



Energize Denver Technical Guidance

Part 1– December 2022

Agenda

December 7

Background, equity considerations, electrification updates to building code, benchmarking, performance requirements: setting targets, target adjustments, electrification credit, renewables credit

December 15

Alternate compliance options (minimum requirements, timeline adjustment, electrification option, 30% EUI reduction property type, MAI buildings), performance evaluation, penalties, small buildings, support and incentives

Vendor Training Series available online in [“Help, Resources, and Incentives”](#)
Pass quiz to be listed on Energize Denver [Service Providers Directory](#).

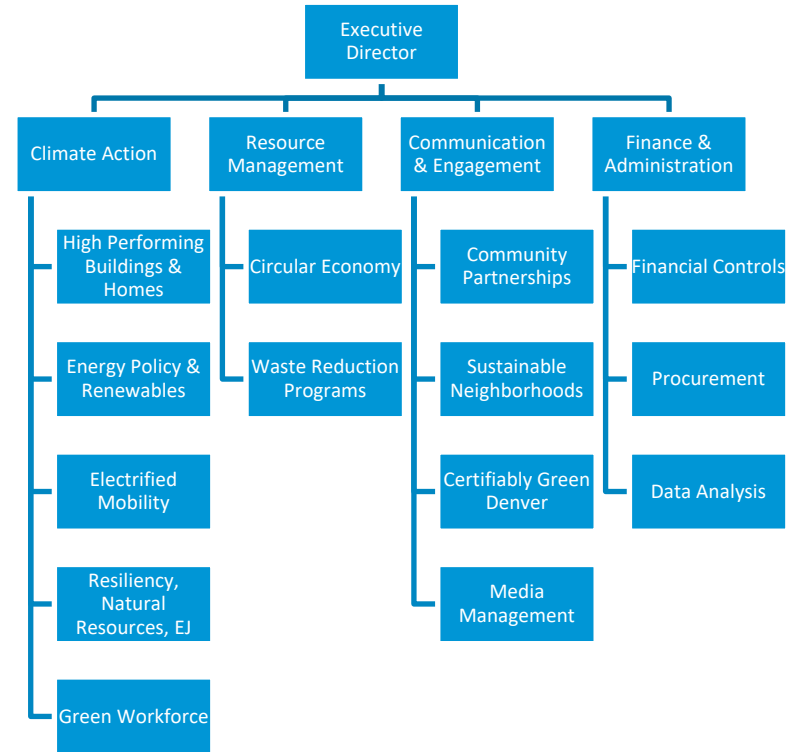
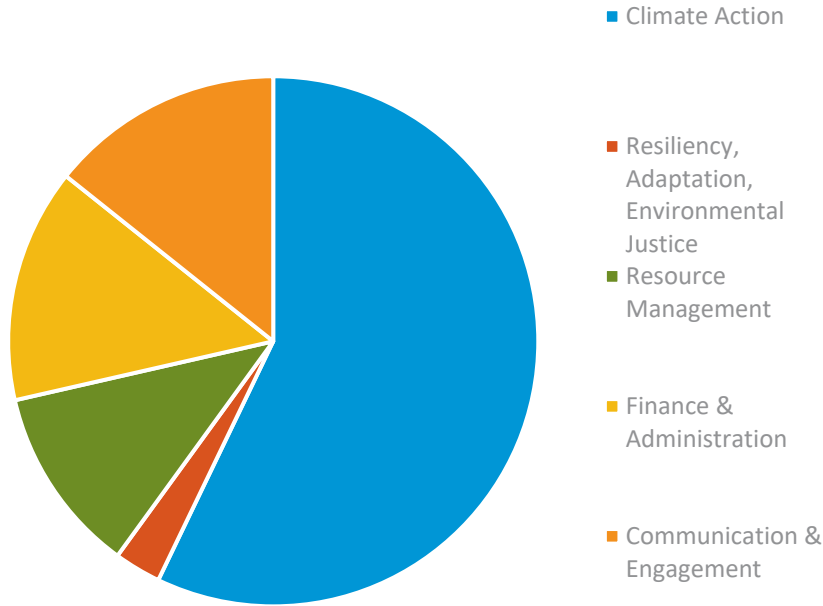
Session Setup

- Webinar will be recorded
- Video and slides will be posted to the website and emailed to registrants
- Participants are muted
- 50 - 60 minutes of content
- 30+ minutes of Q&A
- Use the Q&A box to ask questions

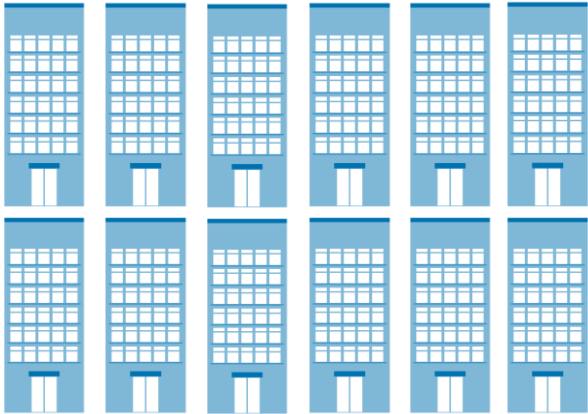
Background

Office of Climate Action, Sustainability and Resiliency

Staff Distribution per Division



Commercial and Multifamily Buildings are 49% of Denver's GHG Emissions



> 25,000 sq ft:

- 82% of sq. footage
- 3,000 buildings



< 25,000 sq ft:

- 18% of sq. footage
- 14,000 buildings

Denver has committed to eliminate greenhouse gas emissions by 2040. For buildings and homes, this means our goals are:

- All **new** buildings and homes “net zero energy” by 2030
- All **existing** buildings and homes “net zero energy” by 2040

Energize Denver Task Force



Charge: Implement a building performance policy that includes energy efficiency improvements and strategic electrification of all existing buildings and homes, so they achieve *net zero energy by 2040*. The program should improve health and equity outcomes, create jobs, and drive climate solutions in buildings.

- 8 task force meetings January-August 2021
- Many working group and side meetings along the way
- Built on best practices and lessons learned in other cities
- Recommendations developed with a racial equity lens
- Community engagement – public survey and input sessions

Energize Denver Ordinance Sections

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 buildings 5,000 to under 25K sq. ft.
- Improvements to energy efficiency and increase renewables

Electrification

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

The Climate Benefit:

Carbon Impact	Cumulative Carbon Reduction by 2040 (million tons eCO2)
Task Force Goal	13.7
Benefit of performance policies	8.2
Benefit of electrification policies	3.6
Benefit of all policies	11.8

- ~80% reduction in building emissions by 2040.
- **Over \$1 billion** in benefit through avoided social cost of carbon, which is the cost of the damages created by carbon dioxide emissions.

Benefits for Building Owners and Occupants

As the buildings improve their energy use and lower the cost of operations, Denver will become a more competitive, attractive city for businesses and residents.

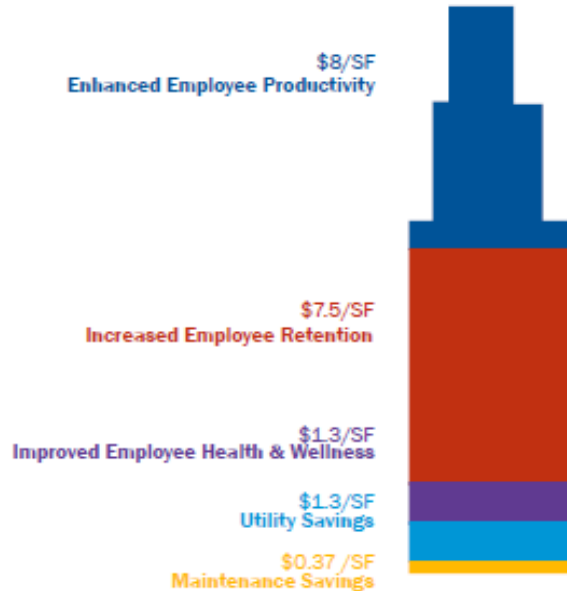
Additional benefits:

- Improved return on investment for building owners
- Improved building stock in City of Denver
- Higher property values
- Reduced energy bills and cost of operations
- Improved indoor and outdoor air quality

The Value of High-Performance Buildings

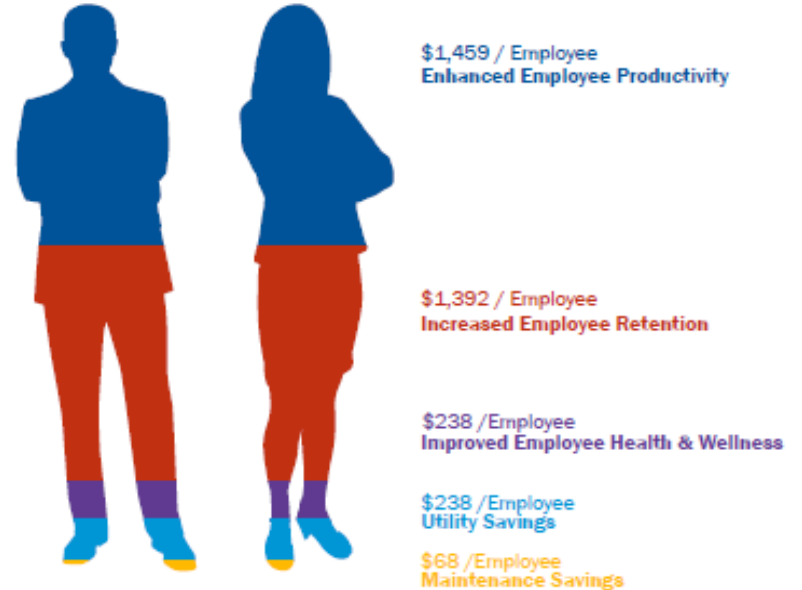
\$18.56

Additional Annual Value Per Square Foot



\$3,395

Additional Annual Value Per Employee





Equity

Developed with a Racial Equity Lens

We used a racial equity lens, but it was designed to also promote equity for other historically under resourced groups. Our goal is to always use the lens!

1. Does our process ensure that the voice of people of color is **present**, that the process is **accessible**?
2. Are we ensuring the outcomes **prioritize, provide benefits and improve lives of** people of color?
3. How will this proposed policy or decision be **perceived by** people of color?
4. Does this policy or decision ignore or worsen **existing disparities** or produce unintended consequences?
5. What are the **barriers** to more equitable outcomes? (e.g., mandated, political, emotional, financial, programmatic, or managerial).

CHECK POINT: Based on the above responses, what revisions are needed in the decision under discussion? Are there other things to take into consideration?

Creation Process: Community is a Co-Designer



Outreach

Identify

Community
Engagement

Design

- Who they are
- Where they are

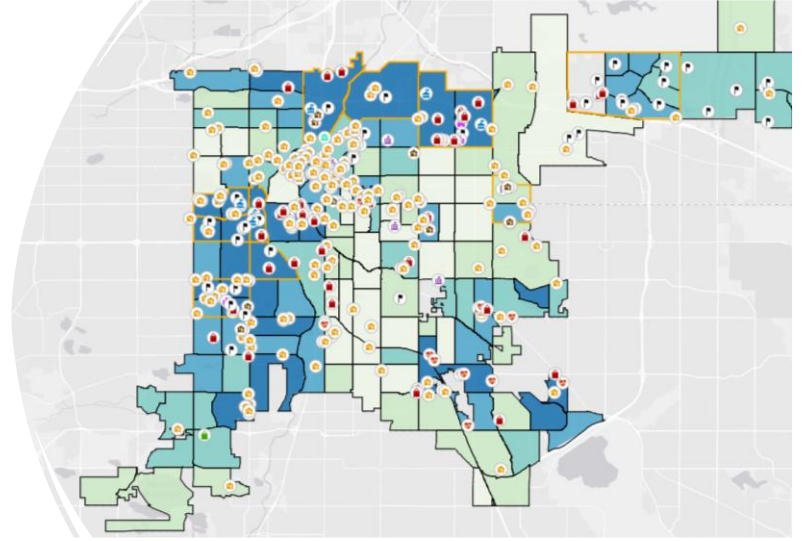
- Community
- Building Owners
- Key Partners

- Services
- Incentives



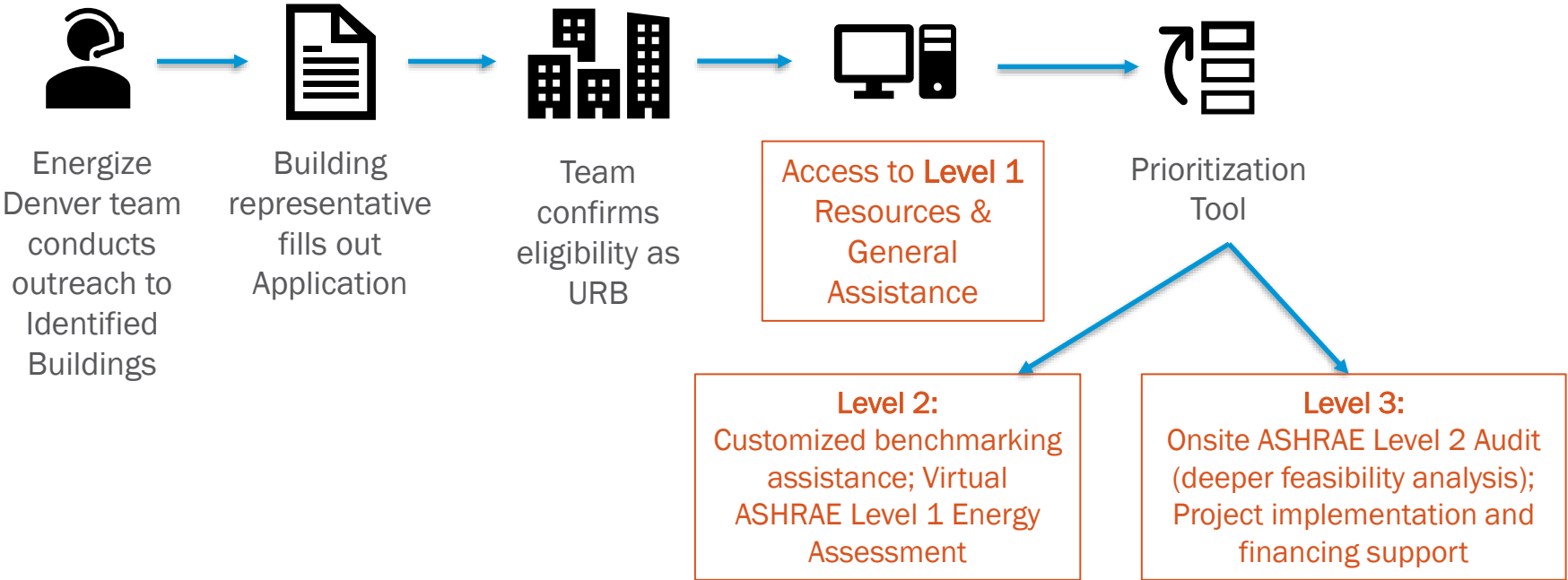
Identifying Under-Resourced Buildings

- Market rate located in **NEST** neighborhoods with a high prioritization ranking on the URB equity index
- Buildings with **affordable housing** units or otherwise serving **frontline communities**
- Buildings with **human service** providers as tenants/owners
- Buildings of **significance** to community members
- Buildings with a high prioritization ranking on the URB equity index with **affordable rents**



Social Equity Index: identifies and highlights environmental and socioeconomic indicators (utility burden, income stress, heat island, asthma rates, redlining, racial composition, etc.)

Benchmarking & Performance Requirements Technical Assistance Process for Under-Resourced Buildings



Electrification Updates to Code

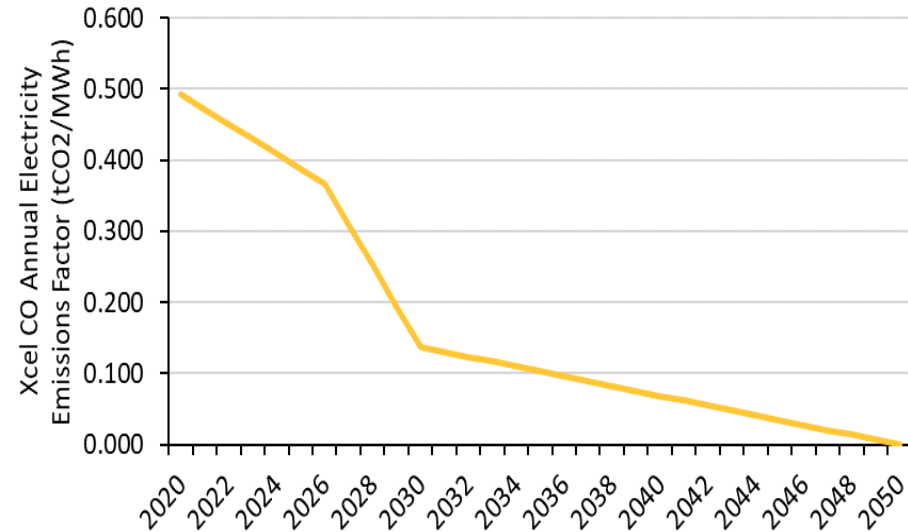
Applies to all buildings under the International Building Code
(not International Residential Code)

Xcel Energy is Rapidly Decarbonizing the Grid

Goal: 80% renewable electrical grid by 2030!

[2021 Xcel Energy Clean Energy Plan](#)

- Colorado [House Bill 1261](#) requires Xcel to decarbonize the grid.
- Denver's electric grid is already built to withstand high air conditioning load during the summer.
- Through Xcel/CASR analysis, we found the grid can support electrified winter heating needs without significant infrastructure build-out.



Improved Equity and Safety

- In 30% of low-income apartments in Denver today, gas equipment fails carbon monoxide tests, compared to less than 5% of market rate apartments.
- Apartment residents with gas appliances have nearly three times the rate of asthma compared to apartments with electric appliances.

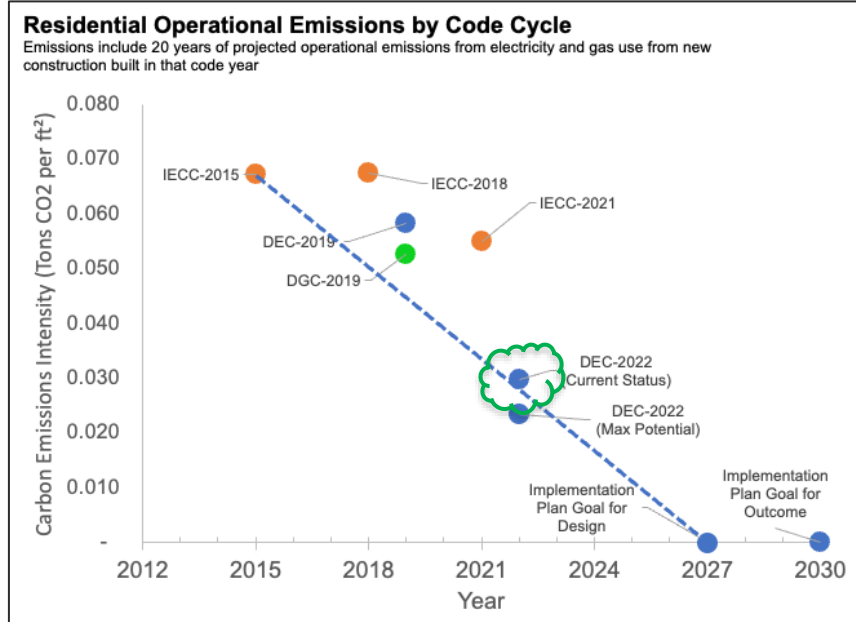
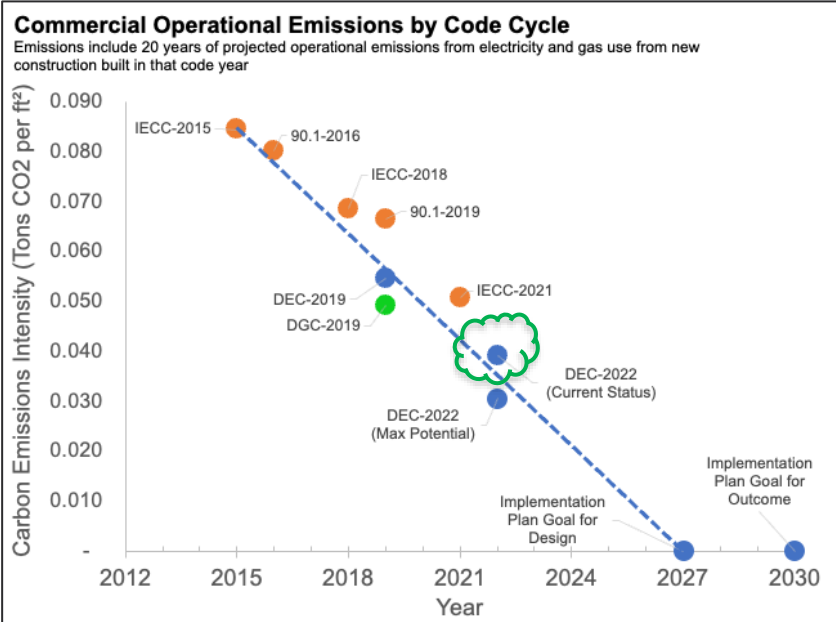


Heat Pumps as the Solution

- Heat pumps *move* heat instead of *creating* it, achieving 200-300% efficiency (100% efficiency is based on a source that creates heat – ex. natural gas).
- While natural gas is currently less expensive than electricity, more efficient heat pumps use 2-3x *less* energy than gas heating systems.
- As such, except on especially cold days, these systems should achieve relative cost parity on usage.



2022 Building & Fire Code Adoption - Energy Code



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 gas systems vs. AC and heat pump.	X		
Heat pump required upon replacement of furnaces, roof top units, individual water heaters when cost-effective.		X	
Heat pump required upon replacement of PTACs, boilers, central hot water when cost-effective.			X

Effective March 1, 2023

Permit process changes to near parity in permitting between gas systems and electrification

Starting March 1, 2023, when replacing a unitary air conditioner or condensing unit, a natural gas heating system, or natural gas water heaters in commercial and multifamily buildings, there will be new requirements based on Energize Denver Code updates:

- Quick permits for affected equipment will no longer be available
- Affected equipment replacements will require a plan review to obtain a permit

Effective March 1, 2023

Permit process changes to near parity in permitting between gas systems and electrification

When a unitary air conditioner or condensing unit serving a heated space is replaced with another unitary air conditioner or condensing unit, one of the following is required:

- Provide an Electrification Retrofit Feasibility Report
- Right sizing of equipment

When a gas-fired storage water heater or instantaneous water heater is replaced with another gas-fired storage water heater or instantaneous water heater, one of the following is required:

- Provide an Electrification Retrofit Feasibility Report
- Perform leak testing of gas pipes

Exceptions:

- This section shall not apply when equipment is replaced as an Emergency equipment replacement.
- This section shall not apply to the replacement of gas-fired boilers used for space heat or water heat until 2025.

Effective March 1, 2023

Permit process changes to near parity in permitting between gas systems and electrification

When a gas-fired warm-air furnace is replaced with a gas-fired warm-air furnace, two of the following are required;

- An Electrification Retrofit Feasibility Report.
- Right sizing of equipment
- Perform leak testing of gas pipes

Also, the new furnace shall meet one of the following:

- Low-nitrogen dioxide emissions shall not exceed 14 nanograms of nitrogen dioxide per joule of useful heat delivered to the heated space.
- An Annual Fuel Utilization Efficiency of not less than 90 percent.

Exceptions:

- This section shall not apply when equipment is replaced as an Emergency equipment replacement.
- This section shall not apply to the replacement of gas-fired boilers used for space heat or water heat until 2025.

Exception: Indoor gas-fired make-up air units are not required to comply with this section.

Electrification Feasibility Reports (EFR)

Analyzes the feasibility of using an electric heat pump when replacing HVAC equipment and compares the heat pump to a natural gas system on:

- Install costs
- Annual energy costs
- Social cost of carbon dioxide over the life of equipment

[EFR Website](#)



[Download the Template >](#)

Electrification Outreach and Resources

- Website: Electrification Feasibility Reports template & trainings, Guidance for how to plan for equipment replacement
- Direct mailers about code change to building owners and contractors
- Pilots started in September. Still taking applicants - fill out this [form](#) to be considered
- Direct outreach to under-resourced buildings and contractors
- Incentives available later in 2023



Electrification Feasibility Report Trainings

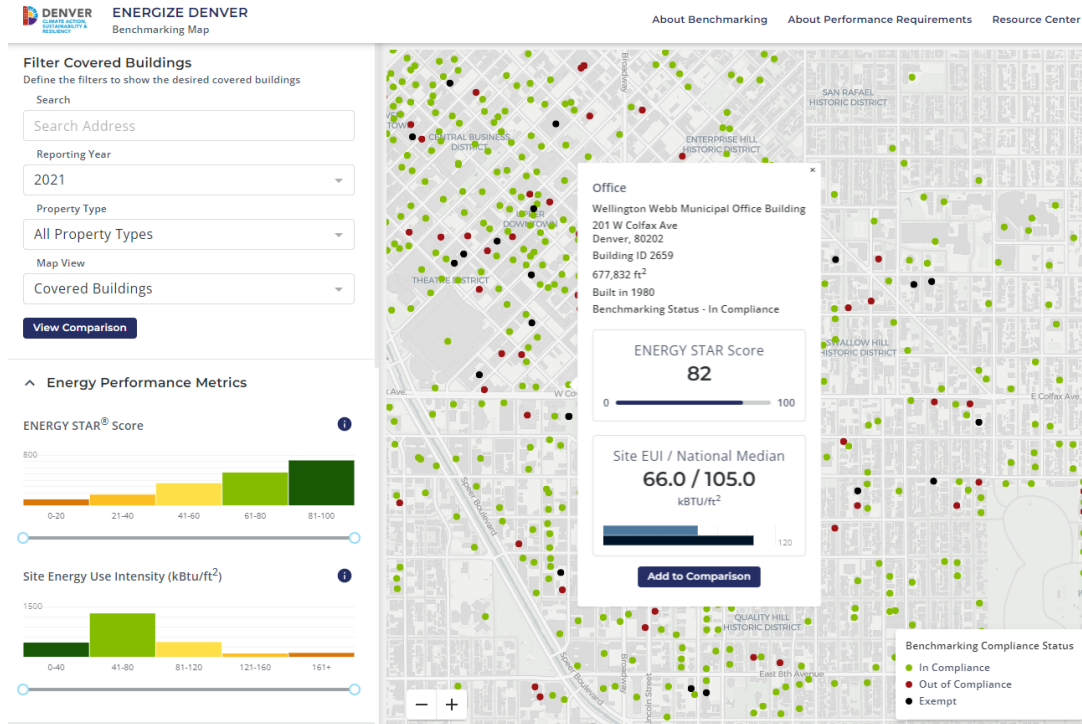
In-depth contractor trainings on requirements, permitting, and EFRs start in January 2023

- HVAC Contractor Training - January 26, 1 – 4 pm
- HVAC Contractor Training - February 15, 4 – 7 pm
- Plumber Training - February 16, 1 – 4 pm
- Energy Professional Training - March 2, 1 – 4 pm
- Design Engineer Training - August 10, 1 – 4 pm



Benchmarking

Benchmarking since 2016



- Buildings 25,000 square feet and larger
- Reports submitted through Energy Star Portfolio Manager (ESPM)
- Due June 1 each year
- <https://energizedenver.org/>

Third-Party Data Verification

Complete and accurate benchmarking is the foundation for building performance standards

Required submission within the benchmarking report for calendar years 2024, 2027, and 2030.

ENERGY STAR® Data Verification Checklist

N/A EPA Sample Office
Registry Name: EPA Sample Office
Property Type: Office
Gross Floor Area (GFA): 275,500
Built: 1975
For Year Ending: Dec 31, 2019
Date Generated: Sep 1, 2022

Property & Contact Information

Property Address: EPA Sample Office, 123 Main Street, Arlington, Virginia 22206
Property ID: 2095470

1. Review of Whole Property Characteristics

Basic Property Information

1) Property Name: EPA Sample Office
Is this the official name of the property? Yes No
If "No," please specify: _____

2) Property Type: Office
Is this an accurate description of the primary use of this property? Yes No

3) Location:
123 Main Street
Arlington, Virginia 22206
Is this correct and complete? Yes No

4) Gross Floor Area: 275,500 ft² Yes No

Page 1 of 2

- Generate a Data Verification Checklist within ESPM following Portfolio Manager directions
- Have a third-party data verifier confirm the information and sign checklist.
- Keep signed checklist on file and enter verifier's information on the Details tab in ESPM.
- If the building is already ENERGY STAR Certified for that year, if the time frame overlaps by six months or more, then the checklist used for certification can be used.

Data Verifier Requirements

Approved Data Verifiers possess 1 of the following licenses, credentials, or certifications, and are in good standing:

- Professional Engineer (PE) issued within the United States
- Licensed Architect (RA) issued within the United States
- Certified Energy Manager (CEM)
- Building Energy Assessment Professional (BEAP)
- (new) Energy Management Professional (EMP)
- Any other additional data verifier license or training program credentials recognized by CASR and posted to its website

Data Verifier can NOT be:
the building owner or an
employee of the building
owner

OR

the building owner's
designee, or an employee of
that designee, who prepares
or submits benchmarking
information in ESPM

Benchmarking for Normalized Performance Targets

Important for benchmarking to reflect certain items in detail for normalized performance targets and target adjustments:

- Swimming pools
- Data Centers
- Parking
- Electric vehicle charging stations
- Third-party loads to exclude (must be sub-metered)
- High-intensity building types should be broken out with correct square footage



Benchmarking Exemptions

A building owner may request an exemption from benchmarking provided:

- The building was not occupied and did not have a certificate of occupancy (or temporary CO) for the 12 months required
- The building was not occupied, due to renovation, for all 12 months required
- The building has a demolition permit where the demolition work has started on or before the date the report is due
- The building is presently experiencing qualifying financial distress, defined as: (1) the building is the subject of a qualified tax lien sale or public auction due to property tax arrearages; (2) the building is controlled by a court appointed receiver; or (3) the building has been acquired by a deed in lieu of foreclosure
- The building where the majority of energy is consumed for manufacturing, industrial, agriculture, or for other process loads.

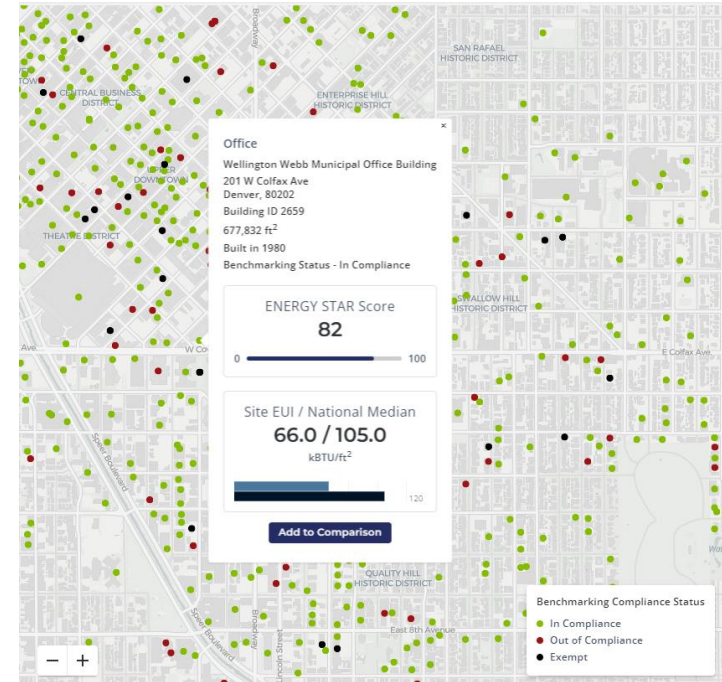
To request an exemption, the owner should fill out the [exemption request form](#) and provide documentation requested to substantiate the request.

The approved exemption is only for the year submitted. Exemptions must be filed each year.

Data Use/Confidentiality

- Energize Denver program information is publicly available on the Benchmarking Map and the Open Data catalog.
- CASR publishes basic building information and energy performance metrics annually for all buildings reporting that year.
- No personally identifiable information is included in these data sets.

As of November 21, 2021, the previous benchmarking exemption for energy management practices being a confidential business practice **is no longer a reason for exemption**. If the building owner believes its energy performance is a confidential business practice that includes trade secrets, privileged, or confidential commercial information, the owner can submit a [Confidential Data Request](#) form.



Colorado Benchmarking & Performance

- Administered by the Colorado Energy Office
- Performance Requirements in development
- Buildings 50,000 sq. ft and larger - \$100 annual filing fee
- **Due June 1 annually**
- **Two ways to submit benchmarking:**
 - If the building is in a city that already benchmarks (Denver, Boulder, etc.), the city will pass along the report submitted, but building must pay \$100 fee to CO directly
 - If the building is in a city that does not benchmark, go to the CO website for more details on how to submit report



[https://www.buildingperformanceco.com/
Benchmarking@buildingperformanceco.com](https://www.buildingperformanceco.com/Benchmarking@buildingperformanceco.com)

Performance Requirements

Commercial, Multifamily, Institutional,
Municipal 25,000 square feet and larger

Part 1:

- Setting Targets
- Target Adjustments
- Electrification Credit
- Renewables Credit

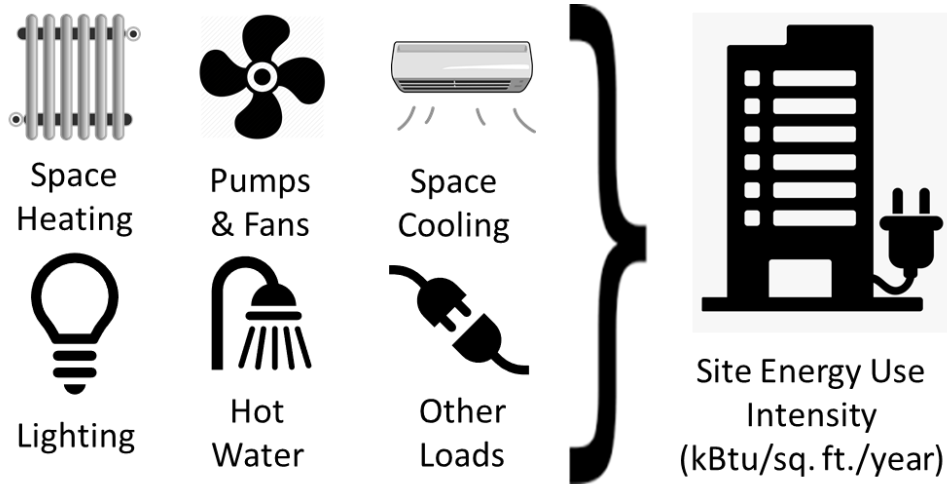
Part 2:

- Alternate Compliance
- Performance Evaluation
- Penalties
- Compliance Scenarios
- Support & Incentives

Setting Targets

Energy Performance Targets

Uses Site Energy Use Intensity, or EUI, as a measure of your building's total energy usage (kBtu divided by square footage)



Setting 2030 Targets

Covers almost 3,000 buildings in Denver!

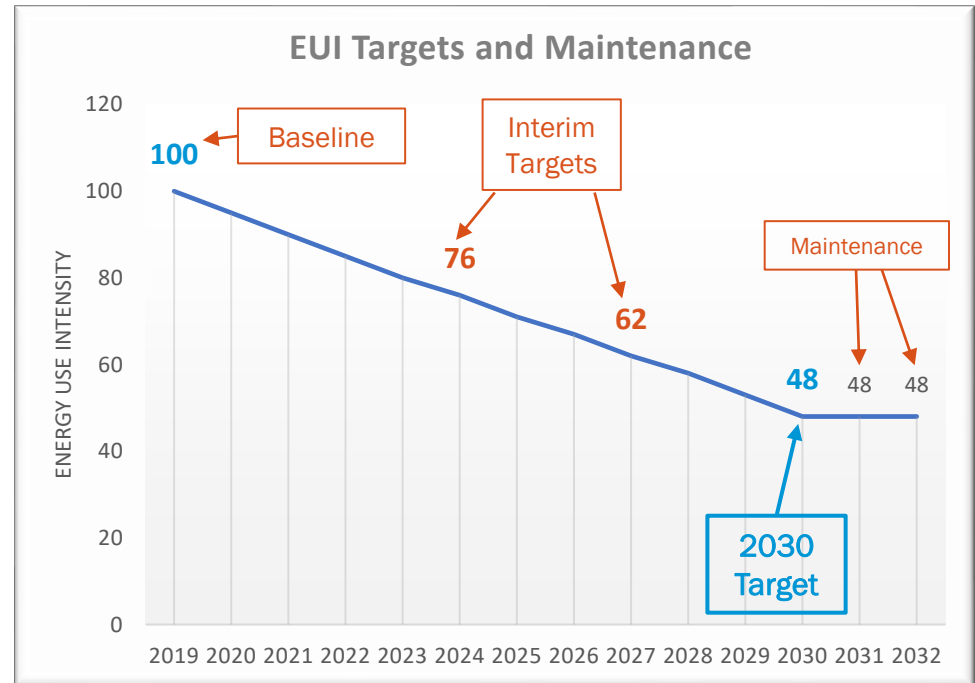
- Applies to all buildings 25,000 sq. ft. and larger
- Targets set at the 15th percent for all covered buildings in Denver using 2019 baseline (i.e. 85% of covered buildings will have to take action)
- Mixed-use buildings will have a blended target based on weighted % of 3 largest building types

ESPM Building Type	Target EUI
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

**Targets set for 70+ different property types*

Performance Targets and Maintenance

- Target Setting:
 - Baseline = 2019
 - Interim targets for 2024 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.



Unique Building Types

Several building types did not fall into one of the standard building types found in CBECS and did not have another national dataset readily available. As a result, the following building types were determined to be unique and received **general 30% reduction targets**:

- Aquarium/Zoos
- Museums
- Convention Centers
- Ice/Curling Rinks
- Indoor Arena
- Other – Entertainment/Public Assembly
- Other – Science/Technology
- Transportation Terminal/Station

An Alternate Compliance Option is available to determine appropriate targets for these buildings

Other Types

Manufacturing, Agricultural, or Industrial (MAI) buildings are on a different timeline for developing performance requirements (final by December 2023).

Definition: a facility where a portion of energy is consumed in process loads for manufacturing, agricultural, or industrial purposes. Process loads are energy consumed for bona fide purposes other than heating, cooling, ventilation, domestic hot water, cooking, lighting, appliances, office equipment, small, or other plug loads. Includes ESPM building types Drinking Water Treatment & Distribution, Energy/Power Station, Other – Utility, and Wastewater Treatment Plant. Also includes Class A data centers.

Data Centers are split into two categories based on the square footage it occupies in the building:

- Class A: 15% or more of the square footage of the building (MAI designation)
- Class B: Less than 15% of the square footage of the building (target adjustment available)

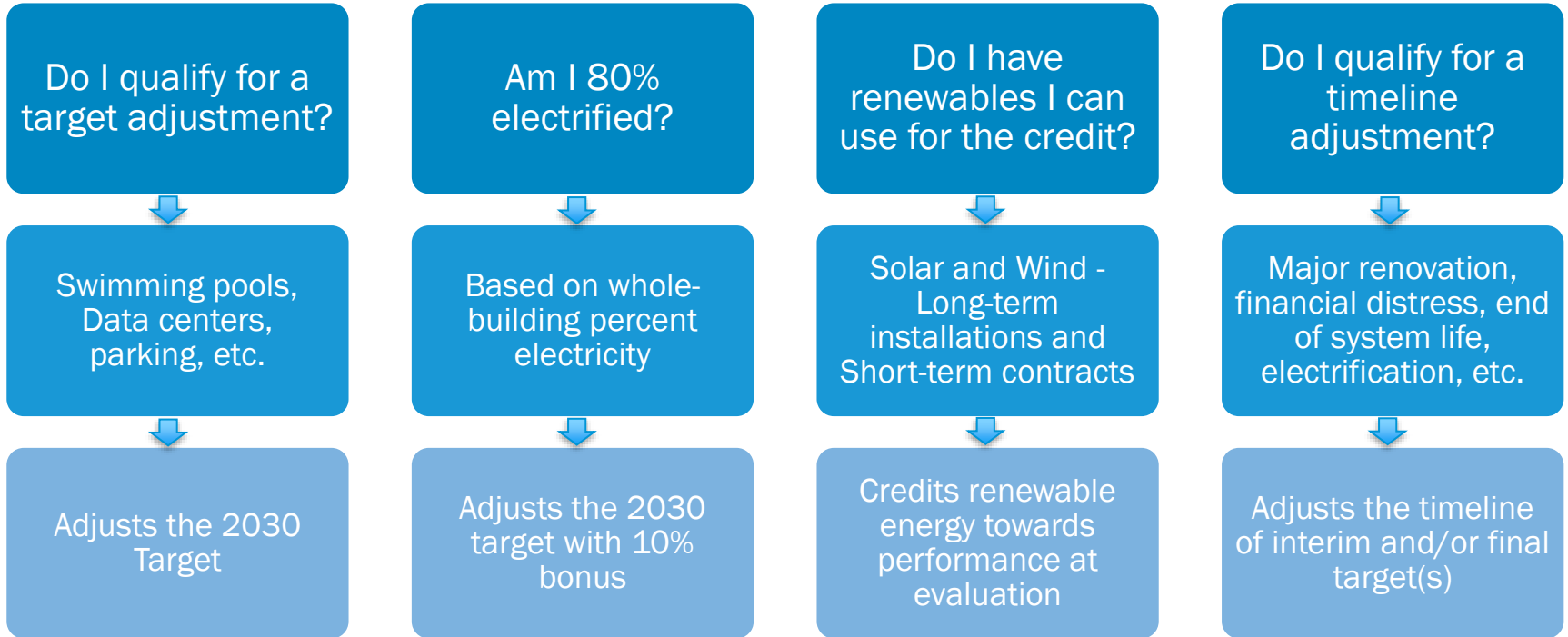
New Construction enter the program after they receive their CO and are consuming energy for 12 full calendar months. CASR will set the 2030 target and interim targets within 6 months of receiving the first benchmarking report.

A “**campus**” is a collection of two or more buildings that act as a single cohesive property with a single shared primary function and are owned and operated by the same party. Several considerations for campuses are available throughout the program.

Demolition – 2 Options

- **Exemption:** should be requested if the demolition will be started or completed *before* the next performance period evaluation
 - demolition permit for the entire building has been issued and work has started on or before the Benchmarking report for the performance period is due
 - demolition permit for a portion of the building has been issued where the remaining building will be less than 25,000 sq. ft., shifting the building to the small building performance requirements (5,000-24,999 sq. ft.)
- **Timeline Adjustment:** planning to demolish a building within 2 years *after* performance requirements are due

Flexibility in Compliance





Target Adjustments

Target Adjustment Reasons

*Adjust the final 2030 energy performance target of a building

*Uses 2019 baseline data to make changes to interim targets

- Significant variations in operations or inherent characteristics of the building itself.
- Previous benchmarking submission were incorrect:
 - building type classification
 - square footage corrections
 - inaccurate energy data that affects the baseline
 - a high-intensity space (such as a restaurant) was not accounted for in the largest three building types.
- Building alterations
 - Building type has changed due to a renovation
 - Building has added or demolished square footage with a different or high-intensity property type

Available Adjustments

Value Charts available in
Technical Guidance Appendix

Adjustment Type	Eligible Building Types
Operating Hours	Office, Retail Store, Worship Facility, Non-refrigerated Warehouse, Refrigerated Warehouse, Supermarket/Grocery Store
Indoor Swimming Pool	All building types
Outdoor Swimming Pool	All building types
Parking – open	All building types
Parking – partially enclosed	All building types
Parking – completely enclosed	All building types
Data Centers	All building types with Class B data centers with Data Center definition
More than 3 property types	All building types

*all adjustments are based on normalization methods from EPA ENERGY STAR.

Target Adjustment Submission

Third-party Data
Verification of 2019
benchmarking
submission required!

Target adjustment applications can be made at any time, but the building owner needs to be aware of the impact the adjustment could make, not only on the 2030 targets, but also the interim targets. The earlier the application is submitted, the better for the building owner when it comes to performance evaluation.

Submission:

- Online application form with applicable adjustments checked
- Resubmitted 2019 benchmarking report (or other approved year) with third-party verification
- Data Verification Checklist signed by the third-party data verifier
- Other supporting documentation as needed

- To have adjustments complete before the beginning of 2024, the deadline for submission is October 1, 2023.
- To have the 2024 Interim target adjusted before performance evaluation in 2025, the deadline for submission is December 31, 2024.

Electrification Credit

Electrification Credit

If the whole building is at least 80%, as measured by “percent electricity”, the building will get a 10% Site EUI bonus as an incentive to electrify.

Adjust targets

- For buildings already 80%+ electricity, a 10% EUI bonus will be applied to the 2030 target and new target notifications sent to building owners.
- “Percent electricity” will be calculated during the 2024, 2027, 2030 target evaluation. If a building reached 80%+, the 10% electrification bonus will be applied to the target before evaluating performance.

Alternate Compliance

- For buildings that plan to reach 80%+ electrification by 2030, an alternate compliance option will adjust the interim and final targets with the 10% bonus with the agreement that electrification will be complete by 2030.
- Electrification has been added as a valid reason for requesting a timeline adjustment

Renewables Credit

Renewables Credit

Solar or wind power generation, on-site or off-site, will be credited to the building's total energy use before performance targets are evaluated, *regardless of Renewable Energy Credit (REC) retainage.*

- The credit will be calculated on an annual basis based on generation that occurred in the 12-month performance period being evaluated.
- For campuses that have renewable installations that are not physically connected to a particular building, CASR will work with the building owner to credit the kWh generated amongst the buildings within that campus portfolio.
- If an Owner can demonstrate that the building's renewable energy sources are a confidential business practice, the Owner can submit a Confidentiality Request for renewable credit submission to be kept confidential and not subject to CORA requests or included in open data disclosures.

Renewables Credit

Long-term Installations or Contracts – No Limit

On-site installation

Provide proof that the solar or wind installation is installed, most likely an interconnection agreement

Off-site installation

Provide proof of ownership (contract or interconnection agreement)

Off-site owned by third party

Provide evidence of a subscription, lease, or purchase of a share in program offered by Xcel Energy or located in Colorado PSC territory

Must be at least five (5) years and renewed a minimum of every five (5) years for the life of the building

Renewables Credit

Short-term Contracts or Subscriptions

Contract or Subscription

- Provide evidence of a subscription, lease, or purchase of a share in either an Xcel Energy program or a community project located in Colorado PSC territory.

Term

- Term of purchase must be at least 12 months to equal the performance period of the interim target and continue to be purchased annually for maintenance of the target through the next interim target date.

Short-term contracts or subscriptions are allowed to assist with **interim targets only**:

- 2024, 2025, 2026 - up to 20% of the building's electricity usage
- 2027, 2028, 2029 - up to 10% of the building's electricity usage
- 2030 and beyond - short-term not allowed

Renewable Credit Submission

If the building received renewable generation from more than one category (example: 1) solar installed on building and 2) purchased month-to-month subscription to fill a gap), the owner must fill out a renewable credit submission for each type.

Submission form:

- Enter total kWhs generated or purchased during the 12-month performance period
- Enter type of installation or contract (long-term vs. short-term)
- Enter if the RECs were retained
- Upload proof of ownership interconnection agreement or contract
- Upload one month's example of a bill or report that shows the kWhs generated

Denver's Most Frequent Renewable Scenarios

Scenario	Type of Contract	Possible Program
Solar/Wind power generated capacity on-site	Long-term	Net Metering, Solar*Rewards
Solar/Wind power generated capacity off-site	Long-term	NA
Multifamily building where tenants purchased solar through Community Solar Garden subscription	Long-term	Solar*Rewards Community
Community Solar Garden Host (credit available if a portion of kWhs generated are distributed to building directly)	Long-term	Solar*Rewards Community
Subscription for solar and/or wind power generation (5 years minimum contract)	Long-term	Renewable*Connect
Subscription for solar and/or wind generation (month-to-month or less than 5 years)	Short-term	Windsource

2024 Interim Target Timeline Adjustment

CASR has approved a one-year timeline adjustment to the 2024 target for **all buildings that have a complete 2021 calendar year Benchmarking Report** (2022 Reporting Year) on file with CASR.

- For buildings that **are in compliance** with the 2021 calendar year benchmarking, the first interim target will be due in **2025**.
- For buildings that **are not in compliance** the 2021 calendar year benchmarking, the interim target will remain due in **2024**.

Check your benchmarking compliance status by looking up the 2022 Reporting Year status at www.energizedenver.org.

Register for Part 2 or Watch the Training Videos!

December 15, 12:00-1:30pm

Alternate compliance options (minimum requirements, timeline adjustment, electrification option, 30% EUI reduction property type, MAI buildings), performance evaluation, penalties, small buildings, support and incentives



Vendor Training Series available online in [“Help, Resources, and Incentives”](#)
Pass quiz to be listed on Energize Denver [Service Providers Directory](#).

Questions?

Energize Denver Hub:
general support and questions

<http://denvergov.org/energizedenver>
energizedenver@denvergov.org
or 844-536-4528

- Enter questions in the Q&A section now
- Questions asked about content to be covered in Part 2 will be answered on Dec. 15