

# **Leveraging the Existing Certification Structure of an Organization for Energy Efficiency**

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## **ABSTRACT**

For over 100 years the Refrigerating Engineers and Technicians Association (RETA) has represented the operators of industrial refrigeration systems for cold storage, food distribution and food processing plants nationwide. RETA's primary mission is the professional development of operators. A centerpiece is RETA's certification programs for operators in the safe and reliable operation of complex, custom refrigeration systems. RETA meets the requirements of the American National Standards Institute (ANSI) for being an ANSI-accredited certification body, and the market recognizes these certifications for their technical rigor and professional value.

For twelve years, the Northwest Energy Efficiency Alliance (NEEA), funded by northwest electric utilities, has been working to accelerate energy efficiency through market transformation. A key strategy for NEEA is to team with industry associations and leverage their market influence and structure to create initiatives that will help further both the associations' and NEEA's missions.

The focus of this paper is the joint effort of NEEA and RETA currently underway to develop and roll out a new "specialist certification" for operators in the energy efficient operation of industrial refrigeration systems: Certified Refrigeration Energy Specialist (CRES). RETA's certification programs have become nationally recognized standards – leveraging RETA's certification program structure and reputation is essential to the market acceptance and success of CRES. Based on demonstration trainings rolled out to date in the Northwest, activities undertaken by CRES operators can reduce energy use by two percent to as much as ten percent over several years of consistent effort, depending on the energy efficiency opportunities found.

## **How "CRES" Was Born: A Marriage of Two Unique Organizations**

In 2011 the Northwest Energy Efficiency Alliance (NEEA) and the Refrigerating Engineers & Technicians Association (RETA) began discussing the idea of a joint effort to develop and roll out the Certified Refrigeration Energy Specialist (CRES) program, a new certification focused on the energy efficient operation of industrial refrigeration systems. These systems are complex, custom-built, and usually ammonia-based. The target applicants for the certification program are operators, technicians, managers, and refrigeration professionals.

As stated by Don Tragethon, Executive Director of RETA, "one of RETA's goals for the Certified Refrigeration Energy Specialist program is for the hands-on operator to gain more appreciation and respect from their employers by successfully acquiring this credential and making a positive difference to the bottom line where they work."

A key strategy for NEEA is to team with industry associations such as RETA, and leverage their market influence and structure to create initiatives that will help further both the associations' and NEEA's missions. NEEA identified RETA as an important ally in the

industrial refrigeration market because RETA has a focused mission and dedicated members. RETA also is accredited by the American National Standards Institute (ANSI) as a “certification body for personnel.” This paper discusses the meaning and significance of the latter in the third section (“What is an ANSI-Accredited Certification Body?”).

NEEA is providing funding to help RETA launch the CRES program. The funding targets : (1) development of formal “Learning Objectives” (LOs) for CRES<sup>1</sup>; (2) development of CRES exam questions, and; (3) marketing of the CRES certification in the Northwest through press releases, articles, brochures, flyers, presentations, a promotional video, etc.; and (4) three multi-session demonstration trainings in the Northwest to kick-start the certification.

## **How Can Professionals Have Confidence in the Value of Energy Efficiency Certification Programs?**

There are certification programs for energy efficiency in various types of buildings, systems, and equipment. How can the market – that is, employees and employers – be confident that having a certain certification ensures the recipient has specific, demonstrable knowledge and capabilities to take action to manage and reduce energy use?

Adding to the market’s potential difficulty of assessing value is the existence of certificates as opposed to certifications. Often to receive a certificate an individual only needs to be exposed to material. For example, they may simply have to show that they have attended a certain number of hours of classroom or web-based training. Little or no testing may be involved.

If certification programs can be developed and implemented in accordance with rigorous, consistent, and transparent standards, the market can more readily assess their value and credibility. One mechanism for facilitating the formal application of agreed-upon standards is the accreditation of the entities that develop certification programs. These entities may include companies, institutions, and agencies. Certifications developed by accredited entities can play an important role in supporting and complementing efforts to achieve, and particularly to maintain, energy savings.

## **What is an “ANSI-Accredited Certification Body”?**

ANSI offers an accreditation service for “certification bodies” – entities that develop certification programs for either “products” or “personnel.” Accredited entities must meet rigorous international standards.<sup>2</sup> ANSI is the only institution in the United States that is *itself* accredited to provide this accreditation service.<sup>3</sup> No other national accreditation process is as stringent.

Accredited certification bodies for *products* certify products as complying with a set of agreed upon specifications. For example, ANSI accredits certification bodies to determine

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<sup>1</sup> Learning objectives guide the development of both training in the energy efficient operation of industrial refrigeration systems, and the CRES certification exam questions.

<sup>2</sup> Certification bodies for products must comply with ISO/IEC Guide 65. Certification bodies for personnel must comply with ANSI/ISO/IEC 17024, *General Requirements for Bodies Operating Certification Systems of Persons*, published in 2003 and recently adopted as an American National Standard.

<sup>3</sup> ANSI is a member of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). ANSI’s own accreditation process must comply with ISO/IEC 17011.

whether products such as appliances meet the required specifications to be certified as ENERGYSTAR<sup>®</sup>. Accredited certification bodies for *personnel* adhere to strict processes and protocols for developing and delivering certification programs for the knowledge and capabilities of people.

Over a period of 11 years beginning in 2002, RETA staff and its members have invested substantial time and resources towards gaining their ANSI accreditation. In 2007, RETA applied for accreditation of their two levels of refrigeration safety and reliability certification programs, Certified Assistant Refrigeration Operator (CARO) and Certified Industrial Refrigeration Operator (CIRO).<sup>4</sup> They received ANSI approval in March 2008. Since then, over 1,150 operators have earned CARO certification and over 750 have become CIRO certified.

ANSI accreditation must be renewed every five years; RETA is currently undergoing the rigorous reaccreditation process. ANSI's decision to extend RETA's accreditation to 2018 is expected by the fall of 2013.

Based on conversations by the authors of this paper with RETA staff and members, refrigeration companies, operators, and regulatory agencies such as the Occupational Health and Safety Administration (OSHA) explicitly recognize the value of CARO and CIRO. Operators are aware of the value for their professional development and marketability. Management knows the value of certification to plant operation, productivity, and safety, and that these benefits directly and indirectly contribute to a company's financial bottom line. As a case in point, one regulator remarked that regulatory agencies consider CARO and CIRO staff an important if not essential element in safe refrigeration system operation and in incident response.

As when professionals become CARO and CIRO certified, CRES will increase an operator's value as an employee and may improve their marketability. RETA plans to apply to add the CRES program to its ANSI-accredited programs when CRES accumulates sufficient performance data to meet ANSI requirements.

## **The Accreditation Process and Requirements**

The added detail in this section is so the reader can gain an appreciation of the specific value of becoming an ANSI-accredited certification body.

It typically takes several years for a certification body to demonstrate full compliance with ANSI standards. ANSI's review includes the entity's organizational structure, management systems, and record keeping. A particularly important focus of accreditation is standards used to develop a certification examination. Each exam must be a fair, valid, and reliable assessment of the applicants' essential knowledge and capabilities. A testing expert (psychometrician<sup>5</sup>) is usually involved to make sure the questions are clear, and have only one correct answer. He or she also analyzes the test results, or "tests the test" to ensure that test takers' interpretation of each question within a particular test is consistent. The certification body must also provide documented evidence to ANSI that participants are actually applying the knowledge and

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<sup>4</sup> The CARO examination requires no experience as a refrigeration operator. The CIRO examination requires two years of experience and measures more complex understanding of system operations and troubleshooting. RETA has also developed the Refrigeration Authorized Instructor (RAI) program to formally qualify refrigeration instructors. RETA is applying to get the RAI ANSI-accredited.

<sup>5</sup> A psychometrician is a person skilled in the development, administration and interpretation of objective psychological tests. For ANSI-accreditation, they may have oversight of many aspects of a certification body's application process and would ensure that each exam question is effective at assessing the applicant's knowledge and capabilities.

capabilities reflected in the certification. ANSI also maintains strict separation between training and exam development. For example, it bars people who are involved in training candidates for a particular examination from developing questions for that test.

## **CRES Content and Benefits**

RETA's Certification Committee is in the process of developing the CRES exam based on the agreed upon Learning Objectives (LOs). The LOs encompass at a high level the following:

- Describe the basic parts of an industrial refrigeration system, the purpose of each part, and how the parts work together as a system. Define refrigeration terms.
- Define and use basic energy efficiency concepts and terms; perform basic calculations and conversions with energy units; understand approaches for tracking energy use and measuring energy savings.
- Optimize and maintain the energy efficiency of compressors, condensers, evaporators, and associated refrigeration equipment. This involves optimizing both individual components and the refrigeration system as a whole by implementing operation & maintenance strategies. Examples include improving part-load performance, reducing system lift, and applying effective defrost strategies.
- Optimize and maintain the energy efficiency of non-refrigeration loads: lighting, compressed air, pumps, fans, and other industrial systems. CRES covers these other systems because their energy use on average is 40 percent of refrigeration plant energy use.
- Understand the relationship between implementing specific energy efficiency opportunities and maintaining (and potentially improving) production, temperature control, product quality, plant reliability, and safety. Describe other potential non-energy benefits from energy efficiency.
- Select and use measurement units, processes, and methods to establish a baseline for energy use and intensity.
- Perform simple energy savings calculations and understand the economic analysis concepts that might be used to evaluate energy efficiency opportunities.
- Prepare a plan (examples: staffing, funding, timeline) for implementing the activities/projects and maintaining the savings over time.
- Obtain management support, approval, and recognition for implementing these opportunities and for an overall Strategic Energy Management plan.

CRES operators will have the knowledge and capabilities to bring bottom-line benefits to their company. These operators can identify energy efficiency opportunities that reduce a company's energy costs while maintaining or improving productivity, product quality, safety, and reliability. Activities undertaken by CRES operators can reduce energy use by two percent to as much as ten percent over several years of consistent effort, depending on the energy efficiency opportunities found. Managing energy costs can improve a company's competitiveness and support their sustainability efforts. Food service and retail companies are increasingly demanding sustainability from their refrigerated storage and food processing partners – tracking energy use and improving efficiency are important elements of sustainability documentation.

CRES operators will also be able to bring non-energy benefits to their plants. Examples include:

- Ability to hold tighter set points
- Better defrost management
- “Systematic” approach to defrost & equipment maintenance
- Increased equipment and process safety and reliability through better system surveillance and operation
- Reduction in maintenance time and costs, and increased equipment life because equipment not run as hard or long
- Increased ability to troubleshoot because of increased knowledge of system
- More flexibility to provide additional services to the organizations

## **How to Become a Certified Refrigeration Energy Specialist (CRES)**

Operators, technicians, managers, and refrigeration professionals may apply to become a CRES. The requirements are as follows:

- Demonstrate understanding of refrigeration concepts, systems and safety.
- Pass the CRES exam to demonstrate understanding of energy management particularly as it applies to safe refrigeration operation.
- Complete and document five energy efficiency activities in their facilities (refrigeration and non-refrigeration).
- Renew their certification every three years by completing two additional activities each year (a total of six) and acquiring required professional development hours (PDH).
- Applicants can take a formal training in energy efficient operation of refrigeration systems, but training is not required.

The requirement that CRES applicants complete and document energy efficiency activities is a new certification element for RETA, and is integral to the expected success of the CRES program in both imparting knowledge and managing energy use. Taking the CRES exam will be one test of applicants’ knowledge; completing and formally documenting activities will also test their capabilities to concretely and continuously apply their knowledge in the plant. NEEA is funding the creation of a database in which applicants will document their activities.

An “activity” for CRES is broadly defined as an action that 1) directly achieves and or maintains energy efficiency in a facility, or 2) supports the achievement of, energy efficiency in a facility. An activity that directly achieves energy efficiency can be a no- or low-cost operations or maintenance change, or it can be a capital project or equipment change.

Below are some examples of activities that would qualify for the CRES certification:

- Reducing lift by using a lower condensing pressure set point or by enabling wet bulb approach control if that is a control system option. Documenting this new set point or control setting ensures that it becomes standard practice in the facility.

- Seasonal adjustment of defrost initiation and duration times, derived from actual observation of evaporator frost, is another activity that leads to energy savings. As before, documenting this procedure and the rationale will help it become standard practice in the facility.
- An example of a supporting activity is the annual calibration of system pressure gauges and thermometers against a known reference sensor. The details of these calibration procedures would be formally described and entered into the maintenance management system as required.

Each CRES applicant will demonstrate that he/she has successfully implemented his/her energy efficiency activities by recording them in an electronic database managed by RETA. The database will be a resource for other CRES applicants and CRES-certified operators to learn from the energy efficiency experiences of others. The database elements and structure will address issues of confidentiality of data and information.

## **Training to Support CRES**

While NEEA is focusing on supporting RETA on the certification development, rather than on training, NEEA is offering three demonstration trainings to kick-start CRES in the Northwest. These trainings are designed both to convey the energy efficiency content, and to demonstrate a participant-centered training model based on the principles of optimizing adult learning. These principles are espoused by the *Bob Pike Group*<sup>6</sup> and are taught in their “Train the Trainer Boot Camp.” NEEA has funded the demonstration training instructors from Cascade Energy to attend Bob Pike training to learn how to apply the participant-centered approach. In doing so, NEEA is pursuing a second prong of its market transformation strategy, which is to encourage the adoption of this participatory model for more industrial energy efficiency trainings.

CRES also complements and supports several training and energy management programs that already exist in the Northwest. Examples include Energy Trust of Oregon’s Refrigeration Operator Coaching (ROC) program and Energy Smart Industrial Program’s High Performance Energy Management (HPEM) funded and administered by the Bonneville Power Administration (BPA). One of NEEA’s market transformation goals is to have training organizations and other entities already in the market take on CRES-related training of their own accord. This has been the case for CARO and CIRO.

## **CRES Demonstration Class Highlights**

The Puget Sound Chapter of RETA hosted the first multi-session demonstration training at Trident Seafoods in Seattle. Fifteen technicians and operators attended from eight different plants, representing four different companies. The series involved six half-day sessions taught every two weeks over a period of four months. The series was taught by Kyle Huth of Cascade Energy, Project Engineer and refrigeration energy efficiency specialist. He wove in participatory activities ranging from hands-on exercises in the Trident Seafoods engine room to multiple

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<sup>6</sup> Information on the Bob Pike Group can be found at [www.bobpikegroup.com](http://www.bobpikegroup.com)

group exercises in the classroom involving games, quizzes, and active movement. The participants were able to clearly demonstrate retention and understanding of the efficiency concepts taught.

Training participants also implemented five activities in their own plants outside of class time to fulfill this part of the CRES requirements. At the end of the training, participants presented to their peers and management on those activities and what they had learned.

By the end of the four-month training, each Puget Sound training participant had done five low- and no-cost energy efficiency activities in their plants (for example, set point adjustments) that will save each plant, on average, an estimated \$17,000 annually. One way to promote this concept to Management is to describe it as “equivalent profitability savings” from energy efficiency. An example of this is: “if a company has a 5% profit margin (average for the food processing industry), it would take an additional \$340,000 in sales to generate \$17,000 in profits (5% of \$340,000)”.

Class participants also learned about how continuous energy improvement can increase plant safety and reliability. As Don Tragethon, Executive Director of RETA remarked, “The benefits from the Certified Refrigeration Energy Specialist effort will be improved safety, more profitability for the facility by reduced power costs, and enhanced skill sets for each technical person involved in the program.” CRES operators can improve the safety and reliability of their plants because good energy management requires better system surveillance, more frequent checking and calibration of equipment, more systematic system maintenance, reductions in how long and hard equipment is running, better defrost management, and more. As part of the demonstration training offering, NEEA helped fund the installation of real-time metering equipment and a sophisticated monitoring system to measure energy use and savings from the no- and low-cost activities that applicants had implemented. The monitoring system is supported by regression analysis and features user-friendly interfaces and real-time graphs of expected and actual energy use, energy savings, and a cumulative sum of energy use change.

## **How CRES Supports Existing Utility and Market Transformation Programs**

Along with other certifications, the CRES program will support the creation and persistence of energy savings in the Northwest and beyond. Certification programs can complement and support utility programs, including training programs, technical assistance programs, incentive programs focused on low- and no-cost operation and maintenance changes, measure-based incentive programs, and programs focused on Strategic Energy Management<sup>7</sup> initiatives.

CRES professionals will implement energy savings that utilities and market actors will be able to leverage to maintain a pipeline of savings. Certified operators and their companies will be more likely to be aware of and participate in utility programs because of their own investment in energy efficiency through CRES. More concretely, CRES requires documented energy efficiency activities – a formal process that ensures that operations and maintenance activities will be sustained. CRES also supports savings persistence by requiring continued education for recertification that includes Professional Development Hours (PDH) and additional activities.

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<sup>7</sup> The latter efforts focus on the idea that organization-wide support, especially executive support, and a culture of continuous energy improvement with broad employee engagement, are essential to optimizing and sustaining energy savings.

The activities database will be a resource for operators to learn from the energy efficiency experiences of others.

One example of a program that CRES complements is Energy Trust of Oregon's Refrigeration Operator Coaching (ROC). The ROC program is a training and technical assistance program whose purpose is to deliver documented energy savings from low- and no-cost measures focused on system operation and maintenance. ROC can create a foundation of trained operators who will likely be interested in CRES. If ROC participants become CRES certified, this will create an even greater commitment by operators to continuous energy efficiency improvement, and an even greater expectation on the part of their managers that the CRES operators will deliver energy savings. This is a win-win for ROC and CRES.

Another specific program that CRES complements is the Energy Smart Industrial Program's High Performance Energy Management (HPEM) funded and administered by the Bonneville Power Administration (BPA). HPEM focuses on applying continuous improvement practices similar to Lean and Six Sigma. In cooperation with the customer's utility, HPEM staff facilitate a process whereby the customer puts in place the elements of an organization-wide approach to continuous energy improvement. The CRES program supports this process for refrigeration companies by creating qualified, engaged employees with a professional investment in energy efficiency. HPEM incentives are paid out over time so that a consistent program of managing energy results in a direct financial reward along with lower energy use.

NEEA is supporting CRES because it has the elements of and potential to be a strong and cost effective market transformation initiative. RETA's goal is to eventually "own" and manage CRES, and for existing market entities to offer trainings to support operators preparing for the CRES exam.

## **Conclusions and Lessons Learned**

Professional certification has many benefits for employees, employers, industrial firms, and the utilities that serve them. Having ANSI-accredited certification bodies develop certification programs optimizes those benefits by ensuring that the programs conform to rigorous, consistent, and transparent standards. These standards ensure that recipients of the certifications have demonstrated knowledge and capabilities. The CRES certification program can lead the way for other certification efforts in other industries and practices.

The benefits of professional certifications in refrigeration energy efficiency from accredited organizations are:

- For industrial professionals: professional development and recognition, enhanced marketability, and increased job satisfaction.
- For refrigeration companies: energy savings ranging from two up to ten percent, bottom line dollar savings, improved competitiveness, and enhanced sustainability, all while maintaining and potentially improving productivity, product quality, safety, and reliability.
- For utilities: a pipeline of energy savings from the continued efficiency activities of certified professionals and their companies; increased participation in utility programs and enhanced savings persistence.
- The benefits to market transformation organizations: ability to leverage the market influence and structure of certification bodies; market traction from the credibility of



certification; market momentum created by associations' commitment to ANSI accreditation; certification programs can create market pull for the creation of supporting trainings.

The following lessons have been learned so far:

- The process of becoming an ANSI-accredited certification body is long and involves significant resource commitment.
- The addition of activities for certification requires significant effort on the part of the certification body to define activity criteria and review qualifying activities.
- Commitment from market actors beyond operators and their employers can make a positive impact in interest and acceptance for certification programs. These market actors include utilities, vendors, consultants, contractors and manufacturers.

Altogether, the benefits of a formal, ANSI-accredited certification program supporting energy efficiency are substantial and long-term – these benefits justify the effort and time needed for implementation.

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