, or overhangs
g. Added weather-stripping and/or caulking to windows, roofs, walls, or floors
h. Performed a cost-benefit analysis
i. Went through the process of NFRC Site-Built Certification

[ASK IF ME1a-i = 2]
ME2a. It seems we have not captured the changes you have made. Please describe the changes you have made to the building's shell in order to save energy where you applied concepts taught in the course.

[ASK IF ME1a-i=1, ELSE SKIP TO ME3]
ME2ab. Please describe any additional changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

ME3. In the course of making the changes you described, did you or any party to this project receive technical or financial assistance through a utility program?

1. Yes
2. No
3. Don't know

[ASK IF ME3=1, ELSE SKIP TO ME2B]
ME4. In which programs did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name
7. Other, Specify
8. Don't know

ME5. Did the course provide you information about the utility program in which you

participated?

1. Yes
2. No
3. Don't know

[ASK IF ME5=1]
ME6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

Building Envelope Module EUCC

[SKIP TO DC1, IF ME3=1]
[ASK IF ME1a-g=1] ELSE SKIP TO ME52]
ME2b. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END]

ME9. Approximately, how many square feet is your facility(ies)? If the changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END (1-99999]

[SKIP to ME8a, IF ME2b<2]
For the next set of questions, please think about the facility that has been impacted the most by the energy saving changes you implemented.

[ASK IF ME1a-g=1]
ME8a. Please enter the zip code of your facility (or the facility impacted the most by changes to the building shell):

[ASK IF ME1a-g=1]
ME8b. What type of building did the work occur in?

1. Assembly (e.g., an assembly hall or a church)
2. Primary or Secondary Education (SKIP TO ME8c)
3. University or College (SKIP TO ME8d)
4. Grocery
5. Health/Medical (e.g., a hospital or nursing home) (SKIP TO ME8e)
6. Lodging (e.g. hotel, motel) (SKIP TO ME8f)
7. Manufacturing (e.g., Bio Tech, light industrial manufacturing) (SKIP TO ME8g)
8. Small office building (e.g. less than 25,000 square feet)
9. Large office building (e.g. greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO ME8h)
11. Retail (SKIP TO ME8i)
12. Storage (SKIP TO ME8j)
13. Refrigerated Warehouse
14. Single Family Residential (SKIP TO ME8k)
15. Multi-family Residential
16. Agricultural
17. Other (Specify:_____)

[SKIP TO ME10]

ME8c. Was the retrofit in a primary school, a secondary school or a relocatable classroom?

1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO ME10]

ME8d. Was this a university or college?

1. University
2. College

[SKIP TO ME10]

ME8e. Was this a hospital or nursing home?

1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO ME10]

ME8f. Was this a hotel or motel?

1. Hotel
2. Motel

[SKIP TO ME10]

ME8g. Was this a biotech or light manufacturing type of facility?

1. Biotech
2. Light Manufacturing
3. Other, specify

[SKIP TO ME10]

ME8h. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[SKIP TO ME10]

ME8i. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story (e.g. greater than or equal to 25,000 square feet)
2. Large single-story (e.g. greater than or equal to 25,000 square feet)
3. Small (e.g. less than 25,000 square feet)

[SKIP TO ME10]

ME8j. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[SKIP TO ME10]

ME8k. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

ME10. How many years old is your facility? An estimate is fine.

___ [NUMERIC OPEN END]

NE6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NE7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NE8. What are the operating hours of this facility? Please provide an average hours per day for each.
a. Weekdays [NUMERIC OPEN END, 0-24](enter 99 for DK)
b. Saturdays [NUMERIC OPEN END, 0-24] (enter 99 for DK)
c. Sundays [NUMERIC OPEN END, 0-24] (enter 99 for DK)

ME7. The next section asks about the technical details of the changes to the shell of your building. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO ME52]

NE9. What type of cooling system do you have in your facility? (Select all that apply)
1. Central AC
2. Room AC
3. No air conditioning

[SKIP TO NE16 IF NE9=3]
NE10. Is your AC system a compression, an evaporative, or a heat pump system?
1. Compression

2. Evaporative
3. Heat pump

NE11. Was the AC unit energy efficient?
1. Yes
2. No

NE12. What is the SEER rating of your AC system?
[NUMERIC OPEN END, 0-99] (Don't know)

NE13. How many years old is your AC system?
00. Less than one year
[NUMERIC OPEN END, 0-99]

NE14. How often did your facility use the AC system?
1. No usage
2. Intermittent usage
3. Constant usage

[SKIP TO NE16 IF NE14=1]
NE15. What are the set points for the AC system during the summer?
a) Day set point: (DK)
b) Evening set point: (DK)

NE16. What type of heating system do you use in your facility? [MULT. RESPONSE]
1. Furnace
2. Baseboard
3. Radiator
4. Portable heaters
5. Heat pump
6. Other (including fireplaces, etc.) - specify
7. Do not have heating system

[SKIP TO ME11, IF NE16=7] [MULTIPLE RESPONSE]
NE17. What type of fuel does your heating system use?
1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood or Coal
6. Solar
7. Other, specify

NE18. Is this heating system energy efficient?
1. Yes
2. No

NE19. How many years old is the heating system?
00. Less than one year
[NUMERIC OPEN END, 0-99]

NE20. How often does your facility use the heating system?
1. No usage
2. Intermittent usage
3. Constant usage

[SKIP TO ME11 IF NE20=1]
NE21. What are the set points for the heating system during the winter?
a) Day set point: (DK)
b) Evening set point: (DK)

[ASK IF ME1a=1, ELSE SKIP TO ME24]
ME11. You indicated that you installed temperature barriers at your facility. Which of the following types of temperature barriers were installed in your efforts to save energy at your facility? [SELECT ALL THAT APPLY]
a. Floor insulation
b. Wall insulation
c. Roof/ceiling insulation
d. Radiant barrier
e. Other, specify:

[REPEAT FOR ME11a-d=1]
ME12. Approximately how many square feet of [INSERT FROM ME11a-d] did you install?

[ASK IF ME11a=1, ELSE SKIP TO ME16]
ME13. Did the floor have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF ME13=2 or 3]
ME14. What is the R-value of the floor insulation installed?
[Numeric Open End], DK

[ASK IF ME13=1]
ME15. What is the R-value of the floor insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK IF ME11b=1, ELSE SKIP TO ME20]
ME16. Did the wall have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF ME16=2 or 3]
ME17. What is the R-value of the wall insulation installed?
[Numeric Open End], DK

[ASK IF ME16=1]
ME18. What is the R-value of the wall insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK ALL NOT JUST THOSE WHO DO NOT KNOW R-VALUE]
ME19. Please use the pull down menus below to indicate the configuration of your wall insulation.

Changes to Wall Insulation

Original Configuration	**Item**	**Current Configuration**
(Fiberboard Sheathing, Polysyrene, etc)	Insulation Type	(Fiberboard Sheathing, Polysyrene, etc)
(Numeric Open End) in Inches	Insulation Thickness	(Numeric Open End) in Inches

[NOTE: INSULATION TYPES FOR DROP DOWN]
1. Fiberboard Sheathing
2. Polysyrene
3. Polyurethane
4. Polyisocyanurate
5. Batt
6. Perlite filled
7. Polyurethane filled
8. Grouted
9. No type selected
10. Don't Know

[ASK IF ME11c=1, ELSE SKIP TO ME24]
ME20. Did the roof/ceiling have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF ME20=2 or 3]
ME21. What is the R-value of the roof/ceiling insulation installed?
[Numeric Open End], DK

[ASK IF ME20=1]
ME22. What is the R-value of the roof/ceiling insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK ALL NOT JUST THOSE WHO DO NOT KNOW R-VALUE]
ME23. Please use the pull down menus below to indicate the configuration of your roof/ceiling insulation.

Changes to Roof/Ceiling Insulation

Original Configuration (Fiberboard Sheathing, Polysyrene, etc)	Item	Current Configuration (Fiberboard Sheathing, Polysyrene, etc)
(Numeric Open End) in Inches	Insulation Thickness	(Numeric Open End) in Inches

[NOTE: INSULATION TYPES FOR DROP DOWN]

1. Fiberboard Sheathing
2. Polysyrene
3. Polyurethane
4. Polyisocyanurate
5. Batt
6. Perlite filled
7. Polyurethane filled
8. Grouted
9. No type selected
10. Don't Know

NE22. What percentage of the attic is insulated?
[NUMERIC OPEN END, 0-100]

[ASK IF ME1b=1 ELSE ME62]
ME24. You indicated that you installed roof framing or a cool roof at your facility. Which of the following types of framing were installed in your efforts to save energy at your facility? [SELECT ALL THAT APPLY]

a. High R-value roof framing
b. Cool roof (light colored roof)
c. Other, specify:
d. Don't Know

[REPEAT FOR ME24a=1 AND ME24b=1]
ME25. Approximately how many square feet were affected by the [INSERT FROM ME24a-b] you installed?

[ASK IF ME24a=1, ELSE ME27]
ME26. What type of roof framing was installed?

1. Wood
2. Metal
3. Concrete
4. Stress skin

[ASK IF ME24b=1, ELSE ME62]
ME27. Please describe the roof's surface, finish, and color before and after the cool roof was installed.

- Surface: (Dropdown list: Aluminum, Asphalt pavement, Clay tile, Felt, etc)
  a. Before:

b. After:

- Reflective: (Yes, No, DK)
  c. Before:
  d. After:
- Flat: (Yes, No, DK)
  e. Before:
  f. After:
- Color: [Open End]
  g. Before:
  h. After:

[ASK IF ME1c=1, ELSE ME33]
ME62. You indicated that you upgraded windows at your facility. Were all of these the same type of windows and framing?

1. Yes
2. No
3. Don't know

ME71. Were these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF ME62=1 OR SELECTED ONE DIRECTION IN ME71, ELSE ME28]
ME63. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after they were upgraded please enter them below, otherwise please select "Don't Know." The SHGC values that you enter should be between 0 and 1.

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF ME62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME71, ELSE ME64]
ME28. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after they were upgraded please enter them below, otherwise please select "Don't Know." If you did not upgrade windows facing a particular direction, please leave that row blank. The SHGC values that you enter should be between 0 and 1

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				

West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF ME63=DK AND (ME62=1 OR SELECTED ONE DIRECTION IN ME71), ELSE ME29]
ME64. Please use the pull down menus below to tell us about the windows you upgraded. If you did not upgrade windows facing a particular direction, please leave that row blank. Please leave row blank of not applicable.

	a. Old window panes	b. Old glass type	c. Old window framing	d. New window panes	e. New glass type	f. New window framing	g-j. Square foot of window (by direction)
Windows							

[ASK IF ME28=DK AND ME62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME71, ELSE ME33]
ME29-32. Please use the pull down menus below to tell us about the windows you upgraded.

Direction	a. Old window panes	b. Old glass type	c. Old window framing	d. New window panes	e. New glass type	f. New window framing	g. Square foot of window
ME29. North (or mainly north)							
ME30. East (or mainly east)							
ME31. South (or mainly south)							
ME32. West (or mainly west)							

CHOICES FOR WINDOW PANE TYPES:
Single
Double
Triple
Quadruple
No type selected
Don't know

CHOICES FOR GLASS TYPES:
Clear
Tinted
Low-e
Reflective
Low-e and argon filled
Argon filled
Spectrally selective
No type selected
Don't know

CHOICES FOR WINDOW FRAMING:
Aluminum with thermal break
Aluminum without thermal break
Aluminum – unknown whether a thermal break present
Vinyl
Wood
Insulated fiberglass/vinyl
Structural
No type selected
Don't know

[ASK IF ME1d=1, ELSE ME34]
ME33 You indicated that you installed window framing at your facility. Please use the pull down menus to tell us about the window framing.

	Window Frame Type
a. Before window framing installation:	Aluminum with thermal break Aluminum without thermal break Aluminum – unknown whether a thermal break present Vinyl Wood Insulated fiberglass/vinyl Structural No window framing selected Don't know
b. After window framing installation:	Aluminum with thermal break Aluminum without thermal break Aluminum – unknown whether a thermal break present Vinyl Wood Insulated fiberglass/vinyl Structural No window framing selected Don't know

[ASK IF ME1e=1, ELSE NE26]
ME34. You indicated that you installed window film at your facility. Which type of window film was installed in your efforts to save energy at your facility(ies)? [SELECT ALL THAT APPLY]

a. Reflective
b. Spectrally selective
c. Other, specify:
d. Don't Know

[ASK IF ME34a=1 ELSE ME68]
ME65. You indicated that you installed reflective window film at your facility. Were all of the windows on which you installed reflective window film the same type and with the same framing?

1. Yes
2. No
3. Don't know

ME72. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF ME65=1 OR SELECTED ONE DIRECTION IN ME72 ELSE ME35]
ME66. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed reflective window film please enter them below, otherwise please select "Don't Know."

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF ME65=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME72, ELSE ME67]
ME35. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed reflective window film please enter them below, otherwise please select "Don't Know."

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				
West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF ME66=DK AND (ME65=1 OR SELECTED ONE DIRECTION IN ME72), ELSE ME36]
ME67. Please use the pull down menus below to tell us about the windows on which you installed reflective window film.

	a. window panes	b. glass type	c. window framing	g-j. Square foot of window (by direction)
Windows				

[ASK IF ME35=DK AND ME62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME72, ELSE ME68]
ME36-39. Please use the pull down menus below to tell us about the windows on which you installed reflective window film. If you did not upgrade windows facing a particular direction, please leave that row blank. Please leave row blank of not applicable.

Direction	a. Window panes	b. Glass type	c.Window framing	g. Square foot of window
ME36. North (or mainly north)				

ME37, East (or mainly east)				
ME38. South (or mainly south)				
ME39. West (or mainly west)				

[SEE CHOICES ABOVE FOR ME29-32]
[ASK IF ME34b=1 ELSE NE26]
ME68. You indicated that you installed spectrally selective window film at your facility. Were all of the windows on which you installed spectrally selective window film the same type and with the same framing?

1. Yes
2. No
3. Don't know

ME73. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF ME68=1 OR SELECTED ONE DIRECTION IN ME73, ELSE ME40]
ME69. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed spectrally selective window film please enter them below, otherwise please select "Don't Know."

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF ME68=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME73 ELSE ME70]
ME40. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed spectrally selective window film please enter them below, otherwise please select "Don't Know." If you did not install film to windows facing a particular direction, please leave that row blank. The values you enetered should be between 0 and 1.

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				
West (or mainly west)				

	Don't Know	Don't Know

[ASK IF ME69=DK AND (ME68=1 OR SELECTED ONE DIRECTION IN ME73), ELSE ME41]
ME70. Please use the pull down menus below to tell us about the windows on which you installed spectrally selective window film.

	a. window panes	b. glass type	c. window framing	g. Square foot of window (by direction
Windows				

[ASK IF ME40=DK AND ME68=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN ME73, ELSE ME45]
ME41-44. Please use the pull down menus below to tell us about the windows on which you installed spectrally selective window film. If you did not upgrade windows facing a particular direction, please leave that row blank. Please leave row blank of not applicable.

Direction	a. Window panes	b. Glass type	c. Window framing	g. Square foot of window
ME41. North (or mainly north)				
ME42. East (or mainly east)				
ME43. South (or mainly south)				
ME44. West (or mainly west)				

[SEE CHOICES ABOVE FOR ME29-32]

[ASK IF ME1f=1 ELSE ME49]
ME74. You indicated that you installed window shading at your facility, were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF MULTIPLE DIRECTIONS SELECTED IN ME74]
ME45-48.You indicated that you installed window shading at your facility. Please use the pull down menus below to tell us about the shading you installed.

Main orientation of windows	a. Shading type	b. Height	c. Width	d. Length	e. Distance from window	f. Length of average window facing this direction	g. Width of average window facing this direction	h. Total Number of windows facing this direction	i. Number of windows with this type of shading

ME45. North (or mainly north)	[see choices below]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]
ME46. East (or mainly east)									
ME47. South (or mainly south)									
ME48. West (or mainly west)									

SHADING TYPE CHOICES:
Fin
Awning
Over-hang
No type selected

[ASK IF ME1g=1 ELSE ME52]
ME49. You indicated that you installed weather-stripping and/or caulking at your facility. Where did you add weather-stripping and/or caulking in your efforts to save energy at your facility? [SELECT ALL THAT APPLY]

a. Windows
b. Roof
c. Walls
d. Floor

ME50. Did you have a blower door test done before and after the weather-stripping / caulking?

1. Yes
2. No
3. Don't know

[ASK IF ME50=1, ELSE ME52]
ME51. What is the ACH (Air changes per hour) results of the blower door test before and after you added weather-stripping and/or caulking? [Numeric Open End]

a. Before:
b. After:

ME52. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF ME52=1 ELSE SKIP TO ME56]
ME53. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF ME53=1 or 3]
ME54. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF ME53=2 or 3]
ME55. Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF ME52=2 ELSE SKIP TO QEO1]
ME56. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

Residential End Use Customers

[ASK IF Respondent Type=EUCR, ELSE IF Respondent Type=EUCC SKIP TO EO1, ELSE SKIP TO TA1]
MF1. You indicated that you have applied the concepts taught in the course to save energy at your home. Have you made any of the following changes to the shell of your home? [Yes =1, No =2, Ask for each]

a. Installed temperature barriers in the floor, wall, roof, and/or ceiling (e.g. floor insulation, radiant barrier)
b. Installed roof framing or a cool roof
c. Installed new energy efficient windows or upgraded existing windows
d. Installed window framing
e. Installed window film
f. Installed window shading with fins, awnings, or overhangs
g. Added weather-stripping and/or caulking to windows, roofs, walls, or floors
h. Performed a cost-benefit analysis
i. Went through the process of NFRC Site-Built Certification

[ASK IF MF1a-i = 2]
MF2. It seems we have not captured the changes you have made. Please describe the changes you have made to the building's shell in order to save energy where you applied concepts taught in the course.

[ASK IF MF1a-i=1, ELSE SKIP TO MF3]
MF2ab. Please describe any additional changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MF3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program?
1. Yes
2. No
3. Don't know

[ASK IF MF3=1, ELSE SKIP TO MF8a]
MF4. In which programs did you participate? [MULTIPLE RESPONSE]
1. Express Efficiency
2. Multi-Family Rebate Program
3. Low Income Energy Efficiency
4. A rebate program, but I don't know the name
5. Other, Specify
6. Don't know

MF5. Did the course provide you information about the utility program in which you participated?
1. Yes
2. No
3. Don't know

[ASK IF MF5=1]
MF6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

Building Envelope Module EUCR

[SKIP TO X1, IF MF3=1]
[ASK IF MF1a-g=1 ELSE SKIP TO MF52]
MF8a. Please enter the zip code of your home:

[ASK IF MF1a-g=1]
MF9. How many square feet is your home? An estimate is fine.

[NUMERIC OPEN END]

[ASK IF MF1a-g=1]
MF10. How many years old is your home? An estimate is fine.

MF7. The next section asks about the technical details of the changes to the shell of your building. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO MF52]

NF9. What type of cooling system do you have in your home? (Select all that apply)
1. Central AC
2. Room AC
3. No air conditioning

[SKIP TO NF16 IF NF9=3]
NF10. Is your AC system a compression, an evaporative, or a heat pump system?
1. Compression
2. Evaporative
3. Heat pump

NF11. Was the AC unit energy efficient?
1. Yes
2. No

NF12. What is the SEER rating of your AC system?
[NUMERIC OPEN END, 0-99]

NF13. How many years old is your AC system?
00. Less than one year
[NUMERIC OPEN END, 0-99]

NF14. How often does your home use the AC system?
1. No usage
2. Intermittent usage
3. Constant usage

[SKIP IF NF14=1]
NF15. What are the set points for the AC system during the summer?
a) Day set point:
b) Evening set point:

NF16. What type of heating system do you use in your home? [MULTIPLE RESPONSE]
1. Furnace
2. Baseboard
3. Radiator
4. Portable heaters
5. Heat pump
6. Other – specify
7. Do not have heating system

[SKIP TO ME11, IF NF16=6]
NF17. What type of fuel does your heating system use? [MULTIPLE RESPONSE]
1. Natural Gas
2. Electric

3. Oil
4. Bottled Gas
5. Wood or Coal
6. Solar
7. Other, specify

NF18. Is this heating system energy efficient?
1. Yes
2. No

NF19. How many years old is the heating system?
00. Less than one year
[NUMERIC OPEN END, 0-99]

NF20. How often does your home use the heating system?
1. No usage
2. Intermittent usage
3. Constant usage

[SKIP IF NF20=1]
NF21. What are the set points for the heating system during the winter?
a) Day set point:
b) Evening set point:

[ASK IF MF1a=1, ELSE SKIP TO MF24]
MF11. You indicated that you installed temperature barriers in your home. Which of the following types of temperature barriers were installed in your efforts to save energy at your home? [SELECT ALL THAT APPLY]
a. Floor insulation
b. Wall insulation
c. Roof/ceiling insulation
d. Radiant barrier
e. Other, specify:

[REPEAT FOR ALL MF11a-d=1]
MF12. Approximately how many square feet of [INSERT FROM MF11a-d] did you installed?

[ASK IF MF11a=1, ELSE SKIP TO MF16]
MF13. Did the floor have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF MF13=2 or 3, ELSE TO MF15]
MF14. What is the R-value of the floor insulation installed?
[Numeric Open End], DK

[ASK IF MF13=1, ELSE TO MF16]
MF15. What is the R-value of the floor insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK IF MF11b=1, ELSE SKIP TO MF20]
MF16. Did the wall have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF MF16=2 or 3, ELSE MF18]
MF17. What is the R-value of the wall insulation installed?
a. [Numeric Open End], DK

[ASK IF MF16=1, ELSE MF19]
MF18. What is the R-value of the wall insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK ALL NOT JUST THOSE WHO DO NOT KNOW R-VALUE]
MF19. Please use the pull down menus below to indicate the configuration of your wall insulation.

Changes to Wall Insulation

Original Configuration	**Item**	**Current Configuration**
(Fiberboard Sheathing, Polysyrene, etc)	Insulation Type	(Fiberboard Sheathing, Polysyrene, etc)
(Numeric Open End) in Inches	Insulation Thickness	(Numeric Open End) in Inches

[NOTE: INSULATION TYPES FOR DROP DOWN]
1. Fiberboard Sheathing
2. Polysyrene
3. Polyurethane
4. Polyisocyanurate
5. Batt
6. Perlite filled
7. Polyurethane filled
8. Grouted
9. No type selected
10. Don't Know

[ASK IF MF11c=1, ELSE SKIP TO MF24]
MF20. Did the roof/ceiling have any previous insulation?
1. Yes
2. No
3. Don't know

[ASK IF MF20=2 or 3, ELSE MF22]
MF21. What is the R-value of the roof/ceiling insulation installed?
a. [Numeric Open End], DK

[ASK IF MF20=1, ELSE MF23]
MF22. What is the R-value of the roof/ceiling insulation before and after the installation?
a. Before change [Numeric Open End], DK
b. After change: [Numeric Open End], DK

[ASK ALL NOT JUST THOSE WHO DO NOT KNOW R-VALUE]
MF23. Please use the pull down menus below to indicate the configuration of your roof/ceiling insulation.

Changes to Roof/Ceiling Insulation

Original Configuration (Fiberboard Sheathing, Polysyrene, etc)	**Item**	**Current Configuration** (Fiberboard Sheathing, Polysyrene, etc)
(Numeric Open End) in Inches	Insulation Thickness	(Numeric Open End) in Inches

[NOTE: INSULATION TYPES FOR DROP DOWN]
1. Fiberboard Sheathing
2. Polysyrene
3. Polyurethane
4. Polyisocyanurate
5. Batt
6. Perlite filled
7. Polyurethane filled
8. Grouted
9. No type selected
10. Don't Know

NF22. What percentage of the attic is insulated?
[NUMERIC OPEN END, 0-100]

[ASK IF MF1b=1, ELSE MF62]
MF24. You indicated that you installed roof framing or a cool roof in your home. Which of the following types of framing were installed in your efforts to save energy at your home? [SELECT ALL THAT APPLY]
a. High R-value roof framing
b. Cool roof (light colored roof)
c. Other, specify:
d. Don't Know

[REPEAT FOR MF24a=1 OR MF24b=1]
MF25. Approximately how many square feet were affected by the [INSERT FROM MF21a-b] you installed?

[ASK IF MF24a=1]
MF26. What type of roof framing was installed?

1. Wood
2. Metal
3. Concrete
4. Stress skin

[ASK IF MF24b=1]
MF27. Please describe the roof's surface, finish, and color before and after the cool roof was installed.

- Surface: (Dropdown list: Aluminum, Asphalt pavement, Clay tile, Felt, etc)
  a. Before:
  b. After:
- Reflective: (Yes, No, DK)
  c. Before:
  d. After:
- Flat: (Yes, No, DK)
  e. Before:
  f. After:
- Color: [Open End]
  g. Before:
  h. After:

[ASK IF MF1c=1, ELSE MF33]
MF62. You indicated that you upgraded windows at your home. Were all of these the same type of windows and framing?

1. Yes
2. No
3. Don't know

MF74. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF MF62=1 OR SELECTED ONE DIRECTION IN NF23, ELSE MF28]
MF63. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after they were upgraded please enter them below, otherwise please select "Don't Know." The SHGC values that you enter should be between 0 and 1

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF MF62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN NF23, ELSE MF64]
MF28. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after they were upgraded please enter them below, otherwise please select "Don't Know." If you did not upgrade windows facing a particular direction, please leave that row blank. The SHGC values that you enter should be between 0 and 1

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				
West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF MF63=DK AND MF62=1 OR SELECTED ONE DIRECTION IN NF23, ELSE MF29]
MF64. Please use the pull down menus below to tell us about the windows you upgraded. Please enter 99999 if sq. footage is unknown.

	a. Old window panes	b. Old glass type	c. Old window framing	d. New window panes	e. New glass type	f. New window framing	g-j. Square foot of window (by direction)
Windows							

[ASK IF MF28=DK AND MF62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN NF23, ELSE MF33]
MF29-32. Please use the pull down menus below to tell us about the windows you upgraded.

Direction	a. Old window panes	b. Old glass type	c. Old window framing	d. New window panes	e. New glass type	f. New window framing	g. Square foot of window
MF29. North (or mainly north)							

MF30. East (or mainly east)							
MF31. South (or mainly south)							
MF32. West (or mainly west)							

CHOICES FOR WINDOW PANE TYPES:
Single
Double
Triple
Quadruple
No type selected
Don't know

CHOICES FOR GLASS TYPES:
Clear
Tinted
Low-e
Reflective
Low-e and argon filled
Argon filled
Spectrally selective
No type selected
Don't know

CHOICES FOR WINDOW FRAMING:
Aluminum with thermal break
Aluminum without thermal break
Aluminum – unknown whether a thermal break present
Vinyl
Wood
Insulated fiberglass/vinyl
Structural
No type selected
Don't know

[ASK IF MF1d=1, ELSE MF34]
MF33 You indicated that you installed window framing at your home. Please use the pull down menus to tell us about the window framing.

	Window Frame Type

a. Before window framing installation:	Aluminum with thermal break Aluminum without thermal break Aluminum – unknown whether a thermal break present Vinyl Wood Insulated fiberglass/vinyl Structural No window framing selected Don't know
b. After window framing installation:	Aluminum with thermal break Aluminum without thermal break Aluminum – unknown whether a thermal break present Vinyl Wood Insulated fiberglass/vinyl Structural No window framing selected Don't know

[ASK IF MF1e=1, ELSE NE27]
MF34. You indicated that you installed window film in your home. Which type of window film was installed in your efforts to save energy at your home? [SELECT ALL THAT APPLY]

a. Reflective
b. Spectrally selective
c. Standard Film
d. Other, specify:
e. Don't Know

[ASK IF MF34a=1, ELSE MF68]
MF65. You indicated that you installed reflective window film at your home. Were all of the windows on which you installed reflective window film the same type and with the same framing?

1. Yes
2. No
3. Don't know

MF75. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF MF65=1 OR SELECTED ONE DIRECTION IN MF75, ELSE MF35]
MF66. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed reflective window film please enter them below, otherwise please select "Don't Know." The SHGC values that you enter should be between 0 and 1

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF MF65=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF75, ELSE MF67]
MF35. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed reflective window film please enter them below, otherwise please select "Don't Know." If you did not upgrade windows facing a particular direction, please leave that row blank. The SHGC values that you enter should be between 0 and 1.

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				
West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF MF66=DK AND MF65=1 OR SELECTED ONE DIRECTION IN MF75, ELSE MF36]
MF67. Please use the pull down menus below to tell us about the windows before and after you installed reflective window film. Please enter '9999' if square footage is unknown. Please leave field blank if not applicable.

	a. Old window panes	b. Old glass type	c. Old window framing	d. New window panes	e. New glass type	f. New window framing	g. Square foot of window (by direction)
Windows							

[ASK IF MF35=DK AND MF62=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF75, ELSE MF68]
MF36-39. Please use the pull down menus below to tell us about the windows on which you installed reflective window film. If you did not install film to windows facing a particular direction, please leave that row blank.

Direction	a. Window panes	b. Glass type	c. Window framing	g. Square foot of window
MF36. North (or mainly north)				
MF37. East (or mainly east)				
MF38. South (or mainly south)				
MF39. West (or mainly west)				

[SEE CHOICES FOR MF29-32 ABOVE]
[ASK IF MF34b=1]
MF68. You indicated that you installed spectrally selective window film at your home. Were all of the windows on which you installed spectrally selective window film the same type and with the same framing?

1. Yes
2. No
3. Don't know

MF76. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF MF68=1 OR SELECTED ONE DIRECTION IN MF76, ELSE MF40]
MF69. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed spectrally selective window film please enter them below, otherwise please select "Don't Know." The SHGC values that you enter should be between 0 and 1.

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF MF68=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF76, ELSE MF70]
MF40. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed spectrally selective window film please enter them below, otherwise please select "Don't Know." If you did not install film to windows facing a particular direction, please leave that row blank. The SHGC values that you enter should be between 0 and 1.

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				
West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF MF69=DK AND MF68=1 OR SELECTED ONE DIRECTION IN MF76, ELSE MF41]
MF70. Please use the pull down menus below to tell us about the windows before and after you installed spectrally selective window film. Please enter 9999 if square footage is unknown. Please leave the field blank if it is not applicable.

	a. Old window panes	b. Old glass type	c. Old window framing	d. New window # panes	e. New glass type	f. New window framing	g-j. Square foot of window (by direction)
Windows							

[ASK IF MF40=DK AND MF68=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF76, ELSE MF45]
MF41-44. Please use the pull down menus below to tell us about the windows on which you installed spectrally selective window film. If you did not install film to windows facing a particular direction, please leave that row blank.

Direction	a. Window panes	b. Glass type	c. Window framing	g. Square foot of window

MF41. North (or mainly north)				
MF42. East (or mainly east)				
MF43. South (or mainly south)				
MF44. West (or mainly west)				

[SEE CHOICES FOR MF29-32 ABOVE]
[ASK IF MF34c=1, ELSE NF27]
MF71. You indicated that you installed standard window film at your home. Were all of the windows on which you installed standard window film the same type and with the same framing?

1. Yes
2. No
3. Don't know

MF81. Were any of these windows facing…

a) North or mainly North
b) East or mainly East
c) South or mainly South
d) West or mainly West

[ASK IF MF71=1 OR SELECTED ONE DIRECTION IN MF81, ELSE MF57]
MF72. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed standard window film please enter them below, otherwise please select "Don't Know." The SHGC values that you enter should be between 0 and 1.

	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
Windows	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
	Don't Know		Don't Know	

[ASK IF MF71=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF81, ELSE MF73]
MF57. If you know the solar heat gain coefficient (SHGC) and U-value of the windows before and after you installed standard window film please enter them below, otherwise please select "Don't Know." If you did not install film to windows facing a particular direction, please leave that row blank. The SHGC values that you enter should be between 0 and 1.

Upgraded Windows:	SHGC (Before upgrade)	SHGC (After upgrade)	U-value (Before upgrade)	U-value (After upgrade)
North (or mainly north)	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]
East (or mainly east)				
South (or mainly south)				

West (or mainly west)				
	Don't Know		Don't Know	

[ASK IF MF72=DK AND MF71=1 OR SELECTED ONE DIRECTION IN MF81 ELSE MF58]
MF73. Please use the pull down menus below to tell us about the windows on which you installed spectrally selective window film. Please enter '99999' if square footage is unknown. Please leave the field blank if it is not applicable.

	a. Window panes	b. Glass type	c. Window framing	g-j. Square foot of window (by direction)
Windows				

[ASK IF MF57=DK AND MF71=2 or 3 AND SELECTED MULTIPLE DIRECTIONS IN MF81, ELSE MF45]
MF58-61. Please use the pull down menus below to tell us about the windows on which you installed standard selective window film. If you did not install film to windows facing a particular direction, please leave that row blank. Please leave the field blank if it is not applicable.

Direction	a. Window panes	b. Glass type	c. Window framing	g. Square foot of window
MF58. North (or mainly north)				
MF59. East (or mainly east)				
MF60. South (or mainly south)				
MF61. West (or mainly west)				

[SEE CHOICES FOR MF29-32 ABOVE]

ASK IF MF1f=1, ELSE ME49]
NF29. You indicated that you installed window shading at your facility. Were all the windows the same type and with the same framing?

1. Yes
2. No

[Phone only]
NF29. Please use the pull down menus below to tell us about the shading you installed. Please enter '9999' if an answer is unknown.

Main orientation of windows	a. Shading type	b. Height	c. Width	d. Length	e. Distance from window	f. Length of average window	g. Width of average window	h. Total Number of windows	i. Number of windows with this type of shading

MF45.	Fin; awning, over-hang DK	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]

MF77. Were any of these windows facing… (internet)
1. North
2. East
3. South
4. West

[ASK IF MULTIPLE DIRECTIONS SELECTED IN NF27]
MF45-48. You indicated that you installed window shading in your home. Please use the pull down menus below to tell us about the shading you installed. Please enter '99999' if an answer is unknown. Please leave the field blank if it is not applicable.

Main orientation of windows	a. Shading type	b. Height	c. Width	d. Length	e. Distance from window	f. Length of average window facing this direction	g. Width of average window facing this direction	h. Total Number of windows facing this direction	i. Number of windows with this type of shading
MF45. North (or mainly north)	Fin; awning, over-hang	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]	[numeric open end]
MF46. East (or mainly east)									
MF47. South (or mainly south)									
MF48. West (or mainly west)									

[ASK IF MF1g=1, ELSE MF52]
MF49. You indicated that you installed weather-stripping and/or calking in your home. Where did you add weather-stripping and/or caulking in your efforts to save energy in your home? [SELECT ALL THAT APPLY]

a. Windows
b. Roof
c. Walls
d. Floor

MF50. Did you have a blower door test done before and after the weather-stripping / caulking?

1. Yes
2. No
3. Don't know

[ASK IF MF50=1, ELSE MF52]
MF51. What is the ACH (Air changes per hour) results of the blower door test before and after you added weather-stripping and/or caulking? [Numeric Open End]

a. Before:
b. After:

MF52. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MF52=1 ELSE SKIP TO MF56]
MF53. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MF53=1 or 3]
MF54. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MF53=2 or 3]
MF55. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MF52=2 ELSE SKIP TO QEOR1]
MF56. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

10. HVAC

MC1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the HVAC equipment? [1=Yes, 2=No]

a. Replaced existing HVAC units with more new efficient units of the same type (retrofit of existing HVAC units such as a chiller or packaged unit)
b. Installed new energy efficient HVAC units as part of a facility remodel or construction project where there were no previous units
c. [REMOVED REPLACED EXISTING COMPONENTS]
d. Installed new components to an existing HVAC system to increase energy efficiency (e.g. VSD on air handling unit)
e. Optimized HVAC system
f. Changed HVAC repair and maintenance practices
g. Installed large fans for cooling buildings or drying projects, or optimized an existing fan system

[ASK IF ALL MC1 a-g = 2, ELSE SKIP TO MC2A]
MC2. It seems we have not captured the changes you have made. Please describe the HVAC changes you have made to save energy where you applied concepts taught in the course.
[OPEN END]

[ASK IF ANY MC1a-f=1, ELSE SKIP TO MC3]
MC2A. Please describe any additional HVAC changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MC3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MC3 =1, ELSE SKIP TO MC8]
MC4. In which program did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but don't know the name
7. Other, Specify
8. Don't know

MC5. Did the course provide you information about the utility program in which you participated?

4. Yes
5. No
6. Don't know

[ASK IF MC5 =1]
MC6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1 2 3 4 5 6 7
Not At All Influential Very Influential

[IF MC3=1 SKIP TO DC1]
MC8. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END, ANSWER MUST BE GREATER THAN ZERO, 1-9999]

NC2. Approximately, how many square feet is your facility(ies)? If changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 1-99999]

[SAY/INSERT ONLY IF MC8 > 1]
For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility and** that has been impacted the most by the energy saving changes you implemented.

MC9. The State of California has asked us to provide them with some idea of the energy savings of your actions. We have a number of questions about the work you performed that will help us figure this out. To help us figure out possible weather conditions, we need to know the zip code of the facility where the retrofit or new construction took place.
[NUMERIC OPEN END]
[ALLOW DON'T KNOW]

NC4. How many years old is your facility?
000. Less than one year
[NUMERIC OPEN END, 1-999]

MC10. What type of building did the work occur in?
1. Assembly (e.g., an assembly hall or a church)
2. Primary or Secondary Education (SKIP TO MC11)
3. University or College (SKIP TO MC12)
4. Grocery
5. Health/Medical (e.g., a hospital or nursing home) (SKIP TO MC13)
6. Lodging (e.g. hotel, motel) (SKIP TO MC14)
7. Manufacturing (e.g., Biotech, light industrial manufacturing) (SKIP TO MC15)
8. Small office building (less than 25,000 square feet)
9. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO MC16)
11. Retail (SKIP TO MC17)
12. Storage [SKIP TO MC17b]
13. Refrigerated Warehouse
14. Single Family Residential [SKIP TO MC17c]
15. Multi-family Residential
16. Agricultural Building
17. Other (Specify:_____)

[SKIP TO MC18]

MC11. Was this a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO MC18]

MC12. Was this a university or college?
1. University
2. College

[SKIP TO MC18]

MC13. Was this a hospital or nursing home?
1. Hospital
2. Nursing home
3. Other

[SKIP TO MC18]

MC14. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO MC18]

MC15. Was this a biotech or light manufacturing type of facility?
1. Biotech
2. Light Manufacturing

[SKIP TO MC18]

MC16. Was this a fast food or sit down restaurant?
1. Fast Food

2. Sit Down

[SKIP TO MC18]

MC17. Was this a large multistory, large single-story, or small retail building?

1. Large multi-story
2. Large single-story
3. Small

[SKIP TO MC18]

MC17b. Was this a conditioned or unconditioned storage space?

1. Conditioned
2. Unconditioned

[SKIP TO MC18]

MC17c. Was this a stationary or mobile single family home?

1. Stationary or immobile home
2. Mobile home

NC6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NC7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NC8. What type of heating system do you have in your facility? (Select all that apply)
[MULTIPLE RESPONSE]

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. No heating system
8. Other, specify

NC9. What type of cooling system do you have in your facility? (Please select all that apply)

1. Central AC
2. Room AC
3. No air conditioning

NC9B. Was your AC system a compression, an evaporative, or a heat pump system?

1. Compression
2. Evaporative
3. Heat pump

NC10. What are the operating hours of this facility? Please provide an average hours per day for each.

a. Weekdays [NUMERIC OPEN END, 0-24 (Enter '99' if unknown)
b. Saturdays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)

c. Sundays [NUMERIC OPEN END, 0-24] (Enter '99' if unknown)

NC11. What is the square footage of the area affected by these changes?
[NUMERIC OPEN END, 1-99999]

NC12. What is the cooling capacity of the space affected (in tons)?
[NUMERIC OPEN END] [1-9999]

[ASK IF MC1a =1 OR MC1b=1 OR MC1c=1 OR MC1d=1 OR MC1e=1 OR MC1f=1 or MC1g=1 ELSE SKIP TO MC80]
MC7. The next section asks about the technical details of the changes you made to the HVAC equipment at your facility. Do you personally have knowledge of these details?

1. Yes
2. No [SKIP TO MC80]

[IF MC1a=1 (i.e., Replace Units), ELSE SKIP TO MC32]
MC20. Did you retrofit the main cooling unit, heating unit or both?

1. Cooling unit
2. Heating unit
3. Both cooling and heating units

[ASK IF MC20=1 OR 3, ELSE SKIP TO MC22]
MC21. Which cooling unit(s) did you replace? Please select all that apply.

1. Packaged DX unit - cooling only
2. Packaged DX unit – cooling and heating in the same unit
3. Chiller
4. Air cooled heat pump
5. Geothermal heat pump
6. Other (Specify)

[ASK IF MC20=2 OR 3, ELSE SKIP TO MC23]
MC22. Which heating unit did you replace? Please select all that apply.

1. Gas fired furnace
2. Boiler
3. Air cooled heat pump
4. Geothermal heat pump
5. Other (Specify)

[ASK IF MC21=3, ELSE SKIP TO MC24]
MC23. We are interested in some information about your old and new chillers. If a particular detail below was not changed, leave the box blank in the "new" column. Please enter '9999' if an answer is unknown.

	Old Chiller	New Chiller

Type	(Centrifugal, Gas fired chilled water, Gas fired absorption, Waste heat absorption, Steam fired absorption, Reciprocating Screw compressor, Scroll compressor)	(Centrifugal, Gas fired chilled water, Gas fired absorption, Waste heat absorption, Steam fired absorption, Reciprocating Screw compressor, Scroll compressor)
NC13. Type of cooling	Water cooled or air cooled?	Water cooled or air cooled?
Total Capacity (tons)	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
Efficiency (kW/tons)	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK
Age	[NUMERIC OPEN END] DK	Not applicable

[ASK IF MC21 =1 or 2, ELSE SKIP TO MC25]
MC24a-f. You may have replaced one or many packaged units. We know that these can be of different sizes. Please fill in the number of packaged units you replaced of each size.

__ Less than 5.4 tons
__ 5.4 to 7.5 tons
__7.6 to 11.25 tons
__ 11.26 to 20 tons
__ 21 to 63 tons
__ Greater than 63 tons

MC91-96h.
Please tell us about the packaged units you replaced that were [SIZE]. If a particular detail below was not changed, leave the box blank in the "new" column.
If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC24>0

a. Old Unit Tons	c. Number of units replaced that were this tonnage	e. Approximate efficiency of these units	g. Type of efficiency	b. New Unit Tons	d. Number of new units that were this tonnage	f. Approximate efficiency of these units	h. Type of efficiency
1. [NUMERICA OPEN END] DK	[NUMERICA OPEN END] DK	[NUMERIC OPEN END] DK	EER SEER DK	[NUMERICA OPEN END]	[NUMERICA OPEN END]	[NUMERICA OPEN END]	EER SEER DK

[ASK IF MC21=4 or 5 OR MC22 =3 or 4, ELSE SKIP TO MC26]
MC25a-f. You may have replaced one or many heat pumps. We know that these can be of different sizes. Please fill in the number of heat pumps you replaced of each size.

__ Less than 5.4 tons
__ 5.4 to 7.5 tons
__7.6 to 11.25 tons
__ 11.26 to 20 tons
__ 21 to 63 tons
__ Greater than 63 tons

MC85A-MC90L. Please tell us about the heat pumps you replaced that were [SIZE]. If a particular detail below was not changed, leave the box blank in the "new" column.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC25>1

a. Old Unit Tons	b. Number of units replaced that were this tonnage	c. Approximate Cooling efficiency of these units	d. Type of efficiency	i. Approximate heating efficiency of these units	j. Type of efficiency of heating unit	e. New Unit Tons	f. Number of new units that were this tonnage	g. Approximate efficiency of these units	h. Type of efficiency	k. Approximate heating efficiency of these units	l. Type of efficiency of the heating unit
1. [NUMERIC OPEN END] DK	[NUMERIC OPEN END] DI	[NUMERIC OPEN END] DK	EER SEER COP DK	[NUMERIC OPEN END] DK	HSPF COP DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	EER SEER COP DK	[NUMERIC OPEN END] DK	HSPF COP DK

[ASK IF MC22=1 ELSE SKIP TO MC27]
MC26a-f. You may have replaced one or many gas furnaces. We know that these can be of different sizes. Please fill in the number of gas furnaces you replaced of each size.

__ Less than 65 kBtu/h
__ 65 to 90 kBtu/h
__ 91 to 135 kBtu/h
__ 136 to 240 kBtu/h
__ 241 to 760 kBtu/h
__ Greater than 760 kBtu/h

MC97A-MC117. Please tell us about the gas furnaces you replaced that were [SIZE]. If a particular detail below was not changed, leave the box blank in the "new" column.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC26>0

a. Old Unit kBtu/hrs	c. Number of units replaced that were this size	e. Approximate efficiency of these units (%)	b. New Unit kBtu/hr	d. Number of new units that were this size	f. Approximate efficiency of these units (%)
[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK

[ASK IF MC22=2 ELSE SKIP TO MC29]
MC27a-f. You may have replaced one or many boilers. We know that these can be of different sizes. Please fill in the number of boilers you replaced of each size.

__ Less than 100 MBh
__ 100 to 200 MBh
__ 201 to 300 MBh
__ 301 to 600 MBh
__ 601 to 1000 MBh
__ Greater than 1000 MBh

MC223-MC258. Please tell us about the boilers you replaced that were [SIZE]. If a particular detail below was not changed, leave the box blank in the "new" column.

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC27>0

a. Old Unit MBtu/hrs	c. Number of units replaced that were this size	e. Approximate combustion efficiency of these units (%)	b. New Unit MBtu/hr	d. Number of new units that were this size	f. Approximate combustion efficiency of these units (%)
[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK

MC29. What is the square footage of area served by the HVAC equipment about which you just told me?
[NUMERIC OPEN END, 1-999999]
DK

[ASK IF MC1b=1 (i.e., New units), ELSE SKIP TO MC50]
MC32. Did you install a cooling unit, heating unit or both?
1. Cooling unit
2. Heating unit
3. Both cooling and heating units

[ASK IF MC32=1 OR 3, ELSE SKIP TO MC34]
MC33. What cooling unit did you install? Please select all that apply.
1. Packaged DX unit - cooling only
2. Packaged DX unit – cooling and heating in the same unit
3. Chiller
4. Air cooled heat pump
5. Geothermal heat pump
6. Other (Specify)

[ASK IF MC32=2 OR 3, ELSE SKIP TO MC35]
MC34. What heating unit did you install? Please select all that apply.
1. Gas fired furnace
2. Boiler
3. Air cooled heat pump
4. Geothermal heat pump
5. Other (Specify)

[ASK IF MC33 =3, ELSE SKIP TO MC36]
MC35. We are interested in some information about your new chiller.

	New Chiller
Type	(Centrifugal, Gas fired chilled water, Gas fired absorption, Waste heat absorption, Steam fired absorption, Reciprocating compressor, , Scroll compressor, Screw compressor (code 08))
NC14. Type of cooling	Water cooled or air cooled?
Total Capacity (tons)	[NUMERIC OPEN END] DK
Efficiency (kW/tons)	[NUMERIC OPEN END] DK

[ASK IF MC33 =1 or 2, ELSE SKIP TO MC37]
MC36a-f. You may have installed one or many new packaged units. We know that these can be of different sizes. Please fill in the number of packaged units you installed of each size..

__ Less than 5.4 tons
__ 5.4 to 7.5 tons
__ 7.6 to 11.25 tons
__ 11.26 to 20 tons
__ 21 to 63 tons
__ Greater than 63 tons

MC118-MC141. Please tell us about the new packaged units you installed that were [SIZE].

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC36>0

a. New Unit Tons	b. Number of new units that were this tonnage	c. Approximate efficiency of these units	d. Type of efficiency
[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	EER SEER DK

[IF MC33=04 or 05 OR MC34=3 or 4, ELSE SKIP TO MC38]
MC37a-f. You may have installed one or many new heat pumps. We know that these can be of different sizes. Please fill in the number of heat pumps you installed of each size..

__ Less than 5.4 tons
__ 5.4 to 7.5 tons
__ 7.6 to 11.25 tons
__ 11.26 to 20 tons
__ 21 to 63 tons
__ Greater than 63 tons

MC142-MC177. Please tell us about the new heat pumps you installed that were [SIZE].

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC37>0

a. New Unit Tons	b. Number of new units that were this tonnage	c. Approximate Cooling efficiency of these units	d. Type of efficiency	i. Approximate heating efficiency of these units	j. Type of efficiency of heating unit

[NUMERIC OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END]	EER SEER COP DK	[NUMERIC OPEN END]	HSPF COP DK

[IF MC34 =1 ELSE SKIP TO MC39]
MC38a-f. You may have installed one or many new gas furnaces. We know that these can be of different sizes. Please fill in the number of gas furnaces you installed of each size.
.
__ Less than 65 kBtu/h
__ 65 to 90 kBtu/h
__ 91 to 135 kBtu/h
__ 136 to 240 kBtu/h
__ 241 to 760 kBtu/h
__ Greater than 760 kBtu/h

MC178-MC195. Please tell us about the new gas furnaces you installed that were [SIZE].

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC38>0

a. New Unit Btu/hrs	b. Number of this size	c. Approximate efficiency of these units
1. [NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK

[ASK IF MC34 =2 ELSE SKIP TO MC41]
MC39a-f. You may have installed one or many new boilers. We know that these can be of different sizes. Please fill in the number of boilers you installed of each size.
.
__ Less than 100 MBh
__ 100 to 200 MBh
__ 201 to 300 MBh
__ 301 to 600 MBh
__ 601 to 1000 MBh
__ Greater than 1000 MBh

MC259-MC276. Please tell us about the new boilers you installed that were [SIZE].

If you installed multiple units and they are not identical, please provide details on just one of them. Please enter "9999" if an answer is unknown.

Repeat for each size where MC39>0

a. New Unit MBtu/hrs	b. Number of this size	c. Approximate combustion efficiency of these units

[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK	[NUMERIC OPEN END] DK

[ASK IF MC32=1,3]
MC41. What is the square footage of area served by the HVAC equipment about which you just told me?
[NUMERIC OPEN END, 1-999999]
[DK]

[ASK If MC1d=1 (i.e., New components), ELSE SKIP TO MC58]
MC50. You indicated that you installed <u>new</u> components to an existing HVAC system. Which part of the HVAC system was the component installed in? (select all that apply)

1. Air handling equipment
2. Controls/Set points
3. Heating and cooling equipment
4. Don't know

[ASK IF MC50=1, ELSE SKIP TO MC53]
MC51. Which of the following air handling components did you replace? (select all that apply)

1. Duct insulation
2. Efficient motors
3. Variable speed drives
4. Variable air volume conversion or adjustment
5. Fan Powered mixing box
6. Other, specify
7. Don't know

[ASK IF MC51=1 ELSE SKIP TO MC53]
MC52. What is the Rvalue of the insulation for the ducts?

a) [NUMERIC OPEN END, 0-100]
b) Don't know

[ASK IF MC51=2, OTHERWISE SKIP TO MC54]
MC53. We know you may have installed multiple types of motors. Please fill out the matrix for the types of new motors that you installed. Please leave the row blank if you did not install a motor of that type. Please enter '9999' if an answer is unknown.

a. Type of motor	b. Number installed of that type	c. Where installed	d. New Variable Speed Drive installed?	f. New horsepower
1. (standard efficiency, high efficiency, high efficiency two-stage, and high efficiency variable speed, other, don't know)	[NUMERIC OPEN END] DK	(On the supply fan, on the return fan, on a cooling tower fan, on a secondary fan, other, don't know)	Y/N DK	[NUMERIC OPEN END] DK

[ASK IF MC51=3, ELSE SKIP TO MC55]
MC54. We know you may have installed multiple variable speed drives onto existing motors. Please fill out the matrix below for the motors on which these drives were installed. Please enter '9999' if an answer is unknown.

a. Number of motors on which VSDs were installed	[NUMERIC OPEN END] DK
b. Average horsepower of motor on which VSDs were installed	[NUMERIC OPEN END] DK
c. Average age of motors on which VSDs were installed	[NUMERIC OPEN END] DK
d. Where installed	(On the supply fan, on the return fan, on a cooling tower fan, on a secondary fan, other, don't know)

[If MC50=2, ELSE SKIP TO MC56]
MC55. Which of the following Control or Set Point Equipment did you install? [MULTIPLE RESPONSE]

1. Demand control ventilation
2. Energy management system
3. Heating/cooling time clock
4. Other, specify
5. Don't know

[If MC50=3, ELSE SKIP TO MC58]
MC56. Which of the following heating or cooling equipment components did you install? [MULTIPLE RESPONSE]

1. Water side economizer
2. Reheat coils
3. Cooling tower for a packaged unit
4. Direct Cooler
5. Evaporator or Desiccant System
6. Indirect Cooler
7. Heat recovery
8. Other
9. Don't know

[If MC56=2, ELSE SKIP TO MC58]
MC57. What is the total energy rating of the new reheat coils you installed?
New coils [OPEN END, DK] Units [KW, kBtuh, Other, DK]

[ASK IF MC1e=1 (i.e., Optimization), ELSE SKIP TO MC77]
MC58. What part of the HVAC system did you optimize? (select all that apply)

1. Controls
2. Air Handling Equipment
3. Other

4. Don't know

[ASK IF MC58=1, ELSE SKIP TO MC69]
MC59. Which of the following controls was optimized (select all that apply)
1. Thermostat
2. Occupancy sensors
3. VAV Terminal Box
4. Economizer Controls
5. Raised Cooling Delivery Set point temperature
6. Lowered heating system delivery temperature
7. Other
8. Don't know

[ASK IF MC59=1, ELSE SKIP TO MC64]
MC60. What type of changes did you make to your thermostat(s)? Please select all that apply. [MULTIPLE RESPONSE]
1. Changed temperature setpoints
2. Reduced the number of hours of operation
3. Other
4. Don't know

[ASK IF MC60=1, ELSE SKIP TO MC62]
MC61. What were the changes to the setpoints in Degrees F for heating and/or cooling?

a. Setpoint Type	b. Old Setpoint (Deg F)	c. New setpoint (Deg F)
1. Cooling		
2. Heating		

[ASK IF MC60=2, ELSE SKIP TO MC64]
MC62. How many fewer hours per week is the cooling system running?
_____Record hours per week
Don't know

MC63. How many fewer hours per week is the heating system running?
_____Record hours per week
Don't know

[ASK IF MC59=2, ELSE SKIP TO NC15]
MC64. What percentage of the conditioned area were occupancy sensors installed on?
_____Record percentage
Don't know

[ASK IF MC59=3, ELSE SKIP TO MC69]
NC15. Please describe the steps you took to optimize your VAV terminal box.
[OPEN END]

[ASK IF MC58=2, ELSE SKIP TO MC77]
MC69. Which of the following air handling equipment operations were optimized? Please select all that apply.
1. Ducts

2. Filters
3. Economizer
4. Heat recovery system
5. Other, specify
6. Don't know

[ASK IF MC69=1, ELSE SKIP TO NC16]
MC70. Which of the following duct optimization measures did you perform? Please select all that apply.

1. Duct insulation
2. Leak reduction
3. Pressure balancing
4. Other, specify
5. Don't know

[ASK IF MC69=1, ELSE SKIP TO MC73]
NC16. Please describe the steps you took to optimize your ducts.
[OPEN END]

[ASK IF MC69=2, ELSE SKIP TO MC74]
MC73. After you optimized your filter system, what was the percentage reduction in pressure drop across the filter?
_____ Record percentage pressure drop
Don't know

[ASK IF MC69=3, ELSE SKIP TO MC75]
MC74. What were the steps you took to optimize your economizer?
[OPEN END]

[ASK IF MC69=4, ELSE SKIP TO MC76]
MC75. What were the steps you took to optimize your heat recovery system?
[OPEN END]

[ASK IF MC69=5, ELSE SKIP TO MC77]
MC76. What were the steps you took to optimize your other air handling equipment?
[OPEN END]

[ASK IF MC1f=1 (i.e., Maintenance Change), ELSE SKIP TO NC17]
MC77a. There are many possible changes to your maintenance practices that you may have made. Below we have a list of what those changes could be. Please select the changes in maintenance practices that you now perform more frequently than you did before taking the course.

Maintenance Practice
1. Adjust bypass dampers
2. Clean or replace filters
3. Check fan blades for tightness
4. Lubricate fan motor

Maintenance Practice
5. Adjust operating pressures
6. Evaluate vent system
7. Clean blower wheel
8. Inspect valves
9. Tighten electrical connections
10. Evaluate safety controls
11. Measure temperature difference
12. Adjust thermostat calibration
13. Check start and run capacitors
14. Check start and run delays
15. Measure voltage differences
16. Measure amperage draw
17. Test fan limit switch
18. Test thermocouple
96. None of the above

MC78. Did the course cause you to change any other energy saving maintenance procedures not listed previously?

1. Yes
2. No
3. Don't know

[ASK IF MC78=1 ELSE SKIP TO NC17]
MC79. What are those maintenance procedures and how often do you do them?
[OPEN END]

[ASK IF MC1G=1 ELSE MC80]
NC17. Please indicate the changes you made to your fan system. [MULTIPLE RESPONSE]

1. Replaced an old fan or fan system with new fan(s)
2. Installed a new fan or fan system where one did not exist
3. Made changes to the operation of an existing fan or fan system to make it run more efficiently
4. Other (specify)

[ASK IF NC17=01, else NC18B]
NC18A. We are interested in some information about your fan replacement. What was the application of the fan(s) that you replaced? [MULTIPLE RESPONSE]

1. Agricultural drying
2. Manufacturing drying
3. Building Cooling
4. Other (specify)

[ASK IF NC17=02, ELSE NC19]
NC18B. We are interested in some information about your fan installation. What is the application of the fan(s) that you installed? [MULTIPLE RESPONSE]

1. Agricultural drying
2. Manufacturing drying
3. Building Cooling
4. Other (specify)

[ASK IF NC17=01 OR 02 ELSE NC33]
NC19, How many total fans have you installed (including replacement fans)?
[NUMERIC OPEN END 0-9999]

NC19a-y. In the grid below, please provide the requested information about your old and new fans. If this installation was not a replacement, please put a "0" for the number of old fans and leave the rest of the old column blank. If you installed multiple types of fans, please focus on the most common type you installed.

If a particular detail below was not changed, leave the box blank in the "new" column. Please enter "9999" if an answer is unknown.

.	Old Fan(s)	New Fan(s)
Number of Fans	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Fan(s)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Fan Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Fan Speed (rpm)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Fan Flow (cfm)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Impeller Size (inches)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Fan pressure rise in H_20 (inches in water column)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Pressure required for process in H_20	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower of Fan Motor	Drop down box with ranges	Drop down box with ranges
Average Fan Motor Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Fan Motor Amps	[NUMERIC OPEN END]	[NUMERIC OPEN END]

Fan Motor Speed	1. Constant 2. 2 speed 3. Variable	1. Constant 2. 2 speed 3. Variable
Average Hours of Operation per Week	[NUMERIC OPEN END]	Not applicable

[ASK IF NC18A = 3 OR NC18B=3 ELSE NC33]
NC30. Does this fan system supplement another cooling system or is it the only cooling in this building?

1. Supplements another cooling system
2. Only cooling system in the building

NC31. How many square feet are cooled by this fan system?
[NUMERIC OPEN END]

NC32. Please indicate your thermostat settings before and after you made this change to your cooling system.
Before: [NUMERIC OPEN END]
After: [NUMERIC OPEN END]

[ASK IF NC17=03 ELSE MC80]
NC33. Please describe in detail the changes you made to the operation of an existing fan or fan system to make it run more efficiently.
[OPEN END]

MC80. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MC80=1 ELSE SKIP TO MC84]
MC81. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MC81=1 or 3]
MC82. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MC81=2 or 3]
MC83. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MC80=2 ELSE SKIP TO E01]
MC84. Please provide a rough estimate of the annual energy savings in dollars or kilowatt hours, or as a percentage reduction of in your energy costs. An approximation or your best guess is fine.
[OPEN END]

11. LIGHTING

[ASK IF Respondent Type=EUCC, ELSE SKIP TO MB1]
MA1 You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the lighting equipment at your facility(ies)? [Yes =1, No =2, Ask for each]

a. Replaced existing lighting fixtures with more efficient fixtures (Retrofit of existing fixtures)
b. Installed energy efficient lighting fixtures or bulbs where there were previously no existing fixtures
c. Installed lighting controls
d. Removed existing lighting fixtures without replacement (de-lamping)
e. Changed lighting repair and maintenance practices
f. Changed lighting system operations

[ASK IF MA1a-f = 2, ELSE SKIP TO MA2A]
MA2. It seems we have not captured the changes you made. Please describe the lighting changes you have made to save energy where you applied concepts taught in the course.

[ASK IF MA1a-f = 1, ELSE SKIP TO MA3]
MA2A. Please describe any additional lighting changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MA3 In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MA3=1, ELSE SKIP TO MA6]
MA4. In which program did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. Other, Specify
7. Don't know/refused

MA5a. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
3. Don't know

[ASK IF MA5a=1]
MA5b. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

Lighting Module EUCC
[IF MA3=1 SKIP TO QE01]
NA1. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END]

NA2. Approximately, how many square feet is your facility? If the changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 1-99999]
[FACILITIES COULD BE LARGER THAN 99,999. GO WITH 999,999]

[SKIP to NA3, IF NA1<2]
NA2b. For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility** and that has been impacted the most by the energy saving changes you implemented.

NA3. Please enter the zip code of the facility.
[NUMERIC OPEN END, 1-99999]

NA4. How many years old is your facility? An estimate is fine.
000. Less than one year
[NUMERIC OPEN END, 1-999]

NA5. What type of building did the work occur in?
1. Assembly (e.g., an assembly hall or a church)
2. Primary or Secondary Education (SKIP TO NA5a)
3. University or College (SKIP TO NA5b)
4. Grocery
5. Health/Medical (e.g., a hospital or nursing home) (SKIP TO NA5c)
6. Lodging (e.g. hotel, motel) (SKIP TO NA5d)
7. Manufacturing (e.g., Biotech, light industrial manufacturing) (SKIP TO NA5e)
8. Small office building (less than 25,000 square feet)
9. Large office building (greater than or equal to 25,000 square feet)
10. Restaurant (SKIP TO NA5f)
11. Retail (SKIP TO NA5g)
12. Storage [SKIP TO NA5h]
13. Refrigerated Warehouse
14. Single Family Residential [SKIP TO NA5i]
15. Multi-family Residential [SKIP TO NA5j]
16. Agrigultural
17. Other (Specify:_____)

[SKIP TO NA6]

[ACCORDING TO THIS LOGIC, QUESTIONS NA5a THROUGH NA5i DON'T GET ASKED]

NA5a. Was this a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO NA6]

NA5b. Was this a university or college?
1. University
2. College

[SKIP TO NA6]

NA5c. Was this a hospital or nursing home?
1. Hospital
2. Nursing home
3. Other, specify

[SKIP TO NA6]

NA5d. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO NA6]

NA5e. Was this a biotech or light manufacturing type of facility?
1. Biotech
2. Light Manufacturing

[SKIP TO NA6]

NA5f. Was this a fast food or sit down restaurant?
1. Fast Food
2. Sit Down

[SKIP TO NA6]

NA5g. Was this a large multistory, large single-story, or small retail building?
1. Large multi-story
2. Large single-story
3. Small

[SKIP TO NA6]

NA5h. Was this a conditioned or unconditioned storage space?
1. Conditioned
2. Unconditioned

[SKIP TO NA6]

NA5i. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

[ASK IF NA5=15]
NA5j. How many units in this multifamily home were affected?
[NUMERIC OPEN END, 0-9999]

NA6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NA7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NA8. What type of heating system do you have in your facility? [MULTIPLE RESPONSE]

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. Other, specify
8. No heating system

NA9. What type of cooling system do you have in your facility? (Select all that apply) [MULTIPLE RESPONSE]

1. Central AC
2. Room AC
3. No air conditioning

[SKIP TO NA10 IF NA9=3]
NA9b. Is your AC system a compression, an evaporative, or a heat pump system?

1. Compression
2. Evaporative
3. Heat pump

NA10. What are the operating hours of this facility? Please provide an average hours per day for each.

a. Weekdays [NUMERIC OPEN END, 0-24]
b. Saturdays [NUMERIC OPEN END, 0-24]
c. Sundays [NUMERIC OPEN END, 0-24]

[IF MA3=1 SKIP TO QE01]
[ASK IF MA1a-f = 1 ELSE SKIP TO MA26A]
MA6a. The next section asks about the technical details of the changes you made to the lighting equipment at your facility. Do you personally have knowledge of these details?

1. Yes
2. No [SKIP TO MA26a]

[ASK IF MA1a OR MA1b OR MA1d = 1, ELSE SKIP TO MA14]
MA6. Which of the following types of lighting fixtures were changed in your efforts to save energy at your facility(ies)? [SELECT ALL THAT APPLY]

1. Linear fluorescent tube lights
2. Exit signs
3. High Bay Lighting (including HID lighting)
4. Incandescent Lighting

00. Other, specify (go to MA14 if "other" ONLY)

[SHOW ONE TABLE FOR EACH FIXTURE TYPE MA6a, MA6b, LMA6c = 1]
(MA7-9)
You indicated that you changed some [**LIGHTING TYPE FROM L1]** at your facility(ies). Please use the pull down menus below to indicate the configuration of your old lighting and your new lighting. If you replaced or installed multiple fixtures types, please provide the information for the most common one.

[Lighting Type] Lighting System Affected by Energy Saving Action

Original Configuration	Item	Current Configuration
	Lamp Type	
	Ballast (Magnetic 01, Electronic (generic) 02, Electronic (high efficiency) 03, Dimming electronic 04, Programmed Start 05, Pulse Start 06, No Ballast Selected 96, Don't know 98, Not applicable 99	
	Lamp Length	
(Numeric Open End)	Watts per Lamp	(Numeric Open End)
	Number of lamps per fixture	
(Numeric Open End)	Number of Fixtures	(Numeric Open End)

Linear Fluorescent Tube Lights:

Original Lamp Type:

- T5
- T5 High Output
- T8
- Super T8
- Thermal T8 (for use in refrigerator cases)
- T10
- T12
- Add: Metal Halide

- Add: Mercury vapor
- Add: High pressure sodium
- Add: Low pressure sodium

Current Lamp Type:

- T5
- T5 High Output
- T8
- Super T8
- Thermal T8 (for use in refrigerator cases)
- T1
- T12
- Add: Metal Halide
- Add: Mercury vapor
- Add: High pressure sodium
- Add: Low pressure sodium
- DK

High Bay Lights:

Original Lamp Type:

- T5
- Metal halide
- Pulse start metal halide
- Mercury vapor
- High pressure sodium
- Low pressure sodium
- Traditional halogen
- Halogen infra-red (IR)
- Reflector lamp
- Ceramic metal halide
- Probe start ceramic metal halide
- Light emitting diodes (LEDs)

Current Lamp Type:

- T5
- Metal halide
- Pulse start metal halide
- Mercury vapor
- High pressure sodium
- Low pressure sodium
- Traditional halogen
- Halogen infra-red (IR)
- Reflector lamp
- Ceramic metal halide
- Probe start ceramic metal halide
- Light emitting diodes (LEDs)

[ASK IF (MA7K=0 OR 99) OR (MA7L=0 OR 99) ELSE MA8A]

NA11. Approximately how much of your building area (square feet) is lit by the linear fluorescent tube

lights you just described?
[NUMERIC OPEN END, 0-99999]

[ASK IF (MA8K=0 OR 99) OR (MA8L=0 OR 99) ELSE MA9A]
NA12. Approximately how much of your building area (square feet) is lit by the exit signs you just described?
[NUMERIC OPEN END, 0-99999]

[ASK IF (MA9K=0 OR 99) OR (MA9L=0 OR 99) ELSE MA10A]
NA13. Approximately how much of your building area (square feet) is lit by the high bay lighting you just described?
[NUMERIC OPEN END, 0-99999]

Response categories will be developed to create pull down menus for each item in the table above. For the lighting module we have identified 26 lamp types, 4 ballast types, 5 lamp sizes, 3 options for lamps per fixture and numeric open ends for the other items.

[SHOW TABLE FOR FIXTURE TYPE L1d = 1]
(MA10)
You indicated that you changed some incandescent lighting at your facility(ies). Please use the pull down menus below to indicate the configuration of your old lighting and your new lighting. If you replaced or installed multiple fixtures types, please provide the information for the most common one.

Changes to Incandescent lighting

Original Configuration	**Item**	**Current Configuration**
Incandescent	Bulb type	(LED, CFL, Other)
(Numeric Open End)	Number of Bulbs	(Numeric Open End)
	Watts per Bulb	(Numeric Open End)

[ASK IF (MA10B=0 OR 99) OR (MA10C=0 OR 99) ELSE MA11A]
NA14. Approximately how much of your building area (square feet) is lit by the incandescent lighting you just described?
[NUMERIC OPEN END, 0-999999]
[ASK IF MA6a = 1]
MA11. What are the approximate hours of operation for the **fluorescent tube lighting system** that you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "99" if unknown)*
_____ b. Days per week *(Enter "99" if unknown)*
_____ c. Weeks per year *(Enter "99" if unknown)*

[MAYBE ADD A QUESTION d. TO ALL OF THESE: "ARE THESE LIGHTS LEFT ON FOR ALL OR MOST OF THE NIGHT?]

[ASK IF MA6a = 1]

NA14a. Is the **fluorescent tube lighting system** primarily in use during the daytime or nighttime?

1. Daytime
2. Nighttime
3. Used equally during the daytime and nighttime

[ASK IF MA6c = 1], ELSE MA13

MA12. What are the approximate hours of operation for the **high bay lighting system that** you just described? An estimate is fine.

_____ a. Hrs per day *(Enter "99" if unknown)*
_____ b. Days per week *(Enter "99" if unknown)*
_____ c. Weeks per year *(Enter "99" if unknown)*

[ASK IF MA6c = 1]

NA14b. Is the high bay lighting system primarily in use during the daytime or nighttime?

1. Daytime
2. Nighttime
3. Used equally during the daytime and nighttime

[ASK IF MA6c = 1]

NA14c. What is the height of the high bay lighting you just described?
[NUMERIC OPEN END, 0-9999] in feet

[ASK IF MA6d = 1]

MA13. What are the approximate hours of operation for the **incandescent lighting** that you changed? An estimate is fine.

_____ a, Hrs per day *(Enter "99" if unknown)*
_____ b. Days per week *(Enter "99" if unknown)*
_____ c. Weeks per year *(Enter "99" if unknown)*

[ASK IF MA6d = 1], ELSE MA14

NA14d. Is the **incandescent lighting** primarily in use during the daytime or nighttime?

1. Daytime
2. Nighttime
3. Used equally during the daytime and nighttime

[ASK IF MA1c=1, ELSE SKIP TO MA21]
MA14 You indicated that you installed lighting controls. What type of lighting controls did you install? [MULTIPLE RESPONSE]

1. Occupancy sensors
2. Dual technology occupancy sensors
3. Day-lighting controls (Photo-sensors)
4. Occupancy sensors and photo-sensor combination
5. Other
6. Don't Know

[ASK IF MA14=5]
MA14a. Please describe the lighting controls you installed at the facility(ies) your business occupies or manages. [OPEN END]

[ASK IF MA14=3 OR 4 ELSE MA16]
MA15. What type of control did you install? [MULTIPLE RESPONSE]
[RESPONSE WITH CODE 1 WAS REMOVED FOR WAVE2]

2. Continuous control (for top-lit space daylighting)
3. Continuous control (for side- lit space daylighting)
4. 1-step control (for top-lit space daylighting)
5. 2-step control (for top-lit space daylighting)
6. 2-step control (for side- lit space daylighting)
7. Don't Know

MA16. Approximately how many lighting controls did you install? An estimate is fine. [NUMERIC OPEN END]
Don't know

MA17. Approximately how many lighting fixtures are controlled by the new lighting controls? An estimate is fine. [NUMERIC OPEN END]
Don't know

[ASK IF (MA17=0 OR 9998) ELSE MA18]
NA15. Approximately how much of your building area (square feet) is lit by fixtures controlled by the new lighting controls you installed? An estimate is fine.
[NUMERIC OPEN END, 0-99999]

MA18. What is the wattage of the most common type of fixture controlled by the new lighting controls? An estimate is fine. [OPEN END]
Don't know

[ASK IF (MA18=0 OR 9998) ELSE MA19]
NA16. What is the most common light fixture type controlled by the lighting controls you installed?

1. Linear Flourescent Tube Lights
2. Exit Signs
3. High Bay Lighting
4. Incandescent Lighting

5. Other (specify)

MA19. What are the approximate hours of operation for the lighting system controlled by the new controls? An estimate is fine.

_____ a. Hrs per day *(Enter "99" if unknown)*
_____ b. Days per Week *(Enter "99" if unknown)*
_____ c. Weeks per year *(Enter "99" if unknown)*

MA20. What percentage of the time that the lighting system is operating is the space actually occupied? An estimate is fine.
[NUMERIC OPEN END]
Don't know

[ASK IF MA1e=1, ELSE SKIP TO MA22]
MA21. You indicated that you changed lighting repair and maintenance practices. Please describe the changes to the lighting system repair and maintenance practices have you made. [OPEN END]

[ASK IF MA1f=1, ELSE SKIP TO MA26a]
MA22. You indicated that you changed the operation of your lighting systems in some way. Which of the following changes did you make to the operations of the lighting equipment? Please select all that apply.

1. Changed number of hours the lighting equipment is in use
2. Changed the time of day I use my lighting equipment
3. Other

[ASK IF MA22=3], ELSE MA24A
MA23. Please describe the changes you made to the operations of the lighting equipment. [OPEN END]

MA24a. Approximately how many lighting fixtures are affected by this change? An estimate is fine.
[NUMERIC OPEN END]
Don't know

[ASK IF (MA24A=0 OR 9998) ELSE MA24B]
NA17. Approximately how much of your building area (square feet) is lit by fixtures affected by this change? An estimate is fine.
[NUMERIC OPEN END, 0-99999]

MA24b. What is the average wattage of the fixtures affected by this change? An estimate is fine.
[OPEN END]
Don't know

[ASK IF (MA24b=0 OR 9998) ELSE MA25]
NA18. What is the most common light fixture type affected by this change?

1. Linear Flourescent Tube Lights
2. Exit Signs
3. High Bay Lighting
4. Incandescent Lighting
5. Other (specify)

[SHOW TABLE IF MA22 = 1]
MA25. You indicated that you changed the number of hours the lighting equipment is used at your facility(ies). Please indicate the time of use before and after the change.

Changes to Lighting Equipment Hours of Use

Original Time of Use		Current Time of Use
(Numeric Open End)	Hours per day	(Numeric Open End)
(Numeric Open End)	Days per Week	(Numeric Open End)
(Numeric Open End)	Weeks per year	(Numeric Open End)

MA26a. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF MA26A=1 ELSE SKIP TO MA29]
MA26b. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MA26b=1 or 3]
MA27. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF MA26b=2 or 3]
MA28 Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MA26A=2 ELSE SKIP TO E01]
MA29. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]
Don't know

Residential End Use Customers

[ASK IF Respondent Type=EUCR, ELSE IF Respondent Type=EUCC SKIP TO EO1, ELSE SKIP TO TA1]
MB1. You indicated that you have applied the concepts taught in the course to save energy at your home. Have you made any of the following efforts to improve the energy efficiency of the lighting in your home? [Yes =1, No =2, Ask for each]

a. Replaced existing incandescent light bulbs with compact fluorescent lamps (CFLs)
b. Replaced existing hard wired light fixtures with compact fluorescent lamp fixtures
c. Reduced the number of hours you use the lights in your home

[ASK IF MB1a-c = 2, ELSE SKIP TO MB2A]
MB2 Please describe the changes you have made to save energy where you applied concepts taught in the course.

[ASK IF MB1a-c = 1, ELSE SKIP TO MB3]
MB2A. Please describe any additional lighting changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MB3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MB3=1, ELSE SKIP TO MB6]
MB4. Please describe the assistance you received? [OPEN END]

MB5. Did the course provide you information about utility programs in which you could participate?

1. Yes
2. No
3. Don't know

[ASK IF MB5=1]
MB5b. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program.

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MB3=1 SKIP TO X1]
[ASK IF MB1A-C=1 ELSE NB4]
NB1. What type of heating system do you have in your home? [MULTIPLE RESPONSE]

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. Other, specify
8. No heating system

NB2. What type of cooling system do you have in your home? (Select all that apply) [MULTIPLE RESPONSE]
1. Central AC
2. Room AC
3. No air conditioning

[ASK IF MB1a=1, ELSE SKIP TO MB9]
MB6. You indicated that you installed compact fluorescent lamps (CFLs) in your home. How many CFLs did you install? An estimate is fine.
_____[NUMERIC OPEN END]

MB7. What is the wattage of the most common type of CFL you installed in your home?

_____[OPEN END]

[ASK IF MB1b=1, ELSE SKIP TO MB13]
MB9. You indicated that you installed fixtures with compact fluorescent lamps (CFLs) in your home. How many fixtures did you install? An estimate is fine.
_____[NUMERIC OPEN END]

MB10. How many CFLs are installed in the most common type of fixture you installed in your home?
1. 1
2. 2
3. 3
4. 4
5. 5

00. Other, specify

MB11. What is the wattage of the CFL(s) installed in the fixtures you have been describing?

_____[OPEN END]

[ASK IF MB1c=1, ELSE SKIP TO NB4]
MB13. You indicated that you reduced the number of hours you use the lights in your home. How

many light fixtures were affected by this change?

_____[NUMERIC OPEN END]

MB14. What is the wattage of the most common type light fixture affected by this change?

_____[OPEN END]

NB3 Approximately how many hours per day do you use the light fixtures affected by this change?
A. Before change: _____ Hrs per day
B. After change: _____ Hrs per day

NB4. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
1. Yes
2. No

[ASK IF NB4=1 ELSE SKIP TO NB8]
NB5. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF NB5=1 or 3]
NB6. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF NB5=2 or 3]
NB7 Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF NB5=2 ELSE SKIP TO EO1]
NB8. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]
Don't know

12. MOTORS AND PUMPS

[ASK IF Respondent Type=EUCC OR EUCR, ELSE SKIP TO TA0]

MG1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the motors or pumps at your facility(ies)? [1=Yes, 2=No]

h. Replaced **existing** motor(s) with new more efficient units
i. Installed **new** energy efficient motor (s) that were not part of a replacement
j. Replaced **existing** pump (s)with new more efficient units
k. Installed **new** energy efficient pump (s) that were not part of a replacement
l. Installed speed or sizing controls on existing pumps or motors
m. Redesigned or replaced piping to improve flow
n. Changed motor or pump repair and maintenance practices
o. Implemented a demand reduction program involving pumps or motors

[ASK IF MG1a-h = 2 ELSE SKIP TO MG2A]

MG2. It seems we have not captured the changes you have made. Please describe the motors/pumps changes you have made to save energy where you applied concepts taught in the course.

[ASK IF MG1a-f=1, ELSE SKIP TO MG3]

MG2A. Please describe any additional changes you made to motors or pumps to save energy where you applied concepts taught in the course.

[OPEN END]

96. Did not make any other change

MG3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

3. Yes
4. No
5. Don't know

[ASK IF MG3=1, ELSE SKIP TO NG1]
MG4. In which program did you participate? [MULTIPLE RESPONSE]

7. Standard Performance Contract
8. Express Efficiency
9. Savings by Design
10. Multi-Family Rebate Program
11. Low Income Energy Efficiency
12. Premium Motors Rebate Program
13. A rebate program, but I don't know the name
14. Other, Specify
15. Don't know/refused

MG5. Did the course provide you information about the utility program in which you participated?

7. Yes
8. No
9. Don't know

[ASK IF MG5=1]
MG6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MG3=1 SKIP TO X1]
[ASK IF MG1a =1 OR MG1b=1 OR MG1c=1 OR MG1d=1 OR MG1e=1 OR MG1f=1 OR MG1g=1 or MG1h = 1 ELSE SKIP MG57)]
NG1. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END 1-100]

NG2. Approximately, how many square feet is your facility(ies)? If the changes were made to multiple facilities please provide an average. (An estimate is fine)
[NUMERIC OPEN END, 1-999999]

[SKIP to NG3, IF NG1<2]
NG2b. For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility** and that has been impacted the most by the energy saving changes you implemented.

NG3. Please enter the zip code of the facility.
[NUMERIC OPEN END, 1-99999]

NG4. How many years old is your facility?
000. Less than one year
[NUMERIC OPEN END, 1-999]

NG5. What type of building did the work occur in?

17. Assembly (e.g., an assembly hall or a church)
18. Primary or Secondary Education (SKIP TO NG5a)
19. University or College (SKIP TO NG5b)
20. Grocery
21. Health/Medical (e.g., a hospital or nursing home) (SKIP TO NG5c)
22. Lodging (e.g. hotel, motel) (SKIP TO NG5d)
23. Manufacturing (e.g., Bio Tech, light industrial manufacturing) (SKIP TO NG5e)
24. Small office building (less than 25,000 square feet)
25. Large office building (greater than or equal to 25,000 square feet)
26. Restaurant (SKIP TO NG5f)
27. Retail (SKIP TO NG5g)
28. Storage [SKIP TO NG5h]
29. Refrigerated Warehouse
30. Single Family Residential [SKIP TO NG5i]
31. Multi-family Residential
32. Agricultural
33. Other (Specify:_____)

[SKIP TO NG6]

NG5a. Was this a primary school, a secondary school or a relocatable classroom?

4. Primary
5. Secondary
6. Relocatable classroom

[SKIP TO NG6]

NG5b. Was this a university or college?

3. University
4. College

[SKIP TO NG6]

NG5c. Was this a hospital or nursing home?

4. Hospital
5. Nursing home
6. Other, specify

[SKIP TO NG6]

NG5d. Was this a hotel or motel?

3. Hotel
4. Motel

[SKIP TO NG6]

NG5e. Was this a biotech or light manufacturing type of facility?

4. Biotech
5. Light Manufacturing

[SKIP TO NG6]

NG5f. Was this a fast food or sit down restaurant?

3. Fast Food

4. Sit Down

[SKIP TO NG6]

NG5g. Was this a large multistory, large single-story, or small retail building?

4. Large multi-story
5. Large single-story
6. Small

[SKIP TO NG6]

NG5h. Was this a conditioned or unconditioned storage space?

3. Conditioned
4. Unconditioned

[SKIP TO NG6]

NG5i. Was this a stationary or mobile single family home?

3. Stationary or immobile home
4. Mobile home

NG6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NG7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NG8. What type of heating system do you have in your facility? [Multiple Response]

5. Natural Gas
6. Electric
7. Oil
8. Bottled Gas
9. Wood
10. Solar
11. No heating system
12. Other, specify

NG9. What type of cooling system do you have in your facility? (Select all that apply)

4. Central AC
5. Room AC
6. No air conditioning

NG10. What are the operating hours of this facility? Please provide an average per day

d. Weekdays [NUMERIC OPEN END, 0-24] DK
e. Saturdays [NUMERIC OPEN END, 0-24] DK
f. Sundays [NUMERIC OPEN END, 0-24]

MG7. The next section asks about the technical details of the changes you made to the motor and pump equipment at your facility. Do you personally have knowledge of these details?

3. Yes
4. No [SKIP TO MG57]

Section 1 Replace Motor (s)

[If MG1 a= 1 ask, otherwise skip to MG15A]
MG8. You indicated that you replaced some motors at your facility. In the grid below, please provide the requested information about your old and new motors. If you replaced multiple types of motors, please focus on a single type. You will have the opportunity to describe the other motors in subsequent questions.
Please enter "9999" if an answer is unknown

CHANGES TO MOTORS

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor	Not applicable	[OPEN END]

MG9. Did you replace another type of motor?

1. Yes
2. No

[ASK MG10 If MG9 =1 ELSE SKIP TO MG15A]

MG10. In the grid below, please provide the requested information about the second type of old and new motors.
Please enter "9999" if an answer is unknown

CHANGES TO MOTORS

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor	Not applicable	[OPEN END]

MG11. Did you replace another type of motor?

1. Yes
2. No

[ASK MG12 If MG11 =1 ELSE SKIP TO MG15A]

MG12. In the grid below, please provide the requested information about the third type of old and new motors.

Please enter "9999" if an answer is unknown

CHANGES TO MOTORS

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor	Not applicable	[OPEN END]

MG13. Did you replace another type of motor?

1. Yes
2. No

[ASK MG14 If MG13 =1 ELSE SKIP TO MG15A]

MG14. In the grid below, please provide the requested information about the fourth type of old and new motors.

Please enter "9999" if an answer is unknown

CHANGES TO MOTORS

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor	Not applicable	[OPEN END]

Section 2 Install Motor (s)

[ASK MG15 If MG1b = 1 ELSE SKIP TO MG22A]

MG15. You indicated that you installed some new motors at your facility. In the grid below, please provide the requested information about your new motors. If you installed multiple types of motors, please focus on a single type. You will have the opportunity to describe the other motors in subsequent questions.

Please enter "9999" if an answer is unknown

	New motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Application of Motor	[OPEN END]

MG16. Did you install another type of motor?

1. Yes
2. No

[ASK MG17 If MG16 =1 ELSE SKIP TO MG22A]
MG17. In the grid below, please provide the requested information about the second type of new motors.
Please enter "9999" if an answer is unknown

	New Motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Application of Motor	[OPEN END]

MG18. Did you install another type of motor?

1. Yes
2. No

[ASK MG19 If MG18 =1 ELSE SKIP TO MG22A]
MG19. In the grid below, please provide the requested information about the third type of new motors.
Please enter "9999" if an answer is unknown

	New Motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Application of Motor	[OPEN END]

MG20. Did you install another type of motor?

1. Yes
2. No

[ASK MG21 If MG20 =1 ELSE SKIP TO MG22A]
MG21. In the grid below, please provide the requested information about the fourth type new motors.
Please enter "9999" if an answer is unknown

	New Motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Application of Motor	[OPEN END]

Section 3 Replace Pump (s)
[ASK MG22 If MG1 c= 1 ELSE SKIP TO MG29A]
MG22. You indicated that you replaced some pumps at your facility. In the grid below, please provide the requested information about your old and new pumps. If you replaced multiple types of pumps, please focus on a single type. You will have the opportunity to describe the other pumps in subsequent questions.
Please enter "9999" if an answer is unknown

CHANGES TO PUMPS

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump	Not applicable	[OPEN END]

MG23. Did you replace another type of pump?

1. Yes
2. No

[ASK MG24 If MG23 =1 ELSE SKIP TO MG29A]
MG24. In the grid below, please provide the requested information about the second type of old and new pumps.
Please enter "9999" if an answer is unknown

CHANGES TO PUMPS

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump	Not applicable	[OPEN END]

MG25. Did you replace another type of pump?

1. Yes
2. No

[ASK MG26 If MG25 =1 ELSE SKIP TO MG29A]
MG26. In the grid below, please provide the requested information about the third type of old and new pumps.
Please enter "9999" if an answer is unknown

CHANGES TO PUMPS

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

MG27. Did you replace another type of pump?

1. Yes
2. No

[ASK MG28 If MG27 =1 ELSE SKIP TO MG29A]
MG28. In the grid below, please provide the requested information about the fourth type of old and new pumps.
Please enter "9999" if an answer is unknown

CHANGES TO PUMPS

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]

Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

Section 4 Install Pump (s)

[ASK MG29 If MG1d = 1 ELSE SKIP TO MG36]

MG29. You indicated that you installed some new pumps at your facility. In the grid below, please provide the requested information about your new pumps. If you installed multiple types of pumps, please focus on a single type. You will have the opportunity to describe the other pumps in subsequent questions.

Please enter "9999" if an answer is unknown

	New pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Application of Pump	[OPEN END]

MG30. Did you install another type of pump?

1. Yes
2. No

[ASK MG31 If MG30 =1 ELSE SKIP TO MG36]

MG31. In the grid below, please provide the requested information about the second type of new pumps.

Please enter "9999" if an answer is unknown

	New Pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Application of Pump	[OPEN END]

MG32. Did you install another type of pump?

1. Yes
2. No

[ASK MG33 If MG32 =1 ELSE SKIP TO MG36]
MG33. In the grid below, please provide the requested information about the third type of new pumps.
Please enter "9999" if an answer is unknown

	New Pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Application of Pump	[OPEN END]

MG34. Did you install another type of pump?

1. Yes
2. No

[ASK MG35 If MG34 =1 ELSE SKIP TO MG36]
MG35. In the grid below, please provide the requested information about the fourth type new pumps.
Please enter "9999" if an answer is unknown

	New Pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Application of Pump	[OPEN END]

Section 5 Install Speed or Pump Controls

[ASK MG36 IF MG1e= 1, ELSE SKIP to MG51A]

MG36. You indicated that you installed speed or sizing controls on existing pumps or motors. Exactly what type of action did you take? Please select all that apply. [MULTIPLE RESPONSE]

a. Installed an adjustable speed drive (ASD) or variable speed drive (VSD) on an existing motor
b. Installed a variable frequency drive (VFD) on an existing motor
c. Changed the sizing or flow rate of a pump
d. Redesigned a motor or pump system
e. Other (Specify)

[ASK IF MG36a= 1 or MG36b=1, ELSE SKIP to MG44]

MG37. You indicated that you installed a drive(s) to an existing motor at your facility. Please describe the details of the changes you made to the motor control.
[OPEN END]

MG38. In the grid below, please provide the requested information about the motors on which you installed the drive(s).
Please enter "9999" if an answer is unknown

	Motors
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
Average age of motors on which drive was installed	[NUMERIC OPEN END]
Application of Motor	[NUMERIC OPEN END]

[ASK IF MG36c = 1, ELSE SKIP TO MG51]
MG44. You indicated that you changed the sizing or flow rate of a pump(s) at your facility. Please describe the sizing or flow rate changes you made.
[OPEN END]

MG45. In the grid below, please provide the requested information about the pumps on which you changed the sizing or flow rate.
Please enter "9999" if an answer is unknown

	Pumps
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
Application of Pumps	[OPEN END]

MG47. What was the average flow rate before and after you made these sizing or flow rate changes? Please give a percentage.
Before: [NUMERIC OPEN END] DK
After: [NUMERIC OPEN END] DK

[ASK IF MG36d = 1 ELSE SKIP TO MG51A]
MG51. Please describe in detail the system redesign changes that you made.
[OPEN END]

Section 6: Redesigned or Replaced Piping
[ASK IF MG1f =1 ELSE SKIP TO MG52A]
MG51a. You indicated that you redesigned or replaced piping to improve flow. Please describe in detail the changes you made.
[OPEN END]

Section 7: Changed Motor Repair and Maintenance Practices

[ASK IF MG1g =1 ELSE SKIP TO MG54]

MG52. There are many possible changes to maintenance you may have made. Below we have a list of what those changes could be. Please select "Yes" under "Perform?" column for the changes in repair and maintenance practices that you made as a result of the information you learned in the course.

Please leave row blank if not applicable.

Maintenance Practice	Perform? [1=YES 2=NO 3= DK]	Describe the application that these motors/pumps are being used for?	On how many motors/pumps is the action being taken?	Average Horsepower of motors affected	Average efficiency (%) of motors affected	About how many hours per week are these motor/pumps in operation
1. Energy efficient rewinds		[OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END, 0.00 to 99.99]	[NUMERIC OPEN END, 0-100]	[NUMERIC OPEN END]
2. Maintain voltage level		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
3. Increase power factor		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
4. Eliminate distribution system losses		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
5. Install energy efficient belts		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
6. Check for shaft alignment or damage		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
7. Other motor maintenance		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
8. Other pump maintenance		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]

[ASK IF MG1h=1 ELSE SKIP TO MG57]

MG54. What actions did you take to reduce the motor/pump-related demand? Please select all that apply.

[MULTIPLE RESPONSE]

a. Turned off HVAC equipment during peak conditions,
b. Turned over process equipment during peak conditions,
c. Stop pump or motor during peak period
d. Installed off-peak cooling or heating storage system
e. Other (specify)

MG55. Please describe the specific demand reduction changes you made.

[OPEN END]

MG56. What is the approximate reduction in peak demand KW that you realized from these changes?
[NUMERIC OPEN END]
Don't know

MG57. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?
3. Yes
4. No

[ASK IF MG57=1 ELSE SKIP TO MG61]
MG58. Did you estimate electricity savings, dollar savings, or both?
1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MG58=1 or 3]
MG59. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MG58=2 or 3]
MG60. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MG57=2 ELSE SKIP TO EOR1]
MG61. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

13. POOLS

[ASK IF Respondent Type=EUCC, ELSE SKIP TO MP1]
MO1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, please describe the changes you have made to the pool(s) at your facility(ies) in order to save energy. [OPEN END]

MO2. In the course of making the changes you described, did you or any party to this project receive technical or financial assistance through a utility program?

1. Yes
2. No
3. Don't know

[ASK IF MO2=1, ELSE SKIP TO MO6]
MO3. In which program did you participate?

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. A rebate program, but I don't know the name
7. Other, Specify
8. Don't know

MO4. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No

8.Don't know

[ASK IF MO4=1]
MO5. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MO2=1 SKIP TO DC1]

MO6. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MO6=1 ELSE SKIP TO MO10]
MO7. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MO7=1 or 3]
MO8. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF MO7=2 or 3]
MO9. Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MO6=2 ELSE SKIP TO EO1]
MO10. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine. [OPEN END]

Residential End Use Customers

[ASK IF Respondent Type=EUCR, ELSE IF Respondent Type=EUCC SKIP TO EO1, ELSE SKIP TO TA1]
MP1. You indicated that you have applied the concepts taught in the course to save energy at your home. Please describe the changes you have made to the pool at your home in order to save energy. [OPEN END]

MP2. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program?
1. Yes
2. No
8. Don't know

[ASK IF MP2=1, ELSE SKIP TO NP6]
MP3. In which program did you participate?
1. Express Efficiency
2. Multi-Family Rebate Program
3. Low Income Energy Efficiency
4. A rebate program, but I don't know the name
5. Other, Specify
8. Don't know

MP4. Did the course provide you information about the utility program in which you participated?
1. Yes
2. No
8. Don't know

[ASK IF MP4=1]
NP5. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MP2=1 SKIP TO X1]

NP6. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MO6=1 ELSE SKIP TO MO10]
NP7. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MO7=1 or 3]
NP8. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF MO7=2 or 3]
NP9. Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

ASK IF MO6=2 ELSE SKIP TO EO1]
NP10. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine. [OPEN END]

14. REBATES

[INSERT AFTER TC6 IF EUCC, AFTER TR4 IF EUCR, AFTER TA0 IF MA]

MU1. As a result of what you learned in the course, did you or any party to a project receive technical or financial assistance through a utility program?

1. Yes
2. No
3. (Don't know)
4. (Refused) (PHONE ONLY)

[ASK IF MU1=1, ELSE IF RESPONDENT TYPE=EUCC SKIP TO DC1 ELSE SKIP TO X1 IF RESPONDENT TYPE=EUCR ELSE SKIP TO D1 IF RESPONDENT TYPE=MA]

MU2. In which programs did you participate? [MULTIPLE RESPONSE]

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. Other, Specify

98. (Don't know)
99 (Refused) (PHONE ONLY)

NU1. Was this program(s) sponsored by one of the investor owned utilities? Investor owned utilities are San Diego Gas and Electric, Southern California Edison, Southern California Gas, and Pacific Gas and Electric.

1. Yes
2. No
3. Don't know
4. (Refused) (PHONE ONLY)

[ASK IF MU1=1]

MU3. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1 2 3 4 5 6 7 8 9

Not At All Influential Very Influential (DK) (Refused) (Refused is for PHONE ONLY)

[GO TO DEMOGRAPHICS]

15. RENEWABLES

Renewables Commercial End Use Customers

[ASK IF Respondent Type=EUCC, ELSE SKIP TO MJ1]

MI1. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one California's investor owned utilities, have you taken any of the following actions at your facility(ies)? [Yes =1, No =2, Ask for each]

a. Installed a **new** solar energy system (e.g. hot water heating, radiant floor heating, pool heating, photovoltaic)
b. Made changes to the design or operation of an **existing** solar energy system

[ASK IF MI1a AND MI1b = 2]

MI2. Please describe the changes you have made to save energy where you applied concepts about renewables taught in the course.

MI3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program?

4. Yes
5. No
6. Don't know

[ASK IF QMI3=1, ELSE SKIP TO MI7]

MI4. In which programs did you participate? [MULTIPLE RESPONSE]

1. California Solar Initiative
2. New Solar Homes Partnership
3. Other, Specify
4. Don't know/refused

MI5. Did the course provide you information about the utility program in which you participated?

3. Yes
4. No
5. Don't know

[ASK IF MI5=1]

MI6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[SKIP TO DC1 IF MI3=1]

[ASK IF MI1a OR MI1b=1 ELSE SKIP TO MI70]

MI7. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END, ANSWER MUST BE GREATER THAN ZERO, 1-9999]

MI10. Approximately, how many square feet is your facility(ies)? If the changes were made to multiple facilities please provide an average. (An estimate is fine)

___ [NUMERIC OPEN END, 1-999,999]

[SAY/INSERT ONLY IF MI7 > 1]
For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility and** that has been impacted the most by the energy saving changes you implemented.

MI8. Please enter the zip code of this facility. [0-99999]

MI9. In which building sector, would you classify your facility?
1. Industrial
2. School (SKIP TO MI8c)
3. Aquaculture
4. Car Wash
5. Laundry
6. Lodging (e.g. hotel, motel) (SKIP TO MI8f)
7. Large office building (Equal or greater than 25,000 square feet)
8. Small office building (Less than 25,000 square feet)
9. Restaurant – sit down
10. Restaurant – fast food
11. Single Family Residential (SKIP TO MI8k)
12. Multi-family Residential

MI8c. Was this a primary school, a secondary school or a relocatable classroom?
1. Primary
2. Secondary
3. Relocatable classroom

[SKIP TO MI11]

MI8f. Was this a hotel or motel?
1. Hotel
2. Motel

[SKIP TO MI11]

MI8k. Was this a stationary or mobile single family home?
1. Stationary or immobile home
2. Mobile home

MI11. How many years old is your facility? An estimate is fine.
000. Less than one year.
___ [NUMERIC OPEN END, 0-999]

NI6. How many floors are above ground in your facility?
[NUMERIC OPEN END, 0-999]

NI7. How many floors are below ground in your facility?
[NUMERIC OPEN END, 0-999]

NI8. What type of heating system do you have in your facility? (Select all that apply) [MULTIPLE RESPONSE]

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. Solar
7. No heating system
8. Other, specify

NI9. What type of cooling system do you have in your facility? (Please select all that apply)

1. Central AC
2. Room AC
3. No air conditioning

[ASK IF NI9=1,2]

1. NI9B. Is you AC system a compression, an evaporative, or a heat pump system?
   Compression
2. Evaporative
3. Heatpump

NI10. What are the operating hours of this facility? Please provide an average hours per day for each.

a. Weekdays [NUMERIC OPEN END, 0-24] (Enter 99 if unknown)
b. Saturdays [NUMERIC OPEN END, 0-24] (Enter 99 if unknown)
c. Sundays [NUMERIC OPEN END, 0-24] (Enter 99 if unknown)

[ELSE ASK IF MI1a=1, ELSE SKIP TO MI52]
MI12. You indicated that you installed a new solar energy system. What type of system is it? Is it a… [Multiple Response]

1. A solar hot water heating system
2. A solar hot water system for a radiant floor system
3. A solar pool heating system
4. A photovoltaic system to generate electricity
5. Other (specify)

[ASK IF MI12 = 1, ELSE SKIP TO NI13]
NI11. We'd like some information about your new **solar hot water heating system**.
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

NI12. What type of water heating was replaced with the solar water heater?[MULTIPLE RESPONSE]
1. Natural Gas
2. Electric
3. Oil
4. Other, specify

MI49. What percent of your facility's water heating needs are met by the solar water heating system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

[ASK IF MI12 = 2, ELSE SKIP TO NI16]
NI13. We'd like some information about your new **solar radiant floor heating system**.
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

NI14. What type of space heating was replaced with the radiant floor heating? (Please select all that apply)
1. Natural Gas
2. Electric
3. Oil
4. Other, specify

MI50. What percent of your facility'sheating needs are met by your solar system?
_____[NUMERIC OPEN END, 0-100] (Don't know)

NI15. Are the floors heated by electricity, heated water, or heated air?
1. Electricity
2. Heated water
3. Heated air
4. Other, specify

[ASK IF MI12 = 3, ELSE SKIP TO MI51]
NI16. We'd like some information about your new **solar pool heating system**
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

MI42. Is the pool, where you installed a solar pool heating system, an indoor or outdoor pool?
1. Indoor
2. Outdoor

MI43. What is the main use of the pool?
1. Residential
2. Commercial
3. Competition
4. Don't know

MI44. What is the square footage of the pool? (An estimate is fine)
_____[NUMERIC OPEN END, 1-99999]

MI45. What is the temperature of the pool in Fahrenheit?
_____[NUMERIC OPEN END, 0-99]

MI46. How many months of the year is the pool heated?
_____[NUMERIC OPEN END, 0-12]

MI47. Do you typically use a pool cover when the pool is not in use?
1. Yes
2. No
3. Don't know

MI48. What percent of your pool's heat is supplied by the solar water heating system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

[ASK IF MI12 = 4, ELSE SKIP TO MI52]
MI51. We'd like some information about your new **photovoltaic system**.
What percent of your facility's electric load is met by the PV system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

[ASK IF MI1b=1, ELSE SKIP TO MI70]
MI52. You indicated that you made some changes to an existing solar energy system. What type of system did you change? Is it a…[MULTIPLE RESPONSE]
1. A solar hot water heating system
2. A solar radiant floor heating system
3. A solar pool heating system
4. A photovoltaic system to generate electricity
5. Other

[ASK IF MI52=1, ELSE SKIP TO NI21]
NI17. You indicated that you made changes to your **solar water heating system** When you made changes to your existing system, did you add more solar collectors to the system?
1. Yes
2. No

[ASK IF NI17=1 ELSE NI20]
NI18. What was the total square footage of the solar collectors:
a. Before: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)
b. After: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)

NI19. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NI17=2 ELSE MI65]
NI20. Please describe the changes you made to your system.

MI65. What percent of your facility's water heating needs are met by the solar water heating

system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

[ASK IF MI52=2, ELSE SKIP TO NI26]
NI21. You indicated that you made changes to your **solar radiant floor heating system** When you made changes to your existing system, did you add more solar collectors to the system?

1. Yes
2. No

[ASK IF NI21=1 ELSE NI24]
NI22. What was the total square footage of the solar collectors:

a. Before: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)
b. After: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)

NI23. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NI21=2 ELSE MI66]
NI24. Please describe the changes you made to your system.

MI66. What percent of your facility's heating needs are met by your solar system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100](Don't know)

NI25. Are the floors heated by electricity, heated water, or heated air?

1. Electricity
2. Heated water
3. Heated air
4. Other, specify

[ASK IF MI52=3, ELSE SKIP TO MI67]
NI26. You indicated that you made changes to your **solar pool heating system** When you made changes to your existing system, did you add more solar collectors to the system?

1. Yes
2. No

[ASK IF NI26=1 ELSE NI29]
NI27. What was the total square footage of the solar collectors:

a. Before: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)
b. After: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)

NI28. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NI26=2 ELSE MI58]
NI29. Please describe the changes you made to your system.

MI58. Is the pool, where you made changes to an existing solar pool heating system, an indoor or outdoor pool?

1. Indoor
2. Outdoor

MI59. What is the main use of the pool?

1. Residential
2. Commercial
3. Competition
4. Don't know

MI60. What is the square footage of the pool?
_____[NUMERIC OPEN END, 1-99999]

MI61. What is the temperature of the pool in Fahrenheit?
_____[NUMERIC OPEN END, 0-99]

MI62. How many months of the year is the pool heated?
_____[NUMERIC OPEN END, 0-12]

MI63. Do you typically use a pool cover when the pool is not in use?

1. Yes
2. No
3. Don't know

MI64. What percent of your pool's heat is supplied by the solar water heating system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

[ASK IF MI52=4, ELSE SKIP TO MI70]
MI67. You indicated that you made changes to to your **photovoltaic system** What percent of your facility's electric load is met by the PV system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100] (Don't know)

MI70. Have you performed an engineering or post-installation analysis to determine how much electricity, natural gas, or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MI70=1, ELSE SKIP TO MI75]
MI71. Did you estimate electricity savings, therm savings, dollar savings, or both energy and dollar savings? [MULTIPLE RESPONSE]

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated therms saved

[ASK IF MI71=1]
MI72. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF MI71=2]
MI73. Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MI71=3]
MI74. Approximately how many therms did you save annually? [Numeric open end, limit 1,000,000 therms]

[ASK IF MI70=2, ELSE SKIP TO EO1]
MI75. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, therms, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]

[ASK IF MI7 > 1]
MI76. How do the energy savings at this facility compare with the energy savings at your other facilities?

1. Significantly fewer energy savings from the other facilities
2. Somewhat fewer energy savings from the other facilities
3. About the same energy savings from the other facilities
4. Somewhat more energy savings from the other facilities
5. Significantly more energy savings from the other facilities

Residential End Use Customers
MJ1. You indicated that you have applied the concepts taught in the course to save energy at your home. Have you taken any of the following actions at your home? [Yes =1, No =2, Ask for each]

a. Installed a **new** solar energy system (e.g. hot water heating, radiant floor heating, pool heating, photovoltaic)
b. Made changes to the design or operation of an **existing** solar energy system

[ASK IF MJ1a AND MJ1b = 2]
MJ2. Please describe the changes you have made to save energy where you applied concepts about renewables taught in the course.

MJ3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program?

1. Yes
2. No
3. Don't know

[ASK IF QMJ3=1, ELSE SKIP TO MJ8]
MJ4. In which program did you participate? [MULTIPLE RESPONSE]

1. California Solar Initiative
2. New Solar Homes Partnership
3. Other, Specify
4. Don't know/refused

MJ5. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
3. Don't know

[ASK IF MJ5=1]
MJ6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[SKIP TO DC1 IF MJ3=1]
[ASK IF MJ1a OR MJ1b=1, ELSE SKIP TO MJ70]
MJ8. Please enter the zip code of your home.

MJ10. How many square feet is your home? An estimate is fine.

___ [NUMERIC OPEN END]

MJ11. How many years old is your home? An estimate is fine.

___ [NUMERIC OPEN END]

NJ8. What type of heating system do you have in your home? (Select all that apply) [MULTIPLE RESPONSE]

1. Natural Gas
2. Electric
3. Oil
4. Bottled Gas
5. Wood
6. No heating system
7. Other, specify

NJ9. What type of cooling system do you have in your home?

1. Central AC
2. Room AC
3. No air conditioning

[ELSE ASK IF MJ1a=1, ELSE SKIP TO MJ52]
MJ12. You indicated that you installed a new solar energy system. What type of system is it? Is it a…[MULTIPLE RESPONSE]

1. A solar hot water heating system
2. A solar hot water system for a radiant floor system
3. A solar pool heating system
4. A photovoltaic system to generate electricity
5. Other (specify)

[ASK IF MJ12 = 01, ELSE SKIP TO NJ13]
NJ11. We'd like some information about your new **solar hot water heating system**.
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

NJ12. What type of water heating was replaced with the solar water heater?
1. Natural Gas
2. Electric
3. Oil
4. Other, specify

[ASK IF MJ12=1 ELSE SKIP TO MJ50]
MJ49. What percent of your home's water heating needs are met by the solar water heating system? (An estimate is fine)
_____[NUMERIC OPEN END, 0-100](Don't know)

[ASK IF MJ12 = 02, ELSE SKIP TO NJ16]
NJ13. We'd like some information about your new **solar radiant floor heating system**.
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

NJ14. What type of space heating was replaced with the radiant floor heating? (Please select all that apply)
1. Natural Gas
2. Electric
3. Oil
4. Other, specify

MJ50. What percent of your home's heating needs is met by your solar system?
_____[NUMERIC OPEN END](Don't know)

NJ15. Are the floors heated by electricity, heated water, or heated air?
1. Electricity
2. Heated water
3. Heated air
4. Other, specify

[ASK IF MJ12 = 03, ELSE SKIP TO MJ51]
NJ16. We'd like some information about your new **solar pool heating system**
What is the total square footage of solar collectors? (An estimate is fine) [Numeric open end] (Don't know)

MJ42. Is the pool, where you installed a solar pool heating system, an indoor or outdoor pool?
1. Indoor
2. Outdoor

MJ44. What is the square footage of the pool?
_____[NUMERIC OPEN END]

MJ45. What is the temperature of the pool in Fahrenheit?
_____[NUMERIC OPEN END]

MJ46. How many months of the year is the pool heated?
_____[NUMERIC OPEN END]
MJ47. Do you typically use a pool cover when the pool is not in use?
1. Yes
2. No
3. Don't know

MJ48. What percent of your pool's heat is supplied by the solar water heating system?
_____[NUMERIC OPEN END] (Don't know)
[ASK IF MJ12=4, ELSE SKIP TO MJ52]
MJ51. What percent of your home's electric load is met by the PV system?
_____[NUMERIC OPEN END] (Don't know)

[ASK IF MJ1b=1, ELSE SKIP TO MJ70]
MJ52. You indicated that you made some changes to an existing solar energy system. What type of system did you change? Is it a…[MULTIPLE RESPONSE]
1. A solar hot water heating system
2. A solar radiant floor heating system
3. A solar pool heating system
4. A photovoltaic system to generate electricity
5. Other

[ASK IF MJ52= 01, ELSE SKIP TO NJ21]
NJ17. You indicated that you made changes to your **solar water heating system** When you made changes to your existing system, did you add more solar collectors to the system?
1. Yes
2. No

[ASK IF NJ17=1 ELSE NJ20]
NJ18. What was the total square footage of the solar collectors:
a. Before: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)
b. After: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)

NJ19. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NJ17=2 ELSE MJ65]
NJ20. Please describe the changes you made to your system.

[ASK IF MJ52=1, ELSE SKIP TO MJ66]
MJ65. What percent of your home's water heating needs is met by the solar water heating system?
_____[NUMERIC OPEN END]

[ASK IF MJ52=02, ELSE SKIP TO NJ26]
NJ21. You indicated that you made changes to your **solar radiant floor heating system** When you made changes to your existing system, did you add more solar collectors to the system?
1. Yes
2. No

[ASK IF NJ21=1 ELSE NJ24]
NJ22. What was the total square footage of the solar collectors:
a. Before: [NUMERIC OPEN END 0-9999]
b. After: [NUMERIC OPEN END 0-9999]

NJ23. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NJ21=2 ELSE MJ66]
NJ24. Please describe the changes you made to your system.

MJ66. What percent of your home's radiant floor heating needs is met by your solar system?
_____[NUMERIC OPEN END] (Don't know)

NJ25. Are the floors heated by electricity, heated water, or heated air?
1. Electricity
2. Heated water
3. Heated air
4. Other, specify

[ASK IF MJ52=3, ELSE SKIP TO MJ67]
NJ26. You indicated that you made changes to your **solar pool heating system** When you made changes to your existing system, did you add more solar collectors to the system?
1. Yes
2. No

[ASK IF NJ26=1 ELSE NJ29]
NJ27. What was the total square footage of the solar collectors:
a. Before: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)
b. After: [NUMERIC OPEN END 0-9999] (Enter 9999 if unknown)

NJ28. Please describe any other changes you made to the system.
(No other changes)

[ASK IF NJ26=2 ELSE MJ58]
NJ29. Please describe the changes you made to your system.

MJ58. Is the pool, where you made changes to an existing solar pool heating system, an indoor or outdoor pool?

1. Indoor
2. Outdoor

MJ60. What is the square footage of the pool?
_____[NUMERIC OPEN END]

MJ61. What is the temperature of the pool in Fahrenheit?
_____[NUMERIC OPEN END]

MJ62. How many months of the year is the pool heated?
_____[NUMERIC OPEN END]

MJ63. Do you typically use a pool cover when the pool is not in use?

1. Yes
2. No
3. Don't know

MJ64. What percent of your pool's heat is supplied by the solar water heating system?
_____[NUMERIC OPEN END] (Don't know)

[ASK IF MJ52=4, ELSE SKIP TO MJ70]
MJ67. What percent of your home's electric load is met by the PV system?
_____[NUMERIC OPEN END] (Don't know)

MJ70. Have you performed an engineering or post-installation analysis to determine how much electricity, natural gas, or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MJ70=1, ELSE SKIP TO MJ75]
MJ71. Did you estimate electricity savings, therm savings, dollar savings, or both energy and dollar savings? [MULTIPLE RESPONSE]

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated therms saved

[ASK IF MJ71=1]
MJ72. Approximately how many dollars did you save annually? [NUMERIC OPEN END, limit $1,000,000]

[ASK IF MJ71=2]
MJ73. Approximately how many kWh did you save annually? [NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MJ71=3]
MJ74. Approximately how many therms did you save annually? [Numeric open end, limit 1,000,000 therms]

[ASK IF MJ70=2, ELSE SKIP TO ER1]
MJ75. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, therms, or as a percentage reduction in your energy costs. An approximation or your best guess is fine. [OPEN END]

16. TITLE 24

Recently, you attended a course/activity, [COURSE NAME], at [CENTER]. In an effort to assess the impact of such courses and to determine what actions you may have taken as a result of participating in the course, we ask that you complete this brief survey. The survey should take no more than 15 minutes for you to complete.

SCREENERS

S1. Do you recall attending the [COURSE NAME] course on [COURSE DATE] at [CENTER]?

1. Yes
2. No [terminate]

S2. Are you employed by or do you have any service contracts with any public utility or Energy Centers?

1. Yes [terminate]
2. No

ATTENDEE CHARACTERIZATION

AC1. Which of the following **best** describes your motivation for taking the [COURSE NAME] course?

1. to learn something that I could apply at my home
2. to learn something that I could apply at my work

[ASK IF AC1=2, ELSE SKIP TO K1]

AC1A. Do you work for a city or state government agency?

1. Yes
2. No

[ASK IF QAC1=2]

AC2. Which of the following **best** describes where you intend to apply the information you learned in the course?

1. at the facility(ies) my [business] [government agency] occupies
2. at the facility(ies) my [business] [government agency] manages (e.g. property managers)
3. in facilities occupied or managed by customers to whom I provide services (e.g. architects, engineering firms, contractors, code inspectors)
4. other, specify

AC3. How would you best describe your job title?

1. Builder or developer
2. Code official
3. Home Energy Rater Specialist (HERS)
4. Architect, Designer
5. Engineer,
6. Building Modeler
7. Subcontractor/trade (carpenters, roofers, electricians, HVAC, plumbers, painters)
8. (Other. Specify)

[ASK AC4 IF AC3=1]

AC4. What is your principal focus as a builder or developer?

1. Design
2. Purchasing
3. Land acquisition and development
4. Plan development and code approval
5. Finance and fund acquisition
6. Construction
7. Subcontractor/trade (carpenters, roofers, electricians, HVAC, plumbers, painters)
8. Warranty
9. Supplier
10. Sales
11. (Other. Specify)

RESPONDENT TYPE DEFINED
[Classify QAC1=1 as EUCR [residential end-use customer]]
[Classify QAC1=2 and QAC2=1, 2 as EUCC (commercial end-use customer)]
[Classify QAC1=2 and QAC2=3, 4, 00 and AC3 = 1,4,5,6, 7 or 8 as MA[market actor]]
[Classify QAC1=2 and QAC2=3, 00 and AC3 = 2 as CO[code official]]
[Classify QAC1=2 and QAC2=3, 00 and AC3 = 3 as HR[HERS Rater]]

NOTE
CO=1 AND HR=1 SHOULD SKIP OVER QK5D

NOTE CODE OFFICIALS GET SPECIAL CORE QUESTIONS BELOW:
[ASK CO=1]

For the next four questions, please use a scale that ranges from 1 to 7 where one is "not at all" and 7 is "a great deal".

A4a. How much did the course cause you to think differently about how you enforce Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

A4b. How much did the course cause you to want to make changes in how you enforce Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

A4c. How much did the course increase your awareness of methods for enforcing Title 24 code?

1	2	3	4	5	6	7
Not At All						A great deal

For the next question please rate your agreement with this statement.

A4d. The course was a good way to explain the importance of enforcing Title 24 code.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

ACTIONS TAKEN – CO

[ASK IF Respondent Type = CO, ELSE SKIP TO HR1]

CO1. Based on a scale of 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate the degree to which you agree with the following statement: As a result of taking the [COURSE] course, I am better able to enforce energy code requirements in the buildings I inspect.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

CO2. Since your participation in the [COURSE], have you changed or enhanced the way you inspect buildings where you applied the concepts taught in the course?

1. Yes
2. No

ASK IF CO2= 1, ELSE SKIP TO CO12]
We'd like to learn more about the changes you have made to your services using what you learned in the course. If the change described is not something that you do in your work, please answer "does not apply".

CO13a. Since you took the course, do you enforce energy efficient codes that you were **unfamiliar** with prior to the course more frequently?

1. Yes
2. No
3. Does not apply

[ASK IF CO13A=1 ELSE SKIP TO CO14A]
CO13b. Please describe the energy efficient codes you enforce more frequently. Please provide as much detail as possible.

CO14a. Still thinking about the changes you made to your services since you took the course…do you use **new methods** to enforce codes that you were familiar with prior to taking the course?

1. Yes
2. No
3. Does not apply

[ASK IF CO14A=1 ELSE SKIP TO CO15A]
CO14b. Please describe the new methods you use. Please provide as much detail as possible.

CO15a. Still thinking about the changes you made to your services since you took the course…do you conduct a more thorough examination than prior to taking the course?

1. Yes
2. No
3. Does not apply

[ASK IF CO15A=1 ELSE SKIP TO CO4]
CO15b. Please describe the changes you have made to how you conduct examinations. Please provide as much detail as possible.

[SKIP TO CO5 IF CO13a =1 OR CO14a=1 OR CO15a =1]
CO4. We may not have accurately captured your changes in our questions above. Please describe the specific changes you made to your building inspection practices where you applied the concepts taught in the course?

[ASK IF CO3a=1 OR CO3b=1 OR CO3c =1 ELSE SKIP TO CO6]
CO5. Please describe any additional changes you made to your building inspection practices where you applied the concepts taught in the course.

CO6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to make the changes you just described?

1	2	3	4	5	6	7
Not At All Influential					Very Influential	

CO7. Since your attendance at the [COURSE] course, have the changes or enhancements you just told me about become standard practice for you?

1. Yes
2. No

CO8. Approximately how many times over this past year (i.e., 2008) have you implemented this change or enhancement in the buildings that you inspect? [NUMERIC OPEN END]

CO9. In your opinion, have the changes or enhancements you have made to the inspections you perform resulted in measurable energy savings in the facilities you have inspected?

1. Yes
2. No
3. Don't know

[ASK IF CO9=1 ELSE SKIP TO CO11]
CO10. In your opinion, how would you characterize the energy savings realized in the buildings you inspect as a result of your participation in the course? In general would you say these are ….

1. Significant energy savings,
2. Moderate energy savings, or
3. Measurable but insignificant energy savings

CO11. Do you catch code violations more frequently as a result of taking the course?

1. Yes
2. No

[ASK IF CO2=2]
CO12. What is the principal reason you have not incorporated any of the concepts taught in the course to enhance the inspection you perform?

1. I was already incorporating the actions in my work.
2. The course did not give me sufficient information to implement the concepts.
3. There have been no appropriate applications to apply the concepts.
4. Other, Specify

ACTIONS TAKEN – HR

[ASK IF Respondent Type = HR, ELSE SKIP TO D1]
HR1. Based on a scale of 1 to 7 where 1 is strongly disagree and 7 is strongly agree, please indicate the degree to which you agree with the following statement: As a result of taking the [COURSE] course, I am more able to accurately rate buildings as to their energy efficiency..

1	2	3	4	5	6	7
Strongly disagree					Strongly agree	

HR2. Since your participation in the [COURSE], have you changed or enhanced the way you rate buildings?

1. Yes
2. No

[ASK IF HR2= 1, ELSE SKIP TO HR9]
HR3. Please describe the changes or enhancements you made to the way you rate buildings. Please provide as much detail as possible [OPEN END]

HR4. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to make the changes you just described?

1	2	3	4	5	6	7
Not At All Influential					Very Influential	

HR5. Since your attendance at the [COURSE] course, have the changes or enhancements you just told me about become standard practice for you?

1. Yes
2. No

HR6. Approximately how many times over this past year (i.e., 2008) have you implemented this change or enhancement to the service you provide to your clients?
[NUMERIC OPEN END]

HR7. In your opinion, have the changes or enhancements you have made to the inspections you perform resulted in measurable energy savings in the facilities you have inspected?

1. Yes
2. No [SKIP TO D1]
3. Don't know [SKIP TO D1]

HR8. In your opinion, how would you characterize the energy savings realized in the buildings you inspect as a result of your participation in the course? In general would you say these are ….

1. Significant energy savings,
2. Moderate energy savings, or
3. Measurable but insignificant energy savings

[ASK IF HR2 = 2]
HR9. What is the principal reason you have not incorporated any of the concepts taught in the course to enhance the rating service you provide?

1. I was already incorporating the actions in my work.
2. The course did not give me sufficient information to implement the concepts.
3. There have been no appropriate applications to apply the concepts.
4. Other, Specify

IMPACT MODULE SECTION for EUCC and EUCR
[ASK IF Respondent Type=EUCC OR EUCR, ELSE SKIP TO TA0]
MT1. You indicated that you have applied the concepts taught in the course to save energy at your facility. Thinking just about those facilities that are served by one of California's investor owned utilities, in what area(s) did you make changes?
[multiple response]

1. Lighting
2. HVAC
3. Building Envelope/Windows/Cool Roofs
4. Pumps and Motors
5. Solar water or solar building heating

00. Other (specify)

[SKIP IF ONLY CHOOSE ONE OF 1-5 IN MT1 OR ONLY MT1=00]
[ONLY INCLUDE END USES CHOSEN IN MT1]
MT2. You indicated that you made changes across a number of areas. Which one would you say resulted in the most energy savings?

1. Lighting
2. HVAC
3. Building Envelope/Windows/Cool Roofs
4. Pumps and Motors
5. Solar water or solar building heating

MT3. Please describe any additional areas that you made changes in order to save energy where you applied concepts taught in the course.
[OPEN END]
98. Did not make any other change

[SKIP TO LIGHTING IF MT1 ONLY 1 OR MT2=1; HVAC IF MT1 ONLY 2 OR MT2=2; ETC.]
ENERGY SAVINGS Qs FOR EUCC "OTHER" ACTIONS
MT4. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

1. Yes
2. No

[ASK IF MT4=1 ELSE SKIP TO MT8]
MT5. Did you estimate electricity savings, dollar savings, or both?

1. I have calculated dollars saved
2. I have calculated kWh saved
3. I have calculated both dollars and kWh saved

[ASK IF MT5=1 or 3]
MT6. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MT5=2 or 3]
MT7. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MT4=2 ELSE SKIP TO EO1]
MT8. Please provide a rough estimate of the annual energy savings in dollars or kilowatt hours.
[OPEN END]
Don't know

17. WATER MANAGEMENT

[ASK IF Respondent Type=EUCC,or EUCR]
MY1a. You indicated that you have applied the concepts taught in the course to save energy at your facility(ies). Thinking just about those facilities that are served by one of California's investor owned utilities, have you made any of the following changes to the motors or pumps at your facility(ies)? [1=Yes, 2=No]

a. Made changes to pumps and motors at your facilities
b. Made energy saving changes to the water supply processes that did not involve motors or pumps
c. Made energy saving changes to the waste treatment processes that did not involve motors or pumps
d. Implemented a demand reduction program

[ASK IF MY1aa-ad = 2 ELSE SKIP TO MY2A]
MY2. It seems we have not captured the changes you have made. Please describe the changes you have made to save energy where you applied concepts taught in the course.

[ASK IF MY1aa-ad=1, ELSE SKIP TO MY3]
MY2A. Please describe any additional changes you made to save energy where you applied concepts taught in the course.
[OPEN END]
96. Did not make any other change

MY3. In the course of making the changes you described above, did you or any party to this project receive technical or financial assistance through a utility program other than the course?

1. Yes
2. No
3. Don't know

[ASK IF MY3=1, ELSE SKIP TO MY7]
MY4. In which program did you participate?

1. Standard Performance Contract
2. Express Efficiency
3. Savings by Design
4. Multi-Family Rebate Program
5. Low Income Energy Efficiency
6. Premium Motors Rebate Program
7. A rebate program, but I don't know the name
7. Other, Specify
8. Don't know

MY5. Did the course provide you information about the utility program in which you participated?

1. Yes
2. No
3. Don't know

[ASK IF MY5=1]

MY6. Using a scale of 1 to 7 where 1 means not at all influential and 7 means very influential, how much influence did the information provided in the course have in your decision to participate in the utility program?

1	2	3	4	5	6	7
Not At All Influential						Very Influential

[IF MY3=1 SKIP TO DC1]
NY1. In how many facilities did you implement these changes? If you only made changes to one facility please enter 1. [NUMERIC OPEN END, ANSWER MUST BE GREATER THAN ZERO, 1-9999]

NY2. Approximately, how many square feet is your facility? If the changes were made to multiple facilities please provide an average.
[NUMERIC OPEN END, 1-99999]

[SKIP to NY3, IF NY1<2]
NY2b. For the next set of questions, please think **only** about **one** facility **that is served by a California investor owned utility** and that has been impacted the most by the energy saving changes you implemented.

NY3. Please enter the zip code of the facility.
[NUMERIC OPEN END, 1-999999]

NY4. How many years old is your facility?
000. Less than one year
[NUMERIC OPEN END, 1-999]

NY5. Does your facility include water treatment, waste treatment, or both?
a. Water treatment only
b. Waste treatment only
c. Both water and waste treatment
d. Neither (specify)

MY7. The next section asks about the technical details of the changes you made to the water and waste treatment equipment at your facility. Do you personally have knowledge of these details?
1. Yes
2. No [SKIP TO MY61]

[ASK IF MY1AA = 1, ELSE SKIP TO MY54]
MY1. What specific changes did you make to the pumps and motors… [Yes=1 No=2]
a. Replaced **existing** motor(s) with new more efficient units
b. Installed **new** energy efficient motor (s) that were not part of a replacement
c. Replaced **existing** pump (s)with new more efficient units
d. Installed **new** energy efficient pump (s) that were not part of a replacement
e. Installed speed or sizing controls on existing pumps or motors
f. Redesigned or replaced piping to improve flow
g. Changed motor or pump repair and maintenance practices

Section 1 Replace Motor (s)

[If MY1a= 1 ask, otherwise skip to MY15A]

MY8. You indicated that you replaced some motors at your facility. In the grid below, please provide the requested information about your old and new motors. If you replaced multiple types of motors, please focus on a single type. You will have the opportunity to describe the other motors in subsequent questions. Please enter '9999' if an answer is unknown.

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor	Not Applicable	[OPEN END]

MY9. Did you replace another type of motor?

1. Yes
2. No

[ASK MY10 If MY9 =1 ELSE SKIP TO MY15A]

MY10. In the grid below, please provide the requested information about the second type of old and new motors. Please enter '9999' if an answer is unknown.

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor		[OPEN END]

MY11. Did you replace another type of motor?

1. Yes
2. No

[ASK MY12 If MY11 =1 ELSE SKIP TO MY15A]

MY12. In the grid below, please provide the requested information about the third type of old and new motors. Please enter '9999' if an answer is unknown.

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]

Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor		[OPEN END]

MY13. Did you replace another type of motor?

1. Yes
2. No

[ASK MY14 If MY13 =1 ELSE SKIP TO MY15A]

MY14. In the grid below, please provide the requested information about the fourth type of old and new motors. Please enter '9999' if an answer is unknown.

	Old Motor(s)	New Motor(s)
Number of Motors	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Motor	[NUMERIC OPEN END]	Not applicable
Application of motor		[OPEN END]

Section 2 Install Motor (s)

[ASK If MY1b = 1 ELSE SKIP TO MY22A]

MY15. You indicated that you installed some new motors at your facility. In the grid below, please provide the requested information about your new motors. If you installed multiple types of motors, please focus on a single type. You will have the opportunity to describe the other motors in subsequent questions. Please enter '9999' if an answer is unknown.

	New motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Motor Application	[OPEN END]

MY16. Did you install another type of motor?

1. Yes
2. No

[ASK MY17 If MY16 =1 ELSE SKIP TO MY22A]

MY17. In the grid below, please provide the requested information about the second type of new motors. Please enter '9999' if an answer is unknown.

	New Motor

Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Motor Application	[OPEN END]

MY18. Did you install another type of motor?
1. Yes
2. No

[ASK MY19 If MY18 =1 ELSE SKIP TO MY22A]
MY19. In the grid below, please provide the requested information about the third type of new motors. Please enter '9999' if an answer is unknown.

	New Motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Motor Application	[OPEN END]

MY20. Did you install another type of motor?
1. Yes
2. No

[ASK MY21 If MY20 =1 ELSE SKIP TO MY22A]
MY21. In the grid below, please provide the requested information about the fourth type new motors. Please enter '9999' if an answer is unknown.

	New Motor
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Motor	[NUMERIC OPEN END]
Motor Application	[OPEN END]

Section 3 Replace Pump (s)
[ASK If MY1c= 1 ELSE SKIP TO MY29A]
MY22. You indicated that you replaced some pumps at your facility. In the grid below, please provide the requested information about your old and new pumps. If you replaced multiple types of pumps, please focus on a single type. You will have the opportunity to describe the other pumps in subsequent questions. Please enter '9999' if an answer is unknown.

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]

Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

MY23. Did you replace another type of pump?
1. Yes
2. No

[ASK MY24 If MY23 =1 ELSE SKIP TO MY29A]
MY24. In the grid below, please provide the requested information about the second type of old and new pumps. Please enter '9999' if an answer is unknown.

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

MY25. Did you replace another type of pump?
1. Yes
2. No

[ASK MY26 If MY25 =1 ELSE SKIP TO MY29A]
MY26. In the grid below, please provide the requested information about the third type of old and new pumps. Please enter '9999' if an answer is unknown.

	Old Pump(s)	New Pump(s)
Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

MY27. Did you replace another type of pump?
1. Yes
2. No

[ASK MY28 If MY27 =1 ELSE SKIP TO MY29A]
MY28. In the grid below, please provide the requested information about the fourth type of old and new pumps. Please enter '9999' if an answer is unknown.

	Old Pump(s)	New Pump(s)

Number of Pumps	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]	[NUMERIC OPEN END]
Average Age of Old Pump	[NUMERIC OPEN END]	Not applicable
Application of pump		[OPEN END]

Section 4 Install Pump (s)

[ASK If MY1d = 1 ELSE SKIP TO MY36]

MY29. You indicated that you installed some new pumps at your facility. In the grid below, please provide the requested information about your new pumps. If you installed multiple types of pumps, please focus on a single type. You will have the opportunity to describe the other pumps in subsequent questions. Please enter '9999' if an answer is unknown.

	New pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Pump Application	[OPEN END]

MY30. Did you install another type of pump?

1. Yes
2. No

[ASK MY31 If MY30 =1 ELSE SKIP TO MY36]

MY31. In the grid below, please provide the requested information about the second type of new pumps. Please enter '9999' if an answer is unknown.

	New Pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Pump Application	[OPEN END]

MY32. Did you install another type of pump?

1. Yes
2. No

[ASK MY33 If MY32 =1 ELSE SKIP TO MY36]

MY33. In the grid below, please provide the requested information about the third type of new pumps. Please enter '9999' if an answer is unknown.

	New Pump
Number of Pumps	[NUMERIC OPEN END]

Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Pump Application	[OPEN END]

MY34. Did you install another type of pump?

1. Yes
2. No

[ASK MY35 If MY34 =1 ELSE SKIP TO MY36]
MY35. In the grid below, please provide the requested information about the fourth type new pumps. Please enter '9999' if an answer is unknown.

	New Pump
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
How many rated as Energy Star or NEMA Premium Pump	[NUMERIC OPEN END]
Pump Application	[OPEN END]

Section 5 Install Speed or Pump Controls

[ASK IF MY1e= 1, ELSE SKIP to MY51A]
MY36. You indicated that you installed speed or sizing controls on existing pumps or motors. Exactly what type of action did you take? Please select all that apply. [MULTIPLE RESPONSE]

a. Installed an adjustable speed drive (ASD) or variable speed drive (VSD) on an existing motor
b. Installed a variable frequency drive (VFD) on an existing motor
c. Changed the sizing or flow rate of a pump
d. Redesigned a motor or pump system
e. Other (Specify)

[ASK IF MY36a= 1 or MY36b=1, ELSE SKIP to MY44]
MY37. You indicated that you installed a drive(s) to an existing motor at your facility. Please describe the details of the changes you made to the motor control.
[OPEN END]

MY38. In the grid below, please provide the requested information about the motors on which you installed the drive(s). Please enter '9999' if an answer is unknown.

	Motors
Number of Motors	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Average Efficiency (percentage)	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
Average age of motors on which drive was installed	[NUMERIC OPEN END]

Application of Motor	[NUMERIC OPEN END]

[ASK IF MY36c = 1, ELSE SKIP TO MY51]
MY44. You indicated that you changed the sizing or flow rate of a pump at your facility. Please describe the sizing or flow rate changes you made.
[OPEN END]

MY45. In the grid below, please provide the requested information about the pumps on which you changed the sizing or flow rate. Please enter '9999' if an answer is unknown.

	Pumps
Number of Pumps	[NUMERIC OPEN END]
Average Horsepower	[NUMERIC OPEN END]
Hours of Operation per Week	[NUMERIC OPEN END]
Application of Pumps	[OPEN END]

MY47. What was the average flow rate before and after you made these sizing or flow rate changes? Please give a percentage.
Before:[NUMERIC OPEN END]
After:
[NUMERIC OPEN END]

[ASK IF MY36d = 1 ELSE SKIP TO MY51A]
MY51. Please describe in detail the system redesign changes that you made?
[OPEN END]

Section 6: Redesigned or Replaced Piping

[ASK IF MY1f =1 ELSE SKIP TO MY52A]
MY51a. You indicated that you redesigned or replaced piping to improve flow. Please describe in detail the changes you made.
[OPEN END]

Section 7: Changed Motor Repair and Maintenance Practices

[ASK IF MY1g =1 ELSE SKIP TO MY54]
MY52. There are many possible changes to maintenance you may have made. Below we have a list of what those changes could be. Please select "Yes" under the "Perform?" column for the changes in repair and maintenance practices that you made as a result of the information you learned in the course.

Maintenance Practice	**Perform? [1=YES 2=NO]**	**Describe the application that these motors/pumps are being used for?**	**On how many motors/pumps is the action being taken?**	**Average Horsepower of motors affected**	**Average efficiency (%) of motors affected**	**About how many hours per week are these motor/pumps in operation**
1. Energy efficient rewinds		[OPEN END]	[NUMERIC OPEN END]	[NUMERIC OPEN END, 0.00 to 99.99]	[NUMERIC OPEN END, 0-100]	[NUMERIC OPEN END]

2. Maintain voltage level		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
3. Increase power factor		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
4. Eliminate distribution system losses		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
5. Install energy efficient belts		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
6. Check for shaft alignment or damage		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
7. Other motor maintenance		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]
8. Other pump maintenance		[OPEN END]	[NUMERIC OPEN END]			[NUMERIC OPEN END]

Section 8: Demand Response

[ASK IF MY1ad=1 ELSE SKIP TO MY57]
MY54. What actions did you take to reduce your facility's demand? Please select all that apply. [MULTIPLE RESPONSE]

a. Turned off HVAC equipment during peak conditions,
b. Turned over process equipment during peak conditions,
c. Stop pump or motor during peak period
d. Installed off-peak cooling or heating storage system
e. Pump water off-peak
f. Run other equipment off-peak
g. Other (specify)

[ASK IF MY54a=1 OR MY54b=1 OR MY54c=1 OR MY54d=1 OR MY54e=1]
MY55. Please describe the specific demand reduction changes you made.
[OPEN END]

MY56. What is the approximate reduction in peak demand KW that you realized from these changes?
[NUMERIC OPEN END]
Don't know

Section 9: Water Treatment

[ASK IF MY1ab=1, ELSE SKIP TO MY59]
MY57. Which of the following measures did you take to save energy from water treatment? Please select all that apply. [MULTIPLE RESPONSE]

a. Automate to monitor and control
b. Use computer aided design and operation
c. Implement system leak detection and repair
d. Implement pump discharge throttling
e. Manage well production and draw –down

f. Sequence well operation
g. Promote water conservation
h. Implement a sprinkler reduction program
i. Implement program for high volume users
j. Other

MY58. Please describe in detail what measures you took. If possible provide the amount of water saved, kWh saved, therms saved, and/or kW reduced.

Section 10. Wastewater Treatment

[ASK IF MY1ac=1, ELSE SKIP TO MY61]
MY59. Which of the following measures did you take to save energy from wastewater treatment? Please select all that apply. [MULTIPLE RESPONSE]

a. Reduce fresh water consumption
b. Optimize flow with controls
c. Stage treatment capacity
d. Manage for seasonal/tourist peaks
e. Implement flexible sequencing of tank use
f. Recover excess heat from wastewater
g. Cover basins for heat retention
h. Optimize aeration system
i. Implement fine-bubble aeration
j. Implement an aerobic digestion option
k. Implement a biosolids processing or mixing option
l. Implement a dissolved oxygen control option
m. Implement an ultraviolet disinfection option
n. Implement an effluent recycling option
o. Other, Specify

MY60. Please describe in detail what measures you took. If possible provide the amount of water saved, kWh saved, therms saved, and/or kW reduced.

MY61. Have you performed an engineering or post-installation analysis to determine how much electricity or dollars you save annually from the energy saving actions you have implemented?

3. Yes
4. No

[ASK IF MY61=1 ELSE SKIP TO MY65]
MY62. Did you estimate electricity savings, dollar savings, or both?

4. I have calculated dollars saved
5. I have calculated kWh saved
6. I have calculated both dollars and kWh saved

[ASK IF MY62=1 or 3]
MY63. Approximately how many dollars did you save annually?
[NUMERIC OPEN END, limit $1,000,000]

[ASK IF MY62=2 or 3]
MY64. Approximately how many kWh did you save annually?
[NUMERIC OPEN END, limit 1,000,000 kWh]

[ASK IF MY61=2 ELSE SKIP TO DC1]
MY65. Please provide a rough estimate of the annual energy savings in dollars, kilowatt hours, or as a percentage reduction in your energy costs. An approximation or your best guess is fine.
[OPEN END]
Don't know