

# GRADIENT

## Accelerating Building Decarbonization

CALPLUG, APR 22 2024



•GRADIENT

Our mission is to provide  
**planet-positive  
building comfort**

# Gradient revolutionizes HVAC installation and efficiency for modern comfort



All-climate, high performance electric heating and cooling



QUICK, LOW-COST INSTALLATION

ALL-SEASON COMFORT

SMART CONNECTIVITY

95% LOWER DIRECT EMISSIONS

# The Stick: Building Performance Standards Impose Penalties for Inefficiency

## Example Building Performance Standards

Local Law 97 (NYC)

BERDO 2.0 (MA)

Denver Green Code

Many more via the [Institute for Market Transformation](#) and the [National BPS Coalition](#)



Passed BPS Policy or Program

Committed to passage of BPS policy or program by Earth Day 2024

- ✓ Building Performance Standards target the reduction of energy use or carbon emissions from existing buildings, as compared to Energy Codes that apply to new construction
  - Specify energy use or emissions reductions.
  - Penalties if exceed targets.
- ✓ Example: NYC Local Law 97
  - Covers buildings 25k square feet and larger.
  - Targeting 40% emissions reductions by 2030 and 80% by 2050, a reduction only achievable with heat pumps.
  - Charges \$268/tCO<sub>2</sub>eq over targets; **each Gradient offsets ~0.4 tCO<sub>2</sub>eq/yr in NYC, or ~\$107/yr in fines.**
  - Led to NYCHA CH4A Challenge, which Gradient won.





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# Faster + Lower Cost for Building Owners Today

Existing solutions require extensive permitting, construction, retrofits, skilled labor



## Per room estimates

	 Gradient	 Mini-split
Hardware	\$3,800*	\$1,200
Installation	\$0 - \$100	\$2,200
Electrical Upgrades	\$0	\$1,400
Other**	\$0 - \$100	\$1,100
<b>TOTAL (per room)</b>	<b>\$3,900</b>	<b>\$5,900</b>

\*\*Gradient before incentives

\*\*Demo, drywall, wall-mount thermostat, load calcs

# Total Cost of Ownership (TCO) vs. Traditional HVAC

- ✓ Compelling TCO for older multi-family buildings with traditional HVAC heating systems for one Gradient customer
- ✓ Lower day one capital costs for window-based heat pumps due to available incentives and high cost to maintain traditional HVAC system
- ✓ More energy efficient with lower heating and cooling costs
- ✓ Significant savings in ongoing maintenance costs

70%+ reduction in annual total costs 

	NYC Area Multi-family	
Housing type	5+ unit multifamily	
Baseline heating	Steam boiler	
Baseline fuel	Natural gas	
Baseline cooling	Window AC	
Year built	pre-1970	
	Steam	Gradient
Capital cost	\$29.45/ft2	\$12.50/ft2
Capital cost after incentives	\$29.45/ft2	\$3.89/ft2
Lifetime	30	15.3
Capital cost per year, Window AC	\$0.11/ft2	N/A
Annualized capital cost	\$1.09/ft2	\$0.25/ft2
Annual heating fuel cost	\$0.22/ft2	\$0.13/ft2
Annual cooling fuel cost	\$0.17/ft2	\$0.13/ft2
Annual maintenance cost	\$0.93/ft2	\$0.17/ft2
<b>Annual total cost</b>	<b>\$2.41/ft2</b>	<b>\$0.69/ft2</b>

# Guiding Principles of Product Strategy

The user matters

Modular infrastructure scales faster/cheaper

Digital/networked control

Professional grade without professional install



GRADIENT Dashboard

NYCHA Units

- Download Shadowdoo CSV
- Download Errors CSV
- Download Defrost CSV
- Download Stuck EXV CSV

Devices

	State	Power	Mode	Fan Speed	Indoor Temp	Set Point	
	Standby	Off	Heat	Medium	32.0°F	85.0°F	1C
	Heat	On	Heat	Medium	80.4°F	80.0°F	1C
	Heat	On	Heat	Low	76.3°F	79.0°F	1C
	Heat	On	Heat	Low	80.0°F	80.0°F	1C
	Heat	On	Heat	Low	69.6°F	70.0°F	1C
	Heat	On	Heat	Medium	80.4°F	80.0°F	1C
	Fan Only	On	Fan Only	High	72.4°F	77.0°F	1C
	Standby	Off	Cool	High	72.7°F	60.0°F	1C
	Heat	On	Heat	High	79.0°F	79.0°F	1C





# Customer Testimonials for Gen 1



“

Genuine ease with zero intimidation. My partner and I were able to get it in our window within 15 minutes and powered on shortly after. How cool is that!

Carol L.

“

It's so easy to use, it doesn't take up window space, it looks nice, and the heat is not uncomfortable to your body if you are sitting close to the unit.

Blake W.

“

I extremely liked the mobile app and the overall interface and its quick reaction time

Hans V.

“

It runs quiet and it cooled the room right down on a hot night in Oaktown! So far so good. :)

Gabriel K.

“

Form and function are no longer at odds.

Brad T.

“

It heats and cools! Only got hot enough one day for A/C but wow, great.

Laura F.





# Central Valley Project

## Overview

<b>Units</b> 100	<b>Product</b> Generation 1	<b>Location</b> CA Central Valley	<b>Installation Date</b> March 2023
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## Key Result

Reduction in utility bills for more than 50% of residents

## Summary

Partnered with Redwood Energy for surveys and bill analysis and the Electric Power Research Institute (EPRI) for smart plug coordination.

The collaboration was pivotal in honing our offerings and approach across markets. The data gathered informs our understanding of user preferences and behaviors, driving enhancements in product reliability, interface, and satisfaction.





# NEEA Study Results

The Northwest Energy Efficiency Alliance (NEEA) Micro-Heat-Pump Field Study revealed that tenants highly value the Gradient (“the saddle unit”) for its ease of installation, efficient performance, user-friendly design, and unique all-in-one heating and cooling feature, making it a standout choice in the market.



## Ease of Installation

“Saddle unit users had an easier time with installation. They considered the instructions clear and found the numbered boxes to be helpful”

## Performance and Design

“Participants appreciated its performance design ease of installation quietness temperature control and overall user experience”

## All-in-One Heating and Cooling Feature

“The benefits of heat pump technology should be marketed especially the all-in-one heating and cooling feature which is unique to this product”

## User-Friendly Controls

“Most found the settings + controls easy to understand + manage”



# NYCHA Resident Feedback: The All-Weather 120V

“Es magnifico!”  
“Muy elegante.”

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“I love the look.”

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“The air feels more fresh.”

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“I am very comfortable.”

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“The air feels so much more fresh! I have issues with my breathing and I feel like I can breathe better now!”

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“The other day I came out of the shower and wanted to dry my hair. When I walked by the warm air from the Gradient, I realized I could use that to dry my hair instead of my hair dryer, so I leaned over and dried my hair with the Gradient.”



# Product Performance at NYCHA: Efficiency and Satisfaction

## Cost Efficiency

Operates **15% to 78% cheaper** than fossil fuels, demonstrating significant cost savings across different conditions.

## Partner Satisfaction

NYCHA, NYPA, NYSERDA partners express high satisfaction.

## Residential Approval

Positive resident feedback highlights comfort, control, and improved conditions post-installation.

## Operational Efficiency & Performance

System maintains intended efficiency/capacity within plug load (< 10 amps). Achieved COP of 3.0 to 5.6 in moderate temps (37-44°F) and 2.5 to 4.7 in the coldest conditions (24-27°F).

## Cost Analysis

### Moderate Temp Efficiency

COP 3 (worst) to 5.6 (best) yields cost reductions of **29% to 78%** compared to fossil fuels.

### Coldest Day Efficiency

COP 2.5 (worst) to 4.7 (best) shows cost reductions of **15% to 74%**, far outperforming traditional heating.

## Key Takeaway

Gradient's technology not only surpasses traditional fossil fuel systems in cost and efficiency but also earns strong partner and resident endorsements, setting a new standard for heating in urban communities.

# THANK YOU

