

# Appendix 3

## HVAC Market Assessment

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# **SECTION 3A**

## Contractor In-Depth Interview Guide

# Contractor In-Depth Interview Guide

The main purpose of this interview guide is to gather feedback across a variety of topic areas related to the unitary AC market in New York State. We plan to complete up to twenty-five interviews with contractors.

Hello, my name is [NAME] and I am calling from Opinion Dynamics on behalf of NYSERDA. May I speak with [NAME]?

[WHEN SPEAKING TO CONTACT, OR IF MORE INFORMATION IS NEEDED]

NYSERDA is currently conducting research to learn more about the unitary AC systems used in commercial facilities in New York. As part of this research, we are reaching out to a few contractors like you to get your thoughts on the HVAC market in the state. Specifically, any information you provide will be used to set more accurate baselines for energy efficiency programs, to aid public and private innovation in the commercial marketplace, and to calculate energy savings and the potential of additional energy efficiency opportunities in New York over the next three and five years.

Do you have 20 to 30 minutes to speak with me? Your responses will be confidential, and we will not link you or your company with anything we report to NYSERDA. I do not work for NYSERDA. I am a third-party contractor hired to help NYSERDA conduct this research.

[OBTAIN PERMISSION TO RECORD CONVERSATION]

[READ IF NEEDED] All transcripts will remain in confidence with Opinion Dynamics although anonymous quotes may be used in reporting.

## DEFINITION OF UNITARY AC SYSTEMS

I'm going to ask you a number of questions about your business, customers, and the general market for unitary AC systems in New York state. Before we do that, I'd like to define what we mean by unitary in the context of this study. We define unitary systems as AC systems that include an evaporator/cooling coil, a compressor, and a condenser. They can be packaged or split systems. We are including VRF or VRV systems and excluding PTACs.

## INTRODUCTION

1. First, can you tell me your job title and major responsibilities? How long have you held this position?
2. Can you describe the services that your company offers?
3. What geographic region do you serve?
4. Who are your key customers for commercial unitary AC projects? [PROBE FOR BUILDERS, DEVELOPERS, SMALL/LARGE BUSINESS, INDUSTRIAL]
5. I would like to better-understand the typical process of a commercial unitary AC project. Could you briefly describe the key steps involved from the time you first meet with the client to the time that the project is completed?

- a. What is your company's level of involvement on the projects? Are there other market actors that play an integral role?
  - b. Are there differences depending on the type of customer, small or large commercial business?
6. What type/brand of unitary AC systems are you installing in your customer facilities?
- a. Where do you purchase your commercial unitary equipment from? [PROBE FOR DISTRIBUTOR/MANUFACTURER REPRESENTATIVE]
  - b. What percent of your equipment is purchased through these channels?

**CHARACTERIZATION OF COMMERCIAL UNITARY AC SYSTEMS MARKET IN NEW YORK STATE**

- 7. What is the share of commercial buildings in New York where unitary systems are currently installed? What is the share of buildings where unitary systems could be applicable? [PROBE FOR RTU VS SPLIT SYSTEMS AND DIFFERENCES BETWEEN SEGMENTS]
- 8. What is the total number of commercial unitary system distributors in New York?
- 9. Who are the top distributors/manufacturers of commercial unitary systems in New York, in terms of systems sold? What is their approximate market share and rank? [PROBE FOR SHARE/RANK BY SYSTEM TYPE]

Firm	NY Market Share	NY Rank
1.		
2.		
3.		
4.		
5.		

- 10. There are several different sources of demand for new commercial HVAC equipment, including new construction, planned replacement, emergency replacement, and early replacement for energy efficiency retrofit. What share of the market do you estimate each of those four markets represent in New York?
- 11. To your knowledge, does the competitive landscape of the commercial unitary system differ by regions of the state? [PROBE FOR DIFFERENCES BETWEEN NYC, LONG ISLAND, DOWNSTATE, AND UPSTATE]
- 12. What is your approximate annual revenue of commercial unitary system projects in New York? What is the breakout by RTU and split systems?

**ENERGY EFFICIENCY**

- 13. What are the main technologies used to improve the efficiency of unitary systems? [PROBE FOR ADVANCED RTU CONTROLS AND VARIABLE REFRIGERANT FLOW (VRF)]
  - a. What is the percentage of energy savings and demand reduction that can be expected from each of the technology type?
  - b. Which technology is the most cost-effective and why?
- 14. Do you recommend these technologies to your commercial unitary AC clients?
  - a. [IF YES], what percent of your unitary AC projects incorporate these technologies? [PROBE FOR SHARE OF EACH TECHNOLOGY IDENTIFIED]
  - b. [IF NO], what are some factors that motivated this decision?

15. Approximately what percentage of your 2015 commercial unitary system projects meet CEE Tier 1 and Tier 2 specifications? [\[IF NEEDED, PROVIDE CEE TIER 1 AND TIER 2 SPECIFICATIONS BELOW\]](#) To your knowledge, does this distribution reflect the existing commercial unitary systems in New York?

Equipment Size	CEE Tier 1	CEE Tier 2		
	Specification (If needed)	% Share	Specification (If needed)	% Share
<65,000 Btu/h	15 SEER		16 SEER	
≥65,000 Btu/h and <135,000 Btu/h	11.5 EER		12 EER	
≥135,000 Btu/h and <240,000 Btu/h	11.5 EER		12 EER	
≥240,000 Btu/h and <760,000 Btu/h	10.3 EER		10.6 EER	

16. Thinking about the segments you serve, what segments are typically good candidates for higher energy efficient systems? [\[PROBE FOR OFFICE BUILDINGS, SCHOOLS AND UNIVERSITY, HEALTH FACILITIES\]](#) Why are these good candidates?
17. Does your firm try to offer/sell higher energy efficient systems and technologies when possible and offer/sell standard efficiency equipment as a second option or is your strategy to focus on both higher and standard efficiency systems?
- a. Is this a common practice among other contractors?
18. From your perspective, what factors typically drive your customers to choose one commercial unitary AC system over another?
- a. What are the most important factors for customers when selecting commercial unitary AC systems? [\[PROBE FOR COST, EFFICIENCY, RELIABILITY, AND EASE OF MAINTENANCE\]](#)
- b. What are some factors that play an important role in influencing customers to choose more efficient products? [\[PROBE FOR INCENTIVES AND SAVING ENERGY/MONEY\]](#)
19. Is there a division in the distributor market among those who specialize in sales of higher-efficiency equipment and those who mostly sell baseline equipment?
20. In your opinion, what is the level of contractor awareness of energy efficient commercial unitary systems and technologies in New York State?
- a. How do contractors learn about new energy efficient technology?
- b. What are contractors' installation practices for commercial unitary AC systems? [\[PROBE FOR STANDARDS/REGULATIONS FOLLOWED BY COMMERCIAL UNITARY AC CONTRACTORS\]](#)
- c. What are the maintenance practices among contractors and customers? [\[PROBE FOR TYPES/FREQUENCY OF MAINTENANCE SERVICES\]](#)

## MARKET TRENDS

21. I am interested in your perspective on the various factors that might have influenced or are currently influencing the sales of energy efficient unitary AC systems for the commercial market in New York State.
- a. What role do federal standards and regulations play in new product development?
- b. What role do utility programs play? [\[INCLUDING MARKETING AND REBATES\]](#)
- c. What role does consumer preference play?
- d. How about competition within the commercial HVAC market and technological developments in general?
- e. Any other factors aside from the ones that I just mentioned? If so, what are they?

22. Has overall sales of higher efficiency unitary AC systems increased, decreased, or stayed the same over the past three years?
  - a. What do you think this trend can be attributed to?

## **MARKET BARRIERS**

Now I would like to understand the barriers that prevent the market adoption of higher efficiency commercial unitary systems.

23. What are the barriers to manufacturing unitary AC system overall?
  - a. What are the barriers to manufacturing higher energy efficient systems?
  - b. How may these barriers be overcome?
24. In your opinion, what are the market-level barriers to the installation of unitary AC systems overall?
  - a. What are the barriers to installing higher energy efficient systems?
  - b. How may these barriers be overcome?
25. In your opinion, what are the contractor-level barriers to the installation of unitary AC systems overall?
  - a. What are the barriers to installing higher energy efficient systems?
  - b. How may these barriers be overcome?
26. Thinking about the barriers that we just discussed, are any of them more or less specific to NY State?
27. Are there regulatory or other factors that either drive or inhibit the growth of the NY State market?

## **WRAP UP**

28. What other contractors that play an integral role in the HVAC market in New York State would you recommend that I speak to?
29. Do you have any other comments or suggestions for us?

Thank you very much for taking the time to assist us with our research. Your contribution is very important part of the process.



# **SECTION 3B**

Engineering/Architectural  
Firm In-Depth  
Interview Guide



# Engineering/Architectural Firm In-Depth Interview Guide

The main purpose of this interview guide is to gather feedback across a variety of topic areas related to the unitary AC market in New York State. We plan to complete up to ten interviews with engineering/architectural firms.

Hello, my name is [NAME] and I am calling from Opinion Dynamics on behalf of NYSERDA. May I speak with [NAME]?

[WHEN SPEAKING TO CONTACT, OR IF MORE INFORMATION IS NEEDED]

NYSERDA is currently conducting research to learn more about the unitary AC systems used in commercial facilities in New York. As part of this research, we are reaching out to a few engineering/architectural firms like you to get your thoughts on the HVAC market in the state. Specifically, any information you provide will be used to set more accurate baselines for energy efficiency programs, to aid public and private innovation in the commercial marketplace, and to calculate energy savings and the potential of additional energy efficiency opportunities in New York over the next three and five years.

Do you have 20 to 30 minutes to speak with me? Your responses will be confidential, and we will not link you or your company with anything we report to NYSERDA. I do not work for NYSERDA. I am a third-party contractor hired to help NYSERDA conduct this research.

[OBTAIN PERMISSION TO RECORD CONVERSATION]

[READ IF NEEDED] All transcripts will remain in confidence with Opinion Dynamics although anonymous quotes may be used in reporting.

## DEFINITION OF UNITARY AC SYSTEMS

I'm going to ask you a number of questions about your business, customers, and the general market for unitary AC systems in New York state. Before we do that, I'd like to define what we mean by unitary in the context of this study. We define unitary systems as AC systems that include an evaporator/cooling coil, a compressor, and a condenser. They can be packaged systems, split systems, and VRFs. We are excluding PTACs.

## INTRODUCTION

1. First, can you tell me your job title and major responsibilities? How long have you held this position?
2. Can you briefly describe the services that your company offers?
3. What geographic region do you serve?
4. Who are your key customers for commercial unitary AC projects? [PROBE FOR BUILDERS, DEVELOPERS, SMALL/LARGE BUSINESS, INDUSTRIAL]

5. I would like to better-understand the typical process of a commercial unitary AC project. Could you briefly describe the key steps involved from the time you first meet with the client to the time that the project is completed?
  - a. How do you spec HVAC units in spec and bid projects? Do you try to include energy efficient options? How often do you downgrade to standard units during the bid process and why?
  - b. What is your firm’s level of involvement on the projects? Are there other market actors that play an integral role?
  - c. Are there differences depending on the type of customer, small or large commercial business?

**CHARACTERIZATION OF COMMERCIAL UNITARY AC SYSTEMS MARKET IN NEW YORK STATE**

6. What is the share of commercial buildings in New York where unitary systems are currently installed? What is the share of buildings where unitary systems could be applicable? [\[PROBE FOR RTU VS SPLIT SYSTEMS AND DIFFERENCES BETWEEN SEGMENTS\]](#)
7. What is the total number of commercial unitary system distributors in New York?
8. Who are the top distributors/manufacturers of commercial unitary systems in New York, in terms of systems sold? What is their approximate market share or rank? [\[PROBE FOR SHARE/RANK BY SYSTEM TYPE\]](#)

Firm	NY Market Share	NY Rank
1.		
2.		
3.		
4.		
5.		

9. There are several different sources of demand for new commercial HVAC equipment, including new construction, planned replacement, emergency replacement, and early replacement for energy efficiency retrofit. What share of the market do you estimate each of those four markets represent in New York? What percent of your firm’s projects does each market represent?
  - a. Can you briefly describe the criteria for replacing/retrofitting unitary AC systems? In other words, under what circumstances would you recommend that a customer replace a system instead of retrofit?
10. To your knowledge, does the competitive landscape of the commercial unitary system differ by regions of the state? [\[PROBE FOR DIFFERENCES BETWEEN NYC, LONG ISLAND, DOWNSTATE, AND UPSTATE\]](#)
11. What is your approximate annual revenue of commercial unitary system projects in New York?

**ENERGY EFFICIENCY**

12. What are the main technologies used to improve the efficiency of unitary systems? [\[PROBE FOR ADVANCED RTU CONTROLS AND VARIABLE REFRIGERANT FLOW \(VRF\)\]](#)

- a. What is the percentage of energy savings and demand reduction that can be expected from each of the technology type?
  - b. Which technology is the most cost-effective and why?
13. Do you recommend these technologies to your commercial unitary system clients?
- a. [IF YES], what percent of your unitary AC projects incorporate these technologies? [PROBE FOR SHARE OF EACH TECHNOLOGY IDENTIFIED]
  - b. [IF NO], what are some factors that motivated this decision?
14. Approximately what percentage of your 2015 commercial unitary projects meet CEE Tier 1 and Tier 2 specifications? [IF NEEDED, PROVIDE CEE TIER 1 AND TIER 2 SPECIFICATIONS BELOW] To your knowledge, does this distribution reflect the existing commercial unitary systems in New York?

Equipment Size	CEE Tier 1	CEE Tier 2		
	Specification (If needed)	% Share	Specification (If needed)	% Share
<65,000 Btu/h	15 SEER		16 SEER	
≥65,000 Btu/h and <135,000 Btu/h	11.5 EER		12 EER	
≥135,000 Btu/h and <240,000 Btu/h	11.5 EER		12 EER	
≥240,000 Btu/h and <760,000 Btu/h	10.3 EER		10.6 EER	

15. Thinking about the segments you serve, what segments are typically good candidates for energy efficient systems? [PROBE FOR OFFICE BUILDINGS, SCHOOLS AND UNIVERSITY, HEALTH FACILITIES] Why are these good candidates?
16. Does your firm try to recommend higher energy efficient systems and technologies when possible and recommend standard efficiency equipment as a second option or is your strategy to focus on both higher and standard efficiency systems?
- a. Is this a common practice among other engineering/architectural firms?
17. From your perspective, what factors typically drive your customers to choose one commercial unitary AC system over another?
- a. What are the most important factors for customers when selecting commercial unitary AC systems? [PROBE FOR COST, EFFICIENCY, RELIABILITY, AND EASE OF MAINTENANCE]
  - b. What are some factors that play an important role in influencing customers to choose more efficient products? [PROBE FOR INCENTIVES AND SAVING ENERGY/MONEY]
18. In your opinion, what is the level of contractor awareness of energy efficient commercial unitary systems and technologies in New York State?
- a. What are contractors' installation practices for commercial unitary AC systems? [PROBE FOR STANDARDS/REGULATIONS FOLLOWED BY COMMERCIAL UNITARY AC CONTRACTORS]
  - b. What are the maintenance practices among contractors and customers? [PROBE FOR TYPES/FREQUENCY OF MAINTENANCE SERVICES]
19. Is there a division in the distributor market among those who specialize in sales of higher-efficiency equipment and those who mostly sell baseline equipment?

## MARKET TRENDS

20. I am interested in your perspective on the various factors that might have influenced or are currently influencing the sales of energy efficient unitary AC systems for the commercial market in New York State.
  - a. What role do federal standards and regulations play in new product development?
  - b. What role do utility programs play? [\[INCLUDING MARKETING AND REBATES\]](#)
  - c. What role does consumer preference play?
  - d. How about competition within the commercial HVAC market and technological developments in general?
  - e. Any other factors aside from the ones that I just mentioned? If so, what are they?
21. Has overall sales of higher efficiency unitary AC systems increased, decreased, or stayed the same over the past three years?
  - a. What do you think this trend can be attributed to?

## MARKET BARRIERS

Now I would like to understand the barriers that prevent the market adoption of higher efficiency commercial unitary systems.

22. What are the barriers to manufacturing unitary AC system overall?
  - a. What are the barriers to manufacturing higher energy efficient systems?
  - b. How may these barriers be overcome?
23. In your opinion, what are the market-level barriers to the installation of unitary AC systems overall?
  - a. What are the barriers to installing higher energy efficient systems?
  - b. How may these barriers be overcome?
24. In your opinion, what are the contractor-level barriers to the installation of unitary AC systems overall?
  - a. What are the barriers to installing higher energy efficient systems?
  - b. How may these barriers be overcome?
25. Thinking about the barriers that we just discussed, are any of them more or less specific to NY State?
26. Are there regulatory or other factors that either drive or inhibit the growth of the NY State market?

## WRAP UP

27. What other engineering/architectural firms that play an integral role in the HVAC market in New York State would you recommend that I speak to?
28. Do you have any other comments or suggestions for us?

[Thank you very much for taking the time to assist us with our research. Your contribution is very important part of the process.](#)



# **SECTION 3C**

HVAC Manufacturer/  
Distributor In-Depth  
Interview Guide

# HVAC Manufacturer/Distributor In-Depth Interview Guide

The main purpose of this interview guide is to gather feedback across a variety of topic areas related to the unitary AC market in New York State. We plan to complete up to ten interviews with a mix of vendors and manufacturers.

Hello, my name is [NAME] and I am calling from Opinion Dynamics on behalf of NYSERDA. May I speak with [NAME]?

[WHEN SPEAKING TO CONTACT, OR IF MORE INFORMATION IS NEEDED]

NYSERDA is currently conducting research to learn more about the unitary AC systems used in commercial facilities in New York. As part of this research, we are reaching out to a few manufacturers/distributors like you to get your thoughts on the HVAC market in the state. Specifically, any information you provide will be used to set more accurate baselines for energy efficiency programs, to aid public and private innovation in the commercial marketplace, and to calculate energy savings and the potential of additional energy efficiency opportunities in New York over the next three and five years.

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## DEFINITION OF UNITARY AC SYSTEMS

I'm going to ask you a number of questions about your business, customers, and the general market for unitary AC systems in New York state. Before we do that, I'd like to define what we mean by unitary in the context of this study. We define unitary systems as AC systems that include an evaporator/cooling coil, a compressor, and a condenser. They can be packaged systems, split systems, and VRVs. We are excluding PTACs.

## INTRODUCTION

1. First, can you tell me your job title and major responsibilities? How long have you held this position? Are you involved in determining the types of products are offered by your company in New York State? [LEVEL OF INFLUENCE]
2. Can you describe the commercial unitary AC systems your company offers? [PROBE FOR PACKAGED SYSTEMS, SPLIT SYSTEMS, CAPACITY OF SYSTEMS]
3. [ASK MANUFACTURER] What are your distribution channels for commercial unitary AC systems?
  - a. What percent of your sales or shipment go through these channels?

4. [ASK DISTRIBUTOR] Are you a manufacturer-owned or independent distributor?
  - a. What geographic region do you serve?
  - b. What type of customers do you sell to? [PROBE FOR ENGINEERING/ ARCHITECTURAL FIRMS, MECHANICAL CONTRACTORS, GENERAL CONTRACTORS]
  - c. Approximately how many percent of your sales does each customer type account for?
5. What are your stocking practices influenced by? [PROBE FOR UTILITY INCENTIVE PROGRAMS AND REGULATIONS]

**CHARACTERIZATION OF COMMERCIAL UNITARY AC SYSTEMS MARKET IN NEW YORK STATE**

6. What is the share of commercial buildings in New York where unitary systems are currently installed? What is the share of buildings where unitary systems could be applicable? [PROBE FOR RTU VS SPLIT SYSTEMS AND DIFFERENCES BETWEEN SEGMENTS]
7. What is the total number of commercial unitary system distributors in New York?
8. Who are the top distributors/manufacturers of commercial unitary systems in New York, in terms of systems sold? What is their approximate market share and rank? [PROBE FOR SHARE/RANK BY SYSTEM TYPE]

Firm	NY Market Share	NY Rank
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5.		

9. There are several different sources of demand for new commercial HVAC equipment, including new construction, planned replacement, emergency replacement, and early replacement for energy efficiency retrofit. What share of the market do you estimate each of those four markets represent in New York?
10. To your knowledge, does the competitive landscape of the commercial unitary system differ by regions of the state? [PROBE FOR DIFFERENCES BETWEEN NYC, LONG ISLAND, DOWNSTATE, AND UPSTATE]
11. What is your firm’s approximate share of commercial unitary systems market in New York, in terms of systems sold? [IF UNABLE TO PROVIDE MARKET SHARE, ASK APPROXIMATE RANKING OR TIER]
12. Approximately how many commercial unitary systems did your firm sell in New York in 2016? What was the breakout of these sales by RTU and split systems?
13. What is your approximate annual revenue of commercial unitary system sales in New York?

**ENERGY EFFICIENCY**

14. What are the main technologies used to improve the efficiency of unitary systems? [PROBE FOR ADVANCED RTU CONTROLS AND VARIABLE REFRIGERANT FLOW (VRF)]

15. Do you offer these technologies in your product line?
  - a. [\[IF YES\]](#), what percent of your unitary AC sales incorporate these technologies? [\[PROBE FOR SHARE OF EACH TECHNOLOGY IDENTIFIED\]](#)
16. Approximately what percentage of your 2016 commercial unitary systems meet CEE Tier 1 and Tier 2 specifications? [\[IF NEEDED, PROVIDE CEE TIER 1 AND TIER 2 SPECIFICATIONS BELOW\]](#) To your knowledge, does this distribution reflect the existing commercial unitary systems in New York?

Equipment Size	CEE Tier 1	CEE Tier 2		
	Specification (If needed)	% Share	Specification (If needed)	% Share
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17. Thinking about the segments you serve, what segments are typically good candidates for higher energy efficient systems? [\[PROBE FOR OFFICE BUILDINGS, SCHOOLS AND UNIVERSITY, HEALTH FACILITIES\]](#) Why are these good candidates?
18. Does your firm try to offer/sell higher energy efficient systems and technologies when possible and offer/sell standard efficiency equipment as a second option or is your strategy to focus on both higher and standard efficiency systems?
  - a. Is this a common practice among other manufacturers/distributors?
19. From your perspective, what factors typically drive your customers to choose one commercial unitary AC system over another?
  - a. What are the most important factors for customers when selecting commercial unitary AC systems? [\[PROBE FOR COST, EFFICIENCY, RELIABILITY, AND EASE OF MAINTENANCE\]](#)
  - b. What are some factors that play an important role in influencing customers to choose more efficient products? [\[PROBE FOR INCENTIVES AND SAVING ENERGY/MONEY\]](#)
20. In your opinion, what is the level of contractor awareness of energy efficient commercial unitary systems and technologies in New York State?
21. Is there a division in the distributor market among those who specialize in sales of higher-efficiency equipment and those who mostly sell baseline equipment?

## MARKET TRENDS

22. I am interested in your perspective on the various factors that might have influenced or are currently influencing the sales of energy efficient unitary AC systems for the commercial market in New York State.
  - a. What role do federal standards and regulations play in new product development?
  - b. What role do utility programs play? [\[INCLUDING MARKETING AND REBATES\]](#)
  - c. What role does consumer preference play?
  - d. How about competition within the commercial HVAC market and technological developments in general?
  - e. Any other factors aside from the ones that I just mentioned? If so, what are they?



23. Has overall sales of higher efficiency unitary AC systems increased, decreased, or stayed the same over the past three years?
  - a. What do you think this trend can be attributed to?

## **MARKET BARRIERS**

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27. Thinking about the barriers that we just discussed, are any of them more or less specific to NY State?
28. Are there regulatory or other factors that either drive or inhibit the growth of the NY State market?

## **WRAP UP**

29. What other manufacturers/distributors that play an integral role in the HVAC market in New York State would you recommend that I speak to?
30. Do you have any other comments or suggestions for us?

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