Heat Pump Survey and Roadmap

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Agenda

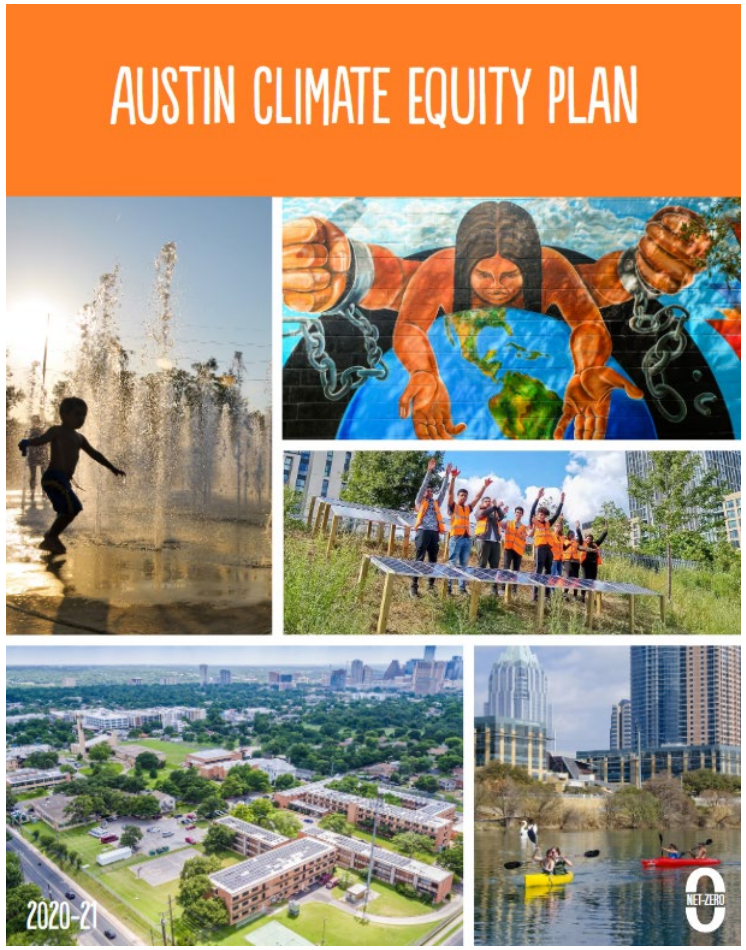
Office of Sustainability

- Heat Pump Technology Overview
- HVAC Contractor Survey Summary and Recommendations

Austin Energy

- Current Austin Energy Incentives (ADD Federal and upcoming State)
- Heat Pump Roadmap

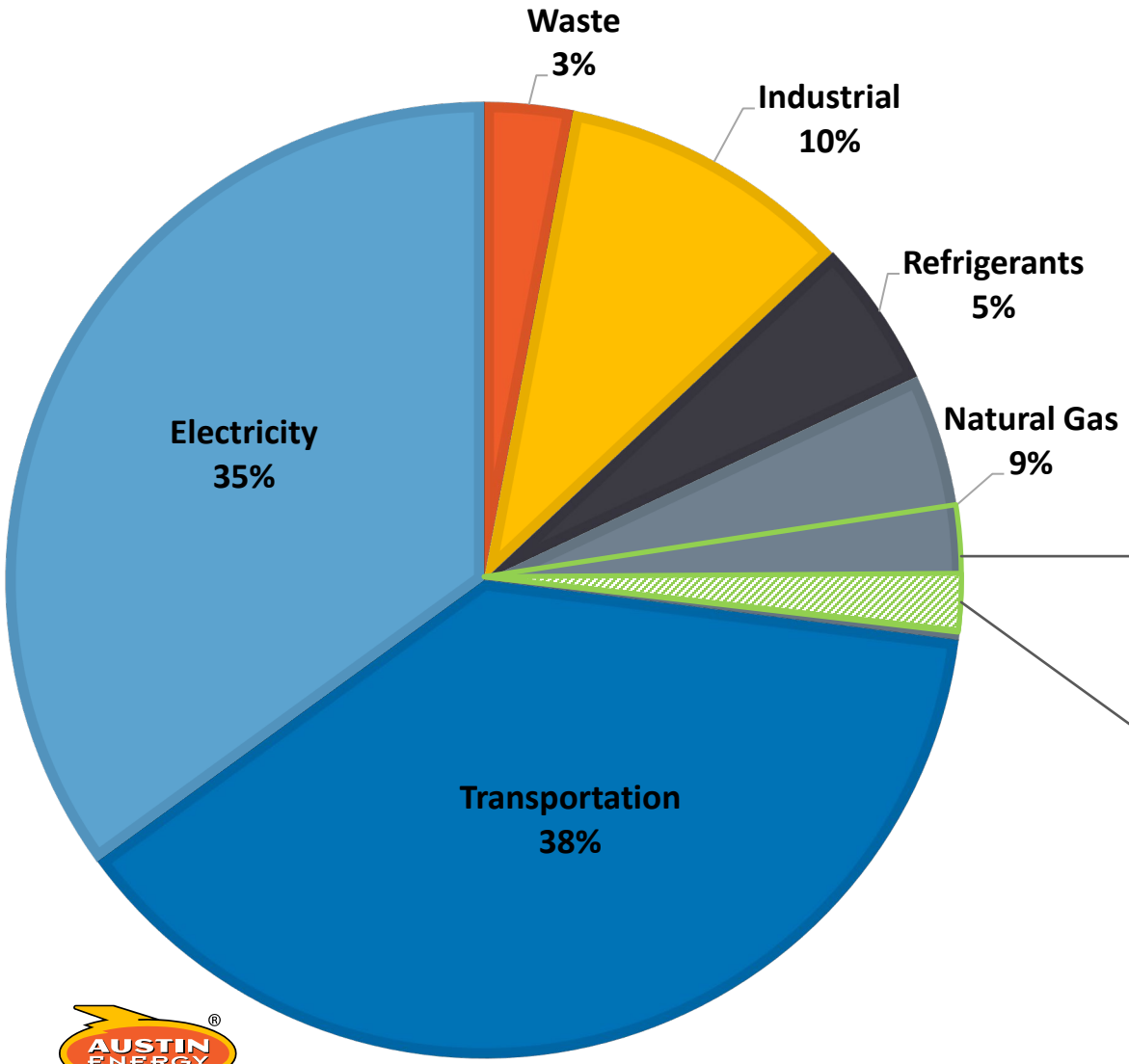
Austin Climate Equity Plan



Austin Climate Equity Plan: Commissioned in 2020 and adopted in 2021, the plan identifies 17 goals and 75 strategies to equitably achieve net-zero greenhouse gas emissions by 2040.

Included in the plan were calls for **energy-efficient buildings** and support for evaluating and improving access to **high-efficiency** heating and cooling options like heat pumps and heat pump water heaters.

Austin's Community Carbon Footprint



2021: Total 11 Million Metric Tons (MT) of CO2 Equivalent (CO2e)

~9% from on-site use of natural gas; ~1 Million MT CO2e/year

- ~ 50% from single-family homes
- ~ 50% of single-family usage from gas furnaces

~ 2.25% from natural gas furnaces at single-family homes; ~250,000 Metric Tons of CO2e per year

Heat Pump Overview

- HVAC systems that efficiently move hot air from inside your home to the outside to cool down the interior.
- In the winter, it runs in reverse to heat your home by transferring heat through compression and expansion of refrigerant
- These are a single-system alternative to air conditioners installed with gas furnaces or electrical resistance heating
- Most common: 1) ductless mini-split and 2) ducted system with exterior condenser and interior air-handler
- Most efficient is a variable-speed, inverter-based heat pump

Ductless mini-split: exterior and interior units

Ducted System: 3 ton 15 SEER2 exterior condenser and interior air handler

Photo sources: Shutterstock, HVAC Direct, and https://www.energy.gov/energysaver/heat-pump-systems

Residential Heat Pump Benefits

- Simplicity - Only 1 system, not 2 (AC and gas furnace)
- Consistent all-season heating and cooling
- Potential improved indoor air quality
- Potential lower bills if switching from resistance heating
- Renewable energy to run a heat pump less carbon intensive than burning natural gas onsite

Residential Heat Pump Challenges

Building and Fuel Type

- Approx. 70% of single-family and 35% of multifamily households rely on gas for heating*
- Heat pump compatibility and cost savings vary across building and HVAC type
- Installation costs increase if changes to ducting, mechanical space, heat load, etc are needed
- Electrical panel upgrades may be required

Customers and Contractors

- Heat pump equipment and installation costs vary
- Customer perception of bill impacts, efficiency, and value impacted when replacing broken HVAC
- Colder winter may result in higher electricity usage and bills compared to gas furnace
- Local HVAC contractors and maintenance industry could benefit from additional training, experience, and decision tools

* From Austin Energy analysis of Energy Audit and Disclosure Ordinance (ECAD) data

New Building Scenario

RESIDENTAL NEW CONSTRUCTION

AUSTIN: SINGLE-FAMILY HOMES

RMI analyzed the costs of a new all-electric home versus a new mixed-fuel home that relies on gas for cooking, space heating, and water heating. **In Austin, the all-electric home saves $4,400 in net present costs and 15 tons of CO_2 emissions over a 15-year period.**

Source: Rocky Mt. Institute Analysis

Existing Building Retrofits

	Gas Furnace + AC >> Heat Pump	Elec. Resistance + AC >> Heat Pump
Equipment Costs	Comparable for similar efficiency units (<$5k difference)	Comparable for similar efficiency units (<$5k difference)
Installation Costs	Higher: Elec. panel upgrade ($2k), or other modifications (e.g. larger concrete pad for condenser or new conduit)	Similar (assuming no other upgrades required for code compliance)
Bill Impact	Summer: **Potential Moderate Bill Savings** Winter: potential savings during mild winters (<$100/household); higher bills in cold winters	**Summer: Potential Moderate Bill Savings** **Winter: High Bill Savings**
Emissions Impact	**Reduced**	No change locally, some impacts at utility scale
Overall Assessment	Emissions reduction but customer payback impacted by winter temperatures	Ideal target for heat pump conversion, particularly at multifamily properties that do not require building or HVAC modifications

Data based on Austin Energy project data and high-level estimates

Heat Pump Study Overview

FY2023-2024, the City of Austin's Office of Sustainability contracted with Terra Lumina Consulting to engage with residential HVAC contractors and develop a report to:

- Identify barriers to **prioritizing energy efficient technologies** like high-efficiency heat pumps and heat pump water heaters in building retrofits and
- Provide recommendations for steps the City can take to address those barriers
- Consider research of national trends and best practices

Heat Pump Study Key Results

- > 75% of survey respondents indicated that at least 15% of new and replacement HVAC system installations are heat pumps
- 88% of contractors report that customers are satisfied with heat pumps
- Contractors confirmed that cost is the biggest barrier to residential heat pump adoption
- 75% of survey respondents reported that Austin Energy's rebates make them more likely to encourage customers to choose heat pumps

Challenges + Recommendations

Challenge	Recommendations
Higher Upfront Costs	1. Increase and modify incentives 2. Provide unbiased cost-benefit information 3. Stimulate bulk purchasing discounts 4. Require 200-amp panel sizing for new construction and major renovations
Longer sales cycle	5. Provide education / marketing support to drive heat pump sales 6. Panel sizing requirement
Cold temperature performance	7. Require inverter-based models with variable speed motors to maximize efficient operations in all Austin climate 8. Provide un-biased local cold temperature performance data
Limited contractor experience with electrical upgrades	9. Provide publicly available tools and guidance on electrical upgrades 10. Offer networking and electrical skill building opportunities
Contractor resistance to adoption	13. Increase positive messaging 14. Phase out cooling-only systems where HP options are available

Challenges + Recommendations Multifamily Properties

Challenge	Recommendations
High Maintenance Costs	1. Offer fundraising support for affordable housing providers.
Incentive design	2. Redesign multifamily incentives to rebate individual HP system components and labor 3. Offer rebate project management support for multifamily customers
Lack of maintenance staff training	4. Provide free onsite training for affordable housing maintenance staff

Austin Energy

Heat Pump Strategy: Past, Present, Future

Sara Norris

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Austin Energy Heat Pump Incentives

Residential

- Equipment: $400-$750/system
- Whole Home Retrofit: $800-$1200/system
- Tune-Up: $175/system
- Federal Incentive: $2k/household

Multifamily

- Equipment: $300-$400/ton
- Tune-Up: $312-360/system

Commercial

- Equipment: $30-$290/ton
- Small Businesses Receive Additional 30% Bonus
- Tune-Up: $180-$680/system

- Host HVAC and building performance contractor trainings
- Contractor reimbursement for equipment and field staff training
- New Construction Pilot Incentives
- Annual evaluation and analysis of program design and incentive rates

Heat Pump Analysis and Planning

- Cost Effectiveness: develop customer friendly calculators and decision tools that consider existing building/fuel type and cold weather performance
- Increased Electric Load: quantify impact on customer bills and local electric system
- Austin Energy Goal Alignment: potential GHG metric and shift from MW savings only
- Equity KPI's: ensure balanced program design, outreach, and incentives

Heat Pump Preliminary Roadmap FY25-FY27

Customer Outreach

- Cost benefit tool, support data gathering and decision guides
- Develop a Heat Pump savings calculator to support customer decision making
- Education to support proactive decision making – avoid emergency HVAC failure

Contractor Engagement

- Provide Heat Pump training and resources
- Increase networking opportunities and collaboration with installers, distributors, and manufacturers
- Support partnerships between HVAC and electrical trades

Program Design and Incentives

- Align incentives with goals (MW or GHG) using 3rd party evaluation consultant.
- Shift focus to more holistic GHG metrics to better capture fuel transition
- Evaluate support for customer electric upgrades (incentive, technical, etc.)

Questions?