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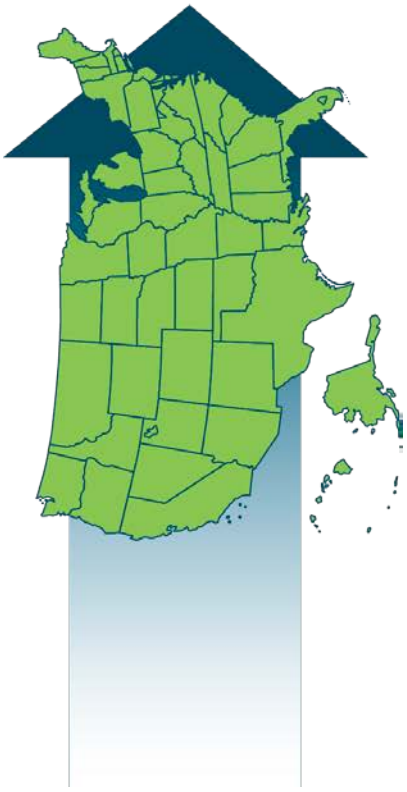

Greater Energy Savings through Building Energy Performance Policy: Four Leading Policy and Program Options

Existing Commercial Buildings Working Group

May 2014

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Acronyms

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BOMA	Building Owners and Managers Association
CO	certificate of occupancy
coop	rural electric cooperative
DOE	U.S. Department of Energy
ECB	Existing Commercial Building
EERS	energy efficiency resource standard
EPA	U.S. Environmental Protection Agency
GSA	U.S. General Services Administration
HVAC	heating, ventilating, and air conditioning
IOU	investor-owned utility
LABBC	Los Angeles Better Buildings Challenge
LEED	Leadership in Energy and Environmental Design
M&V	measurement and verification
MLS	Multiple Listing Service
MOU	memorandum of understanding
muni	municipal utility
NYSERDA	New York State Energy Research and Development Authority
PG&E	Pacific Gas and Electric Company
PUC	public utility commission
SEE Action	State and Local Energy Efficiency Action Network

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Summary

Many state and local policymakers have enthusiastically supported policies such as energy codes, building audit requirements, and incentives for efficient equipment, as just a few examples. These policies have been established with the intent to make significant improvements to energy efficiency. However, their outcomes are often based on assumed impacts on energy use rather than measured energy reductions. This paper lays out recommendations for linking existing policies and developing new policies, such that their success is based on the real energy savings achieved in buildings. This approach has the potential to affect the entire building lifecycle. In the design stage, energy design software can be adjusted to improve the accuracy of energy use estimations. Data collected during building start-up can lead to fine-tuning equipment to achieve designed performance levels, not to mention be used to identify major failures in building systems. As building occupants change, spaces are reconfigured, and equipment ages, continuous collection of energy performance data can be used by building operators to adjust and improve systems that they know are not operating as they should. They can also benchmark their buildings to understand how they compare to similar buildings and identify opportunities to make changes that result in improved performance. At the time of sale, owners can benefit further from their efforts to maintain and increase energy efficiency through property assessments that place value not only on the building shell but on the operating costs the new buyer will incur.

Policymakers can support a data-informed building lifecycle through a number of policies and programs, several which have been outlined in this paper. As these are further explored and developed at the local levels to fit state and city contexts, policies will become more effective and provide new insights into strategies and actions that increase our effectiveness at achieving improved energy performance.

Vision Statement

- A future where energy efficiency policies for commercial- and publicly owned buildings are informed by and directly tied to actual energy performance.

Many state and local governments, as well as researchers and policy advocates, have been working to expand the policy framework for energy efficiency in the buildings sector, recognizing this sector's importance in addressing this century's energy and environmental challenges. A vision is emerging in this arena that centers on using measured energy performance as a driver for an expanded set of building energy programs and policies that help capture cost-effective energy savings over the full and long lifetime of buildings. While the specifics of a jurisdiction's policy suite may include traditional and expanded approaches to building codes, incentives, taxation, valuation/appraisal, and utility programs, in this vision measured performance is a central organizing principle, and would drive the design and operation of policy and program activities.

Intent and Audience

Policymakers around the United States are working diligently to advance public policies that improve the way buildings use energy, from construction through the building lifecycle. Because buildings account for almost half of U.S. energy use and CO_2 emissions, reducing building energy use is a high priority in many jurisdictions. Benefits include energy savings, lower air pollutant emissions, enhanced jobs, and improved energy security and resiliency. Many approaches to policy and program design have focused on predicted savings arrived at through the use of energy modeling tools, but it is clear that the outcomes in terms of measured savings do not always match these predictions. A 2008 study[1] compared modeled energy use to measured energy performance for 121 green buildings,[2] and results revealed a poor correlation between the two. Energy performance showed savings ranging from 50% higher than predicted to losses that put performance levels below the code baseline.[3] The difference in

[1] http://newbuildings.org/sites/default/files/Energy_Performance_of_LEED-NC_Buildings-Final_3-4-08b.pdf.

[2] The study, conducted by the New Buildings Institute, analyzed 121 buildings with Leadership in Energy Efficiency Design (LEED) certification.

[3] "Energy Performance of LEED for New Construction," New Buildings Institute; March 2008.

building energy performance between prediction and outcome and the opportunities to close this gap are the driving force behind this white paper. This paper does not discuss every potential action that state and local governments can take to drive energy performance. Rather, it specifically focuses on policies that can help the market recognize and achieve measurable improvements in efficiency outcomes. The intent of the included recommendations is to educate policymakers and to highlight emerging opportunities across the country for updating policies to improve results in measured performance. This white paper is intended for an audience of state and local policymakers, including legislators, council members, agency leaders, and staff members, and while the majority of early activity summarized is from large urban settings, the concepts can be adapted for smaller, more rural environments.

Introduction

Since the 1970s, the primary mechanism for addressing energy consumption of buildings in the United States has been energy codes. These establish mandatory criteria for building thermal envelopes and other building components, and have been used to improve building energy efficiency in new construction and renovation. Today, most state and local governments have energy codes in place based on national models such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 or the International Energy Conservation Code. They are often administered in a prescriptive fashion, with relatively specific requirements, and are enforced via mechanisms such as plan review and field inspection. However, conventional codes typically regulate only the rated energy efficiency of individual components or the rated performance of the building based on assumption-based simulation. Building energy performance during the occupancy period is driven by many additional factors, including installation methods, operation practices, and occupant-installed "plug loads." The resulting gap between modeled and measured energy performance suggests that there is a place for other approaches that complement energy codes to drive additional improvements in efficiency and added economic and environmental benefits.

Similarly, many other policies and programs aimed at promoting improvements in building energy use are challenged to predict performance of energy efficiency actions. Equipment rebates typically provide financial incentives to install efficient equipment that are based on assumptions about the amount of energy that will be saved. Equipment sizing, quality of installation, operation, and overall system efficiency may all play a role in the energy savings, but are not aspects covered under the program. The growing recognition of the value of retro-commissioning and the energy savings demonstrated by extensive case studies[4] are a testament to the many factors affecting energy performance. Only by incorporating steps to measure real savings can programs achieve their expected outcomes.

To change this, some thought leaders around the country are beginning to envision an expanded policy framework that goes beyond the design and construction phases of a building's lifecycle, looking for ways to connect and extend policies into the area of measured energy performance during the building's occupancy period. This expanded performance framework, spanning the building lifecycle, seeks ways to ensure the efficiencies that codes are intended to provide during design and construction are realized in actual performance outcomes and documented by measured energy performance data. It also helps ensure that buildings adapt over time to take advantage of improving technology and practice for improved efficiency. This is a key element of a broader vision for the future in which all policies targeting building energy use can move beyond assumed impacts to yield real impacts and improved performance.

Putting such a vision into practice requires a suite of innovative policies that push and pull the commercial buildings market to drive improvements in energy performance. This paper defines four options for policy and program solutions that support this kind of vision by building on current activity in the marketplace. While these solutions are not necessarily as "tried and true" as conventional energy codes or other established policies, these options highlight emerging performance-based policies and programs that some jurisdictions have implemented or are developing. **The policy landscape is so varied and localized that not all of these options will work for all jurisdictions. Consequently, this paper is structured to briefly frame each option, share the early experiences of leading jurisdictions, and provide guidance to support further action that state and local jurisdictions can choose to pursue.**

[4] One of the most extensive online collections of case studies is made available by the California Commissioning Collaborative at www.cacx.org/resources/commissioning.php?sort=project.

BACKGROUND: UNDERSTANDING THE DATA GAP

Data is the currency of building energy performance. Building owners need accurate data on a timely basis to benchmark and track performance. Markets need access and transparency to use data in meaningful ways. Professionals need data to design and then to manage buildings for efficiency and performance. Policymakers need data to understand buildings and their markets, to shape effective policies, and to track policy impacts and effectiveness. These needs underlie the success of the policies and programs recommended in this paper, as well as all efforts to improve building energy performance.

Governments can help improve data accuracy and availability by supporting customers in gaining enhanced access to their energy use data. Electronic access is becoming more widely available, but requires data standards and software solutions to make it work on a practical basis. Otherwise, it can be difficult for utility customers to obtain energy consumption data at the needed level of aggregation, or in forms that provide useful information. For example, utility data in K-12 school districts is commonly billed at the school district level, leaving building operators without direct access to feedback on individual building performance.

For these reasons, federal, state, and local agencies are working with utilities to enhance customer data access, and enable its interpretation as a critical currency for managing energy use through tools like the U.S. Environmental Protection Agency (EPA)'s ENERGY STAR Portfolio Manager and the national standards for access and interoperability provided through the Green Button[5] initiative. These efforts have encouraged utilities in several states to implement data solutions that enable automated access to electronic energy data records. One example is the Energy Performance Benchmarking[6] offered by Pacific Gas and Electric Company (PG&E) to help commercial building owners identify poorly performing buildings, as well as comply with California laws (CA AB 1103,[7] *Nonresidential Building Energy Use Disclosure Program* and San Francisco Environment Code Chapter 20, Existing Commercial Buildings Energy Performance Ordinance). Owners can authorize PG&E to automatically upload building energy use data to ENERGY STAR Portfolio Manager on a monthly basis. In addition, PG&E also offers its customers access to electricity data via *Green Button Download My Data* and *Green Button Connect My Data*, as well as a proprietary format that predates the Green Button initiative.

Mindful of these issues, state and local governments are acting to increase visibility of energy performance data to encourage greater awareness of energy performance in commercial building markets, to help building owners and managers improve performance, and to demonstrate the value of high performance buildings over time. The most common of these policies are benchmarking and public disclosure ordinances, which make information on energy performance available either to the public or to prospective buyers or tenants. Most of these policies leverage ENERGY STAR® Portfolio Manager, which provides energy performance benchmarks based on a building's measured, whole building energy usage. Leading the way, a number of jurisdictions across the country have enacted benchmarking and disclosure laws.[8] See the appendix for links to several SEE Action documents and resources that provide detailed information on energy performance data and benchmarking.

[5] Green Button, an element of Energy Data Initiative, responds to a White House call to action to provide electricity customers access to their energy usage data on electric utility websites and in a consumer friendly format. www.greenbuttondata.org.

[6] This program assists customers with benchmarking and uses Web Services in Portfolio Manager to upload energy usage information to property owners' accounts. www.pge.com/en/mybusiness/account/diy/benchmarking.page?WT.mc_id=Vanity_benchmarking.

[7] CA AB 1103 requires owners of non-residential buildings with gross floor areas larger than 5,000 square feet to benchmark energy use and disclose the results at the buildings sale, lease, or refinance. www.energy.ca.gov/ab1103/.

[8] As of March 2014, Austin, Texas; Boston, Massachusetts; the State of California; Chicago, Illinois; the District of Columbia; Minneapolis, Minnesota; New York City; Philadelphia, Pennsylvania; San Francisco, California; Seattle, Washington; and the State of Washington have enacted benchmarking and disclosure laws and are in various stages of implementation. See www.buildingrating.org for new and updated policies.

Four Leading Policy and Program Options: #1. Outcome-Based Building Policies

Extending the framework for building energy policy and programs beyond conventional codes to encompass the many "lives" of a building from planning through design, construction, changing occupancy, and renovation, can provide important opportunities to improve energy performance and save money for the building owner and/or occupants. Applying policy requirements at multiple points in the life of a building would support not only rated efficiency at the point of construction, but also energy performance during occupancy, and could trigger appropriate remedial action to compensate for degradation in performance over time. This *lifecycle-oriented and outcome-based policy framework* would not only establish minimums for rated energy performance for new construction, but would also support a broader portfolio of policies and programs designed to drive the entire building stock toward better performance and greater savings.

Where Are We Now?

The building code enforcement process is devised to ensure that a building is not only designed with the right mix of components, materials, and equipment to meet efficiency requirements, but that construction and installation practices support expected energy performance. Building energy codes have been responsible for significant improvements in the efficiency of the nation's building stock over time, but a number of circumstances have also limited their effectiveness. Some factors that drive building energy performance are not covered by today's codes, such as plug loads, orientation and passive design elements, and ongoing system maintenance. Incomplete compliance with current energy codes is exacerbated by budget limits, competing priorities, lack of knowledge, and lack of enforcement. Many building departments lack the funding to adequately hire and train the necessary number of code officials to ensure they have the needed time and skills to inspect energy requirements. A lack of clarity and interpretation of the code can also lead to non-compliant products, materials, and installation practices.[9] In addition, the lack of a commissioning requirement can result in heating, ventilating, and air-conditioning (HVAC) systems that are typically not tested to verify that they operate as designed. These and other factors can cause building energy performance to vary from expectations based on design standards.

Initiatives such as (1) Compliance Collaboratives are growing in an effort to overcome these kinds of enforcement challenges. At the point of occupancy, some jurisdictions require HVAC-system commissioning—a process that tests systems to ensure they operate as intended. Commissioning is incorporated into the U.S Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED) rating system, which is required by the U.S. General Services Administration (GSA) for all GSA new construction and renovation through the (2) Facilities Standards for the Public Buildings Service.[10] During a building's lifetime, changes typically occur in ownership and function, renovations and expansions alter the physical structure, equipment ages, maintenance practices lag, and changing building operators employ ad hoc methods to keep equipment functioning. Each of these changes can affect energy performance. Conventional codes require examination of efficiency features for new construction and major renovations, but commissioning of systems in an existing building ("retro-commissioning") provides a methodology for systematically evaluating and improving energy performance. (3) New York City's local law 87 (LL87) requires periodic retro-commissioning for buildings over 50,000 square feet.

Pursuing This Option

One of the challenges for an outcome-based policy framework is to address the reality that multiple owners and operators would need to be engaged over the building lifecycle. Ideally, the entity responsible for designing and constructing a building would be required to meet a certain level of energy performance and then be held accountable for success or failure. While equitable, a single policy that extends the point of compliance beyond

[9] Commercial Building Energy Codes—Usability and Compliance Methods, Building Codes Assistance Project; http://energycodesocean.org/sites/default/files/resources/BCAP_Commercial%20BEC_Usability_Compliance.pdf; 2008.

[10] The Facilities Standards for the Public Buildings Service PBS P100 is a mandatory standard applied to new buildings, repairs, and modifications for the Public Buildings Service of the GSA. www.gsa.gov/portal/content/104821.

conventional codes and the certificate of occupancy (CO) stage may leave entities that had nothing to do with design choices or construction practices with the responsibility of implementing steps to correct energy performance problems, such as audits or retro-commissioning. (4) The City of Seattle is currently tackling these issues under its optional code compliance scheme based on set energy targets. Widespread success in addressing these challenges to support design, construction, operation, and adaption of a building to drive high energy performance (and financial savings) through the building's lifecycle is likely to require a number of policies, linked together through building performance information. The following menu is provided for consideration.

Design Phase

- **Energy Modeling:** Policymakers can support efforts in the energy efficiency community, or at the federal level, to use real operating data to improve building simulation model accuracy, and approve software that meets best practice guidelines.

Construction Phase

- **Site inspection**: Diligent enforcement of conventional energy codes to ensure that construction follows the approved design and components are correctly installed to maintain their energy efficiency characteristics is critical. Improving code officials' technical capabilities for complex construction issues and using third-party experts can increase the effectiveness of site inspections.
- **Commissioning**: Commissioning means the testing and fine-tuning of installed energy systems to meet design performance levels. As an extension of the energy code, a commissioning requirement puts in place additional activities during design, construction, and building start-up that would seek to ensure that energy-related building systems perform as they were designed. This step crosses the point when the CO is issued, and so would need to include clarity on pre-CO and post-CO requirements.

Occupancy Phase

- **Energy Performance Benchmarking and Disclosure**: This policy makes energy performance visible in commercial real estate markets by requiring the disclosure of energy use data or performance scores. Widely used across the United States, ENERGY STAR Portfolio Manager[11] compares actual energy use among similar buildings to generate benchmarking scores. Such feedback indicates the scale of improvement opportunities that are likely available and can play a valuable role in the decision-making process for owners and property managers. As a part of New York City's *PLANYC*, (5) Local Law 84 (LL84) requires energy and water benchmarking for all privately-owned buildings over 50,000 square feet. A recently completed 2013 Benchmarking Report details the findings of the policy's first two years of data collection.
- **Periodic Retro-Commissioning**: Some jurisdictions have established requirements for commissioning of existing buildings to build upon performance benchmarking and drive performance improvement over time. Retro-commissioning is typically conducted once every 3 to 5 years and focuses primarily on optimizing system functionality and interaction. Improvements in maintenance and operation practices are also identified, as well as equipment replacement needs.
- **Periodic Energy Audits/Assessments**: These requirements call for a thorough assessment of building energy systems and technology. Audits, such as those required under San Francisco's (6) Existing Commercial Buildings Energy Performance Ordinance, identify significant investment and capital improvement opportunities and typically cover the full range of energy components and equipment. Boston[12] and California[13] are two jurisdictions that have also indicated intent to require asset ratings of commercial buildings to assess efficiency and opportunity for improvement.
- **Renovations/Additions**: Times of major renovation or expansion can afford additional opportunities to improve energy performance. Jurisdictions can enforce energy codes, which apply to all new construction

[11] www.energystar.gov/buildings/about-us/how-can-we-help-you/benchmark-energy-use/benchmarking.

[12] https://www.neep.org/public-policy/energy-efficient-buildings/building-energy-rating/building-asset-rating.

[13] www.aceee.org/files/proceedings/2012/data/papers/0193-000104.pdf.

and some renovations, more rigorously and can also apply existing energy audit and retro-commissioning policies, specifically, in such projects. If the jurisdiction has an energy audit requirement for existing buildings, this could be applied to renovations and additions such that the most recent audit or a new audit required as part of the plan review process could be used to identify required energy upgrades.

- **Change of Ownership or Occupancy**: When a building is sold or tenant space is built out for new occupants, these points in the building lifecycle can create opportunities to improve energy performance. Jurisdictions can extend their policy frameworks to establish various requirements that may be appropriate at these points, such as energy audits, retro-commissioning, required upgrades, and provision of tax incentives, financing, or other inducements to improve energy performance.

Getting Started

- Take an inventory of current energy codes and other requirements related to energy use, including the construction energy code currently in force, any CO requirements, and other requirements for equipment start-up testing, energy performance benchmarking, retro-commissioning, and energy audits.
- Assess "gaps" in energy performance requirements across the building lifecycle.
- Define policies that could be added in an expanded building energy codes framework, such as improved construction code enforcement, commissioning, benchmarking, retro-commissioning, and change of ownership/major use.
- Define ways for energy performance data to move with the building from policy to policy. For example, a jurisdiction can establish an energy certificate system that accumulates design features and energy ratings, operational performance ratings, equipment upgrades, and related data through the building lifecycle. This information can be included with official property records or other long-term data management platforms.

SEE Action has produced a number of documents and resources that provide detailed information on topics related to outcome-based building policies. Please see the following links for these resources:

- Energy Benchmarking, Rating, and Disclosure for Local Governments Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_benchmarking_localgovt.pdf.
- Energy Benchmarking, Rating, and Disclosure for State Governments Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_benchmarking_stategovt.pdf.
- Energy Benchmarking, Rating, and Disclosure for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_benchmarking_ratepayerregulators.pdf.
- Benchmarking and Disclosure: State and Local Policy Design Guide and Sample Policy Language www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_benchmarking_policy.pdf.
- Energy Performance Benchmarking and Disclosure Policies or Public and Commercial Buildings Presentation www1.eere.energy.gov/seeaction/pdfs/taylor_ecb_webinar_07262012.pdf.
- Energy Audit and Retro-Commissioning Policies for Public and Commercial Buildings Presentation www1.eere.energy.gov/seeaction/pdfs/taylor_ecb_webinar_08302012.pdf.
- Retro-Commissioning for State and Local Governments Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_retrocommissioning_stateandlocal.pdf.

- Retro-Commissioning for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_retrocommissioning_regulators.pdf.

ADDITIONAL PROGRAM DETAILS

(1) **Energy Code Compliance Collaboratives** provide a forum for diverse stakeholders affected by energy codes to work together to address common concerns, set goals, and share resources. Collaborative states currently include Colorado, Delaware, Idaho, Nebraska, Nevada, New Hampshire, Pennsylvania, and Texas. http://energycodesocean.org/compliance-collaboratives-portal.

(2) **The Facilities Standards for the Public Buildings Service** establishes design standards and criteria for new construction, repairs and alterations, and modernization of GSA facilities. These standards include requirements relating to sustainability and energy use, and reference the LEED rating system (www.usgbc.org/leed), which addresses various aspects of green building through a point-based category system and provides third party verification of green buildings. www.gsa.gov/graphics/pbs/2010_P100_Final.pdf.

(3) **NYC's Local Law 87** (LL87) is part New York City's Greener, Greater Buildings Plan. LL87 requires that these buildings also undergo periodic energy audit and retro-commissioning measures. www.nyc.gov/html/gbee/html/plan/ll87.shtml.

(4) **Target Performance Path, City of Seattle's new energy code compliance option,** is a recently launched experiment that lets building design professionals achieve energy performance in their own way. Aside from a few requirements, including commissioning and sub-metering, designers are freed from the technical obligations of the energy code in return for a building that is modeled, constructed, and operated below the set energy use target. Owners have up to three years to demonstrate achievement of the target level of performance for their building type and, if they fail, can receive back half of the fine levied in order to improve performance. The market will have to resolve issues such as developer and owner obligations and how to handle change of ownership. However, if successful, the program will provide insight into the most effective design and operation strategies that achieve measured energy performance. www.seattle.gov/DPD/default.htm.

(5) **NYC's Local Law 84 (LL84)** requires owners of buildings greater than 50,000 square feet in area to annually benchmark energy and water usage and submit to the City for public disclosure. The law outlines a standardized process for benchmarking by capturing information using ENERGY STAR Portfolio Manager. Property owners who do not comply are subject to violations and penalties of $500 quarterly up to a maximum of $2,000. The City releases benchmarking reports annually with analysis of the data collected. www.nyc.gov/html/gbee/html/plan/ll84.shtml.

(6) **The San Francisco Existing Commercial Building Energy Performance Ordinance** requires owners of non-residential buildings in San Francisco with areas larger than 10,000 square feet to benchmark energy use and annually disclose results. Buildings must also undergo an energy audit every five years. www.sfenvironment.org/energy/energy-efficiency/commercial-and-multifamily-properties/existing-commercial-buildings-energy-performance-ordinance.

Four Leading Policy and Program Options: #2. Performance Incentives

Today's building energy performance policy framework focuses mainly on new buildings and major renovations, based on the premise that good design leads to good performance over a building's lifetime. However, as discussed previously, good performance over time requires more than good design alone. The expanded policy framework described in the prior section outlines policy options for driving improvement across the building lifecycle. Alternatively, some jurisdictions may prefer voluntary policy and program solutions in place of, or as complements to, requirements. This section outlines a framework of voluntary incentives that can be tied to measured energy performance. This option is primarily market-driven, with public intervention limited to a set of "carrots" in which market forces act to drive energy performance improvements. Using measured performance as the basis for such incentives can help to align actual performance with broader public policy goals.

Where Are We Now?

Many of the typical incentives offered by state and local governments focus on new construction, and thus fail to place enough value on post-construction building performance. These incentives reward the installation of certain technologies and products predicted to create efficiency gains. Common state and local incentives include:

- **Rebates and grants** aimed at a defined set of measures.
- **Loans for energy efficiency upgrades** offered with advantaged interest rates, loan terms, or credit terms (examples include revolving loan funds, interest buy-downs, and loan loss reserve funds).
- **Permitting and planning assistance** provided when state and local governments waive building permit fees, give accelerated permit and building plan review, offer design assistance, and relax restrictions on setbacks, residential density, and height for buildings that qualify for eligible energy efficiency or green building certifications.

Programs that more closely incentivize improved building performance include a partnership arrangement between 13 local Building Owners and Managers Association (BOMA) International associations and the federal EPA, state and local government, and other local real estate groups. Annual "Kilowatt Crackdown" or "Watts to Water" programs are voluntary competitions, such as the one in Minneapolis,[14] and involve benchmarking actual energy and water use in buildings and competing to see which building can best improve its performance over a year's time. Designed as an innovative and fun way to motivate action, the programs give recognition to successful participants and demonstrate that the voluntary marketplace works.

Relatively few state and local governments employ tax incentives to reward investment in energy efficiency and increased performance. Some states offer tax incentives, primarily linked to state income and business taxes. County and city governments are often restricted in the tax incentives they can provide by state tax laws, which vary widely across the country. Montgomery County, Maryland, is one jurisdiction that is using the tax code as a tool to increase local investment in energy efficiency and increase overall building performance in the area. The County is able to offer these tax incentives because the State of Maryland permits local governments to offer property tax credits for high performance buildings.

Pursuing This Option

Experience to date suggests a preference for voluntary incentives over penalties, such as required efficiency improvement or code citations. Because they are punitive, penalties are often seen as not "market-based" or user-friendly. For these reasons, jurisdictions may choose to focus on incentives only, at least initially. The solution-set contained in this option includes:

[14] www.bomampls.org/boma/KWCD/KilowattCrackdown.aspx.

- **Direct incentives** for measured performance improvement, including rebates for commissioning, retro-commissioning, or energy systems upgrades
- **Advantaged financing** for energy upgrades, involving credit enhancements, interest subsidies, and other features, sometimes using public agency bonding authority
- **Permitting and planning incentives**, such as streamline permit review, development density allowances, and relaxation of other planning and zoning requirements for projects that can be expected to provide improved energy performance
- **Recognition incentives,** such as local government challenges to business to set savings targets and be recognized for achieving savings milestones, or use of the ENERGY STAR label for high performance buildings to help the market value lower energy costs
- **Tax incentives** rewarding construction of high performance buildings or improvements to energy efficiency using actual measured performance as the basis for tax deduction eligibility instead of following traditional patterns of using assumed savings tied to design standards and equipment upgrades, for example.

A key issue in direct incentive programs is whether to pay on the basis of prospective or measured savings. For example, some jurisdictions promote retro-commissioning with rebates based on predicted energy savings. However, this design may not induce building owners to measure and improve actual performance after the project is implemented. To address this issue, the New York State Energy Research and Development Authority (NYSERDA) offers (1) Monitoring Based Commissioning Incentives that help pay for equipment and engineering services to gather and manage data. Measurement and verification (M&V) requirements in the program enable NYSERDA to adjust final incentive amounts based on actual energy performance. NYSERDA also offers a (2) Multifamily Performance Program that provides rebates to building owners for implementing energy reduction plans. Performance payments are based on actual energy savings compared to energy performance goals after one year of operation. Under a similar program in New Jersey, (3) the Pay for Performance program for existing buildings, cash incentives are offered to implement energy reduction plans for work in commercial, industrial, and institutional buildings. The plans are developed by technical program partners and, after implementation, benchmarking reports from ENERGY STAR Portfolio Manager are required to verify savings and determine the amount of the incentives.

A second key issue is whether to offer direct incentives or rely primarily on the value of public recognition. Many voluntary programs leverage the recognition value of energy performance, including the federal (4) Better Buildings Challenge and (5) ENERGY STAR program. Better Buildings Challenge partners agree to reduce their energy use by at least 20 percent over a 10 year period and share their energy savings solutions, which are featured on the Challenge's website as implementation models for others to emulate. ENERGY STAR certified buildings are eligible to receive certification signage to publicly display their achievement and may create a profile in the ENERGY STAR certified buildings and plants online listing. Several local building energy challenges similarly operate primarily on the recognition value of being seen as a leader among peers in one's market space. While such programs do come with operating costs, the cost of monetary incentives need not be part of the policy framework. Some local programs provide a mix of these solutions, using recognition and incentives to drive demand for the building improvements, verified through measured savings, as in the (6) Los Angeles Better Buildings Challenge (LABBC).

Jurisdictions can also choose to adapt their tax systems to encourage sustainable practices like energy efficiency, as well as raise revenue. Local governments tend to use the property tax system for energy incentives, granting tax abatements or rebates to qualifying building owners. States may choose to use business taxes as the focus of such incentives. State regulations can be updated so that states, as well as county and city governments, can amend tax regulations to incent improved energy performance in commercial buildings. The states of Maryland, Nevada, New York, and Virginia provide local governments with the option to grant property tax credits or exemptions for new and existing energy-efficient buildings that meet certain standards. In Maryland, the state tax code provides greater flexibility for local governments to offer property tax credits for buildings that demonstrate high

performance. (7) Montgomery County gives property tax credits on new or extensively modified commercial buildings that meet defined high performance building standards.

Getting Started

- Lead by example by driving energy performance through measured savings in public buildings to show how it can be done.
- Assess available incentive options, including utility programs if available.
- Review state and local tax laws to assess the ability of the jurisdiction's taxation systems to provide tax incentives for high performing buildings, then engage and work with stakeholders to determine the most effective types of tax incentives.
- Determine whether it is realistic to include penalties in the policy suite.
- Develop performance measurement mechanisms and the accompanying data access solutions needed to support energy performance verification in a robust and user-friendly manner.
- Challenge leading builder owners and managers to become market leaders by forming the first wave of voluntary participants.

SEE Action has produced documents and resources that provide detailed information on performance incentives. Please see the following links for these resources:

- Strategic Energy Management for State and Local Governments Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_strategicenergymanagement_stateandlocal.pdf.
- Strategic Energy Management for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_strategicenergymanagement_regulators.pdf.
- Credit Enhancement Overview Guide www1.eere.energy.gov/seeaction/pdfs/credit_enhancement_guide.pdf.

ADDITIONAL PROGRAM DETAILS

(1) NYSERDA's Monitoring Based Commissioning Incentives (MBCx) offers incentives for the installation of energy information gathering technologies that aid in building monitoring and operations. M&V requirements dictate that NYSERDA must have access to building data for two years and adjusted final incentive amounts are based on energy performance. www.nyserda.ny.gov/Energy-Efficiency-and-Renewable-Programs/Commercial-and-Industrial/CI-Programs/Existing-Facilities-Program/Performance-Based-Incentives/Monitoring-Based-Commissioning-Incentives.aspx.

(2) The New York Energy Smart Multifamily Performance Program, a New York State rebate program for multifamily housing properties, pairs building owners with performance partners to benchmark their property, create an energy reduction plan with performance targets, and implement recommended projects. Reaching energy performance goals allows building owners to receive performance payments based on actual energy savings after one year of operation. www.nyserda.ny.gov/BusinessAreas/Energy-Efficiency-and-Renewable-Programs/Multifamily-Performance-Program/Multifamily-Performance-Program/Existing-Buildings.aspx.

(3) **Pay for Performance-Existing Buildings, part of New Jersey's Clean Energy Program,** offers commercial buildings cash incentives to implement energy reduction plans. The plans are developed by technical program partners with expertise in energy audits, financial planning, and implementation. Post-project benchmarking reports from EPA ENERGY STAR Portfolio Manager are required to verify savings actually achieved. Incentives for electricity and natural gas savings are paid based on actual savings, provided that the minimum performance threshold of 15 percent savings has been reached. www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings.

(4) **DOE's Better Buildings Challenge** provides technical assistance and recognition to commercial and industrial building owners who commit to reduce the energy use of their building portfolios by 20 percent or more over the next 10 years, report on their energy performance results, and share their strategies. www4.eere.energy.gov/challenge/.

(5) **The EPA ENERGY STAR Program** works with businesses and public sector organizations to improve the energy performance of commercial and industrial buildings. Organizations adopt an energy management strategy and can earn ENERGY STAR certification for their buildings by providing energy use data showing superior performance over a recent 12-month period. www.energystar.gov/buildings/about-us.

(6) **The LABBC** encourages property owners to take action by offering subsidized services and free resources for energy performance improvements that support the LABBC goal of achieving a 20 percent reduction in energy use across 30 million square feet of existing buildings by 2020. http://la-bbc.com/.

(7) **Montgomery County, Maryland's Property Tax Code** gives property tax credits on new or extensively modified commercial buildings that meet defined high performance building standards. The county defines an "extensive modification" as a structural change that alters 50 percent or more of the building's square footage. Property tax credits ranging from 10 to 75 percent of the cost of the upgrade can be applied over a period of 3 to 5 years; the amounts vary based on the type of project and the rating it receives. The County uses the LEED rating system, although other rating systems may also be used. www6.montgomerycountymd.gov/dectmpl.asp?url=/Content/dep/energy/EnergyIncentives.asp.

Four Leading Policy and Program Options: #3. Property Valuation and Appraisal Policies

Real estate appraisals reflect the decisions of buyers and sellers of real estate. If market participants demonstrate a significant demand for energy-efficient and high performance buildings, qualified real estate appraisers will align energy performance with value. The real estate appraisal processes used for commercial buildings are arguably more likely to address green and energy efficiency attributes than the sales comparison approach typically used for residential appraisals. The primary data systems used in residential appraisals are not usually populated with green or energy efficiency-related fields, creating a data gap and making comparable sales selection for high performance properties difficult or impossible to achieve with consistency and credibility. Appraisers also report that they are frequently asked to remove adjustments within the appraisal report for green or energy efficiency features unless they are backed by comparable sale information, which often does not exist in new construction or rehabilitation. Commercial appraisals typically use an income approach, which may be the most applicable approach in many income producing properties. This approach will likely capture savings attributable to high performance features and equipment during analysis of income and expenses. Still, commercial real estate appraisers describe challenges to reporting analysis of high performance income producing properties, mostly because of market pressure to reduce the appraisal's scope and cost.

Where Are We Now?

Current efforts in this area tend to fall in two types: 1) closing the data gap by increasing education and awareness of the importance of capturing real estate sales information and 2) promoting education on methodologies available to analyze and report market reaction to high performance building. The National Association of Realtors has embarked on a Green MLS[15] project to develop a set of best practices for local and regionally-owned multiple listing service (MLS) companies in order to capture relevant fields relating to high performance building. This project had input from the real estate appraisal community and includes fields that are applicable to the real estate valuation process. Many state and local energy offices have held meetings promoting application of the Green MLS by local MLS systems. Adoption of such fields is on the rise, but less than half of MLS systems include such fields today.

Some state governments are beginning to take policy and program action to incorporate the value of energy-efficient buildings into appraisal practices and associated real estate market channels. The Governor of Colorado, for example, began supporting training for real estate agents, lenders, and appraisers in 2009 as part of their (1) Green Real Estate Initiative. The State of Colorado also entered into a memorandum of understanding[16] (MOU) with the Appraisal Institute[17] to subsidize appraiser education of existing courses on the valuation of sustainable buildings. This MOU resulted in a study evaluating the impacts of solar power in specific markets in Colorado.[18] Other states, such as Alabama, have also subsidized appraiser education on green appraisal issues.

To help ensure that green and energy efficiency market impacts are fully analyzed, industry groups like the Appraisal Institute[19] and insurance companies are working in collaboration with public agencies to better incorporate energy performance and related sustainability indicators in their real estate market practices. The Appraisal Foundation—in collaboration with DOE—has developed appraiser qualifications and appraisal guidance for valuing green buildings. The *Model Scope of Services for Green Building Valuation*[20] is a part of a pilot program to document the added value of energy-efficient, green buildings. DOE has also developed a commercial building

[15] www.greenthemls.org.

[16] www.appraisalinstitute.org/appraisal-institute-agrees-to-work-with-state-of-colorado-on-valuing-green-homes/.

[17] www.appraisalinstitute.org/newsadvocacy/news/2012/State-of-colorado-green-homes-10-9-2012.aspx.

[18] www.appraisalinstitute.org/newsadvocacy/news/2013/Solar-Electric-Systems-Positively-Impact-Home-Values-10-31-13.aspx.

[19] www.appraisalinstitute.org.

[20] http://mts.sustainableproducts.com/certified_products/Model%20Green%20Home%20Valuation%20Scope%20of%20Work%2010-27-12.pdf.

energy asset score[21] that provides standardized metrics about the energy efficiency of a building and its equipment. This type of information will help the market associate value with high performance and provide the appraisal industry with data to support the reflection of energy performance in assessed value.

Pursuing This Option

Educate Commercial Real Estate Professionals

When professionals across the market, including brokers, lenders, and appraisers, as well as buyers and tenants, are educated on the value of high performance buildings, they can build this knowledge into longer-term property value. However, the real estate business is characterized by high turnover, making education a critical element of any effective state or local policy action aimed at changing real estate market practices. State governments can encourage this by including energy performance and valuation modules in the continuing education requirements that are typically attached to licensing regulations. Granting official continuing education units or credits for energy-related curricula can keep these issues in front of real estate professionals year after year. Local governments can work with their local real estate board, listing services, and lending associations to develop and promote these educational resources, as well as include energy performance information in market-facing channels such as listing services. By acting in these ways to bridge the knowledge gap about energy performance, state and local governments can play critical roles in making it an integral part of real estate market operations.

Getting Started

- Work with stakeholders to review current commercial real estate sector practices and identify key barriers to valuing building energy performance.
- After determining what is needed in your area, develop a plan to tackle barriers.
- Work with key stakeholders to refine and implement your plan by partnering with early adopters and local businesses to promote best practices.
- Create educational materials, plug them into real estate education channels, and stay engaged with the real estate community to sustain market engagement and turn lessons learned into improved practices.

SEE Action has produced documents and resources that provide detailed information on property valuation and appraisal policies. Please see the following links for these resources:

- High Performance Leasing for State and Local Governments Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_highperformanceleasing_statelocal.pdf.
- High Performance Leasing Strategies for State and Local Governments Presentation www1.eere.energy.gov/seeaction/pdfs/sledd_ecb_highperformanceleasing_022613.pdf.

ADDITIONAL PROGRAM DETAILS

(1) The State of Colorado's Green Real Estate Initiative, launched in 2009, is a collaboration with Multiples Listing Services (MLS) to include information about energy efficiency in the on-line real estate catalog. The Governor's Energy Office has supported the development of training modules for real estate agents, lenders and appraisers to help utilize the new energy efficiency fields in the tool and explain energy efficiency features to prospective buyers. http://www.colorado.gov/cs/Satellite/GovEnergyOffice/CBON/1251631746218

[21] http://energy.gov/eere/buildings/commercial-building-energy-asset-score.

Four Leading Policy and Program Options: #4. Utility Program Policy and Partnerships

Many utilities operate energy efficiency programs in response to regulations set by their utility commission or governing body. In many cases, local utilities can become powerful partners in providing incentives, technical assistance, data access, and other services that support improved energy performance. Utilities can also offer policymakers effective access to the market through their program delivery mechanisms. Policymakers can engage in the regulation process with public utility commissions (PUCs) to provide important input on issues ranging from the importance of harmonization across state utility programs to the maintenance of funding under (1) energy efficiency resource standards (EERS). Historically, utility programs have focused on transaction-specific incentives such as rebates for replacing specific types of equipment. More recently, some utilities are exploring incentives based on measured whole building performance, and are incorporating performance benchmarking as part of retro-commissioning programs. As technologies such as advanced metering are deployed and electronic data exchange methods begin to penetrate the utility business, utilities are envisioning data access and energy performance information as increasingly central to their customer service and efficiency program offerings. (2) Green Button, an element of the Energy Data Initiative[22] led by DOE, seeks to make customer energy data available through utility-funded solutions. State and local governments needing help in implementing their policies can build partnerships that effectively leverage utilities' enhanced data access and related program offerings to support their commercial sector energy performance goals.

Where Are We Now?

Utilities are required by law or regulation in about half of U.S. states to achieve certain levels of energy savings over defined time periods through EERS. Most efficiency programs provide:

- Prescriptive incentives such as rebates for specific technologies and products, with energy savings estimated on a "deemed-savings" basis from historical data
- Evaluation, measurement, and verification activities that do not regularly assess whole building performance and typically check a sample of projects to verify installations and estimate net savings for specific measures.

However, some utilities are increasing their focus on whole building performance. Retro-commissioning programs in particular may include a benchmarking element that measures energy performance for the building on a pre- and post-treatment basis. State and local governments can leverage such programs by first volunteering their own buildings for participation, and then by promoting the program among private building owners and managers.

Pursuing This Option

Local governments served by municipal utilities (munis) or rural electric cooperatives (coops) typically have more flexibility in working with these entities, whereas investor-owned utilities (IOUs) are regulated by state PUCs, which usually work through more complex and formal processes. Local governments in muni or coop service areas can pursue a wide range of partnerships as appropriate for mutual interests. For governments seeking to work with IOUs, the spectrum of engagement is bracketed by engaging *upstream* in state-regulated utility program design and partnering *downstream* with utility programs after they are implemented. Some governments have also worked with utility programs so that government policies are paired with voluntary incentive programs offered by a utility. In 2012, the San Francisco Commercial Lighting Ordinance[23] requiring a minimum efficiency level for fluorescent lamps was paired with limited-time free technical assistance and financial incentives to facilitate and ease the transition. Under (3) SF Energy Watch, this partnership between PG&E and the County and City of San Francisco continues to promote energy efficiency. The federal government has long partnered with

[22] www.data.gov/energy/page/energy-data-initiative.

[23] www.sfenvironment.org/news/update/commercial-buildings-shedding-some-light-on-the-sf-commercial-lighting-ordinance.

utilities. Through the EPA's ENERGY STAR program, utilities are offering whole building approaches such as (4) ComEd, for example, providing no-cost energy performance benchmarking using Portfolio Manager. Through DOE's Better Buildings Challenge, utilities provide access to whole building data, offer multi-measure programs, and report on results.

At the most formal level of participation, state or local agencies can seek intervener status with PUCs to allow participation in rate cases and formal proceedings to influence utility programs and policies. This can require specialized technical and legal expertise, and a significant time commitment. Participating in less formal PUC processes such as working groups and collaboratives offers opportunities to help shape program designs, but still requires technical expertise and time commitment.

Partnering With Utility Programs

After utility program are operational, state and local agencies can leverage them to support their policy and program goals. Agencies can start by taking a "lead by example" approach, entering their own buildings in utility programs and encouraging private building owners to do the same. Over the longer term, agencies can magnify the impacts of their policies by leveraging utility programs to drive transformation of commercial building end use markets. Examples of innovative utility programs that are linked to actual energy performance include:

- In the State of California, the Statewide Customized Offering for Business offered by PG&E,[24] Southern California Edison, San Diego Gas and Electric, and Southern California Gas Company provides cash payments to businesses based on actual annual kilowatt-hour or therm savings achieved by certain energy efficiency upgrades. Payments of up to 50 percent of the total project cost are based on fixed incentive rates for actual energy savings and peak electric demand (kilowatt) reduction achieved in the first year after implementation.
- National Grid offers customers in the State of Rhode Island support to develop energy management plans under their Whole Building Assessment Initiative.[25] They work with both commercial and municipal customers on improving energy performance in buildings through a holistic look at energy use that includes benchmarking, system-wide opportunity analysis, and staff training.

Getting Started

- Assess staff expertise, time availability, and other resources in gauging agencies' participation in utility program design and related regulatory processes.
- Participate in state PUC processes, as appropriate, to encourage program designs that reward whole building energy performance.
- Engage with local utility programs that incorporate energy performance measurement by participating directly with public buildings and promoting the program to commercial building market players.
- Consider linking state and local energy performance policies to utility program and data access resources.

SEE Action has produced documents and resources that provide detailed information on ratepayer-funded energy efficiency programs. Please see the following links for these resources:

- A Utility Regulator's Guide to Data Access for Commercial Building Energy Performance Benchmarking www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_data_access_guide.pdf.
- A Regulator's Privacy Guide to Third-Party Data Access for Energy Efficiency www1.eere.energy.gov/seeaction/pdfs/cib_regulator_privacy_guide.pdf.
- Strategic Energy Management for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_strategicenergymanagement_regulators.pdf.

[24] www.pge.com/en/mybusiness/save/rebates/ief/index.page.
[25] https://www.nationalgridus.com/narragansett/business/energyeff/4_whole_building.asp.

- Retro-Commissioning for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_retrocommissioning_regulators.pdf.
- Energy Benchmarking, Rating, and Disclosure for Regulators of Ratepayer-Funded Programs Fact Sheet www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_benchmarking_ratepayerregulators.pdf.

ADDITIONAL PROGRAM DETAILS

(1) **Energy Efficiency Resource Standards** are state policies that establish savings targets for energy use that utility and non-utility program administrators must meet through customer energy efficiency programs, encouraging end-user energy saving improvements. www.aceee.org/topics/eers.

(2) **Green Button,** an element of the Energy Data Initiative led by DOE, is an effort responding to a White House call to action to provide electricity customers access to their energy usage data on electric utility websites and in a consumer friendly format. www.greenbuttondata.org.

(3) **SF Energy Watch Commercial Program** offers technical assistance, equipment rebates, and discounted equipment installation to a range of San Francisco business types for qualifying energy efficiency projects. The program is a result of a partnership between PG&E and the City and County of San Francisco and is funded by California utility ratepayers. A number of local governments in PG&E's service territory have developed similar Energy Watch Partnerships with PG&E to provide incentives and educational materials for their local businesses. www.sfenvironment.org/sf-energy-watch/overview/sf-energy-watch-partner.

(4) **Commonwealth Edison Smart Ideas Commercial Real Estate Program,** part of a partnership between the utility, which serves Chicago and the Northern Illinois area, and EPA's Building Performance with ENERGY STAR, is a strategic energy management program for commercial office buildings. The program offers no-cost benchmarking and consulting services to help participants set and track energy performance targets and assistance in benchmarking using Portfolio Manager. www.comed.com/business-savings/programs-incentives/Pages/commercial-real-estate.aspx.

Workforce Training and Credentialing: A Postscript

Because energy performance in buildings is a labor-intensive endeavor, and because the U.S. building stock includes over 5 million nonresidential buildings, developing and maintaining a competent and credible workforce is a critical part of an effective energy policy framework. Workforce training and credentialing are essential to ensure consistent levels of technical expertise and quality of work in the assessment and implementation of energy performance improvements. Accordingly, DOE is working with industry to establish voluntary national guidelines[26] to promote quality and consistency across programs. The building energy performance workforce embraces a wide range of skills and roles, from code officials to appraisers, and from building operators to third-party performance experts. Sustained high levels of energy performance in a given building market only occur when all of these stakeholders are engaged effectively over time.

Currently, building industry professionals too frequently engage in energy performance measurement and improvement as "above and beyond" their official job descriptions. While some common professional trainings and certifications used in the building industry—such as those for professional engineers, registered architects, and code officials—incorporate energy performance elements, these are typically treated as optional electives rather than core requirements. Similarly, although energy efficiency-related training and credentialing offerings have expanded in recent years through organizations such as the American Institute of Architects, Association of Energy Engineers, ASHRAE, Building Owners Management Institute, USGBC, and Northwest Energy Efficiency Council, these programs are seen mainly as voluntary career development choices rather than as providing fundamental skills.

State and local jurisdictions can leverage these training and credentialing programs in their building policies, to ensure that basic levels of competence and quality are upheld in implementing their commercial sector energy policy suite. One way to do this is by requiring the use of certain professional credentials as conditions for receiving grants, loans, utility incentives, or tax incentives for energy efficiency projects. Another option, being pursued in cities such as San Francisco and New York, is to require professional certifications for individuals conducting required energy audits and retro-commissioning for buildings covered by municipal ordinances. Additional examples include programs in state and local governments that offer financial incentives for professional energy performance training. Programs such as those in Michigan, Maine, and Illinois offer tuition rebates or discounts for Building Operator Certification training courses.[27] As state and local governments work to expand building energy policy frameworks to include measured performance, this kind of training and credentialing will become increasingly important to grow and sustain the workforce needed to deliver energy performance consistently and credibly at the building level and across entire markets.

As a first step in building the energy performance workforce, governments can require and/or incentivize training and certification for their public facilities staff, first to demonstrate their value and second to influence the private market. They can also update licensing and other registration requirements for registered architects, professional engineers, and code officials in their states to require more specific credentials related to energy performance, and by incorporating such requirements into continuing education requirements for re-certification/relicensing. At a national level, getting involved with DOE's Better Building Workforce Guidelines[28] is a way to participate in the continuing evolution of these programs. Jurisdictions can provide stakeholder input to the guidelines, and once they are issued, can apply the professional certifications, certificate programs, and other aspects of the guidelines in their policy suites.

[26] www4.eere.energy.gov/workforce/.

[27] www.theboc.info/.

[28] www4.eere.energy.gov/workforce/participate.

Building energy performance-related certification programs include:

- Association of Energy Engineers Certification Information www.aeecenter.org/i4a/pages/index.cfm?pageid=3330.
- American Society of Heating, Refrigerating, and Air Conditioning Engineers Certification Information www.ashrae.org/education--certification/certification.
- Building Owners Management Institute Certification Information www.bomi.org/Students/Educational-Offerings/Designations-and-Certificates/Designation-Programs.aspx.
- Building Operator Certification Information www.theboc.info/.

Appendix: Additional Background Resources

Building Energy Rating and Disclosure Policies—Update and Lessons from the Field, Northeast Energy Efficiency Partnerships, February 2013; www.neep.org/Assets/uploads/files/public-policy/building-energy-rating/BER%20Supplement_FINAL%20DRAFT_2-25-13.pdf.

Building Operator Certification (BOC)—Better Building Energy Performance, Northwest Energy Efficiency Alliance; http://neea.org/initiatives/commercial/building-operator-certification-expansion.

BuildingRating.Org—Sharing Transparency, rating and disclosure policy adoption and resource website; www.buildingrating.org.

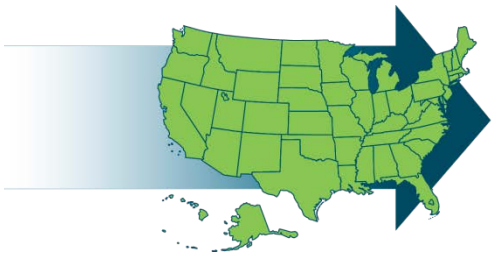
City of Seattle, Resource Conservation Management Plan—Energy Efficiency, 20% by 2020, Seattle Office of Sustainability and Environment, October 2013; www.seattle.gov/environment/documents/RCMP_2013_FINAL.pdf.

Developing Effective Codes and Standards for Net-Zero Energy Buildings, Ryan Colker, Dave Hewitt, and Jessyca Henderson, March 2011; newbuildings.org/sites/default/files/5_Developing_Effective_Codes_and_Standards.pdf.

Energy 2013 On the Road, Alliance to Save Energy, September 2013; www.ase.org/sites/ase.org/files/energy_2030_state-local_report.pdf.

Greening the Public Sector, Maximizing Energy Efficiency—Regional Policies Mandating High Performance State-Funded Public Buildings and How to Maximize their Energy Efficiency, Northeast Energy Efficiency Partnerships, October 2012; http://neep.org/Assets/uploads/files/public-policy/high-performance-buildings/HPB%20Policy%20Report_FINAL.pdf.

New Commercial Building Asset Rating in the U.S., Institute for Building Efficiency, an initiative of Johnson Controls; www.institutebe.com/energy-policy/New-Commercial-Building-Asset-Rating-in-the-U-S.aspx.



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STATE & LOCAL ENERGY EFFICIENCY ACTION NETWORK