Retrocommissioning and Building Tune-Up Policies

KEY FINDINGS

This fact sheet reports the costs, benefits, and city experiences of designing and implementing retrocommissioning and building tune-up policies. These policies can be an affordable and effective tool for policymakers to achieve meaningful GHG emissions reductions from energy efficiency actions in buildings.

The cities assessed used between 1.5 and 2 full-time equivalent employees in the policy design phase. IT infrastructure and consultant costs were the largest expenditures in both the design and implementation phases. One city projected greenhouse gas emissions reductions to be 5% in covered buildings in the first year of compliance. The city also projected 31.6 to 37.9 new direct jobs created per 100,000 residents due to building retrocommissioning and tune-up activity.

Retrocommissioning and building tune-up policies require building owners to improve the operations and performance of existing building systems. A *tune-up* (or *retuning*) refers to identifying energy-saving opportunities and optimizing building energy systems to achieve those savings (Gahagan 2021). Generally, tune-ups require little to no investment in capital improvements in building systems (e.g., purchasing new equipment); rather, they involve reprogramming, adjusting, and optimizing the systems already in place. *Retrocommissioning* is a different but related process that targets, among other systems, the control and coordination of the building automation system. Retrocommissioning can but does not necessarily lead to energy savings. Tune-ups and retrocommissioning do not achieve savings year after year unless performed periodically, so cities will generally require complying buildings to conduct tune-ups on a set schedule, such as every five years.

Though retrocommissioning and tune-ups differ in practice, we present these policies alongside each other in this fact sheet because the activities are related, programmatic costs and benefits are similar, and breaking out by each type of policy could compromise city anonymity.

The Environmental Protection Agency (2019) estimates that retrocommissioning can achieve energy savings of 15% in commercial buildings and pay back the initial investment within eight to nine months. Four major cities have adopted stand-alone retrocommissioning or tune-up policies, and several more cities list the action as a compliance option in their benchmarking-plus policies.

This fact sheet is part of *By the Numbers*, a series on the administrative costs and community-wide benefits of local energy efficiency policies. The populations of the jurisdictions that we studied as part of this series ranged from 100,000 to more than 1 million. We identified the following trends based on interviews with staff for three cities

participating in the project. To view other entries in the series, please visit the *By the Numbers* web page.[1]

Costs of Retrocommissioning and Building Tune-Up Policies

Cost data on retrocommissioning and building tune-up policies are scarce. Table 1 illustrates design, implementation, and participant costs (i.e., costs to building owners) using anonymized data provided by three cities. Detailed cost tables can be found in Appendix A.

Table 1. Costs of retrocommissioning and building tune-up policies

	Design costs		Annual implementation costs		Participant costs
City	FTEs used	Other costs	FTEs used	Other costs	Financial expenses
City A	1.5	$30,000+	0.5*	$70,000+	Cost of hiring specialist or cost of exemption
City B	—	—	Unknown**	Mailers	—
City C	1.75	$694,000	1.5***	$284,775+	—

***City's reported FTEs were insufficient to successfully implement the program. **City reported that a small team spends some of its time working on the policy. It is unclear how many FTEs the city needs to implement the policy. ***City uses 2.5 FTEs for implementation; however, the city hired consultants to provide one of these FTEs. The cost of this FTE ($150,000) is included in consultant costs; here we show the number of local government FTEs used for implementation. Also note: We allowed cities to delineate design and implementation costs; however, formal adoption of the policy was a typical milestone marking the switch from the design phase to the implementation phase. Therefore, design costs can generally be read as one-time costs occurring prior to formal adoption of the policy, and implementation costs can generally be read as annual, recurring costs, although in some instances one-time costs may exist during the implementation phase. Design phase costs are the total amount spent for the entirety of the design phase, which generally lasted one to two years.**

Overall, cities faced three common costs during the life cycle of a retrocommissioning or building tune-up policy: staff, IT infrastructure, and consultant costs. Staff costs and those related to IT infrastructure were generally the largest expenditures.

The design phase required between 1.5 and 1.75 FTEs, and there were $30,000 to $694,000 in other costs for the cities that shared these data. The difference in these other costs

[1] For more information on our methodology and scope of research, please see the topic brief in the *By the Numbers* series.

between City A and City C are predominantly due to City C spending $549,000 over three years to develop an online portal to accompany the policy.

Further, City A reported that implementation currently uses 0.5 FTEs but noted that a greater number of FTEs is necessary to effectively implement the policy. City A also hired a consultant that covered 1 FTE at a total cost of $70,000. Similarly, $150,000 of City C's implementation costs went toward a consultant that covered the equivalent of 1 FTE. Further, the city spends $134,775 annually for IT maintenance.

One city reported that if a building applied for and received an exemption, the cost to the building was very little. Buildings that were not exempted and had to comply with the retrocommissioning or tune-up requirement incurred the cost of hiring a specialist to perform the work.

Benefits of Retrocommissioning and Building Tune-Up Policies

Only one city reported realized benefits data on these policies. For the other cities, it was either too soon to know the impact of their policies or the data had not been collected. However, it is possible to gain some early insights into the effectiveness of these policies. Table 2 lists the benefits of retrocommissioning and building tune-up policies.

Table 2. Benefits of retrocommissioning and building tune-up policies

		Community-wide		
City	Reporting period	Percentage of building stock required to comply	Emissions reductions	Jobs created (per 100,000 residents)
City A	One year (projected)	10%	5%	31.6 to 37.9 direct jobs
City B	—	1.3%	—	—
City C	One-year average	7%	10,300 $MTCO_2e$	—

Percentage of building stock required to comply was calculated by dividing the total number of buildings required to comply with the policy as provided by the city by the total building count for that city as listed in the NREL's State and Local Planning for Energy database (NREL 2022).

One city projected that its policy will result in a 5% reduction in greenhouse gas emissions from covered buildings in the first year of compliance. Further, this city estimated that the policy will create 31.6 to 37.9 direct jobs per 100,000 residents. While developing its policy, the city conducted a study using one municipal building; the building realized cost savings of $24,000 per year.

In addition to the above benefits, retrocommissioning and building tune-ups can improve indoor air quality and occupant comfort (EPA 2014).

OBTAINING ASSET-LEVEL DATA

One city's compliance report allowed the city to capture details on the type of equipment used in buildings. Asset-level data can help cities set more appropriate standards and regulations when considering other energy efficiency requirements, such as building performance standards.

Policy Design and Adoption Process[2]

KEY TASKS AND ACTIVITIES

Stakeholder outreach and community engagement, especially with the segments of the real estate community likely to be affected by the policy, are important during the design phase. City A stated that deciding on the differences between the legislation language and the regulation language was a key task during the design phase. The city reported that it is important for the legislation to set savings targets requiring buildings to achieve a specified level of energy or emissions reductions. However, the legislation should exclude specifics on implementation. This allows the city to make changes to program implementation administratively through rulemaking without needing to go through the legislative process. The city reported that the rulemaking process required significant stakeholder engagement. A second city convened a technical advisory group to participate in the rulemaking process. And a third noted that a simpler policy will likely result in a better compliance rate.

[2] Information included in this section and in the Policy Implementation section that follows is specific to retrocommissioning and building tune-up policies. It should be considered along with the general trends identified in the topic brief that accompanies this fact sheet.

KEY STAKEHOLDERS

Real estate and buildings community: Building Owners and Managers Association, U.S. Green Building Council

Energy service providers: energy and water utilities, tune-up and retrocommissioning providers

Nonprofit organizations: Urban Sustainability Directors Network, sustainable building nonprofits, local trade unions

Other stakeholders: Municipalities that have adopted similar policies, local trade unions

Federal agencies: U.S. Department of Energy, DOE laboratories

CHALLENGES

Pushback from stakeholders, especially the real estate community and institutional investors with large portfolios of old buildings, was a leading challenge to policy design and adoption. Some building managers with old properties prioritized health and safety concerns, such as removing asbestos and lead, over energy use, and the city needed to acknowledge the financial limitations imposed by those priorities. Some concerns raised by the real estate community required one city to pursue a less stringent requirement. While stakeholder engagement can be challenging, cities cited the importance of this process.

For one city, determining the best way for building owners to report compliance was another challenge to overcome.

Policy Implementation

KEY TASKS AND ACTIVITIES

Key tasks during implementation are compiling a covered buildings list, creating and designing a website where building owners and managers can find compliance report templates and other compliance information (e.g., a schedule), and reviewing reports when submitted. Follow-up is sometimes necessary to ensure that the information submitted is accurate. This follow-up can range from corresponding with the building owner or manager to visiting the building. One city also reported the need to review extension requests, issue violations, and review building owners' or managers' challenging of violations. Further, one city noted that its program process evaluation occurs simultaneously with program implementation, which allows the city to continually adapt and improve the program. One early evaluation helped decision makers understand where improvements could be made in program implementation, develop performance metrics, and list options on methods to estimate energy and GHG emissions reductions.

Lessons Learned for Design and Implementation

Consider requiring reports to be submitted by a professional. Requiring credentialed professionals to conduct the retrocommissioning or tune-ups and/or to submit the

compliance reports can improve both compliance rates and the quality of the reports and reduces the amount of time cities may spend conducting follow-ups. Creating or leveraging a certification process to determine who is eligible to submit a report can also improve compliance rates.

Prioritize community education before new regulations are released. One city learned the hard way the importance of having informational resources on hand before regulations are first announced. This city was caught short, resulting in a high volume of questions about its policy. It had to catch up by hosting webinars and virtual office hours, and it had to quickly create informational resources to educate the community on the regulations.

Begin program evaluation early. Early program evaluation allowed one city to make changes over time and improve policy outcomes. The city's evaluation consisted of a standard process evaluation to understand where the program needed changes, creating performance indicators with input from stakeholders, and outlining options to estimate energy and emissions reductions. Further, the city kept lines of communication open with stakeholders, which enabled it to understand the aspects of implementation that were working and to identify barriers to implementation.

Equity in Design and Implementation

One city stated that city agencies are working with nonprofits to leverage existing workforce development programs and ensure that low-income and marginalized residents participate in the workforce opportunities provided by the policy. It also educated stakeholders in minority businesses on how they can participate and provided services to buildings required to comply with the policy. However, equity considerations are not included in the legislation or regulations. Further, out of municipal concern that its policy would harm renters, the city exempted the residential sector.

Another city conducted a structural equity assessment during the design phase of the policy to understand the impacts on tenants; on building owners who were Black, Indigenous, and people of color; and on community-based organizations. The city continues to evaluate the impacts of the policy on these constituencies during implementation. The city also provides compliance support for nonprofits and invests revenues from noncompliance fines in efficiency upgrades for affordable housing. The city also partnered with a local college to develop a workforce to support the program.

References

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Appendix A. Detailed Cost Tables

Table A1 lists detailed, itemized costs for retrocommissioning and building tune-up policies. Implementation costs are reported on an annual basis unless otherwise noted.

Table A1. Detailed costs of retrocommissioning and building tune-up policies

Cost type	City A	City B*	City C
Design costs			
Minimum FTEs used	1.5	—	1.75
Consulting services	$15,000 + small contract	—	$145,000
IT infrastructure build-out	$15,000	—	$549,000 over three years
Community outreach	—	—	$83,000 (incl. consulting costs)
Total non-FTE design costs	**$30,000+**	—	**$694,000**
Implementation costs			
Minimum FTEs used	0.5**	Small team	1.5***
Consulting services	$70,000	—	$150,000
IT infrastructure	—	—	$134,775
Marketing	1 to 2 mailers per building	Reminder letters	Mailers and violations
Quality assurance	—	Staff time†	—
Incentives and subsidies	—	—	$0.12 per sq. ft. for nonprofits
Total non-FTE implementation costs	**$70,000+**	—	**$284,775+**
Participant costs			
Approximate cost of compliance	Cost of hiring specialist or cost of exemption	—	—

***City B reported limited cost and benefit data; though there are additional costs, we include only what the city reported. **City's reported FTEs were insufficient to successfully implement the program. ***City uses 2.5 FTEs for implementation; however, the city hired consultants to provide one of these FTEs. The cost of this FTE is included in consultant costs; here we report the number of local government FTEs used for implementation. †"Staff time" indicates that the cost associated with quality control is already accounted for in the "minimum FTEs used" value.**