

HIGH-PERFORMANCE HVAC TODAY™

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Commercial Market Review and Forecast

ALSO IN THIS ISSUE:

**How to Determine "Live"
Commercial Duct Leakage**

**How Can You Market
HVAC Performance?**

**Partner Spotlight: "We're
Not Your Grandfather's
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Are Your Technicians Winterized?



Mike Weil is editor-in-chief and director of communications and publications at National Comfort Institute, Inc. Contact him at ncilink.com/ContactMe.

As I write this, a massive winter storm is wreaking mayhem from California through Texas and sweeping to the Eastern shores of the U.S. Outside temperatures are hovering in the low 20s, and wind chills are in the single digits or lower. It's been snowing steadily here in Cleveland for nearly 24 hours to the tune of more than a foot of snow on the ground. And more is expected here and across the country.

In the middle of this, my wife and I are doing some remodeling and have several contractors working in our home. I don't envy them; especially the countertop guy who has to trim the new counters in the garage.

I was impressed that they made it to work when road conditions are so poor. I was also impressed at how prepared they are for the inclement weather. I'm talking about layers of clothes, gloves with liners, good hats that cover their ears, polar-like winter coats, and so on.

Being safe and warm at home is awesome for me, but this is a busy and dangerous time of year for the contracting community.

HVAC technicians, especially those who work on commercial rooftops, often have to take off their gloves to handle small parts and such. It only takes a few minutes touching metal for fingers to get so stiff you can barely move them. The danger of frostbite is indisputable.

The **U.S. National Institute for Occupational Safety and Health (NIOSH)** says that anyone who works in a cold environment may be at risk for cold-related illnesses and injuries, or "cold stress." The NIOSH site (ncilink.com/NIOSH) says that workers face increased risks working in cold environments, especially if they take certain medications, are in poor physical condition, or suffer from illnesses such as diabe-

tes, high blood pressure, or heart disease.

According to the **Canadian Centre for Occupational Health and Safety (CCOHS)**, "A cold environment challenges the worker in three ways: by air temperature, air movement (wind speed), and humidity (wetness). To work safely, these challenges must be counterbalanced by proper insulation (layered protective clothing), by physical activity, and by controlled exposure to cold (work/rest schedule)."

If you visit and scroll through the CCOHS website at ncilink.com/CCOHS, you can find some very specific information about what your technicians should wear, what frostbite signs to look for, and much more.

Other safety concerns should focus on how to use ladders in winter, understanding the impact of subzero temperatures both physically and mentally, and preparing your technicians to deal with mild hypothermia issues. These are among the necessities to winterize your technicians.


For even more specific information on layering and the types of clothing your service and installation techs should wear, check out ncilink.com/snowpatrol. Though this site focuses primarily on police officers, its information could be quite useful for your team.

HVAC technicians are out there, right now, helping consumers, working on rooftops, and in the process exposing themselves to extreme weather elements.

Take the time to prepare your workers mentally and physically to recognize cold warning signs and work safely outdoors.

Apparently, my remodel contractors had been so prepared that they were able to work quickly and safely to get our projects done.

Your team should be able to do the same.

Stay safe out there. 

Written By HVAC Professionals for HVAC Professionals

"SER RATING: WHAT DOES IT MEAN?" BROCHURE FROM NCI

SER stands for System Efficiency Ratio. It differs from SEER in that it is the rating for the entire HVAC system (including ductwork and building construction conditions).

The "SER Rating: What Does it Mean?" brochure from National Comfort Institute (NCI) is a great tool that our team uses

to help explain what this means to our customers. It explains how the manufacturer's rated efficiency on air conditioning units and furnaces are based on laboratory testing conditions.

Laboratory conditions just don't exist in the real

world. The equipment can be the absolute most efficient, but when installed into a house with inadequate ductwork, its efficiency will not be the same. And if you install it incorrectly, it's even worse.

The brochure is a powerful way for us to explain our training, certifications, and expertise. It backs up our selling story.

Besides all the great content in the brochure itself,



I circle the myhomecomfort.org website and tell customers to go there to learn even more. This URL leads to NCI's consumer-focused website.

The brochure and website give us more credibility because they represent a third-party resource. Customers trust that.

This brochure is part of NCI's **Home Comfort Series** of brochures that address almost all consumer questions on why Performance-Based Contracting™ is so important.

You can find these brochures at the following link (along with a wide array of other support materials): ncilink.com/SupportMaterial. You can order brochures here or call NCI Customer Care at 800-633-7058.

— By Gary Katz, owner, Total Comfort, Minneapolis, MN



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We're Not Your Grandfather's *Dwyer* Anymore

In 1931, in Chicago, IL, F.W. Dwyer Manufacturing Company was founded to produce liquid-filled manometer test instruments. In 1953 they developed the Magnehelic, which grew in popularity and became the manufacturer's flagship instrument. Over the years, their growth led Dwyer to move its headquarters from Chicago to newly built and greatly expanded facilities in Michigan City, Indiana, where they remain to this day.

The company has three more facilities in Indiana and manufacturing in Fergus Falls, MN and Kansas City, MO.

According to Andy Orlowski, senior customer experience manager, most people know Dwyer because of the Magnehelic.



Andy Orlowski

"It's been called the best differential pressure gauge on the market," he says.

Orlowski, who began his career with Dwyer after graduating college in 2004, adds that its product line expanded through development and acquisitions. He says Dwyer bought brands like **Mercoid**, **W.E. Anderson**, and **Proximity**.

"In addition, we've expanded our reach. Today Dwyer is a global company with sales offices in the United Kingdom, Australia, Singapore, Hong Kong, and Shanghai.

"Also, Dwyer works with distributors that cover sales internationally outside of the U.S. Plus, we work with channel partners domestically."

EVOLVING MARKET STRATEGY

In the very beginning, Orlowski says Dwyer's market approach was all direct sales. "We still do some of that today. But as the company grew, we expanded into international markets. Developing strong distribution networks became vital.

"So today, we work with channel partners, and then they work directly with the customers," he says. "We've spent a lot of time thinking about how to grow these relationships, which led us into the partnering programs such as the one we have with National Comfort Institute (NCI)."

Dwyer serves two distinct vertical markets: HVAC and Process Control. Under HVAC, Dwyer produces products for building automation, testing-and-balancing, and clean rooms. They also work with original equipment manufacturers of air handling equipment, chillers, and more.

On the process side, Orlowski says Dwyer makes products for the water and wastewater markets, the powder and bulk markets (manufacturers of dust collectors and pneumatic conveyance systems), and the oil and gas markets.

But like everything else, strategies change in concert with advances in

technology and market needs. With the advent of wireless and Bluetooth technologies, Dwyer evolved and now has products that take full advantage of this technology's best attributes.

WE'RE NOT YOUR GRANDFATHER'S DWYER ANYMORE

Jaden Lane is Dwyer's test business development manager covering all test equipment product lines in the U.S. She says that "Over the last decade, wireless has advanced exponentially. For the most part, especially when it comes to test equipment, everyone wants to save their data in the cloud to access it later.



Jaden Lane

"That's been a huge focus for us, not just with the test equipment portfolio, but with some of our other products used to measure air quality and pressure as well."

Lane began working with Dwyer in 2016. She interned for them while working on her mechanical engineering degree. After graduation, she joined Dwyer full-time.

She says Dwyer works hard to incorporate Bluetooth, IoT (Internet of Things), and other technologies to help make products more technician-friendly, easier to use, and take advantage of cloud-based data storage. "It's important to note that we've

Dwyer headquarters in Michigan City, IN.

always designed and manufactured products in the U.S., and our designs come directly from our Michigan City headquarters," adds Orlowski. "We've doubled down on that and are committed to innovation as one of our core values. We have over 650 patents. It's part of who we are."

He adds that in addition to technical prowess, Dwyer has always worked hard to understand customers better. Today, more than ever, product design is based a lot on customer input. And today, he says customers are looking for wireless technology.

"We trust the voice of the customer," he says. "We try to understand better what the market needs."

These efforts led to creating tools and products with the highest quality and ease of use, as well as a "cool" factor, especially in the HVAC industry.

THE CLOUD, APPS, AND MARKET CHANGES

Lane says another objective for Dwyer is to create tools that attract a younger crowd.

"There's an age gap. We see contractors who have 20 to 40 years of experience. We see millennials who are coming into the field and just learning the HVAC trade," she says.

"Millennials are full-on with this technology and they're running the latest and greatest, most innovative tools. So that is one of our market focuses.

"In that light, we are working more with cloud-based software. Specifically, we're redesigning what we call the mobile meter app (ncilink.com/MobileMeterA for Google, ncilink.com/MobileMeterB for Apple).



This app communicates with many of our wireless handheld devices, including our hot-wire anemometer, vane probe, hygrometers, and more. They all communicate via Bluetooth to our mobile app," she says.

Lane explains that Dwyer designed the app so contractors can log data in a folder that represents a job. For example, if you are working on airflow at XYZ Hospital in room 12, you can save your traverse result data for that duct in the app, which connects to the Internet or Wi-Fi, and uploads it to the cloud. That data remains backed up in the cloud, and technicians always have access to it.

DWYER AND PERFORMANCE-BASED CONTRACTORS

Both Orlowski and Lane say that High-Performance HVAC contractors trained and certified by NCI are vital users of the Dwyer product lines.

"We want to make sure that our tools are optimized for High-Performance HVAC contractors to use," says Orlowski. "These are tools they use every day, so the instruments must be reliable, rugged, and cost-effective. If the tools don't work, the technicians can't work."

Lane concurs. "Some of the sharp-est contractor minds are members of

NCI," she adds. "Their input, through the products they buy and the feedback they share, is instrumental to the changes we've made. So being able to partner with NCI members is amazing and valuable."

That kind of feedback was one of the drivers for Dwyer to partner with NCI and its membership. Lane says that the feedback they receive from the Performance-Based Contracting community is very valuable.

THE PANDEMIC IMPACT

According to Orlowski, the outbreak of COVID-19 impacted the manufacturing community in many ways, and Dwyer was no different. But he says the company has a few things in place that eased the burden.

"One key factor," he explains, "is that most of our manufacturing and suppliers are domestic. We didn't have to struggle with pipeline issues from



Adam Burton is Dwyer's Distribution Sales Manager.

different countries like so many other industries did.

"Another critical factor is that we saw an increase in demand for some of our low-pressure products for filtration, flow meters,

PARTNER SPOTLIGHT

ventilators, and so on. This demand helped to balance out some of our other areas where the market lagged.

Because of the shutdowns and social distancing, Dwyer tightened down. Processes and daily regimens changed significantly – from deep cleaning and social distancing at the manufacturing plants to moving to a more work-from-home environment.

Orlowski says that despite these changes, the manufacturing plants were able to keep up with demand.

He adds that the Dwyer office and sales team were already familiar with working remotely, so work-from-home orders had little impact.

"We embraced the Google platform. We all had laptops. So we were able to maintain our normal level of service

Jaden Lane trains with contractors during an NCI Hydraulics class.

and support for our customers.

"The bottom line is that we look forward to 2021 and getting past the pandemic," Orlowski says.

AND REGARDING THE FUTURE ...

Dwyer strives to be a company on which contractors can depend. Jaden Lane says they want to be the contractors' support group. That means supporting them from not only a product design standpoint but also regarding service support.

She says, "Between our support team and our channel partners, we want to make sure they know we have their backs, and they can depend on us to make sure they have

everything they need.

Dwyer is pleased to have evolved beyond being the manufacturer for an older generation. With products aimed at improving a contractor's ability to test, measure, and diagnose performance issues with HVAC systems, they can proudly say they are reaching out to the next generation.

For these and many more reasons, **Dwyer Instruments** is the focus of our spotlight in March 2021.



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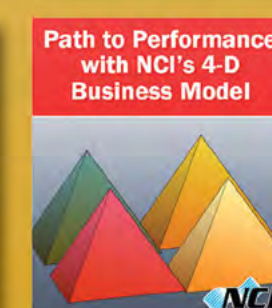
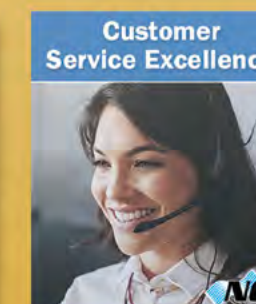
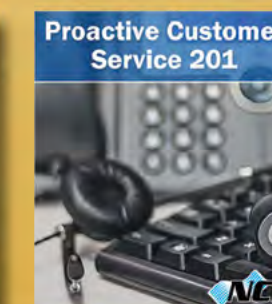
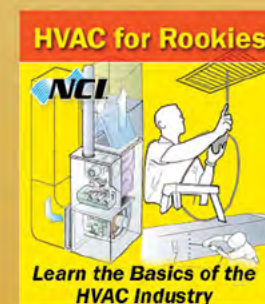
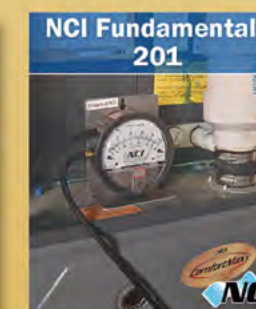
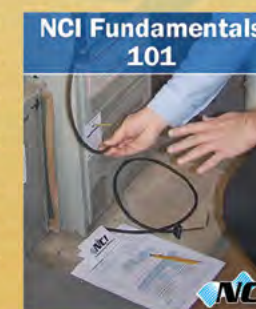
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NCI's Online University

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Commercial Market Review & Forecast: Bellwether Winds Shift for the Better

The COVID-19 Pandemic shook the U.S. (and the world for that matter) to its core. The nearly overnight switch from working in public spaces (offices, factories, manufacturing facilities, retail, and foodservice) turned on a dime to a work-from-home environment that left commercial office spaces empty or almost empty.

What will the new normal look like once this country gets vaccinated and people can return to the office environment?

Experts say that things may be very different from life before 2020, especially regarding downtown offices, hotels, and stores. Today, commercial building owners are working hard to develop safe new Indoor Air Quality (IAQ) strategies to lure wary, remote workers back into office buildings.

Fact: many businesses see remote workers as a financial boon, but building owners see them as a threat to the office market. For example, online meeting platforms can interfere with recovery in business travel. Also, retail management says that after a year of shopping from home, consumers favor that approach over heading out to their local shopping centers and malls.

In December 2020, **Pew Research Center** conducted a survey ([ncilink.com/2020PEW](https://www.pewresearch.org/2020/12/01/returning-to-workplace/)) about returning to the workplace. They found that 64% of people say they would feel uncomfortable returning, with 31% feeling very uncomfortable. Being exposed to the coronavirus was a significant concern for 57% of respondents.

So building owners need to focus on changing those concerns by working to create COVID-safe workspaces. But what if building owners don't do this?

EMPTY BUILDING SYNDROME

In October 2020, *Politico* magazine ran an article on how all the empty commercial and retail

buildings could lead to another economic crisis.

"The longer the pandemic paralyzes hotels, retailers, and office buildings, the more difficult it is for property owners to meet their mortgage payments — raising the specter of widespread downgrades, defaults, and eventual foreclosures," writes Katy O'Donnell ([ncilink.com/odonnell](https://www.ncilink.com/odonnell/)).

Another impact from a more permanent work-from-home scenario includes declines in public and private pensions.

Say what? The issue is that most public and private pensions are heavily invested in commercial real estate. If workers fail to return to the office environment, real estate values decline, and that will negatively impact pensions. Declining pensions will hurt a lot of Americans, not just the wealthy.

Furthermore, apartment buildings, which have been an economic bright spot, could change drastically. O'Donnell points out this could change if unemployed people cannot get jobs and have to depend on future Federal COVID relief packages. Without this help, more renters will begin missing rent payments.

NOW FOR SOME GOOD NEWS

It seems that many building owners and managers are preparing for a "re-occupancy" of commercial and retail real estate by redesigning space for social distancing and creating indoor environments that should help workers feel safe returning to said buildings.

Others are re-purposing their properties to replace tenants who either went out of business or decided to continue as virtual entities.

Mark Hawkinson, president of the Technical Solutions Group of ABM Industries (a national facilities management firm), says that building owners' strategies must recognize that re-occupancy of their buildings won't happen all at once. It will be in phases, and owners must "prepare to scale."

In his article ([ncilink.com/FacilityExec](https://www.ncilink.com/facility-exec/)), Hawkinson points out that so much depends on the speed (or lack thereof) of vaccinations and people's comfort levels for returning to offices.

Building owners and managers need to prepare for eventual hybrid models where tenant employees work partly from home and partly from the office. Owners and managers need to ramp up resources to help comply with social distancing mandates. They must work hard to develop reliable supply chains and maintain a solid stock of cleaning supplies.

Most importantly — they need to really update and upgrade their HVAC systems to assure proper air changes, air quality, comfort, and energy efficiency. This is fantastic news for the HVAC Industry.

COMMERCIAL HVAC OUTLOOK

More good news: **Grand View Research** reports that the commercial HVAC segment of the U.S. market is expected to "register the highest compound annual growth rate (CAGR) during their 2020 to 2027 forecast period due to increasing urbanization and the rise of construction spending in the commercial sector.

They state that "retrofitting and replacement of these HVAC units with energy-efficient solutions to minimize energy consumption is expected to drive the segment growth."

Add to that, the state of the commercial real estate industry today provides even more opportunities, especially for High-Performance Commercial HVAC contractors. With building owners concerned about creating safe environments for tenants and their employees, the HVAC systems are more critical than ever.

One of the easiest ways to create those safe environments is by making sure the



building has proper air conditioning, heating, ventilation, and excellent air quality to protect and provide ideal comfort.

Ventilation is key. **The U.S. Occupational Safety and Health Administration (OSHA)** states that "Adequate ventilation throughout the work environment can help to maintain a safe and healthy workplace ([ncilink.com/OSHA-COVID](https://www.osha-slc.gov/covid-19/))."

The building's ductwork must allow for proper airflow throughout a building because proper airflow removes contaminated air and replaces it with clean air.

With clean indoor air so crucial during the pandemic, building owners and managers are keen to improve their systems, replace older systems, and better service existing systems. Commercial duct renovations as well as system testing and balancing bode well for the High-Performance HVAC contractor.

Speaking of service, preventive maintenance is more important than ever today. Commercial HVAC contractors should see growth in their service agreement services. According to **CMS NextTech** (another facilities management organization) that advises building owners to "determine exactly what you have under the hood" before resuming the daily operation of HVAC systems. HVAC contractors can help with this by testing and measuring the systems and offering a menu of upgrades to improve and make them more COVID-safe.

Energy efficiency also remains a

top concern for commercial building owners. In its annual *Energy Efficiency Indicator* survey of facility managers, released in December 2020, **Johnson Controls** found that more than half of those surveyed plan to increase their investment in energy efficiency, renewable energy, and smart building technology in 2021 and beyond.

Johnson Controls Vice President of Global Energy and Sustainability Clay Nesler says, "The Covid-19 pandemic highlighted the need to improve the health and safety of buildings, particularly by increasing their ability to operate under different conditions, both planned and unforeseen."

He adds that although the pandemic has changed how people are investing in their buildings, "occupant health and energy efficiency continue to be top of mind, and we anticipate these investments will be a priority in 2021 as more people return to shared spaces."

This survey shows that 79% of building owners either already have or plan to increase air filtration. Seventy-five percent are planning to or already have installed an air treatment system. And 72% have already or are planning to increase outdoor ventilation rates.

This is terrific news for the Commercial High-Performance HVAC community because all of these needs fall into their professional wheelhouse. They should see increased business as more building owners jump on board and begin prepping their facilities for the return of workers.

SUPPLY CHAIN ISSUES

In 2020, while manufactured equipment shipments were up, commercial building construction was down. This certainly impacts the HVAC contract-

ing community.

Many HVAC contractors faced shortages in crucial components during 2020 (mostly attributed to workforce issues caused by COVID-19 absences) in the distribution channel. General contractors also felt this.

According to **Associated Builders and Contractors** Chief Economist Anirban Basu, many general contractors experienced repeated interruptions in project work. "Acquiring key materials and equipment has also become more difficult, with occasional price shocks for certain commodities.

"With vaccinations proceeding apace, many contractors will benefit from fewer interruptions going forward and the restart of many postponed projects," Basu says.

TRENDS AND PREDICTIONS

For the HVAC Industry at large, technology waits for no one. The bellwether winds of change are pushing advancements in smart technology, refrigerant development, and renewable energy. All of these impact the progress toward building safety and control which bodes well for the entire construction market.

Now is the time for more HVAC contractors to begin incorporating a more holistic view of system technology to include ventilation.

They do this with better-trained technicians focused on testing, measuring, repairing, and balancing commercial mechanical systems to the point where they can prove to building owners and facility managers that

their HVAC systems deliver what they are designed to deliver.

As a result of the pandemic and other influences, the commercial HVAC market is on the edge of a terrific growth spurt.

Add in the continuous aging of equipment, better technology, and better ways to test and prove that systems are operating as designed, and contractors can look forward to a much better year in 2021 and beyond. **NCI**



Mike Weil is Editor-in-Chief of **High-Performance HVAC Today** magazine as well as director of communications for National Comfort Institute. He has served the HVAC Industry for nearly 40 years in various editorial positions. He can be reached at ncilink.com/ContactMe.

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How to Determine "Live" Duct Leakage

Why is live duct leakage testing important? What problems does testing resolve? The first question can be answered by considering that since the dawn of man and the invention of the chimney, improper venting and leakage have caused energy, health, and safety problems. Efforts to resolve these issues are codified. Still, without measuring and testing, you can only guess where the leakages are and the damage they are causing.

In new federal construction projects, the **Whole Building Design Guide** (ncilink.com/WBDG) sets the standards. It requires Duct Air Leak Testing (DALT) on new federal construction projects.

In addition, the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) outlines DALT in their **HVAC Air Duct Leakage Test Manual** (ncilink.com/SMACNADuct).

During construction, portions of high and medium-pressure duct systems are isolated and capped off. This practice is HIGHLY impractical after the system is installed and operational.

Ductwork must be isolated and sealed before completion. The sections are then pressurized using specialized equipment, such as the duct leak test machines made by TSI/Alnor (ncilink.com/TSIducttest) or McGill (ncilink.com/McGill).

The pressure drop across a calibrated orifice is then checked against the instrument manufacturer's flow conversion table to determine the leakage rate.

AIR DON'T CARE

The Department of Energy (DOE) defines Residential Duct Air Leak Testing under the following guidelines: ncilink.com/DOEductguide.

Just remember, a duct system doesn't care where you install it. The same rules of physics apply to airflow for both residential and commercial construction. There are plenty of residential-type installations in commercial buildings all over the country.

In 2016, the Building Commissioning Association surveyed approximately 300 facility professionals. The survey (ncilink.com/2016BCA) showed that 74% of respondents believed that duct leakage was a significant factor in increased energy consumption.

A study was conducted of NCI Certified contractors, then verified through **ComfortMaxx™** (ncilink.com/CMMaxx) software. It found that out of 847 commercial systems tested, the average **System Performance Score** (ncilink.com/ICYMI1028) was 48% of manufacturers' rated unit output.

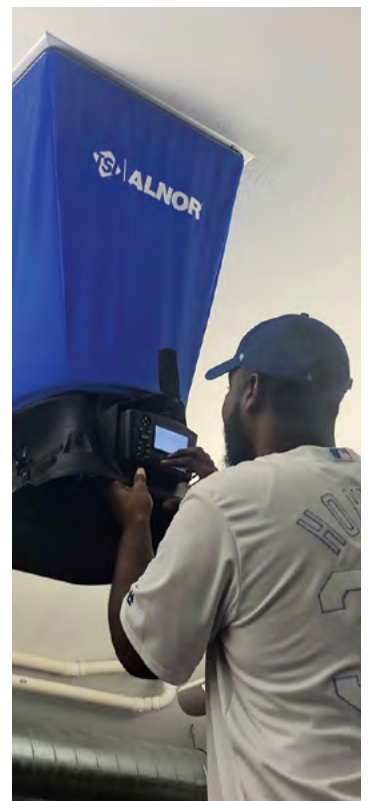
The testing included diminished delivery due to restrictive and undersized duct systems, as well as thermal loss or gain. Duct leakage was a consistent factor in the testing.

THE TESTING PROCESS

You should also consider the ASHRAE/ANSI Standard for testing duct leakage in operating systems, "Method of Test to Determine Leakage of Operating HVAC Air Distribution Systems."

In summary, the method of testing outlined in ASHRAE 215 states that the technicians should read total airflow from a unit or fan via duct traverse with a calibrated instrument, then read the inlet/outlet flows with a

Using an air balance hood, this commercial HVAC technician tests airflow to discover whether there are duct leaks in this live system.



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calibrated balancing hood.

That's an over-simplification. The standard states that to ensure accuracy, the technician performing the test must take 20 balancing hood readings at one-second intervals at every inlet or outlet on the tested system. Let that sink in.

One requirement of the ASHRAE Standard that I agree with is all equipment in use is in current, NIST-traceable calibration.

To simplify the duct leakage testing process, use the following eight steps:

1. Find an appropriate duct traverse location. Ten duct diameters are textbook. However, in the real world, that's hard to find. The next best option is 80% downstream from any transition, regardless of how much straight duct is available
2. Take a duct traverse using either the **Equal Area** (ncilink.com/EqualArea) or **Log-Tchebycheff** (ncilink.com/LogDefinition) method. Both National Comfort Institute and National Balancing Council recommend the Equal Area method for simplicity and repeatability



Using a vane anemometer, this technician measures air velocity, volume flow, and temperature as well as airflow at registers.

3. Assure your data meets the ASHRAE 111 "75% Rule." That is when 75% of the readings are between the highest reading and 10% of the highest reading
4. Read the inlets/outlets with a cali-

brated balancing hood

5. Traverse any inaccessible inlet/outlet with a balancing hood
6. Subtract the inlet/outlet readings from the duct traverse
7. The difference is the amount of duct leakage
8. Divide the inlet/outlet readings by the duct traverse to determine the percent of duct leakage.

DUCT SEALING

NCI takes the following four-step approach towards duct sealing:

- First, **Test** the duct system
- Second, **Renovate/upsized** the duct system
- Third, **Seal the duct** system where testing indicates
- Fourth, **Add insulation** where testing indicates.

Duct system renovation, sealing, and insulation by themselves only address some issues. You must consider how all of these aspects work together for the best results.

ASHRAE 221 proves that duct leakage only addresses one-third of HVAC problems.

Thermal loss, or heat loss/heat gain, is another major issue attributed to duct leakage. The first law of Thermodynamics is that heat flows to cold. Hence the terms "Heat Gain" in summer HVAC operation and "Heat Loss" during winter HVAC Operation.

Because duct leakage is often only PART of the problem, it takes comprehensive, surgical, yet simple testing to indicate which issue is the criminal element at play.

COMMUNICATING PROPERLY

There are a few notes that every contractor should be aware of when

determining live duct leakage. When talking about duct leakage, no matter how you present the data, all the installing contractor hears is "the Testing, Adjusting, Balancing (TAB) contractor is saying I did not do my job."

For example, you tell them, "I took a duct traverse with a calibrated instrument, and I am reading 1,000 CFM leaving the unit, yet I am reading 800 CFM at the supply outlets." They don't hear that.

I've dealt with this HUNDREDS OF TIMES, and sometimes the issues are due to poor installation, sometimes not. The point is as the TAB contractor; you need to be careful how you present your data.

Sometimes the installing contractor performed their job correctly, but other trades used the ductwork as load-bearing scaffolding. When you have a 250-pound electrician, or building automation guy walking on the ductwork, it won't function the same, will it?

If someone insists you've dampered the system down from 1000 to 800 CFM, you should know that is physically impossible. Yet, it's often perceived that way. If airflow goes into the unit, it comes out of the unit. If it isn't making it out of the supply registers, airflow may be above the ceiling.

If your inlet/outlet readings are higher than your unit duct traverse, recheck your readings.

SO, YOU HAVE DUCT LEAKAGE. NOW WHAT?

Test the Duct System: Multiple national surveys indicate that hundreds of contractors conduct audits. They test thousands of systems and have documented and proven that most duct systems are undersized.

Many installations have Total External Static Pressure (TESP) that is so excessive that it can damage or shorten the blower motor's life. If ductwork on these systems is sealed arbitrarily, without replacing restrictive fittings or upsizing under-sized runs, this can further increase the TESP and do more harm than good.

Evaluate duct systems via static pressure profiles and upgrades. Any upsizing should occur before duct sealing.

Renovate/Update the Duct System: Take the test results to identify the duct system sections that need renovation and/or upsizing. While



HVAC technicians testing airflow, velocity, and temperature in a commercial duct run.

system from these results instead of tearing it out and starting over.

Seal the Duct Work: Once you renovate/upsized the ductwork, THEN you can seal it.

Following are some rules for sealing the duct system:

- **Be professional.** Don't slather it on as if it were a rack of ribs. Apply the sealant surgically and professionally. Tape off areas not being sealed. Whether you call it Mastic, pookie, goop, or my favorite from our Canadian professionals, Goose Crap,

you can find many problems using static pressure testing and measurements, you also need airflow readings from a balancing hood to find which ducts don't deliver the right amount of air. You can surgically repair a duct

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duct sealant is expensive and should be used both sparingly and cleanly

■ **Ensure the air handling unit/fan is turned off when sealing**, and leave it turned off for at least 24 hours after. If the sealant is applied while the unit is running, air will blow through the leaks preventing proper setting.

Here is an experiment you can try at home: Take two drinking straws – slice each one about one inch with a razor. Apply duct sealant to both slices. Immediately blow through one and let the second straw sit for 24 hours, then blow through it. You'll see a dramatic difference

■ As stated above, conduct your own experiments with sealing at your office. Train your employees to do it properly.

When working in occupied build-


ings where the ductwork needs to be sealed, let the owners or tenants know the system will need to be “down” or shut off for a short period.

Add Insulation Where Testing Indicates: Although this article is about duct sealing, I would be remiss as a professional if I did not address another issue that was proven and discussed by *ASHRAE/ANSI Standard 221 – Test Method to Field-Measure and Score the Cooling and Heating Performance of an Installed Unitary HVAC System*.

Temperature is the missing piece of the puzzle that assures the heating and cooling capacity from the equipment makes it into the building.

If temperature changes through the duct system, comfort and efficien-

cy issues result even if air delivery is correct.

Accurately determining live duct leakage is a critical skill for TAB, HVAC, and facilities professionals. Keep in mind duct leakage must be kept in context with other essential elements — such as temperature and Btu delivery — that determine HVAC system performance. 



Scott Fielder is the director of **National Balancing Council (NBC)**, an operating unit of National Comfort Institute (NCI). He is an instructor and course developer who works closely with applicants for NBC certification and provides both technical and administrative support to NBC Certified Professionals. He can be reached at ncilink.com/ContactMe.

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How To Market Performance

When it comes to marketing your Performance-Based Contracting™ services, it is so important to continually educate your customer and show them how you can solve their comfort and efficiency problems. When your technical team is trained in testing, measuring, and diagnosing total HVAC systems (including the ventilation system), they will discover issues your customers and your competitors never knew existed.

One of the most significant issues we hear about is uneven temperatures in different rooms in peoples' homes. Most people think that is just the way it is. It's normal. But it shouldn't be. So at Kennihan Plumbing, Heating, and Air Conditioning, we've developed a strategy to market our services to help customers overcome these deficiencies.

We have two approaches to our strategy: First and most importantly, we target most of our marketing to our existing customer base. They already know and trust us. Our first line of “attack” is through our technicians, from whom customers receive information on our performance approach. We then follow up on that through our various marketing channels that only target our existing customer base.

TRAINING

We work hard to train and instill pride in our work ethic and workmanship with our technicians. All our technicians understand what the High-Performance approach is and how it differentiates us from competitors. It is ingrained in our technicians.

When they perform maintenance on a furnace, air conditioning unit, or any other system component, part of our protocol is for technicians to fill out our inspection form. This form is where they record their measurement numbers. It is our manual version of the **AirMaxx Lite™** app (ncilink.com/AML0118).

We use colors to highlight what the numbers mean. We give this inspection form to the customer. The form helps explain to customers what the numbers mean and opens the door to further discussion. It helps the customer ask the right questions.

One side benefit of doing this is that if the customer shares this form with other contractors, those contractors won't be able to answer the questions. It can lead the customers back to us.

IT ALL STARTS WITH OUR TECHNICIANS

When we go into peoples' homes, we have an opportunity to talk to them about how our approach is different and what that can mean to them. Our techs open with that conversation before they do anything else. This conversation is part of how we educate the customer on the importance of static pressure. They then see us as professionals who know what we are doing.

In other words, everything starts after our technicians do the performance check. When they finish testing and measuring (and recording their results), they share what they discovered with the customers.

During that conversation, they explain our performance approach, what they found, and how those results impact both the equipment's functionality and the customers' comfort. They will also explain how Kennihan can help with the variety of services we offer.

When they speak with customers, our techs use simple comparisons to help customers “see” the measurements. They use blood-pressure-to-static-pressure comparisons, which allows the techs to become more comfortable having these discussions with customers.



Part of the Kennihan marketing strategy uses print in the form of newsletters and direct mail pieces. Pictured here is one of their direct mailers.



Having a marketing strategy and budget is essential when planning and promoting your brand and High-Performance services.

EMAIL FOLLOW-UP

After the tech visit, we follow up with the customer using a series of emails from our marketing team that touch on all the different services we offer. The emails explain how the ductwork is part of the overall system and cannot be ignored if we are to truly get at the heart of whatever problems the customer is facing inside their home.

The emails explain everything in medical terms. For example, we talk about how if someone has heart problems, doctors don't just look at and repair the heart. They always look at the entire circulatory system. In the HVAC universe, ductwork IS the circulatory system of a home. The emails go out once or twice a week.

PRINT AND SOCIAL MEDIA MARKETING

We also send out a monthly print newsletter and direct mail campaigns that address the High-Performance Contracting approach. The newsletters can go into more detail, are more personalized, and are essential parts of our ability to gain more business and profits from our existing customer base.

With so many young people and families owning homes in our service area, we also strive to educate them using social media. I believe in delivering consistent messaging in whatever medium customers want. That not only includes having a Facebook page, a website, and more, but we also use newspapers and local magazines, as well as word-of-mouth to get our message out there.

But as I said, it all begins with the

technicians. They are part of the culture of performance, so they start the conversation. And even during the jobs, they are talking about HVAC performance issues with the customers.

WHO HAS THE TIME FOR ALL OF THIS?

In a word – nobody. That is why Kennihan uses third-party vendors to help. On the digital side, we use a company called **iMarket Solutions** (ncilink.com/imarket). We meet weekly to go over our schedule.

On a spreadsheet, I create a plan for the entire year. It's broken down by month and week, where I plug in general relevant messaging for the time of year. Then I sit down with my rep at iMarket each week to discuss what items to talk about in those emails.

I provide the general idea of the marketing message, and my vendor creates the actual, professional message based on that.

Our email blasts go out 3X per month. This strategy helps Kennihan continue to build trust-value with existing customers.

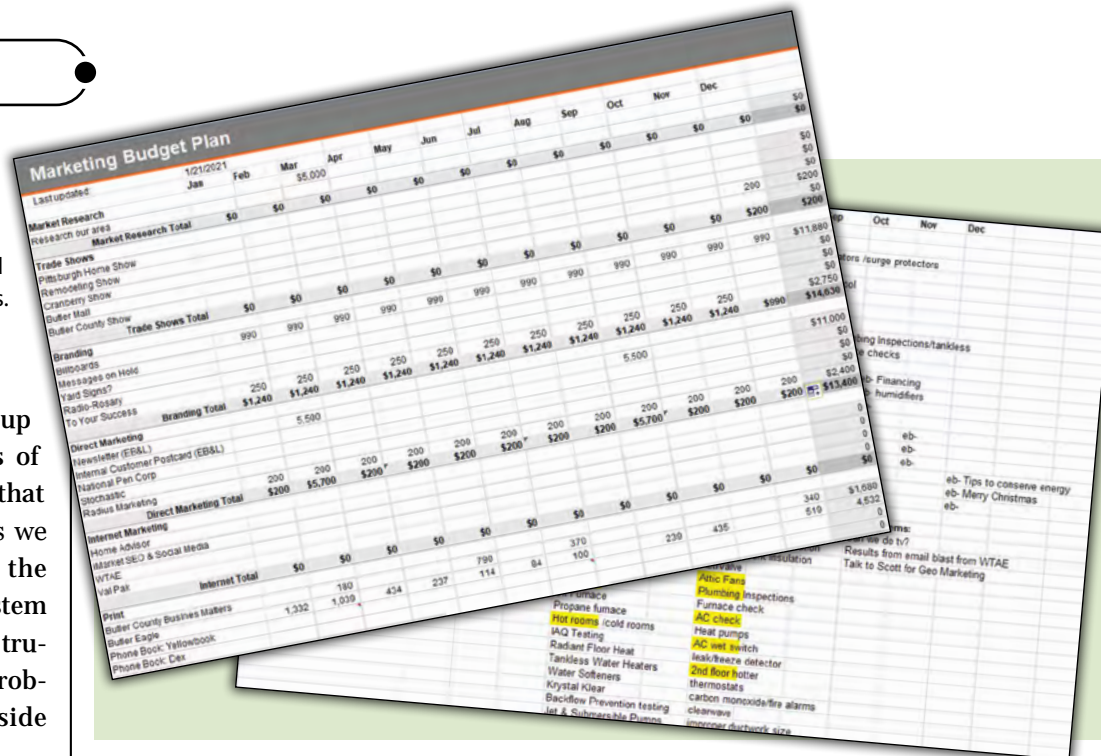
In addition, our company uses outside supplier EB&L marketing (ncilink.com/EBL) for print newsletters.

I believe that no matter what promotional or marketing medium you use, your messaging must work together. You must coordinate the message between digital and print. The only difference for us is the print newsletter. The newsletter allows me to elaborate more on our promotional topic while still being congruent with the digital messaging.

As we strive to educate customers on the superior benefits of a performance approach to maintaining, repairing, and even replacing their home comfort systems, the importance of consistency stretches across all the different ways they could read that message.

Before the pandemic, we also marketed our performance capabilities at live events like home shows. The pandemic has put a stop to that, for now. Home shows allow us to see customers face-to-face and provide a real opportunity to distinguish our company as a Performance-Based Contracting™ firm.

We offset some of the costs of home shows by using vendor co-op money.



Again, this is part of our objective to help educate customers on what we do and why it is so important.

It remains crucial to keep the messaging at live events the same as the messaging in other marketing. Consistency is critical.

TRACKING RESULTS

As National Comfort Institute teaches, "If You Don't Measure, You're Just Guessing." This truth goes beyond the HVAC side of the business. You need to measure everything, and that includes marketing results. Digital metrics are much easier to track and measure. One such measure we track closely is the cost per lead.

I discuss this with our content creators in our meetings when they share

the numbers with me (another advantage of using third-party partners).

Right now, for Kennihan Plumbing, Heating, and Air Conditioning, our cost per lead hovers around \$57. That is our year-to-date digital number.

We have various benchmarks that we measure email blasts against, including things like open rate.

When it comes to tracking leads from our print programs, I look for a ratio of leads per marketing piece. In an ideal world, that would be a 10 to one ratio. In other words, for every dollar I spend in print marketing, I see \$10 in sales.

However, in my experience, it's only three to four dollars in sales.

Our strategy isn't to shotgun the entire market area to people who don't

know us. When you key in on your existing customers, it's not a hard sell. You've already built trust with them.

Because of that, we've already started educating them and helping them understand what we do and how we can use Performance-Based Contracting to improve their homes. Add in the pre-established trust, and they are open and willing to make the necessary upgrades and changes.



Jose Montes is the office manager at Kennihan Plumbing, Heating, and Air Conditioning, in Valencia, PA. His industrial engineering background propels him to always look for improvement. As a contractor, he enjoys sharing what he has learned with others. Feel free to contact him at ncilink.com/ContactMe.

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The PowerPack is designed exclusively for National Comfort Institute (NCI) members and includes access to some of NCI's recorded webinars, online training, and downloads.

Be sure to share them with your team during the month of March.



- We think you'll find these tools and training materials very helpful as you continue to grow your High-Performance HVAC business.
- Here is a peek at the March offering:
- ✓ **How Air Balancing Saves Money** (Article)
 - ✓ **Generic Fan Performance Data** (Download)
 - ✓ **Traverse Grilles and Registers** (Webinar)
 - ✓ **Value and Comfort Pre-Season Balancing Hood Basics** (Online Training).

Just go to ncilink.com/PwrPak to access your PowerPack today. If you have any questions or are unable to access any of the tools in this program, please contact us at 800-633-7058.

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One of the best benefits of being a National Comfort Institute (NCI) member is the **Member Rewards TIPP** (Training Incentive Partnership Program). As a member in good standing, your company is eligible to participate in TIPP. Incentive dollars from our vendor partners are

deposited into your training account in the form of NCI Bucks.

Earn bucks in several ways. One is to make purchases from vendor partners via the **Member Rewards TIPP**. Visit our partners here: ncilink.com/mrpartners.

You can also earn bucks when you buy seats in training classes. In addition to any member discounts you receive, members earn five NCI Bucks for every \$100 in training they purchase.

That number goes up if you subscribe to our **Learning Excellence Live Online** or **Premium** memberships.

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You can use these funds to pay for any live or online training class and event. You can also use NCI bucks toward the purchase of tools and instruments from the NCI store.

Find more information on NCI Bucks at ncilink.com/bucks. Or call 800-633-7058 and speak to a Customer Care representative to learn more about TIPP, Bucks, and every other benefit that your membership provides.

NEW Residential Air
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Certification

NCI members now have a new benefit: An online live certification class for residential air balancing. This online course features several hands-on demonstra-

tions that include how to use the test instruments, how to determine proper testing locations, as well as live system testing and interpretation of readings.



One of the key benefits of this online certification class is it enhances your company's professional reputation and establishes yourself in your marketplace as the true air balancing expert.

To qualify for **Residential Air Balancing training**, the student must hold a current NCI certification (or must be registered to complete a class and certification exam) in either Duct System Optimization and/or Residential System Performance. Also, the student must pass NCI's Residential Air Balancing online exam.

This class is eight hours of live, online training provided over two days. Day one focuses on the history and purposes of air balancing and how to do an airflow traverse (includes a hands-on demonstration).

Day two teaches you how to prepare for system balancing, goes over air testing and balancing procedures, and highlights how to overcome balancing obstacles. Then you will learn how to conduct a final system test and fill out documentation correctly.

As more HVAC and energy professionals discover the importance of testing and balancing, the better equipped they can be to answer the needs of clients and the demands of building departments and utility programs.

If you are interested in learning more, go to ncilink.com/RezTabOL or call 800-633-7058 and speak to one of NCI's Customer Care representatives.



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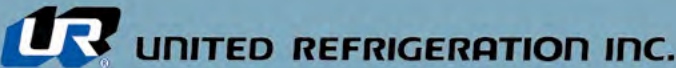
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Why Our Industry Keeps Getting a Bad Name



Dominick Guarino is publisher of *High-Performance HVAC Today* magazine and CEO of National Comfort Institute, Inc. He can be reached at ncilink.com/ContactMe

Last week my son-in-law called me from St. Louis at 4 AM saying the furnace stopped running and the house was getting cold. I walked him through restarting the furnace. We checked the ignition sequence, and I surmised the flame sensor was dirty or had gone bad.

We got it working intermittently, but I was concerned about my newborn granddaughter staying warm, so I told him to get a tech out to look at the flame sensor. He called a local HVAC contractor recommended by a friend.

Here's a detailed accounting of what happened next: It was Saturday, and -4°F outside and they had a newborn in the house. He was told no one could get there until Monday. **Really?** Since the heat was still mostly running we decided to risk it and wait till Monday – unless it went out altogether.

What the technician did: The tech cleaned the flame sensor – which was the cause of the lockouts. He also noticed the blower came on immediately upon a call for heat. He told my son-in-law they had a bad board that would cost \$1,100 to replace! He then offered to replace the 80% furnace for \$3,600.

My son-in-law told me the tech never looked up the board replacement cost – he gave him a price off the top of his head and then rattled off the \$3,600 replacement price. It was obvious the tech was trained to quote a high repair price and follow up with a replacement price to get a quick change-out and commission.

This technician missed an opportunity to dig further. He could have taken five minutes to inspect the unit more thoroughly, and maybe five more minutes to install static pressure test ports to actually test and verify how the unit was working.

By testing and asking the homeowner a few questions, he would have found real issues that needed to be addressed. A typical customer would have appreciated the extra care, and may have considered different repair or replace options. But the opportunity was lost, as it was apparent this tech was

never trained to do any of those things.

Since I was flying out to visit my new grandbaby later that week, I instructed my son-in-law to hold off making a decision. Just in case, we ordered a board for \$100 which came in a few days.

Here's what I found: First, the board wasn't the problem. An advanced thermostat setting took control away from the furnace and turned on the blower when the stat called for heat. I switched it back to furnace. I also tested the high-limit switch, which was fine.

Next, I cleaned the blower which had 15 years of caked-on dirt. It looked like it had never been cleaned. I set the blower speed to medium-low as some rooms were not getting enough heat. Unfortunately, I didn't have any instruments with me so I couldn't check airflow or static pressures.


What he could have done differently:

1. Checked the thermostat programming and changed the setting back to furnace control.
2. Inspected the blower and offered to clean it.
3. Offered a service agreement to lock in a long-term customer and future replacement work.
4. Mentioned the furnace was 15 years old, and they may want to consider replacing it before it breaks down. He could have then quoted different replacement options and financing.

It was obvious this service call had little to do with doing the right thing for the customer. It was a high-pressure, robotic changeout approach taught by many industry organizations.

Is this any way to treat a customer? Is this approach really necessary for a service company to make a profit? My answer is a resounding NO.

There's a better way to add value, increase revenues, and make a great profit while still doing the right thing for your customers.

If you haven't already, think about changing your mindset to becoming a High-Performance contractor who trains your people to test — and always put the customer first. 

California Utility Hosted Online Live Training for HVAC Professionals



NCI High-Performance HVAC training is now available to HVAC professionals throughout California. Southern California Edison and Pacific Gas and Electric have partnered with NCI to provide advanced training and certification through its online, live classes.

These NCI classes also qualify for NATE (North American Technician Excellence), and BPI (Building Performance Institute) Continuing Education Credits.

Here's how the training works:

Certification classes: These online, live classes are provided in 4-hour blocks. For example our Residential Duct System Optimization and Commercial System Performance classes each consist of four, 4-hour segments of training over a two week period. Students who participate in these classes will also qualify for online-proctored NCI certification exams after the training.

Recertification classes: NCI-certified professionals can recertify for two years by participating in these online classes taking place over two consecutive half-days. We currently offer recertification training towards NCI residential and commercial certifications.

In addition NCI is offering several technical and sales non-certification classes.

National Comfort Institute thanks the following Investor-Owned Utilities for hosting this training for HVAC professionals throughout California:



Upcoming California Training Calendar

| | | |
|--|--|---|
|  SOUTHERN CALIFORNIA EDISON | Explore HVAC Field Performance March 1 5-7 pm Pacific | 2-hour training program Regular Price: \$95 Student fee: Just \$15 per student |
|  Pacific Gas and Electric Company | Duct System Optimization Certification** March 16-17, 23-24 8 am - 12 pm Pacific | 16-hour training program Regular Price: \$690 Student fee: Just \$100 per student |
|  SOUTHERN CALIFORNIA EDISON | Residential Air Balancing Certification** March 25-26 8 am - 12 pm Pacific | 8-hour training program Regular Price: \$590 Student fee: Just \$50 per student |
|  SOUTHERN CALIFORNIA EDISON | Airflow Testing & Diagnostics* March 30-31 8 am - 12 pm Pacific | 8-hour training program Regular Price: \$395 Student fee: Just \$50 per student |
|  Pacific Gas and Electric Company | Commercial System Performance Certification** April 6-7, 13-14 8 am - 12 pm Pacific | 16-hour training program Regular Price: \$690 Student fee: Just \$100 per student |

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This program is funded by California utility customers and administered by SCE and PG&E under the auspices of the California Public Utilities Commission.



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