

Air Source Heat Pump Manufacturers Roundtable

CEDA Program

11/15/2023

nbi new buildings
institute

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WHAT IS CEDA?



The California Energy Design Assistance (CEDA) program promotes the electrification and decarbonization of new building construction or major renovation. CEDA works in collaboration with project teams to reduce energy demand, consumption, and carbon emissions.

CEDA serves commercial, public, high-rise multifamily, industrial, and agricultural projects in Pacific Gas & Electric (PG&E), Southern California Edison (SCE), SoCalGas (SCG), and San Diego Gas & Electric (SDG&E) service areas.



WHY PARTICIPATE IN CEDA?

- Receive complimentary custom **decarbonization** analysis to identify and evaluate opportunities
- Gain analysis of **energy costs and paybacks**
- Receive **financial incentives** to help offset the costs of decarbonization measures for qualified projects
- Demonstrate commitment to high performance building practices and design



DESIGN TEAM INCENTIVES

Design teams are stretched thin on time and budget, but that doesn't mean decarbonization needs to be put on the back burner.

CEDA is now offering design team incentives on top of the incentives your project will get for implementing decarbonization measures. It's a win-win!



INCENTIVE SUMMARY

- Based on **net¹ first year energy savings** beyond standard practice baseline²
 - **Fixed incentive rates** for kWh, therms saved (bonus for electrification)
- Incentives are capped at the lesser of 100% of incremental measure costs or 50% of full measure costs
- Incentives may be capped for buildings with onsite generation exceeding usage on an hourly basis.

Energy Savings:

- \$0.20/kWh
- \$0.30/therm
- \$1.00/therm (electrification)

¹ Net savings are based on CPUC determined net-to-gross ratio to account for free-ridership and program influence
² The All-electric program's standard practice baseline is mixed fuel for buildings with natural gas available nearby

HAVE A PROJECT TO DISCUSS?

For more information, please contact one of our program outreach specialists:



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Tina Hendrix
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<https://californiaeda.com/>

Air Source Heat Pump Manufacturers Roundtable



Air Source Heat Pumps



Courtesy of Mitsubishi Electric Trade HVAC US

Introduction

- Heat Pump Market Landscape
- Advancing Heat Pumps (NEEA)

Manufacturer Presentations

- LG
- Carrier
- Mitsubishi
- Daikin

Roundtable with Q+A

Heat Pump Efficiency + Grid Decarbonization

CleanTechnica

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Heat Pumps Up To 3 Times More Efficient In Cold Conditions

September 11, 2023 · Steve Hanky · 0 Comments

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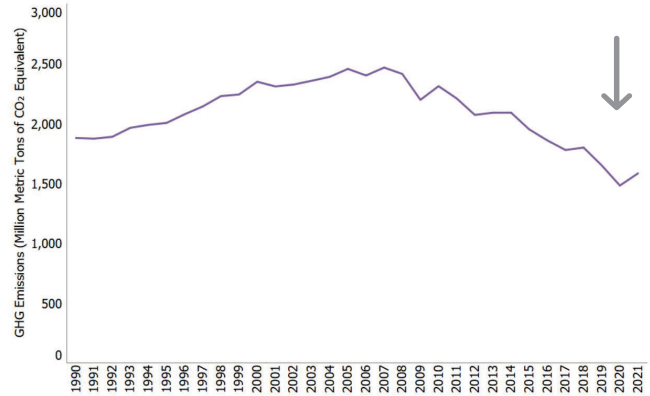
A new study from Oxford University and the Regulatory Assistance Project used data from seven field studies across North America, Asia, and Europe which shows that heat pumps are two to three times as efficient as combustion or resistive electric heating technology, even in temperatures well below 0°C (32° F). In fact they perform significantly better than their fossil fuel-based competitors even in temperatures approaching -30°C (-22° F).

Heat Pumps In Maine

These findings suggest standard heat pumps are suitable for almost all American homes which will come as no surprise to people in Maine who have switched to them in a big way in response to a program of education about heat pumps coupled with significant rebates provided by the state government. The changeover to the newer technology has fossil fuel interests concerned.

According to the *Washington Post*, the National Oilheat Research Alliance, a trade association representing heating oil sellers, has funded campaigns fighting electrification that target New England homeowners and real estate agents. The alliance's propane counterpart, the Propane Education and Research Council, has put out training material coaching installers how to dissuade customers from switching to electrical appliances.

36% emissions drop since 2007

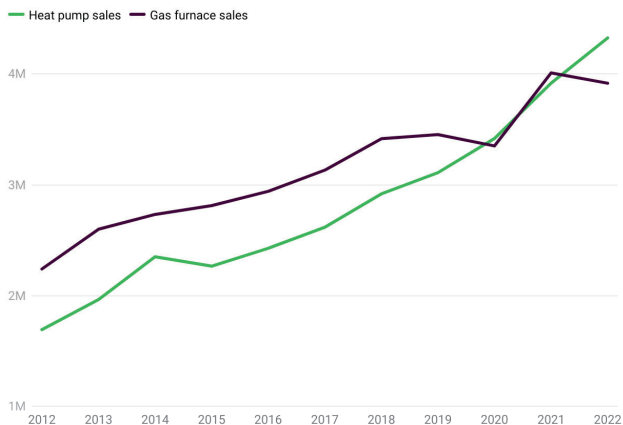


U.S. Environmental Protection Agency (2023). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021



Heat Pump Growth in the US

Heat pump sales in U.S. surged past gas furnaces in 2022



2022 figures include sales data for Jan–Nov and projected sales for Dec.
Chart: Canary Media • Source: Air-Conditioning, Heating, and Refrigeration Institute

Top 10 states for heat pumps

U.S. states with the highest percentage of households using central heat pumps

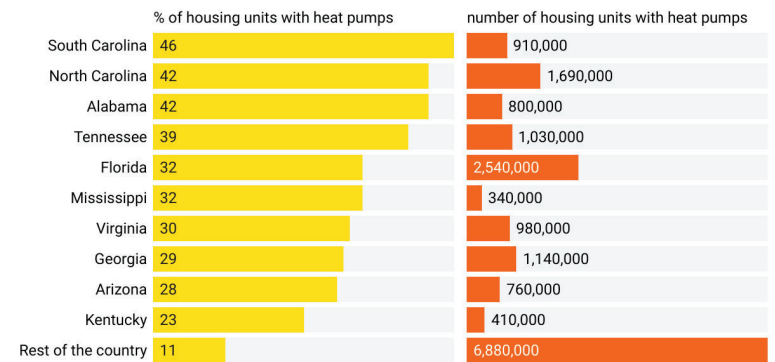


Chart: Canary Media • Source: U.S. Energy Information Administration, Residential Energy Consumption Survey (June 2022)

California's Goal of 6 Million Heat Pumps by 2030



HOME PROCEEDINGS RULES AND REGULATIONS PROGRAMS AND TOPICS FUNDING

Home > Newsroom > News Releases > Top Global Building Appliance Manufacturers and Distributors Commit to Help California Achieve Six Million Heat Pump Goal

Top Global Building Appliance Manufacturers and Distributors Commit to Help California Achieve Six Million Heat Pump Goal

For Immediate Release: October 10, 2023

SACRAMENTO — Today, 10 of the world's largest manufacturers, distributors and suppliers of building heating and cooling equipment signed an agreement committing to actions aimed at achieving California's goal to have six million electric heat pumps installed by 2030.

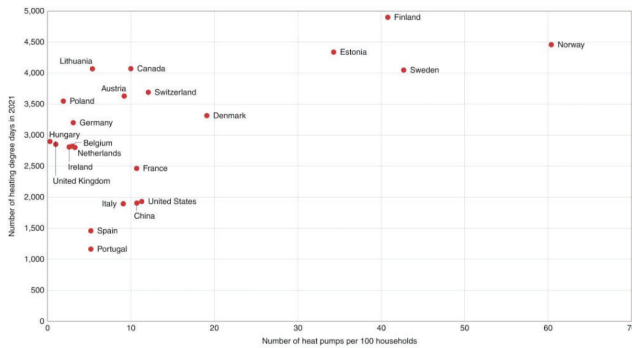
The announcement took place at a two-day summit hosted by the California Energy Commission (CEC) and EPRI. The event brought government leaders together with industry, academic, community partners and others to explore affordable, reliable, and equitable pathways to electrifying buildings — a key part of California's plan to achieve carbon neutrality by mid-century.

The manufacturers signing on include A. O. Smith Corporation, Carrier, Daikin, Fujitsu, Johnson Controls, Lennox International, LG Electronics, Mitsubishi Electric Trane HVAC US, Rheem Manufacturing Company, and Trane Technologies.



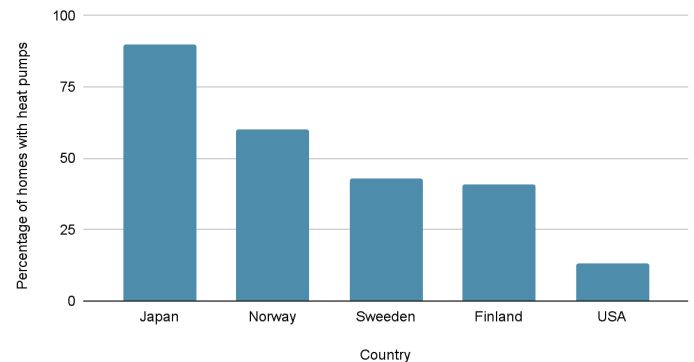
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Heat Pump Adoption is Much Higher in Other (Colder) Countries



Countries with much higher heating needs have much higher percentages of heat pumps. [Source Nature](#)

Heat Pump Market Share in Select Countries



Source [Heat Pump and Thermal Storage Center Japan](#), [Nature](#) article and [EIA](#).

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Today's Panelists

- **Suzi Asmus, Senior Program Manager, Northwest Energy Efficiency Alliance** | Suzi has been managing NEEA's Residential HVAC programs since 2015, initially with the Ductless Heat Pump Program and now with the newly-launched Advanced Heat Pump Program.
- **Mark Thomson + William Robertson, LG Electronics** | Mark and William are experienced energy demand side management leaders.
- **Shawn LeMons, Performance Construction Manager, Mitsubishi Electric Trane U.S.** | Shawn is focused on efficient cooling and heating systems for residential new construction.
- **Jonathan Moscatello, Business Development Manager, Daikin North America** | Jonathan is a nationally regarded expert in residential contracting and heat pumps and has worked at Daikin since 2021.
- **James Momperousse - Energy & Utility Sales Manager - Carrier** | With over 10 years of HVAC experience, James plays an active role in maximizing clean energy opportunities for Carrier Ductless and VRF products.

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Advanced Heat Pumps

Suzi Asmus

Senior Program Manager, Northwest Energy Efficiency Alliance

November 15, 2023

CLASSIFICATION LEVEL: PUBLIC



The Alliance



What Does NEEA Do?

NEW
EMERGING TECHNOLOGIES

PORTFOLIO EXECUTION

CODES & STANDARDS

CONVENE AND COLLABORATE

MARKET INTELLIGENCE

NEEA's Resources

BetterBuilt^{NW}

Resources ▾ Programs ▾ Connect ▾ About ▾

🔍 Stay Informed

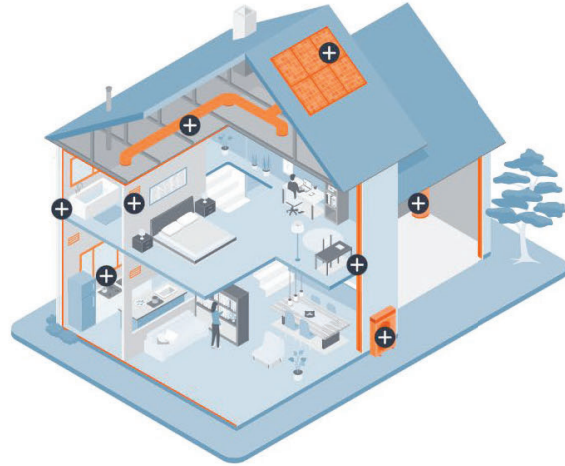
- Training
- Available Resources
- Case Studies
- HVAC Sizing Tool
- News
- Events

Your Home for Northwest Construction Efficiency Resources

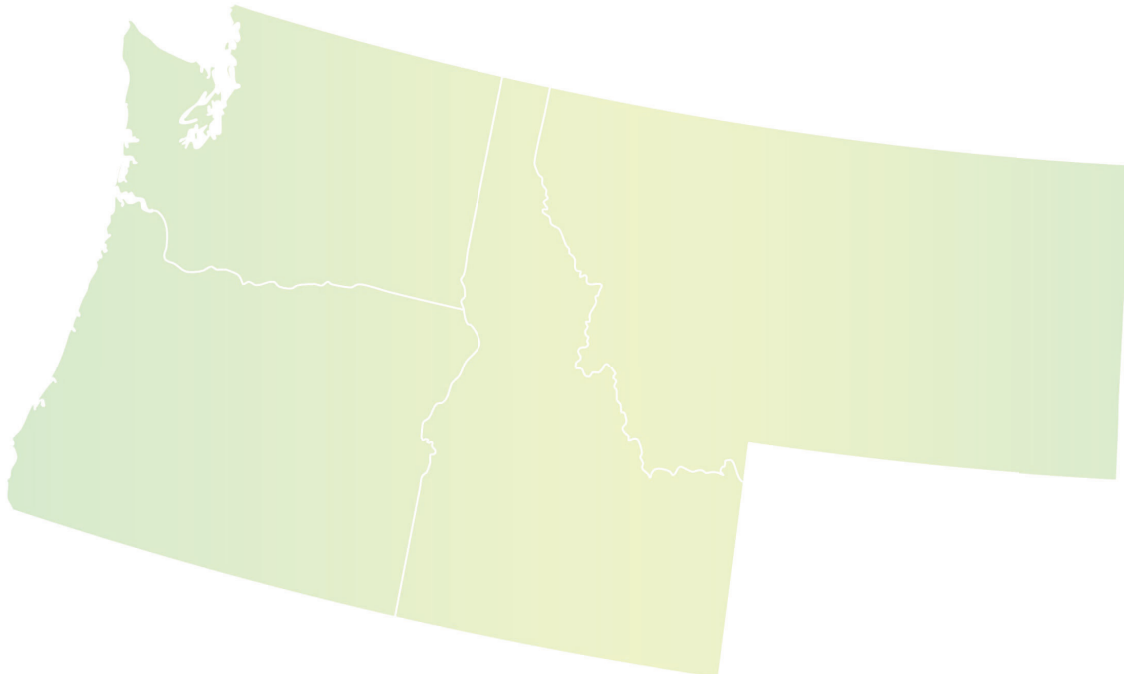
BetterBuiltNW works to accelerate the use of energy-efficient building practices in residential construction.

Find a Professional

Find a Utility



The Northwest Market & Priorities



Heat Pump Research

- Efficient features & capabilities
- Testing and rating procedure
- Quality installation practices
- Micro heat pumps (room/window)
- Thermal battery combo heat/water heating
- Dual fuel gas/electric heat pumps

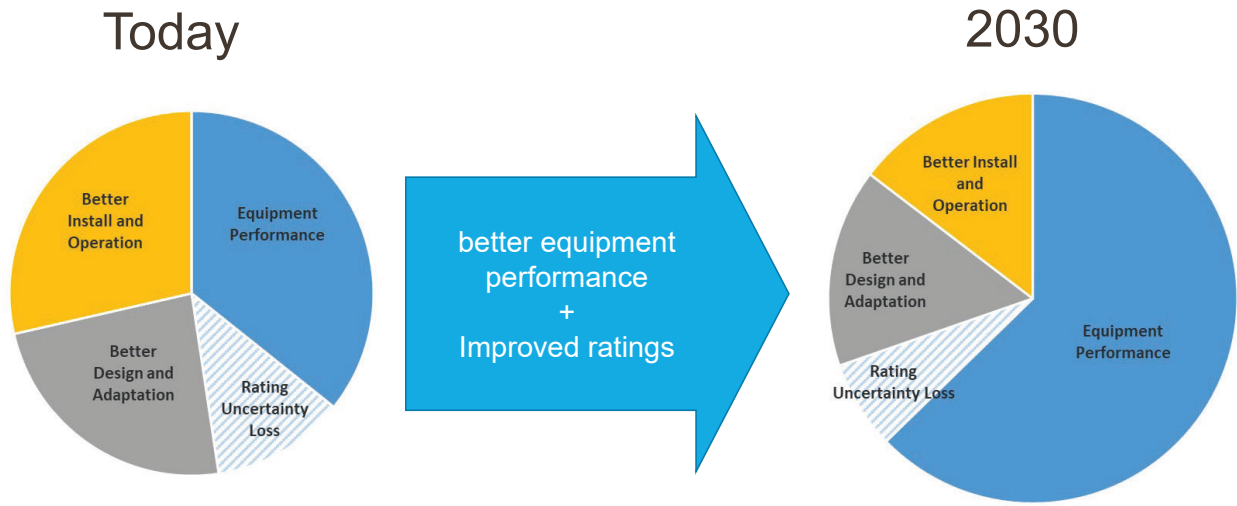
<https://www.mwalliance.org/advanced-heat-pump-coalition>

[Northwest Energy Efficiency Alliance \(NEEA\) | Product Council](#)

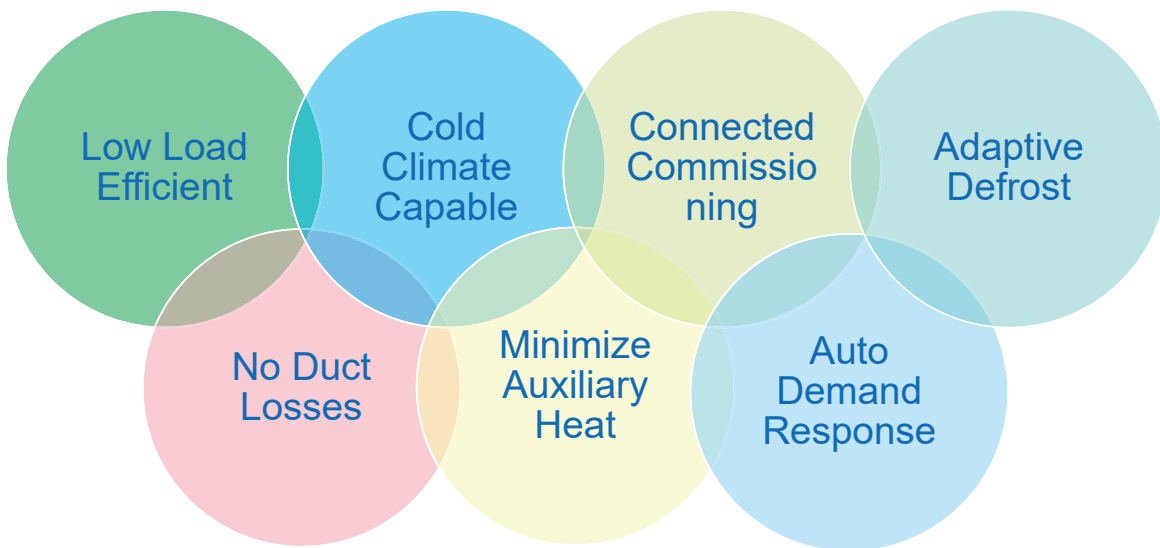
NW Residential Heat Pump Incentives

- NEEA aims to help regional utilities improve the efficiency of all residential heat pumps installed in the Northwest.
 - Ducted & ductless
 - Electric & dual fuel
 - Primary & supplemental
 - Replacement, displacement & upgrade

➤ Total System Performance Vision



➤ Improvements



Intervention Approach



Make qualifying products for each improvement identifiable in the market



Build adoption among manufacturers and efficiency program partners



Influence specification and standards bodies to include improvements

Suzi Asmus

Senior Program Manager, NEEA
sasmus@neea.org





AIR CONDITIONING TECHNOLOGIES

ASHP PRODUCT OVERVIEW

Mark Thomson, Senior Business Development Manager Utilities
Bill Robertson, Senior Account Manager / CAC Distribution Sales Northeast
November 15, 2023



RESIDENTIAL AND LIGHT COMMERCIAL SOLUTIONS

LG Air Conditioning Technologies



KEY FEATURES



LGRED® HEAT TECHNOLOGY

Advanced technology that can exceed 100% of the rated heating capacity performance down to 5°F and continuous heating performance down to -13°F.



DEHUMIDIFYING MODE

Uses sensors in the indoor unit to accurately measure room temperature and control humidity by adjusting the setpoint and fan speed.



OPTIMIZED AIRFLOW



Jet Cool / Jet Heat Mode operates the unit at a high speed to quickly cool or heat a room.



Swirl Wind / Chaos Wind allows for customized lower and fan speed operation to create a stronger, wider airflow for reduced temperature stratification and to provide more natural air circulation.



Auto Operation adjusts the temperature and fan speed automatically to match the user's preference from three levels of comfort.



Art Cool™ Gallery 3D Airflow uniquely provides three-directional airflow for more natural and effective air circulation.



GOLD FIN

Gold Fin™ Coating is an anticorrosion coating to help protect your system from corrosive elements, allowing the coil to maintain excellent heat transfer properties for an extended time.



DEFROST CONTROL

Removes frost from the outdoor coil when ambient outdoor temperatures are low and simultaneously shuts down the indoor fan to prevent cold air from being blown into the controlled space.



AUTO SLEEP MODE

Automatically increases the temperature setting 2°F twice in 30 minute increments. The indoor unit shuts off when the timer setting is reached.



AUTO RESTART

Automatically restarts the system after a power failure.



STYLISH DESIGN

LG air conditioning solutions come in a variety of indoor units, including the Art Cool™ Gallery, which includes a panel that works like a customizable picture frame. For Multi F solutions, choose from different capacities to match load demands appropriately while maintaining the aesthetic of any room's décor.



SINGLE ZONE SYSTEMS

SINGLE ZONE SOLUTIONS Lineup

Btu/h	9,000	12,000	15,000	18,000	24,000	30,000	36,000	42,000	48,000
ART COOL™ Mini	LA09H5V5	LA12H5V5		LA18H5V5					
ART COOL™ Premier	LA09H9V3	LA12H9V3	LA15H9V3	LA18H9V3	LA24H9V3				
Extended Piping					LS24H9V3	LS30H9V3	LS36H9V3		
High Efficiency	LS09H5V5	LS12H5V5		LS18H5V5					
Standard Efficiency	LS09H9V3	LS12H9V3		LS18H9V3	LS24H9V3				
Mega 208/230V	LS09H9V2	LS12H9V2		LS18H9V2	LS24H9V2				
Mega 115V	LS09H9V2	LS12H9V2							
Low Wall Console	LC09H9H4	LC12H9H4							
Ceiling Cassette	LC09H9H4	LC12H9H4	LC18H9H4	LC24H9H4	LC30H9H4	LC36H9H4	LC42H9H4	LC48H9H4	
Ducted					U4C48H9H4	U4C36H9H4	U4C24H9H4	U4C18H9H4	
Vertical AHU				U2E116H4	U2E116H4	U2E116H4	U2E116H4	U2E116H4	



LG ThinQ
 -app platform for all LG products
 -standard on all high-wall units
 -accessory available on all units



PWFMD200



MULTI-ZONE Lineup

OUTDOOR UNITS			
Btu/h	Multi F	Maximum Indoor Units	Combination Sample
18,000	LMU183HV LGRED ⁺	2	
24,000	LMU243HV LGRED ⁺	3	
30,000	LMU303HV LGRED ⁺	4	
36,000	LMU363HV	4	
36,000	LMU361HHV LGRED ⁺	5	
42,000	LMU421HHV LGRED ⁺	6	
48,000	LMU481HV LMU480HHV LGRED ⁺	8	
54,000	LMU541HV	8	
60,000	LMU601HV	8	

MULTI-ZONE Lineup

INDOOR UNITS							
Btu/h	7,000	9,000	12,000	15,000	18,000	24,000	36,000
Wall Mounted	ART COOL™ Gallery	LMAN07HAD	LMAN12HAD				
	ART COOL™ Mirror						
High Efficiency		LAN09HGS	LAN12HGS		LAN18HGS		
Low Wall Console		LMN079MT	LMN09HGS	LMN12HGS	LMN159MT	LMN18HGS	LMN249MT
			LMN20HGS	LMN24HGS			
Ceiling Cassette	4-Way	LMC078HV	LMC098HV	LMC128HV			
Ducted	Low Static		LDN097HV	LDN127HV			
Ducted	High Static					LHN24HV	LHN36HV
Vertical A/U							
						LVN18HV	LVN24HV

Air Conditioning Technologies



CONTROLS

Individual Control



PREMTC00U



PREMTB100



PREMTA200



PWLSSB21H



PREMTBVC2,3,4



ZRTBS01

Model	Description
PREMTC00U	Simple Wired Remote Controller
PREMTB100	Standard III Wired Remote Controller
PREMTA200	Deluxe Wired Remote Controller
PWLSSB21H	Wireless Remote Controller
PREMTBVC2	LG MultiSITE™ Remote Controller
PREMTBVC3	LG MultiSITE™ Remote Controller with Motion and Humidity Sensor
PREMTBVC4	LG MultiSITE™ Remote Controller with ZigBee® Pro Wireless Network
ZRTBS01	Remote Temperature Button Sensor

Air Conditioning Technologies



Existing LG Lineup Single Zone EnergyStar 6.1 cold climate

Single Zone									
System Model	Indoor Model	Outdoor Model	AHRI Ref #	SEER2	EER2	HSPF2	Energy Star 6.1	Energy Star Cold	
Art Cool Premier	LA090HV3	LAU090HV3	204825177	27	15.8	13.5	Y	Y	
	LA120HV3	LAU120HV3	204825178	25	13.8	11.2	Y	Y	
	LA150HV3	LAU150HV3	204825179	25	15	11	Y	Y	
	LA180HV3	LAU180HV3	204825180	24	14.4	10.8	Y	Y	
Art Cool Mirror	LA240HV3	LAU240HV3	204825181	23	13	10	Y	Y	
	LA090HSV5	LSU090HSV5	10867393	23.2	14.5	10.2	Y	Y	
	LA120HSV5	LSU120HSV5	10570122	22	12.5	10	Y	Y	
	LA181HSV5	LSU181HSV5	207482345	22	12.55	9.5	Y	Y	
High Efficiency	LS090HSV5	LSU090HSV5	10867394	22.2	14.4	10.2	Y	Y	
	LS120HSV5	LSU120HSV5	10570123	22	12.5	10	Y	Y	
	LS181HSV5	LSU181HSV5	207348503	22	12.55	9.5	Y	Y	
	LS243HLV3	LSU243HLV3	204825182	22	13	9.5	Y	N	
Long Pipe	LS303HLV3	LSU303HLV3	204825183	20.5	11.5	7.8	N	N	
	LS363HLV3	LSU363HLV3	204825184	19	10	7.8	N	N	

System Model	Indoor Model	Outdoor Model	AHRI Ref #	SEER2	EER2	HSPF2	Energy Star 6.1	Energy Star Cold	
Cassette	LC098HV	LCU098HV	211234500	20.2	13.85	10.55	Y	Y	
	LC128HV	LCU128HV	211234502	19.4	12.6	10.35	Y	Y	
	LC188HV	LCU188HV	211234504	20.5	12.5	9.7	Y	Y	
	LC249HV	LCU249HV	211234513	20	11.7	10.2	Y	Y	
Console	LC369HV	LCU369HV	211234506	21	12.5	10	Y	Y	
	LC429HV	LCU429HV	211234514	19.3	10.45	10.05	N	Y	
	LQ090HV	LUU090HV	211234501	21	12.6	10.4	Y	Y	
	LQ120HV	LUU120HV	211234503	20.8	12.6	10.2	Y	Y	
Mid Static Duct	LH098HV1	LHU098HV1	212578846	16	11.8	10.4	Y	Y	
	LH128HV1	LHU128HV1	212578845	16	11.7	10.5	Y	Y	
	LH188HV1	LHU188HV1	212578844	17.8	12.6	9.9	Y	Y	
	LH248HV1	LHU248HV1	212578843	18.5	11.8	10.4	Y	Y	
High Static Duct	LH248HV	LUU248HV	211234506	16.85	11.7	9	Y	Y	
	LH368HV	LUU368HV	211234509	18.85	11.95	9.2	Y	Y	
	LV120HCV	LVU120HCV	211078860	16	12.2	9.3	Y	N	
	LV180HCV	LVU180HCV	211126484	15.6	11	8.7	N	N	
VAHU CV	LV240HCV	LVU240HCV	21126485	15.1	9.5	8.5	N	N	
	LV300HCV	LVU300HCV	21126486	15.5	9.5	9.1	N	N	
	LV181HV	LVU181HV	211234505	17.25	12.3	9.25	Y	Y	
	LV241HV	LVU241HV	211234507	17.6	11.45	9.7	N	Y	
VAHU	LV361HV	LVU361HV	211234510	16.25	11.0	8.95	N	Y	
	LV420HV1	LVU420HV1	211234515	17.2	10.75	9.35	N	Y	
	LV480HV1	LVU480HV1	211234516	16.5	9.7	9.3	N	Y	
	LC188HV4	LCU188HV4	205788783	20.0	12.8	9.4	Y	Y	
LGRD Cassette	LC249HV4	LCU249HV4	205788784	21	12.6	10.2	Y	Y	
	LC369HV4	LCU369HV4	205788788	21.5	12.6	10.55	Y	Y	
	LC429HV4	LCU429HV4	205788789	19.5	12.8	10.75	Y	Y	
	LC489HV4	LCU489HV4	205788771	17.5	12.5	10.65	Y	Y	
LGRD Mid Static Duct	LH188HV1	LHU188HV1	212578842	17.5	12.3	9.2	Y	Y	
	LH248HV1	LHU248HV1	212578847	16.75	11.8	9.4	Y	Y	
	LH248HV4	LHU248HV4	205788787	16.75	12.0	9.4	Y	Y	
	LH368HV4	LHU368HV4	205788789	16.5	12.0	9.2	Y	Y	
LGRD High Static Duct	LH428HV	LUU428HV	205788770	18.7	12.05	9.15	Y	Y	
	LH488HV	LUU488HV	205788772	17.7	11.7	9.4	Y	Y	
	LV181HV4	LVU181HV4	205788774	17.05	13.35	8.9	Y	Y	
	LV241HV4	LVU241HV4	205788775	16.45	11.95	9.25	Y	Y	
LGRD VAHU	LV361HV4	LVU361HV4	205788773	16.4	11.95	9.3	Y	Y	
	LV420HV4	LVU420HV4	205788776	17.3	12.00	8.45	Y	Y	
	LV480HV4	LVU480HV4	205788777	17.75	11.95	8.4	Y	Y	

Red model #s indicate LGRD*



Existing LG Lineup Multi-Zone EnergyStar 6.1 cold climate

MUHF	System Model	Rated Efficiency						Energy Star 6.1	Energy Star Cold	
		AHRI Ref #	SEER2	EER2	HSPF2	Energy Star 6.1	Energy Star Cold			
18MBH	LMU183HV Non-Ducted Combination	208131884	22.5	13.5	9.6	Y	N			
	LMU183HV Mixed Combination	208132537	20.5	13.0	9.3	Y	N			
	LMU183HV Ducted Combination	208131885	18.5	12.5	9	Y	N			
	LMU243HV Non-Ducted Combination	208131886	22.5	12.5	9.4	Y	N			
24MBH	LMU243HV Mixed Combination	208132538	20.5	12.5	9.2	Y	N			
	LMU243HV Ducted Combination	208131887	18.5	12.5	9.0	Y	N			
	LMU303HV Non-Ducted Combination	208131888	22	13	9.2	Y	N			
	LMU303HV Mixed Combination	208132539	20.25	12.5	9.0	Y	N			
30MBH	LMU303HV Ducted Combination	208131889	18.5	12	8.8	Y	N			
	LMU363HV Non-Ducted Combination	208131890	21.5	12.5	9.0	Y	N			
	LMU363HV Mixed Combination	208132540	19.75	12.1	8.8	Y	N			
	LMU363HV Ducted Combination	208131891	18	11.7	8.6	Y	N			
36MBH	LMU483HV Non-Ducted Combination	210529233	20.8	12.8	9.5	Y	N			
	LMU483HV Mixed Combination	210580662	19.9	12.7	9.5	Y	N			
	LMU483HV Ducted Combination	210529234	19	12.6	9.5	Y	N			
	LMU543HV Non-Ducted Combination	210529235	20.6	12.6	9.3	Y	N			
54MBH	LMU543HV Mixed Combination	210560663	19.55	12.55	9.3	Y	N			
	LMU543HV Ducted Combination	210529236	18.5	12.5	9.3	Y	N			
	LMU601HV Non-Ducted Combination	206717015	20.5	11.3	10	N	Y			
	LMU601HV Mixed Combination	206717016	19.5	11.15	9.75	N	Y			
60MBH	LMU601HV Ducted Combination	206717003	18.5	11	9.5	N	Y			

Red model #s indicate LGRD*



LG's New Hydronic Product Line is Well-Timed for Electrification Growth of DHM (Domestic Hot Water)

LG's new products, in new market segments with high growth potential:

- HPWH (Heat Pump Water Heater)
- AWHP (Air to Water Heat Pump)
- Hydro Kit (VRF Water Heating Indoor Unit)

NBI Manufacturer Round Table Mitsubishi Electric

November 15, 2023



Shawn LeMons
Performance Construction Mgr
(Former BPI, IECC, RESNET, LEED, PHIUS, Thermography)

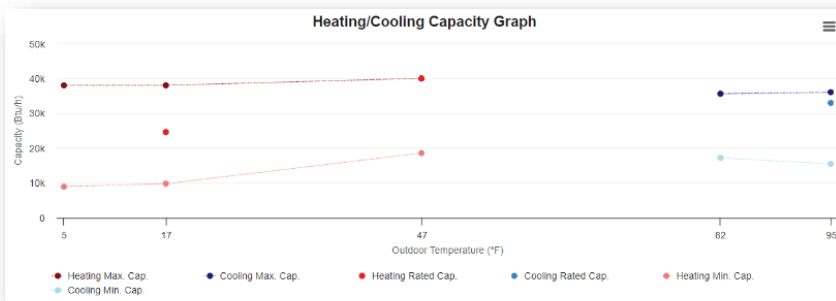
www.mitsubishicomfort.com

MITSUBISHI ELECTRIC TRANE HVAC US

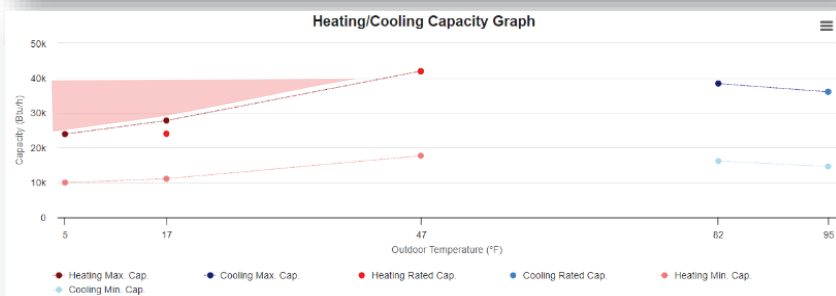
Double Check Your Specs



Both are on the NEEP ccASHP list. Which one is right for your client?



Cold Climate
100% @ 5°F
80% @ -13°F
Opp @ -22°F



Standard
66% @ 17°F
57% @ 5°F
Opp @ -8°F



<https://neep.org/heating-electrification/ccashp-specification-product-list>

MITSUBISHI ELECTRIC TRANE HVAC US

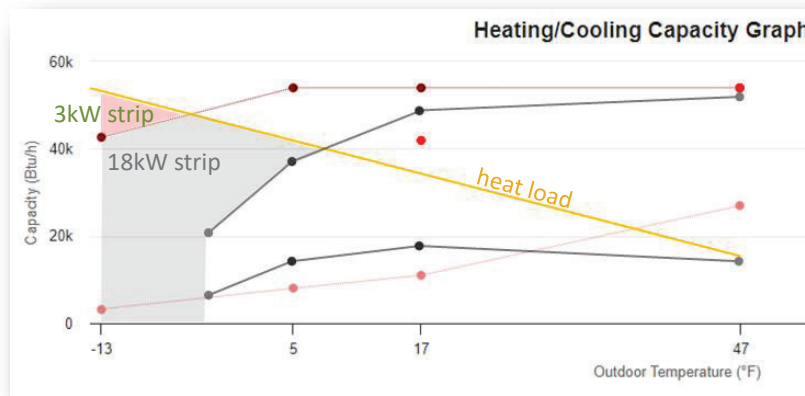
Double Check Your Specs

Which is right for the client?

MXZ-SM48NAMHZ + 2 duct systems

Up to 23 SEER, 12 HSPF
54,000 Max Btu/h @5°F
COP 1.9 @5°F

- ❖ **3kW heat strip below -4°F**
- ❖ Heat pump to -24°F
- ❖ Maintains efficiency
- ❖ **65A total breakers**
(50A+15A)



Two high efficiency ducted heat pumps

Up to 24 SEER, 13 HSPF
39,600 Max Btu/h @ 5°F
COP 2.48 @5°F

- ❖ **18k heat strip below 9°F**
- ❖ Heat pump off at ?°F
- ❖ Efficiency plummets
- ❖ **190A total breakers**
(2x30A, 2x15A, 2x50A)



<https://neep.org/heating-electrification/ccashp-specification-product-list>

MITSUBISHI ELECTRIC TRANE HVAC US

The RIGHT Heat Pump - Winter

Beyond Spec Performance

4T ccASHP + 2 duct systems
200amp SPAN panel

- ❖ -18°F @ 8am 12/22/2022
Denver design temp 0°F
3700 sf home, 46 kBTU/h load
- ❖ "...expected it to be much colder,
but it was great... evenly heated"
- Sekhar Paladugu
www.heliohome.io
- ❖ Max ampacity 42A (10 kW)
- ❖ **Stayed below 25A (6 kW)**



<https://www.mitsubishicomfort.com/blog/metus-span-collaborate>

MITSUBISHI ELECTRIC TRANE HVAC US

Ceiling Mounted Heat Pump



Slim Design

EZ FIT® Ceiling Cassette

The MLZ-KP EZ FIT® fits between 2x8 ceiling joists providing a clean flush-mount appearance. A popular selection for room upgrades or new construction projects. Fully serviceable from below, no access panels needed.

Capacities: 6,000 to 18,000 BTU/H

Sound: as low as 21 dB(A)

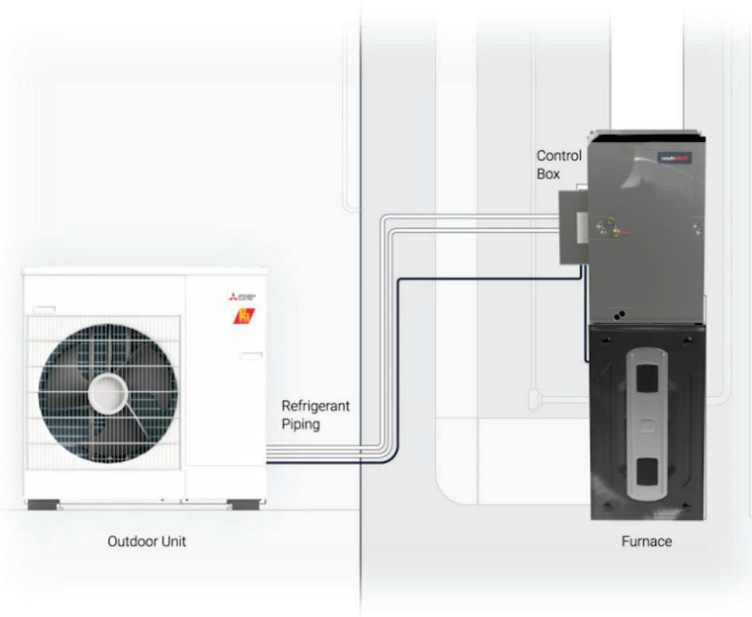
Condensate: Drain lift mechanism 19"



<https://www.mitsubishicomfort.com/intelli-heat>

MITSUBISHI ELECTRIC TRANE HVAC US

Intelligent Hybrid Heat Pump



The Award Winning

intelli-HEAT™

Upgrade your current HVAC system to a Hybrid **Dual Fuel Heat Pump** and significantly reduce gas usage and CO2 emissions. This smart system not only improves AC efficiency on hot days, but also determines the best source of heat (gas or electricity) on cold days.



<https://www.mitsubishicomfort.com/intelli-heat>

MITSUBISHI ELECTRIC TRANE HVAC US

All-Climate SMART MULTI



6, 8, 10 ton MXZ-SM 3-phase

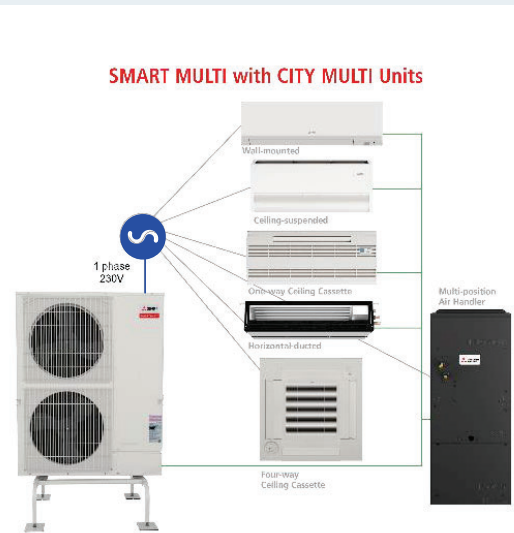


M&P-series
Up to 12 indoor units

City-Multi
Up to 30 indoor units

IEER: up to 24.5
COP: up to 4.2

Max total piping: 1,017 ft
Max furthest pipe: 425 ft



https://www.mylinkdrive.com/usa/SMART_MULTI

MITSUBISHI ELECTRIC TRANE HVAC US

Less Refrigerant, Air or Water Source



Future Proof
Hybrid VRF

The world's only two-pipe Hybrid Variable Refrigerant Flow (VRF) system that exchanges heat between refrigerant and water. Air or water source units connect to the Hybrid Branch Controller (HBC) allowing for simultaneous heating and cooling.

30-40% less refrigerant charge per system

No refrigerant in occupied spaces

Future Proof and adapt to market regulations



<https://hybridvrf.com/>

MITSUBISHI ELECTRIC TRANE HVAC US

IRA Guide

MITSUBISHI ELECTRIC
HEATING & AIR CONDITIONING

Homeowners **1-800-433-4822** Mon-Fri 8AM-7PM EST

Find Contractor Products About Resources Español

The Inflation Reduction Act (IRA)

Unprecedented Federal energy efficiency improvement incentives for homeowners, builders and building owners

The Inflation Reduction Act of 2022 (IRA) is the largest ever climate investment by the Federal Government in American history, projected to reduce greenhouse gas (GHG) by 31% to 44% below the 2005 levels by 2030. The IRA will also bring energy bill relief to U.S. households by incentivizing the adoption of more efficient, all-electric appliances. Importantly, the IRA recognizes the key role of highly efficient, variable-capacity heat pumps in slashing domestic GHG emissions and lowering energy costs for Americans.

Explore Benefits For:

- [U.S. Homeowners](#)
- [Builders and Contractors](#)




Inflation Reduction Act 25C Tax Credit Qualified Product List
Download as of 12/29/2022

North Qualified Products

Product	Model	Product	Model
MEL10000001	MEL10000001	MEL10000001	MEL10000001
MEL10000002	MEL10000002	MEL10000002	MEL10000002
MEL10000003	MEL10000003	MEL10000003	MEL10000003
MEL10000004	MEL10000004	MEL10000004	MEL10000004
MEL10000005	MEL10000005	MEL10000005	MEL10000005
MEL10000006	MEL10000006	MEL10000006	MEL10000006
MEL10000007	MEL10000007	MEL10000007	MEL10000007
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Performance Construction

National team to support building professionals

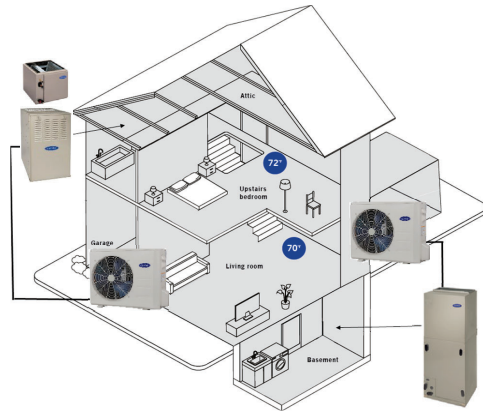
Project Support
Education and Collaboration
Industry Advocacy



Shawn LeMons
Performance Construction Manager
AZ, CO, UT, WY
slemons@hvac.me.com
720-648-0505

Crossover Solution – What is it?

- “Crossover” = Bridging the gap between two formerly incompatible systems
- **Maintain unitary characteristics while leveraging elements of ductless technology**
- With both gas and electric options available, a Carrier/Bryant/ICP crossover system is great for any space or application
 - High performing
 - Fit-for-purpose
 - Consistent comfort
 - Small size
 - Whisper quiet operation
 - Third-party thermostat compatible



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37

Crossover Solutions - How it works

38MURA

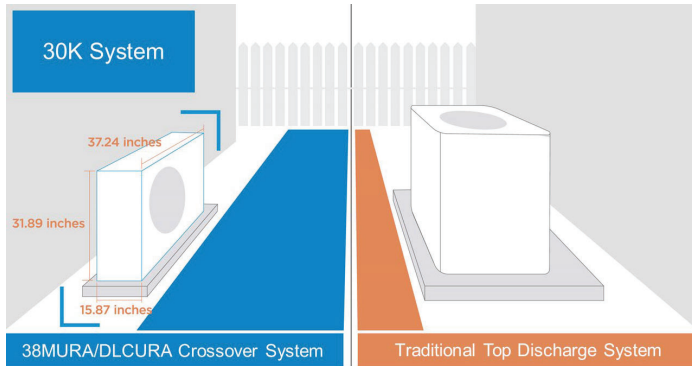
- Conventional DLS outdoor
- ODU has a 24V interface built-in
- No additional accessories are required
- Only the suction line needs to be insulated
- Uses conventional unitary line-set sizes



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38

Crossover Solutions – 38MURA



Features/Benefits
Compatible with Res Fan Coils and Furnaces
Increased Coverage 1.5 – 5 ton
Small footprint
Inverter-Driven Compressor
Add-on Replacement Opportunities
Available in Standard Heat and High Heat
Conventional Line-set Sizes

*Available in Q2 2023



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Toshiba Carrier VRF U-Series

Enhancements

- Efficient new outdoor unit chassis design
- Triple & twin rotary compressors and new inverter
- Elite Heat model offering (Ratings to -30F)
- Communication Wave Tool for remote data trending

SMMSu
SUPER MODULAR MULTI SYSTEM



Indoor units ***Launched***
Phase In 30% complete




Heat Pump
• Production – June 2023
• **Q3 Availability subject to PIPO**

Heat Recovery
• Production – Dec 2023
• **Q2 Availability subject to PIPO**



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u-Series Heat Pump Offering

Items		SMMS-e	SMMS-u	SMMS-u (Elite Heat)
Appearance				
Chassis (mm)	Small	6 ton W39.0" x D30.7" x H72.9"	6, 8 ton W39.6" x D31.0" x H66.5"	-
	Medium	8, 10 ton W47.6" x D30.7" x H72.9"	10, 12, 14, 16 ton W51.4" x D31.0" x H66.5"	6, 8, 10 ton W51.4" x D31.0" x H66.5"
	Large	12, 14ton W63.0" x D30.7" x H72.9"	-	-
Max combination capacity		38 ton	40 ton	30 ton
Max combination units		3	3	3
Piping length (m)	Total length	3281 ft	3937 ft	3937 ft
	Farthest Equivalent	771 ft	771 ft	771 ft
	Height (ODU-IDU)	295 ft	361 ft	361 ft
Max number of IDU		64	74	64
Operating Temperatures (Cooling)		14 F ~ 122 F	-10 F ~ 125 F	-10 F ~ 125 F
Operating Temperatures (Heating)		-4 F ~ 60 F	-22 F ~ 60 F	-30 F ~ 60 F

Ref. <https://www.sharedocs.com/hvac/docs/1001/Public/00/TCTC-E23-VRF004-2.pdf>



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41



THANK YOU

James Momperousse
 Energy & Utility Sales Manager
 James.Momperousse@carrier.com



ABOUT DAIKIN

Daikin is focused on both profit and environmental goals—and heat pumps are our core technology.

<p>1</p> <p>HEAT PUMPS</p> <p>DAIKIN CORE TECHNOLOGIES</p>	<p>2</p> <p>MANUFACTURING CAPABILITY</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>More than 90 global production bases for localized production</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>More than 76,000+ EMPLOYEES 80% are outside Japan</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Business development in more than 150 countries</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>76% of our sales are from outside Japan</p> </div> </div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p>Comprehensive AC Manufacturer Handling both AC equipment and refrigerants</p> </div> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p>AIR SPECIALISTS</p> </div>	<p>3</p> <p>MISSION</p> <p>Environmental Vision 2050</p> <p>We will reduce the greenhouse gas emissions generated throughout the entire life cycle of our products.</p>
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In total, production has been established at more than 100 locations in 28 countries

Europe

- Daikin Europe N.V. (Belgium; 1972)**
 - Commercial ACs, Heating products
- Daikin Industries Czech Republic (2003)**
 - Residential ACs
- Daikin Applied Europe S.p.A. (Italy, acquired in 2008)**
 - Screw and Centrifugal Chillers
- Daikin Turkey (2011)**
 - Residential ACs, Heaters

Japan

- Shiga Plant (Kusatsu, Shiga; 1970)**
 - Residential ACs
- Sakai Plant (Sakai, Osaka; 1937)**
 - Commercial ACs

U.S.

*including bases for filters and refrigeration

- Daikin Applied Americas INC. (Staunton, VA; acquired in 2007)**
 - Large Screw Chillers, Centrifugal Chillers
- Goodman Global Group Inc. (Houston, TX; acquired in 2012)**
 - Residential Unitary Systems, Gas Furnaces, Commercial ACs

India

- Daikin Air Conditioning India (2009)**
 - Residential and Commercial ACs

Asia

- Daikin Industries (Thailand) (1990)**
 - Residential and Commercial ACs
- Daikin Malaysia Sdn. Bhd. (Acquired in 2007)**
 - Residential ACs, Commercial ACs
- Daikin Air Conditioning Vietnam (2018)**
 - Residential ACs

China

- Daikin Air-Conditioning (Shanghai) (1995)**
 - Commercial ACs, Heat Exchangers, Air Cooled Chillers
- Daikin Air-conditioning (Suzhou) (2011)**
 - Residential and Commercial ACs
- McQuay (Wuhan; acquired in 2007)**
 - Water Cooled Chillers, Centrifugal Chillers
- McQuay (Shenzhen; acquired in 2007)**
 - Air Cooled Chillers, Fan Coil Units

South America

- Daikin Air Condicionado Amazonas Ltd (2012)**
 - Residential and Commercial ACs

3

Daikin Texas Technology Park—Houston



VISION: Become a leading center for heat pump innovation in North America

- Continually provide environmentally friendly, high-performance products to meet the unique needs of North American customers
- To grow sustainably while building solid relationships with all stakeholders such as customers, regional and local communities, governments, industry, academia, and our employees

1

Manufacturing

Over \$100 Million recent investment in new and upgraded equipment
Latest technology offers increased productivity



3

Engineering Laboratories

54 testing labs
Ability to create test conditions with temperature ranges from -40° F to +140° F

2

Distribution Center

Twelve warehouses consolidated into one central location
Connection to Manufacturing reduces lead time and costs of moving material

4

Offices & Amenities

LEED Certified Gold
Co-location of groups to improve collaboration and speed of innovative execution



About DTP

- Total investment >\$500M
- Daikin's largest facility investment
- No public funding
- 497 acres for the full site
 - 94 acres under roof
- >12,000 employees on site

Types of Daikin Inverter Heat Pumps

For Commercial Buildings

Variable Refrigerant Flow (VRF)



For Residential Buildings

Ducted Split Systems

- These are designed as central systems and use ductwork to distribute conditioned air
- Available in all-Electric Heat Pump or Dual-Fuel: Heat Pump with Gas Furnace



Ductless Split Systems

- Designed as zonal systems and distribute conditioned air with or without ductwork.



Commercial Applications

- Space conditioning for people:
 - Ideally for offices and institutional
 - Sometimes used in multi-family
- Features:
 - Multi-zonal—up to 128 zones per system
 - LARGE capacities and lots of options
- WHAT'S NEW: adding domestic hot water heating



Indoor Units



Controls



Residential Applications—Ducted Splits Systems

USES

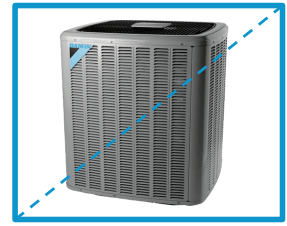
- Mainly used in single family homes
- Sometimes used in multifamily
- Connects to the existing ductwork
- Available as a heat pump system (all electric) and as an “add-on” to a furnace (dual fuel)

WHAT’S NEW? More Technology!

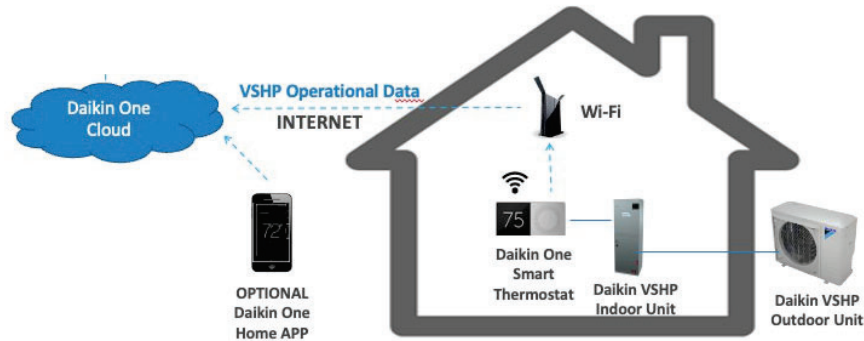
- Variable Speed Heat Pumps (VSHP)
- Cloud connectivity for better service



Choose
this more modern
technology going ahead.



Avoid
this technology
going ahead.



7

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Residential Applications—Ductless Splits Systems

USES

- Great for use in single and multifamily homes to:
 - Replace methane gas or electric resistance heat
 - Reduce use (or displace) for any existing heating source, especially electric resistance
- Increasingly used in new construction as a sole source of heating and cooling.

WHAT’S NEW? Lots!

- New “low GWP” refrigerant called R32
- Major product revisions in 2024 and 2025 with higher efficiency ratings.

<https://www.r32reasons.com/>

R32 HOME R32 REASONS RESOURCES R32 TRAINING STAY INFORMED

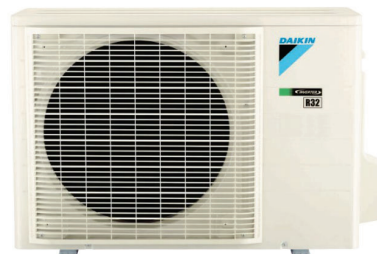
There's more than one good reason to choose R-32.
In fact, there are 32 of them.

Up to 12% more efficient than 410A.	Light weight units.	Better than 410A for the planet.	Easy to work with.
Globally accepted.	Non-proprietary.	Lower price per pound.	Pure, not blended

DAIKIN ATMOSPHERA

Single Zone Heating and Cooling System

Up to 27.4 SEER2 | Up to 11.2 HSPF2 | Up to 16.3 EER2



<https://daikincomfort.com/go/atmosfera/>

8

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