A Targeted Energy Outcome Existing Buildings Toolkit for Cities

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ABSTRACT

Making an old pickup truck 20% more efficient will save far more gas than making a hybrid 20% more efficient. However, our commercial building energy policies are generally not targeted at the most inefficient buildings in the building stock. Energy codes primarily target the market for new construction. For existing buildings, they generally have a more limited scope with no provisions for buildings based on poor performance. Additionally, the energy codes leave a large portion of energy use in buildings – most notably plug and process loads – unregulated and typically have no post-occupancy regulations. Utility incentive programs for existing buildings generally do not specifically target buildings based on performance, and utility programs that address operational issues are rare.

In conjunction with the Northwest Energy Efficiency Alliance, New Buildings Institute is developing a pilot program to address these policy gaps. The pilot will give cities a toolkit to specifically address the worst performing buildings in their stocks and operational inefficiency. The toolkit includes a selection of policy mechanisms from which a city can choose to incent or require poor performing buildings to improve their performance and a policy infrastructure that provides the mechanisms with foundational pieces needed to function and enables the mechanisms to work in conjunction with each other. The result is a flexible toolkit that fills significant gaps in energy policy and has the potential to save a significant amount of energy.

Introduction

Although some cities and states have begun to adopt disclosure and mandatory retrocommissioning ordinances, energy codes are still the primary, or only, policy that cities use to regulate the energy consumption of their building stocks. This leaves a significant gap in these cities' policy toolkits for reducing the energy consumption and carbon emissions of the buildings in their city. However, the impact of existing energy codes is inherently limited. They only regulate construction events, leaving the lion's share of the building stock unaddressed. For these new buildings and new major renovations, energy codes also only regulate a portion of the factors that contribute to the actual energy performance of buildings. And since the Certificate of Occupancy is the mechanism used for code enforcement, traditional energy codes have no ability to get at post-occupancy factors and issues.

Through their impact on new construction, energy codes serve a vital role in the energy policy toolkit. However, rather than relying exclusively on the limited and diminishing returns that can be delivered by energy codes, cities have the opportunity to consider new energy policies, new policy tools to add to their policy toolkits. One such new tool would be an energy policy that uses actual performance data about the city building stock to target the absolute worst performing buildings for improvement. Whether through incentive or regulatory mechanisms, a city could use such a policy to pull up the rear of the building stock, focusing impact on those buildings where intervention will have the greatest impact. Figure 1 shows how, even though they represent a small portion of the population of the total building stock, poor performers represent a significant portion of a building stock's total energy consumption. A policy that targets the worst 1-5% of the stock can have a significant energy impact.

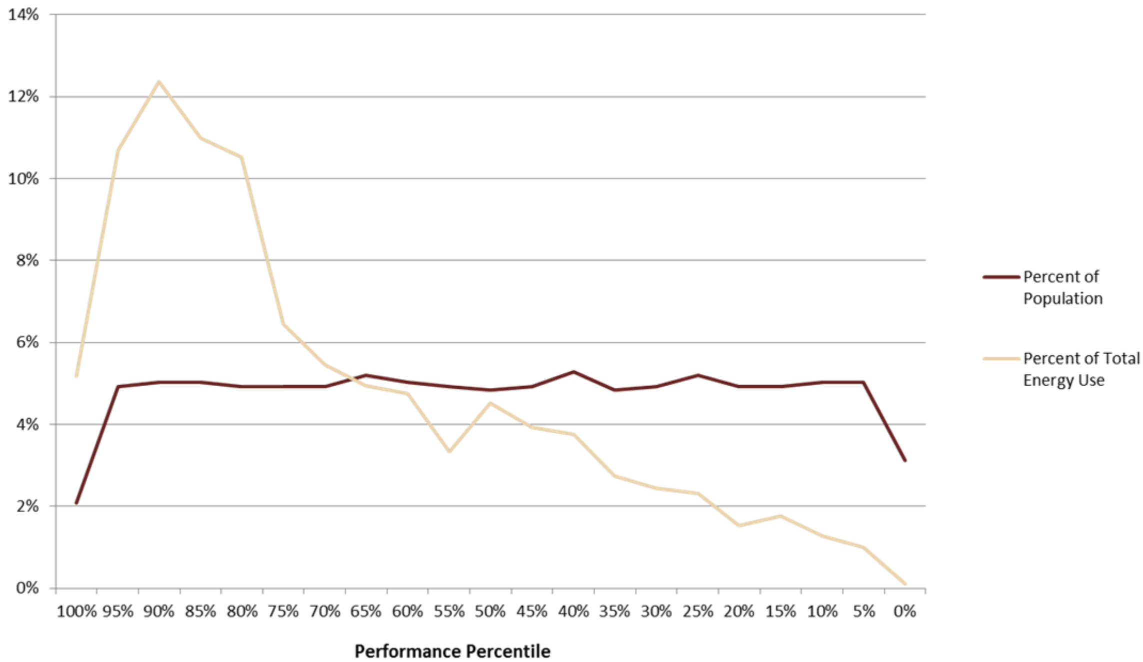

Figure 1. Energy consumption distribution of New York City offices from public disclosure data.

This paper will explore the gaps in existing policies that create the need for new approaches and frame out what a new policy that is grounded in actual performance and targeting poor performers might look like.

Gaps in Existing Policy

In surveying the policy landscape for cities in the United States, four primary tools for improving energy performance in buildings emerge: the energy code, mandatory above-code standards for municipal and municipal-related buildings, disclosure ordinances, and mandatory periodic retrocommissioning and retrofits.

Currently, mandatory periodic retrocommissioning and retrofits like those detailed in New York City's PlaNYC represent the forefront of the development of municipal policy toolkits. Unlike energy codes, policies like these specifically address issues of poor maintenance and system age in buildings that don't undergo elective constructive events. Considering how under-addressed existing buildings are, this is significant step forward. However, age is not the only culprit in poor performance, so the impact these policies can have is intrinsically limited.

Benchmarking and disclosure policies have been rapidly expanding in cities; nearly a dozen US cities now have some sort of disclosure ordinance in place. Information can be a powerful market mover. Owners get information about the actual performance of their buildings, allowing them to compare that performance to other buildings or their own over time, and empowering them to make informed decisions about capital investments and operations. Potential buyers and lessees get information about actual performance, empowering them to make real estate decisions armed with knowledge about the impact of energy performance. Purely informational policies have many advantages, not the least of which is the lower barrier to market acceptance. But information can have a greater impact if it comes with a regulatory component requiring owners to take action.

Many cities have leveraged city functions to encourage or require buildings to meet above-code standards. Utilizing the control they have over municipal buildings and municipal building leases, some cities require that all buildings owned or leased by the city meet the above-code standard. Similarly, many cities have attached benefits such as property tax incentives or development rights/inducements to above-code standards. In some cases this is a simple percent improvement over code, while in others it can be adoption of a green standard like LEED. These policies only reach as far as municipal real estate or the buildings that respond to the inducement. In addition, these policies suffer all the same limitations characteristic of the underlying energy code.

At this time, mandatory periodic requirements are rare (the New York City example being the most prominent), and just over a dozen cities have disclosure ordinances.[1] Energy codes are by far the most widespread policy tool – although even now not all states and cities have an energy code – and still the primary policy tool even in cities that have branched out into new policy tools. However, energy codes have significant limitations that circumscribe the range of impact they can have.

The Limitations of Traditional Energy Codes

Traditional energy codes are limited along two axes: breadth of scope and time. Energy codes have a defined scope that includes which buildings are subject to the code and which components of the buildings are subject to the code. Traditional energy codes only apply to construction events, so only new construction and retrofits to existing buildings are subject to the requirements. In the case of retrofits, with only a few exceptions, only those portions of the building undergoing construction are subject to the code requirements. In any given year, only 1-2% of the building stock is comprised of new construction and major renovations (gut-rehabilitations that are essentially new construction). So, 98% of the building stock falls outside the purview of the energy code each year. One argument for the sufficiency of energy codes that regulate new construction is that every existing building was once new construction, and the average lifespan of a commercial building is 30-50 years, so the energy code will eventually affect nearly every building in the building stock. However, up to 50 years of poor performance is a significant missed opportunity. And although tenant turnover typically occurs on a 5-7 year cycle, the scope of tenant improvements subject to the energy code rarely extends beyond lighting.

[1] The landscape is quickly evolving; see http://www.buildingrating.org/content/us-policy-briefs for a reasonably up-to-date list of jurisdictions that have adopted or are developing benchmarking and disclosure ordinances/policies.

The scope of the energy code is constrained even in new construction. Energy codes do not regulate all energy uses in a building. Plug and process loads, as well as miscellaneous loads such as people movers, are all outside the scope of energy codes. While codes have successfully reduced regulated HVAC, lighting and water heating loads, plug loads have actually grown with the introduction of more and more consumer electronics and appliances. The consequence is that the success of energy codes has actually decreased their impact as the loads they regulate shrink and the loads that they do not regulate grow.

Even within regulated loads, the energy code is limited. The energy code doesn't actually regulate the energy performance of buildings. Instead, it regulates "performance proxies," elements of building specification that impact performance. And while these have a strong correlation to actual performance, they are not the same thing. For example, the code requires minimum levels of insulation, minimum performance in the windows, minimum HVAC efficiency, etc. But the code does not regulate many factors of a building design that influence performance. For example, the code has efficiency requirements for all kinds of HVAC systems, but treats all those systems as if they are equal. In reality, air-based systems tend to consume more energy than fluid-based systems. Heat and cool carried in fluids can be pumped with far less energy than air – with its much lower capacity to carry heat –that is blown throughout a building by fans. Code also gives only limited recognition to passive strategies such as natural ventilation, daylighting and passive heating. In fact, code does not differentiate between a building that was designed to not need air conditioning from one with a minimally compliant rooftop package system, even though the building with an active cooling system would consume far more energy.

The other axis along which energy codes are limited is time. The Certificate of Occupancy is the standard mechanism used to enforce the construction code, including the energy portion. Until the building demonstrates compliances with the energy code, it cannot obtain a Certificate of Occupancy and be put into service. Once that Certificate of Occupancy is granted, the code has no further authority over the building until a new construction event requires a new building permit. However, building performance is not set in stone at construction, and there are many factors post occupancy that affect performance. Equipment can deteriorate and get out of calibration. Usage patterns can change from those intended in the design. Schedules and occupancy densities can be increased. Controls can be overridden or mis-programmed. All of these can affect building performance, and the energy code has no way to regulate them.

Actual Performance and Poor Performance

The answer to these gaps in existing policy is to craft a complementary policy to specifically target them. Using the actual performance of buildings as the policy trigger rather than construction events alone, as in the energy code, offers the opportunity to address all factors that contribute to building efficiency but are out of the energy code's reach. And specifically targeting the poor performers carries several advantages.

The first of these advantages is the greater ease in setting performance targets. There are many legitimate reasons that one building might consume more energy than another. The building could be a more intensive type. Commercial kitchens, laboratories, data centers and hospitals will all legitimately use more energy than offices, schools and buildings used for public assembly. Some buildings have longer hours of operation than others, and some have greater occupancy densities. The difficulty in accounting for all the potential diversities has been the single largest stumbling block to the implementation of Outcome-Based Codes.[2] However, code compliance is a relatively high target. At the low end, a policy can be predicated on the idea that there is a minimum level of performance that no building should fall below regardless of how it is being used, a level of performance that characterizes only the "energy hogs" in the building stock.

This is both a technical advantage and a market advantage. From a technical standpoint, the threshold for poor performance is much easier to identify than that for superior performance. A threshold for superior performance has to account for the fact that some buildings are 24/7 operations, some retail establishments sell items with climate control parameters, some offices pack more workers and computers in than others. The low-end threshold can be set at a level that no building – regardless of legitimate operational factors such as schedule, occupant density, etc. – should fall below.

The market advantage is that if the policy is targeting only the poorest performers, it will be much harder to sell an objection to the policy. It inherently targets the portion of the building stock with the greatest potential for improvement, and the greatest per capita energy use. An example from automotive fuel efficiency can illustrate the point. If the fuel efficiency of a hybrid is improved by 20%, it might go from 50 MPG to 60 MPG. Over a typical 12,000-mile annual usage, that would result in a savings of 38 gallons of fuel. But if an old truck were to have its fuel efficiency improved by 20%, it might go from 12 MPG to 14.4 MPG. Over the same 12,000 mile annual usage, that is 168 gallons of fuel. The difference is a factor of more than four.

Targeting poor performers also has financial benefits. Like-kind equipment replacement is a fairly fixed-cost project, regardless of the performance of the equipment being replaced. Since cost is fairy fixed, the greater the performance delta between the existing and new equipment the better the cost benefit equation and the shorter the payback. By targeting those worst performers, the policy is also generally targeting the most cost-effective retrofit projects.

Finally, there is a social benefit to targeting the worst performers. Poor performing buildings are also those more likely to be disinvested and rundown. A poor performer policy incidentally also targets buildings with the greatest need to reinvestment. This allows the city to leverage other community development programs, resources and policies with this energy policy. Since these buildings are also the ones most likely to have owners with limited capital for reinvestment, this synergy is essential.

The Poor Performance Policy Toolkit

A poor-performance policy toolkit would be composed of two parts: Policy Infrastructure and Efficiency Mechanisms. The Policy Infrastructure includes all the policy pieces that need to be in place to make the efficiency mechanisms work, creating the framework

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[2] Denniston, S. "Bringing Outcome-Based Code Compliance to the IgCC." In *ACEEE Summer Study, Asilomar, CA, August 12-17, 2010*. Washington DC: ACEEE, 2012.

that allows the individual mechanisms to save energy. The Efficiency Mechanisms are the actual policies that incent or require poor performing buildings to improve or be penalized. The Toolkit also includes a diverse selection of mechanisms from which a city could choose, ranging from incentives to penalties. The mechanisms are what encourage or require a building owner to improve performance.

A city would begin by collecting performance data about the building stock. This data would then be analyzed to identify the worst performers. Once the level of poor performance is identified, the city can make the decision about how aggressive to be with improvement goals. With the performance target in place, the city would select a mechanism or collection of mechanisms that are appropriate to the city and the specifics of its authority, staff capacity, funding and local market.

The Policy Infrastructure

All of the Efficiency Mechanisms in the Toolkit are supported by a common Infrastructure, a collection of foundational elements that all of the efficiency mechanisms require. Implementing the underlying infrastructure separately keeps the individual mechanisms simpler and allows them to be more closely coordinated with each other. The underlying pieces include:

1. A data source for the baseline performance of the city's building stock that can be used to determine what a poor performing building is.
2. An energy scale derived from that data that can be used to set performance thresholds for triggering the different mechanisms.
3. Ongoing disclosure of building performance that can be used to determine which buildings will be eligible for incentives or subject to requirements or penalties.
4. A means of notifying poor performing buildings and informing them that they are eligible for the incentives or subject to the city-mandated requirements or penalties.

Performance data. Performance data is an essential piece of the toolkit. The data is used to assess the overall performance of the city's building stock and provides the starting point for establishing a roadmap. Goals cannot be set without a firm grasp of the present condition. The data set needs to be representative of all building types and all of the building conditions in the city. In order for this data to be used to establish a baseline, it needs to include a minimum set of data points, including: building owner with contact information, building location, total energy use, total square footage, building type (if a building contains multiple types, then also what percentage of total area belongs to each type).

The energy scale. Energy Use Intensity (EUI of kBTU/sf) is a standard way of measuring a building's total energy. It is an essential piece of information, but dealing with EUIs on a policy level presents some difficulties. Every building type uses energy differently. Even if built to the same energy code in the same climate, a fast-food restaurant will use almost 2.5 times the energy per square foot as an office. The EUIs of these two buildings do not give a good basis for comparing efficiency. If EUIs are to be used to set performance thresholds for the mechanisms, those thresholds will have to be encoded in tables with a separate EUI for each building type. The diversity of building type EUIs also hinders messaging since the city cannot use a single number as a milepost for every building in the stock.

An energy scale solves these problems. It allows energy performance to be easily understood, contextualized and compared. The baseline performance of the building stock serves as the top end of the scale down to zero net energy (and even onward to net positive energy in the future). The EUI of each building type in the baseline data is averaged separately and serves as "100" on the scale. A score can be calculated for any building by comparing its EUI to the baseline average EUI of its building type. In this way, different building types can be directly compared by comparing their scores. Perhaps more importantly, policy can be established with a single number and easily communicated to the public. The city simply needs to establish where on the scale it wants to trigger the various mechanisms. The city can plot out future trigger points on the scale as the entire building stock is steadily improved. The city can even easily set different thresholds for different mechanisms. Incentives might be offered at one point on the scale, requirements at another and penalties at another. Moving forward into the future, mechanisms rewarding/encouraging the best performing buildings can be tied to the same scale, just at a different level.

Energy Star is an obvious option for the energy scale. It is well established in the market, and the score is automatically produced by Portfolio Manager, the de facto standard for building benchmarking. However, Energy Star has some features that make it less than ideal for this application. While an Energy Star score uses building-specific monthly energy bills and information like building use and size, it relies on a national average source conversion factor rather than a district-specific conversion factor to develop a score[3]. Additionally, an Energy Star score represents a statistical comparison of energy use to the median consumption of the 2003 Commercial Building Energy Consumption Survey (CBECS) dataset. These factors mean that incremental improvements in Energy Star scores do not represent a correspondingly consistent improvement in energy performance. This makes it difficult for policy makers to rely on it to track progress toward the ultimate goal of net zero energy or carbon neutrality. Finally, there is a real value to the normalization process implemented in the Energy Star scoring methodology that intends to neutralize factors such as occupant density and schedule, but this is done in a "black box" that lacks the kind of transparency that are often demanded of governmental regulations.

Ongoing benchmarking/disclosure. The initial data on building performance is only used to establish the baseline and create the energy scale. Ongoing disclosure of energy performance is also needed. Disclosure of performance data needs to be an annual occurrence so the performance of individual buildings is continually assessed to identify the poor performers. (This disclosure does not need to be public, private disclosure to the jurisdiction is sufficient, even if it loses the corresponding benefits of public disclosure.) Building performance can vary from year to year as the physical characteristics and uses of buildings change. The Toolkit is intended to address the ongoing performance of the building stock, checking in on a regular basis

[3]http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/difference

to ensure that the performance of individual buildings is staying above the minimum threshold established by the city.

Ideally, ongoing disclosure is achieved through the same mechanism that provided the baseline performance data. While the baseline data only needs to be representative and may not include every building in the target building stock, ongoing disclosure does need to capture all of the buildings in the target building stock.

Notification. Notification is essential for all of the mechanisms to work. The owners of poorly performing buildings need to know that their buildings have fallen below the thresholds set by the city. That information alone is valuable. Simply knowing that their buildings perform badly compared to others will inspire some owners to self-remediate the poor performance. The information is also valuable to the real estate market. Potential buyers and renters will want to know the score of the building so they can assess the impact of energy use on operational expenses relative to other locations. It even has the potential to affect the valuation of the buildings in the local real estate market.

Beyond information, notification provides a way for the city to communicate to owners when their buildings have become eligible for incentives or subject to regulations in accordance with the efficiency mechanisms the city has chosen, and to inform those owners about what those mechanisms will entail for the buildings.

The Efficiency Mechanisms: Incentives

The Toolkit includes two different kinds of Efficiency Mechanisms: Incentives and Regulations. Each mechanism will require different commitments on the part of the city and will find a different level of acceptance in the local market. Therefore, the city should choose the mechanisms that suit its unique circumstances best.

The incentive mechanisms are inducements to get the owners of poor performing buildings to improve performance. They do not require action, so they can be implemented in the first year of the Pilot. Care must be taken to limit system gaming with the Incentive Mechanisms. The city does not want to offer valuable incentives to buildings whose energy consumption dropped simply due to vacancy or under-utilization. Affidavits attesting to continuity of use are one means that can ensure incentives are rewarding actual improvements in performance, not just incidental reductions in consumption.

The Incentive Mechanisms are a Utility Incentive Program Partnership, Property Tax Abatement, and a Revolving Loan Fund.

Utility incentive program partnership. This efficiency mechanism requires partnership with a local utility. Ideally, the utility would already have an incentive program in place that could be used. Utility program administrators would be given contact information for owners of buildings that fall below the performance threshold. The program administrators would contact these owners and offer them the opportunity to participate in the incentive program. Targeting these buildings is to the utility's benefit. As discussed above, these buildings will generally have the greatest potential for improvement, upgrade options with the shortest payback period and the best cost-effectiveness. With the loss of "low-hanging fruit" incentive programs to advancing codes, this can be an effective way for utilities to get the most savings out of a program.

Property tax abatement. Buildings that fall below the performance threshold become eligible for a special property tax abatement program. Falling below the performance threshold opens a window of eligibility for the program, say 5 or 10 years. The building's performance in the initial year sets a performance baseline. The building is then eligible for the abatement each year that the building can demonstrate a minimum performance improvement over the baseline (at least 20%). The abatement can be for the full or partial value of the property taxes. It can also be tied to the degree of improvement: greater performance improvements lead to a greater abatement. Where revenue neutrality is necessary, abatements can be paired with tax penalties for poor performers that do nothing (although the increased political barriers to this kind of approach should be considered).

Revolving loan fund. For this efficiency mechanism, the city establishes a revolving loan fund to fund energy efficiency upgrades for poor performing buildings. Buildings that fall below the performance threshold become eligible for a low- or no-interest loan from the fund to be used for energy efficiency upgrades that will improve the building's performance by a minimum amount (at least 20%). The loan amount would be determined by the city, but a set dollar amount per building square feet is optimal. It allows the city to avoid the need to validate cost estimates and allows projects flexibility in approach. The loan is granted based on substantiation that the upgrades will provide the savings. Substantiation could be based on modeling or by participation in a proven prescriptive program. Ongoing, the low interest rate is tied to actual achievement of the goal. The loan maintains the low interest rate each year that the actual performance of the building meets the savings goal. If the building does not meet the savings goal in a given year, the loan defaults to a higher interest rate until the savings have been achieved.

Once the loan fund is established, it is self-sustaining. Payments from previous loans will replenish the fund. For added security, the city can potentially guarantee the loan through the property tax lien structure. Many cities run revolving loan funds through development commissions and handle all administration in-house. In addition to internal funding sources, there have historically been some external sources of funds such as the Energy Efficiency and Conservation Block Grant Program. The biggest obstacle to this approach is finding the initial seed money for the fund. Tight municipal budgets may not be able to provide it, but there are grants and foundations focused on energy and climate change issues that may be enlisted.

The Efficiency Mechanisms: Requirements and Penalties

The second set of mechanisms either penalizes a building for falling below the performance threshold or requires buildings that fall below the performance threshold to take some action. For this reason, owners should be given some advance notice that their buildings will be subject to the regulations so they have a chance to self-remediate poor performance. In practice, this means that a building would not be subject to the mechanism until it had fallen below the performance threshold two years in a row. After the first year, the owner is notified that their building will be subject to the regulation if it falls below the performance threshold again the following year. This gives the owner a year to improve the building's performance on their own before facing the requirements or penalties. A two-year trigger will allow buildings to self-remediate after falling below the performance threshold the first year and avoid the requirements or penalties the second year. Self-remediation is ideal because it saves the city the time and expense of administering the mechanism and of imposing and enforcing penalties for noncompliance.

Incentives are far more politically palatable than penalties and regulations, so city governments should carefully consider market acceptance for this sort of approach. The Regulation Mechanisms include Name and Shame, Code Citation, Required Efficiency Upgrade, and Energy Hog Tax.

"Name and shame." Buildings that fall below the performance threshold are identified on a public registry as the worst performers in the city. Public disclosure of energy use can achieve this same purpose, but with public disclosure identifying the worst performers requires an individual to scope the total range of performance of the entire building stock and then try to figure out where an individual falls in that range. This approach does that work and makes the worst performers readily identifiable.

Owners would not be required to take any action based on this listing, but a building's presence on the list will have a valuation effect. Buildings on the list will be less desirable for lease and sale, and this impact on valuation will give owners an incentive to improve performance in order to get off the list in future years. An important consideration with this approach is that the jurisdiction needs to provide building owners a right and process to appeal the listing. Owners need to be able to make the case that, due to errors in the process or particular circumstances, their building(s) should not be on the list.

Code citation. Buildings that fall below a certain performance threshold would receive a code citation for poor performance. The citation will only be cleared when the performance of the building rises above the threshold. Code citations do not prevent a building from continuing to be occupied and used for its intended purpose. However, depending on state and local law code citations can delay and even prevent building sale or lease and the refinancing of a building. This impediment will give owners an incentive to improve performance and clear the citation. This regulation can also give city building departments an additional tool for dealing with nuisance properties. Very poor performing buildings are more likely to be poorly maintained and may have other maintenance issues.

This mechanism leverages the existing building department infrastructure. If the city has adopted a property maintenance provision in its local code – such as the International Property Maintenance Code –there is already a place in the code for this type of code requirement.

Retrocomissioning. Buildings that fall below the performance threshold would be required to undergo a retrocommissioning (RCx) protocol within a specified period of time. The RCx protocol would include a combination of prescribed system checks, routine maintenance tasks and remedies for certain system failures. The owner would contract an RCx firm to complete the RCx protocol. Once the RCx protocol is completed, the firm would provide certification to the city. Buildings that do not comply would receive a penalty, such as a fine or a code citation.

This efficiency mechanism requires that the city have a market of professionals capable of doing the RCx work. The RCx protocol will address all the building systems, so the presence of only industries like HVAC repair may be insufficient. RCx contractors will need the expertise on staff to address multiple different systems in the building.

Required efficiency upgrades (stick). Buildings that fall below the performance threshold are required to meet at least one item from a list of energy efficiency upgrades within a specified period of time. The owner would contract a contractor to do the work. Since all the options would require a permit, final inspection would serve as verification. The list might include: roof insulation upgrade, cooling equipment upgrade, minimum LPD requirement, lighting controls requirement, minimum daylighting requirement, ductwork upgrade, window retrofit, or a minimum renewable requirement.

Energy hog tax. Buildings that fall below a certain performance threshold would be subject to an energy hog tax assessed on the building's property taxes. This tax can take one of several forms ranging from an alternate mil rate for energy hogs to a flat penalty per square feet. As long as buildings continue to fall below the threshold, they will be subject to the energy hog tax. When performance rises above the threshold, the standard taxation scheme is restored.

An advantage of this mechanism is that it can use existing enforcement mechanisms. Building owners that don't comply will be subject to whatever penalties are assessed to buildings with unpaid or underpaid property taxes.

Impact

The 2003 CBECS (Commercial Buildings Energy Consumption Survey) dataset can be used to get an idea of the impact that a poor performance energy policy could have. Looking at just the office building type, the impact of a code stringency update can be compared to the impact of a poor performance energy policy. In the case of code stringency improvement, we will assume a 20% code stringency improvement for the last three years of the survey (a full code cycle) and that a 20% increase in stringency would actually result in a 20% reduction in energy consumption. For the poor performance energy policy case we will set a performance target that would capture just the worst 1% of the building stock and assume those buildings did only the absolute minimum required to get above the threshold. Figure **2** shows the result. Eliminating only the worst 1% of the building stock saves approximately 2.5 times more than a 20% code improvement stringency improvement in place for three years. A fairly conservative approach to regulating the poorest performers in the building stock has the potential to save significantly more energy than a rather aggressive approach to energy code improvement. Where politically feasible to set the

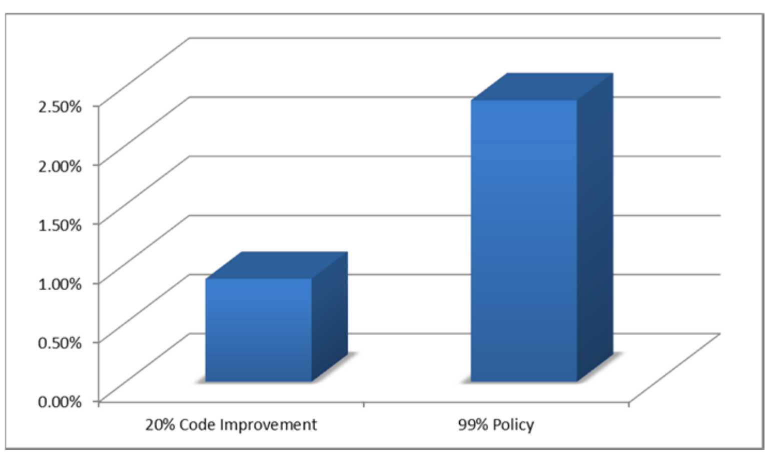

Figure 2. Comparing the relative impact of a code stringency update to a poor performance policy strategy.

standard higher – the worst 2%, 3%, 5%, 10% - the impact could be even more significant.

The Northwest Energy Efficiency Alliance, along with New Buildings Institute, will be approaching cities in the Pacific Northwest to pilot this concept under the Community Building Renewal Pilot. Through broadening the concept of what an energy policy for buildings looks like and leveraging actual performance, cities have the opportunity to significantly improve the energy performance and reduce the carbon emissions of their building stocks.