



ENERGIZE DENVER TASK FORCE RECOMMENDATIONS

Draft – July 19, 2021

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DRAFT

EXECUTIVE SUMMARY

The Energize Denver Task Force was tasked with helping the City design a building performance policy for existing buildings that improves health and equity, creates jobs, and drives climate solutions in existing buildings that achieve net zero energy by 2040. Translating this goal into cumulative greenhouse gas emission reductions results in 13.7 million metric tons of CO₂ saved between now and 2040. Denver's definition of a net zero energy building is highly energy efficient, all electric, providers of demand flexibility to the grid, and powered by renewable electricity. The task force recommends revisiting this goal and the policies recommended here in light of the latest technology and climate science.

The task force is a diverse group representing diverse sectors and stakeholders in Denver. Membership included building owners and managers, our local utility, energy providers, resident/tenant/non-profit representatives, labor and workforce representatives, environment and clean energy representatives, and a member of Denver City Council.

Denver is committed to advancing racial equity through the recommendations developed by the Task Force as well as through the actual implementation of the policy. Racial equity is a systemic endeavor, resulting in equitable opportunities and outcomes where race and ethnicity can no longer be used to predict life outcomes, and outcomes for all groups are improved. The Task Force developed a racial equity lens, a racial equity road map, and specific equitable implementation recommendations to ensure that its process, policy recommendations, and the City's implementation are centered in principles of equity.

The first policy recommendation by the task force focused on energy efficiency and renewable electricity. The Task Force recommends a "trajectory approach" where a target Energy Use Intensity (EUI) for 2030 should be set for every building type in Denver that achieves at least 30% total energy savings across all buildings. Required interim targets for 2024 and 2027 will be set for each building by drawing a straight line from that building's baseline EUI to the final EUI target. Alternate compliance options will be available for buildings who need them. These include an option to adjust the timeline for their interim targets and an option to adjust the final target due to inherent characteristics of the building. Solar on-site will be fully credited towards energy use, directly lowering the net EUI of the building. The 15% of buildings that already have achieved the target EUI for that building type (or better) will not need to take further action, they will just need to maintain their performance.

The second policy recommendation by the task force focused on eliminating greenhouse gas emissions from fossil gas used for space and water heat in buildings through requirements for electrification of space and water heating equipment at the time of system replacement. For each major type of space and water heating equipment the task force has recommended the dates when each of these three steps should be taken:

- Step 1 - Incentives for Electrification Schematic Design and Costs
- Step 2 - Permitting Ease Equal: Make the permitting process equal because permitting a heat pump is harder than gas system today.

- Incentives for Heat Pumps for All Buildings
- Step 3 - Require heat pumps when systems are replaced.
- Incentives for Heat Pumps for only Under resourced Buildings

The Task Force recommends ensuring that the permitting process is equal in ease by 2023-25 and by 2025-27 that the City require heat pumps for most equipment replacements.

Implementation should include:

- **Building Resource Hub:** to provide these resources to all buildings, and extra technical and financial assistance to under resourced buildings. Getting to get to net zero energy in Denver's existing buildings will require supports such as marketing, outreach, training, education, financing, technical assistance, and advocacy.
- **Incentives:** Design equitable financial incentives and plan to offer them for the typologies where partial or full electrification is required. The total incentives for building space and water heating typologies with 2025 heat pump requirements would be \$16.7 million assuming 5% of system installs in a given year receive incentives to achieve cost parity with a like for like gas system replacement. Incentive dollars will support women and minority owned businesses and high-road jobs through labor standards that ensure job quality and equitable job access.
- **Workforce:** Ensure that Denver has a trained workforce ready for the transition to net zero energy and the continued operation and maintenance of homes and buildings beyond the transition.
- **Oversight:** Oversight from a Technical Advisory Committee and regular check points that ensure the policy is achieving the climate goals, cost effectiveness goals, and racial equity goals laid out in this document. This also ensures flexibility over time and consideration of new technologies. The Task Force recommends revisiting the policy every four years.

The policies recommended in this document result in a cumulative emission reduction of 10.8 million metric tons of CO2 saved between now and 2040. While this doesn't achieve the task force goal it achieves as much as the task force feels is reasonable and achievable for building owners and managers in Denver. The City should continue to investigate how to make up the gap.

1. INTRODUCTION

1.1 CHARGE

The Energize Denver Task Force was charged with helping the City design a building performance policy for existing buildings that:

- 1) **Improves Health and Equity:** Improve indoor air quality, comfort and health outcomes. Lower energy costs for businesses and improving energy equity. Ensure under resourced communities can thrive under the policy.
- 2) **Creates Jobs:** Create clean energy jobs and driving economic recovery from COVID.

Drives Climate Solutions in Buildings: Buildings are responsible for over half of the greenhouse gas emissions in Denver today. The Task Force will design a policy that will require existing buildings to achieve Net Zero Energy by 2040. The Task Force will help the City design a regulatory path that enables all buildings achieve this goal. Net Zero Energy means highly efficient, all electric, grid flexible, and powered by 100% renewable electricity.

The Task Force worked from January through August of 2021 and developed the following recommendations.

1.2 TASK FORCE MEMBERS, CITY STAFF AND FACILITATOR

TASK FORCE MEMBERS

For the 2021 Energize Denver Task Force, the City selected stakeholders from across the real estate sector, energy sectors, labor, workforce development, affordable housing, small business, resident advocates, solar, energy efficiency, and environmental advocates. Many members have expertise and interest across multiple areas and sectors. We have grouped participants here according to their primary role.

Building Owners/Managers	<ul style="list-style-type: none">1. Amie Mayhew, Colorado Hotel & Lodging Association2. Frank Arellano, LBA Realty3. Jon Buerge, Urban Villages4. Kathie Barstnar, NAIOP Colorado5. Lori Pace, Denver Metro Association of Realtors6. Peter Muccio, Apartment Association of Metro Denver7. Stephen Shepard, Denver Metro BOMA
Utility/Oil and Gas	<ul style="list-style-type: none">8. Tyler Smith, Xcel Energy9. Sam Knaizer, bp, bpx energy10. Scott Prestidge, Colorado Oil and Gas Association

Residents/Tenants/Non-Profit Representatives	11. Aaron Martinez, Urban Land Conservancy 12. Angela Fletcher, Denver Housing Authority 13. Jennifer Gremmert, Energy Outreach Colorado 14. Jonathan Cappelli, Neighborhood Development Collaborative
Labor/Workforce Training	15. Jennie Gonzales, IBEW 68 16. Sergio Cordova, Pipefitters Local Union No. 208 17. Eddie Bustamante/Anthony Trujillo, LiUNA Local 720
Environment/Clean Energy	18. Celeste Cizik, Group 14 Engineering 19. Christine Brinker, Southwest Energy Efficiency Project (SWEEP) 20. Jenny Wilford/Emily Gedeon, Colorado Sierra Club 21. Ariana Gonzalez/Alejandra Mejia Cunningham, NRDC 22. Mike Kruger, Colorado Solar and Storage Association (COSSA) 23. Monique Dyers, Ensign Energy Consulting 24. Steve Morgan, Bolder Energy Engineers, Rocky Mountain Association of Energy Engineers
City Council	25. Jolon Clark, Denver City Council District 7

CITY STAFF

Katrina Managan, Buildings Team Lead, lead the Energize Denver Task Force process for the City. Other staff from the Office of Climate Action, Sustainability and Resiliency who helped support the Task Force were:

- Jan Keleher, Building Electrification Lead
- Amber Wood, Energy Program Administrator
- Maria Thompson, Buildings Program Administrator
- Taylor Moellers, Sustainable Neighborhoods Administrator
- Jarrett Vigil, Buildings Intern

INDEPENDENT FACILITATOR

The Task Force was facilitated by Ryan Golten of the Consensus Building Institute (CBI), who acted as an advocate for members’ procedural interests while remaining impartial to the substance of the issues under discussion.

SUPPORTING PARTNERS AND CONTRACTORS

- Laura Dyas, Group 14
- Jeremy Hayes, Upright Consulting
- Dwinita Mosby Tyler, The Equity Project
- Kim Desmond, Denver Office of Social Equity and Innovation
- Sean Denniston, NBI
- Zack Hart, IMT

1.3 GUIDING PRINCIPLES

The Task Force was committed to developing a performance policy for existing buildings that all of its diverse members could support. Task Force members underscored the policy needed to be flexible, incremental, and revisited regularly to avoid and mitigate unintended consequences. Racial equity, green jobs, community engagement, incentives and supports were central to the policy recommendations and their implementation. From the outset, guiding principles for the Task Force included the following:

- Focus on people and real human lives. Improve overall well-being.
- Account for disparate climate impacts and historic racial inequities in Denver. Accelerate positive impacts to low-income and BIPOC communities from a clean energy transition.
- Support innovation and provide for multiple pathways, rather than one-size-fits-all.
- Ensure policies are achievable, workable on the ground, effective, and sustainable.
- Seek cost-effective strategies.
- Seek 'eager compliance' among building owners and managers by ensuring solutions are achievable, well supported, and rolled out gradually and strategically. Consider flexible compliance options that are both performance-based and prescriptive.
- Recommend incentives with financing to ensure all Denver buildings, and especially low-income communities, benefit from and can comply with the policy.
- Allow for flexibility with changing circumstances, as new clean technologies become cost effective.
- Minimize unnecessary requirements.
- Seek mutually supportive co-benefits (e.g., lowered heating/cooling costs, improved air quality).
- Benefit local families and Denver's economy by providing for robust job training/ workforce transition and good, livable, new jobs that help alleviate the economic devastation of COVID-19.
- Seek to attract new businesses by making Denver one of the greenest cities in the country.
- Recognize Denver is unique but don't reinvent wheels; learn from what is working elsewhere.
- Recognize we don't have a choice about getting to Net Zero Energy – this is the biggest and most important challenge of our time!

1.4 DENVER'S DEFINITION OF NET ZERO ENERGY

Denver was challenged by the 2020 Climate Action Task Force to reach net zero emissions as a community by 2040. While the overall goal is based on emissions, the metrics for an individual building is based on energy and equipment used to achieve that goal, because those are more measurable at a building level. There will be different solutions for different buildings to ensure a fair and consistent level of effort across building types, sectors, and neighborhoods. Additionally, the recommendations from the Energize Denver Task Force include incentives and supports to make this goal attainable and fair, and to prioritize historically disadvantaged communities as discussed below.

The Task Force recommends revisiting this definition of Net Zero Energy at least every four years and assess the cost-effective technologies and pathways to achieve this goal.

Denver developed a definition of Net Zero Energy through the [2020 Climate Action Task Force](#) process and the [Net Zero Energy New Buildings Implementation Plan](#) development process. Denver's current definition of Net Zero Energy is those buildings that are:

- 1) Highly Energy Efficient
- 2) All Electric
- 3) Powered by Renewable Energy and Electricity (Xcel Energy will deliver a grid that is 80% renewable by 2030. Where additional distributed solar is added in Denver, Xcel typically retains the renewable energy credits (RECs). Denver's priority, therefore, is to add renewable capacity and work with Xcel so they retire the RECs to reach net zero emission electricity.)
- 4) Providers of Demand Flexibility for the Grid

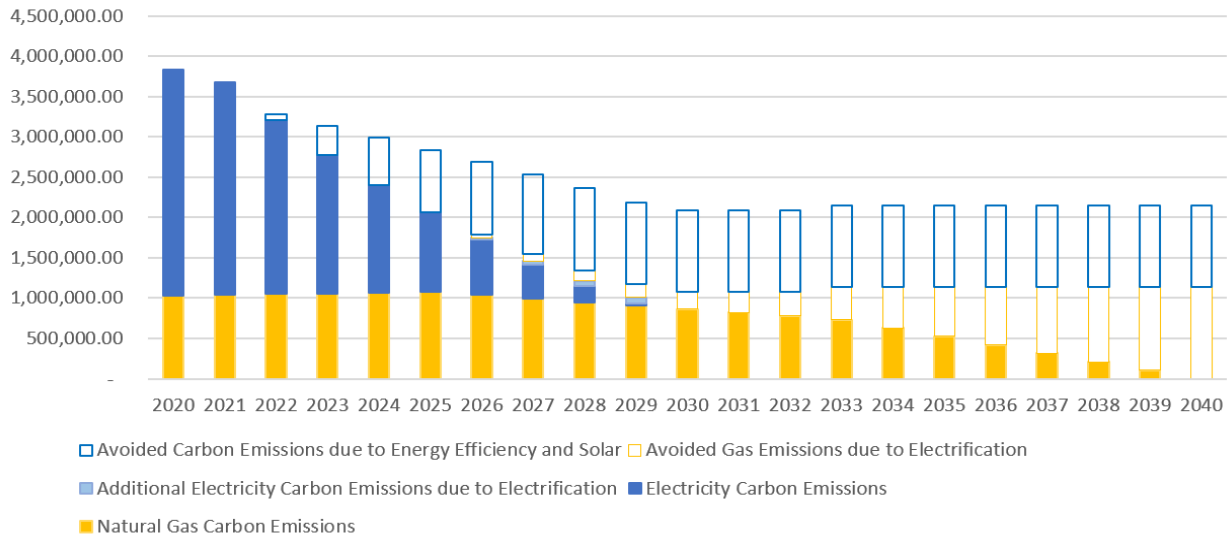
Thus, for purposes of this policy, qualifying buildings must meet all four of those things by 2040. Achieving that goal would result in a cumulative carbon emission reduction of 13.7 million metric tons between 2021 and 2040.

1.5 COMMUNITY ENGAGEMENT

Summary of community engagement conducted by the Task Force conducted July 19th – July 29th.

1.6 IMPACT OF THE TASK FORCE RECOMMENDATIONS

The task force's goal was set by the City per the Climate Action Task Force's recommendation to achieve net zero energy by 2040. The numerical goal of saving 13.7 million tons of eCO₂ is illustrated graphically by the open bars in the bar chart below:



As part of the policy development, Denver worked with Group 14 to develop the Denver Building Policy Tool. This tool helped the Task Force develop recommendations based on carbon impact, cost effectiveness, and implementability. The recommended policies included in this document result in the following carbon benefits, and the following societal benefits from those avoided emissions.

Carbon Impact	Cumulative Carbon Reduction by 2040 (tons eCO ₂)
Task Force Goal	13,744,214
Benefit of EE & RE policies	7,265,364
Benefit of electrification policies	3,575,939
Benefit of all policies	10,841,303

The reductions of 10.8 million tons of cumulative emission reductions are equate to removing 2.3 million passenger vehicles from the road for one year. While this doesn't achieve the task force goal it achieves as much as the task force feels is reasonable and achievable for building owners and managers in Denver. The City should continue to investigate how to make up the gap. A more detailed discussion of ideas that were rejected at this time but might be considered along with new ideas in the future may be found in section 7.1.

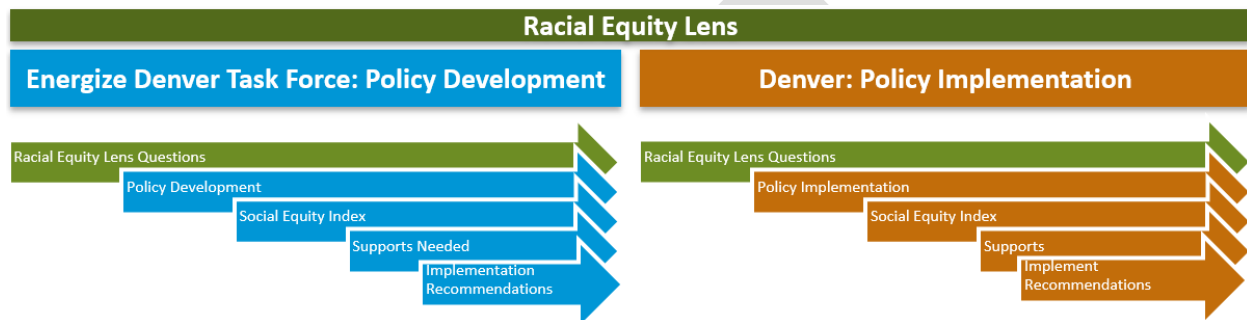
The task force's recommendations also result in the following avoided social cost of carbon:

Cumulative avoided social cost of carbon by 2040	Cumulative avoided social cost of carbon by 2050
\$825 million	\$1.9 billion

2. RACIAL EQUITY

Denver is committed to advancing racial equity through the recommendations developed by the Task Force as well as the actual implementation of the policy. Racial equity is a systemic endeavor, resulting in equitable opportunities and outcomes where race and ethnicity can no longer be used to predict life outcomes, and outcomes for all groups are improved.

Working with Denver’s Office of Climate Action, Sustainability, & Resiliency (CASR) and the Office of Equity and Social Innovation (OESI), the Task Force developed several tools to ensure that its process, policy recommendations, and the City’s implementation are centered in principles of equity, as discussed below.



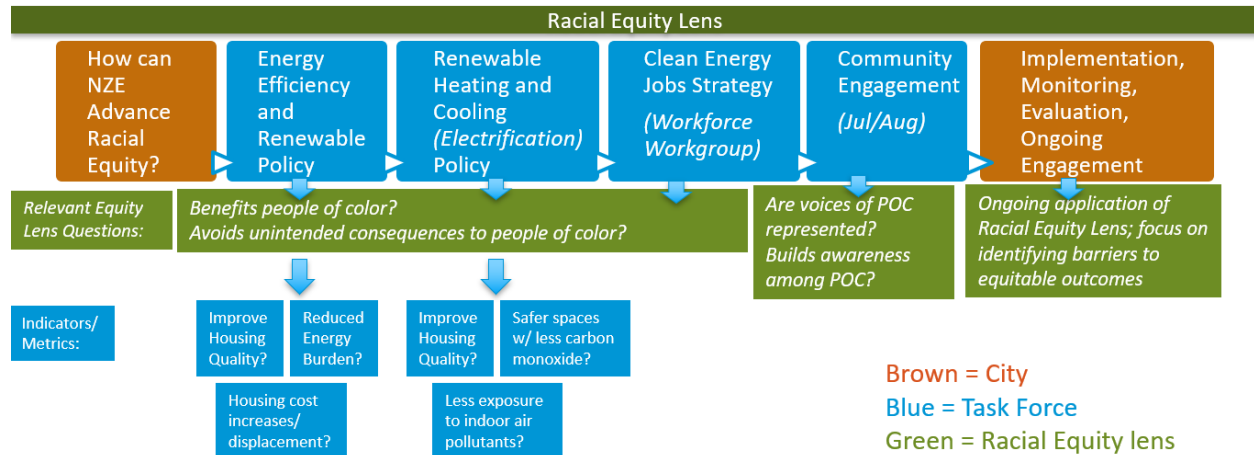
2.1 RACIAL EQUITY LENS

The Task Force developed a racial equity lens to help center equity in the policy and promote equity for historically disadvantaged groups. The Task Force centered its focus on race because we know data shows designing for racial equity results in improvements for all groups. The goal of the Task Force was to keep the lens on at all times – more like lasik than glasses. The Racial Equity lens included the following questions:

- 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) Does this policy or decision ignore or worsen existing disparities or produce unintended consequences?
- 4) What are the barriers to more equitable outcomes? (e.g. mandated, political, emotional, financial, programmatic, or managerial).
- 5) How will this proposed policy or decision be **perceived by** people of color?
- 6) **CHECK POINT:** Based on the above responses, what revisions are needed in the decision under discussion? Are there other things to take into consideration?

2.2 RACIAL EQUITY ROADMAP

This roadmap frames equity focus areas, indicators, and metrics. The focus areas are based on the “Equity Indicators for the City of Denver” from the University of California, Berkeley. The Task Force recommendations include measurable outcomes, where appropriate and possible. Denver also developed the Denver Building Policy Design Tool to quantify carbon, energy, and costs as a way to model the impacts of different policy options and shed light on the various equity indicators.



To help quantify the benefits and avoid unintended consequences for people of color, we asked specific questions to inform our Equity Lens.

- 1) Are we on the right track to provide benefits to people of color through decreased monthly energy bills?
Are we on track to benefit people of color through improved housing quality (including improved ventilation and thermal comfort)?
- 2) Are we on track to avoid increased housing costs for, and/or displacement of, people of color?
- 3) Are we on track to benefit people of color through improved housing quality (including improved ventilation and thermal comfort)?
- 4) Are we on track to benefit people of color through safer living spaces with less carbon monoxide risk?
- 5) Are we on track to benefit people of color by lowering exposure to indoor air pollutants that impact asthma rates?

2.3 SUPPORT FOR UNDER-RESOURCED BUILDINGS

This policy can deliver benefits for people of color in terms of reduced energy bills and improved quality of housing and buildings.

SUPPORT PROVIDED TO UNDER RESOURCED BUILDINGS

To ensure people of color see these benefits first, and that unintended consequences are avoided, the City will under resourced buildings will need additional support in the form of:

- 1) **Additional Technical Assistance:** The City would provide buildings owners and managers in areas needing the most help with building specific one-on-one consultative services and free energy assessments to aid owners in compliance from start to finish.
- 2) **Additional Financial Assistance:** Under resourced buildings will receive incentive dollars to help them ensure cost parity for the electrification requirements with a like for like replacement. In addition, these building owners should be able to apply for funding to directly help subsidize project costs for those who need in most. The City should evaluate any gentrification pressures from the policy on an ongoing basis and explore ways to mitigate these in a way that achieve a maximum equity benefit with City incentive and assistance dollars.

IDENTIFYING UNDER-RESOURCED BUILDINGS

Here is how we are going to determine which buildings are under-resourced: The Social Equity Index will help identify buildings in communities with high need or high vulnerability. (See Social Equity Index below.) An additional screening will be applied to buildings inside or outside of high-need areas to help identify buildings that are serving communities of color, owned by people of color, with majority residents people of color or low-income, or otherwise meet widely used standards to identify under resourced buildings.

Buildings serving under resourced communities and people of color will be identified through an verification process. The process should be simple enough to facilitate easy participation of under resourced buildings, but rigorous enough to screen out applications that won't actually help under resourced communities. Any appeals to the decision on an application will go to the Technical Advisory Committee for their review. Building owners and managers in areas needing the most help will be able to qualify for additional support in two ways:

- 1) **Expedited verification for buildings that have a high score in the Social Equity Index:**
 - a. The Social Equity Index will help identify buildings in communities with high need or high vulnerability. (See Social Equity Index below.) Buildings in these areas will be eligible for a very simple, streamlined, application. The streamlined application will help identify buildings that are serving communities of color, owned by people of color, with majority residents people of color or low-income, or otherwise meet widely used standards to identify under resourced buildings.
 - b. The City will do outreach to all buildings in these areas to help them comply.
- 2) **More extensive applications** will be available for buildings outside these areas. This application should identify buildings that are serving communities of color, owned by people of color, with majority residents people of color or low-income, or otherwise meet widely used standards to identify under resourced buildings.

SOCIAL EQUITY INDEX

The Task Force recommends developing a Social Equity Index to identify neighborhoods that are most vulnerable and where buildings are located that support communities of color. The City should use a series of indicators to create a Social Equity Index that will assign weighted value equity scores at the

census tract level. Denver staff provided the [Greenlink Equity Map \(GEM\)](#) indicators to help develop a Social Equity index.

Add more on weighting of indicators from community engagement survey.

These indicators include:

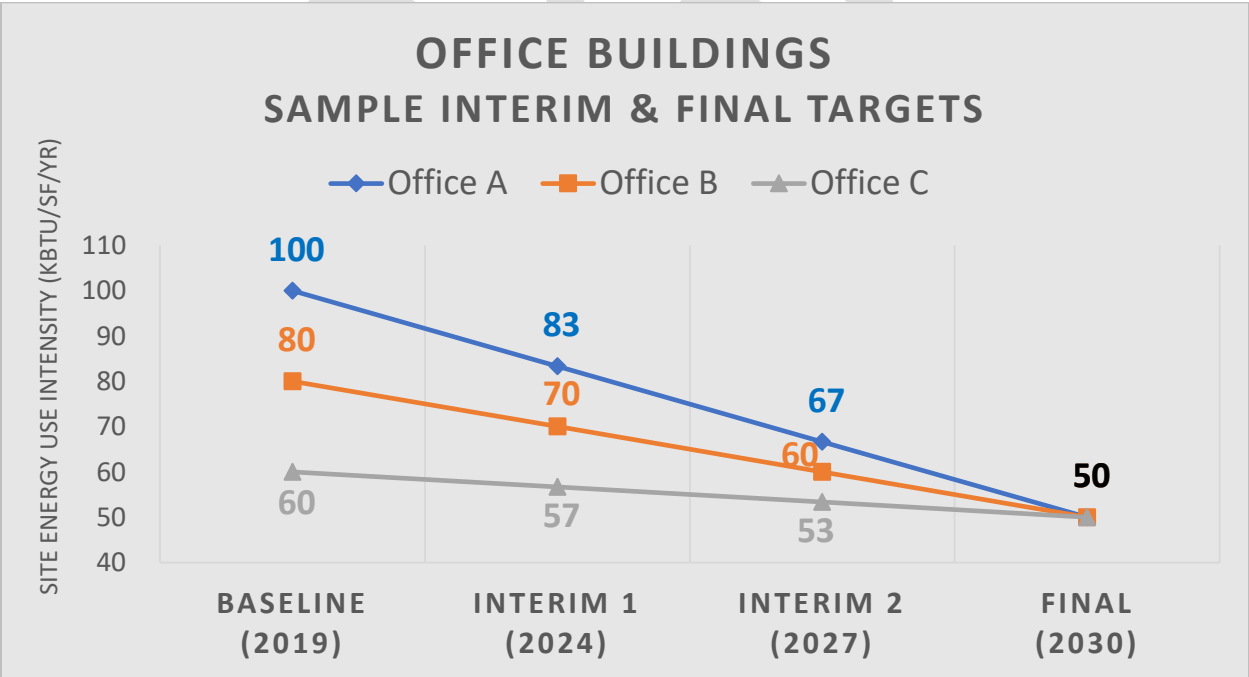
- 1) Demographics
 - Racial Composition
- 2) Health
 - Asthma rates
 - Health Insurance Stress
 - Pollution
- 3) Housing
 - Eviction Rates
 - Household Living Cost Burden
 - Renter or Owner
 - Inadequate Heating or Cooling, unmet energy needs
 - Lack of Amenities (food deserts, park space, etc)
- 4) Technology
 - Lack of Internet Access
- 5) Income
 - Income Stress
- 6) Utility burden
 - Households with Above Average, High, or Severe Energy Burden
- 7) Other indicators: transportation and EVs

3. ENERGY EFFICIENCY AND RENEWABLE ENERGY POLICY RECOMMENDATIONS

3.1 A 30% IMPROVEMENT IN ENERGY PERFORMANCE BY 2030

Clear targets for existing building performance offer a way to meaningfully reduce emissions while increasing building operations efficiency, lowering costs and creating local jobs. The Task Force recommends a “trajectory approach.” This approach uses a combination of long- and short-term performance requirements to provide building owners with regulatory certainty and appropriate flexibility to accommodate typical capital planning cycles, while still pushing owners to improve their properties at the earliest opportunity.

All buildings over 25,000 square feet should be covered by these energy efficiency and renewable energy requirements. Covered buildings should be grouped by building type and a long-term performance target should be created for each building type measured through Energy Use Intensity (EUI). A target Energy Use Intensity (EUI) for 2030 should be set for every building type in Denver that achieves at least 30% total energy savings across all buildings. Required interim targets for 2024 and 2027 will be set for each building by drawing a straight line from that building’s baseline EUI to the final EUI target.



Achieving 30% savings is challenging but doable according to many buildings experts nationally and locally. It is achievable with current technologies and meets the Energize Denver Task Force’s goal of feasibility and flexibility as part of the proposed policy. 30% savings means that all buildings will need to

perform as well as the top 15% of buildings of that building type by the deadline of 2030. Each covered building will have a baseline EUI based on average historical energy use in 2019. The City should use weather normalized EUI from ENERGY STAR Portfolio Manager.

Solar on-site will be fully credited towards energy use, directly lowering the net EUI of the building. Solar off-site will also be fully credited towards energy use, lowering the EUI. Building owners and managers will self-certify the off-site solar contract. Off-site solar will be revisited every three years by the Technical Advisory Committee as utility-scale solar is increasing.

Credit for high performers: The 15% of buildings that already have the target EUI for that building type (or better) will not need to take further action, they will just need to maintain their performance.

3.2 ALTERNATE COMPLIANCE OPTIONS

The following alternate compliance options add flexibility for buildings where the above requirements won't work in terms of timing or end goal. These alternatives should be revisited every three years by the Technical Advisory Committee as technology advances.

REQUEST A DIFFERENT COMPLIANCE TIMELINE: APPLY FOR A MORE COST-EFFECTIVE TIMELINE TO MEET THE SAME END GOALS

A building owner or manager may apply to change their compliance timeline to meet the same end goal if capital improvements will be most cost effective or feasible if they wait until:

- End of system life for space and water heating systems that the building owner plans to electrify with heat pumps.
- Time to refinance the building for affordable housing or other projects with very limited access to capital.
- Timing of a major renovation
- Timing when a major tenant will move out

To adjust the timeline a building owner must submit a plan for an alternate timeline to reach the same end goal. The requirements for a plan should be relatively simple, but the penalties should be higher than under a normal timeline if it's not met. Plan's should demonstrate that:

- The reason for the requested delay.
- A retrofit plan with planned project dates and an energy model showing the results of the future planned project and how it meets the required EUI reduction.
- As part of that plan, they must submit proof that all reasonable efficiency improvements have already been undertaken given the reasons for the requested delay. For example, if a building owners is waiting for the end of space or water heating systems to electrify those systems, and expecting the energy savings from those system replacements, they must still demonstrate that quick payback items such as LED lighting upgrades, VFD and motor upgrades and controls

upgrades have been completed. They also must demonstrate the reason why solar cannot be installed to meet the interim target.

ADJUST THE END GOAL: DUE TO INHERENT CHARACTERISTICS OF THE BUILDING OR A SUBSTANTIAL CHANGE IN USE

Denver should develop a standard application process through which building owners and managers can apply to adjust their performance target to account for significant variations in occupancy type, operating hours, or other operations of the building or inherent characteristics of the building itself that make achieving the target challenging. For example, a building owner or manager could use this process to adjust their target if a new data center moved into a building that was previously just office space. A standard analysis should be developed that a building owner must hire an engineer to complete. The final target EUI, as well as the interim targets, for a building may be adjusted up (or down) based on the analysis.

PRESCRIPTIVE OPTION (2024, 2027): FOR 25,000-100,000 SQUARE FOOT BUILDINGS

To get buildings under 100,000 square feet on the path, a prescriptive option will be available in 2024 and 2027 to meet interim targets, but not for final 2030 targets. If a building electrifies space and water heat (partially or fully) through the use of heat pumps and verifies they have all-LED lights they would then be in-compliance with interim targets, regardless of EUI. Just doing these two things will result in 25-35% savings. This gets most buildings started well on the way to performance. Building owners will need to self-certify that heat pumps are the primary source of space heat, that all hot water is provided by a heat pump, and that all lights in the building are LED's. They also will need to report the year when each piece of equipment was installed so the City can check benchmarking data for verification. The City should also go out and verify compliance by a portion of the buildings selecting this compliance option in person to ensure compliance.

MANUFACTURING OPTION

This alternate compliance option is only for a building where the building is used primarily for manufacturing or agricultural processes. This option only applies if the manufacturing or agricultural process uses significant energy. Distribution centers and warehouses DO NOT qualify.

The details on the rules for how these buildings will save 30% by 2030 shall be developed by a new CASR staff person that leads the manufacturing emission reduction work with input from manufacturing and agricultural stakeholders. One option that manufacturing and agricultural stakeholders might consider is that would be for these buildings to develop an ENERGY STAR Score using [ENERGY STAR Energy Performance Indicators for plants](#) and achieve and maintain a score of 75 or higher.

3.3 COST EFFECTIVENESS

The simple payback from energy savings for measures most buildings would need to undertake to comply with the above energy efficiency and renewable energy policy is 3-15 years.

3.4 SUPPORT FOR BUILDING OWNERS AND MANAGERS

Getting to get to net zero energy in Denver’s existing buildings will require supports such as marketing, outreach, training, education, financing, technical assistance, and advocacy. A **Building Resource Hub** will be developed to provide:

- 1) **A Performance portal** for each building with recommendations on next steps, and direct links and references to Xcel rebates as part of every explanation of what is required.
- 2) **Web Resources:** a resource hub website.
 - **Ex: DC’s Building Innovation Hub:** type - Online Resource Hub with self-navigable resources: <https://buildinginnovationhub.org/>
- 3) **Materials:** develop written materials that describe the policy and communicate the requirements of the policy to different building sectors. Examples of materials to be developed:
 - **Resources** for building owners informing them about their options, steps to comply, case studies, checklists, rebates, grants, incentives. Specific by building type and size.
 - **How-to Guide:** Free, consolidated list of list of requirements and implementation resources (ex: [Atlanta Building Efficiency Energy Audit Requirement](#) help page including a directory to find auditors)
 - **Check lists:** Provide compliance checklists and 1-1 support to ensure building owners understand requirements and related building codes and regulations (ex: [Compliance Checklist from Montgomery County, MD](#))
- 4) **Targeted Outreach and Education**
 - **Outreach:** targeted outreach to covered building owners and affected communities on what the policy is and what it means for them. Focus on positive outcomes and long-term benefits.
 - **Education:** Development and administration of presentations, workshops, and trainings tailored to different building types and sizes for building owners and managers.
- 5) **General Phone Assistance:** Directing building owners to appropriate resources available on the webpage.
- 6) **Financial Assistance:** Direct building owners to financial assistance that they qualify for (incentives, PACE financing)
- 7) **Technical Assistance:** Connect building owners to approved service providers. Annual check-in’s for building owners and managers to make sure they’re making progress.
- 8) **Community Engagement:** Engage with partners organizations (BOMA etc.)
- 9) **Recognition:** Host challenges and provide awards to market leaders
- 10) **Building Mentor program**
- 11) **Bulk purchase options**

As detailed in the equity section earlier, under resourced buildings will receive even more support in the form of additional technical assistance and additional financial assistance.

3.5 THE GREEN BUILDINGS ORDINANCE

The Existing Building Energy Program requirements in the Green Buildings Ordinance (GBO) are similar to, but not as strong as, the energy efficiency and renewable energy requirements proposed by this task force. Keeping both sets of requirements would be confusing for building owners and manager, and would not accomplish more for the climate since the requirements are redundant. The Green Buildings Ordinance technical advisory committee should work to recommend changes to the GBO so that it meets its original intent, the negotiated Green Roof Review Task Force Outcome and isn't redundant with this ordinance.

3.6 PENALTIES FOR NON-COMPLIANCE

Fines should be somewhat more than the cost of compliance and should be heftier for buildings with an alternate compliance timeline. The compliance obligation and status of the building must be tied to the building with disclosure requirements, an attachment to the deed or a development agreement that attaches to the parcel. The City should explore mechanisms for financially guaranteeing someone does something, while ensuring equity is taken into consideration.

For the first interim compliance deadline in 2024 the City should start in early 2022 to strongly encourage building owners and managers to plan for improvements in 2022 and 2023. The City should push building owners and managers to make actual improvements in 2022 and 2023 because the carbon savings from energy efficiency in these early years will be the very greatest. Improvements made in 2022 and 2023 years will show up in the 2024 interim compliance year benchmarking report. Some building owners and managers may struggle to make changes that quickly, and so for those who are out of compliance when the 2024 benchmarking data comes in by June 1 of 2025 the City should focus its efforts on doing everything it can to support those out of compliance building owners in quickly putting a plan in place and doing upgrades as soon as possible vs. simply fining those who missed their first compliance target.

4. RENEWABLE HEATING AND COOLING (ELECTRIFICATION) POLICY

4.1 POLICY RECOMMENDATIONS

Clear targets for renewable heating and cooling through electrification of heating and water heating equipment offer a way to significantly reduce emissions while increasing energy efficiency and creating local jobs. The Task Force recommends a “partial electrification approach,” that uses partial electrification at end-of-life replacement through heat pumps for primary heating and water heating by equipment type. This provides building owners with regulatory certainty and appropriate flexibility to accommodate typical capital planning cycles, while still pushing owners to improve their properties at the earliest feasible opportunity.

All commercial and multifamily buildings should be covered by these renewable heating and cooling requirements. Covered buildings should be grouped by heating or water heating system type. Heating and water heating typologies are detailed in [The Energize Denver Renewable Heating and Cooling Plan](#). The space and water heating typologies, the percent of buildings with that technology, the capital cost and operating cost increase compared with a like for like replacement, and the EUI reduction from partial and full electrification are shown here.

Heating Typology	% of buildings	Incremental Capital Cost (%)	Change in Annual Energy Bills (%)	EUI reduction from electrification
Space Heat				
Gas Furnace	32%	0-8.5%	0%	24-30%
RTU	25%	0-12%	0%	24-30%
PTAC	3%	78%	0%	21-24%
Boiler	12%	66%	19%	24%
Water Heat				
Individual System with Tank	96% of Multifamily	0-48%	<1%	
Gas Point of Use	21%	7-20%	4%	
Central System with Tank	48%	30-45%	5%	

Achieving partial electrification with capital cost parity is challenging but doable for gas furnaces, RTUs, individual systems with a tank and gas point of use. PTACs, Boilers, and Central systems with a tank are very custom systems, so the above numbers are very rough approximations for these three system types. The policy recommendation for these 3 system types is different and relies on a cost effectiveness and feasibility test because of the custom nature of these systems. Incentives are needed

to help with the capital cost. The operating costs of this policy increase 1-5% for water heating, and supports and incentives are needed for this as well. It is achievable with current technologies and with minimal environmental and social impacts of mineral developments.

The policy mechanism for renewable heating and cooling will be through permitted heating and water heating equipment replacements. Currently the Community Planning and Development (CPD) offers quick permits for like-for-like equipment that only need an inspection (no plan review), as well as commercial walk-through permits for replacing gas equipment with electric heat pumps with a 48-hour turn-around plan review and an inspection. There are three reasons we recommend updating the permitting process including making the permitting process more robust, life/safety considerations, and streamlining replacements for electric equipment.

1. Quick permits do not include plan review that allows the city to verify the system actually meets code in the review process. In addition, contractors sometimes pull quick permit for systems that do not qualify.
2. Life/safety can also be enhanced through requiring gas pipe leakage testing.
3. The current permitting process discourages upgrading to heat pumps because the process is easier to replace equipment with what is already in the building (which is typically gas).

For each major type of space and water heating equipment the task force has recommended the dates when each of these three steps should be taken:

Step 1 - Incentives for Electrification Schematic Design and Costs

Step 2 - Permitting Ease Equal: Make the permitting process equal

- Incentives for Heat Pumps for All Buildings

Step 3 - Require heat pumps when systems are replaced. The requirements should be structured with a second low carbon option so that Xcel incentives are maintained.

- Incentives for Heat Pumps for only Under resourced Buildings

Electrification schematic level design with costs means that an engineer looks at equipment you have, equipment you need, capacity sizing, etc. The deliverable is a narrative that does not include details like wire sizing and signed and stamped plans. The schematic level design should include operating costs, first costs, costs with the social cost of carbon factored in, and costs per unit of emission saved.

In addition, all water heaters installed in commercial buildings should be compatible with the ANSI/CTA-2045 demand response protocol so that they can be providers of demand responses to the grid.

Furnaces, RTUs, Individual Systems with Tanks, Gas Point of Use

Building Space or Water Heating System	2022	2023	2025
Gas Furnace	Step 1: Pay for electrification schematic design	Step 2: Incentivize heat pump replacements. Permitting Ease Equal Gas equipment replacement requires an efficient condensing system* for furnaces and two of the following: - electrification schematic level design with costs - right sized equipment - gas pipe leakage test, and repair any leaks	Step 3: Heat pumps required as the primary heating source - Fossil gas back-up allowed for gas furnaces and RTU's - Full electrification for Individual system with a tank - Electric resistance allowed for point of use. Incentives only for under resourced buildings.
RTU			
Individual System with Tank			
Gas Point of Use System			

* Require low-NOx combustion flue gasses as a way to effectively require condensing.

For gas furnaces and roof top units 'primary heating source' means the heat pump is the lead heating source, and gas only turns on when the heat pump can't cover the load. For these system types 70-80% of heating needs should be able to be met by heat pumps cost effectively.

PTACs, Boilers, Central Hot Water

Building Space or Water Heating System	2023	2024	2025	2027 (or when partial electrification nears cost parity)
PTACs	Step 1: Pay for electrification schematic design	Step 2a: Incentivize heat pump replacements.	Step 2b: Permitting Ease Equal Gas equipment replacement requires an efficient condensing system* for furnaces and two of the following: - electrification schematic level design with costs - right sized equipment gas pipe leakage test, and repair any leaks	Step 3: PTAC: Heat pumps (PTHP) required as the primary heating source (with fossil gas back-up allowed). Boilers and central systems: Have to convert, at least partially, to heat pumps if they can, and if no heat pump for your application then, electric resistance boilers preferred over gas. Incentives only for under resourced buildings to meet requirements.
Boilers				
Central System with Tank				

For PTACs, Boilers and Central Systems with a tank ‘primary heating source’ means the heat pump is the 1st stage (where there are multiple units in sequence) or lead heating source, so gas only turns on when the heat pump can’t cover the load. For these system types ~50% of heating needs should be able to be met by heat pumps cost effectively.

For these three space and water heating system types the electrification requirements penciled in here as starting in 2027 should only be required when economically and technologically feasible. All buildings will need to study this feasibility starting in 2025. In 2027, heat pumps as the primary heating source will be required at the time of permitting a system replacement unless the applicant demonstrates a lack of technological or economic feasibility.

4.3 FINANCIAL INCENTIVES

The City should design equitable financial incentives and plan to offer them for the typologies where partial or full electrification is required. The following table shows the amount of incentive dollars that might be needed if just 5% of annual system installs in a given year receive sufficient incentives to achieve capital cost parity with a like for like gas system replacement:

<u>Building Space and Water Heating Typologies with 2025 Heat Pump Requirements</u>	<u>Annual Incentive Cost</u> Assuming 5% of system installs in a given year receive incentives to achieve cost parity with a like for like gas system replacement.
Gas Furnace (to Ductless Mini-Split System)	\$8.31 million
RTU (to RTU heat pump with gas back-up)	\$7.14 million
Individual System with Tank	\$0.69 million
Gas Point of Use System	\$0.54 million
Total	\$16.7 million

The City should design incentives to promote equity and should annually reassess the incentive value needed to achieve the following key priorities that should be met with incentive dollars:

- **Phase 1, Incentivizing Early action for all buildings:** Incentives should be designed in the early years to get uptake happening in market rate and affordable properties – these incentives may have to offer more than enough to just achieve cost parity to drive early action. Incentives should be designed so that at least 2-3% of equipment replacements for that typology should be heat pumps in the years prior to requirements to start early action and market learning.
 - The City should conduct sufficient intensive outreach to under resourced buildings to get more to participate so that at least 50% of early action incentives to go under resourced buildings in early years prior to when heat pumps are required.
- **Phase 2, Helping Under resourced Buildings with Compliance:** Once heat pumps are required for each typology incentives should all go to helping under resourced buildings comply. All under resourced buildings should at a minimum receive sufficient incentives to achieve capital cost parity with a like for like replacement for the life of the requirements. The City should study how to mitigate any (even small) operating cost increases for under resourced communities.

- **Phase 3, Phase out when cost parity is achieved:** City incentives should phase out when electrification reaches cost parity with a like for like replacement. (either with or without utility incentives.)
- **Ongoing, Approach to Incentives from Others:** City incentives should fit with existing utility incentives. And, the City should advocate for more utility, federal, or other incentives.

4.4 CITY INCENTIVE STANDARDS: LABOR STANDARDS AND OPPORTUNITIES FOR MINORITY- AND WOMEN-OWNED BUSINESSES

The City should ensure City incentive dollars support women and minority owned businesses and high-road jobs through labor standards that ensure job quality and equitable job access. To do that, the City should require contractors to meet many of the following requirements to utilize incentive dollars:

- 1) Women and Minority Owned Business
- 2) Commitment to high-road labor standards and prevailing wage as demonstrated through:
 - Certification, apprenticeship, or other worker skill requirements to engage a skilled and trained workforce.
 - Evidence of a skilled and trained workforce, abidance with building code and labor laws, OSHA 30 safety regulations, and a history of quality workmanship; contribution to state-approved and/or JATC apprenticeship programs with a graduation rate of at least 30%.
 - Healthcare, retirement, wage standards, such as prevailing wage requirements.
 - Use of best value/responsible contracting method in their contracting where they do not simply take the lowest bid, but rather contract to firms who provide the best total value to the community including less tangible factors like health benefits, retirement benefits, continued career opportunities (as defined in Colo. Rev. Stat. § 40-2-129).
 - Quality assurance and quality control processes to ensure high work quality and that equipment is installed, commissioned, and operating as designed.
 - Regional targeted and local hire requirements to ensure the participation of underrepresented workers and/or graduates from approved pre-apprenticeship, training and education programs.

The City should collaborate with Colorado’s Building and Construction Trades Council, industry associations, contractors and building managers to shape the details of the requirements for the use City incentive dollars.

The City should create a robust monitoring and enforcement program to monitor employment agreements and assure City incentive dollars help create high-road careers, local employment, and opportunities for minority and women owned businesses in conjunction with key stakeholders. The City should publicly report on how well the program is going and ways it could be improved annually.

5. WORKFORCE TRAINING RECOMMENDATIONS

The City should ensure that Denver has a trained workforce ready for the transition to net zero energy and the continued operation and maintenance of homes and buildings beyond the transition.

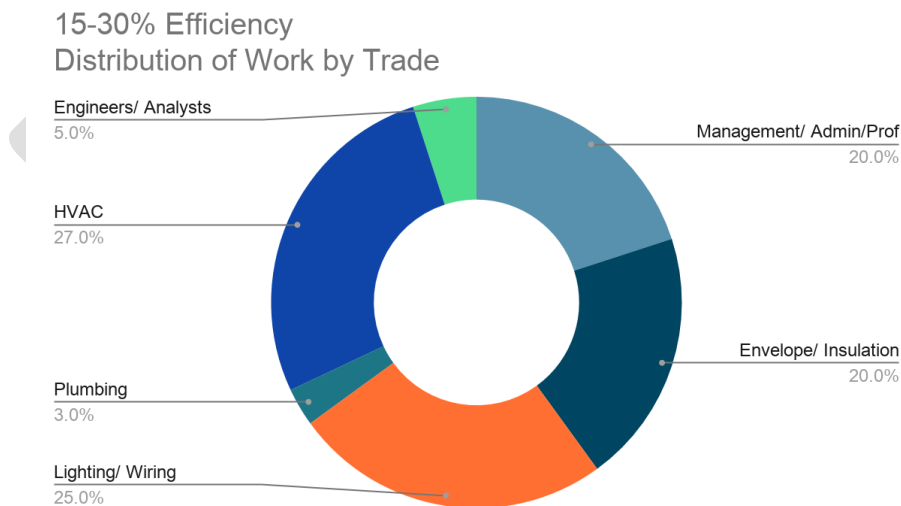
Decarbonizing Denver’s existing commercial and multifamily buildings will require an upskilling of the existing workforce and the training of new workers to meet the demand and the City’s Net-Zero Energy goals by 2040.

The Task Force recommends aligning the following recommendations with Denver’s broader high-road clean energy workforce vision: “Our vision is to create career pathways and expand opportunities for individuals from under-resourced communities and enable a just transition to support a climate-resilient and sustainable Denver.”

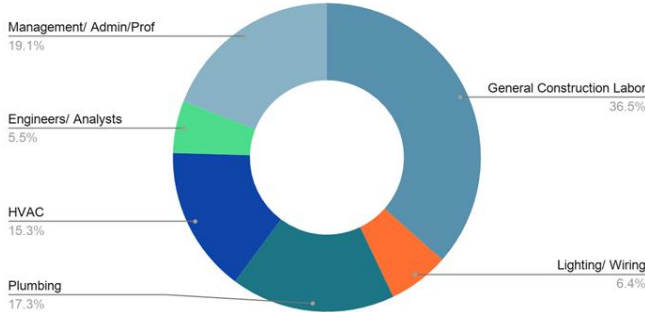
5.1 JOB CREATION

Building decarbonization jobs will include plumbers, electricians, carpenters, laborers, building engineers, contractors, property managers, solar installers, HVAC technicians, energy auditors, building performance technicians and insulators. A jobs analysis conducted by Inclusive Economics found that:

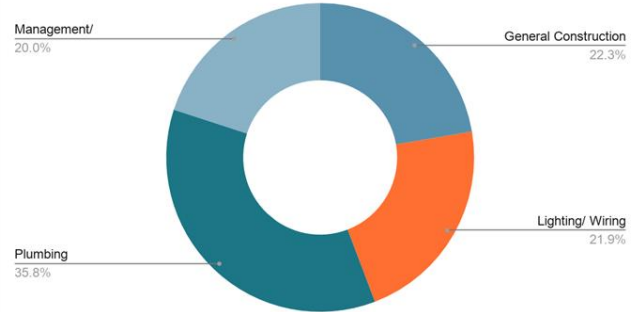
- Building decarbonization could result in 300 new 30-year careers in electrification and up to 1300 new 30-year careers in building efficiency in Denver.
- Efficiency is where you get the greatest jobs impact
- There is work for lots of different trades, not just electricians
- It’s not just quantity of jobs, but quality matters, policies matter!



Heating & Cooling Electrification
Distribution of Work by Trade



Water Heating Electrification
Distribution of Work by Trade



Without attention to job quality, the career-path potential of these jobs is unlikely to be realized. Policies to accelerate building decarbonization need to support the training and retention of skilled workers. Establishing labor standards is important to ensure that building decarbonization policy supports family sustaining careers, thereby building and retaining the skilled workforce necessary to achieve Denver’s ambitious building decarbonization goals.

5.2 EQUITABLE ACCESS (OUTREACH & EDUCATION)

The City should do the following outreach and education to give more equitable access into these jobs:

- Identify Community Based Organizations (CBOs) who can provide outreach, education, and recruitment to people from under-resourced communities, BIPOC & Women.
- Develop and fund an educational program about building decarbonization jobs in the construction trades for high school students.
- Partner with high schools serving under-resourced communities and people of color to implement programs.
- Help students and parents/guardians understand the career pathways these jobs that can lead to that are high-road, family sustaining careers.

5.3 TRAINING PROGRAMS AND PATHWAYS

The City should do the following to develop training and placement programs and pathways that prepare and support our workforce for this transition:

- Map out the workforce training ecosystem and define entry points for workers at different levels: new entrants, workers transitioning out oil and gas careers, workers in need of upskilling, low-wage workers. Denver should coordinate efforts with the State and others to avoid redundancy and maximize cumulative impact in this area.
- Work with and allocate ongoing City funding for local workforce partners, pre-apprenticeships, school districts/community colleges and CBOs to create training opportunities and a long-term pipeline of workers for decarbonizing the existing commercial and multifamily buildings through HVAC Contracting, Solar Installation, Building Engineering, Property Management, Plumbing and Electrical and other construction trades.

- Ensure safety is a critical focus area of all training funded provided by the City.

To build a pipeline of entry level workers to overcome the shortage of HVAC workers today the City should fund and build the capacity of entry level pre-apprenticeship training programs targeted at under resourced communities.

For current workers, the City should do the following to support upskilling and a just transition:

- Identify certifications, trainings, and job placement needed to do decarbonization work.
- Assess what institutions provide or can provide upskilling and training on new technology/certifications to existing and transitioning workforce.
- Provide employers/contractors with scholarships or stipends for upskilling training or certifications.
- Research which oil and gas careers may go away over time due to the broader transition of our economy (not this policy specifically). Provide workers transitioning out of oil and gas careers with scholarships or stipends for upskilling training or certifications to help them move into the building energy space.

For minority- and women-owned businesses, the City should provide capacity building support to enable them to take advantage of the growing work available in building decarbonization.

The City should monitor and report annually on how well the above is achieved with the dollars spent.

6. IMPLEMENTATION, MONITORING, EVOLUTION, ONGOING ENGAGEMENT RECOMMENDATIONS

The City shall implement the policy as specified here with oversight from a Technical Advisory Committee and regular check points that ensure the policy is achieving the climate goals, cost effectiveness goals, and racial equity goals laid out in this document. This also ensures flexibility over time and consideration of new technologies. The Task Force recommends revisiting the policy every four years.

6.1 EQUITABLE IMPLEMENTATION AND EVALUATION

To ensure equitable outcomes, the racial equity lens needs to go beyond policy development. To get measurable results, we recommend that the City:

- Ensure measurable outcomes by using the identified focus areas, indicators, and metrics
- Develop a Social Equity Index in 2021 to understand impacts and trends over time
- Develop and scope outreach to these buildings beginning in 2022
- Develop incentives and supports
- Develop programs and tools to prevent increased cost burdens and associated gentrification and displacement. The City should work to prevent additional rent burdens on people of color, low-income people, and community-serving businesses or nonprofits.
- Ensure ongoing community outreach to communities and people of color
- Use the mechanism to update policy based on racial equity outcomes
- Ensure funding is assessed based on racial equity

This policy can deliver benefits for people of color in terms of reduced energy bills and improved quality of housing and buildings. To ensure people of color see these benefits first, and to avoid unintended negative consequences, the City will target extra incentives and support to parts of the City with a history of poverty and redlining, and in which more people of color and historically disadvantaged communities live (see earlier sections on equity and incentives). We recommend that the city also:

- Identify more ways to get the benefits of this policy to communities of color first
- Proactively identify buildings in areas that serve people of color through the Social Equity Index
- Streamline/eliminate application for incentives and supports for buildings in areas that serve people of color

COMMUNITY OUTREACH

We recommend ensuring that community outreach continues after policy development and into implantation. Extra focus should be placed on outreach to communities and people of color to ensure measurable positive outcomes for racial equity.

6.2 TECHNICAL ADVISORY COMMITTEE

A Technical Advisory Committee as a recommending body will help the City assess the factors and implementation questions below.

On an **ongoing basis**:

- Decisions to adjust targets and timelines as needed for individual buildings
- Racial equity outcomes using the Racial Equity Lens
- How to enable off-site solar contracts for compliance by tall buildings
- Reviewing incentive design and incentive amounts needed
- Review appeals by any under resourced buildings who were denied additional assistance.

At a minimum **every four years** the Committee should do a larger review of:

- Alternative compliance options – ensure compliance is achievable for all and that climate goals are met
- Changes in availability of technology over time

The Committee shall **include representation** from the following groups:

- Property managers of apartments, condos, offices, warehouses, hotels, and other building types
- Low-income housing and non-profit building providers
- Building energy and HVAC system consultants and contractors
- Labor
- Environmental groups
- Utilities and energy producers

6.3 CITY STAFFING

CASR will need the following staff to implement the energy efficiency and renewable energy requirements, the incentives, and the community engagement recommended by the Task Force:

- 1) 5 new staff in addition to our one benchmarking staff to implement the energy efficiency and renewable energy requirements and to support buildings in electrification. These staff will oversee the program and hub, handle tracking and data management, run the technical advisory committee, handle enforcement, and manage the contract with the ~\$1 million/year contract with the resource hub that will support all buildings with compliance, with extra support for buildings in areas with high equity index scores.
 - a. These staff will support the 3,400 buildings impacted that are at or over 25,000 square covering 76% of energy use

Buildings Impacted	Large Buildings (≥ 25,000 sqft)	Small Buildings (< 25,000 sqft)
Buildings Impacted (#)	3,400	14,158

Total Building Area (%)	82%	18%
Total Energy Use (%)	76%	24%

- b. These staff will also support all the smaller buildings in preparing for and meeting the electrification requirements in large and small buildings:

Buildings by Space Heating Typology	Large Buildings (≥ 25,000 sqft)	Small Buildings (< 25,000 sqft)
Gas Furnace	1,501	5,946
RTU	940	5,238
PTAC	286	128
Boiler/ Steam Hydronic System	433	142
Buildings by Water Heating Typology	Large Buildings (≥ 25,000 sqft)	Small Buildings (< 25,000 sqft)
Individual System with Tank	467	3,256
Central System with Tank	2,093	5,097
Gas Point of Use System	843	5,805

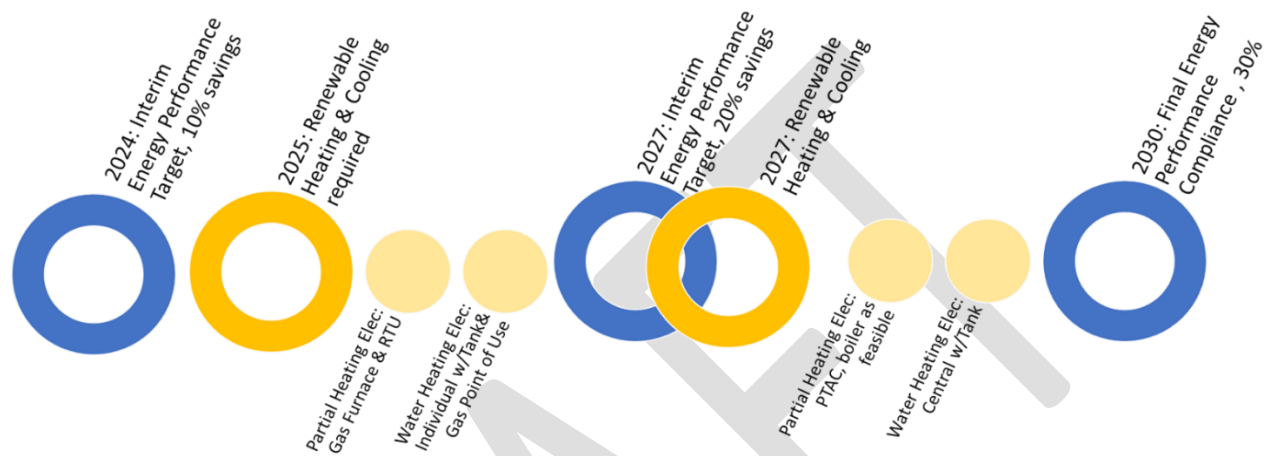
- 2) 3 staff to develop and manage contracts for all incentives the Task Force recommends.
- 3) 1 staff to manage the recommended community engagement as part of implementation

CPD will need x new staff to support the increase in walk through permits and plan reviews of engineering drawings as buildings move to electrifications. CPD should also upgrade their permitting system to track progress on electrification and the number of gas systems vs heat pump systems installed each year. The anticipated new plan reviews by year are shown here, with estimated staffing levels needed each year:

Fill in actual CPD needs.....coming soon.

7. HOW IT ALL COMES TOGETHER

We recommend the policy and supports developed in this document. These need to address equity, workforce, outreach and the capability of flexibility and revisiting the policy to ensure outcomes and incorporation of new practices, technologies, and approaches. From a high level, there are detailed policy requirements for energy efficiency and renewable energy as well as renewable heating and cooling (electrification) requirements for existing buildings as shown in the timeline below.



This policy also helps meet Denver climate goals and the goal of the Task Force to meet the goals and make it achievable for Denver. As a result, these recommendations save Denver 10.8 million tons of CO₂e saved through 2040 (cumulative carbon reduction).

7.1 WHAT ELSE IS NEEDED TO REACH THE GOAL? CONSIDERATIONS FOR FUTURE POLICY REVISIONS

The task force recommendations above fall about 3 million tons short of the cumulative emission reduction goal given to the task force. But, the recommended policies achieve as much as the task force feels is reasonable and achievable for building owners and managers in Denver given today's technology, practices, and approaches. The City should continue to investigate how to make up the gap. The following ideas that were rejected at this time but might be considered along with new ideas in the future.

- Require a LED lights in all buildings under 25,000 square feet.
- Lower the size threshold for the Energy Efficiency and Renewable Energy requirements to 10,000 sq ft.
- Require solar panels on some or all buildings.
- Require partial or full electrification of HVAC systems at end of system life even when less cost effective as compared to a like for like replacement.
- Require partial or full electrification of HVAC systems when they are not at end of system life.
- Require more than 30% energy savings across the building stock.

There are likely many solutions and policy ideas that haven't been thought of yet that can also help fill the gap. The City, with help from the Technical Advisory Committee, and other stakeholders, should continue to strive to achieve Net Zero Energy existing buildings by 2040.

DRAFT