
MT2030
CLIMATE
SUMMIT
SUN VALLEY 26
PRESENTED BY TORUS

DENVER
CLIMATE ACTION, SUSTAINABILITY & RESILIENCY

Prioritizing Building Electrification in Denver

Solutions Lab: Sustainable Buildings

MT2030 Summit
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Overview

1. Denver's Office of Climate Action, Sustainability and Resiliency (CASR)
   Achieve zero emissions as quickly and equitably as possible.
2. Why Denver is prioritizing building electrification and thermal networks
3. Case Studies: Electrification at different scales and contexts
4. Opportunity: Convert avoided infrastructure costs into incentives
5. Summary

The Office of Climate Action, Sustainability, and Resilience is responsible for rapidly and equitably decarbonizing Denver

DENVER CLIMATE ACTION, SUSTAINABILITY & RESILIENCY | CLIMATE PROTECTION FUND

Reduce GHG emissions

65% by 2030 from 2019 baseline

100% by 2040 (without carbon offsets)

Make Strategic Investments

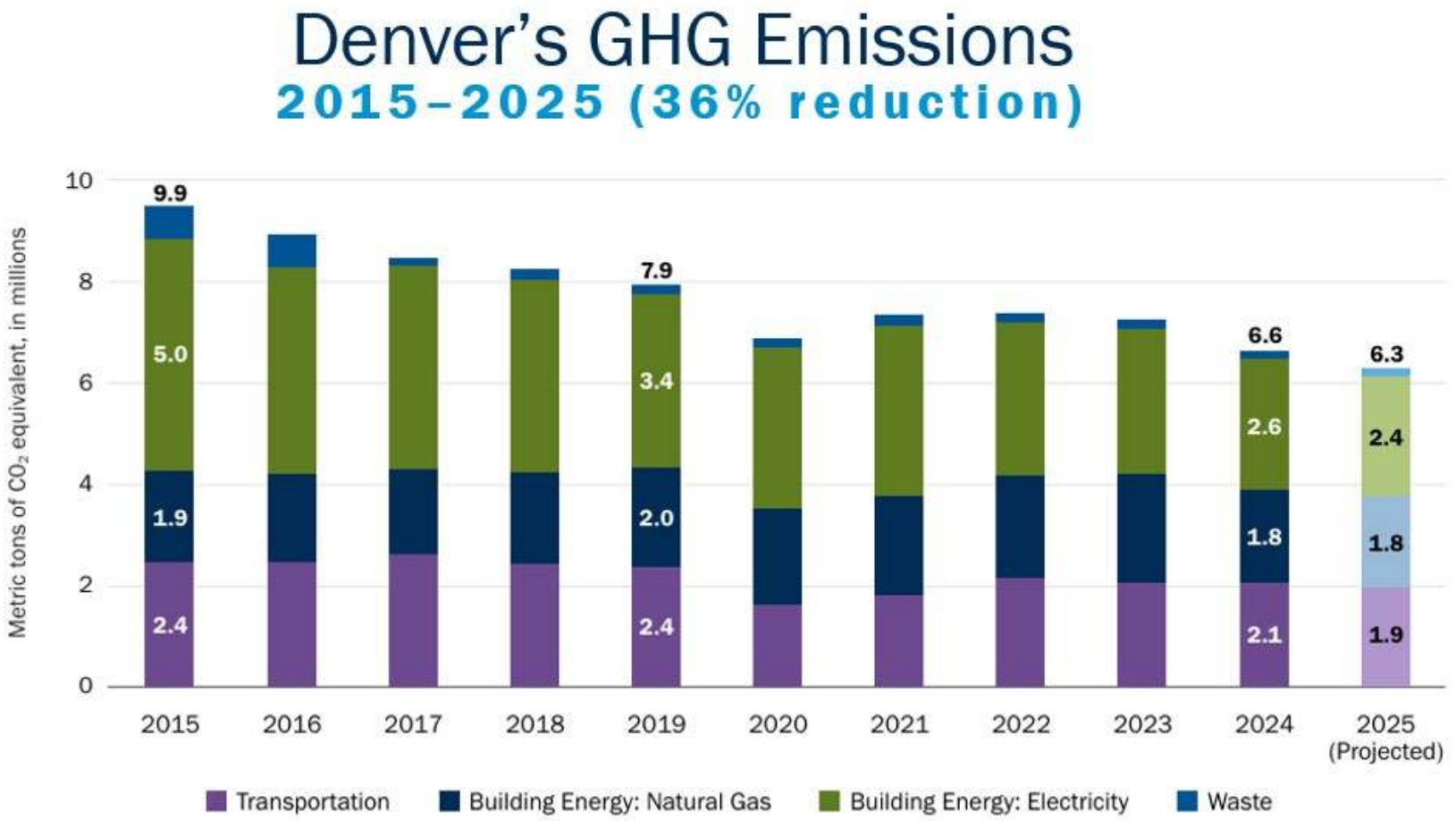
0.25% sales tax with equity exemptions

$50 million annual budget

One of eight LEED Platinum certified cities in the world

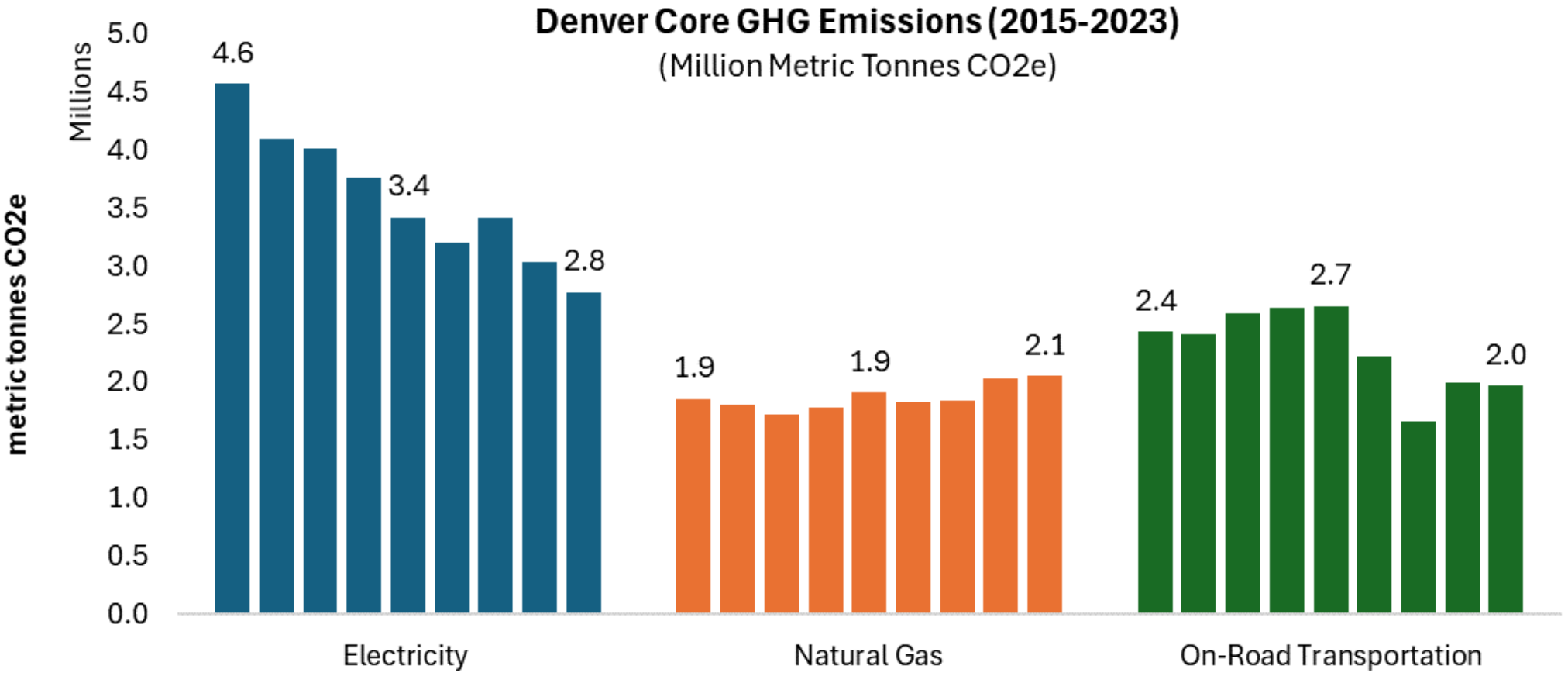
Ranked #2 in the ACEEE City Clean Energy Scorecard

GHG emissions are declining, but we are not on track

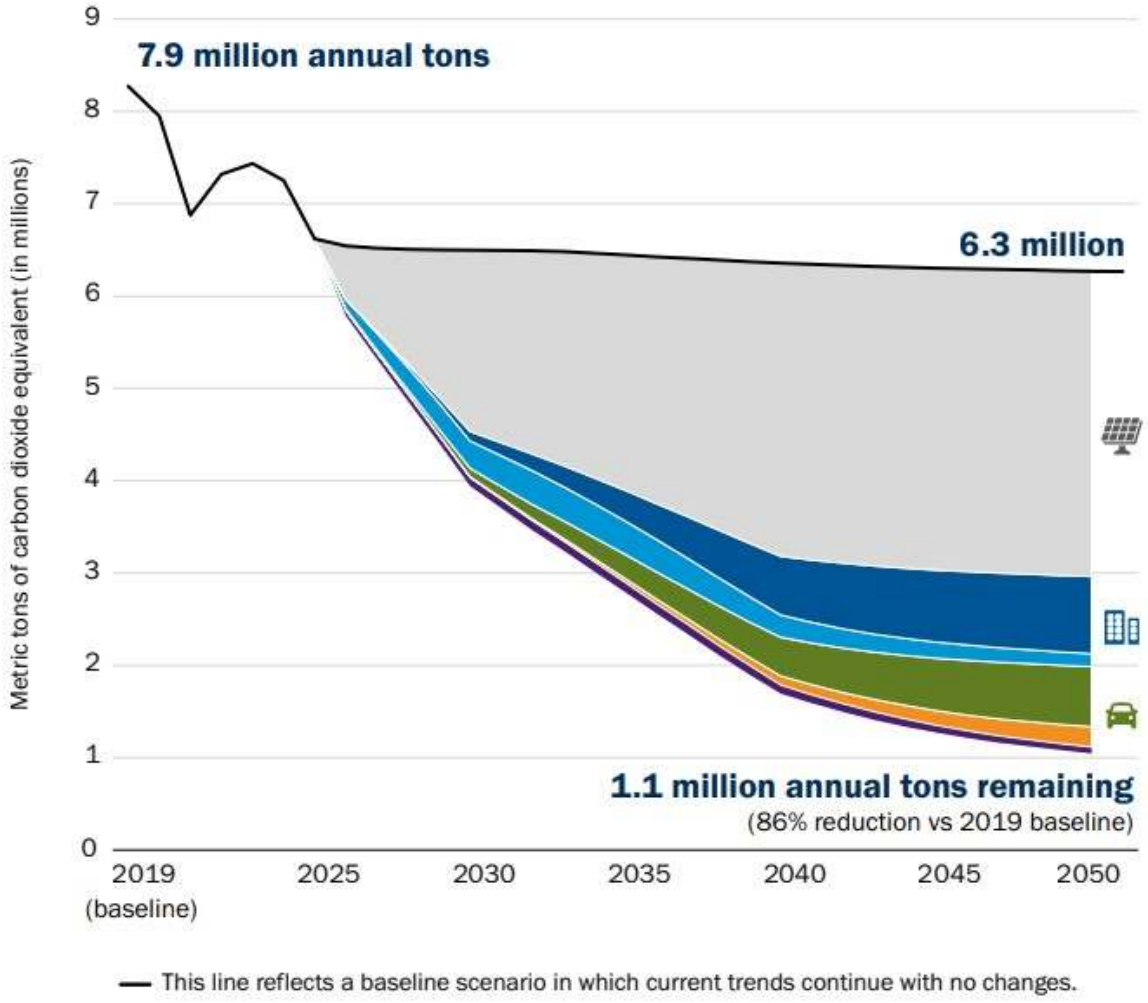


Why not?

Denverites continue to burn fossil fuels for power, heat, and transportation.



Modeled results: After greening of the grid, electrification of building heating systems is the highest impact lever we can pull

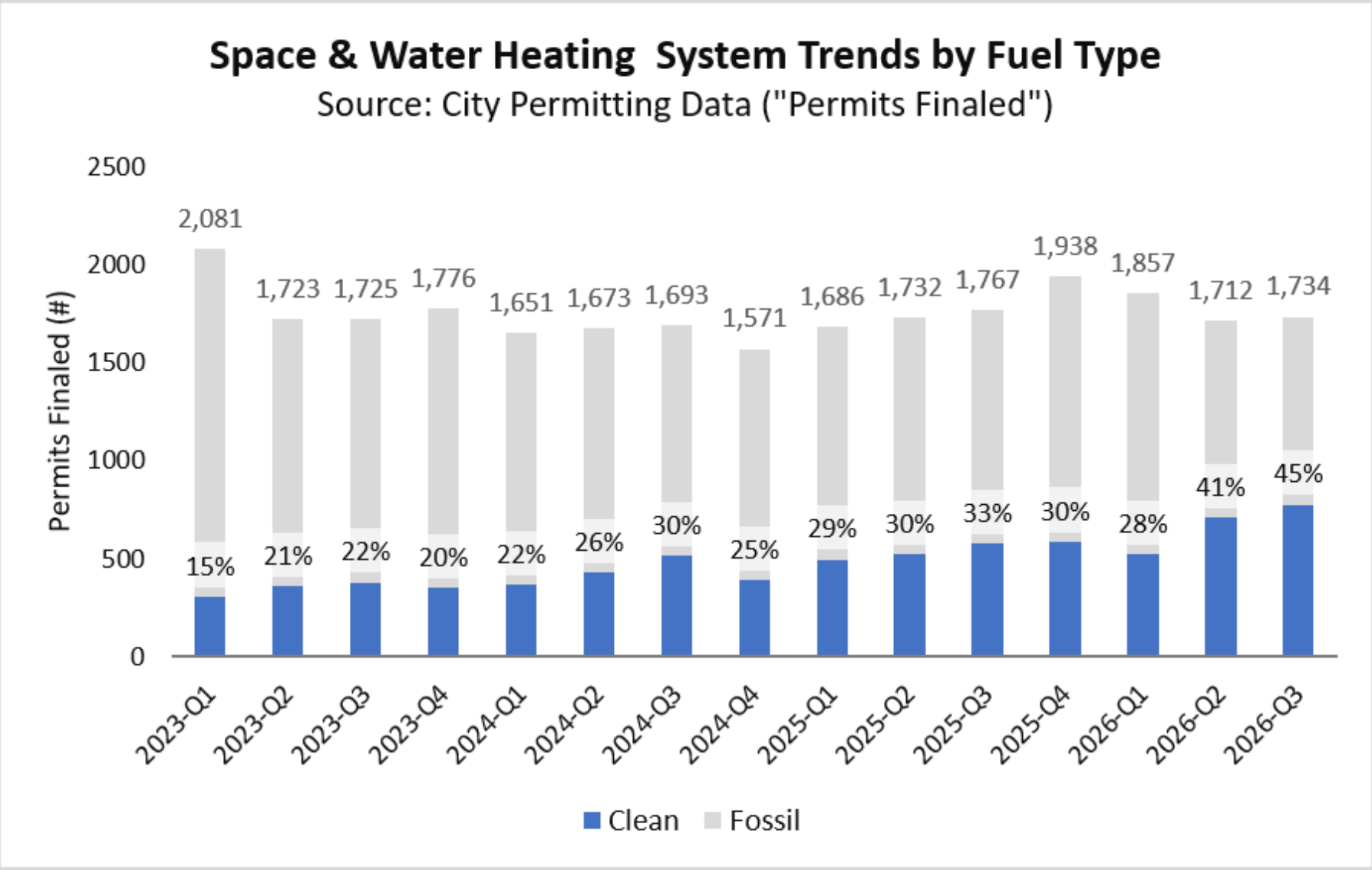


Cumulative Metric Tons Avoided (2025 - 2050)	Targets by Core Emissions Sector
65.2 million	**Electric Grid Decarbonization** ■ 85% by 2030 (PUC approved) □ 98% by 2040
11.7 million	**Electrification of Building Systems** □ 60% of space/water heating equipment permits by 2030 □ 90% by 2040
6.2 million	**Building Energy Efficiency** ■ 30% reduction in commercial use by 2032 (Building Performance Policy Aligned) □ 10% reduction in residential use by 2032 □ 35% reduction in total by 2040
8.6 million	**Light Duty Vehicle Electrification** ■ 82% of new registrations are EV by 2032 (CO Advanced Clean Cars) □ 95% new registrations by 2040
2.2 million	**Heavy Duty Vehicle Electrification** ■ 46% of new registrations are EV by 2032 (CO Advanced Clean Trucks) □ 95% new registrations by 2050
0.9 million	**Vehicle Miles Traveled per Capita** □ 10% reduction by 2040 □ 20% reduction by 2050 (Denver Moves Everyone aligned)

■ Required □ Projected

Denver is increasing the "clean" share of heating permits.

However, we need different solutions to address different needs citywide.



As we electrify, managing peak demand matters.

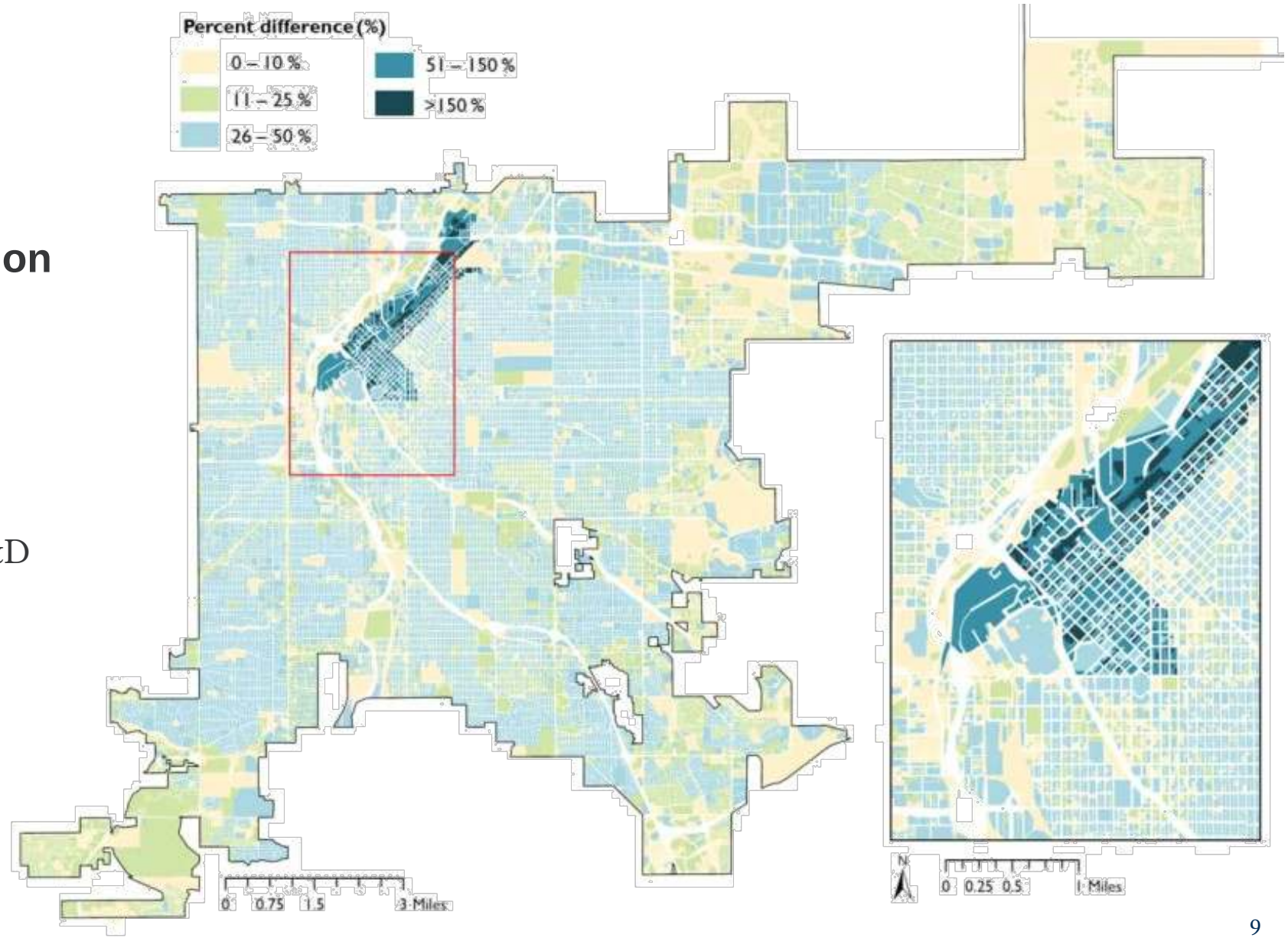
Denver Citywide Electrification Impact Study (2026)

Moderate vs High Load Cases

- Peak increase 2,123 MW
- ~$2 billion in grid costs
- Marginal capital cost for T&D ~$890 - $1,050 per peak kW

Primary Peak Load Reductions

- EV Load Shifting
- Ground Source Systems
- Efficiency Improvements (pre-1970 residential)



Update: District Energy Initiatives around Denver

Concurrent strategies to study the use of district energy at different scales

02 Ground Source Heat Pumps at City Facilities

03 Neighborhood Electrification & Thermal Energy Networks

04 Large Redevelopments

05 Downtown Ambient Loop



Krisana All Electric Affordable Housing
Building Electrification Showcase Incentives

Krisana Affordable Housing

- 151 Unit Affordable Housing Project
- Year Completed: 2024
- Air Source Heat Pumps and Heat Pump Water Heaters for Each Unit
- Level 2 EV Charging
- Avg Monthly Utility Bill: $65 per unit
- Developer chose all-electric after another project required an extra $200,000 for a gas line extension



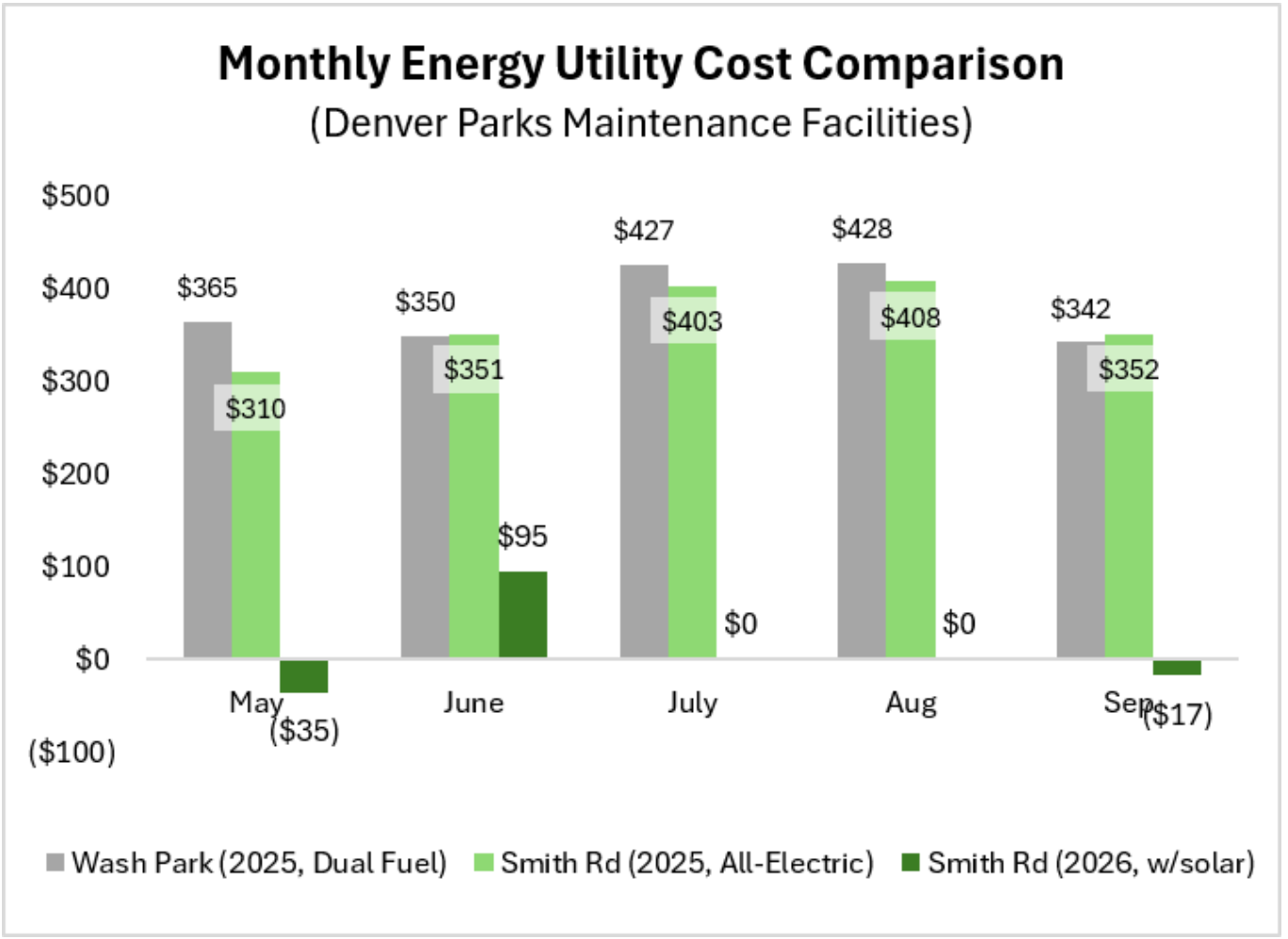
denvergov.org/files/assets/public/v/1/climate-action/documents/buildings-and-homes/energy-code/krisana-case-study.pdf

Smith Road - Northeast Denver Parks Maintenance HQ
Ground Source Heat Pumps at City Facilities

All-electric Maintenance Facility, 5k sqft

- $4.5 million: Total Facility Cost
- $750k: GSHP Cost
  - $225k: IRA Credit Eligibility
- ~6%: Net Premium on Total Facility Cost
- Lower monthly energy bills than a comparable dual-fuel maintenance facility



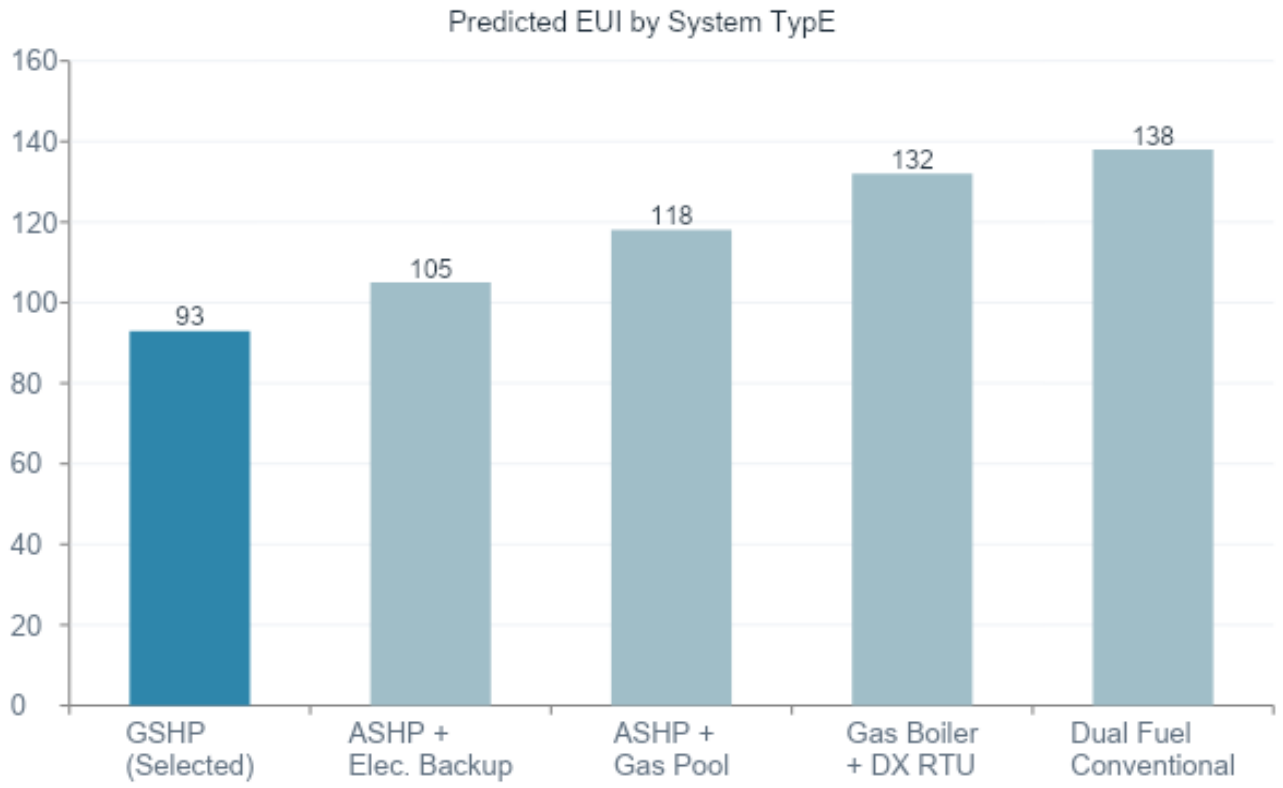


Westwood – Regional Scale Recreation Center
Ground Source Heat Pumps at City Facilities

First 100% geothermal rec center in U.S.

- 41,000 sqft, with two pools
- Closed loop GSHP (48 bores at 600-ft depth)
- Air-to-air energy recovery and ASHP on the exhaust air side of pool dehumidification
- $56 million: Total Facility Cost
  - $1.8 million GSHP premium (3% of total) over dual-fuel was offset by IRA Credit Eligibility.
- Net project cost savings after stacking incentives.





93
EUI
Lowest of all systems modeled

~17,000
MT CO_2e
Lifetime (50-yr) emissions avoided vs. conventional

Ruby Hill – Community Thermal Energy Network (TEN)

Neighborhood Electrification

PUC Funded – HB1252 Thermal Energy Network Pilots

- Community geothermal network
- Participating customers have 100% of project costs covered.
- Anchor Customers Host Geothermal
  - Athmar Rec Center
  - The Church Denver
- Xcel Energy and Denver



rubyhillthermalnetwork.com

Valverde - Residential Air Source Heat Pump Retrofits
Neighborhood Electrification

PUC Funded - Clean Heat Plan

- Target: Electrify 100 homes
- Eligible homeowners receive 100% of project costs covered.
- Upgrades include:
  - Air-source heat pumps
  - Heat pump water heaters
  - Home weatherization
  - Induction cooking ranges
  - Electrical and panel upgrades
  - Smart thermostats
- Xcel Energy, Denver, and Zero Homes



Cold Climate Heat Pump
(Marie Montoya, Denver)



Whole Home Electrification
(Rebecca Gallardo, Denver)

Ball Areana/River Mile – Nearly 100MW of avoided demand

Major Developments

Leveraging ice rink heat recovery, thermal energy storage, and sewer heat recovery into an integrated stadium district thermal energy network. Reduces up-front infrastructure costs and ongoing OpEx.





Water Source HPs with connection to downtown network and wastewater heat recovery

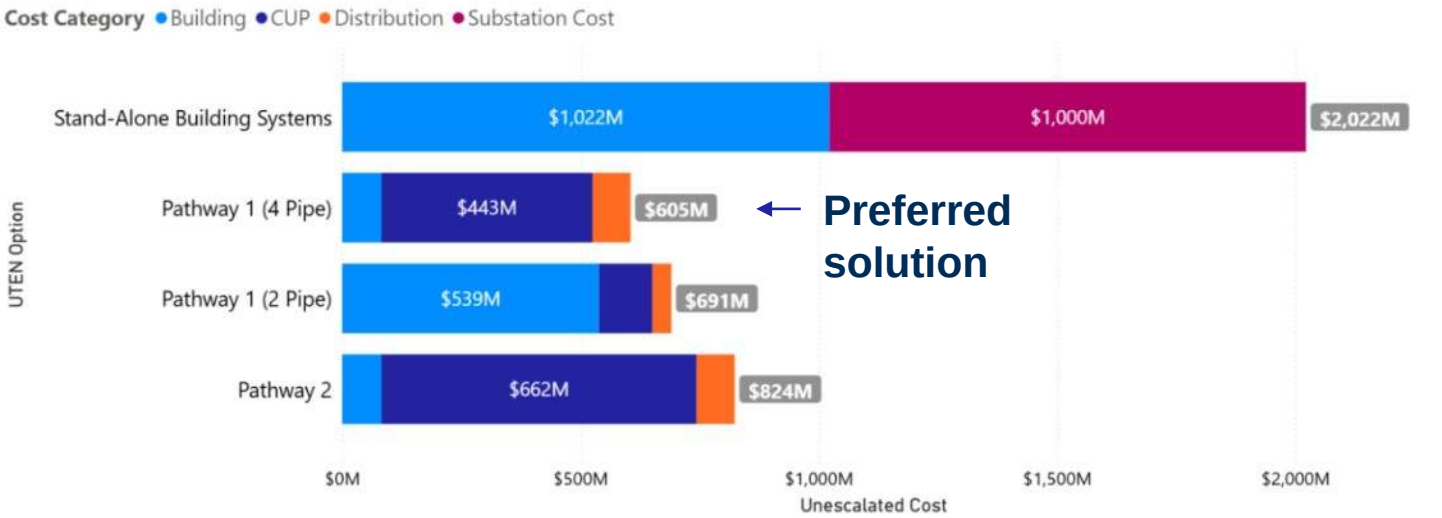


Figure 7.1 - Life cycle costs, including potential additional substation costs (additional electric infrastructure sensitivity) for the baseline option

85 to 92 MW of avoided peak electrical demand via the preferred district solution

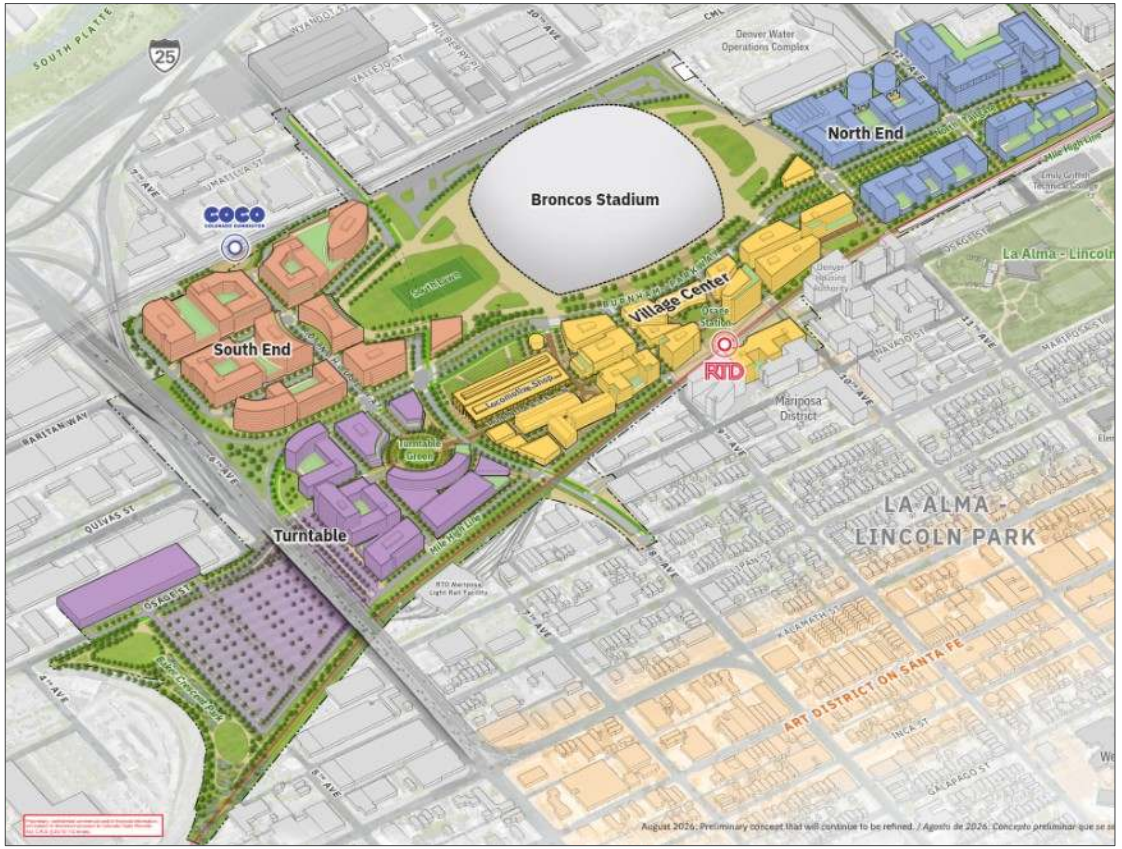
Lowest capital and operating costs via the preferred district solution

Burnham Yard – Broncos Stadium District (~7 million sqft)

Major Developments

Studying all-electric, geothermal-anchored design without prescribing the specific solution.

Design thermal energy networks with the ability to connect or extend into adjacent communities.



Study Underway

Burnham Yards

Project timeline: Complete by End of October 2026 to inform the Infrastructure Master Plan and energy system basis of design.

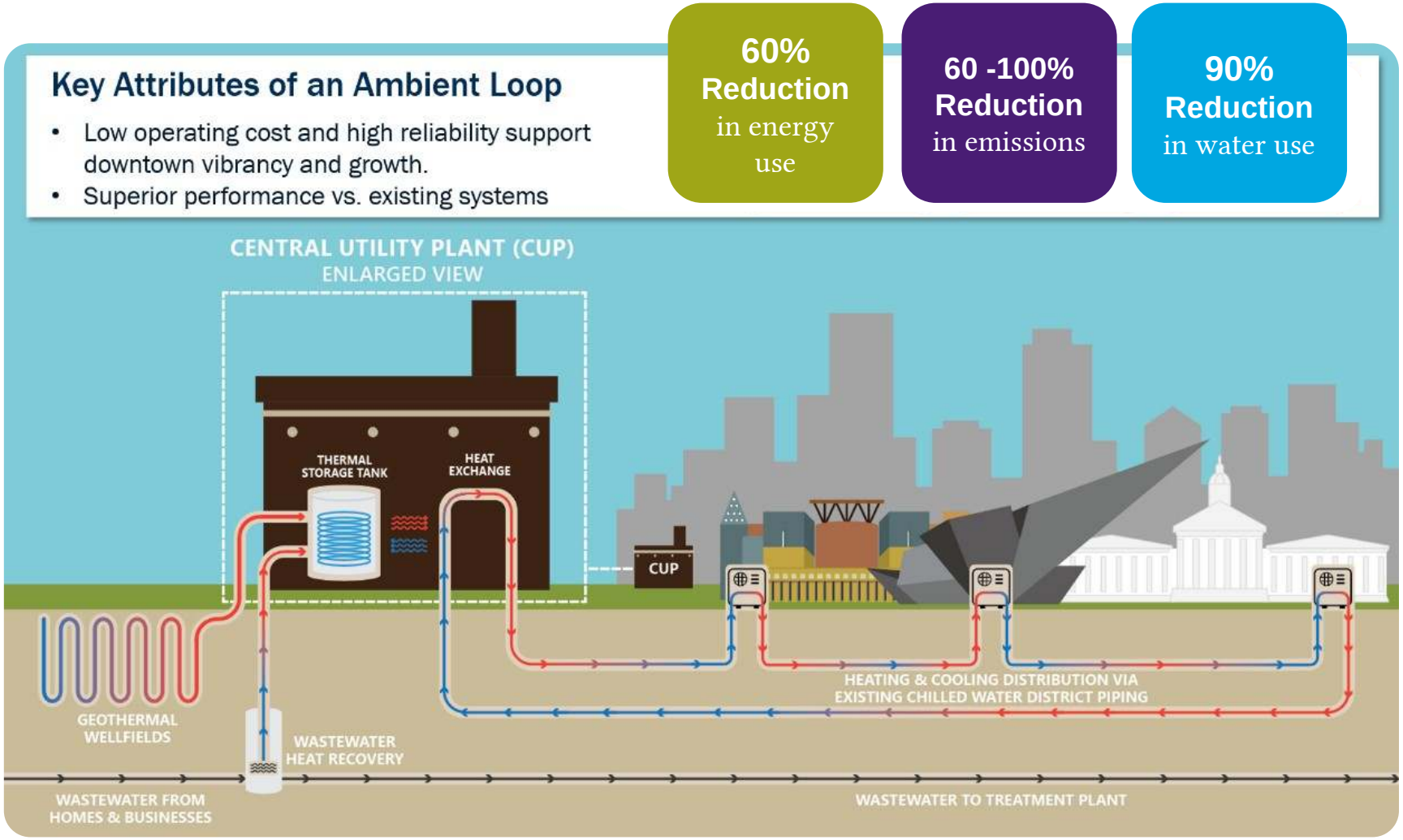
Goal: Lowest cost design to avoid fossil-fuel heating.

Scale: The long-term district planning basis assumes a broader Burnham Yard buildout range of ~5 to 7 million gross sqft of non-stadium development over time.

City Owned Facilities – Pilot approved by PUC on 10/7/26

Downtown Denver Ambient Loop

Convert downtown city-owned buildings from steam to a shared ambient-temperature water loop served by water-source heat pumps.



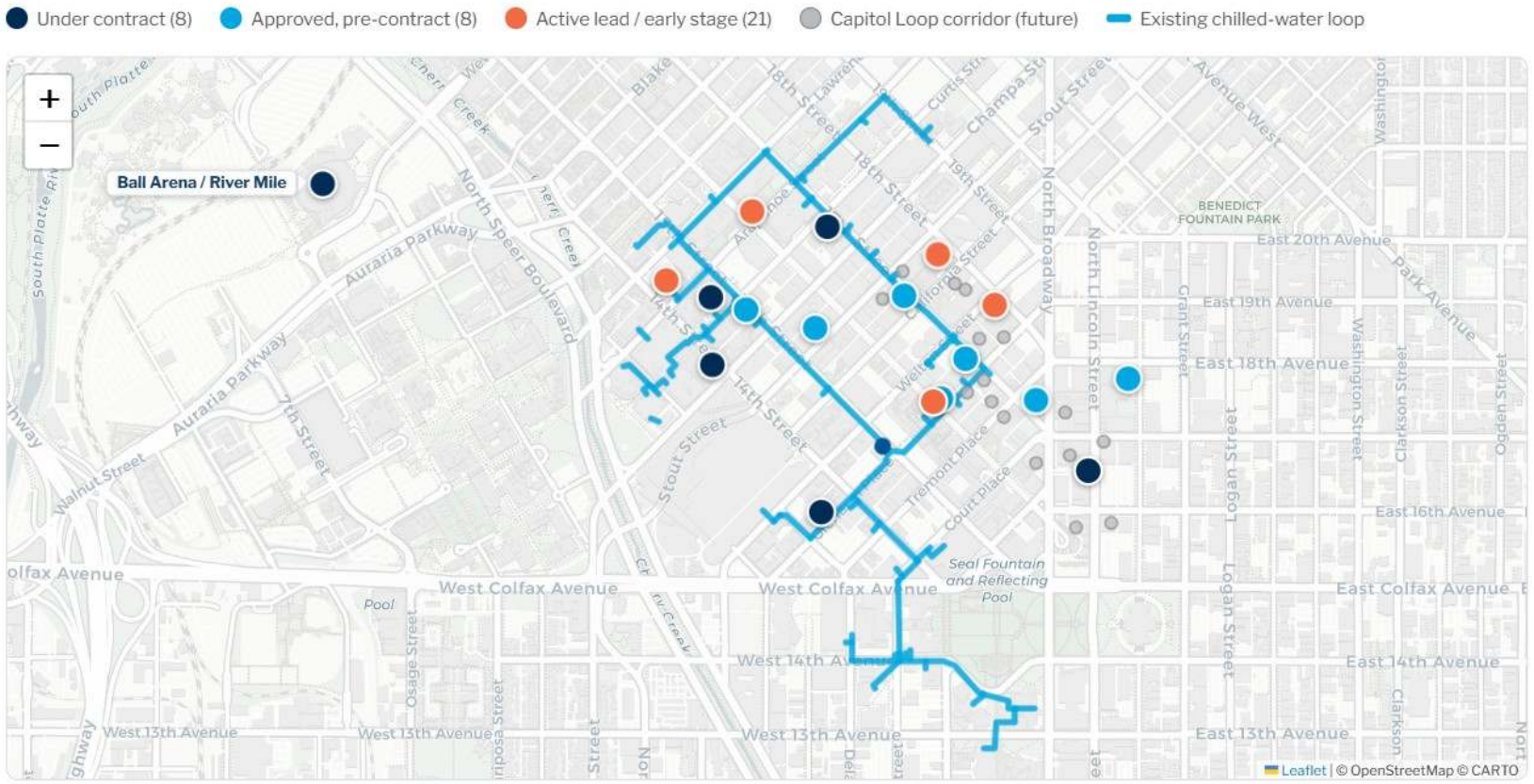
CASR Funding Incentives – Private Downtown Buildings

Downtown Denver Ambient Loop

Support downtown private buildings to achieve a managed transition from steam to the ambient loop.

Opportunities cluster around the downtown thermal loop

A significant share of the pipeline clusters on Denver's existing downtown chilled-water loop (blue), while other anchors and active opportunities reach across the city. Grey dots trace the Capitol Loop corridor — buildings whose future conversion could extend the loop. Pins are colored by stage. The result is a citywide opportunity pipeline with a strong downtown concentration, not a claim that every opportunity is on the loop.



Common opportunity to support electrification

Convert avoided infrastructure costs into customer incentives

Residential Gas Service Line Replacement Program

- 60-day notice posted September 21, 2026
- Residential dual fuel customers facing a planned gas service line replacement within the next 10 years
- Voluntary electrification instead of a new gas line
- $10,000 incentive to disconnect gas service

HB24-1370 Gas Priority Planning Communities

- Identify gas terminal end points
- Stack customer incentives to switch



Non-Pipe & Non-Wires Alternatives Modifications

- Quantify the alternative infrastructure costs to serve major developments
- Convert the avoided cost to ratepayers into a standard customer incentive ($ per peak kW avoided, etc.,)
- Thermal energy networks are demonstrating economic and environmental benefits

Summary

Reaching a zero emissions future requires us to stop burning fossil fuels for heating.



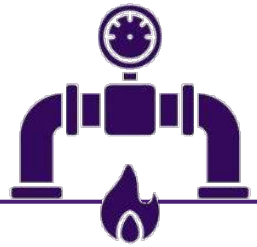
Electrification must be "cost effective"

Society cannot afford to keep burning fossil fuels. Make it cost effective to stop.



There is more than one way to electrify.

Air source, ground source, and thermal energy networks can serve different contexts.



Capture the value of avoided utility infrastructure

Gas service lines, distribution main replacements, feeder & substation avoidance.

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Thank you!