The Energy Efficiency Group -

Green Buildings Advisory Committee

Best Practices for Implementing Green Building Standards Memo

Introduction

This memo explores the best practices for implementing green building standards in eight different jurisdictions that are among the most successful and respected in achieving their goals. The memo begins with a brief literature review and a description of the jurisdictions and their relevant laws, rules, departments, and councils. An overview of how each place defines and achieves its success is then followed by specific sections on measuring, tracking, and enforcing benchmarking and construction, on their approach to marketing and generating awareness, on resources, partnerships, and connections with stakeholders, and on their approach to equity.

Information for this memo comes from a variety of sources including research papers and news stories, but especially from each agency's publicly available reports and interviews generated with key stakeholders and administrators. This memo provides a broad description of best practices, either as reminders or new information for its readers, while offering specific anecdotes and details from on-the-ground experiences that make a significant and sometimes surprising contribution to achieving success. The practitioners who shared their expertise for this report were very generous with their time and were eager to ensure the best green building practices extend beyond their own jurisdictions.

The purpose of this memo is to support the Green Buildings Advisory Committee's role in implementing the Rhode Island Green Buildings Act by highlighting best practices.

Since later sections of TEEG's report address recommendations for the Committee, this section does not address RI's practices, instead, it offers an opportunity to identify an overview of best practices, many of which may already be occurring in RI.

Literature review

While new reports continue to be published, such as this memo, the most useful papers are not always the newest ones. Governments and individuals have been doing this work for a long time. Many of the programs in this memo, though significantly evolved, began in the early 2000s. While this memo will highlight the details that matter and the lessons learned from each jurisdiction's successes and failures, the broad outline of how to approach green building has not changed significantly even if the standards (and expectations) for construction practices and materials have changed dramatically. Change is a necessity, but sustainable progress requires clear goals and processes that necessitate a steady evolution. The one major exception to this sense of continuity has been the creation of building performance standards (BPS) with hard requirements and multiple pathways to compliance. The 2021 EPA report on BPS is an excellent resource.

Second, most of this literature is not specific to public buildings, but rather high-performance buildings in general. The goals and processes are overlapping at different scales. Concern about climate change serves as one catalyst, and the improvements in building performance in both public and private buildings can contribute to reducing greenhouse gas emissions. Many of the jurisdiction's key programs are "leading by

example" programs precisely because they want to showcase what is possible and what the best practices are for any building.

All stakeholders need to be involved in the process including elected officials, government staff, trades, builders, utilities, architects, inspectors, and community representatives. The varied priorities of the stakeholders need to be considered, and most importantly, there must be dedicated staff members who coordinate these stakeholders. Likewise, coordination across departments/agencies is crucial with clear staff leads. In particular, consider how to engage with facility directors and managers. There should be incentives and not just mandates to promote participation, however, they should be cost-effective. Furthermore, an engaged staff team can point to and support applications for existing financial programs related to green building both within and beyond the jurisdiction.

Leading by example on green buildings demonstrates the success of new technologies and creates the expertise necessary to build new markets. Education is crucial and can include a lecture series, and specific program training. For certain agency staff members and builders, some of this training should be mandatory. Another key point reiterated later in this review, is that much of this information is not specific to one jurisdiction, hence in addition to in-house training, people should be empowered to seek out other resources and earn continuing education credits for doing so. Alongside these training and lecture series, there should be an opportunity for reflection and to use existing successful projects as models. A marketing plan should communicate both goals and results to stakeholders and the wider public.

The best way to establish clear targets is to start with an existing program that sets building construction and efficiency standards. For example, many jurisdictions use the LEED rating system. This also applies to benchmarking: rather than creating something new, using ENERGY STAR Portfolio Manager is going to save time and work better for its users. Having third-party tools can reduce staff labor, however, the jurisdiction still needs to build the staff expertise to work with these systems and have enforcement and checklist protocols in place. In short, the jurisdiction sets the goals and leads a team to achieve these goals by coordinating, funding projects, having clear enforcement guidelines, and sharing expertise that all stakeholders can rely on.

The following guides and documents informed this section and they each provide a useful overview and specific details and case studies for implementing a green building program.

Building Performance Standards: Overview for State and Local Decision Makers from Benchmarking and Building Performance Standards Toolkit By Environmental Protection Agency (Published 2021) (This is the single most relevant and helpful document to review.)

Public Buildings Portfolio Management-Implementation Guide By New Buildings Institute, EcoEdge, Malka, and, NEEA (Published 2018)

Going Beyond Code: A Guide to Creating Effective Green Building Programs By the U.S. Department of Energy (Published 2011)

Good Practice Guide: Municipal Building Guide By C40 Cities Leadership Climate Group (Published 2016)

Energy Efficiency Programs in K-12 Schools: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs By the Environmental Protection Agency (Published 2011)

Jurisdiction and Administration Introduction

This section introduces the jurisdictions with their most relevant laws, executive orders, regulations, administration, key language, and councils related to public green buildings. These jurisdictions were chosen in consultation with the Office of Energy Resources based on their accomplishments and relevance to RI. The most recent dates for the laws are included first with previous rules stated when relevant. Given the changing laws, this overview is meant to be representative of key goals and does not include every single law related to green buildings. While there is generally one main law or executive order that applies to this work, parts of many different laws also apply to green buildings in general and public green buildings–typically it is a patchwork of laws with one main directive informing the focus.

There are several different, overlapping teams doing this work in most jurisdictions: for example a policy/technology group, a lead-by-example group, and a government building sustainability group. Several team leaders repeatedly emphasized the importance of both supportive commissioners and strong laws: when the law says that buildings must decarbonize then there is no debate over gas boilers and the conversations can focus on collaborating on the best plan.

1.) Massachusetts

a.) 2022- State Law- "Act Driving Clean Energy and Offshore Wind" Includes a requirement that the "Massachusetts School Building Authority shall conduct an assessment of elementary and secondary school buildings relative to energy efficiency, building conditions, safety, and public health." It also requires benchmarking for all buildings over 20,000 square feet.

b.) 2021- State Law- "An Act Creating a Next Generation Roadmap for Massachusetts Climate Policy" Sets statewide goals for reaching net-zero emissions by 2050. Includes the creation of an environmental justice council to advise the Secretary of Energy and Environmental Affairs.

c.) 2021- Executive Order- No. 594: "Leading by Example: Decarbonizing and Minimizing Environmental Impacts of State Government" (Revision of 2007 Leading by Example Order 484) The Leading by Example Program is staffed by the Department of Energy Resources to work with all state agencies. The Leading By Example Council is comprised of representatives from agencies, higher education institutions, and quasi-public authorities to provide feedback to the program staff. The Division of Capital Asset Management and Maintenance (DCAMM) is tasked with ensuring LEED silver or higher for all new construction of public buildings and that they meet targets for energy use intensity reduction. Any agency with more than 75 employees must appoint at least one Leading By Example coordinator. On an annual basis, LBE shall be responsible for tracking and collecting building and vehicle energy consumption, clean energy development, GHG emissions, and other relevant

information associated with state government operations. LBE shall report annually on progress toward meeting the targets and objectives of this Order. Every five years, starting in 2025, LBE shall publish a comprehensive review of portfolio progress and efforts undertaken.

2.) Washington

a.) 2022 and 2019- State Law- "Clean Buildings Law"- All buildings over 50,000 sq feet must comply with the Clean Buildings Performance Standards run through the Department of Commerce.

b.) 2020- Executive Order- 20-01- "State Efficiency and Environmental Performance," Agency directors are required to make new buildings net-zero or zero energy capable. A Governing Council reports directly to the Governor on the most cost-effective opportunities for reducing GHG emissions and improving the energy efficiency of state government operations. The Council chair will be policy staff from the governor's office. Each covered agency has to appoint both an executive-level manager and a staff member to work with the Office of State Efficiency and Environmental Performance (SEEP) to adhere to the order. SEEP is the Governing Council administrator.

c.) 2020- State Law Revised- "Greenhouse gas emissions limits for state agencies," contains goals to reduce emissions on a decade-by-decade basis. Agencies must report to SEEP every two years on actions planned to reduce emissions and their long-term strategy. The Department of Enterprise Services may create the report for agencies with fewer than five hundred employees.

d.) 2009- State Law- Chapter 39.35D RCW- "High-Performance Public Buildings" superseded by Executive Order 20-01 above. It builds on a 2005 law requiring all major projects from the state capital budget to meet at least the LEED Silver standard.

3.) California

a.) 2017- State Law- AB 802- All buildings over 50,000 square feet are required to submit an Energy Benchmark Report to the California Energy Commission (CEC). CEC also establishes building energy efficiency codes that are updated every three years.

b.) 2012- Executive Order- B-18-22- (Superseded 2004 EO which first required LEED for all new construction of state buildings)- All state agencies must reduce emissions with a 50% goal by 2020 and 100% goal for 2025 that all state building construction and renovation projects be zero net energy. Buildings over 10,000sq feet must obtain LEED Silver or higher. Department of General Services works with other agencies to develop policies for maintenance and operation to achieve efficiency improvements and incorporate them in the State Administrative Manual. (Builds off 2006 State Law, AB-32, California Global Warming Solutions Act). The Office of Sustainability is in the Department of General Services.

4.) New York

a.) 2022- Executive Order No. 22- "Directing State Agencies to Adopt a Sustainability and Decarbonization Program." (Leading by Example) Includes the creation of GreenNY Council co-lead by directors from major state agencies related to building operations and energy, responsible for implementing the EO. Most state agencies are required to appoint a sustainability coordinator to liaise with the council and are encouraged to create a sustainability team within their agency, who will respond to an annual survey from the Council. The agencies must work with the New York Power Authority (NYPA) to ensure they are meeting efficiency goals. New construction must also strive for no fossil fuels and low-embodied carbon in the construction process. Also builds on EO no 166 (2017) which ordered all state entities to reduce GHG by set percents, with leadership from the Department of Environmental Conservation and New York State Energy Research and Development Authority

b.) 2019- State Law- "Climate Leadership and Community Protection Act"- Has a goal to reduce emissions by 40 percent by 2030 and no less than 85 percent by 2050 from 1990. Provisions for state agencies are detailed in the 2022 Executive Order.

c.) 2012- Executive Order 88- Established BuildSmart NY- Through the NY Power Authority, BuildSmart tracks, advises, audits, and plans for projects contributing to energy savings in state-owned buildings.

d.) 2009-State Law- "State Green Building Construction Act" -All new state buildings and major renovations must comply with green building guidelines established by the Office of General Services.

5.) Vermont

a.) 2020- State Law- "Global Warming Solutions Act"- Requires Vermont to reduce GHG to 26% below 2005 levels by 2025. Then 40% below 1990 levels by 2030 and 80% below by 2050. This legislation included the creation of the Climate Council with members from state agencies, and also a range of stakeholders appointed by the legislature; the Council is responsible for creating an action plan.

b.) 2018- "State of Vermont Department of Building and General Services Design Guidelines"- Guidelines to exceed energy savings of standard code. They require collaboration between the design team and energy efficiency utilities. If an RFP does not state a certification level, then new buildings are built to a minimum LEED Gold and existing buildings are renovated to a minimum of LEED Silver.

c.) 2006- State Law- "State Energy Management Program" -First created in 2006 with an additional fund coming online later. A revolving loan fund program to promote efficiency savings in public buildings called the State Resource Management Revolving Fund and State Energy Revolving Fund. The Energy Office is in the Department of Buildings and General Services and works closely with Efficiency Vermont.

d.) 1992-State Law- "State Agency Energy Plan"- Since 1992 every six years this plan (SAEP) is updated by the Department of Buildings and General Services. The places contain clear and measurable reductions in total energy consumption, expanding renewable use, and reduction in GHGs. Each state agency must prepare a biannual Agency Energy Implementation Plan.

6.) New York City

a.) 2019- "Climate Mobilization Act"- Local Law 97 Led by the Mayor's Office of Climate and Environmental Justice and implemented by the Department of Citywide Administrative Services (DCAS) Division of Energy Management (DEM). Sets GHG emission reduction targets for municipal buildings (different targets for other buildings) with a 40% reduction in GHG emissions by 2025 and 50% reduction by 2030 from a FY2006 baseline.

b.) 2014- "Local law to amend the administrative code of the City of New York, in relation to reducing greenhouse gases by eighty percent by two thousand fifty" -Local Law 66 Updated a previous 2008 law to require an 80% reduction in greenhouse gas emissions by 2050 over 2005 levels for city government operations.

c.) 2005 and Amended 2016- Local Law 86 and then 31 and 32- "The City Green Capital Building Program." Led by the Director of the Mayor's Office of Environmental Coordination (MOEC). "Most capital projects with an estimated construction cost of $2,000,000 or more involving the construction of a new building, addition to an existing building, or the substantial

reconstruction of an existing building, across most occupancy groups, are required to be designed and constructed to achieve a LEED gold or higher rating, or other alternative green building standards." "Across most occupancy groups, similar city-owned projects are required to be designed as a low energy intensity building."

7.) Washington D.C.

a.) 2018- "Clean Energy Omnibus Act"- Includes the establishment of the Building Energy Performance Standard (BEPS), which applies to all District-owned buildings over 10,000 sq feet. Under BEPS all applicable buildings must meet a minimum energy performance, and if they fail to meet the threshold then they must take steps to improve their energy performance. The BEPS program is run by the Department of Energy & Environment. The act is a product of multiple working groups and stakeholder interviews. Also includes a lead-by-example plan of energy retrofits for D.C.'s existing public buildings and the development of a Strategic Energy Management Plan for the Department of General Services buildings.

b.) 2008- "Clean and Affordable Energy Act"- Required annual benchmarking and disclosure of building energy performance through Energy Star Portfolio Manager. For public buildings over 10,000 sq feet and 50,000 for private buildings. Operated by the Department of Energy & Environment.

c.) 2006- "Green Building Act"- Includes specifications for projects that are District-owned or at least 15% of the total cost is financed by the District. Must meet or exceed Leed Silver.

8.) Federal Government

a.) 2021- Executive Order 14057- "Federal Building Performance Standard"-Sets a goal of a net-zero emissions building portfolio by 2045 with a 50 percent emissions reduction by 2032. "The Chair of the Council on Environmental Quality (CEQ) and the Director of the Office of Management and Budget (OMB) shall review the targets, and agencies shall incorporate such targets into the performance management systems." New construction and modernization projects over 30,000 sq feet shall all be net-zero by 2030. Each agency shall "implement CEQ's Guiding Principles for Sustainable Federal Buildings in building design, construction, and operation of all new Federal buildings and renovated existing buildings."

b.) 2021- Federal Rule- Department of Energy- Starting in 2025 any new or renovated federal building will have to reduce on-site emissions by 90% relative to 2003 levels, with full decarbonization required by 2030.

c.) General Services Administration- as the largest civilian landlord coordinates with other agencies including EPA and DOE. Also contains the Office of Federal High-Performance Green Buildings, created by Congress through the "Energy Independence & Security Act," in 2007.

Success Defined

This section explores how jurisdictions have defined and achieved success in broad terms. The original RFP for this report noted that while there is no single criteria for success the following apply: "Minimize total lifetime costs of owning, maintaining, and occupying buildings. Minimize greenhouse gas emissions of the building stock. Optimize buildings to enhance non-energy benefits, including but not limited to occupant health, safety, and productivity. Maximize the use of sustainable materials and minimize waste. Other objectives as they advance state policy goals." While certain metrics like the number of LEED buildings may encompass multiple goals, it still does not capture the whole. Furthermore, success should not only be defined as past accomplishments as some programs have been in place for decades and others have just started. All of the jurisdictions reviewed in this memo are among the leaders in the United States, but their success, goals, and resources still vary widely.

In the federal government, the Office of Management and Budget includes a scorecard on sustainability that applies to each agency, so that they can be assessed individually in their approach to sustainability. Teams such as the Office of High-Performance Federal Buildings set specific goals for themselves on the road to net-zero public buildings. The associated Green Building Advisory Committee's success rests on the focus of its task groups and the specific problems they seek to collaboratively solve such as building decarbonization or approaches to leasing government offices that meet net-zero emissions standards.

Vermont's State Energy Management Program has clear financial goals for each project as well as the entire program. This includes a goal of lifetime savings from the

efficiency projects that exceed what was invested in the program. On a yearly basis, one revolving fund is expected to achieve $150,000 in new annual savings. In some years the longer-term goal is met whereas the short-term goals are not met. The financial terms of the program make the outcomes clear, though the shorter payback period limits its ability to engage in more ambitious projects.

For jurisdictions like Massachusetts that have been engaged in this work for many decades, almost all of the low-hanging efficiency work has already been completed. The larger projects move much slower, but part of their long-term achievement is also how the facilities partners have become committed to this new path. Success is judged in part by a changing culture where formerly uninterested stakeholders now feel invested and take an active role in contributing to more efficient and less carbon-intensive buildings. For programs like Massachusetts' Leading By Example, the completion of each individual, major project matters too. These big projects not only represent progress toward a larger goal, but they also show what is possible for other facilities across the state and beyond.

The Office of General Services Resiliency and Sustainability team in New York state has also largely moved past simpler efficiency work to focus on bigger decarbonization projects. Thus even as they look at making reductions in energy use as one ongoing metric of success in the short term, they reflect on their progress toward their more ambitious goals. Alongside short and long-term quantitative measures in terms of carbon and energy, success is also measured in terms of their ability to meet the needs of their tenants that include other factors such as comfort. In addition, deferred maintenance on state buildings in NY (but also true elsewhere) represents both a challenge and an opportunity to plan and finance a big leap forward in more sustainable and productive buildings.

Using its benchmarking data, California has already reduced GHG emissions by 67% in state buildings since 2010. Each individual agency creates its own sustainability roadmap that allows them to explain its achievements, failures, and targets for the future. The Office of Sustainability in the Department of General Services annually creates strategic goals for that year along with a five-year plan. In addition to working towards longer-term goals such as decarbonization, regular renewable energy and energy efficiency projects that require no capital and save the state money contribute to their ongoing sense of success. Finally the growing number of state-owned LEED buildings, that date back to a 2004 executive order, also stand as an enduring achievement.

Four jurisdictions, the federal government, Washington State, Washington D.C., and New York City are now focused on a building performance standard that is being implemented in various phases. While past achievements and relationships with agencies and facilities managers give these teams confidence, they are focused on the future. Just as each building manager has to follow a path to ensure they are complying with the building performance standard, so too do those who implement the standard. Thus, in Washington State, one current metric of success is its ability to reach and educate the owners and managers of thousands of buildings who will need to comply with this standard. For a team equivalent to seven full-time employees, this is a great accomplishment. Though success is judged on each step of implementation, the purpose of building performance standards is clear. For example, Washington D.C.'s Building Energy Performance Standard came as a result of a 2018 law that will reduce greenhouse gas and energy consumption by 50% by 2032.

New York City's Division of Energy Management (DEM) in the Department of Administrative Services (DCAS) has had tremendous success building capacity through training and funding staff members throughout the city. DCAS provides funding to other city agencies to hire and train city staff to sit on those agencies' Energy Teams to implement energy efficiency and clean energy projects and operations within agencies. These staff work to implement the City's goals. NYC has also mandated the hiring of Agency Chief Decarbonization Officers at the highest emitting agencies to direct agencies' decarbonization efforts. DCAS has significant financial resources because of the mandated legislation and policy prioritization by City Council and the Mayor. City Council passed legislation and the Mayor's Office of Climate and Environmental Justice introduced policy due to a strong advocacy community both in terms of technical experts and climate and environmental justice advocates. DEM takes many different approaches by working closely with agencies and using systems-based approaches that allow them to scale projects like lighting efficiency. They use information, not just benchmarking, but past experiences working on individual buildings, to be proactive by creating service plans and a continuous series of improvements that provide preventative maintenance and increased efficiency.

Given that most jurisdictions have distinct and overlapping laws, definitions of success also vary between the different teams and programs even as they work towards a common if unstated goal of saving money, reducing energy use, and creating better buildings to work in. Several people interviewed for this report also described the way in which despite the long history of sustainability work within their agency or jurisdiction—that the goals and achievements are both happening at an accelerated pace. This relates to a common refrain that success was defined not only in quantitative terms but also qualitative

and even cultural in regards to building a bigger team that extends beyond the core energy/sustainability office. Their route to public green buildings is not only coming from above but also because of changing priorities among facilities managers and stakeholders who are invested in this process.

Finally, failure to meet goals consistently may also reveal that certain goals may have been too aggressive. The ENERGY STAR team at the EPA suggests regularly checking the feasibility of one's goals and what can be done. This ground-truthing need not be an extensive audit, but simply using the existing benchmarking data and as well as surveys with stakeholders to make sure that one's goals are aligned with what is possible.

How jurisdictions measure, track, and enforce implementation

As mentioned earlier in this report, it bears repeating that strong and specific laws matter. Several teams noted that decarbonization laws in particular made their work much easier and more streamlined with no need for debate about certain topics like gas boilers. This is also true of the new building performance standards. Alongside these laws and executive orders, many team leaders emphasized the increased support and focus from their commissioners and governors. When the commissioner of the general services department states that sustainability is one of their top goals then that makes a big difference, especially given that the number of people working on green building teams is relatively small.

Even with clear legislation, plenty of grey areas exist that still require a certain level of accommodation and negotiation with facilities managers and partner agencies. For example, in Washington State, the Building Performance Standard applies to all larger

public and private buildings. Failure to comply with these standards results in a fine applied on a square foot basis and there is a mechanism to fine public buildings as well. To be clear, such a fine would be a measure of last resort and there are exemptions for financial hardship. In the District of Columbia, the Department of Energy & Environment cannot fine public buildings for failing to meet the standards. Instead, there is an expectation of good faith collaboration and further political pressure from constituents if agencies do not meet their goals. In general energy teams' first approach to working with stakeholders is "How can we help you?" rather than highlighting the consequences of not meeting standards.

There are two separate if related issues regarding tracking of green buildings, the first is identifying the buildings themselves and the second is benchmarking in order to assess and achieve specific goals. While data tracking and analysis is a priority for all teams, it is rarely streamlined and the data lead's primary responsibility is often locating and centralizing many disjointed streams of information. Jurisdictions typically have an existing database of buildings, however, there are sometimes gaps in this knowledge and they may still be listed separately such as K-12 buildings and higher education campuses separate from other agency buildings. Likewise, tracking of LEED projects requires creativity, for example in Massachusetts they use a single LEED email to register projects so that staff turnover does not mean this information can get lost. Their e-builder project management software has a LEED checklist included.

Like the data related to construction and physical buildings, benchmarking data flows in from multiple directions. Since each jurisdiction typically has overlapping laws and teams (a topic discussed in more detail in the subsequent section), the information often has to pass through several entities. In California, the process is relatively streamlined with

agencies entering into ENERGY STAR Portfolio Manager once a year along with auto-uploaded information from the utilities. Massachusetts has an energy insight tool that pulls directly from utilities along with information from statewide contract reporting and real-time metering from certain agencies.

Benchmarking is an absolute necessity for prioritizing green building. All of the jurisdictions studied rely on ENERGY STAR Portfolio Manager for their benchmarking needs. For some jurisdictions, this has been a requirement since the early 2000s. This benchmarking data form the basis of long-term planning: for example, the worst-performing buildings revealed through benchmarking receive a higher priority. Washington D.C. has a robust data team that not only uses its information to plan, enforce, and consider equity outcomes but has also created an impressive visualization tool that is accessible to a public audience: https://buildingperformancedc.org/#dc/2021?layer=energy_star_score&sort=energy_star_score&order=desc&lat=38.865374851611634&lng=-76.98652267456055&zoom=12

This contributes to public understanding and hence greater pressure to meet or exceed the requirements for public green buildings. Data transparency plays a big role in encouraging compliance. Some other examples include Massachusetts Leading By Example's forthcoming data dashboard, and the Federal Office of Management and Budget's annual scorecard on agency performance on energy efficiency and sustainability. Whatever the bureaucratic hurdles, no agency director wants to receive a poor performance review on their sustainability performance.

Partnerships, resources, training, and tracking of stakeholders

A key theme that emerged in the research and writing of this report is the flexibility of each team. Data, funding, and partners all come from multiple sources. Respondents mentioned that their work frequently involved "coralling" or "cat herding." While there may be room for streamlining, especially in regard to data, the distributed nature of this work offers much flexibility that should be viewed as a strength.

Partners not only include other government officials, but adjacent non-profit organizations as well. The National Association of State Energy Officials (NASEO) "facilitates peer learning among state energy officials, serves as a resource for and about State Energy Offices, and advocates the interests of the State Energy Offices to Congress and federal agencies." In the Northeast, the Northeast Energy Efficiency Partnerships (NEEP) has worked closely with many teams. For example, Washington D.C.'s back-end compliance system for its Building Energy Performance Standard was created at a competitive rate by NEEP. These organizations also play a key role in supporting the networks needed to sustain this work across stakeholders. Events that offer training and an opportunity for individuals to meet and share their experience and expertise informally have had great results. Based on the success of the Community Energy Network in Connecticut, NEEP is developing similar networks in other jurisdictions.

The federal government partners with state and local governments through a number of programs. The Department of Energy has a State and Community Energy Program and State Energy Program that helps provide funding and technical expertise. The Environmental Protection Agency's ENERGY STAR Program provides training: https://www.energystar.gov/buildings/training?testEnv=false They also have a dedicated team focused on state and local governments to explain the value of Portfolio Manager and

the ways in which benchmarking and performance standards can form the foundation of a successful energy program. Caterina Hatcher and Brendan Hall are the current program managers and can be contacted at Hatcher.Caterina@epa.gov and hall.brendan@epa.gov

Non-profit efficiency programs like Efficiency Vermont do a high volume of projects and have lots of expertise and services they can offer public green building teams. Many groups also work closely with the utilities in their jurisdictions. And finally, there is a vast network of private energy consultants that both public and private building managers rely on. (This report being one example of such a relationship.) These various partners help to explain why relatively small numbers of staff work on any given program since they can rely on a network to scale up and meet their jurisdiction's ambitious goals. In some cases, certain work that was once outsourced like LEED certification is now in the process of being done in-house in places such as California.

Most jurisdictions have a variety of teams that do distinct and complementary work. For example in New York State, The Office of General Services Resiliency and Sustainability is focused on implementing green buildings for state buildings. They work closely with the New York Power Authority (NYPA) and the New York State Energy Research and Development Authority (NYSERDA) to discuss policy, project management, and technology. In Massachusetts, the Leading by Example team collaborates with the Energy & Sustainability team in the Division of Capital Asset Management & Maintenance (DCAMM). MA's Leading by Example program has funded studies that DCAMM is in turn using to plan some of its projects. While some groups such as the Federal Office of High-Performance Buildings consider themselves a "think and do tank," there are benefits to having different teams focused on policy, technology, and implementation. For example, given that a massive

state-capital electrification project might be one of the first projects to encounter grid limitations, it makes sense that the public buildings teams are in conversation with a wide network of energy officials.

Various councils, committees, and working groups help to glue these varied groups together. In the federal government, the Interagency Sustainability Working Group (ISWG) includes members from all federal agencies. In their own words ISWG "Serves as a forum for information exchange and promotes agency implementation of goals for sustainable buildings. Fosters discussions on widespread adoption of sustainable design and operations in the federal sector. Develops technical guidance and tools to support implementation of agency sustainability policies for federally owned, operated, and leased buildings." All councils follow some version of this model that includes planning, training, and the creation of consistent standards.

Meeting leaders make a conscious effort to make such monthly or bimonthly meetings "not too bureaucratic." Content and form are varied. Inspiring and interesting speakers present on a range of topics. Agendas and slides are typically released in advance so that attendees know what to expect. Larger meetings will sometimes use breakout sessions into smaller groups so that more people can be engaged and share back with the whole group. It is helpful for someone to actively track meeting content and solicit feedback on future meetings. A few other examples of such meetings include California's Sustainable Working Group, the GreenNY Council, and Massachusetts' Leading by Example Council. Attendees are either strictly government representatives or include other stakeholders such as architects and builders.

There are requirements for agencies to appoint clear staff leads to participate in these conversations. In some cases, the primary energy/sustainability team will fund the positions in other agencies. NYC's DCAS has one such program, described here: "Since 2011, DCAS has provided funding for dedicated energy management staff at partner City agencies. These staff include Energy Managers, Energy Analysts, Energy Coordinators, Solar Project Managers, and Directors of Energy and Sustainability. They are charged with developing, implementing, and tracking their agency's energy and emissions reduction efforts. They help identify potential energy efficiency projects, apply for competitive funding, create accountability at the agency level for meeting emissions reduction goals, and support cultural change across their organizations. DCAS works with all agency energy management staff to coordinate efforts citywide and share best practices across agencies. Currently, DCAS directly funds 22 energy management staff members at 12 of the largest City agencies."

While the monthly or bimonthly meetings do provide some training, some jurisdictions offer their own training programs. For example, NYC's DCAS has its own Energy Management Institute created in partnership with the City University of New York, which has been attended by over 1,800 NYC employees. The programs are free to all employees with priority given to the City's public buildings staff. In most cases, however, a number of courses and trainings that are not affiliated with any particular agency are promoted to meet the skills gap and steep learning curve of new projects.

Marketing and awareness

The role of communication varies across departments within each jurisdiction. For example, Massachusetts' Leading by Example program has a team of five with one dedicated communication lead responsible for press releases and their annual awards. Most teams focus on reaching their key stakeholders whether limited to public buildings or all larger buildings. All programs have some type of email list that they have built up over the years with whomever they consider the relevant stakeholders such as sustainability leads in each agency and facilities managers. This long-standing tool should not be discounted. Unless the email list is inundated with messages, it remains an effective tool for updating projects and meetings.

Many programs rely heavily on their websites to reach people. Nearly every jurisdiction includes a range of reports, recorded meetings, and FAQs on their websites. These websites are generally well-designed and accessible with clear headings and sections, and limited large blocks of text. The importance of these sites is especially true of newer programs such as those implementing a building performance standard that have to educate and answer a range of questions.

District of Columbia's Department of Energy and Environment has created a Knowledgebase site with information organized in clear themes. https://dc.beam-portal.org/helpdesk/kb/

Washington's Department of Commerce Clean Buildings' homepage includes overlapping sections on their primary queries including: "How to comply," "Frequently asked questions," "Clean buildings library," "Customer support and resources," "Clean buildings portal," and "Early adopter incentive program." https://www.commerce.wa.gov/growing-the-economy/energy/buildings/

Within California's Office of Sustainability website, their "LEED Certified State Buildings" page has clear, expandable sections on "Requirements," "Types of LEED certifications," "Resouces," and finally a chart that shows the Cumulative number of LEED Certified buildings by year.
https://www.dgs.ca.gov/OS/Resources/Page-Content/Office-of-Sustainability-Resources-List-Folder/California-LEED-Certified-State-Buildings

Equity

While all jurisdictions consider equity, it is in places where specific mandates from the legislature and governor/mayor are the clearest that the most steps are being taken. Some interviewees also noted the fact that public buildings are more likely to be in a disadvantaged community which makes working on public buildings as a whole relevant to equity.

The most important program related to equity links all of the jurisdictions. The Justice 40 initiative, an Executive Order signed by President Joe Biden "has made it a goal that 40 percent of the overall benefits of certain Federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution." These "certain Federal investments" include those related to climate change, clean energy, and energy efficiency. The Federal government continues to release guidance, but other jurisdictions are mobilizing to figure out how to incorporate these rules and funding into their own work. This initiative has a requirement that all programs "engage in stakeholder consultation and ensure that community stakeholders are meaningfully involved in determining program benefits," a process relevant to public green buildings. The Federal

government has also created a Climate and Economic Justice Screening Tool that is being used by federal agencies but could be adapted for use by other jurisdictions: https://screeningtool.geoplatform.gov/en/#8.3/35.968/-94.158

New York State has its own requirement for funding dedicated to disadvantaged communities, which like the Federal government's screening tool goes down to the census tract level. Their Environmental Bond Act "will advance equity and environmental justice by directing at least 35% of total funding towards disadvantaged communities that are often the most impacted by pollution and climate change."

Many grant programs like those in Massachusetts and Washington include extra incentives for applications incorporating equity into their proposals. In Washington, one grant program collaborates with the Department of Health and their environmental health impact map in order to promote green building and prioritize cleaner air. The sustainability roadmaps created by state agencies in California also consider equity in their plans.

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