Steven Winter Associates, Inc.
Improving the Built Environment Since 1972

City of Fort Collins Building Performance Standard

COST BENEFIT ANALYSIS

BACKGROUND

In 2021, the City of Fort Collins, in partnership with residents and businesses, established a strategic goal to reduce 2030 greenhouse gas emissions by 80% below 2005 baseline levels. Fort Collins' buildings make up over two thirds of local community carbon emissions, and thus are the largest opportunity for carbon savings. The City Our Climate Future Plan, the community guide to address climate, waste and energy goals, identified Building Performance Standards as a Next Move under Efficient, Emissions Free Buildings.

This report estimates the overall costs and benefits associated with implementing a Building Performance Standard for buildings over 5,000 square feet located within the City of Fort Collins. The costs are based on lessons learned from other jurisdictions, local energy and cost data, and on-the-ground energy efficiency experience and technical expertise.

BUILDING PERFORMANCE STANDARDS

Building Performance Standards (BPS) are policies that require energy use reduction in existing buildings. A BPS mandates building owners to meet performance targets by actively improving their buildings over time. By 2023, thirteen U.S. cities and states had passed legislation to implement a BPS. These policies are unique to each jurisdiction with no one-size-fits-all approach. Fort Collins reviewed existing policies as part of the work to determine a localized approach for the community.

The main components of the recommended building performance policy are outlined in table 1.

Table 1: Building performance standards elements

Covered Buildings	Commercial and multi-family buildings 5,000 SF and above	
Performance Targets	Using 2022 data, average energy use was determined for ENERGY STAR ® Portfolio Manager ® building types and achievable reductions were applied to end uses. If a building is:	
Compliance	**10,000 SF+**	**5,000 – 10,000 SF**
	Buildings must meet the established targets by 2030	Buildings must meet the established targets by 2035
Alternative Compliance Options	**10,000SF+**	**5,000 – 10,000 SF**
	If the established target represents greater than a 25% from baseline, buildings are not required to exceed a 25% reduction. Mixed use buildings can request a blended target to account for various use types.	If the established target represents greater than a 15% reduction from baseline, buildings are not required to exceed a 15% reduction. Mixed use buildings can request a blended target to account for various use types.
Exemptions	The following property types will be exempted from having to comply: Industrial, indoor agricultural, manufacturing, single family residential, public buildings	
Penalties	$0.70/kbtu	$0.70/kbtu

ENERGY AND GREENHOUSE GAS COST SAVINGS

All energy, greenhouse gas (GHG), cost, and savings figures are presented as cumulative totals between 2025 (an assumed starting point of the policy) and 2035 (the proposed final compliance year for local buildings). These values are the result of assumed compliance for all covered buildings required to meet their respective target, with the savings caps described above in place. Savings are assumed to gradually accrue until the final compliance periods.

To estimate the impact of the building energy performance standards, the analysis team developed a model that applied the performance standards to a draft covered buildings list. The analysis team then calculated the cumulative impact of the potential standards on energy use, energy cost, retrofit capital cost, administrative costs, and GHG emissions. The cumulative impacts were measured from the years 2025 to 2035 to estimate the ten-year savings for both large and small buildings. The ten-year time model also allows for sensitivity to changes in energy and capital costs. While the energy and greenhouse gas savings will extend beyond the timeframe of this policy, they were capped at 2035 in this study, the final year for small buildings to comply.

Table 2: Cumulative Impacts of a BPS from 2025-2035

Benefits		Costs	
Avoided Social Costs of Carbon ($)	$534,900,000	**Capital Cost**	$226,400,000
Energy Savings ($)	$194,800,000	**Program Administration Cost**	$3,188,000
Total	**$729,700,000**	**Total**	**$229,588,000**

Energy Use

The 2025-2035 cumulative result of a BPS in Fort Collins could lead to energy savings of over 8,000,000 MMBtus. On an individual building level, this will likely result in lower utility bills. Buildings that follow efficiency upgrades similar to those proposed in the BPS have shown to average energy bills that are "at least $0.50 per square foot lower per year, or 35% lower than the average office building."[1]

Greenhouse Gas Emissions

The 2025-2035 cumulative result of a BPS in Fort Collins could lead to a reduction in greenhouse gas emission of 0.8 Million Tons of CO2e. This is equivalent to the annual emissions of nearly two natural gas fired power plants.[2]

Social Cost of GHG emissions

When factoring in the avoided social cost of greenhouse gas emissions, such as health effects, property damage from climate-related natural disasters, and the disruption of energy systems, the benefit increases to $3.18 for every $1 in cost. When considering only energy savings, BPS implementation has a projected benefit of $0.85 for every $1 in cost spent between 2025-2035.

[1] Air Pollution Control Division. (2023). *Cost-Benefit Analysis.* Colorado Department of Public Health and Environment.
[2] United States Environmental Protection Agency. *Greenhouse Gas Equivalencies Calculator.* Greenhouse Gas Equivalencies Calculator | US EPA

O&M Considerations

Operations and maintenance (O&M) costs are the costs associated with "obtaining, installing, operating, and maintaining the equipment to meet the performance standard"[3]. While these costs are not factored into the above cost/benefit ratio, a statewide analysis of O&M costs shows that even when using high-end estimates of upfront O&M costs, the benefit cost ratio remains over 2.5 for the state of Colorado[4]. Studies have demonstrated that energy efficiency upgrades lower building operation costs by 30% on average, and lower maintenance costs between 25%-30%[5]. Initial O&M costs for installing and operating equipment vary depending on the measures being implemented. For example, a statewide analysis of partial and full electrification of gas furnaces was shown to increase O&M costs between 5-8.5%. However, partial and full electrification using heat pump rooftop units decreased annual operating costs between 5-9.7%. Colorado State's analysis of the costs of BPS implementation calculated a total O&M cost of $229,705,746 across 8,000 affected buildings. This roughly amounts to an O&M cost of $28,713 per building. Energy savings resulted in over $5 billion, or $644,325 per building[6].

IMPACT COMPARISONS

The analysis team calculated the annual and cumulative energy use and associated costs and emissions for the years 2025-2035, shown in Table 3, without a BPS policy. No capital cost was assumed under the baseline case, as the technical analysis considered the total capital cost of upgrades without including business as usual equipment replacements.

Table 3: Baseline case vs BPS compliance scenario

Category	2022 Annual Totals (No Policy) All Buildings	2025-2035 Cumulative Totals (No Policy)	2025-2035 Cumulative Totals (BPS Compliance)
Electricity Use (Million Btu)	2,340,434	28,085,209	23,408,540
Electricity Savings (Million Btu)	-	-	4,676,670
Gas Use (Million Btu)	2,456,584	29,481,416	26,022,363
Gas Savings (Million Btu)	-	-	3,459,053
GHG Emissions (Million Tons CO2e)	0.4	5.3	4.5
GHG Emissions Savings (Million Tons CO2e)	-	-	0.8
Energy Cost (Million $)	$89	$1,214	$1,019
Energy Cost Savings (Million $)	-	-	$194
Capital Cost (Million $)	-	-	$226.4

[3] Air Pollution Control Division. *Cost-Benefit Analysis.*
[4] ibid
[5] ibid
[6] ibid

BPS Groups

The proposed BPS policy applies to buildings between 5,000 and 50,000 SF and will allow for smaller buildings (5,000-10,000 SF) to delay compliance. While the State of Colorado requires all buildings over 50,000 SF to comply with a statewide BPS, the City of Fort Collins may also consider enforcing compliance for those buildings as well. To better understand the variances between these the impact and costs, the study team created three building groups. The three size groups were adopted for the modeling portion of the technical analysis and referenced within as 'BPS Groups':

Table 4: Group descriptions

Group	Size	Model Start Year	Interim Target Year	Final Target Year
Group 1	5-10k City	2025	2030	2035
Group 2	>10k City	2025	2027	2030
Group 3	State	2025	2027	2030

The table below describes the differences between savings in each BPS Group.

Table 5: Group results

Group	Group 1 (5-10k SF City)	Group 2 (>10k SF City)	Group 3 (State)
Floor Area	2,518,855	37,096,230	14,145,840
Parcel Count	358	815	102
Parcels Retrofitting	243	506	47
Energy Savings (Million BTU)	221,245	4,686,610	3,227,869
GHG Savings (Million Tons CO2e)	0.02	0.4	0.4
Capital Costs (Million $)	$14.9	$171.3	$40.2

COST IMPLICATIONS

Building Owners and Tenants

Building owners commonly see cost savings from implementing energy efficiency measures. Studies have demonstrated reductions in onsite energy demand can lead to average energy bills approximately 35% lower than those of an average office building[7]. Further studies have also shown that building operating costs can drop 30% following green building upgrades, and maintenance costs may decrease between 25-30% as well[8,9] Electrification also has the benefit of adding stability and predictability to long-term capital planning.

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[7] ibid

[8] Washington DC Department of Energy & Environment (2022). *Cost and Benefit Impact Study of the Building Energy Performance Program.* https://dc.beam-portal.org/api/v3/media/helpdesk/attachments/kb/BEPS/79/BEPS_Cost-Benefit_Study.pdf

[9] Air Pollution Control Division. *Cost-Benefit Analysis.*

Depending on how far an individual building is to the target, building owners may have to take on expenses. Building owners might pass on the cost of implementing this rule to their tenants, which could lead to higher rents. In addition to pass-through-costs, there is the risk that implementation of the proposed building performance standards could "harm equity priority communities through gentrification and housing displacement, while benefiting landlords."[10]

However, tenants typically see economic benefit from this policy as well through lower utility bills. On average, packaged renovations and retrofits have shown to reduce operating costs by 11.5% and 17% respectively. If tenant utility bill reductions are equal to the rent increase, then the change in costs could be net neutral. Additionally, the reduction in demand also reduces risks associated with accelerating utility costs or spikes."[11]

Other issues may arise with communication and clarity of rule requirements, technological comprehension of reporting and compliance software, and funding for under-resourced buildings. It is in the public's best interest to keep the compliance process as simply and streamlined as possible.

Government Administration

BPS implementation costs are estimated between $200 - $400 per building per year where data exists for other jurisdictions, meaning Fort Collins would need to invest between $240,000 and $575,000 per year for staffing and external contractors.

Due to the existing Building Energy and Water Scoring program, the City of Fort Collins has already invested the key infrastructure needed to run a BPS program. Key infrastructure includes:

- A benchmarking database and disclosure map
- External communication materials (website, guidance documentation, FAQs)
- Industry engagement and education on building performance measurement
- Internal staff to manage a program

Fort Collins may be on the lower end of these ranges because these investments have been made.

Table 6: Administrative cost estimates for a BPS

Building Size	Cost range
5,000 SF+ City Buildings	$205,800 - $411,600
5,000 SF+ City and State Buildings	$255-000 - $510,000

Opportunities for Cost Mitigation

While there are significant expenses associated with program implementation, there are incentives available for both city government and building owners through state and federal funding. The 2022 Inflation Reduction Act (IRA) is $370 billion investment in clean energy solutions across the economy[12] and represents the most significant federal action on the topic. The funding in this package will flow to local jurisdictions through grants, loans, rebates, incentives, and other investments to local governments and utilities. The funding from this program is designed to alter the market and encourage electrification on multiple fronts. The IRA contains

[10] Ibid.
[11] Dodge Construction Network. (2021). *World Green Building Trends 2021.* https://www.construction.com/resource/world-green-building-trends-2021/
[12] Cleanenergy.gov. (2022). *Inflation Reduction Act Guidebook.* https://www.whitehouse.gov/cleanenergy/inflation-reduction-act-guidebook/

funding for many elements, electric grid modernization, electric vehicle charging infrastructure, battery supply chain support, public transportation, and clean energy generation.

A suite of programs within the IRA address building efficiency in particular:

179D – Energy Efficient Commercial Building Deduction

179D is a $0.50-$1.00 tax deduction per square foot for buildings achieving a range of reductions in energy use from a qualified retrofit baseline or ASHRAE 90.1 guidelines. A larger bonus up to $5.00 per square foot is available if certain labor requirements are met. The ASHRAE pathway must use Internal Revenue Service (IRS) approved modeling software and for both pathways, a qualified person must certify savings. Lighting, HVAC, and envelope improvements are covered, and the deduction applies to existing buildings and new construction.

Clean Electricity Investment Tax Credit (ITC)

The ITC provides deep reductions for clean energy system costs (including solar, wind, geothermal, energy storage, microgrid controllers and dynamic glass) via a credit of up to 30% of cost. Up to an additional 20% credit is available depending on the location of the project within a designated “energy community”.

Multifamily Components

Specific sections apply to multifamily properties. These are described here to highlight the breadth of the incentives:

- 45L Tax Credit - Energy Efficient Home Credit: For buildings meeting energy efficiency targets
- High Efficiency Electric Home Rebates (HEEHRA): Rebates for electric HVAC equipment upgrades
- Home Energy Performance-Based Whole-House Rebates (HOMES): Rebates for energy-saving retrofits, include heat pump installation

Funding for Local Government, Utilities, and Non-Profits

- Technical assistance for building energy code adoption: $1B grants to help local governments adopt and implement new energy codes
- Greenhouse Gas Reduction Fund: $27B to be distributed to Green Banks or similar
- Environmental and Climate Justice Block Grants: $3B for local governments and nonprofits for disadvantaged communities
- GHG Planning and Implementation Grants: Support for municipalities to develop and implement plans for reducing GHG emissions
    - Includes support for development of BPS
- Advanced Industrial facilities deployment program
- State Home Efficiency Contractor Training Grants

EXTERNAL BENEFITS

In addition to the greenhouse gas savings from implementing a BPS, there are several other benefits that were not explicitly quantified for this analysis but should be considered as part of the policy discussion.

Creation of New Local Jobs

The development of building performance standards will increase the demand for workers in the building efficiency and renewable energy industries. According to the International Energy Agency, six to fifteen jobs are created for every $1 million USD spent on building efficiency[13.] Additionally, it is anticipated that between 2019 and 2029 the job growth for HVACR mechanics and installers will be 4%[14]. This increases the demand for both union and non-union trade workers and supports workforce growth and development in these industries throughout implementation. Qualified technicians are required for the growing number of sophisticated climate-control systems, driven by the demand for energy efficient equipment in commercial and residential buildings. On average, workers in the energy efficiency industry "earn 28% above the national median wage"[15]. Therefore, building energy performance standards will drive the growth of quality employment in Fort Collins throughout its life cycle.

Health and Safety

The necessary upgrades buildings will be required to make due to the development of building performance standards will ultimately decrease health and safety risks for residents. While Fort Collins does not require electrification, it may encourage it. Electrification eliminates equipment using gas or liquid fuels that require on-site combustion. The combustion process releases air pollutants such as methane, nitrogen oxides, carbon monoxide, and particulate matter that are damaging to human health. For example, studies have linked respiratory illness cases to gas cooking[16]. Children are particularly vulnerable to these health impacts; children living in a home with a gas cooking stove have a 42% increased risk of current asthma and a 24% increased lifetime risk of asthma[17]. BPS policies may drive the replacement of this equipment with those such as heat pumps and induction stoves that do not require a chimney, gas line, oil tank, or the burning of fuels. It will also drive action in older buildings that may have higher retrofit needs including deferred maintenance like critical health and safety improvements, poor envelope performance, and outdated wiring and HVAC distribution systems. This is even more significant for older buildings that serve low- and moderate-income households. Overall, the implementation of BPS will create a healthier and safer environment for building occupants including its most vulnerable members.

Increased Economic Competitiveness of Building Owners

In addition to operating cost benefits, studies have shown that energy efficiency upgrades add consumer desirability and raise demand for building occupancy[18]. Green buildings or buildings with higher-than-average efficiency have demonstrated occupancy rates up to 18% higher than average, greater occupancy retention,

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13 Air Pollution Control Division. *Cost-Benefit Analysis.*
14 U.S. Bureau of Labor Statistics. (2023). *Occupational Outlook Handbook: Heating, Air Conditioning, and Refrigeration Mechanics and Installers.* https://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm#tab-1
15 Air Pollution Control Division. *Cost-Benefit Analysis.*
16 Kalinoski, Gail. (2020, November 16). Cutting Carbon Emissions Through Electrification. *Commercial Property Executive.* v https://www.commercialsearch.com/news/cutting-carbon-emissions-through-electrification/
17 Emerald Cities Collaborative. (2020). *The Building Electrification Equity Project.* https://emeraldcities.org/wp-content/uploads/2021/04/BEE_Report_Final.pdf
18 Colorado Department of Public Health and Environment.

and a 5.9% higher net operating income[19,20]. Due to market demand for green buildings, building owners are able to charge higher premiums for leased spaces[21]. Green building upgrades may also add between 2%-17% to a building's resale value[22]. Investor, tenant, and regulator perceptions of energy efficient buildings contribute to added value and consumer desirability of green buildings. Tenants prefer to lease space in green buildings and expect buildings to demonstrate their commitment to sustainability[23]. Building performance standards provide a metric for stakeholders to gauge progress towards responsible business practices, and as a result, green building upgrades for building owners. Failing to comply with building performance standards may reduce the economic competitiveness of building owners, as stakeholders perceive non-compliance as a failure to commit to responsible business practices[24].

METHODOLOGY FOR COST ANALYSIS

Creating the Potential Covered Buildings List

Using a combination of Fort Collins property records and benchmarking data, the floor area and covered buildings were identified using the size thresholds and buildings definition in the proposed BPS policy.

For all building types, the various definitions rules were applied to buildings with floor area over 5,000 SF:

- If the building did not submit benchmarking data, the Land Use Code was used to determine the occupancy type.
- Exempt use types and publicly owned buildings were filtered out
  - College/University
  - Data Center
  - Hospital (General Medical & Surgical)
  - Manufacturing/Industrial Plant
  - Parking
  - Public Buildings

Mapping baseline energy use to non-benchmarked buildings

Reported buildings were assigned energy use based on known distribution from benchmarking data. For buildings without energy benchmarking data (n=106), the methodology for mapping energy data to buildings without energy data was the same for all building types. The known energy distribution from statewide benchmarking (Boulder, Denver, and Fort Collins combined) was averaged by use type and the median Electric EUI and Gas EUI was applied to the properties of the same use type. Electric and Gas kbtus were then estimated using the GFA of the property found in the county tax assessor dataset. On aggregate, the impact of achieving targets can be estimated this way, even if the energy use for a given non-benchmarked building would not be accurate for that specific building.

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19 CBRE. (2023), *U.S. Building Performance Standards in 2023 and Beyond.* https://www.cbre.com/insights/viewpoints/u-s-building-performance-standards-in-2023-and-beyond
20 Colorado Department of Public Health and Environment.
21 Ibid.
22 Ibid.
23 CBRE. *U.S. Building Performance Standards in 2023 and Beyond.*
24 ibid.

Approximating the Energy Reduction Paths of Covered Buildings

For all covered buildings, evaluated on the building level, the following analysis is performed to calculate the impact of the final performance standard:

- If the building had a lower site EUI than the final performance standard, the energy use did not change (building maintains current energy use through the entire BPS period).
- If the building had a higher site EUI than the final performance standard, energy is lowered to the final performance standard or to the cap (whichever requires less of a reduction) by reducing gas use and electricity use through energy efficiency. Once the Energy Efficiency (EE) threshold is met through efficiency retrofits, and if the building's target is lower than the EE target for that occupancy type, further energy reductions are made through electrification of gas equipment, while increasing electricity proportionally as a result of the conversion from gas to electric equipment. If electricity needs to be further reduced after gas use is eliminated, it is reduced until the final performance standard is met by the final compliance cycle.

Specifically, retrofits happen in this order for each building to meet the interim target and the final year target:

1. If gas EUI was greater than the gas component of the EE threshold, gas use was reduced through efficiency work (without electrification).
2. If electricity EUI was greater than the electricity component of the EE threshold, electricity used was reduced toward the electricity component of the EE threshold.
3. If more reduction was needed, uses were electrified to meet the target.

Baseline energy use was based on calendar year 2022 benchmarking data, the most current year of data available for this technical analysis. From that baseline, each covered building was assumed to meet the interim and final year performance targets by the compliance deadline and maintain interim performance until the next deadline.

Cost Assumptions

Utility Rates

Fort Collins utility rates were utilized to estimate costs per kbtu. To estimate electricity rates specifically, the business and residential rate classes were averaged at $0.10/kWh. A 5% escalation rate was then applied to both gas and electricity to estimate rates in future years.

Table 7: Estimated Utility Rates

Fuel	Period	**Class**	**Cost**	**Unit**
Natural Gas	Current	All	$0.7897	$/therm
Electricity	Current	Business	$0.0899	$/kWh
Electricity	Current	E200 | GS	$0.1162	$/kWh
Electricity	Current	E250 | GS25	$0.1033	$/kWh
Electricity	Current	E300 | GS50	$0.0979	$/kWh
Electricity	Current	E400 | GS750	$0.0767	$/kWh
Electricity	Current	E600 | Substation	$0.0716	$/kWh
Electricity	Current	All	See below	$/kWh

Retrofit Costs

The costs to retrofit a building were estimated based on data from historical Efficiency Works Business tracking data (verified against CA CEDARS, ComEd planning, Xcel planning and actual data), as well as Steven Winter Associates' research and retrofit experience. Costs were separated into three different categories: Electric energy efficiency measures, Natural Gas energy efficiency measures, and Natural Gas system replacement. Costs were estimated by kbtu/sqft for each use type.

Disclaimer on Retrofit Capital Costs

While best estimates are used to develop total retrofit costs for measures, each measure is subject to a wide variety of factors within and outside the building. Each cost estimate should be interpreted as a rough estimate that is the result of a high-level review of building conditions and applicable measures. Costs are total equipment and labor costs, not including avoided costs of existing equipment replacements, incentives, or financing agreements which may reduce initial capital costs, all of which are components of developing a net cost of each measure for each building.

GHG Assumptions

Greenhouse gas emissions factors from energy consumption were provided by the City of Fort Collins. The emissions factors provided by SPP were used to calculate future ghg savings.

Table 8: GHG emissions factors

Fuel	Period	Metric	Conversion
Natural Gas	Current	0.0052 MTCO2e/therm	0.052 kg/kBtu
Electricity	Current	0.460853 MTCO2e/MWh	0.135 kg/kBtu

Natural gas emissions factors are calculated to remain constant through the 2035 period at 0.135/ kg/kBtu.

Electricity emissions factors are currently estimated to also remain constant at 0.135 kg/kBtu through the 2035 period for this exercise. Keeping the factor constant assumes no savings are claimed through the decarbonization of the electricity grid through 2035. Calculations can be adjusted, however, to reflect changes to the grid during the compliance period and separate savings from a BPS as compared to those resulting from the grid.

The Social Cost of Carbon, and the savings realized by the reduction in GHG emissions, is calculated as a net present value across the ten-year plan of the BPS implementation. A social cost of $190 per metric ton of GHG emissions for 2020 to 2030 and $230 per metric ton of GHG emissions for 2030 to 2035 were used along with a discount rate of 2.0%. These values were provided by an EPA Impact Analysis released in 2022.[25] A 'Business as Usual' scenario social cost was calculated by assuming that the 2025 GHG rates would stagnate throughout the ten-year time horizon. A BPS scenario social cost was developed by decreasing the GHG emissions at the same yearly relative percentage rate as the gas use decrease, using the current 2025 and the projected 2035 GHG emissions rates. Once the net present value of each scenario's social cost was calculated, the two were compared to realize the savings from the BPS implementation.

[25] U.S. Environmental Protection Agency. (2023). *EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances.* https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf

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APPENDIX:

Calculation Steps for a Sample Building

1) Example building: Multifamily Building (FC1113)
    a. Elec EUI: 22 kBTU/SF
    b. Gas EUI: 41 kBTU/SF
    c. Site EUI: 63 kBTU/SF
    d. Floor Area: 136,527 SF
2) Building Final Performance Standard was assigned by occupancy type. The EE target was used for this example:
    a. Multifamily Target: 43 kBTU/SF Site EUI
    b. Because the difference between the target and the baseline is 32%, a cap of 25% was applied and set the new standard to 47 kBTU/SF
3) Interim Performance Standard Target were calculated as halfway between current site EUI and final standard
    a. Interim Performance Standard: 55 kBTU/SF
4) Electrification site EUI ratio was calculated per occupancy type using this calculation, which is the weighted average of the electrification ratios for each end use in the building, weighted by the estimated energy use of each end use for the occupancy type[26]:
    a. (ZNC elec EUI – elec_EE EUI) / gas_EE EUI)
    b. = 26 - 16 / 27 = 0.36
5) The building's gas EUI and electricity EUI were both higher than the Energy Efficiency thresholds, so energy efficiency work is modeled to be done to meet the target.
6) For Interim Performance Standard
    a. Electricity use was reduced by 2 kBTU/SF through energy efficiency.
    b. Gas use was reduced by 6 kBTU/SF through energy efficiency.
        i. The building was able to reduce gas use to make up the rest of the way to the target without going below the gas EE threshold
    c. Resulting EUI was 63 – 2 – 6 = 55 kBTU/SF and the building met the Interim Performance Standard.
    d. Using the occupancy type specific capital costs for different end uses on a $/kBTU savings basis, costs to meet each target are estimated as:
        i. 2kBTU/SF of electricity energy efficiency work * $0.32/kBTU = $89,979
        ii. 6kBTU/SF of gas energy efficiency work * $0.20/kBTU = $162,222
7) For Final Performance Standard, repeated step 6 using the Interim Performance Standard result as the new baseline energy use
    a. Electricity use was reduced by 1kBTU/SF through energy efficiency which costs $60,286
    b. Gas use was reduced by 7kBTU/SF through energy efficiency which costs $181,002.
8) Electricity and gas EUI were multiplied by floor area to do citywide impact calculations in kBTU

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[26] Elec_EE EUI and gas_EE EUI are the electricity and gas components of the EE target, as calculated in the CNCA tool. These EUIs are used to compare an individual building's electricity and gas use to the assumed optimal efficiency EUI in each energy type. Achieving a gas EUI lower than the gas_EE EUI in a building would likely require some form of electrification.