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CRES Initiative Market Test Assessment Final Report

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Executive Summary

The Northwest Energy Efficiency Alliance (NEEA) together with the Refrigerating Engineers & Technicians Association (RETA) developed a new energy efficiency certification for professionals operating industrial refrigeration systems: Certified Refrigeration Energy Specialist (CRES) credential. The CRES initiative seeks to transform industrial refrigeration operation practices by offering an American National Standards Institute (ANSI)-accredited operator certification in system energy performance, primarily focused on refrigeration systems. CRES is not yet ANSI-accredited, although the initiative is working toward that objective.

NEEA contracted with Energy 350 and Research Into Action (“Evaluation Team”) to help it determine the impacts of the CRES credential and its appeal among refrigeration professionals and their managers in the Northwest. To this end, the Evaluation Team conducted onsite visits, in-depth interviews, and surveys with key market actors: RETA staff, CRES certificants and candidates,¹ non-CRES certified refrigeration professionals, and vendors serving firms with industrial refrigeration systems.

The findings in this report are based on analysis of surveys with these market actors. Below we present a summary of the key findings, conclusions, and recommendations from this study.

Key Findings, Conclusions, and Recommendations

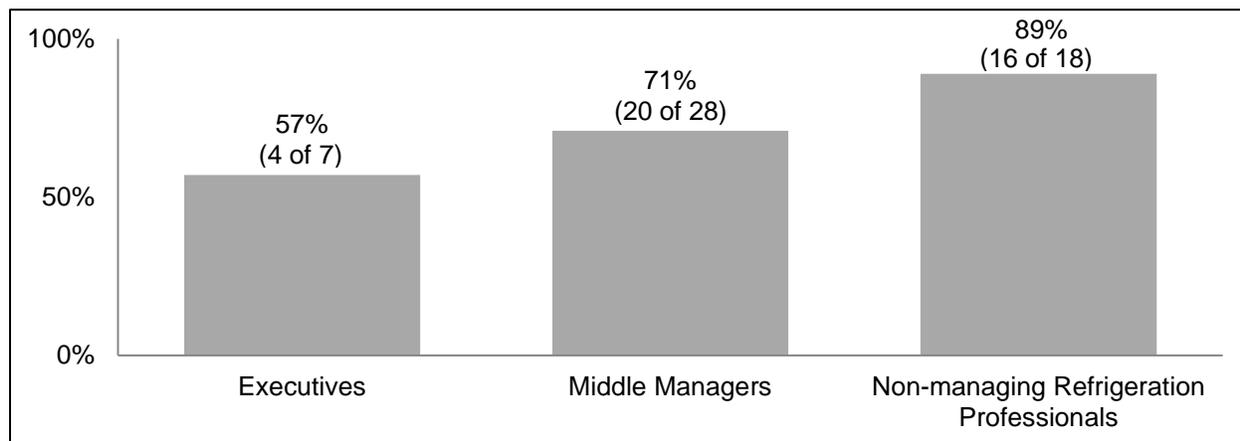
The findings and recommendations in this report are not based on a representative sample of the four state region – Idaho, Montana, Oregon and Washington. NEEA and its contractor did not conduct interviews in Idaho with the targeted audience for this report at the request of Idaho Power Company.

Conclusion: CRES awareness was moderate to high among interviewed refrigeration professionals and lowest among the executives included in the sample.² About three-quarters (40 of 53) of non-CRES certificants and half (5 of 10) of vendors were aware of CRES. Among non-CRES certificants, executives had the lowest awareness compared to middle managers and non-managing refrigeration professionals (Figure 1).

¹ CRES certificants are those who are CRES certified and candidates are those who are pursuing CRES but have not yet completed all certification requirements.

² Executives are refrigeration professionals who reported being owners or senior managers of the company.

Figure 1. Awareness of CRES by Type of Respondent (Non-CRES Survey Data)



Conclusion: Executives need more convincing of the value of CRES. Less than half (2 of 7) of executives, compared to more than half (17 of 28) of middle managers in the non-CRES certificant sample reported that CRES would influence their hiring decisions.³ Similarly, among CRES certificant or candidates, half (2 of 4) of executives and nearly all (4 of 5) middle managers noted CRES would influence their decision of who to hire.

Energy efficiency does not appear to be a top priority to executives. Fewer executives than middle managers in the non-CRES certificant sample reported their company values training staff to operate refrigeration systems efficiently. Both executives and middle managers were more likely than non-managing refrigeration professionals to describe meeting operational targets as more important than optimizing energy use.

Recommendation: Considering that executives are the key decision makers in authorizing staff training, CRES marketing should be optimized to; 1) increase awareness of CRES among executives; and 2) include effective “value proposition” messages around CRES. Messages linking energy efficiency with other considerations important to executives (for example, safety, and productivity) are likely to be effective. NEEA should explore whether these messages could be delivered to executives directly or through middle managers or non-managing refrigeration professionals.

Conclusion: Non-managing refrigeration professionals will need employer-provided support to pursue CRES. All 14 CRES certificant or candidates reported their company paid or will pay the costs associated with CRES and allows them to pursue CRES during work time. About one-quarter reported they would have pursued CRES if their company had not paid for the costs.

³ After briefly describing CRES to respondents who were previously unaware of it, both the non-CRES certificant survey and CRES certificant and candidate survey asked managers how influential would CRES be on their hiring decisions or recommendations regarding two similarly qualified candidates – one that was CRES certified and other that was not.

Analysis of the non-CRES certificant survey data revealed a similar pattern. Of 18 non-CRES certificants who were non-managing refrigeration professionals, four reported pursuing CRES. Of these four individuals, all noted their employer will pay the costs associated with certification. Of the other 14 non-managing refrigeration professionals who reported not pursuing CRES, more than half (57%) noted they would likely pursue CRES if their employer paid the costs associated with the certification. This percent increased only slightly, to 64%, when asked whether they would pursue CRES if their company paid the associated costs and allowed them to pursue CRES during work time.

Recommendation: Consider providing financial support for the CRES exam, preparatory classes, or training materials to encourage those without access to employer-provided support to pursue CRES.

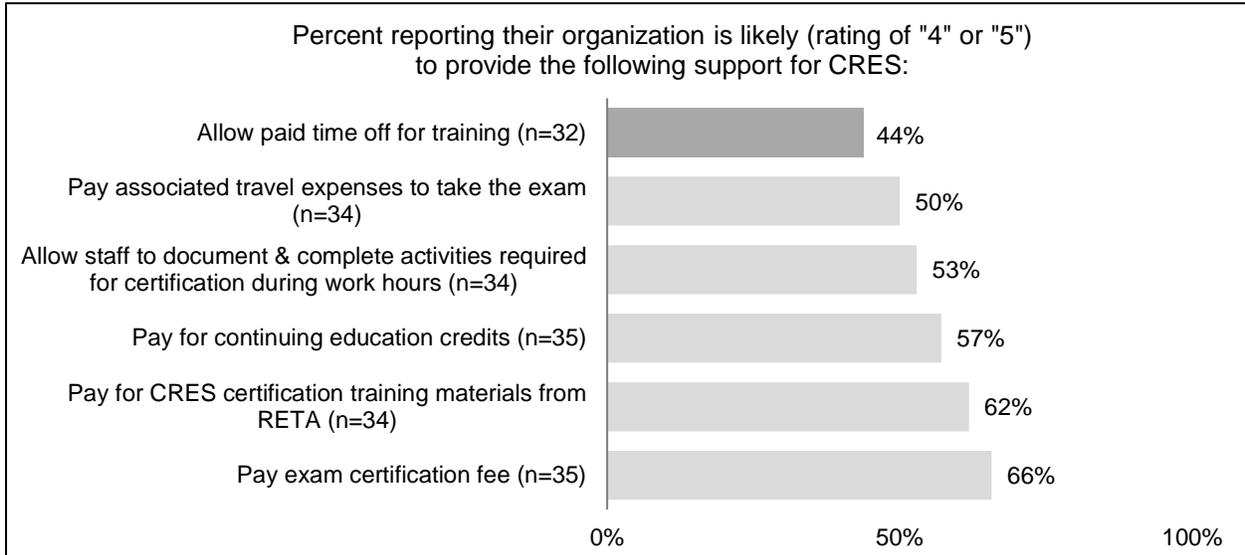
Conclusion: The current exam is a barrier to CRES adoption. Nearly one-third (3 of 10) of CRES candidates are no longer pursuing CRES; these individuals did not pass the exam. They reported concerns over ability to pass the exam without additional training. RETA staff noted that there is no handbook or materials to prepare for the exam outside of information from the preparatory classes. One RETA contact explained that a difficult test paired with limited study material will not hold back the “superstars,” but it will likely hold back other refrigeration professionals.

Recommendation: Continue and expand education efforts for refrigeration professionals to better prepare them to sit for the exam. Several CRES certificants and candidates provided suggestions on what would have helped them to prepare for or take the CRES exam:

- › More time when taking the exam
- › More online training or study materials, including a sample test, to prepare for the exam
- › More preparatory classes; have instructors cover all relevant topic areas in preparatory classes

Conclusion: Employers are reluctant to support elements of CRES that require refrigeration professionals to be away from their jobs during work time. Executives and middle managers reported a lower likelihood that their companies would pay for training time than pay for costs associated with CRES (Figure 2).

Figure 2. Likelihood that Employer will Provide Support for the Following Elements of CRES, Manager Perspective (Non-CRES Certificant Survey Data)^{a, b}



^a Answers provided using a scale from 1 (not at all likely) to 5 (very likely).

^b Some respondents failed to answer these questions. Missing data excluded from this analysis.

Recommendation: The CRES value proposition should alert managers to the immediate efficiency benefits gained from operators conducting the projects that lead to certification.

1. Introduction

The Northwest Energy Efficiency Alliance (NEEA), an alliance of more than 100 Northwest utilities and energy efficiency organizations, together with the Refrigerating Engineers & Technicians Association (RETA), developed a new energy efficiency certification – the Certified Refrigeration Energy Specialist (CRES) credential – for individuals involved with the operation of industrial refrigeration plants, including refrigeration and other plant systems that use energy. NEEA designed the CRES initiative (“initiative”) to encourage industrial refrigeration professionals in the Northwest to become CRES certified and apply low- and no-cost energy efficiency practices in refrigeration plant operation.

The initiative theory suggests that refrigeration professionals who become certified via the initiative will have the skills and capabilities to optimize the energy efficiency of the refrigeration and other energy-using systems in their respective plants, allowing the industrial facility to capture both energy and cost savings. The expectation is that on-going certification will be sought by refrigeration professionals as business owners come to value improved systems operation and savings captured by CRES-certified staff.

NEEA contracted with Energy 350 and Research Into Action, Inc. (“Evaluation Team”) to help it determine the impacts of the CRES credential and its appeal among refrigeration professionals in the Northwest. To this end, the Evaluation Team conducted onsite visits, in-depth interviews, and surveys with key market actors: RETA staff, CRES certificants and candidates, non-CRES certified refrigeration professionals, and vendors serving firms with large-scale industrial refrigeration systems.⁴

This report documents findings from these market research activities on the appeal of CRES, whether CRES generates energy savings, and the initiative’s successes and challenges.

1.1. CRES Certification Background

NEEA and RETA finalized the CRES learning objectives in January 2013.⁵ As of November 2013, RETA offered CRES certification to refrigeration professionals in the Northwest. While no other credentials are required to qualify for the CRES certification, CRES candidates need to demonstrate sufficient knowledge of refrigeration operation and energy management strategies while maintaining the safety of refrigeration systems. For initial certification, the refrigeration professional must pass the exam and successfully document five energy efficiency activities.

⁴ The Evaluation Team defined large-scale refrigeration systems as ammonia based, built-up fluorocarbon, or other large industrial refrigeration systems typically used for processing or preserving goods.

⁵ The prior 2014 NEEA RETA CRES report, available at neea.org and titled *RETA CRES Initiative: Market Characterization, Baseline Study, and Forecast Report*, provides the listing of CRES learning objectives.

The exam tests the mastery of the following topic areas:⁶

- › The function of refrigeration system components, including knowledge of system safety, reliability and concepts required for effective operation
- › Energy efficiency basics, including energy measurement concepts, calculations and conversions, measuring and tracking energy use, and energy mapping to document energy efficiency and savings in refrigeration and other energy using systems
- › Operation best practices, including instrumentation and calibration, automated controls and operations, monitoring and interpreting systems operations data, design and sizing system components, managing defrost cycles, and managing refrigeration loads
- › Approaches to facility energy management, including elements and strategies for effective energy management, setting and monitoring performance indicators to measure improvements in energy efficiency, and creating opportunities to improve energy efficiency
- › Managing energy use of other systems, including opportunities to improve energy efficiency of non-refrigeration systems such as lighting, compressed air, and pumps

Preparation for CRES can be through self-study or by taking a CRES preparatory training course.

The CRES initiative includes features to ensure CRES certificants continue to pursue efficiency activities. To maintain the certification, every three years individuals must complete 12 professional development or continuing education hours and document implementation of six additional energy efficiency activities related to refrigeration or non-refrigeration system operations.

1.2. Research Objectives

NEEA and the Evaluation Team sought to:

- › Validate that CRES will yield a minimum level of energy savings by improving the precision of the per certificant savings rate resulting from having a CRES professional on staff
- › Determine whether the RETA CRES certification has sufficient potential appeal among RETA, vendors, and refrigeration professionals (both technicians who operate equipment and managers of refrigeration operations staff) to achieve transformation of the industrial refrigeration plant operations market

⁶ RETA published the *CRES Certification Application Handbook*, which describes the topic areas covered in the exam. The handbook is available from: <http://reta.com/?page=certapplication>.

This report presents findings on the potential appeal of CRES among market actors. The findings and recommendations in this report are not based on a representative sample of the four state region – Idaho, Montana, Oregon and Washington. NEEA and its contractor did not conduct interviews in Idaho with the targeted audience for this report at the request of Idaho Power Company. Also, research of the per certificant savings rate is ongoing and will be reported in a separate report.⁷

To assess appeal of CRES, the Evaluation Team identified several research topics to explore with the market actors. Table 1 displays the research topics and maps those topics to each data collection activity.

Table 1. Research Topics Mapped to Data Collection Activities

Research Topics	CRES Certificant or Candidate Survey / Onsite Visits^a	Non- CRES Certificant Survey	Vendor Survey	RETA Staff Interviews
Involvement with RETA	x	x	x	
Training and certifications of staff	x	x	x	
Likelihood of pursuing CRES if employer paid the cost associated with CRES	x	x		
Likelihood of pursuing CRES if employer allowed staff to use paid time to pursue CRES activities	x	x		
Experience with CRES, including why pursue CRES	x			x
General importance of certifications when hiring	x	x	x	
General importance of energy efficiency in refrigeration plant operation, including what are the key attributes of an effective refrigeration operator	x	x	x	
Expectations about CRES adoption				x
CRES marketing and outreach, and its success to date	x	x	x	x

^a The Evaluation Team conducted onsite visits with CRES certificants only.

⁷ The original intent was to publish energy savings estimates and market research findings in one report. Because the program is new (too few certificants as of July 2015), the Evaluation Team opted to report market research findings separately from the ongoing energy savings validation research.

2. Research Activities

Several data collection activities informed this research study. A summary of the activities appears below (Table 2). The appendices contain interview and survey instruments.

Table 2. Summary of Data Collection Activities

Target Groups	Population	Method	Strata	Sample
RETA staff	n/a	Phone in-depth interview	-	3
Non-CRES certificants (Refrigeration professionals not pursuing CRES)	740 – 4,000 ^a	Web survey	Non-managers & managers ^b	53
CRES candidates (Started CRES certification process)	~ 15	Phone survey	Non-managers & managers ^b	10 ^c
CRES certificants (Completed CRES certification process)	< 5 ^d	Onsite visit, in-person survey	Non-managers & managers ^b	4
Vendors who serve firms with large-scale refrigeration systems	Unknown	Phone survey	-	10
Total				80

^a The lower end of the range is based on an average number of refrigeration professionals per facility multiplied by the total number of refrigeration facilities in the Northwest. (According to the prior 2014 NEEA RETA CRES study, there were 185 refrigeration facilities in the Northwest and, on average, four operators worked at each facility.) The upper end of the range is based on RETA's staff responses; they estimate there are between 3,000 to 4,000 refrigeration professionals in the Northwest.

^b The Evaluation Team surveyed refrigeration professionals who manage refrigeration operations staff (executives and middle managers) and those without any management responsibilities. The team planned to survey 30 managers and 30 non-managers; however, due to the low response rate by non-managers, the team was only able to survey 18 non-managers.

^c Of the ten surveys, nine were completed and one was partially completed.

^d Four individuals were CRES certified as of April 2015. Three worked in the Northwest and one was from California, working as a vendor that provides energy consulting services to industrial facilities in California.

2.1. Instrument Design

The Evaluation Team conducted in-depth interviews with RETA staff and telephone, web, or in-person surveys with CRES certificants and candidates, non-CRES certificants, and vendors. Each interview guide and survey instrument included questions tailored to its targeted respondents. The RETA interview guide contained primarily open-ended questions designed to help the Evaluation Team learn more about the RETA's CRES promotional activities, motivations and barriers to CRES adoption, and RETA's expectations of the CRES market uptake. The survey instrument targeting CRES certificants and candidates included a mix of open-ended and closed-ended questions on various topics to assess the appeal of CRES in the market as well as gather in-depth data on the CRES certification experience. The survey instruments targeting non-CRES

certificants and vendors contained primarily closed-ended questions on the appeal of CRES in the market. Appendix D includes final drafts of all questionnaires.

2.2. Non-CRES Certificant Survey Sample and Implementation

The Evaluation Team received several lists of refrigeration professionals who worked for companies across Oregon, Washington, Idaho, and Montana. The lists, provided by NEEA and Energy 350, included 314 companies and had a total of 618 contacts.⁸ The Evaluation Team removed duplicate names from these lists and any contacts without email addresses, leaving 597 names. All 597 contacts received an email invitation to take the survey and a \$50 incentive if they took the survey.⁹ The Evaluation Team asked those who responded to the survey to provide additional contacts, which yielded 23 additional contacts.¹⁰ These 23 contacts also received an email invitation to take the survey and offered a \$50 incentive. The Evaluation Team telephoned many of the contacts who received the email invitation to remind and prompt them to take the survey and engaged local RETA chapters to advertise the survey. This approach resulted in 53 completed surveys, which yielded a response rate of 9%. The survey fielding period lasted from December 2014 to April 2015. However, the findings and recommendations in this report are not based on a representative sample of the four state region – Idaho, Montana, Oregon and Washington. NEEA and its contractor did not conduct interviews in Idaho with the targeted audience for this report at the request of Idaho Power Company.

2.3. Certificant and Candidate Survey Sample and Implementation

NEEA provided a list of CRES certificants and candidates to the Evaluation Team. The Evaluation Team surveyed all four certificants in-person and contacted all candidates to complete a telephone survey. The Evaluation Team surveyed the certificants in-person when conducting onsite visits with the certificants. The survey fielding period lasted from January to March 2015.

2.4. Vendor Survey Sample and Implementation

The Evaluation Team developed a convenience sample of selected vendors that included 15 vendor contacts working for companies offering refrigeration operation and maintenance services across various geographic areas in the Northwest. The Evaluation Team contacted all 15 contacts to complete a telephone survey (10 completed the survey). Almost all (9 of 10) contacts who took the survey reported the facilities they serve are located in multiple geographic areas in

⁸ The lists from NEEA included contacts from most of the companies with industrial refrigeration facilities in the Northwest.

⁹ The Evaluation Team offered a \$50 incentive because the initial response rate to the survey was low.

¹⁰ Due to the low response rate by non-managers, the Evaluation Team asked managers who took the survey to provide contact information of their non-managing refrigeration operations staff.

the Northwest – Idaho, Montana, Oregon, or Washington. One of the 10 contacts served facilities located in Washington. The survey fielding period lasted from January to February 2015.

3. RETA Staff Perspective on CRES Adoption

RETA, a national organization dedicated to the professional development of industrial refrigeration professionals, oversees certification of refrigeration operators in the safe operation of refrigeration systems. Currently, RETA offers three certifications: Certified Assistant Refrigeration Operator (CARO), Certified Industrial Refrigeration Operator (CIRO), and now CRES.¹¹

To gather feedback from RETA about the adoption of CRES among refrigeration professionals, the Evaluation Team carried out in-depth interviews with three RETA staff in January 2015. Interview contacts were involved in various roles at RETA. Each contact had many years of experience in the refrigeration industry and with RETA.

The in-depth interviews covered the motivations and barriers to CARO, CIRO, and CRES adoption; lessons learned from promotion of CARO and CIRO; ongoing promotion of CRES; and expectations for market uptake of CRES. The following subsections describe key findings from this data collection effort.

3.1. Motivations and Barriers to CRES Adoption

3.1.1. Motivations

Contacts identified energy savings and sustainability as the primary motivations of companies to have their refrigeration operations staff obtain the CRES certification. With regard to energy savings, contacts believe that once managers see how the CRES certification can save the company money, they would be motivated to support their staff in obtaining the certification. One contact stated, “The certification of refrigeration professionals leads to a reduction in electrical usage and energy savings equal money savings.” With regard to sustainability, contacts reported that the certification is a way to show corporate commitment to sustainability. As one contact explained: “Sustainability is the biggest reason companies likely want to do this. They are not only saying they are sustainable, but are able to show through the certification that they are doing it.”

The added skills or technical knowledge that refrigeration professionals would gain by being CRES certified is another reason why refrigeration professionals are interested in CRES. Two RETA contacts mentioned the desire for refrigeration professionals to better themselves by increasing their knowledge of and skills in refrigeration operation and energy efficiency.

¹¹ CARO is an entry-level American National Standards Institute (ANSI)-accredited credential designed to recognize those with a sufficient knowledge to work under supervision in industrial refrigeration. CIRO also is an ANSI-accredited credential; it recognizes those who are knowledgeable about refrigeration concepts and applications needed to supervise industrial refrigeration operations. CRES is not yet ANSI-accredited, although the Initiative is working toward that objective.

When asked what motivated RETA to develop CRES, contacts reported that NEEA approached RETA regarding the creation of the CRES certification. All three contacts mentioned adding the CRES certification to their CARO and CIRO list was a logical next step for RETA. One contact stated, “Leaders see the value in not only energy savings for companies, but also in the value of another accreditation program.”

3.1.2. Barriers

RETA contacts reported four potential barriers to CRES adoption:

1. Many refrigeration professionals already have the CARO or CIRO certification, so refrigeration professionals and their management may have trouble perceiving the value of obtaining an additional certification. This is especially true of CRES because of the many requirements involved and the need for management support with the training and energy project activities.
2. RETA is finding that corporate management at companies (especially management of large companies) is hesitant to share confidential information with employees who are not managers, which can hinder employees when completing required activities for CRES. For example, the management may not share the facility electrical usage or a utility bill with the employees pursuing CRES and such information may be necessary to complete and document CRES-related activities. Nevertheless, one RETA contact did say, “a large percent of the professional side [engineers and consultants] will see CRES as a value”; and thus, as management sees the value in CRES they would then be more supportive of their staff when pursuing CRES.
3. RETA’s certification committee is finding that documentation requirements are stringent. Some of the CRES documentation packets are not complete or are lacking important details. This creates a “back-and-forth” with the applicants to complete the application, which can delay the CRES certification process.
4. A contact noted that the CRES exam is very difficult. For example, because there are no prerequisites for the exam, the exam includes refrigeration elements that would be covered under CARO or CIRO. (This was intentional because NEEA did not want to add a prerequisite and potentially hinder some individuals from pursuing CRES, and RETA wanted to ensure that those pursuing CRES had adequate knowledge of refrigeration safety and reliability.) Another contact reported that there is no handbook or materials to prepare for the test outside of information from the class. The website has a brief application handbook that references eight different study materials available from RETA, with a caveat that, “RETA does not endorse or guarantee that all content areas in the CRES exam are covered in those materials” (RETA 2013). This contact reported that a difficult test paired with limited study material will not hold back the “superstars,” but it will likely hold back other refrigeration professionals. Findings from the CRES certificant and candidate survey support this concern (see Chapter 5).

3.2. Promotion of CRES

Marketing of the CRES certificate is just getting started. Recently, RETA established a marketing committee in order to further promote the CRES certification in the next few months. All three contacts mentioned discussion of CRES at the RETA chapter meetings. Two contacts mentioned ongoing promotion of CRES on the website, at the annual conference, and through the RETA Breeze newsletter distributed to RETA members.

3.3. Expectations for CRES Uptake in the Market

For RETA, the CRES certification is just starting to progress and is on track to meet the expectations. All RETA contacts reported the certification is likely to increase as companies realize the energy and financial savings of having CRES certified staff. One contact noted managers will likely obtain certification quicker than refrigeration service professionals without management responsibilities.

For 2015, the contacts expect 10 to 60 additional CRES certifications nationwide, and for the next five years, they expect 50 to 300 CRES certifications nationwide. Contacts also noted they expect about 25-40% of Northwest refrigeration professionals to become CRES certified in the next five years.

At the time of the interviews, there were only four CRES certified individuals – three in the Northwest and one in California. Twenty-one individuals have taken the test (17 in the Northwest, 4 elsewhere), ten of which passed the test (7 in Northwest, 3 elsewhere) and are now working on their CRES credential activities. Two RETA contacts noted the required credentialing activities are slowing down the certification process and that the number of certified individuals will jump as the individuals finish their activities.

4. Appeal of CRES

This chapter presents findings from telephone, web, or onsite surveys with 53 non-CRES certificants, 14 CRES certificants or candidates, and 10 vendors. The chapter is organized into five sub-sections: CRES awareness and promotion, likelihood of pursuing CRES, perceived benefits of CRES, importance of certifications when hiring, and organizational culture regarding energy efficiency.

Where possible, the Evaluation Team compared non-CRES certificant responses with CRES certificants or candidate responses and reported notable differences. The Evaluation Team also reported notable response differences between different types of respondents:

- › Executives – refrigeration professionals who reported being owners or senior managers of the company,
- › Middle managers – refrigeration professionals who reported managing other individuals in the company but were not owners or senior managers, and
- › Non-managing refrigeration professionals – refrigeration professionals who had no staff management responsibilities in the company.

Response differences between different types of respondents, when reported, should be interpreted with caution because the small sample sizes of each group limited the ability to identify statistically significant differences.

4.1. Respondents' Roles and Responsibilities

Of 53 non-CRES certificants who completed the survey, seven were executives, 28 were middle managers, and 18 were non-managing refrigeration professionals. All 18 non-managing refrigeration professionals and the majority (29 of 35) of managers (executives and middle managers) reported operating refrigeration equipment. The respondents have many years of refrigeration experience; among those who reported operating refrigeration equipment, about half (24 of 47) have been conducting operations for more than 10 years.

Of 14 CRES certificants or candidates, four were executives, five were middle managers, and five were non-managing refrigeration professionals. All five non-managing refrigeration professionals and the majority (6 of 9) of managers (executives and middle managers) reported operating refrigeration equipment. Among those who reported operating refrigeration equipment, nearly two-thirds (7 of 11) have been conducting operations for more than 10 years, compared to about half of those in the non-CRES certificant sample.

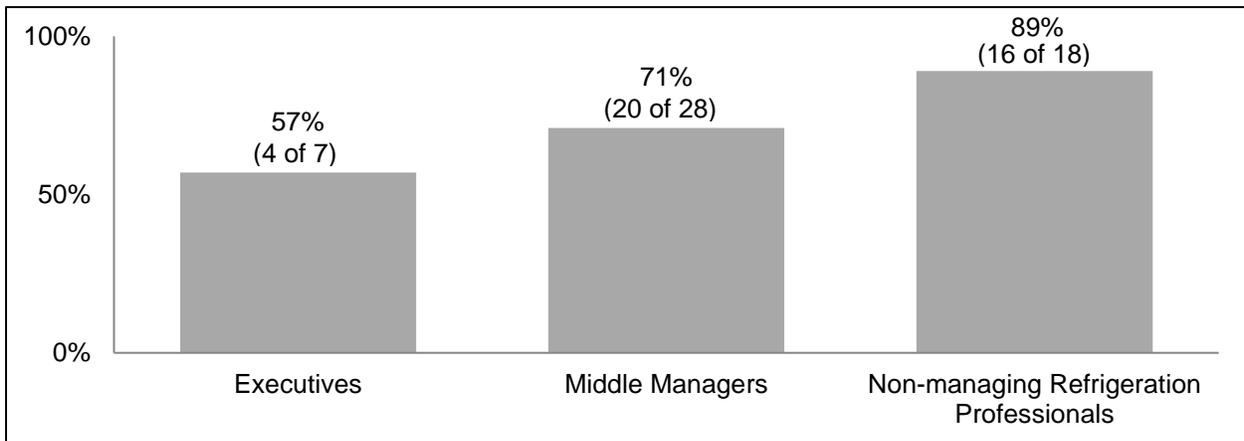
Of 10 vendor contacts, one reported to be the owner of the company and three were involved in sales at high-level positions: vice-president of sales, director of sales, and sales engineer. Three were engineers, either overseeing operations or reporting to be the chief engineer; and three were managers, although in slightly different capacities: either a training manager, office manager, or service manager.

4.2. CRES Awareness and Promotion

CRES awareness was moderate to high among interviewed refrigeration professionals. The Evaluation Team examined awareness of the CRES credential among non-CRES certificants and vendors. The Evaluation Team first asked respondents to report whether they had heard of the CRES credential without providing an explanation of the credential. Thirty-six of 53 non-CRES certificants and four of 10 vendors were aware of the CRES credential. Then, the Evaluation Team provided a description of the CRES credential to those who had not reported hearing about it, to see if, when prompted, they recalled knowing about it. Among the 17 non-CRES certificants and six vendors who had not heard of CRES, when given a description of the CRES credential, four non-CRES certificants and one vendor recalled hearing about it. Overall, if considering responses to both questions, about three-quarters (40 of 53) of non-CRES certificants and half (5 of 10) of vendors were aware of CRES.

Among non-CRES certificants, executives had the lowest awareness compared to middle managers and non-managing refrigeration professionals (Figure 3). This suggests that the marketing could be optimized to increase awareness of CRES among executives, as they are the key decision makers in authorizing staff training. Almost all (5 of 7) executives reported having the authority to approve staff training, whereas half (14 of 28) of middle managers had this authority in the non-CRES certificant sample.

Figure 3. Awareness of CRES by Type of Respondent (Non-CRES Survey Data)



Marketing and outreach efforts by NEEA and RETA are increasing awareness of CRES among refrigeration professionals. CRES certificants and candidates most commonly reported hearing about CRES from either a NEEA representative or through a RETA or NEEA sponsored brochure or flyer (Table 3). All vendors aware of CRES had learned about CRES from a RETA representative.

Table 3. Information Sources (CRES and Vendor Datasets;^a Multiple Response Allowed)

How did you hear about CRES?	CRES Certificants / Candidates (n=14)		Vendors Aware of CRES (n=4) ^b	
	Count	Percent	Count	Percent
From NEEA representative	4	29%	-	-
From RETA or NEEA sponsored brochure or flyer	3	21%	-	-
RETA meeting	2	14%	-	-
RETA conference	2	14%	-	-
RETA workshop or training	2	14%	-	-
Supervisor	2	14%	-	-
From RETA representative	1	7%	4	100%

^a Due to survey length constraints, the Evaluation Team did not ask this question of non-CRES certificants.

^b One vendor who was aware of CRES but opted not to answer this question was excluded from this analysis.

4.3. Likelihood of Pursuing CRES

4.3.1. Interest in CRES

A notable minority of refrigeration professionals are already considering the CRES credential. Of the 40 non-CRES certificants aware of CRES, 10 (25%) reported they are pursuing CRES. Of these 10 respondents, six were managers (either executives or middle managers) who reported operating refrigeration systems and four were non-managing refrigeration professionals.^{12, 13}

The Evaluation Team, after describing the CRES credential, asked the 14 non-managing refrigeration professionals who were either unaware of CRES or not pursuing CRES to indicate how likely they would pursue CRES now that they knew something about it. Two of these 14 respondents reported they would be likely to pursue CRES in the next two years (Table 4).

Overall, one-third (6 of 18) of non-managing refrigeration professionals in the non-CRES certificant sample either reported pursuing CRES or willingness to pursue CRES now that they knew something about it.

¹² Of six managers pursuing CRES, five were middle managers and one was an owner of a refrigeration plant.

¹³ One non-CRES certificant said he was CRES certified. Because this contact was not on the NEEA’s list of CRES certificants, the Evaluation Team excluded this response from the count of those pursuing CRES.

Table 4. Likelihood of Pursuing CRES Among Non-managing Refrigeration Professionals Unaware of or Not Pursuing CRES Currently (Non-CRES Survey Data, n=14)

Based on what you know now about CRES, how likely are you to pursue it in the next two years? ^a	Count	Percent
Not likely (Rating of "1" or "2")	7	50%
Somewhat likely (Rating of "3")	3	21%
Likely (Rating of "4" or "5")	2	14%
Don't Know	2	14%

^a Respondents used a 5-point scale from 1 (not at all likely) to 5 (extremely likely).

4.3.2. Employer Support for Training

Both the CRES certificant and candidate survey and non-CRES certificant survey asked executives and middle managers to report the percentage of their staff with access to employer-provided training support and the percentage of staff using such support for certification training. Executives and middle managers in both surveys reported that more than three-quarters (88% and 78%, respectively) of their staff had access to employer-provided support for training and development (Table 5). In contrast to the proportions of staff with access, smaller proportions of staff (69% and 48%, respectively) had used that support for certification training.¹⁴ Also of interest is the apparent difference between the CRES and non-CRES certificants or candidates.

CRES-certificants or candidates appear both (1) to have greater access and (2) to use employer-provided support for certification training more than non-CRES certificants (as evidenced by the sample means in Table 5).

Table 5. Staff Access to and Use of Employer-Provided Training Support, Manager Perspective (CRES and non-CRES Datasets)

	Executives and Middle Managers Who Were:	
	CRES Certificants / Candidates (n=9)	Non-CRES Certificants (n=33) ^a
Average % of staff with access to employer-provided support for training and development	88%	78%
Average % of staff who have used employer-provided support for certification training	69%	48%

^a Two respondents opted not to answer these two questions. Missing data excluded from this analysis.

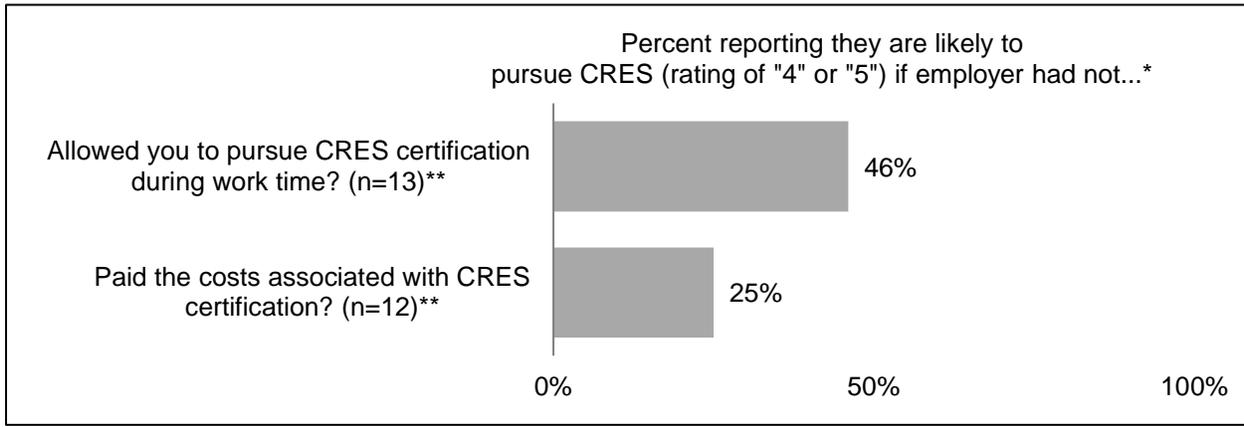
¹⁴ Respondents used 0%, 1-25%, 26-50%, 51-75%, and 76-100% response categories when answering this question. To estimate the average percent across these responses, the Evaluation Team calculated the mid-point of each response category and assigned the appropriate mid-point value to each respondent's answer.

4.3.3. Importance of Employer Support for CRES

Refrigeration professionals will need financial support from employers to pursue CRES.

All 14 CRES certificants or candidates reported their company paid or will pay the costs associated with CRES and allows them to pursue CRES during work time. A minority reported they would have pursued CRES if their company had not paid for the costs, and less than half were willing to pursue CRES if their employer decided to not allow them to pursue CRES during work time (Figure 3).

Figure 3. Willingness to Pursue CRES without Employer-provided Support (CRES Certificant/Candidate Data)

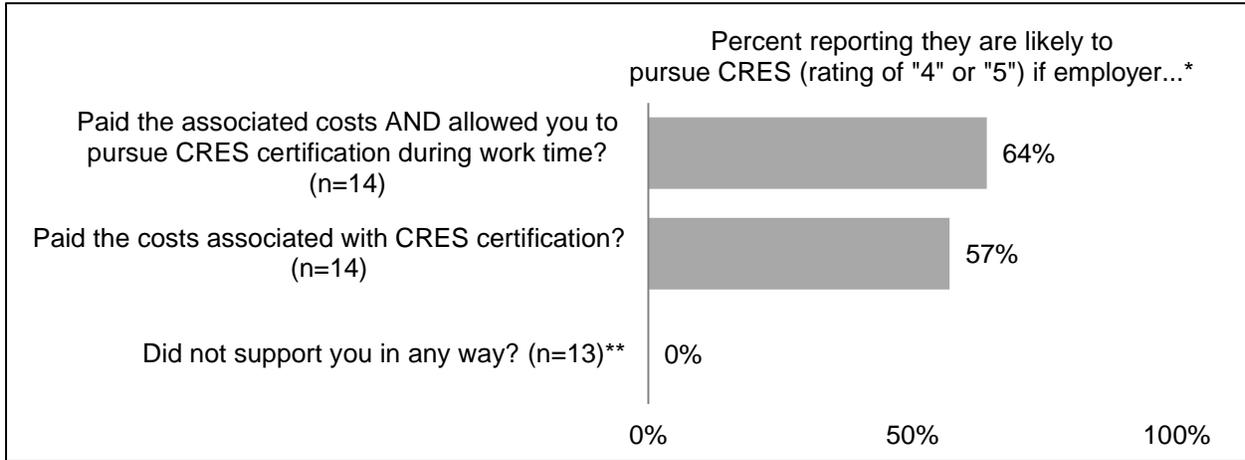


* Answers provided using a scale from 1 (not at all likely) to 5 (very likely).

**Some respondents opted not to answer these questions. Missing data excluded from this analysis.

Analysis of the non-CRES certificant survey data revealed a similar pattern. Of 18 non-CRES certificants who were non-managing refrigeration professionals, four reported pursuing CRES. Of these four individuals, all noted their employer will pay the costs associated with certification and nearly all (3 of 4) said their employer will pay the costs and also allow them to pursue CRES during work time. Of the other 14 non-managing refrigeration professionals who reported not pursuing CRES, more than half noted they would likely pursue CRES if their employer paid the costs associated with the certification (Figure 4). This percent increased only slightly when asked whether they would pursue CRES if their company paid the associated costs and allowed them to pursue CRES during work time (Figure 4).

Figure 4. Willingness to Pursue CRES among Non-managing Refrigeration Professionals Who Are Currently Not Pursuing CRES (Non-CRES Certificant Survey Data)



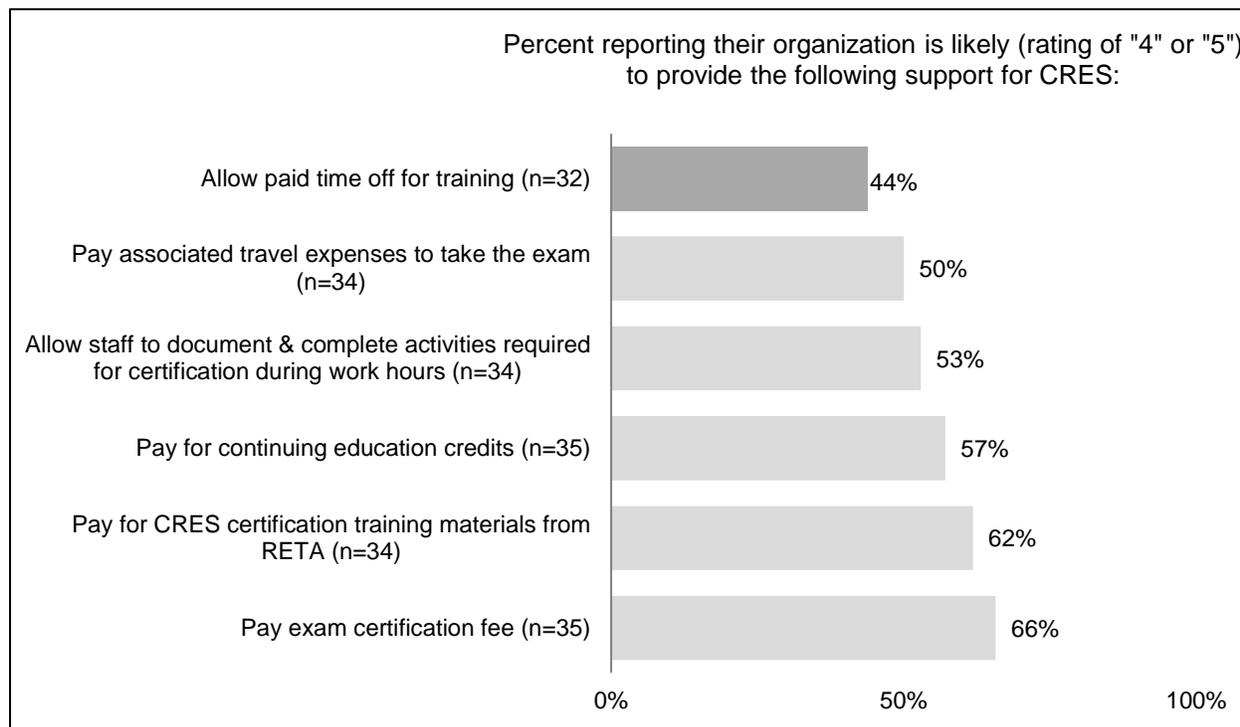
* Answers provided using a scale from 1 (not at all likely) to 5 (very likely).

**Missing data from one respondent.

The non-CRES certificant survey also briefly described the CRES certification process to executives and managers and asked them how likely their company would be to pay for or support various elements of CRES training. Several findings emerged from these data.

Employers are reluctant to support elements of CRES that require refrigeration professionals to be away from their jobs during work time. Executives and middle managers reported a lower likelihood that their companies would pay for training time than pay for costs associated with CRES (Figure 5). This suggests that there is an opportunity to alert managers to the immediate efficiency benefits gained from operators conducting projects at the workplace that lead to certification.

Figure 5. Likelihood that Employer will Provide Support for the Following Elements of CRES, Manager Perspective (Non-CRES Certificant Survey Data)^{a, b}



^a Answers provided using a scale from 1 (not at all likely) to 5 (very likely).

^b Some respondents failed to answer these questions. Missing data excluded from this analysis.

Those who said that their company is not likely to provide support on any of the elements explained their company's position. There was no single explanation identified by a significant number of respondents. Two respondents noted their company would likely not provide support for CRES due to budget constraints as well as time taken away from critical daily operations. Other comments were: other RETA certifications are good enough, internal training is provided, lack of support from top officials, too small of an operation, and not a common company practice (one mention each).

4.4. Value of CRES

4.4.1. CRES Addresses Gaps in Refrigeration Professionals' Skills

The CRES credential has the potential to address an apparent energy efficiency knowledge gap among refrigeration professionals. Although the executives and middle managers in the non-CRES certificant sample indicated their staff is sufficiently skilled in understanding the function of refrigeration system components, less than half of the executives said their staff is sufficiently skilled in the following areas, which CRES certification covers:

- › Understanding operation best practices

- › Knowing approaches to facility energy management
- › Managing costs via efficient operations
- › Managing energy use of non-refrigeration system

Vendors noted there would be many positive benefits if more of their clients were well-trained in operating the equipment efficiently, with respect both to operations generally and to energy use specifically. While two vendors were concerned that this training would result in less maintenance and service work, which could reduce their profits, most (6 of 8) found training their clients on system components and operation techniques to be beneficial. The majority (5 of 8) reported that well-trained clients would lead to fewer maintenance calls, which can reduce maintenance costs and improve the troubleshooting process because, if the clients better understood the system, they could relay pertinent information when making a maintenance call. About one-third (3 of 8) reported that well-trained clients would allow them to capture more of the benefits of having an energy efficient product. If the clients understand refrigeration fundamentals, they will be able to use the product in a way to generate energy savings. A minority (2 of 8) also mentioned that industrial refrigeration systems are dangerous and complicated, so if the client is trained in the operation of the equipment, they will be better able to operate the equipment safely.

4.4.2. Perceived Benefits of CRES

The majority of CRES certificant or candidates pursued CRES to improve their skills (Table 6). The second reason for pursuing CRES was to increase their job opportunities (Table 6).

Table 6. Motivations to Pursue CRES (CRES Certificant/Candidate Survey Data, n=14; Multiple Response Allowed)

Why did you decide to become CRES certified?	Count	Percent
To improve my skills	10	71%
More job opportunities at current company or elsewhere	4	29%
To get better pay	3	21%
To be promoted	3	21%
Related to field	2	14%
Other	2	14%

4.5. Importance of Certifications When Hiring New Staff

Both the CRES certificant and candidate and non-CRES certificant survey and survey asked executives and middle managers to report which certifications or training they consider when hiring refrigeration operations staff. Executives and middle managers in both surveys reported that CARO or CIRO certifications are most commonly considered when hiring new staff (Table 7).

Four of 10 vendors, when asked what their clients consider when selecting a vendor, reported their clients consider either CARO or CIRO and two reported their clients look for both CARO and CIRO.

Managers who were CRES-certificants or candidates were more likely than non-CRES certificant managers to consider RETA certifications when hiring staff. In particular, managers who were CRES certificants or candidates were approximately twice as likely to report they would consider CARO or CIRO when hiring staff than non-CRES certificant managers (Table 7).

Table 7. Considerations When Hiring Staff, Manager Perspective (CRES and Non-CRES Datasets; Multiple Response Allowed)

Which certifications or training do you consider when hiring refrigeration operation staff?	Executives and Middle Managers Who Were:			
	CRES Certificants / Candidates (n=9)		Non-CRES Certificants (n=35)	
	Count	Percent	Count	Percent
CIRO	8	89%	16	46%
CARO	8	89%	15	43%
CRES	3	33%	7	20%
Refrigeration Operator Coaching	3	33%	4	11%
Other Education / Training / Licenses	5	56%	3	9%

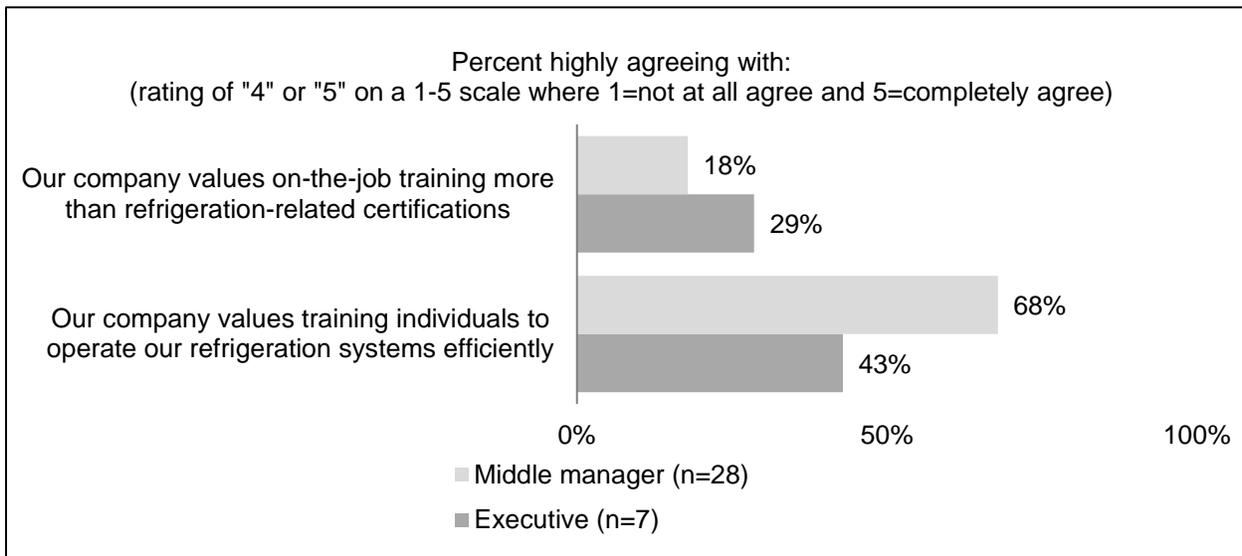
To explore managers’ receptiveness to CRES, both the CRES certificant and candidate survey and non-CRES certificant survey asked managers how influential would CRES be on their decision or recommendation of who to hire if they interviewed two similarly qualified candidates for a refrigeration operator position, but one of the candidates was CRES certified while the other was not. Using a 5-pt scale where 1 meant “not all influential” and 5 meant “extremely influential,” about half (19 of 35) of non-CRES certificant managers and about two-thirds (6 of 9) of CRES certificant or candidate managers noted CRES would influence (a rating of “4” or “5”) their decision of who to hire.

Executives need more convincing of the value of CRES. Less than half (2 of 7) of executives, compared to more than half (17 of 28) of middle managers in the non-CRES certificant sample, noted CRES would influence their decision of who to hire when asked about the hypothetical scenario referenced above. Similarly, among CRES certificants or candidates, half (2 of 4) of executives and nearly all (4 of 5) middle managers noted CRES would influence their decision of who to hire.¹⁵

¹⁵ It is important to note that executives value certifications. The key finding here is that they value it less than middle managers.

Additionally, fewer executives than middle managers in the non-CRES certificant sample reported their company values training staff to operate refrigeration systems efficiently, while more executives than middle managers reported their company values on-the-job training more than certifications (Figure 6). These findings suggest a need to develop effective “value proposition” messages around CRES for executives.

Figure 6. Perceptions about Training (Non-CRES Certificant Survey Data)



Four of 10 vendors also reported considering certifications when hiring new staff. Three reported they consider the CARO certification, and all four said they consider the CIRO certification. Six vendors who reported not looking for specific certifications when hiring new staff said the certifications are uncommon among refrigeration professionals. One vendor reported that in the past, certifications were not an important consideration, but with the new Occupational Safety and Health Administration (OSHA) requirements, these are becoming more important in hiring and also more important to his customers. Others reported they have been asked about the certifications of their employees in the proposals and that new clients tend to be the ones asking about such certifications.

4.6. Professional Membership, Certification, and Training

CRES certifiants or candidates demonstrated the highest level of activity with regard to refrigeration training, certification, and professional organizations. As shown in Table 8, CRES certifiants or candidates were more likely than non-CRES certifiants or vendors to be members of RETA, receive CARO or CIRO, or attend Refrigerator Operator Coaching (ROC) – a regional energy efficiency initiative administered by Energy Trust of Oregon, Bonneville Power Administration, and regional utilities.

Table 8. Regional and National Membership, Training, and Certification (CRES, Non-CRES, and Vendor Datasets; Multiple Response Allowed)

Organization / Initiative	Offering	CRES Certificants/ Candidates (n=14)		Non-CRES Certificants (n=53)		Vendor (n=10)	
		Count	Percent	Count	Percent	Count	Percent
RETA	Membership	13	100% ^a	24	45%	7	70%
	CIRO	11	79%	17	32%	4	40%
	CARO	8	57%	12	23%	2	20%
Refrigeration Operator Coaching	Participants	8	57%	10	19%	0	0%

^a For this statistic, n=13 because one respondent did not answer this question and was excluded from the analysis.

The CRES certificants or candidates appear to have more face-to-face interactions with RETA than non-CRES certificants. The CRES certificants or candidates were the most likely group to obtain RETA’s training materials and attend RETA’s national conference and training classes that were not online (Table 9). The non-CRES certificants were the most likely group to attend an online class from RETA or to take a practice exam to prepare for a specific certification (Table 9).

Table 9. Involvement with RETA (Multiple Responses Allowed)

Engagement with RETA Services and Training Events	CRES Certificants / Candidates (n=14)		Non-CRES Certificants (n=53)		Vendors (n=9) ^a	
	Count	Percent	Count	Percent	Count	Percent
Obtained RETA’s training materials	12	86%	35	66%	4	44%
Attended RETA National Conference	11	79%	24	45%	6	67%
Attended any RETA-promoted training classes that were not online	11	79%	30	57%	Not asked	
Taken a practice exam provided by RETA to prepare for a specific certification exam	4 ^b	29%	26	49%	3	33%
Attended any of RETA’s industrial Refrigeration online courses	1	7%	18	34%	-	0%

^a One respondent unaware of RETA who was not asked this question was excluded from this analysis.

^b All CRES certificants, whereas none of CRES candidates, reported taking a practice exam to prepare for a certification exam from RETA.

In addition to RETA, vendors were actively involved with other professional organizations. The Evaluation Team asked only vendors whether they were members of other professional organizations. While less than half reported being members of International Institute of Ammonia Refrigeration (IIAR), International Association of Refrigeration Warehouses (IARW), or Global Cold Chain Alliance (GCCA) (Table 10), more than half (6 of 10) reported attending events or using training materials from IIAR, IARW, or GCCA. Three reported attending the IIAR, IARW, or GCCA national conferences and three used the guides, bulletins, and manuals from these associations to augment training materials and stay up to date on technical matters.

Table 10. Regional and National Membership, Training, and Certification (Non-CRES, CRES, and Vendor Datasets; Multiple Response Allowed)

Organization / Initiative	Offering	Vendor (n=10)	
		Count	Percent
International Institute of Ammonia Refrigeration (IIAR)	Membership	4	40%
International Association of Refrigeration Warehouses (IARW)	Membership	2	20%
Global Cold Chain Alliance (GCCA)	Membership	1	10%

4.7. Organizational Culture Regarding Energy Efficiency

4.7.1. Energy Efficiency Policies

Many companies with industrial refrigeration facilities have policies that foster energy efficiency behavior. As shown in Table 11, more than two-thirds (70%) of companies where respondents (both CRES certificants or candidates and non-CRES certificants) worked had one or more energy efficiency policies and procedures (Table 11).

Table 11. Organizational Policies and Procedures (Multiple Responses Allowed)

Policy	Combined CRES and Non-CRES Survey Data (n=43) ^a	
	Count	Percent
A staff member that is responsible for energy and energy efficiency	23	53%
Defined energy savings goals	18	42%
Written sustainability or energy management plan	13	30%
A specific policy requiring that energy efficiency be considered when purchasing refrigeration equipment	12	28%
Other ^b	5	12%
<i>None of the above</i>	13	30%

^a The CRES and non-CRES samples included several individuals that worked for the same company. This table has eliminated duplication of firms across the two samples; the respondents (53 non-CRES certificants and 14 CRES certificants or candidates) worked for 43 unique companies.

^b Other comments were: consider energy efficiency when buying equipment, knows of general but no formal policy, there exists an internal energy committee, always looking for energy improvements that are cost effective, and something about LEAP Engineers (unclear what is meant by that).

Vendors also reported whether all, some, or none of their clients had any energy efficiency policies. Nearly all (9 of 10) vendors said that some of their clients had at least one of the policies referenced in the Table 11. Four noted that their clients used other strategies to reduce energy use. Two respondents reported that their customers invested in energy efficiency upgrades, and one of them explained that it was important to his clients to have a payback timeframe of two years or less for energy efficiency investments. Another respondent reported that her clients are trying to reduce energy use “across the board” without being more specific. Another said his customers were striving to reduce energy use and staff numbers by using automated systems. This respondent also wanted to note that in addition to helping customers reduce energy use and staff costs through automation, the plants are safer because the automated systems incorporate warning and safety notifications.

4.7.2. Value of Operating Equipment Efficiently

Vendors are selling energy efficiency services to their clients. All vendors reported selling energy efficient products and services. These products and services were reported to account from a low of 5% to a high of 100% of annual revenues.¹⁶ Eight of the ten respondents reported a proportion of annual revenues associated with energy efficient products and services of 25% or less; the average value across all ten vendors was 28%. Nearly all (8 of 10) vendors reported that annual revenues associated with energy efficiency products and services have increased over

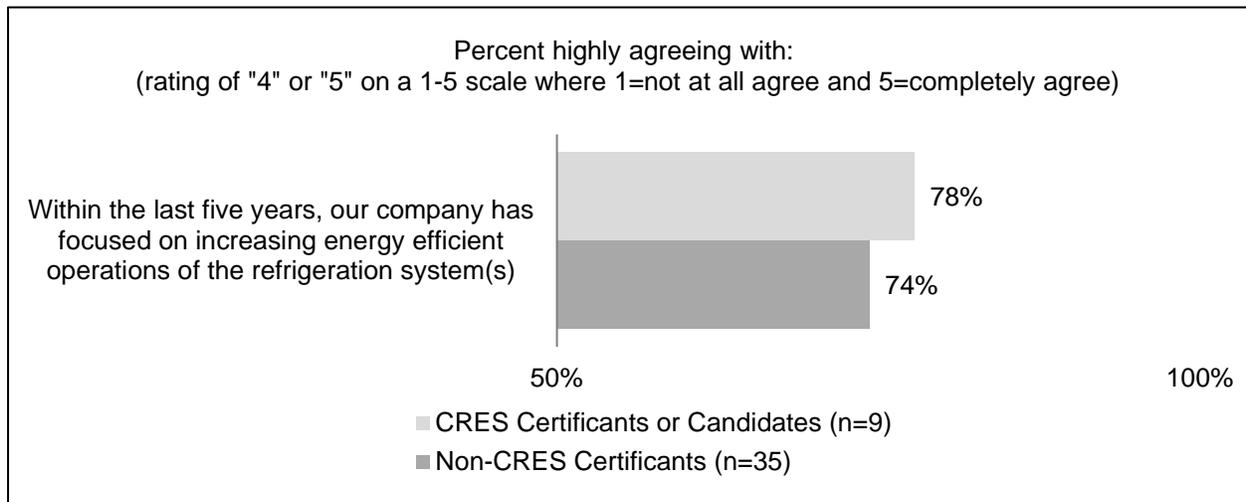
¹⁶ Energy efficient products and services include custom refrigeration design, controls and software design, installation, safety training, remote system monitoring, repair, and maintenance.

the past two years. Seven of 10 also noted that the energy efficiency products and services they offer were important in differentiating them from some of their competitors.

Vendors do not offer discounts to their clients who are pursuing energy efficient operation of the refrigeration systems. If the client received any monetary incentive, it was from the utility company or through the equipment manufacturer. None of the vendors indicated that they plan to start offering discounts to clients who choose to pursue energy efficient operation of their refrigeration systems.

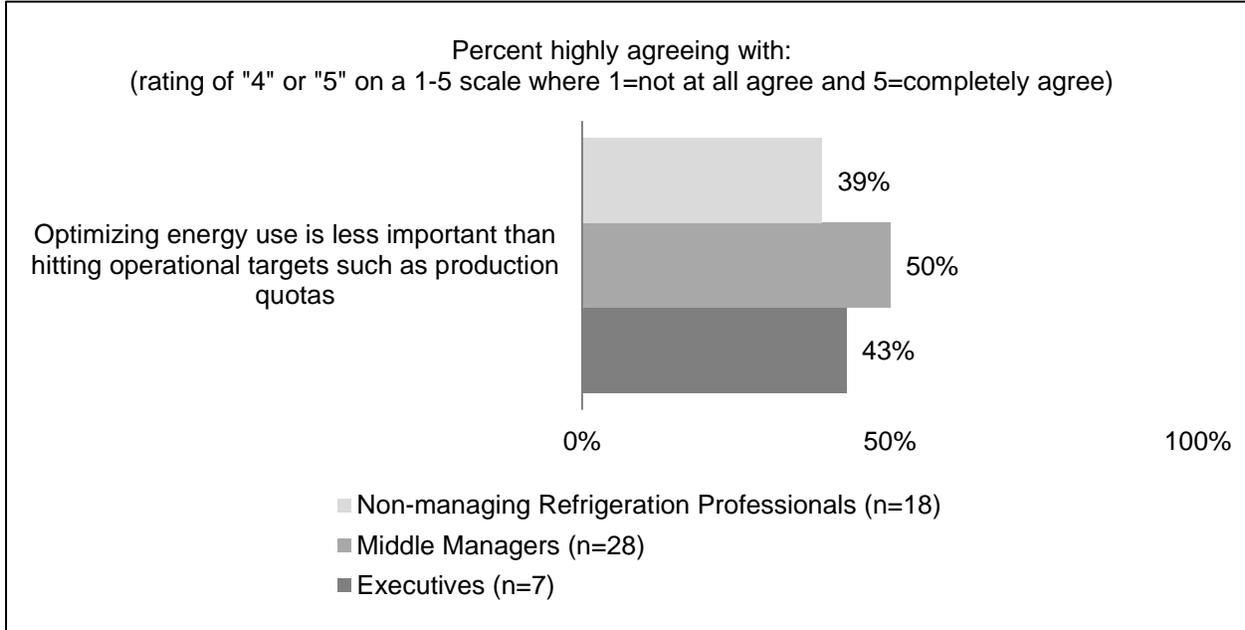
Refrigeration professionals also reported increasing importance of energy efficiency. More than two-thirds of managers (this group includes both executives and middle managers) noted their companies have focused on increasing energy efficient operations of the refrigeration systems in the past five years (Figure 7).

Figure 7. Perceptions about Energy Efficiency, Manager Perspective (CRES and Non-CRES Survey Data)



More non-managing refrigeration professionals value operating equipment efficiently than managers. More non-CRES certificant managers than non-managing refrigeration professionals agreed with the statement “optimizing energy use is less important than hitting operational targets such as production quotas” (Figure 8). This suggests that messaging around energy efficiency aspects of CRES should be linked with other refrigeration operation considerations that are important to managers.

Figure 8. Perceptions about Energy Efficiency and Productivity (Non-CRES Survey Data)



4.8. Importance of Technical Proficiency When Hiring Vendors

When choosing a vendor, service attributes such as technical proficiency are more important to companies than price. The interviewed vendors reported customer service, technical proficiency, and safety/reliability are roughly equivalent factors that their clients consider when selecting a vendor, with price being relatively less important (Table 12). Similarly, CRES certificants or candidates and non-CRES reported that price was the least important factor among those listed in Table 12 below (these findings are presented in Appendix A and Appendix B). These findings suggest the market values quality.

Table 12. Important Factors Clients Consider when Selecting Vendors (Vendor Survey Data)

Factor	Number Reporting Which Factor is the Most Important to Clients (n=10)	Mean Score of Importance Rated 1 – 5 (n=10)
Customer Service	4	5.0
Technical Proficiency	2	4.9
Safety/Reliability	2	4.8
Price	2	3.8

When asked about other indicators of technical proficiency clients consider when selecting a vendor, all vendors said that their clients consider experience and reputation, and have indicated that they have been chosen based on their reputation and prior client satisfaction instead of the price of their services.

When asked a similar question, the CRES certificants or candidates were more likely than non-CRES certificants to report safety related awards or CARO or CIRO certifications are indicators of technical proficiency their organization pays attention to when contracting out refrigeration operation or maintenance work (Table 13).

Table 13: Key Indicators of Technical Proficiency when Contracting, Multiple Responses Allowed

Indicator	Cert (n=8) ^a	Non-Cert (n=30)
CIRO	5 (63%)	7 (23%)
CARO	4 (50%)	4 (13%)
Possession of safety-related awards	4 (50%)	4 (13%)
Possession of other refrigeration-related certifications	3 (38%)	14 (47%)
Other ^b	4 (50%)	5 (17%)

^a Only includes companies that contract out for refrigeration service work as well as executives and middle management, plus one missing response

^b Other includes dependability, response time; welding, rebuilds; any related training certs; and demonstration of skill

5. Experience with CRES

Four CRES certificants and 10 CRES candidates reported on their experience with CRES certification process. More than half (8 of 14) of CRES certificants or candidates reported at least one aspect of CRES did not go smoothly for them. Respondents most commonly mentioned that training covered in the class or study materials was not adequate to prepare individuals for passing the exam successfully (five mentions). Other concerns were:

- › The slow-pace of the application process (two mentions)
- › Inability to answer three mechanical-related questions on the exam due to missing data (unclear what is meant by “missing data”) (two mentions)
- › The training did not prepare students to take the test (one mention)¹⁷
- › Missing the online “best-practice guide” because many class attendees failed to go online (a trainer pre-printed the application, so there was no need to go online) (one mention)

The difficulty of the exam is a barrier to CRES adoption. Nearly half (4 of 10) of CRES candidates are anticipating completing requirements for CRES at the end of 2015. However, nearly one-third (3 of 10) of CRES candidates (i.e., surveyed individuals that the Evaluation Team terms CRES candidates) are no longer pursuing CRES. These individuals have taken the exam and failed it, and they reported concerns over ability to pass the exam without additional training and difficulty in finding time to complete and document five energy efficiency activities (Table 14).

Table 14. Where are Candidates in the CRES Certification Process (CRES Candidate Survey Data, n=10)

Where in Process	Count	Percent
No longer pursuing CRES	3	30%
Preparing to take the exam again	2	20%
Documenting 5 energy efficiency activities	2	20%
Just started	1	10%
Submitted all the paperwork on 5 energy efficiency activities	1	10%
Other	1	10%

A few CRES candidates who had already taken the exam reported how they prepared for the CRES exam. Three took a class and three noted preparing through self-study. Two of the respondents noted both taking a class and preparing through self-study.

¹⁷ Please note that ANSI requirements make a distinction between teaching students the body of knowledge tested by the exam and teaching students how to pass the specific exam. ANSI does not accept the latter.

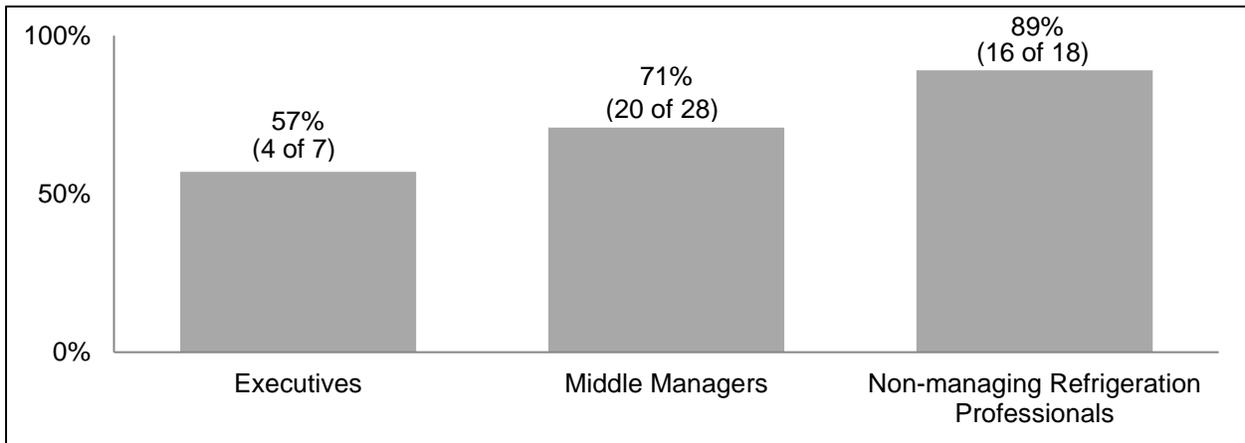
CRES certificants or candidates provided suggestions on how to improve the CRES certification process. Five respondents reported that having a trainer cover all areas of the test would have been helpful in making the preparation go smoother for them. Two suggested a sample test and two reported needing more time to do the test. One wanted online training or a class near their place of work.

6. Conclusions and Recommendations

The findings and recommendations in this report are not based on a representative sample of the four state region – Idaho, Montana, Oregon and Washington. NEEA and its contractor did not conduct interviews in Idaho with the targeted audience for this report at the request of Idaho Power Company

Conclusion: CRES awareness was moderate to high among interviewed refrigeration professionals and lowest among the executives included in the sample. About three-quarters (40 of 53) of non-CRES certificant and half (5 of 10) of vendors were aware of CRES. Among non-CRES certificant, executives had the lowest awareness compared to middle managers and non-managing refrigeration professionals (Figure 9).

Figure 9. Awareness of CRES by Type of Respondent (Non-CRES Survey Data)



Conclusion: Executives need more convincing of the value of CRES. Less than half (2 of 7) of executives, compared to more than half (17 of 28) of middle managers in the non-CRES certificant sample reported that CRES would influence their hiring decisions.¹⁸ Similarly, among CRES certificant or candidates, half (2 of 4) of executives and nearly all (4 of 5) middle managers noted CRES would influence their decision of who to hire.

Energy efficiency as it relates to industrial refrigeration operation does not appear to be a top priority to executives. Fewer executives than middle managers in the non-CRES certificant sample reported their company values training staff to operate refrigeration systems efficiently. Both executives and middle managers were more likely than non-managing refrigeration

¹⁸ After briefly describing CRES to respondents who were previously unaware of it, both the non-CRES certificant survey and CRES certificant and candidate survey asked managers how influential would CRES be on their hiring decisions or recommendations regarding two similarly qualified candidates – one that was CRES certified and other that was not.

professionals to describe meeting operational targets as more important than optimizing energy use.

Recommendation: Considering that executives are key decision makers in authorizing staff training, CRES marketing should be optimized to; 1) increase awareness of CRES among executives; and 2) include effective “value proposition” messages around CRES. Messages linking energy efficiency with other considerations important to executives (for example, safety, and productivity) are likely to be effective. NEEA should explore whether these messages could be delivered to executives directly or through middle managers or non-managing refrigeration professionals.

In addition, middle managers also are key decision makers in authorizing staff training (nearly half of middle managers in the non-CRES certificant sample reported having this authority). Thus, NEEA should ensure it has marketing strategies and materials tailored to different types of decision makers.

Conclusion: Non-managing refrigeration professionals will need employer-provided support to pursue CRES. All 14 CRES certificants or candidates reported their company paid or will pay the costs associated with CRES and allows them to pursue CRES during work time. About one-quarter reported they would have pursued CRES if their company had not paid for the costs.

Analysis of the non-CRES certificant survey data revealed a similar pattern. Of 18 non-CRES certificants who were non-managing refrigeration professionals, four reported pursuing CRES. Of these four individuals, all noted their employer will pay the costs associated with certification. Of the other 14 non-managing refrigeration professionals who reported not pursuing CRES, more than half (57%) noted they would likely pursue CRES if their employer paid the costs associated with the certification. This percent increased only slightly, to 64%, when asked whether they would pursue CRES if their company paid the associated costs and allowed them to pursue CRES during work time.

Recommendation: Consider providing financial support for the CRES exam, preparatory classes, or training materials to encourage those without access to employer-provided support to pursue CRES.

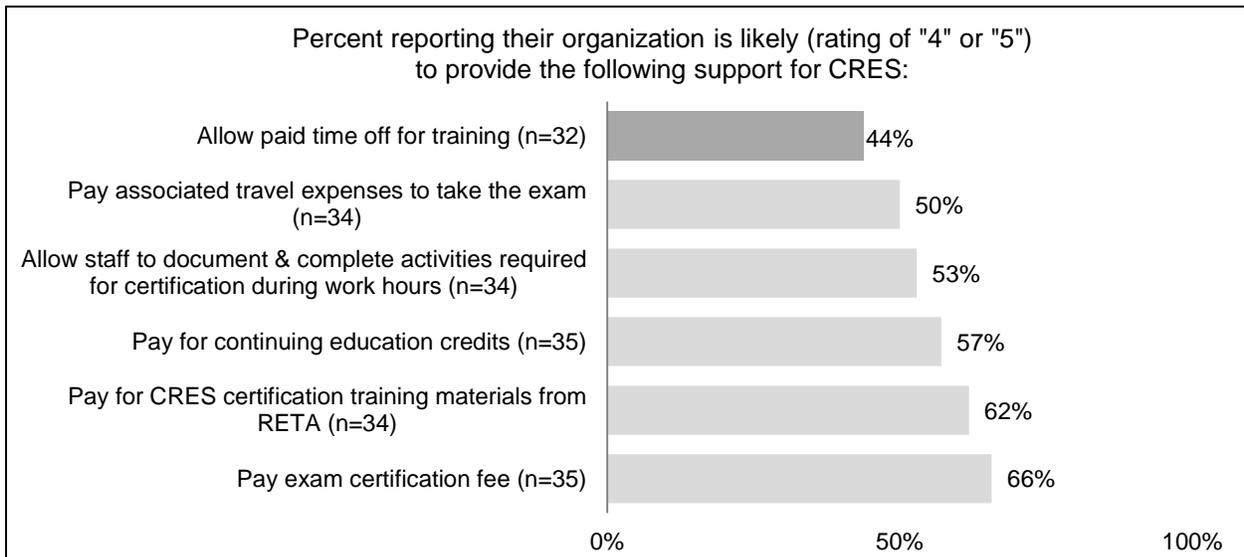
Conclusion: The current exam is a barrier to CRES adoption. Nearly one-third (3 of 10) of CRES candidates are no longer pursuing CRES; these individuals did not pass the exam. They reported concerns over ability to pass the exam without additional training. RETA staff noted that there is no handbook or materials to prepare for the exam outside of information from the preparatory classes. One RETA contact explained that a difficult test paired with limited study material will not hold back the “superstars,” but it will likely hold back other refrigeration professionals.

Recommendation: Continue and expand education efforts for refrigeration professionals to better prepare them to sit for the exam. Several CRES certificants and candidates provided suggestions on what type of training or study materials would have helped them to prepare for the CRES exam:

- › More time when taking the exam
- › More online training or study materials, including a sample test, to prepare for the exam
- › More preparatory classes; have instructors cover all relevant topic areas in preparatory classes
- › More information on how to manage costs with energy efficiency operation practices

Conclusion: Employers are reluctant to support elements of CRES that require refrigeration professionals to be away from their jobs during work time. Executives and middle managers reported a lower likelihood that their companies would pay for training time than pay for costs associated with CRES (Figure 10).

Figure 10. Likelihood that Employer will Provide Support for the Following Elements of CRES, Manager Perspective (Non-CRES Certificant Survey Data)^{a, b}



^a Answers provided using a scale from 1 (not at all likely) to 5 (very likely).

^b Some respondents failed to answer these questions. Missing data excluded from this analysis.

Recommendation: The CRES value proposition should alert managers to the immediate efficiency benefits gained from operators conducting the projects that lead to certification.

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Appendices

Appendix A. CRES Certificant and Candidate Survey Findings

Appendix B. Non-CRES Certificant Survey Findings

Appendix C. Description of the Refrigeration Facilities and Vendor Services

Appendix D. Instruments

Appendix A. CRES Certificant and Candidate Survey Findings

This appendix provides findings from a survey conducted with four Certified Refrigeration Energy Specialist (CRES) certificants (those who received CRES certification) and 10 CRES candidates (those who started the CRES certification process but have not yet received the certification). The purpose of the survey was to understand respondents' involvement with Refrigerating Engineers & Technicians Association (RETA), the value of refrigeration training and certifications, experience with CRES, and importance of energy efficient practices in refrigeration operations.

This appendix includes frequencies of all responses and notable response differences between certificants and candidates as well as executives, middle managers, and those without any management responsibilities. Response differences between different types of respondents, when reported, should be interpreted with caution because the small sample size limited the ability to make statistical comparisons. Although the sample was small, it was still adequate to provide an overall confidence/precision of 85%, $\pm 15\%$ since the population of those pursuing CRES was very small. About twenty individuals were CRES certificants or candidates as of April 2015.

A.1. Work Experience

The sample had nearly an equal distribution of respondents who were executives (4 of 14), middle managers (5 of 14), or non-managing refrigeration professionals (5 of 14).

As shown in Table 15, all five non-managing refrigeration professionals and the majority (6 of 9) of managers (executives and middle managers) reported operating refrigeration equipment. Among those who reported operating refrigeration equipment, nearly two-thirds (7 of 11) have been conducting operations for more than 10 years.

Table 15. Work Experience, Operation of Refrigeration Equipment

Responsibilities and Length of Time with Those Responsibilities		Type of Staff			Total (n=14)	
		Executives (n=4)	Middle Mgmt. (n=5)	Non-managing Refrigeration Professionals (n=5)		
Conducting operation of the refrigeration systems	No	2	1	-	3 (21%)	
	Yes	< 1 yr.	-	-	-	-
		1-2 yrs.	-	-	-	-
		3-5 yrs.	1	-	-	1 (7%)
		6-10 yrs.	0	1	2	3 (21%)
		10+ yrs.	1	3	3	7 (50%)

Nearly all (3 of 4) executives and more than half (3 of 5) of middle managers have been managing refrigeration operations staff for more than six years. Executives have been managing staff for longer than middle managers (Table 16).

Table 16. Work Experience, Management of Refrigeration Operations Staff

Responsibilities and Length of Time with Those Responsibilities	Type of Staff			Total (n=14)
	Executives (n=4)	Middle Mgmt. (n=5)	Non-managing Refrigeration Professionals (n=5)	
Supervising other refrigeration operations staff and/or service providers	No	-	-	5 (36%)
	Yes			
	< 1 yr.	-	-	-
	1-2 yrs.	-	1	1 (7%)
	3-5 yrs.	1	1	2 (14%)
	6-10 yrs.	1	2	3 (21%)
	10+ yrs.	2	1	3 (21%)

Among those who manage staff, about two-thirds (6 of 9) reported having the authority to approve staff training at the company expense. All four executives reported having the authority to approve staff training, whereas less than half (2 of 5) of middle managers had this authority.

A.2. Involvement with RETA

All respondents reported they are a member of RETA with almost all stating other individuals at their organization also are members of RETA or that their organization has a corporate membership (Table 17).

Table 17. Involvement with RETA, Multiple Responses Allowed (n=13)^a

RETA Membership	Count	Percent
I am a member of Refrigerating Engineers & Technicians Association or RETA	13	100%
Other individuals in my organization are members of RETA	12	92%
My organization is a member of RETA (We have corporate membership)	11	85%
None of the above	-	-

^a Missing data for one respondent.

When asked about whether they have attended or accessed any of RETA’s services or training events, respondents most commonly mentioned obtaining training materials from RETA, followed closely by attending RETA’s training classes or the national conference (Table 18).

CRES certificants, in particular, appreciated taking a practice exam from RETA to prepare for a specific certification exam. All CRES certificants and none of the CRES candidates reported taking a practice exam from RETA.

Table 18. RETA Services, Multiple Response Allowed

RETA Services and Training Events	CRES Status		Total (n=14)
	Certificants (n=4)	Candidates (n=10)	
Obtained RETA’s training materials (for example, refrigeration series course workbooks)	3	9	12 (86%)
Attended RETA National Conference	3	8	11 (79%)
Attended any RETA-promoted training classes that were not online	3	8	11 (79%)
Taken a practice exam provided by RETA to prepare for a specific certification exam	4	0	4 (29%)
Attended any of RETA’s industrial Refrigeration online courses	1	0	1 (7%)

In general, respondents valued RETA’s services and training events. As shown in Table 19, all who attended RETA-promoted courses rated online or traditional face-to-face courses as valuable (a rating of “4” or “5”). All who took a RETA practice exam rated the exam as valuable. The vast majority also rated RETA’s training materials and the national conference as valuable.

Table 19. Value of RETA’s Services and Training Events among Those Who Attended Training Events or Accessed RETA’s Services

RETA Services and Training Events	Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all valuable” and 5 meant “very valuable”
Attended any RETA-promoted training classes that were not online (n=11)	100%
Attended any of RETA’s industrial Refrigeration online courses (n=1)	100%
Obtained RETA’s training materials (for example, refrigeration series course workbooks) (n=12)	92%
Attended RETA National Conference (n=11)	82%
Taken a practice exam provided by RETA to prepare for a specific certification exam (n=4)	75%

A.3. Refrigeration Operations Training and Certifications

A.3.1. Training and Certifications

In addition to CRES, RETA offers an entry-level Certified Assistant Refrigeration Operator (CARO) certification and a more advanced Certified Industrial Refrigeration Operator (CIRO) certification. (The certifications are independent; CARO is not a prerequisite to CIRO.) About three-quarters (11 of 14) of respondents reported having the CIRO certification, whereas just over half (8 of 14) reported having the CARO certification. Of those without CIRO (3 of 14), only one had plans to pursue it. Of those without CARO (6 of 14), none had plans to pursue it.

Additionally, more than half (8 of 14) of respondents reported participating in the Refrigeration Operator Coaching (ROC). ROC helps industrial refrigeration service professionals learn how to identify energy savings opportunities. Various agencies sponsor ROC, including Bonneville Power Administration and Energy Trust of Oregon.

CRES certificants were less involved with the ROC initiative and had more certifications than CRES candidates. About half (2 of 4) of CRES certificants, compared to more than half (6 of 10) of CRES candidates, reported participating in the ROC. In contrast, nearly all (3 of 4) CRES certificants had CARO and CIRO credentials, whereas less than half (4 of 10) of CRES candidates had both credentials.

To further assess which certifications are the most common among refrigeration professionals, the survey asked executives and middle managers to report whether their staff had CARO, CIRO, or CRES as well as whether their staff attended ROC. The majority of executives and middle managers reported that some staff had CARO or CIRO credentials (Table 20). Very few reported their staff attended ROC, and one respondent reported that some of their staff is pursuing CRES.

Table 20. Percentage of Those Reporting Their Refrigeration Operations Staff Received RETA Certifications or Attended ROC (Multiple Response Allowed, n=9)

	CIRO	CARO	CRES	ROC ^a
Some staff received this credential / attended this training	6 (67%)	5 (56%)	-	2 (25%)
Some are pursuing it	3 (33%)	2 (22%)	1 (11%)	-
None plan to pursue / attend	1 (11%)	3 (33%)	-	3 (38%)
Don't know	-	-	-	3 (38%)

^a Missing data for one respondent.

A.3.2. Support for Training

Executives and middle managers reported the percentage of their staff with access to employee-provided training support and the percent using such support for certification training, using 0%, 1-25%, 26-50%, 51-75%, and 76-100% response categories. To estimate the average percent

value across these responses, the Evaluation Team calculated the mid-point of each response category (e.g., a mid-point for 51-75% category was 63%), and then assigned the appropriate mid-point value to each respondent’s answer. Please note that the sample included a few respondents from the same company, and all respondents from the same company gave the same answer.¹⁹

Executives and middle managers reported that on average, the vast majority of their staff had access to employer-provided support for training and development, and about two-thirds of the staff had used that support for certification training (Table 21). Executives reported a higher percentage of staff used the employer-provided support for certification training than middle managers (Table 21). The Evaluation Team hypothesizes that executives either:

- › Gave a better estimate of the proportion of staff who used employer-provided training support than middle managers because all executives had the authority to approve staff training while less than half of middle managers had this authority; or,
- › Overstated the proportion of staff who used employer-provided training support due to a belief that the company supports training, whereas middle managers who likely deal with day-to-day operations and the budget may have seen that the budget cannot support training to the degree that top management desires.

Table 21. Access to Training Support, Manager Perspective

	CRES Status		Type of Staff		
	Certificants (n=4)	Candidates (n=5)	Executives (n=4)	Middle Mgmt. (n=5)	Total (n=9)
Average percentage of staff with access to employer-provided support for training and development	88%	88%	88%	88%	88%
Average percentage of staff who have used employer-provided training support	71%	67%	82%	58%	69%

A.3.3. Importance of Certifications When Hiring

Both top officers and middle managers reported that CARO and CIRO certifications are more important considerations when hiring staff than CRES or other refrigeration-related education (Table 22).

Executives reported CRES was a consideration more frequently than middle managers (Table 22), which is a positive finding since executives are likely the key decision-makers when hiring new staff. Additionally, executives reported RETA’s certifications (CARO, CIRO, or CRES)

¹⁹ The Evaluation Team targeted all CRES certificants. A few CRES certificants or candidates worked for the same company.

were considered more frequently when hiring staff than Refrigeration Operation Coaching, indicating that certifications are valued more by executives than training seminars.

Table 22. Considerations When Hiring Staff, Manager Perspective (Multiple Response Allowed)

Certifications and/ or training	Type of Staff		Total (n=9)
	Executives (n=4)	Middle Mgmt. (n=5)	
CARO	3	5	8 (89%)
CIRO	3	5	8 (89%)
CRES	2	1	3 (33%)
Refrigeration Operator Coaching	1	2	3 (33%)
Education/ Training/ Licenses	3	2	5 (56%)

^a Only executives and middle managers were asked about access to support.

About two-thirds (6 of 9) of respondents who were executives or middle managers rated CRES as being influential on who to hire (a rating of “4” or “5” on a 5-pt scale) when responding to the hypothetical scenario noted in Table 23. Half (2 of 4) of executives and nearly all (4 of 5) middle managers reported CRES would be influential on their decision on who to hire.

Table 23. CRES Influence in Hiring New Staff, Manager Perspective

<p>Based on what you know now about CRES, if you were to interview two similarly qualified candidates for a refrigeration operator position in your company, where one of the candidates had the CRES credential and the other did not, how influential would CRES be on your decision on who to hire?</p> <p>Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all influential” and 5 meant “extremely influential”</p>	
Executives (n=4)	50%
Middle Managers (n=5)	80%
All (n=9)	67%

A.4. CRES Experience

A.4.1. CRES Information Channels

Marketing efforts by Northwest Energy Efficiency Alliance (NEEA) and RETA appear to be successful. Respondents most commonly reported hearing about CRES from either a NEEA representative or through a RETA or NEEA sponsored brochure or flyer (Table 24).

Table 24. Information Sources About CRES (Multiple Responses Allowed, n=14)

How respondents heard about CRES	Count	Percent
From NEEA representative	4	29%
From RETA or NEEA sponsored brochure or flyer	3	21%
RETA Meeting	2	14%
RETA Conference	2	14%
RETA Workshop or Training	2	14%
Supervisor	2	14%
From RETA representative	1	7%

A.4.2. Employer Support for CRES

All CRES certificants or candidates reported their company paid or will pay the costs associated with CRES certification and allow them to pursue CRES activities during work time. Three CRES certificants also reported receiving additional support, which included having a training room available at work for preparation.

Financial support from employers appears to be highly important for refrigeration professionals to engage with CRES. A minority of CRES certificants or candidates were willing to pay the costs associated with CRES if employer decided not to provide such support (Table 25).

Table 25. Likelihood of Pursuing CRES If Employer is Not Willing to Support CRES

Would respondents pursue CRES if employer were not willing to...	Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all influential” and 5 meant “extremely influential”
Pay the costs associated with CRES certification? (n=12)	25%
Allow you to pursue CRES certification during work time? (n=13)	46%

A.4.3. Motivations and Challenges for Pursuing CRES

The majority of respondents pursued CRES to improve their skills (Table 26). The second reason for pursuing CRES was to have more job opportunities (Table 26).

Table 26. Motivations to Pursue CRES (Multiple Response Allowed, n=14)

Reported reasons as to why they pursued CRES	Count	Percent
To improve my skills	10	71%
More job opportunities at current company or elsewhere	4	29%
To get better pay	3	21%
To be promoted	3	21%
Related to Field	2	14%
Other	2	14%

The Evaluation Team coded open-ended responses and examined interviewer notes on questions pertaining to how far along CRES candidates were in the CRES certification process. As shown in Table 27, nearly one-third (3 of 10) of CRES candidates are no longer pursuing CRES. These individuals explained why they are no longer pursuing CRES; they are concerns over ability to pass the test without additional training and have difficulty in finding time to document energy efficiency activities. All three candidates who are no longer pursuing CRES took the exam and failed it.

Table 27. Where in the CRES Process are Candidates (n=10)

Where in Process	Count	Percent
No longer pursuing CRES	3	30%
Preparing to take the exam again	2	20%
Documenting 5 energy efficiency activities	2	20%
Just started	1	10%
Submitted all the paperwork on 5 energy efficiency activities	1	10%
Other	1	10%
Total	10	100%

More than half (8 of 14) of CRES certificants or candidates reported at least one aspect of CRES did not go smoothly for them. Respondents most commonly mentioned that training covered in the class or study materials were not adequate to prepare individuals for passing the exam successfully (five mentions). Other concerns were with the application paperwork process being slow, inability to answer questions on the exam due to missing data, and class trainer lacking the full knowledge in providing thorough information (two mentions each).

About a quarter of CRES certificants or candidates noted that there is no need to improve the CRES certification process, stating that it “went fine.”

A few CRES certificants or candidates did provide suggestions on how to improve the CRES certification process. Five reported that having the trainer cover all areas of the test would have been helpful in making the process easier for them. Two suggested a sample test and two

reported needing more time to do the test. One wanted online materials and/or training near his place of work, and one respondent reported needing more feedback or information on the topic of managing costs with energy efficiency operation practices.

CRES candidates who had already taken the exam were asked about how they prepared for the CRES exam. Of the 10 candidates, three reported taking a RETA preparatory class and three noted preparing through self-study. Two of the respondents reported both taking a class and preparing through self-study.

A.5. Importance of Energy Efficiency

A.5.1. Important Skills for Effective Refrigeration Operation

Technical and/or mechanical ability in operating refrigeration systems followed by being detail-oriented were the two most often mentioned critical attributes of being an effective refrigeration operator (Table 28). Nearly all (3 of 4) executives mentioned technical and/or mechanical ability as the most critical skill in effective refrigeration operation, whereas nearly all (4 of 5) middle managers noted being detail-oriented is the most critical skill in effective refrigeration operation.

Table 28. Characteristics Critical to be an Effective Refrigeration Operator (Multiple Response Allowed)

Characteristic	CRES status			Type of Staff		Total (n=14)
	Certificants (n=4)	Candidates (n=10)	Executives (n=4)	Middle Management (n=5)	Non- managing Refrigeration Professionals (n=5)	
Technical/Mechanical	2	7	3	3	3	9 (64%)
Detail oriented / Attentive	0	8	2	4	2	8 (57%)
Understanding of Refrigeration Systems	1	2	1	0	2	3 (21%)
Understanding of Safety	0	3	0	1	2	3 (21%)
Troubleshooting skills	1	2	0	0	3	3 (21%)
Dedicated to field/position	0	2	1	1	0	2 (14%)
Willingness to learn	0	1	1	0	0	1 (7%)
Other	2	4	2	3	1	6 (43%)

^a Other responses included: observation, common sense, fabrication capabilities, being flexible and learning new technologies, constant attention/monitoring of the system, having big picture in mind (balance between energy efficiency and needs of production), and motivation.

The CRES certificant and candidate survey asked respondents to rate the importance of skills which are covered during CRES training, using a scale from 1 to 5 where 1 means “not at all important” and 5 means “extremely important.” Overall, respondents equally rated these skills as important: understanding of the function of refrigeration systems, operation best practices, and managing costs via efficient operation (Table 29).

Table 29. Importance of the Following Skills for Refrigeration Operations Staff (Multiple Response Allowed, n=14)

Importance of These Skills:	Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all important” and 5 meant “extremely important”
Understanding the function of refrigeration system components, safety issues and required monitoring	100%
Understanding operation best practices such as improving part	100%
Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety	100%
Knowing approaches to facility energy management such as setting and monitoring performance indicators	71%
Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps	57%

Executives were more likely than middle managers or non-managing refrigeration professionals to rate knowing approaches to facility energy management and managing energy use of non-refrigeration systems as important (Table 30). CRES certificants were more likely than CRES candidates to rate knowing approaches to facility energy management and managing energy use of non-refrigeration systems as important (Table 30).

Table 30. Importance of the Following Skills for Refrigeration Operations Staff (Multiple Response Allowed)

Importance of These Skills:	CRES Status			Type of Staff	
	Certificants (n=4)	Candidates (n=10)	Executives (n=4)	Middle Mgmt. (n=5)	Non-managing Refrigeration Professionals (n=5)
Knowing approaches to facility energy management such as setting and monitoring performance indicators	100%	60%	100%	60%	60%
Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps	75%	50%	100%	60%	20%

Table 31 compares the responses of management staff in the CRES sample (executives and middle managers) regarding their staff’s skills with the responses of refrigeration professionals regarding their own skill levels. Managers were somewhat less likely than refrigeration professionals to rate the latter’s proficiency as sufficiently skilled.

Table 31. Skills of Refrigeration Professionals, Two Perspectives

Skill Areas	Managers Report their Staff is Sufficiently Skilled in ...(n=9)	Refrigeration Professionals Report they are Sufficiently Skilled in ... (n=5)
Understanding the function of refrigeration system components	78%	100%
Understanding operation best practices	56%	80%
Knowing approaches to facility energy management	56%	40%
Managing costs through efficient operations	56%	100%
Managing energy use of non-refrigeration systems	44%	40%

A.5.2. Energy Efficiency and Organizational Culture

The Evaluation Team asked executives and middle managers a series of statements whether they agree (a rating of “4” or “5” on a 5-pt scale) with several statements noted in Table 32 below. Executives and middle managers were more likely to agree with the company valuing training individuals to operate refrigeration systems efficiently as well as the company increasing energy efficient operations of refrigeration systems in the last five years (Table 32).

Table 32. Agreement with These Statements (ratings of “4” or “5”), Manager Perspective

Percentage rating “4” or “5” on a 1-5 scale where 1 meant “completely disagree” and 5 meant “completely agree”		Total (n=8)
Within the last five years, our company has focused on increasing energy efficient operations of the refrigeration system(s)	Count	7
	Agree (4 or 5 rating)	87.5%
Optimizing energy use is less important than hitting operational targets such as production quotas	Count	6
	Agree (4 or 5 rating)	75.0%
Our company values training individuals to operate our refrigeration systems efficiently	Count	8
	Agree (4 or 5 rating)	100.0%
Our company values on-the-job training more than refrigeration-related certifications	Count	6
	Agree (4 or 5 rating)	75.0%

The Evaluation Team asked refrigeration professionals who perform refrigeration operation activities to rate the organizational culture at their company (Table 33). The highest level of agreement was in staff feeling encouraged to find solutions to problems and knowing how to safely optimize energy use while maintaining reliable system operation.

Table 33. Organizational Culture on Staff Support, Refrigeration Operators

Statement	Count	Percent who Agree with rating of “4” or “5”
At work, I am encouraged to find solutions to problems I encounter operating the refrigeration system. (n=18)	9	90%
I know how to safely optimize energy use while maintaining reliable system operation. (n=18)	9	90%
My company values having a certified professional operate and maintain its refrigeration systems. (n=17)	8	80%
Optimizing energy use is less important than hitting operational targets such as production quotas. (n=18)	6	60%
My suggestions for improvements to operating and maintaining the refrigeration system are seldom taken seriously. (n=17)	2	20%
My services in operating and maintaining the refrigeration system are not highly valued by my company. (n=17)	1	10%

A.6. Importance of Technical Proficiency When Hiring Vendors

Although none of the companies respondents worked for outsourced the operations of the refrigeration controls, all did contract out some aspects of equipment maintenance to vendors.²⁰

When selecting vendors, all respondents said technical proficiency and nearly all said customer service was important (7 of 8) (a rating of “4” or “5” on a 5-pt scale). The majority (5 of 8) also said price of service was important. Executives were more likely than middle managers to say customer service was important.

When asked to identify the most important factor between price, customer service and technical proficiency when selecting a vendor, respondents most commonly said technical proficiency. Executives, whose perspective is the most important when deciding who to hire, reported technical proficiency is the most important factor, followed by customer service.

Since technical proficiency appeared to be important, we asked executives and middle management to note which certifications or awards listed in Table 34 are key indicators of technical proficiency. Of those who selected a key indicator, 25% chose one, 25% chose two,

²⁰ Please note that all respondents from the same company provided the same answer when asked about the refrigeration operations and maintenance services that were contracted out. Only includes companies that contract out for refrigeration service work, plus one missing response.

38% chose three, and 13% chose five. Respondents most commonly reported CIRO as the key indicator of technical proficiency, followed by CARO and possession of safety-related awards (Table 34). Middle managers were more likely than executives to select CARO, CIRO, or possession of safety-related awards as the key indicators of technical proficiency.

Please note that the Evaluation Team did not ask about the CRES credential. It is unlikely that refrigeration professionals consider CRES to be a key indicator of technical because CRES is a new certification in the marketplace.

Table 34. Key Indicators of Technical Proficiency When Deciding Which Vendor to Hire, Multiple Responses Allowed

Indicators (Not an open-ended question - the Evaluation Team asked about each indicator)	CRES Status		Type of Staff		Total (n=8) ^a
	Certificants (n=2)	Candidates (n=6)	Executives (n=3)	Middle Mgmt. (n=5)	
CIRO	-	5	1	4	5 (62.5%)
Possession of safety-related awards	1	3	1	3	4 (50.0%)
CARO	-	4	-	4	4 (50.0%)
Other ^b	2	2	2	2	4 (50.0%)
Possession of other refrigeration-related certifications	1	2	1	2	3 (37.5%)

^a Only includes companies that contract out for refrigeration service work as well as executives and middle management, plus one missing response

^b Other includes dependability, response time; welding, rebuilds; any related training certs; and demonstration of skill

A.7. Firmographics

The majority CRES certificants or candidates (8 of 14) worked in facilities located in Oregon, indicating that CRES certification may be adopted faster in Oregon than in other Northwest regions. Overall, there were ten companies represented in this survey with the majority having one respondent per company (7 of 10). The majority of companies were smaller with one to five operators (Table 35).

Table 35. Number of Refrigeration Operators per Organization, Responses per Company

Number of Operators	Frequency	Percent ^a
1 to 5	6	67%
6 to 10	1	11%
More than 10	2	22%
Total	9 ^a	100%

^a Missing one response

As shown in Table 36, respondents reported a broad range of refrigeration activities performed in the facilities they worked at, with the vast majority reporting refrigeration in the facility was used for cold storage followed by blast cooling/freezing of perishable goods (Table 36).

Table 36. Refrigeration Activities Performed in the Facilities, Responses per Company, Multiple Responses Allowed (n=10)

Activities	Count of Those Reporting	Percent
Blast cooling/ freezing	6	60%
Process cooling	2	20%
Freeze drying	1	10%
Cold storage	8	80%
Hybrid Hydro Cool	1	10%

Appendix B. Non-CRES Certificant Survey Findings

This appendix provides findings from a survey conducted with 53 non-CRES certifiants or refrigeration professionals who have not received the CRES certification. The purpose of the survey was to understand respondents' roles and responsibilities, involvement with RETA, the value of refrigeration training and/or certifications, and importance of energy efficient practices in refrigeration operations.

This appendix includes frequencies of all responses and notable response differences between executives, middle managers, and non-managing refrigeration professionals. Response differences between different types of respondents, when reported, should be interpreted with caution because the small sample size limited the ability to make statistical comparisons. The sample was adequate to provide an overall confidence/precision of 85%, $\pm 15\%$.

B.1. Work Experience and Types of Respondents

The sample had a majority of respondents who were middle managers (28 of 53), followed by non-managing refrigeration professionals (18 of 53) and a small minority of executives (7 of 53).

As shown in Table 37, all 18 non-managing refrigeration professionals and the majority (29 of 35) of managers (executives and middle managers) reported operating refrigeration equipment. Among those who reported operating refrigeration equipment, almost half (24 of 53) have been conducting operations for more than 10 years.

Table 37. Work Experience

Responsibilities and Length of Time with Those Responsibilities		Type of Staff			Total (n=53)	
		Executives (n=7)	Middle Mgmt. (n=28)	Non-managing Refrigeration Professionals (n=18)		
Conducting operation of the refrigeration systems	No	1	5	-	6 (11%)	
	Yes	< 1 yr.	-	2	-	2 (4%)
		1-2 yrs.	-	2	3	5 (9%)
		3-5 yrs.	-	3	7	10 (19%)
		6-10 yrs.	1	2	3	6 (11%)
		10+ yrs.	5	14	5	24 (45%)

Nearly all (6 of 7) executives and two thirds (19 of 28) of middle managers have been managing refrigeration operations staff for more than six years. Executives have been managing staff for longer than middle managers (Table 38).

Table 38. Work Experience, Management of Refrigeration Operations Staff

Responsibilities and Length of Time with Those Responsibilities		Type of Staff			Total (n=53)	
		Executives (n=7)	Middle Mgmt. (n=28)	Non-managing Refrigeration Professionals (n=18)		
Supervising other refrigeration operations staff and/or service providers	No	-	-	18	18 (34%)	
	Yes	< 1 yr.	1	-	-	1 (2%)
		1-2 yrs.	-	5	-	5 (9%)
		3-5 yrs.	-	4	-	4 (8%)
		6-10 yrs.	4	9	-	13 (25%)
		10+ yrs.	2	10	-	12 (23%)

Among those who manage staff, more than half (19 of 32) reported having the authority to approve staff training at the company expense. Almost all (5 of 7) executives reported having the authority to approve staff training, whereas half (14 of 28) of middle managers had this authority.

B.2. Involvement with RETA

Nearly half of respondents reported they are a member of RETA with a third stating other individuals at their organization also are members of RETA and a fifth stating that their organization has a corporate membership (Table 39).

Table 39. RETA Membership, Multiple Responses Allowed

Respondent & Organization (n=49) ^a	Count	Percent
I am a member of RETA	24	49%
Other individuals in my organization are members of RETA	16	33%
My organization is a member of RETA	10	20%
None of the above	11	22%
Don't Know	5	10%

^a Missing data for four respondents.

When asked about whether they have attended or accessed any of RETA's services or training events, respondents most commonly mentioned obtaining training materials from RETA, followed closely by attending RETA's training classes that were not online (Table 40).

Table 40. RETA Services, Multiple Responses Allowed

RETA Service and Attendees	Type of Staff			Total (n=53)
	Executives	Middle Mgmt.	Techs	
Attended RETA National Conference	3	9	12	24 (45%)
Attended any of RETA’s industrial Refrigeration online courses	3	8	7	18 (34%)
Obtained RETA’s training materials	4	16	15	35 (66%)
Taken a practice exam provided by RETA to prepare for a specific certification exam	4	9	13	26 (49%)
Attended any RETA-promoted training classes that were not online	4	11	15	30 (57%)
Hired RETA-endorsed instructors to come to the facility to train you or your staff	3	5	-	8 (15%)
Attended training sessions from RETA-endorsed instructors who came to the facility to train the staff	-	-	12	12 (23%)
Obtained any of RETA’s certifications	4	9	14	27 (51%)

In general, respondents valued RETA’s services and training events. As shown in Table 41, the vast majority who obtained RETA’s training materials, obtained any RETA certification, or attended any RETA-promoted training classes that were not online rated them as valuable (a rating of “4” or “5”).

Table 41. Value of RETA’s Services and Training Events Among Those Who Attended Training Events or Accessed RETA’s Services

RETA Services and Training Events	Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all valuable and 5 meant “very valuable”
Obtained RETA’s training materials (n=35)	94%
Obtained any of RETA’s certifications (n=27)	85%
Attended any RETA-promoted training classes that were not online (n=30)	80%
Taken a practice exam provided by RETA to prepare for a specific certification exam (n=26)	77%
Attended RETA National Conference (n=24)	75%
Hired RETA-endorsed instructors to come to the facility to train you or your staff (n=8)	75%
Attended any of RETA’s industrial Refrigeration online courses (n=18)	67%
Attended training sessions from RETA-endorsed instructors who came to the facility to train the staff (n=12)	58%

^a The Evaluation Team excluded “not applicable” responses from this analysis.

B.3. Refrigeration Operations Training and Certifications

B.3.1. Training and Certifications

In addition to CRES, RETA offers an entry-level CARO certification and a more advanced CIRO certification. (The certifications are independent; CARO is not a prerequisite to CIRO.) About one-third (17 of 53) of respondents reported having the CIRO certification, whereas less than a quarter (12 of 53) reported having the CARO certification. Of those without CIRO (36 of 53), seven had plans to pursue it. Of those without CARO (41 of 53), six had plans to pursue it.

Additionally, several (10 of 53) of respondents reported participating in the ROC. ROC helps industrial refrigeration service professionals learn how to identify energy savings opportunities. Various agencies sponsor ROC, including Bonneville Power Administration and Energy Trust of Oregon.

To further assess which certifications are the most common among refrigeration professionals, the survey asked executives and middle managers to report whether their staff had CARO, CIRO, or CRES as well as whether their staff attended ROC. About a quarter of executives and middle managers reported that some staff had CARO or CIRO credentials (Table 42). Very few reported their staff attended ROC, and one respondent reported that some of their staff received CRES.

Table 42. Percentage of Managers Reporting Their Refrigeration Operations Staff Received RETA Certifications or Attended ROC (Multiple Response Allowed, n=35)

	CIRO	CARO	CRES	ROC ^a
Some staff received this credential / attended this training	8 (23%)	7 (20%)	1 (3%)	6 (17%)
Some are pursuing it	4 (11%)	6 (17%)	-	3 (9%)
None plan to pursue / attend	13 (37%)	15 (43%)	-	12 (34%)
Don't know	8 (23%)	7 (20%)	-	12 (34%)

B.3.2. Support for Training

The executives and middle managers reported the percent of their staff with access to employee-provided training support and the percent using such support for certification training, using 0%, 1-25%, 26-50%, 51-75%, and 76-100% response categories. To estimate the average percent value across these responses, the Evaluation Team calculated the mid-point of each response category (for example, a mid-point for 51-75% category was 63%), and then assigned the appropriate mid-point value to each respondent's answer. Please note that the sample included a

few respondents from the same company, and all respondents from the same company gave the same answer.²¹

The executives and middle management reported that on average, over three-fourths of their staff had access to employer-provided support for training and development, and just under half of the staff had used that support for certification training. Executives reported a lower percentage of staff who had used the employer-provided support for certification training than middle managers (Table 43). The Evaluation Team hypothesizes that executives provided a better estimate of those who used employer-provided training support than middle managers because almost all executives (5 of 7) had the authority to approve staff training while half of middle managers (14 of 28) had this authority.

Table 43. Access to Support – Manager Perspective

	Executives (n=7)	Middle Mgmt. (n=26)^a	Total (n=33)^a
Percentage of refrigeration professionals with access to employer-provided support for training and development	74%	79%	78%
Percentage of refrigeration professionals who have used employer support for certification training	41%	50%	48%

^a Some respondents opted not to answer these two questions. Missing data excluded from this analysis.

Executives and middle management were asked about the likelihood to provide different levels of support. Respondents chose a rating of “4” or “5” on a 1-5 scale where 1 meant “not at all likely” and 5 meant “very likely”. The most likely support selected was pay exam certification fee followed by pay for CRES certification training materials from RETA. Providing paid time off for training was the least selected as likely by respondents (Table 44). Among those who manage staff, about two-thirds said their organization is likely to pay for the CRES exam certification fee.

²¹ Some CRES certificants or candidates in our sample worked for the same company, which was not a problem because our population was refrigeration professionals pursuing CRES not companies pursuing CRES (for example, some were technicians and some were middle managers that worked for the same company in the sample).

Table 44. Likelihood to Provide Support

	Count ^a	Rating of “4” or “5” on a 1-5 scale where 1 meant “not at all likely” and 5 meant “very likely”
Pay exam certification fee	35	23 (66%)
Pay for CRES certification training materials from RETA	34	21 (62%)
Pay for continuing education credits	35	20 (57%)
Allow staff to complete activities and documentation required for certification during work hours	34	18 (53%)
Pay associated travel expenses to take the exam	34	17 (50%)
Allow paid time off for training	32	14 (44%)

^a Some respondents opted not to answer all of these questions. Count is for those who responded to question in any way.

Manager who said that their company is not likely to provide support explained their perspective when asked for clarification on why their company is not likely to support certain aspects of CRES. The most common explanation was budget and time (2 mentions each). Other comments were: other RETA certifications are good enough, internal training, lack of support from top officials, too small of an operation, and that is it not a common company practice (one mention each).

B.3.3. Importance of Certifications when Hiring

Both executives and middle managers reported that CARO and CIRO certifications are more important considerations when hiring than CRES or other refrigeration operations education (Table 45).

Executives reported CRES was a consideration more frequently than middle managers (Table 45), which is a positive finding since executives are likely the decision-makers for hiring new staff. Additionally, executives reported CARO, CIRO, and CRES was a consideration more frequently when hiring than refrigeration operation coaching, indicating that certifications are valued more by executives than training seminars.

Table 45. Considerations When Hiring, Manager Perspective (Multiple Responses Allowed)

Consideration	Top Officer (n=7)	Middle Mgmt. (n=28)	Total (n=35)
CIRO	3	13	16 (46%)
CARO	3	12	15 (43%)
Refrigeration Operator Coaching	0	7	7 (20%)
CRES	1	3	4 (11%)
Education/Training/License	1	2	3 (9%)

Know individual	0	1	1 (3%)
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The majority (19 of 35) of respondents who were executives or middle managers rated CRES as being influential on who to hire (a rating of “4” or “5” on a 5-pt scale) when responding to the hypothetical scenario noted in Table 46. Almost a third (2 of 7) of executives and majority (17 of 28) middle managers reported CRES would be influential on their decision on who to hire.

Table 46. CRES Influence in Hiring New Staff, Manager Perspective

<p>Based on what you know now about CRES, if you were to interview two similarly qualified candidates for a refrigeration operator position in your company, where one of the candidates had the CRES credential and the other did not, how influential would CRES be on your decision on who to hire?</p> <p>Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all influential” and 5 meant “extremely influential”</p>	
Executives (n=7)	29%
Middle Managers (n=28)	61%
All (n=35)	54%

B.4. CRES Awareness

Marketing efforts by NEEA and RETA appear to be successful. Three-fourths of respondents have heard about the CRES certification. Of the 40 who have heard about the CRES certification, ten are pursuing CRES (25%).²² The one certified individual is a top officer. Of those who are pursuing CRES, five are middle management, four are refrigeration professionals, and one is a top officer. Refrigeration professionals are more likely to have heard about the CRES certification than middle management, who are more likely to have heard about it than executives (Table 47/ Table 47).

Table 47. CRES Awareness

		Executives (n=7)	Middle Mgmt. (n=28)	Refrigeration Professionals (n=18)	Total (n=53)
Have you heard about the CRES certification?	Yes	4	20	16	40 (75%)
	No	3	8	2	13 (25%)

²² One non-CRES certificant said he was CRES certified. Because this contact was not on the NEEA’s list of CRES certificants, the Evaluation Team excluded this response from the count of those pursuing CRES.

B.5. Employer Support for CRES

The Evaluation Team asked respondents who perform refrigeration operation activities (n=14) a series of statements to assess the level of agreement (a rating of “4” or “5” on a 5-pt scale) for staff support in the organization culture (Table 48).

Financial support from employers appears to be important for refrigeration professionals to engage with CRES. Of those who are currently not pursuing CRES, the majority rated they would likely pursue if their employer paid the costs associated with certification with even more likely if employer paid the costs and were allowed to pursue CRES during work time (Table 48). No respondents marked likely to pursue if their employer did not support them in any way (Table 48).

Table 48. Impact of Employer Support on those Not Pursuing CRES Currently

Likelihood to obtain CRES if employer... where 1 “not at all likely” and 5 is “very likely”	Count ^a	Likely Rating of “4” or “5”
Paid the costs associated with CRES certification (n=14)	8	57%
Paid the associated costs AND allowed you to pursue CRES certification during work time (n=14)	9	64%
Did not support you in any way (n=13) ^b	0	0%

^a Only asked of those not currently pursuing CRES.

^b Only asked of those not currently pursuing CRES but one missing response.

Of the four respondents who are currently pursuing CRES, all rated they their employer will pay the costs associated with certification and support them in any other way with three-quarters reporting their employer will pay the costs and allow them to pursue CRES during work time (Table 49).

Table 49. Impact of Employer Support on Those Pursuing CRES

Employer will...	Total ^a	Percent “yes”
Pay the costs associated with CRES certification	4	100%
Pay the associated costs AND allowed you to pursue CRES certification during work time	4	75%
Support you in any other way	4	100%

^a Only asked of those currently pursuing CRES. 49 System Missing

B.6. Importance of Energy Efficiency

B.6.1. Important Skills For Effective Refrigeration Operation

Understanding of refrigeration systems followed by detail oriented and understanding of safety were the three most often mentioned critical attributes of being an effective refrigeration operator (Table 50). The majority (4 of 7) of executives mentioned detail oriented/attentive and/or understanding of safety as the most critical skill in effective refrigeration operation, whereas the majority of middle managers (15 of 28) and technicians (10 of 18) mentioned understanding of refrigeration systems as the most critical skill (Table 50).

Table 50. Characteristics Critical to be an Effective Refrigeration Operator (Multiple Response Allowed)

Characteristic	Type of Staff			Total (n=53)
	Executives (n=7)	Middle Mgmt. (n=28)	Technicians (n=18)	
Understanding of Refrigeration Systems	2	15	10	27 (51%)
Detail oriented / Attentive	4	8	6	18 (34%)
Other ^a	3	8	7	18 (34%)
Understanding of Safety	4	6	7	17 (32%)
Experience / Training	2	7	-	9 (17%)
Willingness to learn	3	3	3	9 (17%)
Dependable/Reliable	1	4	3	8 (15%)

^a Other responses included purchasing skills, ability to grasp production needs, inquisitive and curious, follow institutional requirements, follow regulations, look to improve and update system, clear communication, properly troubleshoot, mechanically inclined, financial impact understanding, as well as patience.

The survey asked Non-CRES Certificant respondents to rate the importance of skills that are covered during CRES training, using a scale from 1 to 5 where 1 means “not at all important” and 5 means “extremely important.” These respondents had not taken the CRES training and were not informed that the skills the Evaluation Team was asking about are skills covered during the CRES training. Overall, respondents rated understanding of the function of refrigeration systems highest followed by understanding operation best practices and managing costs via efficient operation (Table 51). Executives were more likely than middle managers to rate managing costs by efficiently operating the refrigeration equipment as important (100% and 79%, respectively).

Table 51. Importance of the Following Skills for Refrigeration Operations Staff (Multiple Response Allowed, n=35 – Executives and Middle Managers)

Importance of These Skills:	Percentage rating “4” or “5” on a 1-5 scale where 1 meant “not at all important” and 5 meant “extremely important”		
	Executives (n=7)	Middle Management (n=28)	Total (n=35)
Understanding the function of refrigeration system components, safety issues and required monitoring	100%	100%	100%
Understanding operation best practices	100%	89%	91%
Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety	100%	79%	83%
Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps	86%	71%	74%
Knowing approaches to facility energy management such as setting and monitoring performance indicators	86%	64%	69%

Executives and middle managers were asked to report whether their staff were sufficiently skilled in areas noted in Table 52. In addition, refrigeration professionals were asked to report on their own skills. Refrigeration professionals were much more likely to state they are sufficiently skilled in all areas listed in Table 52 than managers who were less likely to report their staff was sufficiently skilled in those areas (Table 52).

Table 52. Skills of Refrigeration Professionals

Skill Areas	Managers Report their Staff is Sufficiently Skilled in ...(n=35)	Refrigeration Professionals Report they are Sufficiently Skilled in ... (n=18)
Understanding the function of refrigeration system components	71%	100%
Understanding operation best practices	49%	83%
Knowing approaches to facility energy management	31%	44%
Managing costs through efficient operations	37%	50%
Managing energy use of non-refrigeration systems	40%	50%
None of the Above	17%	0%

B.6.2. Energy Efficiency and Organizational Culture

This section reports on company characteristics. In some cases, we surveyed more than one respondent from a given organization. In this section, we report all the company attributes indicated across the firm’s multiple respondents.

The Evaluation Team asked executives and middle managers a series of statements whether they agree (a rating of “4” or “5” on a 5-pt scale) with several statements noted in Table 53 below. Executives and middle managers were most likely to agree that their company has increased the efficiency of operating their refrigeration systems in the last five years (Table 53). The majority of respondents also agreed that their company values training individuals to operate refrigeration systems efficiently (Table 53).

Table 53. Agreement with These Statements (ratings of “4” or “5”), Manager Perspective

Percentage rating “4” or “5” on a 1-5 scale where 1 meant “completely disagree” and 5 meant “completely agree”	Total
Within the last five years, our company has focused on increasing energy efficient operations of the refrigeration system(s) (n=34)	76%
Our company values training individuals to operate our refrigeration systems efficiently (n=35)	63%
Optimizing energy use is less important than hitting operational targets such as production quotas (n=34)	50%
Our company values on-the-job training more than refrigeration-related certifications (n=34)	21%

The Evaluation Team asked refrigeration professionals who perform refrigeration operation activities to rate the organizational culture at their company. Most refrigeration professionals reported a supportive organizational culture at their company. They reported: (1) feeling encouraged to find solutions to problems; (2) being taken seriously when providing suggestions; and (3) feeling valued by their company (Table 54). The majority of refrigeration professionals also noted that their company valued having a certified professional operate and maintain refrigeration systems (Table 54).

Table 54. Organizational Culture on Staff Support^a

Statement	Count	Percent who Agree with rating of “4” or “5”
At work, I am encouraged to find solutions to problems I encounter operating the refrigeration system. (n=18)	15	83%
My company values having a certified professional operate and maintain its refrigeration systems. (n=17)	11	76%
I know how to safely optimize energy use while maintaining reliable system operation. (n=18)	7	39%
Optimizing energy use is less important than hitting operational targets such as production quotas. (n=18)	7	39%
My suggestions for improvements to operating and maintaining the refrigeration system are seldom taken seriously. (n=17)	5	29%
My services in operating and maintaining the refrigeration system are not highly valued by my company. (n=17)	5	29%

^a Only asked of technicians. One missing response for three of the statements.

B.7. Importance of Technical Proficiency When Hiring Vendors²³

Although none of the companies respondents worked for outsourced the operations of the refrigeration controls, almost all did contract out some aspects of refrigeration services to vendors (34 of 38). Companies were most likely to contract out for maintaining equipment (31 of 34) than operating controls (12 of 34).

When selecting vendors, nearly all respondents said technical proficiency or customer service was important (29 of 30 each) (a rating of “4” or “5” on a 5-pt scale). The majority (20 of 30) also said price of service was important.

When asked about the most important factor of the three referenced above when selecting a vendor, respondents most commonly said technical proficiency. Executives, whose perspective is the most important when deciding who to hire, reported technical proficiency is the most important factor, followed by customer service. Price was less important.

Since technical proficiency appeared to be important, we asked executives and middle management which certifications or awards are key indicators of technical proficiency. Of those who selected a key indicator, 63% chose one, 22% chose two or three, and 16% chose four. Respondents most commonly reported possession of other refrigeration-related certifications as

²³ For the question on contracting out (Q1, Q2), we first took the highest managers response and then took the highest level of response (used “yes, all of it” rather than “yes, but not all of it”) if different responses from the same staff category. If the managers reported they do not contract out, then we excluded any response on what they contract out for. Two of the companies are unknown. These two responses were taken as different companies and responses.

the key indicator of technical proficiency, followed by CIRO (Table 55). Executives were more likely than middle management to select CARO, CIRO, or possession of safety-related awards (Table 55) as the key indicators of technical proficiency.

Table 55. Key Indicators of Technical Proficiency when Contracting, Multiple Responses Allowed

Indicator	Executives (n=6)	Middle Mgmt. (n=21)	Refrigeration Professionals (n=3)	Total (n=30)
Possession of other refrigeration-related certifications	3	11	-	14 (47%)
CIRO	2	4	1	7 (23%)
Other	1	4	-	5 (17%)
Possession of safety-related awards	2	2	-	4 (13%)
CARO	1	3	-	4 (13%)

B.8. Firmographics

Overall, there were 38 companies represented in this survey with the majority having one respondent per company (30 of 38). Two of the companies were unknown so we considered these responses as different companies. Half of the companies were smaller with one to five operators followed by nearly a third having six to ten operators (Table 56).

Table 56. Number of Operators per Organization

Number of Operators	Frequency	Percent ^a
1 to 5	19	56%
6 to 10	11	32%
More than 10	4	12%
Total	34 ^a	100%

^a Missing four responses

Table 57 Respondents reported a broad range of refrigeration activities performed in the facilities they worked at, with the vast majority reporting the purpose of the facility is for food processing (Table 57).

Table 57. Refrigeration Activities Performed in the Facilities, Responses per Company, Multiple Responses Allowed (n=38)

Activities	Count of Those Reporting	Percent
Food	27	71%
Storage/Warehouse	5	13%
Pharmaceuticals	3	8%
Beverage	1	3%
Other ^a	4	11%

^a Other products include laboratory, heavy industry, regional hospital, and data center.

Respondents reported a broad range of refrigeration activities performed in the facilities they worked at, with the vast majority reporting refrigeration in the facility was used for cold storage, followed by blast cooling and freezing (Table 58).

Table 58. Refrigeration Activities Performed in the Facilities, Responses per Company, Multiple Responses Allowed (n=38)

Activities	Count of Those Reporting	Percent
Cold storage	34	89%
Blast cooling/ freezing	24	63%
Process cooling	20	53%
Freeze drying	2	5%
Other ^a	5	13%

^a Others include chill water plant, computer room precision cooling, Dry CO₂ ice, and ice making.

Appendix C. Description of the Refrigeration Facilities and Vendor Services

Refrigeration is typically associated with food processing, distribution and cold storage, as shown in Table 59.

Table 59. Goods Processed and Activities Performed in Respondents' Facilities (Non-CRES, CRES, and Vendor Datasets; Multiple Response Allowed)

Products and Processing Activities	Combined Non-CRES and CRES Survey Data (n=43) ^a		Vendors (n=10)	
	Count	Percent	Count	Percent
Types of Products Processed				
Food (dairy, meat, seafood, bread, fruit, or vegetables)	33	77%	10	100%
Beverage	3	7%	8	80%
Pharmaceuticals	3	7%	5	50%
Other ^b	4	9%	3	30%
Types of Activities Performed				
Cold storage	36	84%		No data
Blast cooling/freezing	25	58%		No data
Process cooling	20	47%		No data
Freeze Drying	2	5%		No data
Other ^c	5	8%		No data

^a This table has eliminated duplication of firms across the two samples; the respondents (53 non-CRES certificants and 14 CRES certificants or candidates) worked for 43 unique companies.

^b Other products include memory chips/electronics, laboratory, heavy industry, regional hospital, data center, and winery.

^c Other activities include hybrid hydro cooling, chill water plant, computer room precision cooling, dry CO₂ ice, and ice making.

To support refrigeration plants, vendors most commonly mentioned offering custom refrigeration design, controls, and software for refrigeration system management, equipment installation and repair, and preventative maintenance services (eight mentions each). Six vendors also noted selling refrigeration equipment and variable frequency drive controls. Four offered basic refrigeration training. Three offered safety training, remote system monitoring, and safety inspections. Two vendors provided energy audits.

Appendix D. Instruments

D.1. RETA CRES Certification: RETA Staff In-depth Interview Guide

D.1.1. Introduction Script

Hello. My name is _____, and I am with Research Into Action. I am calling on behalf of Northwest Energy Efficient Alliance, also known as NEEA. You may have recently received an email invitation from NEEA to participate in a study they are conducting on the Certified Refrigeration Energy Specialist or CRES credential. Based on your involvement with RETA and your knowledge about CRES, we would like to get your input on the directions and challenges relating to promotion and uptake of CRES credentials. This interview should last about 30 minutes.

[IF NO APPOINTMENT WAS SCHEDULED VIA EMAIL:] Is now a good time to talk? If not, could we schedule another time at your convenience?

Before we proceed, please know that your responses will be confidential, and any analyses will not identify individuals.

Also, would it be OK with you if I recorded our conversation to aid in my note taking?

[Interviewer: *If permission given, record the interview.*]

D.1.2. Role and Responsibilities [ASK ALL CONTACTS]

- Q1. Please briefly describe your role at RETA.
- Q2. Please briefly describe your experience with the industrial refrigeration sector.
- Q3. [IF NOT MENTIONED]: What is your involvement with the CRES certification?

D.1.3. Marketing and Outreach [ASK APPROPRIATE CONTACT]

NOTE: We will have some information about contacts, and thus, the screener question below may not be needed. We left the screener question in case we do not have sufficient information to determine which contact can answer these questions.

Screener: Some of my questions concern RETA's CRES promotion or marketing and outreach activities. Are you able to speak to this topic? [INTERVIEWER: *if they are the appropriate contact, ask them questions in this section; If not the appropriate contact, ask who would be the appropriate contact, record the name and contact information here, and skip to Q14.*]

- Q4. What are RETA's activities and plans for promoting the CRES certification in the Northwest? [PROBE for marketing channels such as mass media, direct mail, face-to-face, etc.]
- How did you decide to use that/those marketing channel(s)?
 - [IF NONE OR LITTLE] What marketing and outreach for CRES is RETA planning?
- Q5. What do you think is the main appeal of or value of CRES to operators?
- Q6. And the appeal or value for managers?
- Q7. And what type of messaging has RETA used in its marketing? That is, what does the marketing try to communicate about CRES? [PROBE for messaging strategies – improved employee skills, money/energy savings, job advancement, etc.]
- Why did you decide on that message/those messages? [PROBE for whether the messaging was based on the past experience with CARO or CIRO or based on some other information they had about their target market.]
 - [IF NONE OR LITTLE] What type of messaging is RETA planning to use in its marketing?
- Q8. [IF SOME MARKETING HAS OCCURRED] And have you been seeing the response you anticipated to get from the CRES marketing and outreach efforts met your expectations? [IF NECESSARY: Were they effective?]
- Q9. Do your marketing and outreach efforts differ – or will they differ – for the different regions in the Northwest? [IF NEEDED: across ID, MT, OR, or WA or across urban/rural areas]
- [IF SO] How are they different?
- Q10. [IF NOT MENTIONED, ASK:] In addition to what you have already been doing, are you planning any other type of marketing and outreach activities for promoting the CRES certification in the Northwest in the next year? [IF YES:] What are you planning and why?
- Q11. What challenges (if any) did RETA face when launching and/or promoting the CRES certification? [PROBE about challenges relating to development of the messages, figuring out the best channels to use, or identifying the target market/audience]
- [IF CHALLENGES MENTIONED, ASK]:
- How did RETA overcome these challenges?
 - Did you face similar challenges when launching and/or promoting CARO and CIRO? If so, how did your experience in overcoming those challenges with CARO and CIRO help with CRES?

- Q12. [IF NOT MENTIONED, ASK:] Do RETA chapters promote the CRES certification in the Northwest?
- [IF YES] How so?
 - [IF NO] Are they planning to?
- Q13. [IF NOT MENTIONED, ASK:] Do your marketing and outreach strategies differ at all for refrigeration professionals near RETA chapters compared to those that are distant from RETA chapters? If so, how?
- Q14. What feedback (if any) have you received from refrigeration professionals or companies regarding how they learned of CRES?

D.1.4. Appeal of Certifications and Barriers [ASK ALL CONTACTS]

- Q15. Why did RETA decide to develop CRES certification?
- Q16. What have you heard from the market on what drives companies to send individuals to get CRES certified? To get CARO/CIRO certified?
- Q17. In your experience, what are the major barriers for refrigeration operations staff and managers to pursue CRES certification? Are the barriers different for CARO and CIRO?
- Q18. What proportion of refrigeration facilities would you say are constrained by these barriers?

D.1.5. Market Trends and Expectations [ASK ALL CONTACTS]

Next, I would like to know about current trends and RETA's expectations for the CRES certification.

- Q19. In the Northwest, how many individuals are CRES certified as of today?
- How many are pursuing CRES as of today?
- Q20. What are RETA's expectations for the eventual uptake of CRES certification in the Northwest?
- Q21. [IF NOT MENTIONED IN Q17:] With the current development path that RETA and NEEA are pursuing for CRES certification, how many individuals would you estimate will be CRES certified in the next year?
- How about in the next 5 years?
- Q22. Do you have an estimate of the number of refrigeration professionals in the Northwest?
- How about in the country?

Q23. Do you have an estimate of the number of firms with an industrial refrigeration system in the Northwest?

- How about in the country?

Q24. What do you think is the maximum percentage of refrigeration professionals that will become CRES certified in the Northwest?

- What factors do you think will be the major drivers in reaching that number?
- What factors will be the major barriers?
- How long would you estimate it would take for the Northwest to reach that percentage, if ever?

Q25. Is there anything else you would like to share with us?

That was my last question. Thank you very much for all of your valuable time. We know it was a significant investment, and we appreciate it.

D.2. Vendor Survey

D.2.1. Phone Introduction

Hello. My name is _____ and I am with Research Into Action. I am calling on behalf of Northwest Energy Efficient Alliance (NEEA).

[If Contact Name Known] Could I speak with [Name]?

[If Contact Name Not Known] NEEA is conducting a study of refrigeration system operation practices in the Northwest region. I would like to speak with the person at your company who manages products and services staff to ask him or her a few questions about your firm's refrigeration services, pricing, and the market. Who would that be?

[Explain the purpose of the study if requested.]

Name and Title: _____

Phone: _____

[When Connected with the Correct Person] Hello. My name is _____ and I am with Research Into Action. I am calling on behalf of Northwest Energy Efficient Alliance (NEEA), an organization funded by northwest utilities to support efforts to reduce energy consumption. NEEA is conducting an assessment of refrigeration system operation practices in the Northwest region. The results of this study will help support the training and education offered to those involved with operating and maintaining large-scale refrigeration systems.

Considering your firm provides refrigeration products and services to various organizations in Idaho, Montana, Oregon, or Washington, I have a few questions that I'd like to ask you about

your staff, services, and the market that you serve. I'll only need about 15 minutes of your time. Is now a good time to talk? If not, could we schedule another time at your convenience?

[*If needed*]: Appointment date and time: _____

Before we proceed, please know that your responses will be confidential to the extent permitted by law, and any analyses will not identify individuals or firms.

Also, would it be OK with you if I recorded our conversation to aid in my note taking?

[*Interviewer: If permission given, record the interview.*]

[*Interviewer: Only read question options if indicated.*]

D.2.2. Refrigeration Products and Services Offered

First, I'd like to ask you a few questions about your job and your organization.

[ASK ALL]

Q1. What is your role at your organization?

1. [OPEN-ENDED RESPONSE]

99. Refused

[ASK ALL]

Q2. What refrigeration products and services does your organization provide to other businesses and buildings? We are interested in those services associated with large-scale systems. By large scale, we mean ammonia based refrigeration systems, built-up fluorocarbon, or other systems used for processing or preserving goods.

[MULTIPLE response] *Do not read.*

1. Custom refrigeration design

2. Controls or software design for managing the refrigeration system(s)

3. System/equipment installation

4. Repair of equipment and/or parts

5. Compliance services (safety inspections, development of operating procedures, etc.)

6. Preventative maintenance/ regular maintenance

7. Remote system monitoring

8. Basic refrigeration training

9. Safety training

10. Refrigeration equipment

96. Other, please specify: [OPEN-ENDED RESPONSE]

98. Don't know

99. Refused

[ASK ALL]

Q3. What products or services, if any, do you offer to clients that would help them control their refrigeration energy loads?

1. [OPEN-ENDED RESPONSE]
96. None
98. Don't know
99. Refused

[ASK IF Q3=1 (THEY MENTIONED PROVIDING ENERGY EFFICIENCY SERVICES)]

Q4. Ideally, do any of these energy efficiency products or services perform best when operated by staff with specialized training?

1. Yes – *[If yes, ask]:* What training makes the difference? _____
2. No
98. Don't know
99. Refused

[ASK IF Q3=1 (THEY MENTIONED PROVIDING ENERGY EFFICIENCY SERVICES)]

Q5. Thinking of energy efficiency services and/or products that your company provides, what proportion of your annual revenues is associated with those services or products?

1. [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK IF Q5≠DON'T KNOW OR REFUSED]

Q6. About the annual revenues of your energy efficiency products and/or services, have they increased, decreased, or stayed the same over the past two years?

[SINGLE RESPONSE]

1. Increased
2. Decreased
3. Stayed the same
98. Don't know
99. Refused

Q7. What motivates your clients to buy your energy efficiency services?

1. [OPEN-ENDED RESPONSE]
99. Refused

[ASK IF Q3=1 (THEY MENTIONED PROVIDING ENERGY EFFICIENCY SERVICES)]

Q8. Are there any job specializations at your organization relating to energy efficiency?

1. Yes – *[If yes, ask]:* Which ones? _____
2. No
98. Don't know
99. Refused

[ASK ALL]

Q9. Do any of your field staff monitor and/or operate the controls of large-scale refrigeration systems, either remotely or on-site, for your clients?

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

D.2.3. Involvement with RETA and Other Refrigeration Associations

[ASK ALL]

Q10. Which of the following groups and/or associations have you heard of?

[MULTIPLE RESPONSE] *[Read and check all that apply]*

1. Refrigerating Engineers & Technicians Association or RETA
2. Global Cold Chain Alliance or GCCA
3. International Institute of Ammonia Refrigeration or IIAR
4. International Association of Refrigerated Warehouses or IARW
98. Don't know
99. Refused

[ASK IF Q10=1 (Heard of RETA)]

Q11. Which of the following statements are true about you or your organization?

[MULTIPLE RESPONSE] *[Read Statements 1-3]*

1. I am a member of RETA
2. Other individuals in my organization are members of RETA
3. My organization is a member of RETA (We have corporate membership)
4. None of the above
98. Don't know
99. Refused

[ASK IF Q10=1 (Heard of RETA)]

Q12. RETA offers many services and training opportunities to members and non-members. Please indicate whether you have attended or accessed any of the following services or training events and how valuable were those services or events.

[RANDOMIZE ALL ITEMS; INPUT 1-5 SCALE WHERE 1=Not at all valuable and 5=Very valuable FOR EACH ITEM WITH DON'T KNOW, REFUSED AND NOT APPLICABLE OPTION]

<p>RETA Services or Events</p> <p><i>[If they indicate they attended or accessed a service, ask them to rate that service.]</i></p> <p><i>[If they indicated not attending or accessing a service, check NA]</i></p> <p>Have you...[Read]</p>		<p>Using a scale of 1-5 where 1 means “not at all valuable” and 5 means “very valuable,” how valuable was this service or event?</p>
<p>a. Attended RETA National Conference</p>		<p>1-5 scale w DK, Ref & NA- did not attend</p>
<p>b. Attended any of RETA’s industrial Refrigeration online courses</p>		<p>1-5 scale w DK, Ref & NA- did not attend</p>
<p>c. Obtained RETA’s training materials (for example, refrigeration series course workbooks)</p>		<p>1-5 scale w DK, Ref & NA- did not obtain</p>
<p>d. Taken a practice exam provided by RETA to prepare for a specific certification exam</p>		<p>1-5 scale w DK, Ref & NA- did not take</p>
<p>h. Obtained any of RETA’s certifications (for example, Certified Assistant Refrigerator Operator or CARO or Certified Industrial Refrigerator Operator or CIRO certification)</p>		<p>1-5 scale w DK, Ref & NA- did not obtain</p>

[ASK IF Q10=1 (Heard of RETA)]

Q13. What other training events or services from RETA have you attended or accessed?

1. [OPEN-ENDED RESPONSE]

[ASK IF Q10=2 through 4 (Heard of GCCA, IIAR, or IARW)]

Q14. You mentioned you have heard of [INPUT RESPONSES 2-4 FROM Q10, IF SELECTED]. Are you or your company a member of this/those organizations?

1. Yes – *[If yes, ask]:* Which ones? _____
2. No
98. Don't know
99. Refused

[ASK IF Q10=2 through 4 (Heard of GCCA, IAR, or IARW)]

Q15. Many services and training opportunities are provided to members and non-members of [INPUT RESPONSES 2-4 FROM Q10, IF SELECTED]. What training events or services, if any, have you attended or accessed from this/those organizations?

1. [OPEN-ENDED RESPONSE]

D.2.4. Training, Certifications, and Company Policies

[ASK ALL]

Q16. Thinking of your products and services staff, what technical refrigeration-related training and/or certifications have they received or are in the process of receiving?

[Interviewer, please check all that apply. Probe for CARO, CIRO, and ROC; when probing for ROC, mention ROC is sponsored by BPA, Energy Trust, or a utility.]

Certified Assistant Refrigeration professional (CARO)

Some received this credential

Some are pursuing it

Don't know

Certified Industrial Refrigeration professional (CIRO)

Some received this credential

Some are pursuing it

Don't know

Refrigeration professional Coaching (sponsored by BPA, Energy Trust, or a utility)

Some received this credential

Some are pursuing it

Don't know

Other, please specify: [OPEN-ENDED RESPONSE]

[ASK ALL]

Q17. Which certifications or training does your company consider when hiring staff?

[MULTIPLE RESPONSE]

1. Certified Assistant Refrigeration professional (CARO)
2. Certified Industrial Refrigeration professional (CIRO)
3. Refrigeration Energy Specialist Certification (CRES)
4. Refrigeration professional Coaching
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

[ASK Q9=YES (HAVE OPERATIONS STAFF)]

Q18. You mentioned you have field staff that monitors and/or operates the controls of large-scale refrigeration system(s), either remotely or on-site, for your clients. How many employees in your organizations do these activities?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8
9. 9
10. 10
11. More than 10 (If so, how many:_____)
98. Don't Know
99. Refused

D.2.5. What Your Clients Look For in a Vendor

[ASK ALL]

Q19. Using a scale from 1 to 5, where 1 is “not at all important” and 5 is “very important,” please rate the importance of the following factors to your clients considering a product

or service provider such as your company. **[Interviewer: After they give you ratings, ask “And, which one is the most important?”]**

[RANDOMIZE ALL ITEMS; INPUT 1-5 SCALE WHERE 1=Not at all important and 5=Very important FOR EACH ITEM, WHERE NOTED, WITH DON'T KNOW & REFUSED OPTIONS]

Factors	Ratings	And, which one is the most important?
Price	1-5 scale w DK & Refused	[]
Customer service	1-5 scale w DK & Refused	[]
Technical proficiency	1-5 scale w DK & Refused	[]
Safety/Reliability	1-5 scale w DK & Refused	[]

[ASK ALL]

Q20. Is possession of Certified Assistant Refrigeration professional or CARO certificate a key indicator of technical proficiency your clients pay attention to when selecting refrigeration service provider(s)?

[SINGLE RESPONSE]

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK ALL; DISPLAY ON THE SAME PAGE AS Q20]

Q21. How about possession of Certified Industrial Refrigeration professional or CIRO certificate? [If necessary: Is it a key indicator of technical proficiency your clients pay attention to when selecting refrigeration service provider(s)?]

[SINGLE RESPONSE]

- 1. Yes
- 2. No
- 98. Don't know
- 99. Refused

[ASK ALL]

Q22. What other key indicators of technical proficiency do your clients pay attention to when selecting refrigeration service provider(s)?

- 1. [OPEN-ENDED RESPONSE]
- 98. Don't know
- 99. Refused

D.2.6. Awareness of CRES

[ASK ALL]

Q23. Have you ever heard of the Certified Refrigeration Energy Specialist credential, also called CRES?

[SINGLE RESPONSE]

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

[ASK IF Q23=NO OR DON'T KNOW]

Q24. CRES certification requires taking an exam to demonstrate the mastery of refrigeration system operations and energy management strategies. There also is a performance aspect related to CRES, which includes documenting the implementation of five energy efficiency activities at a facility an individual works at. Is this something you have heard about?

[SINGLE RESPONSE]

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

[ASK IF Q23=YES OR Q24=YES]

Q25. How did you hear about CRES?

[MULTIPLE RESPONSE]

1. From RETA representative
2. When vising RETA website
3. From RETA or NEEA sponsored brochure or flyer
4. From NEEA representative
5. Trade Publication, please specify: [OPEN-ENDED RESPONSE]
96. Other, please specify: [OPEN-ENDED RESPONSE]
98. Don't know
99. Refused

D.2.7. Vendors' Use of Certifications to Differentiate Themselves in the Marketplace and Willingness to Discount Their Services to Clients Pursuing Energy Efficiency

[ASK ALL]

Q26. You probably have clients with a range of refrigeration operation skills. How might your services or products be affected if more of your clients were well-trained in operating the equipment efficiently? Would you say this would be an advantage, a disadvantage, or would make no difference to your business?

1. Advantage
2. Disadvantage
3. Makes no difference
98. Don't know
99. Refused

[ASK IF Q27=Advantage or disadvantage]

Q27. Can you explain why you said that?

1. [OPEN-ENDED RESPONSE]

[ASK ALL]

Q28. Using a scale of 1-5 where 1 is “not at all important” and 5 is “very important,” to what extent are... [Read]

	Rating
...energy efficiency related products and services important for differentiating you from other suppliers/providers?	[INPUT 1-5 SCALE WHERE 1=not at all important and 5=very important; ALSO INCLUDE DON'T KNOW and REFUSED OPTIONS]
...refrigeration-related certifications important for differentiating you from other service providers?	[INPUT 1-5 SCALE WHERE 1=not at all important and 5=very important; ALSO INCLUDE DON'T KNOW and REFUSED OPTIONS]

[ASK ALL]

Q29. Have you ever offered discounts to clients pursuing energy efficient operations of their refrigeration systems?

[SINGLE RESPONSE]

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

ASK IF Q29=1 (YES)]

Q30. Why have you offered discounts?

1. [OPEN-ENDED RESPONSE]

[ASK IF Q29=NO OR DON'T KNOW]

Q31. Would you consider offering discounts to clients pursuing energy efficient operations of their refrigeration systems?

[SINGLE RESPONSE]

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

[ASK IF Q31=1 OR 2 (YES OR NO)]

Q32. Why do you say that?

[Interviewer: Obtain as much information as possible when asking this question; probe for factors reducing interest or feasibility if they said they would not offer discounts, or probe for factors increasing interest in offering discounts if they said they would consider it in Q31]

1. [OPEN-ENDED RESPONSE]

[ASK IF Q29=YES OR Q31=YES]

Q33. By what percentage [IF Q29=1 (YES) INPUT “do you discount your services”; IF Q31=1 (YES) INPUT “would you be willing to discount your services”] for clients who are pursuing energy efficient operations of their refrigeration systems?

1. [OPEN-ENDED RESPONSE]

D.2.8. Appeal of CRES to Vendors (Ask this section of only those who said “Yes” in Q9 – that is, they have field staff that monitors and/or operates the controls of the refrigeration system(s), either remotely or on-site, for their clients)

You mentioned you have field staff that operates the controls of large-scale refrigeration systems, either remotely or on-site, for your clients.

Q34. Using a scale of 1-5 where 1 means “not at all important” and 5 means “very important, how important would you say it is for your refrigeration operations staff to have mastered these skills? [Read 1-5]

[RANDOMIZE CHOICES; INSERT 1-5 SCALE WHERE 1=Not at all important AND 5=Extremely important (add “Don’t know” and “Refused” option) FOR EACH ITEM BELOW]

1. Understanding the function of refrigeration system components, safety issues and required monitoring
2. Understanding operation best practices such as improving part-load performance, reducing system lift, or using effective defrost strategies to optimize system energy use

3. Knowing approaches to facility energy management such as setting and monitoring performance indicators
4. Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety
5. Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps

Q35. Thinking of your refrigeration operations staff, please indicate the areas in which you would say they are sufficiently skilled to do their jobs effectively. Are they sufficiently skilled in ... *[Read]*

[RANDOMIZE CHOICES; MULTIPLE CHOICES] *[Check all that apply]*

1. [DISPLAY IFQ34.1>1] Understanding the function of refrigeration system components
2. [DISPLAY IF Q34.2>1] Understanding operation best practices
3. [DISPLAY IF Q344.3>1] Knowing approaches to facility energy management
4. [DISPLAY IF 34.4>1] Managing costs through efficient operations
5. [DISPLAY IF Q344.5>1] Managing energy use of non-refrigeration systems

D.2.9. Importance of Operating Refrigeration Equipment Efficiently to Their Clients

We are almost done with the survey. I have a few more questions.

[ASK ALL]

Q36. Thinking of the clients you serve, please indicate if all, some, or none of them have the following policies and/or goals: *[Read 1-4]*

Policies/Goals	All	Some	None	98- Don't Know	99-Refused
1. Written sustainability or energy management plan					
2. A staff member that is responsible for energy and energy efficiency					
3. Defined energy savings goals					
4. A specific policy requiring that energy efficiency be considered when purchasing refrigeration equipment					

[ASK ALL]

Q37. What other energy efficiency policies and/or goals do your clients have?

1. [OPEN-ENDED RESPONSE]

96. None

[ASK IF ANY Q36 1-4 Questions=All or Some OR Q37=1 (STATED ANOTHER POLICY/GOAL)]

Q38. Thinking of your clients who have energy efficiency goals, what is your role in meeting those goals?

1. [OPEN-ENDED RESPONSE]

[ASK IF ANY Q36 1-4 Questions=All or Some OR Q37=1 (STATED ANOTHER POLICY/GOAL)]

Q39. For those clients with energy efficiency goals, do you provide them with the utility program information that might benefit them?

[SINGLE RESPONSE]

1. Yes

2. No

98. Don't know

99. Refused

D.2.10. Vendor Characteristics & Characteristics of the Firms Vendors Serve

[ASK ALL]

Q40. Thinking of your clients, what are they typically processing at their facilities with the refrigeration systems?

[MULTIPLE RESPONSE]

1. Dairy

2. Meat

3. Seafood

4. Fruit

5. Beverage

6. Pharmaceuticals

96. Other, please specify: [OPEN-ENDED RESPONSE]

97. Not applicable – no processing, facility used for cold storage only

99. Refused

[ASK IF Q40≠97]

Q41. And, what types of refrigeration activities do they typically perform there?

[MULTIPLE RESPONSE]

1. blast cooling/ freezing

2. process cooling

3. freeze drying
4. cold storage
96. Other, please specify: [OPEN-ENDED RESPONSE]
99. Refused

[ASK ALL]

Q42. In which cities or states are the facilities that you serve located?

[MULTIPLE RESPONSE]

1. Boise to Twin Falls area, Idaho
2. Billings area, Montana
3. Portland area, Oregon
4. Seattle area, Washington
5. Yakima area, Washington
96. Other, please specify: [OPEN-ENDED RESPONSE]
99. Refused

[ASK ALL]

Q43. How many employees in your organization service refrigeration systems in those facilities? Be sure to include yourself if applicable.

[SINGLE RESPONSE]

1. One
2. Two
3. Three
4. Four
5. Five
6. Six
7. Seven
8. Eight
9. Nine
10. Ten
11. More than ten (If so, how many:_____)
12. None
98. Don't know

D.2.11. Survey End

Thank you very much for all of your valuable time. We know it was a significant investment, and we appreciate it.

CLICK "SUBMIT" THANKS AGAIN!

D.3. CRES Non-Certified Refrigeration Professionals (RPs) & Owner/Manager Survey

D.3.1. Original Email Letter

{EMAIL SUBJECT LINE: Your feedback will help support best practices in refrigeration system operations }

Dear **[RESPONDENT]**,

Energy 350, on behalf of Northwest Energy Efficient Alliance (NEEA), is conducting an assessment of large-scale refrigeration system operation practices in the Northwest region and asks you to lend your knowledge and experience to this important study. The survey may take as little as 12 minutes, but we encourage you to take the time you need to share as much as possible, so we can provide better services to people like you.

The results of this study will help support the training and education offered to those involved in refrigeration system operations activities. Your responses to this online survey are very important in helping us to understand the education and training needs in your industry.

To begin the survey, click on the link below. Once you start the survey, you can stop at any time; to resume where you left off, just click on the link in this email again.

Follow this link to the Survey: [INPUT LINK]

If you would prefer to take this survey by telephone, please call Doré Mangan at 866-395-4642 ext.332, between Pacific time zone hours of 9:00 a.m. and 5:00 p.m.

All of your responses will be confidential to the extent permitted by law, and any analyses will not identify individuals or firms. If you have any questions about this effort, please contact Steve Phoutrides at NEEA (sphoutrides@neea.org) or myself.

Thank you for your participation and for making a much-needed contribution to meeting the educational needs and improving the capabilities of your industry.

Sincerely,

Nick O'Neal, Project Manager
Energy 350
(503) 333-8161

D.3.2. Email Letter with \$50 Incentive

{EMAIL SUBJECT LINE: Refrigeration system operations study; You will receive \$50 by participating in the study}

Dear [RESPONDENT],

We need your participation in this important short survey and will express our thanks by sending you a \$50 check.

Energy 350, on behalf of Northwest Energy Efficient Alliance (NEEA), is conducting an assessment of large-scale refrigeration system operation practices in the Northwest region and asks you to lend your knowledge and experience to this important study. Your responses to this short online survey are very important in helping NEEA support the education and training needs in your industry.

The survey may take as little as 12 minutes, but we encourage you to take the time you need to share as much as possible, so we can provide better services to people like you. To begin the survey, click on the link below. You can stop at any time; to resume where you left off, just click on the link in this email again.

When we receive your completed survey, we will mail a check to the address you provide within three business days. (We will not use this address for any other purpose and will delete the information from our records within one month.)

Follow this link to the Survey: [INPUT LINK]

If you would prefer to take this survey by telephone, please call Doré Mangan at 866-395-4642 ext.332, between Pacific time zone hours of 9:00 a.m. and 5:00 p.m.

All of your responses will be confidential to the extent permitted by law, and any analyses will not identify individuals or firms. If you have any questions about this effort, please contact Steve Phoutrides at NEEA (sphoutrides@neea.org) or myself.

Thank you for your participation and for making a much-needed contribution to meeting the educational needs and improving the capabilities of your industry.

Sincerely,

Nick O'Neil, Project Manager
Energy 350
(503) 333-8161

D.3.3. Screening, Number of Ref. Staff, & Decision-Makers

Note to reviewers: The survey is designed as an online survey rather than a phone survey. If we conduct phone calls to obtain additional completes, we will revise certain instructions currently shown with the questions as instructions for the interviewers.

First, I'd like to ask you a few questions about your job and your organization.

[ASK ALL]

S1. Which of the following best describes you?

[SINGLE RESPONSE]

1. Owner or a senior manager of a business or organization
2. Employee other than owner/senior manager of a business or organization
3. Unemployed/Retired →SKIP TO TERMINATION SECTION

[ASK ALL]

S2. How many people in your organization run and maintain large-scale refrigeration systems located in the Northwest (Idaho, Montana, Oregon, or Washington)? Be sure to include yourself if applicable. By large-scale, we mean ammonia based refrigeration systems, built-up fluorocarbon, or other systems used for processing or preserving goods.

[SINGLE RESPONSE]

1. None
2. One
3. Two
4. Three
5. Four
6. Five
7. Six
8. Seven
9. Eight
10. Nine
11. Ten
12. More than ten (If so, how many:_____)
98. Don't know

[ASK IF Q2=Don't know]

S3. In the building(s) where you work, how many people run and maintain the refrigeration system(s)?

1. [Open-ended response]
98. Don't know

[ASK ALL]

S4. Do you personally perform any refrigeration system operation activities?

[SINGLE RESPONSE]

1. Yes
2. No

[ASK ALL; ASK ON THE SAME SCREEN AS S5]

S5. Are you in charge of or do you manage other people who perform refrigeration system operation activities at your organization, including contract service providers?

[SINGLE RESPONSE]

1. Yes
2. No

S5b Just to confirm, do you manage others within your organization?

1. Yes
2. No

S5c Thank you. We have already received a number of responses for managers; therefore we are not looking to interview managers at this time. However we are looking to interview Refrigeration professionals that do not manage others. Could you provide us with the contact information of an individual in your organization that operates your refrigeration system(s) but does not manage other staff? We have a few questions about training and/or certifications that we would like to ask them.

1. First Name
2. Last Name
3. Email
4. Phone

[PROGRAMMER: IF THEY SAY “NO” TO BOTH S4 & S5 AND S1=EMPLOYEE (NOT OWNER/SENIOR MANAGER) TERMINATE]

S6. How long have you been:

[DISPLAY IF S4 YES] Conducting operation of the refrigeration systems? [SINGLE RESPONSE]

1. Less than a year
2. 1 to 2 years
3. 3 to 5 years
4. 6 to 10 years
5. More than 10 years

[DISPLAY IF S5 YES] Supervising other refrigeration operations staff and/or service providers? [SINGLE RESPONSE]

1. Less than a year
2. 1 to 2 years
3. 3 to 5 years
4. 6 to 10 years
5. More than 10 years

[ASK IF S5=YES (IN CHARGE OF OR MANAGE OTHER STAFF) OR S1=OWNER/SENIOR MANAGER]

S7. Do you have the authority to approve staff training and/or certification at the company expense?

[SINGLE RESPONSE]

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

[ASK IF (S5=NO (NOT IN CHARGE OF OR MANAGE OTHER STAFF) AND S1=2 (EMPLOYEE THAT IS NOT OWNER/SENIOR MANAGER) OR S7=NO OR DON'T KNOW)]

S8. In your organization, who typically has the authority to approve staff training and/or certification at the company expense?

[MULTIPLE RESPONSE]

1. Owner
2. Property or facility director, manager, or supervisor
3. Other type of director, manager, or supervisor
96. Other, please specify: [Open-ended response]
98. Don't know

[PROGRAMMER: IF THEY SAY "NO" TO BOTH S4 & S5 (DO NOT RUN OR MAINTAIN THE SYSTEM NOR MANAGE OTHER OPERATIONS STAFF) AND OWNER/SENIOR MANAGER WITH NO AUTHORITY TO APPROVE STAFF TRAINING (S1=1 AND S7=NO/DON'T KNOW) TERMINATE]

D.3.4. Use of Service Providers

[ASK ALL]

Q1. Does your company contract out any work on the refrigeration systems?

[SINGLE RESPONSE]

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

[ASK IF Q1=YES]

Q2. Please indicate whether your organization contracts out the work associated with these activities:

Activities	1-Yes, all of it	2- Yes, but not all of it	3-No	98-Don't Know
a. Operating the controls	()	()	()	()
b. Maintaining the equipment	()	()	()	()

[ASK IF Q1=YES]

Q2b. If you contract out work, could you provide us with the contact information of your service provider(s)? We have a few questions about training and/or certifications that we would like to ask them.

1. First Name
2. Last Name
3. Company Name
4. Email
5. Phone

[ASK IF Q2=YES (CONTRACT OUT WORK ON REFRIGERATION SYSTEMS) AND (S1=OWNER OR SENIOR MANAGER OR S5=YES (IN CHARGE OF OR MANAGE OTHER STAFF)]

Q3. Please rate the importance of the following factors when selecting your refrigeration service provider(s), and indicate which one is the most important.

[RANDOMIZE ALL ITEMS; INPUT 1-5 SCALE WHERE 1=Not at all important and 5=Very important FOR EACH ITEM, WHERE NOTED, WITH DON'T KNOW OPTION]

Factor	Rating	And, which one is most important?
Price	1-5 scale w DK	[]
Customer service	1-5 scale w DK	[]
Technical proficiency	1-5 scale w DK	[]

[ASK IF Q2=YES (CONTRACT OUT WORK ON REFRIGERATION SYSTEMS) AND (S1=OWNER OR SENIOR MANAGER OR S5=YES (IN CHARGE OF OR MANAGE OTHER STAFF)]

Q4. Which of the following are key indicators of technical proficiency that your organization pays attention to when selecting your refrigeration service provider(s)?

[MULTIPLE RESPONSE]

1. Possession of safety-related awards
2. Possession of Certified Assistant Refrigeration professional (CARO) certificate
3. Possession of Certified Industrial Refrigeration professional (CIRO) certificate
4. Possession of other refrigeration-related certifications
96. Other, please specify: [Open-ended response]
97. None of the above
98. Don't know

D.3.5. Involvement with RETA

[ASK ALL]

Q5. Have you heard of Refrigerating Engineers & Technicians Association or RETA?

[SINGLE RESPONSE]

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

[IF Q10=Yes]

Q6. Which of the following statements are true about you or your organization?

[MULTIPLE RESPONSE]

1. I am a member of RETA
2. Other individuals in my organization are members of RETA
3. My organization is a member of RETA (We have corporate membership)
4. None of the above
98. Don't know

[IF Q10=Yes]

Q7. RETA offers many services and training opportunities to members and non-members. If you have attended or accessed any of their services or training events listed below please rate how valuable those services or events were. If you have not attended or accessed a service or training event listed below, please select N/A.

[THIS IS A MATRIX QUESTION; RANDOMIZE ALL ITEMS; INPUT 1-5 SCALE WHERE 1=Not at all valuable and 5=Very valuable FOR EACH ITEM, WHERE NOTED, WITH DON'T KNOW AND N/A OPTION]

RETA Services or Events	How valuable was this service, event, or certification?
a. Attended RETA National Conference	1-5 scale w DK and N/A
b. Attended any of RETA's industrial Refrigeration online courses	1-5 scale w DK and N/A
c. Obtained RETA's training materials (for example, refrigeration series course workbooks)	1-5 scale w DK and N/A
d. Taken a practice exam provided by RETA to prepare for a specific certification exam	1-5 scale w DK and N/A
e. Attended any RETA-promoted training classes <u>that were not online</u>	1-5 scale w DK and N/A
f. [ASK IF S5=YES (In charge of or manage other staff)] Hired RETA-endorsed instructors to come to the facility to train you or your staff	1-5 scale w DK and N/A
g. [ASK IF S5=NO (employee not in charge of other staff)] Attended training sessions from RETA-endorsed instructors who came to the facility to train the staff	1-5 scale w DK and N/A
h. Obtained any of RETA's certifications (for example, CARO, CIRO)	1-5 scale w DK and N/A

[IF Q10=Yes; DISPLAY Q13 ON THE SAME PAGE AS Q12]

Q8. If there were any other training events or services from RETA that you have attended or accessed, please describe them here.

1. [OPEN-ENDED RESPONSE]

D.3.6. Training and Certifications

[ASK ALL]

Q9. What technical refrigeration-related training and/or certifications have you received or do you expect to receive in the near future? Please check all that apply. [RANDOMIZE ALL BUT OTHER]

Certified Assistant Refrigeration professional (CARO)

1. Received it
2. Pursuing it
3. Do not plan to pursue
98. Don't know

Certified Industrial Refrigeration professional (CIRO)

1. Received it
2. Pursuing it
3. Do not plan to pursue
98. Don't know

Refrigeration professional Coaching (sponsored by BPA, Energy Trust, or a utility)

1. Received it
2. Pursuing it
3. Do not plan to pursue
98. Don't know

Other, please specify: [Open-ended response]

[ASK IF S5=YES (IN CHARGE OF OR MANAGE OTHER STAFF)]

Q10. Thinking of your staff, what technical refrigeration-related training and/or certifications have they received or are in the process of receiving? Please check all that apply. [RANDOMIZE ALL BUT OTHER]

Certified Assistant Refrigeration professional (CARO)

1. Some received this credential
2. Some are pursuing it
3. None plan to pursue
98. Don't know

Certified Industrial Refrigeration professional (CIRO)

1. Some received this credential
2. Some are pursuing it
3. None plan to pursue
98. Don't know

Refrigeration professional Coaching (sponsored by BPA, Energy Trust, or a utility)

1. Some received this credential
2. Some are pursuing it
3. None plan to pursue
98. Don't know

Other, please specify: [Open-ended response]

D.3.7. Awareness of CRES

[ASK ALL]

Q11. Have you ever heard of the Certified Refrigeration Energy Specialist credential, also called CRES?

[SINGLE RESPONSE]

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

[ASK IF Q23=NO OR DON'T KNOW]

Q12. CRES certification requires taking an exam to demonstrate the mastery of refrigeration system operations and energy management strategies. There also is a performance aspect related to CRES, which includes documenting the implementation of five energy efficiency activities at a facility you work at. Have you heard of it now?

[SINGLE RESPONSE]

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

[ASK IF Q23=YES OR Q24=YES]

Q13. Are you CRES certified?

[SINGLE RESPONSE]

1. Yes
2. No, but I'm pursuing it
3. No and I'm not pursuing it

D.3.8. Training Support, Firm's Hiring Policies and Attributes of Effective Refrigeration professional

[ASK IF S1=OWNER OR TOP OFFICER OR S5=YES (IN CHARGE OF OTHER STAFF)]

Q14. What percentage of your refrigeration operation staff have access to employer-provided support for training and development?

1. 0%
2. 1-25%
3. 26-50%
4. 51-75%
5. 76-100%
98. Not sure

[ASK IF 0>0% OR NOT SURE]

Q15. What percentage of your refrigeration operation staff have used employer support for certification training?

1. 0%
2. 1-25%
3. 26-50%
4. 51-75%
5. 76-100%
98. Not sure

[ASK IF S1=OWNER OR TOP OFFICER OR S5=YES (IN CHARGE OF OTHER STAFF)]

Q16. Which certifications or training do you consider when hiring refrigeration operation staff?

[MULTIPLE RESPONSE; RANDOMIZE ITEMS 1-4]

1. Certified Assistant Refrigeration professional (CARO)
2. Certified Industrial Refrigeration professional (CIRO)
3. Refrigeration Energy Specialist Certification (CRES)
4. Refrigeration Operator Coaching (ROC)
96. Other, please specify: [Open-ended response]
97. None of the above
98. Don't know

[ASK ALL]

Q17. Thinking of Refrigeration professional responsibilities, what characteristics are critical to be an effective Refrigeration professional?

1. [OPEN-ENDED RESPONSE]
98. Don't know

D.3.9. Appeal of CRES to Owners/Managers and Refrigeration professionals

Part I: Questions for Owner/Facility Managers [ASK THESE QUESTIONS IF S1=OWNER OR TOP OFFICER OR S5=YES (IN CHARGE OR MANAGE OTHER STAFF)]

Q18. For each of the following areas, how important would you say it is for refrigeration operations staff to have mastered the associated skills?

[RANDOMIZE CHOICES; INSERT 1-5 SCALE WHERE 1=Not at all important AND 5=Extremely important (add "Don't know" option) FOR EACH ITEM BELOW]

1. Understanding the function of refrigeration system components, safety issues and required monitoring

2. Understanding operation best practices such as improving part-load performance, reducing system lift, or using effective defrost strategies to optimize system energy use
3. Knowing approaches to facility energy management such as setting and monitoring performance indicators
4. Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety
5. Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps

Q19. Thinking of your refrigeration operations staff, please indicate the areas in which you would say they are sufficiently skilled to do their jobs effectively.

[RANDOMIZE CHOICES; MULTIPLE CHOICES]

1. [DISPLAY IF Q18.1>1] Understanding the function of refrigeration system components
2. [DISPLAY IF Q18.2>1] Understanding operation best practices
3. [DISPLAY IF Q18.3>1] Knowing approaches to facility energy management
4. [DISPLAY IF Q18.4>1] Managing costs through efficient operations
5. [DISPLAY IF Q18.5>1] Managing energy use of non-refrigeration systems
6. None of the above

Q20. [DISPLAY Q19.6 ON THE SAME PAGE AS Q35] CRES certification requires taking an exam to demonstrate mastery of the following five topics: refrigeration system functions, operation best practices, facility energy management, cost management through efficient operations, and energy management of non-refrigeration systems. It also requires the implementation of five energy efficiency activities. Preparation can be through self-study or by taking a CRES training course. Tri-annual re-certification requires 12 professional development/continuing education hours and documented implementation of six additional energy efficiency activities. The cost of the exam is \$495 for RETA members and \$670 for non-members. Training materials can be purchased from RETA for about \$600 for members and \$1000 for non-members. The exam must be taken at one of the 24 test centers in ID, MT, WA, and OR.

How likely would your organization be to provide the following types of support for a member of your staff to obtain and maintain CRES certification?

[INPUT 1-5 SCALE WHERE 1=Not at all likely AND 5=Very likely FOR EACH ITEM BELOW, AND INCLUDE DK; RANDOMIZE CHOICES]

Type of Support	
Pay exam certification fee	1-5 scale w DK
Pay for CRES certification training materials from RETA	1-5 scale w DK
Pay for continuing education credits	1-5 scale w DK
Pay associated travel expenses to take the exam	1-5 scale w DK
Allow paid time off for training (this includes time spent for self-study or in a class to prepare for the exam and taking the exam)	1-5 scale w DK
Allow staff to complete activities and documentation required for certification during work hours	1-5 scale w DK

[ASK IF ANY ITEM IN THE 6 IS RATED 1, 2, or 3]

Q21. In the prior question, you said your organization is not very likely to provide any support for a member of your staff to obtain and maintain CRES certification. Can you explain why?

1. [OPEN-ENDED RESPONSE]
- 98 Don't know

Q22. Based on what you know now about CRES, if you were to interview two similarly qualified candidates for a refrigeration operator position in your company, where one of the candidates had the CRES credential and the other did not, how influential would CRES be on your decision who to hire?

[SINGLE RESPONSE]

1. 1- Not at all influential
2. 2
3. 3
4. 4
5. 5 –Extremely influential
98. Don't know

Part II: Questions for Refrigerator Operators Staff Who Do Not Manage Other Staff [ASK 55=NO (NOT IN CHARGE OR MANAGE OTHER STAFF)]

Q23. For each of the following areas, how important would you say it is for refrigeration operations staff, like yourself, to have mastered the associated skills?

[RANDOMIZE CHOICES; INSERT 1-5 SCALE WHERE 1=Not at all important AND 5=Extremely important (add “Don’t know” option) FOR EACH ITEM BELOW]

1. Understanding the function of refrigeration system components, safety issues and required monitoring

2. Understanding operation best practices such as improving part-load performance, reducing system lift, or using effective defrost strategies to optimize system energy use
3. Knowing approaches to facility energy management such as setting and monitoring performance indicators
4. Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety
5. Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps

Q24. Please indicate the areas in which you would say you are sufficiently skilled to do your job effectively.

[RANDOMIZE CHOICES; MULTIPLE CHOICES]

1. [DISPLAY IF Q23.1>1] Understanding the function of refrigeration system
2. [DISPLAY IF Q23.2>1] Understanding operation best practices
3. [DISPLAY IF Q23.3>1] Knowing approaches to facility energy management
4. [DISPLAY IF Q23.4>1] Managing costs through efficient operations
5. [DISPLAY IF Q23.5>1] Managing energy use of non-refrigeration systems
6. None of the above

Q25. [DISPLAY Q24.6 ON THE SAME PAGE AS Q24] [IF Q13=1 or 2 INPUT “As you may already know,”] CRES certification requires taking an exam to demonstrate the mastery of the above five topic areas and documenting the implementation of five energy efficiency activities. Exam preparation may involve self-study and/or taking a CRES training course. Tri-annual re-certification requires 12 professional development/continuing education hours and documented implementation of six more energy efficiency activities. The cost of the exam is \$495 for RETA members and \$670 for non-members, and training materials can be purchased from RETA for about \$600 for members and \$1000 for non-members. The exam must be taken at one of 24 test center across ID, MT, WA, and OR.

Q25a. [ASK IF Q13=3 OR Q13 is not displayed] How likely is it that you would obtain the CRES certification if your employer...

[INSERT 1-5 SCALE FROM 1=NOT AT ALL LIKELY TO 5=VERY LIKELY WITH DK OPTION]

...paid the costs associated with CRES certification (ex. travel, exam fee, training materials)	1-5 scale w DK
...paid the associated costs AND allowed you to pursue CRES certification during work time	1-5 scale w DK
...did not support you in any way	1-5 scale w DK

Q25b. [ASK IF Q13=1 or 2] [IF Q13=1 INPUT “Did your employer...”; IF Q13=2 INPUT “Will your employer...”]

...pay the costs associated with CRES certification (ex. travel, exam fee, training materials)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK
...pay the associated costs AND allowed you to pursue CRES certification during work time	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK
...support you in any other way	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK

Q26. [ASK IF Q13=3 or Q13 is not displayed (Not currently pursuing CRES)] Based on what you know now about CRES, how likely are you to pursue it in the next two years?

[SINGLE RESPONSE]

1. 1- Not at all likely
2. 2
3. 3
4. 4
5. 5 –Extremely likely
98. Don't know

Q27. What would keep [IF Q13=3 INPUT “you”; IF Q13=1 or 2 INPUT “others in your organization”] from pursuing a CRES certification? Please check all that apply.
[RANDOMIZE 1 -8]

[MULTIPLE RESPONSE]

1. Cost
2. It would be hard getting authorization or approval
3. [IF Q13=3 INPUT “I”; IF Q13=1 or 2 INPUT “They”] don’t have enough time
4. [IF Q13=3 INPUT “My”; IF Q13=1 or 2 INPUT “Their”] supervisor would not support it
5. Others at my company already have taken the training
6. [IF Q13=3 INPUT “I”; IF Q13=1 or 2 INPUT “They”] already have the skills the training provides
7. [IF Q13=3 INPUT “I’m”; IF Q13=1 or 2 INPUT “They are”] not convinced it would benefit [IF Q13=3 INPUT “me”; IF Q13=1 or 2 INPUT “them”] professionally
8. There would not be anyone to do the work while [IF Q13=3 INPUT “I was”; IF Q13=1 or 2 INPUT “they were”] at training
9. None of the above
96. Other, please specify: [Open-ended response]
98. Don't know

Q28. What would you say are the benefits of having a credential such as CRES?

[MULTIPLE RESPONSE, RANDOMIZE 1-4]

1. Improved skills
2. Ability to get better pay
3. Ability to be promoted
4. More job opportunities at current company or elsewhere
5. None of the above
96. Other, please specify: [Open-ended response]
98. Don't know

D.3.10. Importance of Operating Refrigeration Equipment Efficiently and Benefits Associated with Such Operation

We are almost done with the survey. I have a few more questions.

[ASK ALL]

Q29. Please check which of the following policies or procedures, if any, your company has in place.

1. Written sustainability or energy management plan
2. A staff member that is responsible for energy and energy efficiency
3. Defined energy savings goals
4. A specific policy requiring that energy efficiency be considered when purchasing refrigeration equipment
96. Other, please specify: [Open-ended response]
97. None of the above
98. Don't know

Part I: Questions for Owner/Facility Managers [ASK THESE QUESTIONS IF S1=OWNER OR TOP OFFICER OR S5=YES (IN CHARGE OR MANAGE OTHER STAFF)]

Q30. I am going to list a few statements. Please rate how much you agree with each statement.

[FOR EACH STATEMENT, INSERT 1-5 SCALE FROM 1=NOT AT ALL AGREE TO 5=COMPLETELY AGREE WITH DK OPTION; RANDOMIZE STATEMENTS]

1. Within the last five years, our company has focused on increasing energy efficient operations of the refrigeration system(s).
2. Optimizing energy use is less important than hitting operational targets such as production quotas.
3. Our company values training individuals to operate our refrigeration systems efficiently.
4. Our company values on-the-job training more than refrigeration-related certifications.

Part II: Questions for Refrigerator Refrigeration professionals Staff Who Do Not Manage Other Staff [ASK S5=NO (NOT IN CHARGE OR MANAGE OTHER STAFF)]

Q31. I am going to list a few statements. Please rate how much you agree with each statement.

[FOR EACH STATEMENT, INSERT 1-5 SCALE FROM 1=NOT AT ALL AGREE TO 5=COMPLETELY AGREE WITH DK OPTION; RANDOMIZE STATEMENTS]

1. At work, I am encouraged to find solutions to problems I encounter operating the refrigeration system.
2. My suggestions for improvements to operating and maintaining the refrigeration system are seldom taken seriously.
3. I know how to safely optimize energy use while maintaining reliable system operation.
4. Optimizing energy use is less important than hitting operational targets such as production quotas.
5. My company values having a certified professional operate and maintain its refrigeration systems.
6. My services in operating and maintaining the refrigeration system are not highly valued by my company.

D.3.11. Firm Characteristics

[ASK ALL]

Q32. What are you processing at the facility you work at?

[MULTIPLE RESPONSE]

1. Dairy
2. Meat
3. Seafood
4. Fruit
5. Beverage
6. Pharmaceuticals
7. None of the above
96. Other, please specify: [Open-ended response]

[ASK ALL]

Q33. Which of these refrigeration activities does your organization perform there?

[MULTIPLE RESPONSE]

1. Blast cooling/ freezing
2. Process cooling
3. Freeze drying
4. Cold storage
5. None of the above
96. Other, please specify: [Open-ended response]

Q34. [IF S5=YES (IN CHARGE OF OTHER STAFF)]: Could you provide us with the contact information of an individual in your organization who operates your refrigeration system(s) but does not manage other staff? We have a few questions about training and/or certifications that we would like to ask them.

1. First Name
2. Last Name
3. Email
4. Phone

Q34b. [IF S5=NO (NOT IN CHARGE OF OTHER STAFF)]: Could you provide us with the contact information of an individual who manages either you or other refrigeration operations staff? We have a few questions about training and/or certifications that we would like to ask them.

1. First Name
2. Last Name
3. Email
4. Phone

Q35. Please provide the address you would like your \$50 check to be sent to. (We will not use this address for any other purpose and will delete the information from our records within one month.)

1. Name
2. Address Line 1
3. Address Line 2
4. City
5. State
6. Zip Code

D.3.12. Survey End

Thank you very much for all of your valuable time. We know it was a significant investment, and we appreciate it.

CLICK "SUBMIT" THANKS AGAIN!

D.3.13. Termination

This survey is targeting individuals currently employed and involved with the refrigeration system operations services. Therefore, we do not need to take up any more of your valuable time.

PLEASE CLICK "SUBMIT" TO SAVE YOUR RESPONSES AND EXIT THE SURVEY.
THANKS AGAIN!

D.4. CRES Certified Refrigeration Professionals (RPs) & Owner/Manager Survey

Note to reviewers: Since this survey will be used by Energy 350 when they are onsite interacting with CRES-certified individuals, we structured this survey to be a paper survey. We also want to note that if contacts have no time to complete the survey when Energy 350 visits their facility, Energy 350 will ask them if Research Into Action staff can call them to complete the survey.

D.4.1. Phone Introduction (If Research Into Action Conducting)

Hello. My name is _____ and I am with Research Into Action. I am calling on behalf of Northwest Energy Efficient Alliance (NEEA). NEEA is conducting an assessment of Certified Refrigeration Energy Specialist or CRES credential. The results of this study will help support the training and education offered to those involved with operating and maintaining large-scale refrigeration systems.

Someone from Energy 350 visited your facility recently to collect information on types of activities you have performed to become CRES certification. Although you were not able to complete the on-site survey, you did indicate that it was ok for Research Into Action staff to contact you. I have a few more questions to ask to complete our survey. I'll only need about 15 minutes of your time. Is now a good time to talk? If not, could we schedule another time at your convenience?

[If needed]: Appointment date and time: _____

Before we proceed, please know that your responses will be confidential to the extent permitted by law, and any analyses will not identify individuals or firms.

D.4.2. Number of Ref. Staff, & Decision-Makers

First, I'd like to ask you a few questions about your job and your organization.

[ASK ALL]

S1. Which of the following best describes you? [Read]

- Owner or a senior manager of a business or organization
- Employee other than owner/senior manager of a business or organization

[ASK ALL]

S2. How many people in your organization run and maintain large-scale refrigeration systems located in the Northwest (Idaho, Montana, Oregon, or Washington)? Be sure to include yourself if applicable. By large-scale, we mean ammonia based refrigeration systems, built-up fluorocarbon, or other systems used for processing or preserving goods.

INPUT RESPONSE HERE:

[IF THEY SAID “Don’t know” HERE, ASK S3; OTHERWISE, SKIP TO S4]

[ASK IF THEY SAID “Don’t know” IN S2]

S3. In the building(s) where you work, how many people run and maintain the refrigeration system(s)?

INPUT RESPONSE HERE:

[ASK ALL]

S4. Do you perform any refrigeration operation activities or do you manage other people who perform refrigeration operation activities at your organization?

- Personally perform refrigeration operation activities
- Manage other refrigeration operations staff
- Both – operates system(s) and manages

S5. How long have you been:

[ASK IF THEY SAID THEY OPERATE REFRIGERATION SYSTEM(S) OR DO BOTH – OPERATE THE SYSTEM(S) AND MANAGE STAFF – IN S4] Conducting operation of the refrigeration systems?

- Less than a year
- 1 to 2 years
- 3 to 5 years
- 6 to 10 years
- More than 10 years

[ASK IF THE SAID THEY MANAGE STAFF OR DO BOTH –OPERATE THE SYSTEM(S) AND MANAGE STAFF – IN S4] Supervising other refrigeration operations staff and/or service providers?

- Less than a year
- 1 to 2 years
- 3 to 5 years
- 6 to 10 years
- More than 10 years

[ASK IF THEY ARE OWNER OR SENIOR MANAGER IN S1 **OR** THEY SAID THEY MANAGE STAFF OR DO BOTH - Operate the systems and Manage staff - IN S4]

S6. Do you have the authority to approve staff training and/or certification at the company expense?

- Yes
- No
- Don't know
- Refused

[ASK IF THEY SAID THEY **DO NOT** MANAGE OTHER STAFF (Only operate the equipment) IN S4 **OR** SAID NO OR DON'T KNOW IN S6]

- S7. In your organization, who typically has the authority to approve staff training and/or certification at the company expense?
- Owner
 - Property or facility director, manager, or supervisor
 - Other type of director, manager, or supervisor
 - Other, please specify:
 - Don't know
 - Refused

D.4.3. Use of Service Providers

[ASK ALL]

- Q1. Does your company contract out any work on the refrigeration systems?
- Yes
 - No
 - Don't know
 - Refused

[ASK IF THEY SAID THEY contract out the work in Q1]

- Q2. Please indicate whether your organization contracts out the work associated with these activities: *[Read]*

Activities	1-Yes, all of it	2- Yes, but not all of it	3-No	98-Don't Know	99-Refused
a. Operating the controls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Maintaining the equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[ASK IF THEY SAID THEY CONTRACT OUT ALL OR SOME WORK IN Q2 **AND** THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR ARE OWNERS OR SENIOR MANAGERS IN S1]

- Q3. Please rate the importance of the following factors when selecting your refrigeration service provider(s), and indicate which one is the most important. *[Read]*

Factor	1=Not at all important	2	3	4	5=Very important	98-Don't know	99-Refused
Price	<input type="checkbox"/>						
Customer service	<input type="checkbox"/>						
Technical proficiency	<input type="checkbox"/>						

Which factor is the most important:

[ASK IF THEY SAID THEY CONTRACT OUT ALL OR SOME WORK IN Q2 **AND** THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR ARE OWNERS OR SENIOR MANAGERS IN S1]

Q4. Which of the following are key indicators of technical proficiency that your organization pays attention to when selecting your refrigeration service provider(s)?

[Read and check boxes if they say “yes”]

- Possession of safety-related awards
- Possession of Certified Assistant Refrigeration professional (CARO) certificate
- Possession of Certified Industrial Refrigeration professional (CIRO) certificate
- Possession of other refrigeration-related certifications (If so, which ones: _____)
- Anything else, please specify:

[Do not read]:

- Don't know
- Refused

D.4.4. Involvement with RETA

[ASK ALL]

Q5. Which of the following statements are true about you or your organization?

[Read]

- I am a member of Refrigerating Engineers & Technicians Association or RETA
- Other individuals in my organization are members of RETA
- My organization is a member of RETA (We have corporate membership)
- None of the above

[Do not read]:

- Don't know
- Refused

[ASK ALL]

Q6. RETA offers many services and training opportunities to members and non-members. Please indicate whether you have attended or accessed any of the following services or training events and how valuable were those services or events.

[If they indicate they attended an event, accessed a service or obtained a RETA certification, ask them to rate that event, service, or certification. If they indicate they had not attended an event, accessed a service, or obtained a certification, check NA].

Have you... <i>[Read]</i>	Using a scale of 1-5 where 1 means “not at all valuable” and 5 means “very valuable,” how valuable was this service, event, or certification?							NA
	1=Not at all valuable	2	3	4	5=Very valuable	98-Don't know	99-Refused	
a. Attended RETA National Conference	()	()	()	()	()	()	()	()
b. Attended any of RETA’s industrial Refrigeration online courses	()	()	()	()	()	()	()	()
c. Obtained RETA’s training materials (for example, refrigeration series course workbooks)	()	()	()	()	()	()	()	()
d. Taken a practice exam provided by RETA to prepare for a specific certification exam	()	()	()	()	()	()	()	()
e. Attended any RETA-promoted training classes that were not online	()	()	()	()	()	()	()	()
f. [ASK IF THEY MANAGE OTHER STAFF OR BOTH IN S4] Hired RETA-endorsed instructors to come to the facility to train you or your staff	()	()	()	()	()	()	()	()
g. [ASK IF THEY DO NOT MANAGE OTHER STAFF IN S4] Attended training sessions from RETA-endorsed instructors who came to the facility to train the staff	()	()	()	()	()	()	()	()
h. Obtained any of RETA’s certifications besides CRES (for example, Certified Assistant Refrigerator Refrigeration professional or CARO or Certified Industrial Refrigerator Refrigeration professional or CIRO certification)	()	()	()	()	()	()	()	()

[ASK ALL]

Q7. Are there any other training events or services from RETA that you have attended or accessed?

[OPEN-ENDED RESPONSE]

D.4.5. Training and Certifications

[ASK ALL]

Q8. In addition to Certified Refrigeration Energy Specialist or CRES credential, what technical refrigeration-related training and/or certifications have you received or do you expect to receive in the near future?

[If they said CARO or CIRO in Q6 above, note that here, and ask them what other technical refrigeration-related training and/or certifications they have received or plan to receive besides those they already told you about.]

Certified Assistant Refrigeration professional (CARO)

- Received it
- Pursuing it
- Do not plan to pursue
- Don't know

Certified Industrial Refrigeration professional (CIRO)

- Received it
- Pursuing it
- Do not plan to pursue
- Don't know

Refrigeration professional Coaching (sponsored by BPA, Energy Trust, or a utility)

- Received it
- Pursuing it
- Do not plan to pursue
- Don't know

Other, please specify:

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4]

Q9. Thinking of your staff, what technical refrigeration-related training and/or certifications have they received or are in the process of receiving? Please check all that apply.

[RANDOMIZE ALL BUT OTHER]

Certified Assistant Refrigeration professional (CARO)

- Some received this credential
- Some are pursuing it
- None plan to pursue
- Don't know

Certified Industrial Refrigeration professional (CIRO)

- Some received this credential
- Some are pursuing it
- None plan to pursue
- Don't know

Refrigeration professional Coaching (sponsored by BPA, Energy Trust, or a utility)

- Some received this credential
- Some are pursuing it
- None plan to pursue
- Don't know

Other, please specify:

D.4.6. Training Support, Firm's Hiring Policies and Attributes of Effective Refrigeration professional

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 **OR** THEY ARE OWNER OR SENIOR MANAGER IN S1]

Q10. What percentage of your refrigeration operation staff have access to employer-provided support for training and development?

- 0%
- 1-25%
- 26-50%
- 51-75%
- 76-100%
- Not sure
- Refused

[ASK IF 0>0% OR NOT SURE]

Q11. What percentage of your refrigeration operation staff have used employer support for certification training?

- 0%
- 1-25%
- 26-50%
- 51-75%
- 76-100%
- Not sure
- Refused

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 **OR** THEY ARE OWNER OR SENIOR MANAGER IN S1]

Q12. Which certifications or training do you consider when hiring refrigeration operation staff?

- Certified Assistant Refrigeration professional (CARO)
- Certified Industrial Refrigeration professional (CIRO)
- Refrigeration Energy Specialist Certification (CRES)
- Refrigeration professional Coaching
- Other, please specify: [Open-ended response]
- Don't know
- Refused

[ASK ALL]

Q13. Thinking of Refrigeration professional responsibilities, what characteristics are critical to be an effective Refrigeration professional?

[OPEN-ENDED RESPONSE]

[ASK ALL]

Q14. Using a scale of 1-5 where 1 means “not at all important” and 5 means “very important, how important would you say it is for refrigeration operations staff to have mastered these skills? *[Read]*

Skills	1=Not at all important	2	3	4	5=Very important	98-Don't know	99-Refused
Understanding the function of refrigeration system components, safety issues and required monitoring	()	()	()	()	()	()	()
Understanding operation best practices such as improving part-load performance, reducing system lift, or using effective defrost strategies to optimize system energy use	()	()	()	()	()	()	()
Knowing approaches to facility energy management such as setting and monitoring performance indicators	()	()	()	()	()	()	()
Managing costs by efficiently operating the refrigeration equipment while maintaining product quality, productivity, and safety	()	()	()	()	()	()	()
Managing energy use of non-refrigeration systems such as (but not limited to) lighting, compressed air, boilers, or pumps	()	()	()	()	()	()	()

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR THEY ARE OWNER OR SENIOR MANAGER IN S1]

Q15. Thinking of your refrigeration operations staff, please indicate the areas in which you would say they are sufficiently skilled to do their jobs effectively. Are they sufficiently skilled in...

[Read only if they gave ratings of 2 to 5 in Q34, and check boxes if they indicate their staff is sufficiently skilled.]

- Understanding the function of refrigeration system components
- Understanding operation best practices
- Knowing approaches to facility energy management
- Managing costs through efficient operations
- Managing energy use of non-refrigeration systems

[ASK IF THEY SAID THEY ONLY OPERATE THE SYSTEM(S) OR BOTH – Operate the system(s) and manage staff –IN S4]

Q16. Please indicate the areas in which you would say you are sufficiently skilled to do your job effectively. Are they sufficiently skilled in...

[Read only if they gave ratings of 2 to 5 in Q34, and check boxes if they indicate their staff is sufficiently skilled.]

- Understanding the function of refrigeration system components
- Understanding operation best practices
- Knowing approaches to facility energy management
- Managing costs through efficient operations
- Managing energy use of non-refrigeration systems

D.4.7. Experience with CRES

[Energy 350, when collecting information on the activities they have performed, please ask contacts whether they have done more than five activities but documented only five and impacts or outcomes they observed by doing the activities.]

Next few questions are about Refrigeration Energy Specialist Certification or CRES.

[ASK ALL]

Q17. How did you hear about CRES?

- From RETA representative
- When visiting RETA website
- From RETA or NEEA sponsored brochure or flyer
- From NEEA representative
- Trade Publication, please specify: [Open-ended response]
- Other, please specify: [Open-ended response]
- Don't know
- Refused

[ASK ALL]

Q18. Why did you decide to become CRES certified?

- To improve my skills
- To get better pay
- To be promoted
- More job opportunities at current company or elsewhere
- Other, please specify: [Open-ended response]
- Don't know
- Refused

[ASK ALL]

Q19. Did your employer... *[Read]*

a. ...pay the costs associated with CRES certification (ex. travel, exam fee, training materials)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Refused
b. ...allow you to pursue CRES certification during work time	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Refused
c. ...support you in any other way	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> Refused

[ASK IF THEY SAID their employer had paid the costs associated with CRES IN Q19a]

Q20. Using a scale of 1-5 where 1 means “not at all likely” and 5 means “very likely,” would you have pursued CRES if your employer had not paid the costs?

- 1- Not at all likely
- 2
- 3
- 4
- 5 –Very likely
- Don't know
- Refused

[ASK IF THEY SAID their employer allowed them to pursue CRES during work time IN IN Q19b]

Q21. Using a scale of 1-5 where 1 means “not at all likely” and 5 means “very likely,” would you have pursued CRES if your employer had not allowed you to pursue CRES certification during work time?

- 1- Not at all likely
- 2
- 3
- 4
- 5 –Very likely
- Don't know
- Refused

[ASK ALL]

Q22. Where there any aspects of the CRES certification that did not go smoothly for you?
[PROBE: Anything else?]

[OPEN-ENDED RESPONSE]

[ASK ALL]

Q23. To what degree have you shared knowledge gained from CRES training to other operations staff? Would you say...

[Read]

- To a very great degree
- To a large degree
- Somewhat
- To a small degree
- Not at all

[Do not read]

- Don't Know
- Refused
- NA

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR THEY SAID THEY ARE OWNER OR SENIOR MANAGER IN S1]

Q24. Based on what you know about CRES, if you were to interview two similarly qualified candidates for a Refrigeration professional position in your company, where one of the candidates had the CRES credential and the other did not, how influential would CRES be on your decision or recommendation of who to hire?

Please answer by using a scale of 1-5 where 1 means “not at all influential” and 5 means “extremely influential.”

- 1- Not at all influential
- 2
- 3
- 4
- 5 –Extremely influential
- Don't know
- Refused

[ASK ALL]

Q25. Northwest Energy Efficiency Alliance or NEEA is currently supporting and promoting CRES certification. Do you have any suggestions for NEEA on good ways to promote CRES certification to other refrigeration professionals?

[OPEN-ENDED RESPONSE]

[ASK ALL]

Q26. In the next two years, do you anticipate seeking utility incentives for more energy efficiency upgrades than you applied for in the past two years?

- Yes
- No
- Don't know
- NA – never applied for any incentives in the past
- Refused

D.4.8. Importance of Operating Refrigeration Equipment Efficiently and Benefits Associated with Such Operation

We are almost done with the survey. I have a few more questions.

[ASK ALL]

Q27. Please check which of the following policies or procedures, if any, your company has in place.

[Read]

- Written sustainability or energy management plan
- A staff member that is responsible for energy and energy efficiency
- Defined energy savings goals
- A specific policy requiring that energy efficiency be considered when purchasing refrigeration equipment
- Anything else, please specify:

[Do not read]

- Don't know
- Refused

[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR THEY SAID THEY ARE OWNER OR SENIOR MANAGER IN S1]

Q28. I am going to list a few statements. Using a scale of 1-5 where 1 means “completely disagree” and 5 means “completely agree,” please rate how much you agree with each statement.

Statements	1=Completely disagree	2	3	4	5=Completely Agree	98-DK	99-Refused
Within the last five years, our company has focused on increasing energy efficient operations of the refrigeration system(s).	()	()	()	()	()	()	()
Optimizing energy use is less important than hitting operational targets such as production quotas.	()	()	()	()	()	()	()
Our company values training individuals to operate our refrigeration systems efficiently.	()	()	()	()	()	()	()
Our company values on-the-job training more than refrigeration-related certifications.	()	()	()	()	()	()	()

[ASK IF THEY SAID THEY ONLY OPERATE THE SYSTEM(S) OR BOTH – Operate the system(s) and manage staff – IN S4]

Q29. I am going to list a few statements. Using a scale of 1-5 where 1 means “completely disagree” and 5 means “completely agree,” please rate how much you agree with each statement.

Statements	1=Completely disagree	2	3	4	5=Completely Agree	98-DK	99-Refused
At work, I am encouraged to find solutions to problems I encounter operating the refrigeration system.	()	()	()	()	()	()	()
My suggestions for improvements to operating and maintaining the refrigeration system are seldom taken seriously.	()	()	()	()	()	()	()
I know how to safely optimize energy use while maintaining reliable system operation.	()	()	()	()	()	()	()
Optimizing energy use is less important than hitting operational targets such as production quotas.	()	()	()	()	()	()	()
My company values having a <u>certified</u> professional operate and maintain its refrigeration systems.	()	()	()	()	()	()	()
My services in operating and maintaining the refrigeration system are not highly valued by my company.	()	()	()	()	()	()	()

D.4.9. Firm Characteristics

[ASK ALL]

Q30. What are you processing at the facility you work at?

- Dairy
- Meat
- Seafood
- Fruit
- Beverage
- Pharmaceuticals
- Other, please specify:

[ASK ALL]

Q31. Which of these refrigeration activities does your organization perform there?

- Blast cooling/ freezing
- Process cooling
- Freeze drying
- Cold storage
- Other, please specify:

Q32. *[ASK IF THEY SAID THEY MANAGE STAFF OR BOTH IN S4 OR THEY SAID THEY ARE OWNER OR SENIOR MANAGER IN S1]*: Could you provide us with the contact information of an individual in your organization who operates your refrigeration system(s) but does not manage other staff? We have a few questions about training and/or certifications that we would like to ask them.

[OPEN-ENDED RESPONSE]

[ASK IF THEY SAID THEY ONLY OPERATE THE SYSTEM(S) IN S4]: Could you provide us with the contact information of an individual who manages either you or other refrigeration operations staff. We have a few questions about training and/or certifications that we would like to ask them.

[OPEN-ENDED RESPONSE]

D.4.10. Survey End

Thank you very much for all of your valuable time. We know it was a significant investment, and we appreciate it.