



Energize Denver Benchmarking & Performance Requirements

Denver District Cooling Buildings – February 2024

Agenda

- Basics of Energize Denver
- Denver District Cooling Adjustment
- New Resources
- Next Steps

Energize Denver Ordinance Sections

Electrification

- Implemented by CPD
- All Commercial and Multifamily Buildings
- Partial Electrification of Space and Water Heat upon System Replacement, when Cost Effective

Benchmarking

- Implemented by CASR
- Buildings 25K+ sq. ft. submit energy data annually

Performance

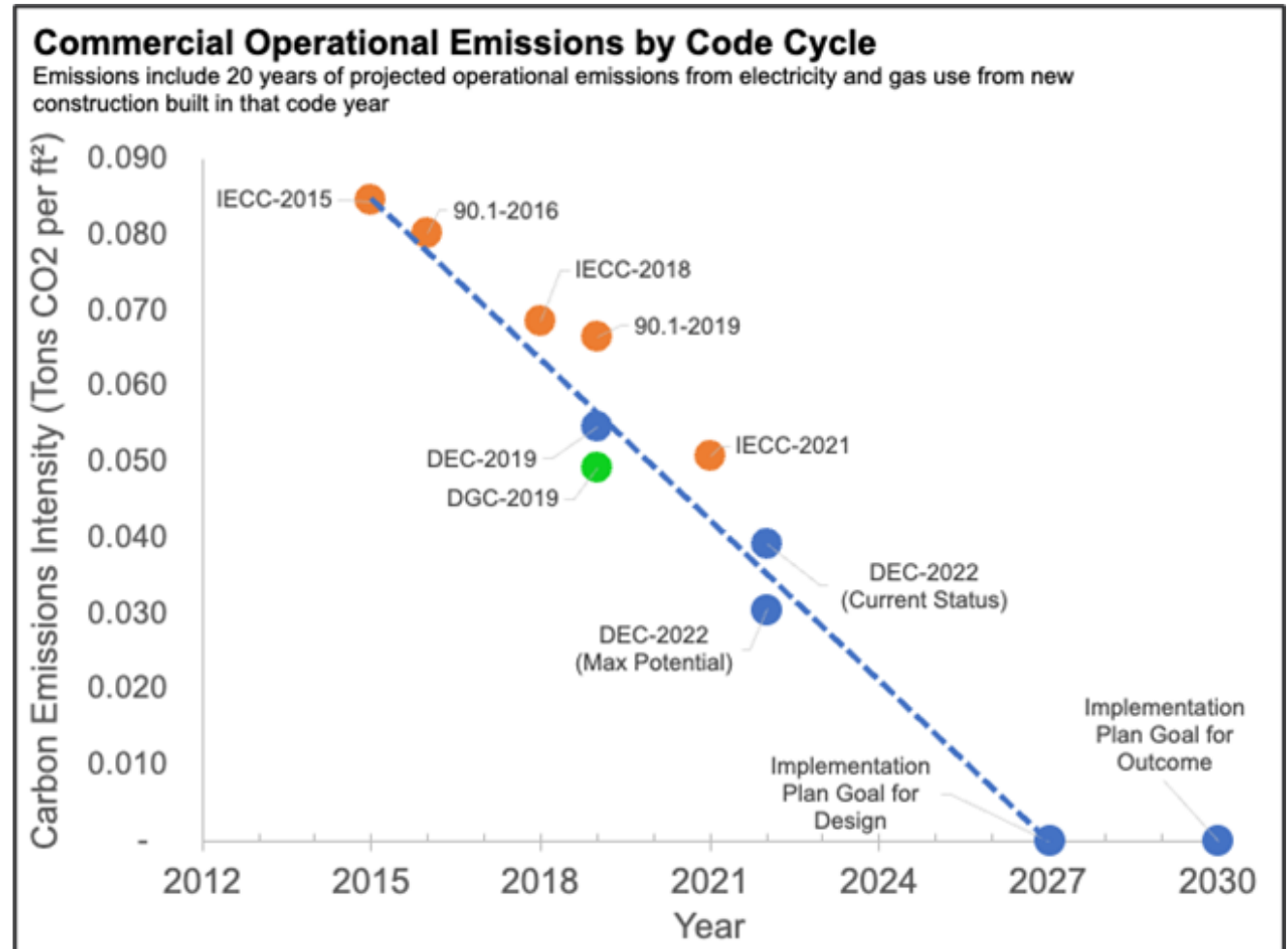
- Implemented by CASR
- Minimum energy efficiency requirements for buildings 25K+ sq. ft, and prescriptive upgrades for buildings 5,000-24,999 sq. ft.
- Improvements to energy efficiency and increase renewables

Electrification Updates to Code

Applies to all buildings under the International Building Code
(not International Residential Code)

New Building Electrification Requirements in Code

- January 1, 2024: no gas-fired or electric resistance furnaces and hot water heaters in new commercial and multifamily construction
- Some exceptions exist
- For more information about new building requirements denvergov.org/buildingcode (Sections C403.2.4 & C404.10)



Existing Building Electrification Requirements

Partial electrification of Space and Water Heat required in Building Code upon System Replacement, when Cost Effective

Amending Denver Building and Fire Code	2023	2025	2027
Permit process: Changes to near parity in permitting between unitary AC/condensing units serving a heated space, gas furnaces, gas hot water heaters and heat pumps.	X		
Equipment replacement: Heat pumps required upon replacement of unitary AC/condensing units serving a heated space, gas furnaces, gas hot water heaters when cost-effective. Permit process: Changes to near parity in permitting between PTACs, boilers, central hot water systems and heat pumps.		X X	
Equipment replacement: Heat pumps required upon replacement of PTACs, boilers, central hot water systems when cost-effective.			X

Steam buildings have heat exchangers on-site (not boilers, etc.), so they won't trigger the electrification requirements because there is no gas system to replace.

Benchmarking & Performance Requirements

Commercial, Multifamily, Institutional, Municipal,
Manufacturing, Agricultural, and Industrial
25,000 square feet and larger

Performance Requirements by Building Size

Buildings
5,000 – 24,999 SF

One-time prescriptive
requirement

Upgrade lighting to 90% LED or
install renewables that covers
20% of annual energy use

Buildings
25,000 SF and Larger

2030 Performance goal with
maintenance requirement;
annual benchmarking

2030 Site EUI targets set by
property type

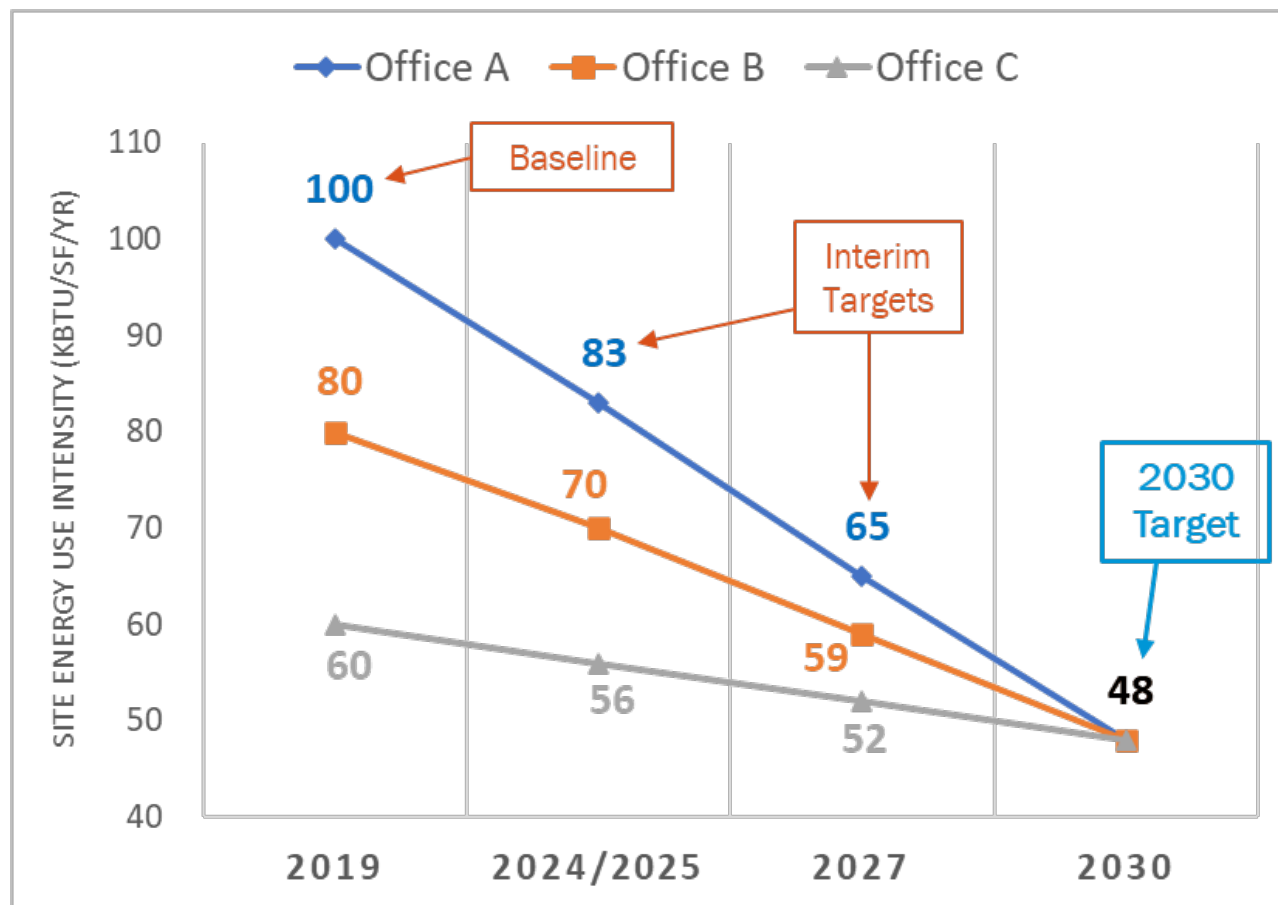
2030 Energy Use Intensity Targets

- Based on annual submission of energy benchmarking
- Applies to all buildings 25,000 sq. ft. and larger
- Targets set at the 85th percent for all covered buildings in Denver using 2019 baseline (i.e., 85% of covered buildings will have to take action)
- Mixed-use buildings will have a blended target based on weighted % of all building types

**Targets set for 70+ different property types*

ESPM Building Type	2030 EUI Target
Office	48.3
Hotel	61.1
Multifamily Housing	44.2
Performing Arts Center	53.2
Distribution Center	25.4
Restaurant	194.1
Medical Office	69.0

Trajectory Model



- Target Setting:
 - Baseline = 2019
 - Interim targets for 2024/2025 and 2027
 - Final 2030 target
- Maintenance: all covered buildings must maintain 2030 target indefinitely
- The targets are the minimums that CASR regulates during performance evaluation. Building owners can move faster if they choose.

District Cooling Adjustment

Denver District Cooling

- We understand that buildings on the Denver District Cooling Loop do not have the same opportunities for certain efficiency upgrades as other buildings of the same property type
- The District Cooling loop offers an **efficient** way for downtown buildings to cool their building
- The city's goal is to not have building owners transition away from efficient systems already in place

A local engineering firm brought to our attention that the way Xcel Energy bills based on Source Energy overinflates the calculation of Site Energy Use Intensity within ENERGY STAR Portfolio Manager, creating an issue with the building's 2030 Site EUI Target. Thank you!

District Cooling Coefficient of Performance

- Consulted with EPA and Xcel Energy, and examined the past 4 years of performance from the District Cooling Loop
- Concluded that the District Cooling Loop has a COP of 3.9, including distribution losses

Figure 10 – U.S. Source-Site Ratio for Electric Chillers

Input Parameters	Low End	High End
Chiller COP	2.9	4.4
Part Load COP	2.6	4.0
COP Including Distribution Losses	2.5	3.9
Average COP	3.2	
Electricity Input to Chiller (kBtu) for 1 kBtu On-Site Cooling (1/COP)	0.3125	
Source Energy Input to Chiller (kBtu) for 1 kBtu On-Site Cooling (Electricity Input x Source-Site Ratio for Electricity)	0.88	
Source-Site Ratio for Electric Chillers	0.88	

[Source Energy Technical Reference \(energystar.gov\)](http://energystar.gov)

Creating a District Cooling Target Adjustment

- Using the past 4 years of benchmarking data, we were able to produce the percentage of district cooling energy use (kBtu) vs the total building's energy use
- We estimated the total amount of district cooling energy usage based on each building's 2030 target
- We calculated the source-site ratio with a COP of 3.9
- Using $1/(\text{source-site ratio})$, we are able to give an additional kBtu credit to the projected 2030 District Cooling usage that considers source energy used

Example Building	
Percent total energy from District Cooling	35%
Original 2030 Target	48.3
Adjusted 2030 Target	54.8

Target Adjustment Next Steps

- Building owners do not have to do anything to receive this adjustment.
- For buildings that have district chilled water usage in their benchmarking report, we will be applying the adjustment to the 2030 target. We encourage buildings to double-check their benchmarking and if DCW is not represented correctly, please work with the Help Desk to update your benchmarking report.
- Once the target adjustment is applied, building contacts will get an email from the city listing the new 2030 target and updates interim targets.
- If a building moves off the District Cooling Loop, then it will revert to the prior targets.
- Building owners still have the opportunity to apply for other target adjustments through the regular process.

Resources

- New Step-by-Step [Compliance Guide](#)
- New “[Resources for Building Owners](#)” page: guides, playbooks, webinars, training library, rebates, incentives, financing, smart leasing, find a form, trained service provider directory
- [Energize Denver Training and Vendor List](#): Training on benchmarking, performance requirements and MAI option for large buildings and training for small building requirements. Completing a quiz correctly will get you listed on our trained vendor list!

New: Performance Requirements Lookup Tool

Building Info

Building ID: 2659
Street Address: 201 W Colfax Avenue
Building Size: 677,832 sq ft

Largest Property Uses

1st: Office
2nd: Parking
3rd: 0

Benchmarking

Current Status: In Compliance
Current Site EUI: 65.3

Target	Year	EUI
Baseline	2019	71.5
1st Target	2025	61
2nd Target	2027	54.6
Final Target	2030	48.3

New Search

New: Building Performance Forecasting Calculator

Building Details

Building ID:

Building Address:

Building Area:

Baseline Year:

Baseline EUI:

Will be 80% Electrified by Final Target?

Base Metrics

Compare to Baseline or Most Recent?:

Selected EUI for Calculations:

Site Energy Use Intensity (EUI) Reduction Forecast

Target	Target Year	Target EUI	Estimated Reduction (%)	Estimated Reduction from Renewables (kBtu/sq. ft.)	Estimated EUI after Reduction (kBtu/sq. ft.)
First Target	2025	61	<input type="text" value="9"/> %	5.0	60.0
Second Target	2027	54.6	<input type="text" value="10"/> %	5.0	53.5
Final Target	2030	48.3	<input type="text" value="10"/> %	5.0	47.7

Renewable Energy Projects

Year	Energy Generated (kWh)	Calculated Performance	Actions
2024	<input type="text" value="1000000"/>	5.0	<input type="button" value="Save"/> <input type="button" value="Remove"/>

Building Performance Forecasting

Potential Fines Forecast

Compliance Period	Potential Fine Without Reduction	Potential Fine With Reduction and Renewable
2025	\$2,135,170.80	\$0
2027	\$3,436,608.24	\$0
2030	\$4,717,710.72	\$0

Other Next Steps

- See if you qualify for a [target adjustment](#) to normalize your target. You might meet or be closer your 2030 target once it's adjusted.
- Get an [energy audit](#) that meets our minimum requirements to see what else you can improve in your building to lower your energy use and meet your target.
- If these steps haven't enabled you to reach your 2030 target, check out the [timeline adjustment](#) process.

Questions?

Building Performance Help Desk

Hours: 8am-5pm, M-F

Phone: 844-536-4528

[Schedule](#) a phone appointment

- Buildings 25,000 SF and larger: email energizedenver@denvergov.org
- Buildings 5,000-24,999 SF: email energizesmallbuildings@denvergov.org

Asistencia en español disponible