Chapter 38 of the Society of Broadcast Engineers
SBE
EL PASO - LAS CRUCES - JUAREZ

JUNE 2024

PO Box 3561 El Paso, TX 79923-3561 www.kint98.com

NEWS

Myth About Heat Pumps ?

Not only do heat pumps work fine in cold weather, they're *still* more efficient than gas furnaces in such conditions.

If you're one of the 100 percent of humans who lives somewhere warmer than –460 Fahrenheit, we've got good news: You probably qualify for a heat pump. Instead of *generating* heat, this emissions-slashing super-hero *transfers* warmth from even freezing outdoor air into your home. If the air is warmer than –460 F, or absolute zero, it's got thermal energy in it.

"Just because it feels cold doesn't mean there's no energy available," says Jan Rosenow, who studies heat pumps at the Regulatory Assistance Project, a policy NGO for the energy community. "There's actually a lot of energy still in the air."

Obviously, no heat pump is designed to operate anywhere near absolute zero. But the toughest among them can certainly operate far below 0 degrees Fahrenheit. Even in extra-cold places, heat pumps can use additional electric elements—space heaters, basically—to provide backup heat for a home. So let's bust one of the most persistent myths about modern heat pumps: that they become worthless as soon as it gets chilly out.

If heat pumps don't actually work in frigid weather, no one told the Nordic nations, which endure Europe's coldest climates, with average winter tempera-tures around 0 degrees Celsius (32 degrees F). As of 2021, Norway had heat pumps in 60 percent of households. In 2022, Finland installed more of the appliances per capita than any other country in Europe, while Sweden has similarly gone all-in on the technology. In the United States, heat pumps are selling like hotcakes in Alaska, and last year Maine announced it had reached its goal of installing 100,000 of the devices way ahead of schedule. These places ain't exactly perpetually sunny California. (US-wide, heat pumps now outsell gas furnaces.)

Because heat pumps are fully electric, they can run on a grid that's increasingly loaded with renewable energy from sources like wind and solar, and backed up with lots of battery power. That makes the appliances essential for decarbonization: A study earlier this year found that if every American got a heat pump, it could cut emissions in the residential sector by 36 to 64 percent, and cut overall US emissions by 5 to 9 percent. What's holding heat pumps back from their full potential isn't that they can't work in cold weather, but that we don't have enough skilled workers to install them as quickly as possible.

Really, it's not a question of whether the heat pump will supplant the gas furnace, but how quickly it will do so. "We are moving past combustion as our primary heat source, for our homes and our families, for the first time in human history," says Paul Lambert, cofounder and CEO of Quilt, which makes a home climate system based on heat pumps.

KTSM-TV

KVIA-TV

KRWG-TV

KBNA-AM/FM & KAMA-AM

KHEY-AM/FM, KPRR-FM & KTSM-AM/FM

KLAQ-FM, KISS-FM & KROD-AM

KPAS-FM-
ALGIE A. FELDER CSBE

KINT98.COM
INTERNET RADIO NETWORK

BURST COMMUNICATIONS INC.- KIRK BASEFSKY

JOHN LACKNESS

ENTRAVISION COMMUNICATIONS

SCMS, INC.-

ABS ADVANCED BROADCAST SERVICES, LLC

KSCE-TV

RF Specialties of Texas

KCOS-TV

KELP-AM
ARNOLD McClatchy.

MARSAND,INC.

Ho Tah Say. LLC

"We've either been burning wood, or burning coal, or burning natural gas, or burning oil."

By contrast, a heat pump works by circulating refrigerants and changing their pressure, and thus their temperature, both to grab thermal energy from outdoor air and then do the reverse in the summer to act like an air conditioner. Over the years, the appliances have gotten ever more efficient as their various components and refrigerants have improved. "It's really all about the refrigerant," says Katie Davis, vice president of engineering and technology for residential HVAC (heating, ventilation, and air-conditioning) at Trane Technologies, which produces heat pumps. "We're expanding and contracting—so we're going from liquid to gas, liquid to gas, liquid to gas—or vice versa, depending on which cycle you're running in."

Critically for climates with very cold winters, the boiling point of the refrigerant is typically between –55 degrees and –59 degrees F. So even if the outdoor air is below freezing, "it's still going to boil that refrigerant," says Davis. "You're going to transfer heat really, really well."

Manufacturers make heat pumps specifically designed for cold climates, which can operate continuously as temperatures plunge into the negative. Trane is developing its own cold-climate heat pump it expects to release in 2025, which uses vapor injection technology. This works like fuel injection in car engines, only it's injecting refrigerant into a closed-loop cycle in the compressor. That boosts the heat pump's ability to extract thermal energy. "With the addition of this vapor injection compressor," Davis says, "we now have the added capacity that we need for our systems to run at these really cold temperatures." In testing, Trane's prototype operated at –23 degrees F.

When scientists are working out the efficiency of different heating techniques, they're considering the "coefficient of performance," or COP, which is the ratio of the energy

SBE CHAPTER 38 OFFICERS

CHAIRMAN
Antonio Castro
SBE member # 11456.
KFOX/COX retired Chief Eng.
800 Arredondo dr.
El Paso. TX 79912
915-584-1220 home
915-525-8507 cell
farahjac@sbcglobal.net

VICE CHAIRMAN
Bruno Cruz
SBE member # 25867
200 E.Alto Mesa
El Paso, TX.79912
915-757-7898
915-526-1842 cell
Bruno.cruzJR@kfoxtv.com

TREASURER
Walter Hanthorn
SBE member # 18307
KSCE TV
4461 Gen. Maloney
El Paso, TX. 79924
915-269-7583 home
915-532-8588 office

CERTIFICATION COMMITTEE:
David Halperin.

MEMBERSHIP COMMITTEE:
Antonio Castro
Warren Reeves

FREQUENCY COORDINATION COMMITTEE:
Warren Reeves
Owen Smith

SCHOLARSHIP COMMITTEE:
Rick Vilardell

WEB SITE COMMITTEE:
Norbert Miles

SUSTAINING MEMBERSHIP:
Antonio Castro

PROGRAM CHAIRMAN:
Warren Reeves

NEWSLETTER:
Antonio Castro

EAS CHAIRMAN:
Michael Rivera

EXECUTIVE COMMITTEE:
Antonio Castro
Bruno Cruz
Walter Hanthorn

EL PASO, TX SBE CHAPTER 38 MEETING MINUTE

DATE 05/14/2024 LOCATION: ANTONIO'ZOOM

MEETING CALLED TO ORDER: 11:00 aM, BY ANTONIO CASTRO. WE WERE 13 (THIRDTEEN) ATTENDANTS.

REPORT OF THE SECRETARY: MINUTES ON MAY 2024 NEWSLETTER. ACCEPTED BY MICHAEL RIVERA, SECONDED BY NORBERT MILES.

REPORT OF THE TREASURER: $ 3,532.69 IN THE BANK. ACCEPTED BY NORBERT MILES, SECONDED BY DAVID GRICE.

REPORT OF THE CERTIFICATION COMMITTEE: MICHAEL RIVERA FOR EXAM S IN AUGUST FOR CBNT AND CBRE CERTIFICATIONS.

REPORT OF THE MEMBERSHIP COMMITTEE: ELIAS VENTANILLA TO INVITE "TELEMUNDO 48" AS SUSTAINING MEMBER.

REPORT OF THE FREQUENCY COORDINATOR COMMITTEE: A CALIFORNIA COMPANY "BLUE ORIGIN " REQUESTED TWO RADIO FREQUENCIES TO OPERATE IN VAN HORN, TX. . NO PROBLEM.

REPORT OF THE SCHOLARSHIP COMMITTEE: NO APPLICANTS HAD REQUESTED FOR THIS YEAR.

REPORT OF THE WEBSITE COMMITTEE: NOW 4958 VS. 4900 EQUAL 56 HITS.

REPORT OF THE EAS CHAIRMAN: TEXAS MONTHLY TEST CAME FINE, NEW MEXICO TEST RECEIVED TWICE.

REPORT OF THE PROGRAM COMMITTEE: NO REPORT.

NEW BUSINESS OR ANY ITEMS FOR THE CHAPTER INTEREST :: MARIO JIMENEZ WAS ELECTED AS CHAPTER ENGINEER OF THE YEAR

OTHER. TO RE-SEND INVITATION OF GBS DINNER AT TBA, AUSTIN

NEXT MEETING DATE AND LOCATION: JUNE THE 11th. TIME AND PLACE T.B.D.

MEETING ADJOURNED: AT 11:23 AM.

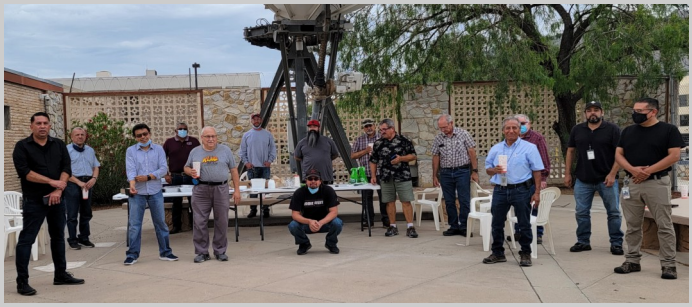
2024 CHAPTER ENGINEER OF THE YEAR:

MARIO JIMENEZ

CONGRATULATIONS !!

JUNE PROGRAM

THE MAY CHAPTER 38 MEETING WAS IN THE ZOOM MODE FROM ANTONIO CASTRO HOME PC.



OUR JUNE MEETING WILL BE IN A ZOOM MODE, NO PRESENTER AT THIS TIME

WHEN: ***JUNE 11 TUESDAY***.

WHERE: ZOOM FROM ANTONIO

TIME: 10:30 AM. FOR WELCOMING AND CHATTING.

consumed to the heat produced. If a technique is 100 percent efficient, it has a COP of 1, meaning one unit of energy going in, one unit of heat coming out. A gas furnace, for example, produces heat that blows into a home, but some of that heat is also lost during combustion, so even the most efficient models have a COP of less than 1.

Overall, it's way more efficient for a heat pump to move heat than it is to generate it, like a gas furnace does. By running on electricity instead of fossil fuels, a heat pump can manage a COP of 3, meaning three units of heat for every one unit of energy, but in extreme cases they can get up to a COP of 6, depending on the conditions and the model.

In a study published last year, Rosenow and his colleagues looked at the data to see how a heat pump's efficiency might decline as temperatures drop. They found that even down at –10 degrees Celsius, or 14 degrees Fahrenheit, the appliances still manage a COP of 2, or 200 percent efficiency. The study also looked at cold-climate heat pumps in more extreme environments: At a punishing –30 degrees C (–22 degrees F), a Mitsubishi model produced COPs between 1.5 and 2, and a Toshiba model between 1 and 1.5.

"These were real buildings operating in the real world, with real people living in them," says Rosenow. "Yes, there is a decline in performance, as you would expect. But the argument that it drops off a cliff once you go below freezing, it's really not supported by the data that we have analyzed."

Put another way: Heat pumps may get less efficient as temperatures plummet, but they can still extract thermal energy from that cold air. If a trained technician has properly installed the heat pump, they'll have sized it both for the volume of the home and in consideration of the lowest temperatures which that area will endure. "You have a maximum capacity that you require for that really cold day," says Rosenow. "The temperature will drop and the heat pump will need more electricity, but it still provides exactly the right amount of heat to keep you comfortable."

To offset such costs for the consumer, governments might implement higher taxes on fossil fuels and use the revenue to lower utility bills. They can also roll out tax rebates or grants for installing heat pumps. The US Inflation Reduction Act, for instance, provides thousands of dollars for people to switch to a heat pump and do additional electric work that may be required to run them. The bill also covers weatherization—means of weatherproofing a building, like insulation and windows—that would help a home retain heat, thus increasing the efficiency of a heat pump: The less you have to run it, the less electricity you have to use and the lower your operating costs.

For exceptionally cold winters, like in Nordic countries, some heat pumps use built-in backup electric heating elements, both to defrost the appliance and to keep providing heat to the indoor space. That usually kicks in when temperatures dip below –10 degrees C (14 degrees F). But with a COP of 1, that heating is *still* more efficient than burning gas in a furnace.

Even then, with the right kind of modern heat pump for the right climate, and with proper home insulation to trap heat, any dips down into temperatures that require backup heating should be rare and brief.

"Ninety-five-ish percent of people will never even go to the backup system ever, even on the coldest day where they live," says Lambert of Quilt. (Quilt says its system doesn't include backup heating because it's efficient enough to maintain capacity at very low temperatures.) "Only 5 percent will use it, but even then it's a very small fraction of their heating load."

The home of tomorrow is fully electric, with a heat pump providing both cooling and heating, even on frigid winter nights. Like the abominable snowman, heat pumps not working in cold weather is a myth.